
***Community Health Centers and
Electronic Health Records:
Issues, Challenges, and
Opportunities***



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NWHF

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INTRODUCTION

This handbook was developed as a resource for community health centers (CHCs) in response to a perceived need for a consolidated set of information that can assist CHCs in working through the decision processes related to deciding if, when and how to implement an electronic health record (EHR) system. The handbook has been developed under the auspices of the Northwest Health Foundation (NWHF) and supported in part by the Kaiser Permanente Community Fund. The purpose of this handbook is to provide an overview of the key factors that will be useful for CHCs to consider as they anticipate the adoption of electronic health record systems. The scope and breadth of the handbook are focused on meeting the particular needs of community-based health centers, largely FQHCs, with particular attention to key decision-makers -- boards of directors, executive and medical directors, clinic managers, and day-to-day supervisors.

The goal in developing this handbook is to provide a resource that is easily accessible and informative, and can assist community health centers in navigating the puzzling challenges and resolving the problematic unknowns related to decision-making, implementation, and adoption of an EHR within the context of the health care safety net.

Framing the Issue

The contents of this handbook should be considered within the context of broader system issues and changes related to health information technology (HIT) occurring both in Oregon and nationally. As with many other health care delivery organizations, safety net providers have begun assessing, implementing, or experiencing the benefits in quality of care and efficiency associated with an electronic health record. The potential improvement in clinical quality for safety net clinics has been a major incentive for implementation of the EHR, as well as anticipating additional efficiency. This is particularly important given the clinics' high proportion of Medicaid and uninsured patients, many of whom are high risk and/or have one or multiple chronic conditions.

“Information technology is still the best hope for the future of health care. It has unique abilities to shape organizations, automate processes, and create and sustain relationship.”¹

This handbook grows out of work in Oregon and is intended to be of particular use to CHCs in Oregon, although the content has relevance for EHR implementation in other jurisdictions. Achieving the full value of EHRs to improve care requires both health system change and critical organizational supports. The most critical element of health system change needed is the ability to exchange health information across individual providers and facilities so that it is available when and where it is needed for patient care. Health information exchange or connectivity has not been achieved in Oregon or nationally in the USA, but important steps are underway to improve the ability to freely exchange patient information among providers, and deal with

¹ Patterson, N. (2004). “The mission of IT in health care: Creating a system that cares.” In Ball, M., Weaver, C., & Kiel, J. (eds.), *Healthcare Information Management Systems: Cases, Strategies, and Solutions* (3rd ed.). New York, NY: Springer-Verlag, p.3.

patient identification and privacy issues. The safety net focuses on primary care and a patient base of uninsured, underinsured, and publicly insured people; its ability to provide timely electronic information on its patient base to hospitals and specialty providers will help to assure the best quality care for individual patients and will also contribute to a more efficient and effective system overall.

Relevance to Health Care Organizations

The decision to purchase and implement an EHR system is a major investment of organizational resources. The organizational focus is often on the initial financial investment, which is a major challenge for safety net organizations stretched by increasing numbers of uninsured patients and increasing pressure on publicly funded health care programs. However, the considerations regarding EHR adoption are even more complex. In addition to the difficulties of financing, these often fragile organizations also face all of the organizational issues associated with successful implementation including identification of champions, organizational buy-in, strategies to cope with the initial disruption caused by any new system, training for all levels of staff, process changes to maximize the potential benefits of the new system and, finally, resources for ongoing training and development.

Including EHRs in quality incentive programs as some large third party payers have done could provide an incentive for the investment, and support the ongoing costs and learning curve. Identifying what strengths are most critical and what strategies have been most effective from early implementers and from the central service organization has great potential to help all who follow. Careful examination of actual and expected outcomes in quality and efficiency is also central to determining and achieving the potential value of EHRs to patients, clinicians, and the health system as a whole.

Rationale for Creating the Handbook

No community health center “should have to ‘rediscover’ an avoidable problem...”²

Taking the issues above into consideration, we have sought to assemble a handbook targeted specifically to CHCs that addresses these key issues, as well as others related to adoption and use of EHRs within the health care safety net. Information and resources available and helpful for understanding EHR adoption in community-based health centers is fragmented and difficult to navigate, especially for a novice who may or may not be familiar with all of the terminology and complexities of an EHR system. This handbook should help CHCs to make well-informed decisions about adoption and implementation of EHRs.

A key contribution of this handbook is to increase awareness and provide clarity on a number of complex and interrelated factors associated with the process of information collection during the early and often most critical stages of the EHR decision-making process. Conceivably, the

² Halamka, J. (2006). Health information technology: Shall we wait for the evidence? *Annals of Internal Medicine*, 144 (10), 776.

contents of this handbook can provide CHCs with a minimum set of resources necessary to thoroughly consider the most relevant issues related to EHR adoption. To achieve this intended goal, the handbook has identified and described the distinct stages and benchmarks of successful EHR adoption in CHCs, in addition to highlighting the fundamental challenges and critical success factors related to EHR implementation.

Overview of the Handbook

The handbook is organized into six chapters addressing basic concepts of EHRs and the health care safety net, the EHR adoption decision-making process, organizational leadership and change management, building information technology infrastructure, phases of EHR implementation, and a summary of best practices and innovations from the field. This handbook shares lessons learned from a number of CHCs that were early adopters as well as other CHCs that have considered but not yet adopted. These lessons can greatly assist other CHCs by identifying and describing key indicators of successful EHR adoption. The handbook will help readers to outline and assess the critical importance of, and adequately plan for, a range of key organizational factors before, during and after EHR implementation. These include disruption to delivery of services, workflow redesign, challenges of training staff and providers, initial and ongoing HIT support, end-user acceptance and satisfaction pre- and post-EHR implementation, and perceived changes in the provider-patient relationship.

This handbook has been designed to meet the needs of leaders and key decision-makers in community health centers, including boards of directors, executive and medical directors, clinic managers, clinicians, allied health staff and front office staff. The handbook translates a number of key findings from a multi-year evaluation study into a synthesized, coherent, and user-friendly format. It also incorporates real-world experiences from a number of CHCs located throughout Oregon and Southwest Washington, many of whom are early adopters and whose experience can help inform other CHCs considering EHR adoption.

Collectively, the lessons shared in the handbook will help to identify and explain many of the challenges that are encountered with implementation of EHRs, including a number of promising practices and indicators of success. A number of case vignettes are included, drawn from individual health centers that participated in the evaluation study. The handbook also integrates information from multiple sources, including published literature, websites, various conference presentations, reports, and handbooks. Throughout the handbook, there are embedded links to numerous templates, informative documents, assessment tools, and helpful online resources. At the end of the handbook are appendices containing a glossary of terms, an evaluation framework, descriptive summaries of online resources particularly useful for CHCs, and a bibliography.

CHAPTER ONE

THE HEALTH CARE SAFETY NET AND USE OF EHR SYSTEMS

In 2006, one in every six Americans (over 45 million people) did not have health insurance.³ National health care expenditures exceeded \$2 trillion, and \$1 out of every \$7 dollars was spent on health care related costs. As people change employers and their health insurance status changes throughout the year, an estimated 80 million may go without any health coverage. The underlying issue of health insurance portability has not been resolved and continues to grow, both in magnitude and severity. Furthermore, the number of uninsured Americans continues to grow, and the likelihood of any significant change or reversal in this inauspicious trend is doubtful. These numbers, along with the increasing numbers of underinsured, have significant implications for the nation's health care safety net.

The safety net is comprised of a vast range of health care providers who deliver primary and preventive care services to the rising numbers of underserved and uninsured in both urban and rural regions throughout the United States. Federally-sponsored community health centers, or CHCs, now represent an integral part of safety net providers.⁴

- ❖ For over 40 years, non-profit, community-based centers have worked diligently to provide millions of the nation's most disadvantaged and vulnerable populations with high-quality primary and preventive health care services.⁵

CHCs have a rich and compelling historical legacy in the United States. Often described as a vast "patchwork" of providers, they differ substantially in terms of organization, size, infrastructure, services provided, and available financial resources. Among them are Federally Qualified Health Centers (FQHCs), rural health centers, migrant health centers, and "free clinics" (also referred to as community-sponsored clinics). In spite of their differences, however, they all share common characteristics: mission-driven, public, and nonprofit health care providers. They serve as a critical resource to provide access to primary care services for millions of low-income Americans, including women and children, minorities, Medicaid beneficiaries, and individuals with special health care needs.

- ❖ Annually, more than 1,000 community health centers deliver comprehensive primary care and ancillary services, including physical, mental, and dental, to approximately 16 million Americans.⁶

These health centers have a successful track record in delivering high-quality, low-cost health care services despite the enormous challenges of providing such services to the underserved.

³ Catlin, A., Cowan, C., Hartman, M., & Heffler, S. (2008). National health care spending in 2006: A year of change for prescription drugs. *Health Affairs*, 27(1), 14-29.

⁴ Fiscella, K., & Geiger, J. (2006). Health information technology and quality improvement for community health centers. *Health Affairs*, 25(2), 405-412.

⁵ Lefkowitz, B. (2007). *Community Health Centers: A Movement and the People Who Made It Happen*. New Brunswick, NJ: Rutgers University Press.

⁶ National Association of Community Health Centers (2005). *The Safety Net on the Edge*. Retrieved from: <http://www.nachc.org/research/Files/SNreport2005.pdf>.

- ❖ These remarkable achievements can largely be attributed to the following factors:⁷
 - CHCs share a unique and historical mission and purpose.
 - They are located primarily in high-need, medically-underserved areas.
 - They are committed to providing accessible services to all individuals in need regardless of ability to pay.
 - They deliver targeted preventive, primary, specialty, and urgent care services, as well as community outreach programs.
 - They tailor their services to meet the needs of each community's unique social, political, cultural and ethnic characteristics.

The success of CHCs is the result of being mission-driven providers. They prioritize quality of care over costs and work in the relentless pursuit of improving health outcomes in medically underserved communities. Their primary mission and purpose is to meet the critical needs of their patients by ensuring access to vital community-based primary health care services and all-important enabling services.

Health Information Technology

“To stand at the intersection of health care and information technology, however, is to recognize the challenge of a lifetime and potentially the opportunity of the new millennium.”⁸

Health information technology (HIT) has been widely touted as having the potential to improve the efficiency, cost-effectiveness, quality, and safety of patient care in the United States. These benefits are greatly needed in a health care system that has been weakened by inefficient and poorly-coordinated systems for care delivery and is consequently experiencing out-of-control costs and inconsistent, poor-quality care. Among the various types of health information technologies, electronic health records have garnered the most attention from health care experts, policy makers, providers, clinicians, and the popular press. The actual benefits of EHRs in ambulatory health care settings, however, are not well understood.

The reality is that although many benefits could potentially be achieved through EHRs, approximately 50% of all health information technology projects either fail or produce suboptimal results. Simply installing an EHR system, or “flipping the switch,” will not bring about improvements in operational and administrative efficiencies. Nor will it result in higher quality, safer patient care. The costs of implementing and maintaining these complex systems too often prove overwhelming for health care organizations, and particularly for CHCs given their fiscal realities. As a result, the adoption and sustained use of EHR systems in the health care safety net has occurred at a relatively slow pace, especially when compared to other segments of the larger U.S. health care system (such as for-profit hospitals and academic health centers). To a certain extent, this is because CHCs encounter a number of barriers and challenges that are structurally unique to the health care safety net when they attempt to adopt an EHR system.

⁷ Lefkowitz, B. (2007). *Community Health Centers: A Movement and the People Who Made It Happen*. New Brunswick, NJ: Rutgers University Press.

⁸ Patterson, N. (2004). The mission of IT in health care: Creating a system that cares. In Ball, M., Weaver, C., & Kiel, J. (Eds.) *Healthcare Information Management Systems: Cases, Strategies, and Solutions* (3rd ed.) (pp.3-21). New York, NY: Springer-Verlag, p. 4.

The Electronic Health Record

“An electronic health record system is more than a computerized version of the traditional paper-based medical record.”

-- Health Information Technology Expert

An electronic health record system is a comprehensive clinical information system that allows providers to electronically create, store, organize, edit, and retrieve patient medical records. Increasingly, EHRs are also being used to help health care professionals monitor the status of patients' health, provide computerized order entry and care decision support, improve adherence to clinical or evidence-based guidelines, expedite patient referrals, and exchange patient information among health care providers in a variety of settings.

In 2003, the U.S. Department of Health and Human Services asked the Institute of Medicine (IOM)⁹ to define what constitutes an electronic health record system. In 2004, IOM's Committee on Data Standards and Patient Safety outlined eight core functionalities that every EHR system needs to provide at a minimum.

❖ The eight core functionalities are:¹⁰

<ul style="list-style-type: none">• Health information and data• Results management• Order entry/management• Reporting and population health management	<ul style="list-style-type: none">• Electronic communication and connectivity• Patient support• Administrative processes• Decision support
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- ❖ Additional important components often found in advanced EHR systems are the ability to:
- Enable immediate access to individual and population-level information among authorized health care providers (e.g., peer-to-peer data exchange across health care settings).
 - Provide knowledge and decision support at the point of patient care to enhance its quality, safety, and efficiency.
 - Support efficient processes for health care delivery (e.g., reduce redundant test ordering and other duplicate medical procedures).

In view of the numerous perceived benefits from using EHRs and the general belief that they are a recognized tool for improving the quality of care, their adoption and use is likely to continue.

⁹ Institute of Medicine (2004). *Key Capabilities of an Electronic Health Record System*. Washington DC: National Academy Press.

¹⁰ See Note #9, p. 12.

Health Centers and Health Information Technology

“It has really changed us in terms of our stature as a health center, with respect to other medical providers in the community. We do as well, if not better, than anyone else in our community. Folks who come here for care don’t have to believe or accept that they are going to get second-class substandard health care.”

-- Executive Director of a CHC after adopting an EHR

All health care providers, including community health centers, operate in an increasingly turbulent and unstable environment. Community health centers, largely dependent on federal and state funding for their general revenue and operating costs, frequently encounter considerable resource constraints, especially when compared with larger for-profit health care providers. In addition, health centers are subject to operational, community governance, and mandated reporting requirements by the federal government.

Community health centers continue to recognize the need for expanding their service provision due to the growing numbers of the uninsured. However, their ability to adequately address the rising demand for service provision is limited due to a number of issues, as already described. Thus providing quality health care services cost-effectively and efficiently, while simultaneously accommodating federal requirements to electronically report increasingly large volumes of administrative and clinical data, creates a unique set of challenges. As a result, CHCs have begun to recognize the importance and potential value of using health information technology to facilitate the delivery of cost-effective, patient-centered health care services.

A limited number of CHCs in Oregon and elsewhere have started to adopt these advanced, complex, and challenging computer-based clinical information systems. Although EHR usage has not yet reached a “tipping point” or “critical mass” in the health care safety net, more CHCs are beginning to move through the stages of EHR adoption. Therefore, it is important to understand the financial, organizational, human, and technical issues, as well as the challenges, associated with such systems.

❖ The five main stages of EHR adoption and implementation are:

<ul style="list-style-type: none">• Pre-contemplation or knowledge-gathering (e.g., an initial assessment)• Contemplation or active decision-making (e.g., developing sufficient information to make an informed decision)	<ul style="list-style-type: none">• Pre-implementation (e.g., preparing organization for EHR adoption)• Implementation or “Go-live”• Maintenance and optimization (e.g., system upgrades and making use of entire system)
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EHRs and CHCs: Challenges and Barriers

“Adoption of an EHR is a major undertaking in terms of cost, and the return on investment makes it difficult for a small practice to justify.”

-- Executive Director of a CHC using an EHR

A number of major challenges exist in the adoption of an EHR, including initial hardware and software costs; the need for long-term financing for system upgrades and maintenance; issues involved with the change and redesign of workflow; staff training; provision of IT support; limited interoperability; and lack of standardization among competing EHR systems.

Even though the needs of CHCs are similar to mainstream health care providers, they face a unique set of challenges regarding the adoption and sustained use of an EHR. The most important one is the initial cost of acquiring the system. This includes *hard* costs (fixed capital), such as hardware, software, and infrastructure upgrades. It also includes *soft* costs, such as a decline in clinic productivity and revenue loss during implementation, the retraining of existing staff, and the possible need to hire new IT staff. These costs are more difficult to estimate than hard costs.

A CHC contemplating the adoption of an EHR system cannot project in advance whether or not it will experience a positive return on investment.¹¹ Although implementation of an EHR holds the promise of improving the efficiency of care delivery, purchasers and payers currently are most likely to benefit financially from a health center’s use of an EHR system rather than the actual health center.

Another consideration is that CHCs may not see as significant an improvement in their reimbursement rates as a for profit clinic might, due to the unique financial structure and funding streams on which CHCs rely. For example Medicaid usually provides a flat reimbursement rate that is based on a per patient visit basis; currently, it does not provide any additional reimbursement for CHCs for time involved in using an EHR. However, to the extent that a CHC is able to bill an insurance company or payor other than Medicaid, it may benefit from improved billing with an EHR. In addition, various grant funding sources are often available to support a CHC’s initial implementation of EHR (i.e. initial purchase costs).

❖ CHCs face non-technical challenges involving organizational issues, including:

<ul style="list-style-type: none">• Inadequate leadership and capacity for project management• Insufficient knowledge around vendor and product selection• Limited skills in contract negotiation and management	<ul style="list-style-type: none">• Lack of expertise in assessment of long-term vendor costs• Limited internal IT support and staff expertise regarding proper EHR use• Inability to develop a comprehensive strategic plan for HIT use
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¹¹ Miller, R., & West, C. (2007). The value of electronic health records in a community health center: Policy implications. *Health Affairs*, 26 (1), 206-214.

Another challenge consists of staff knowledge and attitudinal barriers. For example, a common problem is “infophobia,” or resistance to a computerized system on the part of staff and clinicians.¹² Further compounding an already overwhelming set of technical and human challenges is the lack of adequate computer skills among clinic staff.

Additional concerns pertain to a lack of consistent standards required to securely store, retrieve and exchange medical information electronically with other providers. The standards regarding electronic health information exchange are still unclear, and a number of unresolved privacy concerns related to HIPAA compliance exist.

Finally, few EHR vendors provide customized software to meet a CHCs’ unique clinical needs. For example, CHCs are required to electronically submit data using the Bureau of Primary Health Care’s Uniform Data System, or UDS. However, an EHR’s capacity to be used to compile the necessary data and submit a UDS report is often lacking or incomplete.

All of these challenges create valid concerns about investing in a technology that is still evolving and will possibly either become obsolete without costly upgrades, or unsupported (because of a bankrupt IT vendor).

In summary, adoption of an EHR system presents a number of known challenges and obstacles. As CHCs move towards the adoption and implementation of an EHR, they are likely to encounter numerous unforeseen challenges as well.

EHRs and CHCs: Potential Benefits

“The EHR is a great tool for increasing your efficiencies, improving health outcomes and increasing your revenue.”

-- Executive Director of a CHC using an EHR

Despite numerous challenges and barriers, the rates of EHR adoption continue to climb steadily in community-based health centers. Three main factors are driving this gradual increase: quality, efficiency, and costs. If correctly implemented and properly supported, an EHR system will likely provide CHCs with a number of benefits, including improvement in overall patient care delivery and in processes related to support, finances, and administration.¹³

An EHR system could potentially benefit CHCs in terms of both patient care and organizational efficiencies.¹⁴ The major patient care advantages are:

¹² The term ‘Infophobia’ refers to the following: “Fear of appearing incompetent using information systems technology and fear of the potential harmful effects information might have on practice, position, prestige, or job security.” Rose, J. (2004). IT: Transition fundamentals in care transformation. In Ball, M., Weaver, C., & Kiel, J. (Eds.), *Healthcare Information Management Systems: Cases, Strategies, and Solutions* (3rd ed.) (pp. 145-60). New York, NY: Springer-Verlag, p. 150.

¹³ Institute of Medicine, (2004). *Key Capabilities of an Electronic Health Record System*. Washington DC: National Academy Press.

