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ABSTRACT SUPPLEMENT

Abstracts*

Oral Presentations

001

The Right to Adequate Housing in Puerto Rico: Property Law, Tenure Security, and Public Policy Gaps

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This policy analysis examines Puerto Rico's housing policy through the lens of civil law and its capacity to guarantee the right to adequate housing, especially in post-disaster contexts. The methodology used was qualitative research within a transformative paradigm, applying critical legal theory and human rights law. The sources for this research include Puerto Rico's 2020 Civil Code, special housing legislation, jurisprudence, and comparative frameworks from Argentina, Brazil, and Spain. Findings indicate that, despite constitutional references to a dignified life, Puerto Rico lacks a statutory definition of adequate housing. Existing legal mechanisms, such as private sales, usufruct, and extraordinary acquisitive prescription, are insufficient to ensure tenure security, particularly for vulnerable populations. The study identifies the need to incorporate new models like collective adverse possession and land banks, grounded in human rights principles, to address the ongoing housing crisis. Urgent legislative and policy reforms are required. **Acknowledgments:** None.

002

Experiencias de las Paternidades en el Periodo Perinatal: Salud Mental e Implicaciones para la Política Social en Puerto Rico

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Antecedentes y Objetivos: La salud mental de los padres durante el periodo perinatal continúa siendo un tema invisibilizado en Puerto Rico. Esta etapa, comprendida desde la concepción hasta el primer año de vida del bebé, representa un momento crítico que puede impactar el bienestar emocional, psicológico y social de los hombres y sus familias. El objetivo de este estudio es explorar las experiencias de padres residentes en Puerto Rico durante el periodo perinatal y analizar sus implicaciones para la política social y los servicios de salud. **Método:** Se utilizó un diseño cualitativo fenomenológico. La muestra incluyó dos subgrupos principales: (1) padres que vivieron situaciones difíciles durante el embarazo, parto o posparto, y (2) profesionales de la salud vinculados al cuidado perinatal (trabajadores sociales, enfermeras, psicólogos, obstetras y pediatras). Se realizaron entrevistas semiestructuradas y grupos focales. El análisis se enfocó en identificar patrones de significado en torno a las experiencias y percepciones de ambos subgrupos. **Resultados:** Los hallazgos preliminares destacan tres áreas principales: (1) salud mental paterna, caracterizada por ansiedad, estrés,

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duelo por pérdida perinatal y dificultades para manejar emociones bajo presiones económicas y sociales; (2) experiencias con proveedores de salud, donde los padres describieron exclusión y trato poco empático, mientras los profesionales reconocieron limitaciones institucionales y culturales para incluir a los padres en los procesos; y (3) roles de género y políticas laborales, que reproducen la presión social sobre los hombres como proveedores y evidencian la necesidad de ampliar las licencias de paternidad. Factores protectores incluyeron el apoyo de la pareja, la familia y redes comunitarias. **Conclusión:** Estos resultados evidencian la importancia de integrar a los papás en el cuidado perinatal, reconocer su salud mental como componente esencial del bienestar familiar, y desarrollar políticas públicas más inclusivas. Se recomienda fortalecer la formación de profesionales de la salud, ampliar licencias de paternidad y crear espacios de apoyo psicosocial para padres en Puerto Rico. IRB #2425-189, [06/26/25].

003

Acceso, Calidad, Financiamiento y Recursos Humanos según el Tipo de Sistema de Salud de una Muestra de Países, 1990-2023

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Antecedentes y Objetivos: La estructura y gobernanza de los sistemas de salud determinan la equidad, el acceso y la eficiencia de los servicios. Este estudio analizó la asociación entre el tipo de sistema: Servicio Nacional de Salud (NHS), Seguro Nacional de Salud (NHI), Seguro Social de Salud (SHI), Seguro Privado (PHI) y Seguro Social Estatal (ESHI) y las dimensiones de acceso, calidad, financiamiento y recursos humanos en países de la OCDE entre 1990 y 2023. **Métodos:** Se aplicó un diseño cuantitativo, comparativo y longitudinal utilizando datos secundarios de la OCDE. Se realizaron análisis descriptivos, bivariados y multivariados mediante Gretl, controlando por edad, razón mujer/hombre y PIB per cápita. Los indicadores incluyeron cobertura, tiempos de espera, hospitalizaciones por diabetes, gasto administrativo, gasto de bolsillo y densidad de profesionales. **Resultados:** Los sistemas con mayor intervención estatal (NHS, NHI y SHI) mostraron diferencias significativas respecto a ESHI en cobertura ($p < 0.05$), gasto administrativo ($p < 0.05$) y distribución de médicos ($p < 0.01$). NHS y NHI mantuvieron coberturas $\geq 95\%$ y menores omisiones por costo ($p < 0.05$). En calidad, presentaron menos admisiones por diabetes (-4.4% ; $p < 0.05$) y mayor cobertura de cernimiento ($+22.4\%$; $p < 0.05$). En financiamiento, los modelos públicos tuvieron menor gasto de bolsillo ($p < 0.05$). En recursos humanos, NHS y SHI mostraron mayor equidad territorial ($p < 0.01$). **Conclusiones:** La intervención estatal se asocia con mayor equidad, eficiencia y acceso sostenido. Los sistemas NHS y NHI presentaron el mejor desempeño integral, mientras que el modelo PHI evidenció limitaciones estructurales. Fortalecer la gobernanza financiera, el pooling solidario y la planificación estratégica resulta esencial para la sostenibilidad y la justicia social en los sistemas de salud. Núm. Protocolo 2412322095, 19/2/ 2025. No se recibió financiamiento externo se declara no tener conflictos de interés.

004

La Salud como Derecho Humano: Análisis Crítico del Marco Legal para la Atención al Consumo Problemático de Sustancias en el Contexto Colonial Puertorriqueño

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Política pública analizada: Se examina la Ley 408-2000, conocida como la Ley de Salud Mental de Puerto Rico, con énfasis en su Artículo 13.02, que permite la operación de organizaciones comunitarias conforme a sus “prácticas históricas”. **Marco teórico y disciplina académica:** El análisis se enmarca en el campo del Trabajo Social y se fundamenta en el Enfoque Basado en Derechos Humanos (EBDH), aplicando los principios de participación, rendición de cuentas, no discriminación e igualdad (P.A.N.E.). Este marco permite estudiar las tensiones entre el marco legal y las prácticas institucionales en la atención a personas con consumo problemático de sustancias. **Fuentes de información:** Se consultaron instrumentos internacionales de derechos humanos (PIDESC, Observación General No. 14, Directrices Internacionales sobre Derechos Humanos y Política de Drogas), legislación nacional y federal, informes oficiales, jurisprudencia y literatura académica. **Método de investigación:** Se realizó una revisión documental centrada en la identificación de vacíos normativos, contradicciones estructurales y mecanismos de implementación desde el EBDH. **Hallazgos o resultados:** El Artículo 13.02 debilita la capacidad regulatoria del Estado al permitir la prestación de servicios sin garantías claras de cumplimiento con los estándares de derechos humanos. Esta disposición perpetúa modelos punitivos y moralizantes, limitando la participación de las personas con consumo problemático de sustancias y profundizando desigualdades estructurales relacionadas con el género, la raza, la pobreza y otras condiciones de vulneración. **Implicaciones políticas:** Se recomienda enmendar la Ley 408-2000 para eliminar excepciones que perpetúan prácticas violatorias de derechos humanos, fortalecer los mecanismos de fiscalización y participación ciudadana, y establecer indicadores de monitoreo basados en derechos. Estas acciones contribuirían a garantizar el derecho a la salud y a promover un cambio de paradigma hacia enfoques de salud pública y justicia social. **Reconocimientos:** Este trabajo no obtuvo financiamiento externo. Ningún conflicto de interés.

005

Salud Pública en Crisis: Análisis de las Políticas de Cierre Escolar y Mitigación durante el COVID-19

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Política pública analizada: Este estudio internacional analiza las políticas de cierre de escuelas, educación a distancia y medidas de mitigación implementadas durante la pandemia de COVID-19, evaluando su efecto directo en la salud pública, particularmente en la salud mental, el acceso equitativo a servicios esenciales y la protección de poblaciones vulnerables. **Disciplina:** El análisis se enmarca en la salud pública, desde una perspectiva de determinantes sociales, resiliencia comunitaria y liderazgo en crisis. Se integran teorías que explican cómo las estructuras sanitarias, sociales y educativas inciden en la mitigación del riesgo, el bienestar emocional y

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la capacidad de respuesta. **Fuentes de información:** Se utilizaron entrevistas a líderes escolares en ocho países (Puerto Rico, Colombia, Venezuela, República Dominicana, Chile, España, Francia y Mozambique), junto a políticas oficiales, protocolos sanitarios y documentos relacionados con la gobernanza de salud pública durante la pandemia. **Método:** Se empleó un diseño cualitativo comparado, permitiendo examinar la implementación de las políticas sanitarias y su impacto en la salud comunitaria. El enfoque internacional posibilitó identificar variaciones en acceso a recursos, mitigación de riesgo, respuesta emocional y coordinación intersectorial. **Hallazgos:** Los resultados revelan que las políticas adoptadas, aunque esenciales para controlar la emergencia, generaron consecuencias significativas para la salud pública: aumento de ansiedad, aislamiento social, brechas tecnológicas con repercusión sanitaria y limitaciones en acceso a servicios básicos. A pesar de ello, las escuelas se convirtieron en puntos estratégicos de salud comunitaria al promover prevención, canales de apoyo emocional, entrega de recursos y orientación sanitaria culturalmente adaptada. Las respuestas más sostenibles surgieron de modelos colaborativos entre salud, educación y comunidad. **Implicaciones:** Los hallazgos subrayan la necesidad de políticas intersectoriales que reconozcan a las escuelas como infraestructura esencial para salud pública, fortaleciendo el apoyo psicosocial, garantizando equidad tecnológica como determinante de salud y promoviendo mecanismos colaborativos para futuras emergencias sanitarias. **Reconocimientos:** Ninguno. IRB:51221051 (30/12/2022)

006

Ley Núm. 54-1989 y El Mito De La Neutralidad: Análisis Interseccional Del Diseño Legal Frente a La Violencia De Género Hacia Adultas Mayores

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Política pública analizada: La política pública examinada es la Ley Núm. 54-1989, Ley para la Prevención e Intervención con la Violencia Doméstica, con el propósito de evaluar su capacidad para atender las experiencias de las mujeres adultas mayores sobrevivientes de violencia de género. El análisis demuestra que la ley se sostiene en una racionalidad tecnocrática que privilegia un sujeto femenino homogéneo. **Disciplina o teoría:** El estudio se fundamenta en el Trabajo Social crítico y los estudios feministas, guiado por el Modelo de Análisis de Políticas Feministas Interseccional de Kanenberg, (2020). Este marco, orientado por un lente interseccional, permite examinar cómo categorías como género, edad, clase social, etnicidad, raza y religiosidad operan como ejes de opresión. **Fuentes de información:** Se emplearon fuentes legales como la Ley Núm. 54-1989, Ley 121-2019 y jurisprudencia local, junto a datos demográficos, investigaciones académicas, informes institucionales y marcos internacionales como la CEDAW y decisiones de la Corte Interamericana de Derechos Humanos, permitiendo contextualizar las desigualdades que enfrentan estas mujeres. **Método:** El análisis se desarrolló desde un enfoque cualitativo, basado en un paradigma constructivista y un marco feminista interseccional y decolonial. Se utilizó análisis documental para examinar el contenido normativo de la Ley Núm. 54-1989 e identificar supuestos y vacíos relacionados con género y edad. **Hallazgos:** Se evidencia que la ley no reconoce la edad como categoría política ni incorpora las necesidades de las mujeres adultas mayores, ignorando barreras vinculadas al acceso legal, condiciones físicas, estado emocional, aislamiento social y dependencia económica, lo cual contribuye a su invisibilización institucional. **Implicaciones:** Se propone reformar la ley para definir mujer adulta mayor, vejez y edadismo, adoptar protocolos diferenciados, integrar enfoques gerontológicos, fortalecer alianzas comunitarias y ampliar el rol del trabajo social. Incorporar la interseccionalidad como principio rector es esencial para garantizar acceso real al derecho y la justicia social.

007

**Pharmaceutical Supply Chains for Diabetes Medicines in Puerto Rico:
Policy for Vulnerabilities, Affordability, and SDG 3**

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Policy: The study examines the policy vulnerabilities related to the United States Executive Order 14017 on Critical Supply Chains (2021) in the context of Puerto Rico's pharmaceutical imports, focusing on diabetes treatment medicines. Puerto Rico provides a case study due to its diabetes prevalence (19.8% in 2023, according to the CDC, 2025) and with a 30% dependency on imported pharmaceuticals (Puerto Rico Planning Board, 2025), exposing its health system to global supply disruptions. **Method:** The Chain-Business-Trade (CBT) method, a multi-award-winning framework developed by Aponte-García (2021, 2024), integrates economic, trade, and sustainability dimensions to map value and supply chains for critical goods. This study extends the CBT method to the pharmaceutical value and supply chain, focusing on insulin and oral antidiabetic medicines, which are central to achieving the United Nations Sustainable Development Goal 3 (SDG 3). **Data:** An integrated database was created using shipment-level Bill of Lading data, United Nations Harmonized System (HS) and Broad Economic Categories (BEC) trade codes, port routes, and retail price data, complemented with trade statistics. **Findings:** Results demonstrated concentration and limited redundancy among actors, and price analysis revealed that insulin costs could represent up to 20% of personal annual income, impacting affordability and equity in treatment access. **Implications:** The findings underscore the need for public health policies to support supplier diversification, local pharmaceutical capacity, health system preparedness, transparency, and sustainability aligned with SDG 3. **Acknowledgments:** None.

008

**Acciones y Retos Legislativos en Políticas Públicas para la Salud y la Prevención
de la Violencia hacia las Mujeres en Puerto Rico**

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Política pública analizada: Este análisis examina el conjunto de políticas públicas dirigidas a la salud y la prevención de la violencia hacia las mujeres en Puerto Rico, operacionalizadas a través de los proyectos legislativos radicados entre 2013 y 2024. **Disciplina o teoría:** El análisis se enmarca en la disciplina de política pública, integrando perspectivas de psicología de la salud de las mujeres, salud pública y equidad de género. Este marco reconoce la naturaleza biopsicosocial de la salud y la interrelación entre violencia, salud física, salud mental y los determinantes sociales que afectan la vida de las mujeres en Puerto Rico. **Fuentes de información:** Se revisaron exclusivamente los documentos oficiales disponibles en el Sistema Único de Trámite Legislativo (SUTRA), la plataforma oficial y única fuente para acceder a los proyectos de ley radicados en la Asamblea Legislativa de Puerto Rico. El análisis incluyó todos los proyectos relacionados con salud y violencia hacia las mujeres radicados entre 2013 y 2024.

y la información asociada provista en dicha plataforma. **Método:** Se realizó una revisión documental cualitativa sistematizada, identificando, clasificando y comparando todos los proyectos relacionados con salud de las mujeres y violencia de género. Los proyectos se analizaron según temas, prioridades legislativas y tasas de aprobación.

Hallazgos: En el ámbito de salud de las mujeres se identificaron 19 proyectos, de los cuales el 15.8% culminó en ley; el 33.4% abordó derechos reproductivos y el 66.7% salud mental materna. En violencia hacia las mujeres se radicaron 107 proyectos, con una tasa de aprobación de 33.6%, de los cuales 94.4% fueron relacionados con violencia doméstica. Los hallazgos reflejan una aparente producción legislativa numerosa, pero marcada por baja materialización, dado que solo una fracción mínima culmina en leyes sustantivas. Esto sugiere una actividad legislativa fragmentada y con limitada capacidad de traducirse en políticas públicas efectivas, particularmente en áreas críticas para la salud, la seguridad y el bienestar de las mujeres. **Implicaciones:** Los resultados subrayan la necesidad de fortalecer los procesos legislativos y desarrollar políticas más integradas y efectivas que reconozcan la complejidad de los determinantes de salud y violencia que afectan a las mujeres en Puerto Rico. **Reconocimientos:** Ninguno. No hubo fuentes de financiamiento externo ni conflictos de interés.

009

Pure Intracranial Schwannoma of Cranial Nerve X: Case Presentation and Literature Review

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Background: Schwannomas involving the intracranial segment of cranial nerve X (vagus nerve) are exceedingly rare and often present with nonspecific symptoms, making diagnosis and management particularly challenging. These benign tumors may mimic more common cerebellopontine angle masses and require careful radiologic and histologic evaluation. Non-cranial nerve VIII (vestibular) and cranial nerve V (trigeminal) schwannomas account for only ~10% of intracranial schwannomas, with the lower cranial nerves (IX–XI) collectively representing ~3% of cases. Pure intracranial vagus nerve schwannomas are among the rarest. **Case Description:** A 43-year-old woman presented with two months of progressive left-sided headache, gastrointestinal (GI) discomfort, abdominal pain, and persistent nausea. Brain MRI revealed a 1.9 × 1.7 × 1.7 cm extra-axial mass in the left cerebellomedullary cistern, exerting mild mass effect on the medulla. The patient underwent a left retrosigmoid craniotomy for resection. Intraoperatively, the tumor was found to arise from a single vagal nerve rootlet, which was sectioned to achieve gross total resection; the remaining glossopharyngeal and vagal rootlets were carefully dissected and preserved. Histopathology confirmed a WHO grade I schwannoma consistent with a vagal nerve sheath tumor. Postoperatively, the patient had no focal neurologic deficits but developed mild oropharyngeal dysphagia, requiring temporary nighttime PEG tube support, which was discontinued after rehabilitation. **Conclusion:** This report underscores the clinical and epidemiological rarity of a primary vagus nerve schwannoma presenting predominantly with gastrointestinal symptoms and persistent nausea, without lower cranial nerve deficits. Non-vestibular cranial nerve schwannomas account for a minority of intracranial schwannomas, with trigeminal and lower cranial nerve involvement being most common, while purely intracranial vagal schwannomas remain exceptionally rare, with only a handful of cases described in the literature. Recognition of such atypical presentations is essential for accurate diagnosis and optimal management.

010

The Relationship Between Hand Dominance and ACL Tears in Competitive Volleyball Athletes

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Background and Objective: Knee injuries are common in volleyball athletes, often resulting from the sport's unique movement requirements. Among these, Anterior Cruciate Ligament (ACL) tears are particularly prevalent, and while existing literature has examined risk factors such as biomechanical asymmetries and landing mechanics, there is limited research on the relationship between hand dominance and the side of injury. This study sought to examine the relationship between hand dominance and ACL tear laterality in competitive volleyball players diagnosed with first-time unilateral ACL tears. **Methods:** Following a medical record review of 1,529 consecutive patients, 149 met the inclusion criteria, resulting in a study population of 124 females and 25 males. Data on sex, age, BMI, handedness, and ACL tear laterality were collected through a medical record review. A Fisher's Exact test was used to assess the association between handedness and ACL tear laterality, while binomial tests evaluated differences in ACL tear laterality within each handedness group. **Results:** Among the 136 right-handed players, 81.62% tore their left ACL, while 18.38% tore their right ACL. Among the 13 left-handed players, 84.62% tore their right ACL, while 15.38% tore their left ACL. A statistically significant association was found between hand dominance and ACL tear laterality ($p < 0.001$). Additionally, statistical significance was found between right-handed players tearing their left ACL ($p < 0.001$) and left-handed players tearing their right ACL ($p < 0.05$). **Conclusion:** This study suggests a significant relationship between hand dominance and ACL tear laterality in competitive volleyball players. Right-handed volleyball players were significantly more likely to tear their left ACL, whereas left-handed players predominantly tore their right ACL. These findings suggest a biomechanical or sport-specific risk factor contributing to ACL injury patterns in volleyball players. This study was approved by the Institutional Review Board of Ponce Research Institute-PHSU and informed consent was waived (IRB number: 2503247659/03.07.2025).

011

A Rare Case of Community-Acquired Acinetobacter Urethritis in an Immunocompetent Adult Woman

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Purpose: To present a rare case of severe, community acquired *Acinetobacter baumannii* and *Acinetobacter lwoffii* urethritis in an immunocompetent woman. **Case:** This is the first documented case of severe, community-acquired urethritis due to co-infection with *Acinetobacter baumannii* and *Acinetobacter lwoffii* in a previously healthy 44-year-old woman. The patient presented with dysuria and pelvic pain unresponsive to ceftriaxone, along with a very

enlarged and tender urethra. Urinalysis showed microscopic hematuria, yet urine cultures were negative. Urethral swab cultures identified both *Acinetobacter* species, which were susceptible to trimethoprim-sulfamethoxazole (TMP-SMX), underscoring the suspected community acquired etiology. The patient improved significantly after a 10-day course of oral TMP-SMX. **Conclusion:** This case expands the clinical spectrum of *Acinetobacter* infections, demonstrating their potential to cause community-acquired urethritis in immunocompetent women, a demographic in which such infections are usually self-limiting. It emphasizes the diagnostic importance of urethral cultures in refractory urinary symptoms with negative urine cultures and establishes a pathway to treat *Acinetobacter* infections in cases that are not self-limiting. **Acknowledgements:** We would like to thank the patient for allowing us to present this case.

012

Traumatic Gluteal Compartment Pathology and Hematomas: A Three-Case Series Highlighting Diagnostic and Surgical Challenges

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Purpose: Traumatic gluteal compartment injuries are rare and often underrecognized due to their deep anatomic location and nonspecific presentation. Delayed diagnosis may lead to muscle necrosis, infection, neurologic injury, or prolonged hospitalization. This case series describes three gluteal compartment pathologies treated surgically, highlighting variations in presentation, operative management, and outcomes to identify diagnostic challenges and practical points for care. **Case Description:** Case 1: A 36-year-old man developed right gluteal compartment syndrome after a low-energy fall. Emergent fasciotomy revealed myonecrosis requiring debridement. His course was complicated by wound dehiscence and, requiring serial washouts and negative-pressure therapy. He achieved complete healing and no sciatic deficits. Case 2: A 69-year-old man sustained a high-energy bicycle accident resulting in a large right gluteal hematoma. Surgical evacuation with drain placement was performed. Although the wound healed without complication, his hospitalization was prolonged by severe traumatic brain injury and PEG-related abdominal issues. No gluteal infection or neurologic deficits developed. Case 3: A 73-year-old woman on antiplatelet therapy developed a ~600 mL left gluteal hematoma after a mechanical fall. Operative evacuation with ligation of a bleeding perforating vessel was performed. She required 3 PRBC and 2 FFP transfusions but had no recurrent bleeding. Follow-up CTA showed interval hematoma reduction and no active bleeding. She was discharged on postoperative day three with home PT/OT. **Conclusion:** This series highlights the diagnostic complexity and clinical significance of traumatic gluteal injuries. Delayed intervention can lead to multiple clinical complications leading to acute hospitalization; thus, these conditions demand rapid recognition. This emphasizes the importance of thorough physical examination, early imaging with CT, and a low threshold for operative exploration in patients with rapidly expanding hematomas or severe pain. Continued reporting of similar cases will enhance clinical awareness, refine management strategies, and guide future research into early diagnostic markers and standardized treatment algorithms. **Acknowledgments:** No external funding or conflicts of interest.

013

Tumor-Selective Delivery of Exatecan and SLFN11 Predictive Value in Pediatric Rhabdomyosarcoma

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Background & Objectives: Rhabdomyosarcoma (RMS) is the most common pediatric soft-tissue sarcoma, and outcomes remain poor for high-risk and relapsed disease despite intensive multimodal treatment. Exatecan, a next-generation topoisomerase I inhibitor, shows anticancer activity but is limited by systemic toxicity. CBX-12, a pH-sensitive Exatecan-pHLIP conjugate, enables selective delivery to acidic tumor microenvironments and has shown clinical safety in adults. This project evaluated Exatecan cytotoxicity in RMS cell lines, characterized CBX-12 activity in vivo, and explored SLFN11 expression as a predictive biomarker of response. **Methods:** Drug-sensitivity assays were performed by treating RMS cell lines with 1:3 serial dilutions of Exatecan in 96-well plates. After 72 hours, cells were stained with Hoechst dye, imaged, and quantified to generate dose-response curves and IC₅₀ values. For in vivo studies, RH41 cells were injected orthotopically into SCID Beige mice. Tumor-bearing mice were treated with CBX-12 (10 or 20 mg/kg, 4 times per week for 3 weeks), with tumor volume and body weight measured twice weekly and survival monitored. SLFN11 expression was evaluated using DepMap transcriptomic data and confirmed by western blotting across RMS cell lines. Approved by IACUC, Protocol Number: 2024-20071, Approval Date: 9/30/24. **Results:** Exatecan produced dose-dependent cytotoxicity across RMS cell lines, with low IC₅₀ values and greater activity than other topoisomerase I inhibitors. In vivo, CBX-12 suppressed tumor growth, delayed progression, and prolonged survival while maintaining stable body weight, indicating tolerability. SLFN11 showed variable expression across different RMS cell lines, supporting its potential as a biomarker of sensitivity to DNA-damaging agents such as Exatecan. **Conclusion:** Exatecan and its tumor-targeted conjugate CBX-12 demonstrate preclinical efficacy in RMS models. SLFN11 expression may help identify tumors most likely to respond to treatment; however, additional exploration is required to determine its predictive utility and to advance SLFN11-guided Exatecan strategies in rhabdomyosarcoma. **Acknowledgments:** Cybrexa Therapeutics; Dr. Yves Pommier; Dr. Ranjit S. Bindra; Yale School of Medicine SRP Program.

014

MRI Non-Enhancing Intracranial Meningiomas: Literature Review and Case Series

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Purpose: Meningiomas are the most common primary benign brain tumors, accounting for approximately 43% of all intracranial masses and 58% of all non-malignant intracranial masses. The radiographic characteristics of meningiomas are typical, but variations to this presentation are encountered. On MRI, meningiomas typically appear as well-circumscribed, dural-based masses that show homogeneous contrast enhancement on T1-weighted images. Meningiomas that show minimal or no enhancement on MRI can occur, however, this presentation is uncommon. Our literature review identified only 15 cases. Herein, we present three cases of patients with meningiomas who had minimal or no enhancement on MRI, focusing on their radiographic appearance and their

surgical implications. **Case description:** Three cases of non-enhancing intracranial meningiomas are described. The first is a 65-year-old male who presented with left-sided weakness and word-finding difficulty. MRI showed an extraaxial non-enhancing mass superior to the left cerebellum and inferior to the anterior portion of the tentorium, with significant internal diffusion restriction. Complete resection was achieved via a left paramedian supracerebellar infratentorial approach. Histopathology confirmed a WHO grade 1 meningothelial meningioma, without recurrence at one year. The second case is a 58-year-old female who presented with a seizure episode. MRI showed a left parietal parasagittal mass. Resection was performed via a left parietal parasagittal approach, and pathology revealed a WHO grade 1 meningothelial meningioma, without recurrence at four years. The third case involved a 50-year-old female with seizures and abulia for three months; MRI showed a bifrontal mass. A right frontal approach was used for tumor resection. Histopathology confirmed a WHO grade 1 meningothelial meningioma without recurrence at 22 years. **Conclusion:** Although the most common MRI presentation for a meningioma is a homogeneously enhancing mass in T1-weighted images with contrast, non-enhancing meningiomas can occur and should be included in the differential diagnosis of non-enhancing intracranial tumors.

015

Below-Knee Amputation Following Osteomyelitis from Multidrug Resistant *Stenotrophomonas maltophilia* in a Diabetic Foot Ulcer: A Case Report and Literature Review

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Purpose: To describe a rare case of diabetic foot osteomyelitis caused by multidrug-resistant *Stenotrophomonas maltophilia* co-infecting with ESBL-producing *Escherichia coli*, outline the diagnostic pathway, and discuss therapeutic decision-making including cefiderocol monotherapy after drug-induced liver injury. **Case:** A 64-year-old woman with poorly controlled type 2 diabetes and peripheral neuropathy presented with a purulent, non-healing ulcer over the left lateral malleolus eight months after an untreated ankle fracture. Examination showed a 5-cm ulcer with surrounding necrosis. Initial radiographs and non-contrast CT demonstrated extensive cortical destruction of the distal tibia, talus, and tarsal bones, consistent with osteomyelitis. Deep wound cultures yielded *S. maltophilia* (trimethoprim-sulfamethoxazole resistant; levofloxacin intermediate) and ESBL *E. coli*. Empiric cefepime plus vancomycin was narrowed to ceftazidime-avibactam with aztreonam. After five weeks, rising transaminases prompted discontinuation and transition to cefiderocol 1.5 g IV q8h as monotherapy. Despite targeted therapy, MRI showed osteonecrosis with abscess and complete talar obliteration; interval contrast-enhanced CT demonstrated persistent, rim-enhancing fluid collection with severe erosive changes. Given progressive bone loss and limited prospects for limb salvage, a below-knee amputation was performed. Post-amputation blood cultures were negative. **Conclusion:** Multidrug-resistant *S. maltophilia*, an environmental, water-associated non-fermenter, should be considered in chronic, treatment-refractory diabetic foot infections, especially in humid settings or after prolonged healthcare exposure. Even with guideline-concordant agents (including cefiderocol when other options are precluded) outcomes may be limited by chronicity, biofilm burden, and impaired perfusion. Early deep-tissue culture, advanced imaging, vascular assessment, and timely source control within a multidisciplinary framework are critical to optimize limb-salvage potential. **Acknowledgements:** We would like to thank the patient for allowing us to present this case.

016

3D Printing Fluidic Devices That Serve as Non-Invasive Diabetes and Kidney Disease Diagnostic Tools and Vascular Research Platforms

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Background & Objectives: Cardiovascular diseases, diabetes, and kidney disease rank among the top ten causes of death worldwide. Therefore, technology that is able to diagnose and advance further research of these diseases is necessary to mitigate associated death rates by helping improve their respective treatments. Thus, the goal of this study is to design fluidic technologies that serve as: 1) a diabetes and kidney disease diagnostic tool via urinalysis and 2) fluidic devices that replicate cardiovascular systems for thrombosis studies. **Methods:** To achieve this, fluidic devices were designed using AutoCAD software for subsequent 3D printing with the Sovol 3D printer. Moreover, the printed devices intended for urinalysis diagnostics were used for reagent dry-off of colorimetric species in reaction wells within the devices to achieve glucose and protein quantification in liquid samples. Moreover, the printed fluidic devices that replicated human vasculature were used to perform flow experiments and quantify temporal particle aggregation, thereby further demystifying the hemodynamic parameters that lead to thrombotic events. **Results:** The 3D printed urinalysis sensors exhibited a strong correlation ($R^2 > 0.97$) between biomarker concentration and colorimetric values of the reaction wells. Likewise, temporal particle aggregation and thrombotic event quantification reveal vascular geometries with an inherent high risk of occlusion. **Conclusions:** Future optimization of developed technologies aims to 1) incorporate additional biomarkers to the disease panel of the urinalysis sensor and 2) replicate arteriovenous fistula (AVF) geometries in fluidic devices to pinpoint optimal artery-vein configurations and ultrafiltration rates for hemodialysis treatment. **Acknowledgements:** This research was supported by the lab startup seed capital provided by the University of Puerto Rico at Mayaguez (UPRM) and equipment donations from UPRM and CROEM High School.

017

Fetal Alcohol Syndrome: A Survey of Physicians' and Medical Students' Knowledge and Experience

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Background and Objectives: Fetal Alcohol Syndrome (FAS/FASDs) is a serious condition caused by alcohol consumption during pregnancy, leading to lifelong impairments. Currently, Puerto Rico lacks a surveillance system for FAS. Physician knowledge about fetal alcohol exposure is crucial for prevention. Our objectives were 1: To evaluate the knowledge of medical students and physicians related to the use of alcohol during pregnancy. 2. To explore if medical students and physicians have received education on FAS. 3. To examine whether they offer FAS education to pregnant women in their medical practice. **Method:** We used a cross-sectional design

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and recruited by availability. An informative letter and a self-administered online survey asked about FAS/FASD knowledge, education and application. The inclusion criteria were to be a physician or a third- or fourth-year medical student at the School of Medicine (MSC/UPR); be 21 years or older; read and understand Spanish; be a resident of Puerto Rico and capacity to consent. The study was anonymous, voluntary and confidential. Measures were taken to safeguard participants' risks and benefits. The study started December 15, 2024, through May 31, 2025. **Results:** The sample consists of 51 medical students and physicians from the School of Medicine at the MCS/UPR. Already 39.2% were males and 58.8% were females. About 90.2% were medical students. Regarding knowledge of FAS/FASDs, participants indicated a great deal (8.3%), a lot (52.7%) and a moderate amount (38.9%). About FAS education received, participants indicated a great deal (18.6%), a lot (53.4%), moderate amount (16.2%), a little (11.6%) and none indicated at all. About routine alcohol use assessment in pregnant and reproductive-age women, they indicated always (34.3%), often (15.6%), sometimes (21.8%), rarely (21.8%) and never (9.3%). **Conclusions:** These findings underscore the need to strengthen FAS/FASDs training in UPR medical school. IRB Approved: Protocol #2410305766. **Acknowledgments:** No conflict of interest to declare.

018

Experiencias Asociadas a la Violencia Obstétrica en Mujeres Residentes en Puerto Rico

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Antecedentes y Objetivos: Se estima que entre un 20% y un 75% de las mujeres que asisten a salas de parto en instituciones hospitalarias experimentan conductas violentas por parte del personal de salud, lo que puede resultar en pérdida de autonomía, aumento de morbilidad y mortalidad materna, depresión posparto y trastorno de estrés postraumático (Bohren, 2019; Lafaurie, 2019; Jardin, 2019). Este estudio tuvo como propósito explorar las experiencias de violencia obstétrica vividas por mujeres en salas de parto en Puerto Rico. **Método:** Se utilizó un diseño cualitativo con enfoque fenomenológico interpretativo, guiado por la teoría del Cuidado Humanizado de Jean Watson (1979). Se reclutaron ocho participantes hasta alcanzar la saturación teórica. La recolección de datos se realizó mediante entrevistas semiestructuradas en profundidad, y el análisis se llevó a cabo siguiendo los pasos propuestos por Smith y colaboradores (2009). **Resultados:** Los hallazgos revelaron que todas las participantes experimentaron diversas formas de violencia obstétrica, incluyendo procedimientos médicos invasivos sin consentimiento informado, maltrato verbal y falta de apoyo emocional. Estas experiencias generaron sentimientos de humillación, miedo y trauma, evidenciando un desequilibrio de poder y una atención deshumanizada. Las participantes también reportaron que sus decisiones y planes de parto fueron ignorados, lo que contribuyó a una pérdida de control sobre sus cuerpos y un sufrimiento emocional significativo. Se identificaron cinco temas principales: violencia experimentada, relaciones de poder y control, deshumanización en el trato, pérdida de autonomía e impacto en la vida y rol de madre. **Conclusiones:** En conclusión, la violencia obstétrica vulnera la autonomía, dignidad y bienestar emocional de las mujeres. Los resultados subrayan la necesidad urgente de promover una atención obstétrica respetuosa y centrada en los derechos humanos, así como de implementar políticas y prácticas que garanticen el cuidado humanizado durante el parto. IRB#: B1630122 (10/08/2024)

019

¿Qué Será de las Mujeres Cuando Llegue el Temporal? Análisis de la Política Social sobre Violencia Doméstica en Puerto Rico Durante Desastres Socionaturales

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Antecedentes: ¿Qué será de las mujeres cuando llegue el temporal? Esta interrogante nos conduce a explorar la intersección entre la violencia doméstica y los desastres socionaturales. Puerto Rico (P.R.), por su ubicación geográfica, es afectado por fenómenos naturales que, al coincidir con condiciones vulnerables, se convierten en desastres socionaturales (Berroeta & Pinto de Carvalho, 2020). Las mujeres, especialmente quienes viven violencia de género, enfrentan mayor riesgo (Echegoyemberry, 2018). Estudios señalan una relación entre desastres y violencia de género, siendo la violencia doméstica una de las manifestaciones más prevalentes (Thurson et al., 2021). Las investigaciones en P.R. son limitadas, dificultando la comprensión del fenómeno y el desarrollo de políticas efectivas.

Objetivo: Analizar las políticas sociales sobre violencia doméstica (Ley 54-1989), seguridad pública (Ley 20-2017) y cambio climático (Ley 33-2019) en P.R. y su aplicación durante desastres vinculados a tormentas tropicales y huracanes. **Método:** Revisión documental desde un enfoque cualitativo. **Resultados:** El análisis evidencia una articulación limitada entre las tres políticas sociales. La Ley 54-1989 brinda un marco jurídico esencial, pero carece de disposiciones para ser implementada ante desastres. La Ley 20-2017 moderniza la organización de las agencias de seguridad pública, aunque sin protocolos diferenciados de protección o desalojo para poblaciones vulnerables ante eventos atmosféricos. Por último, la Ley 33-2019 define el cambio climático y sus efectos, pero centra la estabilidad económica y turística, omitiendo estrategias que atiendan las necesidades diferenciadas de las mujeres durante desastres socionaturales. **Conclusión:** Existe la necesidad de incorporar la perspectiva de género en la gestión de desastres. La ausencia de protocolos interagenciales limita la capacidad institucional para garantizar protección y continuidad de servicios a las sobrevivientes. Se hace indispensable que las políticas sociales reconozcan la violencia doméstica como riesgo exacerbado por el cambio climático y garantice la seguridad de las mujeres en todas las fases del desastre. (Número de IRB: 2509001176, fecha de aprobación: 23 de octubre de 2025).

020

Understanding Cervical Cancer Care: Perspectives of Women Living with and without HIV in Puerto Rico

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Background and Objective: Women living with HIV (WLWH) face a higher risk of developing cervical cancer (CC) than women without HIV. While non-medical factors may hinder WLWH's access to timely screening, follow-up, and treatment for precancerous lesions (pre-CC) or CC, the most influential factors remain unclear. This qualitative study explored perspectives on non-medical factors that facilitate or impede CC care continuum among women living with and without HIV in Puerto Rico (PR). **Methods:** Four focus groups (n=20 women) were conducted between April and June 2025. Participants were aged ≥ 21 years, diagnosed with CC or pre-CC between January 2010 and June 2025, and resided in PR at the time of diagnosis. A structured focus group guide explored non-medical factors that facilitated or hindered access to CC care across the cancer control continuum. Focus groups were conducted separately for study groups. Non-medical factors were examined using an adapted social determinant of health framework, encompassing individual-, provider-, and system-level domains. A thematic analysis was performed to identify key patterns and themes across the CC care continuum. **Results:** Both groups reported HPV vaccine refusal or hesitancy and perceived lack of provider empathy as key barriers to CC prevention. WLWH described additional challenges related to discomfort in disclosing their HIV status when accessing care but identified participation in clinical trials as a facilitator for timely detection of CC or pre-CC. Women without HIV reported inadequate follow-up during the diagnostic phase but emphasized the positive impact of family support during treatment. Across groups, positive patient-provider communication was perceived as a facilitator of care, particularly at the time of diagnosis. **Conclusions:** Findings reveal multilevel non-medical factors influencing CC care among women in PR. Interventions addressing provider empathy, HIV-related stigma, and strengthening social support networks are essential to improve timely CC care, particularly for WLWH. **Acknowledgements:** This project was fully supported by NIGMS (grant # P20GM148324) and partially supported by NIGMS (Award #U54GM133807/2P50GM133807) and the National Institute on Minority Health and Health Disparities (NIMHD; Grant # 2U54MD007587) for data storage in REDCap. This study was approved by the IRB of the Comprehensive Cancer Centre of the University of Puerto Rico (Protocol #2411004755) since September 22, 2022.

021

Derechos, Riesgos y Salud: Efectos de Políticas Sociales en el Bienestar de Personas LGBTQ+ en Puerto Rico

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Contexto y Objetivos: Las personas LGBTQ+ enfrentan inequidades en salud debido a factores estructurales y sociales que generan estigma. Este estigma se refuerza por políticas y actitudes discriminatorias que atentan contra sus derechos. Las recientes aprobaciones de políticas públicas a nivel nacional que fomentan la discriminación sistemática de personas LGBTQ+ en sectores clave como el empleo, educación, servicios públicos y privados, salud y vivienda pueden generar estresores adversos para la salud mental y el bienestar general. El objetivo de este análisis es examinar las implicaciones de las políticas públicas aprobadas en Puerto Rico (PR) y en Estados Unidos (EU) sobre la salud mental de las personas LGBTQ+. **Métodos:** En junio de 2025, se administró un cuestionario en línea y en persona durante la parada de Orgullo LGBT en San Juan, PR para evaluar experiencias sobre bienestar y calidad de vida de personas LGBTQ+ en PR. Se llevó a cabo un análisis de contenido de las respuestas a la pregunta: ¿Cómo te han afectado los cambios en las políticas públicas de las administraciones gubernamentales en EU y PR? Para este análisis se utilizó el marco teórico de los Determinantes Sociales de la Salud y el modelo de Estrés de Minoría. (Aprobación IRB: #2504390245, 8 de mayo de 2025.) **Resultados:** En el cuestionario participaron 205 personas LGBTQ+. Cambios actuales o previstos en las políticas públicas sugieren efectos en la salud mental de las

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personas LGBTQ+. Se identificaron estresores distales (estigma) y proximales (expectativa de rechazo). Participantes reportaron sentir miedo, inseguridad, ansiedad e incertidumbre, percepción de pérdida de derechos adquiridos, aumento en el discrimen y la violencia, y mayor vulnerabilidad social. **Conclusión:** Los resultados sugieren que las políticas recientes tienen un impacto inmediato en la salud mental de las personas LGBTQ+. Tal como plantea el modelo de estrés de minoría, esto puede contribuir al deterioro de la salud mental. **Reconocimiento:** Agradecemos a los participantes del estudio, colaboradores comunitarios, miembros del TEAM Network y estudiantes.

022

Política Social, Género y Salud Pública: Barreras Administrativas para la Igualdad Salarial en Puerto Rico

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Política pública analizada: Se estudian las disposiciones administrativas para la implementación de la Ley de Igualdad Salarial de Puerto Rico, Núm. 16 de 2017, establecida con el fin de erradicar el discrimen salarial por género. **Disciplina o teoría:** El trabajo social incluye entre sus áreas de interés, la administración de programas sociales; sus procesos y resultados. Esto, junto al estudio de la planificación estratégica, contribuye al análisis de políticas y su puesta en práctica a través del andamiaje administrativo de los programas. Fuentes de información: Se revisan (1) la Ley 16 de 2017, (2) el Reglamento para Administrar el Programa de Equidad Salarial del DTRH, (3) las Guías Uniformes para el Autoestudio de Igualdad Salarial en el Lugar del Empleo, y (4) la Guía Práctica para la Evaluación del Desempeño Gubernamental (Rivas et al., 2010). **Método:** El estudio requirió el análisis de la gestión administrativa con el modelo lógico para abordar sus metas, objetivos, estructura lógica y mecanismos de rendición de cuentas. **Hallazgos:** El andamiaje operacional, apunta a iniciativas carentes de procesos concretos que viabilicen la implementación de la política. **Implicaciones:** El empobrecimiento de las mujeres se sostiene como un asunto de salud pública que limita la calidad de vida de ellas y sus dependientes. Luego del COVID-19, el salario devengado por las mujeres en Puerto Rico se redujo un 17%. Por cada dólar que los hombres ganan, las mujeres reciben 83 centavos de ingreso. Esto no puede atenderse de manera efectiva, pues la visibilización e implementación de la Ley de igualdad salarial de Puerto Rico se han visto limitadas ante una gestión administrativa deficiente que no provee mecanismos para su funcionamiento. Exacerbando así, los efectos de las políticas de exclusión, la disparidad y desigualdad en las condiciones sociales y de salud pública de las mujeres. **Reconocimientos:** Ninguno.

023

De los Datos a la Acción: El Rol de la Hoja de Evaluación de Riesgo en la Salud y Seguridad de las Mujeres ante la Violencia de Género

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Política pública analizada: En Puerto Rico la política pública para la prevención y respuesta a la violencia de género se rige mayormente por la Ley Núm. 54 del 1989 según enmendada. Se examina como el uso de la Hoja de Evaluación de Riesgo se integra como herramienta para fortalecer la detección de riesgo en las mujeres evaluadas y su intervención oportuna. **Disciplina o teoría:** El análisis se fundamenta dentro de la epidemiología

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social con un enfoque en los determinantes estructurales que influyen en la violencia de parejas. **Fuentes de información:** Se analizaron las querellas de violencia de género evaluadas entre julio y noviembre de 2024, con información demográfica, nivel de riesgo, y factores asociados enviadas por el Departamento de Justicia a el Instituto de Estadísticas. **Métodos:** Se realizó un análisis descriptivo y analítico de los niveles de riesgo clasificados por la Hoja de evaluación de riesgo, explorando patrones por edad, municipio, región judicial y riesgo. **Hallazgos:** Una de cada cuatro mujeres de violencia doméstica evaluadas presenta un riesgo severo o extremo de ser víctima de feminicidio. Los factores de riesgo más críticos en este grupo son la probabilidad hasta casi 11 veces mayor de ser atacadas o amenazadas con un arma (RR=10.83), agresor haya eludido arresto por violencia doméstica (RR= 6.13), forzamiento sexual o amenazas de hacerle daños a los hijos (RR= 5.6). **Implicaciones:** La alta proporción de casos con riesgo severo o extremo exige una intervención urgente y especializada por parte del sistema de justicia y las agencias de protección para prevenir feminicidios. Los factores de riesgo específicos identificados como el uso de armas y el estrangulamiento no fatal, deben guiar la capacitación especializada de los respondedores y la creación de protocolos de seguridad altamente focalizados para las víctimas de mayor peligro. **Agradecimientos:** Instituto de Estadísticas de Puerto Rico y Departamento de Justicia.

024

La Guerra Contra Las Drogas: Iniciativas Adoptadas por el Estado y Sus Implicaciones Para Una Política Pública Alternativa Desde Los Derechos Humanos

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Política pública: Iniciativas de guerra contra las drogas adoptadas por el Estado para combatir el narcotráfico. Disciplina o teoría: Se partió desde la teoría de la complejidad y el enfoque de derechos humanos para desde ese posicionamiento proponer estrategias alternativas para atender el problema del narcotráfico. Fuentes de información: Se recopiló información mediante entrevistas semiestructuradas a formuladores (Senadores/representantes), implementadores (Fiscales estatales/federales) e intérpretes de política pública (jueces federales/estatales), y se integró la perspectiva del sector no gubernamental. **Método:** La investigación fue una cualitativa, desde la teoría fundamentada, con un alcance exploratorio. El análisis se realizó desde la teoría fundamentada y desde la teoría de la complejidad y el enfoque de derechos humanos. **Hallazgos:** Los hallazgos apuntan a una grave omisión en el reconocimiento de la adicción como una enfermedad crónica y como no se diferencia entre quien trasiega y quien la usa. Se destacan tensiones generadas entre vertientes de seguridad y las centradas en salud y derechos humanos. Fue crucial la perspectiva del sector no gubernamental, que establece una necesidad de replantear las estrategias actuales para atender de manera efectiva, las dimensiones complejas del fenómeno. **Implicaciones:** En la creación de políticas públicas alternativas para trabajar con fenómeno del narcotráfico, es imperativo el provocar una reflexión sobre las obligaciones del Estado, las violaciones sistemáticas, la desigualdad y la exclusión de sectores empobrecidos. Es imperativo el acceso y disfrute de derechos desde una visión integral y multidimensional. Las iniciativas de la guerra contra las drogas, no solamente ha fracasado en sus objetivos, sino que han generado consecuencias adversas en términos de violencia, criminalización y violaciones a los derechos humanos. Se hace imperativo transitar hacia un enfoque basado en salud pública y justicia social que garanticen el respeto de los derechos fundamentales y contribuya a una sociedad más justa y equitativa. **Reconocimientos:** Ninguno. IRB: 2425-024 (21/10/2024)

025

Mental Health Problems in Adults from Puerto Rico Living with Arthritis During the COVID-19 Pandemic

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Introduction/Objective: Arthritis is among the most prevalent diseases in Puerto Rico (PR). Adults with arthritis (AWART) are at higher risk of mental health problems (MHP) than adults without chronic diseases (AWOCD). However, little is known about the MHP of Hispanic AWART from PR during the COVID-19 pandemic. We examined the severity and odds for clinical-level symptoms of MHP in AWART (G1=243) versus AWOCD (G2=671) who completed an online survey during the outbreak (IRB-approved June 9, 2020). **Method:** Participants aged 21–79 years (M = 44.65; 80.31% female) were required to be PR residents for ≥3 months before enrollment, have internet access, and understand Spanish. Adults completed a Health/Treatment History Module and questionnaires assessing symptoms of depression, anxiety, posttraumatic stress disorder (PTSD), feelings of loneliness (FOL), fear of COVID-19 infection (FOCI), and death/self-harm thoughts (DSHT). Using ANCOVAs (adjusting for sex, age, household size, education level, and family income), we compared the between-group mean severity of MHP symptoms. Using logistic regression, we estimated the crude and adjusted odds ratios of presenting clinical-level symptoms among AWART. **Results:** AWART had significantly ($p \leq .001$) higher scores in symptoms of anxiety [$F(1, 905) = 20.81$], depression [$F(1, 905) = 41.19$], PTSD [$F(1, 904) = 32.77$], FOL [$F(1, 904) = 31.92$], and total FOCI [$F(1, 903) = 7.54, p = .006$] than AWOCD. G1's adjusted odds of presenting clinical-level symptoms of MHP were 1.48 (personal contact FOCI; $p \leq .01$) to 2.74 (depressive symptoms; $p \leq .001$) times higher than in G2. AWART were 2.75 times as likely as their peers to present DSHT anytime during the pandemic and 3.19 times as likely to present DSHT within the past two weeks ($p \leq .001$). **Conclusion:** AWART showed significantly worse mental health indicators than AWOCD during the pandemic. Routine screening and targeted strategies for addressing their mental health needs are needed, especially during health emergencies. IRB Approval Number: 1920-194 (UPR-Río Piedras). **Acknowledgements:** The research project from which the data reported in this study were obtained (known as “COVID-19 and Mental Health in Adults from Puerto Rico”) was financed with the personal funds of the second author. We are thankful to the research assistants for their collaboration in this study. Some of them were hired thanks to funds granted to the Institute for Psychological Research by the Deanship of Graduate Studies and Research from the University of Puerto Rico, Río Piedras Campus.

026

Stress Dimensions and Dysfunctional Eating Behaviors in Puerto Rico

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Background and Objective: Stress is a multidimensional determinant that may influence health through dysfunctional eating behaviors. This study evaluated how distinct stress dimensions relate to dysfunctional eating behaviors among adults in Puerto Rico, facing multiple stressors and health disparities. **Methods:** Cross-sectional analysis

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using baseline data from the PROSPECT cohort (n=1,379; ages 30–75y). Chronic stress was measured with the 8-item Chronic Burden Scale. Scores included total chronic stress, personal domain (one's health problems, job, financial, relationship, and caregiving), and external domain (loved one's health problems and substance use). Perceived stress was assessed with the 10-item Perceived Stress Scale. Chronic and perceived stress scores were standardized. Emotional eating (EE) and uncontrolled eating (UE) were measured with the TFEQ R18-V2 and categorized as none, moderate, or high. Odds ratio (OR) and 95% confidence intervals (95% CI) of EE and UE were examined using multinomial models adjusted for sociodemographics, health behaviors, and mutual stress dimensions. **Results:** Overall, 29% of participants experienced high EE and 40% high UE. Each one-SD increase in total chronic stress was linked to 43% higher odds of high EE (OR=1.43, 95% CI: 1.22, 1.69). The personal domain showed relatively stronger associations with high EE (1.42, [1.21,1.68]) than the external domain (1.20, [1.04,1.39]). Perceived stress was also associated with higher odds of high EE (1.55, [1.31, 1.83]). Relatively similar higher odds of high UE were observed across domains: chronic stress (1.28, [1.06,1.56]), personal (1.21, [1.001,1.47]), external (1.22, [1.02,1.45]), and perceived stress (1.28, [1.06,1.56]). **Conclusion:** Higher stress levels were linked to higher EE and UE, particularly EE. Relatively stronger associations for perceived stress (vs. chronic) and personal (vs. external) domains suggest that how stress is experienced and internalized may be especially relevant for EE. Using multidimensional stress measures may better elucidate their association with eating behaviors and health. **Funding:** NIH-NHLBI (grant numbers R01-HL143792; 1K01HL171465-01). IRB Approval: Protocol # = IRB18-0934; CR Effective Date = 5/7/2025. PROSPECT has full IRB approval from Harvard TH Chan School of Public Health, Ponce Health Sciences University, and University of Massachusetts Lowell.

027

Art Therapy in the University Context: Exploring a Group Intervention to Reduce Anxiety

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Background: The emotional well-being of university students is vital to their academic and personal development. In Puerto Rico, growing anxiety levels among undergraduates have been linked to workload, performance expectations, and social transitions. Art therapy facilitates emotional expression, self-reflection, and psychological well-being; however, its application in higher education on the island remains limited. **Objectives:** To explore undergraduate students' experiences and perceptions regarding the usefulness of group art therapy interventions to reduce anxiety. **Method:** A qualitative instrumental case study with a phenomenological approach was conducted following Creswell and Poth's (2025) method for data analysis—reading and memoing, coding significant statements, developing themes, and synthesizing shared meanings. The Beck Anxiety Inventory (BAI), a 21-item self-report instrument that classifies anxiety as minimal (0–7), mild (8–15), moderate (16–25), or severe (26–63), was used for descriptive analysis before and after the intervention. Three female students aged 21+ with mild or moderate anxiety participated in five group art therapy sessions integrating breathing, artmaking, and reflection. **Results:** Eighteen students applied; five (27%) met inclusion criteria, while eleven (61%) scored in the severe range (29–44) and were referred for individual services. Descriptive comparison of pre- and post-test BAI scores showed consistent decreases: Participant A (11→6, mild→minimal), Participant B (21→6, moderate→minimal), and Participant C (10→4, mild→minimal). Qualitative themes revealed enhanced calmness, emotional release, and self-awareness fostered by the creative process. **Conclusions:** Group art therapy proved a viable alternative to

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foster emotional well-being in students with mild or moderate anxiety. Although quantitative data were included, the qualitative design precludes generalization. Findings indicate that group art therapy promotes self-awareness and emotional regulation in supportive small-group contexts. It may complement university counseling by offering creative, reflective spaces that enhance student mental health. Future studies should strengthen cohesion, include broader anxiety ranges, and examine longitudinal impacts. Approved by IRB (CIPSHI Protocol #2425-076, May 22, 2025).

028

Student Voices on Basic Needs: A Study at the University of Puerto Rico, Río Piedras Campus

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Background and Objectives: Students at the University of Puerto Rico have faced multiple adversities, including hurricanes, earthquakes, the COVID-19 pandemic, and fiscal crises. The literature indicates that unmet basic needs negatively affect students, often correlating with poor academic performance and increased risk of university dropout. We found no evidence of any studies examining how basic needs specifically impact students in Puerto Rico. We collaborated in a study aimed to understand students' experiences related to house, food, and economic security, transportation needs, educational needs, campus safety, needs of students with functional diversity, health and well-being, recreational needs, and sense of belonging. **Methods:** This mixed-methods study employed a cross-sectional survey design, using convenience sampling of 1,116 students from the UPR Río Piedras Campus. Data was collected through an online questionnaire via SurveyMonkey. In the qualitative phase, 29 participants from five focus groups representing the Faculties of Social Sciences, Natural Sciences, Business Administration, Education, and Humanities were interviewed. The study was approved by the Institutional Review Board of the university (protocol #2223-119 for the quantitative phase and #2425-081 for the qualitative phase on February 13, 2025). **Results:** Students reported facing a multiplicity of needs, particularly economic precarity, food insecurity, and housing insecurity. These needs were associated with a higher likelihood of considering withdrawing from the university. Based on their experiences, participants suggested that the university should adapt to the realities of working students, standardize processes to reduce institutional bureaucracy, secure additional resources to improve campus infrastructure, and provide accessible, affordable housing and more affordable tuition. **Conclusions:** The researchers recommend that universities implement immediate measures to address students' unmet needs and attend to the various social, educational, and environmental factors affecting students.

029

Empowering Public Health Professionals: The Key Role of Health Literacy from the Public Health Preparedness Academy

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Background and Objectives: Effective public health efforts rely on strong health literacy, which enables individuals to access and understand health information. In 2020, the Puerto Rico Department of Health (PRDoH) established the Public Health Preparedness Academy (PHPA) to enhance health literacy among providers and communities. The objective is to discuss the role of PHPA in promoting health literacy, highlighting the importance of continuing education to empower health professionals to improve their ability to actively participate in promoting health and wellness within the served communities. **Methodology:** The evaluation methodology includes the development of training plans based on annual needs assessments, with descriptive statistical analysis to measure knowledge improvements through pre- and post-test and satisfaction evaluations. **Results:** In the last three years, over 20 sessions have been held, with an average of 110 participants per session and a satisfaction rate of 96%, exceeding the expected target. Most of the participants of the PHPA 2024 presented a high level of knowledge (82%) on public health topics. Twenty-eight percent (28%) reflected an increase in knowledge, with the Ageism training being the session with the highest number of participants who presented a change. More than 90% of participants expressed satisfaction, emphasizing its utility, relevance, and appropriateness. **Conclusions:** Public health professionals are key in promoting the health and well-being of the population. It is critical to maintain a workforce motivated and prepared to meet public health challenges. To continue promoting public health as a priority in the PRDoH, the PHPA was integrated as an ongoing effort of the Preventive Block Gant.

030

Programa HOLA: Diseño de un Modelo Educativo Comunitario para Cuidadores Informales de Adultos Mayores

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Antecedentes y Objetivos: Los adultos mayores representan el 28.5% de la población total en Puerto Rico (Censo, 2020). El envejecimiento poblacional ha incrementado la necesidad de fortalecer las destrezas de los cuidadores informales (CI), quienes representan un componente esencial en el cuidado de los adultos mayores (AM). En respuesta a esta realidad, el Programa HOLA, desarrolló un modelo educativo dirigido a transformar el cuidado de salud del AM en el hogar. El objetivo de este proyecto fue diseñar e implementar un modelo educativo comunitario dirigido a promover el cuidado de salud del AM, el bienestar de los CI, así como evaluar la satisfacción de los participantes con la intervención educativa. **Metodología:** La capacitación de 8 horas, con componente teórico

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y práctico, impartida por 16 enfermeros y estudiantes voluntarios abordó los temas del cuidado como: baño en cama, administración de medicamentos, movilización y transferencia, cuidado de la piel, medición de signos vitales y bienestar del cuidador. Las redes sociales fueron el medio para diseminar la promoción y matrícula. Al final se evaluó la satisfacción de los participantes. **Resultados:** De un total de 328 CI con edades entre 21 y 80 años (promedio de 46 años), el 91% fueron féminas, representadas en las nacionalidades de República Dominicana, Colombia, Panamá, Estados Unidos y Puerto Rico. Los CI se subdividieron en 8 grupos de 20 y 21 participantes para rotar en 8 estaciones las cuales tenían una duración de 25 minutos aproximadamente. Se registraron 800 CI por medio de plataforma electrónica de los cuales solo se atendió el 41% de los registrados. Al finalizar, los CI expresaron un 100% de satisfacción con la intervención, tópicos, recursos y utilidad. **Conclusión:** Este modelo representa una herramienta valiosa para optimizar el cuidado en el hogar. Se recomienda institucionalizar este tipo de modelo como parte de las estrategias de salud pública para ofrecer servicio continuo. **Reconocimientos:** Se reconoce la labor de los estudiantes subgraduados voluntarios y estudiantes de la certificación profesional en área de cuidado de heridas y piel. Este proyecto no tiene conflicto de interés.

031

Assessing Institutional Culture and Climate through a Needs Assessment at the University of Puerto Rico, School of Dental Medicine.

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Background and Objectives: A respectful and collaborative institutional climate is essential to promote academic and clinical excellence. The School of Dental Medicine (SDM) conducted an Institutional Culture and Climate Needs Assessment to strengthen its humanistic and ethical environment, aligned with the Commission of Dental Accreditation (CODA) Standards 1–3 and 3–2. The initiative aimed to assess perceptions of intercultural engagement, respect, fairness, professional growth, and recognition among students, faculty, administrative and clinical support staff, and patients. The goal was to identify institutional strengths and opportunities for improvement. **Methods:** A culturally and linguistically adapted survey instrument was designed for this assessment. The survey employed a 5-point Likert scale to evaluate five key dimensions: interculturality, cultural integration and social cohesion, social justice, access to opportunities, and recognition and rewards. The sample consisted of 461 participants. A total of 198 of 209 students responded (95%). Among faculty, 84 of 138 responded (61%); however, when adjusting for full-time equivalency (FTE), the response rate increased to 88%. Administrative and clinical support staff provided 41 responses out of 67 members (61%). A total of 138 patients completed the survey, although a participation rate was not calculated for this group. **Results:** Findings revealed that internal groups including faculty, students, and administrative and clinical support staff shared overall positive yet uneven perceptions of respect, fairness, and professional opportunity. Faculty reported the highest internal confidence in institutional ethics and civility (over 80%), while students and support staff expressed lower trust in transparency, limited recognition for contributions, and fewer opportunities for advancement. Patients showed exceptionally high positive perceptions (above 90%) of respect and professionalism. Across all groups, more than 80% affirmed alignment with SDM's mission and vision and recognized meaningful opportunities for intercultural collaboration and community outreach. **Conclusions:** The needs assessment confirmed a resilient institutional culture grounded in humanistic values. Strengthening communication, recognition and rewards systems, and leadership visibility will further enhance engagement, cohesion, and professional growth across the SDM community. **Acknowledgments:** No external funding or conflicts of interest reported.

032

NutriFit: Innovación Educativa Integral para el Manejo de la Diabetes

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Antecedentes y Objetivos: Aproximadamente 500,000 personas viven con diabetes tipo 2 en Puerto Rico. Esta condición requiere manejo integral que incluya tratamiento, alimentación, actividad física y apoyo emocional. La Asociación Puertorriqueña de Diabetes desarrolló NutriFit, un programa educativo de quince semanas. Basado en el Modelo de Creencias de Salud trabaja los constructos de susceptibilidad, severidad, beneficios y barreras percibidas para aumentar la conciencia de riesgo y promover conductas saludables. Este trabajo presenta los resultados del programa en el desarrollo de destrezas y el cambio de indicadores de salud, incluyendo A1c e índice de masa corporal (IMC). **Métodos:** NutriFit integra sesiones dirigidas por un equipo multidisciplinario compuesto por educadoras en salud, nutricionistas, entrenadores personales y psicólogos. Incluye conferencias, sesiones de actividad física, apoyo emocional y actividades prácticas. Se promueven destrezas como conteo de carbohidratos, lectura de etiquetas, planificación de comidas y uso de tecnología para monitoreo glucémico. Se recopilan mediciones clínicas pre y post (A1c e IMC), cuestionarios de hábitos de salud, encuestas de satisfacción, entrevistas breves y un registro de asistencia. **Resultados:** En la primera cohorte (2022), 30 participantes con valores de A1c superiores al 8% completaron NutriFit. El promedio inicial de A1c fue 9.69%. Tras las intervenciones, lograron una reducción promedio de 4.36%, acompañada de pérdida de peso. En la evaluación más reciente (2024), 54% de los participantes alcanzaron la meta de reducción de A1c, 64% redujeron su IMC, con una disminución promedio de -1.25 kg/m². En todas las cohortes la totalidad de los participantes reporta la integración de al menos un cambio en su estilo de vida. **Conclusión:** NutriFit se consolida como una intervención efectiva que promueve cambios sostenibles en el comportamiento y el control glucémico. Su expansión se proyecta mediante propuestas de financiamiento. **Reconocimientos:** Este proyecto ha sido apoyado por Baxter International Foundation, Direct Relief y Triple S Foundation.

033

Voces de la Coalición: Entendiendo la Continuidad del Cuidado de Cáncer en Escenarios de Climas Extremos en Puerto Rico

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Antecedentes y Objetivos: El Centro de Investigación en Cáncer del Caribe sobre los Riesgos Ambientales y Naturales (CARIB-CARES) es una iniciativa colaborativa entre el Recinto de Ciencias Médicas de la Universidad de Puerto Rico, el Centro Comprensivo de Cáncer de Puerto Rico y la Universidad de las Islas Vírgenes. Su propósito es examinar cómo los eventos climáticos extremos afectan la continuidad del tratamiento de cáncer en el Caribe

estadounidense, una región donde huracanes, inundaciones y fallas prolongadas en servicios esenciales interrumpen cuidados críticos, aumentan el estrés físico y emocional y profundizan inequidades estructurales. Este estudio explora las percepciones de las personas miembros de la Coalición de Socios sobre los efectos del clima extremo en el acceso, la continuidad del tratamiento y la toma de decisiones clínicas, con el objetivo de orientar intervenciones educativas, políticas institucionales y recursos de apoyo que fortalezcan la resiliencia comunitaria. **Metodología:** Se empleó un enfoque cualitativo mediante sesiones de escucha guiadas por preguntas generativas y diseñadas con principios de human-centered design para asegurar que las dinámicas respondieran a las experiencias y necesidades de las comunidades participantes. Este método permitió explorar facilitadores y barreras en educación, acceso a servicios de salud y procesos de recuperación tras emergencias. **Resultados:** Se completaron dos sesiones con diez participantes, mientras se gestiona una enmienda al IRB para incluir entrevistas adicionales. El perfil de participantes incluyó educadores en salud, científicas, académicos, personal de investigación, profesionales de abogacía e investigadores. Los análisis preliminares señalan la necesidad de integrar la preparación climática como un derecho de pacientes con cáncer, incluyendo planes de tratamiento adaptados a emergencias, y evidencian la falta de estrategias educativas basadas en evidencia. **Conclusión:** Estos hallazgos apoyarán el desarrollo de herramientas y políticas que promuevan continuidad del cuidado y resiliencia en los sistemas oncológicos de Puerto Rico. **Reconocimientos:** Este estudio cuenta con el apoyo del Centro de Investigación en Cáncer del Caribe sobre Riesgos Ambientales y Naturales (CARIB-CARES), subvención n.º P20CA294096. Aprobado por IRB 12 de septiembre de 2025 Número de protocolo 2505411587.

034

Estudio de Percepción de Riesgo al Calor Extremo entre Personas Adultas Mayores en Puerto Rico: Impactos y Adaptaciones

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Antecedentes y Objetivos: El 23% de la población en Puerto Rico son adultos +65 años donde el 39% vive por debajo del umbral de pobreza y padecen de múltiples condiciones de salud (cardiovasculares, hipertensión, diabetes). Es uno de los grupos más sensitivos y vulnerables al calor extremo. Este estudio tiene como objetivo entender la percepción de riesgo e impactos del calor extremo en la salud de los adultos mayores en Puerto Rico. **Métodos:** Se diseñó una encuesta transversal autoadministrada. Se reclutaron participantes entre agosto y noviembre 2025 mediante múltiples estrategias en alianza con AARP, municipios y otras organizaciones. 25 organizaciones locales y redes comunitarias diseminaron la encuesta y el volante informativo impreso. Este estudio fue aprobado por IRB-#2506422474 [11-agosto-2025]). **Resultados:** Participaron 772 personas residentes de Puerto Rico. El 67.8% de los participantes tenía entre 60-70 años, y el 81.6% fueron mujeres. La mayoría residía en zonas urbanas (San Juan, Bayamón, Carolina). Las condiciones de salud más reportadas fueron hipertensión (54.99%), artritis (39.3%) e insomnio (32.7%). El 85.1% percibió el año 2024 como más caluroso en comparación con años anteriores. Los síntomas más frecuentes autorreportados relacionados al calor fueron: cansancio (22.9%), dolor muscular (9.3%), sudoración (8.4%) y mareos (5.4%). Las estrategias de adaptación más comunes fueron el uso de abanicos, aire acondicionado, hidratación frecuente, ropa ligera y ajuste de horarios. Las principales barreras identificadas

fueron el alto costo de la electricidad y la falta de espacios públicos frescos o sombreados. Emocionalmente, destacaron sentimientos de preocupación y frustración. **Conclusión:** Los resultados reflejan una alta percepción del aumento del calor extremo entre adultos mayores y limitadas estrategias de adaptación influenciadas por factores económicos y ambientales. Se requiere desarrollar políticas y programas que garanticen acceso a entornos frescos, subsidios energéticos y educación comunitaria para reducir los riesgos de salud relacionados con el calor extremo. **Agradecimientos:** Este trabajo fue apoyado por el Caribbean Collaborative Action Network (CCAN), un equipo del programa NOAA Climate Adaptation Partnerships, bajo el número de subvención NA22OAR4310545.

035

Seasonal Suicide Trends and Regional Temperature Patterns in Puerto Rico: A Descriptive Study of 2000-2024 Data

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Background and Objectives: Suicide remains a significant public health concern, contributing to premature mortality and community burden. Evidence from other contexts suggests that environmental stressors, such as rising temperatures, may influence suicide risk. Given Puerto Rico's climate vulnerability, this study aimed to (1) describe seasonal trends in suicide and (2) explore spatial patterns between land surface temperature (LST) and suicide rates by municipality. **Method:** We obtained suicide data from 2000-2024 from the Institute of Forensic Sciences, facilitated by the Commission on Suicide Prevention. Descriptive statistics summarized seasonal distributions. Age-adjusted suicide rates were calculated by season and year using intercensal estimates from the U.S. Census Bureau and the 2000 U.S. standard population in RStudio. For spatial analysis, we used age-adjusted rates by municipality for 2016-2023 published by the Commission. LST (2016-2023) was derived in Google Earth Engine using MODIS composites (MOD11A2). LST and municipal boundaries were overlaid in ArcGIS Pro to assess spatial alignment with suicide rates. **Results:** From 2000-2024, there were 7,209 suicides. Seasonal distributions were consistent: winter (24%), spring (25%), summer (26%), and fall (25%). Seasonal age-adjusted suicide rates ranged from 1.14 to 3.03 per 100,000, with peaks in summer 2010 (3.03), summer 2001 (2.77), and winter 2004 (2.58). Hottest areas included lowlands, coastal areas and high-density urban areas, such as Ponce, Caguas, and the metropolitan area. Highest suicide counts occurred in municipalities with higher LST: San Juan (n=769), Bayamon (n=394), Ponce (n=362), and Caguas (n=315). From 2016-2023, the highest adjusted suicide rates were in municipalities with lower LST: Culebra (21.7), Aibonito (19.0), and Barranquitas (13.3). **Conclusion:** Findings suggest a potentially inverse relationship between temperature and suicide risk. Future research should examine how socioeconomic and behavioral determinants interact with environmental stressors, such as climate, landslides, and flooding, and how these combined factors may relate to suicide risk. **Acknowledgements:** This work was supported by the Caribbean Collaborative Action Network (CCAN), a NOAA Climate Adaptation Partnerships program team, under grant number NA22OAR4310545. We acknowledge the Puerto Rico Commission on Suicide Prevention for their collaboration.

CARIB-CARES Coalition of Partners Evolution in US Virgin Islands and Puerto Rico: A Social Network Analysis

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Background & Objective: Extreme weather poses threats to the cancer control continuum in small islands such as Puerto Rico and the US Virgin Islands. Effective solutions require a transdisciplinary approach, as no single organization can address all the determinants of health. The Caribbean Cancer Research Center on Environmental and Natural Hazards (CARIB-CARES) established a Coalition of Partners (COPs) to develop strategic collaborations with stakeholders and to enhance understanding of environmental impacts and their connections to public health. This study aims to design a Social Network Analysis (SNA) for CARIB-CARES COPs, that will allow establishing a baseline of information to analyze the coalitions evolution. **Methods:** A 7 phase SNA was designed for CARIB-CARES to study the collaborative network of PR and USVI COPs focusing on the relationships among members. Phases: Administer pilot questionnaire; Incorporate feedback to official data collection instrument and questions based on reviewed literature; Develop a Code book for CARIB-CARES SNA; Review by US Virgin Islands and Puerto Rico's Team; Auto-administer questionnaire by COPs; Analysis and interpretation of results using visualization tool and graphs; Share baseline information with CARIB-CARES team and COPs. Currently phase 1-3 are completed. **Results:** 20 CARIB-CARES and COPs members answered pilot questionnaire. 70 collaborations were documented. Over 90% of collaborations were based on shared information and over 50% were 1-5 times a year. An in-person meeting was held to discuss results and document feedback. A code book for the SNA has been developed with the following descriptions: Type of organization and member status. Code book is currently being reviewed. **Conclusions:** Collaborations in cancer care in the context of weather-related events ensure a patient-centered approach. Understanding the dynamics of the COPs through SNA can help CARIB-CARES track, support and amplify its collaborative impact. Future steps will help determine retention strategies, strengthen key collaborations, and enhance community engagement. **Acknowledgments:** This study is funded by The Caribbean Cancer Research Center on Environmental and Natural Hazards (CARIB-CARES) P20. CA294096. This study was approved by IRB # 2512512153.

037

**Spatial Analysis of Vulnerability and Climate Risks
in Cancer Incidence Across Puerto Rico
Using Integrated Geographic and Cancer Registry Data**

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Purpose: Climate-related events pose increasing risks to cancer patients in Puerto Rico, exacerbating challenges in treatment access and survivability, particularly in disadvantaged and underserved communities. **Objectives:** This study aimed to develop a spatially informed vulnerability index integrating social determinants of health and cancer registry data to identify high-risk areas across the island. **Methods:** Using geospatial analysis, municipalities with the highest cancer trends from 2000 to 2019 were examined through data from the Puerto Rico Central Cancer Registry. A Social Vulnerability Index (SVI) was constructed by standardizing indicators across three domains: cancer burden, climate hazard exposure, and social vulnerability, incorporating data from 2000–2019. Geographic boundaries were based on 2022 U.S. Census TIGER/Line shapefiles, with social vulnerability measures drawn from the CDC-SVI 2022 dataset. **Results:** Preliminary results indicate that ten counties; Adjuntas, Aguada, Cataño, Ceiba, Corozal, Manatí, Naguabo, Quebradillas, Santa Isabel, and Vieques, consistently exhibited high SVI scores (0.89–0.94) alongside elevated cancer incidence. Mean cancer cases in these counties rose steadily from 352 in the earliest period to 521 in the latest. Counties such as Bayamón, Aibonito, San Juan, and Hormigueros demonstrated compounded vulnerability, showing both high cancer incidence and significant climate-disaster exposure, often ranking in the top decile for both metrics post-2010. Flood-zone analyses revealed substantial geographic overlap (90–99%) between metropolitan areas with high poverty-related vulnerability and cancer incidence patterns across all periods. **Conclusion:** The SVI effectively identifies communities burdened by both cancer and environmental risks, emphasizing the need for targeted interventions. Planned analyses include ArcGIS-based spatial mapping and principal component analysis integrating sociodemographic and environmental variables to link patient locations with climate exposures. These maps will aid in identifying high-risk areas and guiding treatment prioritization. Future research will enhance climate hazard modeling to more accurately assess and mitigate climate vulnerability in affected Puerto Rican communities. **Acknowledgements:** This study was fully supported by the Caribbean Cancer Research Center on Environmental and Natural Hazards (CARIB-CARES), grant #P20CA294096.

038

Extreme Heat in Schools: Monitoring with Sensors and School Collaboration

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Background and Objective: In recent years, Puerto Rico has experienced extreme heat episodes with negative impacts on schools. Recent studies (Méndez-Lázaro et. al, 2025) reveal that 36% of schools are exposed to high surface temperatures, increasing the risk of heat stroke. A survey (2023-2024) documented that public schools face greater exposure to extreme heat than private schools due to having less thermal infrastructure. The objective of this initiative is to promote citizen science and school motivation by co-designing an environmental monitoring system in schools in Puerto Rico. **Method:** It involves three teachers and ~20 students in scientific activities using sensors that measure temperature, dew point, relative humidity, and particulate matter (1-10µm) at an hourly frequency, allowing for a high-precision examination of thermal and air quality conditions. Digital platforms are also integrated, which facilitates data collection and analysis, guiding decision-making with student participation to improve the school environment. As part of the pilot phase, environmental sensors (14 Blue Maestro, 1 PurpleAir) were installed at the Escuela Julián Blanco on April 25, 2025 (classrooms, common areas, and exteriors), and at the Escuela Ecológica de Dorado, one of each was installed in one classroom on October 28, 2025. Additionally, three schools have expressed interest in joining. **Results:** The initiative has strengthened scientific education and environmental awareness. Furthermore, the pilot phase demonstrated average temperatures of ~85°F at the school, with the library and cafeteria being the hottest zones. **Conclusion:** This experience generates evidence of thermal inequalities in educational settings. Likewise, this initiative promotes sustainability, student scientific training, and climate action in Puerto Rico's schools. **Acknowledgements:** This effort from Caribbean Collaboration Action Network (CCAN) is funded by the National Oceanic and Atmospheric Administration (NOAA), Climate Adaptation Partnerships/Regional Integrated Sciences and Assessments (CAP/RISA).

039

Protegiendo a la Población de Puerto Rico a Través del Sistema de Alerta Temprana de Calor: Análisis Espaciotemporal de los Avisos en los Años 2023 y 2024

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Trasfondo y Objetivos: El calor extremo tiene impacto negativo sobre la salud y los sistemas socio-ecológicos en Puerto Rico. En el 2018, el Servicio Nacional de Meteorología en San Juan operacionalizó un Sistema de Alerta Temprana de Calor. Los años 2023 y 2024 se consideran los años más calientes en la historia de Puerto Rico. Este informe caracteriza la frecuencia y distribución de los avisos en las zonas más afectadas durante 2023 y 2024. El aviso se emite entre 1-3 días antes del inicio de las condiciones peligrosas y permanece vigente

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exista riesgo. **Metodología:** Se recopilaron todos los avisos de calor extremo de la NWS publicados en la página web de “Iowa Environmental Mesonet” para ambos años. Cada aviso fue clasificado según su tipo, duración y áreas geográficas incluidas. Se realizó un análisis descriptivo de frecuencia y distribución espacial, completado por una prueba de bondad de ajuste para determinar si la distribución de avisos seguía un patrón aleatorio o concentrado. **Resultados:** En 2023 se registraron 67 avisos de calor extremo, con una mayor concentración en Culebra (41) y San Juan-Vecindad (33). En 2024 se emitieron 45 avisos, con un cambio en el patrón espacial: Mayagüez (38), San Juan-Vecindad (36), y Ponce-Vecindad (30) fueron las zonas más afectadas. Ponce-Vecindad mostró el aumento más notable pasando de 1-30 avisos. No hay distribución aleatoria ($p < 2.2e-16$), reflejando la vulnerabilidad persistente de zonas costeras densamente pobladas. En 2024 los avisos comenzaron más temprano en la temporada y se observaron menos en Vieques y Culebra, mientras aumentaron en el sur y sureste de la Isla. **Conclusiones:** El calor extremo es la amenaza climática que más afecta la Salud Pública. Entender cuáles son las zonas más afectadas por calor extremo en Puerto Rico ayuda a identificar poblaciones en riesgo y co-diseñar estrategias de mitigación y adaptación. **Agradecimientos:** Este trabajo fue apoyado por el Caribbean Collaborative Action Network (CCAN), un equipo del programa NOAA Climate Adaptation Partnerships, bajo el número de subvención NA220AR4310545.

040

Cutaneous *Ancylostoma Braziliense* Infection Masquerading as Inflammatory Dermatoses

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Purpose: *Ancylostoma braziliense*, a hookworm infrequently identified in humans, can initially present with nonspecific dermatologic findings that closely resemble common dermatoses. This case is presented to highlight the diagnostic challenges of cutaneous larva migrants in an otherwise healthy young adult, whose symptoms evolved over three months and led to extensive ineffective treatments before the correct etiology was identified.

Case description: A 21-year-old male patient initially presented with an intensely pruritic, macular, erythematous, and violaceous exanthem across the thoracic dermatomes. The eruption was initially presumed to be atopic dermatitis superimposed with a fungal infection, which was treated with topical and then systemic antifungals and corticosteroids. After no resolution, the diagnosis shifted to atopic dermatitis and then herpes zoster. The patient received multiple topical and systemic antibiotics, antifungals, antivirals, and corticosteroids, without a definitive diagnosis or symptom improvement. The infection progressed, resulting in intensely pruritic and painful serpiginous lesions, as well as eosinophilic enteritis. Clinical images taken over the course of the illness demonstrated erythematous and violaceous macules that evolved into papules, vesicles, crusted plaques, and excoriated tracks. After several weeks, the patient's laboratory results showed leukocytosis with marked eosinophilia (62.6%), and a skin biopsy revealed perivascular and interstitial dermatitis with eosinophilic folliculitis, consistent with a parasitic process. Upon further review of the history, the patient recalls having fostered stray dogs that were not dewormed, establishing a link between the clinical presentation and *Ancylostoma braziliense*. **Conclusion:** This case highlights how *Ancylostoma braziliense* can mimic several skin conditions due to its infectious route, such as dermatitis and herpes zoster, often leading to extensive and ineffective treatment regimens. **Acknowledgements:** We thank Dr. José González Chávez for his guidance in the development and review of this case. The authors declare no conflicts of interest and received no financial support for this work.

041

Patterns and Public Health Implications of Musculoskeletal Injuries from Motorcycle Trauma at the Puerto Rico Trauma Center

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Background and Objectives: Motorcycle accidents are a leading cause of high-energy trauma in Puerto Rico, disproportionately affecting young males and resulting in complex musculoskeletal injuries. Unlike the U.S., Puerto Rico lacks strict enforcement of helmet laws and comprehensive rider safety policies, creating a critical gap in injury prevention. This study uniquely examines injury patterns within this policy context, aiming to describe the epidemiology and anatomical distribution of musculoskeletal injuries in hospitalized motorcycle trauma patients. Findings will inform targeted public health strategies to reduce preventable injuries and address legislative gaps.

Methods: A retrospective descriptive cohort study was conducted using the Puerto Rico Trauma Registry. Patients aged 18 years or older admitted from 2016 to 2021 following motorcycle trauma requiring orthopedic consultation were included. Data collected included demographics, injury type, fracture location, hospital length of stay, and insurance coverage. Descriptive statistics summarized findings. The Wilcoxon-Mann-Whitney test was used to evaluate differences across categories, including gender, length of stay, and other relevant variables. IRB approval was obtained.

Results: Among 832 patients, 91.1% were male (mean age 33.9 ± 12.8 years). Most patients sustained multiple injuries; 4,383 fractures were recorded. Common fracture sites included chest (33.8%), skull (33.2%), shoulder-humerus (26%), spine-pelvis (25.5%), and tibia-fibula/knee (24%). Open fractures comprised 6.7% of cases. The median hospital stay was 10 days; males averaged 16.7 days, and females 13.1 days. Medicaid and Automobile Insurance/ACAA covered most patients.

Conclusion: Motorcycle trauma in Puerto Rico predominantly affects young men and results in multiple musculoskeletal injuries. The study highlights the urgent need for public health measures, including helmet enforcement, rider training, and traffic safety policies, to prevent injuries and reduce healthcare burden. Addressing these legislative and safety gaps could significantly reduce preventable trauma. Future prospective studies should explore behavioral, environmental, and policy-related factors to optimize injury prevention strategies. **Acknowledgments:** This work was supported by resources provided by the Department of Orthopedic Surgery. The authors declare no conflicts of interest. IRB: 2301068896 (27/03/2023)

042

Psychoneuroimmunological Profiles in Breast Cancer: A Descriptive Case Series

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Background: Chronic stress and immune imbalance may influence cancer progression through dysregulation of the hypothalamic pituitary adrenal (HPA) axis and inflammatory signaling pathways. Psychological stress can alter cytokine activity, angiogenesis, and tissue repair responses within the tumor microenvironment. **Purpose:** Understanding psychoneuroimmunological patterns in breast cancer (BC) may help clarify how stress physiology and immune function differ across molecular subtypes. This case series examines stress related endocrine markers and immune cytokine profiles in two BC patients representing distinct tumor biology. **Methods:** Two female patients with invasive ductal carcinoma (IDC) were evaluated: one with triple positive disease (ER⁺/PR⁺/HER2⁺) and one with triple negative breast cancer (TNBC). Serum cytokine concentrations were quantified using a multiplex bead-based immunoassay (Milliplex MAP, Millipore Sigma), and results reflect mean values across technical duplicates. Cortisol and related stress metabolites (corticosterone, metanephrine, normetanephrine) were measured by ELISA (R&D Systems; DLD Diagnostika GMBH). Clinical and pathological characteristics were reviewed descriptively. **Results:** Case 1 (Triple-positive) demonstrated high ER and PR expression with HER2 overexpression and PIK3CA mutation. Cytokine patterns reflected Th2 leaning, pro repair and angiogenic profile (IL-4 93.4 pg/mL; MDC 1,143 pg/mL; VEGF 39.1 pg/mL; GRO 8,604 pg/mL). Cortisol decreased from 99.9 ng/mL to 75.8 ng/mL following treatment, suggesting partial HPA-axis recovery and adaptive stress response. Case 2 (TNBC) exhibited an inflammatory dominant immune profile (MCP-1 341 pg/mL; GRO >12,000 pg/mL; EGF 198 pg/mL) with lower reparative cytokines (IL-4 24.4 pg/mL; FGF-2 3.2 pg/mL). Cortisol remained elevated (85.5 ng/mL), indicating ongoing stress physiology and heightened inflammatory activity. (IRB #16800, approval date: February 2018 to January 2023). **Conclusion:** This descriptive case series demonstrates distinct stress immune signatures between triple positive and TNBC. The triple positive case exhibited regulated immune repair activity and improved endocrine stress markers, whereas the TNBC case showed persistent inflammation and elevated cortisol. Psychoneuroimmunology may offer insights into breast cancer heterogeneity and support integrative approaches that address stress, coping, and immune health. **Acknowledgement:** Special thanks are extended to the principal investigator Dr. Eida Castro, my research mentor Dr. Zindie Rodríguez, RCMI, fellow co-investigators, and the supporting institution for their guidance and collaboration throughout this project. I also acknowledge the assistance of all individuals who contributed to this study.

043

Tumor Grade and Survival Outcomes in Penile Squamous Cell Carcinoma: A Puerto Rican Cohort Study

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Introduction/Background: Penile squamous cell carcinoma (PSCC) is a rare but aggressive malignancy with significant mortality, especially in regions with high incidence such as Puerto Rico. Clinical outcomes are influenced by tumor grade, recurrence, and other clinicopathologic factors. This study was conducted to investigate survival outcomes and key prognostic determinants in PSCC. **Methods/Materials:** A retrospective cohort of 100 patients diagnosed

with PSCC in Puerto Rico from 2009 to 2023 was reviewed. Clinicopathologic variables—including age, tumor grade, stage, recurrence, and vital status—were extracted from medical records. Survival analysis was performed using Kaplan-Meier methodology, with differences across groups assessed by log-rank and Mann-Whitney tests. Multivariable Cox proportional hazards models evaluated relative mortality risk associated with pathologic features. **Results:** Tumor grade significantly impacted survival. Patients with low-grade tumors (G1) had the longest mean survival (6.64 years; SD 5.24), intermediate-grade (G2) tumors showed shorter survival (2.96 years; SD 3.00), while high-grade (G3) tumors had mean survival of 4.31 years (SD 4.15) (ANOVA $p=0.009$). Cox regression revealed increasing hazard ratios for mortality with higher grade: HR 1.95 for G2 (95% CI: 0.98-3.89; $p=0.056$) and HR 2.49 for G3 (95% CI: 0.95-6.52; $p=0.062$), compared to G1. Disease recurrence was present in 10% of cases, occurring exclusively among HPV-positive patients; this difference was statistically significant (17.9% HPV+ vs. 0% HPV-, $p=0.002$). There was no statistically significant survival difference by HPV status (mean: 6.22 years for HPV+, 4.55 years for HPV-; $p=0.095$) or p16 expression (mean: 5.87 years p16-, 5.63 years p16+; $p=0.644$). Stage and patient age did not show significant survival effects in multivariate analysis. **Conclusions:** Tumor grade is the most robust predictor of survival in Puerto Rican PSCC patients, with higher grades conferring greater mortality risk. Recurrence, which was significantly more common in HPV-positive cases ($p=0.002$), negatively impacts prognosis, while HPV status and p16 expression do not independently affect survival outcomes. Clinical management of PSCC should prioritize accurate grading and vigilant follow-up for early detection of recurrence to improve survival. Further studies are warranted to refine risk stratification and optimize targeted interventions. IRB approval #: 2290033978 (03/20/2025)

044

Quantitative Proteomics of Astrocyte-Derived Exosomes Identify Potential Novel Biomarkers of HIV-Associated Neurocognitive Impairment

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Background and objectives: Astrocyte-derived exosomes (ADEs) have emerged as important mediators of neuroimmune communication and may contribute to the mechanisms underlying cognitive impairment (CI) in people living with HIV (PLWH). There are no effective therapies neither biomarkers for CI in PLWH. This study aimed to characterize the proteomic profile of plasma ADEs to identify potential biomarkers associated with HIV-associated neurocognitive impairment (HIV+CI). **Method:** Plasma samples were collected from people without HIV (HIV(-); $n=9$), PLWH with normal cognition (HIV+NC; $n=14$), and PLWH with cognitive impairment (HIV+CI; $n=17$) within a Hispanic-Latino cohort matched by age and sex. Exosomes were isolated by ultracentrifugation, and ADEs were immunoprecipitated using anti-GLAST-1 antibodies, with validation via Western blot (CD63, CD9, GLAST-1, GFAP). Quantitative proteomic analysis was performed using Tandem Mass Tag (TMT) labeling and bioinformatics

to determine differentially expressed proteins. **Results:** Seventy proteins were identified, with seven showing significant differential expression (fold change cutoff of 1.5, $p \leq 0.05$). Bioinformatic analyses revealed that PLWH have upregulation of SLK and downregulation of WRAP73 expression compared to the HIV-negative group. QTRT1 was downregulated in the HIV+CI group compared to the HIV+NC. Moreover, sex-stratified comparisons within HIV+CI demonstrated additional differences, with females showing an upregulation of TRAPPC4 and a downregulation of WRAP73 compared to males. **Conclusions:** The differentially expressed proteins in ADEs indicate disruptions in cytoskeletal dynamics (SLK, WRAP73), vesicular trafficking (TRAPPC4), and oxidative stress responses (SLK, QTRT1)—essential processes for astrocyte function. Particularly, studies in mice have demonstrated that QTRT1 knockout leads to memory and learning deficits. These alterations suggest impaired glial homeostasis in people with HIV, particularly those with cognitive impairment. These findings indicate that ADEs protein signatures may reflect both cognitive status and biological sex-dependent regulatory patterns and may serve as promising novel biomarkers for CI in PLWH. **Acknowledgement:** This research was supported in part by grants from the National Institutes of Health: R21NS131061, R01NS099036, U54MD007600, P20GM103475, U54GM133807, K00NS11345, K22NS118975, and the UPR-Comprehensive Cancer Center. Approved by IRB: Protocol # 2290030382 Approval Date: June 5, 2025.

045

Evaluating Differential Gene Expression Overlap as a Predictor of CAR T Cell Treatment Response

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Background and Objectives: CAR T-cell therapy has emerged as a promising treatment for cancer, showing strong success in hematologic malignancies compared with solid tumors. This study evaluates whether the coincidence of differentially expressed genes (DEGs) between untreated cancers and post-CAR T therapy profiles can serve as a predictor of therapeutic effectiveness. **Methodology:** DEG lists from solid (pancreatic cancer) and hematologic (lymphoma) malignancies were contrasted against DEG lists obtained after CAR T-cell treatment. The analysis was performed using OBAMA, a mathematical optimization-based pipeline designed to minimize user bias and ensure objective interpretation. Publicly available microarray datasets were used to quantify DEG coincidence and its potential association with treatment outcomes. **Results:** Hematologic cancers demonstrated consistently higher DEG coincidence with post-CAR T expression profiles, aligning with the known clinical success of CAR T therapy in these malignancies. Pancreatic cancer DEGs were enriched in metabolic and ribosomal pathways, suggesting T-cell exhaustion and immune evasion mechanisms. In contrast, lymphoma DEGs were enriched in immune activation and complement pathways, reflecting a more favorable tumor microenvironment for CAR T efficacy. Sex-based comparisons revealed higher DEG coincidence in lymphoma across groups, indicating possible sex- and tissue-specific response patterns. **Conclusion:** DEG coincidence emerges as a promising biological indicator for predicting CAR T-cell therapy effectiveness, highlighting key differences between solid and hematologic tumors and supporting the development of expression-based predictive metrics.

046

Predictors of Emergency Department ROSC in Out-of-Hospital Cardiac Arrest: Role of Initial Rhythm and Airway Management

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Background: The presenting cardiac rhythm and airway strategy influence early survival in OHCA. Non-shockable rhythms are common and carry poor prognosis. **Methods:** We conducted a retrospective analysis of 212 OHCA cases treated at the University of Puerto Rico Hospital in Puerto Rico between January 2022 and December 2024. Variables analysed included: cardiac rhythm at EMS at emergency department (ED) arrival, and airway interventions performed in the ED. **Results:** At ED arrival (n=211), asystole was the rhythm in 131/211 (62.1%), pulseless electrical activity (PEA) in 67/211 (31.8%), ventricular fibrillation (VF) in 7/211 (3.3%), and pulseless VT in 3/211 (1.4%). Endotracheal intubation was performed in 110/212 (51.9%), while 102/212 (48.1%) were managed without definitive airway. No mechanical CPR devices were used (0/211; 0%). Defibrillation was performed in 45/212 (21.2%), and cardioversion in 3/161 (1.9%). ROSC in the ED was achieved in 54/211 (25.6%) patients. The denominators (N) vary across variables because not all data elements were available for every patient due to incomplete chart documentation. **Conclusion:** Asystole and PEA accounted for over 90% of presenting rhythms, explaining the low rate of successful resuscitation. Intubation was common but not clearly associated with improved ROSC. These findings align with recent evidence supporting a focus on high-quality chest compressions and early defibrillation. Approved by IRB, protocol number 25043901271, approval date 04/25/2025. **Acknowledgements:** This project was supported in part by the Endowed Health Services Research Center of the University of Puerto Rico School of Medicine -Grants 5S21MD000242 and 5S21MD000138 from the National Center for Minority Health and Health Disparities, National Institutes of Health (NCMHD-NIH).

047

Frequency and Causes of Visits to the Emergency Departments by People with Dementia in Puerto Rico

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Introduction: People with dementia (PwD) face cognitive and behavioral challenges daily. For PwD, the unfamiliar environment of an emergency department (ED) can be unsettling and even threatening, which is problematic for PwD, their caregivers and ED staff. And yet, the literature shows that PwD have higher rates of ED visits, more prolonged hospital stays, and greater risk of adverse outcomes than people without dementia. **Objective:** To analyze existing data on ED visits among PwD in Puerto Rico (PR) with the purpose of understanding and documenting

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the frequency, main causes and outcomes of these visits, in order to develop strategies to avoid preventable ED visits and optimize the ED environment for PwD, their caregivers and ED staff. **Methods:** In this observational retrospective study, data gathered by the Alliance for Clinical & Translational Research about the visits by PwD to one of the largest ED in Puerto Rico from July 2014 to October 2025 were included. We analyzed the frequency and main causes for visits to the ED by PwD. We focused on Falls, Urinary Tract Infections (UTI) and Pneumonia as these are reported in the literature as the main causes of visits to the ED by PwD. (IRB#: 2601524355 Approved: 02/03/2026) **Results:** PwD visit the emergency department more often (1.75 visits/patient) than people without a dementia diagnosis (1.59 visits/patient). Out of 66,152 ED visits, 3,451 were made by 1,968 patients with dementia, 62.91% female. The most frequent reasons for ED visits among PwD were Falls (56%), UTI (2.43%) and Pneumonia (0.49%) as well as combinations of these conditions, which is consistent with the existing literature. **Conclusion:** In Puerto Rico, falls are the main reason for ED visits by PwD. To minimize the number of ED visits, healthcare providers must provide advice and educational materials to caregivers to prevent falls at home and other settings. **Acknowledgments:** The Alliance for Clinical and Translational Research (Alliance) is supported by the National Institute of General Medical Sciences (NIGMS) National Institute of Health under the award Number 2P50GM133807-06.

048

40 años del Movimiento Global de Promoción de la Salud (1986–2026): Valoración del Marco Conceptual, las Políticas y los Desafíos

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Antecedentes y Objetivos: La Promoción de la Salud (PS) constituye un paradigma complementario de la Salud Pública moderna. Su quehacer institucional se origina en el 1986 en la Organización Mundial de la Salud (OMS). La Carta de Ottawa constituye el manifiesto global que orienta el marco conceptual, las políticas y las acciones de la PS. La comunidad académica y profesional a nivel global y regional han presentado planteamientos críticos sobre la efectividad de las acciones en PS. El objetivo del trabajo es analizar la perspectiva histórica-institucional de la PS a nivel global, regional y en el contexto puertorriqueño. **Método:** La metodología utilizada ha sido la revisión documental, el análisis de la normativa y las políticas nacionales de PS y la compilación de los desafíos de la PS enunciados por académicos y personas claves del campo profesional. Las unidades de análisis son: las perspectivas conceptuales y estratégicas dominantes de la PS; la descripción de las políticas internacionales vigentes; la experiencia de las redes globales e iberoamericanas de PS y la experiencia en la formación académica-curricular de la PS a nivel continental. **Resultados:** Los resultados del análisis realizado reflejan la alta valoración internacional a las acciones de PS en los sectores de las organizaciones internacionales vinculadas a la salud, en la academia, en las entidades gubernamentales y en las organizaciones de base comunitaria. El conjunto de desafíos para la PS es extenso con predominio de los componentes vinculados a la falta de comprensión de la naturaleza y alcance de la PS, la falta de visibilidad de la PS, la inestabilidad de las políticas y estructuras de PS y la carencia en la asignación de los recursos necesarios para la operacionalización de la PS. **Conclusiones:** Se insiste en la necesidad de que las instituciones de educación superior en general y las universidades impulsen políticas y acciones de PS como parte de su responsabilidad social universitaria.

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Los Ochenta Años de la Promoción de la Salud Escolar en Puerto Rico (1945–2025) y su Contribución Histórico-Institucional a la Salud Pública

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Antecedentes y Objetivos: La Promoción de la Salud Escolar ha sido parte esencial de las acciones políticas y programáticas de la Salud Pública. La salud escolar comprende un conjunto de políticas, actividades y servicios que buscan promover el bienestar físico, mental y social de los estudiantes, previniendo enfermedades y fomentando hábitos de vida saludables dentro del entorno educativo. Sus objetivos principales incluyen crear un ambiente escolar seguro y de apoyo, ofrecer educación en salud y garantizar el acceso a servicios médicos básicos y preventivos, todo esto en colaboración con padres, educadores y la comunidad. Las iniciativas institucionales de salud escolar en el Departamento de Educación en Puerto Rico se oficializan en el 1945 con la creación del Programa de Salud Escolar. El objetivo de este trabajo es analizar los eventos históricos de trascendencia en el desarrollo de la salud escolar en Puerto Rico y su contribución social y educativa al campo de la Salud Pública. Se presentan los desafíos de la Promoción de la Salud Escolar al presente basados en las tendencias globales del ámbito de la salud escolar. **Método:** La metodología utilizada comprende la revisión documental de naturaleza histórica y conceptual de la salud escolar y la revisión de las instancias normativas y las políticas institucionales de la salud escolar en Puerto Rico. **Resultados:** Los resultados del estudio reflejan una significativa contribución social y educativa de las acciones programáticas impulsadas por el Programa de Salud Escolar. **Conclusiones:** Las conclusiones del estudio destacan la necesidad de fortalecer las políticas de Promoción de la Salud Escolar en Puerto Rico. Se reitera la valorización de la OMS cuando afirma que las escuelas ofrecen una oportunidad única para implementar servicios de educación en salud eficaces a gran escala para niños y adolescentes en edad escolar (5-19 años). Las acciones educativas deben abordar los determinantes sociales de la salud y los diversos problemas de salud prevenibles.

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Re-Pensando las Humanidades Médicas en Puerto Rico: Hacia un Saber Situado y una Alfabetización Crítica en Salud

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Antecedentes y Objetivos: Las humanidades médicas aluden a un campo de estudio interdisciplinario de reciente cuño que aúna las humanidades, las ciencias sociales y las ciencias de la salud. Pueden pensarse como una reacción a la sobre-especialización, que desde finales del siglo XIX se verifica en las instituciones educativas, en menoscabo de un entendimiento bio-psico-social del ser humano. Los acercamientos dominantes subrayan; por un lado, la humanización de la relación médico-paciente y; por otro, la crónica de adelantos tecnocientíficos. Aunque válidos, ambos acercamientos resultan limitantes. Proponemos una definición del campo que tome en

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cuenta: 1) la multiplicidad de variables y actores que inciden en la salud pública y 2) problematice la historicidad de los saberes médicos considerando factores políticos, culturales y socioeconómicos. **Método:** Para establecer una definición operativa y conceptual más amplia del campo, sopesamos propuestas curriculares gestadas dentro y fuera de Puerto Rico, examinamos el estado de la disciplina en la isla a partir de publicaciones académicas y recursos disponibles e identificamos vacíos en la literatura y posibles líneas de investigación. **Resultados:** Del corpus textual analizado se desprende una noción de las humanidades médicas que excede los enfoques dominantes abordando la representación de las enfermedades y su tratamiento, el desarrollo de tecnologías médicas y su publicitación, así como el estudio del discurso médico-científico y su vínculo con el colonialismo y la modernización. Esta perspectiva multifocal integra la experiencia local ampliando el potencial de las humanidades médicas para contribuir a la formación de una ciudadanía crítica y sensible. **Conclusión:** La historicidad de las prácticas médicas y el entendimiento mismo del binomio salud-enfermedad destacan las posibilidades de este novedoso campo de indagación, permitiéndonos una mayor comprensión de las variables que entretejen nuestra existencia, dotándonos de un saber situado y práctico para enfrentar los retos sociales y salubristas del siglo XXI.

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Rethinking Public Health Curriculums for Freedom and Health: A Decolonial Discussion from an Afro-Caribbean Archipelago

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Background and Objectives: Puerto Rico's Public Health education has been shaped by over 500 years of coloniality. Based on ideologies of racial, class, and gender supremacy, the production of knowledge about the health of the archipelago has been biased to perpetuating health inequities for racialized populations. To repair injustices and health inequities students must have diverse and inclusive learning environments and thought anti-oppressive paradigms. This study aimed to evaluate the learning environment at the University of Puerto Rico's Medical Sciences Campus (MSC) Graduate School of Public Health (GSPH) and the academic offerings of its General Master's in Public Health (MPH). **Method:** An ethnographic analysis framed through the Social Determinants of Aboriginal People's Health and the theoretical concept of the Coloniality of Knowledge reviewed academic articles, institutional websites, strategic plans, curriculum, and extracurricular offerings. A historical timeline contextualized the development of Public Health education in Puerto Rico; institutional commitments, public announcements and accountability measures were evaluated for the MSC and the GSPH; and at the MPH level, curricular elements pertaining transcultural work, transdisciplinary work, and theoretic frameworks were evaluated. **Results:** The MSC repealed Certificate #139 2022-2023, which established the Office of Diversity, Equity, and Inclusion. However, GSPH's has reaffirmed social justice and equity as core values. The MPH offers multiple elements conducive to decolonial thinking such as: interdisciplinary work, local community and international learning experiences, and theoretical grounding in Social Determinants of Health and Equity, Health Promotion, OneHealth. **Conclusion:** The MSC should reinstate their efforts towards inclusive and equitable learning environments. Although the GSPH has asserted itself as a promoter of social justice and equity, greater efforts can be made towards advancing colonial emancipation through public health teaching. The MPH should adopt explicit decolonial and antiracist paradigms and methodology to train culturally sensitive and competent professionals. **Acknowledgments:** No conflicts or funding.

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Ecofeminismo y Justicia Climática: Luchas Entrelazadas

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Antecedentes y Objetivos: Puerto Rico enfrenta una crisis climática sin precedentes: sequía de 2015, huracán María (2017) con 4,645 muertes, y terremotos de 2019-2020. El Departamento de Educación carece de un currículo que integre la justicia climática con la perspectiva de género. Los Estudios Sociales son ideales para abordar el cambio climático como un asunto político y social, analizando sistemas de poder y desigualdades estructurales. **Objetivos:** 1) Desarrollar una unidad curricular que integre la teoría ecofeminista y el reconstruccionismo pedagógico, 2) Diseñar actividades que faciliten la comprensión de los desastres naturales como construcciones sociales y 3) Promover el pensamiento crítico sobre la justicia climática centrado en el cuidado. **Método:** Se diseñó una unidad de cinco lecciones (50 minutos) para nivel intermedio (sexto a octavo grado), fundamentada en la teoría ecofeminista (Françoise d'Eaubonne, Carolyn Merchant, María Mies, Vandana Shiva, Yayo Herrero) y el reconstruccionismo pedagógico. Incluye lecturas socializadas, análisis de videos sobre la desigualdad de género, discusiones críticas, trabajo colaborativo, collages que representan roles de cuidado durante el huracán María y reflexiones escritas. Se desarrollaron rúbricas y hojas de cotejo para el avalúo. **Resultados:** La unidad produjo cinco planes detallados con objetivos específicos, actividades secuenciadas, materiales originales (lectura "El Huracán que Danzó con la Isla"), preguntas de discusión y herramientas de avalúo. El diseño integra exitosamente conceptos complejos mediante pedagogías accesibles y contextualizadas a la realidad puertorriqueña. **Conclusiones:** Este proyecto responde a la urgencia de integrar la justicia climática con una perspectiva de género en los Estudios Sociales, ofreciendo herramientas pedagógicas concretas y replicables para abordar las intersecciones entre la crisis climática y las desigualdades sociales, y formando generaciones capaces de análisis crítico y transformación social. **Reconocimientos:** Trabajo desarrollado bajo la mentoría de la Dra. Melanie Mercado Méndez y la Dra. Loida M. Martínez Ramos, Universidad de Puerto Rico, Recinto de Río Piedras.

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El trabajo no Remunerado de Cuidados: Consideraciones para las Políticas Sociales en Puerto Rico desde la Determinación Social y los Feminismos

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Antecedentes y Objetivos: El trabajo no remunerado de cuidados es fundamental para el bienestar social, pero permanece invisibilizado, generando inequidades en salud especialmente para las mujeres. Este estudio exploró cómo se manifiesta este fenómeno en Puerto Rico, analizando políticas existentes y perspectivas comunitarias, con el objetivo de generar recomendaciones para las políticas sociales desde la determinación social de la salud y las teorías feministas. **Metodología:** Se utilizó metodología cualitativa con diseño de estudio de casos, analizando comparativamente políticas de Uruguay y Costa Rica, revisando 68 legislaciones puertorriqueñas (2017-2024),

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y entrevistando cuatro lideresas comunitarias y cinco formuladores de política pública en Puerto Rico. Estudio aprobado por el IRB-RCM: 2410298025 (09/18/2024). **Resultados:** Los hallazgos revelan que el trabajo de cuidados recae inequitativamente en mujeres y personas feminizadas, sustentado en estructuras patriarcales, capitalistas neoliberales y coloniales. Las implicaciones incluyen limitaciones en desarrollo profesional, obstáculos para autocuidado y repercusiones en salud física y mental. Se identificó una crisis de cuidados agravada por el envejecimiento poblacional y los desastres socio-naturales. Del análisis legislativo, solo 2.94% de medidas abordaban el tema, ninguna aprobada. La Ley 82-2023 muestra limitaciones significativas: carece de perspectiva de género transversal y financiamiento garantizado. En contraste, Uruguay y Costa Rica implementaron sistemas integrales de cuidados con enfoque de derechos y género. **Conclusiones:** El trabajo no remunerado de cuidados constituye un determinante social de la salud que requiere atención mediante políticas integrales. Se recomienda desarrollar un Sistema Nacional Integrado de Cuidados que garantice visibilización, redistribución y retribución; establecer el cuidado como derecho humano con perspectiva de género; crear estructuras de gobernanza participativa; asegurar financiamiento sostenible; y profesionalizar el trabajo de cuidados. **Reconocimientos:** El comité de esta disertación estuvo compuesto por el Dr. Hiram Arroyo Acevedo, el Dr. Juan Negrón Ayala y la Dra. Jenice Vázquez Pagán.

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Health and Well-Being of Sexual and Gender Minorities in Puerto Rico

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Background and Objectives: Sexual and gender minorities (SGM) experience health disparities and inequities when compared to heterosexual populations. SGM in Puerto Rico (PR) face significant health disparities, mainly stemming from experiences of discrimination, stigma, and systemic inequities. The goal of this analysis was to identify the main issues affecting the health and well-being of LGBTQ+ individuals in PR. **Method:** We conducted an online and in-person survey at Pride events in PR in June 2025. Self-identified LGBTQI+, 21yrs+ participants were invited to voluntarily complete a brief survey (online or in-person Pride events) including questions about key issues affecting the well-being of the LGBTQI+ population, experiences of discrimination, and other health-related matters. Descriptive statistics were used to analyze the data in SPSS. **Results:** A total of 205 participants provided oral consent and completed the data collection instrument. Most participants were men (56.1%), had an average age of 40 years, identified as gay (51.2%), held at least a bachelor's degree (79%), were employed (55%), and had an annual income below \$40,000 (76.5%). Experiences of discrimination were commonly reported in places of worship (35%), online environments (34%), and within their families (27.7%). Additionally, 22.4% have experienced discrimination in healthcare settings. A total of 26.3% reported their overall health status as "regular." Among a list of issues related to the well-being of SGM in PR, most participants prioritized protecting LGBTQ rights (58%), protecting against conversion therapy (30.7%), and ensuring access to healthcare (30.2%). **Conclusion:** Discrimination is a significant barrier for SGM in PR, impacting their ability to access healthcare and influencing their perceived health priorities. This leads to healthcare avoidance and distrust of health professionals due to anticipated or past stigmatization and discrimination. Their concerns reflect the current social and political actions challenging the well-being of minoritized populations. Approved by IRB #: 2504390245, May 8, 2025.

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Información, Consentimiento y Salud Sexual en Mujeres Histerectomizadas en Puerto Rico: Implicaciones Éticas y Clínicas

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Antecedentes y Objetivos: En Puerto Rico se estima que más de 465,000 mujeres se han sometido o se someterán a una histerectomía, una cirugía común pero frecuentemente acompañada de orientación limitada. Dos investigaciones consecutivas revelaron deficiencias significativas en la información médica provista antes y después del procedimiento, especialmente en aspectos relacionados con la recuperación física, los cambios en la sexualidad y el bienestar emocional. Estas brechas informativas generan dudas éticas sobre la calidad del consentimiento informado y sobre el acceso equitativo a información esencial para la toma de decisiones. Este proyecto tuvo como objetivos: (1) evaluar el nivel y la calidad de la información recibida por las pacientes, (2) documentar sus experiencias emocionales, sexuales y de calidad de vida luego de la histerectomía, y (3) analizar las implicaciones éticas que surgen cuando la orientación es insuficiente o poco accesible. **Método:** Se desarrollaron dos cuestionarios aprobados por IRB y distribuidos mediante redes sociales, Cartero Ponce y la plataforma histerectomiapr.com. Participaron 301 mujeres en la primera investigación (2021–2022) y 388 en la segunda (2023–2025), para un total de 689 participantes. Se recopilaron datos cuantitativos y cualitativos sobre tipo de histerectomía, orientación médica recibida, recuperación física, efectos en la sexualidad y apoyo social. Los hallazgos se complementaron con una revisión de literatura médica, ética y anecdótica para contextualizar los resultados. **Resultados:** En la primera investigación, se identificó una falta considerable de información provista a las pacientes. El 67% expresó necesitar más orientación, y más del 35% buscó información adicional. También se reportaron brechas relacionadas con movilidad, recuperación y expectativas posoperatorias. En la segunda investigación, estas deficiencias se profundizaron en el ámbito sexual. Más del 60% no recibió información sobre posibles efectos sexuales o emocionales. Los hallazgos cualitativos reflejaron disminución del deseo, sequedad, dolor, ansiedad y afectación en relaciones de pareja. La satisfacción con la orientación médica promedió 4.4/10. **Conclusión:** Las dos investigaciones evidencian una brecha crítica en educación pre y posoperatoria. Es necesario fortalecer el consentimiento informado y crear recursos de apoyo accesibles. **Agradecimientos:** Agradezco la colaboración del Centro de Investigación para el Desarrollo Social (CIDEs), de la Dra. Carmen I. Soto, del personal técnico y de todas las participantes que contribuyeron a ambas investigaciones. Aprobado por el IRB. Números de protocolo: 2021110004 (aprobado el 2 de diciembre de 2021) y 2024060007 (aprobado el 26 de junio de 2024).

