

FULL APPLICATION

DAVIES AWARD PROGRAM



Citizens Memorial Healthcare

1500 N. Oakland, Bolivar, Missouri 65613

Project Infocare Highlights

Electronic Medical Record across the continuum of care, including hospital, long term care, home care and physician clinics.

100% use of CPOE by admitting physicians in hospital and long term care. 100% use of online multidisciplinary care and medication administration documentation.

“Chartless” – no paper charts maintained in the hospital.

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PROJECT INFOCARE

Citizens Memorial Healthcare (CMH) is an integrated rural health care delivery system with 1,538 employees and 98 physicians. The system includes one hospital, five long term care facilities, 16 physician clinics and home care services. The EMR/CPOE project at CMH is known as Project Infocare. The EMR crosses the continuum of care and is used by 100% of admitting physicians. The hospital is chartless – no paper charts are maintained.

MANAGEMENT

System Planning. Formal planning resulted in a clear vision that supports CMH organizational objectives. The system selection process was employee-driven and benefited from full administrative support. An integration strategy for system acquisition was adopted. MEDITECH was selected as the primary vendor. The system also includes PACS.

Implementation. Implementation planning created consensus on priorities. Implementation was phased with these milestones: Kick Off-March 2002, first applications-October 2002, paperless with full use of EMR and CPOE in the hospital-December 2003, fifth and final long term care facility live with CPOE-February 2005. CMH used cross-departmental teams during implementation that were successful by giving equal loyalty to the project and their home departments. Physician training was provided one-on-one and functionality was personalized.

Operations. Most data is collected through direct entry by physicians and caregivers. Other data is interfaced or scanned. Support is provided by IS Specialists and Superusers, who still provide physician support on the nursing floors during morning rounds. The EMR and CPOE continue to evolve with added functionality.

FUNCTIONALITY

Targeted Processes. CMH targeted the elimination of paper in favor of queryable data and was seeking improvement in registration, scheduling, physician access to information, care documentation, charge capture processes and coordination of care across care settings.

Information Access. The EMR is an integrated, longitudinal health record across the continuum of care at CMH. User-specific views are determined by roles.

Decision Support. Decision support is provided in the EMR and during CPOE, including allergy and interaction checking, presentation of pertinent lab results, order-specific rules, order sets and knowledge bases.

Workflow & Communication. Data is immediately transferred within the system and is available in all units and facilities. There is no need to copy records or re-enter data upon transfer.

Other Functionality. The system is fully integrated with financial applications.

Patient Safety. The system supports patient safety by eliminating handwriting/transcription errors, by requiring completeness of orders, through clinical decision support, and by providing access to clinical information and a patient medical history.

System Use. In a one-hour sample from May 2, 2005, 115 users launched 1,260 requests to the EMR and information was delivered on 1,074 visits for 352 patients from eight different facilities. The EMR for the most popular patient in the hour was accessed by six different users from six different locations.

TECHNOLOGY

A network backbone and 50 servers support networks connecting 33 buildings with wired and wireless access. Remote access is provided by Citrix Secure Gateway. Project Infocare meets HIPAA requirements. CMH uses HL7 interfaces for the data not directly entered into the EMR. The Project Infocare EMR is widely available. Downtime planning, along with backup and data protection procedures safeguard the EMR and assure constant availability of patient care data.

VALUE

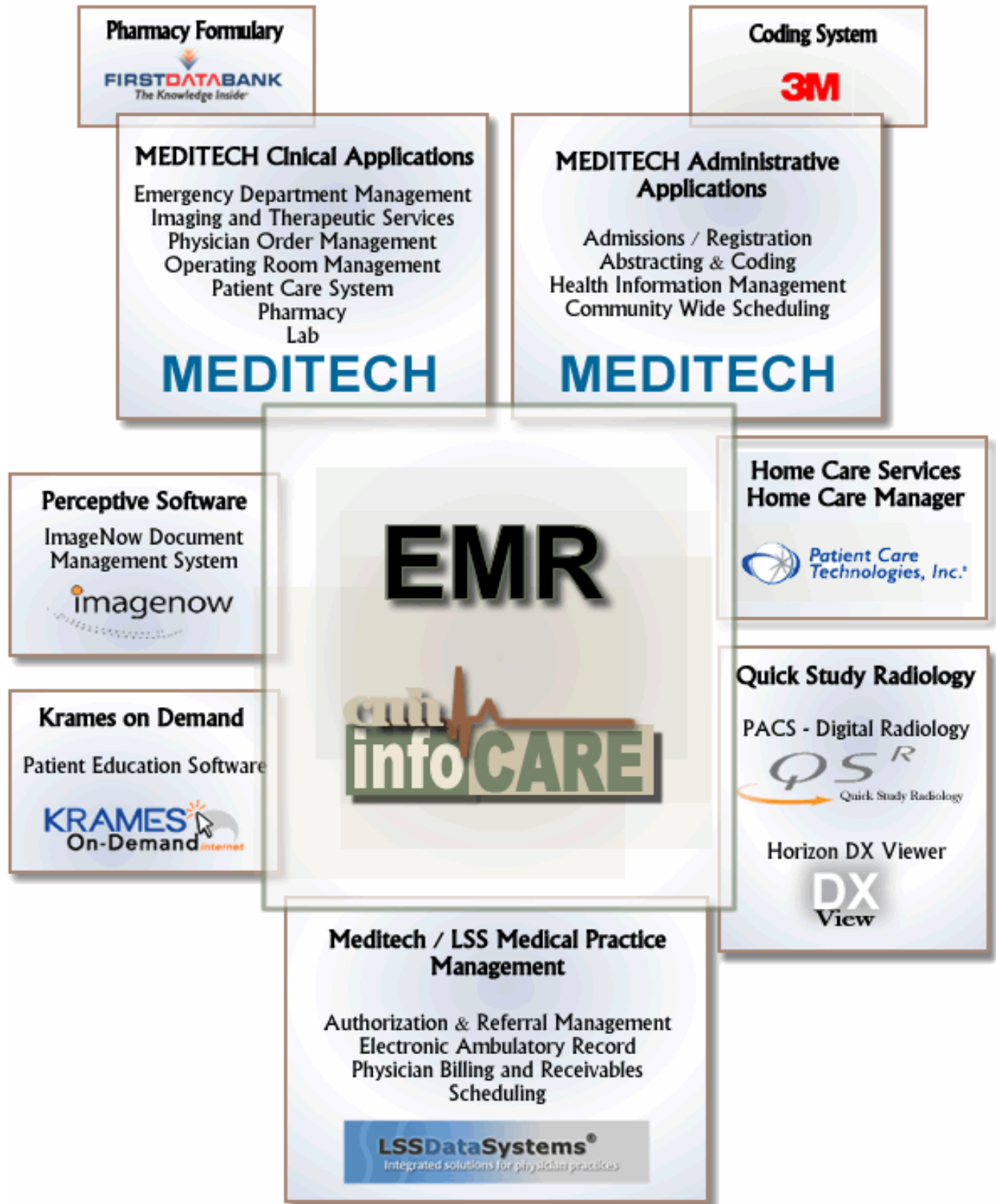
Business Case. Since the implementation of Project Infocare, CMH has experienced an increase in Adjusted Occupied Beds and in net patient revenue, a decrease in FTE's per Adjusted Occupied Bed, and elimination of medical records scanning/microfilming costs

Process Improvement. 92% of patients registered are "known to the system" and therefore not asked to repeat demographic information. 20,000 bar-coded Express Registration cards have been issued. More than one half of radiology exams are scheduled directly by a physician office. 64,860 patient records have been created in the EMR. A unique EMR identification number links visits together. Physicians are able to view individual visits, multiple visits or all visits in one comprehensive online chart. Over \$1,000,000 in supply and procedure charges are captured per month as a byproduct of care documentation. "Yellow-sticker-charging" has been eliminated from hospital inpatient floors.

Surprise Benefits. CMH has also experienced an improvement in the revenue cycle through a decrease in accounts receivable for the CMH physician clinics, an increase in supply charges per patient day, and a decrease in claim denials.

Thank you for the opportunity to participate in the Davies Award Application process.

GRAPHIC OF SYSTEM



PROJECT INFOCARE EMR

Select Source

Back

Citizen's Memorial Healthcare
 Citizen's Memorial Healthcare LTC

Exit

- Admitted
- My | Group
- Admitted LTC
- My | Group
- Emergency Dept
- My | Group
- Other

Select Facility

Back

Citizens Memorial Hospital
 Cmhc Clinics
 Home Care Services

Exit

- Admitted
- My | Group
- Admitted LTC
- My | Group
- Emergency Dept
- My | Group
- Other
- My | Group
- How Results
- Recent Access
- Personal

Intensive Care Unit

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PATIENT NAMES HERE

EMR#	HubLive0047753
MR#	HS00208776
EMR#	HubLive0047872
MR#	HS00208812
38 M	EMR# HubLive0030049
MR#	HS00206446, CL00015436
EMR#	HubLive0007945
MR#	HS00106320, CL00029141...
M	EMR# HubLive0010077
MR#	HS00153672, CL00000637

Exit

- Admitted
- My | Group
- Admitted LTC
- My | Group
- Emergency Dept
- My | Group
- Other
- My | Group
- How Results
- Recent Access
- Personal
- List | Report
- Any Location
- Any Record
- Rounds Report
- My | Group
- Sign Documents

Visits by date

Apr 20, 2004	Angina	Acct#	H00000107255
Citizens Memorial Hospital - Intensive Care Unit - ICU-41			
Provider Practice Visits			
		Acct#	CA0000030328
Cmh Clinics - Humansville Family Medical Cen			
Mar 6, 2004	Ambulance Only	Acct#	H00000099734
Citizens Memorial Hospital - Ambulance			
Mar 6, 2004	Pneumonia	Acct#	H00000099121
Citizens Memorial Hospital - Discharged: Mar 15, 2004			
Feb 6, 2004	Ambulance Only	Acct#	H00000094313
Citizens Memorial Hospital - Ambulance			
Feb 6, 2004	Ambulance Only	Acct#	H00000094309

Other Record

- Visits by date
- Visits by diagnosis
- View "M" visits
- List "M" visits
- View all visits
- Summary List
- Allergies
- View PCI
- Moved to other Records
- Add to personal list
- Suspend
- Help

24 Hour - Wednesday Vital Signs

Saturday Sunday Monday Tuesday Wednesday

Vital Signs Intake & Output Laboratory Reports

	12-4a	4-8a	8-12M	12-4p	4-8p	8-12M	
Temp							Max: 97.1 Min: 97.0
BP							Max: * 168/65 Min: * 121/45
Pulse							Max: * 98 Min: * 72
Resp Rate							Max: 20 Min: 20
Pulse Ox							Max: Min:

Other Record | Visit | Exit

- My Panel
- 24 Hour
- Vital Signs
- I & O
- Notes
- Medications
- Order
- Order History
- Allergies
- Laboratory
- Microbiology
- Blood Bank
- Pathology
- Imaging
- Other Reports
- Care Trends
- Care Activity
- History
- Summary
- Encounters
- Referrals
- Graph
- Print Screen
- Suspend
- Help
- Other Menu

MANAGEMENT

1. SYSTEM PLANNING

ABOUT CMH

Facilities and services. Map of where EMR is implemented. Number of physicians and end users.

Citizens Memorial Healthcare is an integrated rural health care delivery system serving a population of 80,000 in Southwest Missouri. Citizens Memorial Healthcare (CMH) is made up of two corporate entities. Citizens Memorial Hospital is a Missouri public hospital district and Citizens Memorial Health Care Foundation is a related 501(c)3 non profit corporation.

SERVICES

- Hospital. 74-bed acute care hospital including 48 Medical/Surgical/Swing Beds, 8 ICU/Telemetry beds, 8 Obstetrics beds (The BirthPlace) and 10 Geriatric Psychiatric beds (The Wellness Unit).
- Emergency Services. Level III Trauma Center and Ambulance services for two counties. Hosted air ambulance service in cooperation with a tertiary hospital.
- Outpatient Services. Surgery, rehabilitation therapies, cardiology, ancillary services, sports medicine and visiting specialist clinics.
- Home Care Services. Home Health, Hospice, Home Medical Equipment, Homemaker Plus services and Health Transit services.
- Physician Clinics. A total of 16 rural physician clinics, including 11 primary care certified rural health clinics, one orthopedic clinic, one general surgery clinic, one ophthalmology clinic, one podiatry clinic and one pain management clinic.
- Long Term Care. Five long term care facilities with a total of 476 beds and one residential care facility with 60 beds.

EMPLOYEES

NUMBER OF EMPLOYEES	#
Hospital Services	607
CMH Physician Clinics	170
Home Care Services	122
Long Term Care	
Citizens Memorial Health Care Facility	117
Parkview Health Care Facility	96
Colonial Springs Health Care Facility	115
Community Springs Health Care Facility	100
Ash Grove Health Care Facility	86
Butterfield Residential Care Facility	21
Support & Administration	104
TOTAL EMPLOYEES	1,538

CMH opened in 1982 with 53 beds and 90 employees. 25 of those employees are still employed at CMH today.

Half of employees eligible for the CMH Career Ladder program are participating by attaining advanced education or certification.

Donald J. Babb, CEO, was awarded the American Hospital Association Shirley Ann Munroe Leadership Development Award in 1997 for expanding community outreach and creating a fully integrated health care delivery system in Bolivar, Missouri.

PROVIDERS

CMH has 98 physicians credentialed to serve patients in their facilities. Of the 98 physicians on staff, 45 admit patients to the hospital or long term care facilities, eight are Emergency Department physicians and 45 are consulting and outpatient physicians. Recently, 21 of CMH’s physicians were named as “Top Docs” in a regional survey of their peers. CMH physicians were recognized in these categories: Cardiology, Endocrinology, Family Practice, Geriatric Medicine, Gynecology, Ophthalmology, Orthopedics, Pediatrics, Primary Care, Emergency Medicine and Radiology. 27 of the physicians are employed, 71 are independent.

PATIENT STATISTICS

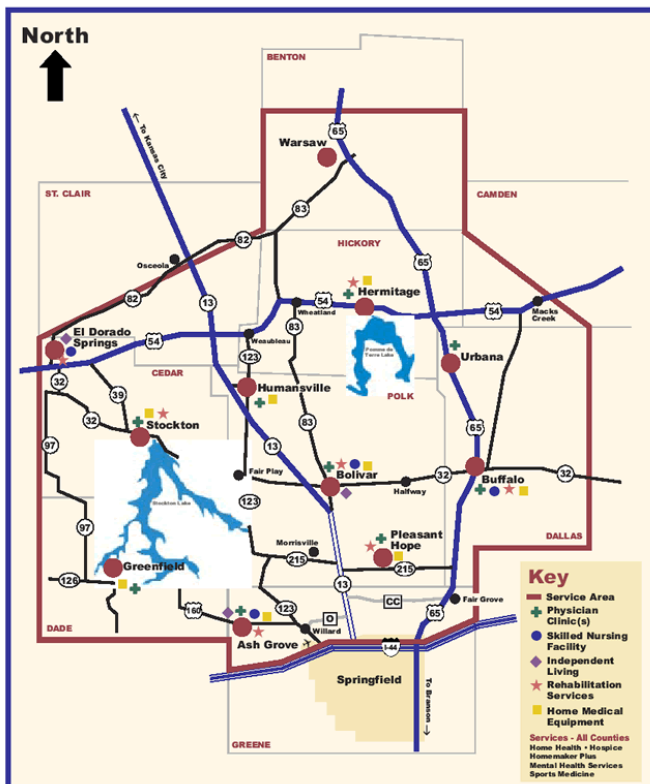
HOSPITAL CENSUS		
	Beds	Average Census
Medical/Surgical	46	24
ICU/Telemetry	10	6
OB & Nursery	8	6
Geriatric Psychiatry	10	6
TOTAL	74	42

ANNUAL STATISTICS	
	#
Emergency Department Visits	19,888
CMH Physician Clinic Visits	130,031
Surgeries	2,776
Births	464
Home Care Visits	14,455
Long Term Care Daily Census	423

GOVERNANCE

CMH is governed by an elected Board of Directors with six members. Board Members serve six year terms. The hospital district was formed by a vote of the district in 1978. CMH opened in 1982. The Chairman of the Board of Directors who was elected in 1978 still serves as Chair today.

Service Area Map



Citizens Memorial Health Care Foundation is a related foundation. The CMH Foundation operates five long term care facilities. The Foundation is governed by an appointed Board of Directors with nine members. One member is common to both the Hospital and Foundation boards. The CEO of the hospital also serves as Executive Director of the Foundation and is a voting member of the Foundation Board.

