EMR Implementation In Community Hospitals:
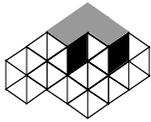
Critical Factors for Success

Sponsored by CPSI

Reported by Porter Research

January 2007

EXECUTIVE SUMMARY

"We've got 21st century medical practices, but (a) 19th century paperwork system,"
President Bush declared in a January 2005 speech at the National Institutes
of Health in Bethesda, Maryland. Nearly 24 months later, the substance of the
President's statement still holds true. However, hospitals investing in the safety
of their patients and care practices of their clinicians are working to change
that through the implementation of Electronic Medical Records (EMR). The
President continued, "...medical electronic records (are) going to be one of the
great innovations in medicine."

Computer Programs and Systems, Inc. (CPSI) wanted to better understand and benchmark
goals for and barriers to EMR implementation and validate early benefits experienced by
implementing hospitals in the rural and community setting. They contracted with Porter
Research, an Atlanta-based market research firm specializing in healthcare information
technology, to conduct primary market research with hospital leadership who have responsibility
for EMR implementation and it's performance.

The research was conducted from April to July 2006 through telephone-based interviews with
105 Managers, Directors, VP's and C-level executives with I.T., clinical, or financial responsibility
at rural- and community-based hospitals who have implemented an EMR. Approximately
seventy-three percent of the responding hospitals had implemented CPSI's ChartLink® EMR
portal. The remaining surveys were distributed among competitive solutions to increase the
studies validity and application across the market. Twenty-five percent of the responding
population had also implemented CPOE.

Respondents were introduced to the research with questions pertaining to the goals for and
barriers to EMR purchase and implementation:
- Improvements in "Patient Safety" and "Physician Access to Clinical Information" were the
  highest ranked implementation goals
- 48.6 percent pointed to "Resistance to Change" as the greatest barrier to actually deciding
  to pursue the implementation of an EMR
- Similarly, respondents indicated "Time" (61.5%) and "Lack of Internal Support" (33.7%) as
  the most common barriers to physician adoption
- Overall, respondents rated physician participation in implementation as average

When asked about the impact EMR usage has had on patient care at their hospital, 90
percent noted improvement and 74 percent described that as "considerable" or "significant."
In validating implementation triggers and goals, "Access to Clinical Information" received
mention by 75.2 percent of respondents as the most significant patient care benefit, a catalyst
for other improvements:
- Respondents agreed EMR/ CPOE implementation has lead to Improved Patient Safety,
  Communications with Patients, Outcomes, and Reduction in Medical Errors
- Other benefits to implementation were also noted and respondents strongly agreed that
  the implementation of EMR has provided them the tools to "Become Paperless"
- Organizations implementing CPOE noted improvements to Clinician Satisfaction,
  Pharmacy, Nursing, and Ancillary Workflows

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[1] Source: The White House, "President Participates in Conversation on Health Care," The White House,
http://www.whitehouse.gov/news/releases/2005/01/20050126-5.html
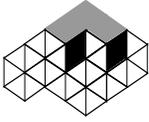
Furthermore, the research identified two contributing influencers driving heightened success of EMR implementation:

- Organizations rating Physician Participation in EMR Implementation as satisfactory noted significant improvements with overall satisfaction metrics and increased patient care benefits, but an EMR can be successfully implemented with varying levels of physician participation
- CPOE utilization appears to improve physician satisfaction with the EMR and accentuate patient care improvements

The implementation of EMR was a significant and positive step toward improving patient care in a large majority of the hospitals surveyed. Because the research focused on rural and community hospitals, typically smaller facilities based on bed-size, it was important to understand the impact of hospital size on the implementation. Not only did the research verify that these facilities can successfully implement an EMR but most respondents felt their size actually created advantages, like improved communications.

