



Preface to the Report:

Broadband Infrastructure in West Virginia Healthcare

Preface by the West Virginia Healthy Care Authority

Report Prepared by KRM Associates, Inc.

March 2009

LEGISLATIVE BACKGROUND

The West Virginia Legislature passed HB 4637 during the 2008 legislative session establishing *W. Va. Code § 31-15c-11(f)*. The statute, inter alia, requires that the West Virginia Health Care Authority (HCA) submit a written report to the Broadband Deployment Council (Council) by the end of October each year. In short, this particular report is to accomplish two things:

1. To describe, in detail, the existing broadband infrastructure for medical use, or controlled by medical facilities or providers in the state; and,
2. To describe all programs, initiatives, or applications utilizing broadband that are promoted by these healthcare facilities or providers.

See: <http://www.legis.state.wv.us/BillTextHTML/2008SESSIONS/RS/BILLS/HB4637%20enr.htm>

DEVELOPMENT OF AN INITIAL REPORT

In order to provide an initial report, it was necessary for HCA to seek resources and expertise in the private sector. KRM Associates has been involved in conducting surveys of healthcare providers to assess the health information technology and telecommunications landscape across the state.

Attached is the initial report completed by KRM Associates. It includes a current assessment and a draft plan for completing the duties outlined in the statute. WVHCA is in the process of developing a final work plan.

ISSUES IDENTIFIED BY THE INITIAL REPORT

A review of requirements, preliminary findings, and careful evaluation of the scope of work required, results in several decision points for consideration.

Broadband connectivity for healthcare services in the state is provided by a select group of carriers, primarily through Dial-up telephone modem, Cable Modem, DSL, and Telecommunication carrier systems level 1 (T-1) or above. The same telecomm vendors provide services to health care organizations, other businesses, local and state government and the public. The Connect West Virginia project (See: <http://connectwestvirginia.org/>) has provided mapping information to identify broadband availability and service areas throughout the state. It would be advantageous to continue to aggregate the function of collecting information about actual connectivity.

A number of questions arise:

- How should data collection be standardized and coordinated to avoid confusion and overlap of effort?
- Would there be greater value and efficiency in assigning the data collection activities for broadband infrastructure hardware and bandwidth to one entity and share the data?
- If so, which agency should collect the data?
- In any case, how much data should we collect?
 - What surveys will we use to collect the information, or, should we conduct a more exhaustive census?
 - Will surveys be web-based, mailed, by telephone or a combination of survey types?
 - How, or should we, conduct interviews?
 - What types of businesses and health care providers will we contact?
- Should we survey end-users about their broadband connections?
- How, or should, broadband providers be surveyed?
- How should we share the data?

Initial estimates of the total cost and the level required to gather information for the West Virginia Health Care Authority report, alone, total approximately \$300,000 for 2009. The cost of additional telephone surveys and an increase in the number of survey recipients will add additional cost. Internal labor resource limitations may also require the use of outside vendors to accomplish the tasks. Potential areas for collaboration and cost savings exist if reporting of broadband availability and infrastructure were centralized.

It would be very helpful if the Council would define the scope and level of effort expected for the survey of each sector. The cost of the effort to accomplish these goals should be taken into consideration.

HCA recommends that a small work group of key staff from each of the agencies be formed to develop a draft, coordinated work plan for the Council to consider.



Broadband Infrastructure in Healthcare

Existing Broadband Capabilities And Unmet Demand for West Virginia's Health Care System

Prepared by KRM Associates for the West Virginia Health Care Authority
January 2009

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WV Health Care Authority (HCA) Capabilities Report

I. HB 4637 BACKGROUND

WV Legislature passed the HB 4637 in the 2008 legislative session requiring the WV Health Care Authority (HCA) to develop a written report to the council due each year detailing existing broadband capabilities and unmet demand for WV's health care system as follows:

The chair of the West Virginia healthcare 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).

See:

<http://www.legis.state.wv.us/BillTextHTML/2008SESSIONS/RS/BILLS/HB4637%20enr.htm>

II. REPORT REQUIREMENTS

The 2008 Preliminary Report shall include a current inventory and a brief discussion of the problem statement. The remainder of the report will be devoted to a work plan for collecting the data and maintaining the data in an electronic and easily retrievable format, and developing the more detailed 2009 report that will include the collection of additional data on physician offices within six months.

Detailed information to be provided in the 2008 Preliminary report will include:

1. Infrastructure:
 - a. Collection and reporting on the existing infrastructure owned, leased, used, operated, or purchased by all hospitals, medical facilities, and clinics.
 - b. Collection and reporting on any unmet demand for broadband by hospitals, medical facilities, and clinics.
2. Application: collection and reporting on all programs, initiatives, or applications, focusing on telehealth and electronic health records, utilizing broadband that are promoted by hospitals, medical facilities, and clinics.

III. CONCEPTS AND METHODOLOGY

In order to complete the short turnaround time requirements for this preliminary report, the HCA contracted with KRM Associates, Inc. (KRM). In January 2008, the West

Virginia Department of Health & Human Resources (WVDHHR) had previously contracted with Shepherd University and KRM to conduct a series of surveys to help assess the health information technology and telecommunications landscape across the state. The surveys were designed to gather data from hospitals, major FQHC and rural health clinics, nursing homes, and individual physician practices. The construction of the surveys and the methodology for collection was a collaborative effort involving input from DHHR, West Virginia Health Information Network (WVHIN), and the WV Telehealth Alliance.

KRM also acquired data from a number of other sources to further augment data collected via the state-wide survey, e.g. HIMSS Analytics database, WV State Medical Association, WV Health Care Authority (HCA). Data from West Virginia Connect, Connected Nation, and other sources were also collected, analyzed, synthesized, and used in preparing this preliminary report. In order to complete a more comprehensive report for 2009, more complete, up-to-date data will need to be collected on the broadband infrastructure in the state and, more specifically, its use by health care facilities.

The survey was developed and finalized by July 2009, in order to complete the data collection phase by October 2009. Experience has shown that getting health care providers to cooperate and submit their data requires extensive manual effort and follow-up. The collected data has been analyzed and a draft report generated by December 2009. KRM continues to collect updated information.

Survey Methodology

Three surveys were developed – one for hospitals, a second for FQHC and rural health clinics, and the other for small family or general physician practices. The surveys were designed to gather data on EMR systems, existing computer resources, broadband connectivity, Internet connectivity, telehealth, and other key health information applications. SelectSurvey.NET™ was used to create the web-based surveys. The survey data captured were stored in an SQL Server 2005 database for subsequent detailed analysis. All surveys were designed to take as little time as possible to complete so more people would be willing to take the time and participate, the physicians survey, a concern about limited response rate from physician practices resulted in development of a much shorter version.

While the goal was to collect a 100% response rate from hospitals and FQHC clinics, it was recognized that realistically only a small response would be practical from small physician practices. The goal was to try and achieve at least a 20% response rate from small practices.

A cover letter, copy of the survey, and passwords to the online survey were sent to hospitals in April 2008. The clinic survey cover letter and passwords were sent out in late June 2008. The physician practice survey was sent out in September 2008.

The surveys were completed over a 9 month period. A follow-up methodology consisted of emails and telephone calls to encourage hospitals, clinics, and private physician practices in rural and urban areas to complete the survey via fax, online, or over the phone. Additionally, all physician practices were sent a hard-copy survey for completion.

The key factors for having a comprehensive survey methodology is to assure that data captured will provide information to help make key decisions to further understand the need of broadband connectivity for health IT systems within West Virginia. One of the primary reasons for construction of these comprehensive surveys was to avoid contacting the healthcare entities multiple times for similar, but slightly different, information.

IV. CURRENT BROADBAND INVENTORY PRELIMINARY FINDINGS

The conclusions in this report are based upon the limited number of hospitals, clinics, and physicians who responded to the survey. Any inferences based these statistics should take this fact into account.

The following are findings from the analysis of information collected from the 2008 survey of hospitals, clinics, county health departments, and physician offices across the state of West Virginia. Note that some of the hospital statistics have been supplemented by data from the 2007 survey conducted by HIMSS Analytics where no response was received by the 2008 WV HIT Readiness Survey:

Hospital Response to the 2008 Survey

Table 1-Hospital Responses

Completed	Incomplete	No Response	Total Requests
41% (30)	24% (18)	35% (26)	74

- 76% (31) of the hospitals responding to the survey claim to have implemented, or begun implementation of, an electronic medical record (EMR) system. However, when the number of software modules that have been implemented are more closely scrutinized (e.g. Laboratory, Pharmacy, Radiology, Order Entry), the number of hospitals operating and fully utilizing an EMR system is less than 50%. The following table shows how the respondents' implementations break down.

Table 2-Full EMR Implementation by Hospital Type

Type of Hospital	Number Surveyed	Number Responding to this Topic	Number Using Full EMR Capabilities*	Number Planning Full Implementation
Acute Care	37	14	3	2
Long Term Acute Care	2	1	0	0
Critical Access	18	6	1	1
Psychiatric	4	2	0	0
VA	4	4	4	0
WVDHHR	4	4	0	0

* Note that this refers to the capabilities of the systems in use, some of which are less robust than others.

