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Program Evaluation of a Bundled Educational Intervention to Enhance Implementation of Professional Exchange Report

Luanne M. Shaw
Grand Valley State University, shawlu@gvsu.edu

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Luanne M. Shaw

Kirkhof College of Nursing

Grand Valley State University

Advisor: Jean Barry, PhD, RN, NEA-BC

Project Team Members: Marie VanderKooi, DNP, MSN, RN-BC and

Keverne Lehman MSN, RN-BC

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Abstract

Communication handover is a source of potential error and risk to patient safety. Electronic-based tools may reduce errors and mitigate risks to patient safety. Electronic tools have been successfully implemented using multiple methods of education and training. Electronic tools vary in functionality and integration with the electronic health record (EHR). A large West Michigan Regional Health System (RHS) implemented a new EHR containing an embedded tool for communication handover called Professional Exchange Report (PER). There was inconsistency in the practice of bedside report by nurses. The RHS planned to use a bundled approach of educational interventions to implement the new tool and report structure including communications, video demonstration, in-seat training and at the elbow support during the go-live. This project systematically evaluated the interventions to implement PER using evidence based methodology. Evaluation was based on collection of data and evidence through interviews, pre- and post-implementation surveys, observations of the report process, and review of documents related to planning, implementing and evaluating the program. Organizational leaders engaged in robust planning. Educational interventions were evidence-based. Implementation was carried out effectively. The organization did not have a detailed, specific plan for evaluation of educational interventions or PER outcomes. Change in length of report could not be attributed to the process change, and nurse perceptions of the process and consistency of practice at bedside did not change. Observed opening of the EHR during report increased by 68%. There were statistically significant increases in yes responses to awareness of, understanding why, knowledge of specific, and ability to make practice changes.

Keywords: electronic, computer-based, technology-enhanced, computerized, handover, handoff, hand-off, end of shift report, shift to shift, shift report, inter-shift report, and rounding

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Executive Summary

Background. The Regional Health System (RHS) was amidst one of the largest changes in its history with implementation of a new electronic health record (EHR). There was opportunity to build upon work around communication handovers initiated by the central shared leadership in years prior. Handovers were inconsistently taking place at the bedside, opening of the EHR during report was rare, and the new EHR contained an embedded tool to support the exchange of information between health professionals.

Purpose. The purpose of this Doctor of Nursing Practice (DNP) project was to evaluate how the RHS planned, implemented and evaluated bundled educational interventions to support the implementation of PER. The objectives and evaluation included any impact on average length of report, nurse satisfaction with communication handover, consistency of location of handover and use of the EHR during report, and patient satisfaction measures for communication with nurses. The focus was on two in-patient medical surgical units within one of the RHS sites.

Significance. Program evaluation is a useful tool in looking at how a change is planned, implemented and evaluated. Evaluation helps the organization learn what was done well, what could be improved and how to adapt or increase the sustainability of practice changes. Even incremental changes can help improve efficiency and may impact cost savings over time.

Current Practice. Nurses rely on standard paper report sheets to organize information and give report. The average length of report on the two units was 4 minutes 42 seconds, with 61% of observed reports under 5 minutes in length. Nurses were occasionally or frequently satisfied with the communication handover on their units. Report took place at the bedside 71% of the time observed, and the EHR was opened 19% of the time. The units were meeting expectations for

measures of patient satisfaction with being treated with courtesy and respect though were below target scores for nurse communication in a way patients could understand and listening carefully.

New Evidence. The literature has demonstrated that electronic tools can help support communication handovers. Implementations are most successful with involvement of key stakeholders throughout the planning, implementing and evaluating processes and using a variety of educational interventions. Accurate, up to date, easily accessible information are important characteristics of electronic handover tools for user satisfaction. Post implementation, the average length of report was 4 minutes 27 seconds, a 15 second reduction. The average length of report for night shift handing off to days decreased by 43 seconds. Nurse satisfaction with communication handover and report occurring at bedside did not change. Use of the EHR during report increased by 68%. Though the PER was often opened, nurses still primarily relied on their paper report forms to provide information.

Intervention. Using multiple methods of communication and educational interventions is an evidenced based approach to implementing a change such as practice of communication handover. Through use of a video demonstration, classroom discussion, and practice, there were statistically significant increases in participant awareness of changes to practice, understanding why practice was changing, knowledge of specific changes, and ability to make changes to the practice of communication handover.

Cost Analysis. The cost of program evaluation is very low for the RHS when performed by a DNP student and may provide valuable insight and recommendations. The cost of poor evaluation could be significant in reduced sustainability and lack of understanding for future implementation projects.

Considerations. Ideally program evaluation takes place throughout the process of implementing change or after the process has been implemented. This program evaluation took place throughout the process and two-weeks post-implementation. The measures related to patient satisfaction with nurse communication were not able to be collected at the time the project concluded. The use of an implementation model or framework such as the Consolidated Framework for Implementation Research along with the ADKAR model can be helpful in planning, implementation and evaluating implementations.

Recommendations. Further monitoring of the practice of communication handover is recommended to determine continued improvements or worsening in the length of report, consistency of use of the PER and nurse satisfaction with the process. Tracking the process over time would allow for monitoring for variation in practice. When sufficient data points, such as 12 points in time are collected, run or control charts can be constructed to evaluate the variation. Having a formal evaluation plan before implementation may improve desired practice changes and sustainability. Further consideration of the paper report forms is needed to evaluate adaptation to the form or possible elimination of the form or transition to a different type of nurse worksheet. Continued reinforcement of expected behaviors is needed to increase and sustain the use of PER. Consideration of adapting the bundled educational interventions to further address specific desired behaviors or the culture and content of report may improve use and sustainability of the PER tool. Some of these recommendations could be excellent projects for future DNP students within the RHS.

Program Evaluation of a Bundled Educational Intervention to Enhance Implementation of

Professional Exchange Report

According to the World Health Organization (WHO) there is a nearly 1 in 300 chance of

a patient experiencing harm while receiving health care; in developed countries, as many as 10%

of patients are harmed during hospital care (WHO, 2014). Various and often complex systems-

related factors cause harm to patients in hospitals. People contribute to these errors through break

downs in human factors with leadership and communication cited as the most common root

causes of sentinel events (Joint Commission Resources, 2015). Health systems must continue to

mitigate risks of errors in communication and care delivery. One of the National Patient Safety

Goals (NPSG) is to improve the effectiveness of communication among caregivers (Joint

Commission, 2017). The Institute of Medicine (IOM) calls for redesign in use of information

technologies as one strategy to address issues around patient safety (IOM, 2001).

Phenomenon of Interest

The process of nurse's exchange of information at the point of transfer of care is known

by several names including the following; hand off, handover, end of shift, inter-shift or change

of shift report. The exchange of information between nurses is a source of frustration and error in

practice due to the inclusion of subjective information, omission of information, and a lack of

patient involvement in the process (Lupieria, Creatti & Palesea, 2016). Handover is intended to

provide the necessary patient information and to transfer the responsibility of care; this takes

place in complex health systems and impacts patient safety (Friesen, White & Byers, 2008).

Recurring themes in the literature on nursing communication handover highlight

challenges to health systems in implementing evidence-based methods to produce the best

possible outcomes. One theme is the failure of nurses to convey complete and vital information

during handover to ensure continuity of patient information (Bakon, Wirihana, Christensen & Craft, 2016; Flemming & Hubner, 2013; Smeulers, Lucas & Vermeulen, 2014). Second, there are various methods or models in use, but no strong evidence to suggest the superiority of one over the others for effectiveness (Bakon et al., 2016; Staggers & Blaz, 2013). Third, literature supports the practice of bedside nurse communication handover while also indicating problems with implementation, adequate tools for delivering the right information, and sustainability (Gregory, Tan, Tilrico, Edwardson & Gamm, 2014; Staggers, Clark, Blaz & Kapsandoy, 2011).

The phenomenon of communication handover is not consistently defined in the literature (Cohen & Hilligoss, 2010). There is no clear evidence to support one specific process. Implementation of bedside communication handover and supporting tools has proven difficult (Alhamid et al., 2016; Gregory et al., 2014).

Recent Strategies to Address the Problem

Bedside nurse communication handover has been implemented in hospitals around the world to improve patient safety and both patient and staff satisfaction. When communication handover takes place at the bedside, the patient can contribute to his or her story, be an active participant in his or her care, and be provided an opportunity to correct misconceptions (Maxson, Derby, Wrobleski & Foss, 2012). Discussing the patient story when transferring care to an oncoming nurse at the bedside creates a process of risk reduction (Groves, Manges & Scott-Cawiezell, 2016). Improved team and work environments including communication, accountability for care, perceptions of safety, and ability to learn about the patient have been reported regarding staff satisfaction with bedside handover (Mardis et al., 2016; Oroviogoicoechea, Beortegui & Asin, 2013).

The introduction of information technology in the process of communication handover at the patient bedside is relatively new and has been difficult to implement (Staggers et al., 2012). Electronic tools are intended to support the process of gathering, identifying and communicating information during handover. The prevalence of these tools has significantly increased with national initiatives.

In 2005, strategies to improve handoff were published including the use of technology to improve communication, suggesting use of electronic records to convey patient information (Friesen et al., 2008). Both the UK and Australia released initiatives around safe handovers in 2004 and 2007 respectively (Flemming & Hubner, 2013). In 2008, the Joint Commission released safety goals and expectations for handoffs to be standardized, including an opportunity to ask and respond to questions (Joint Commission, 2008). A systematic review indicated a surge in the literature since 2008 to address communication errors and lack of anticipatory guidance during handovers with systematized information and electronic tools integrated in EHR systems (Flemming & Hubner, 2013).

Educational strategies to improve handovers have included multiple methods. Methods that have resulted in improvements in handover content, confidence, and perceptions included combinations of interventions addressing more than one learning style. Simulation with teamwork and communication workshops; sessions which drew on evidence, audits, and expert opinions with a standardized tool and location for handover; various forms of lectures followed by practice with feedback; simulation in small groups with accompanying video and online material are all strategies which have produced desired results (Gordon & Findley, 2011).

Standardization of nurse communication handover in organizations has attained varying degrees of success. Required universal forms, mnemonics for communication (e.g. Situation,

Background, Assessment, and Recommendation [SBAR]), and attempts at creating minimum data sets (MDS) for electronic nurse handovers are some attempts at standardization (Johnson, Jeffries & Nicholls, 2011). As with any change or program implementation, the culture, context, engagement of key stakeholders, level of staff motivation to change, amount and delivery method of communication, in addition to other factors all contribute to likelihood of acceptance and sustainability (Chapman, Schweickert, Swango-Wilson, Aboul-Enein & Heyman, 2016; McMurray, Chaboyer, Wallis, & Fetherston, 2010; Nelson & Massey, 2010; Small et al., 2016).

The use of change models to implement bedside handoff has shown some success in creating sustainability. Kotter's Change Model (Kotter, 2012) was chosen in one study because of its flexibility with organizational structure and strategies to address various responses to change (Small et al., 2016). When significant change occurs in type or structure of handover, such as moving from paper to electronic health record (EHR) based report, change models and quality improvement methods can be beneficial (McMurray et al., 2010).

Influential factors in making changes to the process of communication handover include patient safety, improved technology, federal mandates, and patient and staff satisfaction. Strategies to enhance satisfaction with and outcomes of bedside communication handover include patient participation in the process, use of information technology, standardization, and educational interventions. The most successful implementations have incorporated change management models. The following section will provide the context for this project.

Context and Significance

A West Michigan Regional Health System (RHS) implemented a new model of care and electronic health record (EHR). The goal of the initiative was to increase quality of care, decrease costs of care, design care for the way people live and to improve accessibility, all goals

of the Triple Aim (Berwick, Nolan, & Whittington, 2008). Formerly, the RHS used multiple EHR platforms, making transitions of care and the patient experience less than optimal. By using a uniform electronic platform across the RHS, patient experience may be improved, and the patient story communicated more seamlessly.

The new EHR embeds evidence-based tools to inform care and increase interprofessional contributions to the patient story. The concepts of data, information, knowledge and wisdom are central to enabling evidence-based clinical decision support within the EHR workflow (Elsevier, 2016). The new EHR bridges the gap between practice and technology and supports the exchange of the patient story across multiple settings in healthcare (Elsevier, 2016). There was an opportunity to leverage this EHR to enhance the process of communication handover or professional exchange report (PER) at handover of care between inpatient nurses in the RHS.

An organizational assessment of the RHS found strong support for quality improvement and changes which improve workflow, patient, and staff satisfaction. The assessment revealed hesitancy from staff nurses in changes affecting the paper-based bedside communication handover process. This hesitancy was expressed in numerous informal conversations with bedside nurses within the RHS and during a meeting specifically addressing a potential move away from paper and towards an electronic report. Nurses strongly relied on a standardized paper-based report tool to organize their work, patient information, and to hand over patient information at shift changes.

The new EHR utilizes an electronic communication tool which displays the most up to date clinical information, personalization of the patient's plan of care, and progress towards meeting patient care goals. If nurses perceived a threat to their workflow or could not find value in the electronic tool, they could create work-arounds or revert to past practices rather than

embracing and sustaining desired changes. There was concern about how paper-based report forms and the EHR integrated PER might work together to improve workflow while maintaining patient and staff satisfaction with changes. There was also a need to manage the change effectively, develop and identify measures for evaluation, and a need to ensure sustainability since the changes would be made system wide eventually.

Transitioning to a new EHR presented an opportunity to improve the process of communication handover. There were high stakes for nurses in changing their practice and their reliance on paper-based report structure. Through a bundled approach of interventions, the RHS rolled out the PER process. This project examined and evaluated the implementation efforts of the RHS in the delivery of these interventions and in staff acceptance and use of the PER process. The evaluation focused specifically on the implementation impact for two adult in-patient medical-surgical type units at one of the RHS sites, a community hospital.

Problem Statement

Nurses were not consistently giving report at the bedside or using the EHR during handover communication. Prior policy updates and a toolkit were made to address communication handover within the RHS; however, those practices were not sustained. Trainers providing direct education related to use of the new EHR and PER tool were concerned about educational content and how to answer questions about the new report process. Results from an internal survey with various bedside nursing staff and nurse leaders on professional practice indicated opportunities for improvement in staff perceptions and use of integrated documentation and clinical tools. These findings suggested a need for intervention to address gaps in the practice of nursing communication handover.

To address the problem, the RHS implemented a bundle of interventions including communications in various formats, discussion and collaboration with key stakeholders, a video demonstration of the PER process, hands on computer training, and support during the go-live of the EHR. Revision of policies and supporting documents also took place or were assigned to clinical nurse specialists to update. The planning and implementation process was supported by key stakeholders across the RHS and from multiple disciplines. There was support from the vendor through transformation services to facilitate implementation, support go-live, and develop sustainability plans. The question of interest to this project was how the interventions were planned, implemented, evaluated and what early impact, if any, was made on the report process. Through use of quality improvement and change management methodology, this project evaluated implementation of this program on two adult in-patient units at one of the RHS sites.

Evidence Based Initiative

The Electronic Tool

A systematic literature search of English-language, peer-reviewed, full-text articles published on electronic handoff tools or methods between January 1, 2000 to June,1 2017 was conducted. Studies focused on use and implementation, evaluation, or outcomes of electronic-based handover tools and included either qualitative or quantitative data. Most literature on the subject was physician or medical team based. Most literature on true EHR-integrated tools emerged since around 2008. Studies for review were limited to adult medical/surgical inpatient units or wards since these most closely matched the population of interest for evaluation.

A flow chart of the process for study selection and an analysis table of the literature can be found in Appendices A and B, followed by an explanation of the leveling of evidence in Appendix C (leveling based on Melnyk & Fineout-Overholt, 2013). The specifics of each study

including themes, population and setting, design, sample sizes, interventions or measures, major findings with any statistically significant results, and limitations are included in the table in Appendix B. The literature represents multiple disciplines and spans the globe, indicating a universal issue and need for this type of project. The studies inform how well electronic-based handoff tools or systems have been used, implemented and accepted by users. The following sections synthesize findings of the literature reviewed.

Use.

 Tools vary significantly in structure and organization despite some general universal characteristics (Abraham, Kannampallil & Patel, 2014). Tools must be, in fact, useful, reflecting structure and function that flows and works for the needs of the end user and organizational demands. Use of tools must be embedded with the patient's story and tasks associated with meeting goals of the patient's plan of care (Staggers et al., 2012).

Use of tools was impacted by whether the needed information was directly available, or whether important information was missing, difficult to find, or inaccurate (Staggers et al., 2011). Barriers to use include inability of tools to update information in a timely manner, persistent inaccuracies, clinician resistance to change, duplication of work, lack of training, and lack of integration with the EHR to name some (Davis et al., 2015). Users of tools may develop work arounds or revert to old practices if tools are poorly designed, ineffectively implemented or old methods such as paper-based tools remain available (Alhamid et al., 2016; Brebner, Sandhu, Addison & Kapadia, 2011; Hunt & Staggers, 2011; Staggers et al. 2012). Just because the tools and technology are present, does not guarantee they will be used, or used as intended.

Implementation. Strategies for successful implementation have included collaboration with key stakeholders throughout the process, adequate training, EHR integration,

communication and flexibility in tools (Davis et al., 2015). Changes in tools or processes bring

the possibility of resistance leading to decreased compliance, negative end-user perceptions, and

potential negative impact on organizational or patient outcomes. End-users should be involved

in the design, testing and implementation of electronic tools to increase likelihood of change and

sustainability (Johnson, Sanchez & Zheng, 2015; Nelson & Massey, 2010; Schuster et al., 2014;

Vawdrey, Stein, Fred, Bostwick & Stetson, 2013). As of 2010, usability testing and evaluation of

EHR products by vendors was not common and standardization across the industry was lacking

(McDonnell, Werner & Wendel, 2010). Professions, specifically nursing, continue to rely on and

prefer paper forms for organizing patient care and for handover of information, a practice steeped

in tradition (Staggers et al., 2011).

Outcomes. Mixed results were reported on quality and completeness of information

provided at handoff using electronic based tools. Limited evidence was found related to patient

safety outcomes, though some studies reported reduced or no change in risk for errors or patient

harm (Davis et al., 2015; Hunt & Staggers, 2011; Johnson, Sanchez & Zheng, 2016; Li, Ali,

Tang, Ghali & Stelfox, 2013; Van Eaton et al., 2010; Vawdrey et al., 2013). Many studies

reported high user satisfaction though mixed results were reported on improved efficiency. Some

studies reported improved communication both among and between professions (Barnes,

Campbell, Stockman & Wunderlink, 2011; Hunt & Staggers, 2011; Raptis, Fernandes, Chua &

Boulos, 2009; Van Eaton, Horvath, Lober, Rossini & Pellegrini, 2005; Vawdrey et al., 2013).

Sometimes, unintended consequences can be positive, such as when a tool is used to improve

communication and decrease workload by unintended users (Schuster et al., 2014).

Evaluation. Context has a significant effect on the use and successful implementation of

handoff tools (Abraham et al., 2014; Alhamid et al., 2016; Chapman et al., 2016; Staggers et al.,

2012). Unit culture encompasses the values of nurses or the team of professionals exchanging information within that unit which then defines the content of communication handovers (Staggers et al., 2012). Design of tools should embrace innovation in functionality, user-interface and acceptance, and safety considerations like clinical decision support or mechanisms for triggering alerts or audits (Hunt & Staggers, 2011). The tool must match or support the way the end-users work (Staggers et al., 2011).

Electronic based report systems may be rejected for many reasons. Typically, they have failed to meet user expectations. When tools do not contain up-to-date information, cause duplication of work, lack personalized information, are not portable, or do not function in line with the way users process and present information they are likely to be rejected (Flemming & Hubner, 2013).

Effective tools integrate information across the entire EHR and incorporate portable technology support throughout the shift (Staggers et al., 2011; Staggers et al., 2012). These types of tools are most likely to be successfully implemented. Some important data desired by users that was frequently not included in electronic tools included a complete list of allergies and code status (Davis et al., 2015). Most tools have neither fully addressed the issue of clinical decision support or anticipatory guidance nor the ability to present the full patient story leaving them less likely to be successfully implemented (Flemming & Hubner, 2013).

Limitations of the Literature Review on Electronic Handover Tools

Systematic reviews of literature were limited to English language articles only. Some studies relied on self-reported data rather than exact measurements limiting significance of time saved in length of report and potential cost savings from decreased overtime. Many studies used survey methods for data collection and convenience sampling which may reduce the chances of a

representative sample. Quality improvement reporting lacks generalizability of findings since the data are site specific. Many investigations reflect issues in study design, selection of measures to accurately reflect correlations and outcomes, and lack of generalizability. Small sample sizes, convenience sampling, and single site studies may not reflect needs globally.

The search was conducted for this review using some exclusions, such as only English language publications and available in full text, which could eliminate potential relevant information. The articles represented multiple professions with more literature related to tools designed and tested with physicians: whether those results translate to nursing handover communication is somewhat questionable. Some of the systematic reviews included studies that were outside of adult in-patient settings.

Electronic bedside report is a newer phenomenon in the nursing literature and a challenging topic to design high level research around which limits evidence to support one best practice. Additionally, there is a general lack of literature on evaluation of implementing electronic tools for bedside communication handover. However, there is a sufficient base of literature on which to base this program evaluation on and to make recommendations for sustainability.

Evidence Based Recommendations Regarding Electronic Handover Tools

Early and ongoing engagement of end-users and stakeholders representing multiple disciplines is strongly suggested as an effective strategy in designing for the use and implementation of electronic handover tools (Alhamid et al., 2016; Nelson & Massey, 2010). The literature supports standardized structures for handover tools yet suggests that some flexibility be allowed for individualization and for adaptation in various service lines (Davis et al., 2014).

Flexibility also embraces the importance of context and culture in facilitating or disrupting successful implementation (Chapman et al., 2016).

The literature reviewed can assist organizations, such as the RHS, learn from not only the success of others, but also from failures and its' own previous change efforts. The literature serves to make useful recommendations for conducting an evaluation of an implementation of electronic-based handover tools. Gaps in the evidence base include further study of patient outcomes related to electronic based bedside report, how to effectively integrate the patient's story into integrated tools, and development of validated and reliable tools to evaluate practices of electronic bedside report. This project provided an opportunity to consider some of these gaps and evaluate how PER was implemented.

Bundled Educational Interventions

Adult learners have various preferences for instructional format, process information differently, and have different learning styles. When multiple formats can be used to both deliver and interact with content, a greater portion of the intended audience is reached. Adult learning theory, such as Knowles 4 Principles of Andragogy (1984), are useful when determining educational methodology (Pappas, 2013). Knowles emphasized the importance of involvement of adult learners in planning and evaluation of their education, how individual experiences serve as the basis for learning, that interest in education increases with relevance to and impact on work or personal life, and that learning is problem-centered. The RHS utilized a variety of educational interventions with the contribution of end-users and subject experts to address these concepts of adult learning, which was evidence based.