INTRODUCTION

This report was contracted by CPSI to release information from a 2006 market research study exploring the implementation of EMR and CPOE in rural- and community-based hospitals, including Critical Access Hospitals. Specifically, the research wanted to:
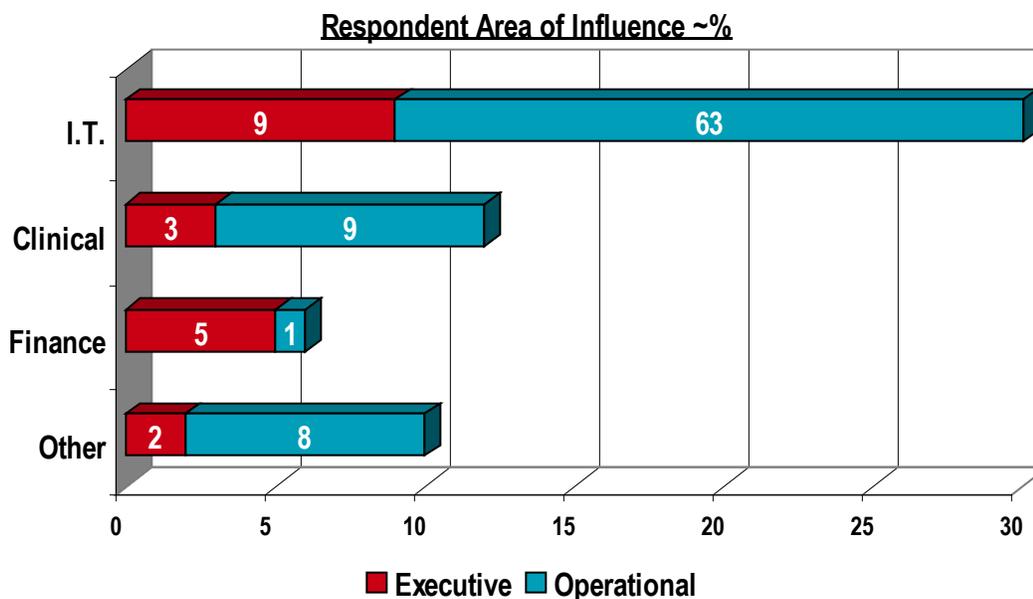
- Understand hospital goals for implementation
- Understand barriers to purchase and implementation
- Identify the perceived impact of hospital size on implementation
- Validate early impact on patient care and other benefits experienced by implementing hospitals
- Explore modifiers for implementation success

CPSI selected Porter Research - a healthcare I.T. focused market research and consulting firm - to conduct telephone-based interviews with 105 hospitals that have implemented an EMR. Responses were collected April 4th through July 27th, 2006, with both CPSI customers and non-customers of varying bed sizes:

Respondent Type/ Bed Size Category	Customer 77 (~73.3%)	Non-Customer 28 (~26.7%)
0-25 (~19%)	14 (~13.3%)	6 (~5.7%)
26-49 (~33.3%)	30 (~28.6%)	5 (~4.7%)
50-99 (~32.4%)	24 (~22.9%)	10 (~9.5%)
100-199 (~13.3%)	9 (~8.6%)	5 (~4.7%)
200 - 250 (~1.9%)	0 (~27%)	2 (~1.9%)
Sample Representation for Critical Access Hospitals		
CAH (~35.2%)	31 (~29.5%)	6 (~5.7%)

NOTE: Non-customers were using systems provided by Meditech (16), Dairyland (7), HMS (2), BlueWare (1), Cerner (1), and proprietary technology (1).

Respondents were selected based on having visibility to the implementation process and responsibility for post-implementation performance. Responses were collected from both Executives (C-, VP-level) and Operational (Directors, Managers) level respondents, mostly with I.T., Clinical, or Finance responsibility.

Respondent Area of Influence ~%

Area	Executive	Operational
I.T.	9	63
Clinical	3	9
Finance	5	1
Other	2	8

■ Executive ■ Operational

Background to the Study

An Electronic Medical Record, or EMR, is a longitudinal record of a patient consisting of data owned by a single provider. Generated as a by-product of daily health information system (HIS) functions, an EMR provides caregivers with immediate access to information relevant to that patient, impacting care and safety in real time. One major component of an EMR is Computerized Physician Order Entry (CPOE). CPOE enables caregivers to electronically place orders for medications, tests, or other therapies with clinical decision support.

The future of health information revolves around the development of the Electronic Health Record (EHR). In an EHR, data belongs to the patient rather than the provider and will be updated from the EMR of multiple providers. The Department of Health and Human Services is charged with carrying out President Bush's Executive Order mandating EHRs for all patients by the year 2014. The Office of the National Coordinator of Health Information Technology was established with the goal of accelerating the adoption of EMRs. The challenges of tying together EMRs in a cohesive EHR include the establishment of EMR certification requirements, development of interoperability standards, the development of a nationwide health information network, and identification of current laws and regulations that might impede progress toward achieving the goals of the Executive Order.

Certainly the future development of EMRs and EHRs will be entwined and the key driver for the participation in an EHR will be the successful implementation of an EMR. The forces shaping the direction of EMR/EHR developments are indeed powerful. The Certification Commission for Health Information Technology (CCHIT) EMR certification process is redefining the marketplace as healthcare information technology vendors adapt their products to achieve certification and remain competitive. Additionally, proposed changes in the healthcare regulatory environment, such as the modification of Stark and anti-kickback laws and the promotion of electronic prescribing, will have the effect of increasing physician participation and moving healthcare toward the realization of a national EHR.

Focus of White Paper

CPSI wanted to better understand and benchmark the implementation experiences of community hospitals using an EMR. The two main objectives of this study centered on:
1. Understanding the goals supporting the implementation of an EMR and barriers implementing hospitals needed to overcome.
2. Validating with primary research CPSI's claims to the impact implementation of an EMR can have on patient care and other aspects of the hospital's operating environment.

