

The Distribution of Specialist Physicians in Puerto Rico: Supply and Demand Projections of Twenty-Five Medical Specialties

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Objective: In recent decades, there have been major waves of physician migration from Puerto Rico, disproportionately affecting rural and suburban areas most. To quantify this issue, the supply of physicians of twenty-five different specialties was compared to their projected demand by municipality, region, and as a whole for Puerto Rico.

Methods: Data regarding the availability of physicians across the archipelago was obtained through a partnership with CredeMtia - Manejo de Servicios de Salud of Puerto Rico. Demand projections were calculated based on literature review of current demand for each specialty, and then compared to current supply on the archipelago and each of its regions and municipalities.

Results: The resulting data has shown that 64% of the investigated specialties have an inadequate supply of physicians in Puerto Rico. Physicians are predominantly located in the Metropolitan region of the archipelago, leaving the majority of Puerto Rico with limited access to healthcare.

Conclusion: The results emphasize the need for healthcare reform and can be used to aid in the training and placement of physicians in the most pressing areas of need to help address this problem.

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In recent decades, Puerto Rico's healthcare system has undergone major reforms amid ongoing structural and financial challenges (1). The current system has resulted from effects of several major factors: privatization upheaval, debt accumulation, and a prevalent pattern of physician migration (1).

Prior to the 1970s, Puerto Rico operated under a regionalized medical system in which each of its 78 municipalities had treatment centers supported by four main hospitals across the archipelago. However, a wave of privatization came over the healthcare system in the 1970s (1). This was followed by *La Reforma* in 1993, which was put forth by Governor Pedro Rosselló (2), and the creation of the Puerto Rico Health Insurance Administration by the PRHIA Act of 1993 (3). These actions were aimed to decrease government spending on healthcare and shift the focus of the government to regulating health services, rather than providing them (3). As such, much of the public healthcare infrastructure was transformed into private sector establishments, causing an increase in the number of Puerto Ricans without health insurance and in the cost of healthcare services (2).

The next policy put forth was *Mi Salud* in 2010, which aimed to expand medical care to uninsured populations through federal, commonwealth, and local funding, working in conjunction with Medicare and Medicaid (1). However, Puerto Rico receives Medicaid funding through a capped block grant rather than based on per capita income, resulting in significantly lower coverage than on the U.S. mainland. While its FMAP (Federal Medical Assistance Percentage) has historically been fixed at 55%, it would be 83% if calculated like U.S. states (4). While the Consolidated Appropriations Act of 2023 raised this to 76% through 2027, other territories received a permanent increase to 83% (5). Despite

paying federal taxes like all U.S. citizens, Puerto Ricans face persistent underfunding, occurring alongside the archipelago's \$70 billion debt, \$25 billion of which is tied to healthcare (6).

In parallel with these challenges, Puerto Rico has experienced substantial physician migration to the continental United States. From 2006 to 2016, the number of physicians on the archipelago decreased from 14,000 to 9,000, losing over a third of its physicians within a decade (7). Family medicine residency data supports this trend: of 111 graduates (2011–2017), only 45 remained in Puerto Rico by 2018 (8). Interviews conducted by the Urban Institute, a non-profit organization, in 2017 also suggest that physicians reported migrating due to limited opportunities for advancing their training in Puerto Rico, low salaries, and difficulties in working with various health insurance companies (1).

As such, the majority of the archipelago (91.18%) has been federally deemed medically underserved as Health Professional Shortage Areas (HPSAs) for primary care as of December, 2023 (9). Although partial data is available on the availability of primary care on the archipelago, based on a review of literature on the subject, limited data is available on the current distribution of

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specialist physicians in Puerto Rico. This study aims to analyze the supply, demand, and distribution of these physicians, as well as draw attention to which areas of the archipelago are most in need of specialized medical care.

Materials and Methods

Data concerning physician specialties and their provider locations was accessed from a database provided by CredeMtia - Manejo de Servicios de Salud of Puerto Rico, an organization certified by the National Committee of Quality Assurance (NCQA) that provides credential verification and healthcare provider data, from March, 2024 (10). This study was determined to be exempt from Institutional Review Board (IRB) review as it involved only the analysis of de-identified, administratively sourced data and did not involve direct interaction with human subjects. Metrics were compiled to visualize the availability of physician specialties across all municipalities of the archipelago. The municipalities were categorized as urban, suburban, or rural derived partially from the Urban and Rural Classifications of the United States Census Bureau (11). Urban municipalities were those with populations above 50,000 people and with a minimum population density of 1000 people per square mile. Suburban municipalities were those that met only one of these criteria, while rural municipalities met neither qualification. The six regions used in this study are based on the Puerto Rico Tourism Company's regional framework, which differs from the seven-region classification used by the Puerto Rico Department of Health; a full list of municipalities and their corresponding regional assignments is available upon request from the corresponding author (12). These six regions include Porta del Sol, Porta Atlántico, Porta Cordillera, Porta Caribe, Región Metro, and Región Este.

