



A Practical Guide to Effective Use of EHR Systems

Guide 4



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A companion to:

Minnesota Statewide Implementation Plan, 2008

*A Prescription for Meeting Minnesota's
2015 Interoperable Electronic Health
Records Mandate*

Minnesota e-Health Initiative

The Minnesota e-Health Initiative is a public-private collaborative whose Vision is to accelerate the adoption and use of health information technology in order to improve health care quality, increase patient safety, reduce health care costs and improve public health.

INFORMATION ON GUIDES

GUIDE 1:

Addressing Common Barriers to
EHR Adoption. A Practical Guide for
Health Care Providers
Released June 2008

GUIDE 2:

Standards Recommended to
Achieve Interoperability in Minnesota
Updated June 2009

Guide 3:

A Practical Guide to
Electronic Prescribing
Released June 2009

GUIDE 4:

**A Practical Guide to Effective
Use of EHR Systems**
Released June 2009

ACKNOWLEDGEMENTS

The Minnesota Department of Health thanks the many members of the Minnesota e-Health Initiative for their ideas, their expertise and their time in developing this guide. Please refer to the Appendix A for a listing of work-group members.

Upon request, this material will be made available in an alternative format such as large print, Braille, or cassette tape.

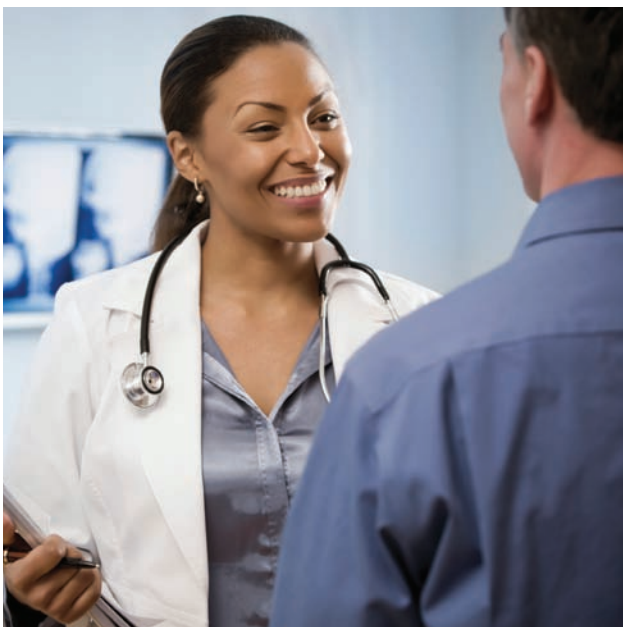


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Preface

You have done the comprehensive planning resulting in a successful “go-live” implementation of your electronic health record (EHR). This guide provides information that will help you and your organization address the following questions:

- How do you optimize the value of your investment?
- How do you effectively use your EHR as a tool to improve clinical practice and support healthier communities?

This Guide is intended to assist your organization in maximizing the value of its investment and to achieve the core values of increased patient safety and improved quality of care that accrues both to your organization and to the patients and communities you serve.

A Practical Guide to Effective Use of EHR Systems compiles in one place the experience, lessons, tips, templates and resources from both your peers and the academic and industry literature. The guide is intended to be practical in its content and message, it is based on the best advice of your peers and industry experts on how to achieve optimal value and maximum utility from your EHR system.



“...if EHRs are to catalyze quality improvement and cost control, [clinicians] and [all health care settings] will have to **use them effectively**. That means taking advantage of embedded clinical decision supports that help [clinicians] [provide] better care of [their] patients.”

Paraphrased from
David Blumenthal, M.D., M.P.P.
[NEJM, 360; 15 April 9, 2009]

Executive Summary

The real value from investing in and implementing an EHR system comes from using it effectively to support efficient workflows and effective clinical decisions, in participating in voluntary and required quality reporting initiatives, and in contributing to the improved health of individuals and populations.

This guide utilizes the Minnesota e-Health Initiative’s definition and framework for effective use. The framework includes four major components:

- *Organizational Support*
- *Health Care Decision Support*
- *Health and Practice Improvement*
- *Community Health Improvement*

For each component, the Guide provides specific, concrete examples, tips and advice to help you optimize the use of your EHR system. Informational resources are also provided to enable further research and implementation.

The workgroup identified many factors that are important to optimize the effectiveness of your EHR. These factors are grouped into four component parts of the Minnesota e-health effective use framework. The components are organized as logical groupings that are intended to ease implementation of these practices. It is recognized that the groupings are not perfectly discrete and some overlap occurs across components. The focus for improvement should be based on recommendations contained in each component.

1. Organizational Support

Organizational support refers to supporting continuous improvement to enhance organizational functions, design and competencies of the workforce. The recommendations are grouped into several categories for organizational support, including:

- Leadership & governance structures
- Competent workforce
- Practice culture & workflows
- EHR related funding
- Value on investment
- Technology resources
- Compliance with legal, regulatory and policy requirements

2. Health Care Decision Support

Health care decision support refers to utilizing relevant patient-centered knowledge and information to support care delivery. Decision support capacity enables clinicians and consumers to receive alerts, reminders, and other information at the point of care. The field of decision support systems is extensive. This component of the framework has drafted the tips and recommendations into categories for clinicians and consumers. The factors for both areas are grouped into several categories.

The decision support tools discussed include:

- Clinical Decision Support
 - Documentation forms or templates
 - Situation-specific flow sheets
 - Relevant data presentation
 - Reference information
 - Order Sets
 - Alerts and Reminders
 - Protocols and Pathways
- Consumer Decision Support
 - Access to EHR information
 - Access to care plans
 - Access to decision support tools and treatment recommendations with supportive patient information

3. Health and Practice Improvement

Health and practice improvement refers to use of information contained in EHRs to improve quality of care as well as individual and population health for clients internal to your organization. Examples of information in your EHR that will support these efforts include:

- Care Management / Care Coordination
 - Disease / Care Registries
 - Population and individual level analysis
 - Integrated care – including Health Care Homes
- Quality Improvement
 - Patient and provider satisfaction
 - Patient Safety
 - Measurement
 - Process improvement

4. Community Health Improvement

Community health improvement refers to the ability of EHRs to utilize relevant population and public health information that supports community health improvement in partnership with external organizations. Examples include:

- Information sent to Public Health
 - Reportable disease case reports
 - Immunizations administered
- Information received from Public Health
 - Clinical / Epidemiology Alerts
 - Immunization history and forecasting
- Quality Reporting
 - ARRA and other incentives
 - Minnesota and national quality reports
- Clinical Research and Evaluation

ACTION STEPS YOU CAN TAKE NOW

You are implementing an EHR or you have already completed your implementation and want to get the most out of your investment. Planning for effective use can begin during the process of assessing the need for a system, planning and adoption. However, whether or not you completed these steps during your implementation process, you can and should begin working toward effective use now.

Described below are what your peers consider to be the top action steps you can take now to optimize the value of your EHR system, organized by the four categories presented earlier.

Organizational Support

- Plan for post-implementation governance to provide leadership on the technical and workflow issues that are likely to arise. The skills needed for this phase focus on continuous improvement of your EHR use.
- Develop an internal communications and marketing plan to support the ongoing work of optimizing your EHR.
- Ensure both clinical and operational leadership are visible and committed to the ongoing work, including effective communication.
- Identify populations you serve that could benefit from a team approach, and include members of the population on teams that are working on health care decision support or community health improvement.
- Maintain and update staff training.
- Formalize a “super-user” role for staff who “get” the new system easier than most. Make it easy for staff to share their tips and discoveries with others.
- Continuously observe workflow to promptly identify and address barriers to effective use.
- Plan to do advanced training tips sessions about six months after your EHR system is launched.
- Plan your approach for clinical business continuation for situations when the computer is not available.
- Investigate additional revenue streams that your EHR may generate.

Health Care Decision Support

- Start simple, beginning with a modest number of decision support areas based on your quality goals.
- Understand that health care decision support is about knowing how and what clinicians and consumers need to consider in providing and receiving care, then developing or obtaining tools to improve that decision making. Tools may be available through business partners or vendors for free or at low cost.
- Select the right tool to support effective clinical decisions, whether templates, order sets, alerts or other tools; remember to consider timing and user roles during the selection process.
- Be cautious in establishing new alerts to avoid alert fatigue. Create ways for users to provide feedback on alerts. Track where feedback comes from to ensure that concerns are addressed. Make sure your clinicians are comfortable with the reasons these alerts exist.
- Organize a standing provider/clinician committee whose focus is to educate and bring other users up to speed. Members of the committee will serve as EHR champions. Convene the group regularly to provide input on enabling additional EHR features and designing decision support features.
- Work with vendor user groups to learn about ways to leverage your system to achieve desired outcome and how to take advantage of features in new releases.
- Share and build on work already done by other organizations or business

partners, such as templates, documentation tools, flowsheets, guidelines and any custom-built features and tools.

- Create an ongoing process to re-examine best practices and evidence you have encoded into your EHR (order sets, alerts, flow sheets, etc.).
- Create easy and effective access to information for consumers to support their decision making, such as providing access to EHR information, decision tools, care plans or treatment information.

Health and Practice Improvement

- Utilize the power of the EHR to facilitate organizational level/specific population level analysis of information with the intent of improving care delivery and health outcomes.
- Advocate for enabling a care registry feature (also known as disease registries) in your EHR. Utilize that tool to facilitate monitoring, follow-up and referral of patients with chronic and other conditions.
- Set quality improvement priorities based on:
 - Parameters related to the population your organization serves
 - Metrics that need priority attention (e.g., specific disease registry)
 - The specific quality improvement goals of your organization
 - Financial incentives or other funding
- Determine what data elements have to be captured (and how to ensure consistency in how they are captured) for each priority area selected. Research what is needed to report the quality data in the format required.
- Determine if your organization has expertise for querying and analyzing data. If not, partner with organizations that can help, such as universities or quality improvement organizations, vendors or other business partners.

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Community Health Improvement

- Learn how your EHR system can be used to generate automated reports to public health based on specified criteria, such as positive lab results for reportable diseases/conditions, immunizations, or diagnoses.
- Test your readiness for exchanging data electronically with your customary trading partners. Widespread, secure data exchange will enable improved continuity of care for all.
- Support local and state public health to ensure that their systems are updated and prepared to exchange data.
- Set priorities for quality reporting based on requirements or suggestions by health plans, federal or state programs, or other sources.
- Ensure policies are in place for use of EHR data for research to improve the health of the community, such as including research consent on your HIPAA forms.
- Learn how your EHR can support patient participation in research efforts.

Introduction

Effective use of EHR systems is an on-going process that needs to begin in the early planning stages for an EHR and continue throughout its life cycle.

This Guide assumes you have done the comprehensive planning that has resulted in a successful “go-live” implementation of your EHR system. Regardless of how your implementation went, you may find compelling reasons to re-think and re-tool your system to achieve better results. While this may seem redundant, implementation of EHR systems, much like the adoption and use of similar systems, involves a cyclical process to achieve the most desirable results; in this case, fully supporting workflows, increasing competencies and improving operations. An EHR system is not static; changes to the system must be expected.

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In addition, this guide assumes you have created specific, measurable goals for use of your EHR system, such as:

- Improved quality of care and enhanced patient safety
- Improve patient satisfaction and access to information
- Support for health maintenance, preventive care, and wellness
- Increased productivity and reduced “hassle factors” with the aim of improved satisfaction for clinicians, consumers, and caregivers
- Support for revenue enhancement
- Support for predictive modeling and development of evidence-based healthcare guidance
- Secure data exchange among all key internal and external partners
- Utilization for public health, quality, clinical research and other reporting purposes

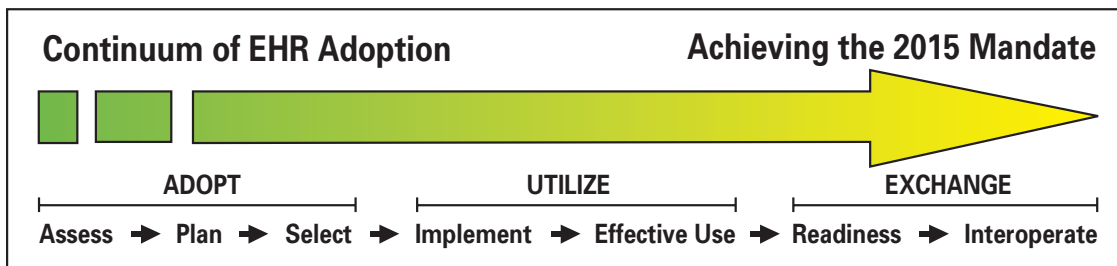
Achieving such goals will undoubtedly challenge your organization and its staff in ways probably not experienced before. You will have to confront “post-live” barriers that will require what will likely be an unprecedented degree of collaborative, enterprise-wide commitment to problem-solving. While this guide was created to assist you in addressing those challenges, it is focused primarily on providing practical actions, tips, tools, templates and resources that will help overcome barriers to achieving optimal success. It contains the collective wisdom of many individuals who are living through the journey toward the effective use of EHRs.

As first published in *A Prescription for Meeting Minnesota’s 2015 Mandate for Interoperable Electronic Health Records—A Statewide Implementation Plan*, the framework identifies seven major steps in adopting and effectively using an interoperable EHR system. The seven steps in turn are grouped into three major categories (see figure 1):

- **Adopt**, which includes the sequential steps of Assess, Plan and Select.
- **Utilize**, which involves implementing an EHR product and learning how to maximize its value to your organization and patients.
- **Exchange**, which includes readiness to exchange health information with other partners, as well as having an EHR system that actually interoperates electronically with other systems, ideally with minimal need for human intervention.

This document focuses primarily on the UTILIZE portion of this model.

Figure 1: Minnesota Model for Adopting Interoperable Electronic Health Records



MINNESOTA E-HEALTH DEFINITION FOR “EFFECTIVE USE”

No single definition is in use for “effective use” of EHRs. The definition developed by the Minnesota e-Health Initiative builds on work in the published literature regarding EHR value, optimal use, system improvement, population health, and health and care outcomes. The definition was developed with input from the Minnesota e-Health Advisory Committee and its Effective Use Workgroup members (refer to Appendix A). This definition supports the concept of Minnesota’s EHR adoption continuum found in the 2008 Minnesota statewide plan.