Video methodology. Video (and all forms of media technology) are broadly used and well-established adjuncts to education in academia and other settings. The use of video provides

numerous benefits in reaching large numbers of subjects with minimal resources as was needed in the RHS. A recent study supported the assumption that videos are effective for training and the study provides support for research suggesting that Gen Y prefers visual methods of learning over reading text (Hedderly & Scott, 2015). The adult medical-surgical units evaluated are staffed by a large proportion of Gen Y nurses making the video intervention evidence based.

Classroom practice. Staff nurses were required to attend instructor-led sessions, which included hands-on practice with the new EHR and the PER screen. Students were given time to role play communication handover using the PER tool in class after a general overview and watching the video of the PER demonstration. These types of interventions appeal to adult learners who prefer tactile, interactive, and kinesthetic styles of learning and promotes experiential learning (The VARK Modalities, 2017).

Communications. Information regarding the PER was delivered to nurses in multiple formats and through multiple venues. Fliers describing and depicting the PER screen and format were posted on the units. Electronic communications occurred through the RHS internal website. Information was shared directly by the unit manager, shared leadership council and super users in staff meetings and in conversations during work, at classes, and during informal conversations. Feedback mechanisms included dialogue during meetings or in classes. Staff nurses could also bring questions or concerns to super users and unit leadership. Using more than one method of delivery to ensure timely and accurate reception of information is supported by organizational culture and the literature.

At the elbow support. The literature describes what is termed as, "at the elbow" support during implementation of EHRs and their respective tools, such as the PER implementation. This type of support involves specially trained individuals (super-users) who are actively engaged

during go-live to allow the end user to optimize application of the tools and effectively

incorporate new processes into workflow (Rizer, Kaufman, Sieck, Hefner & McAlearney, 2015).

The super-users typically are staff within the practice setting who have received additional

training to be able to assist with training, mentoring and supporting peer end users. Super-users

providing at the elbow support are most often taken out of their normal staffing role during go-

live to be readily available to their peers. The support tapers off gradually as end users become

more confident and competent with the product and processes.

Intense support was provided from the EHR vendor, as well as from within the

organization, during the initial weeks of go-live to assist staff with many new workflows and

incorporation of the new EHR. Super-users from the units of interest were available 24-7 and

designated by brightly colored shirts and ID badges. Assistive personnel from the EHR vendor

were also available on units and rounding, identifiable by a different colored shirt and ID badge.

Leadership supported units through allowing and encouraging over-staffing and the accrual of

overtime during the go-live period. Through informal conversation, the staff on the units of

interest reported that the "at the elbow" support was appreciated, found the support helpful most

of the time, and expressed some concern for what would happen when issues arose once the

extra support was no longer available. These responses and concerns are consistent with

behaviors reflecting a need for ongoing consideration of the ability of staff members to use the

tools effectively and reinforcement to support needs and expected practice.

Program Evaluation

Evaluation is important for several reasons. First, it has been reported that up to

70% of change initiatives fail (Leonard & Coltea, 2013). This is strong evidence that change is

difficult to successfully implement, organizations must learn from their failures, and they must plan carefully for sustainability.

Second, learning from within and outside the organizational history can be significant. The concept of "failing forward" comes from the work of John Maxwell (2000) to embrace learning from failures or mistakes to focus on what can be done differently and to seek innovative approaches to move forward. The RHS will be able to take initial learning during its first go-live to improve upon further future implementation at additional sites.

Finally, it has been said that, "what gets measured, gets done," the origin of which is debatable, however, the truth is also questionable (Henderson, 2015). For example, simply measuring weight does not produce loss. The measurement helps track progress towards goals, so measurement is a form of evaluation. Evaluation also provides accountability in determining what was accomplished, what was done to get the achieved results, and what should be done differently to achieve different results.

According to Patton (1987), program evaluation is a process which critically appraises a program. The process involves the collection and analysis of evidence of a program's activities, characteristics, and outcomes. The purpose of program evaluation is to make judgments regarding the program to both improve its effectiveness or inform decisions about the program.

There are two broadly accepted types of program evaluation. Formative evaluation takes place early the development and implementation stages of a program to inform strategy and provide direction for continuous improvement (Guyadeen & Seasons, 2016; MEERA, n.d.). Summative evaluation occurs once a program is well established and describes to what degree the intended outcomes are being met (Guyadeen & Seasons, 2016; MEERA, n.d.). This program evaluation was more formative since the implementation occurred less than a month from post-

implementation observations on impact and the PER process will be continued to be rolled out to the remaining RHS sites over the next year.

Several considerations are necessary for effective formative program evaluation. The My Environmental Education Evaluation Resource Assistant (MEERA, n.d.), a University of Michigan based group, has adapted and summarized some of these important considerations. Evaluation should build upon existing knowledge and incorporate resources available to address how the goal is being achieved. Evaluation needs to include diverse perspectives and as complete, unbiased results as possible. Evaluation must be honest to provide actual improvement opportunity. Results of a good evaluation should be replicable and as rigorous as possible.

Additional factors in effective formative evaluation may also be considered as discussed by Hall, Freeman, and Roulston (2014). These authors emphasize four essential approaches including participatory, responsive, educative, and qualitative (Hall et al., 2014). Each of these approaches contribute to outcomes of genuine partnerships, emerging and adaptable responses, capacity building, and a thorough, complex understanding of the phenomena (Hall et al., 2014).

Conceptual Models

Theory/Conceptual Framework selected to frame/define the key concepts

The Consolidated Framework for Implementation Research (CFIR) served as the conceptual framework for this project (see Appendix E and F). This comprehensive framework supports implementation of evidence based practice, is useful in formative evaluation, and is being used to guide implementation in health care settings (Damschroder et al., 2009; Breimaier, Heckemann, Halfens & Lohrmann, 2015). This framework helped formulate the steps for evaluation of implementing a new process of bedside report using the electronic health record.

One benefit of the CFIR is that it draws from multiple published implementation theories to provide a comprehensive structure for implementing a program, change, or evaluation of an implemented program or change (Breimaier et al., 2015). The five domains of the CFIR provide structure for planning, implementing, and evaluating interventions to increase the likelihood of change and improved practice (Damschroder et al., 2009). Though the evaluation focused on the process domain, each domain will be briefly addressed in relation to this project.

Intervention characteristics. Interventions must be adapted to the organization yet maintain as high a degree of fidelity as possible. Although the new EHR has been integrated into many health care settings, each one has its own culture and individual needs. The process of communication handover is adaptable to various settings to meet the needs of the staff, situation, and patient condition. When implementing the PER, the organization considered the established practice and culture of nurses' use of paper-based tools to integrate and transition practice to improve outcomes yet maintain the integrity and the intention of the electronic based tool.

The Inner setting. The inner setting reflects the organizational structure as well as the both tangible and intangible networks and sources of influence. The organizational structure adjusted to move to one uniform EHR, unified billing system, and new practice model. The structure may continue to transform as the new model of care emerges and partnership councils evolve. These changes in structure may support or hinder sustainability of PER. For example, if the RHS fails to provide a mechanism for ongoing monitoring of the process or feedback from end-users, the sustainability of PER will be less likely.

Outer Setting. The outer setting includes socioeconomic conditions and in this case, political and strategic influence from federal regulation. The organization considered influential factors from within and outside of the organization as well as across its system for successful

implementation and sustainability. How the RHS responds to outer influences may impact future

implementation and sustainability of the PER. For instance, the RHS must ensure adequate

financial support and public accountability for the purchase and maintenance of the new EHR for

increased likelihood of acceptance and sustainability. These actions are influenced by legislation

such as MACRA (Medicare Access and CHIP Reauthorization Act of 2015 [Civic Impulse,

2017]), which requires pay for performance addressing quality, value and accountability

(Practice Fusion, 2016).

Characteristics of individuals in the organization. Individual characteristics were key

to identify and strategically select those who were both respected, content experts, and influential

among their peers to champion efforts. Individuals who were not as accepting of change or

actively resisted change were also considered and included in identifying barriers and concerns.

One issue that came up is the use of paper report sheets. Nurses were very vocal about wanting

to maintain this practice to organize their work. When the subject of going completely electronic

was broached in a workgroup meeting and communications suggesting the paper tools would be

eliminated from practice, nurses passionately advocated for the continued use of paper

tools. Clinical nurse specialists, educators, staff nurses and nursing informatics collaborated on

this issue. Consideration of how to best integrate current practice without compromising the

fidelity of the PER was an important factor in acceptance or rejection of the new process.

Inclusion of end-users in these discussions and decisions improved the degree of acceptance and

sustainability of the new process.

Implementation Process. Change must be planned and managed well with room for

adaptation and adjustment to produce the best possible outcomes. Policies in the organization

were or are being updated. Tools and resources accurately reflect and support expected

behaviors. Communication and education were as clear as possible and allowed for feedback and support. Some practices were not specifically addressed, such as who would sign into the computer during report, or what the process would be if the system malfunctioned. Some processes were left to the staff to organically work through in a way that made sense to their workflow and culture. Careful consideration of key stakeholders was made and the degree to which their involvement influenced and impacted the change process was considered.

The CFIR constructs of each domain further assisted in making conceptual distinctions and organizing ideas for evaluation. Each domain was useful for determining how well each construct was addressed during the planning, implementation, and evaluation of the PER process. It was also useful for the explanation of behaviors encountered and a model of implementation to explain and determine effectiveness of methods. Further discussion of the process domain and its constructs will continue in the section on the design for this evidence based initiative.

Implementation model to guide project methodology

The organization started training leadership and project managers in the ADKAR model, a change management strategy (Prosci, 2017, see Appendix G). This model is based on practical research conducted in over 900 organizations (Connelly, 2017). The acronym ADKAR, stands for awareness, desire, knowledge, ability and reinforcement, five concepts to achieve for one to successfully change. An assumption of the model is that when change is understood at the level of individuals, organizations can increase the likelihood of successfully implementing change at the macro level (Hiatt, 2006). The model can help to explain, identify, and address reactions to change throughout the process. The model was used in managing the transition to the new PER as well as in evaluating the implementation effort.

The first step in implementing a practice change is to make the key stakeholders aware, involve them in the process, and gain feedback. Desire for change will depend on individual motivation, level of awareness, and perceived potential wins or losses. The stakeholders then can increase their knowledge of the change through providing rationale, engaging in discussion and incorporating feedback. Sometimes people lack the ability to make the necessary change and need training, reframing or other forms of support and resources to be successful. Reinforcing expected outcomes and desired changes help people better transition to new practices. Evaluating each concept of the model in relation to the implementation of the PER will provide insight for sustainability long-term and recommendations for future implementation at other regional sites.

The CFIR and ADKAR models provided structure to create an evaluation plan for this project. These models provide practical insight for designing, implementing and evaluating changes. They provided a foundation or underpinning for evaluation of implementing PER at one of the RHS sites.

Need and Feasibility Assessment of Organization/Population

To determine organizational capacity for change, opportunities for improvement, and the feasibility of successful intervention, an assessment of the state of the system prior to implementation was completed. Models are helpful in framing organizational assessments to highlight potential or actual problems and to evaluate findings. Since the organization was in process of large scale change centered on enhanced information systems, better understanding of the patient story and improved patient experience, use of the Organizational Intelligence Model ([OIM] see Appendix H and I; Falletta, 2008) gave structure to the assessment process.

Falletta (2008) proposes that the OIM is useful in interpreting data from employee surveys. A recent survey was conducted by an external vendor related to employee perceptions of

professional practice within the RHS which made this model particularly helpful. The model is

relatively new compared to other models and frameworks in the organizational development

literature; the model highlights relationships and employee engagement.

Substantial financial and human resources were being allocated to the implementation of

a new EHR, billing system and practice model. From the grass-roots level, or inpatient nursing

level, there was some hesitancy and insecurity about the implications and scope of the change for

direct practice, such as in handover communication. Staff expressed enthusiasm for improved

efficiencies and capabilities of a new EHR, such as evidence based tools. Staff were concerned

about leaving current practice and efforts behind given prior experience with poorly managed

change. The scope and amount of change going on in the organization combined with the

hesitancy of staff to make changes in the handover process were potential barriers to successful

implementation and sustainability of PER.

Elements of the OIM addressed organizational capacity and suggested areas of strengths,

weaknesses, opportunity and threats (SWOT) or challenges to successful planning,

implementation and evaluation of the proposed intervention. Analyses of SWOT and

stakeholders assisted in identifying what Bryson (2011) calls critical success factors, or the

necessary items that must be done well to consider a project or outcome successful. Use of the

power versus interest grid was a helpful tool in considering which stakeholders had high interest

and the power to affect the outcome of interest (Bryson, 2011). The tool provided visualization of

which persons or teams needed information, influence, and collaboration in determining whether

to continue the project. (See Appendix J.)

The stakeholder analysis determined what level of involvement each required for

successful outcomes. Central Shared Leadership (CSL), a nurse driven structure of

communication and influence within the RHS, had high interest and power in this subject since

extensive effort had recently been vested in handover communication by this group. This group

spent a significant portion of its meeting prior to go-live reviewing the content of the PER,

having the lead Clinical Nurse Specialist (CNS) present to the group and show the demonstration

video of the process, had time for questions and discussions, and charged the group with role

modeling for and encouraging their peers in the process change.

Compliance and privacy issues needed to be addressed and representative stakeholders

engaged to ensure that tools and processes recommended did not violate corporate or legal

policies, such as protection of privacy concerns. There were no issues or concerns related to

privacy that would present any new or increased risks to protection of patient information.

Patient experience representatives even strongly supported the new process citing high patient

satisfaction with being invited to participate in information sharing.

Direct leadership, mangers, supervisors, and vendor related designees also had significant

power and interest in a communication handover project for their direct reporting staff and the

products, tools and resources which supported them. The manager of the project units was

actively engaged in informing and supporting her staff, encouraging her unit based shared

leadership and staff to contribute to ideas to improve their handover processes. The vendor

related designees were actively supportive during the planning and go-live processes to gather

information, provide guidance, and offer recommendations.

The project committee representing faculty from Grand Valley State University and a

mentor from the RHS were vital to the entire process of developing, implementing and

evaluating the effort, products and outcomes of the project. Guidance and moral support were

offered by project committee members. The RHS mentor was integral to facilitating

opportunities to observe, gather evidence, and to take feedback to the appropriate individuals or groups for revisions or additional consideration.

Finally, the person assumed to be most influential in production of a video for the educational intervention, was the simulation and video production expert for the RHS, who could provide guidance, feedback and advance or delay the production efforts and final product. This individual provided support through templates, consulting and support during the filming of the video. The person who ended up filming and producing the final video was not originally identified as a stakeholder but came to the project on recommendation from the patient experience team. This individual had the availability and skills needed to assist the RHS in producing this important educational tool for one of the elements to the bundle of interventions.

The SWOT analysis for this project (see Appendix K) attempted to identify as many enablers and barriers as possible to the success or failure of implementing educational interventions to address issues around communication handover. Of interest, the recent work on the Handover Communication Toolkit by the CSL was both an internal strength and a weakness. A strength in that there was groundwork laid to build upon, a weakness if the project was perceived as discrediting or not valuing the previous work done or people involved. The readiness for the project was evident based on strong support from the leadership team, available tools and resources and the fact that there was no other product or interventions to address gaps in communication handover education with the new EHR.

Based on the findings of the organizational assessment, circumstances presented an opportunity to meet a need in the organization. It was feasible to implement and evaluate the effectiveness of educational interventions to enhance implementation of PER. Barriers or factors affecting feasibility of the proposed project included the amount of change taking place in the

RHS and staff hesitancy or resistance to change. Complexity of video production and timeframe for production and implementation of interventions with planned in-seat training were also of concern related to the feasibility of successful implementation. The most pressing threats external to the organization were competing priorities and an uncertain political environment around potential repeal or changes to health care legislation.

The likelihood of sustainable practice change through the bundled educational interventions is highly dependent on whether significant behaviors were recognized and how those behaviors were managed throughout the change process. Nurses having an awareness of the need for change, having desire for the change to happen, having knowledge about how to change, having ability to implement new skills and behaviors and having the necessary reinforcement to sustain change once made were the necessary conditions for sustainable change (Prosci, 2017).

Sustainability is also dependent on the ongoing management of the polarities of practice and technology, and staff and patient satisfaction. The organizational capacity for change is robust. The feasibility of the organization implementing, evaluating, and sustaining the practice of PER is good. The feasibility of completing an evaluation of the implementation of the bundled educational interventions to enhance PER is very good.

Project Plan

Purpose of Project with Objectives

The RHS, where the Doctor of Nursing Practice (DNP) student completed a practicum in Health Systems Leadership (HSL), implemented PER, an evidence based process integrated within the EHR, using a bundle of evidence based educational interventions to improve handover communication. The purpose of the project was to systematically evaluate the implementation of

PER. Evaluation includes the entire process of planning, developing, delivering and evaluating

the bundle of interventions to effect the desired change.

Objectives:

1) Perform an evidence based evaluation of the implementation of PER at a local site

   within the RHS.

   a. Determine how the RHS planned the bundled education

   b. Determine how the RHS executed implementation

   c. Determine how the RHS evaluated the process

2) Determine the impact of the implementation of PER process change:

   a. Determine any change in average length of time to perform bedside report

   b. Determine any change in perception of the report process

   c. Determine any change in consistency of bedside PER practice, e.g. how often

      nurses use the EHR at the patient bedside for the PER rather than at the

      nurse's station or reverting to the paper standardized report form

   d. Determine any change in Hospital Consumer Assessment of Healthcare

      Providers and Systems (HCAHPS) scores related to communication with

      nurses during this process change; there are three questions patients rate on

      this topic including:

      i. Nurses explain things in a way you can understand

      ii. Nurses listen carefully

      iii. Nurses treat you with courtesy and respect

Type of Project

This project was a program evaluation. A program evaluation uses a systematic method of

collecting, analyzing and interpreting information to answer questions about or determine

effectiveness of a program using evidence (Office of Planning Research and Evaluation, 2010).

The process of evaluation was guided by the CFIR process domain and ADKAR models. Quality

improvement methods were used for measurement. The project provides feedback and

recommendations to the organization on its initial implementation and change process

management. The project may assist the RHS in sustaining the change and making necessary adaptations to implement the process at its other sites.

Setting and Resources

The project took place within a large West Michigan Regional Health System. The site of interest was a 248-bed community based teaching hospital. The selected units were designed for adult or older adult patients with medical or surgical conditions. The sizes of the two units are comparable, the same manager covers both units. The adult unit has been in operation less than one year and recently established a core staff of 20 RNs. The older adult unit is well established with a core staff of 28 RNs.

Resources for the program evaluation included development of survey and audit tools to gain information on staff practices and perceptions, including the paper and printing of them. Secure storage was arranged for any data collected. Surveys were scanned into a secure drive within the organization then paper surveys were shredded though they did not contain any personal or patient information. Time was spent by the DNP student on selected units for field observations and interviews with staff members and nurse leaders. A reliable device and method for timing length of report was to use the stopwatch feature on a smart phone from the time information started to be shared until the conclusion of information sharing. Access to quality data to obtain results of patient satisfaction with nurse communication was granted or information provided from the unit manager prior to implementation of PER. Use of quality improvement graphing of aggregate data was used to display and interpret results.

People were a significant resource to this project as well. Support from the Principle for Interprofessional Practice (PIP), as well as guidance from and collaboration with key stakeholders, was crucial. Leadership support and staff engagement with the process (i.e.

willingness to participate in surveys, informal interviews and to be observed) was necessary and no one refused to be observed while some chose not to complete surveys. Guidance and support from the project committee ensured that the project both met the requirements for completion of the DNP program and provided valuable contribution to the RHS.

Design for the Evidence-based Initiative

Based on findings from the review of literature, implementation science knowledge, and quality improvement methodologies, the project used the process domain of the CFIR to evaluate the bundled educational interventions and implementation of PER. The other four domains have been considered in the organizational assessment, which included a SWOT and stakeholder analysis. The CFIR is a type of determinant framework, which can be useful for evaluation since it specifies concepts and constructs that can be operationalized and measured (Nilsen, 2015). Determinants influence the outcomes of implementation, helping to interpret their influence on outcomes (Nilsen, 2015).

A diagram representing the process domain of the CFIR can be found in appendix L. The following questions were addressed: To what degree was the intervention planned? What planning documents or guiding frameworks were used or created if any? What was the quality of planning, such as use of evidence based planning or use of validated methods? Who was involved in the process, key stakeholders, omissions of opinion leaders, inclusion or exclusion of formal leaders or external change agents? Was the plan carried out or executed as developed? Was there evidence based or proven strategies of implementation? What was measured, if anything? What do the results of measurements mean? What will be done with the data? What do people say about the process? Each of these questions assisted in evaluating the implementation of PER.

Participants/ Sampling and Recruitment Strategies

Participants included nurses working on two adult inpatient medical-surgical units within one of the RHS sites. This sample was chosen by convenience and by permission of the unit manager with support of the PIP. Participation in the evaluation surveys, observations or interviews was voluntary. No personal identifying information was collected. No identifying patient information was recorded or collected. Observations of communication handover did often take place at the bedside; however, patients could refuse to have the process observed. There were no foreseeable risks to participation for staff or patients and no compensation, other than candy or snacks for staff, was provided.

Several sessions of the in-seat EHR training for adult in-patient nurses were selected for distribution of surveys regarding practice and perceptions of the interventions and educational strategies. These survey questions were partially based on the ADKAR model. These surveys were reviewed by the lead CNS for communication handover policy work, the PIP, nurses previously involved in the communication handover work, and nurse educators for face validity. The in-seat sessions had participants from multiple adult in-patient units from two of the RHS sites. Completion of the surveys was voluntary with no foreseeable risk for participation and no compensation, other than candy, was provided.

A select number of leaders were interviewed by voluntary participation to gain further insight on the implementation process. Interviews took place utilizing a semi-structured format both face to face, via conference calls, and via email. There was no foreseeable risk to participation by leadership and no compensation was provided.

Measurement: Sources of Data and Tools

To provide evidence of whether each objective of the project was met, thorough data collection was important. Sources of information included key stakeholders, leadership and staff within the RHS and site of focus, and policies or supporting documents. Data came from survey tools designed by the DNP student since no suitable validated tools were identified (see Appendices M and N). All surveys were reviewed by the lead CNS for communication handover policy, the PIP, a staff nurse, and nurse educator for face validity. All survey data collected was scanned onto a secure drive within the RHS. Any paper surveys were then shredded within the RHS.