- 22% (7) of the hospitals responding said they use a pure electronic medical record (EMR), while 69% (22) use a hybrid electronic/paper record, with 9% (3) still relying solely on a paper record.

- Of the 49 respondents to this question indicating they had Internet connectivity, 4% (2) indicated they did not know what type of connectivity they had. Of those who provided this information, 54% (26) reported having either T-1 or T-3 connections.

Hospital Internet Connectivity

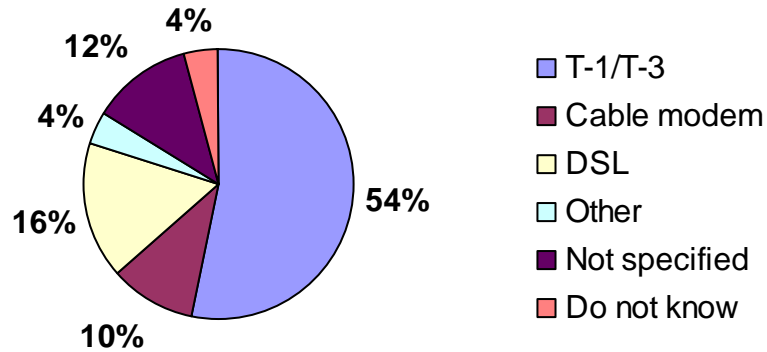


Figure 1-Hospital Internet Connectivity

- 60 (95%) of the hospitals responding to either the survey have a corporate web site on the Internet.

Hospitals with Web Sites

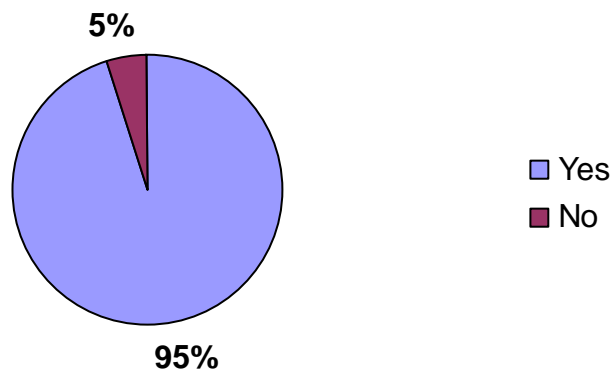


Figure 2-Hospital Web Site Statistics

- 23% (7) of the hospitals surveyed indicated they are participating in a RHIO or HIN. The Veterans Hospitals are using the Federal Health Information Exchange (FHIE) to exchange data with Department of Defense (DoD) hospitals. A definition of RHIO/HIN was not given in the survey. This may have been interpreted differently by respondents.

**Does your organization belong to a
RHIO or HIN?**

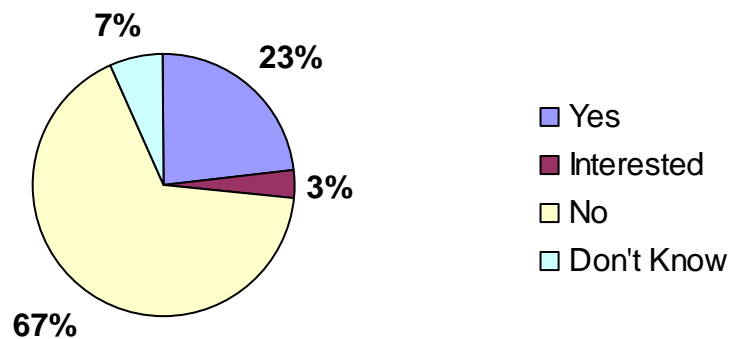


Figure 3-RHIO HIN Statistics

- With regard to Telehealth applications, 64% (19) of hospitals surveyed said they are already using Teleradiology, 13% (4) were interested in implementing this capability, but 23% (7) responded that there was currently no interest in this capability. A smaller number are utilizing Telecardiology and Telepathology solutions.

Hospital Interest in Teleradiology

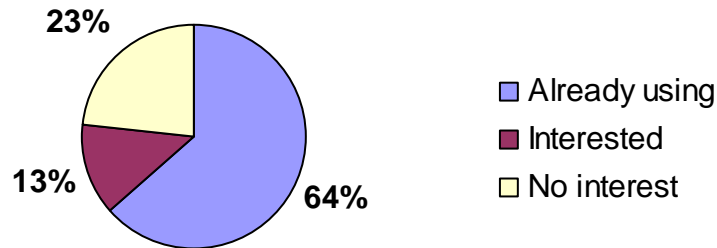


Figure 4-Hospital Teleradiology Statistics

Clinic Response Statistics

Table 3-Clinic Responses

Completed	Incomplete	No Response	Total Requests
39% (37)	5% (5)	56% (52)	94

- 17 of the clinics and county health departments responding to the survey have implemented, or begun implementation of EMR systems. All but one of the county health departments responding to the survey indicated that no current plan was in place to implement an EMR.

Table 4-Clinic EMR Use, by Type of Clinic

Type of Clinic	EMR Implemented	EMR Planned	No Plans	Total Responses	Total Surveyed
FQHC	12	3		16	33
Free Clinic	4			4	11
Not Funded			1	1	1
County	1		17	21	49
Totals	17	3	18	52	94

- Two EMR systems reported as being frequently deployed clinics across the state are HealthWV and RPMS (RPMS is used in conjunction with another vendor's practice management system, as seen below). HealthWV is installed primarily in small free clinics (4 respondents), while RPMS is installed in FQHC clinics with multiple distributed smaller sites.

Clinic EMR Vendors

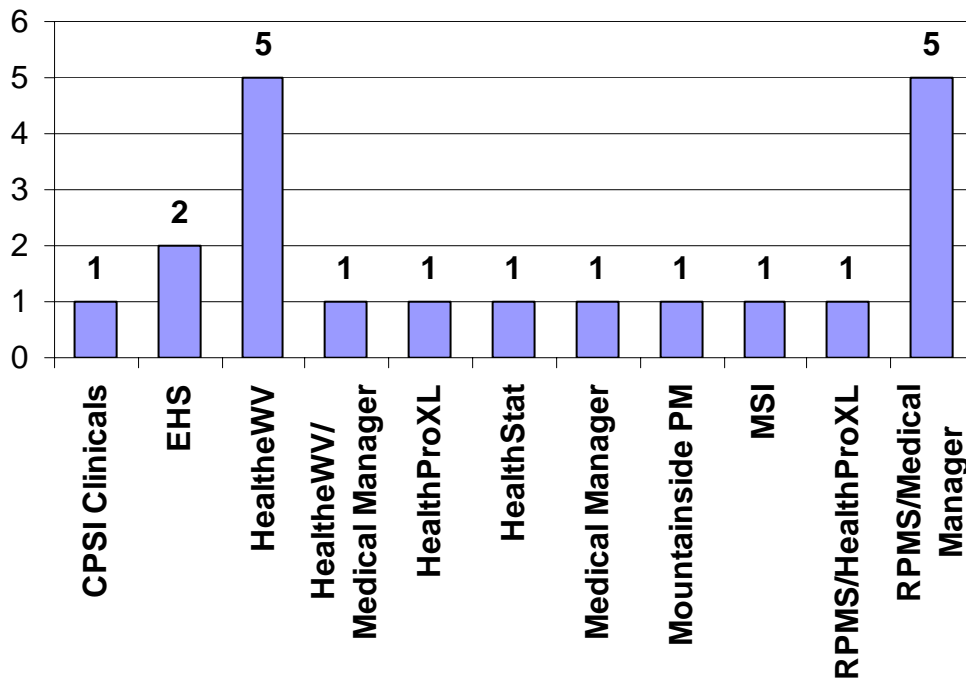


Figure 5-EMRs Reported in Use by Clinics

- Most of the responding clinics (38) have some form of high speed telecommunications connection to the Internet, i.e. T-1, DSL, or Cable Modem.

Clinic Internet Connectivity

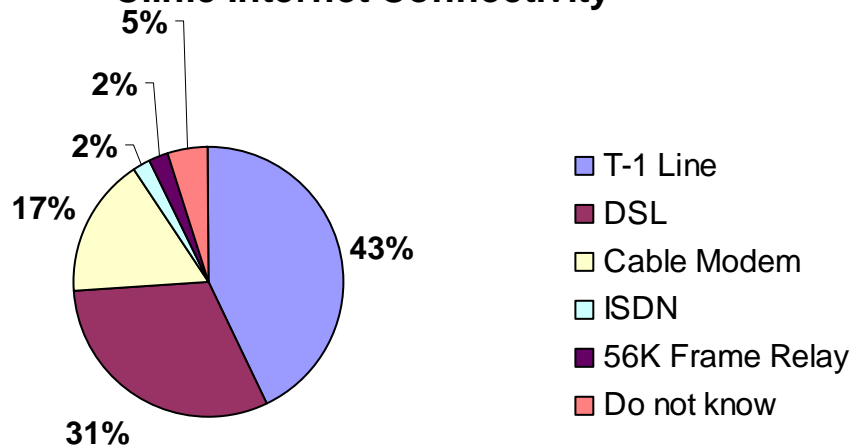


Figure 6-Clinic Internet Connections

- The survey shows that 67% (28) of the responding clinics have web sites and (33% (14) do not.

