West Virginia Health Information Technology Infrastructure

Broadband Availability for Health Care Programs in West Virginia

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Existing Requirements, Capabilities and Unmet Need

With the passage of key federal legislation in recent years, the use of health information technology to improve the cost and quality of health care has become the predominant focus for health care delivery in the United States. Through the use of electronic health records and other health information technology initiatives, new methods and models for delivering and enhancing the quality of care and for measuring the outcomes of that care are at the forefront for improving the health care delivery system.

Broadband availability has become the single most important requirement for change in West Virginia's health care system. It is the conduit for enhanced and timely communications between doctors, doctors and patients, doctors and pharmacists and other health care providers. It facilitates the provision of medical care to un-served and under-served populations through remote diagnosis, treatment, monitoring, and consultations with specialists through telemedicine.[1] Rather than delaying treatment, broadband is the conduit for providers to communicate with other providers to facilitate health care interventions and timely treatments in areas lacking advanced diagnostic capabilities and specialty services.

Broadband and the use of health information technology is transforming health care by:

- leveling the playing field between urban and rural medical capabilities;
- reducing health care costs by enabling the widespread use of electronic health records;
- facilitating timely diagnoses and treatments;
- leveraging global resources to find efficiencies; and
- empowering individuals to manage personal health decisions.[2]

In order to implement health information technology changes, providers must have broadband available in order to implement or enhance their technology resources to meet the expectations, not only at the local level, but nationally as well. Generally, broadband enables hospitals, providers and clinics to ultimately improve the care provided, while decreasing associated costs.

Background and History

In 2008, the West Virginia Legislature passed HB 4637 requiring the West Virginia Health Care Authority (WVHCA) to develop a written report for the Broadband Deployment Council detailing existing broadband capabilities and unmet need for West Virginia's health care system as follows:

> *The Chair of the West Virginia Health Care Authority shall submit a written report to the council by the thirty-first day of October of each year describing in detail the existing broadband infrastructure owned, leased, used, operated or purchased by all hospitals, medical facilities, clinics or healthcare providers; all programs initiatives, or applications utilizing broadband that are promoted by hospitals, medical facilities, clinics, or healthcare providers; and any unmet demand for broadband by hospitals, medical facilities, clinics, or healthcare providers. W. Va. Code §31-15c- 11(f).*[3]

The Patient Protection and Affordable Care Act of 2010 (PPACA)

In recent years, the healthcare system has been focused on designing new ways to increase the quality of healthcare while supporting patients' ongoing management of chronic conditions proactively. While the use of health information technology, particularly electronic health records, has become the impetus for accomplishing these goals, new technology is rapidly improving programs that not only promote accountable and coordinated care, but provide widespread integration of data that can be accessed and shared between providers and used for developing and implementing treatment plans.[4]

The most recent federal congressional action that facilitates the use of health information technology in the health care system is the Patient Protection and Affordable Care Act of 2010 (PPACA). Although challenged, recent action by the United States Supreme Court, in a case known as, *National Federation of Independent Business v. Sebelius,* upheld the majority of provisions of the Act, including those related to health information technology.[5] One of the most significant requirements in the PPACA related to health information technology is the provision requiring the Department of Health and Human Services' Secretary to integrate the electronic health record meaningful use incentives, established by the Health Information for Clinical and Economic Health Act of 2009 (HITECH) Act, with the reporting mechanisms of the Physician Quality Reporting System (PQRS) required by the 2006 Tax Relief and Health Care Act, which uses a combination of incentive payments and payment adjustments to promote reporting of quality information by eligible professionals.[6]

In order to achieve meaningful integration of the two separate programs, providers and organizations are being incentivized to implement electronic health record systems that enable the sharing of data seamlessly among the care team while having the ability to measure and report quality metrics using the same data.[4] Incentive payments for using electronic health record technology in a 'meaningful' manner, i.e., for submitting quantity and clinical quality[7] measures, is the mechanism being used by the federal government for providing higher quality care delivery, improved patient safety, and shared decision making by patients and physicians.[8]

Through federal legislation, providers are being rewarded for transforming health care delivery through health information technology implementation. Meaningful use incentives and all of the resources the federal government is making available to assist providers is encouraging electronic health record implementation at the practitioner level. Regardless of the system being used, providers are taking advantage of early electronic health record implementation incentives in-state as well as nationally. A recent report from the Centers for Medicare & Medicaid Services (CMS) notes that the agency has made $3.12 billion in incentive payments to physicians, hospitals, and other health care providers who have implemented electronic health records that meet "meaningful use" requirements. In January alone, CMS distributed $519 million to eligible providers.[9] By the end of May 2012, more than 110,000 eligible professionals and 2,400 hospitals had received a total of $5.7 billion in meaningful use incentive payments, nationally.[10]

