
Healthcare Technology Resource Guide



Community Clinics Initiative
Strong Clinics, Healthy Communities

Section One: Know Where You are Headed and Why

The convergence of the national conversation about Health Information Technology, Electronic Health Records, and the need to improve our health care system has resulted in a level of energy around the questions about what it means to implement Electronic Health Records and how it should be done. The national conversation has taken place largely in the headlines and as sound bites in Presidential press conferences. What we know through research conducted by CHCF and through the experience of CCI's grantmaking to community clinics, is that this conversation is complex and challenging. The reality of making EHR a tool that works for CHCs and advances their mission is a long way off.

The CHCF-CCI EHR project grew out of a belief that the needs of CHCs must be taken into account in the development, deployment, and policy debate around the use of technology tools to improve health care. As we observe these national discussions, and work with grantees that are trying to implement EHRs, we have seen little evidence of an organized understanding and response to CHCs from the vendor market place. Also, CHCs have not been able to collectively articulate their unique needs in a way that vendors can respond to. Along the way, we have learned about the unique needs of community health centers, the promise and the limitations of EHRs, and the intense need to reflect on and refine an organization's systems and processes. This will prepare them to use technology tools to improve clinic operations, improve health outcomes, and to ultimately improve community health.

It is this critical issue of Readiness that brought us to the guide that follows this introduction. As you may recall in 2003, CCI released a report to the field entitled "[Technology Management to Build Capacity and Create Sustainability](#)", written by Tom Dawson and SA Kushinka of Full Circle Projects. This report and the model call for clinics to implement a continuous cycle of technology improvements. Instead of applying resources to technology in short intense bursts, or on a project-by-project basis, the model calls for clinics to build and maintain significant technology management capacity. Clinics can use that capacity in a continuous sustained effort to keep technology systems moving forward, aligned with clinic business planning and processes. Because of the success of this model, we have asked the authors at Full Circle Projects to revisit the model with an eye on the pathways to successful EHR readiness and eventual adoption.

Full Circle Projects has worked with domain experts to develop a guide containing tools, case studies, techniques and methods for successful procurement, implementation and integration of information systems into clinic operations. This outline is just the beginning of what we hope will be a growing body of knowledge compiled as a practical resource guide, with contributions from the field as you find tools and resources along the pathway to healthier communities.

Section Two- EHR Readiness and Technology Management

The Connection Between EHR Readiness and Effective Technology Management

EHR implementation and operation is complex, significantly more complex than practice management system implementation and operation. EHR touches so many areas of clinic operations and affects clinic processes so deeply that determining readiness can be a daunting task. EHR readiness is especially critical, as implementation of an EHR will exacerbate existing healthcare technology problems and issues. The goal of this Healthcare Technology Resource Guide is to provide vetted information and tools to support clinics as they evaluate EHR readiness and build their capacity to select, implement, and operate complex healthcare information systems, including EHR.

Technology management and operations capability is a core EHR readiness factor that can be examined by clinics regardless of mission or size. Look at how your current technology and healthcare information systems are working; especially practice management, clinical applications and disease registries. Are clinicians represented in system planning? Does your organization regularly evaluate how well computer systems are supporting frontline clinic operations? Are technology projects designed, completed, and evaluated in an orderly and efficient manner? Are computers and networks running smoothly, and are technical support costs under control? Is your clinic taking full advantage of the capabilities of your practice management systems? Are new modules or functionalities successfully added regularly to improve clinic operations? If you answered yes to all these questions then you exhibit characteristics of solid technology management at the organizational level and successful technology project management in the trenches. If not, the good news is that something can be done about it with hard work but minimal cost and disruption.

What is Effective Technology Management?

A model of effective technology management is presented in the CCI Report to the Field – Technology Management to Build Capacity and Create Sustainability. The report calls for clinics to implement a continuous cycle of technology improvement. Instead of applying resources to technology in short intense bursts, or on a project-by-project basis, the model calls for clinics to build and maintain significant technology management capacity, then use that capacity in a continuous sustained effort to keep technology systems moving forward, aligned with clinic business processes.

Successful technology operations are supported with sound technology management structures, clear lines of responsibility, and the attentive support of clinic leadership. Sound technology leadership also provides direction for the clinic staff, vendors, and outside consultants with roles in implementing the clinic's vision and how technology can support that vision. Technology management structures can provide the means to evaluate staff, vendors, consultants, and managers and hold them accountable. Absence of strong technology management structures and processes increases the risk of failure for mission-critical systems, and strains the clinic processes that these applications support.

Under the model proposed in Technology Management to Build Capacity and Create Sustainability:

- Clinic operations are tightly integrated with technology and information systems, making it essential that a clinic's executive-level technology manager has a broad organizational perspective, including knowledge of both technology and operations;
- Sustained investments are made in technology management, planning, and training;
- Communication and coordination are valued - leaders from all disciplines are consulted when identifying issues and needs and determining priorities;
- Clinics provide appropriate support to their users with managed resources, whether staff-based, consultant-based, or a combination of the two;
- Technology staff, as well as vendors and consultants, are supervised, evaluated, and held accountable by management;
- Technology projects are structured, budgeted, managed, and evaluated by management.

