

Assessing Adherence to Pain Medication
Reassessment and Documentation Using Timed Visual Reminders

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Abstract

Problem & Purpose: In the fiscal year 2022, the completion of pain reassessment documentation was 38% of all oral pain medication administration at the current clinical site, a Neuro Intermediate Care Unit (Neuro IMC) at a large tertiary care hospital. Published evidence shows that timed visual reminders in the electronic health record (EHR) and standardized staff education increase the frequency of timely pain reassessment. This project aimed to improve the rate of pain reassessment and documentation within 60 minutes after PRN oral pain medication administration to 100% by using timed visual reminders within EPIC over 15 weeks in fall 2023 on the Neuro IMC. **Methods:** Timed visual reminders in EPIC automatically pop up after pain medication administration. The project leader (PL) promoted staff RN adherence by obtaining formal written commitments from key partners, preparing champions and shift huddles, sharing weekly chart audits, and setting up online and in-person educational sessions. The PL performed weekly chart audits, entered data (medical record number [MRN], completion of pain reassessment documentation within 60 minutes) into REDcap, a HIPAA-compliant database, and surveyed staff RNs each month regarding response to a visual reminder tool within EPIC. The PL transformed these data into run charts to identify patterns over the 15 weeks. **Results:** The project measured the number of times nurses completed pain reassessment within 60 min per total number of times nurses gave oral pain medications. RNs completed 928 oral pain medication administrations. Seventy pain reassessment documentation occurred for another purpose or inadequate timing and were eliminated. Pain reassessment documentation within 60 minutes of administration by RNs occurred for 75.3% of all oral pain medication administration. **Conclusions:** Timed visual reminders within EPIC improved pain reassessment and timeliness of documentation rate from 38% to 75.3%.

Keywords: reminders or visual reminders, pain assessment or pain reassessment

Assessing Adherence to Post-Pain Medication Reassessment and Documentation

Using Timed Visual Reminders

Pain is one of the primary reasons to seek medical care in the general population. Approximately 20.4 % (50 million) of adults in the U.S. suffer from chronic pain (Centers for Disease Control and Prevention [CDC], 2018). The costs of pain are between \$560 to \$634 billion annually, as a result of increasing healthcare needs, and decreasing productivity or workforces (Dowell, 2016). Effective pain management is essential to facilitate the progression of a patient's condition and recovery, shorten the length of hospital stays, promote quality of life, and reduce healthcare expenditures.

Pain management may have a strong relationship with patient satisfaction in healthcare institutions and hospital reimbursement (Centers for Medicare and Medicaid Services [CMS], 2021; Tawil et al., 2018). Pain assessment is a critical component in identifying the efficacy of pain management therapy. Hämäläinen et al. (2022) described 114 patients' perceptions of pain assessment and reassessment in a large academic urban emergency department (ED). Results from a patient questionnaire indicated that over 20% of patients reported that ED nurses did not perform pain reassessment after pain medication administration, and 24% of patients were not pleased with ED nurses' pain assessment.

According to hospital data in the fiscal year 2022 (FY22), the completion of pain reassessment documentation was 38% at the current clinical site, Neuro Intermediate Care Unit (Neuro IMC), and 32% hospital wide. The patient satisfaction scores related to pain management were 35% for Neuro IMC and 69% for the hospital (HCAHPS, 2021). Pain management affects patient readiness for discharge and healthcare costs. The average overnight hospital cost for intermediate care units is approximately \$3,000 (CMS, 2022). Adequate pain control promotes

early mobility after procedures and facilitates the recovery and discharge process leading to shortened length of hospital stays and reduced healthcare expenditure.

Few studies have examined the root causes of inadequate pain reassessment by nurses. Bizimana & Bimerew (2021) surveyed 121 nurses at two public district hospitals in Burundi. Survey results indicate that the root causes for the problem of low pain reassessment scores are infrastructural problems, such as a lack of leadership, procedures and policies, finances, and technology, and environmental conditions, such as staffing, equipment, unit environment, and patients.

This DNP project aimed to improve the rate of pain reassessment and documentation within 60 minutes after oral pain medication administration for 100% of eligible patients on the Neuro IMC. The implementation over three months in fall 2023 of timed visual reminders in the EHR to perform post-pain medication reassessment fulfilled this aim.

Available Knowledge

The proposed evidence-based solution for the clinical site was the addition of timed visual reminders in the electronic health record (EHR) to perform post-pain medication reassessment within 60 minutes after oral pain medication administration (Shah et al., 2021; Von How et al., 2018). In a randomized controlled trial among 21 Dutch ICUs, the evidence demonstrated more improvement in adequate pain management in the feedback-with-toolbox group (toolbox = a list of actions to overcome barriers) compared to feedback alone (Roos-Blom et al., 2019). In a controlled pre/post-intervention that linked standardized education and a quality improvement intervention, Hogan et al., 2016 identified significant reductions in pain intensity, faster delivery of pain medication, and timely pain reassessment among a post-intervention group of 373 older adults in an academic ED setting. The intervention included

electronic medical record (EMR) tools, staff education, and weekly staff performance feedback. See Appendix A for an evidence summary table and Appendix B for a synthesis of the evidence.

Rationale

The Promoting Action on Research Implementation in Health Services (PARiHS) framework in Figure 1 guided the implementation of timed visual reminders to improve post-pain medication reassessment and documentation (Rycroft-Malone, 2010). The framework hypothesized successful implementation based on three determinants, including the function of the evidence (E) (research and local information), the qualities of context (C) (culture and leadership), and the facilitation (F) of the implementation process (an internal and external person as a facilitator) (Bergström et al., 2020). The project leader (PL) disseminated the project site's pain reassessment data and research evidence to staff and leadership to gain support for a new practice change. Effective teamwork, constant recognition of the unit culture, and supportive leadership were the pertinent qualities of context. The way to facilitate successful implementation was to perform chart audits, gain key partners' commitment and staff buy-in with incentives (a unit pizza party with the goal achievement), prepare volunteered unit champions from day and night shifts, and provide staff education.

Methods

Context

Contextual elements were considered for the effective implementation of the project because they could be facilitators or barriers to the project. The contextual elements that facilitated the outset of introducing the intervention were effective teamwork, constant recognition of the unit, support and promotion of learning by leadership on the unit and organization, and effective feedback on the performance of individuals, teams, and systems.

Some contextual elements hindered the outset of introducing the intervention. The *structural* contextual elements relevant to the current problem on the site were; short staffing which increased individual workload and produced a high turnover rate; lack of current clinical policies and procedures for pain reassessment and documentation on the site and in the organization; lack of staff knowledge about the importance of pain reassessment and documentation; low priority of pain reassessment and documentation on the site; and lack of unifying tools and available resources for pain reassessment and documentation in EHR.

The current contextual elements of *processes* relevant to the problem on the site were; inadequate pain assessment and reassessment of patients with neurological disorders; inadequate pain medications ordered in the electronic medication administration record (eMAR) causing delayed administration of pain medication and intensifying pain; un-individualized education on patients about pain management options and self-pain assessment; and inconsistent initial pain assessment and reassessment requirements with different oral pain medications in EPIC.

Intervention

The intervention included adding a new visual reminder that would pop up 60 minutes after oral analgesic administration via an existing task manager form within EPIC. The staff RN logged in to the designated department in EPIC and selected the assigned patient. Next, the “BRAIN” screen was displayed as a default screen with a list of assigned patients. The staff RN then clicked on the flowsheet reminder and completed the documentation of pain reassessment within the 60-minute preset mark. See Appendix C for the site team member titles and project responsibilities.

The desired site structures included heightened staff awareness of the problem, pain reassessment education, timed visual reminder tools already built into EPIC, and the availability of pain reassessment educational materials and policies. The desired site processes included

implementing the timed visual reminder as a more visible main screen icon in the RN flowsheet, ensuring adequate pain medication orders, and requiring pain reassessment and documentation for all PRN oral pain medications.

Five strategies achieved the project aims. The PL obtained formal written commitments from key partners to keep them accountable; gained staff buy-in by altering incentive structures, for 100% post-reassessment documentation; prepared champions to keep communication open with one-to-one meetings and shift huddles to discuss project progress; shared a summary of weekly chart audit data reports with staff and CSR; and set up online classes and in-person educational sessions on mandatory education day. The project timeline is shown in the Gantt Chart in Appendix D.

Measurement

The operational definition of the measure of intervention was the number of staff RNs who complete education sessions for a visual reminder tool in EPIC, the number of satisfaction scores of staff RNs who utilized the intervention in EPIC, and the number of pain reassessment and documentation attributed to a visual reminder tool in EPIC. The rationale for choosing measures was that education had a significant effect on staff to increase awareness of the importance of pain reassessment and documentation; the number of staff who utilized the intervention demonstrated the relationship between the intervention and the outcomes; staff satisfaction was important to assess for adherence and sustainability of the implementation in the future; and the number of pain reassessments and documentations defined the effectiveness of the intervention.

Unit policy required RNs to perform a pain assessment using two reliable and valid instruments for pain assessment: the Numerical Rating Scale (NRS), an eleven-point numeric pain scale that ranges from 0 to 10, for communicable adult patients, and the Multidimensional

Objective Pain Assessment Tool (MOPAT), a five-point pain scale, for noncommunicative patients (Lazaridou et al., 2018; Wiegand et al., 2018). The reliability of the outcome measures could be stronger, but the validity is strong. The results could be different and inconsistent based on staff decisions even though the intervention was reproduced under the same conditions. However, the measures accurately represented the intervention's efficacy and supported the outcome measures' strong validity.

The measurement plan and methods were the completion rates of in-person and online training before the project started; weekly chart audits on all staff RNs who completed pain reassessment and documentation within 60 minutes of post-PO pain medication administration by using a timed visual reminder tool, and staff survey to evaluate weekly staff satisfaction scores and the use of BRAIN as a default screen always (100%) to assist pain reassessment documentation during project implementation time frame. See Appendix E for the chart audit tool, Appendix F for the staff survey, Appendix G for the measurement plan, Appendix H for the fishbone analysis, and Appendix I & J for current and desired site process maps.

