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Intensive Education, Compliance Monitoring and Interdisciplinary Collaboration Increase Meaningful Use Compliance

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Introduction and Background
Boston Children's Hospital (BCH) began participation with the Centers for Medicare and Medicaid Services (CMS) Electronic Health Record (EHR) Incentive program, Meaningful Use (MU), in 2011. Since that time, data has shown low compliance amongst providers in ambulatory setting. Needs assessment completed by the BCH Clinical Education and Informatics team (CEI) demonstrated knowledge deficits around use of the EHR. Based on the success of previous education initiatives, the team used a three-pronged approach: providing intensive education, monitoring compliance, and improving interdisciplinary collaboration.

Methods
After thorough assessment of ambulatory clinics in early 2013, it was apparent that additional Clinical Informatics Specialists (CIS) were required to fill education gaps identified. A proposal was presented to the executive committee and 6 positions were created for the CEI team. New team members brought a range of clinical, educational and work experience. The new CIS were oriented over 6 weeks. The CIS' main priority was to be in the clinics daily providing education around electronic documentation. Once the CIS were in place, weekly meetings were held with the project manager, the CEI team and clinical staff to trouble shoot common issues. These issues were dissected until resolution or a recommended workflow was developed. Weekly compliance reports acted as both a measurement tool, and provided guidance for focused training of clinical staff while sparking friendly competition amongst clinicians.

Results
CMS defined specific compliance requirements that the clinician must meet or exceed to participate in the MU program. Initial reports as of June 1, 2013 showed poor compliance. The education initiative was implemented on August 1, 2013. As of December 29, 2013, final reports revealed increased compliance in a majority of measures.

Table 1: Meaningful Use Measurement Compliance

Measure	June 1, 2013 Compliance	December 29, 2013 Compliance
Computerized Provider Order Entry	99%	99%
Incorporate Lab Results	99%	99%
Documentation of Demographics	100%	100%
Recorded Vital Signs	94%	96%
Documentation of Smoking Status	94%	100%
Electronic Transmission of Prescriptions	86%	87%
Documentation of Active Allergy Profile	69%	97%
Documentation of Active Medication List	75%	98%
Documentation of Problem List	8%	88%
Clinical Summary Documentation (New functionality for all providers)	-	90%

Discussion
Many important lessons were learned prior to and during the 2013 MU measurement period. Having executive support is crucial to success for project buy in. Providing individualized teaching plans for providers and clinics, trainer flexibility, and 1:1 education were most effective. Bidirectional communication and transparency were critical. Finally, MU Champions within the clinic provided an entry point for trainers to gain access to staff and helped sustain momentum during the measurement period. Remaining transparent with our clinicians as the projects progress in 2014 and 2015 is vital. We have also learned that the earlier the better when it comes to providing education so end users will have ample time for hands-on experience.

References

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Standardizing Interprofessional Patient Education Documentation

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Introduction and Background
Patient Education in a pediatric setting can be complex, and is usually multidisciplinary. It is necessary during all aspects of a patient encounter and often has regulatory requirements. Patient education is provided and documented by clinicians including nurses, physicians, coordinators, and pharmacists. Transplant education is a highly regulated aspect of Pediatric Transplant care, and is assessed by the Centers for Medicare and Medicaid Services (CMS). Within our institution, the transplant population includes: heart, liver, kidney, lung, multivisceral, and bone marrow transplant. Patients can be seen on three inpatient units, plus the intensive care units. The number of clinicians that interact with the patients and provide education is enormous, and education can be provided along any aspect of the continuum of care.

At our institution, documentation varied slightly amongst the three inpatient transplant units, Cardiology, Surgical, and Bone Marrow. The units had designed paper grids to track the details of education, the dates of the education, as well as notes about when the education may need to be reinforced or repeated for different caregivers. The nursing staff often had to access previous admission education information for the patient, but sometimes the document was not accessible, even in the scanned documents section of the electronic health record. Identifying a need for a more standardized approach to this highly regulated practice of documenting education, the Nursing Director of Transplant, as well as some of the transplant specialty nurses inquired about creating a way to document the transplant education. The reason that the current education documentation was not working for this group was because the historical recall of the education was not optimal.

Methods
A group was convened involving clinical experts, an Application Specialist and Informatics Nurse Specialists to identify and brainstorm a new way to document the transplant education. The Application Specialist was familiar with ultra-grids, and worked with the team to build this method for documentation. An Ultra-grid is a tabular format that can be inserted into a form which provides consistent topics and standardized documentation options for all clinicians. The process of identifying education statements that could be standard amongst the diverse transplant groups presented a challenge. Collaboration led to implementation of consistent regulatory driven language, which supported best practice.

Results
Successful implementation was evidenced by anecdotal feedback from users. The change from a paper form to electronic method decreased the incidence of misplaced documentation. Clinicians reported that information was easy to document and transparent to the interprofessional team. This documentation was also reported to aid in smooth transitions of care because it was clear what had been taught and what education still remained. The transplant teams also reported that education documentation was accessible during a regulatory survey.

Discussion
The benefits of this new education documentation include the ability for multiple contributors to document in a standard way; easy accessibility to both document and retrieve information; and the feasibility of recall for regulatory purposes. The transplant education grid project became the framework for all education documentation throughout the electronic documentation system.