The data will show that community hospitals, including smaller critical access hospitals, have been able to successfully implement an EMR. In fact, respondents often felt their size actually created advantages throughout the implementation. Certainly, the research presents a validation of documented improvements to patient care and processes throughout the hospital. Hospitals with strong physician participation in EMR implementation and CPOE usage only accentuate the hospital's realized benefits.

HOSPITAL GOALS AND BARRIERS FOR EMR IMPLEMENTATION

Respondents were also asked to identify their goals for the implementation of an EMR and then to rank those goals from 1 (most important) to 3 (least important).

"Improve Patient Safety" received the highest average ranking (1.61 out of 3) and was ranked by the most respondents as the number one most important goal. "Improve Physician Access to Information" ranked second overall, at 1.79.

Please rank the top 3 identified goals for the implementation of the EMR

Goal	Average Ranking	% Of Respondents Identifying Goal
Improve Patient Safety	14 (~13.3%)	6 (~5.7%)
Improve Physician Access to Information	30 (~28.6%)	5 (~4.7%)
Reduce Dependence on Paper-based Documents	24 (~22.9%)	10 (~9.5%)
Physician Satisfaction	9 (~8.6%)	5 (~4.7%)

Barriers to EMR Evaluation and Purchase

CPSI also wanted to understand the barriers the average hospital has to overcome in order to actually decide to pursue the evaluation and purchase of an EMR. Two primary barriers were identified:

1   Resistance to Change: Largely cultural, physician and employee support, training, and lack of computer skills.

"Resistance to Change" was mentioned by nearly half of all respondents, at 48.6%.

> **"People not wanting to get rid of their paper. They still want that printed copy in hand."**
> *Alabama, Clinical Consultant, RN*

> **"…Resistance to change, mainly on the part of physicians. They're very reluctant to use technology. They resist computers even though a lot of them are moving toward or have already gone to EMR's in their practices. You have difficulty with them using the hospital systems."**
> *North Carolina, Clinical Systems Analyst*

2   Financial Constraints: Financial resources including costs and capital investment. Financial concerns seemed to decrease as bed size increased.

Noted by 33.3% of the sample, Financial Constraints is the second biggest obstacle to overcome.

> **"…We had to look at how we were going to get the right system in place with the budget we have."**
> *Michigan, Director of IT*

Although "Resistance to Change" is a consistent challenge throughout all responses, "Financial Constraints" are more pronounced as hospital bed size decreases. Both of these barriers are common to implementations of new technology.

Physician Cited Barriers to EMR Implementation

Next, the survey asked respondents what physician-cited barriers were given for the implementation and adoption of their EMR. "Time" was the most cited barrier, followed closely by elements related to "Fear of Change."
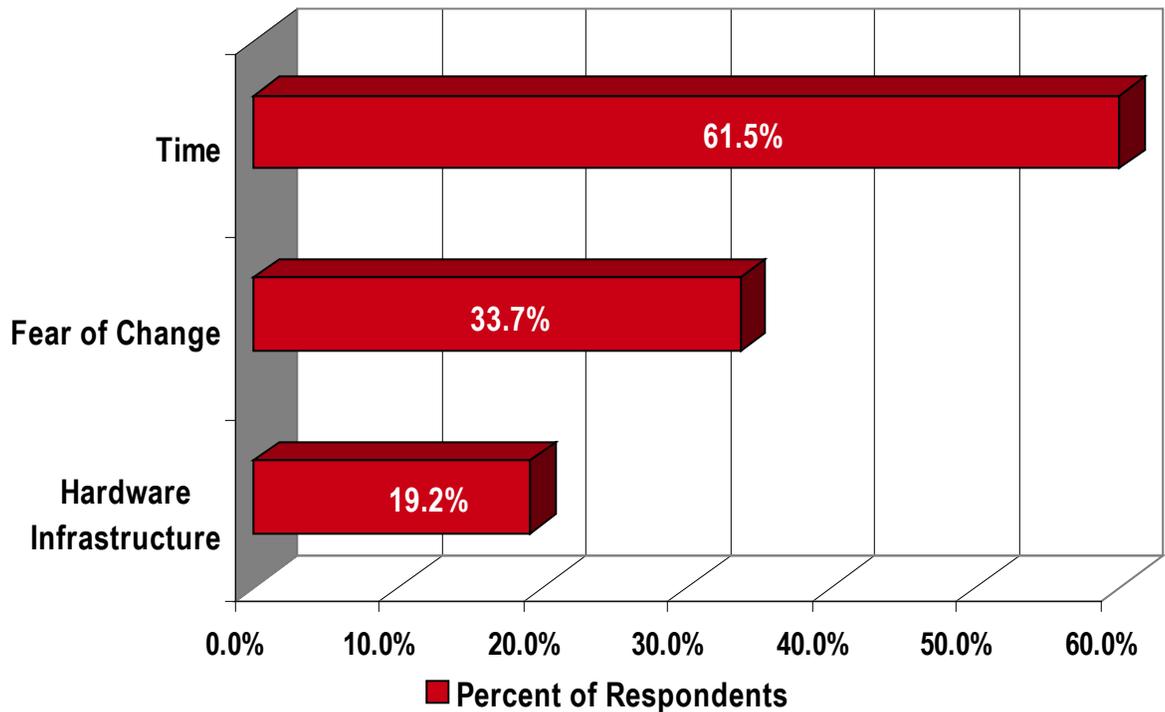
"Time" was typically referring to the time required for training and lack of perceived return on time invested.

