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Enhancing Nurses' Pain Reassessment and Documentation Using Clinical Decision Support: A Quality Improvement Project in Acute Care

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Abstract

Purpose: The project aimed to educate medical-surgical registered nurses (RNs) on using the clinical decision support (CDS) tools to complete pain reassessment and documentation. Objectives were to increase pain reassessment compliance, identify perceived pain reassessment barriers, and change current pain reassessment and documentation behaviors.

Background: Nurses are responsible for assessing, reassessing, and managing patients' pain. Quality pain reassessment and documentation are essential to effective pain management.

Methods: Participants were accrued via convenience sampling in addition to inclusion and exclusion criteria. The Plan-Do-Check-Act (PDCA) Cycle was used to guide the pilot project conducted in one medical-surgical unit. Implementation interventions: asynchronous computer-based learning module with step-by-step instruction and demonstration on how to use the CDS tools, dissemination of tip sheets to reinforce learning module content, unit rounding, and distribution of information on the importance of pain reassessment and documentation. Participants were also invited to complete an electronic questionnaire to evaluate demographics and perceived pain reassessment barriers.

Results: 18 participants completed the project. The educational intervention had a small effect on the participants' pain reassessment compliance one-week post-intervention. By the second post-intervention week, compliance dipped and regressed to baseline. The primary barriers contributing to participants' pain reassessment compliance rates were time constraints, competing patient care priorities, heavy workload, inadequate staffing, and forgetfulness.

Conclusion: The project results suggest that an educational intervention focused on CDS tools could improve nurses' pain reassessment and documentation compliance and behaviors.

Keywords: CDS, medical-surgical RNs, pain reassessment and documentation

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Pain management is integral to healthcare because it is linked to patient outcomes and satisfaction (McNamara et al., 2019). In 2001, The Joint Commission developed standard pain assessment and management guidelines for healthcare organizations focusing on better assessments and treatments for patients experiencing pain. Despite educational efforts and established pain management policies, healthcare organizations find it challenging to meet these guidelines (as cited in The Joint Commission & Baker, 2017). According to Akbar et al. (2019), the pain management challenges stem from unstandardized clinical approaches, inconsistent collaboration, and ineffective communication between staff regarding pain management.

Nurses are part of the interdisciplinary team responsible for assessing, reassessing, and managing patients' pain (Margonary et al., 2017). Specifically, nurses have an ethical obligation to monitor the patient's pain to ensure it is acceptable (American Nurses Association Center for Ethics and Human Rights, 2018). Nurses assess pain using the patient's self-report, pain-intensity scales, observational skills, and clinical judgment. The pain assessment objective is to evaluate the patient's overall pain experience (Elsevier, 2021). The subsequent pain reassessment is vital in determining the efficacy of the pain intervention (Robertson, 2021). Therefore, nurses must perform and document a quality pain reassessment to effectively manage the patient's pain (Ross et al., 2017). Comprehensive pain reassessment documentation should include the patient's pain score and physiological changes in response to the pain intervention (Ross et al., 2017). Pain reassessment data is vital to providers because they can modify the patient's treatment plan based on this data (Robertson, 2021).

Pain reassessment documentation is a written or electronic account of the nurse's encounter with the patient. In other words, quality pain reassessment documentation tells the patient's story—what type of pain is being treated, how it is being treated, and the clinical-decision making processes that resulted in the actions taken (Robertson, 2021). Nurses communicate the patient's pain status and response to the care plan to providers when the pain reassessment is documented (Robertson, 2021). Regulatory bodies, such as The Joint Commission and DNV, also review pain reassessment documentation to monitor the quality of pain management within healthcare organizations (Robertson, 2021).

Background and Significance

Although important in clinical practice, pain also significantly impacts individuals experiencing pain and society. The U.S. Department of Health and Human Services acknowledged the experience of pain as a public health issue on a national level. Over 50 million adults experience chronic pain daily, resulting in physical, psychological, and socioeconomic costs to these individuals (U.S. Department of Health and Human Services, 2019). Furthermore, pain costs our nation between 560 to 635 billion dollars annually (U.S. Department of Health and Human Services, 2019). The direct costs are the dollars healthcare organizations spend to care for patients experiencing pain. The indirect costs include the losses from decreased productivity, such as disability and absenteeism due to pain (U.S. Department of Health and Human Services, 2019).

Pain is also regarded as a public health issue on a global level (Mills et al., 2019). Specifically, chronic pain impacts at least 10% of the world's population, approximately 700 million people (Jackson et al., 2014). Furthermore, some countries estimate chronic pain prevalence at 20-25% (Jackson et al., 2014). Nurses are uniquely positioned to reduce pain's

social and economic burden by reassessing and documenting patients' pain concerns (Amendano, 2018). Quality pain reassessment and documentation increase the likelihood of the patient healing faster and participating in treatment activities (Fairview Health, 2019).

Problem Statement

A current problem in many acute care medical-surgical units is the lack of consistent pain reassessment and documentation following non-scheduled pain medication administrations. Often nurses do not complete a timely pain reassessment, and their documentation excludes the patient's response to the pain intervention (C. Skelton, personal communication, September 17, 2021). The Pain Management policy at the healthcare organization where this project was conducted indicates that nurses must document a pain reassessment within 60 minutes after administering a non-scheduled pain medication. The pain reassessment documentation must include the patient's pain score, sedation level using the appropriate sedation scale, and respiratory pattern/effort (C. Skelton, personal communication, September 17, 2021). Nurses must reassess and document pain concerns following a non-scheduled pain medication administration because the patient may experience unrelieved pain, oversedation, or respiratory complications (DeVore et al., 2017). According to Ho and Burger (2020), similar documentation inconsistencies occur when nurses administer scheduled pain medications.

Inconsistent pain reassessment and documentation also pose a significant problem for healthcare organizations because pain is a nursing quality measure linked to patient satisfaction and outcomes (Schroeder et al., 2016). The Centers for Medicare & Medicaid Services reduces healthcare organizations' reimbursements when patients are unsatisfied with their pain management (Schroeder et al., 2016). Alternatively, healthcare costs increase when patients

experience adverse complications from suboptimal pain management as it could extend their recovery time and hospital stay (U.S. Department of Health and Human Services, 2019).

Clinical Question

Clinical decision support (CDS) is a technology tool that assists clinical decision-making by analyzing patient-specific data and providing recommendations to providers through alerts and reminders (Gold et al., 2018). In the study by Gold et al. (2018), the use of CDS demonstrated increased nurses' adherence to pain reassessment documentation requirements and improvements in the quality of care for patients experiencing pain. Since CDS improved the nurses' pain reassessment documentation compliance in the study by Gold et al. (2018) and other published studies in the literature review, the clinical question guiding this project is: Does CDS training improve medical-surgical registered nurses' pain reassessment and documentation in the acute care setting? The clinical question is significant because it facilitated the search for relevant literature to the identified clinical problem.

Purpose of the Project

This quality improvement (QI) project aims to increase nurses' knowledge of using the CDS (timed reminders) within the electronic health record (EHR) to complete pain reassessment and documentation efficiently. The main objective of this project is to improve nurses' pain reassessment compliance, thereby enhancing the patients' pain management (Wissman et al., 2020). Other objectives are identifying perceived pain reassessment and documentation barriers and changing nurses' current behaviors associated with pain reassessment and documentation.

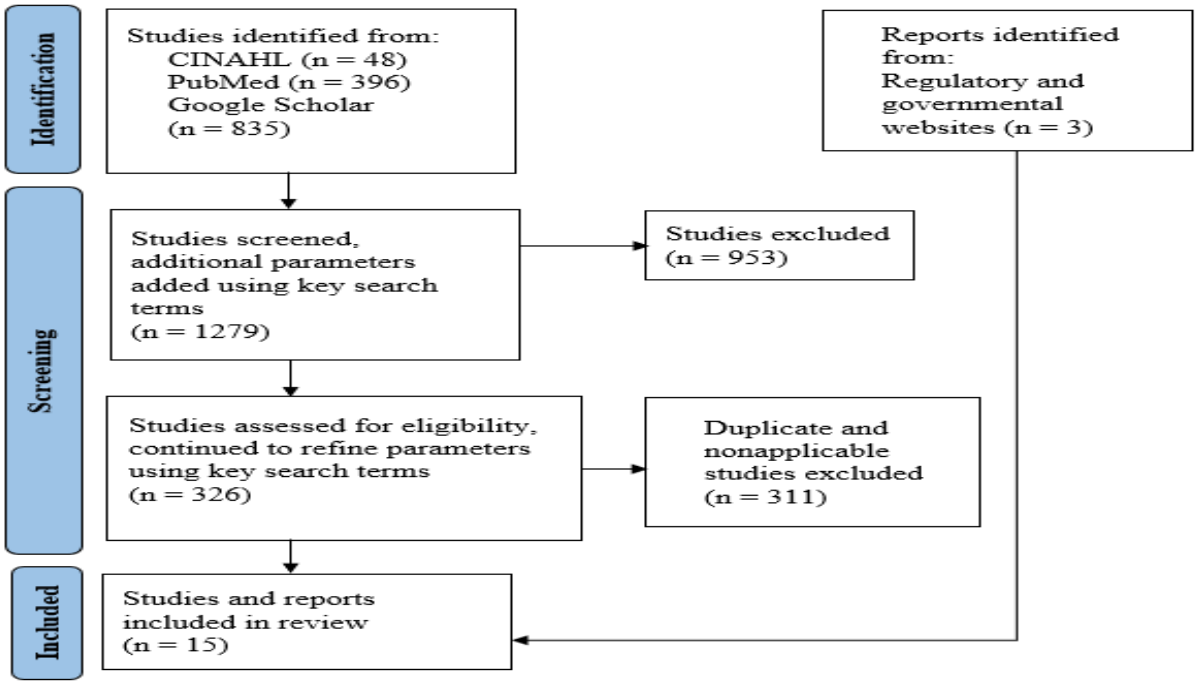
Systematic Review of the Literature

The search for relevant literature was primarily conducted in the CINAHL, PubMed, and Google Scholar databases. Additional searches occurred on the following regulatory and

governmental agencies' websites: The Joint Commission, Det Norske Veritas (DNV) Healthcare, Agency for Healthcare Research and Quality (AHRQ), and the U.S. Department of Health and Human Services. Studies were obtained from CINAHL, PubMed, and Google Scholar using the date range of 2016-2021. Key search terms and phrases were used to identify potential studies that addressed the clinical question. The key search terms and phrases included pain reassessment, pain reassessment and documentation, use of EHR reminders to improve pain reassessment, timed reminders OR alerts OR prompts AND pain AND nurse, pain reassessment AND CDS, CDS for nurses, and pain reassessment in the acute care setting OR hospital. Other inclusion criteria included peer-reviewed articles and the English language. Studies older than five years were excluded from the literature search. Reference Figure 1 for additional details about the search results.

Figure 1

Search Results



Note. From "The PRISMA 2020 statement: An updated guideline for reporting systematic reviews," by M.J. Page, J.E. McKenzie, P.M. Bossuyt, I. Boutron, T.C, Hoffmann, C.D. Mulrow, et al., 2021, *BMJ*, (https://doi.org/10.1136/bmj.n71). Copyright 2021 by the *BMJ*.

After identifying 15 articles that helped address the clinical question, the student principal investigator (PI) appraised and synthesized the evidence using Johns Hopkins evidence-based practice tools (Dang & Dearholt, 2018). The evidence summary and synthesis tables are attached as Appendix G and H, respectively (Dang & Dearholt, 2018). Five themes emerged from the review and synthesis of the literature: barriers to effective pain reassessment, educational interventions to improve pain reassessment, CDS effectiveness, CDS outcomes, and CDS risks.

Barriers to Effective Pain Reassessment

Nurses' pain reassessment is essential for effective pain management (Schroeder et al., 2016). However, nurses encounter multiple barriers when reassessing pain (Amendano, 2018; Ross et al., 2017; Zuazua-Rico et al., 2020). Several studies identified how nurses' lack of knowledge regarding pain assessments and attitudes toward pain contribute to inadequate pain management (Amendano, 2018; DeVore et al., 2017; Zuazua-Rico et al., 2020). Nurses' lack of pain assessment knowledge and dismissive attitudes regarding pain often results in a stigma toward patients experiencing pain (U.S. Department of Health and Human Services, 2019). This stigma can be a barrier to adequate pain management because the nurse views the patient negatively, thus leading to a likely increase in suffering from pain (U.S. Department of Health and Human Services, 2019).

A nurse's workload can also impede the assessment of pain. Zuazua-Rico et al. (2020) studied the relationship between the frequency of pain assessments, nursing workload, and the

nurses' pain knowledge. There were 41 nurses and 317 patients included in the study. The Nursing Activities Score Scale (NAS) was used to measure the nurses' workload. This study's results indicated that the average workload for the nurses was high at 71.97 points, as the NAS specifies that the maximum workload during a shift is 100 points (Zuazua-Rico et al., 2020). The study demonstrated that nurses no longer prioritize pain assessments when they experience increased workloads, as 35.8% of the patients did not have their pain assessed during the study period (Zuazua-Rico et al., 2020). Nurses have many tasks to complete during their work shifts. Consequently, they may perceive pain reassessment as a lower priority compared to urgent patient care needs, such as hemodynamic and ventilation instabilities (Zuazua-Rico et al., 2020).

