Nurse Handoff Standardization in a Pediatric Intensive Care Unit

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Submitted to: Dr. Sharon Norman-Chair

This paper is submitted in partial fulfillment of the requirements for the Doctor of Nursing Practice degree.

Abstract

Inadequate handoffs are persistent issues in hospitals contributing to patient safety concerns. Standardization of handoffs reduces general adverse events, increases effectiveness of communication, satisfaction, and overall quality. Despite recommendations by the Patient Safety Group at The Joint Commission, our local pediatric intensive care unit did not have a formal standardized nurse handoff. The purpose of this quality improvement project was to implement a standardized process for shift handoffs and evaluate the influence on nurse perception of communication and handoff quality. The project included the development of standardized handoff materials, nurse education, surveying nurses on their perceptions of handoff quality, and performing observational audits. Data was analyzed and results showed a strong overall adherence to the standardization at 86%. However, there was no statistically significant improvement in nurses' perceptions of communication or handoff quality after implementation of the standardized handoff. Ongoing education and data collection is needed to sustain the standardized process. Future work should consider the impacts of this handoff process on patient safety and adverse events.

Introduction

Problem Description

Nurse handoff consists of the transfer and acceptance of patient care responsibility and requires effective communication to ensure continuity and patient safety. Inadequate handoffs are frequent and persistent issues in hospitals. The Joint Commission included effective handoff communication in their National Patient Safety Goals in 2006. Furthermore, this goal became a provision of care standard in 2010 (Joint Commission, 2017). Additionally, patient handover is one of the World Health Organization's top five priorities (Desmedt et al., 2021). Despite these recommendations, handoffs are often performed casually and without structure. Suboptimal handoffs persistently contribute to patient safety concerns and adverse events including treatment delays, falls, wrong-site surgery, and medication errors. These failures were responsible for 30 percent of malpractice claims, $1.7 billion in costs, and 1,744 deaths over five years (Joint Commission, 2017).

These preventable incidents are often the result of poor communication between healthcare workers. There are several factors that have been identified as contributing to ineffective handoffs including: lack of standard protocols and policies, lack of training, team awareness, breakdowns in communication, attitude and culture (Desmedt et al., 2021).

Our institution is an urban, academic 151 bed children's hospital with 6,500 hospitalizations per year. Within the institution, our unit is a 20-bed pediatric intensive care unit (PICU). Despite being a large academic center, we did not have a standardized hand-off in place between nurses within the PICU prior to this project. Several standardized handoffs are utilized within the PICU for patients transferring from the operating room (OR) to PICU and from PICU

to the wards. This is a local problem that needed to be addressed to improve communication, handoffs, and ultimately patient safety within our PICU.

Available Knowledge

In reviewing the recent literature, there were several applicable studies identified that evaluated interventions to improve nurse handoffs. There were four systematic reviews of descriptive and qualitative studies identified that each reviewed between nine and 30 studies. All four of these systematic reviews found that the implementation of a standardized nurse handoff improved the overall handoff process (Bukoh & Siah, 2020; Desmedt et al., 2021; Galatzan & Carrington, 2018; Raeisi et al., 2019).

This standardization process found to increase effectiveness of communication, satisfaction, organization, and overall quality of the content (Galatzan & Carrington, 2018). There were fewer omissions of information, decreased time required, and an improved perception of teamwork and nurse satisfaction (Desmedt et al., 2021). Additionally, a structured handoff reduces general adverse events and errors related to handovers. Completing this process at the bedside allows for early assessment of the patient which contributes to an increase in patient safety (Bukoh & Siah, 2020).

There were two additional single-center qualitative studies identified. The first was performed on a 38-bed medical-surgical unit with an implementation of a standardized handoff and staff education on the new process. These interventions demonstrated increased nurses' perceptions of shift report and reduced the time required to perform shift handoff (Usher et al., 2018). The second study was performed at a 400-bed hospital in South Korea across several different nursing units. They found that nurses who reported using handoff guidelines and

checklists rated the quality of their handoffs the highest, as well as had the highest perception of patient safety (Kim et al., 2020).