PROJECT INFOCARE EMR LOCATIONS

The Project Infocare EMR is available on the CMH network in the hospital, in 16 physician clinics, in five skilled nursing (long term care) facilities, in all rehabilitation services locations and at the Home Medical Equipment site. All 45 providers who admit to the hospital or long term care facilities are actively using the EMR to provide care. All other providers are trained in the use of the EMR and access it as needed. About half of non-admitting providers access the EMR occasionally. In addition, the EMR is available in three independent physician clinics whose physicians admit to CMH. The EMR is also available by remote access. 15 physicians have taken advantage of remote access and regularly use the EMR from home.

CMH STRATEGIC OBJECTIVES

Strategic objectives for CMH and how they guided the strategy for Project Infocare.

CMH strategic objectives are the result of planning and collaboration of a Strategic Planning Team that includes Administration, Management Staff, Board of Directors and Medical Staff.

CMH objectives and strategies fall into four broad categories:

- Quality of Care and Service Excellence through master facility expansion, medical staff recruitment and development, clinical program development and quality improvement efforts.
- People Focus through recruitment of qualified staff, development of existing staff, and retention.
- Financial Strength through productivity improvements, medical staff engagement in financial efforts, and accuracy and completeness in documentation and coding.
- Market Development through the implementation of a comprehensive marketing plan and improved access to care in all areas.

During the development and revision of these objectives and strategies in 1999, the Strategic Planning Team questioned the ability of the organization's information systems infrastructure to support the resulting initiatives across the continuum of care. As a result, they initiated an IT assessment and planning process.

When that assessment began in April of 2000, the extent of computerization at CMH was a 1970's hospital billing and registration package running on an AS400 maintained and modified by a small staff of programmers. There were separate software packages operating in the hospital lab and pharmacy. CMH also maintained billing software for the CMH Physician Clinics. CMH did not have any nursing documentation online. All medical records were written or printed on paper.

PROJECT INFOCARE GOALS

Project Infocare goals and their relationship to organizational strategic objectives.

During IS strategic planning, these broad IT Strategies were adopted to align with and support organization strategic objectives and initiatives:

- Enhance Access to Care
- Improve Continuity of Care
- Provide Physician Connectivity
- Gain Operational Efficiency
- Support Facility & Services Expansion
- Push Quality/Performance Improvement

PROJECT INFOCARE VISION

Process by which the Project Infocare vision was developed, reviewed, accepted and communicated.

The name Project Infocare was adopted and this vision statement was formalized during planning:

- Project Infocare will be implemented to enable a patient to enter anywhere into the continuum of care and have a personal identity that is maintained across that continuum.
- Physicians and other caregivers will have access to all of that patient's medical information within the healthcare continuum.

- Health care providers will be able to document efficiently and safely within the software system. Providers will be supported by clinical decision support that will prevent medical errors and improve adherence to standards of care. Providers will be able to spend more time with patients.
- The community will realize the benefit of the investment of time, talent and money in Project Infocare by enabling the healthcare continuum to become technologically advanced and poised to grow to meet demand and offer new services to current patients and to the community at large.

The vision was developed by the IS Steering Committee and ratified by the CMH Board of Directors. The vision was promoted through newsletters and training materials. The Project Infocare vision is still presented to all new employees during general orientation.

PROJECT INFOCARE LEADERSHIP

Involvement of governing boards and executives in defining, guiding and supporting Project Infocare.

The CEO, COO, and CFO actively served on the IS Steering Committee. Board Members and Medical Staff Members were invited to participate in all product demonstrations. To ensure that the Board Members and Medical Staff were fully aware and supportive of the recommendations of the IS Steering Committee, a special demonstration by the preferred vendor (MEDITECH) was provided to a full joint meeting of the Board and Medical Staff and their consensus of support was obtained. A visit to the corporate offices at MEDITECH included the CEO and Chairman of the Board of Directors.

In addition, the CEO for CMH (who has been recognized many times for his visionary leadership), was the keynote speaker for the Project Infocare implementation kick off. He expressed confidence in the success of the implementation and the positive impact it would have on patient care, quality, and service.

PROJECT INFOCARE GOVERNANCE

IS Steering Committee. Composition, roles and responsibilities, decision-making authority.

CMH has one IS Steering Committee. This Committee was the driving force behind the planning and implementation of Project Infocare and continues to provide guidance and long-term planning and budgeting for IS initiatives. Membership on the IS Steering Committee is specifically designed to include clinical, non-clinical and financial representation, as well as representation across the continuum of care (hospital, long term care, home care and physician clinics). IS Steering Committee members are:

Chief Executive Officer	Director of Finance, CMH Foundation
Physician Champion	Director of Finance, CMH
Chief Information Officer	Director of Home Care Services
Chief Operating Officer	Director of Butterfield Residential Care Facility
Director of Physician Clinics	HCIS Manager
Director of Clinical Services	Network and Support Manager

During planning, IS Steering Committee members recruited team members and led discussions to develop functional requirements for requests for proposal (RFP) that were distributed. They scheduled demonstrations and recruited participation and evaluation of vendors. They analyzed responses to the RFP and the results of employee evaluations of vendor demonstrations. These IS Steering Committee members participated in site visits. They developed an ROI analysis and made final recommendations to the Board of Directors and CEO.

Dr. Joseph Spurlock represented the physicians in the process. During the implementation, a second physician champion (Dr. Lou Harris) was added and a larger physician team (the Physician Order Management, or POM Team) was developed to make decisions on the features and functionality that were of most critical importance

to the EMR and CPOE. During implementation, the POM Team met frequently. The two physician champions now meet monthly with key staff (IS Specialists, Medical Records representatives, Pharmacist and the CIO), to continue to refine and enhance system functionality.

PROJECT INFOCARE NEEDS ASSESSMENT

Process for identifying the need for Project Infocare.

CMH followed a formal needs assessment process with the assistance of VHA Consulting. The Consultant assigned to CMH was Wayne Stuckey. Mr. Stuckey led the team through a year-long series of steps to assure that IS efforts would support organization strategies.

The IS Assessment and Planning Process was conducted by a team that eventually became the CMH IS Steering Committee. The timeline for the process was:

- Information Technology & Systems Assessment, April, 2000
- Information Systems Strategic Planning, January, 2001
- Vendor Selection & Contract, December, 2001
- Information Systems Implementation Planning, January, 2002

INFORMATION TECHNOLOGY & SYSTEMS ASSESSMENT

An information technology and systems assessment was conducted in April, 2000. The assessment included a complete inventory of existing information systems and resources in use at CMH and a demonstration of those systems by end users.

As a result of that assessment, the team identified these “Top IT Issues:”

- Disparate systems and databases
- No common patient identification
- Lack of continuity of patient care information across the delivery system
- Lack of clinical documentation systems
- Operational inefficiency
- No availability of medical record in electronic format
- No decision support capability
- Minimal information technology standards
- Insufficient information systems resources

The following recommendations & conclusions were offered:

- Establish an IS Steering Committee and Information Technology Strategy
- Review organization strategic objectives and align IT strategies to support those initiatives
- Develop an integrated information system to serve hospital, clinics, long term care and home care
- Replace existing information system within realistic time-frame and resource constraints
- Expand Information Systems resources (staff and budget)

These guiding principles were adopted for application prioritization, and software and technology acquisition:

- The IS strategic direction is guided by the long-term vision and strategic plan for the organization.
- Common system solutions will be implemented for like functions across departments where the system can meet 70% - 80% of individual department requirements. This will provide operational integration across the continuum of care.
- Investments in new systems and technologies must demonstrate a positive return on investment based on business and clinical benefits.

- Existing investments in systems will be preserved and expanded wherever appropriate.
- Priority will be given to those systems that best support overall organizational needs.
- To achieve integration, CMH will look to a single core vendor whenever possible, but will select other vendors for niche systems where benefits outweigh the lack of integration.
- Improvement in provider productivity as well as reducing the “hassle” factor for physicians will be considered key requirements for system selection.
- System acquisition will be driven by weighted criteria including functionality, ease of use, technology and support requirements.
- CMH will adopt systems and technologies that are on the upward curve of their system lifecycle, will be an early adopter of proven technologies, and will avoid alpha/beta relationships and custom development particularly for mission-critical functions.
- System acquisition will follow a formal process including needs assessment, requirements definition and vendor due diligence.
- Information Services will develop the infrastructure to support known upcoming strategic projects with capability for quick incremental growth.

PROJECT INFOCARE SYSTEM ACQUISITION

Decision making process and approach to acquiring the system.

The pros and cons of integration versus best of breed strategies in system acquisition were discussed and debated by the IS Steering Committee. The Committee very deliberately chose and continues to support an integration strategy for CMH. This strategy has proven successful and is one reason CMH has been able to rapidly implement the EMR and CPOE across care settings.

The selection process at CMH was employee-driven. Teams of employees were involved in each step. When the decision was made to pursue a new system that included the EMR and MEDITECH was selected, there was strong consensus around the plan from throughout the organization. That consensus has been a key to CMH’s success in implementation. In fact, one of the biggest challenges in the implementation has been keeping up with the demand. Departments and employees were so excited about the new system, that they all wanted to be first to implement.

The steps in the Selection and Contract process were:

Project Teams made up of end users were convened. The teams (there were 39 total teams) were challenged to identify functional requirements for a new system, develop demonstration scenarios, participate in and evaluate demonstrations, conduct reference checks, participate in site visits and recommend vendor(s) of choice. The teams were asked to think big by asking themselves “In my wildest dreams, what would information systems do for me in my job and department?”

A timeline was established for the Request for Proposals (RFP) Process with a goal of completing contracts by December, 2001.

The RFP included over 200 pages of functional requirements identified by the project teams. Vendor Analysis was done by scoring each vendor against those functional requirements. The top three vendors were invited to present product demonstrations. Evaluation surveys were completed by over 100 project team members

attending each vendor demonstration. Reference checking was done. A second demonstration for physicians and board members was done to ensure that they were “on board.” A corporate visit was conducted to the MEDITECH headquarters. Five site visits were conducted, including one specifically for physicians and clinics, one specifically for home care services and one specifically for long term care facilities.

MEDITECH was chosen as the recommended vendor based on their proven technology which is utilized in over 1,900 health care organizations. MEDITECH has a 36 year history in the industry lending to confidence in their stability. The MEDITECH Client/Server platform was selected in order to maintain flexibility and ease the transition for end users accustomed to using Windows products at home.

A detailed budget was prepared for Project Infocare. The IS Steering Committee spent considerable effort identifying the full cost of the project to assure that Administration and the Board were fully aware of the commitment. They did not downplay the size of the budget, but rather made an effort to assure that the needed resources were understood and appropriated. This strategy has proven successful. During the implementation of the new system, the team has not had to expense energy in securing resources, which allowed all efforts to be focused on implementation excellence.



PROJECT INFOCARE BUSINESS CASE

Justification for the investment in Project Infocare.

Many of the key goals for Project Infocare were process improvements which are identified in the Functionality Section of this document. A financial return on investment analysis was also prepared. Return on investment was projected to occur from the following with a positive return projected to occur within five years of the initial investment.

- Growth of admissions.
- Increase in revenue due to the use of standard protocols.
- Increase in net revenue by more accurate coding made possible by improved availability of information to substantiate diagnoses.
- Elimination of five positions.
- A decrease in transcription costs.
- Elimination of medical records scanning and microfilming costs.

Actual return on investment has already occurred in many of these areas, and in areas not anticipated as quantified in the Value Section of this document.

PROJECT INFOCARE COSTS

Projected costs of Project Infocare.

The costs budgeted for Project Infocare included the software, hardware, personnel costs and travel and training.

Software costs included software from MEDITECH, and ImageNow from Perceptive Software. Software costs also included the first year costs for these knowledge bases:

Krames On-Demand Patient Education System, First Data Bank Medication Knowledge Base, and 3M Coding and Reimbursement System. As Project Infocare is an organization-wide effort encompassing more than the EMR, software costs also include software not directly related to the EMR, such as Kronos Workforce Time and Attendance System, Neoforma Online Market, and Unisource collections system.

Software	\$3,428,807
Hardware	\$1,588,543
Personnel	\$730,374
Travel & Training	\$255,000
TOTAL BUDGET	\$6,002,724

At CMH, hardware costs were particularly significant because of the lack of information systems infrastructure within the organization. Local, metropolitan and wide area networks had to be established along with the acquisition of the servers and devices to support the system. Surveys were conducted and a walk-through in each department and facility was conducted to help in estimating the number of devices that would be required for the project. Employees were challenged to decide: “If the patient chart was on a computer – how many computers would you need in your department?”

Personnel costs were budgeted and time was floated during the implementation to a Project Infocare Department to allow for accurate capture of these costs. Personnel costs were estimated using a document provided by the vendor for each application, which were quite accurate.

Travel and training costs were significant, but were minimized as much as possible. During travel to the MEDITECH training site in Massachusetts, a corporate apartment was rented which significantly reduced hotel costs and a lease car was maintained which to reduce car rental costs. During vendor travel to the hospital, the vendor was requested and agreed to stay at a local hotel in Bolivar where the hospital has a reduced rate.

At \$5,000,000, the size of the initial budget was large for a rural hospital and community. The funds were financed with tax exempt bonds. An additional amount of \$1,000,000 was approved and financed one year later to complete the full EMR in the CMH long term care facilities and physician clinics.

The budget and recommendation to proceed were presented to and approved by the CEO and Board of Directors *all culminating in signed contracts in December, 2001*. CMH is not a “rich” hospital with a large endowment. Like most rural health care providers, CMH struggles to provide a wide array of services to the community. The investment in Project Infocare is a testament to the organization’s commitment to provide the best possible care and service to patients.

PROJECT INFOCARE RISK MANAGEMENT

Process for explicitly identifying the risks of Project Infocare. Risk reduction strategies.

During Implementation Planning, the IS Steering Committee identified risks associated with the implementation and these techniques to address those risks:

RISK	TECHNIQUES TO ADDRESS THE RISK
End users lack confidence in new system	Understand and become experts on the system before training end users
Some end users will lack of basic computer skills	Train in the basics of computer operations so end users won’t feel intimidated by the new technology
End users that already have computerization in their departments may resist change	Begin the implementation with current users and gain support
Limited resources could prevent adequate support for all functionality and end users to be implemented	Phase in functions and applications in order to ensure sufficient resources for support during training, implementation and post-live phases
A rush to complete the EMR could result in an EMR without substance	Build a foundation upon which an EMR can be developed
End users may tend to add new processes instead of reworking processes using the new tools	Seek process improvements in each step to enhance workflow for end users
Known “problem people” who are resistant to all changes may try to derail the project	Identify problem people and make a positive effort to engage them in the process
End users who may not be scheduled to implement for many months, may become misinformed about system purposes, schedule and efforts	Market the project to end users throughout the continuum of care

CMH also requested a review of the EMR by the hospital’s Risk Manager. The Risk Manager reviewed the system and recommended the use of certain terminology in building assessments and physician tools.

PROJECT INFOCARE LESSONS LEARNED IN PLANNING

Lessons learned in the planning processes.

What CMH did during system planning that promoted success:

- Used a formal, involved and open planning process.
- Employees were involved in the process in a very meaningful way and drove system selection.
- Key physicians, board members and CEO were instrumental in defining, launching and supporting the project.
- The CMH CEO provided public encouragement and expression of confidence in success and importance of project.
- Adequate resources were allocated for the project.

2. IMPLEMENTATION

PROJECT INFOCARE IMPLEMENTATION PLANNING

Planning process for implementation. Defining, guiding and focusing to meet the goals of the project..

Implementation planning was conducted in a two-day session in January, 2002, using Franklin Covey's 4 Roles of Leadership model. The planning was conducted off-site to minimize interruptions. A facilitator skilled in the Franklin Covey processes was utilized. The Implementation Director and Implementation Specialist from the major vendor (MEDITECH) participated along with the IS Steering Committee. Below is a grid summarizing the results of the intensive planning effort.

