

15th
Annual

Scientific 2026 Day

May 6

Shaping the Future of Chronic Disease
Management Through Precision Nutrition,
Omics, and AI

PRHSJ
Puerto Rico Health Sciences Journal

ABSTRACT SUPPLEMENT

Editorial

Shifting Paradigms: Integrating Innovation to Advance Chronic Disease Research and Management

Chronic diseases, including cardiovascular disease, cancer, diabetes, and Alzheimer's disease, remain the leading causes of morbidity and mortality in Puerto Rico, the United States, and globally (1-3). This burden is further exacerbated by persistent variations in health outcomes and social drivers of health, which are increasingly recognized as key priorities within the National Institute's of Health research agendas (4). Collectively, these challenges highlight the need to move beyond traditional paradigms to more effectively capture interindividual variability in disease risk, progression, and therapeutic response (5). The integration of precision nutrition, omics and multi-omics technologies, and artificial intelligence into both research and clinical practice expands the scope of strategies available to optimal health outcomes (6-7). However, the successful implementation of these approaches required sustained, coordinated, and interdisciplinary efforts, alongside continued investment in research capacity and healthcare infrastructure.

Precision nutrition seeks to tailor dietary recommendations based on an individual-level determinants of response, including genetic variation, metabolic status, microbiome composition, behavioral patterns, and environmental exposures. In parallel, multi-omics technologies-encompassing genomics, transcriptomics, proteomics, metabolomics and other omics- enable the comprehensive characterization of biological systems, facilitating biomarker discovery and advancing understanding of disease pathophysiology (7-8). Furthermore, advances in artificial intelligence have enhanced dietary assessment methodologies, enabled the development of personalized nutrition interventions, improved chronic disease management, supported virtual health coaching, and strengthened public health nutrition strategies (9).

The Alliance for Clinical and Translational Research (Alliance) acknowledges the need to advance our current conceptual frameworks of chronic disease by emphasizing the central role of nutrition and fostering innovation across this rapidly evolving scientific landscape. Through the support of research initiatives, training programs, and related activities, the Alliance promotes the adoption and integration of transformative approaches, including precision nutrition, omics sciences, and artificial intelligence, among investigators within its network and the populations they serve.

Under the theme "Shaping the Future of Chronic Disease Management Through Precision Nutrition, Omics, and AI", the Alliance convened its 15th Scientific Day, featuring a diverse array of scientific poster presentations, the abstracts of which are included in this supplement. All submissions underwent a rigorous peer-review process. The resulting body of work spans multiple domains, including basic science, clinical and translational research, behavioral and social sciences, health services and implementation science, and public health and community-based research.

The Alliance serves as a critical platform for the dissemination of research conducted by faculty, investigators, trainees, and community partners across academic and professional institutions. These contributions collectively

advance efforts to redefine health and well-being for populations in Puerto Rico and beyond. This supplement further serves as a call to action: sustained commitment to interdisciplinary collaboration, expanded access to high-quality research opportunities, and the strategic application of emerging innovations will be essential to advance scalable solutions for the prevention and management of chronic diseases.



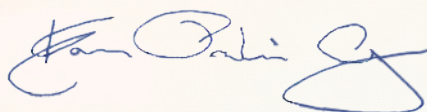
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Abstracts*

PROTEIN EXPRESSION PROFILE AND CYTOTOXIC EFFECTS OF XYLAZINE IN HUMAN CARDIAC FIBROBLASTS

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INTRODUCTION: Xylazine has emerged as a major public health concern as an adulterant in the illicit drug supply and has been linked to severe medical complications. However, its direct effects on cardiac cells remain poorly understood. The response of cardiac fibroblasts, central regulators of myocardial structure, remodeling and injury has not been characterized. This study investigates the effects of xylazine on human cardiac fibroblasts and identifies early protein expression changes associated with fibroblast dysfunction.

METHODS: Undifferentiated AC-16 human ventricular fibroblasts were exposed to increasing concentrations for 24hrs. Cell viability was assessed using the resazurin reduction assay, and IC₅₀ values were determined by nonlinear regression of dose–response curves. Apoptosis and cardiac associated protein expression (Creatine Kinase (CK-MB), cardiac troponin T, and myoglobin) were evaluated following treatment with vehicle, camptothecin, or xylazine, using Annexin V assay and western blot.

RESULTS: Xylazine exposure reduced cardiac fibroblast viability in a dose-dependent manner, with an IC₅₀ of 80 ng/mL. Apoptosis analysis shows that the loss of viability was associated with programmed cell death pathways. Protein profiling showed consistent CK-MB expression with absent cardiac troponin T and myoglobin, consistent with an undifferentiated fibroblast phenotype and establishing a baseline protein signature for subsequent dysfunction analyses.

CONCLUSION: Xylazine reduced cardiac fibroblast viability in a dose-dependent manner and induced apoptosis, suggesting direct cardiotoxicity. The resulting protein expression profile provides a foundation for identifying biomarkers of xylazine-associated cardiac injury.

Funding: This research was partially supported by the following programs:

- The RCMI Program (U54 MD007600) from the National Institute on Minority Health and Health Disparities (NIMHD).
- The NIH-R25 Hispanic Clinical and Translational Research Education and Career Development (HCTRECD) Award (R25MD007607).
- The Hispanics in Research Capability (HiREC) Endowment Award (S21MD001830) from the NIMHD.
- 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.

IRB/IACUC Exemption Statement: This study was conducted exclusively using established human in vitro cell lines (AC-16 cardiac fibroblasts) and did not involve human subjects, identifiable human samples, or animal models.

***Disclaimer:** All information contained in this document was published as provided by the Organizing Committee.



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ANGIOTENSIN II-AT1R SIGNALING PROMOTES PRO-INFLAMMATORY AND OXIDATIVE RESPONSES IN MICROGLIA

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INTRODUCTION: The renin-angiotensin-aldosterone system (RAAS) has emerged as an important regulator of immune responses in the central nervous system (CNS). Angiotensin II (Ang II), the main RAAS effector peptide, signals primarily through the angiotensin II type 1 receptor (AT1R) and has been associated with oxidative stress and inflammatory signaling. However, the direct contribution of Ang II-AT1R signaling to microglial activation remains incompletely understood. This study investigated whether Ang II promotes pro-inflammatory and oxidative responses in microglia and whether these effects are mediated by AT1R.

METHODS: Brain tissues from experimental autoimmune encephalomyelitis (EAE) and control mice were analyzed for RAAS-related gene expression. Human HMC3 microglial cells were treated with Ang II (10–100 nM) with or without the AT1R antagonist losartan. Inflammatory and oxidative responses were evaluated by quantitative PCR, ELISA for interleukin-6 (IL-6), nitric oxide quantification using the Griess assay, and reactive oxygen species (ROS) analysis using oxidative stress assays.

RESULTS: EAE brain tissues showed increased expression of Ang II, AT1R, and inducible nitric oxide synthase (iNOS). In HMC3 microglia, Ang II significantly increased IL-6 expression and secretion, ROS production, nitric oxide levels, and NF- κ B-associated gene expression. Pharmacological blockade of AT1R with losartan markedly reduced these pro-inflammatory and oxidative responses, indicating receptor-dependent signaling.

CONCLUSION: These findings demonstrate that Ang II promotes a pro-inflammatory microglial phenotype through AT1R-dependent mechanisms. The Ang II-AT1R axis may represent an important regulator of microglial-mediated neuroinflammation and a potential therapeutic target for neuroinflammatory and neurodegenerative disorders.

Funding: San Juan Bautista School of Medicine.

IACUC Approval: Brain tissue samples from C57BL/6 mice with experimental autoimmune encephalomyelitis (EAE) and age-matched controls were obtained from a previously completed and IACUC-approved study from Hooke Laboratories (MA, USA).



LOW FREQUENCY-DBS OF THE NAC IN MORPHINE SPONTANEOUS RECOVERY AND REINSTATEMENT

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INTRODUCTION: Opioid use disorder (OUD) is a chronic, relapsing condition with one-year relapse rates of 80–90%, underscoring the need to strengthen extinction of drug-seeking. Low-frequency DBS (LF-DBS) (20 Hz) of the Ventral Striatum/Nucleus Accumbens (VS/NAc) accelerates extinction of morphine conditioned place preference (CPP) and increases hippocampal brain-derived neurotrophic factor (BDNF), implicating BDNF–Tyrosine kinase B (TrkB) plasticity. Whether these effects persist during abstinence or reflect DBS-induced hippocampal plasticity independent of training remains unknown.

METHODS: Adult rats underwent morphine CPP, followed by extinction training with sham or LF-DBS delivered bilaterally to VS/NAc during extinction sessions. Behavioral outcomes included days to reach extinction criterion, spontaneous recovery after a 7-day drug- and DBS-free interval, and morphine-primed reinstatement. In a separate cohort without CPP training, rats received LF-DBS or sham stimulation only. Brain tissue was collected for Western blot quantification of BDNF and p-TrkB expression.

RESULTS: LF-DBS accelerated extinction of morphine CPP but did not prevent spontaneous recovery or reinstatement. In DBS-only animals that did not undergo CPP training, LF-DBS increased hippocampal BDNF and showed a trend toward elevated p-TrkB, indicating that DBS alone is sufficient to engage hippocampal BDNF–TrkB signaling independent of behavior.

CONCLUSION: LF-DBS increases hippocampal BDNF expression independent of CPP training, supporting a BDNF–TrkB–mediated plasticity mechanism underlying extinction enhancement. Although preliminary data show no significant reduction in spontaneous recovery, additional subjects are needed to increase power. Ongoing studies will assess reinstatement and expand circuit-wide BDNF/TrkB profiling to define the mechanistic link between LF-DBS, plasticity, and relapse prevention.

IACUC Approval: Protocol #9940112, University of Puerto Rico Medical Sciences Campus, Department of Anatomy and Neurobiology.

ALPHA-7 nAChR ACTIVATION REDUCES HIV REPLICATION FROM MICROGLIA IN A DONOR-DEPENDENT MANNER

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INTRODUCTION: HIV-associated neurocognitive disorders (HAND) affect nearly half of people living with HIV, even with antiretroviral therapy. No effective treatments currently exist for this neuroinflammatory disease. The activation of $\alpha 7$ nicotinic acetylcholine receptor ($\alpha 7$ nAChR), a mediator of the cholinergic anti-inflammatory pathway, improves locomotor, learning, and memory deficits in a mouse model of HAND while reducing microglial activation. In contrast, in human T cell lines, an $\alpha 7$ nAChR agonist activated HIV-1 transcription. Similarly, we found that $\alpha 7$ nAChR agonist SEN12333 induced a donor-dependent increase or decrease in HIV-1 replication from microglia. Our objective is to confirm if the effect of SEN12333 in HIV-1 replication from human microglia is mediated through $\alpha 7$ nAChR activation. *We hypothesized that $\alpha 7$ nAChR activation will be responsible for reducing HIV-1 replication after SEN12333 treatment.*

METHODS: We isolated monocytes by adherence from peripheral blood mononuclear cells (PBMCs) from people without HIV (n=5) from our Hispanic-Latino Longitudinal Cohort. 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 pre-incubated with $\alpha 7$ nAChR antagonist α -Bungarotoxin for 30 min, followed by treatment with $\alpha 7$ nAChR agonist SEN12333 for 2 days. HIV-1 p24 antigen levels were measured by ELISA.

RESULTS: α -Bungarotoxin pre-treatment blocked the agonist-mediated decrease in HIV replication from MMG.

CONCLUSION: $\alpha 7$ nAChR activation is responsible for the decreased HIV replication after SEN12333 treatment. Future studies will confirm if $\alpha 7$ nAChR activation is also responsible for the agonist-mediated increased HIV-1 replication in other donors.

Funding: 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.

IRB Approval: 1330422.



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TARGETING GRP78 WITH THERA-GRP TRIGGERS ER STRESS MEDIATED APOPTOSIS IN GBM

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INTRODUCTION: Glioblastoma multiforme (GBM) is an aggressive primary brain tumor resistant to therapy due to metabolic plasticity and persistent cellular stress. GRP78, a key ER chaperone, promotes tumor survival by maintaining proteostasis and regulating the unfolded protein response (UPR). This study evaluates Thera-GRP, a monoclonal antibody targeting GRP78, investigating its impact on ER stress signaling, tumor metabolism, and cell survival.

METHODS: A172 cells and normal human astrocytes (AHN) were treated with Thera-GRP (0–50 $\mu\text{g/mL}$). GRP78 expression in patient-derived GBM tissues and cell lines was evaluated via qRT-PCR and immunohistochemistry. Apoptosis was assessed by TUNEL staining and caspase-12 activation. Integrated proteomics (TMT LC-MS/MS) and metabolomics identified pathway-level changes. In vivo efficacy was tested in orthotopic GL261 mouse models. Pharmacological GRP78 inhibition (0.75–30 μM) was examined, with ER stress markers (CHOP, ATF4, eIF2 α) analyzed by Western blot.

RESULTS: Thera-GRP dose-dependently reduced A172 viability, with maximal suppression at 12.5 $\mu\text{g/mL}$ ($p=0.004$) while sparing AHN cells ($p=0.89$). GRP78 was elevated in patient-derived GBM tissues (2.5–3.7-fold, $p=0.01$). Pharmacological inhibition yielded an IC_{50} of 26.04 μM . Thera-GRP induced ER stress-mediated apoptosis, confirmed by increased TUNEL positivity ($p=0.006$) and caspase-12 activation ($p=0.003$). Multi-omics revealed downregulation of glycolytic enzymes (PKM2, ENO2) and ER chaperones (CALR, EIF2, PDI).

CONCLUSION: Targeting GRP78 disrupts ER proteostasis and metabolic adaptation in GBM, triggering ER stress-driven apoptosis and tumor suppression. These results support Thera-GRP as a promising therapeutic strategy for glioblastoma.

Funding: This research was funded by Title V, US Department of Education: UPR-RCM Title V Grant Award # P031S200104, PRSTRT 2025-00157 and NIH BRAIN Initiative 1U24NS124026-01A.

IACUC Approval: All animal procedures were approved by the SUNY Upstate Medical University IACUC# 412.

THE ROLE OF ZEBULARINE IN MODULATING CELL MIGRATION IN MODELS OF DOCETAXEL-RESISTANT PROSTATE CANCER

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INTRODUCTION: Prostate cancer (PCa) is one of the most common types of cancer diagnosed in men. DNA methylation has been investigated as a biomarker for disease aggressiveness and therapy resistance in PCa. Although PCa is considered a slow-growing disease, it can progress into metastatic castration resistance (mCRPC). Docetaxel is the standard first-line chemotherapy for mCRPC; however, drug resistance occurs in almost 50% of patients. Therefore, this study aims to elucidate whether altering DNA methylation patterns in docetaxel-resistant (DR) PCa cell lines alters various cellular functions. Our hypothesis is that if DNA methylation patterns in parental and DR PCa cells can be altered using Zebularine, changes in various biological processes such as migration and proliferation will be observed.

METHODS: To evaluate the effects of Zebularine (12.5–400 μ M) on the proliferative capacity of PCa cell lines (PC-3, DU-145, and 22Rv1) and their DR counterparts, the MTT assay was performed. Protein expression changes in DNMT1, DNMT3A, and MDR1 were evaluated through Western Blot. Effects over cell migration capacity were evaluated using the Wound Healing assay.

RESULTS: Treatment with Zebularine reduced cell viability in a concentration-dependent manner in all cell lines. Non-toxic concentrations of Zebularine (25 μ M and 100 μ M) were selected. Protein expression changes were only detected for DNMT1, where a reduced expression was observed in all cell lines except DU145-DR. For the cell migration assays, Zebularine reduced the migration capacity in DR cell lines (PC3-DR and DU145-DR).

CONCLUSIONS: Zebularine led to successful inhibition of DNMT1, helping reduce migration capacity in DR cells.

Funding: Research supported by U54 PHSU-MCC Grants #U54CA163071 and #U54CA163068, Molecular and Genomics Core (NIMHD Grant MD007579), and NIGMS-NIH #U54GM133807 through the Technologies and Resources for Research Core Laboratories (TRRCL) from the Hispanic Alliance for Clinical and Translational Research (Alliance) at the PHSU.



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SCAMP3 MODULATES EGFR-ERK/STAT3 SIGNALING AND THERAPEUTIC RESPONSE TO ERLOTINIB AND C188-9 IN TNBC XENOGRAFTS

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INTRODUCTION: Triple Negative Breast Cancer (TNBC) relies on receptor tyrosine kinase signaling, but therapeutic benefits from targeted agents are often limited due to rapid pathway adaptation. We previously identified Secretory Carrier Membrane Protein 3 (SCAMP3), as a regulator of epidermal growth factor receptor (EGFR) trafficking and downstream oncogenic signaling output. EGFR activates ERK1/2 and STAT3 and is associated with cancer stemness. Here, we investigated whether SCAMP3 loss modulates EGFR/ERK and STAT3 *in vivo*. We hypothesized that SCAMP3 depletion attenuates EGFR-dependent ERK/STAT3 pathway, reduce stemness expression, and enhance antitumor responses to directed inhibitors.

METHODS: SUM-149 WT or SCAMP3-knockout (SC3KO) cells were implanted into SCID mice and treated with vehicle, erlotinib (EGFR inhibitor), C188-9 (STAT3 inhibitor), or the combination (25mg/kg each) for 21 days. Tumor growth was monitored longitudinally, and tumor lysates were analyzed by immunoblotting for STAT3, p-STAT3 (Tyr705), ERK, p-ERK, CD44, and Nanog.

RESULTS: Erlotinib and combination therapy significantly reduced tumor growth compared with vehicle in both WT and SC3KO xenografts. In WT tumors, erlotinib and C188-9 increased p-ERK levels, whereas combination treatment attenuated this effect. In contrast, in SC3KO tumors, erlotinib reduced p-ERK and p-STAT3 relative to vehicle, while C188-9 enhanced their activation. Erlotinib also decreased CD44 and Nanog levels in SC3KO tumors.

CONCLUSION: In summary, our data suggests that SCAMP3 promotes tumor-propagating phenotypes by modulating crosstalk between EGFR/ERK and STAT3 signaling interactions *in vivo*. These results support new strategies that incorporate SCAMP3 status as a potential determinant of response to EGFR- and STAT3-targeted treatments in TNBC.

IACUC Approval: #059-2020-28-01-PHA-IBC, Universidad Central del Caribe.

Funding: SC2GM141720 NIH/NIGMS (IJSA).

DC-SIGN (CD209) ACTIVATION PROMOTES SURVIVAL IN B-CELL LINES

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INTRODUCTION: DC-SIGN (dendritic cell-specific intercellular adhesion molecule [ICAM-3] grabbing non-integrin; CD209) is a C-type lectin receptor that functions as a pattern recognition receptor involved in antigen recognition, adhesion, and immune signaling. DC-SIGN, predominantly expressed on dendritic cells and macrophages, has also been reported on peripheral B cells. However, the functional significance of DC-SIGN signaling in B cells remains largely undefined. This study investigates the cellular effects and signaling pathways induced by DC-SIGN activation in B-cell lymphoma models.

METHODS: Burkitt's lymphoma cell lines expressing DC-SIGN (Ramos DC-SIGN and Raji DC-SIGN) were used to evaluate the effect of DC-SIGN activation on cell survival. Cells were pre-treated with mannan for 24 h to activate DC-SIGN. Cell death was subsequently triggered by stimulating Ramos DC-SIGN cells with anti-IgM or Raji DC-SIGN cells with cytarabine for 24 h. Apoptosis was quantified using Annexin/7AAD flow cytometry. Wild-type Ramos and Raji cells lacking DC-SIGN expression were used as controls and results were compared to anti-IgM or cytarabine only treated cells.

RESULTS: Activation of DC-SIGN significantly increased survival in both Ramos DC-SIGN and Raji DC-SIGN cells following apoptotic stimulation. This effect was not observed in wild-type cells. Western blot analysis in Ramos DC-SIGN cells revealed this survival response activated a p38/Bcl-2 signaling pathway.

CONCLUSION: These findings demonstrate that DC-SIGN activation promotes survival in B-cell lymphoma models subjected to apoptotic stimuli and highlights a previously underexplored role for DC-SIGN in B cells.

