Improving Handoff Quality and Nursing Teamwork Between Intrahospital Settings with Transfer Checklists

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Abstract

Background. Frequent transitions between healthcare settings create opportunity for suboptimal handoffs, error, and compromised patient safety. These handoffs represent some of the more labor-intensive nursing activities and yet limited research has explored this significant exchange of information and responsibility.

Purpose. The purpose of the proposed project was to evaluate whether the implementation of a nursing transfer protocol would promote teamwork and collaboration between nurses in the Medical Intensive Care Unit (MICU) and medical oncology unit (MOU) and improve overall perception of handoff quality.

Design. This was a quasi-experimental project with pre-post comparison using the Nursing Teamwork Survey (NTS) and Manser rating tool for handoff quality (Manser Survey).

Methods. The Manser survey was distributed to nurses in both units to evaluate the quality of handoffs. Nurse volunteers from both units used data collected from the Manser surveys to create an oncology transfer checklist for use during transfers. Perceptions of teamwork between units were evaluated using the NTS both before and after creation of the transfer protocol. Quality of handoffs after implementation of the checklist was evaluated using the Manser survey.

Results. Neither the Modified NTS nor the Manser survey items demonstrated statistically significant improvement in scores.

Conclusions. While it is uncertain whether the oncology transfer checklist fundamentally changed handoffs, clinical results suggest that bringing two teams together to learn about their structural and role related processes and allowing them to collaborate on handoff improvement, supported improved handoffs and optimal patient care, and also helped to promote socialization, trust, situational awareness and teamwork that is essential between intra-hospital settings.

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Section I – Introduction and Research Question

Background

Extensive healthcare literature exists that describes the risks inherent in clinical handoffs in the hospital setting with an estimated 24 handoffs per patient hospitalization (Robertson et al., 2014). Discharge from one specialty setting, such as an ICU or operating room, to another setting, is a high-risk event where suboptimal handoffs create opportunity for errors and breaks in patient safety (van Sluisveld, 2015). Currently, nursing literature on patient handoffs mostly pertains to the traditional end of shift transfer of care from one nurse to another within the same work environment, and despite the importance and frequency of the intrahospital handoff, little research relating to this unique exchange exists (McFetridge et al., 2007). Similarly, insufficient literature can be found that describes patient admissions, discharges, and transfers—nursing activities that have been found to be the most labor intensive aspects of the role (Lin et al., 2012). And while technical skills and the sharing of pertinent patient information are the foundation of the handoff process, these transfers serve other essential roles, such as creating group cohesion and serving as a means for social support amongst nursing staff (McFetridge et al., 2007). Discussions of non-technical skills that are essential to optimal handoff and serve to promote socialization, training, trustful relationships, and role clarification are largely missing from the literature (Manser et al., 2013). Equally important to patient safety are the human factors that contribute to teamwork such as communication, leadership, shared decision-making, and situational awareness (Pezzolesi et al., 2012). The purpose of the proposed project was to determine if the implementation of a nursing transfer protocol would promote teamwork and

collaboration between nurses in the Medical Intensive Care Unit (MICU) and medical oncology unit (MOU), and improve overall perception of handoff quality.

Theoretical Framework

Donabedian's Structure-Process-Outcome (SPO) conceptual model was utilized as the framework for this project. This well accepted model serves as a robust means to evaluate quality improvement efforts using three essential pathways where the structure of healthcare services and environments influence the processes involved in patient care, and ultimately impact outcomes (Hickey & Brosnan, 2012). Understanding the existing connections between structure, process, and outcome is an essential requirement prior to conducting any quality improvement or patient safety effort. Once the relationship between the three components is understood, evaluation and assessment of quality could occur. Including structure, process, and outcome elements in improvement efforts allows the clinician to better assess the strengths and weaknesses of a project, and more accurately interpret results or make necessary changes (Donabedian, 1988).

The first dimension of the SPO model is structure, which refers to characteristics of the environment where care is provided. This encompasses all of the details pertaining to the healthcare personnel and their capabilities, equipment and resources, patient demographics, and organizational factors (Hickey & Brosnan, 2012). In this project, the structural components of the MICU and MOU as pertains to their functionality, nursing leadership, staff characteristics, unit engagement, and existing policies and practices related to handoffs, were considered when making suggestions for process change.

Process, the second dimension of the SPO model, describes the patient care or health related intervention that is provided (Donabedian, 1988). In this project, process relates to the

activity of handoff that is conducted between two nurses when a patient is transitioning between the MICU and MOU. Features of this handoff process such as communication, location, workflows, handoff format, and frequency of handoffs between units were assessed.

The third dimension of the SPO model is outcome. The measurable changes or effects that result from a process activity impacted by its structural components define this dimension (Hickey & Brosnan, 2012). In this project, the outcomes related to patient handoffs were described by the nurses' perceptions of handoff quality and teamwork between the two units. Once the three components of the SPO model were understood within the context of the project, manipulating structure and process allowed for interventions that could possibly impact the desired outcomes (Donabedian, 1966). Therefore, impacting the process related to handoff through development and use of a nursing handoff protocol helped to shape outcomes and influence perceptions related to handoff quality and teamwork. Positive outcomes then helped to validate the effectiveness of the quality improvement effort (Hickey & Brosnan, 2012).

Question

Does the creation and implementation of a nursing handoff protocol improve nurse perceptions of teamwork and quality of handoffs between the MICU and the MOU?

Section II – Review of the Literature

Patient transitions between hospital settings involve some of the more complex activities performed in healthcare. The following review sought to assess the current literature pertaining to handoffs between intrahospital settings and identify how transfers are related to teamwork and collaboration. In order to evaluate the influence of transfer protocols on perceived teamwork and collaboration, the electronic databases PubMed and CINAHL were searched. The following key words were used for the search "transfer or handoff or handover" with "teamwork" and "intra

hospital or hospital" which supplied 89 potentially relevant citations. The mesh heading "transfer, intra hospital" was combined with the mesh headings "collaboration or teamwork" to provide 52 citations from the CINAHL database. Bibliographies were hand searched for ancestry studies that met inclusion criteria in order to identify other possible sources. Inclusion criteria were: 1) studies of patient transfer and handoff between settings in acute care hospital settings and 2) studies of teamwork or collaboration and 3) studies that include healthcare professionals. Exclusion criteria were: 1) studies of patient transfer and handoff between two different facilities, 2) studies of handoffs within the same unit or setting at shift change, 3) studies of handoff between paramedics and the emergency department, 4) studies of the discharge of patients to the primary care or home setting and 5) studies of the physical safety process of transferring patients within the hospital (see Figure 1 for search process). A total number of 15 studies were reviewed. Four systematic reviews, seven intervention studies, and four descriptive studies were identified that met inclusion criteria.

Results

Systematic reviews

Four systematic reviews were identified that met inclusion criteria (see Table 1). The reviews evaluated practices, outcomes, and deficiencies related to the patient handoff process. The effectiveness of interventions intended to improve the safety and the process of patient handoffs was also examined. Within the four systematic reviews a total of eighty-seven descriptive and interventional studies were evaluated. Handoff studies were conducted in a variety of settings and practice areas including between staff members in the same setting or unit, the OR and receiving site (PACU or ICU), the ICU and the ward, and the ED and receiving inpatient unit. A variety of interventions were described: direct observations, interviews and

focus groups, questionnaires and surveys, handoff protocols and tools, nurse liaisons, and training experiences. Various study measures included descriptive observation and analysis, number or errors, adverse events, or information omissions reported, handoff duration, communication problems, perceived quality of handoff, teamwork quality, staff satisfaction, and compliance with handoff protocols.

Moller, Madsen, Fuhrmann, and Ostergarrd (2012) systematically reviewed 23 studies of postoperative handoffs and concluded that there were many challenges in teamwork amongst different disciplines with various skill sets and expectations and that there was frequently incomplete or ineffective communication between teams. Many of these communication breakdowns were related to the complexity of care transitions and varying pathways that patients take after surgery. Several studies hypothesized that documenting and formalizing handoff activities, particularly through use of checklists, would allow for additional support for clinical decision-making and would improve communication between teams. In two of the 23 interventional studies reviewed, teamwork was measured and found to have statistically significant improvement after implementation of a standardized tool for patient handoff.

Ong and Coiera (2011) reviewed 24 studies and concluded that high workload and time constraints, information omissions, ward nurses' lack of expertise and confidence of managing ICU patients, and informal and unstructured reports reduced the quality of handoffs. Nineteen of the studies were primary studies reflecting handoff practices and pitfalls, while the remaining five studies described handoff communication interventions employed during intrahospital transfers. Four studies reviewed the use of nurse liaison programs to help facilitate communication between units and found this handoff technique to improve the transfer process.

Three of five interventional studies reviewed found structured sign out pathways or handoff protocols to significantly improve staff communication, quality of the handoff, and teamwork.

Robertson, Morgan, Bird, Catchpole, and McCulloch (2014) evaluated the effectiveness of intrahospital handoff studies and reported that staff satisfaction improved in 35% of the 29 reviewed studies after implementation of a handoff intervention. Over eighty discrete outcomes were measured in the different studies and were grouped into the categories of information transfer, staff satisfaction, clinical outcomes, and handoff duration. While the design of the outcome measures varied among the 29 studies, outcomes pertaining to information transfer appeared to improve in more than 50% of the studies (Roberston, et al., 2014).

van Sluisveld et al. (2015) reviewed 11 studies of patient transfers and attempted to evaluate the effectiveness of interventions meant to improve safety and efficiency of handoff between ICU and ward settings. While no statistical analysis of teamwork was provided in the review of the handoff interventions between intensive care units and general wards, unspecified interventions involving nurse liaisons and use of handoff forms appeared effective in improving handoff quality. Six of the studies reported statistically significant effects in two categories—continuity of care and preventable adverse events. While the selected systematic reviews addressed a range of in-hospital practice areas and measured a variety of different outcomes, many of the studies described positive changes in teamwork and handoff quality after implementation of a handoff intervention.

Intervention studies

Seven studies that either developed and or evaluated a handoff protocol or handoff performance assessment tool were identified as meeting the inclusion criteria (See Table 2). The selected studies utilized a variety of designs, mostly a mixed methods or observational approach,

to inform the creation of a handoff protocol or to examine the quality and teamwork in the handoff process with a specific measure. Five of the studies were conducted in the postoperative setting. The remaining studies were conducted between an ICU and general medical unit or emergency department.

Handoff Protocols.

Two studies used Appreciative Inquiry (AI) to improve the patient handoff process. AI is an innovative philosophy and process improvement methodology that builds on the processes and positive relationships that already exist within organizations in order to promote change and continued success (Cooperrider & Srivastva, 1987). Clarke et al. (2012) used the philosophy and methodology unique to AI to further explore transfers and inform improvements in handoffs between an ICU and general medical unit in a Canadian tertiary hospital. Thematic analysis from staff interviews demonstrated the patients' welfare and "trust" as important elements of an ideal transfer. After a series of semi structured interviews, the research team collaborated with staff members to develop a "perfect handoff" protocol based on the collected data from the interviews that included: a quiet place for nurses to prepare for handoff, time to speak to patients and families about transfer, a standardized phone report, and a transfer checklist. The "perfect handoff" protocol was not evaluated in this study however; a proposed evaluation plan would include chart audits and feedback surveys (Clarke et al., 2012).

Shendell-Falik, Feinson, and Mohr (2007) conducted a demonstration project using the AI approach to engage staff and identify and learn from their most effective handoff experiences as a way to improve patient handoffs. AI was used to facilitate the redesign of ED to inpatient telemetry unit nursing handoff in a large New Jersey medical center. Interviews and focus groups were utilized and subsequent staff collaboration resulted in creation of a transfer protocol,

welcome script, and several related improvement projects. Fourteen nurses from the ED and the telemetry unit interviewed each other and participated in these focus group activities. Nurse satisfaction and teamwork improved from 90-97.6% to 99.2% (a relative improvement of 2.4-9.3%) after implementation of the AI Intervention (Shendell-Falik et al., 2007).

Two studies (Nagpal et al., 2013; Yang & Zhang, 2016) conducted prospective pre-post intervention studies that aimed to improve the process of postoperative patient handoffs. Both sets of authors created handoff tools that standardized the handoff process and included instructional proforma or checklists and pathways.

Nagpal et al., (2013) conducted a pre-post intervention study between the OR and PACU settings at a large teaching hospital serving both GI and vascular surgery populations. These authors implemented a handoff protocol and process for postoperative handoff. Pertinent measures included information omission, task errors, handoff duration, teamwork, and nurse satisfaction. Both teamwork scores (improvement of median score from 3 to 4; $p<.001$) and nurse satisfaction scores (improvement of median score from 4 to 5; $p<.001$) showed a statistically significant increase after implementation of the handoff protocol (Nagpal et al., 2013).

Yang and Zhang (2016) conducted a study that involved handoff of neurosurgery patients between the OR and the ICU in a Chinese tertiary hospital. The intervention utilized a post-operative handoff protocol that included a checklist, standardized handoff pathway, and required core team member involvement. The authors found that teamwork scores improved significantly from a moderate score of 3 to a high score of 5 ($p<0.001$) after protocol implementation. Communication and team performance scores were maintained three months after the intervention (Yang & Zhang, 2016).

Handoff performance assessment tools.

