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# LEARNINGS FROM THE LEADERSHIP OF CREDIT ACCESS HOSPITALS ON ELECTRONIC MEDICAL RECORDS

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**ABSTRACT**

As EMRs grow, healthcare providers' performance will be improved and healthcare costs will be reduced, which is driving increasing use of electronic medical records (EMRs). Small rural hospitals, in particular, lack evidence to support these beliefs. All hospitals in Iowa were asked to participate in a survey assessing their health information technology (HIT) capabilities. An assessment of the operational Electronic Medical Record perceived advantages EMRs was conducted by conducting structured interviews with implementation of electronic medical records in 15 critical access hospitals. EMRs were implemented in most hospitals for the purpose of improving adeptly, availability of time, and assurance of excellence. EMR implementation was also viewed by many CAH leaders as a necessary business strategy to enhance profitability and remain competitive. Other factors may contribute to the decision, besides perceived future federal mandates, key hospital leaders want to embrace HIT based on hospital orientation. In terms of quantifiable results, anticipated benefits were consistent with goals, but realized benefits seldom met expectations. Critical access hospitals should implement electronic medical records (EMRs) based on these findings, which extend the limited research on this subject.

**Keywords:** - Leadership, Hospitals, Electronic, Themes, Records.

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## INTRODUCTION

The widespread use of health information technology (HIT) is helping hospitals and healthcare providers improve their performance [1]. Along with improved performance, Due to a common belief that EMRs and EHRs will result in significant cost reductions, the adoption of HIT in the form of electronic medical records is accelerating, improvements in patient safety and quality of care, and an overall improvement in population health [2]. An initiative to facilitate the sharing of health information was enacted by the federal government in 2004, which culminated in a National Health Information Infrastructure (NHII) [3]. It has been difficult to adopt EMR systems despite federal initiatives [4].

Considering the diffusion of EMRs and EHRs accurately is difficult because of the terminology used inconsistently. The concepts contain completely different meanings, but both are crucial to improvement of patient safety, quality and efficiency of healthcare delivery, and cost reduction efforts on a local, regional, and national level [5]. An EHR consists of information (data) in EMRs, which are legal documents created in healthcare environments. Healthcare providers, payers/insurers, and patients/consumers can share medical information using an EHR, which emphasizes interoperability. Our study uses the term EMR broader than EMR because many participants do not have interoperable system.

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The majority of hospitals with an EMR system are large, urban, and/or teaching hospitals [6, 7]. A study by Ward and colleagues found that more than 80% of urban hospitals collected basic clinical information using computers for potential integration into EMR systems, while fewer than 40% of hospitals in rural Iowa did [8]. A similar finding was made by Houser and Johnson, who found that hospitals located in rural Alabama are less likely than those in urban or suburban areas to have implemented an EMR system [9].

Oftentimes, small rural hospitals lacking critical access hospital status have difficulty investing in HIT. The Balanced Budget Act of 1997 allowed rural hospitals to become CAHs if they met specific criteria. A CAH must be not-for-profit, located in a non-metropolitan statistical area, at least 35 miles (15 miles in mountainous regions) from another short-term general hospital to qualify, and have no more than 25 beds (a combination of acute care and swing beds). Agreements, contracts, and affiliations for transfer and services can limit the length of stay to 96 hours on average [10]. Several CAHs' margins have improved due to the change from a prospective payment system to retrospective cost-based payment under Medicare [11, 12]. Many CAHs have been able to enhance patient quality and refurbish aging facilities thanks to the improved financial situation [14]. As of right now, the United States has 1,305 CAHs on board [15]. Rural hospitals in particular have yet to be adequately surveyed for the extent of their use of HIT.

CAHs' investment in EMR systems may be significantly changed as a result of the American Recovery and Reinvestment Act of 2009 (ARRA). As long as they are able to fulfill the "meaningful use" criteria in a three-stage process from 2011 through 2015, CAHs can receive incentives (depreciation of the cost of an EMR system within the same year). If meaningful use of EMRs cannot be demonstrated by 2015, Medicare payments may be reduced. CMS and the Office of the National Coordinator for Health Information Technology (ONC) proposed a meaningful use definition on December 30, 2009, and are awaiting feedback from the public. Incentives are not specifically available for CAHs under Medicaid.