Funding: This research was supported by The RISE Program Award Number R25GM110513 from the National Institute of General Medical Sciences.

IRB/IACUC Approval: IRB/IACUC approval is not needed. This project does not involve animals or human subjects.



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ERGOSTEROL PEROXIDE EXPLOITS TNBC PROTEOSTASIS DEPENDENCE BY TARGETING UBR4 TO INDUCE PROTEOTOXIC CELL DEATH

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INTRODUCTION: Triple-negative breast cancer (TNBC) lacks targeted therapies, leading to poor patient outcomes. Ergosterol peroxide (EP), a *Ganoderma lucidum* extracted compound, displays selective anti-TNBC properties. Our proteomic profiling identified the E3 ubiquitin ligase UBR4 as an EP target. UBR4 with KCMF1 and Calmodulin (CaM) form the SIFI complex, which promotes cancer cell survival under proteotoxic stress. We hypothesize that EP exploits TNBC proteostasis dependence by inhibiting SIFI through UBR4 targeting to trigger proteotoxic stress and cell death.

METHODS: MDA-MB-231 TNBC cells were treated with vehicle, EP (20 μ M), EP2 (3 μ M), MG132 (5 μ M), or cycloheximide (10 μ M). UBR4 was immunoprecipitated and immunoblotted for KCMF1 and CaM. Immunocytochemistry assessed UBR4, KCMF1, and CaM abundance/co-localization. ROS, protein aggregation, and protein synthesis were measured by fluorescence microscopy. Mitochondrial function was evaluated by Seahorse in TNBC cells vs. cardiomyocytes. Ubiquitination and cytochrome c release were assessed by immunoblotting and immunofluorescence.

RESULTS: EP and EP2 disrupted SIFI complex integrity by reducing UBR4 and CaM interaction and UBR4 abundance while KCMF1 remained unchanged. EP and EP2 induced ROS and selectively increased protein aggregation in TNBC cells vs. MCF10A. EP and EP2 decreased protein synthesis and impaired mitochondrial respiration in TNBC cells but not cardiomyocytes. Finally, EP and EP2 decreased ubiquitination while cytochrome c release confirmed apoptosis.

CONCLUSION: EP and EP2 induce ROS, increasing cellular stress. SIFI complex disruption initiates a proteotoxic cascade involving protein aggregation, translation inhibition, and mitochondrial impairment, culminating in apoptosis exclusively in cancer cells. This selective activity underscores EP's promise as a targeted therapeutic for TNBC.

Funding: This research was supported by a National Institute of General Medical Sciences (NIGMS) of the National Institutes of Health award under grant number R16GM145488 to M.M.M.; an Advanced Research Grant (#2024-00195) and EnTRUST grant (#2025-00112) from the Puerto Rico Science Technology and Research Trust to M.M.M.; UCC pilot project program grant to M.M.M.; Louisiana Board of Regents Support Fund Award LEQSF-RD-A-05 and NIGMS grant number R15GM148983 to F.R and NIGMS under award number U54GM133807.

IRB/IACUC Exemption Statement: This study did not involve human subjects or animals. All experiments were conducted using established commercial cell lines and in vitro biochemical methods; therefore, IRB and IACUC approval were not required.

HEXANOATE CYTOTOXIC IMPACT DIFFERS BY BREAST CANCER TYPE

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BACKGROUND: Breast cancer (BC) remains a significant public health challenge, of which progression mechanisms have not yet been fully understood. Medium-chain fatty acids (MCFAs) are microbial metabolites that have shown to contribute to cancer progression. However, the molecular mechanisms in which MCFAs impact different breast cancer types remain largely undefined. Among these, hexanoate represents an understudied MCFA whose effect warrants further investigation. For this reason, we evaluated the impact of hexanoate on cell viability using *in vitro* models of triple-negative breast cancer (TNBC) and luminal A subtype: MDA-MB-231 and MCF-7, respectively.

METHODS: MDA-MB-231 cells were cultured in RPMI-media and MCF-7 in DMEM-media, both at 37 °C, 5% CO₂ with 10% fetal bovine serum. Cell viability was measured using AlamarBlue assay, and hexanoate treatment was given in serial dilutions (1:2) starting at 800mM for 24, 48, and 72 hours (h). The half-maximal inhibitory values (IC₅₀) were assessed via fluorescence (590nm). Proliferation was evaluated by seeding 150,000 cells/well and treating cells with 7.5mM of hexanoate. Cell quantification was performed at 24h, 48h, and 72h post-treatment using a TC20 automated cell-counter.

RESULTS: Hexanoate decreased MDA-MB-231 viability in a consistent IC₅₀ of 29mM through all-time points, while MCF-7 cells displayed a time-dependent reduction in IC₅₀ values (IC₅₀ = 515mM - 26mM). Furthermore, hexanoate significantly decreased cell proliferation at 72h in MDA-MB-231 ($p = 0.004$).

CONCLUSIONS: Hexanoate can reduce cell viability in MDA-MB-231 and MCF-7 cell models. The consistent IC₅₀ values and reduction in proliferation in TNBC model suggests a differential sensitivity to hexanoate.

Funding: This project was funded by the National Institute of Allergy and Infectious Diseases (NIAID) Grant #5R25AI183304-02, National Human Genome Research Institute: 1R25HG012702-01 and diversity supplement, National Cancer Institute: R21 CA264606, the National Institute on Minority Health and Health Disparities: RCMI Program U54 MD007600, and the Federal Department of Education's Developing Hispanic-Serving Institutions Program – Title V (PO31S200104).

IRB/IACUC Exemption Statement: This project did not involve the use of human subjects, human participants, or identifiable human biological samples. Therefore, the project did not require review or approval from an Institutional Review Board (IRB).



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THE ROLE OF NEK2 AND AURKB ON TRIPLE-NEGATIVE BREAST CANCER PROGRESSION

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INTRODUCTION: Triple-negative breast cancer (TNBC) is the most aggressive subtype of breast cancer. TNBCs aggressiveness is mostly attributed to their high rates of chromosome instability, proliferation, and metastatic potential. Studies show that overexpression of mitotic kinases NEK2 and AURKB are implicated in chromosomal instability and epithelial-to-mesenchymal transition (EMT). Despite their clinical relevance, no co-targeting therapeutic strategy exists to interrupt the distinct mitotic signaling pathways driven by these kinases. Thus, our study aims to investigate the functional convergence of NEK2 and AURKB as drivers of metastatic progression in TNBC. We hypothesize that NEK2 and AURKB cooperatively regulate mitotic and EMT events that fuel early metastasis.

METHODS: TNBC cell models (MDA-MB-231 and 157) were used to perform genetic knockdown via siRNA-shRNA and invasion assays. Our goal was to determine how individual and dual suppression of NEK2 and AURKB could alter EMT behaviors.

RESULTS: Kaplan-Meier survival confirmed high expression of NEK2 or AURKB was significantly associated with overall and relapse-free survival. Protein-protein interaction analysis showed that both AURKB and NEK2 may converge on EMT-related pathways, while enrichment analysis showed their inhibition could impair metastatic progression by disrupting EMT signaling. Western blot analysis (after individual and dual knockdown of NEK2 and AURKB) confirmed a decrease in EMT transcription factors ZEB1, SLUG and CD44. Invasion assay demonstrated statistically significant reduction after individual and dual knockdown of both kinases.

CONCLUSION: Overall, these data suggests that dual knockdown of mitotic kinases AURKB and NEK2 may be a promising approach to reduce EMT processes of TNBC cell lines.

Funding: R01CA266046, NIH-NIGMS (T32GM144896), NIH-NIGMS PRINBRE (P20 GM103475), Ponce Research Institute, Molecular Genomics (MAGIC) Core (MBCL-RCMI #RR003050MD007579).

IRB Approval: The above referenced protocol is considered exempt after review by the IRB Committee that oversees the use of humans as experimental subjects pursuant to Federal regulations, 45 CFR Part 46. 101(b) (4).

PALBOCICLIB PRE-TREATMENT AS A POTENTIAL SENSITIZER OF TNBC CELLS TO MITOTIC KINASE TTK INHIBITOR TREATMENT

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INTRODUCTION: Triple-negative breast cancer (TNBC) is characterized by genetic instability and high metastatic potential, with chemotherapy as the primary treatment. Mitotic kinases that drive genomic stability, such as Threonine Tyrosine Kinase (TTK), exhibit increased expression in TNBC. TTK regulates spindle assembly checkpoint, and its overexpression promotes centrosome amplification, chromosome instability, and early metastasis. Palbociclib, a CDK4/6 inhibitor that induces tumor cell senescence, is currently approved against luminal breast cancer but not TNBC. Due to the reduced sensitivity of non-cycling cells to chemotherapy, simultaneous treatment between Palbociclib and different chemotherapeutic agents has shown antagonistic effects. Studies suggest that sequential treatment with Palbociclib followed by chemotherapeutic agents decreases TNBC cell line viability. Therefore, 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.

METHODS: MTT assays were used to determine IC₅₀ and IC₇₅ values for each inhibitor individually and in combination in TNBC cells. Multiple treatment schedules were tested to identify optimal drug pairing and timing. Western Blot measured levels of cell-cycle transcription factors.

RESULTS: 5nM Palbociclib pre-treatment 24 hours prior to 6nM TTK inhibitor treatment showed significant decrease in MDA-MB-157 cell line viability. Western Blot results showed decreased levels of cell-cycle transcription factors, such as Cyclin D1, after sequential treatment in both TNBC cell lines.

CONCLUSION: Variations in drug response at viability and molecular levels may reflect differences in cell cycle regulator expression across TNBC cell lines. Findings suggest that Palbociclib pre-treatment sensitizes TNBC cells to TTK inhibition.

IRB Approval: The above referenced protocol is considered exempt after review by the IRB Committee that oversees the use of humans as experimental subjects pursuant to Federal regulations, 45 CFR Part 46. 101(b) (4).



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IMMUNE RESPONSES IN WOMEN WITH CERVICAL DISEASE PROGRESSION FOLLOWING ANTIBIOTIC TREATMENT

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INTRODUCTION: Women with a Spanish background experience a 45% higher incidence of Human Papillomavirus (HPV) related cervical lesions compared to other racial groups. Antibiotic-driven changes in the microbiome may contribute to HPV progression. While the effects of antibiotics on the gut are well understood, their impact on immune responses remains unclear. This study characterizes systemic and cervicovaginal immune responses in women with recent antibiotic exposure.

METHODS: The study recruits patients from Puerto Rico to collect cervical cytobrushes and blood samples. Participants were healthy without cervical lesions or individuals with HPV-related dysplasia. Immune cells were isolated and phenotyped by flow cytometry to quantify innate, B, and T cell subsets. Subset frequencies were compared by cervical disease and antibiotic use within 90 days (recent) and more than 90 days (not recent).

RESULTS: Among 61 participants, 20% reported antibiotic use within 90 days of sampling. The most reported antibiotics were Penicillin agents and Ciprofloxacin. Flow cytometry analysis detected an increased frequency of granzyme B expression in Natural Killer T (NKT) cells from the blood and cervix of individuals without dysplasia who received recent antibiotic treatment before sampling. This group also exhibited an increased frequency of CD8+ T cells expressing the exhaustion marker Programmed Death-1 (PD-1).

CONCLUSION: Preliminary results suggest that antibiotic use impacts innate and adaptive immune responses, potentially through microbial antigen release, especially in individuals without ongoing HPV infection. Linking these immune phenotypes to the cervicovaginal microbiome will help identify the impact of antibiotics on immune and vaginal microbial populations.

Funding: This study was partially funded by the National Institute of General Medical Sciences of the National Institute of Health (NIGMS-NIH) COBRE Puerto Rico Center for Microbiome Sciences 1P20GM156713-01. This study was also partially supported by the National Cancer Institute (U54CA96300) and the National Institute on Minority Health and Health Disparities (R25MD007607).

IRB Approval: 2210058249 with the University of Puerto Rico, Medical Sciences Campus.

DEVELOPING AN IN VITRO SYSTEM TO ELUCIDATE THE ROLE OF IFN-1 IN THE GLYCOLYTIC ACTIVITY OF MDSCS IN CANCER

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INTRODUCTION: Myeloid-derived suppressor cells (MDSCs) play a central role in tumor immune evasion by suppressing anti-tumor immune responses and contributing to resistance to cancer immunotherapy. Type I interferon (IFN-1) has been shown to reduce the suppressive activity of MDSCs and inhibit tumor growth in preclinical models. Emerging evidence suggests that IFN-1 may also influence cellular metabolism by decreasing the expression of glycolytic genes. However, the mechanisms through which IFN-1 regulate glycolytic pathways in MDSCs remain unclear. This study aims to develop a reproducible in vitro system to investigate the metabolic effects of IFN-1 on MDSC-like cells.

METHODS: The human promyelocytic leukemia cell line HL-60 was used to generate polymorphonuclear MDSC-like (PMN-MDSC-like) cells through an optimized in vitro differentiation protocol. A literature-based differentiation strategy was implemented to improve phenotypic homogeneity and reproducibility. Cell differentiation and phenotype were validated using flow cytometry. Glycolytic activity was evaluated by measuring glycolytic gene expression using quantitative polymerase chain reaction (qPCR) and by assessing functional metabolic changes through glucose uptake assays.

RESULTS: The optimized differentiation protocol generated a more homogeneous PMN-MDSC-like population compared with previously reported approaches. This system enabled consistent evaluation of glycolytic gene expression and glucose uptake, providing a reliable platform to study metabolic regulation in MDSC-like cells.

CONCLUSION: This HL-60-based model provides a reproducible system to investigate how IFN-1 signaling influences glycolytic metabolism in MDSC-like cells. Understanding these mechanisms may support the development of metabolic-based strategies to improve the effectiveness of cancer immunotherapy.

Funding: Supported by PR-LAMP ROUSS (NSF HRD-2008186) and PR-INBRE (NIH P20GM103475).

IRB/IACUC Statement: This study was conducted exclusively using established human cell lines (HL-60) under in vitro conditions and did not involve human subjects or animal models. Accordingly, this research is exempt from Institutional Review Board (IRB) and Institutional Animal Care and Use Committee (IACUC) approval.



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AMYLOID-B DEPOSITION IN GLIOBLASTOMA IS LINKED TO VASCULAR REMODELING AND APP PROCESSING PATHWAYS

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INTRODUCTION: Glioblastoma (GBM) is an aggressive brain tumor with a poor prognosis. Identifying biomarkers for targeted therapies remains a major challenge in GBM treatment. Recently, we demonstrated that amyloid- β (A β), a peptide classically associated with neurodegenerative diseases, accumulates in GBM tumors. This study aims to investigate the mechanism underlying A β accumulation in GBM tissues.

METHODS: Immunohistochemical analysis and confocal imaging were performed to assess A β localization in human GBM tissue sections. Glial fibrillary acidic protein (GFAP), ionized calcium-binding adaptor molecule 1 (Iba1), and CD31 were used as markers of astrocytes, microglia, and blood vessels, respectively. Western blot analysis was performed to evaluate the expression of A β and amyloid precursor protein (APP), along with matrix metalloproteinases 2 and 9 (MMP-2 and MMP-9), presenilin-1, nicastrin proteins involved in A β production and vascular endothelial growth factor (VEGF). Pearson correlation analysis was conducted to assess relationships among A β , VEGF, MMP-2/9, presenilin-1, and nicastrin.

RESULTS: Confocal imaging revealed robust A β accumulation in blood vessels and in tumor regions with high vascularization, as well as strong A β accumulation in microglia and, to a lesser extent, in glioma cells. Western blot analysis showed strong correlations between A β levels and factors such as VEGF, MMP-2, and presenilin-1, indicating complex regulatory interactions driving A β accumulation.

CONCLUSION: These findings demonstrate that A β accumulation in GBM is closely linked to tumor vascularization and microglial involvement. The strong correlations with VEGF, MMP-2, and presenilin-1 suggest that both vascular remodeling and proteolytic processing contribute to A β buildup.

Funding: This study was supported by: NIH Grants 1R15CA287203 and 1R16GM153522.

IRB Approval: protocol #2024-31 from July 30, 2024.



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HEMI CHANNEL AND CYSTINE-GLUTAMATE ANTIRPORTER MEDIATED GLUTAMATE RELEASE IN GLIOBLASTOMA

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INTRODUCTION: Glioblastoma (GBM) is a brain cancer often causing seizures and cognitive decline. Glutamate, an excitatory neurotransmitter, is elevated in GBM tumors, resulting in a neuronal excitotoxic environment. This elevation is linked to the cystine-glutamate antiporter (xCT), which is upregulated in tumor and tumor-infiltrated microglia. Hemi channel dysregulation may also contribute to increased glutamate upregulation in the tumor microenvironment. We hypothesize that coordinated activity of hemi channels and xCT in tumor cells and associated microglia contributes to glutamate accumulation in GBM. The purpose of this study was to evaluate mechanisms of glutamate accumulation in GBM tumors.

METHODS: Primary and commercial GBM cell lines were used to quantify glutamate levels in conditioned media, with and without co-cultured human microglia (HM03). Three- and 24-hour time points assessed the effects of Sulfasalazine (SFS), an xCT inhibitor, and the hemi channel inhibitor Carbenoxolone (CBX) at 10, 100 μ M, and 100 μ M, respectively.

RESULTS: Co-culturing with microglia did not significantly alter glutamate release by glioma cells compared to glioma cells alone. Microglia treated with glioma-conditioned media showed reduced glutamate release compared to untreated microglia. Both SFS and CBX reduced glutamate release in glioma cells compared to controls, with CBX producing a greater inhibitory effect than SFS at both concentrations.

CONCLUSION: Elevated glutamate in GBM is mediated by xCT and hemi channels. The greater inhibitory effect of CBX compared to SFS suggests hemi channels represent a significant pathway in GBM and microglia. These findings support a role for hemi channels alongside xCT in regulating glutamate.

Funding: The study supported by NIH Grants 1R15CA287203 and 1R16GM153522.

IRB/IACUC Statement: No human nor animals were used in the experiments conducted for this research.



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IN VITRO EVALUATION OF METABOLISM AND VIABILITY IN OROPHARYNGEAL CANCER CELLS WITH TETRACYCLINE AND CEFAZOLIN

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INTRODUCTION: The use of antibiotics in head and neck cancer patients, particularly in the post-operative setting, remains non-standardized and has been associated with negative alterations of the microbiome and negative implications for cancer outcomes. On the other hand, some antibiotics, such as tetracycline, may negatively influence the viability, morphology, and migration of pharyngeal carcinoma cells. Furthermore, head and neck cancer is highly associated with human papillomavirus (HPV) infections, yet how antibiotics affect HPV-positive cancer cells remains unknown.

METHODS: Here, our objective was to evaluate the effects of two antibiotics—tetracycline and cefazolin—on the metabolism of mEERL cells, a mouse HPV-positive oropharyngeal cancer cell line. Cell metabolism was assessed using MTT assay following 24 and 48 h exposures to five concentrations of tetracycline (270 to 16.9 μ M) and ten concentrations of cefazolin (25,600 to 50 μ M).

RESULTS: As expected, tetracycline exhibited time- and concentration-dependent cytotoxic effects, reflected by MTT reduction. Cefazolin directly reduced the MTT dye even in the absence of mEERL cells, making the assay results inconclusive. Still, microscope observations revealed a possible reduction in cellular confluency.

CONCLUSION: In conclusion, the observed cytotoxic effects of tetracycline on HPV-positive oropharyngeal cancer cells suggests a potential role that merits further investigation as a potential consideration in patients with HPV-positive head and neck cancer and HPV who require antibiotic treatment. Ongoing apoptosis assays and planned in vivo studies will further elucidate the mechanisms of cell death and the influence of these antibiotics on the oral microbiome and immune responses.

Funding: 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. This study was partially funded by the National Institute of Allergy and Infectious Diseases (NIAID) Grant #5R25AI183304-02.

IRB/IACUC Statement: This study is exempted from IRB or IACUC approval since it only relied on in vitro models.