Three studies created and or evaluated tools used to assess handoff quality. Manser, Foster, Gisin, Jaeckel, and Ummenhofer (2010) developed a rating tool to assess handoff quality between three unique settings in a tertiary hospital: pre-emergency department (ED) and the ED, OR and the PACU, and PACU and the ward. The quality of handoff was assessed using the developed tool by the sending clinician, the receiving clinician, and a human factors observer. See Figure 2 for the original rating tool for handoff quality. Exploratory factor analysis demonstrated three factors that accounted for 49.96% of the variance in the survey items: information transfer which pertains to the technical aspects of handoff and information transmission; shared understanding which relates to the relationship between the sender and receiver during handoff; and working atmosphere which pertains to the type of environment in which the handoff occurs. Correlational and multiple regression analyses demonstrated good predictive validity of the three factors previously described. Information transfer was highly correlated with perceived handoff quality ($r=0.54$, $p \leq 0.001$), shared understanding ($r=0.40$, $p \leq 0.001$) and working atmosphere ($r=.19$, $p \leq 0.01$). The authors concluded that these three factors have good predictive validity for the concept of perceived handoff quality.

Manser, Foster, Flin, and Patey (2013) conducted a prospective observational study to examine team communication during postoperative handoff and its relationship to perceived handoff quality. Handoff observations were used to develop a taxonomy of team behaviors and activities and the handoff assessment tool created by Manser et al. (2010) was utilized by participants to rate transfer handoff quality. A total of 117 transfers were observed between three settings in a Scottish teaching hospital: OR to PACU, PACU to ward, and OR to ICU. The ratings of shared understanding were directly correlated to communication behaviors of

assessment (r=0.27, p<. 01) and acknowledgement (r=0.32, p<. 01). Establishing a shared understanding was significantly correlated with overall handoff quality (β=0.28, p<. 001). Study results highlighted the active role that receivers play in handoff quality and concluded that handoffs are team activities.

Nagpal et al. (2011) developed and validated the Postoperative Handoff Assessment Tool (POHAT) to evaluate its effect on information transfer and teamwork after major surgical procedures. After development the authors tested its feasibility and reliability through observation of 100 patient handoffs after surgery in two London teaching hospitals. Inter-rater reliability for the Postoperative Handoff Assessment Tool (POHAT) was excellent for all outcomes, including teamwork (r=0.829, p<0.001). Results revealed that the POHAT is a reliable instrument to assess the quality of postoperative handoff.

The seven intervention studies that met inclusion criteria reviewed both original handoff protocols and existing handoff performance scales used to measure quality and teamwork in the handoff process in mostly perioperative settings. The findings from these studies suggest that use of such protocols and handoff performance scales can enhance self-reported ratings of teamwork and improve the perceived quality of handoffs between staff members.

Descriptive studies.

Four descriptive studies evaluating intrahospital handoffs were identified that met inclusion criteria (See Table 3). The studies utilized a combination of direct observations, collection of pertinent documentation, and both individual and group interviews to further explore intrahospital handoffs and better understand the factors that contribute to the handoff experience. Two of the four studies focused on handoffs between intensive care unit settings and lower acuity settings or wards.

An ethnographic study conducted by Lin, Chaboyer, Wallis, and Miller (2013) in an Australian teaching institution interviewed 85 various staff members in both the ICU and acute care setting and observed 28 individual discharges from the ICU to the acute care setting. Analysis from this study described how acute care nursing staff received limited information about patients coming out of the ICU that often created a confusion and distrust among staff members. Enhanced teamwork and coordination was noted in units where nurse liaisons were available, and staff members felt better supported and described improved continuity of care. (Lin et al., 2013).

A similar study conducted by Toccafondi et al. (2012) observed 22 transitions between the ICU and acute care setting and found that a shared understanding about the handoff process was generally high in both units and both staffs mostly agreed upon what information should be shared during transfer and what specifics hindered handoff communication. Identified barriers to handoff between nursing staff included a lack of standardized handoff procedures and limited involvement of the patient or caregiver. It was noted that ICU staff and acute care staff had differing opinions on what additional information would be needed to enhance intrahopsital handoffs (Toccafondi et al., 2012).

Whittacker and Ball (2000) conducted a qualitative study that described the experience of ward nurses receiving patients from the ICU in two academic medical centers and found that experiences were largely varied based on years of nursing practice. Differing degrees of nursing experience created fears about patient condition upon discharge, concerns related to limited resources, extent of patient and family involvement, problems with communication, and challenges related to patient workload and dependency. Recommendations for improved clinical practice based on these descriptive findings included changes to documentation that summarized

ICU events and immediate patient needs, shadowing experiences for ICU and ward staff, nursing handoffs that occurred in the ICU prior to patient discharge, and orientation to the new unit for patients and family members (Whittacker & Ball, 2000).

A final descriptive study by McFetridge, Gillespie, Goode, and Melby (2007) explored the handoff process between the Emergency Department and ICU nurses in two Northern Ireland hospitals. Interviews and focus groups revealed a lack of structure in the handoff between both units and described how ED nurses' often sensed a loss of control and exclusion from the process. Descriptive data revealed a lack of structure in the handoff process between units. Nurses in both settings lacked clarity and awareness of each other's specific roles and felt that dedicated time for bedside handoff with a well developed tool would allow for improved teamwork and enhanced handoff quality (McFetridge et al., 2007). All four of these descriptive studies support that coordinated patient handoffs can strengthen teamwork between intrahospital settings.

Discussion

The studies selected for this literature review describe the importance of human factors and non-technical skills in intrahospital patient transfers. While the chosen studies were conducted in a variety of settings and populations, the majority of intrahospital handoff research that measures teamwork and other nontechnical skills has been conducted in the post-operative setting. Many of the studies were managed with small sample sizes, uncontrolled, confounding factors and reported limited statistical findings. The four selected systematic reviews described nontechnical skills as secondary processes. However, many of the studies described positive changes in teamwork and transfer quality after implementation of various handoff interventions. Intervention studies employing handoff protocols or handoff assessments were also mainly found

in the post operative setting, with only two of seven studies reporting settings and populations outside of perioperative locations. Findings from the intervention studies suggest that use of such tools results in improved perceptions of teamwork and quality of handoffs between staff members. Two of these studies implemented the Appreciative Inquiry model as an effective and innovative alternative to standard improvement processes related to intrahospital patient transfers.

The descriptive studies were conducted in a variety of settings and populations and explored the factors that contribute to handoff experiences. Amongst the many barriers illustrated, a general lack of knowledge related to structural processes and role awareness existed amongst the different team members in all of the studies. Two of the four studies described handoffs between the intensive care unit setting and the lower acuity settings or wards.

Numerous findings have demonstrated the risks involved in clinical handoffs and the consequences that result from breakdown in communication and transmission of essential information. However, non-technical skills such as teamwork, situational awareness, and trust are as essential to the safe transition of patients as the more frequently studied technical skills required for handoff communication. In conclusion, limited knowledge exists that evaluates the nontechnical teamwork skills that are crucial for safe and efficient patient transfers. The available literature generally describes the handoff interventions and tools tested in the perioperative setting, with very few studies of ICU to ward or ED to ICU transfers. Therefore, further research is needed that better evaluates patient handoffs between these higher and lower acuity settings. Additionally, more studies that evaluate the non-technical skills pertaining to patient handoff and their relationship with teamwork should be further investigated. The purpose of the proposed project will be to determine if the implementation of a nursing transfer protocol

would promote teamwork and collaboration between nurses in the MICU and the MOU and would improve overall perception of handoff quality.

Question

Does the implementation of a nursing transfer protocol improve nurse perceptions of teamwork and quality of handoffs between the MICU and the MOU?

Institutional Review Board Approval

Institutional Review Board (IRB) exemption was granted for the project by applying to the University's Institutional Review Board for Health Sciences Research (IRB-HSR #19287). See Figure 2.

Section III – Methods

This project was conceptualized to understand the process of promoting collaboration among nurses in the MICU and the MOU by measuring baseline perceptions of nursing teamwork and handoff quality between units and incorporating those findings into the institution's existing nursing standard work for bedside handoff at change of shift (SW for bedside handoff) to better meet the needs of patients and team members during transfers between units and improve overall perceptions of nursing teamwork and care delivery.

This project evaluated results of the development and implementation of an augmented handoff protocol in order to answer the following questions: 1) Does the process of working together as an intraprofessional group to create a handoff protocol improve nursing teamwork among the participants? 2) Does the implementation of an augmented handoff protocol improve the perceived quality of nursing handoffs between units?

Definition of Terms

Handoff. The act of transitioning responsibility and accountability for a patient's care to another individual or group either temporarily or permanently (Robertson et al., 2014).

Shift Handoff. Handoff conducted at the end of a nursing shift where responsibility is transferred from the outgoing nurse on the unit to the incoming nurse on the unit.

Sending Nurse. A nursing staff member who is providing report over the phone or in person on a patient that he or she is handing off to the care of a nurse on another unit.

Receiving Nurse. A nursing staff member who is receiving report over the phone or in person on a patient that he or she assuming care of from a nurse on another unit.

Shift Manager. The clinical nurse, typically with several years of nursing experience, who helps manage the nurses, support staff, patients and processes on a given unit, and ensures normal workflow.

Unit Leadership. Unit team members often comprising the Nurse Manager, Medical Director, Advanced Practice Nurses and other nurse leaders who are responsible for the daily operation of the unit and help to support front line team members.

Research Design

A quantitative quasi-experimental design with pre and post comparisons was utilized to answer the project questions.

Sample

A convenience sample of all nurses in the MICU and the MOU who work on a full-time or part time basis were included in the project. Inclusion criteria included: a) licensed nurses with an associate, baccalaureate, or master's degree in nursing and b) a permanent employment in the MICU or MOU. Exclusion criteria included: nursing team members employed in either unit who function as a clinical nurse assistant (CNA) or advanced practiced registered nurse (APRN). A

subgroup of the larger sample consisting of nursing staff members from both units created the formal nursing handoff protocol. These nursing team members were limited to those who have been employed at the academic medical center in either the MICU or MOU for at least a year and have been involved in a patient handoff between the two units. The intention was to have no fewer than six nurses and no more than ten nurses utilized for this sample.

Setting

This project took place in an academic medical center in the mid-Atlantic region and focused on the nursing staff caring for medical oncology patients being transferred from the MICU to the MOU. The MICU is a closed 28-bed unit caring for critically ill adults age 18 and older. It is the largest of five critical care units in the medical center. The medical oncology unit is comprised of 36 acute care beds, 14 of which are designated for patients with newly diagnosed leukemia or those undergoing stem cell transplantation. This unit serves four unique oncology service lines: medical oncology, malignant hematology, gynecologic oncology, and neuro-oncology. In a 12-month period between July 2015 and June 2016, the Medical Intensive Care Unit (MICU) admitted a total of 524 transfers from the 13 adult medical-surgical acute care units within the academic medical center. Transfers from the MOU accounted for 13.9% of those admissions. The nurse managers and leadership teams granted approval for the project (Figure 2).

Measures

Manser Survey. The Rating Tool for Handoff Quality was created by Manser, Foster, Gisin, Jaeckel and Ummenhofer (2010) to measure the quality of patient handoffs in a variety of patient care settings through use of a self-assessment tool. The tool consists of a total of 19 items. Sixteen of the items describe handoff characteristics related to teamwork and information

transfer. Overall handoff quality is assessed with a separate item question and two additional items are included to better describe the circumstances surrounding the handoff (i.e. pressure for time). All items are completed using a four-point scale of "agree," "partially agree," "partially disagree," and "disagree." Handoffs were reviewed by the clinician receiving the patient, the clinician handing off the patient, and an independent human factors observer between three practice settings (paramedic to emergency department; anesthesia to post-anesthesia care unit (PACU), and PACU to inpatient ward). Exploratory factor analysis demonstrated three factors that accounted for 49.96% of the variance in the survey items: information transfer which pertains to the technical aspects of handoff and information transmission; shared understanding which relates to the relationship between the sender and receiver during handoff; and working atmosphere which pertains to the type of environment in which the handoff occurs. Correlational and multiple regression analyses demonstrated good predictive validity of the three factors previously described. Information transfer revealed the highest correlation with perceived handover quality ($r = 0.54$, $p \leq 0.001$), followed by shared understanding ($r = 0.40$, $p \leq 0.001$) and working atmosphere ($r = 0.19$, $p \leq 0.01$). See figure 4 for permission to use the Manser Survey.

Nursing Teamwork Survey. The Nursing Teamwork Survey (NTS) is a validated instrument developed by Kalisch, Lee, & Salas (2010) to assess perceptions of nursing teamwork in acute care inpatient hospital settings. The NTS is comprised of a 33-item survey, where responses are measured on a Likert scale (1 = *rarely*, 2 = 25% *of the time*, 3 = 50% *of the time*, 4 = 75% *of the time*, and 5 = *always*). NTS items pertain to five teamwork factors: trust, team orientation, backup, shared mental model, and team leadership. High scores are indicative of higher perceptions of teamwork. This instrument has shown good reliability with a test-retest coefficient of .92 and an overall alpha coefficient of .94. While originally designed to focus on

within-team performance, for the purpose of this project a modified NTS using two of the five factors—trust (α = .847) and a shared mental model (α = .834)—was utilized to best assess teamwork in a broader sense in order to analyze perceptions between the MICU and MOU nurses creating the handoff protocol. Permission was obtained the NTS prior to initiation of the project (Figure 5).