Demand projections were calculated for twenty-five medical specialties and subspecialties, according to the most prevalent medical causes of death in Puerto Rico, such as heart disease and diabetes (13), and remaining data available in the CredeMtia - Manejo de Servicios de Salud database (10). The database gave a comprehensive list of medical providers across the archipelago. While CredeMtia is a for-profit credentialing organization, the underlying sources used by CredeMtia for provider locations and specialist numbers are the same sources subsequently utilized in the 2025 Puerto Rico Healthcare Workforce Study conducted by FTI Consulting on behalf of the Financial Oversight & Management Board (FOMB) for Puerto Rico (28); these sources were not yet publicly available at the time of data collection, making CredeMtia the most comprehensive accessible resource for provider information at that time.

Specialties and subspecialties were grouped according to the American Board of Medical Specialties (14). For general surgery specifically, only database categories with "general surgery" in the name were considered, not including further subspecialties, as the source for general surgery demand projections distinguishes between this surgical specialty and its subsequent subspecialties, such as hand surgery and pediatric surgery, among others (15). The projections were based on studies done previously conducted by professionals for each respective specialty and compared to the supply of physicians in Puerto Rico. The specialties analyzed

and respective populations per specialist (in parentheses) were allergies/immunology (60,260) (16), anesthesiology (20,000) (17), cardiology (13,660.2) (15), dermatology (33,333.3) (18), emergency medicine (10,699.6) (15), endocrinology (45,516) (19), gastroenterology (19,513.7) (20), general surgery (7,196.9) (15), infectious diseases (32,216.3) (20), neonatology (65,440) (20), nephrology (27,944.1) (20), neurology (15,627.3) (21), neurosurgery (61,000) (22), obstetrics/gynecology (6,780.7) (15), oncology (15,763.3) (23), ophthalmology (15,293.5) (15), orthopedic surgery (11,676.3) (15), otorhinolaryngology (28,714.3) (15), pathology (16,360.5) (15), psychiatry (7,299.3) (24), pulmonology (21,602.2) (20), radiology (9,106.8) (15), rheumatology (50,688.4) (20), urology (27,057.7) (15), and vascular surgery (107,796) (25). The demand for neurosurgeons is a current subject of debate as many contend that the 1977 projection of 1 neurosurgeon per 100,000 people is not an accurate reflection of their need (26). As such, demand projections for this study were calculated based on the Association of American Medical Colleges' rate for neurosurgeons in 2012 (22). Physician-to-population ratios for each of the twenty-five specialties were calculated according to established ratios for each specialty by literature analysis and then applied to the population of Puerto Rico. Demand for municipalities, regions, and the archipelago were calculated according to the 2020 Census population (27). These raw numbers for supply and demand were subject to rounding, with the exception of rounding down to zero for need, and were compared to supply to deem whether a specialty was underserved. The percentage of the population underserved for each metric was determined by extrapolating the ratio of specialists to population to determine what percentage of the population was adequately served according to supply, and accordingly subtracting from the total to yield the underserved population. As such, the lower the percentage, the closer the supply is to meeting the specialist demand. Maps were then created to visualize the data in terms of how many specialties had an adequate supply of doctors and medical care in each municipality and region.

Results

To understand and visualize the distribution of physician specialists in Puerto Rico, trends were analyzed for the archipelago as a whole, each of the six regions, each region type (urban, suburban, rural), and each municipality.

The supply, demand, and remaining need for each specialty for the entirety of Puerto Rico can be seen in Table 1. The results reflect that 16 of the 25 specialties analyzed, making up 64% of specialties in this study, had an inadequate supply of physician specialists in Puerto Rico.

Table 2 reflects the proportion of the population underserved in each of the six regions of the archipelago in each field. Three of the six regions — Porta del Sol, Porta Atlántico, and Porta Cordillera — have an inadequate supply of physicians in 100% of the specialties analyzed. Some of the specialties analyzed in these regions showed no record of certain specialists being present. The Región Metro, or metropolitan region surrounding San Juan, Puerto Rico's capital, has the highest concentration of physician specialists of the six regions with 92% of the specialties analyzed adequately staffed here.