ANATOMICAL LOCATION AND HPV STATUS INFLUENCE ORAL MICROBIOME IN PUERTO RICAN HEAD AND NECK CANCER PATIENTS

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INTRODUCTION: In PR, the incidence of HNC is 2.5 times higher than among individuals in the US with Spanish ancestry. 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 HNC tumor samples from Puerto Rican patients, followed by HPV genotyping and microbiome analyses using 16S rRNA sequencing. Alpha and beta diversity, taxonomic characterization, and biomarker analyses were conducted using QIIME2, MicrobiomeAnalyst, and Random Forest.

RESULTS: Although beta diversity was 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 showed lower richness and Shannon diversity than the oropharynx, hypopharynx, and oral cavity. Although not statistically significant, the oral cavity shows the largest HPV-associated effect size ($R^2 = 0.091$) across site-specific analyses.

CONCLUSION: These findings support the anatomical site as an important ecological driver of HNC microbiome structure and, in the oral cavity, may suggest localized ecological modulation by HPV. Future studies will correlate microbiome composition with HNC clinical characteristics using machine learning to improve the prediction of overall, cancer-specific, and disease-free survival. This work promises to unlock the microbiome's potential for improving patient prognoses.

Funding: This study was partially supported 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.

IRB Approval: Approved by the IRB, Protocol # 2311164967, [University of Puerto Rico Medical Sciences Campus].



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SMILE-HEART: SYSTEMIC AND MACHINE LEARNING INTEGRATION FOR IDENTIFYING LINKS BETWEEN ORAL HEALTH AND HEART DISEASE

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INTRODUCTION: Oral diseases such as dental caries, periodontal disease, and tooth loss remain highly prevalent among adults in the United States. Cardiovascular disease (CVD) is a leading cause of morbidity and mortality, and evidence suggests oral and cardiovascular conditions may co-occur through shared biological and behavioral pathways. However, population-level studies integrating oral health and cardiovascular outcomes remain limited. The NIH All of Us Research Program enables investigation of oral-systemic relationships using harmonized electronic health records (EHRs) and survey data from a diverse national cohort. This study characterizes patterns of co-occurrence between oral health conditions and CVD and evaluate whether oral health indicators improve cardiovascular risk identification using machine learning.

METHODS: This observational study uses de-identified EHR and survey data from the All of Us Research Program (Registered Tier). Oral conditions, including dental caries, gingivitis, periodontitis, and tooth loss, are identified using ICD-10 and SNOMED codes. Cardiovascular outcomes include hypertension, atherosclerosis, coronary artery disease, and ischemic heart disease. Participants are grouped into four cohorts: oral disease only, cardiovascular disease only, oral-cardiovascular co-occurrence, and controls. Data are processed using reproducible workflows in Python and R. Predictive models include logistic regression, Random Forest, XGBoost, and Support Vector Machines, with model explainability evaluated using SHAP.

RESULTS: Preliminary analyses indicate substantial cohort availability, including dental caries (~18,800 participants), gingivitis (~6,500), periodontitis (~7,200), hypertension (~168,000), and atherosclerotic conditions (~53,000).

CONCLUSION: Integrating oral health indicators with cardiovascular risk models may support earlier identification of risk patterns and interdisciplinary prevention strategies in oral-systemic health research.

Funding: This work was supported by the Healthy Americas Research Consortium (HARC) through the Healthy Americas Foundation, with funding to the National Alliance for Hispanic Health from the National Institutes of Health (NIH Award OT2OD025277).

IRB Approval: The IRB Office reviewed the request and determined that using All of Us “Controlled Tier” data does not constitute human subjects research under 45 CFR 46. Therefore, individual projects using this data do not require IRB review or approval.

DETECTING SPATIAL HOTSPOTS OF ORAL CANCER IN PUERTO RICO, 2010-2019: A GIS ANALYSIS OF INCIDENCE AND MORTALITY

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INTRODUCTION: Oral Cavity and Pharyngeal Cancer (OCPC) rates vary geographically, yet it is unclear whether OCPC incidence and mortality cluster spatially within Puerto Rico at the municipal level.

METHODS: We conducted a spatial analysis of OCPC rates across the 78 municipalities of Puerto Rico for 2010-2019. Age-adjusted incidence and mortality rates were obtained from the Puerto Rico Central Cancer Registry. Municipal boundaries were obtained from 2022 Census TIGER/Line shapefiles. Global Spatial Autocorrelation for incidence and mortality was assessed with Moran's I. Local Clustering was evaluated with the Getis-Ord Gi* Statistic, with Z-Scores classified into hot/cold spots at 90%, 95% and 99% confidence. Multiple testing was adjusted using Benjamini-Hochberg false discovery rate (FDR).

RESULTS: No evidence of global spatial autocorrelation was observed for incidence (Moran's I = -0.01, p = 0.49) or mortality (Moran's I = 0.09, p = 0.11). Local Gi* for incidence identified 2 hot spots: Arecibo 95%, Florida 95%; and 3 cold spots: Patillas 95%, Yabucoa 90%, Mayaguez 90%. Mortality analysis identified 3 hot spots: Arecibo 99%, Manatí 95%, Aguada 90%; and 7 cold spots: Aibonito 90%, Corozal 90%, San Juan 90%, Carolina 95%, Juncos 95%, Caguas 99%, Gurabo 99%. However, none of these clusters remained statistically significant after FDR correction.

CONCLUSION: From 2010-2019, OCPC incidence and mortality in Puerto Rico did not exhibit strong municipal-level spatial clustering, though localized high- and low-rate areas were observed. Mortality cold spots were concentrated near the metropolitan region. Incorporating additional covariates may clarify geographic disparities and OCPC burden.

IRB Statement: The study was exempt from IRB review because it utilized publicly available, de identified data from the Puerto Rico Central Cancer Registry.



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THE FIRST POPULATION-BASED STUDY OF PRIMARY CNS TUMORS IN PUERTO RICO

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INTRODUCTION: Primary central nervous system (CNS) tumors are a major global health concern, with a U.S. age-adjusted incidence rate (AAAIR) of 25.34 per 100,000. Puerto Rico, the largest U.S. territory, lacks population-based data describing its CNS tumor burden. Given its unique demographic and genetic composition, epidemiologic patterns may differ from mainland and global populations.

METHODS: A retrospective population-based study was conducted using the Puerto Rico Central Cancer Registry for all primary brain and other CNS tumors diagnosed from 2011–2020. Tumors were classified according to 2016 WHO criteria and ICD-O-3 codes. Age-adjusted incidence and mortality rates were calculated using the 2000 Puerto Rico, 2000 U.S., and WHO standard populations.

RESULTS: A total of 4,362 cases were identified, including 2,454 females and 1,908 males (median age 60). Non-malignant tumors accounted for 2,652 cases and predominated in females (1,644). Malignant tumors totaled 1,710, more common in males (900), with median age 62. Meningioma was the most frequent overall (1,260), and glioblastoma was the most common malignant tumor (821). The overall AAAIR (Puerto Rico 2000 standard) was 11.10/100,000 (malignant 4.32; non-malignant 6.78). There were 1,294 malignant deaths, with an age-adjusted mortality rate of 3.11/100,000, higher in males.

CONCLUSION: This first population-based analysis of CNS tumors in Puerto Rico demonstrates lower incidence and mortality than U.S. and global estimates, suggesting possible genetic, demographic, environmental, or healthcare system influences. These findings establish a baseline for future studies on CNS tumor disparities in populations with Spanish or Caribbean background.

IRB Approval: PUNCTURE IRB Protocol #2210058273, approved by the University of Puerto Rico Medical Sciences Campus Institutional Review Board.



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DISPROPORTIONATE COMORBIDITY BURDEN AMONG NATIVE HAWAIIAN AND PACIFIC ISLANDER PATIENTS WITH EPILEPSY

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INTRODUCTION: Patients with epilepsy (PWE) from different population backgrounds often experience disparities in chronic disease burden, access to care, and health outcomes. Native Hawaiian and other Pacific Islander (NHPI) communities represent a population for whom epilepsy-related health data remain limited despite a high prevalence of chronic conditions that may influence neurological outcomes. This study aimed to characterize seizure profiles, etiologies, and comorbidity patterns among PWE receiving care in Hawaii, with particular attention to NHPI patients.

METHODS: A retrospective chart review was conducted on 500 patients diagnosed with epilepsy who received care at Hawaii Pacific Neuroscience between January 2019 and July 2020. Patients were categorized according to self-identified/self-reported population background (White, Asian, NHPI, or Other). The analyzed variables included seizure type, seizure control, epilepsy etiologies, and medical and psychiatric comorbidities. Statistical comparisons between groups were performed using chi-square tests and one-way ANOVA.

RESULTS: No significant differences were observed among groups in age, sex distribution, seizure type, or seizure control. However, NHPI patients exhibited a disproportionately high comorbidity burden. Compared with other groups, NHPI PWE demonstrated significantly higher rates of elevated BMI, obesity, diabetes mellitus, cardiovascular disease, PTSD, sleep disorders, and current tobacco use ($p < 0.05$ for all).

CONCLUSION: NHPI individuals with epilepsy experience a greater burden of medical and psychiatric comorbidities despite similar seizure characteristics. These findings highlight the importance of culturally informed screening and integrated care strategies to improve epilepsy management and advance health fairness in populations with limited access to care.

Funding: None.

IRB/IACUC Approval: Approved by the Institutional Review Board of Hawaii Pacific Neuroscience.



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IL-6-DRIVEN INFLAMMATION AND GENE-ENVIRONMENT INTERACTIONS IN COLORECTAL CANCER DISPARITIES AMONG PUERTO RICANS

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INTRODUCTION: Early-onset colorectal cancer (EOCRC) is increasing in Puerto Rico despite declining overall colorectal cancer (CRC) incidence. Interleukin-6 (IL-6), a pro-inflammatory cytokine, contributes to CRC progression through inflammatory signaling, immune modulation, and inflammation-associated DNA damage. Elevated circulating IL-6 levels and functional IL-6 promoter variants have been associated with CRC risk, suggesting that genetically driven systemic inflammation may contribute to EOCRC. We hypothesized that Puerto Rican individuals carrying pro-inflammatory IL-6 promoter alleles exhibit increased circulating IL-6 levels, which, together with lifestyle and metabolic factors, may increase susceptibility to EOCRC.

METHODS: A case-control study included CRC patients (n=40) and healthy controls (n=40). Peripheral blood lymphocytes were collected for DNA extraction and IL-6 genotyping by real-time PCR. Plasma IL-6 levels were measured using enzyme-linked immunosorbent assay (ELISA). Sociodemographic and lifestyle data were obtained through surveys.

RESULTS: Among CRC participants, lifestyle risk factors were prevalent, with 50.7% reporting low physical activity and over 70% classified as overweight or obese. Pro-inflammatory IL-6 promoter genotypes were highly prevalent across both groups. CRC patients exhibited higher plasma IL-6 levels than controls. Individuals carrying the IL-6 promoter single-nucleotide polymorphism (SNP) IL-6-174G>C exhibited higher circulating IL-6 levels than those with the wild-type genotype.

CONCLUSION: These findings demonstrate a high prevalence of pro-inflammatory IL-6 genotypes and their association with increased circulating IL-6 levels. This supports a population-level predisposition to heightened inflammatory signaling and suggests a role for gene–environment interactions in CRC disparities. Larger studies are needed to further define IL-6–mediated inflammation in EOCRC risk.

Funding: This project was supported by the NCI Transition Career Development Award to promote Diversity (Award number CA226395) and COBRE Center for the Promotion of Cancer Health Research (NIGMS award number P20GM148324).

IRB Approval: Approved by the IRB, Protocol #2290034759A013.

PERCEIVED NEIGHBORHOOD CHARACTERISTICS AND CHILDHOOD ASTHMA IN SOUTHERN PUERTO RICO

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INTRODUCTION: Childhood asthma remains the most common chronic illness among children, with a prevalence in Puerto Rico nearly twice that of the continental United States (11.4% vs. 6.5%). Neighborhood social environments, including community cohesion and perceived safety, may influence asthma morbidity. This study examined associations between caregivers' perceptions of neighborhood characteristics and lifetime asthma diagnosis among children aged 5-11 in southern Puerto Rico.

METHODS: Caregivers (n=157) of 179 children were recruited from clinical practices. They completed a demographic questionnaire, the Perceived Neighborhood Scale (PNS), and a modified version of the CDC Asthma Experience. Descriptive statistics summarized sociodemographic characteristics. Associations between PNS domains and asthma were assessed using bivariate analyses and multivariable logistic regression adjusted for household income (alpha = 0.05).

RESULTS: Forty-three (24.0%) children had a lifetime asthma diagnosis. Children with asthma were significantly more likely to be male than those without asthma (67.6% vs. 35.0%, p=0.01). No significant group differences emerged for age, caregiver education, household income, or municipality. Mean scores across the PNS domains (social embeddedness, sense of community, neighborhood satisfaction, and perceived crime) were similar between households with and without children with asthma. Logistic models showed no statistically significant associations between PNS domains and asthma. However, higher social embeddedness and sense of community were associated with lower, though non-significant odds of asthma.

CONCLUSION: Neighborhood social perceptions were not significantly associated with childhood asthma in this sample. However, observed trends suggest that greater social connectedness and sense of community may be protective, supporting further investigation in larger studies.

Funding: support from the NIH-NIMHD grant U54MD007579.

IRB Approval: Protocol #2505265377, Ponce Medical School Foundation.



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TIME TO RECOVERY FOLLOWING PEDIATRIC DIABETIC KETOACIDOSIS: INSIGHTS FROM A ONE-YEAR RETROSPECTIVE ANALYSIS

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INTRODUCTION: Diabetic ketoacidosis (DKA) is frequently diagnosed in pediatric intensive care units (PICUs). At our institution, we follow a standardized protocol for DKA management that does not differentiate based on severity. This study aims to analyze the time to resolution of DKA categorized by severity.

METHODS: We performed a retrospective review of medical records for patients diagnosed with DKA from January to December 2025. Inclusion criteria consisted of individuals aged 0-21 years with DKA as the primary diagnosis. Exclusion criteria included patients who developed DKA during hospitalization for other conditions and those with incomplete records. Statistical analysis was conducted using GraphPad Prism 11.

RESULTS: Of 38 patients with DKA admitted to the PICU, 32 met the inclusion criteria. The median time to DKA resolution, assessed by blood gas analysis, was 10.8 hours for the mild group, 18.9 hours for the moderate group, and 45.8 hours for the severe group. A significant difference in resolution time was observed between the mild and severe groups ($p < 0.005$).

CONCLUSION: Our findings suggest that a standardized management approach for DKA results in similar resolution times for mild and moderate cases, while severe cases require significantly longer to resolve.

IRB Exemption Statement: This study is exempt from IRB approval as it involved existing, non-identifiable data.



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METABOLIC INFLUENCES ON PEDIATRIC FRACTURE HEALING: RECONSIDERING VITAMIN D

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INTRODUCTION: Vitamin D is essential for calcium and phosphate homeostasis and plays a critical role in skeletal growth, mineralization, and bone remodeling during childhood. Hypovitaminosis D is increasingly recognized worldwide and may impair bone mineral accrual and skeletal strength. However, the relationship between vitamin D status and pediatric fracture risk remains controversial, with conflicting findings reported in the literature.

METHODS: A narrative review of the literature was conducted to evaluate the biological mechanisms linking vitamin D to bone metabolism and fracture repair in children. Studies examining vitamin D physiology, pediatric fracture epidemiology, and clinical outcomes associated with vitamin D status were analyzed to synthesize current evidence.

RESULTS: Vitamin D regulates intestinal calcium and phosphate absorption and supports osteoblastic activity and mineralization of newly formed bone. Deficiency may lead to secondary hyperparathyroidism, increased bone turnover, and decreased bone mineral density. Several studies demonstrate lower serum vitamin D levels among children presenting with fractures; however, others report no independent association between vitamin D concentration and fracture occurrence, suggesting fracture risk is influenced by multifactorial metabolic, genetic, and environmental determinants.

CONCLUSION: Vitamin D plays an important biologic role in pediatric bone health and fracture repair. While current evidence regarding its direct association with fracture risk remains inconsistent, optimization of vitamin D status represents a potentially modifiable factor supporting skeletal development and bone healing. Further prospective studies are needed to clarify the role of vitamin D screening and supplementation in pediatric fracture management.



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EXPLORATORY AGE AND SEX ADJUSTED GWAS OF MACCE IN PUERTO RICAN CARDIOVASCULAR PATIENTS TREATED WITH CLOPIDOGREL

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INTRODUCTION: Major adverse cardiovascular and cerebrovascular events (MACCE) remain clinically relevant outcomes among clopidogrel-treated patients, yet their genetic determinants are poorly understood in Puerto Rican populations. We performed an exploratory genome-wide association study (GWAS) to identify variants associated with MACCE in Puerto Rican patients receiving clopidogrel.

METHODS: Genome-wide genotype and clinical data from 316 Puerto Rican patients treated with clopidogrel were analyzed, including 48 MACCE cases and 268 controls. Logistic regression adjusted for age and sex was performed in PLINK v1.9. Genome-wide significance was defined as $P \leq 5 \times 10^{-8}$ and suggestive significance as $P \leq 1 \times 10^{-6}$. Results were evaluated using Manhattan and quantile-quantile plots, and genomic inflation was assessed with lambda genomic control.

RESULTS: No variants reached genome-wide significance. One suggestive association signal was identified at rs75924277 on chromosome 15 ($P = 5.191 \times 10^{-7}$; OR=4.652) which is related to GABRA5 gene. The quantile-quantile plot showed minimal inflation ($\lambda = 0.9641$), supporting adequate control of systematic bias in this preliminary model.

CONCLUSION: This age and sex adjusted exploratory GWAS identified a suggestive locus associated with MACCE in Puerto Rican patients treated with clopidogrel. These findings support the feasibility of covariate-adjusted pharmacogenomic analyses in this heterogeneous population and warrant validation in larger cohorts and ancestry-informed follow-up studies.

Funding: National Institutes of Health under NIMHD-RCMI grant number U54 MD007600 and the Pharmacy School of the University of Puerto Rico Medical Sciences Campus.

IRB/IACUC Approval: Approved by the IRB, Protocol #2290033933, University of Puerto Rico Medical Sciences Campus.

PSYCHOSOCIAL STRESS, ENDOTHELIN-1, AND EARLY CARDIOVASCULAR RISK FACTORS IN PUERTORRICAN CHILDREN

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INTRODUCTION: Childhood is a critical period for cardiovascular health development. Early exposure to psychological stress and sleep disturbances may disrupt autonomic and vascular regulation, increasing long-term cardiovascular disease (CVD) risk. Children remain understudied despite disproportionate exposure to adversity. Endothelin-1 (ET-1), a potent vasoconstrictor involved in endothelial dysfunction and vascular inflammation, may serve as a biomarker linking psychosocial stress to early cardiovascular vulnerability.

METHODS: In this ongoing cross-sectional study, children were recruited from the Puerto Rico Health Justice Center and pediatric community clinics. Participants completed two visits including PROMIS Pediatric measures (stress, sleep, family relations), trauma history, physical assessments, blood pressure, fasting lipids and glucose, and blood collection for biomarker analysis. Plasma ET-1 concentrations were quantified. The current analysis includes 44 participants (mean age 12.1± 2.3 years; 73% female).

RESULTS: Overall, 68.4% of participants had at least one CVD risk factor: overweight/obesity (23.7%), hypertension (21.6%), high cholesterol (21.6%), low HDL (21.6%), and high fasting glucose (10.8%). Risk-factor clustering (≥2 factors) occurred in 21.0%. Elevated stress (34.2%) and poor sleep (23.7%) were common. Elevated ET-1 levels were detected in 29% of participants and were associated with higher stress scores and poor sleep ($p < 0.05$).

CONCLUSIONS: Puerto Rican children show early cardiovascular risk alongside psychosocial stressors. Elevated ET-1 suggests a biological link between stress, sleep disturbances, and endothelial dysfunction, highlighting the need for early screening strategies integrating psychosocial and vascular biomarkers.

IRB/IACUC Approval: The administration protocol was reviewed by the Institutional Review Board (IRB) of San Juan Bautista School of Medicine and approved as protocol EMSJBIRB- 12-2025.

Acknowledgements: Research reported in this publication was supported by the National Institute of General Medical Sciences of the National Institutes of Health under award number U54GM133807. The content is solely the responsibility of the authors and does not necessarily represent the official view of the National Institutes of Health.