The common strategies to monitor contextual elements that were expected to contribute to success and failure were surveys, communication, and feedback methods from staff, champions, and leadership. A weekly chart audit was another important strategy to monitor contextual elements contributing to the efficiency of the intervention. Solid contextual elements, such as good teamwork, supportive leadership, and effective communication, were more encouraged for the success of the implementation of change and better patient outcomes.

Ethical Consideration

The project required an International Review Board (IRB) review at UMB to determine if the project was non-human subject research (NHSR) before implementation of the project. The submission date was July 23, 2023. In addition, the project required approval from the hospital,

which included submitting such required documentation as, contact information, project summary, resources utilized, Departmental Operational Review, and IRB designation as NHR. No risk of harm to the patient or staff was identified, and all data collected for the project was entered into the Research Education Database Capture (REDCap) application, a HIPAA-compliant database (Harris et al., 2019). Detailed information is listed in Appendix K for site ethics procedures and Appendix L for IRB determination of the review pathway. The PL disclosed that she is a staff RN at the project site.

Results

The chart audit measures were analyzed weekly and reported in a run chart to show the effectiveness of timed visual reminders for pain reassessment and documentation over the entire implementation period in Figure 2. The outcome data demonstrated that pain reassessment documentation within 60 minutes of administration by RNs occurred for 75.3% of all oral pain medication administration (699 out of 928) in the Neuro IMC over the 15 weeks. RNs completed 928 oral pain medication administrations. Thirty-eight pain reassessment documentation occurred between 1 and 19 minutes, which was too soon to determine the effectiveness of pain medications, and 32 pain medications given to patients for another purpose were eliminated. The data analysis revealed that the completion rate of pain reassessment and documentation within 60 minutes increased by 37.3%, compared to the fiscal year 2022 (FY22). During the project week 1-15, the range of the adherence rate was between 54.8% and 84.6%. The data findings demonstrated an upward trend on a run chart from 54.8% at week 1 to 84.6% at week 7, which indicated a dramatic change in the process. The adherence rate was slightly decreased to 79.6%, and 70.8% during the project weeks 8 and 9, respectively, and 80.9% and 75.3% during weeks 12 and 13, respectively. Overall, the adherence rate was increased during the project period.

All 24 staff RNs (100%) completed the pain reassessment documentation education sessions at the beginning of the implementation and weekly surveys to determine staff satisfaction over 15 weeks of the implementation period. All 24 staff RNs (100%) were satisfied with a timed visual reminder to assist with pain reassessment documentation in week 15 from 86.7% in week 1 in Figure 3. The staff survey revealed that 8 RNs (53.3%) set BRAIN as a default screen always (100%), 3 RNs (20%) for most of the time (75%), 2 RNs (13.3%) for sometimes, and 2 RNs (13.3%) for never in week 1 to assist pain reassessment documentation. In week 15, the staff survey revealed that 24 RNs (100%) set BRAIN as a default screen always (100%) to assist pain reassessment documentation.

The first three weeks showed slow changes in adopting and utilizing a timed visual reminder for pain reassessment and documentation as their routine documentation activity. Unit champions to keep communication open and shift huddles to discuss project progress and dissemination of weekly chart audit data reports with staff had a direct correlation with the improved outcomes. Good teamwork and supportive leadership had positive impacts on the success of the implementation of change and better outcomes.

Unintentional consequences and barriers to the implementation of the project were: (a) non-regular staff RNs, including supplemental RNs and pooled RNs from different units, who were not educated on the timed visual reminder; (b) new staff RNs started on the unit during the project week 8 and overwhelmed with a new job; (c) patients unavailable for tests and procedures when it was time for pain reassessment; (d) increased unit acuity; (e) leadership priority shift during JCAHO survey window, and (f) short implementation period, which had negative impacts on the outcome.

Two modifications to decrease these barriers were to develop an education package of pain reassessment and documentation in the preceptor binder in week 11 and create a reminder

icon/emoji displayed on bulletin boards behind each computer in the nursing station, staff breakroom, and staff bathroom that was visible to all staff RNs in week 5. The icon/emoji is in Figure 4.

Discussion

The key finding of the project is a timed visual reminder leading to an increased pain reassessment documentation rate. The project positively impacts staff RNs with high staff satisfaction with a pain reassessment tool, patients with better pain management, and facilities with improved patient satisfaction and outcomes. Adequate pain management is essential for the patient recovery and discharge process resulting in shortened length of hospital stays and reduced healthcare costs. The intervention is cost-effective because the timed visual reminder is already built in the EHR and does not require additional equipment, programs/systems, or changes for implementation. The average time that staff spent documenting with a timed visual reminder was less than 10 seconds, and no interference with nursing workflow was reported related to the intervention. Low to no-cost intervention has a higher chance of being adopted in the facility. Those positive findings of the intervention increase the potential for sustainability. The sustainability plan and efforts are continuing periodic chart audits, dissemination of performance feedback and outcome data to staff RNs, and education for staff, including in new hire/contract RNs orientation. The constant efforts to maintain implementation and modify limitations are pertinent to sustain the intervention. The project method and findings have the potential to be disseminated to other units to improve patient outcomes in the hospital.

The results with findings from the project are expected from a comparison of other publications. Evidence demonstrates that staff education, feedback methods, and reminder systems are essential strategies to succeed in quality improvement (QI) initiatives, and the project utilizes similar strategies, which lead to anticipated outcomes.

The limitation of the project was that this project was designed to address a specific clinical practice problem in the context of the Neuro IMC, involving the site workflow and resources, and populations served in this setting, making findings from this project non-generalizable to any setting or population outside of the Neuro IMC. The factor may have limited internal validity such as bias or imprecision in the project design, methods, measurement, or data and efforts made to minimize and adjust for limitations. This may be the reason for significant changes in outcomes in a short period of 3 months.

Conclusion

Fifteen weeks of data indicate that timed visual reminders within EPIC improve pain reassessment and timeliness of documentation rate by at least 75.3%. The results suggest that a timed visual reminder is useful for improving pain reassessment documentation and pain management on the clinical site. The strengths of the project are low-cost intervention and ease of participation in the intervention. The intervention is already present in EPIC and does not require additional systems or costs. The preset timer with timed visual reminders makes it easy for staff to be compliant with pain reassessment documentation. Improving pain reassessment documentation has a strong relationship with pain management and lowers the healthcare costs associated with pain and the length of hospitalization.

The positive outcomes from the project increase the likelihood to sustain and spread the project in practice. To sustain the intervention, weekly chart audits, periodic education for staff RNs, meetings with champions, and dissemination of data findings with staff RNs are pertinent factors of the practice change. With the unique clinical site characteristic of a lot of new hires and contract RNs, the educational materials will be included in new hire/contract RNs orientation to ensure all staff obtained standard education on pain reassessment documentation. Dissemination of the project methods and findings to other units is inevitable with its benefits.

The project findings suggest that timed visual reminders have significance in improving adherence to pain reassessment documentation promptly and overall pain management. Pain management has a positive association with patient satisfaction in healthcare facilities and hospital reimbursement because it is an important factor in promoting patient outcomes and quality of life. Adequate pain management facilitates a patient's condition, improves the quality of life, shortens the length of hospital stays (approximately \$3,000 per night in IMC unit), and reduces healthcare costs.

The project will be a good starting point for further QI initiatives for the unit and is limited to oral PRN pain medications. Future QI initiatives can be done with timed visual reminders being used for scheduled and IV pain medications or with different methods to remind staff, such as phone notification systems or reminders with flashlights in EPIC, to enhance reminder systems. Unit-specific modification of limitations from the project will be another QI initiative in the organization. Staff motivation and commitment to implement EBP to improve patient outcomes is a key to sustaining QI initiatives.

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Improving pain reassessment and documentation rates: A quality improvement project in a teaching hospital's emergency department. *Journal of Emergency Nursing*, 46(4), 505–510. <https://doi.org/10.1016/j.jen.2019.12.008>

Figure 1

The Promoting Action on Research Implementation in Health Services (PARiHS) Framework



(Li, 2017)

Figure 2

Run Chart Displaying Weekly Percentage of Pain Reassessment Documentation within 60 Minutes