Does your organization have a Web site?

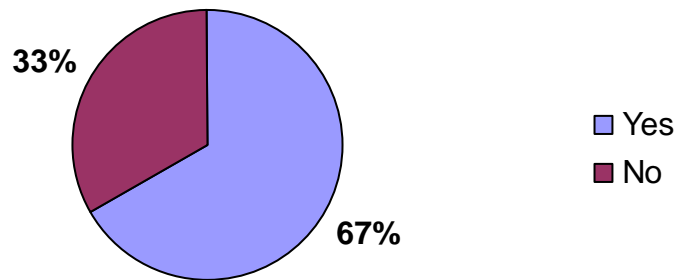


Figure 7-Clinic Web Sites

Physician Response Statistics

The surveyed population included only family and general practitioners not employed by hospitals or clinics.

Table 5-Physician Responses

Completed	Incomplete	No Response	Not Usable	Total Requests
8% (33)	5% (20)	82% (316)	5% (22)	389

- Over half (17) of the small physician offices responding now use a Practice Management (PM) system. The most frequently reported PM software product, reported by 3 physician offices, is *Medical Manager* by Sage.
- 44% (15) of physician offices responding to the survey said they were using an EMR. An additional 18% (6) say they are planning on implementing EMR systems in the next 2-4 years, but 38% (13) said they did not have a current plan for acquiring an EMR system.

- Over 90% of physician offices are connected in some way to the Internet. For those few who are not connected, 33% cite cost as the main reason and 67% state they don't want to be connected at this time.

Physician Practice Internet Connections

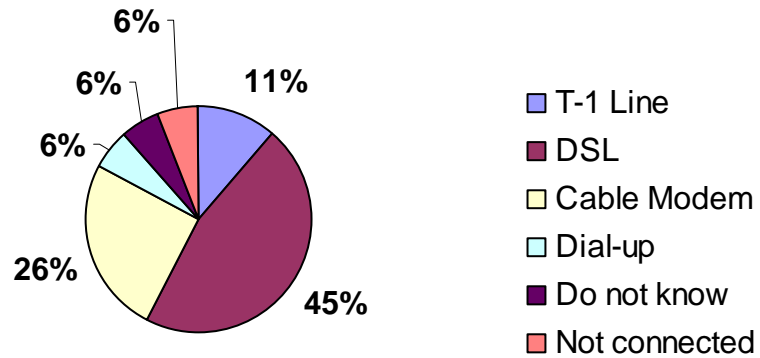


Figure 8-Physician Internet Connections

- 26% (9) of physician offices report currently having their own Web sites on the Internet.

Physician Practices with Web Sites

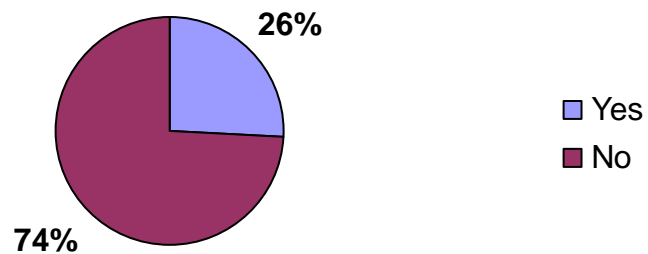


Figure 9-Physician Web Sites

- 26% (9) of the physician offices reported that they now accept or exchange secure email with their patients.

Physician Practice Secure eMail

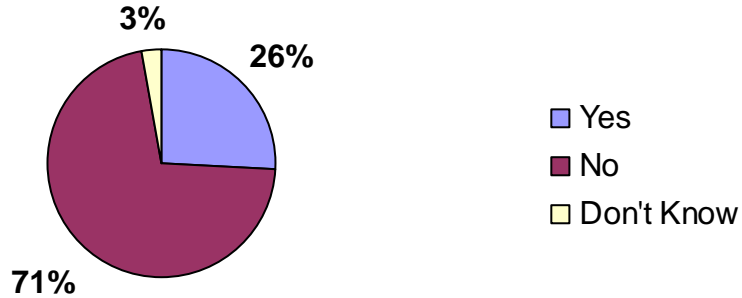


Figure 10-Physician Secure eMail

- When asked how they send out medical record information, 97% (33) of respondents say they use the mail, 74% (25) fax the information, but only 1 reported using secure email. The numbers above add up to more than 100% due to the overlap of usage of the transmission methods.

How do your respond to requests for records?

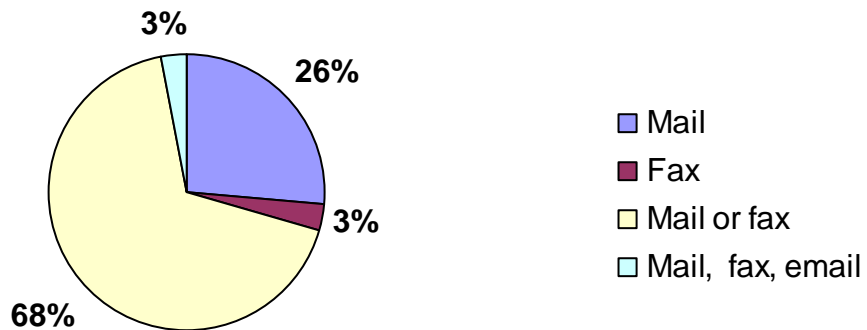


Figure 11-Physician Response to Medical Records Requests

- While 18% (7) of physicians reported using Teleradiology, 62% (25) indicated no current interest in this capability. The numbers were almost identical when asked about other Telehealth capabilities such as Teledermatology, Teleconsultation, Telepathology, etc.

Physician Use of Teleradiology

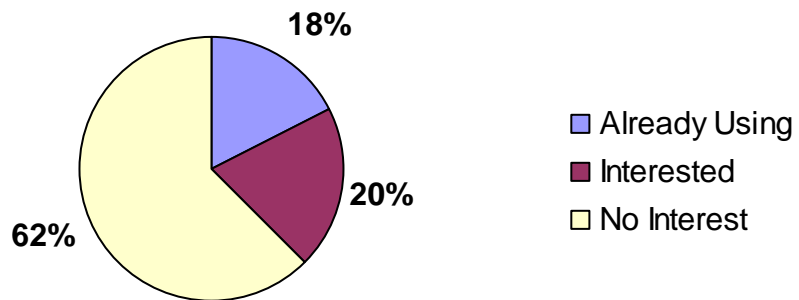


Figure 12-Physician Teleradiology

V. PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

The conclusions in this report are based upon the limited number of hospitals, clinics, and physicians who responded to the survey. Any inferences based these statistics should take this fact into account.

Electronic Medical Record Systems

- EMRs are being widely deployed in hospitals who responded to the survey. 79% (37) of these have already implemented an EMR system. An additional 17% (8) are in the process of acquiring or implementing EMR systems
- 52% (20) of the responding clinics and county health departments have implemented, or begun implementation of EMR systems. However, all but one of the 18 county health departments who responded indicated they had no current plan to implement an EMR. Cost was a key factor cited.
- Efforts should be taken to evaluate progress by hospitals, clinics, and physician offices to use their EMR systems to improve patient care outcomes and enhance patient safety.

Telecommunications

Broadband connectivity is the starting point for many of the hospitals, clinics, and physician practices to be able to share patient data from EMR systems when needed. The WV Health Information Network (WVHIN) and WV Telehealth Alliance initiatives are focused on helping put the needed telecommunications infrastructure into place across the state.

- 31 of the 49 hospitals responding to the question of connectivity are connected with broadband through T-1 / T-3 and cable telecommunications lines. This leaves approximately 35% of hospitals that may have connectivity of less than high-speed.
- Hospitals, clinics, and physician offices in the state with EMR systems should be encouraged to actively collaborate and participate in WVHIN initiatives. Initial focus should be facilitating the exchange of data among the most prevalent hospital information systems including MEDITECH, VistA, McKesson, Siemens, and CPSI electronic medical record (EMR) systems which make up 60% (26) of the EMR systems in hospitals responding to the survey.

