

HEALTH IT AND HEALTH DISPARITIES

Columbia Basin Health Association –
using a robust health IT infrastructure
to improve health care quality,
coordination, and access for rural and
migrant populations



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Case Study Report: Columbia Basin Health Association – using a robust IT infrastructure to improve health care quality, coordination, and access for rural and migrant populations

“Using the philosophy that ‘if you can measure it, you can manage it,’ and embracing technology as a vital tool for both operations and management has allowed CBHA to make improvements that benefit the organization’s financial position, quality of patient care, and employee performance.” – CBHA 2008 Healthcare Information and Management and Systems Society Davis Applicationⁱ

Report Summary	
Intervention and Setting	Columbia Basin Health Association (CBHA) is a Federally Qualified Health Center (FQHC) operating three clinics in the rural Columbia Basin of WA. CBHA developed a strong health information technology (health IT) infrastructure and implemented innovative IT pilot projects with the goal of improving quality of care and access for the rural and migrant populations they serve.
Target Population	A low-income, primarily Spanish-speaking population; 78% of CBHA patients identify as Hispanic. Approximately half (48%) of the patient population are migrant or seasonal farmworkers.
Technology Description	<p>Core Health IT Technologies</p> <ul style="list-style-type: none"> • Electronic health record (EHR), including bi-directional interface with state immunization registry • Electronic dental record (EDR), including multimedia dental patient education software • WiredMD educational materials and videos <p>Innovative Pilot Projects</p> <ul style="list-style-type: none"> • Mobile ultrasound device <p>Teledermatology intervention</p>
Funding and Start-up	CBHA capital expenditures and small seed funding for pilot projects
Data and Analysis	<p>Content analysis using NVivo for a series of in-person and telephone discussions with CBHA stakeholders and participants including:</p> <ul style="list-style-type: none"> • Chief Executive Officer of CBHA • Chief Medical Officer of CBHA • Director of Quality at CHBA • Clinic Managers at CBHA • Director of Operations at CBHA • Dental Clinic Supervisor at CBHA • Multiple CBHA providers, including physicians, physician assistants, and dental

	<p>assistants</p> <ul style="list-style-type: none"> • Individuals who receive medical and dental services from CBHA • A representative from Mobisante, the IT vendor for the mobile ultrasound device pilot • The Washington State Immunization Coordinator • Staff from the University of Washington who partnered with CBHA on a tele dermatology pilot project
<p>Key Take-Aways</p>	<ul style="list-style-type: none"> • Multimedia strategies using new mobile tools or educational videos integrated with EHRs can overcome patient literacy and language barriers. • Strong leadership and committed staff are important to sustaining a health IT program. • Innovative customization of systems to meet the unique needs of providers who care for the underserved encourages buy-in. • Quality reporting directed at providers can lead to improved patient outcomes. • Data integration with internal and external sources improves efficiency.

Introduction

Located in the rural Columbia Basin of Washington State, Columbia Basin Health Association (CBHA) is a Federally Qualified Health Center (FQHC) operating clinics in Othello, WA, Mattawa, WA and Connell, WA. According to its mission, CBHA “provide(s) equal access to quality health care to all persons regardless of age, sex, color, ethnicity, national origin, or the ability to pay.” CBHA serves a primarily Spanish-speaking population; 78% of their patients identify as Hispanic. Most are Mexican with a growing Mazateco¹ population, and approximately half are migrant or seasonal farm workers. They serve a population with low income and low education levels, and use information developed for a 4th grade to 6th grade reading level for materials distributed to patients. Fifty percent of CBHA’s patient population earn less than 100% of the Federal Poverty Level (FPL) and 42% are between 100%– 200% FPL. The majority of CBHA patients receive health insurance benefits through Medicaid (41%) or are uninsured (28%).²

Nationally, rural residents, accounting for approximately 20% of the population, lack equivalent access to health care and public health services, and face significant disparities with respect to many health conditions, compared to their urban counterparts.ⁱⁱ Specifically, according to the Agency for Healthcare Research and Quality (AHRQ) 2010 National Healthcare Quality and Disparities Report, “rural residents... are less likely to receive preventative services and on average report fewer visits to health care providers.”ⁱⁱⁱ Seasonal and migrant farm workers, including large numbers of Hispanics and rural residents, face similar health disparities further complicated by cultural and language barriers.^{iv} Few transportation options, a limited health workforce, and inadequate financial resources, are just some factors that contribute to the health disparities faced by these populations.

