Improving Effective Interdisciplinary Communication in a

Neonatal Intensive Care Unit

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Abstract

Background: Poor communication skills decrease job satisfaction, increase employee turnover, and decrease the quality of patient care (Donchin et al., 2003). Multiple studies have showed that communication training improves communication, conflict management, and overall job satisfaction (Boss et al, 2013; Jasper et al., 2011). A level III Neonatal Intensive Care Unit (NICU) had been dealing with communication issues that appeared to decrease job satisfaction and had lost experienced staff members to other institutions.

Purpose: The purpose of this quality improvement project was to increase effective interdisciplinary communication, improve conflict management, teamwork, leadership, and job satisfaction between the interdisciplinary staff within the NICU with a communication intervention.

Methods: A pretest/posttest design measured the variables of communication, conflict management, teamwork, leadership, and overall job satisfaction of the interdisciplinary staff of a NCIU before and after a communication intervention.

Results: A communication improvement initiative does significantly increase effective communication (P = .009) (P = .029) and conflict management (P = 0.31) among the interdisciplinary staff of a NICU.

Implications for Practice: These findings support the use of communication improvement projects to not only improve communication of an interdisciplinary team, but also for conflict management.

Implications for Research: Consideration for further studies includes the use of councils and shared governance within the framework of the Diffusion of Innovation Theory. The role of

councils and their dynamics within this theory were efficient and beneficial to the outcomes of

this project.

    Keywords: interdisciplinary communication, NICU communication, team

communication, job satisfaction, diffusion of innovation, shared governance, councils

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Chapter 1: Introduction

Effective communication within any occupation is important; however, in some occupations it can be the difference between life and death. Without effective communication, information can be misconstrued, distorted, or completely lost. Communication can be defined as a "linear transmission of messages through a conduit that results in understanding" (Nemeth, 2008, p. 713). According to Nemeth (2008), effective healthcare team communication is more than just correct information being passed on but also the formation of healthcare teams that are effective in multiple institutions and varied cultures. Ineffective communication, especially in an intensive care environment, causes breakdown in healthcare teams and is perceived to be a significant cause of medical errors (Alvarez & Enrico, 2005).

Problem & Purpose

Neonatal Intensive Care Units (NICUs) are highly specialized units that care for critically ill or premature infants. The interdisciplinary highly trained staff of a NICU includes many healthcare professionals such as dieticians, social workers, physical and occupational therapist; however, the core caregivers during critical care or resuscitation are the neonatologists, neonatal nurse practitioners (NNP), bedside nurses, and respiratory care practitioners (RCP). These staff members form a collaborative team or a cohesive unit that provides coordinated care for these infants. Each member of the NICU team plays a vital role in providing safe, effective, quality, and patient-centered care to these infants. Poor interdisciplinary communication skills and miscommunication between the health-care team has been shown to lead to frustration,

decreased job satisfaction, and high staff turnover rates (Azoulay et al., 2009; Karanikola et al., 2012; McDonald, Rubarth & Miers, 2012). Ultimately, this can result in decreased quality patient care and medical errors (Donchin et al., 2003).

The staff at a 44-bed Level III NICU located in urban Southeastern North Carolina participated in an employee engagement survey. Gallup (2015) organization defines employee engagement as the involvement with and enthusiasm for work. This is the employee's commitment to their job and the institution in which they work. This survey looked at the areas of personal growth, teamwork, and individual contribution. The results, especially from the NICU nurses and respiratory care practitioners (RCP) in all of these areas were dismally low. Nurses also raised concerns about the lack of respect as they felt they were "not being heard" by the medical team. Tensions between staff members were high, and there was increased friction in the already stress-filled unit. Some reliable and experienced employees left the unit to work at other institutions. Morale and job satisfaction in the unit was low as evidenced by the poor feedback from the employee engagement survey. It appeared that there was a lack of effective communication and this may be the underlying issue within this unit. There was evidence for a comprehensive communication program within this NICU. A comprehensive communication program qualifies as a quality improvement initiative. This project will answer the following questions: Does the implementation of a communication initiative improve communication between interdisciplinary staff, improve teamwork, and improve conflict resolution? Will improved communication improve job satisfaction between the interdisciplinary staff? The implementation of this proposed program and the subsequent statistical evaluation would answer these questions and provide evidence whether the communication initiative is effective.

Nurse Practitioners (NPs) are leaders in NICUs and other ICUs. This project utilizes the leadership role of NPs within the intensive care setting to set the standard of care with good communication skills by leading interdisciplinary rounds, initiating huddles, and implementing quality improvement projects that improve the overall safety and delivery of high quality patient care.

The purpose of this program was to improve interdisciplinary communication and change the behavior and perspective of the staff of a NICU in order improve interdisciplinary teamwork. Communication is not a new concept; however, institutions must be vigilant to improve these skills as they directly affect patient care. Thus, this proposed program designed to improve communication and teamwork in the NICU environment was an innovation—a quality improvement initiative. The vision of this project diffused and spread through the social system of the NICU. The change theory used to implement this project was Roger's (2003) Theory of Diffusion of Innovation coupled with the principles of shared governance.

Chapter 2: Analysis of Literature Review

Communication issues are the primary cause of problems not only in the intensive care environment, but in other occupations as well. In the 1960s and the 1970s, the aviation industry had many accidents that were attributed to crew communication issues (McCulloch, Rathbone, & Catchpole, 2011). The communication issues associated with these accidents became known as "monitoring and challenging" errors (Nemeth, 2008, p. 23). These errors occurred because of the inability of one crewmember, usually a junior member, to get the attention of the senior crewmember concerning a safety concern. Through mandatory communication and simulation training, the aviation industry was able to significantly decrease these errors. These types of errors are relevant in the healthcare industry as well. Junior team members often are reluctant to 'speak up' for fear, embarrassment, or being labeled incompetent (Edmonson, 1999). In 2008, the Joint Commission had 2,455 sentinel events reported (World Health Organization, 2009). In over 70% of cases, communication failure was the primary cause of the event (World Health Organization, 2009). It is important that communication strategies be developed to facilitate interdisciplinary team communication and subsequently improve the quality of patient care and patient safety.

Methods of Literature Review

An integrative electronic literature search was done using the database at a university library. Using Medline via PubMed search forum, the key words of "interdisciplinary team communication in the intensive care unit" were entered. The search provided 195 articles. Titles and abstracts of these articles were reviewed. Articles were excluded in which subject matter was inappropriate to the project, such as articles on communication with family, simulation team training only, and ethical communication issues.   Fourteen articles were reviewed in their

entirety and of those 11 articles were found that would provide valuable information about communication in the ICU environment, interdisciplinary teams, staff job satisfaction and patient safety. *Figure 1* is the flowchart for the PubMed literature search.

A second search was initiated—again using the computer database. Using the Google Scholar search forum the key words of "interdisciplinary team communication in the intensive care unit" for the years of 2007-2015 provided 71,700 hits. The abstracts of the first 500 articles were reviewed and the same criteria were applied as was stated previously. Six of the articles found in the PubMed search and met criteria for use were found in this search as well. Twenty articles were reviewed in their entirety and seven more articles met criteria for this project. Other articles were found from the reference list of the applicable articles found with previously mentioned searches. *Figure 2* is the flowchart this the Google scholar search.

Communication in Intensive Care Units

Several studies within the intensive care environment have shown that communication and conflict resolution are important factors in an intensive care setting where interdisciplinary teams work together. These articles are listed in Table 1. A cross-sectional survey done of four Scottish ICUs was performed in 2007 (Reader, Flin, Mearns, & Cuthbertson, 2009). The survey was adapted from the ICU nurse physician questionnaire, which was developed by Stephen Shortell and his colleagues (Shortell, Rousseau, Gillies, Devers, & Simons, 1991). This tool is psychometrically reliable and well validated and has been used numerous times to assess ICU communication. The results were based on a 47% return rate of 184 surveys (48 questionnaires were received from physicians and 136 questionnaires were from the nurses). The multiple regression analysis of this survey showed a significant relationship ($P < 0.05$) between open communication and the understanding of patient care goals, especially the junior team members.

A cross-sectional survey by Chang et al. (2010) of all full time healthcare workers in an ICU assessed perceptions of communication and teamwork. Staff's perception of these variables was poor as well as poor perception of leadership (62% of physicians and 74% of nurses) (Chang et al. 2010). This study had some limitations, such as small sample size (N=111). Poor perception of communication skills, teamwork and leadership theoretically may be detrimental to job satisfaction. McDonald et al. (2012) showed that overall satisfaction was significantly related to physician communication, knowledge of specialty, and organizational support.

A large multivariant analysis of 323 ICUs in 24 different countries examined conflict in the ICU setting (Azoulay et al., 2009). The population of the study consisted of 7,498 respondents that were ICU staff. The survey was developed by the European Society of Intensive Care Medicine and was given on one day to all of the respondents. Azoulay et al. reported that 70% of the survey respondents reported conflicts within their respective units. The majority of these conflicts were severe in nature and associated significantly with job strain. Job workload, ineffective communication, and end-of-life care issues were areas targeted for improvement. This study suggested a multifaceted conflict-resolution program is needed for ICU staff members. Clearly the stress and strain of the work done within intensive care units could be decreased with improved communication skills.

Jasper et al. (2012) did a quantitative, multicenter correlation study in Germany of 142 staff members from five different ICUs. This study compared data from the Effort-Reward Imbalance Questionnaire, Hospital Anxiety and Depression Scale, Social Support Questionnaire, and Life Satisfaction Questionnaire. The study found that high job strain and burden resulted in an increased incidence of stress with symptoms such as dissatisfaction with life in general, posttraumatic stress disorder, and depression. Karanikola et al. (2012) also showed a significant

association with increased positive feelings of the nursing staff with quality communication that promotes psychological well being (P = 0.04). This communication increases job satisfaction and retention. These findings again supported the need for communication improvement for units and individuals to reduce mental stress and increase job satisfaction.

A pretest-posttest repeated measures design by Boyle and Kochinda (2004) showed that nurse/physician communication could be improved and the benefits from this improvement had the potential benefits of increased quality patient care, increased patient survival, shorter hospital stays, improved staff relationships, and increased job satisfaction. Wahlin, Elk, and Idvall (2010) did a personal interview of 8 nurses and 4 physicians in an ICU. They were asked to tell about a good and bad experience in the ICU and about a day that they felt satisfied leaving work. They were also asked to share an experience that increased strength and power. From these interviews it was concluded that good teamwork and a supportive environment increased empowerment. Empowerment is an inner strength and power that according to Covey (2009) "creates more innovation, initiative, and commitment" (p.265). Empowerment at work is associated with decreased job stress and fewer burnout syndromes, and increased work satisfaction.

Teams and teamwork, especially in the intensive care environment is critical in giving high quality safe and effective care. Communication is a key component to the successful function of teams. Simmons and Sherwood (2010) did a qualitative analysis at a 500-bed hospital with nurses from the NICU and emergency rooms. These nurses were part of intensive interdisciplinary teams. Eleven nurses were from the NICU and eight were from the emergency room. From these focus groups it was found that teams are complex relationships that revolve around trust, respect, and communication. Poor communication led to unresolved conflicts and

that led to even more communication barriers. The authors concluded that healthcare, especially in an ICU setting is a team sport requiring the coordination of interdisciplinary teams.