Table 1. Supply and demand of specialties in Puerto Rico

Specialty	Demand	Supply	Needed	Percentage of population underserved
Allergies/Immunology	54.5	14	40.5	74.3%
Anesthesiology	164.3	216	0.0	0.0%
Cardiology	240.5	293	0.0	0.0%
Dermatology	98.6	85	13.6	13.8%
Emergency Medicine	307.1	198	109.1	35.5%
Endocrinology	72.2	110	0.0	0.0%
Gastroenterology	168.4	170	0.0	0.0%
General surgery	456.6	206	250.6	54.9%
Infectious diseases	102.0	102	0.0	0.0%
Neonatology	50.2	78	0.0	0.0%
Nephrology	117.6	119	0.0	0.0%
Neurology	210.3	159	51.3	24.4%
Neurosurgery	53.9	31	22.9	42.5%
Obstetrics/Gynecology	484.6	478	6.6	1.4%
Oncology	208.5	156	52.5	25.2%
Ophthalmology	214.9	199	15.9	7.4%
Orthopedic surgery	281.4	167	114.4	40.7%
Otorhinolaryngology	114.4	62	52.4	45.8%
Pathology	200.8	106	94.8	47.2%
Psychiatry	450.2	477	0.0	0.0%
Pulmonology	152.1	133	19.1	12.6%
Radiology	360.8	307	53.8	14.9%
Rheumatology	64.8	85	0.0	0.0%
Urology	121.4	97	24.4	20.1%
Vascular Surgery	30.5	17	13.5	44.2%

The specialties were also analyzed according to the region type of each municipality, which can be seen in Table 3. Figure 1 serves as a visual aid of which municipalities across the archipelago were distinguished as urban, suburban, and rural for this analysis. As reflected by the data, when all 47 rural municipalities were totaled, no specialties were of adequate supply for their overall population. The most well-staffed specialties in rural areas were anesthesiologists, nephrologists, and obstetricians/gynecologists; however, even in these specialties, more than half of the rural population of the archipelago is left underserved due to low supply compared to their demand. The suburban municipalities of the archipelago also showed no specialties of adequate supply when totaled for all suburban municipalities. In the 12 urbanized areas of the archipelago according to study parameters, 88% of specialties (22 of 25) were adequately staffed, leaving only the specialties of allergies/immunology, general surgery, and otorhinolaryngology understaffed.

A further breakdown of the supply versus demand projections of municipalities of each subtype can be seen in Table 4. This data reflects that 89% of rural municipalities (42 of 47) had 0-20% (0-5 of 25) specialties adequately staffed. Similarly, 84% of suburban municipalities fell into this range. When analyzing urbanized areas, 42% belonged to this range, while only 25% of the urban

municipalities had 84-100% (21-25 of 25) of the 25 specialties analyzed adequately supplied. As a whole, this data points to the regionalization of the medical care available in Puerto Rico as physicians are primarily located in urban regions. A Kruskal-Wallis test revealed a statistically significant difference in the number of specialties adequately supplied across rural, suburban, and urban municipalities ($H = 12.56, p = 0.002$). Post-hoc Mann-Whitney U tests indicated that urban municipalities had significantly greater specialty supply than both rural ($p = 0.001$) and suburban municipalities ($p = 0.034$), while rural and suburban municipalities did not differ significantly from one another ($p = 0.115$). Spearman correlation analysis further confirmed a significant positive association between municipality urbanization level and number of specialties adequately supplied ($r = 0.38, p = 0.001$), suggesting that increased urbanization is associated with greater specialist availability.

A more detailed analysis of each municipality of Puerto Rico was also conducted and reflected in Figure 2, which reflects that the majority of the archipelago has at most 20% of the specialties analyzed adequately supplied. These municipalities make up 80.77% of the archipelago. Remaining results reflect that of the 78 municipalities, two (2.56%) showed 24-40%, six showed 44-60%, and two more (2.56%) showed 64-80% of their specialties adequately staffed. Lastly, San Juan, Ponce, Manatí, Bayamón, and Mayagüez (6.41% of the archipelago's municipalities) had a range of 84 - 100% of their specialties supplied. San Juan specifically had 100% of its demand supplied. Further metrics for each of the municipality's supply and demand for the specialties analyzed can be requested from the author.