Furthermore, Amendano (2018) conducted a QI project to improve nurses' pain reassessment compliance and increase nursing knowledge of the pain management process. The QI team used a multimodal approach to improve pain reassessment compliance by implementing pain assessment guidelines, educational in-services, visual cues, and an EHR reminder icon. All RNs working in the Emergency Department (ED) were recruited, and the participation was 33.0% (N = 23) (Amendano, 2018). As a result of these interventions, the chart audit indicated nurses' pain reassessments increased from 43.33% to 80%, and their pain reassessment documentation accuracy increased from 46.66% to 80% (Amendano, 2018). According to the Knowledge and Attitudes Survey results, nurses' pain knowledge improved from 65.65% to 89.56% (Amendano, 2018). The study's findings indicated that a comprehensive approach to remedy pain reassessment compliance improved nurses' pain reassessment, documentation, and knowledge.

Logistical challenges can also pose a barrier to effective pain reassessment for nurses. Amendano (2018) performed a needs assessment to identify pain management improvements

and discovered the healthcare organization's pain management policy was outdated and needed pain assessment guidelines. These findings contributed to the nurses' pain assessment and reassessment incompliance (Amendano, 2018). According to Ross et al. (2017), unstandardized workflows, unclear pain management policies, and undefined documentation requirements can result in low pain reassessment compliance rates.

Furthermore, time constraints and inefficient EHR systems negatively impact nurses' pain reassessment and documentation. Nurses are often occupied with other patient care tasks, resulting in less frequent pain reassessments (Zuazua-Rico et al., 2020). In several studies, inefficient EHR systems prevented the nurses from efficiently documenting pain reassessments (Amendano, 2018; Gold et al., 2018; McCarthy et al., 2018; McNamara et al., 2019; Ross et al., 2017). Therefore, inefficient EHR system design can hinder nurses' pain reassessment documentation quality and timeliness (Ozkaynak et al., 2017).

Educational Interventions to Improve Pain Reassessment

Educational interventions are essential to improving nurses' pain reassessment and documentation (DeVore et al., 2017; Drake & Williams, 2017; Wissman et al., 2020). The subsequent studies used different educational methods to improve nurses' pain reassessment compliance. Specifically, Wissman et al. (2020) conducted their QI project in the ED. The QI team provided all ED nurses with ongoing pain management education, performed daily chart audits with feedback, and distributed weekly newsletters, including the department's pain reassessment rate (Wissman et al., 2020). The nurses' education focused on pain management best practices and the correct method to document a pain reassessment in the EHR. The study's findings indicated nurses' pain score reassessment and documentation increased from 36.2% to 62.3% (Wissman et al., 2020).

DeVore et al. (2017) conducted a QI project in a trauma and toxicology unit. All staff nurses assigned to this unit participated in the project. DeVore et al. (2017) implemented an evidence-based pain management algorithm to provide nurses with step-by-step instructions on assessing and managing patients' pain. The algorithm guided the nurses to assess pain at specific intervals and determine the appropriate pain intervention based on the patient's pain score. The algorithm improved nurses' pain management knowledge and patients' satisfaction with pain management (DeVore et al., 2017). From the student PI's perspective, CDS and algorithms are similar in methodology. CDS and algorithms assist nurses with clinical decision-making by directing them to complete a particular task at a specific time, such as a pain reassessment. However, CDS provides direction to nurses automatically within the EHR.

Furthermore, Drake and Williams (2017) conducted a systematic review of the literature to examine how various nursing educational interventions impacted clinical outcomes for acute pain management. Eight of the twelve studies affirmed educational interventions positively affected nurses' pain assessments. In one study, the QI team implemented CDS in addition to pain management education. This study's findings indicated nurses' pain assessments improved from 64% to 79% (Drake & Williams, 2017).

CDS Effectiveness

Several studies in the literature review discuss how CDS within the EHR improved nurses' pain reassessment and documentation (Gold et al., 2018; McCarthy et al., 2018; McNamara et al., 2019). In each study, the QI team modified their EHR system to include different forms of CDS. For example, Gold et al. (2018) implemented CDS as a dynamic text. The text automatically displayed the patient's recent pain assessment, the time of the assessment, the performed intervention, and indicated to the nurses when the pain reassessment was due. All

staff nurses working in the ED participated in the QI project after receiving education on how to use the CDS during their daily huddles. The CDS rapidly increased nurses' documentation of the pain reassessment from 42% to 68.6 %, and their pain reassessment documentation continued to increase to 80.3% five months post-implementation of the dynamic text (Gold et al., 2018).

According to McCarthy et al. (2018), using CDS as electronic visual cues with real-time feedback improved nurses' pain assessment documentation compliance. Specifically, the nurses' initial pain assessment documentation increased by 4%, and the inclusion of the pain scale increased by 5% (McCarthy et al., 2018). Conversely, Ross et al. (2017) recommended implementing CDS as a patient care dashboard to improve nurses' adherence to pain reassessment standards. A patient care dashboard within the EHR would allow nurses to see immediately when the patient's pain reassessment is due. In addition, McNamara et al. (2019) added a reminder in the EHR to prompt the nurses to complete the patient's pain reassessment and documentation. The EHR reminder was coupled with nursing education on pain scales and goals for pain reassessment (McNamara et al., 2019). The post-intervention data indicated overall pain documentation increased from 20% to 40%, and pain reassessment increased from 0% to 40% in the single postoperative unit (McNamara et al., 2019).

In another study, Aloufi (2020) conducted a literature review to examine the effects of CDS on the quality of nursing care. Aloufi identified 32 studies from Google Scholar. The literature review findings indicated variability in CDS effects because each study focused on a different context of CDS. However, in 14 studies, the researchers viewed CDS as highly beneficial to the quality of nursing care (Aloufi, 2020). The researchers concluded that CDS reduces nurses' cognitive workload, improves compliance with established standards, and enhances nurses' clinical decision-making capacity (Aloufi, 2020).

In contrast, Gold et al. (2018) noted CDS could increase a provider's cognitive workload if they do not have access to the clinical information to determine the relevance of the CDS. Providers also may not process the information in the CDS because they are presented with substantial amounts of information in a limited time (Gold et al., 2018). The difference in opinion associated with cognitive workload highlights the importance of CDS usability testing. Therefore, the CDS testing process should include system users who can determine if the CDS works well to support their clinical workflows and patient care tasks (Gold et al., 2018).

Furthermore, Von How (2018) conducted a randomized control trial in a simulated ED environment to understand if an external timer device improved the frequency and timeliness of the pain score reassessment. The timer device reminded the nurse to complete the pain score reassessment in the experimental study. A total of 20 nurses ($N = 20$) were recruited for the study (Von How, 2018). Ten nurses were randomly assigned to both the intervention and control groups. As a result of the experiment, 50% ($n = 5$) of the ten nurses in the intervention group completed 100% of their pain score reassessment documentation (Von How, 2018). Only 10% ($n = 1$) of the ten nurses completed 100% of their pain score reassessment documentation in the control group (Von How, 2018). The nurses in the study perceived that the timer device improved their pain score reassessment documentation. As indicated in the study, using a timer device to alert nurses to reassess pain can optimize pain documentation, thus improving pain control and patient satisfaction (Von How, 2018). The timer device is comparable to CDS alerts. Therefore, there is a high probability that the results will be similar if nurses use the CDS within the EHR to complete their pain reassessment and documentation.

CDS Outcomes

Dunn-Lopez et al. (2017) conducted an integrative review focusing on CDS for nurses in the hospital setting. Dunn-Lopez et al. focused on diverse types of CDS: alerts, text-based suggestions, and summary dashboards to determine CDS usability and its effect on patient outcomes. Overall, the usability findings were positive. Nurses reported CDS was easy to learn and improved the efficiency and accuracy of their work. From a patient outcomes perspective, using CDS significantly improved nurses' medication and symptom management (Dunn-Lopez et al., 2017).

Furthermore, Ozkaynak et al. (2017) conducted a systematic review to assess nurses' use of the EHR system for symptom management and documentation. This study revealed an inefficient EHR system could negatively impact pain reassessment documentation. It was inferred that an efficiently designed EHR system integrates CDS as eighteen of the reviewed studies suggest the use of CDS improves nurses' documentation timeliness, accuracy, and completeness (Ozkaynak et al., 2017). Based on these improvements, the assumption is that the quality of care and patient safety could also improve with the use of CDS. Specifically, the timeliness, accuracy, and completeness of nurses' pain reassessment and documentation improve the consistency of pain management care and ensure that patients' pain is reassessed and addressed at the appropriate time following the pain intervention.

The AHRQ (2019) also promotes CDS use within the healthcare system because CDS provides timely information to providers at the point of care and aids in decision-making regarding patient care activities. CDS can also alert providers of potential problems and provide patient care suggestions (AHRQ, 2019). CDS is also important as it can facilitate provider tasks by presenting timed reminders to complete pain reassessment and documentation. Therefore,

CDS is a tool that can effectively improve healthcare quality, safety, efficiency, and effectiveness (AHRQ, 2019).

CDS Risks

Despite the effectiveness of CDS, there are risks associated with its implementation. According to Sutton et al. (2020), CDS can cause alert fatigue because providers encounter frequent and insignificant alerts. When providers are presented with frequent alerts, they may dismiss the alerts regardless of their significance (Sutton et al., 2020). Gold et al. (2018) agree that alert fatigue is a common concern when implementing CDS. Therefore, healthcare organizations must consider alert fatigue as a phenomenon among providers, which can jeopardize patient safety (Gold et al., 2018). As part of the project, the student PI considered this phenomenon as it may be a barrier for nurses when using the CDS.

Literature Review Discussion

According to the literature review studies, many healthcare organizations have identified inconsistencies in nurses' pain reassessment and documentation (Amendano, 2018; DeVore et al., 2017; Gold et al., 2018; McNamara et al., 2019; Ross et al., 2017; Wissman et al., 2020). Furthermore, researchers have indicated several barriers that hinder nurses from achieving optimal pain reassessment, documentation, and management (Al-Mahrezi, 2017). These barriers include a lack of clearly defined pain management guidelines and heavy workloads (Amendano, 2018; DeVore et al., 2017; Gold et al., 2018; McNamara et al., 2019; Ross et al., 2017; U.S. Department of Health and Human Services, 2019; Wissman et al., 2020; Zuazua-Rico et al., 2020). In the literature review studies, the pain reassessment and documentation inconsistencies were remediated by implementing QI projects that included an educational intervention, chart audits with feedback, CDS tools, or an evidence-based pain management algorithm (Amendano,

2018; DeVore et al., 2017; Gold et al., 2018; McNamara et al., 2019; Ross et al., 2017; Wissman et al., 2020). These interventions improved nurses' pain reassessment compliance by providing pain management knowledge and reminding nurses to complete the patient's pain reassessment and documentation (Amendano, 2018; Drake & Williams, 2017; Gold et al., 2018; McCarthy et al., 2018; McNamara et al., 2019). In summary, the literature review studies confirmed an educational intervention coupled with CDS effectively improves pain reassessment compliance. For this reason, the student PI incorporated an educational intervention focused on how to use the CDS in this QI project.

Evaluation of the Evidence

Strengths and Limitations

By completing the appraisal and synthesis of the evidence, the student PI determined the strength of the evidence was good and consistent (Dang & Dearholt, 2018). In reviewing the literature, the student identified one Level I study, seven Level III studies, two Level IV studies, and five Level V studies. Therefore, the student identified sufficient evidence to support the recommendation for nurses to incorporate CDS into their pain reassessment workflows (Dang & Dearholt, 2018).

The student PI identified two limitations relating to the literature review studies. The first limitation is that most of the literature review studies did not indicate whether the interventions led to a sustainable change in nursing practice. Only one QI project found that pain reassessment compliance continued with the use of CDS (Gold et al., 2018). The sustainability of the pain reassessment improvements was not observed in the other QI projects (Amendano, 2018; DeVore et al., 2017; McNamara et al., 2019; Wissman et al., 2020). This ambiguity implies the

need to continuously monitor nurses' CDS adoption and pain reassessment compliance rates to sustain the improvements (Aloufi, 2020).

The second limitation is the strength of the overall evidence from the literature review. Specifically, the overall evidence did not yield strong and compelling research, such as randomized control trials, related to CDS effectiveness on the improvements in nurses' pain reassessment compliance. Despite these limitations, the research studies validated an educational intervention focused on how to use the CDS tools has the potential to improve nurses' pain reassessment compliance, as evidenced by their increased performance from baseline (Amendano, 2018; Drake & Williams, 2017; Gold et al., 2018; McCarthy et al., 2018; McNamara et al., 2019).

Gaps in Literature

This QI project is unique because it addresses the gap in the specialty of nurses that researchers have not studied regarding pain reassessment compliance. The studies in the literature review focused on ED, critical care, and primary care nurses (Amendano, 2018; DeVore et al., 2017; McNamara et al., 2019; Ross et al., 2017; Wissman et al., 2020; Zuazua-Rico et al., 2020). However, the target population for this QI project is medical-surgical nurses. Conducting the project with medical-surgical nurses will broaden the scope of the specialty of nurses studied regarding improvements in pain reassessment compliance. It is important to note that pain management and reassessment can vary across healthcare settings due to influencing factors: patient population, changes in patient conditions, treatment options, guidelines, and training (Diiulio et al., 2020).