Underlying most of the communication issues within the NICU, it was found that interdisciplinary patient rounds supported good communication, teamwork, and safe quality patient care. Licata et al. (2013) changed rounds in a pediatric ICU from physician led to more staff interactive. Nurses were taught to lead rounds and became 'members' of the critical care team. This process discovered three important changes for the nurses: 1—they felt more valued by the medical team, 2—leading rounds reinforced the need for nurses to be part of rounds and 3—the process is better for patients even if rounds take longer. By just adding nurses to rounds made the nurses feel more valued and the communication of patient information improved.

Communication intervention--such as interdisciplinary rounds promote teamwork across role boundaries and junior and senior team members. Breaking down communication barriers decreases the likelihood of medical errors because the staff feels more empowered to verbalize issues (Reader, Flin, Mearns, & Cuthbertson, 2007).

Pronovost et al. (2003) took interdisciplinary rounds a step further doing a prospective cohort study on an oncology ICU. The specific goal of this project was to improve communication with the addition of daily goals of care that included a care plan, task list and communication plan (Pronovost et al., 2003). Most of the interdisciplinary team did not know the daily goals at the initiation of the project; however most of them knew the daily goals after implementation. Associated with this knowledge was a 50% decrease in ICU length of stay. The author of the study attributed this success to the calcification of tasks, care plans, and communication plans. Interdisciplinary teams, working for common goals can decrease ICU length of stay and the associated healthcare costs.

Communication Improvement Strategies in Intensive Care Units

Through the review of the current literature, many strategies to improve communication in the intensive care environment were found that potentially could be adapted to the NICU environment. These articles are listed in Table 2. Many of these projects created an atmosphere of clear and effective communication, which lead to improved teamwork, conflict resolutions, job satisfactions, and ultimately patient safety.

Dadiz et al. (2013) developed a simulation-based training program to train interdisciplinary staff of a labor and delivery unit and pediatric team on effective communication and teamwork. After the simulation exercises were completed debriefings facilitated discussion with the team of 'what was done correctly?' and 'what could have been improved?' Through this training and communication staff were able to work better as a team and overall communication between the teams significantly improved over time. This program was effective for emergent team communication and simulation training definitely has its role within the NICU environment.

Ohlinger, Brown, Laudert, Swanson, and Fofah (2003) developed a survey that was administered to four different NICUs. The survey concentrated on 6 different areas: unit coordination, working in the NICU, leadership, management, disagreements, authority, and unit culture. The Care team developed seven potentially better practices: "1—a clear, shared NICU purpose, goals, and values; 2—effective communication among and between teams and team members; 3—leaders lead by example; 4—nurture a collaborative NICU environment with trust and respect; 5—live principled standards of conduct and standards of excellence; 6—nurture competent and committed teams and team members; and 7—commit to effective and positive conflict management" (Ohlinger et al., 2003, p. 471). Although the validity of this program has

yet to be established it provides an important framework to address the problems at a Level III NICU. This program was too broad for the purpose of this project.

A systematic literature review conducted by McCulloch, Rathbone, and Catchpole (2011), looked at the effects of teamwork and communication training with in the health care environment to improve clinical outcomes. This study reviewed 1,036 abstracts and then identified 14 articles in detail. Of the 14 studies reviewed, eight of these examined teamwork quality and non-technical skills. Five of these studies were extremely small and the evidence presented considered extremely weak—whether it was positive or negative. The three remaining studies showed that the implementation of strong teamwork training strategies was effective in the medium to long term; however, these studies failed to offer a specific teamwork-training program and did not specifically measure the effects of communication improvement strategies.

For any communication program to be effective there must be leadership support. Diedrick, Schaffer, and Sandau (2011) created a successful communication strategy to implement evidence-based practice. They found that leaders who were involved in the process of determining that communication practice changes were needed but also needed to be involved in the change strategy. If leaders are active in the project there is a higher probability of success.

TeamSTEPPS was created for healthcare professionals after 20 years of research, by the U.S. Department of Defense's Patient Safety Program and the Agency for Healthcare Research and Quality (AHRQ) (Mayer et al., 2011). The purpose of the program is to ultimately improve patient safety by improving teamwork and communication skills. Mayer et al. (2011) implemented the TeamSTEPPS program in two areas, a Pediatric ICU and a Surgical ICU. The interdisciplinary staff of these two ICUs received 2.5 hours of comprehensive training in team leadership, situation monitoring, mutual support, and communication. This project was very

successful as staff's perception of teamwork and communication improved, as well as relationships between the different staff disciplines. "Respondents specifically noted improvement in overall communication and the ability to openly communicate concerns" (Mayer et al., 2011, p. 270).

Most impressive however, was the improvement seen in the interdisciplinary teams' overall patient care. There was a significant decrease in the meantime to starting extracorporeal membrane oxygenation (ECMO) following participation in TeamSTEPPS in the PICU and SICU from a mean time of 23 minutes to 13.96 minutes (P = 0.02) (Mayer et al., 2011). Nosocomial infections also were reduced overall in both units. Both of these improvements reduce mortalities/morbidities, length of hospital stay, and overall healthcare cost.

Denver Health and Hospital Authority in collaboration with (AHRQ) implemented and evaluated a team communication strategy that could be adapted to many different health care settings (Dingley, Daugherty, Derieg, & Persing, 2014). The tool kit of the program included interdisciplinary rounds, daily patient goals, huddles between the interdisciplinary staff, and training in a standardized communication format.

The communication format that was used by Denver Health was Situation, Background, Assessment, and Recommendation (SBAR). SBAR provides structured communication within the healthcare environment and is recognized as the communication standard for healthcare by JCAHO and is endorsed by the American College of Healthcare Executives and the American Organization of Nurse Executives (Dingley et al., 2014).

This program was implemented in the medical intensive care unit (MICU) and an acute care unit (ACU). Communication "events" and their response times were recorded. Pre and posttest data was obtained on the "events" and then the average mean response times were

compared. The results were similar for adjusted communication time: a significant decrease (p = 0.01) in mean adjusted communication time for the MICU and a non-significant decrease (p = 0.31) in mean adjusted communication time for the ACU (Dingley et al., 2014).

This toolkit is easily adaptable and modifiable to the NICU setting. Interdisciplinary daily rounds were already the daily routine in the NICU; however, daily goal sheets were not used and rounds are hampered by many interruptions. The presenter was often left frustrated and at times pertinent information was not shared. Interruptions in rounds are a source of disruption of clinical activity and need to be minimalized to improve thorough communication of each patient's clinical data (Alvarez & Enrico, 2005).

Theoretical Framework-Diffusion of Innovation

The increased number of clinicians conducting research and utilizing evidence-based findings to guide practice has caused policies of the modern health care system to be constantly changing (Schmidt & Brown, 2014). Understanding the process of how to constantly adapt to the best ideal in patient care is challenging to the most transforming leader. This adaptation is necessary to provide quality, safe, and affordable patient care. The Theory of Diffusion of Innovation is a change theory that allows for new and old innovations to be introduced into a network. The information or innovation is then diffused throughout the system to bring about synergistic change over a period of time. The main components of this theory are the innovation, communication channels, time, and the social system. This theory organized the communication initiative and gave it the framework for its application within the NICU. Rogers' (2003) Theory of Diffusion of Innovation consists of four main elements—innovation, communication channels, time, and the social system.

Innovation. The innovation is the change in practice or the implementation that is to take place. The innovation of this quality improvement initiative is the communication program to improve communication between interdisciplinary teams. In order to do this there must be a change in staff behavior and perspective to implement the project. This change will begin with a change agent and is the knowledge phase of the project. According to Rogers (2003), the change agent is an expert in the innovation. They could also be called linkers or facilitators in that they are the link between the innovation/change and to the clients or receivers. For the purpose of this project, this author was considered the change agent or the one who will initiate the change to improve communication in the NICU environment.

Communication Channels. The communication channels are the second element of Roger's theory. The innovator or change agents share their knowledge of the innovation to networks. These networks are the means of sharing the innovation to the members of the social system or institution. Rogers (2003) believed that interpersonal communication channels were more powerful and could create stronger alliances for the innovation. In this project, the communication channels were formed through the application of councils as found in shared governance. Councils became the conduit for the concept of communication to flow through the social system of the NICU. The change agent cannot distribute all the information and recruit support for the innovation alone.   The use of councils was imperative for the diffusion of information through the NICU. As one person is empowered and changed—their experience is then replicated to others and a synergistic social change to the NICU environment.

Shared governance is a team approach to problem solving and can be integrated with the innovation theory to empower the council members to diffuse the information through social networks over a period of time and among a specific social system (Rogers, 2003). By

employing the use of councils or teams to this NICU project the innovator began diffusion of the

communication initiative to the NICU leaders and a core peer group. The change agent chose

the council of peer innovators because they were leaders in each of their prospective disciplines.

The councils then diffused the communication innovation to their peers within the NICU to the

point of critical mass and the process of diffusion became self-sustaining.

Time. The innovation-diffusion process occurs over a period of time. Rogers, (2003)

divided the entire process into five time periods: 1-knowledge, 2-persausion, 3-decision, 4-

implementation, and 5-confirmation.   In the knowledge phase of the process information is

gathered. This is the how, why, who, and what phase of the process. A literature search is part

of this process and acquiring the knowledge of what others have done before and what still is

unknown.

In the persuasion phase, the innovator develops their attitude about the innovation and then

if the attitude is positive takes the innovation to the champions and early adopters to recruit their

support. The social opinions of the innovators, peers and colleagues will also help form their

overall opinion of the innovation and its perceived success or failure. The persuasion phase

continues into the decision stage, where there is rejection of the innovation by the change agent

or an adoption of the innovation. With innovation adoption there is implementation of the

innovation in practice. The final phase is confirmation—if the innovation should be adopted

permanently or discontinued.

Rogers (2003) believed that rate of adopting an innovation was increased with increased

relative advantage, compatibility, simplicity, trialabilty, and the observability of the project

(Sahin, 2006). Relative advantage is the perception that the innovation is better than the

previous idea.   The innovation also needs to be compatible and simple to institute within an

organization. If an innovation can be trialed within an organization and observed directly, it can be accepted and adopted at a quicker rate. The communication initiative was compatible to the NICU and was easily trialed and observed within the NICU. The project soon gained relative advantage as the NICU staff observed the improvements of the project.

Social System. The last element of the diffusion process is the social system. Rogers (2003) defined the social system as "a set of interrelated units engaged in joint problem solving to accomplish a common goal" (p. 23). The councils will be used to diffuse the innovation to the social system. As the information or implementation is diffused through the communication network to the social system there will be problems and issues that arise. The councils implemented the plan-do-study-act (PDSA) cycle to problem solve and accomplish a common goal.

Plan-do-study-act (PDSA). Consistent lasting change does not happen overnight and requires monitoring by all the stakeholders involved. According to Berwick (1996), improvement cannot be achieved from just a system of work but also through the proper system design. The councils acted as the eyes and ears of this project in a NICU environment. When smaller issues arose they were brought to both councils where application of the Plan Do Study Act (PDSA) cycle was applied.   A journal of all these issues, changes, and results was kept as part of the overall project and detailed the positive and negative results.

The PDSA cycle allows growth through making changes and then reflection upon the consequences of those actions. Apply what works and then dismiss those that do not. "The primary purpose of the PDSA quality improvement model is to establish a functional relationship between the process changes in systems of health care and variation in outcomes" (Speroff & O'Connor, 2004, p. 17).