As of June, 2012, West Virginia Medicaid had distributed $31.8 million in health information technology incentive payments to West Virginia eligible providers and hospitals. The table below details Medicaid's payment distribution by provider type. Overall, 1001 West Virginia providers serving both Medicaid and Medicare recipients have received $49,399,513 from the EHR Incentive Programs as reported by the Centers for Medicare and Medicaid Services.[11]

Total WV ELECTRONIC HEALTH RECORD PIP payments as of June 8, 2012					
Hospital Count	*Hospital Amount*	*EP* Count*	*EP Amount*	*Total Count*	*Total Amount Paid*
26	**$21.1 million**	**519**	**$10.7 million**	**545**	**$31.8 million**

*Eligible healthcare professionals [12]

As incentives are being paid, the data being gathered as a result of electronic health record implementation will be used to measure health care improvements by provider; the results will be published on a publicly available website in the future. For providers who choose not to comply, penalties will be assessed through the reduction in reimbursements for services.[13]

Current Infrastructure

Health Care Connections

In order for providers to comply with federal requirements, the needed telecommunications infrastructure must be developed across the state, especially in rural West Virginia. Millions of dollars to deploy and enhance current broadband availability has been allocated to West Virginia through numerous grants. However, West Virginia still has one of the lowest household broadband adoption rates among the states, according to the November 2011 report, "Exploring the Digital Nation," released by the federal Department of Commerce's Economics and Statistics Administration and the National Telecommunications and Information Administration.[14]

Broadband deployment is the focus of numerous public and private organizations, and efforts are ongoing to improve its availability. In July 2011, Frontier Communications Corp. reported that 76 percent of its West Virginia customers had access to high-speed broadband, up from 62 percent in June 2010. They pledged to offer high-speed services to at least 85 percent of the homes and businesses in its service territory by 2015.[14]

Recently, the Federal Communications Commission's (FCC) Connect America Fund, a national public-private effort to connect 19 million rural Americans to high-speed internet by 2020, is one program that has provided nearly $4.6 million to target and boost high-speed internet to rural West Virginia.[15]

Programs that expand broadband, such as the aforementioned, help to ensure health care in rural areas. For example, WVU Healthcare has partnered with Davis Memorial, a rural hospital, not only to provide the Tele-stroke program, a video-based, neurological care program that will assist in the development of

treatment strategies for patients who suffer a stroke, but also provide the ability to share imaging scans and assist in the administration of intravenous, clot-dissolving drugs.[16]

The combination of federal incentives and contributions by programs to deploy broadband affords hospitals, providers and clinics the ability to rapidly implement new technology. Hospital & Health Networks magazine named WVU Healthcare as one of the "Most Wired" in 2012.[17] MyWVUChart, WVU Healthcare's online patient portal, is being used by more than 20,000 patients to access personal health records, view lab results, manage appointments and pharmaceutical refill requests, and obtain medical advice from their doctors. Last year, U.S. News & World Report listed WVU Hospital as one of the 118 "high performing" hospitals that has adapted health information technology.[18]

Other hospitals in West Virginia are also being hailed for utilizing internet-based services that allow for faster and more efficient care across hospital systems. Thomas Memorial Hospital, Charleston Area Medical Center and St. Mary's Hospital are using Sorian, an Internet-based system which allows records to be accessed from anywhere the web can be accessed; patient information can be viewed by doctors, pharmacists, nurses and even housekeeping in an effort to provide better care.[19] Through this system, doctors can view test results, change orders remotely and notify the nursing staff of changes. For the future, the hospitals will be working to set up a network that will allow the sharing of patient records between the hospitals as needed for even greater care and cost efficiencies.[19]

Cabell-Huntington Hospital has also been recognized in its successful adoption of electronic health record technology. Healthcare Information Management Systems Society (HIMSS) gave the hospital the HIMSS Analytics' award, which is the second-highest level of recognition in the Electronic Medical Record Adoption Model Stage 6 Award, and an award that only 5% of all hospitals in the nation have received. Cabell- Huntington Hospital's electronic medical record system has impacted patient care and patient safety by combining prior diagnoses, procedures, medication and allergies into one record. The system has the ability to provide faster and more efficient sharing of patient health information between physicians, and other healthcare providers, not only within the hospital, but outside of the hospital as well.[20]

Broadband Makes It Possible

Numerous agencies and organizations are working to improve or make high-speed data communication available for hospitals, clinics, physician practices and other healthcare entities. As a result, many health care providers are presently able, or soon will be able to provide and measure health services and share patient health care information with other providers as needed.