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Barcode Scanning of Medications: The Journey to Safety with Wireless Devices

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Introduction:
Barcode Medication Administration (BCMA) has been shown to decrease medication errors at the point of administration[1]. Barcoding is an important tool in the medication safety toolkit along with Computerized Provider Order Entry (CPOE), drug-drug, drug-allergy checking and full integration of medication smart pumps-allowing the order to flow to the pump for programming and the documentation to flow back to the Electronic Medical Record (EMR).

Methods:
At Boston Children's Hospital, barcode scanners were implemented initially for breast milk checking and then soon after the same scanners were used for medication administration. We used a first generation barcode scanner that was tethered to the computer on wheels in every patient room. After 4 years of use, we re-evaluated the devices with extensive testing and feedback from staff nurses and chose to swap out wired scanners with wireless scanners. We piloted three types of scanners (two wired and one wireless) on six units- two ICUs, two inpatient units, one oncology unit and one procedure unit. Using a simple survey tool, 61% of the staff chose the wireless scanner as the preferred device.

Results:
After the initial implementation of BCMA we saw about a 50% decrease in serious medication errors and we have been able to maintain a sustained decrease in medication errors. The new wireless scanners have increased staff satisfaction with the technology since there is no longer the need to bring the whole workstation on wheels to the bedside-they can bring just the scanner. Staff has also reported the new scanners are faster and easier to use.

Discussion:
There have been many lessons learned throughout our implementation and optimization of BCMA. Best practices include: expectations of nurse leaders that staff barcode every med, every time; pharmacy staff needs to test every new product for "scannability" before it is put into circulation; all medications need to be labeled (including those taken from an automated dispensing system in liquid form); barcoding does not negate the need to inspect medication for volume, color, etc.; slow initial implementation allows for identification and mitigation of work arounds as well as one on one training and follow up; and unit and person level reports work to increase compliance. Staff input into devices that will be used at the bed side is crucial in determining what fits in the workflow. Now that the infrastructure is laid with wireless barcode scanners, we will be able to start scanning smart pumps to connect the pump to the Electronic Medical Record and have the order flow seamlessly to the pump and the data flow back to the chart.

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Integrating Electronic Documentation Across Pediatric Institutions

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Introduction
The use of electronic health records is a growing demand nationally. The HITECH Act laid the groundwork for the adoption of EHRs by the year 2015. Augmenting the requirement of adoption, the Affordable Care Act has also set guidelines for meaningful data to be entered into the EHR based on national standards. Although institutions are required to implement EHRs, the reality is that different organizations have the authority to implement a system of their choice that meets not only the federal demands of documentation, but also the strategic demands of the institution. In today's complex healthcare environment, multiple healthcare organizations must often collaborate in patient care delivery. This poster will highlight the collaborative work needed to standardize the documentation of patient care from three institutions into one EHR. The three institutions included an urban pediatric hospital, an urban adult hospital, and an urban cancer institution. Using a variety of EHRs during the continuum of care for a single patient seen at each of these settings was not transparent to all institutions. The pediatric institution's EHR, already used by two out of the three institutions, was selected as the sole EHR for this project.

Methods
Over a three month period, a multidisciplinary working group was tasked with instituting a single source of documentation in the pediatric institution's EHR. This effort required identification of documentation needs of all providers associated with the care of the radiation oncology patient. Patient care delivery included radiation, medication administration, and chemotherapy delivery. The analysis included the need to recognize the various billing processes related to medication ordering and distribution and the radiation therapy. Clinicians involved in the documentation process included radiation oncology doctors, radiation oncology nurses, radiation oncology radiation therapists, pediatric oncology doctors, pharmacists, and ancillary clinicians requiring view only access. The implementation plan included the engagement of stakeholders, analysis of workflow, identification of the documentation needed, documentation building and testing, as well as clinician training and support. The analysis of billing was simplified as the charges were already captured in other workflows, and therefore this new encounter build dropped all charges. Already existing discrete data fields were used to ensure standardization and consistency. Meaningful use demands were also considered.

Results
Meeting a strict go-live date, the implementation of the EHR in the urban adult hospital was successful, as demonstrated by patient encounters appropriately displaying in the designated EHR which allowed for clinician documentation. On an ongoing basis, clinician support is provided to improve the capture of details of documentation, as well as to be able to identify documentation needs. A nursing informatics specialist continues to meet with the nursing staff on a weekly basis to identify needs and provide supplemental training as requested by users.

Discussion/Conclusion
As a result of the project implementation, documentation completed throughout the care of the pediatric radiation oncology patient is transparent to all of the caregivers throughout these three institutions. Anecdotal feedback from all caregivers is that the collaborative process for documentation allows for more integrated care for this complex patient population.

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Boston Children's Hospital: Our Journey to Smarter Infusion Pumps

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Introduction

Boston Children's Hospital (BCH) identified a need for new infusion pumps and took advantage of the opportunity to implement smart pumps. Historically, BCH has utilized IV and PCA Infusion Pumps from several different vendors to give patients IV medications and fluids depending on the type of therapy. The multi-vendor pump strategy was challenging for Clinical and BioMedical staff and was recognized as a potential patient safety risk. Transitioning to a single vendor pump system provided a straighter path to future pump integration within the Electronic Medical Record (EMR) and standardized the clinician's workflow; which in turn lends itself to increase patient safety and future integration.