Procedures

Pre-Intervention. Nursing team members involved in the sending and receiving of medical oncology patients between the MICU and the MOU completed an evaluation of handoff quality using the Manser Survey to assess handoff after every patient transfer between units for a minimum of four weeks and a maximum of eight weeks depending on sample size. Each patient transfer yielded a maximum of two surveys: one evaluation from the nurse sending the patient from their unit and one evaluation from the nurse receiving the patient to their unit. In addition to completing the Manser Survey for handoff quality, nurses designated which unit they were from and whether they were sending or receiving the patient. Both sets of staff received education about use of the Manser Survey before the project began. The Manser Survey was available in paper form on both units in a designated location. Shift managers, unit leadership, and the project lead helped staff to complete the surveys and ensured completed tools were collected and maintained in a confidential manner.

Intervention. Shortly after beginning the Pre-intervention phase, nursing staff from the two units were solicited via email invitation to volunteer to be a part of the intervention group. Ten nurses expressed interest, but only six staff nurses, three from the MOU and three from the MICU, were able to participate due to scheduling conflicts. These six nurses gathered at a designated off unit location on a day they were not in-patient care for a one-time four-hour work

session. After completing the modified NTS, introductions were made and the project lead briefed the volunteers on the purpose of the project and shared an information sheet with each of the attendees. Discussion regarding background information related to unit structure, staffing responsibilities and roles, and historical trends in patient movement was facilitated by the project lead. Next, a visual breakdown of Manser survey results from the Pre-intervention data was shared with the group and results were discussed at length (Table 5). After a short break, the volunteers used the Manser data, the institution's existing standard work for handoff, and their own clinical experience, to create their product: the oncology transfer checklist (Figure 6). This checklist was intended to move with the patient between units during transfers and serve as a guide for giving handoff and a source of oncology related information pertinent to the individual patient. The checklist could be updated and revised with each episode of movement or with new changes in the patient's disposition. Key items of the checklist included diagnosis and oncology subspecialty information, unique oncology patient findings, stem cell transplantation status, and unique medication needs. Whenever possible, the volunteer group felt strongly about conducting a face to face introduction between the nursing providers and patient, to enhance communication, teamwork, and the patient experience. The modified NTS was administered to this volunteer group again after the creation of the new oncology transfer checklist.

Post Intervention. The newly designed SW for unit handoff was distributed to nursing staff in both units via email and in person education from shift managers, unit leadership, and the project lead. Copies of the SW for unit handoff were placed in convenient areas on both units. The MICU and the MOU utilized the new SW for unit handoff during patient transfers between units for an additional four to eight-week period. Nurses sending and receiving medical oncology patients between the MICU and MOU once again utilized the Manser Survey to assess handoff

after every patient transfer. In addition to designating which unit they were from and whether they were sending or receiving the patient, nurses also noted whether or not they utilized the oncology transfer checklist and if they performed an in person handoff before transfer. The Manser survey was available in paper form on both units in a designated location. Shift managers, unit leadership, and the project lead helped to remind staff to use the new SW for unit handoff for patient transfers and encouraged staff to complete the Manser survey.

Analysis. Manser survey data collected before and after the implementation of the SW for unit handoff was evaluated to determine if the perceived quality of nursing handoffs between units improved. Modified NTS data from the subgroup of nurses who created the SW for unit handoff was evaluated to determine if the process of working together as an intraprofessional group improved the perception of teamwork amongst the participants.

Data Analysis Plan

The data collected from both the NTS and Manser surveys was collected and stored in a secure location. This data was transferred into the Statistical Package for the Social Science (SPSS), version 24 (SPSS, Chicago) statistical software for analysis. The Wilcoxon Signed-rank test was performed for NTS findings and was utilized to assess differences in team members' perception of teamwork before and after participation in the subgroup of MICU and MOU nurses. Findings from the Manser surveys utilized the Mann Whitney U test to determine differences in the perception of handoff quality after implementation of the new nursing handoff protocol. Descriptive statistics pertaining to survey questions that identified unit location, sender or receiver role, use of the oncology transfer checklist, and ability to perform an in person handoff were performed.

Protection of Human Subjects

Participants. The Manser Survey form included a consent letter to participants describing their involvement by completing the survey and the intended plans for the survey results. Risks to participants included the possible breach of confidentiality as nursing staff may be asked to complete a rating tool for handoff quality pertaining to a transfer in which they participated. Participants were informed that their participation is voluntary and that they could decline the survey without consequence. No potentially identifiable data, other than unit of employment and designation of role as sending or receiving nurse, was recorded on the survey for handoff quality. Every effort was be made to keep completed Manser surveys confidential and kept in a secure location on each unit.

Subgroup Participants. The nurses from the MICU and MOU also received a consent letter prior to participating in the volunteer group that described their involvement in the exercise and the intended plans for the group's outcomes. Risks to nursing participants were considered minimal, as the only risk was loss of confidentiality. Participants were informed that they could decide to leave the group at any time without consequences and that their modified NTS survey data would remain anonymous and confidential. These participants were provided food and parking for their involvement in the group activity but were not directly compensated.

Section IV – Results

Pre Intervention

Manser surveys were collected over a four-week time period during the Pre-intervention phase to assess perception of handoff quality. Table 4 presents the descriptive findings from the Pre-intervention phase. Twenty-one transfers occurred between the MICU and the MOU during this time allowing for a potential 42 survey opportunities. In total 30 surveys were collected resulting in a 71.4% overall return rate. The MOU collected 13 surveys yielding a 61.9% unit

specific return rate and the MICU collected 17 surveys yielding an 80.9% unit specific return rate. From the surveys collected, 16 surveys were from nurses giving handoff to another nurse on a different unit and 14 surveys were from nurses receiving handoff from another nurse on a different unit. A visual breakdown of Manser survey results from the Pre-intervention data was created for the volunteer group's use during the intervention phase (Table 5).

Intervention Phase

The modified NTS was administered to the volunteer group participants before and after creation of the SW for unit handoff, renamed the oncology transfer checklist (Figure 6) to assess differences in team members' perception of teamwork before and after participation in the subgroup activity. Table 6 presents the results of the Wilcoxon Signed-rank test for the NTS findings. Item 9 (*changes to improve practice*) and item 12 (*constructive feedback*) demonstrated a statistically significant improvement in scores ($p=0.046$ and $p=0.025$ respectively). However, upon application of the Bonferroni correction for multiple comparisons, the adjusted p-value ($p=0.0036$) rendered the modified NTS items 9 and 12 not statistically significant. Figures 7 and 8 present the statistical findings for the aforementioned survey items using the Wilcoxon Signed-rank test.

Post intervention

Manser surveys were collected over an eight-week time period during the post-intervention phase to assess perception of handoff quality after the implementation of the oncology transfer checklist. Table 7 presents the descriptive findings from the post-intervention phase. Nineteen patient transfers occurred between the MICU and the MOU during this time allowing for a potential 38 survey opportunities. In total 20 surveys were collected resulting in a 52.6% overall return rate. The MOU collected six surveys yielding a 31.6% unit specific return

rate and the MICU collected 14 surveys yielding a 73.7% unit specific return rate. From the surveys collected, 12 surveys were from nurses giving handoff to another nurse on a different unit and eight surveys were from nurses receiving handoff from another nurse on a different unit. Additional questions on the post-intervention survey demonstrated a 50% usage of the oncology transfer checklist with only 2 surveys indicating that a physical in person handoff occurred prior to transfer.

Analysis

Table 8 presents a comparison of Manser survey data collected pre and post intervention. Findings from the Manser surveys utilized the Mann Whitney U test to determine differences in the perception of handoff quality after implementation of the new nursing handoff protocol. None of the Manser survey items demonstrated statistically significant differences. Overall, survey items received high scores both before and after the implementation of the oncology transfer checklist.

Section V – Discussion

Data Analysis/Results Interpretation

Manser Survey Data

While there was no statistically significant improvement in Manser Survey scores before and after implementation of the oncology transfer checklist, data collected suggested that perception of handoff quality was positively reported throughout the project. Both the MICU and the MOU answered that they agreed that handoff quality was very high 70% of the time during the pre-intervention phase and 75% of the time after the implementation of the oncology transfer checklist. Several of the survey items that addressed information transfer, shared understanding, and working atmosphere, the three factors identified by Manser to impact handoff quality, were

positively perceived by the MOU and MICU and demonstrated an improvement in average scores after implementation of the oncology transfer checklist. These items (Items 9, 10, 11, 12, and 16) addressed handoff elements that are essential to a successful, team oriented patient transfer (Manser et al., 2010). Notably, respect for the patient's experience, joint team effort to ensure handoff completion, active enquiry regarding questions, minimal tension between team members, and establishing a point of contact, were all items where average scores improved after introduction of the oncology transfer checklist. See table 8 for a breakdown of Manser Survey items before and after implementation of the oncology transfer checklist.

Modified NTS Data

Several items from the modified NTS administered to the volunteer group participants before and after creation of the oncology transfer checklist demonstrated statistical improvement in perceptions of teamwork between the group members prior to the Bonferroni correction. Aggregate data from the two factors used for the modified NTS, shared mental model and trust, totaled 27.7 and 30.7 respectively for the volunteer group. Historical data from the administration of the NTS to all nursing units within the academic medical center in 2015 revealed aggregate scores of 26.63 and 26.78 for trust and shared mental model in the MICU, and aggregate scores of 27.83 and 27.11 for trust and shared mental model in the MOU (Gadd, 2016). See table 9 for findings from this 2015 survey. After spending a considerable amount of time together reviewing the Manser data from Phase 1 and discussing both the current state of handoff procedures between the units and what the group perceived to be ideal handoff procedures, group conversation repeatedly addressed the importance of teamwork between the MOU and MICU in caring for this unique population. This suggests that in combining improvement efforts between two units, team members can share information, receive and

appreciate meaningful feedback, and become aware of others' strengths and weaknesses in order to build more trusting relationships that allow for successful engagement in handoff activities.

Strengths and Limitations

Limitations

Patient movement between the MOU and the MICU did not follow historical patterns throughout the course of the project. Phase I reflected more typical movement of patients between the MOU and the MICU with 10 patients transferring between the units, some with multiple admissions back and forth, for a total of 21 transfers over a four week timeframe. Patient movement was considerably slower between units after implementation of the oncology transfer checklist with 16 patients accounting for 19 transfers between the two units over the course of eight weeks. More oncology patients were directly admitted to the MICU from the Emergency Department, outside facilities, or clinic setting than normal, creating a more atypical flow of patients between the units as most oncology patients are generally admitted to the MOU first and then transfer to the MICU later during their hospital stay.

While all nursing team members received electronic communication and on unit huddle points regarding project details, not all team members were able to receive in person education from the project lead due to the large volume of staff employed on each unit and the variability in schedules. Despite this, more than half of the nursing staff between the units received in person communication and instruction about the project. The complexity of the project and the infrequency of patient transfers, particularly in the second half of the project, may have affected survey completion and staff responses. For the purpose of this project, Manser surveys did not include any patient specific data to ensure confidentiality and protection of patient sensitive information; however, using patient identifiers may have helped uncover particular oncology

populations or types of transfer events that could benefit from further examination and improvement or special attention.

Other limitations of the project include the use of surveys to obtain information about quality of handoffs and teamwork. Therefore, results reflect the perceptions of the participants rather than observations of handoff and teamwork skills and behaviors. Additionally, this project was conducted on only two units within one academic medical center. Consequently, results may not be generalizable to other units within that medical center, nor might they be reflective of other hospitals or health settings. The sample size is low due to the limited number of patients transferred between the MICU and MOU, which limits the generalizability of the project findings. While validated and reliable, the NTS has previously only been used within the individual unit setting and for the purpose of the project will now be tested in a group of participants from two different settings using a small sample. Similarly, the Manser survey has not been validated between ICU and acute care settings. Use of different tools other than the NTS and Manser Survey may have resulted in different results and potentially statistically significant outcomes.

Strengths

While there were no statistically significant changes in the Manser Survey data before and after implementation of the oncology transfer checklist, anecdotal reports from nursing staff in both units confirmed the perceived value of the new tool. Although usage of the oncology transfer checklist was only reported in 50% of the post intervention transfers, commentary from both MICU and MOU nurses validated the importance of the information shared on the checklist. MICU nurses frequently remarked that they were unaware of the significance and value of some the information on the checklist, with many noting a desire to learn more about the

oncology population to ensure that the best care is provided to these patients in the ICU setting. Nurses from the MOU described the checklist as a way to learn more information about the patient's ICU stay and stated that it served as a reminder that MICU nurses are typically less familiar with the oncology terminology and might need more explanation and detail during handoff related to cancer specific treatments or patient needs. On one particular occasion, the coordination of having MOU staff meet the patient prior to transfer to the MOU allowed for confirmation from both teams that the patient was indeed ready for ICU discharge and allowed for more efficient, expedited patient movement, especially since the patient also needed transportation to the Cancer Center for radiation treatment prior to transferring to the MOU.

Using the Manser survey as a means to evaluate the non-technical handoff skills in addition to more traditionally studied technical handoff skills is another strength of this project. Factors related to successful nursing handoffs—information transfer, shared understanding, and working atmosphere—were evaluated in the medical oncology inpatient population for the first time. The success of the subgroup of nurses from the MOU and the MICU who volunteered to review the Manser data and create the oncology transfer checklist was validated not only by encouraging participant feedback but also by the success of the group in creating their product, the oncology transfer checklist, in a limited time with minimal resources. While self-selected and likely representative of staff members already engaged in other various unit improvement activities, all six of the volunteers verbalized how much they enjoyed the experience of meeting other team members, learning from each other, and working together to create a tool to improve the handoff process. Many of them verbalized a desire to participate in similar experiences and learn more about each other's patient populations and skill sets. Furthermore, using a subgroup of nursing staff from each unit to jointly design a handoff tool demonstrated feasibility of

collaborative inter-unit quality improvement efforts and suggested improved perceptions of nursing teamwork.