Through the framework provided by the theory of diffusion of innovation, the council formation from shared governance, and the application of the PDSA cycle, lasting change and improvement will be made to the relationships of the interdisciplinary staff of the NICU. *Figure 3* illustrates the dynamics of the theory of diffusion, shared governance, and the application of PTSD. *Figure 4* is Rogers (2003) model of the five stages in the innovation process.

Chapter 3: Methodology

Needs Assessment

The staff at a 44 bed Level III NICU located in urban North Carolina appeared unhappy with their job and dissatisfied with the interdisciplinary relationships that exist within the unit. This was evidenced by the poor performance on the 2013 Gallup employee engagement survey and by the loss of multiple experienced and reliable employees to other institutions. One of the motivating causative factors appeared to be attributed to poor interdisciplinary communication and conflict resolution. The constant barrage of stress in the intensive care setting comes from caring for very small and ill patients who cannot tell where they hurt. In addition there are bullying co-workers, unappreciative physicians, leaders who seems to not understand, and nurses who seem to complain about every single thing they are asked to do. Each discipline in the NICU may see the other disciplines through a very narrow window. It is important to realize that different disciplines may view the same situation completely differently. For example, a study by Robertson (1996) studied how physicians and nurses used theories of ethics in everyday patient care. It was found that physicians and nurses share a commitment to the principles of beneficence and autonomy; however, physicians and nurses differed in their applications of these principles. When there were issues and conflict, nurses valued patient autonomy or the parent's right to make decision based on end-of-life care. Physicians, however; valued beneficence or doing the right thing and doing good for the infant, despite what the parent may think (Robertson, 1996). The underlying issue is a gap in communication between the interdisciplinary staff. Many communication issues that cause the greatest conflict within the intensive care environment stem from the different ways that physicians, nurses, and other staff member think and apply solutions to conflicts within that environment.

Communication within health care organizations can be complex, especially when dealing with an interdisciplinary team in a critical care unit. Building these teams requires energy, time and commitment. Effective communication holds teams together and helps team members build interdependence on one another. A lack of interdisciplinary communication brings chaos, frustration, stress, and increased risk for accidents and errors.

A communication improvement program is considered a quality improvement initiative and is meant to improve the quality of health care within an institution. The Institute of Medicine defined quality of health care as care that is "safe, timely, effective, efficient, equitable, and patient-centered" (National Academy of Sciences, 2014, para. 7). This improvement program was promoted most efficiently within the framework of the theory of diffusion of innovation. Utilizing an interdisciplinary approach to a quality improvement initiative through the application of councils allows adoption of different viewpoints and knowledge. And finally, with the application of the PDSA cycle, it also resulted in new recommendations that were not previously considered (Schmidt & Brown, 2014).

Method & Procedures

This unit based performance improvement project, used the diffusion of innovation model, shared governance, and PDSA improvement cycle, used a pre/post-test design that compared attitudes and communication between an interdisciplinary staff of the NICU before and after the implementation of a communication quality improvement initiative. Quantitative data was collected via a modified version of Stephen Shortell's ICU-Nurse Physician Survey that assessed communication, leadership, conflict management, and job satisfaction (Shortell, Rousseau, Gillies, Devers, & Simons ,1989).

Sample. The sample includes staff involved with NICU consisting of physicians, neonatal nurse practitioners, nurses, and respiratory care providers (N=106). Each staff member received a modified survey via his or her work email. Participation in each survey was completely voluntary without any penalty or retribution for nonparticipation. Informed consent was implied via participation in the survey. Years of service, age grouping, education level and staff disciplines were the only demographic information obtained and will not be identifiable.

Setting. The setting is a 44-bed level III NICU in urban southeastern North Carolina. A level III NICU cares for babies of all gestational ages that require mechanical ventilation and nitric oxide. This particular NICU, however; did not care for infants requiring extracorporeal membrane oxygenation, cardiac surgery and some gastro-intestinal surgery. This NICU is part of a larger tertiary healthcare system.

Instruments. The Gallup survey provided valuable pretest information on staff job satisfaction, teamwork, and individual contribution that lead to the development of this project. The ICU Nurse-Physician Questionnaire, developed by Shortell, Rousseau, Gillies, Devers, & Simons (1989), was chosen to measure interdisciplinary staff communications, teamwork, leadership, conflict management, and job satisfaction. This survey was modified to incorporate not just physicians and nurses but also nurse practitioners and respiratory care providers. Dr. Stephen Shortell was contacted and permission was obtained to use this tool for this project—see *Figure 5*. This tool is a 5-point likert scale that will specifically measure the variables of communication, teamwork, conflict resolution and job satisfaction. The questions addressed: Does the implementation of a communication initiative improve communication between interdisciplinary staff, improve teamwork, and improve conflict resolution? Will improved communication improve job satisfaction between the interdisciplinary staff? This tool assesses

each discipline's leadership communication and the team's technical ability as well as its ability

to care for the patient and their families. Problem solving and conflict avoidance is also

measured and finally staff's satisfaction with their job is calculated. This survey has been used

many times as a tool to measure communication between interdisciplinary personnel in multiple

health care settings.

A measurement tool must be reliable and valid and its limitations must be discussed.

Measurements that are both reliable and valid produce more accurate findings (Kim & Mallory,

2014). According to Shortell, Rousseau, Gillies, Devers, and Simons (1991), almost all of the

questions of the ICU Nurse-Physician Questionnaire indicate good to high reliability using 0.70

as the commonly accepted cutoff criterion.   The lower reliability questions are around 0.60,

which is the accepted reliability standard. The tool also shows evidence of both convergent and

discriminant validity, which was confirmed by Shortell et al. (1991) through direct observation

of nine units. Shortell et al. (1991) also found evidence that individual member responses can be

"reliably and validly aggregated to the unit level, permitting the individual responses to be

aggregated to the unit level" (p. 721). The scale can be used in a variety of health care settings

with minor changes to referents. This tool measures discipline relationships, interdisciplinary

relationships, communications, teamwork, conflict resolutions, and overall job satisfaction

within the ICU environment (Shortell, et al. 1991).

Intervention

There was a need for an initiative to improve communication, teamwork, and conflict

resolution skills with the interdisciplinary staff of the NICU. The program toolkit from Denver

Health and Hospital Authority by Dingley, Daugherty, Derieg, and Persing (2014) appears to be

the narrowest in focus and the most adaptable to the NICU environment. Development of the

research and toolkits was supported through a grant by (AHRQ) and can be used without specified permission. The proposed communication program was adapted from this AHRQ program and was promoted most efficiently within the framework of the theory of diffusion of innovation and the application of the PDSA cycle.

The Denver Health program showed that strategies to enhance teamwork and communication can be successfully implemented in the acute care setting and that more efficient and effective communication is the result (Dingley et al., 2014). The toolkit strategies focused on structured communication such as SBAR, which is an acronym for situation, background, assessment, and recommendation. Flight crews in the US Navy originally used SBAR (Hamilton & Chou, 2014). Kaiser Permanente later introduced its use into the health care industry for patient report at shift change. In the Denver Health program SBAR was used as a framework in which to organize and present patient information to other team members. It was used to focus on creating an environment of 'psychological safety' where interdisciplinary teams were helpful, assertive, and clarifying.

The SBAR portion of this toolkit was easily adaptable to the NICU and would be beneficial to the interdisciplinary staff. Since January 1, 2006, Joint Commissions has required that healthcare facilities implement a structured plan to hand-off communication, including an opportunity to ask and respond to questions (Haig, Sutton, & Whittington, 2006). SBAR is JCAHOs preferred structured communication model.

Interdisciplinary rounds using a daily goal sheet are another part of Denver Health's toolkit. Open discussion and collaborative communication with physicians, nurses, physical therapists, occupational therapists, social workers, and pastoral care can provide the means to define and set specific care plan goals for each patient each day. A study by Pronovost et al.

(2003) showed that when interdisciplinary daily rounds focused on daily goals there was a significant improvement of physicians and nurses who understood the goals of care for each day from 10 to 95% as well as improved communication between the providers, and a 50% reduction in the length of stay in the ICU.

Team huddles are another part of the toolkit from Denver Health. Huddles are a quick meeting done early each shift with key personnel. They differ from rounds in that they deal directly with direct caregivers—for example the nurse. Huddles can provide clarification of orders or other issues. This provides a time where questions and other patient related issues can be addressed in a non-confrontational and non-threatening way. Huddles can be led by nurse managers, charge nurses, nurse practitioners, physicians, or adapted to other type of health care units and be ran by lead by shift supervisors or department heads.

Program Implementation

The IRB committee at the NICU's institution granted exempt status for this quality improvement program—see *figure 6*. IRB exempt status was granted at East Carolina University on December 22, 2014. With IRB approval the initial phase of this program began with the initial survey and then the formation of two councils-- a systems council and point of service council. *Figure 7* is the IRB exemption from ECU and *figure 8* is a project timeline that has been included for this project.

Survey process. The modified sixty-three question pre-test ICU Nurse-Physician Questionnaire was administered via Qualtrics® (Qualtrics, 2015) through staff email addresses. The survey opened on January 8, 2015 and closed on February 8, 2015. Each NICU staff member received a link to the survey. Informed consent was implied with the completion of the survey. No identifiable demographic information was obtained--only age groupings, education

levels, experience level, and staff discipline. There were only 5 physicians surveyed—to protect their identity the age demographic question was not asked to this discipline.

Qualtrics® assigned each recipient a random unique ID number that was used link the pre and post-test surveys together without disclosing identity; however, even though this was explained in the survey instructions the participants may not remember this number to link the surveys.

Qualtrics® has the capabilities to set up the survey so that responses are anonymized and IP addresses were removed from the collected responses. The survey was accessed upon a computer that is password protected with adequate firewalls. Data is being stored in a piratedrive folder, which is an online storage folder that has layered security and credentialed administrators for added security (East Carolina University, 2014).

There was a breach of confidentiality with the pretest survey. The survey was sent out and set up appropriately for the anonymized response. Six individuals opened the survey but failed to complete all of the questions. These participants became known to the surveyor due to name notification of Qualtrics®. No other personal information was accessed.   Qualtrics® was immediately contacted to troubleshoot the problem. A private distribution had been selected instead of open access and this canceled out some of the anonymized features. This problem was immediately corrected and the post survey distributed this April did not have any of these issues.

 The ECU IRB office was then contact and informed of the breach for further instruction. It was felt that this would not be an issue since IRBs main concern was for those that had completed the survey and that their identity was not disclosed, which it was not. The six surveys that were not completed were excluded from any analysis data and the surveys and names were deleted from the data file.

Councils. After the pre-test survey, council formation was implemented. Two councils were formed in early January of 2015, a systems council and a points of service council. These councils were separate entities that did not interact with one another. Each council had specific functions within their core groups. The councils are part of the innovation and change--not just a by-product of this project. These councils implemented 'their' ideas as leaders to improve job morale and employee retention and provide quality patient care.

Systems council. A systems council consists of the leadership of the NICU and the Women's/Children's Service Line of the hospital. Its members is composed of the NICU medical director (lead physician), patient care manager (nursing leader), co-directors of the NNPs, RCP NICU director, Women's & Children's Service Line director, and another member from nursing administration. All of these leaders are stakeholders within the NICU organization—meaning that each one of these leaders has an interest or concern in the organization and to the success of the organization (Porter-O'Grady, 2009). If leadership is empowered with this project, it will increase the probability of its success. If just one of these leaders does not 'buy in' to this project, then it is most likely destined for failure. It is important to build this project within the foundation of the NICU leadership because without their support the necessary changes will not be implemented, supported, or enforced. By involving a team, the program has a higher chance of success. Not one single person can create a shift in the focus of an organization design and working structure—it takes the involvement of many members with a team approach to make lasting changes (Porter-O'Grady, 2009).