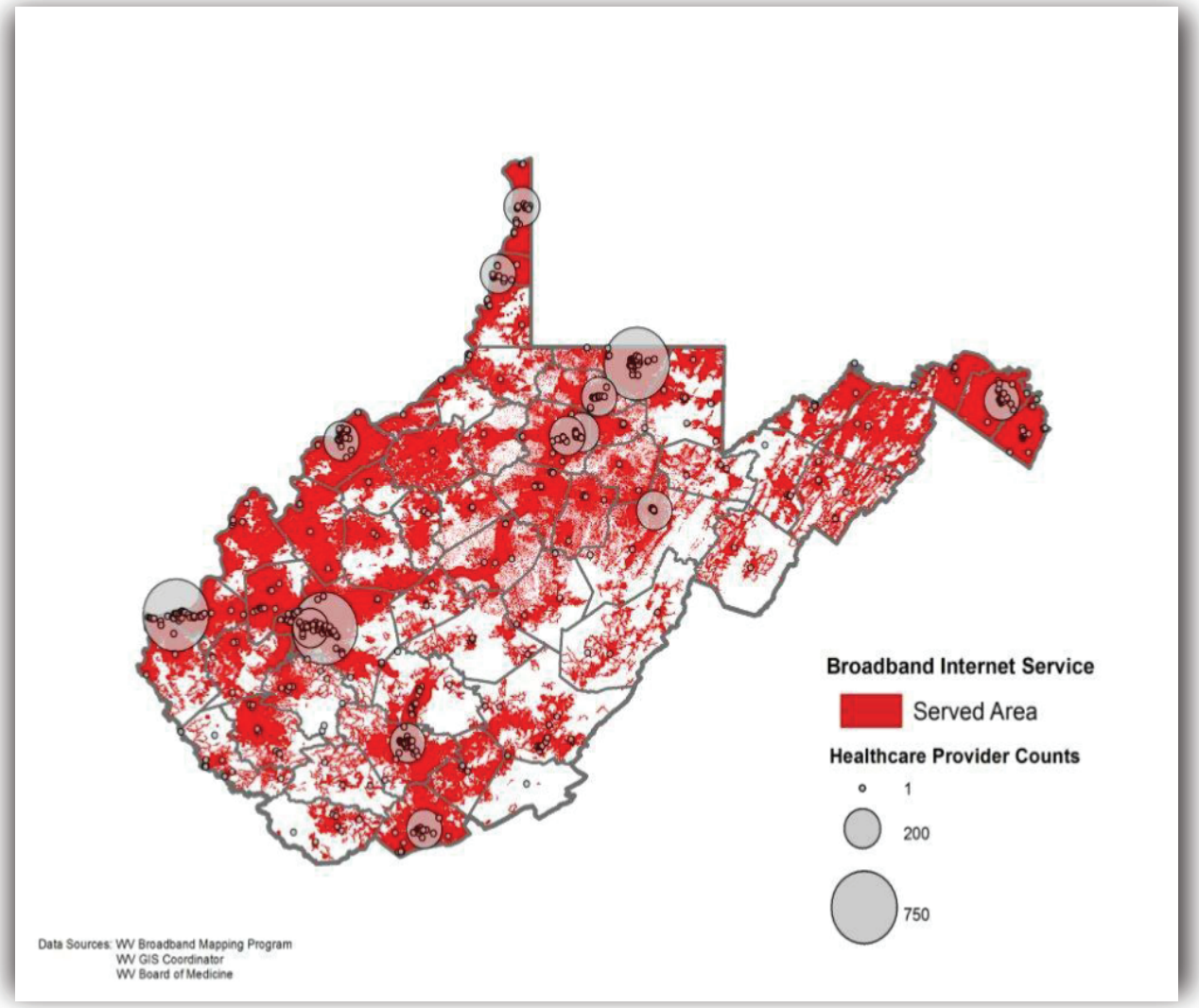
Broadband makes it possible for West Virginia's providers to use the health care data collected through electronic health records, report nationally required measures, participate in health information exchange with other providers and coordinate care, improve health and provide efficient, cost effective care.

