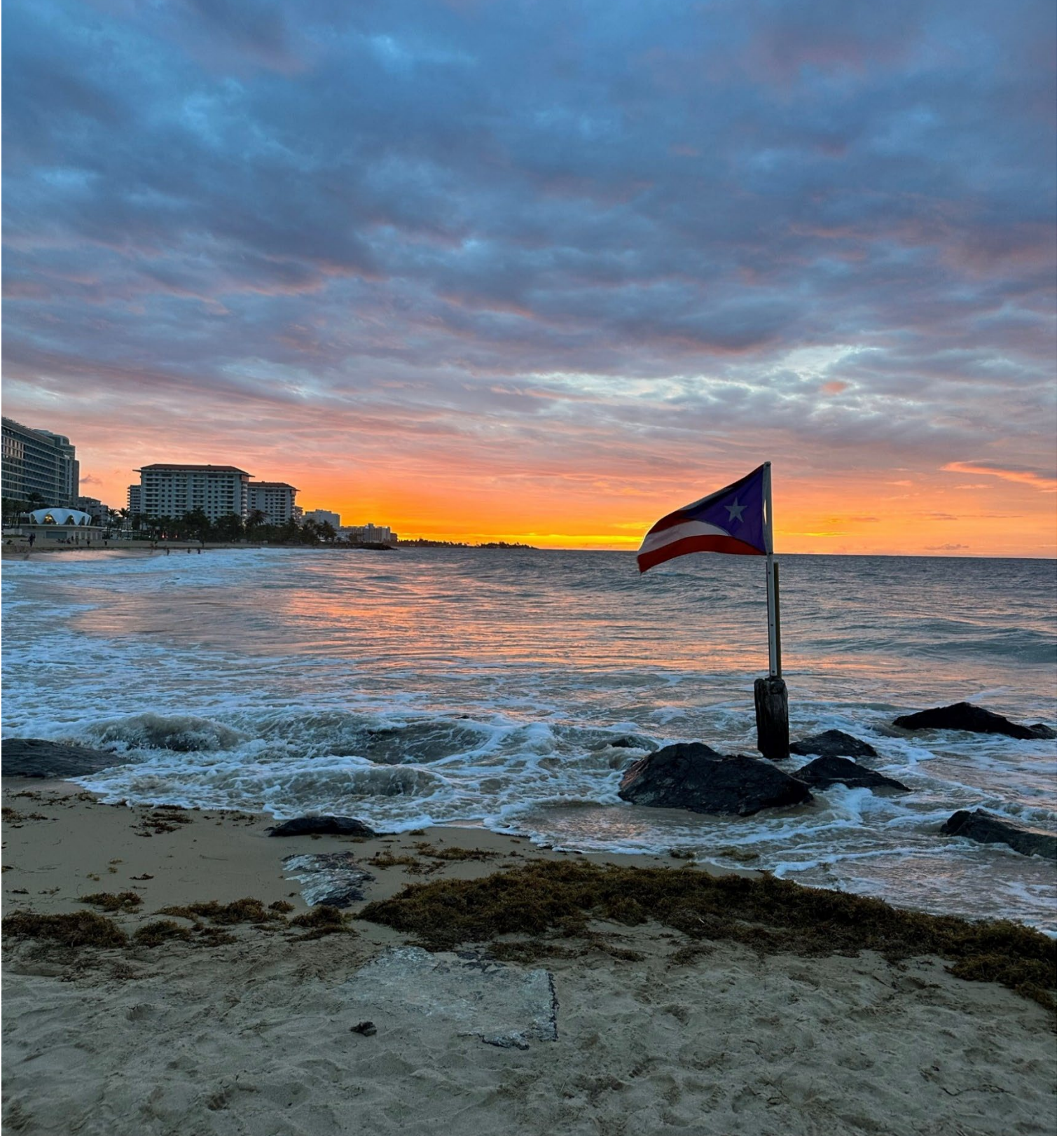


# 2023 Annual Report to Congress

Public Law 117-328: Consolidated Appropriations Act, 2023



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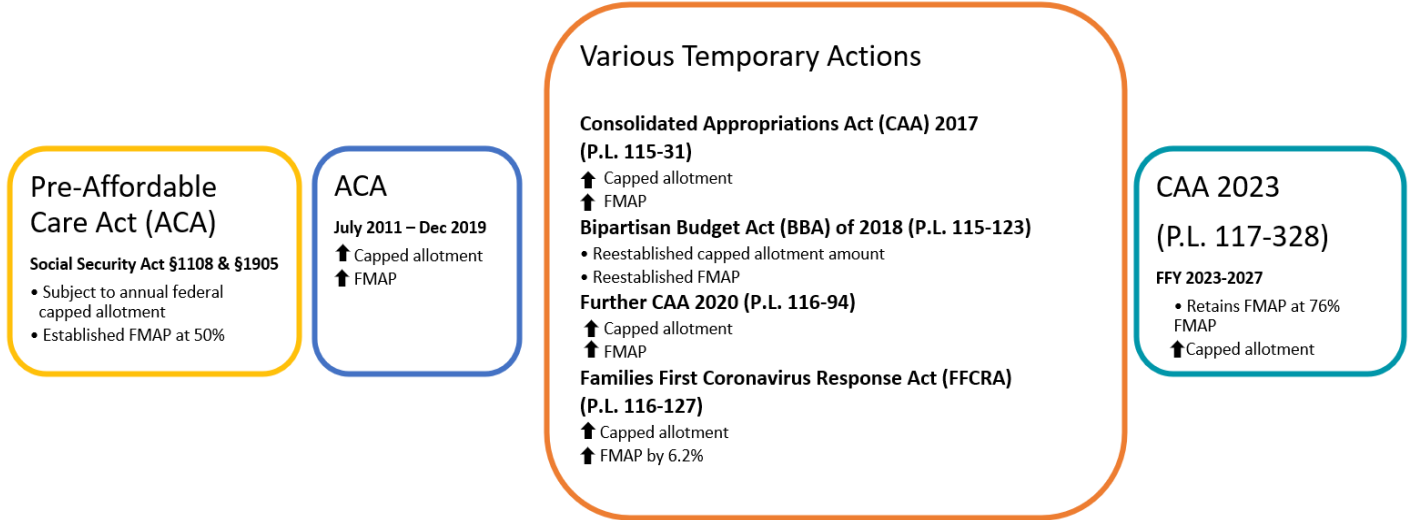
# 1. Executive Summary

The Puerto Rico Medicaid Enterprise (ME) is composed of the Puerto Rico Department of Health (PRDOH), the Puerto Rico Medicaid Program (PRMP), and the Puerto Rico Health Insurance Administration (PRHIA, commonly referred to as Administración de Seguros de Salud [ASES] in Spanish). These entities collectively oversee the delivery of Medicaid and Children’s Health Insurance Program (CHIP) services and appreciate the opportunity to report on Puerto Rico’s improvements and initiatives implemented within our Medicaid Program since the 2021 Annual Report to Congress. PRDOH is the single state Medicaid agency. Within PRDOH, PRMP determines Medicaid eligibility of residents and is responsible for the operation of the Medicaid Management Information System (MMIS), provider enrollment, and the eligibility system (MEDIT3G). PRHIA was created in 1993 to oversee, monitor, and evaluate services offered by managed care organizations (MCOs) under contract with PRHIA. All Medicaid beneficiaries in Puerto Rico are enrolled in managed care (See Section 4.1).

This report provides an overview of Puerto Rico’s Medicaid Enterprise, the landscape in which it operates, as well as updates on the current and future tasks, activities, and actions for continued program improvement. These activities take place in the context of continuing to recover from the coronavirus (COVID-19) public health emergency like the rest of the nation. Unique to Puerto Rico is the additional need to recover from the wide-scale damage caused by Hurricanes Irma and Maria. Puerto Rico suffered widespread infrastructure damage to its healthcare facilities, experienced inflationary pressures, and faced a lack of available equipment and supplies as it worked to rebuild.

Puerto Rico’s Medicaid Enterprise has submitted reports to CMS and Congress highlighting our program investments and enhancements and articulating how we have used our allotted funding to increase access to healthcare under Medicaid. Our Medicaid Enterprise is funded on an annual basis with a federal capped dollar amount. Over the years, that capped funding amount has been increased by temporary funding adjustments, some of which were awarded in response to natural disasters and the COVID-19 public health crisis. While these increased annual allotments were extremely helpful and provided interim stability and resources, Puerto Rico continues to have limitations with funding some mandatory and optional services. Figure 1 shows the history of Medicaid funding in Puerto Rico.

## Puerto Rico Medicaid Funding History



**Figure 1: Puerto Rico Medicaid Funding History<sup>1</sup>**

Congress passed the Continuing Appropriations Act, 2021 and Other Extensions Act that maintained our capped funding levels with an 82 percent Federal Medical Assistance Percentage (FMAP) until December 3, 2021 (our enhanced 76 percent FMAP plus the 6.2 percent Families First Coronavirus Response Act [FFCRA] enhancement). These dollars mitigated the impact of our historical cycle of receiving temporary federal funding enhancements and regularly preparing for a fiscal cliff. In December 2022, Congress passed the Consolidated Appropriations Act, 2023, which extended the 76 percent FMAP for another five years until the end of Federal Fiscal Year (FFY) 2027. It also provides federal block grant funding for the next five years. This aims to ensure continued, medium-term fiscal stability and, therefore, increased access to needed care for family and individuals with low incomes (See Section 4.3). However, if adequate state-like funding is achieved, we will have the opportunity to make further programmatic improvements to benefit the people of Puerto Rico.

In addition to funding challenges, Puerto Rico also faces increased difficulties with provider access much more than its state counterparts. Puerto Rico faces large-scale professional emigration and an aging provider population. We hope to help stabilize the situation with the provider reimbursement increases we have implemented, raising fees for many providers to 75 percent of Medicare as detailed in Section 6.1.1. Approximately half the island’s population is enrolled in Medicaid or CHIP, and many have chronic conditions, which puts increased stress on provider availability (See Section 4.2).

Despite historically unpredictable funding dynamics and provider out-migration, Puerto Rico has made major progress toward impactful program improvements under the leadership of the Secretary of Health, Hon. Dr. Carlos Mellado Lopez.

Puerto Rico has implemented several program oversight enhancements by building program integrity

<sup>1</sup> Congressional Research Service. June 22, 2023. “Legislative History of Medicaid Financing for the Territories.” *Congressional Research Service*. [https://www.everycrsreport.com/files/2023-06-22\\_R47601\\_a8b408e9224568ef24c5b49c245e910420059e86.pdf](https://www.everycrsreport.com/files/2023-06-22_R47601_a8b408e9224568ef24c5b49c245e910420059e86.pdf)

processes to capture and address fraud, waste, and abuse (FWA) and increasing program transparency. These enhancements are directed toward bolstering program oversight, improving program quality, and strengthening program integrity. Specifically, Puerto Rico has restructured its program integrity unit to create a new division, added staff, and hired a program integrity lead. It has also developed comprehensive new program integrity policies, procedures, and tools, including a new manual and training guidelines. Coordination with other investigatory agencies has been prioritized (See Section 5.3.1).

Puerto Rico has also acted to improve, standardize, and make more rigorous its procurement practices. It has established a threshold and justification requirements for non-competitive procurements. Standardized procedures have been developed for competitive procurements related to requests for proposals (RFPs), evaluations, and contract negotiations. To increase accountability, ownership, and signoff, responsibility for different parts of the process are assigned. Multiple RFPs are currently under procurement for contracts once awarded on a sole-source basis (See Section 5.3.2).

Puerto Rico has focused on improving its governance and program management functions. Our recent focus has been on key high-level improvements of our Medicaid Enterprise, with priority on developing enterprise governance, data governance, information technology projects, and program standardization. Through these improvements, we were able to establish processes to align data-strengthening priorities with clear leadership and decision-making processes. Improved data governance will help support performance in a variety of program areas, including financial oversight and quality metrics reporting, such as Child and Adult Core measures. Program standardization and new program and project management structures have helped strengthen vendor contract oversight (See Section 5.1).

In the area of technology, since the last report, PRMP has implemented and certified a significant upgrade to its eligibility system. This was accompanied by a comprehensive review and update of PRMP's eligibility manual. Additional upgrades are planned. In parallel, Puerto Rico has engaged contractors to upgrade the financial and reporting capabilities of its MMIS, with implementation expected in spring 2024 (See Section 5.2).

As important as these more administrative improvements are, they are all in the service of providing better services to an expanded pool of Medicaid beneficiaries. Building on one of the highest COVID-19 vaccination rates in the country, Puerto Rico implemented multiple temporary changes to increase access to vaccines and treatments, as well as implementing the optional COVID-19 eligibility testing group. When federally allowable, some changes were adopted as part of ongoing Medicaid operations (See Section 4.2.1). Puerto Rico also expanded coverage of vaccines for adults, covering recommended vaccines for all adults, not just those at higher risk (See Section 6.2.2). Puerto Rico received a grant under the Money Follows the Person program and is using those funds to plan for the implementation of long-term services and supports (LTSS) and non-emergency medical transportation (NEMT) should permanent and sustainable funds become available (See Section 7.2).

Puerto Rico also loosened some eligibility requirements during the COVID-19 emergency and is in the process of gaining federal approval for increased income eligibility levels. Puerto Rico is now working to

manage its newly reinstated eligibility redetermination process (the “unwind”) so that beneficiaries are appropriately evaluated and do not lose coverage unnecessarily (See Section 6.3).

As Puerto Rico plans for state-like funding, we are taking steps to meet requirements imposed on states, as feasible within budget constraints. Puerto Rico is in the middle of its first Payment Error Rate Measurement (PERM) audit, working with CMS and PERM contractors to fully implement the pilot. We are planning for our first Medicaid Eligibility Quality Control (MEQC) pilot, preparing for implementation in 2024 (See Section 5.3.3). In addition, Puerto Rico has joined the Medicaid Drug Rebate Program (MDRP) and a recent CMS visit acknowledged a successful MDRP implementation (See Section 6.2.3).

Despite these improvements, current Medicaid funding results in a Medicaid program that lags behind how other Medicaid programs are funded. The island’s health system is strained by lack of funding and a dwindling provider population. A state-like funding structure for Puerto Rico Medicaid can support provision of these services, expand eligibility, and drive health equity, which is a stated CMS priority. We look forward to working with Congress to achieve state-like funding to move toward the goal of a healthier Puerto Rico for the U.S citizens who reside there.

## 2. Introduction

In FFY 2020 and 2021, Puerto Rico submitted an Annual Report to Congress, as required by Section 202 of the Further Consolidated Appropriations Act 2020, Public Law (P.L.) 116-94. The contents of the Annual Report were set forth in Section 1108(g)(9) of the Social Security Act (SSA).

On December 29, 2022, the Consolidated Appropriations Act, 2023, (P.L. 117-328) was enacted. This act amends SSA 1108(g)(9) by reinstating annual reporting for FFY 2023 and each subsequent year before FFY 2028 if Puerto Rico receives a Medicaid cap increase or an increase in the FMAP for such FFY. Section 1108(g)(9) of the SSA, as amended, states the following:

*“(9) Annual report- (A) In general: Not later than the date that is 30 days after the end of each fiscal year (beginning with fiscal year 2020 and ending with fiscal year 2021) and for fiscal year 2023 and each subsequent fiscal year (or, in the case of Puerto Rico, and for fiscal year 2023 and each subsequent fiscal year before fiscal year 2028), in the case that a specified territory receives a Medicaid cap increase, or an increase in the Federal medical assistance percentage for such territory under section 1396d(ff) of this title, for such fiscal year, such territory shall submit to the Chair and Ranking Member of the Committee on Energy and Commerce of the House of Representatives and the Chair and Ranking Member of the Committee on Finance of the Senate a report, employing the most up-to-date information available, that describes how such territory has used such Medicaid cap increase, or such increase in the Federal medical assistance percentage, as applicable, to increase access to health care under the State Medicaid plan of such territory under subchapter XIX (or a waiver of such plan). Such report may include—(i) the extent to which such territory has, with respect to such plan (or waiver)— increased payments to health care providers; increased covered benefits; expanded health care provider networks; or improved in any other manner the carrying out of such plan (or waiver); and any other information as determined necessary by such territory.”*

This 2023 Annual Report provides Puerto Rico’s response to comply with Section 1108(g)(9) of the SSA and describes the current landscape of the Puerto Rico Medicaid Enterprise, the improvements made since the last report in 2021, and plans to continue program improvements.

Puerto Rico is a U.S. commonwealth with a large population that has significant health needs. Our Medicaid program’s funding and governance structures are different than U.S. states. Despite resource disparities between Puerto Rico and state Medicaid programs, Puerto Rico Medicaid continues to invest in program enhancements to better serve our Medicaid beneficiaries while simultaneously strengthening our program’s governance, technology, and oversight. Accordingly, as Puerto Rico Medicaid demonstrates a capability to implement a Medicaid enterprise with structures for robust contract oversight, program integrity, and data transparency, we continue to advocate for state-like treatment of our program, which

will improve the experience of Medicaid beneficiaries.

As described in the history of Puerto Rico’s Medicaid funding in the Executive Summary, various pieces of federal legislation have temporarily and incrementally increased funding to the Puerto Rico Medicaid Program<sup>2</sup>. P.L. 117-328 also extends the increase in FMAP to 76 percent for Puerto Rico for another five years (through the end of FFY 2027) and also increases the federal capped allotment for each FFY through 2027 to sustain Puerto Rico’s Medicaid Program and enable further programmatic improvements. Puerto Rico appreciates the increase in the federal capped allotment for FFYs 2023 – 2027 from P.L. 117-328. These funding enhancements help ensure interim fiscal stability for Puerto Rico’s Medicaid Program, thereby increasing access to needed healthcare services for individuals with low incomes in Puerto Rico. We continue to strive to use Congress-provided funding to increase eligibility levels, enhance services covered, and improve reimbursement rates for providers—all with the overarching goal of increasing access to needed healthcare for our beneficiaries.

As we support Medicaid program operations and explore options for program improvements, we look forward to maintaining the strong relationship with our federal partners at the Centers for Medicare & Medicaid Services (CMS), the Governmental Accounting Office (GAO), and Congress to advance our program’s positive momentum and advocate for a commensurate funding structure. This report captures actions we have taken and demonstrates our capacity and commitment to the beneficiaries we serve by operating a strong Medicaid program.

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<sup>2</sup> Congressional Research Service. June 22, 2023. “Legislative History of Medicaid Financing for the Territories.” *Congressional Research Service*. [https://www.everycrsreport.com/files/2023-06-22\\_R47601\\_a8b408e9224568ef24c5b49c245e910420059e86.pdf](https://www.everycrsreport.com/files/2023-06-22_R47601_a8b408e9224568ef24c5b49c245e910420059e86.pdf)



### 3. Difference in Medicaid Funding Between the States and Puerto Rico/Other Territories

Medicaid is the primary federal program that provides access to healthcare to qualifying individuals with limited resources, including many of the nation's most vulnerable populations. Medicaid is jointly funded by the state and federal government, with the federal government matching a percentage of the state's program expenses based on a formula that considers per capita income relative to the national average. The formula results in a state-specific FMAP. The funding for States is open-ended, and the FMAP rates range from 50 percent to 83 percent. The FMAP was temporarily increased for all Medicaid programs through the FFCRA, P.L. 115-217), to respond to the COVID-19 pandemic. This FFCRA temporary increase is being phased out, with the final phase-out period ending December 31, 2023. Certain Medicaid expenses, populations, or medical services have a different match rate. The Affordable Care Act (ACA) provided an option for states to expand their Medicaid eligibility criteria, and those expansion populations were initially covered 100 percent by the federal government. For states that opt in to this Medicaid expansion, that match percentage incrementally decreases to 90 percent over time. Many general administrative costs are covered at 50 percent, while some types of state Medicaid administrative costs, such as eligibility and enrollment systems, are eligible for a federal match rate as high as 90 percent. Certain medical benefits, such as family planning, also have a higher federal match rate.

CHIP funding in Puerto Rico is determined using the same methodology used for U.S. states, which is an annual capped allotment, as established under Section 2014 of the SSA. There is also a separate enhanced CHIP FMAP, that is about 15 percent higher than the regular Medicaid FMAP. As of September 2023, Puerto Rico used CHIP funds to pay for coverage for approximately 69,000 children, who are enrolled in its Medicaid expansion CHIP.<sup>3</sup>

The Medicaid program, including CHIP, is arguably the most consequential federal program in Puerto Rico because, as of September 2023, it provides healthcare services to 1.6 million<sup>4</sup> people, or about 50 percent of the island's population. However, our program differs in fundamental ways when compared to state Medicaid programs.

Territories do not receive federal funding based on the same calculations as states. Puerto Rico is subject to an annual Medicaid cap pursuant to Section §1108(g) of the SSA. This means the federal government will match Puerto Rico's Medicaid spending up to the cap, and any Medicaid spending above that cap is the sole responsibility of Puerto Rico. This is unlike states that have open-ended Medicaid funding. Figure 2 depicts this difference in funding.

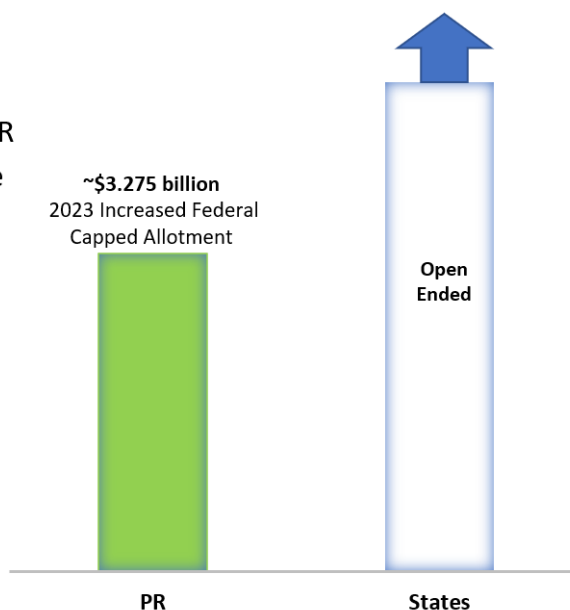
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<sup>3</sup> Departamento De Salud. September 2023. "Programa Medicaid Statistics." *Departamento De Salud. Programa Medicaid - Departamento de Salud*

<sup>4</sup> Ibid.

### Funding Allotted

Through P.L. 117-328, the Puerto Rico (PR) allotment will increase through FFY 2027. However, the PR funding is still capped, while state funding is open ended.



**Figure 2: Funding Allotted<sup>5</sup>**

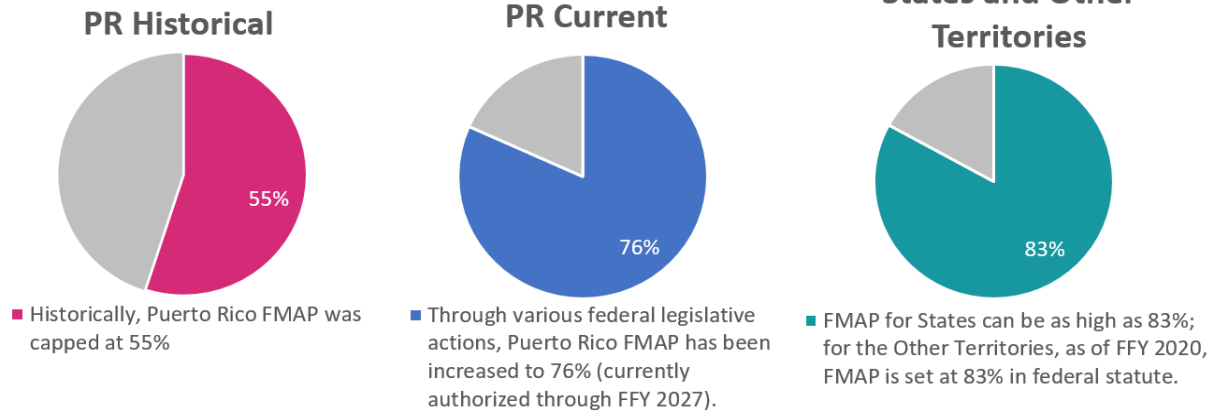
The FMAP for Puerto Rico was set in statute at 50 percent in 1968, increased to 55 percent by the ACA of 2010, and raised to 76 percent through FFY 2027 via Congressional actions, including P.L. 117-328. Puerto Rico’s FMAP is currently at 77.5 percent through the end of calendar year 2023 as a result of enhanced FMAP provided during COVID; it will remain at 76 percent through FFY 2027.<sup>6</sup> The Puerto Rico FMAP would revert to 55 percent if no additional congressional action is taken before the end of FFY 2027. If calculated using the FMAP formula, Puerto Rico would likely receive the maximum rate of 83 percent; however, the FMAP formula uses per capita income data reported by the U.S. Department of Commerce’s Bureau of Economic Analysis, and Puerto Rico does not report per capita income.<sup>7</sup> Any expenditures beyond the federal capped allotment are paid entirely with territory dollars, further deflating the FMAP rate. Figure 3 compares Puerto Rico's current FMAP rate to its historical rate and that of other states.

<sup>5</sup> Consolidated Appropriations Act, H.R. 2617, Pub. L. 117-328 (2023). [H.R.2617 - 117th Congress \(2021-2022\): Consolidated Appropriations Act, 2023 | Congress.gov | Library of Congress](https://www.congress.gov/117/legislation/house-bills/2617)

<sup>6</sup> Congressional Research Service. June 22, 2023. “Legislative History of Medicaid Financing for the Territories.” Congressional Research Service. [https://www.everycrsreport.com/files/2023-06-22\\_R47601\\_a8b408e9224568ef24c5b49c245e910420059e86.pdf](https://www.everycrsreport.com/files/2023-06-22_R47601_a8b408e9224568ef24c5b49c245e910420059e86.pdf)

<sup>7</sup> Ibid.

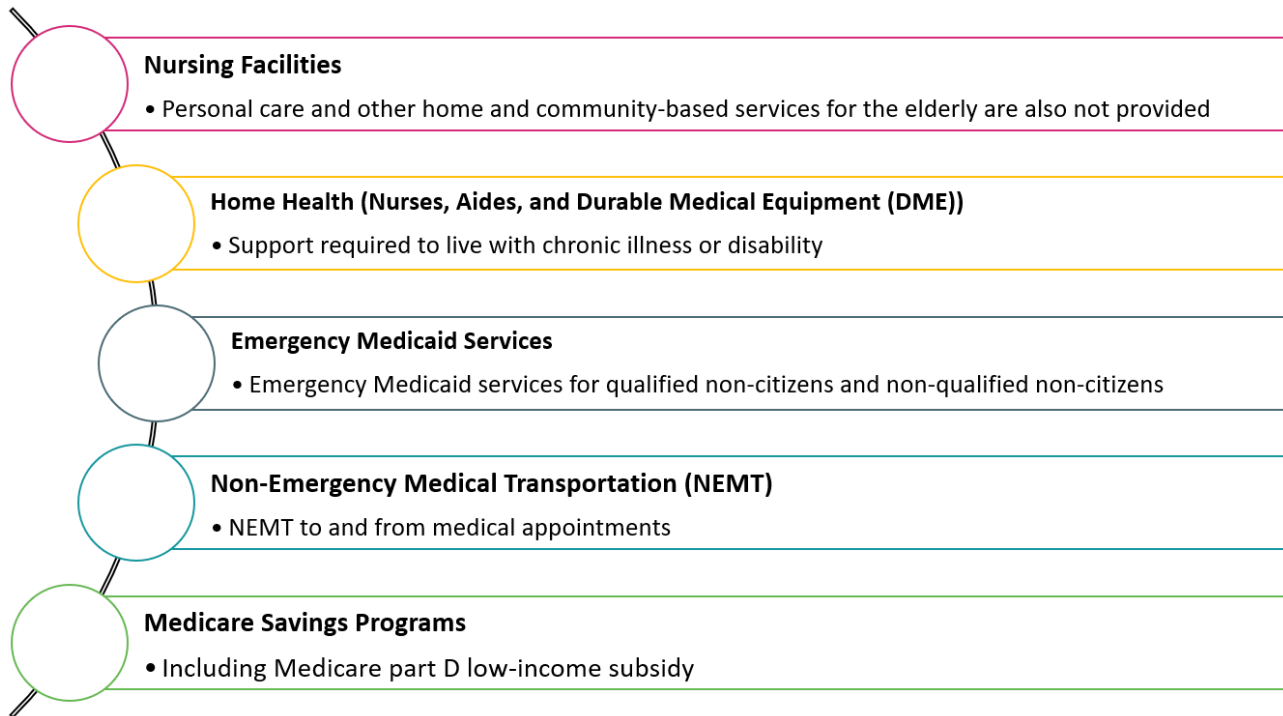
### Puerto Rico's Lower FMAP



**Figure 3: Puerto Rico's Lower FMAP<sup>8</sup>**

The territory also faces ongoing challenges with access to care, including provider migration off-island, and has been unable to cover certain critical benefits. Figure 4 shows mandatory services that are not covered, as well as Puerto Rico's fiscal inability to opt into the Medicare Savings Program.

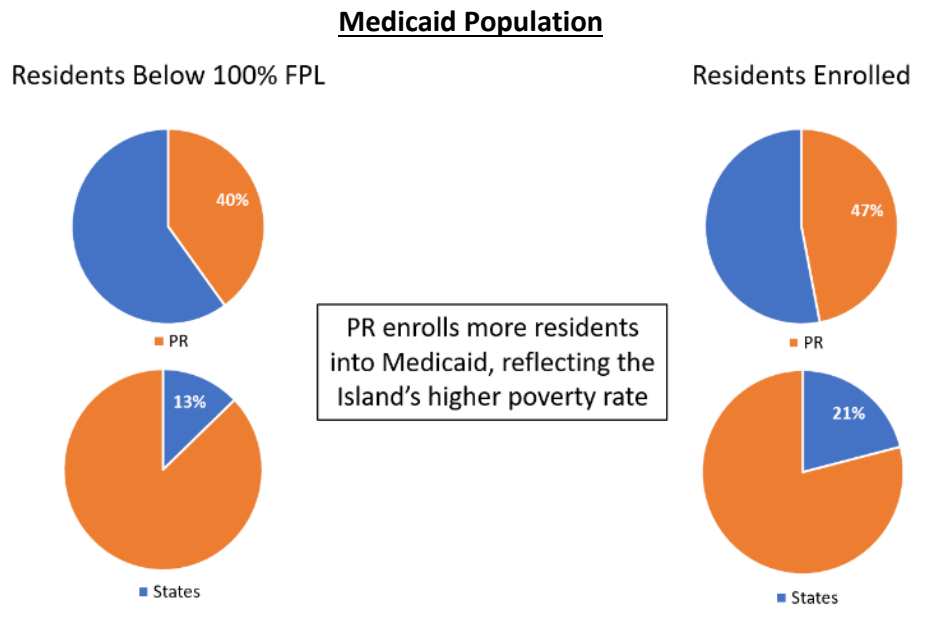
### Puerto Rico Coverage Gaps



**Figure 4: Puerto Rico Coverage Gaps**

<sup>8</sup> Congressional Research Service. June 22, 2023. "Legislative History of Medicaid Financing for the Territories." Congressional Research Service. [https://www.everycrsreport.com/files/2023-06-22\\_R47601\\_a8b408e9224568ef24c5b49c245e910420059e86.pdf](https://www.everycrsreport.com/files/2023-06-22_R47601_a8b408e9224568ef24c5b49c245e910420059e86.pdf)

In 2021, 40.4 percent of our population was living below 100 percent of the Federal Poverty Level (FPL), which is 20.8 points higher than the next closest state (Louisiana at 19.6 percent) and the U.S. average (at 12.8 percent); the U.S. average does not include Puerto Rico.<sup>9</sup> In 2021, 46.9 percent of the island’s total population was enrolled in Medicaid and CHIP—12.5 points higher than the next closest state (34 percent for New Mexico) and 25.8 percent higher than the U.S. average of 21.1 percent (U.S. average does not include Puerto Rico).<sup>10</sup> Figure 5 illustrates these disparities.



**Figure 5: Medicaid Population<sup>11, 12</sup>**

<sup>9</sup> Kaiser Family Foundation. 2021. “Distribution of Total Population by Federal Poverty Level.” *Kaiser Family Foundation*. Accessed September 19, 2023. <https://www.kff.org/other/state-indicator/distribution-by-fpl/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Under%20100%25%22,%22sort%22:%22desc%22%7D>

<sup>10</sup> Kaiser Family Foundation. 2021. “Health Insurance Coverage of the Total Population.” *Kaiser Family Foundation*. Accessed September 19, 2023. <https://www.kff.org/other/state-indicator/total-population/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>

<sup>11</sup> Kaiser Family Foundation. 2021. “Distribution of Total Population by Federal Poverty Level.” *Kaiser Family Foundation*. Accessed September 19, 2023. <https://www.kff.org/other/state-indicator/distribution-by-fpl/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Under%20100%25%22,%22sort%22:%22desc%22%7D>

<sup>12</sup> Kaiser Family Foundation. 2021. “Health Insurance Coverage of the Total Population.” *Kaiser Family Foundation*. Accessed September 19, 2023. <https://www.kff.org/other/state-indicator/total-population/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>

## 4. Landscape of Puerto Rico’s Medicaid Program

To better understand program improvements and the additional and ongoing funding needs of the Medicaid program, our overall Medicaid landscape is described in the following section, including our agency governance structure, our current and anticipated needs based on population and healthcare changes, our program’s funding and current use of funds, and FFY 2022 program expenditures.

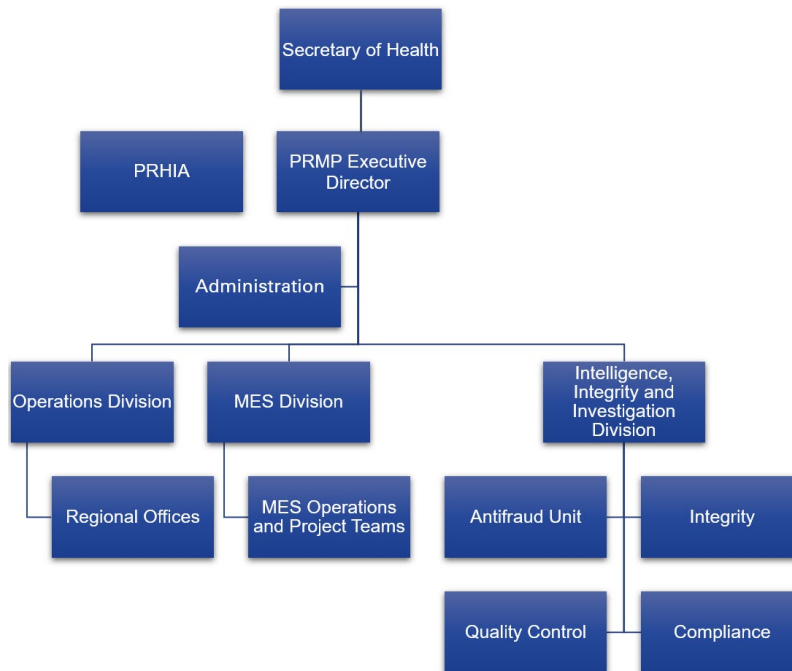
### 4.1 Medicaid Enterprise and Oversight Boards

PRDOH is the single SMA administering the Puerto Rico Medicaid Program. There is a longstanding sister agency relationship between PRDoH and PRHIA, defined by an interagency memorandum of understanding (MOU). PRMP, a department under the PRDOH, oversees the Medicaid State Plan, determines Medicaid eligibility of residents, and is responsible for the operation of the MMIS, the Provider Enrollment Portal (PEP), and the eligibility system (MEDITI3G). PRHIA was created in 1993 to oversee, monitor, and evaluate services offered by MCOs under contract with PRHIA. PRHIA is a public corporation overseen and monitored by a board of directors (BOD).

There is also a federally mandated oversight agency, the Financial Oversight and Management Board for Puerto Rico (FOMB), that helps ensure fiscal responsibility in the contracting procedures of the island’s government agencies. The FOMB must approve government contracts, including Medicaid contracts, in the amount of \$10 million or more and can audit other contracting processes at its discretion.

Figure 6 below summarizes the governance and staffing structure of the Medicaid Enterprise.

**Medicaid Enterprise Governance and Staffing Structure**



**Figure 6: Medicaid Enterprise Governance and Staffing Structure**

#### 4.1.1 Puerto Rico Department of Health (PRDOH)

The PRDOH Medicaid program is chartered with ensuring appropriate delivery of healthcare services under Medicaid and CHIP, which is structured as an expansion of Medicaid. PRDOH provides access to Medicaid services to eligible individuals by operating local Medicaid eligibility offices throughout all the Island municipalities. Residents applying for Medicaid coverage provide demographic and socio-economic information for their household.

Healthcare services to Medicaid-eligible individuals are delivered under managed care through networks of providers located throughout our geographic regions. All individuals who are eligible for Medicaid receive services through a managed care arrangement.

PRMP retains responsibility for eligibility determination, policy, Medicaid State Plan maintenance, federal reporting, and financial administration. While PRHIA, which is known in Spanish as the Administración de Seguros de Salud de Puerto Rico (ASES), implements and delivers services through our managed care delivery system, PRDOH leads coordination between the agencies to deliver the Medicaid program.

#### 4.1.2 Puerto Rico Health Insurance Administration (PRHIA)

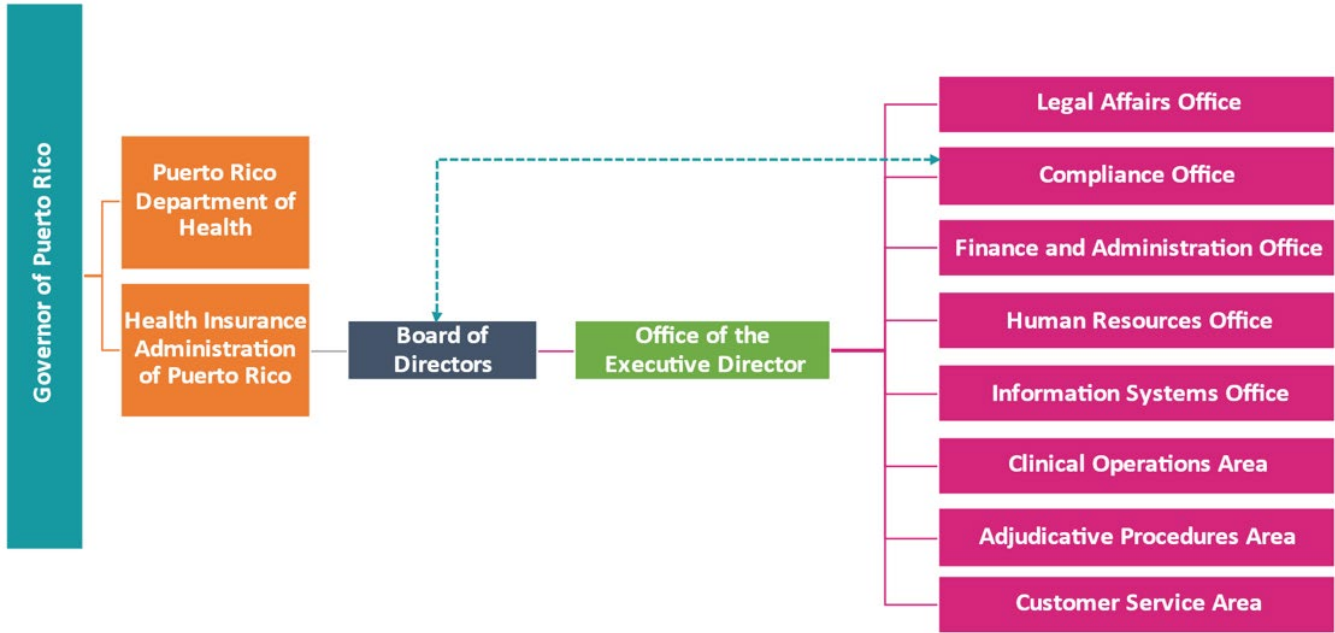
PRHIA directs the managed care delivery system aspects of the Puerto Rico Medicaid Program. The Puerto Rico Health Reform Program (Plan Vital) created a government health insurance program under a managed care delivery system. In 1993, an interagency MOU (which has been updated multiple times) was established to delegate the implementation of the Medicaid managed care delivery model to PRHIA, a public corporation established by Law No. 72 on September 7, 1993, as amended. PRHIA is responsible for the program design and implementation of Plan Vital contracts with MCOs. The process of selecting the managed care organizations, negotiating, and managing those contracts was assigned to PRHIA pursuant to Law No. 72. PRHIA also oversees the contracted pharmacy benefits manager.

In 2006, PRHIA implemented the Medicare Platino program to provide additional coverage benefits to beneficiaries of Medicaid and Vital (formerly called Reforma) who are also eligible for Medicare (i.e., dually eligible) and enrolled in a Medicare Advantage Organization (MAO). PRHIA holds contracts with the MAOs.

PRHIA is responsible for implementing coverage changes, assisting PRMP in evaluating potential program changes, and/or estimating the cost of implementing new services or changes in reimbursement. PRHIA is also responsible for communications with beneficiaries about benefit changes and with providers about benefit or reimbursement changes.

PRHIA is charged with managing MCO compliance issues, including managed care contracting, managed care oversight (program integrity, quality measures), fair hearings related to MCO services, and benefits for beneficiaries, and provider appeals. Figure 7 shows PRHIA's organizational structure.

**Puerto Rico Health Insurance Administration Organizational Chart**



**Figure 7: Puerto Rico Health Insurance Administration Organizational Chart**

**4.1.3 The Puerto Rico Health Insurance Administration BOD**

PRHIA is governed by a BOD made up of eleven members, six are ex-officio members and five are appointed by the governor of Puerto Rico with the advice and consent of Puerto Rico’s Senate.

The ex-officio members include the Secretary of Health, the Treasury Department Secretary, the Administrator of the Administration of Mental Health and Addiction Services (ASSMCA), the Director of the Office of Management and Budget (OMB), the Executive Director of the Puerto Rico Fiscal Agency and Financial Advisory Authority (AAFAF), and the Insurance Commissioner or their delegates. The governor of Puerto Rico appoints the president of the BOD from among its members.

**4.1.4 Financial Oversight and Management Board for Puerto Rico**

The FOMB was created under the federal Puerto Rico Oversight, Management and Economic Stability Act (PROMESA) of 2016. FOMB consists of seven members appointed by the President of the United States and one ex-officio member designated by the governor of Puerto Rico. FOMB is tasked with working with the people and the Government of Puerto Rico to create the necessary foundation for economic growth and to restore opportunity to the people of Puerto Rico.

In its oversight of the Medicaid Enterprise, the FOMB must approve all government contracts and amendments with an aggregate value of \$10 million or more. FOMB may review any contract below that threshold at its sole discretion. All proposed contracts or amendments stemming from the rate negotiations between PRHIA and the Plan Vital MCOs must be submitted to the FOMB for review and approval prior to

execution. Also, certain proposed rules, regulations, administrative orders, and executive orders must be submitted for FOMB review prior to enactment.

## 4.2 Healthcare Needs

As of September 2023, approximately half of Puerto Rico's population is enrolled in Medicaid and CHIP.<sup>13</sup> To provide the best possible service for beneficiaries, we have implemented coverage changes, enhanced collaborative efforts with various agencies for data collection, and subsequently are utilizing this data for making well-informed decisions, particularly in support of vulnerable populations.

Self-reported health is often fair or poor for Puerto Rico residents. This can be attributed to lifestyle choices as well as the prevalence of chronic conditions they report. These chronic conditions put Puerto Rico residents at higher risk of life-threatening health complications. Medicaid's inability to fund the full range of services exacerbates the problem.

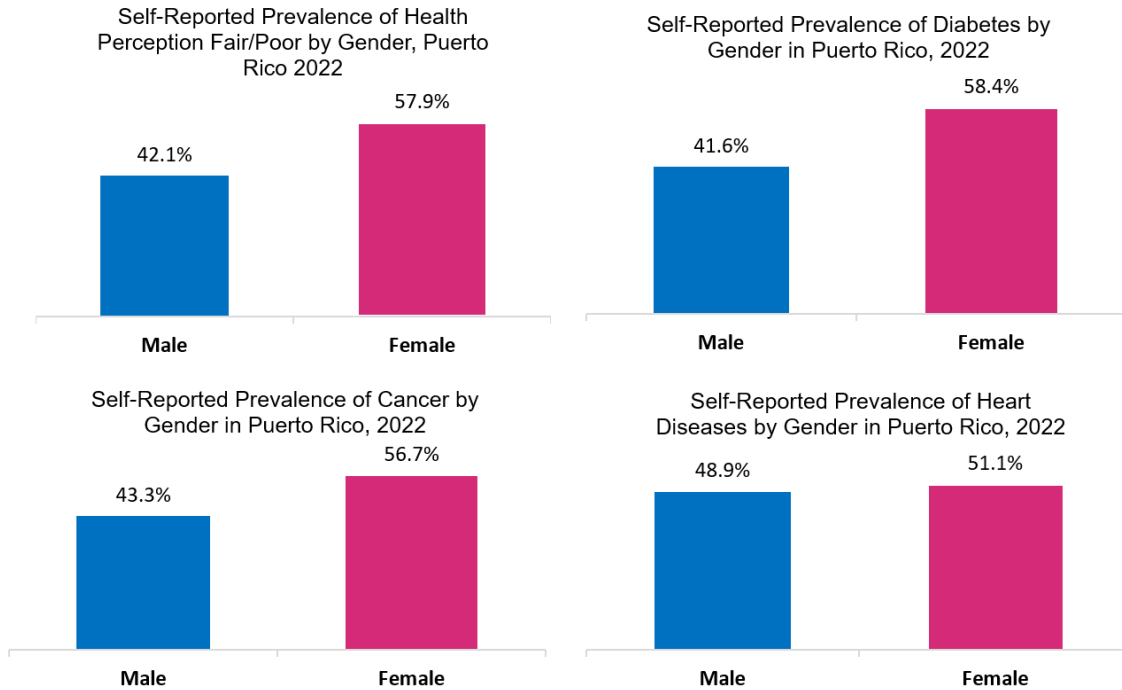
The Behavioral Risk Factor Surveillance System (BRFSS) is a collaborative project between all the states in the United States and participating U.S. territories and the Centers for Disease Control and Prevention (CDC). The BRFSS is administered and supported by CDC's Population Health Surveillance branch, under the Division of Population Health at the CDC's National Center for Chronic Disease Prevention and Health Promotion. Puerto Rico collaborates with the CDC to conduct BRFSS surveys that collect information about demographic characteristics and the prevalence of healthcare needs within Puerto Rico. The survey results help frame the demographic landscape and the distribution of chronic health conditions that require the development of effective public health interventions and tailored healthcare strategies. Collecting this information provides Puerto Rico leadership with a better understanding of health-related behaviors. Figure 8 shows self-reported health status and prevalence of diseases in the Puerto Rico Behavioral Risk Factor Surveillance System (PR-BRFSS) survey.

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<sup>13</sup> Departamento De Salud. September 2023. "Programa Medicaid Statistics." *Departamento De Salud. Programa Medicaid - Departamento de Salud*



**BRFSS Self-Reported Prevalence of Disease and Health Perceptions in Puerto Rico**



**Figure 8: BRFSS Self-Reported Prevalence of Disease and Health Perceptions in Puerto Rico<sup>14</sup>**

For a more comprehensive explanation about the BRFSS surveys, please see 4.2.2 Identifying Healthcare Needs. See Appendix A for information about the BRFSS survey, a breakdown of the responses, and a more comprehensive summary of the conditions impacting Puerto Rico residents.

Puerto Rico also faces heightened challenges due to its geography, including hurricanes, power outages, earthquakes, and high dependence on imported health technology. Notably, hurricanes have been detrimental and take years to recover from. In September 2017, Hurricanes Irma and Maria caused billions of dollars in damage to Puerto Rico. The impact of these hurricanes cannot be overstated. The hurricanes left severe economic losses and damage to infrastructure. Hundreds of thousands of residents needed assistance to meet basic needs for an extended period.<sup>15</sup> The hurricanes shut down electricity, water, and sewer services, hindered first responders’ ability to dispatch 911 calls, and halted transportation.<sup>16</sup> Schools and some healthcare facilities were forced to close, and hospitals had to rely on emergency generators.<sup>17</sup>

Despite challenges, Puerto Rico’s leadership is committed to ensuring access to healthcare. It has been shown that residents of Puerto Rico are receptive to new healthcare services, as exemplified by Puerto Rico having a higher percentage of people fully vaccinated against the COVID-19 virus compared to U.S. states. In 2023, 84% of the total population in Puerto Rico completed the primary series of vaccinations (as

<sup>14</sup> Behavioral Risk Factor Surveillance System Data Report 2022 (Appendix A)

<sup>15</sup> Central Office for Recovery, Reconstruction, and Resiliency. August 8, 2018. “Transformation and Innovation in the Wake of Devastation: An Economic and Disaster Recovery Plan for Puerto Rico.” *Central Office for Recovery, Reconstruction, and Resiliency*. <https://recovery.pr.gov/documents/pr-transformation-innovation-plan-congressional-submission-080818.pdf>

<sup>16</sup> Ibid.

<sup>17</sup> Ibid.

compared to the U.S. at 69%).<sup>18</sup> This demonstrates the willingness of Puerto Rico residents to take part in healthcare services when they are accessible.

#### 4.2.1 COVID-19

Federal pandemic flexibilities enabled Puerto Rico to enact time-limited coverage changes that adapted Medicaid operations to beneficiary needs to address the complexities and health threats posed by the COVID-19 pandemic. In 2021, Puerto Rico authorized pharmacies, pharmacists, pharmacy interns, and pharmacy techs to administer the COVID-19 vaccination under the preventive services benefit. The coverages also updated the reimbursement methodology for vaccine administration. Puerto Rico also implemented several other temporary benefits, which included disregarding unemployment compensation benefits funded by the territory, covering the new optional group for COVID-19 testing, imposing less restrictive resource tests on certain eligibility groups, and continuing to consider individuals as residents if they left the territory due to the pandemic.

Puerto Rico has continued efforts to provide accessible COVID-19-related services to Medicaid beneficiaries. In 2023, in compliance with the American Rescue Plan (ARP), Puerto Rico extended coverage for COVID-19-related treatments, COVID-19 vaccines and vaccine administration, and COVID-19 at-home testing. All of these benefits are provided without beneficiary cost sharing. This extended coverage helps Puerto Ricans manage the transition from a pandemic to an endemic disease.

#### 4.2.2 Identifying Healthcare Needs

To continue efforts to adapt to the needs of island residents, the PRDOH is conducting studies of vulnerable communities focusing on the impact of COVID-19. The goal of these studies is to lead to intervention activities that will mitigate health disparities. Through careful analysis of the study results, strategies are being developed to support communities. Report findings are utilized to formulate recommendations for Puerto Rico program leadership, to help make informed decisions for COVID-19-related and other healthcare needs of Puerto Rico residents. See Appendices B, C and D for more information about the PRDOH survey methodology, results, and recommendations.

Additionally, as previously mentioned, PRDOH and CDC BRFSS surveys collect information about demographic characteristics and the prevalence of healthcare needs within the population. BRFSS is a continuous system of telephone surveys designed to gather information on health-related risk behaviors, chronic health conditions, and the utilization of preventive services among noninstitutionalized adults aged 18 and older residing in the United States. The PRDOH, operating under a cooperative agreement with the CDC, first implemented the BRFSS in 1996. The primary aim of BRFSS is to gather standardized, state-specific data on preventive health practices and risk behaviors associated with chronic diseases, injuries, and preventable infectious diseases among adults. Key factors assessed by BRFSS include tobacco usage,

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<sup>18</sup> U.S. Department of Health & Human Services. February 23, 2023. "Puerto Rico Territory Profile Report, 02.23.2023." *HealthData.gov*. [https://healthdata.gov/api/views/dfc5-i6nj/files/fc8142b3-dca6-40ee-9207-25e8148464f8?filename=Puerto Rico State Profile Report 20230223 Public.pdf](https://healthdata.gov/api/views/dfc5-i6nj/files/fc8142b3-dca6-40ee-9207-25e8148464f8?filename=Puerto+Rico+State+Profile+Report+20230223+Public.pdf)

healthcare coverage, knowledge and prevention of HIV/AIDS, physical activity, and fruit and vegetable consumption.

The BRFSS report provides a comprehensive analysis of health perception, chronic health conditions, and the impact of COVID-19 in Puerto Rico. By examining the prevalence of chronic conditions, vaccination status, infection rates, and public health implications, we gain a deeper understanding of the health landscape in the territory. We recognize the importance of collecting and analyzing data that enables Puerto Rico to make informed decisions and implement targeted interventions. As Puerto Rico navigates the complexities of public health, it becomes evident that data-driven strategies are paramount in safeguarding the well-being of our population.

### 4.3 Funding

This section describes Puerto Rico's specific funding schema and how that funding is utilized. The current state of the program, including improvements and reforms, was made possible by various federal funding extensions and temporary increases.

From July 1, 2011, through September 30, 2019, Section 2005 of the ACA provided an additional \$5.5 billion in Medicaid funding to Puerto Rico by amending Section 1108(g) of the SSA.<sup>19</sup> Once the annual capped allotment appropriated through the ACA was used, Puerto Rico was able to draw down from a pool of \$925 million above the \$5.5 billion of funds appropriated in lieu of establishing a health insurance marketplace.<sup>20</sup> The Consolidated Appropriations Act of 2017 provided Puerto Rico with nearly \$300 million in additional Medicaid funds, and the BBA of 2018 provided Puerto Rico Medicaid with \$3.6 billion in disaster response funding until September 30, 2019.<sup>21</sup> The Further Consolidated Appropriations Act, 2020 (P.L. 116-94) provided Puerto Rico and the other U.S. territories with an increase in Section 1108(g) of the SSA capped funds and an increase in the FMAP to 76 percent.<sup>22</sup> In FFY 2021, on September 30, 2021, Congress passed a continuing resolution (CR) that maintained Puerto Rico's current capped allotment funding levels and enhanced FMAP through December 3, 2021. The Families First Coronavirus Response Act (P.L. 116-27) increased the federal capped allotment for Puerto Rico and increased the FMAP rate for all Medicaid programs by 6.2 percent for the period of the COVID-19 PHE.<sup>23</sup>

The Consolidated Appropriations Act, 2023, P.L. 117-328, was signed into law on December 29, 2022. P.L. 117-328 delinks the Medicaid continuous coverage requirement from the enhanced FMAP (6.2 percent) authorized as part of the COVID-19 PHE and extends the 76 percent FMAP for Puerto Rico for five years (through the end of the FFY 2027).<sup>24</sup> P.L. 117-328 also allocates Medicaid funding in Puerto Rico for the next five years and secures the U.S. government's portion of Puerto Rico's costs. For FFY 2023, Puerto Rico is

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<sup>19</sup> Congressional Research Service. June 22, 2023. "Legislative History of Medicaid Financing for the Territories." *Congressional Research Service*. [https://www.everycrsreport.com/files/2023-06-22\\_R47601\\_a8b408e9224568ef24c5b49c245e910420059e86.pdf](https://www.everycrsreport.com/files/2023-06-22_R47601_a8b408e9224568ef24c5b49c245e910420059e86.pdf)

<sup>20</sup> Ibid.

<sup>21</sup> Ibid.

<sup>22</sup> Ibid.

<sup>23</sup> Ibid.

<sup>24</sup> Consolidated Appropriations Act, H.R. 2617, Pub. L. 117-328 (2023). [H.R.2617 - 117th Congress \(2021-2022\): Consolidated Appropriations Act, 2023 | Congress.gov | Library of Congress](https://www.congress.gov/bills/117/2617/versions/1/summary)

granted \$3.275 billion in Medicaid funds.<sup>25</sup> Puerto Rico has appreciated the increases and acknowledges that P.L.117-328 removed “temporary” from the reference to the FMAP increase in Section 1905(ff) of the act. However, the sunset date for the FMAP increase for Puerto Rico is still set in statute as September 30, 2027, unlike the other territories.

P.L. 117-328 further establishes criteria for an additional \$375 million annually for the Puerto Rico Medicaid Program if specific requirements are satisfied.<sup>26</sup> The requirements and Puerto Rico actions are detailed here:

Puerto Rico is eligible to receive \$300 million in additional funding by establishing a reimbursement floor for physician services at 75 percent of Medicare reimbursement. Puerto Rico has amended its contracts with MCOs to include the 75 percent reimbursement floor. Puerto Rico appreciates receipt of the \$300 million for FFY 2023 and looks forward to continuing to work with CMS to help ensure receipt of this funding for FFY 2024 through FFY 2027.

Puerto Rico is also eligible for an additional \$75 million for FFY 2023 through FFY 2027. To receive this funding specifically for FFY 2023 through FFY 2025, Puerto Rico must satisfy the requirements in Paragraph (7)(A)(i) of Section 1108 of the SSA, which requires the designation of an officer (other than the director of such agency) to serve as the program integrity lead, which Puerto Rico established to satisfy the requirement. Puerto Rico appreciates receipt of the \$75 million for FFY 2023 and looks forward to continuing to work with CMS to help ensure receipt of this funding for FFY 2024 through FFY 2027.

Puerto Rico continues to satisfy the requirements in Paragraph (7)(A)(i) of Section 1108 of the SSA by designating a program integrity lead who is not the director of the agency.

To continue to receive the additional \$75 million in FFYs 2026 and 2027, Puerto Rico must continue to meet the requirements for the program integrity lead, and the U.S. Health and Human Services Secretary must determine that Puerto Rico has designated a contracting and procurement oversight lead who is fulfilling the requirements in Paragraphs (7)(A)(v)(II) and (7)(A)(v)(III) of Section 1108 of the SSA. Puerto Rico has a designated contracting and procurement oversight lead and anticipates no difficulties in receiving the additional \$75 million through FFY 2027.

Puerto Rico appreciates this additional support and is pleased to acknowledge the receipt of the additional \$375 million for FFY 2023. We look forward to continuing to comply with the requirements of P.L. 117-328 to receive this funding for FFY 2024- 2027.

#### **4.4 Demographics of Program Enrollment and Eligibility Enhancements**

As of September 2023, Puerto Rico provides Medicaid coverage to approximately 1.5 million individuals,

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<sup>25</sup> Consolidated Appropriations Act, H.R. 2617, Pub. L. 117-328 (2023). [H.R.2617 - 117th Congress \(2021-2022\): Consolidated Appropriations Act, 2023 | Congress.gov | Library of Congress](https://www.congress.gov/bills/117/2617)

<sup>26</sup> Ibid.

with a total population of 3.2 million residents.<sup>27</sup> An additional 69,000 children under the age of 19 are covered under the island’s CHIP.<sup>28</sup>

We are determined to provide high-quality care to our beneficiaries. We continue to make efforts to expand eligibility for Medicaid coverage on the island and our deep commitment to the health of the population we serve.

In December 2020, with additional funding provided by P.L. 116-94, we extended the sunset date for the income eligibility level to 85 percent Local Poverty Level (LPL). As of July 31, 2021, 33,785 beneficiaries became eligible due to this change. Puerto Rico removed the sunset date from the 85 percent LPL , effective October 1, 2022.

As a result of additional funding provided by P.L. 117-328, Puerto Rico has submitted a Medicaid State Plan Amendment, which once approved, will further increase income eligibility levels to 100 percent of the FPL. This is a significant enhancement as previously, due to funding constraints, Puerto Rico had to deflate the poverty level to a LPL, which meant Puerto Rico residents had to have lower incomes to qualify for Medicaid than U.S. state residents. The proposed FPL increase has the potential to provide Medicaid coverage for a significantly larger share of the Puerto Rican population.