¹⁴ Dick, R., Steen, E., & Detmer, D. (Eds.) (1997). *The Computer-based Patient Record: An Essential Technology for Health Care* (Rev. ed.). Institute of Medicine. Washington DC: National Academy Press.

- Enhancing coordination and integration of services within and across multiple health center sites.
- Improving delivery of population health through improved chronic disease management and increased provision and frequency of preventive health screening services and procedures.
- Enhancing patient, staff and clinician satisfaction.

❖ The major organizational advantages are:¹⁵

<ul style="list-style-type: none"> • Increasing organizational efficiencies by reducing duplications and/or redundancies within the health center. • Improving frequency and use of alerts and clinical reminders among both staff and clinicians. • Serving as a comprehensive data repository for various administrative, reporting and funding purposes. • Improving accessibility, reliability, legibility and quality of patients' medical records, potentially resulting in a reduction of medical errors. 	<ul style="list-style-type: none"> • Reducing medical record and transcription costs. • Improving processes for internal communications, patient care planning, follow-up, event tracking, patient referrals, ordering, and accessibility of lab results. • Documenting services received by the patient for legal and reimbursement purposes. • Better positioning to participate in EHR exchange when such systems become more widely used among providers.
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The emerging trend of CHCs to adopt EHRs can be expected to continue to gain momentum in the near future. Increasingly, community health centers view an EHR as a tool with which to enhance coordination and integration of services, increase organizational efficiencies, improve quality of health care services, and improve population health management. These benefits are directly aligned with CHCs' mission and purpose; thus, they help support the rationale to move forward with EHR adoption.

Linkages with Other Resources in the Community

“Take a look at what is available in your community health care system, and what does it mean if the hospital and other clinics are on a different [EHR] system.”

-- Executive Director of a CHC using an EHR

Engaging with key stakeholders in your community is important when considering adoption of an EHR system. A significant factor in the decision-making process is becoming informed of local IT initiatives within the safety net and the larger community health care system. This often entails engaging in ongoing discussions with local providers and other CHCs. For example, learning “best practices” for EHR adoption and identifying solutions for sharing patient

¹⁵ Gelmon, S., Maty, S., Gates, V., & Droppers, O. (2007, July). *Semi-Annual Report, Electronic Health Records in Safety Net Clinics Implementation Evaluation*. Portland State University, Portland, OR.

information electronically are necessary steps in building linkages with others in your community. As one clinical director of a CHC described it: “Our greatest source of information was from the private medical side and other community health centers.”

- ❖ Consider adopting a “collaborative approach” with other CHCs and local area providers.

You should find out what is happening in your community of providers around adoption and use of various EHR systems. Prior to making the decision to adopt an EHR, your health center should thoroughly assess and evaluate existing local area resources, knowledge, and expertise related to the adoption and use of EHR systems. Identify existing gaps in the infrastructure required to freely exchange patient information electronically within your region. The value and importance of having strong community connections with other community health care providers, both locally and regionally, will be valuable as your health center moves forward in the decision-making and implementation process. CHCs should try to effectively pool their limited resources and leverage existing external resources by working with community partners, and thoroughly consider EHR adoption, if possible, from a community integration perspective.

- ❖ Doing your homework upfront can better position your health center to more effectively and efficiently share and exchange patient information with area providers.

Any health center considering adoption should also explore health information exchange initiatives -- either emerging or already established within the service area. Most of the clinical data required to deliver quality health care services by a CHC often resides somewhere else, such as in hospitals, laboratories, pharmacies, or health plans. Thus, collaborating with area health care organizations is important for identifying ways to improve the exchange of patient data (i.e. interoperability). Do what you can to make sure that critical patient information is made available at the point of care, when needed, by all providers. Even if, after adoption, your health center is still unable to freely exchange patient information back and forth among area providers and emergency departments, then consider alternative approaches of how best to facilitate exchange of patient information. Two commonly employed approaches are either faxing paper copies of a patient’s electronic medical record or providing read-only access to such records through Internet use.

“Doing this in collaboration with other health centers has been extraordinary useful.”

-- Clinical Director of a CHC reflecting upon EHR adoption

CHAPTER TWO

DECISION-MAKING AROUND EHR ADOPTION

This chapter outlines the important issues and key decision points one needs to fully understand and address when considering the adoption of an EHR system.

Getting Started

- ❖ A good starting point is to ask: Will an EHR system help to support and facilitate our overall mission and strategic goals as a community health center?

Action Steps

The first step in developing a thoughtful and comprehensive answer to this question is to conduct a thorough study of the key issues. Action steps should include:

<ul style="list-style-type: none">• Conducting a thorough needs assessment.• Analyzing the financial implications and return on investment for EHR adoption.• Evaluating your existing IT use and capacity.	<ul style="list-style-type: none">• Determining your overall readiness for EHR implementation and the resulting change management.• Assessing your ability to support a complex, expensive and challenging technology for the entire health center, both short- and long-term.
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Asking the Right Questions

As you begin to explore the role and potential value of an EHR system, it is important to fully address the following questions. This will ensure that a rich and informative preliminary discussion occurs as leaders of your organization begin to assess its IT needs.¹⁶

<ul style="list-style-type: none">• Does your health center need an EHR system? Why or why not?• Are adequate financial and organizational resources available to fully support and maintain an EHR over the long term?• Do the potential benefits of adopting an EHR system justify the costs of purchasing and maintaining it?	<ul style="list-style-type: none">• Is purchasing and supporting an EHR system the best use of your limited financial resources?• What are the opportunities for IT collaboration by networking with community partners and locally affiliated health care providers (such as specialty providers or area hospitals)?
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¹⁶ Gelmon, S., Maty, S., Gates, V., & Droppers, O. (2007, July). *Semi-Annual Report, Electronic Health Record in Safety Net Clinics Implementation Evaluation*. Portland State University, Portland, OR.

The Role and Use of Consultants

Hiring consultants is an important issue that a health center should thoroughly consider. The level of technical expertise and guidance provided by IT consultants, especially those who have worked within the health care safety net, offers a unique perspective to assist your health center during the decision-making stage, with selecting a vendor and EHR system and crafting an overall adoption strategy for your health center. Possible benefits include a more in-depth understanding around the business case; reasonably accurate estimates related to lost productivity and revenue declines; hardware, software, and long-term maintenance cost estimates; and formulating strategic planning and implementation strategies – all tailored to your particular health center and its context and environment.

Consultants can also provide you with access to advanced resources, help to create economies of scale, and enable you to participate in collaborative endeavors with other CHCs. The overriding goal is not having to “reinvent the wheel” by hiring external expertise during the critical stages of the adoption process. Both adopters and non-adopters have benefited from a range of services provided by outside expert consultants. However, due to financial limitations, your health center will likely encounter this reality -- employing consultants is a difficult and expensive undertaking. An alternative and potentially less costly approach is having community experts volunteer to help your health center work through the process.

Additional Resources

To obtain a helpful tool with which to consider the role and use of consultants, download Capital Incubator’s (2005) *Hiring a Consultant for a Community Health Center* from the Community Clinics Initiatives: <http://www.communityclinics.org/content/general/detail/819>.

EHR Systems: Essential or Extravagant

“Technology for the sake of technology should not be the end goal.”

-- CHC Executive Director

To determine whether an EHR is the best investment of your limited resources, it is important to identify the trade-offs involved by answering some basic questions:

- Will investing significant resources, both financial and organizational, improve the overall quality of your health care delivery?
- Will an EHR system improve your ability to meet the needs of the community you serve?
- How will this investment support your overall mission?
- Will adoption of an EHR system help you to achieve your primary goals and objectives more efficiently and cost-effectively?¹⁷

¹⁷ Calman, N., Kitson, K., & Hauser, D. (2007). Using information technology to improve health quality and safety in community health centers. *Progress in Community Health Partnerships: Research, Education, and Action*, 1(1), 83-88. Available at: http://muse.jhu.edu/demo/progress_in_community_health_partnerships_research_education_and_action/v001/1.1calman.pdf

Conducting a Feasibility Study

To answer these questions, you will need to conduct a feasibility study to:

- Compare the capital costs necessary to adopt and maintain an EHR system with alternative and less expensive IT applications.
- Estimate and weigh both the initial and long-term costs involved with EHR adoption.
- Consider competing organizational priorities, such as establishment of a patient-centered medical/primary care home, and team-based care models.

The results of this study will give you a much stronger basis on which to decide whether to proceed with EHR, delay adoption for a certain period of time, or reject adoption altogether.

“We agreed that EHR is going to be a longer-term issue. We all want to get there in some form or another, but we made the very conscious choice that we aren’t even going to try that now, but instead begin developing capabilities that will prepare us for an EHR in the future.”

-- CHC Executive Director

Determining Your Health Center’s IT Needs and Readiness

It is critically important that your health center clarify its basic IT needs and define its organizational goals regarding current and future use of health information technology. Start by clearly defining what you want the EHR system to accomplish.

The preliminary discussion should center on:

- Why or why not adopt an EHR system?
- What critical functions can an EHR provide us with that we cannot do now?
- What are the alternatives?

After this discussion has taken place among your key decision-makers, the next step is to conduct an EHR readiness assessment of your entire organization.

Conducting a Readiness Assessment

The readiness assessment will involve your entire staff, including the clinicians. Its purpose is to solicit their knowledge, skills and attitudes with respect to the use of information technology in day-to-day CHC operations, and from this determine capacity for the potential use of an EHR system. The results represent a vital component in the decision-making process as they will provide a strong indication of whether or not your organization has the capacity to succeed in a project of this magnitude.

There are a number of elements that should be addressed and evaluated when conducting a comprehensive readiness assessment. One of the most important factors to consider is how your health center is currently making use of information technology. For example, an increasing number of CHCs are using computerized disease registries and practice management systems for scheduling, registration and billing. These low-cost IT applications can often serve as initial preliminary steps towards building organizational capacity, knowledge, and understanding of how to integrate more advanced and complex computer-based applications into daily operations.

Case Vignette

The executive director of a community health center which had successfully conducted an EHR feasibility study explained afterwards that they had focused on several major issues. They began by asking whether an EHR could improve their ability to integrate their primary care and mental health services. Then they evaluated whether or not an EHR could serve as a tool to help them achieve system integration within and across the multiple clinic sites they operated. They also analyzed the organizational impact that would result from adopting an EHR system and how best to manage it. Issues of particular concern that emerged from the feasibility study were: lost productivity; impact on staff morale, training, and turnover; and potential variation in use of the EHR by employees.

Additional Resources

For more information on how to evaluate whether or not your health center is ready to adopt an EHR or other HIT system, see the *Health Information Technology Evaluation Toolkit* published by the Agency for Health care Research and Quality (AHRQ). It is available online at:

http://healthit.ahrq.gov/portal/server.pt?open=514&objID=5554&mode=2&holderDisplayURL=http://prodportallb.ahrq.gov:7087/publishedcontent/publish/communities/k_o/knowledge_library/features_archive/features/the_ahrq_national_resource_center_evaluation_toolkit.html

Examples of EHR readiness assessment guides may be found at:

- ❖ *Community Clinics Initiative EHR Readiness Assessment* or the *EHR Starter Assessment*: <http://www.communityclinics.org/content/general/detail/783>
- ❖ Doctor's Office Quality Information Technology (DOQ-IT) Website at http://elearning.qualitynet.org/kc/login/login.asp?kc_ident=kc0001&strUrl=http://elearning.qualitynet.org/Default.asp (NOTE: Accessing materials, tools and other information is free but requires on-line registration.)

The Functionalities of an EHR System: Where to Begin

“Ask clinicians what they want; how would it impact them; what would an EHR do; how would it make your life different; and what would look different if you had it?”

-- Clinical Director of an Early Adopter

An EHR system should provide users with a basic set of functionalities. Commercially available EHR systems increasingly combine multiple IT applications into one integrated whole. Key components can include various administrative functions, integrated laboratory and radiology systems, an electronic pharmacy system, computerized physician order entry (CPOE), and clinical decision support. The complexity and scope of an EHR system will likely depend on the scale, size, and complexity of your health center.

Table 2.1 presents a minimum set of core functionalities contained in a robust EHR system. The list is designed to help you evaluate individual products in order to determine which ones best meet your mission critical needs (as determined by you, not the vendor). You might find it helpful to rank the individual functionalities in order of importance to you: need to have, would like to have, and not critically important but valued.¹⁸

Table 2.1 Core Functionalities of an EHR System

<ul style="list-style-type: none"> • View patients’ problem list, medications list, test results, and other vital information • Result reports (lab, radiology, other) • Order entry (labs, images, other non-medications) • Software interfaces with internal and external labs • Electronic prescription functionality • Referral ordering and tracking • Patient registration information (e.g., master patient index) • Telephone message documentation and tasking 	<ul style="list-style-type: none"> • Secure internal and external email • Scanning • Automated chart documentation (problem lists, medication lists, vital signs, health maintenance) • Patient follow-up/health maintenance alerts • Decision support tools • Health center population analysis tools • Query of system’s database to produce both individual and group reports on clinical issues • Security (passwords and audit trails)
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Whichever EHR system you choose, be sure that it is “Health Level 7 compliant.” Health Level 7 (HL7) is one of the many nonprofit organizations operating in the United States that seek to promote the development, standardization and harmonization of health care information standards. EHR systems that are HL7 compliant are more likely to be able to communicate with one another through the exchange of electronic health information, thereby avoiding potential interoperability issues (see www.hl7.org for more information).

You should also be sure that the EHR system has been certified by the Certification Commission for Health care Information Technology (CCHIT). This organization certifies EHRs based upon well-defined, widely-needed components. The certification is increasingly being recognized and relied upon within the health care field. See www.cchit.org for more information.

Best-of-Breed vs. Integrated IT System: Why it Matters

In making your decision about the best approach, you will also need to decide whether you want to purchase a single, all-encompassing EHR system or take a *best-of-breed* approach. The best choice depends upon your clinic’s existing IT systems and your available financial resources.

¹⁸ Adler, K. (2005). How to select an electronic health record system. *Family Practice Management*, 12(20), p.57. Retrieved at: <http://www.aafp.org/fpm/20050200/55howt.html>

Health care providers have often purchased separate IT applications from different vendors over time (e.g., laboratory, radiology, computerized physician order entry, and electronic prescribing systems); as a result, many choose to purchase an EHR system that can simply be integrated with their existing systems. This approach, however, requires that the CHC purchase an EHR system that can interface with multiple already-existing IT systems. This often turns out to be problematic since developing the required interfaces can prove more costly and far more complex than initially anticipated.

When considering an integrated system, be sure to verify if the EHR provides a completely new practice management system (PMS) or if it can easily interface with an existing PMS. Other factors to consider include whether or not the software allows for billing functions unique to a CHC, such as sliding scale fees and payment plans. Also verify if the system supports federal reporting requirements such as the Uniform Data Set (UDS) and if it offers population and chronic disease management capabilities.

Additional Resources

To obtain an extensive, well-developed EHR selection toolkit, download the *EHR Selection Toolkits for Community Health Centers* from the California Health Care Foundation:
<http://www.chcf.org/topics/view.cfm?itemID=133495>

To obtain a helpful tool with which to evaluate EHR systems, download Forrester Research's *EMR Evaluation Tool and User Guide* from the California Health Care Foundation:
<http://www.chcf.org/topics/view.cfm?itemID=21520>

Two Application Models: Stand Alone or Network

“The consultants helped us really land on the fact that unless we were willing to spend quite a bit of money and be very successful at recruiting additional IT staff, we probably didn't have the capacity in-house to support the system ourselves.”

-- Executive Director of CHC that did not adopt an EHR

During the decision-making process, it is important for health centers to understand the benefits and drawbacks of two different application models. The first consists of the typical stand-alone model in which the CHC purchases an EHR and is then largely responsible for supporting it through its IT staff. The second model is that of a network, such as an Application Service Provider (ASP) or a Regional Health Information Network (RHIO). The network involves a contract with a third-party vendor that supplies the software and licensing for the system. This entity will often provide IT support and maintenance of the hardware and technical infrastructure. The health center gains access to the EHR via the network over a high-speed Internet connection.

The Stand Alone Model

CHCs often purchase an “off the shelf” (i.e., commercially available) system from a vendor that has designed and built the core applications. The CHC is then responsible for maintaining the equipment and systems.

If you are considering this option, be sure that you carefully analyze whether you have the internal IT capacity and expertise to both maintain and optimize the EHR to meet your unique needs. Installing an EHR is only one part of the complex process involved. Ongoing maintenance, routine upgrades of the software, repairing and replacing system hardware, and modifications to the system can prove challenging, even if you do have your own IT support staff. If you do have adequate IT capacity, a stand-alone system can potentially be the most cost-effective choice.

The Network Model

For health centers with limited IT capacity, the network model offers a positive solution. This model involves working with a third-party company that provides the IT support necessary to operate and maintain your system.

- ❖ Information networks potentially offer numerous benefits, including:
 - The ability to identify and address your unique needs.
 - Knowledge gained by working within a network of multiple community health centers. This allows CHCs to recognize and resolve system-wide issues.
 - A feasible business model based upon a user fee structure. For example, each time a health center accesses a patient's electronic health record, a fee is charged to the health center.
 - An online or call-in helpdesk that supports end-users.
 - IT training for clinic staff.
 - Practice management software, specific reporting functionality unique to CHCs, and customization capabilities.

By joining an IT network, a health center can experience the benefits of economies of scale (such as group purchasing and collective vendor negotiations) and possibly even reduced operational costs. Networks also serve as a forum through which health centers can communicate with each other, share and exchange helpful information and promising practices, and collaborate. Other practical benefits include the pooling of resources among multiple CHCs, the offsite location and storage of data servers, and data management functions such as the centralized administration of claims processing.¹⁹

Possible Shortcomings

A potential shortcoming of IT networks is that they can be financially unstable in the long-term.²⁰ If a network fails, the CHC will have to manage its own IT responsibilities in addition to maintaining the EHR on a day-to-day basis. Although IT networks can potentially reduce the overall adoption and ongoing operating costs, they are still expensive, with both up-front costs and ongoing user-fees. Such costs can potentially be more expensive in the long run compared with adopting a stand-alone system.

¹⁹ Gaylin, D., Goldman, S., Ketchel, A., & Moiduddin, A. (2005). Final Report. *Community health center information systems assessment: Issues and opportunities*. NORC at the University of Chicago. Retrieved at <http://aspe.hhs.gov/sp/chc/chc.pdf>.

²⁰ Miller, R., & Miller, B. (2007). The Santa Barbara County Care Data Exchange: What happened? *Health Affairs* 26(5), w568-580.

The Financial Aspects and Implications of EHR Adoption

The adoption of an EHR is a challenging and complex undertaking for any CHC. Assessing and fully understanding your financial bottom-line, including realistic projections of both initial and ongoing capital investments, is absolutely necessary before moving forward with a final decision.

It is important to realize that any financial benefits (i.e., savings) resulting from the adoption and use of an EHR system are questionable. No overwhelming evidence exists that adoption will provide a positive return on investment for safety net providers.²¹ The reality is that EHRs are an expensive new technology for any health center.²² This is largely due to the unique financial structure of the health care safety net, including limited revenue sources, challenging patient populations, and changing federal/state reimbursement rates.

A set of key issues to consider in assessing the financial aspects of EHR adoption includes:

<ul style="list-style-type: none">• The business model is challenging.• CHCs are unlikely to experience a relative positive return on investment, i.e., cost savings.• A clear positive return on investment may be difficult to demonstrate.	<ul style="list-style-type: none">• The financial costs of operating and maintaining an EHR system are ongoing.• Upfront costs can be high, and the resources required to sustain the EHR long-term are significant.
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Direct Financial Costs

One of the most important factors in making the decision regarding an EHR is whether or not your health center is financially stable and has adequate funding prior to the adoption of an EHR system. This includes not only adequate funding for initial short-term costs (such as system acquisition), but also for long-term costs such as ongoing staff training, maintenance and optimization. The fundamental challenge regarding adoption costs is the initial capital investment necessary to purchase expensive software, hardware, support services, and lost revenue due to productivity declines during the early stage(s) of implementation. Such costs pose a significant challenge to any CHC.

