Implementing a Rate Verification Policy During Safe Hand-Off

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Table of Contents

Abstract:

High-alert medications, particularly intravenous infusions, pose significant risks to patient safety due to the potential for errors in administration leading to adverse drug events. The complexity and critical nature of these medications require safeguards to ensure proper delivery and management of these medications. Implementing policies and procedures for verifying these medications is essential to prevent adverse drug events and ultimately enhance patient outcomes. This project aims to implement a two-RN rate verification hand-off on all high-alert medication infusions in MICU to reduce adverse drug events and improve medication safety.

This project included competency training that consisted of an educational review of high-alert medications, a review of current policies, and interactive training to launch the dual-rate verification process. Following implementation, it was determined that more time was needed to determine a correlation between the two RN rate verifications and the reduction of high-alert medication infusion errors. The preliminary data on the two RN rate verification compliance is reassuring and has the potential for long-term benefits in reducing errors. Continued data is needed to determine the long-term benefits of the two RN rate verification hand-offs on high-alert medication infusions. If results suggest a positive impact on patient safety the overall goal would be to implement this policy housewide on all continuous medication infusions. Future recommendations include expanding the software functionality within the medical administration record (MAR) and enhancing the electronic health record prompts to include rate verification on all continuous medications.

Implementing a Rate Verification Policy During Safe Hand-Off

Adverse drug events (ADEs) are the most common source of hospital-acquired injury, and more than a quarter result from medication errors and, therefore, are preventable (Leung et al., 2015). Medical intensive care patients (MICU) have an increased risk of medication errors because of the complexity of the medical regimen. MICU patients are typically high acuity (very sick) and require multiple continuous intravenous medications. Many of these medications are categorized as high-alert medications because of their systemic effect on hemodynamic stability (Ahmed et al., 2013). When these medications are given incorrectly, they can cause ADEs. This Doctor of Nursing (DNP) project will focus on discrepancies between high-alert intravenous infusion rates documented in the medication administration record (MAR) and the actual high-alert infusion rate programmed on the infusion pump for MICU patients.

There are policies on high-alert medication administration. The goal of these policies is to prevent ADEs from occurring. These policies are limited during specific phases of care. The Joint Commission has recommended that all institutions have policies to verify these medications upon initial administration and during rate changes (2023). These recommendations entail that two registered nurses (RNs) verify high-alert medications before starting the medication and when the rate changes during a high-alert continuous intravenous infusion. The American Diabetes Association initiated protocols in 2012 for institutions to implement safe medication practices when titrating and administering insulin (Kelly, 2014). Insulin is considered a high-alert medication. These protocols include having two registered nurses verify the dose and rate at which these drugs will be titrated during a continuous insulin infusion. Titration refers to increasing or decreasing the dose based on the patient's hemodynamic stability (Marwitz et al., 2019). The two-nurse protocol is in effect during the initiation of the insulin infusion.

The American Nurses Association (ANA) has published *The Nursing Scope of Practice and Standards* to guide organizations on nursing duties and responsibilities (2023). When administering high-alert medication, the ANA agrees with The Joint Commission that two RNs must verify the rate during the initial administration and any rate changes on the high-alert continuous infusions. The ANA further recommends a rate verification between two RNs during safe hand-off. The safe hand-off, by the ANA definition, is a real-time process of passing patient-specific information from one caregiver to another or from one team of caregivers to another to ensure the continuity and safety of the patient's care (2023).

This DNP project aims to implement a policy requiring nurses to complete a rate verification process on high-alert intravenous infusions as recommended by The ANA during the safe hand-off process (2023).

Problem

The MICU evaluated for this DNP project has identified that high-alert medications are being titrated on the infusion pump and not consistently verified in the medication administration record (MAR) during safe hand-off. This can happen when a nurse is titrating a drug and not going through the proper process of scanning the medication to change the rate in the MAR. Instead, they manually program the continuous rate change only on the infusion pump. Circumstances like this can happen during emergencies, and the nurse needs to adjust the rate immediately. Changing the rate through the MAR is a process. Nurses will manually change the rate to prevent a delay in the patient from receiving the new dose. This is, unfortunately, when mistakes are at their highest. In these instances, nurses have forgotten to go back into the MAR and change the continuous infusion rate to reflect the new dose, and they do not have a second RN verifier to confirm the rate has been changed. Adverse drug events (ADEs) are common,

expensive, and dangerous, occurring at a frequency of 65% of adult admissions (Leung et al., 2015). They directly affect patient outcomes and increase unnecessary costs for the institution. The conservative estimated cost of ADEs is approximately $4700 per medication error (Leung et al., 2015). Preventing injury to patients, maintaining high safety standards, and lowering costs are all pivotal components of patient-centered care. Reducing errors should be a priority.

The MICU evaluated for this DNP project currently has a policy that requires all medications to be administered utilizing barcode technology. This involves pump integration of all continuous infusions. Pump integration refers to scanning all medications and the pumps through which the medications will be infused (Bowers et al., 2015). This process allows the MAR to send information to the pump to program it based on the medication order. Manual programming does occur in this process.

High-alert medications require the nurse to manually input the rate into the MAR at which the medication will be infused. Most of these incorrect infusion rates have been found during shift change after safe hand-off. Nurses coming on duty have reported that during their initial assessment, they will find a discrepancy in the pump infusion rate and the rate documented in the MAR. Typically, this suggests that, at some point, the nurse changed the rate on the pump without going through the process on the MAR to change the infusion rate, thus creating a medication error.

Incorrect documentation of infusion rates prevents providers from knowing when a patient is nearing or has met the therapeutic dose. It can impact being on a medication for prolonged periods. An example of this is a patient who is intubated and requires ventilation. Providers and nurses begin to plan for extubation as the patient regains the ability to manage their airway without external devices. These patients are typically on high-alert medication

infusions for sedation purposes. Staff nurses titrate sedation to manage care to determine if patients are appropriate for extubation. If documentation is incorrect and the patient is being infused on a higher dose of sedation than what is documented in the MAR, it could delay their extubation. Proper documentation provides pivotal information on patient trends and allows providers to dictate the patient's care (Hunter, 2011). The Joint Commission has determined a 40% to 80% reduction in error rates in institutions implementing barcode medication administration systems (2023).

When MICU patients receive high-alert medication infusions, there are specific order sets with instructions on administering and titrating of these medications. This allows nurses to titrate these medications based on the patient's improving or worsening condition without the delay of contacting the provider to order individual rate changes. The goal is to titrate these medications to achieve the drug's therapeutic effect. The therapeutic effect is providers' desired outcome to determine the drug's effectiveness (Heather et al., 2014). When the therapeutic effect is not achieved, patients can experience various complications, such as prolonged hospital admissions, unnecessarily prolonged sedation, and drug toxicity, that can lead to catastrophic events. In the MICU at the proposed site, it has been found that some patients on high-alert intravenous infusions are receiving a different dose than what is being documented in the MAR.

High and low concentrations of medications can lead to ADEs. They can impact multiple body systems, leading to further hemodynamic instability and catastrophic complications. Implications vary from minimal to severe. At the low end, patients are not receiving enough medication. Potentially, this can prolong their need to be on the medication and lead to prolonged hospital admissions. Not maintaining a therapeutic dose requires the body to work harder to support an unstable system. This can result in irreversible outcomes (Wolfe, 2016).

Medications that are administered greater than necessary can lead to toxicity. Tragically, this can lead to cardiac arrest, respiratory distress, and organ shutdown (Wolfe, 2016). These patient outcomes are not always preventable. However, nurses must be accountable for performing within the standards of care and ensuring they are titrating medications appropriately. Policies regarding the rights of medication administration are necessary, and all nurses should know them.

The MICU evaluated for this DNP project has policies aligning with The Joint Commission's National Patient Safety Goals. Regarding medication safety, The Joint Commission's goal #3 is to improve the safety of medications by verifying all medication or solution labels, both verbally and visually (2023). Two RNs must verify all high-alert medications at initiation of the drug and during infusion rate changes. This alone is not closing the gap on this problem. The safe hand-off rate verification would adhere to the ANA recommendations and eliminate discrepancies between the pump and what is documented in the MAR (2023).

Medication errors can lead to sentinel events that are reviewed with much scrutiny. Not one person or system reviewed leads to these events; it is every process involved (Ahmed et al., 2013). Putting policies in place that heighten safety, prevention, and awareness is promoted by all governing bodies in healthcare. The MICU evaluated is within a Magnet Hospital. Magnet-designation hospitals provide patients and their families with a benchmark to measure the quality of care they can expect (2017). Maintaining Magnet standards requires adopting practices to achieve the highest level of safety and optimizing patient outcomes. If continued errors occurred, it could put the institution's Magnet status in jeopardy. Ultimately, this can lead to a loss of funding and a decline in reputation.

Data requested in this project is still underway. Since July 2023, medication errors reported through the medical information data analysis system (MIDAS) in the MICU were 363. The total number of those medication errors that involved high-alert intravenous infusions is 58. As a result, the percentage of medication errors that occurred in high-alert intravenous infusions accounts for 15.9% of medication errors that were not properly scanned using barcode technology. This data supports the need for a high-alert intravenous rate verification policy during safe hand-off.

Evidence Search

Selected databases for this review included CINAHL, PUBMED, OVID, and MEDLINE. Using the key terms, Barcode Technology, Rate Verification, High Alert Medications, and Safe Hand-Off, a combination was entered, using the Boolen Operator and Rate verification during safe hand-off, Barcode technology, and pump errors, Delays in barcode technology and tracked, resulting in a total of 32 results. The inclusion/exclusion criteria further narrowed the results, excluding PO medication errors, including telemetry patient continuous medication errors. After applying these criteria, 11articles were selected for review, and synthesis.

PICOT

In Medical Intensive Care Unit Patients (MICU), how does implementing a two-registered nurse (RN) high-alert intravenous rate verification process through the medication administration record (MAR) during safe hand-off, compared to not using two RN rate verification during safe hand-off, affect the incidence of reports to the medical information data analysis system (MIDAS) involving incorrect documentation of high-alert intravenous infusions?

Table 1

Evidence Search Results

Number of relevant hits: 32

Search Terms	CINAHL	MEDLINE	OVID	PubMed	Total for all databases and search terms
Rate Verification	94	508	654	5817	7,073
High Alert Medications	76	259	1698	4359	6,392
Safe Hand-off	3	5	9	21	38
Barcode Technology	33	229	545	15,010	15,817

(Notes: This table represents the search engines used to retrieve data on the listed search terms)

Evidence Synthesis

One of the most critical elements of this project is for nurses and providers to understand how hazardous these medications can be when not managed appropriately. Safeguards such as a two-RN rate verification process ensure patients receive the correct amount of the medication for hemodynamic stability (Mohamed & Abdalla, 2022). This DNP project highlights the medication errors reported due to discrepancies between the medication administration record (MAR) and the infusion pumps delivering high-alert medication infusions.

An article published by *The Scientific Journal of Nursing* has identified nurses lacking significant knowledge of high-alert medications (Abeer et al., 2017). This literature is helpful because it provides insight into the severity with which nurses consider these errors. One hundred sixty-seven nurses were surveyed during this study, and 75% did not meet the required competency for high-alert medication consideration (Abeer et al., 2017). The survey measured the knowledge of high-alert medication indications, contraindications, peak time, half-life, and symptoms of toxicity. When nurses cannot identify the harm these medications pose, they cannot understand the gravity of their decisions when managing them.

Knowledge is only one aspect of decreasing adverse drug events (ADEs). Nurses must be diligent when transferring a patient's care to another provider. Research has been conducted to determine the usefulness of a standardized safe hand-off. *The Journal of Caring Science* published an article that evaluated the effectiveness of implementing a safe practice evaluation checklist to improve safe hand-off (Malekzadeh et al., 2013). These checklists ensured that safety tasks were completed before the incoming staff assumed patient care. This project adds verification that can be tracked and recorded electronically to ensure compliance. The issue with anything standardized is that they are not applicable in all settings (Taylor, 2015). The benefit of this research is that it can be customized for each unit. This would optimize the use of a checklist and enhance successful results. A standardized checklist during safe hand-off could identify documentation errors during shift change, allowing the RN to reconcile the discrepancy at the point of care. Evidence shows that ineffective shift handover increases the risk of medication error and sentinel events. In addition, it can delay treatment, decrease patient satisfaction, and prolong the length of hospital stay (Malekzadeh et al., 2013).

Growing evidence has shown the benefits of a safe hand-off process. Safe hand-off includes patient information, planning, care team involvement, and interventions (Taylor, 2015). In 2009, the Joint Commission identified a standardized approach to handoff communication as a patient safety goal to reduce communication errors (Taylor, 2015). This approach has demonstrated additional benefits to patient safety, including visualization of the patient and verification of information at the point of care (Malekzadeh et al., 2013). Nurses can improve the safe hand-off process by incorporating an electronic safety assessment. This would include a two-RN rate verification on high-alert medication infusions.

Compliance with using smart pumps is critical to effectively preventing errors (Ohashi et al., 2014). Smart pump compliance requires the nurse to scan medications and the pump through which the medication will be infused. During this process, the MAR will send information via Bluetooth to program the pump with the provider's medication order details. Human components must be considered when utilizing smart pump technology. Human components consist of correct documentation within the medication administration record (MAR), using the correct drug library programmed in the pumps, and refraining from overriding the pumps when there is a discrepancy between the MAR and the pump (Ohashi et al., 2014). Clinical information systems such as smart pumps or pump integration technology should be implemented with quality improvement processes to improve their use iteratively (Marwitz et al., 2019).