Highly functioning technology management structures position a clinic to be proactive in their use of technology rather than addressing needs on a crisis-by-crisis basis. In this manner, clinic operations are more effectively supported and technology investments are maximized.

Using this Healthcare Technology Resource Guide

Building the capabilities involved in selection, implementation, and operation of healthcare technology is not easy. There are no cookie cutter solutions. Clinics are different sizes, serve different populations, have different payors, and foster different cultures. Because clinics are not one size fits all, more than one approach may be presented allowing your clinic to select the one that best suits your size, culture, and staff capabilities. Evaluate and select the articles, tools, templates, and examples in this guide based on the specific needs of your clinic.

Use the resources in the guide to support existing systems, when upgrading existing technology management systems, and when implementing new ones. The Technology Maturity and Capability Model at the beginning of section three is a great place to start. It will help your clinic to understand where you're at, identify your strengths and weaknesses, and prioritize your needs. Then look through the outline of resources and tools to find the ones that will support your project.

The Healthcare Technology Resource Guide Online

This Healthcare Technology Resource Guide is available on the CCI website at (<http://www.communityclinics.org>) so it can be used freely by clinics across the country. Community health centers will be encouraged to actively participate in the continuing development of the Healthcare Technology Resource Guide by submitting resources, tools and articles, which will be evaluated by an advisory committee with members from community health centers and managing editors from Full Circle Projects. The goal is to build an easy way for clinics to access the information and tools they need to enhance their use of healthcare information technology in pursuit of their missions.

Section Three - Building Technology Management Capabilities

Use and management of existing systems is often the key indicator of an organization's readiness to absorb more complex and sophisticated technology tools. This section contains information on the process of technology management and provides specific resources to aid clinics in building their technology management and operations capabilities.

A. Resources for Organizational Self-Assessment

Item	Context	Tool, Article, and/or Resource:
<p>1. Technology Maturity and Capability</p>	<p>The first step to building technology capacity is to understand your organization's current strengths and weaknesses. A self-assessment of technology maturity and capability will identify strengths and weaknesses, allowing the clinic to focus capacity building efforts on the areas where they are most needed.</p>	<ul style="list-style-type: none"> • The Technology Maturity and Capability Model
<p>2. EHR Readiness</p>	<p>Implementing EHR has been described as being not merely a technology project, but a change in the way care is delivered. A healthcare organization that feels they would benefit from implementing an EHR needs to assess their capabilities and preparedness across many organizational aspects to identify strengths, weaknesses and gaps in readiness. Doing so in advance of selection and implementation will accelerate the benefit realization process and provide a measure of risk mitigation against the many ways a complex implementation can fail.</p>	<ul style="list-style-type: none"> • EHR Starter Readiness Assessment

B. Resources for Improving Technology Leadership

Item	Context	Tool, Article, and/or Resource:
<p>1. The Technology Leadership and Management Role</p>	<p>Because technology and clinic operations are so tightly integrated, the central technology leadership and management role needs to be filled by an executive-level leader with significant knowledge of both. The design of this his role varies from clinic to clinic, but responsibilities typically include leading technology planning processes, seeking multidisciplinary input, negotiating priorities, allocating resources, and overseeing operations. This role does not require specific technical expertise, but it does take a broad understanding of the capabilities and operational realities of technology and information systems and knowledge of how they can be used to meet the mission and improve clinic operations.</p> <p>Some larger clinics and those that use complex technology and information systems may choose a full time chief information officer (CIO) to fill this role. More typically, an existing member of the central leadership group assumes the role.</p>	<ul style="list-style-type: none"> • CIO job description samples • CIO role description samples
<p>2. Executive-level Strategic Technology Team</p>	<p>Healthcare Information Systems (HIS) impact every part of a clinic. The executive level technology team is the forum where strategic technology issues can be discussed and decisions negotiated that reflect the needs of the whole organization. The multidisciplinary makeup of the technology team makes it effective as a tool for communicating technology issues and decisions between line staff and decision makers.</p>	<ul style="list-style-type: none"> • Executive-level technology team charter samples • Technology team agenda samples

	<p>Some clinics find it effective to discuss technology issues in an existing executive team meeting. In this case the executive team member holding the CIO role creates an appropriate agenda for the technology portion of the meeting. For other clinics, the best choice is to form a specific strategic technology team. This strategy is effective when team composition would benefit from inclusion of one or more staff members not on the executive team.</p>	
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C. Resources for Managing and Sustaining Technology Systems

