The background features a blurred crowd of people, some holding colorful umbrellas (pink, green, blue). A semi-transparent orange network pattern of interconnected lines is overlaid on the image. On the left side, the word 'ALTA' is written vertically in large, bold, orange letters.

# **Overcoming Challenges to Health IT Adoption in Small, Rural Hospitals**

October 2011

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## Preface

This report provides findings on specific health information technology (IT) adoption challenges faced by rural hospitals. Altarum Institute performed the study with funding from the Office of the National Coordinator for Health Information Technology (ONC) under contract HHSP233201000598G.

Altarum Institute would like to thank a group of nationally recognized experts convened in support of informing the case study design and resulting deliverables. This Rural Health IT Advisory Panel, consisting of national rural and health IT experts, committed to lend their expertise and diversity of perspective to ensure best practices and cutting-edge research of health IT adoption in rural settings. The panel also advised on dissemination venues to ensure that this study provides useful information to individuals and organizations creating rural health policy and working in these hospitals around the country.

Name	Role/Organization
<b>John Barnas</b>	Executive Director, Michigan Center for Rural Health
<b>Lynette Dickson</b>	Program Director, Center for Rural Health University of North Dakota
<b>Teryl Eisinger</b>	Director, National Organization of State Offices of Rural Health
<b>Terry Hill</b>	Executive Director, National Rural Health Resource Center
<b>Carla Smith</b>	Executive Vice President, Healthcare Information and Management Systems Society
<b>Kip Smith</b>	Executive Director of the Health Information Exchange of Montana
<b>Louis Wenzlow</b>	Director of Health IT, Rural Wisconsin Health Cooperative

Altarum Institute would additionally like to thank the staff of the eight hospitals who agreed to participate in this study. They contributed a significant amount of time and information to its success by consenting to site visits, several interviews, and extensive provision of financial data. Their involvement provided a rich set of stories and lessons from which to pull to inform our descriptions of key challenges and management strategies.

Hospital	Location
<b>Caro Community Hospital</b>	Caro, MI
<b>Delta Memorial Hospital</b>	Dumas, AR
<b>Ellsworth County Medical Center</b>	Ellsworth, KS
<b>Liberty Medical Center</b>	Chester, MT
<b>Minnie Hamilton Health System</b>	Grantsville, WV
<b>Providence Mount Carmel Hospital</b>	Colville, WA
<b>Punxsutawney Area Hospital</b>	Punxsutawney, PA
<b>South Sunflower County Hospital</b>	Indianola, MS

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## 1.0 Introduction and Background

The American Recovery and Reinvestment Act of 2009 (ARRA) set forth a plan for the advancement of a nationwide health information network to improve the quality and efficiency of care. Central to this vision is the widespread adoption of electronic health records (EHR). Title XIII of ARRA, the Health Information Technology for Economic and Clinical Health (HITECH) Act, authorized the Centers for Medicare and Medicaid Services (CMS) to provide financial incentives to eligible providers and hospitals for the adoption and “meaningful use” of EHRs. Under HITECH, prospective payment hospitals, including critical access hospitals (CAHs), are eligible to receive financial incentives for achieving meaningful use.

Small, rural hospitals lag behind in health IT adoption (Culler et al., 2006) and are far less likely to have adopted EHRs than large, urban, and teaching hospitals (American Hospital Association, 2007; Bahensky et al., 2008, Ward et al., 2006). Despite additional funds available since 1997, CAHs are still less likely than other hospitals to have adopted EHRs and other applications that are preconditions to achieving meaningful use (McCullough et al., 2010). Small, rural hospitals have limited access to capital and infrastructure, and lack a qualified and cost-effective workforce, which contribute to adoption challenges (Casey et al., 2006; Pink, Holmes, & Slifkin, 2009). While small, rural hospitals may share some EHR adoption challenges with larger, urban hospitals (American Hospital Association, 2007; Miller & Sim, 2004), the unique characteristics of the rural healthcare setting sharpen the degree to which these challenges are experienced and assuaged.

The gap in health IT adoption rates between small rural and other hospital settings may persist without additional support (McCullough et al., 2010), resulting in considerable real-world impact. ONC estimates that there are 2,073 CAHs and rural hospitals with fewer than 50 beds, serving an estimated 50 million Americans who live in rural areas (National Advisory Committee on Rural Health and Human Services, 2008). Furthermore, those 50 million Americans make up a large majority of the 62 million Americans who live in communities with shortages in primary care. EHRs and other health IT tools facilitate a culture of health data management and sharing which can create a tremendous impact on patient care and health outcomes, particularly in primary care settings. The application of health IT in rural settings has the potential to transform how hospitals collect, manage, store, use, and share health information. Health IT helps remote communities coordinate care, improve disease surveillance, target health education, and compile regional data, all activities that improve health (National Advisory Committee on Rural Health and Human Services, 2008).

### Benefits of Health IT

- Decrease medication errors
- Reduce redundant tests
- Better utilization and compliance of evidence based practices
- Improve access to critical information
- Improve documentation
- Improve chronic disease management

Unfortunately, the limited information available on health IT adoption in small, rural hospitals provides only modest guidance on how to manage the unique financial, structural and human resources that affect the successful implementation of health IT. To describe the depth and breadth of challenges experienced by small, rural hospitals, and what strategies to employ to overcome them, Altarum Institute collected quantitative and qualitative data on financial, operational, and institutional factors to describe the experiences of health IT planning, implementation, and use. Findings in this study draw upon information from site visits and interviews with key staff at eight small, rural hospitals around the country, selected from a

range of levels of EHR adoption, financial health, and patient and payer mix. The case studies are presented to highlight the experiences of a select number of small, rural hospitals and therefore may not accurately reflect the typical small, rural inpatient provider. This report discusses key management strategies small, rural hospitals can employ to address major challenges to health IT adoption.

## **1.1 Comprehensive Management Strategies**

Despite the wide range of challenges in implementing and adopting health IT, there are numerous strategies and approaches to overcome those challenges. They may help small, rural hospitals realize successful outcomes and benefits of health IT throughout various stages of adoption. As small, rural hospitals have access to different resources than larger, urban hospitals, health IT adoption and implementation requires innovative and creative solutions that will work within the respective hospital's environment and organizational culture. Additionally, efforts of this magnitude and complexity require strong leadership, shared expectations, collaboration, and buy-in from multiple key stakeholders. While there is no way to eliminate all challenges, employing these strategies based on hospital experiences can help other hospitals navigate and anticipate their own challenges.

### **Participate in Collaborative Relationships**

Small, rural hospitals typically have access to fewer resources to finance health IT, complete strategic planning, or engage in long-term implementation projects. Additionally, these hospitals have difficulty recruiting or financing full time departmental staff, particularly IT and nursing personnel who are experienced with health IT implementations.

Hospitals can make up for these limited resources by collaborating with other hospitals, through partnerships with tertiary hospitals, participation in formal or informal alliances with regional CAH or rural hospital networks, or discussions with other users on vendor-sponsored Internet forums. Such networking expands not only a hospital's knowledge of the selection and implementation process through the mutual sharing of experiences, but also provides a more tangible resource pool from which to pull. Some formal alliances provide for more efficiency in researching potential vendors, greater buying and negotiating power with vendors, more information for conducting strategic planning, and sharing IT and nursing staff among a group of hospitals. Collaborating with larger, tertiary hospitals may even afford the opportunity to benefit from reduced pricing on a product, additional IT staffing support, as well as the hosting of their EHR at the partner's physical site. Participating in or forming these types of collaborative relationships with other small, rural hospitals provides access to resources to overcome limitations with financing and staffing throughout the adoption and implementation process.

### **Leverage External Resources**

Few small, rural hospitals possess the experience, resources or staff expertise to implement health IT successfully. Throughout the process of financing, product selection, installation, integration into the workflow and long-term sustainment and advancement of functionalities, hospitals require knowledgeable project management to oversee progress and address challenges.

Aside from regional hospital networks and collaborations, hospitals have a range of external resources, which they can leverage throughout the course of the implementation. Regional Extension Centers (RECs) are a valuable resource for many hospitals as they are intimately familiar with the challenges of health IT implementation and the regulatory environment in which hospitals operate. RECs can provide hospitals with a range of services from strategic financial and infrastructure planning, vendor relations, product selection, project management, workflow integration, additional training, and applying for meaningful use incentives. Proper guidance on navigating meaningful use criteria and attestation is critical, as many small, rural hospitals will depend on receiving these incentives to fund their current implementation or future upgrades. Consulting firms, while potentially expensive, can also assist hospitals in establishing and maintaining IT network infrastructure, strategically planning for future upgrades, and by providing long-term helpdesk support. Hospitals may want to consider applying for grants or supplementary funds, or partner with other hospitals in their regional network, to afford these consulting services. Additionally there are numerous other federal programs that can assist small, rural hospitals in multiple arenas, such as workforce education programs and affordable and sufficient Internet access, which may help offset the lack of internal resources. Please see Appendix C for a listing of additional resources.

