



Trends in Clinical Informatics:
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Building a Pathway to Better Breast Specimen Handling

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Keywords: Data-Driven Quality Improvement, Clinical Documentation, Navigator, EPIC, Patient Safety, Nursing Workflow, Pre-analytic, Time Sensitive, Specimen, Breast, Pathology

Introduction/Background

This quality improvement initiative investigated the challenges of handling time-sensitive surgical breast cancer specimens in the perioperative pre-analytic phase.^{1,2} The introduction of new technology to the OR nurse's workflow, a reduced tissue ischemia time, and other variables including the "great resignation" and staff turnover related to COVID-19, all resulted in unfavorable outcomes from mismanaged specimens at the point of care in an already convoluted process. The goal was to create a sustainable process to help reduce errors in breast specimen handling.

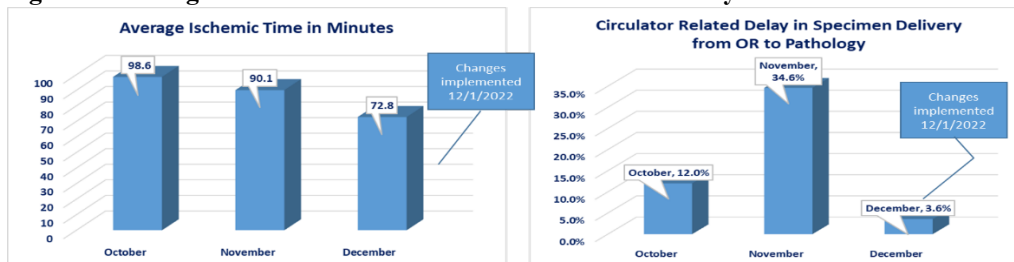
Method

After retrospective analysis and real-time observations, an interdisciplinary working group consisting of pathologists, surgeons, nurses, and informaticists worked to improve the current pre-analytic workflow. The team concentrated on standardizing processes, specimen nomenclature, documentation, and communication. The team agreed on standardized verbiage across three documentation tools, the pathology requisition, specimen labels, and the EHR, to adhere to the time-sensitivity guidelines set for handling mastectomy specimens, in accordance with organizational pathology policy and guidelines. The pathology department was entrusted with clarification of policy and procedure pertaining specifically to breast cancer specimens to create a single reference for the circulator.

Results

A quick-look reference, a reduction in transcription, including pre-built content to reduce data entry, and a conditional documentation screen for the primary breast specimen ischemic times in the pathology component of the EHR, contributed to a decrease in ischemic time and circulator delays and errors by giving the nurse sufficient time for specimen management and EHR documentation.

Figure 1: Average Ischemic Times and Circulator Related Delays



Conclusion

A multidisciplinary team comprised of frontline workers capable of identifying workflow issues and participating in key decision-making was critical to maintaining the new workflow and increasing employee satisfaction. By working collaboratively, the team gained greater understanding and respect for each role in the workflow, resulting in necessary trade-offs across disciplines to improve patient safety.

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Using Implementation Science to Introduce a Wireless Monitoring System Integrated Within the Care Environment

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Keywords: PARIHS Framework, Implementation Science, User Acceptance, Adoption of Technology, Implementation Toolkit.

Introduction/ Background

The PARIHS (Promoting Action on Research Implementation in Health Services) framework guided the implementation of a research study of a wireless continuous monitoring system (CMS), integrated within the hospital bed, capable of trending respiratory rate (RR) and heart rate (HR) to identify patient deterioration. Implementation science promotes practice change required with the adoption of new technology. This framework examines the interplay between evidence, context, and facilitation to translate research into practice. The equation for this framework is $SI = f(E, C, F)$ where SI =successful implementation, is a f =function of E =evidence, C =context, and F =facilitation¹.

Methods

The setting for this project was a 171-bed community hospital. The research team focused on the development of an implementation toolkit guided by the three components (Figure 1). Evidence was informed by previous research². Focus groups/interviews of the multidisciplinary team were conducted to understand current practice and identified barriers. Repeat focus groups post intervention helped to assess user acceptance. Context contains the steps to implement the research. Facilitation was managed using a site primary investigator/facilitator.