Theoretical Framework: Lewin's Change Theory

Kurt Lewin was a social psychologist known for his change management theory (Cummings et al., 2016). Lewin's perception of the change process includes identifying a need for change, taking the necessary steps to achieve the desired behaviors, and sustaining these new behaviors as the status quo (Hartzell, 2021). Unfreezing, changing, and refreezing are the three steps in Lewin's Change Theory (Hartzell, 2021). Lewin's Change Theory has been used in many healthcare organizations to increase the likelihood of a successful change (Udod & Wagner, 2018). For this reason, the student PI used Lewin's Change Theory as a framework to guide the following phases of the QI project: assessment, planning, implementation, and evaluation. Reference Appendix A for additional details about Lewin's Change Theory.

Assessment and Planning

The assessment and planning phases fall under Lewin's unfreezing step—identifying the need for change (Barrow et al., 2021). Communication is essential during the unfreezing step to get buy-in from the individuals involved in the change process (Juneja, 2021). During this phase, the student PI identified the clinical practice problem by assessing the project site and speaking with the healthcare organization's accreditation specialist to understand the current pain reassessment and documentation gaps. Additionally, the student PI reviewed the current pain reassessment compliance rates at the unit level and performed a thorough workflow observation. These assessments helped the student PI understand the pilot unit's current pain reassessment barriers and workflows. The student PI also collected insightful information about the unit, including resource availability, culture, the current state of pain reassessment workflows, and readiness for change (Juneja, 2021). Currently, nurses rely on memory, use the EHR Worklist, and write down reminders to complete their pain reassessment and documentation. As part of the educational intervention, the student PI instructed the nurses to use the CDS for pain

reassessment and documentation, as the CDS will automatically remind them to complete these tasks.

The student PI identified the project interventions and tools in the planning phase. Additionally, the project plan was created in collaboration with the DNP project team, content experts, and nursing leadership at the project site (Moran et al., 2017). Participation from the nurses was essential, as well. According to Nilsen et al. (2020), staff who participated in the planning process exhibited less resistance because they could influence the change. The student PI utilized effective communication strategies, which are critical to obtaining support and bringing awareness to the needed change in pain reassessment and documentation behaviors and workflows (Juneja, 2021). Examples of effective communication strategies used throughout the project were active listening and understanding, respecting the nurses' time, and sending out clear and concise email notifications on the project requirements and status. Interprofessional collaboration and communication were vital and necessary for the success of this project because a partnership was fostered (Dang & Dearholt, 2018).

Implementation

The implementation phase aligns with Lewin's changing step. This step involves transitioning from the current state to the new state (Hartzell, 2021). During the implementation phase, the student PI executed the project plan. The recruitment process and educational intervention began at this time. Udod and Wagner (2018) highlighted three actions recommended by Lewin to assist with the transition process: showing how the old methods are ineffective, encouraging an optimistic viewpoint of the change, and supporting the individuals impacted by the change. These actions are necessary because individuals directly affected by the change often experience uncertainty (Spear, 2016). The uncertainty stems from learning new and diverse

methods of accomplishing their tasks. The impacted individuals also seek the benefits and alternatives to the change (Wojciechowski et al., 2016). Open communication, education, and support are paramount during the implementation phase until the change becomes a habit (Hartzell, 2021).

Evaluation

The evaluation phase of the project represents Lewin's refreezing step. The new behaviors and processes must become the norm during the evaluation phase. Managing and sustaining these new behaviors and processes are crucial in the evaluation phase (Hussain et al., 2018). As the change agent, the student PI monitored the change and motivated the nurses to embrace the change by rounding on the unit and providing encouragement (Lal, 2019). The student PI also monitored the nurses' pain reassessment compliance data to determine whether the project objectives were being met. Lastly, the student PI will identify lessons learned to make modifications for improvement opportunities before disseminating the project results to nursing leadership at the project site.

Methodology

Ethical Considerations

The Institutional Review Board (IRB) approval was obtained from Georgia State University (GSU). According to the project site's executive director of nursing excellence and research, IRB approval from the project site was not warranted for QI projects. Permission to conduct the proposed project was received from the clinical site before initiating the project. The student PI obtained informed consent from the participants, and participation in the project was voluntary. Assurance of confidentiality was provided to participants via the informed consent. All project-related data were stored in a locked filing cabinet and on a password- protected

laptop. After graduation, all project-related data will be destroyed to protect the participants' anonymity.

Participants were also assured that the project results would not harm their employment. The project did not involve direct contact with patients. The project site granted permission to access the Pain Management dashboard for obtaining the participants' pain reassessment compliance data. Lastly, the dashboard and electronic questionnaire do not include identifying information about the participants or the patients.

Project Design

The PDCA Cycle was used to guide the implementation of the educational intervention. The PDCA cycle is a four-step model for testing change. The PDCA cycle involves developing a plan to evaluate an intervention (Plan), conducting the intervention (Do), observing and learning from the consequences (Check), and determining what modifications should be made to the test/pilot (Act) (AHRQ, 2022; Minnesota Department of Health, n.d.). Due to the time limitation, only two PDCA cycles were conducted during the project. The second PDCA cycle was initiated in post-intervention week six after identifying that the participants' pain reassessment compliance was not steadily increasing as anticipated. In response to this issue, the student PI modified the educational intervention. The modifications included the student PI rounding an additional day to provide feedback to the participants about the pain reassessment components that they were missing from their pain reassessment documentation. Reference Appendix B for additional details about the PDCA Cycle.

Population and Sample Size

The project participants were medical-surgical nurses who provided direct patient care on the pilot medical-surgical unit. These nurses varied in their demographics, such as age, gender,

race, ethnicity, educational levels, nursing experience, and employment status. The specific inclusion criteria for the project were RNs who work in a full-time, part-time, traveler, seasonal, agency, or contract capacity. Additionally, the nurses had to be authorized to administer non-scheduled pain medications. The project's exclusion criteria excluded all nurses not working on the pilot medical-surgical unit, nurses working in an as-needed capacity, and nurses not authorized to administer non-scheduled pain medications. Nurses working in an as-needed capacity were excluded because they did not have a set schedule, which could have negatively impacted the project timeline. The target sample size was 20 nurses. However, 18 nurses were recruited for the project.

Recruitment, Retention, and Compensation

In addition to the inclusion and exclusion criteria, convenience sampling was used to accrue participants. As part of the recruitment and retention strategy, the student PI communicated the project's procedures and expectations via announcements during pre-shift huddles, rounded on the pilot unit, and distributed flyers. The flyer included the project site's documentation requirements for pain reassessments. All participants signed the informed consent prior to participation in the project. After signing the informed consent, all participants were sent a recruitment email, including the project purpose, explanation, and timeline. The recruitment process lasted for two weeks. After completing the project, the participants received a $10 Starbucks gift card as a token of appreciation. Only the participants who finished the project were awarded a gift card.

Project Setting

The QI project was conducted at a not-for-profit community hospital in the southeastern part of the United States. This facility has a total of 134 beds. The hospital serves as a regional

safety net and provides healthcare to vulnerable populations, such as low-income and uninsured individuals. Specifically, the project was conducted in a single, 30-bed medical-surgical unit. The unit's average census is 19 patients; the top three diagnoses treated in this unit are gastrointestinal bleeds, respiratory failure, and end-stage renal disease (S. Broome, personal communication, March 19, 2022). The average nurse-to-patient ratio is one nurse to five patients. There are four nursing stations and one medication room within the unit. The pilot medical-surgical unit was chosen for the project because the nurses administer a considerable amount of non-scheduled pain medications because of the patient population treated in the unit.

Evaluation of Resources

The project's direct costs included the participants' time to complete the virtual training module and electronic questionnaire as they completed the project requirements during their work shift, the Epic® trainer's time to assist with training materials, the student PI's time to design the materials, one-to-one training support time between the student PI and project participants, and printing fees for the flyers ($30). Additionally, the student PI gave each participant a Starbucks gift card as a token of appreciation ($10 gift card x 18 participants = $180). The indirect costs included project coordination, recruiting participants, and communications. The communications included the recruitment email, weekly email reminders sent to the participants to complete the learning module and electronic questionnaire, and the project status update emails sent to the manager of the pilot unit.

Implementation Interventions

The primary educational intervention is a 5-minute asynchronous computer-based learning module. The learning module includes instruction and a demonstration of how to use the CDS to complete and document pain reassessments. This project focuses on two CDS tools, the

Brain and a best practice advisory (BPA). The Brain is a dashboard within the EHR system, Epic®, that provides bedside nurses a single timeline view of the tasks they must conduct for their patients and shifts, including pain reassessment tasks (Mercy Technology Services, 2021). When the nurses use the Brain, they receive a BPA or alert within the patient's EHR as a reminder to complete the patient's pain reassessment and documentation. The link to the asynchronous learning module was also included in the recruitment email with instructions to view the learning module within two weeks of receipt. After viewing the learning module, participants were expected to complete and document pain reassessment for the project's duration using the CDS tools. Participants who had not confirmed they had completed the learning module were sent weekly reminder emails before the two-week deadline.

The secondary educational interventions are tip sheets, rounding on the pilot unit, and providing information on the importance of pain reassessment and documentation. The tip sheets include the pain reassessment documentation workflow using the Brain and BPA. The tip sheets were created and obtained from a certified Epic® trainer at the project site. The purpose of distributing the tip sheets and providing one-to-one support by rounding on the pilot unit was to reinforce the content from the learning module. The student PI rounded on the pilot unit for 3-hours, two to three days per week for the project's duration. The rationale for including the information on the importance of pain reassessment and documentation was to increase the nurses' knowledge of how pain reassessment and documentation are linked to pain management. The recruitment email also included the tip sheets and information on the importance of pain reassessment and documentation.

Data Collection

The project site's Pain Management dashboard, a computerized audit and feedback system, was used to collect the participants' pain reassessment compliance data. A computerized audit and feedback system performs a systematic review of clinical performance according to defined criteria and established guidelines. The information is fed back to healthcare professionals in a structured format, like a dashboard (Busse et al., 2019). Healthcare professionals use audits with feedback to change practice, monitor and communicate clinical performance, and improve the quality of care over time (Roos-Blom et al., 2017).

The Pain Management dashboard was designed by the project site's business intelligence architect using Qlik Sense®, a data analytics platform. Qlik Sense® interfaces with Epic® and automatically extracts pain management data using an extract, transform, and load (ETL) process. The automated data flows from Epic's® databases, Chronicles and Caboodle, to Qlik Sense® (A. Pettit, personal communication, March 7, 2022). The dashboard pulls data from the Medication Administration Record (MAR) and Flowsheets activity in Epic®, where nurses administer medications and document pain reassessments. The Pain Management dashboard data automatically refreshes nightly. Therefore, the data displayed in the dashboard are from the previous day. The dashboard is also configured to extract six months of data from Epic® (A. Pettit, personal communication, March 7, 2022).

The Pain Management dashboard allows the nursing leadership and the quality team at the project site to track and trend nurses' compliance with the Pain Management policy, including pain assessment and reassessment. The pain reassessment metric includes the following components: patient's pain score, sedation level, sedation scale, and respiratory status. The documentation of these four pain reassessment components within 60 minutes after administering a non-scheduled pain medication constitutes a successful pain reassessment at the

project site and in this project. The Pain Management dashboard can also measure pain reassessment compliance at an organizational, departmental, or individual user level.

The participants were also invited to complete an electronic questionnaire created in Qualtrics. The questionnaire contains one item for the entry of the assigned ID number, six demographic items, and one item asking about the barriers the participants encounter when completing pain reassessment and documentation, for a total of eight items. Each participant was assigned a unique ID number to link the participants' questionnaire responses and pain reassessment compliance data as part of the recruitment process. All the questions were in close-ended, multiple-choice format, with the question related to pain barriers permitting multi-selections. The link to the questionnaire was also included in the recruitment email. The student PI sent weekly emails to each participant, encouraging them to complete the questionnaire for the project duration.

The electronic questionnaire was used to collect the participants' demographic data and assess perceived pain reassessment and documentation barriers that could impede optimal pain management. The demographic data collected are the participant's age, gender, race/ethnic group, nursing educational level, and employment status. The demographic data and the perceived barriers were collected to describe the participants' characteristics and to discover pain reassessment barriers, respectively.

Data Collection Process

One week before the educational intervention was implemented, the student PI collected the participants' baseline data for pain reassessment compliance from the Pain Management dashboard. After implementing the educational intervention, the student PI collected the pain reassessment compliance data weekly for nine consecutive weeks. The student PI aggregated the

data at the individual user level, but no participant identifiers were included in the project. The student PI manually entered the data from the Pain Management dashboard into a Microsoft® Excel spreadsheet. Overall, the data collection process took approximately two hours per week.

Key individuals involved in the data collection from the Pain Management dashboard were the business intelligence architect from the project site and the GSU statistician. The business intelligence architect served as a resource for any questions related to the manipulation and navigation of the Pain Management dashboard. The GSU statistician assisted with determining the appropriate data collection method.

The student PI collected the data related to the participants' demographic and perceived pain reassessment barriers via Qualtrics as the participants responded to the electronic questionnaire. The student PI monitored the number of completed questionnaires via Qualtrics weekly and sent email reminders to the participants who had not completed the electronic questionnaire. When the project was completed, the student PI exported the participants' responses from Qualtrics to a Microsoft® Excel spreadsheet.