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Physical Activity Impact on Cognition in PWH Varies with Sex

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Background and Objectives: Physical activity has been associated with improved physical health including mental health and cognition. Too little moderate to vigorous physical activity (MVPA) and excessive sedentary time (ST) represent the worst scenario for health and well-being. The recommended steps/day for adults is 8,000-10,000 steps/day while being able to walk fast (>100 steps/min) is considered moderate to vigorous activity. **Method:** A cohort of 57 participants living with HIV (PWH) was evaluated for HIV-associated neurocognitive disorders (HAND) and physical activity using an accelerometer. Measures of activity kilo calories (kcal), average MVPA, sedentary time, and steps per day were calculated. Neuropsychology was performed and HAND was determined using HAND nosology. **Results:** There were no significant differences between men and women regarding age, viral immune profile, smoking, or hepatitis C infection. BMI was significantly higher in women than men. HAND was associated with decreased activity kcal in men ($p=.007$) while in women was associated with decreased average activity kcal ($p=.005$). Sex differences were observed since women presented better cognitive performance in the executive function and sensory perception domains associated with increased average MVPA ($p=.048$ and $.037$ respectively) and associated with steps per day ($p=.016$ and $.015$ respectively); observations not seen in men. **Conclusion:** Findings support the beneficial effect of physical activity on cognition in PWH, especially in women. **Acknowledgements:** This research was supported in part by grants from the National Institutes of Health: U54MD007600, R21NS131061, R01NS099036, U54GM133807, K00NS11345, K22NS118975. Approved by IRB: Protocol # 2290030275. Approval Date: June 10, 2025.

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Tamoxifen Modulates the Gut Microbiome by Promoting Bifidobacterium after Spinal Cord Injury

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Background & Objectives: Tamoxifen, a selective estrogen receptor modulator (SERM), has demonstrated neuroprotective effects after spinal cord injury (SCI) in preclinical models. These effects are attributed to its anti-inflammatory and antioxidant properties, yet the underlying mechanisms remain unclear. Emerging evidence indicates that the gut-brain axis influences inflammation and recovery after SCI, with gut microbiome composition shaping immune responses and central nervous system outcomes. We hypothesized that tamoxifen enhances locomotor recovery by modulating the gut microbiome toward an anti-inflammatory profile, thereby attenuating neuroinflammation and supporting tissue repair. **Methods:** Adult male and female Sprague-Dawley rats received a moderate contusion injury at T10 using a standardized impactor. Animals were randomized to tamoxifen or vehicle control. Fecal samples were collected at baseline (day 0) and at days 7, 14, 21, and 28 post-injury. Microbial DNA underwent 16S rRNA sequencing. Bioinformatics analyses assessed alpha and beta diversity, identified differentially abundant taxa, and characterized temporal shifts in microbial communities. Comparisons were performed across treatment, time, and sex groups to evaluate tamoxifen's specific impact on gut microbial

dynamics after SCI. **Results:** Tamoxifen treatment induced notable shifts in microbiome composition beginning at day 14 post-injury. Treated rats displayed increased abundance of bacterial genera associated with anti-inflammatory signaling, including Bifidobacterium, compared to controls. These microbial changes coincided with the subacute phase of SCI, a critical window for neuroinflammatory responses and secondary tissue damage. The altered microbial profile persisted through days 21 and 28, indicating sustained modulation. Both sexes showed similar trends, though timing and magnitude of changes varied, suggesting sex-dependent responses. These microbial alterations paralleled behavioral improvements in locomotor recovery among tamoxifen-treated animals, reinforcing the link between microbiome modulation and functional outcomes. **Conclusion:** This study provides new evidence that tamoxifen beneficially modulates the gut microbiome following SCI. By increasing anti-inflammatory bacterial genera and promoting a homeostatic gut environment, tamoxifen may reduce systemic and central inflammation during the subacute phase. These effects likely contribute to improved locomotor recovery and highlight tamoxifen's potential as a dual-acting therapeutic agent with neuroprotective and microbiome-targeting properties. Our findings emphasize the importance of considering microbiome dynamics in SCI research and suggest the gut-brain axis as a promising target for adjunctive therapies. **Acknowledgments:** This study was supported by SC1GM144032 from the National Institute of General Medical Sciences of the National Institutes of Health (NIGMS-NIH), the PR-INBRE P20 GM103475 and the COBRE Puerto Rico Center for Microbiome Sciences 1P20GM156713-01 with partial support from the Center for Collaborative Research in Minority Health and Health Disparities (Grant number 2U54MD007600), COBRE (P30-GM149367), and the Puerto Rico Science & Technology Trust (2022-00125).

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Transferrin-Decorated Protein Nanosized-DDS for Codelivery of Synthetic Phospholipids in NSCLC

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Background & Objectives: Non-small cell lung carcinoma (NSCLC) remains a leading cause of cancer-related deaths worldwide and it accounts for 85% of lung cancers. Despite the use of chemotherapy for KRAS-driver NSCLC and tyrosine kinase inhibitors for EGFR-driver NSCLC, most patients relapse due to systemic toxicity, acquired resistance, and metastasis. We hypothesized that a dual bullet drug-protein delivery system (DDS) could improve therapeutic efficacy by enabling targeted co-delivery of pro-apoptotic proteins and a lysophospholipid, while minimizing toxicity to healthy tissues. We developed the DDS by crosslinking cytochrome c (Cyt c), with serum albumin (SA) as a carrier, incorporating the synthetic alkyl-lysophospholipids perifosine (Pf), and decorating the surface with transferrin (Tf) for targeting transferrin receptors overexpressed in NSCLC cells. **Methods:** The nanoparticles were prepared using homogenization at low shear. Encapsulation efficiency, protein and drug concentrations were measured via spectrophotometric assays, while particle size/distribution was measured by Dynamic Light

Scattering (DLS). Cytotoxicity tests were performed in KRAS-mutant A549 and EGFR-mutant H1975 NSCLC cells using MTS viability assays after 24 h exposure. **Results:** Nanoparticles were formed with an average diameter of ~5 nm and a polydispersity index (PDI) of ~0.04, which suggests a uniform distribution. Encapsulation efficiency of the cytochrome c yielded ~80%. DDS formulations reduced viability by ~20% in A549 cells and by ~60% in H1975 cells, supporting their cytotoxic potential when delivered via the protein-based nanocarrier. **Conclusions:** These findings suggest that lysophospholipids can be successfully incorporated into protein nanoparticles and retain anticancer activity. Our results demonstrate that lysophospholipid-loaded protein nanoparticles are a promising therapeutic approach for NSCLC, with potential applications as monotherapy or in combination regimens. Ongoing studies will optimize nanoparticle homogeneity, assess drug release kinetics, and evaluate in vivo efficacy. **Acknowledgements:** This project was supported by San Juan Bautista School of Medicine, PR-INBRE (NIGMS Award Number P20 GM103475-19), and CAPAC (NCI Award R25CA240120). The content is solely the responsibility of the authors and does not necessarily represent the official views of the sponsoring agencies.

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Optimization Protocol for Obtaining Organic Extracts from Tropical Marine Macroalgae with Potential Anxiolytic Effects

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Background and objectives: Marine macroalgae represent a promising source of natural compounds with neuropharmacological potential. This study focuses on optimizing extraction and preparation protocols for bioactive compounds with anxiolytic effects derived from *Stypopodium zonale*, a brown macroalga collected from coastal waters of Puerto Rico. The main objectives included the comparison of extraction methods, the evaluation of solvent systems with varying polarities, and the development of a preparation protocol for administration in *Drosophila melanogaster*. **Methods:** Three extraction techniques were compared: passive extraction, Soxhlet extraction, and ultrasonic bath. **Results:** The ultrasonic bath method demonstrated the highest recovery yield and operational efficiency. Various solvent systems were evaluated, with the dichloromethane:methanol (2:1) mixture proving most effective for obtaining the crude extract. The preparation protocol optimized the dissolution of the crude extract in 95% ethanol, establishing an ideal concentration of 1 µg/µL to ensure safe and low-toxicity administration in *D. melanogaster*. **Conclusions:** Previous behavioral assays in *D. melanogaster* showed a reduction in anxiety-related behaviors following exposure to the extract, suggesting the presence of potential anxiolytic agents. Complementary analyses were initiated, including flash chromatography and H-NMR spectroscopy, for chemical characterization of the obtained fractions. This work consolidates various future methodologies to isolate and identify the compounds responsible for the observed effects, thereby contributing to the potential development of a macroalgae metabolite database in Puerto Rico and the exploration of marine-derived therapeutic agents. **Acknowledgements:** We thank the PR-INBRE program, UPR Cayey Biology and Chemistry Departments, UPR Cayey General Sciences Program, and the Puerto Rico Science, Technology and Research Trust for supporting the project.

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Surface Functionalized ZnSe Quantum Dots Enable Selective and Broad-Spectrum Detection of Heavy Metals in Water

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Background and Objectives: Heavy metal contamination in water poses a critical public health risk, especially in underserved communities lacking access to advanced analytical technologies. Semiconductor quantum dots (QDs) offer tunable fluorescence, high sensitivity, and low toxicity, making them promising tools for environmental nanosensing. This study sought to synthesize zinc selenide (ZnSe) QDs capped with thioglycolic acid (TGA) or polyethyleneimine (PEI) and evaluate how surface chemistry influences their optical properties and ion-detection performance. We hypothesized that capping agents would modulate nanoparticle size, emission behavior, and selectivity toward inorganic contaminants. **Methods:** ZnSe nanoparticles were synthesized through a reflux-assisted reaction at 100 °C for 10 minutes, followed by purification via centrifugation (5000 rpm, 15 min) and solvent washing. Characterization included ultraviolet-visible (UV-Vis) spectroscopy to estimate particle size, photoluminescence (PL) spectroscopy to evaluate emission properties, and Fourier-transform infrared (FTIR) spectroscopy to confirm surface passivation. Ion-sensing assays were conducted using increasing concentrations of Pb²⁺, Cu²⁺, Co²⁺, Sn²⁺, and Ni²⁺. **Results:** UV-Vis spectra revealed an absorbance peak at 323 nm for TGA-ZnSe, consistent with smaller nanoparticles, while PEI-ZnSe showed a red-shifted peak at 362 nm, indicative of larger aggregates. PL analysis demonstrated strong emission at 441 nm for TGA-ZnSe and 467 nm for PEI-ZnSe. FTIR confirmed successful capping through characteristic CH, NH, and OH vibrational modes. Ion-detection assays showed that TGA-ZnSe selectively responded to Pb²⁺, whereas PEI-ZnSe demonstrated broad responsiveness to Pb²⁺, Cu²⁺, Co²⁺, Sn²⁺, and Ni²⁺ with concentration-dependent quenching behavior. **Conclusion:** Surface functionalization significantly influences ZnSe QD optical behavior and sensing selectivity. TGA-ZnSe exhibited high specificity for Pb²⁺, while PEI-ZnSe enabled broad-spectrum metal detection, supporting their potential as affordable nanosensors for water monitoring. **Acknowledgments:** This research was supported by PR-LSAMP (Award HRD-2008186) and PR-INBRE (Award P20GM103475, Science and Technology Competency Education (STCE) Core), under which the author serves as a Junior Research Associate (JRA) for the 2025-2026 cycle. Additional support was provided by the Laboratory of Investigation in Nanotechnology and Characterization (LINC), the Department of Chemistry and Physics at the University of Puerto Rico in Ponce, and mentor Dr. Sonia J. Bailón Ruiz.

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Protein and Glucose Image-Based Sensor to Increase Science Accessibility and Health Monitoring

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Background & Objectives: Diabetes and renal disease affect more than 10% of Puerto Ricans, which calls for tools that can easily monitor biomarkers in non-invasive samples, such as human urine. Chemical quantification of diabetes and renal disease biomarkers, such as glucose and protein, respectively, often requires expensive equipment that hinders accessibility to patients. New sensor technologies should implement selective and inexpensive materials

while requiring minimal equipment for the patient user. This study shows the development of a mobile phone-based colorimetric sensor for glucose and protein, a practical tool for detecting and monitoring diabetes and kidney disease through urine samples. **Method:** Calibration curves for glucose and protein quantification were constructed using glucose and Bovine Serum Albumin (BSA) standard solutions ranging from [0.2 to 1.0] mg/mL. Benedict or Bradford reagents were used to react with glucose and protein standard solutions, respectively. Evaluated reactions for calibration curve construction occurred in reaction wells in 96-well plates or in proprietary 3D printed devices. Colorimetric changes were evaluated via ImageJ processing of reaction well images taken by a smartphone for eventual quantification of reaction well pixel Mean Gray Values (MGVs). **Results:** The glucose and BSA calibration curves demonstrated strong correlations ($R^2 > 0.95$) between MGVs and biomarker concentration. **Conclusion:** These results indicate that the method is robust and that the sensor paired with mobile phone imaging delivers reproducible data. Further validation follows using machine learning in Pirouette software through PLS modeling to assess method accuracy. Overall, this sensor enables frequent health monitoring of patients via urinalysis while serving as a biochemistry and biosensor learning platform for young students interested in biomedical sciences due to its accessibility.

062

Regulation of Sex-specific Stress Vulnerability: Elucidating the Role of Estrogen and Chromatin

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Background and Objectives: Stress-related disorders, including PTSD and depression, are more prevalent in women, suggesting that sex and hormonal state influence brain stress responses. In rodents, circulating estrogen levels fluctuate across the estrous cycle, with high estrogen during proestrus and low estrogen during estrus. Interestingly, hippocampal estrogen levels, a key brain region for stress and memory, do not always mirror circulating patterns; males exhibit higher hippocampal estrogen than proestrous females, indicating local regulation of hormone signaling. Estrogen can shape hippocampal function through estrogen receptors and chromatin remodeling, yet how these mechanisms contribute to sex- and cycle-dependent stress susceptibility remains unclear. Here, we hypothesized that hippocampal estrogen could mediate differences in gene expression and chromatin organization. Further, we aimed to test the role of targeted histone acetylation in stress response. **Method:** We performed epi/genomic analyses (Cut&Run-seq and RNA-seq) in the hippocampus of naive estrous, proestrous and male mice to identify genomic distribution of permissive, repressive or bivalent chromatin states. We also employed CRISPR-dCas9 tools in vivo to elucidate the causal role of targeted histone acetylation in mouse brain. **Results:** We revealed that females in estrous exhibit a higher abundance of repressive and bivalent chromatin states compared to males and proestrous females at baseline, accompanied by pronounced differences in gene expression. CRISPR-based chromatin editing showed that gene-specific manipulations can alter stress susceptibility supporting a causal role for chromatin regulation in stress response. **Conclusion:** These findings reveal molecular pathways underlying sex differences in mood disorders and point to hippocampal estrogen and chromatin regulation in stress vulnerability. **Acknowledgments:** This work was supported by the National Institutes of Health: R01 MH 132680 to TZB, P50 MH096889 to TZB, R01 MH126027 to EAH, T32 MH119049-02 to REH, T32 DA050558-03 to REH, the National Science Foundation: NSF GRFP DGE1845298 to KRA.

063

Crosstalk Between Brain and Heart: Astrocyte Derived Extracellular Vesicles Effects on AC16 Cardiomyocytes

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Background: Extracellular vesicles (EV) mediate intercellular communication by carrying proteins, lipids, and nucleic acids. Recent research highlights their potential role in modulating neuro/cardiac physiology and pathology. Previously, we reported increased levels of astrocyte-derived EVs (ADEs) in plasma of women with HIV (WWH). Moreover, levels of astrocytic activation marker GFAP positively correlated with reactive oxygen species (ROS) in ADEs from WWH presenting cognitive impairment (CI). **Objective:** To investigate whether plasma ADEs from people with HIV (PWH) induce oxidative stress and cell loss in human AC16 cardiomyocytes and determine if ADEs concentration influences the extent of oxidative stress and cell loss. **Methods:** Total exosomes were isolated from plasma of PWH by ultracentrifugation. ADEs were subsequently purified from total exosomes via immunoprecipitation using GLAST-1-positive EVs. Human AC16 cardiomyocytes were cultured and treated with varying concentrations of plasma-derived ADEs (10, 20, and 30 µg) for 24 hours. Oxidative stress and cell loss were assessed by immunocytochemistry and immunofluorescence microscopy through measurement of inducible nitric oxide synthase (iNOS) expression and quantification of DAPI-positive nuclei, respectively. All iNOS fluorescence intensity values were normalized to nuclear counts (sum intensity per nucleus). **Results:** Cardiomyocytes exposed to ADEs showed a clear dose-dependent increase in both iNOS expression and cell loss compared to unexposed cardiomyocytes. **Conclusions:** These results indicate that ADEs from PWH induce cardiomyocyte oxidative stress and cell loss. Further molecular profiling of ADEs cargo is needed to define the mechanisms involved and evaluate their physiological relevance. These findings support previous research studies postulating a potential brain-heart communication axis mediated by EVs. IRB protocol #: 2290030382.

064

Viralizando la Salud Pública: Educando para Comunicar en Tiempos de Infodemia

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Antecedentes y Objetivos: El término infodemia se ha acuñado para definir el bombardeo excesivo de información de salud; en muchos casos incorrecta por omisión o intención, generando desinformación. La infodemia puede tener un efecto en la toma de decisiones de salud, porque complica la identificación de información correcta. Educar sobre herramientas para hacerle frente a la desinformación es fundamental en el proceso de formación de profesionales de la salud pública. El objetivo de este trabajo es presentar el diseño y los productos de un curso electivo sobre infodemia ofrecido a estudiantes graduados en salud pública. **Método:** Como parte de los cursos electivos del Programa de Maestría en Educación en Salud Pública de la Escuela Graduada de Salud

Pública (EGSP) se creó el curso Información y Desinformación en salud pública: combatiendo la infodemia. Se ofreció durante la sesión de verano del año académico 2024-2025. Tuvo una matrícula de 9 estudiantes de tres programas académicos de la EGSP. Se organizó en 12 sesiones sincrónicas y asincrónicas para el estudio de contenido y la aplicación a través de ejercicios. **Resultados:** Los estudiantes participaron de foros de discusión, debates, presentaciones y estudios de caso sobre comunicación en tiempos de información y desinformación. Como resultado final del curso se desarrollaron planes de acción para combatir la infodemia mediante estrategias de política pública, comunicación en salud y movilización comunitaria. **Conclusión:** Como escuela acreditada por el Council on Education for Public Health (CEPH), las competencias fundamentales para egresados en salud pública incluyen destrezas para comunicar en salud, principalmente a través del diseño de mensajes y la diseminación de información de salud, cónsona con los niveles de literacia y el contexto de la audiencia. Ante un panorama de infodemia recurrente es indispensable preparar profesionales capaces de abordar los asuntos de comunicación en salud desde un enfoque certero que contribuya a la toma de decisiones informadas.

065

Experiencias de la Transformación Digital en el Programa de Maestría en Educación en Salud Pública en la Escuela Graduada de Salud Pública

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Antecedentes y objetivo: La transformación digital se refiere al proceso mediante el cual las organizaciones adoptan nuevas tecnologías digitales para mejorar sus operaciones y procesos. La transformación digital en la educación superior implica la aplicación estratégica de las tecnologías digitales para mejorar aspectos de la experiencia educativa y administrativa en las instituciones académicas. El objetivo es compartir las experiencias de la implementación de la transformación digital del Programa de Maestría del Educación en Salud Pública.

Metodología: Al inicio del trimestre se creó un foro en la plataforma Blackboard Ultra en dónde los estudiantes del programa respondieron a las siguientes preguntas: ¿Cómo se sienten sobre participar en una maestría de modalidad híbrida? y, ¿Cuáles son sus expectativas al participar en una maestría de modalidad híbrida? Al completar el trimestre se les solicitó nuevamente a los estudiantes respuesta a las preguntas. **Resultados:** Entre los resultados se resaltan el agrado de los participantes por la flexibilidad de la modalidad, el ahorro de tiempo y dinero en la movilización a la institución, la reducción en la búsqueda de estacionamiento en el recinto y, el acceso a los recursos digitales. Por otro lado, se reconocen los retos de organizar el tiempo, la conectividad y, la necesidad de interacción presencial. Asimismo, resaltaron la intensidad de algunas tareas a distancia. **Conclusiones:** La transformación digital no es un destino, sino un camino continuo de aprendizaje, cuestionamiento, reflexión y evolución. El éxito de la implementación en la maestría depende de la capacidad del programa de mantener una visión centrada en el estudiante, balanceada, flexible, abierta al cambio y comprometida con una educación de calidad, pertinente y con sentido humano.

066

Building AI Literacy for Biomedical Research: Training and Open Resources from Center for Research Education, Scientific Communication-Counseling Opportunities (CRESCO), Title V - UPR Medical Sciences Campus

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Background and Objectives: The emergence of artificial intelligence (AI) in health sciences research has led to the accelerated adoption of innovative technologies, facilitating access to and management of scientific literature. Librarians play a crucial role in enhancing research competencies by promoting information literacy. The Association of College and Research Libraries (ACRL) outlined AI competencies for academic libraries in five areas: technical knowledge, ethical awareness, critical thinking, practical skills, and social impact. The objective of this project was to create a comprehensive and critical guideline based on these principles to train the community of the Medical Sciences Campus (RCM) of the University of Puerto Rico in the use of AI platforms in research. **Method:** The CRESCO team designed and delivered an eight-workshop training cycle, comprising both in-person and virtual sessions, targeting students and faculty at the RCM, with a focus on utilizing Consensus and Scite, two AI-powered research platforms. After completion, the team provided access to both platforms and conducted a survey to assess perceptions and needs regarding the integration of AI in scientific literature reviews. **Results:** We surveyed 91 participants and received 36 responses. Before the workshops, 75% had no prior knowledge of AI tools for research. After training, participants reported a 91.67% improvement in the quality of their literature reviews and expressed a strong interest in pursuing further training. Based on these findings, CRESCO developed an open educational resource on AI competencies in health research for the entire RCM community. **Conclusion:** This multifaceted project, which integrates synchronous instruction, the creation of open learning objects, and data collection and analysis, highlights the value of libraries in leading the ethical and practical adoption of AI in research, strengthening capabilities, and generating scalable educational resources for the RCM academic community and biomedical research in Puerto Rico. **Acknowledgments:** Supported by the US Department of Education: Title V Grant Award # PO31S240244.

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Strengthening Research Capacity in Infection-Related Cancers: Initial Results from the REPMIC Program

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Background: Infection-associated cancers, including those linked to the gut microbiome, represent a significant public health concern in Puerto Rico (PR). Addressing this burden requires a diverse workforce capable of advancing research and improving health outcomes. However, despite this disease burden in PR, structured research training opportunities on these topics, across multiple education levels, are limited. The Research Education Program on Microbes, Infections, and Cancer (REPMIC) aims to address this gap by preparing post-baccalaureate individuals for graduate studies and research careers centered in this field. This abstract describes the program structure and early outcomes from the first cohort. **Methods:** REPMIC is a nine-month research training program that enrolls ten post-baccalaureate individuals from Puerto Rico each year (2024-2029). Trainees engage in mentored, hands-on research in basic, clinical, or population sciences and participate in a comprehensive educational curriculum. Program evaluation includes multiple surveys including baseline and exit surveys among others to assess gains in scientific knowledge, research skills, and academic confidence. **Results:** Across its first two cohorts (2024-2025 and 2025-2026), REPMIC received 47 and 85 applications, respectively. For the current cohort, 60% are women, the average age is 22.2 ± 0.63 years, and 50% hold bachelor's degrees in Biology. Research placements were 70% clinical/translational and 30% population based. Baseline data show that 90% of participants intend to pursue a health professional degree, while 40% plan to apply to a graduate or doctoral degree. The first cohort demonstrated strong productivity, submitting 21 scientific abstracts, participated in 25 conferences, and achieved graduate school admissions, MCAT completion, and employment in cancer research. **Discussion:** REPMIC is the first post-baccalaureate training initiative in Puerto Rico dedicated to research on the intersection of microbes, infections, and cancer. Through individualized mentorship, structured skill development, and systematic evaluations, the program strengthens trainees' preparation and readiness for graduate education and research career pathways. **Acknowledgments:** This project was funded by the National Institute of Allergy Infectious Diseases (NIAID) Grant #5R25AI183304-02. IRB approval: 2409000844.

068

Advancing Careers in Cancer Research through Mentorship: The Cancer Prevention and Control (CAPAC) Research Training Program

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Background and Objectives: The Cancer Prevention and Control (CAPAC) Research Training Program at the University of Puerto Rico Comprehensive Cancer Center is a summer internship program that provides hands-on research experience in Puerto Rico (PR). CAPAC's goal is to increase the number of master's-level graduates and other health professionals who pursue doctoral degrees and/or careers in cancer prevention and control research (CPCR). We describe the outcomes of the program's first five cohorts (2021-2025) and its impact on trainees. **Methods:** CAPAC selects 25 trainees annually who are paired with a mentor based on their research interests. Trainees engage in CPCR projects and participate in educational and career development activities for 10 or 15 weeks. All trainees complete baseline, exit and follow-up surveys. Descriptive statistics were used to summarize program outcomes. **Results:** A total of 123 trainees and 5 peer-to-peer mentors were recruited; 75% were female, 56% current master's students, and 21% first-generation college students. Trainees conducted research in basic

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and translational research (53%), population sciences (32%), and clinical research (15%). When asked about how the program impacted them, 87% of trainees reported that CAPAC strengthened their research skills and 82% that it enhanced their professional skills. Moreover, 77% indicated that participation in CAPAC increased their confidence in conducting research. To date, trainee outcomes include 21 peer-reviewed publications, 117 abstracts presented at scientific conferences, and 13 trainees enrolled in doctoral programs. **Conclusion:** CAPAC, the first and only summer cancer research training program in PR, successfully completed its first funding cycle (2021-2024), was renewed for a second cycle (2025-2029), and will welcome its sixth cohort in May 2026. The program has proven to enhance cancer research skills and experiences among trainees and contribute to the development of the next generation of cancer researchers. **Acknowledgements:** This project is fully supported by NCI (Grant #5R25CA240120-07) and partially supported by NIGMS (Grant #U54GM133807/2P50GM13380) for data storage in REDCap. The study was approved by the Institutional Review Board of the University of Puerto Rico Comprehensive Cancer Center (IRB Protocol #2412006108).

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Learning Together to Care Better: A Case-Based Interprofessional Education Experience in HIV Care

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Background: Interprofessional Education (IPE) is essential in healthcare to promote communication, collaboration, and teamwork among health professions students. Clinical learning environments that fail to value the contributions of all disciplines can impede students' ability to work effectively as a team. **Objectives:** The goal of this project was to help students from different health professions describe, apply, and recognize the value of interprofessional education in their future practice. Specific objectives included identifying professional roles in the management of chronic illness (HIV), understanding the importance of interprofessional communication, and learning to function collaboratively within a healthcare team. **Methods:** This annual activity has been conducted at the University of Puerto Rico Medical Sciences Campus since 2013. Data from 2020–2025 were analyzed. Each year, approximately 200

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students from four schools (Dental Medicine, Nursing, Medicine, and Pharmacy) participated. The activity occurs in two phases. In the first, first-year students (second-year for Pharmacy) discuss a clinical case of an adolescent with HIV in small groups guided by a Psychiatry resident. Later, they meet with multidisciplinary professionals to discuss the case. In the second phase, the same students analyze five HIV cases from infancy to adulthood and present them through role-playing, emphasizing comprehensive and interprofessional care. **Results:** An average of 191 students participated yearly (maximum 225 in 2023–2024). Over 90% rated the content and quality as excellent or good, and 99% found it relevant to their profession. Ninety-eight percent reported that learning from other health professions improved their professional training, and 88.5% found the experience valuable. Most reported increased knowledge and improved communication and role clarity, though some felt overwhelmed by the additional workload. **Conclusion:** IPE is a vital tool in health professions education, fostering skills for collaborative practice and improving healthcare outcomes. Early exposure enhances students' appreciation of teamwork, despite challenges related to workload.

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clinicaLea in Social Media: A Project to Advance Clinical Research Education for Hispanics in Puerto Rico and Abroad

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Background and Objectives: Hispanics (or Latinos) comprise 19% of the US population and 37% of the US population that used 1 or more prescription drugs daily in the past 30 days (2015-2016). However, only 11% of research participants are Hispanics (2020). Therefore, the objective of this project is to innovatively educate the public and potential participants on clinical research in Spanish language. The significance of this project is that it facilitates more Hispanics to participate in clinical research studies so future medicines and medical procedures' effectiveness and safety are adequately documented for this population group. **Method:** "clinicaLea" is a clinical research education page that was created on Facebook, Instagram, and YouTube since July 2025: the top social media apps for adults. Twenty-one (21) videos with clinical research educational content has been posted: 16 videos were on general clinical research topics (including barriers to participation, informed consent, etc.) and 5 videos were on the need for Hispanics' participation in clinical research studies. Video posting is still underway. **Results:** In Facebook, there have been 44,082 views and 1,811 interactions with support of an ad campaign. In YouTube, there have been 12,973 views and 4,599 impressions. In Instagram, there have been 20 views. **Conclusion:** Considering that about 86.6% of adults use social media worldwide, clinicaLea in Social Media project is an innovative approach. Furthermore, it is our understanding that clinicaLea in Facebook, Instagram, and YouTube is the 1st public and potential participant-centric and directed virtual space for clinical research education. Eventually, the audience may become potential clinical research participants who already know what clinical research study participation consists of and the required level of commitment necessary for successful participation. This will lead to a more confident and educated informed consent process, higher clinical research participant compliance, and more robust clinical research studies data.

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**Preventive Health Education for Children and Adolescents in Vulnerable Communities:
A School and Community-Based Outreach Initiative in Puerto Rico**

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Children and adolescents in vulnerable communities in Puerto Rico often experience limited access to preventive health information. This project was developed as an educational outreach initiative aimed at providing general health education through structured in-person activities conducted in public schools, alliance schools, and underserved community settings. The initiative focuses on health promotion and awareness as part of a broader approach to youth development and community engagement. Introductory content related to college readiness is also incorporated. The program consists of scheduled visits during which facilitators deliver standardized educational sessions. Topics are presented sequentially, beginning with personal hygiene as a foundation for health maintenance, followed by sleep hygiene, healthy eating, prevention of arboviral diseases, emergency preparedness, and prevention of sexually transmitted infections. Educational activities use age-appropriate language, participatory exercises, and practical examples. Topic selection is guided by program objectives and general community priorities. Planned future sessions include emotional regulation, substance use prevention, and guidance for transitioning to higher education. This initiative is implemented as a service-learning and community education effort. No individual-level data are collected, analyzed, or reported, and no assessment of participant outcomes is conducted. Activities are limited to the delivery of educational content and the distribution of informational materials. This project illustrates the role of community-based educational outreach in supporting preventive health awareness and youth development in underserved settings. The integration of college readiness concepts broadens the scope of the initiative by addressing both health education and academic preparation. Continued implementation is encouraged as a strategy for community engagement and health promotion.

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**De la Vigilancia a la Acción: Hallazgos del NHBS-PWID Para Responder
al VIH y Hepatitis entre Usuarios Drogas Inyectables en Puerto Rico.**

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Antecedentes/Objetivos: El consumo de drogas inyectables continúa siendo un determinante crítico en la transmisión del VIH y las hepatitis virales en Puerto Rico, donde factores sociales y estructurales agravan la vulnerabilidad de esta población. Este análisis describe el perfil sociodemográfico, conductual y clínico de personas adultas que se inyectan drogas (PWID) participantes en la cohorte 2024 de vigilancia del National HIV Behavioral Surveillance (NHBS-PWID) en EAM San Juan, Puerto Rico. **Método:** Se examinaron los datos más recientes de la ronda 7 (2024), recolectados mediante muestreo dirigido por participantes (respondent-driven-sampling) e incluyeron entrevistas estructuradas y estandarizadas y pruebas rápidas de VIH y hepatitis B y C. **Resultados:** La mayoría de los participantes fueron hombres (82 %) mayores de 40 años (74 %), desempleados (89 %) y con baja escolaridad. Entre 476 personas con pruebas serológicas, el 37 % tuvo anticuerpos contra hepatitis B, el 1.5 % infección activa (HBsAg +) y el 51 % resultados reactivos a hepatitis C. Además, el 51% presentó infección activa confirmada. Aproximadamente el 38 % permanecen susceptibles a hepatitis B, evidenciando brechas en vacunación. **Conclusión:** Estos hallazgos revelan una alta carga de hepatitis viral y determinantes sociales de riesgo, subrayando la necesidad de integrar estrategias de vacunación, tratamiento y reducción de daños dentro de los programas de vigilancia y respuesta comunitaria en Puerto Rico. Los datos de vigilancia NHBS-PWID sirven como herramienta esencial para monitorear tendencias, guiar políticas públicas y optimizar estrategias de prevención centradas en la comunidad en Puerto Rico. **Agradecimientos:** National HIV Behavioral Surveillance (NHBS) National HIV Behavioral Surveillance (NHBS) Puerto Rico Department of Health. Aprobado por IRB del Recinto de Ciencias Médicas de la Universidad de Puerto Rico (Protocolo ID: PWID 2019 - A0910118; PWID 2022 - B2420122; PWID 2024 - 2401175820A00), y todos los participantes otorgaron su consentimiento informado oral, antes de participar.

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Epidemiological Profile, Trends, and Survival Disparities in Pediatric Cancer in Puerto Rico: A Population-Based Study

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Background and Objectives: Pediatric cancer remains the leading cause of disease-related mortality among children and adolescents worldwide. Its biological and clinical features differ substantially from adult malignancies, underscoring the need for population-specific research to inform prevention and treatment strategies. Despite Puerto Rico's predominantly Hispanic population and unique socioeconomic and environmental context, pediatric cancer epidemiology on the island remains insufficiently characterized. This population-based study aimed to evaluate incidence, mortality, temporal trends, stage distribution, and observed survival for childhood cancers (ages 0–19) in Puerto Rico from 2009 to 2020. **Method:** Data were obtained from the Puerto Rico Central Cancer

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Registry Incidence and Mortality Case Files (2009–2020). Analyses included age-adjusted incidence and mortality rates standardized to the 2000 US population. Descriptive statistics summarized case distribution and stage at diagnosis. One-, three-, and five-year observed survival was assessed for the 2009–2015 diagnostic cohort with follow-up through 2020. Temporal trends and Average Annual Percentage Change (AAPC) were calculated using R v4.4.1 and compared with US Hispanic populations (2009–2019). **Results:** Among 1,666 cases, leukemias, myelodysplastic, and myeloproliferative diseases comprised the largest group (24.25%). Incidence of malignant bone tumors significantly declined (IRR 0.69; 95% CI, 0.43–1.10), while other malignant epithelial neoplasms significantly increased (IRR 1.95; 95% CI, 1.55–2.45). Malignant bone tumors represented 14.13% of pediatric cancer mortality. Observed five-year survival was 64.81% for malignant bone tumors and 82.55% for leukemias. Puerto Rico exhibited significantly higher AAPC for leukemias (2.74%) and lymphomas (3.57%) compared with US Hispanics. **Conclusion:** Distinct epidemiologic and survival patterns highlight an evolving pediatric cancer burden in Puerto Rico. Rising trends in leukemias, lymphomas, and epithelial neoplasms emphasize the need for sustained surveillance, etiologic research, and strengthened pediatric oncology resources. Population-specific data such as these are essential for guiding equitable public health strategies and improving outcomes for Hispanic children. **Acknowledgments:** We thank the Puerto Rico Central Cancer Registry for their support. Approved by IRB #2401175811R001 [July 9, 2025].

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Vaccination Unavailability or Delayed Vaccination: Two Plausible Scenarios for a Pandemic. A Case Study Applied to the Puerto Rico's Covid-19 Outbreak

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Background and Objectives: This study examines two plausible scenarios that may arise during a pandemic: vaccination unavailability and vaccination delay. As a case study, we analyze the evolution of the Puerto Rico COVID-19 pandemic under both scenarios. **Method:** Each scenario is modeled with a multi-compartmental framework: $SEI_s I_a HRD$ (pre-vaccination) or a post vaccination $SVEI_s I_a HRD$ (delayed vaccination). The compartments are: Susceptible (S), Vaccinated (V), Exposed (E), Symptomatic Infectious (I_s), Asymptomatic Infectious (I_a), Hospitalized (H), Recovered (R), and Death due to COVID-19 (D). We perform stability analysis via Jacobians, to calculate the equilibrium points, and to derive a novel method to obtain R_v (vaccinated reproduction number). Sensitivity analysis identified key parameters which increase or decrease the value of R_v . **Results:** The simulations forecast that ~74% of the Puerto Rico's population would be vaccinated at the end of the pandemic; a 95% effective vaccine reduces COVID-19 deaths from 9361 (unvaccinated) to 5085; and a four-month vaccination delay (after December 15, 2020) largely nullifies vaccine benefits. With vaccination, $R_v=0.24$, and the disease dies out. In the absence of vaccination, $R_0=4.17$ (basic reproduction number), the equilibrium is unstable, and the disease becomes endemic. **Conclusion:** Our numerical results show that timely vaccination, a high vaccine's effectiveness, and closed borders are decisive for controlling outbreaks, whereas prolonged delays negate most benefits. The new procedure to obtain R_v is broadly applicable to compartmental models with two infection forces. **Acknowledgements:** This research project was partially supported by the University of Puerto Rico-Humacao.

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Long-Term Trends in HPV Vaccine Initiation and Completion in Puerto Rico: Evidence of Structural Timing Gaps Between Clinical Guidance and Mandate Requirements

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Background: Early evaluations of Puerto Rico's 2018 HPV school-entry requirement—including foundational work by Colón-López et al.—documented improvements in adolescent vaccination. However, long-term age-specific patterns remain insufficiently examined, despite evolving scientific recommendations and emerging practices across U.S. jurisdictions. The American Academy of Pediatrics encourages initiating HPV vaccination at age 9, and CDC/ACIP permits initiation at age 9 while recommending routine vaccination at ages 11–12. Puerto Rico's mandate begins at age 11, leaving earlier initiation unaddressed. Although no U.S. state mandates vaccination at age 9, several jurisdictions have begun promoting earlier initiation. Understanding these timing gaps is particularly relevant as immunization program support continues to vary across the United States. **Objective:** To assess long-term age-specific HPV vaccine initiation and completion among adolescents aged 9–17 years in Puerto Rico from 2017 to 2024 and characterize timing patterns under a mature school-entry mandate. **Methods:** A retrospective cross-sectional analysis of 3,584,516 vaccination records from the Puerto Rico Electronic Immunization Registry System was conducted. HPV vaccination was categorized as initiated (≥ 1 dose) or fully vaccinated (2–3 doses). Age- and sex-stratified differences were examined using chi-square tests ($\alpha < .001$). **Results:** Age-related differences were significant ($\chi^2 = 660,997$; $p < .001$). Initiation among 9–10-year-olds remained minimal ($< 0.1\%$). Coverage at age 11 was modest (4.6%) but increased substantially at age 12 (26.7%) and continued rising through age 17 (50.0%). Series completion lagged initiation across all ages. Females exhibited slightly higher coverage than males ($p < .001$). Annual HPV vaccination increased consistently throughout 2017–2024. **Significance:** This seven-year analysis demonstrates sustained progress in HPV vaccination in Puerto Rico, with initiation and completion rates surpassing many U.S. states. The results reinforce the impact of the 2018 mandate while identifying a forward-looking opportunity to align more closely with scientific recommendations supporting initiation at age 9. In a national climate where immunization program support varies across jurisdictions, early-initiation strategies may help strengthen long-term cancer-prevention gains. Puerto Rico is well positioned to continue advancing evidence-informed vaccination policy.

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Gaps in Communication: PrEP-Eligible Men Who Have Sex with Men's Hesitancy to Initiate Conversations About Sexual Health with Healthcare Providers

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Background and Objective: The HIV epidemic remains a major public health challenge in Puerto Rico (PR), with men who have sex with men (MSM) disproportionately affected. As of May 31, 2025, male-to-male sexual contact accounted for 36% of cumulative HIV cases. Pre-exposure prophylaxis (PrEP) is highly effective for HIV prevention, yet PR has the lowest uptake in the United States. Healthcare encounters offer critical opportunities for HIV

prevention counseling, yet hesitancy to discuss sexual health may obstruct PrEP engagement. The objective of this analysis is to describe sexual health communication practices among PrEP-eligible MSM with their healthcare providers. **Method:** An ongoing study in PR collects quantitative data on healthcare communication between PrEP-eligible MSM (as per CDC guidelines) and their healthcare providers. A RedCAP-administered survey measures sexual behaviors and the extent of sexual health and PrEP-related communication. Preliminary analyses were conducted in SPSS using descriptive statistics. **Results:** A total of 38 PrEP-eligible MSM, non-users (average age 39.21 years) completed the questionnaire. Half of them resided in the Metropolitan Health Region (n=19, 50%). Most held at least a bachelor's degree (n=27, 71%) and had insurance (n=35, 92.1%), mainly private coverage (n=25, 71.4%), which facilitates access to services. Few participants reported negative experiences sharing their gender identity (n=2) or sexual orientation (n=3). However, most participants had not initiated conversations with physicians about gender (n=31, 81.6%), sexual practices (n=23, 60.5%), or sexual orientation (n=23, 60.5%). Only 10 participants (26.3%) discussed PrEP during a clinical encounter, mainly with other sources (n=7) rather than their primary physician (n=3). **Conclusion:** Medical encounters, especially with physicians, are a key opportunity to address HIV concerns and discuss prevention options. Enhancing these conversations could potentially increase PrEP uptake in PR. **Acknowledgments:** This work has been supported by RCMI Grant 054-MD007600 from the NIMHD, NIH. Approved by IRB: 2290034653R003, 09/05/2025-09/05/2026.

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Epidemiology and Incidence of Craniosynostosis in Puerto Rico: A Population-based Study

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Background: Craniosynostosis, defined as the premature fusion of one or more cranial sutures, has an estimated national incidence of 1 in 2,500 live births in the United States. In Puerto Rico, the Department of Health reports a slightly lower rate of 1 in 2,800 live births; however, these data are limited by underreporting and inconsistent surveillance. Surgical management in Puerto Rico is highly centralized, with only three pediatric neurosurgeons and one pediatric craniofacial plastic surgeon serving as the sole providers for the entire territory. Despite this concentrated care, no prior epidemiologic study has characterized the local burden of craniosynostosis. This study presents the first island-wide, five-year retrospective analysis of surgically treated cases. **Methods:** A retrospective review was conducted of all patients who underwent corrective surgery for craniosynostosis in Puerto Rico between 2020 and 2025. All procedures were performed by board-certified pediatric craniofacial or neurosurgical specialists. Data collected included patient demographics, craniosynostosis subtype, age at surgery, surgical technique, and hospital length of stay. Descriptive statistics were calculated using Microsoft Excel (Redmond, WA,

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USA). Annual birth prevalence rates were determined and compared with national U.S. benchmarks. Protocol was approved by the IRB of the UPR School of Medicine (2503374157, Date: 04/23/2025). **Results:** Fifty pediatric patients underwent corrective surgery during the study period, including 26 males (52%) and 24 females (48%). The mean age at surgery was 1.4 ± 2 years, and the mean length of stay was 2.8 ± 1.4 days. Sagittal synostosis was most common ($n = 28$, 56%), followed by multiple-suture ($n = 11$, 22%), coronal ($n = 6$, 12%), metopic ($n = 4$, 8%), and pansynostosis ($n = 1$, 2%). Most cases were nonsyndromic (92%), with only four syndromic cases identified. Annual birth prevalence ranged from 7.3 to 15.3 per 10,000 live births, averaging 11.3 per 10,000 (95% CI, 7.9–14.7), nearly threefold higher than the mainland U.S. average. **Conclusion:** The subtype distribution in Puerto Rico mirrors U.S. patterns, yet overall prevalence is markedly elevated. This suggests a potential population-level predisposition. Future research should investigate genetic, environmental, and sociodemographic factors contributing to this increased incidence. **Conflicts of Interest:** No authors have conflicts of interest.

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Análisis de la Asociación entre el Número de Casos Positivos a Dengue y las Variables Climáticas y Socio-ecológicas en el Municipio de San Juan Durante el Periodo de 2021 a 2024

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El presente estudio analiza la asociación entre el número de casos positivos a dengue y las variables climáticas y las variables socio-ecológicas en el Municipio de San Juan, Puerto Rico, durante el periodo de 2021 a 2024. A través de un enfoque ecológico, se integraron análisis estadísticos y espaciales utilizando datos del Departamento de Salud, del Servicio Nacional de Meteorología y del Censo de los Estados Unidos. Los resultados revelaron un total de 1,758 casos confirmados y un promedio de 8 casos por semana epidemiológica. El 83.0% de los casos fueron confirmados a través de una prueba PCR (*Protein chain reaction*, por sus siglas en inglés). Los grupos de edad donde se reportaron la mayoría de los casos se encuentran entre <01-09 años (13.5%), 10-19 años (37.0%) y 40-59 años (26.8%). En el modelo binomial negativo la temperatura fue el predictor más significativo ($p < 0.001$), evidenciando que un aumento de 1 °F se asocia con un incremento aproximado del 9 % en los casos por semana epidemiológica. El análisis espacial determinó que las zonas con mayor densidad poblacional, niveles de ingreso bajo, mayores índices de pobreza y mayor porcentaje de casas desocupadas registraron más casos. El dengue en San Juan posee un comportamiento endémico, hiper-endémico y multifactorial, influenciado por el clima y los determinantes sociales de la salud. Se recomienda fortalecer la vigilancia climática-epidemiológica, la educación comunitaria y los recursos humanos y fiscales tanto del sector gubernamental, privado y del tercer sector para aumentar la capacidad de preparación y respuesta ante una epidemia de dengue. (IRB protocol number: 2504388133)

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Tasas de Uso y Variables Asociadas a Distintas Modalidades de Servicios de Salud Mental en Adultos de Puerto Rico Durante la Pandemia del COVID-19

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Antecedentes y Objetivos: La pandemia del COVID-19 trastocó los servicios de salud mental (SSM). Algunas personas se iniciaron en las modalidades remotas. Los patrones pandémicos de uso de SSM pudieran informar su diseño ante emergencias futuras. Exploramos las tasas y modalidades de SSM recibidos por adultos (N=1736) durante la pandemia y su asociación con variables sociodemográficas. **Método:** Quienes completaron la encuesta virtual (Aprobación IRB: junio 9, 2025) tenían de 21–79 años (M=46.36). Debían residir en Puerto Rico al menos los 3 meses previos a participar, entender español y disponer de internet. Calculamos las tasas de uso de servicios utilizando estadísticas descriptivas. Usando el chi-cuadrado, comparamos la proporción de casos por subgrupos sociodemográficos que recibieron ciertos SSM. Utilizando Odds Ratio (OR), analizamos qué subgrupos mostraban propensiones estadísticamente significativas al uso de SSM generales, presenciales y de vídeo-sesiones ($p \leq .05$). **Resultados:** Un 26.67% (n=463) utilizó SSM. De ellos, 47.95% los recibió presencialmente, 35.64% por vídeo-sesiones, 39.96% vía llamada telefónica tradicional y 1.51% mediante mensajes electrónicos (correo o texto). Utilizar cualquier SSM estuvo asociado a tener historial de trastornos mentales, orientación no heterosexual, ausencia de creencias religiosas, sufrir deterioro económico, ser estudiante universitario(a), recibir ayuda alimentaria, ingreso $< \$20,000$, vivir sin pareja, tener menos de un bachillerato y tener < 40 años. Recibir SSM presenciales se asoció a tener menores en el hogar (OR=2.05), sufrir deterioro económico (OR=1.49), tener ≥ 60 años (OR=1.82) y ser varón (OR=1.64). Recibir vídeo-sesiones se asoció a ser estudiante universitario/a (OR=2.22), de orientación no heterosexual (OR=2.16), de zona urbana (OR=2.11), tener < 60 años (OR=2.45), ingreso $\geq \$20,000$ (OR=1.66) y tener al menos bachillerato (OR=1.63). **Conclusión:** Nuestros hallazgos sugieren la pertinencia de integrar modalidades remotas y presenciales según las características de quienes necesitan SSM, fortalecer la infraestructura tecnológica, capacitar al personal clínico y reducir barreras para acceder los SSM en preparación a emergencias sanitarias futuras. Número de aprobación del IRB: 1920-194, 9 de junio de 2020 (UPR-Río Piedras). **Agradecimientos:** El proyecto de investigación del cual se obtuvieron los datos presentados en este estudio (conocido como “COVID-19 y Salud Mental en Adultos de Puerto Rico”) fue financiado con fondos personales del primer autor. Agradecemos a los(as) asistentes de investigación su colaboración en este estudio. Algunos(as) de ellos(as) fueron contratados(as) gracias a fondos otorgados al Instituto de Investigación Psicológica por el Decanato de Estudios Graduados e Investigación de la Universidad de Puerto Rico, Recinto de Río Piedras.

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El Impacto del Empoderamiento y la Participación de las Partes Interesadas en la Investigación Comunitaria para la Salud Pública

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Trasfondo y Objetivo General: El objetivo de este estudio es desarrollar un perfil comunitario para determinar los factores sociodemográficos y la estimación de la prevalencia de enfermedades de salud física y mental entre los residentes de las Parcelas Viejas de Las Carolinas en Caguas, Puerto Rico. Desde la fase de diseño, el estudio contó con la colaboración del liderato comunitario, asegurando que las necesidades identificadas guiaran las estrategias de investigación. **Método:** Se implementó una metodología cuantitativa de alcance descriptivo, aplicando diseño de estudio transversal. La recopilación de datos se realizó en junio de 2025 mediante encuestas a residentes voluntarios. De 535 unidades de vivienda habitadas, se completaron 170 encuestas, alcanzando una tasa de respuesta de 31.8%. Los análisis incluyeron distribución de frecuencias y proporciones de variables sociodemográficas, condiciones de salud y percepciones de riesgo ambiental. **Resultados:** El 73.5% (n=125) de los participantes fueron mujeres y 26.5% (n=45) hombres. El 53% (n=88) tenía 65 años o más. El 47.1% (n=80) reportó haber completado hasta la Escuela Superior y el 64% (n=101) indicó ingresos familiares menores de \$15,000 anuales. En cuanto al estado de salud, 60.6% (n=103) informó hipertensión, 29.4% (n=50) diabetes tipo 2, 23.5% (n=40) depresión y 22.9% (n=39) ansiedad. La salud física en el último mes se percibió “buena” en 47.1% (n=80) y “regular” en 47.6% (n=81), mientras que la salud mental en el último mes se percibió “buena” en 78.2% (n=133). Respecto a amenazas ambientales, 87.6% (n=149) identificó olas de calor y 82.9% (n=141) vientos huracanados como riesgos relevantes. (Approved by IRB on 06/09/2025, protocol #: 2504391062) **Conclusiones:** Los hallazgos destacan la importancia de mantener enfoques participativos en investigación comunitaria. La colaboración con las lideresas comunitarias fomentó la apropiación de los resultados. Los resultados sugieren el potencial de aplicar la evaluación orientada al empoderamiento para el involucramiento de las partes interesadas y la toma de decisiones políticas. **Agradecimientos:** A las lideresas del CAM, la Asociación de Residentes de la comunidad Las Carolinas en Caguas y a todas las personas participantes por su compromiso con la co-creación de conocimiento desde y para la comunidad.

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Building Bridges Between Science and Society: Strengthening Community Partnerships and Translational Research Capacity in Puerto Rico

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Purpose: Effective community engagement in clinical and translational research is essential to ensure that scientific discovery translates into health outcomes. The Community Engagement and Outreach (CEO) Core of the Alliance for Clinical and Translational Research has developed an integrated strategy to strengthen research partnerships, expand practice-based collaboration, and enhance science communication across academic, community, and healthcare sectors. The CEO's framework blends Community-based Participatory Research, Practice-Based Research, Translational Science Benefits, and Science Communication under a culturally responsive model tailored to Puerto Rico's health ecosystem. **Description:** Three complementary aims guide this strategy. Aim 1 expands community-engaged research approaches that foster long-term, bidirectional partnerships between researchers, patients, and communities to jointly identify and address priority health conditions. Aim 2 strengthens the GROW Puerto Rico Practice-Based Research Network as a platform for clinician-researcher collaboration, supporting shared decision-making, research capacity, and the translation of findings into practice. Aim 3 advances science dissemination through bilingual, plain-language communication, annual showcases, and community-policy dialogues designed to broaden scientific literacy and participation in research. Initial implementation has increased community representation in research governance, generated new community-academic partnerships in chronic disease, environmental health, and aging, and expanded opportunities for clinicians to lead or co-develop studies. Early dissemination metrics show growth in stakeholder participation, bilingual research products, and visibility of community-driven science across the island. **Conclusion:** This framework creates a circle of translation — from community insight to scientific innovation—and back again—turning research into lasting change and beneficial to all. It demonstrates how culturally grounded engagement, capacity building, and accessible science communication can enhance the translational pipeline. By embedding communities and practitioners within each stage of the research process, the CEO Core advances a sustainable model for impactful and contextually relevant science in Puerto Rico. **Acknowledgments:** National Institute of General Medical Sciences (NIGMS)/ National Institutes of Health U54GM133807. Approved by IRB #a2210120 (2029-2025). Disclose: The authors have no conflict of interest to disclose.

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Percepción de los Fisioterapeutas sobre los Servicios de Telesalud

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Trasfondo y Objetivos: En Puerto Rico la ley para la telemedicina data del 2018 (Ley núm. 168). Sin embargo, su utilización por fisioterapeutas no ha sido evaluada. Este estudio exploró las percepciones que tienen los fisioterapeutas sobre los servicios de telesalud para identificar barreras y generar recomendaciones que optimicen su implementación en la práctica clínica. **Método:** Se llevó a cabo una investigación descriptiva-transversal en dos fases. La primera fase consistió en el desarrollo y validación del instrumento de investigación. La segunda fue la recopilación de datos. Los participantes del estudio fueron 45 fisioterapeutas licenciados. Se realizaron análisis estadísticos descriptivos de los datos. IRB#2506417512 (07/29/25). **Resultados:** La mayoría tenía más

de un año de experiencia (86.7%; $f = 39$) y grado doctoral (35.5%; $f = 16$). No obstante, el 96% ($f = 25$) no había recibido capacitación en telesalud y solo el 37.7% ($f = 17$) consideró la telesalud una alternativa viable. El 33.3% ($f = 15$) percibió que puede ahorrar tiempo y dinero. Mientras que el 24.4% ($f = 11$) estaría dispuesto a usar la telesalud y el 31.1% ($f = 14$) reportó limitaciones en su uso, principalmente por la conectividad. La mayoría no había ofrecido telesalud previamente; quienes sí lo hicieron atendieron sobre todo a pacientes ortopédicos y pediátricos. **Conclusión/Discusión:** Los hallazgos muestran que, aunque los fisioterapeutas cuentan con una base clínica sólida, la adopción de la telesalud se ve limitada por la falta de capacitación, la inestabilidad tecnológica, la baja alfabetización digital y preocupaciones sobre la seguridad y la pérdida del componente humano. Sin embargo, quienes sí la han implementado han podido ofrecer educación al paciente y cuidador. Los resultados evidencian la necesidad de fortalecer las competencias tecnológicas, considerar su integración formal en la academia y promover su uso como herramienta complementaria en la práctica fisioterapéutica.

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Uso de Tabaco en Cuidadores en Puerto Rico 2021-2022: Impacto en la Salud y su Calidad de Vida

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Introducción y Objetivos: La carga asociada al rol de cuidador puede incrementar el riesgo de adoptar conductas perjudiciales para la salud, como el consumo de tabaco. A pesar de ser la principal causa prevenible de enfermedad y muerte, la epidemiología del tabaquismo en cuidadores de Puerto Rico (PR) está poco estudiada. El objetivo es desarrollar el primer perfil epidemiológico de cuidadores que reportan uso de tabaco (CUT) en PR, para identificar sus necesidades y estado de salud e informar estrategias de prevención y cesación. **Métodos:** Mediante un estudio transversal utilizando datos del *Puerto Rico Behavioral Risk Factor Surveillance System* 2021-2022 se desarrolló un perfil epidemiológico de los CUT en PR. Se compararon los CUT con cuidadores que no utilizaban tabaco (CNUT), evaluando diferencias sociodemográficas, condiciones crónicas y calidad de vida. **Resultados:** El 11.6% de los adultos en PR se identificaron como cuidadores. La prevalencia de uso de tabaco en esta población fue de 10.1%, mayor que en la población general (9.2%). Entre los CUT, mostraron mayor proporción de personas entre 55 y 64 años (14.7%), hombres (14.3%), divorciados o separados (12.1%), con escolaridad/educación de escuela superior o menor (12.8%) y con ingresos anuales < \$15,000 (15.5%). En salud, el 31.8% reportó tener mala salud y el 58.2% al menos una condición crónica. Las condiciones más prevalentes fueron depresión (37.5%), artritis (27.0%), asma (21.8%), diabetes (21.1%) y enfermedad cardíaca (16.2%). Los CUT presentaron mayor riesgo de infarto (OR=2.55), enfermedad coronaria (2.32), enfermedad renal (1.92), depresión (1.89) y asma (1.85), en comparación con CNUT. **Conclusión:** Estos hallazgos subrayan la necesidad urgente de implementar intervenciones y sistemas de apoyo dirigidos a la prevención y cesación del uso de tabaco entre cuidadores. Al atender los retos que enfrentan esta población mejora su bienestar y la calidad del cuidado que brindan a otras personas. **Agradecimientos:** Los autores desean agradecer a Ruby A. Serrano Rodríguez, DrPH, directora del *Puerto Rico Behavioral Risk Factor Surveillance System*, por proveer los datos utilizados en el análisis de este estudio.

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Iniciativa Juega, Diviértete y Aprende: El Juego como Derecho y Espacio de Promoción de la Salud

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Contexto y Objetivos: El juego es una actividad que contribuye a la salud mediante la socialización, la construcción de subjetividades, la adquisición de habilidades motoras y la reducción del sedentarismo. Favorece las funciones cardiorrespiratorias, musculares, cardio metabólicas y socioemocionales. Además, ha sido reconocido internacionalmente como un derecho. Sin embargo, persisten las barreras para su ejercicio. La Comisión Permanente para la Defensa de los Derechos Humanos del Colegio de Profesionales del Trabajo Social de Puerto Rico promovió el juego como derecho a través de iniciativas en las comunidades y con organizaciones. Los objetivos fueron: recuperar el juego libre, alejándolo de la dependencia del juguete; fomentar el valor del juego en el desarrollo y la salud; y analizar las condiciones materiales que interfieren con el reconocimiento del juego como derecho. **Metodología:** Se organizaron trabajos de promoción y divulgación del juego en tres pilares: el desarrollo de guías socioeducativas; adiestramientos para profesionales y público general; y fomentar el juego con comunidades y organizaciones. **Resultados:** Desde el 2014, esta iniciativa ha publicado 10 guías socioeducativas gratuitas que han abordado el juego desde la inclusión de la población con diversidad funcional, el confinamiento por COVID-19, los juegos tradicionales y el uso de otras actividades lúdicas. Las alianzas interprofesionales y comunitarias posibilitaron capacitaciones y eventos lúdicos en espacios educativos, comunales, hospitalarios, gubernamentales y hogares sustitutos. **Conclusión:** Esta iniciativa ha permitido reflexionar sobre los retos que plantea la promoción del derecho al juego en Puerto Rico ante la ausencia de políticas públicas que lo fomenten, el adultocentrismo, los roles tradicionales de género, las imposiciones de la industria del juguete y la desigualdad de acceso a ambientes construidos que habiliten el ejercicio del juego. Además, se ha fortalecido la promoción del juego en todas las edades como un componente del desarrollo y la salud integral. **Reconocimientos:** Ninguno.

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Environmental Health in Child Care: Local Lessons of a National Program

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Background and Objectives: Clean air is essential for children's health. Yet many early learning facilities lack the knowledge, resources, or time to improve indoor air quality (IAQ) in their facilities, making environmental health concerns a lower priority. The Children's Environmental Health Network's Eco-Healthy Child Care® program (CEHN-EHCC) partnered with community-based organizations and the University of Maryland to implement IAQ monitoring and environmental health improvements in childcare settings. The program objectives are: 1) Implementing a collaborative model between CEHN and its partners while monitoring IAQ in childcare settings;

2) Illustrating an improvement in air quality through the use of indoor air monitors; 3) Providing affordable measures that facilitate the improvement of IAQ in childcare facilities. **Methods:** Outreach to licensed childcare providers was guided by Justice40 Initiative data to prioritize investment on environmental and economic justice initiatives for disadvantaged communities. Alongside the Climate & Economic Screening Tool's ArcGIS data to identify areas with high environmental health burdens. Fifty-eight facilities received training on creating safer learning environments, a portable air cleaner, \$1000 for environmental improvements, and year-long indoor PM 2.5 data monitoring. **Results:** The program expanded on the available information regarding environmental site assessment data, PM2.5 exposure peaks, and the effectiveness of HEPA air filters in reducing PM2.5 levels within childcare sites. **Conclusions:** This collaborative model demonstrates a scalable, evidence-based approach to improving environmental health in childcare nationwide. **Acknowledgments:** This project was made possible through the collaboration and support of the Institute for Tribal Environmental Professionals, Green Door Initiative, Low Income Investment Fund, Latinas Contra Cancer, Partnership for Southern Equity, Air Alliance Houston, and the New Alpha Development Corporation.

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Exploración del Patrón de Cuidado de Incontinencia Urinaria por Médicos Primarios: Una Mirada desde la Terapia Física

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Antecedentes y Objetivos: Se realizó un estudio cualitativo, de corte exploratorio y con un diseño fenomenológico con el objetivo de explorar la experiencia de los médicos de cuidado primario en el manejo, evaluación y tratamiento de pacientes con incontinencia urinaria (IU). **Métodos:** Mediante un muestreo de bola de nieve, iniciado por un flyer, se reclutó a 10 participantes del área metropolitana. Los criterios de inclusión fueron: atender a pacientes de IU y que actualmente ejerza su profesión. **Resultados:** Se identificaron categorías de análisis: conocimiento sobre la condición, población con IU, tratamientos de cuidados, educación interdisciplinaria. Se utilizó una guía de preguntas semiestructurada para indagar el patrón de cuidado atendiendo cada categoría del ICF. En la categoría de conocimiento se halló discrepancias en la habilidad de describir los tipos de incontinencia y sus tratamientos, "abarca muchas cosas, pueden entrar varios factores". Sin embargo, estos mencionan que "reciben mayor volumen de pacientes adultos mayores, mujeres y hombres con problemas de la próstata". En cuanto a los tratamientos, "ofrecen medicamentos y referidos a otros médicos especialistas". En la educación interdisciplinaria, los participantes mencionan tener "desconocimiento de la terapia física (TF)". Igualmente, se halló apertura a recibir educación continua, un médico expresó la necesidad de una educación continua que explique el rol de la TF en el tratamiento de la incontinencia. Además, se halló que culturalmente existen barreras en la atención del cuidado de esta condición dado "el tabú". Los resultados coinciden con la literatura revisada (Charette, 2024). **Conclusión:** La importancia de este estudio fue contribuir significativamente a la comprensión del manejo clínico de la IU por parte de médicos e identificar las brechas existentes en el cuidado de la condición. Igualmente, identificar áreas de intervención de la TF para mejorar los cuidados. **Reconocimiento:** Este trabajo fue financiado en su totalidad con fondos privados de las investigadoras.

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Community Participation in Correctional Reform: A Public Health Approach from Puerto Rico

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Background & Objectives: In Puerto Rico, multiple community sectors have expressed concern about the limitations of punitive correctional models in supporting rehabilitation and social reintegration. Guided by public health principles and community engagement, this initiative sought to convene diverse stakeholders to foster dialogue and generate community-informed perspectives on rehabilitation and restorative approaches within the correctional system. **Program Description:** Community organizations collaborated to establish the Coalition for the Transformation of the Correctional System of Puerto Rico and organized a public forum open to community members, advocates, professionals, students, and individuals with lived experience. The event included brief informational presentations on incarceration demographics, rehabilitation programs, restorative justice, stigma, and community involvement, followed by facilitated small-group discussions. These activities were designed as an open civic engagement space to encourage reflection, shared learning, and collective idea generation. **Outcomes:** Participants collaboratively developed thematic action ideas focused on strengthening community engagement, supporting families, enhancing correctional staff training, expanding educational opportunities, and improving access to mental health resources. These ideas were summarized visually to support ongoing community conversations and future advocacy efforts. **Conclusions:** Creating inclusive, multisectoral community spaces can promote constructive dialogue around correctional reform and highlight community priorities related to rehabilitation and reintegration. Similar engagement initiatives may serve as platforms for continued collaboration and public awareness. **Acknowledgments:** This community initiative was supported by the Autonomous Municipality of Caguas and community donations. The authors report no conflicts of interest.

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The Transcription Factor Basonuclin-1, a Key Player in the Progression of Triple-Negative Inflammatory Breast Cancer

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Background and Objectives: Inflammatory breast cancer is the most aggressive and deadly form of breast cancer, with a high risk of intra-lymphatic invasion and metastasis by tumor cell emboli. Previously, we identified that the triple negative IBC cell line, SUM149PT, displayed high Basonuclin-1 (BNC1) expression, a zinc finger transcription factor associated with epithelial proliferation and brain metastasis. We aim to investigate the functional significance of

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BNC-1 overexpression and to determine BNC1's DNA-binding preferences to characterize its role in IBC. **Methods:** SUM149PT cells were co-transfected with BNC1 CRISPR/Cas9 and HDR BNC-1 plasmid with a puromycin-resistant cassette to generate stable BNC1 knockout cell lines. This was followed by puromycin selection and cell culture expansion. Knockout efficiency was verified by qPCR and western blot. Wound healing and Alamar Blue assays assessed cell motility and viability, respectively. Isolating single-cell colonies later confirmed complete allelic knockouts and allowed genotypic analysis. To identify BNC1 DNA binding in SUM149PT, ChIP was performed using a BNC1-specific antibody, and target enrichment was quantified by qPCR. **Results:** Knockout cells showed a decrease in BNC1 expression as well as a decrease in motility and viability. Complete allelic BNC1 knockout was observed in two monoclonal cell populations. As a positive control, we used ChIP-sequencing data from a different model that identified basoon1 binding sites within the human rDNA promoter and its own promoter region. Our ChIP-qPCR results showed BNC1 enrichment at its promoter region and within the intergenic spacer regions of human rDNA. **Conclusion:** By enhancing cell motility and viability, BNC1 may regulate the expression of a novel cohort of genes involved in the aggressive metastasis of TN IBC. Further studies will validate complete BNC1 deletion in SUM149PT by sanger sequencing and investigate cell proliferation, motility and invasion. We will use ChIP-seq and RNA-seq to characterize BNC1 DNA-binding patterns and transcriptomic alterations in IBC. **Acknowledgements:** We express our gratitude to the members of Peterson Breast Cancer Research Laboratory. This research is supported by the NIH Exploratory/Developmental Research Grant R16, FIPI, University of Puerto Rico, Rio Piedras.

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Poly-UG RNA Quadruplexes as Structural Scaffolds Linking Stress Granule Dynamics to TDP-43 Pathology in ALS

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Background and Objectives: ALS is a fatal neurodegenerative disease marked by progressive motor-neuron loss. Although >40 genes are associated with ALS, >90% of cases are sporadic. A common hallmark across subtypes is TDP-43 proteinopathy: nuclear depletion and cytoplasmic inclusions, often in association with stress granules (SGs), transient membrane-less ribonucleoprotein condensates formed during stress. With chronic or unresolved stress, SGs can lose reversibility and nucleate pathological aggregation, including TDP-43. RNA structure contributes to SG biology. RNA G-quadruplexes (rG4s) modulate RNA-protein partitioning, and a non-canonical poly-UG (pUG) quadruplex was recently discovered in *C. elegans*, formed on long UG tracts. Building on this, our preliminary data indicate that human UG12 tracts form pUG-like structures in vitro, and independent studies report UG-rich motifs among the most enriched sequences in SG-associated transcriptomes. TDP-43 shows high affinity for UG repeats of comparable length, suggesting an intersection between RNA structure and protein recognition. **Methods:** We used DMS-BASH-MaPseq to probe pUG quadruplex formation in vitro and performed a bioinformatic analysis of SG-enriched transcriptomes to assess UG-repeat enrichment. **Results:** DMS-BASH-MaPseq showed that UG12 forms a potassium-dependent quadruplex, with guanine protection signatures consistent with quadruplex folding. Bioinformatic analyses indicated that UG12 is the most abundant dinucleotide repeat among SG-enriched RNAs, supporting the view that pUG-like structures are recurrent features of granule RNAs. **Conclusion:** These findings support a model in which pUG RNA quadruplexes act as structural RNA scaffolds

that nucleate SGs and recruit TDP-43, linking RNA folding to protein aggregation in ALS. Future work will test this model using EMSA to characterize pUG/TDP-43 interactions and circular dichroism (CD) spectroscopy to confirm quadruplex folding within TDP-43-binding RNAs. Collectively, this study introduces pUG RNA structures as potential drivers of SG formation and TDP-43 aggregation, suggesting new mechanistic insights and therapeutic entry points for ALS.

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The Effect of Tamoxifen on Metabolic Patterns, Contractile Properties and Biomarkers of Skeletal Muscle After Spinal Cord Injury

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Background & Objectives: Treating spinal cord injuries (SCI) comes with a series of challenges since it is a condition for which no cure is available. Severe symptoms can be observed in SCI patients, including somatosensory deficits, chronic pain, muscle mass reduction, and loss of movement. Tamoxifen (TAM), a selective estrogen receptor modulator, has demonstrated beneficial effects on the spinal cord. However, the effect of TAM on skeletal muscle is unknown, and this should be established because nerve regeneration and cell survival after SCI is hopeless if muscle deterioration is beyond repair. We hypothesize that administration of TAM after SCI will preserve/promote correct contractile properties of the muscle, maintain the metabolite profile similar to the sham group in skeletal muscles and increase the expression of myosin heavy chain in skeletal muscles. This study sought to elucidate important changes in skeletal muscle physiology after SCI and TAM treatment.

Methods: Adult female and male rats received a moderate contusion at the T10 level (Injury), while the control group (SHAM) underwent only a laminectomy. Animals were randomly assigned to four groups, receiving either tamoxifen (TAM) or placebo pellets. Hindlimb muscles were collected 28 days post-injury, followed by contractility analysis, metabolomics, and Western blot assays. Methods were previously approved by the IACUC (Protocol #245012, June 15, 2022). **Results:** Tamoxifen treatment could reshape metabolic profiles, influence contractile properties and alter biomarker expression in the skeletal muscle of both male and female rats, independently of injury status. **Conclusions:** Our results suggest potential multi-targeted pathways through which Tamoxifen may act to address SCI. **Acknowledgements:** This study was supported SC1GM144032 from the National Institute of General Medical Sciences of the National Institutes of Health (NIGMS-NIH), and the PR-INBRE P20 GM103475 with partial support from the Center for Collaborative Research in Minority Health and Health Disparities (grant number 2U54MD007600), COBRE (P30-GM149367), and the Puerto Rico Science and Technology Trust (2022-00125).

Metabolomic Signatures of Running-Induced Hormesis in the Hippocampus

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Introduction: Low-level environmental stressors, including health-enhancing challenges such as voluntary running exercise, promote neuronal resilience - a phenomenon known as hormesis. This idea provides a useful framework for understanding how exercise-driven metabolic changes in the hippocampus may support neurogenesis and improve cognitive function. However, the precise metabolic mechanisms remain unclear. **Methods:** Male C57BL/6J mice (20 weeks old) were assigned to sedentary (SED) or running (RUN) groups, with RUN mice performing 8 weeks of voluntary wheel exercise IACUC protocol A660121. Hippocampal metabolites were analyzed by GC-MS and LC-MS followed by univariate, chemometric, and pathway enrichment analyses. Metabolic correlation networks were generated in Python from MetaboAnalyst correlation matrices ($|r| \geq 0.03$) and visualized in NetworkX using the Fruchterman-Reingold layout (red = positive, blue = negative). A differential network ($\Delta r = r_{\text{RUN}} - r_{\text{SED}}$) identified metabolite pairs with altered correlations, while the Barnes maze evaluated spatial learning and memory. **Results:** Univariate, chemometric, and pathway enrichment analyses, together with metabolic correlation networks, revealed that running significantly altered neurotransmitter-related metabolites, decreasing glutamic acid and aspartic acid while increasing serotonin and glutamine. GABA levels remained stable, preserving excitatory-inhibitory balance. The RUN group showed enhanced performance in the Barnes maze, linking improved cognition to hippocampal metabolic remodeling. **Discussion:** Metabolomics analysis revealed strengthened coupling among glutamate, glutamine, GABA, aspartate, and asparagine in the RUN group, indicating a reorganization of excitatory-inhibitory amino acid metabolism. The observed coordinated shift suggests an adaptive, regulated control over glutamatergic signaling. This mechanism aligns with metabolic hormesis, promoting both neuroprotection and synaptic plasticity in response to physical exertion. **Conclusion:** Hippocampal glutamatergic signaling after exercise appears dynamically regulated rather than depleted. We hypothesize that exercise intensity determines whether these metabolic shifts promote or hinder neuroplasticity. Our findings support a dose-dependent hormetic model, where metabolic compartmentation and balanced neurotransmitter cycling drive long-term neuronal adaptation. Future work should clarify the role of glutamine-glutamate coupling in sustaining cognitive resilience through glial-neuronal metabolic integration. **Acknowledgement:** This study was supported by the PRINBRE P20 GM103475.

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Non-Closure Partial Nephrectomy Technique in Complex Hilar Tumors: Institutional Experience

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Background: Renal tumors involving the hilar region pose technical challenges due to proximity to vascular structures and limited parenchyma available for reconstruction. In selected cases, a non-closure cortical technique during robotic-assisted partial nephrectomy (RAPN) is used to facilitate hemostasis while minimizing warm ischemia time. **Methods:** This abstract describes an institutional surgical experience using a non-closure cortical approach during transperitoneal RAPN for hilar renal tumors performed between 2017 and 2024. De-identified, aggregate perioperative data routinely collected for clinical and quality monitoring purposes were summarized. All procedures involved tumor endonucleoresection followed by running sutures at the corticomedullary junction, with intentional omission of cortical closure when parenchymal reconstruction was not feasible. Early unclamping and focal hemostatic suturing were employed as part of standard operative practice. **Results:** Seventy-nine procedures were reviewed. Aggregate patient and operative characteristics included mean age 56.9 years, 75.9% male, mean BMI 31.3, mean operative time 182 minutes, and mean warm ischemia time 15.5 minutes. Selective arterial clamping was performed in most cases, and collecting system entry occurred in a subset of procedures. Estimated blood loss, length of stay, perioperative hemoglobin variation, and intraoperative events were documented as part of routine surgical reporting. One postoperative transfusion was recorded. Margin status and follow-up findings were summarized descriptively. **Conclusion:** This report presents a technical overview and perioperative characteristics associated with the non-closure cortical technique during RAPN for complex hilar tumors in routine clinical practice. This approach represents one operative option in anatomically challenging cases. **Acknowledgements:** None.

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Novel BioOptimatics Used to Identify Gene Expression Changes between Autism Spectrum Disorder and Schizophrenia

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Introduction: Autism Spectrum Disorder (ASD) and Schizophrenia (SCZ) are neurodevelopmental conditions with unknown etiologies that significantly impair a patient's social, cognitive, and communication abilities. These conditions share genetic and environmental risk factors such as maternal infection, prenatal stress, and pollution exposure. These common factors indicate the possibility of a common etiology. To advance in this area of research, we propose a novel, optimization-based pipeline that identifies potential biomarkers and biological pathways through structures of maximum correlation. **Methods:** Four microarray and RNAseq datasets (1 ASD and 3 SCZ) of postmortem brain tissue from the Gene Expression Omnibus repository were analyzed: GSE102741 (ASD,

dorsolateral prefrontal cortex), GSE35974 (SCZ, cerebellum), GSE35977 (SCZ, parietal cortex), and GSE21138 (SCZ, prefrontal cortex). The datasets were analyzed using Multiple Criteria Optimization (MCO). First, each dataset individually, and secondly, as a meta-analysis between GSE102741 and GSE21138. Additional analyses, including the Minimum Spanning Tree (MST) method for maximum correlation structure, Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway enrichment, and the Organization of Genes and Functions (OGF) framework, were applied to contextualize the findings. All analyses were performed stratifying by sex. **Results:** Four differentially expressed genes (DEGs) consistently identified across all analyses (HSPA6, RGS1, RNU4-2, and CCL4) emerged as potential biomarkers for both ASD and SCZ. The products of these genes have been reported in scientific literature to correlate to proinflammatory processes, the MAPK signaling pathway, neuroinflammation, positive regulation of calcium-mediated signaling, and cellular communication. We propose these DEGs may correlate to ASD and SCZ conditions: CCL4 over-expression and HSPA6 under-expression could relate via neuroinflammation, RNU4-2 under-expression via alternative splicing, and RGS1 under-expression via neuronal overstimulation. **Conclusion:** The findings of this work highlight key molecular pathways shared between ASD and SCZ which may inform future biomarker discovery and therapeutic strategies. **Acknowledgements:** This work was supported by The Applied Optimization Group of The University of Puerto Rico, Mayagüez Campus.

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Optimización Computacional de la Terapia Antirretroviral con Algoritmos Genéticos en un Modelo Poblacional de VIH

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Antecedentes y Objetivos: La terapia antirretroviral (ART) ha transformado el curso del VIH, pero su impacto poblacional depende de la cobertura, la retención en tratamiento y, especialmente, de la supresión virológica sostenida. El objetivo de este trabajo es evaluar cómo mejorar estos procesos mediante un marco matemático y computacional que conecte evidencia clínica con decisiones programáticas. **Método:** Desarrollamos un modelo compartimental a nivel poblacional que distingue entre personas en ART sin supresión y con supresión, incorporando una fuerza de infección ponderada por etapa clínica y estado terapéutico. Establecemos positividad e invariancia del sistema y derivamos una expresión cerrada del número reproductivo bajo control. Realizamos simulaciones determinísticas y análisis de sensibilidad que muestran patrones consistentes: aumentar la tasa de logro de supresión reduce la transmisibilidad poblacional, mientras que incrementar la pérdida de supresión la eleva; además, mantener una infectividad muy baja en personas suprimidas resulta crítico. **Resultados:** Con base en estos resultados, formulamos un esquema de optimización mediante algoritmos genéticos para identificar combinaciones factibles de parámetros programáticos como metas de adherencia, retención y supresión que minimicen la incidencia acumulada y los costos operacionales bajo restricciones realistas. Los hallazgos sugieren que mejorar la supresión y reducir su pérdida acelera la disminución del número reproductivo, aunque alcanzar niveles inferiores a uno puede requerir estrategias complementarias orientadas a reducir la transmisibilidad basal. **Conclusión:** En conjunto, este estudio demuestra que las herramientas matemáticas y evolutivas pueden apoyar la planificación de intervenciones más efectivas para fortalecer el control del VIH en la población.

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Perineural Invasion as Prognostic Factor in the Development of Secondary Primary Tumors and Recurrences in Oral Cavity Squamous Cell Carcinoma

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Background and Objectives: Oral squamous cell carcinoma (OSCC) accounts for nearly 90% of head and neck malignancies and carries substantial morbidity due to high recurrence and secondary primary tumor (SPT) rates. While perineural invasion (PNI) and extracapsular extension are well known factors of aggressive disease, their role in SPT development is unclear. This study investigates the impact of PNI on recurrence and development of SPTs in oral cavity carcinoma. **Methods:** A retrospective cohort study that included patients with primary oral cavity squamous cell carcinoma treated surgically between 2011 and 2017 and that subsequently developed at least one recurrence or a second primary head and neck carcinoma during follow up. Patient demographics, tumor subsites, histopathologic features, and outcomes were analyzed. **Results:** Among a cohort of 303 patients with recurrent disease or second primaries, 81 met inclusion criteria (46 males, 35 females; mean age 65.4 years, range 24–93 years). Tumor subsites included tongue (28), floor of mouth (9), maxilla (14), mandible (22), buccal mucosa (6), retromolar trigone (1), and soft palate (1). Seven tumors were classified as poorly differentiated; 74 were moderately or well differentiated. Sixteen patients developed a second primary in the head and neck region. PNI was observed in nine patients; one developed a second primary in the head and neck. Eight of the nine PNI-positive patients had advanced-stage disease with local, regional, or distant metastasis. **Conclusions:** PNI does not appear to significantly increase the risk of SPTs or recurrence in oral cavity carcinoma but is associated with advanced disease and higher metastasis rates. Surgery remains the primary treatment for recurrence, often combined with adjuvant therapies, with outcomes influenced by tumor characteristics and prior treatments. Multidisciplinary management and close follow-up may improve outcomes, but overall prognosis remains poor, emphasizing the need for earlier detection strategies and novel therapies. **Acknowledgements:** This project was funded by the National Institute of Health's (NIH) Clinical and Translational Science Awards program (grant number UL1TR002377). The CcaTS program is led by NIH's National Center for Advancing Translational Sciences (NCATS). Approved by IRB, Number: 24-008745, November 2, 2024.

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Impact of Surgical Timing and Treatment Modality on Orbital Floor Fractures Outcomes in a Hispanic Pediatric Population

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Purpose: Pediatric orbital floor fractures (OFF) are complex due to the cartilaginous nature of immature bone, predisposing patients to extraocular muscle entrapment and neural sequelae. However, published literature shows

discrepancies regarding the optimal timing for surgical intervention. This study investigates the impact of surgical timing on outcomes in a Hispanic pediatric cohort with OFF. **Methods:** Records of pediatric patients presenting to the only supratertiary trauma center in Puerto Rico between 2020 and 2025 were retrospectively reviewed. Data collected included the presence of neural deficits, extraocular muscle restriction, and changes in visual acuity. Fisher's exact test was used to determine statistical significance. **Results:** Sixty-four patients were identified with OFF, of whom thirteen underwent surgical management. The mean time to surgery was 10.4 days, with a mean operative duration of 4 hours and 27 minutes. Complications occurred in 4/51 (7.8%) of the conservative group and in 4/13 (30.8%) of the surgical group (OR = 0.19, 95% CI [0.04, 0.91], $p = 0.047$). Of the surgical group, treatment timing was <2 days in 1 patient (7.7%), 3-7 days in 4 patients (30.8%), and >7 days in 8 patients (61.5%). Complications were observed only when surgery was delayed beyond one week, none occurred with earlier repair, suggesting a potential benefit of timely intervention despite limited statistical power. **Conclusions:** Most pediatric orbital floor fractures were successfully managed conservatively with favorable outcomes. All complications occurred in delayed surgical repairs, suggesting earlier intervention may improve results. Overall, these findings underscore the importance of individualized, specialist-directed management in OFF. (IRB: 2303084772A002, last approved: 5/13/2025)

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Bridging the Gap in Heart Failure Management: Comparing Entresto to ACEi/ARBs in Rehospitalization Outcomes

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Background and Objectives: Heart failure (HF) is a leading cause of hospitalization in older adults, with high readmission rates contributing to significant morbidity, mortality, and healthcare costs. Although angiotensin-converting enzyme inhibitors (ACEi) and angiotensin receptor blockers (ARBs) have long been the standard therapy for heart failure with reduced ejection fraction (HFrEF), recent evidence suggests a plateau in their effectiveness. Angiotensin receptor-neprilysin inhibitors (ARNIs), particularly sacubitril/valsartan (Entresto), have demonstrated superior outcomes in clinical trials. However, their real-world impact on HF rehospitalization remains underexplored. This study evaluated the factors associated with HF readmission and compared Entresto versus ACEi/ARBs to guide therapeutic decisions and improve outcomes. **Methods:** A retrospective cohort study was conducted at San Lucas Episcopal Hospital that included patients admitted with a primary diagnosis of congestive heart failure (CHF) from 2022-2025. Electronic health records were reviewed to identify admissions, readmissions and discharge medications (ACEi/ARB or Entresto). Variables collected included number of readmissions, length of stay (LOS) for admission and readmission, and days between admissions. A subgroup of patients initially discharged on ACEi/ARB who were then switched to Entresto after readmission was also evaluated. Statistical analysis was conducted using t-tests with p -values <0.05 considered significant. IRB approval was obtained (Protocol number: 2503253404; approval date 4/14/2025). **Results:** Among 355 patients (250 ACEi/ARB; 105 Entresto), readmission rates were 40.4% vs 37.1%. Median LOS during initial admission was 5 vs. 7.5 days, and during readmission 7 vs. 6 days, respectively. Patients who switched from ACEi/ARB to Entresto demonstrated fewer mean readmissions (2.64 vs

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3.14; $p=0.534$) and longer time between admissions (538 vs 463 days; $p=0.283$). **Conclusion:** Although statistical significance was not reached, patients treated with Entresto exhibited fewer readmissions and longer intervals between hospitalization compared with those on ACEi/ARBs, suggesting clinical relevance. Larger studies are needed to validate these findings and optimize early ARNI initiation.

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Safety of Hand Surgery in the Procedure Room without Post-Anesthesia Care Unit (PACU) Stay

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Background: The use of the procedure room (PR) for hand surgeries performed under local anesthesia has gained popularity due to its efficiency and cost-effectiveness. Each patient who remains in the post-anesthesia care unit (PACU) incurs an additional cost of approximately \$740, representing a significant financial burden when multiplied across annual patient volumes. While prior research supports PR safety and equivalent outcomes to traditional operating room (OR) settings, the necessity of PACU monitoring remains unclear. This study evaluates the safety of bypassing PACU recovery following hand surgery in the PR. **Methods:** A retrospective review was conducted of 102 patients who underwent carpal tunnel release and/or trigger finger surgery in the PR between September 2024 and April 2025. All procedures were performed under local anesthesia, with patients discharged directly from the PR following measurement of postoperative vital signs. Outcomes assessed included adverse events (e.g. new cardiac, pulmonary, or digestive problems, or death), emergency department (ED) visits, reinterventions, intraoperative and postoperative complications within 90 days after surgery. Study approved by IRB (June 24, 2025). **Results:** The mean patient age was 65.2 years (range 25–94), with 60.8% of the patients being female. No intraoperative or postoperative complications, adverse events, or reinterventions were reported. Four patients (3.9%) presented to the ED within 90 days—none for procedure-related complications. All patients were hemodynamically stable at discharge, with mean oxygen saturation of 97% and mean heart rate of 70.5 bpm. Forty-one patients (40.2%) had elevated systolic blood pressure (≥ 140 mmHg) at the time of discharge, of whom 80.5% had known hypertension. **Conclusion:** Bypassing PACU after hand surgeries performed in the PR appears to be safe, with no increase in adverse events, ED visits, reinterventions, intraoperative and postoperative complications or readmissions. Eliminating PACU recovery may reduce healthcare resource utilization and improve procedural efficiency without compromising patient safety.

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Therapeutic Outcomes of Focused Ultrasound-Mediated Temozolomide Delivery in Glioblastoma: A Systematic Review

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Background and Objectives: Glioblastoma (GBM) is the most aggressive primary malignant brain tumor in adults, with persistently poor survival despite standard chemoradiation with temozolomide (TMZ). Limited TMZ penetration across the blood–brain barrier (BBB) and intrinsic resistance mechanisms, including MGMT-mediated repair, restrict its efficacy. Focused ultrasound (FUS) enables transient, localized BBB disruption and has emerged as a promising strategy to enhance drug delivery. This study synthesizes preclinical and clinical evidence on the feasibility, safety, and therapeutic outcomes of FUS-enhanced TMZ delivery in GBM and identifies key methodological limitations to guide future research. **Methods:** A systematic search of PubMed, Cochrane CENTRAL, and ClinicalTrials.gov (through October 2025) identified studies combining FUS (MRgFUS, LIFU, benchtop, or implanted emitters) with TMZ in GBM models or patients. Eligible studies reported at least one pharmacologic or therapeutic outcome and were quality-assessed using SYRCLE RoB, ARRIVE, and CONSORT criteria. **Results:** Of 26 studies screened, six met inclusion criteria—five preclinical and one clinical. All incorporated microbubbles to augment BBB opening. FUS-mediated disruption was feasible and generally safe, with few adverse events at higher acoustic pressures. Preclinical studies showed improved tumor control, prolonged survival, and increased intratumoral TMZ levels. The clinical trial demonstrated reproducible MRgFUS BBB opening without neurological complications and signs of stable disease. **Conclusion:** FUS-mediated BBB opening safely augments TMZ delivery in GBM. Evidence supports its therapeutic potential, warranting standardized protocols and larger, molecularly stratified clinical trials. **Acknowledgements:** Thank you to Dr. D’Amico and NERVE Brain and Spine Group for the guidance and support.

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Brechas en los Servicios y Necesidades Insatisfechas: Voces de Grupos Comunitarios y Entornos Afectivos de Personas con Uso Caótico de Sustancias en Puerto Rico

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Introducción: El fenómeno de sustancias en Puerto Rico se tensiona ante una infraestructura de servicios incapaz de responder a los desafíos que esta presenta. En un contexto capitalista y neoliberal, el desfinanciamiento del Estado da paso a la privatización de algunos servicios de salud. Donde quien consume no tiene acceso a los recursos necesarios y no se consideran a los entornos afectivos en el proceso de cuidado. Asimismo, las comunidades son quienes sostienen los procesos de acompañamiento cuando las instituciones fallan. **Propósito:** Conocer las experiencias de los entornos afectivos acompañando a personas con uso caótico de sustancias, entender cómo las comunidades se insertan en los procesos de acompañamiento y cómo influye la infraestructura de servicios en la atención de estos. **Metodología:** Cualitativa fenomenológica con una muestra no probabilística. Con entrevistas semiestructuradas a entornos afectivos y profesionales de la conducta humana, y grupos focales a grupos comunitarios. Desde un análisis y triangulación de las experiencias. **Resultados:** El fenómeno de sustancias no solo afecta a las personas con uso caótico de sustancias, sino también a los entornos afectivos que deciden acompañarlos. Esto enmarcado en las políticas públicas prohibicionistas que perpetúan el estigma social el cual provoca que los servicios sean desde un modelo asistencialista, paternalista y enfocado en el individuo sin considerar los entornos afectivos que se ven imbricados en la ecuación de acompañamiento y cuidado. **Conclusiones:** Recomendamos una educación sobre el fenómeno desde un enfoque de reducción de riesgos en la cual no criminalice a las personas con uso caótico de sustancias e incluyan a los entornos afectivos y las comunidades para una atención holística y libre de estigma. Aprobado por IRB, 08.14.2025.

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Relationship of PHQ-9 Item 9 with Depressive and Anxiety Symptoms in a University-Based Psychological Services Clinic

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Background and Objectives: Depression and anxiety are among the most prevalent mental health disorders worldwide. Brief and validated instruments such as the Patient Health Questionnaire-9 (PHQ-9) and the Generalized Anxiety Disorder-7 (GAD-7) are widely used to assess the severity of depressive and anxiety symptoms. Item 9 of the PHQ-9, which evaluates thoughts of death or self-harm, has been identified as a valuable indicator of suicide risk; however, its relationship with sociodemographic characteristics and symptom severity varies across populations. The objective of this study was to analyze and compare PHQ-9 and GAD-7 scores and examine the association of Item 9 with depressive symptoms, anxiety symptoms, and sociodemographic variables in a sample of individuals admitted for psychological services at the University Center for Psychological Services and Studies (CUSEP). **Method:** A retrospective cross-sectional study was conducted and approved by the Institutional Review Board (IRB) of the University of Puerto Rico, Río Piedras Campus (#2425-069, approved December 16, 2024). Secondary data from adults who received psychological services at CUSEP between 2022 and 2025 were used. Participants provided informed consent, completed a sociodemographic questionnaire, and completed the Spanish versions of the PHQ-9 and GAD-7. Descriptive statistics, nonparametric correlations, and multivariate analyses were conducted to evaluate independent associations. **Results:** Data from 547 Spanish-speaking adults were analyzed (age: $M = 28.58$, $SD = 12.26$; 65.4% women). The mean PHQ-9 score was 10.72 ($SD = 5.81$) and the mean GAD-7 score was 9.35 ($SD = 5.42$). A total of 26.7% reported suicidal ideation and/or thoughts of death. PHQ-9 Item 9 was moderately associated with total depressive symptoms ($p = 0.48$, $p < .001$) and weakly to moderately associated with anxiety symptoms ($p = 0.34$, $p < .001$), highlighting its clinical relevance as an indicator of symptom severity. **Conclusión:** PHQ-9 Item 9 is a clinically relevant indicator of depressive and anxiety symptom levels. These findings underscore the importance of systematically monitoring Item 9 in clinical settings. **Acknowledgments:** We thank the volunteer student team from the CUSEP research unit.

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High-Risk Behaviors in Hispanic Adolescents with Type 1 Diabetes and a History of Suicide Gestures or Attempts

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Background/Objective: Adolescents with a history of suicide gestures or attempts (HSGA) present higher rates of high-risk behaviors (HRBs) than their peers. Among youth with type 1 diabetes (T1D), HRBs include alcohol, tobacco, and illicit drug use, risky sexual behavior, other rule-breaking behavior (RBB), and disordered eating. Although T1D adolescents with an HSGA are thought to engage more in HRBs than their T1D peers without such a history, few

studies have documented this issue among Hispanic youths. **Method:** We examined the rates of HRBs in T1D adolescents with (G1=18) and without (G2=47) an HSGA. Participants were 65 youths (aged 12-17) enrolled in a depression treatment study (IRB-approved: January 28, 2020). Adolescents and one caregiver each completed relevant questionnaires and modules from a mental health diagnostic interview, including those that allowed us to collect evidence about their HSGA. We used chi-square tests and odds ratios (OR), with 95% confidence intervals, to examine the association between an HSGA and engaging in HRBs ($p \leq .05$). **Results:** As expected, adolescents from G1 were significantly older than their peers. G1 members showed higher rates and odds for the general category of any RBB [OR=20.92 (4.21–103.93)] and in several more specific areas such as current conduct/behavioral disorders [OR=16.50 (3.43–79.29)], current disruptive disorder [OR=8.50 (1.43–50.66)], current attention-deficit hyperactivity disorder [OR=14.88 (2.58–85.60)], history of any substance use [OR=14.78 (3.92–55.74)], history of any illicit drug use [OR=5.38 (1.30–22.19)], and current non-compliance with meal plans [OR=4.59 (1.39–15.09)]. Effect sizes for group differences ranged from medium to large. **Conclusion:** Our findings support the claim that an HSGA in Hispanic T1D adolescents is associated with increased rates and odds for behaviors that are detrimental to their health. Psychosocial interventions for this population should address suicidality and the impact of its associated HRBs on T1D adolescents' health. IRB approval number: 1112-005 (UPR-RP). **Acknowledgements:** The research project from which the data for this study were obtained was supported by funds granted to the third author by the National Institute of Diabetes and Digestive and Kidney Diseases (under Award Number R03DK092547). Work on this study was also possible thanks to Institutional Funds for Research granted to the third author by the Deanship of Graduate Studies and Research from the University of Puerto Rico, Río Piedras Campus.

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Hispanic Adolescents with Type 1 Diabetes and a History of Suicide Gestures or Attempts: Cognitive, Behavioral, Emotional, and Global Functioning

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Background/Objective: Youth with a history of suicide gestures or attempts (HSGA) usually show psychopathological symptoms and functional problems (PSFP) in several areas. Among youth with type 1 diabetes (T1D), few studies have examined the rates or severity of PSFP considering their history of suicidality (yes/no). No study has documented this issue among adolescents with T1D from Puerto Rico. **Methods:** We examined the rates and severity of PSFP among T1D adolescents with (G1=18) and without (G2=47) an HSGA. Participants were 65 youths (aged 12-17) screened for a depression treatment study (IRB-approved: January 28, 2020). Adolescents and one caregiver each completed relevant questionnaires and modules from a mental health diagnostic interview. Clinical evaluators rated adolescents' global functioning and current depressive symptoms. We used chi-square tests, odds ratios (OR), and ANOVAs to examine group differences in PSFP considering cognitive, behavioral, emotional, and global functioning ($p \leq .05$). **Results:** As expected, adolescents with an HSGA were significantly older than their counterparts. G1 showed significantly higher scores in current depressive and anxious/depressive symptoms, cognitive and activity alterations, and suicide ideation, but lower self-efficacy for managing depressive thoughts and global functioning scores than G2. Most effect sizes for these differences were medium. Adolescents with an

HSGA also had higher rates and odds of presenting Major Depression within the previous year (OR=4.09), current suicidality (OR=12.89), severe depressive symptoms in the last two weeks (OR=3.35), and any lifetime anxiety disorder (OR=4.00). Membership in G1 was also associated with higher odds for a history of any psychotherapy or psychiatric treatment (OR=7.04), a history of antidepressant pharmacological treatment (OR=5.64), and at least one lifetime mental health-related hospitalization (OR=11.25). **Conclusion:** Our findings support that an HSGA in Hispanic T1D adolescents is associated with greater severity and increased rates/odds of PSFP in diverse areas. Regular screenings for indicators of suicidality and PSFP are recommended. IRB Approval Number: 1112-005 (UPR Río Piedras). **Acknowledgements:** The research project from which the data for this study were obtained was supported by funds granted to the third author by the National Institute of Diabetes and Digestive and Kidney Diseases (under Award Number R03DK092547). Work on this study was also possible thanks to Institutional Funds for Research granted to the third author by the Deanship of Graduate Studies and Research from the University of Puerto Rico, Río Piedras Campus.

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Using Argumentative Mapping to Explore Multilevel Factors Associated to Colorectal Cancer Stage Disparities in Puerto Rico

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Background: Colorectal cancer (CRC) is the second leading cause of cancer mortality in Puerto Rico, with nearly half of cases diagnosed at advanced stages and screening rates remaining below national targets. These patterns suggest upstream structural determinants shaping diagnostic timing. **Objectives:** To construct an integrated conceptual framework using argumentative mapping examining how municipal-level social determinants of health and social adversity mediated by biological pathways may influence late-stage CRC diagnosis. **Methods:** The argumentation mapping approach was used as the methodological framework to synthesize theoretical and empirical premises supporting a multilevel research question. Four frameworks guided the integration: (1) the WHO Social Determinants of Health model, emphasizing causal hierarchy from structural to intermediary factors; (2) multilevel analysis theory for assessing contextual versus individual-level influences; (3) social genomics and the Conserved Transcriptional Response to Adversity (CTRA) as a potential biological mechanism; and (4) the cancer care continuum model identifying structural barriers in prevention and detection. These frameworks were examined alongside evidence from the Puerto Rico Central Cancer Registry, Puerto Rico Comprehensive Cancer Control Plan 2025-2030, BRFSS screening data, census indicators, and international multilevel CRC studies. **Results:** The framework highlights municipal heterogeneity in poverty, healthcare access, specialist distribution, and screening coverage; consistent disparities by insurance type; documented service access barriers in the Cancer Control Plan; evidence linking socioeconomic adversity to inflammatory gene expression profiles relevant to CRC progression; and international precedents demonstrating feasibility of detecting contextual effects on stage at diagnosis. **Conclusions:** This integrated model provides a theoretically coherent and empirically supported basis for future multilevel studies of CRC disparities in Puerto Rico. It underscores structural determinants as primary targets for intervention and suggests that biological indicators may offer complementary insight within equity-oriented cancer control strategies. **Acknowledgments:** This work was developed as part of doctoral coursework at the UPR Graduate School of Public Health.

Association Between Breast Cancer and Nipple Suction as a Sexual Practice in Northern Mexican Women

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Background: Infectious agents have been proposed as contributors to breast carcinogenesis, supported by the detection of Epstein-Barr virus (EBV), human papillomavirus (HPV), and murine mammary tumor virus (MMTV) in breast tumors. An unstudied yet biologically plausible route of viral exposure involves nipple suction during sexual practices, which may induce microtrauma of the nipple-areola complex and allow exposure to oncogenic viruses present in saliva. **Objective:** To evaluate the association between nipple suction as a sexual practice and breast cancer in women from northern Mexico. **Methods:** We conducted a secondary analysis of a population-based case-control study (2007-2011) across five northern Mexican states. The analytic sample included 988 histologically confirmed breast cancer cases and 1,019 controls. Data was collected using standardized face to face interviews. Nipple suction was self-reported and categorized as never, sometimes, or frequently/always. Logistic regression models estimated odds ratios (ORs) and 95% confidence intervals (CIs), adjusting for age and breastfeeding duration. Analyses were further stratified by menopausal status and tumor immunophenotype (HR+/HER2-, HER2+, triple negative). **Results:** Nipple suction was positively associated with breast cancer in a strong dose-response pattern ($p < 0.001$). Compared with women reporting no nipple suction, those reporting occasional and frequently or always suction had higher odds of breast cancer (OR= 1.38; 95% CI: 1.14 – 1.67; 14.36 95% CI: 9.22 – 22.35). Associations persisted across menopausal groups and tumor immunophenotypes. Sensitivity analyses adjusting for endogenous estrogen index and including sexually inactive participants classified as “never” yielded consistent results. **Conclusions:** This is the first study to report an association between nipple suction as a sexual practice and breast cancer. Findings highlight a potential viral exposure pathway that warrants confirmation through molecular and virological studies. IRB Approval: Approved by the National Institute of Public Health in Mexico (Protocol No. 187-2006)

Social Support Needs of Hispanic Adults from Puerto Rico During the Pandemic: A Comparison by Perceived Level of Mental Well-Being

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Background/Objective: In Puerto Rico (PR), a strong reliance on community networks influences how people cope with adversity. COVID-19 control measures and threats to health/life exacerbated people's need for social support (SS), which is essential for mental well-being (MWB). A low MWB may entail a broader and more intense

SS need. We compared the breadth and intensity of SS need, and the rates/odds of reporting such need in specific areas, among adults from PR with low (G1=814) versus high (G2=893) MWB during the pandemic.

Method: Participants aged 21–79 (M=46.37) completed an online survey (IRB-approved: June 9, 2020). They had to be PR residents for ≥ 3 months before enrollment, have internet access, and understand Spanish. Respondents self-rated their MWB using a 0–10 scale (scores ≤ 6 were considered low) and reported their SS need and its intensity. We used chi-square tests to compare between-group rates of SS need per category. Using Welch ANOVA and Robust ANCOVA, we examined differences in the number of areas in need (NOA) for SS and the global intensity of such need (GIN). Finally, we examined the crude and adjusted odds ratios (ORs) for needing SS in specific areas. **Results:** G1 showed higher rates of need in 14 out of 16 areas and reported significantly ($p \leq .001$) higher NOA [$F(1, 1492.34) = 143.59$, $\eta^2 = 0.08$] and GIN [$F(1, 1611.70) = 142.41$, $\eta^2 = 0.08$] scores than G2. Both findings hold after adjusting for sociodemographic differences. G1's odds for reporting specific need areas ranged from 1.53 (childcare) to 5.12 (psychological/emotional). Twelve out of 14 adjusted ORs remained significant, ranging from 1.40 (help with utilities/repairs) to 4.16 (psychological/emotional). **Conclusion:** Adults with low self-perceived MWB have broader and more intense SS needs than their peers. Increasing the diversity, quality, and accessibility of SS sources is indicated to promote MWB, particularly during public health emergencies. IRB Approval Number: 1920-194 (UPR-Río Piedras). **Acknowledgements:** The research project from which the data reported in this study were obtained (known as “COVID-19 and Mental Health in Adults from Puerto Rico”) was financed with the personal funds of the second author. We are thankful to the research assistants for their collaboration in this study. Some of them were hired thanks to funds granted to the Institute for Psychological Research by the Deanship of Graduate Studies and Research from the University of Puerto Rico, Río Piedras Campus.

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Comparative Analysis of Immune Profiles through Optimization Methods in Alzheimer's Disease

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Background & Objectives: Alzheimer's Disease (AD) is the most common cause of dementia, yet its molecular etiology remains poorly defined. Beyond classical amyloid and tau pathology, recent evidence suggests that immune dysregulation may contribute to disease progression. However, the degree to which AD shares transcriptomic features with autoimmune or other neurodegenerative conditions remains unclear. The objective of this study was to systematically compare AD gene expression profiles to those of various diseases to identify molecular similarities that could inform AD pathogenesis. **Methods:** Publicly available microarray and RNA-seq datasets were obtained from the Gene Expression Omnibus for AD and ten comparison conditions, which fell into these categories: cancer, autoimmune disease, neurodegenerative disease and metabolic disorders. Differentially expressed genes (DEGs) for each disease were identified using the Optimization-Based Analysis of Multiple Arrays (OBAMA) pipeline, which employs Multi-Criteria Optimization to reduce the influence of arbitrary statistical cutoffs. Pathways enriched from each DEG list were analyzed using Reactome. Disease similarity was quantified by applying a weighted Jaccard Index to pathway significance values, producing pairwise molecular distance

scores. **Results:** AD displayed its strongest similarity to Systemic Lupus Erythematosus, Huntington's Disease and Diabetes Type 2. Neurodegenerative diseases such as Parkinson's Disease showed moderate similarity, whereas cancer conditions exhibited substantially larger molecular distances from AD. These results indicate that AD clusters are more closely with immune-mediated disorders than with unrelated disease categories. **Conclusions:** Our comparative analysis reveals that AD share molecular pathways most similar to an autoimmune disease. This implies that immune dysfunction could be a key factor in its etiology and opens new doors towards the creation and/or repurposing of immunomodulatory therapies. **Acknowledgements:** This work was conducted by the Applied Optimization Group at UPRM.

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Psychopathological Symptoms Among Hispanic Adults from Puerto Rico With Different Levels of Physical Morbidity During the COVID-19 Pandemic

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Background/Objective: Chronic physical illnesses (CPIs) pose a higher risk of severe coronavirus-related symptoms, hospitalizations, and mortality. Risk awareness and difficulties accessing in-person services during the pandemic may have made adults with CPIs more likely to experience psychopathological symptoms (PS) than healthy adults. We compared the severity and rates of PS experienced during the pandemic by healthy controls and three groups of adults with increasingly higher physical morbidity levels. **Method:** Participants aged 21–79 (N=1736) completed an online survey (IRB-approved: June 9, 2020). They had to be Puerto Rico residents for ≥ 3 months before enrollment, have internet access, and understand Spanish. Adults completed measures of anxiety, depression, posttraumatic stress, loneliness, fear of COVID-19 infection (FOCI), and death/self-harm thoughts (DSHT). We defined groups based on physical morbidity levels: zero (G1=671), 1–2 (G2=568), 3–4 (G3=317), or ≥ 5 (G4=180) illnesses. We used chi-square tests and ANCOVAs (adjusted for age, education, income, and household size) to compare groups in rates and severity of PS, respectively. **Results:** Rates of PS were statistically similar between G1 and G2, but higher in G3 and G4. G3 and G4 members reported higher depression, anxiety, posttraumatic stress, and loneliness severity scores than G2 members, who showed higher scores than G1 adults ($p \leq .05$). Mean obsessive/agoraphobic FOCI scores were similar in G3 and G4, but higher than in G1. G4 adults showed higher rates and severity of depression and higher rates of DSHT (anytime during the pandemic) than G3 members. **Conclusion:** Our results concur with pre-pandemic studies, which showed that incremental levels of physical morbidity result in increasing levels of PS. Because of their double vulnerability and the unique mental health challenges of adults with multimorbidity, our findings underscore the need for tailored interventions, continuous health-related education, and affordable mental health services for this population, particularly during public health emergencies. IRB Approval Number: 1920-194 (UPR-Río Piedras). **Acknowledgements:** The research project from which the data reported in this study were obtained (known as “COVID-19 and Mental Health in Adults from Puerto Rico”) was financed with the personal funds of the second author. We are thankful to the research assistants for their collaboration in this study. Some of them were hired thanks to funds granted to the Institute for Psychological Research by the Deanship of Graduate Studies and Research from the University of Puerto Rico, Río Piedras Campus.

The Impact of Immune Surveillance on Tumor Growth in Aged, Genetically Matched Oral Cancer Models

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Background and Objectives: Non-HPV associated head and neck squamous cell carcinomas (HNSCC) frequently arise from oral premalignant lesions due to the accumulation of genetic mutations and exposure to carcinogens such as tobacco, alcohol, and aging. To investigate mechanisms of immune evasion and immunotherapy resistance, we developed a panel of syngeneic oral cancer cell lines derived from aged Trp53/Cdkn2a mutant mice. Among these, ROC14A and ROC14B, which originated from the same animal, display markedly different tumorigenic capacities. We hypothesize that differences in T cell-mediated immune surveillance underlie their divergent in vivo behavior.

Methods: ROC14A and ROC14B cells were orthotopically implanted into immunodeficient RAG1 knockout and immunocompetent C57BL/6J mice. To test the role of cytotoxic T cells, a subset of immunocompetent mice received anti-CD8 antibody treatment. Tumor immune microenvironments were analyzed using immunohistochemistry (IHC), while western blots evaluated epithelial and mesenchymal marker expression. Quantitative PCR (qPCR) was performed to profile cytokines, chemokines, and immune checkpoint molecules across the ROC panel. (Approved by IACUC; 8/26/2024). **Results:** ROC14B tumors grew robustly in CD8-depleted mice, demonstrating that CD8⁺ T cells restrict their growth in immunocompetent hosts. IHC revealed that ROC tumors exhibit high proliferative activity with limited lymphocytic infiltration, while macrophages were the predominant immune population. Western blots showed variable epithelial and mesenchymal marker expression, including elevated vimentin in ROC14 and increased keratin-14 in ROC15. qPCR profiling demonstrated increased expression of chemokines (CCL2, CCL5), myeloid markers (CD68, CD11b), and checkpoint molecules (Galectin-9, VISTA, TIM-3), suggesting an immunosuppressive microenvironment. **Conclusion:** Despite their shared genetic origin, ROC14A and ROC14B display differential susceptibility to immune surveillance, with ROC14B likely expressing neoantigens that trigger CD8⁺ T cell-mediated tumor control. The ROC cell line panel recapitulates key features of the immunosuppressive HNSCC microenvironment at both protein and gene-expression levels, providing a platform to study immune escape mechanisms and develop next-generation immunotherapies. **Acknowledgements:** The UPR/MD Anderson Partnership for Excellence in Cancer Research (U54096300).

Impact of Social Determinants of Health on PROMs After TKA in Hispanic Patients: A Prospective Study

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INNOVATING TOGETHER *for Healthier Futures*

Introduction: Social determinants of health (SDOH) influence outcomes after total knee arthroplasty (TKA), yet data on Hispanic patients—particularly in Puerto Rico—remain limited. This study evaluates patient-reported outcomes (PROMs) after robotic MAKO-assisted TKA (a robotic-arm surgical system) in a Hispanic population. **Methods:** We conducted a prospective study of Spanish speaking Hispanic patients ≥ 50 years who underwent MAKO-assisted TKA from 2024–2025. Demographic, clinical, and SDOH variables were collected. PROMs included KOOS, WOMAC, SF-12, PROMIS-10, and ED-Q5 (standardized tools for assessing knee symptoms, function, and global health). Associations between SDOH and outcomes were analyzed using Student t-tests ($p < 0.05$). Paired t-tests assessed pre- to one-month changes. **Results:** PROM data were available for 131 patients preoperatively, 49 at one month, and 23 at three months. Lower socioeconomic status, public insurance, limited rehabilitation access, and transportation barriers were associated with poorer baseline PROMs and follow-up adherence, while higher health literacy and primary care access correlated with better outcomes. PROMs improved significantly after TKA: KOOS increased from 37.1 ± 16.8 to 54.0 ± 18.6 and 66.0 ± 14.0 ; WOMAC decreased from 56.0 ± 21.2 to 33.0 ± 21.0 and 20.5 ± 13.0 (all $p < 0.0001$). PROMIS-10 Physical improved from 37.2 ± 7.4 to 47.4 ± 6.5 , and Mental from 48.6 ± 9.2 to 53.5 ± 7.6 . Diabetic patients, females, and those outside the San Juan/Metro region had worse baseline PROMs, while greater postoperative gains occurred among patients living outside the Metro region, those with PCP access, public insurance, and those receiving cemented fixation, patellar resurfacing, or posterior-stabilized implants. **Conclusion:** SDOH strongly influence clinical and patient-reported outcomes after MAKO-assisted TKA in Hispanic patients. Addressing socioeconomic, access-related disparities, language barrier and cultural differences is essential to improving recovery and promoting equitable orthopedic care. Approved by IRB: 25033748989.