“Since technology has proven to be valuable primarily for improving quality rather than saving money, the prospect of clinics justifying investments in their IT to prospective funders based upon the potential for significant cost savings is unlikely.”²³

²¹ Miller, R., & West, C. (2007). The value of electronic health records in community health centers: Policy implications. *Health Affairs*, 26(1), 206-14.

²² See citation #22 (Miller, R., & West, C., 2007).

²³ *Celebrating technology advances in California’s community clinics and health centers*. Community Clinics Initiative: A joint project of the Tides and The California Endowment, 1996-2006, p. 23. Available at: www.communityclinics.org

❖ Examples of costs that will be incurred include:²⁴

<ul style="list-style-type: none"> • Purchase and installation of IT network and hardware, including servers, PCs/thin clients, printers, scanners and routers • Purchase of the initial software and supporting applications • Use of external consultants • Training clinic staff 	<ul style="list-style-type: none"> • Purchase/construction of interfaces with pharmacy, laboratory and other existing IT applications • Hiring new IT staff and/or retraining existing IT staff • Lost productivity during implementation
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Cost Estimates for EHR: Adoption and Maintenance

Of all the issues surrounding adoption and use of an EHR system, clearly the most difficult challenge for any CHC is financing. The core of this issue relates to the costs associated with purchasing and maintaining the system, including initial, upfront costs and long-term operating costs. Estimating such costs is often difficult. One health economist researcher, who studied six CHCs that were early adopters, estimated the average purchase and implementation costs of an EHR at \$54,000 per provider, or approximately \$16.20 per-patient visit.²⁵ The estimated ongoing costs per provider averaged \$20,610 or \$6.21 per-patient visit. This study concluded that five of the six CHCs studied encountered ongoing financial losses, and that during the first few years after implementation, CHCs could expect an average financial loss per provider to average somewhere between \$5,000 and \$15,000.²⁶ Such estimates have been reported elsewhere, and thus are probably reasonable estimates.²⁷

Sources of Funding for Start-up Costs

Capital costs remain the most significant barrier to adoption.²⁸ Consequently, CHCs need to identify potential sources of funding to pay for the initial implementation costs in addition to the long-term operating and maintenance costs. Your health center will likely need to develop a multi-faceted funding strategy that addresses initial up-front costs and ongoing operational costs.

❖ Potential sources to fund EHR costs include:

- Develop improved claims processing and billing
- Investigate and seek low interest loans
- Participate in Federal and State Medicaid pay-for-performance initiatives
- Apply for available grant funding resources to finance initial capital investment required to purchase the EHR. Such sources may include philanthropic foundations, federal and state agencies including Bureau of Primary Care, or the Agency for Healthcare Research and Quality <http://www.ahrq.gov/fund>

²⁴ Kleiber, D. (2006). *Virginia Garcia Memorial Health Center*. Capital Link. Unpublished.

²⁵ Miller, R., & West, C. (2007). The value of electronic health records in community health centers: Implications for policy. *Health Affairs*, 26(1), p.208.

²⁶ See citation #25, Miller et al., 2007 p.212.

²⁷ Miller, R. et al. (2005). The value of electronic health records in solo or small group practices. *Health Affairs*, 24(5), 1127-1137.

²⁸ Shields, A., et al. (2007). Adoption of health information technology in community health centers: Results of a national survey. *Health Affairs*, 26(5), 1371-1383.

Case Vignette

At one health center, staff were deeply concerned about the decrease in service provision during the implementation process and how that would disrupt patient care. Moreover, management found that the loss of revenue from decreased patient visits would be significant. There were also concerns about the significant capital costs required to purchase, install, and maintain the EHR system, especially if those costs made it impossible to purchase other needed equipment. Overall, both staff and management were informed and demonstrated a level of understanding regarding the various financial costs that would be incurred if their health center moved forward with adoption of an EHR.

The Benefits

It is the responsibility of your steering/selection committee to properly assess if the potential benefits outweigh the projected costs of adopting an EHR. Do not expect to reduce your overall operating costs. To the extent that the health center is seeing insured patients or Medicare patients, there may be an opportunity for improved billing to increase revenue. Nonetheless, any benefits likely will occur in improvements to patient care rather than in net financial savings.

❖ For example, you may achieve:²⁹

<ul style="list-style-type: none">• Improved operational efficiencies (e.g., reduction of overuse/misuse of services)• Reduced costs in transcription, office supplies and services• Ability to provide real time access to patient information anytime and anywhere within the health center and possibly across other health sites• Space efficiencies (e.g., alternative use of existing chartroom)• Automation of standard reporting requirements mandated by government agencies and funders• Reduced administrative staff requirements	<ul style="list-style-type: none">• Enhanced capacity for reporting purposes and quality assurance processes• Improved claims processing and billing• Ability to use newly collected data within the EHR to create new/redesign existing patient programs• Ability to recruit physicians and mid-level practitioners• Elimination of lost/misplaced medical records• Improved medication/prescription management• Improved disease management and delivery of population-based health care
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²⁹ Kleiber, D. (2006). *Virginia Garcia Memorial Health Center*. Capital Link. Unpublished.

Legal Complexities of Electronic Health Information Exchange

“There are some patients that I am sure would be afraid of electronic medical records; there is a big fear of technology. For some of our patients, especially those that do not understand computers or speak English -- they might not be comfortable with using computers and this is a genuine concern.”

-- Medical Office Assistant

Adoption of an EHR system raises important legal issues related to the privacy and security of electronic exchange of health information. This is why it is essential that CHCs carefully consider privacy and security standards prior to adoption. Your health center should understand the legal complexities of electronic health information exchange, storage and retrieval and be sure that you have created the necessary formal agreements and policies with their community partners. Health centers also need to assess how use of an EHR will affect or alter the existing flow of information (e.g., data sharing arrangements).

On the one hand, a valuable benefit from using an EHR system is that it can improve your center’s ability to share information with other IT systems, local health care providers, and federal and state agencies. On the other hand, your existing partnerships with key stakeholders will likely require new and innovative formal governance structures for the access, retrieval, storage and sharing of electronic patient data.

Additional Resource

For more information on issues related to the privacy and security of health information exchange, see the *Health Information Security and Privacy Collaboration Toolkit* published by the Agency for Health care Research and Quality (AHRQ). It is available for download at: http://healthit.ahrq.gov/portal/server.pt?open=514&objID=5562&mode=2&holderDisplayURL=http://prodportallb.ahrq.gov:7087/publishedcontent/publish/communities/a_e/ahrq_funded_projects/rti_toolkit/main/rti_toolkit.html

If the Clinic Says “Yes” To Adopt

If the bottom line results of your feasibility study and readiness assessment indicate that your health center is ready, willing and able to move forward with an EHR system -- and that it also makes sense from the point of view of your mission and services -- what happens next? The next step is to establish a steering committee.

Establish a Steering Committee

To ensure a successful EHR selection process, it is recommended that you form a planning/steering committee directed by an effective, capable leader. The members of the steering committee should represent all levels and positions within your health center, including senior leadership, clinic directors, mid-level management, clinicians, allied health staff, clerical and administrative personnel, and front-line support staff.

Effective communication requires input from those who are directly affected by the use of the new technology – in other words, the entire health center. Seeking feedback and input from employees throughout your organization will help to reduce staff resistance and phobias related to the adoption process. Therefore, it is important to open up the lines of communication as quickly as possible. One of the first steps is to establish channels through which to solicit feedback from the entire staff. Modes of communication can include email, comment boxes, focus groups, newsletters, surveys, and informal discussions.

The EHR Vendor and System Selection Process

Selecting a vendor is one of the most time consuming -- and most critical -- steps in the entire process of EHR implementation. The goal should be to identify a vendor who is able and willing to design an EHR that meets your specific needs, both in the short-term and for the future.

Hundreds of vendors are willing to sell you an EHR. It is important to be aware that the marketplace for health information technology is constantly in flux due to product and vendor immaturity, intense competition coupled with unstable business models, and vendor mergers and acquisitions. Be cautious, therefore, when working with potential vendors. They want to sell you a product, and may de-emphasize important aspects or make unrealistic promises about their product. You are making the investment, and you should manage and direct the process.

A positive note is that an increasing number of vendors are recognizing that CHCs represent a largely untapped market niche in health care. This is a promising new trend, and hopefully CHCs will be able to capitalize on this over the coming years.

- ❖ Five critical steps in selecting an EHR system and vendor are:
 1. Developing the scope of system functionalities (see Table 2.1 above)
 2. Developing a Request for Proposals (RFP)
 3. Product demonstrations
 4. Vendor evaluation
 5. Contract negotiation

Writing a Request for Proposals

After you clearly understand the technical features you are looking for, the next step is to write a Request for Proposal (RFP). The RFP details your requirements for prospective vendors, and allows them to respond directly to your identified needs. As well, it creates a standardized, structured document that enables you to compare each vendor's system functionalities, usability, support, and costs and determine the proposals that best meet your needs.

Table 2.2 presents the key elements of an RFP.³⁰

³⁰ Adapted from: Adler, K. (2005). How to select an electronic health record system. *Family Practice Management*, 12(20), p. 57. Available at: <http://www.aafp.org/fpm/20050200/55howt.html>

Table 2.2: Request for Proposal Checklist

<ul style="list-style-type: none"> • Cover letter • Background information about health center (e.g. practice size, # of locations) • Current use of existing health and other information technology systems • Existing computer hardware and network used (if any) • Request for vendor information (company history, number of employees, history of EHR, related products) • System features (functionalities, software versions and past/future planned updates) 	<ul style="list-style-type: none"> • Hardware and network requirements • Interface with existing IT applications • Product performance specifications • Customer maintenance and system support • Vendor training referrals (including contact names and numbers) to health centers similar in size and scope to yours who are already using the system • Pricing and payment schedule • Service agreements • Security and HIPAA • Warranty and termination clause
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Assessing Vendor Qualifications and Track Records

It is important to critically assess the qualifications and track records of your potential vendors, especially those of your two or three finalists. This requires conducting a thorough and rigorous product assessment of their EHR systems, and should be based upon the evaluation criteria formulated by your health center. Make sure that you appraise the vendor’s industry ratings, longevity, financial stability, and overall quality of product. Be sure to factor in how many other community health centers are using their system.

Also contact the vendor references and, if possible, arrange site visits for your key decision-makers to other comparable sites that are working with this vendor. These visits will enable you to observe how a particular system actually works in a setting similar to yours. It will also give you the opportunity to speak with seasoned clinic personnel (such as executive directors, clinic managers, project managers) who have first-hand experience with the both the vendor and the system including implementation, trouble-shooting, on-site training, and other supports.

Product Demonstrations

The next step is to ask your finalists to give you a hands-on product demonstration. It is critical that key staff participate in these demonstrations, get hands-on experience in conducting a mockup patient visit, explore and use particular functionalities, and ask questions. The more questions asked, the better informed you will be about this vendor.

Have providers and staff both develop their own case scenarios and ask the vendor to respond to them -- scenarios that are different from the routine scenario preplanned by the vendor. Above all, remain vigilant. Do not get caught up with the sales pitch, and never accept an “I don’t know” response from a vendor.

Additional Resources

The Web sites below offer examples of RFP templates:

- ❖ American Academy of Family Practice “How to Select an Electronic Health Record System” available at: <http://www.aafp.org/fpm/20050200/55howt.pdf>
- ❖ QualityNet eLearning Center “DOQ-IT University free course on EHR adoption” available at:
http://elearning.qualitynet.org/kc/login/login.asp?kc_ident=kc0001&strUrl=http://elearning.qualitynet.org/Default.asp

Contract Negotiations: What You Need to Know

Once you have selected the final vendor, it is time to enter contract negotiations. Many organizations struggle with such questions as: Where to start? What are the right questions to ask? What should be negotiated and included in the actual contract? Should we have a lawyer or other professional expert review the contract?

These are all legitimate and important questions to consider at this stage. Any contract should be painstakingly reviewed and analyzed by health center management and legal counsel prior to signing.

- ❖ Issues that should be explicitly addressed within the contract include:³¹

<ul style="list-style-type: none">• Will the vendor provide support 24/7?• Does the vendor have specific agreements defining how quickly it will respond to service calls?• Are routine upgrades included in the maintenance fees?	<ul style="list-style-type: none">• How much does technical support cost?• What is the strategy and plan for providing staff training?• How long after initial implementation will the vendor provide ongoing IT training and system support?
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Make sure that a written contract contains explicit detail on customer service agreements, schedules for training, a timetable for EHR roll-out, timeframes for troubleshooting, specs on customization, and upgrades for the system.

Additional Resources

For information regarding contract negotiation, review Don Tamaki’s *Fundamentals of Negotiating the Deal: Do’s and Don’ts*, available through the Community Clinics Initiative:
<http://www.communityclinics.org/content/general/detail/797>

For an example of a sample vendor maintenance agreement, see Don Tamaki’s helpful tool at the Community Clinics Initiative:
<http://www.communityclinics.org/content/general/detail/796>

³¹ Adapted from: Columbus, S. (2006). Small practice, big decision: Selecting an EHR system for small physician practices. *Journal AHIMA*, 77(5), p. 45.

Conclusion

An EHR system is a complex and transformative information technology solution for any health center. If the center is unable to fully integrate the new technology, the system is likely to perform poorly and fail to meet expectations.

❖ To prevent such an outcome, take the following steps :

<ul style="list-style-type: none">• Assess whether or not the system can support your organizational mission and the needs of your patients.• Establish a committee responsible for the EHR decision-making process.• Develop a comprehensive and realistic set of expectations.• Be sure you thoroughly understand your center's information technology needs before you select a system.	<ul style="list-style-type: none">• Formulate a list of requirements and functionalities that the system needs to provide your center.• Be sure that adoption of an EHR system aligns with your center's mission and overall strategy.• Go slowly through the initial stages of decision-making and pre-implementation.
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Properly executed, a successful EHR decision-making process will thoroughly assess your health center's financial status, existing IT usage, level of expertise, and ability to manage change. It will establish clear and well-defined expectations about use of an EHR and ensure that adequate organizational capacity is available to meet your long-term maintenance needs.

Margret Amatayakul says that successful EHR decision-making is a process in which “each brick ... [needs to] be carefully laid.”³² If you are unable to develop and adhere to a rigorous selection process, you could potentially choose an EHR that does not fit the needs of the health center. On the other hand, adherence to a well-designed selection and review process will likely result in the adoption of an EHR system that is able to grow and evolve with your clinic long into the future.

Key lessons to be learned from reviewing this chapter are that a well-informed EHR decision-making process includes the following steps.

- ❖ The initial steps are:
- Develop an organizational vision and strategic planning around EHR adoption.
 - Realistically assess your IT needs.
 - Create numerous opportunities for management and staff to communicate openly with each other.
 - Establish a steering committee and various work groups.
 - Conduct a readiness assessment.
 - Educate yourself about the financial implications and realities of EHR adoption.
 - Identify a minimum set of core EHR functionalities.

³² Amatayakul, M. (2005). EHR? Assess readiness first. *Health Care Financial Management*, 59(5), p.113.

- Carefully weigh the adoption of an EHR system against other less costly, yet still beneficial and value-added care improvement interventions.
 - Build consensus within your organization regarding whether or not to move forward with adoption.
- ❖ If the decision is made to proceed, the following steps are recommended:
- Explore available options among competing EHR systems, including making site visits to other CHCs.
 - Develop clear and precise specifications and implement them in a Request for Proposal (RFP).
 - Submit the RFP to the vendors whose experience best matches your needs.
 - Choose the two or three best vendors for your clinic and ask them to provide product demonstrations.
 - Ensure that decision-makers participate in these demonstrations.
 - Obtain legal counsel in conducting contract negotiations with your chosen vendor.

Case Vignette

During the early stages of the decision-making process, a community health center expressed concern about the relationship between EHR adoption and the quality of patient care. The principle concern lay in the potential negative impact on the relationship between patients and staff. Staff clearly were worried about being distracted and inattentive to patients while using a computer during examinations. They expressed the need for forthright communication with their patients about the pending use of an EHR and any organizational changes that might result.

In spite of their concerns, however, a majority of staff did anticipate that use of an EHR would improve the quality of patient care because it would improve their ability to manage data, create more efficient billing cycles, conduct medical record audits, and prepare patient reports. Staff also shared a common vision that it would create a more seamless system within the organization and help it become more compatible with the health care community as a whole.

Additional Resource

T. Dawson & S. Kushinka. (2005). *Health Care Technology Handbook*. Full Circle Project. Available through the Community Clinics Initiative at:
<http://www.communityclinics.org/content/article/detail/804>

This is an indispensable handbook for any CHC considering whether or not to adopt an EHR system as well as for CHCs that have already decided to do so in the near future. The handbook has numerous tools, documents, checklists, and references to additional sources.

CHAPTER THREE

LEADERSHIP AND CHANGE MANAGEMENT

Experience has shown that the successful implementation of any health information technology system has little to do with technology.³³ Rather, it often begins and ends with organizational leadership and adequate capacity for change management.³⁴ This involves sufficient buy-in and support from providers and staff, clear communication, the presence of effective clinical and IT champions, and adequate training and retraining of the workforce.

In the past, considerable attention has been placed on the implementation, or go-live, stage of EHR adoption. While this is important, the pre-implementation stage is even more so.

❖ Some of the key factors to assess during pre-implementation include:³⁵

<ul style="list-style-type: none">• Development of a strategic EHR adoption plan that includes both immediate and long-term factors.• Delineation of well-defined roles and assignment of appropriate tasks and responsibilities to members of the project management team.• Identification of physician champions and super-users.• Provision of ongoing staff training.	<ul style="list-style-type: none">• Development of adequate internal IT support and expertise.• Excellent communication among the executive leadership, clinic management, project management team, and staff.• Thorough evaluation of changes in job descriptions, tasks, and responsibilities for the entire staff.
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To ensure a successful go-live experience and long-term use of the EHR, these key factors should be addressed and resolved long before implementation.

How Organizational Culture, Vision and Mission Relate to the EHR

*“Technology is just a tool to help an organization realize its vision and mission.”*³⁶

A health center’s culture plays a vital role in the overall success of EHR implementation. Employee expectations about the implementation process and daily use of the new system are

³³ Berg, M. (2001). Implementing information systems in health care organizations: Myths and challenges. *International Journal of Medical Informatics*, 64(2-3), 143-56.

³⁴ Lorenzi, N.M., & Riley, R.T. (2004) *Managing Technological Change: Organizational Aspects of Health Informatics* (2nd ed.). New York, NY: Springer Verlag.

³⁵ Gelmon, S., Maty, S., Gates, V., & Droppers, O. (2007, January). *Semi-Annual Report, Electronic Health Record in Safety Net Clinics Implementation Evaluation*. Portland State University, Portland, OR.

³⁶ Falkenburg, N. (2004, Dec. 4). Report from the field: Insights by community clinics on information technology adoption. *Community Clinics Initiative*, p.3. Available from <http://www.communityclinics.org/content/article/detail/708>

shaped by the culture of the organization, which is largely defined by the attitudes, sets of beliefs, past experiences, and core values of the employees.

Any EHR adoption plan should be seen as an integral part of overall organizational strategy. Therefore, it should be clearly integrated into the health center's long-term mission, goals, programmatic functions and initiatives. Clinic leaders are encouraged to clearly communicate to all employees why the health center has decided to adopt an EHR, how they will be affected by the various changes, and what the benefits will likely be. A health center without a clear vision and set of goals around use of health information technology will likely find itself muddling through a disorganized and chaotic implementation process, potentially leading to haphazard use of the EHR.

Having a well-defined vision is absolutely critical for success. This means that the executive director and other key leaders will need to assess what the shared values, norms, and beliefs are that guide and shape their organization's overall mission. They will also need to assess employee behavior and attitudes toward EHR.