Method

A multi-disciplinary team was formed with BioMed, Pharmacy, Nursing and ISD to decide upon infusion pumps "must haves." Decision on which infusion pump would be used throughout the pilot was made after a house wide pump fair. After creating and deploying a pilot "pump library;" a pilot was held for 1 week that took place in various locations throughout BCH; including the Operating Rooms, Cardiac Intensive Care Unit, Neonatal Intensive Care Unit, 2 Inpatient Surgical Floors and Oncology Floors. After consensus to transition throughout the house to these new pumps; design was developed collaboratively by Nursing, Pharmacy and Anesthesia. Members of the project team, and subject matter experts reviewed the proposed library in depth and came to consensus for all decisions inclusion of configuration settings and overall medication library design. ISD teams of Networking and Network Operating Systems helped with the creation, maintenance and implementation of servers that were needed for wirelessly maintaining the libraries on the BCH network and on the pumps. The "train the trainer" approach was used for education of clinicians that would need to be trained on the infusion pumps. Multiple team members came together for implementation day. Each patient received their specific pump configuration patient by patient.

Results

Each patient was delivered infusion pumps specially to replace their existing set ups. In addition, new pump tubing and accessories were delivered to each Code Cart. Vendor representatives were also on site to help with implementation, however only BCH Nurses and Clinicians were permitted to exchange and program the pumps for each patient. 95% of all inpatients had been transitioned to new infusion pumps by completion of Day 1. By Day 5, all patients had been transitioned over to the new pump system. Extremely careful planning and solid team work among multiple teams resulted in a successful conversion.

Discussion

Understand, document, communicate and learn Nursing and Anesthesia workflows. Learn and try to understand IT infrastructure of Servers and Networking. Next steps for us includes Infusion Management! Seamless flow of information from the order in the EMR-> Infusion Pump for Auto Programming-> with information flowing back to the EMR for viewing and documentation in the patients record. Bidirectional, closed loop medication administration using BCMA Wireless Scanning. Ability to associate from patient -> device->order and medication ingredient.

References:

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Within 100 Days: Boston Children's Hospital Rapid Cycle Improvement of High Value Medical Equipment and Availability

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Introduction

Executive Sponsors within Boston Children's Hospital (BCH) asked a group of individuals throughout various within the organization to improve the tracking and availability of all parts of the Infusion Pump System. After a successful go live in July 2014, there were several instances where modules could not be located throughout BCH and were thought to be "stolen." The RCI team was then asked to improve the distribution and tracking of all high value equipment- starting with Infusion Pumps- to be completed within 100 days.

Method

A multi-disciplinary team was formed with BioMed, Pharmacy, Nursing, Information Systems Department and Supply Chain to 1) evaluate potential options for distribution and tracking of high value medical equipment; 2) benchmark case experiences at other hospitals and 3) explore implementation options for an automated tracking system. While keeping cost savings, efficiency, productivity and regulatory compliance as key guiding principles, the team was asked to improve the availability and tracking of the complete pump system. The goal was to have pumps consistently available for patients and clinical staff when needed. Success required a measurable result that included metrics such as: (a) time it takes for pumps to be found and delivered- within 5 minutes, (b) stable par levels in the central equipment pool and/or (c) proactively addressing clinical need to ensure equipment is always available. The team met weekly for 12 weeks during which design, build, implementation, support and education of a new application to staff was completed.

Results

The Rapid Cycle Improvement team had two goals to be completed: 1) By 1/1/14, ensure pumps are available within 5 minutes from request to patient for 1 model month. This was reached successfully, based on baseline time of 16 minutes. Goal 2, by 1/1/14, to ensure pumps on 10 South are 100% trackable for the model month - was also met successfully, if the pump was manually scanned.

Discussion

While Nursing loved specific tools that were introduced with this pilot (Wireless Scanners, Tap/Go Solution, Par Level Standards); the request for all nursing to manually scan all pumps all the time was too great. Inconsistent scanning created inaccurate inventory levels resulting in frequent need for reconciliation. The roles and responsibilities of who/when would be cleaning the pumps needs to be implemented. Alerts and Notifications to Supply Chain on when Par was hitting a specific level were instrumental in keeping levels at a satisfactory level. The RCI Team believed that the work that was required with this project was fun and mad cross department relationships stronger, while building trust and confidence within these teams and with the end users.

Next Steps

The RCI team recommended piloting an automatic RFID solution to the executive sponsors. While also, engaging institutional ownership of equipment tracking, cleaning of equipment and maintaining satellite equipment location area.

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Program Development and Implementation of an Integrated Patient Record Using a Wireless Tablet for Nurse Documentation in a Gastrointestinal Endoscopy Unit

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Introduction and Background:
Nurse documentation requirements continuously expand to demonstrate compliance with regulatory guidelines, advances in patient safety and evidence based practice guidelines. Expanded documentation requirements place increased pressure on the bedside nurse. Paper documentation often has missing, illegible or incomplete information making it difficult to meet 100% compliance. Health care reform is underway and financial reimbursement will be tied to measurements of quality, safety and efficiency. This information is best collected using electronic documentation systems. Gathering this information manually is inefficient and requires utilization of scarce personnel resources and adds to the documentation burden of the nurse. The MGH GI Endoscopy Unit designed and implemented an electronic record that replaced paper documentation forms in 2012. This poster will chronicle the decision making process for hardware solutions, software customization, development of an education plan and the implementation process. Particular challenges included space issues, education, training and workflow changes.