Limitations

Due to the complexity of the medical field, supply and demand projections are subject to some variation. Pediatric subspecialties were excluded from the study as physicians may attain certification through multiple training routes, including both pediatric and adult specialty pathways, introducing additional variables that could affect the validity of the supply estimates, with the exception of allergists/immunologists, emergency medicine physicians, and psychiatrists. Raw data for each specialty and municipality can be supplied upon request. Additionally, as demand projections were derived from specialty-specific literature, certain population-level factors such as age distribution, chronic disease prevalence, and part-time and full-time capacity may not be fully captured, and as such, this study may underestimate true specialist demand in some specialties.

Discussion

This study was conducted in response to a lack of data on the availability of specialty medical care in Puerto Rico. Recently, a similar study was published in 2025 by the Financial Oversight & Management Board (FOMB) for Puerto Rico that analyzed the distribution of healthcare on the archipelago (28). Both studies indicate that Puerto Rico has a significant lack of specialists, indicating a strong pattern of regionalization. It is important to note that while certain specialties appear adequately supplied when assessed at the archipelago level, this aggregate view

Table 2. Percent of population underserved by region and specialty

Specialty	Porta Del Sol	Porta Atlántico	Porta Caribe	Porta Cordillera	Región Este	Región Metro
Allergies/Immunology	90.1%	77.2%	100.0%	100.0%	65.7%	50.7%
Anesthesiology	4.4%	31.8%	2.8%	49.4%	54.4%	0.0%
Cardiology	39.2%	35.3%	0.0%	52.5%	45.5%	0.0%
Dermatology	72.5%	62.1%	69.1%	89.5%	71.5%	0.0%
Emergency Medicine	78.8%	75.7%	28.2%	89.9%	63.4%	0.0%
Endocrinology	25.0%	48.3%	0.0%	71.2%	9.3%	0.0%
Gastroenterology	45.3%	29.8%	18.7%	87.7%	44.4%	0.0%
General surgery	58.5%	70.0%	53.4%	75.0%	81.6%	33.9%
Infectious diseases	52.2%	57.3%	18.0%	49.1%	63.3%	0.0%
Neonatology	35.3%	62.8%	24.3%	58.6%	81.4%	0.0%
Nephrology	26.3%	41.8%	15.9%	55.8%	52.3%	0.0%
Neurology	66.5%	64.5%	60.2%	90.1%	86.7%	0.0%
Neurosurgery	79.9%	53.8%	57.7%	100.0%	100.0%	0.0%
Obstetrics/Gynecology	25.1%	37.1%	16.8%	61.4%	44.0%	0.0%
Oncology	61.0%	58.2%	56.2%	90.0%	59.6%	0.0%
Ophthalmology	37.0%	39.2%	50.5%	85.5%	56.5%	0.0%
Orthopedic surgery	96.2%	80.1%	67.6%	77.9%	83.4%	0.0%
Otorhinolaryngology	62.1%	67.4%	60.1%	90.9%	91.8%	0.0%
Pathology	81.1%	81.4%	65.9%	94.8%	90.7%	0.0%
Psychiatry	51.9%	51.6%	37.5%	42.3%	52.2%	0.0%
Pulmonology	57.3%	55.0%	25.0%	79.5%	56.9%	0.0%
Radiology	61.0%	37.9%	57.9%	71.2%	63.7%	0.0%
Rheumatology	24.8%	61.6%	53.1%	84.0%	0.0%	0.0%
Urology	46.5%	48.7%	49.9%	65.8%	61.5%	0.0%
Vascular surgery	100.0%	59.2%	0.0%	100.0%	100.0%	0.0%

obscures significant geographic maldistribution; the majority of these physicians are concentrated in the Metropolitan region, leaving rural and suburban municipalities critically underserved. Though the overall trend of shortages, especially in rural areas, was upheld, specific metrics did vary between the two studies. The FOMB report indicates shortages in cardiology, endocrinology, gastroenterology, and nephrology, while this study suggests that these specialties have adequate numbers overall. Meanwhile, this study points to a shortage in neurologists, though the FOMB report does not. These discrepancies likely reflect methodological differences, yet both studies underscore the urgent need to address specialist access across the archipelago.

