

**Trends in Clinical Informatics:
A Nursing Perspective – Poster Presentations**

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Trends in Clinical Informatics: A Nursing Perspective - Poster Presentation 10th Annual Symposium - May 11, 2012

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Lessons Learned: Electronic Medication Reconciliation Challenges of Early Adoption

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Introduction

Lifespan has grown into a regional healthcare network providing patient services across Rhode Island. Its mission is to improve the health status of the people whom they serve through the provision of customer friendly, geographically accessible and high value services. Its Information Service department supports this mission by providing comprehensive integrated information network to clinicians, staff, administration, and executives. Lifespan has been recognized nationally for its innovation and achievements in electronic medical record (EMR) system's adoption. Lifespan's EMR platform is an older legacy electronic medical record system, Siemens Invision. With the organization's innovative nature and focused vision, Lifespan has achieved Stage 6 of the HIMSS Analytics EMR Adoption Model. Additionally, Lifespan was one of first twenty hospitals in the country to achieve Meaningful Use Stage 1.

Method

In October 2011 it was discovered that Lifespan's Siemens Invision Clinicals v27.0, Medication Reconciliation Discharge Reconciliation modules were not operating properly. A Registered Nurse noted a discrepancy between what the Physician Assistant entered into the EMR and what printed on the discharge paperwork and system generated discharge prescription. The clinician contacted the helpdesk to report the issue immediately and the efforts began to investigate the problem.

Siemens described the issue in a Safety Advisory Notification (November 2, 2011) as the following:

"This issue occurs when set up of the dose form values is not synchronized between First Data Bank (FDB) data, the Common Vocabulary Engine (CVE), the Invision Service Master and the relevant Invision profiles. When dosage forms are missing or mapped incorrectly, two scenarios may occur which could result in the discharge medication list and prescription not being what the discharging clinician intended."

Results

Lifespan partnered with multiple outside groups and agencies to communicate to the public about the event. Lifespan institutions were audited by the Board of Pharmacy, RI Department of Health, and submitted a response statement to The Joint Commission.

Discussion

As information technology advances and becomes ubiquitous in healthcare, all clinicians and nurses have a responsibility to appreciate risks inherent in the use of technology. Lifespan considers themselves early adopters of technology in healthcare and acknowledge the risks associated with pioneering our rapidly advancing technologies. This experience brings to light the risks associated with being early adopters of technology, when national standards are not determined.

The lessons learned from Nursing Informatics Perspective:

- Improved collaboration of all stakeholders through project lifecycle
- Improved education to end users, emphasizing end user responsibility in identifying errors and escalating concerns
- Improved testing to include multilevel testing in various stages of development
- Involve more disciplines and end users throughout the testing phases
- Heightened awareness of conflicting national standards

The organization has taken the approach of being transparent in sharing the experience with others nationally. It is imperative to share this experience and lessons learned to aid other institutions who may be in the initial stages of EMR adoption.

Bringing Safety to Intravenous Chemotherapy Administration Through the Use of Technology

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Introduction

Currently, The Miriam Hospital does not include Intravenous (IV) chemotherapy in the medication administration compliance (MAK) bar-coding process due to the complexity of chemotherapy regimens. It was initially identified that the chemotherapy administration process is so unique that it was impossible to integrate MAK technology into the process. Because chemotherapy agents are such a high risk medication, it is all the more reason to make sure all safe guards are in place to deliver safe and accurate chemotherapy doses. Recognizing the safety that MAK provides, the pharmacy team, oncology nurses, and the clinical informatics team partnered to analyze the process of IV chemotherapy administration and are currently working to integrate MAK into the process.

Methods

MAK brings many safety factors to the medication administration process through addressing the 6 patient rights at the point of care. MAK also provides drug to drug interactions and compares the chemotherapy agents against the patient's allergy list. These three elements are very important in the drug administration process. The IV chemotherapy administration process is so unique and complex that it was not included into the MAK roll out three years ago.

Results

Our proposal analyzes the risks in each step of the current chemotherapy administration process, and then rates the level and frequency of the risk. The current process we use begins with the LIP ordering the chemotherapy using a paper prescription. Pharmacy then verifies the dose and prepares the medication. During this time, the nurse is transcribing the chemotherapy regimen onto a paper schedule which is verified with another nurse for verification of appropriate medication and accuracy of the prescribed dose. After identifying the risks in the current flow, we examine how MAK technology can not only be integrated into the chemotherapy administration process, but show how MAK technology can improve the current workflow to mitigate the identified risks and provide safer patient care.

Expediting Patient Handoffs without Compromise

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The Miriam Hospital, Providence Rhode Island, a lifespan Partner

Introduction

Staff Nurses at the Miriam Hospital in collaboration with The Clinical Informatics Committee began a pilot called SBAR- P. In this pilot staff Nurses give verbal report on each patient at change of shift and follow up with an introduction and farewell in the patient room. As part of SBAR-P, the situation, background, assessment and recommendation must be reviewed. In doing this staff nurses realized that the verbal handoffs were becoming extremely lengthy when patients had complex past medical histories.

Methods

In response to this, an order in Physician Order Management system was created titled "Past Medical History". The admitting nurse on inpatient units began copying the past medical history from the patient's History and Physical. This order would be displayed in electronic orders and was found to significantly decrease the verbal hand off time. The oncoming nurse could see the history in the orders and the nurse reporting off did not have to repeat and wait for the oncoming nurse to transcribe the patients past medical history.

Results

Verbal hand offs on 4-5 patients prior to implementing the Past Medical History order were taking 45min to one hour. This time for the same amount of patients was decreased to 30-40 minutes. This was a great improvement in verbal hand off time, which provided the opportunity to increase the amount of direct patient care while decreasing the amount of incremental overtime.

Patient Education on the WEB

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Introduction

Education for patients undergoing infertility cycles in the Center for Infertility and Reproductive Medicine is done by nurses either in a large class which meets once a week from 8a-11:30a or individually. Due to the amount of information that patients need to hear/learn and the time it takes, the individual classes are usually reserved for patients in need of interpreter services. As the patient population reaches the computer age generation more are looking for alternative WEB based sources of information.

Method

Objective: Look at the patient resources area of the department's WEB site with the plan to update and add to the information available.

The current WEB page consisted of:

1. PowerPoint slides for Invitro Fertilization class.
2. Movies of various classes and tours of specific service areas.
3. Some out dated information about the classes.