Results

The use of the PARIHS framework helped to guide the logistics of the clinical phase of a complex intervention study. Preliminary data via weekly audits reflects user competency. Data reflects improved response time to assess patient deterioration, revealing a response time below 5 minutes as established in previous research².

Figure 1. Toolkit within framework

Discussion/Conclusion

This study is anticipated to end in May 2023. This framework offered the fluidity to change those components that are not working. The framework helped us to visualize the tools and steps employed to determine where to modify the implementation.

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Nurses' Perception of Clinician Communication Before and After Implementation of Secure Communication SMS Texting/Voice Application

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Keywords: Mobile Communication, Secure Communication, HIPAA Compliant Message

Introduction/Background

Issues with team communication were identified at an 800-bed academic medical center. Clinicians utilized a combination of workstations, landline phones, and pagers to communicate clinical issues. These methods were supplemented with alternate non-HIPAA compliant messaging strategies to improve timeliness of communication. There were frequent requests from clinicians to have a more efficient, mobile form of communication. In response, the hospital introduced a Secure Communication, HIPAA compliant, SMS texting/ voice application to all members of the patients' care teams. Nurses completed a survey to evaluate clinician communication before and after implementation of the new technology¹.

Methods

Inpatient nurses voluntarily responded to an invitation to complete an anonymous validated online survey to evaluate clinician communication technology. Inpatient nurses were recruited by sending links to the survey by email messages, printed flyers with QR codes and texting the link of the surveys to the mobile phones. We received responses from 200 nurses before and 178 nurses after implementation of a SMS texting/voice application available for nurses on shared hospital supplied mobile phones. Questions evaluated the use of alphanumeric paging for the pre survey and use of SMS texting/ voice communication for the post survey. The survey consisted of thirty questions adapted from the Health Information Technology Usability Evaluation Scale (Health-ITUES)¹. Nurses completed the online survey in an average of 10 minutes.

Results

Staff who completed the pre-implementation survey evaluating alphanumeric paging gave an average of 30% positive responses to the factors of ease/timeliness of clinician communication, satisfaction, and ease of use. Staff who completed the post-implementation survey evaluating the SMS Texting/Voice application gave an average of 80% positive responses to the same factors.

Other positive impacts revealed in the survey include:

- Significant improvement with workflow, easier and much more efficient to communicate with clinicians
- Ability to respond to patient requests in a timelier manner
- Timeliness of communication related to patients and in unit and inter hospital communication

Discussion/Conclusion

Some of the lessons learned during the implementation were that resources and additional support staff was required to support and maintain the hardware. Decisions about available hardware options had to be discussed with clinical groups with the offer of corporate shared devices as well as reliable and convenient charging options.

The team collaborated frequently with the software and hardware vendors to manage supply chain issues and design a user interface with the hardware that supported clinician workflows. Key to implementation was partnering with all stakeholders to create workflows and guidelines on how to manage communication, especially clinically urgent ones. Providing more applications on the shared mobile platform device resulted in easier access to clinical resources and was an added benefit to clinicians. There is still a gap in users compliance utilizing devices by all clinicians and departments. Nursing Informatics partnership with the information systems team was key in the success during deployment, support, and infrastructure remediation.

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Evaluating an Electronic Algorithm in the Electronic Health Record for Pressure Injury Staging

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Keywords: Pressure Injury EHR Documentation, Electronic Pressure Injury Staging, Pressure Injury Staging, Pressure Injury Staging Algorithm.

Introduction/Background

Hospital-acquired Pressure Injuries (PrIs) are a nursing quality indicator (NQI) and are often compared for benchmarking measures against like facilities. PrIs are common and associated with negative patient outcomes. Timely and accurate identification and treatment of PrIs is needed, however nurses' proficiency with staging is suboptimal.^{1,2} Internal data indicated a 50% accuracy rate of PrI staging. Optimizing the accuracy of nurses' PrI staging will enhance the appropriate plan of care development, intervention, and treatment.

