Continuing Education in Pediatric Emergency Management: Literature Review and Curriculum Development

By

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Abstract

There are few situations health care providers will encounter that are more stressful than the resuscitation of a pediatric patient. Pediatric resuscitations are relatively uncommon events and are generally associated with dismal patient outcomes despite efforts to implement pediatric-specific resuscitation guidelines (Donoghue et al, 2010; Hunt, Walker, Shaffner, Miller & Pronovost, 2008; Mikrogianakis et al., 2008). The purpose of this project is to present an integrative literature review and curriculum blueprint for pediatric emergency management to address the continuing education needs of nurses caring for pediatric patients. Thematic analysis of the literature was undertaken as well as a needs assessment of local nurses to discover what gaps in pediatric emergency management education exist currently. The proposed curriculum is informed by Benner's model of novice to expert (Benner, 1982; Benner, 2001), and Fink's taxonomy of significant learning (Fink, 2013). The theoretical foundation of the curriculum is constructivism, a perspective which acknowledges the previous knowledge and experience of the learners, and ensures that the curriculum remains learner-centred.

Keywords: pediatric nursing, simulation based education, pediatric emergency management

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Continuing Education in Pediatric Emergency Management: Literature Review and Curriculum Blueprint

There are few situations health care providers will encounter that are more stressful than the resuscitation of a pediatric patient. Pediatric resuscitations are relatively uncommon events and are generally associated with dismal patient outcomes despite efforts to implement pediatric-specific resuscitation guidelines (Donoghue et al, 2010; Hunt, Walker, Shaffner, Miller & Pronovost, 2008; Mikrogianakis et al., 2008). There is a clear need for increased and ongoing education to ensure that health care providers maintain competency in pediatric emergency management and pediatric resuscitation.

Purpose/Aim of Project

The purpose of this project is to describe a curriculum blueprint for continuing education for pediatric emergency management. The objectives of this project are to (1) present an integrative review of the literature regarding pediatric emergency management and simulation-based education, (2) describe a needs assessment of nurses working at a regional hospital, and (3) present a curriculum blueprint for a one day continuing education workshop in pediatric emergency management.

Statement of the Problem

Health care providers have many options for participating in well-established certification courses to increase skills and knowledge in pediatric resuscitation. Courses such as Pediatric Advanced Life Support (PALS) and the Emergency Nursing Pediatric Course (ENPC) are routinely offered to health care providers, and are considered by many to be the gold standard for pediatric resuscitation (Donoghue et al., 2010; Hunt et al., 2008). Although these courses have been offered for many years, it is well documented that learning outcomes from courses such as

these may be inadequate in fostering the competencies required in such situations (Donoghue et al., 2010; Tofil, White, Manzella, McGill & Zinkan, 2009). The old adage "practice makes perfect" rings true in many situations, and pediatric resuscitation is no different. How can health care providers remain competent in pediatric resuscitation and pediatric emergency management if there are few opportunities to practice the knowledge and skills learned in traditional courses?

Critical Incident

Our Child, Youth and Family and Emergency Department teams experienced a situation that highlighted the need for increased education in pediatric emergency management. A six-week-old infant was brought to our Emergency Department (ED) after being found unresponsive in her car seat by her mother. She was able to be resuscitated initially, after which she was rushed by ambulance to the ED. The team that responded had members from the ED, Neonatal Intensive Care unit (NICU) and Pediatric unit. Unfortunately, the time that the infant spent in our ED was chaotic and disorganized. There was confusion about the roles and responsibilities of those who responded, where equipment was located and who should be called to assist. Ultimately the infant died, leaving many of the team members who were involved traumatized and asking what else could have been done. Although the outcome of this tragic situation would not have changed, this event demonstrated to me that our team has a lot of work to do regarding the management of pediatric emergencies. While there are policies and procedures in place, they are either unknown to staff or are disregarded in the heat of the moment. I believe what is needed is a curriculum that addresses not only the knowledge and skills required for pediatric emergency management, but also the roles and responsibilities, crisis response management, communication, and teamwork skills.

Competencies

Nursing competence is described by Decker, Sportsman, Puetz and Billings (2008) as involving "the acquisition of relevant knowledge, the development of psychomotor skills, and the ability to apply the knowledge and skills appropriately in a given context" (p. 75). I will utilize this definition of competency for the purposes of this project.

As previously stated, courses such as PALS and ENPC have been developed to certify nurses and other health care providers who will be caring for critically ill pediatric patients. Both courses are internationally recognized and are widely taught around the world (Emergency Nurses Association, 2012). Each course has specific goals and course objectives, categorized as either cognitive or psychomotor (American Heart Association, 2011; ENA, 2012). The intent of courses such as PALS and ENPC is to ensure that nurses and other health care providers are competent to care for critically ill children in emergency situations by teaching both psychomotor skills and necessary knowledge.

