EVALUATION OF CAUSES, CONTRIBUTING FACTORS, AND POTENTIAL SOLUTIONS TO MEDICATION ERRORS

A Scholarly Project Submitted in Partial Fulfillment of
The Requirements for the Degree of
Doctor of Nursing Practice
in
The School of Nursing
Rhode Island College
May 14, 2022
by
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Abstract

Background: Medication errors are one of the most common errors in healthcare that have the potential to cause patient harm. Despite achieving the goal of 95% compliance with medication safety process metrics, medication errors persisted at the organization where the study was completed.

Purpose: This project was launched as an organizational assessment to determine what the causes and contributing factors to medication errors are from the perspective of the bedside nurse. Nurses' opinions regarding potential solutions to errors were also sought for future process improvement planning.

Methods: The Lifespan and Rhode Island College Internal Review Board approved this research which consisted of a mixed-methods survey and focus group that completed a failure modes and effects analysis.

Results: Major barriers to medication safety practices identified in the data were distractions, lack of time, availability of staff to perform safety checks, and scarcity of updated, working computers, and scanners. Factors contributing to errors were confusing or incorrect orders and inadequate communication between healthcare disciplines and the family. Potential solutions to errors proposed by the respondents were pharmacy preparation of exact medication doses, additional working computers, and more staff to verify doses and infusions when needed.

Conclusion: Information gained from the failure modes effects analysis (FMEA) performed by the focus group substantiated the survey data and revealed educating the patient and family about medication being given is an important intervention for staff working with the pediatric population at this setting. Nurses participating in this study had adequate knowledge about safety practices and were able to identify barriers to the established medication administration process, factors associated with errors, and potential solutions to systems issues. Safety practices are not always followed by these nurses due to distractions, lack of time, staffing, and improperly functioning computers.

Key Words: medication error; medication safety; medication administration

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EVALUATION OF CAUSES, CONTRIBUTING FACTORS, AND POTENTIAL SOLUTIONS TO MEDICATION ERRORS

Background and Significance

Medication errors are one of the most common errors in healthcare. It has been estimated that between 7,000-9,000 people die each year in the United States from medication errors (Tariq et al., 2021). Preliminary results from the Agency for Healthcare Research and Quality's National Scorecard on Hospital Acquired Conditions (Updated Baseline Rates 2014-2016), report adverse drug events (ADE) as the number one hospital acquired condition averaging 33.4 ADE's per 1,000 discharges followed by pressure ulcers at 21.6 and falls 8.0 per 1,000 discharges (AHRQ, 2017). Over 7 million patients are affected by medication related errors yearly resulting in additional treatment with costs in excess of $40 billion (Tariq et al., 2021).

The Food and Drug Administration (FDA) defines a medication error as "any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of a healthcare provider, patient, or consumer" (U.S. FDA, n.d.). Technology has been developed by the healthcare industry to mitigate the risks of medication errors and improve patient safety. Computerized physician order entry (CPOE) has made advances in the drug ordering process by eliminating problems with prescription legibility, providing decision support, and dosage guardrails to prevent dosage errors (Seibert, et al. 2014). Automated dispensing cabinets (ADC) have been utilized to provide safe securement of drugs, tracking of medications that are removed, and more timely dispensing of medication as most ADCs are filled with commonly used medications (Seibert et al., 2014). Smart IV pumps with drug libraries are recommended

as a best practice by the Institute for Safe Medication Practice (ISMP). Smart pump technology provides safer medication administration using alerts from the pump to prevent errors with medications or fluids before they are infused (ISMP, 2020).

Although technology has been utilized to improve the safety of the medication ordering, prescribing, and administration process, health information technology (HIT) may also be a contributor to medication errors. Electronic health records (EHR) are tested for usability and safety during the development process (Adams et al., 2021). Despite this testing, EHRs have been implicated in errors related to data entry and workflow support issues (Adams et al., 2021). Alert fatigue resulting from too many or nuisance alerts may cause the user to ignore an important alert that can lead to an error (Adams et al., 2021). Additionally when other electronic devices such as IV infusions pumps and patient monitors are integrated with the EHR, the interoperability of this equipment is not always intuitive and adds another level of complexity to the work of the nurse (Adams et al., 2021). It has been suggested that healthcare organizations evaluate their EHR for data entry, workflow, and alert vulnerabilities that may cause rather than prevent errors (Adams et al., 2021).

Barcode scanning medication administration (BCMA) was intended to take human factors out of the medication administration process to provide a layer of drug safety (Boonen et al., 2020). The technology BCMA was created upon uses digital, linear logic to provide alerts and rules for the nurse using the system (Boonen et al., 2020). Unfortunately, many factors associated with the clinical practice setting make it almost impossible to predict which leads to challenges when designing a workflow for nurses to use BCMA (Boonen et al., 2020). If the workflow that is designed is cumbersome or too

time consuming for the nurse, they will adapt by finding alternative ways to complete their tasks. Boonen et al. (2020) studied nurses' knowledge and deliberation in the medication administration process and noted that "the paradox of nurses being technologically driven to enact one set of practices when they know something else is needed demands subterfuge, ingenuity, and the ability to improvise" (p. 296). Nurses' knowledge of their practice environment, patient population, and institutional medication administration process are factors that must be considered when designing a medication administration workflow intended to improve drug safety.

The Donabedian model of quality improvement focuses on the structure, process, and outcomes of a system to drive change (Tossaint-Schoenmakers et al., 2021). Tossaint-Schoenmakers et al. (2021) conducted a literature review that looked at utilization of the Donabedian model to evaluate the integration of technology into healthcare. There were three major findings from this review that the authors determined to be essential to the success of implementing technology in the healthcare environment. First, in the case of eHealth for patients, the application must be focused on the recipient of the information and how they receive information (Tossaint-Schoenmakers et al., 2021). The second conclusion the authors made was that the inflexibility and complexity of the technology negatively effect the acceptance and integration of it's use into the workflow of clinical staff (Tossaint-Schoenmakers et al., 2021). Finally, the review noted that successfully implemented technology requires adjustment of processes and coordination of human resources to be effectively integrated into a system (Tossaint-Schoenmakers et al., 2021).

The hospital where the DNP project was conducted has implemented most of the previously mentioned best practices to prevent medication errors. Automated dispensing cabinets were put into place over 30 years ago but have increased in size and capacity to contain not only narcotics but all medications including those requiring refrigeration. CPOE, smart pump technology, and barcode scanning have been in place for at least ten years. The electronic medical record has been utilized to run reports to determine barcode scanning compliance by individual unit, nurse, and drug. Nursing leaders have worked with the hospital medication safety specialist to identify drugs with no barcode, reasons for not scanning, and ways to remove barriers to scanning both the patient and medication. Barcode scanning compliance improvement work was started approximately five years ago, at this time the overall compliance was 80%. Following interventions to increase barcode scanning, the compliance rate has reached the goal of 95%. Despite achieving 95% barcode scanning compliance as a process measure for medication safety, our organization continues to experience medication administration errors.

Problem Statement and Study Question

Despite robust efforts to improve medication safety practices, medication errors persist. Due to the complexity of the process and environment, the most significant contributors to errors are not well understood. Staff nurses have a first-hand perspective of the barriers and potential solutions to this problem. The purpose of this project is to better understand nurse perceptions of medication errors, the contributing factors, and potential solutions.

Literature Review

Incidence of Medication Errors

The World Health Organization (WHO) recognizes unsafe medication practices and preventable errors as a cause of patient harm worldwide (Sheikh et al , 2017). In March of 2017, the WHO issued the third Global Patient Safety Challenge to decrease the number of severe, avoidable harm related to medications by 50% over five years, globally (Sheikh et al., 2017). The stance of the WHO is that medication errors are the result of weak medication systems, human factors, and poor environmental conditions that affect any part of the medication administration process from ordering to administration (Sheikh et al., 2017). The WHO set forth five objectives to address the dimensions related to safe medication delivery. These objectives were geared toward evaluating the scope of the problem, developing infrastructure to support the medication administration process, providing guidelines, engaging stakeholders to improve processes, and empowering patients to be part of the medication management process (Sheikh et al., 2017).

In their study, *The Estimating the Additional Hospital Inpatient Cost and Mortality Associated with Selected Hospital Acquired Conditions,* the Association for Healthcare Quality (2017) noted that the average cost a hospital incurs related to an ADE is $5,746 per event above the cost associated with an inpatient hospital stay. In this meta-analysis, ADEs were associated with 12 deaths per 1,000 in-hospital ADEs (AHRQ, 2017). The preliminary 2016 ADE rate according to the AHRQ National Scorecard on Hospital Acquired Conditions is 28.4 ADE's per 1000 hospital discharges. The goal AHRQ has set for 2019 is a twenty percent reduction in this number or 26.7 ADE's per 1000 discharges.