EMR Vendors in Use by Hospitals

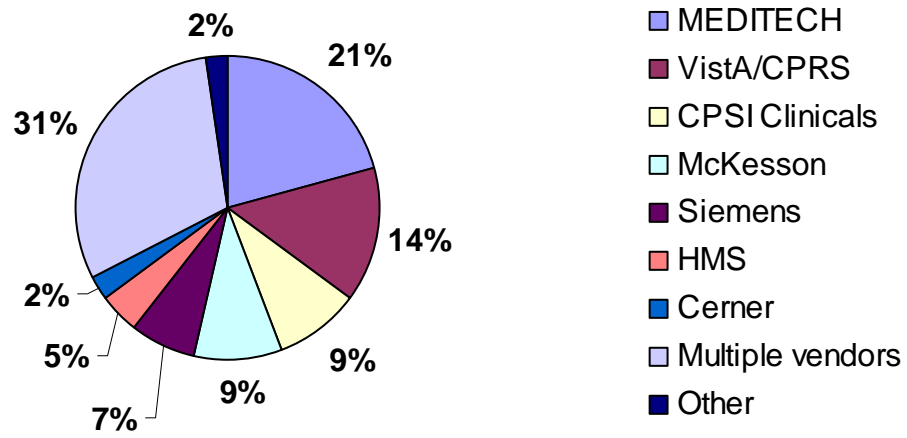


Figure 13-EMR Vendor Presence

- Almost all community clinics, county health departments, and physician offices have some form of high speed (broadband) telecommunications connection to the Internet, i.e. T-1/T3, or DSL/Cable Modem.
- Almost all of the hospitals in West Virginia are connected to the Internet and have web sites. 60% (25) of clinics and county health departments that responded to the survey have broadband access and (28) have Web sites.
- Only 26% (9) of physician offices have web sites. Use of web sites might be a means of implementing secure communications with patients and increasing access.
- The most utilized clinical Telehealth application in the state is Teleradiology. 64% (19) of the hospitals who responded have this capability. Fewer report interest, or use of, other Telehealth systems such as Teledermatology, Telecardiology, and Telepathology. An even lower percentage of clinics and physician offices are using, or have any interest in, clinical Telehealth solutions. The use of broadband for remote conferencing, continuing medical education, and education was not included in this survey,

Recommendation

A workplan should be developed to gather additional information and to deliver reports to the Broadband Council.

An overview of a timetable and schedule proposed by KRM Associates is shown below.

2008 – 2009 Broadband Schedule

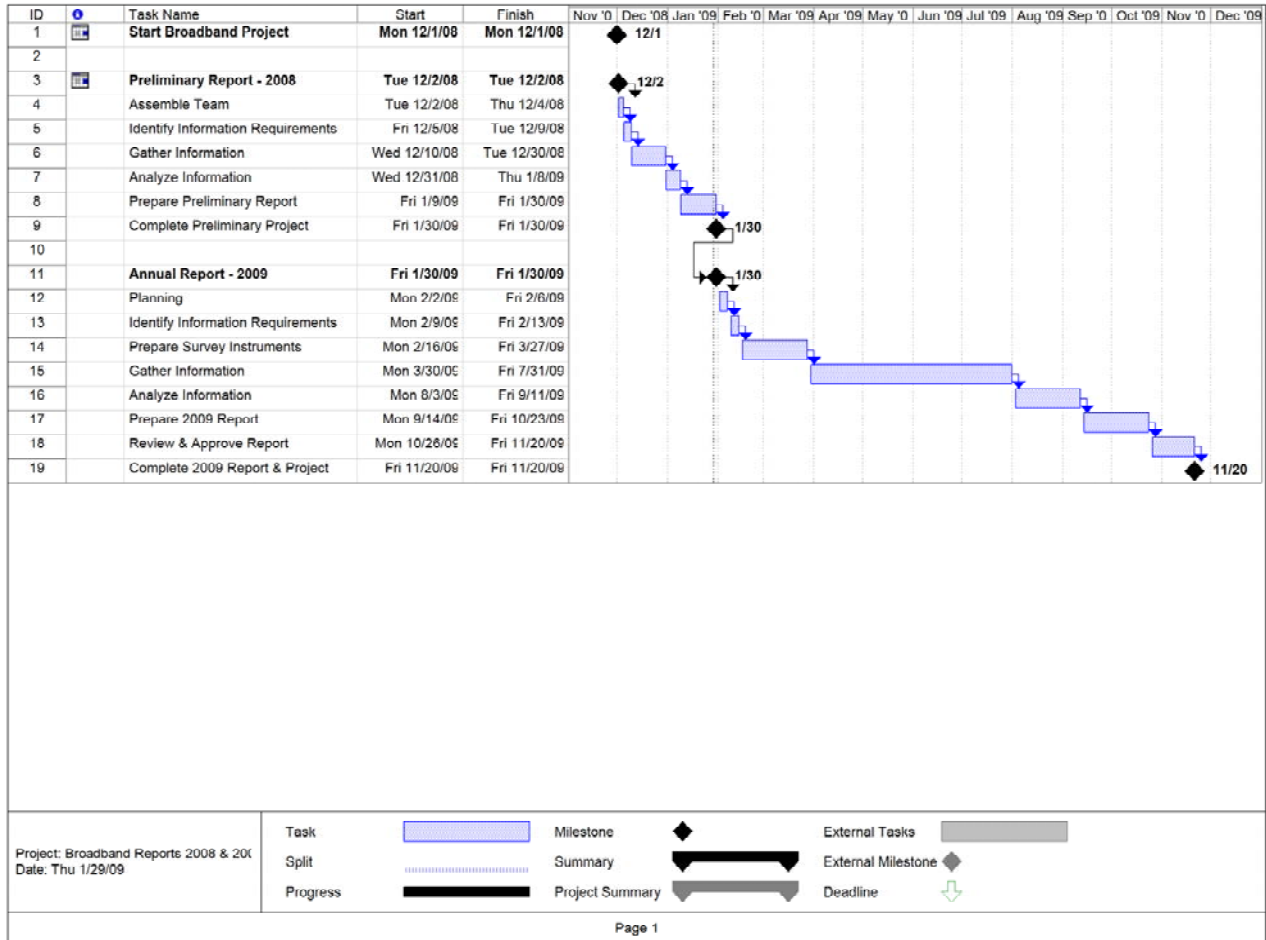


Figure 14-Proposed Schedule 2009

VI. TELEHEALTH NATIONAL STATISTICS

General

- One industry white paper predicts that widespread implementation of telehealth could save the U.S. health care system \$4.28 billion from reducing transfers of patients from one location, such as a nursing home, for medical exams at hospitals, physicians' offices, or other caregiver locations. See: <http://ehealthvirginia.org/downloads/20080529/UTMB%20Telemedicine%20White%20Paper%2019May2008.pdf>.
- One industry report, published by Insight and Intelligence, estimates the home telehealth and remote patient monitoring market to be close to \$5.6 billion and predicts growth of 70% for at least the next three to five years. See: <http://tie.telemed.org/2008/05/forthcoming-report-says-home-telehealth.html>.

TELEHEALTH AND TELEMEDICINE DEFINED

The term '*Telehealth*' was originally used to describe administrative or educational functions related to telemedicine. Now that physicians use email to communicate with patients, and drug prescriptions and other health services are being offered on the web, Telehealth is generally used as an umbrella term to describe all the possible variations of healthcare services using telecommunications. The term '*Telemedicine*' more appropriately describes the direct provision of clinical care via telecommunications--diagnosing, treating, or following up with a patient at a distance.

See:

<http://tie.telemed.org/articles/article.asp?path=telemed101&article=tmco mingnbtie96.xml>

- Despite progress, serious gaps in broadband deployment and adoption persist. State surveys of broadband availability indicate that many rural Americans have no access to broadband. Only 38% of Americans who live in rural areas subscribe to broadband, compared to 57% in urban and 60% in suburban areas. See: http://www.apto.org/publications/reports-studies/state_broadband_initiatives.pdf.

- Remotely monitoring patients with chronic diseases could cut nearly \$200 billion from the country's health care costs in the next 25 years, according to a new study by economist Robert Litan. Public policy changes would be necessary to achieve the full savings, Litan said, but even without them, the technology could reduce health care costs by \$153 billion. See: <http://www.govhealthit.com/online/news/350643-1.html?adcode>.

Specific Uses of Broadband in Health Care

Broadband Uses for Patients

Broadband networking can enhance the medical care of residents in rural communities. Through telemedicine residents can have access to remote specialists that would otherwise be unavailable. Mobility-impaired patients can thus avoid the expense and hassle of traveling long distances for expert consultations. Telemedicine also brings instant access to distant specialists to support diagnostic and treatment services. And patients' with access can save money on prescription drugs ordered online and can take part in medical support groups. See: <http://www.arc.gov/index.do?nodeId=1813>.

Broadband Uses for the Industry

Local health clinics can be linked to regional hospitals to better serve patients. Federal regulations will soon require hospitals and caregivers to submit Medicare and Medicaid claims electronically; those who fail to do so risk losing substantial reimbursements. Cost savings in records management and other administrative duties can be substantial. See: <http://www.arc.gov/index.do?nodeId=1813>.