### **Actively Engage Stakeholders**

Gaining stakeholder buy-in is critical for the successful implementation and integration of health IT. While all hospitals face this challenge when adopting new systems, small, rural hospitals experience this more acutely as they employ fewer staff, require existing staff to perform several duties, and have difficulty recruiting new staff. As multiple levels of staff will be using components of the health IT product and a successful implementation depends, in part, on the product's integration into the workflow, it is critical to involve multiple levels of staff in the product selection and implementation processes.

Forming multidisciplinary leadership teams early in the adoption process, including key stakeholders such as clinicians, technicians, hospital administrators, and front and back office staff, creates an environment where collaboration and staff needs are prioritized. To engage these stakeholders, hospitals can hold regular, formal all-staff meetings, and smaller, departmental planning sessions, or participate in casual discussions in the lunchroom or hallways. In this way, staff members can communicate their needs and concerns regarding the implementation while also forming widespread support for the integration of health IT into the hospital. Additionally, this promotes the formation of a common vision and strategy that incorporates all stakeholder input and can be referred to throughout the adoption process.

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## 2.0 Product Selection

Product selection includes a comprehensive review of the hospital's technology infrastructure to identify health IT products that support their goals, facilitate implementation of meaningful use functionalities, and implement tools and services supporting clinical workflows. Selecting an EHR can be a major challenge, particularly when leadership feels that they do not have access to the necessary technical expertise, even if consultants are engaged to assist in the process.

Once aware of how a product fit within workflows, it was often too costly or operationally challenging to switch to another system. Several hospitals expressed considerable buyers' remorse, but judged that the cost and trouble of switching to another system were just too high. Meaningful use criteria may alleviate some of the angst over selecting product features by creating more standardization among vendors and clear expectations for technology performance.

*"Selection was one of the hardest decisions I've ever made because of the lack of knowledge... everybody has their own recommendation. There is also a lot of misrepresentation of functionality and what is really doable."*

### 2.1 Technical Specification

One of the most common issues reported was difficulty comparing the relative merits of health IT products. EHRs and associated health IT products are major financial and operational investments, so the majority of the hospitals dedicated a significant amount of time and effort into selecting each product. Despite the up-front research, many hospitals expressed buyers' remorse for several reasons. Hospital administrators felt that they were not well equipped or sufficiently knowledgeable about the health IT market to properly compare and select products. Thus, they placed a great deal of trust in the information received from vendors, which, upon implementation, was inaccurate. Rather than base decisions on lengthy assessments and comparisons of product specifications, hospitals selected products based on price and other hospital recommendations.

*If you are interested in learning more about the rural hospitals' experiences with technical specification, see the Delta Memorial Hospital, Liberty Medical Center, Minnie Hamilton Health System, and Punxsutawney Area Hospital case studies in Appendix A.*

### 2.2 Product Interoperability

Interoperability of new health IT products with existing technology (e.g. outpatient EHRs, PACS, financial, or administrative systems) through product integration or interfaces is essential to maximize the utility of the systems themselves. However, developing customized

*"I don't want to spend 100K buying a non-[vendor] CPOE, paying 60K to interface it if my incentive on that is going to be 20K. If by waiting for CPOE with [our vendor], I have no interface costs and I can buy it for 70K..."*

interfaces between products, particularly when two different vendors are involved, can be a lengthy and costly process. The costs of interfaces are often prohibitive within the budget of a typical small, rural hospital and are usually not discussed during the selection process. Vendors may be resistant to building interfaces between their product and other vendor products,

and occasionally, interfaces between same platform modules. Without an interface between the two platforms, staff relies on paper to exchange patient information, including orders for the laboratory, radiology, and pharmacy. Even with interfaces between various modules and platforms, the information may not be integrated, creating the need to propagate changes throughout multiple modules in order to have the system work cohesively.

*If you are interested in learning more about the rural hospitals' experiences with product interoperability, see the Minnie Hamilton Health System case study in Appendix A.*

## 2.3 Privacy and Security

The implementation of basic health IT functionalities creates a range of privacy and security concerns including configuring secure wireless networks, establishing role-based access controls, setting strong individual passwords, and auditing enabled functionality. While some hospitals may not recognize the risks that accompany these concerns, particularly if they are in the early phases of adoption, they are serious factors that all hospitals must address, particularly when meeting meaningful use criteria. As hospitals look forward and consider adopting new technology advances, rural hospitals should be concerned with implementing appropriate privacy and security measures to address the unique challenges of secure mobile technology use. Particularly as staff increasingly use smart phones and tablet PCs in their personal lives, they are requesting the ability to use the same technology in their work environments. Small, rural hospitals with limited experience in accounting for the privacy and security issues associated with health IT are further challenged by the need to institute policies for mobile devices, particularly in circumstances where devices may be misplaced.

## 2.4 Establishing Infrastructure

Small, rural hospitals face additional challenges to establishing the infrastructure necessary to operate complex health IT systems, ranging from a lack of Internet connectivity, outdated hardware, lack of robust privacy and security protections, limited IT expertise, to limited vendor support when completing system builds.

*"Where we are, the connectivity availability is not great. We are very limited with our availability of high speed Internet."*

Due to their geographic isolation, small, rural hospitals often experience difficulty accessing sufficient and affordable Internet bandwidth at the community level. In rural areas, the infrastructure to support high-speed Internet is not widespread, limiting the ability to promote health information exchange with satellite clinics. Furthermore, the potential additional financial burden of upgrading servers, computers, and other hardware and establishing a secure network is another initial cost that makes implementing health IT difficult to manage. Finally, most products require hospital IT staff to build data dictionaries, templates and import drug formulary lists, often with little training or support from the vendor. This amount and level of work is often unanticipated, further overwhelming hospitals during an already challenging task.

## 2.5 Product Selection Management Strategies

### Select the Right Product

Product selection is one of the first major decisions hospitals need to make. Vendors are often the only available information source, which many hospitals distrust because product demonstrations may not be accurate indicators of actual use in any given setting. Additionally,

determining which, if any, additional performance enhancing features to purchase, beyond those required by meaningful use, is difficult. Hospitals want to maximize the useful life of the product to warrant the investment, requiring a concerted effort to balance priorities of specific product features. Incorporating additional (legacy or new) software modules further complicates the selection process, as interface development must occur in order to integrate patient information, driving up the initial costs of the product.

To address some of these challenges, hospitals can utilize non-vendor-based information sources, such as other hospitals using a prospective product, RECs, or industry reviews of certified products. Hospitals should also expect that they will be using a product differently once implemented and to plan their integration accordingly. To maximize the potential life of a product, hospitals may choose to purchase the newest available version of a product, perhaps by waiting a few months for the release of a newer version. Before selecting a product, hospitals must consider the number of systems they would like to integrate, and either negotiate with their vendor to develop interfaces at a lower cost, or even look into purchasing an entire suite of products from one vendor to avoid interface development between two separately supported systems. Stakeholder engagement and user buy-in is critical during the selection process as it will facilitate increased workflow integration.

### **Negotiate Vendor Contracts that Meet Expectations**

Incentive programs and the evolving healthcare field have increased demand for EHRs, straining vendor resources. This results in significant problems with hospital-vendor communication, long delays in implementation due to unresolved technical problems, and working with newly hired vendor staff who may not be sufficiently knowledgeable of the EHR product. As it is difficult to predict the success of a health IT implementation early in the process, hospitals often express regret or disappointment in their progress, with little recourse with vendor relations. Many depend on the EHR vendor to provide a great deal of support through product selection, installation and configuration, training, and ongoing technical assistance, but few explicitly negotiate vendor contracts that fulfill their needs.

While vendors can provide much of this kind of support, hospitals may face additional delays, challenges, and frustration if they do not set realistic expectations both with their vendor as well as among hospital staff. When possible, hospitals and providers should seek education concerning their legal rights and options in negotiating contract with vendors. Contract negotiation can solidify hospital expectations of their vendor, especially in the context of staff training, interface development and ongoing technical support. Hospitals should communicate their needs and openly discuss the implementation plan with their respective vendors, but also prepare to support as much of the ongoing implementation as possible internally. Most vendors provide products with similar features, but it is up to the hospital to integrate those products into the clinical workflow. Setbacks, both minor and major, are likely to occur at some point during the implementation process. If the hospital has unrealistic expectations of how the process should be occurring, a minor setback can become major as staff buy-in decreases in relation to their perception of the process.