Medication Error Prevention Strategies

Electronic medication administration records, barcode medication administration scanning, and computerized physician order entries have utilized technology to make delivering medications safer (Mulac et al., 2020). Barcode medication administration (BCMA) refers to the process of the nurse scanning the patient's identification bracelet and then scanning the medication to verify the patient will be receiving the correct medication prior to the medication being given. The electronic medication administration record will alert the nurse if they scan the wrong patient, the wrong medication, wrong dose, or if the medication is given at the wrong time. Medication alerts for drug ordering and administration are frequently used, as research indicates they can reduce the likelihood and severity of adverse drug events (Sidebottom et al., 2012).

A systematic review of the effects of barcode scanning technology on medication errors done by Strudwick et al. (2018) found 11 studies meeting inclusion criteria for their investigation. The authors found all but two studies demonstrated a decrease in medication errors following barcode scanning implementation (Strudwick et al., 2018). BCMA was determined to prevent wrong patient, medication, dose, time, and route errors by confirming the medication being administered was the one corresponding with the eMAR (Strudwick et al., 2018). Of the two studies that did not show a decrease in medication errors following BCMA implementation, the study by Bowers et al. (2015) showed an overall increase in errors; however, these authors noted that all wrong patient errors were eradicated after implementing BCMA. The Bowers et al. (2015) study only looked at data one month before and one month after BCMA implementation. Strudwick et al. (2018) note that all the studies evaluating error reduction between 6 and 12 months following BCMA implementation showed a significant reduction in errors. The second

study by Helmons et al. (2009) found no reduction in medication errors in their overall analysis, but when time related errors were excluded a reduction in errors was found on medical-surgical units but not in intensive care units. One reason attributed to the reduction in errors when times related errors were excluded was that some nurses take longer to administer medications using BCMA than with a paper-based method (Helmons et al., 2009).

Although barcode scanning of medications during administration has been implemented in most larger hospitals in the United States, nurses are still unable to consistently use this technology as intended with every medication administration. Generally, when BCMA is not used as expected, there is a workflow or technological issue associated with a failure in the process (Seamen & Erlen, 2015). When there are issues with computers used for scanning (dead batteries, lack of internet connectivity, etc.), medications that won't scan, or the nurse is pressed for time, the barcode may be overridden to document the medication administration. Most BCMA systems do not allow for patient preferences for medication administration times so the nurse may be required to retime the medication to give it late or early. The nurse may give the medication when the patient wants it which will likely result in an alert from the electronic medication administration record (eMAR) (Seamen & Erlen, 2015).

Van de Veen et al. (2017) define workarounds as “informal temporary practices for handling exceptions to normal procedures or workflow”. Workarounds to the scanning process have been used by nurses to expedite medication administration or overcome a weakness in the established workflow. An example of a workaround is printing an extra patient band for the nurse to scan at the computer while documenting

medications. Well-designed systems allow for alternative functionality when there is a failure in the system. Seamen and Erlen (2015) give the example of glucometers that allow the nurse to manually enter the patient's medical record number when the bracelet doesn't scan. Although this is an additional step, the nurse is able to verify the patient's identity and does not need to leave the bedside to complete the planned care (Seamen & Erlen, 2015). Often workflow issues are at the root of quality problems which indicates the need for a work redesign to make the process safer of more efficient (Seamen & Erlen, 2015).

Barriers to Safety Practices

Van der Veen et al. (2020) evaluated factors associated with workarounds to the barcode scanning medication administration process. They found that day of the week, time of day, route of administration, irregularly used medications, and patient-nurse ratio were associated with workarounds (van der Veen et al., 2020). Busy weekdays and evening medication passes were more likely to be correlated with one or more workarounds by the nurse (van der Veen et al., 2020). Medications that are not given orally were found to be more challenging to scan. Those medications that the patient may self-administer, such as topicals or inhalers, were often not scanned (van der Veen et al., 2020). Higher patient-nurse ratios were linked to an increased number of workarounds (van der Veen et al., 2020).

Bypassing safety procedures puts both the nurse and patient at risk of making and suffering from a medication error. A study conducted by van der Veen et al. (2018) found that workarounds were observed in 3,633 medication administrations (63%), and of these, 8.2% were associated with medication errors. The association between workarounds and

medication errors was statistically significant as measured by an adjusted OR of 3.06 within a 95% CI of 2.49-3.78. Data for medication errors and barcode scanning reports can be analyzed to compare the impact of errors on the barcode scanning compliance. The volume of patients may also impact the monthly barcode scanning compliance and number of errors. Busier months may force nurses to use workarounds when pressed for time which could result in less compliance and more errors. Further work needs to be done to establish an association between workload (patient days), barcode scanning compliance, and medication errors. When the CPOE and BCMA systems were introduced into modern medication administration technology, the expectation was that errors would be almost completely eliminated (Seamen & Erlen, 2015). Seaman and Erlen (2015), suggest that the problem of human error has been replaced with inefficient or unreliable technology. Additional information is needed to understand the reasons why nurses work around safety systems, what they perceive to be unsafe behavior, and why these systems are not ergonomically friendly.

Practice Gap

Despite the efforts made to decrease medication errors in the hospital setting, mistakes continue to occur. Causes of medication errors may be due to a lapse in performing the five rights of medication safety (right patient, drug, dose, time, route), not confirming the patient and medication with barcode scanning, or any other deviation in the process that results in a mistake. Currently, most hospital medication error statistics rely on self-reporting of errors. This is an inherently slippery slope depending on the safety culture of the organization. If the culture supports reporting and wants to learn from mistakes, it is more likely an error will be reported. If the nurse fears he or she will

be punished for making an error, the likelihood it will be reported decreases. Rutledge et al. (2018) investigated barriers to medication error reporting and found that the highest-ranking reasons for not reporting medication errors were the time-consuming nature of the reporting process and nurse's fear of repercussions after making an error.

Local Context

Failure Modes and Effects Analysis (FMEA) is a tool used to systematically analyze the ways a process might fail (American Society for Quality, 2022). The severity of failure, frequency of occurrence, and ways to detect failure is scored and failures with the highest score are the ones most likely to benefit from improvements made in the established process (American Society for Quality, 2022.). A previous Failure Modes Effects Analysis (FMEA) was done at the project organization by the patient safety department to determine the root cause of medication errors. This was a high-level investigation that included pharmacy leaders, nurse leaders, and providers. The FMEA was conducted by the patient safety staff and included the complete process of medication delivery starting with a provider writing the order, review of the order by a pharmacist, compounding or filling the order, dispensing the order to the nursing unit, obtaining the medication from the automated dispensing cabinet or pneumatic tube system, preparing the medication for administration, and administering the medication to the patient. Unfortunately, the FMEA analysis did not yield any specific root cause of medication errors and additional education was suggested as the solution to the problem.

Previously, new graduate nurses were given a medication safety lecture as well as orientation to medication administration as part of their onboarding process at the study organization. To provide additional education for the nursing staff, a one hour in person

seminar and independent medication safety study module was assigned to all inpatient nurses. Our process metric, barcode scanning compliance, was monitored using monthly reports generated from the electronic medical record (EMR) that were reviewed by nurse managers with nurses not meeting the 90% compliance mark. Incident reports for any safety event including medication errors were reviewed and followed up daily by the nurse leaders with involved staff. Despite these efforts, we continue to experience medication errors. In review of the previous assessments of the medication administration process, bedside nurses who administer medications to patients were not included in the FMEA. The omission of bedside nurses in this assessment was unfortunate as the staff doing the work of administering medications were not present to identify barriers from a "user perspective". Further, many corrective action plans include education as part of the process of addressing errors. While education of staff is important, systems change that can be measured and monitored generally provide changes that are sustainable in the long term (Zaccagnini & White, 2017).

Purpose Statement and Specific Aims

The purpose of this project was to better understand the barriers to safe medication administration from the perspective of the bedside nurse. Specific aims include determining variables contributing to error, nurse perceptions of current safety practices, and opinions on ways to improve the process. The information gathered from the FMEA and survey will be analyzed to identify barriers to safe medication administration at the nurse, process, and systems level. These structure and process barriers will guide the focus of future quality improvement work aimed at preventing medication errors.

Conceptual/Theoretical Framework

The Theory of Planned Behavior (TBP) by Icek Ajzen and Martin Fishbein was used to support this project. The TPB proposes that intentions are the best predictors of behavior, and intentions also have predictors. The three predictors of intention are behavioral beliefs, normative beliefs, and control beliefs (Azjen, 2002). The relationship among these predictors and intention influences the probability of whether the individual plans to perform a behavior or not. Interestingly the TPB does not focus on the role of knowledge in determining behavior but how individual beliefs affect behavior (Azjen et al., 2011). This framework is appropriate to this project which focuses on evaluating what staff believe is a medication error and what practices they believe contribute to error.