Minnesota e-Health definition of effective use is as follows:

As an ongoing element of the Minnesota EHR adoption continuum, effective use means: adequately planned for, selected, and implemented EHR systems that are efficiently and properly populated and used; are supported by and support the continuous commitment of individuals and organizations to improve patient safety and to provide optimal and comprehensive care to clients; achieve value for individuals, families, organizations, and populations across the continuum of care; and support the achievement of Minnesota’s 2015 interoperable EHR mandate. At a minimum, these categories include:

- *Organizational support*
- *Health care decision support*
- *Health and practice improvement*
- *Community health improvement*

MINNESOTA E-HEALTH FRAMEWORK FOR EFFECTIVE USE

The Minnesota e-Health Initiative identified several characteristics or prerequisites for effective use of EHR systems, including:

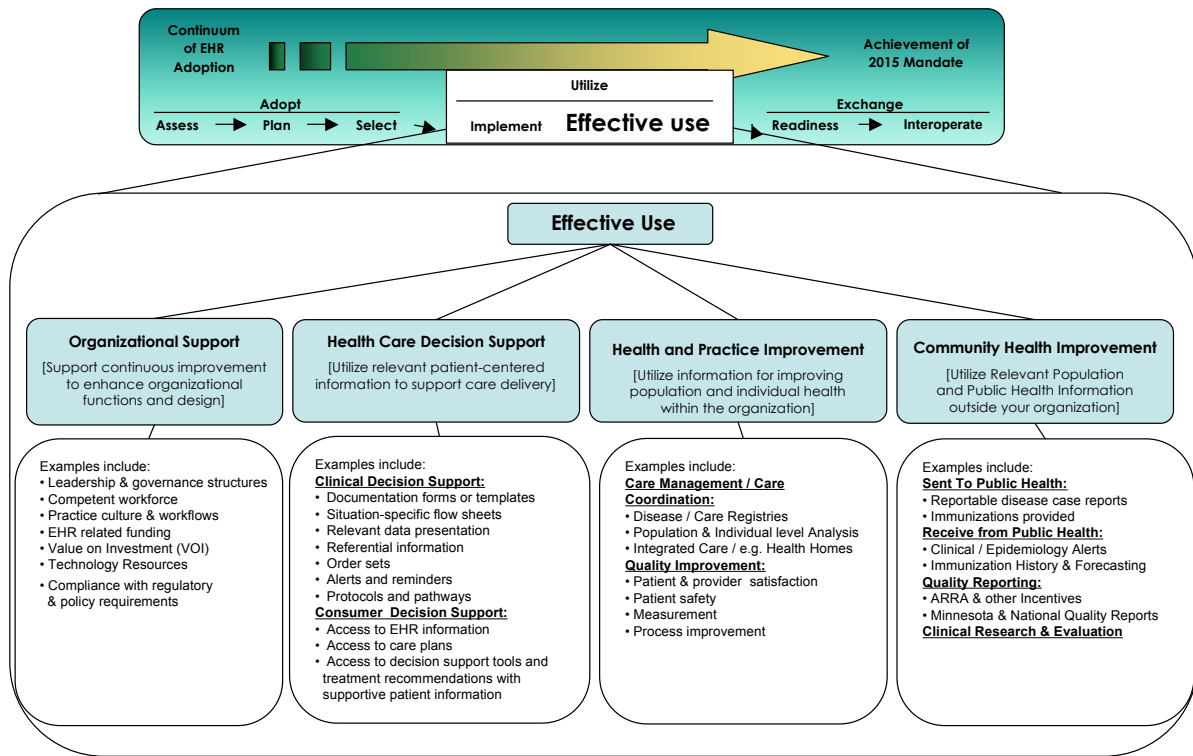
- The system is adequately planned for, selected and implemented
- The system is efficiently and properly populated and intelligently used
- The system is not used to merely replicate old paper processes
- It is both supported by and supports continuous commitment of individuals and organizations to improving patient safety, and providing optimal and comprehensive care to clients and populations
- Use of the system achieves demonstrable value for individuals, families, organizations and populations across the continuum of care, regardless of the setting in which it is used
- Implementation and use of the system represents concrete progress toward achieving Minnesota's 2015 interoperable EHR mandate (For more on the mandate, visit www.health.state.mn.us/ehealth)

These characteristics reflect the complexities of "effective use": having to faithfully represent the needs of both clinical and administrative users, working in diverse settings, and seeking to meet the varied needs of patients, payers, populations and others.

Minnesota's framework for effective use originally emerged from a broader model for the adoption and use of interoperable Electronic Health Record (EHR) systems developed by the Minnesota e-Health Initiative (see Figure 1).

Figure 2 highlights how Effective Use as defined in Minnesota fits within this broader EHR adoption model.

Figure 2: Minnesota Framework for Effective Use of EHRs



For each component, the guide provides specific, concrete steps you can use to develop an action plan for your organization. Informational resources are also provided to enable further research and planning.

1. Organizational Support

Developing the organizational foundation to support your EHR system is critical to ensure effective use. It refers to supporting continuous improvement to enhance organizational functions and design. This includes appropriate leadership and governance structures, competently trained workforce, practice culture and workflows, EHR related funding, value on investment (VOI), technology resources and compliance with regulatory and policy requirements.

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2. Health Care Decision Support

Utilizing relevant patient-centered information to support care delivery is one of the great utilities of an EHR, and it is critical to include both clinicians and consumers as part of healthcare decision support. Smart use of decision support systems (DSS) is essential to achieve a balance of what is possible and what is realistic to incorporate into the workflow. This balance is needed to help avoid alert fatigue, and involves setting priorities for DSS use. Including consumers as part of decision making is an essential ingredient for better health outcomes. This could include access to decision support tools and treatment recommendations with supportive patient information.

3. Health and Practice Improvement

Information contained in EHRs should be used to improve quality of care as well as individual and population health for clients of your organization. For the Minnesota e-Health Initiative this is called health and practice improvement, comprised of care management and care coordination tools like disease/care registries. The intent is to utilize aggregated information for population level analysis, which includes aggregating information to identify trends among groups of patients such as those with asthma or diabetes.

4. Community Health Improvement

EHRs can utilize relevant population and public health information to support community health improvement in partnership with external organizations. This includes information exchange with public health agencies for reportable diseases and immunizations, and also includes information received from public health such as clinical/epidemiological alerts and immunization history and forecasting. It also includes reporting data as needed to support quality initiatives (e.g., Minnesota Community Measurement, Physician Quality Reporting Initiative (PQRI) requirements etc.) and information needed for clinical research and evaluation.

“MEANINGFUL USE” WITHIN THE BROADER CONTEXT OF EFFECTIVE USE

In 2009, Congress passed the Health Information Technology for Economic and Clinical Health Act (HITECH Act) as part of the economic stimulus package. The HITECH Act* authorized new financial incentives through the Medicaid and Medicare programs to ensure that the adoption and use of health IT contributes to a more efficient, effective and safe health care system that achieves improved health outcomes.

In exchange for receiving HITECH Act funds, providers will need to demonstrate “meaningful use” of their EHR system. Congress established three measures of meaningful use in legislation: e-prescribing, procurement of nationally certified EHR systems, and submitting clinical quality measures. Further definition and guidance is expected to be released by the federal Department of Health and Human Services later in 2009.

The federal law gives states some leeway for determining the definition of “meaningful use” for the purpose of determining eligibility for Medicaid incentives. In Minnesota, the Minnesota Department of Health will lead the process to define “meaningful use” to meet Minnesota and federal priorities. The definition of “meaningful use” is important because it will be a key measure that determines provider eligibility to receive incentive funds. *The Minnesota e-Health Initiative views the definition of “meaningful use” as part of a broader framework of “effective use” of electronic health records.* As described in this document, this approach recognizes that the real value in EHR systems comes from using them effectively to support efficient workflows and effective clinical decisions, which have a positive and lasting effect on the health of individuals and populations.

The Guide began with a summary of action steps your organization can take now to increase its effective use—and the value—of your EHR system. It goes on to explore many factors grouped into the four components identified for effective use of an EHR system:

- Organizational support
- Health care decision support
- Health and practice improvement
- Community health improvement



* www.health.state.mn.us/e-health/hitech.html

For more information about the definition of meaningful use please go to www.state.mn.us/e-health/hitech.html



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A PRACTICAL GUIDE TO
EFFECTIVE USE OF EHR SYSTEMS

Organizational Support

Support continuous improvement to enhance organizational function and design

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INTRODUCTION

After going live with an EHR system, ongoing action on organizational issues is critical to ensure effective use of the system. EHR systems function within the environment of an organization, and must both support and be supported by that organizational environment. Efforts that can optimize the workflow, support workforce competencies and improve organizational operations will have an important impact. It starts with ensuring you have a working process to identify and address organizational and workforce related issues as they arise.

Top Action Steps for Organizational Support

- Plan for post-implementation governance to provide leadership on the technical and workflow issues that are likely to arise. The skills needed for this phase focus on continuous improvement of your EHR use.
- Develop an internal communications and marketing plan to support the ongoing work of optimizing your EHR.
- Ensure both clinical and operational leadership are visible and committed to the ongoing work, including effective communication.
- Identify populations you serve that could benefit from a team approach, and include members of the population on teams that are working on health care decision support or community health improvement.
- Maintain and update staff training.
- Formalize a “super-user” role for staff who “get” the new system easier than most. Make it easy for staff to share their tips and discoveries with others.
- Continuously observe workflow to promptly identify and address barriers to effective use.
- Plan to do advanced training tips sessions about six months after your EHR system is launched.
- Plan your approach for clinical business continuation for situations when the computer is not available.
- Investigate additional revenue streams that your EHR may generate.

Leadership and Governance Structures

Create and support a governance structure that assures successful optimization of EHRs within the organization; that is, a governance structure that:

- Understands workflow processes and how the data stream is tracked (e.g., effects across disciplines and on other departments such as health information services, billing, quality improvement, etc.)
- Includes leadership from the executive team, operations, nursing, medical directors, quality, safety, coders, finance, information technology, and others who have a stake in the EHR being successful. Leaders can play a role at different levels within the organization, although the levels of competencies needed may vary depending upon the role they play.
- Comprises broad representation of various essential perspectives.

The actions and considerations in this section give practical insight on how to support the development and implementation of successful governance structures.

Note for small practices and other providers: Small practices and other providers may not have dedicated staff or expertise available to readily support achieving the full potential of the EHR. Vendor-based user group meetings and on line discussion/support groups can be a valuable resource for ideas and solutions in these areas. It is also valuable to do a site visit at a location that has a mature implementation of the same vendor's software. Consider bringing in outside assistance to inform staff how health data can be re-used for multiple purposes ("Enter once, use many times"), and optimal approaches to ensuring the EHR is fully populated in order to capitalize on the system's potential.

1. Plan for post-live governance during the adoption phase to provide leadership on technical and workflow issues.

- a. Provide educational opportunities for the governance team to increase their understanding of the implications of the EHR. Make use of practical tools for education using multiple methods of communication and learning—"a picture is worth a thousand words," and visual displays such as workflow diagrams can clearly show underlying problems and opportunities for improvement.
- b. The governance structure should include members from the executive team, operations, nursing, medical directors, quality, safety, health information services, coders, finance and information technology. It may also be appropriate to have the vendor be represented at some meetings; meetings may need to include ad hoc members from other organizations or business partners with the right expertise, including data needs, the administrative perspective, and the operations perspective, etc. Governance does not stop after go-live.
- c. The governance structure should:
 - Include regular meetings and ongoing communications
 - Articulate and emphasize the vision for the EHR
 - Include cross-disciplinary representatives
 - Allow membership to evolve over time as needed
 - Include leadership knowledgeable about full EHR potential
 - Bring in new ideas from outside organizations as needed

- d. Professional associations can share stories of effective governance structures and approaches in newsletters, on websites and in workshops/conferences to support and encourage organizations and their leadership to adopt best practices in this area.

2. *Support the development of methods and venues for communicating including a systematic way to provide input into the process and a mechanism for regular feedback to vendors.*

- a. Develop an internal plan for communications and marketing.
- b. Make EHR updates a regular section in as many existing communication channels as appropriate.
- c. Assure that the champions in your organization are recognized clinical leaders and have a systematic means to share their insights and “tips and tricks” so that other staff can incorporate them into their everyday practice. Also ensure these champions provide feedback (including staff feedback), insights and recommendations to the governance bodies.
- d. Assure that a communication mechanism is in place for providing feedback to vendors. Involving the vendor with the leadership team, participating in user group meetings, and creating a trouble ticket/enhancement request system are examples of effective feed-back mechanisms.
- e. Through associations and the Minnesota e-Health initiative, health care organizations can share templates, tips and example communication plans describing some of the common improvement issues.

3. *Develop, follow and continually evaluate an ongoing EHR management plan that includes: a workplan with evolving goals, tasks, timeframes, responsibilities and budget; a systematic way to guide the EHR’s evolution; a change management plan to ensure enhancements function properly; cross-functional teams that continue to work together after the go-live date.*

- a. Ensure that the champions and innovators in your organization have a regular means to relay their insights and ideas so that other staff can try them out and perhaps incorporate them into their everyday practice.
- b. Identify and share example goals, metrics, milestones, project management plans and change management plans.

4. ***Be sure to include in your planning topics such as adequate personnel, funding and other resources to achieve effective use.***
- a. Develop a realistic plan/budget to estimate and budget for the costs of ongoing needs to assure optimal use of the EHR (including ongoing training, communications, workflow improvements, governance needs, etc.).
 - b. In the case of cost over-runs that have consumed resources planned for ongoing needs, revise your plan so it incorporates savings from operational efficiencies to support current investments in optimization and effective use.
 - c. Network with other other organizations that may be willing to share example budgets, staffing models and other resources needed once the EHR system is launched.

5. ***Identify and develop EHR champions within your organization.***
- a. Organizations can provide additional training and networking opportunities for EHR champions to help them become experts in the use and training of EHRs; this training can then be passed on within the organization.
 - b. Help your system leadership become EHR champions. Meet with them to reinforce the critically important roles they play in effective ongoing use by all users of an electronic health record system. Help them understand the necessity to provide positive leadership within the organization by:
 - Repeatedly articulating the vision and clinical goals for the EHR
 - Being clear regarding expectations of staff
 - Providing positive leadership by focusing on the opportunities, while directly addressing barriers and/or problems as they arise
 - Providing ongoing communication and celebration of successes
 - Painting the big picture for how effective use of EHRs tie to important quality and safety initiatives (for clinical staff), operational efficiency (for operations), better care (for patients) and other related initiatives
 - c. Identify a provider champion who is a respected clinical leader, one who has the vision of what an effectively used EHR could spearhead efforts in discovering new ways of using technology to improve care delivery.
 - d. Develop champions within the organization that can communicate a clear vision, well-defined goals and set a positive example.
 - e. Associations can develop and communicate best practices for leadership, communication, and developing positive work cultures

that support and encourage the adoption and use of EHRs. This can be done on websites, in newsletters, meetings and other modes of communication to best reach key audiences.

