

**West Virginia Federally Qualified Health Center  
Readiness for Electronic Medical Records**

Adam Baus, MA, MPH  
Cecil Pollard, MA  
Phillip Schenk, MS  
Trisha Petite, RN, MPA

Adam Baus is the Sr. Program Coordinator with the West Virginia University Office of Health Services Research, where he works with primary care sites around the state in facilitating their adoption of electronic patient registries and other forms of health information technology in quality improvement efforts.

Cecil Pollard is the Director of the West Virginia University Office of Health Services Research, where he works to improve the health and social status of West Virginians through program implementation that can impact policy and practice.

Phillip Schenk is the Executive Director of the West Virginia Primary Care Association, where he manages a trade association consisting of all community health centers and other community based clinical organizations in the state of West Virginia.

Trisha Petite is the Assistant Director of the West Virginia University Office of Health Services Research, where she works closely with primary care sites around the state to educate providers and staff on the uses of patient outcomes data to improve patient care and to implement self management programs for patients and their families.

Special thanks to: Nell Phillips, RN, MSM/HCA, Coordinator of Clinical Services with the West Virginia Department of Health and Human Resources for her support and guidance in this work; Janet Hunt, MPH, Practicum Director for the West Virginia University Department of Community Medicine and an editor of this paper; Valerie Frey-McClung, MA, with the Mary Babb Randolph Cancer Center in partnership with the West Virginia Prevention Research Center for her work in editing this paper; and Alex Lubman, MA, with the West Virginia Prevention Research Center for his work in editing this paper.

Contact: Adam Baus, MA MPH  
West Virginia University Department of Community Medicine  
Office of Health Services Research  
Robert C. Byrd Health Sciences Center, South  
PO Box 9190  
Morgantown, WV 26506-9190  
Telephone: (304) 293-1083  
E-mail: [abaus@hsc.wvu.edu](mailto:abaus@hsc.wvu.edu)

## **West Virginia Federally Qualified Health Center Readiness for Electronic Medical Records**

**Context:** The transition from paper-based to electronic medical records (EMRs) within primary care is gaining momentum nationwide. EMRs store comprehensive medical information and are intended to allow data sharing across sites, offer decision support in patient care, facilitate reporting and analysis, improve the management and utility of medical information, and improve quality of care. However, many small, rural primary care centers lack the resources necessary to transition. Literature on EMR adoption highlights areas of caution and the need to assess readiness prior to implementation.

**Purpose:** This research examines the current extent of EMR use and readiness within the state's federally qualified health centers (FQHCs), aiming to better inform state agencies, stakeholders, and FQHC leadership.

**Methods:** WV FQHC administrators were identified, contacted via telephone, and mailed a survey on EMR readiness. Fisher's Exact Test, Pearson Chi Square, and descriptive statistics were generated in JMP 6.0. P values < .05 determine statistical significance.

**Findings:** EMR adoption within WV FQHCs is in its early stages. Use is limited and length-of-use was generally between 0 and 6 months as of September 2006. Most sites not using an EMR plan to within three years. Finances to transition are a primary need.

**Conclusions:** Many readiness activities are taking place within the state's FQHCs, and are shown to be fostered by the presence of a physician champion. However, a number of specific activities should be encouraged, as should the focus on EMR use to improve quality of care and the need for interoperability across care sites.