Broadband Uses for Professionals

Distance learning applications enable health care workers to participate in continuing education programs. Participation in professional organizations and online communities allows rural practitioner's to keep up with advances in the field. See: <http://www.arc.gov/index.do?nodeId=1813>.

Telehealth and Hospitals

According to a JCAHO Report in 2008 on the hospital of the future, Digital technology is changing the focus of care delivery and allowing for more care – care that may fall under the umbrella of the hospital -- to occur outside of the hospital's walls. The migration of care from the hospital bed and physician office to the home that is allowed through technology, *such as Telehealth and EHR systems*, invites the redefinition of the hospital. See: http://www.jointcommission.org/NR/rdonlyres/1C9A7079-7A29-4658-B80D-A7DF8771309B/0/Hospital_Future.pdf.

Telehealth Informational Links

USDA Distance Learning & Telemedicine - <http://www.usda.gov/rus/telecom/dlt/dlt.htm>

FCC & Rural Health Broadband Networks - <http://www.fcc.gov/cgb/rural/rhcp.html>

HRSA & TeleHealth - <http://www.hrsa.gov/telehealth/>

VII. WEST VIRGINIA BROADBAND AND TELECOMMUNICATION STATISTICS

Advanced Tele-Health capability requires the availability of broadband telecommunications that enables users to originate and receive a range of health information provided in textual and graphic formats. While some forms of telemedicine can work effectively over dial-up connections, broadband is essential for some telemedicine applications and enhances others that depend on uninterrupted real-time transmission.

The graph and geographical maps below shows connectivity statistics collected from various broadband surveys of cities and counties throughout West Virginia in 2008.

- According to the West Virginia Broadband Connectivity Census of 2008, out of 832 cities throughout the state, only 21% claimed to have broadband connectivity. See: <http://broadbandcensus.com/zipcodes/cities/WV>
- The major telecommunication companies providing broadband service throughout West Virginia include: Time Warner, Comcast, Verizon, Frontier, Hughes Communication, and Suddenlink. See: <http://www.dslreports.com/search>.

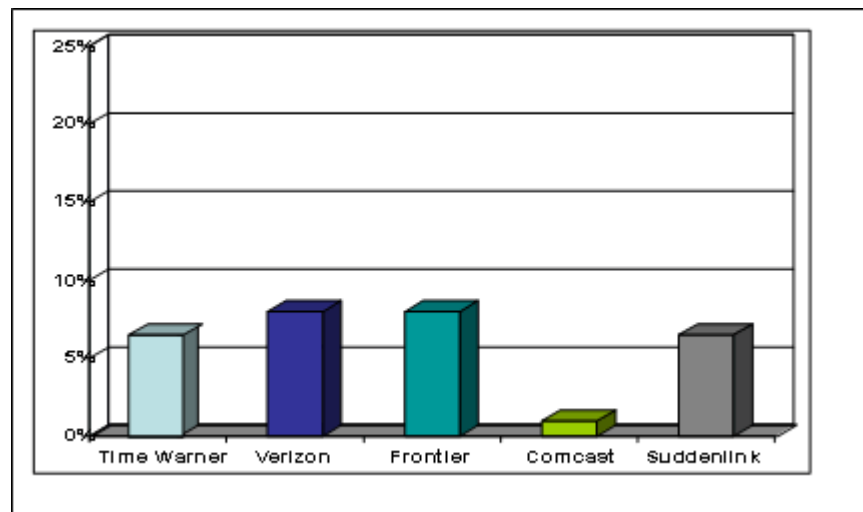


Figure 15-WV Telecommunications Carrier Census

- According to the connectivity assessment, only 10% of OHFLAC facilities throughout West Virginia state that they have broadband connectivity.
- Only 5% of zip codes throughout West Virginia have some sort of broadband connectivity.

A geographic image of the distribution of healthcare facilities throughout the State of West Virginia and an image of broadband in healthcare facilities follow. Figure 16 shows the healthcare facilities (derived from the OHFLAC listing <http://www.wvdhhr.org/ohflac/FacilityLookup/default.aspx>) as yellow pushpins.

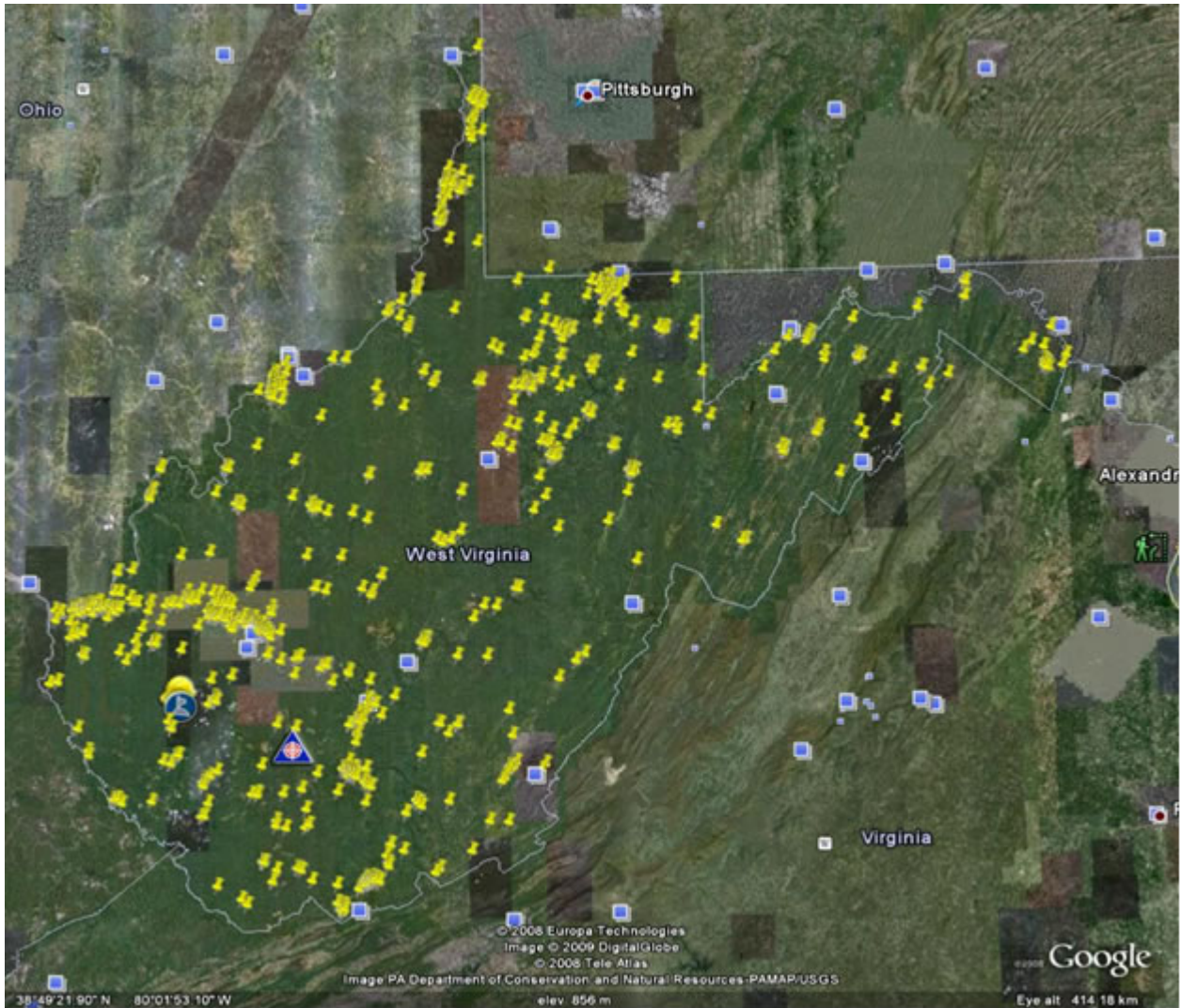


Figure 16-Healthcare Facilities throughout West Virginia

Figure 17, below, shows the healthcare facilities from the previous map that are located in areas where broadband service is **NOT** available as red pushpins. The availability of broadband service was derived by entering each facility zip code into the BroadbandCensus.com Web site (<http://broadbandcensus.com/>) to find out if any companies are reported to be providing service. As can be seen, a significant proportion of healthcare facilities in WV do not have broadband available to them.