The work:

1. PowerPoint slides - The IVF class slides were updated and animated so that one can go from specific topics in the table of contents to specific slides. Slides for the Ovulation Induction section of the class were created and animated. All these material are now available on the WEB site.
2. Class booklets - The 2 class booklets were revised and a third booklet was created. All these materials are now available on the WEB site.
3. The videos were evaluated. One was eliminated in favor of the new class booklet. A three are still up to date. Others are not up to date but not so dated that they need to be removed.
4. A new project was to revise our consent process. A consent booklet was created to describe IVF cycles in simpler terms. It has large print and some pictures. Patients then sign the specific individual consents for the procedures they will be undergoing. All these material are now available on the WEB site.

Results

With up-to-date educational materials patients who are unable to attend class can access materials on the WEB site then only need a short meeting with a nurse to review their protocols.

Projects yet to be finalized/initiated:

1. Adding a voice behind the PowerPoint slides for the classes.
2. Re-filming out of date videos.

Discussion

1. Patients needing infertility therapy have a site to go to, to understand what is involved with specific treatments
2. Nurses now have more tools to educate patients.
3. Patients have multiple ways of learning and reinforcing their knowledge of the intricacies of infertility treatments.
4. Many patient come from other states or countries. This will enable nurses to educate patients remotely and cut down the number of visits to Boston.
5. Future plans are:
 - a. Add a voice behind the PowerPoint slides.
 - b. Re-film the out of date videos.

Using Context Management Across Electronic Intraoperative Nursing Documentation Systems

Eric Hahn BSN, RN¹, Theresa M. Jasset MSM, RN, CNOR¹,
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Introduction

The heartbeat of BWH's OR is an electronic home grown system called OR Times. Perioperative nurses enter key surgical events which translate real time into OR scheduling communications clinicians rely on. However, most of the nursing clinical data remained charted on paper. Perioperative leadership charged our team, comprised of nursing informatics, anesthesia clinical informatician and information systems analysts, with converting the paper documentation to an electronic form.

Method

Analysis determined that OR Times must remain intact as vendor systems could not accommodate its existing functions. It was determined that it was more resource effective to implement a vendor system rather than building upon OR Times. The challenge became that the 2 unique systems could not easily communicate with each other. Our goal was to provide a seamless experience to the end user, avoiding multiple log-ins and struggles with minimizing windows.

Results

We redesigned OR Times into a "side bar application" of the larger vendor system consuming only 25% of the computer display screen, leaving 75% for the vendor application. The principles of Clinical Content Object Workgroup (CCOW) HL7 standard protocol were employed so users remained in the same patient's record while charting in both applications and could switch between programs on one screen.

Discussion

Perioperative nurses' frequently multitask across various systems. Our approach to "blending" 2 distinct applications avoided additional distractions and increased user satisfaction. By allowing users to chart on one screen we reduced the margin of error for incorrect data entry while leveraging electronic workflow efficiencies.

Using Context Management Across Electronic Intraoperative Nursing Documentation Systems

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Instituting a Delirium Assessment in the ICU

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Introduction

Delirium occurs in 60-80% of mechanically ventilated patients and often goes unrecognized in 66-88% of patients. Delirium is associated with poor outcomes in hospitalized patients including increased length of stay and higher mortality rates. In order to decrease the incidence of delirium in our ICU patients we first needed an accurate way to assess and document delirium.

Methods

- Identified a valid, reliable tool for implementation (the CAM-ICU)
- Designed a MetaVision tool to both assess and document delirium using the CAM-ICU
- Created ID badge reminder cards on how to conduct the CAM-ICU and treat delirium
- Designated unit based champions to teach staff how to conduct the assessment
- Educated staff on the delirium protocol and made it available via the portal
- Conducted one on one teaching sessions with staff

Results

- Throughout month of December, documentation improved to 35 % of patients with CAM results
- January results showed 100% of patients had a CAM result documented
- Only 10% of patient with UTA (unable to assess) results

Discussion

There were many hiccups in the process of defining the software changes so the educational rollout was not as smooth or consistent as it could have been. Once the software changes were finalized, the education to staff became more stable as well and documentation improved.

- Continue education of nursing and physicians
- Begin incorporation of CAM-ICU results into morning interdisciplinary rounds
- Encourage discussion of delirium in ICU daily teaching by the attending
- Begin an early mobilization pilot in the Medical ICU that will tie in with the delirium assessment and sedation practices improvement work

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The Hurdles of New Technological Innovations

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The Miriam Hospital, Providence, Rhode Island; A Lifespan

Introduction

The Miriam Hospital has successfully implemented an EMR. In an effort to improve nursing workflow and electronic documentation, The Miriam hospital and its informatics committee began the execution of a plan to phase out computers on wheels and install computer wall units in all in-patient rooms. A pilot was also initiated with the end goal of selecting a tablet device, which would be provided to all Nurses with the goal of improving nursing workflow while increasing electronic documentation at point of care.

Methods

The pilot began with the testing of an Apple IPAD on a 30 bed medical surgical unit with a focus in Cardio-Vascular and Telemetry monitoring. The device was customized with all applications used for nursing documentation and medication administration. Access to all applications were provided through a secure portal to a Virtual Private Network. A special scanner was also paired with the IPAD for barcode medication administration. The goal being that the IPAD be used as the main source for computerized documentation including reading and writing notes, looking up labs, patient education as well as administration of medications. Wall units and desktop PC's were to be utilized as backups should the device require charging. The pilot took place over a one-month period. Other RN's subsequently piloted the device on other inpatient-nursing unit in order to ensure that the device would be the best choice for a variety of nursing workflows.

Results

The results of the pilot concluded that the Apple IPAD was not the best tablet device to support nursing workflow. There were many challenges including:

- Battery life
- Screen size and resolution
- The device did not allow the user to multitask and utilize different applications on the device outside of VPN.
- The device is primarily designed to have one dedicated user.
- Apple requires users to agree to terms and conditions via contract between user and apple. This is a challenge as the device is provided through an employer. Employees would have to agree to terms and set up individual accounts with apple.
- Barcode scanner required frequent pairing, up to 3-4 times a shift. This function should occur automatically once device is paired one time.
- Barcode scanner only worked for 3D barcodes requiring frequent override of other barcoded medications
- The IPAD was also new to our help desk therefore they were not equipped to provide a great deal of assistance if needed.

Recommendation

Select another tablet device and begin pilot to determine compatibility with nursing workflow and documentation systems.

