Informatics Profile

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Introduction to Medical Informatics

MED INF 405

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Informatics Profile

Part I: Informatics profile and Assessment

Hospital Profile

The facility is a 295-bed non-for profit acute care hospital that opened its doors in 1930. Currently there are approximately 1500 employees, with the average length of employment greater than 12 years. There are 580 physicians on staff. Annual admissions are estimated at 14,000, including 1200 births in addition to 48,000 Emergency room visits. The breakdown of beds is:

208 Medical/ Surgical
17-Obsetrics,
26 Intensive Care
20 Pediatrics
24 Psychiatric

Besides the acute care hospital there is an adjacent physician's pavilion, an offsite care station, a diagnostic center, homecare and hospice. The cancer center is affiliated with a medical oncology group at a local university hospital.

Currently there is a very basic computer system in place. The billing department and financial services have a system in place that is adequate at this time. The pharmacy and laboratory are also computerized each with their own system. When the physician writes an order, a unit clerk places the order; for example, the clerk would enter into the computer the requested lab test. Pharmacy orders are sent to the department where the pharmacist or technician enters the information into their system. All progress notes, history and physicals, and orders are written in the paper chart by nursing and physicians.

The anticipated user of the integrated electronic health record includes physicians, nursing, pharmacy, and laboratory. In addition we would like to develop a portal, for patients and providers. With the implementation of any change, we anticipate there will resistance among the staff, particularly the physicians and to a lesser extent, nursing. The physicians realize that conversion to the Electronic Health Record is inevitable, however they are concerned with the functionality and implementation of the system. Since the pharmacy and laboratory have existing systems that they are happy with, unless the new system has the features they deem are essential and demonstrates additional benefits there will be some debate.

There are several items that we are interested in incorporating with the new system. As stated earlier, we have additional locations offsite. We want to integrate these sites using a secure network and since these buildings are with fairly close proximity; we anticipate setting up a metropolitan area network (MAN). In addition, we would like to implement a Virtual Private Network (VPN) to allow for secure remote access to the system. Using a MAN will allow us the flexibility to use voice over Internet protocol (VoIP); Leased lines should connect the locations

to allow for faster transmission rates especially when considering the amount of data transmitted from the diagnostic center.

Our goal is to implement an effective secure, user-friendly system that is expandable for future growth and has redundancy built into the system. This goal include implementing point – of – care documentation in the patient care area using wireless technology along with devices such as tablets, PDA or laptops.
Orders would be implemented at the bedside utilizing computerized physician order entry (CPOE). As this point clinical decision support would be available along with services such as antibiotic assistance programs, and electronic medication assistance that will improve safety and quality.

The strategic plan is to implement the system to be compliant with government standards regarding meaningful use. We realize that the system will probably implemented in phases, and would appreciate a realistic estimated timeline we are hoping with in the next 12 months. Currently there is a minimal IT staff with in the organization, and we will need recommendations regarding the development of an IT department.

Questionnaire

1. What is your organization trying to accomplish with the implementation of the electronic health record?

2. Is your institution trying to qualify for financial incentives for development of the complete EHR?

3. What are the demographics of the hospital?
   a. How many users do you anticipate?
   b. What department will utilize the system?
   c. What are your thoughts regarding implementation, unit by unit or by module overall?

4. Are there existing systems that you would like to integrate or replace within the new system?

5. Would you like employees (Physicians and Nursing) involved in the design and implementation process?

6. Do you currently have an IT department?

7. Describe your IT department.
8. Do you have or want 24 /7 onsite IT after implementation
9. Do you want remote access available?
10. Are there other offsite partners that you would like to integrate with the System?
11. Do you have an existing patient portal?
12. What features would you like in this portal? Do you want patients to be able to schedule appointments from the portal?
13. Do you have an existing security plan? Who is responsible for security? What does the plan entail?
14. What level of support are you interested in after initial deployment?
15. After initial training and implementation, will you do in house training?
16. Have you evaluated any systems that are currently on the market?
17. What features did you like? What features were they lacking?
18. Do you have a budget developed for the project?
19. What is the timeline for implementation?
20. What if any issues do you anticipate?

Part II: Informatics Profile and Assessment

Hospital Profile: Carlsbad Community Hospital

The facility is a 295-bed non-for profit acute care hospital that opened its doors in 1930. Currently there are approximately 1500 employees, with the average length of employment greater than 12 years. There are 580 physicians on staff. Annual admissions are estimated at 14,000, including 1200 births in addition to 48,000 Emergency room visits. The breakdown of beds is:

208 Medical/ Surgical
17-Obsetrics,

26 Intensive Care
20 Pediatrics
24 Psychiatric

Besides the acute care hospital there is an adjacent physician's pavilion, an offsite care station, a diagnostic center, homecare and hospice. The cancer center is affiliated with a medical oncology group at a local university hospital. We anticipate opening the Women's Center for Health and Well being in 2013.

Currently there is a very basic computer system in place. The billing department and financial services have a system in place that is adequate at this time. The pharmacy and laboratory are also computerized each with their own system. When the physician writes an order, a unit clerk places the order; for example, the clerk would enter into the computer the requested lab test. Pharmacy orders are sent to the department where the pharmacist or technician enters the information into their system. All progress notes, history and physicals, and orders are written in the paper chart by nursing and physicians.

The anticipated user of the integrated electronic health record includes physicians, nursing, pharmacy, and laboratory, radiology, physical therapy, rehabilitation, ancillary services, financial services. In addition we would like to develop a portal, for patients and providers. With the implementation of any change, we anticipate there will resistance among the staff, particularly the physicians and to a lesser extent, nursing. The physicians realize that conversion to the Electronic Health Record is inevitable, however they are concerned with the functionality and implementation of the system. We are fortunate to have both a senior physician who has been on staff for 20 plus years and a junior attending physician who are interested in leading the implementation of the EMR. We feel that this will be extremely beneficial in diminishing resistance among the staff. Since the pharmacy and laboratory have existing systems that they are happy with, unless the new system has the features they deem are essential and demonstrates additional benefits there will be some debate.

There are several items that we are interested in incorporating with the new system. As stated earlier, we have additional locations offsite. We want to integrate these sites using a secure network and since these buildings are with fairly close proximity; we anticipate setting up a metropolitan area network (MAN). In addition, we would like to implement a Virtual Private Network (VPN) to allow for secure remote access to the system. Using a MAN will allow us the flexibility to use voice over Internet protocol (VoIP); Leased lines should connect the locations to allow for faster transmission rates especially when considering the amount of data transmitted from the diagnostic center.

The main goal of our project is to improve patient safety and quality of care, thus we aim to implement an effective secure, user-friendly system that is expandable for future growth. Clinical goals include initiating computerized patient charts, CPOE, Clinical Decision support, point of care access, and a bar-coded medication delivery system integrated with medical devices. Point of care documentation will occur in the patient care area using wireless technology along with devices such as tablets, PDA or laptops. As this point clinical decision support would be

available along with services such as antibiotic assistance programs, and electronic medication assistance that will improve safety and quality.

The strategic plan is to implement the system to be compliant with government standards regarding meaningful use. We realize that the system will probably implemented in phases, and would appreciate a realistic estimated timeline we are hoping with in the next 12 months. Currently there is a minimal IT staff with in the organization, and we will need recommendations regarding the development of an IT department.

Questionnaire

21. What is your organization trying to accomplish with the implementation of the electronic health record?

22. Is your institution trying to qualify for financial incentives for development of the complete EHR?

23. What are the demographics of the hospital?
    a. How many users do you anticipate?
    b. What department will utilize the system?
    c. What are your thoughts regarding implementation, unit by unit or by module overall?

24. Are there existing systems that you would like to integrate or replace within the new system?

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26. Do you currently have an IT department?

27. Describe your IT department.

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29. Do you want remote access available?

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40. What if any issues do you anticipate?

