A. Introduction

A key goal of the Puerto Rico Broadband Taskforce is to ensure that Puerto Rico’s broadband infrastructure is ubiquitous and offers ample capacity to meet the needs of applications and use patterns of all citizens, businesses, and institutions. Today, a key industry increasingly using broadband and information technology to effectively deliver services is the Healthcare sector. The Puerto Rico Broadband Taskforce is committed to ensuring that all Healthcare sector stakeholders, including healthcare institutions, doctors, pharmacists, clinical laboratory and diagnostic facilities, public or private major financial contributors and, last but not least, Puerto Rico patients, have access to and are effectively using broadband and Health IT solutions; resulting in more cost-effective care services, and greater patient information about their healthcare experience. The goal of this chapter is to assess the broadband needs of the Healthcare sector, and the state of the broadband infrastructure currently available to meet these needs. Armed with this information, the Plan aims to identify the gap remaining across Puerto Rico to meet this challenge, and to propose solutions to work to close this broadband gap across the island.

To accomplish these goals, the Puerto Rico Broadband Taskforce has partnered with the Puerto Rico Health Information Network (PRHIN), which is represented in the Puerto Rico Broadband Taskforce Healthcare Services Committee. PRHIN is a public, private partnership comprised of multiple stakeholders in the Healthcare sector including the Department of Health of Puerto Rico, and representatives of doctors, hospitals, pharmacies, clinics and, importantly, patients. PRHIN has been working since 2010 to develop the necessary tools through the Federal Health Information Exchange (HIE) project to ensure the effective and safe management of health information records among Puerto Rico stakeholders.1

The PRHIN includes the Health IT Regional Extension Center (REC) of Puerto Rico and the US Virgin Islands, which aims to provide accessible and effective solutions, technical resources, and educational programs to facilitate the transformation of primary care practices in Puerto Rico and US Virgin Islands (USVI) through the adoption and meaningful use of health information technology. A key goal of this program is to support and accelerate healthcare providers’ efforts to become meaningful users of Electronic Health Records (EHR).
Health IT refers to a set of broadband-enabled solutions that offer the potential to improve the overall quality, safety, and efficiency of healthcare delivery.

The PRHIN and the REC of Puerto Rico are part of a nationwide effort to identify and overcome challenges to the expansion of health information solutions that are inherent to the Healthcare sector. The goal is to ensure that healthcare providers and the patients they serve are fully leveraging the benefits of health information technology that broadband technology is increasingly providing. As discussed in detail below, the PRHIN is part of a nationwide initiative aimed to trigger the necessary transformations within the Healthcare sector to achieve this reality. This Strategic Plan complements the work that Puerto Rico and U.S. healthcare provider stakeholders are undertaking by addressing a critical piece of the puzzle: ensuring that all healthcare providers and the patients they serve have access to broadband that meets the capacity, latency, and quality of service specifications necessary to utilize Health IT effectively.

This Strategic Plan is aligned with the goals and strategies identified in PRHIN Strategic Plan. It complements that Plan by focusing on the measuring and building strategies to close the broadband infrastructure gap affecting the Healthcare sector across Puerto Rico. This e-Health strategy also builds upon the work of the Federal Communications Commission (FCC). In its 2010 National Broadband Plan, the FCC recognizes the importance of Health IT in helping deliver improved and more cost-effective healthcare services “by dramatically improving the collection, presentation and exchange of healthcare information, and by providing clinicians and consumers the tools to transform care. Technology cannot heal, but when appropriately incorporated into care, technology can help healthcare professionals and consumers make better decisions, become more efficient, engage in innovation and understand both individual and public health more effectively.”