- f. Encourage EHR champions to discover new tools and more advanced ways of using the EHR. Help them to seek opportunities to network with other EHR users and vendor user groups to learn from their experiences, including:
 - How data from EHRs can inform and support improvements in population health (e.g., aggregation of clinical data on diabetes status of all patients in health system, for population health monitoring)
 - How EHR data can support public health interactions with the health system
 - How EHRs can help organizations meet their goals

Considerations:

- The adage, “We don’t know what we don’t know,” is certainly true in learning to effectively use a complex system like an EHR. These systems have huge potential for supporting practice improvement. Learning from others is the best way to understand that potential.
- As organizations move forward from implementation, leaders need to understand the full capabilities of the EHR, then create a culture that supports end users through continuous training/learning and applies the effective use of EHRs towards their organizational goals, including improving the health status of the communities they serve. Leaders need to be able to articulate a clear picture of a single integrated delivery system (that includes public health and population health) for the patient—a system that can provide all the information needed when it is needed for both the patient and the providers.
- It is critical for leadership to convey the vision and the message that by using this system, the organization will see a very real return on its investment of time, energy, and money in terms of higher quality of care, improved patient safety and efficiency.
- Organizations should consider sharing or highlighting innovative use of EHRs in newsletters, websites and during speaking engagements.
- Champions and other leaders are critical to achieving post-live optimal use. Respected clinician champions provide a vision that can transcend any current problems, can be supportive of change, and that have the trust that can win compliance.
- Consider adopting and using a well-structured goal program to establish and communicate your organization’s goals for EHR use.

- The impact of positive and innovative work environments where the expertise and ability of the staff is solicited and respected by leadership will likely increase the support by staff to adopt and optimize the use of EHRs.
- It is not uncommon that before the EHR system is up and running costs may rise as new functions, custom needs, training, and other issues arise, cause budgets to be exceeded. This can reduce the resources necessary to optimize the system. While it's important to attend to the fundamentals of system use, remember that it is in optimizing its use that the real Return on Investment/ Value on Investment lay. Try to control "scope creep" so that your resources are not exhausted before you achieve your objective.
- Offer internships for informatics graduate students; they can help identify improved workflows, create paths for system optimization, and develop effective training/staff support approaches.
- What gets measured gets done; establish metrics and set goals. Having metrics in place will help measure current status and also progress toward achieving goals for optimal use. For example, a goal could be to have 85% of physicians regularly using CPOE (or some other key EHR feature) by 6 months post-live. Without metrics, you have no way to assess your progress or know of areas which may need attention.
- Myths, rumors and frustrations can grow quickly after go-live. It is important they are promptly addressed and stories of effective use shared.
- Clearly and repeatedly communicate how issues will be addressed, and consider providing reassurance to staff that there is a plan, even if their problems cannot be solved today.
- Post-live governance structures face new challenges of increased expectations, reliability, updates management, training and data use.
- Participants in post-live governance structures may need additional education about issues unique to the effective uses of EHR systems.

Practice Culture and Workflow

Once you have implemented your EHR, your organization will experience changes in workflow and processes. The culture and informal power structures of the workplace will most likely change. Similar to changes in other aspects of our lives, the adoption and use of health information technology may cause upheaval. It will be important to prepare those staff who may struggle with change. The following topics and actions provide insight into preparing for this exciting and challenging time.

It is important to understand the benefits, value and impact of adopting, implementing and effectively using an EHR. One of the important areas

to focus on is workflow. When you are implementing your system it is important to not merely replace an existing paper system with an electronic one; it is important to modify your current workflows to gain the most value from your EHR.

1. *EHR implementation has a significant impact on culture and the power structure of the organization. Be prepared to manage consequences and strong emotions, such as lack of willingness to change, resentment and feelings of powerlessness.*

- a. Leadership will need to help create the culture that captures the vision of optimization and efficiency, and implement a change management process that is easy to understand and carry out.
- b. Acknowledge the difficulty of implementing change. Re-evaluate the workflow to make sure that each team member is doing work that is appropriate to them. Focus on the vision and the goals embodied in the mission.
- c. The clinical and technical leadership need to have an understanding of who and how decisions are made that affect practice culture, roles and responsibilities, etc.
- d. Leadership needs to be understanding of any emotional fallout, sympathize with the feelings behind it, yet be steadfast with the mission and re-iterate the vision. Assure users that over time, all staff will learn how to use the system more appropriately and effectively. Skilled users can share their methods and less skilled users can share their questions and problems so they can be resolved.
- e. Strengthen the knowledge and understanding of staff regarding the value of their clinical data documentation toward population health monitoring and improvements. Provide examples of how incomplete and inaccurate clinical and demographic data undermines the organization's ability to aggregate data for quality improvement, population health monitoring, and public health reporting.

2. *Review workflow to assure optimization and to reach the full potential of the EHR.*

- a. Identify and document all the uses for EHR data (internal and external).
- b. Identify priority populations (such as diabetics) and track patients. Use this data for quality improvement and reporting.
- c. Include a process to optimize workflow early on in the post-live

process and periodically reassess the impact of the EHR on workflow for opportunities to improve both clinical and operational efficiency.

- d. Organizations should share examples of workflow to highlight paths to improved efficiency and performance.
- e. Provide training and resources on LEAN, Six Sigma and other process review methodologies.

3. *Design new workflows that involve the patient or are done in the patient's presence. Be sure to analyze the impact on clinician-patient interactions.*

- a. Train and support all staff to use the EHR integrally with the patient; engage the patient in the EHR by taking advantage of its features to display lab results over time, radiographic images, etc. Treat the EHR system as a powerful patient education tool. This will help increase both staff and patient acceptance of the system. (See also Patient Involvement and Support below.)
- b. Give careful consideration to placement of the monitor and peripheral computer equipment. An example would be to lay out the room to allow the patient and clinician can communicate face to face as much as possible. The monitor can be easily swiveled to engage the patient in the information that is being displayed.

4. *Support the ongoing time/resource commitment to workflow optimization.*

- a. Set an expectation of staff participation in workflow improvement activities and application of change management tools.
- b. Provide support to staff in the form of adequate time, knowledgeable team leads, and executive sponsorship.
- c. Early in the EHR planning phase, develop a realistic plan/budget for workflow optimization needs.
- d. Ask vendor and user groups to devise methods to address workflow issues.
- e. Involve process improvement staff in reviewing EHR workflows.

5. *Address challenges associated with improving workflow in real-time with patients present*

- a. Use role playing in any training plan on workflow optimization, and change roles to see the workflow from the perspective of other users and/or the patient.

- b. Implement a dry run prior to piloting, and pilot the change in a small environment.
- c. Enlist input and feedback from your patients and staff regarding workflows, efficiencies and proposed changes.

6. *Research best practices, methods or standardized ways to understand and improve workflow processes.*

- a. Adopt a standard process improvement methodology (e.g., LEAN) to document and redesign workflow processes as needed.
- b. Engage all staff/end users in analyzing current processes and in developing improved processes.
- c. Communicate updated or changed workflows and diagrams.

7. *Understand the challenges (e.g., lack of interoperability, internal and external impact of ongoing evolving changes) that can result in reduced capacity and disruption to providing patient-centered care.*

- a. Clearly articulate the long-range vision for your EHR and make sure all have input in decisions. Make sure the vision is repeatedly articulated during the times of challenge.

Considerations

- Optimized workflow is critical to improve clinical practice. Workflow is not always redesigned in the pre-live phase of implementation; post-live experience often uncovers weaknesses in both old and new workflows. It is crucial the workflows be re-visited if staff highlights the need for improvements.
- Where do you locate the computer in the exam room? Which way should it face? Does the flow support engagement of the patient? These and other workflow questions are important to resolve for your setting.

Competent Workforce

To effectively use your EHR system, you will need staff that brings the right health information technology (HIT) skills to their position, and are prepared with the knowledge and information that will enhance the value of your system. As with other new technologies, there is a need to develop and train people who will be able to fill the workforce gaps created by a rapidly changing environment.

1. ***Develop an adequately prepared workforce with appropriate health IT skills (e.g., informatics skills, basic IT expertise, and computer skills).***
 - a. Make sure staff are comfortable with basic computer skills. It will be hard for someone to optimize their use of an EHR system if they lack basic keyboarding and other skills.
 - b. Consider shifting roles and responsibilities for staff that have a natural facility and interest in using the EHR.
 - c. Attain an organizational commitment to personnel and resources including:
 - Ensuring that there is someone on staff who can be a bridge between clinicians and IT staff (e.g., a nurse informaticist or a health information management professional). If you are a small organization, encourage someone with an interest in that area to become your bridge.
 - Ensuring ongoing staff training is available and encouraged, including training for new staff and periodic upgrades to the EHR system.
 - Continuing to leverage your “super users.”
 - Utilizing vendors and user groups to provide enhanced learning for trainers, super users and the person who serves as your technical bridge.
 - Using frequently asked questions and newsletters to inform staff about how to optimize the use of EHRs. Store these documents online in a searchable archive.
 - c. Educational institutions should include core informatics principles around optimal use of EHRs in their health care curricula..

2. ***Create adequate training infrastructure that includes a training database, system environment and training rooms.***
 - a. Assess, plan and budget for training needs early on in the EHR planning process, including planning for a test database for training purposes.
 - b. Ensure that the training environment is as close as possible to the actual environment after the EHR system is implemented and being used. Make training rooms and test environments available close to clinical areas so busy clinicians do not need to be pulled away from normal workflow to receive training and preform testing, and have adequate time for training.
 - c. Provide readily accessible learning opportunities such as:
 - “Just-in-time” learning available on the intranet
 - Frequently asked questions readily available from within the application
 - Adequate super user support and ready access to the help desk.
 - d. Consider purchasing laptops that can be used to set up a portable training environment.

- e. Consider the use of web conferencing for short over-lunch or over-break training sessions.
- f. Set up mini-trainings in the break room or lounge on certain days of the week.
- g. Your training and application vendors must make sure their training programs are flexible, can be modified to meet different learning styles, and are tailored to your environment.

3. *Ensure a common understanding of competencies needed to address effective use.*

- a. Use resources such as those from Stratis Health or the Technology Informatics Guiding Educational Reform (TIGER) Initiative (see Resources Section) to understand what needs to be done and the array of competencies needed.
- b. Develop a list(s) of health informatics competencies you want to include in either individual positions or available from across a team.
- c. Work with organizations and associations to document and provide lists of resources that are available to develop informatics and other competencies and training.

4. *As a smaller practice, plan for the expenses associated with training.*

- a. Develop creative and economical ways to provide a learning environment including:
 - Holding lunch and learn sessions
 - Re-purposing older computers to be training workstations
 - Developing a web-portal across small practices for training that can be accessed during non-work hours.

5. *Provide a work environment that supports attendance at necessary training.*

- a. Convince leadership that to effectively leverage their EHR investment it is necessary to develop a culture of continuous learning; show commitment by participating in the training.
- b. Develop a training team that will ensure everyone is trained and that the trainees are receiving the attention and curriculum they need.
- c. Design training programs and modules that address the needs and different learning styles of students to encourage attendance, active participation and recall of information.
- d. Search out and participate in distance learning opportunities.

6. *Develop ongoing refresher courses to mitigate the loss of information or skills obtained in training*

- a. Circle back with users 6 weeks after they have started to use the system to “retest” their skills, re-teach things they may have forgotten and correct inefficient work-arounds. Sometimes an aspect of the system that was a minor irritant in the beginning is now a major frustration. Circling back can identify and address those frustrations before they undermine staff commitment to using the system effectively.
- b. Periodically shadow users to observe their use of the system to understand their learning needs and show them one or two tips.
- c. Establish “super-user” meetings to share lessons learned.

Considerations:

- Be aware of and plan to address the differences between individual competencies and organizational capacity. Even if you have staff skilled in health IT and health informatics, you will also need supporting policies, a secure network, adequate data storage, the ability to exchange data outside your firewall, and other capacities needed to gain maximal value from your EHR system.
- Understand the value of health informatics in developing the workforce competencies you will increasingly rely on in the future.
- Be prepared to identify competency issues across staff and provide innovative solutions where possible.
- Consider sharing your training materials with other organizations.
- Consider using webinars to help with training.

EHR Related Funding

Obtaining funding in today's financial environment is difficult but not impossible. To take advantage of the many benefits of health information technology available through an EHR it will be important to explore innovative and advantageous funding sources including collaborative funding, federal and state monies (in grants, loans, incentives), private grants and loans, and performance-related incentives. The following actions, considerations and resources may help when managing the challenges and opportunities of securing health IT funding.

1. *Understand and budget for costs associated with ongoing maintenance and technical support, system upgrades and staff training.*

- a. Develop ongoing IT support budgets/resource requirements for the EHR environment; obtain board/senior leadership buy-in.
- b. Build a business case for the cost savings (from efficiency, quality, reporting, etc.) that can help fund ongoing support and maintenance.
- c. Ensure budgets are complete and include ongoing costs such as staff training and staff turnover.
- d. Take advantage of incentive programs such as pay-for-performance or Medicare funding through the HITECH Act (see section on meaningful use).
- e. Be incremental in what you attempt to accomplish, and guard against the project scope expanding beyond your budget.
- f. Start with something simple, inexpensive, yet effective in order to demonstrate the value of continuous improvement of the EHR.
- g. Invest in your system in such a way that you will be able to reap the benefit of the HITECH incentive funds, first focusing on e-prescribing and/or quality reporting.
- h. Encourage Quality Improvement Organizations (QIOs) to update their tools, or develop useful tools with your vendor, for planning, measuring and tracking ongoing costs. The value of such a tool is more important than ever given the current financial climate.
- i. Seek out funding from private sources.

Considerations:

- Understand that there are ongoing costs for adopting and using EHRs, and it is critical to examine the appropriate method for your organization to enhance the use of your EHR. Don't try to "bite off more than you can chew" financially—a half-installed and limited system will not help your organization.

- Develop a budget that will allow for funding to accrue over several years, and then support ongoing costs.
- Consider how EHR capabilities may be utilized to enhance current revenue streams or create new ones.

Patient Involvement and Support

Patient support and enthusiasm can help influence your EHR success. Involve patients in the adoption and use of the EHR when possible. Patients can also provide ongoing feedback and insight for continuous quality improvement efforts.

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1. Be sure to involve patients in the planning process, including workflow process improvements.