"The biggest thing was finding times when they could be trained. As we rolled it out we wanted to offer as many solutions as we could to get them trained so we had people up on the floor at certain times, we held classes at night, a lot of times people didn't show up, so I think the biggest thing was trying to find times that would work for the physicians."   *Maine, Director of Operations*

"There is not advantage for them, there is no money incentive, there is not time incentive, even though I was careful to present it to them as best I could, 'if you can do this at home and prepare yourself for your rounds then during rounds you could actually spend more time with your patient than with your nurse trying to get the data."   *Illinois, Manager of Information Systems*

"Fear of Change" was largely defined as physician experience and comfort with using technology or resistance to workflow process reengineering.

"Lack of comfort working with the computer. The physicians were not familiar/ comfortable using the computer, especially the older physicians."   *Kentucky, Director IS*

"They had used paper forever and that is the way they always got their records and they are used to having something in their hands that is on the screen now."   *Kansas, Network Administrator*

The least mentioned physician-cited barrier, "Lack of Hardware Infrastructure" was typically defined as speed of access and infrastructure at the hospital, physician offices and home.

Physician Participation in Implementation

Next, the survey worked to further map physician participation in the implementation of the EMR. A key practice with the implementation of any EMR is to select an initial core group of physicians for the implementation and rollout of the application:

Did the facility select an initial core group of physicians for the EMR implementation?
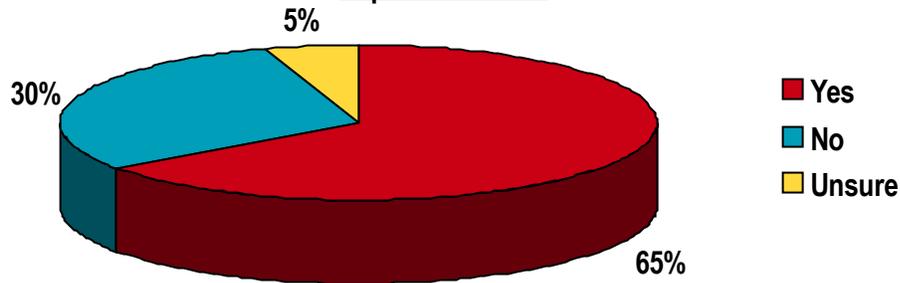
Approximately 65% of responding organizations selected an initial core group of physicians for the EMR implementation. The average number of participating physicians was 4.7.

Respondents were also asked to rate overall physician participation in the implementation process, regardless of whether or not a core group was selected, using a scale from 1 ("Poor") to 5 ("Excellent"). The average hospital rated it a 3.11, or just above acceptable. As we'll see later, physician participation in EMR implementation is a key driver to maximizing overall impact.

Effect of Hospital Size on Implementation

CPSI wanted to better understand the role hospital size played in implementation from the sample, since the research targeted traditionally smaller bed size hospitals in the rural, community and critical access segments.

Less than 25% of all respondents felt the size of their organization created any barriers to implementation of their EMR, and those barriers were in accordance with the overall barriers mentioned by the sample: financial and personnel resources.

> *"If we were larger we would probably have staff on hand to be able to easier deal with the implementation process."* **Colorado, CEO**

> *"I think we are at a cross roads. We have too much technology to stay the same and we are too small to grow. Stuck in the middle. We always have to cut cost but it's hard to add staff but yet we need staff to make it successful."* **Maine, IT Director**

Conversely, 62.9% felt their hospital created advantages during EMR implementation, mostly citing improved communications to facilitate quick response, decision-making, and training.

> *"I think because we had a smaller staff to both train and troubleshoot with I think that made it easier for us... not having 300 people you had to train, just a smaller group and you could do more one on one training instead of having a larger class with maybe not as much individual training."* **Illinois, Marketing Services Director**

> *"Simply scale. A larger hospital translates into a larger medical staff and it's the medical staff that is going to be the limiting factor. They're the ones that you have to win over. The more you have to win over, the harder it's going to be."* **North Carolina, Clinical Systems Analyst**

Overall, it appears that hospitals in our sample tended to believe their size contributed more in the way of advantages than disadvantages during the EMR implementation process.