In addition to the aforementioned studies, a publication from the Patient Safety Advisory Group at The Joint Commission offers recommendations to reduce risk and harm related to inadequate handoffs. Their recommendations include: "standardize critical content to be communicated by the sender during a hand-off – both verbally (preferably face to face) and in written form, make sure to cover everything needed to safely care for the patient in a timely fashion, standardize tools and methods (forms, templates, checklists, protocols, mnemonics, etc.) to communicate to receivers" (Joint Commission, 2017). Additional recommendations include: minimizing interruptions, including patient and family as appropriate, standardize training on how to conduct a successful handoff, monitor the success of the interventions, and make high-quality handoffs a cultural priority (Joint Commission, 2017).

There are several factors that must be taken into consideration to ensure the success of a standardized handoff improvement project, including an assessment of the unit culture and the workflow (Galatzan & Carrington, 2018). Other identified barriers include: high workload, lack of training, lack of time, and divided attention (Desmedt et al., 2021). Lastly, the success of a standardized nurse handoff requires support and commitment from leadership (Joint Commission, 2017).

In summary, the literature favors the standardization of nurse shift report handoffs. There is no single tool or evaluation metric that has been identified to be the most effective; however, the simple standardization of the process has shown to improve the quality of handoffs between nurses. This improvement in handoff quality ultimately contributes to an increase in patient safety and a reduction in adverse events.

Rationale

This project utilized the Institutes for Healthcare Improvement (IHI) Model for Improvement as the quality improvement (QI) methodology. This model has been widely adopted for quality improvement projects, is inexpensive and practical, and has been proven to accelerate change in healthcare settings (Nates et al., 2020). Instead of large and consequently slow implementation of changes, the Plan Do Study Act (PDSA) methodology allows for frequent reevaluations of effectiveness before systemic changes are made, resulting in fast implementation of improvement projects as well as an improved ability to hone study aims and improvement methods (Venogupal, Kasubhai & Paruchuri, 2017). This framework will allow for implementation of standardized handoffs with several reevaluations of effectiveness.

We identified that lacked a standardized nurse handoff process in PICU during a root cause analysis with the creation of a cause-and-effect diagram (Appendix A: Nurse Handoff Standardization Cause and Effect Diagram). The Ishikawa, or fishbone, diagram modeled by the IHI was used to group causative factors into categories such as environment, staff, methods, patient population, and materials in order to help us identify specific areas of improvement. By initiating a standardized nurse handoff, this gap was addressed.

A literature review demonstrated that a standardized nurse handoff is an evidence-based approach to improve the quality of information exchanged between nurses and ultimately increase patient safety and reduce adverse events. This standardization allows our unit to improve the handoff process.

Specific Aims

Implement a standardized handoff for all handoffs that take place between nurses in the PICU by December 2022. This standardization includes verbal and written report, verification of

safety equipment, verification of appropriate alarm parameters, and verification of medication infusions. Eighty-five percent of audited nurse handoffs in the PICU will include all standardized components.

Methods

Context

This QI project was performed in our 20-bed PICU at an urban, academic children's hospital that cares for 1,500 children per year. Our PICU cares for patients from birth to 21 years old with a wide variety of diagnoses. Our unit is a mixed cardiac and medical-surgical PICU that is a part of a Level I Children's Trauma Center, as well as an extracorporeal membrane oxygenation (ECMO) center. We have an average of 80 staff nurses and 15 contracted agency nurses. Our nurses have a wide range of experience, ranging from zero to over 20 years. The majority of our nurses are Bachelor's prepared with several who are Master's prepared. There is strong unit support for this project from nursing management and the Unit Based Nurse Practice Council (UBNPC). A formal letter of support from unit management was obtained (Appendix B: Letter of Support). UBNPC frequently reviews upcoming QI projects and assists in disseminating the information to the rest of the nurses. The nursing culture is supportive of change, and specifically has adopted and implemented other standardized handoff processes between other care areas.