**Key words:** electronic medical record, readiness, rural, federally qualified health center, physician champion

## **Introduction**

The transition from paper-based to electronic medical records (EMRs) within primary care is slowly gaining momentum nationwide. Broadly speaking, EMRs digitally record comprehensive medical information to allow efficient data sharing across sites, offer decision support in patient care, facilitate analysis and reporting, improve the management and utility of medical information, and offer more integrated, targeted healthcare.<sup>1-6</sup> Nationally, EMRs have the potential to save \$77-\$81 billion per year in health care costs.<sup>6-8</sup> However, many small, rural primary care practices, such as those within West Virginia (WV), may not be capable of seamlessly transitioning from paper-based records.<sup>6, 9-10</sup> Literature on EMR adoption highlights characteristics which impede the adoption of these systems and emphasize the need for healthcare professionals to be assessed for their understanding and readiness surrounding EMRs.<sup>3, 10-15</sup> This research examines the extent to which the state's federally qualified health centers (FQHCs) are prepared for the successful adoption of EMRs, and identifies factors which may help promote successful adoption. FQHCs provide essential healthcare services to a large number of persons living in medically underserved areas.<sup>16</sup> This research is based on a mail survey of the state's FQHC administrators, who were asked key questions on the organizational alignment, management capacity, operational capacity, technical capacity, and FQHC needs and resources relating to EMR use.

## **Background**

### *History of EMR Promotion and Use*

EMRs have long been promoted for use within primary care settings, dating back to the 1960s when computers were first used in billing and later for patient scheduling.<sup>11-</sup>

<sup>12</sup> In 1975, the US was estimated to be 15 years away from widespread adoption.

Billions of dollars have been spent in this effort since that time,<sup>2,9,11,13,17-18</sup> yet current estimates on EMR use range from 5% to 20% of the nation's physicians and 20% to 25% of the nation's hospitals.<sup>2,4,7,9,12,19-20</sup>

### *Caution and Barriers Surrounding EMR Adoption*

Common barriers to successful EMR adoption are the: 1) cost of EMR set-up and maintenance,<sup>2,3,6-8,9,13,15,17,21-23</sup> 2) increased amount of time needed for regular practice operations and subsequent loss of revenue at the outset, 3) time and resources required to train staff,<sup>2,9,18,22,24</sup> 4) concerns that insurance companies do not subsidize adoption,<sup>2,7-8,13,18,23,25</sup> 5) lack of standards in data formatting and EMR platforms which inhibit data sharing, as well as the lack of political outcry for these standards to be developed,<sup>6,13,15,17,23-24,26</sup> 6) concerns for ensuring privacy in healthcare information and concerns over the legality of using EMRs in patient care,<sup>2-3,13,21,23,26</sup> 7) lack of a physician champion who understands the EMR and can guide users,<sup>3,22</sup> and 8) lack of overall commitment within a practice to adopt an EMR.<sup>22</sup>

Practice characteristics affect adoption rates. The number of doctors, the number of physicians who are younger, the variety of medical services, and the presence of multiple organization locations are positively correlated with the likelihood of successful adoption.<sup>1,27</sup> Practices in the Northeast and rural locations tend to be less likely to transition successfully.<sup>1,27</sup> Smaller practices require specialized attention due to the uniqueness of each site, constrained finances, and the limited resources available to research EMRs for compatibility.<sup>2,9,12,25,28-30</sup>

EMRs have historically been designed for larger practices and hospitals.<sup>17-19,23-25,28</sup> Many vendors fail to solicit providers' input in EMR design.<sup>2,18,24,29,31</sup> Despite acknowledging the possible benefits of EMR use, a significant number of healthcare

professionals lack confidence and choose to postpone adoption.<sup>11,17,20,25,29,32-33</sup> A number of EMRs are not compatible with commonly used applications, and consequently prevent data sharing.<sup>2-3,9,15,18,29</sup> Coupled with difficulties in design, the benefits of using EMRs are not immediate and can be unpredictable.<sup>2-3,22,26</sup> Adoption will remain precarious until physicians perceive these systems as reliable quality improvement tools and understand the benefits of and barriers to using them.<sup>3,18,33-35</sup>

## **Methodology**

### *Study population identification*

The names and business contact information of the 30 WV FQHC administrators were gathered via the West Virginia Primary Care Association (WV PCA).