Behavioral intention theories (for example, the Theory of Reasoned Action and the Theory of Planned Behavior) and social-cognitive theories have been used to examine and explain HIT usage, as have diffusion of innovations theories, the PRECEDE-PROCEED model, and the Technology Adoption Model 20. There is little research on the factors that influence organizations to implement HIT, such as EMRs, even though these theories are useful for predicting end users' acceptance and adoption of HIT.

Clinical staff resistance, technical issues, concerns about information security, and unquantifiable or delayed returns on investment are a few of the barriers to the implementation of EMRs in acute-care hospitals. In addition to a significant investment in capital, time, and human resources, adopting EMRs into clinical practice requires significant changes to existing systems and processes. Health care providers face significant obstacles due to financial constraints. Scalability, reliability, accessibility, usability, standardization, integration, and security are also technical challenges associated with EMR implementation in urban and rural settings.

Medical care could be transformed through the implementation of EMRs. The systematic reviews have found, however, that EMRs are relatively ineffective or ineffective in terms of improving efficiency, quality, and patient safety when used alone or in conjunction with clinical decision support systems (CDSSs) and computerized provider order entry (CPOE). The purported advantages of EMRs are largely due to studies done on custom EMR systems rather than commercial EMRs (expensive, internally developed). Independent providers, especially small rural hospitals, have few options other than commercial vendors and consultants for implementing EMRs.

The rationale for CAHs adopting EMRs remains largely unknown despite numerous studies that have examined EMR technology. The Medical Records Institute conducted a nationwide survey concerning the usage of and perceived need for EMR/EHR systems. An EMR system selection process was examined in a small study by Chen and Skinner looking at the rationale for implementing EMRs. Further research into how rural providers implement EMRs can be carried out based on these studies. By looking at CAHs in Iowa that have adopted EMRs early, this study examines EMR purchases in the rural landscape. A specific goal of this study is to examine the rationale behind CAH leaders' selection of a specific vendor and how they implemented EMRs. Additionally, it discusses the benefits that EMRs have actually provided and what benefits are expected.

## Methods

### Identification of samples

All Iowa hospitals participated in a survey on HIT capacity conducted in the summer and fall of, which included a checklist of 46 basic and advanced applications. The study focused primarily on clinical applications among the 46 applications (see Tables 1 and 2). Overall, 85 percent of CAHs responded to the survey. There were 70 CAHs who responded, of which 16 were operating an EMR system and 8 were installing one. These 24 CAHs were the sample eligible for follow-up interviews, of which 15 participated.

**Procedure for interviewing**

During the pilot phase, the project team developed and reviewed role-specific follow-up interview questions. In the spring of, twelve chief information officers (CIOs) or directors of information technology were interviewed and 10 chief executive officers (CEOs)/administrators. A master's of health administration (MHA) student trained in interviewing conducted all interviews and audio recorded them. In addition to trancribing the audiotapes, two undergraduate students also assisted with the transcription. Transcripts of the interviews were edited to exclude identifying information (MMW). Four issues were analyzed and synthesized:

1. An EMR system was implemented by their CAH for several reasons
2. Choosing a vendor for their CAH
3. EMR systems are expected to provide a number of benefits
4. How the EMR system has benefited them

TRM abstracted all interviews on these four issues from the transcripts. Both the author and a second co-author (JV) analyzed the interview content independently and identified themes. In order to reach agreement on major themes, TRM and JV reviewed the independently identified themes with MMW (the senior author). Following agreement on major themes and identification of relevant texts, themes and accompanying text were grouped into three categories according to the degree of commonality (see Table 3).

Among CEOs and CIOs, a majority expressed major themes that were common to both groups.

Themes expressed by CEOs and CIOs were generally not shared across leadership positions, but were expressed primarily by the CEOs and CIOs.

Themes that were unique to CEOs or CIOs were those that captured important points of view that could not be articulated by others and that were expressed by either or both CEOs or CIOs.