Item	Context	Tool, Article, and/or Resource:
<p>1. The Annual Technology Planning Process</p>	<p>The annual technology planning is timed to inform development of the budget. The technology plan details projects, partnerships, and expenditures to be made in the next budget year. The plan also identifies potential issues, projects, or partnerships that are on the one to three year horizon. The plan positions a clinic to be more proactive around the use of technology and information systems, allowing clinic managers and fund development staff to prepare resources.</p> <p>The annual technology planning process is led by the person holding the CIO role, and supported by the executive level technology team.</p>	<ul style="list-style-type: none"> • Technology plan samples • Technology budget samples • Technology Planning Guidelines

Item	Context	Tool, Article, and/or Resource:
<p>2. IT Policies and Procedures</p>	<p>Technology policies and procedures are a cornerstone of effective technology management in clinics, used to translate the organization's values, resources, and priorities into a format that is clearly communicated and enforceable. Policies and procedures are one tool used by management to implement aspects of their strategic vision in daily operations.</p> <p>Technology policies and procedures directly reflect an organization's strategic values. Therefore, clinics must develop policies and procedures that reflect not only their use of technology but their organizational culture. Policies and procedures can begin with samples and templates, but they must be customized and regularly updated to match changes in the clinic and technology environments.</p>	<ul style="list-style-type: none"> • Comprehensive technology policies and procedures samples/templates • Acceptable use policy samples/templates
<p>3. User Support Systems</p>	<p>The provision of support services to end users is critical to the success of technology and information systems. Since support services can be provided by IT staff or external consultants, it is important to provide guidelines for service providers so services are provided in a way that is consistent with the clinic's priorities. Service level agreements (SLA) capture clinic priorities and allow a systematic approach to user support and allow more effective management of support resources. An internal help desk system can be used to document requests for technology support services, and track issues to their resolution and create valuable information that can be used to evaluate support resources and identify training opportunities.</p>	<ul style="list-style-type: none"> • Service level agreement samples • Help desk system design samples • Trouble ticket report samples • Help desk software resources • Help desk system report samples • Frequently asked question lists developed from help desk systems

Item	Context	Tool, Article, and/or Resource:
	<p>User support systems will vary widely based on the size of the clinic, the number of clinic sites, and the extent of the use of outside consultants as service providers.</p>	
<p>4. Technology Roles and Responsibilities</p>	<p>A variety of technology roles are held by staff in clinics, but often these roles are not reflected in job titles or documented in job descriptions. Clearly defined and documented technology roles and responsibilities serve many purposes. In addition to their usefulness in writing job descriptions and avoiding misinterpretation, role descriptions can be added to job descriptions allow supervisors to evaluate staff against organizational expectations. Technology role descriptions allow role-based technology capabilities and skill sets to be defined, informing the development of training plans and staff evaluation tools.</p> <p>Technology roles will vary from clinic to clinic, but activities appropriate for inclusion in a role include performing back ups, assisting support service providers, and troubleshooting user technology problems.</p>	<ul style="list-style-type: none"> • Technology support services liaison role descriptions samples • Information Technology Roles and Responsibilities

Item	Context	Tool, Article, and/or Resource:
<p>5. Tactical Technology Team</p>	<p>A tactical technology team provides a forum for coordination and communication between those responsible for providing user support, managing technology projects, and performing system maintenance tasks. The committee is composed of those holding significant operational technology roles led by the executive holding the CIO role, ensuring coordination between the strategic and the tactical. The tactical team tracks issues to resolution, coordinates technology-related activities and projects, and keeps technology support service providers aligned. The team takes direction from the strategic team and communicates the need for strategic guidance to them.</p> <p>The precise makeup and meeting schedule of the tactical technology team depends on your clinic. The team generally meets on a weekly or bi-weekly basis, depending on your size and the extent of the technology projects in process.</p>	<ul style="list-style-type: none"> • Tactical Technology Team charter
<p>6. System Documentation and Guidelines</p>	<p>Teams of people including staff and external consultants, often manage complex information systems, and the technology infrastructures that support them. Documentation of systems and guidelines captures these details so they become assets of the organization, i.e., the knowledge and information stays within the organization.</p> <p>Technology documentation is kept by the clinic, although consultants may contribute to it.</p>	<ul style="list-style-type: none"> • Technical documentation samples • Disaster recovery plan samples • Donated equipment guideline samples

D. Resources for Maximizing the Use of Information Systems

Item	Description	Tool, Article, and/or Resource:
<p>1. Information Systems Roles and Responsibilities</p>	<p>A variety of information system roles are held by staff in clinics that are not reflected in job titles. Clearly defined and documented information system roles and responsibilities serve many purposes. In addition to their usefulness in writing job descriptions and avoiding misinterpretation, role descriptions can be added to job descriptions allow supervisors to evaluate staff against organizational expectations.</p> <p>Responsibilities that can be included in information system role descriptions include training, master file maintenance, vendor relationship management, data integrity and quality assurance, process flow documentation, needs assessment and requirements definition, query and report writing, data dictionary maintenance.</p>	<ul style="list-style-type: none"> • Information system role descriptions
<p>2. Information System Documentation</p>	<p>Information systems documentation captures key information about how HIS are set up and used. Procedural documentation and process flow documentation describes how a particular task or activity is performed, including the people involved, the output(s) of the process and the places in the process where technology systems are involved. This documentation should be maintained as systems and procedures change. This documentation will become an organizational asset that protects the clinic against staff and consultant turnover.</p> <p>Clinics may use procedural documentation to accomplish a variety of objectives. Procedural</p>	<ul style="list-style-type: none"> • Information System Documentation • Procedural documentation • Process flow documentation, samples