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CARDIOVASCULAR DISEASE MORTALITY AMONG BREAST CANCER SURVIVORS: A COMPETING RISK ANALYSIS IN PUERTO RICO

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INTRODUCTION: Cardiovascular disease (CVD) is increasing among breast cancer (BC) survivors, yet their mortality risk remain understudied in Puerto Rico. This study examined cumulative BC and CVD mortality risk in Puerto Rican BC survivors from 2004-2019.

METHODS: Data included 17,430 female BC patients in the Puerto Rico Central Cancer Registry surviving ≥ 1 year post-diagnosis, followed through 2021. Fine-Gray competing risk models estimated age-stratified subdistribution hazard ratios (HRs), evaluating associations of demographic and clinical factors with BC and CVD mortality at 5, 10, and 15 years post-diagnosis.

RESULTS: A total of 6,881 (39.5%) survivors died. BC was the leading cause (3,636 deaths; 52.8%), while CVD accounted for 6.8% (n=470). Median survival was longer for CVD (5.5 years; IQR: 3.1, 8.7) than BC (3.6 years; IQR: 2.2, 5.9). The CVD cumulative mortality risk at 15 years post-diagnosis in those aged 80+ approached BC cumulative risk (14.5%; 95% CI: 9.3, 19.4 and 16.6%; 95% CI: 12.4, 20.6, respectively). Among younger survivors (18–64 years-old), comorbidities (HR=2.7; 95% CI: 1.5, 4.8) and unmarried status (HR=2.2; 95% CI: 1.4, 3.4), increased CVD, but not BC mortality risk. Increased CVD mortality risk was additionally observed across 3 out of 5 treatment modalities and advanced stages at diagnosis.

CONCLUSION: While BC remains the primary cause of death, CVD emerges as a substantial competing risk, especially in older populations with longer survivorship. Distinct risk profiles underscore the need for integrated survivorship care and cardiovascular management in Puerto Rican survivors.

Funding: This research has received no external funding.

IRB Exemption Statement: This study was deemed IRB-exempt due to the use of de-identified data from existing records.

INCIDENTAL TYPE B AORTIC DISSECTION IN AN ASYMPTOMATIC PATIENT WITH RECURRENT FLUOROQUINOLONE USE

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INTRODUCTION: Fluoroquinolones have been associated with an increased risk of aortic aneurysm and dissection. Despite an FDA safety announcement warning against their use in patients at high risk of aortopathy unless no other options are available, these agents remain used in the community. We present a rare case of an incidentally found Stanford type B aortic dissection in an asymptomatic patient with recurrent UTI and prostatitis treated with multiple courses of fluoroquinolones.

METHODS/RESULTS: 81 y/o male with PMHx of hypertension, hyperlipidemia, recurrent UTI, and prostatitis treated with multiple courses of ciprofloxacin who presented with UTI symptoms. CT abdomen and pelvis performed to evaluate suspected UTI-related complications revealed an extensive Stanford type B aortic dissection originating distal to the left subclavian artery and extending throughout the descending thoracic aorta down to the renal arteries. Patient was asymptomatic with preserved end-organ function. Guideline-directed therapy with beta-blocker and CCB was initiated. After multidisciplinary evaluation by interventional cardiology and cardiothoracic surgery, decision was made to pursue medical management with imaging surveillance. He remains clinically stable and asymptomatic.

CONCLUSION: We present a unique case of incidentally acute aortic dissection during workup for UTI. Per the literature, most cases present with abrupt pain, and only 6.4% of patients present with painless aortic dissection. Although this patient had risk factors for aortopathy, including age, hypertension, and hyperlipidemia, recurrent use of levofloxacin likely contributed as an additional precipitating factor. This case emphasizes the importance of cautious and prudent use of fluoroquinolones in patients with risk factors for aortopathy.

IRB Approval: Not applicable (retrospective case report).



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PHARMACOTHERAPY STRATEGIES IN TREATMENT-RESISTANT PSYCHOSIS AND CLOZAPINE USE

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INTRODUCTION: This study examined pharmacotherapy strategies among participants enrolled in PORTI, a three-year coordinated specialty care program at the University of Puerto Rico for individuals experiencing first episode psychosis. Pharmacologic treatment plays a central role in early psychosis care. However, a subset of patients develops treatment-resistant psychosis, defined as inadequate clinical response following trials of at least two antipsychotic medications. Clozapine is the treatment of choice for treatment-resistant schizophrenia and related psychotic disorders, yet it remains underutilized. This study characterized pharmacotherapy strategies, with particular attention to treatment-resistant cases, clozapine use, and treatment history preceding initiation.

METHODS: Data were obtained from the PORTI database, which contains clinical records for participants enrolled between 2023 and 2025. Participants are monitored throughout program participation, and pharmacotherapy adjustments are recorded. Extracted variables included demographic characteristics, antipsychotic regimens, use of long-acting injectable antipsychotics, dual antipsychotic therapy, and initiation of clozapine following inadequate response to treatments. Descriptive analyses summarized pharmacotherapy utilization using Microsoft Excel.

RESULTS: Eight participants required clozapine following inadequate response to antipsychotic trials. Long-acting injectable antipsychotics were prescribed in thirteen participants, while seven required dual antipsychotic therapy. Thirty-nine participants received an antipsychotic in combination with another psychotropic medication, and nineteen were maintained on antipsychotic monotherapy.

CONCLUSION: These findings describe pharmacologic treatment strategies within a coordinated specialty care program for first episode psychosis, including management of treatment-resistant cases. The results highlight the role of clozapine in individuals with inadequate response to standard antipsychotic therapy and provide insight into pharmacotherapy utilization within an early intervention program.

IRB Approval: Protocol No. A4850117.



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VASCULAR BURDEN AND COGNITIVE FUNCTION IN PUERTO RICANS WITH EARLY-ONSET ALZHEIMER'S RISK

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INTRODUCTION: Vascular comorbidities have been previously associated with cognitive decline. We evaluated whether a higher Vascular Burden Index (VBI) is associated with poorer cognitive function, as determined by the Clinical Dementia Rating (CDR) scale and Short Blessed Test (SBT), in Puerto Rican adults with a family history of early-onset Alzheimer's disease (EOAD). Additionally, we analyzed which CDR domains are most sensitive to vascular burden.

METHODS: In a cross-sectional sample of Puerto Rican adults with a family history of EOAD (N=174; mean age 56.17 years; 56.9% female), monotonic associations ($\alpha=.05$) between VBI and cognitive outcomes were tested using Spearman's ρ . VBI was calculated by summing nine pre-specified vascular comorbidities. Global outcomes included the SBT total score and CDR Sum of Boxes; CDR subdomains were examined secondarily.

RESULTS: VBI demonstrated moderate but statistically significant associations with both global measures: SBT ($\rho=.19$, $p=.014$; $n=160$) and CDR Sum of Boxes ($\rho=.17$, $p=.031$; $n=160$), indicating that as vascular burden increases, cognitive and functional performance worsens (higher scores reflect poorer performance). Among subdomains, CDR Memory showed a modest but statistically significant association ($\rho=.15$, $p=.045$; 95% CI [.00, .29]; $n=174$), whereas other domains showed non-significant associations.

CONCLUSION: Greater vascular burden is modestly associated with poorer global cognitive and functional performance, with the CDR Memory subdomain showing the greatest sensitivity. These findings support cumulative vascular risk as a measurable correlate of cognitive decline and highlight the need for longitudinal studies to clarify its predictive value.

Funding: This research was supported by the National Institutes of Health under award number R01AG058918.

IRB Approval: 2290032810R003, University of Puerto Rico, Medical Sciences Campus.



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ASSESSING CLINICAL PREPAREDNESS FOR EMERGENCY DEPARTMENT-INITIATED BUPRENORPHINE IN PUERTO RICO

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INTRODUCTION: Emergency department (ED)-initiated buprenorphine increases engagement in treatment for opioid use disorder (OUD) and reduces morbidity and mortality. Despite its strong evidence and guideline support, adoption in many healthcare systems remains inconsistent. This study assessed physician readiness, perceived barriers, and training gaps related to ED-initiated buprenorphine at a tertiary academic hospital in Puerto Rico.

METHODS: This IRB-approved study (UPR-MSc protocol #2509468020) used a cross-sectional survey among physicians from Emergency Medicine, Psychiatry, Family Medicine, and Internal Medicine. The instrument measured knowledge, confidence, attitudes, and perceived implementation barriers using Likert-scale composite scores. Descriptive statistics, subgroup analyses, and correlation testing identified factors associated with greater readiness.

RESULTS: Forty-one physicians participated; 63.4% were residents. Overall attitudes toward ED-initiated buprenorphine were favorable (composite $M=3.8$), reflecting strong perceived value in addressing the opioid crisis. However, knowledge and confidence were moderate ($M=3.3$, $SD=0.8$), with lowest scores in dosing ($M=2.7$), ED initiation procedures ($M=2.6$), withdrawal management, and referral coordination ($M=2.9$). Most respondents reported no direct initiation experience (76.9%) and inadequate residency training (88.2%). The most frequently identified barriers were lack of training (68.3%), absence of standardized protocols (65.9%), and concerns about follow-up care (56.1%). Physicians with formal addiction training had significantly higher knowledge and confidence scores ($M=4.0$ vs 3.2 , $p=.006$). Knowledge was positively correlated with confidence ($p=.583$, $p<.01$).

CONCLUSION: Although physicians demonstrated strong attitudinal support for ED-initiated buprenorphine, significant educational and structural gaps limit implementation readiness. Targeted training initiatives and standardized clinical protocols are essential to enhance operational capacity and integrate this life-saving intervention into routine ED practice in Puerto Rico.



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GENETIC TESTING AND TARGETED THERAPY USE AMONG BREAST, LUNG AND PROSTATE CANCER PATIENTS: ALL OF US

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INTRODUCTION: Cancer remains the second leading cause of death in the United States (US), including among populations with Spanish/Latin background. Lung, breast, and prostate cancers are the most frequently diagnosed malignancies and major contributors to cancer mortality. Advances in molecular oncology have enabled targeted therapies guided by actionable genetic alterations across lung, breast, and prostate cancers. Despite these advances, biomarker testing and targeted therapy use remain inconsistent in real-world clinical practice. These populations are rapidly growing in the US but remain underrepresented in genomic research, highlighting the need to evaluate treatment patterns.

METHODS: This study used data from the All of Us Research Program, a nationwide biomedical database including over 870,000 participants. A descriptive cross-sectional analysis was conducted among patients with Spanish/Latin background with breast, prostate, or lung cancer (n = 2,520). Variables included demographics, biomarker or genetic testing use, and treatment modality (targeted therapy vs chemotherapy). Descriptive statistics were used to characterize clinical features and treatment patterns.

RESULTS: Among these patients, breast cancer accounted for 57.9% of cases, prostate cancer for 26.6%, and lung cancer for 15.5%. Biomarker testing was documented in a subset of patients across all cancer types and was most frequently observed among breast cancer patients. Targeted therapies were more commonly used among patients who underwent biomarker testing, whereas chemotherapy remained the most frequently documented treatment overall.

CONCLUSION: These findings highlight variability in biomarker testing and targeted therapy use and suggest potential gaps in the implementation of precision oncology among cancer patients with Spanish/Latin background in the US.

IRB Approval: Approved by the IRB, Protocol #EMSJBIRB-1-2026. [San Juan Bautista School of Medicine].



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THE IMPACT OF DEPRESSION AND ANXIETY ON SERVICE-SEEKING BEHAVIORS AMONG STREET-RECRUITED DRUG USERS IN PUERTO RICO

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INTRODUCTION: This study examined factors associated with help-seeking behaviors among street-recruited drug users in Puerto Rico. The main objective was to assess the effects of depression and anxiety on service-seeking for drug treatment, health insurance coverage, and housing.

METHODS: A total of 400 participants were recruited through the community outreach work of two syringe exchange programs. Descriptive statistics, bivariate analyses, and stepwise binary logistic regression were used to estimate the direct effects of depression and anxiety on help-seeking behaviors after controlling for other covariates.

RESULTS: Multivariate logistic regression analysis revealed that depression and anxiety were not significantly associated with help-seeking after adjusting for covariates. However, participants who had been homeless in the past 12 months were 4.3 times more likely to seek services ($p < 0.001$, 95% CI: 2.2, 8.3). Similarly, those reporting fair/poor health were 2.2 times more likely to seek services than those reporting good/very good health ($p = 0.025$, 95% CI: 1.1, 4.3). Engagement with community preventive services and actively receiving formal health services were both strongly associated with help-seeking (OR = 6.9, $p < 0.001$, 95% CI: 3.2, 14.8; OR = 6.8, $p = 0.001$, 95% CI: 2.2, 21.2, respectively).

CONCLUSION: Homelessness and engagement with services were stronger predictors of help-seeking than mental health symptoms. These findings highlight the need to maintain street drug users engaged with community-based harm reduction programs as well as formal treatment for substance abuse. Further research, particularly longitudinal designs, will be needed to better understand service seeking in this population.

IRB Approval: The study was conducted under the approval of the Human Subjects Protection Board of the Medical Sciences Campus (IRB Protocol Number 2303088600).

PSYCHOLOGICAL HEALTH DRIVERS AS PREDICTORS OF QUALITY OF LIFE AMONG PUERTO RICAN ADULTS

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INTRODUCTION: Psychological health drivers such as anxiety, depression, and stress are closely linked to mental health and functioning. However, their relative contribution to different domains of quality of life has been insufficiently examined among Puerto Rican adults. This study examined the association between key psychological health drivers and multiple dimensions of quality of life in this population.

METHODS: A secondary analysis of cross-sectional survey data was conducted using 642 Puerto Rican adults aged 21–82 years ($M = 37.54$, $SD = 13.42$). Anxiety, depression, and perceived stress were assessed as psychological health drivers. Quality of life was measured using the WHOQOL-BREF. Four domains were examined: physical, psychological, social, and environmental quality of life. Spearman correlations examined bivariate associations, and four multiple linear regression models evaluated whether psychological health drivers predicted each domain.

RESULTS: Anxiety, depression, and stress were significantly intercorrelated and negatively associated with all quality of life domains. Regression analyses indicated that psychological health drivers significantly predicted physical ($R^2 = .31$, $p < .001$), psychological ($R^2 = .49$, $p < .001$), social ($R^2 = .28$, $p < .001$), and environmental quality of life ($R^2 = .41$, $p < .001$). Stress emerged as the strongest predictor across domains, followed by depression, whereas anxiety was not significant in most models after accounting for the other drivers.

CONCLUSION: Psychological health drivers are strongly associated with multiple domains of quality of life among Puerto Rican adults. Addressing stress and depressive symptoms may be critical for improving overall well-being in this population.

Funding: The Community Engagement and Outreach Core of the The Alliance for Clinical and Translational Research under the Award Number *U54GM133807* from the National Institute of General Medical Sciences (NIGMS).

IRB Approval: Approved by the IRB, protocol #2203095171, Ponce Health Sciences University.



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MENTAL HEALTH AND SOCIAL DRIVERS OF HEALTH IN PUERTO RICAN ADULTS WITH IRRITABLE BOWEL SYNDROME

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INTRODUCTION: Irritable Bowel Syndrome (IBS) is a chronic gastrointestinal disorder frequently associated with psychiatric comorbidities such as anxiety and depression. Social Drivers of Health (SDoH) refer to the everyday conditions in which people are born, grow, live, work, and age, all of which can shape health outcomes. Examining the prevalence of these SDoH and mental health conditions is key to understanding the experiences of people with IBS in Puerto Rico.

OBJECTIVE: This study aimed to describe preliminary findings regarding mental health conditions and SDoH in Puerto Rican adults diagnosed with IBS.

METHOD: We conducted a secondary data analysis of an ongoing cross-sectional project on gastrointestinal conditions, cognition, and mental health among Puerto Rican residents. Participants with IBS (N = 21) self-reported sociodemographic characteristics, SDoH (education, income, health coverage, food security), and mental health diagnoses. Descriptive analyses were performed. This study was approved by the Ponce Medical School Foundation IRB (Protocol #2412231797).

RESULTS: We found that most participants reported graduate (42.9%) or bachelor's degrees (23.8%) with an annual household income between \$20,000 and \$50,000 (38.1%). Nearly all participants had medical coverage (95.2%), and most reported no food insecurity (76.2%). Mental health diagnoses were reported by 57.1% of participants, most frequently anxiety (52.4%) and depression (33.3%).

CONCLUSION: Although most participants reported favorable SDoH, there was a high presence of mental health disorders, particularly anxiety and depression. These findings emphasize the need to develop mental health and public health initiatives for adults with IBS in Puerto Rico.

PERCEIVED SOCIAL SUPPORT AND PSYCHOLOGICAL SYMPTOMS IN CANCER PATIENTS

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INTRODUCTION: Cancer diagnosis and treatment are often associated with significant psychological distress, including symptoms of anxiety and depression. Perceived social support, particularly from family, friends, and significant others, has been identified as an important protective factor associated with better psychological adjustment and emotional well-being. The aim of this study was to examine the relationship between perceived social support and symptoms of anxiety and depression in individuals diagnosed with cancer.

METHODS: As part of a secondary data analysis, descriptive analyses were conducted for sociodemographic variables and scores from the Hospital Anxiety and Depression Scale (HADS) and the Multidimensional Scale of Perceived Social Support (MSPSS). Spearman correlation analyses were performed to examine the association between anxiety and depression symptoms and perceived social support.

RESULTS: The sample (N = 57) was predominantly female (N = 50; 87.7%). Mean HADS anxiety scores indicated mild anxiety (M = 8.53), while mean HADS depression scores suggested moderate depressive symptoms (M = 11.96). Participants reported high perceived social support on the MSPSS (M = 66.30). Spearman correlation analyses revealed a significant negative association between anxiety symptoms and overall perceived social support ($r = -.31, p = .019$), as well as family support ($r = -.33, p = .013$).

CONCLUSION: These findings suggest that higher perceived social support is associated with lower levels of anxiety among individuals with cancer. In particular, family support may play an important role in psychological adjustment. Strengthening social support systems may help inform interventions aimed at improving emotional well-being in this population.

Funding: This research was funded by the National Cancer Institute (U01CA2900613) and the National Institute on Minority Health and Health Disparities (U54MD007579). The funding agencies had no role in the study design, data collection and analysis, decision to publish, or preparation of this presentation. The content is solely the responsibility of the authors and does not necessarily represent the official views of the mentioned agencies. PHSU-MCC Partnership Grant number (U54CA163071).

IRB Approval: 2303136895R004.



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UNFAIR TREATMENT, CARDIOVASCULAR AND PSYCHOSOCIAL CONDITIONS AMONG PUERTO RICANS IN BOSTON AND PUERTO RICO

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INTRODUCTION: There is limited data on cardiovascular disease (CVD) risk factors among groups with limited background representation. Examining social drivers, such as perceived unfair treatment, within specific populations can inform prevention, diagnosis, and intervention strategies. This study compares cardiovascular conditions, perceived major unfair treatment (PMUT), and stress related to PMUT among Puerto Rican adults living in Puerto Rico (PR) and in Boston, MA.

METHODS: Data were collected from 1,088 adults in PR and 955 in Boston, ages 45–75. We assessed sex differences within and between cohorts using t-tests and chi-squared tests. Binary and ordinal logistic regression models were used to examine associations between perceived unfair treatment and health outcomes, including CVD, diabetes, hypertension, and overweight/obesity.

RESULTS: Puerto Ricans in PR reported significantly more PMUT than those in Boston. In PR, PMUT was associated with higher odds of heart disease, while no such association was found among Puerto Ricans in Boston. High stress related to PMUT was linked to increased odds of both heart disease and diabetes in PR. Among Puerto Ricans in Boston, high stress due to PMUT was associated with greater odds of diabetes only.

CONCLUSION: Perceived unfair treatment and the stress it induces are linked to increased cardiometabolic risk, with different patterns observed by location. These findings underscore the need for tailored public health interventions that address psychosocial stressors specific to each context to improve health outcomes among Puerto Ricans.

Funding: Supported by grant number R01-HL143792 of the National Heart, Lung, and Blood Institute, and by the National Institute on Aging grant number P01-AG023394.