Information Systems Implementation Planning 4 Roles Planning Highlights	
<p><u>Pathfinding</u> These key stakeholders were identified:</p> <ul style="list-style-type: none"> • patients & community, • physicians & other caregivers, • system end users & employees, and • administrative decision makers & Boards of Directors. <p>The Project Infocare vision statement was enthusiastically developed and embraced.</p>	<p><u>Aligning</u> Understanding the importance of aligning to achieve the vision, the team agreed to use these techniques and practices in the implementation:</p> <ul style="list-style-type: none"> • understand and become experts on the system before training, • train in the basics of computer operations so end users won't feel intimidated by the new technology, • begin with current users and gain support, • phase in functions and applications in order to ensure sufficient resources for support during training, implementation and post-live, • build a foundation upon which an EMR can be developed, • seek process improvements in each step to enhance workflow for end users, • identify problem people and make a positive effort to engage them in the process, and • market the project to end users throughout the continuum of care.
<p><u>Modeling</u> The role of the ISSC was determined to be to</p> <ul style="list-style-type: none"> • allocate resources, • remove obstacles, • establish parameters, • serve as cheerleaders, • implement system to maximize functionality, and • serve as communication liaisons. 	<p><u>Empowering</u> The planning team identified the need to form Implementation Teams for the many applications to be implemented. Key qualities to seek in Implementation Team Leaders were decided on and included: knowledge of department or function, trusted/respected, works well with other departments, interest/enthusiasm, communicator/listener, organized/can meet deadlines, and motivated.</p> <p>An Implementation Kick-Off event was planned to include the CMH CEO with all team members. A meeting was scheduled to introduce the project and responsibilities to the chosen Implementation Team Leaders. A chart was developed to show the organizational relationships of the Implementation Teams, IS Staff and Administration.</p>

OBJECTIVES

These specific objectives and strategies were embraced during planning:

PATIENT INFORMATION. Patients will be asked to supply information only once. CMH will store, protect and make that information accessible (only as needed) without redundancy.

PATIENT BILLING. Patient-friendly billing processes, forms and practices will be adopted.

ACCESS. Patients will be able to schedule appointments for all services from all CMH locations.

CARE DOCUMENTATION. Documentation will be captured at the point of care. Charges to patient accounts will be created automatically as care providers document in the system.

INFORMATION FOR PROVIDERS. Direct care providers will have access to easy-to-use, reliable, timely, accurate, and complete information that is available from any location.

PERFORMANCE IMPROVEMENT. CMH will employ the new system tools to enhance patient care, improve delivery and safety of care and support decisions with access to knowledge bases.

DATA COLLECTION & STORAGE. Information will be stored digitally in a retrievable format. Paper documents will be phased out. Queryable data elements will be selected over scanned images.

ORGANIZATION-WIDE PERSPECTIVE. Project Infocare will serve CMH and the health care providers that make up the continuum of care. This continuum consists of many integrated units all serving the same patients across care settings. In making decisions and establishing processes, CMH will consider the effect on the whole continuum.

PROJECT INFOCARE IMPLEMENTATION PROCESS

Implementation plans and phase-in strategy.

Implementation of Project Infocare has been conducted in phases. For each phase, the system was configured, testing was conducted, end users were trained and a parallel run was performed before the implementation date.

IMPLEMENTATION PHASES

Implementation of Project Infocare began in March of 2002 with a Kick-Off Event including 150 participants from teams ready to begin implementation. The CMH CEO presented the importance of the project. He expressed confidence in the success of the implementation and the positive impact it would have on patient care, quality and service.

The financial applications were placed in operation in October, 2002. This first step included General Ledger, Payroll/Personnel, Accounts Payable and Materials Management.

Core clinical applications were placed in operation in December, 2002. These applications replaced disparate systems with integrated solutions and created the shell of the EMR to begin “collecting” data immediately. The applications were Medical Records, Abstracting, Admissions/Registration, Billing/Accounts Receivable, Lab, Pharmacy, Imaging, Community-Wide Scheduling, EMR, Order Entry, Operating Room Management, and an Executive Support System.

Home Care Services software was placed in operation in January, 2003, including the use of in-home documentation utilizing portable devices. Nurses and therapists carry hand held devices and download daily information via a telephone link. Home care visits are available in the EMR.

Physician Clinic Billing was placed in operation in June, 2003, in 16 CMH Physician Clinics. The system replaced a separate system with one that is integrated and established the foundation for ambulatory clinic records within the EMR. Even from this time, each visit in the CMH physician clinics created a visit in the EMR that included diagnosis and demographic information, lab results and transcribed reports.

Long Term Care Billing was placed in operation in June, 2003 in five long term care facilities. This system replaced a separate product with one that integrates to the EMR.

The Nursing and ancillary application was placed in operation in November, 2003, in the hospital including online documentation of care plans, assessments, vital signs and medication administration on all hospital inpatient units.

CPOE was fully functional in the hospital, scanning was implemented for any remaining paper items in the medical record and CMH was paperless in the hospital for current records in December, 2003. Full CPOE implementation was the completion of an intense effort over a period of months that included training, communication, building, rebuilding, designing, redesigning, follow up and support for physicians. CPOE and utilization of the online EMR were phased in as follows.

- Phase I: Electronic signature on transcribed documents & viewing transcribed reports and lab results online. Printing of the documents was discontinued.
- Phase II: Ordering procedures (lab, radiology, nursing services, ancillary services) online.
- Phase III: Ordering medications online and viewing miscellaneous scanned documents associated to a record. Paper charts were eliminated.

Keys to the success of this CPOE implementation were: 1) one-on-one training with physicians for each phase with trusted, determined staff skilled in communication and clinical areas, 2) physician participation in addressing making suggestions for improving the system, and 3) allocation of resources.

CMH provides a physician resource room on the Medical/Surgical floor with computers for physician use only and privacy in composing notes and ordering online. This room also provides a central location for physicians to interact with support staff. The room was staffed full-time during the implementation and is still staffed for two hours each morning by an IS Specialist or Superuser.

PACS (digital radiology) became operational at CMH in January, 2004. Digital images are available throughout the network on any workstation. Diagnostic-quality monitors are available in the Emergency Room, Imaging department, Medical/Surgical, physician resource room, and ICU. Images are available in physician clinics and by remote access.

The first Long Term Care facility implemented nursing and ancillary documentation and CPOE in February, 2004. This implementation at a 111-bed facility was incredibly successful. All nursing and ancillary staff at the facility complete documentation and the online medication administration record real-time using wireless devices on carts, portable devices or hardwired computers. Physicians admitting to the facility enter and review orders and care documentation online.

The second Long Term Care facility implemented nursing and ancillary documentation and CPOE in March, 2004.

CMH implemented an interface with LabCorp Referral Lab in April, 2004 so that lab results from this source are captured as data elements and available for trending.

Interim Billing was implemented in May, 2004. This change in billing processes involves monthly billing while a single patient record is maintained in the EMR. This process replaced a process where patients were discharged monthly, regardless of their care orders or documentation. Interim billing allows the clinical record to be maintained intact for ease of access and use by care providers and physicians.

The third Long Term Care Facility implemented nursing and ancillary documentation and CPOE in June, 2004.

Remote access to the EMR was made available to physicians via Citrix in July, 2004.

Also in July, 2004, CMH implemented Patient Friendly Registration processes to further enhance the registration process. Processes include an Express Registration card that is issued to patients. The card includes a barcoded patient identifier to facilitate quick and accurate patient identification. New processes also include “quick links” to common routines, the ability to view previous insurance cards, the ability to print consents with pre-printed patient information, scripting and standardization of registration processes.

The fifth and final Long Term Care Facility implemented nursing documentation and CPOE in February, 2005. The physicians at this final LTC facility had not had exposure to the EMR prior to the implementation and are not on staff at the hospital. The community in which the facility is located has another community hospital serving the same patients. This “rival” hospital lab is even participating in the EMR by remotely entering lab results into the system.

Also, in February, 2005, CMH launched HealthStream online learning system. In addition to the education required by regulation and accreditation bodies, CMH sees the need to provide ongoing education on the new computer system. Any upgrade to the system now requires the re-education of literally hundreds of employees that work in geographically dispersed locations on varied shifts. To date, over 12,000 courses have been delivered to employees on the new system. New nursing personnel can now take most of their orientation training online.

In March, 2005, CMH’s first Physician Clinic implemented clinical documentation with the Electronic Ambulatory Record and began phasing out paper charts.

Also in March, 2005, the CMH Emergency Department implemented a Patient Tracker which greatly facilitates workflow and communication within the ED.

In April, 2005, CMH implemented policies, procedures and training to meet HIPAA Security Regulations.

The Emergency Department implemented online medication administration in May, 2005.

Scanning was implemented and CMH became completely paperless in the first Long Term Care facility in May, 2005.

when?

Module	Spec.	Mar-02	Apr-02	May-02	Jun-02	Jul-02	Aug-02	Sep-02	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Aug-03	Sep-03	
HGIS	SherryM	Initial			Delivery				Live											
MIS	PeggyE		I	D	Test/Train	Live	10/1													
Report Writer	PeggyE		I	D	Test/Train	Live	10/1													
Comm Scheduling	PeggyE			I/S	D	T	T	L				12/1								
OR Management	PeggyE			I/S	D	T	T	T	L		12/1									
Data Repository	PeggyE											I	D	T	T	L				
Physicians	LindaH																			
Lab	LindaH			I/S	D	T	T	T	T	L	12/1									
Pharmacy	LindaH		I/S	D	T	T	T	T	T	L	12/1									
Imaging/TherapTc Svcs	LindaH			I/S	D	T	T	T	T	L	12/1									
Order Entry, EMR	LindaH			I/S	D	T	T	T	T	L	12/1									
PT Care Systems	LindaH									I/S	D	T	T	T	T	T	L	8/1		
GL/AP	TriciaC		I/S	D	T	T	T	L	10/1											
Mails Mgmt	TriciaC		I/S	D	T	T	L	10/1												
Payroll/Personnel	TriciaC		I/S	D	T	T	L	10/1												
Exec Sup/Budg Frctst (opt)	TriciaC									I	D/T	T	L	2/1						
HomeHealth Pt Care	TriciaC																			
Billing/AR	TriciaC		I/S	D	T	T	T	L	L	L	12/1									
ADM, Med Rec, Case Mix	TriciaC		I/S	D	T	T	T	L	L	L	12/1									
PracMgmt ADM/BAR	TriciaP											I/S	D	T	T	L	4/1			
PracMgmt Clinical/EAR	TriciaP											I/S	D	T	T	T	L	6/1		
LTC Financials	?																			
LTC Clinicals	?																			

PROJECT INFOCARE IMPLEMENTATION GOVERNANCE & STAFFING

Staff, team and committee roles and responsibilities supporting the implementation.

CMH has employed matrix management in implementing Project Infocare. Traditional departmental organization has been maintained while at the same time a project approach has been employed. Cross-departmental teams were formed to implement each application of software in a patient-centered approach. Employees have two separate but equal loyalties – to the project and to their home department. These two loyalties helped the organization balance the project with ongoing operations during implementation and provided a clear path back to pre-implementation staffing levels.

GOVERNANCE. The Project Infocare implementation was guided by the IS Steering Committee. The Committee met regularly, selected and recruited team leaders and team members, facilitated communication with department managers and made decisions when difficult questions arose. As determined during implementation planning, the role of the IS Steering Committee was to allocate resources, remove obstacles, establish parameters, serve as cheerleaders, implement the system to maximize functionally and serve as communication liaisons.

STAFFING. Three additional staff members (IS Specialists) were added to the Information Systems Department. One Specialist focused on financial applications, one on clinical applications and one on long term care and home care. Additional staff members were also added for technical support and network administration. As more applications have been implemented, additional staff has been added to the department. Currently, the IS Department has a staff of 22 FTE's supporting 1,538 employees and over 700 devices on local, metropolitan and wide area networks.

Spring 2005 assignments			Karrie		Katie		Donna Shelby
EMR	Enterprise Medical Record	LTC ADM	Admitting	PCS	Patient Care Systems	BF	Budgeting/Forecasting
OE	Order Entry	LTC BAR	Billing Accts Rec	EDM	ED	ESS	Executive Support System
PCM	Physician Care Mgr	LTC EMR	Enter Med Rcd		PCS training (acute)	ESS	LTC Exec Support
POM	Provider Order Mgmt	LTC MRI	Medical Records		KRAMES	GL	General Ledger
	physician liason MF 9 - 11	LTC PCS	PCS		Ambulance	PP	Payroll/Personnel
	physician training	LTC ABS	Abstracting				Kronos
EDM/EAR	implementation support	LTC OE	Order Entry		Tricia P		GL Depreciation
PHA	Pharmacy			ARM	LSS Referral Mgmt		QuickCharge (KRONOS)
	1st Data Bank		Chad	PVMM	LSS Provider Workload		TTE (KRONOS)
	Pyxis	LTC EMR	Enter Med Rcd	EAR	Elec Amb Record		ACTION (Productivity)
	PDR/Epocrates	LTC PCS	PCS	MPM	Medical Practice Mgmt		FormFast
		LTC OE	Order Entry	PBR	Patient Billing LSS	AP	Accts Payable
	Mary	LTC PHA	Pharmacy	SCH	Scheduling(Provider Pr)	MM	Materials Management
	HMK+		PCS Training (LTC)	RX	LSS RX		Neoforma (MM EDI)
	HME					ITS	Transcription
	QS1 (Emp Pha)		Kim		Tim		Dictaphone
	Survey Plus	ABS	Abstracting	BBK	Blood Bank	ITS	Radiology
SCH	Scheduling	BAR	Billing/AR	LAB	LAB	MRS	Mammography
HH	Home Health	CL	Claims/Remittance	MIC	Micro	CRW	Crystal Reports
NPR	Report Writing	MRI	Medical Records	EAR	Physician liason	LMS	Learning Mgmt IS Admin
	Credentialing		Unisource		Call Center IS admin support		
	AutoData Scanning		HIDI				Peggy
OR	OR		WebMD			DR	Data Repository
	new employee orientation		3M			MIS	MIS/UNV/SYS/dept mgmt
	physician liason TWT 9 - 11		InfoX				AS400
		ADM	Admitting				NPR/CR Report Writing/Crystal R
			Image Now			LMS	Authoring Support

TEAMS. A team was formed for each software application to be implemented. Each team had a team leader and 6-12 members, depending on complexity and impact of the application to be implemented. One IS Specialist served on each team and acted as project coordinator. Expected hours required for each Team Member were discussed and agreed upon with their respective Department Managers. Department Managers were discouraged from taking Team Leader roles.

TEAM LEADERS. Team Leaders were hand-picked based on criteria agreed upon by the IS Steering Committee during Implementation Planning. These key qualities were considered to be important: knowledge of function, trusted and respected, works well with other departments, exhibits interest and enthusiasm, good communicator and listener, organized and can meet deadlines, and motivated.

PHYSICIANS. CMH has two Physician Champions that have served as leaders of the medical staff with regard to Project Infocare. One physician, Dr. Lou Harris, practices in an independent physician practice and the other, Dr. Joseph Spurlock, is employed in a CMH-owned practice. Both physicians admit patients to the hospital and long term care facilities. During the implementation of CPOE, the physician champions and a POM (Physician Order Management) team met regularly to discuss issues and make suggestions for improved system functionality. The two physician champions still meet monthly with key personnel to continue to provide input for enhancements and improvements. The physician champions act as liaisons with the full medical staff and present issues at medical staff meetings.

TIME. A department was created to account for the hours spent on Project Infocare. Team Members floated to that department during the building, testing and training for each application. This method of accounting ensured that Department Managers were not penalized on their department budgets for the time spent in implementation. This structure was seen as an important part of securing enthusiastic support for the project from Department Managers. It also allowed CMH to accurately account for the cost of the project and gave a clearer transition back to normal operating budget amounts.



PROJECT MANAGEMENT. MEDITECH provides interactive online project management tools as a part of implementation services.

TRANSITION TO NEW PROCESSES

Strategy for implementing improved processes. Managing paper and electronic records during phase-in.

During the planning for CPOE and the transition to a paperless environment, the team supporting CPOE developed a plan by creating a “Chart of the Chart”. A table was developed that identified each paper in the medical record, the plan for transitioning that paper to an electronic format and the deadline for that transition. That table served as a timeline and action plan for the transition.

Paper forms were eliminated from the chart in phases. During the first phase, physicians were trained in e-signature, in entering daily notes and in viewing test results and transcribed reports. At that point, the daily notes page, test results and transcribed reports were eliminated from the paper chart. During the second phase, physicians were trained to enter procedure orders, and in the third phase to enter medication orders. During that time, other papers in the chart were transitioned to electronic format through the Nursing documentation application, interfaces or other applications. On the date for implementation of the third phase (medication ordering), document scanning was also implemented to capture the remaining few paper documents and the paper charts were eliminated from the hospital.

During the transition, physicians could still write orders on a paper order sheet, but most soon learned that it was more efficient to use the EMR and keep all documentation and orders in one place. There eventually was a “tipping point”, where even those resistant to the change could see that a mixed environment was inefficient and that use of the system was inevitable.