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Psychiatric Symptoms Among Hispanic Adults from Puerto Rico Living with Asthma During the COVID-19 Pandemic

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Introduction/Objective: The lifetime prevalence of asthma in Puerto Rico (PR) is the highest of any jurisdiction in the United States. During the COVID-19 pandemic, adults with asthma (AWA) were at higher risk for the emergence or worsening of psychiatric symptoms (PS), compared to adults without chronic diseases (AWOCD). However, few studies have documented differences in PS during this health emergency among Hispanics. We examined the severity and odds for clinical levels of PS in AWA (G1=236) versus AWOCD (G2=671) who completed an online survey during the outbreak (IRB-approved: June 9, 2020). **Method:** Participants aged 21–78 years ($M=42.84$; 81.26% female) were required to be PR residents for ≥ 3 months before enrollment, have internet access, and understand Spanish. Adults completed a Health/Treatment History Module and questionnaires assessing symptoms of depression, anxiety, posttraumatic stress disorder (PTSD), feelings of loneliness (FOL), fear of COVID-19 infection (FOCI), and death/self-harm thoughts (DSHT). Using ANCOVAs (adjusting for sex, age, and household size), we compared the between-group mean severity of PS. Using logistic regression, we examined the crude and adjusted odds ratios of presenting clinically-elevated PS in AWA. **Results:** AWA had significantly ($p \leq .001$) higher scores in symptoms of anxiety [$F(1, 900) = 43.49$], depression [$F(1, 900) = 49.04$], PTSD [$F(1, 900) = 58.88$], total FOCI [$F(1, 901) = 20.18$], and FOL [$F(1, 900) = 40.04$] than AWOCD. G1's adjusted odds of having clinically-elevated PS were 1.53 (Obsessive/Agoraphobic

FOCI; $p \leq .01$) to 2.85 (depressive symptoms; $p \leq .001$) times higher than in G2. AWA were 3.13 times as likely as their peers to present DSHT anytime during the pandemic ($p \leq .001$) and 2.86 times as likely to present DSHT within the past two weeks ($p \leq .001$). **Conclusion:** AWA showed worse outcomes related to PS than AW OCD. Public policies must prioritize evidence-based strategies tailored to the mental health needs of AWA during health emergencies. IRB Approval Number: 1920-194 (UPR-Río Piedras). **Acknowledgements:** The research project from which the data reported in this study were obtained (known as “COVID-19 and Mental Health in Adults from Puerto Rico”) was financed with the personal funds of the second author. We are thankful to the research assistants for their collaboration in this study. Some of them were hired thanks to funds granted to the Institute for Psychological Research by the Deanship of Graduate Studies and Research from the University of Puerto Rico, Río Piedras Campus.

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Adults with or Without Hypertension Living in Puerto Rico: Psychiatric Symptoms During the COVID-19 Pandemic

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Background/Objective: Adults with hypertension (AWH) are more likely to have psychiatric symptoms (PS) than adults without chronic diseases (AWOCD). Although the COVID-19 pandemic represented a severely stressful event to the adult population in Puerto Rico (PR), few studies have documented the extent of differences in PS among these groups during this health emergency. We examined the severity and odds for clinical levels of PS among AWH (G1=425) vs. AWOCD (G2=671) who completed an online survey during the outbreak (IRB-approved: June 9, 2020).

Method: Participants aged 21–79 years ($M=46.06$; 77.46% women) had to be PR residents for ≥ 3 months before enrollment, have internet access, and understand Spanish. Adults completed a Health/Treatment History Module and questionnaires assessing symptoms of depression, anxiety, posttraumatic stress disorder (PTSD), feelings of loneliness (FOL), fear of COVID-19 infection (FOCI), and death/self-harm thoughts (DSHT). Using ANCOVAs (adjusting for age and household size), we compared the between-group mean severity of PS. Using logistic regression, we examined the crude and adjusted odds ratios of presenting clinically-elevated PS in AWH. **Results:** AWH had significantly ($p \leq .001$) higher scores in symptoms of anxiety [$F(1, 1090) = 32.13$] depression [$F(1, 1090) = 53.36$], PTSD [$F(1, 1089) = 52.30$], total FOCI [$F(1, 1088) = 21.96$], and FOL [$F(1, 1089) = 28.77$] than AWOCD. G1's adjusted odds of presenting clinically-elevated PS were from 1.53 (Obsessive/Agrophobic FOCI; $p \leq .01$) to 2.64 (PTSD symptoms; $p \leq .001$) times higher than for G2. AWH were 2.42 times as likely as their peers to present DSHT anytime during the pandemic and 2.59 times as likely to present DHST within the past two weeks ($p \leq .001$). **Conclusion:** As expected, AWH showed worse outcomes related to PS than AWOCD. Healthcare providers must emphasize providing evidence-based education and integrated physical and mental health care for this population, particularly considering the extremely stressful nature of health emergencies. IRB Approval Number: 1920-194 (UPR-Río Piedras). **Acknowledgements:** The research project from which the data reported in this study were obtained (known as “COVID-19 and Mental Health in Adults from Puerto Rico”) was financed with the personal funds of the second author. We are thankful to the research assistants for their collaboration in this study. Some of them were hired thanks to funds granted to the Institute for Psychological Research by the Deanship of Graduate Studies and Research from the University of Puerto Rico, Río Piedras Campus.

Poster Presentations

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Neurodevelopmental and Psychotic Disorder Comorbidity in Puerto Rican Patients within the PORTI Program: Clinical Impact and Ethnic Considerations

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Background & Objectives: Individuals with comorbid neurodevelopmental (NDD) and psychotic disorders often present with earlier symptom onset, lower global functioning, and more severe clinical courses than those with psychosis alone. Emerging genetic studies suggest that associations between neurodevelopmental traits and psychotic symptoms may vary by ancestry, suggesting ancestry-specific gene–environment interactions. Despite this clinical relevance, Hispanic/Latino populations—particularly Puerto Ricans on the island—remain underrepresented in research exploring this comorbidity. Caribbean Latinos such as Puerto Ricans have a mixed genetic ancestry that may offer insight into this relationship. **Methods:** We conducted a case series within PORTI, a Coordinated Specialty Care initiative for First Episode Psychosis that has served for 10 years a total of 100 Puerto Rican patients. Using descriptive statistics (N=23), we examined the clinical impact of NDD comorbidity on age of psychosis onset, global functioning, and first hospitalization for psychosis length of stay (FHP-LOS), relative to expected values. **Results:** Earlier psychosis onset was seen in 75% of females with NDD comorbidity, a trend associated with poorer recovery outcomes. Moreover, social functioning impairment exceeds expectations in 75% of females, highlighting the presence of key premorbid domains that could result in poorer functional outcomes. A higher-than-expected FHP-LOS was seen in 75% of our NDD comorbidity sample, but institutional factors in Puerto Rico’s data complicate direct comparison stretching the need for updated local data. MIRECC GAF scores reveal severe occupational impairment in over 75% of patients, despite milder deficits in social and symptomatic domains—possibly reflecting developmental deficiencies and suggesting sociopolitical barriers to employment and education. **Conclusions:** Our findings highlight the urgent need for population-specific research on NDD–psychosis comorbidity and underscore the importance of culturally tailored psychiatric assessment and care strategies for Caribbean Latino populations. Future studies should integrate genetic ancestry, developmental history, and structural factors to inform equitable clinical interventions. **Acknowledgements:** This research was supported by SAMHSA and ASSMCA IRB2290035125R002.

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Exploring Epigenetic Mechanisms of Alcohol Tolerance: the Role of Tip60 via CRISPR Editing

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Alcohol use disorder (AUD) is a chronic neuropsychiatric condition characterized by the development of tolerance and dependence that significantly affects the Puerto Rican population, with prevalence rates exceeding 25 % of adults and markedly higher among men. Recent studies have highlighted that neuroepigenetic mechanisms, including histone acetylation, play a crucial role in modulating the gene expression changes associated with chronic alcohol exposure. The histone acetyltransferase Tip60 has been implicated in neuronal transcriptional regulation and synaptic plasticity, yet its direct role in alcohol tolerance remains poorly understood. This project aims to develop tools to investigate the role of Tip60 in the epigenetic mechanisms of alcohol tolerance using *Drosophila melanogaster* as a model organism. A CRISPR-based transgenic construct was engineered in which the catalytic endonuclease domain of Cas9 was replaced by the histone acetyltransferase (HAT) domain of Tip60 through Gibson Assembly. The fusion construct (dCas9-Tip60) enables targeted chromatin acetylation at specific alcohol-responsive loci, including *Tsf1*, *Lsp2*, and *Jhe*, genes associated with stress and metabolic regulation during ethanol exposure. Preliminary results confirm successful linearization of the pWalium20 vector, insertion of the Tip60 HAT domain, and positive colony PCR screening across 72 samples, verified through Sanger sequencing. Future work includes generating transgenic *Drosophila* lines carrying the dCas9-Tip60 construct, crossing them with guide RNA lines, and performing behavioral assays to measure tolerance phenotypes. This strategy will allow site-specific acetylation to probe how Tip60-mediated transcriptional activation contributes to adaptive responses to ethanol.

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Isolation and Characterization of Fungi Associated with Fiddler Crabs in Mangroves

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Background: Mangrove ecosystems are highly productive environments where aquatic organisms maintain complex relationships with microorganisms. Fiddler crabs (*Uca rapax*) contribute to nutrient cycling and sediment turnover, yet little is known about the fungi associated with them. This research aimed to isolate and characterize culturable intestinal fungi from *U. rapax* collected in Boquerón, Puerto Rico. **Methods:** Five crabs were collected from a mangrove site, on Boquerón, Puerto Rico (18°01'29" N, 67°10'24" W). Under sterile conditions, intestines were dissected under a stereoscope. Contents were diluted in sterile water and plated on chitin agar for culturing. Fungal colonies with distinct morphology were selected for isolation and growth in PDA. Further identification will employ molecular analysis of rDNA genes. **Results:** Four different morphological fungal colonies were successfully isolated. Among them a cream-colored, cottony-textured fungal colony was isolated from the intestine of crab, accompanied by powdery bacterial colonies, possibly Actinobacteria. Other isolates included a dark pink, cottony colony, along with a colony resembling *Aspergillus* sp., and additional pink, powdery colonies. Finally, a colony with a half-white velvety and cottony texture, featuring a dark pink center was isolated. These findings indicate diverse fungal morphologies and suggest a consistent intestinal fungal community among specimens. Purification of isolates is ongoing to obtain a more specific cultures for morphological and molecular characterization. **Conclusion:** Preliminary findings indicate a diverse culturable fungal community within the intestinal tract of *U. rapax*. This research presents an initial step in characterizing mangrove crab microbiota in Puerto Rico, highlighting their potential role in organic matter degradation within coastal ecosystems. **Acknowledgements:** This research was supported and conducted at the Symbiosis Laboratory in the University of Puerto Rico Mayagüez Campus.

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Clinical and Surgical Relevance of Axillary Nerve Variability in its Localization and Innervation of the Triceps Brachii Muscle: A Cadaveric Study

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The triceps brachii muscle is classically innervated by the radial nerve, but occasionally receives motor supply from the axillary nerve—a variation with significant diagnostic and surgical implications. The anatomical course of the axillary nerve is well established, yet variations in its branching pattern, particularly toward the long head of the triceps brachii, are increasingly reported in cadaveric and clinical studies. The purpose of this study is to examine axillary nerve variations, localize them, and discuss their clinical implications. Axillary nerve variations were seen in all three specimens. In one female cadaver, two separate axillary nerve branches inserted into the upper third of the right long head of the triceps brachii. In a male cadaver, a single bifurcating axillary branch supplied the right long head. In another male, a single longitudinal axillary branch was inserted into the medial part of the left long head. All branches ran near the surgical neck of the humerus and beneath the deltoid. All of these are areas commonly involved in shoulder and proximal humeral procedures. These findings agree with reports of dual or exclusive axillary innervation of the triceps long head, although discrete locations differ. Such variations can change the usual "safe zones" in posterior shoulder and deltoid-splitting approaches. Unrecognized variants may lead to nerve injury, misdiagnosis, or weakness in elbow extension. High-resolution ultrasonography or MR neurography before surgery may help detect these differences. Variant branches may also serve as donor nerves for triceps-to-deltoid neurotization. This cadaveric series reveals significant variations in the axillary nerve distribution to the long head of the triceps brachii. Knowledge of these patterns makes shoulder and humeral surgeries safer and improves diagnosis in neuropathies. Surgeons and clinicians should always consider axillary nerve variability when planning surgery and evaluating upper limb function. **Acknowledgements:** We would like to acknowledge our mentor Dr. Wilson Veras and the San Jaun Bautista School of Medicine for all their resources, the availability of their anatomy laboratory, and all their help throughout the course of this study.

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Epithelioid Angiosarcoma Mimicking Peritoneal Mesothelioma

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Purpose: Epithelioid angiosarcoma (EA) is an uncommon vascular malignancy that may arise in the peritoneum and clinically resemble peritoneal mesothelioma (PM). Given their overlapping features, differentiation relies heavily on a systematic diagnostic approach integrating histopathology and immunohistochemistry (IHC). This case illustrates the importance of maintaining diagnostic vigilance when evaluating peritoneal tumors with atypical morphology.

Case Description: A 74-year-old man with cardiovascular disease presented with progressive weakness, anemia, hypotension, and ascites. Imaging revealed diffuse peritoneal nodularity and a small right upper lobe lung nodule. Omental biopsy initially favored mesothelioma. The patient required serial paracenteses and placement of a PleurX catheter for hemorrhagic ascites. His condition deteriorated with acute kidney injury, small bowel obstruction, and severe malnutrition, leading to transition to comfort care. At autopsy, extensive peritoneal involvement was noted. Microscopic examination showed epithelioid cells forming irregular vascular channels filled with red blood cells. IHC demonstrated diffuse positivity for CD31, ERG, and FLI-1, confirming endothelial origin, while WT-1, claudin-4, and BAP-1 were negative, excluding PM. **Conclusion:** This case underscores the necessity of broad IHC panels and critical correlation between morphology and molecular markers when diagnosing peritoneal tumors. Although both EA and PM share similar presentations, accurate classification is essential due to EA's aggressive course and poorer prognosis. Continued investigation into standardized diagnostic algorithms, molecular profiling, and targeted therapies may improve recognition and management of this rare entity. **Acknowledgments:** Supported in part by HCA Healthcare and/or affiliated entities. The views expressed are those of the authors and do not necessarily represent the official views of HCA Healthcare or its affiliates.

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Metástasis Pulmonar con Diferenciación Glandular en Nódulo Cervical: Caso Atípico de un Hombre de 73 Años Asintomático

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Propósito: Los nódulos linfáticos cervicales son un área común en la que neoplasias primarias de cabeza y cuello, como lo son las glándulas salivares, tiroides, piel y el tracto digestivo superior, pueden metastatizar. La metástasis pulmonar con diferenciación glandular a un nódulo cervical es muy poco común, siendo este aproximadamente el 1% de las metástasis. Este estudio de caso busca correlacionar el historial clínico del paciente y las características citológicas de las muestras tomadas en conjunto a pruebas auxiliares para lograr un diagnóstico certero y preciso, y enriquecer la literatura científica. **Descripción del caso:** El estudio de caso presenta a un hombre de 73 años asintomático con historial de tabaquismo y adenopatías cervicales y nódulos tiroideos. Se realizó biopsia por aspiración de aguja fina de un nódulo cervical derecho y un nódulo tiroideo lateral. El análisis citológico para la muestra del nódulo cervical derecho muestra células atípicas positivas para malignidad, con un patrón positivo a las expresiones tumorales de CK AE1/AE3, CK-7, TTF-1 y Napsin, P-53 y P-63 disperso. Este panel inmunohistoquímico y las características citológicas confirman el diagnóstico de metástasis pulmonar con diferenciación glandular. El análisis citológico del nódulo tiroideo lateral derecho mostró tener características benignas. **Conclusión:** El análisis de las características citológicas en conjunto con pruebas auxiliares es indispensable al momento de brindar un diagnóstico preciso y certero. Esto permite proveer al médico un panorama claro ante la recomendación de algún tratamiento. Este estudio de caso permite aportar a la comunidad científica y patológica valiosa información sobre un caso de un hombre adulto asintomático con historial de adenopatías cervicales y nódulos tiroideos, del cual se obtuvo un diagnóstico preciso y certero bajo el análisis citológico, pruebas auxiliares y correlación del historial clínico del paciente. Al momento se desconoce el pronóstico del paciente.

Isolated Sacral Metastasis: An Unusual Presentation of Breast Carcinoma

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Purpose: Breast carcinoma rarely presents with sacral involvement, and distinguishing metastatic disease from other neoplasms is challenging in patients with Neurofibromatosis type 1 (NF1), who are predisposed to multiple, unrelated tumors. This case highlights the diagnostic complexity created by overlapping clinical histories, including a prior gastrointestinal stromal tumor (GIST), and emphasizes the role of integrated pathology and molecular testing in clarifying tumor origin. **Case Description:** A 50-year-old woman with NF1 and remote GIST resection presented with progressive sacral and right leg pain. Imaging demonstrated a lobulated sacral mass (S3–S4), an enhancing L3 vertebral lesion, and intradural nodules at L2–L3. Resection of the sacral lesion revealed a high-grade carcinoma with neuroendocrine differentiation. Immunohistochemistry showed strong ER expression with GATA3, TRPS1, mammaglobin, and epithelial markers, supporting metastatic breast carcinoma. Postoperative studies identified a left breast mass with axillary lymphadenopathy and additional metastatic lesions involving the spine and small bowel. Molecular profiling demonstrated NF1 mutation with RAS/MAPK pathway activation and chromosomal instability but no evidence of BRCA1 mutation or 17q loss, helping distinguish this carcinoma from recurrent GIST or a nerve sheath tumor. **Conclusions:** This case illustrates the diagnostic challenges of evaluating new tumors in NF1 patients, who are susceptible to diverse malignancies. Combined histopathology, immunophenotyping, and genomic profiling were essential for identifying breast origin and avoiding misclassification as recurrent GIST. Vigilant surveillance and prompt evaluation of new symptoms remain critical in NF1 due to their elevated cancer risk. **Acknowledgments:** Supported in part by HCA Healthcare and/or affiliated entities. The views expressed are those of the authors and do not necessarily represent the official views of HCA Healthcare or its affiliates.

Acute Ischemic Stroke Following Bioprosthetic Aortic and Mitral Valve Replacement for Infective Endocarditis

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Purpose: This case aims to highlight the neurological complications associated with infective endocarditis requiring double bioprosthetic valve replacement, emphasizing the importance of early recognition, multidisciplinary management, and postoperative neurovascular surveillance. **Case Description:** A 59-year-old male with congestive heart failure, chronic kidney disease, and severe native aortic stenosis presented with symptoms of

decompensation and was diagnosed with infective endocarditis involving the mitral valve. Due to extensive valvular destruction and hemodynamic instability, he underwent bioprosthetic aortic and mitral valve replacement. His immediate postoperative course was complicated by bleeding, oliguria, and hyperkalemia, requiring stabilization in the intensive care unit. After initial improvement, several days later he developed acute left-sided weakness and dysarthria. A non-contrast CT scan revealed an ischemic infarct involving the right internal capsule and caudate nucleus. He was treated with antiplatelet therapy, cardiovascular optimization, and close neurologic monitoring. Further evaluation included carotid Doppler ultrasound and MRI brain for secondary prevention. The patient showed gradual neurological recovery, regained orientation, and tolerated progressive ambulation prior to discharge. **Conclusion:** Neurological complications such as ischemic stroke remain a significant source of morbidity in patients undergoing surgical intervention for infective endocarditis. This case underscores the need for vigilant postoperative monitoring, timely neuroimaging, and coordinated interdisciplinary care. Identifying high-risk individuals and optimizing perioperative management may reduce stroke incidence and improve outcomes in this vulnerable population. **Acknowledgments:** The authors acknowledge the clinical teams involved in the care of this patient. No conflicts of interest declared.

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Clinical and Surgical Relevance of Radial Nerve Variability in its Localization and Innervation of the Brachialis Muscle: A Cadaveric Study

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The brachialis muscle is classically described as receiving exclusive motor innervation from the musculocutaneous nerve, a terminal branch of the lateral cord of the brachial plexus (C5,C6,C7). However, numerous cadaveric and electrophysiological studies have demonstrated that the brachialis may receive dual innervation from both the musculocutaneous and radial nerves. This anatomical variation holds important implications for surgical safety, clinical diagnosis, and nerve reconstruction. The purpose of this study is to examine radial nerve variations, locate these variations, and discuss their clinical implications. Radial nerve contributions to the innervation of the brachialis muscle were observed in multiple specimens, including both bilateral and unilateral presentations. The variant branches consistently originate from the radial nerve before it bifurcates into superficial and deep branches. They most commonly arose at the midshaft of the humerus. These branches coursed diagonally or perpendicularly toward the lateral surface of the brachialis muscle, inserting directly into it. Some specimens had dual branches (proximal and distal) on the same side, while others showed single, unilateral branches. The findings reinforce prior anatomical and electrophysiological reports, confirming that the radial nerve frequently contributes to the motor innervation of the brachialis, although discrete nerve locations vary. Functionally, this dual supply may preserve partial elbow flexion strength following musculocutaneous nerve injury, offering a compensatory mechanism. Conversely, unrecognized variant branches are vulnerable to iatrogenic injury during anterior or anterolateral humeral approaches, nerve transfers, and fracture fixation procedures. Preoperative imaging, cautious dissection near the distal humerus, and intraoperative nerve stimulation can help prevent inadvertent nerve damage or denervation. Clinical awareness of these findings has a significant impact on surgical strategy, diagnostic interpretation of nerve injuries, and outcomes in upper limb reconstruction. Nonetheless, further large-scale studies are warranted to quantify the prevalence and functional significance of this dual innervation pattern. **Acknowledgements:** We would like to acknowledge our mentor Dr. Wilson Veras and the San Jaun Bautista School of Medicine for all their resources, the availability of their anatomy laboratory, and all their help throughout the course of this study.

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**Asymmetrical Rare Bilateral Variations of the Fibularis Tertius:
A Rare Cadaveric Case Report Including
a Previously Undescribed Variant**

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The fibularis tertius muscle (FTM) is a slender, variable muscle located in the anterior leg. It primarily assists with ankle dorsiflexion and eversion. Anatomical studies show it is absent in 7–20% of individuals. They also describe various insertional variants. Accessory tendons and asymmetrical insertions occur, but bilateral asymmetrical variations are extremely rare. This report describes a bilateral asymmetric accessory insertion of the fibularis tertius muscle found during a cadaver dissection at the San Juan Bautista School of Medicine. During routine cadaveric dissection, we observed bilateral but asymmetrical FTM variations in an adult male cadaver. On both sides, the FTM originated normally from the distal third of the fibula and interosseous membrane. It is then inserted mainly at the base of the fifth metatarsal. Accessory tendons appeared on both sides. On the right, an accessory tendon measuring about 6.0 mm inserted into the interdigital fascia between the fourth and fifth toes, representing a Type III variation. On the left, a second accessory tendon about 6.3 mm extended to the distal phalanx of the fourth toe—a new insertion not previously reported in the literature. The presence of two distinct insertion patterns in one person indicates a unique, bilateral, asymmetrical FTM variant. The right-side fascial insertion matches known morphologies, but the left-side digital insertion is an addition to the literature of an unknown FTM variant. Clinically, these differences may affect dorsiflexion, eversion strength, and lateral ankle stability. They could impact gait symmetry and raise the risk for lateral foot injuries. In surgery, understanding accessory fibular tendons is crucial to prevent misdiagnosis or harm during tendon grafting, reconstruction, or imaging procedures. Overall, these findings show the FTM's wide range of variants and highlight its importance for anatomy education, surgery, and the evolutionary study of human lower limb muscles. **Acknowledgements:** We would like to acknowledge our mentor Dr. Wilson Veras and the San Jaun Bautista School of Medicine for all their resources, the availability of their anatomy laboratory, and all their help throughout the course of this study.

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**Clinical and Surgical Considerations of Anatomical
Variants of the Fibularis Brevis Tendon**

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The fibularis brevis muscle (FBM), also known as the peroneus brevis, plays a crucial role in eversion of the foot and assists in plantarflexion of the foot. It originates from the distal two-thirds of the lateral fibular surface and inserts into the tuberosity of the fifth metatarsal bone, receiving motor innervation from the superficial fibular nerve. However, its distal tendon demonstrates considerable variability, with documented patterns including bifurcation, trifurcation, and accessory slips that insert into nearby structures, such as the cuboid bone, fascia, or the fibularis longus tendon. These variations may influence ankle biomechanics, predispose

to tendon pathology, and impact surgical procedures involving the lateral compartment of the leg and foot. The purpose of this study is to describe and examine the fibularis brevis muscle tendon variations and discuss their clinical implications. From the cadavers examined, sixteen of the 20 limbs (80%) showed deviations from the classical insertion pattern. Accessory slips are inserted onto the cuboid bone, the fascia of the fifth metatarsal, and the head of the fifth metatarsal. Bifurcation of the main tendon was common. One specimen displayed a rare trifurcation, with insertions at the cuboid, the fascia, and the fifth metatarsal tuberosity. Bilateral variations appeared in both male and female specimens. This series showed a high incidence of FBT variations, surpassing reported frequencies. This difference may be due to population or methodological factors. Accessory insertions to the cuboid bone were particularly common, increasing recognition of this structure as a secondary attachment site. The true trifurcation pattern found supports the complexity of distal tendon morphology. These variations have important clinical implications. They may contribute to peroneal tendon crowding, increase the risk of tendinopathy or subluxation, and complicate imaging or surgery. **Acknowledgements:** We would like to acknowledge our mentor Dr. Wilson Veras and the San Jaun Bautista School of Medicine for all their resources, the availability of their anatomy laboratory, and all their help throughout the course of this study.

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Alström Syndrome with Novel ALMS1 Mutations: First Case Report in a Puerto Rican Patient

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Purpose: Patients with the Alström syndrome (ALMS) have cone-rod dystrophy and thus progressive visual impairment, sensorineural hearing loss, metabolic dysfunction, cardiomyopathy, and multiorgan fibrosis. Upon physical examination, patients with ALMS have obesity, short stature, and progressive organ dysfunction affecting the liver, kidneys, heart and lungs. Manifestations due to biallelic pathogenic variants in the ALMS1 gene located on chromosome 2p13 lead to ciliary dysfunction ubiquitously in their body tissues. To our knowledge, limited cases of compound heterozygous ALMS1 mutations have been published, and none have been reported in Puerto Rico. **Case Description:** We describe a case of a 38-year-old male patient with legal blindness, retinal findings, and visual symptoms compatible with cone-rod dystrophy. The patient's comorbidities include complete hearing loss, metabolic syndrome, hypertension and renal disease, with genetic evaluation showing compound heterozygous pathogenic variants: c.11672-2A>G and c.3721_3724del. Our patient's presentation and genetic findings indicate Alström syndrome. **Conclusion:** This case highlights the importance of genetic screening for Alström syndrome in the Puerto Rican population and raises clinical awareness for this rare ciliopathy. Physical examinations, metabolic evaluation, and genetic studies may all contribute to reaching an ALMS diagnosis. Prompt diagnosis may help co-manage and improve the prognosis of patients with the disease. **Acknowledgements:** The authors declare they have no competing interests.

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Cerebral *Cryptococcus neoformans* Abscess as a Forehead Protuberance in Idiopathic CD4+ T Cell Lymphopenia: A Case Report

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Purpose: The purpose of this clinical case presentation is to highlight a rare instance of a cerebral abscess presented as a forehead protuberance caused by a *Cryptococcus neoformans* infection and to raise awareness of the need to evaluate patients for possible underlying immunodeficiencies, as in this case of primary CD4+ T cell immunodeficiency, emphasizing the importance of early recognition and management. **Case Description:** A 48-year-old woman with a medical history of diabetes mellitus, recurrent pancreatitis, anemia, thrombocytopenia, and multiple respiratory infections presented a two-month history of a rapidly enlarging left forehead protuberance. Computed tomography (CT) and magnetic resonance imaging (MRI) of the head revealed a frontal bone lesion with erosion of the outer table and two intracerebral lesions. Surgical excision of the frontal mass was performed, and histopathological examination identified oval yeasts consistent with fungal infection. Culture confirmed *Cryptococcus neoformans*. The patient initially received amphotericin B and fluconazole but was switched to high-dose fluconazole and flucytosine due to intolerance. Further immunological evaluation showed persistent lymphopenia, with absolute CD4+ T cell counts of 91/ μ L and 120/ μ L on two separate tests, confirming idiopathic CD4+ T cell lymphopenia. HIV, hepatitis, autoimmune, and malignancy screenings were negative. Postoperative recovery was favorable, and antifungal therapy was continued for 14 days intravenously, followed by a planned 10–12-week oral fluconazole regimen. Follow-up demonstrated clinical resolution. **Conclusion:** This case represents an uncommon presentation of *Cryptococcus neoformans* cerebral infection manifesting as a forehead mass. Idiopathic CD4+ T cell lymphopenia was identified during laboratory evaluation after surgical excision and fungal diagnosis. Emphasizing key learning points, this case highlights the importance of prompt neuroimaging, histopathological confirmation, targeted antifungal therapy, and immunological assessment in patients with atypical infections, with implications for clinical practice in detecting underlying immunodeficiencies, preventing neurological complications, and guiding effective patient management. **Acknowledgments:** The authors declare no conflicts of interest and report that no external funding was received for this work.

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DICER-1 Primary Intracranial Sarcoma in 3rd Decade of Life

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We report a rare adult case of primary intracranial sarcoma, DICER1-mutant (PIS-DICER1) arising in the right temporal lobe of a 32-year-old man with a history of pediatric Hodgkin lymphoma without prior cranial radiation or temozolomide exposure. He presented with a 6.3-cm complex solid–cystic, contrast-enhancing temporal mass.

Resection was followed by early recurrence requiring re-resection via right craniotomy. Histology showed a highly cellular, infiltrating pleomorphic spindle-cell neoplasm arranged in haphazard fascicles with multinucleated giant cells, brisk mitoses, microvascular proliferation, and necrosis. Immunohistochemistry (IHC) demonstrated diffuse vimentin and CD56, patchy p53, SALL4, and desmin, focal CAM5.2, and loss of ATRX nuclear staining; INI1 and BRG1 were retained. A broad IHC panel was negative (GFAP, OLIG2, SOX10, S100, EMA, synaptophysin, chromogranin, neurofilament, cytokeratin, progesterone receptor, INSM1, IDH1 R132H), helping exclude glial, neuronal, melanocytic, and meningeal differentials. Targeted molecular testing identified DICER1 RNase IIIb hotspot mutation (E1813D) with co-mutations in ATRX (R666*) and NF1 (Y489C), supporting the diagnosis of PIS-DICER1; DNA methylation profiling is recommended for orthogonal confirmation when available. Given the tumor's rarity and aggressive features, management centered on maximal safe resection with multidisciplinary deliberation regarding adjuvant therapy, balancing recurrence risk against the patient's prior malignancy history. Genetic counseling and germline testing were advised to evaluate for DICER1 syndrome and to guide family surveillance; systemic imaging was recommended to exclude additional primary lesions or metastasis. This case expands the clinicopathologic spectrum of PIS-DICER1 into adult hemispheric disease with ATRX loss and NF1 co-mutation, underscores the diagnostic value of integrated histology-IHC-genomics, and highlights practical considerations for postoperative surveillance, genetics-informed counseling, and individualized adjuvant planning.

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Neuro-Ocular Ischemia in Extreme Prematurity: Rubeosis Iridis as a Sentinel of Hypoxic-Ischemic Injury

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Purpose: To describe the clinical course of a preterm infant with rubeosis iridis (RI) and hypoxic-ischemic encephalopathy (HIE), and to illustrate the relationship between ocular and cerebral ischemia in the context of systemic illness. **Case Description:** A 26-week, 820g male twin born to a 28-year-old mother (G8P7A0) with limited prenatal care was admitted to the HOPU NICU. The neonate presented acutely ill with multiorgan dysfunction and developed Type 1 Retinopathy of Prematurity (ROP) with aggressive posterior features. Ophthalmic examination revealed dense vitreous haze, absent red reflex, and bilateral RI involving approximately 45° of the inferior pupillary border with posterior synechiae. Staged laser photocoagulation was performed in two sessions (≈ 5,867 spots total across both eyes), producing partial, bilateral regression of neovascularization. Despite an initially favorable retinal response, concurrent systemic conditions—including bacterial sepsis (*Enterobacter cloacae* complex and *Klebsiella pneumoniae*), congenital syphilis, acute respiratory distress syndrome, thrombocytopenia, and disseminated intravascular coagulation—led to rapid neurological deterioration. Progression from Sarnat Stage II to Stage III HIE occurred within a week, culminating in infant death three months after birth. **Conclusion:** RI is a local ocular response to retinal ischemia and an associated complication of ROP, whereas HIE represents a brain injury arising from reduced oxygen delivery and blood flow. Although these conditions share a similar pathology, there are no published cases describing the concomitant manifestation of all three disease states in premature infants.

The coexistence of RI and HIE in this infant highlight a potential neuro-ocular association in extreme prematurity, where systemic inflammation and multiorgan instability may amplify ischemic and angiogenic responses. While iris neovascularization denotes a direct response to hypoxic conditions in the retina, recognizing RI as a potential marker of global hypoxia may allow earlier detection of central nervous system injury and guide coordinated multidisciplinary care to improve neonatal outcomes. **Acknowledgments:** Reviewed by IRB at the University of Puerto Rico Medical Sciences Campus and determined not to constitute human subjects' research.

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Multimodal Radiosurgical and Surgical Control of Disseminated CNS SFT/HPC: A Case Report and Review of the Literature

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Purpose: To present a rare case of recurrent solitary fibrous tumor/hemangiopericytoma (SFT/HPC) of the central nervous system (CNS) with disseminated intracranial and spinal disease, and to emphasize the role of staged multimodal management, including repeated Gamma Knife radiosurgery (GKS) and surgical resection, in achieving long-term remission. **Case Description:** In 2012, a 51-year-old woman underwent gross total resection of a posterior fossa SFT/HPC. After several years of stability, multiple intracranial recurrences in the posterior fossa were treated with GKS. Months later, new metastatic lesions at the cervical spine C2–C3 levels were identified and resected via laminectomy. Subsequent cerebellar and suprasellar recurrences, an exceedingly rare pattern of disseminated intracranial disease, were managed with repeat GKS. The patient has remained in clinical and radiographic remission for four years following her most recent radio surgical treatment. Literature regarding CNS SFT/HPCs states that these tumors are aggressive and prone to delayed recurrence, while dissemination involving posterior fossa, suprasellar region, and cervical spine is exceptionally rare. **Conclusion:** This case illustrates the highly recurrent and unpredictable behavior of CNS SFT/HPC, with potential for late dissemination to multiple intracranial compartments and the spine long after initial resection. A staged multimodal treatment strategy combining targeted surgery for symptomatic spinal disease with radio surgery for deep or anatomically challenging lesions can provide durable disease control. Continuous long-term surveillance is essential given the risk of delayed and atypical recurrence patterns. **Acknowledgments:** The authors received no specific funding for this work and report no conflicts of interest.

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Parry-Romberg Syndrome: Serial Fat Grafting and Custom Porous Polyethylene Implant Reconstruction of the Left Hemimandible and Zygoma

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Progressive hemifacial atrophy (PHA), or Parry–Romberg syndrome, is a rare disorder characterized by gradual atrophy of soft tissues and underlying bone on one side of the face. Symptoms typically begin in childhood and stabilize by adolescence or early adulthood, and although the exact etiology remains unknown, autoimmune,

vascular, and neurogenic factors have been suggested. The purpose of this report is to highlight the importance of personalized implant design to optimize functional and aesthetic outcomes in facial reconstruction for patients with PHA. We present the case of a 24-year-old female diagnosed with left-sided PHA who demonstrated progressive skeletal and soft tissue asymmetry. The patient underwent augmentation of the left hemimandible and anterior zygoma using a custom porous polyethylene (PPE) implant designed through three-dimensional scanning and mirrored modeling. This implant was tailored to restore skeletal projection and improve facial contour based on the patient's unaffected side to achieve a more natural appearance. PPE was selected for its porous structure, which facilitates soft tissue ingrowth, prevents implant migration, and supports long-term stability. The implant effectively enhanced the hemimandible and zygomatic region. Prior to this procedure, autologous fat grafting had been performed to restore soft tissue volume, particularly in the buccal region, providing a more permanent solution compared to injectable fillers. Future reconstructive procedures are planned, including a custom mental implant to address residual asymmetry of the mandibular symphysis and mental prominence, and rhinoplasty to correct leftward deviation of the nasal tip and asymmetry of the alar base. This case emphasizes the value of staged, patient-specific reconstruction in achieving a stable, symmetrical facial contour in PHA. **Acknowledgments:** The authors declare no conflicts of interest and report that no external funding was received for this work.

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Comparative Clinical Presentation of TBCK Syndrome in Puerto Rican Siblings: A Case-Based Analysis of Disease Progression and Multisystem Involvement

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Purpose: TBCK syndrome is a rare autosomal recessive neurodevelopmental disorder characterized by global developmental delay, hypotonia, epilepsy, and multisystem involvement. Although over 70 cases have been described worldwide, clinical trajectories remain poorly understood, particularly within genetically homogeneous populations. This case study aims to describe and compare the longitudinal clinical course of two Puerto Rican siblings with genetically confirmed TBCK syndrome to highlight phenotypic variability and emphasize the importance of early recognition and multidisciplinary management. **Case Description:** Sibling 1 presented at 20 months with severe hypotonia, global developmental delay, absent language, feeding difficulties, and suspected myoclonic events. Over time, he developed intractable epilepsy, progressive musculoskeletal abnormalities, dysphagia, GERD, hypothyroidism, elevated liver enzymes, cerebral salt-wasting, and significant respiratory decline requiring CPAP. Whole exome sequencing in 2019 identified biallelic pathogenic TBCK variants, confirming TBCK-related encephalopathy. His clinical course was marked by profound neurodevelopmental impairment and frequent hospitalizations. Sibling 2 presented at 4 months with neonatal depression, lung arteriovenous malformation, hypotonia, strabismus, and early myoclonic seizures. Although he demonstrated early developmental gains, he later developed multisystem complications including hypothyroidism, hypercholesterolemia, scoliosis, hip subluxation, recurrent respiratory infections, tracheostomy and gastrostomy dependence, and sleep-related hypoventilation. Despite sharing identical TBCK variants, his progression was slower and early medical stability was greater than that of his sibling. **Conclusion:** These cases demonstrate the progressive and multisystemic nature of TBCK syndrome, while highlighting marked intrafamilial variability despite identical pathogenic variants. Early genetic testing, longitudinal monitoring, and multidisciplinary care are essential for optimizing outcomes. Increased awareness in populations with potential founder variants, such as Puerto Ricans, may facilitate earlier diagnosis and intervention. **Acknowledgments:** Approved by IRB (EMSJBIRB-21-2025, August 29, 2025). No external funding or conflicts of interest. Poster presentation preferred.

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Hoagland's Sign as an Early Indicator of Infectious Mononucleosis: A Diagnostic Insight

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Purpose: To expand awareness of Hoagland's sign-bilateral painless eyelid edema-and its association with infectious mononucleosis (IM) as a valuable diagnostic indicator of Epstein-Barr virus (EBV) infection. **Case description:** A 7-year-old female presented with fever, exudative pharyngitis, marked painless periorbital edema (Hoagland's sign), and multiple enlarged cervical lymph nodes. Physical examination was also significant for right upper quadrant tenderness to palpation and hepatomegaly. Splenomegaly was later confirmed via ultrasound. During the initial days of hospitalization, her condition progressed to include drooling and signs of airway obstruction. Laboratory tests revealed lymphocyte predominance with 35% atypical lymphocytes, and two negative monospot tests. Due to examination and laboratory findings, IM was first in the differential. However, due to the severity and rapid progression of her symptoms in addition to her two negative monospot tests, an extensive diagnostic workup was initiated to exclude alternative diagnosis while EBV titer results were pending. Aggressive treatment measures were implemented including nine total doses of dexamethasone due to partial airway obstruction. EBV titers later confirmed IM, and the patient improved with symptomatic treatment. **Conclusions:** This clinical finding is rarely emphasized in medical literature. Clinicians should consider EBV infection in the differential diagnosis of persistent or unexplained periorbital edema, particularly when accompanied by systemic symptoms such as fever, pharyngitis, and lymphadenopathy. Early recognition of this underappreciated sign is essential to prevent misdiagnosis and unnecessary interventions. **Acknowledgements:** None.

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Unrecognized Large Anterior Myocardial Infarction Presenting as Severe Ischemic Cardiomyopathy with Complete Left Main Occlusion

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Purpose: Complete left main occlusion typically presents with acute hemodynamic collapse, yet extensive collateralization can paradoxically enable sustained physical activity despite critical coronary insufficiency. This deceptive stability delays diagnosis, transforming potentially reversible ischemia into established cardiomyopathy. **Case Description:** A 62-year-old male swimmer with hyperlipidemia presented after six months of worsening exertional heartburn and dyspnea, which he attributed to deconditioning despite maintaining vigorous exercise several times weekly. He delayed seeking medical attention until marked exercise intolerance developed. On presentation, he appeared well with BP 153/90mmHg and clear lungs. However, BNP was markedly elevated (1255 pg/mL). Echocardiography revealed severe left ventricular dysfunction (EF 30%) with regional wall abnormalities and moderate mitral regurgitation. Cardiac catheterization exposed 100% left main occlusion with critical LAD

(90%) and circumflex (80%) stenoses, entirely dependent on extensive right-to-left collateralization. Despite LVEDP of 30 mmHg, the patient maintained hemodynamic stability without inotropic support. The collateral network had effectively bypassed the occluded left main, preventing cardiovascular collapse while permitting continued exercise with progressive symptoms. The patient underwent coronary artery bypass grafting and initiated guideline-directed medical therapy with significant symptomatic improvement. **Conclusion:** Complete left main occlusion can present insidiously in physically active individuals whose exercise-developed collaterals maintain near-normal activity despite catastrophic coronary anatomy. Declining exercise tolerance and elevated BNP should prompt urgent cardiac catheterization, particularly in athletic patients whose collateralization may mask critical disease. The paradox of fitness-developed collaterals, adaptations earned through years of training, results in delayed diagnosis by preserving functional capacity while permitting silent myocardial damage. Early recognition is essential to prevent progression to irreversible cardiomyopathy and guide timely revascularization. This highlights the diagnostic challenges posed by well-developed collateralization and reinforces the need for heightened clinical suspicion and biomarker-driven assessment in active patients with non-classic exertional symptoms.

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**Beyond Short Stature: Coordinated Pediatric Orthopedic
and Endocrine Management
of SHOX-Related Skeletal Disproportion in Two Siblings
with Madelung Deformity**

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SHOX haploinsufficiency is a relatively common yet underrecognized cause of disproportionate short stature and Madelung deformity. Optimal management requires early diagnosis and collaboration between endocrinology and orthopedics to preserve growth potential and function. Madelung deformity can arise from SHOX's role in the development and proliferation of chondrocytes in the growth plates, particularly in long bones. Surgical treatment is typically indicated in patients with worsening deformity, chronic pain, or when non-surgical measures are no longer effective. We report two sisters, diagnosed at age 8 and 10 years with heterozygous SHOX deletion in the PAR1 region (Xp22.33) (chrX: 588294–607626) after presenting with bilateral wrist pain, restricted motion, and progressive deformity. Radiographs demonstrated bilateral classic Madelung deformity with volar tilt of the distal radius and dorsal ulnar displacement, later confirmed by MRI. Both underwent surgical correction, including osteotomy, physeal bar excision, and release of the abnormal volar extrinsic ligament (Vickers ligament), resulting in marked pain relief and functional improvement. The older sibling was pubertal (Tanner III breast) at diagnosis but had an attenuated growth spurt despite an advanced bone age (bone age 13 at chronological age 10 4/12 years), estimating her predicted adult height as 57 inches using the Greulich and Pyle method. The younger sibling was prepubertal at diagnosis with bone age consistent with chronological age, resulting in a predicted adult height of 60.1 inches. Growth hormone (GH) therapy was initiated, resulting in an improvement in height velocity from 8 to 11 cm/year over 8 months in the older sibling, and from 3.9 to 9.6 cm/year in the younger sibling over a shorter treatment duration. This report illustrates the synergistic benefit of early orthopedic intervention and GH therapy in SHOX haploinsufficiency. Recognition of characteristic skeletal features by endocrinologists and pediatricians, along with timely multidisciplinary referral, can prevent progressive deformity and optimize outcomes.

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A Diagnostic Journey to GRIN-1: When Genetic Testing Unlocks a Multisystem Pediatric Case

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Background: The GRIN1 gene is responsible for producing the GluN1 subunit of NMDA receptor which is particularly important in the central nervous system for its involvement in synaptic plasticity and functions as a learning and memory hub. Mutations in this gene are described as GRIN1-related neurodevelopmental disorder and the most commonly reported clinical features include developmental delay, intellectual disability, muscle hypotonia, epilepsy, hyperkinetic movement disorders, and sometimes MRI findings such as polymicrogyria. Early non-neurologic presentations are mentioned but remain under-recognized. **Objective:** To describe an unusual case of GRIN1-related neurodevelopmental disorder initially presenting with severe gastrointestinal and sleep disturbances, highlighting diagnostic challenges and disease progression that led to the diagnosis. **Methods:** This study is a retrospective case report using medical records of a single patient from 1 month through age 12. Specific attention was given to the onset of gastrointestinal and neurologic symptoms. **Case description:** A 1-month old, female patient presenting with feeding intolerance, gastrointestinal reflux and metabolic disturbances was initially evaluated for multiple disorders such as Hirschsprung disease and Retts syndrome. Despite nutritional support, the patient developed persistent sleep disturbances, constipation and global developmental delay during early childhood. By age 3, manifestations of hypotonia, motor delay and later-onset seizures were present. Genetic testing at age 6 revealed pathogenic GRIN-1 variant. **Conclusion:** This case expands the phenotypic spectrum of GRIN1-related disorders by underscoring gastrointestinal dysmotility and sleep disturbance as early, pre-neurologic manifestations. Recognition of atypical presentations may highlight the need for early genetic testing and may facilitate diagnosis. **Acknowledgements:** Approved by IRB (EMSJBIRB- 18-2025, August 19,2025). No external funding or conflicts of interest. Poster presentation preferred.

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Ischemic Scalp Necrosis as a Clinical Sign of Severe Giant Cell Arteritis: A Case Report

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Purpose: Giant cell arteritis (GCA) is a systemic vasculitis typically presenting with new-onset headache, scalp tenderness, jaw claudication, and visual impairment in older adults. Cutaneous manifestations, including scalp tenderness, temporal artery abnormalities, and scalp ulceration or necrosis, are uncommon but may indicate severe ischemia. Scalp necrosis is rare and often associated with a high risk of permanent vision loss. We report a patient with biopsy-proven GCA who initially presented with parietal scalp necrosis. **Case Description:** A 74-year-old male with hypertension, coronary artery disease, and prior malignancies presented with a one-month history of severe scalp pain accompanied by black discoloration and alopecia. Initial treatment with acyclovir for suspected herpes zoster was ineffective. Two weeks later, he developed acute progressive right-eye visual loss. Examination revealed a large, well-demarcated, dark hemorrhagic crust on the right parietal scalp, associated with localized

alopecia and surrounding erythema. Ocular findings included markedly decreased right-eye visual acuity and optic nerve edema with blurred margins. Laboratory tests showed elevated erythrocyte sedimentation rate (61 mm/h) and C-reactive protein (67.1 mg/dL). Magnetic resonance imaging demonstrated T2 hyperintensity and contrast enhancement of the right optic nerve, consistent with ischemic optic neuritis. Right temporal artery biopsy confirmed GCA, showing granulomatous inflammation with giant cells and disruption of the internal elastic lamina. Work-up for other causes of scalp necrosis, including vasculitis, thrombotic disorders, infections, trauma, or malignancy, was negative. The patient was treated with intravenous methylprednisolone (1 g/day for three days, followed by 1 mg/kg/day), without improvement in visual acuity. **Conclusion:** This case highlights the importance of recognizing scalp necrosis as a rare but severe manifestation of GCA. Its presence suggests advanced cranial ischemia with high risk of irreversible visual loss and requires prompt diagnosis and urgent initiation of corticosteroid therapy.

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Large Bowel Obstruction from Foreign Body Ingestion in a Morbidly Obese Autistic Adult

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Purpose: This case illustrates a rare manifestation of large bowel obstruction secondary to pica in an adult patient with autism and morbid obesity. It emphasizes the diagnostic and surgical challenges of managing gastrointestinal complications arising from chronic ingestion of non-nutritive materials in patients with neurodevelopmental conditions accompanied by coexisting health challenges. **Case Description:** A 36-year-old male with a past medical history of morbid obesity (BMI >40 kg/m²), autism spectrum disorder, hypertension, and type 2 diabetes mellitus presented with a four-day history of hematochezia and melena. Family members reported chronic pica, including ingestion of stones, plastics, and paint scrapings. Examination showed a soft, non-distended abdomen with blood on rectal exam. Laboratory testing revealed hemoglobin of 8.6 g/dL and mean corpuscular volume of 55.5 fL consistent with microcytic anemia. The patient was placed NPO and started on high-dose intravenous proton pump inhibitors. Colonoscopy identified a sigmoid mass suspicious for malignancy. Laparoscopic exploration revealed multiple intraluminal foreign bodies and colonic polyps forming partial obstruction. Due to anemia, obesity, and sharp objects within the mass, we performed a Hartman with end colostomy. The resected bowel contained plastic fragments, stones, and benign polyps without malignancy. Preoperatively, the obstructing lesion was highly suspicious for malignancy, and although cancer was strongly considered, the goal was to avoid a stoma due to psychosocial implications in a patient with autism. The plan was partial colon resection with primary anastomosis; however, the patient's class III morbid obesity (BMI ~65 kg/m²) increased operative difficulty. Intraoperatively, the bowel was severely damaged by multiple sharp foreign objects embedded in the mass, making primary anastomosis unsafe and requiring conversion to end colostomy. A complete oncologic resection was achieved with appropriate margins, and thirty lymph nodes were negative for malignancy. **Conclusion:** This case underscores the importance of considering pica-related gastrointestinal complications in adults with autism and obesity presenting with bleeding or obstructive symptoms. **Acknowledgement:** We gratefully acknowledge Dr. Aura Delgado and Dr. Krystal Ortiz for their dedicated and thoughtful surgical care, which played an essential role in the management of this case.

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Extensive Mucocutaneous Eruption with Overlapping Features of Erythema Multiforme and SJS: A Multidisciplinary Perspective

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Purpose: The following case evaluates a patient with extensive mucocutaneous lesions following azithromycin exposure, which were ultimately consistent with erythema multiforme major (EMM) secondary to a post-infectious immune response. The case highlights the clinical overlap between EM, Stevens–Johnson Syndrome (SJS), and Reactive Infectious Mucocutaneous Eruption (RIME), emphasizing the importance of multidisciplinary evaluation in differentiating these disease processes. **Case Description:** A 32-year-old man without significant medical history presented with painful oral ulcers, conjunctivitis, and scrotal lesions one day after initiating azithromycin for a respiratory illness. Examination revealed hemorrhagic crusting of the lips, diffuse mucosal ulcerations, genital bullae, and scattered truncal targetoid macules. Laboratory findings included leukocytosis, WBC 20.1 K/ μ L, and elevated CRP, 92.7 mg/L. Other findings include negative mycoplasma pneumoniae IgM, and results of a punch biopsy of the target lesion revealed pathology indistinguishable between SJS and EMM. Initial suspicion for SJS led to intravenous corticosteroid initiation; however, poor clinical response and secondary oral candidiasis prompted steroid discontinuation. Based on clinical picture, dermatology favored erythema multiforme major, likely post-infectious in origin given his history of recurrent herpes labialis and prior skin blistering. HSV-1/2 IgG serology was suggested. The patient improved with topical triamcinolone, fluconazole, ocular erythromycin, petrolatum, and “magic mouthwash.” Dysphagia and mucosal pain gradually resolved, and no new lesions appeared prior to discharge. **Conclusion:** This case emphasizes the diagnostic ambiguity between erythema multiforme major, RIME, and SJS, where timing of lesion onset, distribution, and systemic findings are crucial for differentiation. Early multidisciplinary management and supportive therapy can prevent complications and improve outcomes. Awareness of infectious triggers, even with negative or unavailable serology, is key to avoiding unnecessary immunosuppression and guiding appropriate treatment.

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Atypical Optic Nerve Appearance in Central Retinal Vein Occlusion

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Purpose: Central retinal vein occlusion (CRVO) typically presents with optic disc edema, venous dilation, and widespread retinal hemorrhages. Atypical optic nerve findings, however, can resemble inflammatory or infiltrative optic neuropathies, requiring expanded diagnostic evaluation. **Case Description:** A 67-year-old woman with diabetes

mellitus, rheumatoid arthritis, hypertension, and hyperlipidemia presented for routine ophthalmologic evaluation without visual symptoms. Examination revealed non-proliferative diabetic retinopathy in both eyes and clinical signs of non-ischemic CRVO in the left eye, including optic disc edema, hyperemia, and hemorrhages. Optical coherence tomography demonstrated mild retinal thickening, and fluorescein angiography showed scattered hyperfluorescent foci with minimal leakage. Two months after presentation, the patient reported mild visual decline secondary to macular edema, which resolved completely after intravitreal anti-VEGF therapy. As optic disc edema improved, new whitish peripapillary lesions appeared, corresponding to hyperreflective areas on OCT of the optic nerve. Because these findings were atypical for uncomplicated CRVO, a neuro-ophthalmic workup was initiated. MRI of the brain and orbits, lumbar puncture, and infectious and inflammatory laboratory tests showed no evidence of infiltrative, demyelinating, or vasculitic disease. Fluorescein angiography revealed no vessel wall staining or leakage suggestive of retinal vasculitis. The peripapillary lesions were determined to represent prominent cotton wool spots associated with CRVO, presenting in an unusual distribution along the optic nerve head. These lesions resolved over subsequent months without development of optic atrophy or collateral vessels. Final visual acuity returned to 20/20, and visual fields remained normal. **Conclusion:** This case illustrates an atypical optic nerve presentation in non-ischemic CRVO, where large peripapillary cotton wool spots may mimic neuro-inflammatory or infiltrative processes. Multimodal imaging and multidisciplinary evaluation are essential for distinguishing atypical CRVO findings from alternative diagnoses requiring different management.

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Silent Obstruction: Mirizzi Syndrome Presenting as Painless Jaundice in a 60-Year-Old Woman

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Purpose: Mirizzi syndrome is an uncommon complication of cholelithiasis in which an impacted gallstone causes extrinsic compression of the common hepatic duct. Because its presentation often mimics more common biliary obstruction, early recognition is essential to prevent complications and guide appropriate therapy. This case highlights the importance of identifying an atypical cause of obstructive jaundice and ensuring structured follow-up after endoscopic intervention to optimize patient outcomes. **Case Description:** A 60-year-old woman with hypertension and hyperlipidemia presented with one week of abrupt, painless jaundice. She denied abdominal pain, fever, or chills. Examination showed generalized icterus and a non-tender abdomen; Murphy's and Courvoisier signs were negative. Laboratory tests revealed a cholestatic pattern, with total bilirubin rising from 14.5 mg/dL to 19.1 mg/dL within 48 hours and normocytic anemia. Ultrasound and MRCP showed a 1.5-cm stone impacted at the cystic duct/gallbladder neck. The common bile duct measured 0.5 cm and contained no obstructing stones, but there was marked intrahepatic ductal dilation due to extrinsic compression of the common hepatic duct by the distended gallbladder and impacted stone, consistent with Type I Mirizzi syndrome. ERCP revealed a proximal common bile duct stricture. A biliary sphincterotomy and plastic stent achieved decompression, followed by laparoscopic cholecystectomy with resolution of jaundice. At scheduled ERCP for stent removal, upward migration into the common bile duct was identified. The stent was retrieved using balloon mobilization and snare

extraction, with clearance of biliary sludge. Four weeks later, the patient was asymptomatic; colonoscopy and upper endoscopy were unremarkable. **Discussion:** Mirizzi syndrome may cause significant intrahepatic ductal dilation despite a normal-caliber CBD, underscoring the need to recognize extrinsic compression. Structured surveillance of temporary biliary stents is essential, as migration may occur silently. **Conclusion:** Early recognition and coordinated multimodal management are critical to preventing morbidity. Routine post-ERCP surveillance remains essential. **Acknowledgments:** The authors report no funding, conflicts of interest, or relevant disclosures. All authors and mentors have reviewed and approved this abstract.

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**Apical Variant Hypertrophic Cardiomyopathy
Yamaguchi Variant Masquerading as Supraventricular
Tachycardia and Provoking Syncope in an Elderly Patient**

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Purpose: Apical hypertrophic cardiomyopathy-Yamaguchi variant (Y-ApHCM), is a distinct phenotype of HCM with isolated LV apical hypertrophy. Its electrocardiography and clinical presentation can mimic ACS, creating diagnostic challenges. This diagnostic ambiguity results in predominantly incidental identification during cardiac imaging. Once accurately diagnosed, Y-ApHCM demonstrates a relatively benign clinical course. **Case Description:** An 81-year-old male with a history of hypertension presented with sudden-onset lightheadedness and transient loss of consciousness. EMS documented tachycardia requiring adenosine. He denied chest pain, dyspnea, palpitations, or prior syncope. On admission, he was hemodynamically stable, with mild elevated troponins. Evaluation revealed two episodes of apparent SVT, requiring adenosine and amiodarone. CT head and brain without contrast were unremarkable. ECG demonstrated deep, symmetric T-wave inversions across limb and precordial leads, raising concern for apical hypertrophic cardiomyopathy. Electrophysiology consultation found no clinically significant SVT; recordings demonstrated marked baseline artifact with visible P waves maintaining normal AV association and only short runs of supraventricular ectopy, insufficient to explain the syncope. MIBI showed mild ischemia. Left heart catheterization revealed preserved LVEF 65%, apical hypertrophy with mid-cavity obliteration, and 20–30 mmHg intracavitary gradient, without LV–aortic gradient. Coronary angiography showed non-obstructive coronary artery disease. Findings confirmed Y-ApHCM rather than arrhythmia-mediated syncope. The patient remained stable and was discharged, and cardiac MRI was recommended for further evaluation. **Conclusion:** Y-ApHCM can mimic arrhythmia-mediated syncope in older adults, leading to potentially misleading initial management. Deep symmetric T-wave inversions, episodic tachycardia without sustained arrhythmia, and mild troponin elevation should prompt structural cardiomyopathy evaluation, particularly when catheterization reveals mid-cavity obstruction with preserved EF. Early recognition of Y-ApHCM is essential to guide appropriate hemodynamic management, avoid unnecessary therapy, and optimize risk stratification for syncope. This case reinforces the need for heightened clinical suspicion and multimodal evaluation when transient tachyarrhythmias coexist with unexplained syncope. **Acknowledgments:** None.

Primary Gingival Mucosal Melanoma: A Case Report and Literature Review Comparing Mucosal and Cutaneous Melanoma

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Purpose: Mucosal melanoma (MM) is a rare but highly aggressive malignancy that accounts for only 1–2% of all melanomas yet is associated with significantly worse survival than cutaneous melanoma (CM). Its biologic behavior, mutational profile, staging criteria, and therapeutic response differ greatly from CM, contributing to delays in diagnosis and challenges in management. Oral cavity MM is particularly difficult to detect early due to its asymptomatic presentation, complex anatomy, and frequent involvement of critical structures that limit complete surgical excision. This case is presented to emphasize the clinical importance of recognizing early mucosal lesions, illustrate the surgical and staging challenges unique to gingival MM, and contextualize these findings within a broader comparison of MM and CM. **Case Description:** A 71-year-old male with type 2 diabetes mellitus, hypertension, and dyslipidemia presented with a newly noted pigmented lesion on the right inferior gingival mucosa. Biopsy confirmed malignant mucosal melanoma. PET/CT imaging demonstrated a 1.3 × 1.2 cm FDG-avid lesion (SUV 9.6) without mandibular invasion, nodal disease, or distant metastasis. The patient underwent radical excision of the gingival lesion with right neck dissection (levels I–III). Pathology revealed a 1.2 cm unifocal MM with positive deep margins and two metastatic lymph nodes (2/12), consistent with pT3N1 disease per AJCC 8th edition criteria. Tumor cells were positive for Melan-A and SOX-10. The patient recovered well postoperatively. **Conclusion:** This case highlights the aggressive nature of mucosal melanoma and reinforces how its biology, staging, and therapeutic responses diverge significantly from those of cutaneous melanoma. The frequent presence of positive margins, early nodal involvement, and lower responsiveness to immunotherapy complicate treatment and worsen prognosis. A deeper understanding of these distinctions is essential for improving early detection, optimizing multimodal management, and guiding future research toward more effective therapies for this uncommon but challenging malignancy. **Acknowledgments:** No external funding or conflicts of interest. This case report qualifies for IRB exemption per institutional policy; no IRB approval was required.

Atypical Origin of the Pectoral Nerves: A Case Report and Review of Clinical Implications for Orthopedic, Reconstructive, and Trauma Surgery

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Purpose: Anatomical variations of the brachial plexus can significantly affect surgical risk during shoulder and clavicular procedures. We present a rare case where the lateral pectoral nerve originates from the anterior division

of the middle trunk, forming an extended ansa pectoralis that gives rise to the medial pectoral nerve, completely bypassing the lateral and medial cords. Documenting this configuration is crucial to prevent avoidable iatrogenic injuries during surgeries such as arthroplasty and clavicle fixation. **Case Description:** During cadaveric dissection of an elderly male at the University of Puerto Rico Medical Sciences Campus, we observed an unusual brachial plexus pattern. After exposing the axillary region, it was noted that the lateral pectoral nerve arose directly from the anterior division of the middle trunk (C7), coursing medially and anteriorly to form a prominent ansa pectoralis that crossed in front of the axillary vessels. From this loop, the medial pectoral nerve emerged to innervate both pectoralis major and minor, without contributions from the lateral or medial cords. This indicated a complete bypass of the standard cord-level arrangement. Detailed neurodissection, high-resolution imaging, and faculty review confirmed the variation. **Conclusion:** This case illustrates a rare trunk-level origin of both pectoral nerves, creating a unique pathway vulnerable to injury during clavicle fixation, shoulder arthroplasty, tumor resections, or deltopectoral approaches. Injury at this level would lead to complete denervation of the pectorals, significantly impacting postoperative strength and rehabilitation outcomes. Awareness of such variants, alongside meticulous dissection and intraoperative nerve identification, is vital. Reporting brachial plexus anomalies will enhance anatomical understanding and improve surgical safety across multiple disciplines. **Acknowledgements:** This research was supported by institutional resources and the Department of Anatomy and Neurobiology, with no conflicts of interest reported.

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Polyclonal Hypergammaglobulinemia in Hurley Stage III Hidradenitis Suppurativa

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Purpose: The purpose of this case study is to describe polyclonal hypergammaglobulinemia (pHGG) as an underrecognized hematologic finding in patients with severe hidradenitis suppurativa (HS). Highlighting this association is important for clinicians evaluating unexplained elevations in immunoglobulins, particularly in the setting of refractory HS with significant systemic inflammation. **Case Description:** A 36-year-old man with a 15-year history of Hurley stage III HS presented with painful nodules, chronic drainage, and extensive sinus tracts involving the axillae, groin, and gluteal cleft. The patient had previously failed multiple systemic and procedural therapies, including oral antibiotics, intralesional corticosteroids, adalimumab, and methotrexate. Physical examination demonstrated hypertrophic scarring, purulent discharge, and diffuse inflammatory activity. Serial laboratory testing showed persistent neutrophilic leukocytosis (peak $18.0 \times 10^3/\mu\text{L}$), microcytic anemia (hemoglobin 10.3–11.5 g/dL), and thrombocytosis ($>500 \times 10^3/\mu\text{L}$). Serum protein electrophoresis revealed elevated IgG (2953 mg/dL) with a polyclonal pattern. Extensive evaluation for infectious, autoimmune, and hematologic etiologies—including

HIV, hepatitis B, latent tuberculosis, JAK2 V617F, CALR, MPL, and BCR-ABL—was negative. No lymphadenopathy, hepatosplenomegaly, or constitutional symptoms were present. Given refractory disease, infliximab was initiated at 5 mg/kg (weeks 0, 2, and 6, then every 8 weeks). The patient demonstrated marked improvement, including reduction of inflammatory nodules, drainage, and pain. Hematologic abnormalities also improved, with decreasing leukocytosis and thrombocytosis. **Conclusion:** This case illustrates that pHGG in HS may represent a reactive process driven by chronic inflammation rather than a clonal disorder. Recognizing this association may guide appropriate laboratory evaluation and prevent unnecessary invasive testing. Effective HS management, particularly with biologic therapy, may result in improvement of associated hematologic disturbances. Additional studies are warranted to determine the prevalence and significance of pHGG in HS. **Acknowledgments:** No external funding was received. The authors report no conflicts of interest. IRB approval was not required for this single-patient case study.

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Recurrent Papillary Tumor of the Pineal Region in a Young Adult: Clinical Course, Therapeutic Challenges, and Management Considerations

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Purpose: Papillary tumor of the pineal region (PTPR) is a rare neuroepithelial neoplasm with limited evidence to guide clinical decision-making. We present a complex case illustrating the multidisciplinary approach, postoperative complications, and long-term recovery considerations in surveillance and treatment of recurrent disease in a young adult. **Case Description:** A 26-year-old female presented with progressive headaches, diplopia, unsteady gait, somnolence, and bladder dysfunction. Initial imaging revealed a pineal region mass with obstructive hydrocephalus. For these reasons, the patient underwent stereotactic biopsy, a ventriculostomy, and a third-ventricle fenestration, followed by a partial tumor resection via bifrontal craniotomy. However, her postoperative course was notable for hospital-acquired pneumonia, hyponatremia, post-extubation aphasia, and Parinaud syndrome. The patient completed adjuvant radiotherapy and subsequently showed significant improvement in strength, communication, and functional independence. Surveillance MRIs demonstrated stable postoperative residual disease without radiographic progression. The patient continued close follow-up with the multidisciplinary team and, eventually, the left eye strabismus gradually improved without surgical intervention. Unfortunately, nearly one year after completing radiotherapy, the patient developed an acute onset of tremulousness and a decline in vision of the left eye. Afterward, a brain MRI revealed a heterogeneous pineal region mass with solid and cystic components, suggesting tumor recurrence. **Conclusion:** This case underscores the rarity and clinical variability of PTPR, leading to high complexity in determining effective management. Furthermore, recurrence of PTPR presents an even greater challenge, as no standardized guidelines exist for optimal surveillance intervals, therapeutic sequencing, or management of progressive disease. This case highlights the need for individualized, multidisciplinary care and contributes to the limited body of evidence guiding treatment decisions. Continued reporting of similar cases is essential to improving understanding of recurrence patterns, refining prognostic expectations, and informing future therapeutic recommendations. **Acknowledgments:** We acknowledge the multidisciplinary teams involved in the patient's care. No conflicts of interest or funding to disclose.

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Free Gracilis Transfer with Vein Conduit Nerve Coaptation for Neonatal Upper Extremity Compartment Syndrome: A Case Report

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Neonatal compartment syndrome (NCS) is a rare, severe disorder that compromises the extremities of newborn patients. We present this case to illustrate a comprehensive microsurgical approach to acute NCS and to highlight reconstructive strategies that can restore meaningful upper-extremity function beyond the immediate postnatal period. Early signs include rapid swelling with desquamation, blistering, or focal necrosis. The patient presented shortly after birth with marked right upper-extremity swelling, blistering, and evolving necrosis consistent with early compartment syndrome. The perinatal course was otherwise unremarkable, and no systemic abnormalities were noted. Clinical evaluation demonstrated rapidly progressive soft-tissue compromise, prompting urgent surgical management. Because of its rarity and variable presentation, NCS is frequently diagnosed late, yet timely recognition and intervention are essential to prevent Volkmann contracture, peripheral nerve dysfunction, and growth disturbance. We describe a case requiring staged microsurgical reconstruction. Initially, a free gracilis muscle flap was transferred to restore elbow flexion, replacing the absent biceps and anchored to the distal humerus and forearm fascia. In the same operation, a Z-plasty improved forearm scarring, a skin graft provided coverage, and neurorrhaphy using a vein conduit coapted the right musculocutaneous nerve to the gracilis motor branch to support reinnervation. Early active elbow flexion of approximately ten degrees developed, permitting structured range-of-motion therapy. A subsequent procedure excised residual hypertrophic scarring with W-plasty and achieved wrist centralization using an iliac crest cortical-cancellous graft, resulting in improved elbow mobility and functional use of the right arm. This case underscores that a focused strategy—free gracilis flap transfer combined with targeted scar revision, skin grafting, and nerve coaptation—can restore functional elbow movement and overall limb utility in acute neonatal compartment syndrome, emphasizing the importance of early recognition and coordinated multidisciplinary care. **Acknowledgments:** The authors report no conflicts of interest and received no external funding for this case report.

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Multidisciplinary Management of PR3-ANCA Positive GPA with Complex Mid-Facial Reconstruction: A Case Report

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Granulomatosis with polyangiitis (GPA) is a rare necrotizing small-vessel vasculitis characterized by granulomatous inflammation of the upper and lower respiratory tract, often with renal involvement, and is strongly associated with anti-neutrophil cytoplasmic antibodies targeting proteinase-3 (PR3-ANCA), which are present in the majority of patients and drive neutrophil activation and vascular injury. Despite advances in immunosuppressive and steroid-sparing therapies, significant morbidity persists. We report the case of a 54-year-old male with Type 2 Diabetes

Mellitus initially presented at age 49 with symptoms diagnosed as major depressive and anxiety disorders. Over the subsequent year, he developed progressive midfacial symptoms, leading to a confirmed diagnosis of PR3-ANCA positive GPA without renal involvement. The disease was characterized by severe upper respiratory and pulmonary involvement, featuring a full-thickness central upper lip defect, palatal involvement, and nodular lung consolidations on imaging. Management with Rituximab induction and Azathioprine maintenance therapy resulted in clinical and serological remission, evidenced by normalized inflammatory markers and the interval resolution of lung nodules on CT scan. After several months of sustained disease quiescence, he underwent successful reconstructive surgery consisting of Bilateral Lip Advancement Flaps, an Interposition Triangular Flap Repair of the full-thickness upper lip defect, extraction of the right first maxillary bicuspid, and revision of post-infectious upper-lip scars. The postoperative course was uncomplicated, with excellent healing and patient satisfaction at 4-month follow-up. The patient is now a candidate for staged nasal reconstruction. This case highlights that initial non-specific psychiatric symptoms can delay the diagnosis of GPA. Furthermore, it demonstrates that successful, complex facial reconstruction is achievable and safe, but is critically dependent on a multidisciplinary approach and a prolonged period of confirmed disease remission prior to surgical intervention. This model of care coordination between rheumatology and surgery is essential for optimizing functional and quality-of-life outcomes in patients with destructive GPA. **Acknowledgements:** The authors report no conflicts of interest and received no external funding for case report.

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Large Retroperitoneal Lipoma in a 19-Year-Old Female: A Pediatric Case Report

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Purpose: Retroperitoneal lipoma (RL) is a rare benign adipocytic neoplasm, with fewer than 20 cases reported worldwide. These tumors can reach substantial size, producing mass effect and displacement of adjacent organs while remaining non-infiltrative. The differential diagnosis is challenging, as radiologic and histopathologic features often overlap with malignant entities such as well-differentiated liposarcoma, requiring careful evaluation and molecular testing for definitive classification. Pediatric RL typically presents as large, asymptomatic masses or with symptoms related to organ compression. This case represents the third registered instance of RL in a pediatric and Puerto Rican patient, contributing important clinical and epidemiological insight to the limited literature on this entity. **Case description:** A 19-year-old female with no prior systemic illnesses was evaluated at the Comprehensive Cancer Center Hospital of Puerto Rico for a large left retroperitoneal mass incidentally discovered following a motor-vehicle accident. The patient was asymptomatic at the time of evaluation, denying pain, weight loss, fever, or gastrointestinal symptoms. CT of the abdomen and pelvis revealed a 33.2 x 16.1 x 15.2 cm fat attenuation mass displacing the left kidney anteriorly and exerting mass effect on bowel loops, uterus and ovaries. MRI confirmed a homogenous fat signal extending from the spleen to the pelvis, crossing the midline and abutting the bladder, consistent with RL versus lipomatosis. PET/CT showed no abnormal tracer uptake. Physical examination was normal. Given the lesion's size and extent, a core biopsy was discussed; however, concern was raised that limited sampling might not represent the entire tumor. Case was discussed in multidisciplinary tumor board review; biopsy, extensive surgical resection vs observation presented to patient and follow-up MRI scheduled. The patient remains clinically stable and asymptomatic. **Conclusion:** This case illustrates the diagnostic complexity and challenges in management of large RL. Evidence-based management requires thorough evaluation and individualized surgical planning to optimize outcomes and avoid overtreatment, underscoring the importance of

specialized multidisciplinary teams for rare benign RL in young patients. **Acknowledgements:** We thank Dr. Rocío Rivera, MD and the multidisciplinary team at the University of Puerto Rico Comprehensive Cancer Center for their clinical contributions. Funding: None. Conflicts of Interests: None.

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Acute Interstitial Nephritis After Semaglutide Initiation: A Rare but Potentially Reversible Complication of GLP-1 RA Therapy

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Purpose: Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) are widely prescribed for type 2 diabetes mellitus and weight management due to their demonstrated cardiovascular, metabolic, and renal benefits. Their use has expanded rapidly in recent years, with a generally favorable safety profile and minimal reports of nephrotoxicity.

Case Description: 43-year old male patient with a history of type 2 diabetes mellitus, hypertension, and prior cerebrovascular accident who presented with one week of progressive malaise, nausea, and vomiting shortly after initiating semaglutide therapy. Laboratory evaluation revealed severe acute kidney injury accompanied by uremic symptoms, prompting initiation of emergent hemodialysis for stabilization. Despite supportive management, renal function failed to recover within two weeks, leading to a percutaneous kidney biopsy that demonstrated allergic interstitial nephritis with moderate interstitial fibrosis and 30% tubular atrophy. The patient was treated with a two-week course of oral corticosteroids, resulting in gradual improvement of renal function and eventual discontinuation of dialysis after two months. **Conclusion:** Although most reported GLP-1 RA related renal effects involve prerenal azotemia or acute tubular necrosis secondary to volume depletion, biopsy-confirmed allergic interstitial nephritis remains exceedingly rare. This case highlights a potential immune-mediated mechanism of GLP-1 RA-induced renal injury and emphasizes the need for clinicians to maintain a high index of suspicion for medication-associated nephrotoxicity in patients presenting with unexplained acute kidney injury after recent initiation of these agents. **Acknowledgements:** I extend my sincere gratitude to Dr. Ricardo Calderón Ortiz, whose exceptional clinical expertise, unwavering commitment to excellence, and generous mentorship greatly enriched this case report, and for whose trust and guidance I am profoundly thankful.

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Diseño de Actividades Creativas para Pacientes con Cáncer y sus Cuidadores

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Antecedentes y Objetivos: La integración de la psicología y las artes ofrece estrategias basadas en evidencia que promueven el bienestar en entornos de salud. Las actividades creativas han demostrado ser valiosas para pacientes con cáncer y sus cuidadores al facilitar la autoexploración, la expresión emocional y la aceptación del proceso oncológico. Con base en ello, este proyecto tuvo como objetivo desarrollar un cuaderno de trabajo con ejercicios creativos de autorreflexión para apoyar el bienestar personal. Además, se incluyó un directorio de servicios psicológicos para la identificación de recursos adicionales y el fortalecimiento de una cultura de cuidado. **Métodos:** Se llevó a cabo un proyecto exploratorio cuya fase inicial consistió en una revisión de literatura sobre intervenciones basadas en arte, materiales de arteterapia y recursos psicoeducativos, lo que sirvió de base

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para el diseño de las actividades del cuaderno. Posteriormente, se desarrollaron las ilustraciones y la plantilla digitalmente. El contenido fue enriquecido mediante consultas con especialistas del Centro Comprensivo de Cáncer y de la Universidad de Puerto Rico. **Resultados:** Tras integrar la retroalimentación, se imprimieron y distribuyeron más de 60 copias del cuaderno en la sala de espera del Centro Comprensivo de Cáncer durante una actividad de arte. El cuaderno final incluye una introducción, beneficios de las actividades creativas, ejercicios orientados a la autoexploración, información sobre emociones y descanso, y un directorio de servicios psicológicos. **Conclusiones:** El cuaderno constituye un recurso accesible, práctico y de fácil reproducción, orientado a promover el bienestar. Favorece el autoconocimiento y el fortalecimiento de recursos personales, posicionando las actividades creativas como un complemento valioso a la atención clínica en el proceso oncológico. **Reconocimientos:** Se reconoce la colaboración de la Dra. Ruth Nina-Estrella, del equipo del Centro Comprensivo de Cáncer, en especial la Dra. Vivian Colón y la Dra. Ana Salas, y del Onco Interest Group del Recinto de Ciencias Médicas.

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A Community-Centered Approach to TBCK-Related Neurodevelopmental Disorder Research in Puerto Rico

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Background: TBCK-related neurodevelopmental disorder (TBCK-NDD) is a rare and progressive genetic condition that significantly impacts patients and their families. Engaging affected communities in the research process is essential to ensure that scientific priorities reflect their needs, particularly within underserved populations experiencing health disparities. **Objective:** To identify the main priorities, concerns, and recommendations expressed by the TBCK community in Puerto Rico in order to guide ethical, relevant, and community-centered research. **Methods:** A community engagement studio was conducted using a Community-Based Participatory Research (CBPR) approach. The two-hour, professionally facilitated session included three mothers of children with TBCK-NDD, two clinical researchers, a student researcher, and two community engagement core members, with an additional observer from another rare disease community. Qualitative data from detailed notes were analyzed thematically, and participant satisfaction was assessed through a structured evaluation form. **Results:** Participants reported high satisfaction across all evaluation areas. Thematic analysis identified six key priorities for future research: (1) building trust through reciprocity and transparency; (2) ensuring logistical accessibility and flexibility; (3) providing holistic support beyond research protocols; (4) fostering authentic and equitable community partnerships; (5) disseminating findings through strategic, multi-channel communication; and (6) promoting long-term systemic change to address rare disease disparities. **Conclusions:** The TBCK community in Puerto Rico outlined a clear vision for patient-centered research grounded in mutual trust and shared decision-making. These community-driven priorities offer a roadmap for developing ethical and impactful studies that advance scientific knowledge while directly responding to family needs. **Acknowledgments:** Funded by the Center for Collaborative Research in Health Disparities and the TBCK Foundation. IRB Approval: 2505404212, July 2025.

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Integrating Practical Molecular Biology and Bioinformatics Through Collaborative Learning for the Creation of Educational Material for Primer Design

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Learning biology techniques primarily with class instruction can limit opportunities for students to apply concepts in real world scenarios. This project aimed to integrate laboratory activities, helping students bridge theory and practice, and the use of bioinformatics tools to design educational materials for PCR primer design. We implemented collaborative learning, where four undergraduate students and one graduate student worked together to design and develop educational materials, allowing them to engage with the content, share knowledge, and develop critical thinking, and teamwork skills. Students actively participated in the cocreation of the PCR module and its exercises, which enhanced their understanding of molecular biology concepts, fostered creativity, promoted ownership of learning, and resulted in a final educational product that can be used by peers. The PCR design module includes a review of prior knowledge necessary to understand molecular techniques, covering DNA structure and replication and sections in gel electrophoresis, PCR, PCR primer design, and bioinformatic tools. Each section includes a formative evaluation exercise. The final module was authored by all five students. The project consisted of three phases: first, discussion of content and required background knowledge; second, practical lab experiences and bioinformatic exercises; and third, cocreation of the educational materials. The module was completed and is available online to the public and later adapted into a workshop. The workshop was delivered to undergraduate students and one class of high school students. Future directions include expanding the module to cover additional molecular techniques and their applications in studying genetic diseases, including more specific examples of diseases, and offering additional workshops for students at both the high school and undergraduate levels. Additional workshops will provide further feedback to improve the module. Thanks to the Biology Department for the facilities and reagents that helped students learn the concepts.

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PAUSA por tu Salud: Videotutoriales de Movimiento y Estiramiento para Promover el Bienestar

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Trasfondo y Objetivos: Desde 2024, la Maestría en Educación en Salud Pública (MPHE) y la AEEDSA han desarrollado recursos de comunicación en salud para promover el bienestar y la actividad física en espacios de estudio y trabajo. Previamente se realizó una encuesta relacionada con el personal de la Escuela Graduada de Salud Pública (EGSP) y se desarrollaron dos rutas de caminata. Las recomendaciones de PAUSA están alineadas con el Plan de acción mundial sobre actividad física 2018-2030 de la OMS y con la iniciativa Healthy People, Healthy Nation del CDC. La iniciativa PAUSA por tu salud invita a separar tiempo para estirar, activar el cuerpo, moverse

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y caminar como parte de la rutina diaria. **Método:** Entre junio y agosto de 2025 se desarrollaron 4 videotutoriales con el estudiantado y personal del MPHE. Entre septiembre y octubre de 2025 los recursos se dieron a conocer en Instagram, Facebook y monitores de la EGSP mediante segmentos cortos de cada video (*reels*) con mensajes claves invitando a ver los videos completos en YouTube. **Resultados:** Las vistas de los 4 *reels* fluctuaron entre 436 y 2,495 por video durante un periodo de aproximadamente 11 semanas. Otras reacciones a los *reels* incluyeron un total de 96 *likes* y 23 *shares*. Solo se registró un comentario. En YouTube se registraron para el mismo periodo entre 6 y 74 vistas de los videos. **Conclusión:** El uso de las redes sociales logra alcance y exposición de información útil, accionable y necesaria. Contribuye también a concienciar sobre la importancia del movimiento y la actividad física para la salud y el bienestar. Se sugiere crear códigos QR para acceso directo a YouTube, obtener insumo de la audiencia sobre las prácticas recomendadas y tiempo a invertir e integrar estrategias para fomentar una cultura favorable hacia el movimiento y la actividad física. **Reconocimientos:** A la Oficina de Asuntos Estudiantiles de la Escuela Graduada de Salud Pública, RCM-UPR por el apoyo y asesoramiento técnico para el desarrollo y la publicación de estos recursos educativos para la comunicación en salud.

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Comparison of the 2017 Pooled Cohort Equations and 2025 PREVENT Models for Primary Prevention in U.S. Adults with Untreated Stage 1 Hypertension: NHANES 2011 to March 2020

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Background & Objectives: The 2025 ACC/AHA hypertension guidelines incorporate the Predicting Risk of Cardiovascular Disease Events (PREVENT) equations to guide the initiation of antihypertensive medications for primary prevention of cardiovascular disease (CVD). This study aimed to compare population sizes recommended for antihypertensive treatment according to primary prevention criteria from the 2017 versus 2025 guidelines.

Methods: Using NHANES data (2011–2020), we identified participants aged 30–79 years who had systolic blood pressure (SBP) of 130–140 mmHg or diastolic blood pressure (DBP) of 80–90 mmHg, and who had no prior diagnosis of hypertension, CVD, diabetes, or chronic kidney disease, and were not pregnant nor taking antihypertensive medication. We estimated the 10-year risk for each participant using the Pooled Cohort Equations (PCE; stroke and myocardial infarction for those aged 40–75 years) and the PREVENT base model for total CVD (stroke, MI, and heart failure for those aged 30–79 years). High risk was defined as a 10-year ASCVD risk $\geq 10\%$ with PCE and total CVD risk $\geq 7.5\%$ with PREVENT. Analyses incorporated NHANES sampling weights to generate nationally representative estimates. **Results:** The initial population for both analyses included 29.6 million U.S. adults with SBP 130–140 mmHg or DBP 80–90 mmHg, not on antihypertensive medication, not pregnant and without CVD, diabetes, or chronic kidney disease. Of these, 18.4 million were aged 40–75 years and thus eligible for risk assessment with PCE; among these, 3.3 million had a 10-year ASCVD risk $\geq 10\%$. In contrast, 24.0 million were aged 30–79 years and thus eligible for total CVD risk assessment using the PREVENT model; of these, 3.5 million had a 10-year PREVENT base total CVD risk $\geq 7.5\%$. **Conclusion:** Under the updated thresholds, PREVENT identified nearly 200,000 more high-risk U.S. adults with untreated stage 1 hypertension than PCE, despite differences in model inputs and age range. **Acknowledgements:** This research was supported by the NIH Ruth L. Kirschstein National Research Service Award (NRSA) institutional training grant T35HL007744 through the Medical Student Research Program (MSRP) at the University of Utah.

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Academic–Community Partnerships for Empowerment: Collaboration Between Profamilias and Public Health Students in Puerto Rico

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Background & Objective: Nonprofit organizations play a vital role in addressing health and social inequities, particularly in resource-limited settings, where collaborative relationships between healthcare providers and community organizations are essential to achieving equitable health outcomes (Tomoh et al., 2024). Academic–community partnerships can bridge this gap by enhancing community impact while giving health professional students meaningful exposure to public health practice in real-world settings (Nanda et al., 2023). The objective of this project is to describe an academic–community partnership between Profamilias and Master of Public Health students aimed at fostering community empowerment and strengthening the organization's outreach capacity across Puerto Rico. **Methods:** This descriptive project originated from the course Interprofessional Collaborative Practice in Public Health (INTD6996), in which students collaborated with Profamilias educators to assist in community interventions promoting sexual and reproductive health. Activities included educational workshops, school visits, and community fairs across multiple municipalities, including coastal areas such as Vieques. The initiative focused exclusively on outreach and education; therefore, IRB approval was not required. **Results:** The collaboration expanded Profamilias' community engagement despite limited personnel and resources, while providing students with hands-on experience in health promotion, teamwork, and interprofessional collaboration. Participants and community members engaged actively in the sessions, showing a strong interest in prevention, consent, reproductive health, and bodily autonomy as essential elements of personal and community empowerment. **Conclusion:** Academic–community partnerships with nonprofit organizations can serve as effective models for community empowerment and experiential learning. The collaboration between Profamilias and public health students illustrates how aligning academic practice with community missions can strengthen outreach efforts, promote equity, and support sustainable public health action across Puerto Rico. This model can also be adapted for use in other courses, academic institutions, and disciplines to enhance community engagement and interprofessional education. **Acknowledgments:** The authors thank the Profamilias team, educators, and community participants for their collaboration and support throughout this initiative.

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Improving Delivery of Serious News Through VitalTalk Training in Neonatal-Perinatal Fellows

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Background: Delivering serious news is a critical, yet often underdeveloped skill in medical training. Studies across specialties have demonstrated challenges balancing clear prognostic communication with empathy and

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responsiveness to family emotion. VitalTalk, an evidence-based communication training, emphasizes using tools such as NURSE statements (Name, Understand, Respect, Support, Explore), ask-tell-ask sequences, and clear “headlines” to align medical information with patient needs. Given the emotionally charged context of neonatal intensive care, structured, empathic communication is essential to support families during critical conversations.

Aim: To evaluate the impact of VitalTalk training on neonatal-perinatal medicine (NPM) fellows’ communication skills when delivering serious news. **Methods:** In this pre-post observational study, 52 recorded videos of standardized patient (SP) encounters were reviewed. All encounters involved 3rd year NPM fellows updating families about their preterm infant’s worsening intraventricular hemorrhage. 15 Encounters from 2013-2016 were pre-VitalTalk, while 37 encounters from 2017 onward were post-VitalTalk. Encounters were coded by 2 independent reviewers for: assessing family understanding, use of signposting, asking permission prior to disclosure, clarity of the headline, and NURSE statement use. Chi-squared analyses were conducted in StataIC to compare proportions of skilled behaviors between groups. **Results:** Following VitalTalk training, fellows showed improvement in all skills (pre/post percentage, p-value): Assessing understanding (73%/86%, p=0.26); sign-posting (60%/81%, p=0.11); asking permission (7%/30%, p=0.07); clear headline (7%/38%, p=0.025); number of NURSE statements (median: 3/7, p<0.001). **Conclusion:** Findings demonstrate that VitalTalk training enhanced communication skills among NPM fellows. These results support incorporating structured communication frameworks into neonatal fellowship curricula to improve clinician confidence and family-centered care. Future work will include exploration of long-term retention and impact on real clinical encounters. **Acknowledgements:** We express sincere gratitude to the CHOP SUMMR program for funding. The authors have no conflict of interest in reporting. This study was exempt by the IRB at the Children’s Hospital of Philadelphia (IRB 23-020818) on 5/2/2023.

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Cuidando Corazones: A Community-Based Home Outreach Initiative Supporting Isolated Caregivers in Puerto Rico

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Background: Juan Asencio, a rural barrio in central Puerto Rico, faces persistent socioeconomic challenges, geographic isolation, and limited access to health and social services. These conditions particularly affect older adults, homebound individuals, and caregivers with restricted mobility. **Program Description:** Cuidando Corazones is a community-led home outreach initiative developed by Casa Salud Inc. to provide educational, emotional, and nutritional support to households experiencing social isolation. The program engages local leaders and faith-based organizations to help identify families in need and organize small “impact teams” composed of educators, spiritual support providers, and volunteers. Teams conduct home visits, distribute food supplies, and share a self-care booklet featuring reflective activities designed to promote emotional well-being and conversation. **Program Highlights:** During its initial implementation in Juan Asencio, the initiative supported multiple households through coordinated home visits and ongoing community assistance. The program also facilitated connections to existing municipal services and established volunteer follow-up support. Due to strong community engagement, the initiative has since been extended to additional barrios in Aguas Buenas and expanded to communities in San Germán and Humacao, illustrating the model’s adaptability across diverse settings. **Conclusions:** Community-driven outreach initiatives such as Cuidando Corazones can help address service gaps among isolated caregivers and older adults by fostering local partnerships, strengthening social support networks, and promoting emotional resilience. Continued expansion will focus on

deepening community collaborations and exploring telehealth-informed support strategies. **Acknowledgments:** This community initiative was supported by Casa Salud Inc. The authors report no conflicts of interest.

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ADEA Academic Dental Careers Fellowship Program (ADCFP): Education on Theories of Growth Control at UPR-SDM

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Background: The Academic Dental Careers Fellowship Program (ADCFP) provides UPR-SDM students with the tools and faculty mentorship to engage on a teaching project. **Objective:** To develop the foundational skills of academic dentistry through mentorship, teaching experience, and scholarly engagement. **Method:** Forty-one second-year dental students were given an in-person class on Theories of Growth Control as part of the EDVI-7245 Human Development course. A Pre-Test and Post-Test consisting of 2 questions with three alternatives per question was given to the class using a QR code. A Post-Presentation Questionnaire with nine questions with Lickert scale answer alternatives regarding the perceived importance of the topic and clarity of the presentation was sent electronically. **Results:** The Pre-Test and Post-Test were answered by 40 out of 41 students. In the Pre-Test, 95% of the class answered both questions correctly. In the Post-Test, over 95% of the class answered both questions correctly. The Post-Presentation Questionnaire was answered by all 41 students. Over 70% of the class strongly agreed that the topic was important and clearly delivered. Seventeen percent of the class strongly agreed they had received previous education on the topic. Twenty-three positive observations were also received. The mentorship received throughout the preparation process played a pivotal role in ensuring the teaching activity's success. **Conclusion:** ADCFP offers students a unique and invaluable opportunity to strengthen communication and teaching skills and share knowledge with peers, while engaging in the pursuit of a dental academic career.

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Barriers to Palliative Care in Patients with Amyotrophic Lateral Sclerosis: A Narrative Review and Educational Initiative

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Background: Amyotrophic Lateral Sclerosis (ALS) is a neurodegenerative disease affecting motor neurons, causing severe disability and death within one to five years after diagnosis, requiring care centered on quality of life (QoL). Palliative Care (PC) is a specialized medical care that aims to improve the QoL and alleviate the suffering of patients with life-threatening illnesses. Application of PC principles to neurological disorders may improve symptom control and psychosocial well-being, yet its use in ALS remains limited. ALS's unique challenges, including psychological burden and loss of communication, hinder the timely implementation of PC. Evidence highlights a lack of awareness of PC among both the community and healthcare providers, especially in Puerto Rico, where,

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despite accessibility to hospice services, fewer than 20 PC practitioners are available. Addressing these barriers through educational initiatives is critical to increase awareness and integration of PC in ALS care. **Objective:** To identify barriers to PC integration in ALS and develop educational materials to raise awareness among patients and caregivers. **Methods:** A narrative review was conducted using PubMed, Google Scholar, and manual searches of relevant neurology and PC journals. Articles discussing barriers, challenges, or PC implementation in ALS were included and reviewed by a PC specialist. Findings guided the development of educational materials, which were distributed at a symposium attended by ALS patients, caregivers, and healthcare professionals. **Results:** Identified barriers included limited awareness of PC, delayed referrals, insufficient provider training, and systemic and cultural obstacles in healthcare delivery. **Conclusion:** Despite proven benefits, PC remains underutilized in ALS. Educational strategies represent a practical approach for earlier PC integration in ALS care. Educational material was distributed to over 100 symposium participants to raise community awareness. Long-term efforts will assess and quantify the impact of these educational interventions on awareness and engagement with PC services. **Acknowledgments:** Thanks to the UPR School of Medicine Clinics, the MDA Association, RCMI grant U54 MD007600 from the NIMHD-NIH, and Caribbean Hispanic ALS Center for Clinical Trials and the ALS Association grant 23-TC-642 for their support.

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Arbona Health Hub: Advancing Accessible Science Research and Communication

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Background and Objectives: Founded in 2023, Arbona Health Hub (AHH) is a registered nonprofit dedicated to making complex scientific topics accessible through digestible articles. It serves as a platform for pre-medical students, medical students, residents, and healthcare professionals to share knowledge on topics of interest. In a time of rising health misinformation and low global health literacy, AHH promotes science communication and accessible education to empower the community with reliable, engaging information. **Methods:** AHH articles undergo a standardized peer-review process to ensure accuracy and quality. Submissions are first sent to a centralized inbox, where the peer-review coordinator assigns blinded articles to reviewers. After thorough evaluation and edits, articles are published under one of three categories: research breakdown, education, or opinion. **Results:** Since 2024, the AHH website has received 11,200 total views and 6,600 unique visitors. Most views came from the United States (4,881) and Puerto Rico (4,552), with additional engagement from Mexico (206), Germany (67), Canada (66), and France (50). The most popular article garnered 589 views, including 145 on the day of publication. To date, AHH has published 59 articles and three compilation issues, contributed by 32 authors from different medical schools and research institutions. **Conclusions:** This is the first educational “health hub” to date with the primary goal of breaking down complex research topics across a diverse range of topics. From the engagement statistics, there is an obvious interest in non-academic scientific publications by pre-medical and medical students that aim to educate the general population.

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Ampliando el Camino Hacia la Escuela de Medicina: Impacto de Charlas Educativas en Estudiantes Subgraduados de Puerto Rico

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Trasfondo: Los estudiantes subgraduados de Puerto Rico enfrentan barreras significativas al perseguir una carrera médica tales como falta de orientación sobre el proceso de admisión y acceso a mentores. Medical Students Pro Education (MSPE), una organización estudiantil de la Escuela de Medicina de la UPR, busca atender estas brechas mediante charlas educativas a estudiantes subgraduados. La meta organizacional es encaminar a estudiantes de diversos contextos socioeconómicos y geográficos hacia una carrera en medicina, y así aumentar la diversidad en las solicitudes y aceptaciones a la Escuela de Medicina de la UPR. **Objetivos:** Analizar el perfil sociodemográfico de los participantes que reciben charlas de MSPE y evaluar la utilidad percibida por estos. **Métodos:** Se realizó un análisis descriptivo de informes administrativos del Centro Hispano de Excelencia entre septiembre y noviembre del 2025. **Resultados:** MSPE impactó a 880 estudiantes de 68 municipios a través de charlas educativas virtuales. 82% de la población era femenina, 58% provenía de escuelas superiores privadas, y 42% de públicas. Respecto a recursos económicos, 19.2% reportó pertenecer a familias de escasos recursos y 24.8% reportó no estar seguro. En relación con redes profesionales, 83.3% indicó no tener un familiar inmediato médico y 50.1% no conocía a una persona que hubiese solicitado a escuela de medicina. En cuanto a la percepción sobre las charlas, 85% de los participantes consideraron la orientación como muy útil, 100% reportó haber aprendido algo nuevo, 95% indicó que utilizará la información recibida, y 100% expresó que esta los ayudaría en su trayectoria hacia estudios en medicina. **Conclusión:** MSPE alcanza una población diversa con acceso limitado a orientación sobre estudios en medicina y redes profesionales. Estas charlas son percibidas como altamente útiles, lo que sugiere que pueden contribuir a disminuir brechas de información y apoyar el acceso equitativo a carreras en medicina.

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Educación Prenatal en Lactancia Materna como Estrategia para Mejorar la Exclusividad en Hospital Universitario en Puerto Rico

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Introducción: La lactancia materna es la mejor forma de nutrición infantil, con beneficios para el vínculo de madre-bebé. A pesar de las recomendaciones de la Organización Mundial de la Salud y la Academia Americana de Pediatría de amamantar de forma exclusiva durante los primeros seis meses, muchas madres enfrentan barreras que interfieren con el éxito al amamantar. La educación prenatal en lactancia tiene un rol esencial en mejorar el conocimiento, la confianza y la preparación materna antes del parto. En el Hospital Universitario de Adultos, principal hospital de referido para Puerto Rico y el Caribe, se observa tasa de iniciación de lactancia (65%), pero baja exclusividad (4%) en recién nacidos sanos a término. **Objetivo:** Evaluar la necesidad de educación prenatal en lactancia; diseñar e implementar un programa piloto de educación en lactancia materna en la clínica

prenatal. **Métodos:** El programa consistió en el desarrollo de diez módulos de veinte minutos cada uno, impartidos semanalmente a las madres que asisten a la clínica. Los temas incluyeron beneficios, contacto piel con piel, enlace adecuado, mitos y dificultades comunes, y lactancia durante las primeras semanas posparto. Las sesiones interactivas se ofrecieron utilizando estrategias variadas. Se administraron encuestas antes y después de las sesiones para evaluar conocimiento y satisfacción, así como seguimientos posparto para evaluar el proceso de lactancia una vez en el hogar. **Resultados:** Catorce madres participaron del cernimiento de necesidades inicial; el 79% tenía información parcial y el 21% desconocía el tema. Ochenta madres participaron en las sesiones educativas. De éstas, 60% pudo hacer contacto piel a piel por al menos una hora; 50% estaba lactando exclusivamente y 67% reportó mantenimiento de lactancia. **Conclusión:** El proyecto piloto educativo demuestra la importancia de integrar la educación prenatal en lactancia al cuidado rutinario como herramienta clave para mejorar las tasas de exclusividad de lactancia materna. IRB protocol #: 2601530363.

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Prospective Study Evaluating Management of Hypertension Induced by Anti-VEGF Therapy in Patients with Active Cancer: VEGFHTN Trial

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Background and Objectives: Vascular endothelial growth factor (VEGF) inhibitors are used to treat several types of cancer but are linked to the development of hypertension, which can interrupt cancer therapy. Managing this side effect effectively is key to maintaining treatment continuity and patient safety. The objective of this study was to compare an algorithmic approach for antihypertensive management with standard care in patients receiving anti-VEGF therapy. We hypothesized that the algorithm would shorten the time required to control blood pressure. **Method:** We conducted a single-center prospective study of 68 patients with active cancer starting anti-VEGF therapy and compared them with a 1:1 matched retrospective control group of 68 patients. Matching criteria included age, gender, race, ethnicity, cancer type, and type of anti-VEGF agent. Hypertension was defined as three consecutive readings $\geq 140/90$ mmHg, and control as three consecutive readings $< 140/90$ mmHg. The primary outcomes were time to blood pressure control, number of medications used, and treatment interruptions. **Results:** Hypertension developed in 80.3% of the prospective group and 72.6% of the control group ($p = 0.235$). Patients treated under the algorithm achieved blood pressure control significantly faster (46.8 ± 105.4 days vs. 157.0 ± 168.3 days; $p = 0.001$) and required more medications on average (1.56 ± 1.24 vs. 1.04 ± 1.09 ; $p = 0.011$). Rates of therapy dose reductions or interruptions were similar between groups. **Conclusion:** A structured, algorithm-driven approach significantly reduced the time to achieve blood pressure control in patients receiving anti-VEGF therapy. Future studies with larger populations may help determine whether this strategy can also reduce treatment interruptions and improve long-term cardiovascular outcomes. **Acknowledgments:** This study was approved by IRB 4 under Protocol PA18-1070: A Prospective Study Evaluating Complications and Clinical Response in Cancer Patients Treated with Anti-VEGF-Related Therapies. Initial approval: January 18, 2019; Last approval: September 29, 2022. Supported by the SOAR Program (R25CA2658000-01A1). The authors report no conflicts of interest.

Cognitive Aids in High-Fidelity Simulation for Nurse Anesthesia Curricula: An Evidence-Based Practice Experience

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Clinical Question: In nurse anesthesia students (P) how does the integration of cognitive aids (CAs) into high-fidelity simulation perioperative crisis (I) affect technical performance non-technical skills, and user perception of CA usefulness (O) during academic semester Fall 2025 (T)? **Scope:** Despite global CAs adoption in simulation-based learning, the UPR–Nurse Anesthesia program lacked formal integration, creating a gap in crisis preparedness education where cognitive overload often impairs decision-making during perioperative crises. **Literature Review:** Ten high-quality studies, including systematic reviews and randomized trials, demonstrate that simulation learning with CAs significantly improves performance in perioperative crisis management, strengthens technical and non-technical competencies, enhances realism, and supports knowledge transfer, supporting curricula adoption. **Project Implementation:** Guided by the Stevens Star Model, the Stanford Emergency Manual was embedded into a high-fidelity MH simulation for 15 nurse anesthesia students. Structured prebriefing, role assignment, and guided debriefing were included. **Results:** Fifteen students participated (median age: 29.5 years; RN experience: 5.6 years). Cognitive aid usability was rated highly (SDS median=87.5, IQR=70–97.5; $\alpha=.75$), as were simulation effectiveness (SET-M median=57; IQR=55.5–57; $\alpha=.82$) and design quality (median=4.7; IQR=4–5; $\alpha=.84-.97$). Due to minimal inter-rater agreement (QLCCT $\kappa=-0.10$; TEAM $\kappa=-0.24$), performance scores (median range: 2.45–3.73) were reported by individual evaluator. Intervention leaders demonstrated high post-intervention EBP beliefs (median=4.49; IQR=4.5–4.75; $\alpha=.919$). **Practice Implication:** High usability ratings and simulation effectiveness scores demonstrate student readiness to use cognitive aids in crisis scenarios. Programs should integrate standardized emergency manuals with structured debriefing protocols. While technical performance assessment requires further validation, positive user perception and strong EBP beliefs among intervention leaders support broader curricular adoption to enhance crisis preparedness aligned with safety standards. **Acknowledgment:** We gratefully acknowledge Sherily Pereira, PhD, and Valerie Linera, DNP, for their mentorship and guidance. We also thank José Bonilla, DNAP, and Emanuel Díaz, DHA, for their institutional support, and Mélanie Alicea-Ávila, PhD(c), for her expertise in simulation design and evaluation. This study was approved by the UPR Institutional Review Board (Protocol #2505414616; July 7, 2025).

Studying the Prevalence of APOE Haplotypes in Caribbean Hispanics Residing in Puerto Rico

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Background: Alzheimer's disease (AD) represents a growing public health challenge in the Caribbean, where the elderly population continues to rise rapidly. Over the past decade, the Caribbean became the fastest-aging region in Latin America, with adults aged 65 and older now forming nearly 57.6% of the total population. Caribbean Hispanics, mainly Puerto Ricans, Cubans, and Dominicans, have lower birth rates and significant outmigration of younger generations, accelerating demographic aging. Multiple factors influence AD risks: genetics, environment, and social isolation, which is common among the elderly because of limited elderly care resources, financial constraints, and reduced family interaction. The Apolipoprotein E (APOE) gene is a polymorphic locus with three alleles: $\epsilon 2$ (protective), $\epsilon 3$ (neutral), and $\epsilon 4$ (risk-enhancing). While $\epsilon 4$ is the strongest genetic risk factor for late-onset AD (LOAD) in European populations, its impact in Hispanic Caribbean individuals remain unclear, as fewer than 3% of AD genetic studies include Hispanic/Latino participants. **Methods:** Patients and NDC controls were recruited through IRB protocol #2309147363. AD patients were recruited through a collaborating geriatrist. Blood samples were collected from each patient and/or participants. DNA was extracted using the QIAcube system and quantified to 10 ng/ μ l. Genotyping was performed using TaqMan SNP assays on the QuantStudio platform, and allele calling was analysed using QuantStudio Real-Time PCR Software v1.3. **Results:** This study aims to determine the frequency and distribution of APOE haplotypes in (3) cohorts and assess their association with late-onset Alzheimer's disease. We analyzed 50 cardiovascular disease (CVD) patients (66.55 ± 13.02 years), 50 AD patients (79.02 ± 7.37), and 52 controls (52.71 ± 9.25). Mean BMI values were AD: 26.32 ± 4.28 , CVD: 29.07 ± 5.01 , and controls: 29.5 ± 6.31 . **Conclusion:** Allele frequencies differed from global patterns, highlighting the need to study APOE variants in Caribbean populations to better understand AD risk.

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Evaluación de la Ley Núm. 102-2025 de Puerto Rico sobre el Reconocimiento Universal de Licencias Ocupacionales y Profesionales: Un Análisis Comparativo con Otras Jurisdicciones, su Impacto y Mejores Prácticas sobre el Licenciamiento en la Profesión Médica

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Política Pública Analizada: La Ley Núm.102-2025 de Puerto Rico establece un marco legal para el reconocimiento universal de licencias ocupacionales y profesionales (ULR) emitidas en otras jurisdicciones de los Estados Unidos. Esta investigación analiza su aplicabilidad en la profesión médica, considerando el contexto migratorio de profesionales de la salud y la necesidad de fortalecer el acceso a servicios médicos en Puerto Rico. **Disciplina o teoría:** El análisis se enmarca en la gobernanza regulatoria y movilidad profesional, considerando los principios de eficiencia administrativa, equidad laboral y protección sobre profesiones reguladas, aplicado al modelo de análisis de política pública del Centers for Disease Control and Prevention. **Fuentes de información:** Se utilizaron fuentes primarias como la Ley Núm. 102-2025, legislación previa local, y marcos legales comparables de Arizona, Idaho y Missouri. Asimismo, se integraron fuentes secundarias que incluyeron literatura académica, informes gubernamentales sobre movilidad profesional, reformas en política de licenciamiento ocupacional y estudios empíricos sobre la migración médica. **Método:** Se empleó un enfoque descriptivo-comparativo mediante análisis documental de textos legales y literatura secundaria. Se identificaron parámetros normativos, requisitos de licenciamiento y procesos administrativos, así como el impacto reportado del ULR en otras jurisdicciones. **Hallazgos:** La Ley Núm. 102-2025 establece un procedimiento acelerado para el reconocimiento de licencias profesionales,

incluyendo la concesión automática de licencia provisional en un plazo de 30 días. Se identifican inequidades entre solicitantes locales y externos, y falta de claridad sobre profesiones incluidas. **Implicaciones:** La Ley Núm. 102-2025 requiere fortalecer la capacidad institucional, el capital humano y la infraestructura tecnológica. Se sugiere explorar mecanismos alternos de credencialización y considerar la inclusión de modalidades como telemedicina. La reducción de barreras normativas sobre el licenciamiento requiere coordinación interinstitucional, claridad normativa y equidad retributiva; futura investigación es requerida para medir el impacto del ULR en la movilidad profesional y la distribución de proveedores de salud. **Reconocimientos:** Ninguno.

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Entre la Evidencia y la Crisis Invisibilizada: Desafíos Globales y Lecciones de Política para Atender la Desconexión Social en Puerto Rico

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Política pública analizada: Se analizaron las políticas vigentes entre los Estados Miembros de la OMS que, en 2024, contaban con estrategias, leyes, planes de acción o directrices dirigidas a la conexión social, reconocida como determinante social de la salud y dimensión esencial para enfrentar el aislamiento social y la soledad como retos de salud pública. **Teoría:** El Informe de la Comisión de la OMS sobre la Conexión Social reconoce la infraestructura social (políticas, servicios, recursos y espacios públicos accesibles) como componente esencial para la participación plena en la vida social, cívica y económica. La investigación aplicó el Marco Analítico de Política de los CDC, que orienta la identificación del problema, evaluación de alternativas y el desarrollo de estrategias mediante un enfoque sistemático. Dado que en Puerto Rico la investigación sobre desconexión social es limitada, este marco permite reconocer la necesidad de generar evidencia sobre magnitud, determinantes y manifestaciones del problema, para diseñar políticas públicas relevantes. **Fuentes de información:** Se evaluaron los contenidos en documentos oficiales de ocho países con políticas explícitas: Dinamarca, Finlandia, Alemania, Japón, Países Bajos, Suecia, Reino Unido y Estados Unidos. **Métodos:** Se implementó metodología cualitativa para la evaluación de definiciones, enfoques de política, estrategias multisectoriales y mecanismos institucionales presentes en las políticas nacionales. **Hallazgos:** El análisis evaluativo de políticas reconoce inconsistencias globales en las definiciones de “aislamiento social” y “soledad”, limitando la vigilancia, producción de evidencia y comparabilidad internacional. La posición de EE. UU. y la incertidumbre vinculada a su membresía en la OMS podrían aumentar la fragmentación global de estándares y datos. **Implicaciones:** Las brechas globales identificadas resaltan la urgencia de consensuar definiciones y generar más datos sobre magnitud y trayectoria del problema. Para PR, estas lecciones son esenciales para fundamentar políticas públicas que respondan a las necesidades de las personas y fortalezcan la salud integral. **Reconocimientos:** Ninguno.

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Bridging the Gap: Rewriting Health Policy in Puerto Rico for Advancement

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Background: Variability in health service availability and coordination across Puerto Rico affects timely care delivery particularly for individuals without a stable home, older adults in remote areas, residents born outside the continental United States, and communities exposed to chronic environmental or economic stressors. This project identified practical policy amendments to strengthen service delivery within existing public health resources. **Methods:** Multi-sector consultation forums and qualitative thematic analysis identified recurring and population-specific barriers. Findings were mapped to current legislation and administrative frameworks to propose feasible amendments that can be implemented within existing frameworks. This project was approved by IRB at Universidad Central del Caribe on November 2025 (#054-2025-37-06-IRB). **Results:** Four pragmatic legislative amendments are proposed to expand service delivery through: 1. Mobile medical teams for individuals without stable housing (Law 130-2007). 2. Essential primary and behavioral health coverage for non-insured residents regardless of place of birth (Law 72-1993). 3. Medical transport priority and fare waivers for older adults in island municipalities (Law 1-2000). 4. Trauma-informed training and reimbursement mechanisms for validated screenings (Law 408-2000). **Conclusion:** These recommendations integrate locally reported needs and priorities into existing administrative mechanisms, promoting effective, sustainable, and measurable improvements in access to essential services. The approach illustrates how stakeholder input can inform policy updates aligned with NIH's emphasis on implementation, accountability, and the optimization of population health outcomes.