### *Survey construction*

Review of the literature surrounding EMR adoption, review of existing assessment tools, and stakeholder feedback informed the survey content. Proper visual layout was further shaped by Dillman's *Tailored Design Method*.<sup>36</sup> Based on a readiness tool made available by Object Health, titled the "Community Clinic EHR Readiness Assessment," this survey was sectioned into organizational alignment, management capacity, operational capacity, and technical capacity. Object Health granted permission to use and/or adapt survey questions from their instrument for use in this research. 'Organizational alignment' describes the extent to which a health center is openly discussing and planning for the transition to an EMR, and promoting a clinic-wide understanding of the impact that adoption may have on practice operations.<sup>37</sup> 'Management capacity' describes a health center's ability to meet the personnel and financial requirements of EMR use.<sup>37</sup> 'Operational capacity' describes a health center's ability to effectively incorporate an EMR into its daily workflow and modify its workflow to

accommodate use.<sup>37</sup> 'Technical capacity' describes the extent to which a health center's computer capabilities, hardware and software meet EMR requirements.<sup>37</sup> These four elements comprise the components of *readiness* within this study. An additional section at the close of the survey was added to gather further information on each FQHC's current level of resources and needs in relation to EMR adoption and use. Preliminary results of the "Survey of Health Center Use of Electronic Health Information" conducted by the National Association of Community Health Centers<sup>38-39</sup> have been incorporated into this analysis for comparison when appropriate.

#### *Survey administration*

An Application for Exemption was approved by the West Virginia University Institutional Review Board. A printed copy of the survey was sent to each administrator of the 30 identified WV FQHCs. Each administrator was telephoned approximately three business days prior to receiving the survey and encouraged to participate. With the survey, each received a pre-addressed, postage-paid envelope. Two follow-up telephone calls were made to increase the response rate.

#### *Survey analysis*

Fisher's Exact Test was used for analysis of 2X2 contingency tables. Pearson Chi Square was used when contingency tables were 2X3 or larger. Frequencies, percents, and cross-tabulations were also used to present results. P values < .05 determine statistical significance. JMP 6.0 Statistical Discovery software was used for analysis.

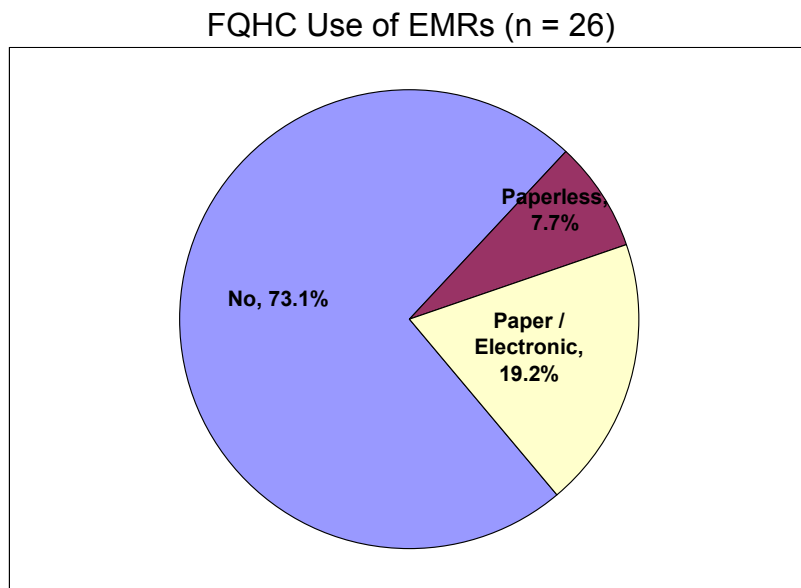
## Results

### *Response rate*

Twenty-six of the 30 surveys mailed to the WV FQHC administrators were completed and returned, resulting in an 86.7% response rate.

### *EMR use*

Seven FQHCs (26.9%) use an EMR as of September, 2006. Only two FQHCs (7.7%) use a paperless system (see Figure).