An additional strength of this project was the inclusion of validated tools. The original Manser survey was tested in three different areas of transition between higher and lower levels of care (EMS to emergency room, OR to PACU, and PACU to acute care). And while a modified version of the NTS was used for this project, Kalisch's initial study of the NTS demonstrated sound reliability and validity that has subsequently been revalidated in numerous other studies.

Nursing Practice Implications

This project will serve to supplement the limited body of knowledge pertaining to intrahospital patient transfers and transfer protocols. To date there are no validated nursing handoff tools specific to the transfer of patients between ICU and acute care settings. Additionally, no previous studies have evaluated the nursing handoff between settings in the oncology patient population. Procedures described in this project should be piloted and tested between other units within this academic medical center, especially those that also care for oncology patients, and between MICU's and MOU's in other institutions. This project provides additional information on handoff quality and intra-hospital teamwork that can be used in future nursing research and could be studied in further detail. The elements of the oncology transfer checklist should be reviewed in greater detail and adapted to meet the changing needs of the patients and care providers on the units. Experiences from this project echo the complexity of patient handoffs described in the literature and can be used to develop additional interventions, especially those involving intra-unit collaboration, that are geared toward improving safety of handoffs, the patient experience, and teamwork between hospital settings.

Products of the DNP Project

This project produced an oncology transfer checklist, for use during patient transfers between MOU and the MICU. The checklist was tested and piloted on both units and results were shared with nursing staff and unit leadership. Creation of the oncology transfer checklist began an important dialogue between the units about the care and unique experience of this particular patient population and also about the roles of the nursing team members in both settings. Collaborating together on this project has begun what will hopefully continue to be a successful working relationship between the two units and will likely lead to future learning and improvement opportunities as they pertains to the care coordination of this unique patient population throughout the system. Discussions about combined oncology related learning opportunities for the nursing staff are underway and plans exist to use the oncology transfer checklist as part of the design for an educational simulation experience between MOU and MICU nurses. Additionally, the oncology transfer checklist and survey results were provided to other institutional nursing leaders who have previously championed handoff improvement efforts related to nursing bedside handoff and shift change. A manuscript report of the project and findings will be submitted to the *Journal of Nursing Administration* for potential publication (See Appendix A for author guidelines).

Conclusion

While it cannot be certain that the oncology transfer checklist fundamentally changed the handoff process or improved handoff quality between the MOU and the MICU, it is evident that by bringing two teams together with the goal of improving the quality of care provided and the patient experience, that it is not only just feasible, but also very possible that the outcomes will be beneficial for nursing team members and the patients they serve. And while technical skills and information pertinent to the oncology patient population were certainly a component of the

project's efforts and the resulting oncology transfer checklist, the non-technical skills that are equally essential to optimal and safe handoffs, were an even greater element of this intervention. Bringing the two teams together to learn about the structural and role related nursing processes unique to the different units and subsequently allowing those participants the opportunity to work together on a handoff improvement activity, served to support improved nursing handoffs and optimal patient care, but more importantly helped to promote socialization, trusting relationships, situational awareness and teamwork that is so essential between the intra-hospital settings.

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Table 1

Systematic reviews evaluating intrahospital handoffs and related handoff interventions

Author	Design & Purpose	Intervention	Setting/Population/Sample Size	Measures	Findings
Møller, Madsen, Fuhrmann, & Østergaard (2012)	Systematic review to evaluate the outcomes and possible hazards of during postoperative handoff and identify recommendations for process improvement.	Studies included both descriptive and interventional studies.	23 studies reviewed, 13 descriptive; 9 interventional. All studies involved postoperative handoff in either the PACU or ICU setting.	Direct observations, interviews, failure mode and effect analysis, surveys, and analysis of reported errors/events were used in the descriptive studies. Interventional studies measured information omissions, technical errors, teamwork quality, and duration of handoff.	Descriptive studies found postoperative handoff teamwork to be challenged by the involvement of professionals across discipline groups, varying skills sets and expectations. The team was often found to be incomplete and ineffective team communication was noted in several studies. In two of the interventional studies teamwork was measured and was found to have significantly improved.
Ong and Coiera (2011)	Systematic Review to evaluate handoff practices and deficiencies in intrahospital patients transfers.	19 primary studies on handoff practices and deficiencies (observation, interview, focus group, questionnaire, review of incidence reports) and 5 interventional studies (liaison nurse, handoff protocol, voicemail sign out, pharmacist initiated handoff)	24 studies reviewed the discharge of patients from critical care to specialty wards, transfer of post surgical patients, and transfers from the ED	Adverse outcomes, characterization and number of incidents reported, malpractice claims, communication problems and barriers, perceived quality of handoff, readmission rates, perceived reporting improvement, number of information omissions.	High workload and time constraints impeded handoff, information omission is common, ward nurses lack expertise and confidence of managing ICU patients, and handoffs are informal and unstructured. Perceived improvement in handoff communication and quality after the interventions.
Robertson, Morgan,	Systematic Review to	2 RCTs and 27 uncontrolled trials.	29 studies in the review captured a total of 11,759	Studies used 82 discrete outcome measures. Outcomes	Information transfer was the only outcome measure that

Author	Design & Purpose	Intervention	Setting/Population/Sample Size	Measures	Findings
Bird, Catchpole, & McCulloch (2014)	evaluate the effectiveness of interventions intended to improve the quality and safety of handoffs within the hospital setting.	Interventions classified into "person interventions" (training and culture), "information system interventions" (information delivery) and "wider system interventions" (technology and infrastructure)	handoffs. 22 studies were performed within one ward environment at shift change (ED, surgery, general medicine, and ICU settings) or between the OR environment and the receiving area (PACU or ICU). Four studies were performed in multiple hospital environments and three gave no detail.	were grouped as related to: information transfer, staff satisfaction, handoff duration, clinical outcomes and compliance with handoff protocol.	improved in more than 50% of the studies. Staff satisfaction improved (35% improvement) in a minority of studies.
van Sluisveld, Hesselink, van der Hoeven, Westert, Wollersheim, & Zegers (2015)	Systematic Review to evaluate the effectiveness of interventions intended to improve both safety and efficiency of handoff between the ICU and ward setting.	Interventions were classified into information, coordination, and communication categories and consisted of efforts involving outreach services; liaison nurses, medication reconciliation strategies, and handoff tool/forms.	11 studies of Patient transfers from varying ICU types to the general ward, studies situated in various types of hospitals; ten studies were single center studies, one was conducted across three sites.	Various outcomes reported. Most reported outcomes related to use of care; continuity of care; mortality; adverse events.	Six studies (55%) reported statistically significant effects in two categories—continuity of care and preventable adverse events. Interventions using nurse liaisons and handoff forms appear most effective in improving handoff quality. No studies provided statistical analysis of teamwork.

Table 2

Intervention studies developing or evaluating handoff protocols or handoff performance tools

Author	Design & Purpose	Intervention	Setting/ Population/Sample Size	Measures	Findings
Clarke et al. (2012)	Qualitative descriptive study and pilot that used Appreciative Inquiry to inform handoff improvements.	1st phase: Semi-structured interviews. 2nd phase: demonstration project (creation and implementation of a handoff protocol)	Study conducted in a tertiary teaching hospital in Canada in 4 acute general medical units. Participation from 29 general duty nurses, 5 ward clerks, 2 homecare coordinators, 9 allied health clinicians, 2 patients, and one family member.	Themes focused on situational variables required for the perfect transfer, the mode and content of transfer communication, and important factors related to communication with patients and families.	Thematic analysis showed the patient's welfare and the issue of trust as overriding themes throughout all interviews. Interviews and collaboration between the group resulted in the creation of a handoff protocol that considered a quiet place to prepare information for transfer, time to speak with the patient and family about transferring, a standardized verbal handoff, and a transfer checklist.
Manser, Foster, Flin, & Patey (2013)	Prospective, cross sectional observation study to examine team communication during postoperative handoff and its implications for handoff quality.	Handoff observations were used to develop taxonomy of handoff activities and behaviors. Manser's handoff assessment tool was used by the participants to rate handoff quality.	The study consisted of clinicians involved in postoperative handoff at a large teaching hospital in Scotland. 21 PACU nurses, 31 anesthetists, 36 OR nurses, 31 ward nurses, and 12 ICU nurses participated. Handoffs were observed in 3 transition settings (OR to PACU, PACU to ward, and OR to ICU) for a total of 117 observations.	Distribution of handoff communication behaviors, clinicians self-rating of handoff quality, and relationships between communication behaviors and handoff quality ratings. Handoff quality was further broken down into patient care information, handoff organization, shared understanding, and conduct.	The communication behaviors of assessment (r=. 27, p<. 01) and acknowledgement (r=. 32, p<. 01) were positively correlated with ratings of shared understanding. Establishing a shared understanding was significantly correlated with overall handoff quality (beta=0.28, P<. 001)
Manser, Foster, Gisin, Jaeckel, & Ummenhofer (2010)	Prospective pre-post intervention study aimed to develop a rating tool to assess handoff quality.	Development and testing of a rating tool for the quality of patient handoff that can be used in a variety of settings	This study was conducted in a tertiary care hospital in 3 settings (paramedic to ED; anesthesia to PACU; PACU to ward). 126 patient handoffs were assessed by the outgoing	Three factors identified—information transfer, shared understanding, and working atmosphere predicts handoff quality. Shared understanding and working atmosphere	Information transfer was highly correlated with perceived handoff quality (r=0.54, p less than or equal to 0.001), shared understanding (r=0.04, p less

Author	Design & Purpose	Intervention	Setting/ Population/Sample Size	Measures	Findings
		and for self-assessment by clinicians directly involved or those assessing as an external observer.	clinician, incoming clinician, and a human factors observer.	pertain to non-technical skills that include cognitive and social ability required in any operational task, especially decision making and teamwork.	than or equal to 0.001) and working atmosphere (r=. 19, p less than or equal to 0.01). These three factors have good predictive validity for the perceived handoff quality.
Nagpal et al. (2011)	Descriptive and exploratory mixed methods evaluation of POHAT on information transfer and teamwork after major surgical procedures.	Phase 1: the Postoperative Handoff Assessment Tool (POHAT) was developed through literature review, interviews, and society guidelines with validation using the Delphi technique. Phase 2: Direct observations tested feasibility and reliability of the POHAT.	Two large teaching hospitals (London, UK and Basel, Switzerland) evaluated the vascular and GI surgery population's operative team and 100 patient handoffs after surgery.	Information omissions, task errors, and teamwork. The five behavioral components of teamwork included: communication, awareness, leadership, cooperation, coordination, and team monitoring/situational awareness.	Inter-rater reliability was excellent for all outcomes. Teamwork ($r=0.829$, $p<0.001$). Results revealed that the POHAT is a reliable instrument to assess the quality of postoperative handoff.
Nagpal et al. (2013)	Prospective pre-post intervention study that implemented a handoff protocol and standardized process to improve postoperative handoff.	Implementation of a handoff protocol which involved handoff proforma and standardization of the process.	A PACU in a large teaching hospital in London served as the study site for 90 observed GI and vascular surgical postoperative handoffs. 50 before the new protocol and 40 after.	Information omissions, tasks errors, teamwork, nurse satisfaction, and duration were measured.	All five components of teamwork (leadership, communication, coordination, cooperation, and situational awareness) improved with an overall increase of median teamwork scores from 3 to 4 ($p<0.001$) and nurse satisfaction also improved significantly after the handoff intervention, increasing from a median score of 4 to 5 ($p<0.001$). The communication element of the teamwork score was

Author	Design & Purpose	Intervention	Setting/ Population/Sample Size	Measures	Findings
					negatively correlated with number of task errors (gamma=-.625, p<0.001) and number of information omissions (gamma=-.663, P<0.001).
Shendell-Falik, Feinson, & Mohr (2007)	Demonstrations project using Appreciative Inquiry was used to engage staff and identify and build off of their most effective handoff experiences.	AI was used to facilitate the redesign of ED to telemetry unit nursing handoff. Interviews and focus groups were utilized and staff collaboration resulted in creation of a transfer protocol, welcome script, and other projects	The ED and inpatient telemetry unit at a large New Jersey Medical Center. Nurses from the ED and the A6 telemetry unit interviewed each other and participated in focus group activities.	Patient satisfaction, nurse satisfaction and teamwork, nutritional and skin assessment, compliance with cardiac enzyme regimen and medication administration record, and percent of telemetry patients able to be transported without a cardiac monitor were measured.	Nurse Satisfaction and Teamwork improved from 90-97.6% to 99.2% (a relative improvement of 2.4-9.3%) after implementation of the AI Interventions between the ED and the inpatient telemetry unit staff.
Yang & Zhang (2016)	Pretest/posttest study aimed at improving postoperative handoff processes and patient outcomes.	A post-operative handoff protocol that included a handoff checklist, a standardized handoff pathway, and core team member involvement.	A Chinese tertiary hospital's 40 bed ICU serving neurosurgery patients served as the study site. 156 multidisciplinary staff members participated in an observed 168 handoffs.	Handoff attendance, admission preparation, the rate of information item report, post handoff discussion, teamwork	Surgeon attendance increased significantly (p=0.007) after implementation of the handoff protocol and all other 104 staff members were present for 100% of the postoperative transfers. Admission preparations increased from 81% of handoffs to 96%. Teamwork scores improved significantly from a moderate score of 3 to a high score of 5 (p<0.001). Three months after intervention, communication and team performance were sustained or improved further.