Reliability of the Evaluation Tools

According to the literature, computerized audit and feedback systems have been used internationally by healthcare organizations to improve the delivery and quality of evidence-based care, such as pain reassessments (Tsang et al., 2021). Furthermore, a meta-analysis indicated that an audit and feedback system is effective for realizing the desired change when baseline performance is low (Roos-Blom et al., 2017). For this reason, the student PI selected the Pain Management dashboard to evaluate the participants' pain reassessment compliance during this project.

The project site's business intelligence architect also successfully evaluated the Pain Management dashboard before it was implemented (A. Pettit, personal communication, March 7, 2022). The pain reassessment compliance data in the Pain Management dashboard were also validated for reliability by the project site's nursing directors and managers. They confirmed the Pain Management dashboard's logic and rules were accurately configured by validating that the pain reassessment compliance data in the dashboard and Epic® were identical (A. Pettit, personal communication, March 7, 2022).

Furthermore, questionnaires are frequently used in research to gain background information on the participants (Von How, 2018). The electronic questionnaire was vital to the project because the demographic data were used to describe the participants' conducting the pain reassessment and documentation. The demographic data were also used to evaluate the participants' demographic variables, such as age, gender, race, ethnicity, educational levels, nursing experience, and employment status. Participants' responses to the question regarding pain reassessment barriers supported the research team's understanding of the challenges participants encountered when completing pain reassessment and documentation.

Data Analysis

The GSU statistician was consulted for the data analysis phase of the project to determine the appropriate statistical test for the level of measurement, design, sample size, and clinical question. All project-related data were exported to a Microsoft® Excel spreadsheet and imported into the Statistical Package for the Social Sciences® (SPSS) for data analysis and visualization. The participants' pain reassessment compliance data were analyzed to determine if the educational intervention improved their pain reassessment compliance from baseline

performance. The quantitative data from the electronic questionnaire were used to characterize the participants and their perceived pain reassessment barriers.

Statistical Tests

Pain reassessment compliance was evaluated using a within-subjects repeated measures ANOVA to analyze week-to-week pain reassessment compliance percentages. Mauchly's Test was used to determine if the assumption of sphericity had been violated ($p < .001$), i.e., a significant degree of variability within the participants' pain reassessment compliance data was observed (Kim et al., 2022). Since Mauchly's Test was significant, a Greenhouse-Geisser correction was performed to adjust the ANOVA results (Kim et al., 2022). Descriptive statistics and measures of frequency, i.e., count and percentage, were used to summarize the data related to participants' demographics and perceived pain reassessment barriers.

Results

The QI project was conducted from August 2022 to October 2022. Fifteen of the eighteen participants responded to the electronic questionnaire; the response rate was 83.3%. Participants' ages ranged from 20 to 60+ years, with 100% identifying as female. Most of the participants self-identified as Caucasian. Additionally, 77.3% of the participants earned a bachelor's degree, and 46.7 % had ten or more years of nursing experience. At the time of the project, 73.3% of the participants self-reported regular, permanent full-time employment status (See Table 1).

Table 1

Participants' Demographics

Variables	*n*	Percent %
Age (years)		
20-29	4	26.7
30-39	4	26.7
40-49	1	6.7
50-59	5	33.3

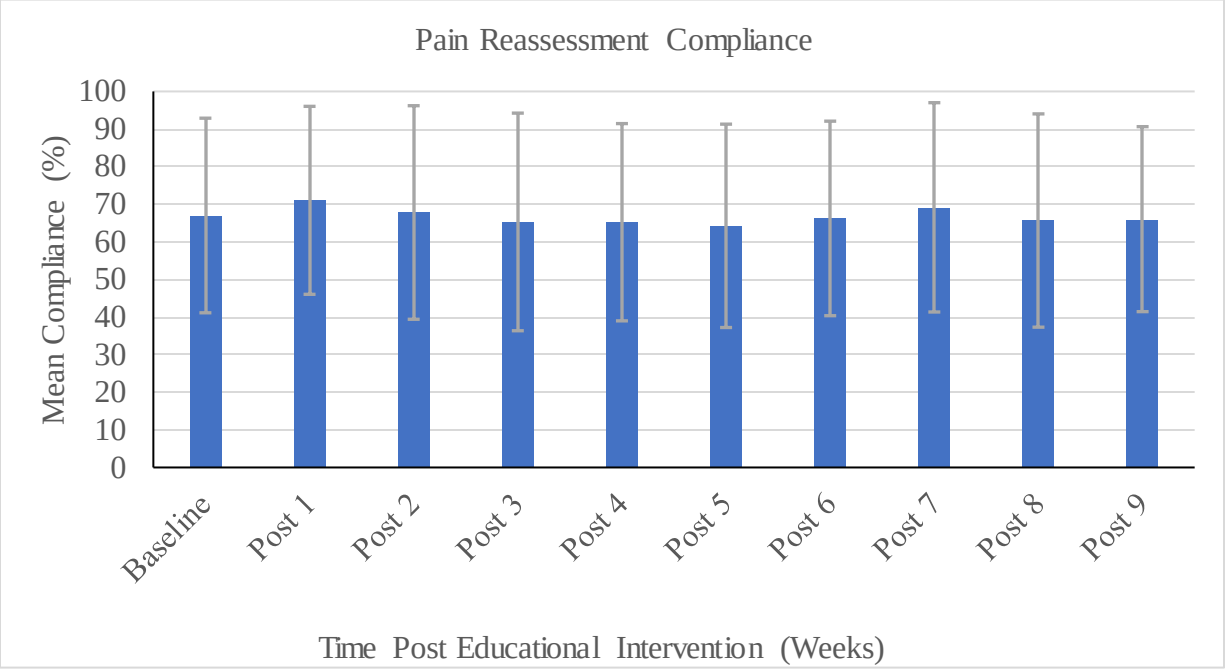
60+	1	6.7
Gender		
Female	15	100.0
Race/Ethnicity		
Caucasian, not Hispanic or Latino	10	66.7
Hispanic or Latino	2	13.3
Mixed	3	20.0
Highest Level of Nursing Education		
Associate degree	3	20.0
Bachelor's degree	11	73.3
Diploma	1	6.7
Nursing Experience		
Less than one year	3	20.0
Two years to less than five years	5	33.3
Ten years or more	7	46.7
Employment Status		
Contract employee	1	6.7
Regular, permanent full-time employee	11	73.3
Regular, permanent part-time employee	3	20.0

Note. $n = 15$.

In total, 18 participants completed the educational intervention. One participant's data were excluded from the analyses due to an incomplete dataset. Therefore, 17 participants' pain reassessment compliance data were analyzed. The participants' pain reassessment compliance data were tracked from baseline, before the intervention, and weekly for nine weeks following the educational intervention. The within-subjects repeated measures ANOVA results revealed that the educational intervention did not significantly impact the participants' pain reassessment compliance compared to baseline performance ($F(1,10) = 0.45$, $p = 0.729$, $df = 3.18$; Figure 2). The educational intervention had a small effect on the participants' pain reassessment compliance one-week post-intervention ($M = 71.05$, $SD = 24.99$) compared to baseline ($M = 67.01$, $SD = 25.88$). However, compliance dipped and regressed to baseline by the second post-intervention week.

Figure 2

Pain Reassessment Compliance at Baseline and Post-Educational Intervention



Note. Field bars represent participants' (N = 17) baseline and post 1–9-week mean pain reassessment compliance data as a percent, and the error bars represent ± 1 *SD*.

The QI project also aimed to identify perceived barriers to pain reassessment and documentation, and this data is summarized in Table 2. The primary barriers contributing to the participant's pain reassessment compliance were time constraints, competing patient care priorities, heavy workload, inadequate staffing, and forgetfulness. Additionally, each participant identified that at least two or more of the barriers listed in Table 2 impacted their pain reassessment compliance.

Table 2

Perceived Pain Reassessment and Documentation Barriers

Barriers	*n*	Percent %
Time constraints	12	80.0
Competing patient care priorities	11	73.3
Heavy workload	11	73.3

Inadequate staffing	10	66.7
Forgetfulness	9	60.0
Alert fatigue	7	46.7
Cumbersome pain reassessment documentation workflow	4	26.7
Nurse indifference	1	6.7

Note. $n = 15$.

Discussion

In this 10-week QI project, the participants' pain reassessment compliance increased by 4.04% from the pre-intervention period to the 1-week post-intervention period using the CDS tools within the EHR. However, the improvements did not sustain throughout the project's duration as anticipated. The results of this QI project were comparable to other projects' findings, as sustained improvements were not observed (Amendano, 2018; DeVore et al., 2017; McNamara et al., 2019; Wissman et al., 2020). In the effort to improve pain reassessment and documentation, the student PI learned that multilevel support is needed, including timely and persistent audits and feedback to potentially sustain the improvements (Wissman et al., 2020). The student PI also learned that practice improvements require interprofessional collaboration and commitment from all individuals involved in the pain management process, as pain management is complex. Future QI projects should include an interdisciplinary team to develop, implement, and champion effective strategies to sustain improvements in pain reassessment compliance rates.

In healthcare, it can be challenging to change current practices and behaviors (Wissman et al., 2020). Many studies have shown that a multimodal approach is required to change current pain reassessment and documentation habits to improve nursing practice (Amendano, 2018; Drake & Williams, 2017; Gold et al., 2018; McCarthy et al., 2018; McNamara et al., 2019; Wissman et al., 2020). This QI project aimed to determine if implementing primary and

secondary educational interventions focused on using the CDS tools would have the same effect on the participants' current pain reassessment compliance rates and behaviors. The participants' pain reassessment compliance rates immediately increased by implementing the virtual learning module, distributing tip sheets, rounding on the pilot unit, and providing information on the importance of pain reassessment and documentation. However, the effect was not enough to change current pain reassessment behaviors as the participants' pain reassessment compliance rates gradually returned to baseline performance by the end of the project. Future QI projects should monitor compliance for a more extended post-intervention period to yield more sustained improvements and hardwire the change in nurses' pain reassessment workflows and behaviors.

Regarding the current project, time constraints, competing patient care priorities, and heavy workloads were identified as the top three barriers impeding pain reassessment and documentation. The results of this project are comparable to other published studies, which indicated that nurses face multiple pain reassessment and documentation barriers (Amendano, 2018; Ross et al., 2017; Zuazua-Rico et al., 2020). Future research should look at perceived time constraints and workload using the Individual Workload Perception Scale to understand the intensity of the nurses' workloads from their perception (Pamuk & Özyürek, 2022). The Individual Workload Perception Scale consists of 29 items, and a Likert-type scale is used to score each item between 1-5. A high score on the scale indicates a nurse's perception of their workload intensity and satisfaction as positive (Pamuk & Özyürek, 2022). Nevertheless, healthcare leaders must address pain reassessment and documentation barriers to encourage improvements in nurses' pain reassessment compliance.

Risks

The potential risks and unintended consequences which may have impacted the project's overall success are resistance from the participants to change current pain reassessment practices, perceived lack of time to document all components of pain reassessments in the EHR, and staff shortages. While rounding on the pilot unit, the participants reported to the student PI that they felt overwhelmed by their heavy workloads, which may have contributed to reduced pain reassessment documentation or lack of compliance.

Limitations

There were limitations to this QI project. The sample size was small, and the project was piloted on a single, 30-bed medical-surgical unit for only ten weeks. The project's sample size and short duration limit the generalizability of the findings. Therefore, implementing similar interventions in other units could produce different results. Additionally, the educational intervention may only be implemented in healthcare organizations that use Epic's® EHR system, as other EHR systems may not have the same configuration capabilities. Another limitation was that there was no effective way to link the participants' pain reassessment compliance data and questionnaire responses despite assigning a unique ID number.

Regarding future research, the student PI suggests that it would be beneficial to conduct the project for a longer duration, with a larger sample, and in other units, thereby potentially improving the generalizability of the project's findings (Amendano, 2018). Additionally, an effective method to match participants' pain reassessment compliance data and questionnaire responses should be explored in future projects.

Clinical Practice Implications

RN and Patient Implications

Quality of care and pain management are priorities in healthcare, particularly in acute care (McCarthy et al., 2018). Pain is one of the most common conditions experienced by patients and managed by nurses in the hospital. Medical-surgical RNs can contribute to these priorities by completing quality pain reassessment and documentation (McCarthy et al., 2018). Evidence indicates that nurses encounter pain reassessment and documentation barriers, making it difficult for them to manage patients' pain (Amendano, 2018; DeVore et al., 2017; Gold et al., 2018; McNamara et al., 2019; Ross et al., 2017; U.S. Department of Health and Human Services, 2019; Wissman et al., 2020; Zuazua-Rico et al., 2020). Nevertheless, there is a need for timely and quality pain reassessment and documentation to be completed following the administration of non-scheduled pain medications using a standard process to increase the likelihood of the patients experiencing reduced pain (Robertson, 2021). Nurses must also realize that providers cannot objectively measure the effectiveness of the pain intervention or successfully control the patient's pain when pain reassessment documentation is infrequent and inadequate (Robertson, 2021).