Methods

Application of evidence-based, nationally recognized PrI staging definitions to the electronic nursing documentation will drive accurate staging and documentation. Correct and reliable assessment by the nurse could decrease the burden of sequelae associated with PrI. The PrI staging tool was developed utilizing an algorithm in the Electronic Health Record (EHR) Flowheets incorporating the National Pressure Injury Advisory Panel (NPIAP) PrI staging definitions. Nurses enter the clinical assessment of the PrI into the PrI staging tool which then calculates the PrI stage. Two nurses with similar years of experience were paired to perform a PrI assessment without discussing their assessments and staging information with each other. Two exact copies of the PrI staging tool were built in the EHR with different log ons. Each nurse received a different log on to assure entries from either nurse were blinded to the the other nurse. They then entered their assessment in the PrI Staging tool. Reliability was evaluated through result comparison of PrI staging between the two staff nurses and a certified wound care specialist. Our initial pilot to obtain reliability of the PrI staging tool was performed over four days.

Results

To date, the study has yielded 14 patient validations of PrI stage utilizing the PrI staging tool. Four out of 14 of the results of the Nurses assessments using the PrI Staging tool were validated by two nurses but not validated by the certified wound care specialists. There was validation with 10 out of 14 Nurse assessments using the PrI staging tool with two nurses as well as the certified wound care specialist which resulted in a 71.4% reliability of the PrI staging tool.

Discussion/Conclusion

We utilized feedback from the Skin Champions, who are nurses with additional training on skin care and PrI staging and assessment, and staff nurses to provide feedback on use of the PrI staging tool. Verbal inquiry and discussion with the skin champion team and staff provided the following feedback regarding the staging tool: the PrI staging tool was not in the nurses workflow for PrI documentation, descriptors are numerous and lengthy, and the PrI staging tool was cumbersome. That feedback will guide us to iteratively improve the PrI staging tool based on feedback.

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Nurse Proactive Rounding Utilizing a Deterioration Index Tool

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Keywords: Predictive Model, Deterioration Index, Rapid Response, Code Response

Introduction/Background

A Rapid Response (RR) improves patient outcomes by deploying a team of highly skilled clinicians to a deteriorating patient's bedside in emergent situations for immediate assessment and treatment. RR is a reactive practice that lacks a mechanism to use data to anticipate unplanned patient care escalations. A clinical pilot was initiated where STAT Nurses would identify, assess, and direct treatment to patients at risk prior to deterioration utilizing the Epic Deterioration Index Predictive Model (EDI).

Methods

The EDI identifies patients at risk for deterioration and was available in the Electronic Medical Record (EMR) on all BWH adult Inpatients. In February 2021, the STAT nurses initiated a pilot program that utilized the EDI to identify and round on patients at risk of deterioration. The STAT nurses printed the EDI report to identify patients at risk with an EDI score >45. The STAT nurse would assess those patients and communicate with the care team for any interventions required and document the care provided in the EMR.

Goal Statement

The goal of the proactive rounding was to utilize a predictive deterioration model to assess and intervene with patients at risk to reduce non-ICU mortality rates. Danesh et. al. found an association between proactive nurse rounding utilizing early warning criteria to identify at-risk patients and a decrease in ICU transfers for deteriorating status.¹

Results

Patient records were reviewed that had a documented RR and an EDI >45. The results of the review revealed that the EDI had a 30% sensitivity in predicting deterioration of patients that required a RR.

Discussion/Conclusion

The review validated the STAT nurse's feedback that the EDI was not sensitive enough to identify patients at risk for deterioration. Patients who were on the report inappropriately were frequently patients who were long term care patients of advanced age and altered neuro status but who were not clinically unstable. Unintended consequences of the proactive rounding included identifying additional patients that were not identified by the EDI report. The combination of proactive rounding on units guided by the EDI >45 and the discussion with the charge nurse on each unit resulted in additional patients receiving assessment and treatments which prevented deterioration that could have resulted in requiring a higher level of care or a Rapid Response.