**Results**

Tables 1 and 2 summarize summary statistics for relevant survey items, as well as Tables 3 to 6 summarize responses to questions focusing on these four issues from CEOs and CIOs.

**Capability Survey Items for Health Information Technology**

Six vendors were selected from 15 CAHs interviewees. CPSI (formerly Dairyland) and Healthland (formerly CPSI) were among the most frequent vendors. As well as Meditech and Keane, Healthcare Management Solutions, Inc. (HMS), and Practice Partners were also identified as vendors. According to table 1, all 15 CAHs had different numbers of full-time equivalent (FTE) IT personnel.

Clinical systems applications were typically supported by external consultants or subcontractors in most hospitals (46.7 percent to a small extent and 40 percent to a large extent). The majority of CAHs (20 percent to a small extent and 20 percent to a large extent) did not use application system providers (ASPs), a unique form of outsourcing that involves a third-party entity managing and distributing software-based solutions and services over a wide network through a central data center to customers. A company that provides ASP services holds the licenses to the software provided, which makes them different from typical outsourcing services.

There were 25% of the hospitals that indicated they were part of a network or system. Most respondents indicated that the hospital's clinical system application purchasing decisions were not affected by the system or network, while half stated that the clinical system application purchasing decisions of their hospital were moderately influenced by the system or network.

CAHs with functional CPOE systems and those in the process of implementing them were reported to have two and four respectively. It was reported that six CAHs had no intention of implementing CPOE. CPOE was planned by four CAHs, but budgets had not been defined, and five had selected vendors and defined budgets.

Two CAHs were in the process of installing a clinical decision support system (CDSS), and three had a functional CDSS. A CDSS was not planned by 11 CAHs. In three CAHs, a CDSS was planned, but no budget had been defined. In one CAH, a budget had been defined and a vendor had been selected.

A functional clinical and financial data repository is available in ten of the CAHs (for retrospective reporting and decision support). A clinical and financial data repository was not planned by thirteen CAHs. CAHs planned to implement clinical and financial data repositories, but hadn't committed to a budget, while another had defined costs and contracted with vendors.

**The follow-up interviews revealed the following findings:**

The benefits of implementing an EMR. The desire to improve efficiency, timely access, and quality was a common sentiment expressed by CAH leaders when they implemented EMRs (Common Theme 1). In addition, many leaders identified it as an essential business strategy for the continuation of the CAH (Common Theme 4) and improvement of its financial performance (CIO Shared Theme 2). Some themes reflect external factors, such as perceived federal mandates (Common Theme 3), while others suggest internal factors, such as the hospital's culture and the desire by key administrators and physicians to embrace HIT (Common

Theme 2; CEO Shared Theme 1). It was expressed by a few hospital leaders (CEOs and CIOs) that the desire to remain competitive and ahead of the curve is one of their top priorities (early adopters).

Vendor selection reasons. A common theme among CAHs was to work with the vendor who installed and maintained their financial package. In addition, most CAHs strived to find the highest quality EMR system that could incorporate both clinical and financial aspects (Common Theme 2; CIO Shared Theme 2). In addition, many CAHs sought vendors with experience working with small hospitals (CEO Shared Theme 1). In order to find a suitable EMR system, CAH leaders engaged in a variety of efforts, such as hosting on-site demonstrations, visiting other hospitals off-site, or contacting vendors' previous clients (CIO Shared Theme 1). The CAH leaders sought a low-cost product after identifying desirable vendors. A common theme 4 (ongoing support and training costs) was taken into consideration by some CAHs when choosing vendors. In pursuit of the common theme of user satisfaction (Common Theme 3), CAH leaders engaged in these various search and evaluation processes.

Using EMRs is expected to provide many benefits. Neither the CEO nor CIO wanted a standalone system (CEO Shared Theme 1; CIO Shared Theme 2). (Common Theme 1) The key to improving quality of care, patient safety, communication, and efficiency or productivity was to have a fully integrated system. According to the Common Theme 2, EMRs could also improve the accuracy and efficiency of capturing and processing charges, reduce storage space occupied by paper documents by moving to a paperless environment, and improve staff accountability by ensuring accurate and efficient documentation (CIO Shared Theme 1).

