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Implementation of the Provider Bull's-eye: A Tool to Guide Clinical Reasoning and Communication for Nurse Practitioners

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Abstract

Problem

In a large urban pediatric hospital in the southeastern region of the United States, Pediatric Intensive Care Unit nurse practitioners (NPs) had difficulty transitioning to practice. Identified NP transition to practice barriers were arduous clinical reasoning and ineffective communication. Transition to practice barriers impact patient outcomes and healthcare cost due to patient care errors, delays in care, and NP turnover from poor practice perceptions. The goal of the Doctor of Nursing Practice project was to examine whether the Provider Bull's-Eye Tool (PBT), a tool to guide clinical reasoning and communication for NPs, would decrease time to diagnosis and intervention selection, while simultaneously improving communication and perceptions of practice confidence in new NPs.

Methods

The PBT was evaluated using a two-group comparison. All pilot participants were volunteers, actively enrolled in a NP program or had less than or equal to two years NP experience. Project participants, N=17, were randomly divided into those who completed simulation in medicine education (SIM) evaluation prior to PBT education, and those who completed SIM evaluation post PBT education. During SIM, project participant time to diagnosis and interventions were documented using a validated checklist. After SIM, each participant verbalized a recorded handoff report to a transferring facility. Recorded handoff reports of both groups were analyzed for communication enhancements from PBT training. Once both groups concluded all project components, a Likert survey evaluating perception of practice confidence after PBT training was completed.

Results

The PBT trained group was observed to be marginally slower during SIMS due to increased cognitive processing; however, they were more likely than the non-PBT group to diagnose and intervene appropriately in several areas. The PBT group also had more effective communication patterns during handoff reports than the non-PBT group. Further, PBT training increased perception of practice confidence in both groups.

Conclusion

Based on findings, the PBT is a promising tool that has the capacity to enhance NP clinical reasoning while simultaneously promoting effective handoff communication. Improving these skills increased perceptions of practice confidence. Combined, these improvements could result in decreased healthcare cost by reducing patient errors, delays, and NP turnover.

Keywords: Nurse practitioner, clinical reasoning, communication, perception of clinical practice, onboarding, transition to practice, clinical outcomes, cost containment, retention, turnover

Implementation of the Provider Bull's-eye: A Tool to Guide Clinical Reasoning and Communication for Nurse Practitioners

Nurse practitioners (NPs) are established providers that are valued team members who assist in standardizing care, generating revenue and reducing the length of stay (Kapu, Kleinpell, & Pilson, 2014). In a large urban pediatric hospital (LUPH) in the southeastern region of the United States, through direct observation, the investigator noted Pediatric Intensive Care Unit (PICU) NPs had difficulty transitioning to practice. Transition to practice barriers were defined as arduous clinical reasoning and ineffective communication with medical doctors (MDs). The investigator, a 21-year veteran registered nurse (RN) and NP in the PICU, believed these unexplored barriers would contribute to patient care delays and poor practice perceptions, which ultimately would impact patient outcomes and healthcare cost. The purpose of the investigator's DNP project was to evaluate the implementation of the Provider Bull's-eye Tool (PBT) (Fig. 1). The PBT is the investigators' self-designed transition to practice focused tool that has been developed to guide clinical reasoning and communication for NPs in the PICU. The aim of the scholarly project was to improve clinical reasoning and communication patterns in licensed NPs and NP students. Improving a NP's ability to accurately develop differential diagnosis and intervene in a timely manner may reduce patient care errors and improve care delays. Furthermore, reducing transition to practice barriers may also decrease associated healthcare cost from patient care errors, delays and frustration driven NP turnover.

Background and Significance

In 2014, to address the observed transition to practice barriers that impeded full practice potential, an evidence based structured multimodal orientation program was implemented at the project site, a LUPH in the southeastern region of the United States (Bahouth & Esposito-Herr, 2009). Despite implementation of the orientation program, the investigator observed transition to practice barriers persisted. One observed barrier was NPs continued to struggle with clinical reasoning or the development of differential diagnosis with appropriate interventions. For the NPs, this frustration was best summarized by Paton, Stein, D'Agostino, Pastores and Halpern (2013), "the steep learning curve in transitioning from being a facilitator of care to becoming a director of care can be daunting due to knowledge deficits, high expectations and most importantly, the pressures of being responsible for time-sensitive, high impact decisions" (p. 440).

A second transition to practice barrier observed by the investigator was ineffective communication patterns with MDs that further limited practice. Per the PICU MDs, handoff reports between providers from PICU NPs were poorly summarized, often lacking problem identification, differentials, rational for interventions and a shared mental model on the plan of care. As described by Spain, Decristofaro and Smith (2004), nurses learn to share information in a rather stylized script that often contains superfluous or redundant information, imbedding the major problem in the jargon. When they transition to a NP role, they often continue this communication pattern which is almost incomprehensible to members of other professions (Spain, Decristofaro, & Smith, 2004). Communication transition to practice barriers decreased interdisciplinary collaboration and were of a mutual concern for both NPs and MDs (Spain, Decristofaro, & Smith, 2004).

Further limiting NP transition to full practice potential in the PICU was a low retention rate of three years, verified by the PICU business manager. Established through dialogue with the PICU NP group, the investigator identified transition to practice barriers, arduous clinical reasoning and ineffective communication directly impacted job satisfaction. Repetitive turnover with constant introduction of novice staff can reduce the quality of patient care, raising concern for increased morbidity and mortality (Casida & Pastor, 2012). Low retention and ensuing turnover cost associated with hiring, education and reduced productivity also heavily impacts the “morale of remaining employees, adds to administrative time and is disruptive to both organizational culture and structure” (Waldman, Kelly, Arora, & Smith, 2010, p. 10).

Arduous clinical reasoning, ineffective communication and low retention have the potential to negatively affect healthcare outcomes and cost. Initially designed to address PICU department need, the PBT was constructed for new orienting NPs. Taking the PBT a step further, the investigator implemented and appraised the PBT as a problem focused Doctor of Nursing Practice (DNP) project to address the identified transition to practice barriers in licensed NPs and NP students.

Clinical Question

Prior to DNP project implementation of the PBT, the investigator used the following problem, intervention, comparison, outcome (PICO) formatted question to guide the scholarly project; For NPs in acute care settings, what are the best practices for developing clinical reasoning and communication skills needed to deliver a proficient handoff compared to current practices, that will improve patient care, communication and retention?

Literature Search

A literature search was conducted using the Georgia State University Galileo search engine which accesses “1.3 million volumes, 276 databases, almost 14,000 e-journals and 30,000 e-books” ("Library Basics," 2017, p. 1). Selected disciplines for the literature search included communication, science, sociology, health and medicine, nursing and allied health. The initial search using the terms nurse practitioner, education, clinical reasoning and communication, yielded over 5,000 articles. Additional search terms were needed in multiple different combinations to yield more selective results. Further, search terms were added to include: critical care, acute care, onboarding best practices, transition, differential diagnosis, collaboration, clinical outcomes, cost containment, retention, job satisfaction and turnover. To best address the clinical question, the literature search was divided into two components and search terms were applicably redistributed. The first focus of the literature search was aimed at defining the best practices for developing clinical reasoning. The second portion of the literature search concentrated on best practices for communicating a proficient handoff. Limitations on the search included the English language, year of publication between 2010 to 2017, and articles specific to the nurse practitioner or physician provider roles. Specific databases of focus were the Cochran Library, CINAHL, and PubMed. Google Scholar was also utilized as an additional search engine for review. Evidence type searches included systematic reviews, clinical practice guidelines, individual research studies and electronic textbooks.

There were no single literature review articles that addressed both best practices for developing clinical reasoning and communication skills needed to deliver a proficient handoff simultaneously. However, redistribution of search terms with separate literature reviews did narrow results. The remaining 120 identified articles were then reviewed for relevance and selection criteria. From the 120 articles, 25 full text articles were pulled for full review. The investigator chose to allow one article outside the date range because it was the only one in existence that directly provided insight into the development of a tool that facilitated clinical reasoning and communication for nurse practitioners. After the elimination of 15 articles found to be either irrelevant to the project or low-level evidence, the final article count was 10.

All supportive literature was evaluated using Grading of Recommendations, Assessment, Development and Evaluation (GRADE) criteria ("GRADE Approach," 2013). The GRADE method is a systematic process of rating the quality of evidence and developing health care recommendations ("GRADE Approach," 2013). The GRADE approach assists the provider in making critical appraisals of evidence, preventing errors and improving communication of information ("GRADE Approach," 2013).

Review of Literature

The review of literature revealed multiple articles defining best practices for developing clinical reasoning and examined communication practices. However, the search did not yield direct evidence of clinical tools similar to the PBT to address the clinical problem. Despite various search strategies, the investigator found the search to be divergent, either addressing best practices for nurse practitioner onboarding or physician handoff communication. Based on search evidence, the investigator believed the identified transition to practice barriers among NPs, arduous clinical reasoning and ineffective communication, had not yet been formally explained. Therefore, the investigator collected relevant articles to build a case for the design and implementation of the PBT to address the clinical problem. For discussion, articles were grouped based on their divergent components into those that define best practices for developing clinical reasoning, followed by those that facilitate communication.

Best Practices for Nurse Practitioner Onboarding

The majority of articles identified in the literature search focused on onboarding nurse practitioners. Onboarding was defined as best practices for increasing knowledge, clinical skill and subsequent clinical reasoning (Bahouth & Esposito-Herr, 2009). An editorial book by Bahouth and Esposito-Herr (2009), *Orientation Program for Hospital Based Nurse Practitioners* summarized best practice standards for NP onboarding education. Knowledge of current NP education standards, as well as the nursing theory behind them served as the foundation for the development and implementation of the PBT. Themes from an expert panel of 20 multidisciplinary leaders, who described areas for improvement in NP clinical education, were also included in the literature review (Giddens et al., 2014). There were six themes: collaborative codesign of a new clinical education system by academic and practice leaders, standardized preclinical preparation, standardized student assessment, use of entrustable professional activities (EPAs) instead of clinical hours as measurable milestones of success, immersive clinical experiences, interprofessional education for team-based care and innovative educational practices (Giddens et al., 2014). Aligning current NP education standards with defined areas for improvement was crucial in the design of the PBT.

The application of either pre-graduate clinical preceptorships, new hire orientation programs, or post graduate fellowships found in literature revealed increased perception of practice confidence, clinical knowledge and decreased NP turnover. Coruh, Roberson-Wiley, Wright, and Kritek (2015) described a 12-week pre-graduate critical care preceptorship in a medical ICU and surgical ICU with non-acute care NP students. These pre-graduate NP students spent 6 weeks in each area and participated in 16 case-based teaching sessions (Coruh et al. 2015). Each session was specifically targeted toward nurse practitioner students and included objective clinical scenarios and a series of case-based questions (Coruh et al. 2015). Participation in the pre-graduate critical care preceptorship resulted in knowledge gains; mean pre-test scores of 50% improved post-test to 74% (Coruh et al. 2015). Further, participants indicated increased perception of practice skill in managing ventilation, shock and chest x-ray interpretation (Coruh et al. 2015).

Squiers, King, Ashbey, and Parmley (2012) also described a pre-graduate clinical preceptorship, known as the Acute Care Intensive Program. Program curriculum included specialized didactic, simulation and immersive ICU team rounding (Squiers et al., 2012). The program was designed to supplement core acute care nurse practitioner (ACNP) curriculum and educate ACNP student intensivist for clinical practice in multidisciplinary critical care facilities (Squiers et al., 2012). The program focuses on the development of cognitive clinical skill to allow for rapid diagnostic processing and clinical interventions through 35-45 high-fidelity simulations during a student's rotation (Squiers et al., 2012). Key components of training include situational awareness, cognitive flexibility and distributive cognition patterns (Squiers et al., 2012). Students rated the program as above average and excellent; however, the results of post-graduation surveys evaluating perception of practice readiness by students and future employers have not yet been released (Squiers et al., 2012).

Simone, McComiskey and Anderson (2016) described a new hire NP orientation and post graduate ACNP fellowship in a medical intensive care unit (MICU). The new graduate NP orientation included a two-day hospital and one day NP role orientation followed by a 12 to 26-week unit-based new hire orientation (Simone et al., 2016). The unit-based orientation included fundamentals of critical care support, advanced trauma life support and the use of a competency-based assessment tool that included: "knowledge, systems, procedural skills, communication, professionalism, and performance improvement competencies and proposed learning methods to acquire knowledge and skills" (Simone et al., 2016, p. 62). The new hire NP orientation increased perceptions of practice readiness from 54% to 94%, and decreased turnover from 14% to 11.4% (Simone et al., 2016).