IMPLEMENTATION OF CPOE IN THE SAMPLE

Approximately 25% of the sample population has implemented CPOE as a component of their EMR. CPSI customers were more likely to have implemented at this stage at 30.3%, compared to 10.7% for non-customers. Meditech and Dairyland were the only competitive solutions utilized.

Has your organization implemented a Computerized Physician Order Entry (CPOE) product?

- 2%
- 25%
- Yes
- No
- Unsure
- 73%
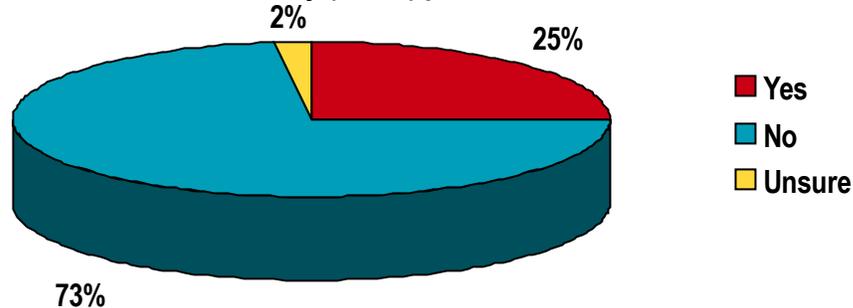
Physician Barriers to Participation in CPOE Implementation

Perceived physician barriers to CPOE implementation and adoption are consistent with those cited for EMR implementation, as "Time" was again the most mentioned, at 84.6%.

> **"The learning curve. They didn't want to take the time to learn."** *Tennessee, Nursing Informatics*

> **"It was hard to get them out here. A lot of physicians had prior engagements."**
> *Florida, Interim Director of MIS*

Overall satisfaction with physician participation in CPOE implementation was rated 3.08, just above acceptable.

VALIDATING IMPACTS AND BENEFITS OF EMR/ CPOE IMPLEMENTATION

Overall, the responding sample has realized substantial benefits through the implementation of their EMR and CPOE. Specifically, organizations have experienced direct impacts on patient care and improvements in other organizational processes of the hospital environment.

Access to Clinical Information as a Driver for Improved Patient Care

When asked what was considered to be of the greatest benefit to patient care provided through usage of the hospital's EMR, "Access to Clinical Information" was directly mentioned by 75.2% of respondents. It was viewed as a driver to Improved Patient Safety, Decreased Errors, Process Efficiencies, and Communication.

Most respondents pointed to physician's being able to access timely, relevant information on their patients while others mentioned increased timeliness of result data and improved flexibility in how data is accessed and reported. Accessibility to a patient's previous records was of primary consideration.

> **"The access to results such as radiology, lab, or pathology for the physician does not require him to go through several channels so it's available at the time he is seeing the patient in his office. The records don't stack up in the department. The physicians could look to see if they have dictated and specified reports."** *Arkansas, IT Director*

Respondents saw a direct correlation between enhanced access to patient information and follow-up to improve patient care.

> "I can't really quantify it but giving physicians remote access to information is much quicker. They are able to be on top of their patient's vitals long before they get a call from the nurse if something changes. They already know about it if they were watching the system."   *Oregon, Director of IT*

> "Patient care does not stop when the physician leaves the patient's room. I'll give you a really good example. Our physicians actually monitor their patients 24/7. One of our physicians takes his laptop to every meeting and he is constantly dialoging with the nurses and monitoring care and directing orders. His outcomes are some of the best."   *Indiana, Director of IS*

Verified Patient Care Benefits

When asked about the impact EMR usage has had on patient care at their hospital, 90% noted improvement and 74% described that as "considerable" or "significant," the two highest potential responses.

Improved Patient Safety received the most overall agreement within the sample as a specific benefit realized through the use of an EMR. Rated as a 3.47 on a 1 to 5 scale, there was significant agreement within the population. More than 55.7% rated their agreement above this average.

> "We have documented improved patient safety."   *Maine, CIO*

Respondents have also experienced Reduction in Medical Errors through improved legibility and transcription, also receiving significant agreement through the sample, with an average rating of 3.36 of out of 5. Responding above the average, more than 52.4% of the population rated it a 4 or 5.

> "It's easier for a nurse when a physician orders medicines because it takes out the legibility problem and transcription. Two possible areas for error are eliminated."   *Tennessee, Nursing Informatics*

Improved Outcomes were directly cited within the population, too, with the specific agreement rated as 3.32 on the same 5-point scale.

> "From a healthcare standpoint it improves patient safety and the potential for a positive outcome."   *Arkansas, I.T. Director*

Only slightly less significant, Improved Patient Communications received moderate mention, rated 3.15. Most respondents attributed this to increased face time with the patient.