Nurse Leader and Educator Implications

Nurse leaders and educators are responsible for mitigating pain reassessment barriers to streamline nurses' pain reassessment and documentation. They must develop an integrated and comprehensive approach to address heavy workloads, inadequate pain management education, and lack of standardized pain management guidelines (Amendano, 2018; Devore et al., 2017; Drake & Williams, 2017; Gold et al., 2018; McCarthy et al., 2019; McNamara et al., 2019; Rababa et al., 2021; Wissman et al., 2020). According to the literature review findings, pain management education, chart audits with feedback, clear pain management guidelines, and CDS need to be incorporated into the comprehensive approach as these interventions significantly

improved nurses' pain reassessment, documentation, and management in the literature review studies (Amendano, 2018; DeVore et al., 2017; Gold et al., 2018; McNamara et al., 2019; Wissman et al., 2020). There is also a need for ongoing pain management education, nurse feedback and support, regular EHR updates with CDS training, and continuous monitoring of pain reassessment compliance to improve and sustain nurses' pain reassessment compliance (Amendano, 2018; DeVore et al., 2017; McCarthy et al., 2019; Rababa et al., 2021). Overall, improving nurses' pain reassessment compliance can positively impact the lives of the patient population suffering from pain because better pain control leads to improved quality of life (U.S. Department of Health and Human Services, 2019).

Policy Implications

An evidence-based pain management policy is essential when evaluating patients' pain concerns as it establishes a standard of care and provides guidance on pain assessment and treatment practices (Amendano, 2018; Rababa et al., 2021). According to Fallon et al. (2016), a pain management policy should focus on elements linked to quality measures (e.g., pain assessment, intervention, and reassessment), leading to improved patient satisfaction and outcomes. Healthcare organizations must define the criteria for assessing, reassessing, and managing patients' pain. Nurse leaders are responsible for determining where these criteria are located and any documentation requirements associated with the pain management process (The Joint Commission, 2022). At the same time, healthcare organizations are responsible for ensuring that efficient pain assessment and CDS tools are available and used appropriately by nurses (The Joint Commission, 2022). In reviewing the project site's Pain Management policy, the student PI observed that the pain reassessment criteria and required documentation elements are outlined in the policy. However, the Pain Management policy does not direct nurses to use

the appropriate CDS tools within the EHR to complete pain reassessment and documentation efficiently. The student PI's recommendation would be for the project site to add the appropriate CDS tools for pain reassessment and documentation to its Pain Management policy for standardization and efficiency purposes.

Dissemination Plan

The results and findings from this QI project will be shared with the healthcare organization where it was conducted. The educational intervention briefly improved nurses' pain reassessment and documentation. After modifications are made to the educational intervention based on the lessons learned, then other nurses in the healthcare organization should have the opportunity to participate in the educational intervention. The student PI would also like to see policies and procedures implemented to help nurses overcome pain reassessment and documentation barriers. The most effective methods to disseminate this QI project's findings are through academic journals and professional conferences.

Conclusion

QI projects bring knowledge into nursing practice. The results of this QI project suggest that an educational intervention focused on how to use the CDS can potentially improve nurses' pain reassessment and documentation compliance and behaviors. At the project site, the policy and pain reassessment workflow require standardization so that nurses can efficiently complete and document quality pain reassessments to manage patients' pain effectively. Adopting CDS tools and a new pain reassessment workflow promotes patient safety by allowing nurses to evaluate and document the effects of the pain intervention efficiently, reduces overall costs related to adverse events from suboptimal pain management, and upholds compliance with regulatory requirements. Most importantly, enhancing nurses' pain reassessment and

documentation can help to ease patients' pain so they can have a better quality of life and positive clinical outcomes.

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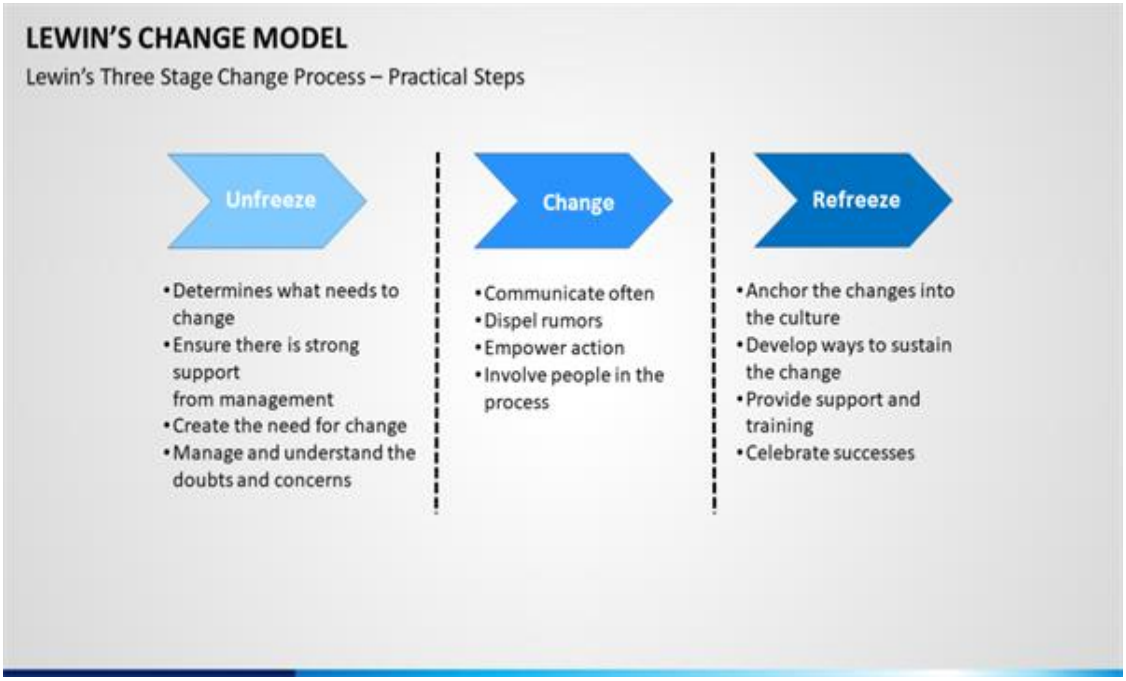
Appendix A

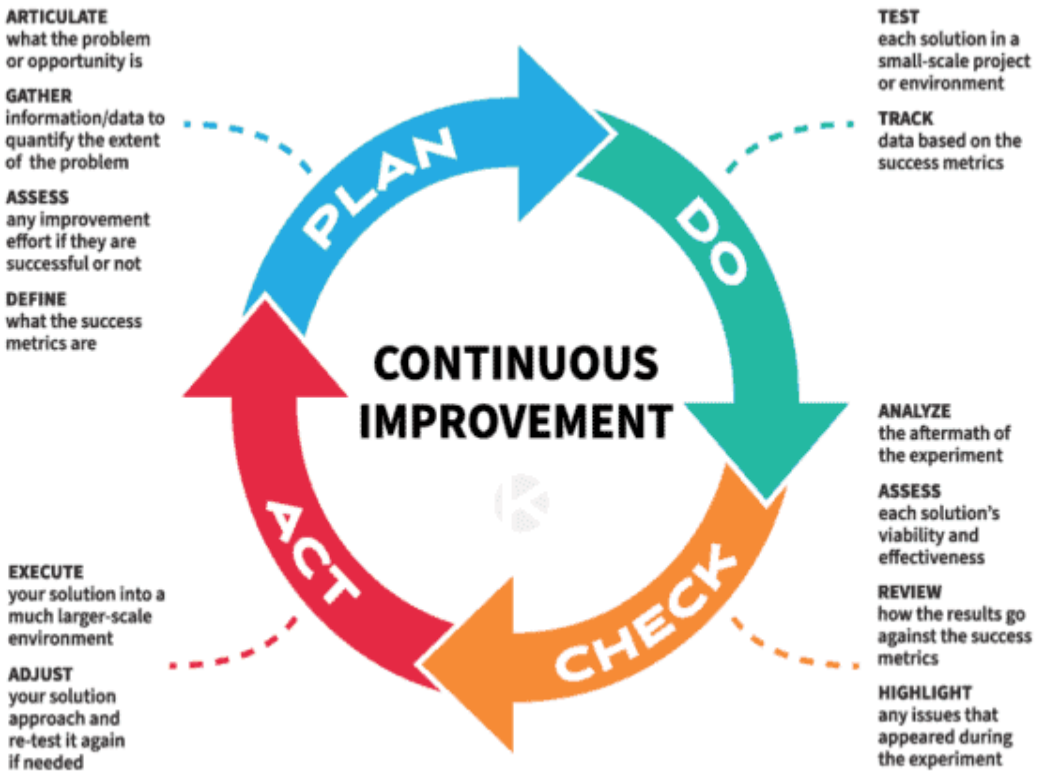
Lewin's Change Model



Note. From Positively impacting society on a global scale through culture awareness, education and action: Charting for change in the workplace, by M. Oliver, 2018, *Human Synergistics International* (https://www.humansynergistics.com/blog/culture-university/culture-university/2018/01/31/charting-for-change-in-the-workplace). Copyright 2019 by the Human Synergistics International.

Appendix B

Plan-Do-Check-Act (PDCA) Cycle



Note. From The PDCA Cycle: What is it and why you should use it, by L. Boiser, 2022, *Kanban Zone* (https://kanbanzone.com/2021/what-is-pdca-cycle/). Copyright 2016-2022 by the Kanban Zone.

Appendix C

Flyer

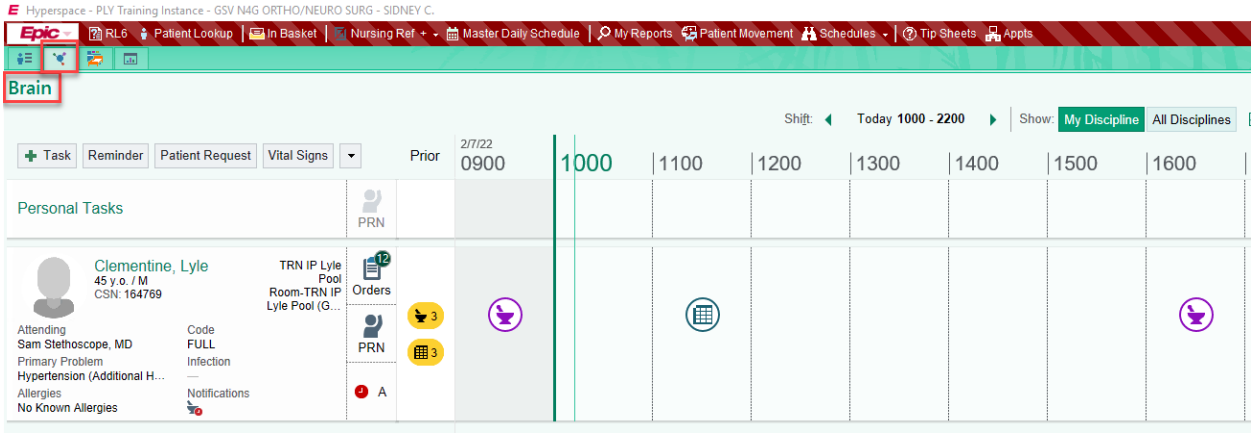
Appendix D

Screenshots from Asynchronous Computer-Based Learning Module

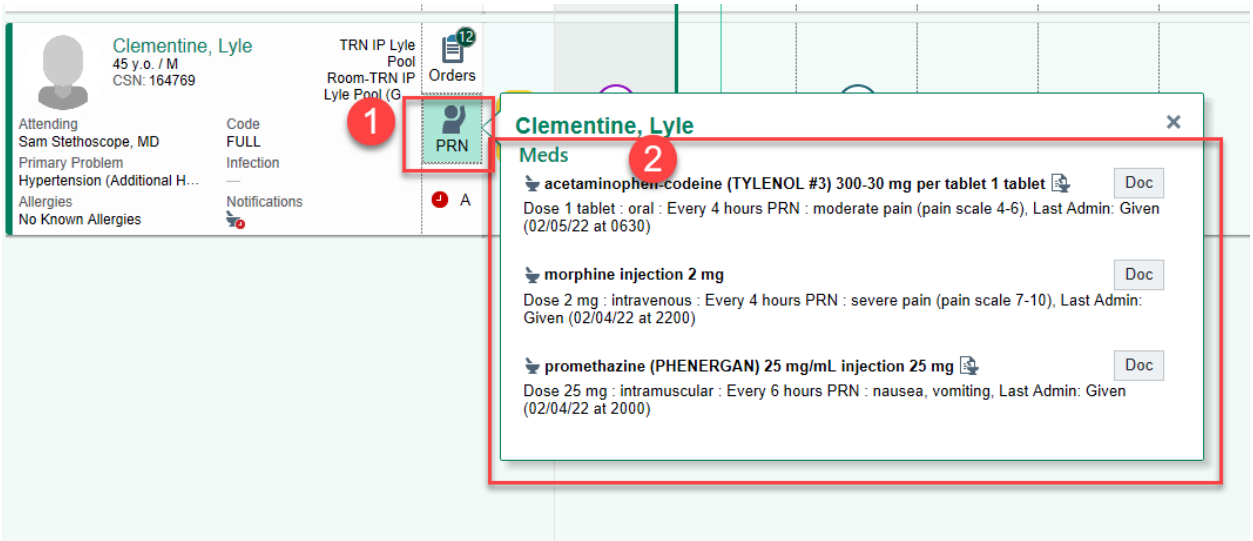
Document Pain Reassessments Using the Brain and Best Practice Advisory in Epic®