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<sup>27</sup> Puerto Rico Department of Health. September 2023. “Beneficiaries by Program as of September 2023.” *medicaid.pr.gov*. September 21, 2023. <https://medicaid.pr.gov/Info/Statistics/>

<sup>28</sup> Puerto Rico Department of Health. September 2023. “Beneficiaries by Program as of September 2023.” *medicaid.pr.gov*. September 21, 2023. <https://medicaid.pr.gov/Info/Statistics/>

## 5. Program Operations

### 5.1 Governance

Puerto Rico continues to add rigor, structure, and standardization across our departments and projects to bolster accountability and improve the performance of our agencies as we strengthen governance structures. We believe a strong governance structure, with underlying processes that support that structure, can provide the goals, vision, and strategic direction for our Medicaid Enterprise, and allow for coordination across the agencies engaged in the enterprise. We have enabled stronger, more consistent decision-making by establishing planned and documented leadership meetings across the Medicaid Enterprise to guide contracting reform and program management. We have also created a governance process for PRDOH and PRHIA to manage data, streamline reporting, and improve quality more effectively. This process guides the implementation of priority initiatives and subsequent enhancements to data management and reporting operations.

While executive leadership sets priorities and assigns resources within and among projects, organizations need additional support to achieve effective, efficient, and consistent program and project management.

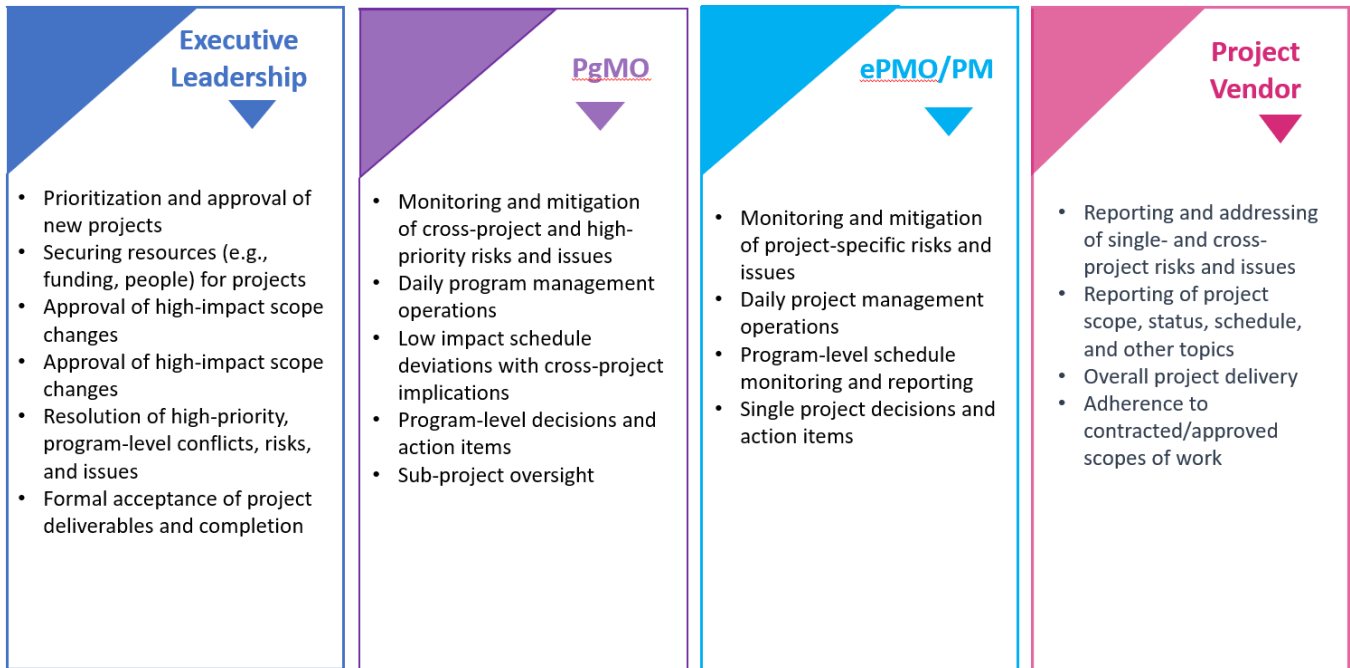
Since the last report, Puerto Rico has established two new governance structures: the Program Management Office (PgMO) and the Enterprise Project Management Office (ePMO).

The PgMO ensures cross-project coordination and manages overarching risks and issues. The PgMO Roadmap has been, and will continue to be, used to guide the full implementation of the PgMO and ensure its effectiveness. The Roadmap will continue to be updated over time. Documents and tools that will support the work of the PgMO include the Outcomes Management Plan (OMP) to support Puerto Rico's move to a more outcomes-based organization per CMS' direction, the regularly updated technology-focused Medicaid Enterprise Systems (MES) Roadmap (described further in Section 5.2) that will guide information technology priorities, and program-level Risk, Action Item, Issue, Decision (RAID) Logs. The PgMO is developing guidance and reusable processes, tools, and artifacts for enterprise standardization.

The primary focus of the ePMO is the standardization of project management tools, processes, roles, and approaches across all MES projects. The ePMO is actively engaged in managing Phase III enhancements to the MMIS and, to a lesser extent, the management of eligibility and enrollment system enhancements. The ePMO makes single-project decisions and oversees daily project operations. The ePMO's work is supported by a set of 14 plan aids created by the PgMO to onboard and manage all new MES vendors and help ensure best practice and standardized approaches. These include aids to manage scope, schedule, cost, changes, quality, and stakeholders as well as templates for change requests and status reports.

Figure 9 shows the different functions of the different levels of governance:

## Levels of Governance



**Figure 9: Levels of Governance**

Other tools and planning documents are in various stages of implementation and focus on helping ensure successful system certifications, including enhanced key program and project metrics and a certification management plan.

Finally, we have invested in a transparency effort, in which program updates and information are publicly shared, improving public trust in our activities.

### 5.1.1 Planned

In addition to maintaining and strengthening project and program management, Puerto Rico is looking to enhance its data governance function. We continue to improve our data collection and analysis capabilities, making it easier for our staff to identify areas of focus for their oversight and management activities and supporting our commitment to data-driven policy and decision-making.

An enterprise-level data management plan is being developed, which will include the creation of a data governance group. Implementation of that plan will be a key priority. Implementation of MMIS Phase III will result in enhanced data quality and data integration.

The implementation of the electronic data warehouse (EDW) will be critical to supporting access to data, key program reporting and analysis, creating a holistic view of our population, and developing and a single version of truth. The goal is to integrate the analytic data into a single data repository for access to analytics across multiple data sources (i.e., the MMIS, HIE, and the eligibility and enrollment system).

Puerto Rico plans to implement a program-level Organizational Change Management (OCM) initiative. This

will include preparing our new PRMP OCM team to apply OCM concepts to MMIS Phase III and future projects and empowering PRMP to successfully maintain and mature an internal OCM department. The implementation of this initiative will also help ensure the successful adoption of technology by reducing resistance to new business processes and technology.

## 5.2 Technology

Puerto Rico is committed to using the power of data and technology to improve operations, drive innovation, and continually push to provide better services to U.S. citizens living in Puerto Rico. We have enhanced the eligibility process and provider enrollment process by procuring new technologies and implementing system modernization efforts, allowing both units to streamline their verification and validation procedures. Puerto Rico Medicaid Eligibility has procured, implemented, and is now using a new eligibility system, MEDITI3G, which allows the eligibility team greater transparency and consistency in its eligibility procedures and will support the implementation of federal MEQC requirements. The system went live on June 1, 2021, and was certified in February 2023.

We are in the process of implementing MMIS Phase III, which will focus primarily on enhancing financial management business processes. Go-live is scheduled for April 2024, with federal certification expected in November 2024. MMIS Phase III will improve access to and the accuracy of financial data, simplify the processes in provider financial management, and help ensure timely and complete reporting of financial data to the federal government.

### 5.2.1 Planned

In a continuous effort to enhance MEDITI3G, the following enhancements are planned: Verify Lawful Presence (VLP), Citizen Portal updates, “No-Touch” application processing, and improvements to overall data quality and reporting capabilities.

We produced an MCO Report Card framework to begin measuring MCO performance and quality in providing benefits and services to the Medicaid population. This framework will continue to help us create an MCO Report Card to enhance public transparency of MCO performance.

Puerto Rico has already launched the fully automated Provider Enrollment Portal to screen and enroll providers in the Medicaid program. We are now planning the next enhancement: to procure, implement, and maintain a Centralized Provider Enrollment and Credentialing (CPEC) solution to manage all Medicaid providers' enrollment, credentialing, and other related activities. An RFP was released, and Puerto Rico is in the process of awarding a contract.

Puerto Rico is currently researching automated asset verification systems and will comply with federal guidelines before the January 1, 2026, deadline. Puerto Rico has already conducted research on other states' systems and has begun to coordinate with other agencies such as the United States Department of the Treasury. A draft RFP has been developed, and Puerto Rico has begun to host vendor presentations.

The MES Roadmap outlines overarching information technology plans rather than specific functionality



upgrades such as those described above. It is a living, multiyear planning document that defines, sequences, and prioritizes future initiatives and projects to bridge the gap between the current MES environment and the desired future state (e.g., aligning human capital with the MES strategic direction and working toward integrating systems across vendors and platforms).

Many of the undertakings described above are also key to our technology plans. Improved project management, a new electronic data warehouse, and OCM are all critical components of Puerto Rico's approach to technology advancement.

## 5.3 Program Oversight

Puerto Rico continues the work of enhancing its infrastructure and oversight processes. We want to reflect the level of integrity and rigor in our programs as other states and demonstrate that we can operate and therefore be funded in the same capacity as states.

### 5.3.1 Program Integrity

Puerto Rico has taken significant steps in the areas of staffing, policy and procedure development, and coordination of program integrity activities across the Medicaid Enterprise.

Providing effective healthcare assistance to eligible beneficiaries and ensuring the financial sustainability of Puerto Rico's Medicaid Program requires a multifaceted approach to program integrity. This approach involves a range of activities and strategies such as verification of eligibility, analytics to detect fraudulent billing and improper payments, provider audits, and investigations into suspected fraud and abuse.

In addition to setting up governance committees, we have also identified performance metrics and developed reporting processes to gauge and communicate progress on program integrity and contracting reform efforts to our federal partners regularly. We have started standardizing program integrity metrics and the approach to identifying and investigating FWA across Puerto Rico Program Integrity Unit (PRPIU) and the compliance division within PRHIA. PRPIU and PRHIA have enhanced their inter-entity cooperation to integrate their approaches to program integrity, prevent information siloes, and enhance communication across units.

PRPIU and PRHIA regularly meet to share information, review leads, and coordinate referrals. PRPIU and PRHIA have standardized their review process across programs, such that they are reviewing for outliers and anomalous behaviors in tandem with each other.

Puerto Rico has been working on improving our staffing and providing a favorable experience to our providers to achieve our shared goal of improving the experience of our Medicaid beneficiaries. This section highlights some of the investments we are making to improve our internal staffing levels and provider experience, which contribute to improving the experience of our Medicaid beneficiaries.

#### 5.3.1.1 Staffing

Puerto Rico established the Division of Integrity, Investigations and Intelligence (D-III) within its Medicaid

Program to support the goal of improving the integrity of our program and enhancing oversight and transparency across the enterprise. We are making strategic investments in gauging staffing levels and workload equity for optimal execution of the Medicaid program. We continue to develop procedures for how best to assign tasks and staff to Puerto Rico Medicaid Program Integrity Unit (PRMPIU) and MEQC tasks so that the PRMPIU becomes a robust team.

D-III methods encompass outreach, education, prevention, industry liaison development, detection, investigation, referral, and the prosecution of FWA of those who victimize PRDOH Medicaid-sponsored programs and grants.

PRMP via D-III intends to assess FWA allegations and conduct preliminary and full investigations with an embedded Puerto Rico Department of Justice Prosecutor, three Department of Public Safety Investigators, and one senior investigator from the Puerto Rico Department of Hacienda (taxation). These resources—along with fraud, integrity, and quality control PRMP team members—will drastically enhance PRDOH’s ability to reduce Medicaid FWA in Puerto Rico.

### **5.3.1.2 Continuation of Program Integrity Lead**

Puerto Rico continues to satisfy the requirements in Paragraph (7)(A)(i) of Section 1108 of the SSA, which requires the designation of an officer (other than the director of such agency) to serve as the Program Integrity Lead.

The mission of the Medicaid Program Integrity Unit managed by the PI lead is to ensure compliance, efficiency, accountability, and coordination within Medicaid and its contracted entities in detecting and preventing FWA and ensuring that Medicaid, CHIP, and state dollars are appropriately paid according to federal and territory requirements. This mission is achieved through activities, including ensuring that contracted MCOs establish policies and procedures to address FWA and Program Integrity as well as auditing to ensure these processes are implemented and that MCOs comply with the contract provisions and federal and state regulations.

The primary objective of the PRMPIU is to ensure the ability to detect and deter potential FWA in the healthcare program. Other PRMPIU objectives include:

- Carrying out program safeguard functions effectively and efficiently
- Providing formal training to PRMPIU, appropriate other Medicaid staff, and contractors on FWA and program integrity
- Collaborating in the detection and investigation of cases identified as possible FWA
- Protecting the confidentiality of all provider and beneficiary information
- Ensuring MCOs recover inappropriate payments
- Referring credible allegations of fraud cases to the Medicaid Anti-Fraud Unit (MAFU), Medicaid Fraud Control Unit (MFCU), or the Office of Inspector General (OIG)

- Coordinating with the MFCU, OIG, and any other agencies
- Monitoring PRHIA’s oversight of MCOs
- Coordinating with the PRMP Policy Department
- Coordinating communication with the MCOs pertaining to surveillance and utilization review through the PRMP Program Integrity Director

PRMPIU initiatives also focus on educating both beneficiaries and healthcare providers about Medicaid rules and regulations, promoting transparency, and strengthening collaboration with law enforcement agencies. The ultimate objective of the unit is to maintain the program’s integrity, protect taxpayer dollars, and ensure Medicaid resources reach those in genuine need of healthcare assistance while deterring and addressing any instances of FWA.

Figure 10 shows the organizational chart for D-III:

**Organizational Chart for D-III**



**Figure 10: Organizational Chart for D-III**

**5.3.1.3 Policies, Procedures, and Tools**

Since the last report, Puerto Rico has developed an array of policies, procedures, and tools to strengthen its program integrity activities. These initiatives are detailed below.

- Puerto Rico developed a comprehensive Program Integrity Manual. This manual encompasses the activities of prevention, detection, investigation, referral, and prosecution of FWA. These activities mainly include monitoring claims patterns, auditing to ensure compliance with plan contracts and agreements, pursuing civil and criminal prosecution where evidence indicates fraudulent activity, and restitution where warranted.
- New formalized procedures related to provider enrollment and oversight were developed:

- Provider background check and fingerprinting policies and procedures
- Criteria for changing the risk level category of a provider and the requirements related to that change
- On-site provider audit requirements and processes
- Mandatory and discretionary provider termination requirements and processes.
- Training requirements for provider, staff, and MCO include:
  - HIPAA privacy requirements
  - Confidentiality and security requirements
  - Non-retaliation policy for whistleblowers
  - Identification and explanation of acceptable standards of practice as defined by applicable federal and state laws and regulations
  - Identification of unacceptable practices and improper activities
  - Explanation of FWA activities and legal penalties
  - PRMPIU contact information (telephone number, email, web page, postal address)
  - Overview of the internal monitoring and auditing process for providers
  - Administrative actions when required
  - If follow-up training is required, review of the disciplinary guidelines for noncompliant or fraudulent behavior will be discussed.
- Additional policies developed include:
  - Conflict of Interest Policy and a related disclosure form, which applies to all employees of PRMP-MMIS, contractual third parties, or partners doing business with PRMP-MMIS
  - Document retention
  - Post-payment review processes and requirements to determine if services were provided and billed in accordance with applicable regulations
  - Method for receiving a referral of FWA from an outside source
  - Appeal levels and processes for Medicaid
  - Refunding of federal share of Medicaid overpayments to CMS and the limitations of recouping overpayments from providers due to bankruptcy or business closure
  - Good cause to reconsider full or partial suspension of payment

- PRMP comprehensively updated its eligibility Policy and Procedures Manual. This Policy and Procedures Manual is another example of Puerto Rico’s commitment to ensure compliance in accordance with federal law, regulations, and the Medicaid State Plan. We also believe this Policy and Procedures Manual demonstrates Puerto Rico’s commitment to accountable eligibility determinations for Medicaid, CHIP, and the state population.

#### **5.3.1.4 Coordination**

Effective program integrity implementation requires a coordinated effort aimed at exhausting all approaches in the fight against ill-intended actors targeting PRMP process gaps and vulnerabilities. The collaborative effort which includes investigators/forensic expertise, law enforcement data system access, interagency investigation processes, interagency ability to share knowledge, understanding of the intelligence cycle, and joint problem-solving will enable PRDOH and its partners to hold violators accountable via civil negotiations, administrative sanctions, or judicial outcomes.

#### **5.3.1.5 Standardizing Activities**

Puerto Rico has started standardizing program integrity metrics and its approach to identifying and investigating FWA across PRMPIU and the compliance division within PRHIA. PRMPIU and PRHIA have enhanced their inter-entity cooperation to integrate their approaches to program integrity, prevent information siloes, and enhance communication across units.

PRMPIU and PRHIA have standardized their review process of FWA leads and are standardizing their treatment of referrals across programs, including reviewing for outliers and anomalous behaviors in tandem.

PRHIA is also working to ensure compliance with its MOU with PRMP with respect to communication, policies, and procedures determined by the Program Integrity Director.

#### **5.3.1.6 Ensuring Communication**

Puerto Rico is establishing regular meetings among those involved in program integrity efforts:

- Conducting bimonthly meetings between the Puerto Rico Medicaid Program Integrity Unit, the Puerto Rico Medicaid Fraud Control Unit, the OIG/Health and Human Services Puerto Rico office, and the MCOs.
- Establishing regular meetings between the PRMPIU and the Puerto Rico MFCU.
- Establishing regular meetings between the PRMPIU, and MCO’s Special Investigation Unit (SIU) to validate contract compliance.
- The Puerto Rico Medicaid Program Integrity Director and MCOs’ SIU will meet at least every three months.

Additionally, an MOU has been developed between MFCU and PRMPIU.

### 5.3.2 Procurement and Contract Oversight, Reform, and Management

Puerto Rico’s vision is to be recognized as a leader in ethics and transparency in procurement and contracting. We are striving to achieve this vision by establishing processes that identify contracting oversight and achieve results with the best possible impact on our beneficiaries—all at a lower cost to taxpayers. Puerto Rico has already taken significant steps toward achieving this goal by strengthening staff, increasing accountability, developing new processes and resource materials, and establishing criteria for non-competitive procurements. Multiple contracts, currently in the RFP phase, that were previously awarded on a sole-source basis, are now subject to competitive bidding.

We have created the following guiding principles to inform the entire procurement process:

<b>Contracting and Procurement Guiding Principles</b>	
<b>Enhance the strategy and planning efforts in our procurements</b>	Strive to align the procurement and contracting processes with the mission and goals of Puerto Rico Medicaid and CMS and engage our multiple agencies within the enterprise in this effort. The procurement process will drive innovative strategies to advance the Medicaid Enterprise.
<b>Further drive competition across procurements</b>	Seek to procure high-quality goods, works, and services in a competitive manner.
<b>Standardize and unify our processes</b>	Use a common structure to standardize and formalize procurement and contracting processes.
<b>Increase transparency</b>	Make most procurement scoring decisions and other relevant information easily accessible to internal and external stakeholders.
<b>Use data to inform our operations</b>	Make data central to our procurement processes and derive insights from that data to drive procurement decisions.
<b>Promote efficient and cost-effective processes</b>	Strive to maximize value by considering existing and expected organizational demands, capabilities, availability of resources, and funding without compromising the efficient provision of goods and services that best serve beneficiaries' needs.
<b>Seek value for money and good stewardship of public funds</b>	Spend public money wisely and focus on reducing waste and abuse of taxpayer dollars.
<b>Create a culture of ownership, accountability, and continuous learning</b>	Define clearly and openly communicate roles and responsibilities across parties throughout the procurement and contracting process. Stakeholders will work cooperatively and collaboratively to continuously improve contracting and procurement processes.

**Table 1: Contracting and Procurement Guiding Principles**

#### 5.3.2.1 Staffing

Puerto Rico has hired a Procurement Oversight Lead, a Procurement Officer, and an Administrative Assistant. The Contracting and Procurement group is part of PRMP’s Administrative Division. Contracting efforts, described further below, are carried out by the Contracts branch with the Administrative Director

as its lead; Procurement efforts are carried out by the Procurement branch and Oversight Lead. The Procurement Oversight Lead informs the Administrative Director of ongoing and future procurement processes.

The Procurement Oversight Lead's position description as it relates to procurement includes:

- Developing a procurement protocol; establishing, communicating, and implementing long-term goals for the office to promote effectiveness and efficiency.
- Serving as the primary contact for procurement-related questions, training, policy and procedure interpretation, and alignment by all departments.
- Ensuring all applicable laws are followed during the process.
- Developing, organizing, and directing procurement policies and procedures.
- Attending meetings on behalf of the procurement office with upper management, clients, guests, vendors, and auditors.
- Managing the procurement process interfaces with all relevant departments and product management teams to effectively support procurement.
- Developing and implementing innovative procurement strategies to maximize spending, reduce risk, and generate savings.
- Attending meetings of the Evaluation Committee.
- Assessing risks of potential contracts and agreements.
- Updating PRMP on all laws and administrative orders related to procurement.

### 5.3.2.2 Policies, Procedures, and Tools

Puerto Rico's most significant policy development accomplishment is the new PRMP Contracting Transparency, Non-Competitive Procurement and Competitive Bid Evaluation Process Standard Operating Procedure (SOP).

This document was developed as a part of Puerto Rico's work to comply with Medicaid contracting reform requirements set forth in Federal Act P.L. 116-94 from December 2019 (particularly, Requirement 3, Develop Contracting Reform Plan). Additionally, the U.S. GAO, and CMS have issued recommendations for Puerto Rico to streamline contracting procedures and increase transparency and requested clarity into PRMP's procurement procedures. The SOP is meant to satisfy the requirement for a written procedure for contracting transparency. This process will be followed to ensure compliance with territorial and federal laws, regulations, and administrative orders. Draft contracts will be shared with CMS only when required as part of the Advanced Planning Document (APD) process.

The process of creating the SOP included conducting research into leading procurement practices of peer

states with similar financial resources and staffing capacity. Additionally, federal guidance and statute, and administrative orders regulating the PRDOH were consulted and integrated. The Contracting Reform Leadership team met regularly to develop these procedures. The process was also informed by Puerto Rico's practical experience using an RFP to hire an External Quality Review Organization (EQRO) contractor.

The SOP is a living document that will be updated as required to reflect new territory or federal requirements.

The SOP consists of a set of steps to be consistently followed to complete the business task efficiently and effectively while maintaining transparency throughout the procurement process. Documenting and following an SOP will allow PRMP to operate in a process-driven manner. The SOP also serves as a training document for new and existing staff, a reference document to guide processes, and a checklist that can be shared externally to demonstrate compliance with federal requirements in Medicaid contracting. More specifically, the SOP was created to:

- Streamline PRMP operations and increase efficiency by bringing consistency to the contracting process
- Increase transparency and accountability by identifying clear process owners at every step
- Decrease training time for new/transitioning employees by providing a written resource detailing the process steps related to procurements
- Provide consistent procedures for applying the CMS regulations and other federal requirements
- Facilitate easier reviews and audits of contracting processes.

This comprehensive document, which became effective June 1, 2022, covers the following areas:

- **Transparency:** The SOP describes the key procurement documents published or disseminated to support transparency and stakeholder involvement in the competitive and non-competitive procurement processes. This SOP covers the following procurement documents issued by ME: Bid Announcements, RFP/Request for Quotation (RFQ) for competitive procurements, Notice of Intent to Award Contract, and the Final Contract. The Contracting Transparency Processes consist of the program actions to ensure all stages of the procurement process (from bids to contracts) are widely available and easily accessible to potential bidders, internal staff, and the general public to promote competition and fairness in the Medicaid program.
- **Process Improvement and Standardization:** This includes a description of what initiates a procurement, the procedure to create an RFP, steps to evaluate and score bids, including descriptions of the evaluation committee and its works, bidder question and answer protocols, and negotiating contract drafting. The SOP also provides related confidentiality and conflict of interest forms. To facilitate process improvement, procurement reviews are now computer-based rather than paper-based.



- **Accountability:** The SOP covers who participates in the process and who has ownership of, and must sign off on, the various steps of the different processes, including a determination that a non-competitive procurement is allowable. This will involve the participation of contracts, legal, finance, and others. Participants may vary depending on the type of contract (e.g., whether it is professional services or a technical systems procurement).
- **Criteria for non-competitive procurements:** Puerto Rico has established that if a contract will be under \$150,000 annually and is not complex, a competitive bid process is not required. There may be some exceptions to these criteria, notably when a contract extension is needed to complete critical work, or there must be a response to a public emergency. A determination that an exception to the competitive bidding process must be accompanied by justification, and there must be confirmation and signoff that all the required steps have been taken.
- **Compliance oversight:** The SOP covers ensuring appropriate attention to oversight, particularly related to the requirement for FOMB approval for contracts over \$10 million. This requirement often slows the procurement process.

### 5.3.2.3 Contract Management

In addition to substantial progress toward improving Puerto Rico's Medicaid procurement processes and making them more competitive, Puerto Rico has acted to improve its management of contracts once they are in place. Puerto Rico has taken the following steps:

- Gathered contract management best practices.
- Increased internal staffing capacity and expertise to manage growing vendor and contract management needs. The Procurement Oversight Lead's responsibilities related to contract management include:
  - Facilitating communication and liaison between vendors and the Medicaid program.
  - Conducting vendor performance reviews.
  - Reporting MES Vendor Management issues to the PgMO.
  - Monitoring vendor performance and compliance with SLAs.
- Establishing and enforcing clear and comprehensive vendor management policies under the direction of PRMP vendor management staff, including tracking and reporting on service metrics.
- Standardizing vendor/contract templates, processes, and expectations to create alignment and efficiencies across the MES as described in the Governance section of this report.
- Formally establishing the PgMO by executive order, which is responsible for coordinating with the procurement office.
- Creating the ePMO, which manages and standardizes information technology projects as discussed

further in Section 5.1.

- Making priority MES procurements outcomes-focused, leveraging contractual ties to demonstration of outcomes.

Puerto Rico has made substantial progress but recognizes there is more work to be done. We continue to work with vendors on contractual terms, moving to outcomes-based procurements, adherence to requirements, and participation in contract management activities.

### 5.3.3 PERM and MEQC

The PERM program measures improper payments in Medicaid and CHIP and calculates improper payment rates for each program. Although CMS has conducted PERM audits on state Medicaid program payments for many years, the program is just being implemented in Puerto Rico. After significant planning, including meetings with PERM contractors and CMS, trainings, operational and system review, and the preparation of related documents, Puerto Rico's pilot PERM review for the reporting year 2024 is currently underway. CMS contractors are reviewing improper payment rates for the reporting period of July 1, 2022, through June 30, 2023. PRMP has submitted all quarterly data. Eligibility case file reviews are underway, while data processing reviews are pending the resolution of technical issues. Review of pharmacy claims is on hold, as Puerto Rico pays these claims under a non-risk managed care arrangement, and CMS needs to determine if these claims should be reviewed using managed care or fee-for-service methodology. During planning and implementation, Puerto Rico has strengthened reporting to identify and apply corrective measures to avoid and correct PERM findings and has addressed delays in data submission.

Under MEQC, states design and implement pilots to evaluate their Medicaid eligibility processes. States have flexibility in designing their studies. Similarly to PERM, states have conducted MEQC reviews for many years. Puerto Rico, however, is currently undertaking its first MEQC review. The MEQC manual used by staff to conduct the pilot is undergoing final revisions. MEQC pilot preparation activities, including developing the plan and drafting the pilot document are ongoing. The MEQC pilot plan is due to CMS by November 1, 2023, for the review period of Calendar Year (CY) 2024. The MEQC report for CY 2024 reviews is due to CMS by August 1, 2025.

Currently, Puerto Rico's MEQC unit primarily consists of seven reviewers and an MEQC director. Each region has one reviewer who is responsible for conducting all MEQC reviews. The MEQC director assigns cases, manages the post-review process, verifies and submits findings, and handles the appeals processes as it pertains to MEQC findings and errors. The MEQC unit also has both a Public Assistance Reporting Information System (PARIS) contact to ensure there is no duplication of benefits across states and an administrative assistant. These staff are currently conducting informal reviews in preparation for the first pilot.

#### 5.3.3.1 Planned Next Steps

Future plans for both PERM and MEQC focus on improving process and collaboration. These include:

- Finalizing SOPs for both PERM and MEQC
- Improving collaboration, including enhancing the partnership with ASES.
- Automating sample selection for MEQC for the next PERM cycle.

## 6. Impact of Program Investments

While Puerto Rico is continuously working toward enhancing our controls, compliance, and oversight activities; being good stewards of program funds; and enhancing public trust in the execution of our Medicaid program, we remain committed to ensuring the program achieves its ultimate goal of providing healthcare for those citizens who qualify for Medicaid. This section highlights some of our key investments and our future priority enhancement efforts. Each investment has been a strategic effort to improve the Medicaid experience for beneficiaries.

In addition to our internal-facing enhancements discussed earlier in this report, we have added new covered services and made considerable investments for our provider community to increase reimbursement rates across provider settings and types. Our program relies on a provider network that can meet the needs of our beneficiaries, and the investments made over the past year have provided higher reimbursements for providers, allowing them to continue to participate in our Medicaid program.

Each investment is focused on our shared goal of improving the experience of our Medicaid beneficiaries. We strive to improve their ability to access care when it is needed and ensure that the care they receive is high-quality.

### 6.1 Increase Provider Payments

We collaborated with the Office of the Assistant Secretary for Planning and Evaluation within Health and Human Services (HHS) to conduct research into analyzing provider movement off the Island or out of Medicaid. These findings suggested significant challenges to keeping providers within the Medicaid program. Before Hurricanes Irma and Maria in 2017, approximately 500 doctors per year were leaving the Island for the mainland. Additionally, Puerto Rico had about half as many emergency room (ER) physicians, neurosurgeons, and ear, nose, and throat (ENT) specialists compared to the mainland average.<sup>29</sup> It is evident that historic funding levels within our Medicaid Enterprise were considered insufficient by providers participating in the Medicaid program. One study by the American Association of Family Physicians found that only four out of ten family medicine graduates remain in Puerto Rico. Primary care doctors who have stayed on the island have a median age of 60, compared with 53 years nationally.<sup>30</sup> Moreover, PR has the lowest number of registered nurses (RNs) per thousand of any state in the U.S., and salaries for both RNs and licensed practical nurses (LPNs) are less than half of what they are in the U.S.<sup>31</sup>

In 2017 the Department of Economic Development and Commerce (DEDC) approved the Incentives for the Retention and Return of Medical Professionals Act, which applied a reduced income tax rate of 4% for providers in Puerto Rico. This was in an effort to overcome the number of doctors who were halting

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<sup>29</sup> Office of the Assistant Secretary for Planning and Evaluation. January 12, 2017. "Evidence Indicates a Range of Challenges for Puerto Rico Health Care System. U.S. Department of Health and Human Services."

[https://aspe.hhs.gov/sites/default/files/migrated\\_legacy\\_files/171926/PuertoRico\\_Assessment.pdf](https://aspe.hhs.gov/sites/default/files/migrated_legacy_files/171926/PuertoRico_Assessment.pdf)

<sup>30</sup> Wilkinson, Elizabeth, David Killeen, Gabriel José Pérez-López, and Yalda Jabbarpour. January 1, 2020. "A Shrinking Primary Care Workforce in Puerto Rico." *American Family Physician* 101(1): 13-14. [A Shrinking Primary Care Workforce in Puerto Rico | AAFP](#)

<sup>31</sup> Bureau of Labor Statistics, U.S. Department of Labor. September 6, 2023. "License Practical and Licensed Vocational Nurses." *Bureau of Labor Statistics*. <https://www.bls.gov/ooh/healthcare/licensed-practical-and-licensed-vocational-nurses.htm>

practicing medicine in Puerto Rico over the last decade.<sup>32</sup> By 2018, 1,953 medical specialists applied for the incentive<sup>33</sup>, costing the Treasury \$237.5 million in 2021 according to an analysis by Open Spaces.<sup>34</sup> While this incentive program has positively impacted the finances of those medical specialists, it has not fully addressed the shortage of medical professionals on the island.

We remain focused on ensuring necessary access to services for the members of Plan Vital, a key element of which is offering a robust provider network. Some of the identified challenges to maintaining that network include the availability of certain provider types island-wide and low reimbursement levels for providers. Increased funding to the Medicaid program has allowed Puerto Rico to take steps to increase reimbursement levels for current and future providers.

### 6.1.1 Increases to Reimbursement for Physician Services

We increased Medicaid reimbursement for professional services under the Plan Vital managed care program from 70 percent to 75 percent of the Medicare Part B Fee Schedule.

Additionally, Medicaid beneficiaries are assigned to a Primary Medical Group (PMG), which delivers and coordinates primary care and other covered services. PMGs play a critical role in ensuring access to preventative care, primary care, and management of chronic conditions. Between October 2021 and September 2023, three fee schedule increases were made for primary care services delivered via PMGs. These fee increases are intended to improve and help sustain access to primary care and other professional services.

### 6.1.2 Inpatient Hospital Payments

This directed payment initiative is designed to increase hospital reimbursement at qualifying short-term acute care (STAC) hospitals to compensate for the operational losses arising from the provision of care for Medicaid beneficiaries.

The directed payments aim to sustain access to inpatient hospital services, support payment and delivery system transformation activities, and incentivize hospitals to code completely and accurately. Complete and accurate coding supports program oversight efforts and the ability of PRHIA to monitor services provided. As PRHIA designs a new DRG-based payment system, these directed payments are intended to support payment and delivery system transformation activities and help the inpatient hospitals remain operational during the transition to a new payment system. As per FOMB's Fiscal Plan, PRHIA will go live with a DRG-based payment system in October 2024.

### 6.1.3 Sub-Capitated Providers

This initiative was designed to increase reimbursement to physicians with a sub-capitated arrangement that could be accommodated within Puerto Rico's budget because sub-capitated providers were not addressed in 1108(g). We have been able to increase sub-capitated reimbursements, specifically providing an increase

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<sup>32</sup> ["Ley de Incentivos Para la Retención y Retorno de Profesionales Médicos" \[14-2017\]](#)

<sup>33</sup> [Some 2,000 doctors in Puerto Rico accept incentives to stay on the island \(diariolasamericas.com\)](#)

<sup>34</sup> [InformeEA\\_GastosFiscalesenPR\\_DesafiosInternos\\_y\\_PerspectivaMundial\\_VersiónEspañol.pdf - Google Drive](#)

to primary medical group and behavioral health providers that are reimbursed by the MCOs on a sub-capitated basis.

#### **6.1.4 Increased Reimbursement for Behavioral Health Services**

In January 2023, we increased reimbursements for behavioral health services to 80 percent of the Medicare Part B fee schedule from the prior rate of 70 percent. Reimbursing behavioral health services at this increased level aims to help sustain and improve access by providing financial incentives for physicians and other providers to remain Medicaid providers and provide behavioral health services to Medicaid beneficiaries.

#### **6.1.5 Increases in Reimbursement for Dental Services**

Between October 2021 and September 2023, three increases to the Medicaid payment rate for dental services were implemented. The goal of these increases is to improve access to dental care for Medicaid beneficiaries by providing financial incentives for dentists and dental surgeons to contract with MCOs. The financial incentives for dental providers support continued access to medically necessary dental services, including preventive, prophylactic, and emergency services which improve oral health.

### **6.2 Expanded Services**

#### **6.2.1 Expanded Adult Dental Services**

Puerto Rico added periodontal scaling and root planning, as well as partial dentures for adults, as covered services under a state plan amendment.

CMS has also approved maintaining a minimum dental fee schedule through September 30, 2023, and anticipates future continued federal approval. Puerto Rico has been able to successfully implement and track expenditures related to this increased benefit.

#### **6.2.2 Expanded Adult Vaccines**

Using a state plan amendment, Puerto Rico added coverage of all vaccines and related administration costs for Medicaid-eligible adults, as recommended by the Advisory Committee on Immunization Practices (ACIP). Previously coverage had only been available for higher risk adults.

#### **6.2.3 Medicaid Drug Rebate Program (MDRP)**

On January 1, 2023, Puerto Rico joined the MDRP. This was a complex, multipart implementation that included system changes and coordination with PRDOH, MCOs, Abarca, the pharmacy benefits manager, and the pharmacies themselves. Significant changes were also required in the State Plan. As part of the related SPA, Puerto Rico also broadened its coverage of prescribed over-the-counter drugs and is making its drug coverage policies more flexible to allow it to be more agile in responding to changes in pharmaceutical innovation and costs. Puerto Rico continues to work with CMS to finalize that amendment.

For the first two quarters in calendar year 2023, Puerto Rico issued over 700 invoices per quarter to manufacturers/labelers for retail pharmacy and physician administered drug rebates for a total of \$280.2 million. Representatives from the CMS pharmacy team completed a site visit to Puerto Rico in September 2023 and expressed their satisfaction with MDRP program implementation, particularly with the processes that have been put in place to meet all the requirements of the MDRP and the degree of understanding and technical expertise of the Puerto Rico team given the complexity of the MDRP. CMS also shared positive feedback on the number of invoiced rebates for the first two quarters of program implementation.

## 6.3 Member Experience

**We are committed to delivering high-quality, accessible care, and have continued to invest in enhancing eligibility processes, improving quality of services, and increasing access to care for members.**

Typically, the first interaction a citizen of Puerto Rico has with the Medicaid program is when they apply for Medicaid coverage. Recognizing the importance of consistent and accurate eligibility determination processes, the Puerto Rico Medicaid Program has completed a thorough review and update to its Puerto Rico Medicaid Policy and Procedures Manual. This manual is used by eligibility caseworkers and details Medicaid requirements related to Medicaid eligibility and outlines the application, evaluation, verification, and case maintenance processes.

The FFCRA required continuous enrollment, until the end of the PHE, of individuals who were eligible for Medicaid at the beginning of the PHE or who became eligible for Medicaid during the PHE. P.L. 117-328 made changes to no longer link FFCRA continuous eligibility with the end of the PHE, effectively ending continuous enrollment on March 31, 2023. Starting April 1, 2023, Medicaid agencies resumed normal eligibility processes, including renewals and terminations for those no longer eligible, and have 12 months to complete redeterminations. This process is commonly referred to as the “PHE unwind.” Puerto Rico identified 1.1 million households that need to have an eligibility redetermination during the unwind period. Puerto Rico has encountered multiple challenges during the unwind period and has continued to identify strategies and activities to mitigate these challenges. As a result of the challenges and new measures recently implemented, Puerto Rico submitted a request to CMS on October 17, 2023, seeking a six-month extension to the unwind period in order to successfully make a redetermination on all beneficiaries.

With the increase in funding appropriated, Puerto Rico has initiated efforts to expand Medicaid eligibility and benefits. We are working to increase the eligibility level used for Medicaid eligibility to 100 percent of the FPL. Once approved, we will be able to expand Medicaid to otherwise ineligible individuals.

### 6.3.1 Reduced Beneficiary Cost Sharing

In 2021, Puerto Rico assessed MCO member benefits to determine compliance with the CMS Final Rule implementing the requirements of the Mental Health Parity and Addiction Equity Act of 2008. As a result of that assessment, effective January 1, 2023, Puerto Rico eliminated copays on all non-pharmacy services other than non-emergency use of the ER, which was maintained to ensure appropriate use of that resource. CMS is still reviewing the related SPA but has indicated it intends to approve the SPA after certain technical

requirements are met.

### 6.3.2 Adult and Child Core Set Reporting

The Medicaid and CHIP Child Core Set and Adult Core Set contain measures intended to serve as a set of measures that, taken together, can be used to estimate the overall national quality of healthcare for Medicaid and CHIP beneficiaries. The Children's Health Insurance Program Reauthorization Act of 2009 (CHIPRA) included provisions to strengthen the quality of care and health outcomes of children in Medicaid and CHIP. CHIPRA required the Department of HHS to identify and publish a core measure set of children's healthcare quality measures for voluntary use by state Medicaid and CHIP programs. By statute, reporting of the Core Sets is voluntary for states. However, beginning in 2024, reporting on the Child Core Set and the behavioral health measures on the Adult Core Set will become mandatory.

The Final Adult and Child Core Set rule was published on August 31, 2023. The rule is effective January 1, 2024, with the first round of reporting required by December 31, 2024. This requires states and territories to comply with the mandatory reporting requirements and submit an SPA attesting that the agency will report on the Adult and Child Core Sets. Puerto Rico aims to satisfy State Plan requirements in accordance with 42 CFR §437.20. Evidence of our readiness to comply with the report requirements can be found in Appendix E, which details the Adult and Child Core Set Reporting by the Puerto Rico MCOs for FFY 2021 and FFY 2022.

While we are mindful of the requirements for Adult and Child Core Set Reporting, we continue to require annual reports from MCOs on the Healthcare Effectiveness Data and Information Set (HEDIS). Please see Appendix F for MCO HEDIS results for Reporting Years 2020 through 2022.



## 7. Looking Ahead to State-Like Medicaid Funding

We are making meaningful changes to the Puerto Rico Medicaid Program with the enhanced funding that has been appropriated, and Puerto Rico continues its commitment to program integrity, managed care oversight, and contract reform. Puerto Rico can continue to build on these successes with support from Congress such as those items outlined below.

### 7.1 Proposed Funding Policy Changes

#### **Federal Capped Allotment**

Because of the annual Section 1108 capped allotment, Puerto Rico can only access federal dollars up to the allotment ceiling, which historically has not been sufficient to fund the Medicaid program each year. If Puerto Rico exhausts its capped allotment, it must fund its Medicaid operations with territory-only funds. Removing the Section 1108 allotment ceiling, consistent with other state Medicaid programs, will provide adequate, sustained funding to Puerto Rico.

#### **FMAP**

The FMAP in Puerto Rico is statutorily set at 55 percent, and even though there is currently an increase to the FMAP (76 percent through September 2027), the level of federal funding for Medicaid expenditures continues to be much lower than if the state FMAP formula were applied to Puerto Rico. If the FMAP for Puerto Rico was established the same as state Medicaid agencies, it would likely result in an FMAP of 83 percent. However, Puerto Rico is simultaneously seeking action for both the FMAP formula and the §1108 capped allotment because increasing the FMAP without an increase in the capped allotment will only result in Puerto Rico exhausting its allotment ceiling faster.

#### **Medicaid Disproportionate Share (DSH)**

Based on federal statute (§1923(f)(9)), Puerto Rico does not receive a Medicaid DSH allotment and, therefore, is unable to make DSH payments to hospitals in Puerto Rico. Medicaid DSH payments would allow hospitals to receive funding to offset any shortfalls related to Medicaid payments and costs related to uncompensated care for serving uninsured residents. DSH funding is one component of the critical funding needed to enable continued hospital care and to promote health equity in all areas of the island.

#### **Low-Income Subsidy (LIS) for Medicare Part D**

According to federal statute (§1860D-14(a)(3)(F)), Puerto Rico residents are not eligible for the Medicare Part D LIS. Instead, Puerto Rico has received EAP Medicaid funds to assist dual eligible only persons with the cost of prescription drugs and must match the EAP funds at its Medicaid FMAP. In contrast, in the 50 states, the LIS for Medicare Part D premium assistance is paid directly by the federal government with no requirement for the state to provide a match. Allowing dual eligible Medicare beneficiaries in Puerto Rico to access the LIS program would help dual eligible Puerto Ricans obtain Medicare Part D assistance. Consistent with the LIS for Medicare Part D stateside, dual eligible Medicare beneficiaries residing in Puerto

Rico with incomes up to 150 percent of FPL could receive assistance for Part D premiums, copayments, and deductibles.

## 7.2 Program Improvements

In 2023, Puerto Rico engaged a vendor to identify the gaps between the Puerto Rico Medicaid State Plan, the eligibility policy and procedure manual, managed care contracts, and operations. Puerto Rico will use the results of the analysis to identify areas where mitigations are needed. Some of the gap findings specifically relate to the items that follow, and resolving the findings will only be possible with state-like Medicaid funding.

### **Mandatory Eligibility Groups**

As noted in Section 4.4 of this report, Puerto Rico has submitted an amendment to the Medicaid State Plan to increase the poverty level used for eligibility determinations. The amendment, once approved, will increase the poverty level to 100 percent of the FPL. While this eligibility expansion will be a significant and positive change, due to funding constraints, Puerto Rico is still unable to cover all mandatory eligibility groups. With state-like funding, Puerto Rico would evaluate the following groups for coverage: Transitional Medicaid and Emergency Medicaid.

### **Covered Benefits and Mandatory Services**

Establishing Medicaid-funded LTSS by covering nursing facilities and home and community-based services would enhance services to individuals with low incomes and disabilities needing extra supports for daily living. In 2022, Puerto Rico applied for and was awarded a Money Follows the Person (MFP) Demonstration Grant. The efforts supported by the MFP Grant include an LTSS Needs Assessment, capacity building for LTSS, as well as NEMT Analysis and Planning. Puerto Rico sought the MFP Grant to prepare for the implementation of Medicaid-funded LTSS and NEMT, anticipating state-like funding to do so.

Puerto Rico would also be able to cover mandatory Medicaid services not currently provided, which include NEMT (noted above) and home health (nurses, aides, and durable medical equipment). In addition, due to the requirements of the Early and Periodic Screening, Diagnosis and Treatment provisions, all optional Medicaid services must be provided to beneficiaries under age 21, which Puerto Rico does not currently cover due to funding constraints.

### **Medicare Part B Buy-In**

Federal statute (§ 1905(p)(4)(A) of the Act) exempts Puerto Rico from providing Part B premium and cost sharing assistance to low-income Medicare beneficiaries. With state-like funding, Puerto Rico would opt into the Medicare Savings Program to extend financial support for Medicare premiums and cost sharing to the Qualified Medicare Beneficiary (QMB) Program and Specified Low-Income Medicare Beneficiary (SLMB) Program populations.

## 8. Conclusion

The government of Puerto Rico appreciates the opportunity to provide Congress with a report about how the annual allotment Puerto Rico received from P.L.117-328 supports our Medicaid Enterprise and has allowed Puerto Rico the opportunity to increase access to healthcare for Medicaid beneficiaries. Federal financial support provides Puerto Rico the ability to enhance services and make program improvements that support the health and well-being of U.S. citizens living in Puerto Rico.

Over the past decade, Congress has funded temporary increases in FMAP and the annual capped allotment. The most recent increase, the federal funding appropriated to Puerto Rico in P.L. 117-328, has allowed our program to continue supporting Medicaid providers to deliver care while making foundational investments in program advancements. These increases have helped Puerto Rico provide the most basic healthcare services to its citizens. To allow Puerto Rico to build on the accomplishments that the recent funding has allowed for, Puerto Rico continues to seek Congressional support for permanent state-like Medicaid funding. Puerto Rico has and will continue to invest additional federal funding for increasing eligibility levels, enhancing provider reimbursement rates, and adding additional Medicaid benefits.

Puerto Rico continues to implement and explore options for program improvements, such as expanded vaccines for adults, reduced cost sharing, increased provider payments, and higher income limits for eligibility. We have demonstrated a commitment to maturing the program through strengthening governance, developing technological capacity and infrastructure, improving program oversight, and increasing program transparency practices. Puerto Rico strives to maintain the strong relationship with our federal partners at CMS, the GAO, and Congress to further our program's positive momentum. As shown in this report, we have plans to continue that progress and look forward to purposefully and strategically partnering with federal agencies to continue policy change and program improvements.

## 9. Appendices

**Appendix A:** Behavioral Risk Factor Surveillance System Report 2022

**Appendix B:** Final Propuesta selección comunidades - Cataño

**Appendix C:** Final propuesta seleccion de comunidades Guanica

**Appendix D:** Propuesta selección comunidades - Salinas

**Appendix E:** MCO Adult and Child Core Set Reporting Federal Fiscal Years 2021 and 2022

**Appendix F:** MCO Healthcare Effectiveness Data and Information Set (HEDIS) Reporting Years 2020 through 2022

## 10. Acronyms

Term	Definition
AAFAF	Fiscal Agency and Financial Advisory Authority
ACA	Affordable Care Act
ACIP	Advisory Committee on Immunization Practices
APD	Advanced Planning Document
ARP	American Rescue Plan
ASES	Administración de Seguros de Salud
ASSMCA	Administrator of the Administration of Mental Health and Addiction Services
BBA	Bipartisan Budget Act of 2018
BOD	Board of Directors
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Center of Disease Control
CFR	Code of Federal Regulations
CHIP	Children’s Health Insurance Program
CMS	Centers for Medicare & Medicaid Services
CPEC	Centralized Provider Enrollment and Credentialing
CR	Continuing Resolution
DGC	Data Governance Committee
DEDC	Department of Economic Development and Commerce
DME	Durable Medical Equipment
DSH	Disproportionate Share
EAP	Enhanced Allotment Plan
EDW	Electronic Data Warehouse
ENT	Ear, Nose and Throat
EQRO	External Quality Review Organization
ER	Emergency Room
FFCRA	Families First Coronavirus Response Act
FFP	Federal Financial Participation

Term	Definition
FFY	Federal Fiscal Year
FMAP	Federal Medical Assistance Percentage
FOMB	Financial Oversight and Management Board
FPL	Federal Poverty Level
FWA	Fraud, Waste, and Abuse
GAO	Government Accountability Office
HHS	U.S. Department of Health & Human Services
LIS	Low-Income Subsidy
LPN	Licensed Practical Nurse
LPL	Local Poverty Level
LTSS	Long-Term Services and Supports
MAFU	Medicaid Anti-Fraud Unit
MAGI	Modified Adjusted Gross Income
MAO	Medicare Advantage Organization
MCO	Managed Care Organization
MES	Medicaid Enterprise Systems
MFP	Money Follows the Person
MFCU	Medicaid Fraud Control Unit
MMIS	Medicaid Management Information System
MOU	Memorandum of Understanding
MDRP	Medicaid Drug Rebate Program
ME	Medicaid Enterprise
MEQC	Medicaid Eligibility Quality Control
NEMT	Non-Emergency Medical Transportation
OCM	Organizational Change Management
OIG	Office of Inspector General
OMB	Office of Management and Budget
OMP	Outcomes Management Plan
OST	Operations Support Team
P.L. 116-94	Public Law 116–94; Further Consolidated Appropriations Act, 2020

Term	Definition
P.L. 117-328	Public Law 117-328; Consolidated Appropriations Act, 2023
PARIS	Public Assistance Reporting Information System
PEP	Provider Enrollment Portal
PERM	Payment Error Rate Measurement
PgMO	Program Management Office
PHE	Public Health Emergency
PI	Program Integrity
PMG	Primary Medical Group
PMPM	Per Member Per Month
PMPY	Per Member Per Year
PR	Puerto Rico
PR-BFSS	Puerto Rico- Behavioral Risk Factor Surveillance System
PRDOH	Puerto Rico Department of Health
PRHIA	Puerto Rico Health Insurance Administration
PRME	Puerto Rico Medicaid Enterprise
PRMP	Puerto Rico Medicaid Program
PRMPIU	Puerto Rico Medicaid Program Integrity Unit
PROMESA	Puerto Rico Oversight, Management and Economic Stability Act
PRPIU	Puerto Rico Program Integrity Unit
QMB	Qualified Medicare Beneficiary
RAID	Risk, Action Item, Issue, Decision
RFP	Request for Proposal
RFQ	Request for Quotation
SHSP	State Health System Performance
SIU	Special Investigation Unit
SLMB	Specified Low-Income Medicare Beneficiaries
SOP	Standard Operating Procedure
SMA	Single Medicaid Agency
SPA	State Plan Amendment
SSA	Social Security Act

Term	Definition
STAC	Short Term Acute Care
VLP	Verify Lawful Presence





# BRFSS

Behavioral Risk Factor Surveillance System

Puerto Rico Behavioral Risk  
Factor Surveillance System

## COVID-19 DATA REPORT

# 2022

Prepared By:

Ruby A. Serrano-Rodriguez, DrPH,MS  
Nimsay Rodriguez-Alamo, MPH



Departamento de Salud  
de Puerto Rico



<https://www.cdc.gov/brfss>



787-765-2929 ext.4520



[rserrano@salud.pr.gov](mailto:rserrano@salud.pr.gov)

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## **I. Background**

The Behavioral Risk Factor Surveillance System (BRFSS) is administered and supported by the Population Health Surveillance Branch of the CDC, which operates under the Division of Population Health at the National Center for Chronic Disease Prevention and Health Promotion. BRFSS is a continuous system of telephone surveys designed to gather information on health-related risk behaviors, chronic health conditions, and the utilization of preventive services among noninstitutionalized adults aged 18 and older residing in the United States. It was initiated in 1984, initially involving 15 states conducting monthly telephone interviews to collect data on risk behaviors. Over time, participation expanded, and BRFSS now encompasses all 50 states, the District of Columbia, and several U.S. territories. During 2017, data was collected from all 50 states, the District of Columbia, Guam, and Puerto Rico. Throughout this document, the term "state" is used to encompass all regions participating in BRFSS, including the District of Columbia, Guam, and the Commonwealth of Puerto Rico.

The Puerto Rico Department of Health (PRDOH), operating under a cooperative agreement with the CDC, first implemented the BRFSS in 1996. The primary aim of BRFSS is to gather standardized, state-specific data on preventive health practices and risk behaviors associated with chronic diseases, injuries, and preventable infectious diseases among adults. Key factors assessed by BRFSS include tobacco usage, healthcare coverage, knowledge and prevention of HIV/AIDS, physical activity, and fruit and vegetable consumption.

Moreover, the Puerto Rico BRFSS (PR-BRFSS) program focuses on collecting health-related information about diseases that are significant causes of morbidity and mortality on the island. The survey is structured with a questionnaire that offers the PRDOH flexibility to investigate various conditions and risk factors that are of interest to local stakeholders. The continuous survey design component of BRFSS enables the capture of changes in behaviors, health status, and preventive screening measures that accompany demographic shifts in the island's population. As a result, since the inception of BRFSS, various stakeholders, including public health practitioners, government agencies, universities, and non-governmental organizations, have utilized the survey data

for purposes such as developing public health intervention programs, assessing program progress toward objectives, crafting proposals and scientific articles, and supporting the formulation of health-oriented public policies.

In line with its mission to disseminate health-related information and estimates, the PR-BRFSS Program presents the PR-BRFSS 2022 Data Report: COVID-19 Vaccination and Long-Term Effects Content. The primary goal of this publication is to enhance awareness and comprehension of health determinants, diseases, injuries, and disabilities among adults residing in Puerto Rico.

## **II. Data Source and Methodology**

This section offers a comprehensive insight into the data source and the methodology applied in this report. Our analysis draws from the Behavioral Risk Factor Surveillance System (BRFSS), combining COVID-19-related questions with core BRFSS inquiries encompassing demographic statistics and health perception related with special modules and emerging sections than emphasizes the Vaccination and Long-Term Effects for this disease.

### **BRFSS Data Collection**

The BRFSS is an ongoing cross-sectional telephone survey conducted annually, providing a standardized methodology designed by the CDC. This methodology ensures uniform data collection across all 54 participating states. State health departments implement CDC guidelines for BRFSS field operations, contributing to the development of the survey instrument and conducting interviews either in-house or through contractors.

### **PR-BRFSS Data Collection**

The Puerto Rico Department of Health (PRDOH) is one of the 11 state health departments that conduct in-house data collection for the BRFSS. The PR-BRFSS employs a standardized questionnaire consisting of three parts: Core Section, optional CDC modules, and state-added questions. The Core, designed by the CDC, includes standard questions covering demographics, current health perceptions, conditions, and



behaviors. Additionally, PR-BRFSS incorporates relevant optional modules, also CDC-designed, to address specific topics chosen to enrich the dataset.

For this report, we have included questions from the COVID-19 module, which focuses on vaccination status and emerging questions related to the long-term effects of COVID-19. These modules have been integrated to provide a comprehensive view of the impact of the COVID-19 pandemic on public health, aligning with core BRFSS inquiries to create a holistic understanding of the health landscape in Puerto Rico.

State-added questions, developed by BRFSS state participants and stakeholders, are not edited, or evaluated by the CDC. However, their inclusion allows for adaptive and context-specific information to be gathered alongside the core BRFSS and optional modules, ensuring a comprehensive and nuanced assessment of health-related issues in Puerto Rico.

### **Sampling and Interview Procedures**

The PR-BRFSS sample participants disproportionately from six (6) strata based on Epidemiological Regions defined by the PRDOH, allowing for adequate sample sizes for smaller geographically defined populations. These strata group the 78 municipalities in Puerto Rico. The survey involves both landline and cell phone samples to increase participation among younger individuals, minorities, and those without landline phones. Telephone numbers from both records are used for monthly interviews.

Interviewers adhere to CDC guidelines and receive training in various areas, including BRFSS overview, role descriptions, questionnaire administration, sampling, coding, dispositions, survey follow-up, and practice sessions. At the end of the calendar year, collected data undergoes internal cleaning and error checks before transmission to the CDC's Office of Surveillance, Epidemiology, and Laboratory Services, Behavioral Risk Factor Surveillance Branch for editing, processing, weighting, and analysis.

## Data Weighting

The BRFSS uses a complex sample design that involves stratification and clustering. Stratification involves dividing the target population into meaningful subgroups (strata) based on geographic regions, demographics, or other relevant factors. Clustering involves selecting groups of households or individuals within strata. Weighting is used to account for this complex sample design. BRFSS data includes weight variables that are assigned to each survey respondent. These weights are used to adjust the data to account for the likelihood of selection and nonresponse bias. Each respondent's weight is calculated based on the probability of selection, the number of adults in the household, and the response rate.

BRFSS changed its weighting methodology from post-stratification to iterative proportional fitting (raking) in 2011. Post-stratification involves adjusting data based on known population proportions of certain characteristics (e.g., age, sex, race/ethnicity). Raking, on the other hand, adjusts for each variable individually in a series of interactions, allowing for a more comprehensive adjustment process. One significant advantage of the raking method is its ability to incorporate a phone source variable. This means that the BRFSS can combine information from participants with landlines and cell phones to generate estimates, providing a more complete view of the population. Raking also allows the inclusion of more demographic variables for adjustments. While post-stratification was limited to a few demographic characteristics, ranking can include variables such as educational level, marital status, and renter/owner status. This enhances the representativeness of estimates. The weighted BRFSS data provides prevalence estimates, 95% confidence intervals, and population estimates for various health indicators. These estimates are essential for understanding the health status and behaviors of the surveyed population.

In summary, data weighting in the BRFSS is a complex process designed to account for the survey's sample design, nonresponse bias, and ensure that the results are representative of the target population for the year 2022. The transition to raking in 2011 brought about improvements in data accuracy and the ability to include additional

demographic variables in the weighting process, making BRFSS data even more valuable for public health research and decision-making.

### **Data Analysis and Reporting**

Data analyses were conducted using STATA for statistical computing and graphics. The report was developed, assembled, and edited using Version 16.1 to ensure alignment with the integrated development environment of the BRFSS report. The result section includes the frequency of responses, prevalence rates, 95% confidence intervals, and population estimates to facilitate the interpretation and use of the results by PR-BRFSS data users and stakeholders.

### **Limitations**

Several limitations of BRFSS data should be considered when using population estimates. First, BRFSS relies on telephone surveys, which may exclude individuals without landlines or cell phones, potentially introducing sampling bias. Those without phones or with limited phone access may differ in demographics, health behaviors, and health outcomes. BRFSS data is self-reported by survey respondents. This introduces the possibility of recall bias, as individuals may not accurately remember or report their behaviors and health conditions. Despite efforts to achieve high response rates, not all selected individuals participated in the survey. Nonresponse bias can occur if non-responders differ systematically from responders in ways that affect the study outcomes. Social desirability bias can also lead to underreporting of certain behaviors. These limitations are important to acknowledge when interpreting the findings.

The BRFSS is a cross-sectional survey, capturing data at a single point in time. It does not follow individuals over time, making it unsuitable for establishing causality or tracking changes within individuals. BRFSS focuses on noninstitutionalized adults, excluding individuals in nursing homes, prisons, or military barracks. These populations may have unique health profiles and are not represented in the data.