Readiness: What You Should Know

“When the impact of technologic change is being managed, people’s needs come first: Without people, we don’t have an organization.”³⁷

An EHR fundamentally changes the way providers, nurses, administrators, and office staff deliver primary and preventive health care services and support the health center's internal operations. Using an EHR requires that staff learn advanced new tasks and skill sets; above all, it requires that they adopt and adapt to new workflows, processes and systems for completing their daily work. The question that arises is whether or not the health center is both ready and able to manage the complex set of changes that will occur prior to, during, and after implementation.

The Readiness Assessment

Before a complicated IT system can be adopted, an assessment should be made of employee readiness. The purpose is twofold:

- To give the staff an opportunity to provide feedback and input into the strategic plan.
- To better identify and understand the health center's strengths and weaknesses earlier, rather than later, in the adoption process.³⁸

Conducting a readiness assessment requires management to collect information from all employees in the organization regarding their level of knowledge about EHR systems, their level of support or resistance, concerns around implementation and use, and general perceptions about adoption. Other key elements include evaluating a health center's existing level of IT

³⁷ Lorenzi, N., Riley, R. (2000). Managing change: An overview. *Journal of American Medical Informatics Association (JAMIA)*, 7(2), p.123.

³⁸ Lorenzi, N.M., & Riley, R.T. (2004) *Managing Technological Change: Organizational Aspects of Health Informatics* (2nd ed.). New York, NY: Springer Verlag.

infrastructure, available financial resources, internal management capacity, and computer proficiency among the staff. See the recommended resources cited previously in Chapter Two.

Information can be collected in a variety of ways -- from surveys, focus groups, and formal interviews to casual hallway conversations. The results are invaluable in the drafting and development of a strategic adoption plan.

Sub-Cultures

One important factor to consider is that different sub-cultures exist within a health center as a result of differences in training and experience. Examples of such sub-cultures include providers and nurses, IT personnel, and management. When these cultures diverge, it can create conflict that needs to be managed and resolved by senior leadership.³⁹

Change Fatigue

Another important factor in employee readiness is change fatigue. This may result from a failed attempt to implement an IT project in the past. It may also result when an organization is constantly implementing new programs and making changes. Therefore, it is recommended that you evaluate what the health center's history is with past IT projects and identify other large initiatives that called for significant change and new learning.

❖ The key steps in conducting a staff readiness assessment are to:

<ul style="list-style-type: none">• Assess the health center's overall values and goals.• Evaluate how well, if at all, an EHR system will advance the center's goals and values.• Analyze how well staff members work with one another.	<ul style="list-style-type: none">• Acknowledge the successes and failures of past initiatives and IT projects.• Determine how willing the staff are (especially providers) to learning new ways of doing things.
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Case Vignette

Senior leadership from a CHC openly commented on a number of challenges they perceived in adopting an EHR system. They wanted further clarification of the system's purpose and functions and wondered whether it would hinder or enhance their clinic's ability to fulfill its mission. They also wanted to be sure there would be adequate time and resources to train staff and providers how to use the technology. They were concerned about having patients' existing paper records available within the EHR; they also wondered if they would be able to use the EHR with interpreters and what the backup plans were for system downtime. Some expressed concern about the challenge of transitioning to an EHR system "in a cost-effective manner in a primary care center." Others were uneasy about the health center's ability to effectively manage the transition from an organizational perspective.

³⁹ Ciesla, G., Connor, J., Dudley, T., & Keens, M. (2005). Early implementation problems of an integrated information system within the White Mountain University Health System. In Hannah, K., Ball, M., Lorenzi, N., Ash, J., Einbinder, J., Mcphee, W., & Einbinder, L. (Eds.), *Transforming Health Care Through Information* (2nd ed.) (pp. 101-13). New York, NY: Springer-Verlag, p. 109.

Change Management: What Is It?

The adoption of an EHR system involves complex organizational change that not only transforms existing organizational processes and clinic workflows, but that also significantly impacts staff and providers. This suggests that health center leaders will need to manage change carefully to ensure the success of the project.

Change management refers to the series of steps a health center should take to achieve its long-term vision for adoption and use of an EHR. Nancy Lorenzi, a leading expert on change management, describes it as the process by which a health center empowers and orientates its staff and providers “from an old way of doing things to a new way of doing things.”⁴⁰

Change management is not a one size fits all strategy. The series of steps needed to successfully implement and realize the potential benefits of EHR differ considerably from one center to another. Therefore, each center should develop its own strategy to fit its unique history, mission, available resources, and existing infrastructure. Nonetheless, there are certain critical factors that ought to be considered, along with the corresponding changes, prior to implementation.

❖ Some of the most substantial changes that need to be managed are:⁴¹

<ul style="list-style-type: none">• The ability to access and manage patient information• Redesign of organizational workflows• Effects on staff and providers (both initial and long-term)	<ul style="list-style-type: none">• Changes in provider-patient interactions• Need for continuous modifications of the EHR to respond to specific needs and patient populations served by the health center
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Changes in Job Descriptions, Tasks, and Responsibilities

EHR adoption results in a number of changes in job tasks and professional responsibilities for clinic staff. Since the magnitude of change can sometimes be overwhelming, it places tremendous stress on employees. A large number of staff, especially providers, will likely offer the following response: “But that is how we have always done things here.” The reality is that for EHR adoption to succeed, change needs to occur. How things are done after implementation will be completely different from how they were done in the past.

On the other hand, EHR adoption can also represent an opportunity to evaluate existing workflows and processes and identify better ways of doing things. The lesson here is that management and the project team need to identify changes in job descriptions and required tasks (both new and old); at the same time, they also should reassure staff that such changes are more beneficial for the health center (and ultimately for themselves and their patients).

⁴⁰ Lorenzi, N.M., & Riley, R.T. (2004) *Managing Technological Change: Organizational Aspects of Health Informatics* (2nd ed.). New York, NY: Springer Verlag, p. 18.

⁴¹ Gelmon, S., Maty, S., Gates, V., & Droppers, O. (2006, July). *Second Six Month Report: Electronic Health Record in Safety Net Clinics Implementation Evaluation*. Portland State University, Portland, OR.

Managing Resistance

Managing resistance is a critical part of the change management process. Implementation of an EHR system requires that staff learn new skill sets while unlearning old habits and ingrained practices. This can be a difficult and painful process. The challenge of learning something new and complex often creates a resistance to change among employees, especially the providers. Staff often views large-scale change -- in particular EHR adoption -- as threatening because the new system significantly affects their jobs and their ability to perform their daily work obligations and tasks.

One solution to this dilemma is to ensure that those who are affected by the changes be involved in all stages of adoption. If they are not -- or they are excluded -- they will likely push back against changes perceived as unwelcome and/or threatening. Clearly, therefore, clinic leaders and the project management team should seek staff input. One rule-of-thumb for the implementation process is 80/20: 80% cultural change and 20% technology adaptation.⁴²

❖ To manage employee resistance, the following strategies are suggested:⁴³

<ul style="list-style-type: none">• Ensure that staff and providers are well-informed throughout the pre-implementation process.• Answer staff questions and clarify the unknowns in a non-threatening way.• Create frequent opportunities for staff to ask questions.	<ul style="list-style-type: none">• Increase communication between management and staff regarding adoption and implementation.• Support active staff involvement through all stages of the project.• Create and promote a positive environment for change.
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Clearly, numerous steps need to be taken to effectively manage organizational and human change. Correctly assessing a health center's readiness for change and evaluating its ability to manage it are critical elements to successful adoption of an EHR system.

Developing Organizational Objectives and EHR Goals

"I think the technology should support your strategic plan and not the other way around. Otherwise, it becomes the case of technology driving the business model, rather than planning driving what the technology is ..."

-- Executive Director of a CHC

A critical element of any strategic EHR plan is developing specific and clearly-defined organizational objectives, tangible project milestones (immediate and long-term), and a set of benchmarks to measure change and evaluate success with adoption and ongoing use. It is

⁴² Lorenzi, N., & Rosenbloom, S. (2003). *Strategies for Creating Successful Local Health Information Infrastructure Initiatives*. Department of Health and Human Services, U.S. Govt. Retrieved at: <http://aspe.hhs.gov/sp/nhii/LHII-Lorenzi-12.16.03.pdf>

⁴³ Gelmon, S., Maty, S., Gates, V., & Droppers, O. (2007, January). *Semi-Annual Report, Electronic Health Records in Safety Net Clinics Implementation Evaluation*. Portland State University, Portland, OR.

important to recognize that full adoption and use may take one to two years, starting from the initial decision-making period to the actual implementation process.

This requires ongoing commitment by executive leadership, mid-level management, providers, and staff. The adoption strategy, at a minimum, should provide a well-planned set of guidelines, project goals, and evaluation benchmarks to ensure that implementation is managed appropriately and effectively.

Essential: The Right Individuals with the Right Expertise

In the past, health care organizations have often focused on the technical factors while ignoring the even more critical human factors, sometimes to their peril. Technological challenges do arise before, during, and after implementation. However, they are usually much easier to resolve than such human challenges as staff resistance, training, and buy-in.

This is why it is critical to have the right individuals on board with effective project management skills and the knowledge and expertise to create well-defined and widely-understood processes for decision-making.

The Implementation Process

❖ The important facets of the EHR implementation process include:

<ul style="list-style-type: none">• Motivation• Vision• Leadership• Project management capacity	<ul style="list-style-type: none">• Workflow redesign• Continuous staff training• Ongoing IT support• Evaluation of goals and objectives in support of an advanced IT system
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Failure to consider all of these factors can lead the project to completely fail, or at best achieve suboptimal results. To prevent these unwanted outcomes from occurring, it is important to have the right individuals (e.g., a respected executive director and physician champion) and the right expertise with which to manage the entire adoption process.

Case Vignette

A senior level manager at a CHC that was an early adopter of EHR explained that their center had primarily relied on its IT vendor for project design and implementation. Unfortunately, no implementation team or designated project manager provided oversight of the transition process. As a result, four years post-EHR adoption, only about half of the providers in the health center were using the system. Even the active users were still not using it 100% of the time. The senior leader believes that one contributing factor to this partial adoption failure has been extensive staff turnover among upper management positions, including the organization’s key champions and early EHR supporters. Another factor, according to the manager is that because the clinic was an early adopter, it did not have the benefit of learning from other CHCs.

Project Governance: Roles, Tasks, and Responsibilities

”It is really important to do a really careful, thoughtful, stepped approach -- one that gives people adequate time to think about what it is they need upfront and gets as many people engaged in that thinking process as possible.”

-- Executive Director of CHC

Varying Levels of Management: Who is Responsible for What?

Health centers can have different levels of management, including executive, mid-level and various front-line work teams. Each has varying levels of authority, leadership roles, and overlapping functions and responsibilities, which sometimes makes the chain of command unclear.

When it comes to IT project governance, however, it is important to define as clearly as possible who is responsible for the processes, relationships, roles, and committees that need to be developed to manage the adoption process.⁴⁴ Each level will play a different role and be assigned different tasks and responsibilities; therefore, each one should also have the authority and leadership to perform well.

Project Committee Team

The project committee team will likely serve as the core of the health center’s project governance structure. This committee, which is comprised of key personnel from throughout the health center, needs to take responsibility for the larger adoption process. This means it is their responsibility to set priorities, determine project budgets, manage staff training, and address IT problems. The project committee is responsible for getting buy-in, cooperation, and commitment from the entire staff. It also manages ongoing communication and feedback from staff and senior leadership and sets realistic expectations for the implementation and use of the system.

Executive Management

Senior leadership is responsible for communicating the health center’s vision around use of EHR. While they may not be involved in day-to-day planning, senior leadership will make the ultimate decisions that have financial and organizational implications, so it is vital that they be engaged as feasible throughout the decision-making process. This should involve administrative, clinical and Board leadership to ensure buy-in throughout the process and avoid unnecessary surprises or confrontations when the EHR decision deliberations are already well-advanced.

Mid-level Management

Mid-level management, such as operations supervisors and head nurses, promotes adoption to staff and providers and settles anxieties (or outright resistance) among the general staff. Experience suggests that mid-level managers can be influential in obtaining buy-in and support and providing day-to-day guidance, and should play key roles on the project team. They should be represented on the project committee team to ensure continuity of EHR decisions with other operational activities within the health center.

⁴⁴ Wager, K., Lee, F., & Glaser, J. (Eds.) (2005). *Managing Health Care Information Systems: A Practical Approach for Health Care Executives*. San Francisco, CA: Jossey-Bass, p. 362.

Project Team Members

Members of various project teams are responsible for making key decisions, moving the implementation process along, checking to see if tasks are completed and on-time, and providing the health center with knowledgeable guidance and expertise on the adoption progress.

Selecting the Project Management Team

“We did it all. We had a plan and an implementation team. The team was divided into different aspects. There were people whose job it was to watch what was happening operationally in the rollout, to deal with the trainings, and people whose job it was to deal with the software aspects of it. The plan extended for a full year after rollout of the EHR.”

-- Executive Director of a CHC

The main purpose of a project management team is to identify, collect and apply all of the information necessary to achieve success with adoption. This means it is important to ensure that the right individuals are at the table -- a well-balanced team of executive, clinical, operational, and IT leaders. Not only is it essential to have a cross-functional team with adequate representation of the health center workforce, but also it is important that these individuals have the appropriate talents, expertise, and level of commitment.

One possible option is to hire a full-time staff member whose main responsibility is managing the EHR adoption process. This option will likely depend on whether or not the health center already has a staff member with the necessary expertise, training, experience, and skill sets to manage the complexities of the adoption process. If not, then it might be necessary to hire someone from outside the organization with the experience and appropriate credentials.

Members of the project team should reflect the shared values of the health center. In addition, these individuals should exhibit the same level of commitment and set of behaviors that are being asked of the providers and staff. Critical for any good project management team is the ability to identify the roles and responsibilities for each team member. It is important to keep in mind that although effective change management usually begins with senior leadership, it is often conducted best by members of the project team, whose level of expertise, commitment, trust, and respect will be felt by the entire staff.

- ❖ A project management team is responsible for maintaining the larger EHR adoption process. This requires the ability to:

<ul style="list-style-type: none">• Supply energetic and supportive leadership• Identify the major tasks that need to be completed and assign them to the appropriate parties• Communicate the CHC’s commitment to implementation	<ul style="list-style-type: none">• Manage people by checking in with them frequently, helping them solve problems, and making sure they complete their tasks on time• Convey clear expectations to staff regarding use of the system• Participate in frequent meetings
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<ul style="list-style-type: none"> • Be sensitive to timelines and project milestones and respond flexibly to changes 	<ul style="list-style-type: none"> • Ensure that the health center supplies the human and financial resources required for successful implementation
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❖ A proactive project management team will not only monitor, but quickly address:

<ul style="list-style-type: none"> • Inadequate skill sets among end-users: not enough training and/or support • Staff resistance: not being knowledgeable enough about potential benefits from EHR adoption or unsupportive of the change process 	<ul style="list-style-type: none"> • Not staying on track or completing necessary tasks in accordance with the timelines • Scope creep: adding features and functionalities beyond the original EHR strategic implementation plan⁴⁵
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❖ Key elements of a successful project management team include:

<ul style="list-style-type: none"> • Active, top-down involvement • Frequent, well-organized meetings • Active participation at all levels 	<ul style="list-style-type: none"> • Not losing sight of the big picture • Keeping the process moving along • Recognizing, learning and responding to failures and shortcomings
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The Cornerstone of Success: Effective Leadership

“Keep in mind...it is better to delay implementation than to risk failure through lack of leadership or reluctance of staff to use the new system...”⁴⁶

The concept of leadership can be difficult to define clearly, in large part because numerous descriptions exist for what constitutes “effective leadership.” In the context of the activities discussed here, leadership essentially refers to the ability of executives and managers to perform the following tasks:

<ul style="list-style-type: none"> • Make key decisions • Provide direction and guidance to the entire staff • Coordinate the CHC’s services and programs 	<ul style="list-style-type: none"> • Communicate the CHC’s mission, vision, and values to the entire staff • Manage the workforce to support the health center and its patients
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⁴⁵ Chin, H. (2004). The reality of EMR implementation: Lessons from the field. *The Permanente Journal*, 8(4), p. 44. Retrieved from <http://xnet.kp.org/permanentejournal/fall04/reality.pdf>.

⁴⁶ Burke, R., Kenney, B., Kott, K., & Pflueger, K. (2001). *Success or failure: Human factors in implementing new systems*. Presented at EDUCAUSE Annual Conference, p. 10. Retrieved from <http://www.educause.edu/ir/library/pdf/EDU0152.pdf>

At its core, leadership is a blend of personal traits and skills used to motivate individuals to accomplish the objectives and overall mission of the organization. An effective leader should have the ability to manage the internal tensions inherent in employee relationships, as well as the often-chaotic environments within a health center.

❖ The characteristics of an effective leader are:⁴⁷

<ul style="list-style-type: none"> • Manages conflict and/or criticism among staff and providers • Creatively resolves complex problems • Possesses the skills and talents to plan and organize well with others • Applies skills as savvy problem solver 	<ul style="list-style-type: none"> • Acts as team player and consensus builder • Demonstrates effective interpersonal skills • Shows aptitude for motivating staff to cooperate and communicate with one another
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The Executive Director

Leadership is fundamental to any successful EHR adoption process. In a CHC, the executive leader is often an executive director (ED) and/or physician champion. The ED should be able and willing to articulate the organization’s vision and mission regarding EHR adoption to the rest of the staff. An ED should also help steer the organization through the processes of implementation and ongoing maintenance of an EHR.

Furthermore, an ED should understand the importance of developing a strategic plan for both the pre-implementation stage and for the go-live stage. He or she should work well with medical directors and other key management staff and serve in key positions of leadership and authority within the health center. The ED does not necessarily need to understand the minutiae and intricacies of the technical aspects of an EHR, but should focus on the conceptual and concrete aspects of how the EHR can best be used to support the health center’s clinical and administrative functions.

One of the most difficult challenges for any executive director is making sure the adoption process remains a priority of the health center in the midst of competing demands. This requires that leadership continuously communicate with the entire health center. One purpose for such communication is to report to staff and providers why the benefits from adoption justify the human, organizational and financial costs. If a health center’s leadership is unable to effectively communicate or articulate a clear vision for EHR adoption, success with implementation can be extremely difficult and the overall success of the entire project will only be remotely possible.

⁴⁷ Adapted from: Burke, R., Kenney, B., Kott, K., & Pflueger, K. (2001). *Success or failure: Human factors in implementing new systems*. Presented at EDUCAUSE Annual Conference, p. 2. Available from <http://www.educause.edu/ir/library/pdf/EDU0152.pdf>

“A road map to success...is essential to getting to the destination, but success is equally dependent on the ability of leaders to persuade, understand and support their teams during the process and particularly to realize the value of making the trip...”⁴⁸

Strong and effective leaders serve as the core change agents for a health center and should maintain ownership of the project throughout all of the stages. Individuals in positions of leadership should be respected by the workforce and able to minimize staff resistance or outright refusal to use the new system. Without the presence of committed leadership, the likelihood of a successful EHR adoption will be uncertain.

Case Vignette

Executive directors from three different health centers that had adopted an EHR system stressed the critical importance of having a strong champion and supporter of the EHR in an executive or leadership position. They said that having a champion was a key factor in the successful adoption of the new system. They defined a champion as the agent responsible for extensive preparation and training of staff prior, during, and after implementation. Their success was due to tireless communication: open dialogue, listening, learning, and working with staff throughout the entire process. Strong leadership led to consensus building, staff buy-in, adherence to a well-developed implementation plan, and adequate oversight before, during, and after implementation.

Physician Champion(s)

A health center should identify at least one physician (and preferably more) to champion the adoption and use of the new system. Without the presence of a physician champion, the pathway to successful adoption will be murky and all the more challenging. Champions of the EHR serve a unique role and purpose in a health center: they are the individuals who rally support among staff and effectively advocate for adoption. Therefore, a physician champion should not only be well-skilled and trained in using the system, but also respected by his or her peers. The influence of the physician(s) among clinical and support staff is important in achieving buy-in among all staff.