By involving leaders early in the process and giving them a voice in the process they will be empowered with the project to improve the unit. The first meeting with the leaders occurred in January of 2015 and was attended by all of the leaders. The project was presented to the

leaders at this time and their approval was obtained. The systems council met again in March of

2015. The project progress, strengths, and weaknesses were discussed at this point. The systems

council members were the opinion leaders of the project. According to Rogers (2003), the

opinion leaders magnify the change agents' efforts and this is what happened with the

communication project. The project promotion by the systems council provided project

credibility to those who may have not otherwise participated in huddles.

Huddles as initially planned were to be conducted on the NICU side of the unit only and

led by the NNPs; however, the medical director suggested that since the physician who signed

the notes in the intermediate care nursery each morning lead the huddles there with the staff each

day. The nurses really liked the time and discussions with the physicians. Hence, barriers were

removed through the action of huddles. For a complete breakdown of the application of the

theory please refer to *figure 9*.

The system council members had more exposure to all the interdisciplinary staff

members. Some members of the points of service council voiced concerns at one point that

some of the NNPs were not doing huddles so the change agent approached the NNP coordinator

and a mass email reminder was sent out reminding them of the project and the problem was

rectified.

Points of service council. The points of service council started the diffusion process of the

project within the NICU environment. This council became the early adopters of the project and

consisted of an interdisciplinary team within the NICU of two RCPs, two day-shift nurses, two

night-shift nurses, one physician, and one NNP. The members were carefully chosen by the

change agent and were composed of influential team members. This council met at the end of the

pre-test survey and the quality improvement project was presented to these individuals prior to

other staff members. It was planned for this council to take the program to their peers informally

initially to begin the diffusion of information throughout the social network of the unit. Formal

training was also provided on the changes to interdisciplinary rounds and the initiation of

'huddles' and SBAR.

The organization of the points of service council marked the beginning of the change in

the communication pattern change of the unit. This council met monthly and corresponded via

email more frequently. This communication was critical and measured the staff compliance and

attitude about the project. The council's input provided valuable insight and their ideas allowed

the project progress and develop. This project was a team approach that began with an idea from

a single individual and then transformed itself through different iterations from multiple

disciplines to solve problems and ultimately improves healthcare quality (Endsley, 2010). Ideas

grow and expand for multiple perspectives and experiences.

Within this council the Plan Do Study Act (PTSD) was applied and many ideas were

added to the initiative. For example, it was suggested to include parents in huddles if they were

in the unit at the time. So this was instituted during the project if the parents were at the bedside.

Dry erase boards are at each baby's bedside to record optimal oxygen range, the doctor,

nurse, NNP, and RCP for the day. It was in this council that one of the members suggested

adding the daily goals to the dry erase board to they would be more readily available for

everyone to see and be reminded of constantly. New boards were purchased through this

initiative for a fresh appearance and to symbolize the new practices.

In another meeting it was suggested that we add a "squawk box" to the unit, which would

be a locked box for interdisciplinary staff suggestions, complaints, and compliments. The

members of this council have all agreed to continue this council as a communication committee

after the project is completed. This committee would formally initiate new changes made in

patient care management.

Interdisciplinary rounds. Minor changes were implemented to the daily interdisciplinary

rounds that were occurring prior to the project in the NICU. Each morning during

interdisciplinary rounds the NNP discussed 2-3 daily goals for each patient that was unique for

them for that specific shift. These short-term goals were steps toward the longer-term goals that

will need to be met prior to discharge. For example, a 600-gram infant may have many short-

term daily goals to be met prior to discharge compared to a 3,000-gram infant that has been

admitted for Transient Tachypnea of the Newborn; however, each infant will need to have

specific unique short-term daily goals that need to be accomplished prior to discharge.

This aspect of the part of the project was not new—interdisciplinary rounds have been

done in this NICU for years with a plan discussed for the day for each baby; however, each day

the NNP did make a special effort to *formally* name out the 'goals' for the day prior to moving

on to the next patient. This was a very minor but important change. This information laid the

framework for huddles.

Huddles. Huddles were the most successful application of this project. After

interdisciplinary rounds in the morning and hand off in the evening the NNP met with each of

their patients' nurses and RCPs. This was a well-received intervention within the unit. NNPs

attend deliveries and would sometimes be late doing huddles and the nurses would be searching

them out and asking when the huddles would happen. Not only were daily goals shared during

this time but also this became a time that new staff asked questions and teaching occurred.

Orders were clarified with the more experienced staff. A significant accomplishment of the

huddles was the voice and empowerment that the nurses have felt—especially the night shift

nurses, who do not have the advantage of daily interdisciplinary rounds. One of the nurses said,

"I now understand the reason for the specific plan of care and can see the whole picture."

SBAR training. During the last month of the project an educational and interactional

training workshop was provided to most of the staff on SBAR technique for communication

between healthcare workers. In hospital units where SBAR has been implemented correctly,

nurses and physicians have an increased perception of effective communication and

collaboration (DeMeester, Verspuy, Monsieurs, & Van Bogaert, 2013). SBAR is used at the

institution; however, all of the interdisciplinary staff was in need of a good review. The SBAR

training included critical language, assertiveness, and debriefings. The SBAR training consisted

of ten sessions from March 12 – April 17, 2015. Training was attended by 50 of 71 (70%)

nurses, 8 of 24 (33%) RCPs, 4 of 5 (80%) physicians, and 9 of 12 (75%) NNPs. The low number

of RCPs that attended training was due to the rotation of shifts of the RCP staff between the

NICU and the other pediatric units. The RCPs rotate out of the unit for over a month at a time.

Outcome Variables

The main objectives for this project was to improve interdisciplinary staff communication,

advance collaborative teamwork, and improve staff job satisfaction. Ultimately this initiative

will increase the quality and safety of patient care within the NICU. Communication within

health care organizations can be complex, especially when dealing within an interdisciplinary

team in a critical care unit. Building these teams requires energy, time and commitment.

Effective communication hold teams together and builds interdependence on one another.

Communication. Effective communication between the interdisciplinary staff of the

NICU is essential in the formation of effective teams. Teams are essential in health care,

especially in intensive care units and "communication is the cement which holds teams together"

(Poole & Real, 2003, p. 396).   In the past, nursing education, especially undergraduate degrees, has not adequately addressed communication skills. Nurse practitioners have substantiated the need for communication skills in practice—not only with patients, but also between interdisciplinary team members (Rosenzweig et al., 2008). Communication skills are imperative in all levels and disciplines of healthcare providers. The ICU-Nurse Physician Survey assessed communication between the interdisciplinary staff.

Teamwork. Communication is closely related to collaboration. To collaborate is to work jointly with others and in essence is the definition of teamwork (Oxford University Press, 2015). High performing ICUs have reported accurate and open communication among the interdisciplinary staff and a more collaborative approach to problem solving with the expertise of all team members (Nemeth, 2008).   The ICU-Nurse Physician Survey assessed team effectiveness in respect to patient care and outcomes and in meeting the patient's family needs (Shortell, Rousseau, Gillis, Devers, & Simons, 1989).

Job satisfaction. Karanikola et al., (2012) showed a significant association with increased positive feelings of the nursing staff with quality communication that promotes psychological well being. This communication increases job satisfaction and retention. According to Thomas, Sexton, and Helmreich (2003) **"**attitudes about teamwork are associated with error reduction behaviors and with improved patient outcomes in ICUs. Good teamwork is associated with better job satisfaction" (p.958). The ICU-Nurse Physician Survey accessed the degree of happiness or unhappiness with the job within the NICU (Shortell, Rousseau, Gillis, Devers, & Simons, 1989).

Quality/safe patient care. Many critical incidents in the ICU--events in which a patient was, or could have been, unintentionally harmed--have frequently shown a link between team communication failures (Nemeth, 2008). Mentioned previously, the Joint Commission for

Hospital Accreditation (JCAHO) had 2,455 sentinel events reported. In over 70% of cases, communication failure was the primary cause of the event (World Health Organization, 2009). With this project, patient safety will not be formally assessed; however, with the possible improvement to team communication it is inferred that there will be an improvement to the quality and safety of patient care. Better patient outcomes and safety has been associated with better communication (Nemeth, 2008). This outcome variable will not be formally measured in this project; however, multiple studies have recognized the relationship between patient safety and communication errors (Reader, Flin, & Cuthbertson, 2007). If significant improvements were made to the communication skills between the interdisciplinary teams, it was expected that there would be an increase to the quality and safety of patient care within the unit as well.

Analysis Plans/Results

SBAR training was complete in mid -April and a post-test survey was administered via Qualtrics® (Qualtrics, 2015). A comparison of the pretest and posttest data was statistically analyzed using descriptive statistics and an independent-samples t-test. A paired t-test was going to be used however; the random unique ID number that was assigned in the pre-test was not used by the participant with the post-test. The two surveys could not be linked and were not a dependent sample. The overall goal of the communication program was to show a statistically significant improvement in communication and collaborative teamwork between the interdisciplinary staff of the NICU. The ICU Nurse-Physician Questionnaire assessed interdisciplinary communication, team effectiveness, interdisciplinary leadership, conflict resolution, and job satisfaction (Shortell et al., 1991).

Chapter 4: Results

A pre and posttest survey was done with the staff of a level 3 NICU in southeastern NC. It appeared that the interdisciplinary staff were dissatisfied with their jobs evidenced by the poor performance on the 2013 Gallup employee engagement survey and by the loss of multiple experienced and reliable employees to other institutions. The interdisciplinary staff consisted of nurses, NNPs, RCPs, and physicians. This quality improvement initiative addressed the key questions of 'Does the implementation of a communication initiative improve communication between interdisciplinary staff, improve teamwork, and improve conflict resolution? Will improved communication improve job satisfaction between the interdisciplinary staff?'

Demographics

Survey, 106 pre and posttest, were emailed to the diverse staff in the NICU. The pretest survey had 70 completed surveys returned and the posttest survey had 56 completed surveys returned, for a return of 66% and 53% respectively. The pretest survey had 76 surveys started with 70 completed. There were 30 non-responders on the pretest and 44 non-responders on the posttest. The posttest survey had 62 surveys started with 56 completed. The surveys that were not completed were discarded from each of the data sets. Table 3 includes the demographics of the pre and post survey participants. This is an extremely high survey response rate—according to fluidsurveys.com, the average online survey response rate is approximately 25% (Penwarden, 2014). The high response rate may be related to the author being a work associate of the participants.

The number of RCPs that participated in the pretest survey dropped from 20% to 14%. This was the most significant drop in participation of the survey between staff. This difference

can most likely be explained secondary to a large majority of RCPs leaving during this time due to organizational issues within their department.

Forty-seven percent of the staff in the pretest survey and 43% of the staff of the posttest survey only have their associates degree; however, the experience of the staff was vast with 45-50% in each group having more than 20 years' experience. Experience and education bring empowerment. Blegen, Vaughn, and Goode (2001) found that units with more experienced staff had lower medication error rates and fall rates but their analysis also showed that units with more baccalaureate prepared staff had higher medication errors. The staff of the NICU overall is very experienced with a majority of the staff with associates degrees.