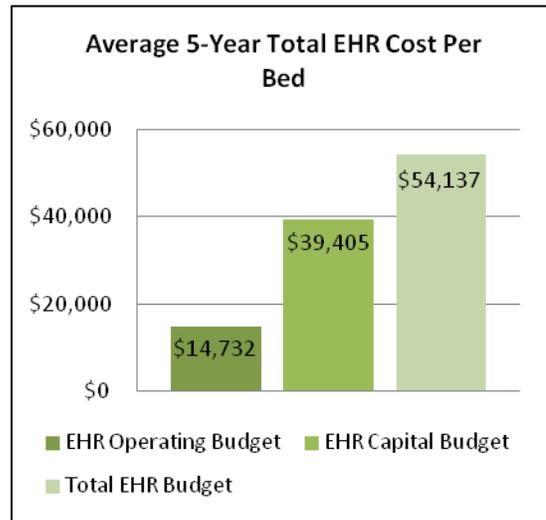
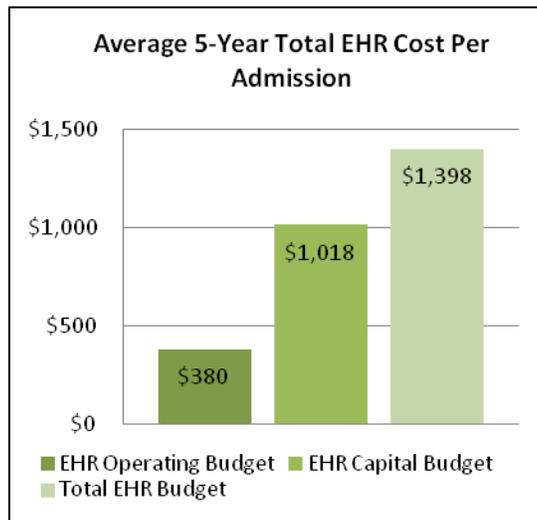
## 3.0 Financing

Small, rural hospitals face significant challenges <sup>1</sup> relating to the short and long-term costs of EHR investment. As hospitals are spending on health IT, revenues are decreasing due to patients shifting to the outpatient setting. Use of internal funds for EHR implementation is subject to fluctuations in hospital finances from one year to another. While hospitals expect that EHRs will improve care, they do not expect to realize economic gains sufficient to offset costs completely, therefore creating permanent additions to annual budgets. Meaningful use estimates indicate that once hospitals are able to attest to meaningful use, the incentives and reimbursements will offset a portion of the EHR investment costs, and in some cases may provide a surplus that can support ongoing maintenance and sustainment costs.

### 3.1 Estimating Costs

Determining the anticipated costs to implement an EHR is a difficult process for many hospitals. While EHR vendors provide estimates for capital costs, hospitals lack the expertise needed to accurately estimate the costs of training staff or productivity loss, often leading to an underestimate of total implementation expenditures. Vendor costs are often higher than budgeted with the inclusion of unanticipated, but necessary, interface development or additional training. Based on these case study experiences, the total cost of ownership averages \$1.5 million, two-thirds of which is capital budget, including expenses such as vendor services and staff training. Provided below is average 5-year EHR cost data by cost per inpatient admission and cost per bed.

Average 5-Year EHR Cost of Ownership	
EHR Operating Budget	\$429,332
EHR Capital Budget	\$1,148,377
<b>Total EHR Budget</b>	<b>\$1,577,709</b>



*If you are interested in learning more about the rural hospitals' experiences with estimating costs, see the Punxsutawney Area Hospital case study in Appendix A.*

<sup>1</sup> The companion report, *Economic Case Study: Overcoming Challenges to Health IT Adoption in Small, Rural hospitals – Financial Evaluation*, is a detailed assessment of the financial impact of EHR implementation and related incentives, but is an internal ONC document as it contains information on the financial status of each participating hospital.

## 3.2 Access to Capital for EHR Investment

The ability to obtain incentive dollars depends upon the capacity of rural hospitals to make the initial health IT investment, but most hospitals struggle to access capital or financing for their EHR investments. Despite the promise of receiving incentive payments for EHR investments, accessing the up-front capital necessary to make the initial investment in health IT is a significant challenge. Thin operating margins and small cash reserves make it challenging to attract lenders as some hospitals with poor credit ratings may struggle to obtain conventional financing. Loans and bonds may have restrictions on use, further limiting their use for EHR investments. A hospital pursuing conventional financing can be at great risk for defaulting on their loans if they finance their health IT and then fail to meet the meaningful use criteria and receive incentive payments. Even hospitals with substantial reserves can face difficulty in allocating funds for implementation since an EHR investment will usually comprise a large percentage of a small hospital's total budget.

*"I wish I would have had more insight into the operational costs to install the whole project. We had a good idea what the capital outlay was going to be, but didn't have an understanding of how many hours folks would have to be committed to this project."*

*If you are interested in learning more about the rural hospitals' experiences with accessing capital for EHR investments, see the Delta Memorial Hospital case study in Appendix A.*

## 3.3 Maintenance and Sustainment Costs

Beyond the initial cost of implementation, health IT continues to be a financial burden on small, rural hospitals. There are significant yearly maintenance costs, including software, hardware, training, and hiring additional IT staffing. Furthermore, as hospitals upgrade software, capital must be continually invested to maintain, upgrade and build necessary interfaces for the systems. The cost of interfaces is often an unanticipated cost at the onset of implementation and can become a significant burden to some hospitals. Hospitals struggle to estimate and plan for the sustainability of their health IT investments. The relatively small pool of financial resources available to small, rural hospitals also restricts the ability to conserve capital for sustainment beyond the large investment necessary for implementation. Hospitals are often unsure of incentive payment amounts, as well as how to best allocate those funds for maintenance and sustainment needs.

## 3.4 EHR Incentive Payments and Issues Specific to Critical Access Hospitals

While CAHs and PPS hospitals report almost identical average EHR capital and operating costs over 5 years, it is anticipated that CAHs will receive significantly less money from the meaningful use incentive program. The incentive payments seem to cover capital costs for both hospital types, and ongoing operational costs for PPS hospitals, but the payments for CAHs leave little additional funds to cover ongoing operations costs. This disparity calls attention to the question of long-term viability for sustaining EHRs in CAHs. Summarized below are reasons for the lower levels of payments to CAHs:

**Many CAHs may not receive Medicaid EHR incentives:** While PPS hospitals are eligible to receive Medicaid payments based on a 10% Medicaid utilization rate, some CAHs may not

reach this level due to innate patient demographics. The American Hospital Association found that roughly two in five CAHs meet the patient volume requirements for Medicaid incentives.

**Past depreciation of EHR costs:** CAHs whose EHR costs are mostly or entirely depreciated are not allowed to apply these costs to their Medicare meaningful use incentives because the incentive payments are based on the present value of the EHR. This penalizes early adopter CAHs and those that plan to spend less on EHR enhancements during the incentive period. Conversely, PPS hospitals will receive their full incentive payments independently of when they made their certified EHR investment.

**Allowable Costs:** There is also some lack of clarity over what constitutes allowable costs. Recent FAQs from CMS indicate that many EHR-related costs, such as training, are not allowed when calculating incentive payment, resulting in lower incentive payments for many CAHs. Actual incentive payments may vary widely depending on final decisions from federal bodies over what is an allowable EHR cost. This uncertainty makes it harder for CAHs to accurately estimate reimbursements for expected costs to include in loan applications, increasing the financial risk of EHR investment.

Summary of Average Costs and Incentive Payments for CAHs vs. PPS Hospitals				
	EHR Capital Cost	Incentive Payment	Difference between Capital Cost and Incentive Payment	Operating Cost
PPS Hospitals	\$1,143,838	\$4,515,455	\$2,785,042	\$586,575
CAHs	\$1,150,193	\$1,555,332	\$38,704	\$366,435

### 3.5 Financing Management Strategies

#### Plan for the Financial Future

Beyond the cost of initial implementation, health IT continues to be a financial burden on small, rural hospitals as maintaining, upgrading, and building necessary system components requires investing additional capital. Hospitals do not often consider long-term maintenance and upgrade costs until after selection and implementation, as they are difficult to accurately project.

To avoid the potential burden of these unanticipated costs, hospitals should financially plan for some basic categories of costs. These include the development or maintenance of interfaces, health IT system upgrades, additional hardware and software purchases, network infrastructure upgrades, and additional staff training. EHR vendors can assist hospitals in understanding and estimating these costs; however, hospitals may want to utilize other outside resources such as other hospitals, consultants, and their regional extension center. Additionally, when negotiating vendor contracts, hospitals should include as many of these foreseeable costs as possible in order to compare against potential reimbursement amounts and therefore apply for additional funding from a variety of sources.

## **Maximize Ways to Offset Costs**

Financial constraints pose significant challenges for many small, rural hospitals during the initial phases of health IT implementation. Despite the promise of receiving incentive payments for health IT investments, accessing the up-front capital necessary to make the initial investment in health IT is a serious challenge. Hospitals have limited financing options, and some with poor credit ratings face greater difficulties as they may not be able to obtain conventional financing. Even pursuing conventional financing carries great risks as a hospital can easily default on a loan if they finance their health IT and fail to meet meaningful use criteria and therefore not receive incentive payments. Furthermore, as more medical services are moving to the outpatient setting, shrinking inpatient volumes have an impact on a hospital's bottom line.

Hospitals have several options to offset some of the costs of their health IT investments. Despite the organizational challenges, hospitals must continue to move forward with their health IT and become meaningful use compliant as incentives will offset some of the initial costs or provide a surplus against investment and sustainability costs. The incentive payments for CAHs will be significantly higher than what is normally received through cost-based reimbursement and will be provided immediately rather than spread over the depreciated life of the health IT. This large infusion of capital at an earlier time will allow CAHs to pay down vendor costs earlier and make it easier to obtain initial capital. Hospitals will also offset any flat or decreased reimbursement from government payers through revenue from commercial insurers. Additional ways to maximize sources of revenue and increase cash flow include diversification of hospital services (such as swing bed programs, skilled nursing facilities, and rural health clinics) and outsource billing and collection functions to improve accounts receivable collections.