	<p>documentation can be easily modified for use as training materials. Some clinics use procedural documentation to create benchmarks that can be used to measure staff competency.</p>	
<p>3. Reports and Queries</p>	<p>Reporting is the tool used to analyze raw data and give clinics the information needed to provide an unbiased look at the organization and inform decision-making.</p>	<ul style="list-style-type: none"> • Report end user guidelines • Dashboard reports by role, samples • Report design documentation • Report inventories • Data dictionary samples
<p>4. Training Plans and Methods</p>	<p>The training plan and method development begins with an understanding of the current environment and the type of training needed. For example, browser-based systems may require training on basic personal computer skills and Internet navigation, as well as in clinic procedures. The training plan will design a consistent approach to new user training, including the need for basic skills courses. Training plans also address ongoing training needs, identifying ways that trainings can be provided with minimal impact on the normal course of operations.</p> <p>Clinics will choose a training approach based on their size, their use of volunteers, and the degree of change that is present in their organization.</p>	<ul style="list-style-type: none"> • Training plan samples • Training Evaluations and Standards

Section Four - Managing Technology Projects

Distinct from the on going and day-to-day process of technology and information systems management, there are technology-related initiatives such as the selection and purchase of Healthcare Information Systems, including Practice Management System and Electronic Health Records, that have a relatively fixed duration and require specific project management skills and tools.

A. Resources for General Technology Project Management

Item	Context	Tool, Article, and/or Resource:
<p>1. Technology Project Definition and Design</p>	<p>Technology projects can be more easily managed when they are well defined and some effort is taken to document the project design. By developing a Scope of Work (SOW) misunderstandings can be avoided through capturing the goals and objectives and key aspects of project design, including project duration, resources, deliverables (output) and completion date.</p> <p>Scopes of work will be written differently, depending on whether projects are being done by internal staff or external resources (consultants), and will vary based on the size and scope of the project.</p>	<ul style="list-style-type: none"> • Scope of Work samples • Technology project evaluation samples
<p>2. Issues Management</p>	<p>The quality of technology support available to clinics from vendors and consultants can be greatly influenced by their ability to manage these relationships well. Tracking delivery of work products, prioritizing issues and defining the desired outcomes in objective, measurable terms are key elements for successful project outcomes.</p>	<ul style="list-style-type: none"> • Issues List samples • Issues Management Process • Call log samples
<p>3. Project Plan and Timeline</p>	<p>The project plan and timeline are used to direct, and coordinate all activities of projects to ensure that the goals and objectives are accomplished within the desired time frame, and to insure that all activities and tasks are realistically and adequately staffed with the right resources.</p>	<ul style="list-style-type: none"> • Sample project plans

B. Resources for Managing a Systems Selection Project

Item	Context	Tool, Article, and/or Resource:
1. Project Charter	A Project Charter is like a contract among the members of the project team and documents the baseline from which the project was launched. Through the course of complex projects, it's often helpful to go back and revisit the original intent and assumptions to either validate that a change in course is necessary or to realign the team. The Charter identifies the roles and responsibilities of team members, lays out the budget expectations, timeline, known and potential project risks, and risk mitigation strategies.	<ul style="list-style-type: none"> • Project Charter sample
2. Project Team Composition	Selecting the right mix of staff members and external experts to guide the selection project is fundamental to its success. Staff members who will be most directly impacted by the new system and who can champion the change process with their peers are ideal team members. A combination of leaders and operations staff is also important to make sure all perspectives – both strategic and tactical - are represented.	<ul style="list-style-type: none"> • System Selection Project Team
3. "Current State" Documentation	Understanding your organization's strengths, weaknesses, and capabilities is an essential step in a major HIS procurement process. The current state analysis captures detailed information relating to your IT infrastructure, use of existing systems, and management of technology and information systems. Also included in the current state documentation are workflow diagrams or descriptions of key processes that the clinic hopes to automate with the new system. The resulting current state analysis is used as a baseline to inform the selection process.	<ul style="list-style-type: none"> • Current State Documentation (sample) • Workflow Diagrams • Hardware Inventories
4. Needs Assessment	As a precursor to the development of more detailed requirements, a needs assessment captures the	