An audit tool was developed for observations with defined criteria for measurement (i.e. how to determine length of report, see Appendix O). This tool was reviewed by the lead CNS for communication handover policy work, the PIP, nurses previously involved in the communication handover work, and nurse educators for face validity. Field notes were kept for any observations, formal or informal interview notes. Data were obtained from the unit manager for HCAHPS scores prior to implementation. All results, notes, and quality data were kept in a secured location within the RHS.

Specific data collected included any evidence of planning, such as meeting minutes, formal plans, or workshops held to prepare for the intervention. Consideration of who was involved or if any key stakeholders were left out of the planning was also evaluated. The evidence will be discussed and analyzed in the following sections through use of the process domain of the CFIR.

Planning. Planning is defined as, "the degree to which a scheme or method of behavior and tasks for implementing an intervention are developed in advance and quality of those

schemes or methods," by Damschroder, et al., (2009, p. 18 of additional file 4). Planning for the

educational interventions to implement PER began over one year prior to the go-live. Evidence

of planning and discussion of the quality of the methods follows.

Exploration of risk assessment or proactive mitigation to reduce or eliminate potential

adverse outcomes of the change was conducted to inform planning. Risk assessment included a

cause/effect analysis (see Appendix P). Cause and effect diagrams are useful quality

improvement tools. This tool is also known as an Ishikawa diagram, for its creator, or fishbone

diagram, which visually represents relationships of influential factors on the effect of interest

(Institute for Healthcare Improvement, 2017). There are several options for labeling or

categorizing potential "causes" on the effect, for this project, "The 4 P's" of service industries"

were used to address policies, procedures, people and plant/technology (Simon, 2017). People

would seem to be the most influential factor on the outcomes of implementing PER on the in-

patient units. Nurses had a strong tradition and culture of report using a paper worksheet. The

decision to keep the worksheet was based on their feedback and to reduce the number of

significant changes to their practice at the time.

The initial visioning meetings for the process change to PER included the PIP,

representatives from leadership and nursing as well as nursing informatics, the vendor of the

EHR product and content experts. From the visioning meetings, the PIP collaborated with small

groups and individuals. The DNP HSL student, as well as key stakeholders with direct interest in

or influence over, and those impacted by the proposed practice change were included. Some of

these individuals were educators, managers, CSL representatives, CNS's, and nursing

informatics representatives. Early conversations led to designating leads over policy revision,

creation of a video demonstration, creation of supporting communications, and support for in-seat training and go-live of the process.

Policy revision. The revision and consideration of the policy on communication handover in the organization was led by a CNS. Content and recommendations were sought from and approved by the CNS team and nurse practice council. At the time of go-live, the policy revisions were still in draft format and pending final approval. There was significant discussion and thoughtful consideration of how specific or directive to make the PER content. A minimal amount of direction and expected information to be communicated at communication handover seemed appropriate while allowing for some flexibility and adaptation to individual patient/family needs and situations. Fidelity to the intent and design of the PER was maintained, while allowing for adaptability as evident in the CFIR constructs. The quality of the final policy cannot be fully addressed at present, though the draft appeared to include input from key stakeholders, maintain fidelity to the PER, and represent organizational values and initiatives.

Video Demonstration. The planning for the video demonstration started approximately 10 months prior to go-live of the new PER tool. The video project was assigned to the HSL DNP student with direct supervision from the PIP. The lead educator for simulation was engaged to provide recommendations and capabilities of the simulation center at the RHS. A template for scripting and providing cues to the videographer and actors was used to create the script for the video demonstration of PER.

The student met with key stakeholders including nurse educators, CSL representatives who had contributed to prior work on communication handover, nursing informatics representatives, patient experience representatives, the lead CNS on the policy revision, and end-users of PER over the course of 2-3 months. Filming was delayed for further discussion and

resolution of whether the paper report form would be continued, how or if to incorporate paper report sheets into the video, and to allow further development of the PER policy. The student reviewed the current and proposed changes to the policy, recruited actors, recruited a videographer from within the RHS to film, and reserved all necessary equipment and rooms for the video shoot. The simulation educator and patient experience representative were invited to attend the filming session and offer guidance and feedback. The filming took place approximately 5 months prior to go-live to be able to show during in-seat training which started 4 months before go-live.

The first draft of the video was reviewed for content, accuracy and usefulness in demonstrating PER. Feedback was sought from the actors, the PIP, nursing informatics and patient experience representative. Credentialed trainers, who would be providing in-seat instruction and represented various specialties of nursing, were also asked for feedback. Based on the feedback and given the barriers of time constraints and logistical challenges of re-filming, the video was edited to the final version. Introductory scripting was created to describe the purpose of the video demonstration and provide a disclaimer that the setting, scenario used, and scripting were not meant to be prescriptive or reflect all areas of care in complexity and content of report. This information was shown and discussed by the credentialed trainers prior to showing the video during in-seat classes for the new EHR.

The role of the patient was played by the DNP HSL student, who had more than 20 years of nursing experience and some acting experience. The student had limited experience with script writing or providing cues and direction for camera angels and focus. It was also difficult to direct the process and see what was being captured in the video while playing a role. For example, since the video was filmed within the simulation center, other equipment and

mannequins may have appeared in the background of scenes. This made it even more beneficial

to have the patient experience representative and simulation educator's input during filming.

There was some difficulty in recruitment of experienced nurse actors to demonstrate the

PER process who had been recommended by nurse educators. Aligning all necessary individual's

schedules given the necessary timeframe presented a challenge. The final actors were nurses

chosen by convenience, since they were readily available and willing; both were on restricted

duty working in the building where the simulation center was located. These nurses were newer

to the profession and organization, each with less than one-year experience. These nurses,

however, were representative of the population of interest.

Neither of the actors had prior experience with acting. The nurses were given an

overview of the PER, allowed to review the script the week before filming, and given time to run

through the process a couple times before filming began. The actors were encouraged to ad lib to

make the conversation more like how they would perform handover, which reduced their anxiety

and increased their willingness to participate. Their only compensation was their normal salary

since the filming was done as part of their scheduled work day. Nominal gift cards were given by

the DNP HSL student to thank them for their efforts.

The planning for the video was robust in inclusion of input from stakeholders and

development of the script. The content was accurate, though not all terminology reflected the

new process. The scenario was not very complex, which may have affected how some nurses

perceived the video. Results of the perception surveys will be discussed in a following section.

The video was used in some leadership and CSL meetings in the two months prior to go-live,

which was not originally planned for, though contributed to the communication, understanding

and distribution of the PER content. A more complex scenario, accurate terminology, not having

the director in every scene, and having more experienced actors who memorized the script would

be recommendations for reproduction or if considering creating a new video demonstration.

Supporting communications. The terminology and basic structure of PER began to be

introduced approximately 6-8 months prior to go-live. Information began to appear on the

internal web, presented in leadership and unit staff meetings, discussed and viewed during in-seat

training for leadership from multiple disciplines, posted on fliers throughout in-patient units, and

discussed in rounding by leadership, educators and super-users.

Communications were designed by the CNS who worked on policy revision, nursing

leadership, and nursing informatics. The concepts were also addressed during required education

for staff nurses on related topics to the new EHR. There were brief video or audio vignettes

posted on the internal web site that leadership could show during staff meetings, share with

others who were not at live sessions, or direct staff to the site to view.

The frequency of communication increased in the two months prior to go-live with more

specific information posted on fliers, tip-sheets and required all-staff meetings. Fliers used

phrases like "wins" to describe functionality that would improve efficiency or staff satisfaction

with work flow and communication. The point was made that the communication handover

policy supported the PER process, that the PER was multi-disciplinary focused, and that the

paper report sheets would not be removed.

Supporting communications reflected desired content, were approved by leadership, and

well-received by staff. Fliers were produced on the organizational templates designed for the

new EHR initiative. Managers, directors and credentialed trainers used accurate terminology and

content to communicate during meetings, classes and information posted on the internal web. A

mechanism for feedback or direction to obtain further information was provided on each

published communication.

Support during in-seat training and go-live. Credentialed trainers and super-users were

selected in the 8-10 months prior to go-live to allow for extensive training and planning of

schedules. These individuals would provide direction and support during in-seat training, which

included simulating PER, and during go-live through at the elbow support. Additional support

was provided during go-live by the vendor of the EHR, the content experts team, and by a

contracted company who frequently works with the vendor during go-lives. The degree of

support provided varied by the role and experience of the individual and his or her knowledge

and understanding of the PER content and processes specific to the RHS. Staff were appreciative

of this type and amount of support when asked during interactions during and after go-live.

Engaging. Engaging is defined by Damschroder et al., as, "attracting and involving

appropriate individuals in the implementation and use of the intervention through a combined

strategy of social marketing, education, role modeling, training, and other similar activities.

(2009, p. 18 of additional file 4). Numerous individuals were engaged in the process change. The

PIP included key stakeholders at all levels of the organizational structure and a variety of

effective strategies were used to engage individuals and teams.

Opinion leaders. "Individuals in an organization who have formal or informal influence

on the attitudes and beliefs of their colleagues with respect to implementing the intervention,"

are opinion leaders (Damschroder, et al., 2009, p. 19 of additional file 4). Many opinion leaders

were identified through the organizational assessment. The PIP also identified content experts

and peers of end-users who had both formal and informal influence over the implementation of

PER. The CNS's, leadership, educators and nursing informatics representatives all had influence

over the implementation and sustainability of the process. Representatives from CSL, end-users and super-users held informal influence over their colleagues in how and what was communicated, role-modeled and encouraged or discouraged by these individuals.

Formally appointed internal implementation leaders. "Individuals from within the organization who have been formally appointed with responsibility for implementing an intervention as coordinator, project manager, team leader, or other similar role," defines formally appointed internal implementation leaders (Damschroder, et al., 2009, p. 19 of additional file 4). These individuals have been discussed in previous sections and were identified or appointed by the PIP or sponsoring director. The impact of each varied based on experience, training, and level of expertise on the content and role.

Champions. "Individuals who dedicate themselves to supporting, marketing, and 'driving through' an implementation, overcoming indifference or resistance that the intervention may provoke in an organization," are champions according to Damschroder, et al., (2009, p. 19 of additional file 4). The champions in the process of planning, delivering, and implementing the educational interventions included the PIP, lead CNS, the CSLC representatives and most super-users. For the two medical surgical units, the super-users, CSLC representatives and manager championed the efforts by encouraging staff to participate in interventions, use the PER and provide feedback on their experiences.

The manager directly engaged staff prior to the educational interventions and implementation to gain perspective on their concerns, practices, and ideas on how to be most successful, demonstrating elements of the ADKAR model. Super-users, who were also charge nurses, encouraged and reminded staff to use the PER during communication handovers at shift huddles reinforcing the process change. Super-users who had been primarily in "at the elbow"

support roles the first two weeks after the implementation of the new EHR were eager to role

model the process of PER to their peers when stepping back into direct staffing roles.

   External change agents. Individuals who are affiliated with an outside entity who

formally influence or facilitate intervention decisions in a desirable direction are external change

agents (Damschroder, et al., 2009, p. 20 of additional file 4). The PER tool is part of the EHR

and therefore the structure and content are primarily determined by the vendor. Consulting with

representatives from the vendor on the design, capabilities and adaptability or the tool allowed

some customization of the tool and may lead to further adaptations based on feedback from end

users and leadership. The student and PIP also consulted with experts from the transformational

services content team to determine what educational tools were available and to recommend

content for creating the video demonstration. These external change agents had formal influence

on the design of the tool and bundled interventions to support sustainable use of the tool.

   Executing. Damschroder et al. (2009) define executing as the actualization of the plan.

Minor adjustments had to made to timing of completion of the video. Observation dates needed

to move up for the student to fulfill graduation requirements. Retrieval of outcome data for nurse

communication had to be omitted due to timing of the DNP program completion and availability

of data coinciding to the timing of the implementation. Interventions were otherwise completed

and implemented according to plan.

   Reflecting and evaluating. Reflection and evaluation includes, "quantitative and

qualitative feedback about the progress and quality of implementation accompanied with regular

personal and team debriefing about progress and experience," (Damschroder, et al., 2009, p. 21

of additional file 4). Short pre-training and immediate post-training surveys, and pre- and post-

go-live surveys were given to explore nursing practices and perceptions of both current

communication handover and the new PER processes. Surveys gathered information about use of clinical tools, nurse perceptions of interprofessional documentation and basic demographic data, such as unit of practice and number of years in practice. The data was evaluated for a shift in perceptions, nurses' satisfaction with video and classroom content, and for any success of change in handover practice. Informal interviews regarding communication handover practices and informal observations before and after the go-live process helped to identify changes in perceptions and practice. (See Appendix Q for data collection plan table.)

     Pre-post bundled intervention survey results. The ADKAR model was used to formulate the survey questions given to staff nurses during in-seat computer training. Credentialed trainers, who were nurses selected from the organization, covered the introduction of the PER tool including an overview of the content and showing the participants screen shots of the tool. The DNP HSL student was introduced to the participants before this content was covered and pre-intervention surveys were distributed and collected prior to viewing the video demonstration. After the video was shown, the trainers further discussed the PER tool's function and gave participants a scenario and opportunity to role play or simulate giving report with each other. Post-intervention surveys were then distributed and collected.

     Four different sessions of in-patient training were selected at the convenience of the DNP HSL student to observe the implementation of bundled interventions and to distribute and collect surveys. The observed sessions were all during afternoon and evening hours beginning at 4pm and ending at 1am. The PER content was covered within the first 2 hours of each session. The sessions were mandatory and staff either signed up independently or were assigned to sessions based on their shift worked and unit needs. The shift worked by participants was not considered on the survey.

There was a total of 100 pre-surveys collected and 96 post-intervention surveys. Class

size varied from a size of 8-40 participants. Some participants were trained super-users of the

new EHR and were assisting the trainers leading the classes. Participants responding to the

surveys represented nurses from a wide variety of in-patient units including medical surgical and

critical care areas. Over half the participants had less than 3 years of nursing experience and half

of those, less than one-year experience in nursing. The large representation of this range of

experience could have been due to these nurses working afternoon or night hours, which tends to

have a higher prevalence of less experienced nurses. Table 1 represents the numbers of

participants according to years of experience in nursing.

Table 1. Participants by Years Nursing Experience Pre-Post Video/Classroom surveys

■ All sessions Pre (N = 100)   ■ All sessions Post (N = 96)
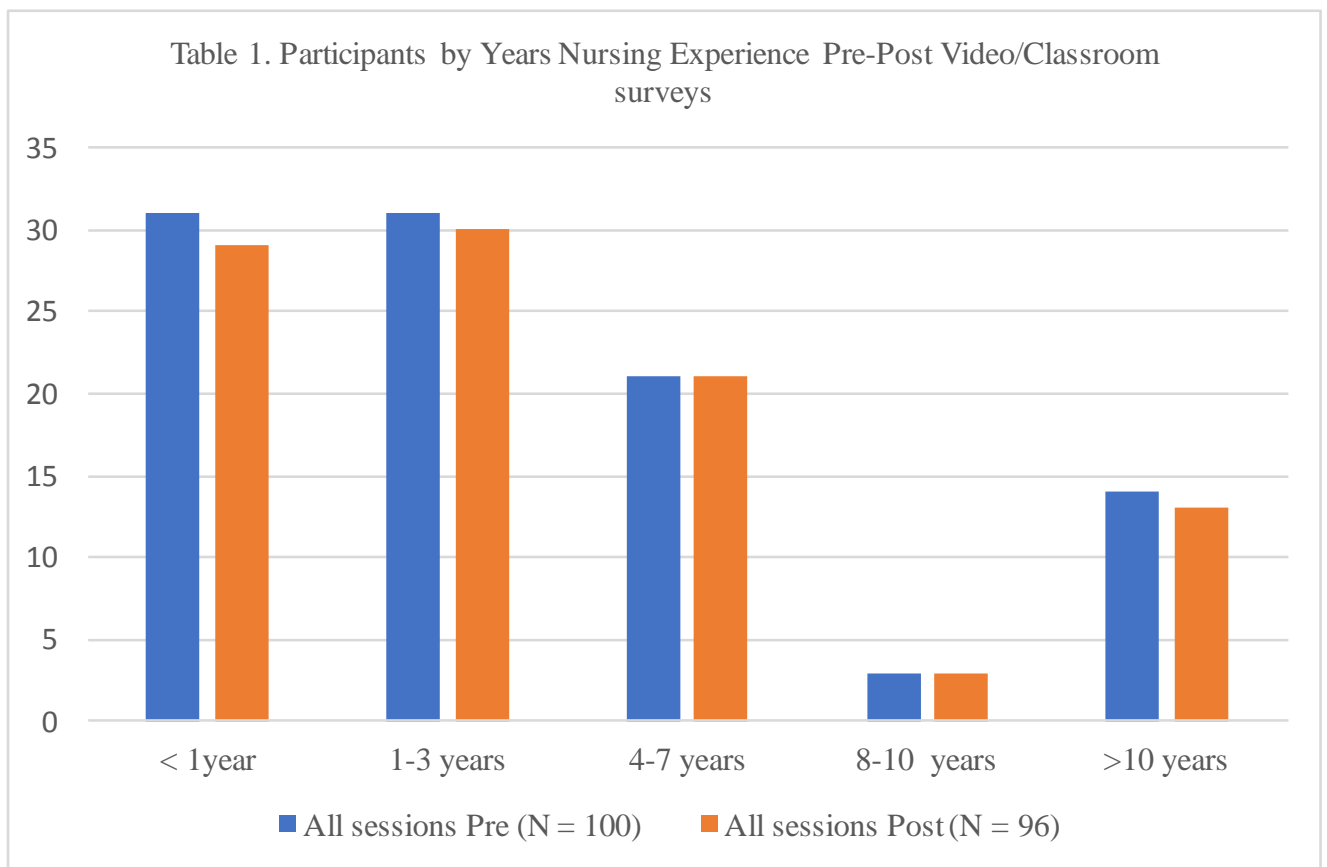
Most respondents indicated awareness of a change in practice before the content on PER was covered. Most nurses indicated they understood why the practice was changing and desired to make changes to their practice of communication handover. A One Sample Test of Proportions was used with a significance level of $p <$ or $= 0.05$ to determine whether the post-test population proportion differed significantly from the pre-test proportion of "yes" responses. Awareness of the practice change increased from 86% to 100%, ($p < .0001$). Understanding of why the practice was changing increased from 68% to 95%, ($p < .0001$). Though there was a slight increase in "yes" responses to the desire to make practice changes, the increase was not statistically significant ($p = 0.0559$). A yes response to having knowledge of specific changes to communication handover increased by 71% after receiving video and classroom interventions, ($p < .0001$).

Most nurses indicated having the ability to make the changes, while the group was almost equally split on whether reinforcement was needed to help make the practice change. The difference in post-survey "yes" responses to having the ability to make the changes was statistically significant ($p = 0.0013$), while "yes" responses to needing reinforcement did not represent a statistically significant change ($p = 0.1585$). Thus, nurses were self-reportedly more aware, had some desire, though not a significantly increased desire after education, were more knowledgeable, had ability, and may need some reinforcement of practice changes post education. Survey results are displayed in Table 2. (See Appendix R for statistical results.)

Table 2. Pre- (n = 100) and Post- (n = 96) Video and Classroom Educational Intervention Surveys
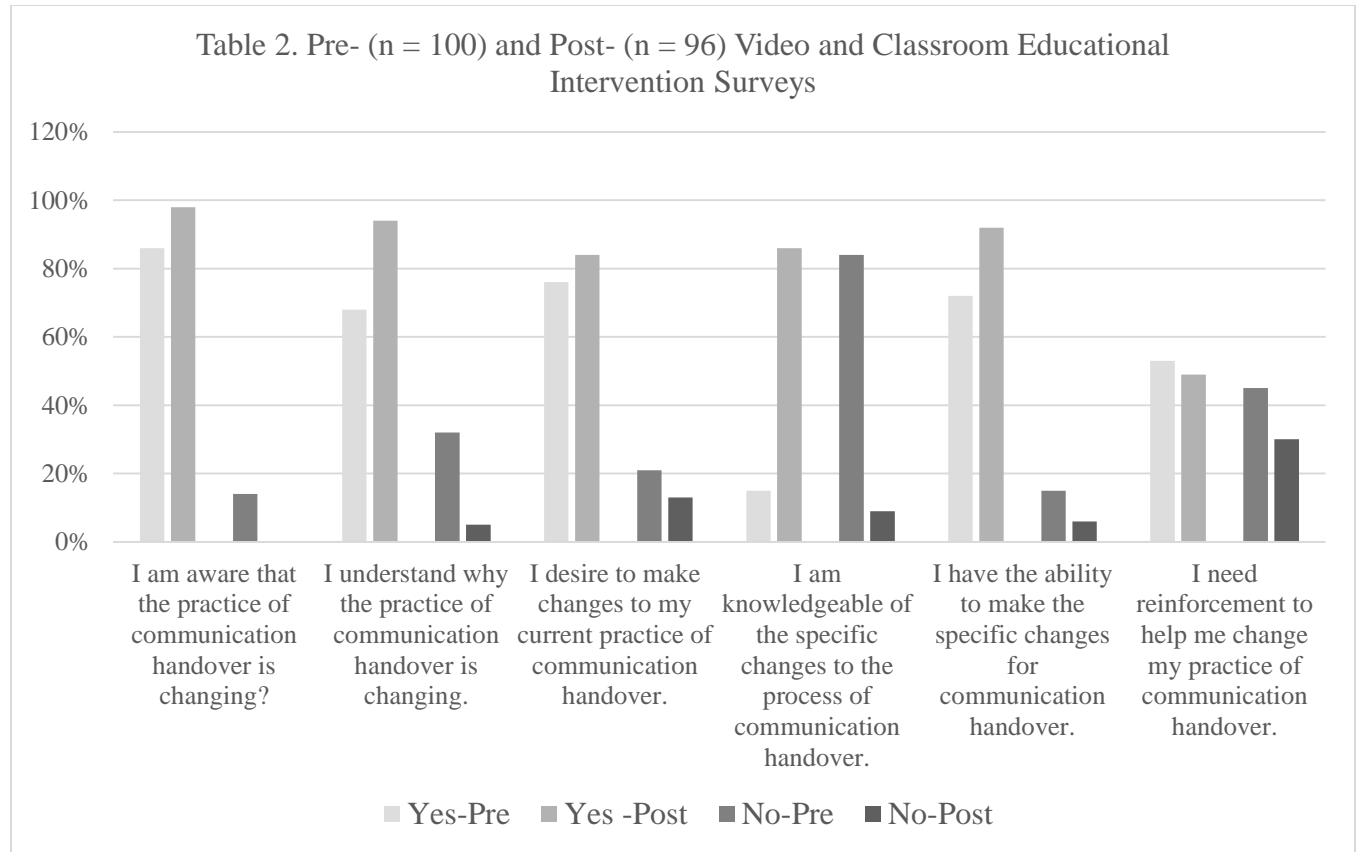
Interestingly, not all the specifics of the changes in communication handover were given to or even known by the credentialed trainers. Leadership did not want to be too prescriptive in the process changes yet provide some guidance and possible examples of what report might look like. The EHR vendor and content expert team did not have a visual example of report, only a written guide describing the use of the PER screen.