Healthcare is one of the prime areas in which a high-speed broadband network can facilitate new models of service delivery; however, a ubiquitous and robust broadband infrastructure is necessary to fully leverage the benefits of Health IT. High-speed broadband access enables information-driven health practices that dial-up cannot provide. Broadband supports the use of Electronic Health Records (EHR), a more effective means of exchanging accurate patient information between healthcare providers. Broadband also empowers healthcare providers to deliver telemedicine services (medical diagnostic and treatment services), removing geographic and time constraints for isolated communities by enabling video consultation and patient monitoring. These technologies permit communications between patient and medical staff with both convenience and fidelity, as well as the transmission of medical, imaging and health informatics data from one site to another.
Furthermore, the use of mobile networks and adoption of tools such as smartphones – coupled with the burgeoning demand for consumer applications on mobile devices – is empowering patients to take control of their own health. User-friendly telemedicine applications designed to measure blood pressure, control diabetes, and transmit diagnostic information to physicians and other healthcare providers are increasingly becoming available for consumers. Demand for these broadband enabled services and applications are driving bandwidth demands. As a result, provision and improvements in telemedicine and other Health IT initiatives will rely on increasing bandwidth capacity, more storage and processing capabilities, and higher levels of security to protect patient information.

To ensure that Puerto Rico patients and the healthcare providers serving them will be able to fully leverage the benefits of Health IT, the Puerto Rico Broadband Taskforce sets the following goals and standards:

**Strategic Goals for Puerto Rico - Healthcare**

All Puerto Rican healthcare providers and patients should have access to broadband that meets the capacity, latency, and quality of service specifications necessary to utilize healthcare information technology and provide telemedicine services effectively.

**e-Health Goals:**

- By 2015, create a nationwide e-care network that will ensure interconnectivity between all stakeholders, including patients, healthcare providers, and payers – public and private.
- By 2015, ensure broadband network capacity available to healthcare providers:
  - 4 Mbps to all healthcare providers
  - 10 Mbps to nursing homes and rural healthcare providers
  - 25 Mbps to clinics and large physician practices (5-25 physicians)
  - 100 Mbps to hospitals
- By 2020, ensure 1 Gbps to academic and large medical centers
1. The Impact of Health IT in Healthcare Delivery

The Healthcare sector has unique challenges. It inherently generates mountains of information, yet at the same time is duty bound to keep these mountains hidden for the sake of individual privacy. For companies charged with managing and working with this information, high-speed Internet access and technology innovations are crucial. On a daily basis, doctors must keep up with the latest research; patient records have to be easily accessible and accurate; and images, test results, and prescriptions have to be delivered promptly, without errors, to practitioners, pharmacies, and insurance providers. In healthcare, errors and delays are not only costly, but also may be hazardous to a patient’s health.

There is a developing set of broadband-enabled solutions that can play an important role in the transformation of the Healthcare sector. These solutions, most often grouped under the name health information technology (Health IT), offer the potential to improve healthcare outcomes while simultaneously controlling costs, extending the reach of the limited pool of healthcare professionals, and enabling providers to better manage patient care through secure use and sharing of health information. Furthermore, as a major area of innovation and entrepreneurial activity, the Health IT industry can serve as an engine for job creation and global competitiveness.

Health IT includes the use of EHRs instead of paper medical records to maintain health information. Many providers are converting to EHRs which can be easily updated and shared on secure, internal networks. EHRs help ensure that appropriate medical information is available, reduces medical errors and healthcare costs, and improves coordination among healthcare facilities. As a result, EHRs will ultimately enable significant improvements in the quality of healthcare for patients and reduction of healthcare delivery costs. A keen example of the impact of EHRs on a patient’s quality of life comes from the testimony of chronic patient Gregorie Stokes III regarding how the WebDMEMR EHR system has drastically improved his ability to get quality healthcare service in Puerto Rico. After more than 20 years struggling to collect and present his vast health history to new healthcare providers, Mr. Stoke reports that “you can imagine my relief to finally meet a physician [in Puerto Rico] with an Electronic Medical Record capability accessible to me and my numerous physicians across the multiple systems of healthcare, public and private, inside and outside Puerto Rico.”
Recognizing these potential benefits, and the need for government coordination and encouragement to make it a reality across the U.S., the Health Information Technology for Economic and Clinical Health (HITECH) Act seeks to improve American healthcare delivery and patient care through an investment in Health IT. The provisions of the HITECH Act are specifically designed to work together to provide the necessary assistance and technical support to providers, enable coordination and alignment within and among states, establish connectivity to the public health community in case of emergencies, and ensure that the workforce is properly trained and equipped to be meaningful users of EHRs. Combined, these programs build the foundation for every American to benefit from EHRs, as part of a modernized, interconnected, and vastly improved system of care delivery. The Office of the National Coordinator for Health Information Technology (ONC) at the Department of Human and Health Services is overseeing this process.