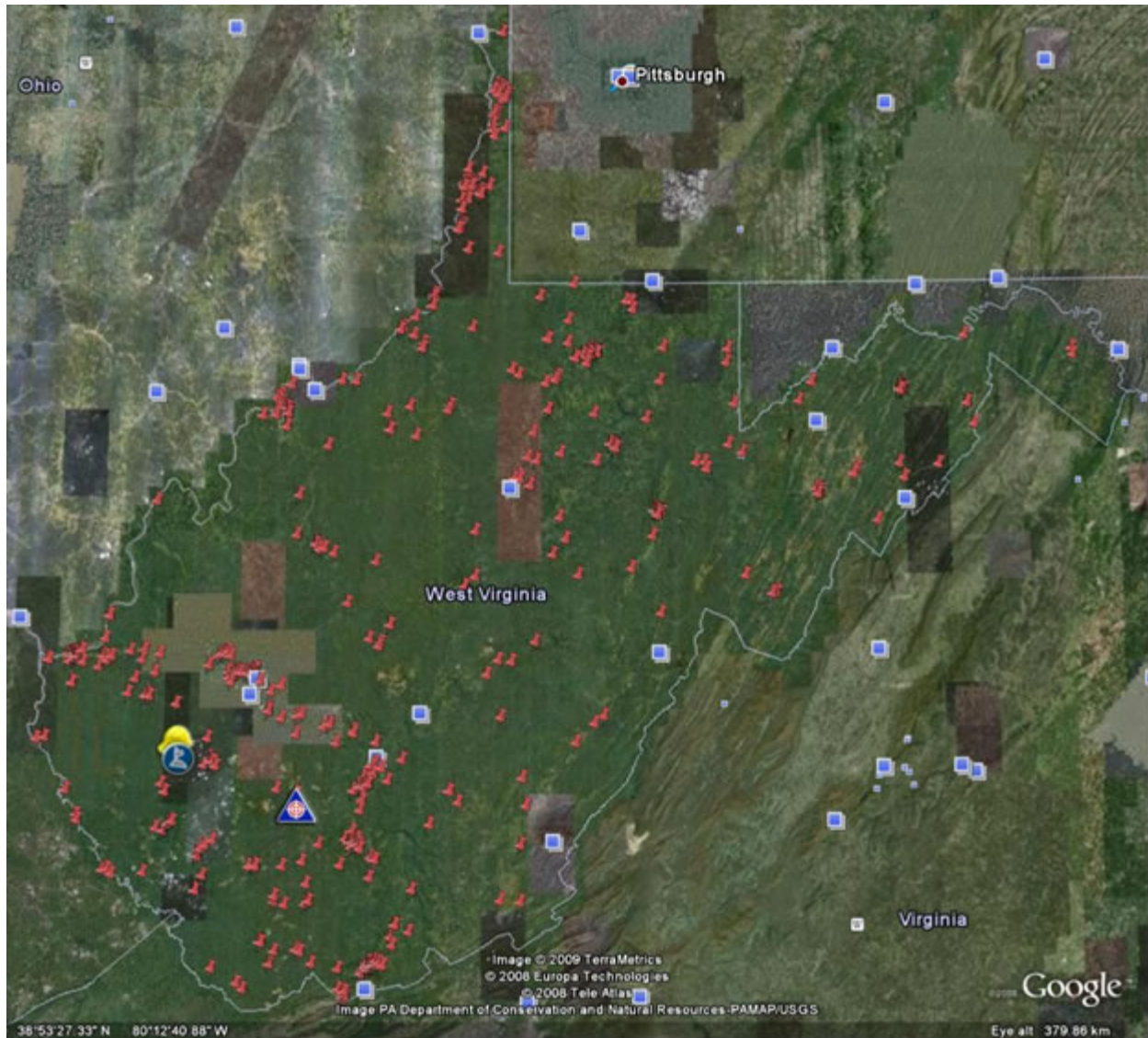


Figure 17- Healthcare Facilities in Areas with No Broadband Availability

Broadband connectivity is the starting point for many of hospitals, clinics, and physician practices to be able to share patient data when needed. Benefits to having broadband connectivity in rural areas are:

- Increase equipped first responders' access to necessary healthcare information, especially in the presence of widespread wireless or digital radio links are available.
- Increase access and potential increases in the quality of healthcare, as illustrated by a recent study at the Midland Memorial Hospital in Midland, Texas. See: <http://www.centredaily.com/business/technology/story/1151673.html>.

Connect West Virginia

Connect West Virginia has brought together public agencies and private providers of broadband service to create an inventory of residential broadband service available across the state. Connect West Virginia has conducted a practical assessment of current broadband services, which will allow them to present the picture of broadband issues that need to be addressed at the state and local level. The primary goal of their mapping and research process is to pinpoint areas of West Virginia that do not currently have access to broadband technology. For more information on their efforts, see: <http://www.connectwestvirginia.org/>.

- Go to the following link to see the Broadband Inventory map for West Virginia produced by Connected Nation - ftp://ftp.connectwestvirginia.org/CWVPublic/Connect_West_Virginia_Mapping/Statewide_Maps/Broadband_Statewide.jpg

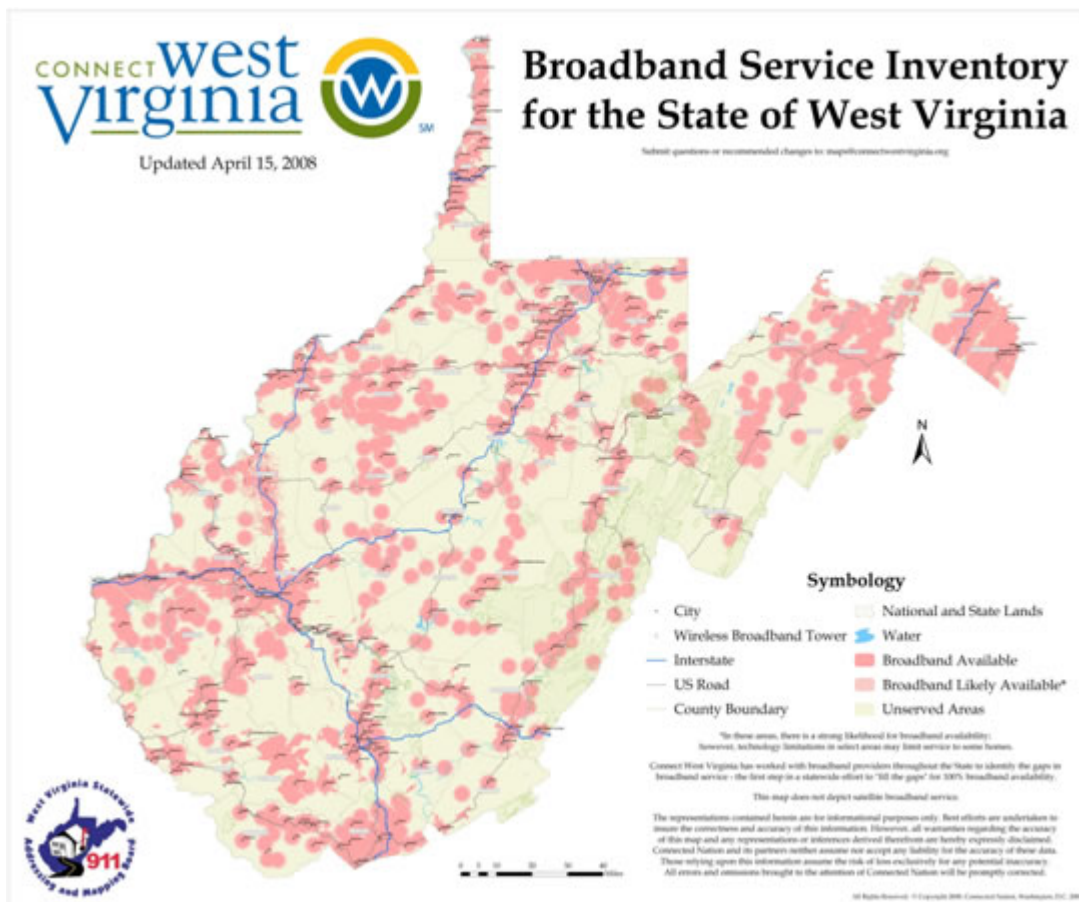


Figure 18-Connect WV Broadband Services Inventory

Appendix A

State Broadband Initiatives – November 2008 Report¹

Economic Growth Depends on High-Speed Networks - Because advanced communications networks provide a platform for economic development and improved public service delivery, it is absolutely vital for government -- in partnership with the private sector -- to adopt policies ensuring that every American home, business, and community has access to affordable, high-quality Internet services. States that adopt broadband policies see the benefits in job growth, more effective public services, and increased citizen engagement.

Millions of Americans Don't Have High-Speed Internet - Despite progress, serious gaps in broadband deployment and adoption persist. State surveys of broadband availability indicate that many rural Americans have no access to broadband. Only 38 percent of Americans who live in rural areas subscribe to broadband, compared to 57 percent in urban and 60 percent in suburban areas.

Similarly, lower-income Americans are much less likely to connect to broadband services. Only one-quarter of those earning less than \$20,000 a year subscribe to broadband, compared to 60 percent of middle-class Americans (earning \$40,000 to \$50,000 annually) and 85 percent of those earning over \$100,000 a year.

The U.S. Trails Behind Other Countries - The United States has fallen from 1st to 15th place internationally in the percentage of households with broadband. Americans pay more for slower speeds than do families and business in other countries like Japan, Canada, and France. Unlike many other nations, the U.S. has failed to adopt a national broadband policy that encourages investment in and adoption of high-speed Internet access.