A local hospital conducted a study to improve medication safety by implementing a 2-person verification system before medication administration. According to the findings, nurses engage in a brief 2-person verification process to reduce medication errors due to inaccurate infusion pump programming (Subramanyam et al., 2016). Implementation of 2-person verification resulted in >90% of medication programming being double-checked before medication administration (Subramanyam et al., 2016). The results of this project led to the development of a comprehensive quality improvement project to restructure the safe hand-off process at this institution. The electronic rate verification process includes the outgoing RN and the on-coming RN physically entering the patient's room and performing a rate verification through the MAR. This DNP project aims to implement a quality improvement policy that emulates this institution's policy.

The proposed DNP site has reported increased medication errors through the institution's Medical Information Data Analysis System (MIDAS) since July 2023. These reports correlate

with incorrect infusion rates on high-alert medications at shift change. Infusion rate discrepancies happen for various reasons. Unplanned events include codes, patient hemodynamic changes, or other unforeseen events. Rates are adjusted in an emergent event and not correctly documented. To close the gap, an additional rate verification during safe hand-off should be required to decrease the discrepancies in infusion rates reported at shift change. By doing this, the off-going RN and oncoming RN will perform the same verification process during medication initiation or a rate change. The technology is already available through the MAR due to the current policy on high-alert medication recommendations by The Joint Commission.

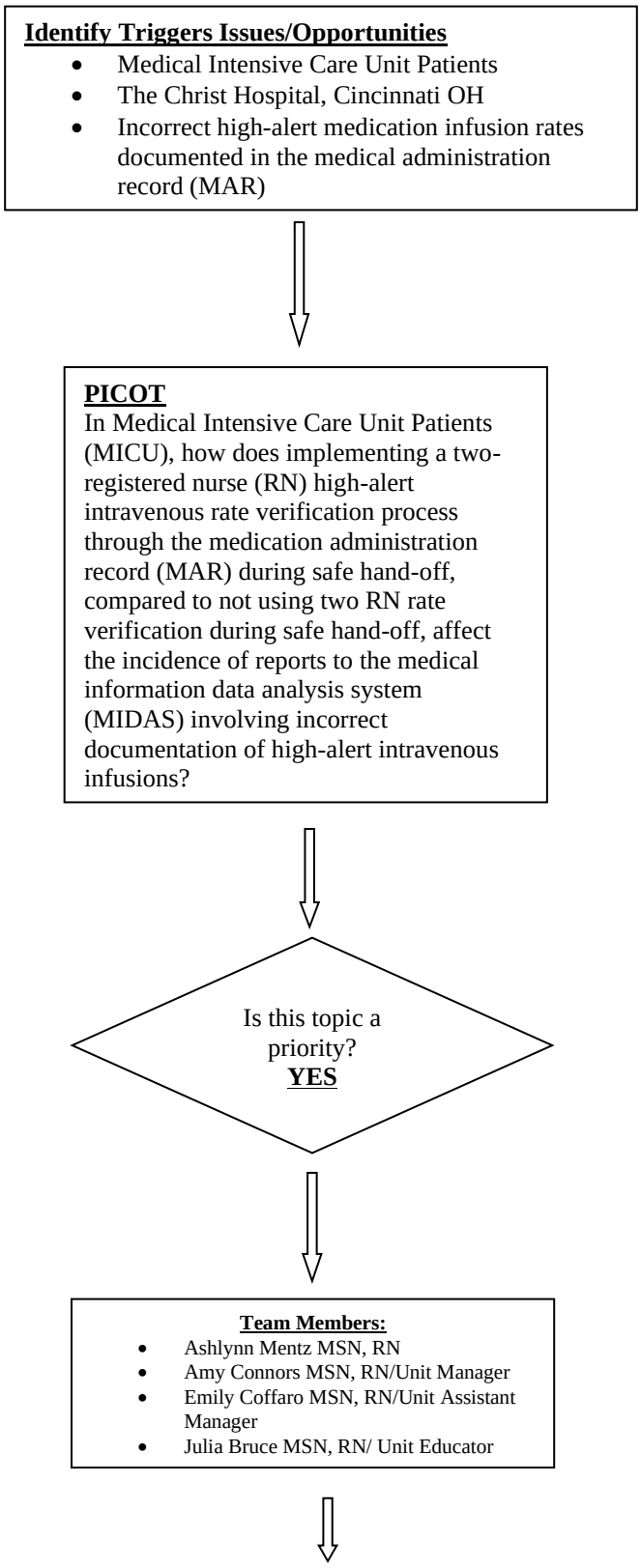
Measuring this process will require acquiring reports from risk management to access MIDAS reports regarding incorrect infusion rates at shift change and an audit system to determine compliance with rate verification during safe hand-off. Correlating the safe hand-off compliance with the MIDAS report will determine if implementing this process directly impacts the decrease in MIDAS reports that involve incorrect infusion rates during shift hand-off.

Evidence-Based Practice Model and Theoretical Framework

The Iowa Evidence-Based Practice Model was chosen for this EBP-QI initiative in the medical intensive care unit (MICU). This figure demonstrates the application of the Iowa Model model to the DNP EBP-QI project in a visual model. This method is appropriate for this project because it diligently guides the steps to help identify issues, research solutions, and implement changes with feedback loops.

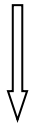
Figure 1

The Iowa Evidence-Based Practice Model


Identify Triggers Issues/Opportunities
Medical Intensive Care Unit Patients
The Christ Hospital, Cincinnati OH
Incorrect high-alert medication infusion rates documented in the medical administration record (MAR)
PICOT
In Medical Intensive Care Unit Patients (MICU), how does implementing a two-registered nurse (RN) high-alert intravenous rate verification process through the medication administration record (MAR) during safe hand-off, compared to not using two RN rate verification during safe hand-off, affect the incidence of reports to the medical information data analysis system (MIDAS) involving incorrect documentation of high-alert intravenous infusions?
Is this topic a priority?
YES
Team Members:
Ashlynn Mentz MSN, RN
Amy Connors MSN, RN/Unit Manager
Emily Coffaro MSN, RN/Unit Assistant Manager
Julia Bruce MSN, RN/ Unit Educator

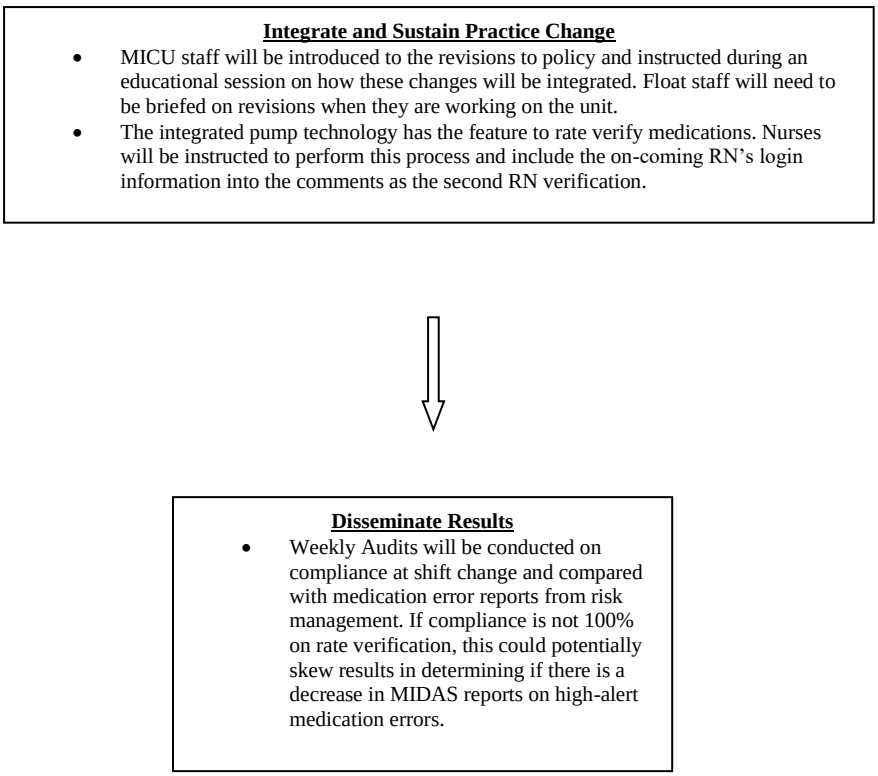
Assemble, Appraise, and Synthesize Body of Evidence

- Staff survey developed for feedback on implementing a two-RN verification during safe hand-off
- Various literature recommends a two-RN verification process for all high-alert medication. It is a Joint Commission safety standard. Credible research suggests that many medication errors happen at or shortly after shift change. Investigating these two problems and developing a method to close the gap has the potential to decrease ADEs and discrepancies documented in the medical administration record (MAR)
- There is not direct research on implementing a two-RN rate verification process during safe hand-off. There is institution have adopted this practice because it is a recommendations of the American Nurses Association (ANA)



Design and Pilot the Practice Change

- Risk management will provide weekly compliance reports in two parts: 1) medication errors in MICU and 2) MAR overrides in MICU
- Audit document development for weekly compliance of rate verification at shift change on all high-alert medication infusions in MICU
- Draft policy revision within current high alert-medication policy for quality improvement to review.
- Introduce policy revision to MICU staff in the weekly announcement to initiate safe hand-off changes.
- Work with Unit Educator Julia Bruce on how to implement new process.



Note: Figure adapted from *The Iowa Evidence-Based Practice Model, (2016)* Wojciechowski, E., Murphy, P., Pearsall, T., French, E., (May 31, 2016) A case review: Integrating Lewin's theory with lean's system approach for change. *The Online Journal of Issues in Nursing* 21(2). https://doi.org/10.3912/OJIN.Vol21No02Man04

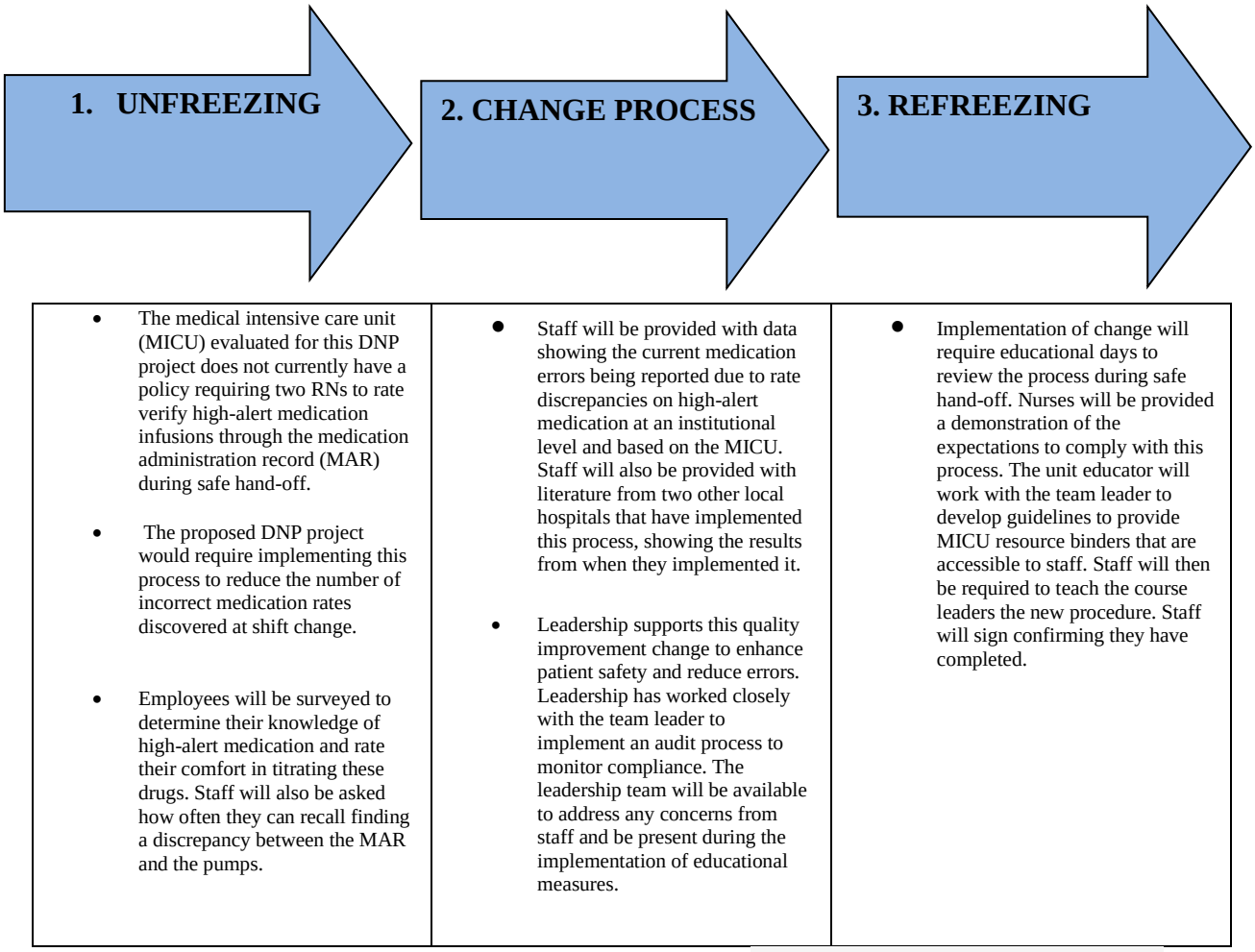
Theoretical Framework

Quality improvement and patient safety are vital in shaping healthcare and advancing healthcare professionals' abilities. Theory contributes to the development of these processes by guiding educators and providers to understand the relationships within these obstacles.

Lewin's Three-Step Model Change Management is highlighted throughout the nursing literature as a framework to transform care at the bedside (Wojciechowski et al., 2016). The model supports nurses through the various transitions and identifies areas of strength before implementing change. Lewin's Change Model consists of three key stages: Unfreezing, Changing and Refreezing. See Figure 2.