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Muertes con Presencia de Fentanilo en Puerto Rico, 2018–2024: Silos en Política Pública

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En 2025, el Departamento de Salud (DS) de Puerto Rico (PR) alertó que ya se detecta el uso de carfentanilo en la Isla. Para atender esta urgencia, se realizó una revisión sistemática sobre el carfentanilo en la base de datos de PubMed y se compararon datos entre agencias gubernamentales de PR. **Política pública analizada:** La Orden Administrativa Núm. 597-B (OA-597-B) del DS, abril 2025, actualiza la notificación obligatoria de eventos de sobredosis por opioides y otras sustancias mediante el sistema BioPortal y la vigilancia sindrómica ESSENCE. **Disciplina o teoría:**

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Este estudio se basa en análisis empírico para proveer recomendaciones que aseguren la efectividad futura de OA-597-B. **Método:** Se realizó una revisión sistemática de la literatura en PubMed, años 2015-2025, y análisis de datos secundarios sobre muertes con fentanilo en PR, 2018-2024. **Fuentes de información:** Se compararon informes emitidos por el DS y ASSMCA que se nutren de la base de datos del Instituto de Ciencias Forenses. **Hallazgos:** La revisión sistemática de literatura identificó 282 artículos, en donde la atención a temas toxicológicos (n=94) o farmacológicos (n=62) superaron al número de publicaciones en salud pública (n=35). DS reportó 3,026 muertes que se distribuyen en 2,719 hombres, 302 mujeres y 5 no especificados. Un análisis por edad reveló que el mayor número de muertes ocurrió entre 35-44 años. Las mayores tasas de mortalidad (por 100,000 habitantes) por región de salud para este periodo fueron: Mayagüez (n=16), Ponce y Metro (n=15), Bayamón (n=13), Caguas y Arecibo (n=12). Se detectaron discrepancias numéricas entre informes gubernamentales. **Implicaciones:** Es necesario fortalecer la implementación de la OA-597-B para validar datos entre agenciales, crear programas de prevención y asignar presupuestos para estas actividades. El Instituto de Estadísticas de PR puede ser un ente que valide la información estadística entre agencias. **Reconocimientos:** Ninguno.

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Puerto Rico Newborn Screening Initiative to Improve Phenylketonuria Management: A Quality Improvement Project

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Background: Timely biochemical monitoring is essential for effective dietary management of phenylketonuria (PKU). Delays associated with traditional venous sampling and laboratory processing in non-local facilities can limit rapid clinical response and care coordination. Although home-based dried blood spot sample collection and newborn screening (NBS) laboratory service is available in many states for PKU patients, its systematic integration into the follow-up workflows in Puerto Rico has not been tested. This Quality Improvement (QI) project addressed this operational gap by redesigning specimen collection and reporting processes. The objective was to reduce laboratory turnaround time and improve the efficiency of routine PKU monitoring. **Methods:** Outcome measures included laboratory turnaround time and timeliness of result communication to the parents and/or clinical care team. Process measures focused on successful home specimen submission and laboratory completion. The intervention consisted of providing families with dried blood spot collection kits for home use, enabling free mail-in submission, and prioritizing laboratory analysis using a non-derivatized MS-MS method in the PR NBS facility. **Results:** The redesigned process reduced turnaround time for laboratory results from approximately 7–15 days to 1–3 business days using home-based sample collection and the local laboratory service. Improvements were observed in specimen processing efficiency and result delivery, supporting more timely communication between families and the multidisciplinary care team. **Conclusion:** This QI initiative demonstrates that integrating home-based specimen collection with expedited laboratory analysis can significantly enhance operational efficiency within the long-term follow-up of patients. The model supports more responsive clinical management for individuals with PKU and offers a scalable framework for optimizing metabolic monitoring workflows. Future efforts will focus on strengthening caregiver education, optimizing reminder systems, and evaluating long-term sustainability. **Acknowledgments:** The authors acknowledge the Puerto Rico Newborn Screening Program laboratory staff, and genetic specialists. The Health Resources and Services Administration (HRSA), Department of Health and Human Services (HHS) provided financial support for this project. The award provided 100% of total costs and totaled \$332,221. The contents are those of the author. They may not reflect the policies of HRSA, HHS, or the U.S. Government.

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Uso de Estrategias No Farmacológicas para Reducir el Dolor en Niños durante Venopunción

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Antecedentes: Las venopunciones son procedimientos comunes pero dolorosos en pediatría, generando estrés tanto en los pacientes como en sus cuidadores. A pesar de las recomendaciones sobre el manejo del dolor, las estrategias no farmacológicas, como la distracción, suelen ser poco utilizadas. Este proyecto tiene como objetivo reducir el dolor percibido en niños durante venopunciones en el Hospital Pediátrico Universitario implementando y evaluando intervenciones no farmacológicas. **Métodos:** Se utilizó la metodología PDSA para implementar intervenciones como lactancia, música, distracción visual y contacto piel con piel en pacientes pediátricos. El proyecto incluyó 27 pacientes, de 0 hasta 14 años en áreas de pediatría general. Se estableció data de base, observaciones y documentación del dolor utilizando la escala Wong-Baker FACES antes y después de aplicar las estrategias. Se recopilaban datos sobre la duración del procedimiento, número de intentos, y el comportamiento del niño. **Hallazgos:** Se observó una reducción en los niveles de dolor tras aplicar las estrategias con puntuaciones promedio en la escala Wong-Baker disminuyendo de 8-10 a 2-5. El número de intentos necesarios para completar la venopunción se redujo de 3-5 a 1-2, y la duración del procedimiento disminuyó alrededor de un 70%, completando la mayoría en menos de 10 minutos. Los cuidadores informaron una mayor satisfacción y menor ansiedad durante el procedimiento. **Conclusión:** Las estrategias no farmacológicas fueron efectivas para reducir el dolor durante las venopunciones pediátricas. Se demuestra que la implementación temprana de estas prácticas puede mejorar la experiencia del niño y debe integrarse en los protocolos clínicos del hospital. Seguir capacitando constantemente es muy importante para que el personal pueda mantener y continuar implementando prácticas no farmacológicas.

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Influences on Doxycycline Post-Exposure Prophylaxis Awareness, Acceptance, and Accessibility among MSM/TGW in Puerto Rico: A Rapid Qualitative Study

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Bacterial sexually transmitted infections (STIs) remain a significant public health concern in Puerto Rico, particularly in disproportionately affected populations. Doxycycline post-exposure prophylaxis (Doxy-PEP) has demonstrated effectiveness in reducing bacterial STIs among high-risk populations in clinical trials within the United States and Europe. However, contextual factors shaping its use in Puerto Rico remain poorly understood. This study aimed to identify informational, interpersonal, and structural influences on Doxy-PEP awareness, acceptance, and access among men who have sex with men (MSM) and transgender women (TGW) in Puerto Rico, with a view to informing future implementation strategies, including pharmacist-led interventions. This rapid qualitative study used semi-structured interviews with 12 MSM and TGW ≥ 18 years residing in Puerto Rico. Participants were recruited through community partners, flyers, and professional networks. Spanish-language interviews

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explored perceptions of Doxy-PEP, sources of information, concerns (e.g., antimicrobial resistance), and access factors, including cost and insurance coverage. Interviews were transcribed, de-identified, and analyzed using rapid qualitative analysis (RQA) involving structured summaries, consensus coding, and matrix-based thematic synthesis. Analysis identified informational, interpersonal, and structural influences shaping perceived barriers and facilitators to Doxy-PEP uptake. Informational influences included confusion between Doxy-PEP and HIV PrEP, uncertainty about indications, and antimicrobial resistance concerns; interpersonal influences reflected trust or mistrust in providers, experiences of stigma, and reliance on peer networks; and structural influences involved insurance constraints, medication cost, geographic barriers, and variability in pharmacy availability. Findings highlight gaps in public understanding and healthcare communication regarding Doxy-PEP. This study identifies actionable barriers and facilitators that inform implementation strategies tailored to the Puerto Rican context. Pharmacist-led education and prescribing strategies may serve as one avenue to improve access and, ultimately, address STI-related disparities. Approved by IRB [2411318454; March 26, 2025]. **Acknowledgements:** The authors gratefully acknowledge the contributions of all participants and collaborators. No external funding was received, and the authors declare no conflicts of interest.

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Designing an mHealth Intervention for ADRD Caregivers in Puerto Rico: Wireframing and Early-Stage Development

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Background and Objectives: Caregivers in Puerto Rico play a significant role in supporting loved ones with Alzheimer's disease and related dementias (ADRD). They often shoulder substantial emotional, financial, and health-related burdens, underscoring the urgent need for accessible and culturally relevant support solutions. This study used a user-centered approach to identify their needs and guide the design of a mobile health (mHealth) solution to support them. **Methods:** A literature review explored gaps in caregiver support, followed by an analysis of 31 caregiving apps from Google Play and the Apple App Store, and interviews with 15 informal caregivers. Insights from these efforts were synthesized and used to start the preliminary design and wireframing stage of an mHealth intervention to support ADRD caregiving. **Results:** Thematic analysis revealed unmet needs, including limited access to educational resources, emotional support, and reliable information. Caregivers reported stress and isolation but showed strong interest in technology-based tools for caregiving and personal well-being. Few existing apps specifically addressed dementia caregiving, and most lacked emotional wellness features or culturally relevant content, with none designed for Latino Puerto Rican caregivers. Existing tools also varied widely in quality, usability, and adherence to evidence-based design principles. Data from these efforts guided the initial wireframing of an mHealth intervention focused on three key areas: (1) education and training, (2) access to information about resources, and (3) tools to manage daily caregiving tasks. **Conclusion:** Data collection shows that caregivers generally have a positive attitude toward adopting mHealth interventions to support their caregiving and well-being. While not addressing all challenges, these interventions have strong potential in the three identified areas and should be carefully tailored to the context, experiences, and cultural background of Puerto Rican caregivers. IRB approval number: 2024030019 - Committee for the Protection of Human Subjects in Research at the University of Puerto Rico, Mayagüez Campus.

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Assessing Factor Stability of Beliefs and Clinical Concerns in a DoxyPEP Survey Instrument: An Exploratory Factor Analysis Among Pharmacists in Puerto Rico

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Background and Objectives: Bacterial sexually transmitted infections (STIs) such as syphilis, chlamydia, and gonorrhea remain a significant public health concern in Puerto Rico, with 6,541 cases in 2023 and 6,181 in 2024. Doxycycline post-exposure prophylaxis (DoxyPEP) a single 200 mg dose taken within 72 hours of condomless sexual exposure has shown up to two-thirds reduction in STI incidence among men who have sex with men (MSM) and transgender women (TGW), prompting CDC recommendations in 2024. Pharmacists, as highly accessible healthcare professionals, may support DoxyPEP implementation; however, their knowledge and perceptions have not been assessed locally. This study aims to validate whether the instrument designed to assess pharmacists' knowledge, beliefs, and clinical concerns regarding DoxyPEP accurately reflects the two-factor structure identified in the pretest. **Methods:** A 51-item online questionnaire was developed for licensed pharmacists practicing in Puerto Rico. Content validity was established through expert review and cognitive interviews. A pretest was followed by reliability testing and Exploratory Factor Analysis (EFA). The survey is being distributed via convenience sampling. To date, 90 responses have been collected, allowing a second EFA to evaluate factor stability. Approved by IRB 02/27/2025 (Protocol #: 2412328147). **Results:** The pretest EFA (n=30) yielded a Kaiser-Meyer-Olkin (KMO) value of 0.587, indicating inadequate sampling adequacy and limiting interpretation of the initial two-factor structure. With the larger sample (n=90), KMO improved to 0.785, supporting a stable and interpretable model. Reliability analyses showed strong internal consistency for both subscales, with improved performance for Beliefs ($\alpha = 0.784$) and consistently excellent reliability for Clinical Concerns ($\alpha = 0.874$). **Conclusion:** The improvement in KMO from 0.587 to 0.785 supports a valid, stable two-factor structure. Improvements in reliability coefficients further reinforce that each factor consistently measures its intended construct. Continued data collection will enable Confirmatory Factor Analysis and examination of associations between pharmacists' knowledge and sociodemographic characteristics to guide targeted educational efforts. **Acknowledgments:** None.

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Association of COVID-19 with New-Onset or Exacerbated Rheumatoid Arthritis in Puerto Rico: Analysis of a National Medical Claims Database

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Background: Emerging evidence suggests COVID-19 may influence the risk of developing rheumatoid arthritis (RA); however, their incidence and associated risk require larger, population-based research. This study aims to evaluate the association and risk factors linked to RA post-COVID in Puerto Rico. **Methods:** This retrospective cohort study utilized claims data from Plan Vital, the publicly funded health insurance program administered by the Administración de Seguros de Salud de Puerto Rico (ASES). De-identified patient-level data from 2018–2022 were analyzed. RA and related diagnoses were identified using ICD-9-CM and ICD-10-CM codes, and COVID-19 was identified using ICD-10 code U07.1. Individuals with COVID-19 in 2020, 2021, or 2022 were compared to those without documented COVID-19 in the same year, excluding patients with RA at baseline. New RA diagnoses

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were tracked in subsequent years. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated using Fisher's exact test, with analyses stratified by sex. Additionally, annual RA prevalence (2018–2023) and incidence (2019–2023) were estimated. **Results:** In 2020 COVID-19 was associated with higher RA risk overall (OR 1.28, 95% CI 1.21–1.36, $p < 0.0001$); lower odds in females (OR 0.12) and higher in males (OR 1.29). In 2021 no significant association overall was found (OR 1.03); sex-stratified analyses non-significant. In 2022 the RA risk increased overall (OR 1.35) and in females (OR 1.18); male subgroup not significant (OR 1.13). Population-level trends showed that RA prevalence rose from 1.66% (2018) to 2.63% (2021), then declined to 2.24% (2023); annual incidence peaked at 1.10% in 2021. **Conclusions:** COVID-19 infection was associated with increased RA risk in select years, particularly among females. Population-level RA prevalence and incidence fluctuated during the pandemic period. Factors beyond demographics may shape the risk of developing post-COVID RA and require further investigation. **Acknowledgements:** Supported by SJBSM Research Center; IRB Approval: EMSJBIRB-4-2023.

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Smurf Bees: An Assay to Determine Intestinal Integrity as a Measure of Health Decline with Age or Other Factors in Honey Bees (*Apis mellifera*)

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Background & Objectives: Aging affects overall health, including gut integrity. Intestinal permeability, the passage of materials from the gut lumen into circulation due to epithelial damage, is observed with reduced gut integrity in various species. The Smurf Assay (SA), developed in *Drosophila melanogaster*, assesses gut integrity using non-absorbable blue dye. In healthy individuals, the dye remains in the gut, but in compromised individuals, it spreads throughout the body, indicating reduced gut health and proximity to death. We adapted SA to *Apis mellifera* to assess gut integrity changes due to age or stressors. **Methods:** First, we tested dye toxicity in forager bees at 0%, 0.1%, 0.5%, and 2% dye concentrations in 2 M (molal) sucrose. With 40–50 bees per box, survival probability and Smurf phenotype frequency were recorded over eight days. **Results:** Smurf bees appeared in <1% of cases after 24 hours. Mortality did not increase in blue-fed bees for the first four days but rose thereafter, correlating with age. When paraquat, an oxidative stressor, was added, Smurf frequency and mortality increased with paraquat dose. **Conclusion:** This study is the first to adapt SA in bees, demonstrating its effectiveness in assessing gut permeability, similar to other species. We discuss the significance of increased Smurf phenotype frequency with age and stress exposure. **Acknowledgements:** The research was supported by the Louis Stokes Alliances for Minority Participation (LSAMP) program.

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Impacto de la Pandemia de COVID-19 en la Prestación de Servicios de Salud Mental: Percepciones de Profesionales de la Salud en Puerto Rico

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Introducción: La pandemia de COVID-19 alteró profundamente la prestación de servicios de salud, afectando múltiples niveles del sistema de salud. Este estudio exploró la percepción de los profesionales de la salud sobre el impacto de la pandemia en la prestación de servicios de salud mental en Puerto Rico durante su primer año (marzo 2020 a marzo 2021). **Métodos:** Se utilizó un diseño cualitativo fenomenológico, basado en el modelo de los cuatro niveles anidados del sistema de salud: paciente, equipo de cuidado, organización y ambiente. Se recopiló datos mediante un cuestionario en línea con preguntas abiertas. Participaron 15 profesionales de la salud que laboraban en tres niveles de cuidado: hospital general con unidad de salud mental, sala de emergencias y centro de servicios primarios. Se realizó un análisis temático inductivo. **Hallazgos:** Se identificaron patrones que revelaron un aumento significativo en las necesidades de salud mental de los pacientes, caracterizados por ansiedad, duelo y aislamiento. También se identificó una brecha digital que limitó el acceso a servicios. Los profesionales enfrentaron crisis de agotamiento laboral y dificultades en la coordinación interdisciplinaria. A nivel organizacional, se identificaron barreras como la infraestructura deficiente, escasez de recursos y adaptación forzada a la telemedicina. A nivel ambiental, se documentaron desigualdades en la financiación de la salud mental e incertidumbre regulatoria. Algunos factores facilitaron la respuesta ante estos retos, como el compromiso del personal, el apoyo emocional, la reorganización de servicios y las flexibilizaciones que facilitaron la telemedicina. **Conclusión:** La pandemia expuso y amplificó desigualdades estructurales en el sistema de salud mental. Los hallazgos resaltan la necesidad de fortalecer la planificación estratégica, invertir en infraestructura tecnológica y mejorar la coordinación entre niveles de cuidado. Este estudio aporta evidencia crítica para el diseño de políticas y programas resilientes de salud mental desde una perspectiva sistémica. IRB: #2212067165, aprobado 4/2/2025. **Reconocimientos:** Ninguno.

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Attitudes and Knowledge about OUD Treatment among Pharmacists and Pharmacists in Training in Puerto Rico

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Background and Objective: Opioid use disorder (OUD) represents a global public health crisis, and pharmacists play a key role in delivering effective OUD treatments. To describe and compare attitudes, perceptions, and knowledge toward OUD treatment between pharmacists and pharmacists in training, aiming to support integration of effective strategies in Puerto Rican clinics and pharmacies. **Methods:** A descriptive cross-sectional study was conducted using an online questionnaire. Stigmatizing attitudes were defined as social processes characterized by exclusion, rejection, or devaluation. Knowledge measured experience, skills, and knowledge regarding OUD and

buprenorphine treatment. Both constructs used Likert scales. Results were analyzed with Pearson's chi-square and Fisher's exact tests; $p < 0.05$ was significant (IRB #2304099516; #B1080122). **Results:** The study recruited 48 PharmD students (70.8% female; mean age 25.4) and 130 practicing pharmacists (83.5% female; mean age 51.9). Pharmacists were more likely to report willingness to maintain close relationships with individuals with OUD (67.21% vs. 32.79%, $p = 0.026$) and were more likely than students to feel uncomfortable receiving medical care from a provider with OUD history ($p = 0.004$). Regarding training, 54.17% of students lacked OUD training during their PharmD program, and 75.0% had no experience working with OUD patients. Most professionals were familiar with the dosage (95.38%) and administration of buprenorphine (96.92%), as well as the risks of combining it with central nervous system depressants (87.69%). **Conclusion:** Findings evidence the need to integrate targeted OUD training into pharmacy education (graduate programs and continuous education) to reduce stigma and improve patient care. **Acknowledgments:** The authors acknowledge the contributions of Adriana Mejía Sánchez, Carolina Rivera Caro, and Natalia Más Kildare for their valuable assistance in data collection. This study was approved by the Institutional Review Board (IRB) of University of Puerto Rico, Medical Science Campus under protocol number 2304099516 on June 22, 2023, B1080122 on August 26, 2022.

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Synthesis, Electrochemistry, and In Vitro Anticancer Activity of (Z)- and (E)-2-Substituted-3-Ferrocene-Acrylonitrile Compounds

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Background & Objectives: The discovery of new metal-containing anticancer drugs has garnered attention over the past four decades. Well-known drugs like cisplatin and its derivatives are still used in 50% of cancer treatments. However, their use is limited by platinum-resistant tumors and nephrotoxicity. Consequently, new organometallic compounds are being explored as potential anticancer agents. Ferrocene derivatives are versatile scaffolds with various pharmacological applications, including anticancer activity, that are of particular interest. This study aims to investigate a series of aryl-ferrocenyl acrylonitrile derivatives and their effects on cancer cells. **Methods:** Ferrocene acrylonitriles were synthesized via carbon-carbon bond formation through Knoevenagel condensation between aryl acetonitriles and ferrocenecarboxaldehyde. All compounds were characterized by IR, NMR, UV-Vis, GC-MS, and X-ray crystallography. Their cytotoxicity was screened against MCF-7 and MDA-MB-231 breast cancer cells using the Sulforhodamine B assay. Anti-migratory activity was assessed using a wound-healing assay with metastatic MDA-MB-231 cells. The electrochemical properties of ferrocene compounds were examined in acetonitrile using cyclic voltammetry. **Results:** Single-crystal X-ray diffraction of three representative compounds showed the Z configuration of the double bond and revealed an eclipsed conformation between the two cyclopentadienyl rings. All compounds exhibited UV/Vis absorption of low intensity for d-d* transitions within the Fe atom, ranging

from 426 to 509 nm. The observed redox potentials of the compounds ranged from 499 to 679 mV. Among the sixteen synthesized compounds, two showed growth inhibition with GI50 values between 9.1 and 11.9 μM in MDA-MB-231 cells, while ten had GI50 values ranging from 23.1 to 30.1 μM in MCF-7 cells. One compound inhibited 13% of the migration activity in the metastatic MDA-MB-231 cell line. **Conclusions:** Our results indicate that ferrocene-acrylonitrile hybrids and their derivatives are promising pharmacophores with antiproliferative and antimigratory effects. Acknowledgments: This research was supported by NIGMS NIH SC2GM116712, PR-INBRE P20GM103475, NSF CHE-1626103, and PRSTRT grants.

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Determinantes Sociales de la Salud y la Adherencia a los Medicamentos en Adultos con Enfermedad Renal Crónica en Etapa Prediálisis

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Antecedentes y Objetivo: La enfermedad renal crónica (ERC) constituye un importante problema de salud pública con repercusiones en discapacidad, morbilidad, mortalidad y costos de tratamiento. La adherencia a los medicamentos es fundamental para retrasar su progresión y mejorar los resultados de salud. Sin embargo, los determinantes sociales de la salud (DSS) pueden influir significativamente en este comportamiento. El propósito de esta investigación fue examinar los DSS que inciden en la adherencia a medicamentos en pacientes adultos con ERC en etapa prediálisis atendidos en clínicas ambulatorias de nefrología en Puerto Rico. El estudio se basó en el modelo ecológico de Bronfenbrenner (1987), el cual permitió contextualizar las influencias ambientales, sociales y económicas que afectan la conducta terapéutica. **Método:** Diseño cuantitativo de corte transversal analítico con una muestra por conveniencia de 144 participantes. Los datos se recopilieron mediante un cuestionario sociodemográfico y el instrumento ARMS, que mostró alta confiabilidad ($\alpha = .87$). **Resultados:** La no adherencia a los medicamentos resultó en 36.81% de los participantes. Entre los DSS con significancia estadística se identificaron: bajo nivel económico ($p = .021$), inseguridad alimentaria ($p = .001$), inestabilidad de vivienda ($p = .006$), estatus laboral ($p = .049$), enfermedad pulmonar ($p = .026$), enfermedad reumática ($p = .025$) y dificultad para pagar deducibles ($p < .001$). En el modelo de regresión ajustado, el bajo nivel económico (OR = 2.90), el estatus laboral (OR = 4.87), la enfermedad pulmonar (OR = 2.81), la enfermedad reumática (OR = 2.53) y la dificultad para pagar deducibles (OR = 3.18) se mantuvieron como predictores significativos de no adherencia. **Conclusión:** Los hallazgos evidencian la influencia multidimensional de los DSS en la adherencia a los medicamentos y destacan la necesidad de intervenciones de enfermería integrales que incluyan evaluación social, educación terapéutica y políticas públicas que reduzcan las disparidades en el manejo de la ERC en Puerto Rico. (UPR-MSU IRB- Protocolo # 2410299619)

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Identifying and Characterizing Curcumin as a Natural Compound That Promotes Longevity and Health Span in *Drosophila melanogaster*

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Background & Objectives: The world's population is aging, presenting an urgent public health issue. Aging is the greatest risk factor for many chronic diseases. To better understand aging and its underlying mechanisms, twelve hallmarks of aging have been proposed-biochemical and biological characteristics that underlie the aging process. Studies have demonstrated that intestinal barrier dysfunction is a conserved hallmark associated with a decline in overall organismal health. Improving intestinal barrier function through therapeutic interventions is a promising approach to promote health span (the disease-free period of life) and lifespan (maximum longevity) extension. Natural products represent a significant reservoir for identifying compounds with this potential. Curcumin, a polyphenolic compound extracted from the turmeric root, has been reported to extend the lifespan and improve gut barrier integrity in adult *Drosophila*. We aim to characterize the molecular mechanisms underlying curcumin's effects on longevity and health span. **Methods:** To assess the impact of curcumin on the barrier function using the Smurf assay, we utilized the aging-accelerated fly model (18 days old) and fed flies Curcumin (0 μ M, 62.5 μ M, 125 μ M, and 500 μ M in 0.147% DMSO) for 5-6 weeks. The 'Smurf assay' evaluates gut barrier dysfunction by feeding flies food mixed with blue dye No. 1; if the gut is leaky, the flies turn blue, indicating imminent death. Additionally, we performed other assays on flies treated with or without curcumin, including immunohistochemistry (using the pHH3 marker) to detect over proliferation of mitotic cells in the gut, colony-forming units (CFU) counts, and full-length 16S rRNA sequencing to characterize the gut microbiome. **Results:** Preliminary data indicate that curcumin exhibits a dose-dependent effect on age-related leaky gut and remodeled the gut microbiome, with no effect on the proliferation of mitotic cells. **Conclusion:** These findings provide insight into the molecular mechanisms underlying the beneficial effects of curcumin during aging. **Acknowledgments:** Supported by NIH-ID GeNe Grant (1R25HG012702-01)

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Associating and Correlating Clinical and Imaging Features in Glioblastoma Patients with Differential Survival Outcomes

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Background and Objectives: Glioblastoma (GBM) is a highly aggressive and heterogeneous high-grade tumor with infiltrative growth and unfavorable clinical outcomes. Predictive analysis can be carried out by characterizing clinical and imaging features that increase survival outcomes. This understanding can improve clinical practice by providing clinicians with a more targeted and individualized approach to treating patients with GBM. **Methods:** Clinical and imaging data from patients with GBM were gathered using an IRB-approved neurooncological repository. Three groups of interest were defined: extreme survivors (ES, n=121), those who survived at least 5 years; long-term survivors (LTS, n=134), those who survived between 3-5 years; and short-term survivors (STS, n=145), who survived less than 1 year. We used R to conduct chi-squared statistical tests and create Kaplan-Meier survival curves, graphs that compared clinical features to survival outcomes. The clinical features include motor weakness, numbness, vision loss, seizures, headaches, memory loss, and lethargy. (Approved by IRB June 2024 (IRB #- 17-009682). **Results:** We found that motor weakness and lethargy were the main clinical presentations in the STS cohort compared to ES and LTS (p<0.001), ES presented with seizures and headaches (p<0.001), while

LTS presented with increased memory disturbances and sensory deficits relative to the other two groups. In terms of tumor location, STS presented with more right frontal tumors ($p < 0.05$). There was no significant relationship between sex and tumor location. Additionally, being less than 50 years old was a significant predictor of survival ($p = 0.01$). **Conclusions:** These findings show that factors such as age, clinical presentation, and radiological data can be valuable indicators of survival outcomes. Further studies should aim to integrate specific tumor measures and clinical findings that can predict length of survival.

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Prevalence and Associated Factors of Polysubstance Use Among Adolescents in Puerto Rico

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The prevalence of polyconsumption has increased in recent years among adolescents in Puerto Rico. The use of multiple substances during secondary school years is a growing concern and is associated with negative health outcomes such as depression, anxiety, and absenteeism. This study has two main focuses: (1) to assess prevalence, risk, and factors related to polyconsumption in teenage years in a representative sample of adolescents in Puerto Rico, and (2) to promote evidence-based strategies to reduce prevalence and risk during teenage years. Consulta Juvenil XII is a survey designed to investigate the prevalence of substance use and its associated risk factors. The survey was conducted during the 2022–23 and 2023–24 academic years. This cross-sectional study utilized a self-administered questionnaire. Use of two or more substances (alcohol, tobacco, marijuana, cocaine, crack, heroin, or amphetamines) was defined as polysubstance use. The sample included 3,635 (49.5%) males and 3,714 (50.5%) females. Half of the sample (50.2%) was between seventh and ninth grade. The substance used most by students in the year before the survey was alcohol (34.0%), followed by marijuana (8.8%) and tobacco (6.0%). Using polytomous regression, the dependent variable had multiple categories. Poisson distribution and regression were applied, with a skewed distribution. High school students ($OR = 2.48$; 95% CI: 2.43–2.52) reporting clinical-level depressive symptoms ($OR = 1.28$; 95% CI: 1.27–1.29) are more likely to use multiple substances. The evidence presented here suggests that interventions for adolescent polysubstance use should rely on their direct surroundings and community-based efforts, while public health legislation must address the structural conditions that foster vulnerability rather than stigmatizing the individual. Based on this study, we propose developing prevention strategies and evidence-based policies that integrate legal frameworks, education, and community action. IRB number: 2022-24.

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Suppression of Sustained Proliferative Signaling in Highly Aggressive Prostate Cancer Cells by 5-Azacytidine-Induced Epigenetic Reprogramming

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Background & Objective: Prostate cancer (Pca) is the leading cause of cancer in men worldwide and a major cause of morbidity in Puerto Rico¹. Despite high initial treatment response rates, most patients eventually progress to metastatic castration-resistant prostate cancer (mCRPC), a stage characterized by continued disease progression despite maintaining low testosterone levels (<50 ng/dL). Docetaxel remains the standard first-line treatment for mCRPC; however, its clinical benefit is often limited by the development of chemoresistance. Increasing evidence suggests that epigenetic dysregulation, particularly aberrant DNA methylation, plays a central role in the emergence of docetaxel resistance². DNA methyltransferases (DNMTs) catalyze the addition of methyl groups to CpG islands, resulting in the silencing of tumor suppressor genes involved in cell cycle regulation, apoptosis, and DNA repair³. 5-azacytidine (5-AZA), a DNMT inhibitor, has been shown to demethylate DNA, restore tumor suppressor gene expression, and potentially sensitize prostate cancer cells to chemotherapeutic agents⁴. This study aimed to evaluate the effects of 5-azacytidine (5-AZA) on cell proliferation, clonogenic capacity, and DNMT1 expression in prostate cancer cell lines (22Rv1 and PC3) and their docetaxel-resistant counterparts. **Methods:** Prostate cancer cell lines were assessed for changes in proliferation and colony-forming ability using a Cell Viability Assay and a Clonogenic Assay. Protein expression changes due to 5-AZA exposure were evaluated through Western blot analysis. **Results:** 5-AZA decreased cell proliferation and clonogenic capacity in a dose-dependent manner across all cell lines (22Rv1, 22Rv1-DR, PC3, and PC3-DR). Both 1 μ M and 2 μ M concentrations reduced proliferation and markedly suppressed colony formation. Notably, PC3-DR cells exhibited a markedly reduced clonogenic capacity compared to their parental line. Western blot analysis revealed a consistent reduction in DNMT1 expression following 5-AZA treatment, confirming epigenetic reprogramming through DNA methylation inhibition. **Conclusion:** Findings suggest that 5-AZA strongly reduces proliferation, clonogenicity, through a reduction of DNMT1 expression in prostate cancer cell lines. Although both PC3 populations were sensitive to 5-AZA, the enhanced response observed in PC3-DR cells may indicate a greater susceptibility of resistant phenotypes, underscoring 5-AZA as a promising epigenetic therapy for mCRPC. **Acknowledgments:** Special thanks to Dr. Carlos Casiano from Loma Linda University School of Medicine for donating the cell models. This research was funded by the U54 PHSU-MCC Partnership Grants #U54CA163071 and #U54CA163068 and supported by the Molecular and Genomics Core (NIMHD Grant MD007579).

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Transition from Physical Therapist Assistant to Doctor of Physical Therapy: Experiences in the Process of Change

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Background & Objective: Physical therapist assistants (PTAs) pursuing a Doctor of Physical Therapist (DPT) degree may encounter distinct advantages and challenges derived from their prior background, influencing their transition into entry level doctoral education. This study explored PTAs' experiences transitioning to DPT, examining pathways to program entry and factors that facilitate or hinder adaptation and identity formation. The study explored the following question: How do PTAs describe their experience in transitioning to the DPT roles? **Methods:** We used a qualitative phenomenological design employing a focus group and individual semistructured interviews, guided by the Transition Shock Model. (Approved by IRB: 06/05/2024, Protocol number: 2404218404). The study included a purposeful sample of six PTAs who were currently enrolled in the DPT program (n=3), completing

the final clinical internship or who had recently graduated from the program (n=3). A phenomenological data analysis was conducted ensuring confirmability and credibility through triangulation, peer review, and research team discussions. **Results:** Prior PTA experience fostered early confidence in patient-management skills, clinical terminology, and documentation. Mentorship, family and peer support, hands-on learning experiences, and strong theoretical foundation in the DPT program further facilitated the transition. Reported barriers included geographic and financial constraints, heavy academic demands, limited access to program information, the need to unlearn ingrained PTA habits, and the challenge of adopting a DPT-level mindset. Recommendations to facilitate the transition included offering informational sessions about DPT admission requirements to students enrolled in PTA programs and encouraging completion of an associate degree in PTA prior to entering a DPT program. **Conclusion:** A PTA background appears to enhance the early development of clinical competencies, supporting initial adaptation to DPT entry-level expectations. However, extensive prior PTA experience may hinder adjustment to autonomous decision-making and evolving professional standards. Physical therapy education programs should consider implementing evidence-informed strategies to optimize PTA-to-DPT transitions and strengthen professional role integration and identity. **Acknowledgments:** The authors gratefully acknowledge Dr. Elsa Orellano and Dr. Cynthia Cruz for their expert review of the question guide, and Dr. Alma Ortiz for her critical reading and valuable feedback. No external funding was received for this study.

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Early Age of E-cigarette Initiation and Polysubstance Use Among Adolescents in Puerto Rico

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The prevalence of e-cigarette use has increased in recent years among adolescents in Puerto Rico. Meanwhile, the use of multiple substances among youth is of increasing concern and has been associated with a variety of negative health outcomes. The objective of this study was to assess the prevalence of e-cigarette use in combination with other substances, and the risk of polysubstance use among a representative sample of adolescent students in Puerto Rico. Consulta Juvenil XII is a survey that aims to study the prevalence of substance use and its risk factors. The survey was conducted during the 2022-23 and 2023-24 academic years. The study utilizes a self-administered questionnaire. Use of two or more substances (alcohol, tobacco, marijuana, cocaine, crack, heroin, or amphetamines) was defined as polysubstance use. The sample included 3,635 (49.5%) males and 3,714 (50.5) females. Half of the sample (50.2%) was between seventh and ninth grade. The substance most used by students in the year prior to the survey was alcohol (34.0%), followed by marijuana (8.8%) and tobacco (6.0%). The prevalence of e-cigarette use was 16.4%. The prevalence of polysubstance use was 10.1% and e-cigarette initiation before 14 years old was 7.6%. Adolescents who used e-cigarette were 3.7 times more likely to use three or more substances than those who did not use drugs. Poisson regression analyses revealed that students who use e-cigarette before 14 years old were significantly more likely to report polysubstance use after controlling for sociodemographic variables (POR = 4.82; $p < 0.001$). Findings of this study suggest that adolescents who use e-cigarette before 14 years old seem to be at higher risk for polysubstance use. Understanding who is most likely to report early vaping initiation is important in developing interventions to prevent multiple drug use among adolescents. IRB approval number: 2022-24.

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Development of CRISPR-Cas9-Loaded Nanoliposomes for the Treatment of Liver Cancer

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Background and Objectives: Primary liver cancer ranks as the third leading cause of cancer-related deaths worldwide, with one of the lowest five-year survival rates. Its treatment remains challenging due to late-stage detection and the development of resistance to first-line therapies such as Sorafenib and Lenvatinib. The Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR)-Cas9 gene-editing system offers a powerful approach to target and disrupt overexpressed oncogenes in cancer. However, efficient delivery of Cas9 remains an obstacle. Liposomes, nanoparticles composed of lipid bilayers, exhibit an inherent tropism for the liver, and can effectively protect protein and RNA cargos from degradation. Despite these advantages, a critical gap remains: current liposomal platforms have not been fully optimized for the delivery of large CRISPR components, and the parameters that maximize Cas9 loading, stability, intracellular trafficking, and genome-editing efficiency in liver cancer cells are not well defined. Notably, several FDA-approved CRISPR therapies already rely on liposomes as delivery systems, underscoring their translational potential. We hypothesize that our liposomal formulations will enable efficient Cas9 delivery and uptake in liver cancer cells. This study seeks to systematically optimize nanoliposome formulations for Cas9 delivery in liver cancer cells. **Methods:** Cas9-GFP fusion proteins were encapsulated into several nanoliposome formulations and added to HepG2 liver cancer cells. Internalization of Cas9-GFP was assessed via fluorescence microscopy, while nanoliposome particle size distribution was characterized using Dynamic Light Scattering (DLS). **Results:** Fluorescence microscopy demonstrated that cellular internalization varied significantly with the lipid composition of the formulations. DLS showed average liposome-Cas9 particle diameter below 200 nm for all formulations. The size and charge of the liposome formulations were optimal for systemic delivery. **Conclusions:** Our liposome formulations were able to effectively deliver Cas9 therapies into liver cancer cells. This work serves as a foundation for future liposome-based Cas9 therapies targeting genetic aberrations in liver cancer. **Acknowledgments:** We would like to acknowledge the NIGMS/NIH R16 Sure Grant #1R16GM145558-04 (PEVM) and the UPR Comprehensive Cancer Center.

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Precision of Automated Landmarking Procedures for Estimating Cranial Shape: An Assessment of the (M)ALPACA Algorithm Using Rhesus Macaque Crania

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Background and Objectives: Geometric morphometrics allows us to study the complex shapes of organisms through focused statistical methods. The collection of landmark data, which provide shape information, is time-consuming and prone to researcher bias, especially for large datasets. Use of automated software to collect landmarks may

reduce both the time spent in manual data collection and human error. However, data on the precision of landmarks estimated from different template inputs (e.g. different observers) in such software is lacking. This study asked how different input templates affect automated landmarking outputs in the (M)ALPACA algorithm. Our main objective was to determine if landmarks generated with (M)ALPACA from templates collected by different observers and those from manual inputs could be combined into a single dataset for geometric morphometric analysis. We hypothesized that researcher input would have an effect on (M)ALPACA outputs. **Methods:** Two observers created templates to estimate landmarks with (M)ALPACA for the same set of digital specimens (n = 33). Landmarks were estimated for each template set and were compared to each other and to manually collected landmark data (n = 60). Landmark sets were analyzed in MorphoJ with Principal Component Analysis and simple linear regressions to assess size effects. We used Canonical Variate Analysis with 1000 permutations to compare datasets. **Results:** (M)ALPACA landmarks differed from manually identified ones. Landmarks also varied systematically depending on the template set used to estimate them (Goodall's $F = 233.6655$, Pillai's trace = 1.0000, $p < 0.001$). (M)ALPACA estimates for the posterior part of the skull differed the most between sets. **Conclusions:** Landmarks estimated from templates created by different researchers cannot be treated as a single group for analysis due to discrepancies in landmark location. Discrepancies may be in part due to the nature of specific landmark locations (type I versus type III). Improvement of landmark precision is needed. **Acknowledgments:** The Caribbean Primate Research Center is funded by NIH ORIP #2-P40-OD012217.

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Understanding the Descriptive Epidemiology of Male Breast Cancer in Puerto Rico, 2000-2022

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Background & Objectives: Breast cancer (BC) is mainly considered a disease in women, but male BC (MBC) accounts for approximately 1.0% of BC diagnoses. Because MBC is rare, there is limited understanding of its epidemiology through the cancer research continuum. The objective is to discuss the clinical characteristics and secular incidence trends of MBC in Puerto Rico (PR) using population-based data for the period 2000-2022. **Method:** Data provided by the Puerto Rico Central Cancer Registry (PRCCR) for a cohort of 394 cases were analyzed using frequency distributions and age-adjusted rates (per 100,000 males; 2000 US standard population). The SEER*Stat software v9.0.42.0 and the Jointpoint Regression software v5.4.0.0 are used to compute the age-adjusted rates and the average annual percentage change (AAPC), respectively. **Results:** Thirty-nine percent of cases were <65 years and 43.9% were staged as localized at diagnosis. The incidence trend was stable throughout the period (AAPC=0.93) with age-adjusted rates of 0.9 and 1.1 for the years 2000 and 2022, respectively. The analysis accounted for the potential impact of hurricane Maria and the COVID-19 pandemic. The study was registered on IRB as 2509475267. **Conclusion:** As documented worldwide, MBC is a rare disease in Puerto Rico as well. The analysis of secular trends suggests that this disease has remained stable in the local male population since 2000. Findings suggest a compelling need for male-specific clinical research to better understand the epidemiology of MBC. This study constitutes the first approach to understanding this type of cancer in men in Puerto Rico. Ongoing

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multinational effort is required to gain a better understanding of the disease. **Acknowledgements:** “The collection of cancer-incidence data by the Puerto Rico Central Cancer Registry (PRCCR), as part of the statewide cancer reporting program mandated by the Puerto Rico State Law No. 28 of March 20, 1951, and Law No. 113 of July 30, 2010 (Law of the Puerto Rico Central Cancer Registry, was supported, in part, by the National Program of Cancer Registries (NPCR) of the Centers for Disease Control and Prevention (CDC). The ideas and opinions expressed herein are those of the author(s), and endorsement by the PRCCR is not intended, nor should be inferred.”

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Endemic Puerto Rican Plant Extracts Demonstrate Potent Antiplasmodial Activity

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Background and Objectives: Drug resistance to antimalarial drugs is on the rise. At present, *Plasmodium falciparum* has developed resistance to nearly all types of medications, representing a serious public health problem for malaria treatment and control. The use of herbal formulations offers novel, potent alternatives to antimalarial treatments. The objective of this study is to investigate the antiplasmodial activity of the herbal extracts of a Puerto Rican endemic plant (Plant A). **Methods:** The antiplasmodial activity of Plant A was evaluated in the *Plasmodium berghei* model in an in vitro luminescence-based assay and in *P. falciparum* using SYBRGreen (erythrocytic stages). Parasites were incubated with the compound, and their growth was determined. Dose-response curves were obtained using GraphPad Prism, and IC₅₀ values were determined. Red blood cell (RBC) lysis assays were performed to assess the host cell toxicity of the extracts at the equivalent concentrations. To test the transmission-blocking potential, extracts were initially tested to assess their ability to inhibit *Plasmodium* ookinete formation (mosquito stage). **Results:** Parasite growth inhibition revealed IC₅₀ values ranging from ~0.13 to 0.18 µg /mL in the *in vitro* luminescence assay, and an IC₅₀ value of 18.64 ng/mL in the Ookinete Assay. No significant hemolysis was observed in the RBC lysis assay at active concentrations, indicating parasite-selective activity. **Conclusion:** Results revealed potent antiplasmodial activity of the crude extract in *P. falciparum* and *P. berghei* blood stages. Preliminary data showed activity in ookinete stages, potentially inhibiting transmission. These results provide evidence that supports the use of herbal formulations as potential alternatives to conventional antiplasmodial drugs for effective treatments. **Acknowledgments:** CCRHD grant U54 MD007600(NIMHD); NIH PR-INBRE (grant # P20GM103475). Approved by IACUC (Protocol #2480108). Valid until April 18, 2026.

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Comparación de las Características Sociodemográficas de los Inmigrantes en Puerto Rico: 2005-2009 y 2019-2023

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Introducción y Objetivos: En Puerto Rico, el envejecimiento poblacional continúa aumentando aceleradamente. Factores que contribuyen: baja fecundidad, la emigración de jóvenes y la alta esperanza de vida. El promedio de edad en los inmigrantes ha aumentado cerca de 4 años, lo que refleja un cambio en la estructura de edad y envejecimiento. A diferencia de los emigrantes, el flujo de inmigrantes ha permanecido disminuyendo y actualmente solo representan cerca del 3% del total de la población de la Isla. El objetivo del estudio fue describir y comparar las características sociodemográficas de la población de inmigrantes durante 2005-2009 y 2019-2023. **Metodología:** Esta investigación fue de carácter descriptivo transversal. La fuente de datos fue la Encuesta sobre la Comunidad de Puerto Rico, periodos: 2005-2009 y 2019-2023. **Hallazgos:** El flujo de inmigrantes pasó de 38,341 a 29,670 personas entre 2005-2009 y 2019-2023. Los inmigrantes que llegaron a la isla durante 2019 – 2023, mostraron una media de edad mayor a los del periodo 2005 – 2009, 37 años vs. 33 años, respectivamente. La proporción de mujeres fue apenas mayor (51% versus 49%) en el periodo de 2019 – 2023. En el periodo 2005 – 2009, se observó un porcentaje más bajo en tener un grado asociado o más (19% versus 33%). La proporción de inmigrantes bajo el nivel de pobreza disminuyó. La media de ingreso aumentó de 15,162 a 21,590 dólares para el 2019 – 2023. **Conclusión:** Los hallazgos indican diferencias importantes en edad, ingreso y educación en la población inmigrante. A pesar de que hubo un aumento en los ingresos y en sus niveles de educación, los cuales son componentes positivos. Estos también mostraron un aumento en la edad promedio. La investigación resalta la importancia de idear estrategias para promover la llegada de inmigrantes para el impulso económico de Puerto Rico y comprender sus cambios poblacionales recientes.

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Perfil de Salud de Veteranos en Puerto Rico: 2019-2023

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Trasfondo y Objetivos: La población de veteranos en Puerto Rico se estima que fueron aproximadamente 68 mil para el periodo de 2019-2023. Los veteranos se definen como personas que han prestado servicio activo en una rama del ejército de los Estados Unidos por 181 días o más. El objetivo de la investigación es describir el perfil de salud de los veteranos en Puerto Rico en el periodo de 2019-2023. **Metodología:** Esta investigación es uno de carácter descriptivo y transversal, utilizando los datos de la Encuesta de la Comunidad de Puerto Rico en el periodo, 2019-2023. Se analizaron variables de cobertura médica, discapacidad, impedimentos físicos y mentales, luego observadas con sus características sociodemográficas tales como sexo, edad, y nivel de pobreza. **Resultados:** De los veteranos estimados en Puerto Rico para los años 2019-2023, el 5.1% son mujeres, el 19.6% tiene entre 70% y 100% de discapacidad, y una décima parte (10.3%) tiene dos discapacidades, donde las de mayor prevalencia son ambulatoria (27%), vida independiente (21.7%) y auditiva (19.2%). El 40.3% de los veteranos tienen dos tipos de planes médicos. **Conclusión:** La proporción de los veteranos bajo el nivel de pobreza es cercana a una quinta parte de su total (18.3%). A su vez, el porcentaje de veteranos con alguna discapacidad es cercano a la mitad de toda la población de estudio (45.3%). El 83.1% de los veteranos que tienen plan médico, tienen una cobertura pública. Los análisis mostraron que los veteranos presentan obstáculos de salud que afectan su calidad de vida. Esto debe ser atendido a través de la formulación de políticas públicas, además de la necesidad de concientizar sobre su vulnerabilidad y sus necesidades.

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Development and Validation of Clopidogrel in Plasma of the Hispanic Caribbean Population Using UHPLC-MS/MS

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Background & Objectives: The Hispanic population in the USA is the fastest-growing racial/ethnic group, marked by significant socioeconomic and genetic diversity that affects the prevention, diagnosis, and treatment of cardiovascular diseases (CVD). As the leading cause of death in the USA, CVD presents a major public health challenge. Puerto Ricans display a unique genetic admixture of European, West African, and Amerindian ancestries, resulting in substantial genetic heterogeneity. That might be responsible for the inadequate response of some Hispanic Caribbean patients to a key component of dual antiplatelet therapy, clopidogrel. The primary objective of this study is to develop and validate a method for the quantitative analysis of clopidogrel in human plasma using ultra-performance liquid chromatography-tandem mass spectrometry (UHPLC-MS/MS). **Method:** We developed a sensitive and rapid UHPLC-MS/MS method for quantifying clopidogrel, following FDA guidelines for Bioanalytical Method Validation. The analysis utilized positive electrospray ionization in multiple reaction monitoring mode (MRM) with a run time of 5.0 minutes. The calibration curve linear range was established at 0.03-150 ng/mL (ppb). Clopidogrel and an internal standard (IS) were extracted from a 250 µL plasma sample using a simple protein precipitation procedure with acetonitrile. (IRB Protocol #: 2290033933A003; Date: 11/10/2023). **Results:** We achieved a low limit of quantification (LLOQ) of 0.03 ppb and a low limit of detection (LLOD) of 0.01 ppb. The method demonstrated linearity, accuracy, precision, extraction recovery, and acceptable matrix effects for all clopidogrel concentrations tested. **Conclusion:** This study aims to improve the effectiveness of clopidogrel therapy among Caribbean Hispanics, bridging the gap between pharmacogenetics and pharmacokinetics. Our validated method is among the most sensitive and rapid currently available. These findings will assist in confirming the presence of CYP2C19 *2 and *3 polymorphisms in this population and aid in classifying metabolizer types based on clopidogrel concentrations for future investigations.

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Clinical Course of PICU Patients After Spinal Fusion: Associations Between Blood Loss-Related Complications and Opioid Dosing

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Background & Objectives: Adolescent idiopathic scoliosis (AIS) is a genetic syndrome characterized by an abnormal curvature of the spine. It manifests as a lateral deviation in the coronal plane. Female adolescents between 10-18 years of age who are undergoing their growth spurt, are susceptible to being diagnosed with AIS. Standard management includes observation, bracing, and posterior spinal fusion (PSF) for patients with spinal curves greater than 45 degrees. Among the postoperative complications of PSF, pulmonary complications are the most common and may arise from multiple factors. Although current evidence highlights several perioperative elements as potential contributors to complications, their direct association with prolonged intensive care unit (ICU) length of stay (LOS) remains unclear. This study aims to identify respiratory complications in pediatric patients with short versus prolonged ICU stays (SLOS and LLOS, respectively) following PSF surgery. Additionally, it seeks to evaluate how these complications may be influenced by perioperative factors, with particular focus on total opioid dosage used for postoperative pain control and the magnitude of intraoperative blood loss. **Methods:** A retrospective review was conducted in a tertiary teaching hospital in Puerto Rico, assessing opioid administration and intraoperative blood loss in 40 patients aged 10 to 21 years admitted to the ICU after PSF between November 2018 and December 2023. Approved by IRB (2407252385) on 07/17/2025. **Results:** The mean age was 13.4 ± 2.7 years, with 30 females and 12 males, and a mean LOS of 3 ± 1.4 days. While mean hemoglobin and cumulative opioid doses differed between groups, correlations with LOS were weak and non-significant. Ongoing data collection aims to expand the sample size and strengthen statistical power. **Conclusions:** These findings contribute to understanding perioperative factors that may increase the risk of prolonged ICU stays in AIS patients, with potential implications for optimizing postoperative management and improving outcomes.

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Cross-Population Analysis of High-Risk HPV in Women Born in Puerto Rico and the Dominican Republic

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Background and Objectives: Human papillomavirus (HPV) is one of the most common sexually transmitted infections where high-risk HPV (HR-HPV) serotypes are strongly associated with cervical cancer. Past studies have shown that distribution of HPV genotypes varies across regions and ethnicities, but Hispanic women remain underrepresented in HPV research. The purpose of this study is to determine whether significant differences exist in cervical cytology results and genotypes between Puerto Rican-born and Dominican-born women. **Methods:** Cervicovaginal swabs were collected from 81 women (39 born in the Dominican Republic and 42 born in Puerto Rico) under IRB protocol #2290033153. These samples underwent genomic DNA extraction, followed by HPV typification using short-polymerase chain reaction-fragment assay (SPF10-LiPA). Participants were matched for body mass index (BMI), age, menopausal and physiological status to reduce confounding. Statistical analyses were conducted using Fisher's exact test, with significance set at $p < 0.05$. **Results:** The HPV positive rate was 72.2% in the Dominican Republic cohort and 87.8% in the Puerto Ricans. Among women from the Dominican Republic, negative to

intraepithelial lesions (NILM) was the most frequent cytologic finding (74.4%), followed by high grade lesions (HGSIL) (12.8%), low-grade lesions (LGSIL) (10.3%), and atypical squamous cells of undetermined significance (ASCUS) (2.6%). In Puerto Rican-born women, the distribution was NILM (43.6%), HGSIL (30.8%), and LGSIL (25.6%). The most common HR-HPV in Dominican participants were HR51 (18%), HR16 (13%), and HR33 (13%); in Puerto Ricans, HR16 (30.7%), HR51 (23.1%) and HR66 (23.1%). No statistical difference was seen in HR-HPV distribution between Puerto Rican and Dominican women in this cohort ($p=0.062$). **Conclusions:** These findings suggest that ethnicity may influence HPV infection patterns within Hispanic populations. Future directions include expanding the cohort with a larger sample size to further assess these results. This approach will contribute towards the development of prevention and screening strategies. **Acknowledgements:** This project was supported by the UPR-Medical Sciences Campus Center for Collaborative Research in Minority Health and Health Disparities (RCMI) 2U54MD007600, the NIAID Research Education Program on Microbes, Infections and Cancer (REPMIC) R25AI183304, NIH-NIGMS Alliance Programs U54MD007587, and the COBRE Puerto Rico Center for Microbiome Sciences 1P20GM156713-01.

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Conectividad Tecnológica y Trauma: Un Análisis Cualitativo de Foros Comunitarios en Puerto Rico

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Antecedentes/Objetivos: La tecnología está cada vez más integrada en la interacción social, el acceso a información de salud y la resiliencia comunitaria. En Puerto Rico, el limitado acceso a la infraestructura tecnológica confiable amplía la brecha digital, agrava el aislamiento social y puede intensificar los efectos del trauma, especialmente tras desastres. Este estudio exploró cómo la conectividad tecnológica o su ausencia afecta el bienestar social, la resiliencia y los procesos de recuperación en comunidades puertorriqueñas. **Método:** Se llevó a cabo un foro comunitario cualitativo con 12 participantes que representaron al tercer sector ($n=6$), la academia ($n=4$), el sector público ($n=1$) y la empresa privada ($n=1$). A través de un análisis categorial, se examinaron las experiencias y percepciones de los participantes sobre el acceso tecnológico, el trauma y la resiliencia colectiva. **Resultados:** Los participantes identificaron la conectividad limitada como una barrera para la comunicación, el apoyo social y el acceso a recursos críticos de salud y recuperación. Las barreras de acceso digital se describieron como un factor que amplifica el malestar emocional y la fragmentación comunitaria, especialmente en zonas rurales y aisladas. En contraste, un mayor acceso digital se asoció con una mejor cohesión social, empoderamiento y circulación de información durante situaciones de crisis. **Conclusión:** Reducir la brecha tecnológica es esencial para mitigar los efectos del trauma y fortalecer la resiliencia comunitaria en Puerto Rico. Se requieren políticas de integración digital equitativas y una inversión sostenida en infraestructura para mejorar la conectividad, promover el bienestar mental y facilitar la recuperación social tras eventos adversos. **Agradecimientos:** Apoyado por el National Institute of General Medical Sciences (NIGMS) y los National Institutes of Health bajo el número de subvención U54 GM133807. Aprobado por IRB #a2210120.

A Medical Program to Provide a Medical Examination for Individuals that May Have Been Exposed to Asbestos in a Non-Industrial Setting

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Background and Objectives: In May 2012, regulated asbestos-containing material was improperly removed from a government office building, potentially exposing approximately 450 individuals to asbestos fibers in a non-industrial setting. The precise exposure level for each person remains unknown. Breathing asbestos fibers may increase the risk of several chronic diseases, including asbestosis and several types of cancer. This study aims to estimate the incidence and prevalence of cancer, pulmonary disease, and other asbestos-related conditions in these individuals. **Methods:** A baseline medical examination program was designed to establish participants' health status relative to potential asbestos exposure. Inclusion criteria were determined by the U.S. Department of Justice (DOJ) through a Victims' Coordinator and enforced via federal subpoena, targeting individuals present at the affected site for at least eight hours during May 14–18, 2012. The examination included: (1) completion of a validated OSHA-based questionnaire; (2) high-resolution CT scan; (3) interpretation by radiologists; (4) independent review of imaging, and (5) consultation for incidental findings. A follow-up evaluation is scheduled three years post-baseline. **Results:** The first 53 participants evaluated in 2020 in the first phase of the study were mostly female (50.9%). Most report good physical health (90.9%), yet 62.3% report a history of lung disease, 29.2% asthma, and 11.1% chronic bronchitis. Additionally, 12% reported prior asbestos exposure and 16.3% smoked at least 100 cigarettes in their lifetime. These findings highlight potential respiratory health concerns among the exposed population. **Conclusions:** This program represents a cost-effective, medically appropriate approach to monitoring individuals exposed to asbestos outside industrial environments. Findings will inform public health strategies, occupational health policies, and future surveillance programs for environmental exposures. Approved by IRB, Protocol No. 2401180406, January 26, 2025. **Acknowledgements:** This research was supported by the U.S. Department of Justice.

Yeast Split-Intein Mediated Protein Ligation (ySIMPL) for Detecting Protein-Protein Interactions of Mechanosensory Proteins

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Background and Objectives: The SIMPL (Split-Intein Mediated Protein Ligation) assay has proven to be a robust system for studying protein-protein interactions (PPIs) of human proteins in living mammalian cells. However, it had not been adapted previously for use as a screening tool for PPIs in yeast. This study introduced key modifications that enable SIMPL to be used in validation studies in *Saccharomyces cerevisiae*. This new yeast SIMPL system (ySIMPL) is compatible with tagging yeast bait genes at their endogenous chromosomal loci. It provides a straightforward approach to studying protein interactions in their natural cellular environment. **Methods:** We applied ySIMPL to validate PPIs of the well-studied yeast cell wall stress sensor protein Wsc1 as a proof-of-principle. **Results:** We have confirmed Wsc1p interactions with several known protein partners, Egd2p, Ras2p, Tef1p, and Zeo1p. Yck1p is an interactor protein previously confirmed by iMYTH and MS methods but not by ySIMPL. The intensity of putative spliced intein bands on Western blots varied between different prey, with Ras2p and Zeo1p having the strongest signals. Importantly, no signals for spliced intein products were detected with negative interactor proteins or empty vector controls, underscoring the specificity and robustness of the system. **Conclusions:** This work establishes ySIMPL as a reliable and versatile tool for studying direct protein-protein interactions in yeast, complementing and expanding the existing toolkit available to the yeast research community. **Acknowledgements:** We want to acknowledge the Medical Sciences Campus Instrumentation Cores.

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Expression and Purification of the Bacterial Toxin Uropathogenic Specific Protein

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Background & Objectives: The Uropathogenic Specific Protein (USP) is a multidomain protein produced by different strains of uropathogenic *E. coli* and some species of *Salmonella*. The protein has been linked to cellular damage and inflammation. Full-length USP protein consists of three domains with defined functions: an Hcp domain in the N-terminus, followed by a pyocin domain and finally, a nuclease domain presumed to cause DNA damage. The most widely studied version of USP has only 2 domains, the pyocin and the nuclease domains. Interestingly, the Hcp domain has been left out of most studies since this makes the protein harder to purify. In this work, we produced a full-length version of USP using standard recombinant technology coupled with a denaturing purification protocol. **Methods:** To do this, we have developed and perfected a multiple step purification system where we express the protein on a BL21 *E. coli* strain. The sequence has a 6 histidine tag which allows us to purify it on a histidine affinity chromatography column. To further purify the protein, we use a size exclusion chromatography column (Superdex 75) and in order to confirm the presence of our protein we perform an SDS-PAGE electrophoresis followed by two confirmations: a Coomassie stain and a western blot with a proprietary antibody that is specific to the short version, as well as our full-length version of USP. **Results:** Our team has successfully purified the full-length version of USP and a mutant version that lacks nuclease activity (USP Δ HNH). We managed to produce 0.43 mg of pure WT USP and 66.7 mg of pure USP Δ HNH, per liter of culture. Activity assays will be performed to assess the catalytic competency of these enzymes. **Acknowledgements:** This research was supported by the NIH grant 5R16GM153691-02 and R25AI183304.

Outdoor Bioallergens and Maternal Health after Natural Disasters: Scoping Review

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Background & Objective: Natural disasters worldwide create environmental conditions that can adversely affect pregnant women, including increased exposure to stressors such as elevated levels of bioallergens. This scoping review evaluates the scientific literature available on the association between bioallergens exposures and maternal health outcomes during and after natural disaster events to identify gaps and future areas of research. **Methods:** A scoping review of literature was conducted in accordance with the PRISMA 2020 guidelines. The databases searched for this review were PubMed, Google Scholar and ProQuest. The search strategy used keywords and MeSH terms related to external and outdoor bioallergens, maternal and perinatal health, natural disasters, and hurricanes to identify studies assessing associations between environmental bioallergens, maternal outcomes, and disaster-related events. Inclusion criteria were papers in the last 5 years, longitudinal cohort studies, studies of pregnant women or perinatal period and with the exposition of bioallergens and having outcome maternal health. Analysis and summary of papers were performed. **Results:** Searches in PubMed (78 articles), Google Scholar (787 articles) and ProQuest (144 articles) were screened using predefined inclusion and exclusion criteria focused on outdoor bioallergen exposure and maternal health outcomes. After removing duplicates, non-English or Spanish, books, and studies unrelated to the research question, 11 of the initial 1,009 records met the inclusion criteria. The available evidence suggests that natural disaster-related increases in environmental bioallergens are associated with adverse maternal health outcomes. **Conclusion:** The limited number of studies examining bioallergens exposure following natural disasters and its impact on pregnant women highlights a significant gap in knowledge, education and awareness. Given that birth outcomes are key population health indicators, the lack of information on preventive measures and mitigation strategies for bioallergens exposure may elevate risks during the perinatal period. Notably, one study reported increased fungal spore levels following natural disasters. **Acknowledgements:** This research was supported by NIH Grants R00DE024571, R37DE008559, S21MD001830, and 2P50GM133807. Approved by IRB, 09/17/2025.

Characterization of Outer Membrane Vesicles (OMVs) from pks+ *E. coli* strains NC101 and DH10B

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Background & Objectives: Colibactin is a genotoxin encoded by the pks genomic island in pathogenic Gram-negative bacteria and has been implicated in colorectal cancer. Colibactin synthesis and activation occur in a two-step process in which pre-colibactin is produced in the bacterial cytoplasm and subsequently activated into colibactin within the periplasmic space. However, the mechanism by which pks⁺ bacteria export colibactin to host cells remains unclear. We hypothesize that outer membrane vesicles (OMVs), nanosized proteoliposomes released by Gram-negative bacteria capable of transporting diverse biomolecules, serve as a delivery system for this toxin to host cells. **Methods:** To investigate this, OMVs were isolated from pks⁺ E. coli strains NC101 and DH10B using the exoEasy Maxi Kit and quantified with a BSA-based protein assay on a Synergy H1 microplate reader. **Results:** Yielding concentrations consistent with typical OMV preparations. The stability and morphological characteristics of the extracted OMVs will be evaluated using dynamic light scattering (DLS). Metabolites extracted from OMVs will be examined via mass spectrometry to confirm the presence of known colibactin-related intermediates. Additionally, OMVs will undergo proteomic analysis to identify proteins involved in OMV–host interaction mechanisms. Finally, we aim to assess the effects of OMV exposure on large intestinal epithelial cells to better understand their contribution to colibactin-associated toxicity and colorectal cancer development. **Conclusion:** Ultimately, this research seeks to clarify how OMVs mediate colibactin transport and cytotoxicity, providing new insights into bacterial factors that promote colorectal carcinogenesis. **Acknowledgements:** This research was funded by the National Institute of Allergy and Infectious Diseases (NIAID) Grant #5R25AI183304-02.

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Defining the *Drosophila* NMJ as a Model System to Study Synaptic Maladaptation to Alcohol Exposure

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Alcohol tolerance is at the center of addiction and is achieved through the nervous system's adaptation to alcohol. The *Drosophila* larval system has been used to shed light on Alcohol Use Disorders (AUDs). Indeed, associative learning is inhibited in animals subjected to rapid exposure but is restored in chronically exposed animals, while withdrawal also inhibits learning. This showed that adaptation to alcohol is occurring in the *Drosophila* larvae. Interestingly, studies describing the effects of alcohol on postsynaptic targets are numerous, while the presynaptic release machinery remains less studied. In order to shed light on the synaptic changes underlying this adaptation, we assessed essential molecules after different alcohol exposures: acute, rapid/binge, chronic, and withdrawal. We also asked whether activity-dependent synaptic activity (ADSP), the cellular correlate of learning and memory, was affected by alcohol. To do so, we quantified the de novo synaptic boutons that are formed after repeated stimulation. Our results show that the modulator of synaptic vesicle dynamics, Synapsin, is unaffected by alcohol. In contrast, the abundance of Synaptotagmin 1, a transmembrane synaptic vesicle protein and calcium sensor, decreases by 29% in animals subjected to rapid alcohol exposure. In addition, Syntaxin 1A, a t-SNARE protein essential for exocytosis, increases by 34% in acute exposure and 56% after chronic alcohol exposure. Finally, we found that ADSP is reduced in animals exposed to rapid alcohol or experiencing withdrawal, while maintained

at control levels in chronically exposed animals. These results show that the synapse is subjected to significant remodeling at different stages of alcohol exposure, suggesting that synaptic adaptation is occurring in this system. In addition, the plasticity at the NMJ mirrors the results obtained with the associative learning paradigm and suggests that the synaptic modifications taking place during alcohol exposure might be part of the maladaptation leading to AUDs. **Acknowledgements:** We would like to acknowledge the following support: NIH NIGMS COBRE P20GM103642 and NIH-RCMI U54MD007600.

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**Metabolomic Profiling of Fresh and Formalin-Fixed Paraffin-Embedded Samples
Reveals Metabolome Alterations in Penile Cancer**

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Background and Objectives: Penile cancer presents significant morbidity and mortality in Puerto Rico, with HPV-associated cases comprising 56% of cases. The link between clinical variables and metabolomic alterations has not been studied in penile cancer. This study aimed to characterize the metabolomic profiles of fresh and formalin-fixed paraffin-embedded (FFPE) penile cancer samples to identify correlations with patient clinical variables: HPV infection status, tumor stage and tumor grade. **Methods:** In this study, 14 fresh and 37 FFPE penile cancer samples were processed for metabolomic analysis. HPV infection status was determined using INNO-Lipa HPV Genotyping and RHA kit HPV SPF10-LiPA25 kits. Sample aliquots were analyzed using GCMS/MS-TQ8050 equipment. Clinical variables were provided by the Departments of Pathology and Surgery. Filtering of raw data was conducted using AMDIS 32 and the NIST MS Spectrum database. Statistical analysis (T-test and Mann-Whitney test) of metabolomic profiles was done using MetaboAnalyst 6.0. **Results:** Our study identified 52 metabolites in the fresh samples and 18 in the FFPE penile cancer samples. The fresh sample cohort yielded eight metabolite classes: amino acids, sugar alcohols, fatty acids, carboxylic acids, nucleic acids, sterols, cofactor and vitamins, and others. The FFPE cohort yielded five metabolite classes: amino acids, sugar alcohols, fatty acids, carboxylic acids, and other metabolites. Statistical findings suggest that HPV infection status and tumor stage are significantly correlated with alterations in expression of several metabolites in both sample cohorts: isoleucine (0.011), homoserine (0.0001), cysteine (0.0385), glycolic acid (0.0215), methylmalonic acid (0.0475), malic acid (0.0483) and heptanoic acid (0.0461). Statistical findings found no significant correlation between tumor grade and metabolomic alterations.

Conclusion: Our findings suggest that HPV infection status and tumor stage alter metabolomic pathways in penile cancer. Further understanding is needed to identify novel metabolic biomarkers and therapeutic targets to improve treatment outcomes for this disease. **Acknowledgements:** This research was supported by the NIGMS/NIH under Award Numbers P20 GM103475 and the Metabolomics Research Core at the University of Puerto Rico Medical Sciences Campus, San Juan, Puerto Rico. Approved by IRB: IRB number: 2290033978 / Last IRB approval date: 03/20/25.

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Amphetamine Use, Mental Health, and Early Clinical Exposure Among First-Year Medical Students in Puerto Rico

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Background: Professional identity formation (PIF), the process through which medical students internalize professional values and coping strategies, is fundamental in early training. Globally, amphetamine use among medical students has increased, suggesting maladaptive coping that may affect PIF and mental health. Research in Puerto Rico (PR) is scarce. This study estimated the prevalence of amphetamine use among first-year medical students (MS1) and examined its associations with early clinical exposure, mental health indicators, and social determinants of health (SDOH). **Methods:** From January to December 2024, MS1 from all PR medical schools completed a cross-sectional REDCap survey (n = 92). Instruments included the Symptom Checklist-90 (SCL-90) and an SDOH questionnaire. The exposure variable was self-reported lifetime amphetamine use for medical school purposes. Age-adjusted binary logistic regression models assessed associations between amphetamine use, mental health symptoms, and early clinical exposure in SPSS v31.0. **Results:** Overall, 30.4% of participants reported amphetamine use. Compared with nonusers, amphetamine users had higher somatization (OR = 3.42, p = .005), anger-hostility (OR = 3.39, p = .002), and overall mental health severity (OR = 2.10, p = .05). Early clinical exposure was inversely associated with amphetamine use (OR = 0.10, 95% CI 0.02–0.57, p = .009). Students with early clinical exposure were 11.9 times less likely to use amphetamines for medical school purposes. No significant associations were found with other SDOH variables. **Conclusions:** Amphetamine use was prevalent among MS1 and correlated with poorer mental health and reduced early clinical exposure. Early clinical exposure showed a strong protective effect; students with early exposure were nearly 12 times less likely to report amphetamine use. Integrating early clinical engagement into the medical curriculum may support adaptive coping and PIF. Longitudinal studies are needed to clarify causal pathways and guide wellness initiatives. Approved by the Institutional Review Board of Ponce Health Sciences University (IRB approval #2401179723), December 2023. Conducted in accordance with the Declaration of Helsinki. **Acknowledgments:** We acknowledge our academic partners at Ponce Health Sciences University, Albizu University, Harvard University, and the University of Rochester Medical Center for their valuable collaboration and support. Funding: Fundación Intellectus. Disclosure: The authors are affiliated with Psicosis Foundation LLC, a nonprofit organization dedicated to advancing mental health research and education in Puerto Rico.

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Food Insecurity and Health-Related Behaviors of Puerto Rican Adults With Diabetes During the COVID-19 Pandemic

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Background/Objective: The COVID-19 pandemic posed significant disruptions to the health-related behaviors (HRBs) of people worldwide, including those in Puerto Rico (PR). Access to resources to afford adequate nutrition was also affected, particularly among adults with chronic illnesses for which a healthy diet is essential for their treatment. We compared food insecurity (FI) indicators and HRBs of adults with diabetes (AWD; G1=199) and adults without chronic diseases (AWOCD; G2=671) living in PR who completed an online survey (IRB-approved: June 9, 2020) during the outbreak. We expected AWD to present worse outcomes than AWOCD in all areas examined. **Methods:** Participants aged 21 to 78 (M=44.00) had to be PR residents for ≥ 3 months before enrollment, have internet access, and understand Spanish. Adults completed a Health/Treatment History Module, the Latin American and Caribbean Food Security Scale (in which higher scores mean greater levels of FI), and questions about the impact of the COVID-19 pandemic on HRBs. We used analysis of covariance, adjusted for age and household size, to compare groups in FI Total scores and individual items, and in several indicators of the outbreak's impact in health-related areas. **Results:** G1 showed significantly higher FI Total scores than G2 [$F(1, 858) = 21.14, p < .001$]. The same pattern was observed in seven of the eight FI items. G1 also showed a significantly lower frequency of physical activity in the previous 30 days compared to G2 [$F(1, 865) = 29.15, p < .001$]. Compared with G2, AWD reported a significantly higher negative impact of COVID-19 control measures on their nutritional behavior, sleep patterns, weight, and overall health-related self-care. **Conclusion:** Our findings confirmed that AWD presented worse outcomes than AWOCD in FI indicators and HRBs during the pandemic. Health-related public education and improved access to quality food sources should be promoted among AWD during future public health emergencies. IRB Approval Number: 1920-194 (UPR-Río Piedras). **Acknowledgements:** The research project from which the data reported in this study were obtained (known as "COVID-19 and Mental Health in Adults from Puerto Rico") was financed with the personal funds of the second author. We are thankful to the research assistants for their collaboration in this study. Some of them were hired thanks to funds granted to the Institute for Psychological Research by the Deanship of Graduate Studies and Research from the University of Puerto Rico, Río Piedras Campus.

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Evaluating the Prevalence of APOE Polymorphisms (rs429358 and rs7412) and Their Association with Inflammatory Biomarkers in a Caribbean Population

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Background and Objectives: Apolipoprotein E (APOE) plays a crucial role in lipid transport and metabolism; it is strongly associated with the development of Alzheimer's disease (AD) and cardiovascular disease (CVD). The impact of APOE on lipid regulation and AD risk varies among its isoforms (E2, E3, and E4), which differ by only two

amino acids yet exhibit distinct structural and functional properties. Limited data exist on these polymorphisms in Caribbean Hispanic populations, where AD and CVD are highly prevalent. This study aimed to assess the distribution of APOE polymorphisms (rs429358 and rs7412) and their association with 40 inflammatory biomarkers, exploring potential links, and establishing a basis for future haplotype analyses to clarify their role in inflammation. **Methods:** Participants of Caribbean Hispanic origin (Dominican Republic, Cuba & Puerto Rico) living in Puerto Rico were recruited. Blood samples were collected for plasma and DNA extraction. Single-nucleotide polymorphism analysis was performed to identify APOE variants. Statistical analyses were carried out using GraphPadPrism, with multiple t-tests applied to explore correlations between polymorphisms and inflammatory factors. **Results:** A total of 89 patients were evaluated for the presence of rs429358 and rs7412, and their association with 40 inflammatory factors. The rs429358 variant was identified in 3.37% of participants and showed no significant differences with the inflammatory markers. Meanwhile, rs7412 polymorphism was present in 97.27% of the population showed a significant association with interleukin-11 (IL-11) levels, with a p-value of 0.03. Higher concentrations of IL-11 were observed among individuals carrying this variant. **Conclusions:** These findings suggest a potential association between rs7412 polymorphism and IL-11 levels, indicating a possible role of genetic variation in inflammatory regulation. Understanding this relationship may help clarify how APOE genotypes contribute to inflammation-related conditions such as AD and CVD. Future work will include haplotype analysis to determine whether specific allele combinations further influence IL-11 expression and related inflammatory pathways. (Approved by IRB #2309147363, November 16, 2024)

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Site-Specific Oral Microbiome Patterns in Puerto Rican Head and Neck Cancer Patients

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Background & Objectives: Head and neck cancers (HNCs) are the seventh most common cancer globally and the sixth most prevalent in Puerto Rico. They are also the eighth leading cause of cancer deaths among Puerto Rican men. Understanding HNC development and prognosis in this population is vital. The oral microbiome plays a significant role in HNC, as previous studies have shown that microbial dysbiosis can affect diagnosis and treatment. However, little is known about the oral microbiome patterns in Puerto Rican HNC patients and their stability in response to clinical factors. Therefore, the objective of this study is to determine the bacterial communities associated with HNC in Puerto Rican patients. **Methods:** Genomic DNA was extracted from 79 histologically confirmed HNC tumor samples from Puerto Rican patients, followed by HPV genotyping and microbiome analyses using 16S rRNA gene amplicon sequencing. Data were deposited in Qiita/Deblur for quality control and bioinformatics analyses. Downstream analyses, including alpha and beta diversity, taxonomic characterization, and biomarker analyses, were conducted using QIIME2, MicrobiomeAnalyst, and Random Forest. **Results:** Although beta diversity was generally similar across different anatomic sites, a significant difference was observed between the larynx and

the oropharynx ($P = 0.041$, $FDR = 0.355$). The larynx consistently demonstrated lower richness and Shannon diversity compared to the oropharynx, hypopharynx, and oral cavity. Furthermore, Random Forest models showed weak discriminatory power ($MDA < 0.05$) for all six metadata variables analyzed: anatomic location, surgery, HPV status, radiotherapy, and chemotherapy. **Conclusions:** The oral microbiome of Puerto Rican HNC patients appears to be highly resilient to various clinical factors. The only meaningful differences in richness and diversity were associated with the anatomical site, particularly the larynx. Future studies are needed to further understand the prognosis of HNC in this high-burden population, which could lead to innovative diagnostic and therapeutic strategies. **Acknowledgments:** This study was partially funded by the Institutional National Institute of General Medical Sciences of the National Institutes of Health (NIGMS-NIH) COBRE Puerto Rico Center for Microbiome Sciences 1P20GM156713-01 and UPR Comprehensive Cancer Center seed funds. IRB Protocol Number: 2311164967, IRB Protocol Approval Date: 02/05/24, IRB Protocol Last Approval Date: 10/06/25.

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**Elucidating the Anticancer Therapy Potential
of Phytoestrogen 8-prenylnaringenin
on Inflammatory Breast Cancer Cells**

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Background: Breast Cancer is the most common cancer among women worldwide. The most aggressive and rare breast cancer subtype is inflammatory breast cancer (IBC). IBC retains a very high recurrence rate and poor prognosis, exhibiting enhanced proliferation, rapid metastasis, and resistance to conventional therapies. New treatment strategies have been proposed around phytochemical compounds, such as phytoestrogens. Phytoestrogens are plant-derived compounds with structural similarity to estrogens that may exert anticancer properties. The phytoestrogen 8-prenylnaringenin (8-PN) is a prenylated flavonoid with high estrogenic potency. we propose to evaluate the effects of 8-PN on cell viability and migration of IBC cell lines. **Methods:** Sum149PT and Sum190 IBC cell lines were cultured under starving media conditions for 48 hours and then treated with concentrations of 8-PN from 0-200 μ M. A 2D Alamar Blue Cell Viability Assay was performed by measuring fluorescence to determine the effects of 8-PN on cell viability. Cell migration was evaluated using a wound-healing assay quantified in ImageJ and a Boyden chamber assay measuring cell movement across a porous membrane. The percentage of wound closure, dose-response curves, and IC_{50} values were generated using GraphPad Prism to elucidate the efficacy of 8-PN in modulating these oncogenic phenotypes. **Results:** 8-PN significantly inhibits the cell viability of IBC cell lines in a dose-dependent manner with IC_{50} values of 13.5 μ M, 3.8 μ M, and 4.0 μ M for SUM149PT cells at -24, -48, and -72 hours, respectively, and 12.6 μ M, 10.3 μ M, and 11.3 μ M at -24, -48, and -72 hours, respectively for SUM190PT. Concentrations of 25 μ M, 13.5 μ M, 12.5 μ M, and 6.125 μ M of 8-PN substantially decreased the cell migration of the IBC lines compared with the control. **Conclusion:** These findings suggest that 8-PN conveys potential therapeutic activity against inflammatory breast cancer by inhibiting cell viability and migration. Further research is essential to characterize the precise signaling pathways modulated by 8-PN within the unique subtypes of IBC.

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Environmental Noise and Air Quality Compliance Assessment from an Active Landfill Operation on a Community in San Juan, Puerto Rico

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Background and Objectives: Chronic noise exposure has been associated with sleep disturbance, stress, and other adverse health outcomes. Landfills can generate continuous environmental noise due to heavy machinery use, traffic, and operational activities, affecting nearby communities. This study evaluated ambient noise levels at four residential locations surrounding an active landfill in San Juan, Puerto Rico, to determine compliance with Puerto Rico Environmental Quality Board (JCA) standards and assess potential implications for community well-being. **Methods:** Ambient noise monitoring was conducted using calibrated Larson Davis SoundTrack LxT2 and SoundExpert 821 sound level meters programmed to collect continuous one-second Leq measurements over 24-hour sampling periods. Monitoring was repeated across multiple weekdays and weekends to capture temporal variability. One-second data were aggregated into 30-minute intervals to calculate L10 values, which were compared with applicable daytime (55–65 dB, depending on zoning classification) and nighttime (50 dB) limits. Pre- and post-calibration checks, weather verification, and standardized placement procedures ensured reliability of the collected data. **Results:** Daytime compliance varied substantially among locations, ranging from approximately 46.7% to 100%. In contrast, nighttime compliance was consistently low (0–11.1%), with most measurement intervals exceeding the 50 dB limit at all sites. Noise patterns correlated with proximity to landfill operational zones, suggesting persistent background and residual mechanical noise even during periods of reduced activity. The findings indicate recurring nighttime exceedances and variable daytime compliance across all monitored locations. These trends are consistent with documented health concerns related to chronic environmental noise exposure. **Conclusion:** The assessment demonstrated that nighttime noise levels consistently exceeded regulatory thresholds across several monitored locations. These findings underscore the urgent need for mitigation measures to reduce noise exposure, particularly for vulnerable populations. Recommended actions include strengthening noise management strategies, enforcing regulations, continuous monitoring and interventions are essential to safeguard community health and the quality of life.

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Factors Associated with Unfulfilled Contraceptive Preference Among Women in Puerto Rico

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Background & Objectives: Puerto Rico has the highest prevalence of unfulfilled contraception preference among 27 U.S. jurisdictions. Unfulfilled contraceptive preference includes: (1) individuals using a method other than their preferred method, (2) individuals not using any method but reporting a preferred method, and (3) individuals using a method despite not wanting to use any method. While previous studies have suggested economic, administrative, and provider-related barriers to contraception, no study has systematically examined how sociodemographic characteristics, social determinants of health, and sources of contraceptive care relate to unfulfilled contraceptive preferences in Puerto Rico. Findings from this study provide much-needed insight into the barriers and challenges affecting reproductive autonomy in Puerto Rico and will inform stakeholders seeking to strengthen contraceptive access and equity on the island. **Methods:** Data from the 2022 Behavioral Risk Factor Surveillance System (BRFSS) was analyzed to estimate the prevalence of unfulfilled contraceptive preferences among women aged 18-49 by age, marital status, health insurance coverage, barriers of care due to cost, housing insecurity, and food insecurity. Logistic regression models were used to determine factors significantly associated with unfulfilled contraception preference ($p < 0.05$). Sources of contraceptive care were analyzed against unmet contraceptive preference prevalences, and types of methods used were compared to types of methods wanted. **Results:** Preliminary results show no significant association between sociodemographic factors, social determinants of health, and unmet contraceptive preference. **Conclusions:** Our results suggest that our chosen social determinants of health are not the driving factors for unmet contraceptive preference in Puerto Rico. Further research should be conducted to examine additional factors.

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Características Sociodemográficas de los Fallecidos en Puerto Rico entre Septiembre de 2017 - Marzo de 2018

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Introducción y justificación: En la temporada de huracanes de 2017, Puerto Rico se vio afectado por el paso de los Irma y María, huracanes de fuerza mayor que provocaron muertes, algunas atribuidas directamente a los huracanes y otras posiblemente a la falta de energía. De septiembre de 2017 a marzo de 2018 se contabilizaron 19,523 defunciones; estas rebasaron por un 9.7 % las de los mismos meses de los años anteriores. Se documentaron 56 como las causadas, según los estándares establecidos, por los estragos de estos fenómenos atmosféricos. **Objetivo:** Describir la mortalidad y las características sociodemográficas de las defunciones. **Método:** El análisis se enfocó en el periodo de septiembre de 2017 a marzo de 2018. Es un análisis secundario de datos, de tipo transversal y de índole descriptiva. Se utilizó como fuente de datos el archivo de las defunciones del Registro Demográfico adscrito al Departamento de Salud de Puerto Rico. **Resultados:** Durante el periodo, 14,121 defunciones pertenecían a las primeras diez causas de muertes. Las defunciones aumentaron un 23.8 % y un 33.0 % en los primeros dos meses (septiembre y octubre de 2017) después de los huracanes Irma y María. Asimismo, nueve de las diez primeras causas de muerte presentaron aumentos. Los tumores [neoplasia] malignos fueron la única causa que no presentó un aumento. La septicemia mostró el alza más marcada, presentando un aumento de un 36.2 % durante el periodo estudiado. Entre las principales causas de muerte, predominaban los hombres

con una mediana de edad de 74 años, mayormente casados y con escolaridad de octavo grado o menos. Sin embargo, las mujeres también demostraron una alta vulnerabilidad, concentrándose las defunciones en féminas de edad avanzada (con una mediana de edad de 81 años), viudas y con bajo nivel de escolaridad.

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Características del Intervalo Protogenésico en Puerto Rico: 2015–2021

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Antecedentes y Objetivos: Puerto Rico ha experimentado una fuerte reducción en nupcialidad y natalidad: entre 1980 y 2014, los matrimonios disminuyeron 49.6% y los nacimientos 52.8%. Este estudio analiza el intervalo protogenésico (tiempo entre matrimonio y primer nacimiento) y las características sociodemográficas y de salud de madres primerizas casadas y sus recién nacidos en Puerto Rico durante 2015-2021. **Metodología:** Estudio descriptivo y transversal basado en 22,765 nacimientos de primer orden de madres casadas, utilizando datos de certificados de nacimiento del Registro Demográfico. Se calcularon intervalos protogenésicos y se analizaron variables como edad, educación, participación laboral, salud materna y neonatal mediante estadísticas descriptivas. **Resultados:** El intervalo protogenésico promedio fue 31.6 meses (mediana 25). El 57.9% de los nacimientos ocurrió en los primeros dos años de matrimonio y el 76.5% antes de los 47 meses. La mayoría de las madres tenía entre 25-34 años y nivel educativo universitario. Mientras aumentaba el intervalo protogenésico, aumentaron educación, fuerza laboral y visitas prenatales (93% con ≥ 9 visitas), mientras disminuyeron factores de riesgo, infecciones y prematuridad. El 48% de los partos fue por cesárea; la mayoría de los recién nacidos presentó peso saludable y ausencia de anomalías congénitas ($>99\%$). **Conclusiones:** Las madres puertorriqueñas casadas tienden a postergar la maternidad. Quienes se casan jóvenes tienen hijos antes, mientras que retrasar el matrimonio aumenta la probabilidad de maternidad tardía. Un mayor intervalo entre matrimonio y primer hijo se relaciona con mayor nivel educativo, mayor participación laboral y más visitas prenatales. Intervalos protogenésicos más largos reducen riesgos como infecciones, prematuridad y bajo peso al nacer, pero aumentan la probabilidad de pérdidas de embarazos previos. Intervalos largos tienden a más sobrepeso en recién nacidos.

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Profile of Postoperative Anemia Following Gastric Sleeve and Gastric Bypass in the Central and North Area of Puerto Rico

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Background and Objectives: Bariatric surgery is a common intervention used to treat morbid obesity and related health conditions. Understanding the demographic and clinical features of patients undergoing these procedures is crucial for tailoring preoperative assessments, postoperative monitoring, and patient education. This study aimed to describe the demographic profile, comorbidities, and surgical details of individuals who had bariatric

surgery at Bariatric Center located in the central area of Puerto Rico. **Methods:** A retrospective descriptive study analyzed medical records of patients who underwent sleeve gastrectomy (SG) or Roux-en-Y gastric bypass (RYGB). Data collected included age, sex, residence municipality, body mass index (BMI), and type of surgery. Descriptive statistics such as means, standard deviations, frequencies, and percentages were used to characterize the study population. **Results:** A total sample size of 162 patients was included in the analysis from a total of 354 medical records. The mean age was 44.6 years (SD = 7.97). The sample consisted of 52.5 % females and 47.5 % males. The most common municipalities represented were Bayamón 11.9 %, Caguas 10.0 %, Carolina 4.5%, and Humacao 4.5 %. Most patients underwent SG 63.1%, followed by RYGB 36.9 %. The mean preoperative BMI was 47.05 kg/m² (SD = 8.92). Additional demographic patterns and comorbidity distributions will be further analyzed as part of the full dataset review. **Conclusion:** This descriptive analysis offers an overview of the demographic and clinical features of patients undergoing bariatric surgery at our institution. Recognizing these patterns can help guide clinical decisions, enhance preoperative risk assessment, and improve postoperative care strategies. Additional research is needed to examine the relationships between patient characteristics, surgical type, and postoperative outcomes. Approval of this protocol was granted by the UPR-MSI Institutional Review Board (IRB # 2503383538) on 07/03/2025.

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Prevalence of Anemia and Biochemical Alterations in Patients After Bariatric Surgery in Southern Puerto Rico

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Background and Objectives: Bariatric surgery is an essential intervention for the management of severe obesity and its associated comorbidities. Understanding the demographic and clinical characteristics of candidates undergoing these procedures is critical for optimizing preoperative assessment, tailoring postoperative follow-up, and strengthening patient education. Variability in demographic factors and surgical selection patterns may influence patient outcomes, thus highlighting the importance of institution-specific profiling. The purpose of this study was to describe the demographic distribution, surgical trends, and key clinical characteristics of patients who underwent bariatric surgery in the southern region of Puerto Rico. **Methods:** A retrospective descriptive review was conducted using medical records from patients who underwent sleeve gastrectomy (SG) or Roux-en-Y gastric bypass (RYGB). Variables collected included age, sex, municipality of residence, type of surgery, and selected clinical indicators. Descriptive statistics—frequencies, percentages, means, and standard deviations—were used to characterize the sample. **Results:** A total of 475 patients met eligibility criteria. The mean age of the sample was 44.83 years (SD = 8.69). A predominance of female participants (71.58%) was observed. The municipalities most frequently represented were Ponce (17.26%), Juana Díaz (4.42%), Coamo (4.00%), and Yauco (3.58%). Surgically, Sleeve Gastrectomy (SG) was the most common procedure performed (62.95%), followed by Roux-en-Y Gastric Bypass (RYGB) (37.05%). Additional demographic and clinical variables will be expanded in future analyses. **Conclusion:** Patients undergoing bariatric surgery at this institution were predominantly middle-aged women with diverse geographic representation. SG was more frequently selected than RYGB. These descriptive findings provide a foundation for refining preoperative evaluations and strengthening postoperative follow-up strategies. Further

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analyses examining comorbidity patterns and clinical outcomes will contribute to improved individualized care planning and long-term management. Approval of this protocol was granted by the UPR-MSC Institutional Review Board (IRB # 2503383538) on 07/03/2025.

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Características Sociodemográficas de Personas Finadas en Base al Método de Disposición en Puerto Rico entre el 2015 y el 2023

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Trasfondo: Desde la ocupación española hasta la presente norteamericana, la inhumación del cadáver (usualmente luego de su aseo y velatorio) ha sido el método predominante de disposición de personas fallecidas. En comparación, la cremación (práctica conocida desde antes de la edad de cristo) tuvo una lenta adopción y reglamentación en la isla, con la práctica siendo mencionada con más frecuencia en documentos gubernamentales a partir del 1968, siendo generalmente accesible a partir del 1987 y finalmente cogiendo auge a partir del siglo XXI.

Objetivo: El objetivo de este trabajo es describir el transcurso de esta práctica fúnebre en Puerto Rico. Esto es un estudio descriptivo basado en los archivos digitalizados de los certificados de defunción del 2015 al 2023 del registro demográfico.

Métodos: Se analizaron las siguientes variables: sexo, edad, estado conyugal, entre otras.

Resultados: En este periodo, ocurrieron 278,960 fallecimientos, de estos 62.9% fueron sepultados, 36.3% cremados y un 0.8% fueron dispuestos por otro método. Entre el 2015 y el 2023, las cremaciones aumentaron en proporción de un 26.8% a un 41.7%. La mayor parte de los fallecidos fueron hombres con un 54.2%. La proporción en los diferentes métodos de disposición son similares tanto en hombres como mujeres. De todos los fallecidos, 76.9% fueron personas mayores de 65 años o más. El 66.6% de personas casadas y el 69.7% de personas viudas fueron enterradas luego de fallecer, en comparación a personas divorciadas o nunca casadas cuyas proporciones aproximaban el 50% entre ambas alternativas de disposición. **Conclusión:** El costo del enterramiento al menos duplica el costo de la cremación. Debido a esto, el método de disposición de los fallecidos puede relacionarse con el estatus socioeconómico del fallecido y/o sus familiares. Más allá, se investiga si esta tendencia creciente de cremaciones se relaciona con el aumento en costo de vida.

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Associations Between Chronic Comorbidities and Health-Related Quality of Life in Breast Cancer Survivors: A Moderation Analysis of Social Support

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Background and Objectives: Cancer represents a major public health burden in Puerto Rico, with breast cancer ranking first in both incidence and mortality among women. Breast cancer survivors (BCS) frequently report multiple chronic comorbidities, which may coexist with and contribute to poorer health outcomes, including

reduced health-related quality of life (HRQoL). Although chronic comorbidities are common in PR, BCS remain underrepresented in HRQoL research, raising concerns about how comorbidity burden is associated with HRQoL in this population. This study assessed cross-sectional associations between comorbidity burden and HRQoL among BCS and evaluated whether social support modified these associations. **Methods:** This cross-sectional analysis included 189 BCS from the START-PR study (November 2023–August 2025). HRQoL was assessed using the Functional Assessment of Cancer Therapy–General and dichotomized at the median (≤ 74 =poor; >74 =non-poor). Comorbidity burden was categorized as 0, 1, or ≥ 2 self-reported chronic conditions. Social support was measured using an adapted Multidimensional Scale of Perceived Social Support and dichotomized at the median (≤ 41 =low; >41 =high). Logistic regression models estimated adjusted odds ratios (aOR) and 95% confidence intervals (CI), controlling for demographic, lifestyle, and clinical factors. Interaction terms assessed effect modification by social support. **Results:** Using participants with no comorbidities as the reference group, having two or more comorbidities was significantly associated with higher odds of poor HRQoL (aOR = 2.98; 95% CI: 1.32–6.71), whereas having one comorbidity was not. Perceived social support did not significantly modify the association between comorbidity burden and poor HRQoL, although slightly attenuated odds were observed among survivors reporting higher support. **Conclusions:** Reporting multiple chronic comorbidities was cross-sectionally associated with poorer HRQoL among BCS. These findings underscore the importance of integrating chronic condition management into survivorship care to identify survivors at increased risk for reduced HRQoL. Longitudinal research is needed to clarify temporal relationships and potential causal pathways. **Acknowledgments:** This project was partially supported by the Office of Cancer Research Training and Education Coordination (CRTEC) of the University of Puerto Rico Comprehensive Cancer Center, the Alliance for Clinical and Translational Research (NIGMS award # U54GM133807), and Bristol Myers Squibb (grant ID # 93918763). The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of the University of Puerto Rico Comprehensive Cancer Center (protocol # 2411004025, approved on November 9, 2023).

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Association Between Hypertension and Health-Related Quality of Life in Cancer Patients from Puerto Rico: The Moderating Role of Sex at Birth

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Background and Objectives: Cancer represents a major public health burden in Puerto Rico that can adversely affect health-related quality of life (HRQoL). Chronic comorbidities further diminish HRQoL. Prior research shows that hypertension is the most prevalent comorbidity among cancer survivors, yet little is known about how it relates to HRQoL in Puerto Rican cancer populations, despite its relevance for targeted survivorship care. This study examined the association between hypertension and HRQoL among cancer survivors and assessed whether sex moderated this association. **Methods:** We conducted a cross-sectional analysis using data from the START-PR Study (2023–2025), which surveyed cancer survivors aged ≥ 21 years who had received active treatment within the past year. HRQoL was measured using the Functional Assessment of Cancer Therapy–General questionnaire; the sample median score (≤ 71 vs. >71) was used to classify participants as having poor versus non-poor HRQoL. Hypertension was based on self-reported diagnosis (present vs. absent). Multivariable logistic regression models

estimated adjusted odds ratios (aOR) and 95% confidence intervals (CI), controlling for sociodemographic, behavioral, and clinical variables. Interaction terms assessed effect modification by sex. **Results:** Among the 597 participants, 124 (20.7%) reported hypertension; 432 (72.4%) were female, with a mean age of 60.34 (± 13.15) years. Those with diagnosed hypertension had significantly higher odds of poor HRQoL (OR=1.62; 95% CI: 1.17–2.24) compared with those without hypertension. After adjustment for covariates, this association remained significant (aOR=1.57; 95% CI: 1.08–2.28). Although sex did not significantly moderate the relationship, the association persisted among female survivors (aOR=1.78; 95% CI: 1.14–2.79) but was attenuated among males (aOR=1.11; 95% CI: 0.55–2.27). **Conclusions:** Hypertension was significantly associated with poor HRQoL among cancer survivors, with some variation by sex. These findings suggest the need to integrate multidisciplinary care, targeted hypertension management, and supportive care strategies to improve HRQoL in this population. **Acknowledgments:** This project was partially supported by the Office of Cancer Research Training and Education Coordination (CRTEC) of the University of Puerto Rico Comprehensive Cancer Center, the Alliance for Clinical and Translational Research (NIGMS award # U54GM133807), and Bristol Myers Squibb (grant ID # 93918763). The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of the University of Puerto Rico Comprehensive Cancer Center (protocol # 2411004025, approved on November 9, 2023).

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Diabetes and Health-Related Quality of Life in Cancer Survivors: Cross-Sectional Analysis of Physical, Functional, Emotional, and Social Domains

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Background and Objectives: A substantial number of adults in Puerto Rico are living with cancer in conjunction with other chronic conditions, including diabetes. This multimorbidity can exacerbate symptoms, impair physical functioning, heighten emotional distress, and complicate self-management, ultimately placing survivors at greater risk for reduced health-related quality of life (HRQoL). The present study examined the association between diagnosed diabetes and HRQoL among cancer survivors, assessing both overall HRQoL and domain-specific outcomes. **Methods:** We analyzed data from the START-PR study (2023–2025), which surveyed cancer survivors aged ≥ 21 years who had received active treatment within the past year. HRQoL was measured using the Functional Assessment of Cancer Therapy–General (FACT-G) instrument. The total HRQoL score was dichotomized at the median (≤ 71 =poor; > 71 =non-poor). Each FACT-G domain was similarly dichotomized using its respective median: physical, emotional, and functional (≤ 17 =poor; > 17 =non-poor) and social (≤ 21 =poor; > 21 =non-poor). Diabetes status was based on self-reported medical diagnosis. Logistic regression models were used to estimate adjusted odds ratios (aOR and 95% CI), controlling for sociodemographic, lifestyle, and clinical variables. **Results:** Among the 573 cancer survivors, 24% reported having been diagnosed with diabetes. In the multivariable analysis, individuals with diabetes had significantly higher odds of reporting poor overall HRQoL (aOR=1.90, 95% CI: 1.22–2.95). Significant associations were also observed for specific domains, with individuals with diabetes showing higher odds of poor functional (aOR=1.67, 95% CI: 1.08–2.59) and physical (aOR=1.76, 95% CI: 1.13–2.55) well-being.

Although the emotional and social domains did not reach statistical significance, the magnitude of associations aligned with expected trends. **Conclusions:** A diabetes diagnosis was associated with poor HRQoL among cancer survivors, particularly in the physical and functional domains. These findings underscore the need for targeted interventions addressing symptom burden, mobility limitations, and daily functioning in cancer survivors living with diabetes. **Acknowledgments:** This project was partially supported by the Office of Cancer Research Training and Education Coordination (CRTEC) of the University of Puerto Rico Comprehensive Cancer Center, the Alliance for Clinical and Translational Research (NIGMS award # U54GM133807), and Bristol Myers Squibb (grant ID # 93918763). The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of the University of Puerto Rico Comprehensive Cancer Center (protocol # 2411004025, approved on November 9, 2023).

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**Actividad Física, Salud Mental y Uso de Redes Sociales:
Relación con Estrés, Ansiedad, Depresión y Soledad
en Estudiantes Universitarios**

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Antecedentes y Objetivos: La actividad física se ha asociado con mejores indicadores de salud mental, mientras que un mayor uso de redes sociales se ha vinculado con síntomas de estrés, ansiedad, soledad y depresión. Sin embargo, existe escasa evidencia en poblaciones universitarias de Puerto Rico que examine simultáneamente la frecuencia semanal de ejercicio y el uso de redes sociales como factores relacionados con el bienestar emocional. Este estudio tuvo como objetivos: (1) evaluar la relación entre la frecuencia semanal de ejercicio y los niveles de estrés, ansiedad, soledad y depresión, y (2) explorar cómo el uso de redes sociales se asocia con estos indicadores de salud mental. **Métodos:** Se utilizó un diseño transversal y muestreo por conveniencia. Los datos se recopilaban mediante un cuestionario en línea que evaluó frecuencia semanal de ejercicio, uso de redes sociales, estrés, ansiedad, soledad y depresión. Participaron 887 estudiantes universitarios. Se realizaron análisis descriptivos y correlaciones de Spearman con corrección de Benjamini-Hochberg. Aprobado por el IRB de la UPR-RP (Protocolo #2022-084). **Resultados:** Los análisis incluyeron 563 casos completos. La frecuencia semanal de ejercicio se asoció negativamente con depresión ($r = -.14$), ansiedad ($r = -.11$) y estrés ($r = -.14$). La asociación con soledad fue pequeña y cercana al umbral de significación ($r = -.08$). El uso diario de redes sociales se relacionó positivamente con depresión ($r = .15$) y ansiedad ($r = .14$). **Conclusión:** Estos hallazgos implican la necesidad de integrar enfoques que contemplen el movimiento regular, la regulación del tiempo en redes sociales y la promoción de estilos de vida que fortalezcan la salud mental. Asimismo, sugieren que la psicología debe avanzar hacia modelos de intervención que consideren simultáneamente factores conductuales y digitales para optimizar el bienestar psicológico en poblaciones universitarias. **Agradecimientos:** Ninguno.

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Medication Inertia in Type 2 Diabetes Management Among Patients with Poor Glycemic Control in Puerto Rico

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Background & Objective: Medication inertia, defined as no adjustment in medication when a clinical indicator suggests one, remains a significant barrier for glycemic control in diabetic patients. The American Diabetes Association recommends that an adjustment in medication, intensification or deintensification, for T2DM patients should not be delayed. Studies in the U.S. report inertia ranges from 35.4% to 85.8% for T2DM; data concerning the Puerto Rican population is lacking. This study aims to determine the prevalence of medication inertia in a sample of Puerto Rican patients with uncontrolled T2DM. **Methods:** A retrospective review of electronic health records (EHR) of adult patients with uncontrolled T2DM (HbA1c $\geq 9.0\%$), receiving services at a primary care center in Puerto Rico between October 2023 and April 2025, and having at least two or more visits in a year was conducted. Medication inertia was defined as no adjustments in medications for glycemic control despite persistence of HbA1c $\geq 9.0\%$ in two or more visits. Descriptive analyses were done using frequencies and percentages for categorical data and means and standard deviations for continuous data. (Approved by IRB Protocol Number 2506423947A001 Approved on July 7th, 2025.) **Results:** EHR for 66 patients with uncontrolled T2DM were reviewed. Most patients were males (59%), from the metropolitan area (98%), with government health insurance (78%). Mean age was 55 years (+/-12.5SD). Frequent comorbidities included hypertension (81%), cardiovascular diseases (78%), and hyperlipidemia (75%). The mean HbA1c value across the first three visits was 10.5%, 9.4% and 9.2% respectively - no changes in medications were reported in 53%, 52% and 72%, respectively. **Conclusion:** Preliminary findings suggest a significant prevalence of medication inertia among our study population, consistent with previous reports in uncontrolled T2DM. Further progress of this study will look to evaluate factors associated such as comorbidities, time gaps, and endocrinologist referrals between visits to better help identify gaps in current management practices in Puerto Rico. **Acknowledgment:** This project was supported in part by the Endowed Health Services Research Center of the University of Puerto Rico School of Medicine -Grants 5S21MD000242 and 5S21MD000138 from the National Center for Minority Health and Health Disparities, National Institutes of Health (NCMHD-NIH).

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Exploring Quality of Life Among Women Living with and Without HIV Following Cervical Cancer and Pre-Cancer Post-Treatment in Puerto Rico

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46th Annual Research and Education Forum

INNOVATING TOGETHER *for Healthier Futures*

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Background: Cervical cancer (CC) and pre-cancer treatments can have lasting effects beyond the clinical setting, affecting women's physical, emotional, and sexual health. Although CC is both preventable and treatable, Puerto Rico (PR) continues to experience a high disease burden. Women living with HIV (WLWH) are at higher risk of CC and pre-cancerous lesions and often experience poorer quality of life (QoL) than HIV-negative women. This study explored how CC and pre-cancer post-treatment experiences affect the QoL of women in PR by HIV status. **Methods:** Four focus groups (n = 20) were conducted between April and June 2025: two among WLWH (n = 8) and two among HIV-negative women (n = 12). Participants were aged ≥21 years, diagnosed with pre-cancerous lesions (n = 15) or CC (n = 5), and resided in PR at the time of diagnosis. Discussions used a semi-structured guide exploring non-medical factors influencing access to CC care. A thematic inductive analysis was conducted to identify and compare emerging patterns related to short-term (immediate post-treatment) and long-term (persistent post-treatment) QoL effects across groups. **Results:** Across groups, participants described challenges affecting their physical, emotional, and sexual health. Short-term effects included unexpected pain, limited information about treatment side effects, and limited patient agency. Additionally, WLWH reported provider discrimination during postoperative care. Long-term effects included menstrual changes, painful intercourse, vaginal dryness, loss of libido, psychological trauma, and a sense of lost femininity. Additionally, WLWH reported restricted access to their medical records when seeking second opinions. **Conclusion:** CC and pre-cancer treatments adversely affected women's QoL in PR, with similar patterns by HIV status. Provider discrimination and limited access to medical records were uniquely reported by WLWH. Findings underscore the need for patient-centered care strategies, such as post-treatment surveillance, patient navigation, and psychosocial support, to improve post-treatment QoL. **Acknowledgments:** This project was fully supported by the NIGMS (Grant #P20GM148324) and partially supported by NIGMS (Award #U54GM133807), the National Institute on Minority Health and Health Disparities (NIMHD; Grant #2U54MD007587) for data storage in REDCap, and the National Institute of Allergy and Infectious Diseases (NIAID; Grant #5R25AI183304-02). IRB: This study was approved by the University of Puerto Rico Comprehensive Cancer Center's IRB (Protocol #2411004755) since September 22, 2022.

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Chronic Physical Diseases and Mental Disorders: Prevalence and Association in Hispanic Adults During the Pandemic

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Background/Objective: Chronic physical diseases (CPDs) are slowly progressive conditions that limit daily activities and require prolonged care. Anxiety disorders (ADs) and depressive disorders (DDs) are the most prevalent mental disorders (MDs) in adults. The COVID-19 pandemic harmed individuals' physical health, particularly if they had MDs,

and vice versa. We examined the prevalence of CPDs and MDs and their association among adults living in Puerto Rico during the pandemic. **Method:** Participants (N=1736, 79.84% female) aged 21-79 (M=46.36), completed an online survey (IRB-approved: June 9, 2020). They had to live in Puerto Rico for ≥ 3 months before enrollment, understand Spanish, and have internet access. Using descriptive statistics (with 95% confidence intervals), we examined the prevalence of different categories of CPDs and MDs. Through Gamma and Pearson correlation coefficients, we estimated the degree of association between these variables. Using logistic regression and Odds Ratio (OR), we examined the relative odds of presenting MDs considering different amounts of CPDs. **Results:** ADs and DDs were the most prevalent MDs. The commonest CPDs were hypercholesterolemia, hypertension, respiratory diseases, thyroid diseases, arthritis, obesity, diabetes, and chronic-pain-related diseases. Gamma correlation was .31 (.24-.37; $p \leq .001$). The linear correlation between the number of CPDs and MDs was significant ($p \leq .001$), but small [$r = .22$ (.16-.27)], varying by sex and age (21-39 versus >40 years). When examining the variables from a categorical approach, having progressively higher numbers of CPDs (0, 1-2, 3-4, or ≥ 5) was associated with incremental odds of presenting at least one mental disorder (OR from 1.92 to 4.30) and with reporting two or more MDs (OR from 2.07 to 5.18), particularly after adjusting for age and sex. **Conclusion:** The relationship between CPDs and MDs suggests the need for integrated approaches to healthcare to reduce the personal and social impact of their exacerbation during public health emergencies. IRB Approval Number: 1920-194 (UPR-Río Piedras). **Acknowledgements:** The research project from which the data reported in this study were obtained (known as "COVID-19 and Mental Health in Adults from Puerto Rico") was financed with the personal funds of the third author. We are thankful to the research assistants for their collaboration in this study. Some of them were hired thanks to funds granted to the Institute for Psychological Research by the Deanship of Graduate Studies and Research from the University of Puerto Rico, Río Piedras Campus.

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Quality Control of Procured Human Heart Samples via Immunohistochemistry

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Background & Objectives: Accurate characterization of procured tissue samples ensures the validity and reliability of human basic science and preclinical research. The common method for characterizing human heart samples, as atrial or ventricular, is bulk RNA sequencing (RNAseq), which is expensive. Here, we aimed to apply immunofluorescence (IF) techniques for the validation of human heart sample chamber origin as atrial or ventricular using the differences in cardiomyocyte morphology that have already been established histologically. **Methods:** Six "fast-freeze," Biobank-procured, and deidentified human heart samples from – 3 ventricular and 3 atrial – were thinly sliced, permeabilized, and blocked using standard IF protocols. These samples were already characterized as atrial or ventricular using RNASeq. We incubated the samples with primary antibodies that recognized cardiomyocytes (monoclonal anti-cTNT) overnight at 4°C. Goat anti-mouse IgG2b, conjugated to Alexa Fluor 647, was used as a secondary antibody (1h – RT). We acquired tissue z-stacks using confocal microscopy (Leica SP8) and the resulting images were processed and analyzed using IMARIS and ImageJ software. Cardiomyocyte thickness was measured in 2 slices per z-stack, 2 z-stacks per sample.

Statistical analysis was performed using a two-tailed Student's t-test and a $P < 0.05$ was considered to be significant. **Results:** Both sample types strongly stained for cTNT (cardiac troponin T), as expected, with the staining patterns matching previously determined histological patterns. Ventricular cardiomyocytes were thicker when compared with atria (mean thickness $18.9 \pm 0.5 \mu\text{m}$ ($n = 98$) vs. $10.8 \pm 0.4 \mu\text{m}$ ($n = 140$), respectively) ($p = 1.5 \times 10^{-27}$). **Conclusions:** We concluded that immunofluorescence techniques allow for quality control of human heart chamber origin between atrial and ventricular samples, providing an efficient method for cardiac tissue chamber origin identification. Overall, cardiomyocyte thickness was significantly different between both chambers. Further studies are needed to test other tissue markers, like fibroblasts and chamber-specific myosins, as reliable indicators of cardiac chamber tissue origin. **Acknowledgements:** This work was supported by funding from NIH (NRS T35HL007744 and NHLBI R01HL153025 to Dr. Tristani-Firouzi) and the Medical Student Research Program at the University of Utah.

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Analyzing the Association of School Exclusion Disciplines on Opioid Misuse Among Justice-Involved Adolescents

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Background and Aims: Justice-involved adolescents (JIA) are a population who are at higher risk of opioid misuse (OM), opioid use disorder, overdose, and death associated with OM. School exclusion disciplines (i.e., suspension and expulsions; SEDs) are correlated with an increase in delinquent behaviors and substance misuse. Limited research on the effects of SEDs on OM has been conducted within this population. This study examined the correlation between SEDs and OM among JIA. It was hypothesized that having experienced at least one SED would increase JIA's odds of OM. **Methods:** The study examines a sample of 79,960 JIA from the Florida Department of Juvenile Justice. The data were collected using the Positive Achievement Change Tool from JIA arrested in Florida between 2004 and 2015. Descriptive statistics and logistic regression were used to analyze the relationship between OM and SEDs, controlling for race, sex, age, and history of mental problems. **Results:** JIA with one or more suspension(s) and/or expulsion(s) had over twice greater odds ($OR = 2.2$, $p < 0.001$) of meeting the criteria for past 30-day OM than JIA who had never been suspended and/or expelled. **Conclusions:** School exclusionary disciplines seem to negatively impact on the JIA population. The findings of this study urge for a reformation in disciplinary approaches. It is crucial to identify and implement alternative disciplinary approaches that prioritize maintaining a student's bond with the school, such as teaching Social Emotional Learning skills. **Acknowledgements:** The research reported in this publication was supported by the National Institutes of Health under award numbers 1K01DA052679 (Dr. Micah E. Johnson, PI), R25DA050735 (Dr. Micah E. Johnson, PI, and Kimberly Johnson, co-PI), and R25DA059073 (Dr. Micah E. Johnson, MPI and contact PI). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or the Florida Department of Juvenile Justice.