Methods
Unit leadership assembled a collaborative interdisciplinary workgroup including a technical team and GI nurses to assess documentation needs and workflows. The system needed to encompass three care areas: pre/intra and post procedure. Screens were developed to support the nursing workflow. The Anesthesia Department had experienced success with electronic documentation and the decision was made to customize this program to the meet the needs of the GI Endoscopy nurse record. This choice also allowed the anesthesia and nurse records to be partially integrated. The nurse record had vital signs automatically downloaded and records available in the hospital EHR. There was insufficient space for desktop computers or computers on wheels. Nurses needed to document from the patient bedside especially during sedation administration when assessments are documented every two to three minutes. Based on these requirements the technical team presented a wireless tablet. Logging in to the computer needed to be both secure and fast avoiding delays in care. Single sign on software using RFID badges and e-signatures was incorporated into the tablet. Easy to use features like color coding and highlighting missed fields were included. Nurses developed an educational computer tutorial followed by "hands on" training sessions with super user support during go-live.

Results
There was a staggered roll out between three different locations over a five month period allowing for identification of issues before the next "go live". Unanticipated problems with inadequate wireless coverage, scanner failures, difficulty logging in and unsynchronized times between the program, tablet and the vital sign monitors. A small number of records do not successfully post to the hospital EHR requiring careful monitoring. Education required more resources than were initially planned and some users struggled with the new technology, though all users attained competency. Opportunities for improvement in patient waiting times have been identified and other process improvement initiatives are ongoing.

Discussion
The system has been successfully in use for almost two years. GI Endoscopy electronic nurse records are accurate, legible and compliant with documentation standards and available in the EHR. Both technical and clinical supports were imperative for the successful implementation. Ongoing support and quality assessments continue.

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One Path to Becoming a Nurse Entrepreneur in Healthcare Informatics

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Background
Nurses are prepared in their educational pursuits to provide exceptional care to their patients. As nurses advance their career, the focus of that care delivery becomes more specialized. The specializations include advanced practitioners, administrators, informaticists, educators, researchers, and also entrepreneurs. However, the path toward nurse entrepreneurship is one that has limited formal education or training. Thus, personal accounts must be shared with other nurses to demonstrate the potential path for others. The purpose of this poster presentation is to provide a personal account in career development from a staff nurse to a PhD-prepared nurse entrepreneur.

Methods
The methods taken to describe this personal account represent a combination of professional and educational experiences. Dr. Kelley will describe the importance of her own nursing experience and awareness of the nursing practice environment in order to advance her career. The nursing experience and awareness were instrumental in being successful as a Ph.D. student. While the focus of a Ph.D. program is on research, her research included observations, interviews, and document reviews to formally study how nurses use information needed to know their patients. Through such immersion and awareness she formed an idea for a product that could support nurses to know their patients. However, the execution of the idea, as an entrepreneurial effort, required new knowledge and skills that were not part of her past nursing education and experience.

The foundational knowledge initially came from Dr. Kelley's Master's education in Business Administration. She obtained her MBA from Northeastern University before pursuing her PhD. From that experience, she felt confident with knowing the different sectors of business. However, she recognized the need to tailor that education to the specific pursuit of entrepreneurship (Kawasaki, 2004; Vogel & Doleysh, 1994). Thus, she began attending events in the Boston community that discussed entrepreneurship and connecting with experts in areas that required her attention. She began to find herself surrounded with other entrepreneurs. Their expertise and experiences were helpful to answer questions about moving forward in a certain sector of the business. She also connected with a venture accelerator, IDEA, through Northeastern University for students and alumni.

Results
Dr. Kelley did not anticipate starting a company until she formed an idea for a software application that could help nurses working in hospital settings from her Ph.D. research. After considering the options as to how best to bring the idea into reality, she decided to form a company. Building a company from an idea occurs in stages. The different stages will be described as well as the key knowledge, skills, and resources needed at each stage.

Discussion
Nurses understand the existing problems and are best equipped to develop innovative ideas that can positively impact the nursing profession and the patients receiving care. For some, this may mean taking the formidable step of becoming an entrepreneur. Gaining the required knowledge, skills, finding appropriate mentors and being very resourceful can benefit aspiring entrepreneurs to maximize the potential for success.

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Acuity Based Staffing Module for New Graduate Registered Nurse Hires

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Introduction and Background

In September 2013, NSMC began planning for the orientation of eight new graduate registered nurses. Based upon previous feedback it was determined that the orientation process should be restructured with significant consideration given to the method in which patient assignments were derived. Previously, a new graduate cared for one patient and over time progressed to a full load of five patients. However, just using numbers of patients leads to a wide variation in assigned work. This creates challenges for the nurse to complete the assigned work resulting in increased overtime and employee dissatisfaction. We investigated whether using a staff assignment module that was an extension of an acuity calculation software system, QuadraMed Acuity Plus, already in use in our organization could be a potential solution. QuadraMed Acuity Plus uses multiple patient factors to calculate acuity which in turn could be used to inform assignments that are based upon a patient's workload and geographic location.