The fellowship initially described by Simone et al. (2016) was a nine-month, two-armed program for both a trauma and medical-surgical critical care fellowship. The program now last 6 months, with weekly 1-day standardized didactic sessions, bimonthly procedural workshops or simulation sessions, and allows for crossover electives between the trauma and medical-surgical fellowships (Simone et al., 2016). The fellowship resulted in an 87.5% retention rate into employment (Simone et al., 2016).

NP role transition may be affected by prior RN experience and a formal orientation (Barnes, 2015). Barnes (2015) found that orientation contributed significantly with positive effects on NP role transition ($b=6.24$, $p<.001$). However, prior RN experience neither promoted or inhibited transition (Barnes, 2015). This article established orientation as a perceived best practice, easing transition. Interestingly, the level of RN experience was indeterminate. While this article further reinforces onboarding and tools such as the PBT as a best practice, the investigator included it for another reason; in this study, onboarding practices were favorable, but individual skill level was indeterminate (Barnes, 2015).

These articles guided the development of the PBT and defined pre-graduate clinical preceptorships, new hire orientation programs, and post graduate fellowships as areas for implementation. Improvements in knowledge and differential diagnosis processing were shown in these articles to improve perception of practice confidence, supporting successful NP transition to practice. The PBT also supports the development of clinical reasoning; thus, integration of the PBT into these areas could contribute to successful NP transition to practice. Further, interventions discussed in each of these articles resulted in increased knowledge and skill perception, which improved retention. Use of onboarding measures, including the PBT, in the development of the NP in their role may decrease turnover by increasing knowledge and perception of practice confidence. Another point to consider is the PBT specifically addresses the skill level of the learner, which many onboarding programs do not examine. A tool such as the PBT accounts for experience and may accelerate seasoned providers, which in theory could eliminate the skill level indeterminate results found by Barnes (2015). The investigator further considers this point during theory discussion.

Nurse Practitioner Handoff Report Communication

Communication is a critical component of this DNP Project. The were no recent articles that contributed to the overall knowledge encompassing NP handoff communication. However, there was one descriptive retrospective study by Spain, Decristofaro, and Smith (2004) that described the use of a clinical decision-making worksheet with FNP students in a community setting. Use of the worksheet improved interdisciplinary communication and clinical decision making by providing a framework for organization (Spain et al., 2004).

Other evidence examined included implementation of standardized communication or resident MD handoff processes. Hickey et al. (2012) implemented a standardized communication process that included techniques of assertion, closed loop communication and situational briefing. The study conducted 456 observations of the 6,500 staff trained in clarity in communication (Hickey et al., 2012). Verbal assertation increased from 67% to 97% and situation, background, assessment, recommendation (SBAR) language increased from 18% to over 95% (Hickey et al., 2012). In this study standardizing communication facilitated improvements in communication and teamwork (Hickey et al., 2012).

The final two communication articles examined improvement from the standardization of the resident MD handoff process. Walia et al. (2016) reported an improvement in communication and presumed patient safety by optimizing the handoff process. In this article, a university affiliated community teaching hospital pediatric residency program participated in a three-phase cross sectional study that evaluated pre-intervention, IPASS (illness severity, patient summary, action list, situational awareness and contingency planning and synthesis by receiver) pneumonic and electronic handoff system (EPH) implementation (Walia et al., 2016). Observations of 28 residents during 600 handoffs revealed decreased tangential conversation, improved identification of illness severity, fewer omissions and improved resident perceptions (Walia et al., 2016). Starmer and colleagues (2013) also conducted a study with MD residents. The findings of this study revealed that a multifaceted handoff program reduced rates of medical errors and preventable adverse events. The prospective cohort study evaluated 1,255 patient admissions (Starmer et al., 2013). Of the total admissions, 642 patients were evaluated pre-implementation and 613 patients were evaluated post implementation of a printed standardized handoff document (Starmer et al., 2013). Daily systematic surveillance revealed medical errors decreased 95%, preventable adverse events decreased 95%, and physician time at the bedside increased ($p=.03$) (Starmer et al., 2013).

By design, the PBT standardizes the NP communication process comparable to the clinical decision-making worksheet designed by Spain et al. (2015); thus, the PBT has implications to improve communication and teamwork. Further, it is reasonable to assume that standardizing NP handoff communication could also decrease clinical errors and prevent adverse events. This assumption is supported by Walia et al. (2016) and Starmer et al. (2013), whose studies established that a standardized handoff process, or multifaceted handoff program, reduced rates of medical errors and preventable adverse events with MD residents.

Gaps in Knowledge

The literature review exposed a clinical problem that had not yet been formally explained or evaluated in past studies. The purpose of the literature review was to identify best practices for the development of clinical reasoning and determining the communication skills needed for NPs to deliver a proficient handoff, also known as a provider to provider report. The search did not yield direct evidence of clinical tools used to achieve both, but supportive literature was found to build a case for the design and implementation of the PBT to address the clinical problem in a concurrent manner.

Multiple articles with studies comprised of NP samples were collected as evidence to support best practices for onboarding and the development of clinical reasoning. Although editorial books and expert panels are considered lower levels of evidence by the GRADE approach**,** the investigator allowed pertinent content from Bahouth and Esposito-Herr (2009), and themes from Giddens et al. (2014). The investigator considered knowledge of current and proven clinical practice standards, as well as the theory surrounding them, to be core content needed in the development of the PBT. Limitations from these articles included the potential for outdated material from the editorial book and participation bias from the expert panel.

Several articles dedicated to examining the application of either pre-graduate clinical preceptorships, defined new hire orientation programs, or post graduate fellowships in ICU settings were also included to further define best practices for onboarding. In addition, these articles were included in efforts to align the PBT as a tool performing a similar practice, guiding the NP provider during onboarding in the development of clinical reasoning and subsequent communication during handoff. Simone et al. (2016) provided strong recommendations, but moderate quality of evidence. The study was ACNP specific but limited by a smaller sample size, and the validity of the perception measurement tool was not discussed. Coruh et al. (2015) also provided strong recommendations with a moderate quality of evidence, but the study was limited in sample size and generalization due to its non-ACNP student focus. Squiers et al. (2012) provided strong recommendations but was considered lower level evidence. The three-year ACNP specific study was limited in that it only had early suggestive data.

Barnes (2015) found orientation contributed significantly to NP role transition. This article further reinforced onboarding and tools such as the PBT as best practice for eliminating transition to practice barriers. The study had an adequate sample size with strong recommendations, but moderate evidence quality. Limitations included a predominate family nurse practitioner (FNP) sample and National Institute of Health public access (NIH-PA) manuscript.

Although there were no recent articles that contributed to the overall knowledge surrounding NP handoff communication, there was one descriptive retrospective study by Spain et al. (2004) in which researchers described the use of a clinical decision-making worksheet similar to the PBT that provided a framework for organization. The study provided strong recommendations based on GRADE criteria; however, it had several limitations that restricted its classification to lower level evidence. The study was 13 years old, FNP specific and had no quantitative data to support improved communication findings.

Substantial articles that contributed to the communication component of the review include those that examined implementation of a standardized communication process or resident physician handoff. The studies were not NP specific, but relevance to the PBT was established based on similar role and practice between NPs and MDs during the handoff process. All three of these studies were considered strong recommendations with high quality evidence based on GRADE criteria. Each of the studies had large sample sizes and demonstrated improvements in communication or handoff process, thus improving patient care. There were, however, inherent limitations to each study. Hickey et al., (2012) did not discuss the validity of the communication measurement tool and the study was system wide, not provider specific. Walia et al., (2016) measured three different phases of handoff improvement in the nursery and pediatric floor. The measurement tool was modified, thus affecting validity and there was residency turnover that could have affected outcome. Starmer et al., (2013) did not formally discuss how systemic surveillance for data collection was conducted and implementation of printed handoff documents was not standardized. One unit used a computer-based handoff word document tool.

Theoretical Framework

It is essential to examine the perspective of nursing theory in the development of the DNP project after exploring the applicability of the PBT in practice (McCaffrey, 2012). Incorporating nursing theory to facilitate understanding of the observed transition to practice barriers is vital in the successful implementation of the DNP project. The investigator chose Patrician Benner's (1982) theory, *From Novice to Expert*, to augment identification of the relationships between the project variables, and to provide a framework for outcomes that exist secondary to those relationships (Moran, Burson, & Conrad, 2017).

Benner's theory is based on the Dreyfus Model of Skill Acquisition that postulates that there are five levels of proficiency that one must pass through to acquire and develop skill (Benner, 1982). By using the Dreyfus Model, Benner (1982) identified the five levels of acquired nursing knowledge as novice, advanced beginner, competent, proficient and expert. Benner (1982) identified that movement from one level to the other is based on two general aspects of skill performance. One aspect of skill performance is shifting from abstract principles to reliance on concrete past experience paradigms that contribute to critical thinking (Benner, 1982). The second aspect involves a change in perception, where a situation is seen as a whole and not a compilation of independent parts (Benner, 1982).

Within the context of Benner’s theory, content is key in understanding the observed transition to practice barriers in NPs. When assessing the transition to practice problem through the lens of Benner’s theory, the investigator found new graduate NPs have prior experience as nurses, which contributes to their critical thinking and perception, but they lack experience as an advanced practice nurse. Based on Benner’s levels of proficiency, the investigator concluded that new graduate NPs enter practice as hybrids with attributions of all five of the proficiency levels simultaneously: novice, advance beginner, competent, proficient and expert (Fig. 2). The investigator observed the new graduate NP’s distribution of skill proficiency to be dependent upon the individuals prior experience as a nurse; thus, a new graduate NP can have the need for skill acquisition in any of the five identified levels simultaneously and need a more blended approach when onboarding. To understand the observed transition to practice barriers in depth, the investigator will describe the five proficiency levels identified in new graduate PICU NPs, and examine the relationship based on Benner’s theory.

New graduate NPs in the PICU have struggled with clinical reasoning, which is defined as developing differentials diagnosis with appropriate interventions. Benner (1982) explained those at the novice proficiency level have only been taught attributes or features of the task that can be recognized without situational experience. Explained further, those at a novice proficiency level need to be taught attributes to guide them in situations and rules to guide action (Benner, 1982). The investigator observed that the new graduate PICU NPs could identify some attributes such as retraction or nasal flaring as components of respiratory distress to initiate a differential diagnosis as described by Benner. However, the new graduate NPs lacked the rules of care needed by the novice to guide intervention selection (Benner, 1982). Thus, despite emerging attribute recognition to aid differential diagnosis building, the investigator observed a lack of rules inhibited timely interventions, which resulted in delayed care and poor communication with MDs.

New graduate NPs in the PICU also demonstrated characteristics of the advanced beginner proficiency. As described by Benner (1982), those in the advanced beginner proficiency integrate attributes when performing task, and also employ some aspect recognition or the ability to recognize characteristic of a health process. Benner (1982) goes on to describe that those in the advance beginner proficiency level tend to ignore the differential importance between aspects. Benner quotes an expert clinician to explain their confusion, “they’re like mules between two hay stacks” (Benner, 1982, p. 404). Just as Benner described, the investigator observed new graduate PICU NPs integrating attributes to initiate differential diagnosis. They were also quick to use prior nursing experience to identify basic health processes through aspect recognition. Then identical to the advanced beginner proficiency, the new graduate PICU NPs were unable to prioritize interventions in a timely manner.

Based on the investigators observation, many of the new graduate PICU NPs had achieved the competent level proficiency as RNs prior to their transition into advance practice. Benner (1982) described the competent proficiency level as evidenced by a nurse who has developed the capacity to see actions in terms of long-range goals. Benner (1982) explained that goals dictated which attribute and aspects were considered important, thus allowing for prioritization. Benner (1982) further described the competent nurse as one who has a feeling of mastery through efficient organized planning, but yet still lacks speed and flexibility. The investigator recognized that new graduate PICU NPs were able to see long-range plans with basic diagnosis; clinical management was based on prior nursing experience. However, they lack the depth required to demonstrate true competent proficiency at an advance practice nurse level when dealing with medically complex cases or situations that were not previously experienced as an RN. New graduate PICU NPs lacked the flexibility and speed required to handle more complex cases. In critical situations, new graduate PICU NPs fell back into either a novice or advance beginner proficiency level needing rule and priority guidance.