A second model, Donabedian's (1997) structure, process, and outcome method of evaluating quality of medical care, was also used to substantiate this project. Donabedian (1997) proposes there is a relationship between the structure, processes, and outcomes of an organization. Good structure (i.e., human and capital resources) influences the likelihood that processes (receipt of care) will be good (Donabedian, 1997). If there are good infrastructures and processes within an organization, there is a reasonable chance that outcomes will be favorable (Donabedian, 1997). It is this DNP student's belief that if the system for administering medications is improved, the process of administration will improve leading to improved outcomes of a decreased medication error rate. The Donabedian model provided the framework for both evaluating the problem of medication errors and planning future improvement efforts within the organization where the study will take place.

Methods

Setting

This project was completed at an inner-city children's hospital that is part of a larger adult hospital, which is part of a hospital system. The children's hospital has 85 licensed beds, is a level one trauma and burn center, has a pediatric intensive care unit, and a locked behavioral health unit. The catchment area of the hospital is all of Rhode Island, southeastern Massachusetts, and eastern Connecticut. The primary populations served by the hospital are white, Hispanic, and African American. The payor mix of the organization is approximately 70% Medicare/Medicaid with the remainder private insurance or self-pay.

Participants

This project involved the collection of survey data and the participation of staff nurses in a focus group to complete a FMEA. All staff nurses at the children's hospital were eligible to participate in the survey. The clinical managers of the inpatient units provided the denominator of staff for each unit. A combined total of 145 staff nurses that work in either full time, part time, float, or per diem capacities were contacted to take part in the study. An informational letter was sent to all registered nurses at Hasbro Children's Hospital via an email inviting them to participate in a voluntary research project that included an electronic survey. A separate letter was sent by email to invite staff nurses to participate in a focus group that completed a failure modes effects analysis (FMEA) after the survey was closed. The project goal was to have as many nurses as possible complete the survey with a target of 40 responses. Participation in the focus group plan was limited to the first 10 nurses interested in participating in the FMEA due

to the greater time commitment of the exercise. Informational flyers were posted on each unit advertising the survey and failure modes effects analysis. Participants received an email from their director with an endorsement of the research project, information about the FMEA, and a link to the survey. Reminders to take the survey were shared during unit huddles, standing weekly updates, and by unit leadership.

Intervention

To better understand the factors contributing to ongoing medication administration errors, and to inform potential solutions, a multifaceted needs assessment was completed. The assessment included an electronic mixed-methods survey of staff nurses at the children's hospital and the completion of an FMEA. The mixed method survey included both qualitative and quantitative questions regarding nurse perceptions of key factors contributing to medication errors and potential opportunities for improvement. To protect confidentiality, all survey responses were anonymous.

The FMEA was performed to identify gaps in the current medication administration process by evaluating potential failures in the system. These failures were scored based on the ability to detect them, their frequency, and potential severity if they reach the patient. No personal identifiers were collected, and data was evaluated at the aggregate level only. Flyers advertising the survey were posted on each of the inpatient units within the children's hospital. Reminders to take the survey were shared during unit huddles, standing weekly updates, and by unit leadership.

Measures

A modified medication administration survey based on that of Armutlu et al. (2008), was distributed to the participants via an electronic link to the Qualtrics

application. Qualtrics is a safe and reliable repository for data (Qualtrics, 2018). Permission was obtained from Ms. Armutlu to modify and use her tool. The respondents were asked to give consent electronically before proceeding with the survey. Demographics were collected based on the unit the nurse works on, age, sex, years in nursing, and highest degree attained. The survey asked respondents about their current medication administration practices, opinion about the three main causes of medication errors, and error reporting behaviors. Three qualitative questions were asked about barriers to safety practices, causes of errors, and things staff would like to see fixed.

A separate focus group completed an FMEA using the Institute for Healthcare Improvement's (IHI) template for FMEAs (IHI, 2017). This tool allows the user to go through the steps of a process, identify potential failure modes, causes, and effects. Verbal consent was obtained prior to participation in the FMEA, and subjects were briefed prior to the exercise. The number of participants and verbal agreement to participate in the focus group were documented in a consent note that was kept with the study file. This FMEA was conducted via a Teams meeting. Subjects were asked to respond to questions from the IHI tool and responses were documented on the tool without subject identifiers.

Analysis Plan

Quantitative and qualitative data were analyzed to evaluate factors contributing to medication errors and potential solutions. Quantitative data was analyzed using descriptive statistics. A DNP prepared faculty member assisted the DNP student with the analysis of the quantitative data collected from the study. Qualitative responses were analyzed using content analysis guided by an experienced qualitative researcher.

Ethical Considerations

An unsigned consent disclaimer statement on the survey notified the participant that consent is assumed based on the participation of the subject in the survey. The participants were asked if they agreed to participate in the survey prior to being asked any questions. If the participant selected no as a response, the survey was terminated. Participants selecting yes proceeded to the anonymous survey and an option was given "prefer not to say" if any subject was uncomfortable with answering any of the demographic questions. No incentive was offered for survey participation. All survey data was kept in the password protected drive.

Participation in the FMEA activity was completely voluntary and subjects were assured that there would be no repercussions for any responses. The informational letter informing the nurses of their rights was read to the focus group prior to the start of the activity. Participants in the focus group gave verbal agreement to be part of the research study. Participants were not provided any incentives for participating and informed that any data generated would be kept on a password protected thumb drive which will be stored in the locked filing cabinet of the DNP's office within the children's hospital.

Results

Sample

The project goal was to achieve a convenience sample of approximately 40 registered nurses in the children's hospital responding to the survey. Thirty-nine survey responses were received out of the 145 nurses who were sent the survey yielding a 27% response rate. One response was not completed past the participation agreement question, one survey answered only the demographics questions, seven surveys provided more than

the three required responses in the ranking questions, and five respondents did not complete the three qualitative questions. The seven surveys that completed more than the required answers were omitted from the analysis of the ranking questions.

Five nurses indicated interest in the focus group. All interested nurses were female, and all worked different shifts. Due to the difficulty of scheduling nurses to participate that worked different shifts, only three participants were able to join the focus group. Nurses from both the PICU and other units were present in the group.

Demographics

Thirty-eight nurses completed the demographic portion of the survey. The majority of respondents were nurses for greater than 20 years (n=12), eight had been registered nurses between 11-20 years, seven had 6-10 years of experience, six with 3-5 years, and five with two years or less in nursing. Thirty-six of the respondents identified as female with two identifying as male, there were no staff that identified as non-binary or other. Eleven nurses were over age 51, three were between 41-50 years old, four aged 36-40, three ages 31-35, ten between 26-30 years, and seven were 25 years old or younger. The highest nursing education completed by most of the staff was a BSN (n=26), followed by MSN prepared nurses (n=6). There were equal numbers of ADN and diploma nurses (n=3) with no doctoral prepared nurses completing the survey. The PICU completed more surveys than any other unit (n=25), followed by CHD5 (n=5), the Float/ per diem staff (n=4), CHD4 (n=4), and CHD6BHU (n=1). There were no responses from the 6 Red unit.

Table 1. *Demographics*

	N=	%
Age		
20-25 years	7	18.4%
26-30 years	10	26.3%
31-35 years	3	7.9%
36-40 year	4	10.5%
41-50 year	3	7.9%
51+ years	11	28.9%
Sex		
Male	2	5.3%
Female	36	94.7%
Non-Binary	0	0%
Years as an RN		
<1 years	2	5.3%
1-2 years	3	7.9%
3-5 years	6	15.8%
6-10 year	7	18.4%
11-20 Year	8	21.1%
> 20 years	12	31.6%
Highest Level of Education		
ADN	3	7.9%
Diploma	3	7.9%
BSN	26	68.4%
MN or MSN	6	15.8%
DNP or PhD	0	0%
Unit		
CHD4	3	7.9%
CHD5	5	13.2%
6 Red	0	0%
CHD6	1	2.6%
PICU	25	65.8%
PD/Float	4	10.5%

Survey Results

Respondents were asked a series of 10 questions about medication administration and safety practices. The participants could choose from one of five responses for each question ranging from always, frequently, half the time, rarely, or never. During the analysis the responses were weighted with always given a score of 5, never assigned a score of 1, and the responses in between with a difference of one point each. The average score for each question was calculated to determine the likelihood of whether the nurse would perform the behavior.

The most frequently performed medication safety behavior, checking insulin with another nurse, had a perfect average score of 5.0 among the 37 participants indicating this was a task always performed by the nurses surveyed. Reporting actual or near miss medication events in the safety net event reporting system was the least reported safety behavior with an average score of 4.11 suggesting that this is a behavior that occurs frequently by staff but not all of the time. Those behaviors rarely and never done were administering medications prepared by another nurse (2.08) and preparing or carrying medications for more than one patient (1.65). The lower score for these two questions is actually positive scores for these behaviors. See table 2 and figure 1 for detailed results.