Ideally, a physician champion should be energetic, promote the larger organizational vision, demonstrate a willingness and motivation to lead, and be respected by the health center staff. Important interpersonal skills include the ability to plan, organize and facilitate regular staff meetings, display good time management skills, be an active listener, provide conflict management, and demonstrate strong oral and written communication skills.⁴⁹

Finally, it is important to be aware that certain providers, even those who are highly respected and have a history of being a leader in the health center, might actually turn out to be some of the strongest resisters to change. According to one IT expert, however, such individuals can actually

⁴⁸ Rose, J. (2004). IT: Transition fundamentals in care transformation. In Ball, M., Weaver, C., & Kiel, J. (Eds.), *Healthcare Information Management Systems: Cases, Strategies, and Solutions* (3rd ed.) (pp. 145-60). New York, NY: Springer-Verlag, p.158.

⁴⁹ Krall, M. (2001). Clinical champions and leaders for electronic medical record innovations. *The Permanente Journal*, 5(1), p.44. Retrieved from: <http://xnet.kp.org/permanentejournal/winter01/ClinChampsHS.pdf>

be invaluable. This expert suggests that a health center should even “value these curmudgeons” by “listen[ing] to, carefully evaluat[ing], and respond[ing] to any complains about the system” from such individuals.⁵⁰

It is mportant for staff and fellow providers to view the champion as an individual who is skilled in using the system; reliable and trustworthy; and able to understand not only the intricacies of the system, but also the bigger picture.

Communication Is Critical

”We tried to get everybody involved and excited about the change. We did everything from advertising within our clinic and building anticipation for the EHR.”

-- Clinical Director of a CHC with an EHR

Staff involvement is essential for success with EHR adoption. Lack of active participation and feedback from staff can create resentment, leading to resistance and mistrust, and overall lack of support and commitment to adoption and use of the new system. Furthermore, without staff buy-in and support -- particularly that of the providers -- the change management process will likely result in failure and the use of the system will be sub-par at best.

Staff involvement and participation in the design of the EHR, in particular the pre-implementation process, improves user acceptance and sense of ownership, and reduces resistance to change. This depends, however, upon effective, regular and consistent communication at all levels of the organization. Effective communication will also aid in user acceptance of change and in improved use of the new system. Staff involvement and ongoing communication helps to foster buy-in and support and ensure success beyond the life of the initial implementation stage.

Promoting Effective Communication

Excellent communication with the entire staff helps to promote a sense of ownership of the project and develops trust. Staff members who are invited to participate in decision-making during the development and implementation stages will be more supportive of EHR and willing to use it.⁵¹

- ❖ Some of the issues that influence user acceptance and levels of satisfaction are:⁵²
 - Perceived usefulness of the EHR in terms of understanding how the new system will benefit the health center and improve patient care delivery.
 - User satisfaction and management of staff expectations about the EHR.
 - Usability of the system -- perceived ease of use of the EHR including functionalities, templates, screen layout and graphical user interface.

⁵⁰Chin, H. (2004). The reality of EMR implementation: Lessons from the field. *The Permanente Journal*, 8(4), p.45. Retrieved from: <http://xnet.kp.org/permanentejournal/fall04/reality.pdf>.

⁵¹ Lorenzi, N., Riley, R., Blyth, A., Southon, G., & Dixon, B. (1997). Antecedents of the people and organizational aspects of medical informatics: Review of the literature. *Journal of American Medical Informatics Association (JAMIA)*, 4(2), 79-93.

⁵² See citation #33, Lorenzi, N., Riley, R., Blyth, A., Southon, G., & Dixon, B., 1997, p.87.

❖ Suggestions for promoting staff buy-in and support include:⁵³

<ul style="list-style-type: none"> • Increase communication between management and staff regarding the definition of what an EHR is (and is not) in addition to its purpose. • Create and ensure that adequate communication processes are in place early on to help answer questions and clarify uncertainties about the entire adoption process. • Answer questions and clarify unknowns among staff and providers about the EHR and adoption process. 	<ul style="list-style-type: none"> • Assure that feedback provided by staff and providers is incorporated into the ongoing decision-making process. • Respect the entire staff and value their opinions, regardless of their position and status in the health center. • Address staff concerns about changes in job requirements, such as medical records personnel, and the need for additional time to train and integrate the use of an EHR.
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Case Vignette

Staff members from a community health center that was considering but had not yet adopted an EHR system participated in structured focus groups designed to explore the staff’s perceptions, beliefs, and expectations about use of an EHR and the resulting impact it would have on their daily work. Staff communicated that they clearly anticipated that implementation of an EHR would significantly alter their daily work. Surprisingly, however, is that a large number said they were unfamiliar with how an EHR system operated and did not know how such a system would affect their daily work activities. One staff member stated, “I have no idea how it is going to work.”

The lesson highlighted here is that a considerable amount of time, effort, and resources should be devoted to educating the staff about what an EHR is and is not; what it can and cannot do; how it can affect the individual’s work and interaction with patients; the transition process; and the benefits it will provide the health center. Honestly stating both the benefits and the challenges plays a critical role in this communication.

❖ Leadership can help to promote excellent communication by using the following strategies:

<ul style="list-style-type: none"> • Clearly explain why the health center has decided to adopt an EHR system. • Translate the health center’s vision for the EHR to the staff. • Encourage use of the EHR. 	<ul style="list-style-type: none"> • Convey the anticipated benefits of EHR implementation to employees in terms of how the system will benefit the health center, staff and patients.
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⁵³ Gelmon, S., Maty, S., Gates, V., & Droppers, O. (2007, July). *Semi-Annual Report, Electronic Health Records in Safety Net Clinics Implementation Evaluation*. Portland State University, Portland, OR.

Addressing Staff Concerns

Part of any communication process is helping staff and providers understand exactly how the EHR is going to affect daily workflow. This requires that questions posed by staff members be addressed in a coordinated and comprehensive manner.

❖ Concerns likely to be raised by staff include:⁵⁴

<ul style="list-style-type: none">• Fear of job loss and potential reductions in the number of staff (especially among medical records staff)• No longer having access to information contained in paper charts• Decreased patient access during the “go-live” phase	<ul style="list-style-type: none">• Fear of making mistakes when using the EHR and lack of knowledge about how to correct them• Changes in daily work patterns, types of tasks performed, and provider-client interactions• Disruption of patient care through imposition of new technology
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Realistically, not all concerns, ambiguities or unknowns about implementation can either be anticipated or fully resolved. While it may not be realistic to do away with all staff concerns, it is invaluable to have a strong communication system in place to address them, in particular as new concerns arise.

❖ Recommendations to enhance communication include:⁵⁵

<ul style="list-style-type: none">• Create regular and frequent communication between management and staff regarding EHR adoption and implementation.• Provide additional communication vehicles for staff to raise questions in a non-threatening way.• Assure that feedback provided by staff and providers is incorporated into the ongoing EHR optimization process to the greatest extent feasible.• Address staff concerns about system downtime and failure.	<ul style="list-style-type: none">• Address patient privacy concerns and how to best use an EHR so that it does not affect the provider-patient encounter.• Answer questions in a timely manner and clarify unknowns for staff and providers.• Address issues and concerns regarding room redesign, adequate space, additional computers, etc.• Share knowledge gained from staff and providers at other health centers that have already implemented the EHR.
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⁵⁴ Gelmon, S., Maty, S., Gates, V., & Droppers, O. (2007, July). *Semi-Annual Report, Electronic Health Records in Safety Net Clinics Implementation Evaluation*. Portland State University, Portland, OR.

⁵⁵ Gelmon, S., Maty, S., Gates, V., & Droppers, O. (2007, July). *Semi-Annual Report, Electronic Health Records in Safety Net Clinics Implementation Evaluation*. Portland State University, Portland, OR.

Informing Clients

It is also important to inform clients about the upcoming use of an EHR system. If time permits, providers should speak with patients directly about the system, including possible changes about delivery of services, while offering reassurance that services will continue to be delivered during the transition.

One communication approach adopted by a community health center to inform its clients was developing printed materials and distributing them to their clients. The materials explained what an EHR was and what it was used for. They published these materials in multiple languages and posted them throughout the health center one to two months prior to going live. The specific timing of EHR implementation and impact on clinic hours was clearly publicized and explained, and staff were available to answer questions raised by clients.

Staff Training: It Never Ends

"The training was challenging and it was hard work. Getting a lot of different people trained on the system in a timely fashion was challenging. The real ongoing challenge is just keeping up with the training."

-- Executive Director of a CHC

To ensure a successful roll-out at the time of EHR implementation, it is essential that time be dedicated to train staff on the new system. Finding adequate time and resources for staff and provider training while simultaneously continuing to provide services to patients may be difficult. At a minimum, implementation requires training the entire staff on numerous revised clinical workflows and administrative processes. Providers and staff require intensive training on how to use the EHR as well as how to understand the new and/or modified workflows. Without adequate and ongoing training, neither the staff nor the providers will be able to fully use the EHR.

Key Factors in Training

- ❖ To adequately train staff and providers, the following factors should be considered:
 - Choosing the right location (e.g., onsite versus offsite; dedicated space for training)
 - Scheduling training sessions that are convenient and appropriate for staff
 - Tailoring classes to meet the needs of the health center's providers (organization and delivery of training curriculum)
 - Having the correct training personnel (e.g. trainers who have clinical experience, a strong IT background, and good communication skills)

A clinical director of a CHC offered this recommendation to other health centers preparing for EHR adoption:

"Plan for adequate training. Have a really solid training plan in place and allow yourself enough time to implement it. There is going to be pressure to get the system up and running, and start seeing patients, but your capacity and clinic flow is going to decrease. There is going to be pressure to get it back up prior to EHR implementation. I would say the challenge is not to rush that -- so that providers really learn and know how to use the system."

Computer and Typing Skills

EHR adopters have found that staff members vary considerably in their expertise and comfort levels using a basic computer, not to mention a complex IT system such as an EHR. In fact, a sizable number of staff may have little to no computer experience at all (and is usually related to age). This is why a staff and provider assessment of computer literacy and typing proficiency prior to implementation is so important. Thus it is important to determine how comfortable and competent employees are using a mouse, keyboard, Internet web browsers, drop-down menus, toolbars, and common word-processing and spreadsheet programs.

After assessing these skill levels, a CHC may decide that basic computer literacy and typing courses are required for staff before even attempting to implement an EHR system.

Case Vignette

The entire workforce at a community health center was asked a range of questions related to EHR adoption. Staff identified the general need for comprehensive training prior to adoption. One staff member stated: "Training will save a lot of time and work." However, staff repeatedly expressed concern about the difficulty of being trained and the learning curve associated with developing skills to use the EHR system. A common concern was the limited typing proficiency of some staff members and, therefore, the necessity to train them in basic typing and keyboard usage prior to implementation.

Staff also said that an EHR would increase the time required to complete certain daily tasks, such as data entry, and make others more difficult. Another concern was the insufficient number of computer terminals available with which staff could access the system. Both staff and providers expressed concern regarding how an EHR would affect the interactions and relationships among staff, providers and patients.

Certain providers may have little experience using email or the even the Internet, have spent decades using a paper-based medical chart system, or be completely comfortable with the existing workflows. For these reasons, among others, a health center may determine a need exists to develop training plans for different user groups, such as providers, nurses, allied health staff, administrators, and office personnel. According to some health centers, whatever the user group, the minimum average time required to complete training is 15 to 20 hours. Clearly, some users (probably mostly providers over the age of 30) will need more training time and more advanced training sessions.

*"Training for [EHR] system users should be adequate, timely, tailored to meet the specific needs and experiences of the users, available on an ongoing, as-needed basis and include simulated patient encounters."*⁵⁶

⁵⁶ Studer, M. (2005). The effect of organizational factors on the effectiveness of EMR system implementation. *Electronic Health Care*, 8(4), p. 95.

Training Methodologies

Different approaches and techniques exist for training staff on how to use an EHR system. Training techniques for providers and non-providers will vary. For example, providers need more training than other staff members simply because they use and rely upon the system much more often. Health support staff and administrative staff will need different areas of emphasis reflecting the nature of their positions. The choices in training approaches are training clinicians and non-clinicians separately, or training the two groups together. Another option is a train-the-trainer model, all described below.

Group Training

Many health centers have found that training providers and medical support staff together is beneficial. The support staff often learns how to use the EHR more quickly than providers do and can then serve as mentors both during and immediately after implementation. Training of more administratively-focused personnel may be more beneficial if separate from the providers, given the different emphasis there will be on core functions of the EHR that the staff will use most often.

Peer-to-Peer Training

Other health care centers have found that providers learn best from individuals they trust and with whom they work well, such as fellow nurses and providers. This type of training, referred to as *peer-to-peer*, is not only practical but can also be quite effective. Peer pressure from colleagues (i.e., a physician champion) to use the EHR can help to encourage (or coerce) other providers into using the new system.

Train-the-Trainer

Another potentially helpful approach is to have certain staff, in particular providers, complete a train-the-trainer course to achieve proficiency in all functionalities of the new system. These individuals, called *super users*, are invaluable during the go-live stage of EHR adoption. They can not only provide pre-implementation training, but also be available during implementation for just-in-time problem-solving.

Training Challenges

“Sometimes the training actually happens after the fact.”

-- Clinic Manager of CHC

Clearly, multiple challenges exist with training. One is the stigma some professionals perceive around issues related to computer literacy. In particular, providers often feel uncomfortable, even threatened, by the need to learn a new, complex computer system. The reality is that using an EHR means change -- especially for providers -- involving workflows, staff and patient communication, and the need to do things in new ways that are not necessarily intuitive. This can create a great deal of frustration.

Providers sometimes fear losing their professional status or ending up looking stupid or incompetent. In addition, the lack of time for adequate training often leaves employees struggling to learn how to use the EHR on their own. For example, there are many “hidden” or

rarely-used functions that are difficult to remember. Another potential challenge is that providers can fall considerably behind in their knowledge when the EHR is modified; thus, they can no longer use the system effectively and face yet another learning curve.

In view of these issues, take the necessary steps to ensure that providers are trained thoroughly. Among these are making computers easily accessible and being sure it is easy to log on and off of the system.⁵⁷ It also includes providing specific training about how to use an EHR effectively when a patient is present.

❖ Comprehensive training can include:

<ul style="list-style-type: none"> • Scheduling providers to see fewer patients) during the training period (e.g., 50% of normal) • Specified periods of time for trainings 	<ul style="list-style-type: none"> • Provision of onsite training and support • Simulated patient encounters to help providers adapt their own practice styles
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Case Vignette

One particularly helpful training tool used by a CHC was *chart abstracting* prior to going live. Abstracting consists of providers reviewing patients’ paper-based medical charts and then extracting a limited quantity of information contained in the paper chart such as current medication list(s), progress notes, and patient history. The abstracted information is then entered into the electronic health record.

This health center gave providers an opportunity to abstract patient information from paper-based medical charts, particularly for complex patients, patients that were frequently seen, and patients scheduled to be seen within the first month of go-live. The process of abstracting worked so well as a learning tool that it was replicated at other clinics. It offered providers the chance to acquire basic computer skill sets as well as to learn how to navigate within the EHR.

“With all the experience that we’ve had, one of the things that I have come to a conclusion is that...you need to be really financially prepared to truly invest in the education and training [of staff] upfront and have enough resources that you can offset the loss of encounters and productivity.”

-- Executive Director of a CHC Non-Adopter

It is important not to underestimate the need for providing ongoing training after implementation, especially more advanced training as providers and staff become increasingly familiar with the system and its set of functionalities. Comprehensive training, that never really ends, is essential

⁵⁷ Adapted from: Aydin, C., & Forsythe, D. (2005). Implementing computers in ambulatory care: Implications of physician practice patterns for system design. In Anderson, J., & Aydin, C. (Eds.), *Evaluating the Organizational Impact of Healthcare Information Systems* (2nd ed.) (pp. 5-29). New York, NY: Springer-Verlag, p. 302.

to any implementation and adoption process. Trainings that are infrequent and not correctly targeted to different end-user groups can result in poor performance and use of the system overall. In contrast, regular, periodic, and ongoing trainings will likely result in a workforce that is able to sufficiently use the system and meet the intended objectives of the health center.

Is Your Health Center Ready for the EHR Journey?

*Successful EHR implementations “are becoming increasingly dependent upon how well the people and organizational issues are managed.”*⁵⁸

If the human, organizational, and technical challenges can be successfully managed, the goal to successfully adopt and use an EHR system is within reach. The key is to start with an effective and comprehensive pre-implementation plan.

❖ Prior to go-live, the following key factors should be in place and clearly observable:⁵⁹

<ul style="list-style-type: none"> • Clinic leadership • Project implementation team • IT infrastructure • Adequate organizational resiliency • Clear understanding of the scope and ability to modify EHR • Comprehensive plan for staff trainings 	<ul style="list-style-type: none"> • Thorough assessment of workforce competencies around IT use • Preparations for initial disruption and impact on daily work and staff morale • Resources for provision of ongoing training and IT support • Clear presence of a sophisticated and well-organized implementation plan
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Although daunting, the organizational, technical, and human challenges should be fully addressed prior to go-live. At the end of the day, success or failure with EHR implementation largely rests upon the health center’s ability to manage the human factors. This is why effective leadership, organizational commitment, adequate training, organizational culture, vision, excellent communication, and physician champions can play such a fundamental role in the entire process.

Advice from Experienced Clinics

In 2004, the Community Clinics Initiative, funded by the California Healthcare Foundation and the Tides Foundation, facilitated a one-day conference attended by dozens of community health centers located in the state of California. The purpose of the meeting was to discuss the clinics’ experiences with adoption and use of health information technology. From this discussion and an

⁵⁸ Lorenzi, N., Riley, R., Blyth, A., Southon, G., & Dixon, B. (1997). Antecedents of the people and organizational aspects of medical informatics: Review of the literature. *Journal of American Medical Informatics Association (JAMIA)*, 4(2), p.79.

⁵⁹ Gelmon, S., Maty, S., Gates, V., & Droppers, O. (2007, July). *Semi-Annual Report, Electronic Health Records in Safety Net Clinics Implementation Evaluation*. Portland State University, Portland, OR.

ongoing open dialogue, a report was created highlighting the conference's key findings.⁶⁰ These are summarized below.

<ul style="list-style-type: none">• Technology is just a tool to help an organization realize its vision and mission.• Be clear on the needs you are trying to meet and on the financial and organizational costs before you make your decision on hardware, software, and vendors.• Everyone in the organization needs to understand how technology is going to make things better.• Leadership needs to articulate a clear vision for technology and manage the complexities of its innovation.• Business and financial planning can provide a new perspective for the risks of technology.	<ul style="list-style-type: none">• A comprehensive and multifaceted planning process is fundamental to articulating a clear and realistic vision and bringing it to fruition.• You need staff participation and technology champions throughout the organization.• The organization needs a plan for how it will manage the change that the technology innovation entails.• Technology plans are vital tools for understanding and assessing technology innovation at your clinic.• You are going to need new, specialized expertise early on.• Provide training, training, and more training.
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⁶⁰ *Celebrating Technology Advances in California's Community Clinics and Health Centers* (2006, Sep). Community Clinics Initiative: A joint project of the Tides and The California Endowment, 1996-2006. Retrieved from: <http://www.communityclinics.org/content/general/detail/887>.

CHAPTER FOUR

BUILDING INFORMATION TECHNOLOGY INFRASTRUCTURE

“Don’t bother adopting an EHR if you aren’t willing to build the IT infrastructure.”

-- Information Technology Implementation Expert

Health centers generally use IT systems for day-to-day business operations and to collect and process clinical administration data. The most common applications are the practice management systems (PMS) used for scheduling, registration, and billing. Other applications include disease-specific registries and PC-based software programs such as Excel and Access. However, such systems are often underused due to lack of adequate training and the money needed to support the application.⁶¹

Until recently, few health centers have used IT to support and improve patient care. As a result, the existing IT infrastructure required to support an EHR system in a community health center is often either nonexistent or inadequate. Thus a community health center should carefully assess its existing IT infrastructure prior to moving forward with EHR adoption.

