BerryDunn

GOVERNMENT OF PUERTO RICO

Department of Health
Medicaid Program

Puerto Rico Department of Health

Health Information Technology Support Services Project

Health Information Technology Assessment Report
Version 2.0

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Table i: Version History

Version	Delivered Date	Version Notes
0.1	April 20, 2020	Initial version of the DED submitted to PRDoH for review
1.0	June 19, 2020	First draft of Health Information Technology Assessment Report delivered for PRDoH review
2.0	July 9, 2020	Second draft of Health Information Technology Assessment Report delivered for PRDoH review

1 Executive Summary

The Commonwealth of Puerto Rico (Commonwealth) has made many programmatic, technological, and financial investments in the last several years to improve the health and well-being of the Puerto Ricans it serves, and to improve program oversight to help ensure accountability and strengthen the trust of the public and federal partners. Looking to the future of healthcare delivery and payment in Puerto Rico, the Commonwealth seeks to build on its previous successes and learn from its past challenges to plan for and implement robust health information technology/health information exchange (health IT/HIE) infrastructure and capabilities on the island.

To help drive these efforts, in 2019 the Commonwealth reestablished the Puerto Rico Electronic Health Information Network Corporation (PRHIN), which was originally created in law by Puerto Rico's Law 40 of 2012[1]. According to the law, PRHIN was established as a nonprofit corporation to serve as the State-Designated Entity (SDE) and to develop and implement plans for the exchange of health data across the Commonwealth's healthcare ecosystem through operation of Puerto Rico's HIE, also referred to as the PRHIE.

In April 2020 PRDoH engaged BerryDunn—a health IT consultant—to lead several planning activities, including performing a health IT assessment. To help ensure that the voices of PRDoH stakeholders were reflected in the assessment, BerryDunn facilitated fact-finding sessions with PRDoH stakeholders between May and June 2020 and issued a web survey in June 2020. In addition, BerryDunn performed independent background research and a review of relevant project documents provided by PRDoH and other stakeholders. With this information, BerryDunn documented the Commonwealth's current health IT/HIE-related environment, helped define the future environment, identified gaps between the current and desired future environment, and made recommendations accordingly.

Findings

As a result of the assessment, BerryDunn identified 17 gaps across five assessment areas, as summarized in Table ES1.

Table ES1: Summary of Gaps

Assessment Area	Number of Gaps
Governance/Operations	4
Technology	7
Finance	2

[1] Source: http://www.lexjuris.com/lexlex/Leyes2012/lexl2012040.htm

Assessment Area	Number of Gaps
Policy/Legal	3
Stakeholder Readiness	1
Total	**17**

Recommendations

Based on the gaps identified, BerryDunn developed 14 recommendations for consideration by PRDoH as it moves forward with health IT/HIE planning and implementation efforts, as summarized in Table ES2. BerryDunn categorized recommendations as Foundational or Secondary[2] and listed them in the order of the primary gaps[3] they address.

Table ES2: Summary of Health IT/HIE Planning and Implementation Recommendations

#	Recommendation Description	Primary Assessment Area Gaps Addressed	Priority
1	Implement an effective governance structure for the PRHIN, inclusive of the Board and supporting Committees	Governance/Operations	Foundational
2	Establish an Advisory Council	Governance/Operations Stakeholder Readiness	Foundational
3	Leverage the PRHIN governance structure to prioritize future health IT/HIE capabilities	Governance/Operations Technology	Secondary
4	Develop and implement an organizational structure and staffing plan for the PRHIN	Governance/Operations	Foundational
5	Develop and periodically update a health IT/HIE roadmap with prioritized initiatives and a plan to help PRHIN achieve its health IT/HIE vision, goals, and objectives	Governance/Operations Technology Finance	Foundational
6	Evaluate and address potential barriers to gathering patient-generated data and to patients using the PRHIN's patient portal, and implement solutions to support use of the data	Technology	Secondary
7	Conduct a comprehensive survey of EHR deployment status in Puerto Rico, and deploy a strategy to expand use of EHRs meeting the 2015 Edition of CEHRT	Technology	Foundational

[2] Section 7 provides descriptions of the Foundational and Intermediate.
[3] Gaps are described Section 6.2.

#	Recommendation Description	Primary Assessment Area Gaps Addressed	Priority
8	Evaluate PRDoH's public health registry and electronic lab reporting technologies to determine readiness to exchange health information, and develop a strategy to support exchange	Technology	Secondary
9	Complete development of an HIE Solution Planning Document and Technical Architecture Document, and assess the alignment of proposed solutions with the ONC-recommended health IT modular components	Technology	Foundational
10	Develop a 5-year implementation and operational budget and a funding strategy to help ensure sustainability of the HIE	Finance	Foundational
11	Develop outcomes-based metrics for the PRHIE	Finance Technology	Foundational
12	Develop policies for patients' meaningful consent for health information exchange	Policy/Legal Stakeholder Readiness	Foundational
13	Develop viable participation strategies to help ensure utilization of the PRHIE	Policy/Legal	Secondary
14	Assess Puerto Rico's Law 40 of 2012 and develop proposed changes, as needed, to help ensure the law reflects the current health IT/HIE landscape and PRHIN's needs	Policy/Legal	Foundational

Next Steps

BerryDunn will facilitate decision-making with PRDoH to prioritize the final report recommendations and develop a health IT/HIE roadmap—inclusive of timelines, owners, actions, funding strategies, and performance measures—to implement the recommendations.

The identified gaps and the resulting recommendations will inform PRDoH funding requests to the Centers for Medicare and Medicaid Services (CMS) in an Implementation Advance Planning Document Update (IAPD-U) in June 2020, with additional updates anticipated in an IAPD-U in September 2020. In addition, PRDoH and BerryDunn will incorporate information from the assessment and roadmap into Medicaid Information Technology Architecture (MITA) State Self-Assessment (SS-A) efforts to help ensure alignment with PRDoH's overall Medicaid Enterprise System (MES) strategy.

2 Introduction

2.1 Project Background

The Commonwealth has made many programmatic, technological, and financial investments in the last several years to improve the health and well-being of the Puerto Ricans it serves, and to improve program oversight to help ensure accountability and strengthen the trust of the public and federal partners. Recent examples include modernization of the Puerto Rico Medicaid Program's (PRMP's) Medicaid Management Information System (MMIS), and current efforts to implement an enhanced Medicaid eligibility determination and enrollment (E&E) solution.

> "Health IT is a foundational component of healthcare in the United States and is critical to improving our health system. It has moved from being one tool in the healthcare toolbox to an integral component of healthcare delivery."
>
> ***Office of the National Coordinator for Health IT,*** *2020-2025 Federal Health IT Strategic Plan*

Looking to the future of healthcare delivery and payment in Puerto Rico, the Commonwealth seeks to build on its previous successes and learn from its past challenges to plan for and implement robust health IT/HIE infrastructure and capabilities on the island. Enhanced health IT/HIE infrastructure and capabilities will support ongoing improvement to the quality, safety, and efficiency of healthcare delivery in Puerto Rico and provide additional benefits to patients, providers, and other key stakeholders across the Commonwealth.

To help drive these efforts, in July 2019 the Commonwealth reestablished the Puerto Rico Electronic Health Information Network Corporation (PRHIN), which was originally created in law by Puerto Rico's Law 40 of 2012[4] and operated through funds from the American Recovery and Reinvestment Act (ARRA) assigned to Puerto Rico by the Office of the National Coordinator (ONC) for Health IT. According to the law, PRHIN was established as a nonprofit corporation to serve as the SDE and to develop and implement plans for the exchange of health data across Puerto Rico's healthcare ecosystem through operation of the Commonwealth's HIE, also referred to as the PRHIE.

In addition, in April 2020 PRDoH engaged BerryDunn—a health IT consultant—to lead several planning activities, including performing a health IT assessment, developing a health IT/HIE roadmap, integrating the health IT assessment information into Puerto Rico's MITA SS-A, and providing updates to PRDoH's Advance Planning Document (APD).

[4] Source: http://www.lexjuris.com/lexlex/Leyes2012/lexl2012040.htm

2.2 Report Purpose

The primary purpose of this Health IT Assessment Report is to document the current and desired future health IT/HIE environment, identify the gaps between the two, and provide recommendations for how PRHIN may close the gaps and achieve its vision for the future—in alignment with its MES initiatives. PRHIN will use the results of this assessment to inform its short- and long-term health IT/HIE strategy and support funding requests to federal partners and within the Commonwealth.

2.3 Key Definitions

For the purposes of this report, health IT and health information exchange are defined as follows:

Health Information Technology (Health IT) –

The application of information processing involving both computer hardware and software that deals with the storage, retrieval, sharing, and use of healthcare information, data, and knowledge for communication and decision making[5].

Health IT supports the *exchange* of health information, and is inclusive of *health information exchange* technology.

Health Information Exchange– Health information exchange encompasses two related concepts:

- Verb: The appropriate and confidential electronic exchange of clinical information among authorized organizations (generally spelled out as "health information exchange" in this report).
- Noun: An organization with agreed-upon operational and business rules that provides services to enable the electronic and secure sharing of health-related information[6] (generally referred to as "HIE" in this report).

Definitions for additional terms commonly used throughout the report include:

- PRHIN (Puerto Rico Electronic Health Information Network Corporation): the nonprofit independent corporation responsible for administration of the HIE in Puerto Rico based on Puerto Rico Law 40 of 2012
- PRHIE (Puerto Rico Health Information Exchange): the technology and supporting processes administered by PRHIN to support health information exchange in Puerto Rico
- PRMP (Puerto Rico Medicaid Program): the designated State Medicaid Agency responsible for operation of Puerto Rico's Medicaid program, including providing

[5] Source: https://www.healthit.gov/topic/health-it-basics/glossary
[6] Source: https://www.healthit.gov/faq/what-health-information-exchange

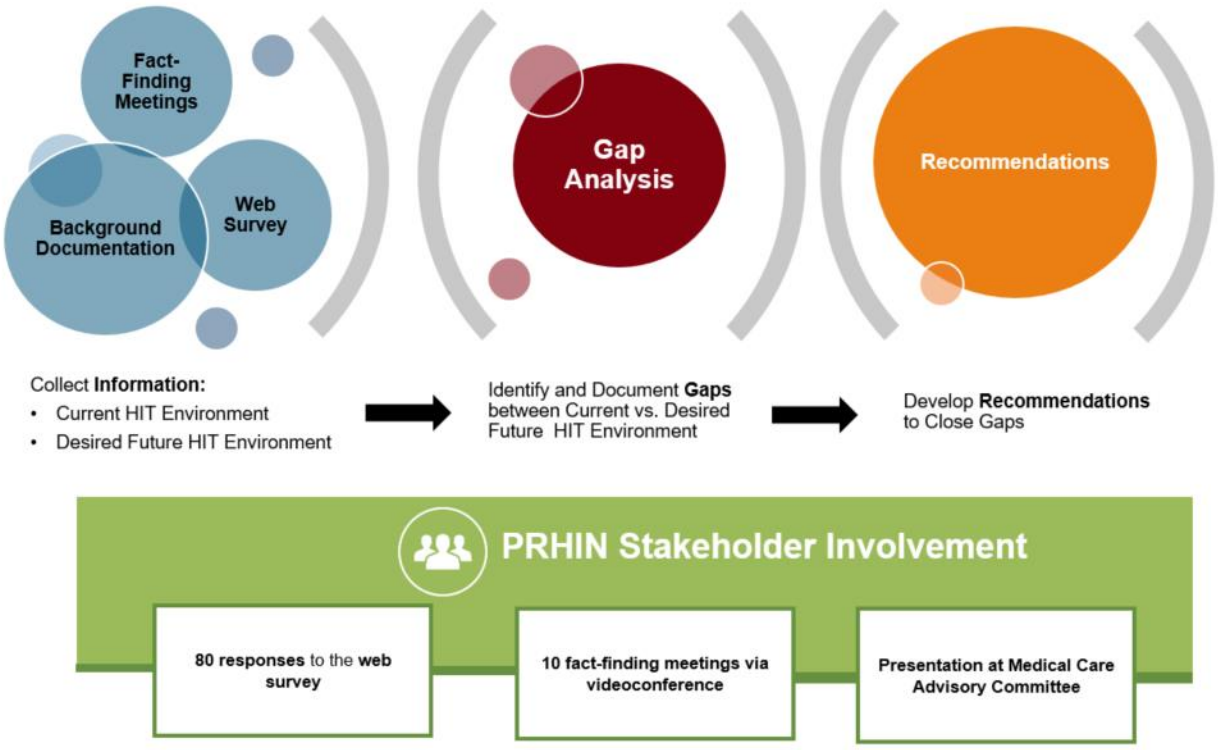
oversight for the Medicaid Program to Promote Interoperability of Puerto Rico (MPPIPR) and other health IT planning activities under the Health Information Technology for Economic and Clinical Health (HITECH) Act

- PRDoH (Puerto Rico Department of Health): the Cabinet-level agency under which PRMP and other public health and health-related programs (e.g., epidemiology, immunization registry, vital statistics) fall; per Puerto Rico Law 40 of 2012, the Secretary of Health is an ex officio member of the PRHIN Board, or instead may be replaced with Puerto Rico's Health IT Coordinator

2.4 Work Performed

To inform the Health IT Assessment Report, from April to June 2020, BerryDunn performed the key activities depicted in Figure 1 in collaboration with PRDoH.

Figure 1: Work Performed for Health IT Assessment Report



2.5 Project Influences

Assumptions are premises about the business, policy, technical, and/or other factors in the project environment that, for the sake of the project, are taken as fact. Constraints are known facts over which there is limited or no control. Constraints can affect the scope, direction, planning, and implementation of a project, as well as the format and content of a report.

2.5.1 Assumptions

The following assumptions influenced the development of this report:

- The Health IT Assessment Report is intended to serve as an initial foundation for PRHIN to build upon as it moves forward with health IT/HIE activities. As additional information is obtained about the current and desired future environment, BerryDunn will iteratively update the Health IT Assessment Report and reflect the most current information in subsequent project documents, such as the health IT/HIE roadmap.
- PRHIN is in its formative stages after being recently reestablished in July 2019. As a result, as PRHIN matures and expands its efforts to engage stakeholders in health IT planning and implementation efforts, BerryDunn expects information in this report—such as the vision, future state goals, and objectives for health IT/HIE efforts—to also evolve.
- Although BerryDunn attempted to identify and document the health IT/HIE infrastructure and capabilities in Puerto Rico as thoroughly as possible given the constraints described in Section 2.5.2, performing a comprehensive inventory of the health IT/HIE infrastructure and capabilities in Puerto Rico was not within BerryDunn's scope of work. The health IT/HIE infrastructure and capabilities provided in this report should not be viewed as an exhaustive catalogue; rather, they are intended to provide general direction to PRDoH's overall strategy and its future investments in health IT/HIE. Should PRHIN determine that a more comprehensive inventory of health IT/HIE infrastructure and capabilities across the island is necessary, a multi-method (e.g., phone calls, in-person meetings, paper surveys, and web surveys), multi-touch approach over a longer project timeline may be required.
- Information provided by PRDoH stakeholders about existing technologies and capabilities is accurate and current. Although BerryDunn attempted to validate information provided through means such as review of documentation and follow-up meetings, BerryDunn did not validate the accuracy of all information firsthand (e.g., through direct observation and analysis of technology and processes).

2.5.2 Constraints

The following constraints influenced the development of this deliverable:

- PRDoH and BerryDunn strove to include a comprehensive group of project stakeholders[7] in information-gathering activities, such as meetings and web surveys. However, stakeholder responsiveness and participation was limited due to competing

[7] BerryDunn did not attempt outreach to payers, including managed care organizations (MCOs), at the request of the Health IT Coordinator as the Health IT Coordinator indicated outreach efforts were occurring through the local CMS office. BerryDunn also did not include Administracion de Seguros de Salud (ASES) in outreach efforts as the Health IT Coordinator determined the agency was not a key stakeholder in the health IT assessment.

stakeholder priorities—such as the COVID-19 outbreak. In addition, due to travel restrictions arising from the COVID-19 outbreak, BerryDunn was unable to hold in-person focus groups and other meetings with key stakeholders across the island. Details regarding stakeholder engagement and participation can be found in Appendix B: Project Participants and Meetings.

- The project timeline was compressed for reasons including contractual delays and lack of project leadership availability early in the project due to a focus on other critical priorities such as the COVID-19 outbreak. In addition, PRDoH desired completion of the assessment by mid- to late June 2020 to inform its request for health IT funding from the CMS for Federal Fiscal Year (FFY) 2021. As a result, information-gathering activities were constrained by the timeline in terms of the number of stakeholders from whom BerryDunn was able to seek input, as well as the number of attempts BerryDunn was able to make to non-responsive stakeholders.
- To help close information gaps, BerryDunn attempted to gather and review existing background documentation developed by entities such as PRHIN (between 2012 and 2017), PRMP, previous health IT consultants engaged by PRDoH, and independent non-governmental organizations and academic institutions. However, for reasons including staffing transitions and natural disasters such as Hurricanes Irma and Maria, the availability of background documentation to inform the assessment was limited, and some of the information that was available was determined to be obsolete and/or possibly inaccurate due to changes in the environment.
- This is a point-in-time analysis and is based upon information provided to BerryDunn up to June 12, 2020. Due to the dynamic nature of the environment in Puerto Rico, BerryDunn expects that the status of the content in this report may change between the time stakeholders provided the information and the time BerryDunn submitted the report.

2.6 Report Format

This report includes nine major sections and five supporting appendices, as follows:

- Section 1 (Executive Summary) provides an overview of key information from other report sections.
- Section 2 (Introduction) provides details on the project background, report purpose, work performed to develop the report, project influences—including assumptions and constraints, and the report format.
- Section 3 (Key Stakeholders) provides an overview of important stakeholders in Puerto Rico who have a vested interest in the success of health IT/HIE efforts.
- Section 4 (Desired Future Environment) provides information on PRDoH's target health IT environment, including alignment with the Medicaid program's vision and goals.

- Section 5 (Current Environment) provides information on the current environment in several assessment areas, including governance/operations, technology, finance, policy/legal, and stakeholder readiness.
- Section 6 (Gap Analysis) presents gaps across the identified assessment areas.
- Section 7 (Recommendations) provides several recommendations to address the gaps identified in Section 6: Gap Analysis.
- Section 8 (Other Considerations) includes additional opportunities that PRDoH should consider as it proceeds with health IT planning and implementation efforts.
- Section 9 (Next Steps) provides next steps based upon PRDoH's needs to keep health IT planning and implementation efforts moving forward, as articulated in the project work plan and associated tasks and project artifacts.
- The related appendices provide supporting details pertaining to the report, including:
    - Appendix A (Glossary of Acronyms) lists the acronyms used throughout this report.
    - Appendix B (Project Participants and Meetings) provides a list of the PRDoH project stakeholders who participated in meetings and who were sent web surveys, as well as organizations that were sent requests for meetings but that did not respond.
    - Appendix C (Information Sources) includes information sources that BerryDunn referenced to gather information for this document.
    - Appendix D (HISMM Dimensions Maturity Sheet) includes a worksheet provided by the federal ONC for Health IT to assess the maturity of health IT using several technical, people and process, and governance dimensions.
    - Appendix E (Detailed Survey Results) includes the results of the web survey issued to stakeholders in June 2020.

3 Key Stakeholders

As in any healthcare ecosystem, numerous important stakeholders within Puerto Rico have a vested interest in the success of the Commonwealth's health IT/HIE efforts. Healthcare services on the island are paid for by both public and private health insurers, and are provided by a mix of urban and rural hospitals, Primary Health Centers[8], primary care and specialty providers, laboratories, pharmacies, diagnostic imaging providers, and other healthcare providers. At the center of the healthcare environment is the patient.

To the extent available, high-level information for each stakeholder group is provided in the following subsections.

3.1 Patients/Consumers

The population of Puerto Rico is estimated to be approximately 3.2 million individuals, with approximately 21% of the population being over 65 years old, and 19% of the population being under 18 years old[9]. As of December 2018, approximately 1,154,350 individuals were enrolled in Medicaid, and an additional 85,004 individuals were enrolled in the Children's Health Insurance Program (CHIP)—or approximately 40% of the population[10].

3.2 Commonwealth of Puerto Rico

3.2.1 Puerto Rico Health Information Network

PRHIN was originally created in February 2012 by Puerto Rico Law PR 40 to comply with a federal provision to improve health services. PRHIN subsequently operated from 2012 – 2017 through an allocation of approximately $7.8 million of funds from the ARRA assigned to Puerto Rico by the ONC of Health IT. During these formative years, PRHIN experienced several implementation and sustainability challenges, leading to internal evaluations by the Commonwealth in late 2017 that resulted in a withdrawal of funds to support key health IT activities.

After that time, PRHIN's activities were stalled until July 2019, when the Commonwealth reestablished PRHIN through CMS' support and approval of funding in a Health IT IAPD-U. Although PRHIN is governed independently from PRDoH and the Medicaid program, PRDoH and PRHIN collaborated on early health IT planning efforts, and the entities plan to continue their strong partnership moving forward to coordinate strategic decisions regarding the Medicaid and health IT enterprise. In the future, PRHIN will play a central role in coordinating

[8] Also referred to as Federally Qualified Health Centers, or FQHCs.
[9] Source: https://www.census.gov/quickfacts/PR
[10] Source: https://www.macpac.gov/wp-content/uploads/2019/07/Medicaid-and-CHIP-in-Puerto-Rico.pdf

Commonwealth health IT efforts, leveraging funding opportunities, and helping to ensure that all Puerto Ricans can benefit from health IT-optimized care.

3.2.2 Puerto Rico Department of Health

PRDoH is comprised of approximately 11 offices that provide a variety of services to "promote and preserve health as an essential condition in humans to enjoy from physical, emotional, and social wellness, and thus contribute to the society with their productive and creative effort" [11]. PRDoH operates public health registries and disease surveillance programs including epidemiology, immunizations, and vital records, as well as a public health laboratory. It is also the agency that oversees PRMP.

Additional information related to several PRDoH Divisions/entities relevant to the PRHIE include:

- **PRMP:** PRMP is the Single State Agency (SSA) for administering the State Medicaid Plan. From an organizational standpoint, the Medicaid Enterprise is comprised of two agencies, PRDoH and Administración de Seguros de Salud de Puerto Rico (ASES), also called the Puerto Rico Health Insurance Administration (PRHIA). ASES is an independent instrumentality of the Government of Puerto Rico and is not a part of any other agency. ASES is responsible for selecting the managed care organizations (MCOs) and managing their contracts. The Medicaid program, currently known as Vital, was established in 1993 and privatized much of the formerly publicly financed healthcare system. The Medicaid program now operates as a capitated system through contracted MCOs.
- **Office of Family Health and Integrated Services (Immunization Division):** The main objective of the Immunization Division—which is part of the Office of Family Health and Integrated Services—is to prevent the emergence of cases of diseases for which vaccines are available (e.g., common measles, mumps, polio, influenza). The Division supplies vaccines to the population eligible for Medicaid, audits the program, and provides education to parents. The Division also supports the immunization registry, which captures information on vaccines administered in Puerto Rico.
- **Office of Environmental Health and Public Health Laboratory:** PRDoH operates the Public Health Laboratories, which are responsible for testing, surveillance monitoring, and reporting of various diseases and conditions, both human and animal. Public health laboratories receive specimens for testing from providers, report results, track the data on reportable conditions, and send reports to the Centers for Disease Control and Prevention (CDC). The Public Health Laboratory system consists of four facilities across the island, and each location houses between one and eight individual laboratories

[11] Source: http://www.salud.gov.pr/

responsible for pathogen surveillance and diagnosis, environmental water testing, and milk testing. The central laboratory in San Juan provides support to the three regional facilities[12].

- **Office of Epidemiology and Research:** The Office of Epidemiology and Research is responsible for developing and maintaining surveillance systems to measure the impact of diseases and conditions on the health of the inhabitants of Puerto Rico, as well as developing the capacity and infrastructure necessary to respond to and control outbreaks or events that threaten the health of the inhabitants of Puerto Rico.