IRB Approval: This study was approved by the Institutional Review Board at Tufts Medical Center and Northeastern University (Boston cohort) and by the Institutional Review Board of the Harvard T.H. Chan School of Public Health (Puerto Rico cohort).

PRELIMINARY EFFECTS OF FACT INTERVENTION FOR CANCER SURVIVORS ON PSYCHOLOGICAL DISTRESS AND HEALTH BEHAVIORS

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INTRODUCTION: Cancer survivors experience psychological distress that can undermine health behaviors important for reducing recurrence risk. Focused Acceptance and Commitment Therapy (FACT), a brief form of ACT that promotes acceptance of difficult thoughts and feelings and value-based action, may help improve distress and health behaviors. We used data from the Cancer Survivors–FACT (CS-FACT) pilot trial to evaluate post-intervention changes in psychological distress and health behaviors.

METHODS: This single-arm pilot trial recruited cancer survivors who had completed treatment 3mo to 3yrs prior (n=27; mean age=53.4) from hospital-based clinics in San Juan. The three-session intervention (delivered individually) focused on clarifying values, identifying workable actions, and reducing entanglement with difficult internal experiences. Participants completed baseline, post-intervention, and 1mo follow-up assessments that included perceived stress (PSS-10), post-traumatic stress symptoms (PTSD Checklist), psychological distress (NCCN Distress Thermometer), and frequency of alcohol consumption and physical activity. Changes across time points were evaluated using Wilcoxon signed-rank (continuous outcomes) and McNemar tests (dichotomous outcomes).

RESULTS: Compared with baseline, median psychological distress scores decreased significantly at post-intervention and follow-up for: perceived stress (baseline=16; post-intervention=12.5; 1-mo follow-up=9.5), PTSD symptoms (baseline=4; post-intervention=1; 1-mo follow-up=2), and the Distress Thermometer (baseline=6; post-intervention=5; 1-mo follow-up=4.5) ($p<0.05$ for all). The proportion engaging in physical activity ≥ 2 times/week increased at follow-up (baseline=30.8%; follow-up=57.7%; $p=0.035$) and marginally post-intervention (50.0%; $p=0.059$). The proportion reporting ≥ 1 alcoholic drink/week decreased marginally at follow-up (baseline=34.6%; follow-up=23.1%; $p=0.083$).

CONCLUSIONS: Preliminary findings suggest CS-FACT may reduce psychological stress among cancer survivors and support health behaviors, including physical activity and reduced alcohol consumption.

IRB: This study was approved by the IRB of the University of Puerto Rico. Protocol #: 2403200540.

Acknowledgements: NIH PR-CEAL.



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FEASIBILITY AND ACCEPTABILITY OF A FOCUSED ACCEPTANCE AND COMMITMENT THERAPY INTERVENTION FOR CANCER SURVIVORS

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INTRODUCTION: Cancer survivors (CS) experience persistent psychological distress, highlighting the need for accessible interventions. In Puerto Rico (PR), CS may face additional social and structural stressors, yet interventions remain limited. Focused Acceptance and Commitment Therapy (FACT) promotes psychological flexibility through acceptance and values-based actions and may be promising for CS. We evaluated the feasibility and acceptability of FACT for CS (CS-FACT) in PR.

METHODS: Participants (n=26; mean age=53.4y) were CS who had completed treatment 3months-3y prior. Eligibility: CS ≥21y reporting mild distress (NCNN Distress Thermometer ≥4) or PTSD symptoms (Civilian Abbreviated Scale ≥4). Recruitment occurred mainly through a hospital-based clinic in San Juan. CS-FACT included three sessions: (1) identifying values and stressors (contextual interview, ACT Matrix); (2) reviewing goals and clarifying values (True North exercise); and (3) reinforcing values-based action through goal follow-up and gratitude exercises. Sessions emphasized SMART goals. Feasibility was assessed via recruitment, enrollment, and retention rates; acceptability via satisfaction with the program, session number, delivery mode, and willingness to recommend it.

RESULTS: Recruitment, enrollment, and retention rates were 55%, 94%, and 76%, respectively. Among respondents, 96% were very satisfied with the intervention. Most were very (56%) or somewhat (31%) satisfied with the number of sessions, though two preferred additional sessions. Most were very (77%) or somewhat (11.5%) satisfied with the virtual format. Overall, 96% would highly recommend the program.

CONCLUSION: CS-FACT showed strong feasibility and acceptability, with favorable recruitment, enrollment, retention, and participant satisfaction. Future work should explore optimizing session number, enhancing engagement, and assessing long-term outcomes and effectiveness.

IRB: This study was approved by the IRB of the University of Puerto Rico. Protocol #: 2403200540.

Acknowledgements: NIH PR-CEAL.

DENTAL AESTHETICS AND SURGICAL TIMING AS DETERMINANTS OF PSYCHOSOCIAL OUTCOMES IN PATIENTS WITH CLEFT LIP AND/OR PALATE

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INTRODUCTION: Cleft lip and/or palate (CL/P) is a common congenital craniofacial condition requiring surgical and orthodontic management across development. While reconstructive success is traditionally measured through functional and aesthetic outcomes, less consensus exists regarding how treatment timing and perceived dental aesthetics influence adolescent self-esteem and psychosocial adaptation. This review synthesizes current evidence examining aesthetic satisfaction and surgical intervention as developmental modifiers of psychosocial well-being.

METHODS: A structured literature review was conducted using PubMed, Scopus, and EMBASE. Search terms combined cleft-related conditions with psychosocial constructs, and surgical or aesthetic treatment variables. English-language human studies evaluating validated psychosocial outcomes were included. Five high-quality studies (four primary investigations and one systematic review/meta-analysis) met eligibility criteria following full-text review.

RESULTS: Evidence suggests overall psychosocial resilience among adolescents with CL/P; however, outcomes vary by surgical timing and aesthetic perception. Early surgical repair (before age 5) was associated with improved speech, academic integration, and social functioning. In contrast, interventions during late childhood (ages 8–10) were linked to increased anxiety and depressive symptoms. Improvements in perceived oral aesthetics following orthodontic and surgical treatment correlated with enhanced quality of life and emotional welfare, although peer-related vulnerabilities persisted in specific subgroups.

CONCLUSION: Psychosocial adaptation in CL/P is multifactorial and extends beyond facial appearance alone. Surgical timing and aesthetic satisfaction significantly shape developmental trajectories. These findings support multidisciplinary care models that integrate surgical, orthodontic, and structured psychosocial support to optimize long-term adolescent well-being.

IRB Approval: Exempt (literature review; no human subjects involved).

PREVALENCE OF EATING DISORDERS AMONG MEDICAL STUDENTS IN PUERTO RICO

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INTRODUCTION: Eating disorders (ED) are characterized by persistent, atypical eating behaviors driven by excessive concern with body weight and shape. Although no national prevalence data exist for Puerto Rico, the lifetime prevalence of EDs in the United States is estimated at 8.60% among females and 4.07% among males. Evidence suggests that medical students may be at increased risk compared to the general population, with a meta-analysis reporting a prevalence of 17.35%. However, ED prevalence in Puerto Rican medical students has not been studied. This study aimed to determine prevalence of ED symptoms in this population.

METHODS: A cross-sectional survey was administered to medical students from four medical schools in Puerto Rico. Participants completed the Eating Disorder Examination Questionnaire 6.0 (EDE-Q 6.0). Global scores were calculated as the mean of the four subscales (Restraint, Eating Concern, Shape Concern, and Weight Concern). A cutoff score of ≥ 2.8 indicated clinically significant ED symptoms. Behavioral items assessing binge eating, self-induced vomiting, laxative misuse, and excessive exercise were considered present if participants reported ≥ 1 episode in the past 28 days.

RESULTS: A total of 152 students completed the survey. Global scores ranged from 0 to 5.35, and 17.8% of participants scored above clinical cutoff. Binge eating was the most common behavior reported (61.8%), followed by compulsive exercise (25.0%), self-induced vomiting (6.6%), and laxative use (7.2%).

CONCLUSION: The prevalence of clinically significant ED symptoms among medical students in Puerto Rico was comparable to international estimates, highlighting the importance of accessible mental health support within medical education.

IRB Approval: Approved by the San Juan Bautista School of Medicine IRB (EMSJBIRB-12-2023).



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YOUR DIET DOMINATES THE UNKNOWN WORLD OF THE GUT AND PREDICTS INFLAMMATION AND IMMUNOLOGIC HEALTH

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INTRODUCTION: Diet is a major determinant of gut microbiome composition and function, linking nutrition with immune regulation and chronic disease risk. The global rise in cardiometabolic, inflammatory, and neurodegenerative diseases parallels the shift toward industrialized, low-fiber diets associated with reduced microbial diversity and increased inflammation. This integrative review examines how dietary patterns influence microbiome diversity, inflammatory balance, and disease risk across modern, ancestral, and migration contexts.

METHODS: A qualitative systematic review was conducted following PRISMA guidelines. Literature from PubMed, ScienceDirect, and Google Scholar (2010–2024) was analyzed, focusing on human studies connecting dietary patterns, gut microbiome diversity, inflammation, and chronic disease outcomes. Included studies evaluated ancestral populations, dietary interventions, and immigrant cohorts using validated sequencing methods. Findings were synthesized thematically; meta-analysis was not performed due to heterogeneity.

RESULTS: Dietary patterns consistently shaped microbiome structure and function. Plant-forward, high-fiber, and polyphenol-rich diets—including Mediterranean, MIND, NiMe, and traditional African diets—were associated with greater microbial richness and enrichment of SCFA-producing taxa such as *Faecalibacterium prausnitzii*, *Roseburia*, *Akkermansia muciniphila*, *Prevotella*, *Bifidobacterium*, and *Lactobacillus*. Ancestral populations showed high microbial diversity, whereas Western diets were linked to depletion and pro-inflammatory signatures. Migration studies demonstrated rapid microbiome loss following dietary acculturation. Beneficial diets correlated with lower inflammatory markers (CRP, TNF- α , IL-6, IL-17) and improved metabolic profiles.

CONCLUSION: Diet is a modifiable driver of microbial resilience and inflammation. Traditional, plant-forward dietary patterns support microbiome health and may reduce chronic disease risk, highlighting their value in precision nutrition and health professions education.



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MULTILEVEL BARRIERS INFLUENCING PUBLIC HIGH SCHOOL STUDENTS' DECISIONS TO PURSUE STEM CAREERS IN PUERTO RICO

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INTRODUCTION: A decline in student interest in science and biomedical research poses risks to the future research and clinical workforce. This study aimed to explore barriers influencing students' decisions to pursue careers in STEM.

METHODS: Students in grades 9–12 from six public high schools participated in focus groups. A semi-structured interview explored: (1) knowledge and perception, (2) interest in pursuing, and (3) perceived barriers to studying STEM careers. Thematic analysis was guided by the Bronfenbrenner's Bioecological Model and Dedoose software was used.

RESULTS: Six focus groups were conducted (n=30; mean= 5 participants per group). Most participants identified as female (70%), were 15 years old (50%), and in 10th grade (46%). Barriers to pursuing STEM careers were identified across four ecological levels. Personal-level barriers included low self-efficacy, limited knowledge of STEM careers, and perceptions that STEM careers are lengthy and academically demanding. At the microsystem level, students reported limited support from teachers and school counselors, and low teacher motivation to deliver effective mathematics and science instruction. At the ecosystem level, factors included financial constraints to afford STEM education and limited access to high-quality educational opportunities. At the macrosystem level, participants expressed concerns about future job opportunities as a barrier to pursuing STEM careers.

CONCLUSION: Understanding these multilevel influences can inform the design of programs that provide academic support, address self-efficacy and career knowledge, and reduce financial and educational access barriers—ultimately supporting the development of a skilled workforce capable of meeting the growing demands of research and healthcare.

Funding: This work was supported by the NIH grant R25MD007607 and the Community Outreach and Engagement Office, University of Puerto Rico Comprehensive Cancer Center.

IRB Approval: Ethical approval for the study was secured from the Comprehensive Cancer Center IRB (#20503011465).

SOCIAL SUPPORT NEEDS OF ADULTS FROM PUERTO RICO WHO HAD DEATH/SELF-HARM THOUGHTS DURING THE SARS-COV-2 PANDEMIC

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INTRODUCTION: The SARS-CoV-2 pandemic imposed overwhelming socio-economic and emotional demands, affecting people's ability to cope with daily activities and hassles. Social support (SS) helps people to cope with these demands and prevent mental health deterioration. Adults with death/self-harm thoughts (AWDSHT) may need more SS to manage pandemic burdens. We examined the SS needs of AWDSHT (G1=321) during the pandemic compared to control peers (G2=1410).

METHODS: Participants (aged 21–79) had to be Puerto Rico residents for ≥ 3 months, have internet access, and understand Spanish. They completed an online survey (IRB-approved), including 16 Yes-No questions about areas of SS need, a self-rating (0–10) of the global intensity (GIN) of the SS needed, and an item to assess DSHT. Using analysis of covariance, we compared groups in their mean number of areas in need of support (NOANS) and GIN scores. We estimated crude and adjusted odds ratios (AORs) for endorsing different areas of SS need when having DSHT.

RESULTS: G1 showed significantly higher NOANS [$F(1, 1701) = 56.07, p < .001$] and GIN scores [$F(1, 1663) = 60.44, p < .001$] than G2. G1's odds for endorsing specific need areas ranged from 1.48 (coronavirus-management guidance) to 3.53 (psychological/emotional support) among 11 statistically significant results. Nine AORs were significant, ranging from 1.54 (economic aid) to 3.02 (psychological/emotional).

CONCLUSION: AWDSHT have broader and more intense SS needs than their peers. Increasing the diversity, quality, and accessibility of SS sources is indicated to promote hope and improve coping in this population, particularly during public health emergencies.

Funding: The research project from which the data reported in this study were obtained was financed with the personal funds of the second author. The first author was hired as a research assistant for this project 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.

IRB Approval: 1920-194 (UPR-Río Piedras).



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IMPACT OF NEONATAL DIAGNOSES ON MATERNAL ANXIETY AND DEPRESSION LEVELS

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INTRODUCTION: Research shows that mothers of neonates hospitalized in the Neonatal Intensive Care Unit (NICU) frequently experience critical significant levels of depression and anxiety during their neonate's hospitalization period associated with the neonate's medical vulnerability. However, it is less known how the severity of the neonatal medical diagnoses shapes maternal psychological outcome, making it important to understand the differences of depression and anxiety among NICU mothers based on neonate diagnoses complexity.

METHOD: The mothers answered a semi-structured interview that included sociodemographic questions, as well as the PHQ-9 for depressive symptoms and the STAI for anxiety symptoms.

RESULTS: Therefore, the study compares the levels of depression and anxiety among mothers of neonates with severe diagnoses to mothers of neonates with mild diagnoses in the NICU. The sample consists of 345 mothers with a mean age of 27 years old from the NICU at the University Pediatric Hospital in Puerto Rico. The education level among the mothers was primarily a high school diploma (20%) and a bachelor's degree (13.9%), the majority of the mothers were married (59.7%) and most of the mother received government help (57%). The most common neonatal diagnoses were respiratory (47.3%), followed by cardiac (30.6%), circulatory (23.4%), digestive (22.3%), and neurological conditions (18.5%). Our results showed that mothers' depressive and anxiety symptoms did not vary significantly across diagnosis severity among our sample.

CONCLUSION: The results showed high levels of reported social support that can minimize the levels of anxiety and depression in mothers with neonates in the NICU. This can explain why levels across our sample do not vary significantly despite the diagnosis of the neonate.



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MATERNAL-INFANT BONDING DIFFICULTIES AND PSYCHOLOGICAL DISTRESS IN THE NEONATAL INTENSIVE CARE UNIT

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INTRODUCTION: Mothers of infants hospitalized in the Neonatal Intensive Care Unit (NICU) frequently experience psychological distress related to separation and disruption of the maternal role, which may interfere with early maternal-infant bonding. This study examined the association between difficulties in establishing maternal-infant bonding and symptoms of anxiety and depression among mothers of hospitalized infants.

METHODS: A cross-sectional study was conducted among 347 mothers of infants admitted to the University of Puerto Rico – Medical Sciences Campus NICU. Participants ranged in age from 15 to 47 years. Bonding difficulties were assessed using maternal role-related items from the Parental Stressor Scale: NICU. Anxiety and depressive symptoms were measured using the State-Trait Anxiety Inventory short form (STAI-6) and the Patient Health Questionnaire (PHQ-9). Pearson correlations and linear regression analyses were performed using IBM SPSS Statistics version 31.

RESULTS: Bonding difficulties were positively correlated with depressive symptoms ($r = .243$, $p < .001$) but were not significantly associated with anxiety ($r = .084$, $p = .117$). Linear regression indicated that bonding difficulties significantly predicted depressive symptoms ($F(1,345) = 21.56$, $p < .001$), accounting for 5.9% of the variance ($R^2 = .059$). Higher bonding difficulty scores were associated with higher depression scores ($\beta = .243$, $p < .001$).

CONCLUSION: Difficulties in establishing maternal-infant bonding during NICU hospitalization are significantly associated with maternal depressive symptoms, underscoring the importance of targeted interventions to support maternal mental health and promote early relational development.

IRB Approval: 2290034206R004.



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A DESCRIPTIVE STUDY ON PRENATAL GENETIC CARRIER SCREENING IN THE PUERTO RICAN PREGNANT POPULATION

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INTRODUCTION: Genetic carrier screening is a tool used to identify the presence of affected alleles in individuals who do not possess the phenotypic presentation of certain genetic conditions. Thus, by determining carrier status, the probability of passing a genetic condition to the individual's offspring can be identified. This study aims to communicate the carrier status prevalence of 14 genetic conditions.

METHODS: Using the Natera, Horizon carrier screen, the incidence of 14 autosomal recessive and X-linked recessive conditions in patients from the University District Hospital high-risk prenatal clinics from November 2021 to January 2022 was determined.

RESULTS: In this study, a total of 368 patients were evaluated, of which 122 (33.2%) had positive carrier results for any of the 14 genetic conditions tested. Alpha thalassemia yielded the most positive cases, with a total of 53 (14.4%), and was followed by spinal muscular atrophy with 28 (7.6%), cystic fibrosis with 16 (4.3%), and fragile X permutation with 11 (2.9%). Sickle cell disease resulted in 10 (2.7%) cases, while medium-chain acyl-CoA dehydrogenase deficiency had 9 (2.4%), Gaucher's disease had 3 (0.82%), and both galactosemia and Smith-Lemli-Opitz syndrome had 2 (0.54%). Tay-Sachs disease, beta thalassemia, hemoglobin C disease, Canavan's disease, and autosomal recessive polycystic kidney disease each had 1 (0.27%) positive case.

CONCLUSION: Identifying the incidence of these alleles in the study population gives insight into their prevalence in the Puerto Rican pregnant population, which may aid in earlier identification and genetic counseling.

IRB Approval: This study (Protocol #2210030022) was approved by the IRB of the University of Puerto Rico, Medical Sciences Campus.

STRUCTURAL DRIVERS OF CARE IN PEDIATRIC OSTEOSARCOMA IN PUERTO RICO

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INTRODUCTION: Pediatric osteosarcoma (OS) outcomes depend on access to specialized oncologic and orthopedic services. In Puerto Rico, care is centralized and complex surgical management frequently requires referral to mainland United States institutions. No prior registry-based study has characterized clinical patterns and treatment pathways in this population.

METHODS: We conducted a retrospective cohort study of 44 patients under 21 years diagnosed with OS using data from the Puerto Rico Central Cancer Registry and the University Pediatric Hospital (HOPU). Variables included geographic region, insurance type, tumor site, metastasis at diagnosis, surgical management, treatment location, Li-Fraumeni syndrome, recurrence, and survival.

RESULTS: Long bones accounted for 84% of tumors, with lower extremity involvement in 80%, primarily distal femur and proximal/distal tibia. Upper extremity tumors comprised 13.6%, and craniofacial involvement 6.8%; no vertebral primaries were identified. Although 61% had private insurance, 54% underwent surgery in the mainland United States. Among off-island referrals, 31% were treated at St. Jude Children's Research Hospital and 23% at other high-volume centers. The overall amputation rate was 80%. Metastatic disease at diagnosis occurred in 26%, predominantly pulmonary (64%). Li-Fraumeni syndrome was identified in 11%. Mortality reached 20%, with recurrence in 23%.