Addendum To Hospital Profile

Reviewing the questions in this survey has opened our eyes to areas that will be involved during the implementation of this project. The main goal for this project is to implement an Information technology system that will help us to improve patient safety along with quality of care. Three areas we want to focus on initially are clinical components, financial and administrative, patient portals. Clinical components that are key include computerized charting, CPOE, point of care access, a bar-coded medication system along with integration of medical devices aimed and reducing medical adverse events. We want our physicians to have remote access to enable them to monitor their patients.

Stakeholders are direct and indirect

- Direct Stakeholders- physicians, nurses, pharmacist, technicians, administrative staff
- Indirect Stakeholders- Patients, patient's families, payers, board of directors

Survey questions per Lisa Bender Consultant

Survey answers per Sharon Perelman CIO

Questionnaire for the Hospital CIO

Security

- Have you performed a security risk assessment for your organization?

- We have not completed a security assessment; we are very concerned regarding the security and patient privacy in light of all of the information that will be incorporated into the EMR.

- Do you have a Chief Security Officer or security expertise within your IT department?
  - We do not have a security officer. As discussed in our hospital profile, we currently have a very minimally staffed IT department. One of our goals is to develop a robust IT department and create a position for a Chief Technology Officer (CTO). Initially, this person will act as the Security Officer; as growth of the organization occurs, we may delegate this position to another employee within the department, other than the CTO.

- Do you have security policies, procedures, and training in place?
  - Reviewing the policy and procedure manual for the IT department, there are areas that may be adequate for the current system, yet will certainly require updating as we proceed with this endeavor.
- Do you perform regular compliance audits on your system? No
- Do you run anti-virus and other security software on your workstations, servers, and network regularly?
  - Antivirus software is routinely run on the servers, but not necessarily on the individual workstations. We have had instances were security updates have been ignored by the user.
- Do you have defined access levels and strong password policies for your current systems? How important are these features?

- Since our current system is limited, user access is not as restricted as it should be. Basically with a little ingenuity one could access any patients' lab data. This is a major concern to our organization that we are not only HIPPA compliant, but that we take all measures available to ensure patients' information is secure not only to sources outside of the institution, but is only available to specific designated users in house. We would like to develop a strong login and password system for user access, yet have concerns with the time and resources used dealing with forgotten usernames and passwords. In light of this we would like to explore biometrics for login; however, we are not certain how we would then accommodate remote access by physicians. On another note, whom is allowed remote access, and to what records do they have access to?

- Do your current systems employ encryption of data? What data?
  - Our encryption process is inadequate, and we would like to update to be compliant with HHS HITECH ACT (Health and human services, Health Information Technology for Clinical Health).

Current Systems and IT

- What electronic systems are you using in your organization currently?
  - Our current electronic system is limited to areas such as lab, pharmacy and the business office. The functions are mainly ordering and retrieving results.
- Who are the key users of the systems? How would they describe the current system?
  - The current users are mainly the unit clerks who enter orders, pharmacy and laboratory. Our anticipated users include: nursing, physician's, pharmacy,

radiology, lab, pathology, blood bank, physical therapy, rehabilitation, respiratory therapy, patient financial services, registration and admissions, transport services, food services, housekeeping and maintenance. Additional users include our offsite locations.

- What features do users like in the current system?
  - As I said, our existing system is so primitive, but it is very easy to use.
- What features do the users dislike in the current system?
  - The current system does not provide most of the features that we are preparing to implement in our organization.
- What is your current network topology? Will it support future needs?
  - Current topology is that of the star topology. This however will not be adequate to support our needs. We are interested in an extended mesh topology, in order to provide redundancy within the system.
- What reports do your current systems support? What reports do you need?
  - Our current system provides very basic information regarding occupancy rate, and information to assist in staffing. We are interested in a product with a Reports Module. Each department has specific reports they would like, this module should be simple to use and customizable per department. We would like to incorporate in to the system reports that will help us monitor the measures we will use to determine meaningful use.
- How do users enter data? What can be improved?
  - Data is currently entered using a traditional keyboard and mouse. Many employees, particularly older providers are concerned with the difficulties of

using a mouse. We may want to explore some aspects of combined touch screen and voice activation.

- Do you automate data entry by medical devices? Which ones? What can be improved?
    - We do not currently automate any devices, and are interested in developing a state of the art integration within the Intensive Care Unit
      (E-ICU). We would like to integrate all of the devices that deliver IV medications throughout the institution.

- What level of reminders and alerts do you have in your current systems? Are they configurable? Do your users suffer from "alert fatigue"?
    - Reminders are quite primitive, i.e, allergies, etc. While researching the implementation of the EMR, a concern came up regarding excessive alerts. This has apparently diminished the effectives of its purpose since the providers tend to ignore alerts that are excessive and continually override the system.
- How is your IT department organized and staffed?
    - IT is mainly available in house 7am-11pm; after hours a technician is on call.
- How are systems maintenance and support handled by your IT organization?
    - System maintenance is a function of the IT department however, minor issues are resolved with in the departments. Backup, storage, updates are done by IT.
- How are data backup and storage handled by your IT organization?
    - Current storage of the data is onsite using optical disc. The information that is computerized at this time is ultimately placed in the paper medical record. Once conversion occurs, we anticipate the need for a storage management system so

that data can be safely and securely archived. We will require back up storage and redundancy processing.

- Which IT functions are outsourced, if any?
  - None
- Do you have longstanding relationships with specific vendors (Cisco systems, Oracle, IBM, etc.)? Must these relationships be preserved?
  - No
- What is the desired timeline for implementation of the new system?
  - 12 months
- What is the proposed budget for implementation of the new system?
  - We have a substantial budget in place due to an aggressive fundraising campaign for the implementation of the EMR ($1.4 million)

) Should the new system be custom built or COTS, or both? Why?

- We are open to investigate both custom built and off the shelf systems. We want the flexibility of a custom system to align with our workflow process, however appreciate the complexity and long term implications of this concept.

- How does your organization handle user training?
  - Training is typically an in house project at our institution .We would require initial training during the implementation phase and would like to have some of our employees certify as trainers. Ultimately we will train in-house.
- What is the projected growth of your organization and user base in the next 5 years? 10 years?

- Our organization is in the process of the building of a Women's Center for Health and Well Being, including a State of the art Breast Center, Diagnostic Imaging and a Family Birthing Center.

Desired System Features

Please answer the following questions using a scale of 1 to 5, with 1 being the least important and 5 being the most important.

- How important is point of care (POC) entry of physician notes for the new system? 5
- How important is POC nursing notes for the new system? 5
- How important is computer aided physician order entry (CPOE) for the new system? 5
- How important is clinical decision support for the new system? 5
- How important is medication reconciliation for the new system? 5
- How important is diagnostic test result reporting for the new system? 5
- How important is data validation for the new system? 5
- How important is access to knowledge resources for the new system? 5
- How important is a patient portal (for online forms, health status monitoring, appointment scheduling, updating personal and billing information) for the new system? 4
- How important is secure email for patient communication (appointment and medication refill reminders, questions) for the new system? 4
- How important is the use of mobile devices (tablet computers, smartphones) for the new system? 5
- How important is remote access for the new system? 5
- How important is automated data capture by medical devices for the new system? 4

- How important is the use of non-keyboard data entry (dictation, video, stylus, touch screen) to the new system? 4
- How important is the customization of screens and reports to the new system? 5
- How big a factor will user resistance be to this project? 3

Please answer the following questions using free text.

- Are there other features you want the new system to support?
  - (See final summary)
- Can you elaborate on user acceptance and training issues identified earlier, if any?
  - A survey taken among our physicians revealed the top two concerns regarding the EMR. These concerns are as follows:
    - Time (lack of time available by the physician for training) 61 %.
    - Fear of change. (33 %)
- Is there a physician in your organization who can serve as an effective champion for a new system?
  - We have both a senior physician and a new attending physician that have a keen interest in working together as the key players in this project. We feel that this combination will be critical to the acceptance of these new systems, especially since the senior physician is well respected among his peers and within the organization.
- Is there anything else about your organization, infrastructure, or users that you wish to describe at this time?
  - Reviewing the questions in this survey has opened our eyes to areas that will be involved during the implementation of this project. The main goal for this project

is to implement an Information technology system that will help us to improve patient safety along with quality of care. Three areas we want to focus on initially are clinical components, financial and administrative, patient portals. Clinical components that are key include computerized charting, CPOE, point of care access, a bar-coded medication system along with integration of medical devices aimed and reducing medical adverse events. We want our physicians to have remote access to enable them to monitor their patients.