3.2.3 Mental Health and Anti-Addiction Services Administration

The Mental Health and Anti-Addiction Services Administration (ASSMCA) is a Puerto Rico-based government agency associated with the United States (U.S.) Department of Health and Human Services (DHHS) Substance Abuse and Mental Health Services Administration. ASSMCA evaluates, monitors, and certifies that the services offered in public and private agencies and organizations licensed by ASSMCA for the prevention, treatment, and rehabilitation of people with mental health problems, addictive disorders, or substance dependence meet the highest quality standards[13].

In 2017, ASSMCA was tasked with creation of the Controlled Medication Prescription Monitoring Program through Act No. 70-2017. The Act sought to create an electronic monitoring system to help ensure that controlled medications are dispensed only to appropriate persons by authorized dispensers, helping to combat prescription drug abuse. The Act was effective immediately, although ASSMCA had six months to organize and establish the program.

3.2.4 Puerto Rico Department of Public Safety

The Puerto Rico Medical Emergencies Corps Bureau (Negociado del Cuerpo de Emergencias Médicas de Puerto Rico, or NCEMPR) is a bureau under the Puerto Rico Department of Public Safety. NCEMPR responds to fire, police, and medical emergencies on the island. NCEMPR provides ambulance services as well as emergency medical response services. The corps employs a number of paramedics, but emergency services are supplemented by other volunteer groups[14].

3.3 Community Healthcare Providers

3.3.1 Hospitals

Puerto Rico currently has approximately 63 hospital facilities[15], including public hospitals, for profit and nonprofit private hospitals, children's hospitals, an academic medical center, and a

[12] Source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6586791/
[13] Source: http://www.assmca.pr.gov/Pages/default.aspx
[14] Source: www.cempr.gov
[15] Source: http://www.pridco.com/

Level 1 trauma center in San Juan. In addition, the Hospital Association (Asociación de Hospitales de Puerto Rico, or AHPR) is an active voice for hospitals on the island, advocating for hospitals at the federal and territory level.

In partnership with M.D. Anderson, the University of Puerto Rico also operates a Comprehensive Cancer Center (CCC), reportedly the first of its kind in the U.S. to focus on the development of cancer treatments for the Hispanic population. The CCC operates the Puerto Rico Cancer Registry.

3.3.2 Primary Health Centers/Federally Qualified Health Centers

Puerto Rico's Primary Health Centers are community-based, nonprofit corporations that play a vital role in providing access to primary and preventive healthcare, particularly in poor and underserved areas. The principal Primary Health Centers are federally qualified health centers, or FQHCs. They are also called "Centros 330" (330 Centers) in Puerto Rico based on their funding source—grants from Section 330 of the Public Health Services Act (PHSA), administered under the Health Resources and Services Administration (HRSA). These are supported by additional Primary Health Centers that may qualify as "FQHC Look-Alikes", which receive Medicaid reimbursement and some HRSA project funding, but are not eligible for Section 330 grants. FQHCs are designed to provide affordable, accessible, and high-quality primary healthcare regardless of ability to pay. Twenty-two organizations receive federal funds from Section 330 and deliver services to more than 392,000 individuals Puerto Ricans in over 85 facilities, four schools, and 10 mobile units. One source indicates that there are approximately 420 physicians in the Primary Health Center network, although BerryDunn was unable to independently verify this number.

All Primary Health Centers receiving Section 330 funds are also part of the Puerto Rico Primary Health Association, Inc. (ASPPR), a nonprofit organization that receives federal funds to provide technical assistance, training, and support to the organizations. ASPPR also includes the Puerto Rico Primary Care Association Network (PRPCAN), the chosen name for the Health Center Controlled Network (HCCN) funded by HRSA to increase the use of information technology to support value-based care. PRPCAN works alongside Primary Health Centers to address operational and clinical challenges related to the use of health IT[16].

3.3.3 Independent Physicians

Puerto Rico's healthcare system is supported by a wide variety of healthcare professionals, with physicians as the backbone of the healthcare network. Estimates from 2018 indicate that Puerto Rico has about 9,787 active physicians, of which 3,857 are primary care physicians[17] and about 7,000 are Medicaid providers. The Commonwealth also authorized licensure of physician

[16] Source: https://saludprimariapr.org/web/centros-de-salud/#graf
[17] Source: https://www.aamc.org/system/files/2019-12/state-physician-Puerto_Rico-2019%5B1%5D.pdf

assistants in 2019, although BerryDunn was unable to identify a source for the approximate number of physician assistants in Puerto Rico. As of 2017, there were reported to be approximately 1,200 practicing dentists in Puerto Rico[18].

Physicians in Puerto Rico are represented by professional associations, including the Independent Practice Associations of Puerto Rico (IPAPR), an organization—through 23 partner IPAS—that brings together over 1,850 primary physicians who care for more than one million patients throughout Puerto Rico[19].

In addition, the Puerto Rico College of Physicians and Surgeons is a mandatory membership organization statutorily-created by Puerto Rico Law 77-1994 that represents all of Puerto Rico's licensed physicians, and the College of Dental Surgeons of Puerto Rico is an organization statutorily-created by Puerto Rico Law Number 162 that represents dentists on the island.

3.3.4 Long-Term Care and Home- and Community-Based Service Providers

Reliable publicly available information on long-term care (LTC)[20] and home- and community-based service (HCBS) providers in Puerto Rico is limited. As these providers are an important part of the healthcare provider community and fulfill a vital need for patients, exchange of health information with them is important to achieving the vision and goals for the PRHIE. Future health IT/HIE planning efforts should attempt to gather additional information about the current state of these provider groups.

3.3.5 Behavioral Health Providers

Reliable publicly available information on behavioral health providers in Puerto Rico is limited. As these providers are an important part of the healthcare provider community and fulfill a vital need for patients, exchange of health information with them is important to achieving the vision and goals for the PRHIE. Future health IT/HIE planning efforts should attempt to gather additional information about the current state of this provider group.

3.4 Reference Laboratories

Several reference laboratory companies with over 930 clinical laboratories[21] are reported to exist on the island, including but not limited to SAIL, BioNuclear, Syndeo, Tekpro, Quest Diagnostics, and Immuno.

[18] Source: https://www.ada.org/en/publications/ada-news/2017-archive/october/ada-ada-foundation-mobilize-to-help-puerto-ricos-dentists#:~:text=Rios%20placed%20the%20number%20of,million%20residents%20of%20Puerto%20Rico
[19] Source: https://www.tuipapr.com/pages/sobre-nosotros
[20] Puerto Rico does not provide coverage for nursing homes under the Medicaid program.
[21] Source: http://ptnet.salud.gov.pr

3.5 Pharmacies

Pharmacies in Puerto Rico are dominated by pharmacy chains, such as Walgreens, Walmart and CVS. The island's largest pharmacy benefits manager (PBM), MC-21, covers more than 900 retail outlets.

3.6 Diagnostic Imaging Facilities

Reliable publicly available information on independent diagnostic imaging facilities in Puerto Rico is limited[22]. As these providers are an important part of the healthcare provider community and fulfill a vital need for patients, exchange of health information with them is important to achieving the vision and goals for the PRHIE. Future health IT/HIE planning efforts should attempt to gather additional information about the current state of this provider group.

3.7 Payers

3.7.1 Medicaid Managed Care Organizations

PRMP delivers its healthcare services through competitively selected MCOs that provide acute, primary, specialty, and behavioral health services territory-wide. The MCOs are paid using risk-based capitated payments. MCOs contract with primary medical groups, which in turn create preferred provider networks. Enrollees may choose their MCOs and make changes once per year during an open enrollment period.[23] MCOs are responsible for administration of the plans, including claims processing.

Five MCOs currently support the Puerto Rico Medicaid program:[24]

- **First Medical Health Plan Inc.** is a third-party administrator that offers health services networks via contracts with a range of health providers to companies and government agencies.
- **MMM (Medicare y Mucho Más) Multihealth** (a subsidiary of MMM Holdings, LLC) is a third-party administrator that provides service networks for Medicaid and Medicare programs. In Puerto Rico, MMM Multihealth offers Medicaid and Medicare services in the northeast and southeast geographic regions of the island.
- **Plan de Salud Menonita (PSM)** is part of the Mennonite Health System (MHS) (Sistema **de** Salud Menonita), offering health services to the Puerto Rican community, with a wide network of providers and facilities. MHS is a not-for-profit, faith-based, membership organization.

[22] Sociedad Radiológica de Puerto Rico y American College of Radiology lists 54 members on their website
[23] Source: https://www.macpac.gov/wp-content/uploads/2019/07/Medicaid-and-CHIP-in-Puerto-Rico.pdf
[24] Source: https://www.asespr.org/proveedores-2/contratos/

- **Molina Healthcare** provides managed healthcare services under the Medicaid and Medicare programs. Molina currently serves the entire island.
- **Triple-S, Inc. (Blue Cross Blue Shield)** is the largest health insurance company in Puerto Rico and is an independent licensee of the BlueCross BlueShield Association whose service area is Puerto Rico. Triple-S Salud offers both Medicaid and Medicare services.

3.7.2 Other Payers

Puerto Rico is served by a number of other companies that offer health insurance, from large national corporations to Puerto-Rico based firms. Other payers include, but are not limited to:

- **Medical Card Systems** (MCS) offers corporate and individual healthcare plans for students, families, and self-employed individuals in Puerto Rico. MCS is a Health Maintenance Organization (HMO) that serves Medicare beneficiaries, and currently serves more than 370,000 members throughout Puerto Rico.
- **Humana** is a full-service benefits solutions company, offering a wide array of health, pharmacy and supplemental benefit plans for employer groups, government programs and individuals. Humana Insurance of Puerto Rico, Inc. offers health, dental, and vision insurance plans and services.
- **Mapfre** is a Puerto Rico-based insurance group that covers property, casualty, life and health insurance.
- **Cigna** is a national insurance company that provides various group health insurance plans, ranging from Preferred Provider Organizations (PPOs), HMOs, health savings accounts, and other plans through a varied healthcare network.

4 Desired Future Environment

4.1 Vision[25]

PRDoH's vision for the health IT/HIE program aligns with the ONC's federal health IT vision[26]:

> "…a health system that uses information to engage individuals, lower costs, deliver high quality care, and improve individual and population health."

At the center of PRDoH's vision are well-informed healthcare consumers who:

- Have easy access to their complete healthcare information wherever they go
- Are able to securely share their health information with healthcare providers and others within their care network according to their goals, values, and cultural and privacy preferences
- Are able to use the information, in collaboration with healthcare providers, to improve the safety and quality of healthcare they receive and their healthcare outcomes

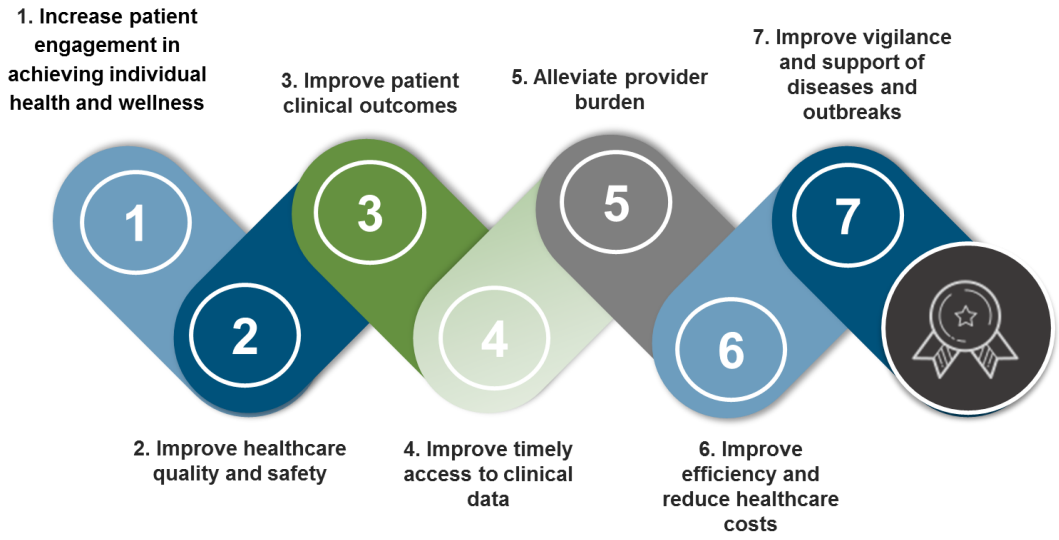
As part of its ongoing planning and implementation efforts, PRDoH intends to expand upon this initial vision to create a health IT program that is sustainable and supports service and data integration across the Medicaid and health IT enterprise.

[25] Sources: PRDoH Health IT IAPD-U , February, 2020; PRHIE Planning Project Kickoff, April 2, 2020; Meetings with PRHIN HIT Coordinator in April 2020
[26] Source: Draft 2020-2025 Federal Health IT Strategic Plan, ONC for Health IT, January 2020

4.2 Goals and Objectives[27]

Figure 2 provides an overview of PRHIN's initial goals for the PRHIE.

Figure 2: PRHIN's Goals



To help achieve these *programmatic* goals, PRHIN's objectives include:

- Creating longitudinal health records with quality health information that can be securely accessed by patients and healthcare teams regardless of service location
- Providing secure access to health information to patients and healthcare teams for individuals displaced due to natural or man-made disasters
- Increasing secure access to health information for healthcare providers using telemedicine
- Increasing tele-monitoring of chronic conditions, such as diabetes, hypertension, and asthma
- Providing supporting tools, such as Artificial Intelligence (AI) and Machine Learning (ML)

Section 5.2.2.1 provides specific *technology* goals that support achievement of these programmatic goals and objectives.

4.3 Priority Health IT Capabilities

Using the ONC's Health Information Sharing Maturity Model (HISMM) as a framework, PRHIN identified nine capabilities as a top priority for the initial implementation of the health IT program. Table 1 lists the capabilities, along with the health IT goals (defined in Section 4.2) the capabilities support.

[27] Sources: PRDoH Health IT IAPD-U , February, 2020; PRHIE Planning Project Kickoff, April 2, 2020; Meetings with PRHIN HIT Coordinator in April 2020

Table 1: Priority Health IT Capabilities

ID	Capability Name	Capability Description[28]	Health IT Goals Supported
Patient Engagement			
HC1	Patient-Generated Health Data	Share patient-generated health data from a patient or caregiver via medical or mobile device; patient-generated health data may include health history, treatment history, biometric data, symptoms, and lifestyle choices	1, 2, 3, 4, 5, 6
HC2	Patient Portal Information	Share information captured in third-party operated patient portals with providers, healthcare systems, and patients	1, 2, 3, 4, 5, 6
Clinical			
HC3	Admission/ Discharge/ Transfer (ADT) Events /Encounter Alerting	Real-time electronic notifications that alert primary care providers and care coordinators about healthcare encounters (e.g., when patients are admitted, discharged, and transferred to/from a hospital) using ADT messages in order to assist with follow-up care coordination	2, 3, 4, 5, 6
HC4	Care Plans	Communicate actions (such as provider actions, instructions for patient or family) for the care team to undertake specific to the patient's clinical needs based on recommendations from a decision support engine or as part of a consult report and active plan; enables care coordination, including responsibilities, actions, timing, and desired outcomes	1, 2, 3, 4, 5, 6
HC5	Health Record	*Provider:* view the patient health record for any purpose that involves a transition of care, enabling care coordination *Patient:* receive aggregated health information (such as, medications, immunizations, allergies, problems, lab results, and radiology results; must include a clinical care document (CCD) as specified by the 2015 Edition Health IT Certification Criteria or the United States Core Data for Interoperability [USCDI]), allowing patients to view and manage their health record	1, 2, 3, 4, 5, 6
HC6	Prescription Monitoring	Mandated sharing when prescribing controlled substances, generally through a Prescription Drug Monitoring Program (PDMP)	2, 3, 4, 5, 6
Public Health			
HC7	Disease and Public Health Registry Information	Share disease and public health data for monitoring required by state and federal law; report data to agencies and public health authorities	4, 7

[28] Source: Health Information Sharing Maturity Model, G. Hamilton and T. Novak, March 8, 2018

ID	Capability Name	Capability Description[28]	Health IT Goals Supported
HC8	Immunization Registry	Share and view patient immunization history in public health registries, allowing for aggregation of health immunization data	4, 7
Master Patient Index (MPI)			
HC9	Patient Identifiers	Locate patient based on demographic or assigned numeric identifier	1, 2, 3, 4, 5, 6, 7

4.4 Alignment with the Medicaid Enterprise

4.4.1 PRMP Vision and Goals

PRHIN's vision, goals, objectives, and prioritized health IT capabilities directly support the Medicaid Enterprise's vision and goals. PRMP's vision[29] for the Medicaid Enterprise includes, but is not limited to:

- Transforming PRMP into an integrated and information-driven agency
- Improving program oversight
- Leveraging technology advancements to improve healthcare outcomes for citizens
- Increasing credibility of the Medicaid program office within the Commonwealth and with CMS

In alignment with this vision, PRMP maintains goals to enhance data quality and improve data integration across the Medicaid Enterprise. Specifically, PRMP goals that the PRHIE will support include:

- Improving the quality of—and strengthening the trust in—data across the Medicaid and health IT enterprise by:
    - Establishing interfaces for data verification (MMIS and E&E)
    - Complying with Medicaid Promoting Interoperability Programs (PIP) requirements
    - Aligning with standards described in the Interoperability Standards Advisory published by the ONC for Health IT
    - Complying with federal reporting (i.e., CMS-64 and CMS-37)
- Improving data integration and providing tools and training-related support for PRDoH staff, healthcare providers, and Medicaid members to further understand and analyze data from across the enterprise

[29] Source: PRMP MMIS and E&E Medicaid Update (MS PowerPoint Presentation), January 2020

In addition, PRDoH envisions that the PRHIE will promote interoperability and help Medicaid providers (i.e., eligible professionals [EPs] and eligible hospitals [EHs]) achieve Meaningful Use (MU) Stage 3 by accelerating coordination of care and providing the necessary tools for providers to comply with federal requirements. PRDoH will focus on advancing data collection among Puerto Rico's Medicaid providers and, eventually, on improving interoperability across all healthcare providers and other entities, as appropriate. This data exchange will improve Medicaid member and provider access to secure, timely, accurate clinical data; improve the coordination of care; and facilitate public health reporting within Puerto Rico and with national registries.

4.4.2 MITA Standards and Conditions

The PRHIE is necessary to support the most critical health information-sharing capabilities needed across the Commonwealth. PRDoH understands and is aligned with CMS' MITA Standards and Conditions as it relates to the PRHIE. Table 2 outlines alignment with each standard and condition.

Table 2: PRDoH Alignment with MITA Standards and Conditions

CMS Standard/Condition	Standard/Condition Description[30]	PRHIE Alignment
Modularity	• A modular, flexible approach to systems development, including the use of open interfaces and exposed APIs • The separation of standardized business rule definitions from core programming • The availability of standardize business rule definitions in both human and machine-readable formats • The commitment to formal system development methodology and open, reusable system architecture	✓
MITA Alignment	States align to and advance increasingly in MITA maturity for business, architecture, and data. • Conducting MITA Self Assessments • Developing MITA Roadmaps • Developing Concept of Operations (COO)	✓
Industry Standards	Solutions should be in alignment with, and incorporate, industry standards including: • Health Insurance Portability and Accountability Act of 1996 (HIPAA) security, privacy, and transaction standards • Accessibility standards established under section	✓

[30] Source: CMS State Self-Assessment Appendix A – Seven Standards and Conditions

CMS Standard/Condition	Standard/Condition Description[30]	PRHIE Alignment
	508 of the Rehabilitation Act, or standards that provide greater accessibility for individuals with disabilities	
Leverage	Solutions should promote sharing, leverage, and reuse of technologies and systems within and among States. Activity includes the following: • Multi-state efforts • Availability for reuse • Identification of open-source, cloud-based, and commercial products • Customization • Transition and retirement plans	✓
Business Results	Solutions should support accurate and timely processing of information. Activity includes: • Degree of automation • Customer service • Performance standards and testing	✓
Reporting	Solutions should produce transaction data, reports, and performance information that contributes to program evaluation, continuous improvement in business operations, transparency, and accountability. Activity includes: • Accurate data • Interfaces with designated repositories or hubs • Automatic generation of reports • Audit trails	✓
Interoperability	Solutions must help ensure seamless coordination and integration with and allow for interoperability with public health agencies, human services programs, and community organizations providing services.	✓

4.4.3 MITA Business Areas and Processes

MITA business areas and processes directly impacted by the health IT capabilities PRDoH identified as a top priority for the initial implementation are provided in Table 3, although other business areas and processes may also be partially impacted. As PRDoH builds upon this initial core set of health IT capabilities, PRDoH will continue to assess and help ensure alignment between the capabilities and MITA business areas and processes.

Table 3: MITA Business Areas and Processes Impacted by Priority Health IT Capabilities

ID	Health IT Capability Name	MITA Business Areas and Processes	
Patient Engagement			
HC1	Patient-Generated Health Data	**Business Area(s):** *Care Management* *Member Management*	**Business Processes:** CM01 Establish Case CM02 Manage Case Information CM05 Perform Screening and Assessment ME01 Manage Member Information
HC2	Patient Portal Information	**Business Area(s):** *Care Management* *Member Management*	**Business Processes:** CM01 Establish Case CM02 Manage Case Information ME01 Manage Member Information ME02 Manage Applicant and Member Communication
Clinical			
HC3	ADT Events /Encounter Alerting	**Business Area(s):** *Care Management* *Plan Management*	**Business Processes:** CM02 Manage Case Information CM05 Perform Screening and Assessment CM06 Manage Treatment Plan and Outcomes CM07 Authorize Referral PL05 Manage Performance Measures
HC4	Care Plans	**Business Area(s):** *Care Management* *Plan Management*	**Business Processes:** CM02 Manage Case Information CM05 Perform Screening and Assessment CM06 Manage Treatment Plan and Outcomes CM07 Authorize Referral CM08 Authorize Service CM09 Authorize Treatment Plan PL05 Manage Performance Measures
HC5	Health Record	**Business Area(s):** *Care Management* *Plan Management*	**Business Processes:** CM02 Manage Case Information CM05 Perform Screening and Assessment CM06 Manage Treatment Plan and Outcomes CM07 Authorize Referral CM08 Authorize Service

ID	Health IT Capability Name	MITA Business Areas and Processes	
			CM09 Authorize Treatment Plan PL05 Manage Performance Measures
HC6	Prescription Monitoring	**Business Area(s):** *Care Management* *Eligibility and Enrollment Management* *Member Management* *Provider Management*	**Business Processes:** CM02 Manage Case Information CM03 Manage Population Health Outreach CM05 Perform Screening and Assessment CM06 Manage Treatment Plan and Outcomes CM08 Authorize Service CM09 Authorize Treatment Plan EE05 Determine Provider Eligibility ME01 Manage Member Information ME02 Manage Applicant and Member Communication ME03 Perform Population and Member Outreach PM03 Perform Provider Outreach
Public Health			
HC7	Disease and Public Health Registry Information	**Business Area(s):** *Care Management*	**Business Processes:** CM03 Manage Population Health Outreach CM04 Manage Registry
HC8	Immunization Registry	**Business Area(s):** *Care Management*	**Business Processes:** CM03 Manage Population Health Outreach CM04 Manage Registry
Master Patient Index			
HC9	Patient Identifiers	**Business Area(s):** *Care Management* *Member Management*	**Business Processes:** CM01 Establish Case ME01 Manage Member Information

4.5 Performance Measurement

4.5.1 Initial Key Performance Indicators

To monitor progress toward achievement of the desired future environment and connectivity goals, PRHIN identified initial key performance indicators[31] (KPIs) to measure and provide

[31] Source: Health Information Technology Advanced Planning Document Update (APD-U) v1.0, Luz Cruz-Romero, February 29, 2020

feedback on onboarding activities for providers, hospitals, payers, and other key participants. PRHIN will further define these KPIs as a part of planning and implementation efforts, including development of the health IT/HIE roadmap. Initial proposed KPIs for the HIE and Enterprise Data Warehouse (EDW) solution implementation include:

- Raw Counts of Providers Added to the Directory
- Data Transmission Rates
- Number of Organizations by Type Transmitting Data
- Number of Organizations Reporting Electronically
- Number of DirectTrust Exchange Transactions
- Rate of Providers Using HIE
- Number of Patient Accounts Created
- Number of Patient Transactions (e.g., View, Send, Download) within the HIE
- Number of Patients Who Have a Clinical Consolidated Document Architecture (C-CDA) Sent or Received
- Number of Multiple Visits from HIE Users

4.5.2 Outcomes-Based Metrics

PRHIN has not yet established outcomes-based metrics for the PRHIE. However, CMS has indicated that outcomes-based certification (OBC) will eventually support all MES projects to enable 75/25 enhanced Federal Financial Participation (FFP) for operations. According to CMS, "OBC ensures that Medicaid systems' projects are focused on achieving outcomes to improve Medicaid programs".