Many West Virginia providers are presently implementing, or moving in the direction of implementing new technologies, while some providers have been implementing electronic health records, meeting meaningful

use criteria and obtaining incentive payments for several years with the assistance of the West Virginia's Regional Health Information Extension Center (WVRHITEC). By mid 2012, WVRHITEC had assisted nearly 1300 providers in obtaining an electronic health record,[21] up from 700 in 2011.[22] Overall, 28% of West Virginia's office-based providers have adopted an electronic health record, according to the Department of Health and Human Services, Office of the National Coordinator's HealthIT Dashboard.[23]

Although many are using available technology, providers will not be able to use it to its fullest extent without broadband. Using data from both the West Virginia Broadband Mapping Program[24] and the West Virginia Board of Medicine, broadband access for individual and group healthcare providers across West Virginia is depicted in **Figure 1**.

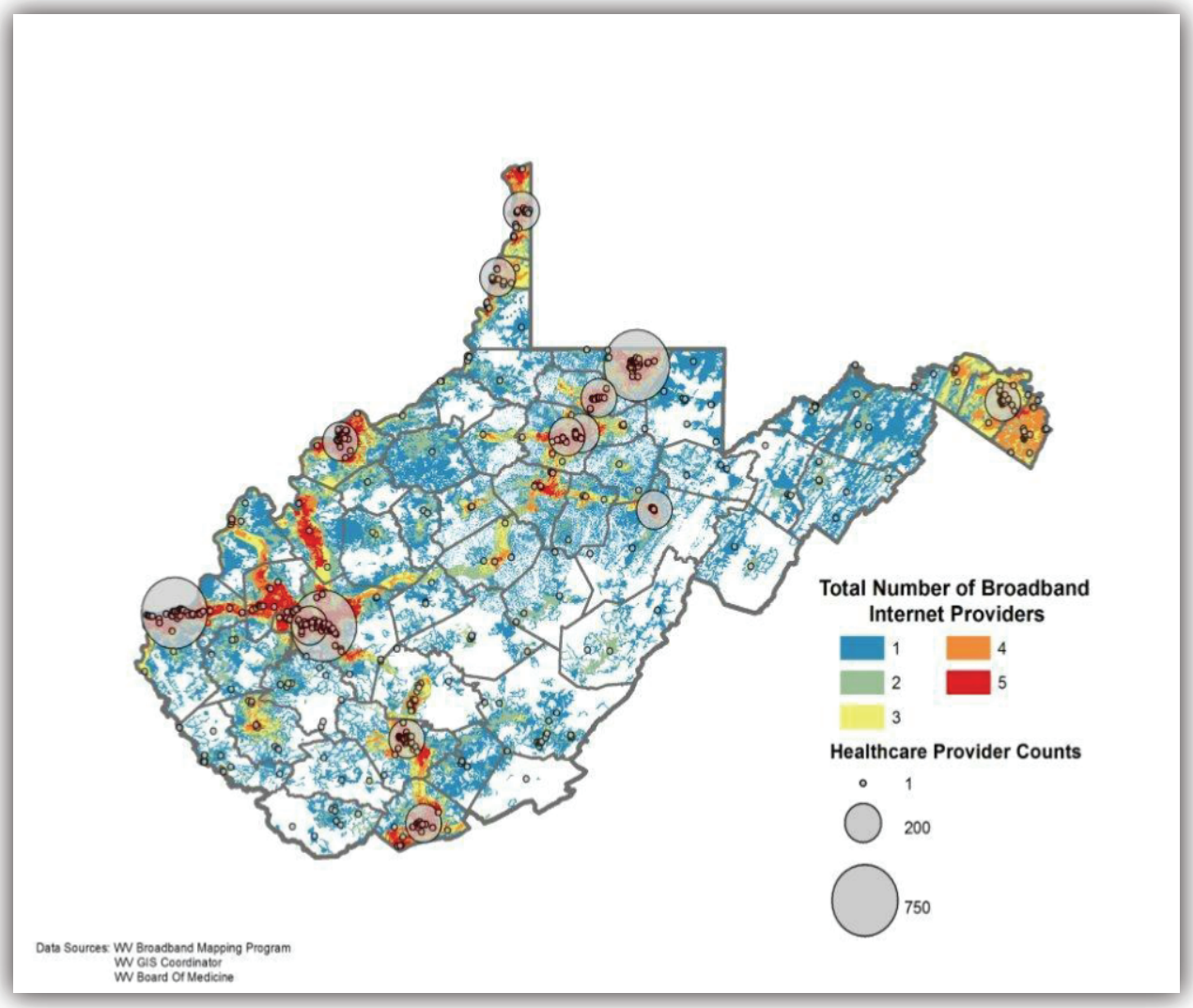
Figure 1



Broadband penetrates the majority of the provider office locations, but not all. There still seems to be a lack of available services for doctors in the southern part of the state, along the eastern border and in isolated areas of the eastern panhandle.

Likewise, there also seems to be a lack of broadband service providers, as noted in **Figure 2,** in the same areas showing little or no access to broadband in **Figure 1**. Although most of the state health care providers in the rural areas have access to at least one broadband service provider, there seems to be few individual or group health care providers who do not have access to any type of service. Fortunately, all West Virginia acute care and critical access hospitals have access to high speed communications (broadband), according to the National Telecommunications and Information Administration.[25]

Figure 2



E-Prescribing

Broadband availability also impacts a clinician's ability to e-prescribe, an electronic means for sending prescriptions from the provider to a dispensing pharmacy.

Surescripts, the nation's largest e-prescription network, recognizes states with the highest e-prescribing rates and performance based on the critical services that constitute e-prescribing: prescription benefit, medication history and prescription routing. Surecripts ranks WV as 34th in the nation for e-prescribing performance.[26]

Adopting the standards to facilitate e-prescribing was a key factor in the U.S. Government's plan to expedite the adoption of electronic medical records and build a national electronic health information infrastructure. The improvements made in patient safety combined with the incentives offered to prescribers not only increased the use of e-prescribing, but became the impetus for providers to begin exploring and using other available technologies to improve the health of their patients.[27]

The table below shows the growth in the adoption of e-prescribing by providers in West Virginia over a three year period.[26]