Health IT can help improve the health and health care of rural and migrant populations. The implementation of health IT in rural areas can help address the health disparities described above. In particular, some telehealth interventions implemented in rural communities show promising improvements in direct access to care among rural residents. Telehealth also facilitates

¹ Mazateco is an indigenous population from the Mexican State of Oaxaca. This group has both unique language needs – specifically, the Mazateco dialect rather than Spanish – and social and cultural customs that impact the provision of care.

² All percentages reflect 2010 data provided by CBHA.

communication and coordination between primary care teams in rural areas and specialists, increasing access to evidence-based care for rural residents.^v Other health IT applications, such as electronic health records (EHRs) with clinical decision support (CDS) functionality, also can improve the overall quality of care in rural areas by increasing provider efficiency and improving adherence to clinical guidelines.^{vi} Finally, health IT applications, such as MiVIA, an untethered personal health record (PHR) for migrant farm workers, demonstrate potential benefits related to continuity of care and patient engagement for highly mobile populations.^{vii}

Core health IT functionality and uses. CBHA leadership reports using health IT as a tool to facilitate efficient care delivery, improve quality of care, enhance access to care, and control cost of care. Table 1 below summarizes the IT tools and pilot projects studied as part of this case study.

CHBA financed the development of a robust health IT infrastructure, including a fully-functional EHR, primarily through IT capital expenditures rather than specific grants. CBHA began strategic planning around EHR implementation in 1999, cultivating the necessary staff and culture to support their use of IT to improve quality and efficiency. Reflecting on their decision to pursue an EHR, one respondent noted, *“When I started, we had no money in the bank. We came up with the bright idea for electronic medical records, but this was in 1999. There was no American Recovery and Reinvestment Act (ARRA) funding. So we did a couple of things. We were responsible for emergency department (ED) coverage for the hospital, and we dropped that so we could have some money to buy a computer and put down the payment on an EHR.”* After implementing the EHR, CBHA reports to have improved efficiencies and increased revenue allowing for additional IT investments.

Sources of Funding

- Funding from HRSA under funds authorized by Section 330 of the Public Health Service Act for FQHCs
- CBHA capital expenditures
- A teledermatology pilot funded by a grant received by the University of Washington as part of a larger initiative focusing on volunteerism in underserved populations through the American Academy of Dermatology.
- Development of an interface with the Washington State Immunization Registry (Child Profile)

Table 1. Overview of Health IT at CBHA

	Type of Health IT	Description of Functionality
Core Health IT Technologies	EHR	<ul style="list-style-type: none"> • Initially implemented Chart Logic in 2000 and switched to GE Centricity in 2007 • Interfaces with internal and external systems, including (1) Billing, (2) Laboratory, (3) Pharmacy, (4) EDR, and (5) Washington State Immunization Registry
	EDR & Caesy Enterprise	<ul style="list-style-type: none"> • EagleSoft EDR implemented across three clinics in 2008 • Interfaces with Caesy Enterprise system, a multimedia dental patient education system, including videos and education materials available in English and Spanish
	WiredMD	<ul style="list-style-type: none"> • Multimedia medical patient education system available in exam rooms, on providers' office computers, and on computers in patient waiting rooms • Videos and educational materials on wide variety of topics, including specific diseases and prevention, available in both English and Spanish with some materials available in other languages
Pilot HIT Projects	MobiUS	<ul style="list-style-type: none"> • World's first smartphone-based mobile ultrasound imaging system cleared by the U.S. Food and Drug Administration in January 2011
	Teledermatology Initiative	<ul style="list-style-type: none"> • Store-and-forward teledermatology software developed by QuickDiagnostics and incorporated into a mobile platform • Consults were provided by dermatologists at the University of Washington, as part of a larger volunteer initiative through the American Academy of Dermatology

Encouraging Adoption & Implementation

We begin by outlining findings related to the design, implementation, and adoption of CBHA’s EHR and EDR. We also include information on the mobile tele dermatology and ultrasound devices pilot projects at CBHA.

“The [software] has to be easier to use and similar to what health providers are already doing. Providers in these settings are already overburdened and if it is an ounce more work, it won’t fly.”
CBHA Administrator

Effective adoption requires planning around buy-in and acceptance.