New graduate PICU who had been seasoned RNs were more likely to fall into either the proficient or expert proficiency. Benner (1982) described the proficient RN as one who perceives a situation as a whole, able to access past experiences. Those at the proficient level hone in on the problem and make decisions easily based on the routine of past experiences (Benner, 1982). The expert however differs; they no longer need rules or guidelines of past experiences to connect understanding of a situation to an appropriate intervention (Benner, 1982). Experts are described by Benner (1982) as having an “intuitive grasp of the situation and zeros in on the accurate region of the problem without wasteful consideration of a large range of unfruitful possible problem situations” (p. 405). The investigator observed new graduate PICU NPs with extensive RN experience were much quicker to use past experiences and intuition to guide decision making. However, the investigator observed those groups skipped over differential building concepts and were more likely to misdiagnose and inappropriately intervene. New graduate PICU NPs who had achieved a RN proficient or expert proficiency level succumbed to the pitfalls of assumptions from past experiences or incorrect intuition.

Utilizing Benner’s theory *Novice to Expert*, the investigator was able to explain the relationship between the observed clinical performance deficits and the hybrid learning needs of the new graduate PICU NPs. Through theory exploration, the investigator determined the PBT should incorporate the needs of all five of Benner’s demonstrated levels of competency simultaneously: novice, advanced beginner, competent, proficient and expert. Guided by Benner’s theory, the investigator confirmed the design of the PBT did in fact address the five proficiency levels simultaneously. To address the novice competency, the PBT was modeled to promote attribute recognition to steer task. Further, it was ruled based to guide new graduate PICU NPs through the clinical reasoning process. For the advance beginner proficiency, the PBT guided prioritization of interventions. Then in consideration of the competent proficiency, the PBT incorporated skill-building scenarios to increase multi-tasking with speed and flexibility. Finally, to address the proficient and expert proficiency, the PBT provided the format for sequenced differential diagnosis building to avoid clinical assumptions based on experience and intuition. Attending to ineffective communication pattern across all levels of proficiency, the PBT provided the format for succinct communication between providers during a handoff report. In summary, based on knowledge gained from Benner’s theory, the investigator found the PBT engaged the NP as they vacillated between the proficiency levels, providing the necessary framework to overcome arduous clinical reasoning and ineffective communication transition to practice barriers.

Methodology

The goal of the DNP project was to explore the PBT as a best practice that decreases NP transition to practice barriers by improving clinical reasoning, communication and perception of practice confidence. As suggested by the evidence, improving these barriers may inherently improve patient outcomes and decrease NP turnover. Therefore, to evaluate the PBT, the following components were examined in a group of PBT practicing versus non-PBT practicing licensed NPs and student NPs during simulation in medicine scenario (SIMs): time to diagnosis, intervention, handoff communication markers and NP perception of practice confidence. Additionally, participants approach to patient care was noted to establish the relationship between Benner’s (1982) levels of nursing proficiency and PBT application as a tool to support multiple proficiency level performance. Further, participant patient care approach was noted to evaluate the PBTs effect on role delineation.

Participants and Recruitment

The design for the DNP project was an exploratory two-group comparison. The participants of the project consisted of RNs currently enrolled in a NP program or new graduate NPs who were employed at a single LUPH in the southeastern United States. The target sample size was 20. Participants were recruited via convenience sampling.

Specifically, participants were recruited by word of mouth and via email through a system distribution list at the LUPH. The email described the purpose and briefly detailed the project with instructions to contact the student principal investigator via email if interested in participation (see Appendix A). Inclusion criteria included LUPH employment with documentation of enrollment in a nurse practitioner program or LUPH employment as a new graduate NP. New graduate NP was defined as less than or equal to two years of clinical practice. Participants whom were not active LUPH employees, were not in a NP program, or those with greater than two years of clinical NP practice were excluded. Upon meeting the necessary inclusion criteria, potential participants were given a formal consent form explaining the project in detail. After voluntary completion of informed consent, project participants were randomly assigned a participant number for data collection. Participant personal identifiers were removed.

Participant Protection

The investigator’s DNP project protocol was submitted to the LUPH research review committee and then the LUPH Institutional Review Board (IRB). The DNP project was designated exempt and approved by both the research review committee and IRB. Participant confidentiality was protected throughout the project. Participants were assigned participant ID numbers with removal of all identifiers. Project data was stored in the investigator’s password protected work desktop with a secure server.

Setting

Participants were recruited from a single LUPH with over 600 beds (Facts, 2017). The LUPH is composed of three separate hospital campuses with a mix of both academic and private practice medicine models (Facts, 2017). Participants viewed the PBT didactic education in a setting of their own choosing. However, SIMs evaluation took place in the SIMs lab at one of the LUPH campuses. The design of the SIMs lab mimics a patient room in the PICU and is fully equipped with the following: automated SIM mannequin, monitor, bed, airway adjuncts, IV and lab supplies, crystalloid fluid and scenario medications. SIM team staff acted as the bedside RN and recorder for participants.

Instruments and Tools

The PBT was designed by the investigator as an instrument in clinical practice to assist student and practicing NPs with clinical reasoning and communication (see Fig. 1). Evaluation of the PBT instrument is the source of the DNP project. Participant characteristics were evaluated with a demographic form (see Appendix B). PowerPoint software was used to develop the PBT didactic module for project application. Project participants performance was evaluated with the *Multi-Rater Assessment Checklist for Performance in Simulated Pediatric Septic Shock* (Dugan, McCracken, & Hebbar 2016) (see Fig. 4). Previously tested by Dugan, McCracken & Hebbar, (2013), the checklist demonstrated validity and reliability with high inter-rater agreement. The checklist was evaluated by expert review, and in five simulated scenarios the 27-item checklist demonstrated an overall percent agreement of 97% (95% CI= 81%-100%) with inter-rater agreement sub analysis aggregating agreement between physicians viewing a single session ranged from 94%-99% (Dugan, McCraken & Hebbar, 2013). Participant handoff communication was evaluated using the PBT Communication Checklist (see Fig. 5), and perception of clinical confidence was evaluated with the Likert PBT Perceptions survey (see Appendix C).

Intervention Implementation

Participants were required to complete a demographic questionnaire. The questionnaire consisted of seven questions. Participants reported the following: gender, graduate NP or student NP status, number of months in practice, number of semesters completed in a NP program, initial masters or post masters, number of years RN experience, and prior emergency, critical care or transport experience (see Appendix B).

Participants were issued their participation number and then were randomly assigned to one of two groups, non-PBT or PBT, with all identifiers removed. The PBT group participated in PBT didactic education prior to SIMs evaluation. The non-PBT group completed the same PBT didactic education after SIMs evaluation to avoid education exclusion, but at a different interval to allow evaluation of PBT effects on performance (see Fig. 3). PBT didactic education was emailed to each participant for review. To maintain consistency, the format for PBT didactic education was a 32-minute pre-recorded PowerPoint that included review of the tool with relevant background and significance of its creation. Further, participants were introduced to the conceptual mechanics of the PBT with guided application through a patient scenario.

During SIMs evaluation in the LUPH SIMs education room, both the PBT group and non-PBT group's performance was observed and appraised using the *Multi-Rater Assessment Checklist for Performance in Simulated Pediatric Septic Shock* (see Fig. 4). The checklist was modified by the investigator to record time to diagnosis and interventions as markers of possible improvement with PBT training. The checklist was additionally modified to include hands-on approach to patient care. Hands-on is defined as approaching the patient with priority focus on task management as a bedside RN. The alternative hands-off approach is characterized as maintaining global perspective of the patient, reserving patient care task for the direction of the SIMs RN. Participant performance data was gathered using two multi-raters, a RN and NP.

After SIMs, each participant gave a handoff report to a transferring facility via voice recorder in a closed room adjacent to the SIMs education room. Recorded handoff reports of both the PBT and non-PBT trained groups were analyzed using the Provider Bull's-eye Communication Checklist (see Fig. 5). The PBT Communication Checklist was developed by the investigator. Communication markers and differences were noted between the PBT and non-PBT groups on the checklist using a multi-rater approach for possible communication enhancement in the PBT trained group. Three multi-raters, two RNs and one NP, served as PBT Communication Checklist multi-raters. All SIMs scenarios were narrated by a single SIMs team member using the same scripted scenario to maintain consistency. Two additional SIMs team members acted as the bedside RN and note taker for the participant to review the scenario after completion.

Following the handoff report, the PBT group completed a Likert Provider Bull's-eye Perception survey and submitted it via email or drop box (see Appendix C). However, the non-PBT group completed the SIMs and handoff report prior to receiving the PBT didactic education. Therefore, the non-PBT group completed and submitted the Likert survey in the same manner, but only after reviewing the PBT didactic education. The Likert Provider Bull's-eye Perception survey was used to evaluate changes in the perception of clinical confidence after receiving PBT didactic education in both groups. After completion, all participants received a certificate for eight hours of MyPath, a LUPH specific education credit, for participation.

Analysis

Components of project analysis included: group demographic characteristics, observed measures of SIMs performance using the *Multi-Rater Assessment Checklist for Performance in Simulated Pediatric Septic Shock*, handoff communication marker comparison using the PBT Communication Checklist, and data from the Likert Provider Bull's-eye Perception survey. All data was entered into a Microsoft Excel spreadsheet using anonymous participant ID numbers prior to exporting to the Statistical Package of the Social Sciences (SPSS) version 25 database. A code book was created using SPSS25 that was used for the remainder of the statistical analysis. All data was stored in the investigator's password protected work desktop with a secure server.

Data analysis consisted of descriptive and frequency reports.

Results

<u>Participants Characteristics</u>

The targeted sample size was 20. Of the 19 consenting participants, 17 or 89%, of participants completed project requirements. The participant sample was 100% female. The PBT group was composed of 10% graduate NPs with an average of 10 months in practice (M=10, SD=0) and 90% student NPs with an average of 2 semesters completed (M=2.22, SD=2.48). In the PBT group 10% of participants indicated their NP degree was post masters and the group had an average of 6 years RN experience (M=6.30, SD=5.18) (see Table 1). The distribution of experience in the PBT group was 25% emergency room (ER), 12.5% trauma, 12.5% PICU, 12.5% Transport, 12.5% cardiac intensive care unit (CICU), and 25% cardiac stepdown unit (CSU) (see Table 2).

The non-PBT group was composed of 22.2% graduate NPs with an average of 5 months in practice (M=5, SD=7.07) and 77.8% student NPs with an average of 3 semesters completed (M=3.29, SD=2.28). In the non-PBT group 11.1% of participants indicated their NP degree was a post masters and the group had an average of 11 years RN experience (M=11.11, SD=8.00). The distribution of experience in the non-PBT group was 33.3% ER, 11.1% urgent care (UC), 11.1% post anesthesia care unit (PACU), 33.3% PICU, and 11.1% CICU.

<u>Time to Diagnosis and Airway Interventions</u>

It was initially hypothesized that the PBT trained group would generate shorter time to diagnosis and intervention; however, in general they did not. The first set of interventions analyzed included placing the patient on a monitor, selecting supplemental FiO2 to treat respiratory distress, and ordering a chest x-ray. Of the first set of interventions, the PBT group only responded faster, (M=168.33, SD=29.09) seconds, when place supplemental FiO2 via non-Rebreather (NRB). The non-PBT group responded faster on all other interventions including: time to monitor, O2 via nasal cannula (NC) placement, O2 via high flow nasal cannula (HFNC) placement and chest x-ray (CXR) (see Table 3).

In regard to group comparison on intervention choice, all participants placed the patient on the monitor. Both groups comparatively placed the patient on a nasal cannula as well, non-PBT group 88.9% and the PBT group 87.5% respectively (see Table 4). However, there was a difference in their response in escalating FiO2 support when patient distress increased. The non-PBT group initiated a non-rebreather (NRB) 44.4% over the PBT group who demonstrated use in 37.5% of participants. Notably however, it was observed that the PBT group was more likely to escalate to HFNC. An average of 75% of the PBT group introduced HFNC, verses 66.7% of the non-PBT group. The non-PBT group was more likely to order a chest x-ray in 100% of participants over 87.5% of PBT group participants.