- a. Encourage patient input/feedback in planning, training, and workflow process improvements that impact their experience of care.
- b. Use patient focus groups and involve them in decisions that will affect them.
- c. Consider adding a patient and/or community leader to the governance group for the EHR.
- d. Include ongoing information about your EHR initiative in your patient communications. Alert patients early in the planning process so they are prepared for the initial changes they will see. Include updated information in waiting rooms that includes what the benefits are to patients.
- e. Include questions about your EHR in your patient satisfaction surveys.
- f. Advocacy groups such as AARP can support EHR adoption and use by educating their membership about the benefits of EHRs, how they can change clinician-patient interactions, and how to get the most personal value out of the EHR.

Compliance with Legal, Regulatory and Policy Requirements

Equal to involving the patient in the process, ensuring compliance with legal, regulatory and policy requirements such as the Federal Rules of Evidence, e-discovery and privacy and security are critical to engendering the buy-in and ongoing support of the community, and to minimizing liability.

1. Ensure the legal and regulatory integrity of the electronic health record.

- a. Engage your attorney and health information management professionals to lead the organization in defining its “legal health record” and “designated record set.”
- b. Establish organizational policies to support the creation and maintenance of an accurate, complete, authentic and secure health record that meets the Federal Rules of Evidence for business records. Please see the resource section for additional information regarding Federal Rules of Evidence.

2. *Provide role-based security to manage the security and authorization of staff as roles and responsibilities change.*

- a. Ensure that your privacy official is:
 - Training staff on system security administration/user setup capabilities.
 - Committed to regularly reviewing security access levels, conducting periodic audits, and making adjustments as needed.
 - Balancing security needs with the need to access the patient record. Clearly document decisions and why they were made. Plan to re-evaluate decisions after they have been implemented.
 - Making sure that staff understands that the consequences of violating privacy related requirements can include termination of employment and revocation of license.
 - Including security and privacy as a part of job expectations and duties.
 - Developing ethical privacy and security training as a part of staff development.

3. *Understand and address patient concerns about privacy with an EHR system.*

- a. Inform and educate patients about privacy and security commitments required by current state and federal law, including consent and breach notification requirements. Look at current practices around informing the patient and ensure that patients are receiving this information in a clear and understandable format.
- b. Review current practices and make sure that as an organization you are at a minimum meeting federal and Minnesota privacy and security requirements. For additional information regarding privacy and security please visit the Minnesota e-Health web site and review materials available from the Minnesota Privacy and Security Program.
- c. Include “health record stewardship” questions in patient satisfaction surveys and provide the feedback to staff in meetings, newsletters and other communication modes.

- d. Make clear to your patients the actions you take to protect the privacy of their records, and what actions you will take if their privacy is compromised. For additional information regarding breach notification please visit the Minnesota e-Health web site and review materials available from the Minnesota Privacy and Security Program.

4. *Create clearly stated and easily understood security policies.*

- a. Provide training on security policies and procedures to all appropriate staff; that is, to anyone with any level of access to the EHR or other IT system.
- b. Allow staff to provide input into policies, and then make policies readily available. If there is a violation, do a root cause analysis, enforce policies, and publicize any corrective action that results.
- c. Develop ethical privacy and security training as a part of staff development.

5. *Simplify the complexities of security requirements and features without undermining their robustness.*

- a. If multiple passwords are necessary, provide a method that will allow users to change all their passwords at once so they are synchronized, either with a single tool that will do it for them, or with all the steps needed to change the password in each of the applications.
- b. Assist users in finding a single standard for passwords that will work in all systems in which they must login; i.e., alpha-numeric, uppercase, non alphanumeric, # of characters, etc.)
- c. Support staff participation in state/local healthcare IT security associations, and track new developments in security standards.
- d. Consider requiring a secure password that is complex but never needs to expire.
- e. Be sure to immediately disable passwords of staff when they leave the organization.
- f. Encourage trade organizations to develop standards for privacy and security implementation for use in the community.

6. *If you are a smaller practice, ensure the staff person(s) responsible for privacy fully understand how your health IT needs to be configured to support your privacy and security policies.*

- a. Don't just rely on your vendor to establish security policies. Understand the features of the EHR and other systems related to security, and ensure all staff use those features appropriately and fully.

Considerations:

- Be ready to inform patients about the benefits and enhanced security that comes with an electronic system, such as auditing. Highlight how such systems can actually improve privacy protections and security.
- Patient advocate groups may have a good understanding of how patients are feeling about the privacy and security of their records. Work with them to understand how to proceed in developing best practices or standards for privacy, as well as effective communications strategies and messages.
- Consider targeting the group of patients who may have the greatest concerns asking for their input, and addressing their specific needs for reassurance.
- Think about how to structure your security systems so that security and privacy protections will protect patients and will still provide for efficient workflow and quality care.

Value On Investment (VOI)

Organizations want to know that they will achieve value for the time, human and financial investments made to implement and effectively use an EHR. Gaining a better understanding of the EHR system's value can help with overcoming internal challenges. By communicating the value of EHRs, consumers can appreciate how these technologies will contribute to their health and safety.

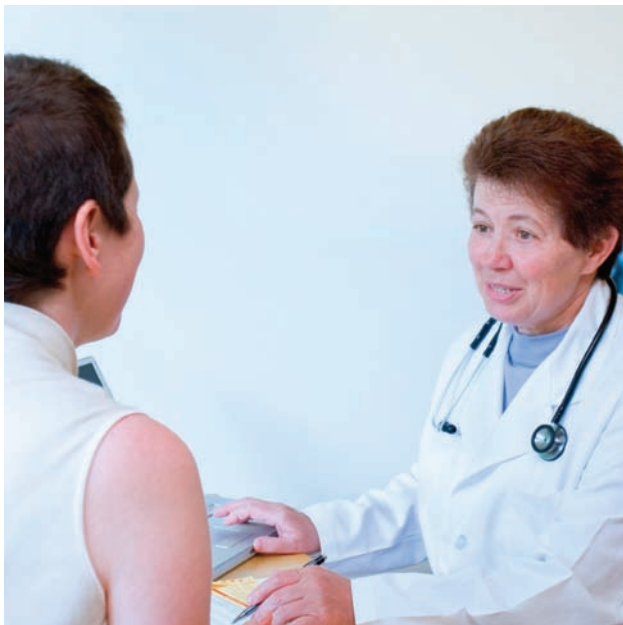
- 1. Develop VOI measures for clinical locations. The measures may include current and planned-for expenditures, the value of implementing and using an EHR beyond measurable financial returns, baseline operational data, performance, knowledge gaps, and systems use.**
 - a. Continue to pay attention to the measures you selected before implementation to ensure you are tracking those items as a part of effective use. Without tracking, it will be difficult to determine how effectively people are using the system or to identify needs and gaps.
 - b. When interested in making changes to your system, be sure to determine what you wish to measure so that you know whether the change was effective or not.
 - c. Before implementing the change to your EHR or process, create measures to establish baseline data for satisfaction of patients and

staff. Then re-measure at defined intervals to gauge the change. Setting baseline satisfaction and periodically re-measuring can help reduce staff turnover, show where improvements have been and can be made, and give a greater understanding of needs and gaps in operational efficiencies.

- d. Vendors and user groups can be a resource for understanding what needs to be measured.

Considerations:

- Determine the optimal time to measure VOI. If it is done only at the beginning of the learning curve, the measure may produce negative results that can be discouraging. Understand that the VOI will improve and as positive results are realized the results can be broadcast more widely.
- Early adopters often have the greatest challenge in being efficient users when they first start out. Have them compare training programs with advice from vendors and users groups to tap into their adaptive skills so that they may be efficient users from go-live.
- Be prepared that some staff will not adapt to the EHR, and may choose to leave. But over time, the EHR system will help with recruitment and retention of qualified staff.
- Optimization is an ongoing effort and, as it continues, will enhance the VOI.
- Don't forget the ongoing costs of the paper-based system (labor, paper, ink, workflow, numbers of people touching the documents, etc.) compared to an electronic system. Consider how to document operational efficiencies enabled by an electronic system.
- When you hear about issues from others, check or audit them against your own environment.
- Look at measuring staff satisfaction. The evidence shows that increased staff satisfaction reduces staff turnover, which in turn can help increase efficiencies and reduce overhead.
- Be sure to examine all your printed reports and evaluate whether or not you need to continue to print them.



Health Care Decision Support

Relevant patient-centered information to support care delivery

INTRODUCTION

Smart use of health care decision support systems is critical to achieving a balance of what is possible and what is realistic to incorporate into the workflow. This balance is needed to help avoid alert fatigue, and involves setting priorities for Decision Support System (DSS) use. Monitor and adjust this balance regularly for optimal impact.

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Top Action Steps for Health Care Decision Support

- Start simple, beginning with a modest number of decision support areas based on your quality goals.
- Understand that health care decision support is about knowing how and what clinicians and consumers need to consider in providing and receiving care, then developing or obtaining tools to improve that decision making. Tools may be available through business partners or vendors for free or at low cost.
- Select the right tool to support effective clinical decisions, whether templates, order sets, alerts or other tools; remember to consider timing and user roles during the selection process.
- Be cautious in establishing new alerts to avoid alert fatigue. Create ways for users to provide feedback on alerts, track where feedback comes from to ensure that concerns are addressed. Make sure your clinicians are comfortable with the reasons these alerts exist.
- Organize a standing provider/clinician committee whose focus is to educate and bring other users up to speed, members of the committee will serve as EHR champions. Convene the group regularly to provide input on enabling additional EHR features and designing decision support features.
- Work with vendor user groups to learn about ways to leverage your system to achieve desired outcome and how to take advantage of features in new releases.
- Share and build on work already done by other organizations or business partners, such as templates, documentation tools, flowsheets, guidelines and any custom-built features and tools.
- Create an ongoing process to re-examine best practices and evidence you have encoded into your EHR (order sets, alerts, flow sheets, etc.).
- Create easy and effective access to information for consumers to support their decision making, such as providing access to EHR information, decision tools, care plans or treatment information.

Identified in this Guide as the second area of opportunity for increasing the value of your EHR investment, decision support systems leverage best practice and medical evidence to produce health care decision support tools that deliver the *right information* at the *right time* to help make the *right decision*. Decision support is about much more than alerts: they include sets of tools that assist each stakeholder in the health care process by providing supporting and enabling informed decisions.

What are Decision Support Systems (DSS)

Use of DSS provides clinicians, patients or individuals with knowledge and person-specific or population-specific information, intelligently filtered and presented at appropriate times to the appropriate person, to foster health processes, better individual patient care, and better population health. *(Adapted from: Roadmap for National Action on Clinical Decision Support by American Medical Informatics Association)*

This guide highlights use of DSS to support two areas: Clinical Decision Support, is to supporting clinical practice decision making; and Consumer Decision Support, supporting consumers in making informed decisions.

DSS can provide patient-specific and timely information at the point of care through such features as:

- displaying condition-specific flow sheets to aid in the evaluation of data
- providing interactive sequential guidance
- using a template to enter complete patient data
- drawing attention to drug interactions or abnormal lab results
- embedding evidence-based practice into order sets and pathways
- enabling alerts and reminders organizing from rules established by the organizations which are based on national guidelines
- enabling quick links to medical and other references

As the body of knowledge surrounding medicine is growing rapidly, most believe that the ultimate advantage of an EHR is in its decision support capability. While a clinician may process information mentally to arrive at a decision, the factors that contribute to that decision making are many—and rapidly increasing—often more than what people can process effectively. A well-designed and maintained DSS can support the clinician in processing discrete data in ways that can result in the best decision for their right patient at the point of care.

DSS can also provide knowledge to patients and others at either an individual or population level.

Planning and Selecting

It is important to select decision support interventions that are based on expert knowledge and on organizational goals around care quality and safety.

The following topic, and their related actions and considerations, will help with the planning and use of DSS that will meet the needs of your staff and patients, improve the quality and safety of care, and improve health outcomes in individuals and ultimately in the community.

1. *Engage stakeholders in developing well-defined goals and objectives for decision support systems.*

- a. Senior management must understand and articulate the value of decision support and how it fits with achieving the organization's vision, mission and strategic goals.
- b. Identify and engage key stakeholders (super users and clinical champions) to identify and define goals and objectives for the clinical decision support program. These stakeholders may include quality improvement, patient safety, medical and nursing staff, and patient representatives.
- c. Communicate with stakeholders about the clinical and technical nature of the decision support program early on in the process.
- d. Prioritize which content to develop first and/or which interventions to improve (e.g., patient safety, chronic disease management, preventive health interventions) based on factors such as your organization's quality initiatives, value to patients, cost to the health care system, availability of reliable data, and acceptability to clinicians and patients.
- e. Publicize successful examples of decision support systems.
- f. Strengthen the knowledge and understanding of staff regarding the value of their clinical documentation in helping to support population health improvements for their patients and for the community. Quality data supports quality reporting.
- g. Vendors can provide Webinars showcasing successful DSS implementations with governance structures used to support creation and evaluation.
- h. Showcase how key performance improvement measures for a system or clinic can be improved through the successful implementation of interventions.

2. *Develop decision support functionality in the EHR tool.*

- a. Participate in user groups in order to articulate a unified set of clinical decision support needs and to have more influence with vendors.
- b. Clearly articulate to the vendor your information system and content needs to optimize effective clinical decision support to help drive

the industry toward providing more robust decision support tools that would better address clinical objectives.

- c. Encourage professional associations to make comparisons of DSS capabilities available for EHR systems.
- d. Encourage state initiatives and specialty associations to create decision support criteria for their specialties and for related quality metrics.
- e. Encourage CCHIT to continue to develop DSS features as criteria for certification of an EHR. See the resources for more information regarding CCHIT.

3. *Design clinical decision support interventions based on the specific workflow.*

- a. Select decision support interventions based on breakdowns in workflow process and where opportunities for improved workflow exist.
- b. Become familiar with and create awareness among fellow providers as to different modalities that exist to guide decision making.
- c. Work as a team to select the most effective and least disruptive tool for the appropriate process e.g. documentation forms or templates, situation-specific flow sheets, relevant data presentation, referential information, order sets and passive reminders vs. pop-up alerts. Present them e.g. the nurse or the physician at the appropriate time (when opening the chart or when signing the order).
- d. Attend user group meetings for your vendor's product and focus on quality improvement talks given by other users.
- e. Attempt to use minimally disruptive interventions as early in the workflow as possible, saving potentially disruptive ones when it is really necessary.
- f. Evaluate the effectiveness of your intervention after it is in place and adjust accordingly.
- g. Organizations such as the Joint Commission, (ICSI) Institute for Clinical and Systems Improvement, and StratisHealth could focus on a specific intervention and provide examples of specific steps that different systems use to achieve their results.