The survey is conducted in English and Spanish, which may pose language barriers for some respondents. Cultural differences can also affect survey responses, particularly among diverse populations. While BRFSS provides state-level data, it may

not offer sufficient geographic granularity for certain local-level analyses or interventions. The inclusion of cell phones and changes in survey modes over time can affect response patterns. Stakeholders should consider how changes in survey administration might impact trends in the data.

In certain demographic groups or for rare health conditions, BRFSS sample sizes may be small, limiting the precision of estimates. Some subgroups within the population may be underrepresented in the survey, making it challenging to draw conclusions about their health behaviors and outcomes.

While BRFSS data is a valuable tool for public health research and decision-making, these limitations should be considered when interpreting and applying the results. Careful analysis, understanding the survey's design, and considering potential sources of bias are essential for using BRFSS data effectively.

By adhering to these methodologies and recognizing their limitations, we aim to provide a robust and insightful analysis of COVID-19, demographic statistics, and health perception within the Puerto Rican population.

### **III. Introduction**

In our comprehensive analysis of the Behavioral Risk Factor Surveillance System (BRFSS) data for the year 2022, we embark on an enlightening journey through the complex landscape of public health. This journey is marked by the exploration of several key modules, each designed to provide a unique perspective on health-related behaviors, chronic conditions, demographic characteristics, and the ongoing COVID-19 pandemic.

To establish a solid foundation for our exploration, we first delve into the demographic characteristics and health perception module. This initial step allows us to grasp the diverse demographic composition of the surveyed population and gain insights into how individuals perceive their own health and well-being. These demographic insights serve as a fundamental backdrop against which we can later contextualize our findings, including our analysis of chronic conditions. Our examination extends beyond demographics and health perception to include an in-depth analysis of chronic conditions prevalent in the population. Chronic health conditions are integral components of the public health landscape, and our exploration of these conditions within the BRFSS dataset provides a comprehensive understanding of their prevalence, distribution, and impact.

Following this foundational exploration, the analysis transitions to a detailed examination of two pivotal modules that shed light on the ongoing COVID-19 pandemic. These modules, namely Module 7: COVID Vaccination CONTENTS and Section 17 in the Emerging Core: COVID Long-Term Effects, emerge as critical components of the BRFSS dataset for the year 2022. They provide crucial insights into vaccination rates, attitudes, and the potential long-term health consequences of COVID-19 within the surveyed population.

By first comprehending the demographic characteristics and health perceptions of the study population, researchers are better equipped to appreciate the broader context in which the COVID-19 modules unfold. These modules, in conjunction with the foundational demographic data, enable the construction of a comprehensive and nuanced narrative detailing the impact of the COVID-19 pandemic on public health.

## IV. Demographic Insights and the Burden of Chronic Conditions

In this section, we delve into a detailed examination of the demographic characteristics and the prevalence of chronic conditions within the surveyed population. Understanding the demographic landscape and the distribution of chronic health conditions is paramount for developing effective public health interventions and tailored healthcare strategies. Our analysis provides a comprehensive overview of these foundational aspects, setting the stage for a deeper exploration of health-related behaviors, COVID-19 modules, and their impact on public health outcomes.

### A. Health Perception

The health perception indicator was obtained from PR-BRFSS participants when asked: "would you say that in general your health is excellent, very good, good, fair, or poor?". Responses were grouped in two categories: 1) Excellent, very good, or good; and 2) Fair or poor, to obtain the perceived health status, in accordance with the CDC Health Related Quality of Life guideline. In the forthcoming analysis, the examination will delve into the relationship between health perception as fair/poor and demographic characteristics, including gender, age, income, and educational status. This exploration unveils the complex dynamics between individual well-being and sociodemographic factors.

Figure 1. Self-reported Prevalence of Health Perception Fair/Poor by Gender, Puerto Rico 2022

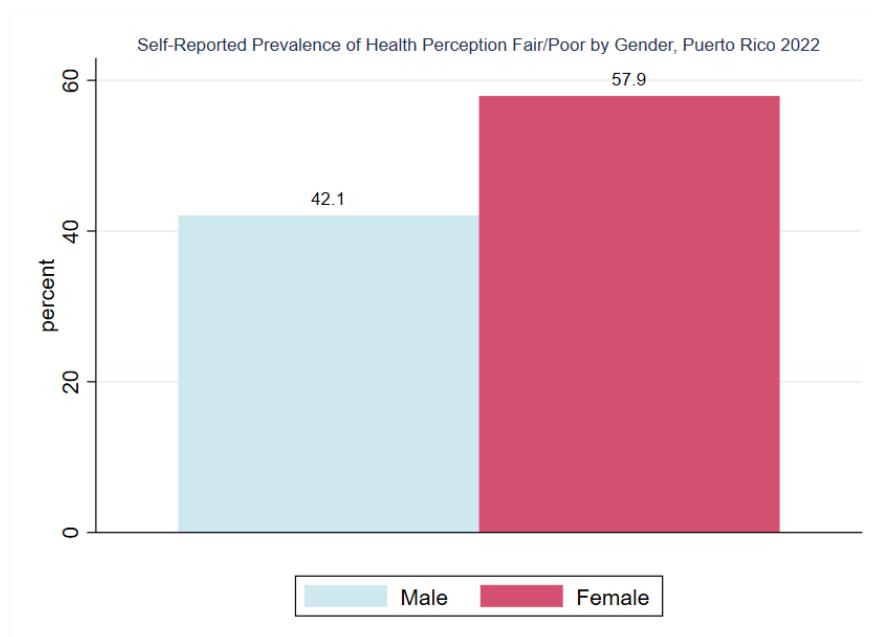


Figure 2. Self-Reported Prevalence of Health Perception Fair/Poor by Age-Group, Puerto Rico 2022

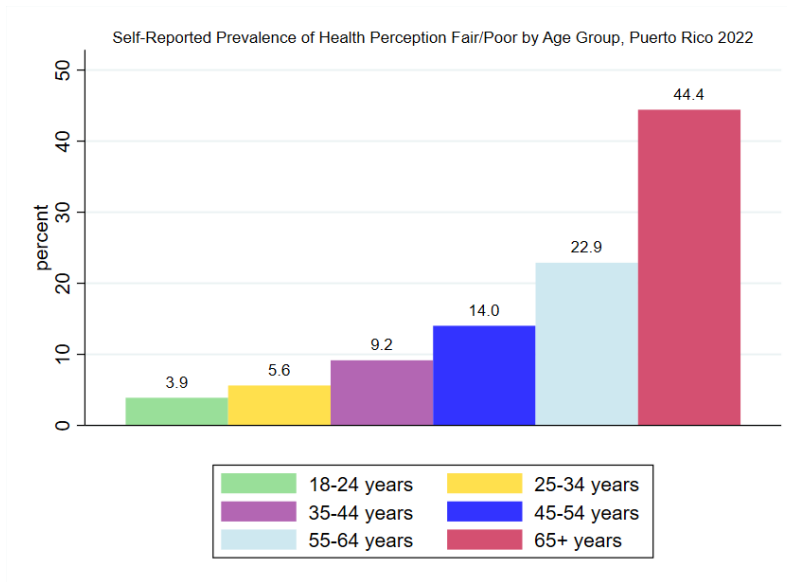


Figure 3. Self-Reported Prevalence of Health Perception Fair/Poor by Education Level, Puerto Rico 2022

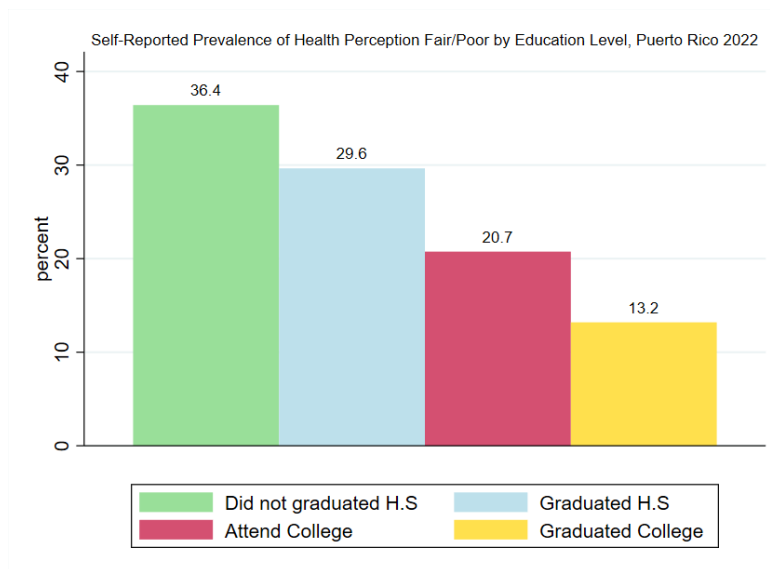
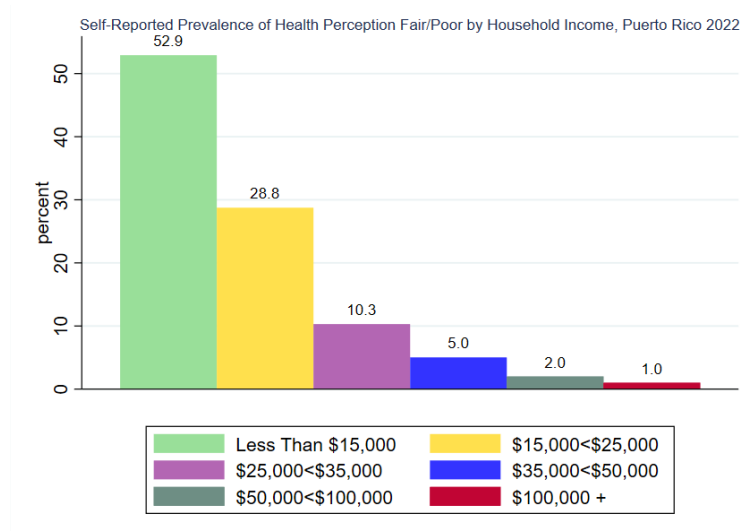


Figure 4. Self-Reported Prevalence of Health Perception Fair/Poor by Income, Puerto Rico 2022



In analyzing the graph depicting the self-reported prevalence of 'fair' or 'poor' health perception in Puerto Rico for the year 2022, the examination begins with a focus on the overall well-being of the population. In **Figure 1.** can be observe that females perceived their health as fair or poor more often than males with 57.9% and 42.1%, respectively. The prevalence estimates increase by age group, from 3.9% in those 18 to 24 years of age to 44.4% in adults 65 years or older (**Figure 2.**). As shown in **Figure 3.**, the health perception as fair poor decreases as education increases with 36.4% in those who not graduated in high school to 13.2% in those who already graduated from College. A social determinant health observation was made in **Figure 4**, observing the decreasing of fair/poor health perception as their income increase from 52.9% in those with a household income less than \$15,000 to 1.0% in those with a higher annual income than \$100,000.

## **B. Physical and Mental Health**

The general health indicator of recent activity limitation because poor physical or mental health was obtained from PR-BRFSS participants that reported at least one day of physical health, and/or one day of mental health not good. Then they were asked:” during the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?”. Responses were grouped in two categories: 1) 0 to 14 days; and 2) 15 or more days), to obtain the global indicator of perceived disability in accordance with the CDC Health Related Quality of Life guidelines. The upcoming analysis will explore the correlation between health perception categorized as poor health more than 15 days and various demographic characteristics, such as gender, age, income, and educational status. This investigation will illuminate the intricate interplay between individual well-being and demographic characteristics.



Figure 5. Self-Reported Prevalence of Poor Health More Than 15 days by Gender, Puerto Rico 2022

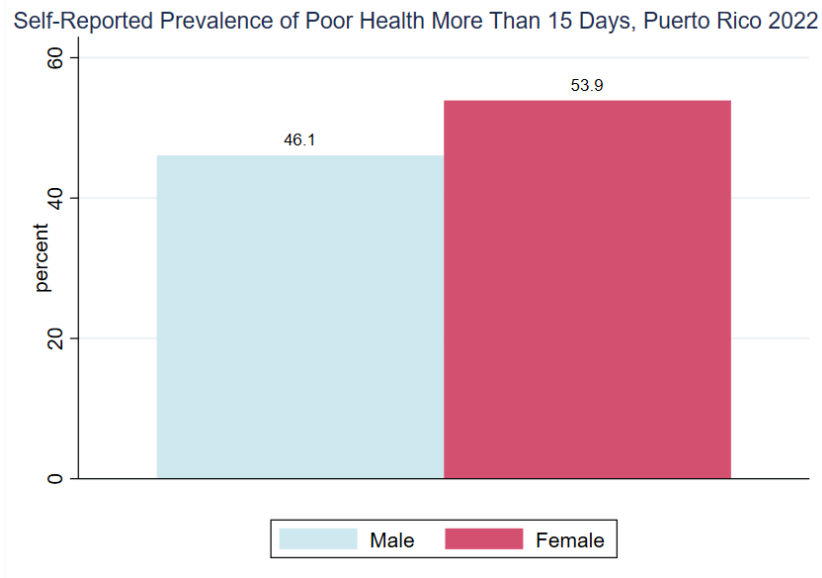


Figure 6. Self-Reported Prevalence of Poor Health More Than 15 Days by Age-Group, Puerto Rico 2022

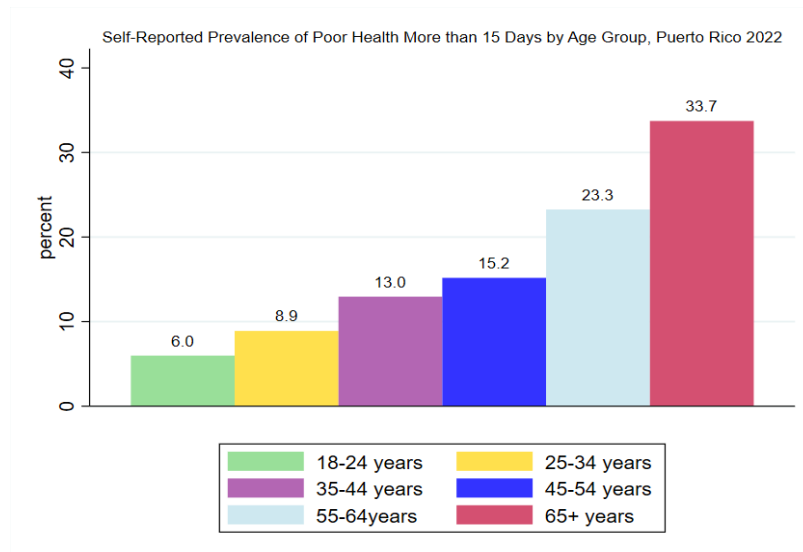


Figure 7. Self-Reported Prevalence of Poor Health More Than 15 Days by Education Level, Puerto Rico 2022

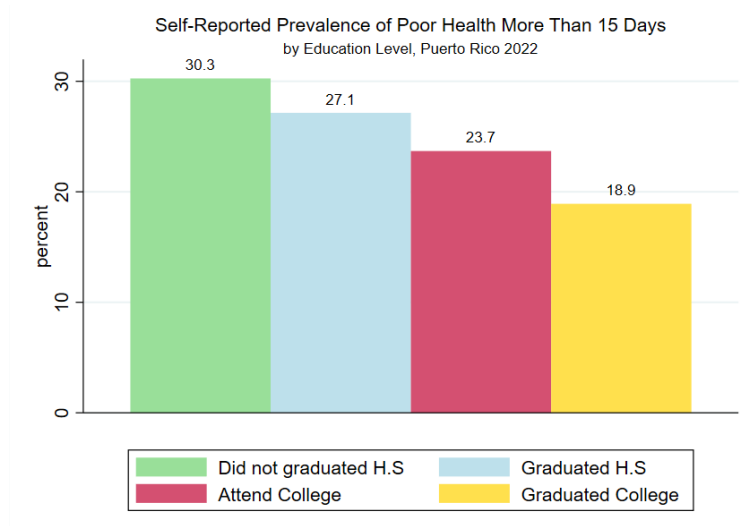
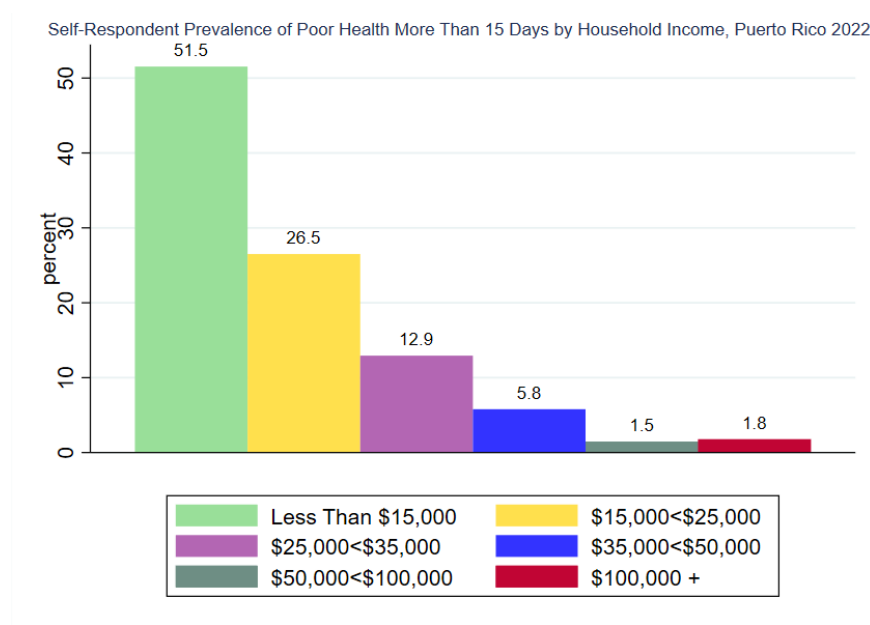


Figure 8. Self-Reported Prevalence of Poor Health More Than 15 Days by Income Status, Puerto Rico 2022



The analysis of the self-reported prevalence of poor health more than 15 days reveals notable variations across different demographic characteristics, providing valuable insights into the health dynamics within the population.

### Gender Disparities

Among the demographic characteristics studied, gender emerges as a significant factor. A striking 53.9% of women reported experiencing poor health for more than 15 days, compared to 46.1% of men. This gender disparity underscores the need for targeted interventions to address women's health concerns (**Figure 5**).

### Age-Related Trends

Age plays a crucial role in the prevalence of extended poor health. The prevalence starts relatively low at 6.0% among individuals aged 18-24 years but steadily increases with age. Notably, it surges to 33.7% among those aged 65 years and older. This age-related trend signifies the evolving healthcare needs of different age groups, with older individuals being more susceptible to prolonged health issues (**Figure 6**).

## **Educational Attainment**

Education level is another influential factor. As shown in **Figure 7**, Individuals without a high school diploma report a significantly higher prevalence of poor health (>15 days) at 30.3%. In contrast, those who have graduated from college exhibit a lower prevalence of 18.9%. This observation highlights the potential role of education in promoting health literacy and positive health behaviors.

## **Income Strata**

An in-depth examination of income levels unveils a compelling pattern. The category with the highest prevalence of poor health for more than 15 days is those who earn less than \$15,000 annually. This group faces a prevalence rate that necessitates special attention and tailored support mechanisms. Understanding the socioeconomic underpinnings of this disparity is crucial for effective public health interventions (Figure 8).

Beyond these demographic variations, it is essential to consider the broader context of social determinants of health. Factors such as access to healthcare, lifestyle choices, and social support networks can significantly influence an individual's health perception and the reported prevalence of prolonged poor health. To address these disparities comprehensively, a multifaceted approach that combines healthcare access, education, and socioeconomic support is warranted. In conclusion, the analysis of self-reported health perception and its association with demographic characteristics underscores the complexity of health dynamics. These findings illuminate the importance of tailoring public health interventions to address the unique needs of different demographic groups while acknowledging the overarching influence of social determinants of health on individuals' well-being.

### C. Cancer

In the examination of health dynamics within Puerto Rico's population for the year 2022, a pivotal aspect to explore is the prevalence of cancer. This investigation hinges on a fundamental question posed within the survey: 'Have you ever been told you had melanoma or any other types of cancer?' The responses to this question unveil critical insights into the burden of this chronic disease within the surveyed population, shedding light on its prevalence, distribution, and potential implications for public health. Let us delve into this essential aspect of the survey data to understand the landscape of cancer prevalence in Puerto Rico.

Figure 9. Self-Reported Prevalence of Cancer by Gender, Puerto Rico 2022



Figure 10. Self-Reported Prevalence of Cancer by Age-Group, Puerto Rico 2022

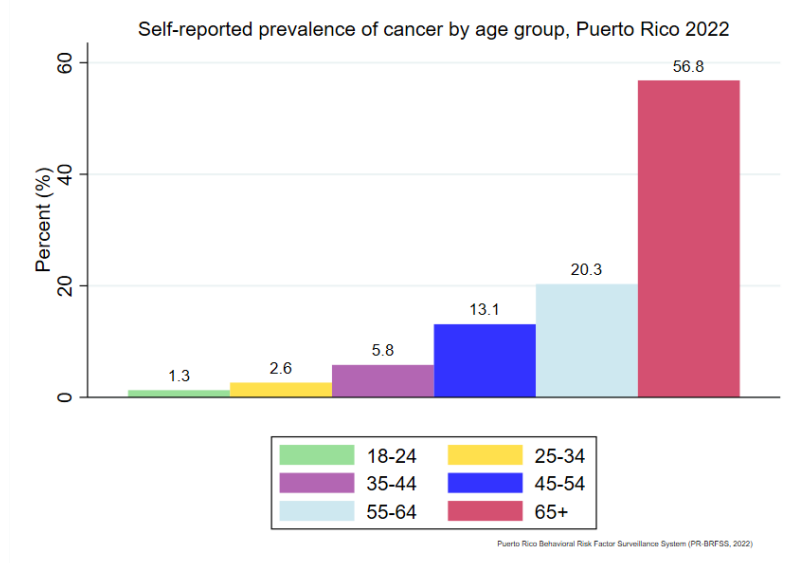


Figure 11. Self-Reported Prevalence of Cancer by Education Status, Puerto Rico 2022

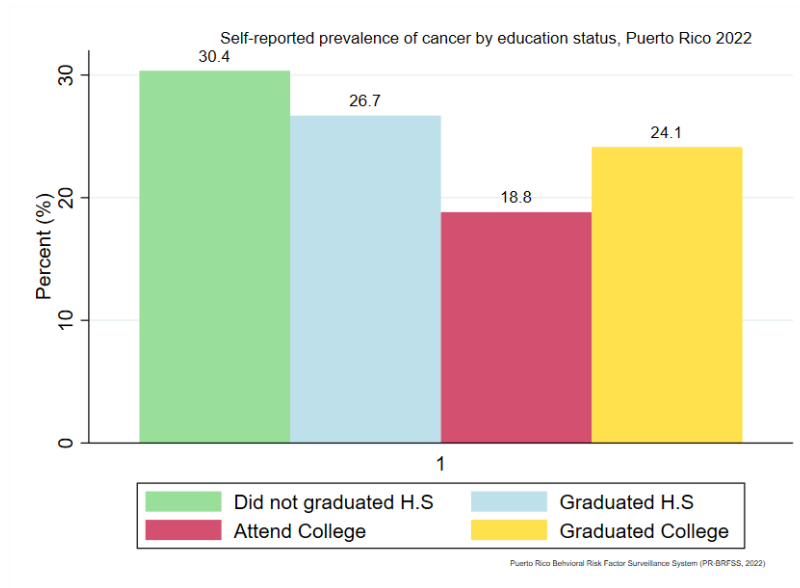
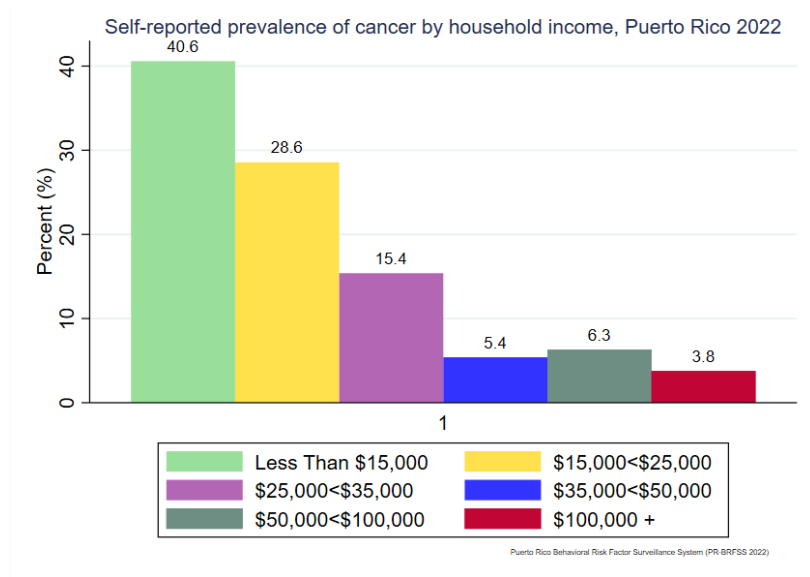


Figure 12. Self-Reported Prevalence of Cancer by Household Income, Puerto Rico 2022



The analysis of self-reported cancer prevalence within the population of Puerto Rico in 2022 unveils crucial insights into the burden of this chronic disease. By examining the data through the lens of gender, age, education, and household income, gain a deeper understanding of the complex dynamics surrounding cancer prevalence.

### Gender Disparities

Gender emerges as a significant determinant of self-reported cancer prevalence. Notably, the prevalence among females stands at 56.7%, while males report a prevalence

of 43.3%. This gender disparity underscores the need for targeted interventions and awareness campaigns tailored to the unique risk factors and healthcare needs of each gender **(Figure 9)**.

### **Age-Related Trends**

The prevalence of self-reported cancer displays a clear upward trajectory with advancing age. Figure **10** represents beginning at a relatively low 1.3% among individuals aged 18-24 years, it steadily climbs to 56.8% among those aged 65 years or more. This age-related trend emphasizes the importance of age-appropriate cancer screening and early detection efforts, particularly for older age groups.

### **Educational Attainment**

Educational status significantly influences self-reported cancer prevalence. Those without a high school diploma report a higher prevalence at 30.4%, highlighting potential disparities in health literacy, access to healthcare, and awareness of cancer risk factors. Conversely, individuals with higher educational attainment exhibit lower prevalence rates, suggesting the potential role of education in promoting health awareness and preventive behaviors **(Figure 11)**.

### **Household Income**

An examination of cancer prevalence by household income categories reveals a notable pattern. Individuals with an annual income of less than \$15,000 demonstrate a higher prevalence of cancer. This observation emphasizes the potential impact of socioeconomic factors on cancer risk and access to healthcare services. Addressing the disparities within this income category becomes a priority for public health initiatives **(Figure 12)**.

In a broader context, these findings underscore the multifaceted nature of cancer prevalence. Beyond individual risk factors, social determinants of health, including socioeconomic status, education, and age, exert a significant influence on an individual's likelihood of self-reporting cancer. Effective cancer prevention and control strategies must

consider these demographic variations and tailor interventions to address the specific needs and challenges faced by various demographic groups.

**D. Diabetes**

The upcoming section delves into the prevalence of diabetes, which stands as one of the most prevalent chronic diseases affecting the population of Puerto Rico. This chronic condition is assessed within the PR-BRFSS through a fundamental question: 'Have you ever been told you have diabetes?' Participants respond with a simple 'yes' or 'no,' allowing us to explore the prevalence of diabetes on the island and gain insights into the health landscape.

Figure 13. Self-Reported Prevalence of Diabetes by Gender in Puerto Rico, 2022

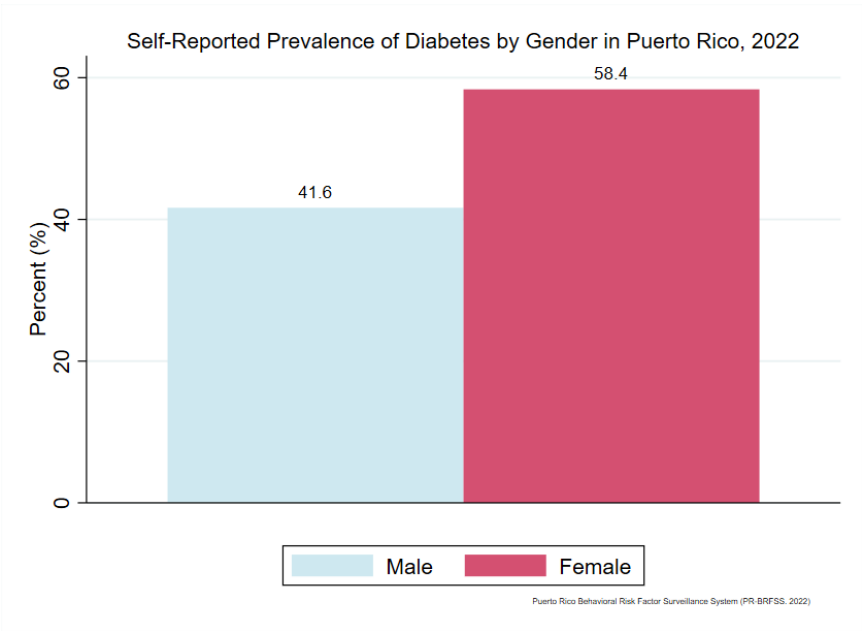


Figure 14. Self-Reported Prevalence of Diabetes by Age-Group, Puerto Rico 2022

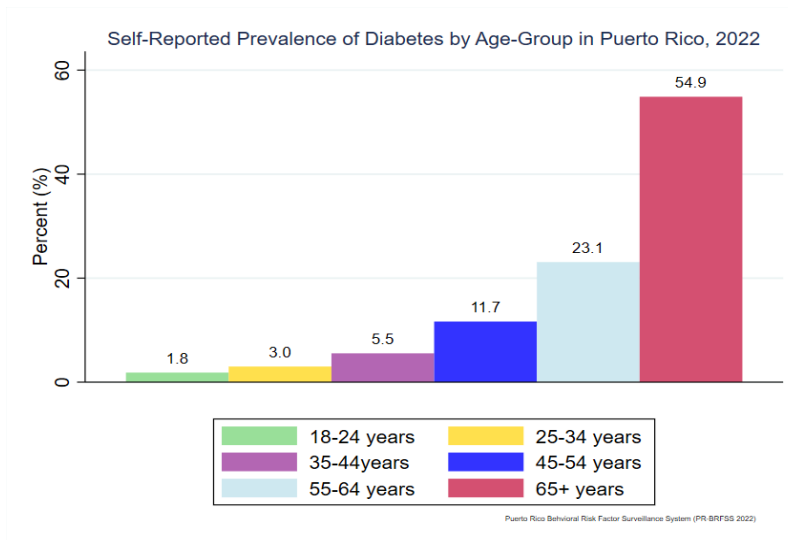


Figure 15. Self-Reported Prevalence of Diabetes by Education Level, Puerto Rico 2022

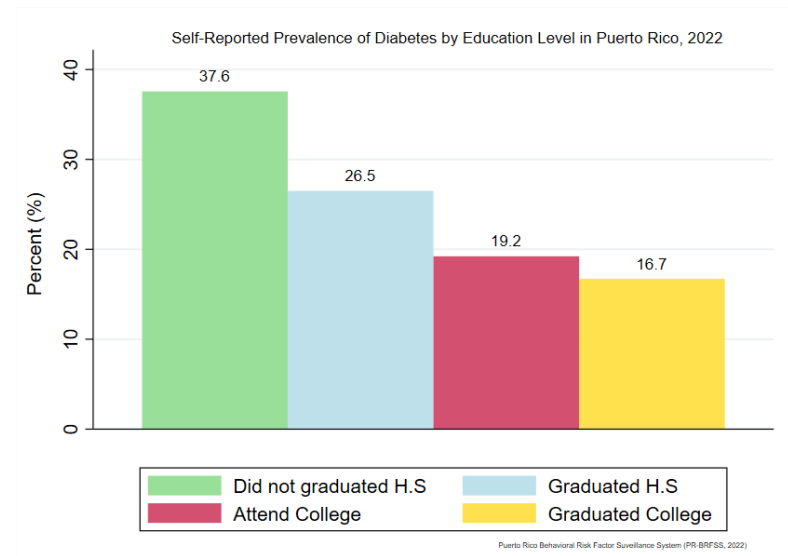
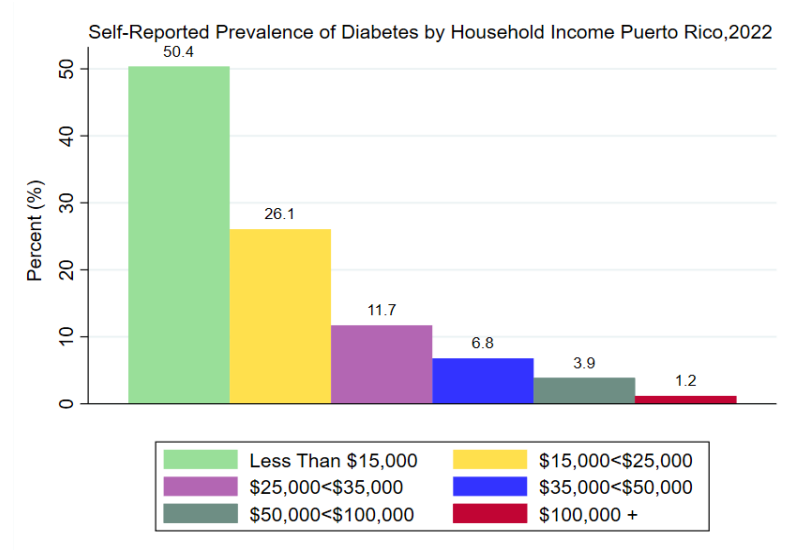


Figure 16. Self-Reported Prevalence of Diabetes by Household Income, Puerto Rico 2022





The analysis of diabetes prevalence within Puerto Rico's population reveals significant disparities across key demographic factors. Gender disparities are evident, with females reporting a higher prevalence at 58.4% compared to males (**Figure 13**). Age demonstrates a positive correlation with prevalence, ranging from 1.8% among those aged 18-24 years to 54.9% among those aged 65 or older (**Figure 14**). Notably, diabetes prevalence exhibits an inverse relationship with education level, with respondents lacking a high school diploma reporting the highest prevalence at 37.6%, in contrast to 16.7% among college graduates (**Figure 15**). Examining household income, a striking pattern emerges—prevalence decreases as income increases, underscoring socioeconomic influences on diabetes (**Figure 16**). However, the prevalence remains significantly high among those with an annual income of less than \$15,000, standing at 50.4%. In contrast, those with the most sustainable income of \$100,000 or more annually exhibit the lowest prevalence at 1.2%. This disparity highlights the urgent need for targeted interventions addressing the multifaceted factors contributing to diabetes prevalence in Puerto Rico.

## **E. Cardiovascular Diseases**

We turn our focus to the analysis of cardiovascular diseases. Here, we combine three key variables representing cardiovascular conditions, namely myocardial infarction, stroke, and coronary heart disease. This comprehensive examination enables us to gain a holistic understanding of the prevalence and distribution of cardiovascular diseases within the population of Puerto Rico for the year 2022. As with previous sections, we will explore the prevalence of these conditions across various demographic factors, shedding light on the intricate interplay between individual health and sociodemographic characteristics.

Figure 17. Self-Reported Prevalence of Heart Diseases by Gender, Puerto Rico 2022

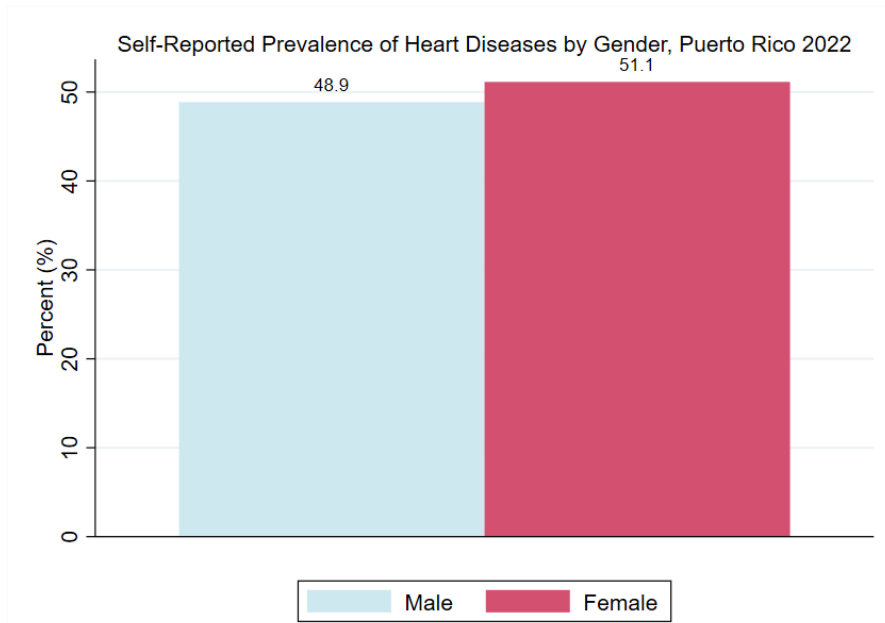


Figure 18. Self-Reported Prevalence of Heart Diseases by Age-Group, Puerto Rico 2022

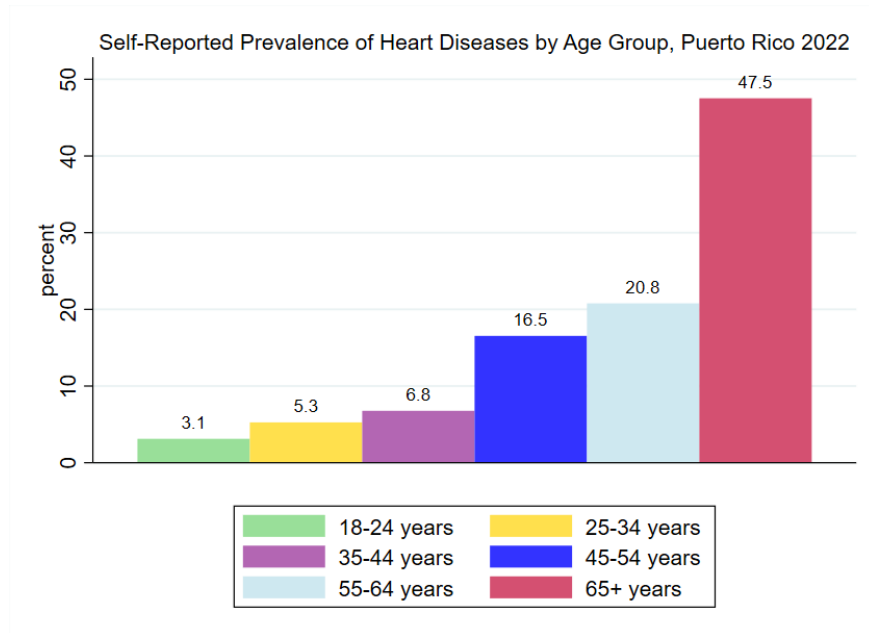


Figure 19. Self-Reported Prevalence of Heart Diseases by Education Level, Puerto Rico 2022

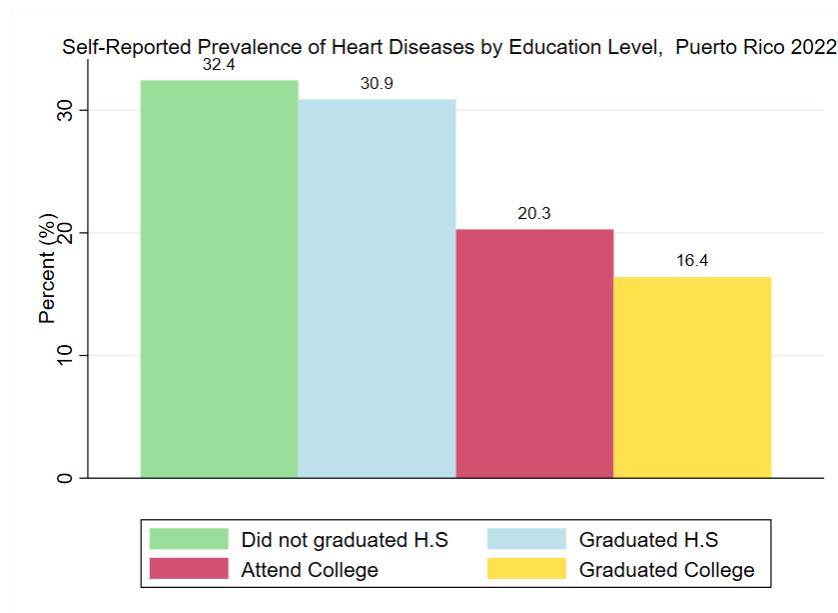
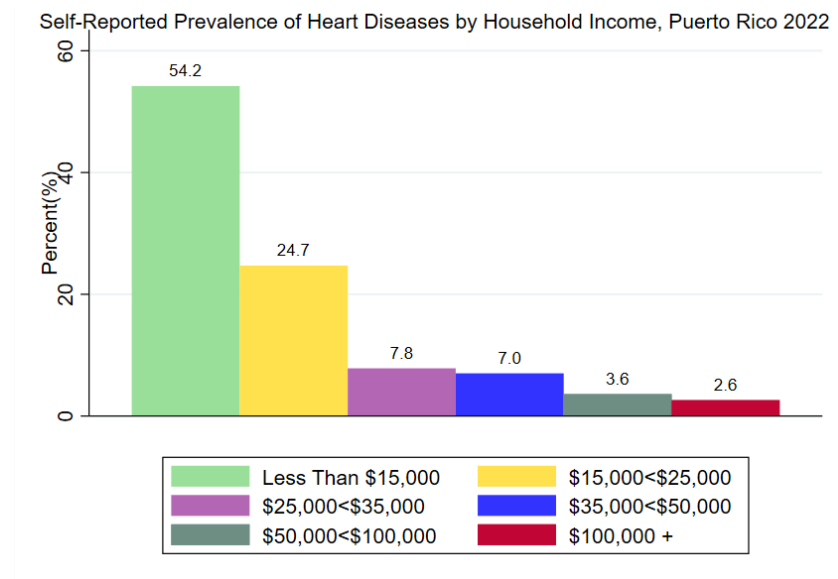


Figure 20. Self-Reported Prevalence of Heart Diseases by Household Income, Puerto Rico 2022



Puerto Rican population for the year 2022 reveals significant trends in the prevalence of heart disease. Gender disparities are notable, with females exhibiting a higher prevalence at 51.1% compared to males (**Figure 17**). Age demonstrates a clear dose-response relationship, with prevalence increasing steadily from 3.1% among those aged 18-24 years to 47.5% among those aged 65 or older, underscoring the age-related risk of cardiovascular conditions (**Figure 18**). Conversely, education level and household income exhibit inverse relationships with cardiovascular disease prevalence reporting

32.4% in those with an education less than high school being the more prevalent and 16.4% in those who graduated College (**Figure 19**). Prevalence decreases as education level and household income increase, emphasizing the potential protective role of higher education and socioeconomic status against these conditions. These findings provide valuable insights into the distribution of cardiovascular diseases, contributing to a broader understanding of their epidemiological patterns within the Puerto Rican population.

## F. Asthma

In our continued exploration of health dynamics within Puerto Rico's population for the year 2022, a pivotal aspect to investigate is the prevalence of asthma. This chronic respiratory condition holds significant importance within the dataset, as it stands as one of the most common respiratory conditions affecting the residents of Puerto Rico. This exploration is underpinned by a BRFSS question within the survey: 'Do you currently have asthma?' Participants provide a straightforward 'yes' or 'no' response, allowing us to delve into the prevalence of asthma on the island and gain valuable insights into the respiratory health landscape.

Figure 21. Self-Reported Prevalence of Asthma by Gender, Puerto Rico 2022

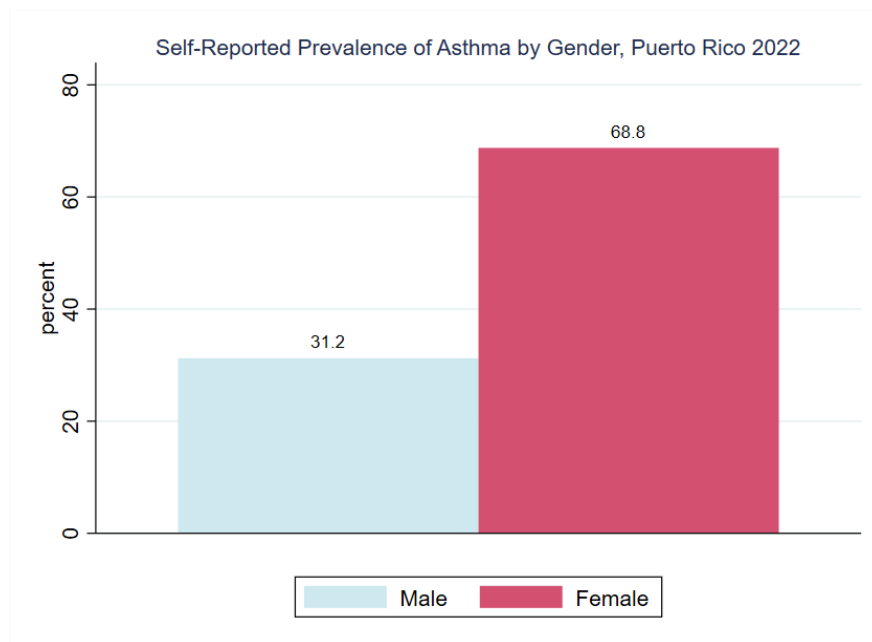


Figure 22. Self-Reported Prevalence of Asthma by Age-Group, Puerto Rico 2022

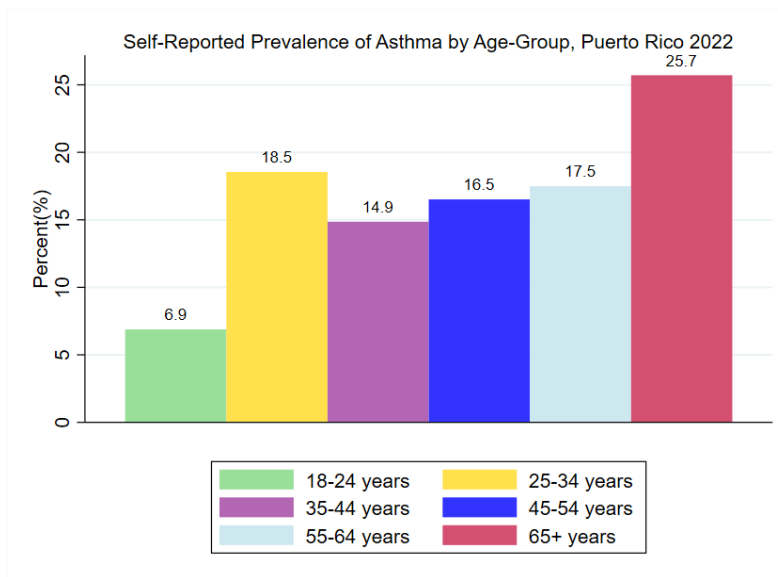


Figure 23. Self-Reported Prevalence of Asthma by Education Level, Puerto Rico 2022

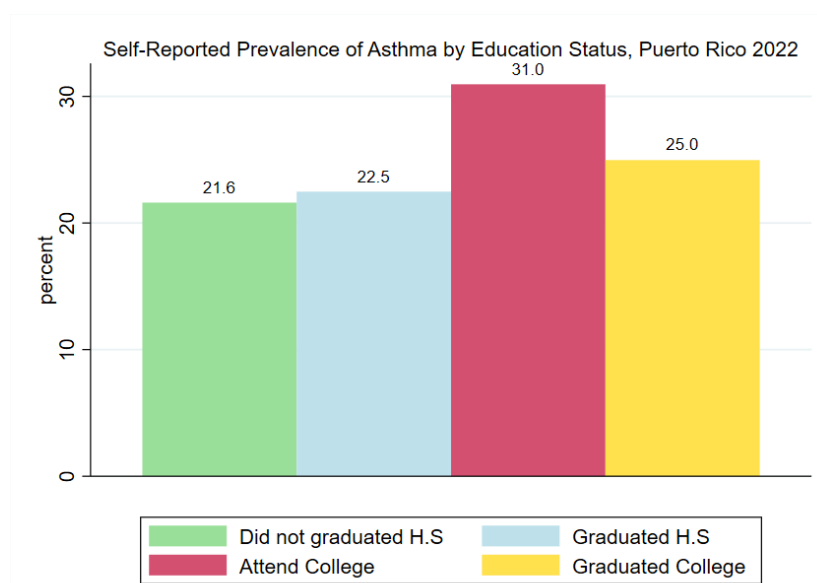
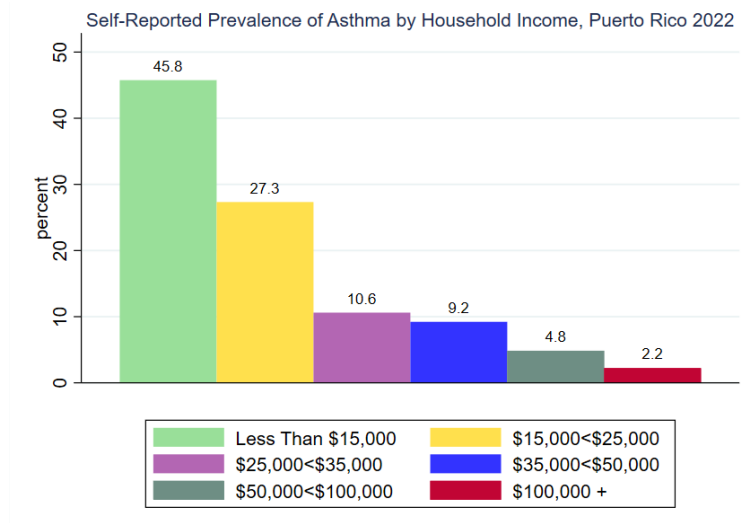


Figure 24. Self-Reported Prevalence of Asthma by Household Income, Puerto Rico 2022



The analysis of asthma prevalence within the Puerto Rican population for the year 2022 reveals distinct patterns across demographic factors. In terms of gender, a notable majority of females, accounting for 68.8% of cases, report asthma (**Figure 21**). Age-related trends indicate that while the 25-34 age group presents a prevalence of 18.5%, it's important to highlight that the highest prevalence is observed among individuals aged 65 and older (**Figure 22**). Education level emerges as a significant determinant, with those attending college during the survey period exhibiting the highest prevalence at 31.0% (**Figure 23**). Lastly, socioeconomic disparities become evident, as respondents with an annual income of less than \$15,000 report a substantially higher asthma prevalence of 45.8% (**Figure 24**). These findings provide a concise and precise overview of asthma prevalence, allowing us to better understand its distribution among different demographic groups within the Puerto Rican population.

## **V. Interplay of Demographic Characteristics, Health Perception, and COVID-19 Testing**

In this section of the report, we embark on a comprehensive analysis that marries demographic characteristics, health perception, and COVID-19 testing results within the Puerto Rican population for the year 2022. This multifaceted exploration allows us to uncover potential connections between individuals' sociodemographic backgrounds, their health perception, and their COVID-19 testing outcomes. To identify significant differences, we employ the chi-square test—a statistical tool designed to assess the independence of variables within a categorical framework. By delving into these interrelationships, we aim to unravel intriguing implications that shed light on the complex dynamics at play in the context of public health and COVID-19 management.

### **A. Health Perception and COVID-19**

Health perception, often characterized as fair or poor, offers valuable insights into how individuals assess their own well-being. Alongside this, we explore the variable 'covidpos,' which identifies individuals who have received the diagnosis of a positive COVID-19 test from healthcare professionals. By combining these two facets, we aim to unravel the

intricate relationship between subjective health assessments and objective COVID-19 diagnoses. This combined analysis provides a unique perspective on how individuals' perceptions of their health align with their COVID-19 experiences, offering significant implications for public health strategies and interventions.

Figure 25. Self-reported Prevalence of Health Perception in Respondents Who Had COVID-19 by Demographic Characteristics, Puerto Rico 2022

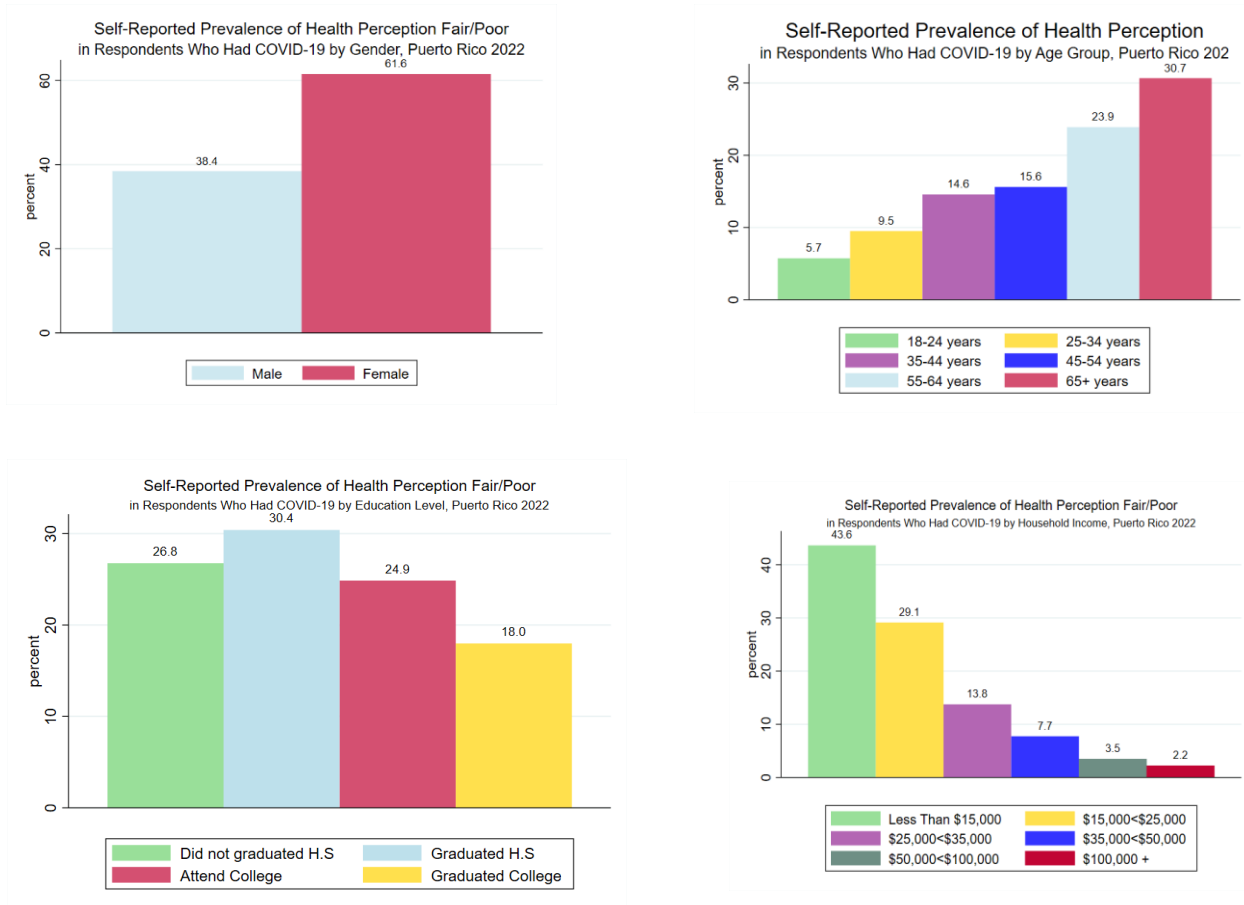


Table 1. Chi-Square Test for Differences Between Health Perception and COVID-19 Test

Would you say that in general your health is:	HAVE YOU EVER BEEN TOLD YOU TESTED POSITIVE FOR COVID-19?		
	Yes	No	Total
Excellent/Very Good/ Good	1,546	2,134	3,680
Fair/Poor	530	1,182	1,712
<b>Total</b>	<b>2,076</b>	<b>3,316</b>	<b>5,392</b>
<b>Chi-Square</b>	60.286		
<b>Pr</b>	0.000		

The interplay between COVID-19 testing outcomes, health perception (fair or poor), and key demographic factors, we begin with a gender-based analysis. Among respondents who received positive COVID-19 test results and reported a fair or poor health perception, females exhibit a notably higher prevalence at 61.6% compared to males (**Figure 25**). This gender disparity underscores potential variations in health perception and healthcare-seeking behaviors. Moving forward, we turn our attention to age groups, where a distinctive trend emerges. The prevalence of positive COVID-19 test results coupled with a fair or poor health perception increases with age. Those aged 18-24 years show a relatively lower prevalence, but this figure steadily rises as we progress through older age groups. This age-related pattern suggests that older individuals, with potentially higher risk factors or comorbidities, may be more likely to perceive their health as fair or poor in the context of a positive COVID-19 diagnosis.

Examining education levels, respondents who graduated from high school but did not pursue higher education display a higher prevalence of positive COVID-19 test results with fair or poor health perception, standing at 30.4% (**Figure 25**). This finding suggests potential disparities in health outcomes related to educational attainment, warranting further investigation into the underlying factors contributing to this observation. Lastly, we delve into the relationship between annual income, and this combined variable. A noteworthy trend emerges, revealing an inverse correlation between income and prevalence. Those with higher annual incomes tend to report lower prevalence, whereas individuals with lower incomes demonstrate a higher prevalence. This disparity emphasizes the complex interplay between socioeconomic factors, health perception, and COVID-19 outcomes.

The chi-square test conducted in this analysis yielded a test statistic of 60.286 with a p-value of 0.000 (**Table 1**). This test statistic is indicative of a strong and highly significant association between the variables under consideration—COVID-19 testing outcomes and health perception categorized as fair or poor. The p-value of 0.000 indicates that the observed association is unlikely to have occurred by random chance alone. This significant association implies that individuals who tested positive for COVID-19 are more likely to report a health perception of fair or poor compared to those who



tested negative. The relationship between these two variables underscores the complex interplay between objective medical diagnoses and subjective health assessments.

## B. Physical and Mental Health and COVID-19

This health-related aspect is combined with the variable 'covidpos,' which identifies individuals who have received a positive COVID-19 test diagnosis from healthcare professionals. By combining these two vital dimensions, we aim to illuminate the nuanced dynamics between self-reported health conditions and COVID-19 testing outcomes. This combined analysis offers a unique perspective on how individuals' subjective assessments of their physical and mental well-being may intersect with their COVID-19 experiences, providing essential insights for tailored public health interventions and healthcare strategies.