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Interfaces with the Electronic Health Record and the TV Vendor Standardize the Delivery of Video Education to Patients in the Hospital

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Keywords:

Patient Education, Plan of Care, Clinical Documentation, Videos, Technology, Interface.

Introduction/Background

Evidence suggests using technology to educate patients improves knowledge and can supplement traditional education methods.¹ Video is one method of providing patients information through technology. Previously, the Brigham and Women's Hospital had an HL7 interface with our TV vendor and a separate third-party video vendor to display content on the patient's TV. Assignments were manually created by the nurse and no data was sent back into our Electronic Health Record (EHR). The third-party video vendor content did not match that of our enterprise patient instruction vendor.

Currently within the EHR Plan of Care (POC) workflows, specific handouts and short videos from the enterprise patient instruction vendor are associated teaching points. A specific file configuration is used to map the video to the associated teaching point. Both handouts and videos provide consistent, evidence-based content. Videos are available for view through the patient portal. To increase access, a bidirectional interface was requested to show the videos mapped in our POC workflow on our inpatient televisions (TVs) and have the results flow back to the EHR.

Methods

In Phase I of this project, the integration team utilized the existing HL7 interface from our EHR and our TV vendor and transitioned to use video assignments created through the POC workflow. The video mapping table was updated to the enterprise patient instruction vendor. In Phase II, a new interface from our TV vendor to our EHR was created to capture when the patient watched the video on their inpatient TV. At the end of watching the video the patient answers "do you have any questions for your nurse?" using their pillow speaker, and their response, date, time, and learner flows back into the EHR. For each phase, extensive testing was completed, and an education program was initiated to ensure nurses understood the functionality.

Results

As a result of the bidirectional interfaces, patients can watch video education specific to their condition on their inpatient TV and the results display in the EHR. As the Joint Commission requires documentation of what clinicians teach, the interfaces consistently capture what was watched and the patient's response. The interfaces eliminated the need for the third-party video vendor which was a cost savings to the hospital. The video assignments are now created through the nurse's standard POC workflow, so there is no longer a need to manually create a video assignment.

Discussion/Conclusion

As a result of our efforts to implement a bidirectional interface, our patient education videos are consistent with the creation of the Plan of Care and match the content available in handouts and the patient portal. While most videos are available in both English and Spanish, our TV screens are in English. Nurses are encouraged to help our Spanish speaking patients by queuing up the videos in the inpatient TV. Also, the patient or family must enter a response to the comprehension question at the end of the video. If they do not enter this response, no information flows back into the EHR. Phase III of this project to look at the utilization of the videos is in the preliminary stage.

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Enterprise Implementation of Ambulatory Evidence-Based Nurse Telephone Triage Module in Epic

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Keywords: Triage, Protocols, Ambulatory, Telephone, Nurse Triage (NT), Implementation, Nurse Triage Module (NTM)

Introduction/Background

Telephone triage is an expanding area of ambulatory nursing care, designed to steer symptomatic patients to the appropriate level of care, estimate urgency and recommend a course of action.¹ Historically, triage documentation and workflows varied across Mass General Brigham (MGB) sites, depending upon the nurse's level of knowledge and triage resources used. The process lacked standardization as did the data, which made outcomes and nursing productivity measurement difficult. To address these issues and provide evidence-based content digitally, MGB licensed the Epic Nurse Triage (NT) Module for fiscal year 2022. We began project meetings in January with a target date of June 20th, 2022, for implementation.

Methods

The project team decided to use the Epic Foundation version as much as possible to adhere to our project timeline. This meant that few changes would be made to the module, and the group could focus on disposition options and the nurse triage note output. The project team decided to limit module access to nursing roles, advanced practice providers and physicians. Training and communication decision were made at the site level.