Part III: Informatics Profile and Assessment Proposal and Options

There are four major goals we will achieve by successfully implementing the Electronic ***Medical Record (EMR) at your institution:***

1. Improved patient care
2. Increase productivity
3. Improve quality of care
4. Comply with regulatory compliance for meaningful use

Key factors for successful implementation of the EMR include:

1. Strong executive leadership committed to the vision
2. The involvement of key stakeholders beginning in the planning phase
3. Promote ways that the EMR will improve patient care and clinical processes
4. Build momentum and excitement among the stakeholders throughout the process

I. Summary of Needs Assessment for Northwestern Illinois Lake Michigan Memorial Hospital.

- A private non-for profit hospital serving northwestern Illinois communities.

- Affiliations: The University Medical School
- Hospital capacity: 854 beds
- Main Campus
    - ◊ Physicians/Faculty- 1656
    - ◊ Medical Students- 2500
    - ◊ Nurses- 1987
    - ◊ Nurse Practioners-405
    - ◊ Researchers- 3173
    - ◊ Physician assistants- 150
    - ◊ Pharmacist-197
    - ◊ Lab personnel- 757
    - ◊ Office Staff-504
- Current System
    - ◊ Custom built
    - ◊ Contains basic patient data
    - ◊ Laboratory
    - ◊ Pharmacy

The goal of the organization is to replace the current system with a state of the art integrated electronic health record.

- Features required
    - ◊ Improve quality of care
    - ◊ CPOE- computerized physician order entry
    - ◊ CDSS- clinical decision support system

- ◊ Clinical notes
- ◊ Medication reconciliation
- ◊ Diagnostic testing and results
- ◊ Custom reports
- ◊ Patient portal
- ◊ Remote access
- ◊ Smart phone/ tablet integration

- Concerns: Security and patient privacy
- Departments to implement EMR
  - ◊ Admissions/ discharge
  - ◊ Clinical Care- Ambulatory, In patient
  - ◊ Pharmacy
  - ◊ Laboratory
  - ◊ Financial/Billing
- Time line for implementation- 12 months

II. Key Stakeholders

- Physician- faculty, staff, medical students, physician assistants (PA)
- Researchers
- Nurses, Nurse practitioners (NP)
- Pharmacist
- Laboratory, Radiology
- Finance and Billing
- IT department

- Patients and caregivers

Stakeholder Needs and Concerns

- Physician- faculty, staff, medical students, physician assistants (PA)

  Locate charts, CPOE, CDSS, Ease in utilization of system; locate lab and radiology reports, and institute remote access, Tablet integration
- Researchers-Ability to access and aggregate data to utilize in research projects
- Nurses, Nurse practitioners (NP)- Orders, labs nursing care plans, pharmacy, smart pumps
- Pharmacist-CPOE, Antibiotic assist programs, procedures for smart pump integration
- Laboratory, Radiology- Need to transition form existing system, Radiology- high speed remote access off site
- Finance and Billing- Accurate swift conversion from existing system, concerned with data loss
- IT department- develop a collegial relationship with vendors
- Patients and caregivers- Patient portal features
  - ◊ Rx refills, make appointments
  - ◊ Secure email to providers
  - ◊ Reminders
  - ◊ Access to current patient education information
  - ◊ A user friendly system

III. Types of Systems- Custom designed vs. Off the shelf from vendor

Why buy a custom designed system? If you cannot find a system that will meet the needs of the organization.

- Advantages of Custom System
  - ◊ Get exactly what you want
  - ◊ Ability to design and implement at your own pace
  - ◊ Ability to design to adapt to current work flow processes

- Disadvantages
  - ◊ Custom systems take a long time to develop
  - ◊ Cost tend to be more expensive due to the time it takes to develop
  - ◊ Some standards may be obsolete by implementation phase
  - ◊ Need to hire outside staff for development
  - ◊ Must have dedicated staff willing to invest time to work with designers throughout the process
  - ◊ A team will need to monitor development process- must develop metrics for assessing performance
  - ◊ Cost to maintain
- Advantages of Off the Shelf
  - ◊ Many products to choose from
  - ◊ Some products are programmed for financial including billing based on payer mix
  - ◊ Vendor systems can be turn key or customized
  - ◊ Cost- less expensive that custom

- ◊ Support and maintenance

- Disadvantages
  - ◊ Possible issues with data integration
  - ◊ May not follow work flow processes
  - ◊ May have extra features that are not needed

IV. Training

There will be a plethora of training methods to accommodate the vast difference in learning styles and levels of computer literacy.

- Class room training- pre-assigned seating with super users strategically placed near user requiring more assistance
- Web-base computer training- modules with levels of proficiency
- Fun goals/rewards for each level attained
- Self-paced learning manuals
- Scenario based training
- Over the shoulder training
- Avoid training during or after shifts- Nurse will be worrying about what work they will need to catch up on afterwards

Physicians present unique opportunities to develop creative ways to encourage and excite them about learning the system. Appreciate that the physicians will need one on one training. A trainer will meet with physicians and assist them in customizing their preferences. Provide a "quite room" with workstations. This will be an inviting area where they can sit with a trainer if

they need help with a particular issue. Snacks and coffee always help! Offer and encourage training for the physician's office staff, they will become super-users. This will allow the MD to log on remotely and if they need help, they will not need to wait for tech support. Once the system is live, the nurses and clerks will become proficient before going live for the MD's; The physicians will continue to write orders while the clerks and nurses will enter the information. Once the nurses and clerks are comfortable with the process, go live with the physicians. Trainers and super –users will be easily identifiable on the units with colored smocks. After the implementation phase is complete, training will turned over to an in house staff.

V. Vendor considerations

- Reputation of the vendor
- Terms of the contract
- Support and maintenance
- Training program

VI. Top 10 vendors

Vendor Name	Total Installations	Percent of Installations
• Meditech	1212	25.5%
• Cerner	606	12.8%
• McKesson	573	12.1%
• Epic Systems	413	8.7%
• Siemens Healthcare	397	8.4%
• CPSI	392	8.3%
• Healthcare Management Systems	347	7.3%
• Self-developed	273	5.8%
• Healthland	223	4.7%
• Eclipsys (Bought by Allscripts)	185	3.9%

VII. Anticipated impact of Implementation

- Improved patient safety

- Improved clinical outcomes
- Improve patient satisfaction
- Institution will be seen as a progressive and high tech
- Attract new physicians
- Increase employee satisfaction
- Acceleration of research program

VIII. Impact of not implementing

- Loss of federal funding for meaningful use
- 2015 Adjustment in Medicare reimbursement

IX. Additional Resources

- Additional IT staff

Part IV: Informatics Profile and Assessment Regulatory Compliance

The executive committee at Northwestern Illinois Lake Michigan Memorial hospital (NILMMH) has reviewed our recommendations regarding implementation of an Electronic Medical Record (EMR). I will provide a brief review of the institutions needs that were presented to the consultant.

The main goal of the project is to improve patient safety and quality of care. There are several key components they will require from the EMR. They want a full-feature electronic medical record that provides Clinical Decision Support (CDS), computerized physician order entry (CPOE), data aggregation and reporting capabilities. Another feature requested is the ability to evaluate trends for planning and research. Additional clinical goals include initiating

computerized patient charts, point of care access, and a bar-coded medication delivery system integrated with medical devices. Point of care documentation will occur in the patient care area using wireless technology along with devices such as tablets, PDA or laptops, and smart phones. Other key features include remote access and a robust patient portal.