Table 2

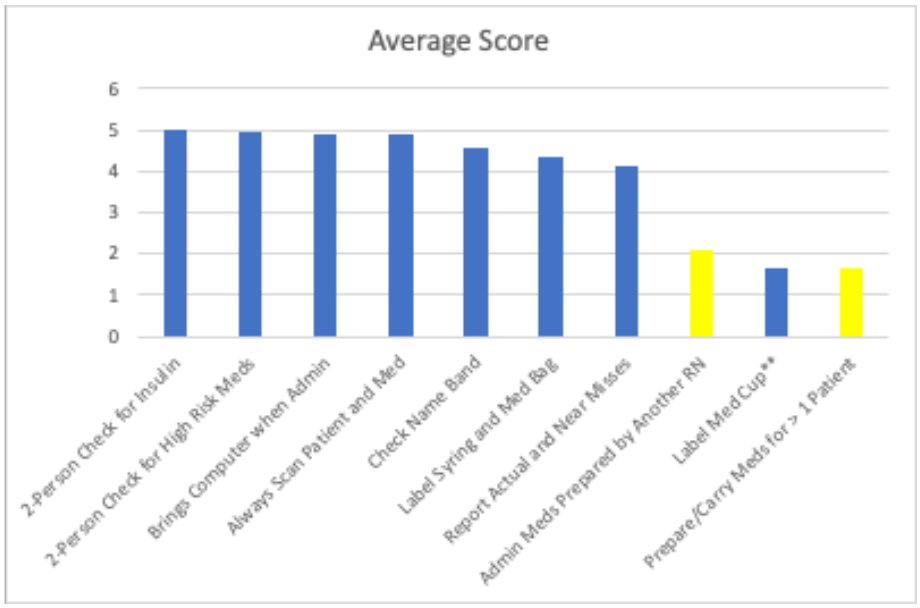
Average Score of Weighted Survey Responses

Factor	Average Score
2-Person Check for Insulin	5
2-Person Check for High-Risk Meds	4.97
Brings Computer when Admin	4.92
Always Scan Patient and Med	4.92
Check Name Band	4.57

Label Syring and Med Bag	4.35
Report Actual and Near Misses	4.11
Admin Meds Prepared by Another RN	2.08
Label Med Cup**	1.65
Prepare/Carry Meds for > 1 Patient	1.65

Figure 1

Column Chart of Average Scores



The number of surveys returned from the PICU was more robust than those of all other units combined. As such, the survey portion of the data was compared to determine if there was a difference between how nurses in the PICU and nurses working on other units administered medications. Pareto charts comparing the data for both groups were very similar in terms of the top five safety behaviors always performed by the nurses. All PICU and other unit respondents reported always performing a two-nurse check prior to the administration of insulin. Nurses from the other units also reported always checking high-risk medications and chemotherapy with another nurse whereas PICU respondents

completed this task 96% of the time. Always scanning the patient and medication prior to medication administration was a practice completed by PICU nurses 92% of the time while other nurses did this 90% of the time. Bringing a computer in the patient's room during medication administrations was a process 92% of PICU nurses and 82% of nurses from other units always followed. Always checking the patient's name band prior to medication administration was a procedure 72% of PICU and 73% of other respondents reported. Labeling medication syringes and bags was identified as a task always completed by 64% of nurses both in the PICU and on other units. Safety behaviors staff struggled with always doing were reporting actual and near-miss errors (26% PICU, 45% other), and labeling medication cups (8% PICU, 0% other). Neither group responded that any of the nurses always prepared medications for more than one patient at a time or administered medications prepared by another nurse.

Figure 2

Chart of PICU Survey Results

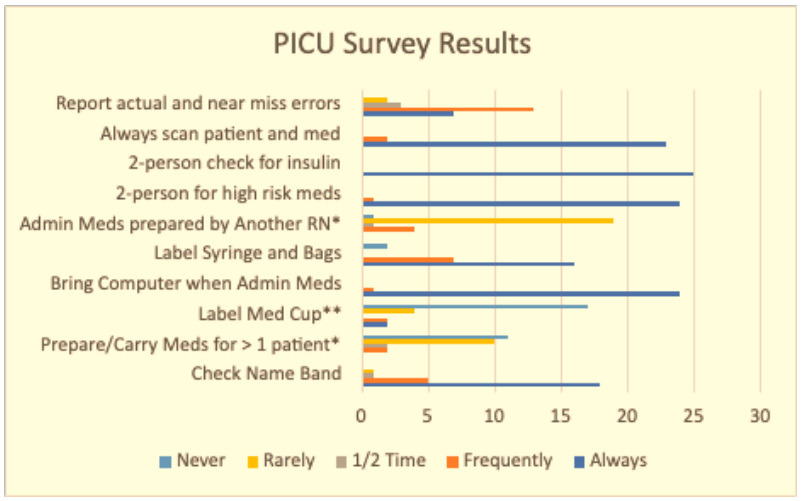


Figure 3

Chart of Non-PICU Survey Results

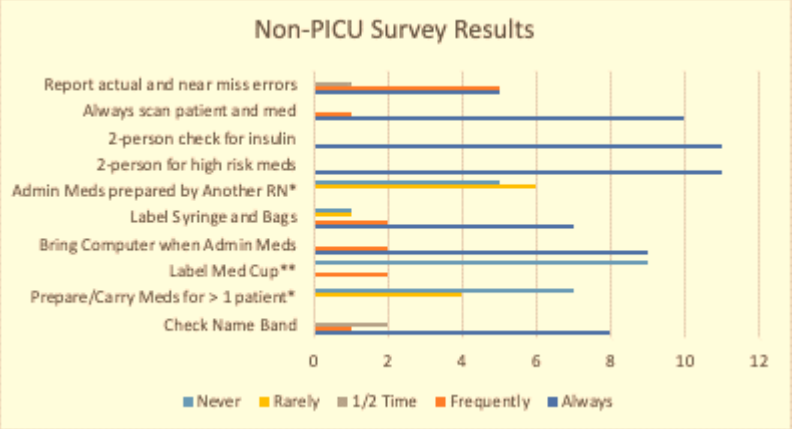


Figure 4

Pareto Chart of PICU Survey Results

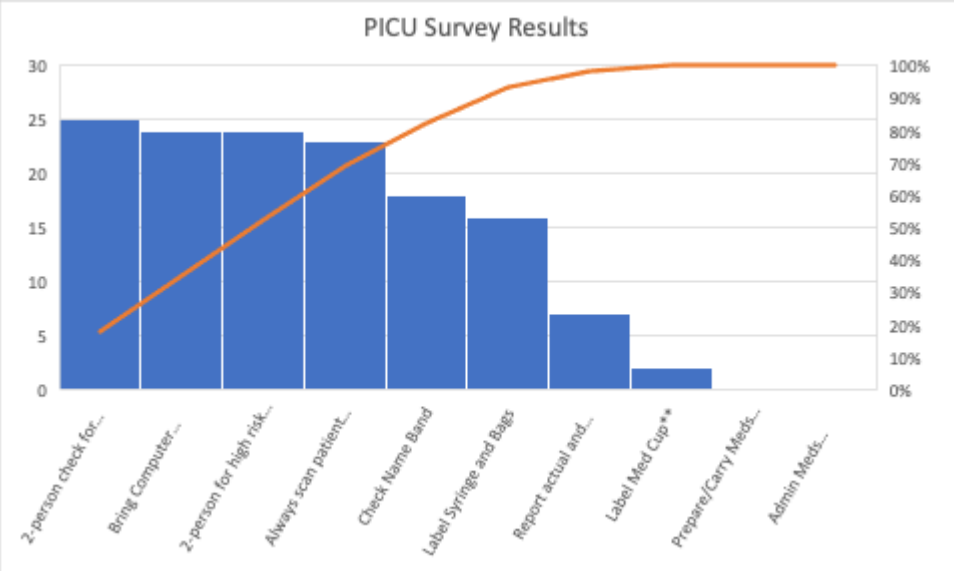
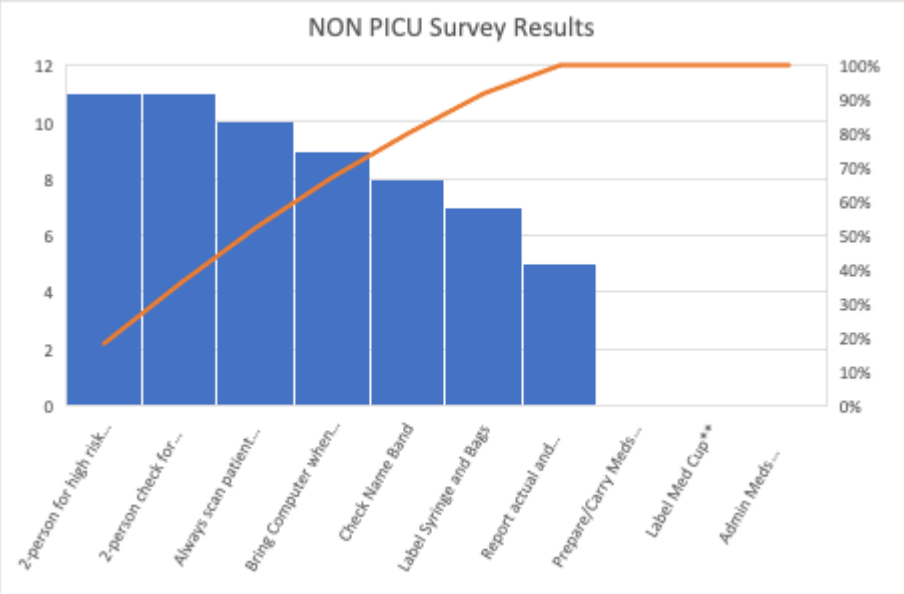


Figure 5

Pareto Chart of Non-PICU Survey Results



In the next section of the survey participants were given 14 different potential causes of medication errors and asked to rank them by first, second, and third most common cause of error. Seven of the 37 respondents chose more than three causes of error, so these responses were excluded from the analysis. Data was aggregated in an excel spreadsheet and a pareto chart was used to determine the results. Confusing orders/ instructions were ranked as the number one cause of error closely followed by distractions. Participants ranked incorrect orders as the third most likely contributor to medication errors. Miscalculations and policies or procedures not being followed were also identified as frequent contributors to error.