Two key programs of this initiative are the State Health Information Exchange Cooperative Agreement Program and the Health Information Technology Extension Program. The State Health Information Exchange Cooperative Agreement Program establishes health information exchange (HIE) capability among healthcare providers and hospitals in each state or territory. This program is designed to encourage breakthrough innovations for health information exchange that can be leveraged widely to support nationwide health information exchange and interoperability. The Health Information Technology Extension Program is a grant program to establish Health Information Technology Regional Extension Centers to offer technical assistance, guidance, and information on best practices to support and accelerate healthcare providers’ efforts to become meaningful users of Electronic Health Records. Leveraging federal grant funding, the PRHIN has partnered with ONC to implement the HIE project across the island.

In addition to EHRs, broadband facilitates efficiency in healthcare delivery and creates opportunities for collaboration between doctors, healthcare specialists, and patients located anywhere in the world. Telemedicine, for example, is a term used to describe the use of medical information exchanged from one site to another via electronic communication to improve patients’ health status. Telemedicine includes network-based technologies like video-conferencing and digital stethoscopes, which allow specialists to consult with patients regardless of geographic location – reducing travel time and hazards – while test results from a hospital emergency room or laboratory can be sent to a radiologist or doctor in seconds, making rapid diagnosis a reality. Because of the increased efficiency and capability, the healthcare industry has found the perfect partner in high-speed broadband technology.
Indeed, this technology saves lives, as exemplified by Phoenix, AZ neurologist Bart Demaerschalk and a stroke victim in a rural health clinic 200 miles away.\(^\text{15}\) Within minutes of receiving an emergency call, Dr. Demaerschalk had set up a video conference, empowering him to look at the patient, ask her questions, go over her brain scan and confirm the diagnosis—all made possible by rural broadband access. Equipped with live video feed via broadband, the doctor was empowered to give the patient a much more thorough evaluation than if it was just over the phone, and ultimately made the right decision for her to be rushed to the hospital to be administered drugs.

Similar results were experienced when the Puerto Rico Department of Health conducted the 2002 telemedicine pilot study that installed a system between the municipality of Vieques and the Tertiary Centro Medico emergency and radiology department in San Juan.\(^\text{16}\) By utilizing image transmission and video conferencing, the remote Vieques facility could send radiology images to be read at the San Juan facility. The project realized significant savings in patient travel expense and an increase in the turn-around time of results, especially for specialized services located only in metropolitan centers. Before, most patients requiring radiology services were escorted via helicopter to a specialist in San Juan.

From rural Arizona to remote Puerto Rico, these examples point to a major problem facing remote or isolated communities: while the nearest hospital is often many miles away, a hospital where experts can diagnose and treat specific disorders are even farther away. In these situations, experts frequently use phone calls to make judgments on patients’ status; but now with advances in video technology, the potential exists for them to make much more thorough diagnoses—as long as the appropriate broadband infrastructure is in place to support the technology.\(^\text{17}\)

Take Naguabo, for example. In this municipality of 26,720 residents there are only 16 doctors serving the community.\(^\text{18}\) This works out to approximately 1,670 patients per doctor; compared to San Juan, where there are 119 patients for every doctor.\(^\text{19}\) Broadband can help bridge the healthcare provider gap in Naguabo, a community where high-speed broadband is available across much of the population. Connect Puerto Rico’s June 2011 broadband availability analysis indicates that more than three-quarters (77%) of Naguabo’s households have access to advertised broadband download speeds of at least 10 Mbps.\(^\text{20}\) That available capacity can be leveraged by doctors, remote clinics, and patients to improve the quality of healthcare service in this community. Other communities across Puerto Rico have acute shortages of medical specialists and could similarly benefit from telemedicine solutions.\(^\text{21}\)
According to the 2010 Connect Puerto Rico Business Technology Assessment, 85% of the businesses in Puerto Rico’s Healthcare sector subscribe to broadband.