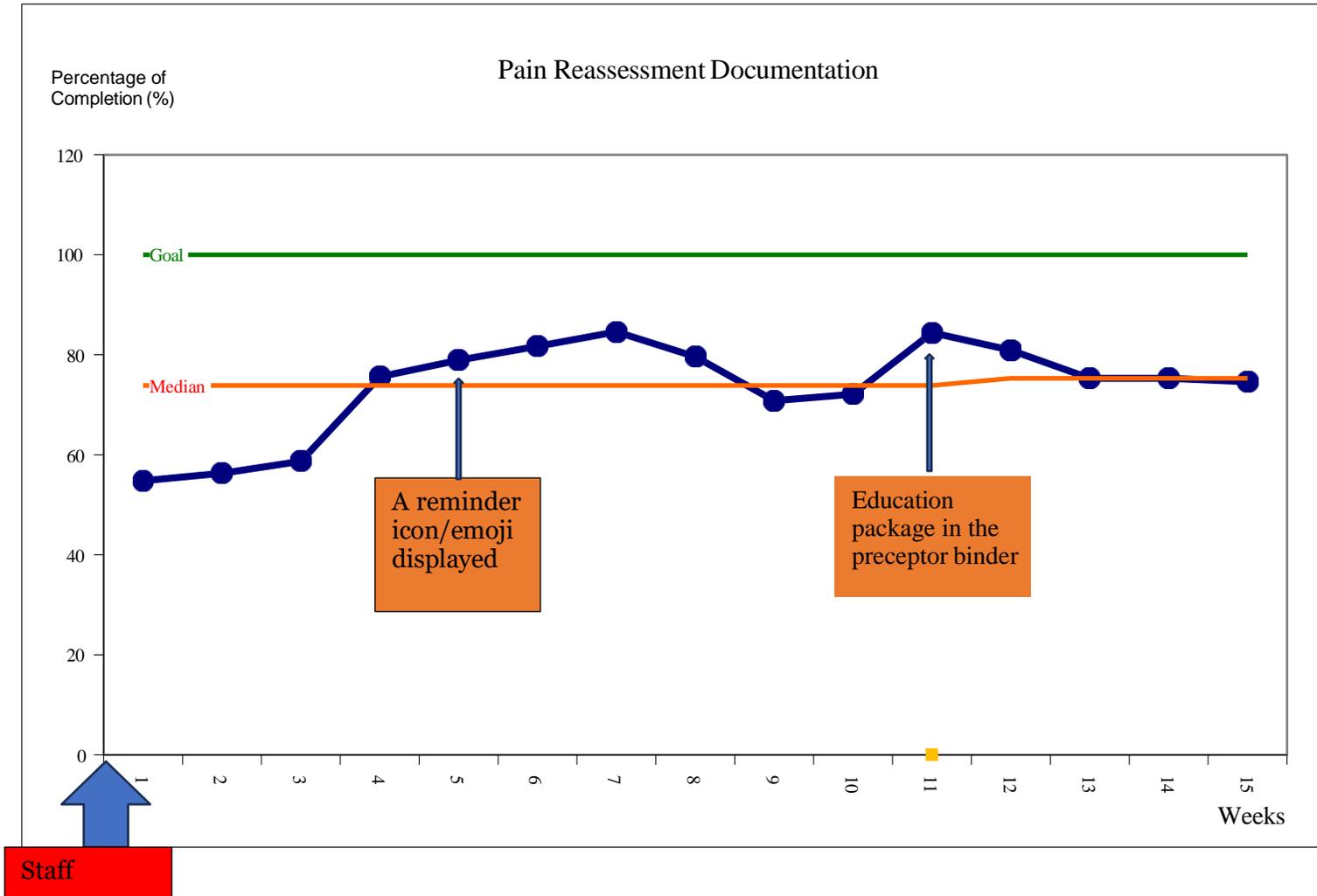


Figure 3

Run Chart Displaying Weekly Percentage of Staff Satisfaction with a Timed Visual Reminder

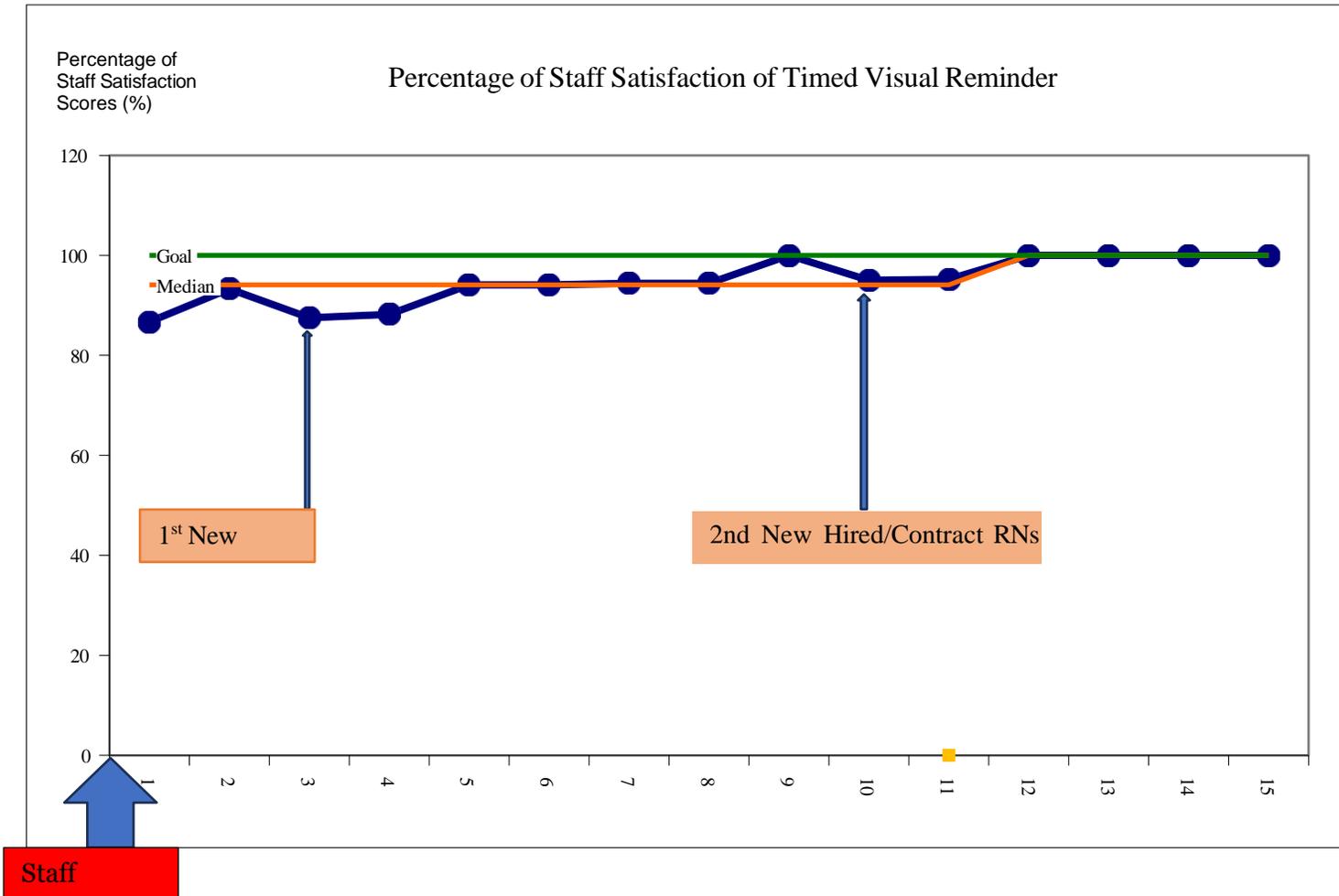


Figure 4

Pain Reassessment Visual Reminder Emoji Displayed in Bulletin Board to Remind Pain Reassessment and Documentation



Appendix A

Evidence Review Table

<p>Citation #1: Von How, N. G., Ahmad Khaldun, I., Siti Sarah, M. Z., & Ida Zarina, Z. (2018). Randomised controlled trial on the effectiveness of audible timed reminders for simulated serial pain score documentation in an emergency department. <i>Medicine & Health (Universiti Kebangsaan Malaysia)</i>, 13(2), 114–121. https://doi.org/10.17576/MH.2018.1302.11</p>					<p>Level and Quality</p> <p>IA</p>
Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>The purpose of the study is to document and compare the mean of documentation performance score (DPS), the variability of time intervals from giving medication to the documentation of the first pain score, and the time intervals of subsequent pain score observation between timer device group and control group and to determine user acceptance of timer device in pain score documentation based on utility, suitability, and preference.</p>	<p>Experimental study; Randomized controlled trial (RCT) study conducted in a simulated environment of an actual functioning ED.</p>	<p>Sampling Technique: Simple random and Convenience</p> <p>Eligible Participants: Staff nurses in ED with minimum qualification of Diploma in Nursing</p> <p>Setting: simulated environment of an actual functioning Emergency Department (ED)</p> <p>Excluded: potential participant with hearing impairment, less than 3 months experience in ED, and without consent</p> <p>Accepted: a total of 20 participants were randomly assigned to each group.</p> <p>Control: 10 participants without visual or audio aid. None were excluded from the study.</p>	<p>Control Protocol: Participants with the standard practice that did not utilize any visual or audio device.</p> <p>Intervention Protocol: Administration of audible alarms at set intervals.</p> <p>Treatment Fidelity (describe the protocol): Treatment fidelity was strong because all participants were briefed regarding the details of each task before the assessment, all participants in the intervention group were given the same instruction on the functions and operations of the timer device, and all participants required to record the time of assessment based on digital clock provided and the pain sore.</p>	<p>Dependent Variable (DV): Documentation performance score, achievement completeness of records, and overall mean of time in the minute between first pain score and serving analgesic</p> <p>DV Measure (measurement tool-reliability, time, procedure): The numeric pain score was used to rate pain. The DV was measured through documentation performance score completed within one hour. Wilcoxon/Mann-Whitney Test showed that the median time intervals for the pain score group were 15 minutes.</p>	<p>Statistical Results: The mean documentation performance score in the timer device group was 94.45% versus 72.22% in the control group ($p < 0.05$). The Fisher’s Exact test failed to show a significant difference in achievement completeness of records ($p = 0.141$) and overall mean of time in the minute between the first pain score and serving analgesic ($p = 0.892$).</p> <p>Clinical significance: The study showed adequate power, Alpha, and strong intervention fidelity representing the significance of the study statistically. The documentation performance score in intervention groups was significant in this study. The limitation of the study could be a small sample size in a simulated ED environment.</p> <p>Conclusions: The researcher concluded that the study demonstrated the addition of</p>