Survey Tool

Shortell's Nurse-Physician questionnaire was modified to measure the variables of communication, leadership, teamwork, conflict management, and job satisfaction. It has been frequently used to measure the relationship of nurses and physicians in the ICU environment and is a valid and reliable tool. The tool was also modified to include NNPs and RCPs as well as nurses and physicians.

A Cronbach's alpha was conducted to measure the reliability of the Nurse-Physician questionnaire and can be found in Table 4. The questionnaire was found to be highly reliable (63 items; $\alpha = .900$). This high reliability is consistent with Shortell, Rousseau, Gillies, Devers, and Simons (1991), who found that almost all of the questions of the ICU Nurse-Physician Questionnaire indicated good to high reliability using 0.70 as the commonly accepted cutoff criterion.

Major Findings

Ideally, a repeated measure design was to be conducted that would match each survey participant with a random identification number. This number would link the pretest and posttest data and a paired t-test would be used for the analysis. Participants did not enter the random identification number on the posttest, initially assigned to them on the pretest. Therefore, the data could not be linked together. A paired t-test would have been optimal with the two samples being the same; however since data could not be linked an independent-samples t-test was done using SPSS.

An independent-samples t-test was conducted to compare the mean values of the pretest survey to the values of the posttest survey. The significant results of this test are found in Table 5. There was a significant difference in the mean scores for three of the questions in the questionnaire. The areas that were significantly improved were communication and conflict management.

Using an alpha level of .05, an independent-samples t-test was conducted to evaluate whether a communication intervention significantly improved communication. There was a significant difference in the scores for the question "I can think of the number of times that I received incorrect information from other staff members in this unit" between the pretest (M=2.44, SD=.911) and the posttest (M=2.89, SD=.98) questionnaire; t= (-2.66), p=.009. A communication program did significantly improve communication within this NICU by decreasing the distribution of incorrect information. The null hypothesis that the communication intervention would not affect communication can be rejected.

There was also a significant difference in the scores for the question "When a patient's status changes, I get relevant information quickly" between the pretest (M=3.63, SD=.809) and

the posttest (M=3.93, SD=.634) questionnaire; t= (-2.10), p=.029. This result indicates that a

communication intervention can improve communication within the NICU environment,

especially when addressing patient care.

There was also a significant difference in the scores for the statement "Unit members will

withdraw from the conflict" between the pretest (M=3.19,SD=.997) and the posttest

(M=3.57,SD=.964) questionnaire; t=(-2.18), p=.031. This result indicates that after a

communication intervention there was a significant improvement in conflict resolution within the

NICU environment. The null hypothesis that a communication intervention will not improve

conflict resolution can be rejected.

Other Results

A Likert-scale was used to measure the interval data of the Nurse-Physician

questionnaire. The scale ranged from 1-Strongly Disagree, 2- Disagree, 3-Neither Disagree or

Agree, 4-Agree, and 5-Strongly Agree.   Data were given an ordinal value as listed above 1-5. A

response was considered positive with answers 4 and 5, neutral with an answer of 3, or negative

with a response of 1 and 2. The overall mean scores can be used to assess the need for an

intervention and/or further evaluation (Kim & Mallory, 2014). If the data from the questions are

more on the positive end (4 to 5) then the need for an intervention is most likely not needed.

This type of survey is a reliable and efficient strategy to ascertain the need for a quality

improvement initiative within a health care institution.

The overall mean comparisons revealed some underlying issues in the NICU regarding

leadership. Table 6 has the mean values of each section of the questionnaire. There was a large

overall drop in the mean values from pretest to posttest in nursing leadership (M=3.05; M=2.69)

and RCP leadership (M=2.91; M=2.69). This suggests that an interdisciplinary communication

intervention did not affect the staffs' perception of leadership. It also suggests that there may be

other factors involved with unit leadership that need to be assessed.

The overall mean of job satisfaction was positive on the pretest (M=3.49) and the posttest

(M=3.48). This was surprising, as the Gallup poll suggested low job satisfaction as well as the

loss of experience staff. This could ultimately affect patient safety. Blegen, Vaughn, and Goode

(2001) found that units with more experienced nurses had lower medication errors and lower

patient falls.

Leadership, teamwork, and overall job satisfactions were not significantly influenced by

the communication project. The null hypothesis with these variables could not be rejected. The

project did improve communication and conflict management within the NICU and laid the

foundation for a communication committee, continuation daily rounds with goals setting,

huddles at the beginning of each shift, and the consistent use of SBAR as a framework for

effective communication within the intensive care environment.

Chapter 5: Discussion

Introduction

A level III NICU in urban southeastern NC had been dealing with communication issues

that appeared to decrease job satisfaction. Over the course of several months, several

experienced staff members had left the unit for employment at other NICUs. A quality

improvement initiative was implemented within the NICU using the framework of the diffusion

of innovation theory. Councils were formed: one consisting of the leadership of the NICU and

another with members of the interdisciplinary staff of the NICU. Through these councils the

PDSA cycle was used to trouble shoot problems and to diffuse the program to the entire

interdisciplinary staff of the NICU.

To measure progress, staff was given a pretest survey that was a modified version of the

Nurse-Physician questionnaire created by Shortell, Rousseau, Gillis, Devers, & Simons (1989).

The survey was given to answer the project questions: Does the implementation of a

communication initiative improve communication between interdisciplinary staff, improve

teamwork, and improve conflict resolution? Will improved communication improve job

satisfaction between the interdisciplinary staff?

A communication improvement program developed at Denver Health and Hospital

Authority by Dingley, Daugherty, Derieg, and Persing (2014) in collaboration with (AHRQ) was

the foundation of the quality improvement initiative that was implemented within the NICU

environment. The initiative consisted of daily interdisciplinary rounds with goal setting for each

patient, huddles among the staff members to reinforce daily goals, and a review of SBAR with

staff members. A posttest of the Nurse-Physician questionnaire measured the effectiveness of the initiative.

Implication of Findings

This study did provide statistical evidence that communication and conflict resolution were significantly improved with the communication initiative. However, leadership, teamwork, and job satisfaction were not significantly statistically improved. Chang et al. (2010) did demonstrate that the perception of communication skills, teamwork and leadership theoretically may be detrimental to job satisfaction. These findings were not replicated in this particular study; however, as mentioned previously, job satisfaction as measured in the pre-initiative was higher than it was initially believed to be.

The study did show a negative perception of leadership within the unit, which was evidenced by the decreasing mean score with nursing and RCP leadership. The drop with the score of nursing leadership cannot be explained; however, the drop of the RCP leadership mean score most likely is related to the changes in staffing over the past couple of years.

Historically, the RCP staff has been exclusive to the NICU and did not float to other areas of the hospital. With budget cuts, RCP leadership started rotating the NICU staff out of the unit to other areas of the hospital. Initially the rotation was between the NICU, PICU, and Peds ER; however, the NICU RCP staff is now floated to the adult side as well. This has proven to be extremely stressful for the RCP staff—most of the experienced RCP have left and are now working at other institutions. The RCP staff feels negatively toward their leadership but they also feel abandoned by the medical team leadership. With an increase in dangerous patient situations secondary to inexperience ICU RCP staff, the NICU and PICU medical teams are now

working with the RCP leadership and the hospital CEO to rebuild an exclusive NICU/PICU RCP team.

Statistically significant findings are important and show direct correlations between quality improvement initiatives and positive change; however, questionnaire means can also be used to assess other underlying issues as well within a complex organization. It is important to realize and look for these issues when conducting a quality improvement study. Ultimately the positive change initiated through these projects enhance the quality of overall patient care, provide improved individual patient outcomes, and reduce the cost of healthcare, which are the Institute of Health's Triple Aim goals. Cochran & Keeney (2014) believe that the goals should be a quadruple aim—adding clinician and staff satisfaction. Staff satisfaction is essential to the achievement of quality patient care, improved individual patient outcomes and a reduction of overall healthcare costs.

Study Limitations

This study was limited with the use of an independent-sample t-test instead of a paired t-test. A paired t-test is more statistically powerful than an independent-sample test. There is more variation in the data from the independent sample. This was evidenced by the variation in the number of responses in each sample. The pretest had 70 surveys that were used while the posttest had 56. This variation however, has little effect to normal variation due to the large sample size of each group. Pagano (2004) has determined that if the sample size is equal to or greater than 30 then the independent-sample t-test can be used without appreciable error. The pretest and posttest groups are very similar in size (70 & 56) and this will also reduce the variance between the two samples.

Recommendations

Clinical. The statistically significant findings of improved communication and conflict

resolution after the implementation of a communication initiative has supported the continuance

of many of the parts of Dingley, Daugherty, Derieg, and Persing's (2014) program.   The

principles of shared governance initiated the use of councils to diffuse information, but also to

problem solve, guide, and support. The continuation of these councils can address other issues

within an intensive care environment and give feedback and information to the interdisciplinary

leadership.

Communication Council/Committee. Any ICU could benefit from a communication

committee. This committee could address issues pertaining to communication whether it be

individual, departmental, interdisciplinary, or institutional. This committee should work closely

with a staff education committee to make sure policy changes are distributed in a timely and

efficient manner. A communication committee could be utilized to build organizational trust.

Organizational trust is the degree that one believes in the promises and good intentions of an

organization (Cook & Wall, 2010). A communication committee could build trust between

leaders and their staff members as well as foster a positive work environment.

Daily Interdisciplinary Rounds and Daily Goals. Daily rounds, with an interdisciplinary

team, provides a daily review of each patient. Discussion between the staff members address

what is working and what is not. Within these changes alternative changes to treatment are

discussed and the pros and cons of each analyzed. Rationales to treatment can be discussed and

teaching occurs among all staff and in particular with inexperienced staff. Setting daily goals in

rounds helps achieve the ultimate goal of for each patient—a healthy discharge to home with few

or no morbidities. Reviewing these goals each day helps to optimize the care each patient

receives. This correlates with Licata et al. (2013) findings regarding interactive interdisciplinary

staff rounds. Nurses began to lead rounds and were empowered by the responsibility. This

process did three important things for the nurses: 1—they felt more valued by the medical team,

2—leading rounds reinforced the need for nurses to be part of rounds and 3—the process

improved patient care because of the increased information from the interdisciplinary staff

during rounds.

      Huddles. This author believes that huddles were the most successful part of this project.

NNP led huddles after each shift change empowered the staff. Staff members felt valued and

then began to contribute more to the process. Initially the NNP would be the one contributing all

the information during huddles; however, after a few weeks the nurses and RCPs were offering

more information and feedback. Huddles improved the work environment and patient care

within the NICU. Kantor, the developer of the theory of organizational empowerment, believed

work environments that provide resources, support, access to information and learning

opportunities empower employees to do their work (Laschinger, Heather, Finegan, & Shamian,

2001). Huddles did empower the nurses to be more involved in the plan of care for their

patients. They were transformed from following orders to being more interactive and involved

in the plan of care.

      SBAR. The continued use of SBAR provides a communication framework. SBAR gives

nurses autonomy, builds interdisciplinary trust, and builds a bridge of communication across not

only disciplines but to leadership as well. SBAR gives the interdisciplinary staff the tools

needed for effective communication between one another. SBAR when used correctly creates an

environment of patient safety that teaches assertiveness and conflict resolution. Diedrick et al.

(2011) found that leadership is essential to the development and maintenance of a

communication strategy. Communication councils composed of leadership and staff could involve leadership and empower staff in this process and should be utilized.