CMS identifies two categories of project outcomes:

- **CMS-required outcomes** that are based on statute, regulation or other formal guidance and are module-specific
- **State-proposed outcomes** that are project-specific and based on the state's specific MES/ecosystem

As of June 2020, CMS has not provided CMS-required outcomes for HIEs due to the variance between states and systems; however, CMS is working on outcomes for PDMPs and will possibly develop outcomes for other public health systems[32]. In an HIE Community of Practice (COP) meeting held on May 26, 2020, CMS indicated that although states/territories may include outcomes metrics in APD submissions in June 2020, states/territories may also opt to provide metrics in subsequent APDs instead, depending on readiness.

[32] Source: HIE COP, David Koppel (CMS), May 26, 2020

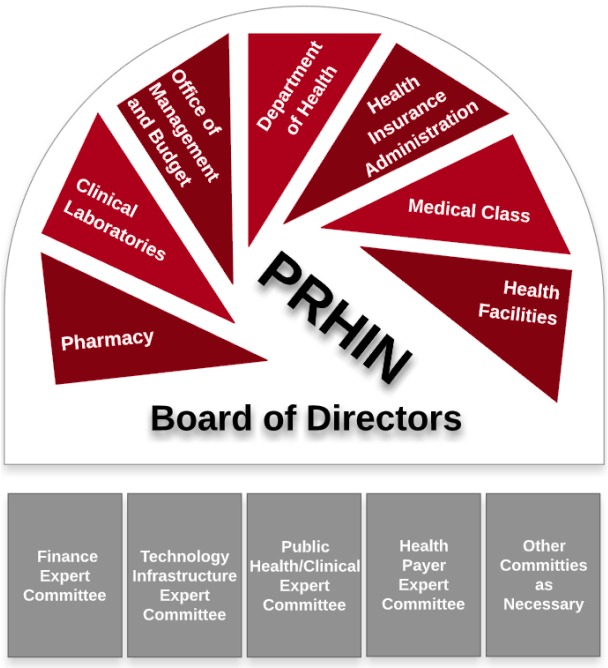
5 Current Environment

5.1 Governance

In 2012, the Commonwealth established the "Law for the Administration and Electronic Exchange of Health Information of Puerto Rico" to comply with the HITECH Act and requirements of the ONC of Health IT. PRHIN was created as a "nonprofit, independent corporation separated from any agency or instrumentality of the Government of Puerto Rico[33]" to serve as the Commonwealth's SDE. In addition, the law created the position of the Health IT Coordinator—attached to PRDoH—to be responsible for promoting and establishing the Strategic and Operational Plan for PRHIN to ensure safe exchange of health information in accordance with federal and Commonwealth regulations. The Health IT Coordinator may serve a term of seven years.

As depicted in Figure 3, the law established a Board of Directors (Board) as the governing body of PRHIN, consisting of three *ex officio* and four other community-based members appointed by the Governor with the consent of the Senate.

Figure 3: PRHIN Governance Structure



Ex officio members include:

- The Secretary of PRDoH, or instead, the Puerto Rico Health IT Coordinator
- The Executive Director of PRHIA
- The Director of the Office of Management and Budget

Community-based members include one representative from each the following sectors:

- Clinical laboratory
- Pharmacy
- Medical class
- Health facility/healthcare professional management of health facilities

The Board is designed to exercise powers and responsibilities as outlined in Article 4 of the law on behalf of PRHIN; enact a set of rules and regulations, as well as a code of ethics; and comply with the goals of the Strategic and Operational Plan. In addition, the law indicates that

[33] Source: http://www.lexjuris.com/lexlex/Leyes2012/lexl2012040.htm

the Board will establish expert Committees on Finance, Technological Infrastructure, Public/Clinical Health, Health Service Payers, and any other committees the Board deems necessary[34].

Specific powers and duties of PRHIN include, but are not limited to:

- Adopt and implement the standards of exchange, security, and interoperability of electronic systems and health data, in accordance with federal and Territory requirements within and outside the jurisdiction of Puerto Rico
- Create and administer the patient master index, provider indices, and other centralized indices or records required for the electronic exchange of information within and outside the jurisdiction of Puerto Rico
- Integrate, through technology and operational processes, patient health data aimed at achieving the electronic exchange of health information between affiliated and non-affiliated entities within and outside the jurisdiction of Puerto Rico
- Implement, together with PRDoH and in coordination with the Governments of Puerto Rico and the United States, the public policies formulated by PRHIN related to health information exchange, in an integrated and uniform manner
- Promote the active participation of health service providers in Puerto Rico, in terms of electronic exchange through health information standards, in a safe and effective manner
- Plan for, acquire, and establish the central technological infrastructure needed for health information exchange
- Design and implement the organizational structure required for PRHIN
- Develop and implement the regulations, rules, policies, and procedures necessary for the electronic exchange of health information and operations of PRHIN, in compliance with the public policy formulated by PRDoH and applicable state and federal laws and regulations

As of June 2020, PRHIN is still attempting to re-establish itself as an independent, nonprofit corporation, and the Board has not yet convened, as the Governor has not appointed the four community-based representatives. The Health IT Coordinator has drafted language for articles of incorporation for PRHIN, which is under review by the Secretary of Health and other Commonwealth leaders. The Health IT Coordinator reported that the target completion date for incorporation is August/September 2020.

[34] Source: Law No. 40 February 2, 2012; Article 6

5.2 Technology

This section of the report provides an overview of health IT assets in the Commonwealth's current[35] environment that PRDoH should consider as it proceeds with health IT/HIE planning and implementation efforts.

5.2.1 Patients/Consumers

Publically available information on patient/consumer access to technologies required to view and/or directly share their health information—such as smart phones, tablets, and personal computers—is limited. In addition, although BerryDunn attempted outreach to patient/consumer advocates in Puerto Rico, contact was not made.

High-level information indicates that:

- In 2018, the number of mobile cellular subscriptions in Puerto Rico was roughly 3.33 million (although not all phones are smart phones with internet access)[36]
- Between 2014 and 2018, 64.5% of households had a computer and 56.2% of households had a broadband internet subscription[37]

5.2.2 Commonwealth of Puerto Rico

5.2.2.1 Puerto Rico Health Information Network

Existing Technology

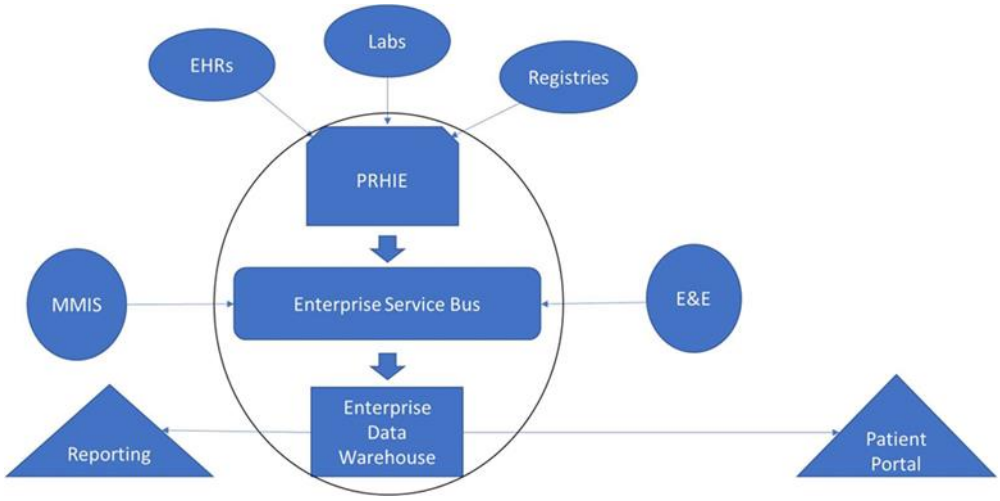
Although PRHIN made efforts to implement health IT infrastructure to support health information exchange from 2012 – 2017, equipment that was purchased is now obsolete and the services are no longer (or never were) functional, rendering PRHIN unable to leverage its previous technology investments[38]. As PRHIN proceeds with development of the PRHIE, the organization must procure new health IT/HIE infrastructure and/or services, and/or leverage health IT assets from other Commonwealth agencies and/or healthcare entities.

[35] The current environment includes health IT assets that are either currently in operation or are "planned". For the purposes of this report, planned means that funding is secured (e.g., via an APD), planning is underway, and implementation is expected in approximately the next 12 months.
[36] Source: https://www.statista.com/statistics/501063/number-of-mobile-cellular-subscriptions-in-puerto-rico/
[37] Source: https://www.census.gov/quickfacts/PR
[38] Information was provided by the Health IT Coordinator and was not independently validated by BerryDunn.

Planned Technology

Figure 4 provides an overview of the near-term vision for the initial scope of the PRHIE implementation as the health IT/HIE infrastructure and services are rebuilt[39].

Figure 4: PRHIE Vision



PRDoH plans to contract with Health Gorilla[40] to provide the following key technology components of the vision:

- An Enterprise Service Bus (ESB) that aggregates, normalizes, and integrates data from multiple electronic components, such as healthcare provider electronic health records (EHRs) (e.g., hospitals, FQHCs, independent physicians); community laboratory systems; public health registries; and PRMP's PDMP, MMIS, and E&E system
- A cloud-based EDW that is compliant with HIPAA and Service Organization Control 2 (SOC 2), and based on Fast Healthcare Interoperability Resources (FHIR) standards for data exchange
- An enterprise portal that allows for secure patient and provider messaging and supports web-based patient access to individual medical information (including via mobile devices)

[39] Sources: Health Information Technology Advanced Planning Document Update (APD-U) v1.0, Luz Cruz-Romero, February 29, 2020; Proposal for HIE and Interoperability Solution for Puerto Rico, Health Gorilla, 2019

[40] BerryDunn requested updated and more detailed information from PRDoH and Health Gorilla regarding the planned HIE technologies for initial implementation, as well as Health Gorilla's deliverables from its planning phase proposal (e.g., a HIE Solution Planning Document and a Technical Architecture Document). However, this information was not provided to BerryDunn at the time of development of this report. (UPDATE as of July 7, 2020: Health Gorilla provided several planning documents to BerryDunn on June 29, 2020. BerryDunn will review and incorporate the applicable content in the HIT Roadmap.)

- A reporting tool that will support federal and public health reporting, as well as population analytics by PRDoH and other Commonwealth agencies
- A master patient index that accurately matches clinical documents from various sources to the identified patient
- Real-time identity verification for patients and providers

Based on preliminary proposal information provided by Health Gorilla, the company's HIE solution is SOC 2-certified and HIPAA-compliant.

According to PRDoH, PRHIE will facilitate connections through interfaces using Direct Messaging and using Application Programming Interfaces (APIs), lowering the burden on the providers. By September 2020, PRDoH aims to connect 75 hospitals, four major laboratories, and approximately half of the 7,000 Medicaid providers on the island connected to the PRHIE.

5.2.2.2 Puerto Rico Department of Health

PRDoH has several health IT assets in the current environment. To the degree appropriate and possible, BerryDunn gathered the information in the "Descriptor" column in Table 4 for each of PRDoH's health IT assets. Descriptor information is grouped into one of several categories defined in the "Categories" column.

Table 4: Health IT Descriptors and Categories

Descriptor	Categories
Status	• Planned—Not Started • Planned—Planning Underway • Planned—Implementation Underway • Currently Operational • Currently Operational—Planned for Sunsetting • Stalled or Started, Not Completed
Core Functionality	Free Text/Narrative
Primary Users	• ASES • ASSMCA • Churches • Clients/Consumers • Community Laboratories • Coroners/Funeral Homes • Courts • Diagnostic Imaging Facilities • Directed Care Organizations • Drug Enforcement Agency (DEA)

Descriptor	Categories
	• Educational Institutions • Epidemiologists • Federal Government • Local Public Health Authorities • Law Enforcement Agencies • MCOs • National Association of Boards of Pharmacy • Pathology Laboratories • Patients • Payers • Pharmacies • PRMP • Providers • Public • Public Health Laboratories • Radiotherapy/Chemotherapy Sites • Researchers
Secondary Users	• Same Categories as "Primary Users"
Data Types Included	• ADT Events/Encounter Alerting • Advance Directives • Care Plans • Claims • Diagnostic Images (e.g., X-rays, MRIs) • Disease and Public Health Registry Information • Eligibility and Benefits • Encounters • Financial • Health Records • Immunization Records • Lab Orders • Lab Results • Personally Identifiable Information (PII) • Prescriptions/Pharmacy • Provider • Quality Measures • Referrals • Social Determinants of Health • Vital Statistics (e.g., Birth, Death)
Data Exchange Types	• Direct Interface • Commonwealth Portal • EHR • Hospital Network • Point-to-Point Interface • Private Provider Portal • DIRECT Secure Messaging • Other Secure Email

Descriptor	Categories
	• Secure File Transfer Protocol (SFTP)/Batch Jobs • Web Services (Simple Object Access Protocol [SOAP]/Basic Authentication Over Secure Sockets Layer [SSL]/Web Services Description [WSDL]/Real Time) • Existing HIE • Lower Layer Protocol (LLP) or Minimal Lower Layer Protocol (MLLP)
Potential Future Health IT Capabilities Supported	• Claims Information Sharing • Eligibility and Benefits Information • Financial Information Sharing • Analytics Reporting • Quality Reporting • ADT Events/Encounter Alerting • Advanced Directives • Care Plans • Health Record • Referral Management • Electronic Prescribing • EMS Integration • Prescription Monitoring • Disease and Public Health Registry • Immunization Registry • Population Health Information • Social Determinants of Health • Patient Consent • Patient Education • Patient-Generated Data • Patient Portal Information • Image Sharing • Lab Orders • Lab Results • Patient Identifiers • Patient Record Locator • Provider Attribution • Provider Directory
Potential Future Support	• Data Exchange With PRHIE • Provide Core Health IT/HIE Infrastructure • Provide Core Health IT/HIE Services
Third-Party Organizations/ Vendors	Free Text/Narrative
Additional Notes	Free Text/Narrative

PRMP

Table 5 provides a summary of current and planned health IT assets within PRMP that PRDoH should consider as it proceeds with health IT planning efforts. Additional details for each system are provided in Tables 6-8.

Table 5: Current and Planned PRMP Health IT Assets

System	Description
Puerto Rico Medicaid Management Information System	• Supports automated Medicaid program management functions, such as claims/encounter processing for the purpose of Transformed Medicaid Statistical Information System (T-MSIS) reporting, program cost and

System	Description
(PRMMIS)	administrative controls, program operations and analytics, and reporting for program management and federal oversight • Provider enrollment portal is a component of the PRMMIS that supports Medicaid provider screening, credentialing, and enrollment, and evaluates provider characteristics and business history to determine if the provider is qualified to offer services under the Medicaid program
Puerto Rico Eligibility and Enrollment System (PREE)	• Determines member eligibility and enrollment for the Medicaid program • Also known as Medicaid Integrated Technology Initiative 2 (MEDITI2)
State-Level Registry (SLR)	• Consists of registry and supports an attestation submission and review process to determine eligibility for state interoperability payments under MPPIPR

Table 6: Overview of PRMMIS

Area	Description
Status	Currently operational: • MMIS Phase 1 went live in March 2018 • CMS certified Phase 1 in January 2020 • Phase 2 is expected to go live in December 2020

Core Functionality	Phase 1 capabilities:
	• Encounter/claims processed by MCOs
	• Capitation payments processed by MCOs
	• Provider eligibility
	• Premiums billed and paid by ASES
	• Reporting to include:
	  ○ Program analytics (Management and Administrative Reporting, or MARS)
	  ○ Program integrity (Surveillance and Utilization Review Sub-System [SURS])
	  ○ T-MSIS
	  ○ Managed care analytics
	  ○ Utilization management
	  ○ Advanced ad hoc analytics
	Components of MMIS Module 1:
	• Business Intelligence Analytical Reporting (BIAR) Data Warehouse/Decision Support (DW/DS), an Oracle database with a data warehousing platform that supports the core Decision Support System (DSS) and has multiple data marts, including MAR; BIAR validates, edits, scrubs, and transforms raw data into a common format to meet analytic and reporting requirements

Area	Description
	• InSight analytic reporting dashboards, which compile and visualize program analytics • Service-oriented architecture (SOA)-based integration through an ESB that moves data files and messages between PRDoH and external systems[41] Phase 2 capabilities: • Provider enrollment and screening via a provider portal • Case tracking Phase 2 enhancements: • Provider management and enrollment configurations • 835 remittance advice transactions • PRMMIS/MEDITI2 member interfaces • Pharmacy claims post-adjudication • Managed care reporting • DSS enhancements, including case tracking, member link/delink functions, and new data element support
Primary Users	• PRMP • ASES • MCOs
Secondary Users	• Federal Government (e.g., CMS) • Clients/Consumers
Data Types Included	• Claims • Encounters • Financial • PII • Provider
Data Exchange Types	• Direct Interface • Commonwealth Portal • SFTP/Batch Jobs • Web Services (SOAP/Basic Authentication over SSL/WSDL/Real Time) • LLP or MLLP
Potential Future Health IT Capabilities Supported	• Claims Information Sharing • Eligibility and Benefits Information • Provider Directory

[41] Hewlett Packard Enterprise, Puerto Rico Department of Health Medicaid Management Information System Statement of Work: Module 1, August 2016 revision

Area	Description
Potential Future Support	• Data Exchange with PRHIE: Technical services implemented for the MMIS system, such as the data warehouse, ESB, and system interfaces have the potential to support interoperability for sharing medical claims, eligibility, and benefits information • Provide Core Health IT/HIE Services: The Medicaid provider directory could be extended to provide a master provider directory/master provider index to support the management of provider information
Third-Party Organizations/ Vendors	• Hewlett Packard Enterprise (HPE) (MMIS module 1) • DXC (MMIS module 2) • Wovenware (verification hub various, interfaces with local Government of Puerto Rico agencies) • Intervoice (planning)
Additional Notes	• None

Table 7: Overview of PREE

Area	Description
Status	Planned—Implementation Underway • Release 1 go-live date is scheduled for April 2021 • Release 2 is scheduled for August 2021
Core Functionality	Medicaid beneficiary eligibility determination and program enrollment Release 1 includes: • Caseworker portal for application intake/process • Rules engine to support CHIP, Modified Adjusted Gross Income (MAGI) Medicaid, non-MAGI Medicaid, and Territory eligibility determinations • Automated appointment scheduling • Case management • Integrated change of circumstance and renewal processes • Interfaces for automated data verification (ASES, Federal Data Services Hub [FDSH], PRMMIS, Social Security Administration [SSA] Composite, Renewal and Redetermination Verification [RRV], Mediq, Territories' and States' Beneficiary Query (TBQ), Equifax, and Central Print) • Federal reporting • Citizen portal for new applications • Baseline appeals Release 2 includes: • Citizen portal – change in circumstance and renewal • Audit/Quality control (QC) • Interface to Remote Identity Proofing (RIDP) and the FAST system • Appeals – enhancements

Area	Description
	• Management reports • Selected local interfaces
Primary Users	• Clients/Consumers • Other Payers • PRMP • Providers • MCOs
Secondary Users	• Federal Government (e.g., CMS) • PRMP (e.g., Program Integrity (PI), Fraud and Abuse, analytics)
Data Types Included	• Eligibility and Benefits • PII
Data Exchange Type	• Direct Interface • Commonwealth Portal • Point-to-point Interface • SFTP/Batch Jobs • Web Services (SOAP/Basic Authentication over SSL/WSDL/Real Time) • LLP or MLLP
Potential Future Health IT Capabilities Supported	• Eligibility and Benefits Information
Potential Future Support	• Data Exchange with PRHIE: Technical services established for bi-directional connections with a wide variety of state and federal entities could be leveraged to share eligibility and benefit information to help ensure providers understand treatment options covered by payers
Third-Party Organizations/ Vendors	• RedMane (Design, Development, and Implementation [DDI], Maintenance and Operations [M&O], cloud services, ESB for local verification) • Wovenware (verification hub various, interfaces with local Government of Puerto Rico agencies)
Additional Notes	• None

Table 8: Overview of SLR

Area	Description
Status	• Currently Operational—Planned for Sunsetting
Core Functionality	The SLR includes the following functionality: • Screening and registering providers for program eligibility • Collecting MU attestation submissions to determine payment

Area	Description
	eligibility
Primary Users	• Providers • PRMP
Secondary Users	• Federal Government (e.g., CMS)
Data Types Included	• Provider • Quality Measures (e.g., MU) • Financial
Data Exchange Type	• Web Services (SOAP/Basic Authentication over SSL/WSDL/Real Time) • Software as a Service (SaaS)
Potential Future Health IT Capabilities Supported	• Due to the program ending in 2021, it is unlikely that the SLR will support future health IT capabilities
Third-Party Organizations/ Vendors	• Conduent (Provides SLR services) • Bridgewater Consulting Group (Provides attestation review)
Additional Notes	• Connection could be repurposed, but technology is one-way and designed for a specific use that will end in 2021

Public Health Registries

Table 9 provides a summary of current and planned public health registries within PRDoH that PRDoH should consider as it proceeds with health IT planning efforts. Additional details for each registry are provided in Tables 10-14.