After presenting a proposal and options to the executive board of NILMMH regarding the EMR there were many questions and concerns. First of all, they liked the idea of a custom system; it appears that this route would meet most of their needs. The ability to tailor the system to the current workflow was very appealing, however there are concerns regarding the time frame for implementation; the proposal states 18-24 months. Assessing the scope of the project and the time commitment required from the key MD's and RN's, we anticipate a much longer process. The risk of post-launch issues along with unknown system performance is concerning. As a result, they have decided on the vendor-supported system. The systems that we presented included Epic and Cerner Electronic Medical Records. By the end of 2010, these companies were virtually tied for the second market share spot. (Meditech being first with about 325 installations). (Conn, 2011, p. 1) It appears that Epic has all of the features they are looking for and more. Revisiting the issue regarding workflow, this is now seen as an opportunity to improve these processes. They like many of the features Epic has including the ability to integrate modules and to support all departments. Clinical pathways, CPOE, care plans, ICU integration, bar coding, and pharmacy integration are just a sample of the features in the Epic system.

There are some concerns however that they want to address prior to committing to the Epic system. There is great concern regarding the transfer of existing data from the financial/ billing areas along with admitting and discharge departments. Accuracy in the conversion of this

data is essential. Also they would like to explore the capabilities as far as customization and the cost associated with this feature.

As the consultant, we want to discuss and review with our client Meaningful Use and the impact it will have as they implement the EMR at their institution, along with security and privacy issues. In 2010, the Centers for Medicare and Medicaid along with the Office of the National Coordinator (ONC) presented regulations for improving quality, safety and efficiency within the health care system by ensuring Meaningful Use of the Electronic Health Record. These measure along with, the Health Information Technology for Economic and Clinical Health Act (HITECH) were instituted to facilitate both the implementation of the EMR, and upgrading the medical coding system to ICD -10. As an incentive to hospitals and providers; the federal government has allocated up to 27 billion dollars over a 10-year period for this initiative. Eligible providers many receive up to $44,000 under Medicare and $63,000 under Medicaid, while hospital's may potentially receive millions of dollars.

A stipulation to be eligible for these financial incentives is that hospitals and providers must utilize a " Certified EMR". What this does is ensures the provider that the system they purchase at a minimum will support the achievement of Meaningful Use
Phase I, which takes place from 2011-2012. Stage I Meaningful Use requires hospitals to meet 19 of the 24 Meaningful Use objectives. In addition to core measures, hospitals must report and meet standards for all 15 of the Clinical Quality Measures, plus they must chose 5 additional objectives.

The program chosen by Northwest Illinois Lake Michigan Memorial Hospital (NILMMH), EPIC, is certified for Meaningful Use. This system has been successful in assisting institutions achieve Meaningful Use. Epic system will ensure functionality, Interoperability,

security and privacy. The addendum at the end of this document is from the Center for Medicare Services (CMS) and will provide guidelines for achieving Meaningful Use.

Health Insurance Portability and Accountability Act (HIPAA) consist of two separate rules; the first is Privacy (2003) and second Security (2005). The essence in the development of HIPAA was to protect patient privacy by protecting their data, and to focus the health care providers on security and privacy. In addition to create standards for securing data and requiring efficiencies in security and transfer of information. "A major goal of the Privacy Rule is to assure that individuals' health information is properly protected while allowing the flow of health information needed to provide and promote high quality health care and to protect the public's health and well being."("HIPAA," 2011, p. 1)

Epic alone cannot ensure that HIPAA in enforced. A detailed security plan from the institution must be in place. As we have discussed in the past, this begins with a security assessment, followed by the assignment of a security officer. Policies will be in place to protect the security of the network including: A firewall, limited access to server rooms (Lock and key with Biometric access), Anti- virus software that is routinely updated and maintained, login passwords, a secure VPN.

Outside threats to privacy are a concern. Breaches to the network, however, more commonly come from within the organization. These breaches may be innocent such as a computer screen left open with a patient's lab results while someone walking by inadvertently views it, or deliberate, when a person uses their access to retrieve information they have no right to see. Outside threats do occur such as intrusion in to the network via viruses or Trojan horses. Hence, much of the compliance will come from the security measures with in the organization and one cannot rely on a single computer program to protect the entire system. Epic does have

robust security measures embedded into the program such as strict encryption standards, and 802.1X radius authentication as well as virtual guest isolation, which protect patient information.

Addendum:(,)

Eligible Hospital and Critical Access Hospital (CAH) Attestation Worksheet for the Medicare Electronic Health Record (EHR) Incentive Program

The Eligible Hospital and CAH Attestation Worksheet allows eligible hospitals and CAHs to log their meaningful use measures on this page to use as a reference when attesting for the Medicare EHR Incentive Program in the CMS system.

Numerator, denominator, and exclusion information for clinical quality measures (CQMs) must be reported directly from information generated by certified EHR technology and are not included in this worksheet. However, information for the remaining meaningful use core and menu set measures does not necessarily have to be entered directly from information generated by certified EHR technology. For each objective with a percentage-based measure, certified EHR technology must include the capability to electronically record the numerator and denominator and generate a report including the numerator, denominator, and resulting percentage for these measures. However, eligible hospitals and CAHs may use additional data to calculate numerators and denominators and to generate reports on all measures of the core and menu set meaningful use objectives except CQMs. In order to provide complete and accurate information for certain of these measures, eligible hospitals and CAHs may also have to include information from paper-based patient records or from records maintained in uncertified EHR technology.

Eligible hospitals and CAHs can enter their meaningful use criteria in the blue boxes. Each measure's objective is included to help eligible hospitals and CAHs enter the correct criteria. Certain measures do not require a numerator and denominator, but rather a yes/no answer, and are marked as such. Measures with exclusions have the exclusion description listed in the measure information section.

Note: Claiming an exclusion for a specific measure qualifies as submission of that measure. If an eligible hospital or CAH claims an exclusion for which they qualify, indicate this in the Attestation System by clicking "yes" under the exclusion part of the measure question.

Eligible hospitals and CAHs must report on the following:

1. 2.
3.

All 14 of the core measures; 5 out of 10 of the menu measures; at least 1 public health measure must be selected as part of the 5 All 15 of the clinical quality measures (CQMs)

Reporting Period: For an eligible hospital or critical access hospital, the reporting period must be at least 90 consecutive days within Federal Fiscal Year 2011 (October 1, 2010, through September 30, 2011).

1Meaningful Use Core Measures - Eligible hospitals and CAHs must fill out all 14 core measures

1

Objective: Use computerized provider order entry (CPOE) for medication orders directly entered by any licensed healthcare professional who can enter orders into the medical record per state, local and professional guidelines.

Measure: More than 30 percent of all unique patients with at least one medication in their medication list admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) have at least one medication

order entered using CPOE
Numerator: Number of patients in the denominator that have at least one medication order entered during CPOE
Denominator: Number of unique patients with at least one medication in their medication list seen by the eligible hospital or CAH during the EHR reporting period
2
Objective: Implement drug-drug and drug-allergy interaction checks **Measure:** The eligible hospital or CAH has enabled the functionality for drug-drug and drug-allergy interaction checks for the entire EHR reporting period
Note: This measure only requires a yes/no answer
Numerator: N/A
YES NO
Denominator: N/A
3
Objective: Maintain an up-to-date problem list of current and active diagnoses **Measure:** More than 80 percent of all unique patients admitted to the eligible hospital or CAH's inpatient or emergency department (POS 21 or 23) have at least one entry or an indication that no problems are known for the patient recorded as structured data
Numerator: Number of patients in the denominator who have at least one entry or indication that no problems are known for the patient recorded as structured data in their problem list
Denominator: Number of unique patients admitted to an eligible hospital or CAH's inpatient or emergency department (POS 21 or 23) during the EHR report period
4
Objective: Maintain active medication list **Measure:** More than 80 percent of all unique patients admitted to the eligible hospital or CAH's inpatient or emergency department (POS 21 or 23) have at least one entry (or an indication that the patient is not currently prescribed any medication) recorded as structured data
Numerator: Number of patients in the denominator who have a medication (or an indication that the patient is not currently prescribed any medication) recorded as structured data
Denominator: Number of unique patients admitted to an eligible hospital or CAH's inpatient or emergency department (POS 21 or 23) during the EHR report period
2