Providers and staff at CBHA expressed enthusiasm regarding their EHR and EDR systems. They felt use of these applications improved efficiency and highlighted numerous useful functions within each system, including ordering x-rays, labs, and electronic prescriptions (e-Prescribing). One provider went so far as to say, *“I really like it. I can’t really say I’d*

change anything about it.” CBHA respondents noted buy-in requires leadership and extensive planning (with dedicated planners) to understand user workflow and requirements.

Customization of systems can add to buy-in. CBHA extensively customized and configured their EHR and EDR to fit providers’ needs and the population served. CBHA designs and implements most customizations in-house with minimal reliance on an outside vendor, allowing flexibility to incorporate priorities quickly and respond rapidly to user needs. For example, CBHA uses their EHR system to enter “alert notes” when a patient checks-in at registration. This functionality gives the provider necessary, up-to-the-minute information on a patient’s condition or unique needs as soon as they open the patient’s chart.

“We wanted to start with diabetes and see how it worked [to add protocols to the EHR]... We started with just a few at the beginning and added things slowly. We didn’t overwhelm [the providers] with a lot of information to start with.”
CBHA Provider

Respondents noted EHR and EDR software selection criteria relied heavily on “wish lists” generated through discussion with providers and other end-users. One respondent noted the need for flexibility as part of their vendor discussions, saying, *“We had to determine if they were willing to work with us to create it how we wanted it to be.”* CHBA added new elements of the EHR and EDR slowly and deliberately with ample input from clinical staff.

“The e-Prescribing thing... is a really neat feature of the software. I love that. It is a great tool for us as providers... It is really quick... We have a list of pharmacies that we use... if they are on the list, I just click there to send the prescription and it is gone.” *CBHA Provider*

Data integration and access to outside sources of data creates new efficiencies.

CBHA leaders prioritized integration across their clinical systems. For example, they linked their EHR and EDR through an interface, allowing for standardized scheduling across clinics. Additionally, CBHA interfaced their internal pharmacy system with their EHR, allowing e-Prescribing and easy prescription transfer between multiple CBHA clinics. CBHA’s EHR facilitates care-coordination by allowing clinicians to view patient

information (admissions and procedures) from the local hospital. Providers make beneficial use of this data during the care encounter: *“A lot of patients go to the ED with a runny nose or something similar, and it is nice that we can check patient records easily too using the EHR from the hospital.”* CBHA also uses their EHR to track and update their patients’ immunization records through a bi-directional interface between their State’s immunization registry (Child Profile) and their EHR. In 2010, the county served by CHBA had the highest percent of children 19-35 months of age with complete vaccination records in Child Profile.

Provider driven promotion and outreach strategies encourages use of consumer-facing technologies. Some CBHA providers discussed showing videos to their patients using the WiredMD system in exam rooms and felt these videos benefited patients with limited literacy and unique language needs. While they noted benefits from the videos, providers indicated they use them infrequently. Although patients mentioned their providers showed them videos, they did not know they could access them through computer terminals in waiting areas. The patients felt they would benefit more from the videos if they knew about different ways to access them. This suggests greater promotion of the videos by medical providers could lead to greater awareness and more potential benefit for patients.

Impact of Adoption and Consequences

CBHA enjoys many of the anticipated benefits of EHR adoption. For example, providers indicated they save time previously spent tracking down paper charts and deciphering hard to read or incomplete records. They also noted improved decision-making through increased information access to labs and medications. Electronic prescribing also yields efficiencies and the EHR allows for automated communications with patients regarding medication recalls or reminders for upcoming appointments. By integrating its EHR with its practice management system, CBHA improved their ability to track patient information, bill to third party payers, and distribute invoices. CBHA administrators also use their practice management system to track and monitor patient wait times to ensure attentiveness to patient satisfaction. We describe the impact of adoption of health IT at CBHA below.

Reported improvement in quality of care and outcomes.

CBHA reports their use of health IT improved quality of care and patient outcomes. They noted the robust reporting capabilities within CBHA’s EHR led to greater awareness of quality, and enhanced outreach and specialized interventions to target specific clinical priorities such as diabetes. Using this technology, CBHA generates patient panels and examines outcomes by provider, demographic characteristics (e.g., migrant workers), or disease status. By tracking data through their EHR, CBHA improved upon numerous indicators with respect to diabetic care. For instance, the percentage of their diabetic patients receiving foot exams in the last 12 months improved from approximately 30% in early 2008 to 80% in June 2011. They also use their EHR to set and reach screening and prevention goals. For example, they recently surpassed a goal by achieving a rate of 70% for women 65 years or older screened or provided therapy for osteoporosis.