Educational. The project findings reinforce previous research, specific to the effectiveness of communication interventions on communication and conflict resolution within the ICU interdisciplinary team (Boyle et al., 2004; Boss et al., 2013; Dadiz et al., 2013; Dingley et al., 2014; Jasper et al., 2012; Mayer et al., 2011; McCullock et al., 2011; Simmons & Sherwood, 2010). The American Association of Colleges of Nursing (AACN, 2015) recommends early socialization in interdisciplinary teamwork. This requires overcoming gender, cultural, and class barriers as well as common goals between each discipline for collaboration. The author's project reinforces the need for an interdisciplinary approach to the teams that care for patients within the ICU environment. Interdisciplinary education may be the link for cost-effective, high-quality health care (AACN, 2015).

Research. The quality improvement project applied existing scholarship to an issue within a NICU. The project used councils to diffuse the innovation to the interdisciplinary staff. The role of councils and their dynamics within the theory of innovation of diffusion is an area that warrants further examination. According to the AACN (2015), the role of the educational process in enhancing or interfering with collaboration of teams and councils has not been well documented. Interdisciplinary relationships within the domain of healthcare systems can provide quality, cost-effective care; however, the dynamics of these relationships will continue to provide new knowledge through examination and research.

Conclusion

The quality improvement project did improve unit communication and conflict resolution. With the improvement in communication there is also an improvement to quality

patient care. Even though there was not any improvement seen in teamwork and job satisfaction the project provided evidence of two areas requiring increased exploration, the area of leadership and the staffs' perception of leaders. These areas can be addressed with a subsequent quality improvement project which will build on the findings of this project with the ultimate goals of increased job satisfaction and improved unit morale.

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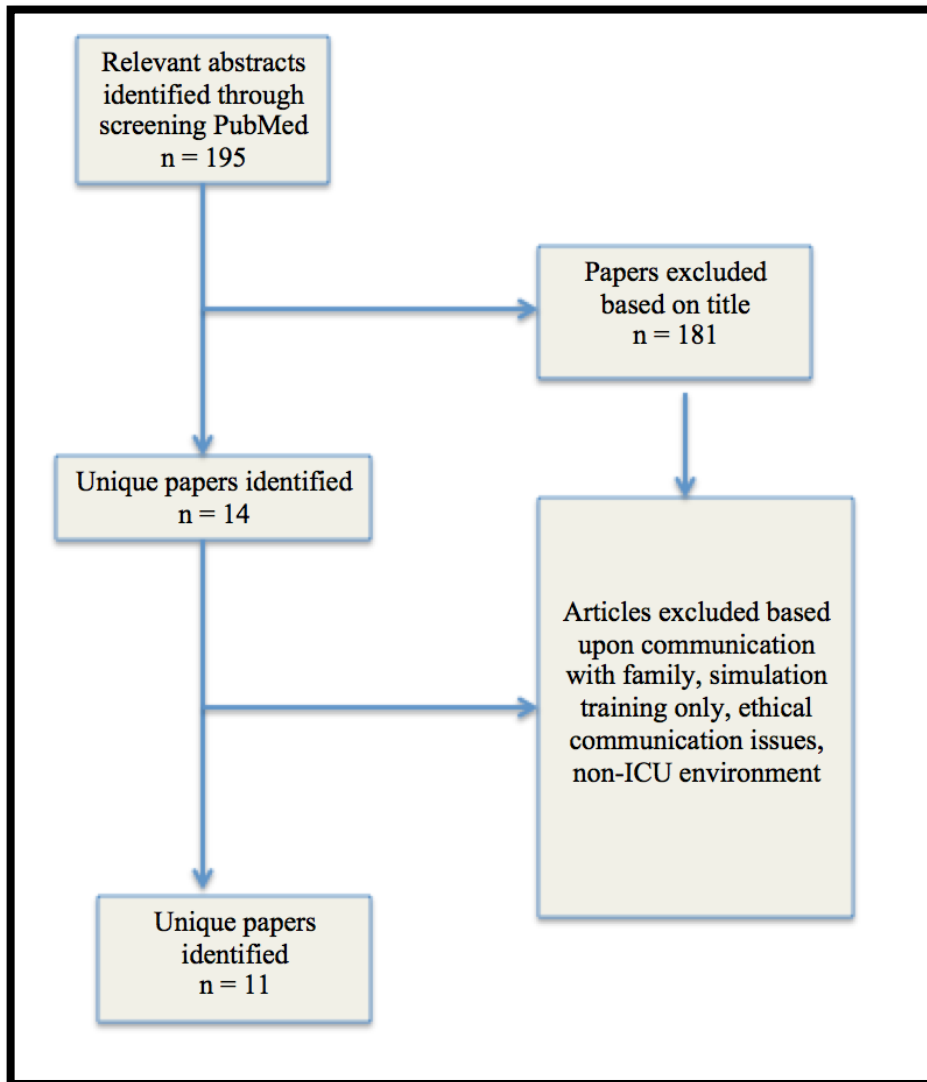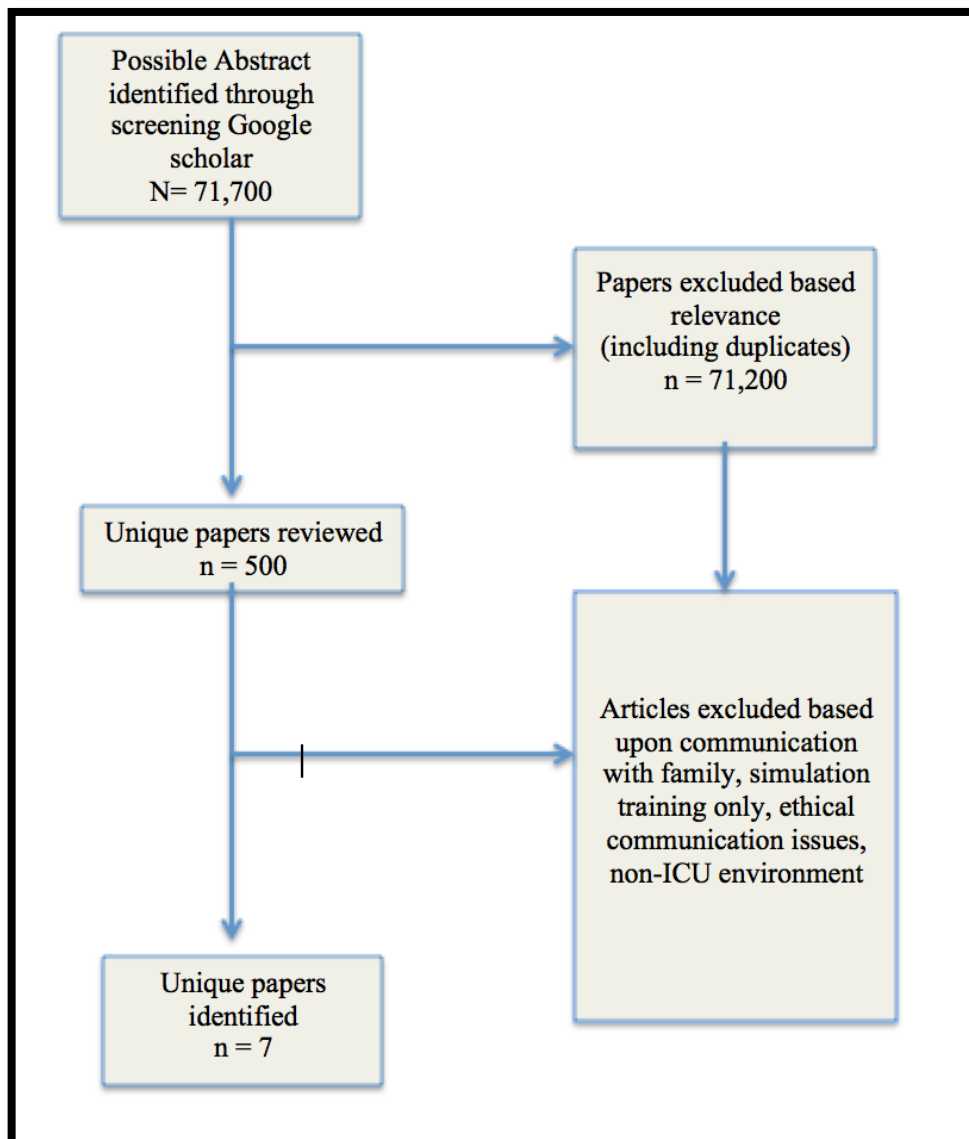
Appendix

Figure 1. PubMed Literature Search

Figure 2. Literature Search Google Scholar

Table 1. Studies of Communication in the Intensive Care Setting

Reference	Research Design	Sample	Instruments	Key Findings
Reader et al. (2009), Interdisciplinary communication in the intensive care unit	Cross-sectional survey	N=184 ICU staff at 4 UK hospitals	ICU-nurse/physician Questionnaire	1-Staff have different views of their communications with one another. 2-Open communication creates a better understanding of patient goals. 3-Environment needs to be conclusive for open communication with out the fear of punishment or embarrassment
Azoulay et al. (2008), Prevalence and factors of intensive care unit conflicts: The conflictus study	One-day cross-sectional survey of ICU clinicians Multivariate analysis	N = 7,498 ICU staff members 323 ICUs in 24 countries	Questionnaire developed by the European Society of Intensive Care Medicine (ESICM)	1-70% of staff reported ICU conflicts. 80% of these conflicts were considered harmful. 2-Conflicts were significantly associated with job strain. 3-Workload, communication, and end-of-life- care cause of strain. 4-Multifaceted conflict-reducing interventions are needed targeting ICU staff
Chang et al. (2010) Interdisciplinary communication in the intensive care unit at the University Hospital of the West Indies	Cross-sectional survey	N=111 All medical staff of an ICU	Questionnaire	Openness of Communication experienced with physicians more than nurses; Less Openness associated with increasing seniority; Nurses understood patient care goals; negative perceptions of leadership; there is a need for leadership and communication training
McDonald, Rubarth, and Miers (2012) Job satisfaction of neonatal intensive care nurses	Descriptive correlation design	RN=72; APRN=37 at 2 regional NICU conferences in 2009 & 2010	Questionnaire	Participants felt most satisfied caring for patients in stressful situations & were satisfied with their level of autonomy and interdisciplinary communication in their units
Jasper et al. (2011), Too little appreciation for great expenditure? Workload and resources in ICUs	Quantitative, multicenter correlation study	N = 142 5 different ICUs in Hannover, Germany Females = 74 (72%) Males = 29 28%) Physicians=25(22%) Nurses=89(78%) Invalid surveys = 39	Questionnaires: 1-- Effort-Reward Imbalance 2--Hospital Anxiety & Depression Scale 3--Social Support 4--Life Satisfaction	1- High job strain and burden with increased incidence of mental stress symptoms. 2-Study supported the need for developing programs that will reduce stress and improve communication and leadership.
Karanikola et al. (2012), Exploration of the association between professional interactions and emotional distress of ICU nursing personnel	Descriptive correlational design	N = 229 Male = 46 Females = 183 Nurses surveyed from 11 different hospitals around Athens, Greece	Questionnaire: Demographic, Hamilton Anxiety Scale, & Index of Work Satisfaction	1-Association with ICU nurses' feelings about quality of interaction that exhibits an association with their psychological well-being. 2-Quality communication between nurses' & physicians increases nurses' job satisfaction and increases retention