The CMH strategy for managing the change for physicians was to be very open and provide ongoing, proactive communication about the project. The team and project manager did not “duck” problems, but rather solicited issues. Issues that were identified, were logged, prioritized, and resolved, and follow up was done with the suggesting physician. The team intentionally provided many avenues for feedback so that no matter what style of communication a physician preferred, he or she had an opportunity to make their issues known. Avenues included one-on-one interaction, paper forms for submitting issues, open forums, presentations at medical staff meetings, specials forums on specific issues and a constant presence of support staff in the Physician Resource Room during rounds.

The CMH CEO was kept apprised of the progress and issues surrounding the project and was supportive both in his approach with physicians and in his willingness to provide the resources necessary to complete the implementation of CPOE.

CMH found that physicians went through stages as they gave up paper and paper processes – denial, then anger, followed by depression, bargaining and finally acceptance. During some of these phases, particularly when you consider the position from which physicians bargain, it was tempting to “give in” and abandon or modify the objectives of the project. Instead, CMH weathered each phase for each physician and used every possible opportunity to gain more insight into how to make the system better.

One of the most successful strategies in the implementation of CPOE was to “make it personal.” CMH created physician-specific order sets and favorites and presented them during training. CMH did not develop these sets and favorites by asking physicians to fill out a form or spend time thinking about their practice patterns, but rather by developing reports to identify the most common orders written by a physician (and entered by ward secretaries) over the six months prior to the implementation. The Team then created those as favorites – so that the physicians were provided with one-click ordering ability for the majority of their orders from day one.

PROJECT INFOCARE TRAINING, EDUCATION & SUPPORT

Overall strategy and approach to training education and support of users.

IMPLEMENTATION TRAINING

TRAINING THE TRAINERS. As a part of implementation services, MEDITECH trained CMH team members in the use of each application. For most applications, two training sessions were held at CMH and one was held at MEDITECH Training Facilities in Massachusetts. Although the cost of the travel to Massachusetts was significant, it allowed the teams to build relationships, to be trained away from everyday interruptions and to feel that the implementation was important.

TRAINING END USERS. Training for end users was developed and conducted by Team Members. The delivery of training varied based on the complexity of the application and the significance of the change in processes required. For clinical areas, training was a challenge because of the number of clinical staff to be trained, the variation in the computer capabilities of the staff, and the significance of the changes in processes to move from a completely paper system to one that is completely electronic. In the clinical areas, training was done in four-hour increments in a “mobile” classroom at the hospital and in the five long term care facilities. Wireless laptop computers were moved from location to location to allow the participants to have hands on access to the Test set of software during training.

TRAINING FOR PHYSICIANS. After attempting training of physicians using a physician-to-physician model and a classroom model, CMH achieved success using one-on-one training in short sessions provided by a CPOE team member. Training was conducted whenever and wherever physicians requested in 30-minute sessions. Follow-up was done during rounds at the hospital. Team members staffed the Physician Resource Room (a room with computers for physician use only on the Medical/Surgical floor) full time during the implementation to answer questions and make system changes immediately upon request. Key to the success of physician

training was the use of qualified staff members that had both clinical and communication skills. Trainers included these key employees:

- Cindi Lockhart. Cindi has been employed with CMH since 1987. Before moving into IS, Cindi was Ward Secretary Coordinator. Cindi not only came to the IS role with experience in ordering on line, but also with a very clear understanding of the processes and communication that occur after ordering as those orders are carried out on the nursing floors. Cindi was tenacious and creative in the use of order sets and system configuration. Her ability to connect with physician was key to the physician's transition to the new system.
- Cristy Smothers. Cristy served as Project Manager for CPOE. Her role was added to help coordinate the effort and communicate with the physicians. She established the Physician Order Management team, conducted planning and issue-resolution sessions, established multiple venues for physician communication, developed a detailed project plan, developed training materials, trained physicians, tracked all issues to resolution and worked one-on-one with physicians to solicit feedback.
- Mike Calhoun. Mike was a former pharmacy technician and was working as an Assistant Coordinator in the Materials Management Department when he was recruited to the IS department to help the physicians transition to medication ordering. He acted as liaison between the physicians and the pharmacy. He designed a rebuild of the pharmacy drug tables to accommodate the needs of both the pharmacy and the preferences of the physicians. He trained the physicians in medication ordering and adapted ordering functionality to meet their needs.

ONGOING TRAINING

CMH deployed an online learning system from HealthStream in February, 2005. CMH has developed courses to provide training in use of the computer system, including Introduction to MEDITECH and Nursing & Ancillary Orientation courses.

ORIENTATION TRAINING. Training is provided for new physicians and employees during their general orientation period. Orientation for physicians is delivered personally by the IS Specialist or Superuser. Follow up training is provided in the Physician Resource Room and upon request. Orientation for nurses is delivered through a combination of online training courses, classroom training and one-on-one training by application Superusers.

UPGRADE TRAINING. In addition to training for physicians, nurses and end users upon hire, there is a continual need for training on new functionality. New functionality may be built within the existing software or may be the result of an upgrade version of the software. Upgrade training is provided in the same format as orientation training using a combination of online learning, one-on-one training, and classroom sessions.

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Type your search term(s) and press "Search" Advanced Search

Search for **citizens PCS** yielded 30 record(s).

Course Title	Course Sponsor	Price	Credits
Citizens Memorial Hospital - PCS Notes	How to enter/amend/view and print notes from PCS.	Free	0.50 (Informational)
Citizens Memorial Hospital - PCS Continued for Hospital Licensed Nursing	This second PCS course addresses: intervention spreadsheets, documenting by group, associated data, protocols, editing documentation, retro and undo for documentation, viewing documentation in the EMR, care plans, ...	Free	3.00 (Informational)
Citizens Memorial Hospital - PCS Continued for Hospital Nursing Assistants	This course is for hospital nursing assistants. It is designed to be taken after "Introduction to PCS". It covers intervention spreadsheets, documenting by group, associated data, protocols, documentation edit and retro...	Free	3.00 (Informational)
Citizens Memorial Hospital - PCS Ordering Procedures, Meds, Tapers, IV	The third course in the series of PCS courses for licensed nursing in the hospital.	Free	1.00 (Informational)

PROJECT INFOCARE COMMUNICATION

Overall communication plan.

The overall communication strategy for Project Infocare was to provide a continuous source of communication on the progress of the project and multiple avenues for feedback at all phases of the implementation. These are some of the tools used:

infoCARE Feb 14, 2005

El Do's Community Springs Live with Computerized Patient Care
 What a difference a year makes!! A year to the day after our first LTC implementation (CMHCF), we went LIVE at our 5th - Community Springs in El Dorado. Susan Wood and the team trained in January and report that this is the smoothest implementation to date. Positive comments have been heard from the nursing staff, stating it wasn't as bad as they thought it would be, and that they are already liking the system. We even had a couple who said they were so nervous about it that they contemplated leaving CMH, but now they are comfortable and even liking computers!! Teamwork is the theme here, everyone works together including the doctors (who pleasantly surprised us with their lack of reluctance) and the lab personnel from Cedar County Memorial Hospital who have agreed to enter the facilities lab results into Meditech! Congratulations to Community Springs and the LTC team!

Rebecca Shanks, RN, entering orders on Meditech

Take a Float on the Healthstream
 915 CMH employees have taken a course on the new LMS (learning management system) since the launch date - Feb 1. Winning departments with 100% completion are: Foundation Billing, Plants and Facilities and CMHCF Nursing! Good job! Courses assigned in 2005 will include the Ed Fair courses and Competency courses. Courses are assigned each month and due that month. COO, Allen Waldo, has agreed to make cameo appearances in the Healthstream courses - so watch for Mr. Waldo!

We are here!

NEWSLETTERS. During the implementation, a Project Infocare, a newsletter was published at least one per month outlining the milestones achieved and the upcoming phases. A separate newsletter, the MEDITECH Minute, was developed for the Medical Staff to focus on issues specific to physicians. The MEDITECH Minute continues to be published and distributed at Medical Staff meetings.

PROJECT INFOCARE FORUMS. Also during the implementation an informal forum arose within the hospital to address cross-application implementation issues, such as terminology and functionality. With an integrated system, a high level of communication is required to assure that maximum benefit is achieved. The forum was held over lunch on a weekly basis. IS Specialists attended and Team Members were encouraged to attend. Each attendee was asked to report on how the implementation was proceeding and what questions, concerns or issues had arisen. This cross-application discussion served an important role in solving problems and assuring that the system implementation was successful.

PHYSICIAN ORDER MANAGEMENT (POM) TEAM. The POM team was open to any and all physicians. The team met regularly during the implementation of CPOE. Physicians were encouraged to attend regular meetings to discuss issues and make decisions.

BOARD COMMUNICATION. A one-page monthly report was prepared and presented to the Board of Directors. In addition, the CIO attends Board Meetings and presented live demonstrations of software as the implementation progressed. This effort ensured that Board Member questions and concerns were addressed throughout the implementation and helped secure their continued support for Project Infocare.

POST-IMPLEMENTATION UPGRADES

Approach to post-implementation upgrades.

Post-implementation, the Project Infocare system is upgraded in two ways.

MINI-UPGRADES. These are changes and enhancements in individual applications. These upgrades expand on existing functionality to improve processes. Mini-upgrades are built and tested in a Test Version of the software. Superusers and department managers participate in any redesign of processes. Once complete and tested, training is conducted by a variety of methods depending on how many employees and physicians are impacted.

EMR	PHA	Linda	Place a consult order on a patient and verify that the patient is added to the appropriate physician list in the EMR
EMR	PHA	Linda	Practice changing the sort of the orders by clicking on the various headers at the top of the Orders panel such as category, date/time, order by etc.
EMR	PHA	Linda	Test placing orders in POM paying particular attention to medication and IV orders. Make sure to cancel orders, edit orders etc.
EMR	PHA	Linda	Code an allergy to Penicillin on a patient through POM Allergy Management. Then place a medication order for Penicillin. Verify upon filing that an allergy interaction check occurs.
EMR	OR	Linda	Enter the Surgical Report that the Operating Room Module sends to the EMR on a patient. Verify that this flows to the Other Reports panel in the EMR.
EMR		Linda	Allergy information - Thoroughly test the flow of allergy information to the EMR.
EMR		Linda	<ul style="list-style-type: none"> The unverified allergy queries of OEALL1 and OEALL2 should have EMR ID's and flow to the Clinical Indicators panel when entered in any of the feeder applications such as ADM, OE, PHA, ITS, or Dietary.
EMR		Linda	<ul style="list-style-type: none"> The verified allergy queries entered in POM should update PHA and POM when entered.
EMR		Linda	During all of the EMR Testing that is done, be sure to continuously monitor HUB Background jobs and take notice of response time and ease of moving through the system. Pay particular attention to color cues: are panels lighting up with a magenta color when there is new

VERSION UPGRADES. MEDITECH offers a version upgrade about once per year that provides new functionality. Version upgrades are configured in a Test Version of the software. Implementation of a version upgrade takes approximately 12 weeks. IS Specialists, network support staff, physician champions and superusers participate in the process, which is treated as a mini-implementation. New functionality is configured and tested, new processes are designed, training materials are adjusted and parallel runs are conducted. End user training is conducted by IS Specialists and Superusers and includes online learning courses, class room training and one-on-one training.

3. OPERATIONS

DATA MANAGEMENT

Processes for ensuring reliable collection of complete and accurate data in a timely fashion.

Data for the EMR is captured at the source. Much of the data is directly entered by care providers using point-and-click tools. Interfaces to clinical equipment and outside systems are also utilized. Physicians utilize CPOE and dictate or type their daily notes. Paper documents, such as Advance Health Care Directives, are scanned and linked to the EMR. All data is immediately available in the EMR for all users.

SYSTEM ACCESS/CONFIDENTIALITY

Achieving a balance between confidentiality/security and the need to access patient information.

Unique user names and passwords are assigned to each user and each user's access to the system is logged and audited. Users are assigned to profile groups, based on their role and position which gives them an appropriate level of access to patient information. Access is limited both in which information within the EMR the user has access to and to which patients the user can see in the EMR. Staff in physician clinics, for example, are only allowed access to the patients associated to their clinic physician, and billing personnel are only allowed access to demographic and billing information for patients. Physicians have access to all records and their use is audited.

IMPACT ON OPERATIONS

Ability to accomplish smooth system implementation with minimal disruptions to patient care.

During implementation, CMH was cognizant of incorporating new processes into the workflow INSTEAD of adding the new processes on top of existing work. End users were generally willing to adapt to the new processes and allowed them to replace prior processes. The IS Steering Committee, IS Staff and Superusers work diligently to identify and replace processes that can be more efficiently done online. Since many employees drive their workflow with paper, teams were careful to track down the uses of paper as it was eliminated and replaced the processes with new, online processes and reports.

ONGOING PLANNING

Planning process that guides resource allocation and decision-making for Project Infocare.

The IS Steering Committee assists in prioritization of projects and reviews and recommends the capital budget to Administration. The annual process for reviewing and recommending resource allocation is:

- 1) Start with Project Infocare Plan.
- 2) Solicit input from department managers, Superusers and IS staff.
- 3) Analyze input and compare to Plan.
- 4) Evaluate requests.
- 5) Prioritize and make recommendations.
- 6) Administration reviews and incorporates into annual budget.
- 7) Board of Directors reviews recommendations, conducts discussion and requests clarification.
- 8) Board approves recommendations with any changes.
- 9) Project Infocare Plan is updated.
- 10) Project Infocare Plan is communicated to stakeholders.

USER AND BUSINESS UNIT SUPPORT

Processes for supporting end users of the EMR after implementation is complete.

Support for users is provided in numerous ways, including a help desk, IS Specialists, and Superusers.

Help Desk. An IS Help Desk is available Monday through Friday from 7:00 a.m. to 5:00 p.m. Two support people are on call for all other hours to respond to hardware, network and software support issues. Track It software is used to manage work orders and the inventory of devices on the network.

IS Specialists. IS Specialists are assigned to each software application. Specialists interact with vendors on issues, make changes to system tables and parameters, monitor system utilization and performance, develop training materials, test new functionality and upgrades, assure that downtime plans and procedures are in place and manage upgrade processes.

Superusers. CMH is fortunate to have 39 Superusers. Superusers have accepted the additional responsibility of being the primary liaison between IS and the end users in their areas. Superusers train end users, assist in developing training materials and test new functionality. Superusers sign an agreement that they will serve this role and they are paid a stipend for the additional responsibility.

As described earlier, an IS Specialist or Superuser is present in the Physician Resource Room where most physicians enter orders and daily notes during morning rounds to assist physicians and solicit suggestions for system improvement.

PROJECT INFOCARE MONITORING & EVALUATION

Processes for monitoring system implementation, effectiveness and user satisfaction with the system.

CMH used Project Infocare Forums to gain feedback from end users. These Forums provided an opportunity for end users or team members to discuss any concerns regarding the project. For physicians, a regular meeting of the Physician Order Management Team was held and IS staff members were present in the Physician Resource Room to obtain immediate feedback from physicians as they were in the process of using the system. Issues identified from any source were logged, prioritized, and resolved, and follow up was done. Solicitation of feedback and issues tracking continues to be used as the final phases of the EMR are implemented.

PROJECT INFOCARE POST IMPLEMENTATION SYSTEM EVOLUTION

How the applications and functions of the EMR have changed since their initial implementation.

The Project Infocare EMR continues to evolve to meet the needs of physicians and other caregivers. Since implementation, these additions in functionality are particularly noteworthy:

Interface to LabCorp referral lab. This interface to the hospital's referral lab allows lab results from LabCorp to be included in the EMR as data elements and trended over time and visits.

Direct capture of endoscopy, digital photos and other reports into ImageNow. These images are captured into the ImageNow document management system by use of a virtual printer so that images are of high quality. Images are linked to the EMR for ease of access by physicians and other care providers.

Patient Friendly Registration initiative. In order to further enhance the registration process, an ad hoc team was formed to address registration issues and implement refined processes. These processes include an Express Registration card, "quick links", the ability to view previous insurance cards, the ability to print consents with pre-printed patient information, scripting and standardization of registration processes.

Additional order sets for physicians. Specialty order sets, such as a hypoglycemia protocol order set designed by the hospital’s endocrinologist, have been created and added for use by any physician.

Ability for physicians to create their own favorites and order sets. New system functionality allows physicians to create their own favorite orders and personal order sets on the fly.

Addition of special panels. New system functionality allows physicians to view patient information presented in special panels by diagnosis. There are special panels for Cardiology, Endocrinology, Hematology, Infectious Disease, Renal/Hepatic, and Respiratory diagnoses.

4. EVALUATION OF MANAGEMENT

Biggest successes in the management approach and what CMH would have done differently.