“We can look at the EHR and if something needs to be done for visit, the check protocols function shows up at the top of the visit. So then we know that certain things need to be checked during the visit. I click on the tab for protocol and it pulls up the last pneumovax for this patient, including when it happened, and the last LDL (low density lipoprotein) he/she had... If you click the “due only” button, it separates only out what specific tests are needed...” CBHA Staff Member

CBHA also routinely distributes “scorecards” allowing individual providers to monitor their performance and identify ways to improve care. Although some providers expressed criticism of the scorecards’ usefulness citing providers’ lack of control over certain outcome measures and variation in case mix from provider to provider, several noted the scorecards helped them better understand the overall health of the population they serve. Respondents also noted the technology allows them to better track and improve upon indicators such as patient wait times.

CBHA uses their EHR’s CDS functionality to increase adherence to care protocols, including the provision of recommended preventive care. In our discussions with CBHA staff, many referred to the

“check protocol” and alert functionalities as helpful for ensuring patients receive the care they need during a visit and ensuring timely outreach to patients who miss appointments. They also use bulk “alert notes” to identify patients in need of intervention (e.g., follow up for all patients with a hemoglobin A1c [HbA1c] greater than nine).

Access to electronic patient education tools perceived as an effective resource for patient engagement. A number of the health IT tools implemented at CBHA facilitate patient engagement. First, the WiredMD patient terminals, available in waiting rooms and exam rooms, provide health information

“I don’t use [WiredMD] that often because I usually do the education by myself, but I use a lot of Google and show it to the patient. I try to go into the medical sites – especially universities or something like that.” *CBHA Provider*

for patients on a number of conditions. Patients we spoke with use the terminals to view videos on topics such as giving birth, breastfeeding, and gestational diabetes. However, CBHA does not currently track how providers access the tool and how many patients use them so the impact of these resources on outcomes remains unclear. Many providers also indicated they provided education directly to their patient by sharing information from the EHR, such as graphs of lab results.

Providers and patients embraced videos focused on dental-related topics available from Caesy Enterprise – integrated with their EDR. The patients we spoke with found the videos easy to understand and more effective than written educational materials. Providers often use the videos to explain different dental procedures or give the patient the option to choose between procedures. Anecdotally, providers feel the videos increase patient engagement, with one provider noting, “We do have a program on dental implants and it really does help with that.... They get to ask more questions, see it done.”

“I really do think the picture is worth a thousand words. They can see them. [The videos] can explain it in great detail. They’re not very long... about three or four minutes each. A great tool.” *CBHA Provider*

“We try not to [refer to specialized services] because we know that they can’t afford it. If our dentist isn’t able to do it, we try to work within our organization rather than referring out. If someone here has more experience than them, they’ll work with them to provide the care the patient needs.” *CBHA Provider*

Overcoming geographic barriers to care through innovative use of technology. Geography presents an important barrier to care for the patients at CBHA. Patients often lack access to specialists in this rural area or need to travel greater distances to receive care. In addition, the mobility of seasonal workers from region to region further complicates access to care. CBHA providers noted many dental issues they saw demonstrated uneven access to care experienced by seasonal workers in rural areas.

Noting these barriers, CBHA piloted several innovative health IT solutions to increase access to testing and specialist services. For example, recently completed pilot tests of a mobile ultrasound device illustrated a number of viable use cases for the tool in CBHA’s rural setting. Increasing access to quality imaging can contribute to improvements in care delivery and may even enhance patient engagement. In the context of OB/GYN care, one IT professional discussed how once people see images of a fetus, it improves engagement on the part of pregnant women and their families by making the pregnancy less abstract and more tangible. CBHA respondents also noted clinicians in the OB/GYN clinic found the mobile ultrasound devices easy to use relative to the large ultrasound kiosks that are bulky and hard to move from room to room.

Similarly, through a teledermatology pilot program, CBHA enhanced patient access to dermatology services. Store-and-forward technology combined with a mobile platform allowed primary care providers and patients to receive specialized consultation quickly and efficiently (often within 24 hours). Some patients did raise occasional patient privacy concerns, but this did not prevent their consent for use of the technology: *“There were a few patients who felt it was mildly embarrassing, but the convenience factor outweighed that every time.”*

“What I have heard from providers themselves is that they don’t always feel like they have enough knowledge of the dermatological conditions that they might see and they come across them fairly infrequently... Anything more advanced or that they haven’t seen before, they do definitely feel like they need a consult. The [teledermatology] option was nice.” *CBHA Staff Member*

Barriers to Use of Technology

CBHA respondents indicate health IT tools contributed to improved efficiency, patient engagement, and quality of care. However, they also identified several barriers to effective use of these tools, highlighted below.