Clinical Informatics in Action: Taking C.A.R.E. Nursing Student Model

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Introduction

This innovative clinical teaching model facilitates clinical informatics in the development of the professional nurse. The *Taking C.A.R.E. of the Nursing Student* clinical teaching model incorporates informatics to engage, empower and improve group dynamics among nursing students, instructor, staff, and patients. During each clinical experience, the *Taking C.A.R.E. of the Nursing Student* model actively involves real time informatics application at multiple levels of patient care. Learning and applying clinical informatics is the backbone for successful student professional nurse development.

Methods

The *Taking C.A.R.E. of the Nursing Student* model involves developing student nurse self-efficacy to improve their transition as nursing students to professional nurses. The goals are to improve patient-centered and family-centered care by developing professional nurses, improving teamwork, and collaboration. The new generation of nursing students requires reinforcement that involves practical use of technology. The *Taking C.A.R.E. of the Nursing Student* model encompasses positive reinforcement, encouragement, structure, and technology to improve self-efficacy.

Results

The mnemonic C.A.R.E. strives to describe a multidimensional approach to develop safe and competent registered nurses. C represents caring, communication, culture, and the coping skills of patients as well as students. A represents assessment of the nursing students, patients, and staff with a focus on education needs including prior adaptation ability. R represents review of the student nurses past clinical or life experiences. R also represents review of the patients past hospital experiences, medical history, and potential medical, surgical, or psychiatric conditions. E represents empathy, empowerment, and evaluation of interventions.

This innovative clinical teaching model involved development of roles with titles indicating empowerment of the student nurse. The different roles are the Charge Student Nurse, the Assistant Charge Student Nurse, the Resource Student Nurse, the Neonate Student Nurse Coordinator, the Equipment Student Nurse Coordinator, the Environmental Student Nurse Coordinator, Taking C.A.R.E. of the Post-Partum Patient Student Nurse Coordinator, and the Documentation Student Nurse Coordinator. The clinical instructor's role would be equivocal to the nurse manager role. This model incorporates the *QSEN Prelicensure KSAs 6 competencies* (www.qsen.org): Patient-Centered Care, Teamwork and Collaboration, Evidence-based Practice (EBP), Quality Improvement (QI), Safety, and Informatics.

Discussion

The goals of *Taking C.A.R.E. of the Nursing Student* clinical roles are to improve the student nurse clinical experience, improve the clinical agency staff satisfaction with the student nurse, improve communication among all multidisciplinary team members, and the ultimate goal to improve patient care. The incorporation of technology during clinical practicum empowers each student to be competent to practice in this competitive healthcare environment.

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Scoring a GOAL! Transitioning the Plan of Care from Paper to Electronic

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Introduction

Regulatory agencies require a plan of care for each patient. CMS regulations were relaxed in 2011 to allow one plan of care for all disciplines and no longer required a nursing specific plan of care. This change along with diminished use of paper management plans led us on a mission to build the perfect plan of care that would tell the story of our patients.

Method

The Caredex was a page in the electronic medical record that pulled a lot of information together to display on one page in order to provide to the clinical staff a picture of what was going on with the patient. To get the whole picture though, RNs were required to also use a paper management plan that would outline the goals for the patient. With everything else being electronic, it was hard to keep the paper up to date. We set out trying to find a common theme among the management plans and worked with a core group of RN Subject Matter Experts to come up with a defined list of 30 patient oriented goals. We added timeframes in which the goals were to be completed and actions to take if the goals were not met. We added this into the Caredex and changed the name to Plan of Care.

Results

The Plan of Care was implemented with the help of SMEs and unit based educators. Daily monitoring for the use of the new goals section was done for 4 weeks to provide immediate feedback to the staff. Sustained used of the plan of care including the goals has been very high and staff are satisfied with the streamlining and semantics of this documentation into the electronic medical record.

Discussion

Additional phases of this project will look at making the plan of care more interdisciplinary. A major lesson learned that has now been used in subsequent implementations is the impact of daily reports to provide feedback and figure out system design limitations or workflow issues that need to be addressed.

Leveraging Practice Fusion's Free Web-Based EHR to Transform Nursing Education

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Introduction

The adoption of electronic health records (EHRs) is a key driver to achieving major health transformation needed in the U.S. healthcare system. This represents a critical juncture for nursing education, as nurses comprise 55% of the healthcare workforce. One of the recognized barriers to improving informatics education for all nurses remains the limited access to EHR information systems and technology. Nursing schools often rely on clinical practicum sites that are frequently limited in scope and provide limited access and education on EHRs for students. This pilot project uses an innovative educational strategy to leverage Practice Fusion®, a free, web based EHR, for family nurse practitioner (FNP) students at Simmons College. Practice Fusion is the fastest growing EHR community in the country with more than 130,000 users serving 28 million patients (www.practicefusion.com).

Methods

Because of budgetary constraints, in January 2012, Practice Fusion® (PF) was selected as a pilot project in an Advanced Health Assessment class of 60 FNP students. This ten-week hands on experience involves a “work-up” of a new “volunteer” paid patient from the Boston community. During the four-hour class, one hour is allotted for the history and one hour for a complete physical exam. Students record pertinent health data in real time using PF on laptops or iPads. After the visit, an extensive, tailored, patient write-up including evidence based differential diagnoses, review of systems, problem list and pharmacologic inventory are uploaded by the student on PF for faculty feedback and grading with a 1:3 faculty student ratio. To date, there are approximately 400 student encounters in our academic EHR.

Results

Preliminary survey results reveals that FNP students perceive a significant educational benefit from using PF in real time. Specifically, they value becoming familiar with, and learning how to use, an EHR as well as learning to incorporate an EHR into workflow while also learning advanced health assessment skills. They also believe that PF makes the volunteer patient experience more realistic, resembles real life practice, and is good practice for the future. One student stated, “EHRs are the wave of the future which we need to learn in school – it is good practice typing and talking to a patient at the same time.”

Challenges include addressing the computer as a potential barrier to facilitating a therapeutic relationship and documentation during the physical exam. Problems with the technology include pop up ads, computers freezing and time outs logging them out of the system. However, the majority would recommend using PF in the future with students at all levels.

Discussion

Practice Fusion's EHR addresses the complex needs of today's nursing students and disrupts the health information technology status quo. This project is ongoing and authentic, situated in practice, teaches skills needed to practice and addresses critical skills which can be translated to future employment regardless of location, demographics or specialty. It also addresses the gap between the information technologies adopted for educational purposes and those actually used in practice. At the conclusion of this pilot project, data mining will include ICD 9 codes, ethnicity, demographic data, and BMIs for 800 encounters.