State Governments Provide National Models - Recognizing the importance of broadband infrastructure, state policymakers have stepped in to fill the national policy void. Many states have adopted a number of bold, yet specific steps to make sure that their residents and businesses have access to advanced communications networks.

¹ APT State Broadband Report, November 2008 - http://www.apr.org/publications/reports-studies/state_broadband_initiatives.pdf

Appendix B

Inventory of Health IT Systems in West Virginia

Medicaid Management Information System (MMIS) An Administrative Claims System

A new web-based Medicaid Management Information System (MMIS) for submitting and processing claims has been developed and deployed. This was the highest priority health IT initiative for the WV Medicaid program and remains key to its current and planned systems environment. West Virginia contracted with Unisys to manage and process Medicaid claims via its innovative health care payer administration solution, known as Health PAS - the only federally certified MMIS solution made up of commercial-off-the-shelf software (COTS) in the country. The Unisys-WVMMIS Web Portal allows providers to:

- Send/receive all HIPAA compliant claims
- Check claims status
- Download Electronic Remittance Advices (ERA)
- Receive billing information

Using this new Medicaid Management Information System, West Virginia is one of the first states to implement a comprehensive Medicaid reform program under the Deficit Reduction Act (DRA). Working with Unisys, West Virginia began overhauling its system more than four years ago, taking the lead in streamlining and evolving its Medicaid systems ahead of most states. Under the direction and assistance from the BMS, Unisys developed and tailored the Health PAS medical/dental and pharmacy claims payment systems for the state. Health PAS manages approximately 22,000 participating healthcare providers; 304,000 members or Medicaid recipients; and about 19 million healthcare claims annually.

The Unisys Health PAS system (www.wvmmis.com) offers the following range of benefits to the state government:

- *Open* - based on open standards, the architecture permitted the easy integration of best-of-breed components
- *Flexible* – appears to seamlessly integrate with other state systems; changes can be accomplished within hours or days instead of weeks
- *Scalable* - can support new components to enhance performance or meet new requirements, adapting as Medicaid programs evolve
- *Configurable* - rules-based and driven by policy, not by technology; it can support unforeseen policy requests

Multi-plan functionality – capable of handling a variety of health care plans/benefit structures

- *Familiar Windows/Web-based interface* - decreases the need for extensive training.

Late last year, West Virginia BMS received federal certification for its Medicaid system. It is the first time that the Center for Medicare and Medicaid Services (CMS) has certified a next-generation commercial-off-the-shelf (COTS) system that conforms to MITA principles and has the flexibility to make quick modifications in the ever-changing healthcare environment. Federal certification for the West Virginia system was a significant milestone.

As the state's fiscal agent, Unisys also provides an array of business process outsourcing services, in addition to the MMIS, that include:

- imaging and managing the workflow of paper claims
- administering the authorization, adjudication and resolution of paper and electronic claims
- providing contact-center and help-desk services and training
- delivering operational, system maintenance, and enhancement support.

For more information visit: <http://www.wvdhhr.org/bms/>.

Electronic Medical Record (EMR) Systems

Tremendous progress has been made to date with a majority of hospitals in West Virginia already having taken steps to acquire and implement EMR systems. EMR usage by large clinics and small practices has not progressed as far.

'Open' VistA Hospital EMR System

West Virginia recently implemented the MedSphere 'Open' VistA hospital information system in seven of its State Hospitals. The system includes an electronic medical record (EMR) module. See

<http://www.hoise.com/vmw/07/articles/vmw/LV-VM-09-07-12.html>

Commercial-Off-The-Shelf (COTS) EMR Systems

Based on the most recent survey of Health IT systems, the following are the top commercial-off-the-shelf (COTS) hospital EMR systems being used in the state: MEDITECH, Epic, Siemens, McKesson, Cerner, and CPSI.

MedLynks Clinic EMR System

The Community Health Network of West Virginia (CHNWV) has implemented the MedLynks EMR system at over 20 of its clinics. MedLynks is based on the 'open source' VistA/RPMS system developed by the federal government. See

www.chnwv.org and <http://www.hoise.com/vmw/07/articles/vmw/LV-VM-09-07-12.html>.

HealthWV

HEALTHeWV is an electronic health records-based disease management and health promotion program designed to improve health care quality, patient outcomes, and patient safety. HEALTHeWV is a congressionally sponsored program supported by the National Technology Transfer Center at Wheeling Jesuit University and a Virginia based company HEALTHeSTATE, LLC. It has been deployed at 25 clinics to date. See <http://www.healthewv.net/>.

Telecommunications & Telehealth Systems

The state has a number of existing and telecommunications networks and new initiatives that are described below.

DHHR Wide Area Network (WAN)

DHHR has completed the original project of connecting Local Health Departments (LHDs) to the DHHR network. This provided the Web based training capability noted above and easier and quick transmission of data in bioterrorism emergency. LHDs were connected to the DHHR offices via ISDN or other service, e-mail was installed and MIS began providing support to a limited number of staff in each LHD. See: <http://www.state.wv.us/ot/2004SP/DHHR-MISDivision.pdf>

WV Health Alert Network (HAN)

The purpose of the West Virginia HAN is to serve as a system for rapid and secure communications, when faced with detection of unusual outbreaks of illness that may be the result of terrorism involving biological or chemical agents. 54 (98%) of 55 local health departments in the State of West Virginia are now connected to the DHHR WAN. See <http://www.wvdhhr.org/han/>, <http://www.wvdhhr.org/han/connectivity.asp>, and <http://www.wvdhhr.org/mis/Network/projects.htm>.

WV Health Information Network (WVHIN)

The West Virginia Health Information Network was established in 2006 by the Legislature at the request of the Governor to promote the design, implementation, operation, and maintenance of a fully interoperable statewide network to facilitate public and private use of health care information in the state while ensuring the privacy and security of patient health care information. It is a public-private partnership for the benefit of all of the citizens of West Virginia. See <http://www.wvhin.org/home.aspx>.

West Virginia Telehealth & Education Network

West Virginia Telehealth & Education Network includes the Mountaineer Doctor Television (MDTV) system. MDTV connects with other locations by using digital ISDN lines. Currently MDTV has 22 member sites located throughout the states of West Virginia, Ohio, and Maryland. See <http://wvthenet.hsc.wvu.edu/index.htm>.

WV Community Mental Telehealth Project

This project provides telemedicine services to the rural community mental healthcare centers (CMHC). West Virginia has 14 major community mental health care centers. A secondary purpose is to allow for healthcare workers in these communities to utilize these telemedicine units for continuing professional education and to take advantage of the health education programs provided through MDTV. See: <http://www.hrsa.gov/telehealth/grants/states/wv.htm>.

Consumer Health Information Systems

There are a number of consumer health information systems that are currently in place in West Virginia. They are briefly described below. Few Personal Health Record (PHR) systems are widely deployed and these are not interconnected to the health care provider EMR systems across the state.

CompareCare

CompareCare is one of the state's consumer health information web sites where citizens can find out how much West Virginia hospitals charge for selected medical services. The system continues to be refined and enhanced. See www.comparecarewv.gov.

HealthyWV

A state government web site promoting a healthier West Virginia through lifestyle and community maintained by the Division of Health Promotion & Chronic Disease. See <http://www.healthywv.org/>.

My HealtheVet

The U.S. Department of Veterans Affairs (VA) medical centers and clinics across the state provide VA patients with access to the *My HealtheVet* PHR system. The military offers active duty servicemen and their family members in West Virginia access to a similar PHR system known as TriCare Online (TOL). See www.myhealth.va.gov and www.tricareonline.com.

Public Health & Disease Surveillance Systems

West Virginia currently has a limited number of public health and disease surveillance systems briefly described below. Real time collection of data from a network of EMR systems could populate a range of disease registries, e.g. HIV/AIDS, TB, etc. There are also many other beneficial public health software products and initiatives funded by the federal government that might benefit the state, e.g. e-Vital, VacMan, etc. See: <http://www.health.gov/default.asp> and <http://www.cdc.gov/vaccines/programs/vacman/default.htm>.

Vital Research Records Project

The West Virginia Vital Research Records Project is placing Birth, Death, and Marriage certificates on-line. Users can search the records and view scanned images of the original records. State death certificates for individuals from all 55 counties dating from 1917 through 1958, and only births for 1853 through 1933 are currently available online. See <http://www.wvculture.org/vrr/vrrhandout.html> and http://www.wvculture.org/vrr/va_select.aspx.

West Virginia Health Status Atlas

This is a state DHHR web site with maps that provide an overview of the health status of West Virginians. See <http://www.wvdhhr.org/bph/oehp/atlas/default.htm>.