EMRs have proved to be beneficial. There were two major categories of CAH leaders: 1) they lacked documented measurements to prove realized benefits accurately or definitively (Common Theme 1), or 2) they assumed that they had achieved the expected benefits despite the lack of official documentation (Common Theme 2). EMRs are largely believed to be ineffective because of staff resistance to change (Common Theme 3).

Iowa Hospital Association. Profiles; Section VI: Hospital and Health System Specific Data.

| **Strategic planning for businesses** | **Number of CAHs (%)** |
|---|---|
| *System vendor for electronic medical records (EMRs)* | |
| ***(CPSI) is a company that provides computer programming services.*** | 6(31.4%) |
| ***HMS, Inc. (Healthcare Management Solutions)*** | 2 (7.1%) |
| ***Dairyland (formerly Healthland)*** | 4 (22%) |
| ***Keane*** | 5(15.4%) |
| ***Medical Information Technology, Inc. (Meditech)*** | 317.4%) |
| ***A partnership between practices*** | 2(7.4%) |
| ***Unspecified*** | 2(8.7%) |
| **Employees employed as full-time equivalents (FTEs) in the IT industry** | |
| None | 3(15.6%) |
| 1–2 | 7(45%) |
| 3–5 | 5(27.8%) |
| 6–10 | 3(16.7%) |
| 11–20 | 2(8.3%) |
| **Consultancy or subcontracting services for clinical systems** | |
| Absolutely not | 3(15.4%) |
| To a limited degree | 8(47.8%) |
| In a significant degree | 7(46%) |
| Clinical system applications rely on application system providers (ASPs) | |
| Absolutely not | 8(59%) |
| To a limited degree | 4(21%) |
| In a significant degree | 4(26%) |

Table No. 1. Supporting Clinical Information System (CIS) for Critical Access Hospitals.

| **System of clinical care** | **Currently implemented systems (%)** | | **Installation or upgrade of how many systems are planned (%)** | |
|---|---|---|---|---|
| | **Installing currently in operation** | **None** | **System of Plans** | **No Plans** |

| | | | | |
|---|---|---|---|---|
| Computerized Provider Order Entry | 7(41%) | 10(71%) | 10(66%) | 7(42%) |
| Clinical Decision Support Systems | 6(35.4%) | 11(72.4%) | 5(28.7%) | 12(78.4%) |
| A repository of clinical data and financial information (Decision support and retrospective reporting) | 11(70.3%) | 6(41.3%) | 3(15.3%) | 14(88.9%) |

Note: The two halves of the table don't necessarily sum to 100 percent because some CAHs with operational systems are also planning to upgrade.

**Table No. 2. A survey of Iowa Hospital Association's capabilities in the area of health information technology. A profile of hospitals and health systems and their specific data; Chapter VI: Hospital and health system specific data**

| **CEOs and CIOs have similar themes** | |
|---|---|
| Theme 1: To improve efficiency, an EMR was implemented (e.g., handling paperwork should be reduced) Information is accessible in a timely manner (e.g., Patients' information is easier to access), and quality (e.g., A reduction in medication errors and improved safety for patients), Ultimately, this would result in better care for patients.<br>Theme 2: Staff members at the highest levels of administration and physicians (e.g., CEOs and CFO) EMRs were implemented as a result of this decision.<br>Theme 3: Because EMRs will soon become mandated, we decided to implement them.<br>Theme 4: It was the inadequacy of standalone systems and their lack of integration that prompted the implementation of EMRs. | |
| **Chief Executive Officers Shared Themes** | **Chief Information Officers' Shared Themes** |
| Theme 1: It was determined to implement this strategy as a result of hospital culture emphasizing staying ahead of the curve in terms of technology and innovation (being early adopters). | Theme 1: The staff and administration of the hospital took ownership of the vision and goal of being comparable to and competing with larger hospitals by implementing EMRs.<br>Theme 2: The initial need to improve their financial processes led to the decision to implement EMRs. |
| **Chief Executive Officers Unique Themes** | **Chief Information Officers Unique Themes** |
| Theme 1: Affiliation with a system influenced the decision to implement Electronic Medical Records. | Theme 1: CIO was responsible for driving the implementation of EMRs, with support from administration and clinical staff.<br>Theme 2: An EMR implementation did not involve the CIO. |