Figure 2

Lewin's Model



Note: Figure adapted from *The Iowa Evidence-Based Practice Model, (2016)* Wojciechowski, E., Murphy, P., Pearsall, T., French, E., (May 31, 2016) A case review: Integrating Lewin's theory with lean's system approach for change. *The Online Journal of Issues in Nursing* 21(2). https://doi.org/10.3912/OJIN.Vol21No02Man04

Unfreezing involves acknowledging the need for change or challenging a belief in practice (Wojciechowski et al., 2016). For this DNP project, the unfreezing stage entails raising awareness of the recommended change in practice. Nurses are not performing a two-RN verification during safe hand-off on high-alert medications, and medication documentation errors have increased. The change process implements and integrates the desired change in practice

(Wojciechowski et al., 2016). In the current process, nurses are not required to perform a two-RN verification on high-alert medication infusions during safe hand-off. Revising the current policy would include a two-RN verification policy during safe hand-off. This practice would require the oncoming and off-going RN to go into the patient's room, scan the high-alert medication infusions into the medication administration record (MAR), and confirm the rate is the same as the pump delivering the medication. Refreezing aims to establish the change as the new norm, ensuring its sustainability over time (Wojciechowski et al., 2016). Implementing this revised policy will be manageable as long as there is compliance within the MICU staff. In the initial stages, frequent auditing will be necessary. Like many other procedures nurses follow, this process should become routine. The result will contribute to the positive well-being of the patient and decrease medication documentation errors that take time for the nurses to file reports.

Project Proposal

This project proposes a systematic approach to reduce high-alert medication infusion errors by implementing a two-nurse verification policy during shift hand-off in the medical intensive care unit (MICU). This project will only include adult patients receiving high-alert medication infusions in the MICU beginning tentatively on December 1, 2024. The goal for this project is to continue indefinitely and be implemented prospectively across the hospital. The MICU is a thirty-two-bed unit. All adult patients receiving high-alert medication therapy will be subject to this policy if they receive high-alert continuous medication infusions. Patients receiving high-alert intermittent infusions will not be included in this project. If these patients transitioned onto a continuous infusion, they would then be included.

Project Aim

This Doctor of Nursing Practice (DNP) project aims to implement a policy to reduce high-alert medication infusion errors in the MICU population. This initiative seeks to enhance patient safety by reducing discrepancies between the documented infusion rates in the medication administration record (MAR) and the actual rates programmed into the infusion pumps. By aligning nursing practice with evidence-based guidelines, this project aims to minimize adverse drug events (ADEs) and improve overall patient outcomes in the MICU. Implementing a safe hand-off policy will foster a culture of safety and accountability among nursing staff while adhering to the recommendations from regulatory bodies.

Project Outcomes

An interdisciplinary team will utilize the *Iowa Evidence-Based Model* to guide implementation and evaluation. The team includes four registered nurses, the unit clinical educator, and the clinical manager. Additional hospital staff who will assist in implementation include an Epic specialist and risk management. This team will be crucial for developing protocols and facilitating training.

Smart pump integration is currently utilized in this institution and nationwide in healthcare institutions. It refers to using advanced infusion pumps connected to a healthcare facility's electronic medical record (EHR) (Chin et al., 2023). Implementing the safe hand-off process with innovative pump technology will ensure that all high-alert medications are programmed correctly and consistently.

Evaluating patient safety metrics such as adverse drug events (ADEs) should directly correlate to the implementing the safe hand-off process in conjunction with discrepancies within the MAR. When comparing data from other institutions that utilize smart pump technology in

this manner, the aim should be to decrease ADEs due to incorrect administration rates by potentially 78% (Chin et al., 2023). Key outcomes will include measuring the incidence of medication errors after implementation and providing insight into safety improvements.

The Intervention

Implementing a policy requires strategic planning and a detailed method. Planning for project elements, including distribution of resources, open discussion, and collaboration, is essential to the success of a project. Utilizing the Lewin Model located in *Figure 2*, each project component will be continually evaluated for revision. .

The new policy will be distributed to key stakeholders, including nursing staff, pharmacy, and quality improvement teams, to gather input and foster collaboration on November 10, 2024. A survey will be included to assess knowledge of the current rate verification policy and safe practice for high-alert medication recommended by the Joint Commission.

Training sessions will be organized by the project leader and the unit educator to provide a simulated demonstration of how the new process will take place. These sessions will include detailed training material outlining the steps for conducting the two-RN verification, emphasizing its critical role in patient safety.

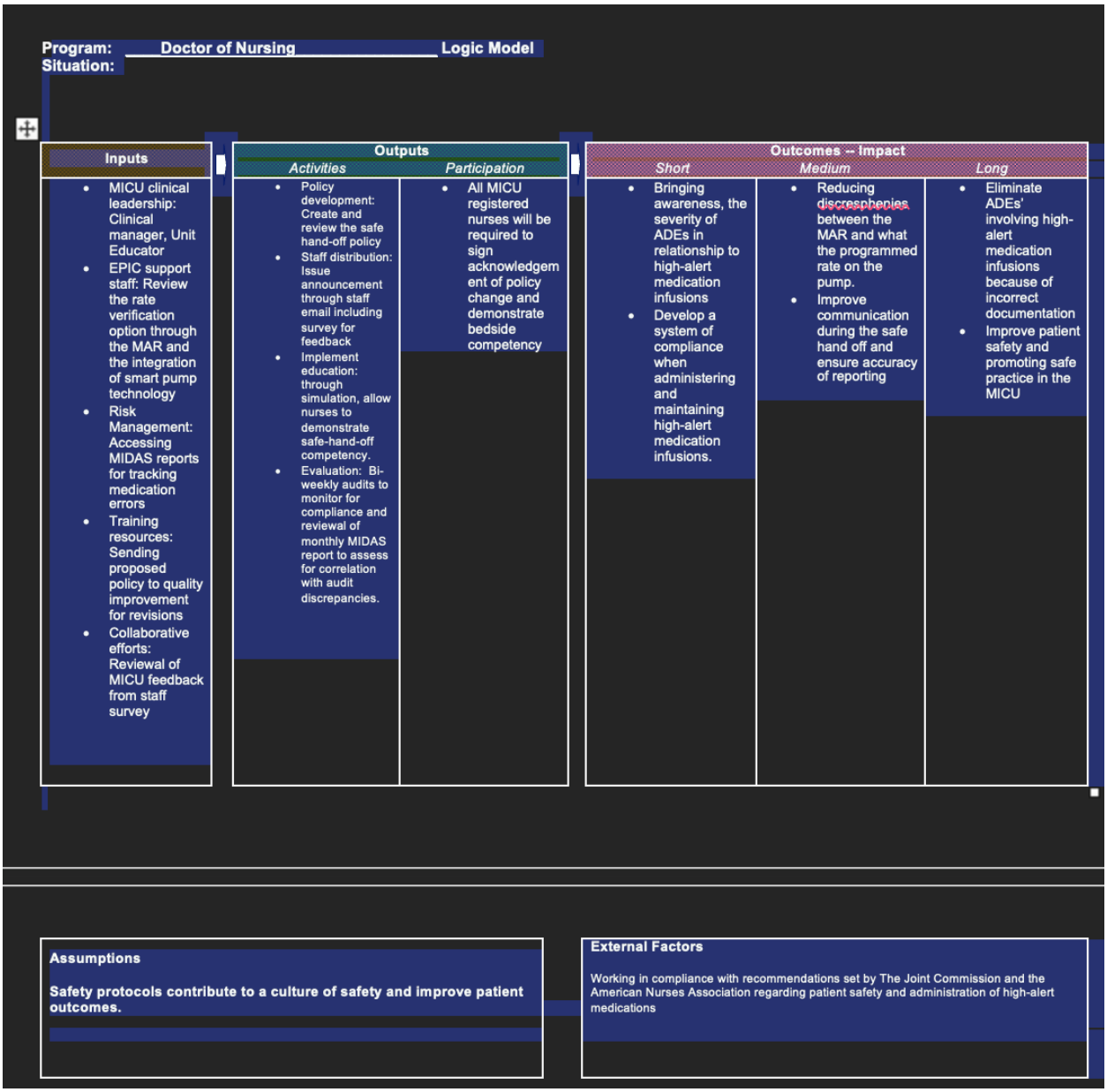
The verification process involves several key steps. Once the shift report has concluded, the outgoing nurse and the incoming nurse will both enter the patient's room. The outgoing RN will log into the electronic health record (EHR) and open the medication administration record (MAR) to view and pull up the high-alert medications that are infusing. The outgoing nurse will then confirm the name and date of birth with the incoming nurse and the patient or the patient's armband. Once confirmed, the outgoing nurse will then proceed to scan the patient's armband, receive a green checkmark in the MAR, and then scan the high-alert medication. Once this is

done, the medication should populate in the MAR, reviewing the details of the medication order. Currently, the outgoing nurse will select the rate verify under the MAR action. This will prompt the outgoing RN to scan the pump that the medication is infusing over. Together, the outgoing and incoming RN will review the rate infusing on the pump with the rate documented in the MAR. If both rates match, the outgoing RN will select confirm on rate verify, and it will prompt the outgoing RN to tap their badge to complete the process. Before completing this action, the incoming RN will type their user ID into the comments box as the second verification. This process ensures both RNs agree before the outgoing RN leaves for the day, creating a system of checks and balances.

To ensure compliance and effectiveness, the project leader will establish ongoing monitoring through audits and EMR documentation reviews. Data analysis on medication errors or near misses will be collected monthly to assess the policy's impact. Monthly feedback meetings will discuss challenges and successes, allowing for continuous policy improvement. Ongoing education and unit resources, such as quick reference guides, will be provided to reinforce the importance of the verification process.

Table 1

Logic Model



Note: This model highlights the strategies utilized to implement the project and effectively evaluate outcomes.

Ethical Considerations

Ethical responsibility requires that healthcare providers do everything possible to prevent harm. Preventing an ADE falls on all providers caring for patients. Nurses are obligated to practice within the standards of care and to adhere to institutional protocols. This project emphasizes accountability through a documented verification process that ensures safe medication administration. This process is not to punish nurses. It is to reduce errors and prevent patient harm.

This project has been reviewed by Mount Saint Joseph University's Institutional Review Board (IRB). Since there is no human subject involvement in this quality improvement project, no further approval was needed. (See Appendix A). However, the institution where this project is being implemented requires all proposed projects to be submitted through the institution's IRB approval team. It is required regardless of the educational institution's IRB conclusion. An IRB request was sent to the institution where the project will be implemented. This is still pending approval (See Appendix B).

Strategic Planning

All nurses in the MICU will sign a document acknowledging they have reviewed the policy for the safe hand-off process at the bedside by November 20, 2024. During the live educational review, nurses will have a patient simulation experience to go through the process of the safe hand-off. Nurses will perform competency by demonstrating the safe hand-off at the patient's bedside. The outgoing nurse will log into EPIC and open the patient's electronic health record (EHR). The outgoing nurse will then open the MAR and scan the patient, scan the high-alert medication that is infusing, and scan the pump. The on-coming nurse and the off-going nurse will verify that the pumps are infusing at the documented rate that is represented in the

MAR. Once confirmed, the oncoming nurse will type their user login into the comment section of the MAR, and it will be documented in the MAR as a correct rate verification between the two RNs.

The team leader and unit educator will do bi-weekly chart audits to review qualifying patients' MARs and determine if nurses are compliant with the rate verification safe hand-off. The auditors will identify these patients by requesting a report from the pharmacy on patients receiving high-alert medication infusions. The auditor will review high-alert medication infusions documented at designated shift changes for the two weeks. The following shift changes take place at 0700, 1500, and 1900. This will assist in determining if the rate verification was documented correctly during these times. Were there circumstances that could explain why it was not done if it was not documented? An example of this could be if a staff member was working an odd shift, staying later than standard shift change times, or other mitigating circumstances that prevented a rate verification from being completed. If non-compliance is determined, both RNs who did not complete the safe hand-off will be emailed regarding the incident and spoken to by the unit educator or clinical manager to review the policy. Both nurses will be required to demonstrate the steps in the rate verification safe hand-off and will sign a letter of acknowledgment that they have been re-educated. If continued incidence takes place, there is the potential for corrective action.

The medication information analysis system (MIDAS) report will be pulled at the end of the month to determine if reported errors correlate with any non-compliant chart audits. Because this policy will not begin until December 1, 2024, the first MIDAS report will not be reviewed until January 1, 2024. This will allow the auditor to determine if the rate of ADEs has decreased with the implementation of this process.

The effects of high-alert medications can lead to lethal adverse drug events (ADEs) in hospitals. Patients who are on high-alert medication are high-acuity patients. Avoiding a pump override, which would imply the nurse changes the rate directly on the pump instead of scanning the medication and the pump. Nurses should always make changes to drip rates through smart pump technology. If a rate is changed manually, this new process would ensure that these errors would be detected so the documentation can be corrected and the necessary medication errors can be reconciled.

Stakeholders

Implementing a policy change to enhance patient safety in a hospital involves diverse stakeholders, each playing a pivotal role in the process. Healthcare providers, including doctors, nurses, and pharmacists, are on the front lines. They are directly affected by new policies and are responsible for adopting these changes in practice. Clinical managers and unit administrators are responsible for overseeing the implementation of these new policies. Their role is to ensure staff are properly trained and have the necessary resources to be successful. These stakeholders are key elements to the success of this project.

Quality improvement teams are responsible for assessing current practices and new practice policies. For this project, the quality improvement teams involved are Risk Management and Hospital Quality Controls. When a new policy is presented, both of these disciplines' roles are to determine if this initiative will promote safe practice and be effective for providers. Risk management plays a crucial part in identifying potential safety risks. This team provides direct insight into patient experiences, incidence reporting, and oversight in shaping new policies that address the institutional needs. Quality improvement is a crucial stakeholder in this project, and the project leader has worked closely with them to coordinate implementation.