Fluid Resuscitation Interventions

The next set of interventions analyzed included placing an IV and administration of up to three boluses of crystalloid fluid. Of these interventions, the PBT group only intervened faster on the third bolus, (M=425.33, SD=170.72) seconds, versus the non-PBT group who demonstrated (M=497.33, SD=64.45) seconds (see Table 5). All participants placed an IV and gave an initial 20cc/kg fluid bolus. When the patient remained tachycardic and hypotensive, 87.5% of the PBT group responded with a second 20cc/kg fluid bolus; however, 100% of the non-PBT group gave a second bolus (see Table 6). Following the second fluid bolus, 37.5% of the PBT group verses 33.3% of the non-PBT group responded with a third fluid bolus.

<u>Lab and Electrolyte Interventions</u>

Time to blood gas, glucose check, hypoglycemia treatment with a D10 bolus and blood culture interventions were also analyzed. The PBT group demonstrated shorter times than the non-PBT group when obtaining a blood gas (M=315.50, SD=93.51) seconds, and when treating hypoglycemia (M=359.33, SD=73.46) seconds (see Table 7). The non-PBT group had shorter times to glucose check (M=316.43, SD=104.84) seconds and blood culture (M=244.67, SD=86.19) seconds, than the PBT group. Another notable difference between groups when reviewing lab and electrolyte intervention time was the discovery that the PBT group was more likely to group these interventions together. Intervention timing for blood gas, glucose check, hypoglycemia treatment and blood culture were more evenly distributed across a consistent mean time with less outliers in the PBT group than the non-PBT group (see Fig. 6).

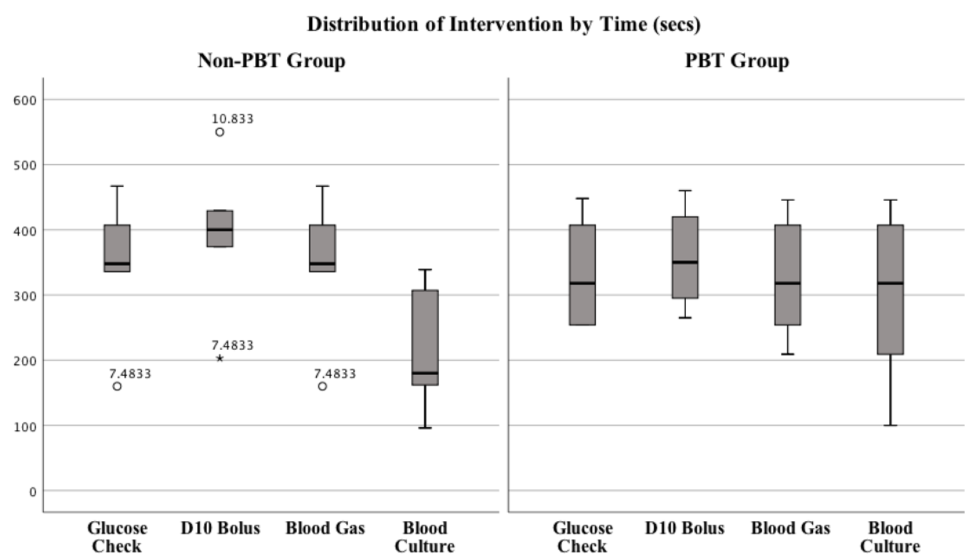

Figure 6. Group comparison of distribution of blood gas, glucose check, D10 bolus and blood culture intervention by time in seconds (secs)

In regard to lab and electrolyte intervention selection, the PBT group was more likely to obtain a blood gas and check a glucose than the non-PBT group. Of the PBT group, 75% obtained a blood gas and 87.5% checked a glucose (see Table 8). However, in the non-PBT group 66.7% obtained a blood gas and 77.8% checked a glucose. After checking a glucose, recognition of hypoglycemia requiring D10 bolus intervention was greater in the PBT group with 75% of participants verses 66.7% of non-PBT group participants administering glucose. Both groups demonstrated 100% compliance drawing blood cultures.

Diagnosis Identification and Antibiotic Management

The non-PBT group had shorter times to sepsis identification and antibiotic administration over the PBT group (see Table 9.) However, by participant percentage the PBT group was more likely to recognize sepsis. Comparatively, 75% of the PBT group verse 22.2% of the non-PBT group verbalized the patient was septic (see Fig. 11 or Table 9). The PBT group was more likely to treat with antibiotics over the non-PBT group. Rocephin was given by 62.5% of PBT group participants verses 55.6% of non-PBT group participants. Vancomycin was given by 37.5% of PBT group participants verses 33.3% of non-PBT group participants. Interestingly, the PBT group was more likely to consider broad spectrum antibiotic coverage with both Rocephin and Vancomycin than the non-PBT group. In the PBT group, 25% of participants gave both Rocephin and Vancomycin, whereas 11.1% of participants in the non-PBT group gave both antibiotics (see Fig. 7).

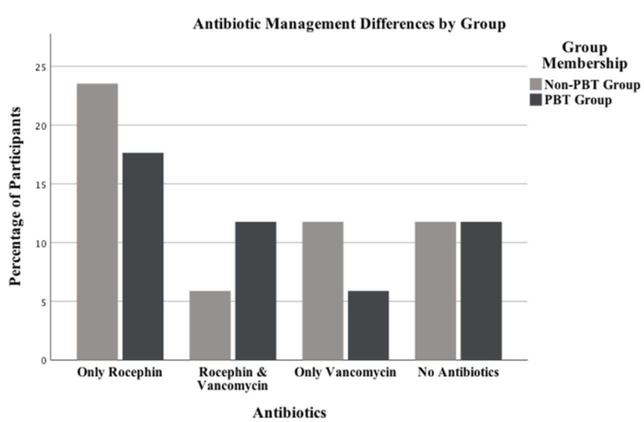

Figure 7. Group comparison of antibiotic management by percentage of participants

Transfer Identification and Total Scenario Time

The final intervention examined was identification of transfer and total scenario time. The non-PBT group had shorter transfer identification times with (M=7.30, SD=2.33) minutes verses the PBT group (M=8.52, SD=3.96) minutes (see Table 10). Further, in regard to transfer, 50% of PBT group participants verses 66.7% of non-PBT participants identified the need to transfer the patient as seen in Table 10. Total scenario time of the PBT group was (M=9.20, SD=3.09) minutes which was longer with a greater distribution across the mean than the non-PBT group (M=8.43, SD=1.53) minutes (see Fig. 8).

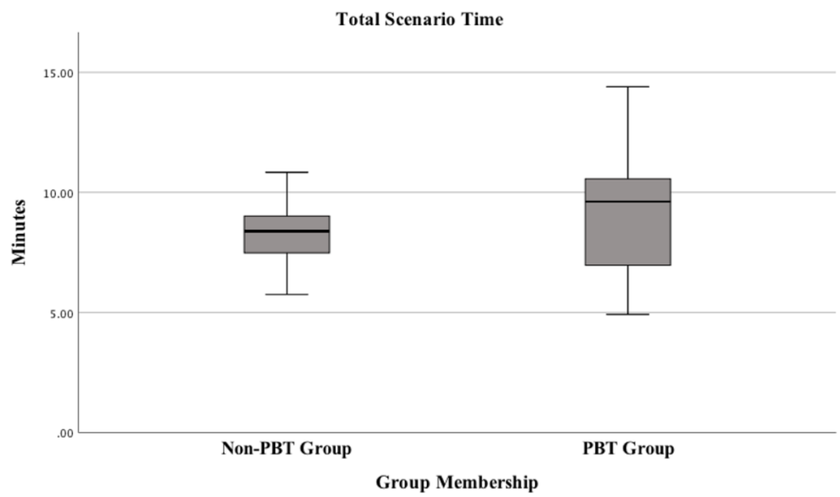

Figure 8. Group comparison of mean total scenario time in minutes (mins)

Participant Approach

Participants were observed to characterize their approach to patient care during the SIMs scenario. The non-PBT group demonstrated a significant hands-on approach with 66.7% of participants moving to the side of the bed to perform patient care task directly instead of instructing the bedside SIMs RN to do so. In the PBT group 12.5% of participants were hands-on. The remaining 87.5% of PBT group participants were not hands-on, maintaining a global perspective of the patient from the foot of the bed while instructing the bedside SIMs RN to perform tasks. These participants were observed to verbalize clinical reasoning when maintaining a global perspective.

Communication

The PBT and non-PBT group handoff communication reports were evaluated based on components of communication and order using the PBT Communication Checklist. Markers of communication included: problem identification, one liner history, narration, presentation of body systems and interventions, mixed assessment, assessment followed by interventions, shared mental model, summarized transfer plan and transfer plan only. Descriptive and frequency reports were generated for group comparison.

As seen in Table 11, 87.5% of PBT group participants identified sepsis as the patient's problem, verses 11.1% of the non-PBT group participants. All participants from both groups were noted to give a one liner history about the patient. Following the one liner history, 37.5% of PBT group participants verses 77.8% of non-PBT group participants gave a narrative report. For the purpose of this project, a narrative report is defined as a communication style based on the order of patient care events, not presentation of body systems in a systematic format.

The following communication markers were evaluated next: presentation of body systems and interventions, mixed assessment, and assessment followed by intervention. Both groups presented in a by body systems format with 100% participation. However, the sequence of presentation of the body systems followed by interventions varied between the groups. For the purpose of this project the correct sequence of the body systems presentation was defined as respiratory (RESP), cardiovascular (CV), neurological (NEURO), fluids, electrolytes, nutrition, gastrointestinal (FEN/GI), hematology (HEME), renal and infectious disease (ID) as outlined in PBT communication training (see Fig.1). A mixed assessment was defined as presentation of body systems assessment out of this order. Of the PBT group, 37.5% of participants verse 100% of the non-PBT group communicated a mixed assessment (see Table 11).

The mixed assessment communication was further explored to examine the predominate body system order in which each group presented. Of PBT group participants, the predominate body system communication adhered to training order, 87% RESP followed by 87.5% CV, then 62.5% NEURO, 75% FEN/GI, 50% HEME, 62.5% RENAL and 62.5% ID (see Table 12). However, when assessing body system communication order, it was noted that PBT group participants did exclude communication of some body systems. NEURO was excluded by 37.5%, HEME 50% and RENAL by 25% of PBT participants (see Table 13).

In the non-PBT group, predominate body system communication order was CV, RESP, NEURO and ID, then FEN/GI and HEME. Of the non-PBT group, 22.2% of participants presented RESP first, followed second by 11.1% CV, third 33.3% NEURO, fourth 44.4% FEN/GI, fifth 22.2% HEME, 0% presented renal and seventh 11.1% ID (see Table 12). Body systems excluded in non-PBT group participants communications were as follows: 55.6% NEURO, 33.3% FEN/GI, 77.8% HEME, 100% RENAL and 11.1% ID.

The next communication marker evaluated was presentation by body systems assessment follow by interventions. For the purpose of this project, assessment followed by interventions was defined as communication of each body system followed by the interventions done to address that body system. Of the PBT group, 75% of group participants gave an assessment followed by intervention report, whereas 55.6% of the non-PBT group did so (see Table 11).

The remaining markers of communication examined included shared mental model and summarized plan verses transfer plan only. For the purpose of this project, shared mental model was defined as an individual communicating the status and understanding of the patient’s condition. In the PBT group, 100% of participants shared their mental model; whereas, 11.1% of non-PBT participants did so (see Table 11). Next, the two groups were evaluated for the presence of a summarized transfer plan. For the purpose of this project, summarized transfer plan was defined as identifying actions done or needed with a transfer plan. Of the PBT group 100% of participants summarized their transfer plan verses 33.3% of the non-PBT. Of the remaining non-PBT group, 55.6% of participants stated a transfer only plan while 11.1% had no transfer plan statement in their handoff communication report.

Perception

Likert Provider Bull's-eye Perception Survey question results from both the PBT group and non-PBT group revealed high mean responses to all questions with low standard deviations. Results were based on a five-point Likert scale where 1= strongly disagree; 2= disagree; 3=neither agree nor disagree; 4=agree; 5=strongly agree (see Appendix C). Both groups received PBT didactic training, but at different intervals to allow for group perception comparison.

Question one, two and five specifically addressed participant perception of PBT performance regarding building differential diagnosis, organizing a handoff report and increasing perception of practice confidence. With Q1 *Overall, the PBT module helped me understand how to build differential diagnosis with timely interventions*, group means were non-PBT group (M=4.44, SD .527) and PBT group (M=4.75, SD= .463) (see Table 14). Then Q2 *Overall, the PBT module helped me understand how to organize a handoff report*, group means were non-PBT group (M=4.67, SD .500) and PBT group (M=4.38, SD= .518). The final question specific to PBT performance, Q5 *The PBT training increased my practice confidence*, group means were non-PBT group (M=4.44, SD=.882) and PBT group (M=4.50, SD= .756).