Although the use of e-prescribing is on the rise, WV ranks 34th in the nation for e-prescribing performance.

Surescripts, the 7th Annual SafeRx Awards, State Progress Reports, December 31, 2011[26]

	2009	2010	2011
Physicians Routing E-Prescriptions at Year End	946	1302	2014
Community Pharmacies Activated for E-Prescribing at Year-End	436	470	504

As shown in **Figure 3** and the E-Prescribing Utilization table,[26] providers in West Virginia are increasingly utilizing available information via electronic means for identifying past and present prescription use prior to prescribing a particular medication and routing to a pharmacy electronically.

Figure 3

Federal incentive programs provided to eligible professionals who e-prescribe, which have been ongoing since 2009, may have influenced the growth of e-prescribing. As these incentive programs were implemented, payments increased incrementally each year; but beginning in 2012, incentive payments were not only reduced, but providers who were not successfully e-prescribing were subjected to a 1% payment reduction. By 2014, incentive payments will decrease further, penalties will increase, and payments will be reduced by 2.0% for those who do not comply.[28]

E-Prescribing Utilization[26]

	2009	2010	2011
Prescription Benefit Requests	**1,219,781**	**3,252,778**	**3,463,649**
Total Prescriptions Routed Electronically	**1,055,556**	**1,618,580**	**3,237,822**
Total Estimated Responses to Medication Requests	**398,073**	**1,487,729**	**1,960,081**

Health Information Exchange

Increasingly, providers are using information technology in their practices, whether through an electronic medical record, e-prescribing, or some other electronic means. The future is fast approaching, whereby, the patient's health information collected by one provider today may be used to communicate, electronically, to another provider taking care of the same patient tomorrow.

Electronic health records, e-prescribing and telehealth are clearly the most discussed when talking about broadband expansion in the health care system. One of the areas that is not discussed as often, but is growing rapidly both locally and nationally, is the health information network (HIN), a common platform for data exchange between distinct entities. A streamlined version of the national HIN is the Direct Project, which aims to facilitate online, standards-based exchange of medical data between health care providers.[29]

At the state level, the West Virginia Health Information Network (WVHIN) has launched a secure electronic health information system for the exchange of patient data among physicians, hospitals, diagnostic laboratories, and other care providers. Working with healthcare providers, West Virginia Medicaid and the West Virginia Bureau for Public Health, the WVHIN's health information exchange (HIE) provides clinicians with a longitudinal patient history at the point of care by capturing clinical and administrative data from electronic medical records and healthcare claims.[30] As of September 2012, WVHIN had approximately 600 users exchanging medical data through Direct secure messaging.