Six different EMRs are used among the seven reporting use. This highlights the current lack of standardization in choice of EMRs across the state. Both FQHCs reporting use of a paperless system are serviced by the same administrator. Of the FQHCs currently using an EMR, 42.9% have been doing so for a short period of time (0-6 months).

### *Organizational alignment*

Among FQHCs not currently using an EMR, the majority (84.2%) have reached consensus that transitioning from paper-based records is appropriate. Nearly 80% of

these sites plan on transitioning, most (53.3%) within the next year. However, 20% are unsure of when they will transition (see Table 1), citing money as a constraint.

Table 1. Time-Frame for Transitioning

	<b>Time Period</b>			
	0-6 months	7-12 months	2-3 years	Unsure
N	1	7	4	3
% of total	6.7	46.7	26.7	20.0

The majority of FQHCs are conducting certain activities relating to organizational alignment, such as studying the pros and cons of adoption (96.2%), reviewing current literature on transitioning (84.6%), and identifying a physician champion to help guide and spur clinic-wide adoption (73.1%). However, over 40% have not established measurable goals and objectives, ensured that all clinic members have a sufficient understanding of EMRs, or planned on revamping office work-flow.

FQHCs conducting the following activities are significantly more likely to use an EMR:

- Generating a list of what they wish to gain from EMR use ( $p < .05$ , two-tailed Fisher's exact test)
- Establishing measurable goals and objectives surrounding use ( $p < .01$ , two-tailed Fisher's exact test)
- Developing a planning team to facilitate adoption ( $p < .05$ , two-tailed Fisher's exact test)
- Planning for revamping office work-flow to accommodate use ( $p < .01$ , two-tailed Fisher's exact test)

The presence of a physician champion was significantly correlated with a number of activities surrounding a health center's organizational alignment. FQHCs conducting the following activities are significantly more likely to have a physician champion:

- Reviewing literature on the experiences of other health centers adopting EMRs ( $p < .05$ , two-tailed Fisher's exact test)
- Generating a list of what they wish to gain from EMR use ( $p < .01$ , two-tailed Fisher's exact test)

- Establishing measurable goals and objectives surrounding use ( $p < .05$ , two-tailed Fisher's exact test)
- Developing a planning team ( $p < .01$ , two-tailed Fisher's exact test)
- Planning for revamping of office work-flow to accommodate use ( $p < .05$ , two-tailed Fisher's exact test)
- Establishing a specific, realistic time-frame for adoption ( $p < .01$ , two-tailed Fisher's exact test)

### *Management capacity*

The majority of FQHCs are conducting activities relating to management capacity that encourage successful EMR adoption, such as considering staffing needs (80.8%), comparing vendors (69.2%), and identifying funding (69.2%). However, between 35% and 40% of FQHCs have not ensured that all medical staff understand their roles in EMR use, developed a plan for EMR testing prior to implementation, determined acceptable revenue losses during implementation, or developed methods for monitoring adoption. Further analyses were conducted to examine the relationship between the preceding activities and EMR use. There is sufficient evidence to conclude that FQHCs developing a plan for testing the EMR prior to implementation are more likely to currently use an EMR ( $p < .05$ , two-tailed Fisher's exact test).

### *Operational capacity*

Most FQHCs are conducting activities relating to operational capacity, such as considering changes in practice operations (65.4%) and considering the initial increased time needed to record visit information (61.5%). However, about 40% have not planned for ensuring data integrity, developed plans to monitor EMR responsibilities and work-flow, planned for customizations from vendors, or planned to hold formal training.