Figure 26. Self-Reported Prevalence of Poor Health More Than 15 Days in Respondents Who Had COVID-19 Test Positive by Demographic Characteristics, Puerto Rico 2022

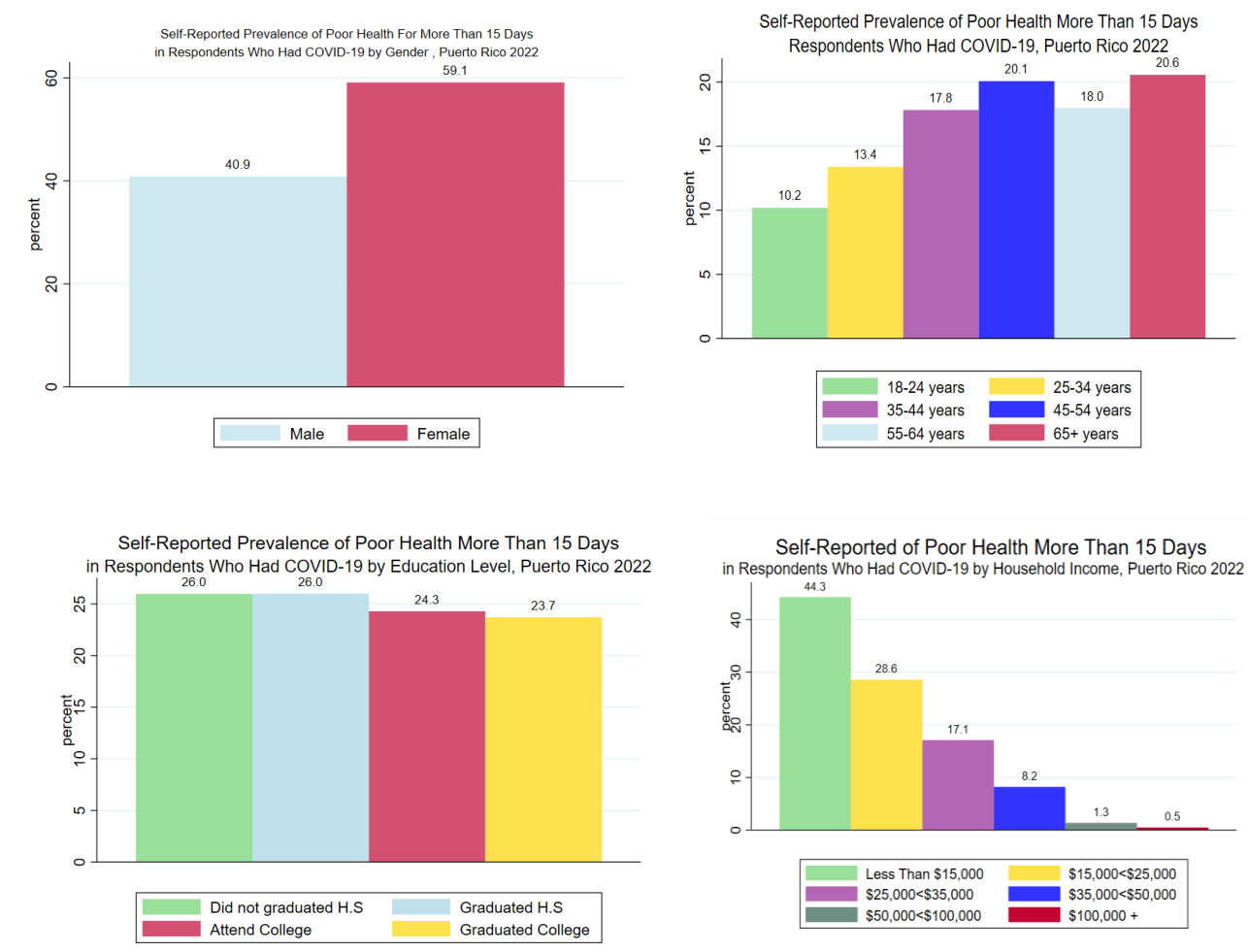


Table 2. Chi-Square Test for Differences Between Poor Health and COVID-19 Test

During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?	HAVE YOU EVER BEEN TOLD YOU TESTED POSITIVE FOR COVID-19?		
	Yes	No	Total
0-14 Days	358	350	708
15-30 Days	130	298	428
<b>Total</b>	<b>488</b>	<b>648</b>	<b>1,136</b>
<b>Chi-Square</b>	<i>44.380</i>		
<b>Pr</b>	<i>0.000</i>		

In our comprehensive analysis of individuals who reported experiencing physical and mental health as poor for 15 days or more, coupled with a positive COVID-19 test, uncover a range of intriguing demographic variations. As shown in **Figure 26**, females demonstrate a significantly higher prevalence at 59.1% compared to males, indicating potential gender-related disparities in both health perception and COVID-19 outcomes. The age groups reveal that respondents within the 45-54 and 65+ age brackets exhibit the highest prevalence at 20.1% and 20.6%, respectively. This suggests that individuals in these age categories may face unique challenges in coping with the combined burdens of health issues and COVID-19. In terms of education, those who did not graduate from high school and those with only a GED report a notably higher prevalence of experiencing poor health and testing positive for COVID-19 for 30 days. This educational disparity emphasizes the intricate relationship between educational attainment and health outcomes. Lastly, the intersection of annual income and this combined variable reveals a pronounced trend. Respondents with an annual income less than \$15,000 exhibit a significantly higher prevalence of 44.3%. This observation underscores the role of socioeconomic factors in health disparities, where individuals with lower incomes may face increased challenges in managing their health during a COVID-19 diagnosis.

The chi-square test conducted in this analysis yielded a test statistic of 44.380 with a p-value of 0.00(**Table 2**), indicating a highly significant association between experiencing poor physical and mental health for an extended duration and testing positive for COVID-19. This compelling finding underscores the complex interplay between subjective health conditions and objective COVID-19 diagnoses, urging further exploration and targeted interventions to address the unique needs of different demographic groups.

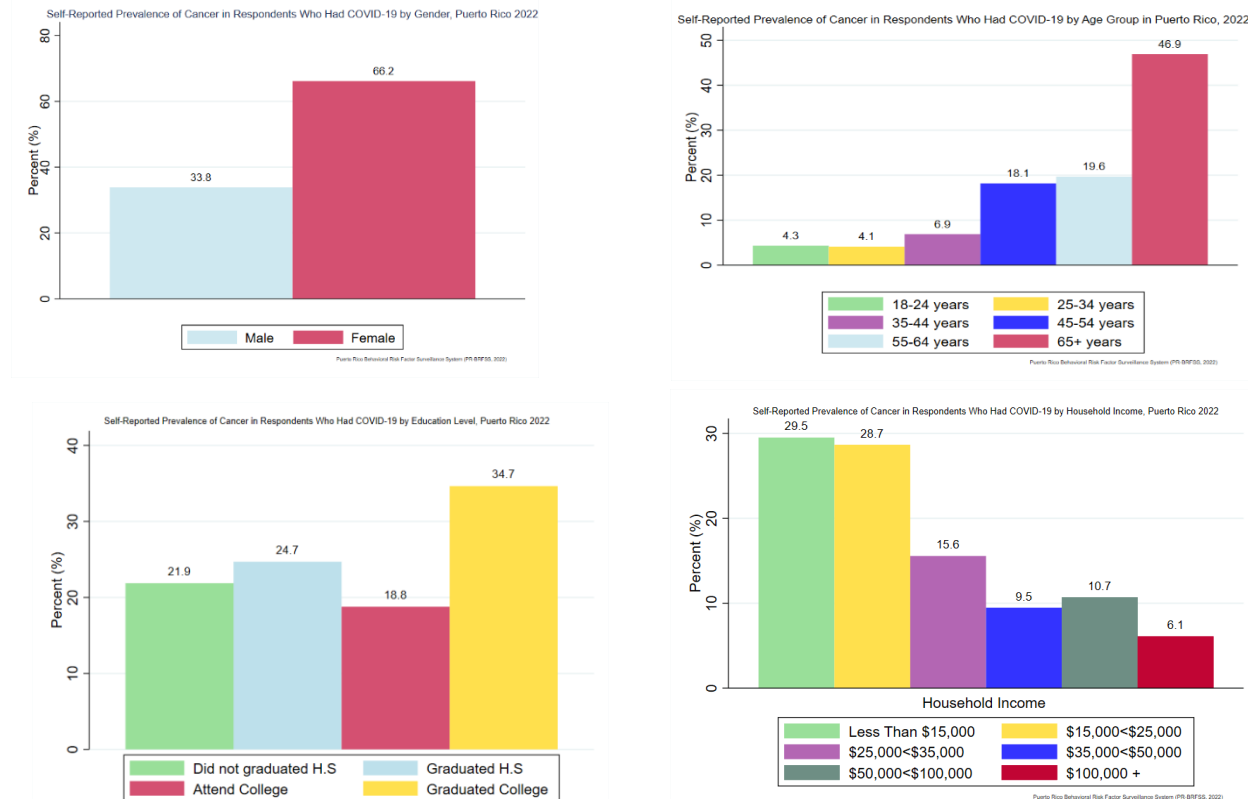
## VI. Chronic Conditions and COVID-19

In this section of the report, the analysis delves into the intricate relationship between chronic health conditions, including cancer, diabetes, heart conditions, and respiratory conditions like asthma, and COVID-19 testing outcomes. These chronic conditions hold paramount significance as they rank among the most prevalent chronic health issues in Puerto Rico. By examining the intersection of these chronic conditions with COVID-19 testing outcomes, valuable insights emerge into the disparities and interactions experienced by individuals who have these conditions when facing the possibility of a positive COVID-19 diagnosis. This combined analysis provides a comprehensive understanding of the unique challenges faced by individuals with chronic conditions in Puerto Rico and informs targeted public health strategies aimed at safeguarding their well-being.

### ANALYSIS RESULTS

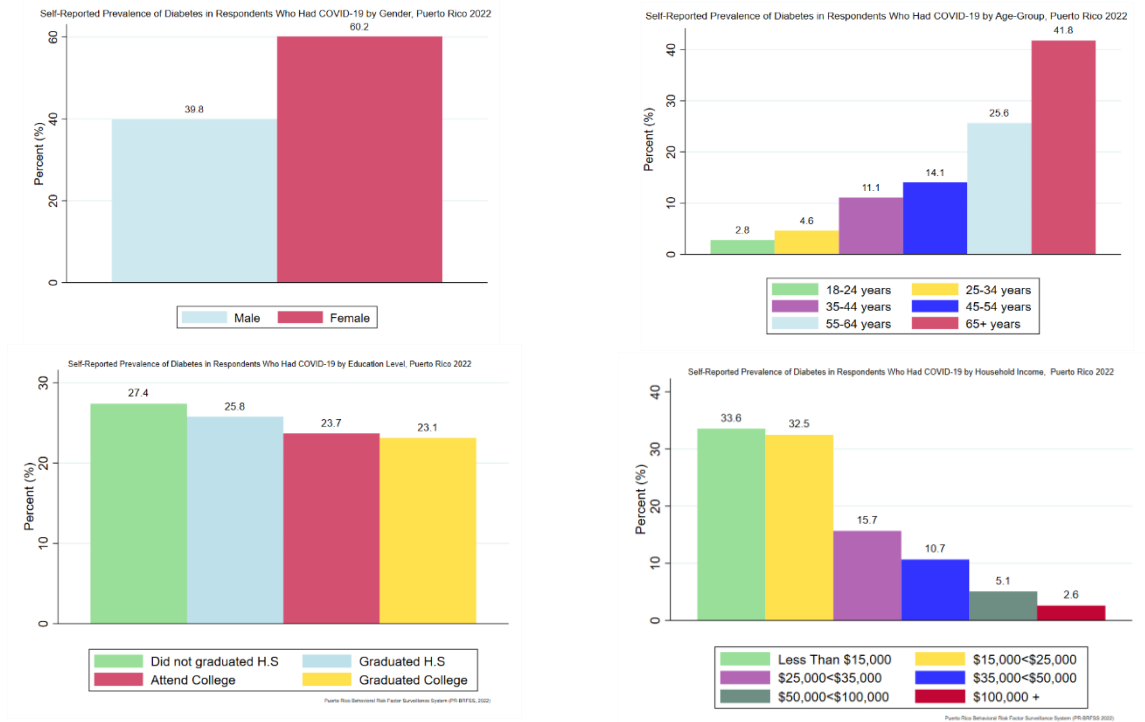
#### i. Cancer

Figure 27. Self-Reported Prevalence of Cancer in Respondents Who Had Positive COVID-19 Test, by Demographic Characteristics, Puerto Rico 2022



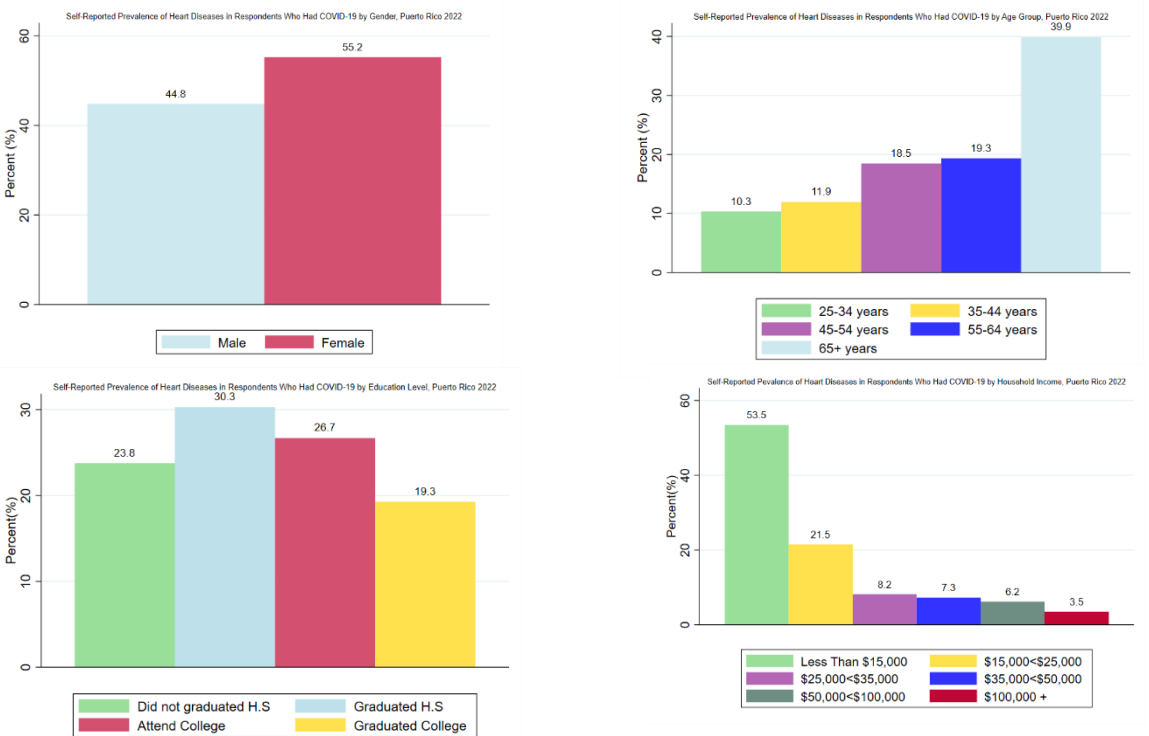
## ii. Diabetes

Figure 28. Self-Reported Prevalence of Diabetes in Respondents Having a Positive COVID-19 Test by Demographic Characteristics, Puerto Rico 2022



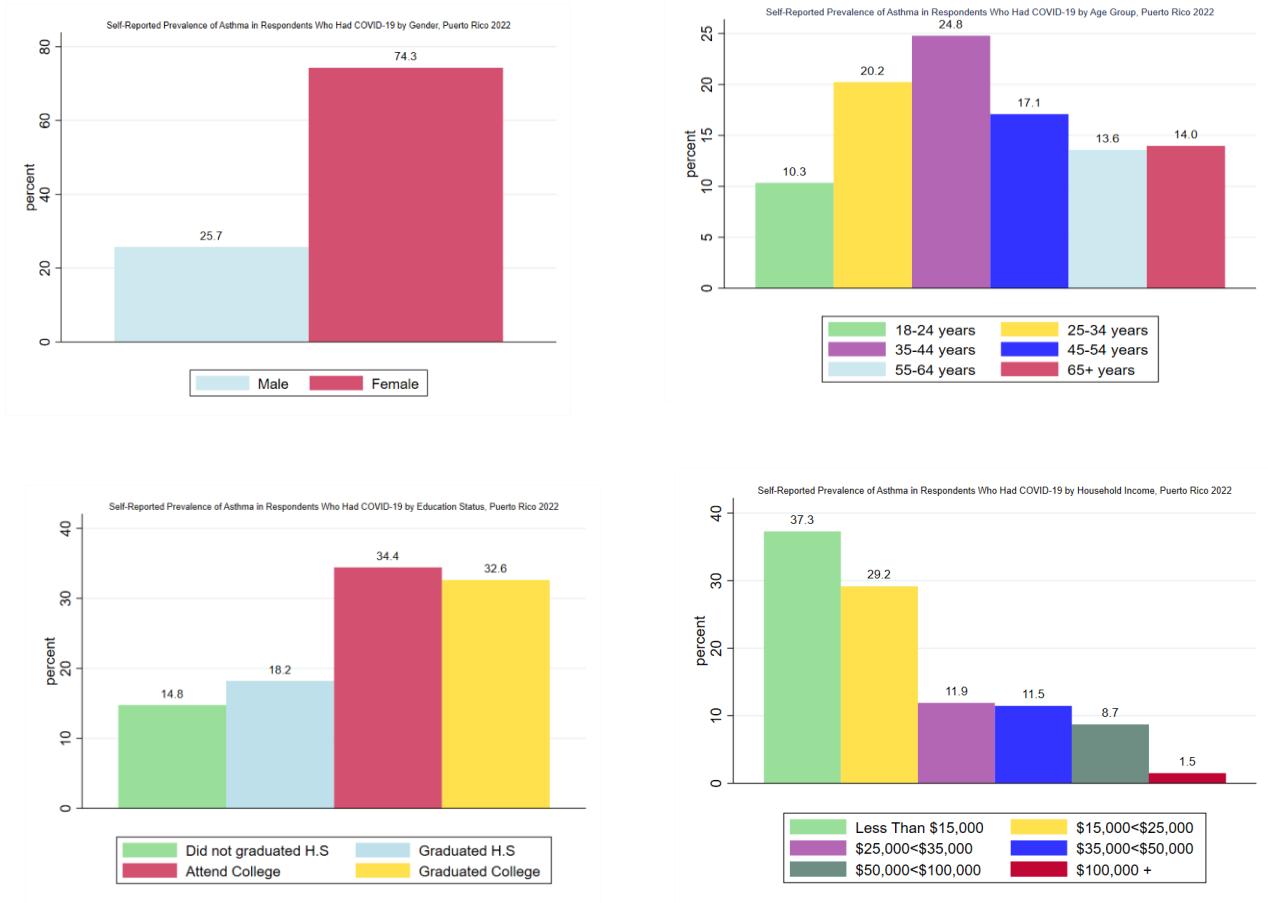
## iii. Heart Conditions

Figure 29. Self-Reported Prevalence of Heart Conditions in Respondents Who Had Positive COVID-19 Test by Demographic Characteristics, Puerto Rico 2022



#### iv. Asthma

Figure 30. Self-Reported Prevalence of Asthma in Respondents Who Had Positive COVID-19 Test by Demographic Characteristics, Puerto Rico 2022



Within this extensive analysis of chronic conditions—including cancer, diabetes, heart problems, and asthma—in conjunction with COVID-19 testing outcomes, several noteworthy patterns emerge. Firstly, across all chronic conditions examined, females consistently exhibit a higher prevalence than males when it comes to testing positive for COVID-19. This gender-based difference underscores potential variations in vulnerability to COVID-19 among those with chronic health conditions, warranting further exploration into the underlying factors contributing to this trend.

Additionally, age plays a pivotal role in the prevalence of certain chronic conditions in the context of a positive COVID-19 test. For cancer and diabetes, prevalence rates increase notably with age, suggesting that older individuals with these conditions face a heightened risk of testing positive for COVID-19. This age-related pattern highlights the

importance of targeted interventions and protective measures for older populations with chronic conditions.

Furthermore, specific insights emerge when considering household income. In the case of cancer, two distinct groups report higher prevalence rates—those with an annual income less than \$15,000 and those with incomes falling within the \$15,000-\$25,000 range (**Figure 27**). These findings underscore potential socioeconomic disparities in the experience of cancer patients who test positive for COVID-19. Likewise, for individuals with diabetes and a positive COVID-19 test, those without a GED or with less than a high school education exhibits a significantly higher prevalence at 27.4% (**Figure 28**). This educational disparity highlights the need for tailored healthcare strategies and interventions to address the unique challenges faced by individuals with lower educational attainment.

Finally, among respondents with heart problems and a positive COVID-19 test, those with an annual income less than \$15,000 report the highest prevalence, standing at 53.5%. This observation underscores the complex relationship between socioeconomic factors and the impact of COVID-19 on individuals with heart conditions. These findings collectively emphasize the multifaceted dynamics between chronic conditions, COVID-19 testing outcomes, gender disparities, age-related patterns, and socioeconomic factors. Such insights are instrumental in informing targeted public health strategies and interventions to safeguard the well-being of individuals in Puerto Rico who live with chronic health conditions.

## Non-Parametric Test Analysis of Chronic Conditions and COVID-19 Outcomes

### i. Chi-Square Test – Cancer

Table 3. Chi-Square Test for Differences Between Cancer and COVID-19 Test

(Ever Told) (You Had) Melanoma Or Any Other Types Of Cancer?	HAVE YOU EVER BEEN TOLD YOU TESTED POSITIVE FOR COVID-19?		
	Yes	No	Total
Yes	130	245	375
No	1,948	3,065	5,013
<b>Total</b>	<b>2,078</b>	<b>3,310</b>	<b>5,388</b>
<b>Chi-Square</b>	2.5881		
<b>Pr</b>	0.108		

The chi-square value of 2.5881 suggests a relatively small degree of association or difference between having cancer and testing positive for COVID-19 (**Table 3**). The p-value of 0.108 is greater than the typical significance level of 0.05. This indicates that the association between having cancer and testing positive for COVID-19 may not be statistically significant at the 0.05 level. In other words, the observed difference may occur due to random chance.

### ii. Chi-Square Test – Diabetes

Table 4. Chi-Square Test for Differences Between Diabetes and COVID-19 Test

(Ever Told) You Had Diabetes?	HAVE YOU EVER BEEN TOLD YOU TESTED POSITIVE FOR COVID-19?		
	Yes	No	Total
Yes	330	770	1,100
No	1,746	2,537	4,283
<b>Total</b>	2,076	3,307	5,383
<b>Chi-Square</b>	42.8152		
<b>Pr</b>	0.000		

As shown in **Table 4**, The chi-square value of 42.8152 is relatively large, indicating a substantial degree of association or difference between having diabetes and testing positive for COVID-19. The very low p-value (0.00) indicates strong evidence of a significant association between having diabetes and testing positive for COVID-19. In other words, the observed difference is unlikely to be due to random chance.

### iii. Chi-Square Test – Heart Conditions

Table 5. Chi-Square Test for Difference Between Heart Conditions and COVID-19 Test

(Ever Told) You Had Heart Disease?	HAVE YOU EVER BEEN TOLD YOU TESTED POSITIVE FOR COVID-19?		
	Yes	No	Total
Yes	1,923	2,911	4,834
No	150	380	530
<b>Total</b>	2,073	3,291	5,364
<b>Chi-Square</b>	26.542		
<b>Pr</b>	0.000		

The chi-square value of 26.542 is relatively large, suggesting a notable degree of difference between having heart conditions and testing positive for COVID-19. The very low p-value (0.000) indicates strong evidence of a significant association between having heart conditions and testing positive for COVID-19. The observed difference is unlikely to be due to random chance.

#### iv. Chi-Square Test – Asthma

Table 6. Chi-Square Test for Difference Between Asthma and COVID-19 Test

Adults who have been told they currently have asthma	HAVE YOU EVER BEEN TOLD YOU TESTED POSITIVE FOR COVID-19?		
	Yes	No	Total
Yes	1,780	2,910	4,690
No	297	402	699
<b>Total</b>	<b>2,077</b>	<b>3,312</b>	<b>5,389</b>
<b>Chi-Square</b>	5.285		
<b>Pr</b>	0.022		

The chi-square value of 5.285 suggests a moderate degree of association or difference between having asthma and testing positive for COVID-19 (**Table 6**). The p-value of 0.022 is lower than 0.05 but not extremely low. It indicates that there is evidence of a statistically significant association between having asthma and testing positive for COVID-19, although the strength of the association is not as strong as in the case of diabetes or heart conditions.

In closing, our comprehensive exploration of the connections between chronic health conditions and COVID-19 outcomes reveals a complex web of interactions that demand our attention. These findings illuminate crucial insights into how COVID-19 behaves within our population, providing us with valuable clues for prevention and intervention. It underscores the need for tailored strategies to safeguard those most vulnerable to the virus. As we navigate these intricate patterns, we're empowered to make informed decisions, cultivate resilience, and foster a healthier future for our community. These associations are not mere statistics; they are stories waiting to be unfolded,



lessons to be learned, and lives to be protected. Together, we embark on a journey towards a safer, healthier Puerto Rico.

## **VII. COVID-19 in Puerto Rico: BRFSS Analysis**

During the last years, COVID-19 has been one of the most-controversial issues within public health in Puerto Rico. Our collective experience has been marked by resilience, adaptation, and a relentless pursuit of knowledge. In this section, the journey unfolds across three vital dimensions: Prevention, Infection, and Action. Each dimension provides a unique perspective, illuminating how our community has grappled with the multifaceted challenges posed by COVID-19. Within the realm of prevention, we embark on a critical analysis, examining vaccination status, vaccine hesitancy, and the precise timing of vaccine doses. This exploration draws inspiration from the wealth of data housed within the BRFSS 2022 COVID-19 Vaccination Module.

The Infection realm beckons us to delve into the narratives of individuals who have confronted COVID-19 head-on. Through rigorous analyses of prior infections, symptom durations, and initial symptoms, these stories unveil the concealed intricacies of our viral adversary, endowing us with invaluable insights into its evolving patterns.

Finally, a course is charted toward Action, placing a prominent spotlight on the public health implications that require our unwavering focus. Within this domain, we meticulously distill our findings, weaving interpretations that not only shed light on the immediate path but also resonate as foundational pillars for making informed decisions and strengthening our communities. These insights transcend the realm of mere data points; they serve as the bedrock upon which we build a resilient and better-prepared future for our communities.

# PREVENTION

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## A. Vaccination Status

To understand the ongoing COVID-19 landscape in Puerto Rico, there's some relevant and pivotal aspect of the battle against the virus—vaccination status. This information was obtained from PR-BRFSS participants when asked: “Have you received at least one dose of a COVID-19 Vaccination?”. Responses were a fundamental Yes or No. During 2022, in Puerto Rico approximately 96.1% of PR-BRFSS 2022 Survey respondents reported received at least one dose of COVID-19 vaccination (**Figure 31**).

Figure 31.

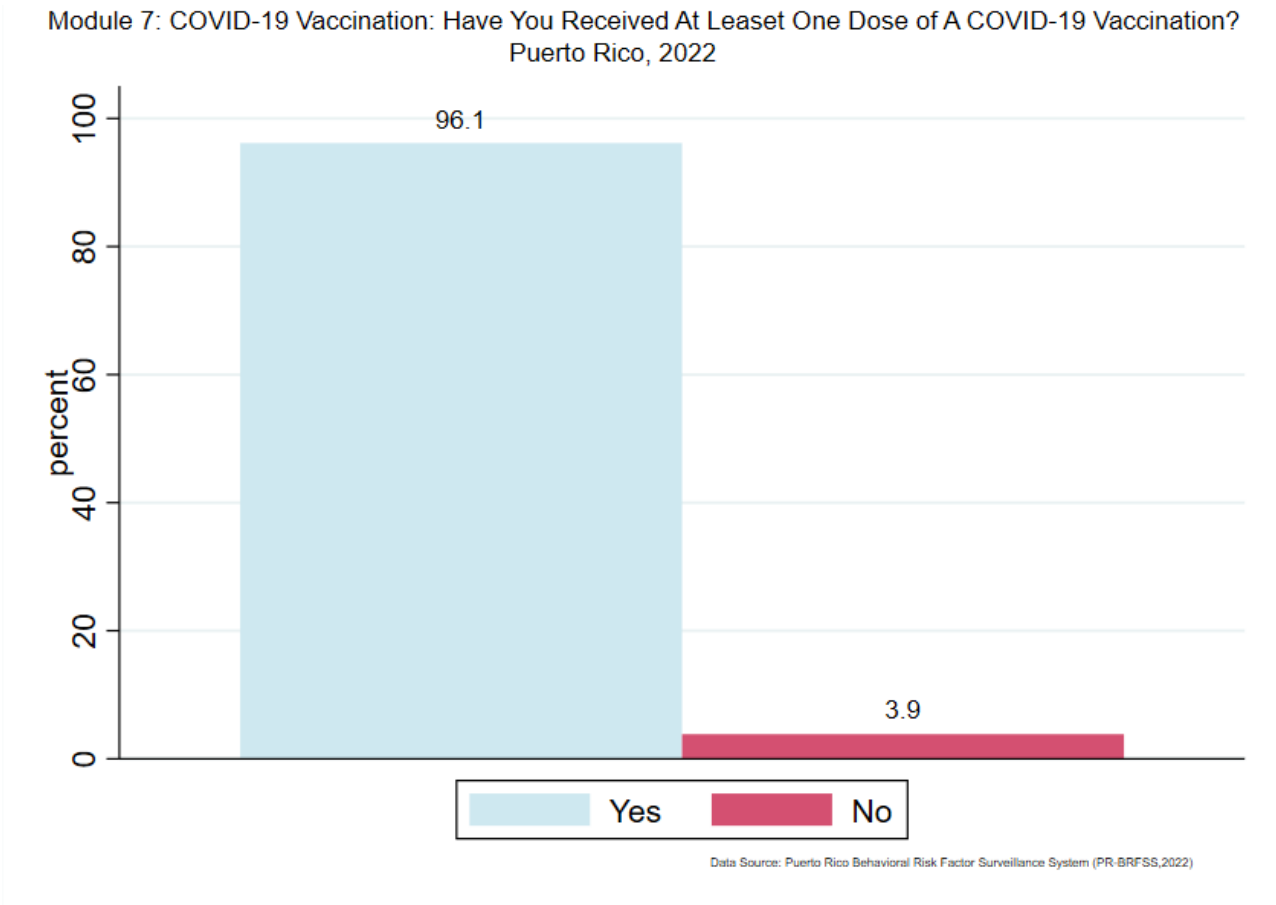


Figure 32. Self-Reported Prevalence of Receiving at Least One Dose of COVID-19 Vaccination by Gender, Puerto Rico 2022

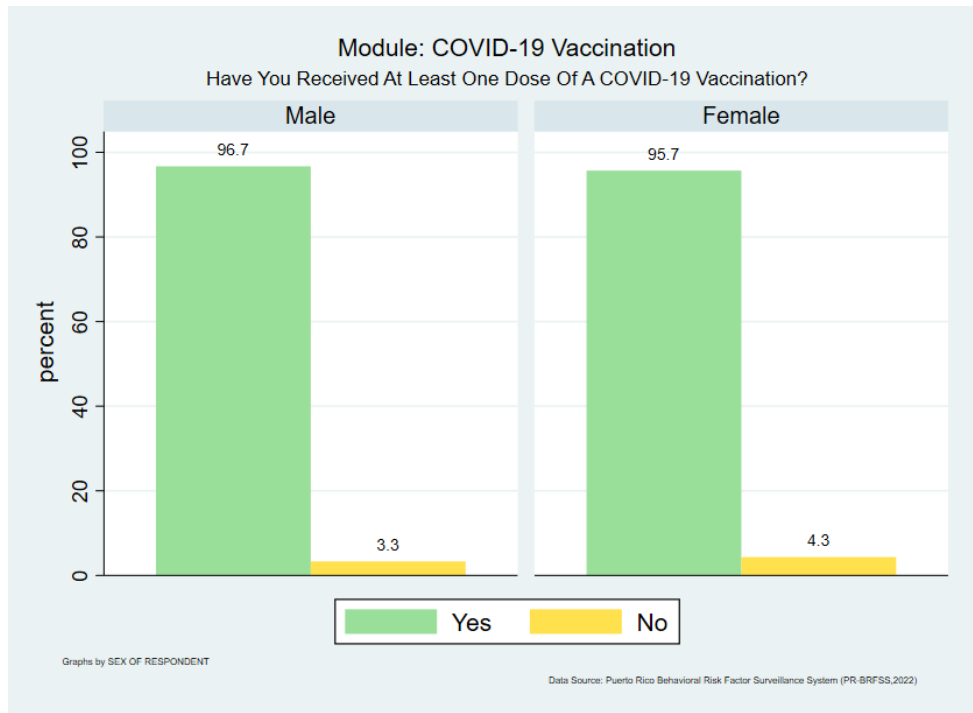


Figure 33. Self-Reported Prevalence of Receiving at Least One Dose of COVID-19 Vaccination by Age-Group, Puerto Rico 2022

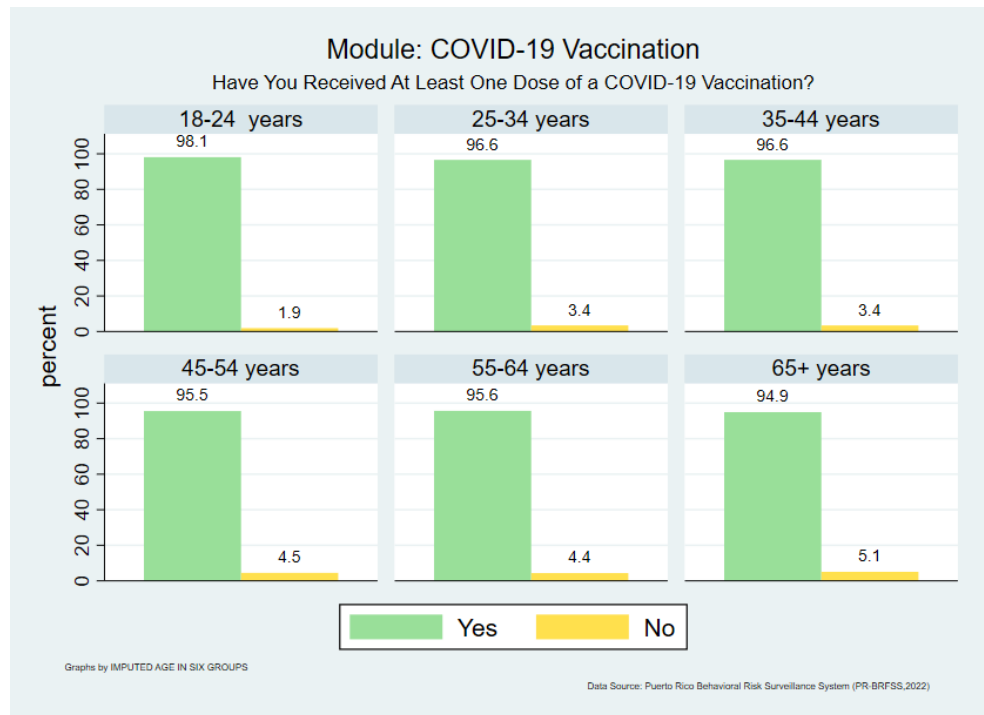


Figure 34. Self-Reported Prevalence of Receiving at Least One Dose of COVID-19 Vaccination by Education Status, Puerto Rico 2022

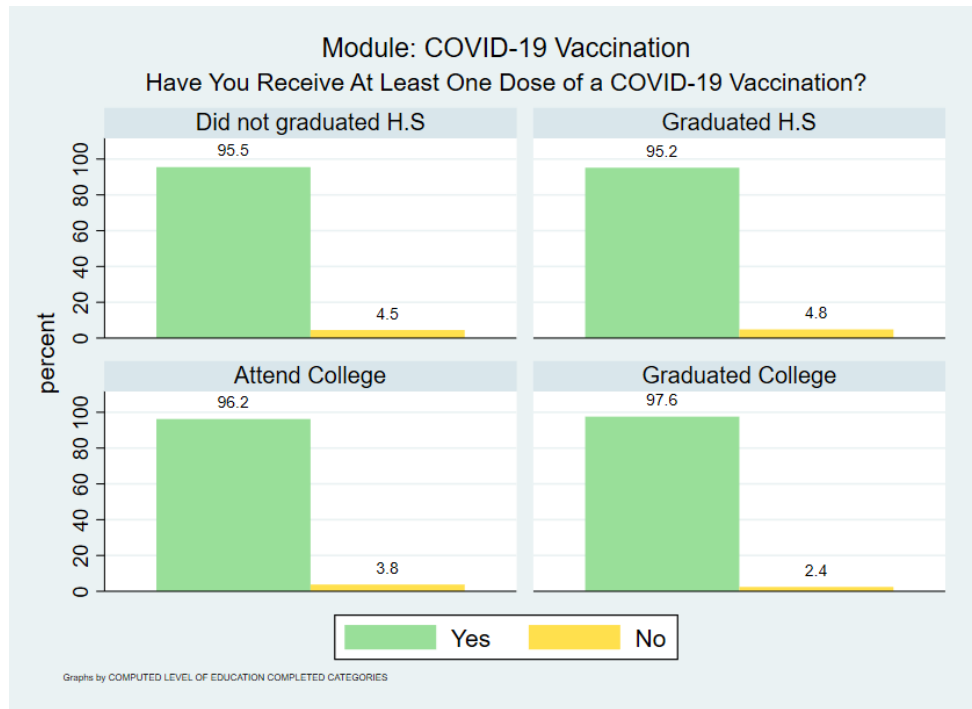
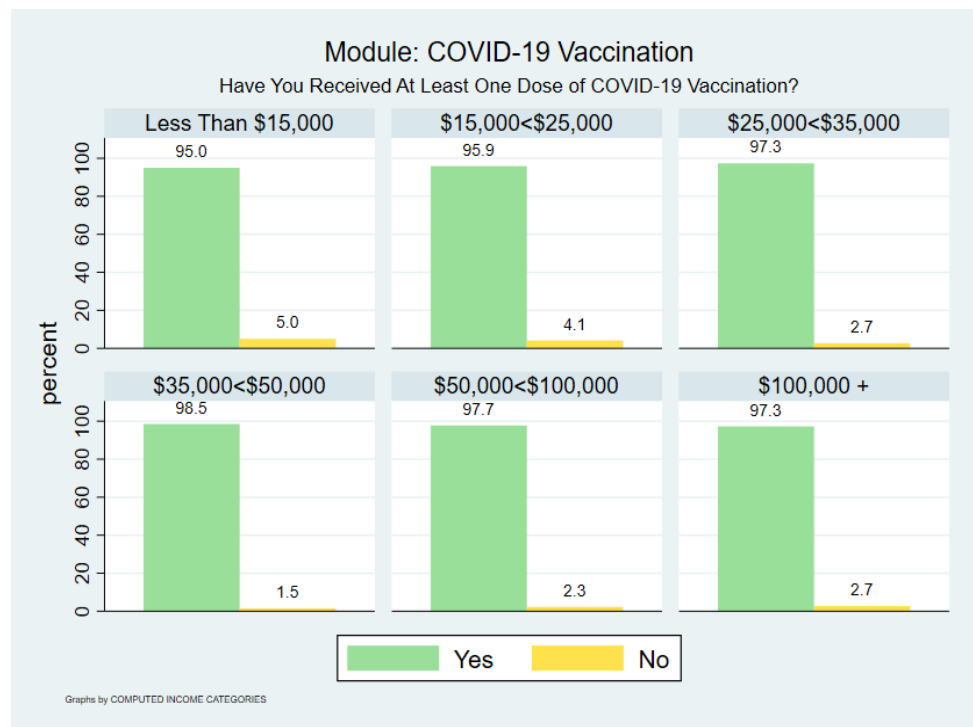


Figure 35. Self-Reported Prevalence of Receiving at Least One Dose of COVID-19 Vaccination by Household Income, Puerto Rico 2022



According to the data reported by demographic characteristic. The response rate to receive at least one dose of COVID-19 vaccine ranges from 94.9% to 98.5%, which is usually quite similar across all demographic categories, which shows that there is no limitation in terms of demographic category in gender, age, education, and household income.

## B. Vaccination Hesitancy

While vaccines have proven to be powerful tools in the fight against the virus, the decision to get vaccinated is often influenced by a complex interplay of factors. In this section, we delve into the multifaceted landscape of vaccination hesitancy, aiming to grasp the underlying reasons that shape individual choices. Through our analysis, we seek to illuminate the dimensions of hesitancy and its potential impact on public health efforts. By understanding the factors that contribute to vaccine hesitancy, we can chart a more informed path toward achieving broader vaccination coverage and community immunity. This indicator was obtained from one question in the Module 7 COVID-19 Vaccination when asked: “Would You Definitely Get a Vaccine, Probably Get a Vaccine, Probably Not Get a Vaccine, Definitely Not Get a Vaccine?” Responses were grouped in the same categories as asked. During 2022, in Puerto Rico 85.5% of the respondents answer to definitely not get a vaccine (**Figure 36**).

Figure 36.

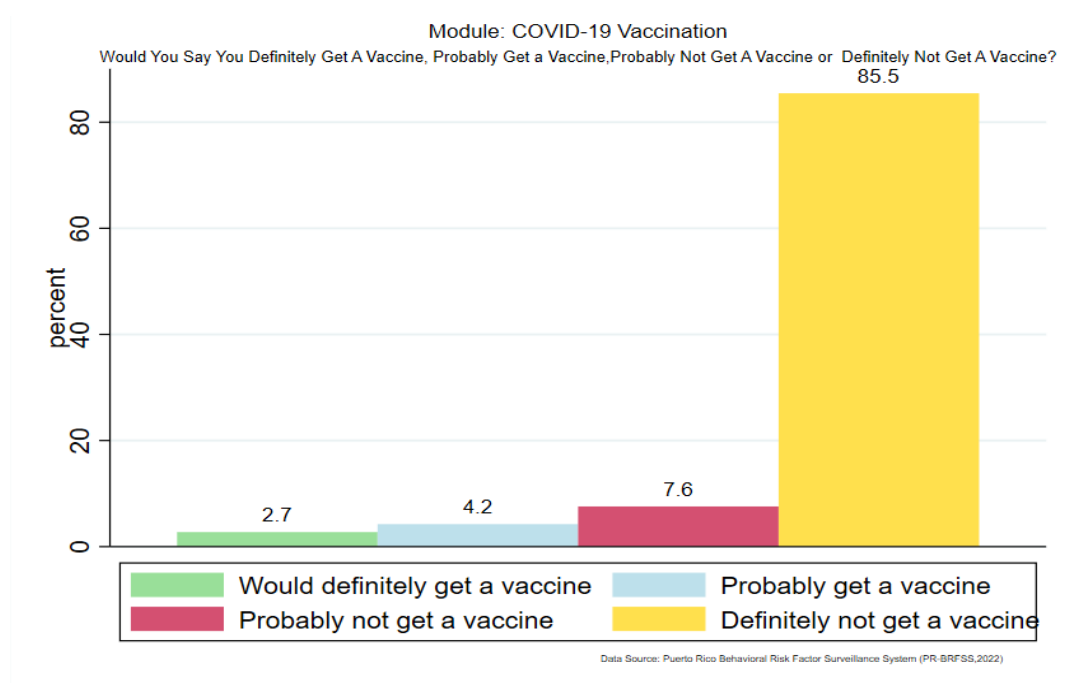


Figure 37. Self-Reported Prevalence of Getting a Vaccine Response by Gender, Puerto Rico 2022

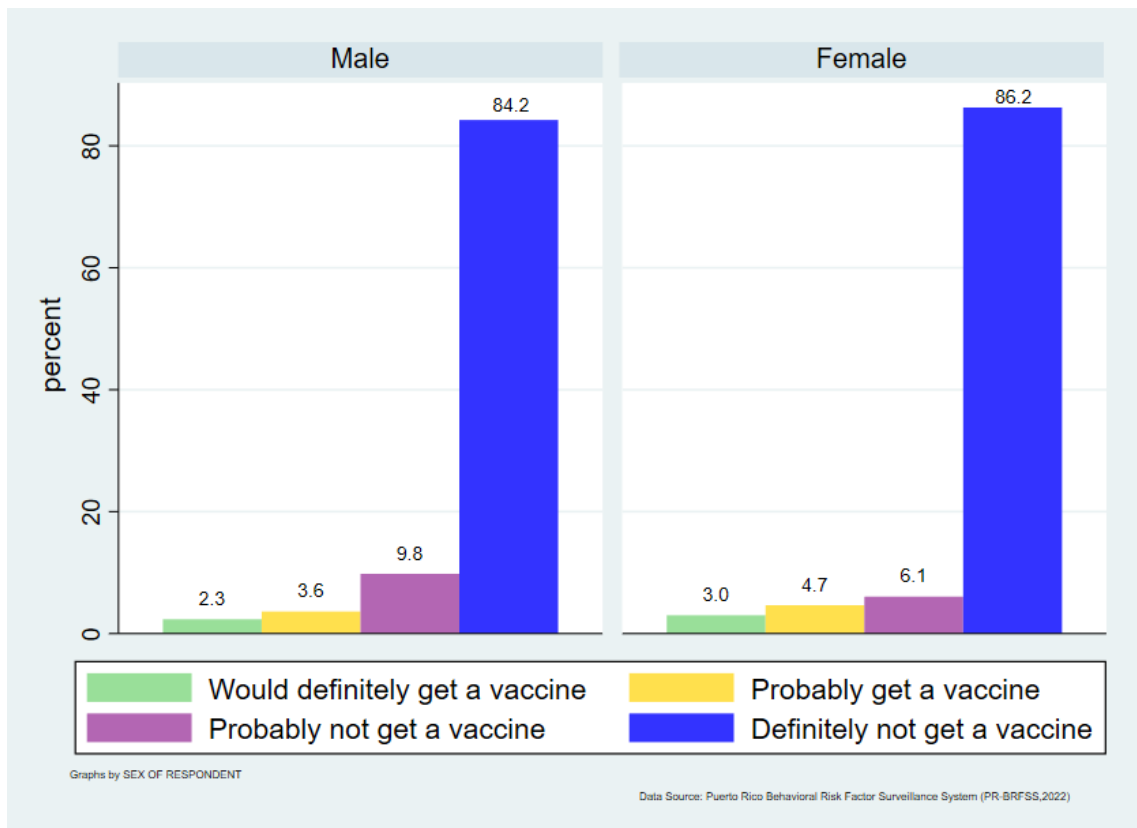


Figure 38. Self-Reported Prevalence of Getting a Vaccine Response by Age-Group, Puerto Rico 2022

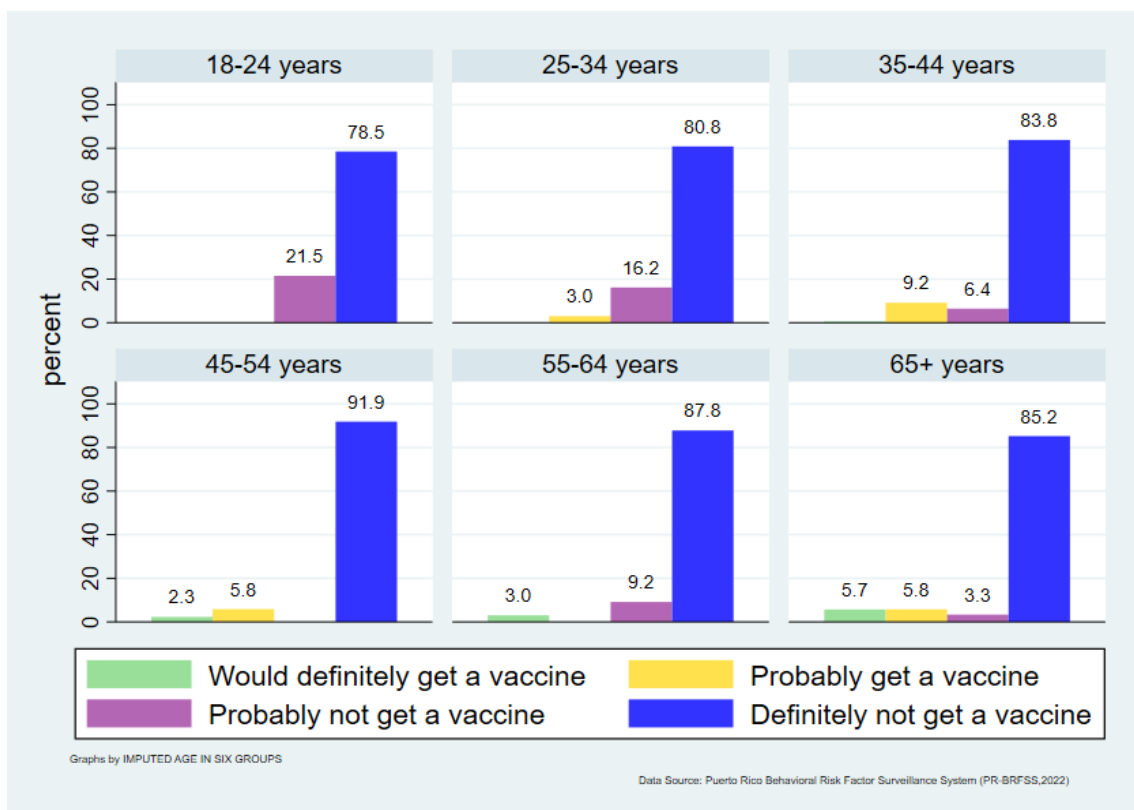


Figure 40. Self-Reported Prevalence of Getting a Vaccine Response by Education Level, Puerto Rico 2022

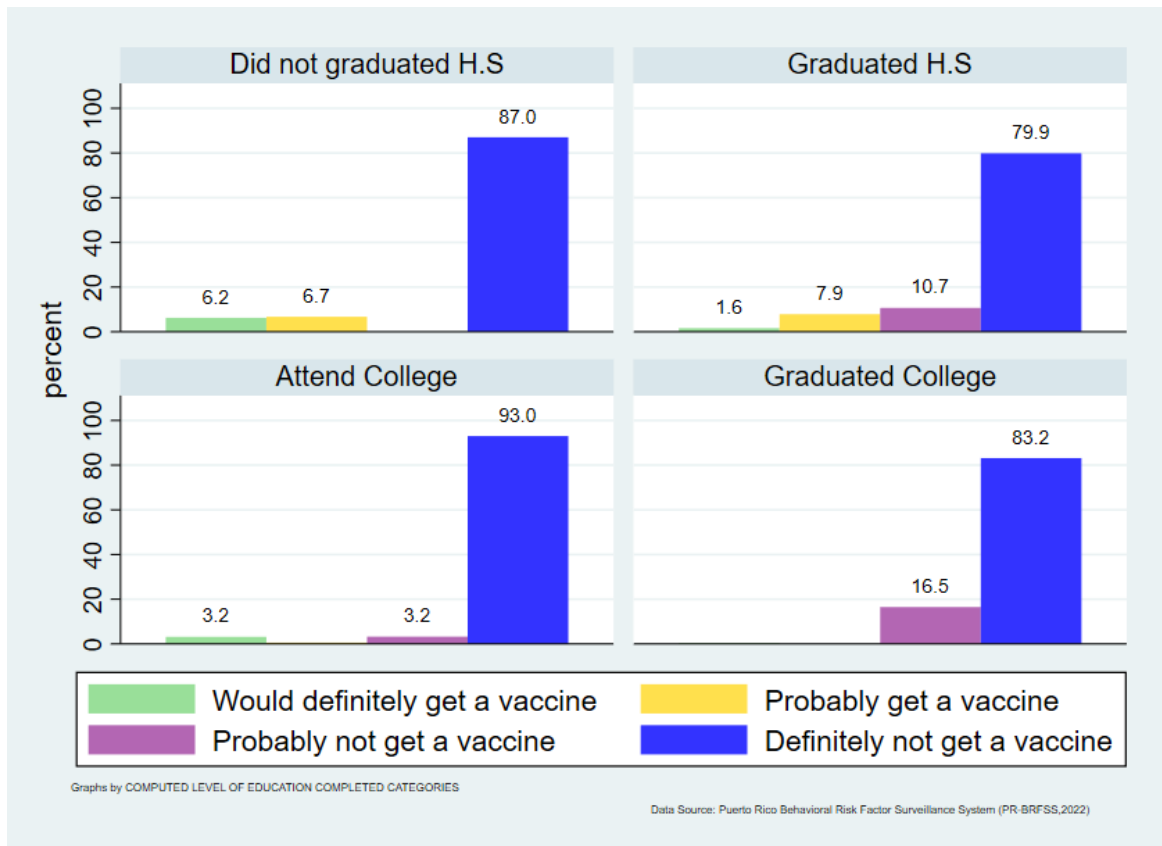
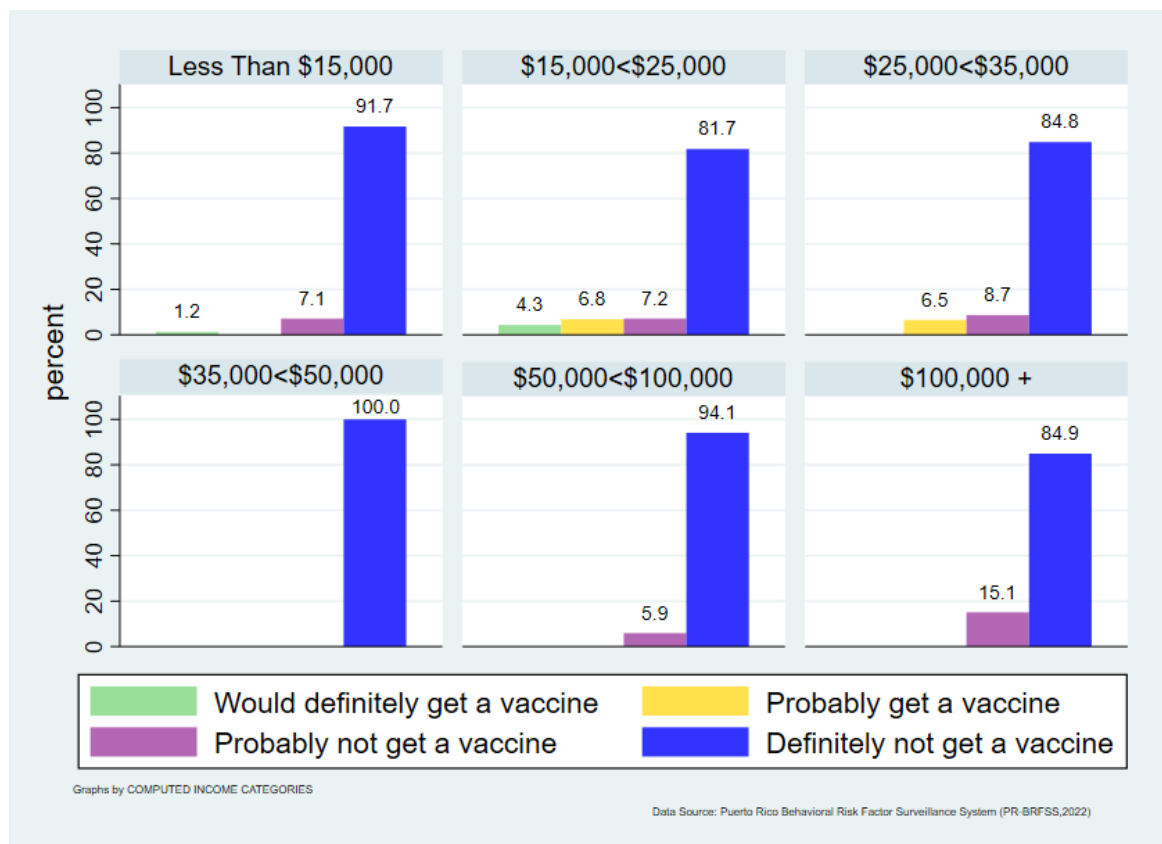


Figure 39. Self-Reported Prevalence of Getting a Vaccine Response by Household Income, Puerto Rico 2022



Analyzing vaccination hesitancy, we find that among respondents, a significant proportion express reluctance to receive the COVID-19 vaccine. When considering gender, both females and males exhibit a notable hesitancy, with 86.2% and 84.2%, respectively, indicating that they would definitely not get vaccinated (**Figure 37**). Age group trends echo this sentiment, with a consistent reluctance to get vaccinated, particularly among younger age groups. However, a glimmer of optimism emerges among those aged 65 and older, where at least 5.7% express a definite willingness to receive the vaccine (**Figure 38**).

Turning to education and income, the prevailing sentiment remains one of hesitancy, as the majority of respondents across different educational and income levels express a strong disinclination to get vaccinated. These insights shed light on the complex landscape of vaccination hesitancy, highlighting the need for targeted strategies to address concerns and promote vaccine acceptance within our community.

### C. Number of Vaccinations Received

As we delve deeper into the realm of COVID-19 vaccination in Puerto Rico, it's important to understanding the number of vaccine doses received by participants. The question 'How many vaccines have you received?' obtained from PR-BRFSS 2022 Survey serves as a vital gauge of vaccination progress and coverage. In the year 2022, our data reveals a noteworthy statistic—approximately 62.3% of participants reported receiving three vaccine doses (**Figure 41**). This prevalence underscores the importance of exploring not only the quantity but also the distribution of vaccine doses, shedding light on the dynamics of our community's vaccination efforts.

Figure 41.