Instruction and Demonstration Using a Test Patient

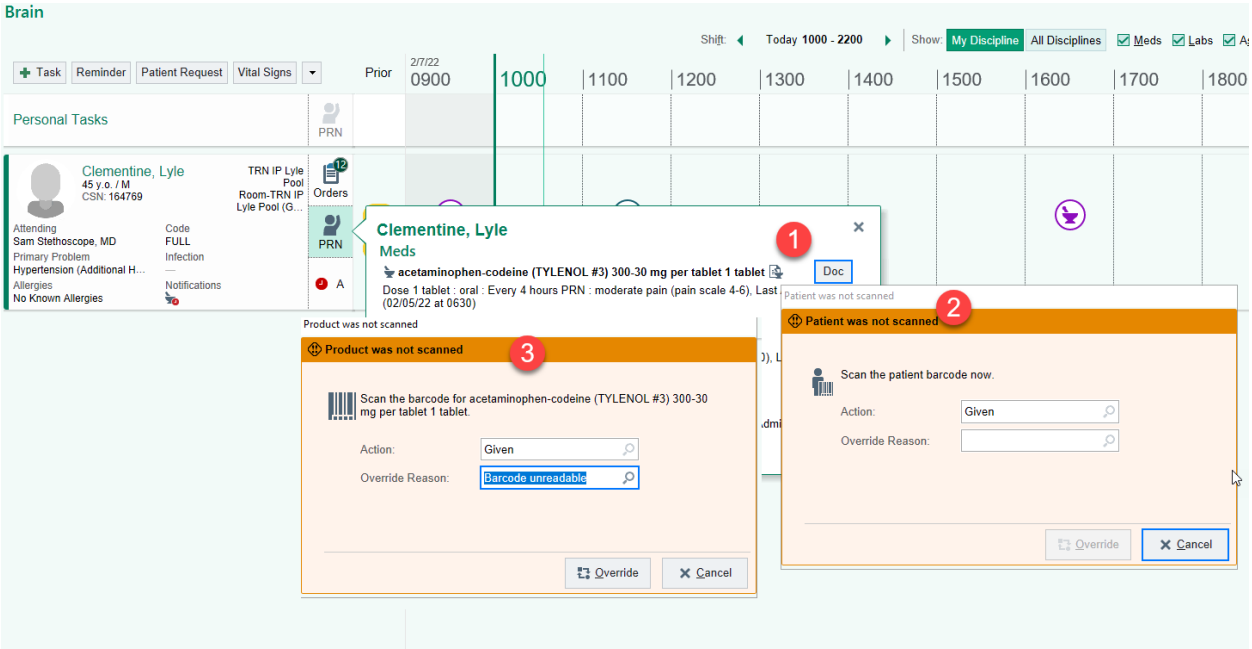
1. Nurse selects the **Brain** activity to view assigned patients.



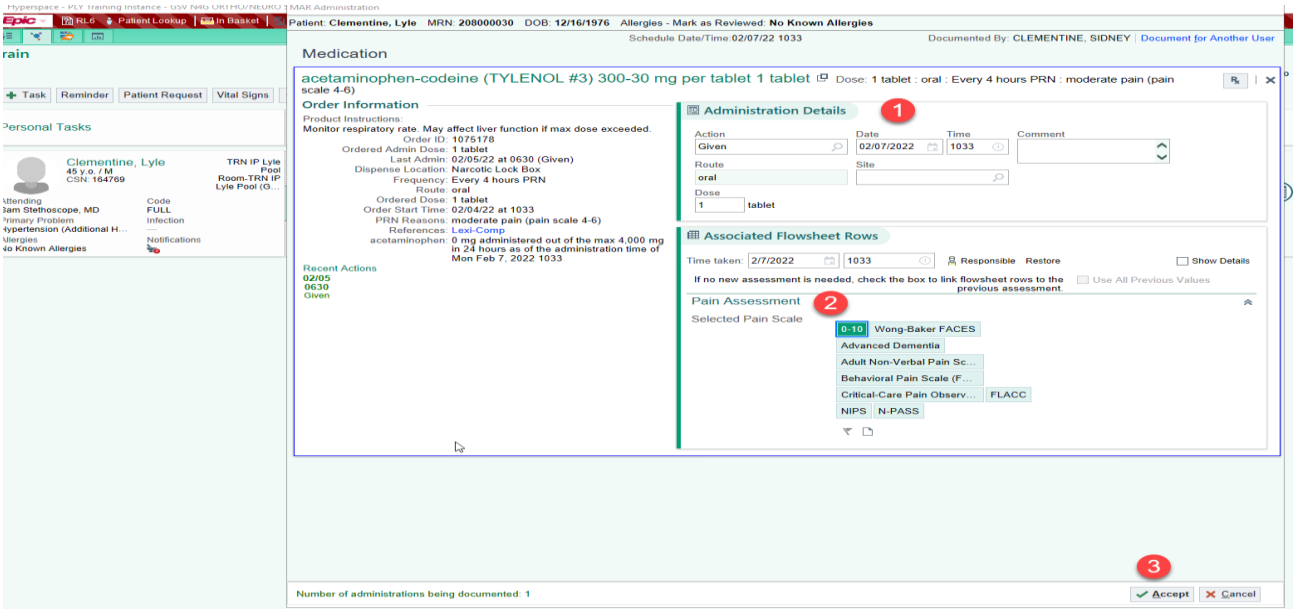
2. Nurse clicks **PRN icon** to view patient's non-scheduled pain medications and then selects the appropriate non-scheduled pain medication based on patient's pain score.



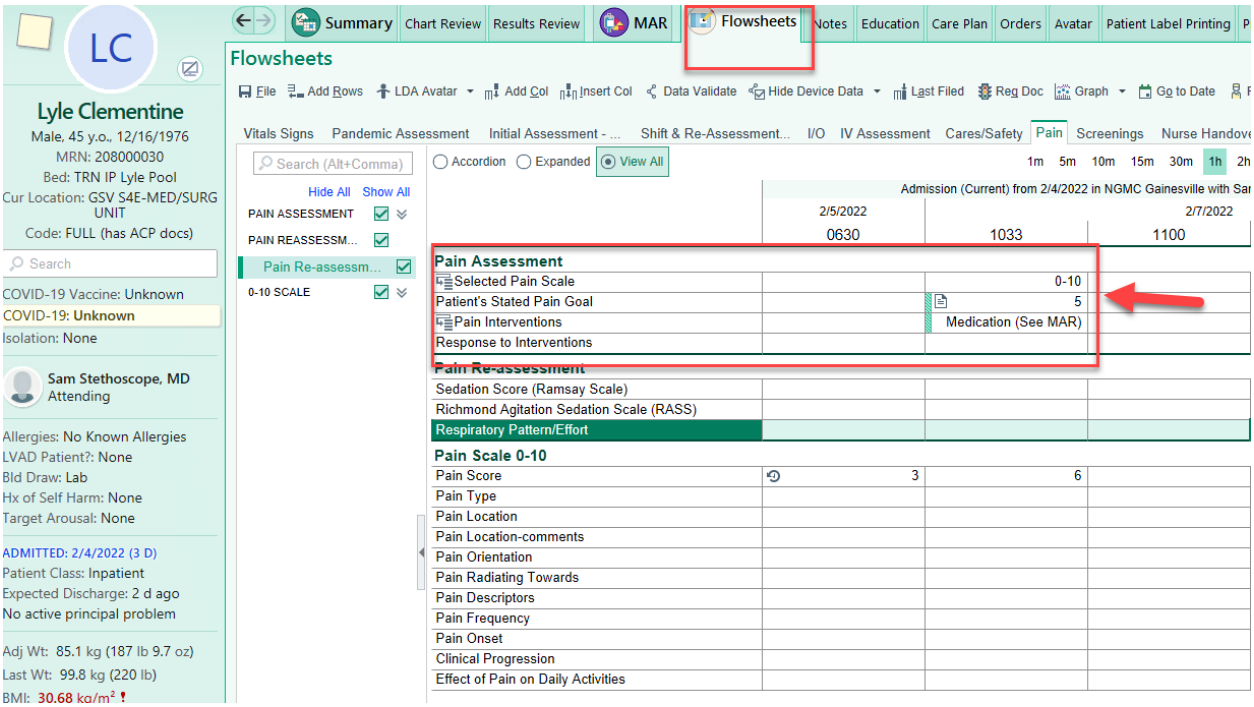
3. Nurse selects **Doc** to document administration of the non-scheduled pain medication, then scans patient barcode on armband and medication barcode for barcode medication administration safety.



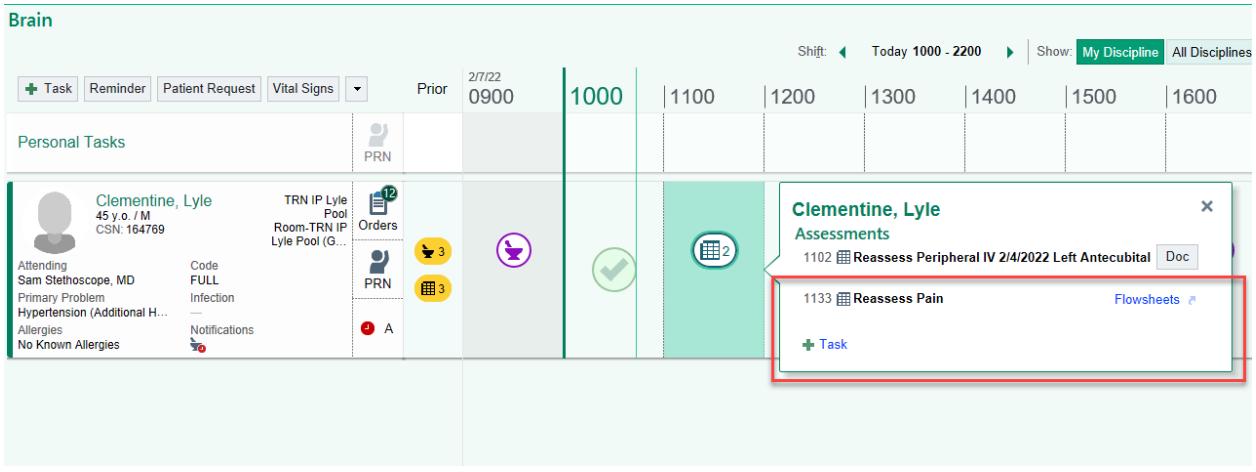
4. Nurse enters medication administration details in the **Medication Administration Record** (MAR), then selects the appropriate pain scale, and clicks **Accept**.



5. From the MAR, nurse navigates to **Flowsheets activity** to complete the documentation of the pain assessment.

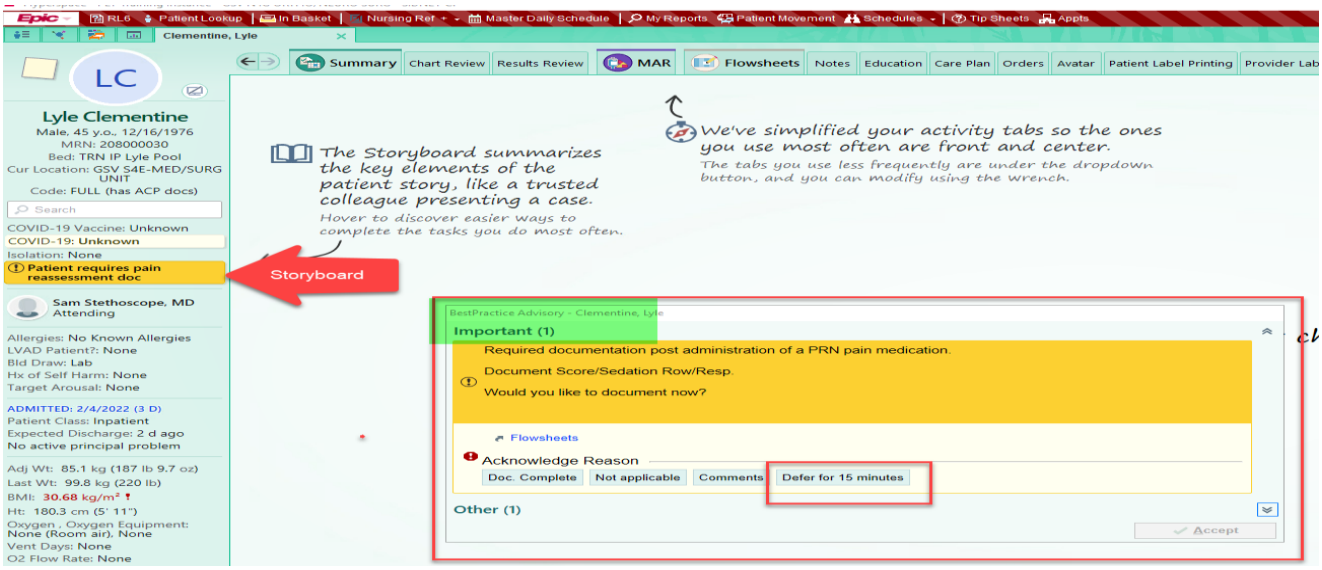


6. The pain reassessment task will automatically populate the **Brain** as a timed reminder 60 minutes post-administration of a non-scheduled pain medication for the nurse to complete the pain reassessment.