The scarcity of physicians has been found to have detrimental effects on both healthcare systems and patient outcomes. Reduced physician supply is associated with increased patient wait times, as suggested by the U.S. Veterans Health Administration, which found that a 10% increase in clinician capacity saw a 2.1% decrease in wait times (29). This is further contextualized by a study conducted in long-term care homes in Ontario that found that residents with same-day access to physicians had lower rates of

hospitalization and emergency department visits in the subsequent future (30). These effects are compounded by geographic maldistribution: a longitudinal study of rural and urban Medicare beneficiaries found that rural residents with complex chronic conditions were less likely to access specialist care, resulting in a 40% increase in preventable hospitalizations and a 23% increase in mortality rate compared to urban residents (31). As seen in Table 4, 89% of rural municipalities in Puerto Rico had at most 20% of specialties adequately staffed, a pattern consistent with these findings and one that likely drives greater reliance on emergency services in these areas (32). These patterns are particularly concerning in the context of Puerto Rico, where a fixed-rate regression model found that physician shortages were correlated with increased rates of chronic health conditions (33), suggesting that the specialist gaps identified in this study may have significant consequences for long-term population health.

With the physician shortage in mind, it is important to advocate for initiatives that address both the economic and structural barriers driving physician migration. In May 2023, physicians in the fifty states and District of Columbia earned, on average, \$263,840 per year (34). Concurrently, physicians in Puerto Rico made an average of \$172,030 (35). This salary disparity of just over \$90,000 has been cited as a driver for physician migration to higher-paying markets (36). To combat this, existing

federal mechanisms can be leveraged without increasing the tax burden on constituents. Puerto Rico is currently included in the NHSC Loan Repayment Program and offers supplemental funds for Spanish-speaking providers (37). Expansion of available positions and NHSC-approved sites on the archipelago would increase provider retention in underserved areas as this program works with providing care to HPSAs (38). Additionally, though partial local fiscal support would be required, the NHSC's State Loan Repayment Program (SLRP) provides an opportunity to expand loan repayment initiatives using federal funds (39), and could serve as an additional mechanism to incentivize physicians to practice in underserved areas if funding were secured at the territory level.

Complementing these financial initiatives, increased federal investment in graduate medical education (GME) at Puerto Rico's teaching hospitals and universities could help address the shortage at its source (40), given that in 2022, the number of available residency spots was less than half the number of graduating medical students (36). Prioritizing rural rotations within these programs is a particularly promising avenue as increased physician exposure

Table 3. Percent of population underserved by specialty in urban, suburban, and rural specialties

Specialty	Rural	Suburban	Urban
Allergies/Immunology	100.0%	75.0%	54.9%
Anesthesiology	50.5%	30.9%	0.0%
Cardiology	62.9%	35.8%	0.0%
Dermatology	86.7%	63.1%	0.0%
Emergency Medicine	82.9%	82.2%	0.0%
Endocrinology	70.9%	30.8%	0.0%
Gastroenterology	68.8%	48.7%	0.0%
General Surgery	75.9%	75.1%	31.9%
Infectious Diseases	61.4%	64.4%	0.0%
Neonatology	73.9%	45.7%	0.0%
Neurology	88.8%	67.6%	0.0%
Neurosurgery	75.7%	100.0%	0.0%
Nephrology	55.4%	26.6%	0.0%
Obstetrics/Gynecology	52.9%	33.4%	0.0%
Oncology	84.9%	58.6%	0.0%
Ophthalmology	74.4%	38.7%	0.0%
Orthopedic surgery	81.4%	72.6%	0.0%
Otorhinolaryngology	79.4%	72.2%	10.1%
Pathology	90.9%	86.4%	0.0%
Psychiatry	66.8%	43.5%	0.0%
Pulmonology	77.6%	55.2%	0.0%
Radiology	71.6%	50.9%	0.0%
Rheumatology	79.8%	15.9%	0.0%
Urology	76.2%	40.1%	0.0%
Vascular surgery	82.8%	85.1%	0.0%

and practice during residency training in rural areas is correlated with higher rates of practice in rural areas in the future (41).

Beyond these programs, innovative structural approaches deserve consideration. Telehealth offers one avenue for bridging specialist gaps in rural municipalities, with evidence suggesting it can increase access to specialist consultations and improve chronic

Table 4. Number of municipalities with adequate specialist physician supply according to urban, suburban, and rural classification.