CONCLUSION: This first registry-based analysis of pediatric OS in Puerto Rico demonstrates substantial structural limitations in surgical capacity and care continuity despite high insurance coverage. These findings establish an evidence base to inform system-level interventions aimed at strengthening local infrastructure and improving equitable pediatric oncology outcomes.

IRB/IACUC Approval: 2401175811.



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COMMUNITY-GROUNDED IMPLEMENTATION STRATEGIES FOR A DYADIC PSYCHOSOCIAL CANCER INTERVENTION IN PUERTO RICO

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INTRODUCTION: Puerto Rican caregivers and patients coping with advanced cancer frequently face emotional and spiritual distress and barriers to psychosocial services. Implementing the Caregiver-Patients Support to Cope with Advanced Cancer (CASA) intervention, adapted for Puerto Ricans to promote spiritual well-being and communication among patients and caregivers, requires context-specific strategies that address multilevel barriers in Puerto Rico (PR). This study aims to identify and prioritize implementation strategies for CASA by integrating the Consolidated Framework for Implementation Research (CFIR), the Expert Recommendations for Implementing Change (ERIC) taxonomy, and the Delphi method.

METHODS: Guided by the CFIR, we identified barriers and facilitators from previous CASA qualitative study and pre-pilot work. The CFIR-ERIC Tool mapped CFIR-identified barriers to implementation strategies. A Community Advisory Board (n=12) evaluated the relevance and feasibility of ERIC strategies for PR through a modified Delphi panel. Strategy prioritization was determined through frequency analyses in SPSS v29.

RESULTS: Facilitators included CASA's cultural alignment, adaptability, and telehealth delivery. Barriers involved limited referral networks, inconsistent dissemination pathways, and overreliance on a single institutional champion. Strongly endorsed ERIC included champion development, coalition-building, and creating a learning collaborative. The Delphi panel prioritized champion development (75%), consensus discussions (50%), involving executive boards (50%), capturing and sharing local knowledge (42%), and leadership recruitment, designation, and training (33%).

CONCLUSION: This study presents a systematic, community-grounded approach to developing an actionable implementation plan for the CASA randomized-controlled trial (RCT) in PR's psychosocial-oncology context. These strategies may guide the implementation of psychosocial interventions or RCTs in other underserved communities.

Funding: This research was funded by the National Cancer Institute (grant number 05-K08CA279242-02, U54CA163071, and U01CA290613), the National Institute on Minority Health and Health Disparities (grant number U54MD007579), and the National Institute of Mental Health (grant number R01MH137857).

IRB/IACUC Approval: Approved by the IRB, Protocol #2403190180 [Ponce Research Institute].

IMPROVING RECOGNITION OF INFLAMMATORY BREAST CANCER IN PUERTO RICAN WOMEN THROUGH A CULTURALLY ADAPTED TOOL

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INTRODUCTION: Inflammatory breast cancer (IBC) is a rare but aggressive breast malignancy associated with poor survival outcomes. Women in Puerto Rico experience disproportionate disease burden, reduced access to therapy, and diagnostic delays. These delays are related to symptom overlap with benign inflammatory breast conditions and the lack of standardized tools to identify IBC manifestations. This study aims to develop and validate a Spanish-language questionnaire to characterize patient experiences, clinical pathways, and barriers to care among Puerto Rican women with IBC.

METHODS: This study follows a multi-phase, cross-sectional design. Phase I involves translation and adaptation of an English-language IBC questionnaire for Puerto Rico. Validation includes evaluation of clarity, cultural relevance, and usability by healthcare professionals (n=5), women without a cancer diagnosis (n=5), and women diagnosed with non-IBC breast cancer (n=5). In Phase II, women (n=368) aged 21–99 with a history of IBC will be recruited to complete the questionnaire. Demographic variables will be analyzed to identify barriers to diagnosis and care.

RESULTS: The adapted instrument was evaluated by physicians from emergency medicine, primary care, gynecology, gynecologic oncology, and surgery. Revisions clarified terminology distinguishing IBC from infectious mastitis and expanded questions regarding symptom onset, diagnostic pathways, and genetic testing. Data collection from women without breast cancer is underway to assess comprehension and usability.

CONCLUSION: Phase I demonstrates the feasibility of translating and adapting an IBC questionnaire for use in Puerto Rico. This tool may improve understanding of IBC presentation and contribute to identifying factors associated with diagnostic delays and treatment disparities.

IRB/IACUC Approval: 2024-26 Universidad Central del Caribe.

Acknowledgments: We thank the Universidad Central del Caribe, participating professionals and women for the Phase I, the Inflammatory Breast Cancer Research Foundation, and Naydi Pérez Ríos of the Alliance for their support and collaboration.



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BREAKING THE SILENCE OF VIOLENCE WITH DATA: THE PUERTO RICO HEALTH JUSTICE CENTER DATABASE STUDY

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INTRODUCTION: Sexual violence is an adverse childhood experience and a major public health concern due to its health and safety consequences. In Puerto Rico, the visibility of sexual violence has been limited by fragmented data systems, restricting the ability to understand prevalence, service gaps, and expected outcomes. The Puerto Rico Health Justice Center (PRHJC) has provided interdisciplinary services since 2015, integrating clinical, forensic, advocacy, legal, and social service information. This project analyzes over 1,000 cases of sexual victimization documented through standardized REDCap templates.

METHODS: A retrospective chart review was conducted using PRHJC's de identified database, including demographics, event characteristics, and service pathways. Data extracted from structured forms capturing variables such as referral source, age group, residence region, type of victimization, and court outcomes. Frequencies and percentages for categorical variables and central tendency for continuous variables.

RESULTS: The mean age of survivors was 13.72 years (SD: 10.10). The three municipalities with the highest prevalence of residence were Caguas, San Juan, and Bayamón. Females accounted for 87% of the cases. The most common form of violence was child sexual abuse (84%), with male offenders in 91% of cases. The most frequently identified perpetrators were stepfathers (22%) and biological fathers (15%). The primary agencies involved included the police department (33%) and family services (25%).

CONCLUSION: The PRHJC Database constitutes a survivor centered dataset on sexual violence in Puerto Rico. Findings underscore the need for coordinated, data driven prevention strategies and highlight the importance of a data warehouse to promote a responsive policy development and resource allocation.

IRB Approval: Approved by the Institutional Review Board, San Juan Bautista School of Medicine, Protocol #EMSJBIRB-9-2026.

Funding: Puerto Rico Office of Women's Advocate; Puerto Rico Department of Justice; Puerto Rico Legislature; Puerto Rico Science, Technology and Research Trust; Intellectus Foundation.

Acknowledgements: Victim/Survivors of sexual violence and Puerto Rico Health Justice staff of health professionals.

PROFILE OF VAGINITIS IN GIRLS RECEIVING TREATMENT FOR CHILD SEXUAL ABUSE AT THE PUERTO RICO HEALTH JUSTICE CENTER

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INTRODUCTION: Most prepubertal gynecological visits are due to vaginal discharge (60%). Vulvovaginitis has been reported up to 30% in sexually abused girls. Understanding that a common occurrence is not equal to normal but rather an alert to other health concerns is important for the evaluation and treatment of these children. While vaginitis is a routine concern during pediatric appointments, physicians must include abuse in their differential diagnoses during evaluation. This study aims to describe the prevalence of vaginitis in girls being evaluated for child sexual abuse (CSA) during a forensic medical exam.

METHODS: We performed a cross-sectional chart review of 297 girls who received services for CSA at the Puerto Rico Health Justice Center between 2017 and 2023.

RESULTS: The average age of participants was 10.10 years (sd 4.42). Demographically, most patients lived in San Juan (16.16%), resided at home (88.22%), and used a public health insurance plan (78.45%). We identified 33.67% of patients presented with infectious vaginitis and 25.59% had an STI. The most common causes of infectious vaginitis were *E. coli* alone (39.0%), yeast (12.0%), and *S. agalactiae* alone (7.0%). The majority of STI infections were caused by herpes simplex virus (90.79%).

CONCLUSION: Although vaginitis often shares pathogens with cases caused by irritants or contamination, CSA must always be considered when treating pediatric patients with repeated and resistant vulvovaginitis, as it may be linked to fondling.

IRB Approval: EMSJB-16-2022, San Juan Bautista School of Medicine.



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DELAYED DIAGNOSIS OF GONOCOCCAL VULVOVAGINITIS IN A SYMPTOMATIC TWO-YEAR-OLD: IMPORTANCE OF STI TESTING AND MEDICAL-LEGAL IMPLICATIONS

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INTRODUCTION: Genital complaints such as pruritus, dysuria, and vaginal discharge are common in prepubertal girls and are frequently attributed to nonspecific vulvovaginitis. Although most cases are benign, persistent symptoms warrant further evaluation, as sexually transmitted infections (STIs) may rarely occur in this population. Identification of *Neisseria gonorrhoeae* in children beyond the neonatal period raises significant concern for possible child sexual abuse (CSA) and requires prompt multidisciplinary evaluation.

METHODS: We describe a clinical case of a two-year-old girl presenting with persistent vulvovaginal symptoms who required multiple healthcare encounters before the diagnosis of gonococcal infection was established.

RESULTS: Over approximately two weeks, the patient underwent four separate medical evaluations for urinary discomfort, genital pruritus, and vaginal discharge. Initial management attributed symptoms to presumed nonspecific vulvovaginitis, and topical treatment was initiated without STI testing. During a subsequent emergency department visit, STI testing was obtained; however, the results were not promptly reviewed. Continued symptoms prompted further medical evaluations before previously obtained results were identified as positive for *Neisseria gonorrhoeae*. Following diagnosis, appropriate antimicrobial therapy and a forensic medical protocol were initiated.

CONCLUSION: This case highlights how diagnostic anchoring on presumed benign vulvovaginitis and delays in laboratory result follow-up may contribute to delayed STI diagnosis in young children. When infections associated with CSA are identified, coordinated medical, forensic, and legal responses may be required. Increased awareness of persistent genital symptoms and reliable systems for reviewing pending diagnostic tests are essential to ensure timely treatment and appropriate medical-legal evaluation.

IRB Approval: Approved by the Institutional Review Board of San Juan Bautista School of Medicine (Protocol No. EMSJBIRB-5-2025).

CLINICAL AND LABORATORY PREDICTORS OF PRESSURE ULCER OUTCOMES IN PUERTO RICO

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INTRODUCTION: Pressure ulcers remain a significant source of morbidity among hospitalized patients, particularly in older populations with multiple comorbidities. Understanding the demographic, clinical, and laboratory characteristics associated with pressure ulcer severity may help improve risk stratification and patient management. This study aimed to characterize the clinical profile and outcomes of hospitalized patients with pressure ulcers and evaluate factors associated with ulcer stage.

METHODS: We conducted a retrospective analysis of 635 hospitalized patients with pressure ulcers. Demographics, comorbidities, laboratory values, ulcer characteristics, treatments, and outcomes were analyzed. Continuous variables were summarized using means and standard deviations, and categorical variables using frequencies and percentages.

RESULTS: The mean age was 75.98 years, and 57.9% of patients were male. The most common comorbidities were hypertension (78.1%) and diabetes (56.9%). Stage 2 ulcers were most frequent (32.3%), and the sacrum/coccyx was the most common location (84.6%). Mean hospital length of stay was 19.43 days and was significantly associated with ulcer stage ($p=0.017$). Sex distribution ($p=0.029$) and Alzheimer's disease ($p=0.008$) also differed significantly by ulcer stage. Urinary tract infection (34.7%) and sepsis (26.8%) were common associated infections. Overall mortality was 33.2%, and 13.7% of patients had a 30-day readmission.

CONCLUSION: Pressure ulcers in hospitalized patients were associated with advanced age, multiple comorbidities, and high mortality. Ulcer stage was significantly associated with length of stay, sex distribution, and Alzheimer's disease. Early identification and multidisciplinary management may improve outcomes.

IRB Approval: Protocol #: 2508277154.



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DELAYS IN PHYSICAL MEDICINE AND REHABILITATION CONSULTATION FOR HOSPITALIZED PATIENTS

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INTRODUCTION: Early involvement of Physical Medicine and Rehabilitation (PM&R) services helps prevent functional decline, address physical deconditioning, and improve discharge planning among hospitalized patients. However, variability in resident physician understanding of PM&R's role and consultation practices may lead to delayed referrals and missed opportunities for early rehabilitation intervention. This study evaluated resident knowledge, practice patterns, and perceptions regarding PM&R involvement and management of physical deconditioning in hospitalized patients.

METHODS: A cross-sectional anonymous survey was distributed to resident physicians across academic teaching hospital residency programs. A total of 106 residents from postgraduate years PGY-1 through PGY-6 participated. The survey assessed knowledge of PM&R's hospital role, ambulation assessment practices, consultation timing and frequency, confidence in identifying physical deconditioning, and perceived adequacy of PM&R-related training during residency.

RESULTS: Among respondents, 46.2% identified PM&R's primary role as providing direct therapy services, while 43.4% recognized evaluation of rehabilitation potential and coordination of care. Ambulation was most commonly assessed on admission (50%) or daily (28.3%). Consultation frequency varied, with 34.9% reporting none during the year and 38.7% reporting five or more consultations. Most residents (69.8%) had consulted PM&R for physical deconditioning, and 77.4% recognized that deconditioning may begin within three to five days of hospitalization. Although 93.4% supported early consultation, 51.9% reported inadequate PM&R training.

CONCLUSION: Residents recognize the importance of early PM&R involvement; however, misconceptions and educational gaps persist. Strengthening residency education and interdisciplinary collaboration may promote earlier consultation, improve recognition of physical deconditioning, and support more timely rehabilitation interventions for hospitalized patients.

Funding: No grants nor other financial support have been accepted for the work. No acknowledgements are necessary.

IRB/IACUC Approval: Approved by the IRB Protocol #2508277347, Centro Médico Episcopal San Lucas.



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COMMUNICATION BARRIERS OF FUNCTIONAL IMPAIRMENTS: A CASE SERIES FROM AN OUTPATIENT CHIROPRACTIC CLINIC

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INTRODUCTION: Communication barriers can lead to inaccurate symptom reports, inhibited decision-making, and less efficient management in patients with intellectual disabilities. These patients report feeling less listened to and insufficiently involved during medical exams. This case series describes communication barriers in adults with functional impairments, and adaptive strategies used in an outpatient chiropractic clinic.

METHODS: Three adults with functional impairments are described, including Fragile X syndrome, Down Syndrome, and autism spectrum disorder. We evaluated the patients using Wong Baker faces Pain Rating Scale, Pain Assessment in Development Disabilities Scale (PADS), Aberrant Behavioral Checklist (ABC), Neck Disability Index (NDI), and Back Oswestry questionnaires. Communication during exams was adapted for each patient with caregiver input when patient-reported symptoms were ambiguous. Muscle stiffness, joint pain, and restricted range of motion were managed using diversified spinal manipulations, instrument-assisted manipulations, soft tissue mobilizations, and home exercises. Patients were seen once per week and re-evaluated every 4-6 weeks.

RESULTS: There were behavioral improvements; ABC score in Case 1 decreased from 16.1% to 1.71%. Stiffness and pain improved in all patients. NDI scores decreased in Case 3 from 30 to 14. Functional capacity improved in Case 2; Milgram's test time increased from 3 to 10 seconds. Caregivers reported relaxation and improved post-treatment behavior.

CONCLUSION: Caregiver and patient input are essential when managing patients with functional impairments. Modifying clinical procedures and establishing routines may improve patient understanding, comfort, and compliance. Patient-reported outcome measures may have limitations; observing subtle clinical signs and modified dialogue can be important for assessing outcomes.

IRB Approval: Protocol 2026-03 (Universidad Central del Caribe).



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ASSOCIATION BETWEEN STRESS AND TMD AMONG MEDICAL AND CHIROPRACTIC STUDENTS AT UNIVERSIDAD CENTRAL DEL CARIBE

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INTRODUCTION: Temporomandibular joint disorder (TMD) comprises conditions affecting the temporomandibular joint and masticatory muscles, often presenting with pain, joint sounds, and limited mandibular movement. Psychological stress has been suggested as a contributing factor, yet data on this association among student populations in U.S. territories, including Puerto Rico, remain limited. This study evaluated the presence of TMD and its correlation with stress among medical and chiropractic students at Universidad Central del Caribe (UCC). Understanding potential differences between these two groups can inform preventive strategies and student wellness initiatives.

METHODS: A cross-sectional, survey-based observational study recruited doctoral students from medicine and chiropractic programs at UCC. Participants completed an anonymous REDCap questionnaire assessing sociodemographic characteristics, TMD symptoms, and perceived stress. Categorical variables were analyzed using chi-square tests, and group means were compared using ANOVA, with significance set at $p < 0.05$.

RESULTS: A total of 69 responses were analyzed; 71.1% met criteria for TMD. The mean Perceived Stress Scale score was 16.9 (SD=8.3; range 0–31), indicating moderate-to-high stress. A moderate positive correlation was found between stress scores and the number of TMD symptoms ($r=0.51$). Comparisons between academic programs showed no statistically significant differences in stress levels ($p = 0.38$) or in the presence of TMD symptoms ($p = 1.00$).

CONCLUSION: TMD symptoms were highly prevalent among healthcare students at UCC and were associated with higher perceived stress, whereas program type showed no effect. Ongoing data collection will allow more comprehensive comparisons between medical and chiropractic students.

IRB Approval: Approved by IRB and/or IACUC, Protocol #2025-29, [Universidad Central del Caribe School of Medicine].

Acknowledgment: This study received no external funding.

Clinical trial: Does not apply. This is an IRB-approved observational cross-sectional survey and is not registered as a clinical trial.



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POCKETALKERS: ENHANCING CLINICAL COMMUNICATION WITH HEARING-IMPAIRED PATIENTS IN PUERTO RICO

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INTRODUCTION: Hearing impairment is prevalent public health that hinder communication in clinical settings, affecting quality and patient privacy. In Puerto Rico, approximately 7% of the population has hearing loss. Assistive listening devices such Pocketalkers offer affordable solution for communicating with hearing-impaired patients, yet physician awareness and us remain unclear. This study evaluated knowledge, awareness, and attitudes toward Pocketalkers among otolaryngologists in Puerto Rico and explored perceived barriers to their clinical adoption.

METHODS: A cross-sectional survey-based study conducted between December 2025 and March 2026. An anonymous questionnaire distributed to practicing otolaryngologists in Puerto Rico via professional messaging platform. The survey assessed demographics, familiarity, prior use, attitudes, and perceived barriers. Data were analyzed using descriptive statistics; inferential analyses included chi-square tests and ANOVA, with significance set at $p < 0.05$.

RESULTS: Ten otolaryngologists participated (mean age 59 years; 100% male). Eighty percent had heard of Pocketalkers and 70% understood the device; however, only 30% had used assistive listening device clinically, and 70% reported clinic. Despite this, 90% willing to implement a Pocketalker if provided, and 70% were open to brief training. Most supported institutional implementation protocols (60% strongly, 30% moderately). Common barriers included lack of availability, patient resistance, limited knowledge, time constraints, and hygiene concerns.

CONCLUSION: Awareness of Pocketalkers is relatively high among Puerto Rican otolaryngologists, but and remain limited. Willingness to adopt them suggests that improving availability and education may enhance communication with hearing-impaired patients and clinical care quality.

IRB Approval: 2507448833.

Acknowledgment: This study received no external funding.

Clinical trial: Does not apply. This is an IRB-approved observational cross-sectional survey and is not registered as a clinical trial.



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PARKINSON'S COMORBIDITIES AND HEALTHCARE UTILIZATION IN PUERTO RICO BASED ON ELECTRONIC HEALTH RECORD BILLING DATA

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INTRODUCTION: Parkinson (PD) is a neurodegenerative disease characterized by motor symptoms; comorbidities frequently coexist. Electronic health record billing data offers an efficient, cost-effective way to assess healthcare across larger populations.