BIGGEST SUCCESSES

- Extensive planning resulted in organization-wide enthusiasm for Project Infocare.
- Assertive solicitation of physician issues allowed CMH to address physician concerns proactively.
- Establishment of Physician Resource Room provided a private location for physician support.
- Personalization of order sets and favorites reduced clicks and hassle for physicians.
- Elimination of paper charts required that all physicians use the system.
- Adequate resource allocation allowed effort to focus on the implementation.
- Support of CEO and Physician Champions helped get through the “tough” times in implementation.

LESSONS LEARNED

WHAT DIDN'T WORK INITIALLY	WHAT CMH DID INSTEAD
Physician-to-physician and classroom training for physicians	One-on-one training in 30-minute sessions whenever and wherever physicians wanted
Ending physician support upon go live	Continued support in Physician Resource Room during rounds
Training hundreds of end users for each change in functionality and upgrade	Implemented HealthStream online training system
Casual follow up on physician issues	Documented processes for soliciting, logging, tracking and following up on physician issues
Teams that focused too narrowly on their single application during configuration and testing. Lack of respect for the I-word (integration) and the impact of each part on the whole.	Project Infocare Forums for discussion of cross-application issues and testing and parallel runs that cross applications and care settings for all new implementations and upgrades.

FUNCTIONALITY

1. TARGETED PROCESSES

ONGOING MANAGEMENT OF PAPER RECORD

Approach to the ongoing management of the paper record – i.e. replace totally or incrementally.

The CMH approach to the paper record is to eliminate it. Maintenance of both an online and a paper record would be a redundancy of effort and would introduce an opportunity for conflict as well as a need to continually monitor differences. A mixed environment, one with a part paper/part electronic record, would introduce the an opportunity for error on the part of physicians in that they would have to consult two sources to see the entire record for a patient.

Prior to elimination of the paper record, an effort was made to transition as many paper forms to an electronic format as possible. Each document in the hospital medical record was analyzed. If possible, the document was included in the electronic record or the information was interfaced. The remaining documents include documents that are introduced from outside the organization (advance directives), documents that are signed by the patient (consents) and test results that are not practical to interface to the EMR at this time because of financial or technical barriers.

Those remaining few documents were scanned on November 30, 2003, and paper charts were eliminated from the hospital on December 1 of that year. An average inpatient EMR has less than 10 documents scanned with the rest of the record captured in an electronic format. Scanning of those few documents is done using a point-of-origin model. The first department to receive the document scans it and links it to the EMR so that information is available online as soon as possible for physician use.

Chart conversion for the physician clinics is done by a different process due to the nature of the lifetime chart maintained in most clinics. In conjunction with the go live for clinical documentation in each physician clinic, key data is entered into the EMR. Important documents are scanned. Post live, no historical data added to the paper chart and the paper chart is pulled for a maximum of three subsequent visits per patient.

ROLE OF PHYSICIANS AND CAREGIVERS

Role of physicians and other caregivers as contributors to the EMR.

Physicians document their daily notes and enter orders directly into the system when they are in the hospital or long term care facilities. Physicians are given the option to enter their notes by typing or dictating and about one half type and one half dictate. Nursing and other caregivers document all care in one multidisciplinary application that also includes respiratory care, rehabilitation therapies, social services and dietary. The same application is used in the hospital, in all five long term care facility and in area rehabilitation offices. Documentation includes assessments, care plans, interventions and medications administered.

PROCESSES TARGETED FOR IMPROVEMENT

Specific processes targeted for improvement in quality, efficiency or reliability.

These specific processes were targeted for improvement as a part Project Infocare.

GOAL/STRATEGY	VISION	PROCESSES TARGETED
Enhance Access to Care & Improve Continuity of Care	Enable a patient to enter anywhere into the continuum of care and have a personal identity maintained across that continuum.	ADMISSIONS/REGISTRATION & SCHEDULING. Patients will be asked to supply information only once. Patients will be able to schedule appointments from any CMH location.
Provide Physician Connectivity	Physicians will have access to all of a patient's medical information within the healthcare continuum.	MEDICAL RECORDS. Providers will have access to easy-to-use, reliable, timely, accurate, and complete information available from any location. Information will be stored digitally in a retrievable format. Paper documents will be phased out.
Gain Operational Efficiency	Providers will be able to document efficiently and safely.	CARE DOCUMENTATION & CHARGING. Documentation will be captured at the point of care. Charges will be captured automatically as providers document in the system.
Support Facility & Services Expansion	Enable the continuum to become technologically advanced and poised to grow to meet demand and offer new services.	COORDINATION OF CARE. Implementation will be done from an organization-wide perspective, with recognition that CMH serves the same patients across care settings
Push Quality/Performance Improvement	Providers will be supported by clinical decision support that will prevent medical errors.	CARE DELIVERY. CMH will employ the new system tools to enhance patient care, improve delivery and safety of care and support decisions with access to knowledge bases.

2. INFORMATION ACCESS

COMPREHENSIVE NATURE OF PROJECT INFOCARE EMR

Extent to which the EMR captures data necessary for an integrated, longitudinal health record.

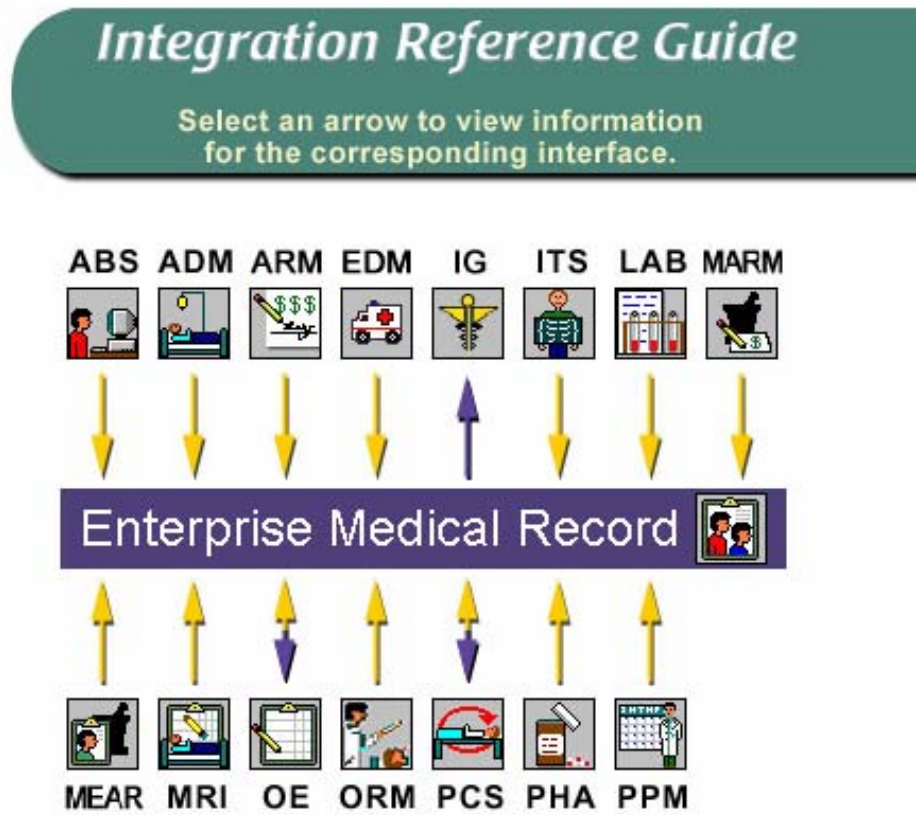
The CMH strategy with regard to the medical record is to complete a comprehensive electronic record that serves as the longitudinal health care record for each patient. To date, more than 64,800 patient records have been created with in the Project Infocare EMR. These records include an entry for all visits within the hospital, long term care facilities, home care and CMH physician clinics.

Each patient has a unique EMR identification number that links their visits and encounters together. Physicians are able to view individual visits, view multiple visits or view all visits for a patient in one comprehensive online chart. The hospital EMR is the complete record and includes all documentation of care as no paper chart is maintained. Any documentation not entered in a digital format is scanned and linked to the EMR for easy viewing.

In the CMH Long Term Care Facilities, all physician documentation and orders are captured in the EMR, along with nursing and ancillary documentation. The remaining paper in the chart is largely administrative and documentation of communication with physicians. One of the CMH Long Term Care facilities is paperless and the other four facilities will be paperless by the end of 2005.

One physician clinic is live with full clinical documentation. Information from each patient’s paper chart in the clinic was abstracted into the electronic record. Key documents are being scanned. Following implementation, no paper will be added to the “historical chart.” Any new paper documents will be scanned into the EMR.

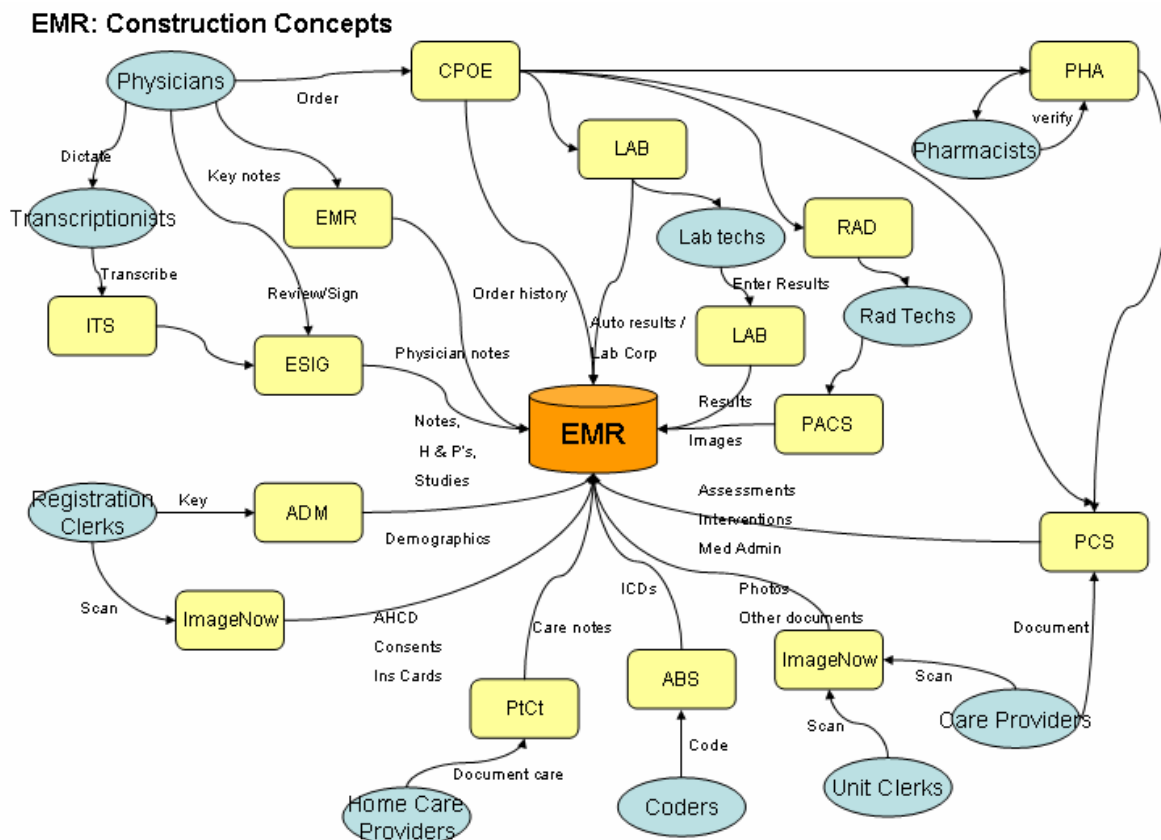
PACS. The Project Infocare EMR also includes digital radiology. Physicians have access not only to transcribed reports on radiology studies, but also to the images. The images are available from any workstation within the hospital network and by remote access. System functionality allows the viewer to zoom, rotate and apply contrast for an enhanced view of the image. Over 2,500 images per month (all images except mammography), are captured as digital images or through computed radiography. As a result, CMH is not only paperless, but also filmless other than mammography.



PROJECT INFOCARE DATA CAPTURE METHODS

Means by which patient data are captured. Interfaces. Methods for accomplishing data entry.

As with a traditional paper record, data is captured from many sources to make up a complete medical record as described in this diagram.



THE EMR INCLUDES all diagnostic test results and reports, physician notes and reports, orders, nursing and ancillary documentation, medication administration records and patient demographics.

PHYSICIAN DOCUMENTATION is either typed or dictated/transcribed into the EMR. A structured note is available in the physician clinic application and will be implemented in the acute and long term care facilities in 2006. Physicians enter orders directly into the system using picklists. In addition, physicians are provided with one-click access to their favorite and common orders. Order sets based on diagnosis or procedure further enhance the ease of use of the system. Pharmacy naming conventions were changed during the implementation to make medication ordering more physician-friendly. Physicians are provided with defaults, prompts and guided choices throughout the system. VOICE RECOGNITION has been trialed by a few CMH physicians, but none have chosen to utilize it on a regular basis yet.

NURSING AND ANCILLARY DOCUMENTATION is done in one multidisciplinary application. Charging for supplies and procedures is done as a byproduct of documentation, eliminating the need for nurses to remember to complete a charge sheet or use charge stickers. Standards of care and care planning are customized by patient diagnosis.

The hospital and all long term care facilities are wireless so that physicians and caregivers are not tethered to the wall and can provide bedside documentation as appropriate for the setting and patients. CMH has adopted a flexible approach to devices after learning of many unhappy hospitals that had invested large amounts in a single device type. In recognizing that users would have differing needs based on their use of the system, their

location, their patient population and their facility layout, CMH allowed users to test various devices and to “swap” devices even after live to find the best fit for their needs. CMH uses laptops on carts, mini-laptops, tablets and desktop PC’s.

It has been a challenge to keep the EMR uncluttered. The billing department at the hospital has had to change their processes and discontinue the practice of monthly discharging to help the care providers and physicians in their use of the EMR. It has become common practice for the IS Specialists and Superusers to ask “but how is that going to look in the EMR?” long before implementing any change to the system.

CPOE

Provider entry of orders. Comparison with rules or standards to reduce errors and improve quality.

Physicians enter orders directly while in the hospital or long term care facilities. They have the option to enter orders remotely, and many choose to do so. Orders are compared in real-time with rules and standards designed to reduce errors and improve the quality of care, including medication interactions and allergy checking, presentation of pertinent lab results, and order-specific rules.

Type/Category	#	% Use	Uses
Admitting Physicians	45	100%	EMR, CPOE, eSignature
ER Physicians	8	100%	EMR, ER Patient Tracker, eSignature
Consulting & Outpatient Physicians	45	50%	EMR, CPOE, eSignature
Hospital & LTC Nursing & Ancillary Caregivers	763	100%	EMR, Care Documentation, Online Medication Administration Record

Physicians using the system include all employed and independent physicians. All orders are entered using CPOE, including procedures, lab, radiology, medication, nursing and ancillary services.

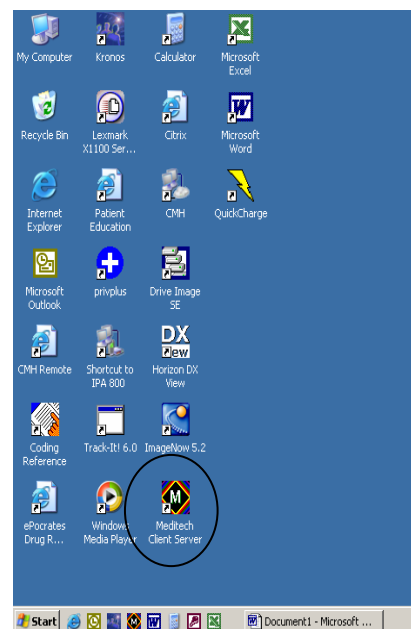
INFORMATION AVAILABILITY AND ACCESS

Availability of the EMR. Remote access to the system.

The EMR is available across the CMH network at the 33 buildings connected directly to the network. There are devices in every department. Users can log on to MEDITECH on any PC on the network.

The EMR is also made available to physicians remotely, so they can access it from home or wherever they may be, which also allows independent physicians to access the EMR from their practice offices.

Physicians can access records by using system features that allow them to quickly view My Patients (any patients currently admitted on which the physician is a physician of record), My Group (all patients for all members of their practice or call group) and My ER Patients (patients currently in the ER on which they are a physician of record). Records are also available using an easy to use patient search by name, visit number, EMR number, or social security number. Once a record is accessed, the physician is presented with all visits from across the continuum of care for that patient. Physicians can view a single visit, multiple visits or all of a patient’s visits in one comprehensive online chart. Trending of test results and special panels with information organized around diagnosis are available in all views.