To stand out as an institution, it is essential to have a strategic intent that focuses on fostering a culture of safety and continuously advancing with growing technology. Due to the possible financial effects this project may have, executive leadership has a direct role in the success of this project. Reputations are built by institutions that practice what they preach. Financial stakeholders gain by reducing costs as a result of these medication errors. Approximately 1.5 million medication errors occur annually in the United States (Leung et al., 2015). This number is based on reporting, not considering errors that go unreported. Based on the literature, ADEs cost approximately $4700 per medication error (Leung et al., 2015). Lowering this cost for institutions provides financial growth for stakeholders and allows more funds to be reinvested in staff and patient care initiatives. These stakeholders will see a financial effect if this project is executed appropriately. Therefore is beneficial to include in this project.

Healthcare staff from all disciplines can benefit from these types of quality improvement projects. Improved protocols support nurses in providing safe care. This can reduce stress, promote competency, and create a more consistent nursing practice. Nursing leadership benefits from encounters with fewer safety concerns, which allows them to focus on staff development, creating positive changes, and promoting a healthy work environment. Hospital leadership gains the benefits of directing their energy toward meeting the standards of the regulatory bodies that encompass healthcare, such as The Joint Commission and other organizations that contribute to accreditation.

The patient and their families are the most important stakeholders who benefit from implementing this quality improvement project. Enhanced safety protocols reduce the risk of injury, leading to better health outcomes, shorter hospital stays, and increased patient satisfaction. Families feel supported and empowered when evident safety measures are taken.

Promoting trust has always been an obstacle in healthcare. Institutions that embrace changes to improve a culture of safe practice build stronger relationships with the patients in the communities they serve.

Driving and Restraining Forces

Reducing medication errors, whether they are high-alert medications or not, should motivate all institutions. Evidence from research supports the effectiveness of smart pump integration and having a safe hand-off process in quality improvement initiatives. Considering the institution has already migrated to these devices, implementation will require minimal training and no additional oversight cost. In addition, alligning with our regulatory bodies promotes an institution's reputation in healthcare. The Joint Commission and American Nurses Association guidelines drive the need for policy change to meet established safety standards (2024).

Restraining forces were met during the initiation of this project. It was discovered that not all high-alert medications had the functionality to perform a rate verify in the MAR. This led us to an alternative method that would fulfill the same purpose. Nurses would still verify through the MAR, but they had to do so by logging in individually and performing a rate verify. This would provide an electronic footprint that the outgoing and incoming nurses completed the electronic handoff. It serves the same purpose until the rate verification option is added to all high-alert medications.

Reinforcement of the policy was needed during daily huddles to remind staff of the policy change. After the first audit was conducted on January 1, 2025, it was determined that out of the 38 patients audited on high-alert medications in December 2024, only 14 had daily compliance with nurses performing the rate verification at shift change. This was evaluated

during the change of shift hours between 0700-1900 and 1900-0700. To promote compliance, the team leader, unit educator, and clinical coordinator developed an incentive plan to engage staff to participate and make this a routine practice. Biweekly, on Fridays beginning January 17, 2025. The nurses who were 100% compliant were entered into a drawing to “skip a float day”. Float days are shifts that nurses on the unit are required to work on another unit within the hospital that has additional staffing needs. This proved to be a very popular incentive. During the biweekly audits, compliance increased by 56% in February 2025

During various discussions with staff members, additional concerns were heard and explored. Specifically, workload concerns. These concerns were anticipated during the planning phase of this project due to the duties and responsibilities that staff already face. When workload is the argument, the counterargument is made that it takes less time to complete a safe hand-off verification than it does to fill out a MIDAS report. More importantly, processes like these speak to our institution's mission. Staff should represent the mission and values of the institution. Recognizing these dynamics is essential for ensuring the successful implementation of the policy, allowing for strategies to enhance driving forces while addressing restraining factors.

The Project Budget

The cost associated with this project is minimal. The capability is accessible through the MAR on many high-alert medications; however, during implementation, some medications were found not to have the rate verification functionality. Due to this, an adjustment was made to ensure all high-alert medications were included in this quality improvement change. Hospital leadership, including Epic Support and Quality Improvement, would like to look at roughly six months of data to show the benefits of this policy to determine if additional functions would need to be added to the MAR to include all high-alert medications. If data collection supports

decreasing high-alert medication infusion errors, leadership would further explore adding the functionality, which would potentially increase the cost for the institution to implement this policy housewide. For this project, no additional funds were needed other than the initial projected cost.

Staff in-service education was provided during pre-planned education days. On these days, staff reviewed various unit policies and performed competency skills assessments that are specific to the MICU staff. Additional hours for the project leader and nurse educator were assessed at $3,024. This is calculated by the project leader and educators' hourly pay rate working an additional 36 hours to prepare educational material. Additional costs included printing copies of the policy to be displayed in the unit resources binders. Developing laminated reminder cards at each workstation to complete the safe hand-off process and badge cards for the nurses if they need a quick reference guide at the bedside. The cost associated with these materials is not an addition to the project budget. These materials were obtained within the unit supply budget approved by the unit manager.

Additional workload for the project leader and the unit educator included developing an online audit sheet, staff literature, and reference guides that were distributed to the unit. Once implemented, the time to conduct audits and synthesize data was included in the workload time. (See Appendix C).

Project Timeline

The policy was submitted to the unit manager on October 15, 2024, and was approved on October 28, 2024. Materials for training, staff surveys, and literature on this project will not be distributed on November 17, 2024. Responses were received by November 25, 2024. The policy was finalized on November 28, 2024. The educational material was finalized and launched on

November 29, 2024. The project went live on December 1, 2024. Bi-weekly audits began on January 1, 2025, to review staff compliance and compare data against MIDAS reports requested from risk management to look for correlations between high-alert medication infusion errors and the safe hand-off verification (See Appendix D). The First MIDAS report will be requested on December 30, 2024. A second MIDAS report was requested on February 28, 2025. Moving forward, a MIDAS report will be requested and run through risk management every 30 days to collect data.

Project Outcomes

Implementation of the safe hand-off verification process was aimed at achieving several outcomes. As discussed in the literature, several nurses are not fully aware of the severity that high-alert medications pose to patients (Leung et al., 2015). Distributing this literature supports the need for this process and will hopefully inform nurses of the extreme risk to patients these medications can have when administered and documented incorrectly. Improving understanding and realizing the importance of proper documentation will hopefully enhance the nurse's knowledge and confidence when caring for patients in high-alert medication infusions. Knowledge is power, and improving knowledge is essential to improving compliance. Adherence to safety protocols is crucial when caring for the high-acuity population. Fostering a culture of safety through accountability is necessary to embrace change, especially technological change. The evidence on smart pump technology has been very favorable to reducing errors. Utilizing the technology that is already available in this institution allows MICU staff to begin this process very easily. This project intends to decrease discrephencies between the infusion rates documented in the MAR and the rate that is infusing on the pumps. This will ultimately lead to fewer ADEs. The final project outcome is by far the most important. Enhanced safety and

patient outcomes. Adherence to this policy is expected to improve patient safety, decrease hospitalizations, and promote the best possible outcome for the patient's health and wellness. All outcomes lead to the same goal: reduce high-alert medication errors. These outcomes are measurable by utilizing the bi-weekly audit and using it to correlate high-alert medication errors reported through the MIDAS reporting tool. The following control chart will be regularly updated once this project has launched. It would reflect ongoing data from MIDAS reports to allow the facilitator to assess the effectiveness of the safe hand-off verification process in reducing high-alert medication infusion errors.

Table 2

Number of High-Alert Medication Infusion Errors each Month

Month	**Number of Errors**	**Average (Median)**
December	6	5
January	5	5
February	0	5
March		
April		

Note: To visualize this data, you would plot the months on the x-axis and the number of medication errors on the y-axis. The run chart would include:

- Data Point: Each month the error count
- Average Line (Median): A horizontal line at the average number of errors

Data Collection, Tools, Analysis, and Visualization Plan

Multiple data collection tools were utilized in the initiation of this project. A pre-assessment survey was provided to determine staff knowledge of high-alert medications, current policy, and their experience with high-alert medications (See Appendix E). Based on the 28 surveys collected, 73% of nurses felt "very competent" in identifying high-alert medications, 96% felt "moderately competent" in identifying potential risks associated with high-alert medication infusions, 62% felt "moderately competent" calculating high-alert medication infusions, 68% felt "moderately competent" performing bedside handoff that included verifying high-alert medication infusions, 58% felt "slightly competent" using the medication administration record to verify high-alert medication infusion rates.

Once education was concluded, staff were given a post-survey to determine if knowledge was gained through the simulation and learning activities (See Appendix I). Based on the survey results, all RNs who participated "strongly agreed" on how to identify high-alert medications, are familiar with the steps of the new policy for two-RN verification, and understand the importance of having a two-RN high-alert medication infusion verification policy.

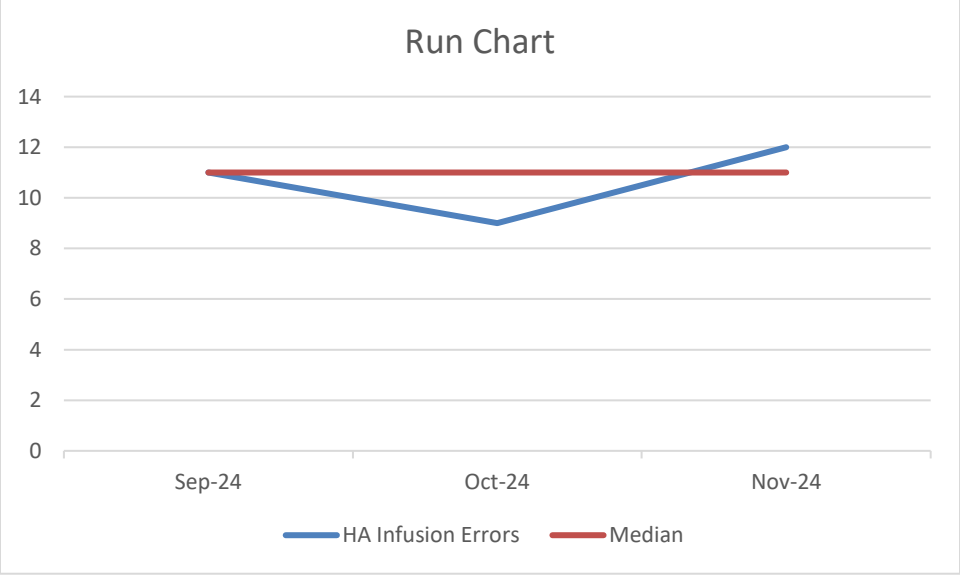
Monthly reports were generated through Epic to track medication errors in the MICU. (See Appendix K). After the implementation of this project, the information from the reporting was used further to determine if high-alert medication infusion errors decreased. An Excel spreadsheet was used to conduct bi-weekly audits on the safe hand-off verification compliance (See Appendix L). This spreadsheet includes the date, shift, medications infusing, rate, verification, verification time, and discrepancies found. Information on the high-alert medication

was compared to the monthly reports pulled by risk management to determine any correlations between the medication error and the time the error occurred.

Before the implementation of this project, MIDAS reports on high-alert medication infusions in the MICU, SICU, and CVICU were collected from September 2024 through December 2024. This data was evaluated to determine how many MIDAS reports were being filed. In September 2024, between all three ICUs, 21 high-alert medication infusion errors were reported. Out of the 21 errors reported, 11 occurred in the MICU. In October 2024, 23 MIDAS reports were filed between all three ICUs. Out of the 23 errors reported, 12 occurred in the MICU. In November 2024, 22 high-alert medication infusion errors were reported. Out of the 16 errors, 7 occurred in the MICU. This information was used for baseline information on how many errors were being reported (See Table 3).

Figure 3

High-Alert Medication Infusion Errors Before Implementation



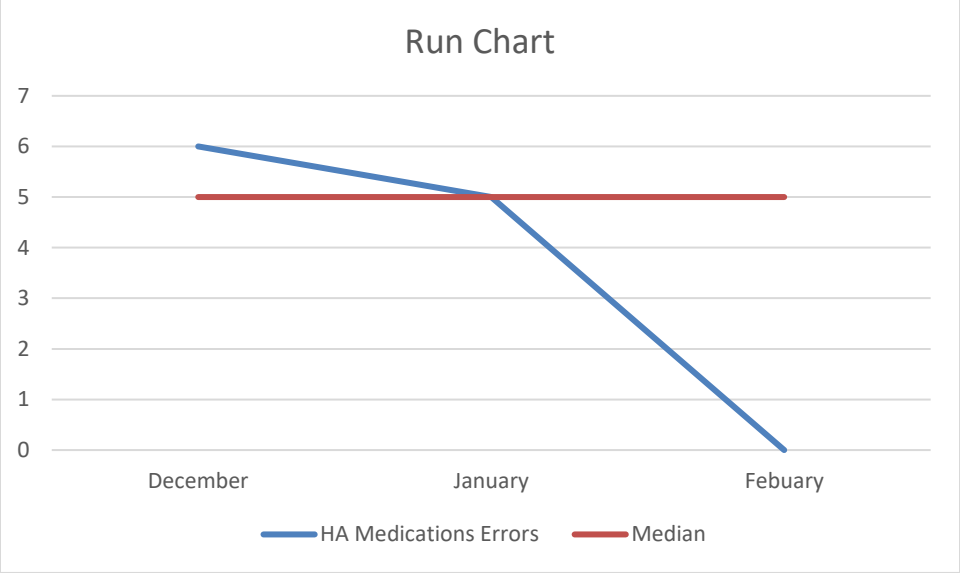
After implementation, the MIDAS reports were pulled solely on high-alert medication infusion errors in the MICU. The SICU and CVICU were excluded from the search criteria..