> "I would say it's increased the amount of time that the doctor can spend with the patient versus looking through the paper chart while he's with the patient. He can look at all of that information before he goes and sees the patient."   *Iowa, IT Director*

Other Benefits of EMR Usage

The study also worked to validate how EMR usage has impacted workflow processes and other aspects of the hospital's operations. Respondents were asked to rate their agreement with each of the following statements in terms of how much they agree with each of the following statements regarding how the usage of an EMR has impacted their hospital.

4.01   **The EMR has provided my hospital with the tools to begin eliminating paper processes and work to become paperless.**

Other benefits related to workflow processes, mostly of physicians, and how employees communicate.

**3.57**   The EMR has improved physician flexibility (work from home, etc.).

3.28   The EMR has improved inter-departmental communications.

3.11   My physicians rely on the EMR to get most of their clinical information.

Certainly, implementing hospitals agree that EMR usage has had a positive impact on workflow and operations for clinicians and other hospital employees.

Validated Benefits of CPOE Implementation

Again, respondents were asked to rate their agreement with how the usage of CPOE has impacted their hospital on a scale from 1 to 5. Overall, there was agreement among that sample related to improvements in Ancillary, Nursing and Pharmacy Workflow. Improvements in overall Clinician Satisfaction were also noted.

Ancillary Workflow	Nursing Workflow	Pharmacy Workflow	Clinician Satisfaction
3.60	3.52	3.24	3.14
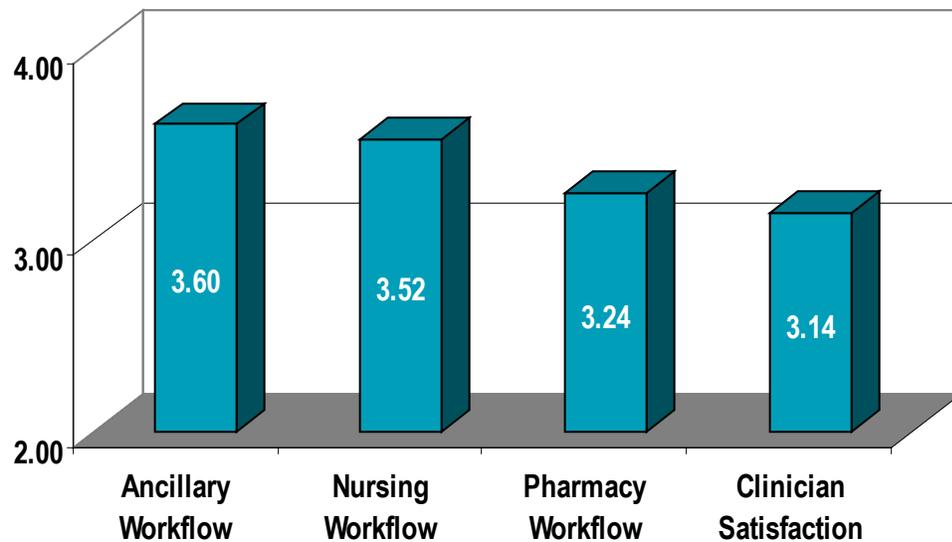
Improved Ancillary Workflow appears to be of the most immediate impact, rated with strong agreement at 3.60. More than 60% of respondents rated this metric above average.

> **"It improved morale and workflow for ancillary departments, who no longer having to enter those orders after a physician has written them."** *West Virginia, Director of Electronic Information*

Also of impact, Improved Nursing Workflow received relatively strong agreement, rated at 3.52.

> **"I think it gets the information to the physician in a timely manner. I think it's reduced phone calls to the nursing staff because he can view that himself and send in the orders. I think it has reduced the communication time with nurses."** *Alabama, Data Processing Manager*

At a rating of 3.24, there was moderate agreement that CPOE Improved Pharmacy Workflow.

> **"For CPOE, it's easier. It's a streamlined ordering process where you are taking out the unit secretary out of part of that loop. So, orders for medicine go directly to pharmacy and directly to a MAR."** *Alabama, Clinical Consultant, RN*

To a slightly lesser extent, there was overall agreement that CPOE usage "Has Improved Overall Clinician Satisfaction."

CONCLUSION

Undoubtedly, hospitals implementing EMR's have documented improvements in patient care and workflow. An improvement in "Patient Safety" and "Physician Access to Information" were the most mentioned goals for EMR implementation. More than 75% of respondents mentioned "Access to Clinical Information" as the chief benefit realized through their implementation.

The more efficient "Access to Clinical Information" gained through the implementation of an EMR appears to be a key driver in overall satisfaction and meeting patient care goals. Ninety-percent of respondents noted improvements in patient care, while 74% stated it was "considerable" to "significant." Participants verified these patient-care benefits through documented improvements in Patient Safety, Outcomes, Patient Communications, and Reductions in Medical Error.