B. Broadband Adoption Among Healthcare Providers Across Puerto Rico

Health IT will not reach its true potential without full access to broadband services. Research remains scarce on Puerto Rico’s healthcare providers’ broadband connectivity needs and the ability of the island’s infrastructure to meet those needs. However, in 2010, as part of the Puerto Rico Business Technology Assessment, Connect Puerto Rico surveyed businesses in the Healthcare sector to determine technology adoption levels. The results were surprising.

According to the 2010 Connect Puerto Rico Business Technology Assessment, 85% of the businesses in Puerto Rico’s Healthcare sector subscribe to broadband. In comparison, only 63% of all businesses in the Healthcare sector located in jurisdictions surveyed by Connected Nation report subscribing to broadband, a difference of 22 percentage points. Furthermore, out of all the industry sectors operating in Puerto Rico, the Healthcare sector reported the third highest broadband adoption rate (Figure VII.1).

![Figure VII.1 - Broadband Adoption in the Healthcare Sector](image-url)
This data indicates that Puerto Rico healthcare providers are subscribing to broadband at higher rates than their counterparts in other U.S. jurisdictions surveyed by Connected Nation. This is a positive outcome. It may well be driven by the relatively large degree of patients in Puerto Rico who qualify for Medicare or Medicaid coverage, and the need for electronic billing under these programs. That being said, as data presented in the next segment indicates, the broadband speeds that these healthcare providers receive is significantly below what their counterparts elsewhere receive and significantly below standards needed to support new Health IT services. The broadband speeds available to the majority of healthcare providers are insufficient to sustain many Health IT solutions, indicating that, while broadband penetration is high in the Puerto Rico Healthcare sector, it is not being fully leveraged to unleash the full benefits of Health IT.

1. The Healthcare Sector’s Broadband Capacity Needs

Having access to broadband is not sufficient to ensure that healthcare providers can fully leverage the benefits of Health IT innovations. It is essential that access be of sufficient capacity to enable the real-time high-capacity necessary to support Health IT solutions. Healthcare providers’ broadband needs are largely driven by the rapidly increasing amount of digital health-related data that is collected and exchanged. Although some delivery settings currently function at lower connectivity and quality, those levels are straining under increasing demand and are unable to support needs likely to emerge in the near future. But how fast is fast enough?

A single video consultation session can require a minimum of a symmetric 2 Mbps connection with a good quality of service. There is a wide range of requirements to support EHRs and medical imaging, and over the next decade, physicians will need to exchange increasingly large files as new technologies such as 3D imaging become more prevalent; stimulating demand for more and better broadband, because these applications have specific requirements for network speeds, delay, and jitter. Figure VII.2 provides examples of file sizes for different types of health data file types that healthcare providers may encounter.
Health IT infrastructure must meet current demands of the healthcare provider as well as grow to meet its future needs. The connectivity needs of different health delivery settings vary depending on their type (e.g., tertiary care center versus primary care physician practice) and their size. Figure VII.3 shows an estimate of the required minimum connectivity and quality metrics to support deployment of Health IT applications today and in the near future at different types of health delivery settings.

![Figure VII.3 - Recommended Bandwidth Speeds By Location Category](image)

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**Puerto Rico Broadband Strategic Plan**

Chapter VII: e-Health

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2. Broadband Speeds Used by Puerto Rico Healthcare Providers

There is little doubt that Health IT initiatives such as EHR, e-prescribing, telemedicine, and health monitoring have the potential to offer tremendously improved quality of care – as well as significant cost savings – in the delivery of care for providers and patients alike. However, based on the suggested bandwidth requirements listed in Figure VII.2 and Figure VII.3, Puerto Rico’s Healthcare sector faces a broadband connectivity gap (Figure VII.4).

The 2010 Connect Puerto Rico Business Technology Assessment indicates that the average advertised download speed reported among businesses in the Healthcare sector is 2.6 Mbps, significantly lower than the 8.6 Mbps average reported by businesses in the Healthcare sector located in jurisdictions surveyed by Connected Nation in 2010. Furthermore, among Puerto Rico’s business sectors, the Healthcare sector reported slower speeds than any sector (Figure VII.4). This lack of adequate infrastructure could prevent Puerto Rico’s health workers from delivering healthcare efficiently.