There were seven high-alert medication infusion errors reported in December 2024, pulled from the January 1, 2025, MIDAS reports. Based on MIDAS data collected on January 1, 2025, from December 2024, six MIDAS reports indicated high-alert medication infusion rate errors.

The MIDAS reports pulled on February 1, 2025, tracking the month of January 2025, reported five high-alert medication infusion errors from MICU. MIDAS reports pulled on March 1, 2025, tracking the month of February 2025, reported zero high-alert medication infusion errors in MICU (See Table 4).

Figure 4

High-Alert Medication Infusion Errors After Implementation



Based on data analysis, the overall reduction in high-alert medication infusion errors after implementation decreased by 66%. This reduction in errors is significant. More time is needed to establish the contributing factors to this decrease. Continued enhancement in compliance should contribute to positive process outcomes for future analysis.

Early reports presented compliance concerns with the staff. There were several patients receiving high-alert medications; however, only one RN was performing the rate verification at shift change instead of two. The project leader, unit educator, and clinical manager developed an incentive for the staff member who reports 100% compliance at the end of each month. All staff members who have 100% rate verification compliance through auditing will be entered into a drawing to "skip a float day". This was well received by staff members. This project is not intended to be used for punitive purposes. It is designed to reduce errors and develop a system that promotes a culture of safe practice when administering and managing patients requiring high-alert medication infusions.

Refining Intervention Tools

Various tools were utilized to educate, implement, and evaluate the effectiveness of this process. For this project, the distribution of a staff survey, information on current policy and new policy, learning activities, resource guides, and post-evaluation surveys were included in education and implementation.

The first tool that was distributed was a staff survey. This survey assessed nurses' knowledge of high-alert medication and their perceived competency in preparing, administering, and monitoring these medications. In addition, it was used to assess how many nurses were going to the bedside during shift hand-off (See Appendix E). The educational materials contained details on the new policy change regarding rate verification during shift hand-off and the current hospital policy on administering high-alert medications. These materials had to be altered due to the change in process to complete the two RN rate verifications. (See Appendix F). During the scheduled training simulation, the nurses had an online escape room activity to review high-alert medication nursing considerations. Once

staff members completed the online activity, they went through an in-person simulation with one of the project leaders (See Appendix H). After completion of the escape room activity and simulation, the nurses were encouraged to complete a post-survey on the education provided (See Appendix I). The survey results were very positive. Overall, the nurses who completed the activity enjoyed a different approach to this form of competence training and felt like they learned something new regarding high-alert medications. (See Table 5). Each nurse received a safe hand-off checklist card that they could attach to their badges as a reference guide. This safe hand-off checklist was posted at each workstation on the unit (See Appendix J). This was then readjusted after implementation. A quantum-resistant ledger (QRL) code linked to this checklist was printed and displayed near the computers in patient rooms as another reference for staff. After implementation, we removed the checklist from the workstations and added the QRL code. It provided the same information but created less clutter in the workstations.

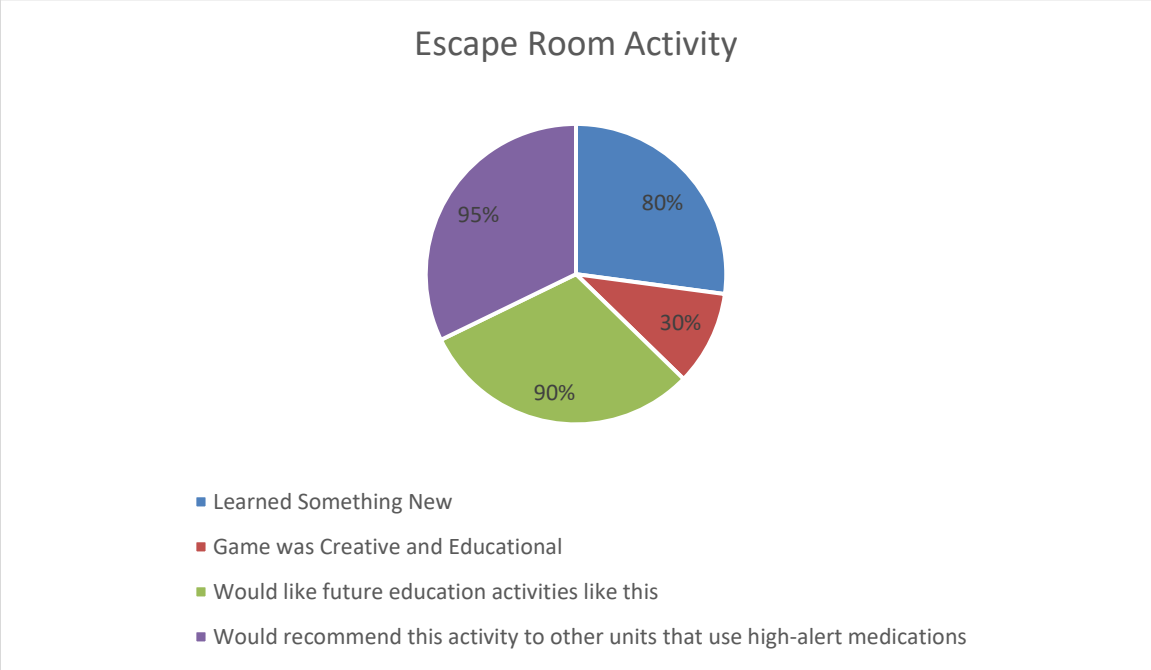
Continuing a collaborative team approach through staff surveys, interactive training activities, and supportive resource guides has prepared staff to incorporate this practice change in their daily care. It would be essential to include these learning activities in new hire orientation and on future staff competency training days.

The audit tools had to be refined once we were faced with an Epic setback. This change consisted of adding another column to add the second hand-off since the prior process recorded both at once. If this policy continues and proves to be beneficial, the Epic support team has agreed to look at adding the additional high-alert medications that are not currently available as a dual rate verification sign-off in MAR. and comprehensive analysis charts serve as ongoing references for staff to follow and hopefully close the gap on when and how

these errors are occurring. Together, all these tools are evident to facilitate a robust framework for enhancing patient safety.

Table 5

Escape Room Activity Staff Survey



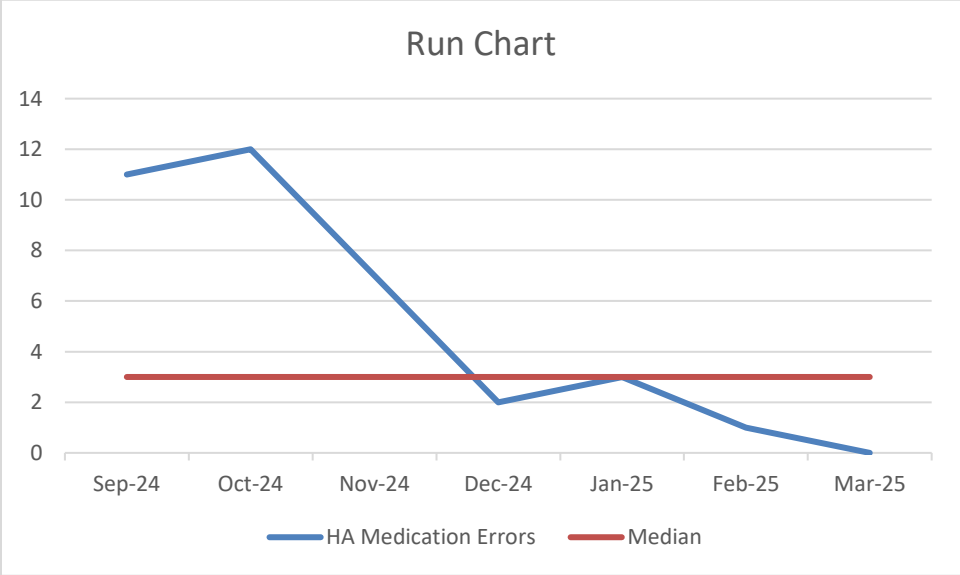
Significance, Implications, and Limitations

The primary rules commonly used in run chart analysis include the shift rule, the trend rule, the number of runs, and the identification of astronomical points (Carey, 2003). A *shift* occurs when six or more consecutive data points fall either above or below the median, signaling a sustained change in the process. A *trend* refers to five or more data points moving consistently upward or downward, which may suggest a systematic shift rather than random variation. Additionally, the total number of runs or groups of points on either side of the median must fall within a certain expected range; having too few or too many runs can imply that the data are not randomly distributed. Finally, an *astronomical point* is a data value that

stands out markedly from the rest, potentially indicating an unusual event or an error (Carey, 2003).

Based on the information in Figure 6, because there are too few runs, it's a signal that the data could not have occurred by chance. This can represent a potential improvement following the implementation of the new policy. There are four rules for interpreting the data on a run chart. When one of these rules is broken, it is a strong indicator that a non-random pattern is present in the data.

Figure 6



To truly identify significance, collecting data over a longer period is essential. Six months would provide better insight into whether implementing this policy will show a sustained decrease in high-alert medication infusion errors.

It is a fair assessment based on the 66% decrease in MIDAS reports on high-alert medication infusion errors, indicating that having a dual hand-off policy impacts safety incidents. Other contributing process factors include looking at compliance with the policy. This enables team leaders on this project to analyze if the RNs are consistent in the dual

hand-off process and determine if it contributes to the decline of errors. In December 2024, 38 patients on high-alert medication infusion charts were audited for compliance. Only 32 occurrences were documented on the compliance audit. This means looking at two shift changes a day for 38 patients; 100% compliance would have documented 76 occurrences. After the incentive program was put in place, January 2025 showed improvement. Twenty-four patients on high-alert medication infusions were audited. Compliance showed 32 occurrences documented. The month of February has thus far shown improvement across the board. Nineteen patients on high-alert medications were audited. Out of the 38 occurrences that would confirm 100% compliance, there were only 2 occurrences that were not documented. February had zero high-alert medication infusion errors reported to MIDAS.

This information is significant in showing overall compliance with policy. This analysis provides pivotal data displaying that compliance continued to improve after implementation.

Project goals were not entirely met due to a lack of data analysis. The alteration in the electronic verification is potentially a deviating factor. Due to unforeseen issues with Epic, having to use an alternative method to electronically verify the added process caused some pushback. Continuation is crucial to move forward in advancing Epic to add all high-alert medications for rate verification to streamline this process.

This quality improvement initiative has significant benefits to patients, providers, and stakeholders. Due to the harsh effects of these medications and the long-term ramifications. This policy can potentially minimize harm to patients, and adverse events, decrease hospitalization time, and improve outcomes. From a provider's perspective, it brings more awareness and autonomy when managing these medications. As an institution, these safety

policies save the facility additional costs in medication errors and potential sentinel events and preserve the reputation of patient safety to the public.

Project Future

Continuation of this project is crucial to success. Six months to a year of data would allow a more comprehensive data analysis in determining if adding this policy will decrease the number of medication errors, including high-alert medication infusions. This will pose more financial investment in upgrading the software in Epic. Decreasing medication errors and patient safety events has substantial cost benefits to the institution and its stakeholders. If the policy becomes housewide and is consistent, the short-term investments in software should return significantly. In addition, if this project becomes a housewide policy, it will be more sustainable. Compliance reports could potentially replace the manual audits currently being performed, and the process can be more streamlined within the institution.

In many institutions in the tri-state area, this policy is already being used in practice. As mentioned previously, this practice is recommended by the Joint Commission. Implementing these recommendations enables the institution to enhance innovation and focus on creating a culture of safe practice.

Many other institutions have taken it a step further and included all continuous medications in their rate-verification process. This includes maintenance fluids and other continuous medications. The long-term goal for this DNP site project would be to implement all continuous medications. The reality is that any medication can be harmful if managed incorrectly. Therefore, incorporating all continuous infusions serves the patient's best interest in promoting positive outcomes.

Conclusion

The goal of this DNP project was to enhance patient safety by implementing a two RN rate verification hand-off on all high-alert medication infusions in the MICU. High-alert medications pose a significant risk to patient safety due to the potential misuse and errors in administration. By implementing a process that would require dual-electronic verification through integrated pump technology, the project aims to minimize the risk associated with incorrect infusion rates. Ultimately, ensuring these high-alert medications are administered accurately, effectively, and are overall safe for the patients.

Sufficient research and data support the implementation of integrated pump technology. One advantage this project already has is that this technology is currently available in this institution. Implementation was more of a performance-based change. Comprehensive training for the MICU staff was necessary to emphasize the sensitivity of administering these medications and the necessity of having a two-RN rate verification hand-off. Current policy dictates dual rate verification on some high-alert medications, but not all. Until all medications have this functionality within the MAR, another approach was developed to ensure two RNs were completing this protocol through electronic verification. Supportive resources were provided to ensure this could be implemented into the staff's workflow effectively.

The results of this project are still premature but promising. Looking at overall high-alert medication errors, numbers have been down since December 2024. This was the beginning of implementation. Looking specifically at high-alert medication infusions, compliance with the two RN rate verifications has increased. Additionally, nursing staff have reported feeling more confident in their ability to administer these medications safely and appreciate the importance of accuracy when managing these medications.

Minor challenges were encountered during implementation. The biggest issue is limited functionality within the MAR. It was discovered early on that not all high-alert medication infusions had the capability of completing a rate verification. This was problematic due to the process involved in this project. After meeting with Epic leadership, quality improvement, and unit leadership, an alternative method was developed for trial-based use. This method produced the same result that the project was measuring, it just added a step. As this project progresses, if benefits are measured, Epic Leadership is willing to look at adding the functionality for all high-alert medications.