	<p>expectations of the clinic about what the new system will help them to accomplish. For example, what processes can be streamlined or automated with technology? What new services or patient outreach can be accomplished with the help of computerized tracking and reminders?</p>	
<p>5. "Future State" Documentation</p>	<p>The future state analysis captures the clinic's assumptions about the features, functions, costs, and outcomes they expect from the system they will select and purchase, and helps the clinic to think about the new capabilities that will be required for them to operate it. This analysis helps the organization to develop a more complete picture of the impact on the organization – both opportunities and challenges – for which they need to prepare.</p>	
<p>6. Requirements Development</p>	<p>Following the more general needs assessment, the development of detailed requirements is an important step to selecting the right solution. Requirements can express the very important variations in operations that are found between clinics, and between CCHCs and other medical providers. Requirements should be included in the Request For Proposal (RFP) to vendors and their response to the RFP attached to the contract.</p>	<ul style="list-style-type: none"> • Guidelines for Developing Clear Requirements
<p>7. Vendor Evaluation</p>	<p>A number of tools and techniques can be used to ensure that the vendor evaluation process is an objective, "apples-to-apples" comparison that is as free of sales hype as possible. These tools and techniques can help health centers to take control of the process in a way that meets their needs and timelines, and requires that the vendor present their solutions in a way that is relevant to CCHCs. Vendors must present their solutions based on the requirements, patient population and service characteristics of the health centers.</p>	<ul style="list-style-type: none"> • Pre-packaged RFP: Risks and Benefits • PM Software Classification • Must-Have List • Guidelines for structured vendor interviews and demonstrations • Demonstration Scenarios sample • Vendor Demonstration Score Sheets • Site visit tips • Evaluating Total Cost of Ownership

<p>8. Vendor Selection</p>	<p>After a thorough, objective and competitive evaluation process, the top two or three solutions will emerge from the group. Depending on the situation, clinics will choose from a variety of processes to select a vendor of choice and runners up from this group of finalists.</p> <p>Clinics learn a lot about themselves and the systems they're evaluating during the process that leads to vendor selection. Additional vendor demonstrations or site visits may be needed to more closely evaluate the differences between the finalists. Pricing is commonly an area where clinics need vendors to provide more clarity. A best and final RFP is an example of how to compel vendors to provide written responses to these questions.</p>	<ul style="list-style-type: none"> • Best and Final Proposals
<p>9. Specifications Development</p>	<p>It is typical that there will be some requirements that cannot be met by a vendor's core system and that custom programming will be required. To make sure that the vendor selected will meet the special requirements in a satisfactory manner, specifications need to be developed and attached to the contract. Distinct from requirements – which describe <u>what</u> is needed – specifications describe <u>how</u> something will work.</p>	<ul style="list-style-type: none"> • System Specifications (sample)

Section Five - Risk Management and Contracting

No complex software application works perfectly. Worse, some clinics have experienced software installations that have failed, in whole or in part, resulting in technology costing hundreds of thousands of dollars (or more) being wasted. Section five presents information on how clinics can use contracts and other legal agreements to manage risk and shape their relationships with vendors and consultants after the sales pitch has ended.

A. Resources for Contracting with Information Systems and Technology Vendors

Item	Context	Tool, Article, and/or Resource:
<p>1. Technology Vendor Contracting and Licensing</p>	<p>The contract a clinic signs with a software vendor will define their relationship. The clinic will want the vendor to stand by the representations made by sale staff during the selection process, as those representations were the criteria upon which the vendor was selected in the first place. Unfortunately for clinics, the legal staff replaces the sales staff during the contracting process, and getting them to warrant the promises of the sales staff can be difficult.</p> <p>This section covers the practical fundamentals of vendor contracting and licensing. Vendors typically present one-sided software agreements, which unfairly place all of the risk of software failure on the clinics. Clinics must know when to push back and respond to such unfair vendor agreements, what issues they need to focus on, and what legal protections that they should insist upon as a condition of entering into the transaction.</p>	<ul style="list-style-type: none"> • Sample Pro-Vendor License Agreement (with comments) • Sample Clinic Addendum to Vendor's License Agreement (with comments) • Diagram System Implementation and Payment Milestones • Sample Pro-Vendor Maintenance Agreement (with comments) • Sample Clinic Addendum to Vendor Maintenance Agreement (with comments)
<p>2. Contract Negotiations 101</p>	<p>Community clinics constitute a new market for software vendors. Most of the clinics have little experience in practice management let alone EMR software. Moreover, the software being marketed to community-based clinics was not specifically designed to meet their</p>	<ul style="list-style-type: none"> • Contract Negotiations Primer: The Do's and Don'ts of Software Licensing