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Optimizing Glioblastoma Therapy: Enhancing TMZ Cytotoxicity with a Selective PARP1 Inhibitor

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Background and Objectives: Glioblastoma (GBM) is an aggressive primary brain tumor with a five-year survival rate below 5%. Current standard therapy with temozolomide (TMZ) and radiation provides limited benefit due to intrinsic and acquired resistance, underscoring the need for novel therapeutic strategies. Poly (ADP-ribose) polymerase (PARP) inhibitors prevent DNA repair by blocking PARP-mediated single-strand break resolution, thereby enhancing the cytotoxic effects of TMZ-induced DNA lesions. This study evaluated the efficacy of a selective PARP1 inhibitor (PARP1i) in combination with TMZ in GBM patient-derived xenograft (PDX) models. **Methods:** U251 and GBM12 PDX cells were treated with TMZ, PARP1i, or both. DNA damage was assessed via comet assays, while activation of DNA damage response signaling (pKap1, pChk1, pChk2) and PAR inhibition were confirmed by immunoblotting. Antitumor effects were evaluated using live-cell imaging, clonogenic survival, and neurosphere formation assays. In vivo, nude mice bearing GBM12 xenografts received PARP1i (3 mg/kg/day) with or without TMZ (12.5 mg/kg/day) for 5 days, and tumor growth, survival, and tolerability were monitored. Statistical significance was determined using bidirectional t-tests and log-rank tests ($p < 0.05$). **Results:** Low-dose PARP1i (10–100 nM) effectively suppressed hydrogen peroxide-induced auto-PARylation in U251 cells. While single-agent PARP1i exhibited modest activity, its combination with TMZ markedly increased comet tail moments, enhanced DNA damage signaling, and significantly reduced clonogenic survival. In GBM12 stem cells, the combination further suppressed neurosphere formation compared with TMZ alone. In vivo, the treatment was well-tolerated and produced superior tumor growth inhibition and prolonged survival relative to TMZ monotherapy. **Conclusion:** These findings demonstrate that selective PARP1 inhibition potentiates TMZ cytotoxicity by promoting irreparable DNA damage and tumor cell death. PARP1i may represent a promising adjuvant to current GBM therapy, warranting further investigation alongside standard TMZ regimens and biomarker development for patient selection. **Acknowledgments:** The Mayo Clinic and NIH supported this work. We thank AstraZeneca for the supply of AZD9574.

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Depression Among Child Survivors of Sexual Violence in Puerto Rico: A Retrospective Chart Review (2016-2024)

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Background: Child sexual abuse (CSA) trauma persists into adulthood; victims are 3 times more likely to suffer depression. Sexual assault has been linked to higher depression and anxiety compared to sexual molestation. Multiple traumas or sexual violence tend to have poorer treatment outcomes, emphasizing the need for tailored approaches, especially in female victims. Preventing adverse childhood experiences and early intervention may reduce health risk behaviors and negative outcomes in young adults. **Objectives:** 1) Identify depression indicators in CSA using validated inventories. 2) Compare depression indicators between victims of sexual assault vs. molestation. 3) Evaluate association between CSA and depression indicators, considering potential confounders. **Methods:** Review of records from a forensic clinical service (January 2016 - December 2024) for abuse victims aged 7-17. Patients completed validated depression screening tools. Participants were classified as sexually molested or assaulted, excluding those with prior depression diagnosis. Confounders include victim's age, relationship to offender, abuse location, incident count, grooming via pornography, maltreatment (isolated vs recurring), and family violence. (Approved by IRB on February 18th, 2025. Protocol Number: IRB EMSJBIRB- 3-2025.) **Results:** Sample of 62 patients; 53.2% experienced sexual molestation, 46.8% sexual assault; mean age 10.45 (SD=3.21). Most offenders were family (80.6%) and abused at home (54.8%). Nearly half (48.4%) faced family violence. Data analysis showed moderate depression on BDI (n=26, M=18.58, SD=11.17) and mild-to-moderate on PHQ-9 (n=24, M=7.33, SD=4.11). T-tests found no significant differences between the type of victimization and indicators for depression (BDI and PHQ-9; $p>0.05$). **Conclusion:** The literature has found that sexual assault results in more severe psychological outcomes than sexual molestation; this study found no significant difference in depression indicators between the two groups. Both types of abuse were associated with moderate depression and clinical diagnoses. These findings underscore the importance of universal mental health screening and intervention for all survivors of CSA, irrespective of abuse type. **Acknowledgments:** PRHJC Personnel. Natalia Maverakis, Rolando Brutus, and Yamir Torres, medical students who contributed to the initial stages of the project.

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Measuring Environmental Sustainability in Orthopaedic Surgery: A Scoping Review of Life Cycle Assessment and Material Flow Analysis Methodologies

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Background: Orthopaedic surgery contributes significantly to healthcare's environmental footprint through implant production, high energy consumption, and single use materials. Despite growing attention to sustainability, there is no standardized framework to quantify environmental impact in this field. This study aimed to identify and summarize applications of Life Cycle Assessment (LCA) and Material Flow Analysis (MFA) in orthopaedic surgery to methodological consistency, findings, and existing evidence gaps. **Methods:** A scoping review was conducted using PubMed, Scopus, and Embase through September 2025. Studies analyzing the environmental impact of orthopaedic procedures with LCA, MFA, or comparable frameworks were included. Extracted data included study design, procedure type, environmental indicators, and methodological parameters. Results were synthesized descriptively. **Results:** Eight studies met inclusion criteria, mainly from Europe and North America. Procedures analyzed included anterior cruciate ligament reconstruction, arthroplasty, and osteotomy. Reported carbon footprints ranged from 10 to 47 kg CO₂e per procedure, primarily driven by implant production and single-use materials. Modeled interventions (reusable textiles, minimalist packs, and recycling) reduced emissions by up to 40%. However, inconsistent system boundaries and outcome metrics limited cross-study comparability.

Conclusion: LCA and MFA are feasible tools for quantifying environmental sustainability in orthopaedic surgery, but methodological variability restricts data interpretation. Establishing standardized reporting frameworks and integrating environmental and economic metrics are essential to guide sustainable, evidence-based surgical practice. **Acknowledgments:** No funding or conflicts of interest to disclose.

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Impact of TAP Block on Recovery in Gynecologic Oncology Surgery: Secondary Analysis Within an ERAS Protocol

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Background and Objective: Over 1,000 women in Puerto Rico are diagnosed annually with gynecologic cancer. About 90% require surgery. One regional anesthesia technique, Transversus Abdominis Plane (TAP) block, may reduce postoperative length of stay (LOS) within Enhanced Recovery After Surgery (ERAS) protocols. We hypothesized that TAP block shortens LOS compared with non-TAP among Puerto Rican women undergoing gynecologic oncology surgery. **Methods:** This secondary analysis included 50 women from a randomized trial conducted December 2022–August 2023 (25 TAP; 25 non-TAP). Demographics were summarized using descriptive statistics, and group comparability was tested with the student t test. LOS differences were evaluated using the Mann–Whitney U test. Spearman correlation examined associations among LOS, BMI, pain, and age. Analyses used IBM SPSS v30 and Stata Now v18 ($p < 0.05$). **Results:** Groups were similar in age and surgery duration. Hypertension and diabetes were most common; endometrial cancer predominated (60%). Most procedures were robotic-assisted hysterectomies with bilateral salpingo-oophorectomy. BMI was lower in the TAP group (29.0) vs non-TAP (35.0; $p = 0.009$). TAP reduced median LOS (24 vs 48 hours; $p = 0.055$) and lowered mean pain (1.96 vs 2.36; $p = 0.281$). Higher BMI and pain correlated with longer LOS ($r = 0.30$ and 0.29 ; $p = 0.04$ and 0.005). **Conclusions:** Although not statistically significant, the 24-hour LOS reduction is clinically relevant and may reflect faster recovery through early mobilization and reduced sedation. Future studies should include BMI stratification, opioid use, and quality of life assessments. **Acknowledgments:** Supported by the Cancer Prevention and Control Research Training Program (CAPAC) (NCI Grant #R25CA240120-06). Approved by UPR IRB (Protocol #2022-08-79; August 15, 2022).

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Genetic and Clinical Profiles of Early-Onset Prostate Cancer in Puerto Rican Men: A Preliminary Characterization

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Background: Prostate cancer (PCA) is the second leading cause of cancer-related death among US men. Early-onset PCA (EOPCa) represents ~10% of diagnoses, with ~58,694 new cases worldwide in 2021. Although incidence is rising, EOPCa remains underexplored. Younger patients often present with distinct clinical features, hereditary predispositions, and long-term survivorship challenges. Hispanic/Latino men, particularly those from Puerto Rico, experience disparities in incidence and outcomes yet remain underrepresented in PCA research. Understanding the epidemiological, clinical, and germline genetic profile of Puerto Rican men with EOPCa is essential for risk stratification and precision medicine. **Methods:** This retrospective study identified 80 EOPCa cases among 9,393 patients treated for PCA (2020–2025) at a tertiary hospital in southern PR. Demographic, clinicopathological variables were collected, including age, PSA, BMI, Gleason score (GS), tumor stage, family history, lifestyle factors, and treatments. Germline testing results were classified as pathogenic, variants of uncertain significance (VUS), or benign. Frequencies of recurrent alterations were calculated. **Results:** Eighty patients were identified; 39 met inclusion criteria. Age ranged 37–49 years (mean 45.7). PSA at diagnosis ranged 1.7–25.4 ng/mL (mean 6.2). Nearly half (48.7%) were obese (BMI ≥ 30). GS 6 was most frequent at biopsy (56.4%) and post-prostatectomy (50.0%), followed by GS 8 (23.5%). Stage T2 (55.9%) and T3 (23.5%) predominated. Family history of PCA was reported by 38.0%. Most patients consumed alcohol (76.9%) but denied smoking (71.8%). Germline testing identified 10.3% pathogenic variants, 35.9% VUS, and 5.1% carriers. Among 21 alterations detected: 15 VUS, 5 pathogenic, 1 benign. Alterations affected 15 genes, recurrent in RECQL4(n=3), POLD1(n=3), ATM(n=2), and TMEM127(n=2). **Conclusions:** This study provides the first characterization of EOPCa in Puerto Rico, revealing a notable burden of germline alterations and emphasizing the need to integrate genetic testing into clinical management. Expanding research among underrepresented populations is critical to improve early detection, prognostication, and equity in PCA care. **Funding:** Intellectus Foundation, U54 PHSU-MCC Grants: U54CA163071 & U54CA163068. Approved by IRB, #2401182151.

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Neurofibromatosis Type 1 and Systemic Lupus Erythematosus in a Pediatric Patient: A Diagnostic Challenge and Rare Co-occurrence

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Purpose: Describe the presentation of a pediatric patient with Neurofibromatosis Type 1 (NF1) and Systemic Lupus Erythematosus (SLE), a rare co-occurrence with overlapping multisystemic manifestations. **Case Description:** Seven-year-old female presenting with 3-month history of intermittent fevers, knee pain, lymphadenopathy, and unintentional weight loss that did not respond to antibiotic treatment nor steroids. Examination was remarkable for fever, hypertension, generalized lymphadenopathy, café-au-lait macules, axillary and inguinal freckling, and generalized edema. Laboratories revealed anemia, proteinuria, and hematuria. Imaging showed diffuse lymphadenopathy, splenomegaly, ascites, pleural effusions, pericardial effusion, and bilateral optic gliomas.

Clinical findings confirmed NF1. Malignancy and infection were initially suspected. Broad infectious studies were negative and symptoms did not improve with antimicrobials. Hematology/Oncology evaluation and biopsies excluded malignancy. Multisystemic presentation was not fully explained by NF1, which prompted evaluation for autoimmune diseases. Laboratories demonstrated low complement levels and positive ANA, anti-dsDNA, and anti-Smith antibodies, confirming SLE. Immunosuppressive therapy was initiated and clinical improvement was seen within two weeks of treatment, including resolution of fevers, and decreasing urinary abnormalities and effusions. Regarding her optic gliomas, she was evaluated by neuro-ophthalmology and oncology teams, who agreed to continue outpatient follow-up to further discuss whether she would benefit from chemotherapy, considering that most patients with NF1 live with their optic gliomas with minimal complications. In addition, blood pressure control was achieved with medication. She was discharged home with scheduled follow-up appointments with multiple specialists. **Conclusion:** This represents the third reported case of co-existing NF1 and SLE in a pediatric patient. The overlap in systemic manifestations can obscure the diagnosis, especially when NF1 alone may explain components of the presentation. This case underscores the importance of maintaining a broad differential and considering autoimmune disease in complex presentations involving genetic disorders, as early recognition and multidisciplinary management are critical to reducing morbidity and improving outcomes. **Acknowledgments:** No funding was received. The authors declare no conflicts of interest and acknowledge the collaboration of the multidisciplinary teams at the University Pediatric Hospital.

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Safer Sunscreen: Cytotoxicity of UV Filters on Human Corneal Epithelial Cells

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Background & Objectives: Sunscreen reduces the risk of skin cancer and premature aging. Low compliance with daily facial application may result, in part, from eye irritation. Developing a non-irritant sunscreen could potentially improve compliance rates. The active ingredients in sunscreen are ultraviolet (UV) filters, including oxybenzone and dioxybenzone. Although oxybenzone is more commonly used, it is associated with a higher incidence of contact and photo-contact allergies. The FDA permits oxybenzone concentrations up to 6% and dioxybenzone up to 3% in sunscreen formulations. This study evaluates the viability of human corneal epithelial cells (hCECs) cultured for 24, 48, and 72 hours following exposure to varying concentrations of these UV filters. **Methods:** hCECs were cultured and treated with concentrations derived from FDA-permitted percentages of oxybenzone (5, 10, 20, 40, 80 μ M) and dioxybenzone (0.0125, 0.025, 0.05, 0.1, 0.2 μ M), as well as vehicle (EtOH). Oxybenzone and dioxybenzone were also combined at corresponding concentrations (5 + 0.0125 μ M through 80 + 0.2 μ M) to evaluate additive cytotoxicity. Cell viability was determined using the CellTiter-Glo Luminescent Cell Viability Assay, quantifying ATP as an indicator of metabolically active cells, at 24, 48, and 72 hours. Statistical significance was assessed using the Kruskal–Wallis test ($p < 0.05$) followed by post hoc pairwise analysis using Dunn's multiple comparisons test. **Results:** hCECs treated with 80 μ M oxybenzone showed decreased luminescence at 72 hours compared to control ($p < 0.05$). Dioxybenzone alone did not differ from control. Combination treatments showed reduced luminescence at 40 + 0.1 μ M (72 hr) and 80 + 0.2 μ M (24 and 72 hr) ($p < 0.05$). **Conclusions:** Dioxybenzone alone exhibited lower cytotoxicity than oxybenzone and demonstrated cytotoxic effects only when combined with the highest oxybenzone concentrations. These findings suggest that future sunscreen formulations may favor dioxybenzone to reduce eye irritation. **Acknowledgements:** The author(s) have no financial interests to disclose.

Serum Sulfatase 2 (SULF2) as a Potential Predictive Biomarker for Cirrhosis Progression and Risk of Hepatocellular Carcinoma

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Liver cirrhosis is an advanced consequence of chronic liver injury attributed to sustained inflammation and progressive fibrosis. As cirrhosis progresses from compensated to decompensated stages, declining hepatic function and architectural disruption create a chronic inflammatory microenvironment that promotes hepatocarcinogenesis and increases the risk of hepatocellular carcinoma (HCC). Patients with cirrhosis, regardless of etiology, have an estimated 2% annual risk of developing HCC, which accounts for 80–90% of primary liver cancers and is the third leading cause of cancer-related death worldwide. Identifying biomarkers that signal cirrhosis progression may enhance risk assessment and enable earlier intervention for HCC. Sulfatase 2 (SULF2) is an extracellular enzyme that modulates oncogenic pathways by editing the sulfation of heparan sulfate proteoglycans. Prior studies using transgenic mouse models with hepatocyte-specific SULF2 overexpression support its role in liver tumorigenesis, consistent with its observed upregulation in cirrhotic liver tissue. In this study, we quantified serum SULF2 using enzyme-linked immunosorbent assay (ELISA) to evaluate its potential as a biomarker for distinguishing liver cirrhosis from hepatitis B and C controls. Preliminary data suggest that SULF2 concentrations vary across patient populations. Elevated SULF2 levels were observed in both HCC and cirrhosis, with the highest concentrations in cirrhosis. Mean expression increased significantly from 19.2 ng/mL in HBV/HCV-infected patients to 65.8 in those with HCC, and 113.4 in cirrhosis. Differences between groups were statistically significant (LC vs. HBV/HCV, $P = 0.0001$; HCC vs. HBV/HCV, $P = 0.02$; LC vs. HCC, $P = 0.005$), supporting the biomarker's prognostic potential. Ongoing analyses aim to stratify cirrhosis and HCC cases by clinical stage and assess associated clinical variables to better understand factors influencing SULF2 variability. Additionally, we are investigating whether SULF2 could serve as a predictive biomarker for progression from cirrhosis to HCC, potentially informing risk stratification and early detection strategies. **Acknowledgments:** Research supported by the NIH Clinical and Translational Science Awards program (UL1TR002377) through the Mayo Clinic Center for Clinical and Translational Science (CCaTS). Approved by IRB (# 21-011610), Approval Date: 12/22/2021.

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Caribbean Botanical Antioxidants: Therapeutic Potential in Oral Health

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Background and Objectives: Oxidative stress is a key driver in the progression of oral inflammatory diseases and diabetes-related complications. There is growing interest in identifying natural compounds that counteract oxidative stress as a strategy to promote oral health. This study aimed to evaluate the antioxidant potential and elemental composition of eight medicinal plants traditionally used to manage diabetes-associated symptoms, and to identify candidates for the development of therapeutic formulations targeting oral health. **Methods:** Aqueous extracts from eight Caribbean ethnomedicinal species were prepared using traditional infusion protocols. Total phenolic content and antioxidant capacity were evaluated through standardised colourimetric assays, including Folin–Ciocalteu, ABTS, DPPH, and FRAP. Metabolomics was conducted to determine essential and trace elements. Correlation analyses were performed to explore relationships between elemental composition and antioxidant activity. **Results:** Three species exhibited consistently high polyphenol levels and potent antioxidant activity across all assays, with radical-scavenging capacities comparable to or exceeding those of reference standards. In contrast, the remaining extracts showed moderate to low activity and lower phenolic content. Metabolomic analysis revealed a highly complex biochemical profile in the three most promising extracts, identifying multiple polyphenols known for their ROS-scavenging properties and their ability to activate antioxidant pathways at the cellular level. These findings underscore substantial interspecies variability, enabling the identification of extracts with robust antioxidant profiles. **Conclusion:** Several Caribbean medicinal plants demonstrate strong antioxidant potential, reinforcing their traditional use in managing diabetes-related conditions and highlighting their promise for oral health interventions aimed at mitigating oxidative stress. Future research will aim to optimise extraction protocols to maximise polyphenol enrichment and to evaluate their biological effects in oral cell models. **Acknowledgments:** This work was supported by a fellowship from UCHCEU/Santander Bank to Michela Capoferri. The authors declare no conflicts of interest.

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Natural and Synthetic Cyclodextrin-Antioxidant Complexes for Dentine Protection

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Background and Objectives: The successful repair of dental tissues remains challenging, as it requires proper remineralisation of collagen. To achieve this, inhibition of enzymatic degradation at the interface between the restorative material and the tooth structure is necessary. Flavonoid antioxidants are promising candidates for this

purpose due to their specific properties and low toxicity. However, they are susceptible to degradation over time; therefore, to allow these molecules to protect the materials for several weeks, a drug-delivery carrier is needed to stabilise and gradually release the antioxidant. This work assesses cyclodextrins as carriers for flavonoids, aiming to promote inclusion complex formation and their potential integration into dental repair materials. **Methods:** Commercial natural cyclodextrins and synthetic ones produced following previously established synthetic routes were used in this study. The encapsulation of the flavonoid antioxidants was characterised using experimental methods (¹H NMR and UV-Vis spectroscopy) and theoretical methods (Molecular Dynamics). Finally, the best candidates have been tested in vitro using three-dimensional collagen fibril models. **Results:** Cyclodextrins have shown a remarkable ability to form inclusion complexes with flavonoid antioxidants, effectively shielding these compounds from oxidative degradation and hydrolysis. Furthermore, cyclodextrin-flavonoid complexes facilitate a controlled and sustained release of the active molecules, which is especially beneficial for applications in tissue engineering and dental biomaterials, where extended antioxidant activity can support collagen integrity and promote remineralisation. **Conclusion:** The integration of flavonoid-cyclodextrin inclusion complexes into composite formulations offers a promising approach for developing next-generation dental materials. By improving the stability, bioavailability, and controlled release of bioactive flavonoids, this method can support hard-tissue regeneration and facilitate new opportunities for minimally invasive restorative treatments. **Acknowledgements:** This work was supported by a fellowship from UCHCEU/Santander Bank to Michela Capoferri, as well as FUSP-PPC-24-088, IP: Maria Isabel Fortea Gorbe and CIAICO/2022/198, IP: Alicia López Castellano. The authors declare no conflicts of interest.

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Sociodemographic Factors and Health Insurance Status Among Out-of-Hospital Cardiac Arrest (OHCA) Patients in Puerto Rico

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Background: Out-of-hospital cardiac arrest (OHCA) remains a major public health concern, with outcomes influenced by demographic and social determinants such as age, sex, and access to health coverage. Understanding population structure and insurance profiles helps guide system-level interventions. **Methods:** We conducted a retrospective analysis of 212 out-of-hospital cardiac arrest (OHCA) cases treated at the University of Puerto Rico Hospital in Puerto Rico between January 2022 and December 2024. The variables analyzed included sex and type of health insurance coverage. Categorical data were summarized using frequency/N (percentage). **Results:** Of 212 patients, 123/212 (58.0%) were male and 89/212 (42.0%) female. Insurance coverage was as follows: 42/212 (19.8%) government-based plans, 5/212 (2.4%) Medicare, 71/212 (33.5%) Medicare Advantage, 68/212 (32.1%) other private coverage, and 26/212 (12.3%) uninsured. A total of 9/212 (4.2%) patients had a documented Do Not Resuscitate (DNR) order at presentation, and 19/212 (9.0%) had a DNR signed in the emergency department. **Conclusion:** Out-of-hospital cardiac arrest in this cohort was more frequent among males and individuals covered by public or government-based insurance, suggesting a higher prevalence of cardiovascular risk and comorbidities in socioeconomically vulnerable groups. The low rate of pre-existing and in-hospital DNR documentation highlights the need to strengthen advance care planning and public awareness initiatives focused on end-of-life decision-making within this population. Approved by IRB, protocol number 25043901271, approval date 04/25/2025.

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Impact of Cardiometabolic Comorbidities on Survival in Out-of-Hospital Cardiac Arrest Patients

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Background: Comorbidities substantially influence the likelihood of cardiac arrest and post-resuscitation survival. Cardiovascular and metabolic conditions remain the predominant contributors. **Methods:** We conducted a retrospective analysis of 212 out-of-hospital cardiac arrest (OHCA) cases treated at the University of Puerto Rico Hospital in Puerto Rico between January 2022 and December 2024. Comorbidities analyzed included: hypertension, coronary artery disease, congestive heart failure, chronic kidney disease, and cancer. Results are expressed as frequency/N (percentage). **Results:** Hypertension was present in 123/194 (63.4%) patients. Coronary artery disease occurred in 17/193 (8.8%), congestive heart failure in 22/192 (11.5%), and renal disease in 23/193 (11.9%). Cancer was documented in 25/192 (13.0%), and hypercholesterolemia in 13/193 (6.7%). Other comorbidities included COPD 4/193 (2.1%), liver disease 2/193 (1.0%), and rheumatologic/autoimmune conditions 3/193 (1.6%). Patients with hypertension and CHF were more likely to present in pulseless electrical activity, while those without significant comorbidity were more often found in shockable rhythms (ventricular fibrillation/tachycardia). Overall survival to ED ROSC was 54/211 (25.6%), with sustained ROSC in 20/212 (9.4%). The denominators (N) vary across variables because not all data elements were available for every patient due to incomplete chart documentation. **Conclusion:** Cardiometabolic comorbidities were highly prevalent among OHCA patients and were associated with non-shockable rhythms and poor outcomes. Preventive interventions for hypertension, heart failure, and renal disease remain essential to reduce OHCA. Approved by IRB, protocol number 25043901271, approval date 04/25/2025. **Acknowledgement:** This project was supported in part by the Endowed Health Services Research Center of the University of Puerto Rico School of Medicine -Grants 5S21MD000242 and 5S21MD000138 from the National Center for Minority Health and Health Disparities, National Institutes of Health (NCMHD-NIH).

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Bystander CPR, AED Use, and Event Location Patterns in Out-of-Hospital Cardiac Arrest (OHCA) from a Puerto Rico Cohort

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Background: The location of cardiac arrest and early bystander actions are major determinants of out-of-hospital cardiac arrest (OHCA) outcomes. Data from local registries help identify system gaps for training and public access defibrillation. **Methods:** We conducted a retrospective analysis of 212 OHCA cases treated at the University of Puerto Rico Hospital in Puerto Rico between January 2022 and December 2024. Event location, witnessed status, and bystander cardiopulmonary resuscitation (CPR) or automated external defibrillator (AED) use were analyzed. **Results:** Cardiac arrests occurred most frequently at home in 139/205 (67.8%) cases, followed by nursing homes 16/205 (7.8%), and public places 15/205 (7.3%). Arrests were witnessed in 137/200 (68.5%) cases. Bystander CPR was performed in 65/204 (31.9%), while AED use by witnesses occurred in only 2/203 (1.0%). In 201/203 (99.0%) cases, no AED was applied prior to EMS arrival. A DNR order was present in 9/212 (4.2%) cases before or at EMS contact. The event time was available in only 9/203 (4.4%) cases, reflecting documentation limitations. The denominators (N) vary across variables because not all data elements were available for every patient due to incomplete chart documentation. **Conclusion:** Most OHCA occurred in private residences and were witnessed in two-thirds of cases. Despite this, bystander CPR was performed in fewer than one-third, and AED use was nearly absent. Enhanced community CPR training and wider AED availability in residential areas could improve early survival. Approved by IRB, protocol number 25043901271, approval date 04/25/2025. **Acknowledgement:** This project was supported in part by the Endowed Health Services Research Center of the University of Puerto Rico School of Medicine -Grants 5S21MD000242 and 5S21MD000138 from the National Center for Minority Health and Health Disparities, National Institutes of Health (NCMHD-NIH).

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Airway Management, CPR Time, and Medication Use in Out-of-Hospital Cardiac Arrest: Insights from EMS Operations in Puerto Rico

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Background: Emergency medical services (EMS) interventions and CPR duration significantly influence OHCA outcomes. Evaluation of prehospital practices helps identify opportunities for optimization. **Methods:** We conducted a retrospective analysis of 212 OHCA cases treated at the University of Puerto Rico Hospital in Puerto Rico between January 2022 and December 2024. Prehospital care data were analyzed in 206 patients. Variables analyzed included: airway management, CPR duration, epinephrine use, and field return of spontaneous circulation (ROSC). **Results:** Estimated CPR time by EMS averaged 48.7 ± 24.0 minutes (range 11–161; n=85). Airway interventions included bag-valve-mask ventilation in 60/165 (36.4%), endotracheal intubation in 44/165 (26.7%), and supraglottic airway use in 21/165 (12.7%). Epinephrine was administered in 106/206 (51.5%) patients, most commonly at 2–3 doses (77/106; 72.6%). Atropine was used in 4/205 (2.0%), and Narcan in 5/205 (2.4%). ROSC was achieved in the field in 5/206 (2.4%) patients. The predominant initial cardiac rhythms were pulseless electrical activity (PEA) in 47/156 (30.1%) and asystole in 30/156 (19.2%). The denominators (N) vary across variables because not all data elements were available for every patient due to incomplete chart documentation. **Conclusion:** Despite prolonged resuscitation efforts (mean duration 48.7 minutes) and frequent use of advanced airway management and pharmacologic interventions, prehospital ROSC remained exceedingly rare (2.4%). These findings highlight the necessity for ongoing evaluation of prehospital care protocols, optimization of response times, enhanced training for prehospital personnel, and thoughtful application of termination-of-resuscitation criteria in

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cases of extended resuscitative attempts in the field. Approved by IRB, protocol number 25043901271, approval date 04/25/2025. **Acknowledgement:** This project was supported in part by the Endowed Health Services Research Center of the University of Puerto Rico School of Medicine -Grants 5S21MD000242 and 5S21MD000138 from the National Center for Minority Health and Health Disparities, National Institutes of Health (NCMHD-NIH).

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Emergency Department ROSC, Sustained ROSC, and Hospital Disposition after Out-of-Hospital Cardiac Arrest

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Background: Achieving return of spontaneous circulation (ROSC) is essential but does not guarantee survival to discharge. Sustained perfusion and ICU-level care determine meaningful outcomes. **Methods:** We conducted a retrospective analysis of 212 OHCA cases treated at the University of Puerto Rico Hospital in Puerto Rico between January 2022 and December 2024. Variables analyzed included: ROSC frequency, sustained ROSC frequency, mortality and post resuscitation final disposition. **Results:** ROSC was achieved in the ED in 54/211 (25.6%) patients. Sustained ROSC, defined as continued perfusion after resuscitation, was recorded in 20/212 (9.4%). ICU admission occurred in 12/211 (5.7%), regular ward admission in 6/212 (2.8%), and telemetry admissions were 0/212 (0%). Overall hospital mortality was 191/208 (91.8%). The denominators (N) vary across variables because not all data elements were available for every patient due to incomplete chart documentation. **Conclusion:** Although approximately one-quarter of patients achieved initial ROSC, sustained perfusion was uncommon, and ICU-level admissions remained exceedingly low. Hospital survival and favorable neurological recovery were rare, reflecting the severity of presentation and the limitations of in-hospital management once persistent hemodynamic stability is established. These findings highlight the need to strengthen the chain of survival through targeted prehospital improvements, including earlier recognition, optimized response times, high-quality chest compressions, and timely defibrillation. Approved by IRB, protocol number 25043901271, approval date 04/25/2025. **Acknowledgement:** This project was supported in part by the Endowed Health Services Research Center of the University of Puerto Rico School of Medicine -Grants 5S21MD000242 and 5S21MD000138 from the National Center for Minority Health and Health Disparities, National Institutes of Health (NCMHD-NIH).

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Mixed-Metal Transferrin Complexes as Potential Vehicles for Titanium (IV) Delivery into Cancer Cells

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Background & Objectives: Iron (Fe) is an essential metal involved in cellular metabolism and proliferation. Dysregulation of Fe homeostasis has been observed in cancers characterized by altered metabolic pathways, making Fe transport a potential therapeutic target. Fe is transferred across the bloodstream and into cells via

serum transferrin (sTf), an 80 kDa glycoprotein. Typically, only one-third of sTf is saturated with Fe, allowing the remaining binding site to coordinate with other metals, including titanium (Ti). Previous studies suggest that Ti(IV), a transition metal with potential anticancer properties, may exert its therapeutic effects via sTf-mediated cellular delivery, though the exact mechanism remains unclear. Determining whether sTf can adopt a stable conformation that accommodates both Fe(III) and Ti(IV) could help explain this mechanism and ultimately enhance Ti(IV) uptake into cancer cells. **Methods:** In this research project, we examined the possibility of mixed-metalation by analyzing the chemical stability of Fe(III)-sTf-Ti(IV) complexes under physiological-like conditions, thereby identifying stable conformations that may maximize Ti(IV) uptake and delivery. Fe(III)-bound sTf samples were prepared and quantified using Bradford and ferrozine colorimetric assays, along with UV-Vis spectroscopy. The chemical stability of the Fe(III)-sTf-Ti(IV) complexes was evaluated using urea-PAGE analysis in the presence of micromolar concentrations of citrate, mimicking human serum conditions. **Results:** Our results suggest that Ti(IV) does not destabilize mono-saturated Fe(III)-sTf. The glycoprotein maintained its structural integrity under the tested conditions and exhibited greater chemical stability than Ti(IV)-saturated sTf as determined by greater migration distance in urea-PAGE. **Conclusions:** These findings indicate potential compatibility for mixed-metal binding, supporting the hypothesis that sTf serves as a Ti(IV)-transporter into cells. Further in vitro studies will determine whether such mixed-metal complexes facilitate the sTf mediated delivery of Ti(IV) into cancer cells and potentiate its therapeutic effects. **Acknowledgements:** This research was supported by the NIH 1R21CA240997 and American Cancer Discovery Boost DBG-23-1156894-01-ET.

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Mitigating Fall and Hip Fracture Risk Through Stage-Specific Exercise in Older Adults with Diabetic Neuropathy: A Narrative Review

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Background and Objectives: Diabetic peripheral neuropathy (DPN) is one of the most frequent complications of diabetes affecting as many as 50% of diabetic patients. DPN frequently presents with decreased levels of proprioception and stability, leading to a higher risk of falls and hip fractures among older adults (≥ 65 years). Even though evidence suggests that exercise is an effective treatment strategy for patients with DPN, many questions remain unanswered regarding the kind, frequency, and duration of exercise interventions tailored to the phase of DPN. Moreover, current clinical guidelines from the American Diabetes Association lack neuropathy stage-specific exercise protocols and only recommend precautions for these patients when exercising. This review aims to examine the evidence on the effects of stage-specific exercise interventions in older adults with DPN, with a focus on balance, mobility, and fall-related fracture risk. **Methods:** Databases and search engines PubMed, PMC, and Google Scholar (2000–2025) were used to select 18 studies according to specific inclusion and exclusion criteria. These examined single and multicomponent exercise programs measuring balance, mobility, or fracture-related outcomes based on the neuropathy severity. Data regarding exercise type, frequency, duration, demographics of individuals, stage of DPN, and outcomes was extracted and analyzed. **Results:** Long term multicomponent programs were shown to be significantly more effective at reducing risk for fall related fracture, as well as improving

proprioception and stability when compared to short term single component exercise programs. **Conclusions:** Structured, stage-specific exercise interventions were consistently linked to improved balance, mobility and fall-related hip fracture mitigation in older adults with DPN. The lack of a standardized classification system for DPN severity may limit the clinical application of these results. Further studies should focus on the development of this system to prescribe more accurate exercise programs for these patients. **Acknowledgments:** No funding or conflicts of interest to be reported.

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Stability of the Gut Microbiome Across Genetic and Behavioral Risk Factors in Hispanic Adults With MASLD

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Background & Objectives: Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD), formerly known as “non-alcoholic fatty liver”, is defined by excessive hepatic fat accumulation (>5% of liver weight) in individuals without significant alcohol intake. Its pathophysiology reflects the overlap of metabolic stressors, genetic susceptibility, and gut microbial imbalance, yet how these factors interact remains unclear. In this IRB-approved study (Pro00078051), we focused on a Hispanic population in Puerto Rico to investigate the composition of gut microbiota associated with the PNPLA3 rs738409 C>G polymorphism, a genetic variant linked to MASLD susceptibility and progression. We additionally evaluated the effects of percent body fat, diet quality, and alcohol consumption patterns on microbial composition. **Methods:** This study recruited 104 Hispanic adults with MASLD. We used TaqMan-based genotyping and 16S rRNA V4 sequencing of fecal samples to characterize participants' genetic and microbial landscapes, respectively. To describe metabolic risk, a validated questionnaire was used to gather additional data on anthropometric measurements, diet, and lifestyle. Random Forest classification, differential abundance evaluations, and alpha and beta diversity metrics were used to analyze microbial data. **Results:** There was no discernible difference in the overall microbial community structure between PNPLA3 genotypes. Likewise, percent body fat, diet quality, and alcohol use showed no significant effects on microbial diversity or community structure. Alpha diversity remained largely stable, with a modest but significant richness difference (Chao1) between heterozygous and wild-type individuals ($p = 0.0139$). Random Forest identified *Lachnospira*, *Faecalibacterium*, and *Blautia* taxa associated with genotype status. However, analyses showed only minor taxonomic variation across groups. This pattern is consistent with known small effect sizes of host genetics on the human microbiome. **Conclusions:** Our results suggest a generally stable gut microbial community across PNPLA3 genotypes and specific metabolic factors in this cohort. **Acknowledgments:** This research was supported by Fundacion De Investigacion De Diego Science and Education.

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Global Disparities in Orthopaedic Surgery: A Narrative Review

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Background and Objectives: Musculoskeletal disorders affect billions of people worldwide and are the leading contributor to disability. Globally demand for orthopaedic medical services keeps increasing yet numerous areas do not have resources to perform urgent and secure surgical operations. As a result, access to safe orthopaedic care remains highly unequal. This narrative review aims to summarize current evidence on disparities in orthopaedic care by incorporating findings from population-based studies, surgical audits, randomized trials, and cost-effectiveness analyses to update the global framework and highlight deficiencies. **Methods:** The research team performed a structured database search of PubMed and Scopus and the WHO Global Index to find studies from 2015 through 2025. Search terms included orthopaedic surgery, global health, surgical access, health systems, and innovation. The research included population-based studies, as well as audits, randomized, cohort designs, economic evaluations, reports about surgical volume and provider density, postoperative outcomes, and new approaches to enhance access. The essential information was extracted and grouped into thematic categories. **Results:** Low- and middle-income countries have <900 surgical procedures for every 100,000 people whereas the recommended is 5,000. Surgeon rates range from 0.22 in Mozambique to 3.97 in Namibia, while Mexico has 10.4, still below the 20-per-100,000 benchmark. In Africa the average of postoperative infections >10.5% and joint arthroplasty complications include 1.6% dislocation and <2% deep infection. Moreover, telemedicine studies yield 77–91% patient satisfaction and task-shifting programs in Malawi achieve 71.3% amputation and 38.7% internal fixation with outcomes equivalent to surgeon-performed procedures. **Conclusion:** The world continues to experience ongoing disparities in orthopaedic surgical care. However, new approaches including task-shifting, tele-orthopaedics, cost effective implants, and 3D printing, are expanding capacity in resource-limited settings. Future projects should standardize outcome metrics, invest in local workforce training, and support fair authorship and data systems to ensure that musculoskeletal care improves for all.

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Stage-Specific Molecular and Immune Signatures in Colorectal Cancer

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Background and Objectives: Colorectal cancer (CRC) is the leading cause of cancer-related deaths in Puerto Rico. While its progression involves well known molecular alterations, stage-specific biological differences remain poorly understood. This study aimed to identify genomic and immune signatures distinguishing early (I, II) from advanced (III, IV) CRC to support biomarker development. **Methods:** We analyzed 28 tissue samples previously collected through the PURIFICAR registry, stratified into early-stage (n=7) and advanced-stage (n=8) with normal tissue

as healthy controls. Differential Gene expression analysis (p -value < 0.05 , absolute $\log_2$ fold change > 2) was performed using DESeq2 (R statistical software), while pathway enrichment was performed using the CancerSEA database to identify functional differences between groups. To validate key findings, qPCRs were done using the $2^{-\Delta\Delta C_t}$ method and expressed as $\log_2$ fold change, with group differences assessed using Wilcoxon rank-sum test to assess major cancer-associated pathways. Luminex-based cytokine profiling was conducted using the Kruskal-Wallis test ($p < 0.05$) to evaluate immune regulation across CRC stages. **Results:** We identified 828 differentially expressed genes (DEGs) unique to early-stage, 1077 to advanced-stage, and 1301 shared. Early-stage CRC tumors exhibited downregulated metabolic genes and markers of immune evasion, while advanced-stage showed upregulated angiogenesis, epithelial mesenchymal transition (EMT), and immune modulation pathways. qPCR confirmed increased angiogenesis in advanced CRC stage, and EMT activation across stages. Cytokine profiling showed suppression of IL-1 α , MIP-1 α , and MIP-1 β in early-stage CRC compared to controls. **Conclusions:** These findings reveal distinct molecular and immune features across CRC stages, suggesting early immune evasion and late invasive mechanisms. Integrating transcriptomic and cytokine data supports the development of stage-specific, noninvasive biomarkers for CRC. Future work will incorporate proteomic profiling to understand the tumor microenvironment dynamics in CRC progression. **Acknowledgements:** This research was supported by CAPAC (Award Grand Number #R25CA240120) from the NCI and NIAID grant Award #1R25A1183304 and UPRCCC Institutional Funds. Supported also by the University of Puerto Rico Comprehensive Cancer Center Division of Shared Resources and Scientific Operations' Immuno-Oncology Core, the Biostatistics and Bioinformatics Core, and the Puerto Rico OMICS Center (PROMIC). Approved by Puerto Rico Familial Colorectal Cancer Registry (PURIFICAR IRB #A2210207) & IRB #2410296903 (5/22/2025).

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Synergistic Properties on TBX5 and GATA4 on Cardiac Regulatory Activity

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Background and Objectives: Transcription factors (TFs) are sequence-specific DNA-binding proteins that control biological processes, such as cellular differentiation and development, by regulating gene expression. One-way TFs drive gene expression is by recognizing and binding to cis-regulatory elements (CREs), such as enhancers and promoters, on the genome. Cardiac TFs, GATA4 and TBX5, are two important TFs that control cardiomyocyte differentiation and heart development. Both are present early in embryogenesis and defects that alter GATA4 and TBX5 functionality can impact proper heart formation, leading to Congenital Heart Defects (CHD). Furthermore, these two TF have been shown to work cooperatively as a heterodimeric complex to increase their synergy and better promote cardiac gene expression. However, the properties behind this, such as the correct spacing between TFs enhancer binding sites to form a heterodimeric protein complex and activate gene expression, are still being elucidated. In this work, we hypothesized that base pair spacing impacts how GATA4 and TBX5 synergistically regulate cardiac gene expression. **Methods:** Firstly, using previously selected SELEX-seq data CREs, in which GATA4 and TBX5 heterodimeric capacities were validated through Electrophoretic Mobility Shift Assays (EMSA), we performed a Dual-Luciferase Reporter Assay to determine synergistic capacities of GATA4 and TBX5 on gene

expression. **Results:** We observed that gene expression was synergistically upregulated in enhancer sites with a 2 base-pair spacing, which correlated with previously obtained data from the EMSAs in-vitro analysis. However, other enhancer sites with alternative binding site spacings yielded both downregulation and upregulation of luciferase activity compared to TFs monomers. **Conclusion:** Our findings suggest that a 2-base pair spacing is preferred for GATA4 and TBX5 heterodimeric and synergistic capacities in regulating cardiac gene expression. This will help us further understand the intricacies and molecular dynamics that TFs play in eukaryotic gene regulation. **Acknowledgments:** This project was funded by the NIH (R25GM061151).

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Post-Mastectomy Breast Reconstruction Techniques and Outcomes in Puerto Rico

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Background & Objectives: Breast reconstruction following mastectomy improves physical and psychological well-being; however, outcome data for women treated in Puerto Rico remains limited. This institutional study aims to characterize reconstruction techniques, patient demographics, and postoperative outcomes at the University of Puerto Rico Medical Sciences Campus and affiliated hospitals, addressing a regional gap in reconstructive surgery research among Hispanic populations. **Methods:** A retrospective observational study was conducted on 22 female patients who underwent breast reconstruction between 2020 and 2024 at the Oncological Hospital Dr. Isaac González Martínez and the UPR Hospital Dr. Federico Trilla. Demographic, oncologic, and surgical variables were extracted from medical records using CPT and ICD-10 codes, while postoperative outcomes were obtained from follow-up documentation. Continuous and categorical variables were summarized using descriptive statistics. **Results:** The mean age was 53.6 ± 10.4 years (median 54; mode 42) with a mean BMI of 29 kg/m². Public insurance predominated (59%). Among patients with available data, 50% had comorbidities, most commonly hypertension (32%) and diabetes mellitus (14%). Reconstructions were predominantly implant-based (95%) and immediate (82%), with one patient who underwent autologous TRAM flap reconstruction. Most mastectomies were skin-sparing or total. Based on available documentation, adjuvant therapy included chemotherapy (27%) and radiation (9%). Lymph node management consisted of sentinel node biopsy (41%) and axillary dissection (14%). Postoperative complications were observed in 11 patients (50%). Minor complications (32%) consisted mainly of wound-healing issues or seroma, while major complications (18%) included implant loss, deflation, and capsular contracture. These findings represent preliminary results from an ongoing data collection effort. **Conclusion:** Implant-based, immediate reconstruction predominated in this initial institutional cohort. Complications were mostly minor, with few major events. These preliminary findings provide foundational data for ongoing and future analyses, and underscore the importance of continued data collection to guide equitable reconstructive care among Hispanic populations. **Acknowledgments:** Initial conceptual input by Guillermo S. López-Torres is recognized. Approved by IRB #2504387999 on July 22, 2025. No conflicts of interest to report.

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Falls Profile Among Amyotrophic Lateral Sclerosis Patients in Puerto Rico

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Background & Objectives: Falls can result in serious injuries like fractures and concussions, and they can lead to long-term consequences regarding psychological and social health. Risk factors for falling include older age, neurological disorders, psychiatric disorders, and orthopedic procedures, among others. The average risk of falling in a year as an older adult is 33%, and every fall or near-fall event increases the probability of developing fear of falling (FOF). FOF is defined as the low perceived self-efficacy at avoiding falls in daily activities, and it has shown to have a negative impact on functionality and quality of life. To better understand FOF in the Amyotrophic Lateral Sclerosis population, we first determined their falls profile. **Methods:** The database used was the local ALS Registry (CELA-PR) with 221 registered ALS patients as of October 2025. Demographics included sex distribution, with 55.7% (n=123) male and 44.3% (n=98) female. **Results:** Of these, 53.9% (n=119) presented with spinal onset, 20.4% (n=45) presented with frequent falls before ALS diagnosis, and 9.1% (n=20) after ALS diagnosis. 15.4% (n=34) of those with spinal onset and 5% (n=11) with bulbar onset presented with frequent falls before ALS diagnosis. Type of disease onset was significantly associated with frequent falls before ALS diagnosis ($X^2 = 10.7$, $p < 0.001$). People with spinal ALS onset are 3.3 times more likely to experience frequent falls before being diagnosed with ALS when compared to bulbar ALS onset. **Conclusion:** ALS patients with spinal onset, show a higher likelihood of experiencing frequent falls before diagnosis. A better understanding of fall patterns in this population, which includes FOF, will provide insight useful for proper and early fall-risk assessment. This should improve patient safety and quality of life from the start of the disease. **Acknowledgements:** Thanks to the UPR School of Medicine Clinics, the MDA Association, RCMI grant U54 MD007600 from the NIMHD-NIH, and Caribbean Hispanic ALS Center for Clinical Trials and the ALS Association grant 23-TC-642 for their support. Approved by IRB 2310153285, February 27, 2024.

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Change in E-Vapor Product Use Among Puerto Rican Youth, Hispanic Youth in U.S., and Overall Youth in U.S.

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Background: Electronic cigarette (e-cigarette) use is a pressing public health concern, particularly among Hispanic youth. E-cigarettes have been associated with increased risk of respiratory conditions, and cognitive and emotional deficits. While Hispanic adolescents report lower use rates than the overall adolescent population, prevalence varies across subgroups. This study compares changes in e-cigarette use among Puerto Rican (PR), Hispanics in the United States (U.S.), and overall youth in U.S. from 2015 to 2021. **Methods:** We analyzed published data collected by the Youth Risk Behavior Surveillance System (2015, 2017, 2019, 2021) for three student cohorts: PR, Hispanic U.S., and overall U.S. Percent changes from 2015 to 2021 were calculated for ever and currently using e-cigarettes overall, by sex (female vs. male), and by grade (9th vs. 12th). **Results:** From 2015 to 2021, ever use of e-cigarettes increased by 72.4% in PR, while decreasing by 22.1% among U.S. Hispanics and by 19.3% nationally. PR males (+52.7%) and females (+105%) showed increases compared to declines in U.S. Hispanics (−34% males, −9.5% females) and overall sample (−30.3% males, −6.1% females). By grade, PR students showed increases at 9th grade (+130%) and 12th grade (+34.6%), contrasting with declines among U.S. Hispanics (−35.7% and −18.3%) and national sample (−29.8% and −10.4%). For current use, PR also showed increases (51.5%), whereas U.S. Hispanics and the national group declined (−32.3% and −25.3%, respectively). PR females had a larger increase (+105.7%) than males (+15%), while both declined in the U.S. groups. By grade, 9th and 12th graders in PR showed increases (97.1% and 145% respectively), opposing the downward U.S. trends. **Conclusion:** Puerto Rican adolescents showed increases in experimentation and current use, contrasting with declines among Hispanic and overall U.S. youth. These results underscore the importance of culturally sensitive interventions and advancing research into contextual determinants driving these trends. **Acknowledgments:** This project was supported in part by the Endowed Health Services Research Center of the University of Puerto Rico School of Medicine -Grants 5S21MD000242 and 5S21MD000138 from the National Center for Minority Health and Health Disparities, National Institutes of Health (NCMH-D-NIH).

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Evaluation of Edelfosine as an Anti-Inflammatory Modulator of Microglial Phagocytosis Activity

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Background and Objectives: Neuroinflammatory processes triggered by epileptic seizures promote neuronal hyperexcitability, disrupt critical neural circuits, creating a self-reinforcing cycle that perpetuates seizure activity. Microglial activation is a key contributor, as pro inflammatory cytokines enhance excitatory neurotransmission. For example, IL-1 β increases presynaptic glutamate release and disrupts NMDA receptor-mediated calcium signaling, while TNF- α elevates AMPA receptor expression, amplifying glutamatergic activity. Therefore, microglia constitute an important therapeutic target. Microglial activation is regulated through pathways like phospholipase C beta (PLC β), where PLC β -dependent calcium signaling promotes cytokine release and chemotaxis. Our laboratory aims to modulate this pathway using edelfosine (Ef), a synthetic alkyl-lysophospholipid known to inhibit PLC β under seizure-like conditions. Prior data from our group show that Ef reduces pro-inflammatory cytokine mRNA expression following pilocarpine stimulation, supporting its potential anti-inflammatory function. We hypothesized that Ef would reduce microglial phagocytosis. **Methods:** To evaluate this, we used the zymosan (immunostimulant) phagocytosis assay in microglial cells under multiple conditions: vehicle $\pm$ pilocarpine (10 μ M), vehicle $\pm$ LPS (100 ng/mL; positive control), Ef (1 μ M) $\pm$ LPS, Ef $\pm$ pilocarpine, dexamethasone (0.5 μ M) $\pm$ LPS, and dexamethasone $\pm$

pilocarpine. Before addition, zymosan particles were sonicated, applied to cells for 10 minutes, quenched, fixed, and cells were imaged using confocal microscopy to quantify phagocytic activity. **Results:** Preliminary findings revealed unexpectedly high phagocytosis in vehicle-treated cells (0.38% DMSO), comparable to LPS, prompting optimization of vehicle controls. As anticipated, dexamethasone markedly reduced phagocytosis under all conditions. Edelfosine, however, increased phagocytic activity relative to vehicle with and without inflammatory stimuli, suggesting a more complex mechanism of action. Ongoing studies are optimizing the current conditions for our assay. **Conclusions:** This work underscores the importance of selecting appropriate vehicles and controls in vitro to ensure rigorous interpretation of neuroinflammatory responses and tests for our anti-inflammatory drug, edelfosine, and its effect on microglial phagocytosis. **Acknowledgements:** This research was supported by COBRE3 Neuroplasticity- P30-GM149367, COBRE Center for Microbiome Studies- 1P20156713-01.

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**Longitudinal Evaluation of Long COVID Symptom Persistence
and Its Association with Moderate to Severe COVID-19
in a Hispanic Cohort from Puerto Rico**

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Background & Objectives: Long COVID (LC) may lead to chronic health conditions requiring sustained medical care. It encompasses a range of symptoms that can persist for weeks, months, or even years following acute SARS-CoV-2 infection. This study aimed to assess the persistence and fluctuation of LC symptoms over 12 months in a cohort of Hispanic patients who experienced moderate-severe COVID-19. **Methods:** We analyzed data from a prospective cohort study of individuals residing in Puerto Rico with laboratory-confirmed SARS-CoV-2 infection during 2022. Demographic and clinical characteristics were collected at baseline. Follow-up interviews were conducted at 3, 6, 9, and 12 months. LC status was classified according to the 2024 definition proposed by the National Academies of Sciences, Engineering, and Medicine. Disease severity was defined as the presence of respiratory difficulty and/or hospitalization during the acute phase. Descriptive statistics were used to characterize the study population. Chi-square tests and multivariable log-binomial regression were used to assess associations between disease severity and LC status, adjusting for sex, age ≥ 65 years, and chronic conditions. **Results:** Of the 261 patients recruited, 151 maintained a LC classification throughout the 12-month follow-up. Among these, 78.15% were female, the mean age was 47.76 years, and 82.78% had chronic conditions. Hospitalization during acute illness was reported by 20.53%. Disease severity was significantly associated with LC at baseline (ORa: 5.03; 95% CI: 1.98–12.77; $p = 0.001$) and at 3 months (ORa: 22.70; 95% CI: 1.28–5.65; $p = 0.009$). Associations declined over time, and were not statistically significant at 6 months (ORa: 1.26; 95% CI: 0.62–2.58; $p = 0.540$), 9 months (ORa: 1.57; 95% CI: 0.79–3.14; $p = 0.207$), or 12 months (ORa: 0.79; 95% CI: 0.40–1.54; $p = 0.507$). **Conclusions:** Acute COVID-19 severity was associated with LC at early follow-ups but not beyond 3 months. **Acknowledgements:** This project was approved by the Institutional Review Board (IRB) of the University of Puerto Rico, Medical Sciences

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Perspectives on the Implementation of HPV Self-Collection in a Federally Qualified Health Center in Texas

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Objective: Cervical cancer screening remains suboptimal in the U.S. and is particularly low in persistent poverty areas such as the Rio Grande Valley (RGV) of Texas. Self-collection for human papillomavirus testing was recently approved by the FDA for use in healthcare settings, demonstrated effectiveness for increasing screening. Implementation in Federally Qualified Health Centers (FQHCs) presents an opportunity to increase screening in underserved populations. This study assessed perceptions on recent adoption of self-collection in one of the first FQHCs in the U.S. to adopt self-collection. **Methods:** We conducted 15 semi-structured interviews with Internal and Family Medicine providers and staff at the FQHC. Interview guides were informed by the Consolidated Framework for Implementation Research (CFIR) and aimed to capture perceptions during early implementation. Transcripts were coded and analyzed using CFIR. All survey instruments and research personnel have been approved by The University of Texas MD Anderson Institutional Review Board (Protocol 2024-0361). **Results:** Providers and staff were generally enthusiastic about self-collection as an option for cervical cancer screening and felt that it was simple to use and addressed common barriers of under-screened patients. It was perceived as being time saving for providers and compatible with clinical workflows. Barriers to implementation included provider misconceptions around eligibility criteria, reluctance to reduce referrals to Women's Health, cultural concerns around modesty, perceived patient preference for provider-performed screening, and hesitancy to recommend a relatively unknown test. Recommended implementation strategies included team huddles and raising awareness about self-collection in the broader community. **Conclusions:** During early implementation, there was simultaneous enthusiasm for self-collection as well as reservations about its use. These findings can inform broader roll-out of self-collection in FQHCs.

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Increase in Microvascular Complications After the COVID-19 Pandemic in Patients with Diabetes Mellitus in Puerto Rico: A Retrospective Cohort Study

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Background and Objectives: Diabetes Mellitus (DM) is a common comorbidity found in patients with COVID-19. The impact of the COVID-19 pandemic on the management of diabetic patients in PR hasn't been explored. This study aimed to assess differences in health metrics, pharmacotherapy and comorbidities pre- and post-COVID-19 pandemic among a sample of patients with DM in PR. **Methods:** We conducted a retrospective, record-based cohort study to evaluate the impact of the COVID-19 pandemic among 96 adult patients with DM evaluated at the outpatient Endocrinology clinics of the UPR-MSC. Information about demographics, medical history, medications, anthropometrics, complications, and laboratory results were extracted from medical records. Pre- and post-pandemic metrics related to diabetes care were evaluated according to the American Diabetes Association's Standards of Care in Diabetes. **Results:** Mean age of our population was 56 ± 14 years with the majority having T2DM (89%) with an average duration of DM of > 10 years. Most patients were female (81%). No significant changes were observed in A1c, fasting glucose, triglycerides, and LDL levels. There was a significant increase in the prevalence of microvascular complications such as neuropathy, retinopathy, and nephropathy post-pandemic. A significant increase in the prevalence of CKD stage 3 and above was also found. An increase in the use of SGLT-2 inhibitors was also observed. **Conclusions:** This study found an increase in microvascular complications among patients with DM in PR following the COVID-19 pandemic, despite no significant changes in glucose control. Our findings underscore the complexity of DM management and highlight the need to monitor microvascular complications in addition to maintaining adequate glucose control. Further research is needed to identify the factors that contributed to these adverse outcomes during the pandemic and to guide the development of strategies that can mitigate risks and prepare us for future public health crises. **Acknowledgements:** The authors have no conflict of interest to disclose. Approved by IRB (protocol 2309145673); approval date 11/14/2023.

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High Glucose-Induced Activation of Microglia: Insights into Neuroinflammation in Diabetes

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Introduction: Type 2 diabetes mellitus is a chronic metabolic disorder that not only disrupts glucose regulation but also increases the risk of neurodegenerative diseases such as Alzheimer's disease. Accumulating evidence suggests that chronic hyperglycemia can trigger neuroinflammation by activating microglia, the resident immune cells of the central nervous system. Excessive microglial activation can lead to the release of pro-inflammatory cytokines, oxidative stress, and neuronal dysfunction. **Methods:** To evaluate the effects of elevated glucose on microglial activation, human microglial HMC3 cells were cultured under normal and high-glucose conditions. Morphological changes were examined using light microscopy, while expression of inflammatory genes (tumor necrosis factor-alpha and interleukin-6) was quantified through quantitative polymerase chain reaction (qPCR). Cytokine secretion was evaluated using enzyme-linked immunosorbent assay (ELISA), oxidative stress levels were

assessed via Muse flow cytometry with a reactive oxygen species-sensitive fluorescent dye, and activation of the NF- κ B signaling pathway was analyzed through protein expression and nuclear translocation studies. **Results:** Exposure to high glucose caused pronounced morphological alterations in microglia, characterized by reduced branching and enlarged somas indicative of an activated phenotype. Elevated reactive oxygen species levels pointed to oxidative stress as a central mediator. Expression and secretion of tumor necrosis factor-alpha and interleukin-6 were upregulated, confirming an inflammatory response. Increased NF- κ B expression and nuclear translocation confirmed a mechanistic link between high glucose and microglial inflammatory signaling. **Conclusions:** These findings demonstrate that high glucose directly induces microglial activation through oxidative stress and NF- κ B-mediated pathways, contributing to the neuroinflammation observed in diabetes. This in vitro model characterizes the mechanisms linking hyperglycemia to neuroimmune activation and outlines potential therapeutic strategies to address diabetes-related neurodegeneration. Future work will extend these findings to animal models to assess translational relevance and therapeutic potential. IRB/IACUC Approval: Not applicable (in vitro study). **Acknowledgments:** The authors thank Dr. Yaritza Inostroza for mentorship and San Juan Bautista School of Medicine Research Program for research support.

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An Analysis of Hymen Type, Tanner Stage, and Menarche in Girls Receiving Treatment for Child Sexual Abuse at the Puerto Rico Health Justice Center

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Background and Objectives: Female pubertal development is a complex biological process marked by changes in external genitalia, hymenal morphology, Tanner staging, and onset of menarche. Although these developmental features are routinely assessed in clinical settings, misinformation and limited knowledge on the hymen, even among physicians, may lead to inconsistencies in exams. Girls who receive services related to child sexual abuse (CSA) often undergo comprehensive genital and pubertal evaluations, presenting a unique opportunity to understand developmental patterns. Additionally, exposure to trauma, including sexual abuse, has been linked to earlier onset of puberty and menarche, raising concerns about developmental outcomes. This study aims to describe key developmental and demographic characteristics in girls receiving treatment for CSA at the time of forensic medical examination. **Methods:** A cross-sectional chart review of 309 girls who received services for CSA at the Puerto Rico Health Justice Center between 2017 and 2023 was conducted. Approved by the IRB June 9, 2022 and renewed 2024. **Results:** The average age of participants was 9.97 years (sd 4.45), and the majority have a public health plan (77.99%). Most participants lived at home (88.35%) while others lived with a relative (2.27%) or in foster care (9.39%). The most frequently observed municipality of residence was San Juan (15.86%). The most common puberty progression was prepubescent (59.22%), Tanner stage I (45.95%), and premenarche (54.05%). The average age of menarche was 11.11 years (sd 1.32). The observed hymen types were narrow-border (41.10%), wide-border (36.89%), and other (22.01%). **Conclusions:** Further research should assess trauma-related developmental changes and strengthen consistency in genital examinations due to the high prevalence of CSA. **Acknowledgements:** This work is possible with the support of Karla Clavelo, Perla Elosegui, Luis Lastra, Mariangely López Serra, José Muñiz, Gabriela Rodriguez Bengochea, Andrea Rosa Vázquez, and Diego Torres.

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Delays in ILD Management Following Radiologic Evidence of Interstitial Lung Abnormalities

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Objective: To quantify the delay between radiologic evidence of interstitial lung abnormalities (ILA) and subsequent clinical diagnosis and management steps, including formal mention of interstitial lung disease (ILD), referral to an ILD specialty clinic, and antifibrotic therapy initiation. Additionally, to explore whether earlier recognition impacts patient outcomes. **Methods:** In this retrospective cohort study, 156 patients were reviewed at a tertiary academic ILD referral center who demonstrated CT findings consistent with ILA. Patient data were extracted from the electronic medical record, and chart review confirmed ILD-related documentation and interventions. Delays were calculated between initial ILA visibility and ILD mention, ILD clinic referral, lung transplant evaluation, and antifibrotic therapy initiation (nintedanib or pirfenidone). Exploratory analyses stratified patients by early (≤ 12 or ≤ 24 months) vs late ILD mention. Kaplan–Meier survival analysis and Cox proportional hazards models (adjusted for age, sex, smoking, and antifibrotic use) were performed. **Results:** Median time from ILA identification to ILD mention was 10.4 months (IQR 0.3–45.7). Subsequent delays included 36.7 months (IQR 4.8–65.2) to ILD clinic referral, 75.0 months (IQR 42.6–95.5) to lung transplant evaluation, and 102.5 months (IQR 52.4–148.3) and 54.6 months (IQR 35.0–83.3) to antifibrotic therapy initiation for nintedanib and pirfenidone, respectively. Exploratory analyses found no statistically significant survival differences between early and late ILD mention groups at 12-month ($p = 0.28$) or 24-month ($p = 0.32$) cutoffs. Cox regression models showed no significant association between delay to ILD mention and mortality (HR 1.00; 95% CI, 0.99–1.01; $p > 0.9$). **Conclusion:** Delays between ILA detection and ILD management represent missed opportunities for earlier diagnosis, risk stratification, and treatment, potentially affecting disease progression and patient quality of life. Greater emphasis in teachings and conferences, along with multidisciplinary care and AI-based tools, may enable more timely recognition and intervention. IRB Number: 17-22317.

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DNMT1 Inhibition Suppresses EMT-Driven Invasion and Migration in Docetaxel-Resistant Prostate Cancer

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Background and Objectives: Metastatic castration-resistant prostate cancer (mCRPC) carries poor prognosis due to androgen- and chemotherapy-resistance. Nearly half of patients develop resistance to docetaxel (DR), underscoring the need for new strategies. Aberrant DNA methylation contributes to drug resistance through gene silencing. This study examined whether DNMT1 inhibition via 5-Azacytidine (5-AZA) could attenuate crucial

process in epithelial-to-mesenchymal (EMT) such as invasion and migration of DR prostate cancer (PCa) cells. **Methods:** Parental and docetaxel-resistant PC3 cells were treated with 5-AZA (0.5–16 μ M, 72 h). Protein markers (AR, ARv7, MDR1, GSTP1, DNMT1) were assessed by Western blot; invasion and migration by Matrigel and wound-healing assays; and EMT markers (CDH1, SNAI2, VIM) by RT-PCR. **Results:** DNMT1 inhibition and GSTP1 re-expression were successfully achieved, confirming global DNA hypomethylation. Invasion of PC3-DR cells was reduced by ~90% versus untreated controls and by ~40% compared with 5-AZA-treated parental cells (1 μ M: $p < 0.0001$; 2 μ M: $p < 0.01$). Migration was also significantly suppressed in DR cells after 48h of exposure to 1 μ M and 2 μ M 5-AZA. EMT modulation included significant CDH1 upregulation (1 μ M: $p < 0.001$; 2 μ M: $p < 0.01$) in PC3-DR cells when compared to untreated cells. **Conclusions:** DNMT1 inhibition decreases invasion and migration of docetaxel-resistant PCa cells, mediated in part by EMT marker modulation. These findings support DNA methylation as a therapeutic target and provide rationale for epigenetic-based strategies in resistant mCRPC. **Acknowledgments:** Sponsored by U54 PHSU-MCC Grants: U54CA163071 & U54CA163068; NIH-NIMHD Grant MD007579, and NIH-NIGMS Grant U54GM133807.

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Maternal Complications and Outcomes by Type of Diabetes Mellitus in Pregnant Women in Puerto Rico: A Retrospective Study

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Background and Objectives: Diabetes Mellitus (DM) is a group of endocrine diseases associated with adverse health outcomes. In Puerto Rico (PR), DM is a major public health concern. A Centers for Disease Control and Prevention (CDC) report estimated a prevalence of 13.6% for 2017–2020 and more recent data identified PR as having the highest diabetes prevalence nationwide at 19.8%^{1–3}. DM during pregnancy increases the risk of complications for both mother and child^{4–7}. Pregnant women may have Type 1 (T1DM), Type 2 (T2DM), or Gestational Diabetes Mellitus (GDM), yet their impact on maternal outcomes in PR remains unclear. This study examines patterns in pregnancy complications across diabetes types, hypothesizing higher complication rates in pre-existing diabetes.

Methods: A retrospective analysis of preliminary data consisting of 60 birth records from 2024 (n=60) from the University District Hospital (UDH) of PR was conducted. Cases were categorized by diabetes type and variables were coded to capture maternal complications and outcomes. Approved by IRB on 9/10/24 (#2406247299).

Results: Across all groups, large for gestational age (LGA) and other pregnancy-related complications were the most frequent findings. In GDM, LGA (n=9) and “other complications” (n=6) predominated, while in T1DM, both LGA and “other complications” (n=9 each) were most common. T2DM cases showed similar patterns, with “other complications” (n=7) and LGA (n=5) leading. Delivery complications were relatively uncommon. When present, fetal distress, fetal malpresentation, and uterine dehiscence were observed across all diabetes types. **Conclusion:** Pregnancies complicated by diabetes at UDH demonstrated consistent patterns of maternal morbidity. LGA and postpartum hemorrhage were the most prevalent complications, with higher frequencies among women with T1DM. These preliminary findings highlight the need for early metabolic control, individualized prenatal surveillance, and coordinated obstetric management to mitigate adverse maternal outcomes among diabetic pregnancies in PR.

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Subclinical Glutarylcarnitine (C5DC) Elevation as a Potential Biomarker in Neurogenetic Risk in Puerto Rican Children

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Background & Objectives: Glutarylcarnitine (C5DC), a dicarboxylic acylcarnitine, is implicated in lysine and tryptophan metabolism, with elevated levels typically indicating glutaric acidemia type I (GA1). In Puerto Rico, a population with a high prevalence of rare genetic disorders, moderately elevated C5DC levels have been observed in children with neurodevelopmental symptoms who do not meet the diagnostic criteria for a GA1. This pattern raises the possibility that subclinical elevations of C5DC may reflect an underlying metabolic signature associated with broader neurogenetic risk. This study investigates a relationship between altered C5DC levels and neurogenetic phenotypes in Puerto Rican children undergoing genetic evaluation for unexplained developmental delay, hypotonia, seizures, or other neurologic features. **Methods:** We conducted a retrospective analysis of acylcarnitine profiles from 703 Puerto Rican pediatric patients evaluated between 2010 and 2022. From this cohort, 98 cases met eligibility criteria, presenting with unexplained neurodevelopmental features including developmental delay, hypotonia, and seizures. C5DC levels were measured via clinical laboratory tandem mass spectrometry and associated with clinical phenotypes, neuroimaging findings, and genetic data. **Results:** A LASSO linear regression identified seventeen phenotypes associated with C5DC levels, including structural brain abnormalities, motor deficits, and cranial morphology. The linear regression confirmed statistically significant associations ($p < 0.05$). A geographic clustering of cases was observed in the northern region of Puerto Rico, particularly in San Juan, Vega Baja, Orocovis, Carolina, and Bayamón. **Conclusion:** Our findings suggest that multiple phenotypes associated with subclinical elevations of C5DC may serve as an indicator of neurogenetic vulnerability in Puerto Rican children. This warrants further investigation into C5DC as a potential metabolic biomarker for inclusion in neurogenetic screening panels, especially within genetically isolated populations with known founder effects. Additional research is necessary to elucidate the mechanistic basis of this association and to assess its diagnostic utility. **Acknowledgments:** This work has been supported by RCMI Grant U54-MD007600 from the National Institute of Minority Health and Health Disparities (NIMHD), National Institutes of Health (NIH). Approval for this protocol was granted by the UPR-MSU Institutional Review Board (IRB #2305114422R002) in July 2025.

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Impact of Power Outages on Health Care for Adults with Chronic Diseases in Puerto Rico

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Background: Energy insecurity has been associated with multiple adverse health outcomes, including an increased risk of chronic diseases and barriers to accessing essential medical services. In Puerto Rico, frequent power outages, worsened by a deteriorated infrastructure and extreme weather events, might exacerbate differences in access to and continuity of medical care. **Objective:** This study aimed to explore how power outages impact health care of chronic diseases among adult residents of Puerto Rico. **Methodology:** This cross-sectional study included 250 adults over 21 years of age, recruited from ambulatory clinics of two healthcare facilities in the municipalities of Carolina and Loíza between June and August 2025. Structured interviews were used to collect sociodemographic and health status information, social determinants of health, and experiences related to power outages. Descriptive statistics were used to outline participants' characteristics, and bivariate analyses, using chi-square tests, were conducted to examine the associations between power outages and chronic disease status. (IRB number: 2504388152, 05/16/2025). **Results:** Most patients were women (66.8%), had post-secondary education (51.6%), participated in the Nutrition Assistance Program (62.4%), and had health insurance (97.2%). A majority (76.8%) reported at least one chronic condition. The most prevalent diseases were hypertension (59.2%), diabetes (32.4%), respiratory diseases (29.6%), renal disease (9.2%), cancer (8.4%), and mental health disorders (11.2%). Participants with chronic diseases reported worsened health conditions ($p = 0.0127$) and difficulty performing daily activities ($p = 0.041$) during periods of power outages. Reported outcomes associated with periods of power outages included discarding medications ($p = 0.0254$), food spoilage ($p = 0.0352$), missing school ($p < 0.001$), and temporary relocation ($p = 0.0046$). **Conclusion:** Preliminary data suggest a significant impact between energy insecurity experiences and chronic disease status. Addressing energy instability is essential to improving the management of chronic diseases and ensuring equitable access to health care, particularly in regions with frequent power disruptions. **Acknowledgements:** Supported by Endowed Health Services Research Center, Grants 5S21MD000242 and 5S21MD000138, National Center of Minority Health and Health Disparities, and National Institutes of Health.

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Long-Term Outcomes and Cost-Effectiveness of Advanced Technologies in Lumbar Spine Surgery: A Scoping Review

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Background: Robotic guidance, augmented reality (AR) systems, and emerging artificial intelligence (AI) tools have accelerated innovation in lumbar spine surgery. Although short-term improvements in screw placement accuracy, radiation exposure, and operative workflow have been reported, the long-term clinical benefits and economic value of these technologies remain uncertain. **Objective:** To synthesize current evidence on long-term outcomes and cost-effectiveness of robotic, AR, and AI-assisted lumbar spine surgery. **Methods:** A scoping review was performed following PRISMA-ScR guidelines. Searches of major databases were conducted from November 2020 to November 2025 using terms related to robotics, AR, AI, lumbar surgery and cost-effectiveness. Human studies reporting at least 12-month follow-up and/or economic outcomes were included. Extracted data were narratively summarized into clinical outcomes, economic analysis and technology-specific themes. **Results:** Twenty-five studies met the inclusion criteria. Robotic-assisted pedicle screw placement demonstrated higher

accuracy than freehand techniques, with ratios of 2.02–3.06 favoring robotics. In comparative cohorts, robotics reduced pedicle breaches (0.27% vs 1.75%) and blood loss (313.7mL vs 431.6mL). A meta-analysis found that robotics decreased hospital LOS by 2.67 days and reduced estimated blood loss compared with fluoroscopy-guided surgery. However, large database analyses from the National Inpatient Sample showed that robotic cases were associated with higher risks of postoperative anemia and transfusion and incurred greater hospital charges. AR case series reported screw placement accuracy of 93–100% and approximately 20% reductions in operative time. Economic evaluations suggested potential long-term savings related to shorter hospitalizations and reduced revision burden, yet cost-effectiveness remains highly dependent on case volume and institutional investment. **Conclusions:** Existing evidence supports procedural and short-term clinical advantages of robotics and AR in lumbar spine surgery, with promising but incompletely defined economic benefits. Long-term outcomes and cost-utility data remain limited, and AI technologies are still in early development. Ongoing multicenter prospective studies incorporating patient-reported outcomes and standardized economic metrics are essential to guide optimal implementation.

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Using Platelet-Rich Plasma and Bone Marrow Aspirate Concentrate Injectables to Conservatively Treat Partial ACL Injuries: A Narrative Review

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Background & Objectives: Anterior cruciate ligament (ACL) injuries are among the most common musculoskeletal injuries; they often determine the longevity of an athlete's career as well as long-term knee stability in both athletic and non-athletic populations. ACL injuries are commonly treated with surgical reconstruction, but the risks may outweigh the benefits when the ligament is only partially disrupted. Platelet-rich plasma (PRP) and bone marrow aspirate concentrate (BMAC) injectables are regenerative therapies that have demonstrated potential to enhance ligament healing by promoting tissue regeneration. The objective of this narrative review was to evaluate clinical and structural outcomes of PRP, BMAC, and combination PRP + BMAC therapy for conservatively managed partial ACL tears. We hypothesized that combined PRP + BMAC therapy would yield superior functional and structural outcomes compared with monotherapy. **Methods:** PubMed (National Library of Medicine) and SciLit databases were searched. A total of 26 studies were identified, of which 6 met the inclusion criteria: partial ACL tears, non-surgical treatment, use of BMAC and/or PRP, and patient age <65 years. Extracted data included patient demographics, functional scores (IKDC, Lysholm, LEFS), pain measures (VAS/NPS), and MRI signal changes. **Results:** PRP studies showed consistent short-term improvements in IKDC, Lysholm, VAS, and functional hop tests, with early but not always sustained benefit. BMAC demonstrated significant gains in tissue integrity as reflected by decreased MRI gray values and improved LEFS scores. Dual therapy of PRP + BMAC demonstrated complete MRI-confirmed ligament continuity, normalized KT-1000 arthrometer measurements, and significant improvements in pain and functional scores at multiple time points up to 36 months. **Conclusions:** Results suggest that the combination PRP + BMAC therapy is associated with a better structural and functional recovery in partial ACL tears compared to PRP and BMAC therapy alone. **Acknowledgements:** No external funding was received. Authors report no conflicts of interest.

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The Predicted Damaging Effects of *PLA2G4EL2* Gene Mutations on Eggshell Strength in *Amazona vittata*

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Background and Objectives: The Puerto Rican parrot, *Amazona vittata*, nearly went extinct due to habitat loss, with only 13 individuals remaining by 1975. This severe genetic bottleneck may have fixed deleterious alleles through drift, including those contributing to the eggshell weakness frequently reported by breeders. This study examines whether *PLA2G4EL2*, a bird-specific phospholipase involved in lipid remodeling and membrane dynamics, harbors functionally deleterious mutations that may underlie the observed eggshell weakness phenotype. **Methods:** The *PLA2G4EL2* gene was identified in the *A. vittata* genome, and its protein-coding sequence was compared with orthologs from other *Amazona* species. Special attention was given to amino acid changes within the calcium-dependent catalytic domain, with variant effects assessed using computational prediction tools. **Results:** Comparative sequence analysis revealed a unique missense mutation within the calcium-dependent catalytic domain of *A. vittata PLA2G4EL2* that was absent in other Amazon parrot species. Functional prediction algorithms classified the mutation as damaging, suggesting impaired catalytic activity. Because phospholipases play a central role in lipid composition and the organic matrix that supports eggshell mineralization, functional disruption of this enzyme could weaken structural integrity. **Conclusions:** *PLA2G4EL2* exhibits reduced evolutionary conservation among birds relative to other candidate genes and contains a lineage-specific, functionally damaging mutation in *A. vittata*. Based on its predicted effect on protein function and its biological role, *PLA2G4EL2* currently represents the only plausible genetic contributor identified thus far to the eggshell weakness observed in the Puerto Rican parrot. **Acknowledgements:** The authors thank the University of Puerto Rico at Mayagüez and Washington University in St. Louis for research support, and acknowledge the guidance of mentors and collaborators who contributed to this project.

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Association of Menopausal Status with High-Risk HPV Infection and Cervical Cytologic Abnormalities

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Background & Objectives: Cervical cancer remains a preventable yet persistent public health burden, with Puerto Rican women experiencing higher incidence than those on the U.S. mainland. Because most cervical cancers arise from high-risk human papillomavirus (HR-HPV), understanding factors associated with viral susceptibility is essential. Menopause introduces hormonal and immunologic changes that may influence HR-HPV susceptibility and related cytologic outcomes; however, these associations are not well characterized, particularly among Hispanic women. This study examined the association between menopausal status, HR-HPV positivity, and cervical cytologic abnormalities, including low-grade (LGSIL) and high-grade (HGSIL) squamous intraepithelial lesions. **Methods:** In this cross-sectional study, 166 women (82 menopausal; 84 non-menopausal) attending gynecologic clinics in San Juan, Puerto Rico completed a questionnaire and provided cervical swabs for HPV genotyping using SPF10-LiPA and cytologic evaluation. Associations between menopausal status, HR-HPV infection, and cytologic abnormalities were assessed using chi-square or Fisher's exact tests, with odds ratios and 95% confidence intervals calculated. Institutional Review Board approval (IRB #2290033153) and informed consent were obtained. **Results:** Overall HPV prevalence was high and similar between menopausal and non-menopausal women (64.6% vs. 65.5%). HR-HPV positivity was higher among menopausal women (57.9% vs. 46.2%), although this difference was not statistically significant ($p=0.195$). Cytologic abnormalities were significantly more frequent in non-menopausal women (26.2% vs. 12.2%), driven primarily by LGSIL, which was nearly three times more common in non-menopausal women (20.2% vs. 7.3%; OR 3.19; 95% CI 1.12–10.48). HGSIL was uncommon in both groups and did not differ significantly (6.0% vs. 4.9%; $p=1.000$). **Conclusions:** No association was observed between menopausal status and HR-HPV infection. However, non-menopausal women had significantly higher odds of LGSIL. These findings suggest that although HR-HPV infection is detected at similar proportions across menopausal groups, low-grade cytologic abnormalities are more frequently observed before menopause, highlighting the importance of age-specific cervical screening strategies. **Acknowledgements:** This research was funded by the Center for Collaborative Research in Minority Health and Health Disparities (RCMI) 2U54MD007600, NIH NIGMS programs Alliance U54MD007587, and PR-INBRE 5P20GM103475-17.

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Impact of Social Determinants of Health on Genetic Care Uptake in Lynch Syndrome Patients in Puerto Rico

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Background & Objectives: Lynch syndrome (LS) is the most common hereditary colorectal cancer (CRC) syndrome. However, it is often underdiagnosed due to several barriers in genetic evaluation associated with social determinants of health (SDoH). We hypothesized that factors such as education, income, access to care, and social support affect the decision to pursue genetic testing among individuals affected by LS or at increased risk. This study aims to evaluate how SDoH affect the uptake of genetic counseling and testing among participants of the PURIFICAR registry in Puerto Rico. Our research question asks: How do SDoH influence patients' knowledge, experiences, and

decision-making regarding genetic counseling and testing for LS in individuals already diagnosed and in their at-risk relatives? **Methods:** Participants were recruited through the PURIFICAR registry. After obtaining informed consent, participants completed a questionnaire by phone call assessing their knowledge and perceptions of LS, perceived barriers to testing, access to care, cost concerns, provider availability, and social support. All responses were recorded in REDCap. Recruitment is ongoing. For this preliminary analysis, descriptive statistics were generated for the first 31 participants, focusing on education, employment, and income. **Results:** Among the 31 participants, 83.9% reported ≥ 12 th-grade education. Most participants were employed (64.5%), with 85% of these working full-time. Reported household income was $\geq \$25,000$ in 74.2% of participants. **Conclusions:** Preliminary results show that most participants in our sample reported higher education levels, employment, and moderate household income. As data collection continues, we will be able to explore how these and other SDoH relate to patients' knowledge, experiences, and decisions about genetic testing. These findings will help guide the next phase of analysis and support future efforts to improve equity in genetic care. **Acknowledgments:** We thank the patients enrolled in the PURIFICAR registry for their time and contributions to this project, and we thank Olga Díaz from the UPR Comprehensive Cancer Center for assistance in data management and patient contact coordination. No external funding was received for this study. Approved by the UPR-MSC IRB (approval number: 2290034759) on 9/18/2025.

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Inflammatory Markers in Robotic Versus Conventional Total Knee Arthroplasty: A Scoping Review

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Background & Objectives: Total knee arthroplasty (TKA) is among the most common, cost-efficient, and successful orthopaedic surgery procedures worldwide. The annual volume of TKA is projected to reach 3.5 million by 2030, and a study found that TKAs are expected to increase by 69% by 2050 compared to 2012. The average hospital cost for a primary TKA is \$10,421, and \$11,906 for a revision TKA. A substantial increase in robotic TKA has been observed between 2018 and 2021, with an average annual increase rate of 85%. Advances in robotic-assisted (RA) TKA promise more precise implant placement and improved surgical outcomes compared to conventional (CM) TKA. However, it remains unclear how these different surgical approaches affect the body's inflammatory response, which is crucial for postoperative recovery and risk of complications. This scoping review explores and maps existing literature comparing inflammatory markers following robotic-assisted and conventional TKA, identifying gaps and opportunities for future research. **Methods:** A comprehensive literature search was performed using keywords such as "inflammatory markers," "inflammation," "conventional total knee arthroplasty," and "robotic total knee arthroplasty." Studies published in English or Spanish from 2000 onward were considered. Articles unrelated to the topic, lacking direct comparisons, or missing data on inflammatory markers, reviews, case reports, or commentaries were excluded. Data focused on comparative reported postoperative inflammatory

markers. **Results:** Four studies were included and analyzed, comparing inflammatory markers such as CRP, ESR, IL-6, and TNF- α after RA-TKA and CM-TKA. Most studies showed significantly lower CRP, ESR, and IL-6 levels in RA-TKA compared to CM-TKA. One study reported a significantly lower measurement of TNF- α in RA-TKA compared to CM-TKA. **Conclusions:** The findings suggest lower postoperative inflammatory marker levels in RA-TKA, indicating reduced surgical trauma, improved recovery, and potential for enhanced outcomes and fewer complications. **Acknowledgements:** None.

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CDCH Expression and Retrograde Nerve Labeling of *Biomphalaria*'s CNS, an Intermediate Snail Host for Human Schistosomiasis

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Background & Objectives: Schistosomiasis affects over 200 million people in tropical regions. The snail *Biomphalaria glabrata* is a key host for *Schistosoma mansoni*, the parasite causing the most common form of human schistosomiasis. Infected snails show reduced egg production, suggesting energy is redirected toward parasite development. The impact of parasitism on *Biomphalaria*'s reproductive physiology remains unclear. Understanding the localization of the reproductive caudodorsal cell hormone (CDCH) will enhance knowledge of host-parasite interactions. **Methods:** The methods utilized in this study include standard histological procedures, in situ hybridization, and immunohistochemistry to localize the reproductive hormone CDCH in the CNS of *Biomphalaria*. Retrograde nerve labeling of the visceral ganglia was performed to identify neurons involved in the function of the female reproductive system. Negative controls were included to confirm the integrity of the procedure. All protocols were approved by the UPS MSC IACUC (Protocol #3220119). **Results:** We found that most CDCH cells were clustered in the right and left cerebral ganglia, with fewer in the left parietal and visceral ganglia. Prominent CDCH-like immunoreactive fibers were observed in the cerebral commissure. Which is consistent with findings in other pulmonated snails, indicating CDCH is secreted into circulation to regulate reproductive behaviors. We found fiber expressions in the visceral ganglia. CDCH expression was detected in the periphery, particularly in female reproductive organs. Retrograde nerve labeling analysis revealed no colocalization of neurons involved in the control of the nerve going directly to the nidamental gland with CDCH protein. **Conclusions:** Future attempts will involve other nerves to further analyze CDCH action on the CNS and peripheral tissues. General findings indicate that CDCH regulates female reproduction in *Biomphalaria*. We found no colocalization with the retrograde nerve labeling performed; CDCH transport to the periphery might involve other ganglia. Future studies will investigate whether CDCH expression changes during *Schistosoma mansoni* infection. **Acknowledgments:** Supported by the National Institutes of Health: MD007600 (RCMI), P30GM149367 (COBRE); National Science Foundation: IOS-2217657 (OSIB), EES-1736019 (CREST), OISE-1545803 (PIRE), and DBI-1337284. Imaging support was provided by the UPR COBRE Center for Neuroplasticity, Neuroimaging and Electrophysiology Facility (NIEF).

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Sel1L-Hrd1 ER-Associated Degradation Complex as a Novel Therapeutic Target in Leukemia

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Background & Objectives: Acute lymphoblastic leukemia (ALL) is the most common malignancy in pediatric oncology. While survival rates have improved dramatically over the past several decades, more effective and less toxic therapies are still needed. In healthy cells, protein homeostasis is tightly regulated, and disruptions in protein production or degradation can contribute to oncogenesis. The Endoplasmic Reticulum-Associated Degradation (ERAD) pathway is a key quality control mechanism responsible for identifying and eliminating misfolded or unfolded proteins. Within this pathway, the Sel1L-HRD1 complex facilitates the ubiquitination and proteasomal degradation of these aberrant proteins. Dysregulation of the Sel1L-HRD1 complex has been implicated in supporting cancer growth, suggesting it may serve as a novel therapeutic target. CP26 is a small-molecule inhibitor that targets the HRD1 complex, inhibits ERAD, and induces ER stress. **Methods:** To assess the cytotoxic potential of CP26 in ALL, we generated CP26 dose-response curves for multiple B-cell and T-cell ALL cell lines in vitro. Cellular ATP content was quantified using the CellTiter-Glo Cell Viability Assay and a luminometer to calculate the half-maximal inhibitory concentration (IC₅₀) values for CP26. **Results:** Our findings demonstrate that ALL cell lines exhibit sensitivity to CP26, supporting further investigation of ERAD inhibition as a therapeutic strategy in ALL. **Conclusions:** Future studies will aim to determine if CP26 shows cytotoxicity towards healthy lymphocytes. **Acknowledgments:** This effort was supported by NIH grant NCI 5R25 CA200508-09 and the Cancer Research Educating and Training Experience.

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Silver-Doped Zinc Oxide Nanoparticles as a Novel Antimicrobial Platform Against *Salmonella typhimurium*

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The emergence of antibiotic-resistant foodborne pathogens poses a significant global health challenge. This study explores the development of silver-doped zinc oxide nanoparticles (Ag-ZnO NPs) as a novel antimicrobial platform targeting *Salmonella typhimurium*, a virulent and widespread cause of gastroenteritis. ZnO nanoparticles were synthesized via a controlled chemical precipitation method to ensure consistent morphology and size distribution. To enhance antimicrobial properties, the ZnO matrix was doped with silver ions (Ag⁺), leveraging the well-established biocidal effects of silver. A modified polyol synthesis route was also employed, incorporating polyvinylpyrrolidone (PVP) and glycol as capping and stabilizing agents. Characterization of the synthesized Ag-ZnO NPs was performed using ultraviolet-visible (UV-Vis) and Fourier-transform infrared (FTIR) spectroscopy. UV-Vis spectra revealed a surface plasmon resonance (SPR) peak at 364 nm, confirming the successful incorporation of Ag into the ZnO framework. FTIR analysis showed characteristic C=O stretching vibrations in the 1650–1750 cm⁻¹ range, attributed to PVP and glycol, indicating effective surface stabilization and enhanced colloidal stability. The dual presence of ZnO and Ag⁺ is hypothesized to produce a synergistic antimicrobial effect through membrane disruption and

oxidative stress mechanisms. The structural and optical data support the successful formation of a stabilized Ag-ZnO nanocomposite with potential enhanced antimicrobial activity. These findings suggest that Ag-ZnO NPs represent a promising material for applications in food safety and biomedical fields, particularly in addressing the growing threat of multidrug-resistant bacterial strains. **Acknowledgments:** This research was supported by PR-LSAMP (Award HRD-2008186).

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Design and Validation of a High-Throughput Screening Platform to Identify Compounds that Promote Healthspan in *Drosophila melanogaster*

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Human aging is closely linked to the decline of gut barrier integrity, a process that contributes to reduced healthspan and increased vulnerability to age-related dysfunction. Puerto Rico (PR), with an average population age of 65 compared to 77 in the United States, faces significant challenges in maintaining quality of life. Extending healthspan—the portion of life lived in good health—has become a major research priority, particularly through identifying natural compounds that help preserve physiological function during aging. *Drosophila melanogaster*, with its genetic similarity to humans, short lifespan, and well-characterized aging phenotypes, serves as an ideal model for studying gut barrier stability over time. The Smurf Assay (SA), which evaluates gut integrity by feeding flies blue dye, reliably detects gut barrier dysfunction, as flies that turn blue exhibit dye leakage and impending decline. We developed a high-throughput (HT) screening platform based on the SA to identify natural compounds that support gut barrier integrity and promote healthspan. The platform is being tested using Sod1ⁿ¹ heterozygote mutants, which exhibit reduced Sod1 activity and show accelerated aging phenotypes, including increased gut barrier vulnerability. The method involves feeding flies food infused with test compounds and blue dye, quantifying the “Smurf” phenotype after exposure, and analyzing outcomes via spectrophotometry. This scalable design enables rapid and reproducible compound screening. Preliminary results show that curcumin reduces gut barrier dysfunction, as treated flies exhibit less dye leakage than controls. Ongoing experiments are testing multiple concentrations of curcumin to refine its potential protective effects. Future work will expand the compound library to include additional natural products such as sesamin and resveratrol, as well as negative controls like allopurinol, to further validate platform performance. Using an automated HT screening approach, this project aims to identify natural compounds that preserve gut barrier integrity and promote healthspan, offering insights for aging research. Supported by NIH-ID GeNe Grant (1R25HG012702-01).

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POF1B, a Downstream Effector of PVT1 exon 9, Interacts with Androgen Receptor in Neuroendocrine Prostate Cancer

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Background & Objectives: Neuroendocrine prostate cancer (NEPC) is an aggressive and poorly understood subtype of prostate cancer that most commonly arises in later stages as a mechanism of treatment resistance. We have recently found that the long non-coding RNA Plasmacytoma Variant Translocation 1 (PVT1), located at the 8q24 locus, is overexpressed at the exon 9 region in a subset of NEPC cell models. Our most recent publication suggests that PVT1 exon 9 overexpression contributes to a reduction in androgen receptor (AR) expression and that the loss of PVT1 exon 9 re-sensitizes NEPC cells to enzalutamide, an androgen deprivation therapy. The underlying molecular mechanism by which PVT1 exon 9 contributes to AR suppression remains unclear. We recently observed that PVT1 exon 9 does not directly bind to AR, which suggests a mediating protein is likely contributing to AR downregulation in PVT1 exon 9 overexpressing NEPC cell models. Based on our most recent data, we hypothesize that POF1B directly mediates AR expression via PVT1 exon 9. **Methods:** To test this hypothesis, we employed Reverse Transcription quantitative Polymerase Chain Reaction (RT-qPCR), western blotting, immunofluorescence, RNA immunoprecipitation, and RNA pull-down assays to examine the interactions among PVT1 exon 9, POF1B, and AR. **Results:** We expect that PVT1 exon 9 overexpression alters POF1B expression, which in turn contributes to the suppression of AR. **Conclusions:** These findings provide new insight into the regulatory pathway of PVT1 exon 9, POF1B, and AR, offering potentially novel strategies for NEPC intervention. **Acknowledgements:** Supported by the Michigan State University Summer Research Opportunities Program (SROP) and Dr. Olorunseun Ogunwobi's laboratory.

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***Klebsiella pneumoniae* as an Etiological Factor of Bovine Mastitis in Puerto Rico**

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Background and Objectives: *Klebsiella pneumoniae* is a gram-negative, lactose-fermenting, facultative anaerobic, rod-shaped bacteria, known for being a common etiological factor of clinical and subclinical mastitis in the mainland. A previous pilot study conducted at a college farm in USA, demonstrated that *K. pneumoniae* was one of the most prevalent pathogens causing mastitis at that location. Correct and fast identification of the bacteria causing mastitis is essential for successful treatment of the animal. Mastitis is responsible for approximately 20 million dollars loss annually in the dairy industry because it presents impaired milk production and quality. The objective of this study was to develop a test for the identification of *Klebsiella Pneumoniae* in milk samples from cows suspected of mastitis in the south-western region of Puerto Rico, to determine its prevalence and provide targeted treatment for this condition by using microbiology and molecular biology techniques. **Methods:** For this, milk samples were collected from 48 cows with suspected mastitis and diagnosed using the CMT and portaSCC assays. Samples were inoculated in MacConkey agar at 37° for 24-48 hours, followed by biochemical testing, including oxidase, catalase, urease, pyrase and coagulase assays. Genetic identification was performed by using PCR analysis targeting the 16s rRNA gene. Results are immediately communicated to the farmer to customize animal treatment. **Results and Conclusions:** Preliminary data suggests that 2 of 19 cows with mastitis are infected with *K. pneumoniae*, which indicates a low prevalence (11%) of the bacteria in the herd. In addition, we tested antibiotic resistance of our isolates which demonstrate characteristic responses for these bacteria. This study was approved by IACUC #2023.12. **Funding acknowledgement:** This study was supported by a grant from NIH awarded to Juliana Pérez-Laspiur, PhD, Director of The Molecular and Cellular Biology Laboratory, UPR Aguadilla, PR (Grant No. 1R15HD109919-01).

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Neuroinflammation in Caribbean Hispanic Alzheimer's Disease Patients: Plasma Cytokines as Early Risk Biomarkers

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Background & Objectives: Alzheimer's disease (AD), the leading cause of dementia, is a progressive neurodegenerative disorder that impairs memory and daily functioning. In the Caribbean, AD ranks among the top ten causes of death—4th in Puerto Rico, 6th in Cuba, and 8th in the Dominican Republic. In Puerto Rico alone, 49,734 residents were diagnosed between 2008 and 2024, and individuals aged ≥ 60 are projected to comprise nearly 40% of the population by 2050. Because AD pathology may develop decades before clinical onset, identifying minimally invasive biomarkers for early detection is critical. This study aims to identify plasma cytokine signatures associated with chronic low-grade neuroinflammation in Hispanic Caribbean AD patients. Neuroinflammation, driven by senescent microglia that release pro-inflammatory cytokines while failing to clear misfolded amyloid- β ($a\beta$) and hyperphosphorylated tau, is central to AD progression. We hypothesized that patients at risk of AD exhibit a distinct plasma cytokine profile compared to cardiovascular disease (CVD) patients and controls (NDC). **Methods:** 152 plasma samples were collected from AD ($n = 50$), CVD ($n = 50$), and NDC ($n = 52$) participants aged 40-84 years. Forty inflammatory mediators were quantified using a multiplex sandwich ELISA array. Statistical analyses included Kruskal–Wallis tests, with $p < 0.05$ and false discovery rate (FDR) < 0.01 considered significant. **Results:** Several cytokines demonstrated significant group differences, including IL-1 α , IL-3, IL-10, IL-16, IFN- γ , TNF- α , and MCP-2. Pro-inflammatory cytokines were elevated in AD compared to NDC, whereas anti-inflammatory cytokines were higher in CVD than in AD or NDC. IFN and TNF family cytokines followed the pattern CVD $>$ AD $>$ NDC. **Conclusions:** Distinct cytokine expression patterns suggest that circulating inflammatory mediators may serve as potential biomarkers for early AD detection in Caribbean Hispanics. Larger studies are needed to validate these findings and inform biomarker assay development. **Acknowledgements:** This research was approved by IRB (#2309147363) on: 11/16/2025.

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Early Physical Therapy as a Protective Factor for 30-Day Readmission After Total Knee Arthroplasty in Puerto Rico: Real-World Evidence

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Background and Objectives: Hospital readmissions after total knee arthroplasty (TKA) increase healthcare costs and may signal gaps in postoperative recovery. Identifying modifiable predictors of readmission can guide improved care coordination and rehabilitation planning. This study evaluated clinical and system-level factors associated

with 30-day readmission following TKA in Puerto Rico using a population-based dataset of de-identified healthcare claims. We hypothesized that earlier initiation of physical therapy (PT) would be associated with lower readmission risk after adjusting for comorbidities and demographics. **Methods:** We performed a retrospective cohort study using de-identified medical and pharmacy claims (2018–2024) maintained by FARO LLC, including insured adult patients in PR who underwent TKA. Logistic regression models assessed associations between 30-day readmission and diabetes, obesity, depression, age, gender, and initiation of PT within 30 or 60 days post-surgery. Variables were retained through stepwise selection. Adjusted odds ratios (aORs) and 95% confidence intervals (CIs) were calculated. The study met criteria for Exempt Category 4 under 45 CFR 46.104(d)(4). **Results:** Among TKA patients, 11% initiated PT within 30 days, 87% received opioids post-surgery. In the final model (Nagelkerke $R^2 = 0.013$), only early PT and age were independent predictors of 30-day readmission. Early PT was associated with a 51% reduction in readmission odds (aOR 0.49; 95% CI 0.30–0.78; $p = 0.003$), while each additional year of age increased odds by 3% (aOR 1.03; 95% CI 1.01–1.05; $p < 0.001$). Diabetes, obesity, depression, gender, and PT within 60 days were not significant. **Conclusion:** Early PT within 30 days is associated with lower readmission after TKA in PR, identifying an opportunity for quality improvement and recovery optimization. Although model performance was modest, the findings reinforce the clinical and policy relevance of timely rehabilitation. Future work should incorporate functional outcomes, inpatient rehabilitation measures, and social determinants to improve predictive accuracy. **Acknowledgments:** Data analysis conducted within FARO LLC's HIPAA-compliant analytic environment. The study used de-identified administrative claims and did not require patient consent.

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Amino Acids Fuel Mitochondrial Energy Metabolism in the Mouse Hippocampus During Running Exercise

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Introduction: Exercise enhances neuronal energy metabolism and promotes hippocampal plasticity, yet the mechanisms remain unclear. The hippocampus, essential for learning and memory, has high energy demands reliant on mitochondria. While glucose and fatty acids are main substrates, amino acids can also fuel mitochondrial metabolism through their conversion into acetyl-CoA, succinyl-CoA, and other TCA cycle intermediates. However, their contribution to hippocampal energy metabolism during exercise remains poorly defined. **Methods:** Male C57BL/6J mice (20 weeks old) were assigned to sedentary or running groups, with RUN mice performing voluntary wheel exercise for 8 weeks. Approved by IACUC (# A660121, 10/21/25). Hippocampal metabolites were profiled using GC-MS, followed by univariate, multivariate, and pathway enrichment analyses in MetaboAnalyst 6.0. **Results:** Voluntary running significantly enriched CoA biosynthesis, the TCA cycle, and oxidative phosphorylation (OXPHOS) pathways, indicating enhanced mitochondrial metabolism. The branched-chain amino acids isoleucine and valine increased, providing carbon skeletons for acetyl-CoA and succinyl-CoA formation, while leucine remained unchanged. In parallel, methionine, threonine, and valine degradation predicted elevation of propionyl-CoA, reinforcing TCA flux. Pathway enrichment analysis revealed significant activation of CoA biosynthesis (enrichment

ratio - ER = 4.2, $p < 0.01$), the TCA cycle (ER = 3.9, $p < 0.01$), and OXPHOS (ER = 3.4, $p < 0.05$), underscoring a coordinated mitochondrial response to exercise. Multivariate analysis showed strong group discrimination between sedentary and running mice ($R^2Y = 0.98$, $Q^2 = 0.952$, $p < 0.001$), explaining 80.7% of total variance. **Discussion:** These findings reveal that voluntary running promotes amino acid-derived fueling of the TCA cycle, strengthening mitochondrial energy output in the hippocampus. Enhanced integration of acetyl-CoA and succinyl-CoA supports neuronal differentiation, synaptic remodeling, and overall cognitive function. **Conclusion:** Amino acid catabolism emerges as a key driver of exercise-induced metabolic plasticity in the hippocampus, coupling nutrient utilization to neural energy demands. **Acknowledgement:** Supported by PRINBRE P20 GM103475.

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Prevalence of Sarcopenia and Osteopenia in Older Veterans in Puerto Rico: Association with Functional and Clinical Assessment (Exercise Physiology/Whole Body Composition)

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Background: Puerto Rico is experiencing one of the fastest aging demographics shifts in the world, underscoring the importance of investigating age-related musculoskeletal disorders such as sarcopenia, osteopenia, and osteoporosis, for which local data are critically limited. These conditions substantially contribute to functional decline, falls, fractures, and mortality in older adults. This represents a novel and highly needed line of investigation in Puerto Rican Veterans, particularly given dietary and lifestyle customs that influence musculoskeletal health.

Objective: The study aims to determine the prevalence of sarcopenia, osteopenia, and osteoporosis among older Puerto Rican Veterans, and to examine their interrelationships and associations with serum biomarkers, SARC-F performance, and dietary calcium intake. **Methods:** This descriptive cross-sectional study recruited 63 Puerto Rican

Veterans aged ≥ 65 years from the VA Hospital in San Juan. Participants underwent a clinical evaluation that included anthropometrics, gait speed, grip strength, SARC-F, and Food Frequency questionnaires. Phlebotomy was used to measure serum vitamin D and calcium, while DXA quantified bone mineral density and appendicular lean mass. Sarcopenia classification was based on muscle strength, functional performance, and DXA-derived muscle mass, and osteopenia and osteoporosis were defined using standard DXA T-scores. **Results:** Sarcopenia affected 34% of participants, osteopenia 56%, osteoporosis 13%, and normal bone density 29%. Most were men (98%), allowing examination of these conditions, which are less frequently studied in this population. Participants with sarcopenia had slower gait speed, while those without sarcopenia more often presented with osteopenia. Average BMI was 28.9, and mean vitamin D was 35.1 ng/mL (32% below normal <30 ng/mL). **Conclusion:** These findings underscore the public-health relevance of musculoskeletal decline among older Puerto Rican Veterans and highlight the need for further characterization of sarcopenia and osteopenia patterns in Puerto Rico. Future work will focus on algorithm development aimed at improving early identification and rehabilitation intervention planning. **Acknowledgments:** This material is the result of work supported with resources and the use of facilities at the VA Caribbean Healthcare System. Disclaimer: The contents of this Abstract do not represent the views of the VA Caribbean Healthcare System, the Department of Veterans Affairs or the United States Government. Approved by IRB on 3/8/2017.

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Slowpoke Potassium Channel Regulates Alcohol-Tolerance Acquisition in *Drosophila Melanogaster* Through the Ventrolateral Neurons

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Background and Objectives: Alcohol has been identified as the most abused substance. Unrestrained alcohol consumption can have detrimental effect on neurological, psychological, and behavioral processes which can alter the homeostatic balance of the body and create psychological dependence of the substance. Furthermore, the conservation of the body's circadian rhythms, such as sleep, become affected as alcohol consumption rises. However, the molecular mechanisms controlling gene expression and neuroadaptations that regulate alcohol-induced behaviors and tolerance are not fully understood. This study focuses on determining the role the voltage gated potassium channel Slowpoke (slo) gene has in alcohol-induced tolerance. **Methods:** Utilizing a *Drosophila* model, the aim of the study focuses on neuronal populations involved in the regulation of alcohol tolerance. The UAS-GAL4 gene manipulation system was employed along with an RNAi targeting sequence (UAS-slo-RNAi) to knock down slo gene expression under different neuronal drivers: pdf-GAL4, which targets the lateral ventral neurons (LNv) responsible for the production and release of the neurotransmitter Pigment-Dispersing Factor (PDF), and elav-GAL4, a pan-neuronal driver expressed throughout the nervous system. Age-equivalent adult female flies were used to measure the outcome of this genetic manipulation by utilizing activity monitors in quantitative assessment of the effect it has on alcohol-induced tolerance. **Results:** Slo gene knockdown in *Drosophila* using both pdf-GAL4 and elav-GAL4 drivers resulted in a reduction of alcohol tolerance. We found that pdf-GAL4/UAS-slo-RNAi flies showed a significant difference in alcohol sensitivity compared to the control group. In contrast, elav-GAL4/UAS-slo-RNAi did not show a significant difference in alcohol sensitivity compared to controls, indicating that pan-neuronal Slo knockdown does not alter alcohol sensitivity. **Conclusion:** Results suggest that the Slo gene is involved alcohol-induced behavior regulation and the development of alcohol tolerance. Results shown in this study can advance and innovate beneficial targets for therapeutic treatment in alcohol-induced behaviors.

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PFOA-Induced Survival Loss and Oxidative Stress in *Drosophila melanogaster*: A Sex-Dependent Toxicity Study

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Background & Objectives: Per- and polyfluoroalkyl substances (PFAS) are persistent environmental pollutants known for their stability, bioaccumulative properties, and well-documented toxicity in mammalian systems. Invertebrate models, particularly *Drosophila melanogaster*, provide a robust and well-characterized system for examining PFAS-induced molecular and cellular disruptions. Because *Drosophila melanogaster* allows the assessment of DNA-level damage and conserved stress pathways, it offers meaningful insight into neurotoxic mechanisms that may also occur in the human brain. **Methods:** This study evaluates the chronic effects of Perfluorooctanoic Acid (PFOA) at concentrations of 100 nM, 10 µM, 100 µM, and 300 µM in *Drosophila melanogaster* through a comprehensive framework that incorporates survival analysis and oxidative stress indicators. **Results:** Adult male and female flies were exposed to each concentration and monitored every seven days, generating chronic Kaplan-Meier survival curves that revealed a sex-dependent response, with females exhibiting higher resistance than males. Survival assays were completed to evaluate PFAS-induced mortality patterns in *Drosophila melanogaster*, while molecular assays, including catalase activity, TBARS for lipid peroxidation, DCFDA-based ROS quantification, and ELISA for oxidative DNA/RNA damage, are currently in progress. **Conclusions:** Together, the survival data provide one of the first invertebrate-based assessments linking PFAS exposure to sex-dependent differences in mortality, and the ongoing molecular work will further elucidate oxidative imbalance and potential neurotoxic effects. These efforts aim to strengthen the use of *Drosophila melanogaster* as a valuable model for environmental risk assessment. **Acknowledgements:** Alek J. Garced Díaz, Derek Santos Díaz, Luis A. González Ayala, Loyda B. Méndez, PhD.

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Exploring the Association Between Sleep Duration, Mental Health, Social Media Use and Videogame Time: A Secondary Analysis

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Background & Objectives: Extensive literature illustrates the positive effects of good sleep habits on individuals' life, ranging from better cognitive functioning to good mental health. Given its crucial role in brain and body development, sleep research is relevant for college students, who often sacrifice sleep to meet academic demands or for entertainment purposes. This study evaluated the relationship between sleep, mental health, social media (SM), and videogame (VG) use among college students in Puerto Rico. **Methods:** Approved by the IRB of the UPR, Río Piedras Campus (protocol #2022-084). Data regarding sleep duration, depression, anxiety,

stress, SM, and VG use were collected through a cross-sectional survey using non-probabilistic convenience sampling ($n = 887$, Female = 74.18%). A Spearman correlation analysis was conducted to establish associations between variables, applying a Benjamini–Hochberg correction. **Results:** The results revealed that sleep duration had a small significant negative association with depression ($r = -.24$, 95% CI $[-.31, -.16]$, $p < .001$), anxiety ($r = -.21$, 95% CI $[-.29, -.13]$, $p < .001$), and stress ($r = -.18$, 95% CI $[-.26, -.10]$, $p < .001$). Additionally, significant positive correlations were observed between SM use and depression ($r = .15$, 95% CI $[.07, .23]$, $p < .001$), anxiety ($r = .15$, 95% CI $[.06, .23]$, $p < .001$), and stress ($r = .11$, 95% CI $[.03, .19]$, $p = .014$). VG time, however, was not significantly correlated with any of the variables. **Conclusions:** These findings suggest that the mental health of Puerto Rican college students is related to the amount of time they dedicate to sleep. Also, excessive SM use could be associated with maladaptive behaviors related to higher levels of psychological distress. **Acknowledgments:** None.

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Maternal Respiratory Syncytial Virus Vaccination During Pregnancy

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Background and Objectives: The respiratory syncytial virus (RSV) is the most significant viral pathogen causing bronchiolitis and pneumonia in infants. The Centers for Disease Control recommends the RSV vaccine during weeks 32 through 36 of pregnancy, from September through January, to protect babies from severe RSV disease. Low maternal vaccination rates compromise maternal health, leave the neonate unprotected, and increase the risk for outbreaks and hospitalizations. This study aims to assess current RSV vaccination practices among women with high-risk pregnancies. **Methods:** This is a descriptive, cross-sectional study of non-adolescent Hispanic mothers whose newborns are admitted to the University Pediatric Hospital Neonatal Intensive Care Unit in San Juan, Puerto Rico, from October 1, 2024, to June 30, 2026. We anticipate that 400 mothers will participate. The survey instrument was designed specifically for this study and consisted of six questions. **Results:** We interviewed 71 participants with a median age of 28 years (range, 24-41 years). Sixty percent were unaware of RSV infection. Only 15% of those referred have been oriented by their obstetricians about the virus. In 80% of cases, immunization was not offered during the current pregnancy. Only 11.3% of the participants received RSV immunization during pregnancy. The immunizations were administered between 26 and 37 weeks of gestation, with a mean of 30.7 weeks. Those to whom the obstetrician did not offer the vaccine did not receive it elsewhere ($p < 0.01$). **Conclusion:** The preliminary findings indicate that the recommendations for RSV vaccination during pregnancy are not being followed as intended. This study supports the critical role of the obstetrician in promoting immunization. Health disparities, a lack of knowledge among primary care physicians about recommendations, public misinformation, vaccination reluctance, and limited access to vaccines may be barriers to achieving the goal of appropriate maternal immunization during the RSV season. IRB Approved: Protocol No. 2508467586 (09/01/2025).