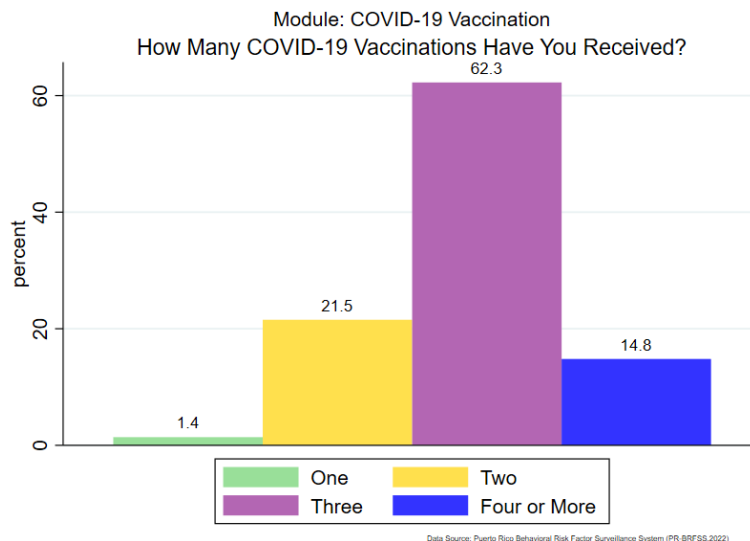




Figure 42. Self-Reported Prevalence of Number of Vaccines Obtained by Gender, Puerto Rico 2022

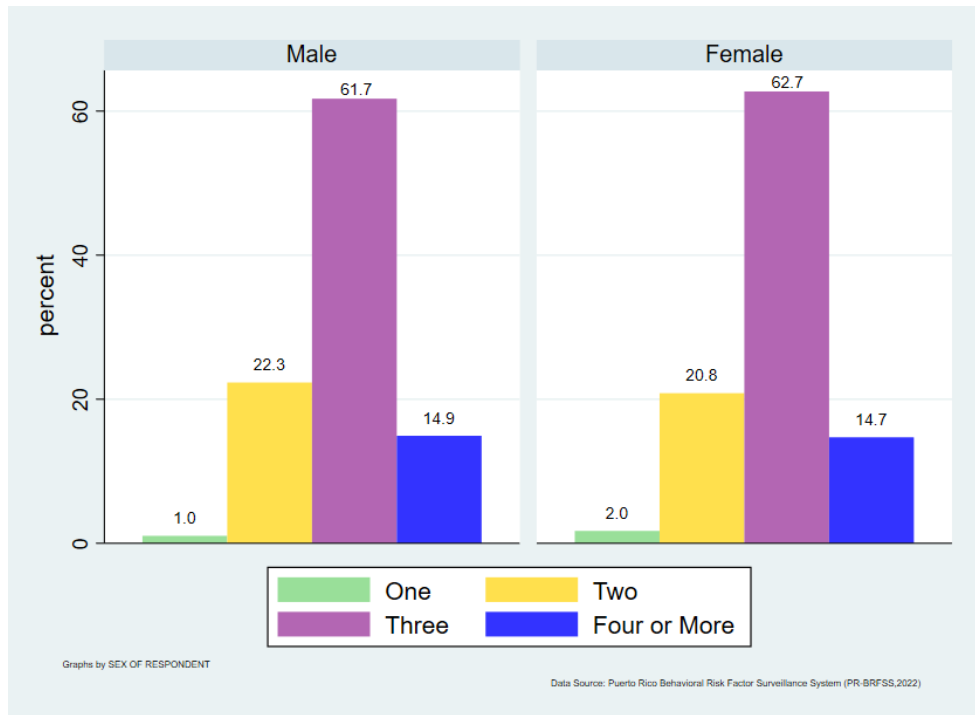


Figure 43. Self-Reported Prevalence of Number of Vaccines Obtained by Age-Group, Puerto Rico 2022

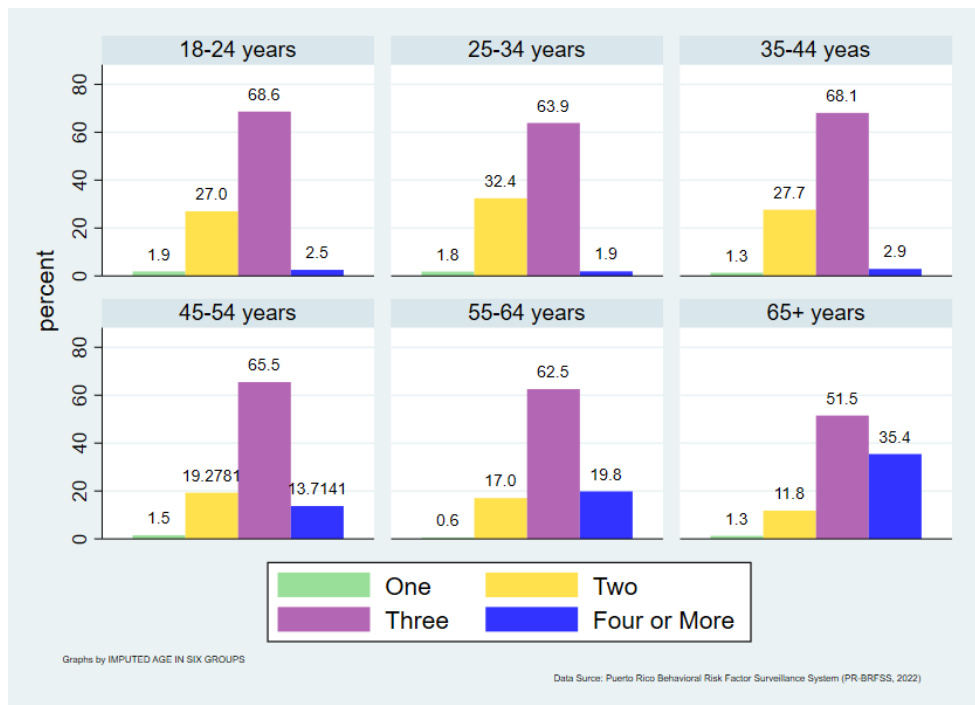


Figure 44. Self-Reported Prevalence of Number of Vaccines Obtained by Education Level, Puerto Rico 2022

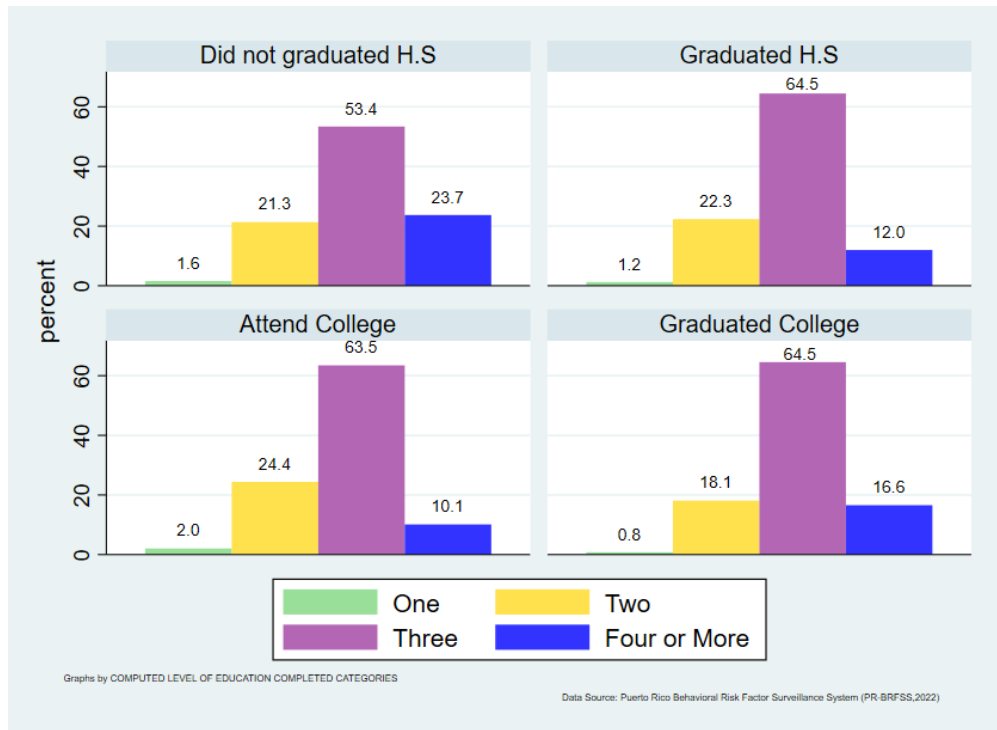
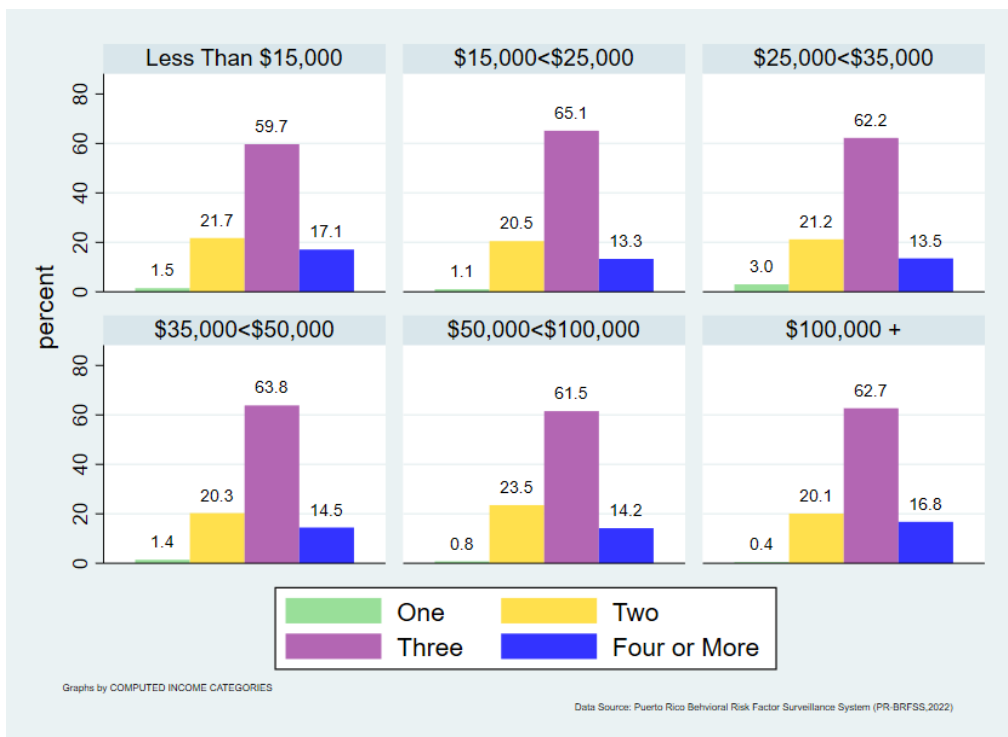


Figure 45. Self-Reported Prevalence of Number of Vaccines Obtained by Household Income, Puerto Rico 2022



As shown in the graphics above, the analysis of response across various demographic characteristics a common trend emerges- the prevalence of having received three doses of the COVID-19 vaccine stands out as the most common response, with a range from 51.5% to 68.1% across different groups. Interestingly, among respondents aged 65 and older, a distinct pattern emerges (**Figure 43**). Within this age group, 34.5% of respondents reported having received four or more (4 or more) doses of the vaccine. This observation hints at a unique vaccination trend among older adults, emphasizing the importance of understanding how different age groups respond to vaccine campaigns and the potential implication for public health strategies.

#### **D. Time Interval Vaccination Doses**

In their pursuit of comprehending the dynamics of COVID-19 vaccination in Puerto Rico, went through a critical dimension of the prevention landscape—the timing of vaccination. This facet of the analysis allows for the discernment of at what point during the pandemic's course individuals successfully completed their vaccination journey. Such insights hold immense value for statistical purposes and for informing public health strategies in response to health emergencies.

To collect this essential data, turned to the BRFSS 2022 Survey Module 7: COVID-19 Vaccination, employing two pivotal questions: 'During what month and year did respondents receive their first COVID-19 vaccination?' and 'During what month and year did respondents receive their second COVID-19 vaccination?' With this wealth of data in hand, categories were constructed based on the years when respondents received their vaccines. This approach enhances the sample sizes within each category and empowers the team to conduct a robust statistical analysis, offering a deeper understanding of the vaccination timeline within the community. In Puerto Rico, the highest prevalence of COVID-19 vaccinations occurred in the year 2021, with 93.2% of respondents indicating that they received their first dose during that year. Similarly, 94.7% reported receiving their second dose in 2021 (**Figure 46**).

Figure 46. Self-Reported Prevalence of Time of Vaccination (First and Second Dose), Puerto Rico 2022

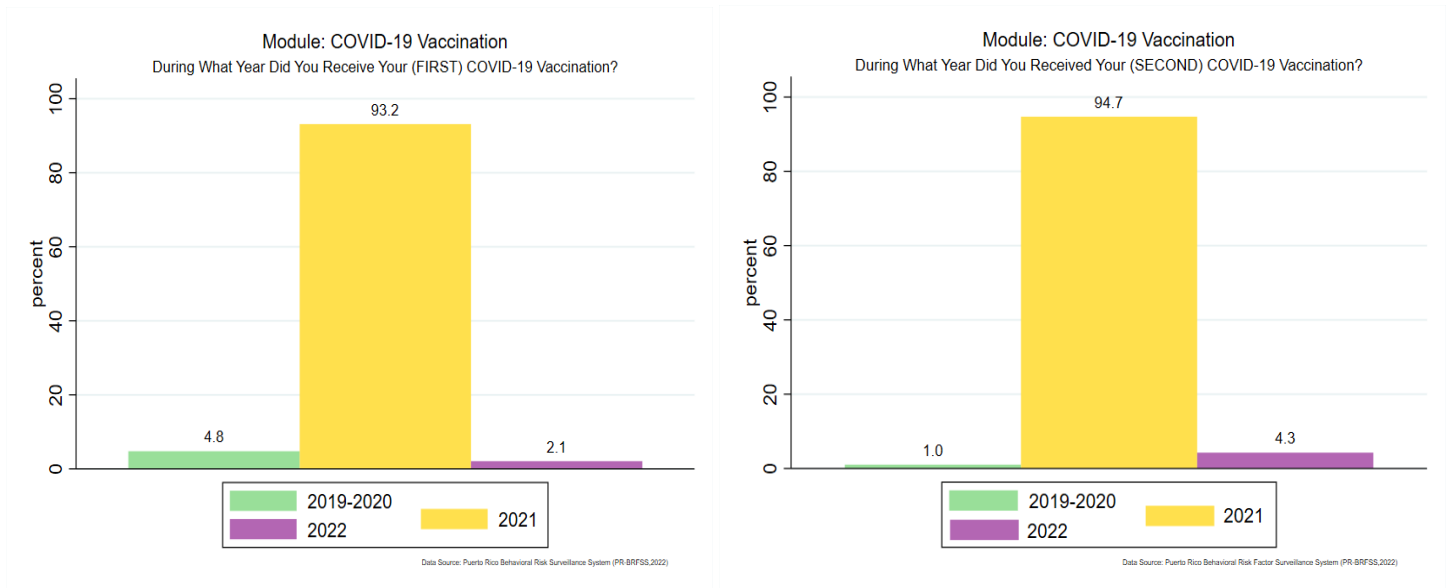


Figure 47. Self-Reported Prevalence of Time of First Vaccination by Gender, Puerto Rico 2022

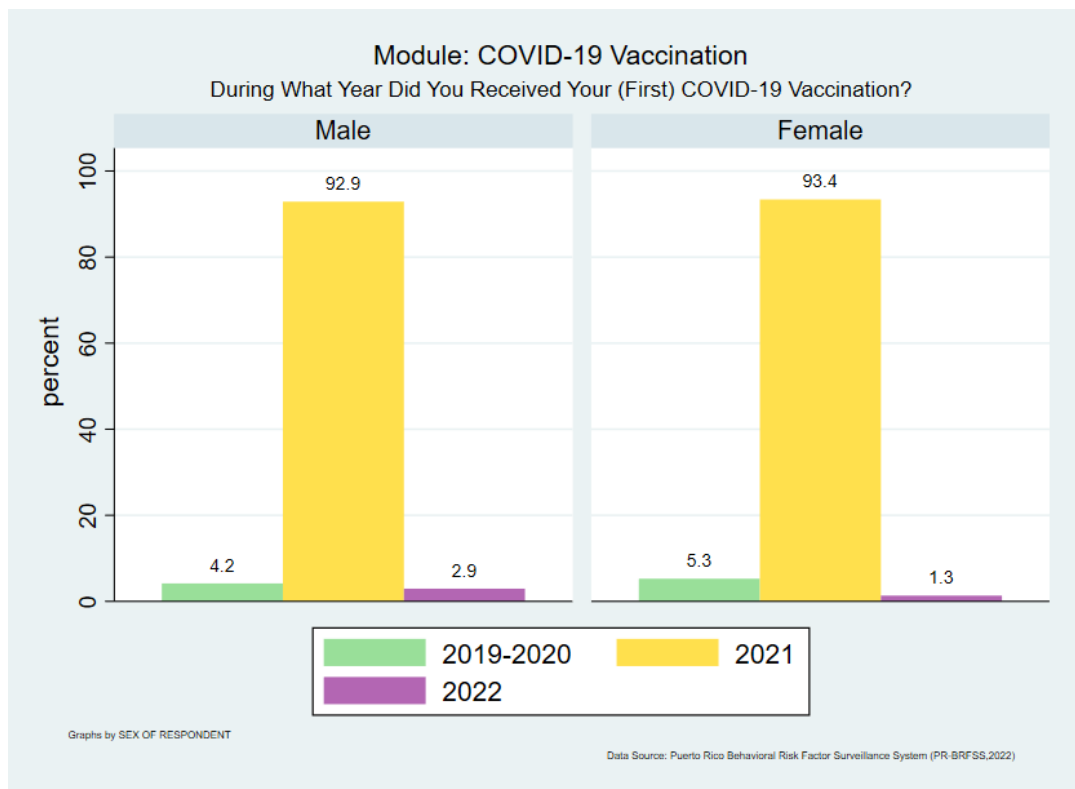


Figure 48. Self-Reported Prevalence of Time of Second COVID-19 Vaccination by Gender, Puerto Rico 2022

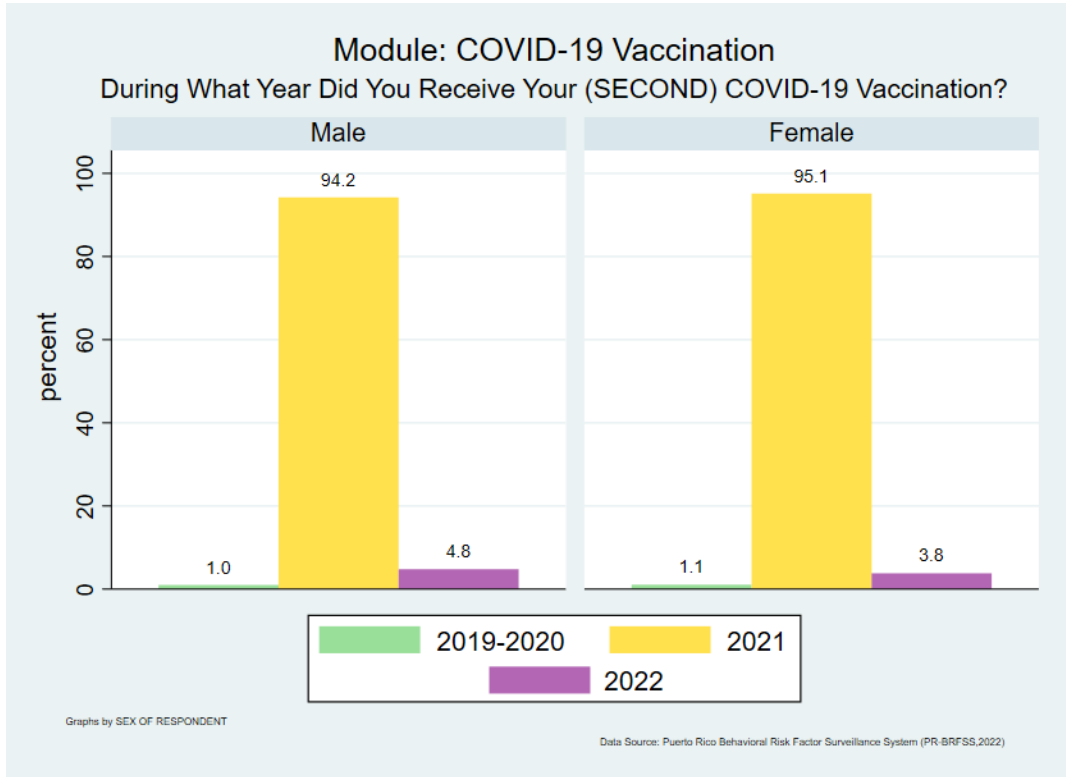


Figure 49. Self-Reported Prevalence of Time of First COVID-19 Vaccination by Age-Group, Puerto Rico 2022

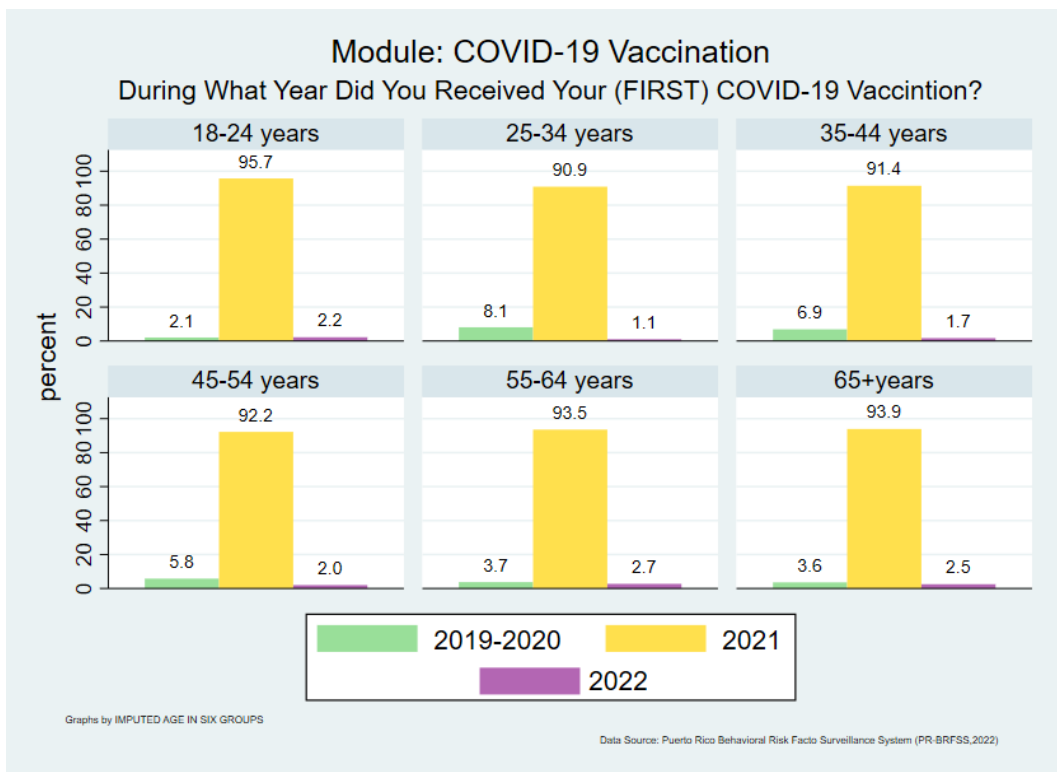


Figure 50. Self-Reported Prevalence of Time of Second COVID-19 Vaccination by Age-Group, Puerto Rico 2022

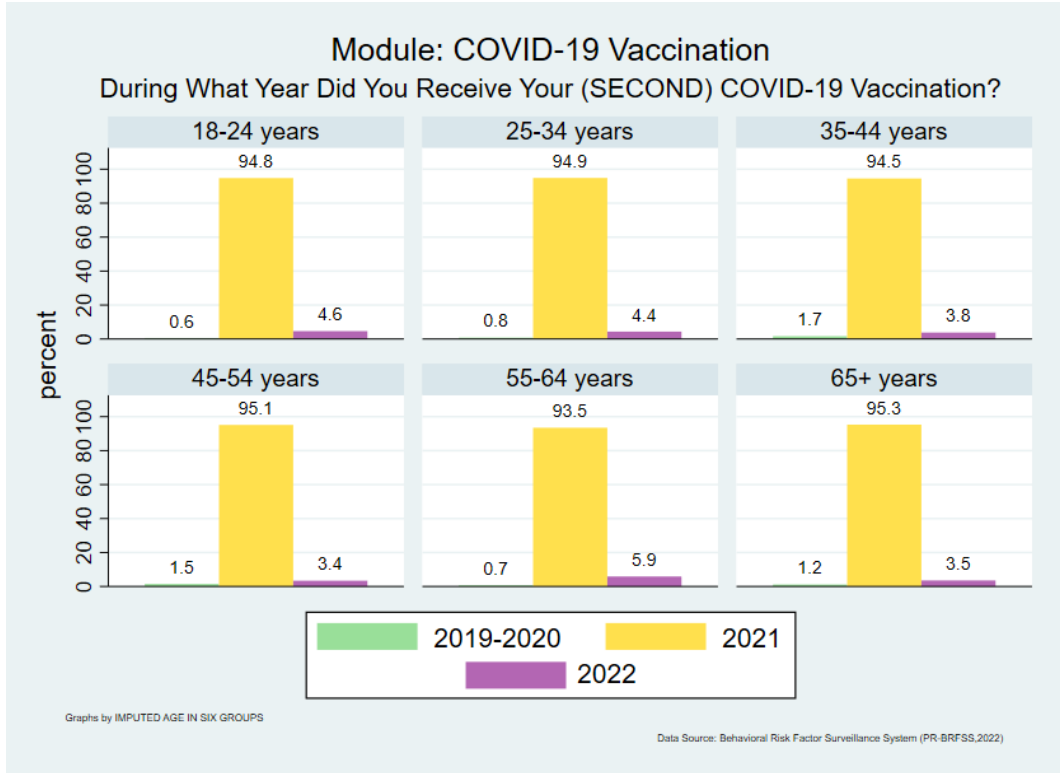


Figure 51. Self-Reported Prevalence of Time of First COVID-19 Vaccination by Education, Puerto Rico 2022

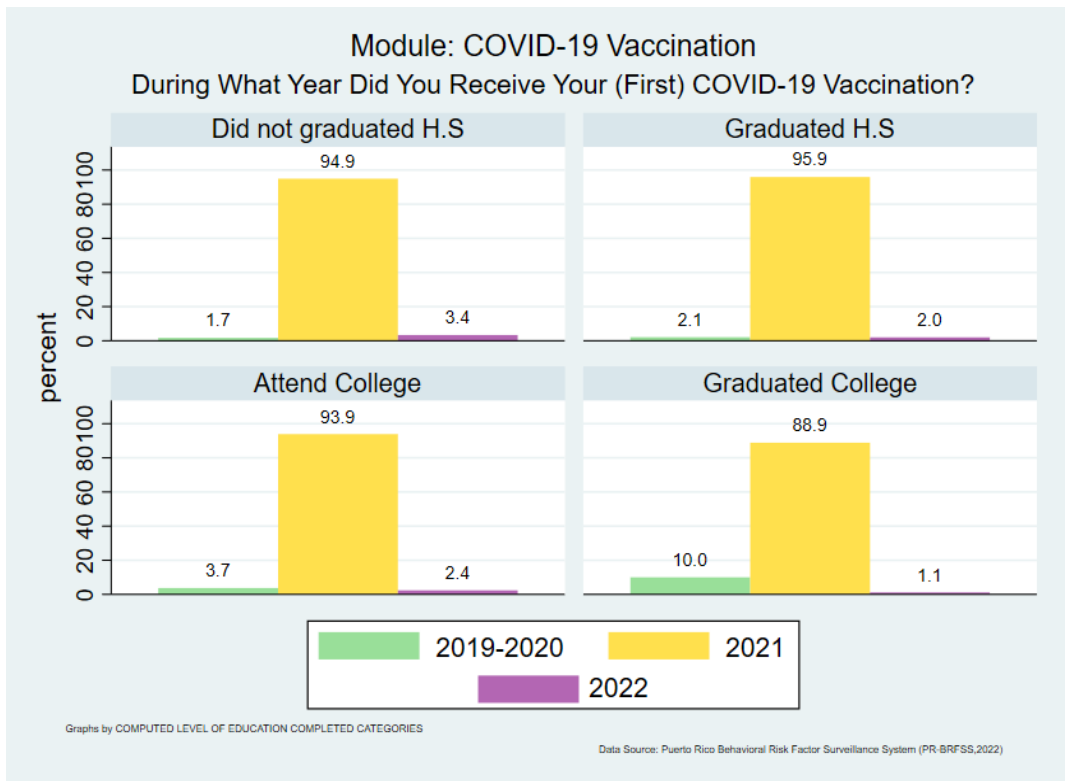


Figure 52. Self-Reported Prevalence of Time of Second COVID-19 Vaccination by Education, Puerto Rico 2022

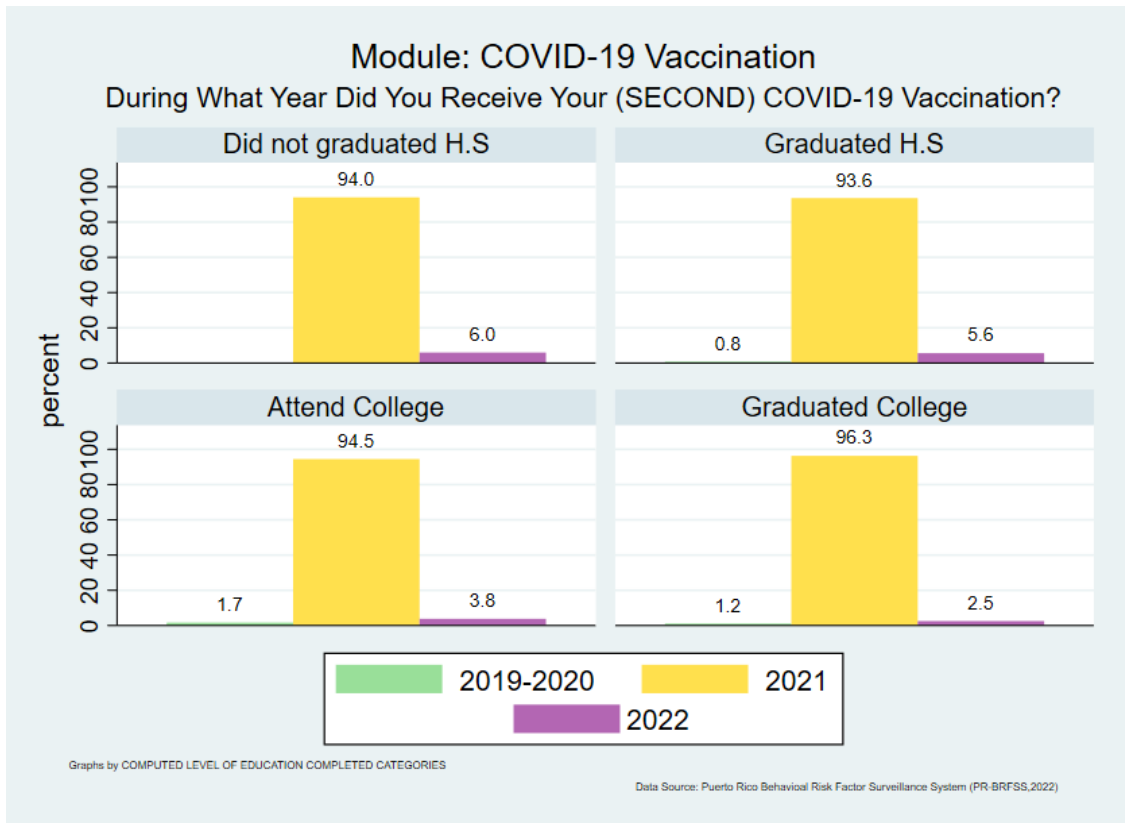


Figure 53. Self-Reported Prevalence of Time of First COVID-19 Vaccination by Income, Puerto Rico 2022

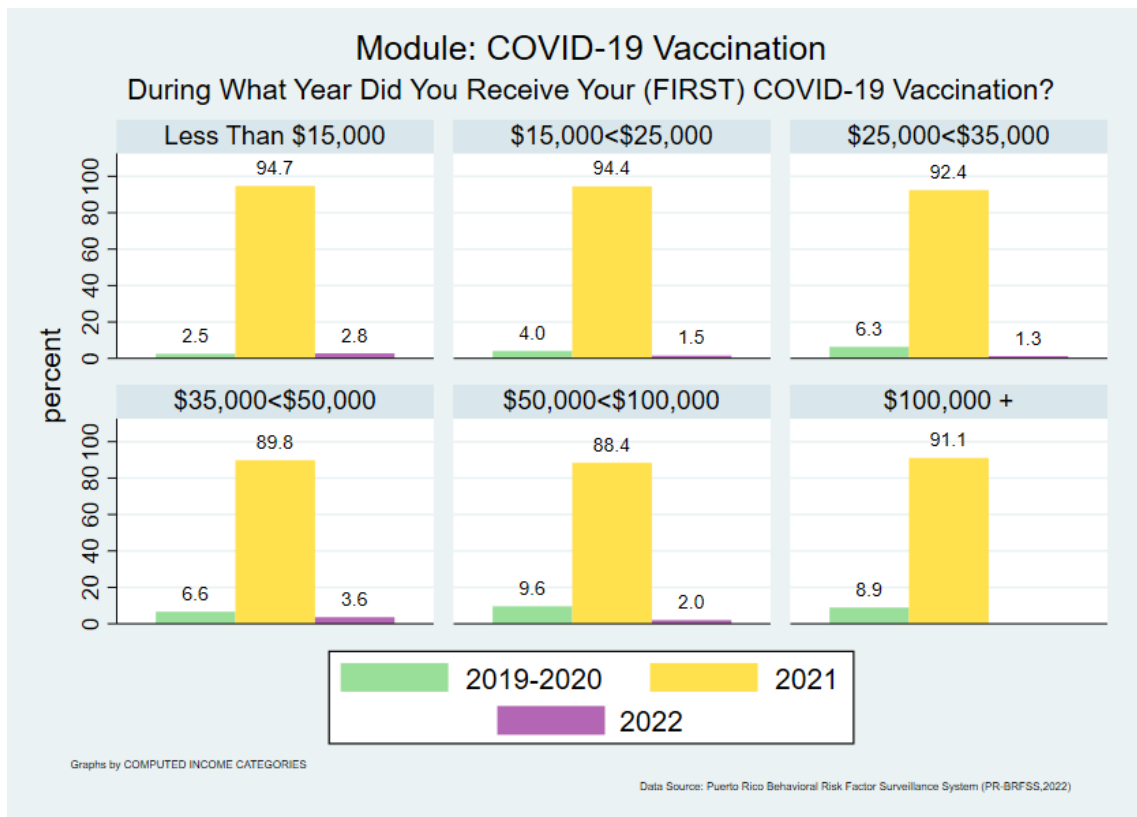
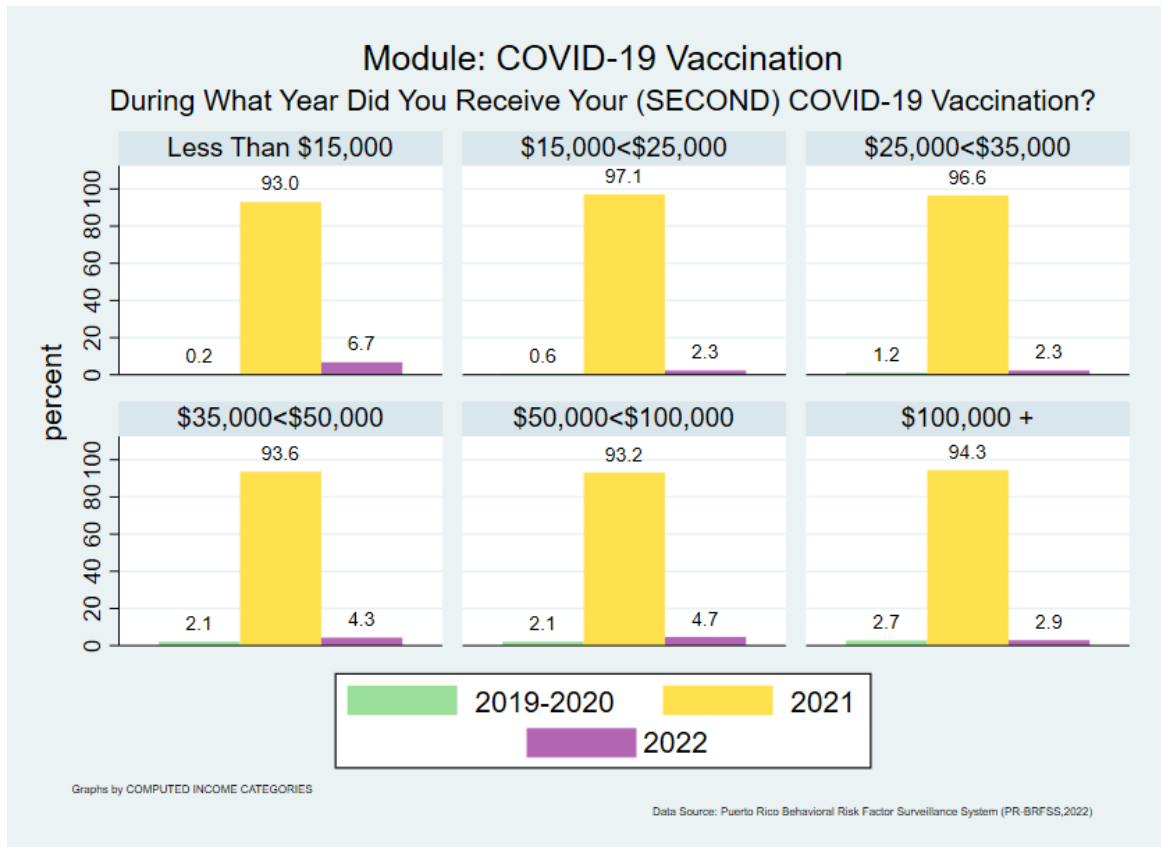


Figure 54. Self-Reported Prevalence of Time of Second COVID-19 Vaccination by Income, Puerto Rico 2022



Analyzing the time interval for each COVID-19 vaccination dose, it becomes evident that over 90% of respondents, irrespective of their gender, age, education, or income, received their vaccinations in the year 2021. This highlights that 2021 was the most active year in the vaccination process, corresponding to a period of increased virus activity. However, a concerning observation emerges vaccination rates substantially decreased from approximately 90% to less than 2.0% across all demographic categories over time. This decline in preventive action raises alarm bells, emphasizing the importance of not letting our guard down in such situations. It underscores the crucial role vaccination plays in safeguarding public health.



# INFECTION

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## A. Previous COVID-19 Infection

The data for this aspect was sourced from the Emerging CORE: COVID-19 Long-Term Effects in the BRFSS 2022 survey. Specifically, respondents were asked, "Has a Doctor, Nurse, or other Health Professional Ever Told You That You Tested Positive for COVID-19?" As shown in Figure 55, in 2022 it was revealed that 38.7% of respondents reported having been infected by the virus. This figure represents less than half of the population under study but is important to know how this infection behaves between demographic characteristics.

Figure 55. Self-Reported Prevalence of COVID-19 Infection, Puerto Rico 2022

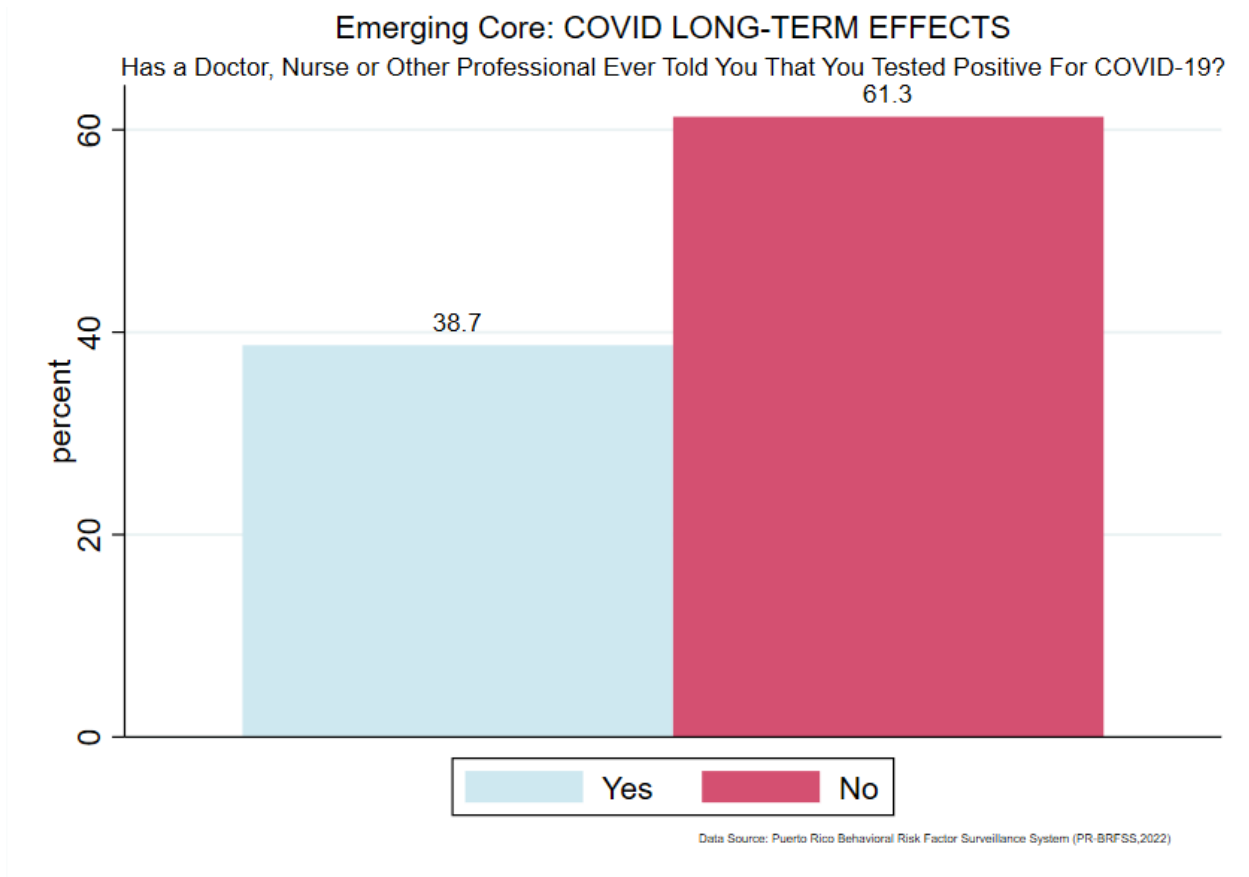


Figure 56. Self-Reported Prevalence of COVID-19 Infection by Gender, Puerto Rico 2022

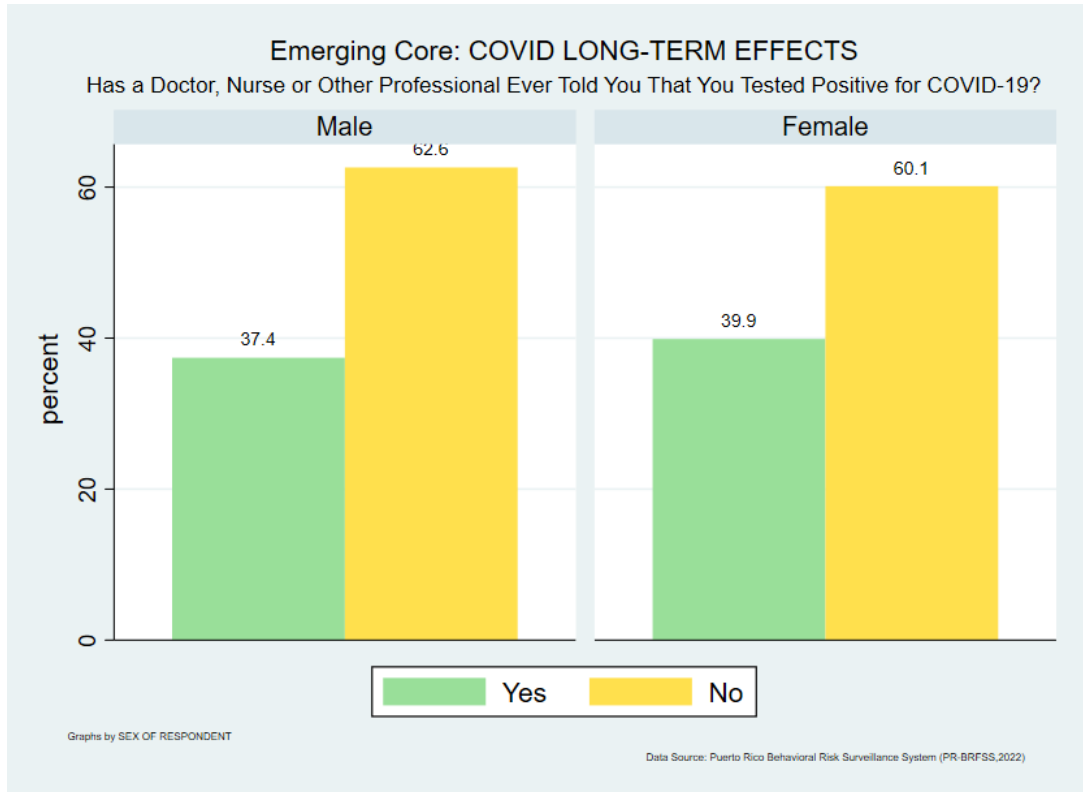


Figure 57. Self-Reported Prevalence of COVID-19 Infection by Age-Group, Puerto Rico 2022

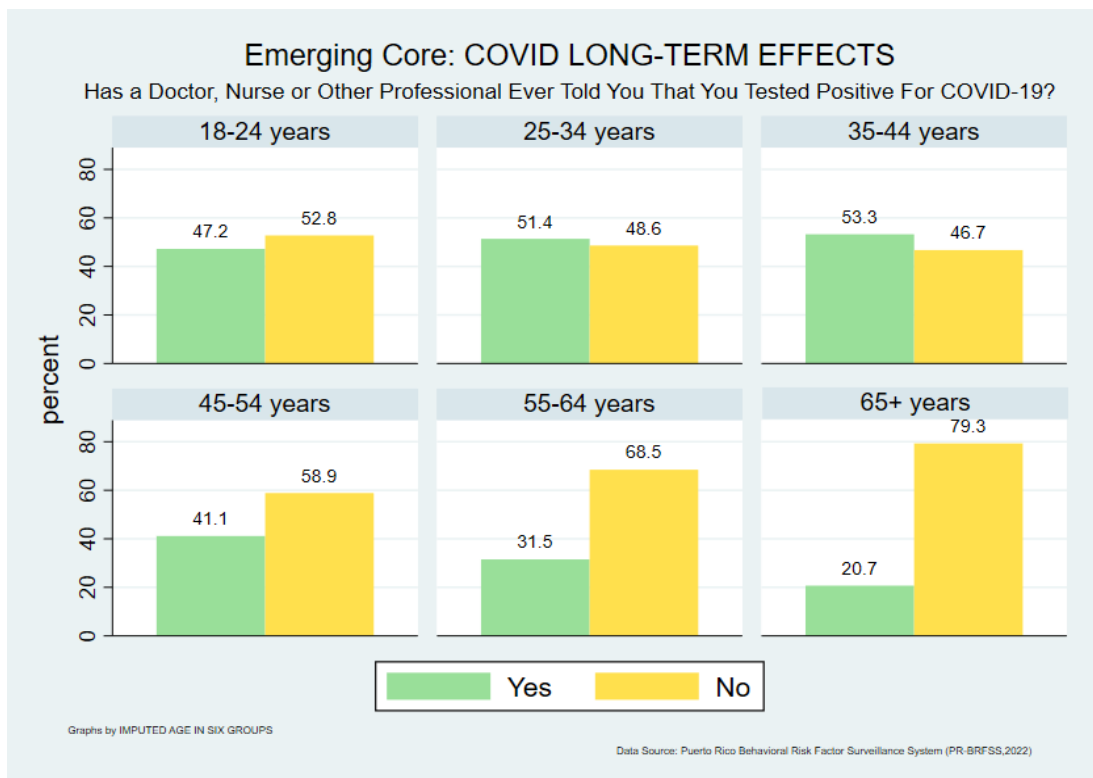


Figure 58. Self-Reported Prevalence of COVID-19 Infection by Education Level, Puerto Rico 2022

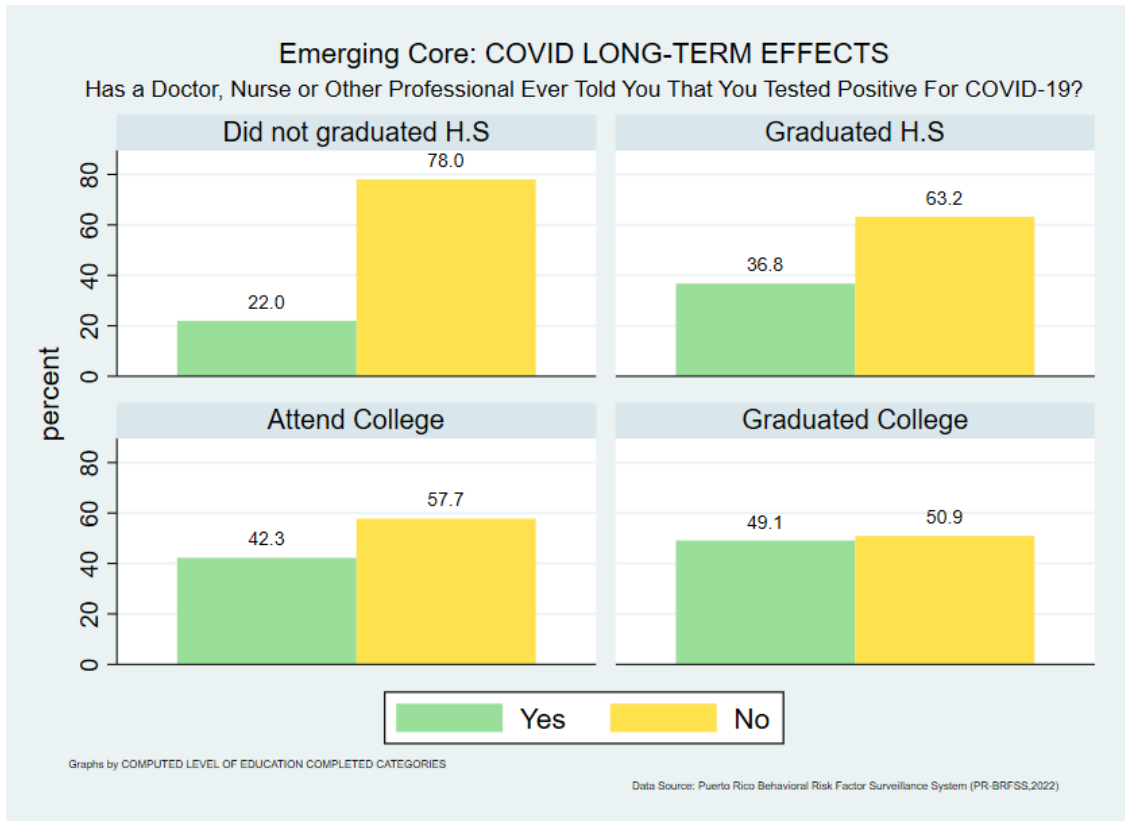


Figure 59. Self-Reported Prevalence of COVID-19 Infection by Income, Puerto Rico 2022

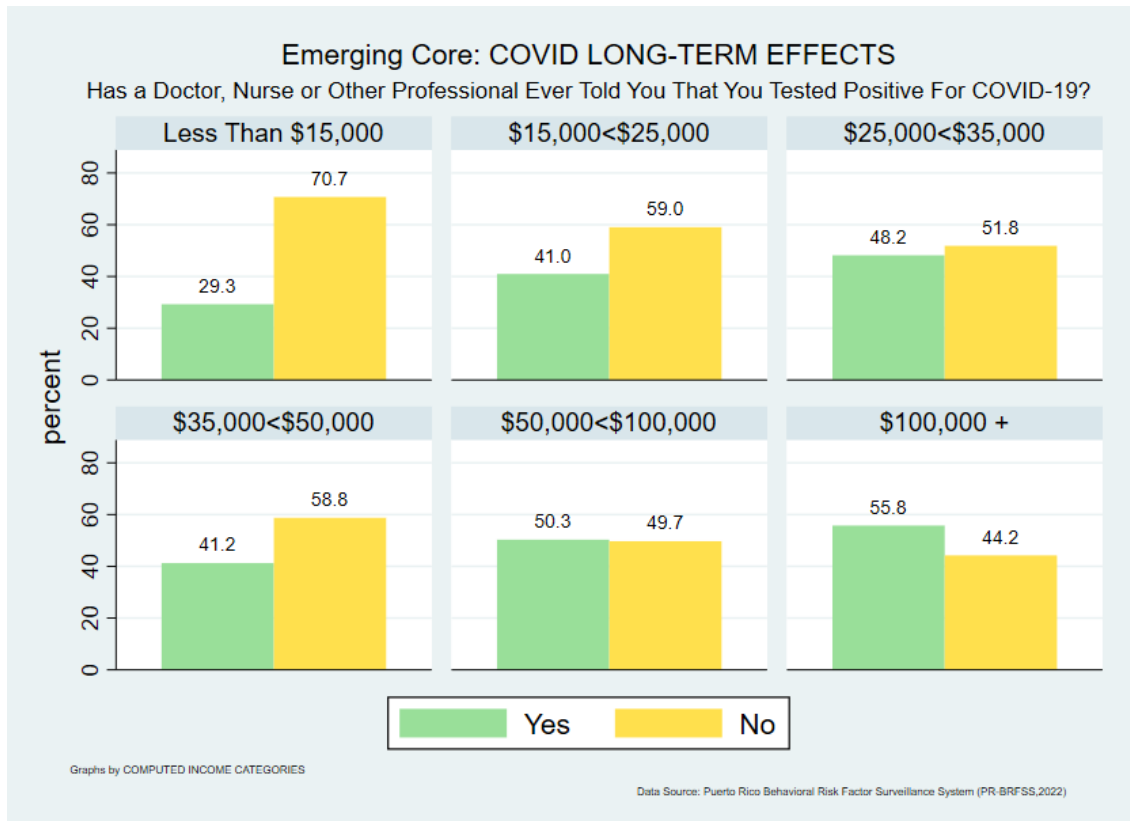
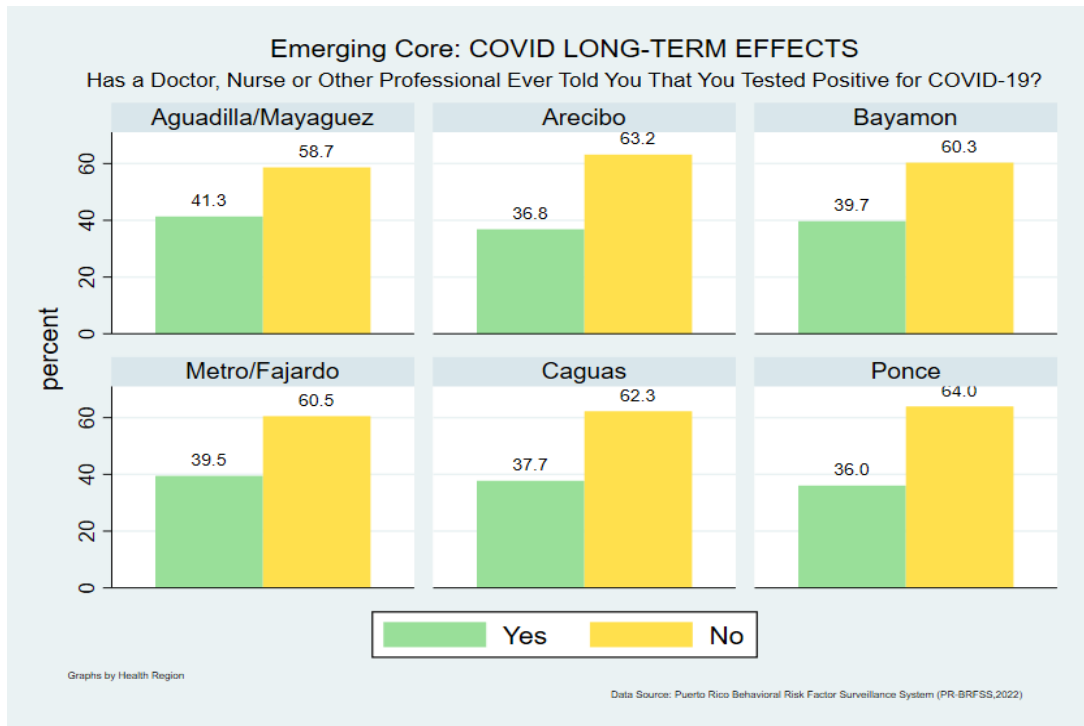


Figure 60. Self-Reported Prevalence of COVID-19 Infection by Health Region, Puerto Rico 2022



In the analysis of previous COVID-19 infections, it's interesting to note that both males and females had similar prevalence rates of testing positive for COVID-19, with 37.4% and 39.9%, respectively (**Figure 56**). However, when we look at different age groups, a distinct pattern emerges. During 2022, respondents between the ages of 25-34 and 35-44 exhibited a higher likelihood of testing positive for COVID-19 compared to other age groups, with prevalence rates of 51.4% and 53.3%, respectively (**Figure 57**).

An intriguing trend emerges when considering education levels and income. Respondents with a College Diploma had a higher infection rate, with 49.1% testing positive (**Figure 58**). Similarly, those with a household income greater than \$100,000 were more prevalent in testing positive for COVID-19 during 2022, with a prevalence rate of 55.8% (**Figure 59**). Within the wealth of data collected in the 2022 BRFSS survey, 41.3% of respondents from the Aguadilla/Mayaguez health region displayed a higher prevalence of testing positive for COVID-19 (**Figure 60**). These findings offer valuable insights into the distribution of COVID-19 infections within different demographic categories, shedding light on potential areas of focus for public health efforts.

## B. Long-Term Effects – COVID-19 Primary Symptoms and Duration

In this section, concluding our exploration of the COVID-19 infection period, focuses on the initial symptoms experienced by respondents and the duration of those symptoms. We extracted these critical insights from the BRFSS 2022 survey by asking respondents to identify their primary COVID-19 symptom and whether they experienced any symptoms lasting for three months or longer that they did not have prior to contracting the virus.

This multifaceted analysis incorporates gender and age-group categories, providing a comprehensive view of how the virus behaves within the Puerto Rican population. By delving into these facets of COVID-19, we gain a deeper understanding of the virus's impact on individuals and communities, enabling us to tailor public health strategies and interventions more effectively. During 2022, 42.0% of the respondents answer that the first symptom experienced was fatigue and difficulty thinking, followed by difficulty breathing and join pain with 40.0% of prevalence in Puerto Rican population (**Figure 60**). Also, in 2022 82.7% of the respondents to the BRFSS survey in Puerto Rico don't experience any symptom that last three months or more after had the virus infection (**Figure 61**).