West Virginia Electronic Disease Surveillance System (WVEDSS)

WVEDSS is a Web-based electronic disease reporting system which will serve health care providers, hospital and national reference laboratories, and local and state public health departments. In the past, specific diseases mandated by law were reported by providers and laboratories to public health agencies on paper forms by fax or mail. WVEDSS will provide manual electronic disease reporting through key entry as well as direct electronic transfer of test results from laboratory information systems. Once fully implemented, this system will dramatically enhance disease surveillance, detection, and response activities in West Virginia and minimize or eliminate the delays inherent in current paper-based systems. See <http://www.wvdhhr.org/idep/wvedss.asp>.

West Virginia Statewide Immunization Information System (WVSIIS)

The WVSIIS web application allows enrolled users to conveniently search for patients in the WVSIIS Central Registry and to view the patients' vaccination records. See: <https://wvsiiis.wvdhhr.org/wvsiiis/>.

ePrescribing

Current electronic prescribing activity in the state includes:

- eRx NOW, Marshall University Initiative, a sponsor of the eRx National ePrescribing Solution offered by Allscripts and their partners.
- RxHub Information Network, which provides formulary information.
- SureScripts Pharmacy Information Exchange which provides electronic connectivity to pharmacies and ePrescribers.
- Products offered by other commercial vendors.

Table B-1-2007 WV ePrescribing Statistics

e-Prescriptions:	2005	2006	2007
New Electronic Prescriptions	-	-	158,322
E-Refill Requests	-	-	12,567
E-Refill Responses	-	-	10,096
Total Electronic Prescription Transactions	-	-	180,985

See: <http://www.surescripts.com/Safe-Rx/nonsaferx-state.aspx?sid=49>

West Virginia Medical Institute

The West Virginia Medical Institute (WVMI) has served as the prime contractor for the U.S. Department of Veterans Affairs (VA) External Peer Review Program (EPRP) since 1991. They utilize data from the VA VistA system to do audits and peer reviews in support of VA quality improvement efforts across the country. WVMI has also implemented quality improvement projects for HHS, DOD, and state Medicaid agencies. They have the organization, business process, and specialized internal information systems to conduct peer review and quality measurement so crucial to improve health care. WVMI and its partners recently demonstrated the feasibility of a statewide online medical error reporting system, linking even the smallest rural critical access hospitals. See http://www.wvmi.org/corp/news/news_9-05-01.aspx and www.wvmi.org.

Other State Health IT Management & Administrative Systems

West Virginia has a number of other management and administrative health information systems. Some of these systems are briefly described below. Many of these are stand alone systems and the state could possibly benefit from having them use a common database management system, be standards based, and by being networked together.

Families and Children Tracking System (FACTS)

FACTS is a large and comprehensive customized system formerly known as the Statewide Automated Child Welfare Information System (SACWIS). It was established by the West Virginia Department of Health and Human Resources (WVDHHR) for the administration of Title IV-E Child Welfare Programs. FACTS was designed and developed based on the requirements established by the U.S. Department of Health and Human Services (HHS), Administration for Children and Families, to support the state’s federal reporting for Adoption and

Foster Care Analysis and Reporting System (AFCARS) and National Child Abuse and Neglect Data System (NCANDS). One can use this website to (1) Access learning initiatives like Desk Guides, Newsletters and Version Notes, and (2) Obtain information on the support offerings. See <http://www.wvfacts.org/wvfacts/default.aspx>.

Information Network for Resident Online Access and Delivery of Services (inROADS)

inROADS helps evaluate you for possible eligibility and allows you to apply/review for benefits offered by the state of West Virginia and lets you check on your benefits information online. See <https://www.wvinroads.org/inroads/PGM/ASP/SC001.asp>.

West Virginia Board of Medicine Licensee Search

Allows any interested party to find practitioners by name, license number, location, or specialty. See: <http://www.wvdhhr.org/WVbom/licenseesearch.asp>.

Recipient Automated Payment and Information Data System (RAPIDS)

RAPIDS is West Virginia's mainframe eligibility determination and benefit calculation system. It includes twenty-one subsystems. Eligibility for public assistance benefits is determined on-line in the 55 counties in West Virginia by over 898 workers and supervisors. RAPIDS supports approximately 2,351 active users whose access ranges from inquiry only to update capability. See <http://www.wvdhhr.org/bcf/it/rapids.asp>.

Trauma and Emergency Medical Information System (TEMIS)

TEMIS is the information system developed and maintained by Office of Emergency Medical Services to collect and maintain the necessary trauma and emergency care information to assure system quality and accountability, as well as to provide data for use in system design and operations. This system includes, but is not limited to, the State Trauma Registry (STR), the State Medical Command Record (SMCR), and the EMS Patient Care Record (EPCR). See: <http://www.wvdhhr.org/mis/network/projects.htm>.

West Virginia Child Placement Network (WVCPN)

The WVCPN provides online access to DHHR licensed group residential facilities, emergency shelters, MR/DD facilities, and DJS Juvenile Centers database to assist a child's Multi-Disciplinary Team (MDT) in determining what resources are available to the child. See: <http://www.wvdhhr.org/wvcpn/>.

Appendix C

Top Health IT Vendors and Systems

This appendix presents information on the top ranked Electronic Medical Record (EMR) systems used in hospitals and clinics nation-wide. It also contains selected information on the current status of EMR usage in the State of West Virginia.

Top 10 Hospital IT Systems – Nationally

Top enterprise or hospital health IT vendors with respect to application market share in the U.S. include:

- Cerner Corporation: <http://www.cerner.com/public/>
- Computer Programs and Systems, Inc.:
http://www.cpsinet.com/default_IE.php
- Eclipsys Corporation: <http://www.eclipsys.com/>
- Epic Systems Corporation: <http://www.epicsystems.com/>
- GE Healthcare (acquired IDX Systems):
<http://www.gehealthcare.com/worldwide.html>
- Medical Information Technology (MEDITECH):
<http://www.MEDITECH.com/>
- Misys: <http://www.misys.com/mys/healthcare/>
- McKesson Information Solutions: <http://www.mckesson.com>
- QuadraMed Corporation: <http://www.quadramed.com/>
- Siemens Medical Systems: <http://www.medical.siemens.com>

Source: *Essentials of the US Hospital IT Market*, HIMSS Analytics – 2007,
<http://www.himssanalytics.org/general/essentials.asp>

Top Hospital IT Systems in WV

Top enterprise or hospital health IT vendors, according to this survey, in West Virginia are:

- Cerner Corporation: <http://www.cerner.com/public/>
- Computer Programs and Systems, Inc (CPSI).:
http://www.cpsinet.com/default_IE.php
- Epic Systems Corporation: <http://www.epicsystems.com/>
- MEDITECH: <http://www.MEDITECH.com/>
- McKesson Information Solutions: <http://www.mckesson.com>
- Siemens Medical Systems: <http://www.medical.siemens.com>

Source: 2008 West Virginia Health IT Readiness Survey (results not yet released by WVDHHR).

The Top EHR Systems implemented in Clinics, Family Practice, or Physician Offices across the U.S.

- Amazing Charts: <http://www.amazingcharts.com>
- GE Centricity:
http://www.gehealthcare.com/users/hit/products/centricity_practice/emr_index.html
- Cerner PowerChart Office:
http://www.cerner.com/public/Cerner_3.asp?id=808
- eClinicalWorks EMR:
<http://www.eclinicalworks.com/eclinicalworks8/features.html>
- e-MDs Chart: <http://www.e-mds.com/solutions/chart/chat.html>
- EpicCare:
<http://www.epicsystems.com/software/enterpriseclinical.php#ambulatory>
- HealthMatics EMR: <http://www.allscripts.com/products/physicians-practice/solutions-ehr.asp>
- Misys: <http://www.misys.com/mys/healthcare/>
- NextGen EMR: http://www.nextgen.com/pro_emr.asp
- Practice Partner Patient Records:
<http://www.practicepartner.com/pr/patientrecords.htm>
- Praxis EMR: <http://www.infor-med.com>
- SOAPware: <http://www.docs.com>
- TouchWorks: <http://www.allscripts.com/products/physicians-practice/solutions-ehr.asp>

Source: *Family Practice Management*. (2008). Vol. 15(2). "User Satisfaction with EHRs: Report of a Survey of 422 Family Physicians." See: <http://www.medscape.com/viewarticle/570380>.

Top Ambulatory HIT Systems (PM + EMR) currently implemented in Clinics, Family Practice, or Physician Offices in West Virginia

- Allscripts Enterprise EHR (formerly TouchWorks):
<http://www.allscripts.com/products/electronic-health-record/default.asp>
- Benchmark Systems: <http://www.benchmark-systems.com/index.php?page=healthcare-solutions>
- emdeon: <http://www.emdeon.com/>
- GE Centricity:
http://www.gehealthcare.com/users/hit/products/centricity_practice/emr_index.html
- HEALTHeSTATES: <http://healthwv.net/program/>
- MediSys Practice Solutions: <http://www.medisyswv.com/>

- Misys: <http://www.misys.com/mys/healthcare/>
- SOAPware: <http://www.soapware.com/>

Source: 2008 West Virginia Health IT Readiness Survey (results not yet released by WVDHHR).