Questions three and four specifically addressed group perception of the PBT's practicality as an easy to navigate, likeable tool. Q3 *The PBT tool was easy to navigate*, group means were non-PBT group (M=4.33, SD=.707) and PBT group (M=4.50, SD= .535) (see Table 14). Then for Q4 *I liked the PBT module*, group means were non-PBT group (M=4.56, SD=.527) and PBT group (M=4.88, SD= .354). The final question on the survey was reserved for general comments or suggestions. Three themes emerged from participant comments: the PBT increased perception of practice confidence, provided NP clinical reasoning framework and communication guidance, and additional PBT application practice was needed (see Table 15).

Discussion

Gaps in knowledge regarding barriers to NP transition to practice exist. The PBT was explored as a tool that may bridge current best practice with a new innovative measure to improve identified transition to practice barriers, arduous clinical reasoning and ineffective communication. Findings suggest the PBT is a promising tool that when employed, improves clinical reasoning, communication and perception of practice confidence in NPs.

Clinical Reasoning

Appropriate intervention choice was based on septic shock standards of care defined by Dugan, McCracken, and Hebbar (2016) in the *Multi-Rater Assessment Checklist for Performance in Simulated Pediatric Septic Shock*. Time to intervention was additionally selected by the investigator as a marker for improved clinical reasoning. Therefore, PBT induced improvements in clinical reasoning were evaluated by both intervention selection and time to intervention.

The non-PBT group unexpectantly had shorter intervention and overall scenario times. However, time to intervention proved to be an inadequate marker to evaluate clinical reasoning for two reasons. First, it was observed that the PBT group paused more frequently during their

SIMs scenario to verbalize clinical reasoning, or their differential diagnosis and intervention considerations. These actions appeared to contribute to extended time to intervention and total scenario time (see Fig. 8). Further, feedback from the PBT Perception Survey establish a theme that participants felt they needed more practice and exposure to the PBT to use it proficiently. This suggested PBT group participants lacked the mastery needed to properly evaluate the PBT's effect on time to intervention. Despite these two barriers, mean intervention time differences between groups were surprisingly marginal. The lowest mean time to intervention difference between the groups was on time to blood gas with a mean time of 12.33 seconds, and the highest was on HFNC with a mean time of 1.65 minutes. The marginal mean time to intervention differences despite cognitive delays from the PBT group suggested inexperience. The PBT may have more effect on time to intervention if participants had more repetitive training exposure. Future testing will be needed to validate this finding.

Intervention selection was the second component examined to evaluate improvements in clinical reasoning. The PBT group demonstrated improved clinical reasoning over the non-PBT group in several interventions. The PBT group was more likely to escalate to HFNC in a patient with respiratory distress. When addressing cardiovascular interventions to treat persistent tachycardia with hypotension, the PBT group was observed to be more likely to pause on the second bolus to consider cardiac dysfunction in their differential diagnosis; this action demonstrated a heightened awareness in their clinically reasoning. PBT group participants whose conclusive differential diagnosis was cardiac dysfunction were observed not to give a second fluid bolus. This consideration was not seen in the non-PBT group, which may have contributed to a higher percentage of non-PBT group participants who gave a second fluid bolus. Interestingly however, a larger participant percentage of the PBT group gave a third fluid bolus when hypotension persisted than the non-PBT group. Of the PBT group, participants who gave a third fluid bolus were observed ruling out cardiac dysfunction in their assessment. This finding with concurrent observation suggested that those in the PBT group demonstrated enhanced clinical reasoning in their management of fluid resuscitation.

Lab work and electrolyte management was an intervention consideration by both groups, but differences existed. In relation to time to intervention, PBT participants were more likely to group blood gas, glucose check, D10 bolus and blood culture interventions closely together. This organizational clustering of interventions was clinically significant for two reasons. The intervention organization suggested the PBT group made intervention selections based on the first line of interventions in the PBT training. Further, the PBT group had shorter times to blood gas, and D10 bolus interventions despite overall longer total scenario times, which were contributed to cognitive delays related to enhance clinical reasoning. This finding suggested that despite overall longer total mean scenario times, PBT training may have prompted the PBT group to initiate these interventions in a more organized accelerated manner.

One of the more divergent clinical reasoning differences between the non-PBT and PBT groups was the identification of sepsis and antibiotic management. The PBT group was substantially more likely to verbally identify sepsis in scenario. They were also more likely than the non-PBT group to give antibiotics. Of interest, the PBT group was more likely to give broad spectrum antibiotics including both Rocephin and Vancomycin over the non-PBT group. These findings suggested that the PBT group had increased clinical reasoning in their identification and management of sepsis. Specifically, it is plausible that correct identification of sepsis in the PBT group may have contributed to increased use of broad-spectrum antibiotics over the non-PBT group.

Current literature does not directly examine NP clinical reasoning or methods to improve it. However, literature describing programs aimed at building knowledge and skill to ease NP transition to practice are abundant. PBT findings on time to intervention and intervention choice can only be compared to similar MD studies using SIMs in evaluation. Dugan, McCracken, and Hebbar (2016) found septic shock intervention management performance scores in resident MDs significantly improved after repetitive SIMs exposure. Similarly, using the same measurement tool for evaluation, exposure to PBT training improved sepsis intervention management in NPs. Improved sepsis intervention management suggested enhanced clinical reasoning in the PBT group.

Participant Level of Experience

The non-PBT group characteristically was a more experienced group than the PBT group. The non-PBT group had a larger percentage of practicing NPs, an increase mean number of semesters completed by NP students and was comprised of participants with a higher mean number of years RN experience. Further, the non-PBT group was predominately composed of ER and PICU employees who regularly initiated sepsis management protocols. Based on protocol experience and sepsis management exposure, it was anticipated that the non-PBT group would likely outperform the PBT group. However, it was an unexpected finding that despite more experience, there were some categories of time to intervention and intervention selection choice in which the non-PBT group did not outperform the PBT group. This consideration further contributed to evidence that supports the PBT as a measure that improves clinical reasoning.

Participant Approach

There were different patient care approaches between the non-PBT and PBT groups. The non-PBT group was more likely to take a hands-on approach than the PBT group. The investigator noted the non-PBT group moved to the side of the bed to perform patient care task directly instead of instructing the bedside SIMs RN to do so, assuming the traditional RN role. Actions observed appeared to be very task oriented, done in a protocolized manner. The investigator related this observed behavior of the non-PBT group to those of a competent proficiency RN who as described by theorist Benner (1982), has the ability to see an action in terms of long-range goals. However, typical of the competent proficiency RN, the non-PBT group selected and prioritized interventions based on recognized attributes and aspects from RN care memory that they were familiar with (Benner, 1982). As demonstrated by findings on intervention selection, the non-PBT group was less likely to consider alternative interventions based on differential diagnosis clinical reasoning. Further, those in the non-PBT group appeared to have poor role delineation as a NP. This was demonstrated by an observed lack of maintaining a global perspective while verbalizing clinical reasoning and instructing patient care from the foot of the bed. These findings suggested PBT training may support Benner's proficiency levels of learning, while also promoting NP role delineation. Further study is needed to validate this finding.

Communication

Result from PBT implementation support its use as a handoff communication standardizing tool. While both groups comprehensively gave a one liner history about the patient, the PBT group was far more likely to identify and communicate the patient's main problem or top differential diagnosis. Of importance as well, the PBT group was more likely to present in an organized systematic way, and less likely to use an indiscernible RN narrative style report based on the order of patient care events. These findings suggest PBT training and tool use facilitated organized communication with rapid problem identification for mutual understanding between NP and MD providers.

When presenting systems and interventions both groups were fully compliant; however, the sequence of the body systems with interventions communication varied between the groups. All participants of the non-PBT group communicated a mixed assessment. The non-PBT group began predominately with the cardiovascular system and often continued to communicate out of the desired body system sequence. The desired order for the handoff communication was RESP, CV, NEURO, FEN/GI, HEME, and ID, which is incorporated into the PBT. This order was based upon the Airway, Breathing, Circulation, Disability, Exposure or the “ABCDE” approach which is widely accepted in the medical community as an approach that improves outcomes by focusing healthcare professionals on the most life-threatening clinical problems (Thim, Krarup, Grove, Rohde & Lofgren, 2012). Further, in pediatrics the desired body system sequence order begins with RESP, as respiratory failure is a common component of critical illness in children and is often the primarily reason for cardiopulmonary arrest as cited by Pediatric Fundamental Critical Care Support (PFCCS) (Madden, 2013).

The PBT group was more likely to lead with the respiratory system, more accurately following the desired PBT communication format. The PBT group was also more likely than the non-PBT group to give a quick summary of intervention done after each body system discussed. The most impressive finding was the exclusion of several of the body systems in handoff communication by the non-PBT group verse the PBT group. These findings suggested that PBT training and tool use promoted the delivery of a more organized, thorough handoff communication.

The final two communication points to consider when discussing results are shared mental model and summarized plan. All PBT participants shared their mental model and summarized a plan. Interestingly, only a small percentage of the non-PBT group shared their mental model and some summarized a plan. These findings suggested that PBT training and tool use promoted a shared vision between NP and MD providers during handoff communication.

The use of clinical worksheets can improve interdisciplinary communication and clinical decision making by providing a framework for organization (Spain et al., 2004). Providing a communication format has been cited to improve communication and teamwork (Hickey et al., 2012). Further, standardizing handoff procedures decreases medical errors, prevents adverse events (Starmer et. al, 2013) and increases perceptions of practice confidence (Walia et al., 2016).

Communication findings suggested the PBT training and tool facilitated organized communication with rapid problem identification, promoted the delivery of a more organized thorough handoff communication and encourage a shared vision between NP and MD providers during handoff communication. Findings suggest the PBT provided framework for clinical reasoning and communication formatting. Supported by literature, PBT enhancement of clinical reasoning and communication may improve patient outcomes and reduce NP turnover by decreasing transition to practice frustrations. Further research is needed to assess the PBTs effects on direct patient outcomes and NP turnover in clinical practice.

Perception

To avoid educational exclusion, perception of the PBT and its improvement on perception of clinical confidence were evaluated by both groups after completing PBT didactic training using a Likert survey. Comprehensively, the PBT successfully increased perceptions of practice confidence in both groups. All questions on the survey had predominately high scores with very little variability. Perceived by both groups, the PBT successfully assisted participants in building a differential diagnosis, organizing a handoff report as well as it improved their practice confidence. The two-question noted with minor variability in standard deviation were Q3 *The PBT was easy to use* and Q5 *The PBT module increased my practice confidence.* Some participants expressed difficulty accessing the PBT computer model, thus this complication may have effected scores regarding ease of use. Other participants communicated frustration, stating in comments they needed to practice more in order to fully understand PBT applicability. This may have marginally reduced scores on Q5 *The PBT module increased my practice confidence.* Future project development will focus on improving accessibility and increasing the amount of PBT case scenario training opportunities prior to SIMs evaluation.

Limitations

Project limitations included a small sample size N=17. Further, the sample was heterogenous, comprised of a wide range of nursing experience and backgrounds, with both NP students and actively practicing NPs. Participants were also recruited from one LUPH. This convenience sampling method contributed to heterogeneity and may also alter results. Another identified sample limitation that may have affected results was the distribution of participants into groups. The PBT group had a larger percentage of cardiac service RNs verses the non-PBT group with a larger percentage of PICU and ER RNs.

Limitation with testing include insufficient exposure time to the PBT for full understanding and applicability to practice. Further, the PBT training module was computer based with no way to verify participant understanding prior to SIMs participation. Testing results were also compiled with only two multi-raters, and the PBT Communication Checklist has yet to be validated. The perception survey was also limited by a convenience sample in which participants were recruited from the investigators place of employment. Even though perception surveys were anonymous, the sample size was small, and participants may have been more likely to feel they could be identified. Lack of perceived anonymity could have skewed results.

Practice Implications

Current literature has yet to define or explore observed NP transition to practice barriers, arduous clinical reasoning and ineffective communication. However, preliminary findings suggest the PBT could comprehensively impact healthcare by addressing these unexplored NP transition to practice barriers. Findings suggested the PBT enhanced clinical reasoning by improving NP sepsis intervention management. Project findings also suggested the PBT promoted organization and rapid problem identification in NP handoff communication. The PBT also supported the delivery of a more comprehensive handoff communication and encourage communication that supported a shared vision between NP and MD providers. Perception of practice confidence was also improved. PBT enhancement of clinical reasoning and communication may improve patient outcomes. Further, increasing perception of practice confidence may reduce transition to practice frustrations, potentially decreasing NP turnover. Combined these improvements could reduce overall healthcare cost.