Figure 61. Self-Reported Prevalence of Primary Symptoms, Puerto Rico 2022

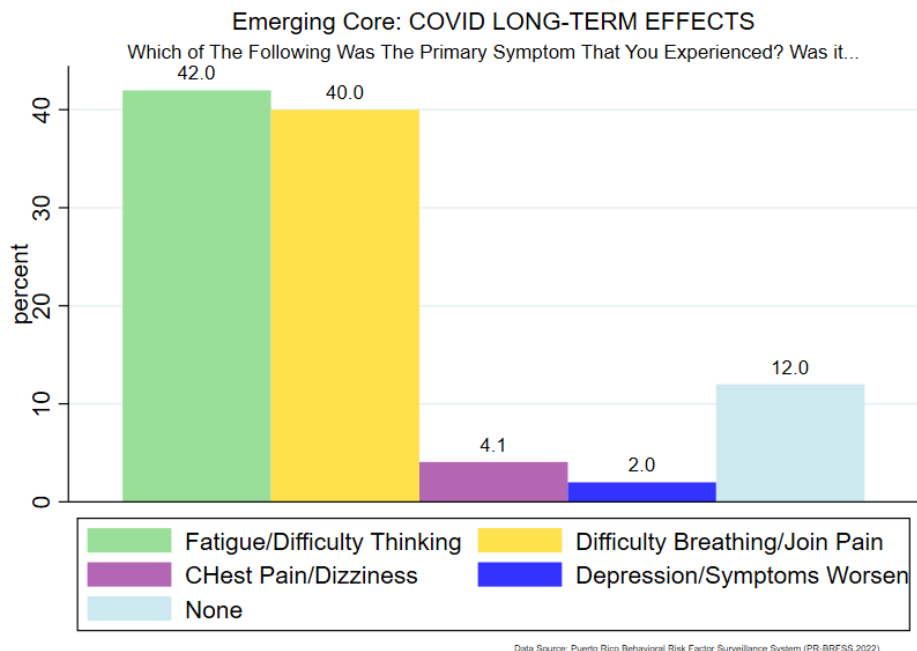
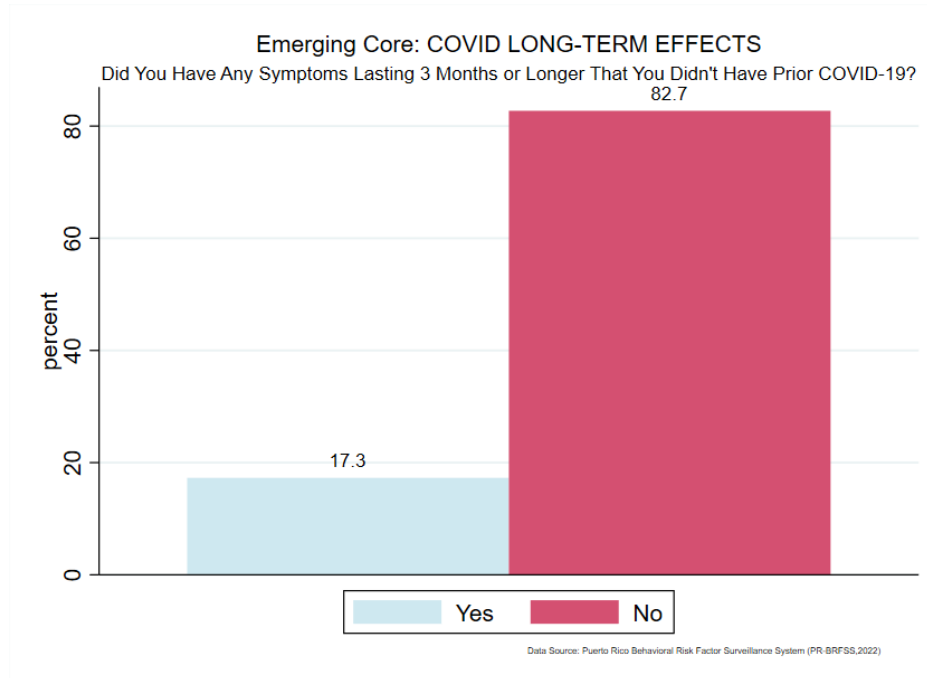


Figure 62. Self-Reported Prevalence of Presence of Long-Term Symptom Duration, Puerto Rico 2022



## Demographic Characteristics of COVID-19 Long-Term Effects

Figure 63. Self-Reported Prevalence of Primary Symptoms by Gender, Puerto Rico 2022

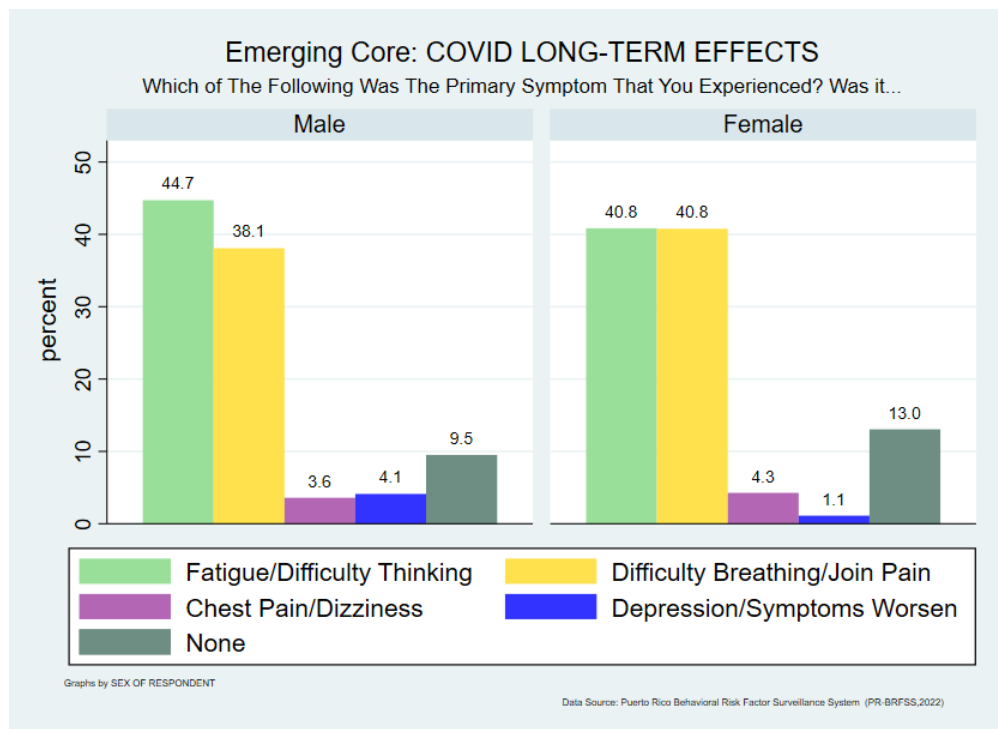


Figure 64. Self-Reported Prevalence of Primary Symptoms by Age-Group, Puerto Rico 2022

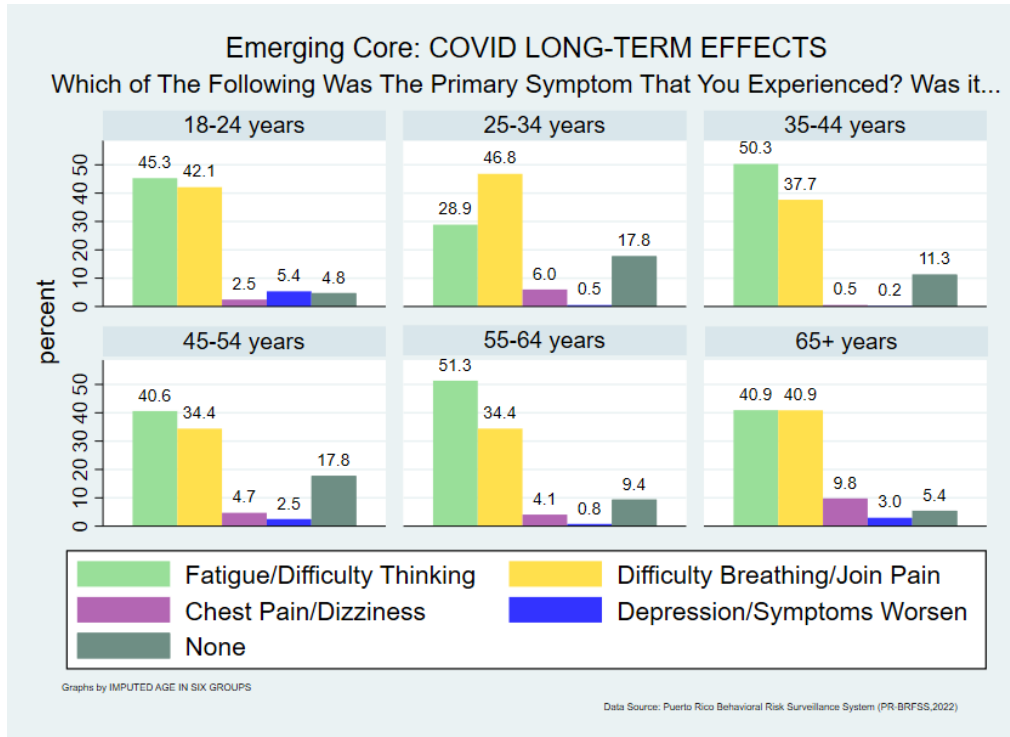


Figure 65. Self-Reported Prevalence of Presence of Long-Term Symptom Duration by Gender, Puerto Rico 2022

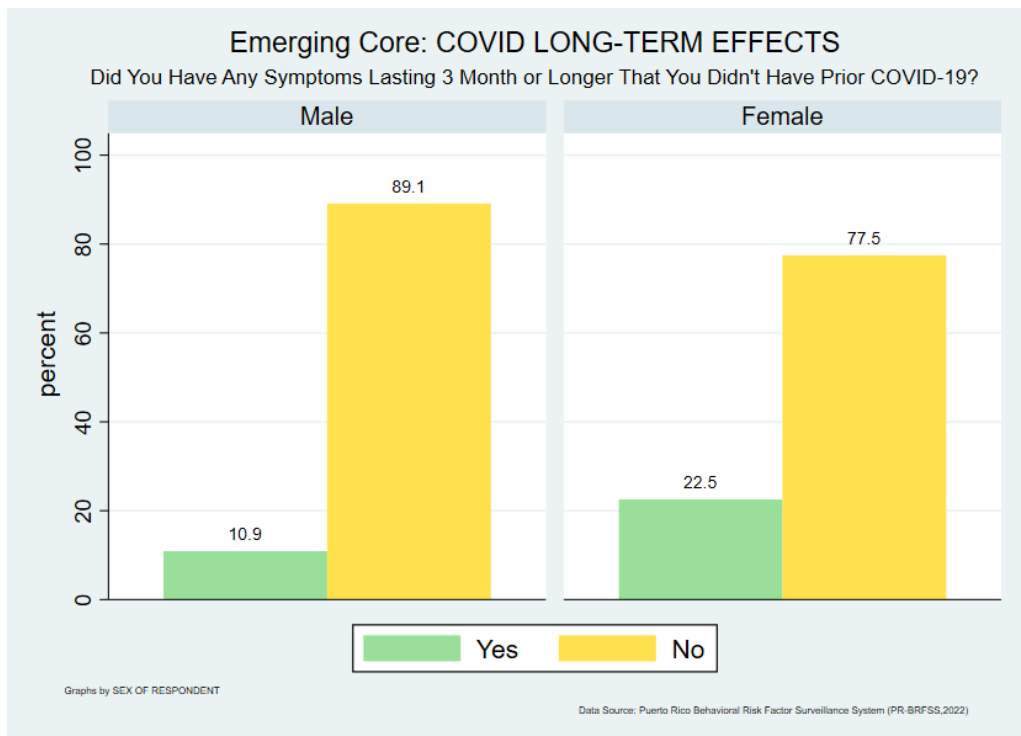
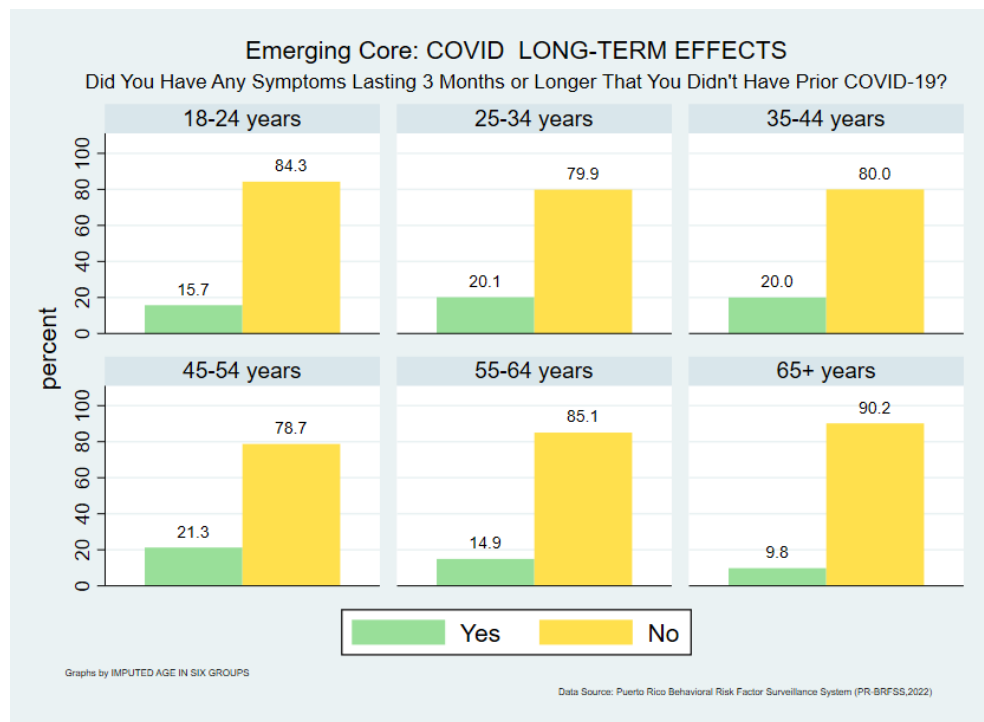


Figure 66. Self-Reported Prevalence of Presence of Long-Term Symptom Duration by Age-Group, Puerto Rico 2022



Shedding light on the initial symptoms experienced by respondents and the extended duration of these symptoms. **Figure 63** illustrates a noteworthy observation, with 44.7% of males reporting fatigue and difficulty thinking as their first and most prevalent symptoms. Similarly, respondents across various age groups identified these symptoms as primary, showcasing their significant prevalence. Interestingly, respondents aged 25-34 and 45-54 stand out with a relatively higher percentage (17.8%) reporting no symptoms, distinguishing them from other age groups (**Figure 64**).

When we shift our focus to the prolonged duration of symptoms—persisting for three months or longer after contracting COVID-19—we find that this phenomenon is less prevalent across all demographic characteristics. This analysis provides valuable insights into the long-term effects of the virus within our community, highlighting the need for ongoing research and support for those affected.



## **PUBLIC HEALTH ACTION**

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In the wake of the COVID-19 pandemic, a collective journey has yielded not only data and insights but also a profound understanding of the interconnectedness of our health and the health of our communities. As we navigate through the implications of this pandemic, it is paramount to recognize that our actions today shape the trajectory of tomorrow's public health landscape. This section embarks on a critical exploration of the public health implications stemming from our analysis of COVID-19 in Puerto Rico.

This section of the report unfolds in three dimensions: Prevention, Infection, and Action. Having dissected the data with precision, we now pivot to the realm of Action—where the findings of our study crystallize into informed strategies and recommendations. These implications are not mere conclusions; they serve as the blueprint for collective response to the evolving COVID-19 landscape. Through data-driven insights and recommendations, aiming the public health efforts, enhance community resilience, and underscore the importance of data collection and analysis in safeguarding our health and well-being.

### **A. Vaccination Promotion**

The role of vaccination in curbing the spread of COVID-19 and preventing severe illness and hospitalization is critical and can be maintain. Highlight the global significance of vaccination campaigns and their success in controlling outbreaks of various diseases will be essential in this specific focus of this section on promoting vaccination and addressing hesitancy among different demographic groups for example, people between 65 years of age and older that are health compromised and are prevalent the chronic conditions. This part of public health action is very important to make a global impact, not only in Puerto Rican population.

In this case, COVID-19 behaves in a way when a vaccination prevention is key to reduce the severity. COVID-19 Vaccines overall continue to stand as a crucial means of safeguarding individuals from severe illness, hospitalizations, and mortality. Opting for

vaccination at this juncture will not preclude the opportunity to receive an authorized variant-specific vaccine in the forthcoming fall or winter as per recommended guidelines. Considering recent escalations in fatalities and hospital admissions, it's imperative to maintain adherence to recommend COVID-19 vaccination protocols. This includes considering additional booster doses for individuals with moderate to severe immunocompromised conditions and adults aged 50 and above<sup>2</sup>.

Vaccines are critical in the safety and prevention inside of public health. The results of the hesitancy in Puerto Rican population, across demographic categories expressed a definite unwillingness to receive the COVID-19 vaccine. This hesitancy ranged from approximately 84% to 86%, highlighting the presence of a significant segment of the population with vaccine concerns or reservations. That's why it's crucial to find a way to increase interventions and communication efforts to address this issue. Strategies should aim to provide accurate information, address concerns, and emphasize the safety of COVID-19 vaccine, particularly in younger age-groups who exhibited higher levels of hesitancy.

## **B. Preventive Measures**

The collected data from the BRFSS 2022 survey, which reveals that a significant portion of the Puerto Rican population remained unvaccinated or hesitant to receive COVID-19 vaccines, it is crucial to underscore the continued relevance of preventive measures. While vaccination is a pivotal tool in curbing the spread of the virus, the hesitancy rates of approximately 84% to 86% among respondents signify that a substantial segment of our community may remain vulnerable to infection. To address this vulnerability, it is imperative to stress the need for ongoing preventive measures, as evidenced by the survey findings. For instance, despite the vaccine rollout, a sizable portion of the population may remain unvaccinated, particularly among younger age groups. Therefore, continued mask-wearing, social distancing, and rigorous hand hygiene practices are vital in minimizing the transmission of COVID-19, protecting those who are yet to receive their vaccinations, and reducing the risk of severe illness or hospitalization.

Moreover, the emergence of new variants, as indicated in data2, further underscores the importance of preventive measures. These variants have demonstrated the potential to impact vaccine efficacy and infect individuals who have already been vaccinated. To safeguard our community, it is essential to communicate the significance of adhering to public health guidelines and reinforcing the use of preventive measures. This collective effort remains paramount in our ongoing battle against COVID-19 and its variants.

### **C. Health Equity**

Health equity concerns have come to the forefront, revealing disparities in infection rates, vaccination access, and healthcare outcomes. BRFSS analysis demonstrates that individuals from lower-income communities, often facing socioeconomic challenges exacerbated by the pandemic, have experienced higher rates of COVID-19 infections. Likewise, disparities in vaccine hesitancy persist, with certain demographic groups displaying lower vaccination rates. To address these inequities, it is imperative to prioritize targeted interventions, accessible healthcare resources, and culturally sensitive messaging. Moreover, the public health community must recognize that health equity is not just a moral imperative but also a strategic necessity for pandemic control. By ensuring that all communities, regardless of their socioeconomic status or background, have equal access to vaccines, testing, and preventive measures, we can better protect the health and well-being of all Puerto Ricans.

### **D. Community**

Community engagement emerges as a critical linchpin in our public health strategy. Puerto Rico boasts a rich tapestry of diverse communities, each with its own unique needs and strengths. To effectively combat the virus and promote vaccination, it is imperative that we foster community engagement and collaboration. Local organizations, healthcare providers, and community leaders play an instrumental role in disseminating accurate information, dispelling myths, and overcoming vaccine hesitancy. By tapping into the trusted voices within communities, it's important to bridge gaps in understanding and address cultural, linguistic, and logistical barriers that may hinder vaccination efforts. Moreover, community engagement allows for the tailoring of public health initiatives to the

specific needs of different neighborhoods and demographics. Together, as a united front, we can forge a path toward a safer and healthier Puerto Rico.

## **VIII. Conclusion**

This report provides a comprehensive analysis of health perception, chronic health conditions and the impact of COVID-19 in Puerto Rico, drawing upon the invaluable data from the BRFSS. By examining the prevalence of chronic conditions, vaccination status, infection rates, and public health implications, we gain a deeper understanding of the health landscape in our community.

These insights underscore the importance of collecting and analyzing data through modules inside of Behavioral Risk Factor Surveillance System (BRFSS) and Puerto Rico Behavioral Risk Factor System (PR-BRFSS), enabling us to make informed decisions and implement targeted interventions. As we navigate the complexities of public health, it becomes evident that data-driven strategies are paramount in safeguarding the well-being of our population. Moving forward, the integration of these modules into our data collection efforts remains crucial for building a healthier and more resilient Puerto Rico.

## IX. References

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1. Centers for Disease Control and Prevention. (2022). *Behavioral Risk Factor Surveillance System Annual Data*. Retrieved from [https://www.cdc.gov/brfss/annual\\_data/annual\\_2022.html](https://www.cdc.gov/brfss/annual_data/annual_2022.html)
2. Centers for Disease Control and Prevention. (2022, July 15). *CDC Finds COVID-19 Vaccination Reduced Risk of COVID-19 Hospitalization*. Retrieved from <https://www.cdc.gov/media/releases/2022/s0715-COVID-VE.html>
3. STATA Corp LLC. (n.d.). *STATA: Data Analysis and Statistical Software*. Retrieved from <https://www.stata.com/>

## X. Appendix

Table 7. Self-Reported Prevalence of Cancer by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I
<b>Gender</b>			
Male	135	43.3	(36.8-50.1)
Female	177	56.7	(49.9-62.2)
<b>Age group</b>			
18-24	4	1.3	(0.3-5.3)
25-34	8	2.6	(0.9-6.9)
35-44	18	5.8	(2.9-11.0)
45-54	41	13.1	(9.6-17.7)
55-64	63	20.3	(15.5-26.1)
65<	178	56.8	(50.1-63.3)
<b>Education</b>			
Not Graduate High School	95	30.4	(23.8-37.8)
High School Graduate	83	26.7	(21.4-32.7)
Attend College	59	18.8	(14.4-24.2)
Graduated College	75	24.1	(19.5-29.4)
<b>Household Income</b>			
<15k	106	40.5	(33.6-48.0)
15k<25k	75	28.6	(22.6-35.4)
25k<35k	40	15.4	(10.5-22.9)
35k<50k	14	5.4	(3.1-9.2)
50k<100k	16	6.3	(3.9-10.1)
100k+	10	3.8	(1.9-7.5)

Table 8. Self-Reported Prevalence of Cancer in Respondents Who Had COVID-19 Positive Test, By Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I
<b>Gender</b>			
Male	32	33.8	(24.4-44.8)
Female	62	66.2	(55.2-75.6)
<b>Age group</b>			
18-24	4	4.3	(1.0-16.2)
25-34	4	4.1	(1.5-10.5)
35-44	6	6.9	(2.9-15.2)
45-54	17	18.2	(11.6-27.2)
55-64	18	19.6	(12.2-30.1)
65<	44	46.9	(36.3-57.9)
<b>Education</b>			
Not Graduate High School	20	21.9	(13.2-34.0)
High School Graduate	23	24.7	(16.4-35.4)
Attend College	17	18.8	(11.7-28.8)
Graduated College	32	34.7	(25.6-44.9)
<b>Household Income</b>			
<15k	24	29.5	(19.0-42.8)
15k<25k	23	28.7	(19.1-40.7)
25k<35k	12	15.6	(9.2-25.0)
35k<50k	8	9.5	(4.7-18.2)
50k<100k	9	10.7	(5.8-18.9)
100k+	5	6.1	(2.2-15.7)

Table 9. Self-Reported Prevalence of Diabetes by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I.
<b>Gender</b>			
Male	416	41.7	(37.4-46.0)
Female	583	58.4	(54.0-62.6)
<b>Age group</b>			
18-24	18	1.8	(0.7-4.2)
25-34	30	3.0	(1.5-5.8)
35-44	4	5.5	(3.8-8.0)
45-54	116	11.7	(9.5-14.2)
55-64	231	23.1	(20.0-26.5)
65<	549	54.9	(50.7-59.0)
<b>Education</b>			
Not Graduate High School	375	37.6	(33.3-42.0)
High School Graduate	265	26.5	(23.2-30.0)
Attend College	192	19.2	(16.6-22.2)
Graduated College	167	16.7	(14.5-19.2)
<b>Household Income</b>			
<15k	409	50.4	(45.6-55.1)
15k<25k	212	26.1	(22.4-30.1)
25k<35k	95	11.7	(8.9-15.2)
35k<50k	55	6.8	(5.0-9.2)
50k<100k	31	3.9	(2.8-5.4)
100k+	9.6	1.2	(0.6-2.2)

Table 10. Self-Reported Prevalence of Diabetes in Respondents Who Had COVID-19 Positive Test by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I.
<b>Gender</b>			
Male	103	39.8	(32.9-47.3)
Female	156	60.2	(52.7-67.2)
<b>Age group</b>			
18-24	7	2.8	(0.6-11.1)
25-34	12	4.6	(2.3-9.0)
35-44	29	11.1	(6.6-18.0)
45-54	36	14.1	(16.8-21.6)
55-64	66	25.6	(19.8-32.5)
65<	108	41.8	(8.1-11.0)
<b>Education</b>			
Not Graduate High School	71	27.4	(.7-35.2)
High School Graduate	67	25.8	(19.9-32.7)
Attend College	61	23.7	(18.2-30.2)
Graduated College	60	23.1	(18.4-28.7)
<b>Household Income</b>			
<15k	68	33.6	(26.0-42.0)
15k<25k	66	32.5	(24.9-41.1)
25k<35k	32	15.7	(11.2-21.5)
35k<50k	22	10.7	(6.3-17.4)
50k<100k	10	5.1	(2.8-8.9)
100k+	5	2.6	(0.9-6.7)

Table 11. Self-Reported Prevalence of Heart Disease by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I
<b>Gender</b>			
Male	251	48.9	(43.3-54.4)
Female	263	51.1	(45.6-56.7)
<b>Age group</b>			
18-24	16	3.1	(1.1-8.6)
25-34	27	5.3	(3.0-8.9)
35-44	35	6.8	(4.5-10.0)
45-54	85	16.5	(12.7-21.3)
55-64	107	20.8	(16.7-25.6)
65<	244	47.5	(42.1-53.1)
<b>Education</b>			
Not Graduate High School	165	32.4	(27.1-38.3)
High School Graduate	157	30.9	(26.0-36.2)
Attend College	103	20.3	(16.5-24.7)
Graduated College	83	16.4	(13.1-20.3)
<b>Household Income</b>			
<15k	221	54.2	(47.9-60.4)
15k<25k	101	24.7	(19.9-30.2)
25k<35k	32	7.8	(5.2-11.6)
35k<50k	29	7	(4.2-11.6)
50k<100k	15	3.6	(1.9-6.7)
100k+	11	2.6	(1.1-5.9)

Table 12. Self-Reported Prevalence of Heart Disease in Respondents Who Had a COVID-19 Positive Test by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I
<b>Gender</b>			
Male	60	44.8	(35.0-55.0)
Female	74	55.2	(45.0-65.0)
<b>Age group</b>			
18-24	0	0.0	0.00
25-34	14	10.3	(4.8-20.9)
35-44	16	12	(6.4-21.3)
45-54	25	18.5	(11.8-27.7)
55-64	26	19.3	(13.1-27.6)
65<	54	39.9	(30.8-49.7)
<b>Education</b>			
Not Graduate High School	32	31.9	(16.2-33.4)
High School Graduate	41	40.8	(22.0-40.0)
Attend College	36	35.9	(18.6-36.7)
Graduated College	26	25.9	(12.6-28.4)
<b>Household Income</b>			
<15k	57	53.5	(42.1-64.4)
15k<25k	23	21.5	(14.7-30.2)
25k<35k	9	8.2	(3.6-17.5)
35k<50k	8	7.3	(3.2-15.6)
50k<100k	6	6.2	(2.1-16.7)
100k+	4	3.5	(0.9-11.7)



Table 13. Self-Reported Prevalence of Poor Health More Than 15 Days by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I
<b>Gender</b>			
Male	203	46.1	(39.5-52.8)
Female	238	53.9	(47.2-60.5)
<b>Age group</b>			
18-24	26	6.0	(3.1-11.1)
25-34	39	8.9	(4.7-16.1)
35-44	57	13.0	(8.8-18.7)
45-54	67	15.2	(11.5-19.7)
55-64	103	23.3	(18.5-28.8)
65<	149	33.7	(28.1-39.9)
<b>Education</b>			
Not Graduate High School	133	30.3	(23.9-37.5)
High School Graduate	119	27.1	(21.9-33.1)
Attend College	104	23.7	(19.1-29.0)
Graduated College	83	18.9	(14.4-24.5)
<b>Household Income</b>			
<15k	197	51.5	(44.2-58.8)
15k<25k	101	26.5	(20.8-33.2)
25k<35k	49	12.9	(8.3-19.7)
35k<50k	22	5.8	(3.7-9.1)
50k<100k	6	1.5	(0.6-3.7)
100k+	7	1.8	(0.6-5.4)

Table 14. Self-Reported Prevalence of Poor Health for More Than 15 Days in Respondents Who Had COVID-19 Positive Test, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I
<b>Gender</b>			
Male	57	41	(28.8-43.3)
Female	83	59	(45.8-71.2)
<b>Age group</b>			
18-24	14	10.2	(4.1-23.3)
25-34	19	13.4	(5.7-28.5)
35-44	25	17.8	(9.7-30.5)
45-54	28	20.1	(12.7-30.3)
55-64	25	18	(11.2-27.4)
65<	29	20.6	(13.2-30.5)
<b>Education</b>			
Not Graduate High School	37	26	(16.2-38.9)
High School Graduate	37	26	(16.2-38.9)
Attend College	34	24.3	(16.2-34.7)
Graduated College	33	23.7	(14.3-36.7)
<b>Household Income</b>			
<15k	54	44.3	(31.6-57.8)
15k<25k	35	28.6	(18.0-42.1)
25k<35k	21	17.1	(7.8-33.5)
35k<50k	10	8.2	(3.9-16.6)
50k<100k	2	1.3	(0.3-5.1)
100k+	1	0.5	(0.1-3.4)

Table 15. Self-Reported Prevalence of Health Perception Fair/Poor by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I
<b>Gender</b>			
Male	705	42.1	(38.8-45.4)
Female	971	57.9	(54.6-61.2)
<b>Age group</b>			
18-24	65	3.9	(2.6-5.8)
25-34	94	5.7	(4.0-7.8)
35-44	154	9.2	(7.2-11.5)
45-54	235	14	(12.1-16.2)
55-64	384	22.9	(20.4-25.5)
65<	744	44.4	(41.2-47.7)
<b>Education</b>			
Not Graduate High School	609	36.4	(33.1-39.9)
High School Graduate	496	29.7	(26.9-32.6)
Attend College	347	20.8	(18.5-23.2)
Graduated College	221	13.2	(11.5-15.1)
<b>Household Income</b>			
<15k	701	52.9	(49.2-56.6)
15k<25k	381	28.8	(25.6-32.1)
25k<35k	136	10.3	(8.2-12.9)
35k<50k	67	5.0	(3.7-6.8)
50k<100k	26	2.0	(1.4-2.9)
100k+	13	1.0	(0.4-2.0)

Table 16. Self-Reported Prevalence of Health Perception Fair/Poor in Respondents Who Had a COVID-19 Positive Test by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I
<b>Gender</b>			
Male	181	38.4	(33.1-44.1)
Female	290	61.6	(55.9-66.9)
<b>Age group</b>			
18-24	27	5.7	(3.2-10.1)
25-34	45	9.5	(6.6-13.5)
35-44	69	14.6	(10.7-19.6)
45-54	74	15.6	(12.1-19.9)
55-64	113	23.9	(19.5-28.9)
65<	145	30.7	(26.1-35.7)
<b>Education</b>			
Not Graduate High School	126	26.8	(21.7-32.5)
High School Graduate	143	30.4	(25.6-35.6)
Attend College	117	24.9	(20.4-29.9)
Graduated College	84	17.9	(14.5-22.1)
<b>Household Income</b>			
<15k	166	43.6	(37.5-50.0)
15k<25k	111	29.1	(24.1-34.7)
25k<35k	52	13.8	(9.9-18.8)
35k<50k	29	7.8	(5.0-11.9)
50k<100k	13	3.5	(2.1-5.8)
100k+	9	2.2	(0.9-5.4)

Table 17. Self-Reported Prevalence of Asthma by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I
<b>Gender</b>			
Male	209	31.2	(26.4-36.5)
Female	460	68.8	(63.5-73.6)
<b>Age group</b>			
18-24	46	6.9	(4.4-10.5)
25-34	124	18.6	(14.3-23.7)
35-44	99	14.9	(11.6-18.9)
45-54	110	16.5	(13.1-20.6)
55-64	117	17.5	(14.0-21.6)
65<	172	25.7	(21.8-30.1)
<b>Education</b>			
Not Graduate High School	143	21.6	(17.0-27.1)
High School Graduate	149	22.5	(18.7-26.8)
Attend College	205	30.9	(26.4-35.9)
Graduated College	166	25	(21.1-29.3)
<b>Household Income</b>			
<15k	253	45.8	(40.0-51.6)
15k<25k	152	27.3	(22.8-32.4)
25k<35k	59	10.6	(7.7-14.5)
35k<50k	51	9.2	(6.4-13.1)
50k<100k	27	4.9	(3.2-7.30)
100k+	12	2.2	(0.9-5.1)

Table 18. Self-Reported Prevalence of Asthma in Respondents Who Had a COVID-19 Positive Test, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I
<b>Gender</b>			
Male	67	25.7	(19.1-33.6)
Female	194	74.3	(66.4-80.8)
<b>Age group</b>			
18-24	27	10.3	(6.0-17.3)
25-34	53	20.2	(14.5-27.5)
35-44	65	24.8	(18.3-32.7)
45-54	45	17.1	(12.6-22.8)
55-64	35	13.6	(9.2-19.6)
65<	37	14.0	(10.2-18.9)
<b>Education</b>			
Not Graduate High School	39	14.8	(9.4-22.3)
High School Graduate	48	18.2	(13.2-24.6)
Attend College	90	34.4	(27.3-42.3)
Graduated College	85	32.6	(26.1-39.9)
<b>Household Income</b>			
<15k	82	37.2	(29.2-46.2)
15k<25k	64	29.2	(22.3-37.1)
25k<35k	26	11.9	(7.5-18.3)
35k<50k	25	11.5	(7.2-17.7)
50k<100k	19	8.7	(5.1-14.5)
100k+	3	1.5	(0.5-4.2)

Table 19. Self-Reported Prevalence of Having At Least One Dose of COVID-19 Vaccine by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I
<b>Gender</b>			
Male	2,432	96.7	(95.6-97.5)
Female	2,728	95.7	(94.6-96.6)
<b>Age group</b>			
18-24	941	98.1	(95.9-99.1)
25-34	756	96.6	(94.3-97.9)
35-44	681	96.6	(94.7-97.8)
45-54	723	95.5	(93.4-97.0)
55-64	778	95.6	(93.2-97.3)
65<	1,281	94.9	(93.2-96.3)
<b>Education</b>			
Not Graduate High School	944	95.5	(92.7-97.2)
High School Graduate	1,426	95.2	(93.6-96.4)
Attend College	1,399	96.2	(94.7-97.3)
Graduated College	1,385	97.6	(96.6-98.3)
<b>Household Income</b>			
<15k	1,466	95.0	(93.2-96.3)
15k<25k	1,229	95.9	(93.9-97.2)
25k<35k	540	97.3	(95.3-98.5)
35k<50k	473	98.5	(96.5-99.3)
50k<100k	332	97.7	(95.5-98.9)
100k+	121	97.3	(91.1-99.2)

RECEIVED AT LEAST ONE DOSE OF COVID-19 VACCINATION?		
	Frequency	Percent (%)
Yes	5,160	96.1
No	207	3.9
	5,367	100

Table 20. Self-Reported Prevalence of Getting COVID-19 Vaccine, Puerto Rico 2022

Would you say you would definitely get a vaccine, probably get a vaccine, probably not get a vaccine or definitely not get a vaccine?		
	Frequency	Percent (%)
Definitely get a vaccine	5	2.7
Probably get a vaccine	8	4.2
Probably not get a vaccine	15	7.6
Definitely not get a vaccine	168	85.5
Total	196	100.00

Table 21. Self-Reported Prevalence of Getting Vaccinated by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates											
	Definitely get A Vaccine			Probably Get A Vaccine			Probably Not Get A Vaccine			Definitely Not Get A Vaccine		
	Frequency	Prevalence %	95% C.I.	Frequency	Prevalence %	95% C.I.	Frequency	Prevalence %	95% C.I.	Frequency	Prevalence %	95% C.I.
<b>Gender</b>												
Male	2	2.4	(0.5-9.3)	3	3.6	(0.9-13.0)	8	9.8	(3.3-25.9)	67	84.2	(69.3-92.2)
Female	4	3	(0.6-12.2)	5	4.7	(1.7-12.0)	7	6.1	(2.8-12.8)	101	86.3	(76.9-92.2)
<b>Age group</b>												
18-24	0	0.0	0.0	0	0.0	0.0	4	21.5	(3.0-70.8)	13	78.5	(29.1-97.0)
25-34	0	0.0	0.0	1	3.0	(0.3-19.3)	4	16.2	(5.0-41.2)	22	80.8	(56.4-93.2)
35-44	0	0.0	0.0	2	9.2	(1.7-37.6)	2	6.4	(0.8-34.5)	19	83.8	(57.2-95.3)
45-54	1	2.3	(0.3-15.1)	2	5.9	(1.4-21.6)	0	0.0	0.0	30	91.9	(76.4-97.5)
55-64	1	3.0	(0.4-19.4)	0	0.0	0.0	3	9.2	(2.9-25.4)	32	87.8	(70.6-95.6)
65<	3	5.7	(1.2-22.4)	3	5.8	(1.6-19.2)	2	3.3	(0.8-12.7)	51	85.2	(70.1-93.4)
<b>Education</b>												
Not Graduate High School	2	6.2	(0.8-33.9)	3	6.7	(1.6-24.4)	0	0.0	0.0	34	87.0	(64.4-96.2)
High School Graduate	1	1.6	(0.2-10.8)	5	7.9	(2.8-19.9)	7	10.7	(3.5-28.0)	54	79.9	(63.8-89.9)
Attend College	2	3.2	(0.7-12.3)	0	0.00	0.0	2	3.3	(0.7-12.8)	49	93.0	(82.9-97.3)
Graduated College	0	0.0	0.0	0	0.00	0.0	6	16.5	(6.5-35.8)	30	83.2	(64.0-93.2)
<b>Household Income</b>												
<15k	1	1.2	(0.2-6.5)	0	0.0	0	5	7.1	(1.7-25.1)	70	91.7	(75.1-97.6)
15k<25k	2	4.3	(1.0-16.1)	3	6.8	(1.8-22.2)	4	7.2	(1.7-26.0)	40	81.7	(1.5-67.0)
25k<35k	0	0	0	1	6.5	(1.2-28.1)	1	8.7	(1.6-34.9)	13	84.8	(75.1-97.6)
35k<50k	0	0	0	0	0	0	0	0	0	6	100.0	--
50k<100k	0	0.0	0	0	0.0	0	0	0.0	0	8	94.1	(74.6-98.9)
100k+	0	0	0	0	0	0	0	0	0	3	84.9	(33.0-98.5)

Table 22. Self-Reported Prevalence of Number of Vaccination Received, Puerto Rico 2022

How Many Covid-19 Vaccinations Have You Received?		
	Frequency	Percent (%)
One	72	1.4
Two	1,108	21.5
Three	3,202	62.3
Four or More	761	14.8
<b>Total</b>	<b>196</b>	<b>100.00</b>

Table 23. Self-Reported Prevalence of Number of Vaccination Received by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates											
	ONE			TWO			THREE			FOUR OR MORE		
	Frequency	Prevalence %	95% C.I.	Frequency	Prevalence %	95% C.I.	Frequency	Prevalence %	95% C.I.	Frequency	Prevalence %	95% C.I.
<b>Gender</b>												
Male	25	1.0	(0.5-1.8)	541	22.3	(19.8-25.1)	1,496	61.5	58.6-64.7	361	14.9	(12.9-17.2)
Female	47	2.0	(1.1-2.6)	567	20.8	(18.8-23.0)	1,706	63.7	60.3-65.1	400	14.7	(13.2-16.3)
<b>Age group</b>												
18-24	17	1.9	(0.8-4.2)	252	27.0	(21.6-33.1)	640	68.6	62.3-74.3	24	2.5	(1.1-6.2)
25-34	14	1.8	(0.8-3.8)	245	32.4	(27.5-37.8)	482	63.9	(58.4-68.9)	15	1.9	(1.1-3.4)
35-44	9	1.3	(0.6-3.0)	189	27.7	(23.3-32.4)	464	68.1	63.2-72.6	20	2.9	(1.8-4.7)
45-54	11	1.5	(0.8-3.0)	139	19.2	(16.2-22.8)	473	65.5	61.3-69.4	99	13.7	(11.0-17.0)
55-64	5	0.6	(0.3-1.3)	133	17.1	(14.2-20.4)	487	62.5	58.6-66.3	155	19.8	(17.0-23.1)
65<	16	1.2	(0.6-2.7)	150	11.8	(9.8-14.2)	654	51.5	48.0-55.0	450	35.4	(32.1-38.9)
<b>Education</b>												
Not Graduate High School	15	1.6	(0.8-3.5)	199	21.3	(17.3-26.0)	497	53.4	48.2-58.5	221	23.7	(19.5-28.5)
High School Graduate	18	1.2	(0.6-2.4)	317	22.3	(19.1-25.9)	916	64.5	60.7-68.1	170	11.9	(9.9-14.4)
Attend College	29	2.1	(1.2-3.6)	342	24.30	(21.1-27.9)	889	63.5	59.8-67.0	142	10.1	(8.5-12.0)
Graduated College	72	0.8	(0.5-1.3)	251	18.10	(15.5-20.9)	894	64.5	61.4-67.5	229	16.6	(14.6-18.7)
<b>Household Income</b>												
<15k	21	1.5	(0.8-2.7)	318	21.7	(18.8-25.0)	875	59.7	55.9-63.4	250	17.1	(14.2-20.4)
15k<25k	13	1.1	(0.5-2.3)	251	20.5	(17.4-24.0)	796	65.1	61.4-68.7	163	13.3	(11.3-15.6)
25k<35k	16	3.0	(1.4-6.5)	115	21.2	(16.7-26.6)	336	62.2	56.6-67.6	73	13.5	(10.8-16.8)
35k<50k	7	1.4	(0.5-4.1)	96	20.3	(14.8-27.2)	301	63.8	57.1-70.1	68	14.5	(11.2-18.5)
50k<100k	3	0.8	(0.3-2.2)	78	23.5	(17.7-30.6)	204	61.5	53.9-68.6	47	14.2	(9.4-20.9)
100k+	1	0.4	(0.1-3.1)	24	20.1	(11.3-33.2)	76	62.7	50.9-73.2	20	16.8	(11.0-24.7)

Table 24. Self-Reported Prevalence of Doses Interval Years by Demographic Characteristics

One Dose

Demographic characteristics	Weighted estimates								
	2019-2020			2021			2022		
	Frequency	Prevalence %	95% C.I.	Frequency	Prevalence %	95% C.I.	Frequency	Prevalence %	95% C.I.
<b>Gender</b>									
Male	74	4.2	(3.0-5.7)	1,654	92.9	(90.8-94.5)	53	3.0	(1.9-4.7)
Female	110	5.3	(4.2-6.6)	1,994	93.4	(92.0-94.6)	28	1.3	(0.9-2.1)
<b>Age group</b>									
18-24	15	2.1	(0.7-5.6)	700	95.7	(90.6-98.1)	16	2.2	(0.6-7.5)
25-34	47	8.1	(5.4-11.9)	532	90.9	(87.0-93.7)	6	1.1	(0.5-2.1)
35-44	36	6.9	(4.6-10.0)	474	91.4	(87.9-94.0)	9	1.7	(0.7-4.2)
45-54	33	5.8	(4.0-8.4)	519	92.2	(89.3-94.4)	11	2.0	(1.0-3.9)
55-64	21	3.7	(2.6-5.4)	564	93.6	(91.1-95.3)	16	2.7	(1.5-4.8)
65<	31	3.6	(2.5-5.2)	810	92.2	(91.9-95.5)	22	2.5	(1.5-4.0)

Two Doses

Demographic characteristics	Weighted estimates								
	2019-2020			2021			2022		
	Frequency	Prevalence %	95% C.I.	Frequency	Prevalence %	95% C.I.	Frequency	Prevalence %	95% C.I.
<b>Gender</b>									
Male	17	1	(0.6-1.8)	1,648	94.2	(92.2-95.6)	84	4.8	(3.4-5.2)
Female	21	1.1	(0.7-1.7)	1,926	95.1	(93.7-96.3)	77	3.8	(2.8-5.2)
<b>Age group</b>									
18-24	4	0.6	(0.1-2.4)	682	94.8	(89.7-97.4)	33	4.6	(2.1-9.8)
25-34	5	0.8	(0.3-2.0)	541	94.8	(91.2-97.0)	25	4.4	(2.3-8.1)
35-44	8	1.7	(0.7-3.2)	476	94.5	(90.7-96.8)	19	3.8	(1.9-7.4)
45-54	8	1.5	(0.3-1.6)	517	95.1	(92.7-96.8)	18	3.4	(2.1-5.5)
55-64	4	0.7	(0.6-2.3)	561	93.5	(90.8-95.4)	35	5.9	(4.0-8.6)
65<	10	1.2	(0.5-2.3)	796	95.3	(93.4-96.7)	30	3.5	(2.4-5.3)

Table 25. Self-Reported Prevalence of Tested Positive to COVID-19, Puerto Rico 2022

HAVE YOU EVER BEEN TOLD YOU TESTED POSITIVE FOR COVID-19?		
	Frequency	Percent (%)
Yes	2,089	38.7
No	3,308	61.3
	5,367	100

Table 26. Self-Reported Prevalence of Tested Positive for COVID-19 by Health Regions, Puerto Rico 2022

Health Region	Have Your Ever Been Told You Tested Positive For COVID-19?					
	Yes			No		
	Frequency	Prevalence %	95% C.I.	Frequency	Prevalence %	95% C.I.
Aguadilla/Mayaguez	329	41.4	(36.5-46.3)	466	58.7	(53.7-63.5)
Arecibo	238	36.8	(31.8-42.2)	408	63.2	(57.8-68.2)
Bayamon	348	39.7	(35.1-44.4)	529	60.3	(55.6-64.9)
Metro/Fajardo	517	39.5	(35.7-43.4)	793	60.5	(56.6-64.3)
Caguas	324	37.8	(33.3-42.4)	534	62.3	(57.6-66.7)
Ponce	274	36.1	(31.4-41.0)	485	64.0	(59.0-68.6)

Table 27. Self-Reported Prevalence of Tested Positive to COVID-19 by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates		
	Frequency	Prevalence %	95% C.I
<b>Gender</b>			
Male	948	37.4	(34.5-40.4)
Female	1,141	39.9	(37.5-42.2)
<b>Age group</b>			
18-24	453	47.2	(41.1-53.4)
25-34	408	51.4	(45.9-56.8)
35-44	377	53.3	(48.4-58.1)
45-54	312	41.1	(37.1-45.3)
55-64	258	31.5	(27.9-35.3)
65<	281	20.7	(18.4-23.2)
<b>Education</b>			
Not Graduate High School	222	21.9	(18.4-26.1)
High School Graduate	550	36.8	(33.2-40.5)
Attend College	618	42.3	(38.7-45.9)
Graduated College	699	49.1	(45.9-52.3)
<b>Household Income</b>			
<15k	452	29.3	(26.1-32.7)
15k<25k	525	40.9	(37.3-44.8)
25k<35k	272	48.2	(42.4-54.0)
35k<50k	198	41.3	(35.0-47.7)
50k<100k	171	50.3	(43.0-57.6)
100k+	72	55.8	(44.3-66.6)

Table 28. Self-Reported Prevalence of Duration of Symptoms COVID-19, Puerto Rico 2022

DID YOU HAD ANY SYMPTOMS LASTING 3 MONTHS OR LONGER THAT YOU DID NOT HAVE PRIOR COVID-19?		
	Frequency	Percent (%)
Yes	355	17.3
No	1,700	82.7
	2,055	100

Table 29. Self-Reported Prevalence of Duration of Symptoms COVID-19 by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates					
	Yes			No		
	Frequency	Prevalence %	95% C.I	Frequency	Prevalence %	95% C.I
<b>Gender</b>						
Male	101	10.9	(8.0-14.6)	826	89.1	(85.4-91.9)
Female	254	22.5	(19.5-25.9)	874	77.5	(74.1-80.5)
<b>Age group</b>						
18-24	70	15.7	(10.1-23.6)	373	84.3	(76.4-89.9)
25-34	81	20.1	(15.1-26.3)	323	79.9	(73.7-84.9)
35-44	74	20	(15.2-25.8)	294	80	(74.2-84.8)
45-54	65	21.3	(16.6-26.9)	240	78.7	(73.1-83.4)
55-64	38	14.9	(10.7-20.5)	218	85.1	(79.5-89.3)
65<	27	9.8	(6.7-14.1)	251	90.2	(85.9-93.3)

Table 30. Self-Reported Prevalence of Primary Symptoms Experienced Having COVID-19, Puerto Rico 2022

Primary Symptom that you experienced? Was it ...		
	Frequency	Percent (%)
Fatigue/Difficulty Thinking	141	42.0
Difficulty Beathing/Join Pain	134	40.0
Chest Pain/Dizziness	14	4.1
Depression/Symptoms Worsen	7	2.0
None	40	12.0

Table 31. Self-Reported Prevalence of Primary Symptom of COVID-19 by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates					
	Fatigue/ Difficulty Thinking			Difficulty Breathing/ Join Pain		
	Frequency	Prevalence %	95% C.I	Frequency	Prevalence %	95% C.I
<b>Gender</b>						
Male	44	44.7	(29.6-60.9)	37	38.1	(23.1-55.70)
Female	97	40.8	(32.9-49.3)	97	40.8	(32.6-49.5)
<b>Age group</b>						
18-24	30	45.3	(23.7-68.8)	28	42.1	(20.8-66.8)
25-34	23	28.9	(17.4-43.9)	37	46.9	(31.6-62.6)
35-44	35	50.3	(35.5-65.1)	26	37.7	(24.1-53.4)
45-54	24	40.6	(27.5-55.2)	21	34.4	(22.2-49.1)
55-64	19	51.3	(33.8-68.6)	13	34.4	(19.8-52.7)
65<	11	40.9	(24.3-60.0)	11	40.9	(23.5-60.9)

Table 32. Self-Reported Prevalence of Primary Symptom of COVID-19 by Demographic Characteristics, Puerto Rico 2022

Demographic characteristics	Weighted estimates								
	Chest Pain/Dizziness			Depression/Symptom Worsen			NONE		
	Frequency	Prevalence %	95% C.I	Frequency	Prevalence %	95% C.I	Frequency	Prevalence %	95% C.I
<b>Gender</b>									
Male	4	3.6	(0.9-12.3)	4	4.1	(0.7-20.0)	9	9.5	(4.1-20.7)
Female	10	4.3	(2.0-9.1)	3	1.1	(0.4-3.0)	31	13.0	(8.4-19.7)
<b>Age group</b>									
18-24	2	2.5	(0.3-16.2)	4	5.3	(0.7-30.3)	3	4.8	(0.6-27.6)
25-34	5	6.0	(1.8-18.0)	0	0.0	0.0	14	17.8	(8.9-32.3)
35-44	0	0.0	0.0	0	0.0	0.0	8	11.3	(4.5-25.5)
45-54	3	4.7	(1.2-16.0)	2	2.5	(0.7-8.7)	11	17.8	(9.2-31.4)
55-64	2	4.1	(1.2-12.9)	0	0.0	0.0	3	9.4	(2.7-28.2)
65<	3	9.8	(1.4-44.7)	0	0.0	0.0	1	5.4	(1.6-16.9)





**Selección de comunidades adicionales para iniciativas colaborativas con programas y/o unidades externas al Programa de Equidad en Salud:**

**Municipio de Cataño**

Subsidiado con fondos de los Centros para el Control y prevención de Enfermedades (CDC, por sus siglas en inglés) #2NH75OT000085 de la Secretaría Auxiliar de Planificación y Desarrollo (SAPD) del Departamento de Salud:

Gobierno de Puerto Rico

Departamento de Salud

**Selección de comunidades adicionales para iniciativas colaborativas con programas y/o unidades externas al Programa de Equidad en Salud:**

**Municipio de Cataño**

**Carlos Mellado López, MD**

**Secretario de Salud**

Pierina Ortiz Cortés, Esq, LL.M

Secretaria Auxiliar

**Carlos Mellado López, MD**

Secretario del Departamento de Salud

**Pierina Ortiz Cortés, Esq, LL.M**

Secretaría Auxiliar de Planificación y Desarrollo

**Jaikiz Chaparro Villanueva, MSW**

Directora Programa Equidad en Salud

**Siomara Pérez Quintana, DrPH, MPH**

Co-PI Programa de Equidad en Salud

**Carlos Feliciano Collazo, MS**

Facilitador en Equidad en Salud- Estrategia 1

**Mariane Alvarado López, MPHE, CHES, CGG**

Facilitadora en Equidad en Salud-Estrategia 1

**Christian Rivera Cátala, MPH**

Epidemiólogo- Estrategia 1

**Ibis Montalvo Félix, Ed.D, MPHE**

Gerente de Proyecto- Estrategia 1

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## RESUMEN

A través de este reporte se presenta la metodología utilizada para seleccionar las comunidades vulneradas en el municipio de Cataño que resultaron del estudio llevado a cabo por el equipo de la Estrategia 1 del Programa de Equidad en Salud, con el objetivo de que se realicen actividades de intervención comunitaria para mitigar las disparidades de salud relacionadas al COVID-19. Además, se comparten los mapas representativos según el análisis de los datos realizado en el programado de QGIS.

## INTRODUCCIÓN

### Trasfondo

En un análisis anterior realizado por el equipo de la Estrategia 1 del Programa de Equidad en Salud (PES), se identificaron comunidades del municipio de Salinas como objetivo para implementar iniciativas de mitigación de COVID-19 mediante entrega de pruebas caseras, apoyo en coordinación de vacunación y materiales educativos. La selección de las potenciales comunidades a impactar se basó en un análisis multietápico, en el cual se consideró un índice de vulnerabilidad social de los municipios, los indicadores epidemiológicos de positividad y por ciento de personas no vacunadas contra COVID-19 en los municipios. Además, se incluyó el índice de vulnerabilidad social al interior de los tramos censales de los municipios, tipo de suelo en las comunidades, tipo de carreteras disponibles en las comunidades y distancia de las comunidades con respecto a centros o facilidades de salud. Los tramos censales son regiones geográficas definidas según datos poblacionales del Censo, con el fin de proporcionar un conjunto estable de unidades geográficas para la presentación de datos estadísticos sobre las características de la población que incluye adentro de esa delimitación (U.S. Census Bureau, 2022). Los datos más recientes para Puerto Rico son del año 2018.

Durante este análisis, se identificaron tres comunidades en el municipio de Cataño como objetivos de prioridad para el plan de trabajo de la Estrategia 1. Sin embargo, del análisis también se desprendió que el municipio de Cataño tenía comunidades con una alta prioridad de atención en cuanto a medidas de mitigación de COVID-19. Entendiendo que el análisis puede favorecer la planificación de otras unidades o programas del Departamento de Salud, el equipo de Estrategia 1 determinó preparar un reporte de los análisis epidemiológicos y socioespaciales correspondientes para el municipio de Cataño.

### Descripción de los datos

A continuación, se presenta una tabla de resumen, por fuente de información, sobre los datos disponibles que se consideraron para el análisis, incluyendo una descripción de cómo se interpretan y cuál es su utilidad para la toma de decisiones.

<b>Fuente: Departamento de Salud (2022)</b>		
<b>Dato considerado</b>	<b>Descripción según la fuente</b>	<b>Utilidad para toma de decisiones</b>
<b>Positividad</b>	<p>Porcentaje de todas las pruebas de RT-PCR positivas, en un periodo determinado (por ejemplo: 7 días). Es decir, cuántas pruebas fueron positivas en un periodo determinado, de todas las pruebas realizadas de RT-PCR durante ese mismo periodo.</p> <p>Razonamiento:</p> $\frac{\text{Número pruebas positivas de RT-PCR}}{\text{número total de pruebas de RT-PCR realizadas (pruebas de RT-PCR positivas + negativas)}}$	<p>Indica cuán extendida está la infección en el área donde se realizan las pruebas, y si los niveles de pruebas se mantienen al día con los niveles de transmisión de enfermedades (Dowdy &amp; D'Souza, 2020)</p>
<b>Vacunación: Porcentaje de serie completa</b>	<p>Porcentaje de personas aptas (5 años o más) que tienen sus vacunas completadas, según la marca de compañía fabricante. Es decir, cuántas personas tienen sus dos dosis de Pfizer o Moderna, o su dosis de Janssen, de todas aquellas aptas (con 5 años o más) que fueron vacunadas.</p> <p>Razonamiento:</p> $\frac{\text{Número de personas aptas (5 años o más) con serie de dosis de vacuna completadas}}{\text{Población apta para vacunarse según estimados intercensales del 2019}}$	<p>Determinar cuántas personas pueden estar necesitando completar sus dosis requeridas. También determinar éxito asociado a campañas coordinadas, según las fechas de rápido aumento (Antonini et al., 2022); y cuánto control de las transmisiones (no necesariamente inmunidad de grupo) se ha alcanzado en una zona geográfica particular (Dowdy &amp; D'Souza, 2021)</p>

Al considerar las variables por separado, cabe destacar que la variable de positividad es más susceptible a cambios temporales, debido a disponibilidad de pruebas diagnósticas y el cálculo del promedio de 7 días. Por otro lado, la variable sobre la serie completada de la vacuna y sus refuerzos es más estable, en tanto el cambio en el estado actual de la situación es más lento (que, por ejemplo, el índice de contagios y el número de casos confirmados).

Fuente: CDC Social Vulnerability Index (2018)		
Dato/ Variable	Descripción según la fuente	Utilidad para toma de decisiones
<b>Vulnerabilidad social</b>	<p>Se refiere a los posibles efectos negativos en las comunidades causados por tensiones externas sobre la salud humana. Tales tensiones incluyen desastres naturales o provocados por el hombre, o brotes de enfermedades. (Agency for Toxic Substances and Disease Registry [ATSDR], 2022)</p> <p>Utiliza 4 áreas claves basadas en 15 variables del censo basado en las encuestas de la comunidad de EE. UU. (y Puerto Rico):</p> <ul style="list-style-type: none"> <li>• Estado socioeconómico (personas por debajo de la pobreza, desempleadas, bajo ingresos, sin diploma de escuela secundaria)</li> <li>• Composición del hogar y discapacidad (personas con 65 años o más, 17 años o menos, más de 5 años con discapacidad, hogares monoparentales).</li> <li>• Estado e idioma minoritario (persona de grupo minoritario, de habla inglés "menos que bien")</li> </ul>	<p><b>General:</b></p> <p>Ayudar a los funcionarios locales a identificar las comunidades que pueden necesitar apoyo antes, durante o después de los desastres (ATSDR, 2022).</p> <p><b>Específicas:</b></p> <ul style="list-style-type: none"> <li>• Calcular la cantidad de suministros necesarios, como alimentos, agua, medicamentos y ropa de cama.</li> <li>• Ayudar a decidir cuánto personal de emergencia se requiere para ayudar a las personas.</li> <li>• Identificar las áreas que necesitan refugios de emergencia.</li> <li>• Planificar la mejor manera de evacuar a las personas, teniendo en cuenta a aquellas que tienen necesidades especiales, como personas sin vehículos, ancianos o personas que no entienden bien el inglés.</li> <li>• Identificar las comunidades que necesitarán apoyo continuo para recuperarse después de</li> </ul>

	<ul style="list-style-type: none"> <li>Tipo de vivienda y transporte (estructuras de unidades múltiples, casas móviles, hacinamiento, sin vehículo, alojamiento para grupos)</li> </ul>	una emergencia o desastre natural.
<b>Índice</b>	Razonamiento: Sumatoria de las sumas de cada área temática, ordenada por los tramos censales y luego calculados por las clasificaciones de percentiles generales. El total de las sumas para cada tema es lo mismo que sumar las clasificaciones de variables individuales.	Los valores de clasificación de percentiles varían de 0 a 1, implicando que los valores más altos indican una mayor vulnerabilidad social entre las zonas geográficas (ATSDR, 2020).

**Nota:** Se exploraron datos para incidencia, mortalidad y hospitalizaciones, según la base de datos del DSPR. Sin embargo, no se utilizaron porque el análisis geoespacial requirió utilizar dos variables como mucho para apoyar la selección de municipios. Las variables priorizadas fueron positividad y por ciento de personas con *booster* o vacunación completada.



## MÉTODOS

Todos los datos del Departamento de Salud se descargaron de las bases de datos de las secciones de «Positividad» y «Vacunación», disponibles en la página web titulada "COVID-19 en cifras en Puerto Rico". La descarga de datos se hizo durante el mes de junio de 2022, seleccionando el periodo de fechas del 1 de enero de 2022 al 31 de mayo de 2022. La justificación para la selección de estas fechas es que se desea trabajar con los datos más recientes del corriente año 2022, los cuales aparte muestran una curva epidemiológica propagada con dos periodos de aumentos considerables de casos y un periodo de disminución de por medio. Las curvas epidémicas propagadas suelen tener una serie de picos sucesivamente más grandes, separados por un período de incubación (LaMorte, 2017; Torok, s.f), y esto se observa en el periodo de enero a mayo 2022. Además, se desea identificar las regiones de Salud que están siendo impactadas en mayor magnitud por el COVID-19, tomando en cuenta las fluctuaciones recientes durante el corriente año 2022.

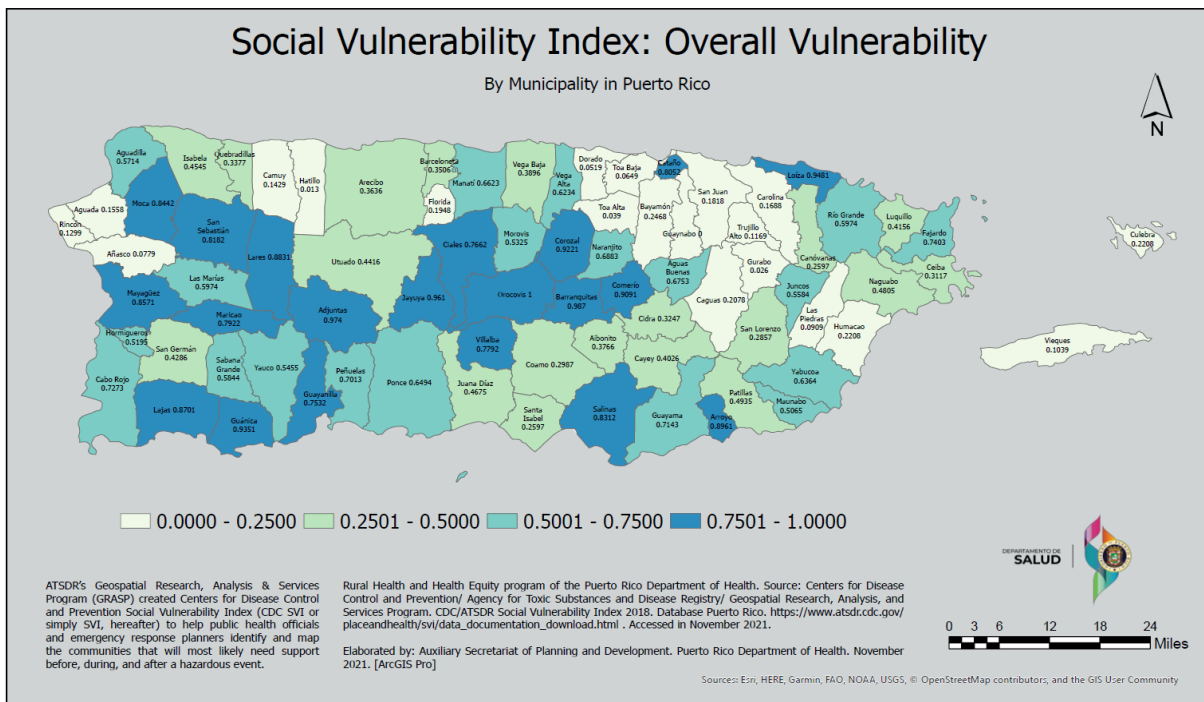
Para complementar el análisis de datos epidemiológicos se decidió hacer uso de sistemas de información geográfica (GIS, por sus siglas en ingles). Este sistema es una herramienta tecnológica que incorpora características geográficas con herramientas para procesar y analizar una variedad de datos contextualizándolos geográficamente. Haciendo uso de esta tecnología, se realizaron mapas que contextualizan espacialmente los indicadores epidemiológicos, indicadores de vulnerabilidad social y otras variables espaciales incluyendo relaciones de vecindad y características del terreno. Los mapas de este reporte fueron creados por el antropólogo de la Estrategia 1, quien funge como Facilitador de Equidad en Salud. Sin embargo, se utilizaron como modelos de referencia los mapas que fueron creados por el geógrafo del Programa de Opioides del Departamento Salud, para identificar los índices de vulnerabilidad social por municipio y por tramos censales al interior de los municipios.