Table 9: Current and Planned Public Health Registries

System	Description
Puerto Rico Immunization Registry (PRIR)	Documents and tracks types of immunizations and dates administered to island residents; commonly used to ensure children received immunizations on schedule and are fully immunized based on their age before attending school
Puerto Rico Central Cancer Registry (PRCCR)	Captures individual diagnoses, treatment, and progression of various types of cancer for surveillance and research
Puerto Rico Demographic Registry	Captures vital events on the island, such as births, deaths, marriages, divorces, and fetal deaths
Public Health Reporting	Captures information on several reportable disease conditions
Electronic Laboratory Reporting	Supports exchange of laboratory results for reporting; currently only electronic COVID-19 reporting

Table 10: Overview of PRIR

Area	Description
Status	Planned—Not Started Due to major power outages on the island, the current system is not functional; however, a CDC alternate method is being used until implementation of the new system, Scientific Technologies Corporation (STC) One, in November 2020
Core Functionality	According to the Immunization Information Systems (IIS) Functional Standards issued by the of the CDC[42], the PRIR is required to: • Record and track immunizations administered to patients of the island, as reported by primary users of the registry • Identify, prevent, and resolve duplicated and fragmented patient records using an automated process • Identify, prevent, and resolve duplicate immunization events using an automated process • Provide comprehensive account management processes consistent with industry security standards • Exchange data with health information systems in accordance with interoperability standards endorsed by the CDC
Primary Users[43]	• Providers (e.g., public and private immunization providers, child and elderly care centers, foster homes) • Directed Care Organizations (e.g., HMOs) • Educational Institutions – both public and private • PRMP
Secondary Users	• Researchers • Federal Government (e.g., CDC)
Data Types Included	• Immunization Records • Lab results • PII • Provider
Data Exchange Types	• EHR • SFTP/Batch jobs • Other secure email
Potential Future Health IT Capabilities Supported	• Immunization Registry • Health Record
Potential Future Support	• Data Exchange with PRHIE • Interoperability capabilities, such as web services, may be leveraged to

[42] Source: https://www.cdc.gov/vaccines/programs/iis/functional-standards/func-stds-v4-1.html#overarching-principles
[43] Source: PRIR Security and Confidentiality Agreement

Area	Description
	connect the PRIR to PRHIE
Third-Party Organizations/ Vendors	• STC will be the vendor providing implementation services, as well as ongoing maintenance and operations services for the new PRIR—STC One
Additional Notes	• Implementation of STC One will allow for: ○ Improved data quality and reduced manual data management processes ○ Additional method of data transport via web services ○ Ease-of-use for providers, with the goal of improving participation among all participant types • PRIR uses Health Level 7 (HL7) Standard 2.5.1 without deviations[44]

Table 11: Overview of PRCCR

Area	Description
Status	• Currently Operational
Core Functionality	• Supports cancer surveillance and research through data collection and normalization; data is established by individual registries
Primary Users	• Epidemiologists • Pathology Laboratories • PRMP • Providers (e.g., hospitals, outpatient clinics) • Radiotherapy/Chemotherapy Sites
Secondary Users	• Local Public Health Authorities • Researchers (including university affiliates) • Federal Government (e.g., CDC)
Data Types Included	• Health Records ○ Diagnosis – Cancer Type and Stage ○ Follow-up Information • PII
Data Exchange Types	• Web Services (SOAP/Basic Authentication over SSL/WSDL/Real Time)
Potential Future Health IT Capabilities Supported	• Additional registries that capture information from different types of providers and systems
Potential Future Support	• Data Exchange with PRHIE

[44] Source: PRIR Local HL7 version 2.5.1 Implementation Guide Release 1.5

Area	Description
Third-Party Organizations/ Vendors	• CCC at the University of Puerto Rico (manages the registry) • CDC
Additional Notes	• Uses Web Plus, a free software program made publicly available by the CDC • Uses Extensible Markup Language (XML) and supports three main functions: online abstracting, file uploading and downloading, and follow-back efforts • Puerto Rico is a member of North American Associations of Central Cancer Registries (NAACCR), which requires adherence to NAACCR data and system security standards

Table 12: Overview of Puerto Rico Demographic Registry

Area	Description
Status	• Currently Operational
Core Functionality	• Supports collecting information on vital events (e.g., births, deaths, marriage and divorce)
Primary Users	• Public • Public Health • Epidemiologists • Courts • Coroners/Funeral Homes • Churches • Providers
Secondary Users	• Researchers • Federal Government (e.g., CDC/National Center for Health Statistics)
Data Types Included	• PII
Data Exchange Types	• Information not available to BerryDunn
Potential Future Health IT Capabilities Supported	• Patient Identifiers
Potential Future Support	• Data Exchange with PRHIE
Third-Party Organizations/ Vendors	• CDC for births, marriages, divorces; technology unknown
Additional Notes	• Death registration not yet electronic[45]

[45]Source: https://oig.ssa.gov/sites/default/files/audit/full/pdf/A-08-14-14013.pdf

Table 13: Overview of Public Health Reporting System

Area	Description
Status	• Currently Operational
Core Functionality	• Supports reportable and notifiable disease surveillance through data collection and normalization
Primary Users	• Community Health Centers • Epidemiologists • Hospitals • Laboratories • Physicians • Public Health
Secondary Users	• Researchers and University Affiliates • CDC
Data Types Included	• Patient • Provider • PII • Test Results
Data Exchange Types	• Web Services (SOAP/Basic Authentication over SSL/WSDL/Real Time) • Point-to-Point
Potential Future Health IT Capabilities Supported	• Other public health registries and databases
Potential Future Support	• Data Exchange with PRHIE
Third-Party Organizations/Vendors	• CDC
Additional Notes	• PRDoH uses the CDC National Electronic Disease Surveillance System (NEDSS) Base System (NBS). NBS supports national standards, including: • Vocabulary standards, such as Logical Observation Identifiers Names and Codes (LOINC), Systematized Nomenclature of Medicine (SNOMED), and RxNorm • Messaging standards, such as HL7[46]

Table 14: Overview of the Electronic Lab Reporting System

Area	Description

[46] Source: https://www.cdc.gov/nbs/documents/nbs-fact-sheet-508.pdf

Area	Description
Status	• Currently Operational
Core Functionality	• Supports electronic lab reporting; BioPortal is a web-based application for searching, sharing, visualizing, and analyzing a large repository of biomedical ontologies, terminologies, and ontology-based annotations
Primary Users	• Public Health • Epidemiologists • Laboratories
Secondary Users	• Federal Government (e.g., CDC) • Hospitals • Physicians • Primary Health Centers/FQHCs
Data Types Included	• Lab Results (only collecting COVID-19 data at this time) • PII
Data Exchange Types	• Web Services (SOAP/Basic Authentication over SSL/WSDL/Real Time)
Potential Future Health IT Capabilities Supported	• Lab Results
Potential Future Support	• Data Exchange with PRHIE
Third-Party Organizations/Vendors	• CDC • Inductive Health (NBS hosting, support, and integration services) • Health Gorilla (Interoperability/integration services)
Additional Notes	• BioPortal has four major components: a web application; API services; widgets, or applets, that can be installed on-site; and a Virtual Appliance version[47]

Electronic systems to support other public health reporting efforts (e.g., case reporting, syndromic surveillance reporting, clinical data registry reporting) have not yet been implemented in Puerto Rico, but the following registries are reported to exist:

- Autism registry, which captures the results of autism screening in children and demographics, diagnosis and other diagnoses/conditions, diagnosing provider, and medical coverage

[47]Source: https://www.bioontology.org/about-us

- Alzheimer's registry, which records patient demographics, signs and symptoms, risk factors, diagnosis, and medications and other therapies

With the advent of the COVID-19 pandemic, the Puerto Rico Public Health Trust Program has also established the Municipal Contact Tracing and Assistance System with several municipalities to track virus cases and virus progression. This project is expected to set the groundwork for more permanent surveillance systems and data analysis[48].

5.2.2.3 Mental Health and Anti-Addiction Services Administration

In 2017, ASSMCA was tasked with creation of the Controlled Medication Prescription Monitoring Program through Act No. 70-2017. The PDMP Program is currently implementing the electronic platform, as described in Table 15, to capture data to support program mandates.

Table 15: Overview of PDMP

Area	Description
Status	Currently Operational; enhancements to the PDMP are planned for completion in September 2020
Core Functionality	Electronic database for prescription monitoring and analysis; includes tools for patient care, drug epidemic alerts, and drug diversion and insurance fraud investigations; capabilities include: • Statewide gateway to facilitate PDMP data sharing within EHRs, pharmacy management systems, and HIEs • Enterprise NarxCare (analytics) • Prescriber reports • Clinical alerts • RxCheck connection for interstate data sharing/integration
Primary Users	• ASSMCA • Pharmacies • PRMP • Providers
Secondary Users	• DEA • Law Enforcement Agencies (when illegal activity is suspected) • National Association of Boards of Pharmacy
Data Types Included	• PII • Prescriptions/Pharmacy • Provider
Data Exchange Type	• Web Services (SOAP/Basic Authentication over SSL/WSDL/Real Time)

[48] Source: https://newsismybusiness.com/p-r-public-health-trust-leads-towns-on-covid-19-contact-tracing/

Area	Description
Potential Future Health IT Capabilities Supported	• Prescription Monitoring
Potential Future Support	• Data Exchange with PRHIE
Third-Party Organizations/ Vendors	• Apriss Health • Health Gorilla (Interoperability/integration services)
Additional Notes	• Gateway data payloads validate against the XML schema as defined by the IJIS Institute in the ijis_pmix_III_niem_2_0_iepd_v0_20_20101108 version of the PMIX standard

5.2.3 Community Healthcare Providers

Although BerryDunn attempted to gather information regarding health IT and health information exchange from community healthcare providers via meetings and web surveys, responsiveness to outreach efforts was low. As a result, BerryDunn gathered limited information from primary sources and could not validate information gathered from secondary sources. As community healthcare providers are critical stakeholders for PRHIN to achieve the vision and goals for the PRHIE, future health IT/HIE planning efforts should attempt to gather additional information about the current state of technology for this group.

Table 16 provides a summary of information available to BerryDunn regarding the current state of health IT for community healthcare providers.

Table 16: Community Healthcare Provider Technology

Area	Description

Hospitals	• Hospitals must have an EHR to participate in the Medicaid program
	• Under the MPPIR[49]:
	  ○ 54 unique hospitals have received at least one incentive payment
	  ○ 27 EHs successfully completed their Stage 3 attestation for interoperability
	• Meditech is reported to be the EHR vendor most commonly used by hospitals (e.g., Systema de Salud Menonita, Dorado Health, Sistema de Salud Episcopal, Doctor's Center, San Carlos Borromeo, Presbyterian Hospital, Wilma Vázquez Hospital, and E-Health Partners)
	• Some hospitals have used Meditech's DIRECT offering to meet MU requirements
	• Some hospital systems (e.g., Sistema De Salud Menonita, an integrated five-hospital system, and Dorado Health System, a four-hospital academic system) have partnered with Health Gorilla to support their interoperability strategies

Primary Health Centers	• According to a 2018 HRSA report[50], 19 of 20 Primary Health Centers in Puerto Rico had an EHR installed at all sites and used by all providers, and one of 20 had an EHR installed at some sites or used by some providers
	• Most had the following capabilities:
	  ○ E-prescribing (19 of 20)
	  ○ Clinical decision support functions (20 of 20)
	  ○ Electronic patient engagement (16 of 20)
	  ○ Electronic summaries of office visits/clinical information (19 of 20)
	• Three of 20 were electronically exchanging information with other key providers/healthcare settings such as hospitals, emergency rooms, and subspecialty clinicians
	• Under the MPPIPR, Greenway Health's SuccessEHS was reported as the EHR used most often by Primary Health Centers; however, in late 2019, Greenway Health indicated it would no longer support SuccessEHS as of December 2019, so many Primary Health Centers began the transition to Intergy, another Greenway Health product

Independent Physicians	• All practitioners that serve Medicaid members in Puerto Rico must have an EHR to participate in the program • EHR adoption and health information exchange capabilities for physicians not serving the Medicaid population is unknown
LTC and HCBS	• EHR adoption and health information exchange capabilities for LTC

[49] Source: Source: Promoting Interoperability Program –Medicaid, Bridgewater Consulting Group, May 13, 2020
[50] Source: https://bphc.hrsa.gov/uds/datacenter.aspx?q=tehr&year=2018&state=PR

Area	Description
Providers	and HCBS providers is unknown • Most LTC and HCBS providers have not been eligible for many federal health IT funding programs, so health IT capabilities may be limited and highly variable
Behavioral Health Providers	• Behavioral health providers that serve Medicaid members in Puerto Rico must have an EHR to participate • Behavioral health providers have also not been eligible for many federal health IT funding programs, so health IT capabilities are likely limited

5.2.4 Other Stakeholders

Although acknowledged as important to health information exchange in Puerto Rico, publically available information on the current technological state of other key stakeholders—such as pharmacies, reference laboratories[51], diagnostic imaging facilities, and emergency medical services (EMS)—is limited, and outreach to these stakeholders was not within BerryDunn's scope of work.

5.2.5 Health IT/HIE Vendors

5.2.5.1 EHRs

Although data on EHR use for all providers in Puerto Rico is not available, Table 17 provides the EHRs most commonly used by providers that participate in the MPPIPR.

Table 17: Most Common EHR Vendors in MPPIPR[52]

Total	EHR Vendor
1,020	EHRez
294	MediRec
686	Neomed
123	Open Dental[53]
457	Practice Fusion
615	Secure EMR[54]

[51] Misresultados is reported to be the largest lab results portal. Misresultados can intake orders from SAIL, reported to be the lab system with the widest adoption on the island. Other companies, namely Tekpro and Lab Warehouse, are reported to be working on a lab results portal by taking advantage of their laboratory information management system offerings; Source: Promoting Interoperability Program – Medicaid, Bridgewater Consulting Group, May 13, 2020.
[52] By most recent attestation. Source: Promoting Interoperability Program –Medicaid, Bridgewater Consulting Group, May 13, 2020.
[53] Commonly used by dentists.
[54] Commonly used by dentists.

Total	EHR Vendor
233	SuccessEHS[55] (GreenwayHeath™)

Of the 51 EHR vendors that EPs/EHs used to apply for the first incentives under the MPPIPR using Certified EHR Technology (CEHRT) that met ONC's 2011 Edition, only 35 EHR vendors continued the certification process to meet ONC's 2015 Edition CEHRT, a requirement for achieving MU Stage 3.

Other EHR products/vendors in Puerto Rico include:

- eClinical Works
- EHREz
- E-MDs
- Hummingbird
- Infomedika
- MedicusEHR
- Meditech
- SabiaMed/CliNext
- PrognoCIS

5.2.5.2 Health Information Exchange

Health Gorilla provides a "secure interoperability solution that enables the entire healthcare ecosystem—patients, payers, providers, digital health solutions, and labs—to seamlessly share health data and aggregate each patient's entire clinical history in one place.[56]"

PRDoH has engaged Health Gorilla to perform HIE planning activities in advance of implementation of initial health IT/HIE infrastructure and services (as described in Section 5.2.2.1).

5.2.6 Payers

Although acknowledged as important to health information exchange in Puerto Rico, publically available information on the current technological state of payers is limited, and outreach to these stakeholders was not within BerryDunn's scope of work. However, stakeholders did report that, to their knowledge, at least two large payers in Puerto Rico provide patient portals.

[55] GreenwayHealth™ reportedly sunset SuccessEHS, which was most commonly used by Primary Health Centers, in late 2019. As a result, several Primary Health Centers are reportedly migrating to GreenwayHealth's™ Intergy product.
[56] Source: https://www.healthgorilla.com/home/about/

5.2.7 Broadband

Ubiquitous, redundant, reliable, and affordable broadband access is an important foundation for healthcare providers to be able to exchange health information and for patients/consumers to access and update health information.

Publicly available information[57] on internet access and wireless communications in Puerto Rico from 2017 indicates that:

- 60.6% of Puerto Ricans had access to wired broadband 25 megabits per second (Mbps) or faster
- 29.5% of Puerto Ricans had access to broadband 100 Mbps or faster
- 0.7% of Puerto Ricans had access to 1 gigabit broadband
- 65.3% of Puerto Ricans had access to wireline service
- 0.7% of Puerto Ricans had access to fiber-optic service
- 59.2% of Puerto Ricans had access to cable service
- 49.8% of Puerto Ricans had access to Digital Subscriber Line (DSL) service

However, in September 2017, Hurricanes Irma and Maria inflicted widespread devastation to Puerto Rico, causing extensive damage to infrastructure and damaging or destroying communications networks. As a result, through late 2019, the Federal Communications Commission (FCC) provided over $382 million in universal services support to assist with network restoration. According to FCC reports, at the time, carriers reported that service had been completely or substantially restored in Puerto Rico—but that many areas of the island remained unserved by broadband, and restored networks remained vulnerable to severe storms. As a result, in September 2019, the FCC approved an additional $500 million over 10 years in fixed broadband support and more than $250 million over three years in mobile broadband support for the “deployment of advanced, hardened networks” and “fast, resilient, and reliable networks to all parts of the islands that will stand the test of time and provide digital opportunity to all Americans living in Puerto Rico.” [58,59]

[57] Source: https://broadbandnow.com/Puerto-Rico
[58] Source: https://www.fcc.gov/document/fcc-invests-950-million-improve-broadband-puerto-rico-usvi
[59] Although their implementation status is unclear, several other previous broadband planning, assessment, and expansion efforts have occurred in Puerto Rico, e.g., the Gigabit Island Plan and Puerto Rico Broadband Taskforce. (https://www2.ntia.doc.gov/puerto-rico, http://www.connectpr.org/sites/default/files/connected-nation/Puerto%20Rico/files/pr_bb_plan_final.pdf, http://www.connectpr.org/sites/default/files/connected-nation/pr_gigabit_plan_020915_final.pdf)

In addition, in 2019, the Commonwealth passed two laws[60] to support broadband expansion:

- HB 1294: Created a law of joint use of the infrastructure of the Electric Power Authority in order to establish the parameters in which private companies and/or individuals can use the electric power service infrastructure to install fiber-optic lines, telephony, internet, and/or any other service
- HB 1976: Created a law to facilitate the implementation and use of small wireless installations or small cells in telecommunications systems in Puerto Rico

The FCC's and Commonwealth's investments in broadband technology in future years will serve as a critical foundation for expansion of both provider and patient health information exchange, access, and use in Puerto Rico.

5.3 Finance

5.3.1 Planning and Initial Implementation Budget and Funding

PRDoH has not developed an overall, complete implementation budget for the component HIE technologies. However, PRDoH has requested and received approval from CMS for the following HITECH funds[61] in support of initial HIE planning and implementation efforts:

- FFY2019: $1,000,000 ($900,000 FFP)
- FFY2020: $5,225,283 ($4,702,755 FFP)

In addition, PRDoH intends to request approximately $9,834,971 ($8,851,474 FFP/$983,497 Commonwealth) in HITECH funds for FFY2021 in an IAPD-U planned for submission to CMS by June 30, 2020.

As of June 2020, PRDoH has not secured other Commonwealth, federal, or private funds for the PRHIE[62].

5.3.2 Ongoing Operational Budget

PRDoH has not developed a budget for ongoing operational costs. Research conducted by the University of Puerto Rico School of Public Health estimated that the total annual cost of an HIE in Puerto Rico would be between $3.5 and $4 million[63]. Estimates for ongoing operational costs

[60] Source: https://www.ncsl.org/research/telecommunications-and-information-technology/broadband-2019-legislation.aspx
[61] Funds included are specific to HIE planning and implementation efforts. PRDoH also requested additional HITECH funds for other HIT-related systems and functions that are not listed.
[62] The ONC of Health IT also assigned approximately $7.8 million of funds from the ARRA to Puerto Rico in support of the Commonwealth's HIE efforts during its early years, although several sources report that no health IT/HIE assets remain available for use.
[63] Source: PRDoH Health IT IAPD-U , February, 2020; discussions with Health IT Coordinator on June 8, 2020

for other HIEs vary widely due to factors such as organizational structure and services approach, although publically available data indicates that annual operating budgets for some SDE HIEs range from approximately $3.9 million to $34 million.

Previous planning documents indicate that the Commonwealth intends to offset the costs of the PRHIE in an ongoing manner through four primary revenue sources:

- Health insurance payer fees based upon the number of beneficiaries in payer plans
- Healthcare provider participation fees (may or may not be necessary in the final business model)
- HIE services
- CMS FFP for ongoing operations for functionality that supports the Medicaid program

However, based on discussions with the Health IT Coordinator, the funding model to help ensure the sustainability of the PRHIE has not been finalized and will be a decided upon when the Board is established.

5.3.3 Federal Funding Opportunities

HITECH funding (90% FFP) for health IT/HIE systems expires at end of FFY 2021, and HITECH funding (100% FFP) for PIP activities (HITECH administration) expires at end of FFY 2022, except for audits/appeals. However, per guidance from CMS, HIE systems and functionality should be leveraged/reused to support other Medicaid business needs and program goals, and therefore may be eligible for MES/MMIS funding[64]. Examples of HIE infrastructure that should readily translate to benefit for the Medicaid program include:

- Provider Directories
- Master Patient Index
- Patient Record Locator Service[65]

CMS also stated that "HIE systems developed with MES 90% FFP should be easier to move to MES 75% FFP for operations (i.e., there is no need to justify the move from HITECH to MES funding if starting with MES funding)[66]. Funding must still be cost allocated if entities other than the Medicaid program benefit from the systems and functionality.

5.4 Policy/Legal

5.4.1 Patient Consent

Although it is not required, healthcare providers may decide to offer patients a choice as to whether their health information may be exchanged electronically, either directly or through an HIE, for purposes permitted by the HIPAA Privacy Rule (e.g., treatment, payment, and

[64] Source: State Medicaid Director [SMD] letter # 18-005
[65] Source: MES APD –COP, April 22, 2020
[66] Source: MES APD –COP, April 22, 2020

operations)[67]. Puerto Rico reportedly has not yet formally established an electronic exchange consent policy for patients, although the Health IT Coordinator has expressed the desire for the Commonwealth to adopt an "opt-in" model. In an opt-in model, the default is that no patient data are automatically made available for electronic exchange unless a patient actively expresses their desire to participate.

In addition, in 2006, the Commonwealth participated in a Privacy and Security Solutions project funded by the Agency for Healthcare Research and Quality (AHRQ). According to a report developed by the ONC in 2007 summarizing project results, at the time, Puerto Rico's laws and regulations were "limited on the privacy and security of health information exchange," there was "an urgent need to review and update these laws," and the project "provided needed momentum in this direction."

The ONC also reported that the project team completed a draft security and privacy policy model for the integrated health information system, as well as a draft health information exchange patient consent clause that provided "explicit privacy and security dimensions intended to increase trust and confidence and promote utilization." These models were reportedly adopted by two PRDoH health information initiatives (i.e., the Hospital Information System/Electronic Medical Record Project and the Project), and Puerto Rico was reportedly working to implement privacy and security data-sharing agreements with states such as New York and Massachusetts.[68]

BerryDunn was unable to find additional information on the status of the Privacy and Security Solutions project, including whether the initial efforts were sustained and/or expanded to other HIE initiatives and efforts and whether any of the privacy security policies remain in place or may be leveraged by PRHIN as it contemplates patient consent policies in Puerto Rico.

5.4.2 Provider and Payer Participation

Puerto Rico Law 40 permits the PRHIN Board to "promote the active participation of health service providers in Puerto Rico, in terms of electronic exchange through health information standards, in a safe and effective manner." However, Puerto Rico law does not currently require provider or payer participation in the PRHIE.

5.4.3 Data-Sharing Agreements

PRDoH has initiated Business Associate Agreements (BAAs) with community laboratories as part of its initial efforts to increase interconnectivity between the laboratories and PRDoH's Epidemiology Division in response to the COVID-19 outbreak. The Health IT Coordinator

[67] Source: https://www.healthit.gov/topic/health-information-privacy-law-and-policy
[68] Sources: https://digital.ahrq.gov/sites/default/files/docs/page/privacy-and-security-solutions-for-interoperable-hie-impact-analysis.html#4.1.27 and https://digital.ahrq.gov/ahrq-funded-projects/past-initiatives/privacy-and-security-project/puerto-rico

indicated that the BAA will be leveraged to enter into agreements with other healthcare entities that opt to exchange information with PRDoH through the PRHIE.

The Health IT Coordinator also reported that PRDoH is in the process of creating a supplement data usage/exchange document that outlines requirements for exchanging information with the PRHIE.

5.4.4 Other

The Interoperability and Patient Access final rule[69] requires CMS-regulated payers, including Medicaid managed care plans and any payers participating in Medicaid and Medicare, to have the following:

By January 1, 2021

- Patient access via secure API to claims/encounter information, costs, and clinical information
- Publicly available provider directory via API

In spring 2021

- Electronic ADT notifications by hospitals to other providers

By January 1, 2022

- Payer-to-payer exchange of certain patient clinical data (specifically the USCDI version 1 data set) at the patient's request

Starting April 1, 2022

- Exchange federal-state dually eligible data from monthly to daily

In late 2020, CMS will begin publicly reporting non-compliance for:

- Information blocking by eligible providers that attested to certain MU Stage 3 measures
- Providers that do not list or update their digital contact information (e.g., a Direct Address, FHIR API endpoint) in the National Plan and Provider Enumeration System

The 21st Century Cures Act also requires payers and developers to use specified standards for interoperability:

- FHIR HL7 Version 4.0.1 FHIR Specification Release 4, October 30, 2019
- SMART IG / OAuth 2.0 Application Launch Framework Implementation Guide Release 1.0.0, November 13, 2018
- OpenID Connect Core 1.0 Incorporating Errata Set 1, November 8, 2014

[69] Source: https://www.cms.gov/Regulations-and-Guidance/Guidance/Interoperability/index

- USCDI vocabulary standards, February 2020, Version 1 (v1), for payers to share their USCDI data with patients via the patient access API and with other payers via payer-to-payer exchange

5.5 Stakeholder Readiness

Using information gathered through fact-finding meetings, the web survey, and review of background documentation, BerryDunn assigned a "Low," "Moderate," "High," or "Not Assessed" status to each key stakeholder group to reflect the group's readiness to adopt the use of health IT and participate in health information exchange with PRDoH. The definition of each readiness level—which is based on Prosci®'s ADKAR® model[70]—is provided in Table 18.