Method

QuadraMed Acuity Plus uses an objective classification process to quantify patient care needs for the next 8 hour shift. Because the acuity score would now impact staffing, it was determined there was a need to validate the accuracy of the data before going live with the staff assignment module. A target goal was set to insure an accuracy rate of 90% for the indicator selection for each nurse assigned to a given patient. It was decided to start working one-on-one with the nurses. This was done on a daily basis with each nurse after the nurse had completed the daily classification in the acuity system on their assigned patients. Together, a member from the informatics team and the nurse would complete a blind monitoring of the patient's classification. This method helped to create an open non-confrontational dialogue for selecting the appropriate indicator and how this system could bring more value to their individual patient care.

Results

Once the indicators proved to be accurate we used the data for that day as a test case to retrospectively calculate the recommended hours of work on a telemetry unit for staff to care for their patients over their eight hour shift. The actual patient load for the eight nurses ranged from 5.21 hours of work to 10.16 hours of work for their eight hour shift. This provided factual evidence that the previous method of assigning patients had significant variation and could be improved.

The acuity based staff assignment module went live and was used to create the patient assignments. The data in Table 1 is an actual day of staffing from the telemetry unit post implementation. Two of the nurses are preceptors to new graduate hires. On this day one team had a higher weighted assignment (RN4) in comparison to the other RNs, because they requested to have a patient from the previous day for continuity of care. The data also demonstrate that the other new grad team did have less Recommended Hours than the other RNs(Preceptor1). With the noted exception, the assignments shown in Table 1 have fairly balanced assignments.

Table 1 Actual Nursing Assignment After Staffing Module Implementation

RN1	RN2	RN3	RN4	RN5	Preceptor1	Preceptor2
Rec 5.97	Rec 6.26	Rec 6.26	Rec 7.39	Rec 5.83	Rec 4.83	Rec 6.83
WI 1.1	WI 1.1	WI 1.1	WI 1.3	WI 1.1	WI 0.9	WI 1.2
Complexity Units 4.2	Complexity Units 3.6	Complexity Units 3.8	Complexity Units 5.1	Complexity Units 5.2	Complexity Units 2.8	Complexity Units 4.8

Discussion/Conclusion

Although the pilot was geared towards the new graduate hires, the benefits of a more even workload impacted all of the nurses. While there has been initial success with the staffing module on the telemetry unit, we plan to continue to monitor the scores and results to see if the value of the staffing system continues over time. The overall consensus by most is this program, which was initially thought to be extra work with little to no benefit for the nursing staff, is now seen as a tool which positively impacts each individual's workload for a given shift.

Reference

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Enterprise-wide, Evidence-Based Multidisciplinary Plan of Care Content Validation: Guiding Principles and Lessons Learned

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Introduction and Background

Evidence-based and Problem-based Plan of Care (POC) content for use in an EHR POC documentation tool can facilitate team-based communication and coordination, decision-making, and evidence-based practice.[1–3] Partners eCare (PeC) is a large-scale effort at Partners Healthcare System (PHS) to replace existing systems with an integrated vendor-based EHR, Epic Systems(c). PeC contracted with Zynx Health(c) as the content provider for evidence-based POC content to be configured into Epic. The aim of this project was to validate the Enterprise-wide POC content that would be configured for use at PHS.

Methods

In preparation for subject matter expert (SME) content validation sessions, we developed Guiding Principles for Partners eCare Multidisciplinary POC documentation. Content validation sessions were held during 3 days in December 2013with over 170 SMEs representing all type of health professionals (excluding medicine) and sites across PHS.

Results

Guiding principles included definition of a Care Plan, Care Planning process, POC activity, a Patient Problem, and Patient Education. Eight Guiding Principles statements were specified, such as: "Standards of care, not related to a specific problem (e.g, common care routines and interventions such as vital signs per protocol), will not be included in the Plans of Care." A critical lesson learned was that SME understanding of EHR functionality (e.g., how assessments, interventions, and notes will be captured) drives critical insight into the validation of POC content, particularly for the aim of reducing "double documentation". Validation of multidisciplinary POC content to capture information beyond standard of care introduces complex challenges due to the variation in standards of care across enterprise sites and the diverse scopes of practice for various health professionals. Standardization was a key guiding principle; yet, Home Care required a distinct approach to POC content than Acute Care settings at PHS.

Limitations: POC documentation may differ depending on system-specific content and EHR constraints.

Conclusion

Identifying and prioritizing POC content for a multidisciplinary enterprise-wide build is challenging. The development of guiding principles was a critical process for success. Guiding principles, while consensus driven and critical, are insufficient on their own for content validation. An iterative, consensus driven post-validation analysis by the Nursing Informatics Advisory Council was critical to confirm consistency in the application of the guiding principles. Inherent project resource limitations support approaching multidisciplinary POC content and configuration from a strategic plan that can be optimized and achieved overtime. Future work should focus on the iterative evaluation and optimization of POC documentation content, strategy and approach.

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Analysis of Nursing CDS Needs and Strategic Plan

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Introduction and Background

Clinical decision support (CDS) has been successfully integrated into electronic health records (EHRs) to enhance nursing decision-making and to drive evidence-based practice.[1] Partners eCare (PeC) is a large-scale effort at Partners Healthcare System (PHS) to replace existing systems with an integrated vendor-based EHR. PHS has a strong history of providing robust CDS solutions to clinicians. Prior to PeC, a majority of enterprise-wide nursing documentation was paper-based, which limited the opportunity to provide enterprise-wide CDS to nurses. PeC provides an opportunity to enhance nursing decision-making and evidence-based practice through CDS tools. The aim of this project is to understand enterprise-wide needs to support nursing decision-making with CDS tools and to identify a useful framework to guide short-term implementation and long-term strategic goals to meet nursing CDS needs.