Table 3

Descriptive studies evaluating intrahospital handoffs

Author	Design	Intervention or Method	Setting/ Population/Sample Size	Outcome Measures Assessed	Findings
Lin, Chaboyer, Wallis, & Miller (2013)	Ethnographic study to research factors that influence patient discharge from the ICU.	Direct observations, semi structured interviews, and collection of documents and policies.	Conducted at a tertiary teaching hospital in Australia in its 14-bed level 3 ICU. 85 individuals participated including: 52 ICU nurses, 16 ICU medical staff, 13 acute care nurses, 2 acute care medical staff, and 2 ICU support and hospital management staff. 28 Discharges were observed over 5 months.	Three activity systems in the ICU discharge process were found: the ICU patient discharge activity, the acute care unit accepting the ICU patient activity, and hospital bed management activity. The six interactive components of each of the three activity systems were identified subjects, objects, tools, rules, community, and division of labor.	Analysis revealed that acute care nurses often received limited information about incoming patients. Lack of knowledge about discharge rationale contributed to distrust amongst some staff and affected teamwork. In units where liaison nurses were available, community members felt better supported and contributed to better coordinated teamwork.
McFetridge , Gillespie, Goode, & Melby (2007)	Multi method approach to explore handoff of patients between ED and ICU nurses.	Documentation review, semi structured individual interviews, and focus group interviews	Two acute care hospitals EDs and ICUs in Northern Ireland. 12 nurses were involved in the initial individual interviews. 2 focus groups at both hospitals with 8 nurses from the ED and ICU combined.	Interview and documentation review revealed 6 core themes: the process of patient handoff, the pre-transfer period, arrival of the patient to the ICU, info giving and receiving, experience and attitude of nurses, and patient handoff: a critical event.	Upon arrival to the ICU with the patient, the ED nurse often felt a loss of control and lack of importance or detachment or exclusion from the process of handoff. Data revealed that nurses from both settings have a lack of clarity and awareness related to each other's roles. There was a lack of structure in the handoff process between units. Reserving time for the ED-ICU nurse bedside handoff would show respect and value for each team and would likely help to improve handoff quality and information inclusion. A handoff tool or framework

					would assist with this process.
Toccafondi et al. (2012)	Observational study to describe shared understanding and common conceptual ground between ICU and low acuity units.	Design of handoff probes that were later completed by the sender, receiver, and observer for use of monitoring handoff communication involving 5 agreed upon content items and comparison of the perceptions on the presence and use of content items.	Conducted in both a teaching hospital and a territorial hospital in Italy and examined handoff between the ICU and low acuity units. 22 transitions were observed.	Information transfer (quantity, accessibility, and relevance), information transfer (agreement between sender and recipient units) and shared understanding and common conceptual ground.	Shared understanding about the handoff process was generally high in both units and both units generally agreed on the type of information shared and the barriers and facilitators of good handoffs. Barriers included no standardized handoff between nursing staff, patient caregiver involvement in handoff and different HIT. ICU staff and low acuity unit staff had different opinions on the added info need to further enhance handoffs.
Whittaker & Ball (2000)	Qualitative descriptive study that aimed to uncover the experience of ward nurses receiving patients from the ICU.	Questionnaires and semi-structured interviews	Two wards of a large academic medical center in London who regularly received patients from the ICU. Seven ward nurses were interviewed and 36 ward nurses completed questionnaires about handoffs.	Thematic content analysis identified four major categories: emotions, problems, communication, and interventions.	The experiences reported by staff varied according to degree of experience. Emotions pertained to fears about the patient condition upon ICU discharge. Problems related to issues of resources, physical wellness, and family members. Communication concerns involved telephone and verbal handoff, required equipment and paperwork. Interventions involved documentation, patient assessment, and required workload/dependency.

Table 4. Pre-intervention manser survey data

Pre-Intervention Data		
21 Transfers = 42 Survey Opportunities		
	Surveys Returned	Return Rate
MOU	13	61.90%
MICU	17	80.90%
Total	30	71.40%
Sender	16	53.33%
Receiver	14	46.67%

Table 5. Visual breakdown of pre-intervention manser surveys.

Handoff Theme/Topic	Overall	8W	MICU	8W Gave	8W Receive	MICU Gave	MICU Receive	PS
1. Logical	1.24	1.23	1.27	1.33	1.14	1	1.67	1
2. Documents used	1.28	1.23	1.33	1.17	1.29	1.11	1.67	1
3. Time allowed	3.53	3.69	3.38	3.33	4	3.7	2.83	4
4. Interruptions minimized	1.28	1.09	1.46	1	1.17	1.57	1.33	1
5. Information relevant	1.14	1.08	1.19	1	1.14	1.2	1.17	1
6. Priorities addressed	1.3	1.15	1.44	1.17	1.14	1.5	1.33	1
7. Clear assessment	1.21	1	1.4	1	1	1.33	1.5	1
8. Complications discussed	1.48	1.31	1.6	1.17	1.43	1.5	1.8	1
9. Contact established	1.37	1.08	1.63	1.17	1	1.5	1.83	1
10. Tension	3.83	3.85	3.81	3.67	4	3.7	4	4
11. Questions resolved	1.36	1.15	1.57	1.17	1.14	1.5	1.67	1
12. Handoff complete	1.17	1	1.31	1.00	1	1.2	1.5	1
13. Documentation complete	1.23	1.31	1.19	1.33	1.29	1	1.5	1
14. Excessive information provided	3.83	3.77	4	3.67	3.86	4	4	4
15. Excessive information sought	3.97	3.92	4	3.83	4	4	4	4
16. Patient experience	1.3	1.08	1.44	1.17	1	1.7	1	1
17. Handoff quality	1.41	1.23	1.6	1.17	1.29	1.56	1.67	1
18. Time pressure for person giving	3.21	3	3.4	2.33	3.57	3.89	2.67	4
19. Time pressure for person receiving	3.33	3.38	3.44	2.83	3.86	3.5	3.33	4
Total Surveys	30	13	16	6	7	10	6	

Perfect Score: 1	>1.5
Perfect Score: 4	<3.5

Table 6. Themes from the Modified NTS (pre and post intervention)

Teamwork Theme/Topic	Pre-Intervention	Post-Intervention	P – value
1. Shift responsibilities	4	4	1.0
2. Roles and responsibilities	3.5	3.67	0.705
3. Expectations clearly communicated	3	3.83	0.102
4. Follow through on commitment	3.67	4	0.157
5. Quality job	4.67	4.67	1.0
6. Shift change information	3.83	3.5	0.157
7. Respect	4.33	4.83	0.083
8. Strengths and Weaknesses	3.5	4.5	0.063
9. Changes to improve practice	3.67	4.33	0.046
10. Share ideas and information	3.5	4.33	0.059
11. Message clarification	3.83	4.33	0.083
12. Constructive feedback	3.5	4.33	0.025
13. Fair reallocation of responsibilities	4.17	4.33	0.564
14. Trust	3.5	4.5	0.063

Table 7. Post-intervention manser survey data

Post-Intervention Data		
19 Transfers = 38 Survey Opportunities		
	Surveys Returned	Return Rate
MOU	6	52.60%
MICU	14	31.58%
Total	20	73.68%
Sender	12	60.00%
Receiver	8	40.00%
Used Checklist	10	50.00%
Did Handoff	2	10.00%

Table 8. Themes from the Manser Survey data (pre and post intervention)

Handoff Theme/Topic	Pre-Intervention	Post-Intervention	P – value
1. Logical	1.24	1.3	0.856
2. Documents used	1.28	1.47	0.408
3. Time allowed	3.53	3.9	0.151
4. Interruptions minimized	1.28	1	0.117
5. Information relevant	1.14	1.25	0.393
6. Priorities addressed	1.3	1.35	0.707
7. Clear assessment	1.21	1.16	0.669
8. Complications discussed	1.48	1.32	0.466
9. Contact established	1.37	1.2	0.458
10. Tension	3.83	3.95	0.704
11. Questions resolved	1.36	1.31	0.452
12. Handoff complete	1.17	1.1	1.0
13. Documentation complete	1.23	1.25	0.968
14. Excessive information provided	3.83	3.79	0.911
15. Excessive information sought	3.97	3.89	0.554
16. Patient experience	1.30	1.1	0.353
17. Handoff quality	1.41	1.45	0.963
18. Time pressure for person giving	3.21	3.26	0.789
19. Time pressure for person receiving	3.33	3.25	0.914

Table 9. Gadd, 2016 NTS Survey Data

			Trust	TeamOrientation	Backup	SMM	TLeadership
MOU	N	Valid	18	17	18	18	18
		Missing	4	5	4	4	4
	Mean		27.8333	33.4118	22.7778	27.1111	16.2222
	Mode		26.00	34.00	19.00[a]	24.00[a]	15.00[a]
Medical ICU	N	Valid	19	19	19	18	19
		Missing	2	2	2	3	2
	Mean		26.6316	33.5789	22.7895	26.7778	14.8947
	Mode		27.00	35.00	23.00[a]	25.00[a]	16.00

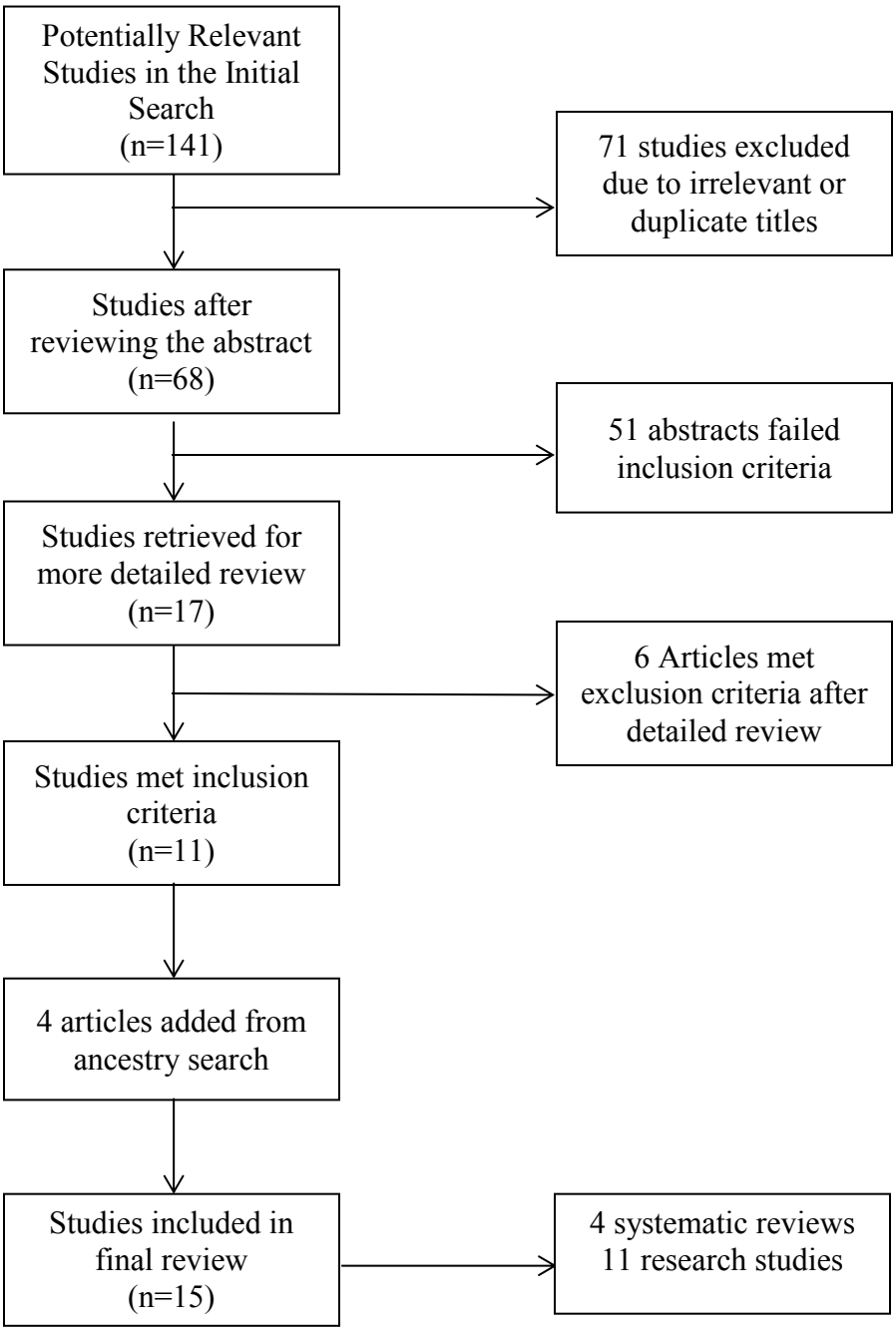


Figure 1. Study Flow for Literature Search and Selection developed by Katelyn Rybicki

For IRB-HSR Use Only

IRB-HSR # 19287

Protocol Title : Promoting Nursing Teamwork Between Intrahospital Settings with Transfer Protocols

The IRB-HSR confirms that this project meets the criteria of research which is exempt from federal regulations under 45CFR46.101(b)(2).

The study does not include health information, therefore HIPAA regulations do not apply.

You are required to protect the data according to the enclosed Privacy Plan.

If you need to modify the procedures in this project you must notify the IRB-HSR first to determine if the project continues to meet the criteria for exempt research.