The presence of a physician champion was significantly correlated with a number of activities surrounding operational capacity. FQHCs taking the following actions are significantly more likely to have a physician champion:

- Considering the potential for increased time needed to record visit information ( $p < .01$ , two-tailed Fisher's exact test)
- Forming a contingency plan in the event of the EMR being "down" ( $p < .01$ , two-tailed Fisher's exact test)
- Identifying and/or developing methods for ensuring data integrity ( $p < .01$ , two-tailed Fisher's exact test)
- Developing a plan for managing EMR responsibilities and work-flow ( $p < .01$ , two-tailed Fisher's exact test)
- Requesting customizations from vendors ( $p < .01$ , two-tailed Fisher's exact test)
- Implementing formal training for providers and staff ( $p < .01$ , two-tailed Fisher's exact test)
- Considering changes in practice operations ( $p < .05$ , two-tailed Fisher's exact test)

The majority of FQHCs using an EMR have mandatory training (71.4%), have received project plans and training from vendors (57.1%), have received vendor-provided training sessions (71.4%), and have the ability to import or export data from their EMR (71.4%). The cost of set-up, maintenance and technical support is the top consideration among all sites.

### *Technical capacity*

The majority of FQHCs do have essential computer infrastructure such as high-speed Internet (96.2%), a computer server (88.5%), and a computer network (76.9%). Additionally, the majority of FQHCs have conducted needs-based assessments of computer hardware and software (69.2%). However, 46.4% do not have in-house information technology support.

In general, FQHCs currently using an EMR were satisfied with: the compatibility of the system in relation to their health center, vendor contracts outlining available support, modifiability of EMRs to meet their specific needs, ability of the EMR to electronically interface with other electronic systems used, ability of the EMR to receive laboratory values electronically, and vendor-supplied plans for data back-up.

*Resources and needs*

The number of health centers within a FQHC’s organization, number of healthcare providers, clinical staff, and office staff are part of a site’s overall resources. This study finds very diverse FQHCs across the state in regard to these measures (see Table 2). The number of health centers included in a FQHC’s organization ranges from 1 to 22, while the number of healthcare providers ranges from 2 to 45. These findings have important implications for the ease with which a FQHC may transition.

Table 2. FQHC Size

<b>Category</b>	<b>Total</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Median</b>
# of health centers (main, plus satellite)	121	1	22	4.7	4.0
# of healthcare providers	362	2	45	14.5	10.0
# of clinical staff (nurses, medical assistance, etc.)	517	2	120	21.5	14.5
# of office staff	682	4	120	29.7	14.0

Improved documentation/data integrity is the most frequently cited reason for transitioning (24.6%), and improved patient care/health outcomes is the second most frequently cited reason (17.5%). Money (38%) and training (16%) are the two most frequently cited needs.

Over 75% of FQHCs use health information technology (HIT), such as an EMR, practice management system, or web-based portal, to obtain clinical guidelines and receive laboratory results. Use of HIT for other purposes is lower (see Table 3).

Table 3. Current Health Information Technology (HIT) Activities

Activities		Yes	No	No Response
Obtaining information on treatment alternatives or recommended guidelines	N	21	4	1
	% of Total	80.8	15.4	3.9
Receiving laboratory results	N	20	5	1
	% of Total	76.9	19.2	3.9
Accessing patient notes, medication lists or problem lists	N	12	13	1
	% of Total	46.2	50.0	3.9
Generating preventive treatment reminders for the physician's use	N	11	14	1
	% of Total	42.3	53.9	3.9
Exchanging clinical data and images with other physicians	N	9	16	1
	% of Total	34.6	61.5	3.9
Writing prescriptions	N	5	20	1
	% of Total	19.2	76.9	3.9

### Discussion

EMR use among WV's FQHCs is limited (26.9%) and there is a lack of standardization in regard to the system used. Six different EMRs are used by the seven FQHCs using one at this time. Furthermore, EMR use within the state's FQHCs is a relatively new development, as the majority of sites that use one (42.9%) have been doing so 6 months or less. However, there is some standardization in regard to another area of HIT. Twenty responding FQHCs (76.9%) use an electronic patient registry, generally the Chronic Disease Electronic Management System (55%) or the Patient Electronic Care System (30%), to track health outcomes measures among patients with chronic health conditions. Thirty percent of these sites have used a patient registry for two years or more. Over half (53.9%) using a registry are members of the National Health Disparities Collaborative. Electronic patient registries, one type of HIT that is easier to implement than an EMR,<sup>40</sup> may hold some benefit as a stepping-stone towards EMR use by acclimating FQHCs to HIT use and electronically tracking quality of care.