Using Technology to Support Bedside Nurses for Delirium

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Introduction

Finding ways to support clinical staff in the identification, treatment and management of delirium is critical to a successful hospital program. Hartford Hospital created an interdisciplinary team called ADAPT (Action for Delirium Assessment, Prevention and Treatment) to collaborate and design standardized effective delirium care throughout the optimization of our electronic tools. This group utilized and leveraged the electronic tools (Allscripts, Sunrise Clinical Manager SCM 5.5 and the Interdisciplinary Patient Care Model using KBC Knowledge Based Charting KBC 2.5) to support the bedside nurses at the point of care to improve the identification of delirium through the accuracy of assessments, documentation, timely notification to providers, and the use of automation.

Methods

Partnering with our IT EHR Team was very successful in aligning practice methodology with functionality. We created several electronic processes that would significantly change the way we evaluate, assess, and treat for delirium. The journey began with capturing the baseline mental status upon admission through soft mandatory fields in a structured note that must be completed within 24 hrs. When the nurse assesses the patient's cognitive / perceptual / neuro status and documents WDL (within defined limits), automation of a negative CAM is generated. If the patient displays an exception then a "documentation reminder" alerts them to do a CAM assessment daily. If during the daily CAM assessment the patient has a positive CAM, and it's the first one within a 72 hour window, a documentation reminder alerts the nurse to contact provider immediately and a CAM Assessment nursing order is generated. Using logic and orders to flowsheet functionality we then auto-generate the Acute Confusion Clinical Practice Guideline (CPG) to the patient Plan of Care. After documentation of 9 consecutive CAM negative assessments, the Acute Confusion CPG becomes inactive and the CAM Assessments every shift get discontinued. This complex electronic process will repeat itself when the patient has the first positive CAM assessment within 72 hours again. Lastly we were able to configure the additional reference data to the CAM tool that assisted the nurses with the accuracy of their assessments in order to support the automation in clinical decision support.

Results

- The ability to perform a comparison of baseline mental status to current mental status
- Captured patient in the beginning stages of Delirium for quicker treatment
- Decreased the lag time in notifying providers for evaluations and treatment
- Automatic updating of the patient's individualized plan of care
- Increased compliance with accurate assessments & interventions for prevention
- Provider clarity with a new Provider Delirium Note and communication alerts

Discussion

Moving forward as we partner practice with technology and make it part of our fabric within the threads of the organization, we are achieving a greater satisfaction among the bedside nurses when solutions are created that not only align with their workflow but standardize documentation, supports best practice and overall increases compliance.

Wading Through the Complexity: Current State Dataflow Analysis of Maternal and Newborn Documentation Requirements

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Introduction

Two academic flagship hospitals are collaborating to design one new multidisciplinary inpatient clinical documentation system. Overarching goals of this project are to move toward standardization in documentation with a focus on patient safety and use of evidence-based practice. In preparation for advancement of the pediatric and obstetric portion of this project, a major directive is to ensure compliance with Massachusetts Department of Public Health (DPH) requirements for data sharing between the maternal and newborn records; representing unique documentation needs of this population. This inquiry emphasizes a need to minimize duplication of clinician effort, reduce the chance for entry of conflicting or erroneous information, and maximize interdisciplinary communication.

Method

In gathering functional requirements for the perinatal area, the nursing informatics team collaborated to analyze current state workflow and dataflow in the perinatal areas at both hospitals. This included outpatient prenatal care and inpatient units: antepartum, labor and delivery, postpartum, newborn nursery and NICU. The team created a Visio representation of the data flow documentation of DPH requirements that must reside in both maternal and newborn records; this was used as a tool to describe these complexities to project leaders and brainstorm potential solutions.

Results

Each hospital uses a different hybrid system, which imports limited maternal information directly into the newborn record at birth. Physicians and nurses currently document primarily in separate systems. Of the twenty-four DPH regulations that are required to reside in both maternal and newborn records, fourteen were found to be recorded by multiple clinicians in multiple systems; opening the possibility for recording discrepant information. This realization of current suboptimal dataflow assisted the informatics team to envision and identify system requirements for this population

Discussion

Our results highlight challenges perinatal informatics professionals face in finding system solutions that optimize workflow, patient safety and provide interoperability with the enterprise electronic health record for this population. Potential solutions include manually entering the same data in both maternal and newborn records, or 'cutting' data from one record and 'pasting' into the other. The ideal solution includes an interface that imports structured data from one record into another linked record, currently a limitation of project software. Such an interface has complex design requirements including transfer and de-identification of data, which are out of scope for this documentation project. Niche obstetric systems include this versatility, but silo maternal and newborn data from other hospital units during the inpatient experience. After discharge the disconnect continues as perinatal records are not integrated with the patient's electronic health record.

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Benchmarking Bar-Code Med Administration

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Introduction and Background

When first implementing a barcode medication administration system there are many critical decisions; equipment, vendor selection, and workflow changes for nursing and pharmacy. Data analysis, customized reports, and metrics demonstrating outcomes are furthest from most peoples' minds. However, once systems are in place and data starts to flow, the obvious question is "how are we doing?" In the fall of 2010 a group of five hospitals from the New England region agreed to start a benchmarking project, across hospital systems, focusing on "Wrong Patient" events averted. Using the same proprietary BCMA product and the same SQL query provided a valid benchmarking methodology.

Methods

Legal guidelines were agreed upon to permit data sharing without patient-specific PHI. A common language was established to refer to data elements and report criteria. Data collection began in February 2011 with the original five hospitals. Currently nine hospitals are participating anonymously.

- All hospitals are using the same proprietary BCMA system: Siemens Med Administration Check (MAK). The system provides a basic SQL query to confirm "Wrong Patients" scanned each month/unit.
- An SQL query was provided by NSMC for the group to use as a reference to confirm "Total Patients" scanned each month/unit
- Participants were also asked to run the provided report from Siemens tallying number of Charted Medications/month/unit
- Each hospital was provided with a data entry workbook in the form of an Excel sheet which they returned to NSMC monthly
- Data is graphed and trended by type of patient care unit (Medical, Surgical, ICU, OB, & Telemetry).