5 **Objective:** Maintain active medication allergy list **Measure:** More than 80 percent of all unique patients admitted to the eligible hospital or CAH's inpatient or emergency department (POS 21 or 23) have at least one entry (or an indication that the patient has no known medical allergies) recorded as structured data
Numerator: Number of patients in the denominator who have at least one entry (or indication that the patient has no known medical allergies) recorded as structured data in their medication allergy list
Denominator: Number of unique patients admitted to an eligible hospital or CAH's inpatient or emergency department (POS 21 or 23) during the EHR report period
6 **Objective:** Record all of the following demographics: preferred language, gender, race, ethnicity, date of birth, and date and preliminary cause of death in the event of mortality in the eligible hospital or CAH **Measure:** More than 50 percent of all unique patients seen by the eligible hospital or CAH or admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) have demographics recorded as structured data
Numerator: Number of patients in the denominator who have all of the elements of demographics (or a specific exclusion if the patient declined to provide one or more elements or if recording an element is contrary to state law) recorded as structured data
Denominator: Number of unique patients admitted to an eligible hospital or CAH's inpatient or emergency department (POS 21 or 23) during the EHR report period
7 **Objective:** Record and chart changes in vital signs: height, weight, blood pressure, calculate and display body mass index (BMI), plot and display growth charts for children 2-20 years, including BMI **Measure:** For more than 50 percent of all unique patients age 2 and over admitted to eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23), height, weight and blood pressure are recorded as structured data
Numerator: Number of patients in the denominator who have at least one entry of their height, weight and blood pressure are recorded as structured data
Denominator: Number of unique patients age 2 or over that are admitted to an eligible hospital or CAH's inpatient or emergency department (POS 21 or 23) during the EHR report period
8 **Objective:** Record smoking status for patients 13 years or older **Measure:** More than 50 percent of all unique patients 13 years or older admitted to eligible hospital's or CAH's inpatient or emergency department (POS

21 or 23) have smoking status recorded as structured data **Exclusion:** An eligible hospital or CAH that sees no patients 13 years or older would be excluded from this requirement
Does this exclusion apply to you? Yes No
Numerator: Number of patients in the denominator with smoking status recorded as structured data
Denominator: Number of unique patients age 13 or over admitted to an eligible hospital or CAH's inpatient or emergency department (POS 21 or 23) during the EHR report period
3

9 **Objective:** Report hospital clinical quality measures to CMS or, in the case of Medicaid eligible hospitals, the States
Measure: Provide aggregate numerator, denominator, and exclusions through attestation as discussed in section II(A)(3) of the final Rule **Note: This measure only requires a yes/no answer**
Numerator: N/A
Denominator: N/A
YES NO
10 **Objective:** Implement one clinical decision support rule related to a high priority hospital condition with the ability to track compliance with that rule **Measure:** Implement one clinical decisions support rule **Note: This measure only requires a yes/no answer**
Numerator: N/A
Denominator: N/A
YES NO
11 **Objective:** Provide patients with an electronic copy of their health information (including diagnostic test results, problem list, medication lists, medication allergies, discharge summary, procedures), upon request **Measure:** More than 50% of all patients of the inpatient or emergency department of the eligible hospital or CAH (POS 21 or 23) who request an electronic copy of their health information are provided it within 3 business days
Exclusion: Any eligible hospital or CAH that has no requests from patients or their agents for an electronic copy of patient health information during the EHR reporting period would be excluded from this requirement
Does this exclusion apply to you?
Numerator: Number of patients in the denominator who receive an electronic copy of their electronic health information within three business days
Denominator: Number of patients who request an electronic copy of their electronic health information four business days prior to the end of the EHR reporting period
Yes No
12 **Objective:** Provide patients with an electronic copy of their discharge instructions at the time of discharge, upon request
Measure: More than 50% of all patients who are discharged from an eligible hospital or CAH's inpatient department or emergency department (POS 21 or 23) and who request an electronic copy of their discharge instructions are provided it **Exclusion:** An eligible hospital or CAH that has no requests from patients or their agents for an electronic copy of the discharge instructions during the EHR reporting period would be excluded from this requirement
Does this exclusion apply to you?
Numerator: The number of patients in the denominator who are provided an electronic copy of discharge instructions
Denominator: Number of patients discharged from an eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) who request an electronic copy of their discharge instructions during the EHR reporting period
Yes No
4

13
Objective: Capability to exchange key clinical information (for example, discharge summary, procedures, problem list, medication list, medication allergies, diagnostic test results), among providers of care and patient-authorized entities electronically **Measure:** Performed at least one test of certified EHR technology's capacity to electronically exchange key clinical information

Note: This measure only requires a yes/no answer
Numerator: N/A
YES NO
Denominator: N/A
14
Objective: Protect electronic health information created or maintained by the certified EHR technology through the implementation of appropriate technical capabilities **Measure:** Conduct or review a security risk analysis in accordance with the requirements under 45 CFR 164.308(a)(1) and implement security updates as necessary and correct identified security deficiencies as part of its risk management process
Note: This measure only requires a yes/no answer
Numerator: N/A
YES NO
Denominator: N/A

Meaningful Use Menu Measures - Eligible hospitals and CAHs must fill out 5 out of 10 menu measures (at least 1 of these must be a public health measure, which are noted with an asterisk)

1*
Objective: Capability to submit electronic data to immunization registries or immunization information systems and actual submission according to applicable law and practice **Measure:** Performed at least one test of certified EHR technology's capacity to submit electronic data to immunization registries and follow up submission if the test is successful (unless none of the immunization registries to which the eligible hospital or CAH submits such information has the capacity to receive the information electronically)
Exclusion 1: An eligible hospital or CAH that administers no immunizations during the EHR reporting period would be excluded from this requirement **Exclusion 2:** If there is no immunization registry that has the capacity to receive the information electronically, then the eligible hospital or CAH would be excluded from this requirement
Note: This measure only requires a yes/no answer
Does this exclusion 1 apply to you?
Yes No
Does this exclusion 2 apply to you?
Yes No
Numerator: N/A
YES NO
Denominator: N/A
5

2*
Objective: Capability to submit electronic data on reportable (as required by State or local law) lab results to public health agencies and actual submission according to applicable law and practice **Measure:** Performed at least one test of certified EHR technology's capacity to provide electronic submission of reportable lab results to public health agencies and follow-up submission if the test is successful (unless none of the public health agencies to which an eligible hospital or CAH submits such information has the capacity to receive the information electronically)
Exclusion: If no public health agency to which the eligible hospital or CAH submits such information has the capacity to receive the information electronically, then the eligible hospital or CAH would be excluded from this requirement **Note: This measure only requires a yes/no answer**
Does this exclusion apply to you?
Yes No
Numerator: N/A
YES NO
Denominator: N/A
3*

Objective: Capability to submit electronic syndromic surveillance data to public health agencies and actual submission according to applicable law and practice **Measure:** Performed at least one test of certified EHR technology's capacity to provide electronic syndromic surveillance data to public health agencies and follow-up submission if the test is successful (unless none of the public health agencies to which an eligible hospital or CAH submits such information has the capacity to receive the information electronically)
Exclusion: If no public health agency to which the eligible hospital or CAH submits such information has the capacity to receive the information electronically, then the eligible hospital or CAH would be excluded from this requirement **Note: This measure only requires a yes/no answer**
Does this exclusion apply to you?
Yes No
Numerator: N/A
YES NO
Denominator: N/A
4
Objective: Implement drug formulary checks **Measure:** The eligible hospital or CAH has enabled this functionality and has access to at least one internal or external formulary for the entire EHR reporting period **Note: This measure only requires a yes/no answer**
Numerator: N/A
YES NO
Denominator: N/A
5
Objective: Record advance directives for patient 65 years old or older **Measure:** More than 50 percent of all unique patients 65 years old or older admitted to the eligible hospital's or CAH's inpatient (POS 21) have an indication of an advance directive status recorded as structured data **Exclusion:** An eligible hospital or CAH that admitted no patients age 65 years old or older during the EHR reporting period would be excluded from this requirement
Does this exclusion apply to you?
Yes No
Numerator: Number of patients in the denominator with an indication of an advanced directive entered using structured data
6