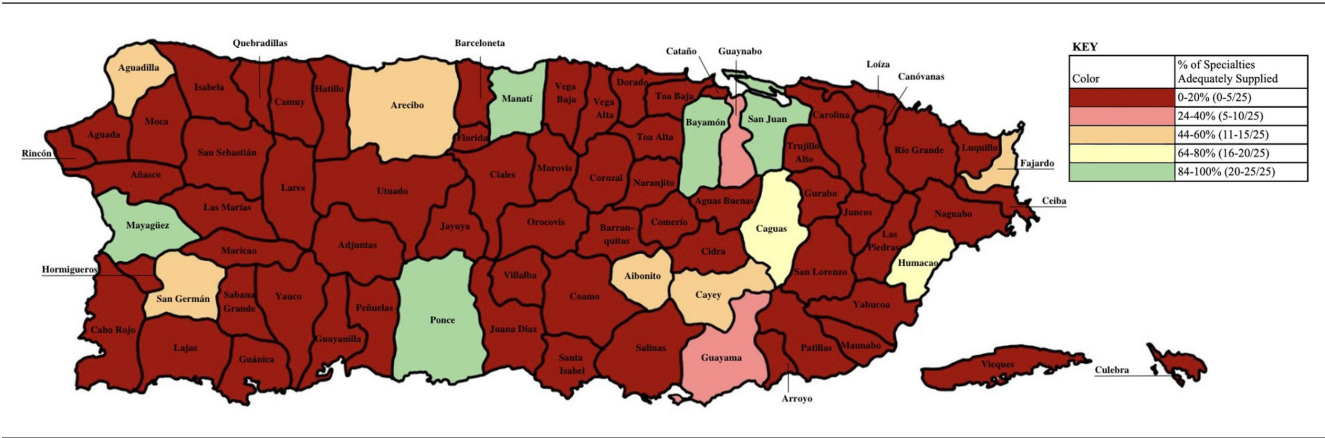
Number of specialties with adequate supply of physicians	Rural (47)	Suburban (19)	Urban (12)
0-5 Specialties Supplied	89.4%	84.2%	41.7%
6-10 Specialties Supplied	2.1%	0.0%	8.3%
11-15 Specialties Supplied	6.4%	10.5%	8.3%
16-20 Specialties Supplied	0.0%	0.0%	16.7%
21-25 Specialties Supplied	2.1%	5.3%	25.0%

disease management in underserved areas (42); however, a data-driven specialist outreach model may offer a more comprehensive solution by enabling direct, in-person specialist access without requiring physician relocation. Specialist outreach models, in which urban physicians conduct regularly scheduled clinics in more rural locations, have been shown to improve access to care when implemented as part of a multifaceted intervention (43). In Iowa, visiting consultant clinics for orthopedic surgery reduced average driving distances to specialists from 19.2 to 8.4 miles, expanding access for an estimated 450,000–670,000 patients of a 3 million population (44). The municipality-level shortage data generated by this study could serve as the foundation for such a program in Puerto Rico, enabling targeted outreach to communities with great need.

As a whole, this study highlights a critical shortage and uneven distribution of physician specialists in Puerto Rico. While aggregate-level data may suggest adequate supply in certain specialties overall, these figures mask profound geographic inequities in rural and suburban municipalities. As such, the findings should be interpreted in light of distribution rather than total numbers alone. Addressing shortages will require multifaceted solutions, including competitive physician compensation, expanded loan repayment programs, investment in medical education and

Figure 1. Distribution of municipalities and regions in Puerto Rico. Municipalities are categorized as rural, suburban, or urban

Figure 2. Breakdown of underserved municipalities by number of specialties with adequate supply



training, and potential for specialist outreach models. However, without intervention, the existing disparities are likely to persist and deepen, with significant implications for the long-term health of Puerto Ricans.

Resumen

Objetivo: En las últimas décadas, ha habido grandes oleadas de migración médica en Puerto Rico, afectando de manera desproporcionada a las zonas rurales y suburbanas. Para cuantificar este problema, se comparó la oferta de médicos de veinticinco especialidades diferentes con su demanda proyectada por municipio, región y en el conjunto de Puerto Rico. **Métodos:** Los datos sobre la disponibilidad de médicos en todo el archipiélago se obtuvieron mediante una colaboración con CredeMtia - Manejo de Servicios de Salud de Puerto Rico. Las proyecciones de demanda se calcularon a partir de una revisión de la literatura sobre la demanda actual de cada especialidad y luego se compararon con la oferta actual en el archipiélago, así como en cada una de sus regiones y municipios. **Resultados:** Los datos obtenidos muestran que el 64% de las especialidades analizadas tienen una oferta insuficiente de médicos en Puerto Rico. Los médicos se concentran predominantemente en la región metropolitana, dejando a la mayoría del archipiélago con acceso limitado a servicios de salud. **Conclusión:** Los resultados enfatizan la necesidad de una reforma del sistema de salud y pueden servir para orientar la formación y distribución de médicos en las áreas con mayores necesidades, con el fin de abordar este problema.

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