3. DECISION SUPPORT

TAILORED INFORMATION INTEGRATION

Features that facilitate access to patient-specific information that helps users in specific situations.

The Project Infocare EMR includes special panels which are diagnosis-specific views of patient information. There are currently special panels for Cardiology, Endocrinology, Hematology, Infectious Disease, Renal/Hepatic, and Respiratory diagnoses available.

A Nursing Status Board, specifically designed for each nursing department, presents nurses and ancillary personnel with pertinent data and quick access to patients in their unit or within their responsibility.

The screenshot displays the 'Respiratory Panel' in the Project Infocare EMR. The interface includes a header with the date and time range '16:00 May 27, 2005 - 15:59 May 29, 2005 - 8 Hour Period'. Below the header are navigation buttons for '1 Hour', '2 Hour', '4 Hour', '8 Hour', and '24 Hour', along with a 'Home' button. The main content area is divided into sections: 'Respiratory Data (Ventilation)', 'Supplemental Oxygen', and 'Cardiovascular Data'. The 'Respiratory Data (Ventilation)' section includes 'Respiratory Rate' (16 (+)), 'Respiratory Effort' (Normal (+)), 'Lung Assessment' (Posterior Throughout), 'Breath Sounds' (Respiratory Phase), 'Throughout' (Rhonchi), and 'Breath Sounds' (Wheezes). The 'Supplemental Oxygen' section includes 'Pulse Oximetry' (90 (+)), 'Oxygen Saturation Assessment' (97% (90-100)), and 'O2 Delivery Method' (CAG (+)). The 'Cardiovascular Data' section includes 'O2 Flow Rate' (15.0 (+)) and 'FI02' (60 (+)). A right-hand sidebar titled 'Special Panels' lists various options such as '24 Hour', 'Vital Signs', 'I & O', 'Notes', 'Medications', 'Order History', 'Allergies', 'Laboratory', 'Other Reports', 'Care Trends', 'Care Activity', 'History', 'Summary', 'Reports', 'Order', 'Graph', 'Print Screen', 'Suspend', and 'Help | Other Menu'.

DECISION SUPPORT APPLIED DURING CPOE, ORDER/CLINICAL PRACTICE STANDARDIZATION & KNOWLEDGE-BASED PROMPTING & ACCESS

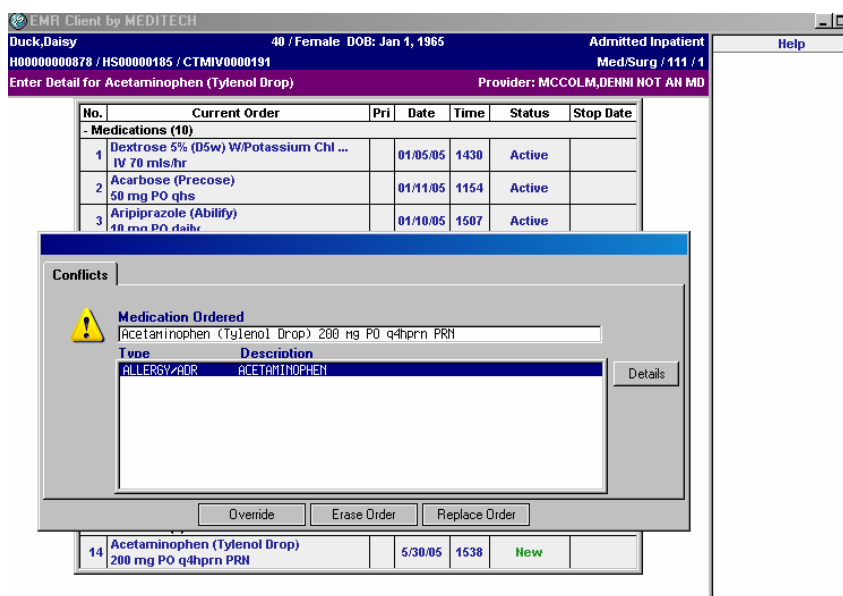
Alerts, prompts and other decision support applied during CPOE. Features that guide users to incorporate recommended practices, enter complete orders, and provide clinicians with access to relevant knowledge.

These decision support tools are used within the Project Infocare EMR and CPOE to support physicians and caregivers during the processes of providing care and entering orders.

- During online medication ordering, physicians are presented with allergy and interaction checking alerts.
- Medications are grouped by type so physicians can easily find alternatives when alerted.
- During medication ordering, physicians are presented with pertinent lab results. For example, if they order Lanoxin, the system will automatically present the patient's pulse rate and dig level.
- Common medication doses and schedules are presented for each medication to streamline the order process and also to minimize errors.
- Administration times of medications are available in the EMR along with documentation of the results, such as pain relief and side effects.
- Medication monographs from First Data Bank are available in both the medication ordering and online medication administration screens
- Order sets have been developed by physicians with special knowledge. For example, an Endocrinologist developed a hypoglycemia set for use by all physicians.
- Orders are automatically created based on nursing documentation. For example, if a nurse documents that a patient smokes and has expressed interest in smoking cessation, an order for a smoking cessation consult is automatically created and transmitted to that department.

- Nursing assessments trigger patient-specific standards of care and documentation tools.
- Nurses are presented with lab results and special instructions during medication administration. For example, during administration of insulin the nurse is presented with blood sugar results.
- Sound alike-look alike medications are flagged for physicians during ordering.
- From links within the EMR, clinicians can access additional resource information, including Krames On Demand patient education, ePocrates drug reference materials and Doctor at Hand, an online system that matches medications with side effects to assist physicians in determining which medications may be causing problems for the patient.

Standard reports are used to monitor the frequency of alerts and how often they are overridden or accepted. Based on these reports, and user feedback, the alerts have been adjusted to assure that physicians are alerted appropriately with meaningful information.



AGGREGATED DATA ANALYSIS AND REPORTING

Features and tools for extracting and aggregating patient information. Reports easily available.

The MEDITECH system includes over 7,000 reports. Types of reports include:

- Standard reports are available in every software application.
- Selection reports where patients are “selected” based on criteria such as diagnosis, lab test results, discharge date, admitting physician and hundreds of other criteria.
- Custom reports that are created by IS Specialists across applications.
- A Data Repository provides another set of the data from the EMR that allows for reporting using common office tools like Crystal Reports.
- An Executive Support System provides drill down capability on standard reports and customizable views of information.

In addition, CMH has recently joined the Institute for Health Metrics (IHM). IHM provides data mining of MEDITECH data for quality improvement purposes. IHM takes raw data from hospitals with the MEDITECH system and analyzes that data for 1) reporting of required data for CMS and JCAHO quality monitors, 2) benchmarking with other hospitals regionally and nationally, and 3) providing data for proactive and robust performance improvement.

4. WORKFLOW & COMMUNICATIONS

PROJECT INFOCARE WORKFLOW

System capabilities for supporting improved workflow within clinical units and across units.

Orders are immediately transmitted to the appropriate area after entry into the system. Nursing and ancillary areas are notified of pending orders in various ways, depending on their department workflow. Nursing personnel are notified of all new orders on their Nursing Status Board.

Physicians are alerted to new information within the EMR by the color of the various EMR tabs (Lab Results, Imaging Reports, etc.). Physicians also have a special desktop that facilitates their workflow by providing easy access to the EMR, e-signature, incomplete records lists, and their office and operating room schedule.

COMMUNICATIONS IN CARE DELIVERY

Capabilities of the system to facilitate communication among personnel participating in the care delivery process. Functions that support hand-offs among entities and cross-entity communication.

In addition to care orders that are transmitted immediately to care providers, physicians can send a “Message to Nursing” with special instructions or information about a patient.

When patients are transferred from unit to unit within the hospital, their EMR is immediately available in the new area so no manual transfer of information is necessary. The same holds true for transfers from facility to facility within the organization. A transfer summary printout is provided for the transport time, but the EMR is accessible from all locations so re-entry of data is not necessary when the patient arrives.

Within the EMR as implemented in physician clinics, there is a physician desktop that alerts physicians to critical lab results, pending tasks and requested prescription refills. A tasking feature also allows communication to flow throughout the physician clinic and includes office staff, nursing staff, clinic administration and physicians.

PATIENT FEEDBACK & ROLE IN IMPLEMENTATION

Role patients and families have had in the design of the EMR. Plans for future patient interaction.

The redesign of processes and care documentation using the EMR has been patient-centered. One key part of the vision of Project Infocare is to meet the expectation of patients that they are “known to the system” and should not be repeatedly asked for the same information as they move throughout the continuum of care. Patients were notified of the new system through the use of posters during the first few months of implementation. All patients registered during the first 90 days of the new system were entered into a drawing for a weekend get-away in Branson, Missouri. Patients have also been issued Express Registration cards as a part of the Patient Friendly Registration initiative. Patients receive the card with an explanation of how it can be used to speed their registration process.

Future plans call for a Project Infocare patient portal that will include access to test results and reports, email with physicians, and appointment requests.

5. DATA SHARING

How data from outside the organization is incorporated into the EMR. How patient information is communicated to other organizations.

Interfaces are used to capture PACS images, referral lab results and lab results from analyzers. Other data from outside the organization is scanned into the system and linked to the patient’s EMR. One area hospital, located

in the same community as one of the CMH long term care facilities, is inputting lab results using remote access to the system.

When a patient is transferred outside the system, a care summary is printed and sent along to provide pertinent information to the receiving facility. CMH also participates in data reporting to the Missouri Hospital Association Hospital data reporting system, in disease surveillance reporting and in emergency preparedness and resource reporting using system tools and reports.

6. OTHER OPERATIONAL ACTIVITIES

ADMINISTRATIVE INTEGRATION WITH THE EMR

How administrative and financial management functions are integrated with the EMR.

As per the integration strategy adopted by CMH, the financial and administration applications are integrated into the EMR system. General Ledger, Accounts Payable, Payroll/Personnel and Materials Management are all MEDITECH applications. Kronos Workforce Time & Attendance, QuickCharge Payroll Deduction system and 3M Coding and Reimbursement system are all interfaced to the appropriate application within MEDITECH.

Due to the integration and data sharing, the new system has had a positive impact on the revenue cycle by leading to a reduction in accounts receivable for the CMH physician clinics. The impact is due to the use of one data base that both supports the patient-centered EMR and more efficiency in charging and billing processes. Days in accounts receivable for the clinics has been reduced by over 30 days. The system also has improved charge capture by the use of automatic charge capture as a by product of care documentation.

The system also allows for improvements in billing and financial accounting processes through proration of accounts to determine and track expected reimbursement, the use of medical necessity checking during scheduling and the process of "scrubbing" claims before submission to payors for appropriateness of coding and charging, all of which improve net reimbursement and help in reducing claims denials.

In addition, there is a wealth of information about the CMH patient population that is accessible due to the integrated nature of the EMR, including the number of new patients to the system, prevalent diagnoses, what services those patients are accessing, which physicians have referred them and other demographics.

PATIENT SAFETY

How the system supports efforts to reduce medical errors and improve overall quality of care.

Key features in the Project Infocare EMR and CPOE that support patient safety efforts are:

Elimination of handwriting and transcription errors when physicians enter their own orders using CPOE.

Completeness of orders through the use of required fields in CPOE. Required fields are minimized as much as possible for physician convenience, but still require that they enter a complete order and don't leave important data for a nurse or pharmacist to fill in.

Clinical decision support during the ordering process, including presentation of 1) allergy and interaction checking, 2) pertinent lab results, 3) common medication doses and schedules, 4) sound alike-look alike medication flagging, 5) order sets that are have been developed and reviewed by physicians with special knowledge and 6) suggested orders created automatically from nursing documentation.

Immediate access to clinical information, including orders, nursing documentation, response to treatments, radiology exams and lab results, which supports physician care decisions.

Access to complete patient medical history from across the continuum of care provides physician with better information with which to make treatment decisions.

Access to knowledge bases with information for use in patient education (medication monographs and diagnosis/procedure instructions) and for physician reference (drug references and side effect checking) provides another opportunity for improvement in the safety and quality of care.

Use of the electronic medication administration record ensures that medication information and orders are current to the minute. Early in the implementation, a physician champion decided to discontinue an order from his home just 10 minutes prior to its scheduled administration. He then called the nurse just to be sure. She said, "Yes." She'd just seen his discontinue order appear on her screen as she was preparing the patient's medications for administration and she had removed the medication to prevent it from being administered.

RESEARCH

Support to research and education, clinical trials, epidemiological surveillance, technology assessment and linkages to larger, multi-institution research and evaluation databases.

CMH is receiving an implementation grant from the Agency for Healthcare Research and Quality in their "Transforming Quality through Health Information Technology" (TQHIT) grant program. The grant not only includes a monetary award but also access to the National Resource Center developed by AHRQ for TQHIT grantees and forums that include interaction with other grantees. The purpose of the grant is to evaluate the effects of health information technology on improving patient safety and quality of healthcare. The objective of the grant is to assess the extent to which health information technology contributes to measurable and sustainable improvements in patient safety, cost and overall quality of care. Research resulting from the grant is intended to inform providers, patients, payers, policy makers, and the public about how health information technology can be successfully implemented in diverse health care settings and lead to safer and better health for all Americans.

In order to be considered for the grant, CMH provided evidence of successfully completing a multi-institutional planning process that had prepared CMH to successfully implement health information technology. CMH was required to describe the planning process, what was learned from the planning process and how lessons learned were incorporated into the implementation plan.

The three-year grant of \$1,500,000 is being used to extend the EMR into the CMH Emergency Department and physician clinics, to expand clinical decision support tools, to implement barcoded bedside medication verification, to enhance physician documentation tools and to implement a patient portal. As a grantee, CMH will be measuring the adherence to standards of care as established by evidence-based medicine, physician productivity during and after implementation in physician clinics, and improvement in the use of preventative screenings and maintenance care for chronic conditions.

As described above, CMH is also a member of the Institute for Health Metrics. The Institute is developing a multi-hospital database for quality improvement and benchmarking purposes. In addition, CMH participates in hospital data reporting, disease surveillance and emergency preparedness reporting.

REGULATORY IMPACTS OF PROJECT INFOCARE

Describe how the EMR facilitates external data sharing and regulatory reporting.

To CMH's surprise, working with regulatory surveyors has actually been one of the challenges of the implementation of the EMR. Although the leadership at CMS promotes the use of electronic health records, CMH's first experience with a hospital CMS surveyor after going paperless was problematic. The surveyor refused to review the online record and instead insisted on a printout. The nursing staff and administration were unfamiliar with the layout of the vast amount of data that was presented in the paper printout of the EMR creating confusion and difficulties in communication.

As a result of that experience, CMH has improved and simplified the printout of the medical record. Although much detail is available in the system, including the date and time an order was entered, the date and time that order was transmitted to the appropriate department, the date and time that order was acknowledged by the receiving department, the date and time the results were submitted, the date and time the results were available and the date and time the provider viewed those results – that is too much information for use by a surveyor. The revision of the printed medical record is simplified and organized so that the important information is more clearly presented and understood.

In addition, CMH was invited to present the EMR to the regional directors of the long term care surveyors in the State of Missouri. The long term care surveyors have adapted well to the EMR. Those who visit CMH’s long term care facilities are provided with a wireless laptop and a signon to the EMR. They do their evaluation of the records online.

In contrast to the initial experience with CMS surveyors, the hospital’s first experience with a JCAHO surveyor was much better. The surveyor promoted and used the EMR as a part of the survey process. The surveyor not only signed on to the system and learned to use the EMR, but also articulated and reinforced the safety features of the system for the nursing staff.

7. USER SATISFACTION, PRODUCTIVITY & EFFECTIVENESS

SYSTEM USE

Extent to which intended users are making use of the EMR. Percentage of orders entered using CPOE.

One of the benefits enjoyed daily by CMH employees is the instant availability of patients’ complete medical records. A nurse in a long term care facility can view lab results from a resident’s last hospital stay at the same moment that the hospital business office is researching the coding or billing of that visit. The following diagrams illustrate EMR access activity in a sample hour. During this time, 115 users launched 1,260 requests for information to the EMR housed on a database server in the data center. In this hour, visit information was “delivered” from eight different facilities – the hospital, clinics, long term care facilities and home health. 352 patients’ records were requested and delivered, virtually, for use. Since CMH bundles all facility visits together to form the comprehensive EMR, each patient may have many visits. 1,074 visits were accessed in this hour.