Understanding the state of broadband access and connectivity for the Healthcare sector is a new but important area of analysis, especially as the need for better data continues to grow. Of particular importance for both Internet providers and policy makers is the ability to understand consumer demand and satisfaction with their broadband subscription. Businesses in Puerto Rico’s Healthcare sector present an interesting case study.
When asked if their business could use more bandwidth, only 15% of businesses in Puerto Rico's Healthcare sector reported that they did, despite their low bandwidth (Figure VII.5). At first glance, this statistic appears to indicate a perceived lack of need, especially when compared to other industry sectors in Puerto Rico.

![Figure VII.5 - Percent of Puerto Rico Broadband-Connected Businesses That Say They Need More Bandwidth by Industry Sector](image)

However, Connected Nation’s 2010 research in eleven states reveals that, in general, the Healthcare sector reports low levels of need for increased bandwidth, and the Puerto Rico Healthcare sector actually ranks near the top of the list in terms of needing more bandwidth (Figure VII.6).

![Figure VII.6 - Percent of Broadband-Connected Businesses in the Healthcare Sector That Need More Bandwidth by Location](image)
In addition to asking businesses about their perceived need for more bandwidth, Connect Puerto Rico inquired upon business satisfaction regarding their broadband service. As figure VII.7 shows, just 38% of Puerto Rico businesses in the Healthcare sector report being "Very Satisfied" with their broadband service, compared to nearly two-thirds (65%) of all businesses in the Healthcare sector surveyed by Connected Nation in 2010. Furthermore, within Puerto Rico, the Healthcare sector reports the lowest level of broadband service satisfaction (Figure VII.7).

Puerto Rico’s Healthcare sector is characterized by high levels of broadband adoption, a lack of perceived need for increased bandwidth, and a low level of broadband service satisfaction. While conflicting in nature, this data may indicate a lack of industry experience with broadband applications, especially when it comes to the infrastructural needs of Health IT applications.

Perhaps supporting these findings is the comparatively short amount of time that businesses in Puerto Rico’s Healthcare sector have been online. Connect Puerto Rico’s findings indicate that 29% of broadband-connected businesses in Puerto Rico’s Healthcare sector report first subscribing to broadband two years or less prior to the survey taking place (August 2010). In comparison, only 15% of all businesses surveyed by Connected Nation report subscribing to broadband for two years or less, indicating that these businesses have much more experience utilizing broadband (Figure VII. 8).
Indeed, the Strategic Plan of the Puerto Rico Health Information Network confirms the conclusion that the Healthcare sector lacks sufficient experience in utilizing Health IT applications. According to the research presented in the Plan, it wasn’t until mid-2010 that local vendors and developers of Health IT applications began to heavily promote their offerings. In 2010, as part of their responsibilities under the State Health Information Exchange Cooperative Agreement Program, the Puerto Rico Health Information Network also conducted a survey in order to identify the status of interoperable Health IT adoption on the island. While the vast majority of respondents reported having some form of broadband in their workplace, survey results evidenced a general lack of awareness about national health information exchange initiatives. Furthermore, it was found that the number of providers and organizations, inpatient and ambulatory, who have selected and installed a Health IT solution are largely a minority. According to the survey, while approximately 59% of inpatient facilities were evaluating Health IT options, less than one-third of inpatient facilities had selected or installed a Health IT solution (Figure VII.9). Among outpatient facilities, nearly two-fifths had not even given any attention to Health IT applications.