The WVHIN:

- Allows exchange of patient health information between hospitals, physicians, labs and other healthcare providers;
- Saves time and reduces administrative costs;
- Supports quality initiatives, including meaningful use;
- Connects directly to the Bureau for Public Health's Immunization Registry;
- Provides access to WVHIN's secure clinical messaging service, WVDirect; and,
- Is the gateway to WV e-Directive Registry, West Virginia's advance directive registry.[30]

Utilizing Wheeling Hospital and West Virginia University Healthcare (i.e., Ruby Memorial Hospital, Jefferson Memorial Hospital, City Hospital and approximately 70 physician clinics) as pilot sites and first implementers of the exchange, the WVHIN has the ability to access clinical information, including lab results, diagnosis history, allergies, and patient visit history, on more than 2.1 million patients. Additional providers, hospitals and health care centers are expected to connect in the near future, ultimately, leading to greater care coordination, improved care and reduced costs.[30]

Broadband and Health Care Education

Going beyond the individual or group provider's electronic medical record or e-prescribing capabilities,the availability of broadband has an even greater impact on patients and providers. Broadband also serves as a tool for educating health care providers and their patients.

In an effort to determine present and future need for broadband services, a survey was sent to each hospital in West Virginia requesting information about the hospital's use of broadband services for educating doctors, professional staff and patients, now and in the future.

Of the 51 hospitals surveyed, 12 hospitals in both urban and rural locations responded. Many of the hospitals are using broadband as an opportunity, not only for education of providers and patients, but for providing patient care. Hospitals are providing and using services as follows:

- 75% of respondents presently use internet based educational programs for professional staff education;
- 56% of respondents use internet programs for career readiness, work force development or alternative career training;
- 100% of respondents use internet programs for continuing medical education;
- 17% of respondents are using the internet for patient consults;
- 10% of respondents have a plan to implement internet-based patient consults within the next year;
- 33% of respondents are using the internet for patient education;
- 13% of respondents have a plan to implement patient education services through the internet within the next year;
- 33% of respondents have video conferencing available at the facility;
- 13% of respondents plan to implement video conferencing at the facility within the next year;
- 67% of respondents reported that the video conference is/will be available for state use;
- 33% of respondents reported that the video conference is/will be available for public use.

In addition to educational programs being offered, direct patient care services are also being provided via telehealth for newborns, dermatology and psychiatric services. It is anticipated that telehealth services will be expanded in the future to include genetic counseling and other types of specialty services not available across the state. Furthermore, comprehensive drug information programs that may be accessed anytime using broadband are being utilized by hospitals to improve care and assist in treatment decisions.

The Future of Health Care and Technology Use

Cloud Technology

Today's health care organizations operate within a tight budget, and the days when organizations made large purchases of hardware and software are fading. New technology that allows *virtual computers* to do the work is fast approaching, and in many cases, is already replacing operations of the past, garnering savings for today's budget conscientious organizations. Virtual computers, or cloud technology, is changing how organizations are handling the demand for information technology given limited resources, providing healthcare organizations and doctors opportunities not afforded in the past.

In a cloud computing system, local computers only need to run the cloud computing system's interface software, which may only be a web browser. The software application and storage of data no longer sits on the user's computer, but exists on the service's computer cloud[31] as depicted.[32] Examples of cloud technology already being used are web-based services like Hotmail, Yahoo! Mail, Gmail, and most notably, Pandora Radio.[33]

Health care organizations and providers are also seeking ways to reduce the cost of information technology by finding innovative ways to collaborate and improve patient care. Using emerging innovations moves health care away from more rigid systems and towards systems that allow providers the ability to simplify technology.[4]

Cloud Technology and Software as a Service

Software as a Service (SaaS) is a model where software applications are hosted by a service provider and made available to customers, typically through the internet.[34]

SaaS provides an opportunity for healthcare providers and organizations to access technology without the cost of maintaining hardware, software or information systems.[4]

Health Information Exchange in the Cloud

Health information exchanges (HIEs) provide a common platform for data exchange between disparate entities. Nationally and at the local level, HIEs are emerging and demonstrating significant results. By moving HIE to the cloud, it is possible for organizations to collaborate with other providers and share data from multiple applications in a single online interface, cost effectively, eliminating the need for a central data repository.[4]