Results

After initial data analysis, in August 2011, from the initial five hospitals, it was evident more time and more participants would be needed for a significant BCMA benchmarking work. The group was announced on the Siemens MAK listserv. This yielded interest from many hospitals, four of which joined the group by January of 2012. Data trends emerged as like units were graphed; however the sample size was too small to reach any firm conclusions. The group was very interested in continuing to work together and encourage other Siemens MAK sites to join the study.

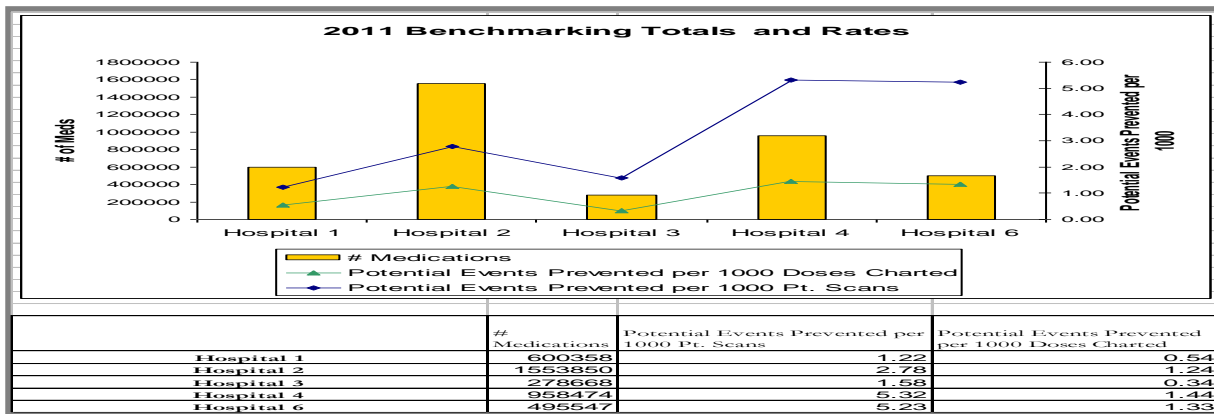


Table 1: 2011 Overview Graph of Like Units for: Meds Administered/Potential Events Prevented per 1000 Doses Charted/Events Prevented per 1000 Patients Scanned

Discussion

Our work generated the following questions for us to consider as we move forward with this evaluation:

- Are the graphing trends due to workflow issues? What role does Nursing Policy play?
- How is Aging equipment versus superior equipment a factor?
- Are hospitals that trend at the top of the graphs simply deriving more benefit from the BCMA system?
- As the group moves forward comparing data we have hopes of establishing best practice guidelines for BCMA.

Enhancing the Implementation Experience by Encouraging Communication of Technical Issues to IT Support Staff

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Introduction

Clinicians adopting new technology need a quick and easy way to provide feedback to the implementation team or technical teams based on issues encountered in new system.

Method

STAT ticket is a unique infrastructure support tool that allows users to click a button while using the Electronic Health Record (EHR) to submit a ticket to the help desk to alert them of an issue. The user can describe the issue or concern in their language and the STAT ticket system captures a screenshot of the application or error in question, user information, logs from the computer and the backend computer information necessary for IT support staff to investigate the problem. STAT ticket was implemented in 2006 throughout the organization; however its presence during the ICU implementation of the EHR in 2011 was instrumental in enhancing the user experience. With any implementation there are often system glitches or errors that need immediate attention and with the critical nature of patients in the ICUs, clinicians do not have time to call the help desk and wait on hold to give the details necessary to troubleshoot a computer problem.

Staff was educated on how to use STAT ticket during EHR training class to ensure they knew how to efficiently report problems and to assure them that issues would be addressed.

Results

During the 5 week implementation period 283 tickets were logged from ICU machines. Tickets were logged by clinicians using the system when they encountered a problem. The implementation team took a first pass at the ticket to see if it was a design issue or a technical issue. If it was a design issue, the implementation team was brought together to address and fix in a timely fashion. If it was a technical issue, the ticket was routed to the help desk to get support staff involved. There was immediate feedback provided to the clinician that alerted them the ticket was being worked on. This immediate feedback mechanism provided confirmation that the ticket was received and in progress. This in turn helped the end user feel that their concerns were being recognized and investigated, which ultimately enhanced the user acceptance of change as they felt they were able to be a part of the solution.

Discussion

Asking for real time feedback from clinicians allows them to feel integrated in the change process and feel like they have a voice. When issues are identified and a fix is warranted, a broadcast message should be sent to alert staff of the status of the issue and to relay the message that IT staff have the information they need and clinicians don't need to spend more time logging tickets for same issue. Real time logging of tickets alerts staff to potential system degradation early.

References

www.STATTicket.com

A Case Control Study to Improve Accuracy of an Electronic Fall Prevention Toolkit

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Introduction

Patient falls are a serious and commonly reported adverse event in hospitals [1]. In 2009, our team conducted the first randomized control trial of a health information technology-based intervention that significantly reduced falls in acute care hospitals [2]. However, some patients on intervention units with access to the electronic toolkit fell. The purpose of this case control study was to use data mining and modeling techniques to identify the factors associated with falls in hospitalized patients when the toolkit was in place.

Methods

Descriptive statistics using two-by-two tables were generated to describe demographic data of cases and controls including percentages within each case/control group. Differences in patient characteristics for cases and controls were evaluated using conditional logistic regression. A priori variables considered for a multivariate conditional logistic regression model included the following significant intervention variables ($P < 0.05$): Document previous fall, out of bed with assist, 1-person assist, 2-person assist, cane, bed/chair alarm, bed close to nursing station, and frequent checks/reorientation. Due to the relatively small sample size, after adjusting for significant patient characteristics, we entered one FTTK intervention exposure into the model at a time. Exact P-values were calculated where feasible. All P-values were two tailed and a P value < 0.05 was considered statistically significant.

Results

A total of 67 patients fell on intervention units during the 6-month intervention period. Of the patients who fell, one was excluded due to incomplete data. Of the remaining cases, 48 had three or more matches for gender, age (within 5 years), first MFS total score and unit length of stay) for a total sample size of 192.