4. *Support the development of decision support human-computer interfaces that help to better manage the number of false alarms and alerts.*

- a. Work with vendors to improve the human-computer interface for the presentation of clinical decision support so that it is minimally disruptive to the clinical workflow, effectively reminds clinicians of things they have overlooked, puts key pieces of data into the workflow so that it can be acted upon immediately without having to go to a different part of the system.

- c. Evaluate users' responses to the alerts. What percent of the time are they being overridden? Are the alerts achieving the required goals? Is all the necessary information being provided or must the user go to a different part of the system to get the information they need?
 - d. Create collaborative efforts that aim to present the correct alert at the proper time, taking various factors into consideration (e.g., consider using role-based alerts).
 - e. Prioritize recommendations to users according to patient- and provider-specific parameters (e.g., expected mortality or morbidity reduction, personal preferences, cost to the individual or organization, effectiveness of the test or therapy, tolerability on the part of the patient to the intervention, location in the clinician's workflow, insurance coverage, clinician's past performance, etc.)
 - f. Evaluate effectiveness of frequent alerts and unintended consequences of seemingly successful alerts.
 - g. Publicize organizations experiences, including not just the successes and the means used, but also include what was attempted and did not work.
 - h. Continue to advocate with CCHIT to make sure that certified EHRs have the ability to target their DSS interventions to the appropriate staff at the proper time.
 - i. Encourage publications to publish articles that provide lessons learned from successes and failures.
- 5. Use discreet data instead of free text where possible.**
- a. Establish a core standard set of discrete data elements that must be recorded. Find the right balance between free-text and structured data.
 - b. Mandate that problem lists, visit diagnoses, medication lists, allergies and key questions which can drive the care process be recorded as discrete data elements and not as free text (e.g. diabetic foot exam).
 - c. Work with vendors to develop methods to make it easier to encode discrete data elements or to extract information contained in the free text portions of EHRs. Make sure vendors are aware of what you need to track and measure. This will enable new clinical decision support interventions to be presented and used to satisfy existing clinical decision support logic.
 - d. Freely share developed content (e.g., ICSI high-technology diagnostic imaging (HTDI) pilot results) and implementation hints (e.g., at vendor user group meetings).
 - e. Monitor the quality of your user documentation in the EHR and seek ways to improve it.

6. *Make plans to create, test, implement, maintain and evaluate decision support systems.*

- a. Leadership needs to understand that the most effective way to get both clinical and economic value from their EHR investment is by implementing and maintaining DSS within their EHR.
- b. Create architecture for sharing executable decision support modules including standards-based interfaces to externally maintain decision support, or knowledge modules loaded into a system.

7. *Make sure to get consensus with the key stakeholders in your organization on what DSS tools to use.*

- a. Set up a governance structure for your organization to address this issue. This can consist of a small, cross functional team which will help to design the interventions, a governance group (such as the quality officer or a leadership team which can set the direction and your super users who can evaluate the appropriateness of the proposed intervention.
- b. Research and review examples of available options, weigh the options and determine which tools will best serve your situation.
- c. Pilot test interventions in small controlled environments to ensure success before implementing across the organization.
- d. Attack “low hanging fruit” that has a high probability of success. Take lessons learned and apply them to more challenging situations to increase likelihood of success.
- e. Measure before implementation and after so that you can judge performance and impact; this will allow you to identify gaps and areas that need particular attention.

Considerations:

- Start slowly by implementing fewer alerts than you think you need in order to allow yourself the opportunity to gain experience.
- Organizational goals and objectives need to be defined in order to develop health care decision support interventions that are likely to meet the needs of the organization. The goals and objectives should be developed through broad input from across the organization.
- It is important to understand the relationship between quality reporting as a driver and clinical decision support. Understanding this relationship will help individuals and organizations realize the importance of clinical decision support and its impact.

- Because the clinical decision support market is at a relatively early stage of evolution, the functionality desired may not be available from current vendors or perhaps has not been developed at this time.
- Advocate that CCHIT reveal their scores on specific items related to DSS to allow purchasers to know what they are getting.
- It is important to keep in mind that tools are available to capture specific data such as family health history. This information can assist with decisions at a later time when risks such as mental health, diabetes, and others arise.
- It is important to step back and review what your needs are and make sure that what is most important for you and your patients will help to determine which templates to use.
- Decision support is often overridden because there are a lot of unnecessary prompts. The alerts and prompts may be more successful if they pop onto the screen at a more appropriate time.
- Careful planning needs to happen to examine your workflow to assure that the right tools are used at the right time and presented to the appropriate person.
- Health care decision support that is set to a higher sensitivity for near lethal events, will result in higher false positives. Users need to understand the reasoning behind this occurrence. Create awareness of the need for varied kinds of sensitivity and specificity settings for various clinical scenarios; use collaborative efforts to decrease false positives and DSS interventions.
- Many systems are oriented to reproducing a paper process which doesn't leverage the features an EHR can provide to support clinical decision making.
- Continue to evaluate the effectiveness of existing alerts and remove those that are no longer necessary.
- Utilize existing resources and work collaboratively to create rules and guidelines for clinical decision support (e.g., efforts by American Medical Informatics Association (AMIA), ICSI guidelines). For additional information please see the resource section at the end of guide.
- Consider leveraging existing systems that include clinical decision support such as the statewide immunization registry.
- Allow for "different solutions" based on conflicting experts advice. Measure outcomes and choose the better performer winning.

Implementation

Implementing the best decision support tools for clinicians and patients is an important step to effectively using your EHR system. There are several key concepts to address when making these important decisions. The following actions, considerations and resources can help to better understand how to manage any challenges.

1. *Determine the most accepted process for implementing decision support systems.*

- a. Assess and utilize existing resources, for example the resources developed by the Healthcare Information and Management Systems Society (HIMSS), on planning for and implementing clinical decision support within an organization. Please see the resource page for additional information.
- b. Make sure to have a pilot site to implement and test the DSS system to help work out bugs on the small scale before trying to manage issues throughout the system. The location can be based on need, size, willingness, and feasibility if you have multiple locations. Determine the best one review and assess each one based on specific criteria.
- c. Enlist the help of those who have already implemented an EHR system to tap into their knowledge and expertise (through contacts at a user group).
- d. Associations can share lessons learned and success stories about implementation including the process used, the benefits of completing the implementation and effectively using the system.

2. *Prepare to overcome the challenge of getting people to agree that the DSS tool is accurate or appropriate.*

- a. Set up a governance structure for your organization to address this issue. This can consist of a small, cross functional DSS team which will help to design the interventions, a governance group (such as the quality officer or a leadership team which can set the direction and your super users who can evaluate the appropriateness of the proposed intervention.
- b. Seek to connect to quality initiatives and informatics efforts in your field.

3. *Show the users how the DSS system will help clinicians quickly and accurately learn critical information about the patient.*

- a. Ask your vendor to demonstrate how to leverage the system to support patient summaries, disease management and decision making.

- b. Learn how to create “views” of the patient which will summarize patient-level information by combining free text, discrete data, and other pertinent data such as the patient’s past medical history, current medication(s), physiologic parameters, and current treatment(s).
- c. Utilize indicators to allow “at a glance” assessments of patient’s status.
- d. Make sure that clinical decision support tools are populated with good data (e.g., using the right codes, etc.).

4. *Be prepared to manage multiple co-morbidities (e.g., of elderly patients) and learn how to decipher recommendations.*

- a. If the system allows it, enable providers to opt-out of certain alerts or measures for certain patients. (e.g. elevated HgbA1c in a patient dying of pancreatic cancer).
- b. Attempt to combine recommendations for patients with co-morbidities by identifying and eliminating redundant, contraindicated, potentially discordant, and mutually exclusive recommendations.
- c. Present a synthesized version of recommendations from two or more guidelines to the clinician.
- d. Encourage vendors to develop systems that allow the user to opt out and / or set the sensitivity of the alerts and reminders that the physician sees for a specific patient, especially when the physician has determined a course of treatment that may not fall within the systems guidelines.
- e. Encourage ICSI to develop commonalities or standards for the guidelines that are included in DSS systems.

5. *Determine the best time to use DSS to notify the user of a necessary action such as when the record is opened, closed, or during the encounter.*

- a. Create an internal group that approves additional pop-ups or alerts to maintain the efficiency and usefulness of the system. It is important that this group is multi-disciplinary and may include core membership from nursing, lab, pharmacy, quality , health information management (HIM) physicians, and business/administration but may involve subject matter experts. This group can also manage complaints about functions that have been implemented and can determine if the alert should be modified or terminated.

Considerations:

- Be sure to involve all stakeholders within your organization from users to management. By doing so you may find or develop unlikely DSS champions.

- Plan to address as many issues as possible when implementing but understand that there will probably be unintended consequences that may arise and determine how your organization will respond to the “unknowns.”
- Coming to consensus is a challenge, especially if a user is going to need to change his or her process that has worked effectively for years. This will result in resistance to change. Therefore, any recommended changes should involve the user and enhance their current workflow.
- Professional groups may disagree based on existing research by their respective societies. Decide which recommendations you will follow and be sure to document your reasons.
- When making decisions about implementing and using DSS systems, consider the benefits for patients when physicians have aggregated accurate data from many encounters addressing multiple issues and parameters. These will greatly inform and assist with making decisions.
- This area is really about information management, and how organizations can best manage the data and make it the most accurate it can be.
- The users of DSS systems need to remain aware of differing and competing guidelines when making decisions and allow the clinician to be able to disable a particular guideline for a patient.
- Implement DSS at a pilot site when the positive impact will be significant and possibly release system-wide if it is minimally disruptive.
- Be willing to start slow to make sure the bugs are worked out before full roll out; consider the end user and others whose workflow will be affected by the implementation.
- Diagnostics are becoming increasingly utilized to determine which patients will respond best to a particular therapy (i.e. therapies for HER2+ metastatic breast cancer). Consider the ability to add patient diagnosis to the DSS.

Evaluation

Evaluation will enhance infrastructure and interventions and provide continuous improvement of decision support methods.

1. ***Create a feedback mechanism for those receiving or that are affected by DSS interventions.***
 - a. Processes should be put in place to periodically and systematically gather and evaluate feedback from various channels, including the following key issues:

- How often each intervention is used (e.g., reference material accessed, specific order sets and templates completed)
- How often alerts are presented, heeded, or overwritten
- What users perceive as the intervention's effects on workflow (e.g., whether interventions are delivered at an appropriate point, message content is considered appropriate and useful, response time is acceptable, and performance and access are reliable)

2. *Tie the health care decision support system directly to overall organizational improvement efforts.*

- a. Utilize performance measures (e.g., pay-for-performance, quality measures) as a target for clinical decision support interventions, especially in circumstances when such improvement has a directly measurable return on investment. This requires careful planning upfront to assess external and internal quality initiatives that affect the organization.

System Maintenance

Once the decision support system has been properly installed, it is critical to develop, monitor and maintain rules for the system. Removing medications or other clinical products from your system that have been recalled is not simple, but needs to be done to maintain the system.

1. *Maintenance is a necessary requirement of supporting an effectively usable EHR. Plan for it.*

- a. Within the organization, create duties for a person to be responsible for managing and ensuring compliance, monitoring and updating of rules.

Considerations:

- Review and determine which guideline/process for modifying or updating outdated rules will be followed or adopted by your organization. These guidelines can help determine how the person managing the system is notified of any changes, and how do they go about making the proposed changes and how these changes are communicated to the users.
- Stay in touch with your vendor as the product is developed to provide feedback and information to ensure that the product you have paid for reflects the needs and issues that have been identified within your organization.



Health and Practice Improvement

Using data for improving population and individual health within the organization

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INTRODUCTION

The third area of opportunity identified for optimizing the use and increasing the value of your EHR investment is *Health and Practice Improvement*. The Minnesota e-Health Initiative defines this term as improving the health status of individuals and populations for patients by using an EHR. For this document, health and practice improvement includes the activities involving care management/care coordination, as well as supporting quality improvement for your practice.

Top Action Steps for Health and Practice Improvement

- Utilize the power of the EHR to facilitate organizational level/specific population level analysis of information with the intent of improving care delivery and health outcomes.
- Advocate for enabling a care registry feature (also known as disease registries) in your EHR. Utilize that tool to facilitate monitoring, follow-up and referral of patients with chronic and other conditions.
- Set quality improvement priorities based on:
 - Parameters related to the population your organization serves
 - Metrics that need priority attention (e.g., specific disease registry)
 - The specific quality improvement goals of your organization
 - Financial incentives or other funding
- Determine what data elements have to be captured (and how to ensure consistency in how they are captured) for each priority area selected. Research what is needed to report the quality data in the format required.
- Determine if your organization has expertise for querying and analyzing data. If not, partner with organizations that can help, such as universities or quality improvement organizations, vendors or other business partners.

Please note: The focus for this section of the effective use guide is to provide practical tips for using your EHR to support Care management/Care Coordination and Quality Improvement. In order to keep this section useful and relevant we have tried to limit the duplication of information from the large body of work and experience that is widely accessible via the internet in these areas. We have included links to a number of useful web sites such as the AHRQ resource center and the national quality forum; each has extensive background information. This section of the guide focuses on sharing the experience from Minnesotans that have worked to use their EHR's to support programs for Care Management/Care Coordination and Quality Improvement. This is a work in progress and may need to be updated periodically to reflect additional experiences and stories from Minnesota.

Care Management/Care Coordination & Quality Improvement

Although closely related, care management and care coordination do apply to two different aspects of health and practice improvement. Care management addresses the achievement of the highest level of health

possible for individuals. Care coordination addresses the organization and delivery of health care services to achieve their optimal use. Both can have an impact on information and data available within an EHR that will help to improve the health of individuals and populations within your organization.

- **Care management** – can be described as the application of EHR systems, health science, incentives, and information to improve medical practice and assist consumers and their support system to become engaged in a collaborative process designed to manage medical/social/mental health conditions more effectively. The goal of care management is to achieve an optimal level of wellness and improve coordination of care while providing cost effective, non-duplicative services.³ Example Care management components may include:

- Identification
- Stratification
- Prioritization
- Intervention
- Evaluation
- Payment/Financing

- **Care coordination** – can be described as the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient’s care to facilitate the appropriate delivery of health care services. Organizing care involves the marshalling of personnel and other resources needed to carry out all required patient care activities, and is often managed by the exchange of information among participants responsible for different aspects of care.⁴ Care Coordination can span the continuum of health care and should be patient focused, timely, and accessible, evaluated for improvement, based on ethical practice, respectful of patient rights, responsive to other care providers and should be reflective of the evolution of health policy and medical practice. Care Coordination can be deployed along major service lines within your organization, these services may include:

- Cardiac Services
- Emergency Department
- Medicine
- Primary Care
- Oncology
- Surgery
- Neurosciences
- Orthopedics
- Thoracic Services
- Women and Newborn Health

- **Quality Improvement**

This guide to effective use of EHR systems addresses how the collection of individual and aggregate data in the EHR can help improve the health of individuals and populations within your organization.