Interventions

A standardized shift report template and checklist was developed with input from key stakeholders. These stakeholders included bedside nursing representation from both day shift and night shift with mixed age and experience level. Input was also received from nursing management. This form was available as a reference at every patient room, as well as

electronically on an online portal for staff to individually use when receiving shift report. This template follows a systems-based report style that includes pertinent patient information and orders. In addition to this templated report, there are checklist items including: verification of airway equipment, verification of emergency drug sheet with correct dosing weight, verification of appropriate alarm parameters on monitoring equipment, verification of infusions with correct dose and expiration time, and verification of line expiration dates (Appendix C: Standardized Report Template).

With the development of the standardized template and checklist, nursing staff received the information and education by way of secure e-mail and one-to-one interactions with the project leader and UBNPC representatives. Specific information was provided on the role of both the oncoming and off-going nurses, the sequence and structure of the handoff, and documentation expectations in the electronic health record (EHR). The off-going nurse is responsible for giving verbal report and documenting verification of infusions with the oncoming nurse in the EHR. The oncoming nurse is responsible for receiving verbal report and completing the checklist items.

Post implementation of the process change, the project lead and staff nurses conducted observational audits at both the morning and evening shift changes to assess adherence to all standardized components using an audit tool (Appendix D: Audit Tool). Additionally, this allowed for coaching and reinforcement with staff.

Study of Interventions

To evaluate and measure the effect of a standardized handoff process in our PICU on the nurses' perceptions of communication and quality of handoff, the Medical Intensive Care Unit Shift Report (MSR) Communication Scale was used (Appendix E: MSR Communication Scale).

This scale is a 9-item tool that examines communication openness, quality of information, and shift report. Each item is measured on a Likert scale with a total possible score of 36. Lower scores indicate a better perception of communication (James et al., 2013).

This scale was administered as a questionnaire pre-intervention as a Qualtrics® survey to all nurses in our PICU through e-mail and was accessible via posted flyers with a QR code. The questionnaire was readministered two-months post-intervention. Participation was voluntary and results remained anonymous. A run chart was utilized to track adherence and the need for additional PDSA cycles.

Measures

The outcome measures for this improvement project are the percentage and number of nurse handoffs in our PICU that are completed with all standardized components from December 2022 to February 2023. The process measure includes the average scores from nurses on the pre- and post-intervention questionnaires assessing perceptions of communication and quality of handoff. Additional considerations were addressed such as hiring of new nurses during intervention implementation and concerns raised by staff during implementation.

Analysis

The evaluation of standardized handoff adherence and use was tracked and reported as a percentage at both the one and two-month time period post-intervention. Pre versus postimplementation data collected from the MSR communication scale was compared quantitatively using independent t tests. This helped identify if there was improvement in overall perceptions of nursing handoff and if the results were statistically significant.

Ethical Considerations

This QI project deidentified all data to address concerns for invasion of privacy. There was low potential for patient harm as this standardization has been shown to ultimately decrease adverse events and patient safety events. There was a risk for staff burden that was monitored and addressed by the project lead during observational audits and feedback from staff. Additionally, this project was deemed to not be human research by the Oregon Health & Science University (OHSU) Institutional Review Board (IRB) (Appendix F: Oregon Health & Science University IRB Determination).

Results

Sixty-six nurses completed the pre-intervention MSR survey in October 2022. Ninety-four percent of nurses who completed the pre-survey were Bachelors prepared nurses while 4% were Masters prepared. Forty-five percent had 5-9 years of nursing experience, 23% had 0-4 years, 12% had 10-15 years, 8% had 15-20 years, and 12% had over 20 years of experience.

A total of 72 audits were completed during PDSA cycle 1 between November 27, 2022 and January 28, 2023. There were 40 audits completed during the one-month post-intervention period and 32 were completed during the two-month period. Audits during dayshift accounted for 46%, and 54% were conducted during night shift. There were 65% of audits conducted on handoffs from staff nurses, 17% from nurses on orientation 10% from float pool nurses, and 8% from travel nurses. For inter-rater reliability, 38% of all audits were also conducted with the project lead present. The goal of this first PDSA cycle was to have 85% overall adherence to the standardization. The overall compliance to the standardized handoff format was 86%. The following system-based sections had adherence of: Diagnosis/History 86%, Neuro 92%, Cardiovascular 83%, Respiratory 85%, Gastrointestinal/Genitourinary 85%, Skin 94%, and Psychosocial 81%.