Table 18: Stakeholder Readiness Level Definitions

Readiness Level	Definition
Low	Stakeholder readiness for change is perceived to be low. A significant segment of the stakeholder group is not aware of the need for change and/or does not have the desire, knowledge, and ability—from a financial, technical, and behavioral perspective—to support the change. Systems and processes are not in place to reinforce the changes after they are implemented.
Moderate	Stakeholder readiness for change is perceived to be moderate. A significant segment of the stakeholder group may be aware of the need for change but has limited desire, knowledge, and ability—from a financial, technical, and behavioral perspective—to support the change. Systems and processes may not be in place to reinforce the changes after they are implemented.
High	Stakeholder readiness for change is perceived to be high. A significant segment of the stakeholder group is aware of the need for change and has the desire, knowledge, and ability—from a financial, technical, and behavioral perspective—to support the change. Systems and processes are in place to reinforce the changes after they are implemented.
Not Assessed	BerryDunn did not assess readiness for change for this stakeholder group as not enough information was available.

Table 19 provides a summary of the perceived status of each stakeholder group's readiness for change. The assigned status for each group is derived from perceptions shared by stakeholders via meetings and web surveys, and BerryDunn's interpretation of those perceptions. Therefore, PRDoH should view the designations as a guide only as it plans for and implements stakeholder engagement and change management strategies that maximize the likelihood of the success of health information exchange across Puerto Rico.

Table 19: Status of Stakeholder Readiness

Stakeholder Group	Status	Observations

[70] Source: https://www.prosci.com/adkar/adkar-model

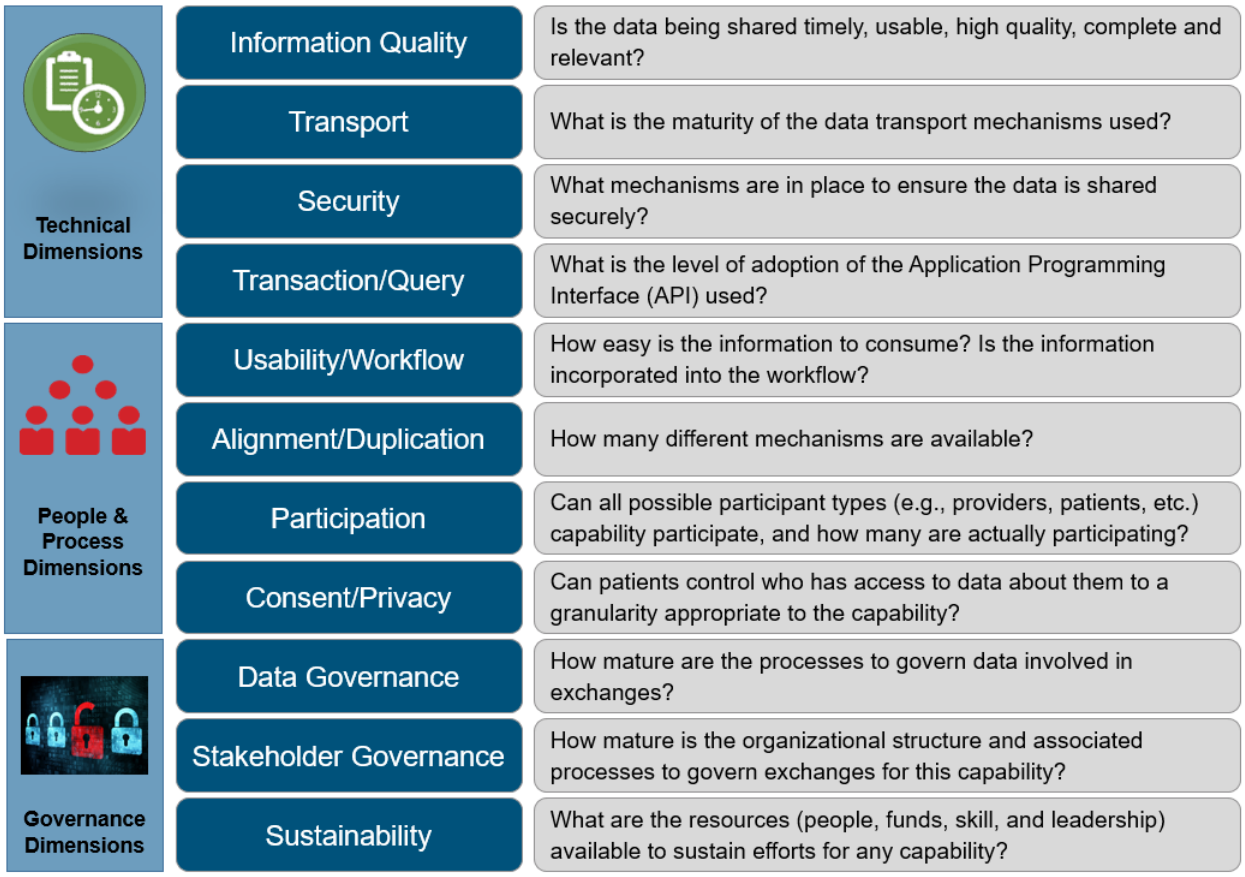
Stakeholder Group	Status	Observations
Patients/consumers		High willingness to allow information to be shared and desire to have easy access to personal health information online, but lower desire/interest in entering own personal health information (e.g., via a portal or app); technology barriers might also exist, i.e., access to smartphones, computers, or other devices (particularly among seniors or lower-income individuals/families), and access to reliable internet
PRHIN		Although there appears to be a high degree of awareness and desire for change among key Commonwealth leaders, a governance structure and systems and processes are not yet in place to implement the changes or to reinforce the changes in a sustainable manner after they are implemented
PRDoH		Although there appears to be a high degree of readiness within PRMP from behavioral, technology, and other perspectives, other PRDoH Offices/Divisions might not have the same level of engagement and/or technological readiness to support health information exchange
ASSMCA		Generally high willingness and ability to support exchange of health information
Hospitals		Generally high willingness and ability to exchange health information
FQHCs		Generally high willingness and ability to exchange health information
Independent Physicians		High willingness and ability to exchange health information among some providers; however, other providers are less willing or able to participate (for reasons including privacy/security concerns, changes to workflows, limited staff resources and time required to implement and use technology, and cost) and/or the technologies required to support the change
LTC and HCBS Providers		Not enough data available at time of report completion to determine a status
Behavioral Health Providers		Not enough data available at time of report completion to determine a status
Community Laboratories		High willingness to and ability to exchange health information; efforts underway to exchange health information with PRDoH in response to the COVID-19 pandemic
Pharmacies		Not enough data available at time of report completion to determine a status
Diagnostic Imaging Facilities		Not enough data available at time of report completion to determine a status
EMS Providers		Not enough data available at time of report completion to determine a status
Health IT Vendors		Many EHR vendors supporting providers on the island do not meet 2015 Edition of CEHRT; vendor training of providers on systems is also reported to be inadequate
Payers		High technical readiness to support exchange of health information,

Stakeholder Group	Status	Observations
		and some stakeholders report a high perceived readiness to exchange health information; however, other stakeholders report strong resistance from payers to share health information as they are currently not incentivized to do so, i.e., in the current healthcare environment, it is in their best interest not to share the data

5.6 Priority Health IT Capabilities

The ONC HISMM maturity model provides government agencies a framework for assessing the maturity of its current health IT capabilities in order to understand gaps, determine next steps to incrementally improve the capabilities, and inform future HIT investments. Figure 5 includes the recommended assessment areas (i.e., dimensions) that should be explored for each applicable health IT capability. Each dimension is evaluated and assigned a maturity level (from 0-5). A description of the levels (from 0-5) for each of the maturity dimensions is provided in Appendix D: HISMM Dimensions Maturity Sheet.

Figure 5: ONC HISMM Maturity Dimensions[71]



PRHIN's priority health IT capabilities[72] include:

- HC1 – Patient-Generated Health Data

[71] Source: Based on information from Health Information Sharing Maturity Model, G. Hamilton and T. Novak, March 8, 2018

[72] A description of the capabilities can be found in Section 4.3 Priority Health IT Capabilities of this report.

- HC2 – Patient Portal Information
- HC3 – ADT Events/Encounter Alerting
- HC4 – Care Plans
- HC5 – Health Record
- HC6 – Prescription Monitoring
- HC7 – Disease and Public Health Registry Information
- HC8 – Immunization Registry
- HC9 – Patient Identifiers

BerryDunn attempted to complete a full assessment of all nine health IT capabilities; however, due to the project constraints described in Section 2.5, BerryDunn was only able to assess HC8 – Immunization Registry. The results are described below.

HC8 – Immunization Registry

Current maturity levels for the immunization registry are low as PRDoH experienced power outages in March 2020 that damaged the IIS' hardware. Planned opportunities for advancement in maturity are anticipated with the implementation of a new IIS, STC One, in November 2020.

Table 21: Immunization Registry Capability Matrix

ID	Dimensions	Current Maturity Level	Planned Maturity Level	Related Health IT Assets	Observations
Immunization Registry					
HC8	Information Quality	1	3	PRIR	Manual processes are used to validate data submitted to the PRIR
	Transport	2	4	PRIR	PRDoH provides HL7 guidance as recommended by CDC
	Security	0	0	PRIR	Unknown baseline Confidentiality/Integrity/Availability (CIA) policies
	Transaction Query	0	3	PRIR	Metrics for capturing transaction and query usage are unknown
	Alignment/Duplication	0	0	PRIR	Metrics for tracking duplication are unknown
	Usability Workflow	0	3	PRIR	Immunization data is currently in a backup database and is not easily accessible
	Participation	0	1	PRIR	Metrics for capturing participation are unknown
	Consent/Privacy	0	0	PRIR	Metrics for capturing consent are

ID	Dimensions	Current Maturity Level	Planned Maturity Level	Related Health IT Assets	Observations
					unknown
	Data Governance	1	1	PRIR	Security and Confidentiality agreements are in place
	Stakeholder Governance	2	2	PRIR	Data/IIS Manager-led within PRDoH
	Sustainability	3	3	PRIR	Federally supported

6 Gap Analysis

6.1 Summary of Gaps

BerryDunn has categorized gaps in PRDoH's health IT/HIE planning and implementation efforts into one of several assessment areas. For the purposes of this assessment, a gap is defined as an activity that has not been completed or an item (e.g., a technology component, organizational resources, law) that does not exist in the current environment that PRDoH may need to address to fulfill its vision for the desired future environment and achieve its goals.

Table 22 provides a description (for the purposes of this report) of each assessment area.

Table 22: Overview of Health IT/HIE Assessment Areas

Assessment Area	Description
Governance/Operations	Overarching structure, policies, and processes—including decision making—used to govern the PRHIE; also includes operational components such as staffing
Technology	Health IT infrastructure, services, or other assets that comprise the PRHIE, or that support future health IT capabilities (considers factors such as completeness of solutions, scalability, interoperability, and maintainability)
Finance	Cost of implementing and operating the PRHIE, revenues/funding to offset costs, and other financial considerations such as long-term financial sustainability
Policy/Legal	Policy and legal framework required to support strategies for health IT advancement (e.g., laws requiring participation in health IT and exchange, potential financial mechanisms, patient consent) and adherence to national laws
Stakeholder Readiness	Readiness of stakeholders to participate in exchange of health information, e.g., awareness of the benefits of health information exchange and a desire to participate; knowledge of how to participate; ability to participate technologically, financially, and operationally; and existence of a structure to reinforce changes in an ongoing manner

Table 23 provides a summary of the number of gaps identified by assessment area.

Table 23: Summary of Gaps

Assessment Area	Number of Gaps
Governance/Operations	4
Technology	7
Finance	2

Assessment Area	Number of Gaps
Policy/Legal	3
Stakeholder Readiness	1
Total	**17**

6.2 Description of Gaps

Table 24 provides a description of gaps between the current environment and PRDoH's desired future environment and the potential impact of each gap if it is not addressed. For ease of reference and traceability, BerryDunn has labeled each gap with an alphanumerical identification (ID) tag, based on the assessment area in which a gap is categorized.

Table 24: Description of Gaps

ID	Gap Description	Potential Impact
Governance		
G1	The Commonwealth has not yet established the PRHIN Board and Committees; however, planning and implementation activities are underway, and financial investments are being made in the PRHIE.	Without the Board and Committee structure in place, key decisions cannot be made, or they are being made with the best information available but without appropriate guidance from the intended governing body, as established in law. As a result, foundational activities (as elaborated on in other gaps) that must occur early in the development of the PRHIE cannot occur. In addition, the HIE activities that PRDoH *is* proceeding with may not align with the Board's vision, goals, guiding principles, and/or priorities, and resources and efforts may need to be redirected when the Board is established.
G2	In the absence of a formal governance structure and supporting staff and processes, a formal stakeholder engagement approach has not been developed and implemented.	Proceeding with HIE planning and implementation activities without engaging key stakeholders in a deliberate and consistent manner adds risk that the PRHIE may not align with stakeholder priorities, fulfill stakeholder needs, and/or adequately consider stakeholder constraints. Ultimately, this may decrease the perceived value of the PRHIE and impact stakeholder buy-in and use of the PRHIE.

ID	Gap Description	Potential Impact
G3	Although the PRHIN Board and Committees will include participants from public agencies and private entities, additional governance structure elements may be required to help ensure alignment across domains (e.g., technology, policy, finance) and entities.	Lack of an overarching governance structure—for example, an Advisory Council comprised of key stakeholder groups—may compromise alignment across health IT domains and public and private entities, decrease the perceived value of the PRHIE, and impact stakeholder buy-in and use of the PRHIE.
G4	With the exception of the Health IT Coordinator role, staff have not yet been allocated to support the PRHIN.	Given the significant level of effort required to establish an HIE and the specialized skillsets required to do so, the lack of critical staff roles for the PRHIN—such as legal and finance experts—may hinder planning and implementation efforts, and critical activities may not be performed, or may be performed inadequately. Given the complicated history of previous government-funded HIE efforts in Puerto Rico, missteps early in the establishment of the PRHIN may cause stakeholders to lose trust, which will be difficult to regain.
Technology[73]		
T1	A health IT/HIE roadmap that outlines PRHIN's long-term strategy and prioritized health IT initiatives—including governance, technology, financial, policy/legal, stakeholder engagement, and other key areas—to achieve the long-term strategy has not been created.	Proceeding with HIE planning and implementation activities in the absence of a long-term strategy and roadmap of prioritized initiatives may result in resources and efforts being expended unnecessarily or in a suboptimal manner, or in misalignment with Board and/or stakeholder priorities. In addition, interdependencies between initiatives may not be clearly understood, which may compromise the success of activities that are undertaken and/or their sustainability. A health IT/HIE roadmap will also help justify future FFP requests; the lack of a roadmap may slow the federal review process and make it difficult to maintain a consistent narrative in subsequent requests for federal funding.

[73] The ID and HIT Capability Name (as summarized in Section 4.3) of applicable health IT capabilities (if any) are provided in parentheses at the end of the description of each technology gap.

ID	Gap Description	Potential Impact
T2	Patient access to the internet and to personal medical devices, smartphones, other mobile devices, and computers may be limited. *(HC1 – Patient-Generated Health Data, HC2 – Patient Portal Information)*	Patients' ability to provide patient-generated data via the PRHIE's patient portal will be negatively impacted, reducing the data that is available to be shared with providers via the PRHIE to improve health outcomes and achieve other goals. In addition, patient access to health information via the PRHIE's patient portal may be reduced.
T3	PRDoH's goals include increasing patients' engagement in their individual health and wellness. To help achieve this goal, PRHIN intends to provide a patient portal as part of the PRHIE. However, several patient portals are reported to already exist in the current environment. *(HC1 – Patient-Generated Health Data, HC2 – Patient Portal Information)*	If the patient portal that is developed as part of the PRHIE does not demonstrate value beyond that which existing patient portals already provide, it may be redundant for many patients, and its use may be limited. Use of the patient portal may be further limited if the value of the portal is not promoted to patients, and/or if it is not readily accessible or easy to use by them.
T4	A full understanding of EHR maturity—including technical interoperability capabilities within the provider community—is unknown, but stakeholder reports indicate that many EHRs being used by providers in Puerto Rico do not meet 2015 Edition CEHRT Standards. *(HC3 – ADT Events/Encounter Alerting, HC4 – Care Plans, HC5 – Health Record)*	Use of outdated EHR technologies may impact the ability of providers to fully participate in health information exchange and to achieve MU Stage 3, and it may impact achievement of goals for the PRHIE.
T5	Electronic systems to support syndromic surveillance reporting, case reporting of reportable conditions, and clinical data registry reporting do not currently exist in Puerto Rico. In addition, although PRDoH is currently successfully implementing electronic lab reporting with reference labs to support COVID-19 test results reporting, additional lab results reporting is not yet supported. *(HC7 – Disease and Public Health Registry)*	The lack of electronic systems to support public health and electronic lab reporting will impact the ability of public health and lab data to be exchanged with the PRHIE and will limit the ability of the PRHIE to provide a single, consolidated view of health information to patients and providers. In addition, the lack of electronic public health reporting systems may impact the ability of EPs and EHs to achieve MU Stage 3 consolidated public health reporting objectives.

ID	Gap Description	Potential Impact
T6	Due to major power outages on the island, PRDoH's electronic IIS is not functional, and an alternative manual process is currently being used. Implementation of a new IIS to support electronic reporting is planned for November 2020. *(HC8 – Immunization Registry)*	The lack of an electronic IIS will impact the ability of immunization data to be exchanged with the PRHIE and will limit the ability of the PRHIE to provide a single, consolidated view of health information to patients and providers. In addition, the lack of a functioning IIS may impact the ability of EPs and EHs to achieve MU Stage 3 consolidated public health reporting objectives.
T7	Although detailed information on planned HIE infrastructure was not made available to BerryDunn, based on preliminary information, core technology infrastructure components required for health IT activities[74] may not be included in initial planning and implementation initiatives, e.g., consent management. Other core technology components—such as identity management, security, provider directories, and data extraction, transformation, and aggregation—appear to be addressed either through Health Gorilla's preliminarily planned scope of work, or through other technologies (e.g., the use of the PRMMIS provider enrollment module). However, an HIE Solution Planning Document and Technical Architecture Document providing a complete, comprehensive, integrated view of the PRHIE's planned technical architecture has not been developed yet. *(HC9 – Patient Identifiers)*	If a complete and comprehensive Technical Architecture Document is not created and foundational core health IT/HIE infrastructure components are not implemented in alignment with MITA standards and conditions, compliance with federal and industry standards may not be met; the value, effectiveness, and efficiency of the PRHIE may not be maximized; and currently planned and future health IT capabilities may not be adequately supported.

[74] Based on ONC's modular health IT model ONC SIM Health IT Resource Center, Health IT-Enabled Quality Measurement Strategic Implementation Guide, Version 1 – January 2017.

ID	Gap Description	Potential Impact
Finance		
F1	A comprehensive, multi-year implementation and operational budget (including both costs and revenues/funding) has not been developed.	Without an understanding of the projected costs to implement and operate the PRHIE in the short- and long-term (e.g., next five years), an accurate estimate of the revenues/funds and the detailed funding strategies required to help ensure the financial sustainability of PRHIN cannot be developed.
F2	Outcomes-based metrics for the PRHIE that demonstrate improvement in the Medicaid program have not been established.	In the future, CMS will require OBC for HIEs as part of the MES. If outcomes-based metrics that support the Medicaid program are not considered early in the planning process, and the PRHIE is not developed and implemented in a manner that supports improved outcomes for the Medicaid program, certification of the HIE and ongoing operational FFP (75%) from CMS may be at risk.
Policy/Legal		
P1	Patient consent policies have not been established.	If specific consent policies are not in place for either the PRHIE entity, or more broadly for the Territory, then the default guidance for consent to view and share health information is based on HIPAA. For organizations governed by 42 CFR Part 2, additional federal consent considerations associated with certain sensitive information exist. The federal requirements act to help ensure the protection of personal health information, but result in a lack of information viewing and sharing due to provider concerns related to liability. This may impact care coordination and the development of longitudinal health records.

https://www.healthit.gov/sites/default/files/onc_hiteqm_strategyimplementationguide.pdf See Appendix B: Modular Health IT Function Guide page 5-10

ID	Gap Description	Potential Impact
P2	Provider and payer participation in health information exchange with the PRHIE is currently voluntary. However, to help ensure the value of the PRHIE to stakeholders, laws that mandate sharing of health information may be necessary if participation rates are low.	The completeness of data will be impacted if providers and payers do not participate in health information exchange, ultimately impacting the utility and sustainability of the PRHIE.
P3	Puerto Rico's Law 40 of 2012[75] might not reflect the current needs of the PRHIN as the environment within Puerto Rico and health IT/HIE more broadly has changed significantly since the Commonwealth first established the law. For example, the Board structure might not include adequate representation from Commonwealth and external stakeholder entities.	If the PRHIN is established based on a law that no longer aligns with the actual needs of the organization and does not reflect current environmental factors, PRHIN's ability to effectively and efficiently achieve its desired goals and objectives may be hindered.
Stakeholder Readiness		
S1	Although certain segments of key stakeholder groups express strong awareness of the need for change and a desire to change, technological readiness is low for certain stakeholders (e.g., patients/consumers, some providers), and stakeholders report that other barriers to exchange of health information exist (e.g., reluctance to share information, privacy/security concerns, impact on workflows).	If stakeholder resistance and/or other barriers to health information exchange are not addressed, buy-in and use of the PRHIE may be negatively impacted, compromising the ability to achieve the vision, goals, objectives, and desired outcomes for the PRHIE.

[75] Source: http://www.lexjuris.com/lexlex/Leyes2012/lexl2012040.htm

7 Recommendations

Table 25 provides high-level recommendations for PRDoH's consideration to help achieve its desired future vision, goals, and objectives and to close the gaps between the current and desired future environment, as described in Sections 4 and 5 of the report. In addition to a description of the recommendation, the table includes the primary and secondary gaps (from Section 6.2) addressed by each recommendation, and the priority of the recommendation based on the recommendation's ability to allow PRDoH to fully achieve its HIE vision, goals, and objectives. Recommendations are listed in the order of the primary gap(s) (as described in Section 6.2) that they address.