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Discovery and Development of Anxiolytic Agents from Tropical Marine Algae using *Drosophila melanogaster* as a Behavioral Model

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Background & Objectives: Reports from the World Health Organization and the National Institute of Mental Health (NIMH) establishes that, one third of the population is affected by anxiety disorders. Standard treatment includes benzodiazepines and antidepressants, which can lead to tolerance and dependence. Natural products (NP) from tropical marine algae, offers promising treatment alternatives due to their bioactive metabolites with neuroprotective properties. Our research focuses on studying the anxiolytic effects of NP derived from tropical marine algae, specifically *Stypopodium zonale*, using *Drosophila melanogaster* as a model organism. We aim to chemically characterize algae extracts, conduct anxiety-related behavioral tests, and propose a mechanism of action underlying the observed anxiolytic effects. **Methods:** *Drosophila* was exposed to algae extracts through chronic and acute treatments. Following exposure, anxiety-like behavior was assessed using Open-Field (OFT) and Dark-Light Box (DLB) tests. Rapid Iterative Negative Geotaxis (RING) assays were performed as a counter-assay to confirm that the algae extracts do not affect locomotor activity. **Results:** Recent data confirms that marine algae *S. zonale*, shows anxiolytic effects similar to diazepam, a benzodiazepine used as positive control. Statistically significant anxiolytic effects were also obtained for *Dictyota cervicornis* and *Padina boergesenii*, although no anxiolytic effects were observed for *Lobophora variegata*, *Ulva*, *Symploca*, and *Sargassum* sp. species. **Conclusions:** Our research represents an unprecedented approach to anxiolytic drug discovery as it improves our understanding of Puerto Rico's marine algae and their natural product's chemo-diversity. **Acknowledgements:** This research has been funded by the Puerto Rico Science, Technology, and Research Trust (CATALYZER Grant), The Interdisciplinary Research Institute at UPR Cayey, PR-LSAMP, and U-Rise, and PR-INBRE.

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Levels of Vitamin D in Chronic Spinal Cord Injury Veterans Residing in Puerto Rico

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Background and Objectives: Vitamin D plays a crucial role in bone health and muscle function. Concentrations above 30 ng/mL are considered sufficient, while levels below 20 ng/mL indicate deficiency. Deficient vitamin D increases the risk of fractures, osteoporosis and muscle weakness. Individuals with spinal cord injuries are at high risk due to factors such as immobilization and reduced sunlight exposure. This study aims to determine the prevalence of vitamin D deficiency in Veterans residing in Puerto Rico with chronic spinal cord injury and explore relationships between patient demographics. **Methods:** The research plan will be performed at the VA Caribbean Healthcare System, Spinal Cord Injury Service including female and male Veterans residing in Puerto Rico with paraplegia or quadriplegia, aged 21-89 years, and mentally competent. Exclusion criteria included pregnancy/

breastfeeding, ages under 21 or older than 89, not treated at SCI, multiple sclerosis, and mentally incompetent. Participants will be obtaining informed consent, a questionnaire and blood sample collection. Researchers will obtain data such as demographics, medical history, and intake of vitamin D. **Results:** The study included 87 subjects: 51 paraplegic and 36 tetraplegic. The average vitamin D level was 36.39 ng/mL, with 34.2 ng/mL in paraplegic patients and 39.5 ng/mL for tetraplegic patients. The overall age was 70.85 years, with paraplegic patients averaging 71.21 years and tetraplegic patients averaging 70.33 years. **Conclusions:** Paraplegic and tetraplegic groups demonstrated borderline vitamin D levels from normal to low. Paraplegic patients were older and represented a larger sample, while tetraplegic patients were fewer and younger. Factors like diet and sunlight exposure may have influenced the results. Overall findings suggest that vitamin D insufficiency appears prevalent among Veterans with spinal cord injury residing in Puerto Rico despite its tropical climate. **Acknowledgements:** This Research was supported with resources and the use of facilities at the VA Caribbean Healthcare System and the Spinal Cord Injury Department. The contents of this Presentation do not represent the views of the VA Caribbean Healthcare System, the Department of Veteran Affairs of the United States Government. Approved by IRB or IACUC (approval number: 00813 and approval date: 12/14/2018).

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**Synthesis, Characterization, Docking Studies,
and Anti-Proliferative Activity of Ferrocene-based Compounds
in MCF-7 Breast Cancer Cell Line**

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Breast cancer is the second type of cancer with the highest incidence among women in the United States, according to the American Cancer Society. The over-expression of the Estrogen Receptor alpha (ERa) is the most prevalent cause for the development and proliferation of these abnormal cells. Metal-based therapeutic drugs (e.g. cisplatin and its derivatives) have been employed to effectively curb the growth of these malignant cells. However, cisplatin-based drugs pose a detrimental risk to healthy cells, thus resulting in adverse side effects due to its lack of specificity. In 1984, based on the research of Kopf-Maier and colleagues, a new compound with enhanced biological activity as anti-cancer named ferrocenium was reported. This organometallic compound generates a reactive oxygen species (ROS), endowing it with cytotoxic effects over the abnormal cells that can lead to the oxidative damage of DNA and induce cell apoptosis. Our research group has recently successfully incorporated ferrocene at estrogen's ring A and D. These ferrocene-hormone complexes proved to have cytotoxic activity similar to conventional therapeutic agents, such as cisplatin and tamoxifen. To precisely target breast cancer cells, we developed two compounds based on a previously synthesized complex in which ferrocene served as the pendant group attached to a series of estrogens. On this basis, we synthesized our first compound, 3-ferrocenyl-estra-1,3,5(10),7-tetraene-17-one, using fluorocarbonylferrocene and estrogen as starting material. With this previously

synthesized compound as starting material aside with NaBH₄ and EtOH for the reaction mixture, we successfully obtained the second product 3-ferrocenyl-estra-1,3,5(10), 7-tetraene-17b-ol. These compounds were characterized using Nuclear Magnetic Resonance (NMR), Infrared spectroscopy (IR), and X-Ray Diffraction (XRD). Computational docking studies were utilized to explore and comprehend the interactions between the ER and the ferrocene-hormone complexes. MTT assays were performed to investigate the anti-proliferative effects of these synthesized ferrocene-based compounds on hormone-dependent MCF-7 breast cancer cells. **Acknowledgements:** This work was made possible through the support of the Research Opportunity for Undergraduate Students in STEM (NSF HRD-2008186). Appreciation is extended to Dra. Mariola M. Flores Rivera (Bridge to the Doctorate Program, NSF HRD-1826558), Dr. Enrique Meléndez, Dr. José A. Carmona-Negrón, and Dr. Dalice Piñero Cruz for their valuable guidance and contributions. Moreover, the Single Crystal X-Ray Diffraction Instrument used in this study was acquired with funding from the National Science Foundation under the Major Research Instrumentation Award CHE-1626103.

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Immune Bridges Between Alzheimer's, SLE, and Type 1 Diabetes Through Gene Expression Analysis

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Background & Objectives: Alzheimer's disease (AD) is traditionally characterized as a neurodegenerative disorder; however, its origin is not completely understood. Growing evidence indicates that immune dysregulation may play a significant role in its pathogenesis. Autoimmune conditions such as systemic lupus erythematosus (SLE) and Type 1 diabetes (T1D) exhibit chronic inflammation and aberrant immune activation, which may overlap with neurodegenerative mechanisms observed in AD. We hypothesized that AD, SLE, and T1D share common molecular signatures involving immune signaling and protein regulation. Thus, their similarity can provide insight into the etiology of the disease. This study aimed to identify shared differentially expressed genes (DEGs) that could explain autoimmune-like molecular patterns in AD. **Methods:** Gene expression datasets for AD, SLE, and T1D were retrieved from the Gene Expression Omnibus (GEO) and analyzed using Multiple criteria optimization (MCO). Overlapping DEGs were identified and subsequently examined through STRING and Reactome to characterize protein-protein interactions and pathway enrichment. **Results:** Preliminary analyses revealed six shared DEGs across AD, SLE, and T1D datasets—RPS4X, FAU, UBB, KLRB1, HLA, and DEFA3. These genes are associated with immune activation, ribosomal stress, and ubiquitination processes, which are commonly dysregulated in both autoimmune and neurodegenerative conditions. **Conclusions:** Our findings suggest that AD shares autoimmune-related molecular features with SLE and T1D, supporting the hypothesis that chronic immune activation may contribute to AD-associated neuroinflammation. Further analyses, including HERC5, are ongoing to elucidate additional immune-mediated mechanisms involved in AD pathology. **Acknowledgements:** Conducted by the AOG, UPRM.

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Evaluating the Effects of Different Concentrations of the Probiotic *Lactiplantibacillus plantarum* on the Locomotion of Young and Old *Drosophila*

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Aging is characterized by a gradual decline in tissue functionality and is considered the main risk factor for chronic diseases such as cardiovascular, neurodegenerative, and metabolic disorders. At the molecular level, aging involves changes in multiple pathways, including alterations in gut microbiota composition that often lead to dysbiosis. This raises an important question: can probiotics support healthier aging? Probiotics, defined by the World Health Organization as live microorganisms that confer health benefits when administered in adequate amounts, can modulate metabolism, immunity, and even brain function, although many mechanisms remain unclear. Among them, *Lactiplantibacillus plantarum* has emerged as a promising candidate due to its natural presence in fermented foods and the gastrointestinal tract. Previous studies in animal models have linked it to improvements in memory, locomotion, and lifespan. To investigate the impact of probiotic supplementation on aging, we used *Drosophila melanogaster*, a model with a short lifespan, genetic tractability, and well-characterized age-related phenotypes such as reduced locomotion. We evaluated the effects of *L. plantarum* strains LpWF and Lp39 at three concentrations (10^8 , 10^9 , and 10^{10} CFU/mL) on the climbing ability of young (15-day-old) and aged (35-day-old) flies at 3 and 24 hours post-treatment. This design allowed direct comparisons across ages, strains, and doses. Preliminary results show that supplementation does not significantly affect locomotion in young flies, whereas in aged flies, Lp39 at all doses and LpWF at 10^{10} CFU/mL appear to negatively impact climbing ability at 24 hours. These findings suggest that probiotic effects are age-dependent. Additionally, unexpected differences in the control group indicate that the vehicle (5% sucrose) may influence locomotion and should be reconsidered. Future experiments will explore different genetic backgrounds, long-term effects of supplementation, early-life exposure, and dosage-dependent responses to better inform microbiome-based strategies for promoting healthy aging.

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Antimicrobial Screening of Fire Ant-Associated Actinobacteria

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Background & Objectives: Actinobacteria are Gram-positive bacteria known for producing a wide range of secondary metabolites with antimicrobial and antifungal properties which are crucial for pharmaceutical and biotechnological applications. Symbiotic actinobacteria associated with invertebrates have recently gained attention due to their role in host defense against pathogens. We hypothesized that Actinobacteria isolated from fire ants (*Solenopsis invicta*) would exhibit antimicrobial activity against selected microorganisms. **Methods:** To achieve this, ten bacterial isolates were obtained from *S. invicta* ants collected along the coastal area in Cabo Rojo, Puerto Rico.

Actinobacteria were isolated from whole fire ant workers and plated in ISP2 medium under enrichment conditions to favor the selective growth of Actinobacteria. These isolates would be tested in confrontation assays against the opportunistic fungus *Penicillium* sp., known to cause respiratory diseases in humans and other infections. Inhibition zones measurement will be performed using ImageJ once the confrontation assays are completed to verify and compare the antimicrobial strength between the isolates. **Results:** Confrontation assays are still in progress. Preliminary screening indicates several isolates with potential antimicrobial activity. Quantitative data will be added once available. **Conclusion:** These findings may guide the selection of strains for molecular analyses aiming at the detecting genes associated with antimicrobial production. Overall, the results attempt to highlight *S. invicta* as a valuable source for isolating Actinobacteria with high potential for future biomedical applications. **Acknowledgements:** Research is conducted at the Symbiosis Laboratory, University of Puerto Rico at Mayagüez. Partially funded by Department of Biology, NASA and PR Sea Grant.

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Neuroproteomic Effects and Behavioral Characterization of Anxiolytic Natural Products from Tropical Marine Algae

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Background and Objectives: Anxiety disorders are the most prevalent psychiatric conditions worldwide, and current pharmacotherapies such as benzodiazepines present limitations including dependence and tolerance. Marine natural products provide a promising source of structurally diverse and neuroactive compounds. This study aimed to evaluate the anxiolytic potential of tropical marine brown macroalgae from Puerto Rico using *Drosophila melanogaster* as a translational model integrating behavioral and proteomic analyses. **Method:** Flies were exposed to crude algal extracts under acute and chronic paradigms. Anxiety-like behavior was quantified using open-field tests, and locomotor controls were assessed through ring assays. Proteomic profiling of fly heads was performed by LC-MS/MS to identify differentially expressed proteins associated with anxiolytic effects. **Results:** Extracts from *Styopodium zonale* produced marked anxiolytic-like effects without altering locomotion, while *Dictyota cervicornis* and *Padina boergesenii* showed moderate effects under chronic exposure. *Lobophora variegata*, *Symploca*, *Ulva*, and *Sargassum* species showed no activity. Proteomic analysis revealed dysregulation of over 50 proteins related to odorant binding, synaptic transmission, and stress-response signaling, indicating a broad modulation of neuronal pathways. **Conclusion:** These findings support tropical marine algae, particularly *S. zonale*, as potential sources of neuroactive compounds with anxiolytic properties. This work represents the first neuroproteomic screening of Puerto Rican marine algae for anxiolytic applications and highlights the integration of behavioral neuroscience and chemical ecology in natural product drug discovery. **Acknowledgments:** Supported by the PR-INBRE Program, UPR Cayey Department of Biology, the Translational Proteomics Center, and the Puerto Rico Science, Technology and Research Trust.

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Association of Selective Serotonin Reuptake Inhibitors in the Occurrence of Craniofacial Malformations: A Narrative Review

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Background and Objectives: Depression is a prevalent mood disorder, particularly among pregnant women, and is commonly treated with selective serotonin reuptake inhibitors (SSRIs). Serotonin, beyond its role as a neurotransmitter, is essential in embryonic development, influencing neural crest migration and craniofacial morphogenesis. Because SSRIs can cross the placental barrier and alter fetal serotonin signaling, concerns have emerged regarding their potential teratogenic effects. This narrative review aims to synthesize current evidence on the association between prenatal SSRI exposure and craniofacial malformations. **Methods:** A literature search was conducted using Google Scholar, PubMed, and ScienceDirect with the keywords: *craniofacial malformations*, *SSRI medications*, and *serotonin*. A total of 4,213 records were identified (Google Scholar = 4,090; PubMed = 6; ScienceDirect = 117). After removing 123 duplicates, records were screened by title, excluding 2,075 based on research focus. The remaining 2,015 were screened by publication date (last 10 years), yielding 15 articles. Inclusion criteria: observational human studies and mouse model experiments. Five studies were selected for review: one longitudinal cohort study, three mouse model studies, and one human stem cell experiment. **Results:** The cohort study reported an increased risk of craniofacial anomalies associated with prenatal SSRI exposure. All three mouse model studies demonstrated alterations in craniofacial structures in exposed groups. The human stem cell experiment showed disrupted neural crest cell behavior linked to abnormal craniofacial development due to altered serotonin levels. Overall, findings support a potential role for altered serotonin signaling in craniofacial malformations. However, causality remains inconclusive due to limited sample sizes and methodological variability. **Conclusion:** Current evidence suggests a possible association between prenatal SSRI exposure and craniofacial malformations, but further well-designed studies are needed to establish causality. Clinicians should conduct thorough risk-benefit assessments when prescribing SSRIs during pregnancy, as emerging evidence continues to evolve.

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Análisis de Datos Secundarios: Comparación de Variables de Salud Mental Durante la Adolescencia en Puertorriqueños

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Antecedentes y Objetivos: La adolescencia es un periodo lleno de retos y desafíos donde se puede desarrollar diferentes condiciones de salud mental tales como el uso problemático de video juegos. En la literatura se evidencia que hay una desproporción en cómo se evidencian estas condiciones según el sexo. El objetivo del análisis de

datos secundario es identificar si existen diferencias significativas por sexo en las puntuaciones de las escalas de IGD, depresión, ansiedad, estrés, soledad y estrategias de afrontamiento. **Método:** Los investigadores utilizaron un diseño transversal y reclutaron una muestra de 159 adolescentes mediante muestreo no probabilístico y un cuestionario en línea. La muestra incluyó mayormente varones (81%) de 13-19 años. El estudio fue aprobado por el IRB del Recinto de Río Piedras de la UPR (protocolo #2324-186). **Resultados:** El análisis multivariado de varianza indicó un efecto principal significativo de sexo sobre el conjunto de variables, Pillai's trace = 0.19, $F(6, 152) = 5.86$, $p < .001$, $\eta^2p = .19$. Los ANOVA univariados de seguimiento mostraron que las mujeres reportaron niveles significativamente más altos de depresión ($F(1, 157) = 18.36$, $p < .001$, $\eta^2p = .10$), ansiedad ($F(1, 157) = 8.89$, $p = .003$, $\eta^2p = .05$) y estrés ($F(1, 157) = 7.44$, $p = .007$, $\eta^2p = .05$) que los hombres. En contraste, no se observaron diferencias significativas por sexo en los síntomas de IGD ($F(1, 157) = 0.47$, $p = .492$), en afrontamiento ($F(1, 157) = 3.03$, $p = .084$) ni en soledad ($F(1, 157) = 2.92$, $p = .089$). **Conclusión:** Estos hallazgos sugieren que, aunque las mujeres presentan un mayor riesgo de sintomatología emocional, esto no se traduce en mayores problemas de uso problemático de videojuegos ni en diferencias claras en afrontamiento o soledad. **Agradecimientos:** La propuesta está financiada por el Build and Broaden de la Fundación Nacional de Ciencias (NSF), grant #2417705.

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Regional Morphological Plasticity Associated with Dietary Change in Rhesus Macaque Mandibles

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Background & Objectives: The capacity of skeletal tissues to remodel in response to environmental stimuli is a type of phenotypic plasticity. Mandibular morphology is plastic and often reflects adaptive responses to dietary demands, where tougher diets promote more robust structures. In 1938, 409 Rhesus macaques (*Macaca mulatta*) were introduced to Cayo Santiago, Puerto Rico, where they initially subsisted on natural vegetation and fruit. In 1970, they began receiving high-protein monkey chow, representing a marked change in masticatory demands. We investigate whether this dietary shift led to morphological changes in mandibular structures. We hypothesize that post-1970 individuals consuming high-protein monkey chow will exhibit region-specific remodeling of the mandible and bigger, more robust jaws. **Methods:** We used 3D models of *Macaca mulatta* mandibles from Cayo Santiago to compare pre-1970 individuals ($F = 12$, $M = 4$) that subsisted on natural vegetation to post-1970 individuals ($F = 10$, $M = 5$) that consumed high-protein kibble. A set of 190 landmarks was collected to capture mandibular shape, organized into five key areas: the symphysis, cross-section at M1, molar tooth rows, mandibular notch, and ramus. Landmark data were analyzed using geometric morphometric methods to quantify overall and region-specific shape variation, allowing comparison of pre- and post-1970 datasets. **Results:** Mandibles of pre- and post-1970 individuals differed significantly. Individuals born before 1970 demonstrated less robust, smaller mandibles, and smaller muscle attachment sites relative to later individuals. Shape variation was most pronounced in the symphysis and ramus, where increased robusticity suggests localized adaptive responses. These findings indicate that secular dietary changes produced functionally relevant morphological divergence. **Conclusions:** The observed morphological differentiation between pre- and post- groups demonstrates that secular change in masticatory demands can induce region-specific morphological changes in the mandible. Increased robusticity and altered geometry in specific areas of the mandible reflect functionally adaptive plastic responses to dietary changes.

COVID-19–Associated Dysregulation of Key Placental Proteins During Pregnancy

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Background: SARS-CoV-2 infection during pregnancy has been associated with adverse outcomes such as preterm birth, preeclampsia, and maternal vascular malperfusion. However, the specific protein-level changes in placental tissue that underlie these effects remain poorly understood. We hypothesize that SARS-CoV-2 infection leads to dysregulation of proteins involved in inflammation and vasculature, disrupting placental function. **Methods:** Proteins were from formalin-fixed, paraffin-embedded (FFPE) term placental samples from SARS-CoV-2 positive women (n=6) and uninfected controls (n=5), all unvaccinated at delivery. Proteins were quantified using Pierce 660 nm protein assay, separated by SDS-PAGE, digested, labeled with tandem mass tags (TMT), and analyzed in a Thermo Fischer Q Exactive Orbitrap Mass Spectrometer. **Results:** A total of 3,396 proteins from COVID-19 positive and negative placenta were identified. Statistical analysis using 1.5-fold change, p-value<0.05, and 2 or more peptides and bioinformatics analysis with the metabolomics data analysis platform (MetaboAnalyst5.0-userfriendly) was performed to consider differentially abundant proteins. A total of 5 upregulated and 12 downregulated proteins in SARS-CoV-2 met the significance criteria. Upregulated proteins were related to chromatin organization and intracellular membrane trafficking, while downregulated proteins were related to receptor signaling, autophagy and endosomal functions, important in placental development. **Conclusion:** Dysregulation of these proteins may impair nutrient exchange, immune modulation, and gene expression at the maternal–fetal interface. These preliminary findings suggest that SARS-CoV-2 infection alters key molecular pathways in the placenta, potentially contributing to poor pregnancy outcomes. Further studies are warranted to validate most significant proteins as candidate biomarkers of COVID-19-related placental dysfunction. **Acknowledgments:** Approved by IRB: Protocol No. 2402193109; Approval Date: 08/02/2024. Supported in part by General Medical Sciences (NIGMS) indirect costs, PR-INBRE-Institutional Developmental Award (IDEA) P20GM103475, RCMI Grant U54MD007600 Research Infrastructure Core components – National Institute of Minority Health and Health Disparities (NIMHD), Translational Proteomics Center, and Bioinformatics and Health Informatics.

A Descriptive Study of Incidence of Comorbidities and Maternal Outcomes in Hispanic Women in Puerto Rico with an Obesity BMI

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Background and Objectives: Body Mass Index (BMI) is the measure of relative weight to height and can influence several pregnancy comorbidities and outcomes. In comparison to other ethnicities, Hispanic women have higher propensity to be obese, increasing the risk of adverse maternal outcomes. This project aims to assess the impact of obesity BMI on maternal outcomes among Hispanic women in Puerto Rico. **Methods:** A retrospective observational study was conducted with IRB approval from the University of Puerto Rico, Medical Sciences Campus. Data was obtained and extracted from medical records of singleton pregnancy patients who met inclusion criteria of an obesity classes I-III BMI at their first visit or at delivery (n=126), and an age range of 17-46 years. Pregnancies that had obesity since the first prenatal visit (n=81) and pregnancies that developed obesity classes I-III by delivery date (n=45) were analyzed separately. Descriptive statistics were used for analysis. **Results:** Mean age for women with obesity class I-III at first visit was 30 and mean age for women with obesity class I-III at delivery was 26. Most common outcome for women who had obesity class I-III since the first visit was C-section delivery (77.78%) followed by hypertensive disorder (61.73%). These results were also translated for women who developed obesity classes I-III by delivery (66.67% and 53.33%, respectively). Pre-term delivery (PTD) was the third most prevalent outcome for both groups (34.57% of mothers who were obese class I-III since first visit and 24.44% for mothers obese class I-III at delivery). **Conclusion:** Obese maternal BMI classes I-III were strongly associated with increased risk for hypertensive disorders and delivering via C-sections. While not as strongly associated, obesity can also lead to PTD. These findings highlight the importance of BMI-based prenatal monitoring to reduce adverse pregnancy outcomes. IRB Approved: Protocol #2406247299A008 (09/10/2024).

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Alpha-7 Nicotinic Acetylcholine Receptor ($\alpha 7$ nAChR) Agonist SEN12333 Induces Donor-Dependent Effects in HIV-1 Replication Levels from Microglia

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Background and Objectives: HIV-associated neurocognitive disorders (HAND) are present in approximately 50% of seropositive patients, despite using antiretroviral therapy (ART). Their pathogenesis includes persistent HIV replication and activation of microglia, enhancing inflammation and promoting neuronal dysfunction and apoptosis. There are no effective therapies available against HAND. As an alternative therapeutic approach, the alpha-7 nicotinic acetylcholine receptor ($\alpha 7$ nAChR), responsible for the activation of the cholinergic anti-inflammatory response by endogenous acetylcholine (ACh), has been proposed as a therapeutic target. Activation of $\alpha 7$ nAChR leads to an improvement in locomotor, learning, and memory deficits in a mouse model of HAND, including a decreased microglial activation in the cerebral cortex and hippocampus. In contrast, recently, it was reported that $\alpha 7$ nAChR activation in human T cell lines activate HIV-1 transcription. Our objective is to determine the effect

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of $\alpha 7$ nAChR activation in HIV-1 replication from human microglia. We hypothesized that $\alpha 7$ nAChR activation in human microglia will reduce HIV-1 replication. **Method:** We cultured repository peripheral blood mononuclear cells (PBMCs) from people without HIV from our Hispanic-Latino Longitudinal Cohort for 18-24h to allow adherence of monocytes to cell culture wells (Approved by IRB #1330422 on 09/16/2022). We treated monocytes with GM-CSF and IL-34 to differentiate them into monocyte-derived microglia (MMG). On day 14, MMG were infected with HIV-1 ADA. On the next day, cells were treated with $\alpha 7$ nAChR agonist SEN12333 and cultured for 2 days. HIV-1 p24 antigen levels were measured by ELISA. **Results:** There were donors demonstrating a significant decrease in HIV-1 replication levels after treatment with SEN12333 at 10 μ M. In contrast, other donors showed a significant increase in HIV-1 replication at 10 μ M. **Conclusion:** These results suggest that $\alpha 7$ nAChR activation responses in HIV-infected microglia are donor-dependent. Future studies will assess the role of Ach in $\alpha 7$ nAChR activation in HIV-infected microglia. **Acknowledgements:** This research was supported in part by grants from the National Institutes of Health: K00NS11345, R21NS131061, R01NS099036, U54MD007600, U54GM133807, HiREC, and the UPR-Comprehensive Cancer Center.

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Assistive Technologies in ALS: Timing, Selection, and Clinical Impact

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Background and Objectives: About 60%–70% of patients with ALS develop difficulties with their speech, up to 40% face moderate cognitive impairment, and 15% present frontotemporal dementia. These symptoms significantly reduce autonomy and complicate daily functioning as the disease progresses. Studies show that early integration of assistive technology can help preserve autonomy and control, slow disease progression, and improve quality of life. Assistive technologies for ALS patients fall into four main categories: gastrointestinal, respiratory, communicative, and mobility support. This review aims to provide a comprehensive guide on current assistive technologies available for ALS patients to support medical professionals, caregivers, and patients in selecting and timing assistive intervention through a patient centered framework. **Method:** This narrative review scoped through published evidence on PubMed; Elsevier Masson SAS and National Institute of Health using the following key words: ALS, assistive technology, statistics. The criteria for inclusion was assistive technologies used in ALS care, focusing on their clinical applications, benefits, and timing of implementation. IRB Approved #2310153285, 27/February/2024. **Results:** Key findings indicate that early introduction of assistive technologies is associated with better patient outcomes. Early use of augmentative and alternative communication (ACC) devices and noninvasive ventilation show particularly strong evidence for maintaining focus and engagement. **Conclusion:** This review supports the importance of early integration of assistive technologies in ALS management. Providing the right interventions at the appropriate stage of the disease can promote greater autonomy and quality of life. This review is still in its first stage, focusing on identifying patient needs and examining how these interventions may affect

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the course of this disease. **Acknowledgements:** Thanks to the UPR School of Medicine Clinics, the MDA Association, RCMI grant U54 MD007600 from the NIMHD-NIH, and Caribbean Hispanic ALS Center for Clinical Trials and the ALS Association grant 23-TC-642 for their support.

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Biochemical and Molecular Identification of *Escherichia coli* Isolates from Milk Samples from Cows with Subclinical Mastitis in Puerto Rico

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Background and Objectives: In the mainland, *Escherichia coli* is one of the primary causes of subclinical mastitis in dairy cattle. There are over 700 strains of *E. coli* identified to date that differ in prevalence, antibiotic resistance, and pathogenical potential but there is no literature on which *E. coli* strains are prevalent in Puerto Rico, which is a key factor to provide customized and effective antibiotic treatment. We previously demonstrated that subclinical mastitis is most prevalent in Puerto Rico and that *E. coli* contributes to 17% of those cases. Thus, the objective of this study is to investigate the antibiotic resistance and virulence gene profile of *Escherichia coli* isolates from milk samples from dairy cows with subclinical mastitis in Puerto Rico. **Methods:** A total of 29 samples milk samples were inoculated in enriched selective media for Gram-negative bacteria and incubated at 37°C for 48 hours. Colony count, morphological analysis, and Gram staining were performed to select and isolate suspected *Escherichia coli* colonies based on their known characteristics. Biochemical tests were performed, followed by PCR amplification of the target gene ADK, for the final identification of *Escherichia coli* in the milk samples. A preliminary study with 10 isolates was performed for antibiotic resistance profiles using disk diffusion method and common antibiotics. **Results:** Preliminary results suggest these isolates are not resistant to sulfamethoxazole with trimethoprim, amoxicillin with clavulanate, nor gentamicin. Current studies are focused on investigating all isolates for antibiotic resistance and virulent genes for the different strains of *Escherichia coli* on isolated colonies. **Conclusions:** We expect to find resistant and highly virulent isolates due to the current ineffectiveness of treatments and chronic mastitis observed in Puerto Rico. This study was approved by IACUC #2023.12. **Acknowledgements:** This study was supported by a NIH (Grant No. 1R15HD109919-01).

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Investigating the Inflammatory Cytokine Profile of Milk from Cows with Subclinical Mastitis

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Background and Objectives: The World Health Organization states that cessation of lactation can be detrimental to human neonate survival and infant nutrition worldwide. One of the major global causes of nursing cessation is mastitis, a chronic inflammatory response of the mammary gland to recurrent pathogenic infection or tissue injury. During clinical mastitis the inflammatory response obstructs the passage of milk through the mammary

gland impairing milk production. It is unknown if the inflammatory molecules in mammary tissue during chronic inflammation alter milk composition. Thus, we aim to investigate and characterize the inflammatory cytokine profile in milk during subclinical and clinical mastitis in a bovine model. The objective of this study was to develop a fast-real-time PCR assay to detect inflammatory cytokines (TNF- α , IL-1 β , IL-6, IL-8, IL-12A, IL-12B, IL-23 and IL-10) in milk samples of cows with subclinical and clinical mastitis. **Methods:** Milk samples were collected from 30 cows with mastitis and healthy cows (control) after diagnosis using the California Mastitis Test. Total RNA was extracted from milk with the MagMax CORE solution kit and converted to cDNA for testing by real-time PCR using SYBR-Green Polymerase. Relative abundance was determined by the delta delta Ct method and a student t-test for statistical analysis. **Results and Conclusions:** Preliminary data in milk from 6 cows suggest a higher abundance of TNF- α and IL-6 in milk of clinical and subclinical mastitis compared to control. High levels of IL-6 in milk have also been reported in humans with chronic mastitis. Current efforts are focused on investigating the relative expression of target interleukins and immunomodulators in all milk samples collected and confirm candidates by western blot analysis. This study was approved by IACUC #2023.12. **Acknowledgements:** This study was supported by NIH (Grant No. 1R15HD109919-01).

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Antibiotic Resistance Profile of *Staphylococcus aureus* Isolates Causing Mastitis

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Background and Objectives: Mastitis is an inflammation that occurs in the mammary glands and one of the most severe problems during lactation present to date. The treatment for this disease blocks milk production causing neonates to be weaned early than recommended, which contributes to developmental and nutritional problems. Several known microorganisms cause this medical condition in humans and cows, such as *S. aureus*, *E. coli*, *S. agalactiae*, *P. aureginosa*, among others. Studies in the mainland and internationally, have shown that *Staphylococcus aureus* is an important contributor of many pathogenic diseases in humans, it is highly contagious, and with a growing resistance to commonly used antibiotics. Thus, the purpose of this study is to characterize the antibiotic resistance of bacterial isolates from milk and characterize the genetic profile of these isolates. **Methods:** Cows (n=29) were tested for bovine mastitis using the California Mastitis Test (CMT). After mastitis confirmation, milk samples were collected, inoculated in Mannitol-Salt agar, and incubated at 37°C for 48 hrs. Suspected colonies based on morphological analysis, were submitted to biochemical testing, and molecular confirmation by amplification of the 16s-rRNA gene using conventional PCR. Disk diffusion method was used to test antibiotic susceptibility in confirmed isolates. **Results:** Preliminary results from 2 isolates reveal they are not resistant to sulfamethoxazole with trimethoprim nor amoxicillin with clavulanate. **Conclusions:** Current steps are focused on characterizing all isolates for antibiotic resistance using disk diffusion and molecular analysis of virulence genes and factors. Expected outcomes include around 60-80% of our isolates to be resistant to common antibiotics. Future research will focus on gene expression comparison of nonresistant and resistant isolates by RNA-seq. This study was approved by IACUC #2023.12. **Acknowledgements:** This study was supported NIH award to Juliana Pérez-Laspiur (Grant No. 1R15HD109919-01).

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Design and Synthesis of TRIP13 Inhibitors for HPV-Driven Cancer

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Background and Objectives: High-risk Human papillomavirus (HPV) related cancers account for 5% of cancers worldwide. HPV causes virtually all cervical cancer, this being the fourth leading cause of death. Currently, there is no unique treatment for HPV-related cancers. Therefore, there is an urgent need for new drugs. TRIP13 is an AAA+ ATPase that regulates the activity of mitotic checkpoint complex (MCC) proteins like Mad2 in the Spindle assembly checkpoint (SAC) during cell replication. TRIP13 has also been found to be overexpressed in numerous cancers and has been correlated with poor prognosis and therapeutic resistance. Previous research demonstrated that the inhibition of Aurora Kinase A with Alisertib combined with Thyroid Hormone Receptor Interactor Protein 13 (TRIP13) knockdown resulted in enhanced apoptosis exclusively in HPV+ cell lines. **HYPOTHESIS:** A combination of an Aurora Kinase A inhibitor and a TRIP13 inhibitor could result in a potential treatment for HPV-related cancer. **Method:** We used the micromolar TRIP13 inhibitor DZC0415 as a lead compound. Molecular docking with Autodock Vina in the TRIP13 crystal structure was used to design novel, more potent and selective TRIP13 inhibitors. Compounds were synthesized using organic chemistry methods. The compounds were purified through flash chromatography and characterized through Nuclear Magnetic Resonance spectroscopy (NMR). The biological activity of the compounds was determined via apoptosis assay using Annexin V/PI staining. **Results:** We successfully have synthesized eight new DCZ0415 derivatives. We will present the apoptotic activity of these compounds when combined with alisertib in HeLa cells. **Conclusion:** This work demonstrated that TRIP13 inhibitors are feasible and that the combination with alisertib induces apoptosis in HPV+ cancer cells. The most active compounds will be further optimized to improve potency and pharmacochemical properties for potential clinical development. **Acknowledgements:** Supported by U54 CA096297-CA096300 and the EnTRUST program of the Puerto Rico Science and Technology Trust.

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Periodic Assessment of Bacteria and Heavy Metals in Yabucoa's Bay

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Background and Objectives: Yabucoa Bay, located in southeastern Puerto Rico, is a coastal ecosystem currently influenced by industrial, recreational, and agricultural activities. Despite its environmental and socioeconomic importance, there is a lack of information regarding the impact of these activities on water quality and ecosystem health. The objective of this study was to conduct a periodic assessment of bacteriological populations and heavy metal concentrations across multiple sites within the area. **Methods:** Sampling points included Guayanés Beach, Caño Santiago, Guayanés River, Yabucoa's Port, and Lucía Beach. Fecal coliform colonies were quantified using a colony counter, and additional bacterial isolates were cultured on TSA medium. Bacterial species were

identified through the BioLog system. **Results:** Across all sampling points, more than 40 bacterial species were detected, including 12 Gram-positive and 29 Gram-negative species, indicating high microbial diversity and potential fecal contamination. Water quality parameters, such as coliform-forming units, supported the presence of persistent bacteriological activity. To evaluate the influence of anthropogenic effects, three heavy metals—cadmium (Cd), lead (Pb), and zinc (Zn) were analyzed. We measured metal concentrations across the site and expected detectable levels, with variations likely reflecting localized and agricultural inputs. The combined presence of diverse bacterial communities and heavy metals underscores potential risks to ecosystem balance and public health. **Conclusion:** This study provides the first baseline dataset for Yabucoa Bay, offering critical insights for future monitoring programs, management strategies, and the development of conservation policies to safeguard water quality in impacted coastal environments. Future work: For future work, we propose continuing to evaluate heavy metal concentrations and their possible impact on bacterial populations in Yabucoa Bay. **Acknowledgements:** This research and its associated instrumentation have been made possible by the MSEIP grant P120A240021.

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Isolation and Characterization of *Pseudomonas aeruginosa* in Milk Samples from Cows Diagnosed with Clinical Mastitis

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Background and Objectives: Clinical mastitis is the number one cause of cessation of milk production in humans and cows. Identifying which bacteria is causing clinical mastitis is essential to prescribe a treatment for fast recovery and minimize economic loss. *Pseudomonas aeruginosa* and *Mycoplasma bovis* are known to cause clinical mastitis and other serious diseases in cows on the mainland. However, in Puerto Rico, we consider other bacteria, such as *E. coli* and *S. aureus* to be primarily responsible for this disease. The objective of this study is to investigate the prevalence of *P. aeruginosa* and *M. bovis* in milk samples from dairy cows with clinical mastitis in farms in Puerto Rico. **Methods:** Milk samples are collected and enriched in selective media and incubated for 48 hours before determination of colony forming units, morphological analysis, specific biochemical tests and PCR amplification of target genes were conducted to identify *P. aeruginosa* and *M. bovis* in milk samples. **Results:** Preliminary results from growth in selective media agars along with biochemical characteristics suggests 2 possible *P. aeruginosa* infection cases at this herd. **Conclusions:** Out of 24 cows suspected of having chronic mastitis, 2 cows seem to be infected with *P. aeruginosa*. This preliminary data suggests an 8% prevalence of *P. aeruginosa* in this herd, which is alarming as this bacterium can cause many diseases in humans. Current studies focus on optimization of identification protocols by PCR analysis for these bacteria. Future studies are focused on fast identification by real-time PCR and testing isolates for antibiotic resistance. This study was approved by IACUC #2023.12. **Acknowledgements:** This study was supported by a grant from NIH awarded to Juliana Pérez-Laspiur, PhD, Director of The Molecular and Cellular Biology Laboratory, UPR Aguadilla, PR (Grant No. Grant No. 1R15HD109919-01).

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Characterizing the *Streptococcus* spp. Isolates Causing Mastitis in Puerto Rico.

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Background and objectives: Mastitis is an inflammation of the mammary gland during lactation; it is the most common disease of dairy cattle. Scientific literature suggests that *S. agalactiae* is a prevalent cause of mastitis in the mainland; however, it is unknown how many mastitis cases are caused by *S. agalactiae* in Puerto Rico. Thus, the specific aim of this study is to isolate, characterize, and investigate the antibiotic resistance profile of *S. agalactiae* in milk samples from dairy cows. **Methods:** Milk samples were collected over a 1-year period from 73 cows and inoculated in selective media for incubation at 37 °C for 48 hours. Determination of colony-forming units and morphological analysis were performed to select suspected *Streptococcus* spp. colonies based on known characteristics. Further characterization was achieved by biochemical testing for the presence of coagulase, catalase, oxidase, pyrase, fermentation of mannitol, maltose, dextrose, sucrose, and lactose, and CAMP test using *S. aureus* as a control. Lastly, conventional PCR amplification of target genes *sklA3*, 16s rRNA, and *PauA* is performed for the final identification of *S. agalactiae*, *S. dysgalactiae*, and *S. uberis*, respectively, in milk sample cultures. **Results:** Our study discovered that 18% of mastitis cases were caused by infection with *S. uberis*, 9% are caused by *S. agalactiae*, and 6% caused by *S. dysgalactiae* infection. Furthermore, preliminary antibiotic resistance testing on isolated colonies demonstrated these isolates to be resistant to sulfamethoxazole + trimethoprim but susceptible to amoxicillin + clavulanate. **Conclusions:** We expect to gain knowledge on the antibiotic resistance profile of bacterial strains that are mostly causing mastitis in animals and identify possible antibiotics that can be effective in eradicating this disease in Puerto Rico. This study was approved by IACUC #2023.12. **Acknowledgements:** This study was supported NIH award to Juliana Pérez-Laspiur (Grant No. 1R15HD109919-01).

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Anti-Tumor Mechanisms of the Tobacco-Derived Cembranoid 4R in Non-Small Cell Lung Cancer

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Non-Small Cell Lung Carcinoma (NSCLC) accounts for approximately 85% of all lung cancer cases and has a low average 5-year survival rate of 28%, largely due to poor responsiveness to traditional therapies such as chemotherapy and radiation. This highlights the need for novel treatment strategies. Our laboratory previously demonstrated that the tobacco-derived cembranoid (1S,2E,4R,6R,7E,11E)-2,7,11-cembratriene-4,6-diol (4R) is non-toxic in vivo at 6 mg/kg and exhibits anti-tumorigenic activity in the Lewis Lung carcinoma mouse model. In this study, we evaluated the mechanism of action of 4R in two NSCLC cell lines with clinically relevant oncogenic mutations: A549 (KRAS-mutant) and H1975 (EGFR-mutant). We hypothesized that 4R reduces NSCLC progression

by decreasing cell viability, inhibiting proliferation, and promoting macrophage adhesion to tumor cells. To test this, we performed propidium iodide-based cell viability assays to determine the IC₅₀ values following 24-hour exposure to 4R. We also performed colony-formation assays to assess long-term effects on cell proliferation. Finally, a macrophage adhesion assay was conducted to examine whether 4R enhances macrophage attachment to NSCLC cells. Our results show that 4R significantly reduces viability in both cell lines, with IC₅₀ values of approximately 35–39 μ M in A549 and 28 μ M in H1975, indicating a greater sensitivity in EGFR-mutant cells. Colony-formation assays revealed that 4R markedly reduced proliferative capacity at 25 μ M in A549 and 6.25 μ M in H1975 ($p=0.0007$ for A549 and $p=0.0029$ for H1975 compared to vehicle). Preliminary macrophage-adhesion data suggest that A549 cells treated with 4R (39 μ M, 24 hrs) show increased macrophage attachment, though additional experiments are ongoing to confirm effects in both cell lines. Overall, these findings support the potential of 4R-cembranoid as a promising adjuvant therapeutic for NSCLC, particularly in tumors harboring KRAS or EGFR mutations. Its greater efficacy in EGFR-mutant cells suggests a possible role for 4R in personalized treatment strategies for NSCLC. **Acknowledgments:** NIH NIGMS RISE UCC award number: R25GM110513, Predoctoral Fellowship to JCS. NIH NIGMS PR-INBRE (IDeA) grant number: 5P20GM103475-17.

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Bioprospecting of Coastal Fungi for the Degradation of Petrochemicals and Synthetic Dyes

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Background & Objectives: Petroleum-derived pollutants, such as used motor oil and single-use plastics (LDPE and HDPE), pose a growing threat to fragile ecosystems like mangroves. Their resistance to degradation warrants sustainable biotechnological solutions. Fungi, due to their enzymatic versatility and adaptability, are promising candidates for bioremediation. This study explores the bioprospecting of fungi isolated from sediments, wood, leaves, and plastics during a mangrove survey in Cabo Rojo, Puerto Rico. **Methods:** Sixty-four strains were isolated, and 22 filamentous fungi were selected for characterization. The strains were cultured in basal liquid medium with 10 mg of Congo Red as the sole carbon source at 28°C and 120 rpm for 10 days to assess the potential degradation of aromatic compounds. The ten most active strains were then tested with used motor oil and LDPE for 21 and 30 days. The activity was evaluated by biomass production and spectroscopic analysis (IR and QCL). Sequencing of ITS region was performed. **Results:** Genera such as *Aspergillus*, *Trichoderma*, *Cystobasidium*, and *Penicillium* were identified. Several strains decolorized Congo Red from the fourth day on, indicating early enzymatic activity. *Aspergillus luchuensis* [P05] reached 60.8 mg of biomass, followed by *Aspergillus* sp. [H02A] and *Trichoderma* sp. [H1] with 54.4 mg and 54.2 mg, respectively. The most efficient strains came from plastic and leaf litter, suggesting adaptation to recalcitrant substrates. Spectral signals near 1374 cm⁻¹ confirm chemical modifications in hydrocarbons and polymers. **Conclusions:** Mangrove fungi show high efficiency in the transformation of petrochemical pollutants. Their environmental origin predicts their degradative performance and provides evidence of ecological adaptation. The spectroscopic data validate their potential as sustainable tools for bioremediation in tropical environments. **Acknowledgments:** This work was supported by NASA, the Symbiosis Laboratory and the Department of Biology at UPR-Mayagüez, as well as the DRNA Cabo Rojo Reserve and the undergraduate students who collaborated on the project.

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Desodorantes y Cáncer de Mama: Estudio Piloto Sobre Determinantes de Acceso a Productos sin Aluminio en el Casco Urbano de Río Piedras

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Introducción: Los desodorantes constituyen un elemento esencial en la rutina diaria en la población puertorriqueña. Sin embargo, los desodorantes que contienen sales de aluminio generan preocupación debido a su posible relación con alteraciones hormonales y efectos asociados al cáncer de mama. En Puerto Rico, esta enfermedad representa una de las principales causas de morbilidad en mujeres. Según el Registro Central de Cáncer de Puerto Rico (2018–2022), el municipio de San Juan presenta una tasa ajustada de incidencia de 97.7 por cada 100,000 mujeres, superior al promedio insular de 91.3. El objetivo principal de esta investigación es analizar los determinantes socioeconómicos que influyen en el acceso y la elección de desodorantes con y sin sales de aluminio en el casco urbano de Río Piedras. **Metodología:** Se realizaron 4 visitas a diversos comercios del casco urbano de Río Piedras. Se recopiló información sobre tipos de desodorante, presencia o ausencia de sales de aluminio, marca, formato, precio y ubicación del lugar de venta. Se realizaron análisis de estadística descriptiva. **Resultados:** Se visitó un total de 5 comercios, incluyendo farmacias, tiendas por departamento, entre otros, para un total de 23 desodorantes de 12 marcas distintas. Cada comercio ofrecía un total de 11 marcas de desodorantes distintas con aluminio y sin aluminio. En promedio, el costo de los desodorantes con aluminio varía entre \$1.85-\$5.65 con un promedio de \$3.98, mientras que el costo de los desodorantes sin aluminio varía entre \$2.99-\$8.75, con un costo promedio mayor (\$4.92). **Conclusión:** Este estudio brinda una mirada única a los determinantes socioeconómicos potencialmente relacionados a cáncer de mama, y sirve como base para futuros estudios sobre factores que condicionan la exposición a compuestos potencialmente dañinos para la salud femenina. Futuros estudios deben evaluar diferencias por regiones para el desarrollo de estrategias de salud pública dirigidas.

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Investigating the Role of the Endocannabinoid System in Chronic Inflammation of the Mammary Gland

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Background and Objectives: Mastitis, a chronic inflammation of the mammary gland, leads to impaired lactation and nursing cessation, posing a significant burden on human neonate survival and development in underdeveloped countries. Addressing the impact of mastitis on infant nutrition worldwide requires a deeper understanding of the molecular pathways involved in mammary tissue inflammation during lactation. Furthermore, effective and accessible treatments are urgently needed to replace non-effective antibiotic regimes and invasive strategies that

irreversibly end lactation. Thus, our objective is to investigate the potential therapeutic role of the endocannabinoid system (ECS) in mastitis. The ECS is known to be a key modulator of immune function and inflammation in many models of chronic inflammation. We hypothesize that the mammary gland during lactation is under ECS regulation, and that during mastitis this system is dysregulated, possibly identifying targets for therapeutic intervention. To test this, we investigated the differential expression of the ECS receptors (CB2, GPR55, TRPV4), related transcription factors (NF- κ B, p38 MAPK) and inflammatory mediators (COX-2, iNOS) in bovine mammary tissue in the context of chronic mastitis. **Methods:** Mammary tissue was collected from cows with or without mastitis. Total RNA was extracted converted to cDNA and tested by Quantitative real-time PCR and SYBR Green as the reporter dye. B-actin was used as a normalizing gene and relative expression was calculated using the delta-delta Ct method. **Results and Conclusions:** Our study reveals that the mammary gland is under the ECS regulation. Furthermore, we observed an upregulation of CB2, GPR55, TRPV4 receptors as well as associated inflammatory markers during mastitis validating the therapeutic potential of ECS modulation in the mammary gland, offering innovative strategies to mitigate mastitis-related inflammation and cease in lactation. This study was approved by IACUC #2023.12. **Acknowledgements:** This study was supported by NIH (Grant No. 1R15HD109919-01).

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Evidence of Dysregulation of Endocannabinoid Synthesizing and Degrading Enzymes during Mastitis

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Background and Objectives: Our main goal is to investigate the therapeutic potential of modulating the enzymes responsible to synthesize and degrade endocannabinoids for treatment of chronic inflammation in the mammary gland, known as mastitis. During mastitis in humans, as in bovines, over-expression of pro-inflammatory cytokines destroys the tissue and impairs milk production with detrimental effects in human postnatal health worldwide. We recently demonstrated the presence of the endocannabinoid system (ECS) receptors, ligands, and signaling molecules in mammary gland during lactation, and provided evidence of their dysregulation during mastitis in a bovine model. The ECS synthesizing and degrading enzymes play a crucial role in regulating the concentration of endocannabinoids in cells, which serve as ligands for the differential activation and inhibition of these ECS receptors. Thus, we hypothesize that the enzymes regulating the synthesis (NAPE-PLD, DAGL α and DAGL β) and degradation (FAAH and MAGL) of endocannabinoids (anandamide and 2-AG) are dysregulated during chronic inflammation of the mammary gland. **Methods:** To test our hypothesis, mammary tissue was collected from healthy and mastitis-diagnosed lactating cows (n=6) and stored in RNAlater. RNA was extracted and converted to cDNA, followed by quantitative PCR amplification of target genes and β -actin as normalizing gene. **Results and Conclusions:** Preliminary data confirms the upregulation of NAPE-PLD, DAGL α , FAAH, and MAGL in mammary tissue from cows with mastitis. Current efforts are focused on testing *in vitro* modulation of these enzymes in a mammary epithelial cell culture model to investigate the therapeutic potential of these enzymes in regulating ECS-mediated anti-inflammatory effects in mastitis associated chronic inflammation. This study was approved by IACUC #2023.12. **Acknowledgements:** This study was supported by NIH (Grant No. 1R15HD109919-01).

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Innate Immune Receptors and their Role in Chronic Inflammation of the Mammary Gland

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Background and Objectives: Mastitis is a chronic inflammation in mammary tissue that results mostly from bacterial infections. The immune system utilizes a multitude of molecules and enzymes, such as ROS and pro-inflammatory cytokines, to combat pathogens. However, prolonged exposure to high concentrations of these molecules can lead to tissue damage through oxidative stress and tissue damage. The innate immune receptors TLR-2 and TLR-4 are known to play a role in exacerbating chronic inflammation scenarios in other tissues. Thus, we hypothesize that TLR-2 and TLR-4 receptors also play a pivotal role in mammary tissue during mastitis. Our project aims to characterize the mRNA expression of immune receptors TLR2, TLR4, and A2A, the transcription factors NF- κ B and p38 MAPK, and known modulators of inflammation iNOS and COX2, which play a role in ROS production that induces oxidative stress. **Methods:** We performed a pilot study in which we collected mammary tissue from four lactating cows with mastitis and RNA was extracted and converted cDNA for optimization of quantitative PCR (qPCR) protocols of target genes using specific primers designed based on published bovine sequences. We then tested gene expression by qPCR using SYBR Green as the reporter dye and B-actin as a normalizing gene. Relative expression was calculated using the delta-delta Ct method. **Results and Conclusions:** Our preliminary data suggests NF- κ B and iNOS expression is increased in mammary tissue from cows with mastitis, while we observed no changes in TLRs expression. Current studies are focused on increasing sample size and validating gene expression changes at the protein level. We expect to find an increase in TLRs expression in cows with mastitis. This study was approved by IACUC #2023.12. **Acknowledgements:** This study was supported by NIH (Grant No. 1R15HD109919-01).

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Endocrine Disruptors in Menstrual Hygiene Products: Their Health Impact, the Availability, and Accessibility in Aibonito, Puerto Rico

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Introduction: Exposure to endocrine-disrupting chemicals (EDC) present in menstrual hygiene products (MHP) has been associated with adverse effects on reproductive and hormonal health, particularly from ingredients such as parabens and phthalates. Given that products such as sanitary pads and daily liners are used on a constant basis, it becomes relevant to examine the accessibility of alternative options that claim to be free from EDC. **Purpose:** This study aims to examine the accessibility of paraben- and phthalate- free menstrual hygiene products in pharmacies across Aibonito, Puerto Rico. **Methods:** A mixed method was employed combining a systematic literature review, conducted to establish the toxicological and reproductive relevance of EDC exposure specifically from pads, daily liners, and tampons. A local assessment was carried across pharmacies in Aibonito, and MHP

that explicitly claimed to be free of EDC were recorded. Product information was collected directly from packaging, including price, ingredient claims, and product type. **Results:** A total of sixteen MHP were identified across all pharmacies. Three main brands were identified: Cotton Top Layer, The Honey Pot, and L. Organic. In terms of cost, EDC-free options were more expensive in average when compared to brands without such claims. This difference in prices suggest an economic barrier to accessing “safer” menstrual hygiene products options. **Conclusion:** By analyzing existing literature and conducting a local assessment of MHP in Aibonito, findings highlight the limited accessibility to “safer”, EDC- free alternatives. This study raises awareness and informs consumers in the county of Aibonito about the potential presence of EDC in menstrual hygiene products, while emphasizing the importance of accessible, “safer” alternative. Further research is needed to expand product sampling across additional municipalities in Puerto Rico and explore potential associations between EDC exposure from menstrual hygiene products and hormone- related conditions, such as breast cancer.

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Toll-like Receptor 3 and Signaling Molecules Expression in Chronic Inflammation of the Mammary Gland

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Background and Objectives: Mastitis is an inflammatory breast disease caused by an infection that develops in mammals during the first weeks of post-partum leading to cessation of breastfeeding and characterized with high and extended production of pro-inflammatory cytokines. The objective of our study is to investigate the mRNA expression of known innate immune receptors, transcription factors, and inflammatory cytokines, such as TLR-3, IRF-3, and IFN- β , known to be related to chronic inflammation responses in other models of inflammation. **Methods:** We isolated peripheral white blood cells and mammary tissue from healthy and mastitis-diagnosed cows. RNA was extracted using TRIzol and converted to cDNA as per manufacturer’s instructions. Specific primers were designed for our target mRNAs using NCBI-Primer BLAST. Expression profile was investigated by conventional PCR and quantitative real-time PCR using b-actin as a normalizing reference gene. As IFN- β inhibits the production of pro-inflammatory cytokines and drives antiviral responses by immune cells, we expected to find a decrease in IFN- β in cows with mastitis. **Results:** Preliminary results show an increase in mRNA abundance of all genes, specially TLR-3 and IRF-3 in white blood cells and mammary tissue indicating the antimicrobial signaling pathway via TLRs is highly activated during mastitis. **Conclusions:** These results support our initial objective by demonstrating that innate immune receptors are involved during mastitis inflammation. Current studies are focused in confirming these changes at a protein level where we expect to confirm the changes observed at mRNA level. For future directions, we plan to perform in vitro cell culture studies to investigate the relation and possible modulation of these proteins as a therapeutic treatment for mastitis. This study was approved by IACUC #2023.12. **Acknowledgements:** This study was supported by a grant from NIH awarded to Juliana Pérez-Laspiur, PhD, Director of The Molecular and Cellular Biology Laboratory, UPR Aguadilla, PR (Grant No. 1R15HD109919-01).

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Predictive Value of Serum Biomarkers for Neurological Complications in Acute Ischemic Stroke: A Narrative Review

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Background: Acute ischemic stroke is one of the most common causes of disability and death worldwide, and can lead to complications such as cerebral edema and elevated intracranial pressure (ICP). Tools such as clinical scores and neuroimaging provide valuable information but remain limited in predicting neurological outcomes. Novel research has focused on utilizing blood-based biomarkers to improve prognostic models and anticipate neurological outcomes. **Objective:** To conduct a narrative review on blood-based biomarkers and their association with stroke-related neurological complications. **Methods:** A narrative review was conducted of studies published between 2019 - 2025 on databases such as PubMed, using keywords such as “biomarkers” “acute ischemic stroke”, and “cerebral edema”. **Results:** Various blood-based biomarkers have been shown to be linked to adverse outcomes in acute ischemic stroke patients. For example, S100B and GFAP are astroglial markers correlated with the onset of malignant cerebral edema and greater infarct volume. S100B levels have been shown to serve as moderate predictors of edema severity and further patient deterioration (AUROC ~ 0.78). Inflammatory biomarkers such as interleukin-6 (IL-6) and interleukin-1 β (IL-1 β) contribute to blood-brain barrier disruption and the formation of vasogenic edema. Additionally, hematologic indices such as neutrophil-to-lymphocyte ratio (NLR) and systemic immune-inflammation index (SII) have been shown to serve as predictors for surgical intervention and neurologic decline. Greater SII values in patients indicate an increased likelihood of decompressive hemicraniectomies. **Conclusion:** Blood-based biomarkers have demonstrated potential as predictive tools for post-stroke complications. Panels combining a variety of biomarkers, including glial, immune and hematologic markers may help improve identification of at-risk patients before complications manifest. Further studies should focus on validating these panels in addition to traditional methods such as imaging studies. **Acknowledgments:** I would like to thank Dr. Noelia Morales for her invaluable mentorship and assistance in this endeavor.

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Preliminary Analysis of Gene Regulation by 40Hz Stimulation in Alzheimer’s Disease Mice Model Revealed via Optimization-Based Gene Profiling

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Background & Objectives: Alzheimer’s disease (AD) is a neurodegenerative disorder characterized by progressive cognitive decline. Recent work suggests that rhythmic visual stimulation can influence brain activity and slow AD progression. It is theorized that this approach targets neural oscillations at gamma frequencies, thus enhancing neuronal communication by reducing protein buildup. This offers a non-invasive strategy for improving cognitive

function in individuals who suffer from the disease. The objective of this study was to evaluate gene expression changes induced by 40Hz gamma stimulation. **Methods:** We analyzed the public dataset GSE77471 from hippocampal CA1 neurons, which recorded the expression pre- and post-therapy for subjects exposed to 40Hz flicker and optogenetic stimulation. Differentially expressed genes were evaluated through the BioOptimatics methodology, which applies Multiple Criteria Optimization (MCO) to identify parameter-free, Pareto-optimal genes and structure their correlated expression changes through Minimum Spanning Trees (MSTs). Functional enrichment was performed with Reactome and KEGG. **Results:** Analysis indicates that 40Hz stimulation produced coordinated expression shifts, including decreased levels of synaptic markers (Syt1, Snap25, Map1b, Cdr1os), stress-response genes (Hspa8, Hsp90aa1), and mitochondrial RNA components, alongside increased expression of mitochondrial respiratory genes (mt-Nd5, mt-Cytb, mt-Co3, mt-Nd1) and regulators of glutamate clearance and plasticity (Slc1a2, Camk2a). MCO also highlighted additional genes of interest for further study. MST analysis identified Hspa8 as a central hub linking synaptic, stress-response, and mitochondrial modules. Enrichment analyses implicated oxidative phosphorylation, synaptic vesicle cycling, and AD-associated neurodegeneration pathways. **Conclusions:** These findings suggest that 40Hz stimulation modulates mitochondrial function and synaptic pathways, supporting its potential as a non-invasive therapeutic approach. The absence of a wild-type control limits the ability to determine whether observed changes reflect normalization or a compensatory response. Future work will expand the analysis using the GSE255004 dataset to validate these signatures and identify additional therapeutic targets. **Acknowledgments:** This work was conducted by the Applied Optimization Group at UPRM.

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Phentermine Use Prior to Surgery and Intraoperative Hemodynamics: Evidence from a Multisite Retrospective Cohort

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Background and Objectives: Phentermine is a sympathomimetic amine commonly prescribed for weight loss. Due to its long half-life (~20 hours), current guidelines recommend discontinuing phentermine at least four days prior to surgery to minimize the risk of intraoperative hypotension. However, these recommendations are based on outdated reports involving phentermine combined with fluphenazine, rather than current formulations, such as phentermine alone or with topiramate. We hypothesized that intraoperative hypotension would not differ significantly between patients who continued phentermine through the day of surgery and those who discontinued it four or more days preoperatively. **Methods:** In this retrospective cohort study, we identified 1,362 adults (≥ 18 years) who underwent elective, non-cardiac surgery under general, neuraxial, or peripheral regional anesthesia at Mayo Clinic locations (Rochester, Florida, Arizona) between January 1, 2019, and December 31, 2023, and were prescribed phentermine or phentermine-topiramate. Patients were grouped by timing of last dose (≤ 1 day vs ≥ 4 days preoperatively). Baseline demographics, surgical and anesthetic factors, and intraoperative hemodynamic variables were compared. (Approved by IRB on January 27th, 2025, approval number 24-013684.)

Results: Results suggest that patients who discontinued phentermine less than four days before surgery had a significantly lower likelihood of experiencing intraoperative hypotension—defined as MAP < 65 mmHg—compared to those who discontinued it four or more days prior ($p = 0.0035$). Similarly, discontinuation less than seven days

before surgery was associated with lower vasopressor use ($p = 0.0145$). **Conclusions:** Findings do not support our hypothesis but suggest phentermine is unlikely to be the sole cause of hypotension risk. Other underlying factors (e.g., comorbidities, physiological responses, intraoperative events) may contribute thus, warranting further investigation. **Acknowledgments:** None.

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Assessing the Biodistribution and Toxicity of Fluorescently Dyed Nano-Polystyrene in *Artemia salina* Nauplii

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Background & Objectives: The increasing presence of micro- and nanoplastics (NPs) in aquatic ecosystems represents a growing concern for environmental and public health due to their potential bioaccumulation and entry into the food chain. Polystyrene nanoparticles (PS-NPs), a prevalent form of NPs derived from consumer plastics, may threaten both marine organisms and, indirectly, human health through trophic transfer. This study evaluated the uptake, distribution, and toxicity of PS-NPs in *Artemia salina*, a model organism in ecotoxicological studies. We hypothesize that PS-NP exposure will produce concentration dependent effects, including increased mortality, greater plastic deposition, and pronounced morphological and behavioral alterations. **Methods:** *A. salina* nauplii were exposed to six concentrations of carboxylate-modified PS-NPs (1.0×10^{-4} – 3.0×10^{-3} %w/v) for 24 and 48 hours. **Results:** Fluorescence confocal microscopy revealed concentration-dependent accumulation of PS-NPs in the digestive tract, with higher concentrations causing gut malformation. Raman spectroscopy confirmed the presence of PS-NPs in exposed *A. salina* through distinct spectral peaks at 1520 cm^{-1} , consistent with polystyrene's phenyl ring vibrations (1485 – 1605 cm^{-1}). Toxicity assays demonstrated dose- and time-dependent mortality, with LC50 values decreasing from 4.81×10^{-3} %w/v at 24h to 3.02×10^{-3} %w/v at 48h. **Conclusions:** These findings indicate that PS-NPs can persist within aquatic organisms and induce physiological stress, underscoring the importance of monitoring nanoplastic contamination as an emerging public health concern. Understanding nanoparticle uptake at lower trophic levels provides critical insight into potential exposure risks to humans through seafood consumption and highlights the need for regulatory frameworks addressing nanoplastic pollution in coastal environments. **Acknowledgements:** This study was funded by the United States Department of Agriculture (USDA), award number NIFA-HSI 2020-38422-32258, NIFA-RIIA 2020-70004-33081, and NIFA-AGFEI 2020-70004-32394, and by the National Science Foundation (NSF), award number HRD 1345156.

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Elucidating Structure and Function of Human Proteins with Limited Knowledge Using Bioinformatics

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Background and Objectives: Unknown human proteins represent a significant gap in the understanding of the human proteome and its biological and clinical implications. Since proteins are molecules that perform essential functions in the regulation of cellular processes, their characterization is crucial for understanding various biological mechanisms that could eventually facilitate the development of biomedical solutions. The purpose of this project was to computationally evaluate and characterize 30 human proteins with a knownness factor of 0 in order to predict and compare their structure, function, and biomedical relevance. **Methods:** For this purpose, a bioinformatic analysis was conducted using programs such as SWISS-MODEL, AlphaFold, UniProt, InterPro, BLAST, and CLEAN to study the molecular information of each protein. **Results:** The analysis allowed the generation of 3D models for each protein, identification of functional domains, prediction of cellular localization, and association with potential biological and pathological processes in which they might be involved. **Conclusion:** Overall, this study highlights the importance of structurally and functionally characterizing proteins with limited information to reduce the existing knowledge gap in the human proteome and thereby advance the understanding of human biology and potential future biomedical applications.

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Aphthera™ Intraocular Lens in a Latino Population: A Case Series

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Background and Objectives: The small-aperture Aphthera™ intraocular lens (IOL) is designed to extend depth of focus using a pinhole effect that improves near vision while maintaining quality distance vision. However, outcomes in Latino populations remain underreported. We hypothesized that unilateral Aphthera implantation would improve uncorrected near visual acuity while maintaining functional distance vision in the fellow eye. **Method:** We conducted a retrospective chart review of 49 Latino patients who received cataract extraction with unilateral Aphthera implantation. The fellow (F) eye either had a monofocal IOL or no surgery. Preoperative and postoperative (1 and 6 months) uncorrected distance visual acuity (UDVA, LogMAR) in the F eye, uncorrected near visual acuity (UNVA, LogMAR) in the Aphthera eye, spherical equivalent (SE), and refractive astigmatism were analyzed. Linear mixed-effects regression models assessed changes over time and between eyes. **Results:** Forty-nine patients (mean age 56.5 years; 18 males, 31 females) were included. Mean UDVA in the F eye improved from 0.26 preoperatively to 0.05 at both one and six months. Mean UNVA in the Aphthera eye improved from 0.72 preoperatively to 0.15 at one month and 0.12 at six months. As expected from intentional myopic targeting, SE in the Aphthera eye was significantly more myopic than the F eye at both follow-ups ($p < 0.01$). Although mild residual astigmatism was present in some Aphthera eyes, consistent with the small-aperture design's known ability to functionally neutralize up to approximately -1.00 to -1.05 D of corneal cylinder, these residual values were clinically insignificant. **Conclusion:** Unilateral Aphthera implantation in Latino patients yielded improved near vision, preserved distance acuity in the fellow eye, and predictable refractive targeting. The Aphthera's ability to neutralize low-level astigmatism supports its utility as a presbyopia-correcting option in this population. Limitations include the retrospective design and absence of patient-reported outcome measures. Approved by IRB: University of Puerto Rico Medical Sciences Campus IRB, Protocol 247026677; approval date: 09/24/2024.

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Nanoparticle-Mediated Delivery of Edelfosine to Limit Macrophage Adhesion During Seizure-Related Inflammation

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Seizures and epilepsy can disrupt the blood–brain barrier (BBB), a highly selective interface that protects the brain, maintains homeostasis, and regulates immune cell entry during inflammation. When the BBB is compromised, immune cells—including macrophages—can infiltrate the brain. Once activated, these macrophages release pro-inflammatory cytokines that exacerbate neuroinflammation and contribute to seizure development. Therefore, identifying alternative therapies that reduce inflammation with fewer side effects is a priority in epilepsy research. Edelfosine, an ether lipid, has been shown to decrease pro-inflammatory protein markers in macrophages and reduce pro-inflammatory mRNA expression in microglia. Given its anti-inflammatory activity in both central and peripheral immune cells, we hypothesized that edelfosine would reduce macrophage adhesion to BBB endothelial cells under seizure-like conditions. To test this, we performed a macrophage adhesion assay using murine BBB endothelial cells (bEnd.3, ATCC) and murine macrophages (RAW 264.7, ATCC). Seizure-like conditions were simulated using pilocarpine (Pilo), a muscarinic receptor agonist, and macrophage attachment to the BBB cells was quantified in the presence or absence of edelfosine. Our model was validated with appropriate controls: pilocarpine significantly increased macrophage adhesion compared with vehicle ($p < 0.00005$), and dexamethasone reduced adhesion under pilocarpine stimulation ($p < 0.005$). Testing edelfosine showed it significantly decreased macrophage adhesion following pilocarpine insult ($p < 0.005$), producing an effect comparable to dexamethasone. These results suggest that one mechanism by which edelfosine exerts anti-inflammatory effects under seizure-like conditions may involve reducing macrophage adhesion to the BBB. Because edelfosine does not cross the BBB, ongoing experiments are evaluating a protein-based drug delivery system for edelfosine. Viability assays with dose–response curves are being performed to establish the safety and effectiveness of these nanoparticles. Overall, these findings validate our BBB–macrophage adhesion model as a useful platform for studying epilepsy-related neuroinflammation and highlight edelfosine’s therapeutic potential as an anti-inflammatory. **Acknowledgements:** This research was supported by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM103475.

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Attenuation of $\alpha 7$ Nicotinic Acetylcholine Receptor Dysregulation by Nicotine in the Context of SARS-CoV-2 Spike Protein Exposure

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Background and Objectives: SARS-CoV-2, the etiologic agent of COVID-19, primarily impacts the respiratory system but is increasingly linked to long-term neurological sequelae; the $\alpha 7$ nicotinic acetylcholine receptor ($\alpha 7$ -nAChR) is a central mediator of the cholinergic anti-inflammatory response (CAR) and its dysregulation may contribute to post-COVID neuroinflammation. This study tested whether the SARS-CoV-2 spike protein modulates $\alpha 7$ -nAChR and whether nicotine preserves receptor function. **Methods:** Using SH-SY5Y human neuroblastoma cells, $\alpha 7$ -nAChR protein abundance and localization were assessed by confocal imaging with a fluorescent $\alpha 7$ antagonist after exposure to spike protein (30, 100, 300 nM; 12–48 h). Transcript levels were measured by RT-qPCR (GAPDH reference) and analyzed by the $\Delta\Delta C_t$ method. **Results:** Confocal imaging revealed a clear dose-dependent decrease in $\alpha 7$ -nAChR protein across 12–48 h at all tested concentrations; nicotine pretreatment 24 h before spike exposure preserved receptor protein and prevented this decline. At 12 h, RT-qPCR showed a modest increase in $\alpha 7$ mRNA ($2^{-\Delta\Delta C_t} \approx 1.19$), while protein was already reduced; remaining mRNA time points are pending. **Conclusions:** Spike protein exposure downregulates $\alpha 7$ -nAChR protein while early transcription shows compensatory upregulation at 12 h, indicating a protein–mRNA disconnect that may reflect receptor internalization/degradation or post-transcriptional regulation; nicotine preserves protein levels and may protect CAR. **Acknowledgments:** We thank the Department of Economic Development and Commerce for supporting this research and confocal imaging facility (NIH-NIGMS grant #P30GM149367).

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Food Insecurity Among Hispanic Young Adults from Puerto Rico Enrolled or Not as University Students During the COVID-19 Pandemic

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Background/Objective: Young adults (YA) faced higher rates of food insecurity (FI) than other adults during the COVID-19 pandemic. In one study, people aged 21–39 were overrepresented among adults facing FI in Puerto Rico (PR) during this period. No study has compared FI outcomes between YA enrolled or not as university students (UNIS). We examined the rates and severity of FI, and the odds for presenting at least moderate FI, among YA enrolled (G1=233) versus not enrolled (G2=331) as UNIS during the outbreak. **Method:** Participants aged 21–39 (M=30.37; 80.32% female) completed an online survey (IRB-approved: June 9, 2020). They had to be PR residents for ≥ 3 months before enrollment, have internet access, and understand Spanish. Respondents completed sociodemographic questions and an FI measure. Using ANCOVA (adjusting for age, education, residential zone, living with or without a romantic partner, and living with or without minors), we examined between-group differences in FI Total scores. With ordinal regression, we explored significant associations by item. Using chi-square, we compared FI rates among groups. With logistic regressions, we estimated odds ratios (ORs) for presenting at least moderate FI. **Results:** UNIS surpassed non-students in FI Total scores [$F(1, 547) = 5.53, p = .019$]. In 5 out of 8 items, G1 showed greater odds of being in higher ordinal FI categories, with ORs from 1.44 ($p \leq .05$) to 2.02 ($p \leq .001$). Adjusted ORs remained significant for three items. The rate of moderate FI in G1 (45.41%) was higher

than in G2 (29.36%), $\chi^2(1) = 15.08$, $p \leq .001$. Crude and adjusted ORs for presenting at least moderate FI were 2.00 ($p \leq .001$) and 1.87 ($p = .003$) times higher for G1, respectively. **Conclusion:** Among YA, UNIS reported worse FI outcomes than non-students. Public policies must prioritize economic and human resources aimed at providing UNIS with continuous access to balanced and nutritious meals during health emergencies. IRB Approval Number: 1920-194 (UPR-Río Piedras). **Acknowledgements:** The research project from which the data reported in this study were obtained (known as “COVID-19 and Mental Health in Adults from Puerto Rico”) was financed with the personal funds of the second author. We are thankful to the research assistants for their collaboration in this study. Some of them were hired thanks to funds granted to the Institute for Psychological Research by the Deanship of Graduate Studies and Research from the University of Puerto Rico, Río Piedras Campus.

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Hispanic Students from Public and Private Universities Living in Puerto Rico During the Pandemic: Rates of Mental Disorders and Treatment

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Background/Objective: University students (UNIS) have experienced a recent increase in psychopathology. UNIS with a history of mental disorders (HMD) have worse health outcomes than healthy peers. High rates of mental disorders (RMD) require assigning human and economic resources to strengthen psychotherapy, counseling, and support networks on campus, while providing more efficient referrals for mental health treatment (MHT). In Puerto Rico (PR), the RMD and MHT among UNIS have been understudied during the pandemic. We examined the RMD and MHT of UNIS from PR during this period, exploring differences in these domains among students from public (G1=163) versus private (G2=155) institutions. **Method:** UNIS aged ≥ 21 ($M=33.20$) completed an online survey (IRB-approved: June 9, 2020). They had to be PR residents for ≥ 3 months before enrollment, have internet access, and understand Spanish. Respondents completed a module including questions about their HMD and MHT. We used descriptive statistics and the chi-square test to estimate the sample RMD and MHT and compare groups of UNIS in these domains, respectively. With logistic regression, we examined the crude and adjusted odds ratios (ORs) for presenting different mental disorders or MHT when enrolled in a public university. **Results:** G1 showed significantly higher rates for any depressive, any anxiety, generalized anxiety (GAD), and any mental disorder than G2 ($p \leq .05$). Their odds of being diagnosed with mental disorders ranged from 1.97 (any disorder) to 3.27 (GAD). After adjusting for sociodemographic differences, ORs ranged from 2.12 (any anxiety) to 3.47 (GAD). Public UNIS showed higher adjusted odds for having presented ≥ 2 mental disorders (2.97), any lifetime MHT (2.12), and any MHT during the pandemic (1.92). **Conclusion:** Public UNIS present higher rates and odds of mental disorders, comorbidity, and lifetime and during-pandemic MHT than their peers. Public administrators should prioritize the mental health needs of public UNIS, particularly during health emergencies. IRB Approval Number: 1920-194 (UPR-Río Piedras). **Acknowledgements:** The research project from which the data reported in this study were obtained (known as “COVID-19 and Mental Health in Adults from Puerto Rico”) was financed with the personal funds of the second author. We are thankful to the research assistants for their collaboration in this study. Some of them were hired thanks to funds granted to the Institute for Psychological Research by the Deanship of Graduate Studies and Research from the University of Puerto Rico, Río Piedras Campus.

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Long Coronavirus Disease 2019 (COVID-19) in Children and Adolescents in Puerto Rico: Preliminary Findings

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Background: Accumulating evidence suggests that children are not immune to the prolonged consequences of COVID-19. Among these long-term effects is Post-Acute Sequelae of SARS-CoV-2 infection (PASC), commonly referred to as Long COVID. In 2022, 1.3% of U.S. children had Long COVID-19, with Hispanic children at higher risk. To this date, there are no reports on the prevalence of Long COVID in children in Puerto Rico. **Methods:** This study employs a descriptive cross-sectional design using a questionnaire. It focuses on 400 caregivers of children and adolescents receiving medical care at the University Pediatric Hospital between October 2024 and May 2026. Statistix 9.0 was used for a descriptive analysis. Approved by IRB (Protocol #2511504798; 17/11/2025). **Results:** A total of 108 children, aged 3 to 19 years old, have participated. Fifty-four percent had a previous infection with COVID-19; of those, in 94.9% of cases, acute infection occurred more than 3 months prior, and 10.2% required hospitalization. Among the 20 symptoms associated with long COVID-19, the most reported were muscle/joint pain (36.2%), back/neck pain (31%), dry cough (31%), headache (25.9%), palpitations (22.4%), and anxiety (22.4%). **Conclusions:** The preliminary findings suggest a high prevalence of long COVID-19 among study subjects. These findings underscore the need for targeted interventions and further investigation into the long-term outcomes of pediatric patients affected by COVID-19 in Puerto Rico, paving the way for more effective prevention and treatment strategies tailored to this vulnerable group.

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Multi-Tool Bioinformatic Workflow for Functional and Structural Characterization of Unknown Human Proteins

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Background & Objectives: The functional and structural characterization of unknown Homo sapiens proteins remains a major challenge in biomedical sciences, as gaps in protein annotation limit our understanding of their roles in human physiology and their relationship with disease. This study aimed to identify potential cellular localization, structural features, possible biological roles, and disease associations in 15 uncharacterized human proteins with a knownness factor of 0. **Methods:** We obtained the UniProt IDs and corresponding amino acid sequences and analyzed them using BLAST, UniProt, InterPro, BRENDA, and CLEAN to evaluate sequence similarity, conserved domains, and potential enzymatic activity. Structural predictions were generated using SWISS-MODEL and AlphaFold. **Results:** Results showed that most proteins were located in the nucleus or cytoplasm. Approximately 20% of the proteins were associated with cancer, 40% with neurological or neurodegenerative disorders, and 20% with infectious or autoimmune conditions. Around 66% of evaluated human proteins resulted in reliable

3D models, whereas the remaining 33% of the proteins resulted in disorganized structures with low confidence.

Conclusions: The multi-tool bioinformatic workflow successfully uncovered functional and structural clues for these uncharacterized proteins, enabling the creation of a protein–disease association dataset. These findings demonstrate the effectiveness of this bioinformatic workflow for predicting roles of unknown human proteins and support future research expanding this pipeline to additional uncharacterized proteins. **Acknowledgments:** We acknowledge the University of Puerto Rico–Mayagüez, the Moya Lab, our mentor Dr. Andrés Moya, and my research partner Zaimar Custodio for their support and guidance.

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Elucidating the Neuroprotective Role of WDR33 Against α -Synuclein-Induced Cytotoxicity

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Background and Objectives: A consistent pathological hallmark in Parkinson's Disease (PD) is the accumulation of misfolded alpha-synuclein in dopaminergic neurons of the substantia nigra, a region essential for motor function. To elucidate the molecular drivers of alpha-synuclein accumulation, gene-gene and protein-protein interaction screens were conducted, coupled with bioinformatic analyses integrating in-house datasets and published genome-wide association studies. These efforts identified more than 2,000 candidate genes implicated in disease mechanisms. CRISPR-based knockdown screens demonstrated that silencing a subset of these genes induces cellular toxicity, with the effect most pronounced in cells overexpressing alpha-synuclein. Among the strongest candidates was WDR33, which encodes a canonical isoform (V1) within the cleavage and polyadenylation specificity factor complex, as well as two noncanonical isoforms (V2 and V3) implicated in regulating the cGAS-STING-dependent innate immune response. These isoforms are proposed to modulate neuroinflammatory signaling and autophagy, thereby influencing alpha-synuclein aggregation. **Methods:** To evaluate this hypothesis, WDR33 isoform expression was profiled in induced pluripotent stem cell (iPSC)-derived neurons overexpressing alpha-synuclein, compared with isogenic controls. Alpha-synuclein protein levels were quantified by Western blot, and isoform-specific expression was assessed by mRNA analysis. In addition, a CRISPR-based knockdown screen using a dead Cas9 system was conducted over 28 days to assess alpha-synuclein-induced cytotoxicity. **Results:** Preliminary results indicated no significant change in V1, V2, or V3 isoform expression across alpha-synuclein iPSC lines. However, WDR33 knockdown markedly increased cytotoxicity in neurons with high alpha-synuclein expression by day 18. **Conclusions:** Findings suggest that WDR33 loss exacerbates alpha-synuclein-induced toxicity, underscoring a critical role for WDR33 in neuroinflammatory pathways and proteostasis in PD. Future work will focus on generating a WDR33 knockout model, testing isoform-specific rescue of alpha-synuclein toxicity, and quantifying cytokine induction through the cGAS-STING pathway. Collectively, these studies aim to define WDR33's mechanistic role in PD pathogenesis and identify therapeutic targets for neuroprotection. IRB protocol #: 2009P000775, Mass General Brigham Institutional Review Board (IRB). **Acknowledgements:** This research was conducted at Brigham and Women's Hospital in the Khurana Laboratory as part of the Harvard/MIT Early Access to Research Training (HEART) Summer Program, supported by the Office for Culture and Community Engagement at Harvard Medical School.

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Molecular Mechanisms of Alcohol Tolerance: The Role of miR-9 in BK Channel Regulation via Wnt/ β -Catenin Signaling

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Background & Objectives: Molecular alcohol tolerance arises from adaptive changes in gene expression and protein signaling pathways that modulate large-conductance calcium-activated potassium (BK) channels, which play a key role in neuronal excitability and behavior. This study investigates the regulatory role of microRNA-9 (miR-9) in these processes. Two principal components underlie molecular alcohol tolerance: (1) the transcriptional regulation of BK channel isoform expression, and (2) the redistribution of these channels at the cellular membrane. MiR-9 is upregulated by ethanol exposure and selectively suppresses the alcohol-sensitive BK channel isoform Zero. In parallel, miR-9 activation triggers the Wnt/ β -catenin signaling pathway, promoting the internalization and redistribution of BK channels, thereby altering their surface localization. Our findings demonstrate that ethanol-induced miR-9 upregulation is essential for both Wnt/ β -catenin pathway activation and BK channel redistribution, positioning miR-9 as a central regulator coordinating these two components of molecular alcohol tolerance. **Methods:** To test this hypothesis, we employed HEK293 cells stably expressing the BK channel Zero isoform. Cells were cultured to 70% confluence, transfected with miR-9 mimics or inhibitors, and treated with 25 mM ethanol and 100 mM LiCl. Following treatment, cells were immunostained for BK channels, β -catenin, and membrane and nuclear markers, and imaged using confocal microscopy (NIS-Elements Viewer Software). Quantitative analyses included measurements of β -catenin and BK fluorescence intensity, colocalization analysis (Manders' and Pearson's coefficients), and statistical evaluation via Student's t-tests and one-way ANOVA. **Results:** Preliminary results indicate that miR-9 upregulation enhances β -catenin expression, and that ethanol-induced β -catenin elevation depends on miR-9 activity. **Conclusions:** These data support a model in which miR-9 modulates both BK channel isoform expression and Wnt/ β -catenin signaling, thereby orchestrating the redistribution of BK channels crucial for the development of molecular alcohol tolerance. **Acknowledgements:** This research was supported by 1NIH NIAA 1R01AA027808-01A1 (CV-M), HiREC-NIMHDS21MD001830 (CV-M), RCMi-CCRHD U54 MD007600 (EF-R).

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Epidemiology and Age-Related Patterns of Genitourinary Trauma in Puerto Rico

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Background: Genitourinary (GU) trauma accounts for 10–20% of abdominal injuries globally, yet data specific to Puerto Rico are limited. Injury patterns, organ involvement and outcomes differ with age group. Given the island's aging population, understanding these trends is essential for improving prevention and care. This study is the first

in the region to examine the epidemiology of GU trauma and compare injury mechanisms, organ involvement, and complications by age. **Methods:** An IRB-approved retrospective analysis (approved on 12/10/2024) was conducted of patients with GU trauma admitted to the Puerto Rico Trauma Hospital from 2017-2025 using data from the Trauma Registry. Patients were classified as non-geriatric (18–64 years) or geriatric (≥ 65 years). Sociodemographic, clinical, and injury-related characteristics were compared using Chi-square or Fisher's Exact tests. Statistical significance was considered when $p < 0.05$. **Results:** Among 10,151 trauma admissions, 695 (6.8%) involved GU injuries. Most patients were male (83%) with a median age of 37 years. Geriatric patients accounted for 12% of cases. Falls were the leading mechanism among geriatrics (42.8% vs. 9.3%), whereas firearms (3.6% vs. 30.4%) and motor-vehicle accidents (17.8% vs. 21.6%) predominated in non-geriatrics ($p < 0.01$). The most affected organs were the kidney (54.8%), bladder/urethra (23.5%), and adrenal gland (14.8%). Adrenal injuries were more frequent in geriatrics (25% vs. 13.4%, $p < 0.01$), and scrotal/testicular injuries were less frequent (1.2% vs. 9.0%, $p = 0.01$). Complications were higher in geriatrics compared to non-geriatrics, including acute kidney injury (19.1% vs. 8.4%), urinary tract infection (15.5% vs. 7.0%), and arrhythmia (8.3% vs. 1.5%) (all $p < 0.01$). Mortality was greater among geriatrics (22.6% vs. 8.0%, $p < 0.01$). **Conclusion:** GU trauma patterns in Puerto Rico differ by age. Geriatrics sustain fewer injuries but exhibit distinct mechanisms and organ involvement. They also experienced higher complication and mortality rates, underscoring the need for age-focused trauma assessment and care. **Acknowledgements:** This project was supported by the Trauma Surgery Department of the UPR School of Medicine Medical Sciences Campus. IRB #ID: 2407250415, Approval date: 12/10/2024, Lead Unit: 401321501060000.

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Crusted Scabies Masquerading as Psoriasis in a 4-Year-Old Girl

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Purpose: Crusted scabies is a rare, severe form of infestation with *Sarcoptes scabiei* var. *hominis*, typically seen in immunocompromised or neurologically impaired individuals. In pediatric patients, it often mimics inflammatory or fungal dermatoses, leading to delayed recognition and inappropriate treatment. This case highlights the importance of early diagnosis and multidisciplinary management to prevent complications and community transmission. **Case Description:** A 4-year-old girl with a history of neurodevelopmental disability presented with a one-year history of progressive, intensely pruritic eruptions involving the scalp, palms, soles, nails, and trunk. She had previously been treated with dupilumab and topical corticosteroids for presumed dermatitis without improvement. Physical examination revealed diffuse erythematous papules with burrows, thick hyperkeratotic crusts on the occipital scalp, toes, and palms, and dystrophic nails with yellow-brown hyperkeratosis. The distribution initially raised suspicion for tinea capitis or psoriasis. Dermatology consultation confirmed crusted scabies. The patient was treated with oral ivermectin 3 mg, permethrin 5% for the patient and contacts, moisturizing lotion, gentle cleansers with emollients, and strict photoprotection. Environmental measures included washing or bagging fomites for two weeks. At follow-up, the patient showed marked clinical improvement; however, follow-up photographs were not available. **Conclusion:** Crusted scabies should be considered in children with neurodevelopmental disorders presenting with chronic, treatment-refractory dermatoses. Misdiagnosis as eczema, psoriasis, or fungal infection is

common, especially with scalp or nail involvement. Early recognition and combined systemic–topical therapy, along with environmental and contact management, are critical for successful outcomes and preventing recurrence.

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Trends in CIP Hospitalizations and Cannabis Licenses for Patients with Dopaminergic Disorders in Puerto Rico

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Background: Cannabis-induced psychosis (CIP) refers to the triggering of psychotic symptoms due to cannabis use. Our previous conference abstract (Serrano & Velázquez, 2025) showed an increase in CIP hospitalizations after the COVID pandemic. A possible explanation being that, during the pandemic, telemedicine might have facilitated the acquisition of cannabis licenses. Several qualifying conditions for medical cannabis licensure involve neurobiological disorders affecting dopaminergic pathways, which have been implicated in vulnerability to CIP hospitalizations (Murray, 2014). Given this, and the rise in CIP hospitalizations in Puerto Rico, we hypothesized that post-pandemic changes in CIP rates may correlate with changes in medical cannabis licensing for disorders involving dopaminergic pathway impairment. **Methods:** We created a model to analyze the trend of cannabis licenses over the years using public information from “Junta Reglamentadora del Cannabis Medicinal”. The data included the total number of patients who had licenses grouped by the different diagnoses. We used R code with a Poisson regression for analysis. **Results:** Contrary to our hypothesis, there has been a steady decline in licensure for diseases associated with dopaminergic dysregulation. Annual reductions were seen in Alzheimer’s disease [24.2%, (IRR = 0.76; 95% CI: 0.73–0.79; $p < 1 \times 10^{-52}$)], Parkinson’s disease [21.6%, (IRR = 0.78; 95% CI: 0.76–0.81; $p < 1 \times 10^{-44}$)], and Bipolar disorder [4.1%, (IRR = 0.96; 95% CI: 0.95–0.97; $p = 3 \times 10^{-13}$)]. Surprisingly, PTSD increased approximately 5.9% annually (IRR = 1.06; 95% CI: 1.046–1.072; $p = 3 \times 10^{-19}$). There was no significant change in the overall number of licenses. **Conclusion:** Post-pandemic increases in CIP hospitalizations do not coincide with increases in cannabis licensing for dopaminergic disorders. These findings suggest that the recent rise in CIP in Puerto Rico is unlikely to be explained by diagnostic shifts in medical cannabis licensing, and other contributing factors should be investigated. **Acknowledgements:** We acknowledge the Hospital de la Universidad de Puerto Rico, Dr. Federico Trilla, for providing access and institutional support. We extend our thanks to Dr. Diana Díaz, Dr. Karen Martínez, and Dr. Fernández Sifre for their mentorship and contributions throughout the research process. IBR protocol 2506429725 approved July 2025.

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When Pierre Robin Isn’t the Full Story: Chromosome 1p36 Deletion Syndrome with Craniofacial Abnormalities

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Introduction: Pierre Robin Sequence (PRS) is characterized by micrognathia, glossoptosis, and, in most cases, cleft palate, often leading to airway obstruction, difficulty eating, and failure to thrive. Chromosome 1p36 Deletion Syndrome is the most common terminal deletion syndrome, affecting approximately 1 in 5,000 to 1 in 10,000 U.S. births. It results from a heterozygous deletion on chromosome 1p and presents with variable features including craniofacial dysmorphism, developmental delays, seizures, heart defects, and brain abnormalities. Despite its prevalence, no cases have been documented in the Puerto Rican population. **Case Description:** We present the case of a 10-month-old male born at 38 weeks via cesarean section with cleft palate, micrognathia, and glossoptosis. PRS was diagnosed at 3-months of age. He experienced recurrent hospitalizations due to pneumonias, respiratory distress, and cardiac findings including pulmonary artery stenosis and a patent foramen ovale. A tracheostomy and gastrostomy were placed. At 5 months, he developed epilepsy and had global developmental delay, spastic diplegia, and cortical dysplasia on brain MRI. Genetic testing revealed 1p36 deletion involving GNB1, RERE, NGLY1, and PEX10. Further chromosomal microarray testing was recommended but not completed due to the patient's passing. **Conclusion:** This case highlights the importance of recognition of syndromic associations with PRS features that can prompt earlier genetic evaluation and coordination of care. Herein, we emphasize the complexity of diagnosing a patient presenting with overlapping features of Pierre Robin sequence and 1p36 Deletion Syndrome. The presence of multiple congenital anomalies including craniofacial dysmorphisms, seizures, structural brain malformations, and congenital heart diseases should prompt early suspicion of an underlying syndromic or genetic etiology. Comprehensive genetic testing is indicated in such presentations to enable earlier diagnosis, guide multidisciplinary treatment, and better-informed clinical decisions.

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Improving Uptake of Lung Cancer Screening for Survivors of Common Cancers

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Background: Lung cancer remains the leading cause of cancer-related death, largely due to late-stage diagnosis. Lung cancer screening (LCS) with low-dose computed tomography reduces mortality, yet fewer than 20% of eligible individuals are screened annually. Cancer survivors eligible for LCS are at high risk and are often evaluated in annual survivorship visits, but poor documentation of smoking history in electronic medical records (EMR) limits identification of eligible patients. This study evaluated whether improving awareness of LCS eligibility in advance of survivorship visits could increase LCS referrals among survivors of common cancers. **Methods:** We conducted a prospective evaluation of adults aged 50-80 years with a history of breast or colorectal cancer attending survivorship visits at a comprehensive cancer center between July 21 and August 25, 2025. Tobacco history was abstracted from structured EMR fields and free-text notes using REDCap. LCS eligibility was determined using 2021 U.S. Preventive Services Task Force and 2023 American Cancer Society guidelines. Descriptive statistics

were calculated using Stata 18. **Results:** Among 108 survivors (74 breast, 34 colorectal; median age 59 years), only 13 (12%) had complete tobacco history in structured EMR fields, while 94 (87%) had data solely in free-text notes. Eleven (10%) met LCS eligibility criteria, and six (55%) were newly identified and referred for LDCT. Extrapolated to annual clinic volumes, approximately 360 survivors may meet LCS criteria yearly. **Conclusions:** Incomplete EMR documentation contributes to under-recognition of screening eligibility among cancer survivors. Integrating structured tobacco history review into survivorship visits may improve early lung cancer detection.

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Predicción Mediante Redes Neuronales de la Terapia Antibiótica Óptima: Tratamiento Combinado Versus Secuencial en *Escherichia coli*

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Antecedentes y Objetivos: La resistencia antimicrobiana constituye una de las mayores amenazas para la salud global, causando millones de infecciones anuales. Estrategias de tratamiento secuencial han demostrado ventajas sobre terapias combinadas en reducir el desarrollo de resistencias, pero la selección óptima para escenarios clínicos específicos permanece compleja. Este estudio desarrolla un marco computacional basado en redes neuronales para predecir la estrategia terapéutica óptima bajo condiciones microbiológicas y farmacocinéticas dadas. **Métodos:** Generamos un conjunto de datos sintético de 15,000 muestras utilizando distribuciones realistas de Concentraciones Mínimas Inhibitorias (CMI) de EUCAST y parámetros de crecimiento bacteriano para *Escherichia coli*. Las variables incluyeron valores de CMI para ampicilina y tetraciclina, tasas de crecimiento bacteriano, concentraciones antibióticas y duración de tratamiento. Evaluamos múltiples arquitecturas de redes neuronales (redes neuronales artificiales, LSTM) comparándolas con modelos tradicionales (Random Forest, regresión logística). **Resultados:** Los modelos de redes neuronales alcanzaron 85\% de precisión en predecir la estrategia óptima, superando significativamente a modelos tradicionales (Random Forest: 78\%, regresión logística: 72\%). El análisis de importancia de características identificó los valores de CMI (48\% de importancia combinada) y concentraciones antibióticas (30\%) como predictores dominantes. El enfoque optimizado demostró 35\% de reducción en el desarrollo de resistencia comparado con protocolos estándar. **Conclusión:** Las redes neuronales proveen un marco computacional efectivo para optimizar estrategias de terapia antibiótica, demostrando desempeño superior sobre aproximaciones tradicionales. Esta metodología ofrece potencial para sistemas de apoyo clínico que combatan la resistencia antimicrobiana mediante recomendaciones de tratamiento personalizadas. Trabajos futuros se enfocarán en validación con datos clínicos y expansión a combinaciones adicionales de antibióticos. **Reconocimientos:** Esta investigación utilizó datos disponibles públicamente de EUCAST y literatura publicada.

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Prenatal Detection and Postnatal Challenges in a Complex Neonatal Renal Case: A Multidisciplinary Approach

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Purpose: Early identification of renal disease can significantly improve long-term outcomes. Prenatal imaging and laboratory studies play a crucial role in detecting serious neonatal pathologies, reducing morbidity and mortality. This case illustrates the importance of multidisciplinary collaboration in achieving an accurate diagnosis of clinically significant renal disease. **Case Description:** A newborn male from a twin pregnancy was delivered at 35 weeks to a 28-year-old primigravida with preeclampsia, gestational diabetes, and uncontrolled hypothyroidism. Family history included a maternal aunt with early-onset renal failure requiring transplantation. At 32 weeks, prenatal ultrasound revealed an oval-shaped fluid collection adjacent to the right kidney, interpreted as a urinoma. Postnatally, the patient's examination was unremarkable except for undescended testes. Renal ultrasound demonstrated dilation, and follow-up imaging suggested multicystic dysplastic kidney (MCDK) versus obstructive dysplasia. Laboratory tests showed elevated creatinine, and a urine culture grew *Enterobacter cloacae*, treated successfully with TMP/SMX. A voiding cystourethrogram (VCUG) revealed no vesicoureteral reflux. The patient remains under multidisciplinary follow-up with pending nuclear medicine imaging to assess renal function and confirm nonfunctioning parenchyma. **Conclusion:** This case emphasizes the vital role of prenatal imaging in anticipating neonatal renal pathology and guiding postnatal management. Early detection, timely diagnostic evaluation, and coordinated care among specialties such as Radiology, Nephrology, Urology, and Pediatrics are key to optimizing outcomes. Continuous monitoring is essential to prevent complications such as recurrent urinary tract infections, hydronephrosis, and renal insufficiency. Effective communication within a multidisciplinary team can be decisive in managing complex neonatal renal disorders with potential long-term consequences. **Acknowledgements:** The authors gratefully acknowledge the collaboration of the Radiology, Nephrology, Urology, Pediatrics, and Infectious Diseases teams in the management of this patient.

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Raising Awareness Beyond Altered Mental Status: PRES Presenting with Headache in Hypertensive Emergency

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Purpose: Posterior Reversible Encephalopathy Syndrome (PRES) is a neurological disorder characterized by headache, seizures, visual disturbances, and altered mental status. It is often associated with severe hypertension, acute blood pressure fluctuations, renal dysfunction, or exposure to cytotoxic or immunosuppressive agents. Neuroimaging typically demonstrates vasogenic edema in the parieto-occipital regions. Although termed "reversible," delayed diagnosis can result in infarction, hemorrhage, or death. **Case Description:** A 62-year-old male with hypertension, chronic kidney disease, heart failure with reduced ejection fraction, diabetes mellitus, and hepatitis C presented with severe headache and dyspnea. He was alert but in moderate respiratory distress. Blood pressure was 215/179 mm Hg, and laboratory findings revealed renal impairment (creatinine 2.53 mg/dL) with respiratory acidosis. A non-contrast CT scan of the head showed occipital hypodensities suggestive of PRES, later confirmed by MRI demonstrating posterior circulation vasogenic edema without diffusion restriction. The patient was admitted to

the intensive care unit, where gradual blood pressure reduction with intravenous antihypertensives led to clinical improvement. **Conclusion:** This case emphasizes that PRES can occur without seizures or significant mental status changes. Isolated headache, considered nonspecific in hypertensive crises, may be the sole manifestation. This subtlety increases the risk of misclassification, such as hypertensive encephalopathy or migraine. PRES involves endothelial dysfunction, cerebrovascular dysregulation, and disruption of the blood–brain barrier, leading to vasogenic edema. Early recognition of PRES is essential to prevent irreversible outcomes. Magnetic resonance imaging (MRI) without contrast remains the diagnostic gold standard, as computed tomography (CT) may fail to detect early or subtle changes. Careful blood pressure management is crucial to achieving reversibility and avoiding neurological sequelae. Clinicians should maintain a high index of suspicion for PRES in patients with uncontrolled hypertension or renal disease who present with new-onset headache or subtle neurological findings. **Acknowledgments:** The authors declare no conflicts of interest and received no external funding.

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Unraveling a Diagnostic Dilemma: Cocaine-Induced Vasculitis versus Lupus Vasculitis in a Patient with Oronasal Fistula

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Purpose: Cocaine-induced vasculitis remains a diagnostic challenge. This case highlights the importance of obtaining a detailed history to minimize the possibility of anchoring bias in patients with a longstanding history of autoimmune disease which can obscure a hidden diagnosis in a sea of confounders. **Case Description:** A middle-aged Hispanic female with history of discoid lupus presented with painful oral ulcerations located in the soft palate associated with dysgeusia, nasal regurgitation of liquids and cacosmia. She reported night sweats, chronic arthralgias at wrist and ankles and generalized malaise. Physical examination revealed erythematous nasal vestibules and midline soft palate well circumscribed lesion with purulent secretions on oral cavity. Found with septal perforation on nasal endoscopy. Imaging hypodense collection with a rim enhancement consistent with small abscess collection. Laboratory evaluation revealed leukocytosis, elevated ESR, positive ANA and p-ANCA, negative dsDNA, c-ANCA normal C3/C4, and a positive urine toxicology for cocaine. Nasal mucosa biopsy showed an ulcer bed with acute vasculitis and neutrophilic infiltrates. Given the patient's history of discoid lupus, arthralgias, and nasal mucosa involvement, autoimmune disorders such as lupus vasculitis and granulomatosis with polyangiitis were initially considered. However, the localized destructive lesion, cocaine-positive toxicology, and lack of evidence of active systemic lupus activity favored levamisole-adulterated cocaine-induced vasculitis as a definitive diagnosis. For management of the oronasal fistula-associated abscess, the patient was started on intravenous ampicillin-sulbactam along with prednisone 20mg, and methotrexate 2.5mg. **Conclusion:** This case illustrates the value of a detailed history, as cocaine-induced vasculitis may cause midline destructive lesions of nasal septum which are often ANCA-positive and may be indistinguishable from otolaryngologic lesions of granulomatosis with polyangiitis or even mimic lupus vasculitis. In patients with pre-existing autoimmune disease, this can lead to diagnostic challenges which may only be distinguished by lack of systemic symptoms and thorough history taking. **Acknowledgements:** The author acknowledges the patient for their contribution to medical knowledge. No conflicts of interest or financial relationships to disclose regarding the subject matter of this case report.

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Clinical Course and Management of WNT-Mutated Medulloblastoma in a Young Adult: A Case Study

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Purpose: Adult medulloblastomas are greatly understudied due to their rarity, representing less than 1% of all central nervous system tumors. While pediatric patients with WNT-mutated medulloblastoma experience survival rates approaching 90%, adults do not share this prognosis, and optimal management strategies remain unclear. This case highlights the clinical course and treatment considerations for an adult female with WNT-mutated medulloblastoma. **Case Description:** A 22-year-old female presented with a 3-month history of right arm weakness, bilateral lower-extremity numbness, headaches, speech difficulty, gait instability, and weight loss. Diagnosis was delayed due to lack of medical insurance. Imaging revealed a posterior fossa mass with associated hydrocephalus, prompting emergent external ventricular drain placement followed by suboccipital craniotomy and tumor resection. Pathology confirmed WNT-mutated medulloblastoma. Postoperative recovery included steroid tapering and a 3-week inpatient rehabilitation course. Staging revealed no metastatic disease. The amount of residual tissue in the posterior fossa appeared minimal and below the 1.5 cm² threshold considered high-risk. She was treated with craniospinal irradiation at a dose of 23.4 Gy in 13 fractions, followed by a 30.6 Gy boost to the posterior fossa in 17 fractions, for a total dose of 54 Gy. Due to limited clinical studies and the absence of standardized adult guidelines, therapy followed adapted pediatric protocols, including craniospinal irradiation with focal boost completed in July 2025 and maintenance chemotherapy derived from combined ACNS0332 and SJMB12 protocols. Her course was complicated by neuropathy, febrile neutropenia, stomatitis, electrolyte disturbances, and severe nausea requiring multimodal antiemetic therapy and dose modifications. Persistent deficits included ataxia, tremor, dysmetria, and expressive aphasia, for which she continues PT/OT and speech therapy. Follow-up MRI on October 14, 2025 showed no residual or recurrent disease. **Conclusion:** This case underscores the importance of documenting adult medulloblastoma to better characterize treatment tolerance and outcomes. It emphasizes multidisciplinary care, close toxicity monitoring, and rehabilitation support. Further research is needed to understand age-related prognostic differences in WNT-mutated medulloblastoma. **Acknowledgments:** We acknowledge Dr. Rocío Rivera-Valentín and the UPR Comprehensive Cancer Center care team. No conflicts of interest or external funding are declared.

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From Fibroadenoma to Phyllodes Tumor: Diagnostic and Therapeutic Insights in a Pediatric Case Report

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Background: Phyllodes tumors are a rare fibroepithelial breast neoplasm, particularly uncommon in pediatric populations. Their presence in children poses unique diagnostic and therapeutic challenges, as breast masses in this age group are often presumed benign. **Purpose:** This report is presented to highlight the importance of careful evaluation and broader implications for women's health in pediatric oncology. **Case Description:** In detail, an adolescent female presented with progressive breast masses initially interpreted as fibroadenomas. Imaging studies revealed multiple solid lesions, and histopathological evaluation confirmed a benign phyllodes tumor

associated with atypical ductal hyperplasia. Surgical intervention was performed, but margins remained positive, raising questions about the need for re-excision. Recent guidelines suggest that negative margins may not always be required in benign phyllodes tumors due to low recurrence rates, underscoring the evolving nature of management strategies. The case was reviewed in a multidisciplinary tumor board, where consensus favored surveillance with imaging rather than additional surgery. Genetic testing was performed given the family history of cancer, and results did not indicate a hereditary cancer syndrome. Although germ-line testing did not reveal a hereditary cancer syndrome, family history remains significant. Ongoing consideration of expanded panels may be warranted. Follow-up care included ongoing imaging, strategic counseling, and coordination with teams to ensure comprehensive management. **Conclusion:** In conclusion this case illustrates the diagnostic transitioning from one type of disease to another in a pediatric patient, emphasizing the importance of pathology review. Future research should focus on refining pediatric-specific management protocols and exploring genetic predisposition in early-onset breast neoplasms. **Acknowledgments:** The authors acknowledge the contributions of the HemaOncoPeds Lab and its Principal Investigator, Dr. Rocío K. Rivera Valentín.

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An Atypical Presentation of APDS in a Pediatric Patient with Episodic Neutropenia: A Case Report

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Introduction: Cyclic neutropenia is a rare blood disorder characterized by episodic absolute neutrophil count (ANC) lower than 1,500 cells/ μ L. Working diagnoses include transient neutropenia, autoimmune diseases, and hereditary disorders. One of such disorders is Activated PI3K delta syndrome (APDS), an uncommon hereditary immunodeficiency resulting from a PIK3CD gene variant that impairs immune cells. The incidence of APDS is around 1 to 2 cases per million population. Disease complications include recurrent respiratory tract infections and lymphoproliferations. The median age for symptom onset is around 2 years of age. **Case Report:** 2-year-old female presented with recurrent episodic severe neutropenia since the early neonatal period with associated mild upper respiratory tract infections and achieved normal ANC between episodes of severe neutropenia. During the neutropenia workup, the patient developed mucous diarrhea, which did not improve despite changes in diet. No familiar history of neutropenia or bone marrow failure syndromes. ANC counts fluctuated between 300 and > 2,000 when febrile. An extensive laboratory workup was completed, including bone marrow evaluation and genetic testing for primary immunodeficiency due to concerns for Swachman Diamond syndrome. All tests came back normal, and an SBDS mutation was not detected. However, the patient was found to be a carrier for multiple variants of unknown significance, including a PI3KCD mutation. Functional analysis of the PI3KCD protein revealed increased mTOR signaling activity and an increase in T follicular helper cells and transitional B cells, suggesting a gain-of-function mutation. This variant has not been previously reported in the literature. Patient continues to develop and grow appropriately, with no infections and with mild neutropenia. **Conclusions:** This is an atypical case of APDS with a new PI3KCD variant to is likely pathogenic. Multidisciplinary care is essential in rare diseases such as APDS to achieve a timely diagnosis and offer early therapeutic interventions and surveillance. **Acknowledgments:** We honor the contributions of Dr. Rocío Rivera-Valentín, MD/PhD. Conflict of interests: No conflicts of interests are declared.

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Patrones de Desigualdad y Vulnerabilidad Socio-Espacial en San Juan, Puerto Rico: Una Exploración

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Justificación: La ciudad es un sistema socio-espacial complejo donde las relaciones sociales se manifiestan, se inscriben y se refuerzan en la configuración física del entorno construido. El análisis espacial, por tanto, permite contextualizar y relacionar los factores estructurales que perpetúan la desigualdad y la vulnerabilidad social. Se propone un análisis de caso para examinar cómo la configuración espacial es inherente a la actividad humana y cómo su morfología puede contribuir a la reproducción de la desigualdad socio-espacial. **Descripción:** Esta investigación explora la relación entre la morfología urbana de San Juan y un indicador compuesto de vulnerabilidad social. Este indicador se construye a partir de datos a nivel de tramo censal, incluyendo la mediana de ingreso, el porcentaje de viviendas alquiladas, el nivel educativo (porcentaje con bachillerato o superior, mayores de 25 años) y la tasa de desempleo. El objetivo es evaluar si la estructura de la red vial se asocia con la distribución de la desigualdad. Para ello, se utiliza el análisis de sintaxis espacial (Space Syntax) para medir la integración global y la asimetría relativa de la trama urbana. Buscamos identificar patrones de vulnerabilidad socio-espacial determinados por la configuración del espacio. **Conclusión:** Los resultados exploratorios muestran que, en primer lugar, se observa un patrón espacial que indica una correlación entre la morfología urbana (integración/asimetría de la red vial) y la vulnerabilidad social en zonas específicas. En segundo lugar, se identificaron agrupaciones de zonas vulnerables localizadas en la periferia del centro de la ciudad, lo que sugiere un patrón de segregación socio-espacial. Los resultados exploratorios dan paso a futuras investigaciones que integren la geografía histórica a los análisis formales que puedan dar cuenta del proceso de formación y transformación de la trama urbana en San Juan.

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Silent Side Effects: Presentation of ART-Related Lactic Acidosis in Infants Presenting to the Emergency Department

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Purpose: Antiretroviral therapy (ART) prophylaxis in infants born to mothers with HIV has significantly reduced vertical transmission rates. However, these medications carry risks of severe side effects including lactic acidosis, a potentially life-threatening condition. Recognizing these toxicities is crucial for emergency department (ED) providers managing pediatric patients on ART. **Case presentation:** A 7-day-old male born at 37 weeks to an HIV-positive mother presented to the ED with persistent, inconsolable crying. The parents denied any additional symptoms and he was feeding adequately for his age. The neonate was receiving an ART regimen of Lamivudine, Zidovudine, and Nevirapine for prophylaxis. Vital signs were stable. Mild clear discharge from the right eye was noted.

Initial evaluation revealed elevated lactic acid levels (4.5 mmol/L, repeated at 4.1 mmol/L) with otherwise normal laboratory findings. The patient was transferred to a higher level of care for further management, where lactic acid levels escalated to 11.7 mmol/L. In coordination with the Infectious Disease team, the ART regimen was changed to Raltegravir. The patient was monitored in the pediatric ward and discharged without further complications, with outpatient follow-up arranged. **Discussion:** This case highlights the potential for ART-related mitochondrial toxicity, particularly from Zidovudine, resulting in severe lactic acidosis. Prompt identification and intervention are paramount. Current guidelines recommend Zidovudine as part of prophylactic regimens, but emerging toxicities necessitate flexibility in treatment plans. Switching to Raltegravir, a drug with a lower risk of lactic acidosis, led to a favorable outcome in this scenario. **Conclusion:** Lactic acidosis in neonates on ART underscores the importance of routine lactate monitoring and individualized treatment adjustments. This case emphasizes vigilance in managing ART toxicities to prevent severe complications, ensuring optimal outcomes for neonates at risk. **Acknowledgements:** The authors received no external funding and declare no conflicts of interest.