		<p>Intervention: 10 participants with a timer device. None were excluded from the study.</p> <p>Power Analysis/Achieved: Power of 80% and 95% of significance level resulting in 10 subjects per arm. The significance of the study on the mean documentation performance score in the timer device group versus in the control group was $p < 0.05$. Power analysis achieved that reduced Type II error.</p> <p>Group Homogeneity: Intervention/Control homogenous group based on p values of patient's baseline demographics and clinical characteristics in Table 1. There was no significant difference between the two groups with patient's demo and clinical characteristics, which were age, nursing experience, ED experience, and PPUKM experience during the study period.</p>			<p>a timer device had the advantage to improve documentation performance score and subsequently the serial pain score documentation in ED. The result showed that 90% agreed that a timer device helps to improve pain score documentation and 80% preferred to have a timer device in pain score documentation.</p>
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<p>Citation #2: Wissman, K. M., Cassidy, E., D, A. F., Hoy, C., Vissari, T., & Baumgartner, M. (2020). Improving pain reassessment and documentation rates: A quality improvement project in a teaching hospital’s emergency department. <i>Journal of Emergency Nursing</i>, 46(4), 505–510. https://doi-org/10.1016/j.jen.2019.12.008</p>					<p>Level and Quality</p> <p>IIB</p>
Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>The purpose of the study is to improve pain score reassessment rates in ED patients who were discharged with extremity pain.</p>	<p>Quasi-Experimental Design (Pre-post interventional design).</p>	<p>Sampling Technique: Simple random and Convenience</p> <p>Eligible Participants: All ED nurses who were employed during all 3-month project periods were included.</p> <p>Setting: A community teaching hospital ED over the 8 months (09/2018-04/2019).</p> <p>Excluded: No exclusion criteria indicated.</p> <p>Accepted: A total of 37 nurses were employed in ED during the study period.</p> <p>Control: No chart audits and newsletter communication regarding pain reassessment documentation.</p> <p>Intervention: Chart audits and newsletter communication regarding pain reassessment</p>	<p>Control Protocol: Participants with standard practice without reinforcement of pain reassessment documentation.</p> <p>Intervention Protocol: Six focus groups with an average of 3 nurses in attendance per group were completed to identify nursing barriers and provide education on the importance of pain reassessment to improve pain management, daily audits were conducted to communicate positive reinforcement and constructive feedback to individual nurses, and weekly newsletters provided a source of ongoing education and continuous staff feedback on the department-wide rates of pain reassessments.</p> <p>Treatment Fidelity (describe the protocol): Daily audits of pain reassessment and documentation rates for individual nurses placed, and a weekly newsletter was created and reported the ED pain reassessment and documentation rates.</p>	<p>Dependent Variable (DV): Pain reassessment and documentation rates.</p> <p>DV Measure (measurement tool-reliability, time, procedure): The pain reassessment and documentation time requirements were determined by the health system’s pain assessment and reassessment policy. The DV was measured through descriptive measures to describe the basic statistics. Every chart by each ED nurse who assessed patients in the ED was examined for the reassessment of pain after an analgesic medication was administered, and the reassessment of pain (yes or no) was the unit of measure in this project. A generalized estimating equation is an approach for analyzing repeated measures over time.</p>	<p>Statistical Results: Baseline pain score reassessment and documentation rates were 36.2% (95% confidence interval, 30.3%-42.3%) in the ED. Pain reassessment and documentation rates increased to 62.3% 95% (CI, 56.8%-67.6%) during the 3-month post-intervention period.</p> <p>Conclusions: The researcher concluded that the study demonstrated that pain reassessment and documentation rates increased by 26% from the preintervention period to the postintervention period.</p>

		documentation. Power Analysis/Achieved: The study did not indicate power analysis. The significance of the tests for all outcomes in the study was demonstrated by using an alpha of 0.05 so that a Type II error could not occur. Group Homogeneity: The study did not indicate homogeneity of the study.			
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Citation #3: Hogan, T. M., Howell, M. D., Cursio, J. F., Wong, A., & Dale, W. (2016). Improving pain relief in elder patients (I-PREP): An emergency department education and quality intervention. <i>Journal of the American Geriatrics Society</i> , 64(12), 2566–2571. https://doi.org/10.1111/jgs.14377					Level and Quality
					IIB
Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>The purpose of the study is to assess the effectiveness of a novel combined education and quality improvement (QI) program for the management of pain in older adults in the emergency department (ED).</p> <p>The goal was to achieve a final pain score of 4 or less in 80% of individuals aged 65 and older</p>	<p>Quasi-Experimental design; Controlled pre- and post-intervention design; Prospective cohort study</p>	<p>Sampling Technique: Convenience</p> <p>Eligible Participants: Staff taking care of individuals aged 65 and older experiencing moderate to severe pain in ED.</p> <p>Setting: An academic urban ED seeing 60,000 adult visits annually.</p> <p>Excluded: No exclusion criteria indicated.</p>	<p>Control Protocol: Participants with standard practice without</p> <p>Intervention Protocol: A novel combined education and quality improvement (QI) program for the management of pain in older adults in the emergency department (ED).</p> <p>Treatment Fidelity (describe the protocol): Nurse education occurred one on one or in small groups, and physician and APN instruction occurred in faculty meetings and conferences. 80% of staff</p>	<p>Dependent Variable (DV): Percentage receiving and time to pain assessment and reassessment, the percentage receiving and time to delivery of analgesic, and pain intensity.</p> <p>DV Measure: The DV was measured by tracking percentages of participants receiving analgesics and undergoing pain reassessment, delay from initial assessment to analgesic receipt, and delay from analgesic receipt to reassessment. Weekly EMR reports detailed ED staff performance on the timing of</p>	<p>Statistical Results: Pain reassessments increased significantly (from 51.9% to 82.5%, $P < .001$). After the intervention, patients had 3.1 (95% CI = 2.1–4.4, $P < .001$) greater odds of receiving analgesics and 4.7 (95% CI = 3.5–6.5, $P < .001$) greater odds of documented pain reassessment. The percentage of patients with a final pain score of 4 or less (out of 10) increased by 47.5% (95% CI = 41.8–53.2%). The median decrease in pain intensity improved significantly, from 0.0 to 5.0 points ($P < .001$),</p>

<p>within 12 months of implementation.</p>		<p>Accepted: 14 attending physicians, 2 advanced practice nurses (APNs), and 86 RNs.</p> <p>Control: The preintervention cohort was identified from the review of all electronic medical records (EMRs) from ED encounters from 01/2012 to 12/2012.</p> <p>Intervention: Linked standardized education, EMR tools including an alert banner for pain reassessment, and continuous QI techniques, emphasizing how ED staff performance would be measured and listing expected performance targets. for multidisciplinary staff in an urban, academic ED from 01/2012 to 01/2014.</p> <p>Power Analysis/Achieved: The study did not indicate power analysis. The significance of the tests for all outcomes in the study was demonstrated by using an alpha of 0.05 so that a Type II error could not occur.</p>	<p>had completed education by 04/01/2013. Education was lined with multimodal QI methods, monitoring, and feedback. Discipline-specific pocket cards were created and distributed for nurse pain assessment and reassessment, including standard scrips and best practices, and for physicians linking pain intensity to analgesic choices and recommending the age-adjusted right drug at the right dose. At monthly staff meetings, education was reemphasized and linked with performance metrics and outcomes, questions were answered, high performers shared success stories and low performers received advice and encouragement. In EMR, best practice alerts were displayed when patients required assessment, reassessment, or analgesics. If pain was not reassessed within 1 hour after oral analgesic administration or 30 minutes after parenteral analgesic administration, an alert appeared and flashed until a pain reassessment was entered. Pain scores of 4 or greater prompted an alert that flashed until an analgesic was ordered or the alert was dismissed.</p>	<p>assessments and reassessments and analgesic administration, associating these metrics with pain scores.</p>	<p>the and median final pain score decreased from 7.0 to 4.0 points (P <.001). The percentage of participants with any pain improvement increased by 43.7% (95% CI = 37.1–50.3%, P<.001). The percentage receiving analgesics increased significantly (from 64.1% to 84.8%, P<.001).</p> <p>Conclusions: The researcher concluded that the study demonstrated significant reductions in pain intensity were achieved, the timing of pain assessments and reassessments was improved, and analgesics were delivered faster. Tightly linking education to targeted QI improved pain management of older adults in the ED. The I-PREP intervention substantially improved pain management in older adults in the ED with moderate to severe musculoskeletal or abdominal pain.</p>
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		<p>Group Homogeneity: Descriptive statistics were calculated to compare the baseline characteristics of the cohorts, including age, sex, race, and education categories. Group homogenous group based on p values no significant difference between two groups.</p>			
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<p>Citation #4: Shah, S., Yeheskel, A., Hossain, A., Kerr, J., Young, K., Shakik, S., Nichols, J., & Yu, C. (2021). The impact of guideline integration into electronic medical records on outcomes for patients with diabetes: A systematic review. <i>The American Journal of Medicine</i>, 134(8), 952–962. https://doi-org/10.1016/j.amjmed.2021.03.004</p>					<p>Level and Quality III A</p>
<p>Purpose or Hypothesis</p>	<p>Type of Evidence and Research Design</p>	<p>Sample (population, size, setting)</p>	<p>Intervention Procedures</p>	<p>Primary Outcome/Measures</p>	<p>Results Conclusions</p>
<p>The purpose of the study is to improve clinical and process outcomes by implementing combinations of electronic medical record interventions including reminders, feedback, and clinical decision support systems.</p>	<p>A systematic review (SR) of a combination of RCTs, quasi-experimental and nonexperimental studies with meta-analyses.</p>	<p>Search Strategy: Four databases were searched, including CINAHL, MEDLINE, PubMed, and Cochrane Library, in August 2016, November 2017, and June 2020. A search strategy was developed for key terms: “electronic health records,” “practice guidelines,” AND “ambulatory care.”</p> <p>Eligible Studies: All study designs that investigated the integration of diabetes guidelines into electronic records. 15,783 records.</p>	<p>Control Protocol: N/A Intervention Protocol: Six studies implemented reminders/prompts, 1 implemented feedback, 4 implemented a Clinical Decision Support System, and 10 implemented combinations of interventions.</p> <p>Treatment Fidelity: Not applicable to SR</p>	<p>Dependent Variable (DV): Clinical outcomes including dyslipidemia and hypertension control and glycemic control. Process-related outcomes include microvascular complications screening, immunization status, and documentation of body mass index, smoking history, family history, and risk score for coronary disease. Physician compliance to guideline recommendations.</p> <p>DV Measure: The DV was measured through documentation of lipid profile, blood pressure, and glycemic control, documentation of CAD risk score and medication prescription, physician compliance with guideline</p>	<p>Level of Measurement: Descriptive analysis of publications due to heterogeneity among the study design and results.</p> <p>Outcome Data Retrieval: Data was obtained from all studies included in the SR.</p> <p>Conclusions: The researcher concluded that the studies demonstrated improvement in monitoring and attainment of guideline and screening targets with a combination of electronic record intervention strategies. Thus, strategies employing combinations of interventions to incorporate guidelines into electronic</p>