Based on evidence and theory in development, the PBT by design has the capacity to assist the NP in the development of clinical reasoning and effective communication. Further, it addresses five of the six theme areas for NP clinical education improvement: collaborative codesign of a new clinical education system by academic and practice leaders, standardized preclinical preparation, immersive clinical experiences, interprofessional education for team-based care, and innovative educational practices (Giddens et al., 2014). The PBT was designed for collaborative use by academic and practice leaders in NP education. It is a standardized pre and post clinical preparation tool that may be applied either in the classroom or during immersive clinical experiences. The PBT promotes interprofessional collaborative communication and is innovative, not previously discussed in literature. The PBTs content design may impact NP education by addressing these theme areas for improvement in NP clinical education. Further, the PBTs versatile nature allows for application in both didactic NP education or in the clinical setting.

Dissemination of pilot findings will take place at the LUPH in which the project took place. The investigator also plans to submit applications for poster presentations at the Society for Critical Care Medicine (SCCM) and the National Association of Pediatric Nurse Practitioners (NAPNAP). The investigator will also aim to submit for publication with journals that focus on NP education in academic and clinical settings.

In order to establish the PBT as a best practice measure in NP education, future steps would include additional testing beyond the pilot with a larger participant sample. The ideal testing scenario would be a multi-university trial with NP students during a defined period in their training. To process such a large sample size the investigator plans to petition for grants that support SIMs education.

References

Bahouth, M. N., & Esposito-Herr, M. B. (2009). Orientation program for hospital-based nurse practitioners. *AACN Advance Critical Care*, *20*(1), 82-90. http://dx.doi.org/10.1097/NCI.0b013e3181945422

Barnes, H. (2015). Exploring the factors that influence nurse practitioner role transition. *The Journal for Nurse Practitioners*, *11*(2), 178-183. http://dx.doi.org/10.1016/j.nurpra.2014.11.004

Benner, P. (1982). From novice to expert. *American Journal of Nursing*, *82*(3), 402-407. http://dx.doi.org/10.2307/3462928

Casida, J. M., & Pastor, J. (2012). Practice pattern and professional issues of nurse practitioners in mechanical circulatory support programs in the United States: a survey report. *Progress in Transplantation*, *22*(3), 229-236. http://dx.doi.org/10.7182/pit2012503

Coruh, B., Roberson-Wiley, G., Wright, C., & Kritek, P. (2015). A collaborative critical care preceptorship for APRN students. *AACN Advanced Critical Care*, *26*(1), 25-31. http://dx.doi.org/10.1097/NCI.0000000000000006

DNP program: A guide for doctor of nursing practice student: Home. (2017). Retrieved November 17, 2017, from http://research.library.gsu.edu/dnp

Dugan, M. C., McCracken, C. E., & Hebbar, K. B. (2016). Does simulation improve recognition and management of pediatric septic shock, and if one simulation is good, is more simulation better? *Pediatric Critical Care Medicine*, *17*(7), 605-614.

Dugan, M., McCraken, C., & Hebbar, K. (2013). 156: Validity of a multi-rater assessment checklist for performance in simulated pediatric septic shock. *Critical Care Medicine*, *41*. http://dx.doi.org/doi:10.1097/01.ccm.0000439305.54750.7c

Facts about Children's. (2017). Retrieved from https://www.choa.org/about-us/newsroom/childrens-facts

Giddens, J. F., Lauzon-Clabo, L., Morton, P. G., Jeffries, P., Mcquade-Jones, B., & Ryan, S. (2014). Re-envisioning clinical education for nurse practitioner programs: Themes from a national leaders dialogue. *Journal of Professional Nursing*, *30*(3), 273-278. http://dx.doi.org/10.1016/j.profnurs.2014.03.002

Hickey, P., Connor, J., Trainor, B., Brostoff, M., Blum, R., Jenkins, K., & Stuart-Shor, E. (2012). Implementation of an organization-wide standardized communication initiative. *Journal of Communication in Healthcare*, *5*(1), 32-39. http://dx.doi.org/10.1179/1753807611Y.0000000015

Kapu, A. N., Kleinpell, R., & Pilson, B. (2014). Quality and financial impact of adding nurse practitioners to inpatient care teams. *JONA*, *44*(2), 87-96. http://dx.doi.org/10.1097/NNA.0000000000000031

Madden, M. A. (2013). *Pediatric of fundamental critical care support*. Mount Prospect, IL: Society of Critical Care Medicine.

Overview of the GRADE Approach. (2013). Retrieved from http://gdt.guidelinedevelopment.org/app/handbook/handbook.html

Paton, A., Stein, D. E., D'Agostino, R., Pastores, S. M., & Halpern, N. A. (2013). Critical care medicine advance practice provider model at a comprehensive cancer center: Successes and challenges. *American Journal of Critical Care*, *22*(5), 439-443. http://dx.doi.org/10.4037/ajcc2013821

Simone, S., McComiskey, C. A., & Anderson, B. (2016). Integrating nurse practitioners into intensive care units. *Critical Care Nurse*, *36*(6), 59-69. http://dx.doi.org/10.4037/ccn2016360

Spain, M. P., Decristofaro, C., & Smith, C. A. (2004). Educating advanced practice nurses for collaborative practice in the multidisciplinary provider team. *Journal of the American Association of Nurse Practitioners*, *16*(12), 535-546.

Squiers, J., King, J., Ashby, N., & Parmley, C. (2012). ACNP intensivist: A new ICU care delivery model and it's supporting educational programs. *Journal of the American Academy of Nurse Practitioners*, *25*(3), 119-125. http://dx.doi.org/10.111/j.1745-7599.2012.00789.x

Starmer, A., Sectish, T., Simmon, D., Keohane, C., McSweeney, M., Chung, E., ... Landrigan, C. (2013, December 4). Rates of medical errors and preventable adverse events among hospitalized children following implementation of resident handoff bundle. *The Journal of the American Medical Association*, *310*(21), 2263-2270. http://dx.doi.org/10.1001/jama.2013.281961

Thim, T., Krarup, Grove, Rohde, & Lofgren (2012, January 30). Initial assessment and treatment with the Airway, Breathing, Circulation, Disability, Exposure (ABCDE) approach. *International Journal of General Medicine*, 117-121. http://dx.doi.org/doi:10.2147/ijgm.s28478

Waldman, J. D., Kelly, F., Arora, S., & Smith, H. L. (2010). The shocking cost of turnover in health care. *Health Care Management Review*,*35*(3), 206-211. doi:10.1097/hmr.0b013e3181e3940e

Walia, J., Qayumi, Z., Khawar, N., Dygulska, B., Bialik, I., Salafia, C., & Narula, P. (2016). Physician transition of care: Benefits of I-PASS and an electronic handoff system in a community pediatric residency program. *Academic Pediatrics*, *16*(6), 519-523. http://dx.doi.org/10.1016/j.acap.2016.04.001

Appendix A.

Provider Bull's-eye Study Participant Recruitment Email Template

Step 1: Email Intro

Implementation of the Provider Bull's-eye: A Tool to Guide Clinical Reasoning and Communication for Nurse Practitioners

Hello, my name is Tammy Zaworski. I am a pediatric nurse practitioner and I am a Doctor of Nursing Practice student at Georgia State University. I am recruiting participants for a project that I am conducting for completion of my Doctor of Nursing Practice degree. I would like to see how we can better help future and current nurse practitioners employed by Children's Healthcare of Atlanta (CHOA). I am interested in evaluating a teaching tool that may enhance clinical reasoning, communication and confidence in student and new nurse practitioners. Would you like to hear more?

If the answer is yes, I will need to ask you a few questions before we begin. Please answer and send you responses back to tammy.zaworski@choa.org (Tammy Zaworski, Principal Investigator).

1. Are you actively employed by CHOA?
2. Are you currently enrolled in a nurse practitioner program, or have two or less years clinical experience as a nurse practitioner?

If you choose to participate, you will receive a certificate of participation. If you are a RN, your certificate can be applied to MyPath credit at CHOA. If you are a NP, your certificate can be applied to continuing medical education with the Pediatric Nursing Certification Board. If you do not want to participate in this study, thank you for your time and enjoy the rest of your day.

Step 2: If Participant is Excluded or Included, Responses Back

Excluded-
Thank you for your willingness to participate, unfortunately, you are not eligible to participate at this time.

Included-
Thank you for your willingness to participate. Please see the attached informed consent form. I will be contacting you shortly to schedule your participation time. Once you have had an opportunity to look over the consent, I will be happy to answer any questions you may have. The consent process will occur on participation day, prior to research activities. The signed consent will be collected on your participation day. If you forget to bring it with you, another will be provided. If you have any other questions or concerns, please feel free to contact me at tammy.zaworski@choa.org

Appendix B

Implementation of the Provider Bull's-eye: A Tool to Guide Clinical Reasoning and Communication for Nurse Practitioners

Demographic Form

1. Gender: Male_______, or Female_______

2. Graduate NP_______, or Student NP________

3. If Student NP, number of program semesters completed _______

4. If Graduate NP, numbers of months in practice_______

5. Is your APRN degree a post master_______. If so list your 1st masters______________

6. Number of years RN experience_______

7. Prior RN years of experience in ER _____ Critical Care_____, or EMS/Transport_____

Appendix C

Provider Bull's-eye Perception Survey

To provide your feedback about this module, please review the following statements and mark whether you disagree or agree using this scale:

1=strongly disagree	2=disagree	3=neither agree nor disagree	4=agree	5=strongly agree

1. Overall, the PBT module helped me understand how to build differential diagnosis with timely interventions.

1=strongly disagree	2=disagree	3=neither agree nor disagree	4=agree	5=strongly agree

2. Overall, the PBT module helped me understand how to organize a handoff report.

1=strongly disagree	2=disagree	3=neither agree nor disagree	4=agree	5=strongly agree

3. The PBT tool was easy to navigate.

1=strongly disagree	2=disagree	3=neither agree nor disagree	4=agree	5=strongly agree

4. I liked the PBT module.

1=strongly disagree	2=disagree	3=neither agree nor disagree	4=agree	5=strongly agree

5. The PBT training increased my practice confidence.

1=strongly disagree	2=disagree	3=neither agree nor disagree	4=agree	5=strongly agree

6. General comments or suggestions for improvement

List of Tables

Table 1

Comparison of group experience level by percentage of participants per group and number of months (mos) in NP practice, number of semesters (sems) as a student NP and years (yrs) RN experience

	Group Membership	
	Non-PBT	PBT
Graduate NP (%)	22.2	10
NP Experience (mos)	(M=5, SD=7.07)	(M=10, SD=0)
Student NP (%)	77.8	90
Student NP Experience (sems)	(M=3.29, SD=2.28)	(M=2.22, SD=2.48)
Post Masters (%)	11.1	10
RN Experience (yrs)	(M=11.11, SD=8.00)	(M=6.30, SD=5.18)

Table 2

Group experience comparison, percentage (%) of participants by hospital department of employment

	Group Membership	
	Non-PBT	PBT
ER (%)	33.3	25
UC (%)	11.1	0
Trauma (%)	0	12.5
PACU (%)	11.1	0
PICU (%)	33.3	12.5
Transport (%)	0	12.5
CICU (%)	11.1	25
CSU (%)	0	12.5

Table 3

Group comparison on time in seconds (sec) to monitor and airway interventions

	Group Membership	
	Non-PBT	PBT
Monitor (sec)	(M=43.56, SD=28.71)	(M=100.38, SD=71.87)
NC (sec)	(M=132.50 SD=52.42)	(M=154.14, SD=89.21)
NRB (sec)	(M=267.25, SD=117.70)	(M=168.33, SD=29.09)
HFNC (sec)	(M=304.00, SD=131.10)	(M=338.33, SD=154.77)
CXR (sec)	(M=269.67, SD=79.01)	(M=336.00, SD=95.80)

Table 4

Group comparison on percentage (%) of participants who demonstrated use of the monitor and airway interventions

Group Membership	Monitor (%)	NC (%)	NRB (%)	HFNC (%)	CXR (%)
Non-PBT	100	88.9	44.4	66.7	100
PBT	100	87.5	37.5	75	87.5