Pediatric Advanced Life Support

The PALS course is considered by many to be the "gold standard" in pediatric emergency management (Donoghue et al., 2010; Hunt et al., 2008). This course was first developed in 1983 using the Advanced Cardiac Life Support (ACLS) framework as a conceptual model, although it differed in its delivery as it was built on a series of case-based scenarios (Cheng, Rodgers, van der Jagt, Eppich & O'Donnell, 2012). The overall goal of the course is to "improve the quality of care provided to seriously ill or injured children, resulting in improved outcomes" (AHA, 2011, p. 1). Through the years the course has been updated and now uses more current instructional techniques including video-mediated instruction and interactive multi-media formatting. Candidates on a PALS course are required to prepare for the course by completing assigned

reading before classes begin. During the course, candidates are expected to actively participate in a series of simulated "core cases," which are designed to re-enforce concepts such as identification and treatment of problems that put a child at risk for cardiac arrest, use of a systematic assessment approach to pediatric patients, use of the PALS algorithms, and effective communication and team dynamics (AHA, 2011).

The course objectives for the PALS course include both cognitive and psychomotor competencies. Cognitive competencies include that the candidate be able to describe the recognition and interventions necessary to prevent cardiac arrest in a pediatric patient, describe the systematic approach to assessment, describe priorities and specific interventions for pediatric patients with cardiac and respiratory emergencies, describe elements of post-resuscitation care, and explain the importance of effective team dynamics including individual roles and responsibilities. The psychomotor competencies are focused on tasks that are key to effective pediatric emergency management, including performing high-quality cardiopulmonary resuscitation (CPR), demonstrating effective airway and respiratory management, applying appropriate cardiorespiratory monitoring, selecting and administering appropriate medications and electrical therapies, establishing rapid vascular access, and demonstrating effective communication both as a team leader and a team member. Candidates are expected to be aware of their own individual scope of practice and to apply course concepts accordingly. For example, it is not within the scope of practice for a Registered Nurse (RN) in British Columbia to intubate a patient, but learning how a patient is intubated and when it is required better prepares the RN to assist the physician or Respiratory Therapist (RT) to do so.

Emergency Nursing Pediatric Course

In 1991 the Emergency Nurses Association (ENA) formed a Pediatric Committee at the request of their membership to focus more on pediatric care (ENA, 2012). One of the priority tasks of the Pediatric Committee was to assess the need for a pediatric emergency nursing course. The ENA Scientific Assembly completed a needs assessment in 1991, and found that there was an overwhelming need for such a course (ENA, 2012). This was echoed in a study done in 1994 by Frederickson, Bauer, Arellano and Davidson that examined the perceived knowledge and comfort of emergency nurses regarding pediatric patients. Not unexpectedly, the authors found that there was a higher level of comfort with pediatric patients in nurses who were certified Emergency Room nurses and who had completed some pediatric-specific education after completing their basic nursing education. The authors reported a perceived lack of knowledge and high levels of discomfort in managing neonatal emergencies, psychiatric emergencies, pediatric fluids and electrolytes, meningococcemia, child abuse and neglect, near-drowning and cardiac arrest (Fredrickson, Bauer, Arellano & Davidson, 1994). The first ENPC manual was published in 1993, with courses beginning shortly thereafter. ENPC addresses each of the areas of perceived lack of knowledge and discomfort identified in the 1994 study by Frederickson et al.

The goal of ENPC is to "improve the care of the pediatric patient in the emergency room setting and to increase the skill and confidence of emergency nurses who care for children worldwide" (ENA, 2012, p. v). As with the PALS course, learning objectives are categorized as either cognitive or psychomotor. Cognitive competencies include describing the characteristics of life-threatening illness and injury in children, identifying anatomical and physiological characteristics unique to children, describing the assessment of pediatric patients, planning specific interventions needed to manage serious illness or injury in pediatric patients, evaluating

the effectiveness of nursing interventions, and identifying health promotion strategies (ENA, 2012). Psychomotor competencies of ENPC include demonstrating a systematic approach to assessment, identifying a plan of care for a pediatric patient, setting priorities for nursing interventions, implementing interventions, and evaluating the response to interventions. Course developers were conscious to collaborate with organizations such as the American Heart Association (AHA), which also offer pediatric courses such as PALS, to ensure that use of terms and information is consistent across all courses (ENA, 2012).

Literature Review

To ensure that my curriculum for pediatric emergency management addresses the needs of the nurses who attend pediatric emergencies, I conducted a literature review to identify key articles focused on pediatric emergency management. I identified peer-reviewed articles that focused on pediatric emergencies and published pediatric emergency curricula. My literature review was guided by the steps outlined by Fulton, Krainovich-Miller and Cameron (2013), where the researcher: 1) determines the clinical question or research topic, 2) identifies the key terms or variables, 3) conducts a computer search by using at least two recognized online databases, 4) reviews abstracts online and disregards irrelevant articles, 5) retrieves relevant sources, 6) prints or downloads articles, 7) conducts preliminary reading to decide on relevant sources, 8) critically reads each source and 9) synthesizes critical summaries of each article.