IT Infrastructure Assessment

The core of any IT infrastructure assessment is identifying what operations, both business and clinical, are currently automated using computers and various software programs.

❖ Common core business operations include:⁶²

<ul style="list-style-type: none">• Accounts payable• Billing• Payroll• Grants management• Purchasing/inventory	<ul style="list-style-type: none">• Patient registration• Appointment/scheduling• Staff and provider scheduling• Utilization review• Medical audits
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⁶¹ Blueprint Research & Design. (2003). *Wiring California's health care safety net: How community health centers are using information technology to improve their services*. Paper presented at the Grantmakers in Health Conference. (p.3). Retrieved from: http://www.communityclinics.org/files/518_Wiring_California_s_Health_care_Safety_Net.pdf

⁶² See citation #61, Blueprint Research & Design, 2003, p. 4.

❖ Common core clinical operations include:⁶³

<ul style="list-style-type: none">• Wellness reminders• Reproductive health services• Managed care features• Disease management	<ul style="list-style-type: none">• Tracking of immunizations rates• Patient tracking/recall• Patient referrals• Case management
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❖ The IT assessment should address three key issues:

- The upgrading of existing IT hardware and/or the installation of completely new hardware.
- The provision of IT training for the entire health center workforce.
- The organization's ability to collect, store and retrieve administrative and clinical data.

❖ The assessment should also analyze the organization's current use of:

- Software programs
- Hardware
- IT systems
- Internal IT training and support
- Determine staff competencies for using advanced clinical IT systems

One of the more important factors to understand is that using IT systems in a piecemeal fashion is ineffective.⁶⁴ Such an approach leads to extra work, including double entry by support staff and systems that are unable to communicate and share data with each another.

Consequently, as you move forward with the EHR adoption process, existing business and clinic IT operation applications should be inventoried and reevaluated in terms of integration with the EHR system.

Ultimately, the larger and more well-resourced a health center is, the more IT capacity it will likely have to support an EHR. The smaller and less resourced a center is, the more it will need to build IT infrastructure – and the more difficult this will be because of the requirement of additional financial and human resources.

⁶³ See citation #61, Blueprint Research & Design, 2003, p. 5

⁶⁴ Blueprint Research & Design. (2003). *Wiring California's health care safety net: How community health centers are using information technology to improve their services*. Paper presented at the Grantmakers in Health Conference, p.7. Retrieved from: http://www.communityclinics.org/files/518_Wiring_California_s_Health_care_Safety_Net.pdf

Internal vs. External IT Expertise: Finding the Balance

“You need a level of expertise to carry [EHR adoption] out and I don’t think that our IT staff has that level of expertise to plan, develop and maintain an EHR system.”

-- Executive Director of a Non-EHR adopter

One of the more challenging and perhaps costly aspects of EHR adoption is the need for IT expertise and support – both initially and on an ongoing basis. IT project management capacity is the ability to initiate, execute, manage and complete any IT adoption process. If this is not in place prior to implementation, information technology implementation will either achieve suboptimal results or fail outright.

❖ Some of the questions that should be answered about IT staffing include:

<ul style="list-style-type: none">• Should we pay to train existing personnel to acquire the necessary level of IT expertise?• Should we hire externally trained and skilled IT personnel?	<ul style="list-style-type: none">• What level of funding is available to support the necessary IT staff required to implement and maintain the EHR applications, either internal, external, or both?
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Options Regarding IT Staffing

“What facilitates success for the EHR is having the right technical people to maintain the system, project managers for system implementation expertise, and clinicians with medical knowledge... all working to configure the system to meet the needs of the clinic.”

-- Health Informatics Specialist

Below are three possible options to consider regarding IT staffing.

Option 1: Hire an Expert: If you have the size and financial resources to justify it, you might want to consider creating new positions for a Chief Technical Officer (CTO), a Clinical Systems Expert, or a Senior Systems Engineer. Such individual(s) would be experts in IT project management who are also experienced in the field of health informatics and clinical operations, workflow, communications, and IT security management.

Option 2: Develop In-House Expertise: You may also decide to select a present employee and provide him or her with the expert IT training necessary to manage the project. This would decrease your dependency on external IT support resources (and possibly your long-term costs). It would also promote self-sufficiency and operational efficiencies.

Option 3: Contract a Consultant: A third alternative is to contract with an independent IT expert or company. This might give you access to more advanced resources, such as technical planning and assistance. Such companies have presumably learned lessons from EHR installations at other CHCs, which avoids the time-consuming process of “reinventing the

wheel.” It might also give you economies of scale and enable you to participate in collaborative endeavors with other CHCs.

Developing IT Management

Whether you develop internal IT expertise and staff or hire outside support, one issue remains the same: It is absolutely critical to have face-to-face, onsite IT support throughout all stages of the adoption process and beyond.

Regardless of the choice, you will need an IT “Systems Information Program Manager.” This means that you should designate a leader or “catalyst” who will ensure that the necessary internal health information technology infrastructure is built. To fill this position, you may want to promote an existing staff member or create a new position. You may also want to create a clinical oversight team with the power and authority to do what it takes to successfully manage the entire process.

The Internal Design Team

“We built an IT team that didn’t really exist before. We had not realized that we needed an IT team, but now we have one.”

-- Clinical Director of a CHC Adopter

The need to modify and reconfigure an EHR system on an ongoing basis presents a number of challenges. One way to manage this is to create a design team that helps to develop the preliminary design and building of the EHR and also serves as the main repository of knowledge following implementation. It is also an excellent way to build internal support and expertise.

Part of the design process includes creating the human-computer interface, which involves the actual screen design and layout. Navigating in and out of multiple software applications while simultaneously running various applications has significantly decreased the level of end-user satisfaction in the past.⁶⁵

The adoption of the EHR gives you a wonderful opportunity to decide what you really want to have, how you want it to work, and how you want it to look.

For these reasons, having a clinical design/build team involved in the human interface design process is critical. Their practical and effective suggestions can make a major difference in user satisfaction in the months and years to come.

Some General Considerations

There are several aspects of building information technology infrastructure to consider; these are discussed below.

Provision of Ongoing Training and Maintenance

In many cases, the responsibility to provide ongoing training after implementation lies with the CHC itself, not with the EHR vendor. This is an important point to clarify; usually the greatest

⁶⁵ Sittig, D., Kuperman, G., & Fiskio, J. (1999). Evaluating physician satisfaction regarding user interactions with an electronic medical records system. *Proceedings of the American Medical Informatics Association Symposium*, 400-4.

threat to a health center's ability to effectively use and manage the EHR lies with inadequate training of the users and ongoing maintenance of the system, rather than actual IT issues relate to hardware and operating systems.

Easy Fixes Versus Hard Fixes

A key insight to keep in mind both prior to implementation and during go-live is that there are “easy fixes” and “hard fixes.” On the one hand, end users will experience numerous technical challenges that can often be quickly resolved by either a well-functioning design/build team or IT support staff. On the other hand, some technical challenges will require much more time to resolve and may involve modification of the EHR system itself. This could require both internal IT expertise and the assistance of the vendor.

Technical Solutions Versus Human Solutions

Technical solutions require making changes to the EHR by, for example, reducing the number of steps to complete certain tasks, such as the number of mouse clicks. Human solutions often require retraining of users after technical solutions have been integrated into the EHR.

Both technical and human solutions will be required to optimize use of the EHR and to improve the quality of patient care. If an internal design/build team has been created, it will be able to monitor and manage these changes.

The Ongoing Change Management Challenge

“Electronic Health Records are a moving target ... in a constant state of change and development.”

-- Health Informatics Expert

The adoption of an EHR system gives users the opportunity to decide how to best use the new technology to streamline and improve existing workflows and processes, and not to simply automate dysfunctional processes or to maintain the status quo.⁶⁶

Consequently, a health center should document its existing workflows by developing visual diagrams. Then the members of the project steering team or build/design team can explore and pilot the precise processes and workflows that should be automated. The vendor will often help to manage this challenging aspect of overall project implementation.

Over time, minor ongoing modifications will be needed to optimize use of the new system and to increase staff buy-in and support. This means that regular, ongoing staff training will be required to help users adjust to system changes and improve acceptance.

“You can't change too rapidly because people cannot adapt to change all the time, so some level of stability with modifying workflows is important.”

-- Health Informatics Expert

⁶⁶ Dawson, T. & Kushinka, S. (2005). *Health Care Technology Handbook*. Prepared by Full Circle Project for Community Clinics Initiative, p.21. Retrieved from: <http://www.communityclinics.org/content/article/detail/804>

Reviewing IT Policies and Procedures: A Necessary Precaution

The implementation of an EHR system requires that you thoroughly revise your existing IT policies and procedures with a view to creating new, more relevant policies and phasing out those that no longer apply.

One of the most important considerations is that of security -- both internally, with staff, and externally, with outside health care organizations and providers. It is important to build a “culture of confidentiality and safety” before, during, and after EHR adoption.⁶⁷ Part of ensuring such a culture is creating and enforcing comprehensive IT policies and procedures around use of the EHR.

For example, it is important to have a comprehensive policy in place around new procedures, such as a 30-second automatic log-off, routine change of login passwords, and audit controls that monitor and record who is using the system and for what purpose(s).

It is also important to have policies regarding occasional periods of downtime, temporary power outages, or total system failure. For example, how should patient data be handled and backed up manually in the event of a system failure?

HIPAA

Even though many vendors promise that their EHR systems are fully compliant with the Health Insurance Portability and Accountability Act (HIPAA), it is important for you to verify that the appropriate administrative, physical, and technical safeguards have been put into place and are monitored over time.⁶⁸

Health centers that adopt an ASP or network model will find that many of these systematic security issues are managed by the ASP or network operator rather than by the individual clinic.

Conclusion

“The EHR is not something where you work really hard for six months or a year; it becomes a very big part of how your health center does business from here on out.”

-- Physician and Health Informatics Specialist

Numerous factors and challenges need to be managed during pre-implementation, some more overwhelming than others. These challenges include provision of adequate training for staff and providers, to ensure adequate computer literacy and typing proficiency prior to implementation; workflow redesign; development of necessary interfaces to achieve interoperability with external health care providers and internal practice management systems; and creation of an environment in which staff members feel comfortable using the EHR.

⁶⁷ Agency for Healthcare Research and Quality (2005). *Annual Patient Safety and HIT Conference Proceedings*. Retrieved from:

<http://healthit.ahrq.gov/portal/server.pt?open=512&objID=650&PageID=0&parentname=ObjMgr&parentid=106&mode=2&dummy>

⁶⁸ Zafar, A. (2005). *Getting started with health information technology implementation*. AHRQ National Resource Center for Health Information Technology, December 1, 2005. Retrieved from www.healthit.ahrq.gov/portal/server.pt/gateway/PTARGS_0_74907_0_0_18/Health%20IT%20Implementation.ppt

Adoption and use of an EHR will produce vast new quantities of business and clinical data, that is often more accurate and informative than the data you had pre-EHR. Adoption of an EHR requires financial, organizational, and human capital to build and to support a comprehensive IT system. Without adequate IT infrastructure, the ability to improve clinical decision-making and overall quality of care will not be achieved.

Implementation of a new EHR system will often bring to light and even “magnify” existing organizational and/or people issues within the health center. Comprehensive technology planning, in particular assuring adequate organizational infrastructure, developing a strategic plan, conducting a readiness assessment, and building sufficient IT capacity will help achieve successful implementation and support the overall goals of the health center.

“Do your homework upfront. Understand for your organization what the barriers are going to be and then find or create a strategic plan to address those barriers before starting – I think that is really key to success and it is different for every organization.”

-- Executive Director of an EHR Adopter

CHAPTER FIVE

IMPLEMENTATION AND GO-LIVE

This chapter addresses the two final stages of EHR adoption: implementation or “go-live” and ongoing maintenance and optimization. The first half of the chapter discusses the key factors, issues, challenges, and concepts that should be addressed during go-live. The second half explores issues related to EHR optimization, such as its impact on staff, how to evaluate quality and safety, and the need for retraining and ongoing IT support.

It is important to understand that, with any IT implementation, unexpected challenges will arise, unintended consequences will occur, and avoidable mistakes will not be avoided. The reality is that no matter how well-prepared you perceive your organization to be prior to go-live, you should expect the unexpected due to the sheer complexity of IT implementation. To deal with such challenges, it is critical that you have sufficient IT staff and dedicated resources in place to resolve problems as they arise.

- ❖ CHCs that are early adopters of EHR systems have much to share with those who follow. Some of their pointers include:⁶⁹

<ul style="list-style-type: none">• Make sure there is sufficient on-site technical assistance for immediate problem-solving during go-live and for training.• Plan ample individual coaching sessions and support for staff that are learning how to use the EHR.• Conduct a well-managed, realistic practice rehearsal.	<ul style="list-style-type: none">• Use multiple problem-solving tools and techniques, such as a command center, parking lot flipcharts, and debriefings, for real-time capture and immediate resolution of problems.• Stage trainings to introduce various EHR components incrementally.
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The Project Schedule: Timeline, Goals and Project Milestones

“Pilot, improve, pilot, improve; don’t roll out until you are sure of success.”
-- Clinical Information Systems Expert

It is important to establish benchmarks for measurement that will help you to evaluate the level of success with adoption, both during and after implementation. The first step is to develop an implementation timeline that has clear goals and project milestones. The second step is to develop an evaluation framework, or set of metrics, with which to assess the success or failure of the implementation process.

⁶⁹ Gelmon, S., Maty, S., Gates, V., & Droppers, O. (2007, July). *Semi-Annual Report, Electronic Health Records in Safety Net Clinics Implementation Evaluation*. Portland State University, Portland, OR.

❖ When establishing a schedule for roll-out, be sure to address the following factors:

<ul style="list-style-type: none">• Establish benchmarks with which to measure implementation success.• Plan for medical records conversion.• Create communication channels with which to give and receive feedback from staff, providers, and IT team.• Develop a process for quickly resolving IT problems as they are encountered.	<ul style="list-style-type: none">• Put plans in place regarding how to respond to employee concerns, fears, job security, push-back, and resistance.• Revise patient scheduling and visits during go-live.• Educate staff about EHR adoption by setting realistic expectations and clinic goals.
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“One of the things that we underestimated was the importance, time and difficulty of transitioning our paper medical records. We went through the difficulties of scanning and not being able to use the scanned documents. We struggled for quite a while over this piece, and it was a costly learning process.”

-- Clinical Director of an Early CHC Adopter

Case Vignette

A few days before the targeted go-live date, a health center held a four-hour dress rehearsal and the entire clinic staff participated. The purpose was to create a comfortable learning environment that gave staff the opportunity to experiment with the EHR and relieve some of the anxieties they had about daily use of the new system.

The lead staff member for the project steering team started the training session with an enthusiastic pep talk. The team leader divided the rehearsal into two sessions. First, the team leader asked half of the staff to role-play patients and half to role-play doctors. They then gave each “patient” a card that identified their “illness.” The “doctors” then examined the patients while completing the entire patient workflow from check-in to check-out. Then participants switched roles. Throughout the entire process, people were encouraged to ask the IT staff questions, such as, “Why is it this way in the EHR?” In turn, the IT staff asked, “How would you normally do this? What is your normal workflow?”

The entire staff found the go-live dress rehearsal to be a useful practice tool and appreciated the opportunity to experience what the EHR system was like, how it operated, and how it worked in the presence of patients before the actual go-live event.

An important issue that arises with implementation is the need to have a well-defined process and timeline in place for converting paper-based medical records into the new system.⁷⁰ With

⁷⁰ For an informative detailed presentation on implementation planning, see: Lohman, P. (2007). *Electronic health records: Implementation planning for success*. Retrieved from: www.wahealthinfocollaborative.org/documents/07EHRImplementationPlanning.ppt

this in mind, it is important to decide in advance which existing records, if any, need to be integrated into the EHR. It is also important to determine how much patient information should be converted into an electronic medical record and who is responsible for inputting paper-based chart information into the EHR system.

Implementation Checklist

The electronic health record is the great magnifier ... the EHR is going to magnify either the strong functions or the dysfunctions of a clinic and/or individual provider.

—Physician and Health Informatics Specialist

Successful early CHC adopters have found the use of a comprehensive implementation checklist prior to go-live to be invaluable. Numerous examples of such checklists can be found on the Web; you can also obtain them from your IT vendor. A number of CHCs found that using their own set of implementation checklists, based upon their organization’s unique needs, was beneficial and practical for meeting the needs of the health center.

❖ Before go-live, be sure the following factors are in place:⁷¹

<ul style="list-style-type: none"> • Clear chain of command and scope of authority for each committee and individual responsible for execution of implementation • Adequate number of PCs and access points for the entire workforce • Date and agenda for the go-live dress rehearsal • Commitment to IT staffing and ongoing support by onsite HIT specialist(s) throughout go-live and beyond • Understanding that implementation of an EHR system is an operational change initiative, not a technology initiative effort • Set of realistic, clear expectations among staff regarding use of EHR 	<ul style="list-style-type: none"> • Knowledgeable clinicians participate actively in design and implementation stages • Individuals with the right mix of clinical, operational and technical expertise are committed early on, and remain so throughout the entire process • Adequate resources available throughout the project (no corners cut) • Systems in place for tracking implementation processes and problem resolutions • Disaster recovery plan in place in case of system failure • A well-defined implementation plan or checklist in place to assess, monitor, and track results, including ongoing successes and failures
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⁷¹ Adopted from Wager, K., Lee, F., & Glaser, J. (2005). *Managing Health Care Information Systems: A Practical Approach for Health Care Executives*. San Francisco, CA: Jossey-Bass, p. 415.

Incremental Rollout vs. “Big Bang” Approach: It Matters...

“We rolled out to different parts of the agency and each time we did a rollout we prepared for that. We got better by learning lessons with each rollout and we are really proud of our rollouts. We had a drop in productivity in the first six-months, but by the end of the first year we were back at full productivity.”

-- Executive Director of an Early CHC Adopter

- ❖ Two main implementation strategies exist for rolling out an EHR system:
 - Incremental or phased
 - Shotgun or big bang

Both strategies have their advantages and disadvantages. Some health centers have adopted a phased-in approach in which providers are gradually trained on how to use the EHR. Often this entails transitioning to full use of an EHR system over a prolonged period of time.

Other health centers have chosen to train the entire clinic staff, and then have gone live with the system all at once. While other health centers that operate multiple delivery sites have chosen to go live one site at a time until the entire organization is exclusively using the EHR. Size, complexity and available support will likely determine which approach is most suitable for you.

Test the System

Whichever implementation approach you choose, it is important to test the entire system prior to go-live. This will help you identify potential problem areas and prevent a number of headaches and hardships for your employees. Be sure to test every computer terminal, scanner, printer, and interface with outside labs and local area medical organizations (if applicable), practice management systems, business applications, and other interconnected IT components.

It is also important to have a backup plan in case the server or system crashes. This should be prepared by, and thoroughly discussed with, your vendor. For example, if the system crashes, do you have a backup plan in place (such as going back to paper) so you can continue seeing patients and providing core services?

Determine the Roll-out Pace

It is important to determine the speed at which you want to turn on or bring into production various functionalities. To do so, you will need to determine which functions are required from day one of go-live and then develop a timeline for adding additional functionalities and features. The pace largely depends on the system you select, the vendor you use, and the priorities of your project management team.

Prepare Your Patients

It is also important for you to prepare your patients for the implementation because patient access will likely decrease during go-live. Therefore, you want to anticipate how you are going to deal with access issues to avoid dislocating your patients during the implementation process.

Expect the Unexpected

“Just the challenge of when you implement a complicated IT thing like an EHR ... Something will go wrong and it can take you months to figure out how to solve it. And so I would say to any group doing it, you have to be prepared that something won’t work.”