Cloud-based EHRs

It is widely known that standalone EHRs are expensive and often have inherent problems achieving interoperability and communication between providers, which may be reasons why some providers have not implemented an office-based EHR. A cloud-based EHR, however, is a seamless option for providers who are anticipating a financial investment for an EHR system. A cloud-based system eliminates the need for EHR implementation, ongoing IT management, upgrades or maintenance, and offers the flexibility to access data from anywhere through the internet. These systems enable providers to communicate and col-

laborate with other providers, online, and interface to aggregate data from multiple locations seamlessly. This technology is more easily available on mobile devices as well.[4]

The data aggregated from a cloud-based EHR system provides a benefit from the public health perspective by acting as a data repository where data from thousands of healthcare users can be analyzed to proactively address healthcare risks, trends and challenges.[4]

An example of a cloud-based EHR system in development is UnitedHealth Group's, Optumhealth. Optumhealth has partnered with Cisco, EMC, Hewlett-Packard, IBM, and others to allow users to use the cloud-based software systems and databases without having to own or manage the technology.

With this technology, the opportunity to consolidate data from various hospitals, doctors' offices, and insurance claims systems, and allow providers and patients to get information from one website, is fast becoming a reality. It will also allow health care providers to communicate, collaborate, share patient data and coordinate services more efficiently and cost effectively. Rather than purchasing a stand-alone EHR system, providers will have an opportunity to purchase EHR technology through the cloud.[35]

Cloud based Medical Imaging

Organizations are struggling with maintenance, storage and access as medical imaging increases by 20- 40% each year. Standalone picture archiving will be a thing of the past with cloud based medical imaging. Not only will the cloud-based services manage the data securely, the service will allow images to be stored, managed and organized into one central location where they can be accessed, viewed and shared between providers, alleviating interoperability challenges faced by many.[4]

mHealth

Mobile medical applications (mHealth) allow patients to download applications that may assist them with many of their medical conditions. For example, there are applications that provide dietary guidelines where food diaries can be kept; applications that allow the user to track glucose and heart rate; and applications that promote exercise, to name a few. Since the Food and Drug Administration (FDA) issued draft guidelines for mobile medical applications in mid 2011, mHealth applications have greater relevance for provider and patient use.[4]

Because of the flexibility and lower cost of mobile technology, many health care providers may explore using this technology for improving patient outcomes. The key for using these devices and applications is to connect patients and providers. Once connected, providers can enable predictive and preventive interventions. The technology is literally in the hands of the patient, and with healthcare professional support of mobile technology applications, a patient's health can be influenced and tracked.[4]

Mobile phone and M2M

A recent study conducted by the Pew Research Center showed that 83% of Americans own a cell phone, 35% own a smart phone, and 8% own a tablet. Among smart phone owners, one-quarter say their mobile phone is their primary source of internet connectivity.[36]

With the growth of mobile technology, mobile applications and mobile websites are quickly emerging, many, allowing machine-to-machine (M2M) communications. Wireless devices are now able to talk to each other, opening up endless opportunities for innovation for health care and the health care provider. These include, but aren't limited to:

- Wireless heart rate monitors that can send data to the patient's mobile phone, which in turn transmits data back to the provider; if there is a problem, the provider can provide instruction immediately.
- When a patient forgets to take their medication at the appropriate time, the networked bottle can trigger a text message or phone call to remind the patient to take the medication.
- Patients can use their mobile phones to record blood sugar levels or other data requested by the provider, allowing the provider to follow-up as needed; given the data input, an application can deliver suggestions about how the patient can make immediate changes.[4]

Mobile technology is an exciting tool for the health care industry and is an opportunity for providers to closely follow patient progress.

Conclusion

Broadband deployment, health information technology and infrastructure investment over the years has vastly improved and transformed West Virginia's health care delivery system. Given all of the advancements, health care organizations and providers continue to explore technological opportunities that will improve the quality of patient care, meet all federal requirements, maximize reimbursement, and at the same time, reduce costs.

With the numerous incentives being offered for health information technology implementation and use of electronic health records, quality care and measurement reporting have also improved. With more options available, however, healthcare providers and organizations considering investments in health information technology must consider not only the availability and speed of broadband, but the technology solution that will affect the many ways they deliver health care now and in the future.

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