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## 4.0 Implementation and Use

Once a hospital selects and finances a product, many different factors can serve as challenges during the implementation process. Hospitals must provide internal support to supplement services provided directly by vendors. This ensures that the products align with workflows and are designed to support identified goals and objectives, and that user training is adequate to health IT utilization.

### 4.1 Organizational Culture

Promoting staff buy-in and acceptance of new systems and accompanying workflows is a frequently encountered challenge. Despite significant efforts to gain staff acceptance of the EHR, staff often become frustrated when the outcomes do not meet their expectations. Hospitals may expect that an EHR implementation will be like other software implementations, where a product can be fully used shortly after installation. Effectively communicating the purpose of the EHR, benefits of full integration, and necessary effort required by staff, is challenging, particularly if a hospital employs few staff members or staff who have operated under a different organizational culture for several years.

### 4.2 Staff Skills and Availability

One of the most common challenges hospitals face is the limited staff expertise and availability. Recruiting and retaining full-time informatics staff with experience completing large-scale implementations is difficult, particularly in rural areas. Some hospitals lack any IT staff, or have previously been unable to justify even one full-time equivalent IT staff member. Additionally, IT staff has multiple responsibilities, preventing them from fully engaging on the implementation project, an important factor for a successful implementation. Beyond the IT staff, users of the health IT systems may only work part time at the hospital, creating gaps between times when they may interact with a system. This creates a challenge to fully learning how to use health IT or addressing workflow changes that may be necessary to ensure proper system utilizations.

*If you are interested in learning more about the rural hospitals' experiences with staff skills and availability, see the Ellsworth County Medical Center and Providence Mount Carmel Hospital case studies in Appendix A.*

### 4.3 User Training

Hospitals require extensive training on the selected EHR, computer skills, and management approaches to support a successful implementation. Vendors often provide one to three days of EHR training in a variety of forms. These may include in person, one-on-one training sessions, “train-the-trainer” sessions where a few hospital staff learn many system processes and then train their colleagues, and web-based presentations that present basic demonstrations of common system processes to large groups of users. Training may not be sufficient to meet hospital needs or may not align with hospital specific workflows, necessitating the development of internal training programs and documents. Training new staff and addressing workflow issues are ongoing challenges for small, rural hospitals, as they likely have no funding for such training or knowledge of how to rework processes to fit the health IT use. Furthermore,

hospitals may face difficulty in receiving training on more advanced system uses such as template creations and report development. Successful use depends on integration into workflows, which requires staff overcoming expectations that the health IT will replicate paper processes and constant refinement by the hospitals. This style of training, however, is time and resource consuming and hospitals described the balance between adequate training and clinical activity, which generates revenue, as delicate and difficult to manage. Furthermore, hospital staff may not have basic computer processing skills or project management experience, neither of which are typically covered during vendor training. Hospitals may not be able to support sending their staff to lengthy training programs or have the capability to teach staff these skills.

*If you are interested in learning more about the rural hospitals' experiences with user training see the Caro Community Hospital, Ellsworth County Medical Center, Liberty Medical Center, and Minnie Hamilton Health System case studies in Appendix A.*

## 4.4 Project Communication

Promoting continual communication of process and outcome expectations between staff, the hospital board, the community, and in particular, the vendor, is often difficult for many hospitals to accomplish. As successful EHR integration is dependent upon adoption of the product by users, hospitals must prioritize understanding workflows. Foremost, to gain the maximum amount of utility from the product, this involves overcoming staff's desire or expectation that the product will replicate their old paper processes in electronic form. While

*"On paper, we used to be able to do it this way. And now with the computer, and I think that's frustrating for some people... But that's changed and people get frustrated."*

using consultants can alleviate some of the issues with inadequate project management and unrealistic expectations, they can be expensive and, without grants or supplementary funds, the extra expenditure may not be realistic for hospitals already stretched thin by their investments in the technology itself.

*If you are interested in learning more about the rural hospitals' experiences with project communication, see the Liberty Medical Center and South Sunflower County Hospital case studies in Appendix A.*

## 4.5 Working with IT Vendors

Hospitals also face potential challenges when working with vendor staff throughout the EHR implementation. Hospitals desire vendor staff to be competent, responsive, and knowledgeable. As vendors are facing increasing demand for their services, the vendor staff supporting hospital implementations will be new to the health IT field or be recently hired by the vendor and still unfamiliar with the EHR. Vendors occasionally fail to maintain the staffing and support capacity necessary to respond quickly and efficiently to demand. In addition, larger vendors frequently acquire smaller vendors and such acquisitions create further uncertainty in the level of continued support hospitals will receive. Hospitals are often defenseless if they do not explicitly outline their expectations and needs of the vendor within their contract. It is difficult to predict the roadblocks that may be faced throughout any step of the implementation, largely because many small, rural hospitals are new to EHR adoption and are unaware of the questions to ask upfront or what to expect from vendors.

*If you are interested in learning more about the rural hospitals' experiences working with IT vendors, see the Caro Community Hospital and South Sunflower County Hospital case studies in Appendix A.*

## **4.6 Implementation and Use Management Strategies**

### **Engage Strong Leadership**

Staff availability is often limited in small, rural hospitals where one individual likely plays several roles. Furthermore, some staff members may only work part time or rotate positions on a regular basis. These limitations may delay or greatly hinder an EHR implementation. While recruiting for these positions is difficult, hospitals that identified current staff members to fulfill some of these roles or found creative ways to hire personnel through collaborative partnerships or outside consulting firms were successful in developing and engaging a dedicated core group of leaders to manage the implementation effort. Such staff members may include IT managers, clinical informaticists, clinical champions, and super users.

For most, active project management was a main driver of success, enabling the hospital to plan, select, implement, and integrate various forms of health IT in an organized and timely manner. This type of leadership not only helps oversee the progress on tasks, but also provides a direction for IT staff and hospital staff to follow. IT managers can work with clinical informaticists to maintain the IT network infrastructure, build, and configure modules to meet clinical needs, and assist the clinical champions and super users with ongoing integration of health IT into clinical workflows. Maintaining such engaged leadership is crucial for the continued successful implementation and long term sustainment of health IT capabilities.

### **Maintain Open Lines of Communication**

Health IT implementation is challenging and often results in feelings of major frustration. Building collaborations between vendors and among hospital staff takes time and organizational cultural shifts to accomplish. Strong, open communication can help alleviate many challenges and frustrations as it fosters collaborative working relationships among all parties. Hospitals should regularly communicate with staff and their vendor about process and outcome expectations as well as inform their community at large about the changes taking place in the hospital. Regular meetings and conference calls to discuss progress on open tasks and future steps for EHR integration aligns the vendor's efforts with the hospital's expectations. Similarly, meetings and discussions with hospital staff can help them understand the intent and potential benefits of using the EHR, assist in gaining their buy-in, as well as discuss how their work processes may change. This level of transparency and communications of expected contributions establishes a strong, internal collaborative team that will be the foundation for the implementation.

### **Integrate Technology into the Workflow**

One of the greatest challenges to successful health IT adoption is integrating it into the workflow. Clinical staff must actively engage with the implemented systems, which requires overcoming expectations that it will be a simple replacement of their existing paper processes, as well as a continuous refinement of new electronic processes. Staff must buy in to the organizational changes that can accompany the introduction of new health IT in order to use it to its full capabilities.

Hospitals may consider gradually rolling out modules, allowing users to accomplish basic interactions consistently before introducing new processes. The balance of old, sometimes paper-based processes and new, electronic processes requires flexibility and a drive towards continuously revising and refining actions. Working with the vendor to build software according to established best practices rather than paper-based processes can also facilitate the movement towards integrating the health IT into the workflow. Additionally, small efforts can result in better workflow integration. Hospitals should consider reducing patient loads during the early phases of implementation to ensure adequate time for staff to learn how to use the system. Hardware supports such as computer carts, additional scanners, and “dummy” computers can help staff with regularly using modules to document at the patient’s bedside, input historical records, and increase computer literacy.

## Invest in Training

Small, rural hospitals experience a range of user training and lack education on computer processing or project management. They rely largely on their vendor to provide initial and ongoing training, but often find that this is insufficient for their needs. This training may only cover basic system interaction, neglect discussions of data privacy and security, and may be taught at an inappropriate level for staff to understand how to integrate it properly into their workflow. At the end of vendor training, hospitals must find a way to train staff on more complex as well as infrequently used system interactions, train new staff members, and provide supplementary training based on hospital-specific processes. Obtaining additional user training can be costly or time consuming, further preventing the staff from learning the system, and thus integrating health IT into their workflow.