“They don’t have access to the computers, but even if they did have it, and had somebody showing it to them...it is pretty restrictive simply due to education.”
CBHA Provider

Unique population characteristics may limit effective utilization of some types of health IT. CBHA clinics serve a largely underserved, underinsured or uninsured population. Nearly everyone we spoke to mentioned challenges associated with using health IT to address the needs of this population. The majority of CBHA patients speak Spanish, work on a seasonal basis for area farms, and have low education and literacy levels, factors complicating their care and ability to use health IT. Providers spoke of the need for interpreters or

bilingual staff to communicate with their patients, and of the complicated nature of ensuring compliance and even conveying orders associated with care of chronic disease.

Most of the patients we spoke with did not own computers or cell phones. They often lacked home internet access and many did not know how to use a computer. CBHA plans to establish a patient portal to meet future anticipated Meaningful Use requirements. While patients seemed interested in the concept of accessing their health information or medical records online, functional limitations may prevent substantial use of a tool of this nature.

Using Health IT can take more time than alternatives.

CBHA respondents identified time as an obstacle related to the use of certain IT tools. Most commonly, respondents mentioned use of WiredMD videos during the patient encounter limits the time the provider interacts directly with the patient. As one provider explained: *“The videos are two – three minutes, but still that is a lot of time since you only have 15 minutes with the patients.”* Several providers contemplated showing videos after the care encounter, although they did not all agree that this approach would work.

“Education level is low; usually elementary level, maybe less. And that is why sometimes they don’t understand really well some of the terms on Wired MD. When that happens, we have to explain to those patients a good amount – using layman terms – so they can understand. I spend a lot of time doing that.” *CBHA Provider*

Policy and Organizational Factors for Replicability

Finally, we present key findings related to organizational and policy factors important to the implementation of technologies at CBHA, particularly as they relate to replicability.

Leadership and vision are critical for sustainability. Much of the technology studied at CBHA gained traction through a clear vision and strong leadership. As described by a key CBHA administrator, *“Some of the pieces fell into place as the organization evolved. But we have always been proactive around what is happening across the field of health care. And we saw [EHRs] as a necessary tool to provide services and maintain an image, to follow our mission statement.”*

Further, CBHA’s strong drive towards innovation allowed for implementation of a variety of technologies. CBHA leadership prioritized resources for IT which facilitated implementation of new technologies, troubleshooting, ongoing customization of products, and continued expansion of services. Health Information Management Systems Society (HIMSS) selected CBHA to receive the prestigious Davies Community Health Award in 2008 making CBHA the first FQHC to receive this honor. This award exemplifies CBHA’s long-term commitment to innovation using health IT.

Partnerships provide much needed support. The CBHA case study demonstrates the importance of a solid partnership with vendors, including registry and technology developers, as instrumental to effective use of health IT in underserved areas. As noted by one CBHA respondent, increased buy-in comes through engaging with key stakeholders in a given community. Providers and CBHA staff also discussed the importance of a vendor willing to act as a partner and provide support throughout implementation and configuration processes.

“Also, with considering different vendors, we had to determine if they were willing to work with us to create it how we wanted it to be... We want them to be part of our team. Based on our need to have it adapt to our needs both historically and moving forward, that’s what we looked for with the vendors... it was all about partnership.” CBHA Staff Member

“I have cohorts that don’t believe in incentivizations but when I look at their organization I see bad access, high cost and poor quality. We defined our culture and made it whatever we want it to be. Everyone decides what culture they want to have and ours is one of high productivity and high quality.” CBHA Respondent

Incentives, regardless of source, can drive the adoption and implementation of technologies.

Multiple CBHA respondents discussed the Medicare and Medicaid EHR Incentive Programs and Meaningful Use, noting the associated incentives play a role in the implementation of technologies. Respondents discussed increased interest in linking registry data with EHRs as driven by Meaningful Use. While CBHA did not choose to adopt an EHR because of Meaningful Use (their use of EHRs pre-dates the program by several years), they prioritize new functionality and upgrades to ensure they will meet various Meaningful Use requirements, both in Stage 1 and in the future. Further, CBHA employs an internal

incentive program for clinicians and other employees encouraging use of IT to foster efficiency and improve quality of care.