For additional information regarding educational resources for research see http://www.virginia.edu/vpr/irb/hsr/education.html

Signed Karen Mimms **Date** 09-06-16

IRB-HSR Staff Member

Figure 2. IRB Approval

RE: Permission for DNP Project
Daniels, Elizabeth R *HS

You replied on 7/11/2016 1:11 PM.

Sent: Wednesday, July 6, 2016 11:12 AM
To: Rybicki, Katelyn Marie *HS; Thomas, Tanya D. *HS

Hi Katelyn,

So good to hear from you! Consider us "all in" and know that we are so glad to be a part of your journey :).

Let's find a date that works once Tanya is back...maybe we could even consider over lunch?

Thanks,
Liz

UNIVERSITY of VIRGINIA HEALTH SYSTEM

The MEDICAL INTENSIVE CARE UNIT

July 11, 2016

Katelyn Rybicki, MSN, RN, CCRN
Medical ICU
UVA Health System

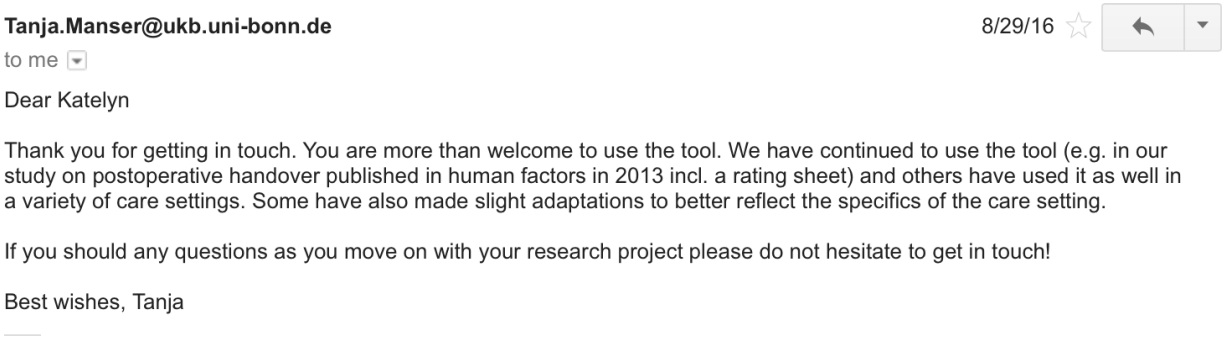
Katelyn,

This letter represents permission given to you to conduct your DNP scholarly project in the Medical Intensive Care Unit. Please let us know how we can be of further assistance.

R. M. Carpenter, MSN, RN
Manager, Medical ICU

Kyle Enfield, MD, MS
Medical Director, MICU

Figure 3. Approval from the unit managers for the MOU and MICU



Tanja.Manser@ukb.uni-bonn.de 8/29/16

to me

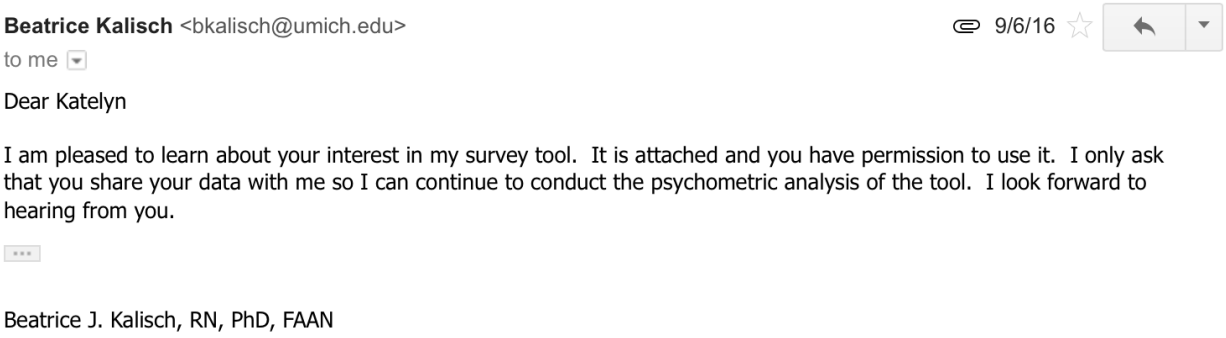
Dear Katelyn

Thank you for getting in touch. You are more than welcome to use the tool. We have continued to use the tool (e.g. in our study on postoperative handover published in human factors in 2013 incl. a rating sheet) and others have used it as well in a variety of care settings. Some have also made slight adaptations to better reflect the specifics of the care setting.

If you should any questions as you move on with your research project please do not hesitate to get in touch!

Best wishes, Tanja

Figure 4. Permission to use Manser Survey



Beatrice Kalisch <bkalisch@umich.edu> 9/6/16

to me

Dear Katelyn

I am pleased to learn about your interest in my survey tool. It is attached and you have permission to use it. I only ask that you share your data with me so I can continue to conduct the psychometric analysis of the tool. I look forward to hearing from you.

Beatrice J. Kalisch, RN, PhD, FAAN

Figure 5. Permission to use NTS

PILOT (Place in Bedside Chart) Last Updated:

Identify	**Patient Sticker**	**Team PIC #'s**
Diagnosis	**Underlying Diagnosis:** *Ex: AML or Lung Cancer* _____ **Reason for hospital admission:** (*check all that apply*) ☐ Diagnosis/Workup; ☐ Chemo induction (initial therapy); ☐ Chemo consolidation (follow up therapy); ☐ Stem Cell transplant; ☐ Disease or treatment complications	(*Circle specialty population*) Malignant Hematology Solid Tumor Oncology Gynecologic Oncology Stem Cell Transplant
Events	**Brief Reason for transfer:** *Ex: neutropenic fever, hypotension, no longer with ICU needs, etc.* **Significant Hospital Events:** Ex: Intubated on 10/22, First neutropenic fever on 10/15, etc.	
Anticipation Assessment	**Review of Systems:** *In addition to normal ROS include* ***pertinent known or anticipated oncology assessment findings or complications*** *(ex: Mucositis, GVHD skin changes)* **Neutropenic:** *Yes/No* Neutropenic Precautions: *Yes/No* Last Fever: _____ Last Cultured: _____ **Stem Cell Transplant:** *Allogeneic/Autologous* Hepa Filter: *Yes/No* Transplant Date: _____ **Oncology Medications:** Administration Requirements: Specific Monitoring Needs: Hazardous: *Yes/No* Name:_____ Required PPE: _____ Last administration: _____ Clinical Trial Drug: *Yes/No* Rx Name: _____ Contact Person: **Transfusion Needs:** Unique Goals/Crossmatching issues _____ Pre Meds: *Yes/No* Rx: _____	
Leave Time	Leave time for questions and clarification. Expectation to conduct brief (2 min) face-to-face introduction with Receiving RN/Receiving Shift Manager and patient/family. *(See back for details and rationale)*	

Version 11/1/16

Figure 6. Oncology Transfer Checklist

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
after – before	Negative Ranks	0[a]	.00	.00
	Positive Ranks	4[b]	2.50	10.00
	Ties	2[c]		
	Total	6		

a. after < before

b. after > before

c. after = before

Test Statistics[a]

	after – before
Z	-2.000[b]
Asymp. Sig. (2-tailed)	.046

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Figure 7. Modified NTS Item 9. Changes to Improve Practice

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
after – before	Negative Ranks	0[a]	.00	.00
	Positive Ranks	5[b]	3.00	15.00
	Ties	1[c]		
	Total	6		

a. after < before

b. after > before

c. after = before

Test Statistics[a]

	after – before
Z	-2.236[b]
Asymp. Sig. (2-tailed)	.025

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Figure 8. Modified NTS Item 12. Constructive feedback

Appendix A

Journal of Nursing Administration
Online Submission and Review System

Editorial Purpose

The Journal of Nursing Administration (JONA) is designed for nurse executives, administrators, and leaders in a variety of healthcare systems, such as hospitals, home care agencies, accountable care organizations, and clinics. **JONA** provides information on management and leadership development; human, material, and financial resource management; staffing and scheduling systems; staff development; labor-management relations; policy, legislation, regulations, and economics related to healthcare and program development; legal, ethical, and political issues; interdisciplinary collaboration; organization-wide projects; corporate issues; diversity management; community relations; innovations; and professional trends. **JONA** is not a research journal; we seek practical, applied content, informed by data (that may have been gathered through a formal research process).

Manuscript Review

JONA is a refereed journal. Published manuscripts have been reviewed, selected, and developed with the guidance of our editorial advisors. Manuscript content is assessed for relevance, accuracy, and usefulness to executives and administrators in healthcare service settings. Manuscripts are reviewed with the understanding that neither the manuscript nor its essential content have been published or are under consideration by others. The review process starts on the first day of every month. As example, February 1 is the start of the review process for all manuscripts received during January. Publication decisions and author notification generally occurs within 16 weeks from the beginning of the review process.

Authorship Responsibility

All persons designated as authors should qualify for authorship. Each author should have contributed significantly to the conception and design of the work and writing the manuscript to take public responsibility for it. The editor may request justification of assignment of authorship. Names of those who contributed general support or technical help may be listed in an acknowledgment that is placed after the narrative and before references.

Each author must complete and submit the journal's **copyright transfer agreement**, which includes a section on the disclosure of potential conflicts of interest based on the recommendations of the International Committee of Medical Journal Editors, "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" (www.icmje.org/update.html). A copy of the form is made available to the submitting author within the Editorial Manager submission process. Co-authors will automatically receive an Email with instructions on completing the form upon submission.

Query Letters

Although not necessary, query letters allow the editor to indicate interest and developmental advice on manuscript topics. These can be sent to JONAEditor@gmail.com.

Manuscript Preparation for Online Submission

Unless otherwise stated, prepare manuscripts according to the *American Medical Association*

(AMA) *Manual of Style* (10th edition). **The maximum manuscript length is 3600 words (abstract through references).** As a general rule, a paper of this length should have no more than 4 figures or tables. Content exceeding this number may be submitted as supplemental digital content (see section on SDC). For examples of style, please see a recent issue of the journal.

Institutional Review Board Approval

If your research or a quality review project met any of the following criterion (intervention to evaluate new or existing practices, adds human subject risks beyond the institutional standard of care, generates new knowledge, and/or the findings have implications beyond the unit or institution), you should provide information in the manuscript about your Institutional Review Board (IRB) process and informed consent. A manuscript reporting a quality improvement initiative generally does not need IRB approval if it meets these criteria: assesses internal process improvement, results are specific only to author's institution and are not intended for use in other organizations, describes standard of care, and is informational in nature, lessons learned).

Format ***(adhering to the format requirements will expedite the review of your submission)***

1. Double space the manuscript using a 10 point type size, any font style.
2. **The maximum manuscript length is 3600 words (abstract through references).**
3. Attach your various individual files containing elements of your entire manuscript. No file should contain information found in any other file:
   - 1 page Word file - Title/author bio page
   - Word file containing text of manuscript, starting with the abstract and ending with the references
   - As many individual files as necessary, each containing 1 table or figure
   - Supplemental digital content
     - Files of tables, forms, data collection instruments, figures (1 table or instrument per file)
     - Video clips supplementing of describing content from the manuscript (see SDC)
4. Add page numbers in the upper right hand corner of each page.
5. Left justify all text, including headings.
6. Do not indent paragraphs; separate paragraphs with an extra return.
7. Subdivide the text into main sections by inserting subheads.
8. All headings go flush left and are distinguish by level as follows:
   - ***First Level Heading (Bold Italic on Separate Line)***
   - **Second Level Heading (Bold Regular on Separate Line)**
   - *Third Level Heading (Regular Italic on Separate Line)*
   - Fourth Level Heading (Regular text, a period, then start the text)
9. Do not put any reference numbers in superscript. They should be normal size text, enclosed with parentheses, e.g. (1-4, 15)
10. Do not use running headers or footers.

Title/Author Biography Page

Information for the title/biography page is placed in a 1 page Word file. The information should not be placed in any other file. This 1 page Word file should contain only:

1 **Title of Manuscript**
2 Author(s) **names and credential**s (highest earned credential only, followed by RN, and certifications (optional).
3 **Author(s') Affiliation(s)** (edit this heading as appropriate) followed by a colon and the following (as appropriate): job title (If more than one author is from the same institution, list job title first, person's name in parentheses, then a comma followed by the next person's job title, etc.), department, institution, city, state.
4 **Corresponding Author** (use this heading). For publication, it is preferable to use a work address. You may include an e-mail address (optional) at end of your mailing address.
5 If no conflicts of interest are present, please declare this. **Funding** information and other **disclaimer or disclosure** information.

Example of a title/bio page with one author
Title: Nursing Revisited: Creative Solutions To Old Problems
Author: Helen Williams, EdD, RN

Author Affiliation: Chief Executive Officer, Y Institution, Big City, Calif.

Correspondence: Dr Williams, Grace Medical Center, PO Box 54, Gray, TX 22222 (hwill@GMC.com).

Example of a title/bio page with two or more authors
Nursing Revisited: Creative Solutions To Old Problems
Jane Doe, PhD, RN, Kathy Free, MSN, RN, May Brown, PhD, RN

Authors' Affiliations: President (Dr Doe), Health Systems, Inc., Gray, Tex; Chief Nurse Officer (Ms Free), James University Medical Center, Louisville, Mass; Instructor (Dr Brown), Adjunct Professor (Dr Doe), School of Nursing, Sunny University, San Diego, Calif.
NOTE: If all authors are from the same place, just list job titles followed by each person's name in parentheses, then the department, institution, city, and state.