Other minor setbacks included some initial resistance from staff. The first compliance report was not reassuring that the staff were on board with adding a new process to their already busy clinical duties. To address this issue, additional educational sessions were held to reinforce the importance of this process. The leadership provided continuous support in staff huddles and weekly staff emails to ensure a smooth integration. Unit leadership launched an incentive process to highlight staff members who maintained compliance. This excited staff members and drastically impacted participation. Moving forward, it will be essential to address time-related concerns by exploring ways to streamline this process or incorporate the pump technology more efficiently.

To sustain and improve the two RN rate verification hand-off, several recommendations are necessary. The first requirement would be to ensure that all medications dedicated to this process must have the functionality embedded into the MAR. The dual verification can be more effective if it is consistent with all medications. Therefore, as the process progresses, if other continuous are added to this policy, then the functionality already exists. Expanding the two RN rate verification hand-off to include other continuous medications could further reduce the

likelihood of medication errors. As mentioned, any medication could potentially cause harm. Additionally, conducting regular compliance audits and providing ongoing education will help maintain the effectiveness of this process and encourage continuous improvement in medication safety.

In conclusion, the implementation of a two-RN rate verification hand-off on high-alert medication infusions has the potential to reduce medication errors and enhance patient safety. Through collaboration, continued education, and innovation, reducing harmful events is possible. Pump integration technology has already shown the benefits of enhancing medication safety. By utilizing this technology, providers can close the gap on human error when administering and managing medications by using its capabilities to the fullest.

References

Abeer, M., Abdalhamid, F. A., Eweda, S., & Elsayed, N. (2017). Nurses knowledge and practice in dealing with high-alert medications. *Alexandria Scientific Nursing Journal*, *19*(2), 1–24. https://doi.org/10.21608/asalexu.2017.208348

Ahmed, A. H., Giri, J., Kashyap, R., Singh, B., Dong, Y., Kilickaya, O., Erwin, P. J., Murad, M. H., & Pickering, B. W. (2015). Outcome of adverse events and medical errors in the intensive care unit: a systematic review and meta-analysis. *American Journal of Medical Quality: The official journal of the American College of Medical Quality*, *30* (1), 23–30. https://doi.org/10.1177/1062860613514770

Bowers, A. M., Goda, K., Bene, V., Sibla, K., Piccin, R., Golla, S., Dani, F., Zell, K. (2015). Impact of bar-code medication administration on medication administration best practices. CIN: Computers, Informatics, Nursing, 33(11), 502–508. https://doi.org/10.1097/cin.0000000000000198

Carey, R. (2003). *Improving healthcare with control charts: Basic and advanced SPC methods and case studies*. ASQ Quality Press.

Chin, K., Donovan, J., Bingham, G., Poole, S., & Tong, E. (2023). Evaluation of Smart Pump Interoperability with an Electronic Medical Record System to Improve Infusion Safety...19th World Congress on Medical and Health Informatics, July 8-12, 2023, New South Wales, Australia. *Studies in Health Technology & Informatics*, *310*, 1341–1342. https://doi.org/10.3233/SHTI231185

Heather H. Seibert, Ray R. Maddox, Elizabeth A. Flynn, Carolyn K. Williams. (2014). Effect of barcode technology with electronic medication administration record on medication accuracy rates, *American Journal of Health-System Pharmacy*, 3(71), 209–218. https://doi.org/10.2146/ajhp130332

Hunter, K. M. (2011). Implementation of an electronic medication administration record and bedside verification system. *Online Journal of Nursing Informatics*, *15*(2), https//doi.org/10.1016/J.SAPHARM.2019.02.00

Kelly, J. L. (2014). Continuous insulin infusion: When, where, and how? *Diabetes Spectrum*, *27*(3), 218–223. https://doi.org/10.2337/diaspect.27.3.218

Leung, A., Denham, C., Gandhi., Tejal, K., Bane, A., Churchill, W., Bates, D., Poon, E. (2015). A safe practice standard for barcode technology. *Journal of Patient Safety* 11(2), 89-99. https://doi.org/10.1097/PTS.0000000000000049

Magnet model. ANA. (2017). https://www.nursingworld.org/organizational-programs/magnet/magnet-model/

Marwitz, K. K., Giuliano, K. K., Su, W., Degnan, D., Zink, R. J., DeLaurentis, P. (2019). High-alert medication administration and intravenous smart pumps: A descriptive analysis of clinical practice. Research in Social and Administrative Pharmacy, 15(7), 889-894. https//doi.org/10.1016/J.SAPHARM.2019.02.007

Maxson, P. M., Derby, K. M., Wrobleski, D. M., & Foss, D. M. (2012). Bedside nurse-to-nurse handoff promotes patient safety. Medsurg nursing: official *Journal of the Academy of Medical-Surgical Nurses*, 21(3), 140–145.

Malekzadeh, J., Mazluom, S,R., Etezad,I T., Tasseri, A. (2013). A standardized shift handover protocol: improving nurses' safe practice in intensive care units, 2(3), 177-85. https// doi.org/10.5681/jcs.2013.022.

Medication management and safety. Joint Commission Resources. (2023). https://www.jcrinc.com/what-we-offer/advisory-services/medication-management-and-safety/

Mohamed, H. R., & Abdalla, S. S. (2022). Effectiveness of nursing guidelines on nurses' performance regarding high alert medications at Neonatal Intensive Care Units. Evidence-Based Nursing Research, 4(2), 54–63. https://doi.org/10.47104/ebnrojs3.v4i2.241

National Patient Safety Goals. (2023). https://www.jointcommission.org/standards/national-patient-safety-goals/-/media/b35ba0b4b9754c6dbafdb1f86e152e5c.ashx

Subramanyam, R., Mahmoud, M., Buck, D., & Varughese, A. (2016). Infusion medication error reduction by two-person verification: A Quality Improvement initiative. Pediatrics, 138(6). https://doi.org/10.1542/peds.2015-4413

Taylor, J. (2015). Improving patient safety and satisfaction with standardized bedside handoff and walking rounds. Clinical Journal of Oncology Nursing, 19(4), 414–416. https://doi.org/10.1188/15.cjon.414-416

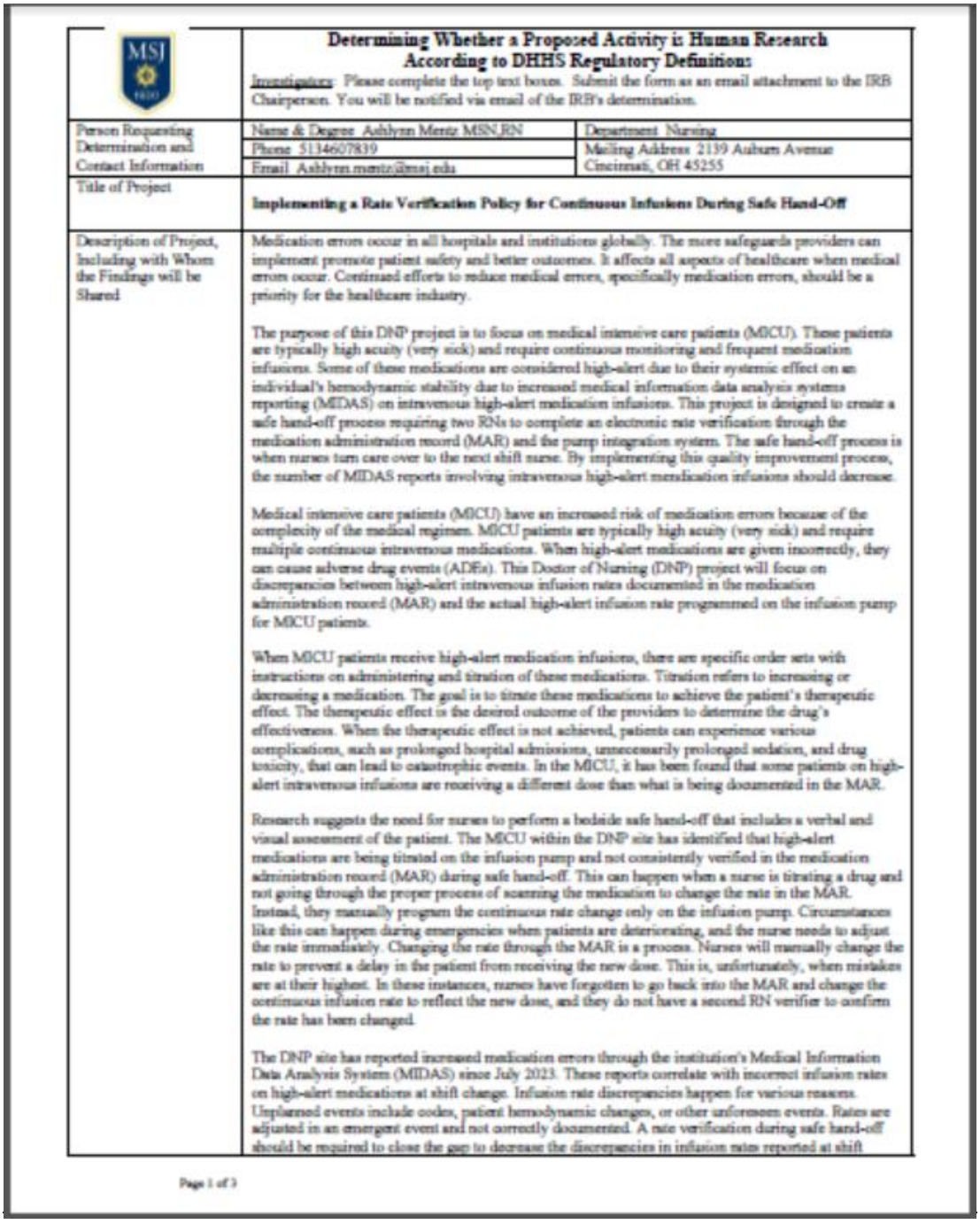
Thomas, M. (2013). Evaluation of the personalized bar-code identification card to verify high-risk, high-alert medications. *CIN: Computers, Informatics, Nursing*, *31*(9), 412–421. https://doi-org.msj.idm.oclc.org/10.1097/01.NCN.0000432120.94699.64

Wojciechowski, E., Murphy, P., Pearsall, T., French, E., (May 31, 2016) A case review: Integrating Lewin's theory with lean's system approach for change. *The Online Journal of Issues in Nursing* 21(2). https://doi.org/10.3912/OJIN.Vol21No02Man04

Wolf Z. R. (2016). Medication Errors Involving the Intravenous Administration Route: Characteristics of Voluntarily Reported Medication Errors. Journal of infusion nursing: the official publication of the Infusion Nurses Society, 39(4), 235–248. https://doi.org/10.1097/NAN.0000000000000178

APPENDIX A

Mount St. Joseph University IRB Request Document



Determining Whether a Proposed Activity is Human Research According to DHHS Regulatory Definition:

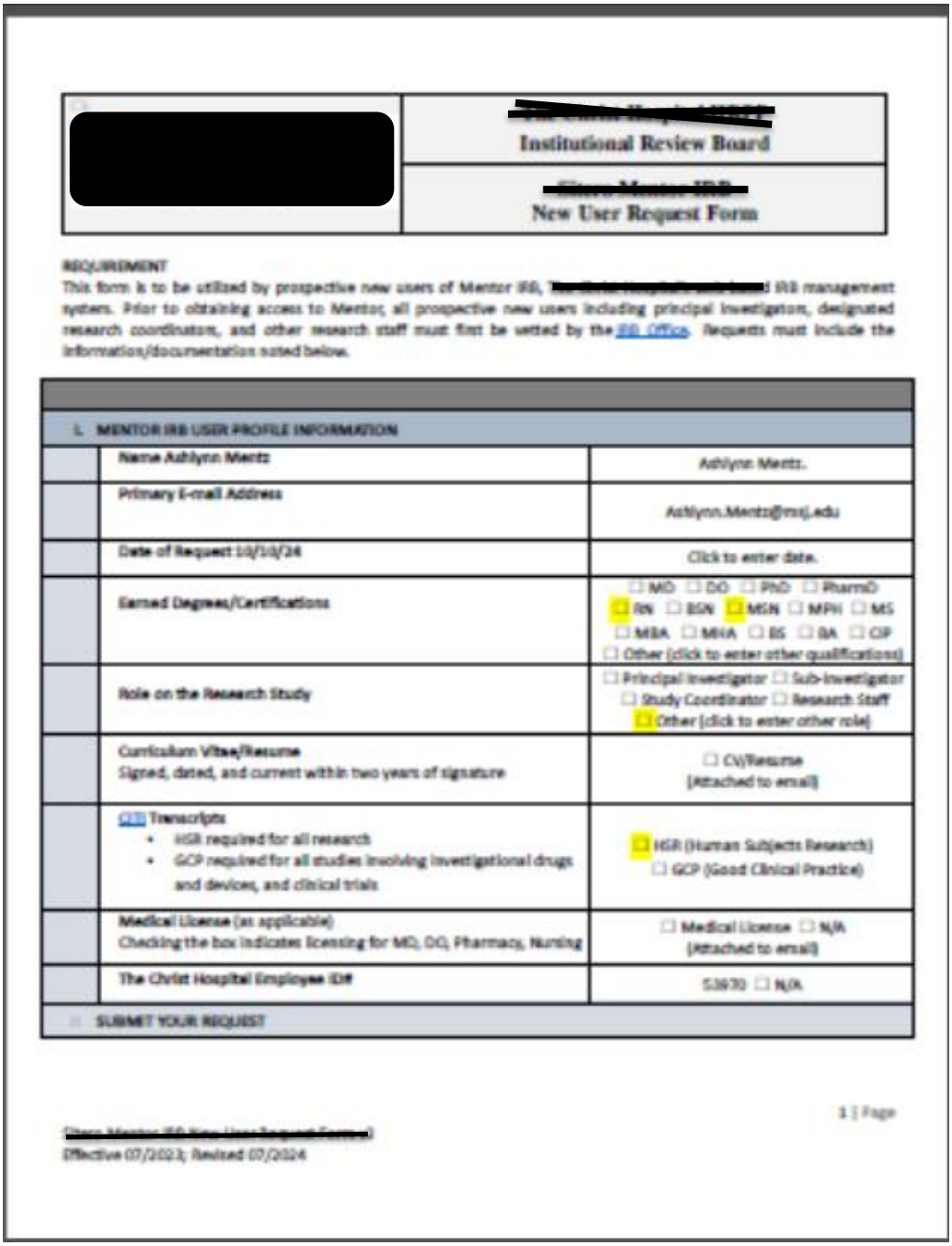
Investigators: Please complete the top text boxes. Submit the form as an email attachment to the IRB Chairperson. You will be notified via email of the IRB's determination.