**Table 3: An overview of the reasons for implementing an electronic medical record**

| **CEOs and CIOs have similar themes** | |
|---|---|
| Theme 1: An existing relationship with the CAH led to the selection of the vendor<br>Theme 2: In choosing a vendor, we looked for a cost-effective Electronic Medical Records with a fully integrated system that combined financial and clinical functions well.<br>Theme 3: End-users (clinical staff) were considered when selecting the vendor.<br>Theme 4: To maintain compliance with new and emerging standards, EMRs and clinical staff must After implementation, you will be responsible for continuing support and training - a cost necessary for the vendor to be chosen. | |
| **Chief Executive Officers Shared Themes** | **Chief Information Officers' Shared Themes** |
| Theme 1: An experienced vendor with similar sized hospitals was selected. | Theme 1: We selected the vendor after visiting other hospitals and/or speaking with previous clients for on-site demonstrations or off-site visits.<br>Theme 2: In choosing a vendor, the cheapest EMR product was considered. |
| **Chief Executive Officers Unique Themes** | **Chief Information Officers Unique Themes** |
| Theme 1: Vendors were selected based on negotiations for | Theme 1: It was decided which vendor to choose based |

| | |
|---|---|
| the hospital to become a show site (a place where vendors can display and demonstrate their products) resulting in cost savings (discounts) and incentives for vendors to provide the best products and services.<br>Theme 2: Since hospitals had remote access, a vendor was chosen to avoid investing in an IT department. | on the timeline for or length of implementation (full roll-out or phases) and on the training process involved.<br>Theme 2: (CIO previously worked in the pharmacy department, which works closely with nursing staff) it is important to choose a vendor that meets the needs of the pharmacy and nursing staff. |

**Table 4: Choose a vendor based on these reasons**

| **CEOs and CIOs have similar themes** | |
|---|---|
| Theme 1: Patient care and safety were expected to be improved through increased efficiency (Reducing medication, transcription, and order handling errors through data processing, bar coding, and timely data use).<br>Theme 2: Charges were expected to be captured and processed more accurately and efficiently, resulting in a reduction in lost charges.<br>Theme 3: It was expected that this implementation would lead to a paperless environment (electronic storage and retrieval of information), resulting in the reduction of storage space. | |
| **Chief Executive Officers Shared Themes** | **Chief Information Officers' Shared Themes** |
| Theme 1: The implementation of an integrated system was expected to improve efficiency and productivity by enabling all departments to access it (revenue). | Theme 1: Through the use of efficient and accurate documentation, it was expected that staff accountability would be improved.<br>Theme 2: An integrated system accessible to all departments was expected to improve communication. |
| **Chief Executive Officers Unique Themes** | **Chief Information Officers Unique Themes** |
| Theme 1: In terms of future federal mandates for EMRs, staying ahead of the curve was expected to be beneficial. | Theme 1: Patients' charts should be easier to access and mandatory reporting should be easier to collect.<br>Theme 2: Improvements in compliance with clinical guidelines were expected to result.<br>Theme 3: Implementation committee members did not inform the CIO of the benefits expected. |

**Table No. 5. Electronic medical records: benefits to be expected**

| **CEOs and CIOs have similar themes** | |
|---|---|
| *Theme 1*: Currently, benefits cannot be quantified, but future returns on investment are expected to be captured.<br>*Theme 2*: The company assumed that its expected benefits had been realized, despite the absence of official measurements and documentation. The company assumed that they had achieved benefits such as improved documentation, medication reconciliation, patient safety, efficiency (process of care), access to and utilization of patient information, charging capture, and some cost savings. In spite of no significant changes in staffing, they were able to increase patient numbers and revenues.<br>*Theme 3*: EMR/EHR systems haven't been able to fully benefit the hospital due to resistance to change (e.g., computer literacy). | |
| **Chief Executive Officers Shared Themes** | **Chief Information Officers' Shared Themes** |
| None | *Theme 1*: Communication has been standardized, patient monitoring has been improved, and staff accountability has been improved.<br>*Theme 2*: As a result, reports of improvements cannot be officially commented on since the CIO wasn't involved in the measurements and documentation. |
| **Chief Executive Officers Unique Themes** | **Chief Information Officers Unique Themes** |
| *Theme 1*: Efforts to implement electronic medical records were perceived to be difficult to quantify by the CEO. | None |