Priority is defined as:

- Foundational: Essential building block to achieve the Commonwealth's initial HIE vision, goals, and objectives in a timely manner
- Secondary: Necessary action to further grow and sustain the Commonwealth's health IT/HIE infrastructure and achieve its HIE vision, goals, and objectives

Table 25: Health IT/HIE Planning and Implementation Recommendations

Recommendation Description		
Recommendation 1: Implement an effective governance structure for the PRHIN, inclusive of the Board and supporting Committees		
Primary Gap Addressed: *G1*	***Secondary Gaps Addressed:*** *All*	***Priority:*** *Foundational*
Implement the requirements in Puerto Rico Law 40 of 2012—including establishing the seven-member Board—to support initial HIE planning and implementation efforts and make decisions in critical areas such as policy and standards development, funding strategies, and technological priorities (as elaborated on in other recommendations). Create the Committees on Finance, Technological Infrastructure, the Public/Clinical Health, and Health Service Payers and additional temporary or permanent committees as needed to inform the Board's decision making in these and other critical areas.		
Recommendation 2: Establish an Advisory Council comprised of stakeholders		
Primary Gaps Addressed: *G2, G3*	***Secondary Gaps Addressed:*** *S1*	***Priority:*** *Foundational*
Establish an Advisory Council to provide feedback that informs Board and Committee decision making. Help ensure representation from key stakeholder groups (e.g., patients/consumers, hospitals, Primary Health Centers, independent physicians, dentists, payers, etc.), and allow open meetings for broader stakeholder input. Consider establishing a charter and purpose, roles and responsibilities, meeting schedule, etc. Example activities that the Advisory Council may engage in include reviewing and providing input into (or approval of) health IT/HIE strategic plans, informing the development of HIE use cases and prioritization of health IT capabilities, and helping assess and address stakeholder readiness.		
Recommendation 3: Leverage the PRHIN governance structure to prioritize future health IT/HIE capabilities		

Recommendation Description		
Primary Gaps Addressed: *G1, G2*	***Secondary Gaps Addressed:*** *T1*	***Priority:*** *Secondary*
Leverage the governance structure established for PRHIN to review and prioritize additional health IT capabilities beyond the initial nine capabilities identified in this report to drive development of a roadmap for future health IT/HIE investments. Establish principles to guide prioritization and decision-making efforts, such as: • Leverage existing resources and national standards to the degree possible and feasible • Cultivate support and establish credibility by demonstrating timely, incremental progress • Invest in core health IT infrastructure and functionalities to create and support services with maximum value (cost vs. benefit) • Protect the health information of Puerto Ricans • Align with MES priorities (as expressed in documents such as the State Plan Amendment [SPA] and waivers) Leverage the Advisory Council to gather inputs, develop HIE use cases[76] that align with PRHIN's guiding principles for health IT efforts, and establish value propositions to prioritize/sequence the use cases to inform subsequent procurement and implementation efforts. Align financial decisions with prioritized health IT/HIE capabilities.		
Recommendation 4: Develop and implement an organizational structure and staffing plan for the PRHIN		
Primary Gap Addressed: *G4*	***Secondary Gaps Addressed:*** *All*	***Priority:*** *Foundational*
Design and implement the organizational structure required to support the PRHIN, as permitted in Puerto Rico Law 40. Develop a phased staffing plan based on the roadmap, key roles needed to support the roadmap, and priority initiatives (e.g., legal/policy and financial activities). Determine the mix of permanent staff versus temporary contractors and/or consultants needed based on the duration of support and the specific subject matter expertise required. Identify a strategy to fund staff and other positions, as well as a recruiting and onboarding strategy.		
Recommendation 5: Develop and periodically update a health IT/HIE roadmap with prioritized initiatives and a plan to help PRDoH achieve its health IT/HIE vision, goals, and objectives		
Primary Gap Addressed: *T1*	***Secondary Gaps Addressed:*** *F1, G4*	***Priority:*** *Foundational*
Develop a health IT/HIE roadmap based on PRDoH's vision, goals, and objectives. Leverage guiding principles for prioritization of health IT/HIE activities and investments in health IT/HIE infrastructure and services—in alignment with PRDoH's vision, goals, and objectives. Identify initiatives (in part based on the recommendations in this report) to address key domains such as governance, technology, finance, policy/law, and stakeholder engagement. Include information such as initiative description, purpose, expected outcomes, actions required, initiative owner, primary stakeholders, time frame, interdependencies,		

[76] PRHIN may be able to leverage use cases from other public and private entities, customizing as needed to reflect Puerto Rico's needs (e.g., https://mehi.masstech.org/programs/mass-hiway/health-information-exchange-toolkit/use-case-library).

Recommendation Description		
and potential funding sources.		
Recommendation 6: Evaluate and address potential barriers to gathering patient-generated data and to patients using the PRHIE's patient portal, and implement solutions to support use of the data		
Primary Gaps Addressed: *T2, T3*	***Secondary Gaps Addressed:*** *None*	***Priority:*** *Secondary*
Leverage the PRHIN Committees and Advisory Council, and perform additional outreach to patient advocates and stakeholders, to identify potential barriers to patients generating and providing health data to the PRHIE through the patient portal or other access points. Develop strategies to remove barriers and to promote the value of the patient portal to increase use, and incorporate strategies and initiatives into the health IT/HIE roadmap, the implementation and operational budget, and other planning and strategy documents. As the PRHIE evolves to an operational status and the data management infrastructure is developed, the potential variety, volume, and uses of patient-generated data should be considered in the requirements for data management solutions. In particular, consider: • Solutions to analyze patient-generated data and identify and flag indicators for providers • Tools for analyzing aggregated patient-generated data		
Recommendation 7: Conduct a comprehensive survey of EHR deployment status in Puerto Rico, and deploy a strategy to expand use of EHRs meeting the 2015 Edition of CEHRT		
Primary Gap Addressed: *T4*	***Secondary Gaps Addressed:*** *T5, T6, S1*	***Priority:*** *Foundational*
Conduct a comprehensive survey of the status of EHR use, including the percentage of EHRs that meet 2015 CEHRT criteria and barriers to provider adoption. Although BerryDunn's health IT assessment attempted to gather high-level preliminary information on the status of EHR use, to gain a more comprehensive and detailed understanding—and to further assess stakeholder readiness—a multi-method (e.g., phone calls, in-person meetings, paper surveys, and web surveys) and multi-touch approach may be required. Based on the results of the survey, develop a strategy and tactics to support the expanded footprint of EHRs that meet the 2015 Edition of CEHRT in Puerto Rico, such as cost, limited technology proficiency, and level of effort/time for providers to implement. Include initiatives related to this topic in the health IT/HIE roadmap.		
Recommendation 8: Evaluate PRDoH's public health registry and electronic lab reporting technologies to determine readiness to exchange health information, and develop a strategy to support exchange		
Primary Gaps Addressed: *T5, T6*	***Secondary Gaps Addressed:*** *None*	***Priority:*** *Secondary*
Evaluate and understand the current and planned maturity levels for the immunization and other public health registries, and determine how PRDoH and PRHIN can help advance maturity levels to support electronic health information exchange. Incorporate initiatives and activities into the health IT/HIE roadmap. For technologies that are more advanced (or that are planned to be in the near future), such as the IIS and electronic lab reporting), incorporate more detailed plans for health information exchange into the HIE Solution Planning Document (in scope for the HIE vendor). Build upon the existing proof of concept (POC)		

Recommendation Description		
with reference labs related to COVID-19 by expanding interoperability with other types of electronic lab reporting.		
Recommendation 9: Complete development of an HIE Solution Planning Document and Technical Architecture Document, and assess the alignment of proposed solutions with the ONC-recommended health IT modular components[77]		
Primary Gap Addressed: *T7*	***Secondary Gaps Addressed:*** *T1-T6*	***Priority:*** *Foundational*
Complete development of an HIE Solution Planning Document that outlines currently planned health IT/HIE solution components, including alignment with PRDoH's priority health IT capabilities and use cases. Include a Technical Architecture Document that describes the proposed PRHIE technical architecture, helping to ensure alignment with MITA. Leverage the ONC's model of core infrastructure modular components (including the HISMM) to help ensure foundational components are in place and planned initiatives are aligned with essential functional capabilities. Use the documents to inform the health IT/HIE roadmap and the implementation and operational budgets.		
Recommendation 10: Develop a five-year implementation and operational budget and a funding strategy to help ensure sustainability of the HIE		
Primary Gaps Addressed: *F1*	***Secondary Gaps Addressed:*** *All*	***Priority:*** *Foundational*
Develop a comprehensive, five-year implementation and operational budget based on the phases and initiatives established in the health IT/HIE roadmap. Identify all cost components—such as required staff, technology, administrative costs, consultant fees, etc. Identify which cost components may be eligible for MES/MMIS administrative (50% FFP); DDI (90% FFP); or maintenance (75% FFP) funding. Begin planning the HITECH to MES APD transition, and identify a schedule for APD submission (e.g., when health IT/HIE solutions should transition to MES funding in one or multiple APDs). Develop a cost allocation plan for systems and functionality that do not support the Medicaid program. Identify sources and develop a plan for funding the Commonwealth's required match for FFP and costs that cannot be allocated to the Medicaid program, including private sector funding that may be required (e.g., fees to carriers). Determine policy and other changes that will be required to implement the funding strategy.		
Recommendation 11: Develop outcomes-based metrics for the PRHIE		
Primary Gaps Addressed: *F2, F1*	***Secondary Gaps Addressed:*** *T1*	***Priority:*** *Foundational*
To help secure FFP for ongoing operational costs of relevant systems and functionality, develop metrics to demonstrate how the PRHIE will help achieve outcomes that improve the Medicaid program. Per CMS guidance, the outcome statement should focus on the important capabilities and the benefit (e.g., efficient, economical, and effective administration of the plan) to the Medicaid program, beneficiaries, and/or providers. CMS also indicates that metrics must demonstrate whether the outcome is being met in a quantitative manner, and recommends that states/territories use data that they already have or that they would already be required to produce.		

[77] Although these documents are included in the HIE vendor's proposed scope of work, the status of their development is unknown as they were not made available to BerryDunn upon request.

Recommendation Description		
Example outcomes related to the health IT capabilities within scope of the initial PRHIE implementation include: • Providers have the ability to bi-directionally exchange data with an IIS to improve reporting and eliminate duplicative immunizations • Reduce Emergency Department (ED) and hospital readmissions by improving outreach and care coordination across care team members • Improve insight into Medicaid services by identifying utilization of ED and hospital admissions and gaps in services to inform Medicaid's program administration and providers on Medicaid population's health[78]		
Recommendation 12: Develop policies for patients' meaningful consent for health information exchange		
Primary Gap Addressed: *P1*	***Secondary Gaps Addressed:*** *S1*	***Priority:*** *Foundational*
Develop policies—in alignment with the U.S. DHHS "Meaningful Consent for Electronic Health Information Exchange[79]" framework and the Office for Civil Rights "Individual Choice" principle[80]—to adequately inform patients of HIE activities and to give them the choice whether or not to participate, which may help build patient (and provider) trust in the HIE. Engage and collaborate with PRDoH's HIPAA Law Enforcement Office duty to help ensure federal and Commonwealth health privacy and security requirements are met, and with PRDoH's Office of the Patient Advocate to help ensure the patient perspective is reflected in the policies. Also consider whether or not to establish basic opt-in/opt-out policies, or more complex policies that provide patients' the ability to identify specific providers with whom they want to share/not share their health information electronically and/or only in the case of emergency. More complex patient consent policies may require a centralized electronic consent management system that allows patient consent directives to be maintained centrally and providers to readily retrieve the directives. Consider factors such as the implications of opt-in versus opt-out policies on the number of patient records the PRHIE will collect (i.e., based on other states' experiences, an opt-in policy will greatly reduce the number of records in the PRHIE), and the impact that collection rates will have on achievement of the goals for the HIE. If PRHIN proceeds with an opt-in consent policy, consider provider workflows and ease of use related to completion of consent forms (e.g., minimize use of multiple forms and systems) to maximize the number of patients who are asked to provide consent.		
Recommendation 13: Develop viable participation strategies to help ensure utilization of the PRHIE		
Primary Gap Addressed: *P2*	***Secondary Gaps Addressed:*** *None*	***Priority:*** *Secondary*
Explore strategies that help ensure voluntary or required provider and payer participation in health information exchange. Strategies that incentivize voluntary participation include prioritizing use cases that		

[78] Source: HIE COP, David Koppel (CMS), May 26, 2020
[79] Source: https://www.healthit.gov/topic/health-information-privacy-law-and-policy
[80] Source: https://www.hhs.gov/sites/default/files/ocr/privacy/hipaa/understanding/special/healthit/individualchoice.pdf

Recommendation Description		
provide significant value to providers (such as ADT alerts), demonstrating efficiencies for providers, and removing barriers to participation (e.g., providing technical and financial assistance). Also assess strategies that mandate participation (e.g., development of laws) if a critical mass of providers opt not to participate in exchange of health information voluntarily. Review other state models to garner lessons learned (i.e., strategies that worked or did not work), unintended consequences, and other impacts of various voluntary and mandatory participation strategies.		
Recommendation 14: Assess Puerto Rico's Law 40 of 2012 and develop proposed changes, as needed, to help ensure the law reflects the current health IT/HIE landscape and PRHIN's needs		
Primary Gap Addressed: *P3*	***Secondary Gaps Addressed:*** *None*	***Priority:*** *Foundational*
Assess Puerto Rico Law 40 to ensure that the law reflects changes within the health IT/HIE landscape since 2012 and the current needs of the PRHIN as environmental factors might have changed since the Commonwealth first established the law. Identify language within each Article that requires updates (e.g., faculties and duties, the Board and expert Committee structures), and follow the Commonwealth's processes for recommending, obtaining approval for, and implementing the proposed changes.		

8 Potential Opportunities

As PRDoH moves forward with planning and implementation of health IT/HIE infrastructure and capabilities in Puerto Rico, potential opportunities that may further enable achievement of the health IT/HIE vision and goals include:

- SUPPORT Act: The SUPPORT Act provides 100% Federal Medical Assistance Percentage (FMAP) to modify PDMPs to become qualified PDMPs, as defined by the Act. In addition, the same level of funding can be used to expand the utilization of the PDMP by onboarding provider systems with direct connections or by expanding subscribed usage through a PDMP portal. Puerto Rico has pursued SUPPORT Act funds, which must be expended by September 30, 2020. However there is an opportunity to continue any unfinished initiatives by incorporating the SUPPORT Act projects into an IAPD-U and converting to 90/10 funding for development and implementation projects.
- Patient Unified Lookup System for Emergencies (PULSE)[81]: PULSE is a service to support access to patient medical information in situations where patients have been displaced from their normal healthcare providers and care settings, e.g., during a natural disaster. Connections of HIEs and provider systems to the eHealth Exchange—which receives federal support and development assistance from the ONC—can be leveraged to make patient information in the connecting systems available to a remote or temporary care facility. A modified PULSE-COVID solution has been developed to allow better access for public health users[82]. Connecting a PDMP to a PULSE solution is underway in some states and will help ensure that PDMP data is available in temporary disaster recovery situations.
- Electronic Case Reporting (eCR) Now[83]: Public health agencies require labs to report certain designated lab results, and an associated requirement exists for providers to submit case reports related to these conditions. Frequently these case reports are paper-based, but they result in data being transcribed into public health systems and subsequently reported to the CDC. eCR Now is an electronic case reporting solution implemented directly from a hospital or provider EHR, with the data flowing to a national reporting point that can then being shared back with the jurisdiction in the form of an electronic message that can be translated into the public health system. The response is very fast and often times the case report is relayed back to the public health jurisdiction

[81] Source: https://sequoiaproject.org/wp-content/uploads/2020/01/PULSE_FactSheet-002.pdf
[82] Source: https://www.healthit.gov/techlab/ipg/node/4/submission/2816#:~:text=Developed%20by%20Audacious%20Inquiry%20and,which%20includes%20more%20than%2060
[83] Source: https://www.amia.org/sites/default/files/AMIA-COVID19-Webinar-Series-eCR-Public-Health-Informatics-2.pdf

before the lab results are reported. At least one vendor, Epic, is prepared to implement this on a very rapid turnaround, i.e., two to seven days. The CDC provides technical assistance. This is being rolled out as part of the response to the COVID-19 outbreak.

9 Next Steps

BerryDunn will facilitate review of the information documented and assessed in this report with PRDoH leadership and other key project stakeholders to gather their insights and make refinements as needed. BerryDunn will then facilitate decision-making with PRDoH to prioritize the final report recommendations and develop a health IT/HIE roadmap—inclusive of timelines, owners, actions, funding strategies, and performance measures—to implement the recommendations and other identified initiatives.

The identified gaps in Section 6 and the resulting recommendations in Section 7 will inform PRDoH funding requests to CMS in an IAPD-U in June 2020, with additional updates anticipated in an IAPD-U in September 2020. In addition, PRDoH and BerryDunn will incorporate information from the assessment into MITA SS-A documents to help ensure alignment with PRDoH's overall MES strategy.

10 Appendix A: Glossary of Acronyms

Table A1 provides a list of acronyms used in this report.

Table A1: Glossary of Acronyms

Acronym	Definition
ADT	Admission/Discharge/Transfer
AHPR	Asociacion de Hospitales de Puerto Rico
AHRQ	Agency for Healthcare Research and Quality
AI	Artificial Intelligence
APD	Advance Planning Document
APD-U	Advance Planning Document Update
API	Application Programming Interface
ARRA	American Recovery and Reinvestment Act
ASES	Administracion de Seguros de Salud
ASPPR	Puerto Rico Primary Health Association, Inc.
ASSMCA	Anti-Addiction Services Administration
BAA	Business Associate Agreement
BIAR	Business Intelligence Analytical Reporting
CCC	Comprehensive Cancer Center
CCD	Clinical Care Document
C-CDA	Clinical Consolidated Document Architecture
CDC	Centers for Disease Control and Prevention
CEHRT	Certified Electronic Health Record Technology
CHIP	Children's Health Insurance Program
CIA	Confidentiality/Integrity/Availability
CMS	Centers for Medicare and Medicaid Services
COP	Community of Practice
CT	Clinical Terms
DDI	Design, Development, and Implementation
DEA	Drug Enforcement Agency

Acronym	Definition
DHHS	Department of Health and Human Services
DS	Decision Support
DSL	Digital Subscriber Line
DSS	Decision Support System
DW	Data Warehouse
E&E	Eligibility Determination and Enrollment
eCR	Electronic Case Reporting
ED	Emergency Department
EDW	Enterprise Data Warehouse
EH	Eligible Hospital
EHR	Electronic Health Record
EMS	Emergency Medical Services
EP	Eligible Provider
ESB	Enterprise Service Bus
FCC	Federal Communications Commission
FDSH	Federal Data Services Hub
FFP	Federal Financial Participation
FFY	Federal Fiscal Year
FHIR	Fast Healthcare Interoperability Resources
FMAP	Federal Medical Assistance Percentage
FQHC	Federally Qualified Health Centers
HCBS	Home- and Community-Based Service
HCCN	Health Center Controlled
HHS	Health and Human Services
HIE	Health Information Exchange
HIPAA	Health Insurance Portability and Accountability Act of 1996
HISMM	Health Information Sharing Maturity Model
HIT	Health Information Technology
HITECH	Health Information Technology for Economic and Clinical Health Act

Acronym	Definition
HL7	Health Level Seven International
HMO	Health Maintenance Organization
HPE	Hewlett Packard Enterprise
HRSA	Health Resources & Services Administration
IAPD	Implementation Advance Planning Document
IAPD-U	Implementation Advance Planning Document Update
ID	Identification
IIS	Immunization Information System
IPAPR	Independent Practice Associations of Puerto Rico
IT	Information Technology
KPI	Key Performance Indicator
LLC	Limited Liability Company
LLP	Lower Layer Protocol
LOINC	Logical Observation Identifiers Names and Codes
LTC	Long-term Care
M&O	Maintenance and Operations
MAGI	Modified Adjusted Gross Income
MARS	Management and Administrative Reporting
MBE	Minority Business Enterprise
Mbps	Megabits per second
MCAC	Medical Care Advisory Committee
MCO	Managed Care Organization
MCS	Medical Card Systems
MEDITI2	Medicaid Integrated Technology Initiative 2
MES	Medicaid Enterprise Systems
MHS	Mennonite Health System
MITA	Medicaid Information Technology Architecture
ML	Machine Learning
MLLP	Minimal Lower Layer Protocol

Acronym	Definition
MMIS	Medicaid Management Information System
MPI	Master Patient Index
MPPIPR	Medicaid Program to Promote Interoperability of Puerto Rico
MU	Meaningful Use
NACCR	North American Associations of Central Cancer Registries
NBS	National Base System
NCPDP	National Council for Prescription Drug Programs
NCEMPR	Negociado del Cuerpo de Emergencias Médicas de Puerto Rico
NEDSS	National Electronic Disease Surveillance System
NMSDC	National Minority Supplier Development Council
OBC	Outcomes-Based Certification
OIAT	Office of Informatics in Advanced Technology
ONC	Office of the National Coordinator
PBM	Pharmacy Benefits Manager
PDMP	Prescription Drug Monitoring Program
PEP	Provider Enrollment Portal
PHSA	Public Health Services Act
PII	Personally Identifiable Information
PIP	Promoting Interoperability Programs
PPO	Preferred Provider Organization
PRCCR	Puerto Rico Central Cancer Registry
PRDoH	Puerto Rico Department of Health
PREE	Puerto Rico Eligibility and Enrollment
PRHIA	Puerto Rico Health Insurance Administration
PRHIE	Puerto Rico Health Information Exchange
PRHIN	Puerto Rico Health Information Network
PRIR	Puerto Rico Immunization Registry
PRMMIS	Puerto Rico Medicaid Management Information System
PRMP	Puerto Rico Medicaid Program

Acronym	Definition
PRPCAN	Puerto Rico Primary Care Association Network
PSM	Plan de Salud Menonita
PULSE	Patient Unified Lookup System for Emergencies
QC	Quality Control
RIDP	Remote Identity Proofing
RRV	Renewal and Redetermination Verification
SaaS	Software as a Service
SAMHSA	Substance Abuse and Mental Health Services
SDE	State-Designated Entity
SFTP	Secure File Transfer Protocol
SLR	State-Level Registry
SMD	State Medicaid Director
SMHP	State Medicaid Health Information Technology Plan
SMHP-U	State Medicaid Health Information Technology Plan Update
SNOMED	Systematized Nomenclature of Medicine
SOA	Service-Oriented Architecture
SOAP	Simple Object Access Protocol
SOC	Service Organization Control
SPA	State Plan Amendment
SSA	Social Security Administration
SS-A	State Self-Assessment
SSL	Secure Sockets Layer
STC	Scientific Technologies Corporation
SURS	Surveillance and Utilization Review Sub-System
TBQ	Territories' and States' Beneficiary Query
T-MSIS	Transformed Medicaid Statistical Information System
U.S.	United States
USCDI	United States Core Data for Interoperability
WBE	Woman Business Enterprise

Acronym	Definition
WSDL	Web Services Description
XML	Extensible Markup Language

11 Appendix B: Project Participants and Meetings

Table B1 includes a list of project stakeholders who participated in fact-finding activities and other project activities between April and June 2020—including the meetings they attended. Table B2 includes additional organizations that BerryDunn attempted to engage in fact-finding meetings but who were unable to be contacted. Table B3 includes the list of individuals and organizations that were sent web surveys for distribution.

Table B1: Project Participants and Meetings

Name	Title	Organization	Meetings Date(s)
Javier Jiménez Jirau	Senior Director of Business Development	Health Gorilla	May 12, 2020
Sergio Wagner	Chief Strategy Officer	Health Gorilla	May 12, 2020
Dan Oppenheimer	Marketing Manager	Health Gorilla	May 12, 2020
Mariana Lopez	Strategic Project Manager	Health Gorilla	May 12, 2020
Juan Pablo Semidey	President and CEO	Bridgewater Consulting Group	May 13, 2020
Mariela Vega	Director	Bridgewater Consulting Group	May 13, 2020
Celinés Nieves	Business Analyst	Bridgewater Consulting Group	May 13, 2020
Alexander Quevedo Pagán	Health IT Coordinator	PRDoH	Numerous
Luz E. “Nildy” Cruz Romero	State Medicaid Director	PRMP	May 14, 2020 May 15, 2020
Dr. Clyde Fasick	Representative, PRMP Medical Care Advisory Committee (MCAC)	Colegio de Dentistas	May 15, 2020
Lcdo. Iván Colón	Representative, PRMP MCAC	Health Insurance Sector	May 15, 2020 and May 28, 2020
Jimmy Báez-Salgado	Representative, PRMP MCAC	ASSMCA	May 15, 2020
Lcdo. Jorge Galva-Rodríguez	Representative, PRMP MCAC	ASES	May 15, 2020
Lcdo. Juan Gonzalez	Representative, PRMP MCAC	Farmacias de Comunidad	May 15, 2020
Dr. Luis Avilés	Representative, PRMP	Alianza Salud Para Un	May 15, 2020

Name	Title	Organization	Meetings Date(s)
	MCAC	Pueblo	
Nancy Vega	Representative, PRMP MCAC	American Association of Retired Persons (AARP)	May 15, 2020
Victor Ramos	Representative, PRMP MCAC	Colegio de Médicos	May 15, 2020
Veronica Rodriguez	IIS/Data Manager	PRDoH Immunization Program	May 18, 2020 and June 2, 2020
Dr. Jorge Hess	Representative, PRMP MCAC	Grupos IPA	May 27, 2020
Julia Santiago-Deliz, Esq.	Directora Oficina de Cumplimiento de Ley HIPAA	PRDoH	May 28, 2020
Various staff	Offices of Epidemiology and Biosecurity	PRDoH	June 11, 2020

Table B2: Organizations Contacted, Not Engaged

Organization Name	Outreach Method/Date(s)
AARP	Email request for fact-finding meeting—5/22/2020 and 5/28/2020
Alianza Salud Para Un Pueblo	Email request for fact-finding meeting—5/22/2020 and 5/28/2020
ASSMCA	Email request for fact-finding meeting—5/22/2020 and 5/28/2020
Colegio de Dentistas	Email request for fact-finding meeting—5/20/2020 and 5/28/2020
Colegio de Medicos	Email request for fact-finding meeting—5/20/2020 and 5/28/2020
Cooperativa de Laboratorios	Email request for fact-finding meeting—5/20/2020 and 5/28/2020
Farmacias de Comunidad	Email request for fact-finding meeting—5/20/2020 and 5/28/2020
Colegio Enfermería	Email request for fact-finding meeting—5/22/2020 and 5/28/2020
Hospitals	Email request for fact-finding meeting—5/22/2020 and 5/28/2020
Office of the Patient Advocate	Email request for fact-finding meeting—5/18/2020
Recinto de Ciencias Médicas	Email request for fact-finding meeting—5/22/2020 and 5/28/2020

Table B3: Organizations/Individuals Sent Web Surveys for Distribution

Organization	Individual Name
ASSMCA	Jimmy Baez-Salgado Suzanne Roig-Fuertes
Colegio de Dentistas	Dr. Rafael Torregrosa
Colegio de Medicos	Dr. Victor Ramos
Colegio Enfermería	Julio Irson Ramos
Farmacias de Comunidad	Juan González Linda Ayala
Hospitals	Jaime Plá
Interoperability Workgroup	Raúl Alicea-Morales
PRDoH Hospitals	Gisselle Van Derdys Jorge Matta Jose Garcia Luis Alvarez Neysha Carmona
Primary Care Association	Alicia Súarez
PRPCAN	Hector Garcia Magaly Lopez
Recinto de Ciencias Médicas	Dr. Roberto Ramírez

12 Appendix C: Information Sources

Table C1 provide a list of primary documents referenced by BerryDunn to develop the report.