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Don't Shrug it Off: The Shoulder Pain That Warned a Necrotic Splenic Abscess

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Purpose: Splenic abscess is rare and potentially fatal, often presenting with nonspecific symptoms. Early recognition is crucial, especially in high-risk patients. We present a case initially manifesting as isolated left shoulder and neck pain. **Case:** A 51-year-old female with insulin-dependent diabetes mellitus, chronic kidney disease, and a recent cerebrovascular accident with left-sided residual deficits presented to the emergency department with acute left shoulder pain radiating to the chest and neck. The patient was hemodynamically stable and physical examination was reassuring. Cardiopulmonary evaluation resulted unremarkable and laboratory workup was only significant for mild hyperglycemia; she was discharged with supportive care. She returned within 24 hours with worsening malaise and evolving abdominal pain now localized to the left upper quadrant. Laboratory results revealed diabetic ketoacidosis, bacteremia, mild transaminitis, elevated alkaline phosphatase, and acute kidney injury. Contrast-enhanced CT of the abdomen and pelvis demonstrated a large necrotic splenic abscess. The patient was started on broad-spectrum antibiotics, underwent attempted percutaneous drainage, and ultimately required splenectomy. Blood cultures grew *Klebsiella pneumoniae*. She completed antibiotic therapy with clinical improvement. **Discussion:** This case illustrates the diagnostic challenge posed by splenic abscess, especially when early manifestations mimic musculoskeletal or cardiopulmonary etiologies. Kehr's sign, or referred left shoulder pain resulting from diaphragmatic irritation transmitted via the phrenic nerve, may precede abdominal findings and serve as the only early clue. High-risk populations such as patients with relative or total immunosuppression, endocarditis or prior splenic infarction, warrant a lower threshold for abdominal imaging when presenting with unexplained shoulder or chest pain. Early use of cross-sectional imaging can prevent diagnostic delays. **Conclusion:** Atypical shoulder pain in high-risk patients should prompt consideration of intra-abdominal pathology. Early CT imaging is crucial for the timely diagnosis and management of splenic abscess. **Acknowledgement:** The authors report no financial support and no conflicts of interest.

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When Weakness Whispers: A Case of Late Genetic Diagnosis of a Congenital Myasthenic Syndrome

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Purpose: Congenital myasthenic syndromes (CMS) are rare inherited disorders of neuromuscular transmission. Mutations in RAPSN, encoding a postsynaptic scaffolding protein critical for acetylcholine receptor (AChR) clustering, are among the most frequent genetic causes. Although congenital by definition, most patients present during childhood and later stabilize, rendering adult diagnosis elusive. When evaluating adults with episodic weakness, differentiating CMS from autoimmune myasthenia gravis is essential by assessing serum autoantibodies. Electrodiagnostic studies may aid diagnosis, though low-frequency repetitive nerve stimulation (RNS) can appear normal, delaying recognition. **Case Description:** A 27-year-old woman with no perinatal complications or family history of neuromuscular disease presented with childhood-onset, exertion-induced generalized weakness causing frequent falls. Rheumatologic and metabolic evaluations were unrevealing. Neurological examination between episodes was normal with full strength and no ocular findings. Low-frequency RNS (3 Hz) of ulnar, spinal accessory, and facial nerves showed no decrement, while needle EMG demonstrated mildly decreased motor unit amplitudes in the right deltoid and biceps. Genetic testing revealed a homozygous RAPSN c.264C>A (p.Asn88Lys) pathogenic variant, confirming the diagnosis of CMS. The patient was started on pyridostigmine, 30–60 mg every 4–6 hours, titrated to symptom response and tolerance. **Conclusion:** This case broadens the clinical spectrum of RAPSN-related CMS and underscores that a normal RNS does not exclude the diagnosis. Recognition of mild or atypical phenotypes prevents misdiagnosis and avoids unnecessary immunotherapy. Early genetic confirmation enables genotype-directed treatment with acetylcholinesterase inhibitors and β_2 -adrenergic agonists, improving strength, endurance, and quality of life. With expanding access to molecular testing, precision diagnostics now play a pivotal role in identifying treatable congenital myasthenic syndromes and improving long-term outcomes in adults with previously unexplained neuromuscular weakness. **Acknowledgments:** We thank the patient for providing informed consent and participation. This work received no external funding or financial support. The authors report no conflicts of interest or relevant financial disclosures.

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Pediatric Insights: A Distinctive Case of Acute Intermittent Porphyrria

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Purpose: The rarity of diagnosing Acute Intermittent Porphyrria (AIP) in a pubertal female in Puerto Rico is increasingly high. The importance of this case is crucial because prompt treatment can prevent potentially life-threatening complications like peripheral neuropathy, paralysis, and respiratory failure. **Case Description:** We present the case of a 16-year-old female with past medical history of bilateral hearing loss, hypotonia, hypothyroidism, chronic kidney disease, and neuropathy. Patient was in her usual state of health until September 2024. She began having

anxiety attacks, abdominal pain, back pain, and generalized weakness resulting in wheelchair needs. In October 2024, was hospitalized in another institution where she was diagnosed with myelitis. After intravenous steroid pulses, her condition worsened, leading to respiratory failure needing invasive mechanical ventilation. Patient is eventually transferred to our institution for therapeutic plasma exchange. We received a quadriplegic patient, treated with plasmapheresis, without significant improvement. **Discussion:** AIP was on the differential but not as the primary diagnosis because of its rare incidence. Patients porphobilinogen levels in random urine were positive and along with her clinical presentation we confirmed diagnosis. Intravenous Heme therapy helps reduce the levels of ALA and Porphobilinogen (PBG), porphyrin precursors which are elevated during acute attacks. She was discharged bedridden, dependent on tracheostomy and gastrostomy but able to shrug her shoulders and slightly flex arms and elbows. She recovered her truncal movement, legs remained flaccid with improved sensation. **Conclusion:** These patients need multidisciplinary follow up care to continue recovery and improvement of quality of life. Follow up with primary neurologist for neuropathic pain, genetics for Hemin infusions, Physical medicine for home physical therapy/ occupational therapy, Speech pathology for communication therapy with speech valve, Psychiatry to continue therapy and anti-depressive medications.

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White Lung and Adnexal Cystic Mass, What is the Correlation? Catamenial Hemothorax

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Purpose: We anticipate that this case will help with disease awareness, early diagnosis, and treatment. **Case Description:** We present the case of a 20-year-old female without significant medical history, who is transferred to the Pediatric Intensive Care Unit (PICU) due to white lung on chest computed tomography (CT). Over one year, she reported exertional shortness of breath, recurrent shoulder pain during menses, decreased appetite, abdominal distension, and weight loss. Imaging revealed a large right pleural effusion on chest CT and a left adnexal cystic lesion on pelvic ultrasound. Patient underwent chest tube placement and 2 Liters of dark red-colored pleural fluid were extracted. She developed spontaneous pneumothorax in the subsequent days and once the patient started her menses, the pleural fluid changed to bright red. Video Assisted Thoracoscopic Surgery was done but no endometrial tissue was found. **Discussion** We discuss a patient with no prior gynecological history who underwent an extensive workup by a multidisciplinary team to determine the cause of her pleural effusion and pneumothorax: ruling out malignancy, inflammatory, and autoimmune diseases. Catamenial pneumothorax is typically associated with menses, even in the absence of pelvic endometriosis symptoms. When catamenial pneumothorax is diagnosed, it should prompt a search for thoracic endometriosis. Hormonal therapy, such as Gonadotropin releasing hormone (GnRH) analogues for 6-12 months post-surgery, is recommended to prevent recurrence. Although patient's VATS procedure did not reveal thoracic endometriosis, catamenial pneumothorax was still considered in the differential diagnosis. **Conclusion:** The main criteria for the diagnosis of catamenial pneumothorax is spontaneous pneumothorax within 72 hours before or after the start of a menstrual period. Often presents with right-sided location and pleural lesions; however, these criteria do not have to be met for diagnosis (3). Long-term surveillance is mandatory due to high risk of recurrence.

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**When Device Malfunction Mimics Disease Progression:
Lead Malposition in CRT-D Therapy**

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Purpose: Cardiac resynchronization therapy with defibrillator (CRT-D) significantly improves morbidity and mortality in patients with heart failure with reduced ejection fraction (HFrEF). However, device malfunction, though uncommon, can mimic disease progression and lead to persistent symptoms. This case highlights a rare CRT-D malfunction due to lead malposition into the coronary sinus, emphasizing the importance of thorough evaluation in refractory heart failure. **Case Description:** A 76-year-old male with coronary artery disease (s/p PCI), HFrEF (EF <20%), and CRT-D implantation for secondary prevention of ventricular tachyarrhythmias presented with progressive dyspnea on exertion and bilateral leg edema for several weeks. He also reported longstanding orthopnea and intermittent exertional chest pressure. Notably, his cardiologist had previously disabled the left ventricular pacing lead due to diaphragmatic stimulation. On evaluation, patient denied medication or dietary noncompliance, recent infection, uncontrolled hypertension, or ischemia-associated symptoms. Transthoracic echocardiography revealed severe left ventricular systolic dysfunction, moderate-severe tricuspid regurgitation, and an echogenic structure with erratic movement attached to the right ventricular (RV) lead. Chest CT demonstrated abnormal RV lead placement coursing into the anterior portion of the coronary sinus. Device interrogation showed no recent arrhythmic events and ineffective CRT pacing. The patient underwent electrophysiologic evaluation and lead revision. A new RV lead was placed in the interventricular septum with successful left bundle branch capture, while the old malpositioned leads were capped and abandoned. Post-procedure interrogation confirmed adequate sensing and pacing parameters, and the patient experienced significant symptomatic improvement. **Conclusion:** Persistent heart failure symptoms in CRT-D recipients should prompt evaluation for device malfunction, especially when common causes of decompensation have been excluded. Lead malposition, though rare, can substantially compromise therapy effectiveness. Multimodality imaging and device interrogation are essential for diagnosis, and timely lead revision can result in marked clinical improvement. Emerging pacing techniques such as left bundle branch pacing offer viable alternatives when lead positioning fails. **Acknowledgments:** The authors report no sources of funding and no conflicts of interest to disclose.

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**Scleromyxedema Following PD-1 Inhibitor Therapy: A Rare Immune-Related
Adverse Event Associated with Dostarlimab**

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Purpose: Immune checkpoint inhibitors (ICIs), including programmed cell death-1 (PD-1) inhibitors, which enhance T-cell-mediated immunity by blocking the PD-1 pathway, have transformed cancer therapy but can induce immune-related adverse events (irAEs) across organ systems. Cutaneous irAEs are common; however, fibro-mucinous dermatoses such as scleromyxedema, a rare systemic disorder with generalized papular and sclerodermoid eruptions typically linked to monoclonal gammopathy, have not been associated with ICIs. **Case Description:** A 72-year-old woman with diabetes complicated by chronic kidney disease and history of breast cancer (now in remission), was diagnosed nine months earlier with endometrial carcinoma. She underwent total abdominal hysterectomy, bilateral salpingo-oophorectomy and lymphadenectomy, completed six cycles of adjuvant carboplatin, paclitaxel, and PD-1 inhibitor dostarlimab without progression, followed by maintenance dostarlimab monotherapy. Five months after dostarlimab initiation, she developed rapidly progressive skin thickening. Examination showed diffuse induration and papular thickening from the ankles to the lower abdomen with a peau d'orange appearance and restricted knee and hip mobility, without sclerodactyly. Laboratory studies revealed anemia (9.8 g/dL), antinuclear antibody 1:160, rheumatoid factor 31 IU/mL, C-reactive protein 21 mg/L, erythrocyte sedimentation rate 29 mm/h, and proteinuria (protein-to-creatinine ratio 2.9) with serum creatinine 1.2 mg/dL; complement levels were normal. Autoantibodies associated with rheumatic diseases were negative. Serum protein electrophoresis was negative. Abdominal computed tomography showed peritoneal fold thickening. Skin biopsy demonstrated dermal mucin deposition, fibroblast proliferation, fibrosis, and CD31/CD34-positive vascular dilation, consistent with late-stage scleromyxedema. Dostarlimab was discontinued. Prednisone 60 mg daily and UVA1 phototherapy were started, followed by intravenous immunoglobulin (2 g/kg every 4 weeks x4), resulting in complete resolution within seven months. Steroids were fully tapered, and no recurrence has occurred. **Conclusion:** To our knowledge, this represents the first case of scleromyxedema after PD-1 inhibitor therapy, broadening the spectrum of ICI-related fibrosing dermatoses and emphasizing the importance of timely, coordinated immunomodulatory care.

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Increased Risk of Surgical Complications in Post-Bariatric Plastic Surgery Patients: A Descriptive Study

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The increasing number of bariatric procedures has led to a growing demand for post-bariatric body contouring surgery. However, these patients present unique risk factors that may increase postoperative complication rates. This study aimed to evaluate postoperative complication rates among post-bariatric patients undergoing plastic surgery in a private practice setting. This retrospective cohort study described and examined the records of twenty-one Puerto Rican female adults with a previous history of bariatric surgery, who underwent plastic surgery

performed by a physician in his private practice between the years 2000 and 2025. Data from eligible cases were manually extracted from medical records. Complication rates were calculated for the cohort using descriptive statistics and compared to complication rates reported in the literature for healthy non-bariatric patients undergoing similar procedures. Among 21 post-bariatric patients, 42.86% experienced postoperative complications, slightly higher than the 31.5% rate reported in the literature, possibly reflecting differences in patient characteristics and surgical factors. Higher complication rates were observed in patients undergoing multiple procedures and those with a BMI > 30, with the highest complication burden seen in patients aged 41–50. The most frequently observed complications in our cohort included diastasis recurrence, abdominal scar revision, and postoperative seroma, consistent with prior literature reporting seroma and wound-related complications among the most common adverse events following body contouring procedures. Post-bariatric patients undergoing plastic surgery experienced a high complication rate (42.86%), consistent with the elevated risk reported in the literature and higher than rates typically observed in non-bariatric plastic surgery patients. Higher BMI and multiple procedures were associated with increased complication rates in our cohort. Understanding the unique challenges of this population is essential for optimizing outcomes, reducing revision rates, and improving patient satisfaction in post-bariatric plastic surgery. We gratefully acknowledge Dr. Juan Maldonado for his assistance in providing access to patient records for this research. His support and cooperation were invaluable to our research.

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Emergence of Autistic-like Features in a Child with Rolandic Epilepsy and CNTNAP2 Variant: A Longitudinal Case Report

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Purpose: Atypical Rolandic epilepsy, particularly when characterized by near-continuous centrotemporal spikes, is increasingly recognized for its impact on neurodevelopment. Prolonged epileptiform activity during critical developmental windows can result in cognitive, language, behavioral, and social-communication changes resembling autism spectrum disorder (ASD). This case is presented to highlight the epilepsy, particularly when characterized by near-continuous centrotemporal spikes, is increasingly recognized for its impact on neurodevelopment. Prolonged epileptiform activity during critical developmental windows can emergence of autistic-like traits in a child with long-standing, treatment-resistant focal epilepsy and evolving EEG abnormalities.

Case Description: A previously developmentally typical girl presented at 2 years 11 months with frequent focal motor seizures involving eyelid fluttering and intermittent right-sided clonic movements. Serial EEGs revealed persistent left centrotemporal spikes, later progressing to sleep-potentiated nearly continuous discharges consistent with atypical Rolandic epilepsy. MRI, PET, metabolic, and autoimmune evaluations were normal. Despite extensive trials of antiseizure medications (levetiracetam, oxcarbazepine, valproate, topiramate, clobazam, lacosamide) and intermittent steroid responsiveness, she remained highly refractory, with seizure clusters reaching 30–50 episodes/day throughout early childhood. Beginning around age 6–7, teachers and therapists documented new behavioral rigidity, reduced eye contact, sensory sensitivities, distractibility, emotional dysregulation, and social withdrawal. Neuropsychological testing revealed an emerging discrepancy: preserved verbal reasoning but marked impairment in visual-motor integration, executive function, and adaptive behaviors, mirroring patterns often seen in ASD. Over the following years, she developed inattention, anxiety, learning difficulties, and reduced social reciprocity, prompting school accommodations and multiple therapies (speech, OT, psychology). A genetic epilepsy

panel later revealed a CNTNAP2 K1127E variant of uncertain significance, a gene previously associated with focal epilepsy, language disorders, and autism-related phenotypes. No structural lesion or surgically resectable focus was identified, and seizures persisted sporadically into adolescence. Approved by IRB: EMSJBIRB- 14-2025 (August 5, 2025). **Conclusion:** This case demonstrates the long-term neurobehavioral consequences of continuous, treatment-resistant centrottemporal epileptiform activity. The late emergence of autistic-like traits highlights the dynamic interaction between epilepsy, brain development, and genetic vulnerability. Clinicians should monitor for progressive changes in social communication, behavior, and adaptive functioning in children with malignant centrottemporal epilepsy patterns. Early neuropsychological surveillance and multidisciplinary intervention may mitigate developmental regression. Further research is needed to clarify the role of genes such as CNTNAP2 in epilepsy-associated ASD phenotypes. **Acknowledgments:** We thank the patient and family for their collaboration. No external funding was received. The authors report no conflicts of interest.

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Post-Esophagectomy Paraconduit Hiatal Hernia (PCHH) Repair with Mesh

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Background: Paraconduit hernias are rare complications after esophagectomies with gastrointestinal reconstruction, involving herniation of intra-abdominal organs into the thoracic cavity through a defect adjacent to the esophageal conduit, typically at the hiatus. Unlike typical hiatal hernias, they occur beside the reconstructed conduit rather than through the original hiatus, often impairing quality of life. Although mesh is widely used in hernia repair, its role in paraconduit hernias remains underexplored. Repair usually entails hernia reduction and placement of a synthetic or composite mesh around the conduit. This study aims to fill this gap by examining real-world outcomes and perioperative characteristics of patients who underwent PCHH repair with mesh, emphasizing effectiveness, recurrence, and prognosis. **Methods:** Medical records of six patients who underwent mesh repair for a PCHH were retrospectively reviewed using the Stanford Research Repository (STARR) Tools platform. Clinical notes and imaging were analyzed for demographics, esophagectomy details, hernia characteristics and surgery, perioperative course, outcomes, and symptom resolution after repair. Pre- and postoperative imaging of the esophageal conduit was compared to assess anatomical changes after repair. **Results:** This case series demonstrated favorable outcomes in most patients. The interval between esophagectomy and hernia repair ranged from 4 months to over 5 years (mean $\approx$ 2 years). Hernias frequently involved large diaphragmatic defects containing bowel, colon, omentum, or multiple organs, producing symptoms such as dyspnea, dysphagia, nausea, and abdominal discomfort. Hospital stays ranged from 3–5 days, with minor complications in two patients and one requiring an 18 day stay. Five of six (83%) reported symptom resolution and resumed regular or soft diets; one recurrence occurred due to unrelated gastrointestinal disease. **Conclusion:** The findings of this study suggest that mesh repair appears as an effective approach for PCHH, with low recurrence and high symptom resolution rates. Outcomes support its selective use, though larger, long-term studies are needed to guide future management.

**Material Hardships, Behavioral Health, and Nutritional Status of Children
Living in Southern Puerto Rico**

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Background & Objective: Material hardships (MH) reflect the inability to afford basic needs such as food, housing, and medical care, providing a more direct measure of vulnerability than income poverty. While poverty rates identify families, whose income falls below the US Census poverty threshold by household size excluding governmental assistance, many at or above still experience MH. Food insecurity (FI), a form of MH defined by the USDA as disrupted or deteriorated diet quality, disproportionately affects households with children. FI is linked to poor nutrition, chronic illness, and behavioral challenges. Puerto Rico has the highest US rates of child poverty (~52%) and FI (~33%). Understanding the intersect between income poverty and FI is essential for identifying pediatric health risks. This study examines associations between FI, anxiety symptoms, and body mass index (BMI) in children aged 8–12 from southern Puerto Rico. **Methods:** This cross-sectional study, approved by IRB (#2403189072A001, May 28, 2024), enrolled 104 caregivers at pediatric clinics in Ponce, PR. Caregivers completed the USDA Food Security Survey Module and a questionnaire on social determinants of health. Child anxiety was assessed using the NIH Toolbox Parent Proxy Anxiety Questionnaire. Height and weight were extracted from medical records to calculate BMI per CDC standards. Data were analyzed using chi-square tests, t-tests, and regression models. **Results:** Children's mean age was 10.1 (1.5) years; half (52.9%) lived below the poverty threshold, and 17.3% of households were FI. Children from FI households had higher anxiety scores than food-secure peers ($p=0.003$), adjusting for age, sex, and income poverty. **Conclusion:** Children in FI households are more likely to experience anxiety symptomatology than those in food-secure homes, independent of income poverty. This suggests that FI may better explain child behavioral health risks. Addressing MH may improve public health practice impacting children's behavioral health and well-being. **Acknowledgments:** We thank Centro Médico Episcopal San Lucas (Dr. F. Soto) and PHSU community-based pediatricians (Drs. M. Justiniano, H. Flores, B. Robles) for facilitating access to their patient population and for data collection. Most importantly, we thank the families who made this study possible.

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From Ultrasound to Embolization in Uterine Arteriovenous Malformation: A Clinical Case Review

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Purpose: To illustrate the diagnostic pathway and fertility-preserving management of a uterine arteriovenous malformation (AVM), a rare but potentially life-threatening vascular anomaly that often presents with recurrent or severe uterine bleeding. This case emphasizes the value of multimodality imaging and timely intervention to prevent hemorrhagic complications. **Case Description:** A 29-year-old female presented with persistent vaginal bleeding following dilation and curettage (D&C). She had no significant past medical history and was hemodynamically stable, but reported ongoing heavy bleeding. Transvaginal ultrasound with color Doppler revealed a heterogeneous myometrial lesion with turbulent, high-velocity flow concerning for a vascular malformation. Further evaluation with contrast-enhanced CT and MRI demonstrated serpiginous enhancing vessels within the myometrium, confirming the presence of a uterine AVM. Given the patient's strong desire for future fertility, selective uterine artery embolization (UAE) was recommended as a minimally invasive, uterus-sparing treatment option. Embolization was performed via angiography, targeting the feeding uterine arteries using particulate embolic agents. Post-procedural imaging confirmed successful occlusion of the abnormal vascular network. Clinically, the patient experienced complete cessation of bleeding and had an uncomplicated recovery. **Conclusion:** This case highlights the importance of early recognition of uterine AVMs and the role of multimodality imaging in diagnosis and treatment planning. Ultrasound serves as an essential first-line tool, while CT, MRI, and angiography provide definitive characterization. Selective UAE is a safe, effective, and fertility-preserving therapy, underscoring the value of interdisciplinary collaboration in managing these patients. **Acknowledgments:** The authors report no conflicts of interest and received no external funding for this case presentation.

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Scrotal Edema and Cellulitis as the Initial Presentation of AIDS in an Undiagnosed HIV-Positive Patient: A Case Report

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Introduction/Background: Scrotal cellulitis is rare, particularly in patients with HIV/AIDS, and may manifest atypically or mimic more severe genitourinary diseases. In immunocompromised individuals, early recognition and tailored management of these infections is essential, as they may be the initial presentation for undiagnosed AIDS. **Case Description:** A 35-year-old man with a history of generalized anxiety, smoking, and multiple male sexual partners presented to the ED with bilateral scrotal swelling, pain, erythema, fever, and chills. Clinical exam showed a tender, erythematous, and swollen scrotum, without fluctuance or visible necrosis. Imaging revealed diffuse soft tissue edema and complex hydrocele, without abscess. Laboratory workup revealed leukocytosis, thrombocytopenia, and neutrophilia. Despite empiric antibiotics and surgical exploration, there was no purulence, confirming a

diagnosis of cellulitis rather than abscess. Persistent symptoms and cytopenia prompted HIV testing (RNA PCR 1,610 copies/mL, positive). The patient left AMA before HAART; two weeks later, he developed an ulcerated scrotal mass (biopsy declined; Kaposi sarcoma vs. squamous carcinoma considered). HAART was initiated and, at six months follow-up, the mass had resolved as confirmed by Infectious Disease physician. **Discussion:** This case highlights scrotal cellulitis as an atypical presenting sign of AIDS. The literature mostly focuses on Fournier's gangrene as a typical HIV-related genitourinary infection, but non-necrotizing, localized cellulitis is extremely rare. Previous reports describe a variety of infectious causes and presentations. Prompt imaging enabled accurate diagnosis and allowed conservative management, avoiding unnecessary debridement. The total resolution of the scrotal mass while the patient was on HAART strongly suggests Kaposi sarcoma, despite the absence of histological confirmation. **Conclusion:** Scrotal cellulitis can be the first clinical indication of AIDS. Awareness of immunosuppression in atypical cases, prompt imaging, and collaboration between urology, infectious diseases, and surgical teams is paramount. HAART was central to both resolution and diagnosis, highlighting the value of considering HIV-related etiologies in severe or atypical scrotal infections. This case adds to the limited literature on non-necrotizing scrotal cellulitis in HIV patients.

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Trusting the Patient Over the Pattern: Uncovering a Benign Osteochondroma Behind Atypical Pain

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Purpose: Atypical presentations present a barrier to clinical diagnoses when physicians rely solely on pattern recognition as a diagnostic tool. Believing the patient's history and averting anchoring biases resulted, in this case, in the diagnosis of a rare presentation of a T12 benign osteochondroma in an otherwise healthy pediatric patient. **Case Description:** A 15-year-old female with no past medical history presented to the ED with complaints of atraumatic chest pain, right flank pain and right upper quadrant abdominal pain that began insidiously that morning. Physical examination was relevant only for exquisite pain upon palpation of the right anterior chest wall, right flank and right upper quadrant that was aggravated by posturing. Labs, including CBC, CMP, U/A, B-HCG, all within normal limits. Chest radiograph revealed an abdominal right upper quadrant calcification of unclear origin. This led to prompt evaluation with bedside right upper quadrant ultrasound, which was remarkable for a hyperechoic lesion casting an acoustic shadow posterior to the right kidney. Further characterization with abdominopelvic CT revealed a bony tumor arising from T12, suggestive of a benign osteochondroma. Patient was then discharged with MRI referral and follow up with neurosurgery outpatient within a month. MRI confirmed the lesion and ruled out intraspinal involvement. Definitive neurosurgical management is still ongoing. **Conclusion:** This case highlights the importance of clinical gestalt and curiosity when objective findings in a physical examination fail to explain a patient's symptoms. Had the patient's atypical musculoskeletal pain in the T12 distribution been disregarded, serious outcomes, such as spinal cord compression, could have emerged and produced significant morbidity as the tumor continued to grow. **Acknowledgements:** No conflicts of interest were identified. No identifiers will be used in the case presentation. Written informed consent was obtained from the patient's guardian for publication of this case report and any accompanying images.

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Cutaneous Warning Signs of a Hidden Malignancy

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Purpose: Paraneoplastic pemphigus or paraneoplastic autoimmune multiorgan syndrome (PNP/PAMS) is a bullous disorder characterized by a polymorphic mucocutaneous eruption associated with underlying neoplasms. Half of cases may present prior to a diagnosis of malignancy, for which cutaneous lesions may ¹be the first indication of disease. We highlight a case in which severe chronic skin lesions led to the diagnosis of Cholangiocarcinoma, emphasizing the importance of high clinical suspicion in the setting of refractory cutaneous manifestations.

Case Description: A 75-year-old female with a past medical history of hypertension, diabetes, hypothyroidism, and hyperlipidemia presented with ulcerating and erosive bullous lesions involving oral mucosa, genitalia, trunk, and extremities of 2 years evolution. The patient was followed at outpatient dermatology clinics for steroid resistant lesions, requiring multiple hospitalizations. Initial biopsies suggested lichen planus versus lichenoid drug eruption. However, since the patient had refractory disease, an extensive work up to rule out a paraneoplastic pemphigus in the setting of occult malignancy was initiated. The most recent biopsy upon worsening of lesions showed bandlike lymphocytic infiltrate in the epidermis with vacuolar alteration of the basal layer, suggestive of lichenoid dermatitis. Abdominopelvic CT revealed a hepatic lesion that was later confirmed as Cholangiocarcinoma. The patient's chronic course of a lichenoid eruption with associated malignancy was highly indicative of PNP/PAMS. She was hospitalized for stabilization prior to dermatology follow-up. Her course was complicated with superimposed infections and respiratory failure. She had significant clinical deterioration and subsequently expired. **Conclusion:** Paraneoplastic pemphigus is almost exclusively observed with lymphoproliferative malignancy. Solid organ malignancies have been described, but to our knowledge, associated cholangiocarcinoma has not been reported. PNP/PAMS manifests as severe disease and represents a poor prognosis, for which looking beyond skin lesions for occult malignancy is of utmost importance to ensure prompt diagnosis and management of the underlying culprit.

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Unusual Joint Involvement in Remitting Seronegative Symmetrical Synovitis with Pitting Edema Syndrome

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Purpose: Remitting seronegative symmetrical synovitis with pitting edema (RS3PE) syndrome is a rare inflammatory disorder characterized by the acute onset of symmetrical distal synovitis, pitting edema of the hands and feet, elevated inflammatory markers, absence of rheumatoid factor, and lack of radiographic erosions. The condition typically affects the hands, feet, wrists, ankles, and shoulders, while knee involvement is uncommon. To our knowledge, knee involvement has not been previously reported. Herein, we present the case of a patient who initially presented with polyarthralgia, including knee involvement, leading to the diagnosis of RS3PE syndrome.

Case Description: A 62-year-old man with a history of gout, hypertension, coronary artery disease, and heart failure presented with two months of melena and fatigue. During hospitalization, he developed diffuse polyarthralgia involving the knees, ankles, elbows, and shoulders. Physical examination demonstrated distal hand edema; swelling and tenderness of the knees and ankles; and limitation in the range of motion of the shoulders and elbows. Laboratory studies revealed microcytic anemia, leukocytosis with neutrophilia, and markedly elevated inflammatory markers, including ESR and CRP. Arthrocentesis of the right knee demonstrated an inflammatory synovial fluid with polymorphonuclear predominance, negative cultures, and no crystals. Magnetic resonance imaging of the upper extremity showed tenosynovitis of the flexor digitorum superficialis and profundus tendons. Malignancy screening, for pulmonary, gastrointestinal, and prostate cancers, was unremarkable. The patient was started on prednisone 20 mg orally daily, resulting in rapid improvement and complete remission within two months. **Conclusion:** RS3PE syndrome carries a significantly higher association with underlying malignancy, highlighting the importance of thorough evaluation. The presence of tenosynovitis, a characteristic feature, may further support the diagnosis. This case emphasizes the need for including RS3PE syndrome in the differential diagnosis of patients presenting with polyarthralgia. Clinicians should remain vigilant, as malignancy screening and timely initiation of immunosuppressive therapy are essential to optimizing patient outcomes.

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Catching the “Puff of Smoke”: Early identification of Moyamoya Disease

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Purpose: Moyamoya Disease is an uncommon vasculopathy of unknown etiology, mostly seen in pediatric patients and females between 45 and 49 years of age. It is characterized by progressive stenosis of the contributing arteries of the circle of Willis, and the formation of a compensatory, net of small-caliber, fragile, blood vessels. Moyamoya Syndrome is the presentation of a moyamoya-like vasculopathy due to a systemic illness and is often difficult to differentiate from Moyamoya Disease. **Case Description:** Here, we present the case of a 32-year-old female with a past medical history of epilepsy, Sjögren's Syndrome, and hypertension, who went to the ER due to sudden onset, severe (10/10), left-sided headache, while running. The headache was associated to right-sided weakness and numbness, dizziness, palpitations, and chest pain. She underwent a brain CT angiography which demonstrated a diffuse left-hemisphere subarachnoid hemorrhage, without evidence of aneurysm or arteriovenous malformation. There was no discrete evidence of arterial stenosis, however, there was prominence of the left-sided cerebral vasculature, in a networking-like formation. Given this asymmetry, digital subtraction angiography (DSA) was recommended to further evaluate the cerebral vasculature. Interestingly, DSA was significant for severe stenosis of the cavernous and supraclinoid portions of the bilateral internal carotid arteries, A1 segment of the bilateral anterior cerebral arteries, and P1 segment of the left posterior cerebral artery. Moreover, a diffuse, classic “puff-like” appearance which characterizes Moyamoya was seen, representing the prominent network of small vessels. The patient underwent optimization of her medical management for blood pressure control and neurosurgery deemed no surgical management was needed. Rheumatology service was consulted and determined that her Sjögren's Disease was well managed and under control, favoring the likelihood that she had presented with Moyamoya Disease rather than Moyamoya Syndrome. **Conclusion:** This case highlights the ability for early identification of Moyamoya-like findings on CT angiography.

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Dupilumab as a Steroid-Sparing Agent in Pemphigus Vulgaris: A Case Report

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Purpose: To highlight the clinical efficacy of dupilumab as a steroid-sparing therapeutic option in a patient with long-standing, treatment-refractory pemphigus vulgaris (PV). **Case Description:** A 61-year-old woman with a 14-year history of biopsy- and serology-confirmed PV presented with chronic, refractory disease despite extensive prior therapies, including azathioprine, mycophenolate mofetil, dapsone, multiple intravenous immunoglobulin courses, and several rituximab regimens. Repeated attempts at prednisone tapering resulted in relapse. Dupilumab was initiated with a subcutaneous injection of 600mg followed by 300mg every two weeks. Lesions improved within two weeks, enabling prednisone reduction to 10mg by week 4. By week 156, azathioprine was tapered to 50mg, and by week 24 the patient reached disease stability on prednisone 2.5 mg every other day. At six months, she remains in complete remission on dupilumab and low-dose immunosuppression. **Conclusion:** This case highlights the successful use of dupilumab in a patient with treatment-refractory PV and underscores its potential role as an alternative therapeutic option for refractory disease. Increasing evidence suggests that dupilumab may serve as a safe and effective steroid-sparing agent in PV by targeting TH2-driven pathways mediated by IL-4 and IL-13. Although clinical responses may vary, many patients achieve disease control with improved tolerability and fewer adverse effects compared to conventional regimens.

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A Case of Recurrent Anti-NMDA Receptor Encephalitis in a Young Woman with Acute Neuropsychiatric Symptoms

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Purpose: Anti-N-methyl-D-aspartate receptor (anti-NMDAR) encephalitis is a rare autoimmune disorder that primarily affects young adults and is often associated with neuropsychiatric symptoms. It can mimic primary psychiatric illnesses, substance-induced psychosis, or infectious encephalitis, leading to diagnostic delays. Early recognition and prompt immunotherapy are critical for favorable outcomes. **Case presentation:** A 29-year-old female with a history of childhood encephalitis at age 14 presented with one month of progressive altered mental status, erratic behavior, visual misperceptions, and a witnessed generalized tonic seizure. On examination, she was agitated, with unstable mood, combative, without neurological deficits. Initial labs were remarkable for positive toxicology for cannabinoids. Head CT and brain MRI were unremarkable. Given subacute psychiatric changes and prior encephalitis, a lumbar puncture was performed. Cerebrospinal fluid (CSF) showed mild pleocytosis with mononuclear predominance, suggestive of viral infection or inflammation, with no organisms on Gram stain or culture. Electroencephalography (EEG) showed low voltage, unreactive background activity, and indicative of a

severe brain abnormality, consistent with encephalitis. The CSF viral panel was negative, but positive for anti-NR1 antibodies. Given progressively severe agitation with auditory hallucinations, the patient was sedated with fentanyl, midazolam, and propofol while receiving treatment. She received intravenous (IV) methylprednisolone for five days, seven sessions of plasmapheresis, IV immunoglobulin for five days, and two rituximab infusions, with resolution of most symptoms. She was discharged on valproic acid, quetiapine, and clonazepam for mood stabilization and seizures, psychosis, and anxiety, respectively. **Discussion:** This case underscores the neuropsychiatric manifestations of anti-NMDAR encephalitis and the importance of maintaining a high index of suspicion in young patients with subacute behavioral changes, psychosis, or seizures. Despite normal neuroimaging, diagnosis was established through CSF anti-NR1 antibody positivity, consistent with autoimmune encephalitis. The patient's improvement following multimodal immunotherapy emphasizes the reversibility of this condition when treated early.

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Beyond the Scan: Lessons from Four Remarkable Nuclear Medicine Cases

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Purpose: To highlight the diagnostic versatility and clinical relevance of Nuclear Medicine through four uncommon conditions in which functional and hybrid imaging provided critical information for staging, management, and follow-up. **Description:** Our department evaluated several patients with rare oncologic and metabolic entities using PET/CT and bone scintigraphy. Among these were plasmablastic lymphoma, sinonasal alveolar rhabdomyosarcoma, juvenile Paget's disease, and sacrococcygeal chordoma. Molecular imaging proved decisive in each scenario. In a 28-year-old HIV-positive male diagnosed with plasmablastic lymphoma, serial ¹⁸F-FDG PET/CT studies after multi-agent chemotherapy allowed quantification of metabolic response and identification of residual disease, guiding therapeutic decisions. In a 30-year-old male with treated sinonasal alveolar rhabdomyosarcoma presenting with left upper-quadrant pain, whole-body PET/CT uncovered distant pancreatic metastases, an exceedingly rare finding, demonstrating the modality's sensitivity for atypical spread patterns. In a 68-year-old female presenting with sacral pain and with history of prior sacrococcygeal chordoma post-radiotherapy, PET/CT revealed local recurrence and hepatic and pulmonary metastases. Despite low FDG uptake, histology confirmed metastatic chordoma. The low FDG avidity underscored the need for CT or MRI correlation and attenuation analysis to avoid underestimation. In a 26-year-old male with juvenile Paget's disease, bone scintigraphy revealed a diffuse, symmetric "super-scan-like" appearance reflecting markedly increased bone turnover, illustrating the ability of nuclear techniques to define disease burden in metabolic bone disorders. Together, these experiences underscore how Nuclear Medicine refines differential diagnosis, monitors therapy, and directly impacts patient outcomes across diverse pathologies. **Conclusion:** Integrating functional imaging into clinical practice enhances precision in evaluating rare malignancies and metabolic diseases. These cases demonstrate that even infrequent disorders can yield substantial teaching value, reaffirming Nuclear Medicine's indispensable role in modern multidisciplinary care. **Acknowledgments:** We thank the technologist teams of the Advanced Technonuclear Imaging Center and the Oncologic Hospital Nuclear Medicine Department. No conflicts of interest declared.

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Neonatal Staphylococcal Scalded Skin Syndrome with Incidental Abdominal Findings: A Case Report

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Purpose: Staphylococcal Scalded Skin Syndrome (SSSS) is a severe dermatologic condition caused by *Staphylococcus aureus* exfoliative toxins A and B. Clinically, SSSS may resemble impetigo, staphylococcal toxic shock syndrome, or Stevens-Johnson syndrome, posing diagnostic challenges. Although primarily a cutaneous condition, incidental complications may occur and can impact clinical outcomes. **Case description:** Case of a 23-day-old male, born at 37 weeks via SVD to a G3P1A1 mother with inadequately treated GBS positive. He was transferred to our institution for evaluation of ocular secretions and progressive facial rash. As per mother, purulent greenish discharge was first noted from the right eye in the morning, which progressed to bilateral eye secretions by the afternoon, accompanied by yellowish discoloration of the facial skin. Approximately one week earlier, she had begun using a nipple shield due to nipple discomfort, after which she observed erythema around the patient's mouth that gradually spread to the face. Physical examination revealed erythematous macular lesions on periorbital regions and cheeks, honey-crusted plaques around the perioral region, and purulent greenish eye discharge. Blood and eye secretion cultures were obtained. The patient was started on intravenous clindamycin and topical tobramycin. Dermatology consultation raised suspicion for SSSS versus acrodermatitis enteropathica, although less likely and zinc levels were ordered. Infectious Disease recommended additional coverage with nafcillin for Gram negative bacteria until cultures were available. Started on vancomycin after nasal cultures were positive for MRSA demonstrating clinical improvement with this management. During hospitalization, the patient developed recurrent abdominal distension with serial KUBs showing dilated bowel loops and minimal distal gas, consistent with ileus versus early obstruction; necrotizing enterocolitis was excluded. He improved with bowel rest, total parenteral nutrition, and antibiotics. **Conclusion:** This case emphasizes the complexity of diagnosing SSSS in neonates, the importance of early culture-directed antimicrobial therapy and underscores the role of multidisciplinary management in addressing incidental complications.

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Thrombotic Thrombocytopenic Purpura with Multisystem Involvement in a Patient with Underlying Mixed Connective Tissue Disease

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Purpose: Mixed connective tissue disease (MCTD) is an autoimmune disorder characterized by high titer autoantibodies against U1 ribonucleoprotein and overlapping features of systemic lupus erythematosus, systemic sclerosis, inflammatory myopathy, and occasionally rheumatoid arthritis. Most patients present with musculoskeletal or cutaneous manifestations, and significant hematologic involvement is uncommon. Thrombotic thrombocytopenic purpura (TTP) is a rare but life-threatening hematologic complication, with only a

few cases described in association with MCTD. This case underscores the importance of promptly recognizing TTP in patients with evolving multisystem autoimmune disease and highlights successful treatment with immunosuppressive therapy when plasma exchange is unavailable. **Case Description:** A 29 year old woman with inflammatory arthritis on low dose methotrexate presented with dyspnea, abdominal discomfort, pleuritic chest pain, scattered ecchymoses and violaceous skin lesions. Examination revealed malar erythema and petechiae. Laboratory evaluation demonstrated microangiopathic hemolytic anemia with elevated LDH and indirect bilirubin, low haptoglobin, schistocytes on peripheral smear, and thrombocytopenia, while renal function remained preserved. Autoimmune serologies showed a speckled ANA pattern and strongly positive anti-U1 RNP antibodies, confirming underlying MCTD. During hospitalization, she developed pericardial effusion, pancreatitis, acalculous cholecystitis and an ischemic cerebral event. ADAMTS13 activity was severely reduced with a detectable inhibitor, confirming immune mediated TTP. Because plasma exchange was unavailable, she was treated with high-dose intravenous corticosteroids and rituximab, achieving complete clinical and hematologic remission. She has remained in sustained remission for more than five years without TTP recurrence, and her MCTD is stable on hydroxychloroquine monotherapy. **Conclusion:** Although uncommon, this case illustrates the need to consider TTP as a potential complication of MCTD. The rapid response to immunosuppression alone, in the absence of plasmapheresis, supports an alternative therapeutic strategy in selected patients when standard therapy is not accessible. Ultimately, this case reinforces the importance of broad diagnostic consideration when autoimmune cytopenias arise in patients with systemic autoimmune features.

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Low Impact Fractures Leading to a Rare Diagnosis of Osteopetrosis with Renal Tubular Acidosis

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Purpose: Osteopetrosis is a rare genetic disorder that tends to present with abnormal bony structure, metabolic acidosis, and intracerebral calcifications. It is usually associated with an autosomal recessive mutation resulting in the deficiency of carbonic anhydrase II (CA2). It has a broad clinical variability and phenotypic presentation that may present a diagnostic enigma in many cases. The purpose of this case report is to highlight the diagnostic challenges posed by rare genetic diseases and to reinforce the importance of early recognition when patients present with atypical combinations of clinical findings. **Case Description:** We highlight a case of a 15-year-old male patient with a pertinent history of multiple low impact fractures, global developmental delay, and intellectual disability. The patient was admitted to the hospital with humerus and femur fractures upon stumbling out of bed. He was found to have unusually hard bones upon orthopedic surgical intervention. Metabolic panel revealed persistently low serum bicarbonate, hyperchloremia, and a normal anion gap, with confirmed metabolic acidosis on blood gases. Findings were suggestive of renal tubular acidosis, prompting a genetic evaluation with a subsequent confirmed diagnosis of Osteopetrosis. The patient was initiated on appropriate therapy with sodium bicarbonate to correct his metabolic acidosis and was subsequently discharged with coordinated multidisciplinary follow-up. **Conclusion:** This case underscores the importance of identifying red flags in medical history, such as low impact fractures and global developmental delay, that may hint towards rare genetic disorders. Prompt recognition and diagnosis is crucial to initiate adequate intervention, avoid severe outcomes, and improve patient care.

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There's More That Meets the Eye: Atypical Peri-Orbital Cellulitis

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Purpose: The reliability of clinical diagnosis often depends on physical exam findings, yet recurrent presentations such as periorbital cellulitis should prompt deeper investigation to ensure appropriate treatment. In this case, what appeared to be persistent periorbital cellulitis in a patient with a known history of breast cancer ultimately proved to be the manifestation of a more complex underlying pathology. **Case Description:** A 56-year-old woman with a history of breast cancer treated with chemotherapy and right-sided radiotherapy presented to the ED with left periorbital swelling. She reported two similar episodes over the past six months, each resolving with oral antibiotics, but this episode had progressed to being unable to open her eye. She denied fever, vision changes, or other systemic symptoms, and exam revealed marked swelling, induration, tenderness, and full, painless extraocular movements—findings consistent with periorbital cellulitis. However, given her oncologic history and recurrent symptoms, a non-contrast maxillofacial CT was obtained, revealing a spiculated periosteal reaction of the left frontal bone and abnormal fat infiltration in the superior orbit, concerning for neoplasm. Patient was subsequently transferred to a tertiary center for a frontal bone biopsy. **Conclusion:** Early recognition of atypical presentations, as demonstrated in this patient who's persistent “peri-orbital cellulitis” revealed frontal bone metastasis from breast cancer, is essential to prevent delays in diagnosis. When typical pathologies become recurrent and don't resolve with standard treatments; emergency physicians must broaden the differential diagnosis and seek further studies to provide more appropriate and definitive interventions. **Acknowledgements:** The authors report no financial support and no conflicts of interest.

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Bridging the Gap: Hemophilia A, Severe Bleeding, and System Barriers in Emergency Care Purpose

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Hemophilia A presents life-threatening bleeding risks, especially when clotting factor replacement is unavailable. Management becomes more complex in secondary care settings where transfer options may be limited. Creative methods of stopping the bleed are warranted. This case demonstrates an imaginative way of treating hemorrhagic shock in Hemophilia A patients without use of factor VIII replacement. **Case Description:** A 22-year-old male with known Hemophilia A presented with moderate gingival bleeding and hematomas 1 day after 3 dental extractions. At initial presentation, hemoglobin was 12.5g/dL and platelets were normal. The patient was shortly discharged after consultation with hematology and internal medicine. He returned less than 24 hours later with worsening oral bleeding, gingival hematomas, and a drop in hemoglobin to 10 g/dL. He subsequently had a large episode of hematemesis, likely from large amount of swallowed blood. Follow up labs showed a hemoglobin of 7 g/dL with thrombocytopenia (platelets 80 x 10⁹/L) with associated hypotension and tachycardia. Transfer to the regional tertiary center was denied due to lack of availability of Factor VIII and concerns regarding futility of transfer. Despite

institutional lack of Factor VIII for intravenous replacement, bridging treatment was initiated using desmopressin, cryoprecipitate, and fresh frozen plasma, along with tranexamic acid-soaked gauze for local control. Given the lack of availability of Factor VIII concentrates, the denial of transfer, and the patient's deteriorating condition with active bleeding, dropping hemoglobin, and decreasing blood pressure, the clinical team elected to use all available hemostatic resources despite recognized limitations. Bleeding resolved approximately 10 hours after arrival. The patient was eventually discharged home after resolution of hemorrhagic shock. **Conclusion:** Severe bleeding in Hemophilia A requires timely and specialized care with factor VIII concentrates as first-line therapy. In resource-limiting settings where factor concentrates are unavailable, desmopressin, cryoprecipitate, tranexamic acid, and fresh frozen plasma may provide hemostatic support and potentially lifesaving treatment. **Acknowledgements:** The authors report no conflict of interests nor financial support.

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Assessing the Impact of Funding Changes on Research and Workforce Stability in Puerto Rico

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Background and Objectives: Recent policy changes and funding cuts have greatly impacted the research ecosystem. As of October 31, 2025, nearly \$22.3 billion in biomedical research funding was cut with Puerto Rico loss reported at \$420.6 million [HHS]. Challenges such as limited funding, loss of support, and administrative burdens threaten the sustainability of academic research. In response, the RCMI-Center for Collaborative Research in Health Disparities (RCMI-CCRHD) at the University of Puerto Rico, Medical Sciences Campus (UPR-MS), conducted a survey to understand the perceived effects of funding changes on its research environment. **Method:** A mixed-methods design combined descriptive analysis of Likert-scale data and qualitative content analysis of open-ended survey responses from researchers affiliated with the RCMI-CCRHD Research Capacity Core facilities. The survey assessed perceptions of funding changes, research challenges, and institutional support. Analyses identified main problems and adaptation strategies related to funding instability and scientific productivity. **Results:** Fifty-seven investigators participated, with 84.2% from UPR-MS, 12.3% from other UPR campuses, and 3.5% from private institutions. Significant disruptions were reported in research activities and policy structures. The most negatively affected areas were planning future research (89.5%), personal well-being (82.5%), and research funding (73.7%). Policy factors seen as most impactful included reductions in training programs (68.4%), DEI policy changes (68.4%), and grant cancellations (61.4%). Qualitative feedback showed widespread anxiety and demotivation (22.8%), administrative burden (14.0%), and decreased collaboration (17.5%). Nearly all respondents (92.9%) experienced emotional or financial stress, and 35% considered leaving academia. However, 24.6% showed resilience by diversifying funding sources, promoting interdisciplinary work, and adjusting project scopes. **Conclusion:** Funding instability has significantly affected research continuity, workforce morale, and the training pipeline among investigators. Nonetheless, the academic community exhibits notable resilience. Sustained institutional support, early-career assistance, and targeted policy actions are critical to preventing talent loss and strengthening research capacity. **Acknowledgments:** Supported by the RCMI - Center for Collaborative Research in Health Disparities, UPR Medical Science Campus, RCMI-Grant NIH-NIHMD U54 MD007600.

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Evaluación Cuantitativa del Aprendizaje en Talleres de Reducción de Riesgos por Uso de Sustancias: Análisis Pre-Pos (Ene-Mar 2025)

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Antecedentes y Objetivos: Las estrategias educativas en prevención y reducción de riesgos son esenciales para fortalecer el conocimiento y la respuesta comunitaria ante problemas de salud pública. El objetivo fue evaluar el impacto en conocimiento de ocho (8) talleres realizados entre enero y marzo de 2025 mediante comparaciones pre-pos de las medias del puntaje de respuestas correctas para determinar el aumento en conocimiento tras la intervención en la mayoría de los participantes profesionales de la salud. **Metodología:** Antes y después de cada sesión se aplicaron pruebas de hasta diez (10) preguntas. Los datos fueron limpiados y emparejados en Excel; el análisis se realizó en IBM SPSS Statistics (v.31.0.1.0) considerando únicamente los casos con información completa en ambas pruebas. Se evaluó la normalidad de las diferencias y se utilizó la prueba t para muestras relacionadas. Se reportaron medias pre/pos, diferencia media, desviación estándar, valor p e intervalo de confianza al 95%. Además, se recopiló información sociodemográfica mínima para caracterizar la muestra. **Resultados:** Se contabilizaron Prepruebas (N=1,691) y Pospruebas (N=982). El análisis por taller sobre pares completos mostró que siete (7) de ocho (8) talleres presentaron mejoras estadísticamente significativas ($p < 0.05$). Los cambios más notorios fueron en “Opioides y el impacto en nuestros adolescentes” ($n=122$; $t=9.41$) y en la “Guía CDC para la práctica clínica en la prescripción de opioides para el dolor, 2022” ($n=86$; $t=6.43$), ambos con $p=0.00001$. El menor cambio se identificó en “Salva vidas: Aprende a usar la naloxona y administrar las tiras reactivas” ($n=84$; $t=0.50$; no significativo). En general, la mayoría de los talleres mostró incrementos consistentes en el puntaje medio, indicando una mejora homogénea del conocimiento entre los participantes. **Conclusiones:** Los talleres produjeron un impacto positivo y estadísticamente significativo en el conocimiento. Se recomienda documentar por taller las tasas de retención y tamaños del efecto, y ampliar horarios y espacios para aumentar la participación en futuras rondas. **Agradecimientos:** Los autores agradecen al Componente de Prevención y Asistencia Comunitaria por la coordinación de los talleres y a todas las personas participantes por su tiempo y disposición, sin cuya colaboración este estudio no habría sido posible.

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Establishment of an Internship Program to Strengthen Public Health Training in Integrated Vector Management for University Students in Puerto Rico

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Background and Objectives: To address the gap in applied public health experience related to Integrated Vector Management (IVM), the Puerto Rico Vector Control Unit (PRVCU) established an internship program aimed at preparing university students for professional practice while supporting local vector control initiatives. **Method:** In collaboration with accredited universities, students completed 3–4-month internships (120–180 hours), focused on community engagement, vector surveillance, and preventive health strategies. Each intern received structured mentorship and practical assignments tailored to their academic background and learning objectives. **Results:** From 2023 to 2025, 31 students from four universities participated in the program, with all reporting high levels of satisfaction. Interns strengthened key competencies, gained hands-on field experience, and demonstrated increased interest in public health careers or graduate studies. In 2024 alone, 18 interns completed 3,317 hours, equivalent to 1.6 full-time employees, highlighting the program's operational value and cost-effectiveness. Their contributions directly supported ongoing public health interventions while fostering essential IVM knowledge, advocacy, planning, and implementation skills. **Conclusion:** The PRVCU Internship Program illustrates an effective experiential learning model that integrates technical training, community engagement, and workforce development in vector management. It equips emerging public health professionals with practical skills and social awareness, enhances institutional capacity without additional payroll costs, and provides a scalable, sustainable model for strengthening Puerto Rico's public health workforce. **Acknowledgments:** This work was supported by the Puerto Rico Science, Technology and Research Trust. We thank the collaborating universities, PRVCU teams, and participating interns for their essential contributions.

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Community Participation in the Integrated Mosquito Control Program in Bayamón, Puerto Rico

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Objectives: Dengue continues to be a public health problem in Puerto Rico, with Bayamón among the municipalities reporting the highest number of cases in past epidemics. This project aimed to strengthen dengue prevention by integrating community participation into the planning, implementation, and sustainability of an Integrated Mosquito Control Program (IMCP) developed by the Puerto Rico Vector Control Unit (PRVCU) in collaboration with the Municipality of Bayamón. **Methods:** Between January 2024 and September 2025, a Community Advisory Committee (CAC) was established as part of the Bayamón IMCP's community engagement component. The CAC's purpose was to gather local feedback and incorporate it into program decisions, such as the identification of distribution centers for passive emanators. The PRVCU community team coordinated virtual and in-person meetings every six weeks for one year, each lasting approximately 1.5 hours. Communication with members was maintained through WhatsApp messages and phone calls. Meetings followed a structured agenda with guiding questions focused on three main topics: vector control and dengue prevention, community participation, and dissemination of results. (IRB Advisor Determination Number: #030524CR; Determination Date: March 5, 2024) **Results:** The CAC included residents, community leaders, and representatives from educational institutions and local organizations. Through snowballing and community mapping, a total of 86 organizations was contacted; 25 collaborated at varying levels, and 10 members from six organizations participated intermittently throughout the year. Scouting America supported orientation and inspection activities to eliminate mosquito breeding sites. Overall, the CAC strengthened communication between the program and local communities, promoted intersectoral

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collaboration, and supported the sustainability of vector control actions. **Conclusion:** The CAC model promoted community participation, enhanced the sustainability of vector control activities, and integrated local perspectives into public health programs. Lessons learned from this experience highlight the importance of flexibility in engagement strategies, consistent communication, and recognition of community contributions. This participatory framework can be replicated in other municipalities in Puerto Rico to strengthen dengue prevention initiatives. **Acknowledgments:** This project is part of the Integrated Mosquito Management Program in Bayamón, implemented by the PRVCU in collaboration with the Municipality of Bayamón and the CDC. We thank the Community Advisory Committee (CAC) members for their collaboration and support, and acknowledge Coral Rosado-Santiago, Puerto Rico CDC Dengue Branch, for her valuable contributions to the project.

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Desarrollo de un Índice Municipal para Identificar Disparidades en Servicios de Reducción de Daños por Uso de Sustancias en Puerto Rico, Ago.–Sep. 2024–2025

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Antecedentes y Objetivos: La División de Salud Pública para la Prevención de Sobredosis del Departamento de Salud de Puerto Rico comenzó la metodología para desarrollar un índice municipal para identificar disparidades en la cobertura de servicios de reducción de riesgos y priorizar recursos ante sobredosis. **Métodos:** Se integraron datos del proyecto OD2A sobre talleres educativos, distribución de naloxona y tasas de intoxicaciones fatales por municipio. Se calcularon variables esperadas y disparidades relativas bajo el principio de proporcionalidad entre necesidad epidemiológica y respuesta programática. Las variables fueron normalizadas (min máx., escala 0–100) e invertidas cuando correspondió; se ponderaron para construir un índice compuesto con los siguientes pesos: tasa de intoxicaciones fatales (30%), disparidad en talleres (20%), disparidad en naloxona (20%), talleres por intoxicación (15%) y naloxona por intoxicación (15%). El índice se visualizó mediante mapas temáticos para facilitar su interpretación y aplicación. **Resultados:** Se analizaron 78 municipios. De entre, 16 municipios (20.5%) mostraron mayor necesidad; 32 municipios (41.0%) mostraron necesidad alta; 30 municipios (38.5%) mostraron necesidad baja o nula según el índice compuesto. De entre 22 municipios (28.2%) no recibieron talleres ni mesas educativas. Añasco presentó la mayor disparidad relativa: 4.05 intoxicaciones fatales/10,000 habitantes, 0 talleres y 30 kits distribuidos. San Juan, pese a la mayor carga absoluta, ocupó el puesto 11. en el índice en la necesidad de recibir más recursos; Trujillo Alto registró la tasa más baja (0.45/10,000) y el índice más bajo. **Conclusiones:** Del índice se desprenden tres aportaciones principales: (1) permite identificar disparidades críticas entre carga epidemiológica y respuesta programática; (2) ofrece una herramienta práctica para priorizar y redistribuir recursos hacia municipios más vulnerables; y (3) su diseño flexible y replicable fortalece la planificación estratégica y la rendición de cuentas institucional, asegurando una cobertura más equitativa y basada en evidencia. **Agradecimientos:** Este trabajo fue desarrollado por la Sección de Evaluación, Mejora Continua y Política Pública, en colaboración con la Sección de Alerta Temprana y Sistemas de Salud, como parte del proyecto OD2A financiado por los CDC.

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Exploratory Study of Psychosocial, Academic, and Structural Factors Influencing Graduate Students' Success Through a Psychoeducational Support Model

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The retention and successful completion of graduate studies are strategic priorities for the University of Puerto Rico, Río Piedras Campus. This exploratory study examines the emotional, academic, and structural factors that influence the trajectories of graduate students in the thesis or dissertation phase who have participated in a psychoeducational support group. The central goal is to identify critical needs and provide an evidence-based response that strengthens both emotional well-being and academic performance, aligned with institutional goals of research excellence and educational equity. The research question guiding this study is: How do psychoeducational support groups influence the academic persistence and emotional well-being of graduate students during the thesis/dissertation stage? The hypothesis posits that group interventions enhance emotional regulation, motivation, and academic persistence. This exploratory study employs a qualitative design with a phenomenological-interpretive approach to explore the lived experiences of graduate students. Data were collected between August 2019 and May 2025 through questionnaires, written narratives, and visual representations, analyzed using triangulation across academic, emotional, and structural dimensions. Preliminary findings indicate that participation in the psychoeducational support groups increased students' self-efficacy, emotional regulation, and motivation. Participants reported greater clarity in research goals, reduced isolation, improved time management, and enhanced coping strategies, demonstrating the group's positive impact on academic persistence and well-being. Psychoeducational support groups represent a viable and scalable model to promote graduate student success and wellness. Future directions include expanding the intervention across academic programs and conducting longitudinal evaluations to assess sustained outcomes. (IRB 2508000354, approved-11/5/2025)

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Bayh-Dole, iEdison, and Federal Compliance in Patent Management at the University of Puerto Rico Medical Sciences Campus

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Background/Objective: The Bayh-Dole Act of 1980 promotes innovation by allowing universities and other institutions to retain title to inventions arising from federal support. iEdison, a system developed by the National Institutes of Health (NIH) and later adopted for interagency use, tracks invention disclosures and ensures compliance with federal reporting requirements. Noncompliance or delayed reporting can result in the federal government reclaiming ownership through march-in rights. In this study, we assessed compliance with iEdison reporting at the University of Puerto Rico Medical Sciences Campus (UPR-MSC). **Methods:** iEdison data were downloaded into Excel and organized using Visual Basic for Applications (VBA) and macros to generate unique information dockets. Each docket was evaluated against federal regulations and Bayh-Dole compliance criteria. A parallel policy review assessed how institutional procedures align with federal expectations. **Results:** Sixty-nine documents were analyzed: one was a draft; 27 were fully compliant; and 41 were noncompliant. Among non-compliant cases,

34 had missing or rejected documentation, 12 had overdue title elections, and 6 had statutory bars; two of these statutory bars were still granted patents. The most common reasons for noncompliance were missing documentation and delays in title election or statutory bar reporting. **Conclusion:** Although several cases did not meet all reporting requirements, this assessment highlights UPR-MSU's proactive approach to understanding and improving compliance with federal research policies. The findings provide a solid foundation for refining administrative procedures, enhancing communication between researchers and compliance staff, and reinforcing institutional accountability. The university's continued efforts to raise awareness, streamline processes, and support inventors reflect its commitment to responsible innovation management and public trust. By translating these insights into practical improvements, UPR-MSU enhances compliance performance, safeguards intellectual property, and ensures that federally funded discoveries continue to make meaningful contributions to scientific progress and societal benefit. **Acknowledgements:** Supported by the RCMI-Center for Collaborative Research in Health Disparities, UPR Medical Sciences Campus, NIH-NIMHD Grant U54-MD54007600.

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**Nivel de Satisfacción de un Grupo de Adultos Mayores
y Estudiantes del Recinto de Ciencias Médicas
con una Clínica de Cernimiento Interprofesional Realizada
en una Égida del Área Metropolitana de San Juan**

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Antecedentes: La población de adultos mayores de 65 años en PR aumentó en las últimas décadas. Para el 2024 esta población fue estimada en 24%. Se espera que para el 2050 sea cerca del 40%. Este incremento representa un reto para los sistemas de salud, requiriendo profesionales con competencias interprofesionales que promuevan atención integrada y centrada en la persona. Facultad y estudiantes de los programas de Maestría en Patología del Habla-Lenguaje (PHL), Doctor en Terapia Física (DTF) y Grado Asociado en Asistencia Dental con Funciones Expandidas (PADFE) de la Escuela de Profesiones de la Salud desarrollaron una actividad interprofesional de promoción de salud dirigida a adultos mayores residentes en una égida. **Objetivos:** 1) Exponer a los estudiantes a una experiencia práctica de trabajo interprofesional; 2) Determinar el nivel de satisfacción de los estudiantes con la experiencia interprofesional; 3) Determinar el nivel de satisfacción de los adultos mayores con los servicios recibidos. **Método:** Se realizó una reunión con la facultad y estudiantes para explicar la logística, objetivos y roles. Los estudiantes explicaron los instrumentos a utilizar. Durante la actividad, se realizaron cernimientos en: examen del mecanismo oral (PHL), evaluación de postura y riesgo de caídas (DTF), revisión de prótesis y estado de salud oral (PADFE y residentes del programa de Medicina Dental). Se recopilaron datos sociodemográficos y encuestas de satisfacción. **Resultados:** Participaron nueve adultos entre 61 y 84 años y 28 estudiantes. Los datos reflejan un alto nivel de satisfacción entre los estudiantes y los adultos. 96% de los estudiantes recomendaron esta actividad para próximos años y 100% de los adultos reportó que estaba satisfecho con el servicio recibido. **Conclusiones y recomendaciones:** Esta experiencia fortaleció las competencias interprofesionales y el aprendizaje en un contexto comunitario real. Se recomienda incorporar experiencias que promuevan el aprendizaje interprofesional, fortalezcan la colaboración efectiva y contribuyan a mejorar la atención de la persona.

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Evaluation of an Online Training Program in Child-Centered Play Therapy and Child-Teacher Relationship Training for Head Start and Child Care Providers

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Background and Objectives: This project evaluated an online synchronous training program integrating Child-Centered Play Therapy (CCPT) and Child-Teacher Relationship Training (CTRT), grounded in Axline's humanistic principles and Landreth's therapeutic skills framework. CTRT extends CCPT relational principles into structured skills appropriate for Head Start and child care environments. The program consisted of five modules delivered between December 2022 and 2024 to a unified cohort of early childhood providers working across ACUDEN-administered child care and Head Start programs. Guided by Kirkpatrick's Training Evaluation Model—Level 1 (Reaction), the objective was to assess participant satisfaction, perceived clarity, relevance, and instructional quality. **Method:** A descriptive educational-program evaluation design was used. A total of 220 early childhood providers participated across the five online synchronous training modules. Because the purpose of the project was to evaluate training quality at the program level, the unit of analysis was the module, consistent with Kirkpatrick's Level 1 (Reaction). Each module included multiple participant subgroups, and all available subgroup means were averaged to produce a single module-level score per item. A 10-item Likert-type reaction instrument (1–5) was used across all modules. Global item means and between-module standard deviations (SD) were calculated to assess overall reaction and program consistency. **Results:** Module-level means ranged from 4.79 to 4.95, with low variability (SD = 0.016–0.111), demonstrating strong consistency across modules. Global item means ranged from 4.80 to 4.92, indicating high satisfaction with the training content and instructional quality. Between-module SDs ranged from 0.106 to 0.196, reflecting moderate but acceptable variability. Highest-rated areas included clarity of communication, facilitator respect, opportunities for questions, and perceived facilitator knowledge (global means = 4.86–4.92). Organization, sequencing, and contextual relevance were also highly rated (global means = 4.80–4.88). **Conclusion:** The integrated CCPT/CTRT online training demonstrated high acceptability, consistency, and strong instructional quality for Head Start and child care providers. Future evaluation should incorporate Kirkpatrick Levels 2–3 to assess knowledge acquisition and skill application.

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Comunicación y Educación en Salud: Interdependencia, Conexiones y Desarrollo de Capacidades

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Trasfondo y objetivos. La comunicación en salud (CS) utiliza diversos medios y estrategias para intercambiar información de salud precisa, comprensible, confiable y oportuna que promueva comportamientos y prácticas favorables para la salud y el bienestar. Al ser una herramienta vital para la Educación en Salud y área de responsabilidad primaria para la *National Commission on Health Education Credentialing* (NCHEC), se exploró mediante una investigación del curso EDSA 6997, su importancia, integración y aplicación entre profesionales de la Educación en Salud en Puerto Rico, así como sus intereses y prioridades de capacitación en temas relacionados.

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Método. Se reclutaron 60 profesionales cuyo último grado académico de Bachillerato o Maestría en Educación en Salud fue completado entre 2008-2023 y que estaban ejerciendo primordialmente labores de educación en salud en Puerto Rico para que completaran una encuesta en línea que fue auto-administrada en mayo de 2025.

Resultados. Según las funciones de sus puestos, comunicación fue la segunda área en la que invierten más tiempo (22%; n=38). En cuanto a la frecuencia con la que integran las áreas de NCHEC según requerido por su escenario laboral, la comunicación obtuvo la segunda frecuencia más alta con un 53.3% (n=32), al combinar las respuestas “Todos los días”/“Casi todos los días”. Entre las áreas temáticas seleccionadas como “importantes” o “muy importantes” de fortalecer indicaron competencia cultural y alfabetización en salud, ambas vinculadas con la CS. Un 28% de quienes expresaron peritaje para ofrecer educación continua, mencionaron temas asociados con la CS.

Conclusión. Evidentemente la comunicación en salud es una función esencial de este grupo profesional. Existe interés en seguir fortaleciendo conocimientos y destrezas en áreas relacionadas. Dado que un 58% expresó interés en colaborar y compartir sobre mejores prácticas, se vislumbran oportunidades para intercambio de recursos y desarrollo de capacidades entre colegas. **Reconocimientos:** Al grupo de estudiantes investigadores de la Maestría en Educación en Salud Pública (MPHE) de la Escuela Graduada de Salud Pública, RCM-UPR que estuvo a cargo del reclutamiento y análisis de resultados de la investigación, con el acompañamiento y supervisión de la facultad del programa académico. El protocolo de IRB #2504389388 fue aprobado el 6 de mayo de 2025.

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Construyendo Capacidad en Adicciones: Tres Años de Intervenciones Educativas en la Universidad Central del Caribe (2022–2025)

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Antecedentes: En Puerto Rico existe una necesidad creciente de profesionales de la salud capacitados en trastornos por uso de sustancias (TUS). La Universidad Central del Caribe (UCC), mediante programas académicos y de servicio (SAC, Fellowship, ISTEP, PRUSAM, UCC-PCSSU y propuestas de ASSMCA), ha desarrollado múltiples intervenciones educativas dirigidas a fortalecer la prevención, detección e intervención en TUS desde diversos escenarios clínicos, comunitarios y académicos. No obstante, el alcance acumulado de estas iniciativas no se había documentado de forma integrada.

Objetivo: Describir el crecimiento, la distribución por modalidad y el alcance educativo de las actividades relacionadas con sustancias y adicciones desarrolladas por la UCC entre 2022 y 2025, así como identificar colaboraciones con centros de tratamiento. **Métodos:** Estudio observacional, descriptivo y retrospectivo de evaluación de programa. La unidad de análisis fue la actividad educativa. Se incluyeron todas las actividades realizadas entre 2022–2025 por los programas SAC, Fellowship, ISTEP, PRUSAM, UCC-PCSSU y propuestas de ASSMCA. A partir de registros administrativos y listas de asistencia se extrajeron: periodo de medición (2022 al presente), programa/proyecto, tipo de intervención educativa (presencial, virtual), cantidad de personas impactadas (asistencias) y número de colaboraciones con agencias comunitarias o centros de tratamiento. Se calcularon conteos y porcentajes agregados por año, programa y modalidad.

Resultados y conclusiones: Los datos muestran un crecimiento sostenido en el número de actividades y participantes en todos los programas y junto con una expansión en el uso de modalidades virtuales. En conjunto, estas iniciativas han ampliado la capacidad de profesionales de la salud y otros actores para atender a la población con TUS. Esta evaluación descriptiva establece una línea base institucional para monitorear el impacto educativo y orientar la planificación de futuras intervenciones. **Agradecimientos:** A HRSA, SAMHSA, Depto. De Salud de PR, ASSMCA por subvencionar cada proyecto.

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Towards a Healthier Future: A Community-Driven Jurisdiction Plan for Alzheimer's and Related Dementias in Puerto Rico

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Introduction: Puerto Rico (PR) faces major challenges with Alzheimer's disease and related dementia (ADRD), compounded by health disparities and a rapidly aging population 41.2% of residents are aged 65 or older. Alzheimer's is the fourth leading cause of death, with an age-adjusted mortality rate of 44.3 per 100,000 inhabitants, exceeding the U.S. average of 36.0. To confront this public health crisis, PR received a CDC's BOLD grant to implement targeted interventions. The initiative's main goal is to create an ADRD jurisdictional plan for 2026–2031 through a coalition of organizations, agencies, and the community. **Methodology:** Since September 2024, the Coalición de Alzheimer y otras Demencias de Puerto Rico (CADPR, in Spanish) convene monthly, engaging 43 entities to guide the creation of the ADRD Strategic Plan. Additionally, this participatory process was complemented by a mixed-methods analysis, including focus groups with informal caregivers and key informant interviews with service providers and healthcare professionals. CADPR has ensured that local voices shape the plan's direction, prioritizing community-informed strategies. **Results and Conclusions:** The plan focuses on critical areas, including but not limited to early detection and diagnosis, risk reduction, preventing avoidable hospitalizations, and supporting caregivers. The mixed analysis with the Sociodemographic Profile, ADRD Profile, the ADRD Caregiver Profile, 22 key informant interviews, and 2 focus groups composed of 22 informal caregivers, allowed culturally adapt this plan. In conclusion, this collaborative approach offers a replicable framework for other jurisdictions, particularly those with large Spanish-speaking or Latino/Hispanic populations, seeking sustainable, culturally responsive solutions to ADRD care. IRB protocol #: 2502350966A001 (06/13/2025).

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Estrategias a Multinivel para Atender la Diabetes en Puerto Rico con un Enfoque desde la Salud Poblacional

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Antecedentes y Objetivos: Durante el año 2023, la diabetes fue posicionada como la tercera causa de muerte en Puerto Rico con una prevalencia estimada de 19.8% a través de los adultos. Factores que inciden en el agravamiento de la situación están: pobreza, escasez de endocrinólogos, desigualdad financiera y políticas públicas que no se adaptan a la realidad social de Puerto Rico. La diabetes Tipo I fue analizada desde la perspectiva de salud poblacional para comprender su impacto estructural y plantear estrategias de intervención intersectoriales en distintos niveles. **Métodos:** Se realizó un análisis de literatura y documentos de política pública utilizando buscadores generales, bases de datos públicas y recursos de agencias gubernamentales, empleando

palabras clave relacionadas con la diabetes en Puerto Rico y salud poblacional. **Resultados:** Tras el análisis de la política pública vigente en Puerto Rico, se identificaron brechas en la implementación y fiscalización de políticas, déficit de educadores en diabetes y la centralización de servicios especializados. Se propuso un plan piloto multinivel de acción simultánea para atender la diabetes con el objetivo de disminuir la incidencia en la isla a lo largo de 10 años. Fase 1: Diagnóstico situacional de las operaciones institucionales. Fase 2: Estandarizar los análisis epidemiológicos vigentes. Fase 3: Implementación simultánea de estrategias de educación en salud, descentralización de servicios y medidas fiscales para la reducción del consumo de azúcar directamente con las multinacionales a nivel político-legal, clínico, escolar y comunitario. **Conclusiones:** La gestión de salud poblacional representa una vía efectiva para reducir inequidades y fortalecer la prevención. Disminuir la incidencia de diabetes en Puerto Rico requiere de acciones concertadas, voluntad política, participación ciudadana y coordinación entre sectores educativos, clínicos y comunitarios. **Agradecimientos:** Esta iniciativa surge como parte del curso ADSS-8011 Sistemas y Políticas de Salud del profesor José Pérez Emanuelli, cohorte 2025.

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Tracheostomy Care in Medically Complex Patients in University Pediatric Hospital

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Background: More than 4,800 tracheostomies in pediatric patients are carried out in the United States each year, and they offer a different airway for breathing in medically complicated patients. Children who have tracheostomies are more vulnerable to potentially fatal infections, mucus plugs, and respiratory discomfort. Many of these issues can be avoided with proper maintenance and equipment use. Standardized training on tracheostomy management is frequently lacking for caregivers and medical personnel. **Research question:** Do caretakers, medical staff and nursing staff know how to properly take care of a tracheostomy? **Objectives:** Identify knowledge gaps among medical professionals and caregivers at Hospital Pediátrico Universitario (HOPU); create and implement a standardized tracheostomy care protocol. **Methods:** An educational project was designed. An anonymous survey was administered to assess tracheostomy care knowledge among caregivers, nursing staff, and medical staff taking care for tracheostomy dependent patients admitted to the general pediatric ward at HOPU. The survey was distributed via Google Forms before and after implementation of a standardized tracheostomy care protocol. To measure comprehension, responses were recorded as "yes/no" and on a rating scale. Data analysis contrasted outcomes before and after the intervention. **Results:** Preliminary analysis revealed that more than 50% of caregivers did not receive orientation on tracheostomy care and lacked all the recommended tools for home management. Medical staff: over 81% reported not having received proper orientation on tracheostomy care. These findings confirmed gaps in knowledge that need a structured, standardized education. **Conclusion:** This project highlights deficiencies in tracheostomy care education among caregivers and medical staff at HOPU. Future steps include post-intervention assessment, integration of simulation-based training, and development of educational materials tailored to both hospital and home settings.

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Estrategias de Reclutamiento del Centro Hispano de Excelencia en la Escuela de Medicina de la UPR: Análisis de Clubes de Medicina y la Generación Z

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Trasfondo: La atención médica es la quinta área de mayor interés profesional entre la Generación Z, según la Career Interest Survey 2022 (N = 11,495) de la National Society of High School Scholars. El 24% de los estudiantes indica que experiencias personales con la salud han influido en sus decisiones universitarias. Un 16% expresó intención de cursar estudios en medicina, duplicándose esta tasa entre mujeres (35%). En Puerto Rico, los jóvenes aspirantes a estudios en medicina enfrentan ciertas barreras: ser primera generación universitaria, bajo dominio del inglés y provenir de trasfondos desaventajados. Para reducir estas brechas, el Centro Hispano de Excelencia de la Escuela de Medicina de la UPR ha implementado estrategias de reclutamiento mediante Clubes de Medicina (CM) en seis escuelas públicas, dirigidos a estudiantes interesados en solicitar admisión a la institución. **Objetivos:** Analizar las características sociodemográficas de estudiantes pertenecientes a los CM y a la generación Z; y evaluar las tendencias en el interés de estudiar medicina. **Método:** Se analizaron datos de informes administrativos del periodo 2020-2024 mediante un enfoque descriptivo y transversal. Resultados: 644 estudiantes fueron reclutados en los CM, el promedio de edad fue de 16 años, siendo el 74.7% mujeres. El 38.60% residen en áreas rurales, 16.60% se autoidentifica como miembro de una familia de escasos recursos, y 5.8% reportó tener ingresos de menos de \$10,000. Un 78.2% expresó intención en aspirar a estudios subgraduados en la UPR, y un 81.8% manifestó interés en alcanzar grados doctorales. Luego del ingreso al Club, 92.2% indicó conocer los requisitos de admisión a la Escuela de Medicina. **Conclusión:** Los hallazgos evidencian que los CM son una estrategia efectiva para fomentar el interés entre jóvenes de la Generación Z y fortalecer su acceso a la educación médica en la UPR, aunque persisten barreras estructurales que requieren ampliar estas iniciativas.

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Rol de las Campañas de Concienciación sobre la Percepción Pública de la Salud Mental

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Antecedentes y Objetivos: La salud mental es un componente fundamental del bienestar individual y social. En los últimos años, las campañas públicas de concienciación han adquirido mayor presencia en medios tradicionales y digitales, buscando reducir el estigma y promover la comprensión del tema. Sin embargo, persisten dudas sobre la claridad, pertinencia y efectividad comunicativa de estos mensajes. Este estudio tiene como objetivo analizar de manera crítica el contenido, las estrategias discursivas y los enfoques mediáticos presentes en campañas de salud mental difundidas públicamente, para identificar sus fortalezas y áreas de oportunidad en la construcción de una percepción social informada. **Metodología:** La investigación se basa en un análisis de contenido de materiales públicos relacionados con campañas de concienciación sobre salud mental, incluyendo anuncios en

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redes sociales, videos institucionales, afiches comunitarios y mensajes educativos accesibles al público general. Se empleó una matriz de codificación que consideró elementos como tono, tipo de narrativa, representaciones visuales, accesibilidad del lenguaje y estrategias persuasivas. El análisis se centró exclusivamente en materiales previamente publicados, sin involucrar participantes humanos, lo que garantiza que el estudio no requiera revisión por un comité de IRB. **Resultados:** Los hallazgos reflejan que las campañas con lenguaje sencillo, narrativas empáticas y elementos visuales inclusivos presentan mayor coherencia comunicativa y potencial para fomentar actitudes positivas hacia la salud mental. No obstante, se identificaron campañas cuyos mensajes resultan ambiguos, excesivamente técnicos o poco representativos de diversas realidades culturales, lo que podría limitar su impacto educativo y social. **Conclusiones:** El análisis evidencia la importancia de diseñar campañas públicas de salud mental que integren mensajes claros, accesibles y culturalmente sensibles. Se recomienda fortalecer la representación visual, diversificar las estrategias discursivas y promover la coherencia entre el mensaje y las necesidades reales de las comunidades. Estas mejoras podrían contribuir significativamente a una percepción social más informada, empática y libre de estigma. **Agradecimientos:** La autora agradece las recomendaciones de profesores, aunque no hayan fungido como mentores y reconoce la contribución de las instituciones que divulgan campañas de salud mental accesibles al público. No hubo financiamiento externo ni conflictos de interés.

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Estrategias Comunicativas y Visuales en Campañas Sociales Digitales: Análisis de su Claridad, Coherencia y Eficacia en la Percepción Pública

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Trasfondo y Objetivos: Este proyecto analiza las estrategias comunicativas y visuales presentes en campañas sociales digitales, con el fin de comprender cómo la combinación de elementos narrativos, lingüísticos y gráficos influye en la claridad, coherencia y eficacia del mensaje. Aunque las campañas sociales han incrementado su presencia en plataformas digitales, persisten retos en torno a la estructura visual, el lenguaje utilizado y la capacidad de generar cambios en la percepción pública. La literatura señala que la efectividad comunicativa requiere equilibrio entre accesibilidad, segmentación estratégica y consistencia visual. El objetivo de este estudio es analizar críticamente estas estrategias, identificando fortalezas y oportunidades de mejora. **Método:** El estudio se desarrolla mediante análisis de contenido de campañas sociales previamente publicadas en medios digitales, integrando principios de guías que resaltan mejores prácticas, recomendando claridad en la llamada a la acción, consistencia visual y adaptación del mensaje a audiencias segmentadas. **Resultados:** Los datos preliminares indican que las campañas que integran narrativas empáticas, lenguaje claro y diseño visual coherente presentan mayor potencial para generar comprensión y resonancia emocional. El uso de tipografías legibles, contraste adecuado, imágenes diversas y mensajes directos fortalece la eficacia comunicativa. No obstante, algunas campañas mostraron exceso de texto, falta de cohesión visual o representaciones poco inclusivas, lo que limita su alcance y comprensión. **Conclusión:** Este proyecto académico destaca la importancia de articular de forma estratégica los elementos visuales y discursivos en campañas digitales. Se recomienda fortalecer la claridad del mensaje, mejorar la accesibilidad visual y lingüística, asegurar coherencia estética y promover representaciones diversas. Estas revisiones pueden incrementar la efectividad comunicativa y favorecer una percepción pública más informada. **Reconocimientos:** A la Dra. Marcilyn Colón Colón por su apoyo y mentoría para delimitar el enfoque del estudio y fortalecer el análisis comparativo de las campañas digitales. Su apoyo enriqueció la revisión teórica y metodológica.

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Improving Postoperative Pain Management in Total Knee Arthroplasty (TKA): An Evidence-Based Implementation of Adductor Canal and IPACK Nerve Blocks

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Clinical Question: In adults undergoing total knee arthroplasty (TKA), does the use of motor-sparing peripheral nerve blocks, adductor canal block (ACB), and IPACK, compared with no peripheral nerve block, reduce postoperative pain, opioid consumption, and time to ambulation within 48 hours? **Scope:** TKA frequently results in significant postoperative pain, delayed mobility, and opioid use. At the project site, analgesia relied mainly on systemic opioids without standardized multimodal or regional anesthesia, leading to inconsistent pain control and recovery. Implementing motor-sparing blocks offered an opportunity to improve analgesia and support earlier ambulation. **Literature Review:** Ten high-quality randomized trials and meta-analyses show that ACB and IPACK improve postoperative pain control, preserve quadriceps strength, and reduce opioid consumption. This evidence supports incorporating motor-sparing regional techniques into standardized TKA analgesia pathways. **Project Implementation:** Following spinal or general anesthesia, patients were given an ultrasound-guided ACB (10–15 mL 0.5% bupivacaine with 4 mg dexamethasone) and an ultrasound-guided IPACK (20 mL 0.25% bupivacaine). Pain scores, pain location, opioid use, and time to ambulation were measured at arrival and at 4, 8, 12, 24, and 48 hours. **Results:** Fifty patients were included. Pain was lowest on arrival (median 0), increased at 4–12 hours (median 5), and decreased at 24 and 48 hours (medians 4 and 3). Median 48-hour opioid use was 28 mg MME (IQR 25; range 0–60 mg). Pain location varied significantly across time ($\chi^2(35)=102.24$, $p<.001$), shifting from absent or localized on arrival to anterior/posterior or multi-site pain at 4–12 hours, then becoming more diffuse at later intervals. Median time to ambulation was 20 hours (IQR 8.69). **Implications for Practice:** Nurse anesthetists should implement standardized multimodal protocols combining ACB + IPACK blocks with pain-score-guided opioid management to improve TKA pain control and facilitate early mobilization. Approved by IRB: Protocol #2505407990. **Acknowledgments:** The authors sincerely thank Dr. Sherly Pereira for her mentorship and guidance, and María Larriuz for her constant support throughout the completion of this project.

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CDH1 Loss, Epigenetic Modulation, and Pro-Inflammatory Gene-Environment Interaction in Orofacial Clefts: A Narrative Review

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Background/Aim: Orofacial clefts, the most common craniofacial anomalies, are linked to CDH1 (E-cadherin) loss and pro-inflammatory gene–environment interactions (environmental exposures during morphogenesis process that affect genes through mutations and pro-inflammatory biomarkers) that disrupt epithelial morphogenesis during development. E-cadherin, encoded by CDH1, orchestrates epithelial morphogenesis and signaling during organ development. This narrative review aimed to synthesize current evidence emphasizing the synergy and interaction between the contribution of CDH1 loss by epigenetic mechanisms, key signaling pathways, underlying cellular

mechanisms that control lip and palate formation, and pro-inflammatory gene–environment interactions to the development of OFCs. **Methods:** As limited evidence is available and new findings are emerging, a narrative review of literature was performed. Search was done through PubMed, EMBASE, SCOPUS, EBSCOHost, and ProQuest databases to answer the research question: How Neural crest E-cadherin loss and epigenetic modulation via pro-inflammatory gene–environment interaction produce Oral Clefts? The search strategy targeted studies addressing neural crest E-cadherin (CDH1) loss, orofacial clefts, epigenetic modulation, and pro-inflammatory gene–environment interactions. Inclusion criteria were restricted to human observational studies published within the last 10 years that reported outcomes related to CL/P associated gene, CDH1, and pro-inflammatory gene expression. Papers were screened by title and summary and two evaluators selected the included articles. 2020 PRISMA guidelines was followed. Limitations of the studies was assessed. **Results:** A total of 237 articles were retrieved. After removal of duplicates and screening of titles and abstracts, 20 studies were identified as potentially relevant, of which five human studies met the inclusion criteria. Two CDH1 focused studies directly examined its role in orofacial clefts: one Mendelian genetics study identifying pathogenic CDH1 variants in nonsyndromic cleft families, and one epigenetic study evaluating CDH1 promoter methylation in cases versus controls. Other included papers were mechanistically relevant but did not provide CDH1 specific quantitative expression or methylation data related to clefts. Tania et al. analyzed peripheral blood DNA from orofacial cleft cases and controls using bisulfite conversion and methylation specific PCR to measure CDH1 promoter methylation. Cox et al. used WES, targeted resequencing, immunohistochemistry, and in vitro functional assays to assess CDH1 sequence variants and adhesion function, rather than promoter methylation. OFC cases in Tania et al. showed the appearance of fully methylated CDH1 promoters, but the overall methylation frequencies did not differ significantly from controls, indicating only a modest and non-significant shift toward higher methylation. None of the studies measured CDH1 mRNA or protein levels in cleft versus non-cleft human tissue, so any expression changes are inferred rather than directly quantified. Tania et al. did not analyze CDH1 methylation by specific cleft subtype or severity, and Cox et al. linked CDH1 loss of function variants to nonsyndromic CL/P without presenting subtype specific or severity graded comparisons. None of the included studies tested interactions between CDH1 related markers and inflammatory or environmental exposures, and although Seidel et al. measured elevated oral cytokines in cleft neonates, CDH1 was not assessed alongside these inflammatory profiles. **Conclusion:** Emerging evidence suggests that epigenetic regulation and pro-inflammatory gene–environment interactions contribute to the pathogenesis of orofacial clefts, with chromatin remodeling and neural crest cell biology as possible mediators. Evidence is still limited; further research is needed to fully understand this complex issue.

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El Rol de las Relaciones Laborales en la Prevención de Riesgos y el Empoderamiento de los Trabajadores en Puerto Rico

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Política bajo análisis: Esta investigación analiza la política pública de prevención de riesgos ocupacionales en Puerto Rico en su conjunto, incluyendo las leyes, reglamentos y normativas relacionadas con la salud y seguridad en el trabajo. Examina cómo el marco institucional vigente promueve o limita la capacidad de los trabajadores para prevenir accidentes, participar en la gestión preventiva y fortalecer la salud y seguridad ocupacional. **Marco teórico y disciplina académica:** El estudio se inscribe en la disciplina de las Relaciones Laborales y la Prevención

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de Riesgos en el Trabajo, adoptando un enfoque de gobernanza participativa y empoderamiento colectivo que integra la dimensión institucional y social de la política pública. Este marco permite analizar cómo las estructuras laborales y los mecanismos de diálogo social influyen en la efectividad de las estrategias de prevención y en la consolidación de una cultura preventiva sostenible. **Fuentes de información:** Se consultaron leyes, reglamentos institucionales, pronunciamientos de la OIT y se realizaron 25 entrevistas semiestructuradas a trabajadores y trabajadoras de distintos sectores económicos en Puerto Rico. **Métodos de investigación:** Se empleó un diseño cualitativo sustentado en el análisis de contenido y la triangulación temática, siguiendo criterios de validez contextual y saturación teórica propios de la investigación social aplicada. **Hallazgos:** El análisis revela inconsistencias entre la normativa y su aplicación práctica. Se identificaron limitaciones institucionales y organizacionales que restringen la participación de los trabajadores en la toma de decisiones preventivas, así como experiencias donde la inclusión de estructuras de diálogo y representación laboral demuestra un impacto positivo en la gestión de riesgos y en el cumplimiento de las políticas de seguridad. **Implicaciones de política pública:** Se propone revisar el marco regulatorio para integrar mecanismos estables de participación laboral y capacitación conjunta, alineados con los estándares internacionales de la OIT y el Objetivo 8 de la Agenda 2030. **Agradecimientos:** A la estudiante María Muñiz Hernández (PEAF) por su valiosa colaboración en este proyecto de investigación, aprobado por el CIPSHI bajo el protocolo #2425-002, aprobado el 30 de agosto de 2024.

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Impact of the VIONE Deprescribing Tool on Medication Optimization at VA Caribbean Health Care System (VACHS) Mental Health Clinics

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Background: Polypharmacy, defined as the concurrent use of five or more medications, is increasingly prevalent in aging populations and Veterans with multiple comorbidities. In older adults, polypharmacy is associated with potentially inappropriate medications (PIMs), adverse drug events, hospitalizations, and reduced function. In mental health populations, risk is magnified due to chronic psychotropic therapy, benzodiazepine use, dementia medications, and other high-risk classes. Veterans with mental health disorders experience higher polypharmacy rates driven by complex comorbidities and long-term medication exposure. VIONE (Vital, Important, Optional, Not indicated, and Every medication has an indication or diagnosis) is a deprescribing tool that provides a structured EMR-integrated framework supporting clinicians in reviewing medications, identifying high-risk agents, discontinuing unnecessary therapy, and tracking progress through dashboards. The objective of this quality improvement initiative is to reduce PIM exposure and improve deprescribing practices in Veterans ≥65 years by increasing psychiatrists' and pharmacists' adherence to VIONE deprescribing strategies within Behavioral Health Interdisciplinary Program (BHIP) and Home-Based Primary Care (HBPC) clinics at the VA Caribbean Healthcare System. **Methods:** This prospective quality improvement initiative will evaluate the impact of VIONE implementation pre- and post-education of psychiatrists and clinical pharmacists. Education will emphasize appropriate medication use guided by AGS Beers Criteria, Anticholinergic Burden considerations, STOPP/START criteria, and VIONE deprescribing principles over six months. Implementation includes use of the VIONE Discontinuation Dashboard, VIONE PIMs Dashboard, and Psychotropic Drug Safety Initiative Dashboard. Impact will be assessed by describing deprescribing, dose reduction, or discontinuation trends among antipsychotics, benzodiazepines, dementia medications, and other high-risk agents. **Results:** Early implementation has begun. Two of four education sessions were completed in October, with positive psychiatrist participation and favorable response toward deprescribing

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discussions. **Conclusion:** Early implementation supports deprescribing in mental health settings caring for older Veterans. Continued education and adherence to VIONE principles may enhance long-term medication safety.

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Association Between Symptoms of Depression and Anxiety and Metabolic Syndrome in Young Adults in Puerto Rico

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Background: Puerto Rican adults face disproportionately high rates of depression and anxiety symptoms and metabolic syndrome (MetS), yet little is known about how these conditions intersect in young adulthood. Examining these associations earlier in life may inform tailored preventive strategies. **Methods:** We analyzed data from 2,734 participants aged 18–29 enrolled in the PR-OUTLOOK Study (2020–2024). MetS was defined by NCEP-ATP III criteria, requiring ≥ 3 of the following: abdominal obesity, elevated triglycerides, reduced HDL cholesterol, elevated blood pressure, or elevated fasting glucose. The number of MetS components was categorized as: 0, 1, or ≥ 2 . Depressive and anxiety symptoms were assessed with the CESD-10 (≥ 10 =elevated) and STAI-10 (≥ 27 =elevated), and classified as both elevated, either elevated, or neither elevated. Associations with MetS presence and number of components were assessed using binary and ordinal logistic regression models adjusted for sociodemographic and lifestyle factors. **Results:** Sixty percent of participants reported elevated depression and/or anxiety symptoms, and 27% presented with ≥ 2 MetS components. Co-occurring depression and anxiety symptoms were associated with higher odds of MetS (OR = 1.67, 95% CI: 1.21–2.31) and with a greater number of MetS components (OR = 1.25, 95% CI: 1.04–1.50) compared with participants without symptoms. **Conclusion:** Mental health symptoms are highly prevalent among this cohort of young adults and are associated with MetS. Integrating mental health services into cardiometabolic risk reduction strategies may be critical to improving long-term health outcomes in this population. Approved by IRB, protocol # 2412327236, approval date 01/21/2025.

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Spatial Patterns of Population Aging in Puerto Rico at the Municipal Level, 2024

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Background and Objectives: Population aging represents one of Puerto Rico's most pressing demographic challenges, with significant implications for social, economic, and health planning. This study explores the spatial patterns of aging across Puerto Rican municipalities to identify territorial concentrations of older adults. The main objective is to analyze the spatial distribution of aging through demographic indicators and spatial analysis tools, using recent

data from the U.S. Census Bureau's Population Estimates Program (PEP) 2024. **Method:** Classical indicators of population aging—median age, Aging Index (AI), and Old-Age Index (OAI)—were calculated for all 78 municipalities of Puerto Rico. These indicators were integrated into a spatial analysis using global and local Moran's I measures to assess statistically significant spatial clustering. Data processing and analysis were conducted using R and GeoDa software. **Results:** The lowest median age was observed in Naguabo (41.4 years) and the highest in Rincón (51.4 years). The AI ranged from 18.4 (Santa Isabel) to 31.1 (Hormigueros), while the OAI ranged from 1.4 (Barranquitas) to 3.2 (Hormigueros). Global spatial analysis revealed a moderate and statistically significant positive autocorrelation for both AI ($I = 0.33$, $p < 0.01$) and OAI ($I = 0.34$, $p < 0.01$). Local Moran's I identified a high-high cluster of older municipalities in the southwest region of the island, while younger municipalities were concentrated in the central-eastern area. **Conclusion:** Population aging in Puerto Rico is not randomly distributed but follows defined regional spatial patterns. These findings highlight the importance of incorporating spatial components into territorial planning and public policies aimed at addressing the needs of the older population. **Acknowledgments:** None.

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Spatial Clustering of Predominant Cancer Types in Puerto Rico, 2010-2019

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Background & Objectives: Colorectal, prostate, breast, and lung cancers are the predominant malignancies in Puerto Rico. Geographic factors including healthcare access and environmental exposures may influence cancer rates. This study aimed to assess spatial clustering patterns of these cancers across Puerto Rican municipalities to identify areas with elevated or reduced disease burden using spatial autocorrelation analysis. **Methods:** Age-adjusted incidence and mortality rates by municipality (2010-2019) were obtained from the Puerto Rico Cancer Registry. Global Moran's I assessed spatial autocorrelation for breast, prostate, colorectal, and lung cancers. Getis-Ord G^* identified geographic hotspots and coldspots. Spatial analysis and map visualization were produced using R Studio (spdep, sp, sf packages). **Results:** Significant spatial clustering was identified for most cancer types examined. Prostate cancer demonstrated the strongest clustering for both incidence (Moran's $I=3.332$, $p<0.001$) and mortality (Moran's $I=4.862$, $p<0.001$). Colorectal cancer showed significant clustering for incidence (Moran's $I=2.793$, $p<0.01$) and mortality (Moran's $I=2.761$, $p<0.01$), with hotspots concentrated in south-central regions. Lung cancer exhibited similar patterns (incidence Moran's $I=2.703$, $p<0.01$; mortality Moran's $I=2.375$, $p<0.01$). Female colorectal cancer showed no incidence clustering but strong mortality clustering (Moran's $I=3.248$, $p<0.001$). Breast cancer showed significant incidence clustering (Moran's $I=2.242$, $p<0.05$) but not mortality clustering. **Conclusions:** Cancer rates in Puerto Rico exhibit significant geographic clustering that varies by cancer type and between incidence and mortality. Dissociation between incidence and mortality patterns suggests geographic differences in treatment access or care quality. Findings identify priority areas for targeted interventions and warrant investigation of socioeconomic, healthcare access, and behavioral risk factors. **Acknowledgements:** UPR Comprehensive Cancer Center Shared Resources and Scientific Operations Division.

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The Impact of Diet Composition on Reductions in Anxiety-like Behaviors in the Blind Mexican Cavefish

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Environmental factors may contribute to the evolution of anxiety-like behaviors in vertebrates. *Astyanax mexicanus*, a teleost fish consisting of surface and cave-dwelling morphotypes, is an established model for examining how ecological pressures shape behavioral adaptation. Surface fish inhabit illuminated, predator-rich rivers, whereas Pachón cavefish have evolved in isolated subterranean environments characterized by perpetual darkness and limited food availability. Across studies, cavefish consistently show reductions in anxiety-like behaviors relative to their surface counterparts. We aimed to determine whether diet composition—one of the major environmental differences between rivers and caves—plays a role in shaping the evolution of reduced anxiety-like behavior in cavefish. To address this, we used the novel tank test, a validated assay for quantifying stress and anxiety-related responses in fish. Fish were maintained for one month on one of three diets: (1) vegetable-based, (2) commercial pellets, or (3) frozen bloodworms. Behavioral endpoints included time spent in the upper and lower halves of the tank, representing exploratory activity (top-dwelling) and anxiety-like behavior (bottom-dwelling), respectively. Surface fish exhibited consistently elevated bottom-dwelling across all diet treatments, indicating heightened anxiety-like responses regardless of nutritional condition. In contrast, Pachón cavefish showed reduced anxiety-like behavior overall. However, individuals fed pellets or bloodworms displayed partial increases in bottom-dwelling, suggesting that certain dietary conditions may modulate this otherwise diminished behavioral phenotype. Together, these findings indicate that while morphotype remains the primary determinant of anxiety-like behavior in *Astyanax mexicanus*, diet composition may influence the expression or plasticity of cave-derived reductions in anxiety. Future work will examine gut–brain interactions as a potential mechanism linking nutrition and behavioral evolution. IACUC approval number: A790124.

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Análisis del Registro de Casos de Enfermedad de Alzheimer en Puerto Rico: Importancia del Diagnóstico Temprano

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a Personas Afectadas por la Enfermedad de Alzheimer.

Introducción: La Enfermedad de Alzheimer (EA) representa la cuarta causa de muerte en Puerto Rico, con una prevalencia de 13.7%. A nivel mundial, se estima que 55 millones de personas están diagnosticadas, proyectándose que esta cifra se triplicará para 2050. Según el Registro de Casos del Centro de Alzheimer, durante el período de agosto 2022 a diciembre 2024, en Puerto Rico se reportaron 1,806 casos de trastorno neurocognitivo leve

(EA leve) y 10,695 casos de trastorno neurocognitivo mayor (EA severa). La EA leve puede ser manejable con medicamentos como Memantina y Namenda, además de nuevos tratamientos en desarrollo, lo cual incrementa significativamente la calidad de vida de los pacientes cuando se diagnostica tempranamente. **Objetivo:** Describir la importancia del diagnóstico temprano de la EA en Puerto Rico y proponer herramientas alternativas para fomentar la detección precoz de la enfermedad. **Método:** Se realizó un análisis descriptivo de datos del Registro de Casos del Centro de Alzheimer, evaluando casos diagnosticados de EA leve y EA severa en Puerto Rico según distribución por sexo, municipio y categorías diagnósticas. **Resultados:** Se identificaron 1,806 casos de EA leve con predominio femenino (65.7%) sobre masculino (34.3%). Los 10,695 casos de EA severa se clasificaron en tres categorías: con alteraciones conductuales, sin alteraciones conductuales y posible. La mayor incidencia diagnóstica se observó en el grupo de 80-84 años, evidenciando diagnósticos tardíos que limitan las opciones de tratamiento. **Conclusión:** Es importante implementar herramientas diagnósticas tempranas accesibles, como utilización de biomarcadores y listas de verificación (Checklists), que permitan identificar EA leve oportunamente. La detección temprana maximizará los beneficios de tratamientos actuales.

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Voces sobre Conducta Suicida: Análisis de Contenido de un Grupo Focal con Estudiantes Universitarios

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Trasfondo y Objetivo: El suicidio es un problema preocupante de salud mental y salud pública a nivel mundial. Es la segunda causa de muerte en la comunidad estudiantil universitaria. El objetivo de esta investigación fue entender la percepción sobre la conducta suicida en un grupo de estudiantes universitarios. El estudio científico de la conducta suicida en la población estudiantil universitaria aporta a los esfuerzos de prevención del suicidio en esta población y es valioso para fortalecer la prestación de servicios profesionales de salud mental dirigidos a esta comunidad. **Método:** Esta investigación cualitativa con diseño fenomenológico utilizó el grupo focal como técnica de estudio. Se administraron dos instrumentos: una hoja de información sociodemográfica y un cuestionario sobre conducta suicida. Se llevó a cabo una reunión de noventa minutos del grupo focal en modalidad presencial. Las narrativas fueron grabadas, transcritas y codificadas para realizar el análisis de contenido. **Resultados:** Participaron siete estudiantes subgraduados de la Universidad de Puerto Rico en Bayamón. El análisis de contenido de las narrativas del grupo focal permitió identificar categorías asociadas a la percepción sobre la conducta suicida de este grupo de estudiantes universitarios. Las mismas se pueden agrupar en conceptualización de conducta suicida, indicadores de riesgo suicida, factores de riesgo, factores protectores, afrontamiento de riesgo suicida y creencias falsas sobre la conducta suicida. Las narrativas muestran una comprensión multidimensional, multicausal y multifactorial de la conducta suicida. **Conclusiones:** Los hallazgos destacan la necesidad urgente de continuar implementando estrategias para promover el bienestar psicológico, la prevención de la conducta suicida entre estudiantes universitarios, la intervención temprana y el fortalecimiento de la prestación de servicios profesionales dirigidos a esta comunidad, incluyendo los servicios de salud mental y la coordinación de redes de apoyo integrales en el contexto universitario. **Reconocimientos:** Ninguno. Aprobada por IRB: 2 de julio de 2024. Protocolo #009-2023-2024.

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Home-Based Physiotherapy Protocol to Increase Physical Activity Levels and Adherence in Older Adults with Type 2 Diabetes

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Background & Objectives: Despite extensive evidence demonstrating the benefits of physical activity (PA) interventions for older adults with type 2 diabetes, rates of physical inactivity remain persistently high (exceeding 50%), underscoring a gap between research findings and implementation in clinical practice. The objectives of this study were to evaluate the feasibility of implementing a patient-centered, home-based PA program for sedentary older adults with type 2 diabetes and, to assess the preliminary impact of the PA program on balance, risk of falls, cardiovascular endurance, and overall strength. **Methods:** A one-group repeated-measures design was used and included adults aged 65 years or older with moderately to well-controlled type 2 diabetes (HbA1c <9%), a sedentary lifestyle, and medically cleared to exercise. The home-based PA protocol was implemented twice a week for 12 weeks. Feasibility was determined by recruitment, retention, satisfaction, and goal achievement rates. Outcome measures at weeks 1, 6, and 12 included weekly active minutes via a smartwatch, dynamic balance (s), muscle strength (Kg, reps), cardiovascular endurance (reps), and fall risk (s) using validated tests. Statistical analyses included ANOVA or Friedman tests ($\alpha=.05$), Wilcoxon signed-rank, and Mann-Whitney U tests. **Results:** Eight participants completed the intervention and were retained throughout the study. All participants expressed satisfaction with the program, and 100% achieved their individual goals. Statistically significant improvements were observed in active minutes ($p=.002$), Timed Up and Go Test ($p=.029$), 30-Second Chair Stand ($p<.001$), Four Square Step Test ($p=.001$), and 2-Minute Step Test ($p<.001$). No significant differences were found for right or left-hand dynamometry ($p=.135$; $p=.154$, respectively). Approved by the IRB, Protocol 2405234620 (08/23/2024). **Conclusion:** These findings indicate that a physiotherapist-supervised, home-based PA program is a feasible approach to increase PA levels among older adults with type 2 diabetes. This model shows potential for promoting long-term behavioral change and improving physical function in this population. **Acknowledgements:** The authors wish to express their sincere gratitude to the Post-doctoral Master in Clinical and Translational Research Program from the Medical Sciences Campus of the University of Puerto Rico. Supported by the Hispanics-In-Research Capability Endowment (HiREC), Partnership between the School of Health Professions and School of Medicine, University of Puerto Rico under grant #S21MD001830 by the NIH National Institute of Minority Health and Health Disparities. Disclosure statement: The authors report there are no competing interests to declare.

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Impact of Cumulative Stressful Life Events on Suicidal Behavior in a Representative Sample of 6th-12th Grade Students in Puerto Rico, 2022-24

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Stressful life events (SLE) have been associated with depression, anxiety, and suicidal behavior, but evidence using population-based samples remains scarce, particularly among Hispanic youth. This study evaluated the association between SLE and suicidal behavior (ideation and attempts) during the previous year among students. The sample (n=7,356) in this survey was selected using a multi-stage stratified cluster sampling design and was representative of all 6th-12th grade students in Puerto Rico. Students completed a self-administered questionnaire. Multiple logistic regression models were fitted to estimate odds ratios and 95% confidence intervals adjusting for potential confounders. Interaction was assessed. Approximately 21.8% of students reported ≥ 4 SLE in the last year, 26.3% reported 2-3 events, and 22.4% only one. More females reported ≥ 4 SLE. Prevalence of suicidal behaviors was highest among students reporting ≥ 4 SLE (ideation=14.5%; attempts=21.2%). A clear dose-response pattern was observed in the association between SLE and attempts; no clear pattern was observed for ideation. Both associations were stronger among males. Males with ≥ 4 SLE had 3.85 higher odds of ideation and 4.24 higher odds of attempts compared to students reporting no SLE after adjusting for age, depressive symptoms, parental support, and age at onset of tobacco, alcohol, or marijuana use; females had 2.83 higher odds of ideation and 3.23 higher odds of attempts ($p < 0.001$). This study highlights the consequences that stressful life events appear to have in our youth's mental health and in their risk of suicidal behavior, particularly among males. Suicide prevention and intervention programs should include measures to mitigate the effects of SLE in a youth's life. Research supported by the Puerto Rico Mental Health Services and Drug Addiction Administration (ASSMCA, by its acronym in Spanish). Approved by UCC IRB #2022-24.

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Qualitative Microbiological Evaluation of a Dynamic Fenestration Prototype for Airborne Contamination Control

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Background and Objective: Airborne microbial contamination poses a persistent challenge for maintaining aseptic conditions during emergency procedures in non-sterile environments. The *Dynamic Fenestration* is a transparent, adaptable device designed to minimize microbial and particulate deposition over exposed tissue surfaces. This study aimed to qualitatively assess its effectiveness in limiting airborne contamination using environmental exposure tests under laboratory and simulated field conditions. **Methods:** Sterile Brain Heart Infusion (BHI) agar plates (60 mm) were used as microbial collectors to simulate wound exposure. Multiple plates were placed under two distinct conditions: protected, beneath the fenestration barrier, and unprotected, exposed directly to ambient air. The collectors were prepared in a biosafety cabinet and exposed to simulated field environments. Exposure times ranged from 30 minutes to 2 hours. Following exposure, all plates were sealed and incubated at 37 °C for 48 hours. They were then observed both macroscopically and microscopically to assess microbial growth patterns,

morphology, and surface contamination. **Results:** Unprotected plates consistently exhibited visible microbial colonies, including circular, opaque, and pigmented growth characteristic of airborne bacterial and fungal contaminants. Colony morphology varied by exposure, with outdoor environmental trials showing a broader diversity of surface growth. In contrast, plates protected by the fenestration barrier remained clear across all trials, confirming the barrier's ability to physically prevent microbial deposition. The reproducibility of these qualitative results across different conditions indicates reliable performance of the system. **Conclusion:** Qualitative microbiological findings support the effectiveness of *Dynamic Fenestration* in reducing airborne microbial contamination. Future studies will expand testing to real-world field environments and integrate microbiology analyses to further validate the barrier's protective efficiency. **Acknowledgments:** This project is supported by the Biomedical Innovation Center, Department of Pharmacology, School of Medicine, University of Puerto Rico Medical Sciences Campus, U.S. Patents No. 11,466,505 and 12,144,577.

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Uso de Sustancias, Estrés Académico y Calidad de Vida en Estudiantes de la Universidad de Puerto Rico

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Antecedentes y Objetivos: Los estudiantes universitarios enfrentan niveles significativos de estrés académico que pueden relacionarse con patrones de uso de sustancias y afectar su bienestar general. Este estudio examinó las relaciones entre el uso de sustancias, el estrés académico y los indicadores de calidad de vida en estudiantes de la Universidad de Puerto Rico. **Método:** Estudio transversal con 1,438 estudiantes de once recintos de la UPR (Carolina, Río Piedras, Mayagüez, Arecibo, Bayamón, Ponce, Cayey, Humacao, Aguadilla, Utuado y Ciencias Médicas). Se midió el nivel de estrés académico mediante escala de 1-5 (Inventario SISCO), uso de sustancias en los últimos 30 días, y cuatro indicadores de calidad de vida: sueño, alimentación, actividad física e interacción social. Se realizaron análisis de correlación de Pearson, pruebas t y ANOVA. **Resultados:** La muestra (66.2% mujeres; edad promedio 20.9±4.3 años) reportó niveles altos de estrés académico (promedio 3.76/5.0; 93.3% con preocupación/nerviosismo). Prevalencia de uso en últimos 30 días: cafeína 65.9%, alcohol 44.8%, marihuana 8.9%. Usuarios de anfetaminas (n=31) mostraron niveles significativamente mayores de estrés (4.30 vs 3.74, p<0.001). Usuarios de alcohol reportaron menor calidad de sueño (3.02 vs 3.24, p<0.001) y alimentación (3.74 vs 4.04, p<0.001), pero mayor interacción social (3.54 vs 3.34, p<0.001). El estrés académico correlacionó negativamente con todos los indicadores de calidad de vida (r=-0.128 a -0.204, p<0.001). Problemas de salud mental: ansiedad 79.6%, estrés 84.3%, depresión 55.7%, ideación suicida 36.2%. **Conclusión:** El estrés académico elevado es prevalente en estudiantes de la UPR y se asocia significativamente con uso de sustancias y deterioro en la calidad de vida. El uso de anfetaminas muestra la asociación más fuerte con estrés elevado. Se requieren intervenciones integradas que aborden simultáneamente el manejo del estrés, prevención de uso de sustancias y promoción de calidad de vida en la población universitaria. IRB #: 2412322250 (03/27/2025)

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Development of an Intrinsic Multi-Spectrometer

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Background: Intrinsic spectroscopy is a relatively novel field. The concept is based on normalizing a spectrometer such that only the spectral components from the samples are contained in their spectra by eliminating the spectral illumination components of the instrument. This is similar to epi-fluorescence spectroscopy using wide-wavelength illumination, without employing band-pass filters and dichroic mirrors. **Methods:** The optical system consists of three integrating spheres, where one sphere serves as the illuminator, featuring multiple LEDs of different wavelengths, including a white LED with a range of 400 to 750 nm. The first sphere illuminates reference and sample cuvette chambers, and the light from the cuvettes passes into the reference and sample integrating spheres. The two beams of light are then directed onto a diffraction grating, where a camera records the diffraction patterns. The images of the diffraction are then transformed into spectra and analyzed by a mini-computer. **Results:** Using empty cuvettes, the instrument is normalized to present a Zero Order Spectrum, which validates that there is no spectral content produced by empty cuvettes. Therefore, when performing spectroscopy with a material in the sample cuvette, the spectral content is intrinsic to the sample and not the instrument. **Conclusion:** This instrument has been operated as a transmission, reflection, and fluorescence intrinsic spectrometer. A study is underway to determine if it can provide intrinsic Raman spectra. The concept and construction of this intrinsic spectrometer are protected under US Patent 12,399,107. **Acknowledgements:** This project is supported by the Biomedical Innovation Center, Department of Pharmacology, School of Medicine, University of Puerto Rico Medical Sciences Campus.