## DISCUSSION

We gained an understanding of the perceived benefits and needs of EMR adoption in small rural hospitals in Iowa through interviews with the CEOs and CIOs of 15 CAHs. In spite of the limited sample size, the main themes of these interviews are in line with that of the limited previous research in a single primarily rural state. This significant investment in rural hospitals has rarely been examined in studies to date 37–39. In light of the available literature's tendency to focus on large,

urban, and teaching hospitals with EMR or EHR systems, these findings greatly expand current knowledge.

From the interviews, a predictable pattern emerges regarding how much CEOs and CIOs at specific hospitals share or differ on certain topics. Around half of the major themes were shared between CEO and CIO across the four questions. There might be a general agreement among CAHs because they are small in size and have a limited number of administrative staff members. The situation wasn't necessarily as it seemed. As well as discussing their hospital's performance and finances, the CEOs often discussed their hospital's position in relation to others. While CIOs were more concerned with customer satisfaction with HIT operations, CIOs typically tended to be more concerned with end-user satisfaction.

## CONCLUSIONS

From these interviews, it appeared that EMR rationales and expected benefits did not match realized benefits when acquiring them. As a result, small rural hospitals invested substantial time, money, and resources into implementing EMRs in high hopes, but they do not have much empirical evidence that these systems are beneficial to their patients.

As a result of this evidence, two key questions arise: 1) Why did small rural hospitals (CAHs) install EMRs before ARRA, and 2) Will small rural hospitals (CAHs) be able to install EHRs to meet the ARRA target dates, and if so, will the EHR implementation yield a return on investment? Due to the fact that many hospitals of any size are still unsure about the true return on investment of an electronic medical record, these questions are of importance 40.

EHRs that meet meaningful use criteria can benefit from incentives offered by the ARRA and avoid disincentives offered by it. In spite of the fact that the 15 CAHs interviewed are well ahead of the curve in implementing EMRs, they still have a long way to go before they achieve full EHR compliance as defined by ARRA. It is difficult for IT staff at these hospitals to implement additional system modules like CPOE when they are already attempting to maintain the current systems. Rural areas also report difficulty finding IT staff with knowledge of clinical or healthcare implementations. A number of healthcare IT professionals are being educated via grants offered through ARRA stimulus funds in order to reduce the shortage of skilled workers. A hospital that is just starting its selection and implementation of an EMR system may find it challenging to meet the requirements for meaningful use.

In order to achieve a true EHR system, vendor systems must be reengineered in order to create health information exchanges (HIEs). Vendors' claims of being able to exchange information with other vendors are questioned by KLAS, a company that evaluates healthcare vendor systems. KLAS notes that vendors have a hard time connecting all the discrete data elements of clinical information systems because of the way they are structured, stored, labeled, and shipped. Partially successful HIEs have chosen simple approaches and/or use the same vendor's systems to transmit clinical information. In addition to these concerns, there are still others concerning the financial viability of HIEs, security, privacy, and the consent of patients.

State or federal funds are responsible for financing approximately 70 percent of all HIEs. Hospitals will still need to upgrade their systems and purchase new equipment in order to meet the meaningful use requirements, even if vendors can make the necessary changes.

Thus, amid uncertainty regarding the value of EMRs, these 15 CAHs illustrate the trend toward incorporating EMRs gradually but steadily. While limited research or personal evidence showed that the EMR systems they adopted were effective, this costly transition gained wide acceptance among CAHs. As a result of the ARRA, critical access hospitals will be able to obtain electronic medical records more quickly, but meaningful use requirements will also pose some hurdles.

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