Corresponding Author: Dr Doe, Health Systems, Inc., 2656 Loop Road, Gray, TX 77054 (janedoe@hs.com).

Conflicts: None to declare.

Abstract

Abstract for non-research paper: 50-75 word abstract that stimulates readers' interest in the topic and states what readers will learn or how they will be better off after reading the article.

Abstract for a research paper: structured abstract of no more than 150 words, with 5 headings - objective, background, methods, results, and conclusions.

Tables and Figures

Tables (information in 2 or more columns) and figures (information in text format, photos, graphs/charts with boxes and/or lines, arrows, etc.), if any, should each be saved in individual files. If you have 4 tables, you will upload 4 Word files.

All tables must be numbered consecutively with Arabic numbers and have a title. All figures must be numbered consecutively with Arabic numbers and have a title.

Figures and tables must be cited in numerical order in the text. Please submit all graphics in black and white. Learn about the publication requirements for Digital Artwork here: http://links.lww.com/ES/A42. If you have any question about working with graphics files, please contact the office for help.

Supplemental Digital Content: Size & File Type Requirements

Authors may submit supplemental digital content to enhance their article's text and be considered for online-only posting. Supplemental digital content (SDC) may include the following types of content: text documents, graphs, tables, figures, graphics, illustrations, audio, and video. All SDC will be peer reviewed.

Supplemental digital content files should be no larger than 10 MB each. Documents, graphs, and tables may be presented in any format. Figures, graphics, and illustrations should be submitted with the following file extensions: .tif, .eps, .ppt, .jpg, .pdf, .gif. Audio files should be submitted with the following file extensions: .mp3, .wma. Video files should be submitted with the following file extensions: .wmv, .mov, .qt, .mpg, .mpeg, .mp4. Video files should also be formatted with a 320 X 240 pixel minimum screen size. For more information, please review LWW's requirements for submitting supplemental digital content: http://links.lww.com/A142.

Supplemental Digital Content: Citing in Text & Master List Compilation

Cite all supplemental digital content consecutively in the text. Citations should: include the type of material submitted, be clearly labeled as "Supplemental Digital Content," include a sequential number, and provide a brief description of the supplemental content. Audio and video citations should also include the length and size of the file.

The last page of your manuscript, immediately following your listing of references, should be a listing of all of your SDC in-text citations, in the order in which they were cited in text. The SDC citation page must be numbered to match the citations from the text. Include a title and a brief summary of the content. For audio and video files, also include the author name, videographer, participants, length (minutes), and size (MB).

Please follow the format below for SDC citation in text and on the citation summary page at the end of your reference list. This is so production staff can then slot the URL they create with the SDC file into the article. The legend citation page at the end of the text is so production can easily see how many SDC items to look for in the text. They will remove the legend before publication, it is only there as a marker for your office and production.

Example of text citation of SDC

"The initial equipment purchase included portable ceiling lifts in 10 departments, floor-based lifts, and lateral transfer devices for all patient care departments…. Lift team job responsibilities included transfer of patients in and out of bed, repositioning heavy patients, lateral transfers, and floor transfers (**See Video, Supplemental Digital Content 1**, which shows lift team staff using

the portable ceiling mounted lift, 5 minutes, 10MB). The lift team members were required to use patient lifting equipment when appropriate and were responsible for the evaluation, maintenance, cleaning, and inventory of all patient lifting/transfer equipment…"

Example of Master List Compilation of all SDC citations at end of manuscript

Video, Supplemental Digital Content 1, which shows the lift team staff using the portable ceiling mounted lift
• Author: Alice Smith
• Videographer: Jane Denholm
• Participants: Members of the hospital lift team
• Length: 5 minutes
• Size: 10MB

References

DO NOT USE ENDNOTES (OR SIMILAR PROGRAM) TO FORMAT YOUR REFERENCES. REFERENCE NUMBERS IN TEXT AND THE ENTIRE REFERENCE LISTING MUST BE IN NORMAL TYPE AND MANUALLY ENTERED. DO NOT USE SUPERSCRIPT.

References are double-spaced and placed at the end of the manuscript file. References are cited consecutively by number and listed in citation order in the reference list. Whenever a reference is repeated in text, it uses the same reference number each time. Journal titles should be abbreviated in the reference listing according to *Index Medicus* style. If not listed in *Index Medicus*, journal titles should be spelled out.

Here are some examples of correctly styled reference entries.

Journals: Author, article title, journal, year, volume, inclusive pages.

Doe J. Allied medical education. *JAMA*. 1975;23:170-184.
Doe J. Drug use during high school. *Am J Public Health*. 1976;64(5):12-22.

Books: Author, book title, place of publication, publisher, year.

Farber SD. Neurorehabilitation: A Multisensory Approach. Philadelphia, Pa: Saunders; 1982.

Winawar S, Lipkin M. Proliferative abnormalities in the gastrointestinal tract. In: Card WI, Creamer B, eds. *Modern Trends in Gastroenterology*. 4th ed. London, England: Butterworth & Co; 1970.

For multiple authors in journals and books:
• If six or fewer, list all authors
• If more than six, list the first three followed by et al.
Please see http://libguides.hsl.washington.edu/content.php?pid=273430&sid=2254151 and http://libguides.hsl.washington.edu/content.php?pid=273430&sid=2254152 for print and

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Appendix B
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Title: Improving Handoff Quality and Nursing Teamwork Between Intrahospital Settings with Transfer Checklists

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Conflicts: None to declare.

Abstract

This project evaluated the effect of a transfer protocol on teamwork and collaboration between nurses in the Medical Intensive Care Unit and Medical Oncology Unit, and overall perception of handoff quality. The pre-post comparison incorporated the Nursing Teamwork Survey (NTS) and Manser rating tool for handoff quality. Neither instrument demonstrated statistical significance. However, clinical results suggest that bringing teams together supported improved handoffs and patient care, and promoted socialization and teamwork between intra-hospital settings.

Background

Extensive healthcare literature describes the risks inherent in clinical handoffs in the hospital setting with an estimated 24 handoffs per patient hospitalization (7). Discharge from one specialty setting, such as an ICU or operating room, to another setting, is a high-risk event where suboptimal handoffs creates opportunity for errors and breaks in patient safety (8). Nursing literature on patient handoffs mostly pertains to the traditional end of shift transfer of care from one nurse to another within the same environment, and despite the importance and frequency of the intrahospital handoff, little research relating to this unique exchange exists (5). Similarly, insufficient literature can be found that describes patient admissions, discharges, and transfers—nursing activities that have been found to be the most labor-intensive aspects of the role (2). Also, while technical skills and the sharing of pertinent patient information are the foundation of the handoff process, these transfers serve other essential roles such as creating group cohesion and serving as a means for social support amongst nursing staff (5). Discussions of non-technical skills that are essential to optimal handoff and serve to promote socialization, training, trustful relationships, and role clarification are largely missing from the literature (3). Equally important to patient safety are the human factors that contribute to teamwork such as communication, leadership, shared decision-making, and situational awareness (6). The purpose of the proposed project was to determine if the creation and implementation of a nursing transfer protocol promotes teamwork and collaboration between nurses in the Medical Intensive Care Unit (MICU) and medical oncology unit (MOU), and improves overall perception of handoff quality.

Theoretical Framework

Donabedian's Structure-Process-Outcome (SPO) conceptual model was utilized as the framework for this study.

Protection of Human Subjects

IRB exemption was granted for the project by applying to the University's Institutional Review Board for Health Sciences Research.

Methods

This study was conceptualized to understand the process of promoting collaboration among nurses in the MICU and the MOU by measuring baseline perceptions of nursing teamwork and handoff quality between units and incorporating those findings into the institution's existing standards for handoff at change of shift to better meet the needs of patients and nurses during transfers between units and improve overall perceptions of teamwork and care delivery.

This study evaluated results of the development and implementation of a handoff protocol in order to answer the following study questions: 1) Does the process of working together as an intraprofessional group to create a handoff protocol improve nursing teamwork among the participants? 2) Does the implementation of an augmented handoff protocol improve the perceived quality of nursing handoffs between units?

Sample

A sample of all nurses in the MICU and the MOU who work on a full-time or part time basis were included in the study. A subgroup of the larger sample consisting of nursing staff members from both units created the formal nursing handoff protocol. These nursing team members were limited to those who have been employed at the academic medical center in either the MICU or MOU for at least a year and have been involved in a patient handoff between the two units.

Setting

This project took place in an academic medical center and focused on the nursing staff caring for medical oncology patients being transferred between the MICU and the MOU. The MICU is a closed 28-bed unit caring for critically ill adults. The medical oncology unit is comprised of 36 acute care beds, 14 of which are designated for patients with newly diagnosed leukemia or those undergoing stem cell transplantation.

Measures

Manser Survey

The Rating Tool for Handoff Quality was created by Manser and her colleagues to measure the quality of patient handoffs in a variety of patient care settings through use of a self-assessment tool (4). The validated instrument consists of a total of 19 items. Sixteen of the items describe handoff characteristics related to teamwork and information transfer. Overall handoff quality is assessed with a separate item question and two additional items are

included to better describe the circumstances surrounding the handoff (i.e. pressure for time). All items are completed using a four-point scale of "agree," "partially agree," "partially disagree," and "disagree."

Nursing Teamwork Survey

The Nursing Teamwork Survey (NTS) is a validated instrument developed by Kalisch and colleagues to assess perceptions of nursing teamwork in acute care inpatient hospital settings (1). The NTS is comprised of a 33-item survey, where responses are measured on a Likert scale (1 = *rarely*, 2 = 25% *of the time*, 3 = 50% *of the time*, 4 = 75% *of the time*, and 5 = *always*). NTS items pertain to five teamwork factors: trust, team orientation, backup, shared mental model, and team leadership. High scores are indicative of higher perceptions of teamwork. While originally designed to focus on within-team performance, for the purpose of this project a modified NTS using two of the five factors—trust ($\alpha = .847$) and a shared mental model ($\alpha = .834$)—was utilized to best assess perceptions of teamwork between the MICU and MOU nurses creating the handoff protocol.

Procedures

Pre-Intervention

Nursing team members involved in the sending and receiving of patients between the MICU and the MOU completed an evaluation of handoff quality using the Manser Survey to assess handoff after every patient transfer between units for a minimum of four weeks and a maximum of eight weeks depending on sample size. Each patient transfer yielded a maximum of two surveys: one evaluation from the nurse sending the patient from their unit and one evaluation from the nurse receiving the patient to their unit. In addition to completing the Manser Survey for handoff quality, nurses designated which unit they were from and whether they were sending or receiving the patient. Both sets of staff received education about use of the Manser Survey before the project began.

Intervention

After gathering four weeks of Manser Surveys, a subgroup of six nurses, three from the MICU and three from MOU gathered to review the handoff quality data and worked together to augment the medical center's existing handoff protocol to meet the needs of both the nursing staff and patients during transfers between units. A new handoff protocol was the product of this subgroup. Volunteers for the subgroup were solicited via email with a goal of having three to four nurses from each unit. The modified NTS was administered to this volunteer group before and after creation of the new nursing handoff protocol.

Post Intervention

The new handoff protocol was distributed to nursing staff in both units via email and in person education from shift managers, unit leadership, and the project lead. The MICU and the MOU utilized the new handoff protocol during patient transfers between units for an additional four to eight-week period. Nurses sending and receiving medical oncology patients between the MICU and MOU once again utilized the Manser Survey to assess handoff after every patient transfer. In addition to designating which unit they were from and whether they were sending or receiving the patient, nurses also noted whether or not they utilized the handoff protocol and if they performed an in person handoff before transfer.

Analysis

Manser survey data collected before and after the implementation of the new handoff protocol was evaluated to determine if the perceived quality of nursing handoffs between units improved. Modified NTS data from the subgroup of nurses who created the handoff protocol was evaluated to determine if the process of working together as an intraprofessional group improved the perception of teamwork amongst the participants.

Results

Pre Intervention

Manser surveys were collected over a four-week time period during the Pre-intervention phase to assess perception of handoff quality. Twenty-one transfers occurred between the MICU and the MOU during this time allowing for a potential 42 survey opportunities. In total 30 surveys were collected resulting in a 71.4% overall return rate. The MOU collected 13 surveys yielding a 61.9% unit specific return rate and the MICU collected 17 surveys yielding an 80.9% unit specific return rate. From the surveys collected, 16 surveys were from nurses giving handoff to another nurse on a different unit and 14 surveys were from nurses receiving handoff from another nurse on a different unit. A visual breakdown of Manser survey results from the Pre-intervention data was created for the volunteer group's use during the intervention phase.

Intervention

The modified NTS was administered to the volunteer group participants before and after creation of the handoff protocol, renamed the oncology transfer checklist to assess differences in team members' perception of teamwork before and after participation in the subgroup activity. NTS findings were analyzed using the paired *t*-test (Wilcoxon Signed-rank test). Item 9 (*my team readily engages in changes in order to make improvements and new methods of practice*) and item 12 (*team members value, seek and give each other constructive feedback*) demonstrated a

statistically significant improvement in scores (p=0.046 and p=0.025 respectively). However, upon application of the Bonferroni correction for multiple comparisons, the adjusted p-value (p=0.0036) rendered the modified NTS items 9 and 12 statistically insignificant.