Current EMR use within WV is comparable to that within the nation's health centers. First, 7.7% of WV FQHCs use a fully electronic EMR compared to 8% of the nation's health centers, and 19.2% use part paper and part electronic EMRs compared to 16% nationwide.<sup>38</sup> Second, the majority (79%) of WV FQHCs not using an EMR plan on making the transition, which corresponds with the trend across the nation.<sup>38</sup> Third, 63.2% of WV FQHCs plan on transitioning to an EMR within the next three years, while 60% of the nation's health centers plan on installing new or replacing existing EMRs within the next three years.<sup>38</sup> Fourth, WV FQHCs and the nation's health centers alike cite the need for increased financial resources for EMR implementation and maintenance. Money is the most frequently cited need among WV FQHCs, while financial support for start-up and ongoing costs is the most frequently cited need nationwide.<sup>38</sup>

Certain findings highlight the need for further, targeted assessment of EMR readiness. First, interoperability was not a concern among most state FQHCs. Among responding sites, improved documentation and data integrity is the primary reason for transitioning (24.6%), while improved patient care and health outcomes ranks second (17.5%). Second, one site noted that it plans on transitioning to an EMR simply because other health centers are doing so.

As more WV FQHCs prepare to transition from paper-based medical records, the positive readiness activities already taking place within these sites should continue. For example, the majority of current EMR users requested product demonstrations from vendors prior to purchase (85.7%), and made site-visits to other health centers already using the EMR they were considering (57.1%). However, this research shows that sites may benefit from increased focus on:

- establishing measurable goals and objectives surrounding EMR use
- identifying the benefits to be gained from use
- ensuring that all members have a sufficient understanding of the system and their roles in its use
- developing a planning team to facilitate adoption
- planning for changes in office work-flow
- testing the EMR prior to implementation
- determining acceptable revenue losses during implementation
- monitoring adoption among all health center members
- implementing formal training for all providers and medical staff
- ensuring data integrity
- customizing the EMR to suit their specific health center

The presence of a physician champion within the FQHC has a positive impact in many of these areas. Sites with a physician champion were significantly more likely to report reviewing literature on the experiences of other health centers, generating a list of what they want to gain from EMR use, forming measurable goals, objectives, time frames and ways of monitoring adoption, forming a planning team, planning on revamping practice operations, ensuring the data within their systems are valid, requesting system customizations, ensuring that providers and staff are formally trained, and planning for how to handle practice operations in the event of their EMR being “down.” Fostering these leaders will aid adoption. While the majority of sites do not use HIT to access patient notes, medication or problem lists, generate preventive treatment reminders, exchange clinical data and images with other physicians, or write prescriptions, these basic uses of HIT may become more widespread given physician champions who foster the understanding and use of such technology.

### *Study limitations*

The level of data collected via this survey limit statistical analyses. Additionally, due to low observation counts within constructed contingency tables, Fisher's exact test was used rather than Pearson Chi Square to help describe correlations among variables. Fisher's exact test does not have confidence intervals to measure the strength of the association between variables.

### **Conclusion**

About one-quarter of WV FQHCs have adopted an EMR. Many others are preparing for future adoption. Much of this activity positively contributes to the overall level of readiness for the successful transition from paper-based to electronic medical records. Activity will likely increase within the next year as more FQHCs plan to transition. However, a number of indicators within this study show the need for caution and further planning prior to EMR adoption. Fostering appropriate reasons for transitioning, an improved understanding of the fit of the EMR with the FQHC, and recognizing the impact the transition will have on budget and resources will prove essential to the long-term success of each site's efforts.