These findings alone are compelling evidence these hospitals are well on their way to meeting implementation goals. In fact, 57.7% of all respondents felt they'd already met their implementation goals, with another 29.4% feeling they were moving in the right direction.

The EMR has also driven workflow improvements, providing hospitals with tools to become paperless and improving both Physician Flexibility and Inter-Departmental Communications. Similarly, organizations implementing CPOE documented improvements in Ancillary Workflow, Nursing Workflow, Pharmacy Workflow, and Overall Clinician Satisfaction.
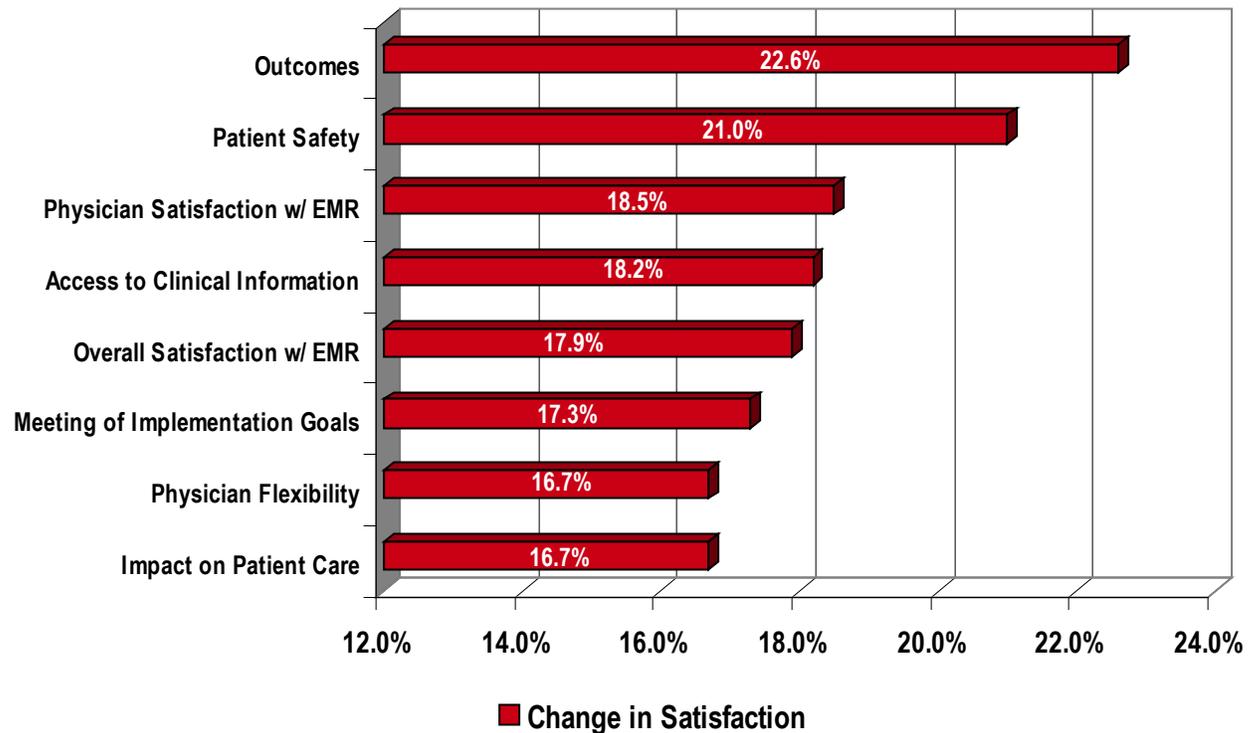
Nonetheless, there appear to be two modifiers for strengthening the impact an EMR's usage has to the hospital: implementation of CPOE and strong physician participation in implementation.