Person Requesting Determination and Contact Information	Name & Degree: Ashlynn Mentz MSN,RN	Department: Nursing
	Phone: 5134607839	Mailing Address: 2139 Auburn Avenue Cincinnati, OH 45255
	Email: Ashlynn.mentz@msj.edu	
Title of Project	**Implementing a Rate Verification Policy for Continuous Infusions During Safe Hand-Off**	
Description of Project, Including with Whom the Findings will be Shared	Medication errors occur in all hospitals and institutions globally. The more safeguards providers can implement promote patient safety and better outcomes. It affects all aspects of healthcare when medical errors occur. Continued efforts to reduce medical errors, specifically medication errors, should be a priority for the healthcare industry. The purpose of this DNP project is to focus on medical intensive care patients (MICU). These patients are typically high acuity (very sick) and require continuous monitoring and frequent medication infusions. Some of these medications are considered high-alert due to their systemic effect on an individual's hemodynamic stability due to increased medical information data analysis systems reporting (MIDAS) on intravenous high-alert medication infusions. This project is designed to create a safe hand-off process requiring two RNs to complete an electronic rate verification through the medication administration record (MAR) and the pump integration system. The safe hand-off process is when nurses turn care over to the next shift nurse. By implementing this quality improvement process, the number of MIDAS reports involving intravenous high-alert medication infusions should decrease. Medical intensive care patients (MICU) have an increased risk of medication errors because of the complexity of the medical regimen. MICU patients are typically high acuity (very sick) and require multiple continuous intravenous medications. When high-alert medications are given incorrectly, they can cause adverse drug events (ADEs). This Doctor of Nursing (DNP) project will focus on discrepancies between high-alert intravenous infusion rates documented in the medication administration record (MAR) and the actual high-alert infusion rate programmed on the infusion pump for MICU patients. When MICU patients receive high-alert medication infusions, there are specific order sets with instructions on administering and titration of these medications. Titration refers to increasing or decreasing a medication. The goal is to titrate these medications to achieve the patient's therapeutic effect. The therapeutic effect is the desired outcome of the providers to determine the drug's effectiveness. When the therapeutic effect is not achieved, patients can experience various complications, such as prolonged hospital admissions, unnecessarily prolonged sedation, and drug toxicity, that can lead to catastrophic events. In the MICU, it has been found that some patients on high-alert intravenous infusions are receiving a different dose than what is being documented in the MAR. Research suggests the need for nurses to perform a bedside safe hand-off that includes a verbal and visual assessment of the patient. The MICU within the DNP site has identified that high-alert medications are being titrated on the infusion pump and not consistently verified in the medication administration record (MAR) during safe hand-off. This can happen when a nurse is titrating a drug and not going through the proper process of scanning the medication to change the rate in the MAR. Instead, they manually program the continuous rate change only on the infusion pump. Circumstances like this can happen during emergencies when patients are deteriorating, and the nurse needs to adjust the rate immediately. Changing the rate through the MAR is a process. Nurses will manually change the rate to prevent a delay in the patient from receiving the new dose. This is, unfortunately, when mistakes are at their highest. In these instances, nurses have forgotten to go back into the MAR and change the continuous infusion rate to reflect the new dose, and they do not have a second RN verifier to confirm the rate has been changed. The DNP site has reported increased medication errors through the institution's Medical Information Data Analysis System (MIDAS) since July 2023. These reports correlate with incorrect infusion rates on high-alert medications at shift change. Infusion rate discrepancies happen for various reasons. Unplanned events include codes, patient hemodynamic changes, or other unforeseen events. Rates are adjusted in an emergent event and not correctly documented. A rate verification during safe hand-off should be required to close the gap to decrease the discrepancies in infusion rates reported at shift	

Page 1 of 3

APPENDIX B

Project Site IRB Request Document



[redacted]

Institutional Review Board

[redacted] IRB

New User Request Form

REQUIREMENT

This form is to be utilized by prospective new users of Mentor IRB, [redacted] IRB management system. Prior to obtaining access to Mentor, all prospective new users including principal investigators, designated research coordinators, and other research staff must first be vetted by the IRB Office. Requests must include the information/documentation noted below.

I. MENTOR IRB USER PROFILE INFORMATION		
	Name Ashlynn Mentz	Ashlynn Mentz.
	Primary E-mail Address	Ashlynn.Mentz@mssj.edu
	Date of Request 10/10/24	Click to enter date.
	Earned Degrees/Certifications	☐ MD ☐ DO ☐ PhD ☐ PharmD ☒ RN ☐ BSN ☒ MSN ☐ MPH ☐ MS ☐ MBA ☐ MHA ☐ BS ☐ BA ☐ CIP ☐ Other (click to enter other qualifications)
	Role on the Research Study	☐ Principal Investigator ☐ Sub-Investigator ☐ Study Coordinator ☐ Research Staff ☒ Other (click to enter other role)
	Curriculum Vitae/Resume Signed, dated, and current within two years of signature	☐ CV/Resume (Attached to email)
	CITI Transcripts • HSR required for all research • GCP required for all studies involving investigational drugs and devices, and clinical trials	☒ HSR (Human Subjects Research) ☐ GCP (Good Clinical Practice)
	Medical License (as applicable) Checking the box indicates licensing for MD, DO, Pharmacy, Nursing	☐ Medical License ☐ N/A (Attached to email)
	The Christ Hospital Employee ID#	53670 ☐ N/A
II. SUBMIT YOUR REQUEST		

1 | Page

[redacted] New User Request Form)

Effective 07/2023; Revised 07/2024

Protocol Review Complete - IRB ID: 24-084

[redacted]
Thu, Nov 14, 2024 at 6:19 AM
To: ashmentz@gmail.com

[redacted]
Institutional Review Board
FWA #00000702

Protocol Review Complete - IRB ID: 24-084

[redacted] **plementing a two RN rate verification policy on high alert medication infusions** is complete.

If you have any questions, [redacted]

APPENDIX C

Project Budget

	A	C	D	E	G	H	I
2	**Budget Plan for Project:**				*Notes* : This template is completed with inserted information from an actual DNP project, delete and add your numbers		
3							
4	**Item**	**Time (hours**	**Cost**		**Project Activities**	**Hours**	
5	**Personnel Costs**				Education development	32	
6	Project lead in-kind services	36	$1,512.00		Education of Members	12	
7	Information Services/EPIC Support	4	$168.00		Data Collection	80	
8	Project Manager	36	$1,512.00		Data Analysis	24	
9	Quality Outcomes Analyst	2	$84.00				
10	Unit Manager	50	$2,250.00		Collaboration	16	
11					Write-Up	16	
12	**Total**		**$5,526.00**		**Total**	180	
13							
14	**Non-Personnel Costs**						
15	Food for monthly meeting		$100.00				
16	Printing Poster		$0.00				
17	Printing or copying		$38.00				
18							
19							
20							
21	**Total Non-Personnel Costs**		**$200.00**				
22	**Grand Total (Expenses)**		**$5,726.00**				
23							
24							
25							
26							

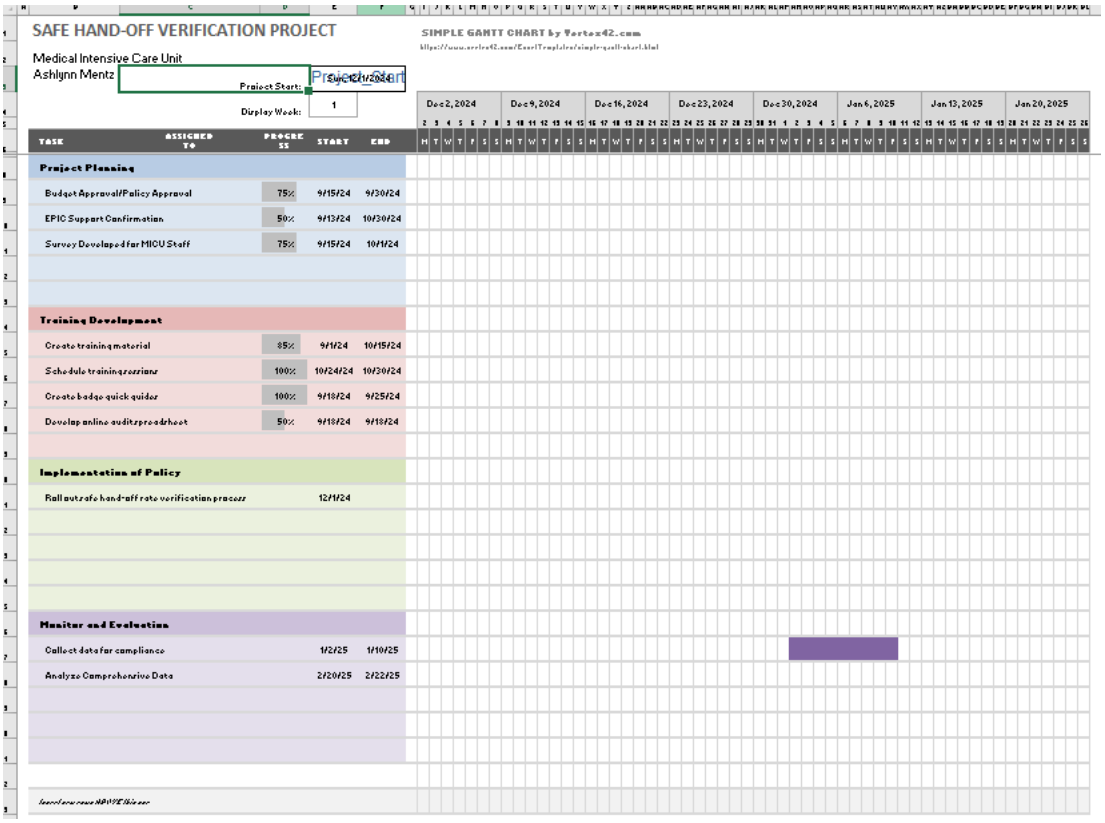
APPENDIX D

Implementation Timeline Chart and Gaant Chart Template

Implementation Timeline Chart

Date	Phase	Tasks
September 1-5	Preparation	-Assemble project team
September 10-15	Preparation	- Research best practices - Gather materials
September 18-25	Preparation	- Develop training materials - Prepare escape room activity
October 24-30	Preparation	- Schedule training sessions - Send invitations
November 20-25	Training	- Conduct staff training sessions
November 25-28	Training	- Gather feedback through post-training surveys
November 28-30	Training	- Final preparations and adjustments
December 1	Implementation	- Official policy launch - Begin new protocol
January 2-10	Monitoring & Evaluation	- Observe compliance: bi-weekly MAR audits - Collect data from Risk Management on MIDAS
February 15-18	Monitoring & Evaluation	- Mid-implementation review meeting
February 20-22	Monitoring & Evaluation	- Comprehensive evaluation and analysis
March 1-5	Reporting & Improvement	- Prepare a final report on the findings

Gaant Chart Template



SAFE HAND-OFF VERIFICATION PROJECT

SIMPLE GANTT CHART by Vertex42.com

Medical Intensive Care Unit

Ashlynn Mentz

Project Start: Sun, 12/1/2024

Display Week: 1

TASK	ASSIGNED TO	PROGRESS	START	END
Project Planning				
Budget Approval/Policy Approval		75%	9/15/24	9/30/24
EPIC Support Confirmation		50%	9/13/24	10/30/24
Survey Developed for MICU Staff		75%	9/15/24	10/1/24
Training Development				
Create training material		85%	9/1/24	10/15/24
Schedule training sessions		100%	10/24/24	10/30/24
Create badge quick guides		100%	9/18/24	9/25/24
Develop online audit spreadsheet		50%	9/18/24	9/18/24
Implementation of Policy				
Roll out safe hand-off rate verification process			12/1/24	
Monitor and Evaluation				
Collect data for compliance			1/2/25	1/10/25
Analyze Comprehensive Data			2/20/25	2/22/25

Dec 2, 2024 | Dec 9, 2024 | Dec 16, 2024 | Dec 23, 2024 | Dec 30, 2024 | Jan 6, 2025 | Jan 13, 2025 | Jan 20, 2025

APPENDIX E

Pre-Assessment Survey

High-Alert Medications Competency Survey

Instructions: Please answer the following questions honestly. Your responses will help us identify areas for improvement and training needs regarding high-alert medications.