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**Figure VII.8 - Percent of Broadband-Connected Businesses in the Healthcare Sector That Have Been Using Broadband for Two Years or Less**

![Percent of Broadband-Connected Businesses](image)

**Figure VII.9 - Inpatient/Outpatient Facility Responses to Healthcare IT Adoption**

![Inpatient/Outpatient Facility Responses](image)
3. The Need for Increased Capacity

For the benefits of Health IT solutions to be realized, meaningful use of these applications must be attained. However, adequate infrastructure required for Health IT applications is first needed. According to the FCC’s National Broadband Plan, smaller providers can achieve satisfactory Health IT adoption with a download speed of at least 4 Mbps for single physician practices and 10 Mbps for two-to-four physician practices, even though these solutions may not provide business-grade quality-of-service guarantees.\textsuperscript{30} Based on this requirement, Puerto Rico definitely faces a connectivity gap. As Figure VII.10 indicates, although businesses in Puerto Rico’s Healthcare sector pay a similar monthly price for broadband service, the average advertised speed is significantly lower; and at 2.6 Mbps, hardly fast enough to support current Health IT applications.

Furthermore, Connect Puerto Rico’s 2010 Residential Technology Assessment appears to confirm that Puerto Rico’s Healthcare sector is straining under the current capacity (Figure VII.11).\textsuperscript{31} Among the 31% of Puerto Rico residents with a home broadband subscription, 53%, (or approximately 485,000 residents) utilize their broadband subscriptions to access Health IT applications. This includes 49% who access health or medical information, 10% who communicate with their health insurance company, and 11% who communicate with their doctors or other healthcare professionals.
In comparison, among all jurisdictions surveyed by Connected Nation in 2010, 81% of broadband-connected households utilize their connection to access Health IT applications. This includes 73% who search for health or medical information, 41% who communicate with their health insurance company, and 34% who communicate with their doctors or other healthcare professionals.

Thus, in regards to Puerto Rico’s broadband infrastructure for the Healthcare sector, three gaps remain: education, adequate infrastructure, and utilization. Proper education and awareness measures need to be taken in order to encourage adoption of Health IT applications in the Healthcare sector. Furthermore, Puerto Rico’s bandwidth constraints are preventing healthcare providers from achieving full utilization of video consultation, remote image diagnostic, and EHR technology. These gaps must be filled to accelerate the benefits of broadband and to support needs likely to emerge in the near future.
C. Policy Recommendations To Accelerate e-Health Opportunities Across Puerto Rico

The previous section describes the state of broadband adoption and usage across Puerto Rico healthcare providers and identifies significant gaps in broadband infrastructure serving the healthcare community and Health IT usage that remain a challenge in Puerto Rico. Available data indicates that Puerto Rico healthcare providers are lagging behind in the adoption of Health IT solutions, and that the broadband capacity serving them today is drastically insufficient to support increasingly available Health IT solutions. Consumers and patients, on the other hand, are also lagging behind the adoption and usage of broadband technology that will ultimately enable, among other things, full leverage of these Health IT solutions to ensure better healthcare and, ultimately, higher quality of life.

It is imperative that this gap be closed – and fast. Health IT is in its infancy. As emerging Health IT applications become more prevalent and the importance of bandwidth capacity grows, it will be critical that Puerto Rico’s healthcare providers have the infrastructure that they need. In this section we outline a series of strategies that will help achieve these goals across Puerto Rico. Building upon the experience of the PRHIN and other healthcare IT experts, this section analyzes the key challenges preventing full penetration of Health IT solution across Puerto Rico, and proposes a series of strategies to overcome these challenges.

1. Drastically Enhance Broadband Capacity Available to Healthcare Providers

Chapter 3 of this Strategic Plan outlines in detail the state of Puerto Rico’s broadband infrastructure, and identifies a significant broadband access gap across the island. Data presented in this chapter indicates that this gap is affecting the ability of healthcare providers to fully leverage Health IT opportunities. It is imperative that the access gap be closed across the island to serve all citizens and institutions and, in particular, to provide access via robust speeds for healthcare providers. Elsewhere in this Strategic Plan we discuss the challenges and strategies to promote increased investment in broadband capacity. We do not reiterate those strategies here, but do emphasize that serving the broadband needs of hospitals, clinics, laboratories, diagnostic centers, and payers into the system is imperative for Puerto Rico to contain the costs of healthcare delivery and improve health statistics across the island.
This Strategic Plan sets the following target speeds for broadband access available to all healthcare institutions across the island:

### Strategic Goals for Puerto Rico - Healthcare

All Puerto Rican healthcare providers and patients should have access to broadband that meets the capacity, latency, and quality of service specifications necessary to utilize healthcare information technology and provide telemedicine services effectively.