Methods

We conducted a literature review to understand the current state of CDS, with a particular focus on nursing, and identified conceptual frameworks to categorize the spectrum of nursing CDS needs.[2] We reached out to enterprise site nursing contacts to conduct an environmental scan of high priority existing CDS and paper-based tools used in nursing practice that guide decision-making as a means to identify requests for CDS tools.

Results

Identifying paper-based decision aids that may be ripe for CDS is a challenge. We found that describing the defining characteristics of CDS facilitated nurses understanding and ability to identify opportunities for CDS. Consideration of organizational strategic aims and safety and quality measures can help guide identification of priorities. The Data-Information-Knowledge-Wisdom Conceptual Framework may be useful to understand short term goals for go-live and long term strategic goals for nursing CDS.[3] Using this framework a continuum of types of nursing CDS needs is emerging: 1) facilitating data capture, 2) meeting information needs, 3) guiding knowledge-based decision making, and (future state) 4) exposing analytics for wisdom-based clinical interpretation by the nurse.

Limitations

Identification of CDS needs is an initial step in the CDS lifecycle. The implementation of identified needs is resource-dependent and must be prioritized among other competing project needs.

Conclusion

Identifying and prioritizing paper-based tools that can be modified into electronic CDS is challenging. The strategic process is evolving and relies on close collaboration and engagement with clinical sites. Due to project resource limitations, it is necessary that CDS is incorporated in a long-term strategic plan that can be optimized and achieved overtime. The Data-Information-Knowledge-Wisdom Conceptual Framework may be a useful mechanism to guide a strategic approach for meeting nursing CDS needs and aligning with the organizational strategic plan.

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Participatory Design and Development of a Patient-centered Toolkit to Engage Hospitalized Patients and Care Partners in their Plan of Care

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Introduction and Background

Acute care hospitals have been long recognized as complex, dynamic, and fast-paced environments characterized by suboptimal communication.[1, 2] Providing tools to support communication, patient activation and engagement can improve patient outcomes and lower healthcare costs.[3] Engaging patients in their recovery plan and providing them with information they need to be informed participants in that plan are key strategies for adverse event and error prevention. The aim of this project is to develop and pilot test a web-based patient centered toolkit (PCTK) prototype to improve access to health information and to engage hospitalized patients and caregivers in the plan of care.

Methods

Individual and group interviews were used to identify plan of care functional and workflow requirements and user interface design enhancements. The types of interviews conducted to engage end users in development and refinement of the PCTK were as follows: 1)Bedside interviews with patients and family (Round 1); 2)Patient/Family Advisory Council group interviews; 3)Professional care team group interviews; 4)Bedside interviews with patients/family (Round 2).

Results

The initial prototype lacked specific tools to allow patients and family to document their personal goals, concerns, problems and preferences for care. It did include a space for patients and family to write questions that they could later share with the care team, but patients and family told us that this was insufficient; they wanted to directly communicate with their care team members. We added the care planning tools and a message board to the next prototype but soon learned from patients, family, and care team members that the user interface was too busy and that it would be difficult for older patients or patients who are not computer savvy to use. We simplified the user interface and the care planning tools in the next version of the prototypes and received positive feedback about patient and family intention to use the toolkit.

In our most recent bedside interviews there was a limited sample of 7 participants. Patients told us that they would use the care planning tools if they were available today and that they thought other patients would use it as well. Patients and family also reaffirmed the value of the additional information available from the PCTK such as pictures and roles of care team members, medications, test results, a discharge checklist, food and diet information and tailored information about their condition and their safety risks.

Discussion/Conclusion

Qualitative methods within a participatory design approach supported the development of a PCTK prototype that will be implemented on intensive care and oncology units to engage patients and professional care team members developing their plan of care during an acute hospitalization.

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Preventing Perioperative Peripheral Nerve Injury in Surgical Patients using Clinical Decision Support

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Abstract

Peripheral nerve injuries (PNIs) are an adverse complication from surgery. This quality project has four objectives: 1) Raise the awareness of peripheral nerve injury for operating room (OR) nurses; 2) implement a decision support screen to assist in the patient assessment and offer evidence-based interventions; 3) improve the nursing documentation of patient positioning; and 4) decrease the overall incidence of PNI.

Introduction

A PNI is defined as the interruption of electrical activity that affects either the motor, or sensory, or to both nerve functions. The PNI incidence rates for upper or lower extremities range from 0.02% to 21% [1]. The causes of a PNI are considered multifactorial. Risk factors play a significant role in increasing a patient's susceptibility[2].

Methods

This project introduced the OR nurses to decision support with the implementation of a PNI risk assessment screen. Study design was quasi-experimental, involving all 44 operating rooms in an academic medical center. Primary outcomes included an increase in both PNI knowledge and documentation of interventions. Nurses were also introduced to basic decision support and reminders instructed them to document patient positioning.

Evaluation

Baseline data was obtained via retrospective audit of nursing documentation on patient positioning. PNI assessment screen components were validated with OR nursing experts. Use-case document assisted with determining the limitations of the PNI screen. One investigator developed an online survey that was used as a reference point on measuring baseline nursing knowledge about PNI before the educational presentation. Education on PNI and an introduction of the PNI assessment screen was accomplished. PNI incidence rates were determined using ICD-9 codes.