Denominator: Number of unique patients age 65 or older admitted to an eligible hospital's or CAH's inpatient department (POS 21) during the EHR reporting period
6
Objective: Incorporate clinical lab test results into certified EHR technology as structured data **Measure:** More than 40 percent of all clinical lab test results ordered by an authorized provider of the eligible hospital or CAH for patients admitted to its inpatient or emergency department (POS 21 and 23) during the EHR reporting period whose results are either in a positive/negative or numerical format are incorporated in certified EHR technology as structured data
Numerator: Number of lab test results whose results are expressed in a positive or negative affirmation or as a number which are incorporated as structured data
Denominator: Number of lab tests ordered during the EHR reporting period by authorized providers of the eligible hospital or CAH for patients admitted to an eligible hospital's or CAH's inpatient or emergency department (POS 21 and 23) whose results are expressed in a positive or negative affirmation or as a number
7
Objective: Generate lists of patients by specific conditions to use for quality improvement, reduction of disparities, or outreach **Measure:** Generate at least one report listing patients of the eligible hospital or CAH with a specific condition **Note: This measure only requires a yes/no answer**
Numerator: N/A
YES NO
Denominator: N/A
8
Objective: Use certified EHR technology to identify patient-specific education resources and provide those resources to the patient if appropriate **Measure:** More than 10 percent of all unique patients admitted to the eligible

hospital's or CAH's inpatient or emergency department (POS 21 or 23) during the EHR reporting period are provided patient-specific education resources
Numerator: Number of patients in the denominator who are provided patient-specific education resources
Denominator: Number of unique patients admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) during the EHR reporting period
9
Objective: The eligible hospital or CAH who receives a patient from another setting of care or provider of care or believes an encounter is relevant should perform medication reconciliation **Measure:** The eligible hospital or CAH performs medication reconciliation for more than 50 percent of transitions of care in which the patient is admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23)
Numerator: Number of transitions of care in the denominator where medication reconciliation was performed
7

Denominator: Number of transitions of care during the EHR reporting period for which the eligible hospital's or CAH's inpatient or emergency department (POS 21 to 23) was the receiving party of the transition
10
Objective: The eligible hospital or CAH that transitions their patient to another setting of care or provider of care or refers their patient to another provider of care should provide summary care record for each transition of care or referral **Measure:** The eligible hospital or CAH that transitions or refers their patient to another setting of care or provider of care provides a summary of care record for more than 50 percent of transitions of care and referrals
Numerator: Number of transitions of care and referrals in the denominator where a summary of care record was provided
Denominator: Number of transitions of care and referrals during the EHR reporting period for which the eligible hospital's or CAH's inpatient or emergency department (POS 21 to 23) was the transferring or referring provider
8A

Part V: Training

Updated Hospital Profile: Carlsbad Community Hospital

The facility is a 295-bed non-for profit acute care hospital that opened its doors in 1930. Currently there are approximately 1500 employees, with the average length of employment greater than 12 years. There are 580 physicians on staff. Annual admissions are estimated at 14,000, including 1200 births in addition to 48,000 Emergency room visits. The breakdown of beds is:

208 Medical/ Surgical, 17-Obsetrics, 26 Intensive Care, 20 Pediatrics, 24 Psychiatric

Besides the acute care hospital there is an adjacent physician's pavilion, an offsite Care Station, a Diagnostic Center, Homecare and Hospice. The cancer center is affiliated with a medical oncology group at a local university hospital. We anticipate opening the Women's Center for Health and Well being in 2013.

Currently there is a very basic computer system in place. The billing department and financial services have a system that is adequate at this time. The pharmacy and laboratory are also computerized each with their own system. The current workflow process is as follows: the

physician writes and order in the chart, the unit clerk transcribes the order and directs it to the appropriate source. There are triplicate pullouts in each section of the order sheet, the original stays in the chart, and there are bins for pharmacy and lab. Runners collect these papers continuously throughout the day. Copies of orders that involve nursing are placed on the clipboard. If an order is Stat it is faxed to that department. All nurses, notes, physician notes H& P's are hand written and held in the 3 ring binders. Pharmacy orders are sent to the department where the pharmacist or technician enters the information into their system.

The clinical units have a very rudimentary system in place. There are computer terminal at the desk on each patient care units. Features present are patient demographic information, lab results, radiology reports and medication lists. The patient's chart is maintained at the nursing station in a three ring binder. In addition each patient has a smaller clipboard bedside chart located in a slot on the door to the room. We are aware that this may be a HIPAA violation. This clipboard contains daily information, i.e. vital signs, Intake and Output (I&O), nursing notes current medications and scheduled appointments (PT, Radiology). These day sheets are removed at the end of the 11pm- 7am shift and placed in the chart at the nursing station. When the patient leaves the unit for a test or appointment, the 3 ring binder chart goes with, but not the bedside chart.

The anticipated users of the integrated electronic health record includes physicians, nursing, pharmacy, and laboratory, radiology, physical therapy, rehabilitation, ancillary services, financial services. In addition we would like to develop a portal, for patients and providers. Features Included in the patient portal will allow them to make appointments, refill prescriptions, receive reminders, and enable secure email to providers, along with patient education information. The physician portal will allow remote access, with the ability to view their patient's charts, enter orders, and retrieve lab and radiology reports. Clinical components of the EMR will include computerized charting for physician, nursing notes, CPOE for all departments including lab, radiology, PT, Rehab. There will be point of access documentation, CDSS (Clinical Decision Support Systems) including an Antibiotic Assistant Program that is aimed at reducing adverse medial events. The second phase of our implementation will include the integration of medical devices such as smart pumps and smart ventilators in the ICU's.

With the implementation of any change, we anticipate there will resistance among the staff, particularly the physicians and to a lesser extent, nursing. The physicians realize that

conversion to the Electronic Health Record is inevitable, however they are concerned with the functionality and implementation of the system. We are fortunate to have both a senior physician who has been on staff for 20 plus years and a junior attending physician who are interested in leading the implementation of the EMR. We feel that this will be extremely beneficial in diminishing resistance among the staff. Since the pharmacy and laboratory have existing systems that they are happy with, unless the new system has the features they deem are essential and demonstrates additional benefits there will be some debate.

There are several items that we are interested in incorporating with the new system. As stated earlier, we have additional locations offsite. We want to integrate these sites using a secure network and since these buildings are with fairly close proximity; we anticipate setting up a metropolitan area network (MAN). In addition, we would like to implement a Virtual Private Network (VPN) to allow for secure remote access to the system. Using a MAN will allow us the flexibility to use voice over Internet protocol (VoIP); Leased lines should connect the locations to allow for faster transmission rates especially when considering the amount of data transmitted from the diagnostic center. After a successful launch of this program, we will then address the integration to our off site locations including the Women's Health center once it is open. Structural considerations are being incorporated into the architectural design of the Women's Center.

The main goal of our project is to improve patient safety and quality of care thus we will implement an effective secure, user-friendly system that is expandable for future growth. Clinical goals include initiating computerized patient charts, Computerized Physician Order Entry (CPOE), Clinical Decision Support, Point of care documentation and bar-coded medication delivery system integrated in to the EMR. Point of care documentation will be achieved using a variety of technologies including wireless technology along with devices such as tablets, PDA or laptops. Orders would be implemented at the bedside utilizing (CPOE). As this point clinical decision support would be available along with services such as antibiotic assistance programs, that will improve safety and quality.

The strategic plan is to implement the system to be compliant with government standards regarding meaningful use. We realize that the system will probably be implemented in phases, and would appreciate a realistic estimated timeline, we are hoping within the next 12 months.

Currently there is a minimal IT staff within the organization, and we will need recommendations regarding the development of an IT department.