Table 5

Group comparison on time in seconds (sec) IV and crystalloid fluid resuscitation

	Group Membership	
	Non-PBT	PBT
IV (sec)	(M=139.56, SD=81.87)	(M=179.75, SD=84.85)
Bolus #1 (sec)	(M=170.56, SD=80.86)	(M=241.63, SD=173.48)
Bolus #2 (sec)	(M=329.44, SD=88.43)	(M=358.00, SD=189.56)
Bolus #3 (sec)	(M=497.33, SD=65.46)	(M=425.33, SD=170.72)

Table 6

Group comparison on percentage (%) of participants who placed an IV and gave sequential crystalloid fluid resuscitation boluses

Group Membership	IV (%)	Bolus #1 (%)	Bolus #2 (%)	Bolus #3 (%)
Non-PBT	100	100	100	33.3
PBT	100	100	87.5	37.5

Table 7

Group comparison on time in seconds (sec) to blood gas, glucose, D10 bolus and blood culture

	Group Membership	
	Non-PBT	PBT
Blood Gas (sec)	(M=327.83, SD=109.99)	(M=315.50, SD=93.51)
Glucose (sec)	(M=316.43, SD=104.84)	(M=324.71, SD=77.89)
D10 bolus (sec)	(M=381.33, SD=114.33)	(M=359.33, SD=73.46)
Blood Culture (sec)	(M=244.67, SD=86.19)	(M=274.13, SD=131.78)

Table 8

Group comparison on percentage (%) of participants to obtain a blood gas, glucose, treat hypoglycemia and draw blood culture

Group Membership	Blood Gas (%	Glucose (%)	D10 bolus (%)	Blood Culture (%)
Non-PBT	66.7	77.8	66.7	100
PBT	75	87.5	75	100

Table 9

Diagnosis identification and antibiotic management by seconds (sec) and percentage (%) of participant that identified sepsis and administered Rocephin, Vancomycin, or broad-spectrum antibiotics

	Group Membership	
	Non-PBT	PBT
ID Sepsis (sec)	(M=253.00, SD=52.33)	(M=273.67, SD=164.24)
ID Sepsis (%)	22.2	75
Vancomycin (sec)	(M=412.00, SD=92.24)	(M=436.33, SD=162.24)
Vancomycin (%)	33.3	37.5
Rocephin (sec)	(M=396.40, SD=121.78)	(M=451.80, SD=142.95)
Rocephin (%)	55.6	62.5
Broad-Spectrum (%)	11.1	25

Note. Broad spectrum =Vancomycin and Rocephin

Table 10

Group comparison, time to identification of transfer (minutes), percentage (%) of participant transfer recognition and total scenario time

	Group Membership	
	Non-PBT	PBT
ID Transfer (min)	(M=7.30, SD=2.33)	(M=8.52, SD=3.96)
Transfer (%)	66.7	50
Total Scenario Time (min)	(M=8.43, SD=1.53)	(M=9.20, SD=3.09)

Table 11

Group comparison, communication markers noted in handoff report by participant percentage (%)

	Group Membership	
	Non-PBT (%)	PBT (%)
Problem ID	11.1	87.5
One Liner History	100	100
Narration	77.8	37.5
Body Systems & Interventions	100	100
Mixed Assessment	100	37.5
Assessment Followed by Intervention	55.6	75
Shared Mental Model	11.1	100
Summarized Transfer Plan	33.3	100
Transfer Plan Only	55.6	0
No Transfer Plan	11.1	0

Table 12

Group comparison, body system order by percentage (%) of participants who verbalized during handoff report

	Body System Order						
	RESP (1)	CV (2)	NEURO (3)	FEN/GI (4)	HEME (5)	RENAL (6)	ID (7)
Non-PBT (%)	22.2	11.1	33.3	44.4	22.2	0	11.1
PBT (%)	87	87.5	62.5	75	50	62.5	62.5

Note. RESP=respiratory, CV=cardiovascular, NEUO=neurological, FEN/GI=fluids, electrolytes and nutrition, HEME=hematological, ID=infectious disease

Table 13

Group comparison, percentage (%) of participants who excluded select body systems in handoff report

	Group Membership	
Body System Excluded	Non-PBT	PBT
Respiratory (%)	0	0
Cardiovascular (%)	0	0
Neurological (%)	55.6	37.5
FEN/GI (%)	33.3	0
Hematology (%)	77.8	50
Renal (%)	100	25
Infectious Disease (%)	11.1	0

Table 14

Likert Provider Bull's-eye Perception Survey answers by group mean

	Non PBT	PBT
PBT Performance		
Q1 Overall, the PBT module helped me understand how to build differential diagnosis with timely interventions	(M=4.44, SD .527)	(M=4.75, SD= .463)
Q2 Overall, the PBT module helped me understand how to organize a handoff report	(M=4.67, SD .500)	(M=4.38, SD= .518)
Q5 The PBT training increased my practice confidence	(M=4.44, SD=.882)	(M=4.50, SD= .756)
PBT Practicality		
Q3 The PBT tool was easy to navigate	(M=4.33, SD=.707)	(M=4.50, SD= .535)
Q4 I liked the PBT module	(M=4.56, SD=.527)	(M=4.88, SD= .354)

Table 15

Likert Provider Bull's-eye perception survey participant general comments by theme

Theme 1- PBT Increased Perception of Practice Confidence
"This was an excellent presentation. I also believe the practice scenario was very beneficial in learning more about my current skills and where I need to improve to become more confident as an PNP. Thank you!"
"I felt that the PBT module will improve my practice as an NP student and NP."
"This is my first time ever practicing in a NP role. Although it was intimidating, the tool gave me something to fall back into which was comforting."
Theme 2-PBT Provided NP Clinical Reasoning Guidance and Communication Framework
"I feel like the PBT has incorporated information I have learned before in classes like (TNCC, A, B, C, D, E and SAMPLE) and expands it to appeal to me as a provider. It goes further to assist NPs in giving a focused report to another provider. I found that it would be a useful tool to other NPs in their practice."
"As a NP student, one of my biggest concerns is learning how to come up with the correct diagnosis in a timely manner. I feel this framework will be very useful to help remind me the order I need to be thinking in and what to do next to continue to narrow down potential diagnoses and interventions."
"Working in a fast-paced pediatric ICU and as a rapid response nurse, it is important to be able to quickly assess and communicate with the rest of the ICU team. There currently is no formal process like this, so I believe this well help not only practitioners, but nurses as well."
"I was in the control group that did not have access to tool before simulation scenario. Upon reviewing the presentation, taking the time to review and think about the systematic approach, I think it is a great tool to provide to new(er) NP students and practitioners, especially in an ICU setting that is fast paced with often times, a lot of extraneous distractors. Great job! I was able to think back as well and reflect on areas I could have improved on: such as a systems approach, especially with report/handoff."
The PBT allowed me to look at the broad picture and work my way down to a diagnosis (sepsis) that probably would have been more respiratory focused without the PBT model to help guide me. The module was very helpful in understanding the process and kept me engaged and interested throughout."
"Nice, organized, structured approach to a patient that was not like anything I learned in school! Overall very helpful."
"I feel that this is an excellent tool to help guide those transitioning from the nursing role into a provider role. It gives a basis to build your practice skills. As well as a systematic pathway for intervention and diagnosis."
Theme 3- Additional PBT Application Practice Needed
"I think this is a great idea in theory, however, I still feel like I don't fully understand how to use the tool. A few more examples running through the entire tool would have been helpful. But like mentioned in the model, it will just take practice using the tool to start feeling comfortable with it."
"I need to become more familiar with it and use it consistently (comment in reference to statement 5 - The PBT training increased my practice confidence)."
"More practice scenarios in the training portion."

List of Figures

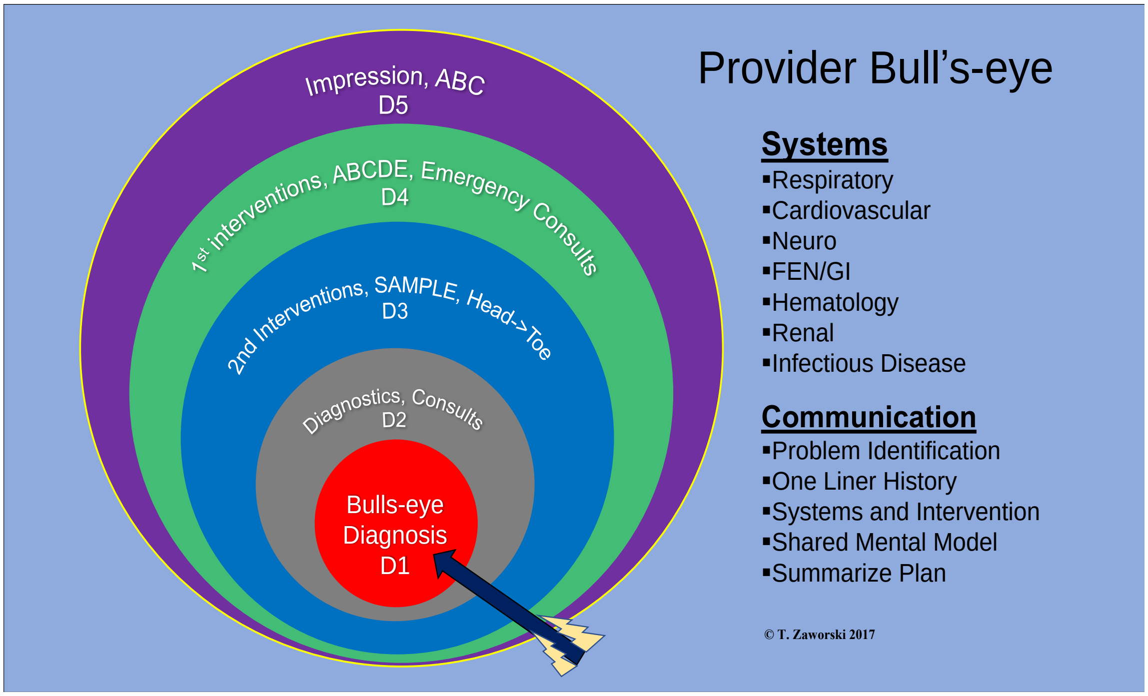

Figure 1. Provider Bull's-eye Tool, © T. Zaworski, 2017. Use only with permission.

Figure 2. NP hybrid learning needs. Adapted from “Novice to Expert”, by Patricia Benner, 1982, *American Journal of Nursing*, *82*(3), 402-407. http://dx.doi.org/10.2307/3462928

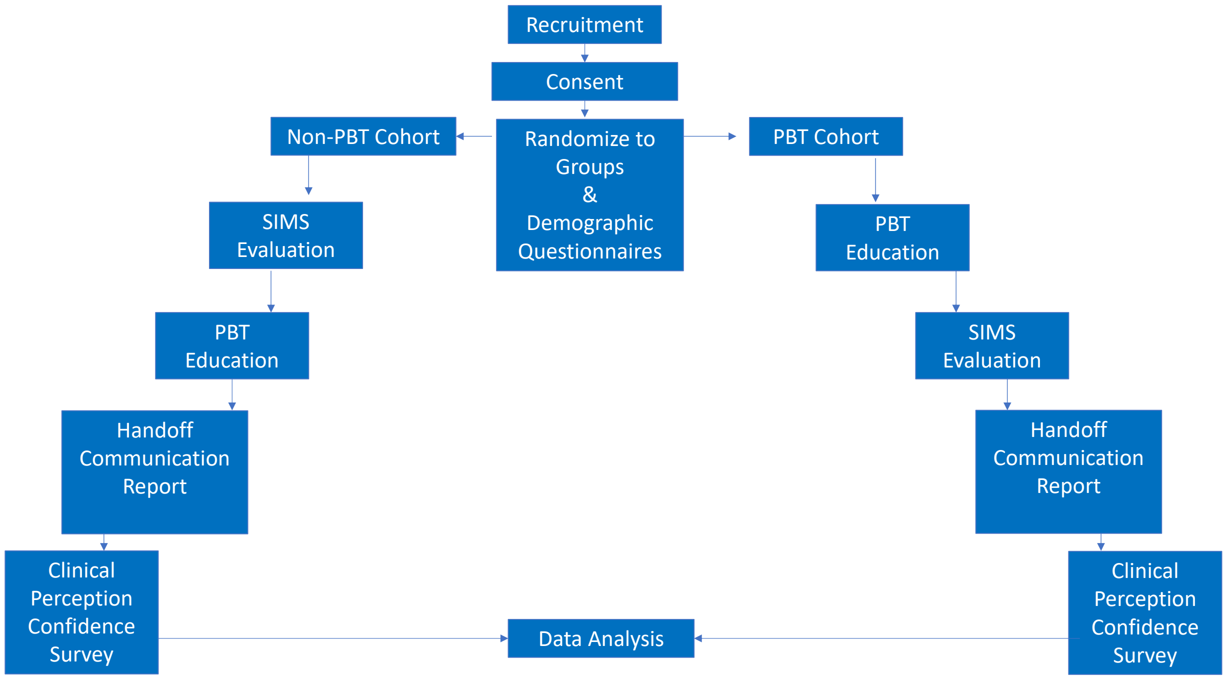

Figure 3. Implementation of the Provider Bull's-eye: A Tool to Guide Clinical Reasoning and Communication for Nurse Practitioners project flow diagram.