³ Adapted from: R. Mechanic. Will Care Management Improve the Value of U.S. Health Care? Background Paper for the 11th Annual Princeton Conference. (<http://sihp.brandeis.edu/council/pubs/Princeton%20XI/Rob%20Mechanic%20paper.pdf>.)

⁴ Adapted from AHRQ, <http://www.ahrq.gov/clinic/tp/caregapt.htm>

EHRs help to improve quality of care by using clinical information to extract indicators and other data, to generate performance reports for your organization. For example, Indian Health Services (IHS) is using a national proprietary medication error reporting system, to improve medication safety. Examples of clinical indicators extracted for quality improvement may include:

- Diabetes
- Immunizations
- Cancer screening
- Cardiovascular disease
- Other clinical measures
- Dental care
- Childhood diseases
- Behavioral health
- Sexually transmitted diseases

Focusing on both individual and aggregate health data at the organization or clinic level reflects a growing commitment to achieve better health outcomes across populations. This includes improved outcomes in both acute situations (for example, earlier detection of infectious disease outbreaks) and chronic conditions (for example, achieving improved tracking of chronic disease management). For example, the latter may include uses of aggregated data from the EHR to identify trends and measures of care provided to patients with asthma or diabetes compared to selected criteria.

Consensus and Communication

Information contained in EHRs, coupled with the growing reporting and other functionalities of full-featured EHRs, is a tremendous resource for improving the health and care of individuals and populations. Understanding how aggregated data on specific populations can assist in providing quality care is crucial for performing well in an environment that increasingly focuses on outcomes.

1. *Inform and communicate the power of utilizing EHRs for care management, care coordination and quality improvement.*

- a. Develop and share a statement of understanding of the value of data for health and practice improvement purposes.
- b. Create a collaborative team that includes stakeholders across care management, care coordination, quality improvement and health informatics to identify opportunities for using EHR data to support health and practice improvement.
- c. Emphasize the need for data capture as discrete data elements that can be aggregated into reports. Limit free text entry into your EHR, which cannot be readily aggregated into meaningful reports.

Information regarding the IHS system can be found in a presentation given by Theresa Cullen, MD, Senior Medical Informatics Consultant, Indian Health Services at the fourth annual Minnesota e-Health Summit. The presentation can be found at:
<http://www.health.state.mn.us/e-health/summit/cullenb06.pdf>.

- d. Create a culture of quality data input in the EHR. Complete and accurate data input is critical for generating accurate population level analysis and quality reports, for research and for other uses of the data. Consistency in documentation is critical for using the data for larger purposes than just documentation, such as for disease registries.
- e. Limit the duration in a hybrid environment (both paper and electronic) during the adoption of your EHR system. The quicker the move to all electronic data capture, the sooner your organization can benefit from improved care management.
- f. Develop policies around importing data from external sources that includes whether and how to accept document archive and free text versus data entry in pre-defined fields.
- g. Publish activities that have been agreed upon for dissemination to providers and other interested stakeholders to generate input and support.
- h. Use the information; the value of the information increases the more it is used. Make sure the data are relevant to the submitter so they see the data and benefits from having it.

Considerations:

- Recognizing that your first priority was EHR selection and contracting, and the second was implementation and efficiency gains, realize that the true Value on Investment will come in using the EHR to support improved quality, especially in area such as disease management. This is what adds true value to payers and consumers, and will bring the benefits of EHR to the practice in the long run.
- Numerous reporting requests/regulations with varied data requirements (some including chart review, direct data submission and administrative claims) can be challenging and frustrating. This is one reason why the healthcare industry needs to move toward more standardized quality/performance measurement and reporting.
- Advanced registry and analytic capabilities require a functioning and mature EHR.

2. Add or turn on your EHR functions that support patient and population improvement, such as disease/care registries and patient population level analysis.

- a. Identify your current EHR's functions that support improvements such as disease registry capabilities.

- b. Participate in vendor user groups and work with your vendor for any necessary customization related to creating registry functions, adding analytic capabilities.
- c. Proactively work with your vendor to add specific functionality as part of future upgrades or contract renewals.
- d. Develop partnerships between your medical, nursing, informatics and IT staff to develop expertise in creating the needed capabilities, registries and analysis.
- e. Support staff with a clinical informaticist with skills to make effective use of the system. Consider contracting part-time for an informaticist or partnering with another organization to share staff.
- f. Work with standards bodies such as the Certification Commission for Healthcare Information Technology (CCHIT) to convey the need and importance of ensuring that EHR applications have disease registry module as a part of certification to enable the capture and analysis of data that can support population health improvement.
- g. Share tools, templates and model RFPs for providers and clinics to support the move towards using EHRs for health and practice improvement.

Value and Use of Data

One of the most obvious returns on investment with an EHR system is to use the data for multiple purposes, capitalizing on the effort made by staff to enter complete and accurate data. Chief among the uses of data is to improve quality of care, including the care management plans, process improvement, quality measurement, and integrated care. Use of data to report to public health authorities is an additional value that is covered in the next section on Community Health Improvement.

1. Create plans to develop a shared understanding of the value of data and the mechanisms to utilize the information derived for individual and population health improvement.

- a. Identify champions within the organization that endorse this concept of the utility of EHR information.
- b. Advocate for data that is complete, accurate and timely as an essential foundation to increase the value and accuracy of population level analysis using registries and other tools.

2. *Gain an understanding of how to use information to improve individual and population health and the quality of practice, such as increased patient and provider satisfaction, and increased patient safety.*

1. Use data to provide feedback to providers, staff and patients and use data to drive decisions for improving care delivery.
2. Create a forum for sharing lessons learned and best practices around practice improvement and population health.
3. Extend partnerships and learning with needed stakeholders and other users of population health data.
4. Demonstrate the value added by EHRs in improving quality by analyzing select aggregate measures of clinical care.

Considerations:

- Consider how to best use data from other sources (such as a Personal Health Record) to ensure continuous, high quality and appropriate care.

Resource Needs

If your EHR system does not have the ability to collect and analyze individual and aggregate data for population health and quality improvement purposes, such as disease registries, you will need a plan for how to convince your vendor to develop these functionalities or export your data from your EHR into another application that can.

1. *Build support for creating and utilizing reporting capabilities.*

- a. Obtain board/senior leadership buy-in for the ongoing budget needed to develop and maintain population health, registry and analytic capabilities.
- b. Build your case for these capabilities based on Value on Investment, keeping in mind that “what gets measured, gets done” and that healthcare is increasingly a sector that is driven by measurement.
- c. Start with something simple, inexpensive, yet effective to demonstrate the value of registries, population health tracking and continuous improvement of quality of care.
- d. Include population health functions (registries/analytic tools) as an essential element of EHR during planning, RFP and vendor negotiation process.

2. *Understand and be prepared to manage funding challenges for ongoing maintenance/support/system upgrades and training.*
 - a. Ensure budgets are complete with ongoing costs, including staff and staff turnover and training.
 - b. Be incremental in what you attempt to accomplish and guard against project scope creep and cost overruns.
 - c. Invest in your system in such a way that you will be able to provide value through population health benefits.

3. *Seek out resources to support software customization and create needed functionality for care management and care coordination.*
 - a. Understand requirements and work with the vendor to purchase capacity as needed.
 - b. Develop partnerships with your medical, nursing, informatics and IT staff to develop expertise in collecting and analyzing individual and aggregate data.
 - c. Recognize that registry functionality and advanced analytic capabilities can be challenging to utilize well, so budget for on-going resources (personnel & programming) to maintain and grow your capabilities and the value of your investment.

Considerations:

- Today some EHRs vendors software can be used “out of the box.” It is essential for providers to work with vendors to provide functions that that provide value in a measurement-driven environment.
- Registry capabilities vary across EHR products and organizations; do your due diligence to thoroughly research the tools being offered.
- Understand that purchasing an EHR, and the vendor relationship that comes with it, is not a one-time event; it requires ongoing and clear communication to ensure the EHR effectively supports the practice.
- Provide feedback to vendors based on use. As products mature, vendors incorporate more features. Also, the national CCHIT certification criteria for EHRs expands requirements with each new version.
- Develop collaborations with other organizations that use the same EHR systems and share software changes.



Community Health Improvement

Utilizing Relevant Population and Public Health Information outside your organization

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INTRODUCTION

Community health improvement is identified as the fourth area of opportunity for increasing the value of your EHR. It is similar to the previous section on Health and Practice Improvement in that it often involves analysis and reporting of aggregate data to examine outcomes and trends, and that it leads to improved health outcomes in populations. It is different in that this section includes exchange of data on individuals for public health purposes, such as disease reporting and the health status of populations.

Top Action Steps for Community Health Improvement

- Learn how your EHR system can be used to generate automated reports to public health based on specified criteria, such as positive lab results for reportable diseases/conditions, immunizations, or diagnoses.
- Test your readiness for exchanging data electronically with your customary trading partners. Widespread, secure data exchange will enable improved continuity of care for all.
- Support local and state public health to ensure that their systems are updated and prepared to exchange data.
- Set priorities for quality reporting based on requirements or suggestions by health plans, federal or state programs, or other sources.
- Ensure policies are in place for use of EHR data for research to improve the health of the community, such as including research consent on your HIPAA forms.

Community Health Improvement also includes reporting of quality indicators as part of local, state and national quality improvement efforts. Use of EHR information to support activities outside the care setting is good for the patient and provider.

The value of your EHR's contribution for community health improvement lies in several areas, including:

- Enabling timely exchange of reportable disease information to public health authorities so threats to community health can be detected early, lowering risk to your patients and the community.
- Monitoring emerging risk factors across a community (such as pediatric obesity or hypercholesterolemia in increasingly younger patients) helps measure how your patients are doing relative to the community.
- Monitoring trends in diseases or conditions that may be caused by environmental or other factors in the community. Such information can provide important contextual information to clinicians in making differential diagnoses.

The value of EHR increases when it is able to receive information from public health that can be incorporated into decision support systems (such as alerts on flu-like illness; vaccine decision support from the statewide

immunization registry) and clinical documentation (vaccine histories from the registry). This can help inform your clinical decisions based on local community risks.

This guide uses the following interrelated concepts:

- **Community Health Improvement**

The overall health status of the community is improved through the utilization of appropriately protected or de-identified data in near real-time from an interoperable EHR system for population health initiatives and public health purposes.

- **Population Health**

Population health is an approach to health that aims to improve the health of an entire population. One major step in achieving this aim is to reduce health inequities among population groups. Population health seeks to step beyond the individual-level focus of medical/health care systems by addressing a broad range of factors that impact health on a population level, such as environment, social structure, resource distribution, etc. A recurring theme in population health is the importance of social determinants of health and the comparatively small impact that medicine and healthcare have on improving health overall.

- **Public Health**

Public health has the legal responsibility to protect and improve the overall health of a community based on population health analysis. Governmental public health agencies provide the backbone to the public health infrastructure, but this infrastructure is also dependent on other entities such as the health care delivery system, the public health and health sciences academia, and other sectors that are heavily engaged and more clearly identified with health activities. Public health also plays a legal regulatory role (e.g., surveying nursing homes or inspecting restaurants).

- **Quality Reporting**

Quality reporting is the standardized collection of healthcare data through an interoperable electronic health record system to: 1) measure performance on dimensions of quality of care and services resulting in improved outcomes (i.e. improved healthcare quality, patient safety, and patient/provider satisfaction); and 2) perform aggregate reporting for assessment and comparisons of healthcare system quality and population health.

■ Research and Evaluation

The focus of research and evaluation is development of new knowledge that contributes to the health of populations. EHRs provide an opportunity to contribute to efforts that study a myriad of factors that can contribute to the health of populations. Knowledge generated is not only for internal use of organizations, but has applicability across organizations to improve the health of populations.

Value of EHR Data

There is an ongoing need to identify and pursue value-added uses of EHR data beyond providing individual healthcare, such as community health improvement. As the emphasis on 'meaningful use of EHRs' gains momentum through The American Recovery and Reinvestment Act of 2009, the various dimensions of effective use of EHRs will gain needed attention. What is important to remember is that improvements in an individual's health contribute to improved health status of the community, while healthier communities contribute to the health of individuals.

1. *Increase awareness about how effectively using EHR data improves community health.*
 - a. Inform colleagues about the value of EHR to positively impact reporting for public health purposes.
 - b. Collect and pass on tips from other organizations that have used EHRs to facilitate the sharing of information.
 - c. Educate peers and professional organizations to promote utility of EHR for reporting purposes (to public health, for quality reports and other mandated reporting requirements).
 - d. Share stories from other practices that have utilized data for research, quality improvements and other purposes.

2. *Develop a shared understanding of the value of data and mechanisms to utilize it for community health improvement.*
 - a. Advocate for good data quality as an essential foundation to increase the value of using EHR information.
 - b. Identify champions within the organization for external use of EHR data.
 - c. Develop relationships with the public health departments in the community and include in discussions.

- d. Advocate for incorporating key external use requirements as part of product certification.

3. *Participate in opportunities to discuss, share your data and learning.*

- a. Share your experiences, lessons learned and best practices to support success in the field.
- b. Demonstrate the value of EHRs in improving quality by analyzing select aggregate measures of clinical care.

General Considerations:

- Consider funding pilot projects to develop methods of assessing community health status through using data extracted from EHRs.
- Consider the legal barriers (if any) for sharing data with public health that need to be reviewed.

Considerations for Public Health Agencies:

- Develop and share a list of the most critical risk factors and other information that would be useful in assessing community health status and threats.
- Expand relationships with the clinical practices and hospitals around how clinical data can be used to measure and improve the health of the community.
- Be more informed about the impact that EHRs can have on health status. Continue to share this information with peers and providers through peer interactions and professional organizations.
- For each of the disease and conditions required by Minnesota law to be reported to Minnesota Department of Health (MDH), publish the corresponding data/result (that is, diagnosis, lab result, symptom, etc.) that would trigger an automated report to public health.
- Advocate for uniformity in data collection methodologies and data definitions.
- Seek funding to support pilot projects that develop methods of assessing community health status through data extracted from EHRs. Use the findings to advocate for similar initiatives and additional funding.