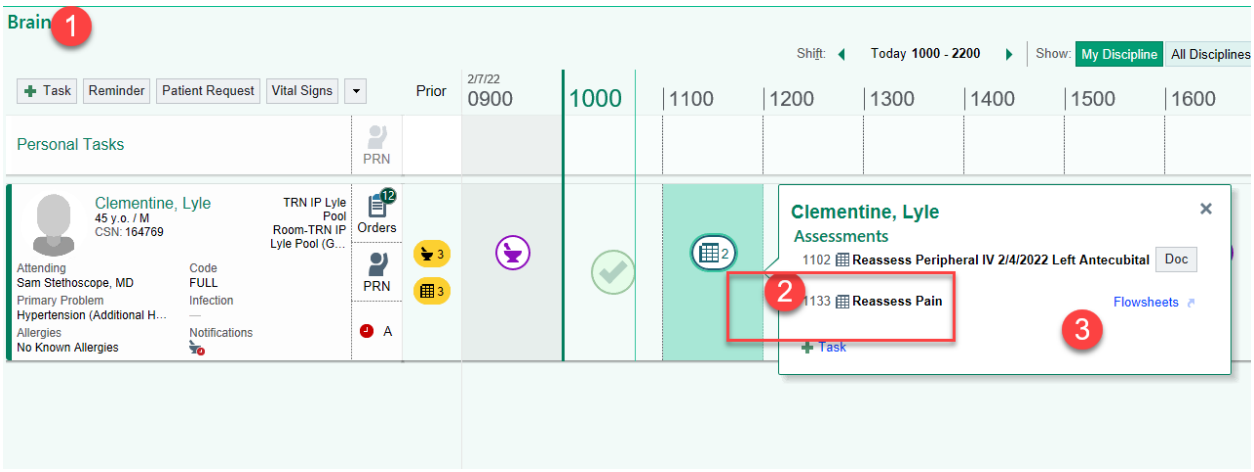


7. If the designated patient's chart is opened before the pain reassessment is due, nurse will receive a **BestPractice Advisory (BPA)** (timed reminder) with information pertaining to

the required documentation elements for pain reassessments. Nurse must keep deferring the alert for 15 minutes until the pain reassessment is due. A **pain reassessment reminder** also shows in the **Storyboard**.

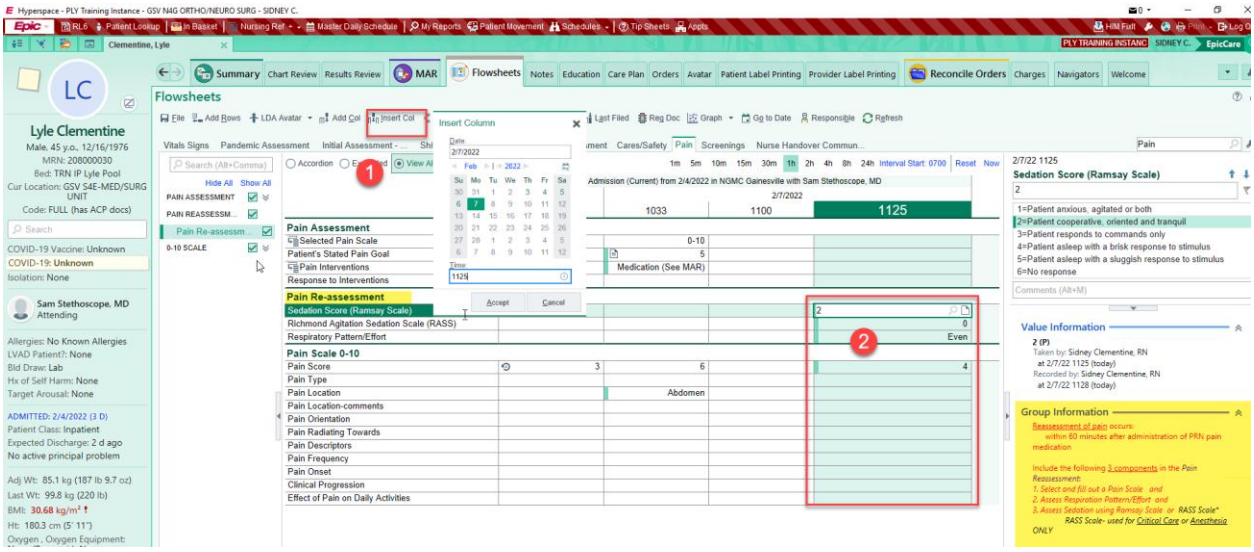


8. When it is time to document the pain reassessment (within 60 minutes post-administration of a non-scheduled pain medication), nurse selects the **Reassess Pain Task** from the **Brain** and then selects the **Flowsheets hyperlink,** which will jump nurse to the **Flowsheets activity** to complete pain reassessment documentation.



9. In **Flowsheets activity** nurse will **insert column** at the time the pain reassessment was completed if not the current time, then nurse will select, and document patient's pain

score, sedation score using the appropriated scale for patient, and respiratory pattern/effort. **Group Information** (highlighted in yellow) also directs nurse to document the required documentation elements (underlined above) for pain reassessments.



End of Pain Reassessment Documentation Workflow using the Brain and BPA (CDS tools).

Appendix E

Electronic Questionnaire

1. **Enter your ID number.**

   _____

2. **What is your age?**

   - 20-29

   - 30-39

   - 40-49

   - 50-59

   - 60+

3. **What gender do you identify as?**

   - Male

   - Female

   - Non-binary

   - Other (please specify): _____

4. **What is your race/ethnic group?**

   - Caucasian, not Hispanic or Latino

   - Black or African American

   - Hispanic or Latino

   - American Indian

   - Asian

   - Filipino

   - Native Hawaiian or Pacific Islander

- Other (specify)_____

5. **What is the highest level of nursing education that you have completed?**

   - Associate degree

   - Bachelor's degree

   - Master's degree

   -Postgraduate degree (DNP, PhD)

   - Other (please specify): _____

6. **How long have you been a nurse?**

   -Less than one year

   -One year to less than two years

   -Two years to less than five years

   -Five years to less than ten years

   -Ten years or more

7. **Select the most appropriate description of your employment status:**

   -Regular, permanent full-time employee

   -Regular, permanent part-time employee

   - Traveler employee

   - Seasonal employee

   -Agency employee

   -Contract employee

8. **What are the barriers you encounter when completing pain reassessments and documentation?**

   -Time constraints

-Heavy workload

-Inadequate knowledge of pain management

-Nurse indifference

-Alert fatigue

-Inadequate staffing

-Competing patient care priorities

-Cumbersome pain reassessment documentation workflow

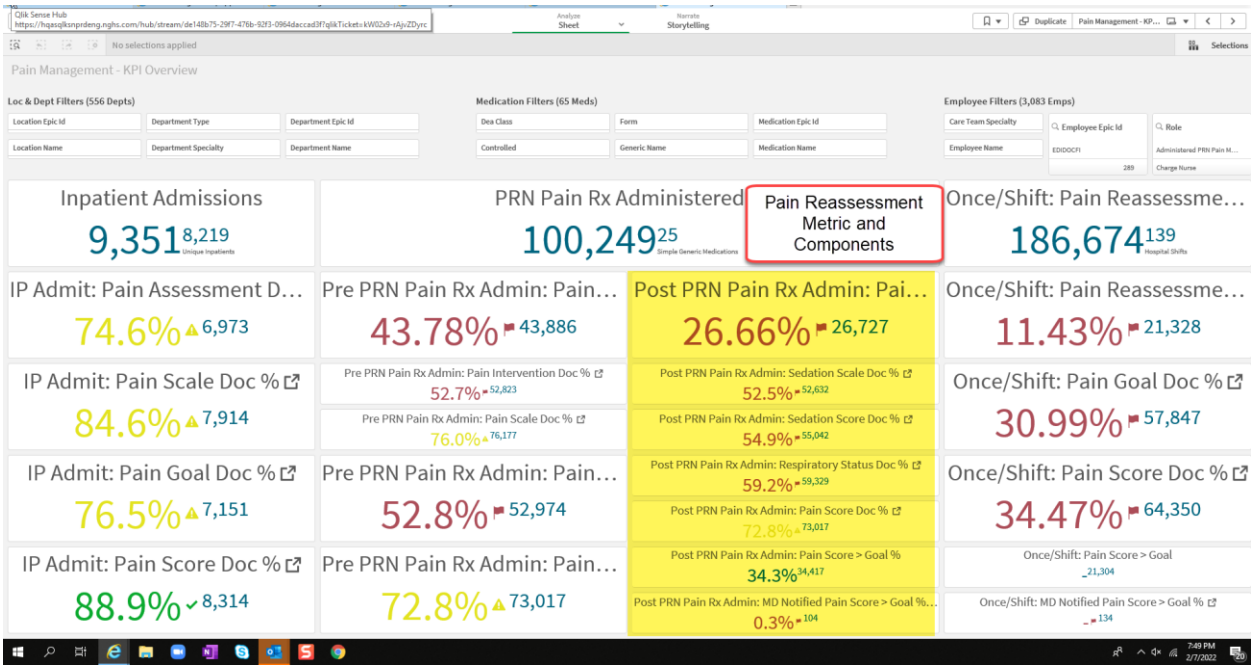
-Forgetfulness

- Other (please specify): _____

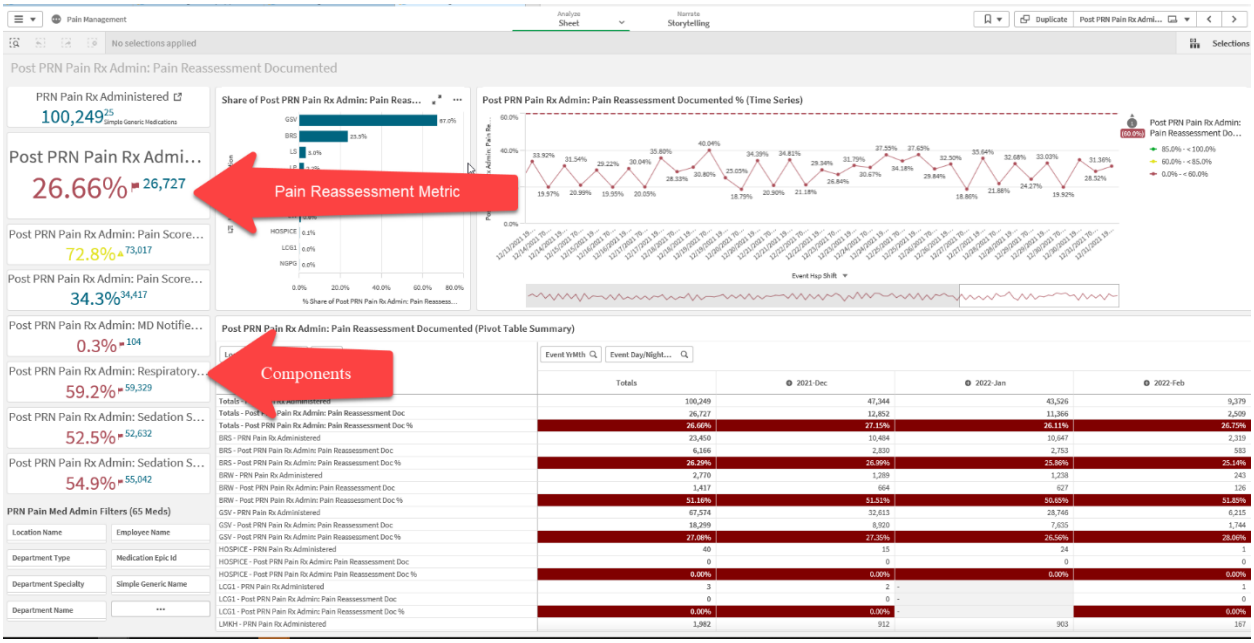
Appendix F

Pain Management Dashboard Screenshots

1. Pain Management: Key Performance Indicators (KPI) Overview



2. Post PRN Pain Rx Admin: Pain Reassessment Documented



Appendix G

Johns Hopkins: Individual Evidence Summary Tool

Johns Hopkins Nursing Evidence-Based Practice

Appendix G
Individual Evidence Summary Tool

Date: October 11, 2021		EBP Question: Do medical-surgical registered nurses in the acute care setting who are trained to use the electronic health record's clinical decision support to complete their pain reassessments have higher pain reassessment compliance rates than registered nurses who do not complete the training?					
Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting or *Not Applicable*	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
1	Gold November 2018	Literature review and performance improvement project	Emergency department	Using CDS best practices can improve documentation compliance and healthcare. The five rights must be applied to improve quality and better outcomes. The five rights include; the right person, for the right patient, in the right place, at the right time. Education intervention provided at huddles	An immediate improvement in discharge pain reassessment compliance was noted after implementation. Data review revealed 42.1% before the implementation of the CDS tool to 66.6% after implementation. Reaching 81.9% five months after implementation.	N/A	Level III A/B High/ Good
2	Kevin M. Wissman,. July 2020	Quantitative and quality improvement project	All patients aged 18 years and older who presented to the emergency department	It noted that guidance and education on proper pain reassessment documentation steps in electronic medical records is needed to improve pain documentation compliance rates. Also educational documents are needed for the improvement of pain	Baseline pain score reassessment and documentation rates were 36.2%. reassessment and documentation rates increased to 62.3%	Short length for the postintervention period. Also there was a decrease in nurses participating	Level III B Good
3	Amendano November 11 2018	Quality improvement	RNs in the ED	reminder icon in the EMR was utilized as part of the quality improvement project to improve pain reassessments QI interventions included education on pain reassessment and documentation, guidelines, visual cues, and EMR reminder	The results of the Knowledge and Attitudes Survey baseline(85.65%) to post-intervention (93.04%) significant improvements were noted with assessments, reassessments and adequate pain documentation	specific to the ED	Level V Quality B good
4	Drake February, 2017	Systematic review	Acute Care Settings	education, audit & feedback, enhanced pain scale use, computerized decision-support system improve pain assessments	Computerized decision support associated with significantly increased pain assessment (79% vs. 64%)	limited search of databases	Level III A/B High/Good
5	Zuazua-Rico March 2020	ambispective cohort study	The sample consisted of 41 randomly selected intensive care nurses	Pain assessments are not prioritized when nurses' have higher workloads. Continued education is needed for pain management and reassessments	nurses workload can impact pain reassessments as well as other patient care priorites	N/A	Level III A High
6	Mc Carthy October 2018	systematic review of quality improvement projects	N/A	To improve patient care documentation CDS was implemented via reminders. Education- 30 min session. Visual cues in the chart prompt nurses to complete missing documentation. CDS provides real time feedback EHR interventions that optimize patient safety and quality of care. It focused on nurses	documentation errors were decreased. Improvements found in pain scale usage and pain reassessments. Documentation compliance improved	per author review was limited due to the focus on acute care settings- that is what I need.	Level V Quality B Good
7	Von How December 2018	Randomised Controlled Trial	20 Staff nurses in ED	Timed device group results showed that a timer device improved pain score documentation and completeness. Also, timer devices improved timeliness of pain reassessment documentation. EHR improves timeliness and frequency of pain control	90% of the participants agreed that timer device helps to improve pain score documentation	The study involved simulation in a control environment and small in number of sample size.	Level I B Good

Attach a reference list with full citations of articles reviewed for this EBP question.