Appendix 1. Multirater Assessment Checklist

Checklist for Inter-rater Agreement - Version 3
Reviewer: -_______________________________
Participant #_____________

MONITORING/BASICS

- ☐ #1) Monitors on patient
- ☐ #2) Assess Patient
- ☐ #3) Call for other help/assistance
- ☐ #4) Call for PICU Bed or PICU Transfer
- ☐ #5) Correctly diagnoses Septic Shock

LAB WORK/IMAGING/MEDICATIONS

- ☐ #6) D-stick
    - ☐ #7) Bolus Dextrose when identified patient as having low glucose
- ☐ #8) Blood Gas
    - ☐ #9) Identify metabolic acidosis
- ☐ #10) Cultures - MINIMUM of Blood Cx
- ☐ #11) Portable CXR
- ☐ #12a) ABx - 3rd Gen. Cephalosporin
- ☐ #12b) ABx - Vancomycin

AIRWAY/BREATHING

- ☐ #13) Place O2
- ☐ #14) Escalate O2 to HFNC or NRB
- ☐ #15) Begin Bag-Valve-Mask ventilation
- ☐ #16) Identify need to intubate patient

CIRCULATION

- ☐ #17) Check pulses; identify poor perfusion
- ☐ #18) Start IV
- ☐ #19) 2nd IV
- ☐ #20) Bolus NS 20mL/kg #1
- ☐ #21) Bolus NS 20mL/kg #2
- ☐ #22) Bolus NS 20mL/kg #3
- ☐ #23) Bolus NS 20mL/kg #4
- ☐ #24) Start Pressors: Dopamine or Epinephrine
    - ☐ #25) Identify cold shock
- ☐ #26) Escalate to 2nd Pressor, or change from Dopamine to Epinephrine

Figure 4. Multi-Rater Assessment Checklist for Performance in Simulated Pediatric Septic Shock. Reprinted from *Does Simulation Improve Recognition and Management of Pediatric Septic Shock, and If One Simulation Is Good, Is More Simulation Better?* (p. 614), by Dugan, M. C., McCracken, C. E., & Hebbar, K. B. (2016). *Pediatric Critical Care Medicine,17*(7), 605-614. Reprinted with permission.

PBT Communication Checklist

Participant Number: ________
Reviewer: ________________

	Yes	No	**Order (1-5)**	Comments
Problem Identification				
One Liner History				
Systems & Intervention				
RESP (Order 1-7)				
CV (Order 1-7)				
NEURO (Order 1-7)				
FEN/GI (Order 1-7)				
HEME (Order 1-7)				
RENAL (Order 1-7)				
ID (Order 1-7)				
Shared Mental Model				
Summarize Plan				

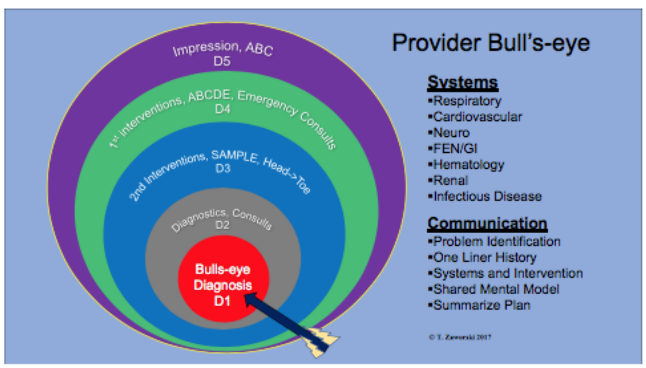

Figure 5. Provider Bulls-eye Tool Communication Checklist by T. Zaworski (2017).

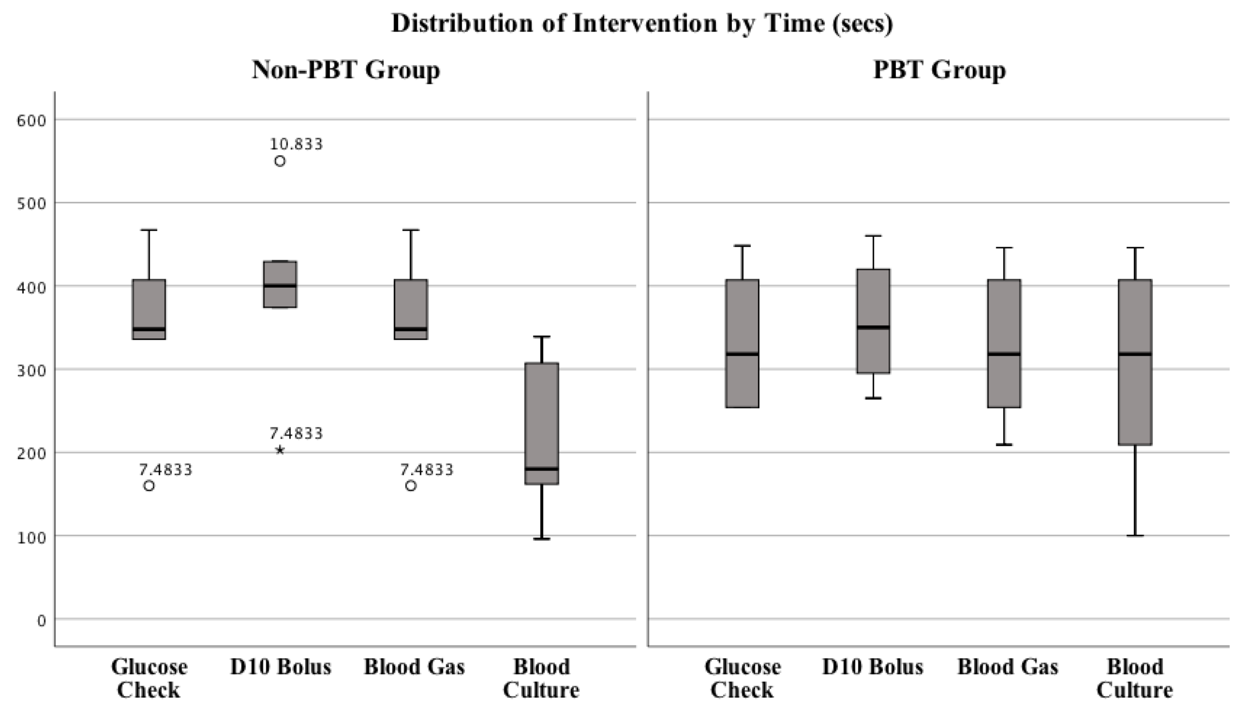

Figure 6. Group comparison of distribution of blood gas, glucose check, D10 bolus and blood culture intervention by time in seconds (secs).

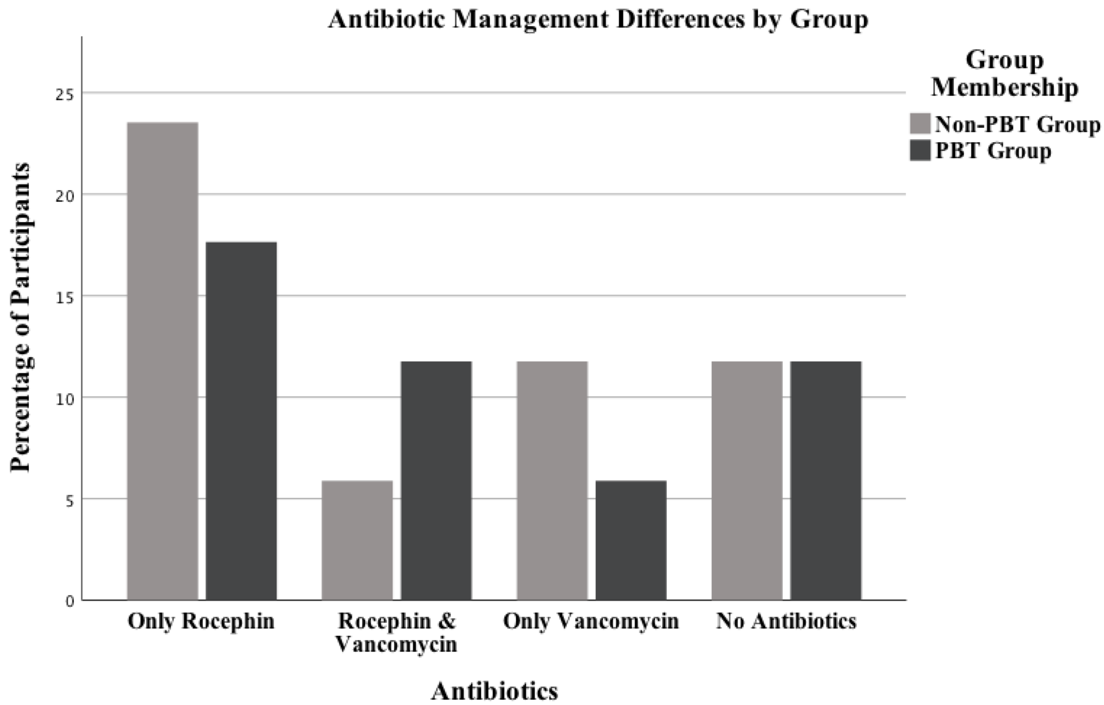

Figure 7. Group comparison of antibiotic management by percentage of participants

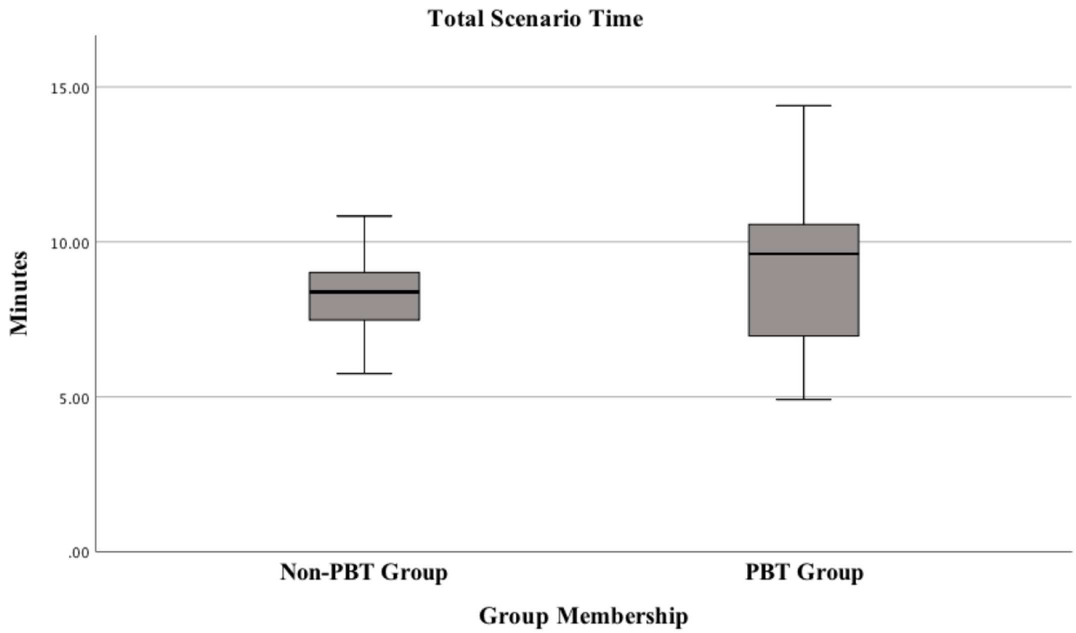

Figure 8. Group comparison of mean total scenario time in minutes (mins)