To provide consistent staff training based on hospital-specific processes hospitals can capitalize on internal resources such as identifying departmentally based super users for each shift and utilizing a train-the trainer style of education. Both of these options allow hospital staff to help each other learn the system, provide a knowledge base that can be referenced throughout the integration process, as well as facilitate user buy-in. Hospitals may also consider consulting with external resources, such as other hospitals, RECs, and consulting organizations. These resources can help a hospital develop training programs as well as user manuals based on specific processes to deploy during initial implementation phases as well as during long-term sustainment phases. Additionally, community colleges are a valuable source for continuing education classes that may assist with teaching basic computer processing skills, as well as project management skills to help managers oversee the implementation process.

*“We identify staff who can lead the others and train them and keep them going out there.”*

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## 5.0 Conclusion

While many challenges are not exclusive to small, rural hospitals adopting health IT, these hospitals acutely experience adoption challenges and must actively work within a limited environment to overcome them. Additionally, small, rural hospitals are more likely to bear the negative outcomes of a dynamic, and at times, volatile health IT field, particularly as they face significant financial risk if they take on debt to invest in health IT and fail to meet meaningful use. While this report enumerates several key challenges, it is imperative to consider the availability of financial, operational, and institutional resources within a small, rural hospital environment, all of which ultimately affect the success of health IT adoption. Small, rural hospitals, as well as those who support them, can use the management strategies presented within this report to alleviate many challenges within this environment. For additional resources on health IT adoption, please consult Appendix C.

1. **Participate in collaborative relationships:** Collaborate with other hospitals to overcome selection, financing, and implementation challenges through the pooling of resources and shared negotiating power.
2. **Leverage external resources:** Seek external resources and expertise to offset gaps in internal capacity throughout the process of financing, product selection, installation, workflow integration, and advancement of functionalities.
3. **Actively engage stakeholders:** Form multidisciplinary leadership teams early in the adoption process to foster an environment where collaboration and needs of staff among multiple levels are prioritized.
4. **Select the right product:** Choose a product based on hospital-specific use, in addition to assessing its affordability, interoperability, and capacity for basic vs. advanced features.
5. **Negotiate vendor products that meet expectations:** Communicate needs and implementation plans with vendors: unrealistic expectations can cause a minor setback to become major as staff buy-in decreases in relation to their perception of the process.
6. **Plan for the financial future:** Work with vendors and consultants to estimate long-term maintenance and upgrade costs early on to avoid unanticipated costs.
7. **Maximize ways to offset costs:** Take the time to assess thoroughly patient mix, incentive eligibility, and the availability of additional funding (grants, etc.) to maximize the ability to offset costs, engaging the RECs and consultants as needed.
8. **Engage strong leadership:** Actively engage leadership to provide a clear vision for staff to follow and serve as a trusted source of authority for project oversight.
9. **Maintain open lines of communication:** Regularly communicate with staff and vendors about process and outcome expectations: a high level of transparency establishes a collaborative team that is the foundation for successful implementation.
10. **Integrate technology into the workflow:** Engage users with the systems to overcome expectations that it replaces existing paper processes and work with vendors to build software based on best practices, while integrating the health IT into the workflow.
11. **Invest in training:** Beyond vendor training, train staff on complex or infrequently used system interactions, train new staff members, and provide supplementary training based on hospital-specific processes.

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## Appendix A: Case Studies

### Caro Community Hospital

**Organizational Snapshot.** Caro Community Hospital (Caro, Michigan) is a 25-bed Critical Access Hospital with 1,225 total inpatient days in 2010. Caro also has three affiliated clinics located throughout Caro, Michigan, providing family care, specialty care, and physical therapy.

**Stage of Health IT Adoption.** Caro's EHR vendor, Opus Healthcare, was recently acquired by NextGen, stalling implementation beyond their NextGen EHR. When NextGen acquired Opus Healthcare, the clinical and financial systems were split apart—the clinical systems shifted to NextGen support, while the financial system continued under a separate company, Creative Healthcare. Caro uses the systems from the two vendors, despite the additional challenges that arise from multi-vendor solutions. While Caro is investigating the possibility of moving to NextGen's financial system, the additional cost will probably be too large to support.

***Implementation is complicated by the volatile EHR vendor marketplace.***

Caro originally chose their EHR vendor because they thought a small company would be more responsive to meeting their unique needs as a CAH. However, that vendor was acquired by a larger vendor, causing significant delays in implementation. Their vendor replaced representatives frequently and go-live on critical systems was delayed with little explanation: they do not have a clear go-live date for their CPOE system after several months of waiting. In addition, there are continued delays in implementing reporting functionalities, which affects the ability to attest to meaningful use. Vendor response to requests for customer support became significantly slower and issues often remained unresolved for long periods.

***Development of tailored training materials is critical to increasing utilization and adoption.***

Caro's nursing and clinical support staff successfully adopted their EHR with few challenges. The tailored training materials and user manuals developed by the Director of Nursing and a super user are main attributes of their success. Caro received "train-the-trainer" support from NextGen, in which three to four designated super users received extensive training on all processes. After this session, two of these lead nurses spent three dedicated working days developing a one-on-one training program for all nursing staff to learn how to interact with the EHR—tailored to the specific processes and work flows the nursing staff were and would be using. In addition, over the course of several weeks, these lead nurses wrote a comprehensive training and user manual, which guides users through the workflow for many EHR uses. With the tailored training and comprehensive manual, the nursing staff was able to successfully interact with the EHR, as well as refer to the manuals to increase their knowledge of the system and refresh their initial training.

## Delta Memorial Hospital

**Organizational Snapshot.** Delta Memorial Hospital (Dumas, Arkansas) is a 25-bed CAH, with 4,554 total inpatient days in 2010.

**Stage of Health IT Adoption.** Delta currently has no health IT implemented in their hospital, aside from an administrative software product for back office processes, including billing and coding. In alliance with two other rural hospitals, they selected Healthland as their vendor and are negotiating installation dates, with the goal to have implementation completed by 2012 in order to apply for Meaningful Use incentives.

### *Participation in an alliance helps hospitals navigate the selection and implementation process.*

Delta collaborated with other local CAHs to form the Greater Delta Alliance for Health, which coordinated with an outside consultant to help navigate the vendor selection and negotiation process. This relationship helped the alliance members explore a larger number of vendors in a more thorough manner, as well as facilitate collaboration among the hospitals. Through the alliance, the hospitals engaged in some informal sharing and provision of technical support among their IT staff. The alliance is exploring developing a centralized IT support desk, conducting collaborative training, and sharing their super user clinical staff. As most staff had little to no experience or exposure to health IT and limited technology skills, this collaborative relationship provides a strong support system for the upcoming implementation process.

### *Debt burden makes it difficult to obtain EHR financing.*

Delta experienced multiple internal management changes over the past decade, including several outside management companies, until 2009 when the current administration began. Under previous management, Delta selected an EHR vendor and began implementation. However, it was halted due to lack of funding. They negated their contract after the current management began, and the process was put on hold until the hospital could work towards developing a more feasible investment and management strategy. The lack of consistent financial management resulted in a substantial amount of debt accrual, which negatively affects their credit rating and ability to borrow. As such, Delta is struggling to identify options to finance their health IT investments. It has been difficult to find sources other than conventional financing options largely because of the uncertainty in the amount or timing of reimbursement from meaningful use. However, if Delta does not succeed in obtaining financing, they will be unable to invest in an EHR and eventually subjected to payment reductions under Medicare.

## Ellsworth County Medical Center

**Organizational Snapshot.** Ellsworth County Medical Center (Ellsworth, Kansas) is a 20-bed CAH, with 2,297 total inpatient days in 2010. Ellsworth has four affiliated rural health clinics located in Ellsworth, Holyrod, Lucas, and Wilson, Kansas.

**Stage of Health IT Adoption.** Ellsworth selected MEDITECH as their inpatient EHR vendor in 2003, with implementation work beginning in 2004. The decision was driven by the opportunity to partner with Hays Medical Center, a nearby 200-bed hospital, and four other CAHs. Through this arrangement, Ellsworth receives special pricing, as well as some network and software support from Hays. In May 2011, Ellsworth updated to the certified version of the MEDITECH EHR modules in their hospital and, with the exception of CPOE functionality, meets the criteria to attest to meaningful use. Ellsworth began implementing an LSS Data Systems in their rural health clinics in 2009 and has the clinic EHR partially up and running.

### *Partnerships with larger hospitals can provide resources and guidance when needed.*

Ellsworth chose to pursue relatively early EHR adoption through a resource-sharing partnership with Hays Medical Center, a nearby 200-bed tertiary hospital. The partnership allowed Ellsworth to negotiate their purchase of MEDITECH at a lower price. In addition, Hays houses MEDITECH, maintains the servers, and is the operating base for a shared IT staff. Since Hays generally implements the MEDITECH systems before the smaller support hospitals, they also serve as a source for best practices.