Johns Hopkins Nursing Evidence-Based Practice

Appendix G
Individual Evidence Summary Tool

Date: October 11, 2021		EBP Question: Do medical-surgical registered nurses in the acute care setting who are trained to use the electronic health record's clinical decision support to complete their pain reassessments have higher pain reassessment compliance rates than registered nurses who do not complete the training?					
Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting or *Not Applicable*	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
8	Ozkaynak September 2017	Systematic review	N/A	To enhance the quality and safety of care, the EMR should be well-designed. In addition, it should be interfaced with CDS that provides information to nurses in a standard format. CDS should be included in assessments, patient care, communication, and patient education	These interventions (individual, organization, task, and technology related factors, and the interplay among them) could better support nurses' work and improve symptom management and documentation.	The literature for symptom documentation by nurses, using EHRs, is fragmented and indexed in multiple repositories	Level III A/B High/Good
9	DeVore January 2017	Quality improvement	23 bed trauma hospital unit	Pain assessment practice can be improved by educating nurses which in turn improved management practices improve patient satisfaction	HCAto PS score increased from the average 55.5% median 59.9% to post implementation average 62% and median 61.5%	sample size small and high turnover rates for nurses	Level III A High
10	Ross May/June 2017	Performance Improvement project	primary care clinic. A convenience sample of 12 patients was tracked using tracer	Using the EMR is more efficient than memory. Nurse need to be able to see when pain reassessments are due at a glance. CDS will do that.	Compliance rates were negatively affected if documentation was not done in real time or the actual time.	project was limited to one large primary care clinic.The sample size was small. Also, workflow changes took place during the project	Level III B Good
11	Sutton 2020	Clinicians' experience and literature review	N/A	CDS improves clinical workflows because the information is easily accessible. CDS enhances adherence to clinical guidelines. In addition CDS in the form of a patient care reminder prompts nurses to follow up on the patients and treatments	CDSS have been shown to augment healthcare providers in a variety of decisions and patient care tasks, and today they actively and ubiquitously support delivery of quality care.	none discussed	Level: V Quality: A High
12	Aloufi April 16, 2020	Literature review	N/A	CDS significantly improves healthcare outcomes. Timely reminders in the EHR are beneficial to the nurses if they adopt the technology.	Nurses strongly believed that CDSS could help them to improve nursing outcomes by facilitating application of standardized nursing care. The types and contents of CDSS the nurses preferred were notifications, alerts, reminders and warning systems, guidelines on point-of-care	Each of the authors used own methodology. Sample size questionable. Results interpreted in own way. restriction of the review and the search strategy	Level: V Quality: A High
13	Lopez June 21 2016	Integrative review	N/A	CDS has been proven to improve the quality of care provided by front-line nurses	CDS supports direct care nursing decisions and has positive effects on process, usability, and patient outcomes. e. We identified significant improvements in 14 of 15 outcomes measured across 10 studies that included designs and measurement to support this inference	limited inclusion critera and excusion rules	Level: V Quality: B Good
14	McNamara 2019	Quality improvement at High Value Health Care National Conference	a single postoperative pediatric unit	To improve pain the timeliness of the pain reassessment an educational intervention was provided to the staff and the QI team added a reassessment reminder in their EHR	Following the interventions overall pain reassessment documentation increased from 0% to 40%. Pain Reassessment improved from baseline median of 0% to 40%. They anticipate more timely pain reassessments with additional education and the use of the EHR reminder which is a form of CDS.	sample size- 1 unit	Level: IV Quality: A High

Johns Hopkins Nursing Evidence-Based Practice

Appendix G
Individual Evidence Summary Tool

Date: October 11, 2021		EBP Question:	Do medical-surgical registered nurses in the acute care setting who are trained to use the electronic health record's clinical decision support to complete their pain reassessments have higher pain reassessment compliance rates than registered nurses who do not complete the training?				
Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting or *Not Applicable*	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
15	AHRQ June 2019	Consensus Position Statement	N/A	AHRQ supports the adoption and implementation of CDS to improve healthcare and clinician's decision making. CDSs must be well developed to offer benefits to users. Considerations include workflow, integration of clinical guidelines, and the right approach	CDS has the capability to improve efficiency, safety, quality, and effectiveness of healthcare if delivered in the right format and the right time in the workflow	does not address nurses or pain reassessments	Level: IV Quality: A High

Attach a reference list with full citations of articles reviewed for this EBP question.

Appendix H

Johns Hopkins: Synthesis Process and Recommendations Tool

Johns Hopkins Nursing Evidence-Based Practice

Appendix H
Synthesis Process and Recommendations Tool

EBP Question:
Do medical-surgical registered nurses in the acute care setting who are trained to use the electronic health record's clinical decision support to complete their pain reassessments have higher pain reassessment compliance rates than registered nurses who do not complete the training?

Category (Level Type)	Total Number of Sources/Level	Overall Quality Rating	Synthesis of Findings Evidence That Answers the EBP Question
Level I ▪ Experimental study ▪ Randomized controlled trial (RCT) ▪ Systematic review of RCTs with or without meta-analysis ▪ Explanatory mixed method design that includes only a Level I quaNtitative study	1 Level 1 RCT	B Good	RCT Simulation in a controlled environment (7) Timed device group results showed that a timer device improved pain score documentation and completeness. Also, timer devices improved timeliness of pain reassessment documentation. EHR improves timeliness and frequency of pain control. CDS provides patient specific recommendations in the form of alerts and reminders. This study used an external timed device that proved to improve pain reassessment documentation. I think it can be generalizable to serve my purpose. Therefore, I can assume using the CDS reminders in conjunction with training would also improve nurses pain reassessment documentation and completeness
Level II ▪ Quasi-experimental studies ▪ Systematic review of a combination of RCTs and quasi-experimental studies, or quasi-experimental studies only, with or without meta-analysis ▪ Explanatory mixed method design that includes only a Level II quaNtitative study	0	N/A	N/A
Level III ▪ Nonexperimental study ▪ Systematic review of a combination of RCTs, quasi-experimental and nonexperimental studies, or nonexperimental studies only, with or without meta- analysis ▪ QuaLitative study or meta- synthesis ▪ Exploratory, convergent, or multiphasic mixed-methods studies	7 Combination of systematic review and quantative studies	A/B High/Good	Compare: Overall using CDS can improve documentation compliance as long it does not disrupt user workflow (1). It reminds the nurse when pain reassessments are due. Education on the proper use of the CDS is needed (9) and the steps for documenting pain reassessments in the EHR using CDS needs to be included as well (2) CDS that provides reminders to nurses in a standard format is recommended. CDS should be included in assessments, patient care, communication, and patient education (8) Computerized decision,support associated (4) with significantly increased pain assessments (79% vs. 64%)

Appendix H

Synthesis Process and Recommendations Tool

▪ Explanatory mixed method design that includes only a level III QuaNtitative study			Data revealed 42.1% before the implementation of the CDS tool to 68.6% after implementation. Reaching 80.3% five months after implementation for pain reassessment compliance (1) Contrast: documentation compliance can be achieved without using CDS hard stops in the EHR which prevents users from proceeding until an action is taken. (1). Negative attitudes towards computer use may cause nurses to not use EHR tools designed to support them (8) Literature mentioned CDS could lead to alert fatigue if poorly designed. (1) Helpful tips: Consider nurses workload and its impact on timely documentation of pain reassessments . It becomes a lower priority when nurses are busy providing other patient care(5). Nurses need to view at a glance when pain reassessments are due. That's what CDS does in the form of a reminder (10)

Category (Level Type)	Total Number of Sources/Level	Overall Quality Rating	Synthesis of Findings Evidence That Answers the EBP Question
Level IV ▪ Opinions of respected authorities and/or reports of nationally recognized expert committees or consensus panels based on scientific evidence	2 High Value Health National Conference and AHRQ	A High	Compare: Both articles in agreement that CDS can be beneficial to nurses' clinical workflows, resulting in improved quality, safety, and efficiency.(15) Quality improvement project was conducted where education and reassessment reminder was added to the EHR yielding an improvement in pain reassessments as seen below (14) Reassessment improved from baseline median of 0% to 40%. (14) Better utilization of the EHR reminder and providing additional education could further improve timely pan reassessments (14) Tips:Failure to attend or ignoring the alert and increase risk of patient experiencing an adverse event (15)
Level V ▪ Evidence obtained from literature or integrative reviews, quality improvement, program evaluation, financial evaluation, or case reports ▪ Opinion of nationally recognized expert(s)	5	B Good	Compare: CDS enhances adherence to clincal guidelines (11). Patient care reminders are prompts for nurses to follow up on patients and treatments. They provide support for healthcare providers (11). Nurses prefer CDS as alerts and reminders at the point of care. Overall documentation compliance increased with the use of CDS in form of EHR reminder, education, and visual cues prompting nurses to complete the missing documentation.(6) significant improvements were noted with assessments, reassessments and adequate pain documentation with the use of a reminder icon in the EMR (3)

Appendix H

Synthesis Process and Recommendations Tool

based on experiential evidence			Contrast: CDS is not beneficial to nurses if they don't use the technology. (12) Nurses may not use CDS if they are not technology savvy. The may feel like it complicates their workflow(11). Tips: well designed CDS will help to reduce the nurse's cognitive workload. They will not have to rely on memory to remember to complete a specific task. (12)

Johns Hopkins Nursing Evidence-Based Practice

Appendix H

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Based on your synthesis, which of the following four pathways to translation represents the overall strength of the evidence?

☐ **Strong, compelling evidence, consistent results**: *Solid indication for a practice change is indicated.*
■ **Good and consistent evidence**: *Consider pilot of change or further investigation.*
☐ **Good but conflicting evidence**: No indication for practice change; consider further investigation for new evidence or develop a research study.
☐ **Little or no evidence**: No indication for practice change; consider further investigation for new evidence, develop a research study, or discontinue project.

*If you selected either **Strong, compelling evidence, consistent results or Good and consistent continue**. If not, **STOP**, translation is not indicated.*

Recommendations based on evidence synthesis and selected translation pathway

My Recommendations:

1. I propose educating medical surgical nurses via rounding and computer based learning to use the CDS (timed reminder) embedded in the EHR (Brain) to see if there is an improvement in pain reassessment compliance rates.
2. Implement a pilot- to evaluate the effectiveness of the intervention before spreading to other units. Obtain lessons learned from the pilot and modify educational intervention accordingly.
3. Fit- recommendation is compatible with unit/organizational priorities as pain reassessments have been cited by the accreditation auditor as inadequate related to timeliness and lacking required documentation elements. Inadequate pain reassessment increase the risk of patient experiencing adverse event related to the pain medication and physicians may not be able to evaluate the pain management effectiveness.
4. Feasibility- I engaged the the Epic trainer for the education piece. Attestation specialist reports pain reassessments are still an issue, especially with the increased Covid numbers. Nurses have an increased workload resulting in pain reassessment having a lower priority. The cost should be minimal. I still need to engage nursing leadership for approval and support.

Consider the following as you examine fit:

Are the recommendations:

- Compatible with the unit/departmental/organizational cultural values or norms?
- Consistent with unit/departmental/organizational assumptions, structures, attitudes, beliefs, and/or practices?
- Consistent with the unit/departmental/organizational priorities?

Consider the following as you examine feasibility:

- Can we do what they did in our work environment?
- Are the following supports available?
  - Resources
  - Funding
  - Approval from administration and clinical leaders
  - Stakeholder support
- Is it likely that the recommendations can be implemented within the unit/department/organization?