Exchange Of Data

It is critical to ensure external stakeholder information systems and clinical EHR systems are able to exchange data for population and public health purposes, such as disease reporting and immunizations. Two recent examples of the benefits of this exchange are the novel influenza A (H1N1) virus and the

salmonella outbreak associated with contaminated peanut butter. In both situations, it was shown that the ability to exchange health information helped to reduce the adverse community-wide impact of these outbreaks, while improving the care of individuals by alerting providers to watch for specific signs and symptoms.

1. *Set your priorities and participate in efforts for the use of bi-directional exchange to support both clinical care delivery and public health.*

- a. Define the EHR functions and filtering rules needed to support electronic capture of and transmission of select information to public health and other stakeholders.
- b. Advocate for using national standards for representing common data elements and for transmission of data.
- c. Identify tools, resources and guides to support healthcare organizations as “data sources,” addressing common data elements, required systems, workflow and process changes, policies for data sharing, legal and regulatory considerations, and business models to support data capture and transmission.
- d. Identify priority exchange transactions where public health and other stakeholder data would be of most value to clinical care.

2. *Build your capacity incrementally.*

- a. Consider a pilot project to test and evaluate the reporting capabilities of EHRs to share information with external partners.
- b. Conduct research to gather evidence of community benefits in using clinical data for a variety of public health and quality use cases.

General Considerations:

- Public-private collaborations should be promoted that can identify resources and opportunities for enhancing public health infrastructure and for advancing exchange among clinical and public health systems.
- Consider the benefits of understanding the health of the community, both your clinical population and the greater state populations, as a critical component of improving care, quality and safety.
- Work to gather support and advocate for electronic reporting of legally-mandated public health conditions.

Considerations for Public Health Agencies:

- Inform policy makers and elected officials about the cost and added value for modernizing public health information systems to be interoperable with EHRs in your community.
- Continue to upgrade public health information systems to participate in bi-directional exchange of electronic information with clinical sector, based on identified priority exchange transactions.
- Build capacity to receive, process and send HL7 messages.
- Work collaboratively with the provider community to identify the benefits of interoperability and of receiving data from public health for managing individual care.
- Participate in national standards-setting activities related to information of public health importance.

Quality Reporting

It is important to participate in quality reporting to local, state and national organizations through an interoperable EHR system. These reports measure performance on dimensions of quality of care and services. The result can help improve outcomes such as healthcare quality, patient safety, and patient/provider satisfaction. Aggregate reporting for assessment and comparisons of healthcare system quality and population health is an important part of quality reporting.

1. *Build consensus on evidence-based quality reporting measures.*

- a. Participate in national and state consensus-building activities (e.g., National Quality Forum, Minnesota Community Measurement) and seek to implement the consensus standards whenever possible. Providers can participate by giving testimony, providing stories, and providing input into the consensus-building process.
- b. Inform providers on how to give input to the process and connect with appropriate policy makers.
- c. Promote active involvement in moving guidelines to practice. There can be as much as an eleven year gap of a clinical practice guideline being used in practice.
- d. Publish consensus activities for dissemination to providers and other interested stakeholders to generate further consensus input and support.
- e. Collect data with sufficient granularity so that all necessary measures can be calculated.

General Considerations:

- It is essential for providers to be part of consensus building process.
- There is variation in clinical practice guidelines put forth by leading organizations and so provider participation becomes even more essential when making choices.
- There is also disparity in measures recommended and their specificity.
- Chronic care and quality reporting add the most value to consumers and payers and will bring the most benefits to the practice in the long term.
- Numerous reporting requests/regulations are a challenge because of varied data requirements, some including chart review, direct data submission and administrative claims. Advocate for standard requests and direct submission.
- The sooner you have a functioning and mature EHR the easier it will be to meet some reporting requirements.

Research and Evaluation

The development of new knowledge that contributes to the health of populations is an important benefit of the effective use of EHR systems. EHRs provide an opportunity to investigate a myriad of factors that can contribute to the health of populations. Knowledge generated is not only for internal use of organizations, but has applicability across organizations to improve the health of populations. In addition, accurate and timely knowledge from research and clinical trials can be made available more quickly to clinicians in the care setting.

1. *Assure patient consent for research use of data (i.e. include on HIPAA forms).*
2. *Collaborate with researchers on studies seeking to answer key questions for improving the health of populations.*
 - a. Work with the researchers to understand the potential value for your patients in applying the study results.
 - b. Understand Minnesota's consent requirements for uses of health data in research.
3. *Develop policies and procedures to support use of EHR data for research, including assurance of review by institutional review board either internally or by an outside organization.*
4. *Work with your vendor to facilitate research access to your EHR data.*
 - a. Work with your vendor and staff to ensure data gathered in EHR is valid and reliable.

- b. Work with your vendor to ensure easy access, retrieval, and analysis of data from EHR that is useful in answering clinical research questions.
- 5. *Network with other organizations about how to streamline research with EHR data.***

Public Trust And Data Policies

As an underlying principle of health and health care, maintaining the public trust, particularly in electronic health information, is paramount. While there may be some sensitivity around utilizing data for public health and quality reporting, it is also a great opportunity for public health and clinical practitioners to communicate the rationale and benefits of community health.

1. *Increase awareness on current data privacy and security practices.*

- a. Clearly characterize, explain and raise awareness of the current laws, rules and regulations governing the use of clinical data for uses other than care delivery, such as, community health improvement.
- b. Engage your organizations leadership structure to provide direction and guidance on the utility of data.
- c. Gain multi-stakeholder consensus on and widely disseminate a common set of principles and policies for use of clinical data for community health purposes.
- d. Develop and widely disseminate tools, resources and guides to support healthcare organizations' use of the common set of principles and policies.

2. *Establish and Implement Policies for Data Use.*

- a. Prepare and use policies, procedures and practices that guide reporting for community health purposes.
- b. Define an appropriate scope for data use for your setting.
- c. Focus on data stewardship and its implications for data control, access, and security, rather than on data ownership.
- d. Draft position statements for proposed data use that can be used for public outreach and awareness.
- e. Advocate for an oversight committee and be as transparent and open as possible about how and with whom data are shared, with what authority, for what purposes and with what protections and safeguards.
- f. Assure technical security measures are in place for use of data within an ethical framework.

- g. Establish a working environment that promotes acceptance of responsibility, awareness of risk, and establishment of trust for health data use.

Considerations for Public Health Agencies

- Create and develop communications and informational programs to educate the public about how their data is used, for what purposes, how it is kept secure, and the value and benefits.

Resource Needs

Sharing information across organizations often requires that each stakeholder update their system and policies to enable the exchange of information. There is a need for one time and ongoing resources to achieve this capability. This often includes the knowledge to know what to do and when to commit capital for financial and personnel resources for software customization and or development that will support reporting capabilities. These resources are necessary in both public health and the clinical setting. For public health it is important for ongoing modernization of their current systems to be prepared for data exchange with the private sector. For the clinical setting, EHR systems may or may not have the ability to collect and report on specific measures of interest for quality reporting and public health.

1. ***Build support for creating and utilizing reporting capabilities.***
 - a. Obtain board/senior leadership buy-in for ongoing IT support for a budget to develop and maintain reporting functionalities.
 - b. Build a business case by taking advantage of incentive programs related to reporting (quality measurement, CMS, ARRA, etc.).
 - c. Start with something simple, inexpensive, yet effective to demonstrate the value of continuous improvement of the EHR.

2. ***Understand and be prepared to manage funding challenges for ongoing maintenance/ support/system upgrades and training.***
 - a. Ensure budgets are complete with ongoing costs, including staff and staff turnover and training.
 - b. Be incremental in what you attempt to accomplish and guard against project scope and cost creeps.
 - c. Invest in your system in such a way that you will be able to provide

value through community health benefits via quality reports and public health reports, present a case for funding based on Value on Investment (VOI).

3. *Participate in partnerships that facilitate reporting for community health and share resources.*

- a. Understand the reporting requirements and participate in vendor user groups and work with your vendor for any necessary customization related to reporting for quality, public health and clinical research.
- b. Develop partnerships within an organization between clinical, informatics, and IT staff to develop expertise in creating the needed functionality for reporting and analysis.
- c. Support staff with a clinical informaticist to make effective use of system. Consider contracting part-time for an informaticist or partnering with another organization to share staff.

General Considerations:

- Reporting tools vary across EHR products, so do due diligence when verifying tools are available that will work with your version of the EHR.
- It is essential to understand that the purchase of EHR and vendor interaction is not a one-time deal and requires ongoing communications to make an EHR system work effectively.
- Collaborations are useful when software changes are done and shared across organizations.
- Early adopters can provide important feedback to vendors. As products mature, vendors incorporate more features. Also, certification criteria (e.g. from CCHIT) tend to include more functional and interoperability requirements over time.
- Moving from paper to electronic modality may lead to changes in job functions. Consider re-training and retaining staff resources to facilitate optimization of EHR.

Considerations for Public Health Agencies:

- Begin or continue to work with your state and federal public health associations and organizations to identify the additional resources that will help support modernization of public health information technology applications.
- Continue to communicate regularly with state and federal policy makers regarding public health resource needs while emphasizing the value and benefits provided by public and population health.

Resources

These and other informational resources are available on the Minnesota e-Health web site, www.health.state.mn.us/ehealth.

ORGANIZATIONAL WEBSITES RELATED TO HEALTH IT

AAFP Center for Health IT:

- Offers consultative, educational and outreach activities to facilitate the adoption and optimal use of health information technology. The online tools are designed to help in the move towards implementing an electronic health record
www.centerforhit.org/online/chit/home/tools.html

AHRQ National Resource Center for Health Information Technology:

- Develops tools to help health care organizations plan for, implement and evaluate health information technology (HIT). These tools describe and recommend strategies for addressing some of the common challenges organizations encounter when working with health IT systems
<http://healthit.ahrq.gov>

AQA Alliance:

- Aims to align and apply modern health information technology with the mission and goals of the AQA, strategy for measuring performance at the physician level; collecting and aggregating data in the least burdensome way; and reporting meaningful information to consumers, physicians and other stakeholders to inform choices and improve outcomes.
www.aqaalliance.org/datawg.htm

AHIMA Practice Briefs

- AHIMA Practice Briefs provide practical and consensus-based guidance on traditional health information management principles and evolving e-HIM functions. Through research and professional volunteer efforts this best practice guidance is offered to the health care industry as a resource for achieving the vision of quality health care through quality information. See in particular the practice briefs on a) eHIM and Electronic Records; b) Compliance, Regulations and Accreditation; c) Privacy, Confidentiality and Security; and d) Health Information Exchange.
http://www.ahima.org/infocenter/practice_tools.asp

American Health Quality Association:

- Develops and manages projects in health care quality improvement and evaluation for payers and purchasers; provides expertise in clinical care, quality improvement, health information management and technology, statistical analysis, and communications to health care purchasers and providers. AHQA represents a national network of community-based Quality Improvement Organizations (QIOs) and other professionals.
www.ahqa.org

American Medical Informatics Association (AMIA):

- Focuses on the development and application of biomedical and health informatics in the support of patient care, teaching, research, and health care administration; offers many tools and publications.

www.amia.org

CDC Public Health Information Network (CDC PHIN):

- Aims to improve the capacity of public health to use and exchange information electronically by promoting the use of standards, defining functional and technical requirements.

www.cdc.gov/phn

Centers for Medicare & Medicaid Services (CMS):

- Assures quality health care for all Americans by various quality initiatives and through accountability and public disclosure. Some initiatives focus on publicly reporting quality measures for nursing homes, home health agencies, hospitals, and kidney dialysis facilities. Consumers can use the quality measures information for these healthcare settings to assist them in making healthcare choices or decisions.

www.cms.hhs.gov/QualityInitiativesGenInfo/

Certification Commission for Healthcare Information Technology (CCHIT):

- Aims to accelerate the adoption of robust, interoperable health information technology by creating a credible, efficient certification process.

www.cchit.org

Connecting for Health:

- Aims to catalyze the widespread changes necessary to realize the full benefits of health information technology (HIT), while protecting patient privacy and the security of personal health information; Explores the concept of how the Common Framework can be applied to address the requirements related to population health objectives such as quality improvement, research and public health.

www.connectingforhealth.org/resources/cfh_ahrq_aqa_rfi_073007.pdf

EHR/CR Functional Profile Project:

- Identifies conformance requirements for information systems providing data being used in clinical research. It is a collaborative effort to expand and adapt the functionality of EHR and associated systems, networks, and processes to support clinical research.

www.ehrcr.org

Healthcare Information and Management Systems Society (HIMSS):

- Topics and tools section presents comprehensive information on key issues related to healthcare information and management systems with an emphasis on training. The resources range from electronic health records, standards, interoperability, privacy and security, clinical informatics and also includes some interactive tools.

<http://www.himss.org/ASP/index.asp>

Institute for Clinical Systems Improvement (ICSI):

- Collaborates to champion the cause of health care quality and to accelerate improvement in the value of the health care to the populations. ICSI's process for the development, revision, and approval of health care guidelines, order sets, and protocols includes a systematic, consensus-based process for reviewing evidence.

www.icsi.org

Joint Public Health Informatics Taskforce (JPHIT):

- Provides a common voice in public health informatics for a more robust enterprise capable of better protecting the population and seeks to unify the public health message in the context of growing and moving towards accrediting public health departments with specific capabilities and to provide measured performance improvement in the area of health information exchange.

www.aphl.org/aphlprograms/informatics/collaborations/jointpublic/pages/default.aspx

Minnesota Community Measurement (MNCM):

- Collaborative effort of health care organizations and professionals dedicated to improving the quality of care Minnesota HealthScores is a community asset, used by medical groups and clinics to improve patient care, by employers and patients as vital information about the cost and quality of health care services, and by health plans for their pay-for-performance programs.

www.mncm.org

Minnesota Medical Association (MMA):

- Champions quality improvement efforts and strives to provide physicians with the tools and resources. Quality improvement initiatives include evidence-based clinical recommendations, quality measurement, electronic health information, physician reimbursement for improved quality (pay for performance), and legislation.

www.mmaonline.net/KeyIssues/QualityandSafety/tabid/1481/Default.aspx

National Committee on Vital and Health Statistics (NCVHS):

- Develops recommendations to HHS on needs for additional policy, guidance, regulation and/or public education related to expanded uses of health data in the context of the developing nationwide health information network with, an emphasis on the uses of the data for quality improvement, quality measurement and reporting.