Forty-two nurses completed the post-intervention MSR survey in February 2023. Similar to the pre-intervention survey, 93% were Bachelors prepared, 5% Masters prepared, and 2% Associate prepared nurses. Levels of nursing experience from respondents were: 14% 0-4 years, 52% 5-9 years, 17% 10-14 years, 7% 15-19 years, and 10% over 20 years.

Pre and post-intervention survey results were compared using the mean scores and independent t-tests (Appendix G: Survey Result). The aim was to demonstrate an overall improvement in scores reflecting an improved perception of handoffs. There was noted improvement in the post-intervention total scores (p 0.17), open communication section (p 0.18), quality of information exchanged section (p 0.55), and shift report section (p 0.3); however, the improved results were not found to be statistically significant.

There were no modifications made to the interventions throughout the project. There were no measured unintended consequences; however future cycles may benefit from examining the impact on the time required for shift handoff, as there was some anecdotally reported decrease in time.

Discussion

Summary

The overall aim of this project was to implement a standardized handoff in a pediatric intensive care unit and evaluate its influence. The first aim was to evaluate the accuracy and adherence to standardized elements of nurse handoffs. This project demonstrated strong adherence to the standardized handoff with an overall rate of 86%. Research has shown that standardized handoff tools improve patient safety (Joint Commission, 2017).

The second aim of this project was to evaluate the impacts of a standardized handoff on nurses' perceptions of communication and handoff quality. This project demonstrated an improvement in nurses' perceptions after the implementation of a standardized handoff, however, results were not found to be statistically significant (p 0.17).

A particular strength of this project included robust input from key stakeholders in the development of the standardized materials which may have contributed to overall strong adherence despite the staffing and acuity challenges during implementation. Additionally, the one-on-one education with the project lead ensured that all staff members received the appropriate information prior to implementation.

Interpretation

There was no statistically significant improvement in nurses' perceptions of handoff quality and communication despite the implementation of a standardized handoff process. This is not consistent with previous quality improvement projects which demonstrated significant improvements after implementation of a standardized handoff (James et al., 2013; Usher et al., 2018).

The association between the standardized handoff process and the MSR scores may have been impacted by other contextual factors. This project was conducted during the Respiratory Syncytial Virus (RSV) and influenza winter surge in which crisis standards of care were declared 5 days prior to the implementation of our standardized handoff process. Therefore, the post-intervention survey was conducted during a period of high patient volume, higher than normal nurse-to-patient ratios and utilization of nurse extenders and Federal Emergency Management Agency (FEMA) nurses to maintain adequate staffing levels.

Limitations

There are limitations to the generalizability of this quality improvement project as it was designed for the specifics needs of a mixed medical/surgical and cardiac PICU. The audit tool usage by many different staff nurses may have impacted the internal validity of the adherence data; however, efforts were made by the project lead to conduct observational audits and reinforcement education to improve inter-rater reliability. The manual data entry, computation and human error may have affected the analysis despite reviewing the data multiple times for accuracy. Finally, the impact on patient safety was not formally evaluated and may have been impacted during this project.

Conclusions

Implementation of this quality improvement project created a standardized handoff process for our PICU that is in alignment with recommendations from the Patient Safety Group at The Joint Commission (Joint Commission, 2017). Continual education and audits, as well as unit and leadership support, are essential to the sustainability of the standardized handoff process. Evaluating the impact of a standardized handoff on patient safety and adverse events is an area for future study and should be addressed in future interventions.