Several factors of handover were not specifically dictated by leadership or spelled out in the policy. One factor was whether nurses would sign into the system when arriving for their shift before or after getting report. If signing in before report, either the oncoming or off-going RN could open the PER tool for the handover, otherwise the off-going RN would have to open the EHR to use the PER tool for each patient report. A second factor was the use of the paper form entitled "bedside report." There was no direction to nurses as to what should or should not

be written on the forms or whether the form even needed to be used. Finally, no specific

consequences were discussed for not using the PER tool for communication handover.

The pre-surveys contained a place for additional comments. Some comments reflected a

lack of knowledge and awareness. One nurse wrote, "I need to know specifics of why and in

what ways report is changing." A nurse with over 10 years nursing experience commented, "I

appreciate standardized report, saves time and decreases confusion!" This comment reflects

some knowledge on the need to change and perhaps some desire. There were also some

comments related to safety. One nurse wrote, "shift change handovers are always a dangerous

time of day for patient safety. The shorter and more informative it can be made; the safer units

will be." This comment reflects knowledge of the need for change and some desire. One nurse

asked, "will the new report be better/safer than current practice?" This may reflect some lack of

knowledge yet desire to improve the process. The RHS could consider evaluation of safety

outcomes during future implementations.

When surveying staff during in-seat training, some of the credentialed trainers covered

introductory material prior to showing the video demonstration, while others showed the video

first. Some trainers reported technological issues which prevented them from showing the video

during their session. In some sessions, participants asked no clarifying or additional questions

about the PER or process of communication handover. In some sessions, participants had

questions about whether the paper report form would still be used. Most questions related to

function of the EHR and what information would be seen in the PER since the training

environment was not complete (i.e. not all areas of the form were populated with information,

nor did trainers know exactly what information would be visible in some areas).

The surveyed educational sessions were part of two required 8-hour long days of training with day and evening shift options for which nurses could register for. Even though the portion on PER was within the first couple hours, anticipating long training days sitting at computer desks may have impacted participants' ability to concentrate, their desire to practice when given the opportunity, and their ability to retain content. Training started approximately 3 months prior to the go-live, which may have impacted retention of knowledge and motivation. Each credentialed trainer brought his or her own teaching style, and though the same curriculum was given to all trainers, some spent less time on given topics, chose to skip some slides, and were not told exactly what PER would look like for the previously discussed reasons. The training environment also did not always function as the live environment and did not completely represent what the PER screen would contain on a real patient.

Post-intervention surveys contained items related to perceptions of helpfulness of the PER overview content and demonstration video. The majority indicated that the video was at least somewhat helpful (97%; n = 93). Most indicated the explanation and overview of PER content was at least somewhat helpful (98%; n = 94). Some, 16% (n = 15) of participants, indicated the video demonstration was very helpful while 20% (n = 19) found the explanation and overview very helpful. The results are displayed in Table 3.

Table 3. Participant Perceptions of Helpfulness of Video and PER Overview Content (n = 96)

- How helpful did you find the video demonstration
- How helpful did you find the explanation and overview of PER during your training?
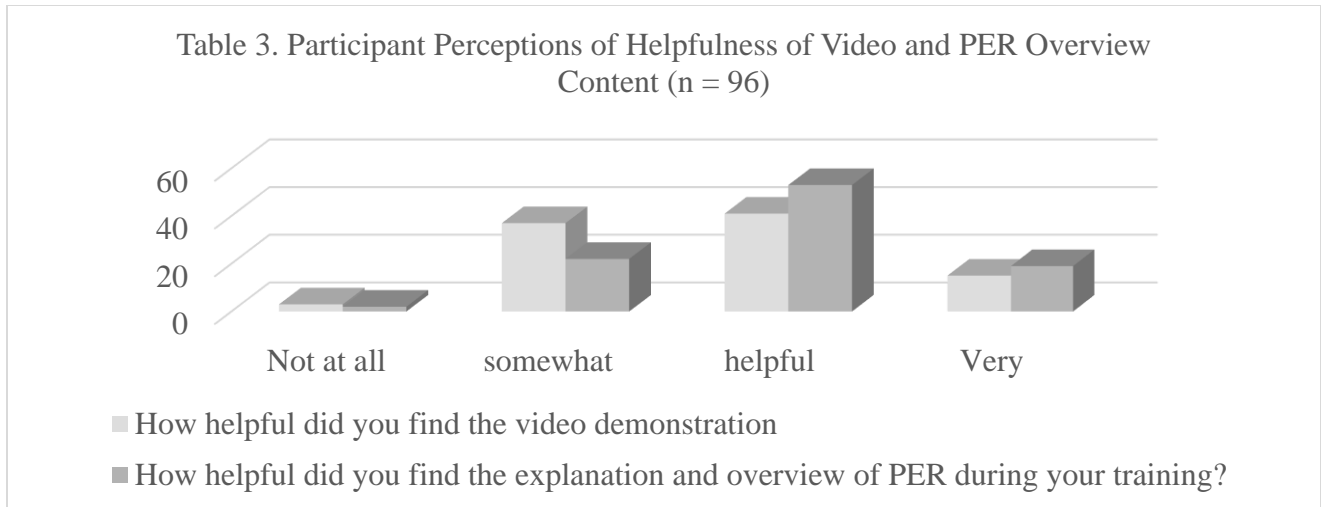
Post-education session surveys allowed respondents to provide comments. One less experienced nurse wrote "still confused," while another nurse with more than 10-years of experience commented, "interested to see how paper use will change with current report changes." Nurses questioned whether the PER tool would replace paper report sheets and functionality regarding sharing diagnostic tests and important events during the patient's stay. Some nurses were, "excited," thought the PER would facilitate communication of emergent orders and changes in real time, and thought "the real-life example video made learning more enjoyable." Other nurses remained skeptical and realistic; "I like having a sheet of paper to reference if the doctor calls and a computer is not available, or when an emergency occurs, and I don't have a computer;" and "ICU report is much more detailed than this summary can be, however, I am sure a hybrid will emerge that allows us to incorporate it into our reports." The comments reflect elements of the ADKAR model. (See appendix S for a thematic analysis of comments from pre-post intervention surveys.)

Pre-post nursing practice and perceptions survey results. Establishing nurse practice and perceptions of the communication handover process before going live with PER was important to establish a baseline for comparison. Unit staff meetings were attended by the DNP

HSL student where the purpose of the project was briefly described, what the student would be doing on the units conveyed, and surveys distributed and collected for feedback. Additionally, surveys were available on the unit for staff to voluntarily and anonymously complete. Most surveys were obtained at the staff meetings. Post go-live, surveys were distributed and collected around shift changes when the DNP HSL student was observing reports and rounding on units.

A total of 17 surveys were collected prior to the go-live of the PER tool and 17 were collected post-go-live, representing 35% of the total staff on both units. Most surveys were completed by staff on unit 1 (pre- 71%, n = 12; post 65%, n = 11), which was the more established unit and focused on care of the elderly. Nurses who completed surveys reported less than one-year of nursing experience (41%, n = 7) in both pre- and post-go-live groups. The next most experienced group responding indicated 1-3 years of nursing experience (pre- 24%, n = 4; post- 29%, n = 5). Tables 4 and 5 represent the characteristics of the survey groups.

Table 4. Unit of Practice

Table 5. Years Nursing Experience
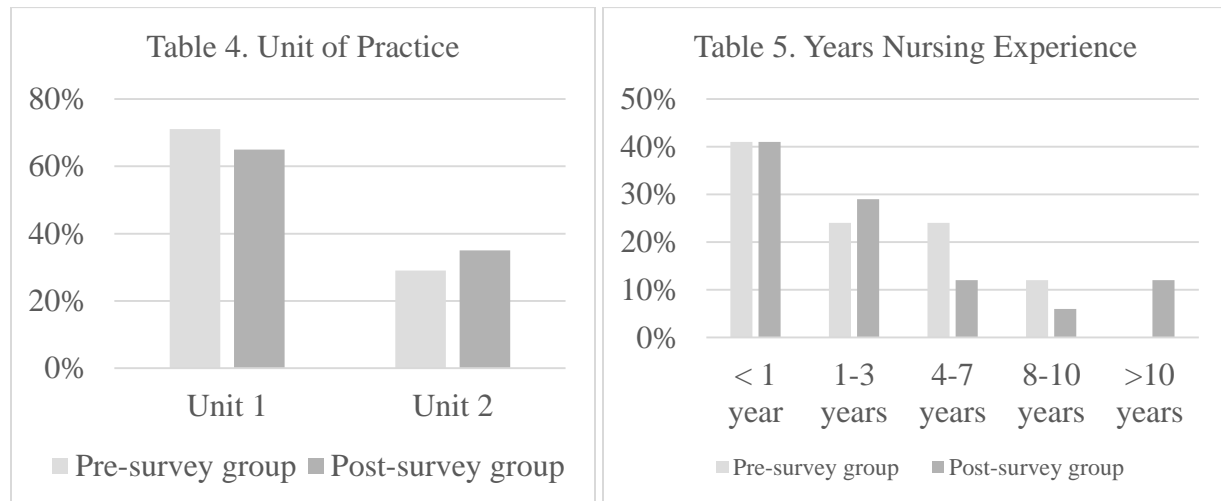
Most nurses (pre-76%, n = 13; post 59%, n = 10) indicated report occurred at the bedside frequently. Nurses reported the EHR was opened at least occasionally (71%, n = 12) pre-go-live and 100% (n = 17) of the time post-go-live. This indicates a 29% increase and at least incremental change in perception of practicing report at the bedside. The percent of nurses

reporting inviting the patient to participate in handover at least occasionally remained

unchanged. Tables 6, 7 and 8 represent pre- and post-responses to the location of handover, use

of the HER during handover and invitation of patient to participate in bedside report.

Table 6. I perform communication handover at the patient bedside

Table 7. I open and use the EHR during communication handover

Table 8. I invite the patient to participate in bedside report.
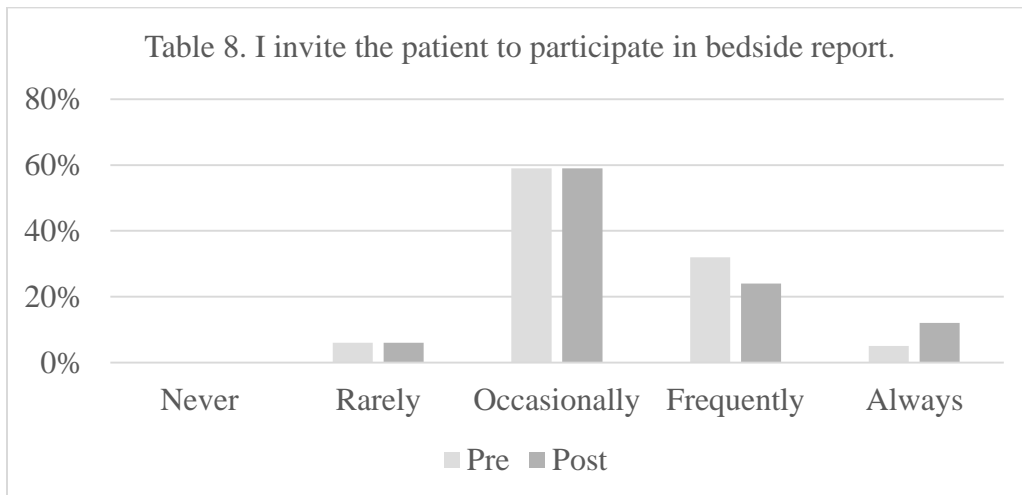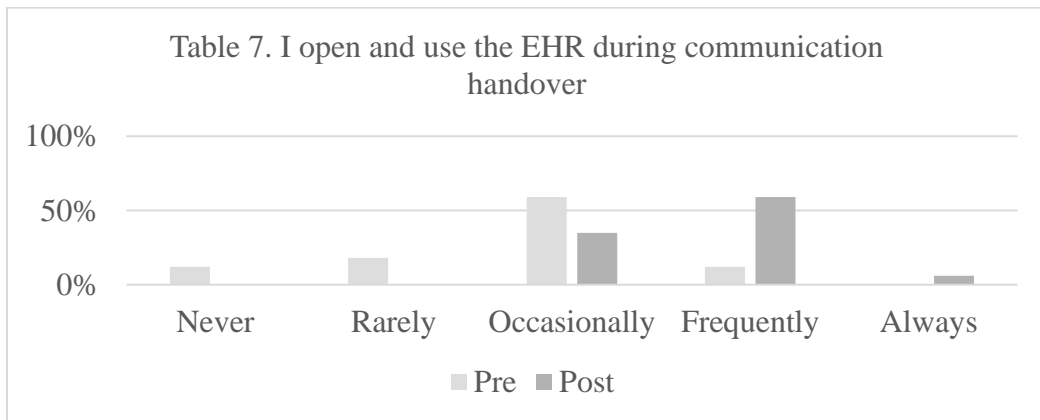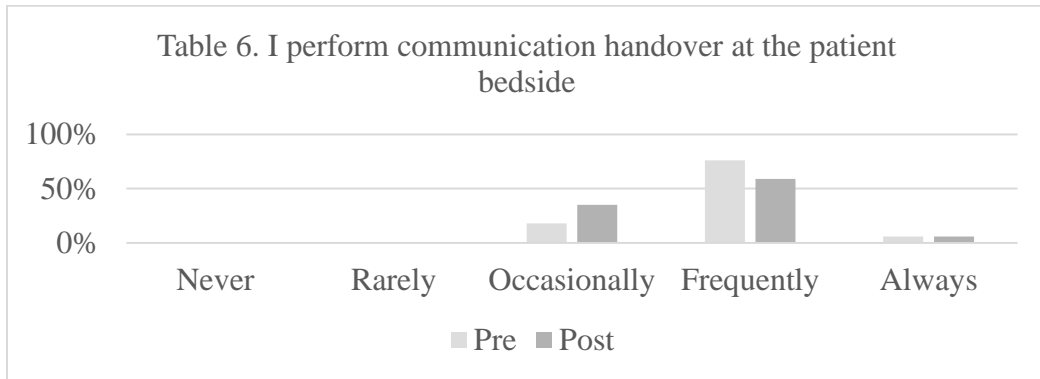
Most nurses perceived length of report frequently lasting 5 minutes or less per patient (47% pre, n = 8; 59% post, n = 10). Nurses indicated knowing the patient's story frequently after report (71% pre, n = 12; 88% post, n = 15), though most RNs indicated needing to go to other sources at least occasionally to get the full story (100% pre, 88% post). There was not a question asking nurses to disclose what specific other sources they went to for patient information. Nurses reported satisfaction with the way handover takes place on their units at least occasionally 94% of the time both pre- and post-PER implementation.

Nurses were given the opportunity to add comments on their surveys. There was only one comment on the pre-go-live surveys, though several nurses added comments or feedback to the post-go-live survey. A couple comments post-go-live focused on content of the PER being incomplete. One comment of note was that, "many people have been hesitant to change. They can't get away from the paper. I will be excited as a super user to help be an example of using the PER." The comment demonstrates awareness, desire, knowledge, ability and reinforcement of the individual in making the desired change. The comment also reflects the impact of culture and context of nurse practice. The decision to keep paper report forms was not an easy one and made from what was thought to be the best interest of the nurses and organization at that time. This may be worth reconsideration and further development of interventions to address the practice culture in future implementations. (For a complete list of comments by ADKAR thematic analysis from the pre- and post-PER implementation surveys see Appendix T.)

The self-reported practice of opening and using the EHR during report increased in those surveyed post-implementation of PER. There were no large shifts in self-reported location of handover at the bedside, self-reported perception of length of report, use of additional resources, or satisfaction with communication handover post-implementation. The pre- and post-survey

groups were the same size, though did not necessarily represent the same nurses, thus

perceptions, or practices of all nurses on these units may vary. Since the survey samples were

obtained by convenience and voluntary participation, this may be a source of bias.

Interview findings. Early interviews, approximately 6-8 months before go-live, were

conducted with key stakeholders to gain insight and feedback on the PER process, gain

perspective and feedback on the video demonstration and to discuss potential barriers or

facilitators to the process change. The lead CNS had concerns about what the communication

handover policy would dictate regarding minimum elements of data inclusion and how to

adequately address the environment of care for safety. She also understood and appreciated the

desire of nurses to keep their paper report sheets and supported considering a name change to the

report sheet and further future modifications.

Educators of in-patient nursing units were supportive of changes to communication

handover which would improve patient engagement, patient and staff satisfaction, accuracy and

safety. It was not clear specifically whether the PER would truly impact any of these desired

changes. A cross-walk of paper report forms and the PER tool revealed many similarities in

content and structure. The PER offered additional interactive and more up to date features than

paper though the educators expressed concerns about whether nurses would really know the

patient's story, for example if any significant events had occurred during the hospitalization or

what led up to the admission. There was not clarity from the nursing informatics team or EHR

partners what exactly would show on the PER screen or what could be added in future upgrades.

Nursing directors and managers were optimistic about the "pitch" on PER from the EHR

vendor partners and content expert team. The tool was promoted as interprofessional,

comprehensive in content, less duplicative, able to include personalization about the patient and

able to relay the patient's story. It was thought the tool might decrease the amount of writing on

paper nurses were doing, decrease the amount of time spent in report, and provide more timely

and accurate information. With these potential benefits, or wins, support was conveyed by

nursing leadership during informal conversations and communications with the DNP HSL

student and observed in unit level and leadership level meetings.

      Semi-structured interviews were conducted with nurses on the two units. Prior to the

implementation of the PER, some staff nurses were excited and agreed that practice could be

improved. Nurses reported it was not always reasonable to give bedside report when patients

were sound asleep, could not actively participate due to cognitive impairment, or refused. Nurses

also admitted that they often did not take time to open the EHR since the information they

needed was written on their worksheets.

      Post-implementation of PER, nurses on the two units reported that they continued to rely

on their worksheets. The nurses stated that the PER had some useful information but did not

exactly match their usual order of information given during report. The nurses identified that the

PER screen did not give the background or events leading up to admission. Nurses also felt other

information such as time of last pain medication, would be helpful to include on the PER screen.

Super users agreed the format did not match the paper worksheet closely enough; one super user

stated nurses would not come to rely on the PER until their paper worksheets were discontinued

or significantly changed.

      The PIP and lead nursing informatics representative were communicated with regularly.

Unstructured interviewing led to expressions of optimism about the process change in potential

benefits to staff and patients. These persons also had expectations that practice would not change

quickly or completely without further intervention and support. There was discussion of a pilot

on the units of interest for this project to trial a printed report from the new EHR that would

contain a minimum data set of patient demographics to replace the paper report sheet nurses

used. It would be up to the nurses to determine how to best use the paper tool. There was not

firm decision as to when or how this trial would proceed at the time of conclusion of this

program evaluation.

In an interview with the PIP just prior to go-live with the PER changes, the DNP HSL

student questioned whether a process had been established or clear expectations made known for

beginning the report process as nurses started their shifts. The PIP conveyed that the process may

have been intentionally left to each unit to determine what worked best based on individual unit

culture and input from unit-based shared leadership, end-users, and leadership. The PIP was not

aware of any disciplinary action plan or consequences for staff nurses not using the PER tool

during handovers. With the significant amount of change in the organization, it was agreed that a

punitive approach at this stage was not beneficial. Managers could enforce the policy of

communication handover/PER policy as they enforced other policies that were not followed or

upheld. This may be worth revisiting prior to future implementation within the RHS or after

sufficient time has passed for the process change to be more fully adopted.

Most interviews were informal and unstructured in nature. It was extremely difficult in

the weeks leading up to and the month after go-live of the new EHR to set meetings and

interviews with leadership or staff. Most leaders and staff nurses were expected to work full time

or more the weeks following go-live to provide as much support as possible to their teams.

Having more formalized interviews with structured questions may have produced richer

qualitative findings or additional insight to assist in evaluating the bundled interventions.

However, people may have felt freer to respond with an informal structure.

Pre-post observation findings. Communication handovers were observed pre- and post-go-live of PER. It was beneficial to confirm if what nurses stated on their practice surveys reflected what they were doing in practice. Observations also provided baseline data to compare with post-go-live observations to determine if any changes occurred.

The DNP HSL selected five different dates by convenience pre- and three dates post-go-live to observe handovers with permission of the unit manager. Nurses were given the option of being observed, though none refused. Handovers were observed either during the morning shift, which began at 0700 or at night, beginning at 1900. Pre-go-live, a total of 31 communication handovers were observed, 16 at night, 15 in the morning, 16 from the unit specializing in care of the elderly, 15 on the adult medical surgical unit. Post-go-live, 30 communication handovers were observed, 15 each at night and in the morning, and 15 from each of the two units.

The majority (pre- 71%; post- 70%) of reports took place at the patient bedside, though less than half (pre- 42%; post- 40%) of patients participated in the process. Participation was defined by asking questions, offering information when not asked, or answering questions if asked. Participation included the patient or family member, if present. Report was less likely to take place at the bedside when patients were sleeping and had poor rest during the shift, when there was another health professional in the patient room completing an assessment or task, or when the patient had not yet arrived in the unit.

The EHR was opened during report only 19% of the time pre-implementation, and other resources were rarely to never used during report (pre- 3%; post- 0%). When the EHR was opened, it was to confirm a lab or diagnostic result or medication question. Other resources included any source of information other than what the RNs had written on their paper report sheets or the information provided from the nurse giving report. Occasionally patients or family

members would contribute clarifying information or answer questions regarding their history, recent events, or status.

Post-implementation, the EHR was opened 87% of the time during PER observations. This was a significant increase from pre-implementation; however, during observations it was noted that though the EHR was open to the PER screen, nurses giving the handover mostly referred to their paper report sheet versus reading from the PER screen. Some nurses did refer to the PER screen at various points during handovers. Nurses were more likely to confirm a lab or diagnostic result, or verify a medication time or change while the EHR was open. Table 9 represents observed practice of opening the EHR during report.