-- IT Project Manager

It is vital to not underestimate the disruption and frequent periods of chaos that will arise during go-live. You should both expect and plan (as best as possible) for unanticipated problems, including unforeseen productivity changes and surprising challenges around provision of IT training. A key characteristic for successful implementation is the ability to manage the entire process in a proactive manner: anticipating, addressing, and resolving problems as they arise.

This requires adequate management capacity, IT infrastructure and support, and the presence of key leaders and IT champions in the health center. Another critical aspect is to understand that the process requires ongoing modifications, which means you will need to adapt workflows and practice patterns as necessary to achieve successful EHR adoption at each clinic site.

❖ Potential factors likely to be of critical importance include the ability to:

<ul style="list-style-type: none">• Communicate details and timelines for go-live to your entire workforce.• Continuously update your workforce on the progress and respond to their ongoing concerns and questions.	<ul style="list-style-type: none">• Be prepared for the unanticipated events and results that will emerge.• Recognize and celebrate successes with milestones and achievements.• Communicate to your staff and providers what to expect and when.
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Onsite IT Support

Successful implementation requires that an IT support team be onsite to handle both technical and human-related issues. It is important to ensure that the support team has clear leadership and is able to coordinate and resolve problems in a timely manner. In order to problem-solve ongoing end-user challenges, the IT support staff need to also be well-versed in medical concepts and terminology so they can understand the substance of issues being addressed by the staff.

As one provider at a CHC expressed during the first weeks of the go-live stage: *“When the support staff leaves, we fall apart.”*

Establish a Command Center

It is a good idea to establish a command center during go-live so you have a well-organized and well-executed system in place for identifying, classifying, prioritizing, and resolving problems as they occur. If possible, staff the command center with IT experts who are also health care professionals.

Case Vignette

At the end of each day throughout the first week of go-live at one health center, there was a debriefing session in which the entire staff participated. Key leaders from the EHR support team facilitated the debriefings and maintained an excellent rapport with staff and providers. During these sessions, the facilitator created charts listing various issues and problems that had been encountered throughout the day. In addition, participants identified numerous workflows which were then modified as needed.

According to a lead IT support staff member, “Modifications are necessary because otherwise unmodified workflows could develop into stumbling blocks in the future.” The need for ongoing process improvements with the EHR system during go-live was expressed during each debriefing session. These teaching sessions gave the entire staff the opportunity to ask questions of IT support and clinic management. The initial investment in time and resources quickly helped end-users become more effective and efficient when using the EHR system, which accelerated the optimization process.

Implementation: Unanticipated Challenges and Innovative Solutions

“Don’t sell happiness; sell reality. EHR system implementation is not fun or easy. It will seem inefficient in the short term. The true benefits will not be felt for several months. Be prepared to respond to unforeseen consequences. Expect a demand from some unhappy providers to shut the system down. Make sure the [health center] is ready...to stay the course.”

-- Physician Champion from an early EHR CHC Adopter

During implementation, a number of unanticipated challenges can arise around day-to-day use of the EHR. One challenge is that providers often strive to maintain their productivity levels by seeing the normal number of patients during implementation. The result is that providers fail to have enough time to learn the system’s functionalities.

It is important to train providers to ask their patients to “please bear with me because I am learning a new computer system.” Staff also should be trained to explain to patients that the health center is converting over to a new computer system that involves a learning curve and that this could temporarily limit access to their providers.

Monitoring Staff Morale

When faced with the challenges of learning a new, complex, computer-based system, staff members are likely to react in various ways. Some might feel threatened or discouraged; a few could become overwhelmed by the entire process. Therefore, it is important to monitor all employees during this time and to intervene before anyone becomes so overwhelmed and depressed that they end up quitting.

Using an EHR system requires providers to adopt fundamentally new ways of giving care: accessing and entering patient information, reviewing lab results, ordering tests, requesting referrals, email messaging, etc. As a result, providers should clearly understand that they will likely be required to work longer hours for a while -- both during and after implementation.

"Do I see more patients because of this technology? Probably not...but I am doing a better job with the patients that I am seeing. It almost forces you to be a better doctor."

-- Physician Adopter

Workarounds

When faced with complex and challenging situations, people can be surprisingly adept at finding innovative solutions. In the case of technology, they will often develop "workarounds" that allow them to do things the system was not designed to do. It is important to understand, however, that workarounds can lead to a misuse of the system, which ultimately leads to suboptimal use on a daily basis.

In reality, workarounds indicate that something is not working properly, and staff need more training, or modifications need to be made to the system. Over time, as modifications are routinely made, the goal will be to find the equilibrium between end-users and the system: a fit between human beings and technology.⁷²

Generating Data Reports

The EHR system will allow you to capture new kinds of data. For example, you could potentially query how many diabetic patients have not been seen in the last six to nine months.⁷³ As a result, you should create a plan for the kinds of information your health center would like to capture and how to best use this information.

It is unlikely that your health center will be able to follow-up on all missed diagnostic or therapeutic interventions that the system might allow you to capture. In other words, generating either too many or too few reports can be counterproductive. The important thing is to prioritize the information you actually need based upon your available resources.

Patient-Provider Interactions

As mentioned above, using an EHR will change the way in which providers deal with patients in the examination room. For example, providers may find it challenging to ask the patient questions and conduct an examination while simultaneously locating and/or entering data in the EHR. This also requires that they cognitively process various streams of information while making a diagnosis and deciding upon the appropriate course of treatment. Another

⁷² Coiera, E. (2007). Putting the technical back into socio-technical systems research. *International Journal of Medical Informatics*, 76S, p. 102.

⁷³ Calman, N., Kitson, K., & Hauser, D. (2007). Using information technology to improve health quality and safety in community health centers. *Progress in Community Health Partnerships: Research, Education, and Action*, 1(1), 83-88. Available at:

http://muse.jhu.edu/demo/progress_in_community_health_partnerships_research_education_and_action/v001/1.1calman.pdf

consideration is where to position the computer terminal in the examination room with respect to where the patient is located in order to maintain as much personal contact as possible.

❖ Early adopters have learned several key lessons regarding implementation that may be helpful:⁷⁴

<ul style="list-style-type: none">• Ensure that expert technical assistance is available for training.• Run through a well-managed, realistic dress rehearsal.• Make sure you have plenty of on-site technical assistance for immediate problem-solving during go-live.• Use multiple tools and techniques, such as the command center, flipcharts, and debriefings, to capture problems and create immediate resolutions in real time.• Stage trainings to introduce various EHR components incrementally.	<ul style="list-style-type: none">• Provide individual coaching and support in learning how to use the EHR.• Demonstrate the value of the EHR to all stakeholders to increase their buy-in and support.• Respond immediately to problems as end-users encounter them.• Create tip sheets, quick reference cards, diagrams of new workflows, and frequent updates regarding ongoing changes and modifications made in the EHR system.
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“Don’t try to get everything exactly right from the beginning, because you won’t—the important thing is to be able to evolve the EHR over time and with experience.”

-- Clinical Informatics Specialist

Ongoing Maintenance and Optimization: A Continuous Cycle

“The implementation of an information system in an organization involves the mutual transformation of the organization by the technology and of the system by the organization.”⁷⁵

The EHR is a complex IT system that should serve its users as a helpful tool, not a hindrance. It will need to be refined consistently over time to increase user-friendliness and improve organizational efficiency and effectiveness.

❖ Examples of routine optimizations include:

- Changing EHR functionalities
- Workflow enhancements

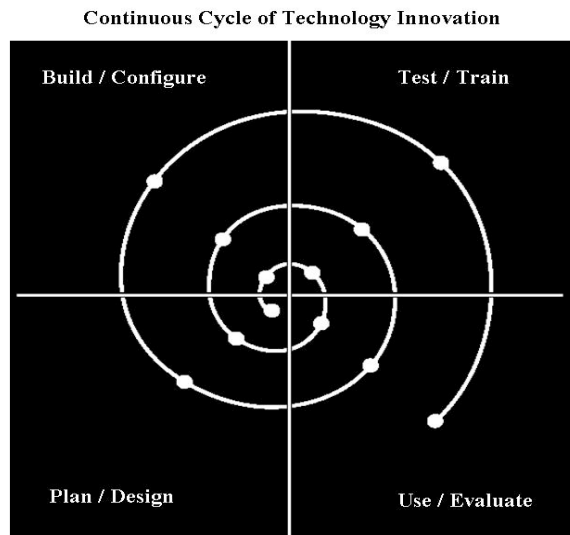
⁷⁴ Gelmon, S., Maty, S., Gates, V., & Droppers, O. (2006, July). *Second Six Month Report: Electronic Health Records in Safety Net Clinics Implementation Evaluation*. Portland State University, Portland, OR.

⁷⁵ Berg, M. (2001). Implementing information systems in health care organizations: Myths and challenges. *International Journal of Medical Informatics*, 64 (2-3), p. 147. Retrieved from: <https://www.cs.tcd.ie/chi/slides/papers/berg-2001.pdf>

- System configuration changes
- Reduction in the number of steps required to complete tasks, such as the number of mouse clicks required for ordering medication refills or closing a patient encounter

To illustrate this point, Figure 5.1 shows the continuous cycle of technology innovation. It begins with the plan/design phase where you create the vision for the EHR and conduct a readiness assessment; then moves to the build/configure phase of establishing the infrastructure and supporting operational elements as described in the previous chapter; then moves to testing the system and training staff; and concludes with the use and evaluation phase. However, as is evident from the figure, the learning from use and evaluation will likely suggest the need for continuous modifications and improvements, thus the cycle is a continuous evolution rather than a stagnant one-time process.

Figure 5.1: Continuous Cycle of Technology Innovation ^{76 77}



Pop-Up Fatigue

A situation that frequently occurs soon after implementation is that of “alert” or “pop-up” fatigue. This is often the result of too many reminders and/or automated alerts being programmed or “turned-on” in the EHR. The danger is that users can begin ignoring such “pop-ups” altogether and result in sub-optimal use of the system’s features. The solution is to pilot-test and fine-tune as much as possible; it also requires some flexibility from the staff.

Fine-Tuning Response Time

Another issue that users frequently encounter has to do with response time. An EHR that is slow in responding to logging on, browsing, and querying/reviewing patient lab results can result in significant dissatisfaction among staff and providers and will soon have negative impacts on the

⁷⁶ Kushinka, S.A., (2006, May 4). *Readiness: What It Looks Like and Why It Matters*. Prepared for the Tides Foundation, Community Clinics Initiative, and Institute for Health care Improvement. Presented at the EHR-Pathways to Healthier Communities Conference. Retrieved from: <http://www.communityclinics.org>

⁷⁷ Plan-Do-Study-Act (PDSA) cycle adapted from Langley, G., Nolan, K., Nolan, T., Norman C., & Provost, L. (1996). *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*. San Francisco, CA: Jossey-Bass Publishers.

overall use of the system. This outcome is not inevitable, but it is a potential issue that needs to be monitored.

Staff Retraining and Ongoing IT Support

“Don’t underestimate the vital link between training and successful system implementation. Training facilitates the transition between development and installation.”⁷⁸

It is strongly recommended that you plan to deliver training on an ongoing basis, including just-in-time and follow-up training, long after go-live. Doing so will increase skill sets organization-wide, improve day-to-day use of the system, and ultimately help realize the full potential of EHR.

In the past, many health care organizations spent considerable amounts of money on purchasing the hardware and IT infrastructure, but they either neglected or underinvested in the time and resources needed to train staff and providers. A health center should not “cut corners on training, nor try to make training a one-size-fits-all approach.”⁷⁹

❖ Recommendations for ongoing staff retraining and optimization are to:⁸⁰

<ul style="list-style-type: none">• Provide both peer-to-peer trainings and HIT trainings led by experts.• Require all staff to attend refresher training courses periodically.• Provide special review sessions on complex functions that clinicians and/or staff regularly encounter and are having difficulty with.	<ul style="list-style-type: none">• Provide ongoing training sessions to resolve issues and teach end-users how to use common EHR functions.• Develop and maintain an ongoing training program for new employees.• Incorporate employee feedback into the ongoing EHR optimization process.
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Case Vignette

One health center makes routine staff retraining sessions mandatory after any modifications are made to the EHR. Aspects of retraining include identifying a list of key retraining points and providing ongoing “pressure training sessions,” which brings staff and/or providers together with IT experts to resolve user issues. Such sessions last about 30 minutes and involve a walk-through of the technical challenges being experienced.

This center also created an EHR map, which showed end-users how to navigate through common functions. Periodic unscheduled, improvised training sessions were conducted. Called “the echo learning process,” these improvised training sessions consist of peer-to-peer trainings that enable providers to learn by observing each other in a group setting. Such sessions allow participants to share and observe individual best practices while learning how to avoid common mistakes.

⁷⁸ Carr, D. (2004). A team approach to EHR implementation and maintenance. *Nursing Management*, 35(5), p. 16.

⁷⁹ Koo, C. (2004). Getting ready for an EMR. *Health Management Technology*, 25(8), p. 26-27. Available at <http://www.acumentra.org/downloads/doqit/getting-ready-Koo.pdf>

⁸⁰ Gelmon, S., Maty, S., Gates, V., & Droppers, O. (2007, January). *Semi-Annual Report, Electronic Health Records in Safety Net Clinics Implementation Evaluation*. Portland State University, Portland, OR.

Evaluation of the EHR: Why and Where to Begin?

“Success, in short, has many dimensions: effectiveness, efficiency, organizational attitudes and commitment, worker satisfaction, patient satisfaction.”⁸¹

Conducting an evaluation of the system is often overlooked in the adoption process. Too often success is erroneously determined by a health center’s ability to install and turn on the new computer system. In reality, however, evaluation involves ongoing assessment and monitoring of the EHR’s impact on staff, quality, safety and efficiency of health care service delivery, as well as on changes in collection and reporting of data.

Although the criteria used to measure success or failure differs from one health center to another, there are some fundamental factors that should be assessed. At a minimum, it is important to evaluate the following three key factors:

1. Impact on workforce and end-user satisfaction
2. System quality, usability, performance, and functional utility
3. Changes in outcomes (administration, business and clinical processes, quality of patient care)

An example of a comprehensive evaluation framework, that includes core concepts and key indicators for measurement or observation, is presented in Appendix 2.

❖ Strategies to evaluating your implementation process and ongoing modifications include:

<ul style="list-style-type: none">• Conducting post go-live reviews among staff and providers.• Evaluating EHR system goals and assessing if milestones have been reached.	<ul style="list-style-type: none">• Ensuring that performance and/or quality reports are being created and used by the health center.• Adhering to routine review of various clinic and administrative processes.
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Additional Resources

For an example of an EHR evaluation toolkit, see: Cusack CM, & Poon, EG. (2007). *Health Information Technology Evaluation Toolkit*. Prepared for the AHRQ National Resource Center for Health Information Technology under contract No. 290-04- 0016. AHRQ Publication No. 08-0005-EF. Rockville, MD: Agency for Health care Research and Quality. Available at http://healthit.ahrq.gov/portal/server.pt/gateway/PTARGS_0_1248_807442_0_0_18/AHRO_Evaluation%20Toolkit.pdf

⁸¹ Berg, M. (2001). Implementing information systems in health care organizations: Myths and challenges. *International Journal of Medical Informatics*, 64(2-3), p. 145. Available at <https://www.cs.tcd.ie/chi/slides/papers/berg-2001.pdf>

Conclusion: Implementation Is Merely the Start of the Journey

“It is clear that installing these systems will not be enough to improve health care quality. CHCs will need to identify ways to realize the potential of clinical decision supports by implementing systems that providers accept and find useful.”⁸²

Many CHCs believe that information technology, in particular EHR systems, offers an array of tools that can enhance their organization by improving their quality of services and patient health outcomes. However, in order to achieve such goals, you should develop a well-coordinated and comprehensive implementation plan to facilitate, navigate and resolve the numerous challenges inherent in implementing an EHR system.

You should also be prepared to experience a rather extensive adjustment period for your entire health center while your employees learn how to manage and use the EHR. Finally, you need to anticipate that there will be unresolved issues and ongoing frustrations that will require attention and retraining.

The key is to vigilantly monitor both the technical and the human issues. Your health center will be significantly affected and shaped by implementation of the EHR. To achieve all of the benefits that are possible from IT, it is useful to understand that implementation is merely the start of a long and not always smooth journey. However, it is a journey well worth taking because the ultimate rewards will benefit your entire organization and the people you serve.

“You will never go back once you go to an EHR...”
-- Executive Director of a CHC Adopter

⁸² Calman, N., Kitson, K., & Hauser, D. (2007). Using information technology to improve health quality and safety in community health centers. *Progress in Community Health Partnerships: Research, Education, and Action*, 1 (1), p. 86. Available at: http://muse.jhu.edu/demo/progress_in_community_health_partnerships_research_education_and_action/v001/1.1calman.pdf.

CHAPTER SIX

SUMMARY OF BEST PRACTICES: A CULTURE OF INNOVATION

“EHR system implementation is not about information technology alone; it is about transforming clinical and business practices. EHR systems and other HIT are an enabling foundation for health care—and organization—reform. The technology does not, in and of itself, cause the reform.”⁸³

To create this handbook, we have drawn on insights gained through a multi-year evaluation project implementation of electronic health record systems. We have incorporated information and best practices from numerous individuals who work in and with health care safety net providers on EHR issues. Our overall intent in creating this handbook has been to expand the limited, but growing, knowledge about the organizational implications, as well as the human and technical issues, associated with EHR implementation, and to clarify its challenges and benefits.

The Promise of the EHR

To achieve critical mass of EHR system adoption by CHCs, much remains to be done, including additional research and greater collaboration among providers willing to share both their failures and their successes.

- ❖ EHR systems are merely a means to an end -- a tool to be used to further achieve the mission and vision of community health centers.

The ultimate goal of adopting an EHR system is to better serve patients who seek assistance through the health care safety net. As practitioners, academics, health policy experts, and researchers, it is critical to remember that information technology makes major advances in quality, safety, and health care disparities reduction possible.⁸⁴

These advances, however, are not guaranteed. Achieving them requires vigilance, sustained effort, and support from purchasers, payers, government, and patients.⁸⁵

Although EHR systems do have the potential to catalyze change, their promise remains largely unfulfilled to date. However, it is likely that in the near future emerging IT innovations will transform CHCs' delivery and coordination of health care. As promising as such systems may be, the challenges inherent in their implementation are significant and should not be understated or downplayed.

⁸³ National Committee for Quality Health Care, Health Care Task Force in EHRs (2006). *CEO Survival Guide: Electronic Health Record Systems*, p.51. Available from: http://healthit.ahrq.gov/portal/server.pt/gateway/PTARGS_0_3882_815832_0_0_18/EHRSurvivalGuide-NOF-2006Edition01-04-08.pdf

⁸⁴ Rosenbaum, S., MacTaggart, P., & Borzi, P. (2006). Medicaid and health information: Current and emerging legal issues. *Health Care Financing Review*, 28 (2), p.29.

⁸⁵ See citation #84.

Synthesis of Key Lessons Learned from Adopters and Non-Adopters

Many CHCs now consider the adoption of an EHR system to be a valuable tool with which to improve the health of their patients and local communities. To better understand the issues they are facing in this regard, authors of this handbook conducted a series of interviews with twelve CHCs -- both adopters and non-adopters -- located in Oregon and Southwest Washington. Their key insights form the basis for some concluding lessons learned.

General Insights from All Clinics

❖ Motivation for Consideration or Adoption of an EHR

The major motivator among both adopters and non-adopters is their belief that an EHR will help them to better accomplish their mission to provide high quality, cost-effective care to vulnerable populations. Both adopters and non-adopters said that an EHR system would help them improve their continuity of care, create more efficient operations, increase their ability to monitor and report on care processes, and facilitate the exchange of medical information with other providers. Both groups also indicated that an EHR system would help them respond to increased federal reporting requirements and pay-for-performance trends.