En esta ocasión, para la selección de comunidades en Cataño, se ratificó el acuerdo previo de identificar tres comunidades desatendidas o vulneradas al interior de cada municipio, según cumplan con los indicadores de interés para llevar a cabo

nuestros esfuerzos de mitigación de las disparidades de salud relacionadas al COVID-19. Este acuerdo responde a atender las necesidades en orden de prioridad o, en caso de que el acceso a una de las comunidades se vea obstruido por alguna razón ajena al PES.

A partir de la experiencia metodológica para la selección de comunidades en el municipio de Salinas (presentada en un reporte previo), la nueva selección de comunidades de Cataño consistirá de una sola fase. Este municipio ya había emergido en la primera fase como parte de los 20 municipios con el índice de vulnerabilidad social más alto en Puerto Rico. El criterio de inclusión de esta fase fue tener un índice de 0.7501 o más, porque implicaría capturar el 25% superior de los municipios con mayor índice de vulnerabilidad social, y sugiriendo esto que los municipios tienen una alta proporción general (no estratificada por barrios o sectores) de personas con perfiles de vulnerabilidad social. La fuente de referencia utilizada fue el mapa provisto por el geógrafo colaborador (ver figura 1).

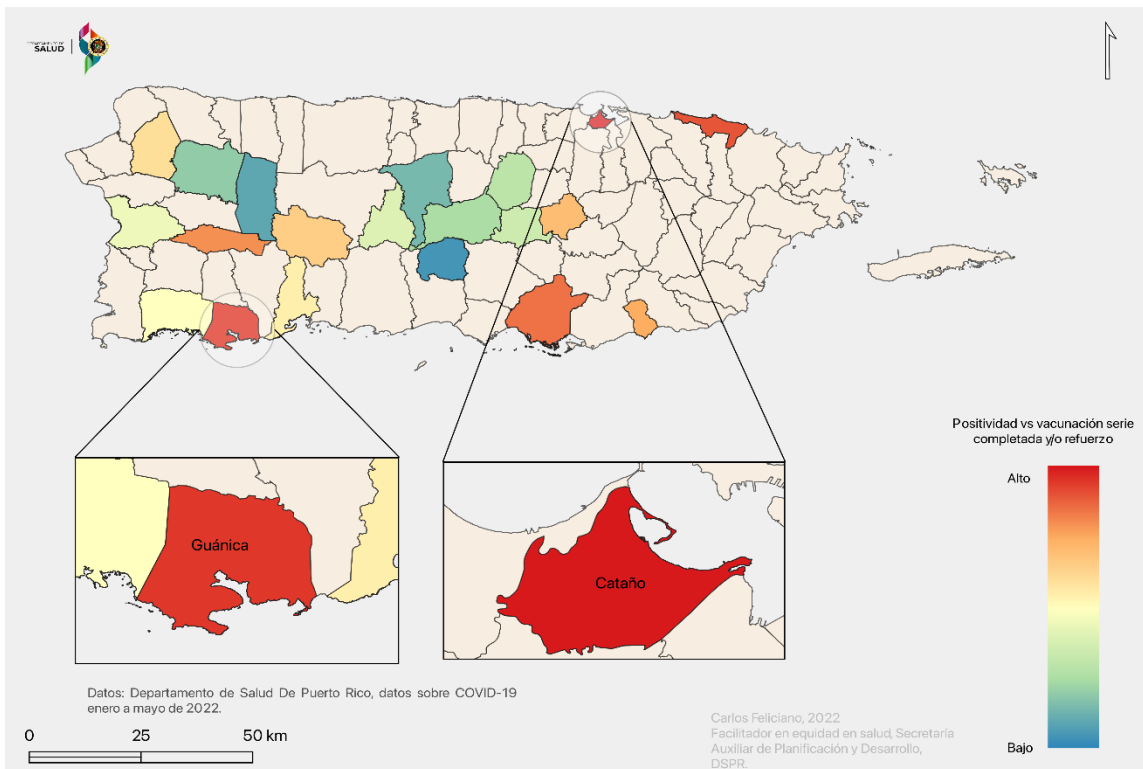
**Figura 1. Mapa de municipios de Puerto Rico con sus respectivos índices de vulnerabilidad social**



**Nota:** Creado en ArcGIS Pro por Francisco Negrón Alemán. De la leyenda se interpreta que los municipios en color azul oscuro representan los municipios con los índices de vulnerabilidad social más altos, adjudicados por su posición en el 25% superior (percentil 75).

El municipio de Cataño también permaneció en la lista de elegibles luego de la segunda fase, que consistió en una exploración socioespacial para identificar los municipios con alto índice de vulnerabilidad que sugerían tener la mayor prioridad de atención en salud, según su tasa de positividad de COVID-19 y el por ciento de personas con vacunación completada contra COVID-19. Cataño fue parte de la lista de los cinco municipios con las tasas de positividad más altas y bajo por ciento de personas con vacunación completada. La fuente de referencia utilizada fue una adaptación del mapa provisto por el Facilitador de Equidad en Salud de la Estrategia 1 (ver figura 2).

**Figura 2: Mapa adaptado de Positividad vs. Sin serie completa y/o booster por municipios**

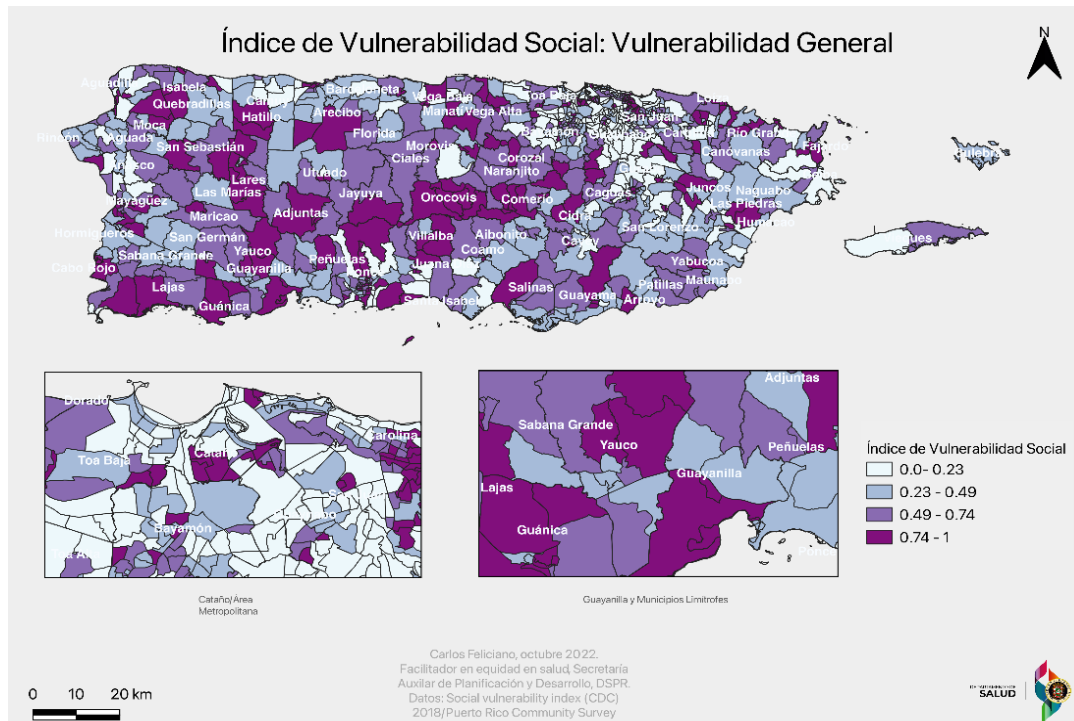


**Nota:** Desarrollado en QGIS por Carlos Feliciano. Los colores atribuidos a los 20 municipios con alto índice de vulnerabilidad social resultan de la combinación de gradientes, donde colores más

intensos u oscuros sugieren una alta proporción de los indicadores epidemiológico bajo análisis. Se destaca Cataño como uno de los municipios objetivo de la selección de comunidades.

En el proceso metodológico anterior para la selección de comunidades (en el caso de Salinas, como un reporte previo) también se identificaron las cantidades de tramos censales con mayor índice de vulnerabilidad social al interior de los cinco municipios con las tasas de positividad más altas y bajo por ciento de personas con vacunación completada. En el caso de Cataño, se identificaron nueve (9) tramos censales de once (11) con el criterio de interés de mayor vulnerabilidad social. La fuente de referencia utilizada fue una adaptación del mapa provisto por el geógrafo del Departamento de Salud (ver figura 3).

**Figura 3. Mapa de municipios de Puerto Rico con sus respectivos tramos censales e índices de vulnerabilidad social específicos.**



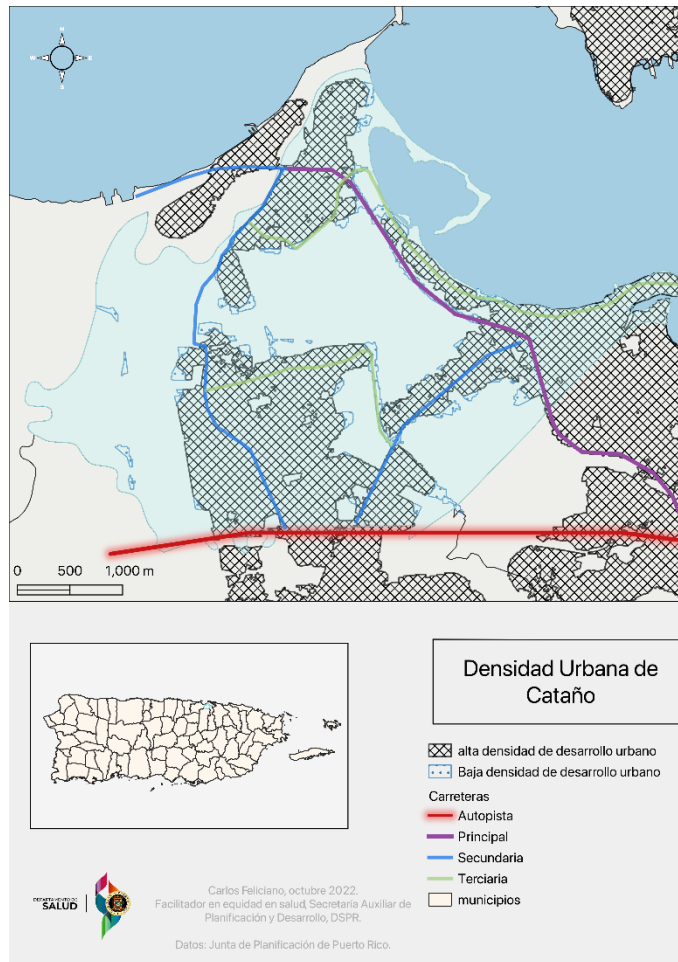
**Nota:** Creado en QGIS por Carlos Feliciano. De la leyenda se interpreta que los tramos censales en color púrpura oscuro representan los tramos con los índices de vulnerabilidad social más altos, adjudicados por su posición en el 25% superior (percentil 75) dentro del municipio al que pertenece.

Lo que constituye propiamente la fase adaptada para la selección de comunidades desatendidas y en el alto riesgo de COVID-19 en el municipio de Cataño será el análisis de los datos de distribuciones socioespaciales, a saber: la identificación de las zonas urbanizadas, las carreteras principales, secundarias y terciarias en relación con esas zonas urbanizadas y la estimación de la distancia de las comunidades con respecto a centros o facilidades de salud. Se optó por indagar en el tipo de suelo urbanizado por sobre los otros tipos debido a que esa variable nos ayuda a identificar más fácilmente las comunidades en el territorio que comprende el municipio.

## Análisis de los datos en su distribución socioespacial

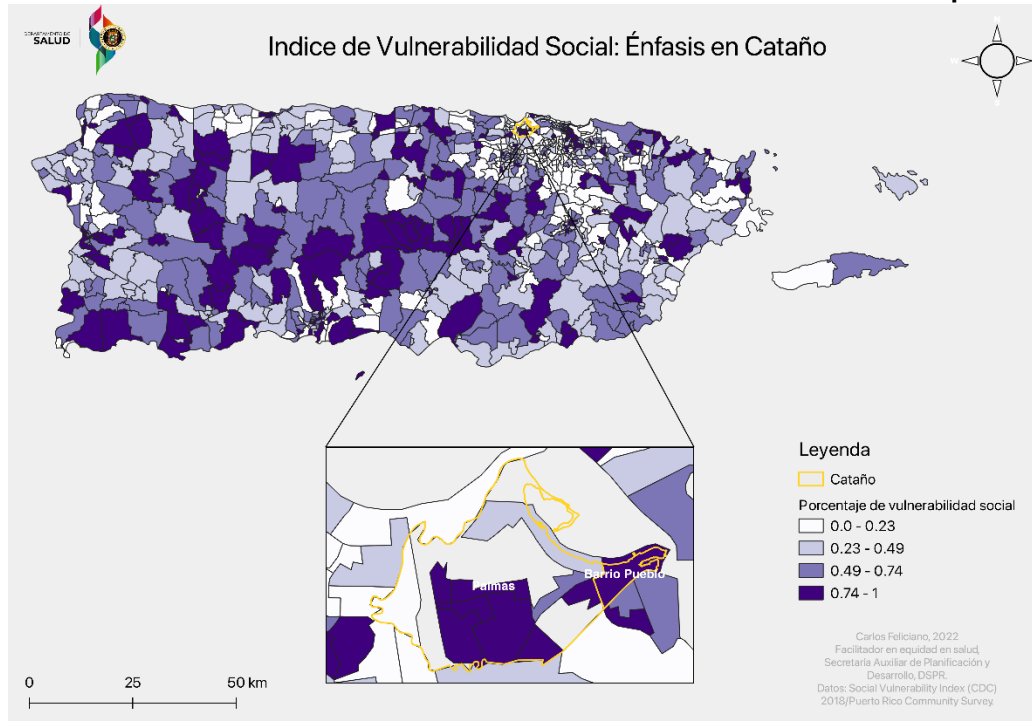
El municipio de Cataño es un pueblo que se encuentra en la zona metropolitana de Puerto Rico, en medio de los dos municipios más poblados del país como Bayamón y San Juan. Según se aprecia en el mapa de "Distribución de suelo urbanizado para el municipio de Cataño" (figura 4), se trata de un pueblo con una infraestructura urbana desarrollada y distribuida por casi todo el territorio. Los once (11) tramos censales que hay en Cataño se encuentran distribuidos en los dos barrios principales: Palmas y Barrio Pueblo (véase figura 5). Las zonas de mayor vulnerabilidad social se encuentran al sur del barrio Palmas, en el sector Las Vegas, y en el barrio Pueblo, sector Coquí II y Cucharillas tanto como en el casco urbano (Véase figura 5).

**Figura 4. Distribución de suelo urbano desarrollado en el municipio de Cataño**



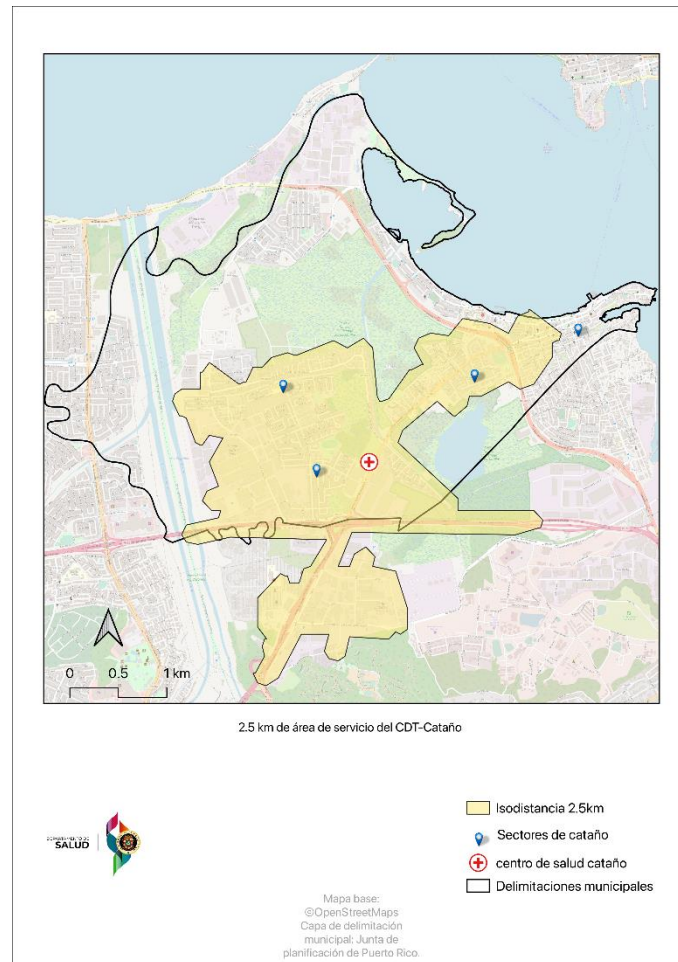
**Nota:** Creado QGIS por Carlos Feliciano. La leyenda del mapa de terrenos presenta las interpretaciones.

**Figura 5. Distribución de índices de vulnerabilidad social en los barrios del municipio de Cataño**



**Nota:** Mapa elaborado en QGIS por Carlos Feliciano. Nótese que los tramos censales son unidades más amplias y por tanto no coinciden con las delimitaciones territoriales de los barrios.

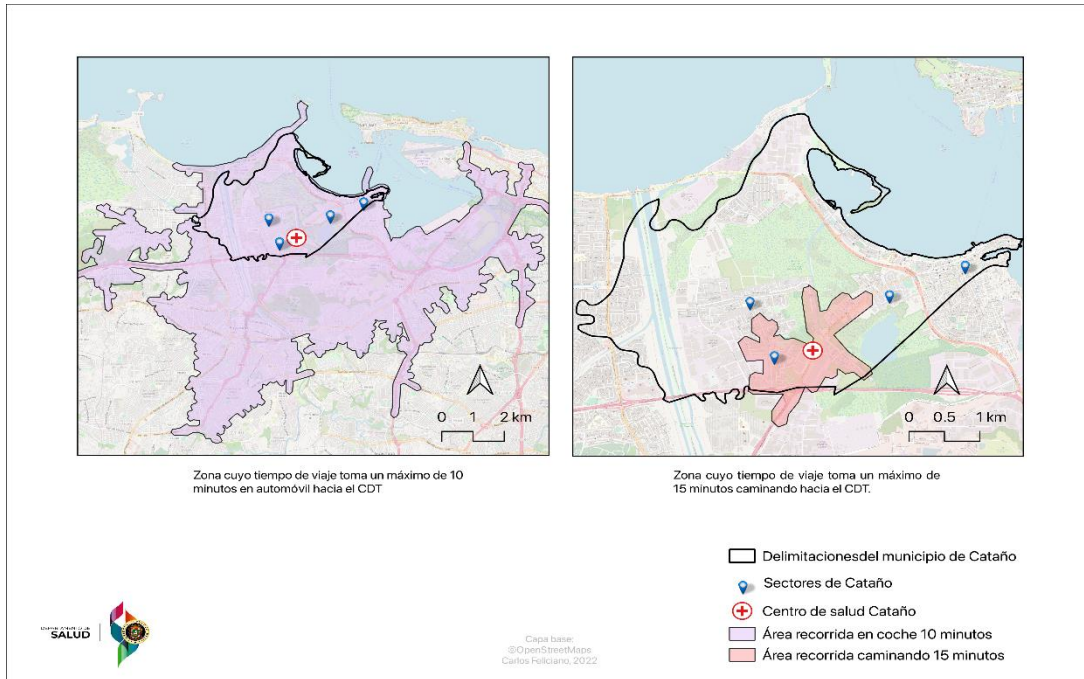
**Figura 6. Área de servicio cubierta por el centro de diagnóstico y tratamiento (CDT) de Cataño**



**Nota:** Mapa elaborado en QGIS por Carlos Feliciano. Para este mapa se cambió el cálculo de referencia de 5 km a 2.5 km debido a la diferencia de tamaño que posee el municipio de Cataño respecto a los otros municipios.



**Figura 7: Área de accesibilidad hacia el CDT de Cataño en relación al tiempo de viaje**



**Nota:** Mapa elaborado en QGIS por Carlos Feliciano. En el mapa de la izquierda se muestran todas las zonas a las que es posible llegar al CDT de Cataño dentro de diez minutos o menos viajando en carro. En el de la izquierda se muestran las zonas que a las que es posible llegar al CDT dentro de 15 minutos caminando. Los cambios de escala entre un mapa y el otro se hicieron para que se pudiera apreciar la totalidad de la zona de servicio recorrida en automóvil. .

Para el análisis geoespacial se realizó un análisis de redes para calcular la distancia y el tiempo para determinar la accesibilidad en relación a un tiempo determinado y a una distancia determinada. En el mapa de “área de servicio cubierta por el centro de diagnóstico y tratamiento (CDT) de Cataño” (figura 6) se presenta la zona que se puede recorrer dentro de un cálculo de 2.5 kilómetros desde el CDT. En el mapa se representa mediante puntos la localización aproximada de cuatro sectores dentro de los dos barrios principales demarcados para el municipio de Cataño, a saber, Palmas y Barrio Pueblo. Se encontró que dentro de una distancia de 2.5 km tres de los cuatro sectores georeferenciados quedan dentro del área de servicio cubierta, el único que queda fuera es el centro urbano.

En cuanto al mapa de isocrono (figura 7) que indica la accesibilidad a una entidad en relación al tiempo de viaje, se realizaron dos modelos, uno que contempla el tiempo de viaje en automóvil y el segundo modelo muestra el área accesible si se va caminando. Para el primer modelo se encontró que prácticamente se puede llegar

en diez minutos o menos a cualquier parte del municipio, esto sin contemplar el tráfico diario. En el segundo modelo se representa el área cubierta dentro de 15 minutos andando y se encontró que solo parte de un sector de Palmas queda dentro de área de accesibilidad de los 15 minutos.

Los centros de salud que se encuentran en el municipio son centros de salud que ofrecen los servicios básicos y de emergencia. Ahora bien, en cuanto a los servicios especializados y tratamientos más abarcadores, encontramos una carencia de instituciones que lo provean en la zona. Examinando las carreteras expresadas en el mapa de densidad urbana (figura 4) podemos ver la accesibilidad a carreteras principales, secundarias y autopista que hay en Cataño debido a que se encuentra medio de la zona metropolitana, dando así acceso a los servicios médicos completos que están disponibles en los municipios aledaños siempre y cuando se tenga acceso a vehículo de motor.

## RESULTADOS

Basado en los análisis iniciales de indicadores epidemiológicos y distribución socioespacial, el orden de prelación de las comunidades para los municipios de Cataño es el siguiente:

- Barrio Pueblo
- Cucharillas
- Coquí II / Juana Matos

El barrio Pueblo pertenece a un tramo censal donde hay un índice de vulnerabilidad de 0.90. Mientras que en Cucharillas se reporta un 0.96 y en Coquí II/Juana Matos hay un índice de 0.65. El índice de vulnerabilidad social general para el municipio de Cataño es de 0.80 (Figura 1).

La razón por la que se presentan tres comunidades en este municipio es para tener una lista que determine el orden en que el equipo encargado de llevar a cabo las iniciativas podrá comenzar a comunicarse con líderes comunitarios; y con ello, determinar la aceptabilidad del líder y la comunidad con relación a nuestras iniciativas. Existe la posibilidad de que alguna comunidad no interese participar en las

iniciativas, por lo que se debería ir haciendo las consultas con líderes comunitarios en orden y de forma anticipada por si esto ocurriera.

## LIMITACIONES

La propuesta de selección de estas tres comunidades al interior del municipio de Cataño estuvo condicionada por factores metodológicos relevantes. Por una parte, a pesar de considerar los indicadores epidemiológicos y el índice de vulnerabilidad social para la selección de los municipios, las características epidemiológicas atribuidas al municipio y las características sociodemográficas atribuidas al tramo censal no necesariamente serán representativas en su totalidad de la comunidad seleccionada. Por otra parte, también resulta una limitación que el análisis socioespacial carezca de los datos sobre cantidad de población dentro de los barrios para así determinar la densidad poblacional en cada uno, y con esto determinar el total de personas a impactar con las iniciativas del plan de trabajo. Otra limitación en la sección de análisis geoespacial fue que no se indagó en las características del terreno generales para este municipio –como se realizó para el reporte anterior del municipio de Salinas –, reafirmando que esto no afectó las conclusiones, aun al perderse ese panorama geográfico general.

## CONCLUSIÓN

Basado en los resultados del presente estudio se recomienda realizar los próximos pasos: 1) identificar y contactar organizaciones que laboren en este municipio, 2) identificar y contactar los líderes comunitarios de al menos una de las zonas seleccionadas, 3) realizar el estudio de necesidades de la comunidad e 4) implementar las iniciativas en la comunidad según el plan de trabajo (administración de pruebas caseras y equipo de protección personal, facilitar el acceso a vacunación y facilitar los talleres educativos sobre temas de COVID-19).

En conclusión, Cataño es uno de los municipios que cumple con los criterios de alto índice de vulnerabilidad social, alto indicador de positividad y bajo indicador de personas con vacunación con serie completa. En cuanto a los resultados de los análisis geoespaciales para este municipio, se encontró que por su extensión territorial tan limitada y su ubicación entre dos de las urbes más pobladas de Puerto Rico se trata de un pueblo con acceso privilegiado carreteras principales y autopistas que le conectan a otros municipios que sí cuentan con infraestructura de servicios de salud completa. Ahora bien, emerge el problema de la transportación cuando se mira el medio de transporte que estas comunidades utilizan. Debido a que los recursos médicos están al alcance siempre y cuando se tenga acceso a vehículos de motor privados. Se recomienda indagar mediante estudios de necesidades y entrevistas personales si existe una infraestructura, ya sea pública o comunitaria, que asista a la población que requiera transportarse fuera del municipio de Cataño con el propósito de recibir algún servicio médico.

## AGRADECIMIENTOS

Agradecemos al Sr. Francisco Negrón, geógrafo del Programa OD2A, por colaborar en el proceso de orientación y desarrollo de algunos mapas.

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Salud:**

**Municipio de Guánica**

**Carlos Mellado López, MD**

**Secretario de Salud**

Pierina Ortiz Cortés, Esq, LL.M

Secretaria Auxiliar

**Carlos Mellado López, MD**

Secretario del Departamento de Salud

**Pierina Ortiz Cortés, Esq, LL.M**

Secretaria Auxiliar de Planificación y Desarrollo

**Jaikiz Chaparro Villanueva, MSW**

Directora Programa Equidad en Salud

**Siomara Pérez Quintana, DrPH, MPH**

Co-PI Programa de Equidad en Salud

**Carlos Feliciano Collazo, MS**

Facilitador en Equidad en Salud- Estrategia 1

**Mariane Alvarado López, MPHE, CHES, CGG**

Facilitadora en Equidad en Salud-Estrategia 1

**Christian Rivera Cátala, MPH**

Epidemiólogo- Estrategia 1

**Ibis Montalvo Félix, Ed.D, MPHE**

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## RESUMEN

A través de este reporte se presenta la metodología utilizada para seleccionar las comunidades vulneradas el municipio de Guánica que resultaron del estudio llevado a cabo por el equipo de la Estrategia 1 del Programa de Equidad en Salud, con el objetivo de que se realicen actividades de intervención comunitaria para mitigar las disparidades de salud relacionadas al COVID-19. Además, se comparten los mapas representativos según el análisis de los datos realizado en el programado de QGIS.

## INTRODUCCIÓN

### Trasfondo

En un análisis anterior realizado por el equipo de la Estrategia 1 del Programa de Equidad en Salud (PES), se identificaron comunidades del municipio de Salinas como objetivos para implementar iniciativas de mitigación de COVID-19 mediante entrega de pruebas caseras, apoyo en coordinación de vacunación y materiales educativos. La selección de las potenciales comunidades a impactar se basó en un análisis multietápico que consideró un índice de vulnerabilidad social de los municipios, los indicadores epidemiológicos de positividad y por ciento de personas no vacunadas contra COVID-19 en los municipios, el índice de vulnerabilidad social al interior de los tramos censales de los municipios, tipo de suelo en las comunidades, tipo de carreteras disponibles en las comunidades y distancia de las comunidades con respecto a centros o facilidades de salud. Los tramos censales son regiones geográficas definidas según datos poblacionales del Censo, con el fin de proporcionar un conjunto estable de unidades geográficas para la presentación de datos estadísticos sobre las características de la población que incluye adentro de esa delimitación (U.S. Census Bureau, 2022). Los datos más recientes para Puerto Rico son del año 2018.

Durante ese análisis primario, se identificaron tres comunidades en el municipio de Salinas como objetivos de prioridad para el plan de trabajo de la Estrategia 1. Sin embargo, del análisis también se desprendió que el municipio de Guánica tenía comunidades con una alta prioridad de atención en cuanto a medidas de mitigación de COVID-19. Entendiendo que el análisis puede favorecer la planificación de otras unidades o programas del Departamento de Salud, el equipo de Estrategia 1 determinó preparar un reporte de los análisis epidemiológicos y socioespaciales correspondientes para el municipio de Guánica.

## Descripción de los datos

A continuación, se presenta una tabla de resumen, por fuente de información, sobre los datos disponibles que se consideraron para el análisis, incluyendo una descripción de cómo se interpretan y cuál es su utilidad para la toma de decisiones.

Fuente: Departamento de Salud (2022)		
Dato considerado	Descripción según la fuente	Utilidad para toma de decisiones
<b>Positividad</b>	<p>Porcentaje de todas las pruebas de RT-PCR positivas, en un periodo determinado (por ejemplo: 7 días). Es decir, cuántas pruebas fueron positivas en un periodo determinado, de todas las pruebas realizadas de RT-PCR durante ese mismo periodo.</p> <p>Razonamiento:</p> $\frac{\text{Número pruebas positivas de RT-PCR}}{\text{número total de pruebas de RT-PCR realizadas (pruebas de RT-PCR positivas + negativas)}}$	Indica cuán extendida está la infección en el área donde se realizan las pruebas, y si los niveles de pruebas se mantienen al día con los niveles de transmisión de enfermedades (Dowdy & D'Souza, 2020)
<b>Vacunación: Porcentaje de serie completa</b>	<p>Porcentaje de personas aptas (5 años o más) que tienen sus vacunas completadas, según la marca de compañía fabricante. Es decir, cuántas personas tienen sus dos dosis de Pfizer o Moderna, o su dosis de Janssen, de todas aquellas aptas (con 5 años o más) que fueron vacunadas.</p> <p>Razonamiento:</p> $\frac{\text{Número de personas aptas (5 años o más) con serie de dosis de vacuna completadas}}{\text{Población apta para vacunarse según estimados intercensales del 2019}}$	Determinar cuántas personas pueden estar necesitando completar sus dosis requeridas. También determinar éxito asociado a campañas coordinadas, según las fechas de rápido aumento (Antonini et al., 2022); y cuánto control de las transmisiones (no necesariamente inmunidad de grupo) se ha alcanzado en una zona geográfica particular (Dowdy & D'Souza, 2021)

Al considerar las variables por separado, cabe destacar que la variable de positividad es más susceptible a cambios temporales, debido a disponibilidad de pruebas diagnósticas y el cálculo del promedio de 7 días. Por otro lado, la variable sobre la serie completada de la vacuna y sus refuerzos es más estable, en tanto el cambio en el estado actual de la situación es más lento (que, por ejemplo, el índice de contagios y el número de casos confirmados).

Fuente: CDC Social Vulnerability Index (2018)		
Dato/ Variable	Descripción según la fuente	Utilidad para toma de decisiones

<p><b>Vulnerabilidad social</b></p>	<p>Se refiere a los posibles efectos negativos en las comunidades causados por tensiones externas sobre la salud humana. Tales tensiones incluyen desastres naturales o provocados por el hombre, o brotes de enfermedades. (Agency for Toxic Substances and Disease Registry [ATSDR], 2022)</p> <p>Utiliza 4 áreas claves basadas en 15 variables del censo basado en las encuestas de la comunidad de EE. UU. (y Puerto Rico):</p> <ul style="list-style-type: none"> <li>• Estado socioeconómico (personas por debajo de la pobreza, desempleadas, bajo ingresos, sin diploma de escuela secundaria)</li> <li>• Composición del hogar y discapacidad (personas con 65 años o más, 17 años o menos, más de 5 años con discapacidad, hogares monoparentales).</li> <li>• Estado e idioma minoritario (persona de grupo minoritario, de habla inglés "menos que bien")</li> <li>• Tipo de vivienda y transporte (estructuras de unidades múltiples, casas móviles, hacinamiento, sin vehículo, alojamiento para grupos)</li> </ul>	<p><b>General:</b></p> <p>Ayudar a los funcionarios locales a identificar las comunidades que pueden necesitar apoyo antes, durante o después de los desastres (ATSDR, 2022).</p> <p><b>Específicas:</b></p> <ul style="list-style-type: none"> <li>• Calcular la cantidad de suministros necesarios, como alimentos, agua, medicamentos y ropa de cama.</li> <li>• Ayudar a decidir cuánto personal de emergencia se requiere para ayudar a las personas.</li> <li>• Identificar las áreas que necesitan refugios de emergencia.</li> <li>• Planificar la mejor manera de evacuar a las personas, teniendo en cuenta a aquellas que tienen necesidades especiales, como personas sin vehículos, ancianos o personas que no entienden bien el inglés.</li> <li>• Identificar las comunidades que necesitarán apoyo continuo para recuperarse después de una emergencia o desastre natural.</li> </ul>
<p><b>Índice</b></p>	<p>Razonamiento: Sumatoria de las sumas de cada área temática, ordenada por los tramos censales y luego calculados por las clasificaciones de percentiles generales. El total de las sumas para cada tema es lo mismo que sumar las clasificaciones de variables individuales.</p>	<p>Los valores de clasificación de percentiles varían de 0 a 1, implicando que los valores más altos indican una mayor vulnerabilidad social entre las zonas geográficas (ATSDR, 2020).</p>

**Nota:** Se exploraron datos para incidencia, mortalidad y hospitalizaciones, según la base de datos del DSPR. Sin embargo, no se utilizaron porque el análisis geoespacial requirió utilizar dos variables como mucho para apoyar la selección de municipios. Las variables priorizadas fueron positividad y por ciento de personas con *booster* o vacunación completada.

## MÉTODOS

Todos los datos del Departamento de Salud se descargaron de las bases de datos de las secciones de «Positividad» y «Vacunación», disponibles en la página web titulada "COVID-19 en cifras en Puerto Rico" (Departamento de Salud, 2022). La descarga de datos se hizo durante el mes de junio de 2022, seleccionando el periodo de fechas del 1 de enero de 2022 al 31 de mayo de 2022. La justificación para la selección de estas fechas es que se desea trabajar con los datos más recientes del corriente año 2022, los cuales aparte muestran una curva epidemiológica propagada con dos periodos de aumentos considerables de casos y un periodo de disminución de por medio. Las curvas epidémicas propagadas suelen tener una serie de picos sucesivamente más grandes, separados por un período de incubación (LaMorte, 2017; Torok, s.f), y esto se observa en el periodo de enero a mayo 2022. Además, se desea identificar las regiones de Salud que están siendo impactadas en mayor magnitud por el COVID-19, tomando en cuenta las fluctuaciones recientes durante el corriente año 2022.

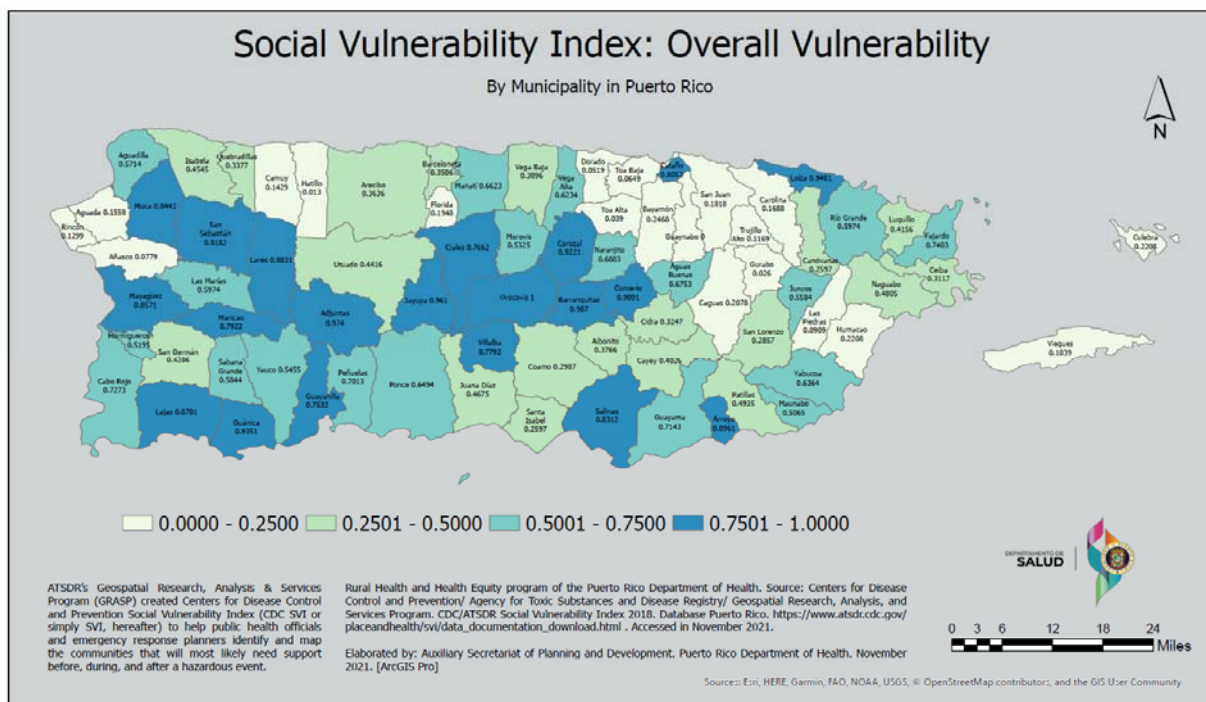
Para complementar el análisis de datos epidemiológicos se decidió hacer uso de sistemas de información geográfica (GIS, por sus siglas en inglés). Este sistema es una herramienta tecnológica que incorpora características geográficas con herramientas para procesar y analizar una variedad de datos contextualizándolos geográficamente. Haciendo uso de esta tecnología se realizaron mapas que contextualizan espacialmente los indicadores epidemiológicos, indicadores de vulnerabilidad social y otras variables espaciales incluyendo relaciones de vecindad y características del terreno. Los mapas de este reporte fueron creados por el antropólogo de la Estrategia 1, quien funge como Facilitador de Equidad en Salud. Además, se utilizaron como modelos de referencia los mapas que fueron creados por el geógrafo del Programa de Opioides del Departamento Salud para identificar los índices de vulnerabilidad social por municipio y por tramos censales al interior de los municipios.

Para la selección de comunidades en Guánica, se ratificó el acuerdo previo de identificar tres comunidades desatendidas o vulneradas al interior de cada municipio, según cumplan con los indicadores de interés para llevar a cabo nuestros esfuerzos de mitigación de las disparidades de salud relacionadas

al COVID-19. Este acuerdo responde a atender las necesidades en orden de prioridad o, en caso de que el acceso a una de las comunidades se vea obstruido por alguna razón ajena al PES.

A partir de la experiencia metodológica para la selección de comunidades en el municipio de Salinas (presentada en un reporte previo), la nueva selección de comunidades de Guánica consistirá de una sola fase. Este municipio ya había emergido en la primera fase como parte de los 20 municipios con el índice de vulnerabilidad social más alto en Puerto Rico. El criterio de inclusión de esta fase fue tener un índice de 0.7501 o más, ya que esto implicaría capturar el 25% superior de los municipios con mayor índice de vulnerabilidad social, y además, los municipios tienen una alta proporción general (no estratificada por barrios o sectores) de personas con perfiles de vulnerabilidad social. La fuente de referencia utilizada fue el mapa provisto por el geógrafo colaborador (ver figura 1).

Figura 1. Mapa de municipios de Puerto Rico con sus respectivos índices de vulnerabilidad social

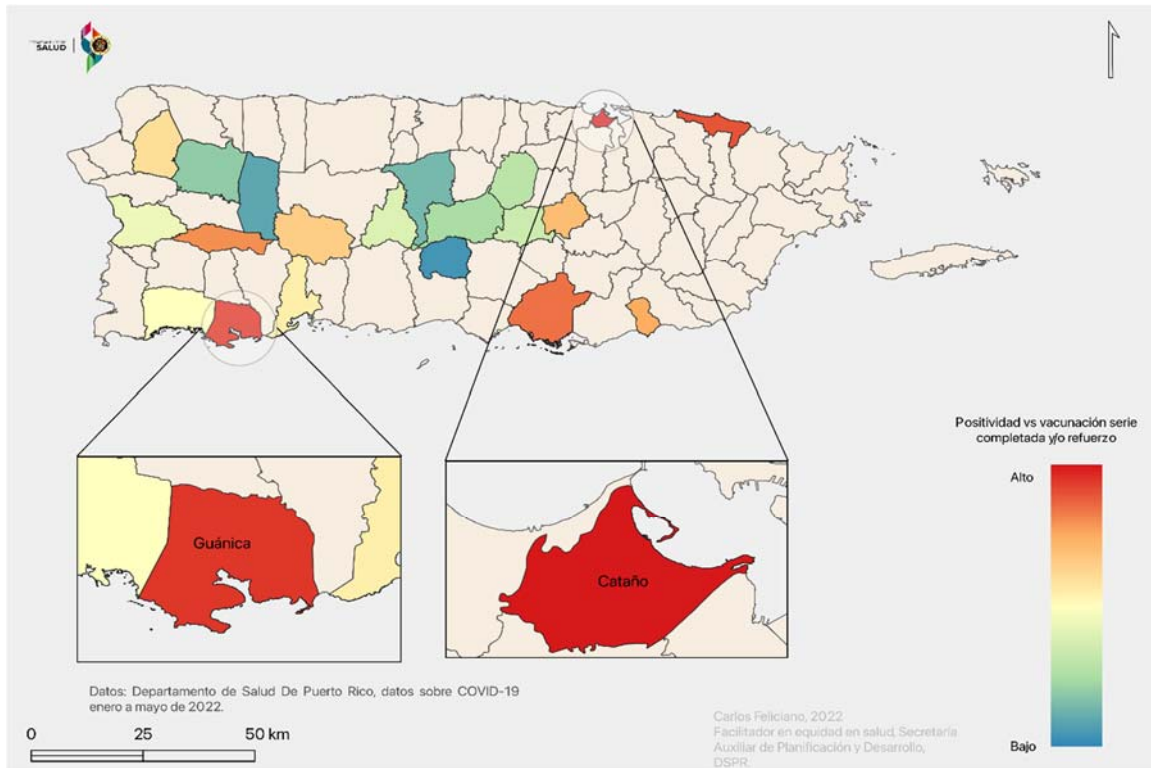


**Nota:** Creado en ArcGIS Pro por Francisco Negrón Alemán. De la leyenda se interpreta que los municipios en color azul oscuro representan los municipios con los índices de vulnerabilidad social más altos, adjudicados por su posición en el 25% superior (percentil 75).

El municipio de Guánica también permaneció en la lista de elegibles luego de la segunda fase, que consistió en una exploración socioespacial para identificar los municipios con alto índice de vulnerabilidad

y que tuvieran la mayor prioridad de atención en salud, según su tasa de positividad de COVID-19 y el por ciento de personas con vacunación completada contra COVID-19. Guánica fue parte de la lista de los cinco municipios con las tasas de positividad más altas y bajo por ciento de personas con vacunación completada. La fuente de referencia utilizada fue una adaptación del mapa provisto por el Facilitador de Equidad en Salud de la Estrategia 1 (ver figura 2). En dicha adaptación se refleja un resultado parcialmente distinto al mapa inicial que se le proveyó al equipo de Estrategia 1. Este último mapa de la figura 2 refleja con mayor precisión los datos epidemiológicos, ya que Guánica aparece con un rojo intenso tras la combinación de las variables de positividad y población sin la serie completa de la vacuna contra el COVID-19, mientras que en el mapa inicial se reflejan los datos invertidos con el municipio de Guayanilla.

**Figura 2: Mapa adaptado de Positividad vs. Sin serie completa y/o booster por municipios**

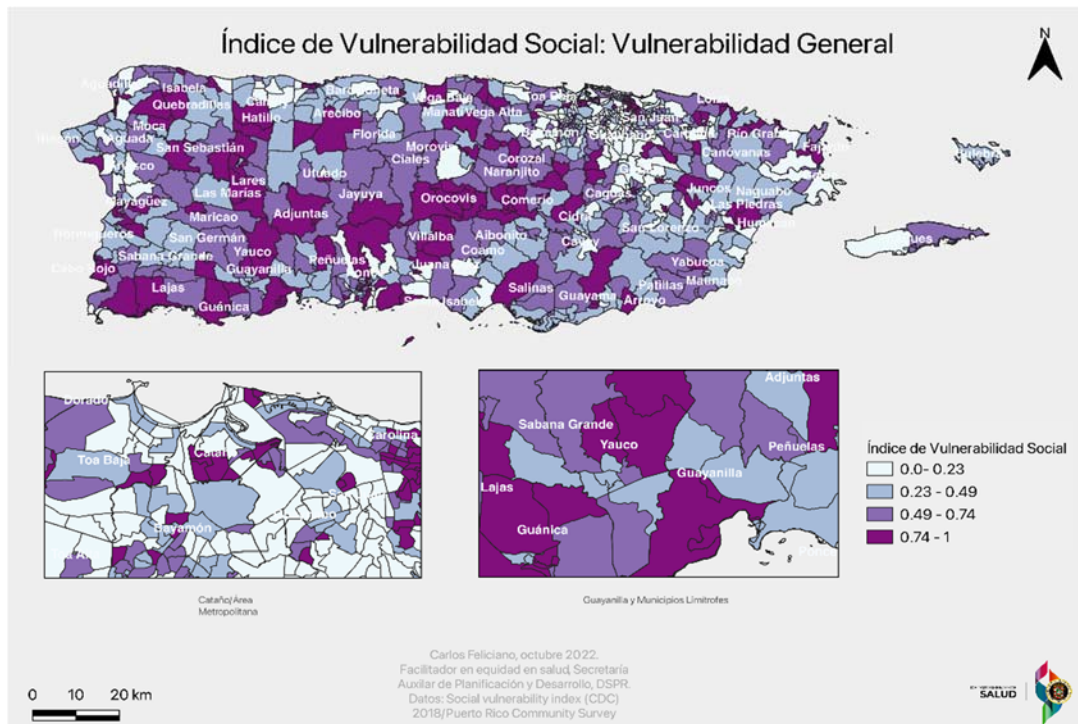


**Nota:** Creado en QGIS por Carlos Feliciano. Los colores atribuidos a los 20 municipios con alto índice de vulnerabilidad social resultan de la combinación de gradientes, donde colores más intensos u oscuros sugieren una alta proporción de los indicadores epidemiológico bajo análisis. Se destaca Guánica como uno de los municipios objetivo de la selección de comunidades.

En la metodología utilizada anteriormente para la selección de comunidades del municipio de Salinas (como un reporte anterior) también se identificaron las cantidades de tramos censales con mayor índice de vulnerabilidad social al interior de los cinco municipios con las tasas de positividad más altas y bajo por ciento de personas con vacunación completada. En el caso de Guánica, se identificaron cinco (5) tramos censales de siete (7) con el criterio de interés de mayor vulnerabilidad social. La fuente de referencia utilizada fue una adaptación del mapa provisto por el geógrafo del Departamento de Salud (ver figura 3).

**Figura 3. Mapa de municipios de Puerto Rico con sus respectivos tramos censales e índices de vulnerabilidad social específicos.**





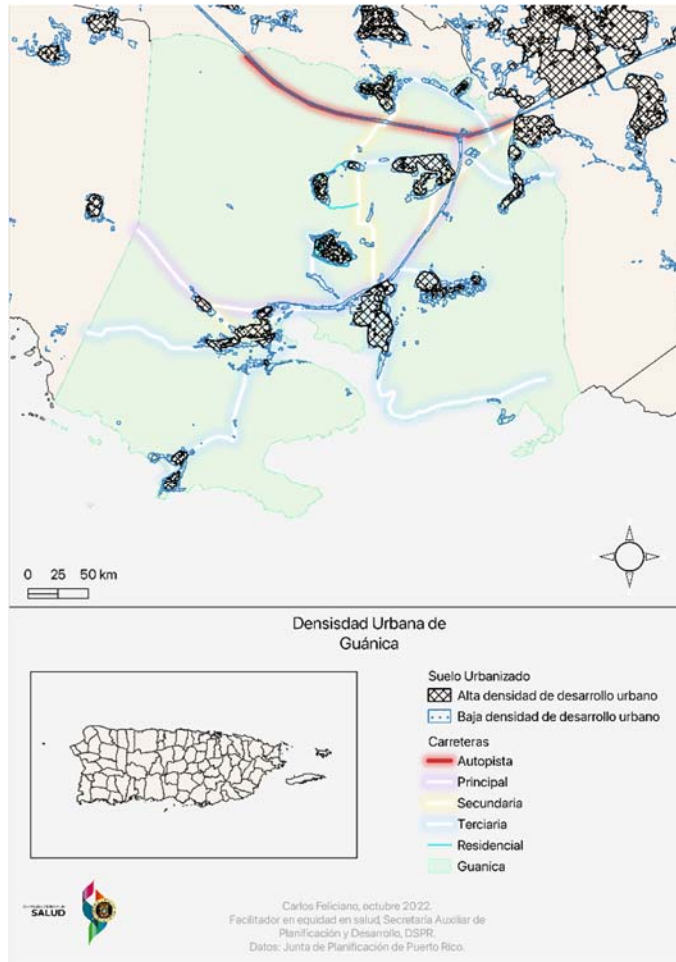
**Nota:** Creado en QGIS por Carlos Feliciano. De la leyenda se interpreta que los tramos censales en color púrpura oscuro representan los tramos con los índices de vulnerabilidad social más altos, adjudicados por su posición en el 25% superior (percentil 75) dentro del municipio al que pertenece.

Lo que constituyó propiamente la fase adaptada para la selección de comunidades desatendidas y en alto riesgo de contraer el COVID-19, el análisis de los datos de distribuciones socioespaciales del municipio de Guánica incluyó: la identificación de las zonas urbanizadas, las carreteras principales, secundarias y terciarias en relación con esas zonas urbanizadas y la estimación de la distancia de las comunidades con respecto a centros o facilidades de salud. Se optó por indagar el tipo de suelo urbanizado por sobre los otros tipos de suelo, debido a que esa variable nos ayuda a identificar más fácilmente las comunidades en el territorio que comprende el municipio.

## Análisis de los datos en su distribución socioespacial

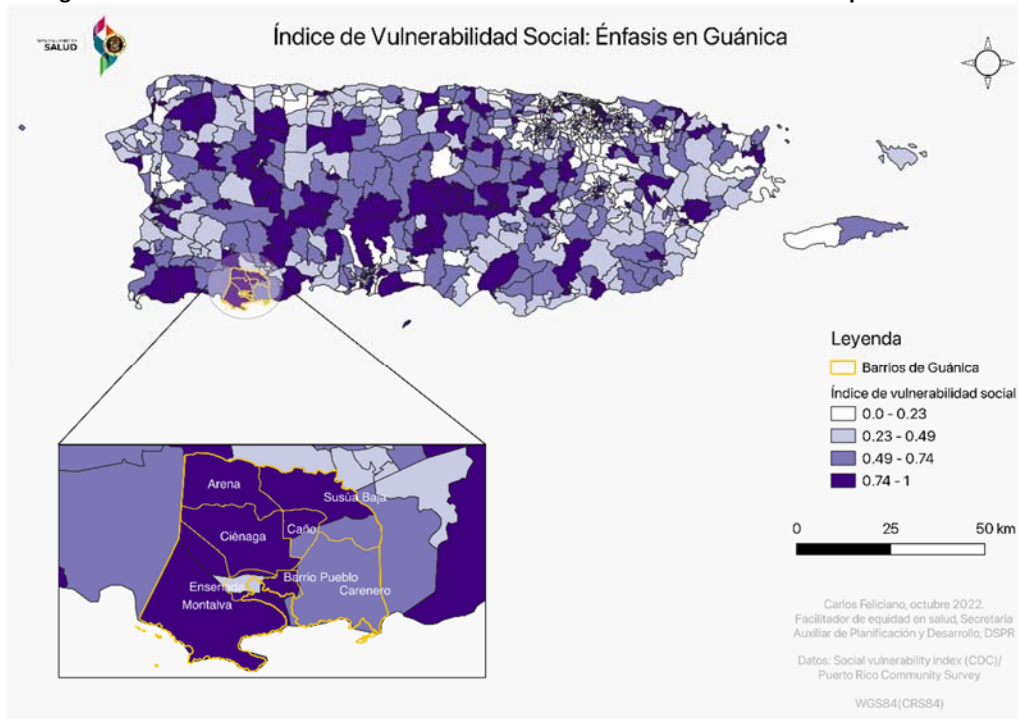
Analizando de forma paralela las características del terreno urbanizado del municipio de Guánica (ver figura 4) y las distribuciones de tramos censales con índices de vulnerabilidad social al interior del municipio (ver figura 5), se considera que la comunidad de Playa Santa, en el barrio Montalva; la comunidad al norte del municipio en el barrio, llamado Susúa, abajo en colindancia con Yauco; y la comunidad Fuig localizada en el barrio Ciénaga, en la periferia noroeste del centro urbano, son algunos de los barrios que se ubican en los tramos censales que indican una vulnerabilidad social alta. Como se puede apreciar en el mapa de “distribución de suelo urbano desarrollado”, las carreteras principales, secundarias y terciarias atraviesan las zonas urbanizadas mostrando conexión entre las comunidades, el centro urbano y la autopista. En el presente modelo no se toma en cuenta el relieve ni el estado de las carreteras.

**Figura 4. Distribución de suelo urbano desarrollado en el municipio de Guánica.**



**Nota:** Creado QGIS por Carlos Feliciano. La leyenda del mapa de terrenos presenta las interpretaciones.

Figura 5. Distribución de índices de vulnerabilidad social en los barrios del municipio de Guánica



**Nota:** Mapa elaborado en QGIS por Carlos Feliciano. Nótese que los tramos censales son unidades más amplias y que no siempre coinciden con los barrios. En este caso encontramos que varios tramos censales agrupan dos o más barrios.

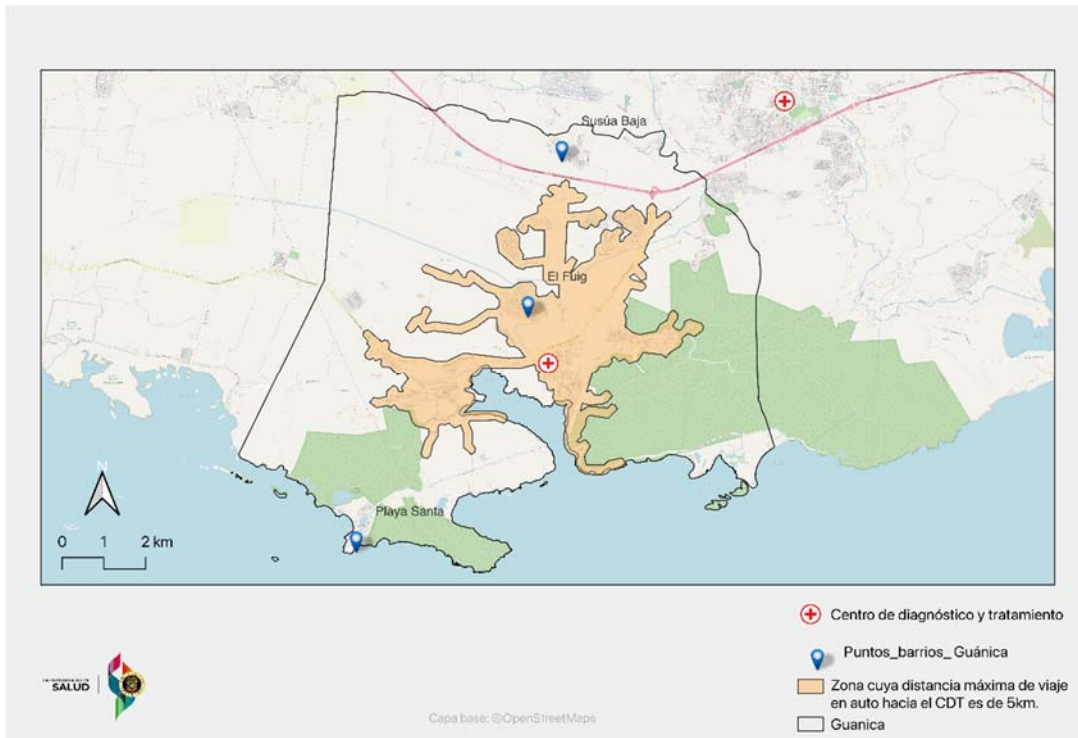
La principal infraestructura de servicios de salud en el municipio de Guánica se encuentra en el centro urbano y se trata del Centro de diagnóstico y tratamiento (CDT). En el mapa que presenta el área de servicio cubierta por el CDT (figura 6), se realizó un análisis de redes para crear un área de isodistancia que indica cuáles son las áreas que están accesibles alrededor de una facilidad dentro de una distancia determinada tomando en cuenta una capa de red de carreteras. Para este caso se calculó el área de servicio a 5 km y se observa en el mapa que dentro de dicha distancia las comunidades de Playa Santa y Susúa abajo se encuentran fuera del área de servicio de 5 km del centro de salud. Mientras, la comunidad de Fuig se encuentra dentro de la zona de servicio y accesibilidad del CDT debido a que la comunidad no está a menos de 5 km de distancia, pero queda relativamente alejada del Hospital Pavía de Yauco (la cruz roja situada al norte del mapa). La comunidad de Playa Santa sería la más alejada del CDT y el hospital, y la comunidad de Susúa abajo quedaría entre medio de ambos centros de salud, aunque ligeramente fuera de los 5 kilómetros de la zona de servicio.

En el siguiente mapa (figura 7) se muestra el resultado de otra técnica del análisis de redes que crea un área de isocrono que muestra las áreas accesibles desde las que se pueden llegar con facilidad dentro de un tiempo determinado. En la figura 8 se presentan dos mapas, el de la izquierda calcula el tiempo de viaje en carro mientras, que el mapa ubicado a la derecha lo calcula caminando. Se aprecia que

la zona de 10 minutos en carro conecta a las comunidades el Fuig y Susúa abajo con el centro con el centro de salud, mientras que Playa Santa sigue quedando fuera de la zona de servicio. Si se observa el mapa (figura 8) de la izquierda que muestra la zona cubierta a 15 minutos andando hacia el CDT, sirve de contraste e indica la dependencia absoluta al vehículo de motor privado que padecen los residentes de Guánica para poder acceder a los servicios de salud entre otros.