Figure 6

Column Chart of Ranking Causes of Error

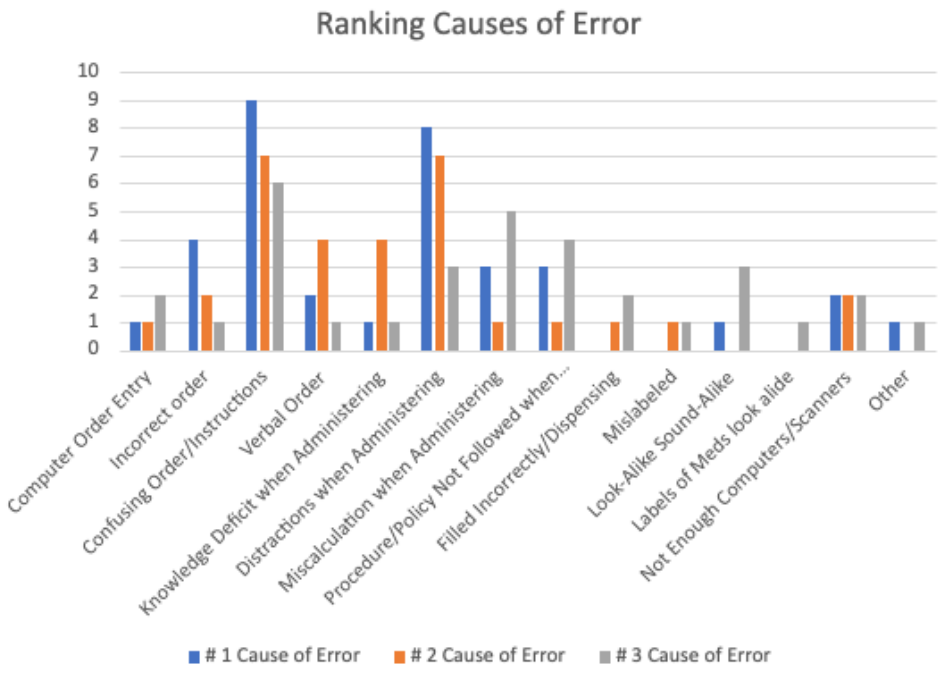
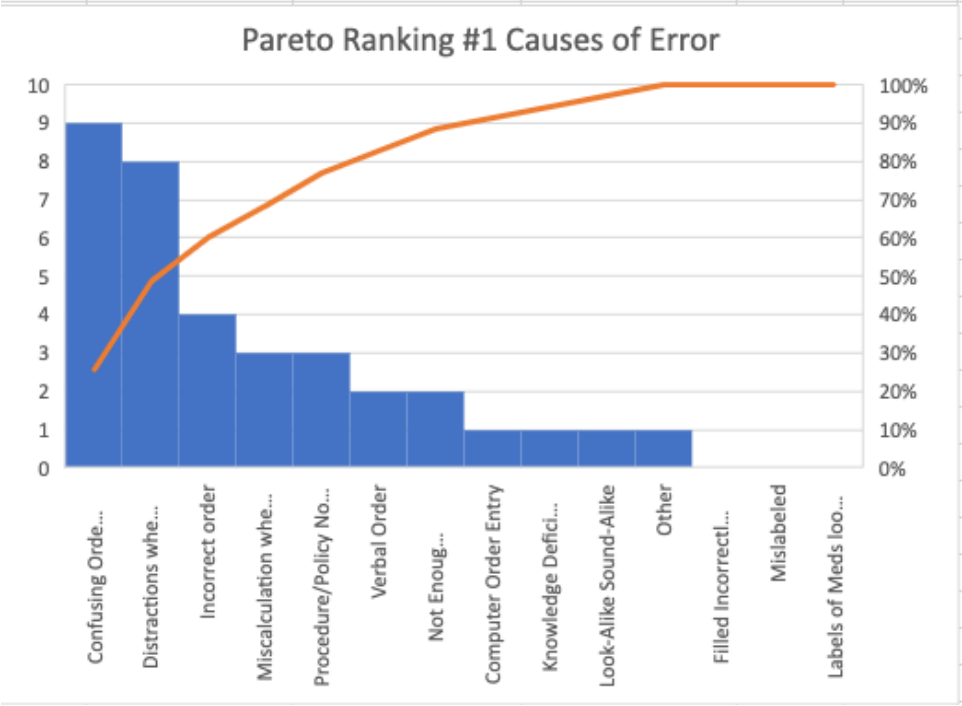


Figure 7

Pareto Chart Ranking Causes of Error



The final section of the survey asked three open ended questions soliciting the nurse's opinion about barriers to medication safety practices, contributors to errors, and one thing nurses would fix about the current medication administration process. Content analysis was used to process this qualitative data. An experienced qualitative researcher (F. P.) and the DNP student independently analyzed the data grouping the responses of each question into categories and identified emerging themes. F. P. and the student then met to reconcile the categories and themes identified for each question.

The first qualitative question, "What do you think is the biggest barrier in following medication safety practices?" yielded 30 responses. Eight separate categories were identified by F. P. and the student. Categories revealed in the analysis were distractions, time, computer issues, staffing/unit activity, pharmacy processes, issues with medications, communication, and other. F. P. had one unassigned comment that she needed clarification about due to unfamiliarity with the barcode scanning process. Following the categorization of this comment, there was 100% agreement between the student and F. P.'s content analysis. Four major themes emerged from the data. The most common theme was time, the lack thereof, and feeling rushed. The second biggest theme was computer equipment issues, computers and scanners not being available, updated, or in working condition. Staffing and unit activity was another theme that cited a busy unit, lack of ancillary staff, short staffing, number of patients, emergent situations, and codes impacted the ability of the nurse to safely administer medications. Distractions and interruptions were the final category participants noted as impacting their ability to following medication safety practices.

"What do you think is the biggest contributor to medication errors?" was the second open ended question answered by participants. There was a total of 30 survey responses to this question with eight categories identified by the analysts. Distractions, time, ordering issues, process issues, preparation, knowledge deficit, communication, and staffing were the categories substantiated by F. P. and the student. There was 96% agreement between F. P. and the student regarding these categories. One study response, "lack of available resources" was identified as a process issue by F. P. and a knowledge deficit by the student. Three preeminent themes emerged from the data. Distraction and interruptions during medication preparation was noted to be the biggest contributor to medication errors with a third of respondents attributing this as the primary cause for errors. Time and rushing were a second theme that nearly 20% of respondents felt was the biggest contributor to errors. Ordering issues involving discrepancies, wrong orders, inaccurate orders, and directions was also a theme determined by respondents to be a major contributor to medication errors.

The final qualitative question participants responded to was "If you could change one thing regarding medication administration, what would it be?". Twenty-seven respondents answered this question which generated seven categories identified by F. P. and the student. Pharmacy preparation, checking for safety, computer/equipment issues, communication, orders, distraction free zone, and other were the categories that emanated from the data. During analysis of the independent categorization of responses, F. P. had two responses that were not entered into a category and the student had one response not categorized. During the analyst's discussion about these responses the student and F. P. agreed on which category to group their unassigned responses in. There was one response

"preparation" that the DNP student moved to the pharmacy preparation category after consultation with F. P. The analysts did not agree on the categorization of the response "residents running medication orders by an NP or attending". F. P. felt this response belonged in the communication category while the student assigned the response to the orders category. When removing the unassigned responses, one response was recategorized by the student and one was not agreed upon by the analysts which netted a 92% agreement in the categories for this question.