Results

The project was implemented on the target date as projected. The functionality offers standardized content for documentation of patient symptoms and recommendations for care advice and disposition. After implementation, NTM usage and disposition outcomes were captured and accessible to department nurse leaders on the Nurse Triage Manager Dashboard. Strategies to monitor access, call times, dispositions and outcomes as quality indicators are areas targeted to examine use and understanding of the NTM.²

Discussion/Conclusion

Documentation is uniform and quality has improved with structured fields; thus, enabling secondary use of data. Implementing the NTM, allowed MGB to standardize NT documentation across the enterprise and capture call data elements.³ The data from NT will guide nurse leaders to measure nursing quality, productivity, and appropriate dispositions. To ensure that the data captured presents an accurate picture, the tool needs to be fully embraced. Feedback specifically around the Initial Assessment format and the resulting NT remains negative. Based on this feedback, the Ambulatory Clinical Consensus Committee collaborated on a redesign. The goal is to improve usability of the initial assessment questions in a more intuitive format and reduce clicks.

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Chasing Safety with Rover

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Keywords: Patient Safety and Quality, Clinical Documentation, Documentation Efficiency, Mobile Technology

Introduction/Background

The American Nurses Association (ANA)¹ describes clear, accurate, and accessible documentation as an essential element of safe, quality, evidence-based nursing practice. The Royal Children's Hospital describes the timeliness of documentation as essential to "providing an accurate reflection of nursing assessments, changes in clinical state, care provided and pertinent patient information to support the multidisciplinary team to deliver great care."²

Nursing documentation in the electronic health record (EHR) can improve patient safety and the quality of care provided when efficient workflows are used to collect and record patient data in a timely manner.³ The use of a mobile phone application for nursing documentation decreases the delay in patient data availability, allowing for prompt decision making and treatment based on a patient's most current status. Epic's mobile phone application Rover is available to nurses and unlicensed assistive personnel (UAP) at most Cleveland Clinic locations and allows caregivers to document in real-time and carry out workflows efficiently through enhanced mobility and flexibility.

Methods

Cleveland Clinic's Rover usage and efficiency report was reviewed to compare minutes between patient data collection and documentation in flowsheets over a 4-month period. Flowsheet documentation by inpatient nursing caregivers from four hospital sites in Northeast Ohio, with and without using the Rover application, was examined.

Results

Utilizing the Rover application improved the average time between collecting and documenting patient data in flowsheets.

Average time of flowsheet documentation not using Rover is 98 minutes (Range is 71 to 125 minutes)

Average time of flowsheet documentation using Rover is 13 minutes (Range is 4 to 22 minutes)

We will provide more detailed figures and graphs in the poster presentation.

Discussion/Conclusion

Per Cleveland Clinic Health System, it is expected that documentation occurs as close to real time as possible.⁴ Using Rover enhances a caregiver's ability to document patient care in real-time. This allows the multidisciplinary team to make prompt clinical decisions based on the most current patient assessment.

We recognize the majority of nursing caregivers do not use Rover to document patient data in flowsheets. To improve adoption, enhancements will be made to the Rover application based on caregiver feedback. Further work will include how the mobile phone application enhances real-time documentation, why it is important to patient safety and how it can improve the caregiver experience.

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Nurse Driven Heparin Continuous Infusion Protocol Optimization with EHR Decision Support

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Keywords: heparin, heparin calculator, medication safety

Introduction/Background

A review of medication safety events identified heparin as the medication reported most often, requiring frequent interventions by Pharmacy to correct heparin infusion rates/doses. In response, Lifespan reviewed evidence-based literature, which supported the plan to explore the use of a decision support calculator embedded in the electronic health record (EHR) that would help reduce miscalculation of heparin infusion rates/boluses.^{1,2} Additionally, adjustments to Lifespan's heparin protocols were made to decrease the time needed to achieve a therapeutic anti-Xa and number of lab draws. Prior to the heparin calculator, workflows for nurse-managed heparin protocols were manual, requiring nurses to review recent lab results and identify corresponding heparin infusion rates/bolus doses.