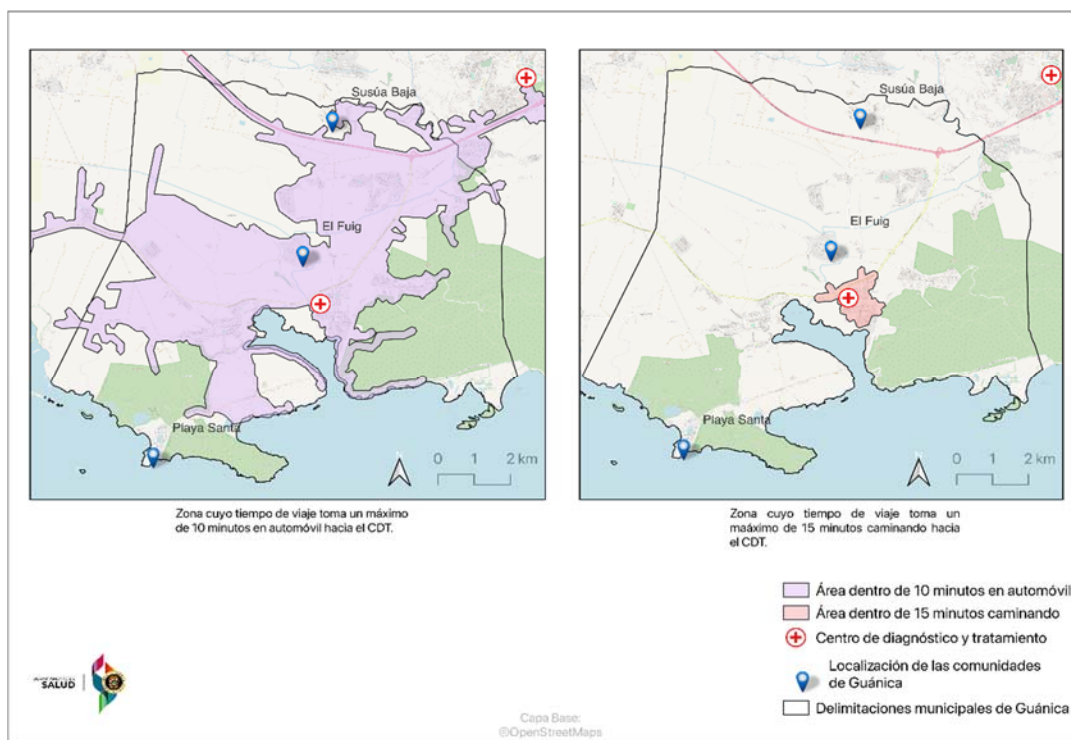
En el cálculo del área cubierta en relación al tiempo no se contempla el estado de la infraestructura de la carretera, ni el tránsito que pueda haber en los distintos horarios. Estas consideraciones de corte más empírico pueden afectar la percepción del espacio, ya que esta última se desarrolla en el plano del espacio relacional que depende de las experiencias subjetivas del tiempo y el espacio (Harvey, 2021, 145). De esta forma, una persona define lo cercano y lo lejano en función de parámetros subjetivos que tienen que ver con la experiencia cotidiana y con la accesibilidad que posea a medios de transporte. Para los efectos del análisis que se llevó a cabo para este reporte, se trabajó desde la noción del espacio absoluto, es decir, una noción del espacio susceptible a la medición e independiente de la percepción individual (Harvey, 2021, 143).

**Figura 6. Área de servicio cubierta por el centro de diagnóstico y tratamiento (CDT) de Guánica**



**Nota:** Mapa elaborado en QGIS por Carlos Feliciano. Para este mapa se cambió el cálculo de referencia a de 5 km a 2.5 km debido a la diferencia de tamaño que posee el municipio de Cataño respecto a los otros municipios.

**Figura 7:** Área de accesibilidad hacia el CDT de Guánica en relación al tiempo de viaje



**Nota:** Mapa elaborado en QGIS por Carlos Feliciano. En el mapa de la izquierda se muestran todas las zonas a las que es posible llegar al CDT de Guánica dentro de diez minutos o menos viajando en automóvil. En el de la izquierda se muestran las zonas a las que es posible llegar al CDT dentro de 15 minutos caminando.

## RESULTADOS

Basado en los análisis iniciales de indicadores epidemiológicos y distribución socioespacial, el orden de prelación de las comunidades para los municipios de Guánica son el siguiente:

- Playa Santa
- Fuig
- Susúa Abajo

En el caso de Guánica, el barrio de Playa Santa se encuentra en un tramo censal cuyo índice de vulnerabilidad social general es de 0.75 en una escala de 0.0-1.0. La comunidad Fuig del Barrio Ciénaga se encuentra en un tramo censal con índice de vulnerabilidad de 0.85, mientras que Susúa abajo se encuentra en un tramo censal con índice de vulnerabilidad de 0.83 en la escala antes mencionada. El municipio de Guánica en su conjunto posee un índice de vulnerabilidad general de 0.93 (véase figura 1).

La razón por la que se presentan tres comunidades en este municipio es para tener una lista que determine el orden en que el equipo encargado de llevar a cabo las iniciativas podrá comenzar a

comunicarse con líderes comunitarios; y con ello, determinar la aceptabilidad del líder y la comunidad con relación a nuestras iniciativas. Existe la posibilidad de que alguna comunidad no interese participar en las iniciativas, por lo que se debería ir haciendo las consultas con líderes comunitarios en orden y de forma anticipada, por si esto ocurriera.

## LIMITACIONES

La propuesta de selección de estas tres comunidades al interior del municipio de Guánica estuvo condicionada por factores metodológicos relevantes. Por una parte, a pesar de considerar los indicadores epidemiológicos y el índice de vulnerabilidad social para la selección de los municipios, las características epidemiológicas atribuidas al municipio y las características sociodemográficas atribuidas al tramo censal no necesariamente serán representativas en su totalidad de la comunidad seleccionada. Por otra parte, también resulta una limitación que el análisis socioespacial carezca de los datos sobre cantidad de población dentro de los barrios para así determinar la densidad poblacional en cada uno, y con esto determinar el total de personas a impactar con las iniciativas del plan de trabajo. Otra limitación en la sección de análisis geoespacial fue que no se indagó en las características del terreno generales para este municipio –como se realizó para el reporte anterior del municipio de Salinas –, reafirmando que esto no afectó las conclusiones, aun al perderse ese panorama geográfico general.

## CONCLUSIÓN

Basado en los resultados del presente estudio se recomienda realizar los próximos pasos: 1) identificar y contactar organizaciones que laboren en este municipio, 2) identificar y contactar los líderes comunitarios de al menos una de las zonas seleccionadas, 3) realizar el estudio de necesidades de COVID-19 en la comunidad e 4) implementar las iniciativas en la comunidad según el plan de trabajo (administración de pruebas caseras y equipo de protección personal, facilitar el acceso a vacunación y facilitar los talleres educativos sobre temas de COVID-19).



En conclusión, Guánica es uno de los municipios que cumplen con los criterios de alto índice de vulnerabilidad social, alto indicador de positividad y bajo indicador de personas con vacunación con serie completa. Según los análisis geoespaciales que se llevaron a cabo en las comunidades de Susúa Bajo y Playa Santa se encuentran a unas distancias que superan los 5 kilómetros respecto al CDT más cercano. Estos lugares se pueden recorrer con relativa facilidad en automóvil privado, pero quedan totalmente inaccesibles para las personas que no cuenten con dicho medio de transporte. Esto no solo apunta un problema de planificación y de infraestructura urbana de transporte, sino que señala una limitación que condiciona la salud de las personas de estos barrios alejados al carecer de un acceso directo a servicios de salud. De los análisis geoespaciales también se desprende la necesidad que hay de realizar actividades de mitigación estratégicamente situadas en los espacios más vulnerables.

Otro detalle a considerar es la naturaleza de los servicios médicos que ofrecen los centros de salud que hemos cubierto en el municipio en cuestión. Guánica contiene como principal centro de salud un Centro de Diagnóstico y Tratamiento (CDT), dicho centro no ofrece todos los servicios que ofrecen los hospitales, lo que deja a las comunidades de Guánica sin otra opción más que movilizarse hacia otros municipios que sí cuenten con hospitales. En el caso de las personas residentes de Guánica, el municipio receptor es Yauco. Por estas razones, la coordinación de esfuerzos para la prevención y control de COVID-19 en Guánica es necesaria, para avanzar en la equidad en salud en Puerto Rico.

## AGRADECIMIENTOS

Agradecemos al Sr. Francisco Negrón, geógrafo del Programa OD2A, por colaborar en el proceso de orientación y desarrollo de algunos mapas.

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**Selección de comunidades para implementar  
iniciativas del plan de trabajo de la Estrategia 1  
Programa de Equidad en Salud  
Año fiscal 2022-2023:  
Municipio de Salinas**

Subsidiado con fondos de los Centros para el Control y prevención de Enfermedades (CDC, por sus siglas en inglés) #2NH75OT000085 de la Secretaría Auxiliar de Planificación y Desarrollo (SAPD) del Departamento de Salud:

Gobierno de Puerto Rico

Departamento de Salud

**Selección de comunidades para implementar  
iniciativas del plan de trabajo de la Estrategia 1 del  
Programa de Equidad en Salud durante el año fiscal  
2022-2023: Municipio de Salinas**

**Carlos Mellado López, MD**

**Secretario de Salud**

Pierina Ortiz Cortés, Esq, LL.M

Secretaria Auxiliar

**Carlos Mellado López, MD**

Secretario del Departamento de Salud

**Pierina Ortiz Cortés, Esq, LL.M**

Secretaria Auxiliar de Planificación y Desarrollo

**Jaikiz Chaparro Villanueva, MSW**

Directora Programa Equidad en Salud

**Siomara Pérez Quintana, DrPH, MPH**

Co-PI Programa de Equidad en Salud

**Carlos Feliciano Collazo, MS**

Facilitador en Equidad en Salud- Estrategia 1

**Mariane Alvarado López, MPHE, CHES, CGG**

Facilitadora en Equidad en Salud-Estrategia 1

**Christian Rivera Cátala, MPH**

Epidemiólogo- Estrategia 1

**Ibis Montalvo Félix, Ed.D, MPHE**

Gerente de Proyecto- Estrategia 1

**Francisco Negrón Alemán**

Geógrafo- Programador GIS

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## RESUMEN

A través de este reporte se presenta la metodología utilizada para seleccionar las comunidades vulneradas en las que se estará implementando el plan de trabajo de la Estrategia 1. Además, se comparten los mapas representativos según los análisis de los datos realizados en los programados de ArcGIS y QGIS. Mas adelante se explica en detalle en que consiste cada uno de estos programas.

## INTRODUCCIÓN

### Trasfondo

Durante los meses de mayo y junio 2022, el equipo de la Estrategia 1 del Programa de Equidad en Salud, inició la redacción de un plan de trabajo para la implementación de actividades de mitigación de COVID-19 en comunidades vulneradas, en el año fiscal 2022-2023. El propósito de este plan es expandir las medidas de mitigación de COVID-19 y el alcance existente del Departamento de Salud de Puerto Rico con las poblaciones desatendidas y afectadas de manera desproporcionada por la epidemia del COVID-19. Para mayo 2023 se espera expandir este alcance a través de estrategias efectivas en salud pública basadas en evidencia, a saber: 1) desarrollar colaboraciones comunitarias para la investigación de casos y rastreo de contactos de COVID-19, 2) facilitar el acceso a pruebas de COVID-19 con proveedores de salud local, y 3) promover educación y comunicación en cuanto a reducción de riesgo relacionados al COVID-19.

Para realizar la selección de los municipios, el equipo de Estrategia 1 consideró posibles variables y auscultó la disponibilidad de los datos de interés según las fuentes oficiales gubernamentales. En primer lugar, se consideraron los datos recopilados y organizados por el Departamento de Salud, disponibles para descargar en su portal



de actualizaciones diarias «COVID-19 en cifras en Puerto Rico». Las razones principales para considerar esta fuente de información es que se trata de datos verificados y actualizados para los cuales las bases de datos son de acceso público, y que además los datos están organizados por región de salud o por municipio.

En segundo lugar, se consideraron los datos externos del Índice de Vulnerabilidad Social (Social Vulnerability Index CDC-SVI), que trabajan los CDC en colaboración con la Agencia para Sustancias Tóxicas y el Registro de Enfermedades (ATSDR, por sus siglas en inglés). La razón principal para utilizar estos datos en el análisis para la selección de municipios es que ayudan a precisar todas las áreas geográficas en Puerto Rico donde urgen esfuerzos para la equidad en salud, según la distribución de perfiles sociodemográficos de cada población. El CDC-SVI es el resultado del cómputo de varios indicadores generados por las estimaciones censales para indicar cuáles son las zonas geográficas con mayor necesidad de planificación de esfuerzos ante situaciones de emergencia. El CDC-SVI está calculado a nivel de municipios y a nivel de los tramos censales que componen el municipio. Los tramos censales son regiones geográficas definidas según datos poblacionales del Censo, con el fin de proporcionar un conjunto estable de unidades geográficas para la presentación de datos estadísticos sobre las características de la población que incluye adentro de esa delimitación (U.S. Census Bureau, 2022). Los datos más recientes para Puerto Rico son del año 2018.

### Descripción de los datos

A continuación, se presenta una tabla de resumen, por fuente de información, sobre los datos disponibles que se incluyeron finalmente para el análisis, añadiendo una breve descripción sobre cómo se interpretan y cuál es su utilidad para la toma de decisiones. Cabe destacar que, aunque se trabajaron los datos para incidencia, mortalidad y hospitalizaciones, según la base de datos del DSPR, estos no se utilizaron en el análisis, porque requirió utilizar un máximo de dos variables para apoyar la selección de municipios. Las variables priorizadas fueron positividad y por ciento de personas con *booster* o vacunación completada.

**Fuente: Departamento de Salud**

Dato considerado	Descripción según la fuente	Utilidad para toma de decisiones
<b>Positividad</b>	<p>Porcentaje de todas las pruebas de RT-PCR positivas, en un periodo determinado (por ejemplo: 7 días). Es decir, cuántas pruebas fueron positivas en un periodo determinado, de todas las pruebas realizadas de RT-PCR durante ese mismo periodo.</p> <p>Razonamiento:</p> $\frac{\text{Número pruebas positivas de RT-PCR}}{\text{número total de pruebas de RT-PCR realizadas (pruebas de RT-PCR positivas + negativas)}}$	<p>Indica cuán extendida está la infección en el área donde se realizan las pruebas, y si los niveles de pruebas se mantienen al día con los niveles de transmisión de enfermedades (Dowdy &amp; D'Souza, 2020)</p>
<b>Vacunación: Porcentaje de serie completa</b>	<p>Porcentaje de personas aptas (5 años o más) que tienen sus vacunas completadas, según la marca de compañía fabricante. Es decir, cuántas personas tienen sus dos dosis de Pfizer o Moderna, o su dosis de Janssen, de todas aquellas aptas (con 5 años o más) que fueron vacunadas.</p> <p>Razonamiento:</p> $\frac{\text{Número de personas aptas (5 años o más) con serie de dosis de vacuna completadas}}{\text{Población apta para vacunarse según estimados intercensales del 2019}}$	<p>Determinar cuántas personas pueden estar necesitando completar sus dosis requeridas. También determinar éxito asociado a campañas coordinadas, según las fechas de rápido aumento (Antonini et al., 2022); y cuánto control de las transmisiones (no necesariamente inmunidad de grupo) se ha alcanzado en una zona geográfica particular (Dowdy &amp; D'Souza, 2021)</p>

Al considerar las variables por separado, cabe destacar que la variable de positividad es más susceptible a cambios temporales, debido a disponibilidad de pruebas diagnósticas y el cálculo del promedio de 7 días. Por otro lado, la variable sobre la serie completada de la vacuna y sus refuerzos es más estable, en tanto el cambio en el estado actual de la situación es más lento (que, por ejemplo, el índice de contagios y el número de casos confirmados).

Fuente: CDC Social Vulnerability Index		
Dato/ Variable	Descripción según la fuente	Utilidad para toma de decisiones

<p style="text-align: center;"><b>Vulnerabilidad social</b></p>	<p>Se refiere a los posibles efectos negativos en las comunidades causados por tensiones externas sobre la salud humana. Tales tensiones incluyen desastres naturales o provocados por el hombre, o brotes de enfermedades. (Agency for Toxic Substances and Disease Registry [ATSDR], 2022)</p> <p>Utiliza 4 áreas claves basadas en 15 variables del censo basado en las encuestas de la comunidad de EE. UU. (y Puerto Rico):</p> <ul style="list-style-type: none"> <li>• Estado socioeconómico (personas por debajo de la pobreza, desempleadas, bajo ingresos, sin diploma de escuela secundaria)</li> <li>• Composición del hogar y discapacidad (personas con 65 años o más, 17 años o menos, más de 5 años con discapacidad, hogares monoparentales).</li> <li>• Estado e idioma minoritario (persona de grupo minoritario, de habla inglés "menos que bien")</li> <li>• Tipo de vivienda y transporte (estructuras de unidades múltiples, casas móviles, hacinamiento, sin vehículo, alojamiento para grupos)</li> </ul>	<p><b>General:</b></p> <p>Ayudar a los funcionarios locales a identificar las comunidades que pueden necesitar apoyo antes, durante o después de los desastres (ATSDR, 2022).</p> <p><b>Específicas:</b></p> <ul style="list-style-type: none"> <li>• Calcular la cantidad de suministros necesarios, como alimentos, agua, medicamentos y ropa de cama.</li> <li>• Ayudar a decidir cuánto personal de emergencia se requiere para ayudar a las personas.</li> <li>• Identificar las áreas que necesitan refugios de emergencia.</li> <li>• Planificar la mejor manera de evacuar a las personas, teniendo en cuenta a aquellas que tienen necesidades especiales, como personas sin vehículos, ancianos o personas que no entienden bien el inglés.</li> <li>• Identificar las comunidades que necesitarán apoyo continuo para recuperarse después de una emergencia o desastre natural.</li> </ul>
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<b>Índice</b>	Razonamiento: Sumatoria de las sumas de cada área temática, ordenada por los tramos censales y luego calculados por las clasificaciones de percentiles generales. El total de las sumas para cada tema es lo mismo que sumar las clasificaciones de variables individuales.	Los valores de clasificación de percentiles varían de 0 a 1, implicando que los valores más altos indican una mayor vulnerabilidad social entre las zonas geográficas (ATSDR, 2020).
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MÉTODOS

Todos los datos del Departamento de Salud se descargaron de las bases de datos de cada una de las secciones, durante el mes de junio, para las fechas de 1 de enero de 2022 al 31 de mayo de 2022. La justificación para la selección de estas fechas es que se desea trabajar con los datos más recientes del corriente año 2022, los cuales aparte muestran una curva epidemiológica propagada con dos periodos de aumentos considerables de casos y un periodo de disminución de por medio. Las curvas epidémicas propagadas suelen tener una serie de picos sucesivamente más grandes, separados por un período de incubación (LaMorte, 2017; Torok, s.f), y esto se observa en el periodo de enero a mayo 2022. Además, se desea identificar las regiones de Salud que están siendo impactadas en mayor magnitud por el COVID-19, tomando en cuenta las fluctuaciones recientes durante el corriente año 2022.

Para complementar el análisis de datos epidemiológicos se decidió hacer uso de sistemas de información geográfica (GIS, por sus siglas en ingles). Este sistema es una herramienta tecnológica que incorpora características geográficas con herramientas para procesar y analizar una variedad de datos contextualizándolos geográficamente. Haciendo uso de esta tecnología se realizaron mapas que contextualizan espacialmente los indicadores epidemiológicos, indicadores de vulnerabilidad social y otras variables espaciales incluyendo relaciones de vecindad y características del terreno. Parte de los mapas fueron creados por el geógrafo colaborador del Departamento de Salud y se utilizaron para las interpretaciones.

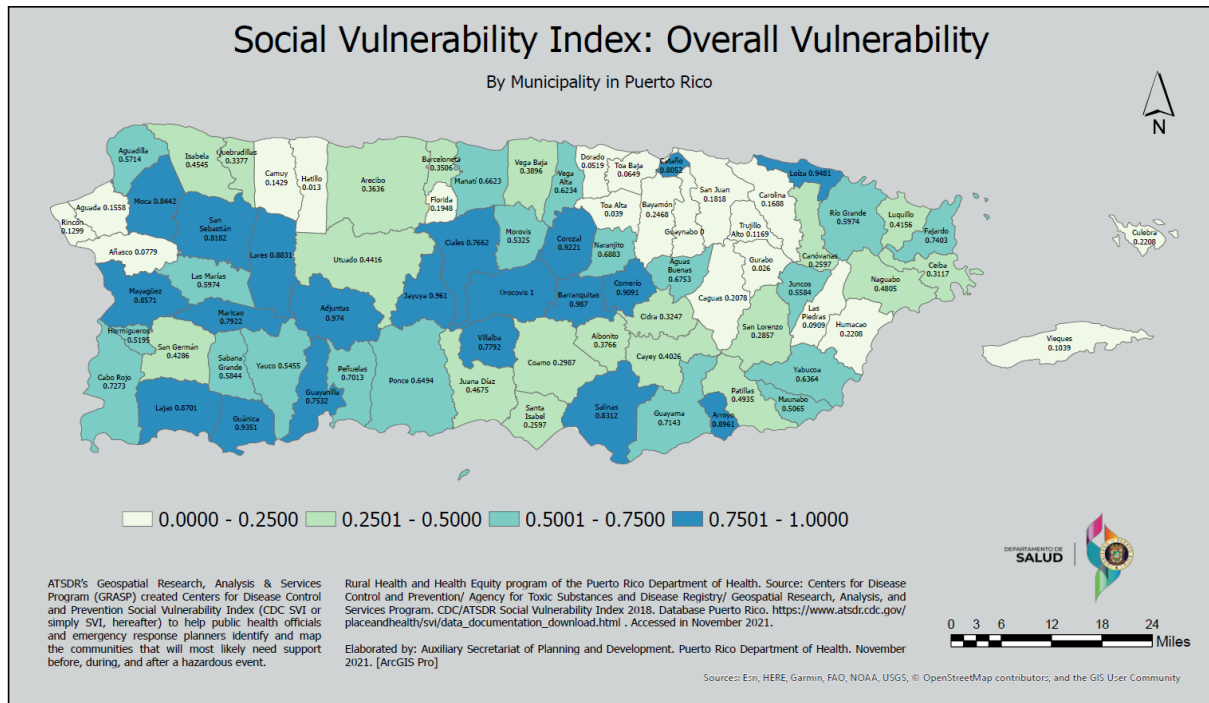
Aunque inicialmente se exploraron los datos para incidencia, mortalidad y hospitalizaciones, según la base de datos del DSPR. Sin embargo, no se utilizaron

porque el análisis geoespacial requirió utilizar dos variables como mucho para apoyar la selección de municipios. Las variables priorizadas fueron positividad y por ciento de personas con *booster* o vacunación completada

Inicialmente se contempló la posibilidad de seleccionar tres municipios que cumplan con los indicadores preestablecidos a modo de ir atendiendo las necesidades en orden de prioridad o, en caso de que el acceso a uno se vea obstruido por alguna razón ajena al programa. Luego de evaluar la viabilidad de esta opción, se optó por reducir la escala a un mismo municipio y a partir de ahí identificar tres comunidades desatendidas o vulneradas que cumplan con los indicadores de interés para llevar a cabo nuestros esfuerzos de mitigación de las disparidades de salud relacionadas al COVID-19.

Al ser varios los indicadores e índices a considerar para la selección de municipios, se realizaron tres fases. La primera fase consistió en considerar los índices de vulnerabilidad social de cada municipio. El criterio de inclusión de esta fase era tener un índice de 0.7501 o más, porque implicaría capturar el 25% superior de los municipios con mayor índice de vulnerabilidad social, y sugiriendo esto que los municipios tienen una alta proporción general (no estratificada por barrios o sectores) de personas con perfiles de vulnerabilidad social. La fuente de referencia utilizada fue el mapa provisto por el geógrafo de la Estrategia 2 (ver figura 1). En esta fase, los siguientes 20 municipios permanecieron en la lista (en orden descendente, según su índice de vulnerabilidad social): Orocovis, Barranquitas, Adjuntas, Jayuya, Guánica, Corozal, Comerío, Lajas, Maricao, Mayagüez, Moca, San Sebastián, Loíza, Arroyo, Lares, Salinas, Cataño, Villalba, Ciales, Guayanilla.

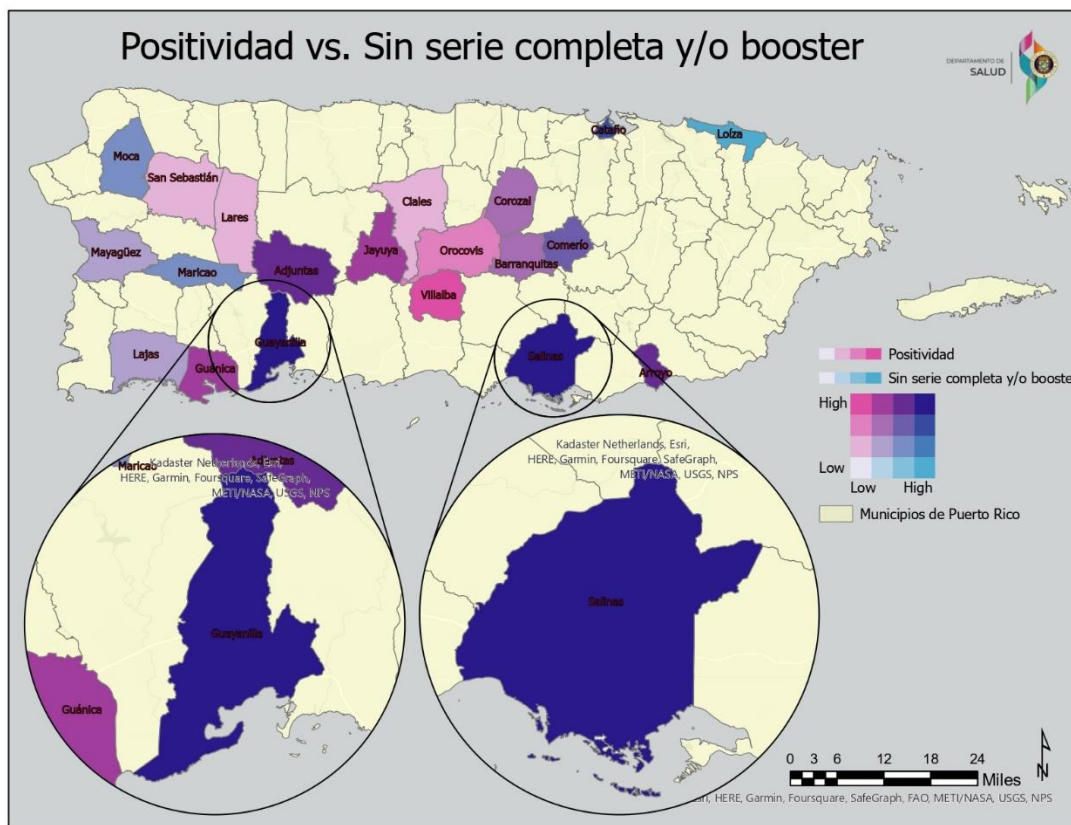
**Figura 1. Mapa de municipios de Puerto Rico con sus respectivos índices de vulnerabilidad social**



**Nota:** Creado en ArcGIS por Francisco Negrón Alemán. De la leyenda se interpreta que los municipios en color azul oscuro representan los municipios con los índices de vulnerabilidad social más altos, adjudicados por su posición en el 25% superior (percentil 75).

La segunda fase consistió en una exploración socioespacial para identificar los municipios con alto índice de vulnerabilidad que sugerían tener la mayor prioridad de atención en salud, según su perfil epidemiológico de COVID-19. Las variables que indicaron mayor magnitud de necesidad fueron las de tasa de positividad y el por ciento de personas con vacunación completada. Específicamente, los municipios que tenían alta tasa de positividad y bajo por ciento de personas con vacunación completada se consideraron como elegibles. Estos municipios fueron: Salinas, Cataño, Guayanilla, Arroyo, Adjuntas y Comerío (ver figura 2). A nivel específico de las variables por separadas, Salinas, Guayanilla y Cataño (representados bajo el color azul intenso en la figura 1) tienen mayor porcentaje sin serie completada y/o *booster* de vacunación; mientras, Arroyo, Adjuntas y Comerío (representados bajo el violeta) presentan un mayor índice de positividad.

**Figura 2: Mapa Positividad vs. Sin serie completa y/o booster**



**Nota:** Creado en ArcGIS por Francisco Negrón Alemán. Los colores atribuidos a los 20 municipios con alto índice de vulnerabilidad social resultan de la combinación de gradientes, donde colores más intensos u oscuros (rosa fucsia y azul celeste) sugieren una alta proporción de los indicadores epidemiológico bajo análisis.

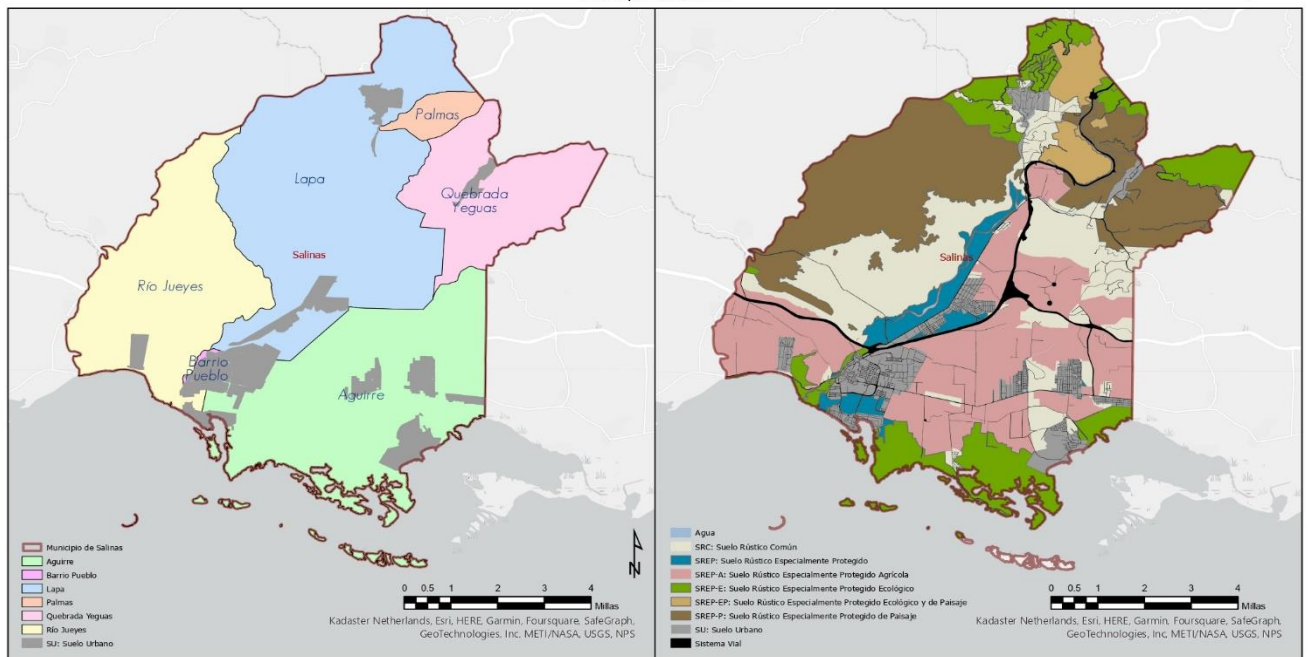
En la tercera fase, se identificaron los tramos censales al interior de cada municipio resultante de la segunda fase, para preseleccionar los que tuvieran mayor Índice de Vulnerabilidad Social (ver figura 3). En el caso del municipio de Salinas, se identificó un (1) tramo censal con alto índice de vulnerabilidad social, de siete (7) tramos censales en total que tiene este municipio. En el caso de Cataño, se identificaron nueve (9) tramos censales de once (11). Respecto a Guayanilla, se identificó un (1) tramo censal de cinco (5). Por otro lado, en Arroyo se identificaron dos (2) tramos censales de cuatro (4). En el caso de Adjuntas, se identificaron cuatro (4) tramos censales de seis (6). Y en el caso de Comerío, se identificaron tres (3) tramos censales de cinco (5).





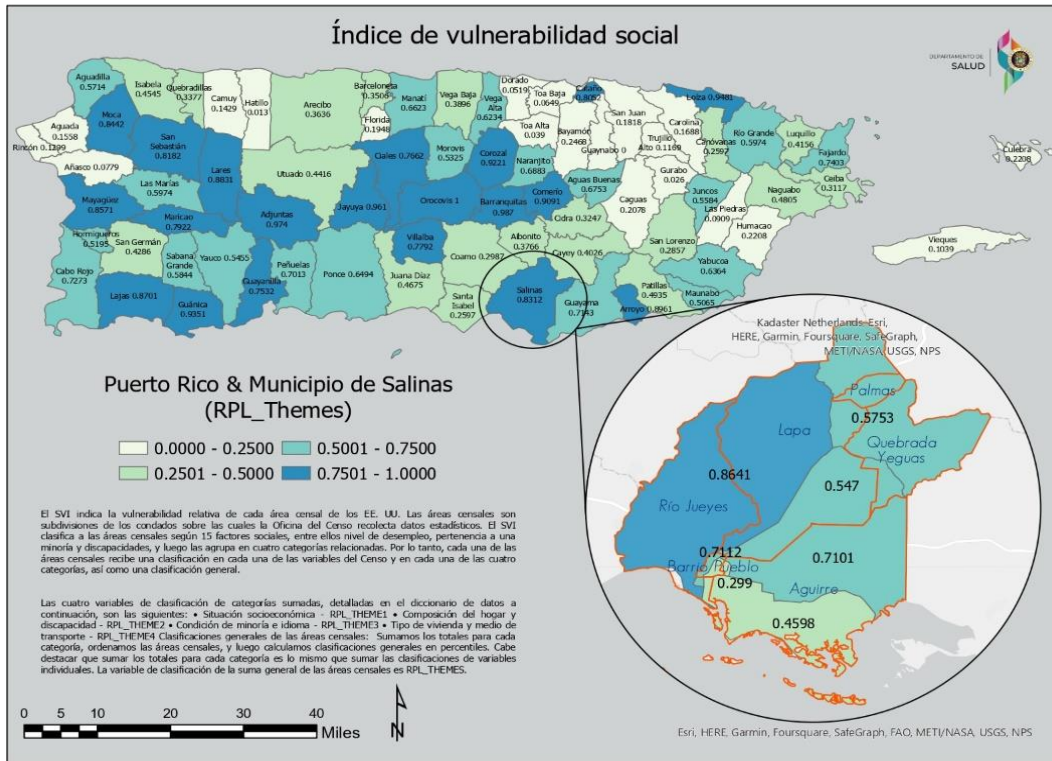
que el barrio Lapa sector Parcelas Vázquez es uno de que indica una vulnerabilidad social alta. Observando las características geográficas de dicho lugar se entiende que se trata de un lugar rural ubicado en la zona montañosa de Salinas. La densidad demográfica puede ser considerable tomando en cuenta el terreno urbanizado que posee. En la sección que señala el suelo rústico común (color crema) en el mapa citado previamente contiene viviendas dispersas a lo largo del terreno. Las imágenes satelitales ilustran este último punto (véase figura 5), en la imagen se puede apreciar la dispersión de las unidades de vivienda en el terreno.

**Figura 4a. Distribución de barrios y tipos de suelos al interior del municipio de Salinas**  
Municipio de Salinas



**Nota:** Creado en ArcGIS por Francisco Negrón Alemán. Distribución de barrios, a la izquierda de la figura; y la distribución de terrenos, a la derecha de la imagen. La leyenda del mapa de terrenos presenta las interpretaciones.

**Figura 4b. Distribución de índices de vulnerabilidad social en los barrios del municipio de Salinas**



**Nota:** Creado en ArcGIS por Francisco Negrón Alemán. Nótese que dos barrios son tramos censales en sí mismos, con los mayores índices de vulnerabilidad social al interior del municipio de Salinas.

**Figura 5. Imagen satelital del barrio Lapa en Salinas.**



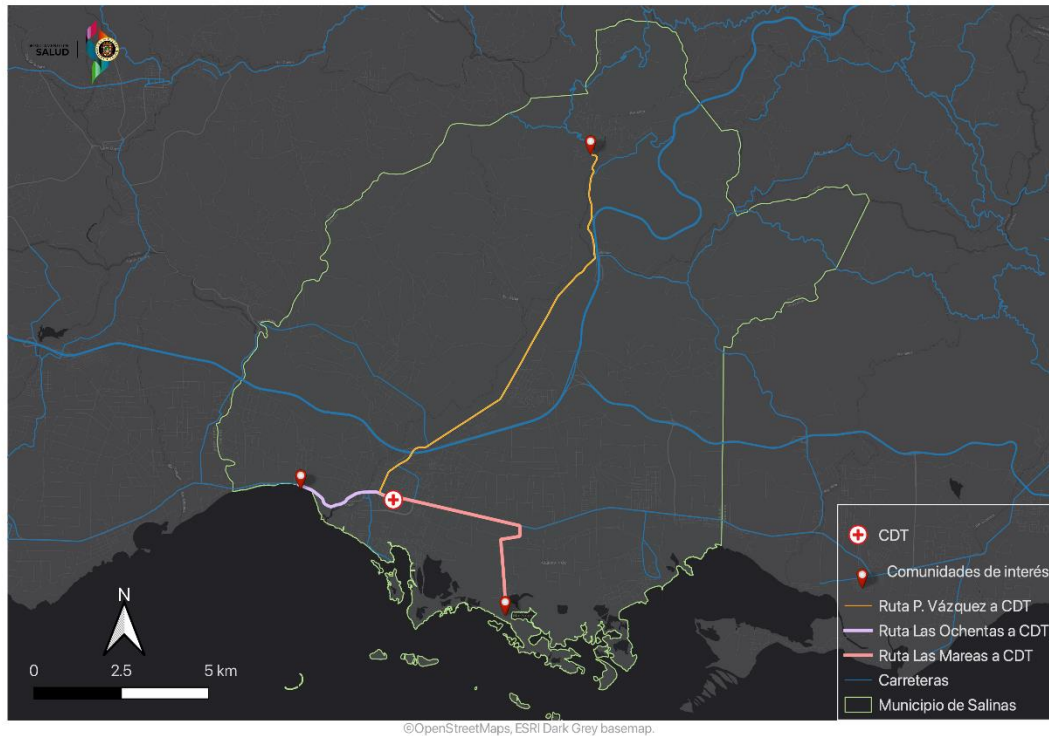
Fuente: Google Earth.

La comunidad de Río Jueyes por su parte posee una sección urbanizada llamada Las Ochentas, la cual está rodeada de área agrícola (color rosa) y suelo ecológico protegido (color verde) (ver Figura 4a). Según datos del índice de vulnerabilidad social (ver Figura 4b), se concluye que Río Jueyes es el segundo barrio con mayor índice de vulnerabilidad social en el municipio de Salinas. Seguido de "barrio Pueblo" y Aguirre. En este último barrio se encuentra la comunidad Las Mareas que se encuentra en el borde de la zona ecológica protegida representada en color verde en el mapa de distribución de barrios por tipos de suelos (figura 4a).

Por otro lado, la principal infraestructura de servicios de salud en el municipio de Salinas se encuentra en la zona urbana. En el mapa que muestra las rutas más cortas desde las comunidades hasta el CDT de Salinas (figura 6) encontramos que las distancias desde marcan esas rutas entre el CDT y las comunidades son para el caso de Parcelas Vázquez 13.3 km, Para Las Mareas hay una distancia aproximada de 6.4 km, y para el caso de Las Ochentas, la ruta más cercana al centro de diagnóstico y tratamiento es de 3.1 km.

Se realizó un análisis de redes sobre el conjunto de datos georeferenciados que indicó que partiendo de las rutas trazadas en el mapa antes mencionado (figura 6), el costo de viaje en términos de tiempo era para el caso de Parcelas Vázquez en relación al CDT de unos 26 minutos calculado a 50 km/h. En el caso de Las Mareas el modelo resultó en un costo de viaje de 13 minutos a 50 km/h, y en el caso de Las Ochentas el costo de viaje resultó ser de unos 6 minutos bajo las mismas condiciones de velocidad. El modelo para calcular el costo de viaje se hizo pensando en distancias recorridas en un automóvil privado. En los estimados no se contempla el tiempo que le tomaría una persona andando en transporte colectivo. En esos casos la duración del trayecto se duplicaría o se triplicaría dependiendo del caso.

**Figura 6. Rutas más cercanas desde las comunidades hacia el Centro de diagnóstico y tratamiento (CDT)**



**Nota:** Mapa elaborado en QGIS por Carlos Feliciano.

## RESULTADOS

El municipio de Salinas tiene un índice de vulnerabilidad social alto de 0.83, ubicándose entre los primeros 20 municipios con el índice más alto. Su positividad acumulada para el periodo de 1 de enero al 31 de mayo de 2022 fue 24.01%, y el porcentaje de personas sin booster o serie completada fue 34.7%. Además, es un municipio con siete tramos censales, de los cuales uno conserva un índice de vulnerabilidad alto.

Basado en los análisis iniciales de indicadores epidemiológicos y distribución socioespacial, las comunidades a seleccionar para implementar las iniciativas del plan de trabajo de Estrategia 1 pertenecen al municipio de Salinas. El orden de prelación de las comunidades es el siguiente:

- #1: Comunidad al norte del barrio Lapas [Parcelas Vázquez]
- #2: Comunidad al sur del barrio Río Jueyes [Las Ochenta]

- #3: Comunidad al sur del barrio Aguirre [Las Mareas]

La comunidad de Parcelas Vázquez se encuentra dentro del tramo censal con índice de vulnerabilidad social general de 0.86, Las Ochentas está ubicada en un tramo censal con índice de vulnerabilidad de 0.71, mientras que la comunidad de Las Mareas está ubicada en un tramo censal con índice de 0.45 (figura 4b). Como resultado del análisis de redes, se concluyó que la comunidad de Parcelas Vázquez es la más lejanas del principal centro de salud del municipio de Salinas, seguido de Las Mareas y en último lugar, de Las Ochentas. Aunque haya algunas comunidades cuyo tiempo de viaje sea entre los 10 a 15 minutos, es siempre considerando que la persona cuente con un vehículo de motor privado. Esta limitación apunta directamente a uno de los factores sociales que determinan el acceso o no a determinados servicios básicos de salud.

La razón por la que se presentan tres comunidades es para tener una lista que determine el orden en que el equipo de Estrategia 1 podrá comenzar a comunicarse con líderes comunitario y con ello, determinar la aceptabilidad del líder y la comunidad con relación a nuestras iniciativas. Existe la posibilidad de que alguna comunidad no interese participar de nuestras iniciativas, por lo que se debería ir haciendo las consultas con líderes comunitarios en orden de prelación de las comunidades si esto ocurriera.

## LIMITACIONES

La propuesta de selección de estas tres comunidades al interior del municipio de Salinas estuvo condicionada por factores metodológicos relevantes. En **primer lugar**, a pesar de considerar los indicadores epidemiológicos y el índice de vulnerabilidad social para la selección de los municipios, las características epidemiológicas atribuidas al municipio y las características sociodemográficas atribuidas al tramo censal no necesariamente serán representativas en su totalidad de la comunidad seleccionada. En **segundo lugar**, la selección de comunidades al interior del municipio de Salinas se hizo en función del tiempo disponible para

implementar el plan de trabajo y de la efectividad de enfocarnos en uno solo municipio. Dado que la intención de la propuesta es elevar a consideración una serie de opciones, la alternativa acordada por el equipo de Estrategia 1 fue hacer el análisis y búsqueda de comunidades alternas al interior de Salinas, y así garantizar una lista de opciones. **Por último**, una limitación en el análisis geoespacial fue la falta de representación de datos sobre cantidad de población dentro de los barrios para así determinar la densidad poblacional en cada uno, y con esto determinar el total de personas a impactar con las iniciativas del plan de trabajo.

## CONCLUSIÓN

Se recomienda realizar los próximos pasos, una vez se reciba visto bueno del liderato del Programa: 1) identificar y contactar organizaciones que laboren en este municipio, 2) identificar y contactar los líderes comunitarios de al menos una de las zonas seleccionadas, 3) realizar el estudio de necesidades de la comunidad y 4) implementar las iniciativas en la comunidad según el plan de trabajo (administración de pruebas caseras y equipo de protección personal, facilitar el acceso a vacunación y facilitar los talleres educativos sobre temas de COVID-19).

A modo de conclusión, Salinas es el municipio principal que cumple con los criterios de alto índice de vulnerabilidad social y altos indicadores de positividad y falta de vacunación con serie completa. La cercanía de las comunidades antes mencionadas con los centros de salud y/o Hospitales en el municipio es una relativa debido a que en el cálculo de los diez kilómetros que enmarca la zona de influencia del centro de salud no se contemplan el estado de las carreteras, la accesibilidad a estas, ni el relieve. Otro detalle a considerar es la naturaleza de los servicios médicos que ofrecen los centros de salud que hemos cubierto en es los municipios en cuestión. Salinas contiene como principal centro de salud un Centro de Diagnóstico y Tratamiento (CDT), en ese tipo de centros no se ofrecen todos los servicios que ofrecen los Hospitales, lo que deja a las comunidades de Salinas sin otra opción más que movilizarse hacia otros municipios que si cuentan con hospitales.

## AGRADECIMIENTOS

Agradecemos al Sr. Francisco Negrón, geógrafo colaborador, por su colaboración en el proceso de orientación, desarrollo de estos mapas y reporte.

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**Puerto Rico Medicaid**  
**MCO Adult and Child Core Set Reporting**  
**Federal Fiscal Years 2021 and 2022**

*Note for all tables: NR = "Not Required" as some measures were not required in FFY2021 that were required in FFY2022.*

Behavioral Health Care			
Adult /Child Core Set	Measure Name	FFY2021 (%)	FFY2022 (%)
Adult Core Set	Adherence to Antipsychotic Medications for Individuals with Schizophrenia: Age 18 and older	NR	66.2
	Antidepressant Medication Management (Treated with and Remained on Antidepressant Medication for 12 Weeks): Age 18 and Older	56.2	54.7
	Antidepressant Medication management (Treated with and Remained on Antidepressant Medication for 6 Months): Age 18 and Older	46	42.1
	Concurrent Use of Opioids and Benzodiazepines: Age 18 and older	12	16.1
	Diabetes Screening for People with Schizophrenia or Bipolar Disorder Who Are Using Antipsychotic Medications: Ages 18 to 64	NR	61.4
	Follow-Up After Emergency Department Visit for Alcohol and Other Drug Abuse or Dependence (Within 7 Days of the ED Visit): Age 18 and Older	26	10.9
	Follow-Up After Emergency Department Visit for Alcohol and Other Drug Abuse or Dependence (Within 30 Days of the ED Visit): Age 18 and Older	34	24.1
	Follow-Up After Emergency Department Visit for Mental Illness (Within 7 Days after Discharge): Age 18 and Older	31.1	19.2
	Follow-Up After Emergency Department Visit for Mental Illness (Within 30 Days after Discharge): Age 18 and Older	57.5	60.7
	Follow-Up After Hospitalization for Mental Illness (Within 7 Days of the ED Visit): Age 18 and Older	38.2	22.3
	Follow-Up After Hospitalization for Mental Illness (Within 30 Days of the ED Visit): Age 18 and Older	60.7	59.2
	Initiation and Engagement of Alcohol and Other Drug Abuse or Dependence Treatment (Within 14 Days of Diagnosis): Age 18 and Older	NR	56.6
	Initiation and Engagement of Alcohol and Other Drug Abuse or Dependence Treatment (Within 34 Days of Diagnosis): Age 18 and Older	NR	11.8
	Medical Assistance with Smoking and Tobacco Use Cessation (Those Advised to Quit): Age 18 and older	NR	64.6
	Medical Assistance with Smoking and Tobacco Use Cessation (Discussed or Recommended Cessation Medications): Age 18 and older	NR	16.6

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	Medical Assistance with Smoking and Tobacco Use Cessation (Discussed or Provided Other Cessation Strategies): Age 18 and older	NR	16.6
	Use of Pharmacotherapy for Opioid Use Disorder: Ages 18 to 64	NR	64.8
Child Core Set	Follow-Up After Hospitalization for Mental Illness (Within 7 Days after Discharge): Ages 6 to 17	53.3	46.5
	Follow-Up After Hospitalization for Mental Illness (Within 30 Days after Discharge): Ages 6 to 17	64.2	50.3
	Follow-Up Care for Children Prescribed Attention-Deficit/Hyperactivity Disorder (ADHD) Medication (1 Follow-Up Visit During the 30-Day Initiation Phase): Ages 6 to 12	19.6	48.3
	Follow-Up Care for Children Prescribed Attention-Deficit/Hyperactivity Disorder (ADHD) Medication (2 Follow-Ups During the 9 Months Following the Initiation Phase): Ages 6 to 12	53.5	7.6
	Metabolic Monitoring for Children and Adolescents on Antipsychotics (Blood Glucose Testing): Ages 1 to 17	56	58.2
	Metabolic Monitoring for Children and Adolescents on Antipsychotics (Cholesterol Testing): Ages 1 to 17	NR	49.5
	Metabolic Monitoring for Children and Adolescents on Antipsychotics (Blood Glucose and Cholesterol Testing): Ages 1 to 17	45.4	48.2
	Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics: Ages 1 to 17	NR	49.2

Care of Acute and Chronic Conditions			
Adult/Child Core Set	Measure Name	FFY2021 (%)	FFY2022 (%)
Adult Core Set	Asthma Medication Ratio: Ages 19 to 64	NR	72.3
	Comprehensive Diabetes Care: Hemoglobin A1c Poor Control (>9.0%): Ages 18 to 75	89.2	73.4
	Controlling High Blood Pressure: Ages 18 to 85	31.2	39.6
	PQI 01: Diabetes Short-Term Complications Admission Rate: Age 18 and Older	6.2	21.9
	PQI 05: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate: Age 40 and Older	126.1	116.3
	PQI 08: Heart Failure Admission Rate: Age 18 and Older	14	71.8
	PQI 15: Asthma in Younger Adults Admission Rate: Ages 18 to 39	12.8	27.1
Child Core Set	Ambulatory Care: Emergency Department (ED) Visits: Ages 0 to 19	90.5	83.7
	Asthma Medication Ratio: Ages 5 to 18	NR	92.7

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Maternal and Perinatal Health			
Adult/Child Core Set	Measure Name	FFY2021 (%)	FFY2022 (%)
Adult Core Set	Contraceptive Care (Provided a Most Effective or Moderately Effective Method of Contraception): All Women Ages 21 to 44	NR	3.7
	Contraceptive Care (Provided a Long-Acting Reversible Method of Contraception): All Women Ages 21 to 44	NR	0.3
	Contraceptive Care (Provided a Most Effective or Moderately Effective Method of Contraception Within 3 Days of Delivery): Postpartum Women Ages 21 to 44	35.1	27.1
	Contraceptive Care (Provided a Most Effective or Moderately Effective Method of Contraception Within 60 Days of Delivery): Postpartum Women Ages 21 to 44	42.6	33
	Contraceptive Care (Provided a Long-Acting Reversible Method of Contraception Within 60 Days of Delivery): Postpartum Women Ages 21 to 44	NR	0.6
	Prenatal and Postpartum Care: Postpartum Care	44.5	38
Child Core Set	Contraceptive Care (Provided a Most Effective or Moderately Effective Method of Contraception): All Women Ages 15 to 20	3.6	1.5
	Contraceptive Care (Provided a Long-Acting Reversible Method of Contraception): All Women Ages 15 to 20	0.2	0.3
	Contraceptive Care (Provided a Most Effective or Moderately Effective Method of Contraception Within 3 Days of Delivery): Postpartum Women Ages 15 to 20	NR	5.1
	Contraceptive Care (Provided a Most Effective or Moderately Effective Method of Contraception Within 60 Days of Delivery): Postpartum Women Ages 15 to 20	19.1	13
	Contraceptive Care (Provided a Long-Acting Reversible Method of Contraception Within 3 Days of Delivery): Postpartum Women Ages 15 to 20	0	0
	Contraceptive Care (Provided a Long-Acting Reversible Method of Contraception Within 60 Days of Delivery): Postpartum Women Ages 15 to 20	NR	1.3
	Live Births Weighing Less Than 2,500 Grams	10.7	11
	Low-Risk Caesarean Delivery	46	47.2
Prenatal and Postpartum Care: Timeliness of Prenatal Care	77.2	57.1	

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Primary Care Access and Preventive Care			
Adult/Child Core Set	Measure Name	FFY2021 (%)	FFY2022 (%)
Adult Core Set	Breast Cancer Screening: Ages 50 to 74	66.7	56.3
	Cervical Cancer Screening: Ages 21 to 64	44.5	42.2
	Chlamydia Screening in Women Ages 21 to 24	57.2	60.3
	Flu Vaccinations for Adults Ages 18 to 64	NR	22.2
Child Core Set	Child and Adolescent Well-Care Visits: Ages 3 to 21	29.4	33.5
	Childhood Immunization Status (Measles, Mumps, and Rubella (MMR) Vaccination by their Second Birthday): Age 2	58.4	53.2
	Childhood Immunization Status (At Least Two Flu Vaccinations by their Second Birthday): Age 2	8.4	5.2
	Childhood Immunization Status (Up to Date on Immunizations (Combination 3) by their Second Birthday): Age 2	7.6	2.3
	Childhood Immunization Status (Up to Date on Immunizations (Combination 10) by their Second Birthday): Age 2	1.6	0.2
	Chlamydia Screening in Women Ages 16 to 20	56.8	60.8
	Developmental Screening in the First Three Years of Life: Ages 0 to 3	NR	14.3
	Immunizations for Adolescents (Human Papillomavirus (HPV) Vaccine Series by Their 13th Birthday): Age 13	37.7	18.6
	Immunizations for Adolescents (Meningococcal Conjugate and Tdap Vaccines (Combination 1) by Their 13th Birthday): Age 13	60.7	40.6
	Weight Assessment and Counseling for Nutrition and Physical Activity for Children/Adolescents (Body Mass Index Percentile Documentation): Ages 3 to 17	19.9	22.3
	Weight Assessment and Counseling for Nutrition and Physical Activity for Children/Adolescents (Counseling for Nutrition): Ages 3 to 17	12.7	22.7
Weight Assessment and Counseling for Nutrition and Physical Activity for Children/Adolescents (Counseling for Physical Activity): Ages 3 to 17	4	16.2	

**Puerto Rico Medicaid**

**MCO Healthcare Effectiveness Data and Information Set (HEDIS)**

**Reporting Years 2020 through 2022**

The four Puerto Rico Managed Care Organizations (First Medical, MMM Multihealth, Plan Menonita, and Triple S) have reported the on the following Healthcare Effectiveness Data and Information Set (HEDIS) measures for Reporting Years 2020 through 2022. For Reporting Years 2020 through 2021, metrics were reported by age. In 2022, PRHIA revised the HEDIS measures list, and the metrics were reported in totals, not divided by ages.

*Notes for all tables:*

- *NR = Not Reported. Some MCOs did not report values for certain measures and are therefore reported as “NR.”*
- *Most fields with a value of NR are for totals (e.g., total annual dental visits). The requirement in 2020 and 2021 was to report measures by age group, therefore not all MCOs reported a “total” value, instead reporting by age group as required.*

Data on MCO performance from Healthcare Effectiveness Data and Information Set (HEDIS)					
Reporting Year 2020					
Care Domain	MCO Measure	First Medical	MMM Multihealth	Plan Menonita	Triple S
<b>Access/Availability of Care</b>	Ambulative/Preventive care visit Total	67.44%	70.13%	NR	NR
	Ambulative/Preventive care visit 20-44 Years	60.48%	62.30%	61.89%	65.00%
	Ambulative/Preventive care visit 45-64 Years	76.64%	78.70%	73.08%	80.60%
	Ambulative/Preventive care visit 65 years and older	80.45%	77.28%	77.10%	81.30%
	Annual dental Visit Total	36.54%	35.87%	NR	NR
	Annual dental Visit 2-3 Years	24.14%	25.00%	35.63%	24.60%
	Annual dental Visit 4-6 Years	39.54%	NR	34.06%	41.3%
	Annual dental Visit 7-10 Years	42.20%	NR	27.77%	43.6%
	Annual dental Visit 11-14 Years	38.45%	37.17%	39.79%	39.40%
	Annual dental Visit 15-18 Years	35.60%	NR	26.76%	36.9%
	Annual dental Visit 19-20 Years	30.38%	29.27%	41.44%	32.20%

**Puerto Rico Medicaid**  
**MCO Healthcare Effectiveness Data and Information Set (HEDIS)**  
**Reporting Years 2020 through 2022**

	Postpartum care	33.29%	46.47%	7.97%	61.60%
	Timeliness of Prenatal Care	74.80%	87.35%	14.36%	89.10%
<b>Utilization</b>	Child and Adolescent Well-Care Visits	16.16%	32.07%	NR	NR
	Child Adolescent Well Visits - 3-11	NR	38.75%	23.86%	33.00%
	Child Adolescent Well Visits - 12-17	NR	31.96%	30.77%	29.50%
	Child Adolescent Well Visits - 18-21	NR	20.27%	15.71%	18.40%

<b>Data on MCO performance from Healthcare Effectiveness Data and Information Set (HEDIS)</b>					
<b>Reporting Year 2021</b>					
<b>Care Domain</b>	<b>MCO Measure</b>	<b>First Medical</b>	<b>MMM Multihealth</b>	<b>Plan Menonita</b>	<b>Triple S</b>
<b>Access/Availability of Care</b>	Ambulative/Preventive care visit Total	NR	69.65%	NR	NR
	Ambulative/Preventive care visit 20-44 Years	57.14%	61.95%	65.69%	64.80%
	Ambulative/Preventive care visit 45-64 Years	74.40%	78.83%	81.17%	80.30%
	Ambulative/Preventive care visit 65 years and older	77.36%	76.21%	76.40%	81.00%
	Annual dental Visit Total	49.22%	50.14%	NR	NR
	Annual dental Visit 2-3 Years	31.00%	33.27%	37.27%	35.90%
	Annual dental Visit 4-6 Years	53.89%	55.81%	55.44%	58.20%
	Annual dental Visit 7-10 Years	56.45%	57.74%	57.01%	60.40%
	Annual dental Visit 11-14 Years	54.11%	54.87%	54.07%	57.90%
	Annual dental Visit 15-18 Years	48.47%	48.62%	48.89%	52.50%
	Annual dental Visit 19-20 Years	36.40%	36.05%	37.08%	39.90%
	Postpartum care	26.39%	52.31%	48.18%	66.70%
	Timeliness of Prenatal Care	64.32%	93.92%	86.37%	85.60%
	<b>Utilization</b>	Child and Adolescent Well-	NR	41.02%	NR

**Puerto Rico Medicaid**  
**MCO Healthcare Effectiveness Data and Information Set (HEDIS)**  
**Reporting Years 2020 through 2022**

	Care Visits				
	Child Adolescent Well Visits - 3-11	8.60%	49.76%	44.76%	45.40%
	Child Adolescent Well Visits - 12-17	16.55%	41.33%	37.96%	39.00%
	Child Adolescent Well Visits - 18-21	19.64%	24.89%	23.60%	24.40%

**Data on MCO performance from Healthcare Effectiveness Data and Information Set (HEDIS)**  
**Reporting Year 2022**

*\*Two of the Metrics were not required (Annual Dental Visits and Adult Access to Preventative Care)*

Care Domain	MCO Measure	First Medical	MMM Multihealth	Plan Menonita	Triple S
<b>Access/Availability of Care</b>	Child and Adolescent Well-Care	45.10%	42.99%	35.93%	39.10%
	Timeliness Prenatal Care	21.80%	56.93%	31.22%	84.40%
<b>Utilization</b>	Prenatal and Postpartum Care	45.10%	66.42%	41.72%	49.60%