Table 9. EHR Opened During Report
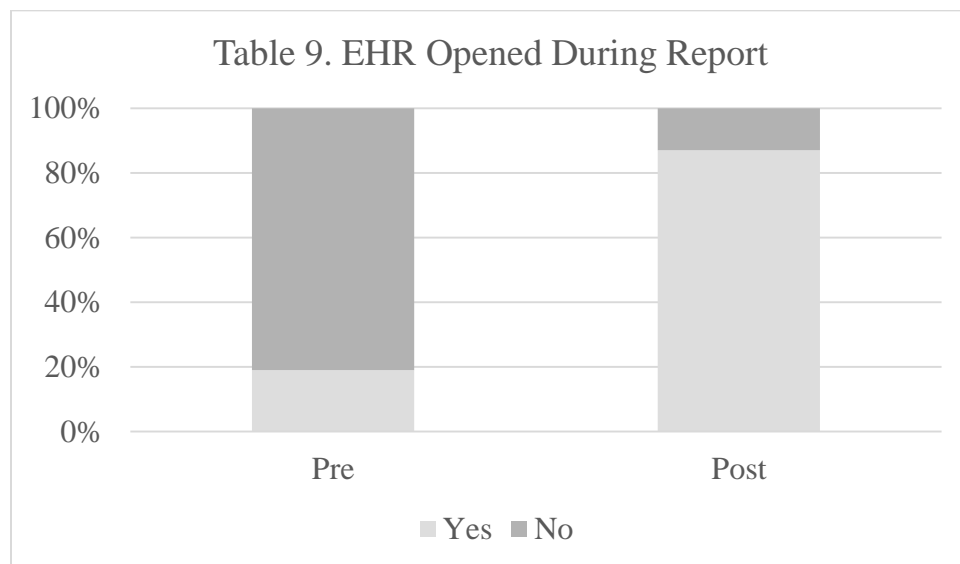
The environment of care was physically addressed just under half of the time (pre- 45%; post- 40%) during communication handovers. According to the communication handover policy, nurses should double check medication drips, complex wounds or drains, address any unusual assessment findings or safety concerns, and perform updates to the white boards in the patient room. The environment was more likely to be checked when report occurred at the bedside.

Nurses verbally reviewed safety concerns such as mobility and skin or wound issues, but did not always physically look at them together during report. Nurses were more likely to physically address the environment of care when something needed to be changed, such as when a patient should have been wearing oxygen, but it was off, or when an IV pump alarm went off. Nurses may have done some visual assessment without verbally communicating this to the observer such as IV placement, presence of devices such as SCDs, or whether bed alarms were on. Some nurses routinely updated their whiteboards first thing upon entering the room, others did not feel this was a priority and that it could be done after all handovers were completed.

The average length of report for all observations pre-PER was 4 minutes 42 seconds. Most reports (61%) lasted five minutes or less, which is the expected length of report according to the policy. Of interest, report lasted on average approximately one minute longer per patient when the night shift reported off to days then when day shift reported off to nights. Post-go-live of the PER tool, average length of report had decreased by 15 seconds or to 4 minutes, 27 seconds and 70% of observed reports lasted 5 minutes or less.

It is worthy to mention that the average length of report for night shift reporting off to days decreased by 43 seconds post-implementation of PER. There may not be a direct correlation as many factors impact length of report, but this would be an average of 2 minutes 18 seconds saved per nurse giving handover on six patients. Though only a couple minutes for one nurse, if this carried over to hundreds of nurses working night shift across the system, potential financial savings could be substantial for reducing overtime cost. Nurse satisfaction with length of report and getting out of work on time may also improve. Further study is recommended to investigate these potential outcomes.

Reports had a range from 53 seconds to 11 minutes and 50 seconds in length. These values represented outliers since the shortest report was an Emergency Department admission that had not arrived on the unit yet. Several factors contributed to the longest report including location away from the bedside, complex and long admission duration with multiple complications, repetition of questions by oncoming nurse, lack of familiarity with the patient by oncoming nurse, and inclusion of many normal findings and a list of negative diagnostic tests by the nurse giving report.

From the observed reports, length was impacted by familiarity with the patient, whether the report was, what the nurses referred to as a, "give back," how complex the patient's admission course was, and how many questions were asked by the oncoming nurse. The "give back" refers to the oncoming nurse having recently cared for the patient. Typically, it meant the oncoming RN was the one who gave report to the off-going nurse at the last shift change. Post-go-live handovers were observed two-weeks after the implementation of PER and the new EHR. Nurses were still learning to navigate the new EHR and how to best incorporate PER into practice.

During observations, many nurses continue to report frequency of vital signs, even when ordered according to the unit standard. Additionally, nurses reported normal physical assessments such as clear lung sounds or that the patient was on room air versus focusing on abnormal findings. Nurses also often read off the entire list of providers, allergies and medical history when this information is visible on the PER; nurses would also often write all of this on their paper forms. When there was a nurse on orientation, sometimes the RN would take time during report to discuss the plan for the day or have a "teaching moment." There may be an opportunity to reduce length of report and amount of time nurses spend writing information with

some additional education, reinforcement of the content and function of the PER, and perhaps

appropriate content to share or tasks to complete during report time.

Though not the focus of this project, how nurses positioned themselves in the room for

report may also impact patient engagement. When nurses faced the patient or periodically asked

for clarification or validation from patients or family members, patients were likely to engage in

the process. When nurses had their backs to patients, the engagement was less often observed.

With functionality of the new EHR system, the first log in can take several minutes.

During observations, report seemed to be more efficient when the off-going RN signed into the

system and opened the patient's EHR to the PER screen. Handover also seemed to flow best

when the off-going RN greeted the patient, introduced the oncoming RN, and explained the

purpose of their visit. Sometimes the off-going RN would also encourage the patient or family to

participate in the process. The on-coming RN would update the whiteboard during this

introduction or prior to leaving the room and asked if the patient needed anything at that moment

before leaving the room, letting the patient know he or she would return. Sometimes, additional

sensitive information would be shared outside the room such as, significant family concerns,

difficulties experienced with refusal of care, or complex safety needs.

The DNP HSL student was not specifically evaluating content on the PER screen but

several observations are worth noting to inform the RHS. First, when able to look at the PER

screen during report, it was noted that the sections on "individualization" and "mutuality" were

often blank. These sections of the PER provide an opportunity to communicate unique

information about the patient and mutually agreed upon goals. Second, the PER contains sections

on clinical practice guidelines and progress towards goals and completion of education. None of

these topics were covered in the reports observed post-implementation of PER. Third, the PER

does not appear to contain a section which relays the precipitating events or background story of how the patient ended up in the hospital. The RN would have to go another area of the EHR to find this information. These may some areas to address if there are opportunities to optimize the EHR in the future and to consider further with upcoming implementations.

Some possible limitations of the observation audits include the following. It may have been helpful to note years of nurse experience of the oncoming and off-going RNs. This was not done to save time and avoid inconvenience to the RNs voluntarily participating. It may have also been helpful to specifically note how many deviations away from the PER screen occurred during report. Some of the areas on the PER link to other parts of the patient's EHR. It was not always possible to see the computer screen depending on how the nurses and observer were positioned. Following the same nurses pre- and post-implementation may have been more valuable. This would have required further consent and coordination of schedules of the observer with the RNs potentially delaying completion of the project. Follow up observations would also be recommended at future intervals to assess further changes and whether the practice change was sustainable.

Finally, there were a few other interesting observations made during handovers. One patient specifically stated that it was nice for her to hear the report since she was "out of it" when being admitted and did not really know what was going on with her or what the plan was. Several times, patients or families corrected some information being shared. Whether report was given at the bedside or at another location, nurses were sometimes interrupted with phone calls, alarms, or other health professionals in the area during report. These are all potentially contributing factors to satisfaction with the process, patient safety, and length of report.

Even small differences can make an impact on satisfaction or safety in quality improvement terms. Incremental changes were most likely to be achieved over significant ones given the post-observations and surveys were completed so soon after the implementation of the new EHR. Post-implementation measures of patient satisfaction with communication with nurses had to be omitted in the evaluation given the timeframe of the project completion requirements and timing of data reporting. From HCAHPS data received from the nurse manager of the units, there is opportunity to improve on "explaining things in a way patients can understand and listening carefully." It would have been difficult to make a direct correlation between the use of PER and these outcome measures but would have been interesting to see if the scores changed significantly.

Steps for Implementation of Project Timeline

The steps for the implementation of this project are listed in Appendix U. Either the semester of completion or end date of completion of each item is included. As mentioned in the previous section, Appendix Q also contains evaluation steps and anticipated dates of completion for data collection. The responses to most questions could be assigned a numerical value to make the data ordinal while some responses were categorical and analyzed as percentages.

Project Evaluation Plan

The project evaluation plan is presented in Appendix Q. Evidence of the success of the project was dependent on collection of evidence through interviews, surveys, observation audits and cooperation from the RHS. The success was also dependent on the student's ability to critically appraise evidence and the actions of the RHS in the implementation of PER.

Ethics and Human Subjects Protection

This quality improvement program evaluation project involves participation of human subjects. Application to the GVSU Human Research Review Committee (HRRC) and RHS Institutional Review Board (IRB) was made to determine whether the project fell under human subject research. The letters of determination of non-research letters from the respective boards can be found in Appendix V. Any survey or observation data collected by the student was kept anonymous, contained within the RHS, and stored or disposed of according to RHS policies upon completion of the project. All data are presented as aggregated information. No patient data were collected, though patient information was overheard when observing the report process. The DNP student did not share any identifiable patient information in any format. The project did not begin until approval and determination were made from both institutions.

Budget

There was no designated budget for this project, though the RHS preceptor was supportive of costs associated with paper copies of surveys and minor expenses related to the project. The DNP student was not paid for her time or involvement in any aspect of the project. There were no grants, sponsors or outside funding supporting this project.

Financial costs of the interventions included the hours contributed by the team filming and editing the video and time invested by the actors. Hours contributed by the RHS and student in developing communications and educational content were also incurred. These costs may be in lost time devoted to other projects or work or opportunity costs. The cost of training staff was absorbed into existing planned computer training time or structures, such as staff meetings or department communications. Resources included the use of a simulation room and equipment

such as a patient bed, IV pump, computer station, head wall and the video recording and editing equipment. Paper and printing materials were also necessary for surveys and observations.

If the intervention were not effectively planned, well- executed and evaluated, costs could have escalated or may increase as the organization continues to take the process to additional regional sites. Additional filming, excessive editing, and waste associated with failure to effect change in the handover process could be significant. Benefits may also be realized by the organization, since the video can be used in ongoing training and orientation. If the interventions are effective, staff will be more likely to follow the expected process, communication handovers may improve, and staff may be more satisfied with the use of the EHR as the source of communication handover content.

Stakeholder Support/Sustainability

The interventions were supported by the RHS PIP, who is responsible for implementation of the new model of care. This mentor was actively invested in the outcomes of this intervention (see letter of support in Appendix W). This mentor assisted in identifying key stakeholders and facilitating work relevant to the process of professional exchange report. In addition, the team of individuals who provided support for the filming and production of the video was actively engaged in the design and process of creation of the video. The unit manager, charge nurses on the two in-patient units, and shared leadership representatives were also actively engaged and vested in the outcomes of the interventions and project.

The Doctor of Nursing Practice (DNP) student working with the PIP applied knowledge and skills of her health systems leadership education to assist and facilitate the development, implementation and evaluation of the intervention bundle. The student created the script, survey tools, monitoring and audit tools, applied quality improvement methods, directed video

production, and assisted in communications and overall evaluation. The student modified

interventions and timelines as appropriate to meet organizational and academic needs and

expectations. The student has completed a program evaluation of the PER intervention bundle

implementation.

Implications for Practice

There are several valuable implications for practice from conducting this program

evaluation. The use of multiple educational interventions was effective in addressing the

awareness and knowledge of the proposed change in practice. Additional interventions may have

been useful in impacting desire and ability to change. These interventions might have been

targeted at nursing culture and workflow around communication handover. Specifically, the

paper report form might have been adapted to look more like the PER screen, removed

completely or renamed as a nursing worksheet rather than report sheet, or additional time might

have been spent reinforcing the communication handover policy. Further reinforcement of the

practice changes will be needed for sustainability of PER and possibly some adaptations to the

bundled educational interventions to reinforce practice changes. Finally, the RHS did not have a

clear evaluation plan for implementing PER as to how it would monitor or enforce the process.

Additional recommendations are based on the work and observations of the DNP HSL

student. The RHS may consider whether patient safety is impacted by the process change of

PER. Evaluation of reported communication errors, perceptions of staff related to safety or some

studies in the review of literature considered safety events reported during handover times.

Additionally, how might the environment of care be better physically addressed during

handovers? Given the large portion of nurses representing less than 3 years of practice in the

intervention surveys and perception surveys, could this group be leveraged in some way for

future implementation? This may require some further analysis to determine acceptance and use

by this group. The RHS could additionally look at socialization of tasks related to

communication handover. What information must be shared, what information can be safely

excluded, how might the patient story and plan of care be better communicated, what is the

process for enculturating new nurses to the process? Finally, how does the positioning of nurses

during report and approach of inviting the patient or family to participate impact the PER?

The bundled educational interventions were successfully implemented. The process went

live after the educational sessions. Whether the practice change will continue to increase and be

sustained is yet to be determined. There was not a clear plan for evaluation of the PER tool

implementation. There was no overall decrease in length of report though the reduction in the

average length of report from the night shift reporting to days was noteworthy from the observed

reports. There was no change in the nurse perception of the report process. The was no change

in the location of report but there was a 68% increase in the opening of the EHR during

communication handover post-implementation. Measures of patient satisfaction with nurse

communication were not able to be determined post-implementation.

The results of the program evaluation can be shared within the RHS and disseminated

outside the system so that others may benefit from learning. Practice can be informed and

improved through evaluation. Capacity for self-appraisal and planning for future

implementations can be increased and enhanced. Finally, program evaluation can contribute to

knowledge in the health care field.

Reflections on DNP Essentials (AACN, 2006) and AONE Competencies (2015)

Essential I: Scientific Underpinnings for Practice

In this project, it was especially useful to integrate nursing science through review of nursing literature and conceptual framework used by nursing and organizational science. The ADKAR model for change management and the Organizational Intelligence Model for the organizational assessment also emphasized scientific underpinnings. Using a change management model already in use within the system improved the student's relatability to and buy-in with leadership, and contributed to the evidence base using these frameworks and models.

AONE nurse executive competencies directly related to this essential are communication and relationship building, as well as knowledge of the health care environment. The DNP HSL student learned about the ADKAR model from spending time in the organization and attending a leadership training on this model while making connections with leadership team members. By building relationships and communicating with various nursing and informatics team members, the student gained insight on the importance of the paper standard report form, how the electronic record might enhance the report process, and what data might be missing in the transition. Having knowledge of the environment through organizational assessment, networking with key stakeholders, and observations on the selected units and during in-seat sessions significantly aided in the program evaluation and allowed for student contribution to the work of implementing the new report process.

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

The increasing emphasis on patient partnership in care and specifically in contributing to the communication handover process led to the development and choice of the electronic tool

and need to evaluate the implementation of the new process. Again, knowledge of the healthcare environment as a nurse executive is crucial in considering ethical, legal and staff/patient centered process changes. Gathering data from adult in-patient nurses during in-seat sessions and two units at one site can inform like areas throughout the system. Through evaluation of this implementation at one community hospital, there was an opportunity to make recommendations for adjustments in the continued rollout at regional sites in the future.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

This essential needed some additional work as far as appraising literature on evaluation. The literature review focused on several aspects of electronic tools for communication handover, though originally did not focus specifically on evaluation. The addition of literature supporting evaluation methods and evidence based interventions strengthened the DNP student's ability to critically evaluate the implementation of professional exchange report and to use data and evidence to inform future decision making. Knowledge of the healthcare environment, communication and relationship building, and business skills were all AONE competencies applied to collect, evaluate, and analyze data and supporting evidence.

Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care

Since this project related to technology for communication handover, evaluating whether the electronic tool functioned as intended and how it was used by nurses will provide valuable learning for the organization. Using professionalism and business skills, such as collaboration and evaluation of interventions, and data management of survey and observation results, were helpful in evaluating the bundled education and use of the PER tool. Knowledge of the healthcare environment provided insight when interpreting and analyzing data and evidence. The

vendor and its support services may also benefit from the data and the organization's experience. Since this project only provided early impact and recommendations for adaptation, it will be of interest to evaluate the use of the technology at regular future intervals.

Essential V: Health Care Policy for Advocacy in Health Care

The decision to move to a new EHR may have been impacted by federal legislation including MACRA and Patient Protection and Affordable Care Act of 2010 (ACA). Internal organizational policy within the RHS was most influential in planning for and implementing changes to communication handover by the RHS. Understanding by the student that the changes in policy needed to represent nurse practice interests, patient safety and satisfaction, and meet mandatory requirements was essential to evaluating the interventions and process change. The DNP HSL student used communication and relationship building, knowledge of the healthcare environment, and professionalism from the AONE Nurse Executive competencies to meet with key stakeholders for policy discussions and recommendations.

Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

The PER tool was designed to be interprofessional in nature. During planning and development of interventions, the DNP HSL student collaborated with other disciplines such as social work, physical and occupational therapy, respiratory therapy, informatics, and communications and marketing. Incorporating how other professions contribute to the PER was important in designing the video intervention. Communication and relationship building, knowledge of the healthcare environment, leadership, professionalism and some business skills were AONE competencies demonstrated and further developed throughout this project.

Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health

This essential was not directly addressed during this program evaluation project. There was some indirect implication for prevention of harm to patients if the PER tool could be correlated with decreased communication errors or decreased adverse outcomes. The original objectives included consideration of patient satisfaction with nurse communication though this data could not be obtained in the timeframe of the project completion requirements. Further research or quality improvement efforts in the RHS could impact prevention of errors. All the AONE competencies would be crucial in those efforts.

Essential VIII: Advanced Nursing Practice

Advanced nursing practice involves comprehensive and systematic assessment of not just patient populations, but also the nursing practice culture. Assessing and understanding the practice and culture of nurses around the use of paper report forms was critical to this program evaluation. The design and implementation of interventions needed to be sensitive to and inclusive of nursing culture and practice in the RHS. Partnering with stakeholders such as the lead CNS and credentialed trainers to effectively plan, implement and evaluate educational interventions. All the AONE competencies were necessary in navigating this essential.

<div align="center">Plans for Dissemination of Outcomes</div>

Dissemination of outcomes will occur within the RHS to assist in the sustainability planning and roll out to each of the regional partner sites. This might include presenting portions of the findings at CSLC, the Nurse Executive Council and on the units where observations of handover took place. Sharing of results upon request may also be made during research events within the RHS or presented to groups upon request. A formal defense was presented to the

project committee, Grand Valley State University community and public guests upon completion

of all required elements. Planning and preliminary portions of the project were presented during

a research event sponsored by Kappa Epsilon at Large, a West Michigan chapter of Sigma Theta

Tau International Nursing Honors Society. An abstract for podium presentation has been

submitted to Sigma Theta Tau International for the 2018 International Research Congress to be

held in Melbourne, Australia. The final results will also be disseminated through publication in

Scholar Works and presented in poster format at the Kirkhof College of Nursing.

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Appendix A

Articles retrieved from GVSU databases:
MEDLINE, PUBMED, CINAHL, EBSCOhost, OVID,
and COCHRANE (N= 5668)

Did not meet inclusion
criteria (N = 5631)

Met inclusion criteria and reviewed (N = 37)

Not relevant to topic; reasons not
included were pediatric population,
setting was surgical, emergency or
non-adult inpatient, tool was not truly
electronic based, or full article unable
to be retrieved. (N = 22)

Relevant to topic (N = 15)

Retrieved secondary
source (N = 12)

Relevant to topic (N = 27)

Not relevant to topic; reasons not
included were pediatric population,
setting not inpatient or tool was not
truly electronic based (N = 7)

Final articles in review
(N = 20)

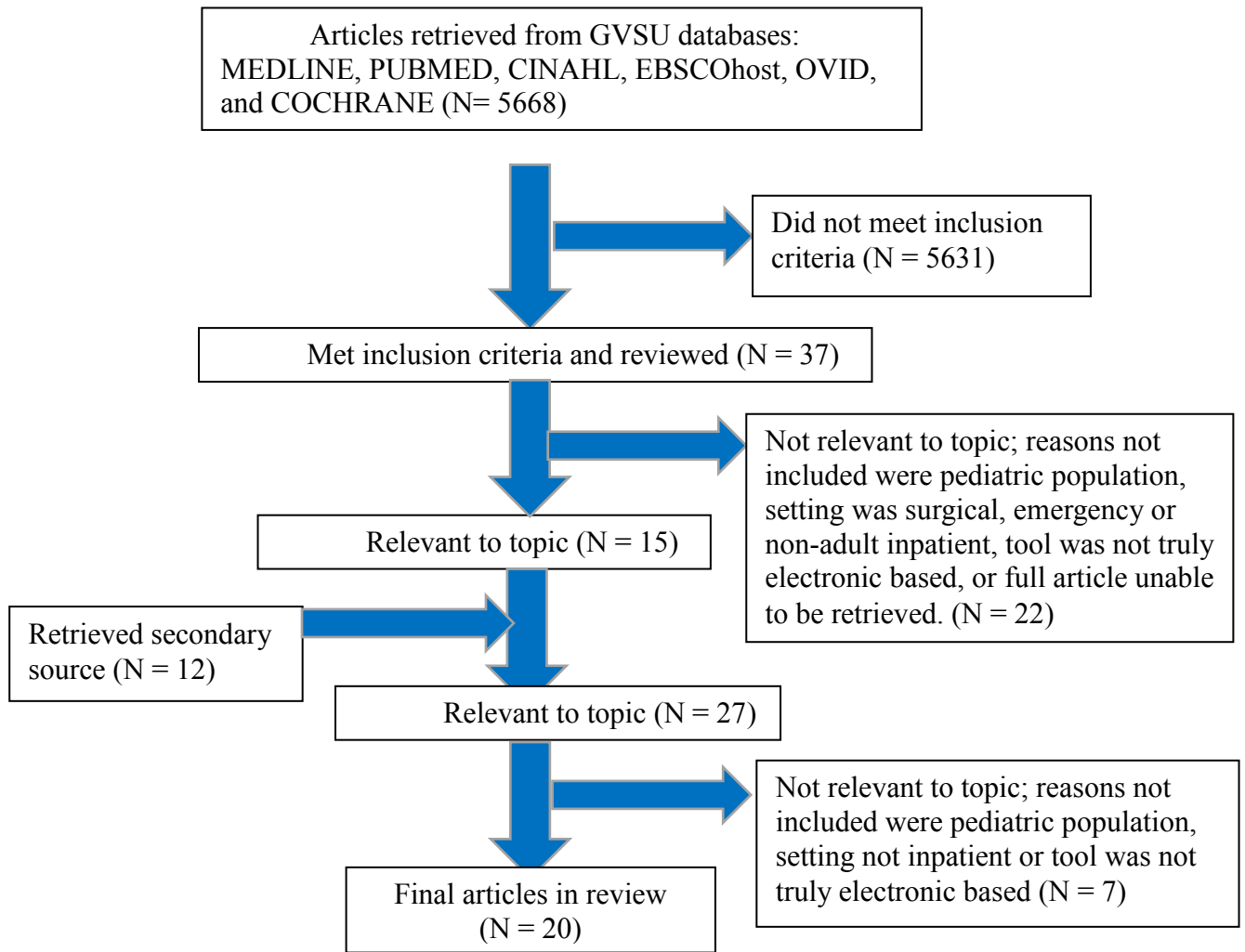*Figure 1.* Flowchart of Study Inclusion. Databases including MEDLINE, PUBMED, CINAHL,

EBSCOhost, OVID, and COCHRANE were searched using a systematic approach with

inclusion/exclusion criteria. Systematic reviews, randomized controlled trials, controlled clinical

trials, controlled before-after studies, quasi-experimental, cohort, qualitative or descriptive

studies regarding electronic-based handover were considered.