1. **Years of Experience in Nursing:**
   - 0-1 year
   - 2-5 years
   - 6-10 years
   - More than 10 years

Competency Assessment:

Please rate your confidence in the following areas using a scale of 1 to 5:

1 = Not confident at all
2 = Slightly confident
3 = Moderately confident
4 = Very confident
5 = Extremely confident

3. **Identifying high-alert medications in our facility:**
   - 1 2 3 4 5
4. **Understanding the potential risks associated with high-alert medications:**
   - 1 2 3 4 5
5. **Correctly calculating dosages for high-alert medications:**
   - 1 2 3 4 5
6. **Performing bedside report at the bedside to verify continuous infusions:**
   - 1 2 3 4 5
7. **Communicating effectively with team members during medication administration:**
   - 1 2 3 4 5
8. **Utilizing the electronic health record (EHR) to verify medication orders:**
   - 1 2 3 4 5

Knowledge Assessment:

Please answer the following questions:

9. **Which of the following is considered a high-alert medication?** (Select all that apply)
   - a) Insulin
   - b) Antibiotics
   - c) Anticoagulants

- d) Pain medications

10. **What steps do you take to ensure safe administration of high-alert medications?** (Open-ended response)

11. **What challenges do you face when dealing with high-alert medications?** (Open-ended response)

12. **What additional training or resources do you feel would improve your competency with high-alert medications?** (Open-ended response)

Final Thoughts:

13. **Do you have any other comments or suggestions regarding high-alert medication safety in our facility?** (Open-ended response)

Thank you for your participation! Your feedback is valuable in enhancing our safety practices.

APPENDIX F

Proposed Policy

Policy Title: Two-RN Verification Process for High-Alert Medication Infusions

Policy Number:
Effective Date: 12/1/2024
Review Date:
Department: Medical Intensive Care Unit
Approved By:

I. Purpose

To enhance patient safety during the administration of high-alert medication continuous infusions by implementing a standardized two-RN verification process during safe hand-off.

II. Scope

This policy applies to all registered nurses (RNs) involved in the administration of high-alert medications working in the Medical Intensive Care Unit at The Christ Hospital.

III. Definition

High-Alert Medications: Medications that carry a high risk of causing significant harm to patients if used in error. Examples include but are not limited to, insulin, anticoagulants, Vasopressors, and certain Neuromuscular Blockades.

IV. Policy Statement

All RNs must adhere to the two-RN verification process for high-alert medication infusions to ensure accuracy, promote safe medication practices, and minimize the risk of medication errors.

V. Procedure

1. **Patient Identification**

   ~RNs must verify the patient's identity using at least two identifiers (e.g., name and date of birth) before medication verification.

2. **Medication Verification**

   ~Before the Outgoing RN completes shift hand-off and the Oncoming RN assumes care of the patient the both RNs will:

- Confirm the medication order against the patient's chart.
- Review the medication's indication, dosage, route, and administration guidelines.
- Scan the patients identification bracelet
- Scan the High-alert Medication infusing
- Scan the pump administering the high-alert medication infusing

3. **Two-RN Verification**
    - The Outgoing RN will call for the On-coming RN to participate in the verification process.
    - Both RNs will:
        - Independently verify the medication name, dosage, route, patient identifiers, and any specific instructions.
        - Both RNs will verify that the rate programmed into the pump administering the high-alert medication matches what is documented in the Medication administration record (MAR)
        - Use the designated RN verification checklist to ensure all steps are completed.

4. **Documentation**
    - Both RNs will document the verification process in the patient's MAR, including their names and the date and time of verification.
    - Any discrepancies identified during the verification process must be resolved before the outgoing RN completes handing over patient care

VI. Training

All nursing staff must complete training on the two-RN verification safe hand-off process before implementation and participate in ongoing education to ensure compliance with this policy.

VII. Compliance

Compliance with this policy will be monitored through audits and feedback mechanisms. Non-compliance may result in disciplinary actions as outlined in [Insert Facility's Policy on Disciplinary Actions].

APPENDIX G

Escape Room Activity

Escape Room Activity: "The High-Alert Medication Challenge"

Overview

Participants will work in teams to solve clues and complete challenges related to high-alert medications. The goal is to "escape" the room by demonstrating their knowledge and skills in a fun and interactive way.

Time Limit

- 30 minutes to complete the challenges and "escape."

Activity Components

I. Introduction (10 minutes)

- Brief participants on the importance of high-alert medications and the objectives of the activity.
- Divide participants into teams of 3-4 members.

II. Clue Stations (4-5 Stations, 10 minutes each)

II. Clue Stations (4-5 Stations, 10 minutes each)

1. **Medication Identification Station**
    - **Clue:** Identify different high-alert medications from pictures or props.
    - **Challenge:** Match medication names with their indications, routes, and potential side effects. Correct matches provide a code to the next station.
2. **Dosage Calculation Station**
    - **Clue:** Solve dosage calculation problems presented on a worksheet.
    - **Challenge:** Each correct answer gives a piece of a code needed to unlock the next station.
3. **Scenario Simulation Station**
    - **Clue:** Read a patient scenario involving high-alert medication.
    - **Challenge:** Identify safety concerns and suggest the correct two-RN verification steps. Provide the right steps to receive the next code.
4. **Error Identification Station**
    - **Clue:** Review a mock medication administration record with intentional errors.
    - **Challenge:** Identify discrepancies (e.g., wrong dose, wrong patient). Each identified error reveals a letter for the escape code.
5. **Communication Challenge Station**
    - **Clue:** Role-play a handoff scenario involving a high-alert medication.
    - **Challenge:** Teams must effectively communicate key information to a “receiving nurse” (facilitator) to receive the final part of the escape code.

III. Final Escape Code and Reflection (10 minutes)

- Once teams complete all stations, they will combine their codes to unlock a box containing a certificate of completion and small prizes.
- Conclude with a group discussion about key takeaways, challenges faced, and how they can apply what they've learned in practice.

APPENDIX H

Simulation Outline

Simulation Training Outline: Two-RN Verification during Shift Hand-Off Policy

I. Introduction

- A. Welcome and Introduction of Facilitators
- B. Overview of Training Objectives
    - 1. Understand the importance of the two-RN verification during Safe Hand-Off process
    - 1. Practice the verification steps in a simulated environment
    - 1. Enhance communication and teamwork among nursing staff

II. Background Information

- A. Review of High-Alert Medications
    - 1. Definition and examples
    - 1. Risks associated with improper administration
- B. Explanation of the Two-RN Verification during Safe Hand-off Policy
    - 1. Purpose and goals
    - 1. Key steps in the verification process

III. Pre-Simulation Preparation

- A. Distribute Materials
    - 1. Checklist for RN verification
    - 1. Scenario descriptions
- B. Review of Simulation Environment
    - 1. Set up simulation lab or designated area
    - 1. Ensure necessary equipment and medication are available

IV. Simulation Scenarios

- A. Scenario 1: Shift Hand-Off on a Patient Receiving a High Alert Medication Infusion
    - 1. Introduce patient case and background information (shift report details)
    - 1. Assign roles (Off going RN, On coming RN, Team Leader for Observation)
    - 1. Perform the two-RN verification process
    - 1. Debrief as a group to discuss the experience

- B. Scenario 2: Handling a Medication Error or Discrepancy
    - 1. Present a situation where a discrepancy occurs during verification
    - 1. Engage participants in problem-solving and communication
    - 1. Discuss appropriate actions and reporting mechanisms

V. Group Discussion and Feedback

- A. Reflect on Experiences
    - 1. What went well during the simulations?
    - 1. What challenges were encountered?

- B. Share Best Practices
    - 1. Discuss effective communication strategies
    - 1. Highlight teamwork and collaboration

VII. Conclusion

- A. Recap Key Takeaways

- B. Discuss Next Steps

1. Implementation of the two-RN verification policy in practice

1. Additional training or resources available

VIII. Evaluation

- A. Distribute Post-Simulation Survey
  1. Gather feedback on the simulation experience
  1. Assess confidence levels in implementing the new policy

APPENDIX I

Post-Education/Simulation Survey

Post-Training Assessment Survey: Two-RN Verification during Safe Hand-Off

Instructions: Please complete the following survey to assess your understanding and confidence in implementing the two-RN verification policy for high-alert medications. Your feedback is essential for continuous improvement.

1. **Years of Experience in Nursing:**
   - 0-1 year
   - 2-5 years
   - 6-10 years
   - More than 10 years

Knowledge Assessment:

Please indicate your level of agreement with the following statements using a scale of 1 to 5:

1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

3. **I understand the importance of the two-RN verification process for high-alert medications.**
   - 1 2 3 4 5
4. **I can accurately identify high-alert medications in our facility.**
   - 1 2 3 4 5
5. **I am familiar with the steps involved in the two-RN verification process.**
   - 1 2 3 4 5
6. **I feel confident in my ability to perform the two-RN verification for high-alert medications.**
   - 1 2 3 4 5

Practical Application:

Please answer the following questions:

7. **How often do you anticipate using the two-RN verification process in your daily practice?**
   - Always
   - Often
   - Sometimes

- Rarely
- Never

8. **What challenges do you anticipate when implementing the two-RN verification policy?** (Open-ended response)

9. **What additional support or resources would help you in applying the two-RN verification process?** (Open-ended response)

Overall Feedback:

10. **Overall, how effective was the training in preparing you to implement the two-RN verification policy?**

- 1 (Not effective) to 5 (Very effective)
- 1 2 3 4 5

11. **What aspects of the training did you find most helpful?** (Open-ended response)

12. **What improvements would you suggest for future training sessions?** (Open-ended response)

Final Thoughts:

13. **Do you have any other comments or suggestions regarding the two-RN verification policy or training?** (Open-ended response)

Thank you for your feedback! Your input is invaluable in improving our practices.

Appendix J

Safe Hand-Off Checklist

Safe Hand-Off Checklist:

1. Confirm Patient Identity

- ☐ Verify patient identity using at least two identifiers (e.g., name and date of birth).
- ☐ Check the patient's ID band for accuracy.

2. Review Medication Orders

- ☐ Confirm the medication name, dosage, and route against the physician's orders.
- ☐ Ensure the medication is appropriate for the patient's condition.

3. Perform the Two-RN Verification

- ☐ **Outgoing RN**: Scan patient, medication, and pump. Select RATE VERIFY in the MAR.
- ☐ **Oncoming RN**: Independently verify all details, including:
  - Medication name
  - Dosage
  - Route
  - Rate on pump matches rate documented in MAR
- ☐ Both RNs must sign off on the verification process: The Oncoming RN can add their in the comments as the second verifier for rate verification

4. Documentation

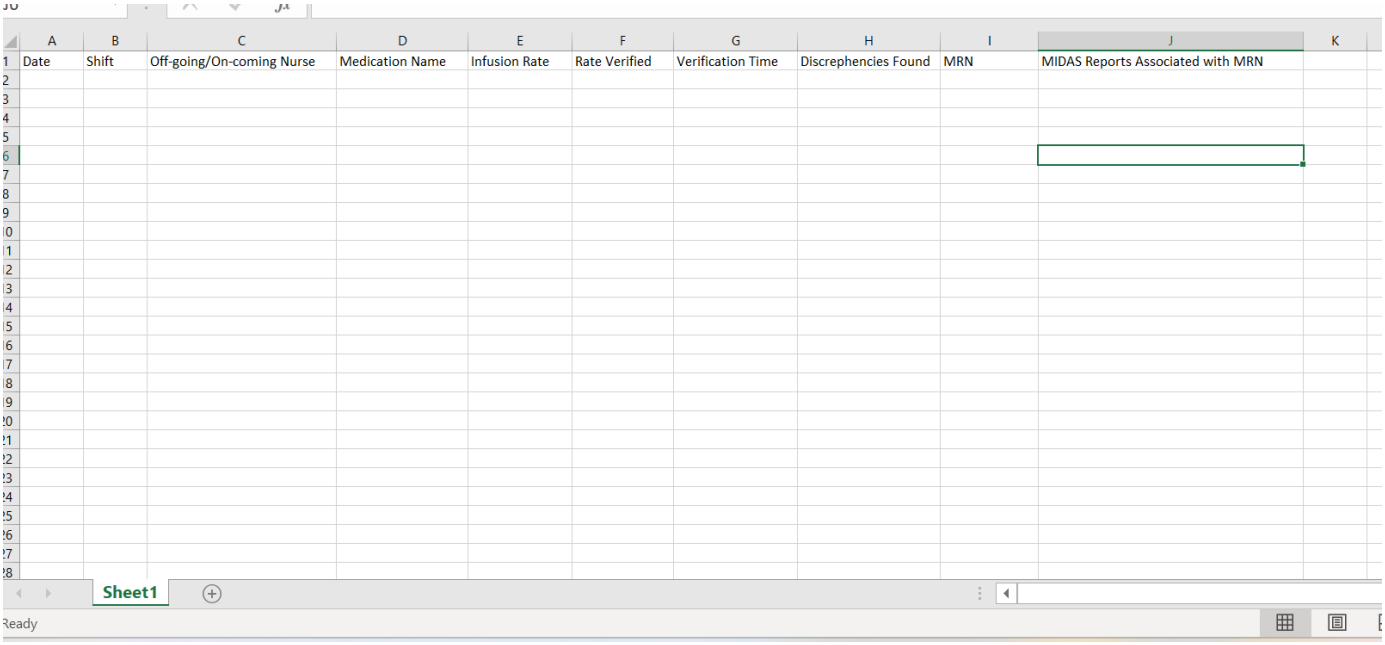
- ☐ Document the medication administration as a RATE VERIFY in the patient's MAR.

Additional Notes:

- Any discrepancies must be resolved before the Outgoing nurse can hand-off the assignment to the Oncoming RN.
- If any concerns arise during the verification process, consult a supervisor or pharmacist.

Appendix L

Bi-Weekly Epic Chart Audit



Date	Shift	Off-going/On-coming Nurse	Medication Name	Infusion Rate	Rate Verified	Verification Time	Discrepencies Found	MRN	MIDAS Reports Associated with MRN

Appendix M

Rate Verification Run Chart

Rate Verification Run Chart

Date	Rate Verified 0700	Rate Verified 1900	Rate Verified Irregular Shifts