### *Dedicate staff to implementation efforts.*

In a 2004 implementation, the hospital devoted considerable resources and time to train staff and go through extensive testing due to the ability to dedicate additional IT staff to the project. There was staff availability to test the system thoroughly and to identify and correct issues before go-live. While there were still initial problems with user buy-in, once they started using the system without any major issues, there were few to no complaints. In contrast, a recent attempt to implement an EHR in the outpatient clinics went so poorly that they ceased implementation and the clinic returned to paper charts. A single IT staff member, who was responsible for maintaining and updating the existing system, also became responsible for carrying out the implementation of LSS in the clinic. When the clinic went live, orders did not transfer correctly through the LSS and MEDITECH interface, which resulted in weeks of frustration among staff. While they resolved most of the interface issues, buy-in for future EHR implementations is perceived as much harder to achieve since the users have now experienced issues with the system first-hand.

### *Train multiple staff members on system use, maintenance, and upgrades.*

Ellsworth experienced 100% turnover in IT in the previous two years. Initially the hospital invested heavily in training super users; however, over the years, the hospital experienced IT staff attrition and new expertise was not developed. As a result, a single IT staff person became responsible for maintaining the system as the other super users left. On short notice, however, the vendor hired this staff member, leaving the hospital without IT support knowledgeable enough about the system to train other users. In response, the hospital revamped their commitment to IT staffing and now maintains four IT staff, including one previously employed by the IT vendor.

## Liberty Medical Center

**Organizational snapshot.** Liberty Medical Center (Chester, Montana) is a 25-bed CAH, with 290 inpatient days in 2010. Liberty is remote, even for a CAH, as the nearest other hospitals are 61 miles to the east or 93.5 miles to the south.

**Stage of Health IT Adoption.** Liberty is currently running a Healthland EHR in the hospital, which they have been implementing over the last several years. The Healthland EHR runs as an ASP model and is hosted in another state. They received grant funding from the North Central Montana Health Care Alliance, comprised of 11 hospitals in the North-Central part of Montana, to add additional modules to the Healthland EHR and the NextGen EHR in their outpatient clinic.

### *Discuss workflows with the vendor before the product implementation.*

After implementing one of the EHRs, the physicians at Liberty worked for three months to implement the tool into their workflows, at which point only one physician was still using the system. However, even as that physician continued to champion the system's use, she had the largest patient load, and her workflow was becoming too slow to support it, so even she ceased using the system. At that point, the leadership team at Liberty began working with their vendor to determine where the process had gone wrong. Eventually, the vendor connected them to a physician who visited Liberty to assess the EHR and quickly determined that the system was improperly set up for their workflows. Apparently, the vendor representative was unfamiliar with CAHs and made assumptions that Liberty's needs would be similar to those of a nearby FQHC, where the vendor had recently completed an implementation. Had there been a clear discussion of workflows and product specifications prior to the product build, this miscommunication could have been avoided.

### *Communication of coming changes to the community will smooth the process for patients.*

It is important to communicate the transition to an EHR, not just to staff and providers, but also to the community, particularly when it affects patient scheduling. During the early stages of implementation, workflows will be at their slowest, and patients may be more likely to notice the changes, particularly if it is taking them longer to access their physician. Liberty embarked on a campaign to inform the community members about the switch through newspaper articles and flyers. Their goal was to increase patient understanding of the process and to inform patients of the anticipated changes in their experience at the hospital. As a result, patients were more understanding when they experienced delays in being able to schedule appointments with their physicians and longer clinical visits. In addition, the newsletters helped to inform patients that they would be required to bring their identification and insurance cards to appointments for addition into the electronic systems –items many patients no longer routinely brought, due to the small size of the community.

### *The best type of training allows staff to experience the system they will be using.*

At Liberty, the clinical staff had limited computer knowledge prior to implementation and required a strong training program. The vendor provided three days of in-depth training, but the delivery method was insufficient for Liberty's needs. As a very small hospital, patient numbers often fluctuate, as well as the number of clinical staff on duty, contributing to the inability to become familiar with the EHRs through consistent hands-on use. The training was three days long and delivered via a web-conference with the vendor in a remote location. The

super users attending the training found it to be insufficient for their needs for several reasons. While the super users could follow along on their computers and work through the EHR processes, it was just as easy to watch the vendor's screen, thereby nullifying the intent of having a "live training." With that type of interaction, it would have been preferable to watch a webinar that was accessible for later reference. In addition, as the vendor was remote, they were not seeing a walk-through of their product as configured, limiting the utility of the training for becoming familiar with their new processes.

## Minnie Hamilton Health System

**Organizational Snapshot.** Minnie Hamilton Health Care Center (Grantsville, West Virginia) is a 25-bed CAH, with 1,681 total inpatient days in 2010. The hospital is a part of the Minnie Hamilton Health System (MHHS), which consists of the hospital as well as one satellite office, four school-based health centers, a dental clinic, MHHCC Glenville State College office, and the MHHCC Annex.

**Stage of Health IT Adoption.** In 2000, MHHCC implemented CPSI, which was selected because the vendor offered clinic, hospital, and financial products. EHR adoption varies across departments and sites due to connectivity and data interfacing issues. In 2010, they implemented a NextGen product in their clinics with an interface to their inpatient and emergency department CPSI products. MHHCC also has a long-term care department, which currently only uses electronic processes for reporting the required minimum data set (MDS) to CMS.

*The type of information exchange with affiliated clinics expected should be determined before implementation.*

MHHS operates as a system of clinics, which created unique challenges in their pursuit of health IT. While they implemented the same CPSI clinic module in the healthcare center and the Glenville clinic, the two sites were set up as separate entities and thus created separate patient records at each site. As patients frequently bounce between the two sites, this is considered counterproductive to the intent of adding additional health IT. Furthermore, connectivity between sites can be a major challenge. RITECH and the state of West Virginia recently issued a FCC grant to upgrade the fiber optic cable from 3mb to 10mb, but due to the order in which connectivity will be established, MHHS is unlikely to see the benefits of increased transmission speed in the near future. Connectivity is especially important as they use tele-radiology, so the transmission of a single film has the capability to slow the entire system down.

*Training is not just an implementation activity.*

Training is a continuing difficulty for MHHS. Several staff members are per diem and/or work at multiple sites, which use differing software products. While the hospital offered initial trainings during implementation, it has been difficult for staff to maintain a working knowledge of the software when they are infrequently working with the systems or using different processes at different sites. Furthermore, as the vendor releases system upgrades, staff are inconsistently informed of the changes, dependent upon the depth of the change, and rarely re-trained in response to such changes. Feedback from the end-users suggested a need for ongoing training to ensure that staff is using appropriate processes, optimizing their workflows from experiential learning and system use, and staying up to date on system upgrades.

## Providence Mount Carmel Hospital

**Organizational Snapshot.** Providence Mount Carmel Hospital (Colville, Washington) is a 25-bed CAH, with 4,536 total inpatient days in 2010. Mount Carmel is a member of Providence Health & Services network, and operates as part of a RHIO, cooperatively sharing clinical data with other care facilities.

**Stage of Health IT Adoption.** Mount Carmel initially implemented MEDITECH in 1997 and expanded to include the clinical modules in 2003. As part of the Providence Health & Services network, Mount Carmel will be implementing Epic's EHR in 2012. They expect to reach HIMSS Level 6 of EMR Adoption by the end of 2011 with widespread physician electronic documentation, fully implemented PACS and Bedside Medication Verification, and a 100% implemented ER. In August 2011, the hospital had met all Meaningful Use Stage 1 requirements using MEDITECH and was actively preparing for the Providence network-wide implementation of Epic's clinical system in late 2012.

### *Transitioning vendors to match network hospitals can hinder independent progress.*

As a member of Providence Health & Services Network, Mount Carmel Hospital maintains a stable financial outlook despite expensive health IT implementation efforts. This support allows for a great deal of freedom to pursue continuous improvements to an already successful MEDITECH implementation. The association with a larger, more financially stable health system has provided access to a strong informatics support staff as well as the drive to implement advanced systems. However, while Mount Carmel has been able to operate mostly independent of Providence, they now face a system-wide change to the Epic platform. Mount Carmel has had to advocate for their position as a small, rural hospital in Providence system meetings that are largely comprised of large hospitals. They are fearful that the Epic transition will disregard their needs and other nuances of being a CAH. Additionally, they are concerned that moving to Epic will set back the progress that they have made over the years implementing and polishing their MEDITECH modules.

### *Develop collaborative and independent resources in anticipation of future needs.*

Mount Carmel joined in a collaborative association with Inland Northwest Health Services (INHS) to provide a range of services that work together to improve health outcomes and create innovation in care. One of these services is the Information Resource Management (IRM), which manages the health IT networks, including a RHIO and hospital-based IT staffing. IRM employs Mount Carmel's informatics staff, which has been one of the main keys to their implementation success. This core informatics team has been dedicated to implementing clinical modules within the context of the clinical workflow. While the collaborative relationship with INHS and IRM has led to past successes, the future of this relationship is uncertain. INHS typically supports MEDITECH implementations, not Epic, which Providence will be transitioning to in the future. Additionally, Providence Health & Services is moving to an enterprise-level, centralized IT support system with the transition to Epic. Ideally, Mount Carmel would like to maintain the relationship with INHS and IRM as it has served them well for over a decade. Regardless of the future, the expertise and experience the Mount Carmel informatics staff has gained will serve the hospital in future health IT implementations.