**e-Health Goals:**
- By 2015, create a nationwide e-care network that will ensure interconnectivity between all stakeholders, including patients, healthcare providers, and payers – public and private.
- By 2015, ensure broadband network capacity available to healthcare providers:
  - 4 Mbps to all healthcare providers
  - 10 Mbps to nursing homes and rural healthcare providers
  - 25 Mbps to clinics and large physician practices (5-25 physicians)
  - 100 Mbps to hospitals
- By 2020, ensure 1 Gbps to academic and large medical centers

As broadband providers continue investing in broadband capacity to meet these goals, more data will be necessary to assess the level of connectivity available to healthcare providers. Part of the broadband mapping efforts undertaken by the Office of the CIO include the collection of data documenting the type and speeds of broadband contracted by community anchor institutions, including healthcare providers. To ensure comprehensive, up to date information, it is imperative that healthcare providers actively cooperate with this initiative, which aims to understand the current state of broadband use across the industry and assess development as broadband services are expanded. To do so, all healthcare providers are invited to provide data about their broadband connectivity by submitting an online survey available at [http://www.connectpr.org/policy](http://www.connectpr.org/policy).

**Recommendation:**
Continue ongoing efforts to document information regarding broadband service capacity used by healthcare providers across Puerto Rico.
2. Overcome the Usage Lag of Health IT Solutions by Puerto Rico Healthcare Providers

Data indicates that a large percentage of Puerto Rico healthcare providers are lagging behind in the adoption and usage of Health IT solutions. It is imperative that the gap be closed to ensure a viable Healthcare sector and to meet federal requirements for continued funding under various programs.

Barriers to Health IT adoption and the broadband capacity necessary to sustain these solutions include financial constraints as well as lack of perceived need. These two factors, affordability and relevance, are in fact inherently one and the same. Healthcare providers that don’t appreciate the efficiencies enabled by Health IT solutions are less willing to invest in the IT systems and broadband capacity necessary to sustain them. In short, too many healthcare providers across Puerto Rico still don’t see these expenses as investments that will rapidly result in lower overall costs of healthcare delivery.

To overcome the lack of perceived relevance, the PRHIN and, in particular, the Regional Extension Centers, has launched awareness campaigns aimed to educate healthcare providers about the benefits of these tools and the potential funding consequences of not adopting solutions such as capacity to manage Electronic Health Records. The Puerto Rico Broadband Taskforce believes these outreach efforts are essential and recommends that resources be allocated to continue funding such efforts.

**Recommendation:**

Overcome the usage lag of Health IT solutions by Puerto Rico healthcare providers. Continue allocating resources to awareness campaigns aimed at educating healthcare providers about the benefits of Health IT.

3. Reinforce Public-Private Partnerships to Overcome Governmental Barriers to Health IT Expansion

Ensuring a vibrant Healthcare sector is a core objective of the Government of Puerto Rico. The current Government and the Puerto Rico Legislature have made significant accomplishments in promoting and expanding Health IT solutions across Puerto Rico. Key milestones include the establishment of the Puerto Rico HIT Coordinator, and the PRHIN, and the office of the Chief Medical Information Officer (CMIO) within the Department of Health. In 2011, the first HIE/HIT legislation was signed into law, enabling the PRHIN to begin to release technical and educational materials aimed to integrate healthcare information processes across the region and defining the role of PRHIN as a key one-stop source of HIE/HIT governance in Puerto Rico.
Much work has been done to date, but much work remains to ensure the ability to overcome legal and institutional stumbling blocks in the sector. One example includes the need for legal clarity regarding privacy law as it affects a patient’s healthcare records. This is a challenge that all nations are facing as a result of the Health IT transformation underway. The legal precedent that exists is typically insufficient to offer clear and robust guidelines on how this information can and cannot be used. Rapid approval of legislation that will clearly define and ensure the privacy rights of patients to their health information is essential to ensure the rapid unleashing of solutions such as EHRs. Patients, healthcare providers, insurance and payer systems need clear legal guidelines of how information will be used, processed, and protected in order to ensure a functional system.