	<p>needs. Therefore, some of the ramifications of this new market context are:</p> <p>A. Experience has shown that software which was never particularly designed for the community clinic market has had serious limitations when first installed;</p> <p>B. Vendors understand the risks that this new software may not perform in accordance with expectations and thus, are reluctant to agree to testing, or having software performance tied to specific, objective functional specifications;</p> <p>C. The market response has been generally not to “push back” on form vendor contract terms that put all of the risk of a failed implementation on the clinics. Predictably, as long as clinics continue to “give-in” to these unfair terms, the vendors have little or no incentive to change their ways. In other words, why should the vendors agree to take on more risk and expense if they don’t have to? Consequently, it is not surprising that clinics have found that their negotiations are painful and slow.</p> <p>This section will cover some of the basics of contract negotiations.</p>	
<p>3. Managing a Vendor Relationship Based on a Contract Agreement</p>	<p>There is a huge sense of relief once the vendor contract is signed. But this is only the beginning. Contracts are the formal framework of the relationship between clinic and vendor or consultant, and the hard fought terms in the contract must be enforced.</p>	<ul style="list-style-type: none"> • Managing a vendor relationship based on a contract agreement • Enforcing service level agreements through the use of help desk systems and logs

B. Resources for Contracting with Technology and Information Systems Consultants

Item	Context	Tool, Article, and/or Resource:
1. Managing Consultants with Legal Agreements	Contracts and legal agreements are often thought of as tools used by vendors, however, they can also be powerful tools for clinics to use in managing technology and information systems consultants to insure that deliverables and services are provided according to expectations.	<ul style="list-style-type: none">• Scope of Work• Time and Materials• Fixed Fee• Deliverables• Service Level Agreements

Section Six - Implementing a New System

Implementing a new system is a challenging and complex process, and must be approached in a structured and methodical way. Design decisions made during implementation will have lasting implications, yet these decisions must be made in rapid fire succession. Decisions are not limited to system design. Clinic operations must be evaluated and redesigned to match the new system's capabilities. A new system implementation most likely means migration from an existing system and integration with other new or existing software components. Staff acceptance and adoption of the new system is key to its success. This section provides information on making the transition to a new healthcare information system.

A. Resources for Managing a System Implementation / System Conversion Project

Topic	Context	Tool, Article, and/or Resource:
1. System Implementation Overview	The process of converting to a new system is largely a linear process, however, there are many concurrent activities as well. During the contracting and implementation process, clinics should identify milestones based on testing and acceptance of various modules, features and interfaces. During the contracting phase, if done properly, acceptance testing has been defined to signal a payment to the vendor.	<ul style="list-style-type: none"> • Application Implementation and Payments Overview Diagram
2. Planning the Implementation Process and Preparing the Organization	Just as in the System Selection Phase, clinics and project teams will be well-served by taking the time to document roles, responsibilities, timelines, risks and risk mitigation strategies, budget and goals/objectives in a Project Charter. Section Four, D.1. describes the project charter further.	<ul style="list-style-type: none"> • Project Charter for an Implementation/Conversion Project (sample)
3. Application Testing	Simulating actual operational conditions before using a new system is a critical step that is often short-changed during the implementation process. Thorough testing,	<ul style="list-style-type: none"> • Unit Test Plan (sample) • Integrated (End-to-End) Test Plan • Reports Testing

	<p>which includes not only how the system is expected to work but also how the system will respond under error conditions, will reduce the stress of implementing a new system and uncover “bugs” and design flaws before the system is operating in a live clinic situation.</p> <p>Several types of testing are important to undertake. The first is “Unit” testing, which is intended to verify that a discrete module, feature or function of the system is working properly. For example, testing a demographic interface from the practice management system to the EHR system to endure accuracy of data and changes to the data is a unit test.</p> <p>Integrated testing, or end-to-end testing, verifies that the data flows through the system from start to finish in the manner that is expected, and that any calculations or data processing along the way are accurate. For example, integrated testing would consist of making an appointment for a patient, registering that patient, assigning them to a sliding fee category, documenting services performed, generating charges from the clinical documentation, producing a bill with the appropriate charges and adjustments, and generating a revenue report that reflects the corresponding increase in revenue, adjustments and A/R.</p>	
<p>4. System Documentation</p>	<p>Most sophisticated systems are highly configurable to allow clinics and doctor’s offices to tailor the application to meet their specific needs and to accommodate different medical specialties. With this flexibility comes a complexity of tables, parameters, data dictionaries and processing rules that work in conjunction with each other to allow clinics to make the system work for them.</p>	<ul style="list-style-type: none"> • System Documentation (sample)

	<p>Documentation of how the system is configured and the rationale, decisions made or calculations involved in setting up the system preserves this knowledge for the organization – especially important in organizations with high turnover - and helps to ensure that the system can be easily modified to meet changing needs. System documentation consists of two parts:</p> <ul style="list-style-type: none"> • How the system works in its “vanilla” state. The vendor supplies this documentation. • Values that have been entered in the tables and parameters, and the rationale for these values. This documentation must be completed by the clinic. 	
<p>5. Process Redesign</p>	<p>Implementing a new system is a golden opportunity to examine workflow and determine how technology can streamline these processes. Too often clinics try to minimize disruption by keeping things status quo, even if the clinic operations are not very efficient or are labor intensive. As more than one process engineer has noted, automating a dysfunctional process only makes bad things happen faster! Failing to redesign processes can dramatically reduce the benefits that are likely to be achieved by implementing technology.</p> <p>It’s often helpful to graphically sketch out current and proposed future processes, identifying both data flow, process outputs (also called “sources and uses of data”) and staff members involved. These process flow diagrams are very useful for conducting training and give staff a clearer picture of how the new system will fit into operations.</p>	<ul style="list-style-type: none"> • Process Flow Diagrams • Sources and Uses of Data (sample)