The univariate conditional logistic regression analyses were completed to answer the research question, “*What factors are associated with falls in older patients?*” Significant associations were found for the following three interventions: ambulatory aid: cane, out of bed with assistance, and two person assist. These three variables were entered into the conditional logistic regression equation and findings suggest that cases (fallers) were significantly less likely than matched controls (non fallers) to be patients who before the fall did not use a cane as an ambulatory aid. Fallers were also 10.1 times more likely than matched controls (non fallers) to be patients who were before the fall known to require assistance getting out of bed (e.g., the FTTK recommended this intervention based on the MFS fall risk profile) and were 14.26 times more likely than non fallers to be known before the fall to require 2 people for assistance when getting out of bed or walking (e.g., the FTTK recommended this level of assistance based on the MFS fall risk profile).

Discussion

Our ultimate aim was to apply our findings to improve the toolkit logic and to generate practice recommendations. The results of our evaluation suggest that the fall prevention toolkit logic is accurate but strategies are needed to improve adherence with the fall prevention intervention recommendations generated by the electronic toolkit.

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A New Beginning at Newport Hospital Noreen Stoner Drexel Birthing Center

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Introduction

Newport Hospital's Birthing Center is a Magnet / Baby Friendly designated facility which represents two percent of the country's hospitals. The 10 bed birthing center was established in 1995. The initial software (1997) utilized for fetal monitoring, birth /postpartum documentation was Hill Rom Watch Child. In 2008, the Noreen Drexel Foundation granted \$275,000 for the purchase of new software and hardware.

Goals:

1. Implement Maternal and Newborn Documentation System to support nursing and physician documentation.
2. Support evidence based care, SBAR communication and care planning

Methods

PEOPLE

Interdepartmental team of Nursing leadership, direct care Registered Nurses, Physicians, Network Services, IS Analysts, and Clinical Informatics regularly met to establish project plan. The team defined the project scope: Fetal monitoring (remote), Mother and Newborn assessments, ADT and Lab interface, Care Planning, Patient Education, Discharge Instructions, electronic records with HIS; Out of project scope: PHM interface, Medication Administration/ Reconciliation, Anesthesia/OR, MU.

PROCESS

Request for proposals were sent to and received from GE Centricity, Hill Rom and Philips. Subsequent demonstrations eliminated GE Centricity due to these deficiencies: depth of clinical content, ease of use and staff support. Concurrent with vendor solicitations and presentations, current workflows were identified and documented. After the new software training the current workflows were adjusted to reflect key changes in process. A site visit was made to a similar size birthing center who utilized Philips. No site visits were available for Hill-Rom's Navicare however we are currently using Hill Rom WatchChild. Hardware and cabling became a major issue due to the age of the current equipment. Two different ergonomic wall units were installed and tested by the end users.

TECHNOLOGY

Hill-Rom's Navicare and Philips were the key vendors chosen along with a potential remote monitoring vendor Airstrips. The key components in evaluating the software vendors were available documentation modules, evidence based updates, allergy, ADT and lab interface specifications, national coding, remote fetal monitoring support, archive function, security, service track record, meaningful use certification and hardware requirements. (A matrix with the vendor comparisons will be included in the poster presentation.)

Results

Contract was signed with Hill Rom Navicare. Project timeline: Commenced on 2/27/2011 with go live on 2/28/2012. Remote fetal monitoring with Airstrips was pushed to potential Phase 2; Fetal monitoring is available to physician offices via VDI. Enovate ergonomic wall units were installed in all delivery areas.

Discussion

EMR documentation was not new to the nursing staff or OBS MD's. It was totally new for the Pediatricians. Newborn documentation was a potential major challenge but we experienced a smooth transition for those involved. Success was the result of engaged clinical staff from project inception and consistent/persistent workflow discussions. All the current and future workflows were documented and thoroughly reviewed with Information Services, Clinical Informatics, direct care clinicians and Nursing leadership. We are one month post go live and minor customization continues. Our issues list is now down to issues which will be addressed in the next release. Hill Rom has proven to be a customer centric vendor.

Quantifying Nursing Workflow and Handoff Practices to Investigate the Effect of a Multidisciplinary Handoff Program on Communication and Patient Safety

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Introduction

The handoff of clinical responsibility between providers is a known source of communication failure that leads to medical errors in the hospital setting. Despite the known potential of technological tools to reduce medical errors, very few handoff programs import medical information directly from the patient record. To address these concerns, we collected data on nursing workflow patterns and handoff procedures. This data will allow us to study the effects on provider workflow and provider experience of a Nursing Handoff Bundle (NHB) for nurses. The NHB will consist of a standardized written handoff tool for nurses in addition to teamwork and communication training for nurses to minimize verbal miscommunications.

Methods

We studied nursing workflow patterns using a time-motion study application and a validated nursing activity task list that was adapted for general pediatric inpatient use. Our research assistant conducted observation sessions with a single nurse and recorded his/her activities using a validated nursing activity task list. The activity task list includes, 1) specific direct/indirect patient care, administrative, and miscellaneous activities, 2) Handoff specific activities, 3) Length of verbal handoff, 4) Communication of key data elements, and 5) Number, type, and cause of interruptions.

Results

A total of 81 nursing sign-outs was observed. The mean time of the sign-out process was 18.6 minutes (SD± 10.3) per patient. With respect to patient identifiers, basic patient identifiers were included in the sign-out process at a rate of 52-68%. Also of note, the frequency with which clarifying questions were asked at the end of the sign-out session was 34%; contingency plans were discussed only 60.5% of the time. During the nursing sign-out processes, interruptions occurred 64.2% of the time of the observed sign-out sessions. The mean number of interruptions per sign-out session was 2.6 (SD±1.6). The mean interruption duration was 59.1(SD±113.7) seconds.

Discussion

From our preliminary observation study, current processes and contents of nursing handoffs were identified. In half of all the observed handoff sessions nurses failed to communicate patient identifiers which are an essential patient safety component in the handoff process. We found that nurses were more likely to omit the communication of a patient identifier if they were familiar with the patient or had previously cared for the patient. In these cases, only updated information or elements were communicated. Since key elements of patient information varied depending on nurses, it is important to provide a tool to help standardize the nursing handoff process. In addition, interruptions occurred frequently and often disrupted or distracted the nurse from the sign-out activity. Since over 60 % of these interruptions were medically related, it would be hard to completely mitigate their occurrence. Therefore, a process on how best to manage interruptions during the course of the nursing sign-out process needs to be considered as one develops nursing handoff tools and verbal sign-out practices. Based on these initial findings and information gleaned from additional observations, we will develop a strategy to improve the current nursing handoff process.