		<p>Excluded: Ongoing Studies, describe no relevant outcomes, or lack of detail to assess eligibility. 15,762 studies were excluded.</p> <p>Included: English-language primary research articles; ambulatory care interventions; electronic record-integrated intervention; and quantitative outcomes. All studies were conducted in primary care settings between 1994 and 2020. Fourteen studies were conducted in the U.S. study durations ranged from 2 months to 12 years and sample sizes ranged from 90 to 4,629,300 participants. 21 studies were included.</p> <p>PRISMA: Included to describe studies obtained in the search strategy with steps for exclusions and inclusions of the study.</p> <p>Power Analysis/Achieved: Not applicable.</p>		<p>recommendation, and screening for microvascular complication.</p>	<p>records may improve processes of care and some clinical outcomes.</p>
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F. (2019). Impact of audit and feedback with action implementation toolbox on improving ICU pain management: Cluster-randomised controlled trial. <i>BMJ Quality & Safety</i> , 28(12), 1007–1015. https://doi-org/10.1136/bmjqs-2019-009588					IA
Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>The purpose of the study is to assess the impact of adding an action implementation toolbox to an electronic audit and feedback intervention targeting the quality of pain management in intensive care units (ICUs).</p>	<p>Experimental study; two-armed cluster randomized controlled trial design using block randomization.</p>	<p>Sampling Technique: Sampling Convenience.</p> <p>Eligible Participants: All 82 ICUs that participated in the NICE registration by telephone and email participated in the trial between January 2016 and November 2017. ICUs were eligible to participate in the trial if they were willing and able to submit the data items needed to calculate the newly developed pain management indicators monthly in addition to their regular data upload.</p> <p>Setting: 82 adult ICUs among 120 hospitals in the Netherlands that send monthly data to the Dutch National Intensive Care Evaluation (NICE) registry.</p> <p>Excluded: Individual patients were excluded if they were delirious, comatose, or had a Glasgow coma score <8 because the pain</p>	<p>Control Protocol: Feedback only.</p> <p>Intervention Protocol: Feedback with the toolbox.</p> <p>A regression analysis for the primary and each of the four secondary outcomes, including data until 3 months before the study started for pre-intervention data.</p> <p>Treatment Fidelity (describe the protocol): Treatment fidelity was strong based on a detailed action implementation description combining evidence from literature and guideline and knowledge from ICU experts. Each participating ICU provided opportunities to receive an educational outreach visit at the beginning of the study period to explain the dashboard, the action plan, and the toolbox when applicable, to ensure the intervention was implemented as intended. All members of the quality improvement team had access to the online dashboard.</p>	<p>Dependent Variable (DV): Adequate pain management.</p> <p>DV Measure: The DV was measured through pain each shift. Pain assessment at least once per patient in each shift and re-measuring unacceptable pain scores within 1 hour and two outcome indicators including acceptable pain scores and unacceptable pain scores normalized within 1 hour. Pain management was considered adequate if, for a specific patient during a specific shift (night, day, or evening), the pain was measured at least once and no unacceptable pain scores were observed, or unacceptable pain scores were followed up with re-measurement and normalization within 1 hour. The pain was measured with VAS or NRS in patients able to self-report, or with BPS or CPOT in ventilated or sedated patients and defined as acceptable or normalized when VAS/NRS<4, CPOT<3 and BPS<6, and unacceptable when VAS/NRS≥4, CPOT≥3 and BPS≥6.</p>	<p>Statistical Results: The absolute increase over 6 months in the proportion of patient shifts with adequate pain management was 14.8% (95% CI 14.0% to 15.5%) in the feedback-with-toolbox group and 4.8% (95% CI 4.2% to 5.5%) in the feedback-only group. In both groups, a significant increase in the proportion of patient- shifts with adequate pain management compared with the pre-intervention period was observed at 1.13 (95% CI 1.06 to 1.22) and 1.04 (95 % CI 1.00 to 1.09) for the feedback-with-toolbox and feedback-only group, respectively). The feedback-with-toolbox group improved significantly more than the feedback-only group (p=0.049). The improvement in the two outcome indicators, the proportion of patient-shift with at least one pain measurement and the proportion of patient-shift with unacceptable pain where the pain was re-measured within 1 hour was not statistically significant (15.6% with 95% CI 14.9% to 16.3% and 10.4% with</p>

		<p>measurement instruments were not valid to use in these patient groups. 61 participants were excluded due to not being able to submit pain management data (n=46) and not being interested (n=15).</p> <p>Accepted: Twenty-one Dutch ICUs with a total of 253,530 patient-shift observations for pain measurement were analyzed.</p> <p>Control: 11 ICUs were randomized to the feedback-only group.</p> <p>Intervention: 10 ICUs were randomized to the feedback-with-toolbox.</p> <p>Power Analysis/Achieved: 24 ICUs with an average cluster size of 600 patient-shift observations in 6 months to have 80% power to detect a significant difference in the performance between the feedback-only and feedback-with-toolbox group of 10% (with a two-sided unpaired t-test with</p>			<p>95% CI 8.4% to 12.5%, respectively). ICUs with the toolbox achieved improvements on all four indicators compared with the feedback-only ICUs, but they only achieved significantly larger improvement in measuring pain each shift (p<0.001).</p> <p>Conclusions: The researcher concluded that the study demonstrated improvement inadequate pain management in the feedback-with-toolbox group compared with feedback alone.</p>
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		<p>$\alpha=0.05$).</p> <p>Group Homogeneity: Intervention/Control homogenous group based on the characteristics of the participating ICUs and patients in Table 2. However, there was no p-value indicated.</p>			
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Citation #6: Dang, H., & Stafseth, S. K. (2023). Documentation for assessing pain in postoperative pain management pre-and post-intervention. <i>Journal of PeriAnesthesia Nursing</i> , 38(1), 88–95. https://doi-org/10.1016/j.jopan.2022.05.079					Level and Quality
					IIA
Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>The purpose of the study is to investigate whether an educational intervention can increase nurses' documentation of postoperative pain assessments, alter patients' opioid consumption, and ensure that patients have at least one documented Numeric Rating Scale (NRS) ≤ 3 at rest before being discharged. A secondary aim was to investigate whether the nurses' education and experience influenced their pain assessments.</p>	<p>Quasi-Experimental study; Observational study with a pre-post design.</p>	<p>Sampling Technique: Sampling Convenience.</p> <p>Eligible Participants: All eligible patients 18 to 100 years old receiving general anesthesia during abdominal, gynecological, orthopedic, plastic, or urological surgery.</p> <p>Setting: A large educational hospital specializing in the care of patients with cancer. The postoperative/intensive care unit has 14 beds of revert and short-time intensive care. The nursing staff comprised 36 nurses; 13 RN, 19 had a postgraduate</p>	<p>Control Protocol: Standard practice</p> <p>Intervention Protocol: Educational intervention, 45-minute teaching sessions within two weeks, addressed validated pain assessment tools and the documentation of pain assessment. Paper reminders for pain assessment for 4 weeks period.</p> <p>Treatment Fidelity: Treatment fidelity was weak based on interventional description using various pain assessment tools and no inclusion criteria were indicated in the study.</p>	<p>Dependent Variable (DV): Nurses' documentation of postoperative pain assessments, opioid consumption, and documentation of Numeric Rating Scale (NRS) ≤ 3 at rest before being discharged.</p> <p>DV Measure: The DV was measured through the Numerical Rating Scale (NRS), the Behavioral Pain Scale (BPS), the Critical Care Pain Observation Tool (CPOT), and Face Legs Activity Cry Consolability (FLACC).</p>	<p>Statistical Results: Descriptive frequency analysis and partial correlation with Pearson's r - value were used, with $P < 0.05$ indicating significance. Overall, the use of assessment tools increased from 6.1% to 25.8%, opioid consumption increased in mean from 3.34 to 4.79 milligrams and the documentation at discharge increased from 81.4% to 91.4%. The documentation of nurses with more than 10 years of experience in the unit especially improved from 17.5% to 31.7%. By partial correlation between documented pain assessments and the nurses' education of pain assessment tools revealed</p>