Appendix B

Table 1. Evidence Summary Table with Levels of Evidence (see Appendix C for explanation of leveling)

Question:	What evidence exists to support and inform the use, implementation, evaluation, or outcomes of electronic/computer based tools for nurse/health provider communication handover in hospital in-patient settings?								
Author, Year	Title	Theme	Population & Setting	Design or Theoretical Framework	Sample Size	Interventions, measures, statistical tests, measurement tools	Major findings	Limitations	Level
Abraham, Kannampallil & Patel (2014).	A systematic review of the literature on the evaluation of handoff tools: Implications for research and practice.	Evaluation of handoff tools and ability to achieve goals	Research articles published between 1 February 1983 and 15 June 2012. The key search terms used were: handoff(s), hand-off(s), handover(s), shift report(s), shift-report(s), signout(s), sign-out(s), and clinical round(s). Multiple discipline focus; multiple settings.	Systematic review of literature	36	**Intervention:** Review of literature **Measures:** Characteristics of handoff tools (type, users and nature of use) **Statistical Tests:** n/a **Measurement Tool:** n/a	Most studies included physician users of electronic handoff tools. Half of the studies were observational and just over two-thirds used survey-based data collection methods. The studies mostly measured user-satisfaction with or effectiveness of handoff tools. Standardization efforts related to care continuity or patient safety were reflected in 81% of the articles. The increased focus on	The limitations of current handoff evaluation studies include a widespread use of surveys or questionnaires which are often not validated for reliability, had a very small sample of respondents (n<20), relied on users' recall (e.g., 'how many patients did you miss), and included no	V

								electronic medical record integrated tools may be in response to federal mandates.	contextual information. Search only of English language. Contextual aspects of handoff may not have been fully considered.	
Alhamid et al. (2016).	Implementing electronic handover: Interventions to improve efficiency, safety and sustainability.	Implementation of electronic handover	Doctors and residents at Singapore General Hospital; medical patient focus	Quality improvement, PDSA, pre-post survey	4 resident rotations and 42 doctors	**Intervention:** QI group of key stakeholders, PDSA cycles, media and online software to improve compliance with electronic handovers **Measures:** percentage of unacknowledged handovers per day, change in provider knowledge of safety rules, perceptions of tool **Statistical Tests:** Wilcoxon signed ranked test with two-tailed values to analyze the survey data **Measurement**	Unacknowledged handovers decreased from nearly 7% to under 2% per day. Percentage of correct responses post-intervention for all safety rules increased significantly (P = 0.01). Percentage of doctors selecting 'strongly agree and agree' post-intervention, especially in improving patient safety (P = 0.05) increased. Collaboration with end-users, support from senior leadership, and combined 'bottom-up' and 'top-down' approaches with	There was no single quantifiable measure that could accurately reflect all aspects of improvement of the handover tool. Knowledge and perception of tools were not measured during each PDSA cycle. The surveys were voluntary with a 62% participation rate so may not accurately reflect all provider views. The study was not designed to assess the	VI

| | | | | | | **tools:** True or false type questionnaire pre/post and perceptions of tool | regular process evaluations are crucial for successful implementation and long-term sustainability. Pre-set timed text reminders and an online video tutorial with quiz mandated for new users improved compliance. Senior clinicians reiterated the importance of compliance to resistant or noncompliant doctors. No critical incidences or adverse patient events were reported throughout the study period. Participants expressed an overall positive perception of the electronic tool with regards to improving patient safety, work efficiency and accountability. | quality of the information exchanged during the handovers. This was a single site, quality improvement initiative in Singapore leading to limited generalizability. | |

Barnes, Campbell, Stockman & Wunderlink (2011).	From theory to practice of electronic handover.	Implementation of electronic handover	Medical, allied health and nursing staff members of multidisciplinary teams on a general medical unit in a metropolitan tertiary hospital setting	Pre- Post survey descriptive	38 pre-39 post	**Intervention:** Implementation of OpenKims computer application; rollout of the system required a 10-min demonstration for users and availability of a handbook. **Measures:** 9 items on usability, quality of information and efficiency for medical staff 5 items on quality of information and preference for nurses 3 items on usability and quality for allied health **Statistical tests:** No statistical analysis was reported. **Measurement tool:** Survey (not indicated how developed or whether validated)	Pre-intervention most staff from all professions were satisfied with the information in the current handover sheets. Post-intervention, all nurses preferred the typed admission notes. The medical staff were very satisfied with the program. Allied health also reported increased satisfaction. The survey revealed users perceived improvement in the information on the handover sheets and admission notes. Users reported no increased time requirement to complete the admission notes. Some hesitancy to use the application was expressed by senior clinicians.	Relatively small sample size, inability to currently review the effect on key performance indicators due to its early stage in implication. The article did not indicate how participants were identified or approached. The program was developed by a Neurologist working in the center and who coauthored the work. The study took place in Australia so unsure about translation to U.S.	VI

| Brebner, Sandhu, Addison & Kapadia (2011). | Implementing electronic patient handover in a district general hospital. | Implementation and outcomes of electronic handover | Medical staff in a large district general hospital in the U.K. | Descriptive comparative; use of change management method | 53 paper based/50 electronic | **Intervention:** Implementation of a structured electronic handover system; lunchtime educational and one to one sessions, removal of the paper method, communication and feedback mechanisms; use of National Institute for Health and Clinical Evidence (NICE) change management methods **Measures:** beliefs and attitudes towards handover **Statistical Tests:** fisher's exact test **Measurement Tools:** audits, pre-survey (did not indicate who developed or whether validated) | E-handover significantly improved the amount of information given. Time of handover, patient DOB, physician information all p = <0.0001; aims and limitations of treatment p = 0.0001. Addressing provider reluctance to change through pre-surveys and dialogue, pointing out inadequacies of paper system, and education and communication with feedback were significant methods to effect change. Additional benefits included: reduced breeches of confidentiality (no paper lists left lying around), information moved with the patient, increased accountability, and avoidance of illegible handwriting. | Single site, small sample, location of U.K. and subject's medical providers all limited generalizability of findings. The timing of the data collection and timing of implementation and education may have impacted handover regardless of the method. | VI |

Chapman, Schweickert, Swango-Wilson, Aboul-Enein & Heyman (2016).	Nurse satisfaction with information technology enhanced bedside handoff.	Outcomes of electronic tool usage	Nurses ranging in age from 20-69, representing 4 race designations, majority female, Bachelor's prepared with 5-14 years' experience as RN and at the study site on 2 med-surg units	A descriptive comparative survey study design	46	**Intervention:** Customized Cerner® nursing communication IT tool, SBAR format **Measures**: nurses' satisfaction with communication of care, levels of comfort using an IT tool, satisfaction with communication received, and overall satisfaction with the tool. **Statistical tests** nonparametric one sample chi-square test to examine nurse characteristics with measures **Measurement tool:** 10 item survey created by author (6 demographic items, 4 Likert ratings of measures	Each variable test was statistically significant with a two-tailed asymptotic significance of 0.000 ($p = 0.05$). Nurse satisfaction scores were high. Nurses with 5-14 years of experience had the lowest satisfaction. The strongest relationship was demonstrated by derived phi coefficient tabulations between race and comfort of using the IT tool (0.991), years as an RN and satisfaction with communication (0.929), education level and comfort of using the IT too (0.915), and years working at the organization and satisfaction with communication (0.912). Nurses' expertise and organizational culture may influence satisfaction with IT tools.	Comments from participants included describing difficulties with computer access, concerns with comfort of using the IT tool, and time limitations were described as a barrier. The sample was non-randomized, small, and a convenience sample. Further evaluation of the validity of the survey instrument is needed. VI

Davis, Riesenberg, Mardis, Donnelly, Benningfield, Youngstrom, & Vetter (2014).	Evaluating outcomes of electronic tools supporting physician shift-to-shift handoffs: A systematic review.	Outcomes for use of electronic tools; Implementation considerations	Literature between January 1, 2008, and September 19, 2014 of studies focused on the evaluation of physician shift-to-shift handoffs and an electronic solution designed to support handoffs; International focus, primarily medical provider focused	Systematic review of literature	37	**Intervention:** Review of literature **Measures:** barriers and strategies for implementing tools, self-reported, process and outcome measures **Statistical Tests:** n/a **Measurement Tool:** n/a	Outcomes included increased or improved content, high provider satisfaction, and improved perception of patient safety and/or quality. Most studies found reductions in time allocated to handoffs. Over half of the studies addressed barriers and strategies to implementation; persistence of inaccurate data was found to be the most frequently reported barrier; collaboration with key stakeholders throughout the process with continuous feedback was the most commonly cited strategy. Optimize data pulled from the EHR, include key stakeholders in design and feedback, provide adequate training, and include free-text options with frequent updates for optimal acceptance.	Only one randomized crossover design study found and 4 used nonrandomized control groups. It is difficult to correlate information transfer with improved patient outcomes. There was potential for error or misrepresentation in data since it was not always clear how much data came directly from the EHR versus input by users.	II
Flemming & Hübner (2013).	How to improve change of shift handovers and collaborative grounding and what role does the electronic	Use and evaluation of electronic tools	Literature on handovers in general and in combination with the terms "electronic record systems" and "grounding"	Systematic review of literature	60	**Intervention:** Review of literature **Measures:** The authors sought to identify what errors and consequences occurred related to handovers, whether errors could be	Communication failures were the most frequent type of error reported with severe negative patient outcomes. Neither verbal only handovers nor written handovers without face-to-face communication were regarded desirable. The	There are more studies in this review addressing physician than nurse handovers about communication failures and their	II

	patient record system play? Results of a systematic literature review.		that covered January 2000 to May 2012. Multiple disciplines focus; international sources; primarily hospital based focus.			overcome by conventional tools or electronic systems, and whether any instruments supported collaborative grounding. **Statistical Tests:** n/a **Measurement Tool:** n/a	quantity of crucial information increased, and quality of information improved with implementation of electronic systems. Most electronically supported handovers used a dedicated application, and a few used the EHR to support handover. Most tools imported data from the EHR while some were stand-alone solutions. Electronic patient record systems provide structured, up-to-date patient details, are designed for documenting the facts, but lack additional important pieces of information and act rather one-dimensionally.	consequences and the use of electronic tools.	
Hunt & Staggers (2011).	An analysis and recommendations for multidisciplinary computerized handoff applications in hospitals.	Outcomes of computerized clinical handoff tools/applications	Literature searched from 1950 to June 28, 2011. The key terms "electronic" and "computerized" served as base terms and they were combined with "handoff","	Systematic review of literature	19	**Intervention:** Review of literature **Measures:** compare application characteristics, review clinical and business advantages and disadvantages of implementing computerized clinical handoff applications, give	Access occurs via internet in freestanding systems, or via computer terminal or mobile devices. Most applications are "integrated" with the EHR, some require manual data entry to varying degrees. Technology can decrease time in preparing for handoffs, reduce risks for clinical errors and help	The literature reviewed did not refer to any high-level evidence such as randomized control trials. The review informs general practice and guidance in developing and potential outcomes	V

			"handoff", "change of shift", "to-do-list", "sign off", "sign out", "handover", "nurse to nurse handoff", "nurse to physician handoff" and "physician to physician handoff" terms. Nurse and physician focused.			recommendations for improvement **Statistical Tests:** n/a **Measurement Tool:** n/a	prioritize tasks. Problems arise when information is not kept up to date (e.g. clinicians develop workarounds). Applications may increase revenue long term by improved handoff communication, decreased adverse clinical events, decreased overtime, and decreased hospital length of stay. To increase acceptance, learning from past changes, enhance safety monitoring, include decision support tools, and create multidisciplinary focus. Benefits must outweigh costs.	of electronic tools for handover, but does not provide high level generalizable evidence for practice.	
Johnson, Sanchez & Zheng (2015).	The impact of an integrated nursing handover system on nurses' satisfaction and work practices.	Outcomes of implementing integrated handover tools & Implementation strategy	Nurses from four wards within a large metropolitan teaching hospital in Sydney Australia.	A mixed methods pre-post-evaluative design	40 pre-80 post	**Intervention:** Introduction of the Integrated Nursing Handover System (INHS). Education included a video demonstrating use of the new system and PowerPoint presentations to emphasize reasons for change. The ICCCO model (Identification of the patient, Clinical history/presentation, Clinical status, Care plan,	There was a significant difference between total scores of pre- and post-surveys ($p = 0.05$). Most significant differences in belief patient involved in handover process (adjusted $p = 0.0005$). Nurses understand patients' medication and care needs always (adjusted $p = 0.021$). Nurses' satisfaction with handover was improved. Major categories identified	This system is designed for use in medical surgical units, and other approaches would be required for critical care, mental health and other areas. No long-term evaluation was proposed, and these initial results may not be	VI

					Outcomes/goals of care) and the minimum data set (MDS) key data items required e.g., vital signs) were included. **Measures:** Nurses' satisfaction and changes to clinical practice **Measurement tool:** Modified Bradley Clinical Handover Survey. Focus groups with clinicians, mangers, and educators The location of handover was observed.	through content analysis included: implementation and the transition, work practice changes and bedside handover, accessible and standardized patient information, accountability for information transfer and a central repository of patient information.	sustained, however, at the two years mark the system is still functioning well. No control group was used nor was the patient perspective evaluated. Since the report was printed there were also some issues with proper destruction/disposal of them.	
Johnson et al. (2016).	Reducing patient clinical management errors using structured content and electronic nursing handover.	Outcomes of electronic bedside handover	Inpatient medical-surgical nurses in a metropolitan hospital in Sydney, Australia.	A pre/posttest evaluative design	97 Pre/ 112 post han dov ers	**Intervention:** implementation of the ICCCO mnemonic for structured nurse handover and development of a MDS within the EHR for handover; education sessions **Measures:** handover content with reliability testing, patient incidents, length of report **Statistical Tests:** Wilcoxon rank sum tests to compare report content **Measurement Tool:** verbatim transcripts of	There was a statistically significant increase in the number of words and phrases relating to 4 out of 5 of the ICCCO domains; patient identification, clinical history/presentation, clinical status, and care plan ($p < 0.001$). (outcomes discussion did not increase $p = 0.9$). No difference was found in the recorded length of handover ($p = 0.56$). The were no significant changes in fall rates or shift in medication error rates. There was a	There is limited generalizability since the study took place at one Australian hospital. The study relied on self- reported data which may not reflect accurate numbers. The initial positive findings could be lost over longer periods of time without ongoing review and education. The	VI

| | | | | | | handovers, self-report, digital timing, p- and u-control charts to evaluate changes to incidents | significant decrease in the nursing clinical management error rate after implementation. Communication and documentation errors dropped to 0 for 8 or more consecutive months post-implementation. | article did not specify the content or methods of educational delivery at the sessions. | |
| Li, Ali, Tang, Ghali & Stelfox (2013). | Review of computerized physician handoff tools for improving the quality of patient care. | Outcomes of computerized handoff tools (CHT) | A search of systematic reviews, and clinical trials, from January 1960 to December 2011; physician handoff focused. | Systematic review of literature | 6 | **Intervention:** review of literature for the use of CHTs for physician handoff for hospitalized patients. **Measures**: study characteristics, characteristics of CHTs, study outcomes and recommendations for CHTs **Statistical Tests**: n/a **Measurement Tool:** n/a | Two studies showed that using CHTs reduced adverse events and missing patients; Three demonstrated improved overall quality of handoff; One suggested CHTs could enhance efficiency and continuity of care during physician handoff. Conflicting impacts on consistency of handoff were found in 2 studies. Evidence is limited that CHTs improve physician handoff and quality of care. | Since this review was studying physician CHTs, generalizability to other disciplines is not certain. One RCT was found. There was no clear evidence that patient outcomes improved. | II |

| Nelson & Massey (2010) | Implementing an electronic change-of-shift report using transforming care at the bedside processes and methods. | Outcomes of implementing electronic handover tool | Nurses on 32-bed GI surgical oncology unit | Plan-Do-Study-Act Model Quality Improvement Methods, descriptive, surveys | Not indicated in article | **Intervention:** Clinical nurse-led development, testing, and implementation of an electronic template based from Excel and process for change-of shift report **Measures:** time spent in change of shift report, amount of end of shift overtime, staff perceptions of information quality in report, and staff satisfaction with process change **Statistical Tests:** none reported **Measurement Tools:** 5-item pre- and post-survey with Likert scale (developed by organization); PDSA observation and feedback | Perceived usefulness and efficiency of the process, quality and flow of information increased. Length of report time decreased by about 39 minutes resulting in less overtime and cost savings. Engaging leaders to reinforce expectations and peer accountability were effective strategies to gain acceptance as well as an RN core team to lead the process. | The process took 2 months and 7 cycles of testing. The template was accidentally lost periodically, testing cycles were not always smooth, and there was resistance by some staff in early cycles. No formal sample size was reported. The tool was not part of the EHR. The tool was printed and given to oncoming RN for review prior to a face to-face bedside communication. Generalizability is limited since one site. | VI |

Oroviogoicoec hea, Beortegui & Asin (2013)	Implementing a computerized tool for shift handover report writing.	Outcomes of implementing computerized tool for shift handover report	Inpatient medical surgical nurses at a teaching hospital in Spain.	Questionnaire, descriptive comparative study	82	**Intervention:** Implementation of a computerized tool for shift report **Measures:** perceptions of functionality, content, quality of report, impact on practice **Statistical Tests:** Reliability was calculated by Cronbach's [alpha] coefficients. A comparative analysis of possible differences in perceptions among different hospitalization units was performed. Mann-Whitney U test and Kruskal-Wallis nonparametric tests were used in analysis. **Measurement Tools:** 20-item closed questions, two open-ended questions. The	Reliability indexes were high: usefulness of tool (0.80), content (0.70), impact on practice (0.86). Significant differences between global perception of impact on practice between units ($x^2 = 6.704$; $p = 0.035$). Significant differences were observed in quality of information ($x^2 = 7.832$; $p = 0.20$) and quality of shift report ($x^2 = 7.044$; $p = 0.030$). The overall perception of the tool was positive, though surgical units were more positive. The tool conveys the most significant information about the patient, enhances the quality of information, and of shift handover. A high percentage of nurses cited incorrect use of the tool.	This study has addressed nurses' perceptions of the tool but not its actual use at the shift handover. This tool is not solely computer-based or paper free. The sample was for convenience and only included one institution in Spain.	VI

						closed answers included dichotomic variables (yes or no) and quantifiable variables according to a Likert scale			
Raptis, Fernandes, Chua & Boulos (2009).	Electronic software significantly improves quality of handover in a London teaching hospital	Outcomes of electronic handover	Hospital at night (HaN) teams comprised of nurses, medical and surgical staff handovers at an acute tertiary hospital in London	Observational comparison, prospective	773 paper based and 872 electronic based	**Intervention:** An EHR integrated tool was implemented **Measures:** Content of handover, distribution of patients, management required at handover; compare quality of handover from day to night staff during a period of paper-based and electronic handover **Statistical Tests:** Chi square to compare study periods **Measurement Tools:** Observation by a study author	There was a significantly greater number of complete information fields (patient details and location, diagnosis and problem, plan of action, and team details) with electronic handover than with paper-based in all areas. Descriptive data suggested that the patient workload was greatest for the medical team and least for the primary emergency response team nurses. Simple tasks related to minor procedures and administration made up about two-thirds of the night workload.	There was little resistance to change among junior doctors. Formal training in the software was routinely provided post-induction. The format of electronic handover may have motivated or influenced both day and night teams to maximize information transfer. Paper based handover required everyone to annotate their sheets leading to incomplete data. This was a single site convenience study with no randomization	VI

							limiting generalizability.	