***Stakeholders are Direct and Indirect**:*

Direct- Physicians, Nurses, Pharmacists, Technicians, Administrative staff, Ancillary Staff

Indirect – Patients, Patient family members, payers, Board of Directors

We will need to develop a robust security plan. Our plan is to do a security assessment. Upon evaluation of these results, we will designate a Chief Security Officer. Policies and procedures will be developed.

Summary of Needs Assessment for Northwestern Illinois Lake Michigan Memorial Hospital.

- A private non-for profit hospital serving northwestern Illinois communities.
- Affiliations: The University Medical School
- Hospital capacity: 854 beds
  Main Campus
- Physicians/Faculty- 1656
- Medical Students- 2500
- Nurses- 1987
- Nurse Practioners-405
- Researchers- 3173
- Physician assistants- 150
- Pharmacist-197
- Lab personnel- 757
- Office Staff-504
- Current System
  - Custom built
  - Contains patient demographic data
  - Laboratory
  - Pharmacy

The goal of the organization is to replace the current system with a state of the art integrated electronic health record.

- Features required
    - CPOE- computerized physician order entry
    - CDSS- clinical decision support system

      This will be implemented after CPOE
    - Clinical notes
    - Medication reconciliation
    - Diagnostic testing and results
    - Custom report

      Examples includes items such as census reports, acuity levels to assist in staffing
    - Patient portal
    - Remote access
    - Smart phone/ tablet integration
- Concerns: Security and patient privacy
- Limited access to patient files to providers involved in care of that patient
- Departments to implement EMR
    - Admissions/ discharge
    - Clinical Care
    - Pharmacy
    - Laboratory
    - Financial/Billing
- Time line for implementation- 12 months

Key Stakeholders

- Physician- faculty, staff, medical students, physician assistants (PA)
- Researchers
- Nurses, Nurse practitioners (NP)
- Pharmacist
- Laboratory, Radiology
- Finance and Billing

- IT department
- Patients and caregivers

Stakeholder Needs and Concerns

- Physician- faculty, staff, medical students, physician assistants (PA) Locate charts, CPOE, CDSS, Ease in utilization of system; locate lab and radiology reports, and institute remote access, Tablet integration
- Researchers-Ability to access and aggregate data to utilize in research projects
- Nurses, Nurse practitioners (NP)- Orders, labs nursing care plans, pharmacy, smart pumps
- Pharmacist-CPOE, Antibiotic assist programs, procedures for smart pump integration
- Laboratory, Radiology- Need to transition from existing system, Radiology- high speed remote access off site
- Finance and Billing- Accurate swift conversion from existing system, concerned with data loss
- IT department- develop a collegial relationship with vendors
- Patients and caregivers- Patient portal features
    - Rx refills, make appointments
    - Secure email to providers
    - Reminders
    - Access to current patient education information
    - A user friendly system

Goals of Implementing EMR at your institution

5. Improved patient safety
    a. By a decrease in medication adverse events as a result of transcription errors
6. Increase productivity
    a. Decrease transmission time for nursing entries (notes, vital sign) allowing nursing more time at the beside
7. Improve quality of care

   a. By using modules such as Antibiotic assistance program
   b. Clinical pathways
8. Comply with regulatory compliance for meaningful use
   a. Compiling data from the EMR to substantiate meaningful use
   b. Meaningful use will be discussed in depth

Key factors for successful implementation of the EMR include

5. Strong executive leadership committed to the vision
   a. Senior physician mentioned will be the CIO (Chief Informatics Officer)
   b. Chief Nursing Informatics Officer to be identified (CNIO)
6. The involvement of key stakeholders beginning in the planning phase
   a. CIO, CNIO and representative from each discipline will be involved in the process from the beginning.
   b. Will develop focus group of patients to provide input as patient portal is under development
7. Promote ways that the EMR will improve patient care and clinical processes
8. Build momentum and excitement among the stakeholders throughout the process

Anticipated impact of Implementation

- Improved patient safety
  - Reduced medication adverse events with CPOE due to transcription errors
- Improved clinical outcomes
  - Using the antibiotic assistance program will provide appropriate antibiotics in a timely matter ultimately resulting in decrease length of stay
- Improve patient satisfaction
  - Patients can refill rx, make appointments and send emails to providers via patient portal
- Institution will be seen as a progressive and high tech
- Acceleration of research program

- Researcher will have access to data for research project

Impact of not implementing

	Medicare		Medicaid	
	Physicians	Hospitals	Physicians	Hospitals
Incentive start	Calendar yr 2011	FY 2011	2011	2016
Incentive End	Calendar yr 2016	FY 2015	2016	2021
Incentive Amount	Up to $ 44,000	$2million base	Up to $65,000 0	
Reduction	Calendar yr 2015	FY 2015	No Penalty	No penalty

Regulatory Compliance

The executive committee at Northwestern Illinois Lake Michigan Memorial hospital (NILMMH) has reviewed our recommendations regarding implementation of an Electronic Medical Record (EMR). I will provide a brief review of the institutions needs that were presented to the consultant.

The main goal of the project is to improve patient safety and quality of care. There are several key components they will require from the EMR. They want a full-feature electronic medical record that provides Clinical Decision Support (CDS), computerized physician order entry (CPOE), data aggregation and reporting capabilities. Another feature requested is the ability to evaluate trends for planning and research. Additional clinical goals include initiating computerized patient charts, point of care access, and a bar-coded medication delivery system integrated with medical devices. Point of care documentation will occur in the patient care area using wireless technology along with devices such as tablets, PDA or laptops, and smart phones. Other key features include remote access and a robust patient portal.

After presenting a proposal and options to the executive board of NILMMH regarding the EMR there were many questions and concerns. First of all, they liked the idea of a custom system; it appears that this route would meet most of their needs. The ability to tailor the system to the current workflow was very appealing, however there are concerns regarding the time frame for implementation; the proposal states 18-24 months. Assessing the scope of the project and the time commitment required from the key MD's and RN's, we anticipate a much longer process. The risk of post-launch issues along with unknown system performance is concerning. As a result, they have decided on the vendor-supported system. The systems that we presented included Epic and Cerner Electronic Medical Records. By the end of 2010, these companies were virtually tied for the second market share spot. (Meditech being first with about 325 installations). (Conn, 2011, p. 1) It appears that Epic has all of the features they are looking for and more. Revisiting the issue regarding workflow, this is now seen as an opportunity to improve these processes. They like many of the features Epic has including the ability to integrate modules and to support all departments. Clinical pathways, CPOE, care plans, ICU integration, bar coding, and pharmacy integration are just a sample of the features in the Epic system.

There are some concerns however that they want to address prior to committing to the Epic system. There is great concern regarding the transfer of existing data from the financial/ billing areas along with admitting and discharge departments. Accuracy in the conversion of this data is essential. Also they would like to explore the capabilities as far as customization and the cost associated with this feature.

As the consultant, we want to discuss and review with our client Meaningful Use and the impact it will have as they implement the EMR at their institution, along with security and

privacy issues. In 2010, the Centers for Medicare and Medicaid along with the Office of the National Coordinator (ONC) presented regulations for improving quality, safety and efficiency within the health care system by ensuring Meaningful Use of the Electronic Health Record. These measure along with, the Health Information Technology for Economic and Clinical Health Act (HITECH) were instituted to facilitate both the implementation of the EMR, and upgrading the medical coding system to ICD -10. As an incentive to hospitals and providers; the federal government has allocated up to 27 billion dollars over a 10-year period for this initiative. Eligible providers many receive up to $44,000 under Medicare and $63,000 under Medicaid, while hospital's may potentially receive millions of dollars.

A stipulation to be eligible for these financial incentives is that hospitals and providers must utilize a " Certified EMR". What this does is ensures the provider that the system they purchase at a minimum will support the achievement of Meaningful Use
Phase I, which takes place from 2011-2012. Stage I Meaningful Use requires hospitals to meet 19 of the 24 Meaningful Use objectives. In addition to core measures, hospitals must report and meet standards for all 15 of the Clinical Quality Measures, plus they must chose 5 additional objectives.