EMR use within WV's FQHCs is a relatively new development, presently characterized by a lack of standardization in choice of system. More important is the effort to ensure that these systems are interoperable, or capable of sharing data across sites. Ensuring interoperability among EMRs rather than focusing on the specific EMR being used may allow more attention to be focused on improving the quality of patient care. EMR adoption across the nation is taking place within a healthcare system characterized by a lack of necessary infrastructure. Placing WV's efforts within the context of the nation's will prove beneficial, as will sharing lessons learned within WV.

## References

- 1) Simon JS, Rundall TG, Shortell SM. Drivers of electronic medical record adoption among medical groups. *Joint Commission on Accreditation of Healthcare Organizations*. 2005; 31 (11): 631-639.
- 2) Miller RH, Sim I. Physicians' use of electronic medical records: barriers and solutions. *Health Affairs*. 2004; 23 (2): 116-126.
- 3) Satinsky M. EMR: Questions come before answers. *Review of Ophthalmology*. 2004; 67-72.
- 4) Improved medical technology could affect health, lower cost. *The Nation's Health*. (n.d.). Retrieved January 17, 2006, from EBSCOhost.
- 5) Collins B, Wagner M. Early experiences in using computerized patient record data for monitoring charting compliance, supporting quality initiatives and assisting with accurate charging at Allina hospitals & clinics. *International Journal of Medical Informatics*. 2005; 74 (11-12): 917-925.
- 6) Taylor R, Bower A, Girosi F, Bigelow J, Fonkych K, Hillstead R. Promoting health information technology: is there a case for more-aggressive government action? *Health Affairs*. 2005; 24 (5): 1234-1245.
- 7) Traynor K. Race is on for electronic medical record adoption. *American Journal of Health-System Pharmacy*. 2005; 62: 2222-2223.
- 8) Swartz N. (2005 November/December). Electronic health records could save \$81 billion. *The Information Management Journal*, p 6. Retrieved January 17, 2006, from EBSCOhost.
- 9) Baron RJ, Fabens EL, Schiffman M, Wolf E. Electronic health records: just around the corner? or over the cliff? *Annals of Internal Medicine*. 2005; 143: 222-226.
- 10) Harris KD, Parsons JT, Jimenez R. Developing a methodology for the customization of an electronic medical record in a rural health care setting. Arizona School of Health Sciences, Sun Life Community Health Center; (n.d.).
- 11) Hovenga E, Kidd M, Cesnik B, editors. *Health informatics: an overview*. Melbourne: Churchill, Livingstone; 1996: 1/9-9/9.
- 12) Himmelstein DU, Woolhandler S. Hope and hype: predicting the impact of electronic medical records. *Health Affairs*. 2005; 24 (5): 1121-1123.
- 13) Burton LC, Anderson GF, Kues IW. Using electronic health records to help coordinate care. *The Milbank Quarterly*. 2004; 82 (3): 457-481.