OBJECTIVE: Describe the frequency of comorbidities and healthcare utilization for PD in Puerto Rico (PR) using electronic healthcare claims data from a cohort with ICD-code G20 for PD.

METHODS: Descriptive, retrospective study, using insurance claims databases for Medicare Advantage (MA) and Commercial Insurance (CI) representing 46% of insured population. Inclusion criteria: age 21 years at first claim; ICD-code G20 on 2 claims with at least one neurologist evaluation; one PD medication. Data includes electronic medical services and hospital discharge claims with ICD-10 code G20 for a 5-year period. Data collected in aggregated form for analysis. Demographics, comorbidities, services rendered (Ambulatory, Hospitalizations, ER visits) were summarized using frequencies and percentages.

RESULTS: 96% of PD patients used MA and were over 75 y/o; 58% of this cohort were male. CI enrollees were younger than MA beneficiaries. Ambulatory services rendered were greater for primary care physicians and neurologists for MA. Subspecialists and emergency department visits were common. Frequent comorbidities include cardiovascular (29.7%), endocrine (28.7%), musculoskeletal (16.7%), gastrointestinal (12.5%), hematologic (11.7%).

CONCLUSION: This is the first study using electronic billing data from an insured cohort to assess the most frequent PD comorbidities and healthcare services utilized in PR. These data are important to establish public policy and understand the needs of the PD population. Future analysis could explore PD healthcare costs in PR.

IRB Approval: Approved by the IRB # 2506415857, University of Puerto Rico Medical Sciences Campus.

Disclosure: Alliance (P50GM133807) The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health - AbbVie sponsored and contributed to the interpretation of data, in writing, reviewing, and approval of the final version. No honoraria or payment were made for authorship. Estela Monserrate is AbbVie employee and may hold stock or options. Carmen Serrano has conducted research funded by AbbVie; Gladys Flores, Angélica Arroyo Cruz, Naydi Pérez, Iris Martínez have nothing to disclose.

ALZHEIMER'S DISEASE AND RELATED DEMENTIA CARE IN PUERTO RICO: PERSPECTIVES FROM PRIMARY CARE PHYSICIANS

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INTRODUCTION: Puerto Rico (PR) faces compounding challenges in caring for individuals with Alzheimer's disease and related dementias (ADRD): an aging population, chronic health system strains, and repeated disaster exposure. Limited evidence exists on how these pressures affect care across clinic types.

METHODS: We conducted a qualitative study using thematic analysis, including semi-structured interviews with physicians and clinic leaders from 25 primary care clinics across PR (May–October 2025), six federally qualified health centers (FQHCs) and 19 non-FQHCs. Interviews were conducted in Spanish via videoconference, transcribed verbatim, and coded using AI-assisted qualitative methods organized around the WHO Health System Building Blocks framework.

RESULTS: Findings varied across the WHO building blocks. In service delivery, FQHCs offered more integrated, community-based models, including home-based care and social needs support, while non-FQHCs showed greater fragmentation. Workforce challenges, including post-María emigration and burnout, were pervasive; FQHCs had greater access to multidisciplinary teams supporting comprehensive management of patients with complex comorbidities. Information systems were more developed in FQHCs through federal reporting requirements; non-FQHCs reported limited infrastructure and greater technology failures post-disaster. Financing constraints, including insufficient reimbursement and competition with mainland salaries, drove staff migration, with greater vulnerability in non-FQHCs. Governance differed markedly: FQHCs benefited from federal quality standards, board accountability, and ASPPR affiliation, while non-FQHCs showed greater governance variability and limited long-term planning.

CONCLUSION: Organizational structure shapes ADRD care capacity across all the domains. Targeted investments in workforce retention, care integration, and disaster preparedness, particularly for non-FQHCs, are essential to equitable, resilient ADRD care in PR.

Funding: R01AG075508 from the National Institute on Aging.

IRB Approval: UPR-MS: #2690122/ #2311162366; RAND: #2021-N0674.



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PRICE VARIABILITY AND TRANSPARENCY FOR COMMON NEUROSURGICAL PROCEDURES IN TOP US HOSPITALS

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INTRODUCTION: Federal hospital price transparency regulations were enacted to help patients anticipate healthcare costs. Procedure-level cost information is often inconsistently reported for identical services.

METHODS: We conducted a cross-sectional analysis of public machine-readable files (MRFs) from a top-100 U.S. hospital cohort, extracting hospital-reported standard charges for ten high-volume neurosurgical CPT codes. Hospitals were excluded if an MRF was not publicly available, if CPT-linked line items were absent, or if a usable standard charge could not be identified. CPT codes were located using exact identifiers and confirmed using procedure descriptions; when a standard charge was unavailable, minimum and maximum values were recorded. This study used publicly available hospital pricing data; IRB approval was not required.

RESULTS: 83 hospitals met inclusion criteria. CPT-level price reporting was frequently incomplete. Standard-charge reporting ranged from 26.5% for cranial tumor excision with navigation to 50.6% for anterior cervical discectomy and fusion, while up to 65.1% of hospitals provided no usable CPT-level price for certain cranial procedures. Among hospitals reporting standard charges, median prices varied substantially by procedure and demonstrated right-skewed distributions. Interhospital dispersion was extreme across CPT codes, with max-to-min ratios ranging from 77.8-fold to 8,903.6-fold for identical procedures.

CONCLUSION: Among these U.S. hospitals, CPT-level price reporting remains inconsistent and vary for the same procedures. Standardized, procedure-level reporting frameworks may be necessary to enable meaningful cost comparison and support value-based neurosurgical care.

Funding: None.

A MIXED-METHODS STUDY OF THE BRIDGE ACCESS PROGRAM IMPLEMENTATION IN PUERTO RICO: SUCCESSES AND CHALLENGES WITH INSIGHTS FOR FUTURE IMMUNIZATION PROGRAMS

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INTRODUCTION: The Bridge Access Program was implemented in the United States, including Puerto Rico (PR), to improve access to SARS-CoV-2 immunizations for uninsured adults following the end of the federal public health emergency. This convergent, mixed-methods study aimed to (1) describe sociodemographic characteristics of individuals who participated in the program in PR, (2) compare these characteristics with those of the general uninsured population, (3) examine implementation successes and challenges in PR through qualitative interviews with community pharmacists and program facilitators.

METHODS: Quantitative data were analyzed to characterize participant demographics and assess patterns of program utilization in relation to social vulnerability and uninsured population distribution. Semi-structured interviews were conducted with community pharmacists and implementation facilitators in PR to explore experiences with the Bridge Access Program.

RESULTS: Quantitative findings indicated program utilization was positively associated with municipalities with larger uninsured populations; however, uptake was not higher in areas with greater social vulnerability, suggesting uneven access relative to need. Qualitative analysis identified four primary thematic domains: gaps in program understanding and communication, structural and workflow constraints, operational facilitators, and patient experience and perceived impact. Participants reported administrative complexity, technological barriers, and limited outreach as key challenges to program implementation, while strong pharmacist engagement and community trust were noted as facilitators.

CONCLUSION: Findings suggest that program reach in PR was influenced more by contextual and implementation factors than by technical design limitations. Future immunization initiatives should prioritize targeted outreach, streamlined administrative processes, and locally tailored implementation strategies to improve equitable access among uninsured populations.

FUNDING: No funding to declare.

IRB/IACUC Approval: Approved by the IRB Protocol #2411311548, [University of Puerto Rico Medical Sciences Campus]



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EPIDEMIOLOGIC PERSPECTIVE ON SERVICE UTILIZATION AND DISPARITIES IN NEURODEVELOPMENTAL DISORDERS IN PUERTO RICO

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INTRODUCTION: Neurodevelopmental disorders (NDDs) represent a significant public health concern characterized by lifelong developmental, behavioral, and cognitive impairments. In Puerto Rico, limited research exists on access to services for individuals with NDDs. This study evaluated healthcare service utilization among individuals with NDDs in Puerto Rico and examined the influence of social drivers of health, including socioeconomic status, education, and insurance coverage.

METHODS: A cross-sectional survey was conducted among caregivers of individuals with NDDs in Puerto Rico (n = 92). Data were collected using REDCap platform. Descriptive analyses summarized characteristics, diagnoses, and service utilization. Bivariate analyses and multivariate logistic regression examined associations between social drivers and caregiver-reported satisfaction with therapy services. A municipal-level vulnerability index was developed to identify geographic disparities in service access.

RESULTS: Autism spectrum disorder (37%) and attention-deficit/hyperactivity disorder (29%) were the commonly reported diagnoses. Fifty-eight percent of participants reported at least one comorbid condition. Spatial analysis identified municipalities (Orocovis, Morovis, and Gurabo) with high vulnerability, while overall vulnerability across Puerto Rico averaged 2.16 ± 0.75 . Multivariate logistic regression showed no significant associations between education, income, or insurance coverage and caregiver satisfaction with therapy services ($p > .05$). However, caregivers with income between \$20,000 and \$39,999 showed a significant association with reported progress (OR = 6.5, 95% CI [1.23, 34.46], $p = .028$).

CONCLUSION: Findings highlight geographic inequities in access to specialized services for individuals with NDDs in Puerto Rico. Geographic and infrastructural barriers appear to play a greater role than individual socioeconomic factors in shaping service access.

IRB Approval: Approved by the Ponce Health Sciences IRB, Protocol # 2507275499.

CHALLENGES IN CKD AND RENAL FAILURE IN PUERTO RICO: MULTISECTORAL APPROACH

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INTRODUCTION: Puerto Rico faces a critical health crisis due to the high prevalence of chronic kidney disease (CKD), which affects approximately 16.8% of the population—higher than the regional average of 10.2%. Despite the enactment of laws like the 2008 GFR Act for early detection, data collection remains deficient, hindering effective policy-making and intervention. The roundtable aimed to address challenges in CKD care, focusing on early detection, unmet patient needs, and the role of local data in improving health outcomes.

METHODS: The event included two expert panels and interdisciplinary group discussions. Panel A focused on current challenges in CKD care, while Panel B emphasized intersectoral collaboration for prevention and management. Participants included healthcare professionals, government officials, researchers, patients, and community leaders. Discussions were organized into three groups: service provision and prevention, unmet needs and social determinants, and research and policy.

RESULTS: Key challenges identified include fragmented healthcare systems, limited access to nephrologists, insufficient early detection, lack of education, and inadequate data collection. Proposed solutions include strengthening primary care, creating a unified data system, promoting early prevention and education, addressing social determinants, and fostering intersectoral collaboration. Successful legislative models, such as the Stroke Law and Cancer Law, were highlighted as potential frameworks for CKD policies.

CONCLUSION: The event underscored the need for a coordinated, evidence-based approach to CKD management in Puerto Rico. Recommendations include establishing a national renal registry, enhancing education, promoting research, and fostering intersectoral partnerships to improve prevention, treatment, and patient outcomes. A clear implementation plan with measurable goals and accountability mechanisms is essential for addressing the CKD crisis effectively.

Funding: Community Funds, Alliance of Puerto Rico.

IRB Approval: Approved by the IRB, Protocol # STUDY00007145, University of Texas at Austin, as an study exempted since activities on this research doesn't involved human subjects as defined by DHHS and FDA regulations.



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FOUR YEARS OF IMPACTING COMMUNITIES TO MITIGATE THE MISINFORMATION ABOUT PUBLIC HEALTH ISSUES IN PUERTO RICO

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INTRODUCTION: Over the past four years, the Puerto Rico Community Engagement Alliance (PR-CEAL) program has led community-engaged initiatives throughout Puerto Rico (PR) using evidence-based strategies to disseminate reliable health information and improve access to care. However, health misinformation has emerged as a persistent challenge. This study describes the dissemination strategies implemented to mitigate misinformation across several public health topics.

METHODS: Through a community-based approach, PR-CEAL collaborated with partners across PR to reach populations with limited access to health resources (2022-2023), provide information on chronic disease prevention and management, and promote cancer prevention (2023-2025). Dissemination strategies included educational campaigns, targeted social media outreach, community-feedback mechanisms, supplemental funding for community-based organizations (CBOs), and the implementation of a Community Health Worker (CHW) initiative.

RESULTS: Over four years, PR-CEAL participated in 617 activities across 67 municipalities in PR in collaboration with 90 organizations. Most individuals were engaged through one-on-one educational orientations at health fairs (413, 67%), followed by services fairs (93, 15%). Four culturally tailored campaigns reached more than 120,000 individuals and generated high levels of digital engagement. Supplemental funding enabled 3 CBOs to reach 1,500 individuals who received food services, preventive, and educational materials. In addition, the CHW initiative educated 20,000 individuals through 590 events.

CONCLUSION: Documenting community-driven efforts to counteract health misinformation is essential for replicating and validating short-term public health gains and fostering a sustained culture of wellness. The trust, capacity, and engagement built through ongoing partnerships support the implementation of community-engaged strategies and contribute to the advancement of health goals.

Funding: This research was, in part, funded by the National Institutes of Health (NIH) Agreement OT2HL158287. The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the official policies, either expressed or implied, of the NIH and Comprehensive Cancer Center of the UPR.

IRB Approval: A2409000060, 2409001365, 2410002380, 2410002304, 2409001216.

Clinical Trial: NCT07214051.

IMPACT OF THE ADULT IDENTITY MENTORING (AIM) PROGRAM ON YOUTH RISK PERCEPTIONS IN PUERTO RICO

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INTRODUCTION: Adult Identity Mentoring (AIM) is an evidence-based sexual risk reduction intervention that aims to decrease risk behavior among middle school age youth. The intervention was delivered in a group format at the school setting in PR.

METHODS: Program impact was evaluated using pre- and post-intervention surveys assessing key indicators around pregnancy, drugs, and alcohol. A sample of 401 participants was included in this analysis. T-test analyses were used to evaluate changes in agreement regarding the link between risk behaviors and potential negative impacts on long-term goals and life success.

RESULTS: Preliminary results show high educational aspirations, strong academic performance, and generally positive home environments. Aspirations were well above the midpoint ($M = 4.02$), and grades averaged between A and B ($M = 1.64$). Homework time was roughly one hour per day, with slightly lower reported effort. Family support indicators were consistently high, with caregivers almost always expressing pride, offering praise, and discussing students' accomplishments, suggesting a warm and validating emotional climate. There is a strong perception of the risks associated with alcohol and drug use during adolescence ($M=3.28, 3.46$) with a small to moderate effect size ($d=.26, 0.44$), agreeing that such behaviors reduce the likelihood of becoming a successful adult.

CONCLUSION: Participants showed a strong aspiration for their future, with a desire for good grades, a commitment to higher education, and a supportive home environment. Their perception of the risk of alcohol and drugs was high, and they agreed that it could impede them in their life.

Funding: DHS OPA (TP1AH000294).

IRB/IACUC Approval: Approved by the IRB, Protocol #2024-02, [Universidad Central del Caribe].



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EXPLORING PUERTO RICAN PARENT'S VIEWS TOWARDS CONTRACEPTION DISCUSSIONS WITH THEIR DAUGHTERS

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INTRODUCTION: Adolescent pregnancy continues to disproportionately affect minority populations, including Latinx communities, where cultural norms, stigma, and gaps in school-based sexual education can shape how families discuss contraception. This study seeks to better understand these factors specifically within the Puerto Rican population

METHODS: This ongoing mixed-methods study uses an anonymous online questionnaire to assess Puerto Rican parents' attitudes, beliefs, and experiences discussing contraception with their adolescent daughters. The survey includes Likert-scale items, multiple-choice questions, and open-ended prompts. Descriptive statistics summarize quantitative responses, while qualitative comments undergo thematic analysis. Data is collected and stored securely using REDCap.

RESULTS: Preliminary data from the first 16 participants (n = 16) indicate that most parents (approximately 80%) have discussed contraception or related reproductive health topics with their daughters. Many described initiating conversations earlier than their own caregivers did, often motivated by childhood experiences where such discussions “never happened” or were shaped by “tabú.” Despite this openness, parents identified persistent cultural and structural barriers—including stigma, inadequate school-based education, and religious influences—that limit access to reliable information. Approximately 40% of respondents expressed that physicians should take a more active role in initiating contraceptive discussions, providing clear and judgment-free education, and offering practical tools such as visual aids or contraceptive kits.

CONCLUSION: Early findings suggest a generational shift toward more open communication about contraception among Puerto Rican families, alongside a strong desire for clinician partnership. Strengthening provider-parent communication may help reduce longstanding taboos and support informed contraceptive decision-making among adolescents.

Funding: Not applicable.

IRB/IACUC Approval: Approved by IRB, Protocol # EMSJIRB-2-2026, San Juan Bautista School of Medicine.

BAYESIAN PREVALENCE ESTIMATIONS OF TREATED PEOPLE WITH HIV IN PUERTO RICO IN SMALL-SAMPLE SETTINGS

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INTRODUCTION: Puerto Rico has reported high rates of HPV cancer and one of the highest prevalences of HIV/AIDS in the U.S., aggravated by the lack of studies focused on high-risk populations. Moreover, there is lack prevalence estimates for both woman and men living with HIV in Puerto Rico. In the U.S. prevalences for HPV among woman and men are 35% and 45%, respectively.

METHODS: HPV genotyping and survey data from an on-going study titled Multi-omics Predictors of Oral HPV Outcomes among People Living with HIV in Puerto Rico (P20GM148324) was used to estimate population prevalence. The *rjags* library in R Software (v4.5.2) will run Markov Chain Monte Carlo (MCMC) simulations with uniform priors. The metrics that we reported were apparent prevalence (AP), Maximum Likelihood Estimator (MLE), population prevalence, standard errors, and 95% credible intervals (CrI) for the posterior distribution of the prevalence. A classical approach, Rogan-Gladen, was run as a reference.

RESULTS: The prevalence estimation for men was 0.159 ± 0.054 (CrI95%: 0.056 - 0.265) with AP, 0.357 ± 0.040 (CrI95%: 0.280 - 0.436), close to MLE (0.356). Meanwhile, prevalence estimation for women was 0.079 ± 0.065 (CrI95%: 0.003 - 0.242) with AP, 0.298 ± 0.049 (CrI95%: 0.241 - 0.419), somewhat far from MLE (0.214).

CONCLUSION: The Bayesian model provided prevalence estimations for both men and woman of our interest population. In the classical approach, the estimation for women was not valid due to failure of compliance with the model assumptions, which is a documented downside.

IRB Approval: 2021-05-50, 2022-10-87.



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COMMUNITY RESILIENCE PLANNING WITH PEOPLE EXPERIENCING HOMELESSNESS IN PUERTO RICO

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INTRODUCTION: People experiencing homelessness face heightened vulnerability during disasters, public health emergencies, and extreme weather events. These risks are intensified by limited access to shelter, healthcare, hygiene, and coordinated emergency response. This project aimed to develop a Community Resilience Plan grounded in the experiences, priorities, and recommendations of people experiencing homelessness and service providers.

METHODS: A participatory planning process was conducted through a representative working group led by Coalición de Coaliciones Pro Personas sin Hogar de PR. Multiple data sources were integrated, including secondary data from the Homeless Management Information System and primary data from community questionnaires. 137 questionnaires were completed by people experiencing homelessness in Ponce, Caguas, Juana Díaz, and Mayagüez, along with 18 service provider questionnaires and from key informants. Mixed data were used to identify vulnerabilities, resilience needs, and priority actions.

RESULTS: Four major resilience needs were identified: people experiencing homelessness with substance use disorders, those living with mental health conditions, older adults experiencing homelessness, and service and housing providers facing operational limitations during emergencies. Participants described barriers to safe shelter, healthcare, medications, hygiene, reliable information, and continuity of services during hurricanes, earthquakes, pandemic, and extreme heat. The planning process generated a shared resilience vision and priority goals related to housing access, integrated health services, safe facilities, hygiene, trustworthy information, and social connection.

CONCLUSION: This demonstrated the value of participatory resilience planning with people experiencing homelessness. Findings support the development of community-informed strategies and policies that strengthen emergency preparedness, continuity of care, and long-term housing stability in PR.

Funding: Supported by CDBG-DR funds through the Puerto Rico Department of Housing under the Whole Community Resilience Planning Program.

IRB/IACUC Approval: This project involved community resilience planning and needs assessment activities lead by community. IRB not applicable.