| Schuster et al. (2014) | Electronic handoff instruments: A truly multidisciplinary tool? | Outcomes of electronic communication tools | Nurses, unit secretaries, physical and occupational therapists, discharge planners, and social workers at a large urban tertiary teaching institution. | Convenience sample, qualitative, descriptive survey | 231 | **Intervention:** A computerized physician sign-out note (CSON) was embedded into the EHR (Sunrise Acute Care, Allscripts Healthcare Solutions). **Measures:** how and how much the CSON was used by non-physicians; perceptions of data quality of the CSON **Statistical Tests:** descriptive statistics for frequency of use, usefulness for tasks, and accuracy of the CSON; chi square, p < 0.05 considered significant **Measurement Tool:** A paper survey instrument developed by the authors, 10 items including demographics, type of profession, and | The tool was used by over half of respondents during their shifts. A larger percentage of nurses used the CSON for handover than other professions ($p = 0.010$). Nurses found the tool significantly more useful than other providers for obtaining medical history ($p = 0.011$), current medications ($p = 0.006$), and allergies ($p = 0.004$). Nearly one third of nurses also found it useful, very useful, or essential for completing daily tasks. Most nurses found the tool accurate compared to non-nurses ($p = 0.001$). Nurses with 5 or less years of experience considered the CSON accurate compared to those with > 5 years of experience ($p = 0.002$). | The survey instrument was not validated. Single institution, convenience sample. For some respondents, the denominator to which the survey was distributed was not known and could not determine response rate; few responses from staff outside nurses and care coordinators. Only day shift nurses from selected units were included. Surveys were distributed by supervisors, introducing potential bias. Single site limits generalizability. | VI |

						primary medical specialty area. The instrument assessed the degree to which non-physician providers incorporated CSON into their daily practice, and examined which work functions were facilitated by the CSON. Most items used a 5-poin Likert-type scale.			
Staggers, Clark, Blaz & Kapsandoy (2011)	Why patient summaries in electronic health records do not provide the cognitive support necessary for nurses' handoffs on medical and surgical units: Insights from interviews and observations.	Use and evaluation of Electronic tools generated from EHRs	Nurses with at least 6 months experience in two institutions in the western USA: an academic medical institution and an oncology specialty hospital.	A qualitative, interpretive descriptive study	26 RNs/93 handover reports	**Intervention:** Installation of computerized patient summary reports **Measures:** use of new summary report and use of the EHR during handoff, environmental factors **Statistical Tests:** none reported **Measurement tools:** observation, audio taping field notes, nurses giving report were also interviewed immediately after completing handoffs	Summary reports were printed from the EHR or a personalized paper form was made (their "brain"). Pertinent information was added manually throughout their shifts. Nurses felt the summary report was incomplete (i.e., lack of patient history, orders not complete, printed form different from computer screen, not customizable or organized the way nurses work). Nurses liked portability and accessibility of paper. Nurses with more	This study involved two institutions sharing one vendor-supported electronic health record. Sampling methods were purposive rather than randomized and only included two hospitals limiting generalizability.	VI

						using semi-structured questions	experience used the summary less.	
Staggers, Clark, Blaz & Kapsandoy (2012)	Nurses' information management and use of electronic tools during acute care handoffs.	Use and evaluation of Electronic tools generated from EHRs	Nurses on 5 medical/surgical units with at least 6 months of experience in 2 western hospitals with a robust EHR.	Qualitative, interpretive descriptive study	26 RNs/93 handovers	**Intervention:** Implementation of electronic handoff forms, leadership encouragement to use new forms **Measures:** length of handoffs, use of electronic tool, content of handoff **Statistical Tests:** none reported **Measurement Tools:** audiotaping handoffs, semi-structured interviews, observations, and field notes.	Contextual information, the plan of care, and current patient status were expected content for handoff. All nurses relied on a paper form they referred to as their "brains" to give verbal handoff vs. the summary report in the EHR. The available EHR was used only to double-check information during handoffs, never to guide the form or content of the handoff report. Most of the nurses in the study (65%) used a personalized, hand-made paper form. Of the 35% of nurses who used the computer-generated Nursing Summary Report, all wrote additional information onto the form.	The sampling process was purposive rather than randomized or using multiple sites. The study included only units with synchronous, verbal handoffs; therefore, the results may not generalize to other report methods or locations.	VI
Van Eaton, Horvath, Lober, Rossini &	A randomized, controlled trial evaluating the impact of a computerized	Outcomes of computerized rounding and signout systems	Resident physician teams at a 450-bed tertiary care university	Prospective, randomized, multi-site controlled	161 residents /14 teams	**Intervention:** implementation of a computerized rounding and sign-out system (UW Cores)	The number of patients missed on rounds was significantly reduced ($p = 0.0001$). Residents spent more time with patients	The control group may have had artificially longer pre-rounding times due to recreating	II

Pellegrini (2005).	rounding and sign-out system on continuity of care and resident work hours.		hospital in Washington state and a 368-bed Level I adult and pediatric trauma center	crossover study		**Measures:** number of patients missed on AM rounds, time spent at the bedside before rounds, perceptions of system impact on continuity of care, descriptions of nature of resident work and timing **Statistical Tests:** Poisson regression models, Welch Two Sample *t*-test **Measurement Tools:** self-reports, email surveys with 5-point Likert scale, interviews	in pre-rounds ($p = 0.36$). Resident assessment of sign-out quality and continuity of care improved. Mean portion of pre-rounding time spent hand-copying information was significantly reduced (p = 0.0001). Team rounds were shortened by 1.5 minutes/patient (p = 0.0006). Most residents reported finishing their work sooner. Many residents secretly maintained lists in the UW Cores system at the time they were in the control group (which would mean the effects of computerization were even greater than reported).	manual patient lists. Times were estimated by residents. Scrutiny over information collection, management and transfer may have impacted resident practice. Randomization unit was of teams versus individuals leaving inability to control for exposure to the system. Generalizability may be limited. Survey tools may not have been validated and unclear how interviews were structured.	

Van Eaton, McDonough, Lober, Johnson, Pellegrini & Horvath	Safety of using a computerized rounding and sign-out system to reduce	Outcomes of computerized rounding and signout systems	Resident physician teams at a 450-bed tertiary care university hospital in	Prospective, randomized, multi-site controlled crossover study	14 teams 15,587 rounds	**Intervention:** implementation of a computerized rounding and sign-out system (UW Cores)	The computerized system does not increase the incidences of deviations from expected care (*p* =	It could not be determined whether ADEs were related to decisions made by study teams or	II

(2010). (Refers to same study as above looking at different outcomes)	resident duty hours.		Washington state and a 368-bed Level I adult and pediatric trauma center			**Measures:** number of reported deviations in expected care, medical errors, and ADEs **Statistical Tests:** *t*-tests, Wilcoxon rank sum test, power calculations and logistic regression **Measurement Tools:** Phone calls, chart review, review of quality assurance database of ADEs compared to study team lists of inpatients.	0.85), resident reported medical errors (*p* = 0.68), or ADEs (*p* = 0.70). There were no significant differences between the study group team findings.	cross-covering residents. Baseline probability of error was very low. Randomization was of the resident team, which included individuals who joined and left teams during the study. There was no control for resident experience. Team behavior may have been impacted by conditions.	
Vawdrey, Stein, Fred, Bostwick, & Stetson. (2013).	Implementation of a computerized patient handoff application.	Implementation of a handoff tool integrated with electronic health record	Resident physicians and other professionals at two large academic medical centers in an urban, medically underserved community	Descriptive implementation, audits of patient handoff application	Not indicated in article	**Intervention:** implementation of a customizable and printable "handoff" within the HER; no formal training; a short instruction guide, referred to locally as a "job aid" was made available.	The application was regularly viewed by nurses and ancillary staff. Anecdotal reports indicated that nurses viewed the patient handoff application as a reliable and timely source of information on patient status and plans for treatment or	This was not a structured, formal research study. Use of the tool was optional. The implementation took place at only two specific hospitals within a system so generalizability is limited.	VI

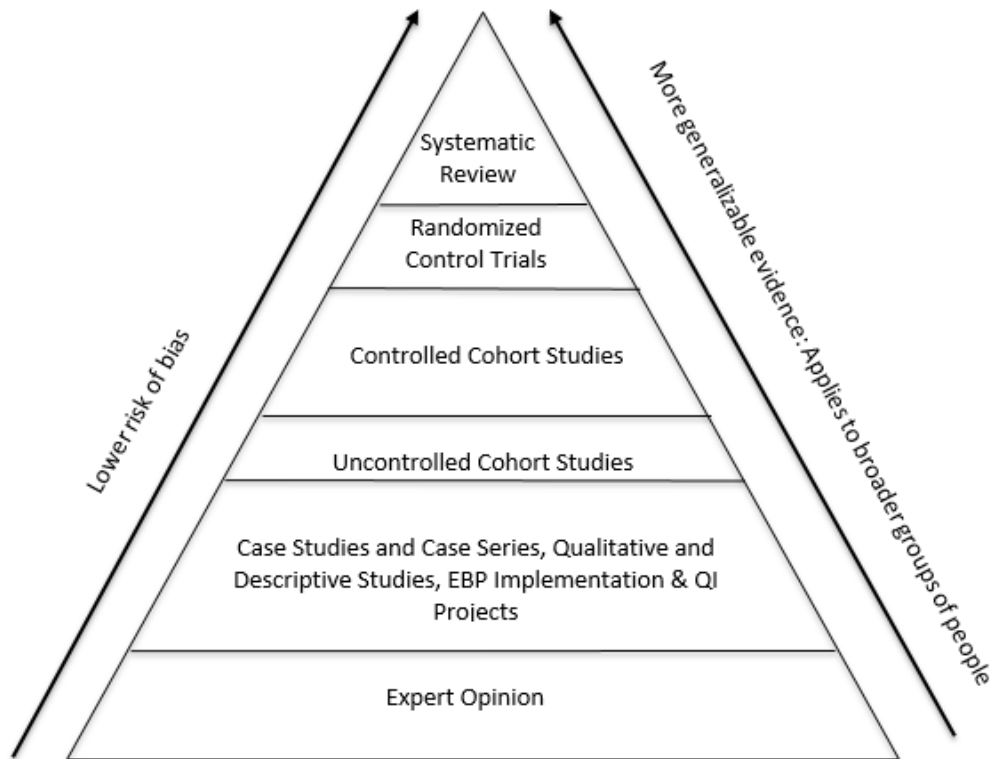| | | | | | | **Measures:** number of times application accessed, report created or printed; time of access, user ID, user role, patient ID **Statistical Tests:** n/a **Measurement Tools:** log generated by the application; observation | discharge. Clinicians have reported time saved because the printed report replaced tedious pre-rounding activities such as gathering and re-writing patient vital signs and laboratory test results. Direct retrieval of active medications from the order entry system was most appreciated. Face-to face discussion during handoffs of patient care can be supported by information technology. | | |

Appendix C

Figure 2. The hierarchy of evidence pyramid (Melnyk & Fineout-Overholt, 2015, p. 92). Used

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Appendix D

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Appendix E

Figure 1: Major Domains of the CFIR
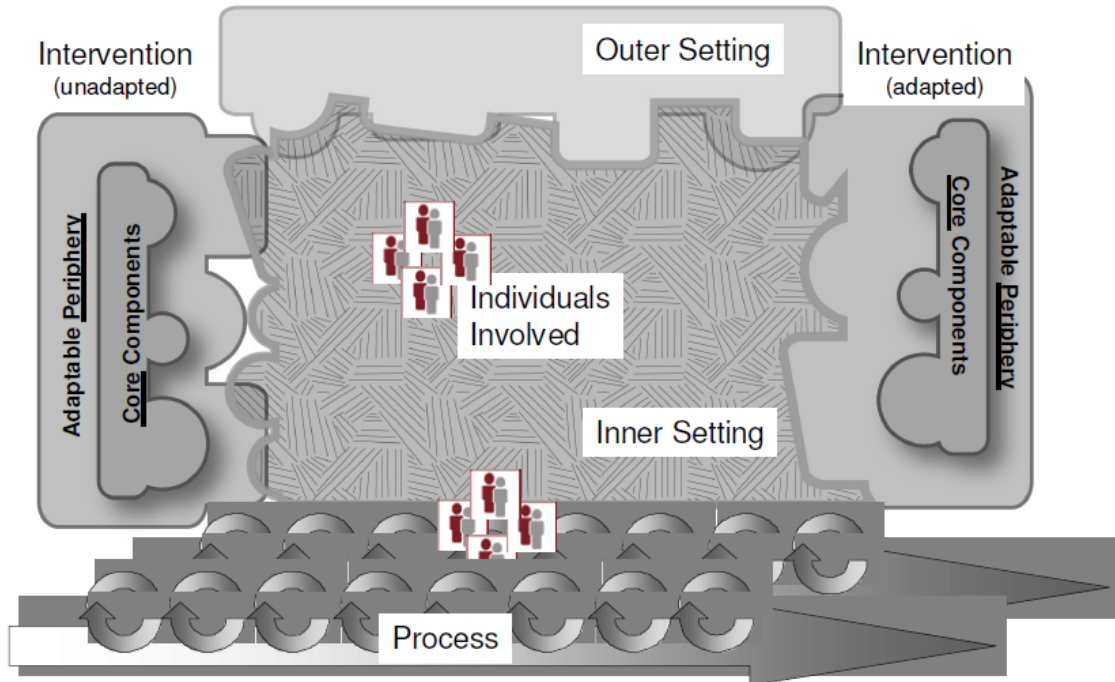
Figure 3: The major domains of the CFIR representing how domains interact in substantive and complex ways to influence the effectiveness of implementation efforts (Damschroder et al., 2009).

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Appendix F

Consolidated Framework for Implementation Research Construct Descriptions

		Topic/Description	Short Description
I. INTERVENTION CHARACTERISTICS			
	A	Intervention Source	Perception of key stakeholders about whether the intervention is externally or internally developed.
	B	Evidence Strength & Quality	Stakeholders' perceptions of the quality and validity of evidence supporting the belief that the intervention will have desired outcomes.
	C	Relative advantage	Stakeholders' perception of the advantage of implementing the intervention versus an alternative solution.
	D	Adaptability	The degree to which an intervention can be adapted, tailored, refined, or reinvented to meet local needs.
	E	Trialability	The ability to test the intervention on a small scale in the organization [8], and to be able to reverse course (undo implementation) if warranted.
	F	Complexity	Perceived difficulty of implementation, reflected by duration, scope, radicalness, disruptiveness, centrality, and intricacy and number of steps required to implement
	G	Design Quality and Packaging	Perceived excellence in how the intervention is bundled, presented, and assembled
	H	Cost	Costs of the intervention and costs associated with implementing that intervention including investment, supply, and opportunity costs.
II. OUTER SETTING			
	A	Patient Needs & Resources	The extent to which patient needs, as well as barriers and facilitators to meet those needs are accurately known and prioritized by the organization.
	B	Cosmopolitanism	The degree to which an organization is networked with other external organizations.
	C	Peer Pressure	Mimetic or competitive pressure to implement an intervention; typically because most or other key peer or competing organizations have already implemented or in a bid for a competitive edge.
	D	External Policy & Incentives	A broad construct that includes external strategies to spread interventions including policy and regulations (governmental or other central entity), external mandates, recommendations and guidelines, pay-for-performance, collaboratives, and public or benchmark reporting.
III. INNER SETTING			
	A	Structural Characteristics	The social architecture, age, maturity, and size of an organization.
	B	Networks & Communications	The nature and quality of webs of social networks and the nature and quality of formal and informal communications within an organization.
	C	Culture	Norms, values, and basic assumptions of a given organization.
	D	Implementation Climate	The absorptive capacity for change, shared receptivity of involved individuals to an intervention and the extent to which use of that intervention will be rewarded, supported, and expected within their organization.
	1	Tension for Change	The degree to which stakeholders perceive the current situation as intolerable or needing change.
	2	Compatibility	The degree of tangible fit between meaning and values attached to the intervention by involved individuals, how those align with individuals' own norms, values, and perceived risks and needs, and how the intervention fits with existing workflows and systems.
	3	Relative Priority	Individuals' shared perception of the importance of the implementation within the organization.
	4	Organizational Incentives & Rewards	Extrinsic incentives such as goal-sharing awards, performance reviews, promotions, and raises in salary and less tangible incentives such as increased stature or respect.

5	Goals and Feedback	The degree to which goals are clearly communicated, acted upon, and fed back to staff and alignment of that feedback with goals.
6	Learning Climate	A climate in which: a) leaders express their own fallibility and need for team members' assistance and input; b) team members feel that they are essential, valued, and knowledgeable partners in the change process; c) individuals feel psychologically safe to try new methods; and d) there is sufficient time and space for reflective thinking and evaluation.
E	Readiness for Implementation	Tangible and immediate indicators of organizational commitment to its decision to implement an intervention.
1	Leadership Engagement	Commitment, involvement, and accountability of leaders and managers with the implementation.
2	Available Resources	The level of resources dedicated for implementation and on-going operations including money, training, education, physical space, and time.
3	Access to knowledge and information	Ease of access to digestible information and knowledge about the intervention and how to incorporate it into work tasks.

IV. CHARACTERISTICS OF INDIVIDUALS		
A	Knowledge & Beliefs about the Intervention	Individuals' attitudes toward and value placed on the intervention as well as familiarity with facts, truths, and principles related to the intervention.
B	Self-efficacy	Individual belief in their own capabilities to execute courses of action to achieve implementation goals.
C	Individual Stage of Change	Characterization of the phase an individual is in, as he or she progresses toward skilled, enthusiastic, and sustained use of the intervention.
D	Individual Identification with Organization	A broad construct related to how individuals perceive the organization and their relationship and degree of commitment with that organization.
E	Other Personal Attributes	A broad construct to include other personal traits such as tolerance of ambiguity, intellectual ability, motivation, values, competence, capacity, and learning style.

V. PROCESS		
A	Planning	The degree to which a scheme or method of behavior and tasks for implementing an intervention are developed in advance and the quality of those schemes or methods.
B	Engaging	Attracting and involving appropriate individuals in the implementation and use of the intervention through a combined strategy of social marketing, education, role modeling, training, and other similar activities.
1	Opinion Leaders	Individuals in an organization who have formal or informal influence on the attitudes and beliefs of their colleagues with respect to implementing the intervention
2	Formally appointed internal implementation leaders	Individuals from within the organization who have been formally appointed with responsibility for implementing an intervention as coordinator, project manager, team leader, or other similar role.
3	Champions	"Individuals who dedicate themselves to supporting, marketing, and 'driving through' an [implementation]" [101](p. 182), overcoming indifference or resistance that the intervention may provoke in an organization.
4	External Change Agents	Individuals who are affiliated with an outside entity who formally influence or facilitate intervention decisions in a desirable direction.
C	Executing	Carrying out or accomplishing the implementation according to plan.
D	Reflecting & Evaluating	Quantitative and qualitative feedback about the progress and quality of implementation accompanied with regular personal and team debriefing about progress and experience.

Table 2: The CFIR constructs with short definitions (Damschroder et al., 2009). (Used with permission under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.)

Appendix G
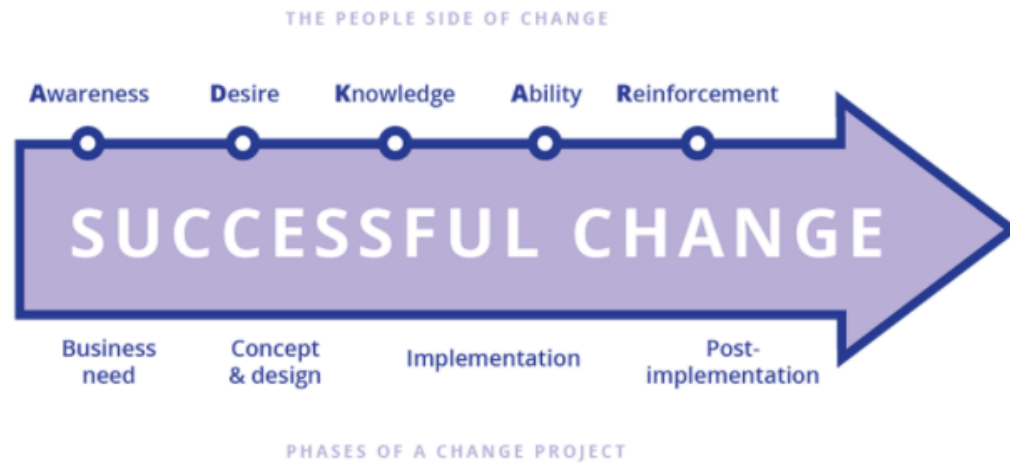
Figure 4: The ADKAR change model with phases of a change project. The model is goal-oriented towards individual and organizational change. Each concept must be addressed and managed through the stages of project planning and evaluation. (Prosci, 2017).

Appendix H

Falletta's Organizational Intelligence Model

Figure 5: The Organizational Intelligence Model™ (2017) is a framework for facilitating and interpreting organizational assessment. Multiple variables impact overall organizational performance outcomes and the model represents strategic drivers in the upper portion and indicators of organizational capacity which drive performance in the lower portion. (Used with permission, see Appendix I.)

Appendix I

Permission for use of Organizational Intelligence Model Via Email Communication

Hi Luanne,
Feel free to use the model.
The only request I have is to please send me your paper when you are finished.

I hope your research goes well.

Best Regards,

Milo Sindell
C. 415-595-5530 | Skyline Group

From: Luanne Shaw <shawlu@gvsu.edu>
Date: Thursday, May 4, 2017 at 8:44 AM
To: Milo Sindell <msindell@skylineg.com>
Subject: RE: OI INSTITUTE Contact Form

Hi Milo, thanks for your prompt reply!

I am interested in the Organizational Intelligence Model as portrayed on www.oi-institute.com/organizational-intelligence-model-skyline I believe created by your OI institute and your 2014 Organizational diagnostic models a review and synthesis.

Luanne M. Shaw, MSN, RN, CEN
Affiliate Faculty, KCON
CHS 448
301 Michigan St. NE
Grand Rapids, MI 49503
office: 331-5768
cell: 915-6700
shawlu@gvsu.edu
luanne_shaw@juno.com
luanne.shaw@spectrumhealth.org

Appendix J

Figure 6: Power Versus Interest Grid of stakeholders internal and external to the RHS to show

who will be most influential in achieving or preventing outcomes and rationale for inclusion

(Bryson, 2011).

Appendix K

SWOT Analysis

Strengths (internal-helpful to objectives)	Weaknesses (internal-harmful to objectives)
Handover toolkit Current policy Leadership support Video equipment DNP student Integrated training Evidenced based tools in new EHR	Inconsistent practice Competing projects Large scale changes Tight timeline Focus not all-inclusive Limited video experience of student Perception of not valuing toolkit
No similar video Collaboration with university partners May improve patient experience	Competing priorities May hinder patient experience Perceived privacy risk Other methods of intervention may be better
Opportunities (external-helpful to objectives)	Threats (external-harmful to objectives)

Figure 7: The SWOT analysis (Bryson, 2011) conveys capacity and feasibility of the RHS for

readiness for an educational intervention to address the lack of education around new processes

and expectations of communication handover/professional exchange report.

Appendix L

Evaluation Design

Figure 8: Project Design Diagram. Each box represents a stage in the process domain with the constructs of planning, engaging, executing and evaluating. The diagram represents a continuum for process evaluation.

Appendix M

Surveys-Communication Handover Pre-and Post-Implementation

(RHS log was inserted here.)
Professional Exchange Report Pre-Go-Live Survey
By completing this survey, you are contributing to knowledge of practices around communication handover. There is no obligation to complete the survey or compensation for participation. Your responses are anonymous, only aggregate data will be reported and there is no foreseeable harm to participation. Thank you for your responses! If you have any questions or concerns regarding this survey, please contact Luanne Shaw, (RHS contact email was inserted here.)

What is your current unit of practice?_____

How many years have you been a nurse?

       <1 year   1-3 years   4-7 years   8-10 years   >10 years

	1 Never	2 Rarely	3 Occasionally	4 Frequently	5 Always
I perform communication handover at the patient bedside.					
I open and use the Electronic Health Record during communication handover.					
I invite the patient to participate in bedside report					
Typically, my report per patient is 5 min. or less or 30 min. or less for ICU.					
At the end of report, I know my patient's story.					
After report, I need to go to other resources to get the patient's full story.					
I am satisfied with the way communication handover takes place on my unit.					