Four major themes were prominent in the categories identified by the analysts. The first theme revolved around pharmacy preparation and availability of medications when they are due. Thirty percent of respondents noted they wanted pharmacy staff to prepare and send the exact dose of a patient's medication to the nursing unit. Another theme nurses responding would like to change was computer and equipment issues. The ability to have more efficient, working equipment was desired by 15% of respondents. A third theme 15% of respondents would improve was checking medications for safety. Participating nurses felt having the staffing, resources, and time to double check medications when there are new orders or doubt was a change they would like to see. Finally, communication about medications was the last theme emerging from the data. Fifteen percent of respondents noted that problems with communication about indication, comments, and clarity were areas that had opportunity for improvement.

FMEA Results

Participants were asked to join the focus group via a Teams electronic platform to complete an FMEA using the IHI QI Essentials FMEA tool (IHI, 2017). The DNP student facilitated the exercise by asking the nurses attending to identify the steps in the

process of medication administration. Three participating nurses identified 30 steps in the medication administration process. The nurses were then asked to identify failure modes, causes, then effects of each step in the process. This information was recorded by the student and shared on the computer screen so all participants could see, comment on, and request changes.

Participants then scored the likelihood of each failure to occur on a 10-point scale with 1 being unlikely and 10 being very likely to occur. Next, the nurses scored the ability of the current system to detect each failure using the same 10-point scale with 1 being likely to detect and 10 being very unlikely to detect. Finally, the nurses scored the failure of the severity of the effect if the error reached the patient. The scale ranged from 1 having no effect to 10 yielding severe effects. Once scoring for the failures was completed the participants were thanked and the meeting ended. The scores of the likelihood of occurrence, likelihood of detection, and severity were multiplied to calculate the risk priority number (RPN) (IHI, 2017). The RPN is used to identify the failure modes that have higher severity, lower detection, and more frequent occurrence so improvement specialists can determine which opportunities for improvement to prioritize first.

The steps in the medication process with the five highest RPNs were taken from the thirty identified steps in the medication administration process. The RPNs scoring 100 or greater are as follows: explain to the patient/family why the medication was given, check the order, verify with a second nurse, two-nurse check for continuous infusions, and programming the IV pump. Checking the order and verification of a drug or continuous infusion by a second nurse were barriers to medication safety that were also

reported by respondents in the qualitative portion of the survey data. Interestingly, explain to the patient/family why the med was given scored the highest RPN of 245 but was not previously mentioned in either the quantitative or qualitative survey data.

Table 3

Chart Five Highest Ranked Steps in the FMEA Process

Steps in the Process	RPN
Explain to the patient/family why the med was given	245
Check the order	210
Verify with 2nd RN	120
2 RN Check for continuous infusions	105
Program IV pump	105

Discussion

The purpose of this project was to identify the causes and contributing factors of medication errors and potential solutions from the perspective of the bedside nurse administering medications. A survey of nurses at the children's hospital found that nurses adhere to safety practices particularly when it comes to administering high-risk medications and barcode scanning. Participants ranked confusing orders, distractions, and incorrect orders as the top three causes of medication errors. Qualitative questions from the survey as well as an FMEA validated that distractions, availability of staff to assist with verification of medications, and computerized equipment not in working order are contributing factors to medication errors. Potential solutions to errors offered by the respondents were exact doses or medications prepared by the pharmacy, computer equipment that is faster and in working order, and more staff available to assist with medication checking.

The number of respondents from the PICU outnumbered those from all other units combined by a ratio of approximately two to one. This may be attributed to an active professional governance council and unit leaders that promoted the survey to the staff. PICU medical providers and nursing leadership have developed a culture in their unit that engages staff to participate in shared decision making and encourages all team members to bring concerns or opinions about care forward. Other units within the hospital do not have a team of medical providers that practice on one designated floor such as the PICU which makes the culture difficult to replicate on the other units. In addition, the PICU has a clinical manager and assistant manager. The CHD4 and CHD5 units both had vacancies for assistant managers at the time the study was conducted which likely affected the ability of leadership to assist the student with promoting the survey.

Other factors that may have influenced the survey response rate could be related to the environment. The children's hospital has been undergoing renovations for the last two years. Renovations have resulted in units being closed for construction, staff being floated to other areas in the hospital due to their unit being closed, and the stress of trying to care for the same number of patients with up to 20 beds closed at a time. Additionally, the survey was administered during a period that was two years into the COVID-19 pandemic. Many nurses have left hospital-based nursing amid the pandemic which has led to short staffing and burnout that the remaining staff struggle with (Gray et al., 2021). These factors may have contributed to the low return of the survey.

Following taking part in the study, several staff members made comments about questions on the initial portion of the survey to the student. Staff noted they felt the question "do you label the medication cup with the patient's name" was irrelevant. The

nurses reported that the med cup is used only for the purpose of handing the medications to the patient and it was felt this would be a waste of time. These staff members stated they prepare medications for one patient at a time so these questions did not apply to their practice. Staff also commented they do not give medications that were prepared by another nurse and were a bit perplexed as to why this question was asked.

It is interesting to note that at the time the survey was administered, all the units except 6 Red had computers installed in each patient room as well as computers on wheels, but only 96% of PICU and 82% of other nurses reported bringing computers into the room during medication administration. Ninety-two percent of PICU and 91% of other nurses responded that they always scan the patient and medication prior to administering medication. These results could indicate that the medication is being scanned with the computer outside the room on the other units. Considering distractions were cited as a primary cause of error, it may be plausible to look at the workflow to determine if this practice contributes to the nurse being distracted.

While nurse attention to insulin and other high-risk medications appears to be high based on the survey results, less attention was given to reporting actual or near-miss medication errors. The reason for failure to report actual or potential errors may be two-fold. First, there have been long standing complaints that the hospital's event reporting system is time-consuming and cumbersome. Second, staff may not feel an occurrence is worthy of an event report if the patient wasn't harmed or a mistake was caught before it reached the patient. Identifying the reasons for not reporting near misses was beyond the scope of this project. Future research is needed to explore the contributors to under-reporting of near-misses. This is an important issue to address because leadership can

address systems issues may not be aware of precursors to errors because they don't see the value of reporting a problem when they are short on time and no harm occurred.

Only 64% of staff in all areas of the hospital reported always labeling syringes or bags of medications. The pharmacy often sends premixed bags with the manufacturer's label on them, or products made in the pharmacy with labels on them. It is possible that the question was interpreted literally, and staff did not answer that they always label the bags or syringes because they come prelabeled. This is a question that needs more dialogue with the staff to understand why medications may not be labeled.

Over 90% of the nurses responded that they always scan the patient and medication prior to administration. Only 72% (PICU) and 73% (other) of the participants reported checking the patient's name band prior to giving medication. It could be assumed that this 20% discrepancy in practice accounts for reliance on barcode scanning technology alone to accurately identify the patient without visually confirming the name band on the patient. It is noted in the literature that although technology may be useful in preventing some errors, it may also introduce other unanticipated errors as a result (Wang et al., 2019).

The ranking portion of the survey identified confusing orders and instructions, distractions, and incorrect orders as the top causes of errors. This was corroborated by the qualitative portion of the survey as distractions and communication were categories that emerged in the responses of all three questions. A study done by Kavanagh and Donnelly (2020), also found distractions and interruptions to be contributors to errors but noted that they were more amenable to improvements than other contributors. Concerns about orders and ordering issues were categories present in two of the three open-ended

questions. Abraham et al. (2021) reported that a multitude of different types of ordering errors contribute to medication errors. In their research on risk factors associated with ordering errors, 22% of errors observed reached the patient (Abraham et al., 2021). This statistic substantiates the responses of the nurses in regard to ordering errors. Other prominent themes in this portion of the survey were problems with computer equipment and lack of time, particularly in relation to being able to adequately complete safety-related tasks.

The FMEA produced similar concerns about the potential for failure in the orders and verification of medications. Programming IV pumps was another highly ranked failure mode that fits under the umbrella of computers and equipment. Interestingly the highest-ranking failure mode identified in the FMEA was failure to educate the patient and/ or family about why the medication was being given. This concern did not emerge as part of the qualitative portion of the survey nor was it part of the initial survey questions or ranking questions. There are a couple of reasons that this may have been ranked so highly. First, the nurses participating in the focus group are pediatric nurses who practice in a facility that has embraced the concept of family-centered care. It is common practice in this facility to include families in the care of the patient. Second, as educating the patient about which meds are being given was not addressed in the survey, it may have been overlooked until the FMEA revealed this activity as an important process step. In discussion about this process step in the FMEA, the nurses that participated felt strongly that if the family was not made aware of what medication was being given and the patient developed an adverse reaction, trust would be broken with the family and the therapeutic relationship may be irreversibly damaged.

Limitations of this study include a low survey response rate and low participation in the focus group. Safdar et al. (2016) cite the average response rate for online surveys is between 20% to 30%. The survey rate for this study was 27% and although this is within the average response rate noted above, one could argue that this rate does not adequately reflect the opinions of all staff nurses within Hasbro. Further, the response rate for the PICU was double that of the other units combined, likely leading to an over-representation of the nurse opinions from this unit. The focus group was composed of only three nurses, two from the PICU and one from CHD5. Connelly (2015) states that focus groups are generally composed of six to ten people. This research is again likely over-representing the views of PICU nurses and has a small group size.