The following graph demonstrates the percentage increase of EMR satisfaction and/ or effectiveness when respondents had also implemented a CPOE.
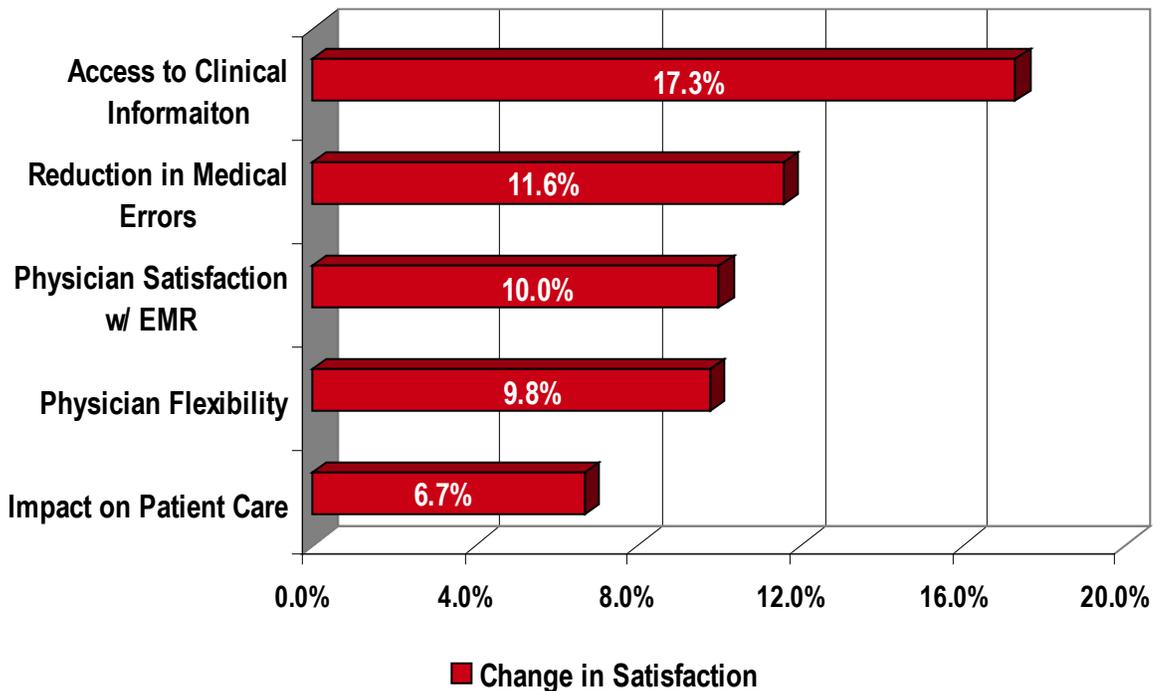
A marked increase of 10% in Physician Satisfaction with the EMR is most likely directly related to the two most substantial improvements: a 17.3% increase in Access to Clinical Information and 9.8% increase in Physician Flexibility. Physicians aren't the only ones seeing the benefit, though, as respondents utilizing CPOE also noted improvements in the EMR's impact on patient care and a further reduction in medical errors.

Similarly, the graph below demonstrates the percentage increase of EMR satisfaction and/ or effectiveness when physician participation in EMR implementation was rated a 4 or a 5 of a scale of 1 (poor) to 5 (excellent). This should be considered "satisfactory" participation.

| Category	Change in Satisfaction
Outcomes	22.6%
Patient Safety	21.0%
Physician Satisfaction w/ EMR	18.5%
Access to Clinical Information	18.2%
Overall Satisfaction w/ EMR	17.9%
Meeting of Implementation Goals	17.3%
Physician Flexibility	16.7%
Impact on Patient Care	16.7%

■ Change in Satisfaction

The patient care benefits of the EMR become even more pronounced as physicians become more involved in the EMR implementation process, in the way of Improved Outcomes and Patient Safety. Additionally, Physician Satisfaction likely increases due to improved access to clinical information and flexibility.

Ultimately, hospitals are 17.3% more likely to hit their implementation goals early and 17.9% more likely to be satisfied with their EMR when physicians have at least satisfactory participation in implementation. However, it is important to note that the EMR can and has been successfully implemented in hospitals with lower levels of physician satisfaction and without CPOE.

Not only are community and critical access hospitals successfully implementing an EMR and realizing the benefits of doing so but most of the respondents felt that their hospital's size created advantages in the implementation process. Respondents felt they're better equipped to make and act on decisions, communicate with their staff, and accomplish the needed training.

Certainly, these community hospitals are making a positive impact on patient care and operations through the implementation of an EMR. These gains are even more pronounced with CPOE implementation and as physicians take a more active role in implementation.
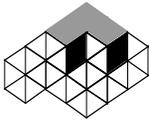
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About Computer Programs and Systems, Inc.

CPSI is a leading provider of healthcare information solutions for community hospitals with over 600 client hospitals in 46 states. Founded in 1979, the Company is a single-source vendor providing comprehensive software and hardware products, complemented by complete installation services and extensive support. Its fully integrated, enterprise-wide system automates clinical and financial data management in each of the primary functional areas of a hospital. CPSI's staff of over 800 technical, healthcare and medical professionals provides system implementation and continuing support services as part of a comprehensive program designed to respond to clients' information needs in a constantly changing healthcare environment. For more information, visit www.cpsinet.com.

About Porter Research

Since 1989, Porter Research has delivered the needed knowledge to the healthcare information technology industry. Senior executives with world-class sales and marketing experience at major healthcare I.T. companies lead a team of veteran market research specialists to conduct more than 7,000 annual research interviews with decision makers and influencers at all levels of healthcare delivery, from physician offices and hospitals to payers. Our custom B2B market research products enable our customers to develop plans and strategies to take to the market, validate opportunities to improve sales success, and ultimately increase customer satisfaction. For more information, visit www.porterresearch.com.