		<p>degree in intensive care, and the remaining 4 were specialists in oncology, anesthesia, or midwifery.</p> <p>Excluded: Patients who had received epidural, spinal, or various nerve blockades or lidocaine – infusion as pain relief in the postoperative unit.</p> <p>Accepted: 304 patients undergoing cancer surgeries in a postoperative unit in 14 weeks from November 2020 to February 2021.</p> <p>Control: N/A.</p> <p>Intervention: N/A.</p> <p>Power Analysis/Achieved: The study did not indicate power analysis. The significance of the tests for all outcomes in the study was demonstrated by using an alpha of 0.05 so that a Type II error could not occur.</p> <p>Group Homogeneity: Characteristics of the study population were indicated in Table 1, but homogeneity was unable to be determined</p>			<p>that nurses’ education did have a significant influence by Pearson’s $r=0.198$ and $p=0.008$.</p> <p>Conclusions: The researcher concluded that the study demonstrated improvement in nurses’ documentation of postoperative pain management and documentation at discharge by educational intervention and reminders about basic systematic pain assessment and the evaluation of pain measures.</p>
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		due to a lack of p values of the patient’s baseline demographics and clinical characteristics.			
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<p>Citation #7: Ista, E., van Dijk, M., & van Achterberg, T. (2013). Do implementation strategies increase adherence to pain assessment in hospitals? A systematic review. <i>International Journal of Nursing Studies</i>, 50(4), 552–568. https://doi-org/10.1016/j.ijnurstu.2012.11.003</p>					<p>Level and Quality</p> <p>IIA</p>
Purpose or Hypothesis	Type of Evidence and Research Design	Sample (population, size, setting)	Intervention Procedures	Primary Outcome/Measures	Results Conclusions
<p>The purpose of the study is to review the comparative evidence for implementation strategies aiming to improve nurses’ adherence to pain assessment recommendations in hospitalized patients.</p>	<p>Systematic Review (SR) is a combination of RCTs and quasi-experimental studies using the narrative method.</p>	<p>Search Strategy: The databases used to search relevant studies were PubMed (Medline), Embase, CINAHL, and Cochrane library from 1990 to May 2022 using the following search terms or equivalent index terms and free-text words for each of the different databases: “nurs*” AND “compliance OR adherence” AND “pain assessment, pain measurement” AND “implementation OR knowledge transfer OR quality improvement” Not limited by the language of publication.</p> <p>Eligible Studies: 57 articles were eligible based on abstract and title selection.</p> <p>Excluded: 34 studies were excluded due to the setting outside</p>	<p>Control Protocol: Standard practice.</p> <p>Intervention Protocol: Guideline recommendations; protocol or program for pain management; a new assessment tool used to document pain scores, algorithms, and new guidelines; practice and policy change for pain assessment; education and nurse feedback.</p> <p>Treatment Fidelity: Treatment fidelity was strong because there was a detailed description of the SR process in the study. The study indicated inclusion and exclusion criteria and the duration of the study.</p>	<p>Dependent Variable (DV): Improving nurses’ adherence to pain assessment recommendations from two weeks and six months post-implementation.</p> <p>DV Measure: The DV data were extracted from all studies included in a systematic review by one member of the review team. The outcomes that were considered were adherence rates (percentages) for all types of pain assessment including assessment and reassessment after treatment intervention and pain intensity or treatment effects before and after implementation. Measurements were taken by the authors between two weeks and six months after the strategies were initiated.</p>	<p>Level of Measurement: Narrative synthesis due to different definitions of adherence rates; unable to pool of effects sizes; heterogeneity of implementation strategies, outcomes, and participants.</p> <p>Outcome Data Retrieval: Review team extracted data from all included studies.</p> <p>Analysis: N/A</p> <p>Conclusions: Based on SR, the researcher concluded that the study demonstrated implementation strategies, such as education, feedback, and reminders, used to improve nurses’ adherence to pain assessment. After strategies were implemented, the absolute adherence rates improved compared to the before measurement by 9% up to 49%.</p> <p>SR Bias Risk: Bias risk is moderate due to the low</p>

		<p>hospital, adherence rates not documented before and after implementation activities, and/or for intervention or control groups.</p> <p>Accepted: 23 studies to include RCTs, CRCTs, quasi-experimental studies, CBAs, ITS, before-after studies without a control group, and comparative studies with historical controls.</p> <p>PRISMA: Included to describe studies obtained in the search strategy with steps for exclusions and inclusions of the study.</p> <p>Power Analysis: Not applicable.</p> <p>Homogeneity: The heterogeneity of the implementation strategies used prevented authors from recommending one strategy that was preferred.</p>			<p>quality of studies used.</p>
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Appendix B

Evidence Synthesis Table

Project Title: Visual Reminders to Improve Post-Pain Medication Reassessment and Documentation			
JHNEBP Model Level	Total Number of Sources	Author and Quality Rating of each study	Synthesis of Findings
<p>Level I Experimental study · Randomized Controlled Trial (RCT) · Systematic review of RCTs with or without meta-analysis</p>	<p>2 RCTs (Von How et al.; Roos-Blom et al.)</p>	<p>IA: Von How et al., 2018 IA: Roos-Blom et al., 2019</p>	<p>A randomized controlled trial (RCT) study conducted by Von How et al. (2018) demonstrated that the addition of a timer device improved the pain documentation performance score and subsequently the serial pain score documentation in ED. A cluster randomized controlled trial study by Roos-Blom et al. (2019) demonstrated improvement in adequate pain management in the feedback-with-toolbox group compared with feedback alone. The results are consistent and generalizable in all two studies. Those studies have sufficient sample sizes for the study design and definitive conclusions.</p>
<p>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</p>	<p>3 Quasi-Experimental design (Wissman et al.; Hogan et al.; Dang and Stafseth)</p> <p>1 Systematic review conducted (Ista et al.)</p>	<p>IIB: Wissman et al., 2020 IIB: Hogan et al., 2016 IIA: Dang and Stafseth, 2023 IIA: Ista et al., 2013</p>	<p>A quasi-experimental design with pre- and post-intervention conducted by Wissman et al. (2020) demonstrate that pain reassessment and documentation rates increased by 26% from the preintervention period to the postintervention period. The author used interventions, such as chart audits and newsletter communication regarding pain reassessment documentation. Another Quasi-Experimental prospective cohort study conducted by Hogan et al. (2016) demonstrated significant reductions in pain intensity were achieved, the timing of pain assessments and reassessments was improved, and analgesics were delivered faster with the intervention of linked standardized education, EMR tools including an alert banner for pain reassessment, and continuous QI techniques. Quasi-Experimental observational study with pre- and post-intervention conducted by Dang and Stafseth (2023) demonstrated improvement in nurses' documentation of postoperative pain management and documentation at discharge by educational intervention and reminders about basic systematic pain assessment and the evaluation of pain measures. A systematic review conducted by Ista et al. (2013) demonstrated implementation strategies, such as education, feedback, and reminders, used to improve nurses' adherence to pain assessment.</p>

			All four studies are high/good quality because the studies evaluate the quality of data with reliable techniques and have consistent results.
Level III Non-experimental study · Systematic review of a combination of RCTs, quasi-experimental, and non-experimental studies, or non-experimental studies only, with or without meta-analysis · Qualitative study or systematic review of qualitative studies with or without meta-synthesis	1 Systematic review (SR) of a combination of RCTs, quasi-experimental and nonexperimental studies (Shah et al.)	III A: Shah et al., 2021	A systematic review (SR) of a combination of RCTs, quasi-experimental and nonexperimental studies conducted by Shah et al. (2021) demonstrates improvement in monitoring and attainment of guideline and screening targets, processes of care, and clinical outcomes with a combination of interventions to incorporate guidelines into electronic record intervention strategies. The study describes the specific techniques used to evaluate the quality of the data, reasonably consistent results, and a fairly definitive conclusion.
Level IV Opinion of respected authorities and/or reports of nationally recognized expert committees/consensus panels based on scientific evidence			
Level V Evidence obtained from literature reviews, quality improvement, program evaluation, financial evaluation, or case reports · Opinion of nationally recognized expert(s) based on experiential evidence			
Overall Quality Rating w/rational and Recommendation:			
Recommendations Based on Evidence Synthesis			
<ul style="list-style-type: none"> • Strong, compelling evidence, consistent results: solid indication for a practice change. • Good and consistent evidence – practice change • Good but conflicting evidence: questionable indication for practice change; consider risk/benefit analysis • Little or no evidence: no indication for practice change 			

Appendix C

Site Team Table

Team Member Title	Responsibilities
1. <i>Nurse Manager</i>	<ul style="list-style-type: none"> • Guide and support the project from concept to completion within the context of the project site • Collaborate on the recruitment of project team members/stakeholders • Advocate and assist in problem-solving and barrier management • Advise feasibility and sustainability of the project • Assist required approvals in the organization • Provide constructive feedback throughout the project
2. <i>Director of Nursing (Surgery)</i>	<ul style="list-style-type: none"> • Project approval process and Project oversight
3. <i>Clinical Educator</i>	<ul style="list-style-type: none"> • Support the project and assist with recruitment outside of the unit (e.g. NPIC committee) • Advise resources and system navigation that is feasible for the clinical site • Collaborate on creating education tools/materials to staff in-person and online module • Provide constructive feedback throughout the project
4. <i>Senior Clinical Nurse</i>	<ul style="list-style-type: none"> • Help audit and collect data • Monitor implementation progress by sharing

	<p>data with the student and unit</p> <ul style="list-style-type: none"> • Provide constructive feedback throughout the project
<p>5. <i>Information Technology Personnel & EPIC super user</i></p>	<ul style="list-style-type: none"> • Assist technology needs • Advise feasible, creation, and/or up to date unit based visual reminders in epic
<p>6. <i>Staff Nurse/Unit Champions</i></p>	<ul style="list-style-type: none"> • Lead the practice change on the unit, encourage staff to participate in the project, and reduce the resistance to the practice change • AM and PM champions are available for staff to install visual reminders and provide necessary education/resources • Assist with the weekly audit process • Provide feedback during the implementation period

Appendix D

Gantt Chart for Visual Reminders to Improve Post-Pain Medication Reassessment and Documentation

DNP Project Title: Visual Reminders to Improve Post Pain Medication Reassessment and Documentation

Student: Jane Choi

Project Start: Mon, 1/23/2023

Project Site: UMMC - Neuro IMC

Display Week: 1

Jan 23, 2023	Mar 10, 2023	Jun 16, 2023	Sep 22, 2023	Oct 12, 2023	Oct 19, 2023	Oct 26, 2023	Nov 2, 2023
23 24 25 26 27 10 24	10 24 7 21 5 19 2	16 30 14 28 11 25 8	22 6 7 8 9 10 11	12 13 14 15 16 17 18	19 20 21 22 23 24 25	26 27 28 29 30 31 1	2 3 4 5 6 7 8