Methods

In January of 2021, an interdisciplinary team of pharmacists, nursing clinical informaticists, and nursing educators was formed to evaluate/compare existing heparin protocols to evidence-based practice (EBP) and EHR resources. It was determined that updating existing protocols to align with EBP would help patients achieve therapeutic values in a shorter time span. Protocol changes include modifying interventions for suprathreshold anti-Xa; changing the timing of lab monitoring from standard draw times (every 8 hours) to every 6 hour, and adjusting initial infusion rates, bolus doses, and therapeutic ranges. In addition to protocol changes, the group hypothesized that implementing decision support through an EHR-embedded calculator would decrease heparin-related safety events. EHR analysts, Pharmacy, and Nursing worked to build, test, and develop education on calculator use. Staff received education regarding protocol changes was through a practice alert and computer-based learning (CBL), which went live March 8, 2022. At the end of May 2022, staff were assigned an interactive CBL for heparin calculator education with go-live on June 8, 2022. A group chat via Lifespan's secure messaging was established/monitored by the team to provide end-user support in real time post go-live. Record auditing and shoulder-to-shoulder support was also provided to staff.

Results

Medication-use data reviewed by Pharmacy showed that changes to heparin protocols helped significantly reduce the time from initiation of protocol to therapeutic anti-Xa. Additionally, a reduction in the average number of lab draws per patient prior to therapeutic anti-Xa was noted, resulting in cost savings and improved patient experiences. Lastly, a decrease in the severity level and number of "wrong rate" safety events were noted after heparin calculator go-live.

Discussion/Conclusion

Overall, nursing adjusted well to the protocol changes and heparin calculator. Feedback reported include documentation workflow confusion and occasionally misses of populated prompts. Modifications to the heparin calculator's display have been made since go-live. Reported errors/events are regularly reviewed to determine if further optimization and/or education is required. Future steps include reviewing provider-driven protocols to determine possible transition to nurse-driven protocols with calculator decision support.

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Care More, Click Less

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Keywords: Nursing Efficiency, Alerts, BPAs, Documentation optimization; charting experience for nurses.

Introduction/Background

An overall theme of dissatisfaction by nursing of the extensive Electronic Health Record (EHR) documentation resonated throughout nursing. According to McIlreevy et al.¹, at least 35% of a nurse's day is spent documenting due to the increased, fragmented overload of electronic nursing documentation. The documentation burden not only contributes to nurse burnout but impacts the deliverance of patient care. It is critical that healthcare organizations develop innovative technological solutions to alleviate clinician burnout². By using various analytic tools we are able to determine which areas of improvement would have the largest impact. These reports showed three major areas of improvement: Best Practice Advisories (BPAs), EHR nursing education and streamlining flowsheet documentation, specifically physical assessments. The "Care More, Click Less" focus was to reduce the burden of nursing documentation by streamlining and standardizing, decreasing alerts and improving efficiency with the EHR technology.

Methods

Phase One Use Slicer Dicer (visual analytics tool) and BPA analytical tools to identify potential opportunities to make improvements to BPA alerts and created a Slicer Dicer group to evaluate the same data set every month. Each month a review of nurse interruptive firing BPA alerts was done with Clinical Informatics Advisory Committee (CIAC) to gain feedback.

Phase Two CIAC reviewed all Physical Assessments for Acute Care and identified the normal values to be removed. The Information Services (IS) Analysts identified shared rows and made the necessary adjustments as outlined.

Phase Three Improving the nurse charting experience by educating to advanced user skills to improve EHR navigation and performance by nurses.

Results

Phase 1: There was an 86.4% improvement in BPA alerts over 18 months (Figure 1). 1,525,379 to 207,357 alerts (over 6 month intervals). **Phase 2:** 20% decrease in time spent documenting physical assessments (Figure 2) **Phase 3:** 21.9% decrease in time in EHR (169 minutes to 132 minutes).