COMMUNITY HEALTH AND RESEARCH COUNCIL: STRENGTHEN COMMUNITY-ENGAGED RESEARCH IN PUERTO RICO

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INTRODUCTION: Sustained community-engaged research requires governance structures that integrate community perspectives into research agenda setting, implementation, and dissemination. In 2021, the Alliance for Clinical and Translational Research established the Community Health and Research Council (CHRC) as a multisector advisory body designed to strengthen community participation in translational research and foster collaboration between researchers, healthcare providers, and community stakeholders across Puerto Rico.

METHODS: The CHRC operates using community-engaged research principles and a participatory governance framework. Council members represent community-based organizations, healthcare providers, public health agencies, nonprofit organizations, academic institutions, and private-sector partners. Operational procedures, membership enrollment processes, and communication structures were developed in 2021 and reinforced in 2025 to support research priority setting, consultation activities, and dissemination strategies.

RESULTS: Since 2021, the CHRC has served as a platform for community participation in translational research planning. A new operational cycle began September 2025 to strengthen council structure, membership engagement, and collaboration. The council includes representatives from multiple sectors across Puerto Rico. Current cycle, members will participate in planning sessions to review the Alliance mission and identify emerging community priorities, including healthcare access, policy concerns, treatment services, and community resilience initiatives ensuring that community partners play an active role in decision-making and priority-setting. The council will also contribute to planning multisector engagement activities aimed at strengthening collaborative research initiatives aligned with community needs.

CONCLUSION: The CHRC provides a sustainable governance structure that promotes community participation in translational research and supports alignment of research priorities with community-identified health concerns in Puerto Rico.

Funding: Research reported in this publication was supported by the National Institute of General Medical Sciences of the National Institutes of Health under Award Number U54GM133807.

IRB/IACUC Approval: This activity involved program evaluation and stakeholder engagement activities and was determined to be exempt from IRB review by the University of Puerto Rico Medical Sciences Campus (2/24/2026, 2290034094A003).



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EFFECTIVENESS OF VIRTUAL LEARNING ON WILLINGNESS TO ENGAGE IN CERVICAL CANCER PREVENTION

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INTRODUCTION: Cervical cancer remains a significant public health challenge in Puerto Rico, particularly among populations with limited access to screening and preventive services. To address these needs, the Public Health and Well Being Interest Group of the Puerto Rico Public Health Institute developed a virtual educational webinar on cervical cancer prevention. The session aimed to strengthen participants' understanding of risk factors, present evidence-based prevention measures, and promote recommendations to improve screening practices.

METHODS: Learning outcomes were assessed through a pretest and posttest administered during the Zoom session. Following the webinar, participants completed a satisfaction survey distributed via Microsoft Forms to evaluate the session's relevance, perceived impact, and influence on preventive intentions.

RESULTS: The webinar reached 295 participants, and the satisfaction survey achieved a 72% response rate. Respondents included health professionals (69%), other professionals (16%), and students (15%). Most participants (95%) reported that the content was relevant to their work. Regarding preventive behaviors, 99% felt motivated to recommend the Papanicolaou test to others, and 39% were encouraged to schedule their own screening. Intentions to vaccinate children against the human papillomavirus (HPV) increased from 62% presession to 69% postsession. Overall, 91% reported a positive professional impact, and pre/post comparisons demonstrated a 5.9% increase in knowledge.

CONCLUSION: Findings highlight the effectiveness of virtual education in addressing cervical cancer prevention gaps and promoting public health engagement. Continued evaluation of these interventions is essential to understand their influence on knowledge and behavior and to guide the development of scalable strategies that strengthen population-level cancer prevention.

IRB Approval: Not applicable (results from a program evaluation).

SPATIOTEMPORAL ANALYSIS OF COLORECTAL CANCER INCIDENCE IN PUERTO RICO, 2013-2022

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INTRODUCTION: Colorectal cancer (CRC) remains the second most diagnosed cancer in Puerto Rico (PR). Previous studies have provided valuable insights into incidence trends, but there is a gap in spatiotemporal analysis. Understanding spatiotemporal patterns of incidence can inform targeted public health interventions. This study applied Emerging Hot Spot Analysis (EHSA) to identify geographic clusters and temporal trends in CRC incidence across PR.

METHODS: Annual age-adjusted incidence rates (AAIRs) from 2013–2022 at the municipality level were obtained from the PR Central Cancer Registry (n = 75, excluding Culebra, Vieques, and Maricao, due to small numbers). Local indicators of spatial association (LISA) cluster analysis delineated high and low-incidence clusters. ESHA highlighted spatiotemporal dynamics, using space-time cube representations and Monte Carlo simulations.

RESULTS: The analysis revealed significant inter-municipality differences. LISA analysis of 2013-2022 AAIRs mean identified 17 municipalities as high-incidence clusters and 23 municipalities as low-incidence clusters. In 2022, 8 municipalities (Arroyo, Fajardo, Guayama, Jayuya, Lajas, Luquillo, Orocovis, and Toa Baja) remained as high-incidence clusters, while 7 municipalities (Barranquitas, Camuy, Comerio, Patillas, Quebradillas, Rincon, and San Juan) remained as low-incidence clusters. ESHA identified 7 municipalities as sporadic hot spots and 18 municipalities as sporadic cold spots. Cold spots were predominantly concentrated in the PR metropolitan area.

CONCLUSION: This study identified significant spatiotemporal clustering of CRC incidence across municipalities in PR, revealing areas with sporadic high incidence. These findings underscore the importance of spatially informed targeted cancer prevention strategies and support further investigation into drivers of geographic variation in CRC incidence.

IRB Statement: This study utilized publicly available, de-identified data at the municipality level from the Puerto Rico Central Cancer Registry. Therefore, it was determined to be exempt from IRB review.



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HEALTH PROFILE OF AN ASBESTOS-EXPOSED COHORT AT A GOVERNMENT OFFICE BUILDING IN SAN JUAN, PUERTO RICO

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INTRODUCTION: Asbestos exposure in non-industrial settings poses significant long-term health risks. A longitudinal surveillance protocol was implemented following the improper removal of asbestos-containing material at a government office building located in San Juan, PR. The objective is to evaluate respiratory health progression in the exposed cohort by comparing the prevalence and incidence of asbestos-related and other conditions at baseline (2020) and after a follow-up period (2026).

METHODS: The baseline sample (n=53; mean age 52) consisted of 50.9% males and 47.2% females, identified via U.S. Department of Justice subpoenaed records for employees present ≥8 hours during the 2012 exposure window. The protocol employs two phases: baseline (2020) and follow-up (2026). It involves: (1) administration of a validated, OSHA-compliant questionnaire; (2) high-resolution, non-contrast CT scans of the thorax; (3) independent double-reading of scans; and (4) follow-up assessments. Incidence will be determined by comparison between baseline and follow-up CT scan results alongside clinical findings from the scheduled medical consultations.

RESULTS: This analysis characterizes the 2020 baseline health profile and estimates the prevalence of chronic conditions within the cohort. Pulmonary disease was the most prevalent condition (62.3%), with a higher frequency in males (66.7%) compared to females (56.0%). Visual impairments affected 61.54% of the cohort. The least prevalent conditions were auditory issues (15.1%) and Type 2 diabetes (13.2%).

CONCLUSION: The 2020 baseline profile confirms a respiratory disease prevalence that exceeds rates reported for the general Puerto Rican population (approx. 15%). These findings serve as an essential starting point for tracking changes in respiratory health.

Funding: U.S. Department of Justice Supplemental Environmental Project.

IRB Approval: Approved by the Institutional Review Board, Protocol #2401180406R001, University of Puerto Rico, Medical Sciences Campus.

DETERMINATION AND QUANTIFICATION OF FECAL INDICATOR BACTERIA AT ISLA DE CABRA AND PUNTA SALINAS BEACHES IN PUERTO RICO

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INTRODUCTION: Pollution of recreational waters with Fecal Indicator Bacteria (FIB) is a problem that has been seen in several beaches of Puerto Rico representing a public health issue when the permitted levels were exceeded. The aim of this study is to determine and quantify the presence of FIB in the water and sand in the Isla de Cabra (IC) and Balneario de Punta Salinas (PS), recreational beaches highly visited by locals and tourists.

METHODS: Water samples and sand samples were collected in sterile bags at two (2) points (IC01, IC02) at Isla de Cabra, and two (2) points (PS01, PS02) at the Punta Salinas Beach. These samples were transported to the laboratory in a cooler to perform bacteriological analysis using IDEXX methodology, Eosyn Methylene Blue (EMB) and MacConkey selected and differentiated agar plates.

RESULTS: Analysis of the samples showed a variability of the amount of FIB in the sample points and dates analyzed. Water samples showed that IC01 was the most contaminated point by IDEXX identification of *Enterococci* and coliforms and agar plates. Meanwhile, sand samples showed higher contamination in PS01 of *E. coli* in agar plates.

CONCLUSION: The results obtained showed higher amounts of FIB and presence of possible pathogenic bacteria above the established limits by the Environmental Protection Agency representing a higher risk in public health. Climate and maritime conditions (precipitation, marine currents, high or low tide) could be the cause of the results, but also the sewage discharges.

IRB/IACUC Exemption Statement: This research project does not include or work with animals or human subjects.

Acknowledgements: Department of Chemistry at University of Puerto Rico in Bayamón.



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FUNGAL SPORE AND RESPIRATORY VIRAL INCIDENCE IN PUERTO RICO: A MULTI-MUNICIPALITY LAG ANALYSIS (2022-2024)

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INTRODUCTION: Environmental conditions influence respiratory viral transmission, yet the role of airborne fungal exposures in tropical regions with abundant spores remains poorly understood. We evaluated associations between ambient fungal concentrations and influenza and SARS-CoV-2 incidence across Puerto Rico municipalities.

METHODS: Daily fungal spore concentrations from San Juan and Caguas aeroallergen stations (2022–2024) were linked with SARS-CoV-2 and influenza data and aggregated to weekly panels using inverse-distance weighting. High-exposure and high-incidence weeks were defined at ≥ 75 th percentile thresholds. Logistic distributed lag models (lags 0–2 weeks) estimated associations, adjusting for temporal trends. Coefficients were pooled via multivariate meta-regression to evaluate modification by interior vs. coastal classification, Sierra de Luquillo proximity, and metro vs. adjacent designation.

RESULTS: Elevated fungal exposure was associated with increased odds of high viral incidence with lag-dependent patterns. Interior municipalities showed stronger associations than coastal municipalities at all lags ($\beta = 9.23 \times 10^9$ to 1.47×10^{10} , $p < 0.001$). Municipalities closer to Sierra de Luquillo exhibited weaker or inverse associations ($\beta = -3.18 \times 10^{10}$ to -1.44×10^{10} , $p < 0.001$). Adjacent municipalities showed a stronger immediate association than metro municipalities at lag 0 ($\beta = 3.32 \times 10^{14}$, $p < 0.001$), negative at lag 1, and a rebound at lag 2. Residual heterogeneity remained high ($I^2 = 100\%$, Cochran Q $p < 0.001$).

CONCLUSION: Elevated fungal exposure was associated with increased odds of high viral incidence, with marked geographic variability. These findings suggest environmental fungal exposures could impact respiratory viral incidence and underscore the value of ambient fungal spores in infectious disease surveillance.

FUNGAL SPORES AND ASTHMA HEALTHCARE UTILIZATION IN THE SAN JUAN METRO AREA: A MULTI-YEAR LAG ANALYSIS (2018-2021)

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INTRODUCTION: Fungal spores are the predominant airborne allergens in Puerto Rico, yet their health effects are not fully understood. A previous study identified a positive correlation between fungal spore levels and outpatient asthma claims in the San Juan Metro Health Region, but it was limited to a single year (2013). This study broadens the analysis across multiple municipalities over a longer timeline (2018–2021).

METHODS: Daily asthma claims were linked with fungal spore and pollen measurements aggregated across six San Juan metropolitan municipalities (San Juan, Carolina, Guaynabo, Trujillo Alto, Loíza, Canóvanas). Outcomes included any asthma diagnosis and acute asthma encounters, evaluated using distributed lag non-linear models within negative binomial regression, adjusting for aeroallergens, temporal trends, and age composition. Age-stratified and pandemic-phase analyses were also performed.

RESULTS: Age-adjusted models showed no robust overall association between spores and acute-care fraction in 2020 (OR = 1.00; p=0.735). Age-stratified analyses revealed heterogeneity: in 2018, higher spore concentrations were associated with increased acute-care odds among ages 0–17 (OR=1.035; p < 0.001) but decreased odds among adults ≥65 (OR = 0.951; p < 0.001). Pandemic-phase models using 7-day moving-average exposures showed broader acute-care increases across several age groups in 2020, with divergent patterns in 2021. Case-crossover analyses of 2020 ED/inpatient events confirmed a short-lag (3-day) spore association (OR=1.000002; p < 0.001).

CONCLUSION: Fungal spore exposure was associated with asthma healthcare utilization in an age- and phase-dependent manner, highlighting the role of fungal spores in respiratory healthcare dynamics in Puerto Rico.



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BODY BURDEN OF POLYCHLORINATED BIPHENYLS AND BIOMARKERS OF AGING IN GUÁNICA, PR

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INTRODUCTION: Guánica community, living around a newly designated Superfund site, has been chronically exposure to polychlorinated biphenyls (PCBs) for decades. However, evidence of the health effects of these substances is lacking. Given aging affects multiple chronic diseases, this research examines the biomarkers of aging with respect to body burden of PCBs in Guánica.

METHODS: 150 subjects were recruited from Guánica Municipality in 2018-2019. After anthropometric evaluation, their blood samples were collected. Their serum samples were analyzed for 205 PCB congeners using GC/MS, and cell-free RNA (cfRNA) was extracted. Transcriptomic analysis was conducted to identify differential expressions of genes with respect to body burden of PCBs adjusting for age and gender.

RESULTS: Guánica resident had more than six times higher body burden of PCBs than the residents of US mainland. Eighteen genes were significantly associated with total PBCs. Among them 16 were protein encoding genes, which affect oxidative, endocrine, immune, and proteostatic stress responses and manifest as coordinated transcriptional and epigenetic shifts in blood. PCB associated genes map onto multiple hallmarks of aging, including disabled macroautophagy and loss of proteostasis (ATG4C, BLOC1S6, NECAP2; USP33/FEM1C/KLHDC1), cellular senescence and MAPK signaling (KRAS, CNN1), genomic instability and p53 mediated DNA damage responses (USP33), chronic inflammation/IFN signaling (ABCE1), and endocrine–oxidative stress transcription (KLF9).

CONCLUSION: Our results show that PCB–gene associations fall directly within aging relevant pathways, which warrant further investigation into biological aging using telomere length and DNA methylation–based epigenetic clocks, and urgent community screening for PCB and exposure mitigation strategies.

Funding: This work in part was supported by the National Institute of Environmental Health Sciences, NIH (R21ES029765).

IRB/IACUC Approval: This research was approved by the University of Miami Institutional Review Board (20170855).



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CHRONIC DISEASES IN AN ENVIRONMENTALLY BURDENED COMMUNITY OF GUAYAMA, PUERTO RICO

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INTRODUCTION: The Miramar community in Guayama is chronically exposed to air pollutants from a coal-powered plant. These pollutants are known risk factors of cardiovascular and pulmonary diseases (CPD). Guided by our previous research, this community-engaged research will examine the risk of CPD in Miramar community in response to exposure to pollutants from the coal-fired power plant and inform the impacted communities.

METHODS: Between August and December 2022, a community-informed survey was administered to screen Miramar communities for CPD and their exposure history to air pollutants from the coal-fired thermal plant. Their socio-demographic data were also collected. These data were analyzed using descriptive statistical methods. The results were presented to community members and disseminated through multimedia platforms.

RESULTS: Participants had a median age of 50 years, and 80% lived in Miramar for more than five years. Overall, 35% reported a diagnosis of cardiovascular disease, with hypertension and cardiac arrest being the most prevalent conditions, often requiring medical procedures. Additionally, 25% of respondents reported a respiratory illness diagnosed between 2005 and 2022. A total of 43 respiratory conditions were reported, most commonly asthma and sinusitis.

CONCLUSION: Findings indicate elevated burden of CPD in Miramar. Although limited air pollution monitoring conducted in the community showed PM levels below the regulatory standards, these pollutants may still be impacting these populations. Effective dissemination of our research supported environmental justice and guided community advocacy action. Future research should incorporate comprehensive characterization of gaseous and particulate air pollutants, and their associated biomarkers.

Funding: This project was supported by the US Department of Education Title III MSEIP Grant: P120A20009 and partially supported by the Louis Stokes Alliance for Minority Participation (PR-LSAMP).

IRB Approval: This project was approved by the UPR Aguadilla IRB 2021-002.



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CHRONIC DISEASES BURDEN IN COMMUNITIES LIVING AROUND A SUPERFUND SITE IN GUÁNICA, PR

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INTRODUCTION: Communities living around contaminated sites are exposed to hazardous substances, which disrupt endocrine systems, induce systemic inflammation, and result in DNA damage. We discovered hazardous concentration of polychlorinated biphenyls (PCBs) in the sediment samples of Guánica Bay 2013. Guided by our research, the Ochoa Fertilizer Corporation (OFC) in Guánica Municipality was designated a Superfund Site. This research examines the burden of chronic diseases in Guánica vis-à-vis the rest of Puerto Rico (PR).

METHODS: Using a stratified random spatial sampling design, we interviewed subjects at/around public places in Guánica and PR and screened them for the history of chronic diseases and their potential exposure pathways, including consumption of contaminated seafood and inhalation contaminated air.

RESULTS: Our analysis suggests hazardous concentrations of PCBs and toxic metals in sediment, air and fish samples: PCBs concentration in fish organs was 28 times higher than the FDA limits; airborne PCB concentration around the bay was ten times higher than at a background location in PR. 215 subjects from Guánica and 849 from the rest of island participated in the study. Guánica community bears a disproportionately elevated burden of chronic diseases, including cardiovascular diseases, diseases of endocrine systems, and cancers, as compared to the rest of the island, e.g. cancer prevalence in Guánica was significantly higher (3.7%) versus the rest of island (2.5%).

CONCLUSION: Communities need to be screened for the body burden of the Superfund chemicals and engaged in exposure mitigation strategies.

Funding: This work in part was supported by the National Institute of Environmental Health Sciences, NIH (R21ES029765).

IRB/IACUC Approval: This research was approved by the University of Miami Institutional Review Board (20170855).

ENVIRONMENTAL PCBs AND HEALTH OUTCOMES IN TWO SOUTHERN MUNICIPALITIES OF PUERTO RICO: GUÁNICA AND GUAYAMA

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INTRODUCTION: Various studies have reported polychlorinated biphenyl (PCB) levels in aquatic sediments from two municipalities on the southern coast of Puerto Rico, Guánica and Guayama. One study identified extremely high PCB levels in sediments from Guánica Bay, with one sample ranking as second highest concentration reported worldwide. After sampling, the U.S. Environmental Protection Agency (EPA) designated the area a Superfund site. This study examined environmental PCB data (soil, sediments, fish tissue, and biota) to assess potential health risks and disease outcomes by linking exposure data to prevalence data.

METHODS: PCB concentrations from Guánica and Guayama were compared using data from the University of Miami (UMiami), the National Oceanic and Atmospheric Administration (NOAA), and the University of South Florida (USF). Additional data from a 2025 study by the University of Puerto Rico Graduate School of Public Health, which evaluated chronic diseases in Guánica and Maunabo, were used. Cancer prevalence (prostate, breast, and colorectal) was calculated using Puerto Rico Central Cancer Registry data.

RESULTS: PCB concentrations in Guánica reached 129,283 ng/g, exceeding Guayama's highest level (1,232 ng/g) by over 100-fold. Sediment PCB levels were higher in Guánica. Elevated PCB levels were detected in commonly consumed fish, suggesting dietary exposure. Several congeners have been associated to diseases such as type 2 diabetes and cancer.

CONCLUSION: Diabetes prevalence was higher in Guánica. Breast cancer was the most prevalent cancer and has increased over time, particularly in Guánica. Findings suggest a potential link between PCB exposure and increased disease risk, highlighting the need for expanded environmental monitoring.

IRB Approval: This study used publicly available, de-identified online data and was exempt from IRB review.