- 14) Baum N.H. (2005, October). Choosing an EMR: how to determine what's best for you. *Urology Times*, p 32. Retrieved January 18, 2006, from EBSCOhost.
- 15) Amatayakul M. (2005, May). EHR? Assess readiness first. *Healthcare Financial Management*, pp 112-113. Retrieved January 16, 2006, from EBSCOhost.
- 16) National Health Policy Forum. *The fundamentals of community health centers*. Washington, D.C.: The George Washington University; 2004.
- 17) Goldschmidt PG. HIT and MIS: implications of health information technology and medical information systems. *Communication of the ACM*. 2005; 48 (10): 69-74.
- 18) Bristol N. (2005, May). The muddle of US electronic medical records. *The Lancet*, 365, pp1610-1611. Retrieved January 18, 2006, from EBSCOhost.
- 19) Lee J, Cain C, Young S, Chockley N, Burstin H. The adoption gap: health information technology in small physician practices. *Health Affairs*. 2005; 24 (5): 1364-1366.
- 20) May J. The electronic medical record: a valuable partner. *The Journal of Medical Practice Management*. 2005; 21 (2): 100-102.
- 21) Kaushal R, Bates DW, Poon EG, Jha AK, Blumenthal D. Functional gaps in attaining a national health information network. *Health Affairs*. 2005; 24 (5): 1281-1289.
- 22) California HealthCare Foundation. *Electronic medical records: lessons from small physician practices*. San Francisco: University of California; 2003.
- 23) Federal Panel Pushes Plan for EHR Adoption: Sends Congress 14 Proposals. *Computerworld*. (2005, November). Retrieved January 16, 2006, from EBSCOhost.
- 24) Cunningham R. Action through collaboration: a conversation with David Brailer. *Health Affairs*. 2005; 24 (5): 1150-1157.
- 25) Middleton B. Achieving US health information technology adoption: the need for a third hand. *Health Affairs*. 2005; 24 (5): 1269-1272.
- 26) Waegemann C. The vision of electronic health records. *The Journal of Medical Practice Management*. 2002; 18 (2): 63-65.
- 27) Kaushal R, Bates DW, Poon EG, Jha AK, Blumenthal D. Functional gaps in attaining a national health information network. *Health Affairs*. 2005; 24 (5): 1281-1289.
- 28) Walker JM. Electronic medical records and health care transformation: EMR supported health care transformation is too immature for credible estimates of its costs or benefits. *Health Affairs*. 2005; 24 (5): 1118-1120.

- 29) Kleinke JD (1998). Clinical information technology in the real world: an industry analyst describes the difficult lessons learned from the “bleeding edge” of health information technology. *Health Affairs*. 1998; 17(6): 23-38.
- 30) Morrissey J. Certified and ready for duty. *Modern Healthcare*. 2004; 34 (34): 50-52.
- 31) Javitt JC. (2004, May). How to succeed in health information technology. *Health Affairs*, pp W4-321-W4324. Retrieved January 17, 2006, from EBSCOhost.
- 32) California HealthCare Foundation. *Diffusion of innovation in health care*. San Francisco: Institute for the Future; 2002.
- 33) Blair R, Waton K. (2005, September). Like it? Yes. Need it? Yes. Buy it? Nah. *Health Management Technology*, pp 20-25. Retrieved January 16, 2006, from EBSCOhost.
- 34) Center for Information Technology Leadership. *Finding the value in healthcare information technologies*. Boston: Center for IT Leadership, Partners HealthCare; 2002.
- 35) Geyer S. (2004, February). Physicians: the key to success. *Trustee*, pp 6-10. Retrieved January 16, 2006 from EBSCOhost.
- 36) Dillman DA. 2000. *Mail and internet surveys: the tailored design method, second edition*. John Wiley & Sons, Inc. New York.
- 37) California Community Clinics EHR Assessment and Readiness Project page. The California HealthCare Foundation website. Retrieved January 16, 2006, from: <http://www.chcf.org/topics/chronicdisease/index.cfm?itemID=106553>.
- 38) National Association of Community Health Centers, Inc. *Survey of health center use of electronic health information*. Harvard Medical School / Massachusetts General Hospital, George Washington University, Yale University; 2006.
- 39) National Association of Community Health Centers, Inc. *Electronic health information among community health centers: adoption and barriers – fact sheet #0106*. Harvard Medical School / Massachusetts General Hospital, George Washington University, Yale University; 2006.
- 40) Marietti C. Will the real CPR/EMR/HER please stand up. *Health Informatics Online* [serial online]. May 1998. Available at: [http://www.healthcareinformatics.com/issues/1998/05\\_98/cover.htm](http://www.healthcareinformatics.com/issues/1998/05_98/cover.htm). Accessed October 31, 2004.