Figure 1

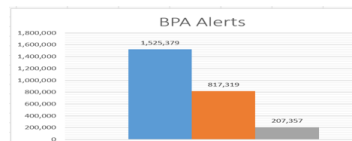


Figure 2

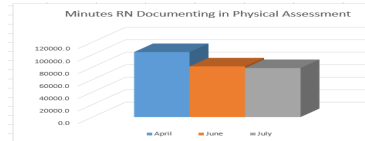
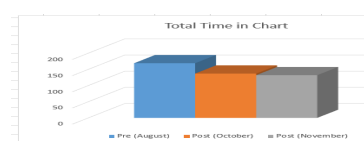


Figure 3



Discussion/Conclusion

Through review of foundation BPAs there is opportunity to identify those that do not fit your organization's practice. Having a routine process to monitor compliance will allow you to identify trends quickly. We often found BPAs were not working as designed, confusing wording, or the staff did not know what to do with the alert. Vendors often include normal in foundation systems even with within defined limit statements. Test and test more before go-live. When you make a change you may not realize all rows are not the same. Post live hands on EHR education provides nurses with tools to streamline their workflow.

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Delivering Targeted Education with Bedside Tablets

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Keywords: Pediatric Diabetes, Diabetes Education, Mobile Device, MyChart Bedside, Tablets

Introduction/Background

Management of children with diabetes can be challenging. Effective self-management calls for diabetes education and training to start at the time of diagnosis and continue throughout the course of disease.¹ Despite advancements in the technology, diabetes management remains cumbersome.¹ Pediatric diabetes educators at our organization created educational videos for children with diabetes, and their families, with the goal of gaining self-management skills. Our educators reported poor compliance with the distribution and review of diabetes education videos primarily because there was no reliable and consistent delivery method to provide the diabetic education videos to patients during hospitalization or after discharge. This abstract describes the changes we made to address this problem.

Methods

To address the need for reliable and consistent delivery methods for pediatric diabetes education videos, we used existing care plans to automate delivery of educational videos to the patient portal and provided hospital owned tablets for viewing. Upon initiation of a Diabetes Care Plan, the diabetes education videos are automatically added in the education section of the electronic health record. Patients and caregivers can access the videos via the myChart Bedside application on hospital issued iPads, or the MyChart application on their personal device. After the video is viewed and acknowledged in the portal, education is automatically documented in the electronic health record. Post discharge, patients and caregivers continue to have access to diabetes education videos via the MyChart patient portal.

Results

As a result of this intervention, 100% of patients with a Diabetes plan of care received educational videos using myChart or myChart Bedside. Additionally, demand for MyChart account activation increased. Nurses and diabetes educators reported greater patient and caregiver engagement in Diabetes education. Nurses also reported an increase in workflow satisfaction and reduction in documentation burden. (more details/graphs to be included in poster)

Discussion/Conclusion

Automatically assigning educational videos based on the plan of care increased educational delivery compliance for pediatric diabetic patients at our institution. Using the patient portal for educational delivery also allowed patients and caregivers to have access to the education after discharge. In addition, automation helped to increase staff satisfaction by reducing workflow burden for nurses and diabetes educators.

We recommend automating education assignments to improve education delivery and increase patient, caregiver, and end-user satisfaction. We also recommend making the education assignments available in the patient portal so patients and caregivers can revisit the education as needed after discharge. This may be particularly impactful in the Neonate and Pediatric populations where pediatric patients and their caregivers are likely to engage with electronic health resources.^{2,3}

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Infusion Pump Interoperability - Safety/Efficiency/Data Accuracy

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Keywords: Infusion Pump, Smart Pump, Interoperability, Medication Safety

Introduction/Background

Incident reporting data highlighted the opportunity to mitigate pump programming errors with the use of interoperability/auto-programming. This project aimed to implement Infusion Pump Interoperability to improve patient safety with medication administration, provide clinician workflow efficiency, and improve data accuracy. Infusion Pump Interoperability is the bidirectional integration between the electronic health record (E.H.R.) and the smart infusion pump. The medication infusion data is transmitted from the E.H.R. to the infusion pump for validation and what has been administered via the infusion pump is transmitted back to the E.H.R. and verified by the clinician.