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Validation of a Patent Combining Intrinsic Spectra of Different Wavelength Ranges Obtained from Different Instruments

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Background: Intrinsic spectra contain only spectral components that are intrinsic to the sample and are absent from components of the illumination. This phenomenon is similar to epi-illumination, which is employed to reveal the fluorescent components of a sample. The intensity of spectral peaks is a function of the instrument settings and proportional to the instrument noise. The advantage of intrinsic spectroscopy is its ability to isolate instrument noise, which can be normalized across different instruments and wavelength ranges. These concepts are presented in US Patent 10,337,916. **Methods:** Validation was performed using a Headwall Hyperspectral system, which contained a camera with a visible range of 400 to 1000 nm and a near-infrared camera with a range of 900 to 2500 nm. Intrinsic hyper-spectral data cubes were obtained with both cameras. Normalizing noise spectra were determined by averaging 10 background scans from each camera. The average noise from the different cameras was normalized by determining the factor that equilibrated the noise from each camera. This factor was then used to adjust the intensities of the intrinsic spectra before combining the spectra from each camera to produce continuous intrinsic spectra spanning a wavelength range from 400 to 2500 nm. **Results:** Combined visible and near infrared spectra of liquid and solid samples were produced. The majority of these extended

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spectra were found to join smoothly. However, a small percentage were found to be offset from each other, and this requires additional study to determine the correct cause. **Conclusion:** Although additional work is required, this approach provides compelling evidence for a broader and more comprehensive spectrum of sample identification by spectroscopy. **Acknowledgement:** This project is supported by the Biomedical Innovation Center, Department of Pharmacology, School of Medicine, University of Puerto Rico Medical Sciences Campus.

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Designing Workplace Ergonomics Training Programs Based on Employee Insights in Puerto Rico

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Background and Objectives: Ergonomic risks like repetitive motions and poor posture remain common in Puerto Rico's industrial workplaces, increasing the risk of musculoskeletal disorders. Adopting best practices fosters a safety-focused culture and long-term benefits for employees and organizations. This study examined employees' perceptions and expectations of ergonomics training to (1) develop a standardized framework for consistent, high-quality instruction, and (2) explore the potential of mHealth interventions to support training. **Methods:** A questionnaire was completed by 312 employees across various industries to assess demographics, prior ergonomics training, and preferences for future training. Data was cleaned and analyzed using descriptive statistics to identify trends and associations between demographics and training perceptions. SysML structure models were then used to generate a preliminary framework for ergonomics training, and a review and initial wireframing stage was undertaken to begin designing an mHealth intervention for ergonomics training. **Results:** The questionnaire showed that many employees have received ergonomics training, though often not recently, and most could apply it in their work. Participants preferred task- and industry-relevant training in in-person, virtual, or hybrid formats, with key topics including safety, injury prevention, and general health. These findings informed the development of a three-stage framework for industrial ergonomics training: (1) Planning and Design, (2) Implementation, and (3) Continuous Evaluation. Insights from the study guided the initial design of an mHealth intervention incorporating microlearning and artificial intelligence. **Conclusion:** These findings underscore the need for workplace ergonomics programs that are accessible, relevant, and tailored to employees' needs. By considering employees' experiences and preferences, organizations can design training strategies that enhance safety, promote well-being, and improve overall job performance. IRB approval number: 2024020002 - Committee for the Protection of Human Subjects in Research at the University of Puerto Rico, Mayagüez Campus.

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A Human-Centered mHealth Design for Culturally Relevant Diabetes Education in Puerto Rico

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Background and Objectives: Type 2 diabetes is one of the most prevalent chronic diseases in Puerto Rico, significantly affecting public health and the quality of life of those living with the condition. Effective self-management requires continuous education and behavioral support, which can be enhanced using mobile

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health (mHealth) technologies. This study focuses on the design and development of a culturally relevant mHealth intervention aimed at improving diabetes education among people with Type 2 diabetes in Puerto Rico. **Methods:** The study involved a literature review to identify cultural factors influencing how Puerto Ricans manage diabetes, an assessment of existing educational materials available to the general population, and the identification of opportunities for innovation in mobile health (mHealth) design. **Results:** The literature review indicated that multiple cultural factors influence how Puerto Ricans self-manage diabetes, including dietary habits and food culture, health beliefs and perceptions, family and social support, language and health literacy, attitudes toward healthcare, socioeconomic and environmental factors, and religion and spirituality. The assessment of existing educational materials available to the general population identified opportunities to enhance diabetes education by utilizing multiple modalities to deliver content, integrating microlearning for more digestible and accessible learning, and exploring the potential for artificial intelligence integration. During the initial design phase, principles from human factors engineering and UI/UX design were applied to develop wireframes for an mHealth platform focused on diabetes education culturally tailored for Puerto Rican. The intervention incorporates microlearning strategies to promote engagement and knowledge retention, while also exploring the use of artificial intelligence, including generative AI and chatbots, to provide real-time education, personalized feedback, and ongoing follow-up support. **Conclusion:** This work represents an early step toward developing a culturally tailored, technology-driven solution to empower individuals with Type 2 diabetes in Puerto Rico to better manage their health and improve long-term outcomes.

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Growing IDEAS: Puerto Rico Nursing Workforce

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Background: Nurses in Puerto Rico work within a landscape marked by economic inequities, chronic underfunding of federal programs, and the long-term effects of public health emergencies. These challenges are compounded by the island's colonial relationship with the United States, which has shaped healthcare structures, educational systems, and access to resources. Puerto Rico faces higher rates of preterm birth and infant mortality than the mainland, limited maternity care access, and significant loss of healthcare infrastructure following hurricanes, earthquakes, and the COVID-19 pandemic. Additionally, nurses on the island earn substantially less than their U.S. counterparts, limiting opportunities for continuing education and professional advancement. These conditions underscore the need for culturally grounded strategies that honor the lived experiences of Puerto Rican nurses.

Purpose: This study examines how an association dedicated to women's health, obstetric, and neonatal nursing can support workforce development in Puerto Rico. **Methods:** A three-phase mixed-methods design included an online survey, three focus groups with direct-care nurses (n = 23), and targeted interviews with hospital and university leaders. Quantitative data were analyzed descriptively, and qualitative data underwent thematic analysis. (Approved by IRB, Protocol #2504394966, approved on July 3, 2025.) **Results:** Among the 106 survey respondents, major challenges included burnout, staff shortages, and high patient volume. Priority educational needs centered on perinatal loss, neonatal care, and high-risk obstetrics. Focus group discussions emphasized

the importance of delivering educational content in Spanish, addressing topics specific to Puerto Rico's clinical and social context, and ensuring culturally meaningful materials. Participants also highlighted the impact of limited staffing, emotional exhaustion, and the need to strengthen patient and family education. **Conclusion:** Overall, the findings demonstrate that workforce development in Puerto Rico requires culturally responsive approaches designed in collaboration with local nurses. Such strategies support professional empowerment, build capacity, and strengthen the women's health and perinatal nursing workforce across the island. Approved by IRB, Protocol #2504394966, approved on July 3, 2025.

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Living Arrangements or Companionship and Economic Income as Factors in the Development of Anxiety and Stress Symptoms Among Adults Aged 60 or Older with Chronic Conditions

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Introduction: In Puerto Rico, the proportion of individuals aged 60 or older (60+) continues to increase. As people age, the prevalence of chronic conditions (CC)—such as diabetes, cardiorespiratory diseases, and cancer—also rises. This, in turn, may contribute to the development of emotional distress, anxiety, or stress. These conditions can be exacerbated by social determinants such as living arrangements or companionship, and income. Purpose: To examine longitudinally the relationship between living arrangements or companionship and economic income with the development of anxiety and stress symptoms among adults aged 60+ with chronic illnesses. **Methodology:** A longitudinal secondary analysis (2018–2023) was conducted with a cohort of 150 adults aged 60+ diagnosed with at least one CC. Participants were assessed across four time points (baseline, 3, 9, and 12 months). Sociodemographic data were collected, including questions related to income and housing. Anxiety and stress were measured using the General Anxiety Disorder-7 Scale and the Perceived Stress Scale. Statistical analyses included ANOVA tests and non-parametric correlations. **Results:** Findings did not show significant differences ($p > 0.05$) in the development of anxiety or stress symptoms when compared with living arrangements or companionship, and economic income. However, a trend was observed indicating an increase in stress levels over time when examining living arrangements or companionship across the four assessment periods (visits 3 and 4). **Conclusion:** Although the findings did not reach statistical significance, they highlight the need to further explore these factors in older adults with CC and how they may influence mental health. Future directions include expanding the sample and assessing a more heterogeneous distribution to enable additional types of statistical analysis. **Acknowledgments:** We would like to thank Dr. Eida Castro Figueroa, the Psycho-Oncology Research Lab, and the RCMI project, as well as the other collaborators. This project was funded under NIH and approved by IRB protocols 180611 and 16800.

**Elevated Cardiometabolic Complications and Mood Disorders
in Puerto Rican Women with Polycystic Ovary Syndrome:
Findings from a Clinical Cohort**

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Background and Objectives: Polycystic Ovary Syndrome (PCOS) is a prevalent condition characterized by menstrual dysfunction, hyperandrogenism, and polycystic ovarian morphology. Four phenotypes present with distinct clinical and metabolic profiles, and the syndrome imposes significant reproductive and metabolic complications across the lifespan. Data on PCOS characteristics in Puerto Rican women are limited. This study aimed to characterize the clinical and cardiometabolic features of women with PCOS in a Puerto Rican clinical population. **Methods:** This descriptive, clinic-based study included 116 women aged 21–45 years recruited from endocrinology and gynecology clinics. Participants underwent clinical, laboratory, and imaging studies. PCOS was diagnosed using the Rotterdam criteria and classified into phenotypes. **Results:** Phenotype A was most common (63.2%), followed by B (24.5%), C (8.5%), and D (3.8%). Dermatologic manifestations included acne (51.7%), acanthosis nigricans (52.6%), hirsutism (31.0%), and alopecia (22.4%). Menstrual disturbances were reported by 87.1% of women, mainly oligomenorrhea (54.3%) and amenorrhea (40.5%), while infertility was reported by 43.5%. Biochemical hyperandrogenism was detected in 77.6% of women. Cardiometabolic abnormalities were highly prevalent: 69.8% had obesity, 79.1% exhibited central obesity, and 65.5% had insulin resistance. Impaired glucose tolerance and type 2 were present in 21.6% and 7.8%, respectively. Nearly half (48.3%) met criteria for metabolic syndrome. Dyslipidemia was common, with low HDL-C (62.1%), elevated LDL-C (58.6%), and hypertriglyceridemia (20.7%). Hypertension was identified in 12.9%, and 60.3% had elevated C-reactive protein. Moderate-to-severe depressive symptoms were reported by 37.9% of women. **Conclusion:** Our findings showed a predominance of phenotype A and highlight a substantial reproductive, dermatologic, and cardiometabolic burden in this population. These results underscore the need for timely diagnosis, multidisciplinary management, and targeted interventions to mitigate long-term morbidity. **Acknowledgements:** The authors have no conflict of interest to disclose. This project was partially supported by the Alliance for Clinical and Translational Research (Alliance) U54GM133807 and 2P50GM133807. Approved by IRB (Streamlyne protocol 2290034657); approval date 06/12/2022.

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Barriers in Smoking Cessation Interventions in Dental Clinics at University of Puerto Rico, Medical Sciences Campus, School of Dental Medicine

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Background & Objectives: Tobacco use increases the risk of cancer, one of the leading causes of death in Puerto Rico. The incidence of oral cancer has been rising, prompting health professionals to investigate effective intervention methods. Smoking cessation therapies have proven cost-effective, and early detection plays a key role in successful intervention. Oral healthcare providers are essential in delivering these interventions. This study aimed to identify barriers and aptitude in smoking cessation interventions among oral healthcare providers in dental clinics at the Medical Sciences Campus School of Dental Medicine, University of Puerto Rico. **Method:** Data was collected in three phases: focus groups with professors, dental staff and students, and in-depth interviews with dental professors. Responses were analyzed to identify barriers, aptitude, and attitudes toward smoking interventions in clinical practice. With the aim of testing the hypothesis: If oral healthcare providers experience barriers that hinder smoking cessation interventions, then their confidence and application in such practices will be reduced, because the clinical education protocol does not adequately integrate cessation strategies into patient care training. The IRB number is 2303092206. **Results:** Participants demonstrated knowledge of smoking intervention and its importance to oral health but faced notable barriers in practice. Students reported a perceived lack of preparation for counseling patients with varying attitudes. Dental staff felt limited in intervention and unaware of pharmacological aids that could improve collaboration between dentists and students, reflecting systemic barriers. Patient resistance was also common, as many acknowledged the harms of smoking yet refused to quit. Despite these challenges, participants expressed motivation to develop an interdisciplinary framework to enhance training and strengthen clinical competence. **Conclusion:** These findings highlight areas to strengthen smoking cessation training within the dental clinical curriculum to improve oral health provider preparedness and deliver more effective smoking prevention advice to their patients.

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Assessing Energy Insecurity and its Effects on Health and Well-Being in Puerto Rico

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Background: Reliable energy is essential for daily activities, health care, and overall well-being. Energy insecurity has been linked to negative social, physical, and mental health outcomes worldwide. In Puerto Rico, frequent power outages may contribute to disruptions in daily routines, access to health services, and overall quality of life. **Objective:** To examine the impact of energy insecurity on adults in Puerto Rico, focusing on its effects on health care, daily activities, and quality of life. **Methods:** A cross-sectional study included 250 adults over 21 years, recruited from ambulatory clinics at two healthcare facilities in Carolina and Loíza. Participants completed a structured interview on sociodemographic, health status, and experiences related to power outages. Descriptive statistics summarize participants' characteristics and experiences of energy insecurity. **Results:** Participants were predominantly women (66.2%), 51.6% had post-secondary education, 62.4% participated in the Nutrition Assistance Program, and 97.2% had health insurance, with 76.8% reporting at least one chronic condition. In the past 12 months, 97% experienced recurrent power outages, with 81.3% reporting three or more outages lasting six or more hours. Frequent disruptions affect daily routines, leading to adjustments such as acquiring alternative energy sources (73%) and household appliances (53%). Interruptions led to social and economic impacts: 65% discarded food, 57% discarded equipment, and 42% reported physical problems related to heat waves. Participants reported worsening health conditions (29%), stress (69%), sleep disturbances (66%), and difficulties performing daily activities (56.8%) and in quality of life (64.8%). **Conclusions:** Frequent power outages in Puerto Rico disrupt daily life, health, and well-being, causing reliance on alternative energy sources and adjustments in routines. Ensuring consistent electricity access is critical, particularly for socially and medically vulnerable adults. **Acknowledgements:** Supported by Endowed Health Services Research Center, Grants 5S21MD000242 and 5S21MD000138, National Center of Minority Health and Health Disparities, and National Institutes of Health. Approved by IRB, protocol number: 2504388152; Approval date: May 16, 2025.

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Intrinsic Processing Reveals Hidden Content in Hematoxylin and Eosin-Stained Tissue

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Background: Hematoxylin and Eosin (H&E) dyes have been the gold standard tissue stains for over a century, staining nucleic acids purple and proteins pink, respectively. Intrinsic image processing has been found to increase contrast, resolution and color differentiation in H&E-stained tissue. This color differentiation may indicate the presence of content other than nucleic acids and proteins. **Materials and Methods:** Two sets of H&E-stained tissues were used in this study. Set 1 consisted of 3 slides of a simple tissue that only presented interstitial nuclei and collagen fibers. One slide was stained only with hematoxylin, another slide only with eosin, and a third slide with both dyes. Set 2 contained three slides with tissues obtained from tonsil, artery, and prostate. Both sets of slides were imaged with a Canon t7i camera attached to a Nikon Labophot microscope. The images were processed with Intrinsic Software and compared with the original images. **Results:** The comparisons of the original and intrinsic images of the first set of slides showed higher contrast and resolution, but no additional color differentiation, as expected, given that the tissue is composed of cells and collagen. However, the second set of slides, which were more complex in structure and function, did reveal strong color differentiation along with increased contrast and resolution. **Conclusion:** These results provide a basis for investigating correlations between tissue content (Set

1) and assessing color differentiation in complex tissues (Set 2). The observed benefits suggest that this image enhancement method has the potential to improve clinical diagnostics. Further validation studies could assess its impact on diagnostic accuracy and interobserver agreement. **Acknowledgments:** This project is supported by the Biomedical Innovation Center, Department of Pharmacology, School of Medicine, University of Puerto Rico Medical Sciences Campus.

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Sedentary Behavior and Depressive Symptoms in Young Adults: Sex at Birth as a Potential Modifier

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Background & Objectives: Sedentary behavior is consistently associated with depressive symptoms in young adults, but evidence on differences by sex assigned at birth remains mixed. Recognizing potential effect modification is critical for the design of targeted prevention and intervention strategies. This study examined the association between sedentary behavior and depressive symptoms among young adults in Puerto Rico, a population disproportionately affected by both conditions, and investigated whether this association differed according to sex assigned at birth. **Methods:** Baseline data from the PR-OUTLOOK cohort (2020-2024), a community-based study of 2,994 adults aged 18-29 years (weighted N=516,047), were analyzed. Depressive symptoms were assessed with the CESD-10 (score ≥ 10 indicating elevated symptoms), and sedentary behavior with the validated Sedentary Behavior Questionnaire. Daily averages were dichotomized as sedentary (≥ 8 hours/day) or non-sedentary (< 8 hours/day) based on thresholds associated with adverse health outcomes. Logistic regression models, both unweighted and weighted (using iterative proportional fitting by age and sex), tested the association between sedentary behavior and depressive symptoms, including an interaction term with sex assigned at birth. Models were adjusted for sociodemographic, behavioral, and psychosocial covariates. **Results:** The sample had a mean age of 23.4 years, with 49.7% women, 63.4% classified as sedentary, and 59.2% reporting elevated depressive symptoms. In adjusted models, sedentary behavior was associated with higher odds of depressive symptoms (OR=1.36, 95% CI=1.11–1.66). However, the interaction between sedentary behavior and sex at birth was not statistically significant ($p=0.15$; males OR=0.8, 95% CI=0.6–1.1; females OR=1.2, 95% CI=0.8–1.6), providing no evidence of effect modification. **Conclusions:** Sedentary behavior was associated with depressive symptoms among young adults in Puerto Rico, with no evidence of sex differences. Findings highlight sedentary behavior as a broadly applicable prevention target and emphasize the urgent need for culturally responsive, population-specific mental health strategies in this high-risk group. **Acknowledgments:** This research was supported by the National Heart, Lung, and Blood Institute (grant R01HL149119). The research was also supported by the Hispanic Alliance for Clinical and Translational Research funding awarded through the National Institute of General Medical Sciences (U54GM133807-05S1). Approved by IRB protocols 2412333349 and 2412333349A001.

**Aging, Chronic Conditions, and Family Care in Las Carolinas, Caguas:
A Descriptive Community Profile**

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Background: Population aging is accelerating across Puerto Rico, where more than one-third of residents are aged 60 or older (Oficina del Procurador de las Personas de Edad Avanzada [OPPEA], 2024). As Matos-Moreno et al. (2022) describe, this demographic transition has increased the prevalence of chronic diseases and functional dependence, creating a growing need for family-based caregiving. Understanding the sociodemographic and health characteristics of aging communities is essential to developing programs that address chronic disease management and strengthen informal caregiving networks. **Objective:** Describe the sociodemographic characteristics, health conditions, and household care dynamics among residents of Las Carolinas, Caguas, during June and July 2025. **Method:** This descriptive cross-sectional study used a structured interviewer-administered questionnaire to collect data on demographics, employment, income, health coverage, chronic conditions, disabilities, and barriers to healthcare. (IRB: Approved by the Office for the Protection of Human Research Participants [OPPHI], University of Puerto Rico Medical Sciences Campus, protocol no. 2505401331, approved June 10, 2025). Field observations supported contextual understanding during data collection. Ninety-six adult residents aged 21 years or older participated (response rate 38%). **Results:** The median age was 64 years (range 22–88). The largest age groups were 55–64 (32.3%), 65–74 (24.0%), and 75 or older (19.8%). The analysis showed that 37.5% of participants were retired, and 39.6% reported three or more chronic conditions, primarily hypertension (52.1%), diabetes (33.3%), and asthma (24.0%). One-third identified as primary caregivers, and half lived with someone who had a physical health condition. Health coverage was evenly divided between public (40.6%) and private (40.6%), with 6.3% uninsured. Reported barriers included unavailable local services (12.6%) and transportation challenges (10.4%). Additionally, 16.7% reported a mobility-related disability, while smaller proportions noted vision (10.4%) or hearing (7.3%) impairments. **Conclusion:** Las Carolinas represents an aging and economically vulnerable community with significant chronic disease burden, functional limitations, and caregiving responsibilities. These findings may inform community-based initiatives focused on caregiver education, chronic disease management, and transportation access for older adults in Puerto Rico. **Acknowledgment:** This study was part of the Integrative Learning Experience, a community integration project to fulfill the requirements for the Master's degree in General Public Health (MPH). The authors thank Dr. Marisol Peña Orellana for her mentorship and the community leaders and residents of Las Carolinas in Caguas, Puerto Rico, for their collaboration and participation. Conflict of Interest: None.

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Efecto del Tratamiento Dental bajo Anestesia General en la Calidad de Vida Relacionada con la Salud Bucal de Adultos con Necesidades Especiales: Revisión Sistemática

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Objetivo: Analizar el efecto del tratamiento dental bajo anestesia general (AG) en la calidad de vida relacionada con la salud bucal (OHRQoL, por sus siglas en inglés) de adultos con necesidades especiales. **Métodos:** Se realizó una revisión sistemática conforme a las directrices PRISMA 2020. Se realizaron búsquedas de estudios en cinco bases de datos hasta octubre de 2025, incluyendo diseños observacionales y ensayos clínicos que evaluaran la OHRQoL mediante instrumentos validados en pacientes mayores de 21 años con discapacidades intelectuales, del desarrollo o físicas, tras recibir tratamiento dental integral bajo AG. **Resultados:** De 2,847 registros identificados, se incluyeron 9 estudios realizados en Europa, Asia y América Latina, con tamaños muestrales de 1 a 3,117 participantes y edades medias entre 18 y 51 años. Solo un estudio evaluó directamente la OHRQoL mediante un instrumento validado, mostrando mejoras significativas a los 12 meses de seguimiento. Los demás estudios reportaron beneficios indirectos, como reducción de la carga de enfermedad oral y altas tasas de éxito en tratamientos conservadores, como la endodoncia, realizados bajo AG. La nutrición por sonda o dieta líquida se identificó como factor de riesgo para requerir tratamientos repetidos bajo AG. **Conclusiones:** El tratamiento dental bajo anestesia general mejora la OHRQoL y los resultados clínicos en adultos con necesidades especiales. Sin embargo, la certeza de evidencia fue baja a moderada debido al predominio de estudios observacionales y la heterogeneidad metodológica.

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El Entorno Construido como Determinante Social de la Salud: Impacto en la Prestación de Servicios de VIH en Puerto Rico

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Trasfondo: El entorno construido (EC) (desarrollo espacial, vivienda, transportación) influye en la accesibilidad a servicios de salud. El objetivo de este análisis es describir cómo el EC es un determinante social de la salud (DSS) que impacta la prestación de servicios de prevención y cuidado del VIH en Puerto Rico (PR). **Metodología:** De marzo a septiembre de 2024 se realizó un estudio descriptivo de métodos mixtos. Se completaron entrevistas con líderes comunitarios (LC) y hacedores de política pública (HPP) vinculados a asuntos de VIH. Las entrevistas exploraron como los participantes consideraban las estrategias y políticas públicas para atender el impacto de los DSS en la salud de las personas afectadas por el VIH. Las entrevistas fueron grabadas, transcritas y analizadas temáticamente. **Resultados:** Participaron 24 personas (12 LC/12 HPP) con una edad promedio de 54 años [± 11.77] y aproximadamente 8 años de experiencia en sus organizaciones. Se identificaron cuatro categorías principales; geografía, vivienda, transportación y servicios de VIH. En desarrollo espacial, se señaló la concentración de

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servicios de VIH en el área metropolitana, lo cual limita el acceso en áreas rurales. Respecto a la vivienda, participantes detallaron como la falta de vivienda segura y estable perjudica el bienestar y la capacidad de las personas de priorizar su salud y el cuidado relacionado al VIH. Las limitaciones en la transportación restringen su movilidad hacia los servicios de salud. Se enfatizó la necesidad de ampliar los servicios existentes y restablecer aquellos cerrados por falta de fondos. **Conclusión:** El EC se manifiesta como una expresión tangible de los DSS, configurando barreras estructurales que afectan directamente la provisión y el acceso a los servicios de VIH en PR. Se sugiere que intervenir en los componentes del EC es crucial para mejorar la equidad en salud y fortalecer la vinculación de las personas a servicios de VIH. Protocolo renovado IRB #2290034461R002; 12 de abril de 2024.

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Dental Caries: The Most Studied Oral Disease in the Pediatric Population of Puerto Rico

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Background & Objectives: The prevalence of pediatric oral diseases is widely documented as a public health concern worldwide. The current work presents the main findings of a scoping review directed to assess the published research on pediatric oral health in Puerto Rico up to December 2024. **Methods:** The Joanna Briggs Institute methodology was applied to conduct a structured review of peer-reviewed studies (in English or Spanish) documenting the burden of oral diseases in the population aged <21 years in Puerto Rico, using the PubMed, EBSCOhost, and Google Scholar databases. The report follows the PRISMA-ScR guidelines. The study protocol was approved by the Institutional Review Board (Protocol #24123285; April 10, 2025). **Results:** Of the eleven studies that met the inclusion criteria, most were cross-sectional. Studies focused mainly on dental caries and were performed by faculty of the School of Dental Medicine at the University of Puerto Rico Medical Sciences Campus. The prevalence of dental caries was estimated to range from 36% to 81%, with a suggested time-related decline that may reflect advances in preventive measures. **Conclusion:** The structured assessment of the published peer-reviewed research on pediatric oral health in Puerto Rico documents that dental caries is the most studied oral disease in the pediatric population of Puerto Rico. The findings of this work can inform the development of an oral health research agenda that fosters collaboration among academia, private clinical practice, and community stakeholders. **Acknowledgement:** We are grateful to the authors of the original publications included in this scoping review for their interest in the oral health of the local pediatric population.

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Risk of Developing a Second Primary Cancer after Radiation Therapy in the First Course of Treatment for Breast Cancer in Adult Women in Puerto Rico

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Background: Female breast cancer is a major public health concern in Puerto Rico. Invasive breast cancer ranked first among cancers diagnosed in women during 2018–2022. Given these trends and the common use of radiotherapy as part of standard treatment, this study aimed to determine whether exposure to radiation therapy as the first course of treatment is associated with an increased risk of developing a second primary cancer (unrelated to the first) among women in Puerto Rico diagnosed with breast cancer between 2004 and 2009, with a follow-up to 2019. **Methods:** Participants were women aged 18 years or older with a microscopically confirmed diagnosis of breast cancer (ICD-O-3:C50.0–C50.9) between January 1, 2004, and December 31, 2009, who were residents of Puerto Rico at diagnosis, and had no prior cancer history or diagnosis of a primary synchronous cancer. These women were followed up to 2019. Data were obtained from the Puerto Rico Central Cancer Registry. This investigation employed a non-concurrent cohort design. The exposed cohort included women who received radiotherapy as part of their initial breast cancer treatment (n=4,244), while the comparison cohort consisted of those who did not receive radiotherapy (n=3,009). A Weibull regression model was used to assess the association between radiotherapy exposure and the risk of developing a second primary cancer. **Results:** In the crude analysis, women who received radiotherapy had a slightly higher risk of developing a second primary cancer compared to those who did not; however, this association was not statistically significant (HR: 1.13;95%CI:0.98–1.29). After accounting for relevant clinical variables, the adjusted HR was 1.11 (95%CI:0.96–1.27). **Conclusions:** Exposure to radiotherapy as part of the initial treatment for breast cancer was not significantly associated with an increased likelihood of developing a second primary cancer among women diagnosed in Puerto Rico between 2004 and 2009. IRB Protocol number: A833012.

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Relationship Between Physical and Emotional Well-being and Self-Rated Health in Vulnerable Older Adults in Post-Pandemic Puerto Rico

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Background & Objectives: Older adults were among the populations most severely affected by the COVID-19 pandemic, experiencing physical, emotional, and social disruptions that shaped their health perception. Studies in the United States, Brazil, and India show that physical inactivity, chronic conditions, and socioeconomic inequalities are associated with poorer self-rated health among older adults. However, limited research has examined these relationships in Puerto Rico, where many older adults live in vulnerable communities affected by the pandemic's long-term impacts. To address this gap, this study examines the association between physical and emotional well-being and self-rated health among older adults living in vulnerable Puerto Rican communities within the post-pandemic context. The central research question is: What is the relationship between physical and emotional well-being and health perception among older adults living in vulnerable communities after the COVID-19 pandemic? We hypothesize that older adults with higher levels of physical and emotional well-being will report more favorable self-rated health, whereas lower levels will be associated with poorer perceived health. **Methods:** Data is drawn from the Puerto Rico Community Action Research and Engagement (PR-CARE) mixed-methods study, which conducted

interviews with older adults between 2023 and 2024. Quantitative variables include self-rated health, physical well-being (sleep, diet, physical activity), and emotional well-being (anxiety and mood), and sociodemographic factors. **Results:** Preliminary observations show variability in self-rated health among older adults. Analyses evaluated how post-pandemic indicators, such as sleep quality, physical activity, and anxiety, shaped perceived health. **Conclusions:** This study seeks to contribute to a clearer understanding of how post-pandemic physical and emotional well-being shape self-rated health among older adults in vulnerable Puerto Rican communities. Findings may help identify behavioral and emotional indicators that influence perceived health, strengthen support networks, and inform policies aimed at reducing health disparities and improving health outcomes among vulnerable elderly populations. **Acknowledgements:** Conducted in collaboration with PR-CARE (1U01MD017426) and the CREPS Research Program. Supported by the NIH Emergency Awards: Community-engaged COVID-19 Testing Interventions among Underserved and Vulnerable Populations – RADx-UP Phase II (RFA-OD-21-008). We acknowledge PR-CARE Academic Co-Investigator Sona Rivas-Tumanyan, DDS, DrPH; Community Co-Investigators from Coai, Inc. (José Joaquín Mullinelli); Coalición de Coaliciones, Inc. (Francisco Rodríguez); and Organización Sistema Acueductos NonPrasa PR (Carmen Villanueva). Approved by IRB on 12/05/2024 (2290035524A002).

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Bus Commuters' Population in Puerto Rico: Their Sociodemographic Shape and Variations in a Decade: 2009-2013 & 2019-2023

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Background and Objectives: Among the workers population in Puerto Rico, there's a small portion that commute daily on bus. This type of commuter has limited options regarding the transportation system, usually available through the urban areas core. Despite a vehicle centered jurisdiction, the bus commuter's population represents a dynamic population, and their sociodemographic shape is often unknown. The analysis aims to deliver a specific profile of the bus commuters and their differences over a decade. **Method:** This is a non-experimental descriptive study with a transversal design using secondary data. Specifically, the Public Use Microdata Sample files from the Puerto Rico Community Survey, between two five years span 2009-2013 and 2019-2023. Bus commuters median age, sex, marital status, educational attainment, disability, health insurance, class of worker, median income and poverty ratio were analyzed, and changes between time periods were assessed. **Results:** Bus commuters' population decreased by 57% in a decade, resulting in nearly 6 thousand workers in recent years. Females' bus commuters were more likely in the 2009-13 period (57%) than 2019-23 (53%), the median age remained in 44 years old. The never married bus commuters increased from 46% to 57% as their main scholar level was high school with 45% to 46%. Moreover, 8% of bus commuters had a disability and more than 20% were without health insurance. Their main working area was the private sector (64%-67%) as their income fluctuates from \$14 to \$18 thousand and 39% were in poverty. **Conclusion:** Workers travelling by bus had a considerable amount without health insurance and six of every ten had a high school degree or less. Despite an increase in their income, the proportion of poverty remains, pointing out that their situation hasn't improved necessarily. Bus commuters' lack substantially of health coverage and could be assessed deeper on future analysis as their health care might be unattended.

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**Association Between Cardiovascular Diseases and Tobacco Use
Among Adults Aged 18 and Older: Puerto Rico, 2023**

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Background and Objectives: Cardiovascular diseases (CVDs) are the leading cause of death in Puerto Rico (PR), accounting for 18.3% (6,278) of all deaths in 2023. Additionally, tobacco use contributed to 4.5% of all deaths that year. Moreover, during this same year, prevalence estimates among adults aged 18 or older were 5.0% for myocardial infarction, 5.9% for coronary heart disease, and 2.8% for stroke. Overall, 10.6% of adults had at least one type of CVD. Given that tobacco use is a known risk factor for CVDs, this study examines the association between smoking and cardiovascular conditions among PR residents. It also describes sociodemographic characteristics and other risk factors by smoking status and frequency. **Method:** Data was analyzed from the 2023 PR Behavioral Risk Factor Surveillance System (PR-BRFSS), which included 4,594 participants. Weighted estimates represent 2,706,206 adults, of whom 286,779 had at least one CVD. Logistic regression models were used to assess the association between tobacco use and CVDs, including myocardial infarction, coronary heart disease, and stroke. Three models were developed: crude (M1), adjusted for age and sex (M2), and fully adjusted (M3) for additional risk factors such as hypertension, high cholesterol, alcohol use, diabetes, and obesity. **Results:** Among 231,038 current smokers, 67.97% smoked daily. In M1, current smokers had 2 times the possibility of experiencing a myocardial infarction (ORM1 2.07, 95% CI: 1.16-3.70) and 68% more possibility of having any form of CVD (ORM1 1.68, 95% CI: 1.07-2.64). Daily smokers showed even stronger associations, with nearly triple the odds of myocardial infarction (ORM1 2.89, 95% CI: 1.45-5.79) and double the odds of stroke and coronary heart disease. **Conclusions:** Findings suggest that smoking increases the likelihood of having CVDs. These results highlight the importance of smoking cessation efforts and support the need for targeted public health interventions and policies to reduce tobacco-related morbimortality in PR. **Acknowledgements:** This project was supported by the PR Department of Health (PRDoH), Centers for Disease Control and Prevention (CDC) grant 6 NU58DP006665-01, and the PR-BRFSS.

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Somatic Mutations in Early-Onset Colorectal Cancer: A US Hispanic Cohort

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Background: The incidence of early-onset colorectal cancer (EOCRC) has been increasing at an alarming rate in the U.S., often presenting at more advanced, less treatable stages. This study aimed to characterize the somatic mutation profile of early-onset tumors from Hispanics living in Puerto Rico (HPR), a population with a high colorectal cancer (CRC) burden. **Methods:** Whole exome sequencing was performed on tumor and mucosa samples of 62 early-onset CRC and 25 average-onset CRC (AOCRC) patients recruited through the Puerto Rico Familial Colorectal Cancer Registry. **Results:** Between both groups, the tumor mutational burden was comparable, but AOCRC displayed more frequent mutations in APC, PIK3CA, TP53BP1, and MUC16. Mutational signature profiling revealed that the SBS1 “clock-like” signature, linked to age-related mutagenesis, was prevalent among both groups, suggesting that the molecular aging mechanisms in EOCRC tumors do not reflect biological age. In particular, 22.45% of EOCRC showed aflatoxin-associated mutational signatures, suggesting a role for environmental exposure in carcinogenesis. **Conclusions:** These findings are crucial since they emphasize the need for population-specific studies to target prevention and early detection strategies for CRC. IRB: #A2210207 and January 15, 2025. **Funding Support:** This research was funded by the National Cancer Institute (NCI) and NCI grant number CA096297/CA096300 (including a Center to Reduce Cancer Health Disparities Diversity Supplement). Additional support was provided by the National Institute on Minority Health and Health Disparities and the National Institute of Allergy and Infectious Diseases award number U54MD007587.

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Non-medical Barriers to Breast Cancer Diagnosis Among a Cohort of Women in Puerto Rico: Findings from the START-PR Study (2023-2025)

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Background and Objective: Breast cancer accounts for approximately 30% of all cancer diagnoses and remains a leading cause of cancer-related mortality among women in Puerto Rico (PR). Early detection is critical to improving survival outcomes; however, non-medical barriers, such as social, economic, and environmental conditions that influence access to medical care, may delay diagnosis and contribute to differences in healthcare utilization and outcomes. This study aimed to examine the association between non-medical factors and the presence of at least one barrier to obtaining a breast cancer diagnosis among women in PR. **Methods:** Data were obtained from the cross-sectional study START-PR (2023-2025), which surveyed cancer patients aged ≥ 21 years who had received active treatment within the past year. Of 485 women who completed the anonymous online survey, 197 (40.6%) reported a breast cancer diagnosis. The primary outcome was the report of at least one non-medical barrier to diagnosis. Multivariate logistic regression models were used to estimate adjusted odds ratios (aOR) and 95% confidence intervals (CI), controlling for sociodemographic characteristics, physical limitations, and having access to own transportation. **Results:** Most participants were aged ≥ 45 years (89.3%), had education beyond high school (85.3%), and held private health insurance (39.1%). Overall, 26.4% reported at least one barrier to diagnosis; most commonly, issues with medical insurance (42.3%), financial difficulties (23.1%), and poor communication with healthcare providers (21.2%). In multivariate analysis, area of residence (urban/suburban vs. rural; aOR=0.33, 95%CI: 0.12-0.89) and the presence of physical limitations that interfered with attending appointments or daily activities (yes vs. no; aOR=8.32, 95%CI: 2.53-27.34) were significantly associated with reporting a barrier.

Conclusions: Over one in four women in this sample experienced at least one non-medical barrier to breast cancer diagnosis. Findings highlight the need to enhance diagnostic access for women in urban/suburban areas and those with physical limitations. **Acknowledgments:** This project was partially supported by the Office of Cancer Research Training and Education Coordination (CRTEC) of the University of Puerto Rico Comprehensive Cancer Center, the Alliance for Clinical and Translational Research (NIGMS award # U54GM133807), and Bristol Myers Squibb (grant ID # 93918763). Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of the University of Puerto Rico Comprehensive Cancer Center (protocol # 2411004025, approved on November 9, 2023).

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Modelado Predictivo de la Supervivencia y Recuperación de *Listeria monocytogenes* en Salmón y Cerdo al Aplicar la Cocción Sous Vide a 55 °C

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Antecedentes y Objetivo: El procesamiento suave sous-vide se emplea cada vez con mayor frecuencia para mejorar la calidad sensorial y nutricional de los alimentos listos para el consumo. Sin embargo, su seguridad microbiológica sigue siendo incierta, ya que las temperaturas moderadas pueden permitir la supervivencia y recuperación de *Listeria monocytogenes*. Este estudio evaluó el comportamiento de *L. monocytogenes* en filetes de salmón y cerdo cocidos a 55 °C durante 30, 60 o 90 minutos, y posteriormente almacenados a 4 °C u 8 °C durante un máximo de 30 días. **Método:** Se aplicó un diseño experimental bifactorial en función de la temperatura y tiempo de cocción aplicado. Los recuentos microbiológicos se analizaron para dos cepas, Scott A y CECT 4031, inoculadas de forma individual y en cóctel (n=648). **Resultados:** La inactivación completa solo se observó para CECT 4031 en carne de cerdo, en otras condiciones se detectó supervivencia y recuperación. Las velocidades de calentamiento lentas (< 2 °C/min) se asociaron con una mayor resistencia, especialmente en Scott A. La inactivación se desvió del modelo logarítmico lineal y se ajustó mejor a los modelos log-lineal con cola de Geeraerd y Weibull de Mafart, con valores D entre 6.8 y 8.3 min. Durante el almacenamiento, se observó crecimiento postratamiento en la mayoría de las muestras de salmón y en cerdo inoculada con Scott A a 8 °C. Las células con daños subletal se recuperaron, mostrando tasas máximas de crecimiento de hasta 1.0 log UFC g/día y fases de latencia de 2 a 14 días. **Conclusión:** Los tratamientos sous-vide a 55 °C no garantizan la inactivación completa de *L. monocytogenes*. Se requiere realizar estudios de validación que integren letalidad y recuperación. Modelos predictivos que consideran inactivación no lineal y heterogeneidad celular ofrecen una herramienta sólida para evaluar la seguridad de los alimentos mínimamente procesados. **Agradecimientos:** RATIONAL Ibérica Cooking Systems S.L.

Association Between Sleep Disturbances and Health-Related Quality of Life Among Cancer Survivors in Puerto Rico

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Background and Objectives: Sleep disturbance (SD) affects approximately 60.7% of cancer patients and has been consistently associated with poorer health-related quality of life (HRQoL). However, SD has not been examined among cancer survivors in Puerto Rico (PR), a population that reports lower HRQoL than U.S. counterparts. This study aimed to estimate the prevalence of SD and evaluate its association with HRQoL among cancer patients in PR. **Methods:** A cross-sectional study was conducted among cancer survivors (n=106) who had received active treatment within the previous year and completed an anonymous online survey between April and August 2025. HRQoL was assessed using the Functional Assessment of Cancer Therapy-General (FACT-G) scale (range: 0-108), which measures physical, social, emotional, and functional well-being. SD was assessed using the PROMIS SD-Short Form 8b (T-score range: 28.9-76.5; with T-scores ≥ 60 classified as moderate/severe and considered clinically significant SD). Multivariate linear regression examined the association between SD and HRQoL, adjusting for sociodemographic characteristics, depression, and physical activity. **Results:** Participants were predominantly female (75%), with a mean age of 60.4 ± 13.5 years. The most common types of cancer among participants were breast (22.6%), leukemia (9.4%), and colorectal (8.5%). About 53.8% of participants received their cancer diagnoses over a one-year period. The mean FACT-G score was 68.4 ± 18.0 . The mean PROMIS SD T-score was 53.5 ± 5.4 , approximately 0.35 standard deviations above the national norm (T-score=50). Moderate/severe SD prevalence was 9.4%. SD was significantly associated with lower HRQoL ($\beta = -0.78$, 95% CI: -1.31, -0.25), lower physical well-being ($\beta = -0.35$, 95% CI: -0.59, -0.11), and lower functional well-being ($\beta = -0.36$, 95% CI: -0.56, -0.16). **Conclusion:** Among a cohort of cancer survivors in PR, SD—although relatively uncommon—was negatively associated with multiple HRQoL domains. Longitudinal studies are needed to confirm these findings. Increasing routine screening and implementing sleep-focused interventions may enhance survivorship care and improve patient outcomes. **Acknowledgments:** This project was partially supported by the Office of Cancer Research Training and Education Coordination (CRTEC) of the University of Puerto Rico Comprehensive Cancer Center, the Alliance for Clinical and Translational Research (NIGMS award # U54GM133807), and Bristol Myers Squibb (grant ID# 93918763). Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of the University of Puerto Rico Comprehensive Cancer Center (protocol # 2411004025, approved on November 9, 2023).

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**Integrated Behavioral Health in a Family Medicine Inpatient Service:
Findings from a Secondary Hospital in Puerto Rico**

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Introduction: Integrated Behavioral Health (IBH) combines medical and psychological care in one setting to address all health-influencing factors. In Puerto Rico, this model remains limited in general hospitals. At Manatí Medical Center Hospital, psychologists were integrated into the Family Medicine inpatient team under a collaborative care model. This study examined the demographic and clinical characteristics of patients seen by the psychology team over one year, including consultation reasons and mental health diagnoses. **Methods:** A retrospective chart review was conducted for all inpatient psychology consultations completed between July 1, 2024, and June 30, 2025. Data included demographics, referral reasons, psychological symptoms, psychiatric history, DSM-5-TR diagnoses, interventions, and discharge recommendations. Descriptive statistics were used to summarize the findings.

Results: Of 440 records reviewed, 388 met inclusion criteria. The average patient age was 61.07 years; 55.7% were women. Most (88%) had at least one chronic condition, mainly cardiovascular disease (50.3%), hypertension (45.4%), and diabetes (38.4%). Nearly half were low-income (49.7%) and elderly (49.2%), and 35.1% were Medicaid-eligible. Referrals came primarily from Family Medicine (59.8%), followed by Internal Medicine (16.2%) and Cardiology (5.4%). Main consultation reasons were emotional support (34.3%), depression (17.0%), anxiety (13.7%), and family support (12.6%). Common diagnoses included trauma- and stressor-related disorders (26.6%), anxiety disorders (14.1%), and depressive disorders (12.5%). Interventions included individual sessions (79.6%), psychoeducation (57.7%), and family interventions (35.8%). Protective factors included family communication (81.2%), support networks (66.8%), faith (30.7%), disease awareness (36.6%), and sense of purpose (29.1%).

Conclusion: Integrated Behavioral Health (IBH) enhances patient care by addressing emotional and social needs within medical settings. By embedding psychologists into hospital teams, IBH enables timely, culturally responsive interventions that support treatment adherence and improve outcomes. This model is especially valuable in resource-limited environments like Puerto Rico, where proactive, strength-based care can reduce disparities and promote holistic healing. IRB Protocol Number: 2506271452; Approval Date: 7/23/2025.

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**Intensidad del Dolor y Cantidad de Opioides en Pacientes Postoperados de Reemplazo
Total de Rodilla: Analgesia Basada en Opioides versus Multimodal**

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Antecedentes y Objetivos: El reemplazo total de rodilla provoca dolor postoperatorio intenso. Tradicionalmente es manejado con opioides, lo que eleva el riesgo de efectos adversos y dependencia. Este estudio comparó la intensidad del dolor y el consumo de opioides (equivalentes en miligramos de morfina, MME) entre una cohorte retrospectiva con analgesia basada en opioides (AO) y una cohorte prospectiva con analgesia multimodal (AM). Además, se exploraron factores asociados a la percepción del dolor en el grupo AM. **Metodología:** Estudio observacional en el que se incluyeron 50 pacientes en AO y 48 en AM del Hospital Ashford. Se recopilaban datos de expedientes clínicos en ambos grupos; en AM, se evaluó la intensidad del dolor. **Resultados:** El 78% de los participantes fueron mujeres. El grupo AO fue de mayor edad promedio que AM (73.2 vs. 69.5 años; $p=.046$). Ambos grupos reportaron dolor severo en la primera medida (>5) y dolor leve en la segunda (<2) entre 18–30 horas postoperatorias. AM consumió 28 MME menos a las 24 horas y 37.5 MME menos a las 48 horas en comparación con AO ($p<.001$). Tras ajustar por sexo, edad, IMC e intensidad de dolor preoperatorio, las odds ratios de presentar dolor moderado/severo fueron 97.8% menores en quienes recibieron acetaminofén/celecoxib en comparación con los tratados con acetaminofén/gabapentina (OR=0.022; IC 95% [0.001–0.372]). El sexo femenino mostró una tendencia no significativa hacia odds ratios más altas de dolor. **Conclusiones:** Aunque ambos grupos experimentaron dolor severo inicialmente, la AM permitió una reducción significativa en el consumo de opioides a las 24 y 48 horas sin aumentar el dolor en la segunda medida. Optimizar el control del dolor en las primeras 24 horas mediante protocolos estandarizados de terapia multimodal, considerando factores individuales, podría mejorar los resultados postoperatorios. Se requieren estudios con mayor tamaño muestral para confirmar estos hallazgos. IRB #: 240826883 (09/19/2024)

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Differential Expression of EMT-Associated Genes in Primary and Metastatic BRAF-Mutated Melanoma

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Background and Objectives: The epithelial-mesenchymal transition (EMT) is a process whereby epithelial cells undergo changes to acquire mesenchymal characteristics, which include enhanced invasiveness, different phenotypic and biochemical profiles, as well as functional reprogramming. The EMT is crucial for embryogenesis, tissue repair, neural crest migration, and wound healing. Previously, we highlighted the correlation that EMT-associated processes have with BRAF-mutated metastatic melanoma. This study aims to find differential expression of EMT-associated genes in primary versus metastatic BRAF-mutated melanoma using transcriptomic datasets from The Cancer Genome Atlas (TCGA). **Methods:** 233 samples (53 primary, 180 metastatic) were analyzed using lasso-logistic regression analysis, and 200 EMT-associated genes were selected from the MSigDB Hallmark collection. **Results:** Lasso-logistic regression analysis identified four genes with non-zero coefficients (LAMC, LLRC15, MMP1, and MMP3), distinguishing primary from metastatic tumors. MMP3 showed the strongest discriminatory power (AUC = 0.85), followed by MMP1 (AUC = 0.79). Differential expression analysis confirmed significant downregulation of LAMC2, MMP1, and MMP3 in metastatic samples. Pearson correlation analysis also revealed strong intergene association, mainly between MMP3 and MMP1 ($r = 0.7926$, $p < 0.001$), and MMP3 and LAMC2 ($r = 0.4118$, $p < 0.001$). **Conclusion:** These findings contribute to the growing body of data regarding the specific tumor microenvironment in primary BRAF-mutated melanoma, detailing the enzymatic processes activated that may give these tumors their metastatic potential.

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Preoperative Versus Surgical Assessment of Donor Heart Defects: Opportunities for Diagnostic Improvement

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Background: Heart transplantation remains the definitive treatment for end-stage heart failure, however, the persistent shortage of suitable donor hearts necessitates optimal graft evaluation to maximize utilization. Structural abnormalities—particularly patent foramen ovale (PFO)—may compromise suitability if not identified before transplantation. Transthoracic echocardiography (TTE) serves as the standard, non-invasive modality for donor heart assessment, yet its diagnostic performance in detecting such defects within the donor population remains inadequately characterized. Emerging evidence shows discordance between TTE and intraoperative findings underscores the need to critically re-evaluate current donor screening practices to enhance diagnostic accuracy and graft selection. **Methods:** A single-center prospective observational study (April 2024–April 2025) systematically evaluated the frequency, characteristics, and detection rates of structural cardiac defects in donor hearts implanted in adult recipients with complete preoperative and intraoperative data. (IRB# 76725, approval date: April 2025, Stanford University). **Results:** During the study, 102 heart transplants were performed, and 15 donor hearts (14.7%) showed intraoperative structural abnormalities—mostly patent foramen ovale (93%), with one excluded case of anomalous coronary origin detected before surgery. Transthoracic echocardiography (TTE) demonstrated limited sensitivity (29%) but high specificity (98%) for detecting abnormalities, yielding a positive predictive value of 80% and a negative predictive value of 89%. Concordance between TTE and surgical findings was moderate ($\kappa = 0.38$), and McNemar's test ($p = 0.016$) confirmed significant disagreement. However, all donors with ≥ 3 high-risk features had atrial septal abnormalities identifiable on TTE, suggesting that increased anatomical complexity may improve detection despite TTE's overall low sensitivity. **Conclusion:** Inadequate detection of structural cardiac anomalies—particularly patent foramen ovale (PFO)—during donor heart evaluation limits organ utilization and transplant success. While transthoracic echocardiography remains an essential tool, its limited sensitivity highlights the need for enhanced diagnostic approaches. Integrating transesophageal and contrast-enhanced imaging, alongside standardized procurement protocols, could improve defect detection, reduce intraoperative unforeseen events, and optimize the safe use of donor hearts. **Acknowledgments:** This work was supported by NIH T35HL160496 & Stanford Cardiovascular Institute and conducted under Dr. Chawannuch Ruaengsri's mentorship.

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Thyroid Dysfunction and Cognitive Decline: Investigating Cognitive Risk in a Hispanic-Caribbean Population with Genetic Predisposition to Alzheimer's

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Background: Thyroid disorders are considered potentially modifiable contributors to cognitive decline and dementia. Both hyperthyroidism and hypothyroidism may affect cognition through vascular and metabolic pathways, although previous studies have shown mixed findings. Recent integrative reviews have also emphasized the behavioral and

neurocognitive effects of thyroid dysregulation. Evidence from Hispanic-Caribbean populations, especially among individuals with a hereditary predisposition to Alzheimer's disease, remains very limited. We hypothesized that thyroid dysfunction would be associated with poorer cognitive outcomes in this genetically at-risk population. This study explored how thyroid disease relates to cognitive performance in a cohort that included presenilin-1 (PSEN1) mutation carriers and their relatives. **Methods:** This cross-sectional study enrolled relatives of participants with early-onset Alzheimer's disease or confirmed PSEN1 mutations. Each participant completed structured interviews, physical and neurological examinations, and cognitive assessments using the Clinical Dementia Rating (CDR) and Short Blessed Test (SBT). Information on demographics, comorbidities, and medication use was also obtained. Associations between thyroid status, cognitive measures, and health conditions were examined with chi-square and Fisher's exact tests. (Approved by IRB on 10/16/2025 Protocol Number 2290032810R003). **Results:** Among 131 participants, 17.8 % had thyroid disease. Those with thyroid dysfunction demonstrated more pronounced global and memory impairment on the CDR ($\chi^2(4)=9.50$, $p=.050$; Fisher $p=.021$), while SBT scores showed no significant differences ($p=.683$). Individuals with thyroid disease more often presented hypertension and antipsychotic use ($p=.014$) and were more frequently treated with cholinesterase inhibitors such as Aricept or Exelon. **Conclusions:** In this Hispanic-Caribbean cohort, thyroid dysfunction was associated with stronger cognitive deficits and psychiatric features, independent of other medical conditions. The results point to the importance of early recognition and integrated endocrine-neurocognitive management to lower dementia risk. Continued longitudinal follow-up will be essential to clarify how thyroid alterations contribute to cognitive decline in genetically vulnerable groups. **Acknowledgements:** This research was funded by grant 5R01AG058918-05.

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Time Intervals and System Performance in Out-of-Hospital Cardiac Arrest: Insights from a Puerto Rico Cohort

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Background: Time from cardiac arrest to intervention is among the most important determinants of OHCA survival. Analysis of system time intervals provides insights into performance and delay points. **Methods:** We conducted a retrospective analysis of 212 out-of-hospital cardiac arrest (OHCA) cases treated at the University of Puerto Rico Hospital between January 2022 and December 2024. Of the full cohort, 140 cases had sufficient documentation for time-interval analysis. Evaluated intervals included CPR initiation to death, emergency department (ED) arrival to death, and EMS scene arrival to scene departure. For each interval, descriptive statistics (mean, standard deviation, and range) were calculated. **Results:** Mean CPR initiation-to-death time was 48.7 ± 24.0 minutes (range 11–161; $n=85$). Ambulance ED arrival-to-death averaged 28.4 ± 34.6 minutes (range 3–313; $n=120$). Scene arrival-to-ED arrival was 37.1 ± 25.9 minutes (range 10–150; $n=42$). Event-to-death interval averaged 86 ± 45.7 minutes (range 41–187; $n=11$). Documented event time was available in only 10/212 (4.7%) cases, reflecting significant data capture gaps. The denominators (N) vary across variables because not all data elements were available for every patient due to incomplete chart documentation. **Conclusion:** Prolonged resuscitation and transport intervals indicate significant operational delays in the OHCA response system. Severe deficits in time documentation further limit accurate performance assessment. Strengthening data capture, accelerating EMS activation and on-scene

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operations, and improving community CPR engagement are essential steps to reduce system delays and enhance outcomes. Approved by IRB, protocol number 25043901271, approval date 04/25/2025. **Acknowledgement:** This project was supported in part by the Endowed Health Services Research Center of the University of Puerto Rico School of Medicine -Grants 5S21MD000242 and 5S21MD000138 from the National Center for Minority Health and Health Disparities, National Institutes of Health (NCMHD-NIH).

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A Descriptive Analysis of Pregnancy Outcomes in Women with Type 1 Diabetes at the UPR University District Hospital in 2024

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Aims: Pregnancy in women with Type 1 Diabetes Mellitus (T1DM) carries more risks when compared to the general population. This retrospective study seeks to identify the most prevalent comorbidities and pregnancy complications amongst this population. A further goal is to examine whether there is a difference in outcomes between women using insulin pumps and those using injections. **Methods:** Birth records from 2024 were reviewed to identify patients with T1DM who were admitted to the hospital labor room at University District Hospital (UDH-LR) of Puerto Rico. Each patient's electronic record was then analyzed, and data was collected. **Results:** A total of 23 patients with T1DM were admitted to UDH-LR. The most common comorbidity was hypothyroidism, present in 39% of patients, followed by obesity in 30%. 65% of cases were complicated by hypertensive disorders of pregnancy. The preterm birth rate was 35%. The cesarean delivery (C/S) rate was 91%, with a primary C/S rate of 45%. There were three intrauterine fetal deaths, all of them being preceded by diabetic ketoacidosis (DKA) in the mother. All three of these mothers were using insulin injections, not pumps. There was one maternal death associated with preeclampsia with severe features and sepsis. This individual had a DKA episode during pregnancy. Data shows two cases of neonatal sepsis. There were three cases of neonatal congenital anomalies, one of which was associated with fetal demise and another with neonatal sepsis. Two of the three cases of congenital anomalies were associated with uncontrolled diabetes during pregnancy. **Conclusions:** Preliminary results showed worse outcomes in both mother and child when the mother had poor glycemic control during pregnancy. Further studies using a larger sample size should be conducted to explore the association between the use of pumps vs injections and maternal and neonatal outcomes. Approved by IRB on Sept 10 2024, Protocol # 2406247299A005.

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Machine Learning Models for Predicting Prostate Cancer Risk in Hispanic Men

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Background: Hispanic communities in the United States face significant economic, healthcare access, and sociocultural challenges that can impact cancer prevention and treatment. The rise of unnecessary biopsies and overtreatment highlights the need for accurate early risk assessment, particularly for Hispanics, whose genetic and sociodemographic profiles remain untargeted in current risk prediction approaches. Machine learning (ML) offers a practical framework for incorporating diverse clinical and genetic data to improve disease prediction. Using data from the *All of Us* Research Program, we developed three ML models: logistic regression, random forest and XGBoost to predict prostate cancer (PCa) risk in Hispanic men. **Methods:** The study cohort included 20,172 Hispanic males, 220 PCa cases and 19,952 controls. Predictors included age group (≤ 40 , 41-59, ≥ 60 years), family history of PCa, smoking status, drinking frequency and the rs10090154 genotype. Data were split 80/20 for training and testing sets. Class weights were used to address case imbalance. Models underwent five-fold cross-validation with sigmoid calibration, and performance was evaluated using ROC-AUC, PR-AUC, Brier score, precision, recall, and F1. **Results:** Logistic regression model achieved the strongest overall performance in discrimination and calibration (ROC-AUC = 0.872, PR-AUC = 0.059, Brier = 0.0105, recall = 0.955, precision = 0.034). Age ≥ 60 and family history of PCa were the strongest predictors, followed by the rs10090154 genotype and former smoking status. Random forest and XGBoost demonstrated similar discrimination but lower calibration compared with logistic regression. **Conclusions:** A class-weighted, sigmoid-calibrated logistic regression model achieved accurate, and well calibrated PCa risk predictions. Despite the low observed case prevalence in the *All of Us* cohort, the model showed strong sensitivity and discrimination, supporting its suitability for biomedical and clinical risk stratification in population-based precision health research. **Acknowledgements:** This project was made possible through the support of the University of Puerto Rico Comprehensive Cancer Center (UPRCCC) seed funds and collaboration of the Cancer Prevention and Control Research Training Program (CAPAC).

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Androgen Excess Is Linked to Depressive Symptoms in Reproductive-Age Women with Polycystic Ovary Syndrome: Evidence from a Clinical Sample

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Background and Objectives: Polycystic ovary syndrome (PCOS) is a prevalent endocrinopathy affecting women across their lifespan. It is associated with several comorbidities, including cardiometabolic disorders, certain cancers, and mental health disorders. Mood disorders in patients with PCOS have been associated with metabolic syndrome (MetS), insulin resistance (IR) and hyperandrogenism (HA). However, there is limited information about these associations in women with PCOS in PR. This study aimed to assess the association of depressive symptoms with MetS, IR and HA in a sample of women with PCOS living in PR. **Methods:** This clinic-based study included 147 women aged 21-45 years recruited from endocrinology and gynecology clinics. Participants underwent a comprehensive medical evaluation, laboratory and imaging studies. PCOS was diagnosed using Rotterdam criteria, MetS using the ATP-III criteria, IR using the HOMA-IR and Depression using the Patient Health Questionnaire (PHQ9). (Approved

by IRB#: 2290034657; approval date 06/12/2022.) **Results:** Mean age was 32 ± 6 years. A total of 116 patients were diagnosed with PCOS (78.9%). No significant differences in the prevalence of MetS, and IR were observed between groups. As expected, PCOS patients had an increased prevalence of HA. No significant associations were found between MetS, IR and a diagnosis of PCOS with depressive symptoms. However, a significant increase in the prevalence of depressive symptoms was found in patients with PCOS who also presented with HA. **Conclusion:** PCOS is a complex condition with a wide spectrum of clinical manifestations. This study highlights the importance of an individualized approach to the evaluation and management of these patients, particularly when mood disorders are present. Further studies are needed to determine whether treating androgen excess can reduce the prevalence or severity of depressive symptoms. Clinicians should remain aware of the complex metabolic and hormonal interactions that characterize this condition to provide optimal care and improve the quality of life of women with PCOS. **Acknowledgements:** The authors have no conflict of interest to disclose. This project was partially supported by the Alliance for Clinical and Translational Research (Alliance) U54GM133807 and 2P50GM133807.

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**Sequential Inhibition of CDK4/6, with Palbociclib,
and the Mitotic Kinase TTK as a Potential Treatment
in Triple-negative Breast Cancer Cell Lines**

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Triple-negative breast cancer (TNBC) is associated with uncontrolled cell proliferation, genetic instability, and elevated rates of metastasis. Lacking targeted therapies, chemotherapy is the primary treatment option. Mitotic kinases that drive genomic stability, such as Threonine Tyrosine Kinase (TTK), exhibit an increased expression in TNBC patients. TTK regulates spindle assembly checkpoint, and its overexpression contributes to centrosome amplification, chromosome instability, and early metastasis. Palbociclib, a CDK4/6 inhibitor known to induce cellular senescence in tumors, is approved against luminal BC but not TNBC. Due to the reduced sensitivity of non-cycling cells to chemotherapeutic drugs, simultaneous association between Palbociclib and different chemotherapeutic agents has shown antagonistic effects. Preliminary data shows no significant decrease in the viability of TNBC cell-lines after simultaneous inhibition of mitotic kinase TTK and CDK4/6. Based on studies stating that a sequential treatment with Palbociclib followed by a chemotherapeutic agent (paclitaxel) decreases TNBC cell-line viability, our study aims to evaluate if resistant TNBC cells may be sensitive to sequential treatment of CDK4/6 inhibition followed by mitotic kinase TTK inhibition. 24 hours after seeding MDA-MB-231 and MDA-MB-157 TNBC cell lines, Palbociclib (PD0332991) was added at increasing concentrations. 24 hours later, TTK inhibitor (BAY1217389) was added at a constant IC₅₀ concentration. MTT Assay was performed after 96 hours of incubation. Pre-treatment with Palbociclib followed by a constant IC₅₀ concentration of TTK inhibitor showed significant decrease in MDA-MB-157 cell line viability. Results state that a sequential treatment strategy with Palbociclib followed by TTK inhibitor treatment can be a potential therapeutic approach for certain populations with TNBC. Differences associated with drug response can be attributed to the difference in levels of cell cycle regulators in TNBC cell lines, which will be investigated further on. Results allowed the reduction of drug levels and toxicity, while potentially improving safety and efficacy for clinical use.

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Association of BMI With Genetic Mutations in Latino Patients with Bardet-Biedl Syndrome

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Background and Objectives: Bardet-Biedl syndrome (BBS) is a rare autosomal recessive ciliopathy characterized by truncal obesity, rod-cone dystrophy, polydactyly, and metabolic dysfunction. More than 28 genes have been implicated in the disorder, with BBS1 being the most frequently affected. Obesity is a central contributor to morbidity in BBS, yet Latino patients remain underrepresented in genotype–phenotype research. This study aimed to evaluate the association between body mass index (BMI) and specific BBS gene mutations in a Latino cohort. We hypothesized that obesity would be most prevalent among patients with homozygous BBS1 mutations.

Method: A retrospective chart review of 27 clinically and genetically confirmed BBS patients was conducted at a single ophthalmology clinic in Puerto Rico. Comprehensive ophthalmic evaluations included best corrected visual acuity, optical coherence tomography, and full-field electroretinography. Next-generation sequencing (Invitae) identified pathogenic variants in BBS1, BBS7, and BBS19. BMI was categorized as normal, overweight, or obese. Statistical analyses included chi-square and Kruskal–Wallis testing ($p < 0.05$). **Results:** The median age was 39 years. BBS1 mutations were found in 21 patients (77.8%). Overall, 14 patients (51.9%) were obese, 10 (37.0%) overweight, and three (11.1%) normal weight. Obesity was most common among individuals with BBS1 mutations, with 11 obese patients (78.6%) carrying BBS1 variants, while BBS7 and BBS19 mutations were less frequently associated with obesity. Among obese patients, 10 (71.4%) were homozygous and three (21.4%) were compound heterozygous. Gender was not significantly associated with BMI distribution, though male patients were more frequently overweight. **Conclusion:** Findings support a strong association between BBS1 mutations—particularly in homozygous or compound heterozygous carriers—and obesity in Latino BBS patients. Larger, more diverse studies are needed to confirm these trends, assess environmental modifiers, and guide targeted metabolic interventions.

Acknowledgments: The authors report no conflicts of interest. IRB approval was obtained from the Universidad Central del Caribe School of Medicine (Protocol #2025-5).

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Outcomes of Tibial Shaft Nonunions: A Systematic Review and Meta-Analysis

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Introduction: Tibial shaft fractures are among the most common long bone fractures. Despite advances in treatment, nonunion remains a common complication leading to prolonged disability and delayed recovery. Although prior research has explored surgical techniques and risk factors for nonunion, there is limited information on the long-term outcomes of patients with tibial shaft nonunion. Therefore, this study aims to systematically review the outcomes of tibial shaft nonunion. **Methods:** PubMed and Embase were searched for studies published between

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January 1, 2000, and September 1, 2024, reporting outcomes for tibial shaft nonunion. Case reports, reviews, and non-English publications were excluded. The selection process adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines. Study quality was assessed using the Newcastle-Ottawa Quality Assessment tool. Meta-analysis using random-effects models was conducted to estimate healing and complication rates. **Results:** Eighteen studies were included for a total of 1,221 cases with tibial shaft fractures complicated by nonunion. Aseptic nonunion demonstrated a higher union rate of 98.4% compared to 96.2% in infectious cases, along with a shorter time to union (4.5 months vs. 8.5 months, respectively). Additionally, the complication rate in infectious cases was higher, with 117 complications reported, while no complications were observed in the aseptic group. Nonunion treated with reamed intramedullary nailing (IMN) showed the highest union rates ranging from 96.8% to 100%, while external fixation ranged from 75% to 100%. Studies evaluating open fractures showed worse outcomes, including higher infection and complication rates compared to those evaluating a mixture of closed and open fractures. **Conclusions:** Tibial shaft nonunion achieves adequate bone union rates, with IMN obtaining the highest union rate after nonunion management. Open fractures and septic nonunion are associated with worse outcomes. Standardizing patient-reported outcomes and improving management for open fractures are critical for enhancing long-term functional recovery.

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Regional Variation in Medicare Part D Prescribing Trends for Benign Prostatic Hyperplasia From 2013 to 2023

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Background and Objectives: Benign prostatic hyperplasia (BPH) affects roughly half of men aged 51–60 and nearly 90% of men older than 80. National guidelines recommend α -blockers for rapid symptom relief and 5- α -reductase inhibitors to reduce long-term progression. Despite consistent recommendations, prescribing patterns vary across U.S. regions due to differences in provider distribution, insurance coverage, and socioeconomic factors. The objective of this study was to evaluate geographic and economic trends in BPH pharmacotherapy under Medicare Part D from 2013–2023. **Method:** A retrospective analysis was conducted using national Medicare Part D claims aggregated by prescriber, medication, and state. Medications were categorized as α -blockers, 5- α -reductase inhibitors, or fixed-dose combinations. Outcomes included total prescribers, prescribing intensity (claims per prescriber), total claims, expenditures, and mean cost per claim. Descriptive statistics and compound annual growth rates (CAGR) were used to summarize 10-year trends across U.S. Census regions. **Results:** From 2015–2023, the Southeast demonstrated the largest increase in prescribers (414,000 to 3.35 million; +709%), followed by the Midwest (+703%) and Northeast (+740%). The Mountain (+910%) and Pacific (+887%) regions grew fastest proportionally but remained lower in volume. Prescribing intensity was highest in the Northeast (632 claims per prescriber) and lowest in the Pacific (139). Nationally, total BPH-related claims increased from 48.2 million to 65.5 million (+36%; CAGR +3.1%). Expenditures decreased from \$2.21 billion to \$1.70 billion (–23%; CAGR –2.7%), reducing the mean cost per claim from \$45.9 to \$25.9 (–43%). **Conclusion:** Substantial regional variation exists in BPH medication use across the United States. The Northeast and Southeast exhibit higher prescribing intensity, whereas the Pacific and Mountain regions show rapid growth but lower absolute volume. Rising utilization alongside declining expenditures suggests increasing efficiency, likely driven by expanded generic availability and formulary optimization. Future research should explore whether geographic differences in medication use reflect disparities in access to procedural management and long-term outcomes.

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Neoadjuvant Pembrolizumab in Resectable High-Risk Cutaneous Squamous Cell Carcinoma: A Systematic Review of Early Outcomes

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Background and Objectives: Cutaneous squamous cell carcinoma (cSCC) is among the most common skin cancers and carries significant morbidity when presenting as high-risk or locoregionally advanced disease. Despite curative-intent surgery, recurrence rates remain substantial. Neoadjuvant PD-1 blockade has emerged as a promising strategy to enhance tumor regression and improve surgical outcomes. However, existing evidence is dispersed across small studies, mixed immunotherapy cohorts, and early-phase trials. This study aims to systematically synthesize preliminary clinical, pathologic, and perioperative outcomes of neoadjuvant pembrolizumab in resectable high-risk cSCC. **Methods:** A systematic search was conducted across PubMed, Embase, Cochrane CENTRAL, and ClinicalTrials.gov using predefined keywords related to cSCC, pembrolizumab, and neoadjuvant therapy. Searches covered 2018 to December 2025. Screening and full-text review followed PRISMA guidelines with dual-independent review. Inclusion criteria were adult patients with resectable or locoregionally advanced cSCC treated with neoadjuvant pembrolizumab. Exclusion criteria included metastatic-only cohorts, non-cutaneous SCC, non-neoadjuvant therapy, and case reports. From 309 articles identified, 36 studies met criteria. Extracted data included pathologic response (pCR, MPR), clinical response, perioperative safety, time-to-surgery, and early survival outcomes. **Results:** Across the 36 included studies, neoadjuvant pembrolizumab demonstrated encouraging tumor regression. Major pathologic response rates commonly ranged from 45 to 70%, while complete pathologic response was reported in approximately 20 to 40% of patients receiving one to three cycles of pembrolizumab. Perioperative safety was acceptable, with high-grade immune-related adverse events occurring infrequently. Several studies noted improved surgical feasibility and radiologic downstaging. Limited early survival data suggest a potential association between strong pathologic response and reduced recurrence risk. **Conclusions:** Preliminary evidence supports neoadjuvant pembrolizumab as a promising therapeutic option for resectable high-risk cSCC, demonstrating substantial pathologic response and favorable safety. Further quantitative synthesis and survival analyses are underway. This work contributes to developing future clinical pathways and strengthens dermatologic oncology research representation from Puerto Rico.

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Emergency Department Pharmacologic Management of Out-of-Hospital Cardiac Arrest: Utilization and Outcomes

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Background: Medication use during cardiac arrest is widespread, though survival benefits remain controversial. Quantifying usage patterns aids evaluation of adherence to guidelines. **Methods:** We conducted a retrospective analysis of 212 OHCA cases treated at the University of Puerto Rico Hospital in Puerto Rico between January 2022 and December 2024. Variables analyzed included: medications given at Emergency Department, ROSC, mortality

and ICU admission. **Results:** Epinephrine was given in 189/212 (89.2%) patients, most receiving 3–4 doses (80/188; 42.6%). Bicarbonate was used in 127/210 (60.5%) cases, calcium in 78/210 (37.1%), and amiodarone in 16/210 (7.6%). Atropine was administered in 10/210 (4.8%), norepinephrine in 21/210 (10.0%), and Narcan in 11/209 (5.3%). Sustained ROSC occurred in 20/212 (9.4%). ICU admission followed in 12/211 (5.7%). Despite aggressive pharmacologic therapy, mortality remained high at 191/208 (91.8%). The denominators (N) vary across variables because not all data elements were available for every patient due to incomplete chart documentation.

Conclusion: Epinephrine was nearly universally administered, with frequent use of adjuncts such as bicarbonate and calcium. However, survival to admission remained low, highlighting the limited impact of pharmacologic therapy on ultimate outcomes. Approved by IRB, protocol number 25043901271, approval date 04/25/2025.

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Association between Mental Health Conditions and HIV Outcomes among People Living with HIV in a Community-Based Clinic of Puerto Rico

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Background and Objectives: Mental health conditions (MHC) are common among people living with HIV (PLWH), often at higher rates than in the general population. Poor mental health has been associated with worse HIV-related health outcomes especially in disease prognosis and treatment adherence. This study aimed to explore the association between MHC and HIV outcomes among PLWH in a community-based clinic of San Juan. **Method:** A cross-sectional study was conducted using data from a Ryan White HIV/AIDS Program grantee between December 2022-2024. Fisher and Chi Square analyses were used to evaluate statistical differences between PLWH with and without MHC. This study was approved by the Institutional Review Board (IRB) of Universidad Central del Caribe School of Medicine (UCCSoM) on October 29, 2024 (protocol 2024-45). **Results:** The prevalence of MHC among 1,000 PLWH was 19.6%. Most were diagnosed with substance use (54.1%), depressive (45.9%), and anxiety (26.5%) disorders. MHC were significantly more prevalent in males, between 21 and 34 years, having Medicaid, being under the 100% of federal poverty level, living with HIV for less than a year, reporting heterosexual sex as high-risk behavior, and having a CD4 value <200 cells/mm³. No statistically significant differences in MHC rates were found when evaluating the 2019 HIV/AIDS Bureau Core Performance Measures (i.e. HIV viral load suppression, prescription of HIV antiretroviral therapy, HIV medical visit frequency, gap in HIV medical visit,

PCP prophylaxis, and annual retention in care). However, PLWH without MHC showed overall better compliance.

Conclusion: Findings may inform strategies to improve patient-centered services and providers' integration, and guide education and prevention interventions, and even health policy efforts, all of which can impact positively HIV patients' experience, care, and health outcomes. It also suggests the need for additional research studies focused on mental health and HIV specifically in Puerto Rican communities. **Acknowledgments:** The authors would like to thank the Puerto Rico Community Network for Clinical Research on AIDS, Inc. (PRCONCRA) for providing access to the anonymized clinical data used in this study. This study would not have been possible without their institutional approval and demonstrated commitment to health services research. We are also grateful to Mrs. Ylene Rodríguez, Mrs. Leycha Rohena, and Dr. Víctor Reyes for their assistance in data preparation, and to their clinical and administrative staff, Dr. Ruth Soto and Dr. Reydi Morales, for their guidance and logistical support.

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Newborn Feeding Practices and Factors Affecting Breastfeeding Rates in the Newborn Nursery, University District Hospital (UDH): A Retrospective Chart Review

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Background and Objectives: Exclusive Breastfeeding is well known to improve maternal and neonatal health outcomes, yet feeding practices can be influenced by multiple factors. The objective was to describe breastfeeding practices in the newborn care unit at the University District Hospital (UDH) and identify factors that may affect breastfeeding rates in order to identify future interventions that may help support breastfeeding in the hospital setting. **Methods:** A retrospective chart review was conducted on 61 newborns admitted to UDH from 2020-2023. Cases in which breastfeeding was contraindicated were excluded. Data was analyzed using descriptive statistics, one-way ANOVA, and Fisher's exact test to evaluate associations between maternal and infant factors and feeding type: exclusive breastfeeding, combination feeding (formula and breast milk), and exclusive formula. (Approved by IRB on 09/09/2025. Protocol Number: 2502362477.) **Results:** The mean maternal age was 27.9 years (SD = 6.4), with most mothers being single (75.4%) and insured through the government Vital plan (82%). Vaginal delivery occurred in 59% of cases, and 59% practiced partial rooming-in. Most infants were appropriate for gestational age (86.9%), with a mean birth weight of 3,101g and mean gestational age of 38.4 weeks. Feeding practices included: 73.8% combination feeding, 16.4% exclusive formula, and 9.8% exclusive breastfeeding. Although no statistically significant associations were identified between groups ($p > 0.05$), among the mothers in the exclusive formula group, 60% had a cesarean section, and 40% practiced partial rooming-in. Among the exclusive breastfeeding group, 83% had a vaginal delivery, and 67% practiced partial rooming-in. **Conclusions:** Combination feeding is the predominant practice at UDH. Exclusive breastfeeding rates continue low despite well-known benefits of this practice and some mothers are not providing breast milk despite having no medical contraindication to breastfeeding. These findings highlight the need for targeted breastfeeding support programs within public health settings in Puerto Rico. **Acknowledgments:** The authors declare no conflicts of interest.

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Outcomes of Pressure-Limited Ventilation vs Volume Target Ventilation in the NICU: Implications for Bronchopulmonary Dysplasia and Associated Morbidities in Preterm Infants

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Background and Objectives: Bronchopulmonary dysplasia (BPD) represents a major chronic respiratory condition impacting preterm infants, especially given the rise in their survival rates. The type of mechanical ventilation employed has been recognized as an important influencing factor. Pressure-Limited Ventilation (PLV) has historically been the primary mode of ventilation. It has now been shown to be inferior to other forms of mechanical ventilation, such as volume-targeted ventilation (VTV), in reducing lung injury. In 2015, VTV was established in our NICU. We aimed to evaluate the incidence of BPD and other comorbidities before and after this change in ventilation modality. **Methods:** Retrospective review of the Vermont Oxford Network, University Pediatric Hospital NICU database from 2005 to 2024 for infants born at <30 weeks' gestational age (GA) who required mechanical ventilation. Data analyzed with Intellectus Statistics. IRB #229003372 (12/21/2017). **Results:** Subjects included 762 infants (2005-2014, n=467; 2015-2024, n=295). Mean birth weight (BW) was 965 grams, and mean GA age was 27 weeks. Infants in the 2nd period had lower BW and GA ($p < 0.01$). The incidence of BPD was higher in the 2nd period (76% vs 87%, $p < 0.01$). Severe intraventricular hemorrhage and retinopathy of prematurity were lower in the 2nd period ($p < 0.01$). There was no difference in pneumothorax or survival ($p = \text{NS}$). **Conclusions:** Advances in neonatal medicine have led to increased survival rates, particularly of smaller patients, who are at higher risk of BPD. Increased survival, as reflected in differences in BW and GA between our groups, was associated with a higher incidence of BPD despite a gentler ventilation strategy. However, significant improvements were observed in comorbidities, including severe IVH and ROP. Further analysis of a cohort of preterm infants treated with VTV, matched by GA and BW, with those treated with PLV is required to determine the impact of the different ventilation modalities.

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Group B Streptococcus Prevalence and its Relation to BMI in Pregnant Hispanic Women with Diabetes Mellitus Type 1, Type 2 or Gestational Diabetes

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Background and Objectives: Diabetes Mellitus Type 1 (T1DM), Type 2 (T2DM), and Gestational Diabetes Mellitus (GDM) have been associated with higher vaginal Group B Streptococcus (vGBS) colonization rates, which increase with poor glycemic control.¹⁻² Obesity and higher BMI classifications are also recognized risk factors for vGBS among pregnant women.³⁻⁴ Hispanic women are at elevated risk for DM and GDM compared to non-Hispanic

whites and experience higher BMIs and vGBS prevalence.³ This study aims to evaluate maternal and neonatal conditions during pregnancy and their outcomes based on DM type and vGBS status. **Methods:** A preliminary retrospective review of 60 maternal records from 2024 at the University District Hospital of Puerto Rico was conducted. Participants were categorized by DM type and vGBS status under IRB-approved protocol 2406247299 (approved 9/10/2024). **Results:** Among participants, 33% (n=20) had GDM, 38% (n=23) T1DM, and 28% (n=17) T2DM. GDM patients had a mean BMI of 42.1 at delivery. Those with known vGBS status (90%), 55% were vGBS negative (Neg-vGBS), and 35% positive (Pos-vGBS). T1DM patients had a mean BMI of 29.5 at delivery. From those with reported vGBS status (69%), 43% Neg-vGBS and 26% Pos-vGBS. T2DM patients had BMIs of 40 at delivery. vGBS status was reported on (76%), 29% Neg-vGBS and 47% Pos-vGBS. **Conclusion:** Patients with GDM and T2DM were more likely to have BMIs in the obesity class III range. T1DM patients were all reported to be overweight and predominantly Neg-vGBS, while GDM patients, despite higher BMIs, were mostly Neg-vGBS. Conversely, T2DM patients were primarily Pos-vGBS. These findings suggest BMI and DM type may influence vGBS colonization risk. Future research should assess BMI classifications, diabetes management, and comorbidities to clarify their roles as predictive factors for vGBS in this population.

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Use of Aspirin Prophylaxis During Pregnancy to Prevent Risk of Preeclampsia in Puerto Rico: A Seven-Year Observational Study

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Background and Objectives: Preeclampsia is a risk factor for prematurity in 4.8% of pregnancies and remains a leading cause of maternal and neonatal morbidity. Since 2016, the ACOG and USPSTF have recommended low-dose aspirin prophylaxis (81 mg daily) for women at increased risk to help prevent preterm birth. Despite evidence of safety and benefit, adherence to these recommendations in Puerto Rico has not been systematically assessed.

Methods: We conducted a cross-sectional study (2019–2025) of mothers whose infants were admitted to newborn services across Puerto Rico (IRB approval number: 2290033476R003). A structured questionnaire assessed whether obstetricians recommended aspirin (Q17), whether mothers reported aspirin use (Q18), and whether use began before 16 weeks of gestation (Q19). Data were analyzed to evaluate trends in recommendation and adherence over a seven-year period. **Results:** A total of 1,321 mothers were surveyed; 801 had identifiable preeclampsia risk factors. The proportion of obstetricians recommending aspirin increased from 19% in 2019 to 52% in 2025 overall, and from 40% to 59% among at-risk women. Reported aspirin use in at-risk women improved from 38% to 56% across the study period. However, initiation before 16 weeks—considered optimal—rose modestly, from 14% in 2019 to 35% in 2025. **Conclusion:** Over seven years, there has been a clear upward trend in both physician recommendation and patient use of aspirin prophylaxis, reflecting gradual alignment with international guidelines. However, delayed initiation remains a critical gap, with fewer than 40% of at-risk women starting aspirin at the recommended gestational window. These findings suggest progress in awareness among obstetricians and adherence by patients but also highlight persistent barriers to early implementation. Aspirin prophylaxis for preeclampsia prevention is increasingly recommended and used in Puerto Rico, however early initiation remains suboptimal. Targeted provider education and patient counseling are needed to optimize timely uptake and maximize preventive benefit. **Acknowledgments:** None.

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Breastfeeding Practices and Challenges during the First 6 Months of Life

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Background and Objective: The WHO and AAP recommend exclusive breastfeeding for the first six months. It reduces the risk of obesity, diabetes, asthma, and infections in infants. It benefits mothers by promoting postpartum weight loss, reducing cancer risk, and preventing hemorrhage and anemia. Many mothers discontinue breastfeeding early due to barriers such as inadequate support, cesarean delivery, early return to work or school, and limited knowledge of benefits. In Puerto Rico, only 31.4% of infants are exclusively breastfed at six months. This study aimed to identify breastfeeding practices and barriers among mothers of infants born at San Juan City Hospital during the first six months, to guide interventions and support programs. **Methods:** A descriptive, prospective, cross-sectional mother–infant study was conducted, including a convenience sample of 200 mothers older than 21 years with infants ≥36 weeks of gestation and a hospital stay <4 days. Structured telephone interviews were conducted in 1 week, 1 month, 3 months, and 6 months post-discharge. **Results:** A total of 123 mothers were recruited; interviews were conducted with 84 mothers in 1 month, 47 at 3 months, and 26 at 6 months. At enrollment, 52% reported exclusive breastfeeding, 48% mixed feeding, and 11% were not breastfeeding. Forty percent reported barriers, most frequent work commitments, insufficient milk production, and lack of time, followed by infant refusal, care of other children, stress, lack of support, study commitments, and free formula access. **Conclusion:** Exclusive breastfeeding slightly exceeded mixed feeding with formula. Early, continuous education and structured, personalized support are essential to overcome barriers, promote exclusive breastfeeding during the first six months, and improve maternal and infant health outcomes. Identifying these barriers in the local community can guide targeted support programs and enhance adherence to AAP recommendations. **Acknowledgments:** None. IRB # 00002788.

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Association between Anxiety, Depression, and Temporomandibular Disorders in Adults: A Scoping Review

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Background/Aim: Temporomandibular disorders (TMD) are common musculoskeletal conditions associated with orofacial pain, functional limitations, and reduced quality of life. Psychological factors, particularly anxiety and depression, have been frequently reported in individuals with TMD. This scoping review aimed to evaluate the

association between anxiety, depression, and temporomandibular disorders in adult populations. **Methods:** A scoping review of the literature was conducted using PubMed, database. Studies published between 2014 and 2025 were screened for inclusion. Inclusion criteria were observational and clinical trials studies; exclusion criteria were systematic reviews and reviews, case series, case reports and meta-analysis. Eligible studies included key outcomes and exposures as adult human populations and assessed anxiety and/or depression in relation to TMD. Search strategy was TMD AND anxiety AND depression. 30 studies were retrieved; when adding adult population only 4 studies were retrieved. After analyzing titles and summary of the studies; five studies met the inclusion criteria and were analyzed descriptively. **Results:** Across the included studies, anxiety and depressive symptoms were consistently associated with the presence and severity of TMD. University student populations with anxiety demonstrated higher odds of reporting TMD. Psychological distress was also associated with increased orofacial pain, functional limitations, and parafunctional behaviors. **Conclusion:** Current evidence supports a consistent association between anxiety, depression, and temporomandibular disorders in adults. Due to the observational nature of the included studies, causal relationships cannot be inferred. These findings highlight the relevance of integrating psychological assessment into multidisciplinary TMD management.

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The Association Between Periodontal Disease and Alzheimer's Disease in Older Adults: A Narrative Review

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Background and aim: Alzheimer's disease, the leading cause of dementia in older adults, shares risk factors with periodontal disease including age, genetics, cardiovascular issues, and chronic inflammation. Periodontal disease, caused by plaque buildup, affects oral structures like the gums and alveolar bone. Growing evidence suggests a link between oral health and neurodegeneration, though this relationship remains unproven. Based on the emerging evidence, this review aims to evaluate whether periodontal disease contributes to cognitive decline and Alzheimer's pathology in aging populations. **Methodology:** A narrative review was conducted. The research question was formulated using the PEO framework: Population – adults diagnosed with Alzheimer's disease; Exposure – periodontal disease; Outcome – progression of Alzheimer's disease. The search was done in PubMed database with the inclusion criteria of clinical studies, clinical trials, observational studies, papers from 2015 to 2025. The search strategy employed were "Periodontal disease" AND/OR "Alzheimer's disease" AND/OR "Periodontitis". Exclusion of systematic reviews, meta-analysis, reviews, case series or case control were applied. 6 studies were found; this retrieved papers were evaluated in abstract title and summary and 3 papers were included in this systematic review: 2 clinical trials and one prospective cohort study. **Results:** Literature is scarce in this topic. Nevertheless, in the available evidence significant association between periodontal disease and Alzheimer's disease was identified. In all studies, patients with periodontitis showed greater cognitive impairment following their increases in inflammatory markers. In addition, it was found that good dental hygiene could delay or prevent neurodegeneration. **Conclusion:** The evidence reviewed suggests that periodontal disease is associated with Alzheimer's disease and that the disease/ Also showed that improving oral health, reduce systemic inflammation, and potentially delay cognitive decline. This search only found two clinical trials, enforcing the need of more research on this area.

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High Blood Pressure, Obesity and Gingivitis in a Group of PR Adolescents

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Background: Obesity in children and adolescents has increased in the last 3 decades. It is a global health problem influencing general and oral health of children and adolescents. Obesity has been evidenced to be related to periodontal disease and general health problems as high blood pressure and diabetes via the inflammation pathway. **Aim:** This study is a retrospective observational study of a database of a previous study. (IRB#: 0640112; approval date September 12, 2025). The study aimed to evaluate the prevalence of high blood pressure (HBP), obesity and gingivitis in a group of Puerto Rican adolescents and possible associations between these variables.

Methods: An analysis of a database of a previous study on obesity and periodontal disease in a group of PR adolescents was conducted. The previous study consisted of the evaluation of BMI, periodontal disease, HBP, HbA1c, salivary cytokines, and saliva cotinine of 187 adolescents aged 12 to 19 years old attending 5 public schools of the Municipality of San Juan, PR. HBP was determined by age and sex and $\geq 120/80$ mmHg when this value exceeds the 90th percentile stated as HBP. Obesity was defined by age and biological sex based on CDC classification on percentiles as (underweight, healthy weight, overweight, and obese over BMI >31). Gingivitis as 10% of more of bleeding on probing or 1 site or more with pocket depth equal or greater to 4 mm. Statistical analysis used Fisher's t-test, the Mann-Whitney test, the Pearson Chi-Square test, and regression to obtain the association of HBP with gingivitis, salivary cytokines, salivary cotinine, BMI, and HbA1c. Confounders as smoking and cotinine levels, age and biological sex were analyzed. **Results:** Nearly 60% of the sample population was female, with a mean age of 15.7 (± 1.25). Of the participants, 48.66% had a healthy weight, 19.79% were overweight, and 30.48% were obese. The prevalence of HBP was 27.8%. Prevalence of prediabetes was 7% and 10.5 % of the HBP were positive for prediabetes. Significant associations were found for HBP and biological sex ($p=0.003$) and BMI ($p=0.02$); obese individuals showed higher BP measurements. A 43% of gingivitis was found; participants with HBP reported having 52.9% of gingivitis compared to non-HBP (but not significant). HBP is related to higher salivary levels of cotinine. Some salivary cytokines were inversely related to HBP. High risk of gingivitis was found for obese adolescents (OR: 2.1 (1.1-4.0), $p=0.003$). **Conclusion:** The studied group of adolescents showed a high percentage of obesity. HBP prevalence was an emerging problem in adolescents and was related to BMI, both risk factors for cardiovascular disease. New public policies must be implemented to prevent obesity and other associated conditions in adolescence.

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Myomodulin Expression and Retrograde Nerve Labeling Analysis for the Central Nervous System of *Biomphalaria glabrata*

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Background and Objectives: Schistosomiasis, or snail fever, is a parasitic disease caused by *Schistosoma* blood flukes that affect millions of people in tropical and subtropical regions with poor sanitation. *Schistosoma mansoni* relies on the freshwater snail *Biomphalaria glabrata* as an intermediate host, where it develops into the infectious cercarial stage. Therefore, understanding the biology of this snail is crucial for controlling disease transmission. In this study, we investigated the expression of the neuropeptide myomodulin in the central nervous system (CNS) of *B. glabrata*, a key vector of *S. mansoni*. Myomodulin is known in gastropods to regulate muscle contraction and behaviors such as feeding and locomotion. However, our findings suggest it may also play a role in male reproductive functions. **Methods:** To explore this, we examined myomodulin expression in the CNS and peripheral tissues of *B. glabrata* using whole-mount immunohistochemistry (antigen: PMNMLRL-NH2), hybridization chain reaction (HCR) in situ hybridization, and retrograde nerve labeling, following IACUC-approved protocols. **Results:** The results showed myomodulin immunoreactivity in several central ganglia, with clusters of positive cells in the buccal and pedal ganglia and abundant expression in the cerebral ganglia. Additionally, some peripheral tissues displayed myomodulin labeling. Importantly, retrograde labeling of the penis nerve revealed cells expressing myomodulin-like peptide, indicating that myomodulin may be involved in the contraction or functional regulation of the penis and other male-associated structures. **Conclusions:** Overall, mapping myomodulin localization in *B. glabrata* enhances our understanding of host-parasite interactions in this biomedical model and may contribute to the development of new vector control strategies for schistosomiasis. **Acknowledgements:** Supported by the National Institutes of Health: MD007600 (RCMI), P30GM149367 (COBRE); National Science Foundation: IOS-2217657 (OSIB), HRD-1137725 (CREST), OISE-1545803 (PIRE), and DBI-1337284. Imaging support was provided by the UPR COBRE Center for Neuroplasticity, Neuroimaging and Electrophysiology Facility (NIEF).

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TFEB Regulates DVL2 via CLEAR Motifs to Modulate Wnt Signaling

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Introduction: Autophagy and Wnt signaling are evolutionarily conserved pathways that maintain cellular homeostasis, differentiation, and stress responses. Although both are implicated in neurodegeneration and cancer, and are critical developmentally, their mechanistic crosstalk remains poorly defined. The transcription factor EB (TFEB) is a master regulator of lysosomal biogenesis and autophagy, activating target genes through CLEAR (Coordinated Lysosomal Expression and Regulation) motifs. In silico motif analysis of TFEB binding targets, revealed three CLEAR motifs within the promoter of Dishevelled 2 (DVL2), a critical component of the Wnt pathway, suggesting that TFEB may directly regulate Wnt signaling. **Methods:** We conducted chromatin immunoprecipitation followed by quantitative PCR (ChIP-qPCR) to test TFEB binding to the DVL2 promoter and performed TOPFlash/FOPFlash luciferase assays to assess how TFEB overexpression impacts Wnt pathway activation. **Results:** ChIP-qPCR confirmed specific, CLEAR-motif-dependent binding of TFEB to the DVL2 promoter. Functional assays demonstrated that TFEB overexpression significantly alters canonical Wnt signaling activity, consistent with transcriptional regulation of DVL2. These findings reveal that TFEB directly influences Wnt pathway dynamics by binding to defined CLEAR elements. **Conclusion and Future Directions:** These findings suggest a previously unrecognized TFEB-DVL2 regulatory axis linking autophagy and Wnt signaling. Ongoing and future studies will aim to validate this interaction through additional mechanistic assays, including site-directed mutagenesis of CLEAR motifs, qRT-PCR and western blot analyses of downstream Wnt targets, and disease-model experiments assessing autophagy-Wnt crosstalk. We

will also explore the role of TFEB post-translational modifications, such as TFEB PARsylation, in modulating this interaction. This work may uncover new regulatory nodes at the interface of autophagy and Wnt signaling, with implications for pathologies such as cancer, aging and neurodegeneration. **Acknowledgments:** RCMI, PR-INBRE, COBRE-Neuroplasticity Core.

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Polysaccharide Peptide Significantly Reduces Glioblastoma Cell Viability: A Step Toward Developing Safer Adjunctive Therapies

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Background and Objectives: Glioblastoma multiforme (GBM) remains one of the most aggressive primary brain tumors, characterized by rapid proliferation, therapeutic resistance, and limited patient survival. Current regimens such as temozolomide (TMZ) are constrained by toxicity and eventual chemoresistance, emphasizing the urgent need for novel agents with reduced side effects. Coriolus versicolor-derived polysaccharide peptide (PSP) is a bioactive compound known for immunomodulatory and antiproliferative properties. This study investigates PSP's cytotoxic effects on human A172 glioblastoma cells to evaluate its potential as a safer therapeutic candidate.

Methods: Human A172 glioblastoma cells were cultured and treated with PSP at concentrations ranging from 500 to 4,000 µg/mL for 6, 9, and 12 days. Cell viability was quantified using MTT assay to assess concentration- and time-dependent cytotoxic effects. **Results:** PSP treatment significantly impaired cell viability across all tested intervals. A172 glioblastoma cell viability decreased to approximately 48% after 6 days and to 30% by day 9. The strongest effect was observed at day 12. At this newly tested 12-day interval, PSP reduced A172 cell viability to approximately 22% at 4,000 µg/mL, demonstrating sustained cytotoxicity with prolonged exposure. Lower concentrations also showed moderate reductions, confirming a dose-dependent response. These results indicate a cumulative cytotoxic stress and possible activation of cell death pathways with sustained PSP exposure. **Conclusion:** These findings support PSP as a promising natural compound that can markedly reduce glioblastoma cell viability in vitro. Future work will include comparative analyses with TMZ to explore PSP as a potential combination therapy, as well as cytotoxicity assays in non-cancerous glial cells (such as HMC3 microglia) to evaluate selectivity. Mechanistic studies will further investigate PSP's modulation of survival and proliferation pathways, including Akt, in a time- and dose-dependent manner. Our goal is to evaluate PSP as a non-toxic candidate for glioblastoma therapy in combination with TMZ. IRB Approval Statement: IRB approval was not required for this study as it does not involve human subjects. **Acknowledgement:** The research reported was supported by the National Institute of General Medical Sciences of the National Institutes of Health under award number U54GM133807.

Polysaccharide Peptide Reinforces Antiviral Immunity via the STAT-PKR-Interferon Pathway: A Mechanistic Route to Restrict HIV-1 Entry in T-Cells

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Background and Objectives: Human immunodeficiency virus type 1 (HIV-1) continues to challenge long-term immune restoration despite current antiretroviral therapy (ART). In 2024, approximately 40.8 million people were living with HIV worldwide, yet only 77% received ART, and over 5 million remain unaware of their status. In Puerto Rico, persistent diagnostic gaps underscore the need for new strategies. Novel immunomodulators that enhance antiviral signaling without toxicity are urgently needed. We previously demonstrated that Coriolus versicolor-derived polysaccharide peptide (PSP) restricts HIV-1 entry by 73% in THP-1 monocytes through Protein Kinase R (PKR)-mediated Cofilin-1 phosphorylation. This study now investigates whether PSP extends its antiviral influence to adaptive immunity by modulating interferon (IFN)-related pathways in CD4⁺ T cells. Signal Transducer Activator of Transcription (STAT) 1 and 2 mediate IFN-driven antiviral gene expression and PKR production. PKR acts as a double-stranded RNA sensor, blocking viral translation and entry. Cofilin-1 is exploited by HIV-1 for cell entry, whereas PKR halts its activation, and IFN- γ amplifies these responses. Together, these molecules form a coordinated network capable of restricting HIV-1 entry. **Methods:** Jurkat T-cells were treated with PSP (50-1000 $\mu\text{g/mL}$) for 3 and 6 days. Cell viability was evaluated by MTT assay. Immunoblots and RT-qPCR analyses quantified protein and transcript levels of STAT1, STAT2, PKR, and IFN- γ to delineate time-dependent activation patterns. **Results:** PSP elicited sustained, dose-responsive activation of antiviral signaling without cytotoxicity. STAT1/STAT2 phosphorylation increased progressively from day 3 to day 6, accompanied by corresponding mRNA upregulation. PKR was markedly elevated, mirroring its role in innate models where PSP restricted HIV-1 entry through Cofilin-1 phosphorylation. IFN- γ transcripts rose in parallel, indicating reinforcement of adaptive antiviral immunity. **Conclusion:** PSP activates the STAT1/2-PKR-IFN signaling in T-cells, strengthening antiviral responses. Building on our innate-immunity findings, these results position PSP as a promising immunomodulatory candidate for integration with ART. IRB Approval Statement: IRB approval was not required for this study as it does not involve human subjects. **Acknowledgement:** The project described was supported by the UCC Pilot Project Program grant (E.A.R.) and the Title V Pilot Project (Grant number: P031S200104) (E.A.R.) The research reported was also supported by the National Institute of General Medical Sciences of the National Institutes of Health under award number U54GM133807.

Erinacine Significantly Enhances Antiviral Signaling in CD4+ T-Cells: A Potent Immunomodulator for Future Viral and Neuroimmune Therapies

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Background and Objectives: Despite advances in antiretroviral therapy (ART), complete immune restoration in HIV-1 infection remains difficult, motivating the search for natural compounds that can reinforce antiviral signaling. Erinacine, a diterpenoid derived from *Hericium erinaceus*, has been recognized for its neuroprotective effects; however, its immunomodulatory capacity remains unexplored. Building on our prior findings with polysaccharide peptide (PSP), which restricted HIV-1 entry in monocytes by 73%, this study evaluates Erinacine's ability to activate antiviral pathways in CD4+ T-cells. Central to this investigation are the Signal Transducer and Activator of Transcription (STAT) and Protein Kinase R (PKR) axes, which are key mediators of interferon responses, and the actin-regulatory protein Cofilin-1, often exploited by HIV-1 for cellular entry. **Methods:** Jurkat T-cells were exposed to Erinacine (50-1000 µg/mL) for 3 days. Cell viability was measured by MTT assay. Immunoblots and RT-qPCR were used to quantify expression and phosphorylation of STAT1, STAT2, PKR, and Cofilin-1. 18S served as a housekeeping gene control. **Results:** Erinacine induced a strong, dose-dependent activation of antiviral signaling without cytotoxicity. PKR and STAT1 expression were significantly elevated at both transcript and protein levels, exceeding the magnitude observed with PSP. Phosphorylated Cofilin-1 levels also rose, suggesting cytoskeletal stabilization consistent with restricted viral entry. STAT2 followed a similar trend, reinforcing the involvement of the interferon-mediated antiviral cascade. **Conclusion:** Erinacine robustly amplifies the PKR-STAT-Cofilin signaling network in CD4+ T cells, suggesting a more potent antiviral activation profile than PSP. These findings position Erinacine as a promising immunomodulatory candidate for future combinatory or neuroimmune applications. Ongoing work aims to evaluate its effects in microglial (HMC3) cells to explore therapeutic potential against HIV-associated neurocognitive disorders. IRB Approval Statement: IRB approval was not required for this study as it does not involve human subjects. **Acknowledgement:** The project described was supported by the UCC Pilot Project Program grant (E.A.R.) and the Title V Pilot Project (Grant number: PO31S200104) (E.A.R.).

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Desafíos en el Manejo de Mpox en Puerto Rico: Perspectivas de Pacientes y Proveedores de Salud

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Trasfondo: A raíz del brote de Mpox en Puerto Rico (PR) en el 2022, se evidenció la falta de un sistema adecuadamente estructurado para el manejo de brotes emergentes, lo que afectó directamente el diagnóstico y tratamiento de personas diagnosticadas con Mpox (PDM). Este estudio tuvo como objetivo analizar las experiencias y perspectivas de los pacientes y proveedores de servicios de salud (PSH) durante este brote. **Métodos:** De julio 2023 a julio 2024 se llevó a cabo un estudio descriptivo. Se reclutaron personas diagnosticadas con Mpox y proveedores de servicios de salud que trabajaron activamente durante el brote. Las entrevistas a los pacientes abordaron experiencias de atención, diagnóstico y tratamiento; las entrevistas a los proveedores exploraron su conocimiento previo sobre Mpox, capacitaciones recibidas, manejo de casos y vacunación. Las entrevistas fueron grabadas, transcritas y analizadas temáticamente. **Resultados:** Participaron n=40 PDM y n=20 PSH. La edad promedio fue de 35.05 ± 8.78 años para los pacientes y 43.0 ± 2.49 años para los proveedores. Se identificó una contradicción en relación con los protocolos de diagnóstico y tratamiento: mientras los proveedores informaron recibir adiestramientos y protocolos claros de parte del Departamento de Salud de PR, los pacientes describieron un trato marcado por desorganización y actitudes estigmatizantes. Los pacientes reportaron dificultades para recibir un diagnóstico oportuno, haber recibido información contradictoria sobre la disponibilidad de medicamentos y tratamientos de Mpox, así como la ausencia de un protocolo adecuado de atención en las clínicas y hospitales. Los participantes mencionaron sentirse sujetos a prejuicios dado el estigma alrededor del Mpox. **Conclusión:** La discrepancia entre la percepción de los proveedores y los pacientes sugiere que los protocolos no fueron consistentes ni efectivos. Esto resalta la necesidad de fortalecer las prácticas de diagnóstico y tratamiento, así como de abordar el estigma, para garantizar un cuidado oportuno y equitativo durante brotes emergentes. IRB del Recinto de Ciencias Médicas, bajo el protocolo #2301073590; 13 de marzo de 2024.

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Bridging Simulations and Epidemiological Data: The Case of COVID-19 in Perú

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Background and Objectives: Perú had the highest COVID-19 mortality per capita in the world. Key causes would be delayed vaccine rollout, vaccine effectiveness, vaccine cover rate, and a strict lockdown. We aim to realize which of them were more significant to account for the COVID-19 highest mortality in Perú. Three scenarios were studied. In the first one, vaccination was not available. In the second scenario, we mimic the Peruvian COVID-19 pandemic in terms of the vaccine used (75% efficacy) and the beginning of the vaccination program (340 days after patient zero). In the last scenario, the vaccination efficacy is improved to 95%, and the vaccination process

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began earlier (310 days). **Method:** In a compartmental framework, eight compartments were used to simulate the pandemic. Namely, Susceptible, Vaccinated, Exposed, Symptomatic Infectious, Asymptomatic Infectious, Hospitalized, Recovered, and Death by COVID-19. Consequently, we obtain a set of eight coupled non-linear differential equations to describe the dynamical system. Next, a Wolfram code was developed in MATHEMATICA (computational software) to solve the system equations and plot the pandemic evolution over time. **Results:** We found at any time during the pandemic, the values of each compartment's population. For instance, simulations forecast that the number of deaths by COVID-19 at the end of the pandemic are 391513 (first scenario), 200862 (second scenario), and 136011 (third scenario). The number of deaths reported by databases is 220602, agreeing with the second scenario. A sensitivity analysis suggested that the coefficients of transmission, recruitment, and vaccine failure are the parameters more relevant in the evolution of the pandemic. **Conclusion:** Early vaccination and a vaccine of at least 95% of efficacy could have reduced significantly the number of deaths of the COVID-19 pandemic in Perú. Furthermore, the disease will remain endemic in the second scenario and will die out in the third one. **Acknowledgements:** This research project was partially supported by the University of Puerto Rico-Humacao.

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Impact of Maternal BMI on Neonatal Outcomes Among Hispanic Women with Preeclampsia at the Medical Sciences Campus Hospital

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Background and Objectives: Preeclampsia is one of the leading causes of neonatal morbidity and mortality. Maternal BMI is also a key factor influencing pregnancy health; however, its specific impact on neonatal outcomes among women with preeclampsia remains unclear. This study aims to assess how maternal BMI affects the neonatal outcomes among 22-46-year-old Hispanic women with preeclampsia delivering at the Medical Sciences Campus Hospital. **Methods:** This retrospective observational study reviewed medical records from the UDH Materno-Infant Clinics for pregnant patients diagnosed with preeclampsia between 2022 and 2025. Participants were grouped by BMI classification (underweight, normal weight, overweight, and obese), and neonatal outcomes were analyzed using descriptive statistics and logistic regression. Approved by IRB on 9/10/24 (#2406247299). **Results:** Preliminary results show that among the 71 preeclamptic patients included, neonatal complication rates varied across BMI groups. Preterm birth occurred in 34.5% of obese mothers, 25% of overweight mothers, 50% of normal-weight mothers, and in the single underweight case (100%). Low birth weight was most frequent among overweight mothers (37.5%), followed by normal weight (25%) and obese mothers (17.2%). Respiratory distress syndrome only occurred in obese mothers (12.1%) and overweight mothers (12.5%). Logistic regression analyses showed that BMI classification was not a statistically significant predictor of preterm birth, low birth weight, or respiratory distress syndrome (all $p > .15$), and no BMI category demonstrated an independent effect on neonatal outcomes. **Conclusion:** Although neonatal outcomes differed descriptively across BMI classifications, maternal BMI did not independently predict neonatal complications among Hispanic women with preeclampsia. Larger studies are needed to clarify the role of BMI in neonatal risk within preeclamptic pregnancies.

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Enhancing Timeliness in Newborn Screening: A Quality Improvement Initiative Using a Courier Service

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Background: Timely transportation of dried blood spot (DBS) samples is critical for the Newborn Screening Program, which enables early detection of hereditary conditions that, if untreated, can lead to irreversible damage or death in newborns. Although samples are collected within 24–48 hours of life, delays in transportation to the laboratory can postpone diagnosis and treatment. The project aimed to improve delivery efficiency by implementing a standardized courier system to reduce delays and ensure timely processing. **Methods:** Data from four hospitals were analyzed before and after the implementation of a transportation protocol established in July 2024 through a collaboration with FedEx. Quality improvement measures included comparing the percentage of samples delivered within 48 hours from sample collection before and after the intervention. Monthly data was reviewed to identify variability and logistical barriers. Descriptive statistical analysis was performed. **Results:** After implementing the FedEx transportation system, the percentage of samples delivered within 48 hours showed general improvement across hospitals, although monthly variability persisted. Hospital 1 showed gradual improvement, maintaining 40–60% of samples delivered within 48 hours during 2025. Hospital 2 displayed high variability and inconsistency although managed to have 80% of samples delivered within 48 hours twice in 2025. Hospital 3 exhibited an upward trend when compared to 2024 with rates above 50% in 2025. Meanwhile, Hospital 4 also showed a progressive increase reaching around 60% by August 2025. **Conclusion:** The FedEx transportation system implemented in July 2024 showed a general improvement in the percentage of sample deliveries within two days, positively impacting logistical efficiency and early detection capacity despite variability among hospitals. Continued monitoring and standardization among hospitals are recommended to further reduce variability and strengthen long-term performance. **Acknowledgments:** The Health Resources and Services Administration (HRSA), Department of Health and Human Services (HHS) provided financial support for this project. The award provided 100% of total costs and totaled \$332,221. The contents are those of the author. They may not reflect the policies of HRSA, HHS, or the U.S. Government.

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An Update on the Effects of Age on the Outcomes of Elbow Release in Arthrogryposis

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Background & Objectives: Arthrogryposis multiplex congenita (AMC) is defined by congenital contractures of two or more joints. The upper limb is affected in most children, and elbow extension contracture is particularly disabling for daily activities. Nonoperative therapy is first line; however, when functional elbow flexion cannot be achieved, posterior elbow release can improve passive flexion. This study updates and expands our 2018 cohort, representing the largest series to date examining outcomes of posterior elbow release in children with AMC. We

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evaluated whether age at surgery is associated with gains in passive elbow arc of motion after posterior elbow release in children with AMC. We hypothesized that surgery before age two would yield the greatest improvements.

Methods: We performed a retrospective cohort study of children with AMC who underwent posterior elbow release at Shriners Children's Philadelphia. Fifty-six elbows in forty-six patients with ≥ 2 -year follow-up were stratified by age at surgery: < 2 years ($n=20$), 2–3 years ($n=22$), and > 3 years ($n=14$). Pre- and postoperative passive arc of motion (AoM) and flexion were compared using analysis of variance, t tests, and linear regression to assess the effects of age and therapy delay on change in AoM (Δ AoM). (IRB protocol number: PHL2404R; approval date: 05/13/2024) **Results:** Age significantly affected Δ AoM ($p=0.007$) and change in flexion ($p=0.023$). Children < 2 years achieved greater gains than children > 3 years, with a mean Δ AoM difference of 23.6° ($p=0.0062$). Although younger children started stiffer, point estimates favored children < 2 years for greater final AoM (mean 76° vs 69° in > 3 years) and a trend toward less flexion contracture. Therapy delay showed no significant association with Δ AoM. **Conclusions:** Posterior elbow release before age two produced the greatest gains in passive arc of motion and flexion without compromising final AoM, supporting early surgical intervention once nonoperative care fails. **Acknowledgements:** No external funding was received. The authors report no relevant conflicts of interest.

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