Outcomes

Use of the PNI decision support screen was voluntary. The PNI screen was completed an average of 51% over a 60 day time period. There was an increase in OR chart nursing documentation of PNI interventions from 63% to 92%, which was statistically significant. OR nurses agreed that decision support has the potential to improve patient outcomes. Due to the low frequency and the study duration it was not possible to demonstrate a decrease in PNI incidence rates. However, these data will now be tracked over longer time intervals. Baseline incidence rates of common areas of PNI injury are consistent with previous studies.

Conclusion

An educational program on PNI and the decision support screen raised OR nurses' awareness, improved documentation, and was well accepted by the staff. The two reminders had a positive effect on documenting patient care and PNI interventions. Decision support had minimal impact in their workflow according to post-survey results.

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An Electronic Patient Safety Checklist Tool for Interprofessional Healthcare Teams and Patients

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Introduction:
Fragmentation of healthcare poses a threat to patient safety, and leads to inefficient care[1]. Several studies have demonstrated the usefulness of checklists to improve the quality of care such as increasing treatment compliance and reducing complications and medical errors in the clinical setting[2,3]. In the current model of care, however, physicians and nurses have separate patient care checklists to organize, manage, and hand off critical patient-based tasks. The goal of this study is to facilitate and support interaction and communication among all the members of a patient care team by developing, implementing and evaluating an electronic Patient Safety Checklist Tool (PSCT). Physicians and nurses will enter data into the PSCT and the contents will be shared with multidisciplinary team members and patients and family to review and provide input. The PSCT is an electronically integrated interdisciplinary suite of tools that will incorporate adaptations of existing validated safety checklists for healthcare providers to use during team rounds. Information dashboards can also be generated to provide a better overview of a patient's care for healthcare providers and patients than the current method of tracking a patient's hospitalization. Information will flow from electronic patient platforms to a Rounding Checklist and from the Rounding Checklist to the Care Team Dashboards. The PSCT would allow all members of a healthcare team to add, edit, and view a patient's safety items and plan of care.

Methods:
1) A problem analysis phase consisted of the study team performing workflow observations, document review, and interviews for healthcare providers; current workflow information sharing and team decision-making during interdisciplinary rounds, team communication, and utilization of safety bundles and to do lists were identified through nine focus groups and observations of clinical teams. Clinical documentation (e.g. physicians' notes, nursing plan of care, flow sheets, personal to do checklists, and notes on white boards) were reviewed to determine the contents of the PSCT. 2) Using knowledge gained in the problem analysis phase we designed the PSCT; 3) We evaluated the feasibility of implementing the checklist and evaluated the impact on workflow and patient outcomes.

Results: Based on workflow analysis, a prototype of a rounding PSCT was designed. Based on healthcare provider and patient feedback, patient risk/status reminder icons were developed for display in a web-based patient portal with detailed educational contents for patients and care partners. Results showed that there were some challenges with implementing an interdisciplinary PSCT. If physicians and nurses share checklists in real time, the timing of documentation is crucial for the checklist to be effective. Another limitation to an interdisciplinary checklist is assigning responsibility for specific content and ensuring completeness.

Discussion: The PSCT has great potential to facilitate efficient and collaborative patient management; however, it is important to identify the best way to use the new tool to share mutually beneficial information between interdisciplinary team members and patients/families. We will conduct additional focus groups and group interviews to identify a new information flow and efficient workflow for care team members.

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Preventing Missed Care: Integration of a System Wide Electronic SBAR – Patient Handoff Process

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Introduction and Background

In February of 2012 the Lifespan affiliates collaborated on the selection of a comprehensive, fully integrated electronic medical record. The Miriam Hospital, a Lifespan affiliate, is a 247 bed University affiliated teaching facility and four time Magnet Designee. This hospital has successfully implemented many best of breed point of care technologies including physician order entry (POM), medication administration check system (MAK) a bar code administration (BCMA) and clinical documentation systems. This abstract will describe the design and integration of a Situation Background Assessment Recommendation –Patient Handoff Process (SBARP) into the electronic medical record (EMR).

Methods

Two years prior to the system wide rollout, groups of subject matter experts (SME) convened to validate design decisions, workflow considerations, and begin phases of change management. The SME group consisted of staff nurses, nurse managers, nurse educators, quality management nurses and informatics nurse council members. Project timeline included functional, integrated and robust testing, as well as management of the final training plan.

Results

The SME's from all affiliates provided comprehensive evaluation of the current handoff processes in place at each affiliate. Processes varied greatly due to a combination of reporting styles, hospital culture and availability of paper tools. Assessment of existing evidence and best practices supports a structured bedside reporting process. Key components include real time reconciliation and patient centered handoff. The SBARP structure promotes reconciliation of ongoing patient surveillance, minimizes variations in communication, and consequently prevents missed care.

Discussion

The organization is resolute to a patient centered, complete and consistent approach to all handoffs. The initiative is included in the 2014 organizational quality priorities. Staff nurse involvement in the design of the handoff screens and process has been integral. The electronic SBARP process has the potential to foster peer to peer professional growth and just in time mentoring that further enhances the safety of our patients.