Overcoming these legal barriers will not only crucially help to promote the penetration of Health IT solutions, such as EHR, it will also help solidify a sound broadband policy for Puerto Rico. As healthcare providers increasingly use these IT solutions, demand from a key sector consuming high-capacity broadband will expand, significantly contributing to the overall sustainability of the sector. Such increased demand will, in turn, affect the economics of broadband built-out to offer ever more robust and fast networks. As in any market, as demand grows and is sustained, supply follows.

To accelerate the penetration of Health IT solutions across the Puerto Rico health system, private and public stakeholders should work to establish pilot programs offering telemedicine services across remote areas of Puerto Rico. Two such pilots could be radially implemented in Vieques and Culebra. A telemedicine pilot program providing remote medical assistance from the San Juan Medical Center to citizens of Vieques and Culebra could offer immediate benefits to thousands of citizens currently underserved by healthcare services and help healthcare providers, public institutions, payer systems, and patients learn how best to implement and benefit from such remote e-Health solutions.

Hence, while promoting Health IT solutions is not the core objective of this Strategic Plan, the Puerto Rico Broadband Taskforce stands in support of the efforts of the Puerto Rico HIT Coordinator and the PRHIN as they strive to overcome legislative and governmental barriers to full implementation of HIE and HIT resources.

**Recommendation:**
Reinforce public-private partnerships to overcome governmental barriers to Health IT expansion.

2 Ibid.


7 WebDMEMR is an abbreviation for “Web Based Disease Management Electronic Medical Record.” An electronic medical record (EMR) is an application used by healthcare providers to store, organize, and access all patients’ clinical data from a particular hospital or practice. An electronic health record (EHR) is a patient centric application where long-term and aggregate health information from one or more encounters in any healthcare delivery setting is stored. In contrast to an EMR, which only stores data from a particular hospital or practice, and EHR allows a patient to store data from any healthcare delivery encounter. WebDMEMR is a web-based application that enables both EMR and EHR functionality for any location in the world, provided an Internet connection is available. WebDMER’s EHR function enables patients to share past data with the physicians of their choice. For more information, visit: http://webdmemr.com/default.aspx

8 Testimonial of Mr. Gregorie Stoke, “Client recommendation for American Telemedicine – President, staff and WebDMEMR.”


10 Ibid.


18 Puerto Rico Health Information Network, (2011). *Physicians report by city in Puerto Rico*

19 Ibid.

20 Per Connect Puerto Rico’s June 2011 NTIA submission.

Note: Fifteen of Puerto Rico’s 78 municipio’s are served by less than twenty doctors, making travel to specialists at hospitals in other regions often necessary.

Note: In 2010, Connect Puerto Rico conducted the Business Technology Assessment, a random digit dial phone survey of 814 Puerto Rican businesses. This provides a margin of error for the territory-wide sample of ±5.1%.

Note: In 2010, Connected Nation conducted a series of random digital dial phone surveys of 9,650 businesses in 11 U.S. states (Alaska, Florida, Iowa, Kansas, Michigan, Minnesota, Nevada, Ohio, South Carolina, Tennessee, and Texas) and Puerto Rico. This provides a margin of error for the entire sample of ±1.6%.

Note: Bandwidth thresholds are actual (i.e., not advertised) speeds.


27 Ibid.

28 Ibid.  
Note: Mbps recommendations reflect compilation of the record. Numbers are guidelines, not precise measures.


Note: The 2010 Puerto Rico Residential Technology Assessment consisted of a random digital dial survey (RDD) of 1,200 Puerto Rico households.

Note: Connected Nation Average data comes from similar phone surveys conducted in thirteen jurisdictions served by Connected Nation in 2010. Connected Nation conducted random digit dial (RDD) telephone surveys of 15,647 adults age 18 and older living in Alaska, Florida, Illinois, Iowa, Kansas, Michigan, Minnesota, Nevada, Ohio, Puerto Rico, South Carolina, Tennessee, and Texas. These surveys were designed to measure technology adoption, how individuals use technology, and barriers to technology adoption among adults.