The research was conducted during the COVID-19 pandemic which is another limitation. Raso et al. (2021) studied nurses' intent to leave the profession during the COVID-19 pandemic and reported 11% of their sample of more than 5,000 nurses planned to leave nursing with another 20% who were undecided. The impact of the pandemic may have influenced nurses' response rate as well as the multifactorial effects that COVID-19 had on the nursing profession such as burnout and moral distress (Raso et al., 2021). The study was also performed by an advanced practice nurse manager who was a supervisor of the participants. Although this was an anonymous survey, responses and decision whether to participate may have been limited to the researcher's relationship to study subjects.

Conclusion

The goal of this project was to understand the barriers to medication safety practices, causes, and factors that contribute to medication errors. Major barriers to

medication safety practices identified in this study were distractions, lack of time, availability of staff to perform safety checks, and scarcity of updated, working computers, and scanners. Factors contributing to errors were confusing or incorrect orders and inadequate communication between healthcare disciplines and the family. Solutions to potential errors proposed by respondents were pharmacy preparation of exact medication doses for patients, enough computer equipment in working condition for all staff, and adequate staffing to have other nurses available to verify doses and infusions. The responses of the quantitative part of the survey were confirmed by the quantitative data themes. Information gained from the FMEA performed by the focus group substantiated the survey data and revealed that educating the patient and family about medication being given is an important intervention for staff working with the pediatric population at this setting.

Donabedian's model can be applied to study findings to improve the structure and process of medication administration to affect outcomes. Future improvement efforts should be focused on ways to address avoidance of distracting nurses preparing and administering medications. Systems issues that need to be addressed include routine maintenance of computer equipment and adequate staffing to ensure safety practices are completed in a timely manner. It would be worth exploring the capacity of the hospital's pharmacy to prepare exact doses of ordered medications as this is a common practice at many large, free standing children's hospitals. Another opportunity for improvement is evaluating the medication ordering system to determine if there are ways to improve the clarity of the order and any additional administration directions or indications for giving the drug. The DNP prepared nurse working in an inpatient setting must be aware of

opportunities to improve the reporting of actual and near-miss medication events so interventions for systems issues are elevated to leadership and changes can be made in real time.

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Appendices

Appendix A Logic Model

Inputs	Outputs		Outcomes – Impact		
	Activities	*Participation*	*Short*	*Medium*	*Long*
Staff • Advanced practice manager • Clinical Development Specialists • Unit Based Clinical and Assistant Clinical Managers • Pediatric Medication Safety Team • Pediatric Medication Safety Specialists • Pediatric Pharmacists • Pediatric Intensivist co-lead of Medication Safety Team • Pediatric Medical Director of Quality • RNs • Parent Consultant • Patient Safety Department staff **Technology** • Safety Net Event Reports • Epic Medication Reports • Finance Reports • Barcode Scanning/Medication Administration Record • Computers **Materials** • Medication policies **Funding** • Within job scope of salaried employees	**Training/Education** • RN orientation • Weekly Friday Updates • Unit Huddles • Sharing of data with RN staff on Quality Boards **Improvement Activities** • Monthly pediatric medication safety meetings • Daily review and follow up of Safety Net medication event reports • Monthly review of overall medication errors • Monthly review and follow up of barcode scanning compliance reports • Monthly senior leadership walk rounds • Monthly unit-based safety rounds **Plan for Future:** Conduct a survey regarding nurse perceptions of what a medication error is and their opinion on how to best prevent errors	**Participants** • Staff RNs • Unit Leadership • Medication Safety Team • Pediatric Medical Director of Quality • Advanced practice manager • Patient Safety Department staff	• Conduct a needs assessment to identify practice gaps • Assemble the DNP Project Team and finalize plan for project • Adapt previously used survey instrument to determine nurse perceptions of medication errors • Submit IRB Proposal • Conduct survey to determine nurse perceptions and current practices	• Understand what actions or circumstances during and resulting from medication administration that nurses perceive to be a medication error by analyzing survey data • Learn what nurses think would be the best ways to decrease medication errors by analyzing data • Learn about nurses' current medication safety practices	• Share aggregated survey results with staff and managers to transparently share information obtained from the survey to elicit ideas for an intervention • Develop an intervention with staff RNs, Medication Safety Team, Unit Leaders, to prevent medication errors based on nurse perceptions of medication errors, nurse thoughts about ways to decrease errors, and current medication safety practices • Roll out the above planned intervention • Follow process and outcome metrics to determine the efficacy of the intervention • Provide education to staff to clarify any misconceptions in the survey • Improve safety of nurse medication administration practices • Decrease pediatric medication administration errors • Decrease patient harm related to medication administration errors

Assumptions	External Factors
• Nurses do not classify all medication errors according to the same classification system as the National Coordinating Council for Medication Error Reporting and Prevention • Nurses do not always follow medication safety practices as were intended by their organization • Nurses know what things could be changed to improve medication safety • Nurses do not want to make a medication error • Nurses do not want to harm their patients by making a medication error • Hospital leadership wants to support staff nurses to improve medication administration processes	• Leadership and staff turnover • Hospital construction • Current COVID pandemic • Staffing ratios • Manufacturer changes to medication packaging or formulations • Pharmacy staffing ratios

Appendix B Force Field Analysis

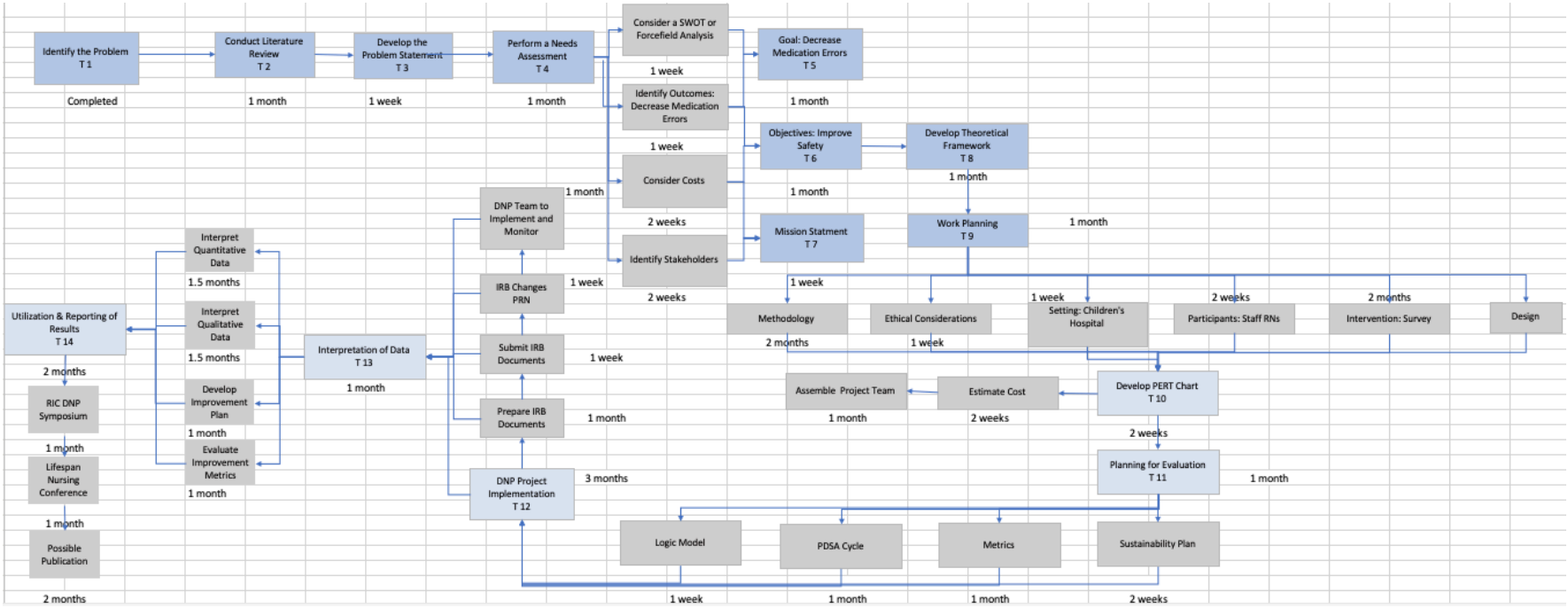
Forces FOR Change (Preventing Errors)	**Score**	**Change Proposal**	**Forces Against Change (Preventing Errors)**	**Score**
Plans are being made for medication rooms to be constructed with hospital renovations	3	Develop an intervention to prevent medication errors in the children's hospital	Omnicell (automated dispensing cabinet) located in the busiest area of the unit	3
Omnicells will be moved into medication rooms	3		No dedicated medication room on CHD4 or CHD5	4
Barcode scanning reports are reviewed monthly, and the managers follow up with non-compliant staff	2		Not all staff are compliant with barcode scanning	2
New computers are being ordered and will be installed in each room with the hospital renovations	3		Not enough computers for scanning medications	3
PICU has a newly renovated medication room	2		Computers are often out of order due to age, dead batteries, failure to hold a charge	2
Staff received a 1-hour lecture regarding medication safety	2		There is not a computer in every room	2
Staff were required to complete a 1-hour independent medication safety module	2		It is a challenge to scan patients on isolation and maintain appropriate precautions	2
There is a process to message pharmacy when there is a medication that does not scan	2		Not all medications have a barcode	2