Using Technology to Improve Patient Safety

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Introduction

The Miriam Hospital (TMH) has been using the medication administration compliance (MAK) system to bring safety to the medication administration process since approximately 2007. The purpose of MAK is to ensure that the 5 patient rights are being met: right dose, route, time, drug, and patient. The Miriam Hospital uses a UDA software application to obtain reports, which include but are not limited to, uncharted medications, wrong patient scans, and patient ID overrides. The UDA application is a data system designed by Siemens that allows access to reports that provide data from the MAK system. In the last year there has been a growing hospital-wide initiative to decrease the patient ID override numbers.

Method

In October 2011, two units at TMH started to work towards reducing the number of patient ID overrides. They started using the monthly override report to target their staff that consistently overrides patient ID bands. One of the two units was more successful because they implemented an action plan. This particular unit would have staff contact the manager if they had to override the patient ID band and then they would have to write a MERS (Medical Event Reporting system) describing why they had to override the bar code. Our strategy to further reduce our numbers is through communication with non-compliant staff and enabling managers to have quicker access to the UDA reports. The override numbers are shared monthly at the Nursing Safety Council and Clinical Informatics Committee meetings. Then the staff nurses bring back the information to their units. It is important to help make staff aware that they are impeding patient safety and that it is not acceptable to override patient ID bands. Also, the managers have recently gained access to the UDA application and have had the application placed on their computers for quicker access to the reports. Education was provided to nursing leadership and a PowerPoint email sent out to managers on how to use the application to obtain various reports.

Results

The unit that implemented an action plan to decrease overrides initially had from 150-170 overrides per month in 2010. They currently have around 20-35 overrides per month, a decrease of approximately 70% within the past year. Hospital-wide, our numbers ranged from 700 to 850 ID overrides per month in 2010. In 2011, after patient ID override initiatives began, a downward trend was noted. The hospital had 845 overrides in January 2011 and trended to 329 in December 2011. We have remained in the 300's consistently for the past four months. With these new methods in place we have already seen a further decline in patient ID overrides and we are working hard to see to it that they continue to decrease.

How to Successfully Evolve into a Perioperative Nursing Informatics Super User

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Introduction

The Perioperative Super-User Role at Brigham and Women's Hospital evolved from staff RNs participation in the conversion process of the operating room (OR) record from ½ electronic and ½ paper, to entirely being computerized. Subject matter experts (SME) from the OR staff were either asked, and/or volunteered, to assist with the content, flow, and design of the new fully electronic perioperative nursing OR record.

Methods

Meetings were held every two weeks with Partners IS analysts, perioperative leadership, perioperative nursing informatics, quality program manager and nurse educators to review and update content for necessary clinical documentation. As the system evolved, SMEs were given the opportunity to have practice sessions prior to going "live" offering valuable constructive criticism. A four-hour session to train the trainer for Super-Users combined with the opportunity to participate in staff's training classes allowed the super users to mature their own skills in using the new system. On the go "live" day, resources were distributed to the Super-Users in the form of a quick tip handout, a central phone number and beeper for questions that required quick action or answer, a form to fill out information on the problem, how it was handled, the OR nurse, room, and if it was resolved.

Results

Excellent communication among team members and staff ensured a successful roll-out of the new system. The success of the project was helped from the efforts of the perioperative Super-Users. Being perioperative nurses themselves, they were already familiar with the fast-pace of the OR, workflow needs, felt comfortable in all surgical services, and with the staff and environment. This approach speaks volumes to the benefits of "growing super users" from within the project's targeted users whenever possible.

Discharge Documentation Module Project Go-Live: Lessons Learned

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Introduction

On November 2, 2011, a large academic medical center went live with a new Discharge Documentation Module. The Module's goals were to create a web-based, multi-disciplinary tool that would promote communication and collaboration amongst all disciplines, create a clear, user friendly document for patients and support safe transitions for patients going home with services or to facilities. The lessons we learned throughout every stage of the Go-Live process provided us with valuable data that will be incorporated into our future Go-Live planning.

Methods

Testing of the application occurred over a three month span of time and was conducted by our IS team in a Quality Assurance (QA) environment. During the testing period, we experienced IS staff turnover, diminishing our resources and creating a time crunch for the IS Analysts. Testing was done mainly in a QA environment, minimal testing was done in production.

Our training plan had multiple phases, the first phase was for Super Users to receive twelve hours of training and for clinical nursing staff members who would be "Unit Champions" to receive four hours of Super users facilitated one hour classes for Nurse and Health Professional End Users and "Unit Champions" were expected to provide on-unit support to their respective units. All Nurses were required to take a one hour Computer Based Training (CBT) prior to attending a "drop in" session. Physicians were required to take the 1 hour CBT and received support via a team of Physician Super Users.

Results

There were many challenges in the first days of Go-Live, most notably, the some testing that passed in QA, did not pass in production. Access to a testing environment that more accurately reflects production or more aggressive testing in production would have identified more issues prior to go-live.

Clinicians were minimally involved in the testing process, so testing did not adequately allow for a broader perspective of the clinician workflow and usage of the Module.

There was confusion about the role responsibilities of the Champions and many units were not staffed appropriately to handle the increased workload. Super Users were the most helpful resource; however, their limited number caused long waits for assistance at time of need.

Conclusion

Thorough testing using full workflow scenarios in a production environment would have caught the most major technical issues prior to go live. During training, we would have benefitted from imparting to the leadership the magnitude of the anticipated changes to practice and workflow and encourage them to prepare accordingly. In hindsight, our "Command Center" should have had a structured Rapid Communication Plan in which Group Pages are used to alert end users to issues and solutions in real time.

Our most positive lesson learned was the vital importance of the right support staff. Our Super Users were an amazing group and the face of this project during Go-Live. Since our rocky start, the Discharge Module has been a great success, with nurses pleased with the content of data, multi-disciplinary design and the expedience of documentation.

Why Bar Code Human Milk in the NICU and Newborn Nurseries?

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Introduction

Breast milk and human donor milk errors in hospitals pose health risks for infants and can cause significant stress for parents, resulting in trust issues with health care providers. The literature cites documented ranges of reported milk errors at 0.07%-0.14% per 1000 feedings.¹ Since 2006 at BWH, there were 3 reported errors of wrong milk administration and 4 near misses. In 2011 the Brigham and Women's Hospital (BWH) implemented a newborn electronic medication administration record with bar code scanning. A request was made from leadership and staff to incorporate a process for bar code scanning all human milk in order to provide the same safety checks and balances as medications. A core team of staff nurses, physicians, nutritionists, lactation consultants, pharmacists and information technology staff partnered to design the new process and build the application.