An Audit of EMR Activity for One Sample Hour from Monday, May 2, 2005



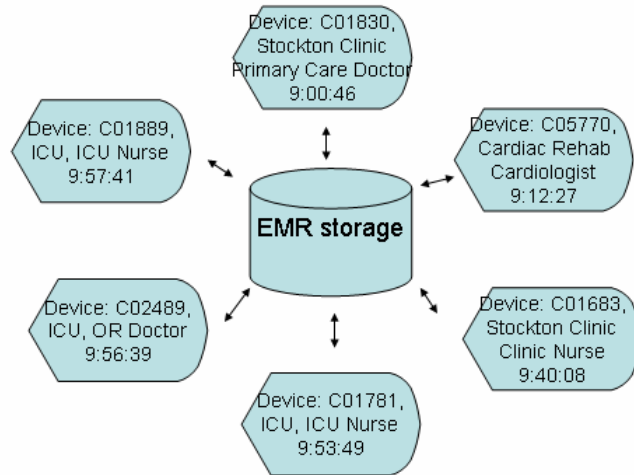
9:00AM ----- 10:00AM

Just a few years ago, patients' charts were physically housed in medical records departments in several counties. Those charts were moved in stacks from the care areas to the physicians' desks, to coding, to billing, then to racks and racks of file folders. How many charts could be located, delivered and "worked" in an hour before Project Infocare?

This diagram illustrates access to one of the most "popular" charts in this sample period. During this hour, the medical record for Patient 8099 was accessed by six different healthcare professionals from six different locations. The devices, or computers, used illustrate the accessibility of the EMR. The record was viewed in the OR, in ICU, in the cardiologist's office at the hospital, and in the primary care physician's clinic, 25 miles away.

More than half of all orders are entered directly by a physician or nurse practitioner using CPOE for hospital patients.

One "Chart" in Many Places: Access to Patient 8099, 9:00AM – 10:00AM



TECHNOLOGY

1. SCOPE & DESIGN OF THE SYSTEM

SYSTEM DESCRIPTION & ARCHITECTURE

Description of the hardware, software, database management, data input technologies, linkages with external systems and databases, image processing and storage, portable and wireless point of care devices.

CMH has come a long way with regard to information systems infrastructure. Five years ago, the organization did not have a computer network, email, voice mail, or shared file and print services. Computing consisted of running limited financial and scheduling applications off of "green screens" attached to an AS400. Dedicated 56K lines and terminal emulation provided limited remote access.

Today, CMH has a progressive, integrated computer system with a network backbone supporting local, metro and wide area networks connecting 33 building. Most facilities are wireless, a variety of devices are used and remote access is provided to all applications.

HARDWARE

SERVERS. Application software runs on 50 IBM and HP servers. All MEDITECH servers use external storage with Raid 0+1 disk redundancy.

CLIENT WORKSTATIONS. The over 700 client workstations on the CMH network are a mixture of desktops, laptops, tablets and mini-laptops. 267 of these devices are mobile and communicate to the network via secure wireless. Mobile devices are either carried or mounted to a variety of carts with arms.

PRINTERS. CMH has 122 printers on the network. HP laserjet printers are used for "everyday" office printing. Datamax thermal printers are used for barcode / requisition printing in lab and radiology. Zebra thermal printers are utilized in physician clinics for to print barcoded labels for specimen identification.

SCANNERS. 64 Fujitsu 4120 desktop scanners are used for document scanning utilizing a point-of-origin model for EMR scanning. Scanners are also used to capture employment applications, invoices and EOB's.

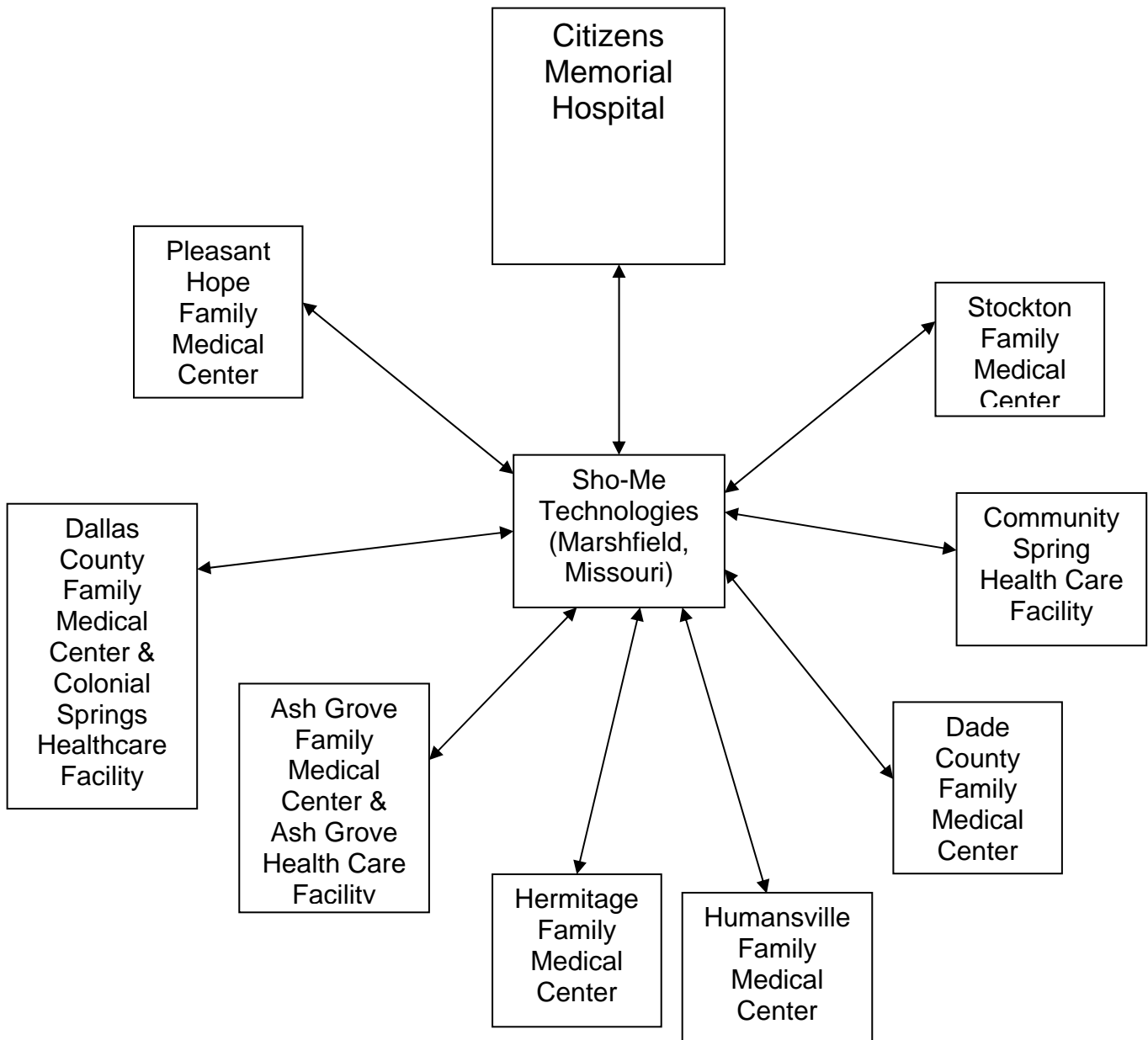
BACKUP SYSTEM. Legato Networker and a Qualstar 4660 tape library provide an enterprise backup solution.

NETWORK

NETWORK BACKBONE. The CMH network is supported by a Cisco 6513 core switch.

LOCAL AREA NETWORK. Gigabit fiber connects the computer room to secondary closets. Clients connect via 100 M copper or 54/11M wireless.

METRO AREA NETWORK. The CMH metropolitan area network consists of 9 campus buildings as well as 7 buildings located within the city of Bolivar, Missouri. CMH connects all of them via leased dark fiber, providing gigabit connection with Cisco switches.



WIDE AREA NETWORK. The CMH WAN consists of a SONET ring provided by a rural electrical cooperative. The system provides a 1.5 MB connection to each of 10 off-site locations and collapses back into the hospital network via a 10 M connection. These connections also provide two local telephone extensions to each of the facilities by channelizing the T1 and pulling two 56K channels out for voice to provide toll-free calling with the hospital.

WIRELESS BRIDGES. CMH provides two remote locations with network connectivity via wireless bridges from existing WAN locations. This provides connectivity to facilities that would have otherwise had to purchase an expensive dedicated connection or rely on dial-up Internet connections.

WIRELESS. CMH has a large number of wireless-enabled facilities currently utilizing 60 Cisco Access Points. Wireless is fully implemented in the hospital, all five Long Term Care Facilities, three administrative buildings, and three physician clinics. All remaining physician clinics will become wireless within the next 12 months as part of the EMR implementation. Wireless security is provided via Microsoft's PEAP. Client devices initially utilized Cisco wireless cards, but currently devices are purchased with integrated wireless.

INTERNET CONNECTIVITY. Connectivity to the internet is provided by a dedicated T1 with Cisco 2621 and Watchguard Firebox. All users with network connections are routed through the hospital firewall. The firewall provides PPTP and IPSEC VPN for incoming access which is currently used by vendors for live interfaces.

REMOTE ACCESS. CMH uses the Internet and Citrix Security Gateway to provide remote access to authorized users. One physician claims to provide "bedside care" by keep his laptop next to his bed at night. If there is a call from a nurse regarding a patient, he doesn't have to rely on the minimal information he would get on the telephone – he can log on, see the full extent of the documentation and enter his order for care of the patient.

IMAGING

DOCUMENT MANAGEMENT. ImageNow by Perceptive Vision, Inc. is utilized for scanning the few paper documents and linking them to the EMR. A designated server is used for image storage and retrieval

PACS is contracted through Quick Study Radiology, Inc. (QSR) on a fee per study basis. Images are captured through a DICOM interface directly from modalities or through computed radiography. The images are maintained on a server at CMH that is owned by QSR and also duplicated on servers at the QSR facility in St. Louis, Missouri. The system is deployed over the CMH network and the images are available on all network workstations and by remote access.

DATA MODEL

Data modeling methodology and approach.

The data model is a hierarchical, proprietary database from MEDITECH. The software structure allows customization of processes and content through the tailoring of rules and master tables. Each data element is described in a data procedure module. Most can be accessed using a proprietary custom reporting tool. Additional custom fields or queries are specified by CMH and used for data collection, storage, and retrieval. CMH also builds some rules that govern data entry.

The EMR has an index pointing back to original data in connected applications. Data and the indices are never purged from the EMR.

INTEGRATION

Approach to integrating the EMR across care settings. Approach to communication and data sharing.

The EMR at CMH is fully integrated – both by design and with external systems. The integration of the system ensures that patient data is centrally located and accessible for any visit – hospital, long term care, physician

clinic or home care. This integration is done with a variety of internal interfaces between the systems and applications. The end user is presented with an EMR that displays all patient information for any visit. External interfaces are done via HL7 and a variety of communication methods.

TRANSFERABILITY

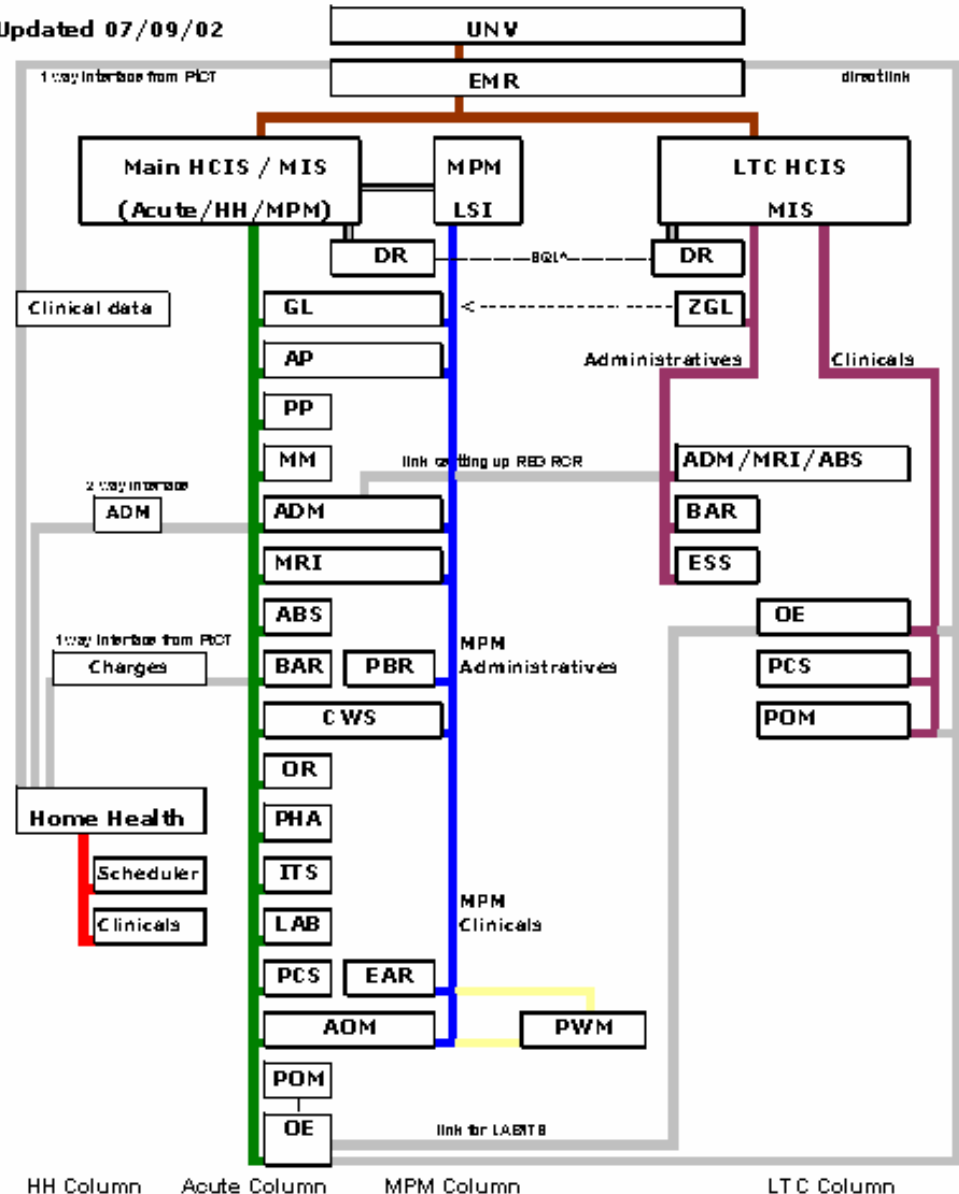
Design tradeoffs between standardization and flexibility, between general and setting specific solutions.

As described in the Management Section, one of the guidelines adopted by the IS Steering Committee was to implement common system solutions for like functions across departments to provide operational integration across the continuum of care. Much effort has been invested in preserving integration and a patient-centric view, but within that view and within the documentation tools, there is much flexibility employed to help assure that the EMR works for each individual department and user.

The view and use of the EMR is tailored to the role of the user. Users can view individual visits, multiple visits, or all visits for any patient. Numerical information can be requested in trend graphs. Assessment tools are specific to location and include variations for each nursing floor (medical/surgical, ICU, geriatric psychiatry, obstetrics, long term care) and for ancillary services (rehab, respiratory care, sports medicine, dietitian, social services and infection control.)

CMH has traded standardization for flexibility in devices. Although it would have been far easier to purchase a large number of the same devices, CMH recognized that departments and users would have varied needs depending on their use, patient population and facility layout. CMH has been successful in implementing the EMR in part due to the flexibility offered in device selection. CMH purchased a variety of devices and allowed users flexibility in selecting the right device for their needs. CMH continues to add, change, and move devices to meet user needs.

CTM Structure
Updated 07/09/02



SCALABILITY

Approach to ensuring that the EMR system can be scaled up or down.

CMH invested in network infrastructure and selected the client/server platform to help provide scalability. Scalability is further enhanced by the use of Citrix for remote and local access. For any new function or service, anywhere with Internet access, the system can be instantly available through a web browser.

EMERGING TECHNOLOGIES

Approach to ensuring that the system can accommodate emerging technologies and innovations.

CMH has configured the Project Infocare infrastructure and systems to accommodate new technologies. For example, with wireless access CMH began implementation-using 802.11B and migrated to 802.11G as soon as it was available. CMH budgets to trial new technologies in preparation for future use. CMH is budgeted to trial these new technologies this fiscal year: IP telephony, a new wireless security protocol, biometric authentication, single signon, and PDA's with integrated bar code readers.

2. SECURITY & DATA INTEGRITY

SECURITY/CONFIDENTIALITY & HIPAA COMPLIANCE

Features employed to secure and protect access to confidential patient data.