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Alarm Fatigue: A Technology Hazard

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Introduction and Background

Alarm fatigue is an emerging topic in healthcare, principally in acute care settings. There have been several definitions of alarm fatigue presented by many organizations, including The Joint Commission (TJC). According to TJC (2013), alarm fatigue is defined as "The constant beeping of alarms and an overabundance of information transmitted by medical devices such as ventilators, blood pressure monitors and ECG (electrocardiogram) machines. As a result, clinicians become desensitized or immune to the sounds, and are overwhelmed by information - in short, they suffer from 'alarm fatigue'(p. 1). Therefore a survey was designed and implemented to discover whether in fact nurses at on two units at the Miriam hospital were experiencing alarm fatigue and whether it impacted their daily workflow.

Methods

The project methodology included IRB review and approval through Rhode Island College as well as The Miriam Hospital. A literature review on the topic of alarm fatigue was performed utilizing the databases CINHAL, OVID, and Pub Med. The search was conducted on information from 1990 through 2014 and was completed utilizing key words alarm fatigue, monitor alarms, telemetry alarms, physiologic monitoring equipment, and patient safety. In reviewing the literature, there were no surveys available that exclusively targeted the discipline of nursing. Therefore A 12-question survey containing 9- likert and 3 open ended questions, designed by the researcher. It was administered to 48 registered nurses on two telemetry-monitoring units. The survey was created based on common themes found in the literature. The survey was available to respondents for a two week time period. The survey explored whether nurses are experiencing alarm fatigue, and also how their daily workflow was impacted by alarm fatigue. Surveys were anonymous and confidential.

Results

Unit A employs 30 staff RN's and unit B employs 33 staff RN's. On unit A there was a 110% response rate which was attributed to additional responses from float staff not assigned to the unit. On unit B there was a 45% response rate.. Survey responses from unit A demonstrated that 86.2% of respondents either strongly agreed or agreed (SA, or A) to having suffered alarm fatigue in the 6 months preceding the survey. 72.4% of respondents strongly agreed or agreed that false alarms disrupted patient care. 82.7% of respondents reported being interrupted more than 10 times per shift by nuisance/false alarms, which was defined on the survey administered. Two definitions of alarm fatigue were also provided. Of unit B respondents 73.3% of respondents strongly agreed or agreed to having suffered alarm fatigue. 93.3% of unit B respondents strongly agreed or agreed that false/nuisance alarms disrupted patient care. 66.6% of respondents reported they were interrupted more than 10 times per shift by nuisance/ false alarms.

Discussion

Nurses must become active participants in system initiatives to mitigate alarm fatigue. There is also great opportunity for end users and manufacturers of monitoring devices to collaborate and work towards a solution which would ultimately decrease alarm fatigue and benefit patient care and safety. Recommendations to decrease alarm fatigue included daily lead and battery changes, proper lead placement and skin prep, removal of nuisance alarms that do not have clinical benefit ie: irregular HR alarms and reviewing of institutional alarm policies with specifics to response times for alarms and individualization of parameters. These are all feasible recommendations most of which have been implemented at TMH including removal of irregular HR alarm.

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Implementation of Electronic Medication Reconciliation in a Community Hospital

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Introduction and Background

The Joint Commission views medication reconciliation as an integral component of safe patient care. Hospital admissions, transfers and discharges are complicated processes with multiple hand-offs. Challenges include multiple providers, modifications and changes to medications, patient adherence, and lack of patient knowledge of their medications. Historically, medication reconciliation was a paper process in our hospital. Even though auditing demonstrated greater than a 94% compliance rate, process reliability was dependent on practitioner expertise, available time and engagement. We believed there was an opportunity for improvement. The EMR medication reconciliation module in our hospital EHR allowed for the implementation of an electronic process. The software allowed all providers to collect, record, update, and review a patient's medication list. This had the potential to streamline the reconciliation process and to provide the interdisciplinary team with point of care access to an accurate medication list.

Methods

The project used Lean Six Sigma Project Management methodology. The interdisciplinary team was comprised of members from Nursing, Medicine, Clinical Support and Information Technology. A Lean Six Sigma Project Manager worked in collaboration with the IT Project Manager to run the project, and a vendor consultant was engaged to provide expertise on the software. We identified and planned for possible barriers to implementation. We recognized very early on the critical role of the pharmacist in the collection of an accurate and complete home medication list. This was especially important in the Emergency Department. Pharmacist hours in the ED were expanded from 20 hours a week to 40 hours a week to address this need.

Results

After go-live, we quickly realized that the new process, although working as designed, posed significant issues for users. We underestimated the impact to physician workflow, which resulted in increased admission time from the ED. However, we did note improvements in the number of medications reconciled on admission. We had to extend user support from the original 2 weeks to 4 weeks due to the complexity of the process, ongoing resolution of issues, and the need for continuing communication of the modifications. Not all staff fully accepted the process changes. The team re-grouped, performed an analysis of current issues, identified key areas for improvement and initiated targeted education.

Discussion/Conclusion

The imported medication list (SureScripts) did not add value to the process as expected. This software does not allow for "live" testing and this prevented us from determining end-user issues prior to Go Live. Although all members of the healthcare team contribute to reconciling the home medication list, it became primarily a physician task, impacting the admission process and in most cases extending the time to completion. In conclusion, a short pilot involving 2-3 physicians would have illuminated many of the issues that caused frustration to users during the first few days. To address the workload issue, ED staff will be engaged to initiate the home medication list for patients being admitted.

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