Project Identification (NDNP810)	Responsible	START	END																												
Start of Spring Term		1/23/23																													
CITI (enter renewal date as end)	Jane Choi	5/8/20	5/8/23																												
HIPAA (enter renewal date as end)	Jane Choi	1/30/23	1/30/24																												
Mobilize - Identify stakeholders/team to support the project: CSR, clinical educator, SCN II, IT staff, unit champions, and nursing staff on the unit	Jane Choi	1/1/23	1/30/23																												
Identify roles/responsibilities of stakeholders/team members	Jane Choi	1/1/23	1/30/23																												
Context Assessment - Identify practice problem of low rates of pain reassessment and documentation on the unit and the main root cause of inadequate staffing with heavy workloads/task-oriented work process	Jane Choi	1/1/23	1/30/23																												
Fishbone assessment	Jane Choi	1/1/23	1/30/23																												
Identify site structures, process, and outcomes assessed with process maps and project structure, process, and outcome goals to improve pain reassessment and documentation	Jane Choi	1/30/23	2/13/23																												
Synthesize Evidence and construct synthesis table to reflect consistency of evidence to support a practice change for the population	Jane Choi	1/30/23	2/13/23																												
Development project planned actions, including providing education sessions and online modules, sharing audit and feedback, and sending weekly email with project reminders, to advance the project intervention	Jane Choi	2/13/23	3/13/23																												
MILESTONE: Submit project proposal	Jane Choi	3/13/23	4/3/23																												
Site IRB Inquiry	Jane Choi	1/23/23	4/24/23																												
REDCap - obtain access and practice software to create auditing tools and survey data collection tools	Jane Choi	1/23/23	3/13/23																												
End of Spring Term			5/17/23																												

Appendix E

REDCap Project Audit Tool

Pain reassessment and documentation
Page 1

Pain Reassessment Audit Tool

Project ID _____

MRN _____

Project Week 1
 2
 3
 4
 5
 6
 7
 8
 9
 10
 11
 12
 13
 14
 15

Initial pain score before administering PRN PO pain medications 0
 1
 2
 3
 4
 5
 6
 7
 8
 9
 10

Pain reassessment completed within 60 minutes after PRN PO pain medications Yes
 No

Appendix F

Project Staff Survey Tool

Pain Reassessment and Documentation

Q. Do you complete pain reassessment and documentation education sessions?

Yes

No

Q. How often do you currently use “BRAIN” as your default screen?

Always (100%)

Most of the time (75%)

Sometimes (50%)

Rarely (25%)

Never (0%)

Q. Are you satisfied with a timed visual reminder to assist with pain reassessment and documentation?

Yes

No

Appendix G

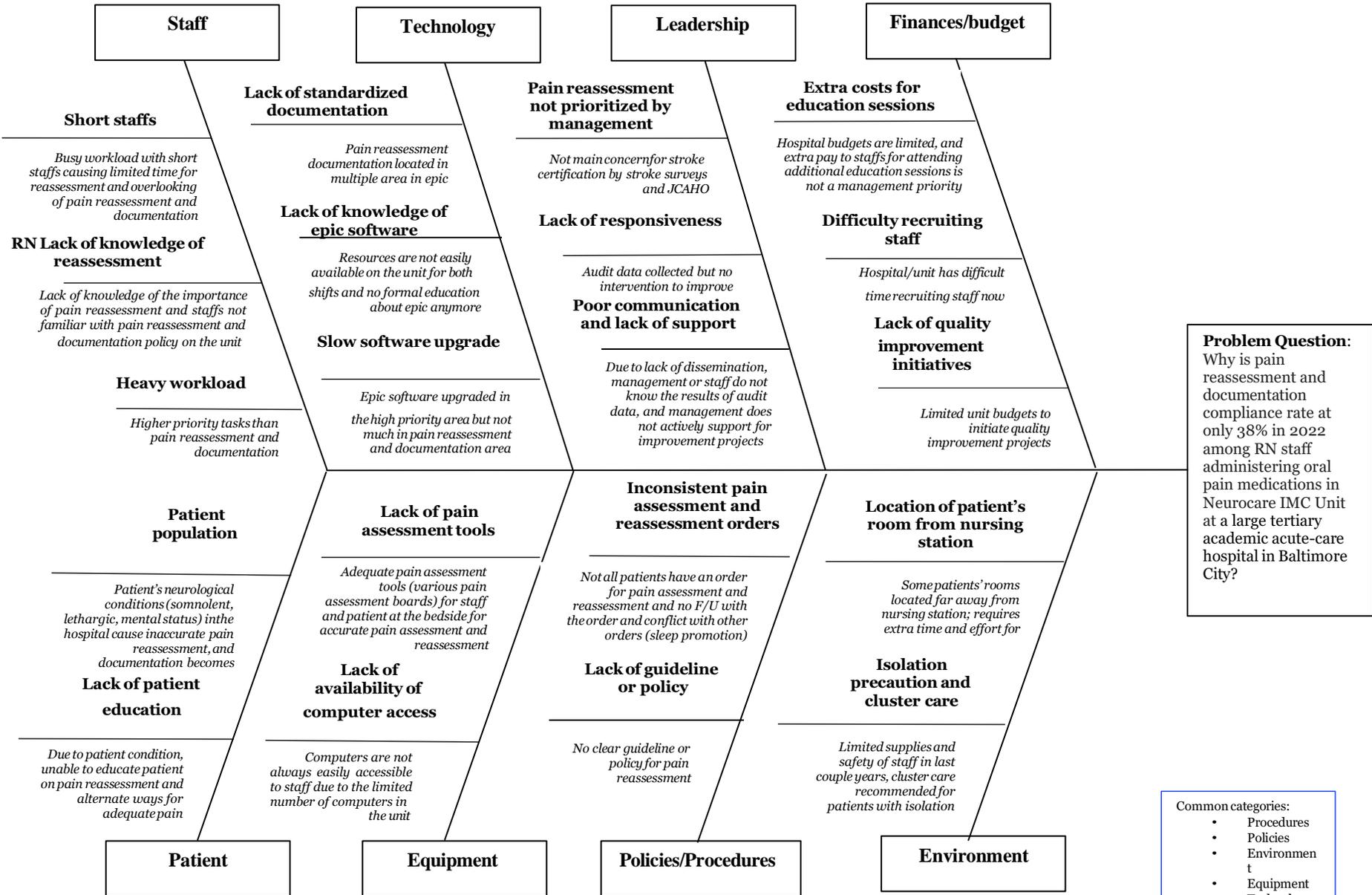
Measurement Plan for Visual Reminders to Improve Post-Pain Medication Reassessment and Documentation

Measures		
Project Goals	Measure Pre-Implementation	Measure During Implementation
Structure		
By August 31, 2023, 100% of staff RN will obtain unit-based education sessions focusing on pain reassessment and documentation topic	Numerator: # of staff RN who completes education sessions for visual reminders in epic Denominator: total # of staff RN who is eligible to complete education sessions	Numerator: # of staff RN who completes education sessions for visual reminders in epic Denominator: total # of staff RN who is eligible to complete education sessions
Education materials available in the unit resource binder for staff regarding the pain reassessment policy by August 31, 2023	Pain reassessment policy in the unit resource binder	Pain reassessment policy in the unit resource binder
Process		
By December 15, 2023, 100% of staff RN will utilize visual alarm reminder tools in BRAIN as default screen	Numerator: # of staff RNs who utilize visual reminders in BRAIN as default screen Denominator: total # of staff RN	Numerator: # of staff RNs who utilize visual reminders in BRAIN as default screen Denominator: total # of staff RN
By December 15, 2023, 100% satisfaction scores of staff RN regarding the efficiency of visual pain reassessment tools	Numerator: # of satisfaction scores of staff RN who utilizes visual reminders in epic for pain reassessment and documentation Denominator: total # satisfaction scores of staff RN for pain reassessment and documentation	Numerator: # of satisfaction scores of staff RN who utilizes visual reminders in epic for pain reassessment and documentation Denominator: total # satisfaction scores of staff RN for pain reassessment and documentation
Outcome		
By December 15, 2023, 100% of staff RN will complete pain reassessment and documentation within 60 minutes of post-PO pain medication administration in Neuro IMC	Numerator: # of pain reassessment and documentation completed by a visual reminder tool in epic Denominator: total # of pain reassessments and documentation completed in epic	Numerator: # of pain reassessment and documentation completed by a visual reminder tool in epic Denominator: total # of pain reassessment and documentation completed in epic
Measurement Plan		
<p>Submit Project Survey(s) and Project Audit Tool from REDCap (Appendix J and K) Appendix E is a chart audit tool created by REDCap to collect data on pain reassessment and documentation within 60 minutes of post-PO pain medication administration after the implementation of visual reminders. Appendix F is a pre-survey that will be completed by the staff RN before implementation and Appendix G is a post-survey after practice change occurs to assess the staff's knowledge of pain assessment and satisfaction with visual reminder tools.</p>		
Project Goals	Data Collection Procedures (who, how, when)	Name of Data Collection Tool

<p>By August 31, 2023, 100% of staff RN will obtain unit-based education sessions focusing on pain reassessment and documentation topic</p>	<p>Who: Project leader (Jane Choi) How: Sign-off based on completion of in-person and online module training in UMMS U When: Before the project start</p>	<p>Pain reassessment survey (Appendix K)</p>
<p>Education materials available in the unit resource binder for staff regarding the pain reassessment policy by August 31, 2023</p>	<p>Who: Project leader (Jane Choi) How: Complete survey after education sessions about awareness of staff RN of pain reassessment hospital policies and resources in the unit resource binder When: Before the project start</p>	<p>Pain reassessment survey (Appendix K)</p>
<p>By December 15, 2023, 100% of staff RN will utilize visual alarm reminder tools in BRAIN as default screen</p>	<p>Who: Project leader (Jane Choi) or designated champions How: Perform a survey to assess the visual reminder tool implanted in the BRAIN as default screen When: Monthly surveys during the project implementation time frame</p>	<p>Pain reassessment survey (Appendix K)</p>
<p>By December 15, 2023, 100% satisfaction scores of staff RN regarding the efficiency of visual pain reassessment tools</p>	<p>Who: Project leader (Jane Choi) How: Perform a survey to gather staff satisfaction scores and the effectiveness of visual pain reassessment tools When: Monthly survey during project implementation time frame</p>	<p>Pain reassessment survey (Appendix K)</p>
<p>By December 15, 2023, 100% of staff RN will complete pain reassessment and documentation within 60 minutes of post-PO pain medication administration in Neuro IMC</p>	<p>Who: Project leader (Jane Choi) or designated champions How: Analyze chat audits through EHR (epic) on all staff RN who complete pain reassessment and documentation within 60 minutes of post-PO pain medication administration When: Weekly chart audits during project implementation time frame</p>	<p>Chart audit tool (Appendix J)</p>