❖ Health Information Systems in Place

With the exception of one clinic, which began its operations with an EHR, all of the clinics that already had a practice management system in place prior to implementation. They clearly see practice management systems as a first, or interim, step to EHR adoption. In addition, most of them participate in one or more regional or national health disparities disease collaboratives and/or registry systems, and the EHR adopters continue to use these national collaborative tools.

❖ Technical Expertise and Collaboration

Both adopters and non-adopters have used the services of technical consultants, including Application Service Providers and/or Networks. Some CHCs said that financial limitations prevented them from employing consultants, even though they would like to do so. Implementers said that having volunteer and community expert resources to help them work through the process played an important role in their success. Both groups placed immense value on a strong network of community health centers and the ability to share with and learn from each other.

❖ Advice to Other Clinics Considering EHR Implementation

Both adopters and non-adopters mentioned the importance of creating sound EHR implementation and financial strategy plans to handle the initial and long-range costs. Both groups also mentioned the importance of creating a sound plan with which to transition from paper to electronic information.

In choosing an EHR, the clinic leaders stressed the need to consider the local environment and systems that are already in use, not just product functionality and operational costs. Both groups also focused on the critical need for staff acceptance (especially clinic staff), the maintenance of morale during the process, and ongoing training programs. Finally, both groups mentioned the productivity loss associated with implementation and the need to plan and financially compensate for this.

Critical Insights from EHR Non-Adopters

❖ Consideration Process

Although they were in different stages in the decision-making process, providers said they had received great benefit from ongoing discussions in their CHC network and had subsequently incorporated these lessons into their planning process. Of particular importance, they mentioned the need to create an organizational vision and strategic plan; to engage management and staff; to conduct a thorough readiness and organizational needs assessment; and to carefully analyze the various options offered by EHR systems. Non-adopters said that the need to understand the costs of vendor and collaborative models, such as an ASP or RHIO, played a particularly important role in their assessment.

❖ Reasons for Non-Adoption or Delay

The fundamental barrier to adoption was cost for both acquisition and long-term maintenance. As a result, they have explored vendor-direct and administrative service options. Another major barrier (also linked to finances) was the presence or absence of the internal capacity to plan, develop and maintain adequate internal IT support and expertise.

❖ Perceived Impact of Not Adopting an EHR

Only one health center felt positive about its decision not to spend one million dollars on an EHR because it meant they had more money with which to retain employees and provide services. Most non-adopters believed that an EHR would contribute to clinical improvements and workflow. Failure to adopt, they said, could lead to the potential loss of information and the inability to improve their clinic reporting capabilities, including the retrieval of patient and billing information. As a result, they see EHR as a part of their future; the challenge is knowing “when and how,” not “whether.”

Critical Insights from EHR Adopters

❖ Selection Process

Four of the five adopting health centers said they had completed a thorough review of their EHR options; three also said they had conducted a thorough vendor selection review and incorporated their findings into the decision-making process. The two most important factors in vendor selection were affordability, including ongoing costs, and system features. Two health centers said that an ASP model, in particular the cost per transaction model, was too expensive for them. One center opted for a system that included both volunteer technical services and the vendor’s offer to supply the system free-of-charge for the first five years. Another center spent hours consulting with local IT community experts before making its selection.

❖ Implementation Process and Challenges

Three of the five adopters used staged rollouts because they did not believe that full rollout was as critical to implementation success as the human elements. Because they operate on such narrow margins, a particularly critical issue was the loss of productivity during training -- before, during and after implementation. A related issue was the providers’ failure to spend enough time to handle both technical and training issues; as a result, most have developed their own in-house IT support and training programs.

❖ Benefits and Disappointments

Adopters identified a range of benefits, including enhanced data collection and access to information; simultaneous access to patient charts and the fact that charts were no longer being lost; improved reporting and quality assurance processes; improved disease management; and better population-based health planning. Two adopters said that their revenues had increased. Others said they have gained a better understanding of the population they serve; have improved their ability to recruit physicians and mid-level providers to their rural area; and have raised their positive image among patients and other providers in the community.

In contrast, adopters cited only a few negatives, including additional costs in staff time (which one center described as overwhelming) and the loss of personnel, especially older physicians.

Conclusion: More Questions than Answers

“The question is not whether or not an EHR system can work in a safety net environment, meaning an FQHC, but the fundamental question is: “Do the necessary resources exist and are they available to make EHR adoption and long-term successful for FQHCs?” The core question is sustainability.”

-- Oregon Health Care Safety Net Expert

Health information technology is a rapidly growing and evolving field, in particular its application and use in the safety net environment. It is therefore critical that executives, practitioners, researchers and other committed professionals working with the health care safety net continue to communicate with and learn from each other. This allows them to identify not only the common challenges and barriers to EHR adoption, but to also increase their knowledge about the most effective approaches and strategies for overcoming them.

This handbook hopefully has synthesized key information, lessons learned and other critical insights that CHCs, IT experts, health care professionals, academics and researchers have acquired about the issues involved in adopting an EHR system. Our hope is that it will serve as a useful guide to CHCs who are contemplating or moving through the decision-making, planning, implementation and maintenance processes. Ultimately, we hope it makes a strong contribution to the rich culture of sharing that already exists within the health care safety net.

APPENDIX 1

GLOSSARY

The field of health information technology (HIT), not to mention health care in general is a rapidly evolving body of knowledge, often referred to as the world of “alphabet soup.” The use of countless acronyms and confusing concepts will give cause to any individual to seek use of a glossary as a means of trying to better understand various terminologies and concepts commonly used and referred to in the perplexing world of health informatics. A number of terms used within the handbook are possibly either unfamiliar or just plain confusing. Therefore, we have created an abridged glossary containing what we hope are straightforward definitions of commonly used terms. At the end of the glossary, we have also included a list of references for those interested in accessing more expansive HIT glossaries available online.

Terminology

Application Service Provider (ASP) – a third-party organization that hosts, maintains, and provides centralized access to either specific IT applications or to an integrated IT system among multiple health care centers.

Best-of-Breed – one approach to IT system adoption. Refers to the process by where a health care center will purchase and adopt individual IT components from different vendors. The intent is to purchase a specialized IT application from a widely recognized and respected vendor (e.g. a electronic prescription system, a reporting system, etc.). Such an approach, however, often requires development of expensive and complex interfaces among the individual IT systems (i.e. different hardware platforms, operating systems, databases, and programming languages).

Community Health Information Network (CHIN) – consists of a computer network used to exchange health information among individual health care organizations/providers, which enter into an agreement prior to active participation. Such networks often are limited to well-defined localized geographic regions.

Clinical Decision Support System (CDSS) – an integrated computer system that aids physicians and allied health professionals in the clinical decision making process. This is achieved by providing such individuals with instant access to evidence-based knowledge and/or well-established medical guidelines for treating patients, often at the point of patient care.

Easy Fix – when a problem is encountered using the EHR by the end-user that is easily resolved by either the IT staff or vendor. Often requires minimal modifications made to the EHR system to repair problem.

End-user – refers to an individual that can access and utilize an EHR and its various applications, via a computer terminal or some other type of interface (e.g. a computer monitor/screen).

Federally Qualified Health Center (FQHC) – are health centers funded by the Bureau of Primary Health Care under section 330 of the Public Health Service Act. These health centers are

required to provide primary and preventive health care services to diverse underserved populations, regardless of an individual's ability to pay.

Functionality – an integrated set of internal capabilities or functions that an EHR system provides. Examples of individual functions automated lab reporting, decision support tools, computerized order entry, among numerous others.

Go-live – term used at the end stage of EHR implementation, when an organization actually begins using the new system in its day-to-day operations.

Hard Fix – when a problem is encountered using the EHR by the end-user that is not easily resolved by either the IT staff or vendor. Often requires substantial modification(s) to the EHR system in order to resolve problem encountered.

Harmonization – is a national process comprised of a set of steps being taken to achieve a widely accepted and useful set of HIT interoperability standards that will support and allow the free flow of data and information between various software applications within the health care enterprise.

HL7 – Health Level Seven Messaging Standard (HL7) was created with the purpose of allowing different IT applications and medical devices to successful exchange data (both within and across multiple health care organizations).

HIPAA – Health Insurance Portability and Accountability Act (HIPAA) is a law enacted by Congress in 1996. The intent of the law was largely twofold: (1) Adoption of national standards for electronic health care transactions, requiring all health care entities to protect the privacy of patient information using appropriate security standards and safeguards; and (2) Mandate that employers provide a limited period of health insurance coverage to workers (and their families) in the event of job loss.

Integrated IT System (or Clinical Information System, CIS) – an alternative approach for IT adoption than Best-of-Breed approach. An integrated Clinical Information System or CIS bundles multiple applications into one system, often resulting in a single user interface.

Interoperability – the ability to exchange health information among multiple providers, particularly those using different IT systems (either software and/or hardware). Ultimately, the end-goal is to freely cross-exchange information between two or more IT systems/applications in a seamless, non-haphazard manner.

Maintenance – all computer systems require ongoing routine maintenance, involving periodic updates of various software applications, hardware upgrades, replacement of out-dated and/or damaged hardware components (including PCs, monitors, keyboards, etc).

Master Patient Index (MPI) – refers to assigning a unique identifier (often numeric) to every patient either within or across multiple health care organizations.

Network Model – an organization or entity that allows health information and/or administrative data to be shared electronically among multiple health care providers and other key stakeholders.

Optimization – the latter stage of the adoption process in which a health care center becomes increasingly more proficient with the day-to-day use of the EHR. Optimization occurs as staff and physicians learn to gradually master the various functionalities and begin fully utilizing the range of capabilities of the new system. This stage requires ongoing assessment and evaluation of EHR use, continual workflow redesign, and staff retraining.

Pop-up – occurs among end-users of the EHR system when an alert, reminder, or other built-in feature is automatically generated, appearing on the monitor or screen. Pop-ups generally require the user to respond to the pop-up prior to being able to move on to the next desired task.

Pop-up Fatigue – occurs when end-users are required to respond to numerous pop-ups while using the EHR system on a day-to-day basis or even during a single patient visit. Often results with end-users bypassing or simply ignoring routine pop-ups features of the EHR system.

Request for Proposal (RFP) – document outlining a health center’s specific requirements for an EHR system submitted to prospective vendors. The document is used to create a standardized, structured process that enables a health center to compare competing vendors and their respective IT systems, embedded functionalities, overall usability, level of IT and end-user support, and overall costs.

Return on Investment (ROI)/Business Case – formal analysis employed by a health center to assess the financial impact and expenses incurred from EHR adoption vs. the potential revenue gains due to changes in service delivery and/or enhancements in organization processes and workflows. Most often, the bottom-line is to evaluate whether or not a health center can expect a financial return on its investment with the purchase of an EHR system.

Regional Health Information Organization/Network (RHIO) – an organization comprised of multiple stakeholders with the expressed intent of enabling the exchange and use of health information among multiple health care providers, public organizations, payers, among others. Establishment of a RHIO ensures that patient information is exchanged in a secured manner with all the necessary security precautions and legal arrangements in place.

Standardization – the ongoing process for developing, refining, adopting, and gradual universal acceptance of a set of standards for storage and exchange of data among competing IT systems within all of health care (in the United States and abroad).

Workaround – occurs when individuals circumvent problems encountered when using the EHR. Usually, a workaround is adopted by an individual as a temporary fix, allowing the individual to continue using the system. Workarounds, however, can quickly become a routine means of bypassing certain computer applications, software programs, and/or particular functionalities within an EHR system. This is potentially problematic because workarounds can lead to non-standardized use of the EHR among its end-users.

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Online Glossaries

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- EHR Consultants. Glossary of EHR Terminology. Available at: <http://www.emrconsultant.com/glossary.php>
- National Association of County & City Officials (NACCO). Glossary of Public Health Informatics Organizations, Activities, and Terms. Available at: <http://www.naccho.org/topics/infrastructure/informatics/glossary.cfm#GrantSites>
- RTI International. Health Information Security and Privacy Collaborative (HISPC) Toolkit: Glossary. Available at: http://healthit.ahrq.gov/portal/server.pt/gateway/PTARGS_0_661678_0_0_18/E_Glossary.pdf
- United States Department of Health and Human Services (DHHS). Health IT Strategic Framework: Glossary of Selected Terms. Available at: <http://www.hhs.gov/healthit/glossary.html>

APPENDIX 2

EVALUATION FRAMEWORK FOR EHR ADOPTION⁸⁶

Core Concept	Indicators
Organizational Characteristics	<ul style="list-style-type: none"> ○ Vision/mission ○ Culture ○ Leadership: clinical, staff, administrative ○ Infrastructure: automation, training, skill levels ○ Clinic/site governance structure ○ Resilience ○ Legal/regulatory/accreditation requirements ○ Sponsorship/funds/fundraising ○ Stability of resources
Technology	<ul style="list-style-type: none"> ○ Scope of EHR, basic functionality (billing, patient records, order entry, pharmaceutical, lab, protocol templates, disease management) ○ Staging of implementation ○ Availability of technical support/assistance ○ Nature of training, timing (initial/ongoing) ○ Interoperability: connectivity with other systems ○ Modification of EHR technology for safety net clinics ○ Existing software: practice management, results reporting, other ○ User-friendliness, usability ○ Uniformity vs. adaptability ○ Hardware/software (bundle of options) ○ Uptime/downtime of system ○ Internal capacity vs. external consultation ○ Privacy and security of data
Human Factors	<ul style="list-style-type: none"> ○ Workforce: scope, array of positions, stability, expertise in IT ○ Staff satisfaction (process and product) ○ Implementation team commitment ○ Training and technical assistance: knowledge, skills, satisfaction ○ Resistance/acceptance (uptake) ○ Employee morale ○ Disruption/integration ○ Impact on daily work ○ Methods for problem resolution ○ Expectations of EHR use ○ Staff involvement/participation in EHR choice, implementation, rollout ○ Confidentiality ○ Volunteers vs. paid clinicians

⁸⁶ Gelmon, SB, Maty, S., & Droppers, O. (2005). "Organizational Impact of EHR Implementation in Safety Net Clinics: Evaluation Matrix." Portland State University, working documents.

Quality of Service	<ul style="list-style-type: none"> ○ Facilitation of patient care (pharmacy, lab, tests, diagnostic procedures) ○ Clinical processes ○ Clinical outcomes ○ Patient education ○ Capacity to deliver care (encounters, visits, staff/patient ratios) ○ Patient satisfaction ○ Decrease redundancies/duplication ○ Decrease in errors/adverse events ○ Patient reorientation (flow-through system) ○ Population management ○ Increase of appropriate prescribing ○ Identification/replication of best practices ○ Improved case and care management
Redesign	<ul style="list-style-type: none"> ○ Administrative processes ○ Workflow (disruption) ○ Clinical practice ○ Physical space ○ Communication systems ○ Documentation ○ Information management and retrieval systems ○ Patient access/contact/flow
Resources	<ul style="list-style-type: none"> ○ Financial ○ Human ○ Training/technical support ○ Enhancement of business processes ○ Increased/decreased efficiencies ○ Viability/stability ○ User fees, new fees/costs, cost recovery, billing ○ Cost-effectiveness of EHR ○ Pooling of information ○ System content
Readiness	<ul style="list-style-type: none"> ○ Goals for EHR/business case ○ Presence of implementation plan: breadth, depth, rollout ○ Flexibility and adaptability ○ Champions/sponsors ○ Identification of resources for contingencies ○ Clear scope of responsibilities ○ External support ○ Ability to move to next stage: timing, optimization, transformation
Administrative Relationships	<ul style="list-style-type: none"> ○ Unique technical/special assistance ○ Support of sponsors for implementation ○ Level of engagement of sponsors ○ Networks of information ○ Knowledge and implementation dissemination/transferability ○ Benefits of relationship with sponsoring organization

APPENDIX 3

RESOURCES

The resources provided here are intended to serve as a selected reference guide to various publications and other information resources, available in print and/or online. In addition to materials referenced throughout the six chapters of this Handbook, the materials, websites, and references listed below offer additional insights, lessons learned, and more in-depth information on specific topics related to the multiple stages of EHR adoption.

This list is not comprehensive but rather offers multiple resources and perspectives around key issues related to EHR adoption across an extensive range of health care organizations, but particularly those operating within the health care safety net.

❖ **Background Articles and Other Selected Publications** (Alphabetically listed by author)

- Barret, M., Holmes, B., & McAulay, S. (2003). Electronic medical records: A buyer's guide for small physician practices. California HealthCare Foundation. Available at: <http://www.chcf.org/topics/view.cfm?itemID=21540>
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- Shekelle, P., Morton, S., & Keeler, E. (2006). Costs and Benefits of Health Information Technology. Evidence Report/Technology Assessment No. 132. (Prepared by the Southern California Evidence-based Practice Center under Contract No. 290-02-0003.) AHRQ Publication No.06-E006. Rockville, MD: Agency for Healthcare Research and Quality. Available at: <http://www.ahrq.gov/downloads/pub/evidence/pdf/hitsyscosts/hitsys.pdf>
- *The Permanente Journal* (2004). Spring Issue, 8(4). The entire issue contains an array of insightful articles related to Kaiser's EHR adoption and implementation experiences. Available at: <http://xnet.kp.org/permanentejournal/fall04/fall04.html>

❖ Annotated Bibliographies

- Doctor's Office Quality – Information Technology (2005). *EHR Systems Implementation: Selected Resources Overview, Preparation, and Pitfalls*. This online resource provides an annotated bibliography listing various reports related to EHR implementation. Available at: <http://www.azdoqit.com/LS4/Implementation%20Resource%20List.pdf>
- Urban Indian Health Institute, Seattle Indian Health Board (2004). An Evaluation of Electronic Health Records in Indian Health Services. This online report is another

annotated bibliography of published literature and program reports on EHR systems. A comprehensive summary of all health information systems evaluation literature to date is presented, collected by conducting a systematic literature review between 1990 and 2004. Available at:

<http://www.ehr.ihs.gov/documents/Annotated%20Bibliography%20for%20IHS%20EHR.pdf>

❖ **Websites, Online Resources, and Other Sources** (Alphabetically listed by agency/organization)

- Agency for Healthcare Research and Quality (AHRQ). National Resource Center for Health Information Technology. This online website is one of the most informative resources available provided by the federal government regarding adoption and use of HIT. Available at: http://healthit.ahrq.gov/portal/server.pt?open=512&objID=650&parentname=CommunityPage&parentid=4&mode=2&in_hi_userid=3882&cached=true
- American Academy of Family Practice (AAFP). This organization provides a useful online resource guide, with documents and tools for managing health care technology projects. The online resource guide is organized into five sections: readiness assessment, preparation, selection, implementation, and maintenance. Available at: <http://www.centerforhit.org/>
- Community Clinics Initiative (CCI). The Community Clinics Initiative (CCI) is a joint program of the Tides Foundation and The California Endowment. CCI has spent nearly an entire decade supporting the capacity of CHCs throughout the state of California, by building infrastructure projects - particularly around the adoption and use of HIT within the health care safety net. The organization maintains a comprehensive website containing numerous reports, documents, templates, an extensive library, list of online resources, and other practical and informative online guides related to EHR adoption. Available at: <http://www.communityclinics.org/>
- Doctor's Office Quality - Information Technology (DOQ-IT). This is a national HIT project funded by the Centers for Medicare & Medicaid Services. The website serves as a useful online resource, providing information on the following issues related to EHR adoption: assessment and planning, selection and implementation, evaluation and improvement, among other issues. Available at: <http://www.doqit-tx.org/>
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- Rural Assistance Center (RAC). A good online resource that provides in-depth information on numerous issues related to health information exchange (HIT). Primarily, the website provides links and brief summaries on dozens of online websites related to HIT. Also includes online references related to the following items: HIT tools, funding sources, list of organizations, terms and acronyms, success stories, bibliographies, and recent news related to HIT. Available at: http://www.raonline.org/info_guides/healthtech/

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Mission

The mission of Northwest Health Foundation is to advance, support and promote the health of the people of Oregon and Southwest Washington.

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