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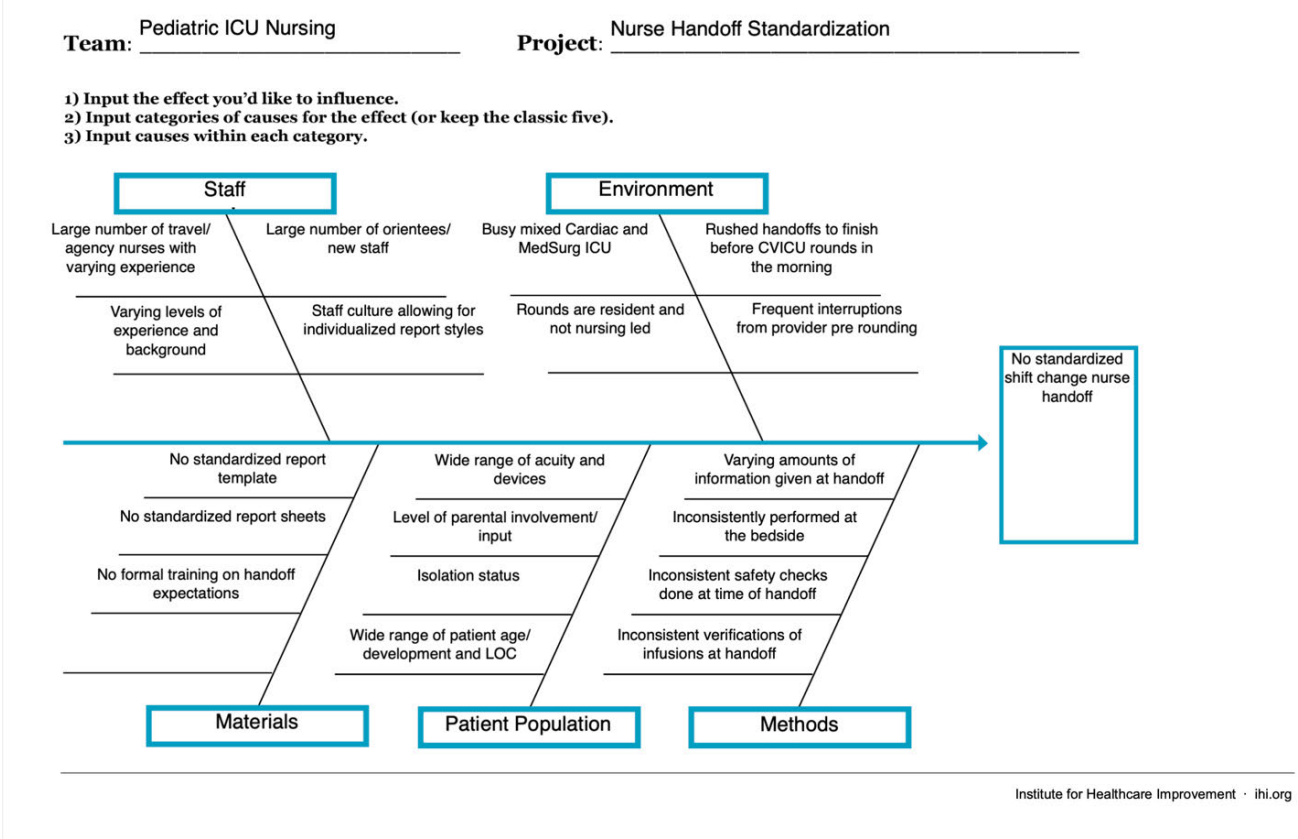
Appendix A

Nurse Handoff Standardization Cause and Effect Diagram



Appendix B

Letter of Support

Letter of Support from Clinical Agency

Date: *August 10, 2022*

Dear *Garrett Chatelain*,

This letter confirms that I, *PJ Companeschi*, allow *Garrett Chatelain* (OHSU Doctor of Nursing Practice Student) access to complete his/her DNP Final Project at our clinical site. The project will take place from approximately *August 2022* to *May 2023*.

This letter summarizes the core elements of the project proposal, already reviewed by the DNP Project Preceptor and clinical liaison (if applicable):