Success depends on building staff commitment to the mission of an organization.

CBHA leadership instituted compensation incentives based on performance metrics, derived largely from their IT applications. Furthermore, CBHA leadership insists all employees live in the communities served by the institution. This rare measure illustrates the ability of strong leadership and strategic recruiting to motivate a common culture (in this case around use of technology). Part of the innovation strategy at CBHA includes promoting talented individuals from all parts of the organization to play a leadership role in its use of systems. For example, CBHA’s lead report designer initially joined the organization as a receptionist and leadership “discovered” his natural aptitude for data and analysis.

The reimbursement environment in a state is a driver of sustainability. Unlike many safety-net providers using EHRs, CBHA leadership notes improvement in reimbursement and financial health

because of their implementation. A key contributing factor being the ability to enroll patients in Washington State’s Basic Health Program, which ensures primary care coverage for some groups in the state not eligible for Medicaid or other programs. CBHA leadership indicated that state efforts to reduce its financial commitment, for example by discontinuing reimbursement for diabetes education, might compromise its ability to sustain innovation.

Summary of Findings

The CBHA case study illustrates the use of different health IT applications to increase provider efficiency and improve care. Respondents emphasized CBHA culture and overall vision as driving forces for innovative use of technology. Partnerships and strong leadership can encourage buy-in from stakeholders and providers, while embedding technology into a broader outreach program to engage patients.

Project Background and Data Sources

The Office of the National Coordinator for Health Information Technology (ONC) and the Health Resources and Services Administration (HRSA) awarded NORC at the University of Chicago a project to conduct case studies examining lessons learned from community organizations using health IT to serve the needs of underserved groups or to address health disparities. The final report from this project will inform the Secretary of the Department of Health and Human Services’ (HHS) work under these topics per Section 3001 of the Health Information Technology for Economic and Clinical Health (HITECH) Act passed as part of the American Recovery and Reinvestment Act of 2009 (ARRA). Findings are based on analysis of notes taken during a series of discussions with vendors, administrators, providers, patients, and other stakeholders.

The case also provides an example of how incentives (both externally created and those developed within an organization) can drive adoption and implementation, and how institutions can support use of health IT even with limited start-up resources. CBHA illustrates the importance of customization of systems to meet specific patient and provider needs, and how quality reporting and integration of data systems, both internally and externally, can improve efficiency and patient outcomes. Finally, the case demonstrates how health IT can be adapted and harnessed to meet the unique needs of populations, such as through innovative development of new mobile tools or provider use of educational videos integrated with IT systems, to overcome patient literacy and language barriers.

ⁱ CBHA HIMSS Davis Application (2008). Available at http://www.himss.org/davies/docs/CHO/CBHA_application.pdf.

ⁱⁱ US Census Bureau (2010). American Fast Fact Finder: Urban/Rural and Metropolitan/Nonmetropolitan Population: 2000 - United States -- Urban/Rural and Inside/Outside Metropolitan Area. Retrieved February 2, 2012 from <http://factfinder2.census.gov/>.

ⁱⁱⁱ Agency for Healthcare Research and Quality (AHRQ). (2011). National Healthcare Disparities Report, 2010. AHRQ Publication No. 11-0004-1. Available at <http://www.ahrq.gov/qual/qdr10.htm>.

^{iv} Rosenbaum, S., Shin, P. (2005). Migrant and Seasonal Farmworkers: Health Insurance Coverage and Access to Care. Available at <http://www.gwumc.edu/sphhs/departments/healthpolicy/CHPR/downloads/migrant.pdf>.

^v Moiduddin, A. & Stromberg, S. (2009). Health Information Technology in California’s Rural Practices: Assessing the Benefits and Barriers. Prepared for the California Health Care Foundation. Available at <http://www.chcf.org/~media/MEDIA%20LIBRARY%20Files/PDF/R/PDF%20RuralHealthIT.pdf>.

^{vi} Moiduddin, A. & Stromberg, S. (2009).

^{vii} NORC. MIVIA PHR Case Study. Available: <http://www.hrsa.gov/healthit/toolbox/HealthITAdoptiontoolbox/PersonalHealthRecords/implementphr.html>.