Additional comments:

LS 08/17

(RHS logo was inserted here.)
Professional Exchange Report Post-Go-Live Survey

By completing this survey, you are contributing to knowledge of practices around communication handover. There is no obligation to complete the survey or compensation for participation. Your responses are anonymous, only aggregate data will be reported and there is no foreseeable harm to participation. Thank you for your responses! If you have any questions or concerns regarding this survey, please contact Luanne Shaw, (RHS contact email was inserted here.)

1) What is your current unit of practice?_____

2) How many years have you been a nurse?

   <1 year   1-3 years   4-7 years   8-10 years   >10 years

	1 Never	2 Rarely	3 Occasionally	4 Frequently	5 Always
I perform Professional Exchange Report (PER) at the patient bedside.					
I open and use the Electronic Health Record during PER.					
I invite the patient to participate in PER.					
Typically, my report per patient is 5 min. or less or 30 min. or less for ICU.					
At the end of report, I know my patient's story.					
After report, I need to go to other resources to get the patient's full story.					
I am satisfied with the way PER takes place on my unit.					

Additional comments:

LS 08/17

Appendix N

Surveys on Professional Exchange Video Pre-and Post-Video Intervention

(RHS log was inserted here.)
Professional Exchange Report Pre-Video Survey

By completing this survey, you are contributing to knowledge of practices around communication handover. There is no obligation to complete the survey or compensation for participation. Your responses are anonymous, only aggregate data will be reported and there is no foreseeable harm to participation. Thank you for your responses! If you have any questions or concerns regarding this survey, please contact Luanne Shaw, (RHS contact email was inserted here.)

1) What is your current unit of practice?_____

2) How many years have you been a nurse?

                     <1 year   1-3 years   4-7 years   8-10 years   >10 years

3) I am aware that the practice of communication handover is changing with the new EHR.

    Yes   No

4) I understand why the practice of communication handover is changing.   Yes   No

5) I desire to make changes to my current practice of communication handover.   Yes   No

6) I am knowledgeable of the specific changes to the process of communication handover.

    Yes   No

7) I have the ability to make the specific changes for communication handover.   Yes   No

8) I need reinforcement to help me change my practice of communication handover.   Yes   No

9) Any additional comments?

LS 08/17

(RHS log was inserted here.)
Professional Exchange Report Post-Video Survey

By completing this survey, you are contributing to knowledge of practices around communication handover. There is no obligation to completing the survey or compensation for participation. Your responses are anonymous, only aggregate data will be reported and there is no foreseeable harm to participation. Thank you for your responses! If you have any questions or concerns regarding this survey, please contact Luanne Shaw, (RHS contact email was inserted here.)

1) What is your current unit of practice?_____
2) How many years have you been a nurse?
    <1 year   1-3 years   4-7 years   8-10 years   >10 years
3) I am aware that the practice of communication handover is changing with the new EHR.
    Yes   No
4) I understand why the practice of communication handover is changing.   Yes   No
5) I desire to make changes to my current practice of communication handover.   Yes   No
6) I am knowledgeable of the specific changes to the process of communication handover.
    Yes   No
7) I have the ability to make the specific changes for communication handover.   Yes   No
8) I need reinforcement to help me change my practice of communication handover.
    Yes   No
9) How helpful did you find the video demonstration?

    Not at all (1)   Somewhat (2)   Helpful (3)   Very (4)

10) Please share any additional comments, concerns, or questions you may have about professional exchange report:

Appendix O

Observation of Communication Handover Audit Tool

(RHS log was inserted here.)
Professional Exchange Report Audit Tool

Nurses will be asked permission to observe communication handover/PER. A nurse may refuse to be observed. The nurse will be informed that the observation is not to make judgement or critique of his or her performance but to collect general data about how handover is being conducted. The nurse will be asked to introduce the observer to the patient. The nurse or observer will explain that only the process of report is being observed and that no information about the patient is being collected or reported. The patient will be informed that he or she may refuse to be observed at any time throughout the process.

Date: _____   Time: _____

Unit Observed	Unit 1	Unit 2
Report at bedside	Yes	No
EHR opened during report	Yes	No
Other resources used during report (other than paper report sheet or EHR)?	Yes Describe:	No
Length of report (defined in minutes/seconds from time of starting of information sharing until conclusion of information sharing).		
Patient invited to participate?	Yes	No
Did patient participate?	Yes Describe:	No
Was environment of care physically addressed? (safety checks, white board, equipment, etc.)	Yes Describe:	No

Anecdotal field notes: (any unusual circumstances such as computer downtime, patient sedated or unresponsive, any deviations from the PER screen, such as subjective additions; these might include major deviations such as making judgmental comments about the patient's personality, appearance or hospitalization; or minor deviations such as how the nurse/patient "got along" through the shift.)

LS08/17

Appendix P

Cause and Effect Analysis

People

Family/patient refuse/request
- Poor sleep?
- Religious/cultural factors?
- Interpreter necessary?

Staff revert to paper only
- Resistant to change?
- Do not find value or helpfulness of PER?
- Peer influence?

Leadership
- Lack of buy in or support

Computer downtime
- Only paper available?
- Power outage/disaster?

Tool ineffective
- Fails to communicate patient story?
- Does not improve length of report?
- Does not integrate paper?

Plant/Technology

Policies

Communication Handover Policy
- Not updated to reflect PER content?
- Does not provide enough guidance to direct the process?
- Provides unreasonable expectations?

Patient Confidentiality
- Concern about violation of privacy?

Patient not on unit
- Transfer in progress?
- At procedure/test?

Patient suicidal/homicidal/prisoner
- Safety attendant; guard?

Educational delivery/content
- Evidence based?
- Accurate?
- Effective delivery method?

Procedures

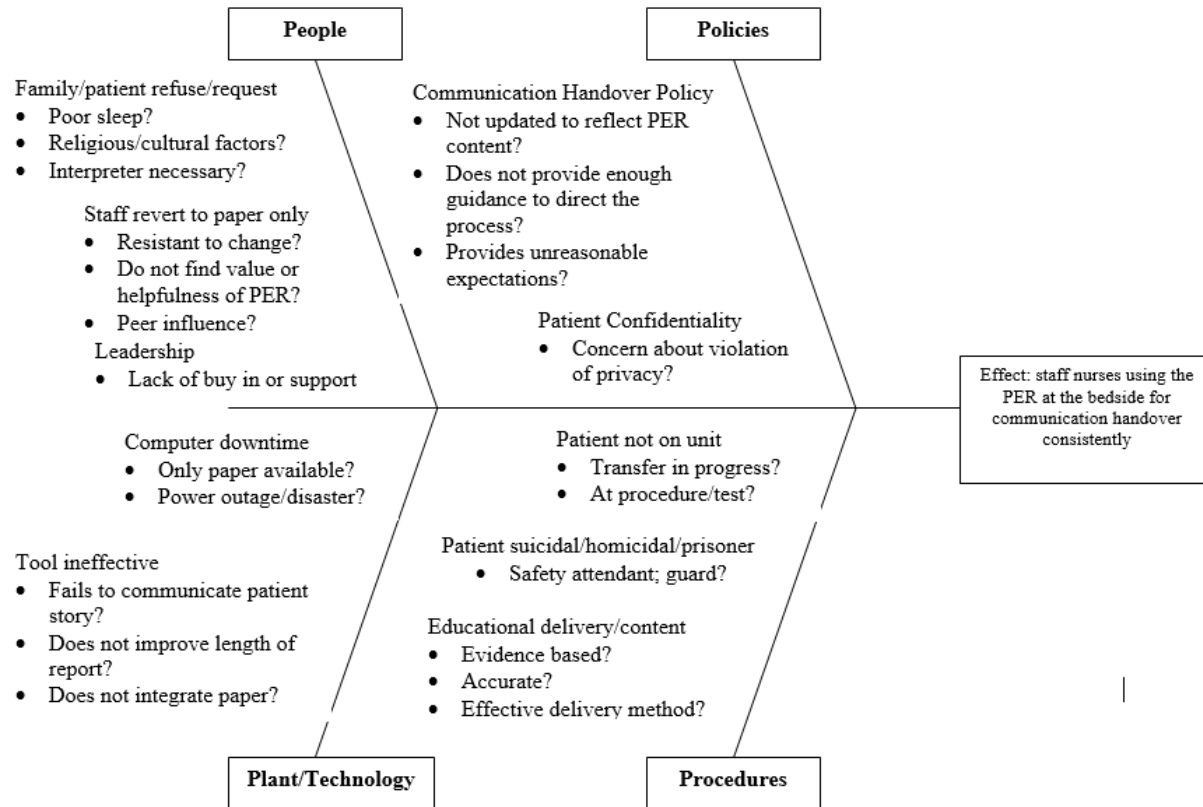Effect: staff nurses using the PER at the bedside for communication handover consistently

Figure 9: Cause and Effect Analysis. The fishbone represents the people, policies, plant/technology and procedures which impact whether staff nurses use the PER tool at the bedside for communication handover consistently.

Appendix Q

Data Collection Plan for Program Evaluation

Evaluation Objectives and Measurements	Data Elements	Data Sources	Data Collection Instruments	When Collected	Data analysis
1. Perform an evidence based evaluation of the implementation of PER at a local site within the RHS					
a) Determine how the RHS planned the intervention **Planning & Engaging**	Documents, meeting minutes, framework or theory, stakeholder involvement	Semi-structured leadership interviews, review of documents, meeting notes, minutes or agendas, meeting attendance records	Audited list of planning documents or processes, field notes	By 11/5/17	Descriptive and thematic analysis
b) Determine how the RHS executes implementation **Engaging & Executing**	Staff and leadership perceptions/feedback; what documents were updated or changed; response to video, classroom, and communication	Staff surveys, semi-structured leadership interviews, review of go-live issues log; review of documents; were policies and supporting documents updated?	Survey tool, interview questions, field notes	By 12/5/17	Descriptive and thematic analysis
c) Determine how the RHS evaluates the process **Reflecting & Evaluating**	Staff and leadership perceptions/feedback; unintended consequences	Staff surveys, semi-structured leadership interviews, review of any outcome measures or resolution of issues log	Survey tool, interview questions, field notes	By 12/10/17	Descriptive and thematic analysis

2. Determine the impact of the implementation of PER process change **Reflecting & Evaluating**					
a) Determine any change in average length of time to perform bedside report	Length of report from time of introduction at bedside to time of conclusion from bedside	Observation of report on selected units	Observation, timing device, audit tool	Before 11/5/17 & between 12/3/17 and 12/10/17	QI chart such as bar graph, descriptive statistics
b) Determine any change in staff perception of the report process	Perceived barriers or concerns about the change; perceived benefits or positive statements	Staff surveys	Survey tool, field notes	Before 11/5/17 & between 12/3/17 and 12/10/17	QI chart such as bar graph, descriptive statistics
c) Determine any change in consistency of bedside PER practice	Performance of report at bedside with HER	Observations, staff surveys	Observation with audit tool, survey tool	Before 11/5/17 & between 12/3/17 and 12/10/17	QI chart such as bar graph, descriptive statistics
d) Determine any change in patient satisfaction related to nurse communication during this process change	Quality improvement dashboards	Nurse communication data; unit manager or QI representative	Results from organization	By 12/15/17 (periods prior to and post go-live)	QI chart such as bar graph, descriptive statistics

Table 3: Project objectives with measures, elements of data, source of data, data collection tool, date of completion and analysis

methods. The Consolidated Framework for Implementation Research Process construct elements are reflected for each objective in

bold.

Appendix R

Question	Post-Survey Proportion = Yes	Pre-Survey Testing Proportion	Z Test Statistic	P-value	Significant?
I am aware that the practice of communication handover is changing	1.0000	0.8600	3.9326	<.0001	Yes
I understand why the practice of communication handover is changing.	0.9479	0.6800	5.6274	<.0001	Yes
I desire to make changes to my current practice of communication handover.	0.8526	0.7857	1.5898	0.0559	No
I am knowledgeable of the specific changes to the process of communication handover.	0.8817	0.1500	19.7620	<.0001	Yes
I have the ability to make the specific changes for communication handover.	0.9574	0.8454	3.0049	0.0013	Yes
I need reinforcement to help me change my practice of communication handover.	0.4894	0.5408	-1.0008	0.1585	No

Table 4: ADKAR based classroom survey questions using one-sample proportion test for significance in change from pre- to post-test "yes" responses. Significance level was set at *p* of less than or equal to 0.05.

Appendix S

Participant Comments Pre-PER Video Intervention Survey
Desire
"I appreciate standardized report, saves time and decreases confusion!"   "Keep report sheets"   "it could be improved" (written next to question 5, I desire to make changes. . .)
Knowledge
"I need to know specifics of why and in what ways report is changing"   "Shift change handovers are always a dangerous time of day for pt. safety. The shorter and more informative it can be made; the safer units will be."   "Will the new report be better/safer than current practice?"   "I'm aware that hand offs are changing but I'm not sure how yet."
Participant Comments Post-PER Video Intervention Survey
Desire
"interested to see how paper use will change with current report changes"   "I am excited!"   "ICU report is much more detailed than this summary can be, however, I am sure a hybrid will emerge that allows us to incorporate it into our reports."   "The computerized method will really help with emergent orders and changes in real time."
Knowledge
"still confused"   "Is this supposed to take place of our paper report sheets?"   "Will this take over paper report sheets?"   "need more info-I think we're getting there"   "how will we share tests/scans/important info during the stay?"
Ability and Reinforcement
"practice" (was written next to "I need reinforcement to help me. . .)

"I like having a sheet of paper to reference the doctor calls & a computer is not available or when an emergency occurs, and I don't have a computer."
General comments about the video
"cute dog" "The real-life example video makes learning more enjoyable"

Table 5: Thematic analysis of quotes from written comments on pre- and post-intervention

surveys based on the ADKAR model.

Appendix T

Participant Comments Pre-PER Implementation Survey
Awareness, Desire, and Knowledge: "Looking forward to the new PER-I feel that report takes much too long currently."
Participant Comments Post-PER Implementation Survey
Desire: "Many people have been hesitant to change. They can't get away from the paper. I will be excited as a super user to help be an example of using the PER."   "Open the PER but don't look at it much"   **Ability:**   "The PER may not contain the patients whole story"   "Need to fill in the details after report"   "It's hard to fit in all 5-6 patients from 0700-0730 with using the PER/computer but I understand the benefit."   "The electronic PER isn't as complete as I would like. I would like it to be more similar to the paper sheets because there are several things from the paper I would like to be aware of."   **Reinforcement:**   "Using PER not at bedside sometimes, but also sometimes at bedside."   "As an oncoming RN, I feel I drive the report to use the PER but off-going RN does not."

Table 6: Thematic analysis Quotes from written comments on pre- and post-PER implementation

surveys based on the ADKAR model.

Appendix U

Project Procedures and timeline

1) Identify a preceptor within the organization of interest (Winter 2017)

2) Obtain permission to work on a project within the organization (Winter 2017)

3) Perform a needs assessment within the organization to identify issue of project focus (Winter 2017)

4) Perform an organizational assessment to identify current state of issue (Winter 2017)

5) Select a committee to oversee project with members from the organization of interest and faculty from Grand Valley State University (Winter 2017)

6) Perform an integrative review of literature on the issue to inform the project development and evaluation (Spring/Summer 2017)

7) Select and apply conceptual model and implementation framework (Spring/Summer 2017)

8) Determine specific setting for project and resources needed (Spring/Summer 2017)

9) Establish design for program evaluation based on the Consolidated Framework for Implementation Research process construct (Spring/Summer 2017)

10) Present proposal of project to committee (Spring/Summer 2017)

11) Obtain IRB approval from university and organizational boards (Spring/Summer 2017)

12) Obtain permission from selected units for observations, interview and surveys conducted on a voluntary basis (Spring/Summer 2017)

13) Select educational sessions for distributing and collecting voluntary survey data (Spring/Summer 2017)

14) Establish specific measurements, sources of data and tools to collect data (Fall 2017)

    a. Pre/post intervention perceptions on bedside communication handover survey (see draft surveys in Appendix O)

    b. Pre/post communication handover video survey (see draft surveys in Appendix P)

    c. Pre/post observations of bedside communication handover

        i. Timing length of report

        ii. Field notes of any special circumstances

        iii. Audit tool/checklist of location, inclusion of patient, environment safety check, updating of white board, use of Electronic Health Record (EHR) (see draft of audit tool in Appendix Q)

    d. Document review and collection

        i. Planning documentation (meetings, minutes, workshops, interviews with stakeholders, evidence of strategy for implementation, evidence of risk mitigation)

        ii. Documentation of issues or resolutions during go-live of intervention (logs, communications)

        iii. Evaluation documentation (meetings, minutes, communications, interviews with stakeholders, evidence for sustainability plan, evidence of learning to apply to future implementations)

    e. Determine any changes in practice or measures (increase, decrease, no change using comparison data in bar graphs and frequency tables)

        i. Length of report

        ii. Consistency of location at bedside

      iii.   Consistency of use of EHR

      iv.   Perceptions of handover process

      v.   Perceptions of awareness, desire, knowledge or ability

      vi.   Patient ratings of nurse communication

15) Produce written evaluation of implementation of professional exchange report stating how well the organization implemented the intervention and what impact the intervention made (Fall 2017, by December 15)

16) Present a defense of the evaluation to the project committee open to public guests (Fall 2017, by December 15 or January 2018)

17) Present findings within the organization of interest (Fall 2017, upon request)

18) Publish the project in Scholar Works (Fall 2107 or January 2018 upon final approvals)

Appendix V

Determination of Non-Research from Educational and Organizational Institutions

DATE: August 4, 2017

TO: Jean Barry
FROM: Grand Valley State University Human Research Review Committee
STUDY TITLE: [1094782-1] Evidence Based Program Evaluation of a Bundled
                         Educational
                         Intervention to Enhance Implementation of Professional Exchange
                         Evidence
REFERENCE #:   18-014-H
SUBMISSION TYPE: New Project

ACTION: NOT RESEARCH
EFFECTIVE DATE: August 4, 2017
REVIEW TYPE: Administrative Review

Thank you for your submission of materials for your planned research study. Upon

review of the aims and description of your study, it has been determined that this project *DOES*

NOT meet the definition of covered human subjects research* according to current federal

regulations. The project, therefore, *DOES NOT* require further review and approval by the

HRRC.

According to your study description, you are conducting *quality improvement project only*

relevant to two nursing units at a local community hospital, which therefore, *does not meet 45*

CFR 46.102 (d); Research is a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge.

Should you change the aims and activities of your project such that it would then meet the definition of human subjects research, please cease any contacts with potential human subjects until such time as you submit the project protocol to the HRRC and receive the committee's approval to proceed. Should you change the aims and activities of your project such that you are unsure if it meets the definition of human subjects research, please submit a new Non-Human Research Determination Form for review by the Office of Research Compliance and Integrity.

If you have any questions, please contact the Office of Research Integrity and Compliance at (616) 331-3197 or rci@gvsu.edu. Please include your study title and reference number in all correspondence with our office.

*Research is a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge (45 CFR 46.102 (d)).

Human subject means a living individual about whom an investigator (whether professional or student) conducting research obtains: data through intervention or interaction with the individual, or identifiable private information (45 CFR 46.102 (f)).

Scholarly activities that are not covered under the Code of Federal Regulations should not be described or referred to as *"human subjects research"* in materials to participants, sponsors or in dissemination of findings.

Office of Research Compliance and Integrity | 1 Campus Drive | 049 James H Zumberge Hall | Allendale, MI 49401
Ph 616.331.3197 | rci@gvsu.edu | www.gvsu.edu/rci

SPECTRUM HEALTH

Human Research Protection Program
Office of the Institutional Review Board
100 Michigan NE, MC 038

Grand Rapids, MI 49503 616.486.2031

irb@spectrumhealth.org www.spectrumhealth.org

NON HUMAN RESEARCH DETERMINATION

August 15, 2017

Luanne Shaw
1840 Wealthy Street SE, MC 439
Grand Rapids, MI 49506

SH IRB#: **2017-199**

PROTOCOL TITLE: **Program Evaluation of a Bundled Educational Intervention to Implement Professional Exchange Report**

SPONSOR: Investigator

Dear Ms. Shaw,

On August 15, 2017, the above referenced project was reviewed. It was determined that the proposed activity does not meet the definition of research as defined by DHHS or FDA.

Therefore, approval by Spectrum Health IRB is not required. This determination applies only to the activities described in the IRB submission and does not apply if changes are made. If changes are made and there are questions about whether these activities are

research involving human subjects, please submit a new request to the IRB for a

determination.

A quality improvement project may seek publication. Intent to publish alone is

insufficient criterion for determining whether a quality improvement activity involves

human subject research. However, please be aware when presenting or publishing the

collected data that it is presented as a quality improvement project and not as research.

Please be advised, this determination letter is limited to IRB review. It is your

responsibility to ensure all necessary institutional permissions are obtained prior to

beginning this project. This includes, but is not limited to, ensuring all contracts have been

executed, any necessary Data Use Agreements and Material Transfer Agreements have been

signed, documentation of support from the Department Chief has been obtained, and any

other outstanding items are completed (i.e. CMS device coverage approval letters, material

shipment arrangements, etc.).

Your project will remain on file with the Office of the IRB, but only for purposes of

tracking research efforts within the Spectrum Health system. If you should have questions

regarding the status of your project, please contact the Office of the IRB at 616-486-2031 or

email irb@spectrumhealth.org.

Sincerely,

Jeffrey Jones MD

Chair, Spectrum Health IRB

cc: Quality Specialist

Appendix W

Letter of Support from Organizational Mentor

From: Lehman, Keverne L.
Sent: Friday, July 07, 2017 4:23 PM
To: Shaw, Luanne M.
Subject: Letter of Support: L. Shaw

Luanne Shaw MSN, RN, CEN is working with me as part of her DNP studies through Grand Valley State University.
I deeply appreciate the work she is undertaking to support our Nexus initiative at Spectrum Health.

Specifically, Luanne is assisting me in developing an educational video showcasing the Professional Exchange Report, both a tool in our new EPIC electronic documentation system as well as a practice change for our nurses and interprofessional staff.
She has been part of the analysis of this tool and careflow as it applies to current and future practice, literature review, and is now scripting and developing the video.
Her plan is to analyze the impact of the video as an educational method in supporting the practice change with our staff.

This work brings together several components of the DNP essentials, including: Leadership for Quality Improvement and Systems Thinking, Information Systems/Technology for the Improvement/Transformation of Health Care, and Interprofessional Collaboration.
She has my full support in this important work!

Keverne Lehman MSN, RN-BC
Principal, Interprofessional Practice
Spectrum Health
251 Michigan NE
Grand Rapids, MI 49503
Office: 616.391.3658