- **Project Site(s)**: *Doernbecher Children's Hospital, Pediatric Intensive Care Unit. 700 SW Campus Dr., Portland, OR 97239*
- **Project Plan:**
  - Identified Clinical Problem: *Ineffective handoffs and poor communication contribute to patient safety concerns and adverse events.*
  - Rationale: *Implementation of a standardized nurse handoff is an evidence-based approach to improve the quality of information exchanged between nurses and ultimately increase patient safety and reduce adverse events.*
  - Specific Aims: *85% of audited nurse handoffs in the PICU will be performed with all standardized components.*
  - Methods/Interventions/Measures: *A standardized shift report template using a systems-based report style and checklist of safety items will be developed and implemented. Observational audits at shift changes will be performed to evaluate adherence. A pre and post intervention survey will be performed using the Medical Intensive Care Unit Shift Report Communication Scale to assess nurses' perceptions of communication and quality of handoffs. Outcome measures will be the percentage and number of nurse handoffs completed with all standardized components. Process measure will include the average scores from the pre and post intervention surveys.*
  - Data Management: *Audits of handoff standardization adherence will be completed, as well as survey response scores. This data will be deidentified and stored securely with password protection.*
  - Site(s) Support: *Distribution of surveys to nurses via e-mail and QR code flyers. Assistance with audit/data collection from charge nurses and/or nursing management.*

During the project implementation and evaluation, *Garrett Chatelain* will provide regular updates and communicate any necessary changes to the DNP Project Preceptor.

Our organization looks forward to working with this student to complete their DNP project. If we have any concerns related to this project, we will contact *Garrett Chatelain* and *Sharon Norman* (student's DNP Project Chairperson).

Regards,

Signature Date Signed

Appendix C

Standardized Report Template

Name Age Dosing Weight Allergies Isolation Diagnosis, Pertinent Past Medical History, Interval Events	**Pediatric ICU Standardized Nursing Report** OHSU DOERNBECHER CHILDREN'S Hospital
Neuro: Status & Assessment Findings (Pupils, strength, deficits) Spine Precautions/Mobility Checks ordered how frequently Drains: EVD @ ___cmH2O, Bolt, ICP, Lumbar Drain EEG Seizure history and rescue Targeted Temperature Management	RESTORE: Y/N, Phase & SBS goal Last titration and # of boluses Drips/PCA Scheduled Pain Meds PRN Pain Meds WAT scores Delirium
Cardiovascular: Tmax HR and rhythm Paced/Mode/Settings BP and hemodynamic goals CVP Assessment Findings (Pulses, CRT, murmur, color, edema)	Lines/Infusions/Dates of line, cap, dressing changes Chest tubes NIRS ranges Pertinent labs, goals, and schedule ECMO Mode/Flow/Sweep Abx/Antivirals/Antifungals Cultures
Respiratory: Assessment Findings (WOB, RR, breath sounds, retractions) spO2 goals Intubated: ETT size, cuff, ___cm @ ____, tape change needed this shift Trach: Type, size, cuff, ties changed this shift	Vent Settings: Mode, RR, Tvol, IP, PS, PEEP, FiO2. PIP/Tvol range, etCO2/Tcom range VDR: Percussive rate, I Time, E Time, I:E Ratio, PIP, PEEP CPAP/BiPAP/HFNC settings iNO, Iloprost, Pulm HTN level Suctioning & Secretions Airway clearance & Nebs
GI/GU: Assessment Findings (Soft, Non-tender, bowel sounds) Diet Feeding Tubes: NG/NJ/GT/GJ/Sump, taped @ _____ cm Feeds: Cont vs bolus, formula, fortification, rate, schedule Ostomy Antiemetics Bowel regimen Voids/Foley Diuretics Fluid balance goal PD/HD/CRRT & orders	**Skin:** Incisions/Wounds Treatments/Dressings Other drains (JP, Penrose, Hemovac) Wound Vac settings CHG/Linen change needed this shift **Psych/Social:** Parent/Guardian names Custody/Medical Decision-Making Issues Outstanding admission database items Visitor exceptions or restrictions SW needs SCAN/DHS involvement Education/Discharge needs

Shift Change Checklist

- Verify Drips: Verify medication, concentration, drip rate, expiration date, line expiration date
- Document rate/dose verify in Epic by offgoing RN
- Verify appropriate size bag/mask and suction with yankauer
- Verify emergency drug sheet with appropriate dosing weight
- Verify alarm parameters
- Verify patient ID band

Appendix D

Audit Tool

Date:

Shift: Day Night

I received report from: PICU Staff Nurse PICU Traveler/Agency Nurse

Orientee Float Pool Nurse

Did the shift report you receive follow the standardized systems-based template?

Y N

Did all pertinent information for your patient get relayed in the appropriate system?