## Punxsutawney Area Hospital

**Organizational Snapshot.** Punxsutawney Area Hospital (PAH) (Punxsutawney, Pennsylvania) is a 49-bed rural hospital, with 6,143 total inpatient days in 2010.

**Stage of Health IT Adoption.** In 2006, PAH added CPOE to their emergency department MEDITECH EHR and is fully functional with electronic systems, including CPOE. Outside of the emergency department, with the exception of CPOE (due in April 2012), PAH is also fully functional with MEDITECH products as of August 2011.

### *A best of breed product is not always the best product to select.*

In their EHR selection process, PAH's decision making processes revolved around whether to purchase a best of breed module from a new vendor or avoid interoperability issues and purchase a less advanced module from their current vendor. The new vendor's product offered additional features, but there would likely be continuing issues with initial and future upgrade integration. PAH explored developing interfaces, but did not pursue the effort due to high initial costs and unknown maintenance and upgrade costs. In addition, they believed they could not afford the staff, consultants, and capital to have a best of breed system. As such, the focus shifted toward maintaining the value of integration, which meant they selected a product that did not include additional features.

### *Let users drive the processes and functionalities.*

PAH describes having had relatively good success with clinician buy-in. Leadership clearly communicated what they were doing, why they were doing it, and how it would impact clinicians. PAH operates with the philosophy that they will support the clinicians when they want to go-live with a module, but if the clinicians do not want to drive the process, it is not going to happen. However, there were clinicians who were very happy with their old systems, and thus unwilling to drive the change. At that point, the hospital leadership communicated the message that the federal government has released standards, and if they want to continue to operate, the hospital needs to go electronic. When clinicians understood the available assistance and incentives, they were more eager to implement the technology.

### *Set clear process and outcome expectations with vendors early on.*

One of the biggest challenges of implementation for Punxsutawney was building templates and dictionaries, only to later learn from their vendor that some of the work had been unnecessary because some of the content was already available from MEDITECH. Staff spent a significant amount of time developing data dictionaries only to discover that it was standard content available elsewhere. Due to the sequencing of the project laid out by the vendor, site staff members were unaware of this until after they had completed the customized building. For the next round of implementation, site staff had to rework their customization to ensure that it matched the vendor's standard content for issues of compatibility.

## South Sunflower County Hospital

**Organizational Snapshot.** South Sunflower County Hospital (Indianola, Mississippi) is a 45-bed rural hospital, with 7,394 total inpatient days in 2010. In addition to the hospital, the health system includes Delta Surgical Clinic, Delta OB/GYN Clinic, and Indianola Family Medical Center.

**Stage of Health IT Adoption.** South Sunflower is in the process of increasing the utilization of their Healthland platform for both financial and clinical processes. They have been using Healthland's Unix-based financial system for many years, and decided to implement the EHR system in 2010. They negotiated with Healthland to become a beta site for Healthland's new Windows-based clinical package that will interface with the financial system. The associated rural health clinic has been using Allscripts for close to 2 years, but there is no current interface between the two systems. When we visited in March 2011, South Sunflower had recently completed upgrades to their network and hardware. In August 2011, all clinical staff had been trained and was using the clinical system to meet Meaningful Use objectives.

### *Being a Beta site can provide discounts, benefits, and additional support—but at a cost.*

South Sunflower's designation as a Healthland beta site allowed the hospital to receive extra attention from the vendor in the early phases of implementation. The hospital held weekly conference calls with the vendor to discuss progress on outstanding items as well as plan for future steps. This line of open communication allowed the hospital to work well with the vendor and build momentum for the early stages of implementation. Additionally, their assigned vendor representative was responsive, quickly addressing critical problems and directing necessary work items to appropriate people on the vendor side. As vendors become increasingly busy with new clients, this added attention in the early phases proved to be a welcome benefit. The amount of support, however, has recently downshifted with the assignment to general Healthland support. The staff anticipates this move will be detrimental to their momentum and are working to maintain a higher level of vendor support. They continue to hold regular conference calls with Healthland to discuss progress towards meaningful use, but they have noticed that other outstanding issues are taking longer to be resolved and that they may no longer be a priority site for Healthland.

### *Meeting Meaningful Use objectives depends in part on vendor support and clear communication of needs and expectations.*

South Sunflower has been successfully working toward increasing the use of their clinical systems. Staff completed vendor-provided training in April 2011 and has since been receptive to additional internal training sessions as well as using computers on wheels to document at the patient's bedside. They are refining workflows to meet meaningful use objectives, but vendor delays with providing accurate reports are preventing their application for incentives. There was some miscommunication between South Sunflower and Healthland concerning where specific EHR items were being pulled from for the Meaningful Use reports. They are working with the vendor to resolve this issue, but it is still unclear when these calculations will be corrected. There are additional issues that South Sunflower has come across during the increased use of the EHR. These include issues with limitations on number of physician sign-offs for lab values and uninformed vocabulary choices for drug formulary selections. South Sunflower is working with their vendor on these design and communication issues, but they also increase the work and timeframe for South Sunflower to meet meaningful use.

***Innovative approaches to sharing resources may not always succeed.***

South Sunflower began working with the Delta Health Alliance after receiving a grant to implement their rural health clinic's Allscripts system. This relationship expanded to include a partnership with two other rural hospitals in the Mississippi Delta region to receive funding for a shared CIO to help with strategic health IT planning. While South Sunflower was optimistic about having a high level of support from the Alliance, the shared CIO did not provide long-term value as hoped, and they decided to use the remaining grant funding for other health IT initiatives. Shortly after ending the relationship with the shared CIO, the Delta Health Alliance discontinued South Sunflower's grant funding and South Sunflower is unsure if they will be able to obtain additional grant funding or support from the Alliance in the future.

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## Appendix B: Study Methodology

### Study Overview

The goal of this study is to understand the EHR adoption process of small, rural hospitals. Altarum Institute conducted qualitative and quantitative studies of the financial standing and health IT adoption experiences of eight small, rural hospitals. These studies provide a broad overview of characteristics and challenges of rural hospitals to incorporate into the design and implementation of public and institutional policies and practices in order to promote rural hospitals' investment in and meaningful use of health IT. The case studies are presented to highlight the experiences of a select number of small, rural hospitals and therefore may not accurately reflect the typical small, rural inpatient provider.

To understand better the depth and breadth of challenges experienced by small, rural hospitals, and what strategies are used to overcome them, Altarum Institute collected quantitative and qualitative data on financial, operational, and institutional factors to describe the experiences related to several areas:

- Challenges to implementation and use
- Challenges to financing health IT
- Management strategies to overcome challenges
- Factors related to successful adoption

### Sample Selection

The sample was drawn from respondents to the American Hospital Association Annual Survey Fiscal Year 2008 (N = 6,407). Results from the 2008 American Hospital Association Survey Information Technology Supplement enhanced these data. To preserve the ability to obtain fully robust data for all of the sites within the sample, sites were only included if they were open and fully operating during the reporting year. Altarum used the following final sampling criteria to achieve a variety of characteristics across the selected sites.

The initial sample was drawn from hospitals identified as rural by the American Hospital Association (AHA) (n = 1,796). The pool of potential participants was reduced further by response to the 2009 AHA Information Technology survey and a combination of other factors that are detailed in Figure 2.2.1 (n = 487).

Potential sites were then evaluated on their level of health IT adoption through designation into one of six categories, including three (basic with notes, basic without notes, and comprehensive) that were defined by a panel of health IT experts for inpatient settings (Jha et al. 2009). This resulted in a final sampling pool of 127 sites.

## Sampling Criteria

AHA Variable	Sampling Criteria	Recruited Sample
AHA Region Code	8 of the 9 Census Division regions <sup>2</sup>	8 of the 9 Census Division regions
CAH Status	<ul style="list-style-type: none"> <li>• 4 CAH</li> <li>• 4 non-CAH</li> </ul>	<ul style="list-style-type: none"> <li>• 6 CAH</li> <li>• 2 non-CAH</li> </ul>
IT Readiness (calculated)	<ul style="list-style-type: none"> <li>• 2 – Comprehensive</li> <li>• 1 - Basic EHR w/Notes</li> <li>• 1 - Basic EHR w/o Notes</li> <li>• 1 - Beginning to Implement Basic EHR</li> <li>• 2 - Have Resources to Implement Basic EHR</li> <li>• 1 - Do Not Have Resources and/or Not Planning</li> </ul>	<ul style="list-style-type: none"> <li>• 1 - Comprehensive</li> <li>• 1 - Basic EHR w/Notes</li> <li>• 1 - Basic EHR w/o Notes</li> <li>• 2 - Beginning to Implement Basic EHR</li> <li>• 1 – Have Resources to Implement Basic EHR</li> <li>• 2 - Do Not Have Resources and/or Not Planning</li> </ul>
Total Expenses (excluding bad debt) <sup>3</sup>	<p>Two hospitals from each expense quartile category.</p> <ul style="list-style-type: none"> <li>• Expenses &lt; \$7.9M</li> <li>• Expenses = \$7.9M to \$14.2M</li> <li>• Expenses = \$14.3M to \$26.9M</li> <li>• Expenses &gt; \$26.9M</li> </ul>	<ul style="list-style-type: none"> <li>• 1 - Expenses &lt; \$7.9M</li> <li>• 4 - Expenses = \$7.9M to \$14.2M</li> <li>• 1- Expenses = \$14.3M to \$26.9M</li> <li>• 2 - Expenses &gt; \$26.9M</li> </ul>
Percent Medicare versus Medicaid Discharges (calculated) <sup>4</sup>	<p>Two hospitals from each category quartile:</p> <ul style="list-style-type: none"> <li>• Medicare/Medicaid discharges &lt; 72%</li> <li>• Medicare/Medicaid discharges = 72% - 82%</li> <li>• Medicare/Medicaid discharges = 83% to 90%</li> <li>• Medicare/Medicaid discharges &gt; 90%</li> </ul>	<ul style="list-style-type: none"> <li>• 3 - Medicare/Medicaid discharges &lt; 72%</li> <li>• 1 - Medicare/Medicaid discharges = 72% - 82%</li> <li>• 2 - Medicare/Medicaid discharges = 83% to 90%</li> <li>• 2 - Medicare/Medicaid discharges &gt; 90%</li> </ul>