<http://ncvhs.hhs.gov/>

National Quality Forum (NQF):

- Focuses on developing and implementing a national strategy for health care quality measurement and reporting. Established as a public-private partnership, the NQF has broad participation from all parts of the health care system and works to promote a common approach to measuring health care quality and fostering system-wide capacity for quality improvement.

www.qualityforum.org

Public Health Informatics Institute (PHII):

- Aims to improve the performance of the public health system by advancing public health practitioners' ability to strategically manage and apply health information systems.

www.phii.org

Stratis Health:

- Serves as an unbiased consultant, guiding health care organizations through change management for EHR implementation. Assists organizations in preparing for, selecting, implementing, and fully using HIT.

www.stratishealth.org/expertise/healthit/index.html

TOOLS, PUBLICATIONS AND PRESENTATIONS RELATED TO ORGANIZATIONAL FACTORS

Communications plan templates

- Tool from Stratis Health that describes a plan for communicating with all stakeholders, including physicians, staff, patients, and families about the process changes that will be taking place during the adoption and implementation of a new EHR system.
<http://www.stratishealth.org/expertise/healthit/clinics/assess.html>

EHR Planning and Implementation tools:

- Stratis Health offers numerous tools which guide the entire process from EHR planning, implementation and optimization;
EHR selector tools on its DOQ-IT (Doctor Office Quality – Information Technology) site
User satisfaction survey templates and HIT and HIE planning tools also available
www.stratishealth.org/expertise/healthit/index.html



Essential People Skills for EHR Implementation Success

Fenton, Susan H., Giannangelo, Kathy, Stanfill, Mary.
AHIMA Practice Brief, Journal of AHIMA 77, no.6 (June 2006): 60A-D.

HIMSS Davies Award:

- Recognizes excellence in the implementation and value from health information technology, specifically EHRs; the application process serves as a valuable introspective self assessment. There are currently four award categories: Public Health, Organizational, Ambulatory, and Community Health Organizations.
<http://www.himss.org/davies/about.asp>

Process change support and solutions tools (practice culture and workflows)

- Tool from Stratis Health that provides potential solutions to common barriers faced by clinics adopting EHRs, such as issues related to costs, cultural and process changes, leadership, the learning curve, security, privacy, etc.
<http://www.stratishealth.org/expertise/healthit/clinics/assess.html>

Minnesota e-Health Initiative Health Informatics Education and Training Resources

- Includes information about health informatics education programs, courses, seminars and conferences for the Minnesota health care workforce.
<http://health.state.mn.us/e-health/cec/educationtrainingresources08.pdf>

Practice brief, practice tools and leadership models

- Various tools are offered by AHIMA (American Health Information Management Association) that address various issues related to EHR and also includes a special section on PHRs and health information exchange.
http://www.ahima.org/infocenter/practice_tools.asp

Sample Project Charters (Leadership and Governance)

- Open Health Tools Sample Project Charter for EHR Implementation <http://www.openhealthtools.com/Reports/Apr08/HII%20%20Project%20Charter.pdf>
- State of Minnesota project charter template - www.state.mn.us/mn/externalDocs/OET/Project%20Charter_030602_Project_Charter_Template_053006.doc

- Microsoft Office project charter template - <http://office.microsoft.com/en-us/templates/TC011414181033.aspx?CategoryID=CT101445011033>
- Vista Community Clinic Project Charter, <http://www.cchealthnetwork.org/media/10182/vista%20cchn%20carepoint%20grx%20implementation%20project%20-%20project%20charter.pdf>

Technology Informatics Guiding Educational Reform (TIGER)

- The purpose of the initiative is to identify information/knowledge management best practices and effective technology capabilities for nurses. TIGER's goal is to create and disseminate action plans that can be duplicated within nursing and other multidisciplinary healthcare training and workplace settings. http://www.tigersummit.com/Home_Page.html

Total cost of ownership tool (EHR related funding and value on investment)

- Tool from Stratis Health to estimate the total cost of ownership and return on investment for HIT applications being considered for acquisition, and to evaluate benefits realized. <http://www.stratishealth.org/expertise/healthit/clinics/assess.html>

Use of Electronic Health Records in U.S. Hospitals

- Ashish K. Jha, M.D., M.P.H., Catherine M. DesRoches, Dr.Ph., Eric G. Campbell, Ph.D., Karen Donelan, Sc.D., Sowmya R. Rao, Ph.D., Timothy G. Ferris, M.D., M.P.H., Alexandra Shields, Ph.D., Sara Rosenbaum, J.D., and David Blumenthal, M.D., M.P.P., *N Engl J Med* 2009;360:1628-38.

TOOLS, PUBLICATIONS AND PRESENTATIONS RELATED TO HEALTH CARE DECISION SUPPORT

A fundamental theorem of biomedical Informatics.

Freidman CP, *Journal of the American Medical Informatics Association*, Volume 16, Number 2, March/April 2009

Computerized provider order entry adoption: implications for clinical workflow

- Campbell EM, Guappone KP, Sittig DF, Dykstra RH, Ash JS. *J Gen Intern Med.* 2009 Jan;24(1):21-6. Epub 2008 Nov 20.

Computerized provider order entry adoption: implications for clinical workflow

- Boyd CM, Darer J, Boulton C, Fried LP, Boulton L, Wu AW. *JAMA.* 2005 Aug 10;294(6):716-24.

Consumers in health care: Creating decision support tools that work

- A report prepared by Shaller Consulting, Stillwater, MN for The California HealthCare Foundation, June 2006. This report focuses on the range, impact and use of decision support tools.

Decision support roadmap and implementation

- Improving Outcomes with Clinical Decision Support: An Implementer's Guide www.himss.org/ASP/topics_cds_workbook.asp?faid=108&tid=14
- A Roadmap for National Action on Clinical Decision Support www.amia.org/inside/initiatives/cds
- Alert Fatigue from the Clininfo Wiki http://www.informatics-review.com/wiki/index.php/Alert_Fatigue

HIMSS Davies Award:

- Recognizes excellence in the implementation and value from health information technology, specifically EHRs; the application process serves as a valuable introspective self assessment. There are currently four award categories: Public Health, Organizational, Ambulatory, and Community Health Organizations.
<http://www.himss.org/davies/about.asp>

Personal Health Records: The Essential Missing Element in 21st Century Health Care

- By Holly Dora Miller, MD, MPA, William A. Yasnoff, MD, PhD, and Howard A. Burde, Esquire
Health Information and Management Systems Society
www.himss.org

The unintended consequences of computerized provider reorder entry: findings from a mixed methods exploration

- Ash JS, Sittig DF, Dykstra R, Campbell E, Guappone K. Int J Med Inform. 2009 Apr;78 Suppl 1:S69-76. Epub 2008 Sep 12.

TOOLS, PUBLICATIONS AND PRESENTATIONS RELATED TO HEALTH AND PRACTICE IMPROVEMENT

AAFP Center for Health IT:

- Offers consultative, educational and outreach activities to facilitate the adoption and optimal use of health information technology. The online tools are designed to help in the move towards implementing an electronic health record
www.centerforhit.org/online/chit/home/tools.html

AHRQ National Resource Center for Health Information Technology:

- Develops tools to help health care organizations plan for, implement and evaluate health information technology (HIT). These tools describe and recommend strategies for addressing some of the common challenges organizations encounter when working with health IT systems
<http://healthit.ahrq.gov/>

Aspects of electronic health record systems:

- Harold P. Lehmann, Patricia A. Abbott, Nancy K. Roderer, 2nd edition, published by Birkhäuser, 2006
Chapter 5 covers electronic health record systems in population health

How clinical decision support can be used to monitor and improve population health:

- Farzad Mostashari and Theresa Cullen
<http://healthit.ahrq.gov/images/nov08cdswebconference/800x600/index.html>

Health Information Technology for Improving Quality of Care in Primary Care Settings:

- Agency for Healthcare Research and Quality, US Department of Health and Human Services
Prepared by: Jerry Langley and Carol Beasley, Institute for Healthcare Improvement
http://healthit.ahrq.gov/portal/server.pt/gateway/PTARGS_0_1248_661809_0_0_18/AHRQ_HIT_Primary_Care_July07.pdf

Improving Medication Use and Outcomes with Clinical Decision Support: A Step-by-Step Guide

- Edited by Jerome A. Osherhoff, MD, FACP, FACML
Health Care Information and Management Systems Society.
www.himss.org

Innovations in Using Health IT for Chronic Disease Management

- Agency for Health Care Research and Quality, U.S. Department of Health and Human Services.
http://healthit.ahrq.gov/images/ianoqcdmreport/cdm_issue_paper.htm

National Voluntary Consensus Standards for Health Information Technology, Structural Measures 2008, A consensus report by the National Quality Forum (NQF):

- Report refers to HIT applications with demonstrated quality improvements: electronic prescribing (e-prescribing), electronic results delivery, patient tracking and care management, CDS, computer physician order entry, and fully integrated electronic health records (EHRs).
www.qualityforum.org/HIT/HIT_Structural_Measures_20%2008%201.14.09.pdf

TOOLS, PUBLICATIONS AND PRESENTATIONS RELATED TO COMMUNITY HEALTH IMPROVEMENT

Health Care Quality Measures Report, Minnesota Department of Health:

- Report which includes final recommendations from Minnesota Community Measurement to the Minnesota Department of Health for quality measures to be initially included in the statewide quality reporting system. The work also includes a national inventory of existing health care quality measures.
www.health.state.mn.us/healthreform/measurement/index.html

How clinical decision support can be used to monitor and improve population health

- Farzad Mostashari and Theresa Cullen
<http://healthit.ahrq.gov/images/nov08cdswebconference/800x600/index.html>

Using Automated EHR Alerts to Improve Physician Reporting

- Joseph Lurio¹, Frances Morrison², Michelle Pichardo¹, Rachel Berg¹, Michael Buck², Winfred Wu³, Nicholas Soulakis³, FarzadMostashari³, Neil Calman¹. ¹Institute for Family Health; ²Columbia University; ³New York City Department of Health and Mental Hygiene
www.syndromic.org/conference/2008/presentations/Track%202/ISDS%20Conference_12_4_08.ppt

APPENDIX A

Minnesota e-Health Initiative Advisory Committee Members

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Advisory Committee Co-Chair;
President and CEO, Stratis Health

Walter Cooney, MA

Advisory Committee Co-Chair;
Executive Director, Neighborhood Health Care Network

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2008-2009 Minnesota e-Health Initiative Workgroups

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Electronic Prescribing Workgroup
Co-Chairs: Alan Abramson, Tim Gallagher

Standards Workgroup,
Co-Chairs: Bobbie McAdam, Mike Ubl

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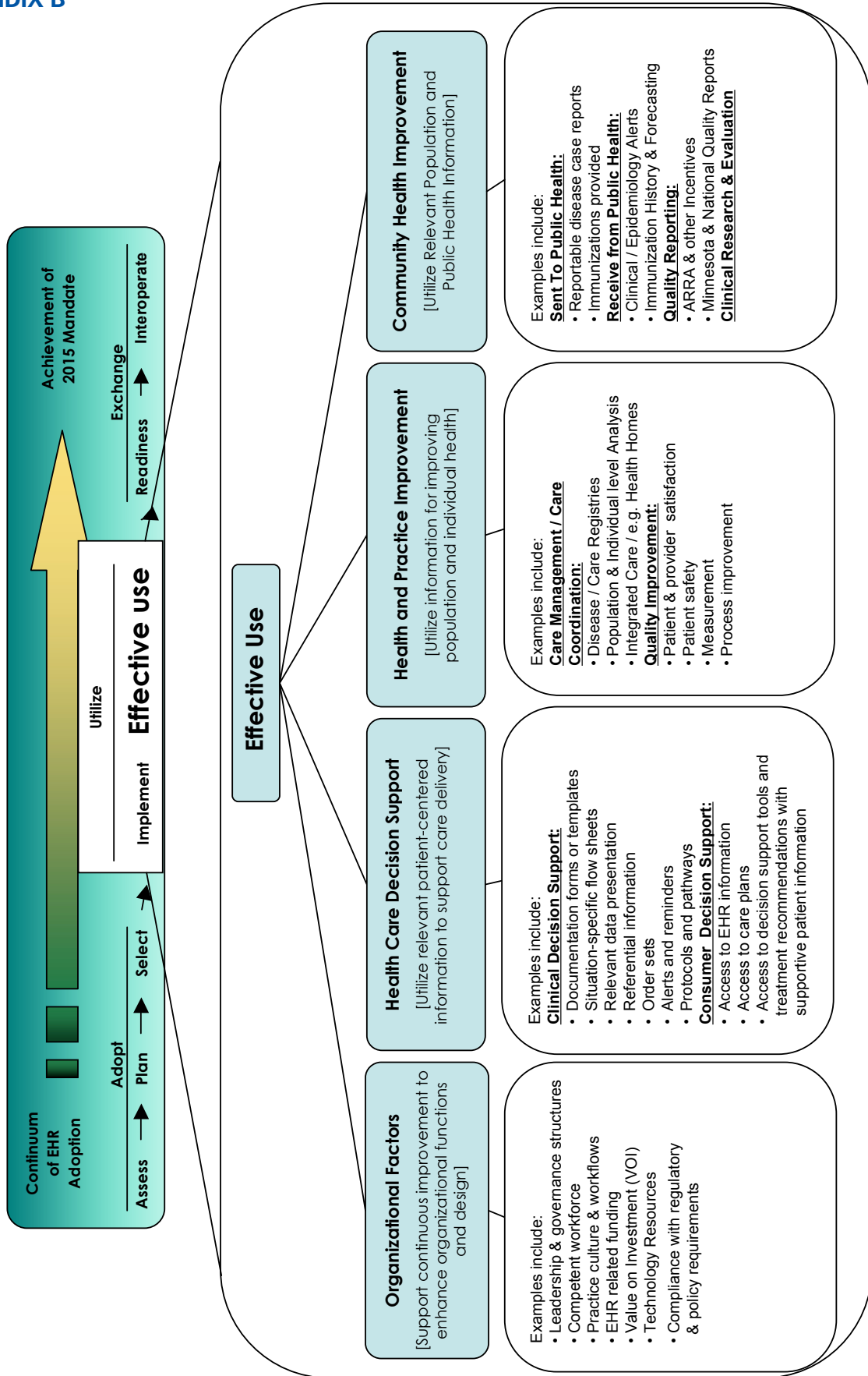
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Minnesota Framework for Effective Use of EHRs





For More Information:



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