			Missing Element(s)?
Patient Info/Diagnosis/Hx:	Y	N	
Neuro:	Y	N	
CV:	Y	N	
Resp:	Y	N	
GI/GU:	Y	N	
Skin:	Y	N	
Psychosocial:	Y	N	

Any identified barriers or problems with the standardized handoff?

Appendix E

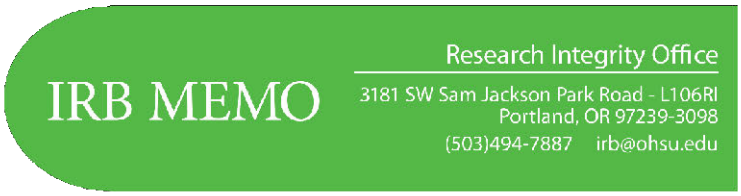
MSR Communication Scale

	Strongly Agree	Agree	Disagree	Strongly Disagree
Open Communication				
I find it enjoyable to talk with other nurses on this unit				
It is easy to ask advice from nurses on this unit				
It is easy for me to talk openly with nurses on this unit				
Communication between nurses is very open				
Quality of Information Exchanged				
The accuracy of information passed among nurses on this unit leaves much to be desired				
I feel that certain nurses do not completely understand the information they receive				
Shift Report				
The change of shift report I receive prepares me to care for my patient				
It is often necessary for me to go back and check the accuracy of information				
The change of shift report I receive on my patients helps me do my job well				

From "Development of the medical intensive care unit shift report communication scale as a measure of nurses' perception of communication" by James, D., Jukkala, A., Azuero, A., Autrey, P., Vining, L., & Miltner, R., 2013, *Nursing: Research and Reviews,* 3, p. 63. Copyright 2013 by Dove Medical Press.

Appendix F

Oregon Health & Science University IRB Determination



NOT HUMAN RESEARCH

August 23, 2022

Dear Investigator:

On 8/23/2022, the IRB reviewed the following submission:

Title of Study:	Nurse Handoff Standardization in a Pediatric Intensive Care Unit: A Quality Improvement Project
Investigator:	Sharon Norman
IRB ID:	STUDY00024771
Funding:	None

The IRB determined that the proposed activity is not research involving human subjects. IRB review and approval is not required.

Certain changes to the research plan may affect this determination. Contact the IRB Office if your project changes and you have questions regarding the need for IRB oversight.

If this project involves the collection, use, or disclosure of Protected Health Information (PHI), you must comply with all applicable requirements under HIPAA. See the HIPAA and Research website and the Information Privacy and Security website for more information.

Sincerely,

The OHSU IRB Office

Appendix G

Survey Results

Medical Intensive Care Unit Shift Report Communication Scale Scores Pre & Post Intervention				
	Mean (SD)			
Domain	**Pre (N=66)**	**Post (N=40)**	**t**	**p**
Open Communication	7.81 (2.16)	7.2 (2.38)	1.36	0.18, ns
I find it enjoyable to talk with other nurses on this unit	1.80 (0.58)	1.64 (0.53)		
It is easy to ask advice from nurses on this unit	1.82 (0.65)	1.74 (0.59)		
It is easy for me to talk openly with nurses on this unit	2.02 (0.69)	1.95 (0.64)		
Communication between nurses is very open	2.22 (0.59)	2.05 (0.64)		
Quality of Information Exchanged	5.15 (1.06)	5.01 (1.31)	0.6	0.55, ns
The accuracy of information passed among nurses on this unit leaves much to be desired	2.32 (0.59)	2.49 (0.61)		
I feel that certain nurses do not completely understand the information they receive	2.83 (0.69)	2.84 (0.65)		
Shift Report	6.45 (1.28)	6.18 (1.30)	1.05	0.3, ns
The change of shift report I receive prepares me to care for my patient	1.83 (0.41)	1.75 (0.43)		
It is often necessary for me to go back and check the accuracy of information	2.74 (0.66)	2.85 (0.67)		
The change of shift report I receive on my patients helps me do my job well	1.88 (0.54)	1.70 (0.46)		
Total	19.42 (3.23)	18.45 (3.99)	1.37	0.17, ns