## Site Recruitment

From November 2010 to February 2011, Altarum utilized an iterative recruitment approach to achieve a convenience sample of the selected characteristics. We made the initial selection of four sites based on the mix of desired characteristics, including membership in different AHA regions. ONC then extended recruitment letters to establish the legitimacy of later contact by

<sup>2</sup> Combined census Regions 1 and 2 as the reduction process resulted in only 5 potential sites for Region 1 and 4 potential sites for Region 2.

<sup>3</sup> The field “Total Expenses (including bad debt)” was not well populated so it was not selected for criteria.

<sup>4</sup> Calculated as (Medicare Discharges) / (Medicare Discharges + Medicaid Discharges). Total discharge information was not available, nor was enrollment information (by payer). The above value was used to assess the patient mix across Medicare and Medicaid and select hospitals serving large Medicare populations versus those serving large Medicaid populations.

Altarum analysts. The potential sites had a set time during which to consider their participation in the case study to ensure that the recruitment process could move swiftly. During this period, Altarum analysts contacted the sites to more fully inform them of the study process and address any questions and concerns. We recruited additional sites based on the mix of characteristics that were not successfully recruited in the prior wave.

## Study Participants

For this case study, Altarum recruited eight small, rural hospitals for participation based on a variety of characteristics, including: American Hospital Association regions, CAH status, stage of IT adoption, revenue, and Medicare and Medicaid as a percentage of total inpatient volume. Altarum specifically sought at least two hospitals that had comprehensive health IT infrastructure implemented for their ability to provide insight into the EHR adoption process. Altarum reviewed each hospital’s finances to examine the financial impact of EHR adoption in contrast to estimated EHR incentive payments. The study included the following hospitals across the nation:

Hospital	Location	Beds	CAH	EHR Adoption Stage <sup>5</sup>	EHR Vendor
Caro Community Hospital	Caro, MI	25	Yes	Implementation Begun or Resources Identified	NextGen
Delta Memorial Hospital	Dumas, AR	25	Yes	Implementation Begun or Resources Identified	Healthland
Ellsworth County Medical Center	Ellsworth, KS	20	Yes	Fully Implemented in All Units	MEDITECH
Liberty Medical Center	Chester, MT	25	Yes	Fully Implemented in All Units	NextGen & Healthland
Minnie Hamilton Health System	Grantsville, WV	25	Yes	Fully Implemented In All Units	NextGen
Providence Mount Carmel Hospital	Colville, WA	25	Yes	Fully Implemented in All Units	MEDITECH
Punxsutawney Area Hospital	Punxsutawney, PA	39	No	Fully Implemented in All Units	MEDITECH
South Sunflower County Hospital	Indianola, MS	45	No	Implementation Begun or Resources Identified	Healthland

Additionally, qualitative data was collected to document the EHR adoption process through semi-structured interviews with:

- Chief Executive Officers
- Chief Financial Officers
- Chief Information Officers
- Chief Nursing Officers

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<sup>5</sup> This reflects the stage of adoption at the time of publication. Several hospitals transitioned adoption stages after initial study recruitment and throughout the course of the study.

- IT Directors
- Clinical End-Users
- Super users/Champions

## Financial Evaluation

Altarum requested the following data from the hospitals to support the financial evaluation:

Data Request	Rationale
Medicare Cost Report	Calculate Meaningful Use incentives
Meaningful Use Readiness Survey	Collect EHR implementation, cost and budget information
Charge Description Master	Evaluate hospital service mix to understand revenue base, service diversification, and pricing structure
Revenue and Usage Report	Combined with Charge Description Master to understand service mix by payer
Financial Statement	Evaluate fiscal tolerance for large capital investments

We requested the Charge Description Master (CDM) and the Revenue and Usage (R&U) report to understand better the variations in reimbursement across payers for the hospital service mix. The CDM provides a comprehensive listing of hospital charges and services. The R&U report provides information about the volume and cost of CDM services including paid encounters/visits, broken out by payer. These two reports support service mix by payer analysis that provides insight into the hospital's reimbursement structure to identify areas of losses and benefits. This analysis identifies variations in financial viability across hospitals to explain why some hospitals may have more difficulty generating positive operating margins. Unfortunately, only a few of the rural hospitals were able to provide the CDM and an R&U report. For those hospitals that did provide this data, they were unable to provide service mix data by payer. This request illustrated that smaller hospitals may not capture service mix by payer data in the same manner as larger hospitals. Therefore, the service mix by payer analysis was substituted with a review of patient service reimbursements by payer to understand the mix of government, commercial, private, and other payers.

## Study Limitations

**Generalizability of findings due to variation in health IT systems.** Study participants were implementing a variety of HIT systems and these findings do not generalize to all of them. We made efforts during case study selection to ensure that general characteristics of the grantees were represented in the evaluation; however, the grantees that were selected for case study may not be representative of all small, rural hospitals around the country

**Non-experimental design.** An experimental evaluation design was not the goal of this study. Instead, we selected the rural hospital sample to provide a varied insight into rural hospital economic challenges. For example, the rural hospital sample includes eight of the nine Census Division regions. However, a sample of only eight hospitals cannot be, by definition, completely representative of the typical small, rural inpatient provider.

**EHR implementation and sustainment Costs.** Within the financial analysis, it was important to understand how much the hospitals had already invested in EHR technology and additional

IT items/investments needed to achieve EHR certification. There was a large variance in EHR solutions across the hospitals. Some of the hospitals added new and different EHR modules or vendor products to current EHR systems. The variance and complexity of the EHR solutions across the hospitals provided a broad range of EHR investment costs.

***Under-reporting of sustainability costs.*** The variance and complexity of the EHR solutions across the hospitals provided a broad range of EHR sustainability costs. Based on feedback from the Rural Health Advisory Panel, we suspect that some of the hospitals may be under-reporting sustainability costs. The AHA and other surveys indicate that the annual EHR sustainability/operating costs are more than double the EHR information technology costs. Included in this may be the need to double or triple critical network and system staff that may not be available in a small, rural hospital setting (Wenzlow, 2010). Therefore, the sustainability costs included in this report may be much lower than the actual sustainability costs.

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## Appendix C: Resources

**ONC Regional Extension Center Program:**

[http://healthit.hhs.gov/portal/server.pt/community/healthit\\_hhs\\_gov\\_rec\\_program/1495](http://healthit.hhs.gov/portal/server.pt/community/healthit_hhs_gov_rec_program/1495)

**Health Information Technology Toolkit for Critical Access and Small Hospitals:**

<http://www.stratishealth.org/expertise/healthit/hospitals/htoolkit.html>

**HRSA's Health IT Adoption Toolbox:**

<http://www.hrsa.gov/healthit/toolbox/RuralHealthITtoolbox/index.html>

**Medicaid Incentive Calculations:**

[https://www.cms.gov/MLNProducts/downloads/Medicaid\\_Hosp\\_Incentive\\_Payments\\_Tip\\_Sheets.pdf](https://www.cms.gov/MLNProducts/downloads/Medicaid_Hosp_Incentive_Payments_Tip_Sheets.pdf)

**Medicare Incentive Calculations:**

[https://www.cms.gov/MLNProducts/downloads/EHR\\_TipSheet\\_Medicare\\_Hosp.pdf](https://www.cms.gov/MLNProducts/downloads/EHR_TipSheet_Medicare_Hosp.pdf)

**Critical Access Hospital Incentive Calculations:**

[https://www.cms.gov/MLNProducts/downloads/EHR\\_TipSheet\\_CAH.pdf](https://www.cms.gov/MLNProducts/downloads/EHR_TipSheet_CAH.pdf)

**ONC Health IT Workforce Curriculum:**

<http://www.onc-ntdc.org/>

**HRSA's Health Network Guide:**

<http://www.hrsa.gov/healthit/networkguide/>

**AMIA 10x10 Courses:**

<http://www.amia.org/education/10x10-courses>

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