Managers ask staff about medications that do not scan in huddles	2		Sometimes the medication has more than one barcode	2
There is a MAR card policy where an ID card with the patient's picture and demographics can be printed if they refuse to wear an ID band	2		Patient's non-formulary medications from home are unable to be scanned	2
The pharmacy staff are available 24/7 to answer medication related questions	2		Patients may refuse to wear a name bracelet	1
There are multiple online references available to staff for medication administration and monitoring information	2		Medication may be unavailable at the time it is due	3
Nurse leaders, advanced practice managers, and educators are available for medication related questions	2		Patient may be unavailable at the time the medication is due	2
Pharmacy can be messaged or called to obtain medication not available in the Omnicell	2		Nurse may not know how to correctly administer medication	2
2 RN check is required for high-alert medications and drips	2		Nurse may not know how to correctly monitor the patient after medication administration	2
Charge nurse is a resource for less experienced staff	2		Medication order may be incomplete, confusing, or not followed appropriately	3

Providers can be paged for clarification of medication orders	2		Hospital renovations will not be complete for another 5 years	2
Barcode scanning helps prevent wrong patient/medication errors	4		Pharmacy is short staffed at times	2
Alerts are provided prn by MAR after scanning	2		Second RN may not be available to double check medication	2
Order fields are built by pharmacists and often have safety guardrails in them	3		New nursing staffing matrix uses less staff with more patients	2
Pharmacists review all medication orders for indication, dose, and interactions	4		Nurses leaving floor to pick up patents in the ED leave less staff on the unit	2
The pharmacy tracks data on pharmacy prevented errors	2		Error reporting is voluntary, there are likely more errors than leadership is aware of	3
			Nurse may bypass alerts from MAR after scanning	2
			Medication may not have the instructions or parameters that the provider wants and they may free text this information	2
			Nursing is short staffed	2
			Patient acuity is high leading to stress on the unit	2
			Nurse, provider, or pharmacist is tired	2
			Nurse, provider, or pharmacist is interrupted during their phase of medication process	4

			Noise on unit from rounds, students, staff contribute to chaos and inattention	2
			Most pediatric medications required the RN to calculate the dose and discard remainder	4
			Med rec not completed correctly on admission	2
			Additional staff to draw up exact doses of all pediatric medications would be a substantial cost to the organization	4

Appendix C PERT Chart



Appendix D Budget

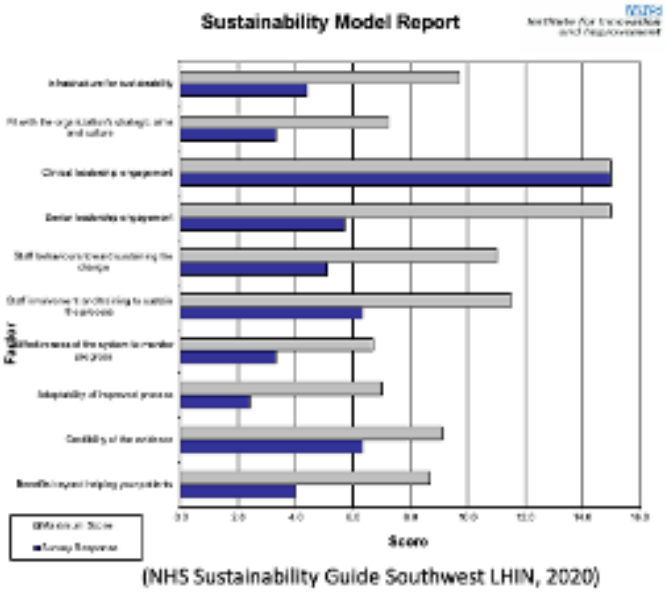
III. Project Funding

Please list each additional funding source.

Funding Type	Sponsor Name	Cost Center #	Primary Grant Recipient
Department	Nursing	1012265	
Other	no funding		
Other	no funding		

Appendix E

Scoring of the NHS Sustainability Model Scoring



(NHS Sustainability Guide Southwest LHIN, 2020)

Process total score	16
+	
Staff total score	30.7
+	
Organisation total score	7.9
=	
Sustainability total score	54.6

- The graph on the left demonstrates scoring of the individual factors
- Overall scoring by aggregate and total are in the box above
- Scores for each individual factor were subtracted from the highest possible score to determine the difference
- The scores with the greater difference yield the biggest potential for change

Appendix F Data Collection Tool

Medication Safety Survey

Start of Block: Informed Consent

The completion of this questionnaire may not benefit you personally. Taking part in this questionnaire is completely voluntary.

Q2 Do you agree to participate in this study?

- Yes (1)
- No (2)

End of Block: Informed Consent

Start of Block: Demographics

Q3 How many years have you been in nursing?

- < 1 year (1)
- 1-2 years (2)
- 3-5 years (3)
- 6-10 years (4)
- 11-20 years (5)
- > 20 years (6)

Q4 What is your age?

- 20-25 years (1)
- 26-30 years (2)
- 31-35 years (3)

○ 36-40 years (4)

○ 41-50 years (5)

○ > 51 years (6)

Q5 What is your highest nursing degree?

○ ADN (1)

○ Diploma (2)

○ BSN (3)

○ MSN or MN (4)

○ PhD or DNP (5)

Q10 What unit do you usually work on?

○ CHD4 (1)

○ CHD5 (2)

○ CHD6BHU (3)

○ 6 Red (4)

○ PICU (5)

○ Float/Per Diem (6)

○ Prefer not to say (7)

Q6 What is your sex?

○ Male (1)

○ Female (2)

○ Non-binary / third gender (3)

○ Prefer not to say (4)

○ Prefer to self-describe (5)

Q7 Please self-describe your gender.

_____

End of Block: Demographics

Start of Block: Quantitative Questions

Q14 Do you check the patient's name band prior to administering medications?

○ Always (1)

○ Frequently (2)

○ About half the time (3)

○ Rarely (4)

○ Never (5)

Q15 Do you prepare and carry medications for two or more patients at a time?

○ Always (1)

○ Frequently (2)

○ About half the time (3)

○ Rarely (4)

○ Never (5)

Q16 Do you label the medication cup with the patient's name and room number?

- ○ Always (1)
- ○ Frequently (2)
- ○ About half the time (3)
- ○ Rarely (4)
- ○ Never (5)

Q17 Do you bring your computer and barcode scanner with you when you administer medications?

- ○ Always (1)
- ○ Frequently (2)
- ○ About half the time (3)
- ○ Rarely (4)
- ○ Never (5)

Q18 Do you label syringes and bags with the medication name, patient name, and room number?

- ○ Always (1)
- ○ Frequently (2)
- ○ About half the time (3)
- ○ Rarely (4)
- ○ Never (5)

Q19 Do you administer medications that another nurse has prepared?

- ○ Always (1)
- ○ Frequently (2)
- ○ About half the time (3)
- ○ Rarely (4)
- ○ Never (5)

Q20, Do you have another nurse double check high risk medications (i.e., chemo, digoxin, drips)?

- ○ Always (1)
- ○ Frequently (2)
- ○ About half the time (3)
- ○ Rarely (4)
- ○ Never (5)

Q21 Do you have insulin doses double-checked by another nurse?

- ○ Always (1)
- ○ Frequently (2)
- ○ About half the time (3)
- ○ Rarely (4)
- ○ Never (5)

Q22 Do you scan the patient and medication prior to every medication administration?

○ Always (1)

○ Frequently (2)

○ About half the time (3)

○ Rarely (4)

○ Never (5)

Q23 Do you report actual medication errors or near misses in Safety Net?

○ Always (1)

○ Frequently (2)

○ About half the time (3)

○ Rarely (4)

○ Never (5)

End of Block: Quantitative Questions

Start of Block: Cause of Error Ranking

Q24 In your opinion, what are the top three causes of error?
Click to write Choice 1 (1)
Click to write Choice 2 (4)
Click to write Choice 3 (5)
▼ Computer entry error (1) ... Other (14)

End of Block: Cause of Error Ranking

Start of Block: Qualitative Questions

Q25 What do you think is the biggest barrier in following medication safety practices?

_____

Q26 What do you think is the contributor to medication errors?

Q27 If you could fix one thing regarding medication administration, what would it be?

End of Block: Qualitative Questions