Methods

Patient care units that participated in the process included a 46-bed, level 3 NICU and 3 well baby nurseries that include 75 beds. In all areas human milk preparation and administration is a manual process done by nursing staff. All nurseries participate in the human milk donor program. The core project team analyzed potential causes of milk errors to understand areas that required improvement. Identified issues included: a complex process, nurse cares for siblings of multiples, milk preparation not done in central area, high frequency task perceived as low acuity, multiple distractions, multitasking care and illegible hand written labels. A workflow analysis revealed many complex steps in preparation and administration that were not standardized among nurses. The team built consensus on one new workflow as well as:

- Containing all milk prep to a central area
- Consensus on quantity of milk to prepare in order to avoid waste
- Defined expiration date of prepared milk
- Updated milk labels
- Standardized the process for placement of infant ID tag

Results

The new workflow has been standardized for safer administration of human milk. Highlights of the workflow changes include:

- Consistent manual verification of mother's ID prior to distributing milk labels
- RN creates computer generated labels
 - Master milk label at time of milk preparation & Infant specific label at the time of feeding
- Access infant identification tag:
 - Readable and able to be scanned & Two bar codes, glucose and med/human milk administration
- Eliminated 2nd RN check for verifying correct infant and milk when bar code scanned

October 2011 – February 2012

Number of documented feedings	31,785
Scanning compliance	99.2%
Number/percentage documented near misses of wrong milk administrations *	1436/0.04%
Top reason documented for not scanning milk	Bar code on label unreadable

Discussion

The team is still faced with some challenges that continued to be worked on:

- Hardware Challenges: Infection Control, Balancing space with lots of equipment, Workflow disruption, Limited battery life requiring frequent changes, environmental safety
- Workflow challenges: Visual check of milk labels required at time labels dispensed to parents & time milk brought into NICU by parents, Wasting of Human Milk: When is it expired?, Patient ID tags and compliance with policy

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Process Workflows as a Basis for Testing and Training

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Introduction

We are working on a collaborative project between two major academic medical centers to create one clinical documentation system. The clinical leads of the project have little formal training in systems lifecycle. The task at hand is to teach and lead the process in a timely fashion.

We are developing an acute care documentation system for all clinicians. This involves many iterations of a simple workflow process. To ease the various parts of the implementation, we encouraged our staff to create a process and then build on it for use in testing and training scenarios. The ability to take this information and apply it to other phases of the project will assist staff to become more adept and efficient.

Method

A staff of approximately thirty is responsible for designing, building, validating, testing, and training for the implementation. We are currently entering the testing phase of this three year project, which incorporates Unit Testing, Functional Testing and Integrative Testing. The staff has created workflow diagrams (VISIO) for depicting the future workflow process. In an effort to streamline testing we have taken the VISIO diagrams and used the flow to create line items for testing the system. This has helped the staff to maintain continuity for workflows and to minimize work intensity for creating the testing documents.

Training documents will use the VISIO diagrams as a guideline for looking at what was done in "Current Workflow" and differentiating that from the "Future Workflow". The individual steps in the testing documentation can be used as a guide for training the end user in the new system. Handouts and teaching tools can be modified using the specific steps needed to enter information into the system.

Results

In re-evaluating expectations for both testing and training, we developed a plan to incorporate the actual end users to help us develop pertinent clinical documentation scenarios. The twelve cases were originally written as narratives by the clinicians with actual day to day occurrences. The clinical leads in the project took the narratives and then applied them to a grid on an excel spreadsheet that allowed for the following to be documented: User, Action, Expected result in the application, and Pass/Fail. These excel spreadsheets were designed to guide documentation on test patients, mimicking a routine hospital visit for that diagnosis. The next step was to use the Future Workflow VISIO and create a training module around the specific process with individual steps that the end user needs to follow for documentation.

Discussion

Using scenarios helped the end user to apply new workflow learning with past patient care actions. Using the workflow documentation in various settings helped the clinical leads to become experts with the system and develop a framework for the entire process.

Status Boards: Graphically Displaying Documentation to Enhance Patient Care

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Introduction

The status board project was initiated in response to the increased need for monitoring and improved visibility of patient safety issues. Nurses were challenged to keep up with timely and complete documentation of patient data, interventions and scheduled tasks. Analysis revealed real time view of critical documentation elements would provide the needed solution. A software feature in our EHR was developed to provide the needed functionality.

In a continuing effort to align with the core values of Hartford Hospital; Excellence, Safety, Integrity and Caring, the Nursing Informatics Team proposed the status board project to enhance patient safety practices and improve documentation. Status Boards provide a visual reference tool for nursing staff to view multiple live data elements within the patient medical record. The goal was to improve documentation quality and enhance patient safety.

Methods

The Nursing Informatics Team targeted a list of documentation areas in need of improvement, as well as, taking suggestions from staff for visual displays of pertinent patient information. With the help of Information Services, the initial Status Board was developed.

In December of 2011, a focus group of six Registered Nurses were chosen for first implementation of the project. After refinement, the Status Board pilot was rolled out to a 42 bed medical surgical unit. Training consisted of Computer Based Training modules made available to all staff, as well as, multiple communications via emails, meetings with the manager, educator, and staff of the unit. Daily rounding from the Nursing Informatics Team helped to provide one-on-one support for the first two weeks of the project. A Post-Pilot analysis including; the Nursing Informatics Team, Information Services, Educator, and Nursing Staff on the unit provided both positive and negative feedback from the pilot. After minimal adjustments in data elements on the Status Boards, the project was then expanded and rolled out hospital wide on a per unit basis.

Discussion

Status Boards are an example of a practical every day use of technology. Safety driven patient data is available in a format that provides a quick visual snap shot of unit activity and patient documentation that needs to be addressed. It is our hope that documentation practices will continue to improve as well as patient safety. To our surprise, this project has reached far more than bedside nursing. Various members of the nursing team have utilized this visual display of data for improvement processes. Staff nurses for documentation purposes, resource nurses for evaluation of unit activity, educators to monitor new orientation documentation and managers for performing daily auditing on various elements of documentation. Additionally, enhancing patient hand off and report from shift to shift was a pleasant unplanned by-product of this project. In the future, the Nursing Informatics Team sees the use of Status Boards expanding even further to enhance patient safety and documentation practices. This can occur by configuring the boards by role, and/or by specialty making them useful tools to multiple disciplines throughout the hospital.