Table 1 cont. Studies of Communication in the Intensive Care Setting

Reference	Research Design	Sample	Instruments	Key Findings
Boyle & Kochinda (2004), Enhancing collaborative communication of nurse and physician leadership in two intensive care units	Pretest-posttest repeated measures design	N = 64 Nurses = 47 Physicians = 17	Pretest and posttest of Collaborative Communication Intervention ICU Nurse-Physician Questionnaire Survey evaluation of ICU patient and organizational outcomes	1-Study found that nurse/physician communication can be improved. 2-Collaborative communication has the potential benefits of increasing patient survival, shorten patient stays, improving ability of staff to meet needs of family, improved staff relationships, and increased staff satisfaction
Wahlin et al. (2010), Staff empowerment in intensive care: Nurses' and physicians' lived experiences	Open-ended interview of ICU nurses & physicians	Registered Nurses = 4 Enrolled Nurses = 4 Physicians = 4	Personal Interview	1-Findings similar with nurses & physicians. 2-A supportive atmosphere & good teamwork are needed to increase empowerment. 3-Staff needs to feel they are doing right by patients, families and other staff.
Simmons & Sherwood (2010) Neonatal intensive care unit and emergency department nurses' descriptions of working together: building team relationships to improve safety	Descriptive qualitative design	NICU (11) & ED (8) Nurses	4 Focus Groups—Interviews	Conflict was a result of a lack of respect. Relationships are built upon trust—shifts distrust one another. There is a need for healthcare professionals to learn teamwork and communication skills
Licata et al. (2013) A foundation for patient safety: Phase I implementation of interdisciplinary bedside rounds in the pediatric intensive care unit	Quality Improvement Initiative	20 Core group nurses & physicians		More active participation from nurses in rounds; increase in reporting of overnight events; increase in reporting of discrepancies in physician orders by nurses
Pronovost et al. (2003) A foundation for patient safety: Phase I implementation of interdisciplinary bedside rounds in the pediatric intensive care unit	Prospective cohort study	16 bed oncology ICU	Survey	Significant increase in number of staff who knew patients daily goals Significant decrease in length of stay in ICU.

Table 2. Communication Improvement Strategies in the ICU Setting

Reference	Research Design	Sample	Instruments	Key Findings
Dadiz et al. (2013), Interdisciplinary simulation-based training to improve delivery room communication	Prospective observational study over 3 years	N=228	Checklist /Ratings	Checklist scores improved annually after SBT sessions. Staff perception of communication also improved with SBT over the 3-year period.
Ohlinger, et al. (2003), Development of potentially better practices for the neonatal intensive care unit as a culture of collaboration: Communication, Accountability, Respect, and Empowerment	Qualitative	4 NICUs	Questionnaire	The Care team developed seven potentially better practices: 1-a clear, shared NICU purpose, goals, and values; 2-effective communication among and between teams and team members; 3-leaders lead by example; 4-nurture a collaborative NICU environment with trust and respect; 5-live principled standards of conduct and standards of excellence; 6-nurture competent and committed teams and team members; and 7-commit to effective and positive conflict management
McCulloch et al. (2011), Interventions to improve teamwork and communications among healthcare staff	Systematic literature review	1036 abstracts, 14 articles reviewed in detail (4 randomized trials, 10 non-randomized trials)		1-Weak evidence that team work training is beneficial. 2-There is a need for better quality research and cost-benefit analysis are needed
Diedrick et al. (2011), A practical communication strategy to improve implementation of evidence-based practice	Quasi-experimental before after design/survey	204 staff nurses surveyed; 104 surveys were returned	Developed a nurse survey to measure consistent communication strategy using a 4-poing Likert-type scale	1- Leadership is essential for development and maintenance of a system of communication. 2-Staff involvement in communication strategy improves nurse satisfaction
Mayer et al. (2011) Evaluating efforts to optimize TeamSTEPPS implementation in surgical and pediatric intensive care units	Observational quasi-experimental before/after design	2 units (PICU & SICU) 5 & 7 physicians; 80 & 77 nurses; 90 total therapists	Observed, Interviews Measurable outcome data	Decreased length of time in PICU and SICU of ECMO set up Overall decrease number of nosocomial infections in PICU & SICU Perceived better teams, communication, and interdisciplinary relationships
Dingley, et al. (2014), Improving patient safety through provider communication strategy enhancements	Pre-test/post-test design	Pilot testing in a Medical Intensive Care Unit (MICU) and an Acute Care Unit (ACU)	Hospital Survey of Patient Safety	1-Increased satisfaction among staff with communication. 2- Higher resolution rates of patient issues. 3-Leadership made a clear difference in the integration of the communication strategies
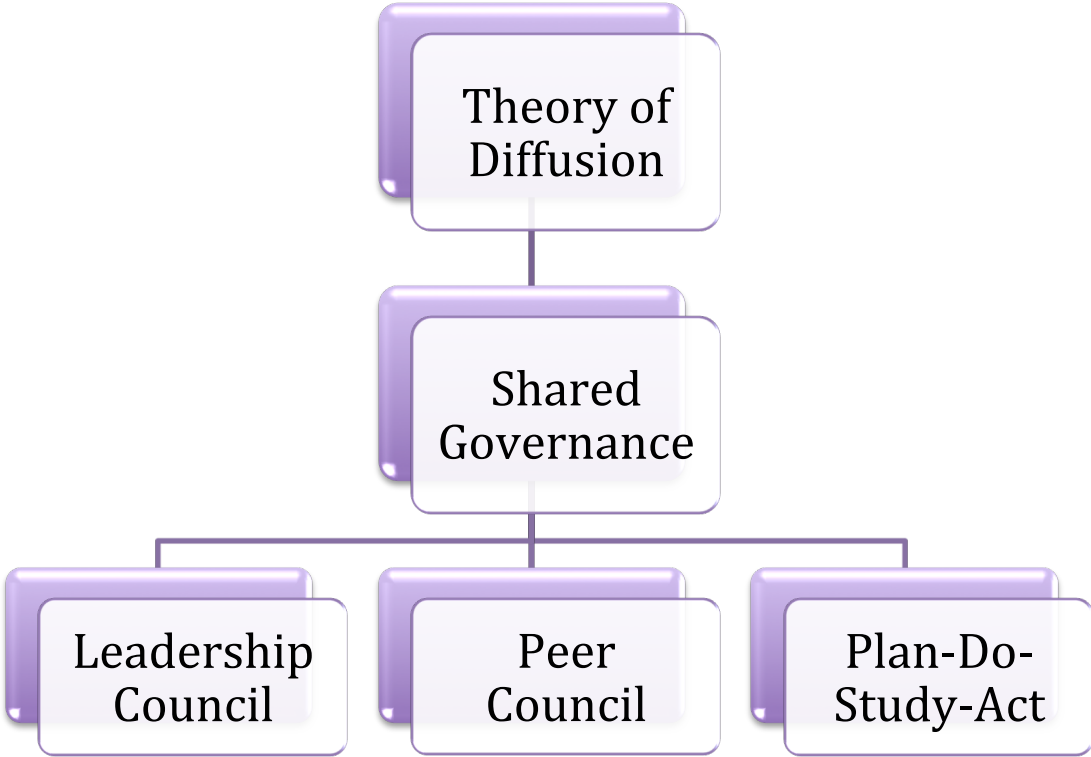
Figure 3. Theory of Diffusion of Innovation with Shared Governance

COMMUNICATION CHANNELS

PRIOR
CONDITIONS
1. Previous practice
2. Felt needs/problems
3. Innovativeness
4. Norms of the social
   systems

I. KNOWLEDGE → II. PERSUASION → III. DECISION → IV. IMPLEMENTATION → V. CONFIRMATION

1. Adoption → Continued Adoption
→ Later Adoption
▲ Discontinuance
2. Rejection → Continued Rejection

Characteristics of
the Decision-
Making Unit
1. Socioeconomic
   characteristics
2. Personality
   variables
3. Communication
   behavior

Perceived Characteristics
of the Innovation
1. Relative advantage
2. Compatibility
3. Complexity
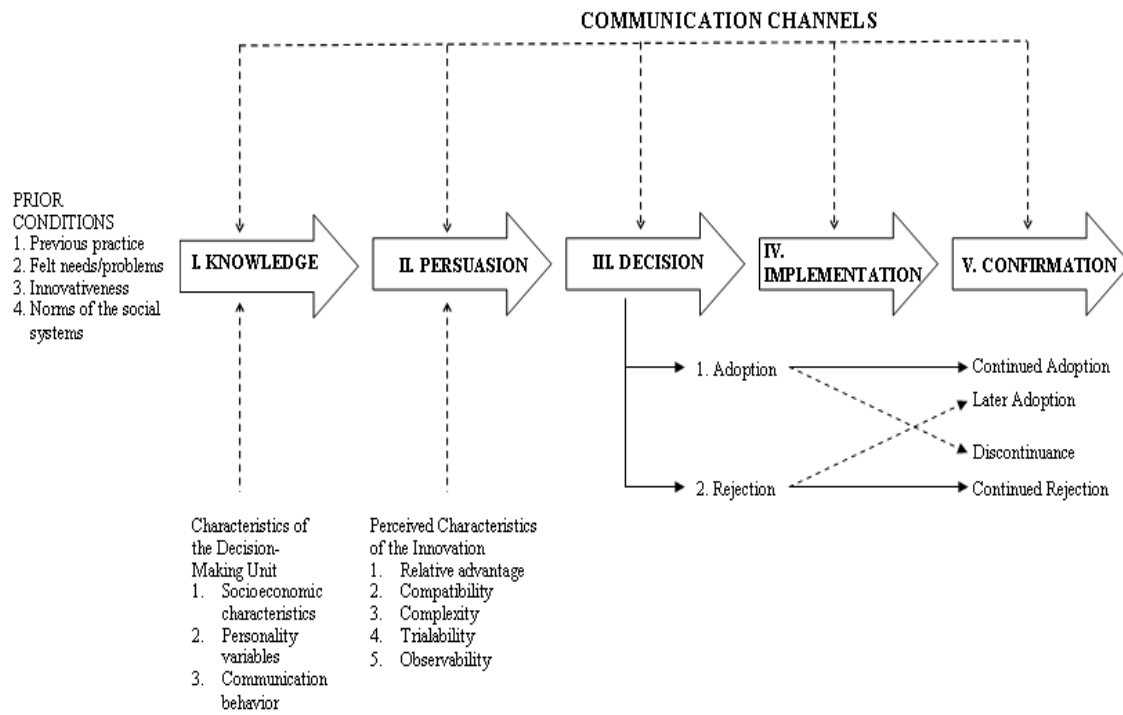4. Trialability
5. Observability

Figure 4. A Model of Five Stages in the Innovation-Decision Process

UNIVERSITY OF CALIFORNIA, BERKELEY
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Blue Cross of California Distinguished
Professor of Health Policy and Management

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Berkeley, California 94720-7360
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June 11, 2014

Wendy Brock, MSN, NNP-BC
East Carolina University
Greenville, NC 27858

Dear Ms. Brock:

I am writing in response to your recent request for permission to use our ICU nurse-physician
questionnaire. This letter should serve as formal indication that you have our permission to use
the questionnaire as long as it is cited in any publications and written materials that may result
from your research. The proper citation for use is: "Excerpted from The Organization and
Management of Intensive Care Units. Copyright 1989, Shortell and Rousseau." I would like to
emphasize that **permission does not extend to either Section II (The Workplace and
Facilities) or Section III (The Organization Culture) of the original full-length
questionnaire that are under control of Human Synergistics and require written
permission from Human Synergistics (these sections are not in the short version)**. You may
adapt any of the other questions in the questionnaire as necessary for your purposes. Additional
information regarding the ICU project and related materials is available at
http://shortellresearch.berkeley.edu/ICU.htm.