Post intervention

Manser surveys were collected over an eight-week time period during the post-intervention phase to assess perception of handoff quality after the implementation of the oncology transfer checklist. Nineteen patients transfers occurred between the MICU and the MOU during this time allowing for a potential 38 survey opportunities. In total 20 surveys were collected resulting in a 52.6% overall return rate. The MOU collected six surveys yielding a 31.6% unit specific return rate and the MICU collected 14 surveys yielding a 73.7% unit specific return rate. From the surveys collected, 12 surveys were from nurses giving handoff to another nurse on a different unit and eight surveys were from nurses receiving handoff from another nurse on a different unit. Additional questions on the post-intervention survey demonstrated a 50% usage of the oncology transfer checklist with only 2 surveys indicating that a physical in person handoff occurred prior to transfer.

Analysis

Findings from the Manser surveys utilized an independent *t*-test analysis (Mann Whitney U test) to determine differences in the perception of handoff quality after implementation of the new nursing handoff protocol. None of the Manser survey items demonstrated statistically significant differences. Overall, survey items received high scores both before and after the implementation of the oncology transfer checklist.

Discussion

Analysis

Intervention Group

Shortly after beginning the pre-intervention nursing staff from the two units were solicited via email invitation to volunteer to be a part of the intervention group. Six nurses volunteered and gathered at a designated off unit location on a day they were not in-patient care for a one-time four-hour work session. After completing the modified NTS, discussion regarding background information related to unit structure, staffing responsibilities and roles, and historical trends in patient movement was facilitated by the project lead. Next, a visual breakdown of Manser survey results from the Pre-intervention data was shared with the group and results were discussed at length. Volunteers used the Manser data, their institution's existing standard work for handoff, and their own clinical experience, to

create their product, the oncology transfer checklist. This checklist was intended to move with patients between units during transfers and serve as a guide for handoff and a source of oncology related information pertinent to the individual patient. The checklist could be updated and revised with each episode of movement or with new changes in the patient's disposition. Key items of the checklist included diagnosis and oncology subspecialty information, unique oncology patient findings, stem cell transplantation status, and unique medication needs. Whenever possible, the volunteer group felt strongly about conducting a face to face introduction between the nursing providers and patient, to enhance communication, teamwork, and the patient experience.

Manser Survey Data

While there was no statistically significant improvement in Manser Survey scores before and after implementation of the oncology transfer checklist, data collected suggested that perception of handoff quality was positively reported throughout the project. Both the MICU and the MOU answered that they agreed that handoff quality was very high 70% of the time during the pre-intervention phase and 75% of the time after the implementation of the oncology transfer checklist. Several of the survey items that addressed information transfer, shared understanding, and working atmosphere, the three factors identified by Manser to impact handoff quality, were positively perceived by the MOU and MICU and demonstrated an improvement in average scores after implementation of the oncology transfer checklist. Notably, respect for the patient's experience, joint team effort to ensure handoff completion, active enquiry regarding questions, minimal tension between team members, and establishing a point of contact, were all items where average scores improved after introduction of the oncology transfer checklist.

Modified NTS Data

Several items from the modified NTS administered to the volunteer group participants before and after creation of the oncology transfer checklist demonstrated statistical improvement in perceptions of teamwork between the group prior to the Bonferroni correction. After spending a considerable amount of time reviewing the Manser data and discussing both the current state of handoff procedures between the units and what the group perceived to be ideal handoff procedures, group conversation repeatedly addressed the importance of teamwork between the MOU and MICU in caring for this unique population. This suggests that combining improvement efforts between two units, team members can share information, receive and appreciate meaningful feedback, and become aware of each others' strengths and weaknesses in order to build more trusting relationships that allow for successful engagement in handoff activities.

Strengths and Limitations

Limitations

Patient movement between the MOU and the MICU did not follow historical patterns throughout the course of the project. Pre-intervention reflected more typical movement of patients between the MOU and the MICU with 10 patients transferring between the units, some with multiple admissions back and forth, for a total of 21 transfers over a four week timeframe. Patient movement was considerably slower between units after implementation of the oncology transfer checklist with 16 patients accounting for 19 transfers between the two units over the course of eight weeks. More oncology patients were directly admitted to the MICU from the ED, outside facilities, or clinic setting than normal, creating a more atypical flow of patients between the units.

The complexity of the project and the infrequency of patient transfers, particularly in the second half of the project, may have affected survey completion and staff responses. For the purpose of this project, Manser surveys did not include any patient specific data to ensure confidentiality and protection of patient sensitive information; however, using patient identifiers may have helped uncover particular oncology populations or types of transfer events that need improvement or special attention.

Other limitations of the study include the use of surveys to obtain information about quality of handoffs and teamwork. Therefore, results reflect the perceptions of the participants rather than observations of these skills and behaviors. Additionally, this study was conducted on only two units within one academic medical center. Consequently, results may not be generalizable to other units, hospitals, or health settings. The sample size is low due to the limited number of patient transfers, which also limits generalizability. While validated and reliable, the NTS has previously only been used within the individual unit setting and for the purpose of the study will now be tested in a group of participants from two different settings using a small sample. Similarly, the Manser survey has not been validated between ICU and acute care settings.

Strengths

While there were no statistically significant changes in the Manser Survey data before and after implementation of the oncology transfer checklist anecdotal reports from nursing staff in both units confirmed the perceived value of the new tool. Although usage of the oncology transfer checklist was only reported in 50% of the post intervention

transfers, commentary and stories from both nursing staffs validated the importance of the information shared on the checklist.

Using the Manser survey as a means to evaluate the non-technical handoff skills in addition to more traditionally studied technical handoff skills is another strength of this study. Factors related to successful nursing handoffs—information transfer, shared understanding, and working atmosphere—were evaluated in the medical oncology inpatient population for the first time. The success of the subgroup of nurses from the MOU and the MICU who volunteered to review the Manser data and create the oncology transfer checklist was validated not only by encouraging participant feedback but also by the success of the group in creating their product, the oncology transfer checklist in a limited time with minimal resources. Furthermore, using a subgroup of nursing staff from each unit to jointly design a handoff tool demonstrated feasibility of collaborative inter-unit quality improvement efforts and suggested improved perceptions of nursing teamwork.

Conclusions

This study will serve to supplement the limited body of knowledge pertaining to intrahospital patient transfers and transfer protocols. To date there are no validated nursing handoff tools specific to the transfer of patients between ICU and acute care settings. Additionally, no previous studies have evaluated the nursing handoff between settings in the oncology patient population. Procedures described in this study should be piloted and tested between other units within this academic medical center, especially those that also care for oncology patients, and between MICU's and MOU's in other institutions. The elements of the oncology transfer checklist should be reviewed in greater detail and adapted to meet the changing needs of the patients and care providers. Experiences from this study echo the complexity of patient handoffs described in the literature and can be used to develop additional interventions, especially those involving inter-unit collaboration, that are geared toward improving safety of handoffs, the patient experience, and teamwork between hospital settings.

While it cannot be certain that the oncology transfer checklist changed the handoff process or improved handoff quality between the MOU and the MICU, it is evident that by bringing two teams together with the goal of improving the quality of care provided and the patient experience, that it is not only just feasible, but also very possible that the outcomes will be beneficial for nursing team members and the patients they serve. Also, while

technical skills and information pertinent to the oncology patient population were certainly a component of the project's efforts and the resulting oncology transfer checklist, the non-technical skills that are equally essential to optimal and safe handoffs, were an even greater element of this intervention. Bringing the two teams together to learn about the structural and role related nursing processes unique to the different units and subsequently allowing those participants the opportunity to work together on a handoff improvement activity, served to support improved nursing handoffs and optimal patient care, but more importantly helped to promote socialization, trusting relationships, situational awareness and teamwork that is so essential between the intra-hospital settings.

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Oncology Transfer Checklist

PILOT (Place in Bedside Chart) Last Updated:

Identify	**Patient Sticker**	**Team PIC #'s**
Diagnosis	**Underlying Diagnosis:** *Ex: AML or Lung Cancer* _____ **Reason for hospital admission:** (*check all that apply)* ☐ Diagnosis/Workup; ☐ Chemo induction (initial therapy); ☐ Chemo consolidation (follow up therapy); ☐ Stem Cell transplant; ☐ Disease or treatment complications	*(Circle specialty population)* Malignant Hematology Solid Tumor Oncology Gynecologic Oncology Stem Cell Transplant
Events	**Brief Reason for transfer:** *Ex: neutropenic fever, hypotension, no longer with ICU needs, etc.* **Significant Hospital Events:** Ex: Intubated on 10/22, First neutropenic fever on 10/15, etc.	
Anticipation Assessment	**Review of Systems:** *In addition to normal ROS include* ***pertinent known or anticipated oncology assessment findings or complications*** *(ex: Mucositis, GVHD skin changes)*	
	Neutropenic: *Yes/No* Neutropenic Precautions: *Yes/No* Last Fever: _____ Last Cultured: _____	
	Stem Cell Transplant: *Allogeneic/Autologous* Hepa Filter: *Yes/No* Transplant Date: _____	
	Oncology Medications: Administration Requirements: Specific Monitoring Needs: Hazardous: *Yes/No* Name:_____ Required PPE: _____ Last administration: _____ Clinical Trial Drug: *Yes/No* Rx Name: _____ Contact Person:	
	Transfusion Needs: Unique Goals/Crossmatching issues _____ Pre Meds: *Yes/No* Rx: _____	
Leave Time	Leave time for questions and clarification. Expectation to conduct brief (2 min) face-to-face introduction with Receiving RN/Receiving Shift Manager and patient/family. *(See back for details and rationale)*	

Version 11/1/16

Themes from the Manser Surveey (pre and post intervention data)

Handoff Theme/Topic	Pre-Intervention	Post-Intervention	P – value
1. Logical	1.24	1.3	0.856
2. Documents used	1.28	1.47	0.408
3. Time allowed	3.53	3.9	0.151
4. Interruptions minimized	1.28	1	0.117
5. Information relevant	1.14	1.25	0.393
6. Priorities addressed	1.3	1.35	0.707
7. Clear assessment	1.21	1.16	0.669
8. Complications discussed	1.48	1.32	0.466
9. Contact established	1.37	1.2	0.458
10. Tension	3.83	3.95	0.704
11. Questions resolved	1.36	1.31	0.452
12. Handoff complete	1.17	1.1	1.0
13. Documentation complete	1.23	1.25	0.968
14. Excessive information provided	3.83	3.79	0.911
15. Excessive information sought	3.97	3.89	0.554
16. Patient experience	1.30	1.1	0.353
17. Handoff quality	1.41	1.45	0.963
18. Time pressure for person giving	3.21	3.26	0.789
19. Time pressure for person receiving	3.33	3.25	0.914

Themes from the Modified NTS (pre and post intervention data)

Teamwork Theme/Topic	Pre-Intervention	Post-Intervention	P – value
1. Shift responsibilities	4	4	1.0
2. Roles and responsibilities	3.5	3.67	0.705
3. Expectations clearly communicated	3	3.83	0.102
4. Follow through on commitment	3.67	4	0.157
5. Quality job	4.67	4.67	1.0
6. Shift change information	3.83	3.5	0.157
7. Respect	4.33	4.83	0.083
8. Strengths and Weaknesses	3.5	4.5	0.063
9. Changes to improve practice	3.67	4.33	0.046
10. Share ideas and information	3.5	4.33	0.059
11. Message clarification	3.83	4.33	0.083
12. Constructive feedback	3.5	4.33	0.025
13. Fair reallocation of responsibilities	4.17	4.33	0.564
14. Trust	3.5	4.5	0.063

Visual breakdown of pre-intervention manser surveys.

Handoff Theme/Topic	Overall	8W	MICU	8W Gave	8W Receive	MICU Gave	MICU Receive	PS
1. Logical	1.24	1.23	1.27	1.33	1.14	1	1.67	1
2. Documents used	1.28	1.23	1.33	1.17	1.29	1.11	1.67	1
3. Time allowed	3.53	3.69	3.38	3.33	4	3.7	2.83	4
4. Interruptions minimized	1.28	1.09	1.46	1	1.17	1.57	1.33	1
5. Information relevant	1.14	1.08	1.19	1	1.14	1.2	1.17	1
6. Priorities addressed	1.3	1.15	1.44	1.17	1.14	1.5	1.33	1
7. Clear assessment	1.21	1	1.4	1	1	1.33	1.5	1
8. Complications discussed	1.48	1.31	1.6	1.17	1.43	1.5	1.8	1
9. Contact established	1.37	1.08	1.63	1.17	1	1.5	1.83	1
10. Tension	3.83	3.85	3.81	3.67	4	3.7	4	4
11. Questions resolved	1.36	1.15	1.57	1.17	1.14	1.5	1.67	1
12. Handoff complete	1.17	1	1.31	1.00	1	1.2	1.5	1
13. Documentation complete	1.23	1.31	1.19	1.33	1.29	1	1.5	1
14. Excessive information provided	3.83	3.77	4	3.67	3.86	4	4	4
15. Excessive information sought	3.97	3.92	4	3.83	4	4	4	4
16. Patient experience	1.3	1.08	1.44	1.17	1	1.7	1	1
17. Handoff quality	1.41	1.23	1.6	1.17	1.29	1.56	1.67	1
18. Time pressure for person giving	3.21	3	3.4	2.33	3.57	3.89	2.67	4
19. Time pressure for person receiving	3.33	3.38	3.44	2.83	3.86	3.5	3.33	4
Total Surveys	30	13	16	6	7	10	6	

Perfect Score: 1	>1.5
Perfect Score: 4	<3.5