Section Seven – General Resources

Section seven contains links to sites that contain a significant amount of information, tools, and/or resources that may benefit community clinics. The sites are listed in the left column. The right column contains a description of the site and the resources available on it, a link to the main page of the site, and in many cases pointers to specific resources or articles.

A. General Community Health Technology Resources

Web Site	Description / Links to Resources
<p>1. Bureau of Primary Health Care – Electronic Medical Records Resources</p>	<p>The Bureau of Primary Health Care (BPHC) is part of the US Dept of Health and Human Resources (HHS) and a subdivision of the Health Resources Services and Administration (HRSA). A section of the BPHC website presents EMR resources. These page offer links to materials and documents prepared by the bureau, as well as related associations or information to assist primary care facilities with the electronic medical records activities.</p> <p>http://bphc.hrsa.gov/chc/CHCInitiatives/emr.htm</p> <p>The following are specific materials located on the BPHC EMR Resources pages which will assist any organization with the basics of EMR procurement process. These documents are available at no cost.</p> <p>Gaud and Associates' Presentation on EMR Procurement ftp://ftp.hrsa.gov/bphc/pdf/chc/EMRProcurementProcess.pdf</p> <p>EMR Planning Requirements http://bphc.hrsa.gov/chc/project_planning_requirements.htm</p> <p>EMR Specs - checklist http://bphc.hrsa.gov/chc/CHCInitiatives/emrspecs.doc</p>
<p>2. National Association of Community Health Centers</p>	<p>NACHC is a trade association representing the interests of community health centers within the United States. Their website offers materials and documents for members compiled from their seminars and conferences offered routinely throughout the US as well as other technical assistance resources for health centers. These materials are available to members and non-members and sometimes have fees associated with them.</p> <p>http://www.nachc.com</p>

<p>3. California HealthCare Foundation</p>	<p>The California HealthCare Foundation is an independent philanthropy committed to improving the way health care is delivered and financed in California, and helping consumers make informed health care and coverage decisions. Formed in 1996, our goal is to ensure that all Californians have access to affordable, quality health care.</p> <p>http://www.chcf.org/publications/</p> <p>CHCF commissions research and analysis, publishes and disseminates information. The CHCF publications section contains several articles relating to EHR:</p> <ul style="list-style-type: none"> Electronic Medical Records: Lessons from Small Physician Practices Electronic Medical Records: A Buyer's Guide for Small Physician Practices Use and Adoption of Computer-Based Patient Records Using Computerized Registries in Chronic Disease Care
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B. General Healthcare Technology Resources

Item	Context
<p>1. American Health Information Management Association</p>	<p>AHIMA is a trade association website providing a library of topics and tools relevant to health information systems and management. The AHIMA FORE library contains links to articles contained in their HIM body of knowledge, compiled from articles published in the Journal of AHIMA, AHIMA Advantage, and other sources.</p> <p>http://library.ahima.org/</p> <p>The AHIMA FORE Library is indexed by topic, or the contents of the library can be searched by key words. Specific articles relating to EHR can be found by searching on the following titles:</p> <ul style="list-style-type: none"> Understanding the EHR System Functional Model Standard Strategic Importance of EHR Management Complete Medical Record in a Hybrid EHR Environment

<p>2. American Medical Association</p>	<p>The AMA is a trade association representing the interests of physicians. This site offers access to two trade publications: AMA News and JAMA; and to other professional resources. These resources are offered to members and sometimes non-members and may have an associated fee for accessing the documents or publications. Older articles appearing in publications are available at no cost.</p> <p>http://www.ama-assn.org/</p>

C. General Technology Management and Operations Resources

Item	Context
<p>1. TechRepublic</p>	<p>This website contains a variety of tools and documents for technology leaders and IT professionals in support of their daily activities. Publications and other materials are available to members and may have associated fees. Membership registration is available at no cost and allows access to limited number of materials.</p> <p>http://www.techrepublic.com</p> <p>TechRepublic provides discussion areas and specific resources relating to technology management and operations, including:</p> <ul style="list-style-type: none"> IT Management (policies and procedures, job descriptions, service level agreements, etc.) Servers / Networking (disaster recovery, server and network performance enhancement) Desktops / Software (PC troubleshooting, tech support tools, email compliance rules,)

Section Eight – Selected Articles and Publications

Clinic technology leaders need to understand the big picture relating to healthcare technology. This can be a difficult task in the age of information overload. To cut through this fog the Community Clinics Initiative staff have gathered a selection of important articles to help clinic technology leadership understand some of the key issues facing the field.