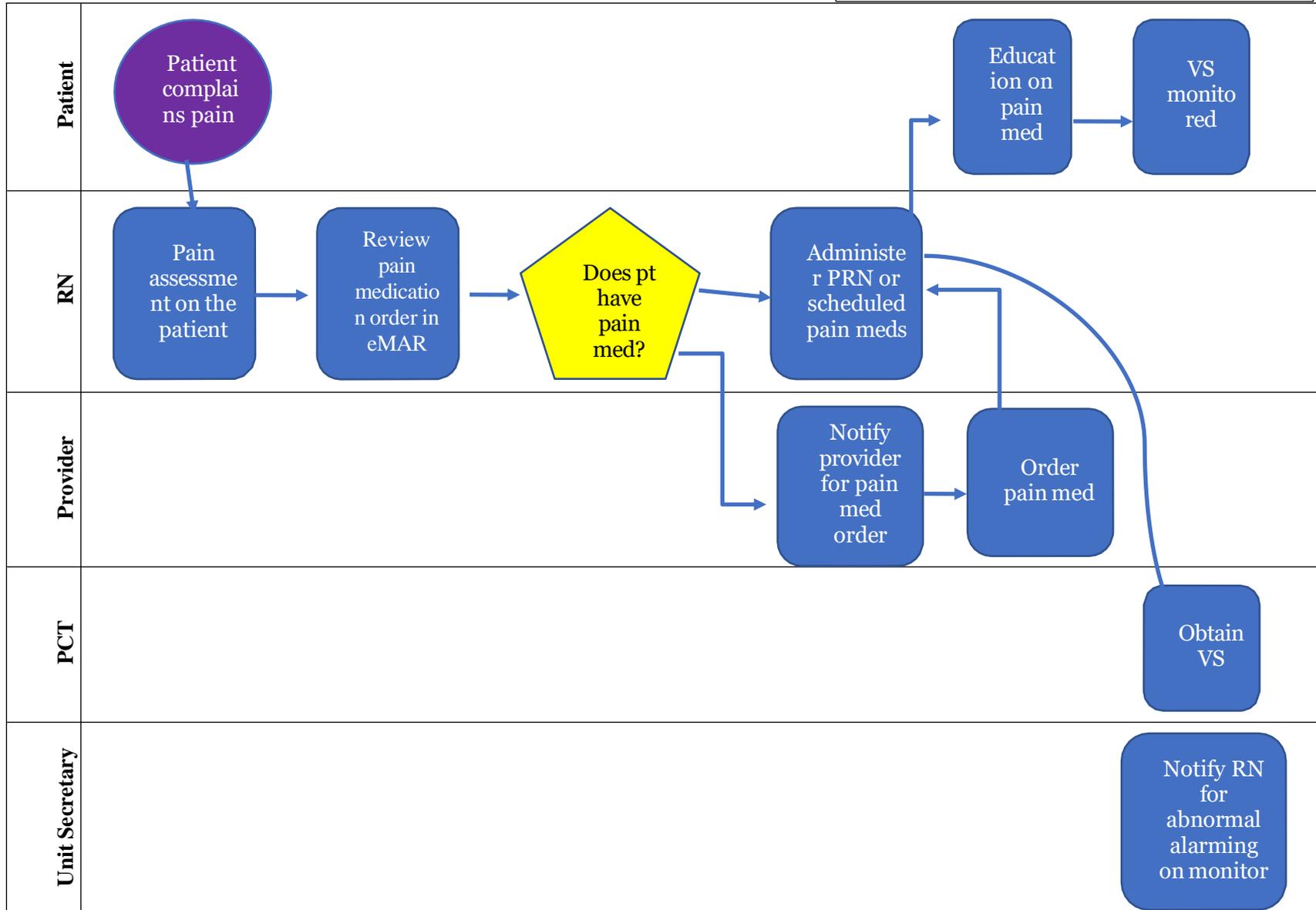
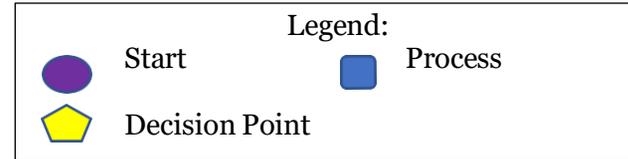
Appendix H

Fishbone Analysis of Pain Reassessment and Documentation on a Neuro IMC



Appendix I

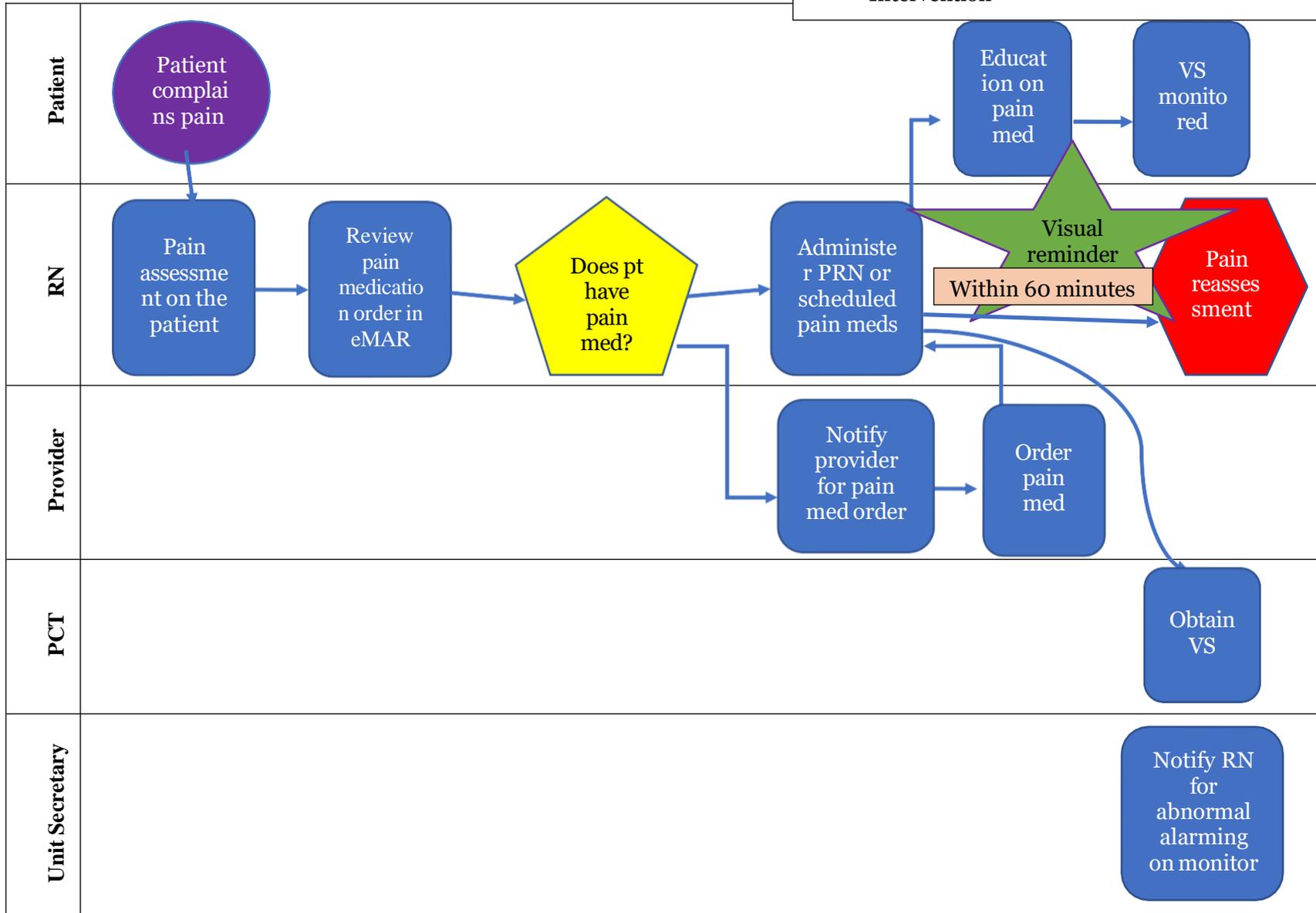
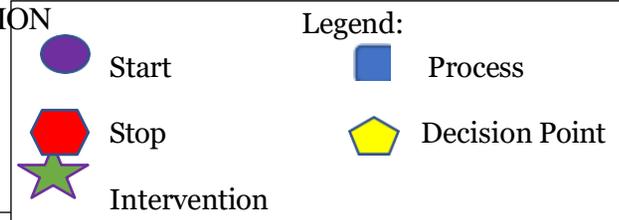
Current Site Processes Map of Pain Medication Administration on Neuro IMC



TIMED VISUAL REMINDERS & PAIN REASSESSMENT DOCUMENTATION

Appendix J

Desired Site Processes Map of Pain Medication Administration on Neuro IMC



Appendix K

Site Ethics Procedures

- **Site approval department:**
 - Human Research Protections Office (HRPO) in the School of Medicine
 - hrpo@umaryland.edu
 - **Director of Nursing Research Department at UMMC**
 - Contact information: Jenni Day, Ph.D., RN, Director of Nursing Research
 - jenni.day@umm.edu / nrebpc@umm.edu
 - The project reviewed by UMSOM IRB for determination
- **IRB Submission Requirements:**
 - Create an IRB account
 - Initial application submission for human subject determination via IRBNet
 - A preliminary review by the IRB office
 - Review CITI training, check for all appropriate signatures, and ensure application parts 1 and 2 are included.
 - Reviewed by IRN manager
 - Human subject Determination Letter published
 - Contact information: irb@umd.edu
- **Due date:** July 23, 2023
- **Review dates:** August 10, 2023

Appendix L

IRB Determination of Review Pathway