Table C1: Documents

Document Name	Author	Document Date
Puerto Rico Department of Health Medicaid Management Information System Statement of Work: Module 1	HPE	August 2016 revision
Health Information Sharing Maturity Model (MS PowerPoint Presentation)	Tom Novak	March 8, 2018
Health Information Sharing Maturity Model Dimensions Maturity Sheet (MS Excel Spreadsheet)	ONC	Unknown
Health Information Technology APD-U v1.0	Luz Cruz-Romero	February 28, 2020
HIE COP (MS PowerPoint Presentation)	David Koppel	May 26, 2020
MES APD COP (MS PowerPoint Presentation)	CMS	April 22, 2020
PRMP MMIS and E&E Medicaid Update (MS PowerPoint Presentation)	Unknown	January 22, 2020
Promoting Interoperability Program –Medicaid	Bridgewater Consulting Group	May 13, 2020
Proposal for HIE and Interoperability Solution for Puerto Rico	Health Gorilla	February 2019
PRHIE Planning Project Kickoff	Health Gorilla	April 2, 2020
Puerto Rico SMHP	PRDoH	April 30, 2012
State Self-Assessment Appendix A – Seven Standards and Conditions	CMS	May 2014, Version 3.0

13 Appendix D: HISMM Dimensions Maturity Sheet

Tables D1 to D3 provide a description of the eleven HISMM dimensions from the ONC's HISMM Dimensions Maturity Sheet.

Table D1: Technical

Technical				
Level	**Information Quality**	**Transport**	**Security**	**Transaction/Query**
	Is the information timely, of high quality, complete and relevant?	*Is the mechanism used to exchange the data standardized, documents, and proven? Ensure that the protocol supports required communication between participants (e.g., request and response). Average across exchanges for the capability maturity level. Transport maturity level for the capability maturity level.*	*What mechanisms are in place to ensure data is shared securely?*	*What is the level of adoption of the APIs used?*
0	No exchanges occurring for information in this capability area			
1	Information available in external systems. Some information is non-human readable, mainly unstructured, little structured meta data across multiple systems. No metrics defined for information quality.	All protocols custom and private are not documented	Baseline CIA policies have been defined but implementation is ad hoc and manual. Separation of duties are mainly admin defined. Systems meet all required Federal and state security policies CIA needs defined.	Sharing of document without meta-data. Only allow for pushing and uni-directional data transfer, for instance DIRECT (to push information). Metrics defined for capturing transaction and query mechanisms usage.

Technical				
Level	**Information Quality**	**Transport**	**Security**	**Transaction/Query**
2	Measurable metrics defined for information quality. Measurable metrics defined for information completeness. Some (not all) information from less than 50% of external systems. Searchable: Results mainly unstructured, ad-hoc formats or PDF with key meta-data structured, human readable, and identification of process improvement.	Documented non-standard protocols.	Some automation to meet CIA baseline policies. These processes are repeatable and required no manual input. Identification of all policies that could be automated. Commitment to tracking policy conformance is in place and there are ongoing efforts to further automate. Baseline requirements met, threats identified, and plans to mitigate defined.	Undocumented API (to query information) – proprietary.
3	Information is searchable within the workflow. Some information are from less than 50% of available external systems. Data is mainly structured, human readable. Measurement of information quality against defined metrics	At least one documented standard protocol in use, and used consistently across the organization. Metrics collected on APIs.	Full automation to enforce need to know, separation of duties, and least privilege policies. Tracking is in place to track conformance with	Using proved standards (XDS-b, API standardized) for query.

Technical				
Level	**Information Quality**	**Transport**	**Security**	**Transaction/Query**
	is ad-hoc. Measure of information completeness against defined metrics is ad-hoc. Use cases for relevance have been determined; with some metrics defined.		policies, and identify areas for further automation. CIA requirements monitored. Plan to address threats to CIA implemented.	
4	Information is searchable within the workflow. Some information are from more than 50% of available external systems. Available same day, and is human readable. Information quality enforcement with repeatable process. Process to track and enforce information completeness.	Mostly documents standards-based protocols. Used consistently internally and externally within the organization.	Full automation to enforce specified policies to meet need to know, separation of duties, and least privilege policies and CIA. Metrics for improvement are defined for policies. CIA requirements enforced, threat mitigation is in place.	Using one or more documented, published, and standards-based API(s). Roadmap is in place to increase use of Standard APIs. Continual monitoring of usage of APIs, with identification of which are industry standard, and tracking of any vendor specific variations.
5	All information from more than 70% of available systems. There is a process to incorporate data from remaining systems in place. Mostly real-time, or on-demand. Incorporate at	Only use of approved standards-based protocols.	Full automation to enforce need to know, separation of duties and least privilege policies, and CIA. Metrics for security policies are	Use only documented, published, and standards-based API (based on recommended standard – e.g., those

Technical				
Level	**Information Quality**	**Transport**	**Security**	**Transaction/Query**
	computable level (semantic and syntactic interoperability) Information quality improvement process is in place. Information completeness improvement process is in place, human readable.		tracked, enforced, and improved; CIA enforced. CIA threat mitigation monitored with continual improvement.	documented in ONC Interoperability Standards Advisory)
MITA Similarities:	*TA Integration & Utility: Utility*	*TA Intermediary and Interface*	*TA Access & Delivery: Security & Privacy*	*TA Integration & Utility: Utility*

Table D2: People and Process

People and Process				
Level	**Alignment/Duplication**	**Usability/Workflow**	**Participation**	**Consent/Privacy**
	How many different mechanisms for this capability are in use by end users?	*How easy is the data to consume? Is the data incorporated into the workflow?*	*Can all possible participant types (providers, patients, payers…) for the capability participate, and how many actual participants are participating?*	*Can patients control (provide consent) who has access to data about them to a granularity appropriate to the capability?*
0	No exchanges occurring for information in this capability area.			
1	Multiple efforts that duplicate capability,	Information is available in a separate system. Information is	All potential participants identified. Metrics are	No metrics captured on consents. All or

People and Process				
Level	**Alignment/Duplication**	**Usability/Workflow**	**Participation**	**Consent/Privacy**
	with no effort to reconcile.	available but not readily accessible.	identified to capture participation. Estimated that less than 25% of the potential participant types (as defined by capability) and not all participants of those types are exchanging.	nothing general consent only, mostly paper based.
2	Metrics and process defined to track duplication. Multiple efforts that duplicate capability. Identification of areas of overlap.	Information is available within the same system but not integrated. Requires extensive manual effort to reconcile, and/or duplicate data entry. Areas identified for automation and improvement to improve incorporation of data across systems. Metrics identified for tracking of usability, leveraging industry standard metrics such as NQF recommendations.	Metrics implemented and tracked to capture participation. Less than 25% of the potential participant types (as defined by metrics) but the majority of participants of those types are exchanging. Program planned to improve participation rates.	Metrics defined for capturing consents. All or nothing consent to data access for specific providers (PCP, Hospitals) captured electronically for capability. Other participant types consent gained through paper based process.
3	Metrics and process implemented to track duplication. Multiple efforts that overlap capability, with business case specific variation identified.	Information available in same system can be reconciled into workflow with minimal manual effort. Metrics identified for usability tracked. Some automated control, areas identified for further automation.	At least 50% of the potential participant types (as defined by capability) exchanging but not all participants. Program implemented to improve participation rates.	Consent to access for specific classes of data using standard data segmentation for specific providers (PCP, Hospitals). Consent remains all or nothing for other

People and Process				
Level	**Alignment/Duplication**	**Usability/Workflow**	**Participation**	**Consent/Privacy**
				participant types (LTPAC, SNF, Home health, pharmacy, etc.)
4	Multiple efforts that have minimal overlap of capability and ongoing efforts to reduce duplicated capabilities. Continual process in place to identify areas of duplication prior to implementing new initiative and remove duplication of capability. Area of commonality modularized where appropriate to enable re-use.	Information is in the same system, reconciled into workflow, with QC. Usability metrics captures areas identified for improvement. The majority of capability is automated, requiring minimal input.	At least 50% of the potential participant types (as defined by capability) exchanging with at least 75% of possible participants of those types exchanging. There are continual improvement efforts to improve participation rates in place.	Consent to access for specific classes of data using standard data segmentation for specific providers (e.g., PCP, Hospitals) and consent to access specific classes of data in specific ways (e.g., viewing, annotating, adding, and updating) for some providers.
5	Single common mechanism used per capability. Modularized where appropriate. There is a process in place to ensure no further duplication were possible.	Real-time information is available on demand within the same system. It is reconciled into workflow, with QC. This process if fully automated, manual input only for human decision make. Metrics are continually tracked and there is a process for continual improvement of usability in place.	At least 95% of potential participants of all potential participant types (as defined by capability) are exchanging. There is a process in place to help ensure participation rates are maintained.	Consent to access for specific classes of data using standard data segmentation for specific providers and consent to ace specific classes of data in specific ways (e.g., viewing, annotating, adding, and updating) for all

People and Process				
Level	**Alignment/Duplication**	**Usability/Workflow**	**Participation**	**Consent/Privacy**
				provider types.
MITA Similarities:	*TA Integration & Utility: Utility*	*TA Integration & Utility: Utility*	*BA Utility or Value to Stakeholders*	*TA Access & Deliver: Security and Privacy*

Table D3: Governance

Governance			
Level	**Data Governance**	**Stakeholder Governance**	**Sustainability**
	How mature are the processes to govern data involved in exchanges? Are common agreements in place, in use, and enforced between participants?	*How mature are the organizational structure and associated processes to govern exchanges for this capability?*	*What are the resources available to sustain efforts for any capability; people, funds, skills, and leadership?*
0	No exchanges occurring for information in this capability area.		
1	Some exchanges of the same type of data for the capability do not have governance agreements in place.	No governance organizational structure in place.	Uncertainty in funding over the next year. Funding is unstable and there is inconsistent leadership support.
2	All exchanges of the same type of data have governance agreements in place but not from a common basis.	Governance organizational structure in place but does not include representation from all stakeholders (participant types that participate in capability) and defined governance processes exist	Uncertainty in funding over the next five years. Funding source is unstable and there is inconsistent leadership support.
3	All exchanges of the data for the capability are governed by a common governance agreement used by all exchanges.	Governance organizational structure is in place, including representation from all stakeholders, and defined governance processes exist.	Certainty of funding over the next three years. Funding source is unstable and there is consistent leadership support.

Governance			
Level	**Data Governance**	**Stakeholder Governance**	**Sustainability**
4	Data exchange governance has quantitative measurement in place to assess process.	Governance organizational structure is in place including representation from all stakeholders and defined governance processes have quantitative measurements in place to assess process.	Certainty of funding over the next three years. Funding source is stable and leadership is engaging and providing direction.
5	Based on quantitative metrics collected about data governance, the governance agreements and process are continuously improved.	Governance organizational structure is in place including representation form all stakeholders, and defined governance processes have quantitative measurements that are continuously improved based on measurements.	Certainty of funding over the next five years. Funding source is stable and leadership is providing direction and incorporating as part of mission.
MITA Similarities:	*IA Data Management Strategy*	*BA Standard Management: Manage Business Relationship Information*	*BA Utility or Value to Stakeholders*

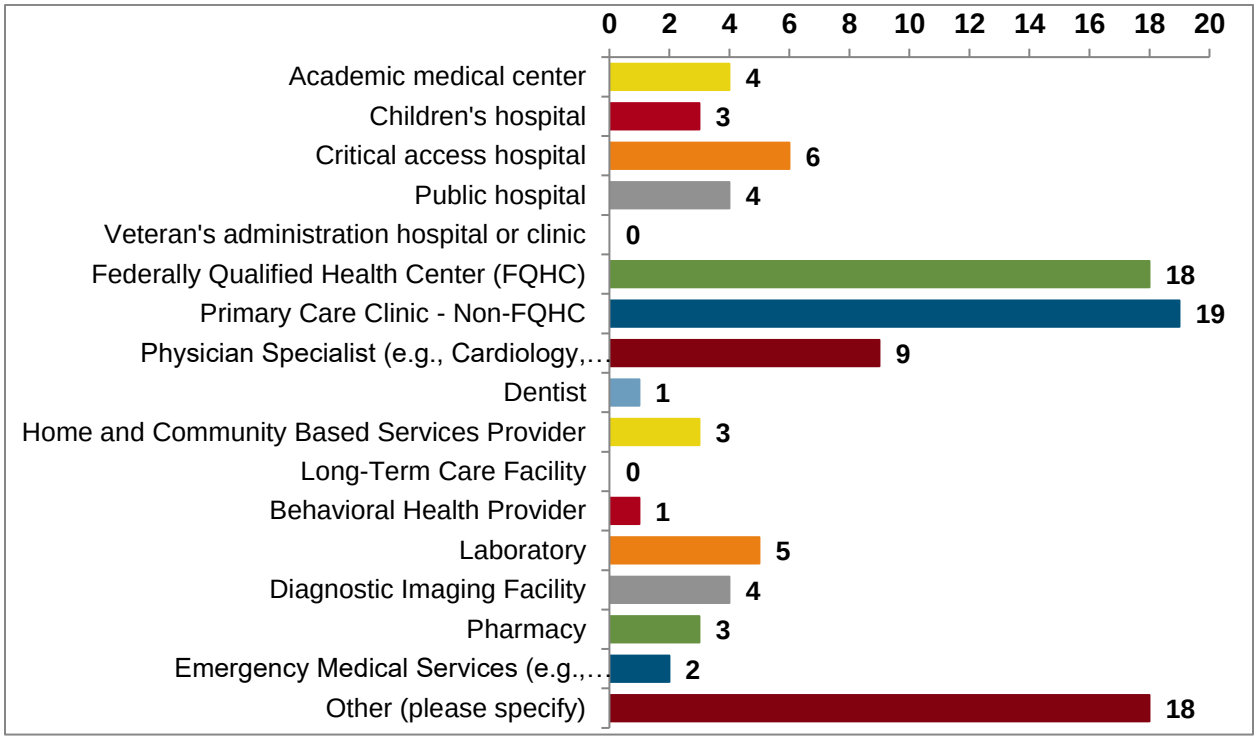
14 Appendix E: Detailed Survey Results

Appendix E summarizes the results of the web survey sent to providers in June 2020. Although 80 survey recipients responded to the report, the response rate is unknown since BerryDunn and PRDoH leveraged Puerto Rico's professional associations to distribute the survey to their respective members.

In addition, due to the relatively small number of responses as compared with the total number of providers in Puerto Rico, caution should be used in extrapolating the survey results as they may not accurately reflect the status of provider health IT/HIE activities across the island.

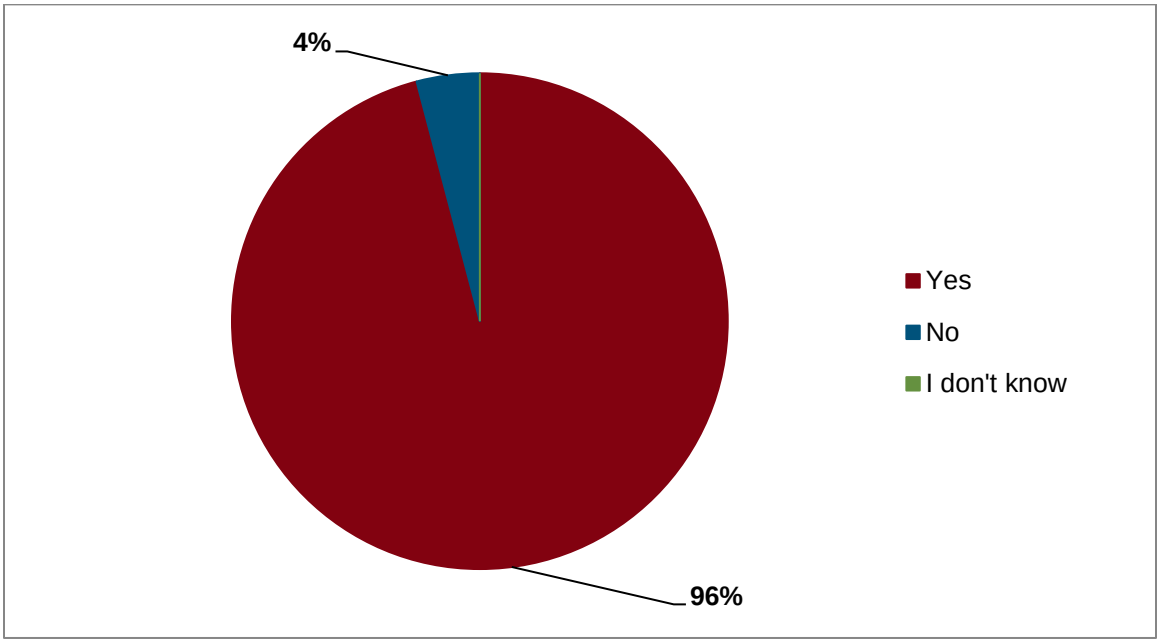
Question 1: Please select the description that best fits your practice/organization

Figure E1: Question 1 Results



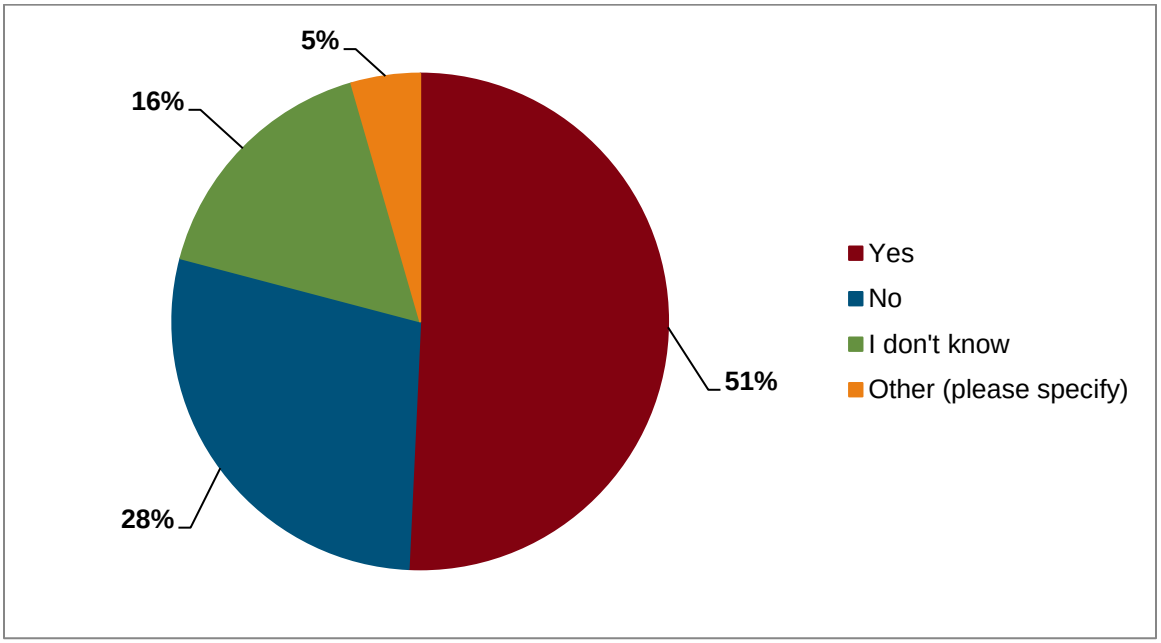
Question 2: Does your practice/organization use an electronic health record/electronic medical record (EHR/EMR)?

Figure E2: Question 2 Results



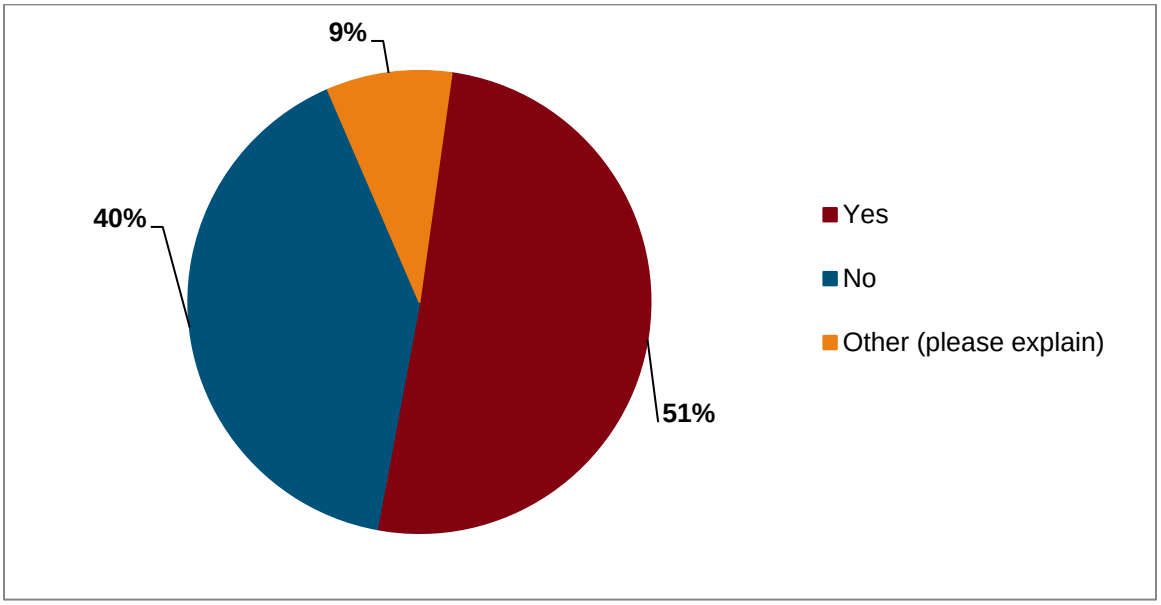
Question 3: Does your practice/organization participate in the Medicare and Medicaid EHR Incentive Programs?