The program chosen by Northwest Illinois Lake Michigan Memorial Hospital (NILMMH), EPIC, is certified for Meaningful Use. This system has been successful in assisting institutions achieve Meaningful Use. Epic system will ensure functionality, Interoperability, security and privacy.

Health Insurance Portability and Accountability Act (HIPAA) consist of two separate rules; the first is Privacy (2003) and second Security (2005). The essence in the development of HIPAA was to protect patient privacy by protecting their data, and to focus the health care providers on security and privacy. In addition to create standards for securing data and requiring efficiencies in security and transfer of information. "A major goal of the Privacy Rule is to assure that individuals' health information is properly protected while allowing the flow of health information needed to provide and promote high quality health care and to protect the public's health and well being."("HIPAA," 2011, p. 1)

Outside threats to privacy are a concern. Breaches to the network, however, more commonly come from within the organization. These breaches may be innocent such as a computer screen left open with a patient's lab results while someone walking by inadvertently

views it, or deliberate, when a person uses their access to retrieve information they have no right to see. Outside threats do occur such as intrusion in to the network via viruses or Trojan horses. Hence, much of the compliance will come from the security measures with in the organization and one cannot rely on a single computer program to protect the entire system. Epic does have robust security measures embedded into the program such as strict encryption standards, and 802.1X radius authentication as well as virtual guest isolation, which protect patient information.

Training

The most critical and often overlooked element of the implementation of the EMR is the training program. No matter how terrific the system is, inadequate training will cause the project to fail. This project is a costly endeavor for the health care organization; training, the final phase prior to "Go Live", is often skimped on due to financial pressures and time constraints. Following this path will prove to be a fatal mistake. Adequate training is the key to seeing a ROI for the institution. There will be a plethora of training methods to accommodate the vast difference in learning styles and levels of computer literacy.

- Class room training- pre-assigned seating with super users strategically placed near user requiring more assistance
- Web-base computer training- modules with levels of proficiency
- Fun goals/rewards for each level attained
- Self-paced learning manuals
- Scenario based training
- Over the shoulder training
- Avoid training during or after shifts- Nurse will be worrying about what work they will need to catch up on afterwards

Physicians present unique opportunities to develop creative ways to encourage and excite them about learning the system. Appreciate that the physicians will need one- on- one training. A trainer will meet with physicians and assist them in customizing their preferences. Provide a "quite room" with workstations. This will be an inviting area where they can sit with a trainer if they need help with a particular issue. Snacks and coffee always help! Offer and encourage training for the physician's office staff, they will become super-users. It would be ideal if a trainer could go to their offices since it will be difficult for the staff to come in to the hospital.

This will allow the MD to log on remotely and if they need help, they will not need to wait for tech support thus increasing user satisfaction. Trainers and super –users will be easily identifiable on the units with colored smocks. After the implementation phase is complete, training will turned over to an in house staff. When planning a training program one of the first areas to evaluate is the current skill level of the users.

Phase I:

1. Skills Assessment

Evaluation will take place of all employees that will be using the EMR. This may seem like a tremendous amount of work, yet it will save time in the end, and provide insight into the development and deployment of the training program. The goal of this is to evaluate skill level and to bring all end-users up to a basic level of computer skills prior to the EMR training program. First a written survey will be distributed that will contain very basic questions regarding computer terminology. Next in the computer-training center (we will discuss this center later), skills that include turning the computer on and off, the ability to use a mouse, demonstrate familiarity with the keyboard, opening and closing a program will be evaluated. Login to the system, password protocols, and the ability to log onto the Internet web site that will provide on line training will be required. This process will be completed early on. The purpose of this phase is to identify users whom may need more assistance becoming comfortable with basic computer skills prior to training for the EMR, and will thus allow some one- on-one training to take place.

2. Need Assessment of the Institution

At this phase we will review what training resources and protocols are already in place. Users will be placed into categories based on the skills assessment.

Category A- Needs additional instruction on basic skills.

a. Metrics will be in place to move to level B.

Category B-Adequate Basic Computer skills

Category C - Advanced Computer skills

Phase II: Pre- Training

The purpose of this phase is to develop a training plan tailored to this institution. At this phase users needing more assistance (Category A) will be provided with additional training and will move to Category B. All users must achieve level B prior to EMR training. Potential super-users will be identified from Category C.

1. Set up a training center- Consult administration for possible training center locations. Consult with IT department for recommendations and guidance regarding setting up network and assisting in designing the center. Separate area in Doctor's lounge for MD training.

2. Category A users will meet with trainers either one-on –one, or attend basic skills workshops scheduled to accommodate users on different shifts.

3. Develop Course Curriculum- Determine timetables and scheduling
    a. The course will be divided into modules. These modules are self paced and will build upon the material learned. Scenario based training relating to that module will be at the end of each module.
    b. A user must complete each module successfully in order to move on to the next module. These modules may be completed on line at home, or in the computer lab. There will be class instruction on each module.
    c. Additional modules tailored to providers: for example physicians will have modules for accessing radiology, and lab results, CPOE, CDSS, Patient charting, remote login.
4. Identify Super-users and key stakeholders from each department
    a. Review work flow process in each department make modifications in protocols
5. Train Super-Users
    a. Train and certify super users
6. Prepare training material -each user will have an individualized training manual with their required modules. This manual will include the information needed for the training process, and instructions how to access them.

7. Determine Supplemental Staffing requirement to allow for training.
    a. Discuss with the administration increased staffing needs during training and implementation phase.

Phase 3: Training

Training manuals will be distributed three months prior to go live. User name, login and passwords will be activated. Schedules will be posted with classes for each module. If users feel that they can complete the self-paced module without classroom instruction, they may do so.

MODULES AND PHASES

Phase 1-Pink Phase 2-Green Phase 3-Purple

Modules	Physicians	Nursing	Pharmacy	Laboratory	Radiology	Financial/Admin	

Researchers	Basic computer skills	x	X	x	x	x	x
	User preferences	x	x	x	x	x	x
	Locate patient's	x	x	x	x	x	x
Implement training after go live 3 months Patient portal	Laboratory results	x	x	x	x	x	Software for Admin/fin depts
	Radiology reports	x	x			x	
	Charting	x	x	x		x	
	Remote Access	x				x	
	CPOE	x	optional	x	x	x	
	CDSS	x		x		x	
	Nursing Care Plans		x				
	Antibiotic Assistance Program	x	optional	x	x		
	Smart Pumps	Optional	x	x		x	
Add information to hospital web site regarding patient portal	Data Conversion			x	x		

Local newspaper advertisement

Contact local TV station- news segment touting patient portal

Mailer to patients of record

Tech support- Phone, email and I-chat tech support for patients

The training center will be open 24/7. Classes will be held for modules on each of the 3 hospital shifts. Module training will begin 3 months prior to training. Staffing on nursing units must be increased during the training period and for a period of time after each phase is implemented.

Estimated time frame is relative to "go live"

Administer skills assessment- 4 months prior to go live
Complete skills assessment and categorized users-3 months
Pre-training phase-3-2 months prior
Training 0-2 months prior
Phase 3 training- 1-3 months after go live
Evaluate functionality and make modifications in system
Training for researcher- 3 months after go live
Training turned over to in house – 4-6 months after go live
Off site locations- Begin process repeating phases 6 months after go live

There is no doubt that it will prove to be a challenge ensuring all providers are trained in the required time frame. Positive re-enforcement is always the best approach. A reward based system for successfully completing modules; this may include a voucher for a free meal in the cafeteria. Other ideas are to provide a "premium parking spot for 1 week for the 1st user to complete each module. A weekly raffle for users that complete modules with a monetary prize. Unfortunately there may need to be consequences if these modules are not completed with in the designated time frame. The most difficult will be the MD's. It may come to sanctions similar to what the institution enforces when medical records become delinquent. Some institutions withhold admitting privileges until this is resolved. Hopefully the physicians will be completely enamored with the system that they cannot wait to train!

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