Methods

A robust multidisciplinary project team was formed comprised of Nursing, Pharmacy, Clinical Engineering, Information Technology Services (ITS), Materials Management, Client Technical Support, Project Management, and Pump vendor representatives. The project utilized the Systems Development Life Cycle Model to perform analysis, design, test, deploy, implement, and maintain the use of the new technology integration with our clinical systems over a 12-month period. A “Big Bang” implementation plan was utilized across a large academic medical system (7 hospital campuses, including infusion centers) with an innovative training and support model that included: interactive LMS modules, unit level mobile training stations (workstation/barcode scanner/infusion pump) with a self-guided training packet for practice & in-services, with a virtual command center immediately accessible to end users during the week of go-live. Additionally, rounding teams were deployed at each hospital setting, promoting the use of infusion pump auto-programming, and reporting any issues to the command center.

Results

The adoption of Infusion Pump Interoperability reduced manual pump programming errors. Soft-Limit alerts on the pump (manual programming error alerts) decreased with the use of interoperability and minimized clinician cognitive burden. Nurse efficiency was enhanced, with an overall reduction of pump programming clicks by 50% for both large volume and titration infusions. Additionally, infusion pump interoperability with the electronic health record provided opportunities to standardize the infusion pump library and infusion pump workflows to reduce variances and medication errors. Weekly compliance reports provided managers with the data analysis to promote adoption and address workflow challenges.

Discussion/Conclusion

Workflow analysis demonstrated reduced clicks on the pump and in the electronic health record. Future opportunities exist for infusion pump interoperability with Pediatric Oncology Pumps, Syringe Infusion Pumps, and Patient Controlled Analgesia. The innovative unit level training tools, rounding support, and virtual command center set a gold standard to be replicated for future project implementations.

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Implementing Monitoring Tools in the Electronic Health Record (EHR) to Improve Nursing Care Plan Documentation

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Keywords: Clinical Documentation, Patient Safety and Quality, Care Plan, Daily Goal, Patient Education

Introduction/Background

Nursing Care Plans are essential to clinical nursing practice.¹ Its documentation on the EHR facilitates communication and collaboration among members of the healthcare team with goal to deliver patient-centered and unified care.² The Public Health Emergency waiver for the Nursing Care Plan documentation was instituted during 2020 Covid pandemic. In the summer of 2022, the Centers for Medicare & Medicaid Services (CMS) issued directive to reestablish the pre-pandemic health and safety standards. There was a need to reincorporate the care plan documentation in the nursing process.

Methods

The clinical nurse informatics team designed and built a Care Plan Audit Template in the Patient List section of the EHR. This is a monitoring tool that includes 14 columns. These columns have patient care information, safety metric clickable icons, or 24-hour color-coded timers. The informational columns are either filled with last documentation filed or a “hover to discover” item (i.e., list of active care plans and education titles). The icons in the safety and quality columns launch a pop-up window when selected, which contains latest nursing documentation and clinical policy references. The color-coded timers indicate the status (current, expired, or due soon) of the care plan and education documentation. The template also includes patient list reports that can be pulled up to efficiently view each patient care plan, education, and daily goal documentation without leaving the current screen. The clinical informatics team met with nursing leadership to provide step-by-step guidance on how to add and use this EHR tool.

Results

Prior to the implementation of the Care Plan Audit Template tool, only 39.98% of patients had updated care plans and 68.66% of patients had updated daily goals. After implementation, there was continuous and sustained improvement in metrics. After one month, there was 92% increase in the number of care plans updated which is a 40.37% increase in percentage of all patients with updated care plan. There was a 29% increase in the number of daily goals updated, which is 21.65% increase in percentage of all patients with updated daily goals.

Discussion/Conclusion

The nursing care plan significantly provides evidence of the nursing process through documentation. The monitoring tool built in the EHR contributed to improving compliance of care plan and daily goal documentation. This tool provided an efficient way to monitor and make necessary real-time adjustments to comply with the regulatory and accreditation standards.

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