We would be very interested in learning of the results (a summary only) of your research. Our
best wishes in your work.

Sincerely,

Stephen M. Shortell
Stephen M. Shortell, Ph.D.

Figure 5. Permission to use ICU Physician-Nurse Questionnaire

CAPE FEAR VALLEY
TRANSFORMING HEALTHCARE

MEMORANDUM

TO: Principal Investigator

FROM: Faye L. Owens, CMSC, CPCS
             Medical Staff Coordinator

DATE: July 15, 2014

SUBJ: Information Request – IRB

Attached is requested information regarding submission of a research protocol to the IRB. It will be necessary for you to:

- Review and sign the attached "investigator agreement".
- Complete the attached "Research Review Summary".
- If applicable, prepare a site specific consent form -- a "Consent Form Template" is attached to assist you in preparing the consent form in an appropriate format. Also, please ensure the consent form contains all elements outlined in the attached "Consent Form Checklist" as this is the document the IRB will utilize in reviewing the consent form for appropriateness.
- Provide a CV for each investigator (if not submitted previously)
- Provide documentation of recent (in the past year) research education for each investigator and protocol coordinator. (CITI on-line education or equivalent – instructions for accessing CITI education are attached)
- Submit all information to me electronically at fowens@capefearvalley.com.

Upon receipt, I will distribute the above information to designated IRB members for preliminary review. You will be notified if the preliminary reviewers have questions so these might be addressed prior to the full meeting of the IRB. Once this has been accomplished, the protocol will be presented at the next meeting of the IRB for full review and approval. The IRB routinely meets on the third Thursday of each month. In order for the protocol to be presented, it will be necessary that all requested information be received at least two weeks prior to the date of the scheduled IRB meeting. Please plan to attend the IRB meeting to present information and respond to questions regarding your research proposal.

If you have additional questions, please do not hesitate to contact me (6039).

Figure 6. IRB Approval at CFVMC

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board Office
4N-70 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** ·
www.ecu.edu/irb

Notification of Exempt Certification

From: Biomedical IRB
To: Wendy Brock
CC:
            Sonya Hardin
Date: 12/23/2014
Re: UMCIRB 14-002317
            Improving Communication Between Interdisciplinary Teams in a Neonatal Intensive Care Unit

I am pleased to inform you that your research submission has been certified as exempt on 12/22/2014. This study is eligible for Exempt Certification under category #2 .

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

The UMCIRB office will hold your exemption application for a period of five years from the date of this letter. If you wish to continue this protocol beyond this period, you will need to submit an Exemption Certification request at least 30 days before the end of the five year period.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

Figure 7. IRB Exempt Status from ECU

NICU Interdiscipliary Communication
Wendy Brock-ECU DNP program
Project Schedule

Program Implementation

Feb. 1 through
April 30, 2015

Post-survey

May 1-21, 2015

Statistical Evaluation

June 1, 2015

| Nov 2014 | Dec | Jan | Feb | March | April | May | Jun | July 2012 | August |

Project Start--Survey

Jan. 1-21, 2015

Councils Meet

Jan. 22-31 2014

Project Finish

August 1, 2015 (tentative)
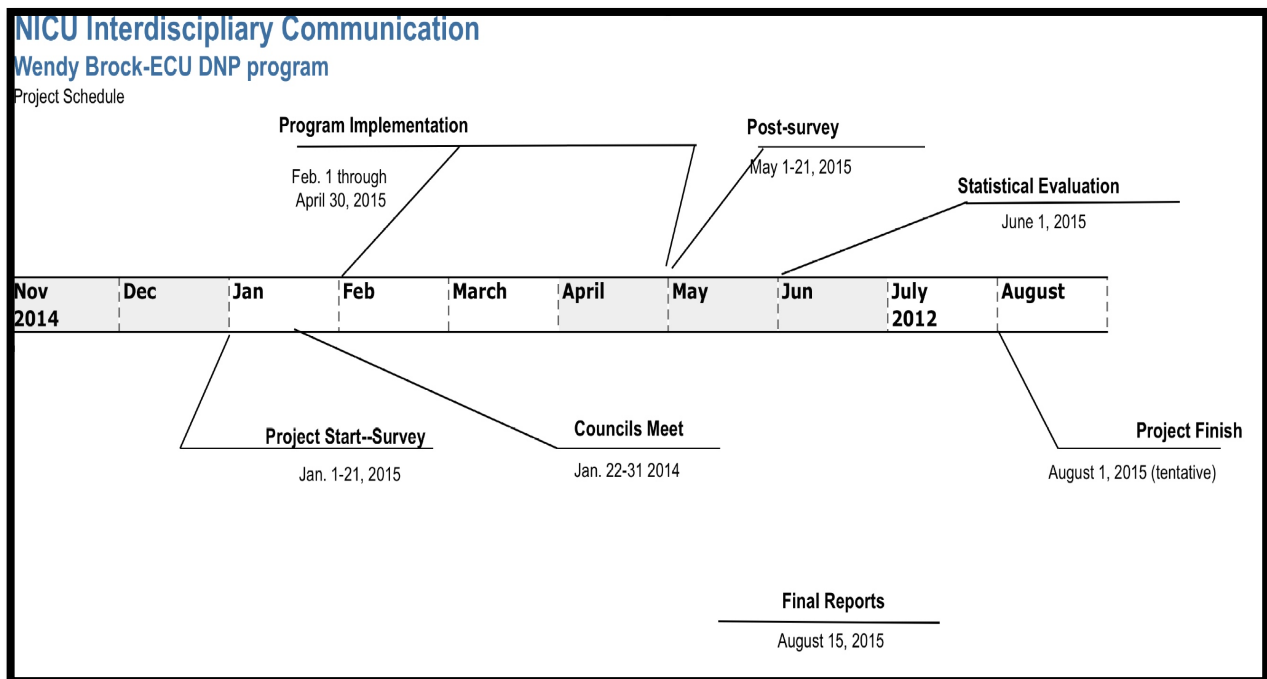
Final Reports

August 15, 2015

Figure 8. Project Timeline
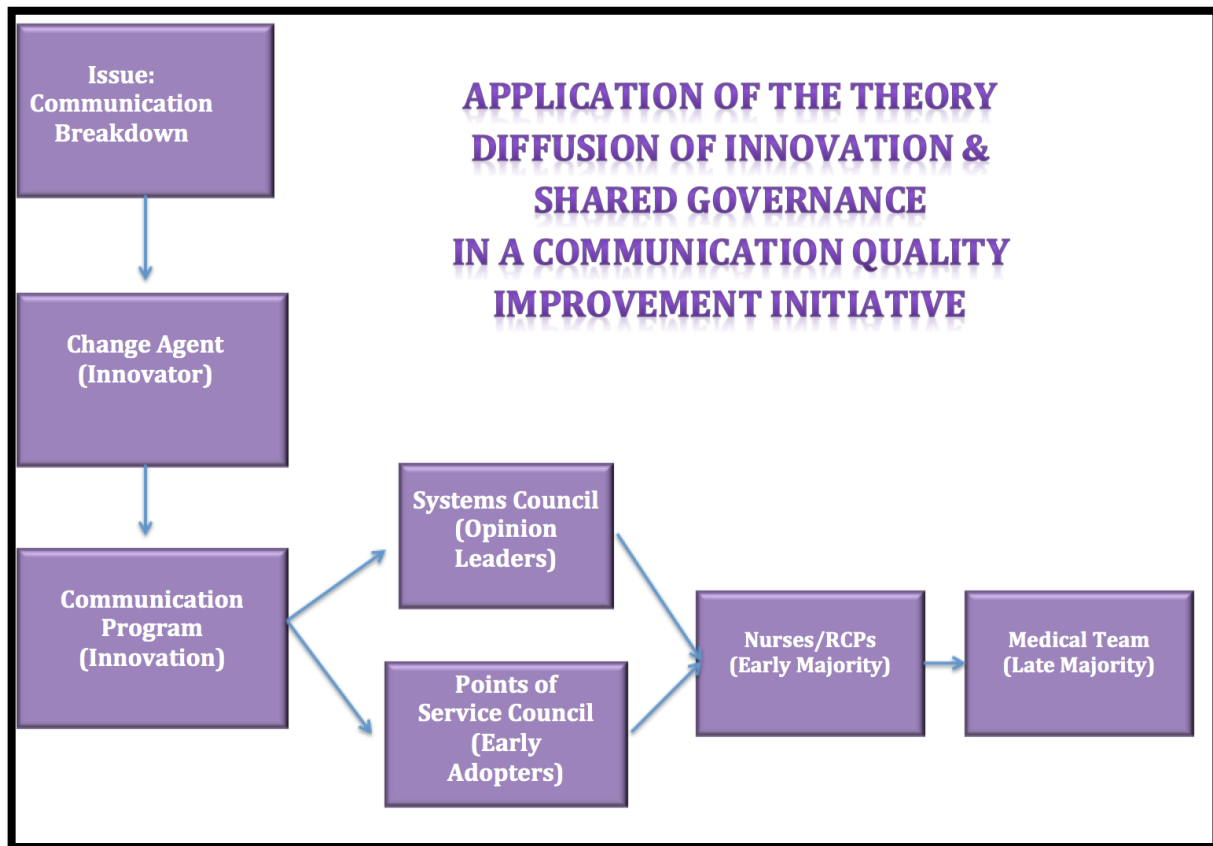
Figure 9. Project Theory

Table 3. Demographics of Pre & Post Survey Participants

		Pretest N=70	%	Posttest N=56	%
Age (years)					
	20-30	11	16	8	15
	31-40	13	18	12	21
	41-50	16	23	13	23
	51-60	25	36	18	32
	>60	5	7	5	9
Position					
	NNP	10	14	9	16
	RCP	14	20	8	14
	RN	42	60	37	66
	Physician	4	6	2	4
Education (Degree)					
	Associate	33	47	24	43
	Bachelor	23	33	23	41
	Masters	11	16	7	12
	Doctorate	3	4	2	4
Experience (years)					
	1-5	15	21	13	23
	6-10	7	10	9	16
	11-20	13	19	9	16
	>20	35	50	25	45
Total		70	100%	56	100%

Table 4. Reliability Statistics of Survey Tool

Cronbach's Alpha	.899
Cronbach's Alpha based on Standardized Items	.900

Table 5. Independent Samples T test of Pre and Posttest Results

	Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
Question	F	Sig	t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
I can think of the number of times that I received incorrect information from other staff members in this unit.	1.81	.180	-2.66	124	.009	-.450	.169	-.785	-.115
When a patient's status changes, I get relevant information quickly.	10.86	.001	-2.10	121	.029	-.295	.133	-.559	-.031
Unit members will withdraw from the conflict.	.639	.425	-2.18	122	.031	-.288	-.388	.178	-.741

Table 6. Mean Variable Measurements

		Pretest N=70	Posttest N=56
Communication Leadership		3.55	3.62
	Nursing	3.05	2.69
	NNP	3.35	3.29
	RCP	2.91	2.69
	Physician	3.11	3.00
Teamwork		3.32	3.38
Conflict Management		3.10	3.00
Job Satisfaction		3.49	3.48

Likert scale 1-5; Positive >3; Negative < 3