A. Articles and Publications Recommended by CCI Staff

Article	Context	Article Information
<p>4. "Effects of Computerized Clinical Decision Support Systems on Practitioner Performance and Patient Outcomes: A Systematic Review," Amit X. Garg, et al., JAMA March 9, 2005 Vol. 293, No. 10</p>	<p>Developers of health care software have attributed improvements in patient care to these applications. As with any health care intervention, such claims require confirmation in clinical trials. The objective of this article is to review controlled trials assessing the effects of computerized clinical decision support systems (CDSSs) and to identify study characteristics predicting benefit. The conclusion is that many CDSSs improve practitioner performance. To date, the effects on patient outcomes remain understudied and, when studied, inconsistent.</p>	<ul style="list-style-type: none"> Article available at JAMA web site: http://jama.ama-assn.org/cgi/content/full/293/10/1223
<p>5. "Computer Technology and Clinical Work: Still Waiting for Godot," Robert L. Wears, Marc Berg. JAMA March 9, 2005 Vol. 293, No. 10</p>	<p>Process-supporting IT has been heralded as an important building block in attempts to improve the quality and safety of health care. Two areas in particular have drawn both attention and funding: clinical decision support and computerized physician order entry. The literature in these fields has been characterized by frequent reports of success. However, systems that are in use in multiple locations, that have satisfied users, and that effectively and efficiently contribute to the quality and safety of care are few and far between.</p>	<ul style="list-style-type: none"> Article available at JAMA web site: http://jama.ama-assn.org/cgi/content/full/293/10/1261

<p>6. "Electronic Technology – A Spark to Revitalize Primary Care," Thomas Bodenheimer, MD, Kevin Grumbach, MD, JAMA July 9, 2003 Vol. 290, No. 2.</p>	<p>The computer revolution has enormous potential to improve primary care in the areas of medical records, communication between physicians and patients, information sharing among health care providers, and rapid access to reliable medical information for both physicians and patients. A number of barriers must be overcome before computerization is widely embraced in primary care. Studies have shown that some computerized systems may improve physician performance and patient outcomes, but if these systems are too time-consuming, physicians may not use them. If primary care practices are to benefit from the electronic revolution, they must redesign their clinical processes to ensure that e-health facilitates rather than hinders the work of physicians.</p>	<ul style="list-style-type: none"> • Article available at JAMA web site: http://jama.ama-assn.org/cgi/content/full/290/2/259
<p>7. "Fulfilling Our Technology Vision, Part 1: Going Paperless," Nancy Nelson, Group Practice Journal, January 2005, Vol. 54, No. 1</p>	<p>Cardiology of Tulsa shares lessons learned from their experiences with implementing an EMR system and managing the significant change to their operations that resulted.</p>	<ul style="list-style-type: none"> • Article provided in attached document
<p>8. "Fulfilling Our Technology Vision, Part 2: Medical Device Connectivity", Nancy Nelson, Group Practice Journal, February 2005, Vol. 54, No. 2</p>	<p>Cardiology of Tulsa shares lessons learned from their experiences with connecting diagnostic equipment to their EMR. This helped them to achieve their goals of creating a more efficient work environment for patients, staff and physicians as well as increasing the accuracy of the patient data that was captured.</p>	<ul style="list-style-type: none"> • Article provided in attached document

<p>9. "Interoperability: The Key to the Future Health Care System," David Brailer, Health Affairs, Web exclusive, January 19, 2005.</p>	<p>In this paper Dr. Brailer assesses the value of electronic health care information exchange and interoperability (HIEI) between providers (hospitals and medical group practices) and independent laboratories, radiology centers, pharmacies, payers, public health departments, and other providers. We have created an HIEI taxonomy and combined published evidence with expert opinion in a cost-benefit model. Fully standardized HIEI could yield a net value of \$77.8 billion per year once fully implemented. Nonstandardized HIEI offers smaller positive financial returns. The clinical impact of HIEI for which quantitative estimates cannot yet be made would likely add further value. A compelling business case exists for national implementation of fully standardized HIEI.</p>	<ul style="list-style-type: none"> • Article available at Health Affairs web site (http://www.healthaffairs.org) in the Web Exclusives section indexed by the date (19 January 2005)
<p>10. "Electronic Health Records: How Close? How Far to Go?," Lisa Sprague, National Health Policy Forum, September 29, 2004, No. 800.</p>	<p>This paper looks at the central role of the electronic health record in health information technology. It considers the extent to which EHRs are in use and initiatives designed to increase their prevalence, as well as barriers to the widespread adoption of EHRs and efforts to surmount them. Particular attention is given to such obstacles as cost, the professional culture of physicians, standardization, and legal questions.</p>	<ul style="list-style-type: none"> • Article available at National Health Policy Forum web site: http://www.nhpf.org/pdfs_ib/IB800%5FEHRs%2Epdf