Unique user names and passwords are assigned to each user and each user's access to the system is logged and audited. Passwords changes are initiated every 90 days. User sessions timeout and users are trained to suspend sessions when leaving a device. Users are assigned to profile groups, based on their role and position, which gives them an appropriate level of access to patient information. A confidentiality agreement is signed by all users. An additional confidentiality agreement is signed by remote users. Policies are written to conform to HIPAA privacy and security requirements.



Use is audited and any questionable accesses to the EMR are reported to the CMH Corporate Compliance office for follow up. Industry standard security techniques such as port disabling, password expiration, enterprise antivirus, lack of local removable drives, and use of certificates are some of the many ways that CMH ensures that the computer systems are secure and confidential.

12/20/2004	0636	12/20/2004	0642	C01979	GPHILL	Compile P
12/20/2004	0638	12/20/2004	0641	C05765	CLYVER	Compile P
12/20/2004	0641	12/20/2004	0656	C05765	CLYVER	Process P
12/20/2004	0642	12/20/2004	0800	C01979	GPHILL	Process P

PATIENT ABS.PAT 170729 Pat Wlist Process Abstract

DATA QUALITY & INTEGRITY

System design features for ensuring reliable, complete and accurate data in a timely fashion.

System alerts for applications flowing into the EMR provide notification to technicians by email and pagers for jobs or queues out of specified ranges. Data integrity checks are stored and verified by the vendor and in-house IS specialists. The EMR system performs nightly integrity checks on all HIS data and has never had a bad integrity check. MEDITECH maintains guidance on its website for recovery and restart of operations after an

outage. CMH has a fully functional TEST version of the software available to all users. The test environment provides the ability to fully test any changes prior to production use.

SYSTEM INTEGRITY AND DISASTER RECOVERY

Technologies and design features to ensure system integrity and restore it when components fail.

System integrity is ensured via industry standard procedures including:

- Enterprise Antivirus
- Firewall
- Redundant hardware components (backup fans, battery backups, etc.)
- Desktop policies restricting user rights and access to removable media
- Physical lockdowns of computer room, closets, and ports

CMH continually evaluates the risk of each network and server component and determines the cost effectiveness of full redundancy. All core hardware and software components are either covered by service plans or have hot spares or both – depending on criticality. Critical client equipment is also covered by maintenance or spares. Information systems staff is available 24X7 with a one hour response time for critical failures.

To provide backup of data, CMH utilizes an enterprise backup solution. Tapes are rotated to on-site and off-site vaults per a pre-defined rotation schedule – resulting in daily, weekly, monthly, and annual backups. The EMR system does not have to be “down” to be backed up. The system makes a snapshot of the EMR data each night and the snapshot is backed up by the enterprise backup system.

DATA ARCHIVING & STORAGE

Extent and manner in which the EMR system design and policies and procedures meet legal requirements concerning the longevity and indelibility of patient record information.

The EMR has an index pointing back to original data in connected applications. Data and the indices are never purged from the EMR. All data entry is date, time and user stamped. CMH has not had a need to purge any EMR data. Should there come a time when a purge is necessary for system performance or other reasons, CMH will archive the data to be purged in report format in the ImageNow system with links to the EMR.

CMH physicians did question the legality of the EMR and the CMH attorney and the attorney for the CMH liability insurance carrier were both consulted. The CMH attorney made a presentation to the medical staff regarding his opinion that the Project Infocare EMR complies with the legal requirements for a medical record in the State of Missouri. The attorney for the liability insurance carrier agreed with the opinion.

3. STANDARDS

COMMON USER INTERFACE STANDARDS

Extent to which the EMR system has achieved a consistent user interface.

Due to the full integration of the system, the EMR view is consistent across the continuum of care. Based on user profile and access the view is the same wherever the user signs on to the system. Within the EMR, users can “drill down” or switch to alternate views by clicking on labeled buttons. Out of range values are color coded. Each visit type has its own icon (long term care visits have a wheelchair, hospital visits are noted by a patient bed). Unavailable panels are “dimmed.” Areas with new data are highlighted by color for each user. On line help is available in all views.

DATA EXCHANGE STANDARDS

Extent to which industry standards (HL7, CCOW) are employed for messaging between systems.

CMH has implemented the following HL7 interfaces in Project Infocare.

Interface Description	Standard Employed	Data Transfer
PACS	HL7	ADT, Orders, and Reports from EMR to PACS. Status update and image link from PACS to EMR.
Pyxis	HL7	ADT, Orders from EMR to pharmacy dispensing machines.
LabCorp	HL7	Orders from EMR to Labcorp. Results from Labcorp to EMR.
Lab Analyzers	HL7	Lab results to EMR.
Kronos	HL7	Time and attendance and payroll deduction to Payroll application.
Virtual Radiology	HL7	PACS images available to remote radiologists.

CMH also transmits claims, receives remittance advices and places supply and medication orders electronically.

DATA CONTENT & VOCABULARY STANDARDS

Extent to which EMR uses standards to ensure consistency in data definition, exchange and use.

As interoperability standards unfold within the industry, MEDITECH has committed to take an active role to assure that all MEDITECH systems will have the ability to share patient medical records across settings and providers using standard communication protocols and medical vocabulary – whatever those final protocols may be. The MEDITECH EMR is designed with data from “supply” applications mapped using standard EMR ID’s. Standard EMR ID’s are utilized regardless of the data’s source. Use of EMR ID’s puts the system in a good position to be able to conform to interoperability standards and vocabularies.

To ensure that MEDITECH’S systems continue to meet requirements in flux, a dedicated resource at MEDITECH monitors and reviews standards in all care settings including acute, ambulatory, long term care and home care. Through the use of a functionality report card, MEDITECH tracks the progress of their system in meeting emerging EHR standards.

COMMUNICATION & NETWORKING STANDARDS

Use of industry standards for communicating and networking.

CMH supports the industry standards of TCP/IP, DICOM, IPSEC, and PPTP VPN.

4. PERFORMANCE

AVAILABILITY

Ability for the EMR to be accessed for patient care whenever and wherever needed.

The Project Infocare EMR is available on over 700 devices in the 33 buildings connected to the CMH network and by remote access. Devices are located in every facility and department. The EMR is available from all CMH computer desktops through the use of a user name and password. Upon logon, the user is presented with whatever applications and views they have been assigned based on their role and responsibilities. Specific devices are designated for physician use only in patient care areas. Many CMH physicians have been issued wireless laptops and tablets and access the EMR while eating breakfast in the cafeteria.

RESPONSE TIME

System response times during peak usage periods and at all locations.

In the hospital and at all campus and metro facilities, users enjoy very fast access to the network with a gigabit backbone and 100M client network connections. Wireless users use an application server to make up for the small performance degradation caused by the 54M wireless network. In WAN locations, system response times are adequate, but could be improved and CMH is evaluating performance improvement options and weighing options. Possibilities include increasing bandwidth, deploying application server technology, or both.

CONTINUITY PLANNING

Downtime plans for short and long term outages.

CMH EMR has experienced only a few minutes of unplanned downtime since implementation of the first applications in October, 2002. CMH does schedule the monthly planned downtime of 2.5 hours. Scheduled downtime allows CMH to perform regular system maintenance. to test and implement new systems and to test disaster recovery procedures.

Client Server Data Recovery Planning Electronic Medical Record

Planning for Critical Data Availability
Downtime Scenarios/ Questions to Consider
What to Do Before Users are allowed on the System

Planning for Critical Data Availability

When EMR is Down, the following should be considered:

The Enterprise Medical Record application is an on line chart that represents a single viewing source from which all relevant clinical results for a patient can be viewed. Results and demographic information flow into the EMR from a wide range of other applications including ADM, PCS, LAB, ITS, and PHA. Nothing purges from the EMR. Navigating through the EMR is done mostly by utilizing the mouse. There is some keyboard functionality used for identifying patients and for POM. Provider Order Management is an ordering feature within the EMR that encompasses allergy management and the ordering of tests and medications. This is the only information that is generated in the EMR, it is mostly a receiving application.

Critical Data - All clinical results in the EMR are considered relevant and critical. If the EMR is unavailable then the other clinical applications that feed the EMR will need to be relied upon. The IS staff at the hospital must have a plan in place to provide this information to the physicians in a timely manner if the EMR is experiencing downtime. Downtime procedures must be defined and all users must be aware of them.

- What is needed depends on if feeder apps are down as well. If they are down no new data will be available.

Downtime plans are maintained for each department and are utilized during monthly planned downtime.

CMH also utilizes downtime scripting to “push” a copy of pertinent patient data to a pre-defined computer in each clinical area. This data is gathered and delivered to the hard drive every few hours via a Boston Workstation script. This push is done several times a day and provides instant access to pertinent patient information in the event of system failure.

In the event of long term downtime, CMH would begin a documented recovery. The primary difference between a short and long term downtime scenario is that in a long term downtime, some paper documentation would be scanned whereas during short term downtime, all paper documentation is entered into the EMR as data elements in the form of retro-documentation when the system is available.

UPGRADES & ENHANCEMENTS

Ability to implement changes that leverage new capability for user of the EMR in an orderly process.

Over the next year, CMH will implement a SAN, wireless network management tools, bar-coded bedside medication verification, enhanced physician documentation tools, improved clinical decision support and evidence-based order sets and a patient portal. Cross-departmental implementation teams, including IS Specialists, Superusers and end users, will continue to be used for these implementations.

VALUE

1. MEETING EXPECTATIONS OF ROI

Success in meeting goals.

EXPECTED ROI	ACTUAL RESULTS TO DATE
Growth of admissions. Increase in revenue due to the use of standard protocols. Increase in net revenue by more accurate coding made possible by improved availability of information to substantiate diagnoses.	Adjusted Occupied Beds (a measure of in and outpatient volume), have increased from 101 to 138 and net patient revenues have increased by 23% since in the implementation of Project Infocare. With new physicians and services in the mix, it is difficult to sort out the impact of just Project Infocare, but CMH feels that the project has had a positive effect on volume.
Elimination of five positions.	Reduction of FTE's per Adjusted Occupied Bed from over 6.0 to 5.5. At 138 AOB's, that difference totals 69 FTE's . Again, not all of this reduction is due to Project Infocare, but clearly the project has had a positive impact.
A decrease in transcription costs.	CMH has not experienced a decrease in transcription costs. In fact, given the option to enter or dictate their daily notes, more physicians have opted for dictation than before Project Infocare. CMH is introducing additional, easy-to-use structured notes tools that should entice more physicians to do direct entry of daily and clinic progress notes.
Elimination of medical records scanning and microfilming costs.	CMH has eliminated all medical records filming costs which were \$48,000 to \$60,000 per year before Project Infocare.

2. ACHIEVING DESIRED CHANGE IN TARGETED PROCESSES

Success in achieving improvement in processes as described in Functionality section.

VISION	PROCESSES TARGETED	OUTCOMES/MEASURES TO DATE
Enable a patient to enter anywhere into the continuum of care and have a personal identity maintained across that continuum.	ADMISSIONS/REGISTRATION & SCHEDULING. Patients will be asked to supply information only once. Patients will be able to schedule appointments from any CMH location.	Over the past 12 months, patients were admitted or registered for care 204,674 times at CMH. 189,912, or 92%, of those times, the patient was "known to the system" (i.e. they already had a record in the EMR) and therefore they only were asked to verify and update information that was already on file. 20,000 Patient Friendly Express Registration cards have been issued to facilitate quick, accurate patient identification. Of the 1,916 radiology exams scheduled at CMH in April, 2005, 1,184, OR 62% were scheduled directly from physician offices.
Physicians will have access to all of a patient's medical information within the healthcare continuum.	MEDICAL RECORDS. Providers will have access to easy-to-use, reliable, timely, accurate, and complete information available from any location. Information will be stored digitally in a retrievable format. Paper documents will be phased out.	64,860 unique patient records have been created in the EMR system. Each record includes information about all visits and encounters the patient has had with the continuum of care, including hospital, long term care, home care and physician clinics. A unique EMR identification number links visits and encounters together. Physicians are able to view individual visits, view multiple visits or view all visits in one comprehensive online chart.

VISION	PROCESSES TARGETED	OUTCOMES/MEASURES TO DATE
		<p>In a sample hour on May 2, 2005, 115 users launched 1,260 accesses to view 1,074 distinct visits on 352 patient records in the EMR.</p>
<p>Providers will be able to document efficiently and safely.</p>	<p>CARE DOCUMENTATION & CHARGING. Documentation will be captured at the point of care. Charges will be captured automatically as providers document in the system.</p>	<p>The hospital and all five long term care facilities are wireless. 267 devices are wireless and support documentation at the point of care.</p> <p>Over \$1,000,000 per month in supply and procedure charges are captured as a byproduct of care documentation without additional steps or tasks. Supply charge capture for inpatients using “yellow stickers” has been completely eliminated.</p> <p>Paper documents have been completely eliminated from the medical record in the hospital and one long term care facility. Paper remaining in the chart for the remaining long term care facilities consists of administrative forms. All long term care facilities will be chartless in 2005. CMH is in the process of phasing out paper charts in the physician clinics as clinical documentation is implemented.</p>
<p>Enable the continuum to become technologically advanced and poised to grow to meet demand and offer new services.</p>	<p>COORDINATION OF CARE. Implementation will be done from an organization-wide perspective, with recognition that CMH serves the same patients across care settings</p>	<p>The Project Infocare EMR includes care information for each patient from across the continuum of care, including the hospital, long term care, home care and physician clinics. The 64,860 patients with records in the EMR have, on average, six distinct visits in their record from across the continuum of care. Some have only one visit to date, while others have many visits across care settings.</p>
<p>Providers will be supported by clinical decision support that will prevent medical errors.</p>	<p>CARE DELIVERY. CMH will employ the new system tools to enhance patient care, improve delivery and safety of care and support decisions with access to knowledge bases.</p>	<p>Clinical decision support tools provided within the Project Infocare system currently include: allergy and interaction checking, grouping of medications, presentation of lab results during medication ordering, presentation of common doses and schedules, presentation of medication administration times, medication monographs available, order sets, automatic orders created based on nursing documentation, nursing assessments that trigger patient-specific standards of care, special instructions for nursing during medication administration and access to resource information from the EMR.</p> <p>One measure CMH tracking is the number of medication alerts and the response to those alerts. In the first quarter of 2005, clinicians were alerted to a possible medication allergy or interaction 329 times. 224 times the clinician entered an override, but 105 times (more than once per day) the clinician erased or replaced the order after they were alerted preventing potential adverse drug events.</p>

3. MEETING OTHER OBJECTIVES

Success in achieving other objectives and unanticipated impacts of Project Infocare.

Surprise benefits from the Implementation of Project Infocare include:

A marked improvement in the revenue cycle where CMH has decreased accounts receivable for the CMH physician clinics from over 80 days to less than 50 days by having the ability to centralize billing and charging functions and databases across 16 physician clinics.

Through automatic charge capture, supply charges per patient day have increased by \$34 (net of price increases) since the implementation of automatic charge capture.

The system has reduced claims denials through the use of real-time medical necessity checking.

Project Infocare has also is allowing CMH to more accurately quantify the effects of marketing efforts through analysis of patient-centered, longitudinal data.

CONCLUSION

In summary, these are the highlights of Project Infocare at CMH in Bolivar, Missouri:

MANAGEMENT: Extensive planning was done for system need, acquisition and implementation. Paper charts were eliminated in the hospital. Physician training and support was provided one-on-one and functionality was personalized to physician practice patterns. Cross-departmental teams were used with loyalty to the project and to their home departments.

FUNCTIONALITY: The Project Infocare EMR is an integrated longitudinal health record that crosses care settings at CMH, which includes hospital, long term care, home care and physician clinics. 100% of admitting physicians use CPOE. Use of the EMR is extensive. Decision support tools and access to knowledge bases are provided.

TECHNOLOGY: The EMR is available on the CMH network in 33 buildings over five counties in Southwest Missouri. The EMR is also available by remote access using the Internet and Citrix.

VALUE: Value has already been demonstrated including financial, clinical and “surprise” benefits.

OF SPECIAL NOTE: CMH has been called on to make many presentations regarding Project Infocare, including presentations for long term care surveyors and administrators, vendor user groups, and grantee forums. CMH has also hosted 21 site visits for other hospitals in the past 16 months.

COMING ATTRACTIONS: The next phases of Project Infocare include full implementation of nursing and physician documentation and CPOE in the hospital emergency department. Completion of implementation of clinical documentation in all CMH physician clinics, implementation of bar-coded bedside medication verification, enhanced physician documentation tools, enhanced clinical decision support and a patient portal.

CMH is an enthusiastic supporter of the electronic health record vision. THANK YOU FOR YOUR CONSIDERATION OF THIS FULL APPLICATION FOR THE DAVIES AWARD.