Figure E3: Question 3 Results



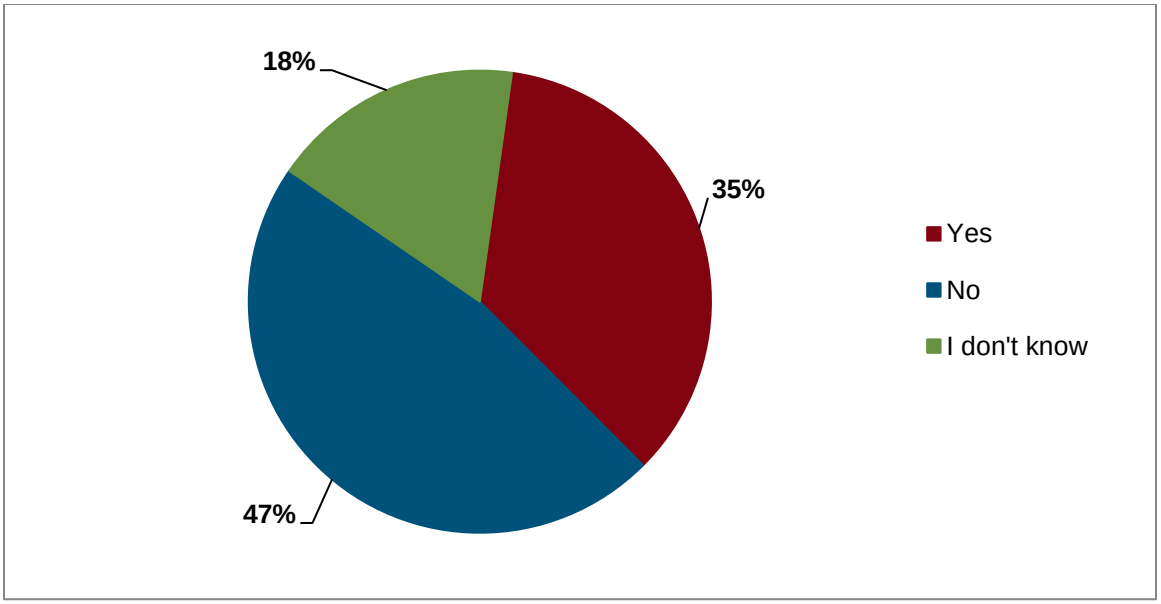
Question 4: Does your practice/organization currently exchange patient health information electronically?

Figure E4: Question 4 Results



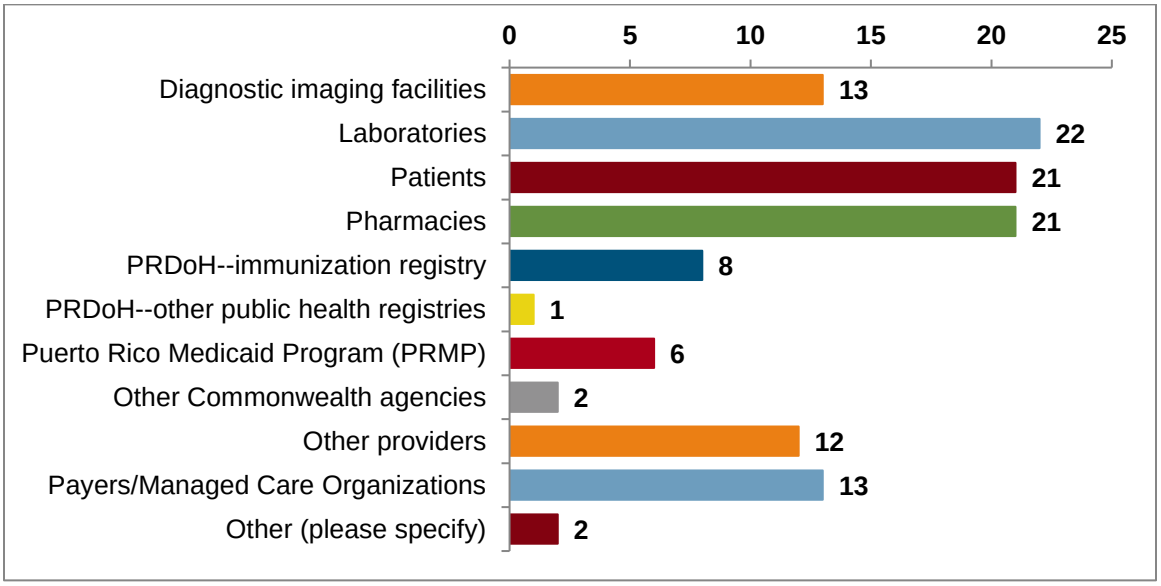
Question 5: Does your practice/organization use third-party organization(s) or vendors (such as a health information exchange) to facilitate electronic exchange with other practices/organizations?

Figure E5: Question 5 Results



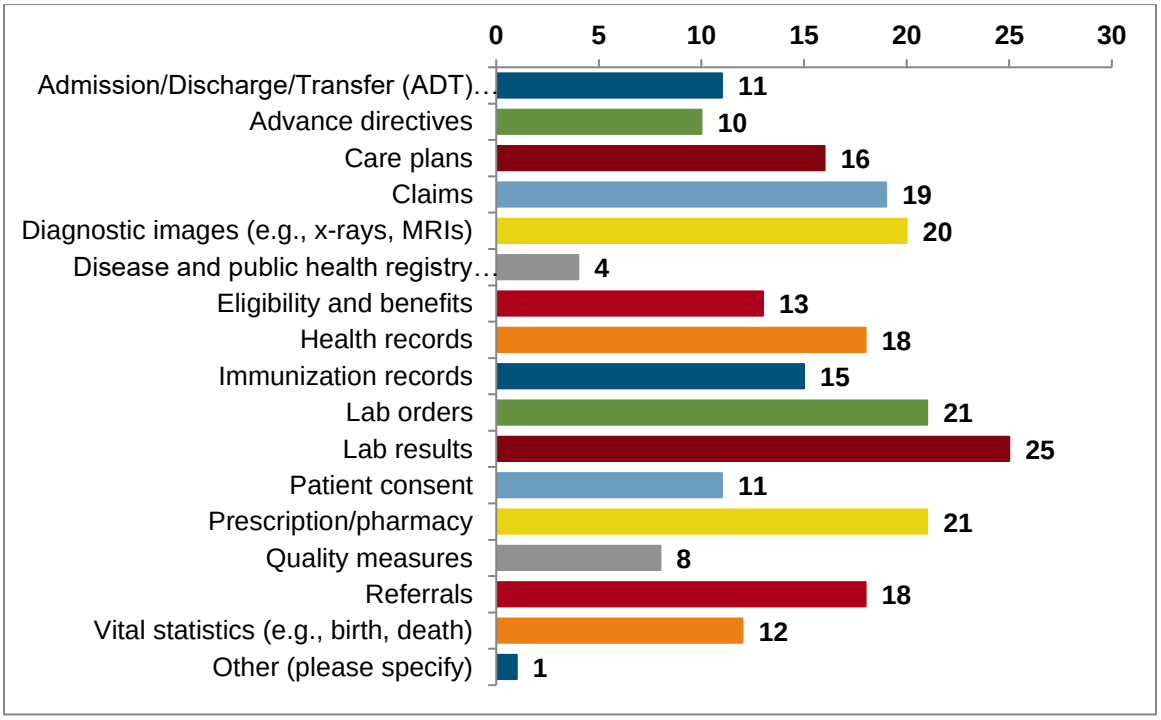
Question 6: With whom does your practice/organization exchange patient health information electronically?

Figure E6: Question 6 Results



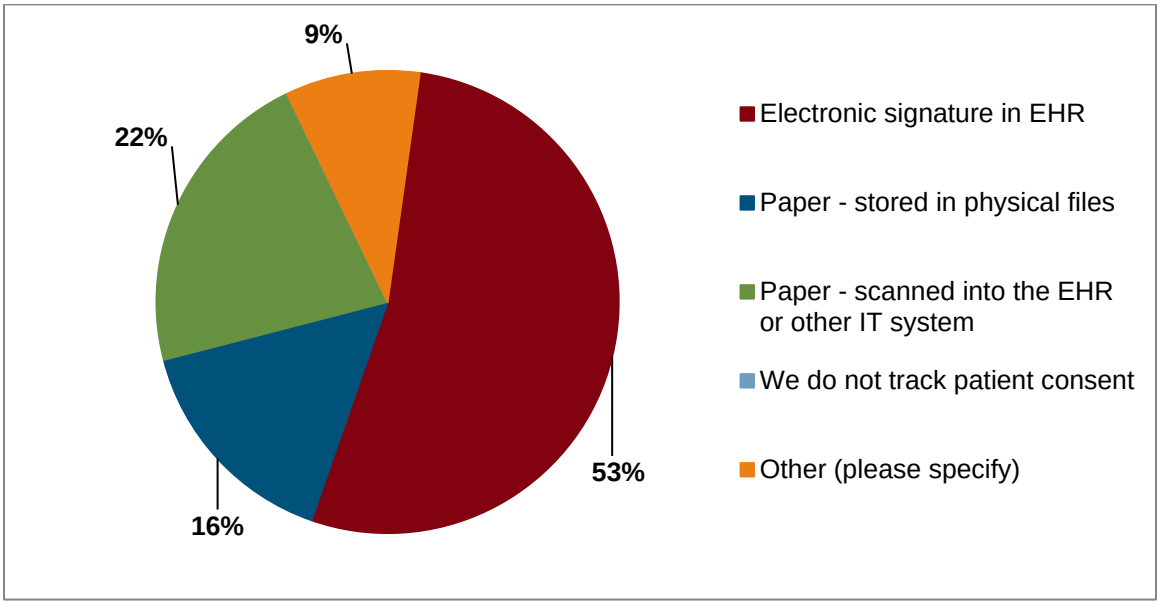
Question 7: What type of patient health information does your practice/organization exchange electronically?

Figure E7: Question 7 Results



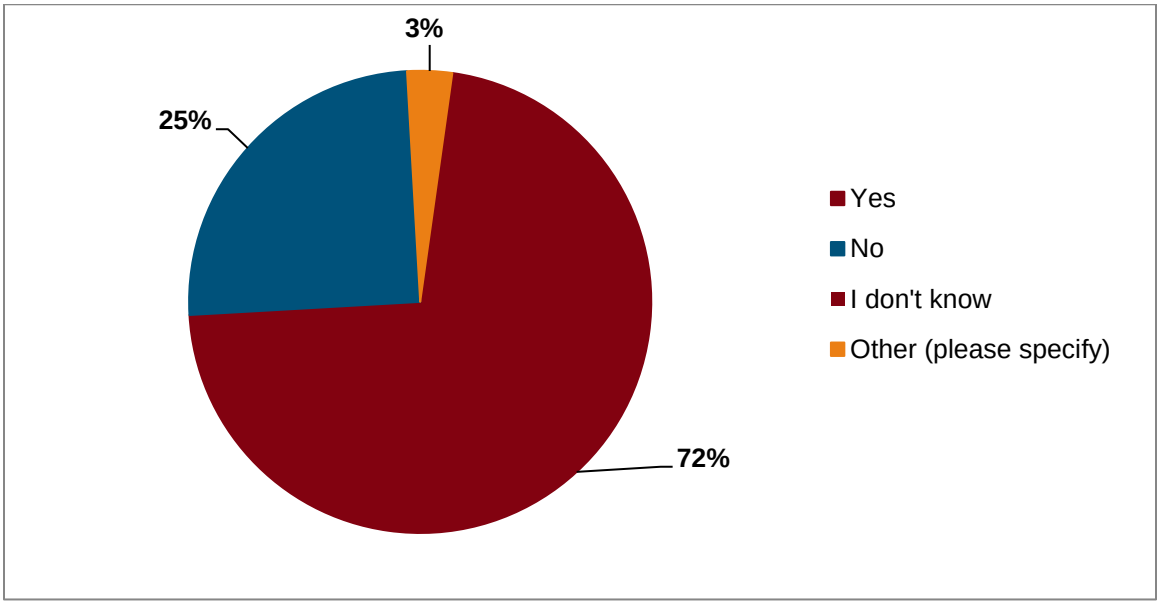
Question 8: How do you track patients' consent to share their health information electronically?

Figure E8: Question 8 Results



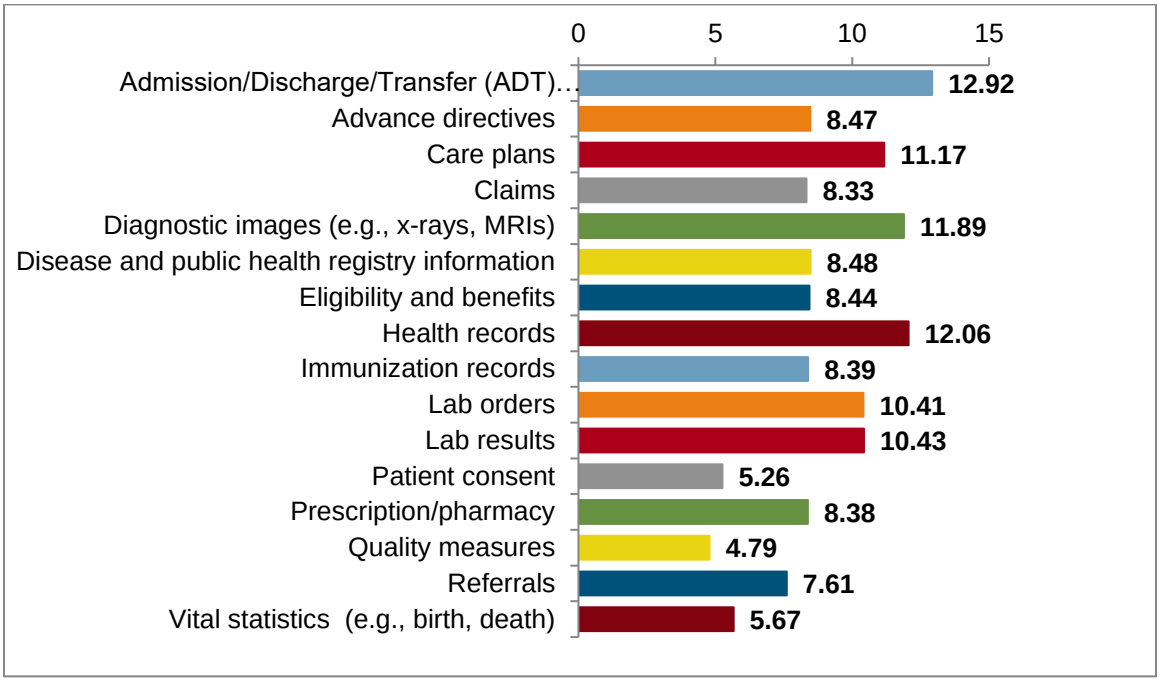
Question 9: Does your practice/organization provide patients access to a patient portal to view their health information?

Figure E9: Question 9 Results



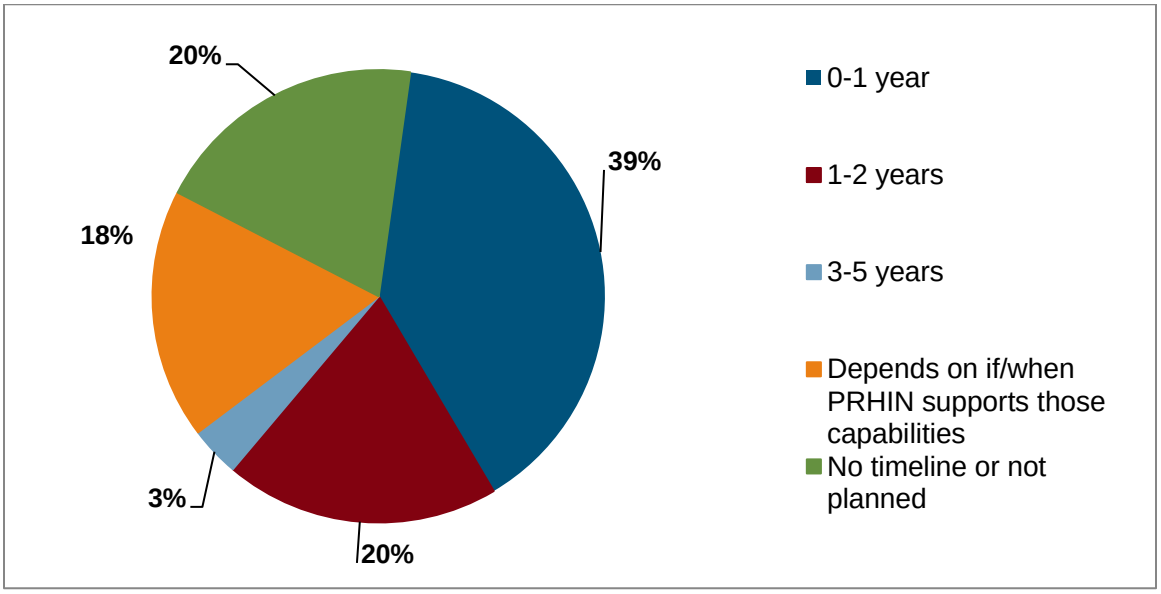
Question 10: If you had the ability to do so before, what data would you like to exchange electronically in the future? Please prioritize.

Figure E10: Question 10 Results



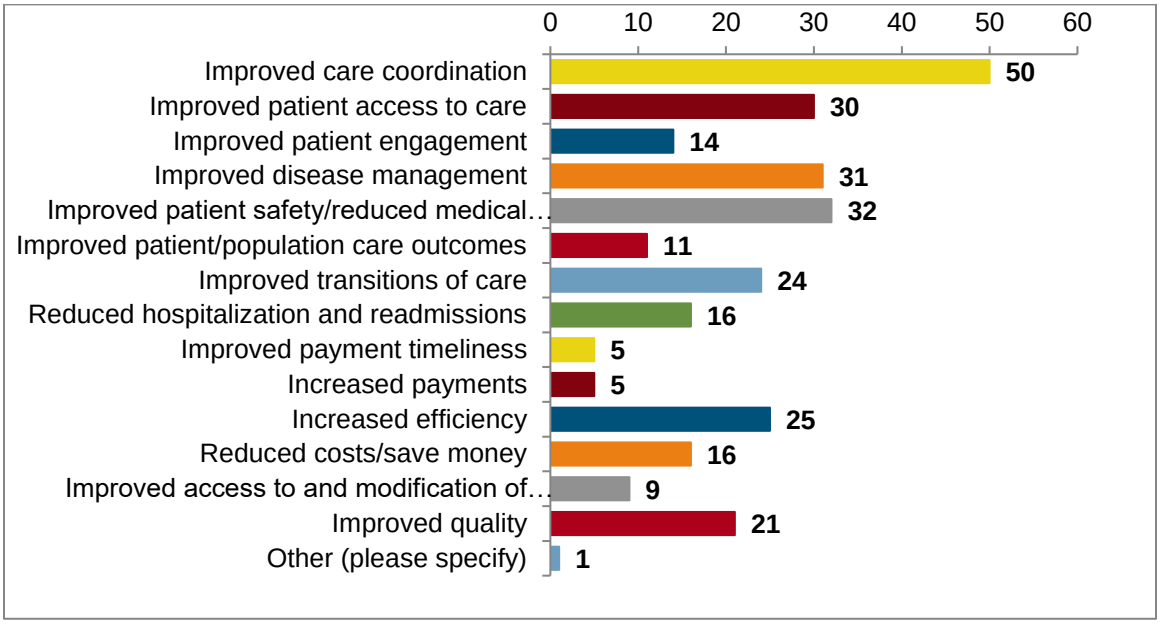
Question 11: What is your timeline for adding these data exchanges?

Figure E11: Question 11 Results



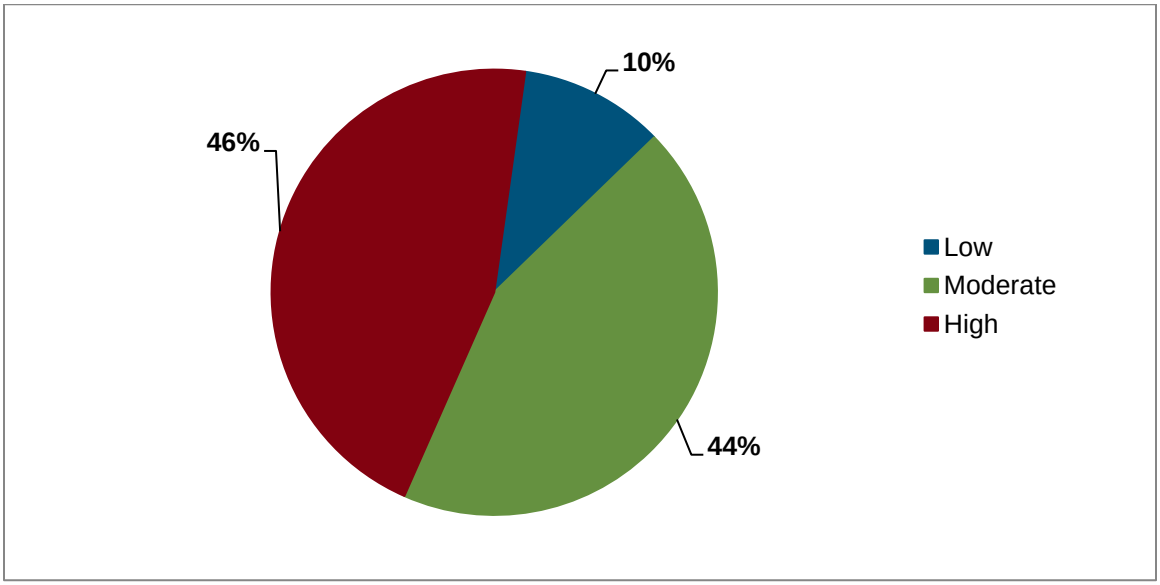
Question 12: What do you believe are the top five greatest potential benefits of electronic exchange of health information to patients and providers in Puerto Rico?

Figure E12: Question 12 Results



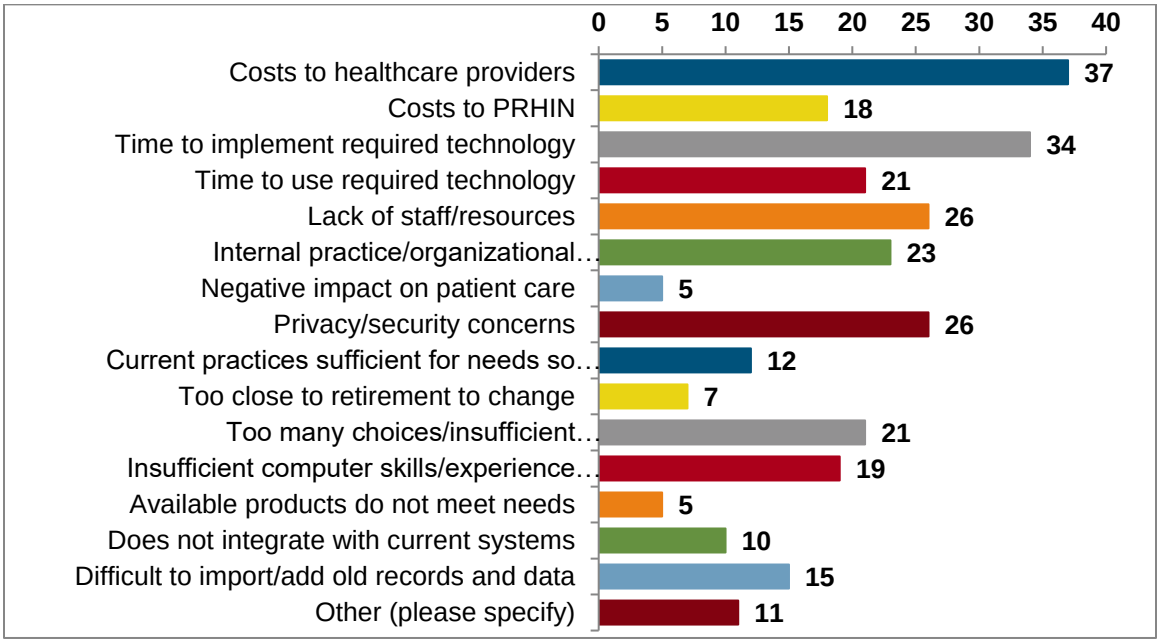
Question 13: Please rate your practice/organization's readiness to participate in electronic exchange of health information. Consider readiness from a technical, resource, and behavioral change perspective.

Figure E13: Question 13 Results



Question 14: What do you believe are the top five potential risks or barriers to electronic exchange of health information to patients and providers in Puerto Rico?

Figure E14: Question 14 Results



Question 15: What are the top three most important things that the PRHIN can do to help your organization be successful in its efforts to implement or expand electronic exchange of health information?

Figure E15: Question 15 Results