With the guidance and support of a skilled University of Victoria librarian, I utilized three databases to conduct my search: the Cumulative Index to Nursing and Allied Health Literature (CINAHL) (EBSCO), MedLine (EBSCO) and Google Scholar ©. The articles were dated between 2004 and 2014, a ten-year period that will stay within the current trends and developments in pediatric emergency management. The search limited articles to those written in

English from Canada, the United States, the United Kingdom, Australia and New Zealand. Key words and phrases included, but were not limited to, pediatric emergenc*, healthcare provider perception of pediatric emergenc*, pediatric resuscitation, pediatric nursing education, simulation in pediatric resuscitation, simulation in pediatric emergenc*, and nurse response to pediatric emergenc*. In addition to this search, I also conducted ancestry searching, where I looked into the reference lists of articles to find additional citations (Whittemore & Knafl, 2005). The systematic and thorough review of citations within articles expanded the number of eligible articles and offered an opportunity to find more potentially useful material (Conn et al., 2003). My initial searching for nurses' or health care providers' perceptions of pediatric emergencies yielded no results, as did my search for nurse response to pediatric emergencies. I found that I had to look into the literature about pediatric resuscitation and simulation to find discussions of how nurses felt about caring for children in emergency situations.

I reviewed 32 articles related to pediatric emergency management, simulation-based education and pediatric nursing. Articles were excluded from the literature review if they were about a population such as physicians, medical residents or respiratory therapists. I included only articles about nurses or nursing students. I narrowed my selection to eight articles that I felt addressed the questions that I was asking and met the inclusion criteria. The selected articles were published between 2005 and 2014 (Appendix 1). Five of the articles I selected were quantitative studies. Of these five studies two utilized a pre-test/post-test design, two used a two-group experimental design, and one used a quasi-experimental, longitudinal design (Bultas, Hassler, Ercole & Rea, 2014; Butler, Veltre & Brady, 2009; Dowson, Russ, Sevdalis, Cooper & DeMunter, 2013; Gates, Parr, Hughen, 2012; Wodrich, Gilmartin & Fink, 2013). Three of the articles were qualitative articles, one literature review (Birkhoff & Donner, 2010), one expert

opinion (Parker & Myrick, 2009), and one educational needs assessment (Monachino, 2005). All of the selected articles were from nursing literature examining nursing pedagogy, or looking at selected populations of nursing students, pediatric nurses or rural nurses who would be caring for pediatric patients.

I critically appraised the articles using either the Johns Hopkins Nursing Evidence-Based Practice Research Appraisal Tool or the Johns Hopkins Evidence-Based Practice Non-research Appraisal Tool (Newhouse, Dearholt, Poe, Pugh & White, 2007). This appraisal tool was selected after exploring a variety of tools, and in consultation with my supervisor. I found this tool to be comprehensive and a good fit for my project (Appendix 2).

Thematic Analysis

Thematic analysis is a process in which literature is reviewed to uncover themes that emerge from the data (Braun & Clarke, 2006; Cameron, 2013). Van Manen, as cited in Cameron (2013), states that "grasping and formulating a thematic understanding is not a rule bound but a free act of 'seeing' meaning." (p. 334). Several methods are suggested in thematic analysis, including keeping reflective journals through the data-collection period, sorting data into general categories in analytical files, and developing a rudimentary coding scheme (Cameron, 2013; Saldañ̃a, 2013). Cameron (2013) describes coding data as the "progressive marking, sorting, resorting, and defining and redefining of the collected data" (p. 335). It is the coding of data that gives researchers the opportunity to see the meaning within all the data that has been collected. Thematic analysis lends itself well to both constructivism and social constructivism, where the themes are analyzed within the sociocultural context (Braun & Clarke, 2006). Braun and Clarke (2006) state that, "from a (social) constructionist perspective, meaning and experience are socially produced and reproduced, rather than inhering within individuals. Therefore thematic

analysis within a constructionist framework…seeks to theorize the sociocultural contexts, and structural conditions, that are provided" (p. 85).

Braun and Clarke (2006) identify six phases to a thematic analysis of literature. Phase one involves familiarizing yourself with the data. During this phase I immersed myself in the data that I had collected by reading through my selected articles several times, and doing so in an active way, where I began to search for meaning and possible patterns.

Phase two of thematic analysis is when the researcher generates initial codes (Braun & Clarke, 2006). Braun and Clarke define these codes as identifying "a feature of the data (semantic content or latent) that appears interesting to the analyst, and refer to the most basic segment, or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon" (2006, p. 88). I accomplished this phase by developing lists of interesting features of the data, and developing initial codes.

The third phase of thematic analysis is searching for themes (Braun & Clarke, 2006). This phase begins when all of the data has been collected and coded, and involves the researcher sorting the different codes into potential themes.

Phase four of thematic analysis begins when there is a set of initial themes; the researcher must then revise and refine the themes. During this phase it will become evident that some themes are not actually themes at all, as they do not have enough data to support them; these might become sub-themes. Other themes might need to be divided into two themes. There are two levels of refinement required in phase four of thematic analysis: in level one I reviewed the coded data extracts to ensure that they formed a coherent pattern. When I was satisfied that they did, I moved on to level two, which involved reviewing the data set as a whole to ensure that the themes accurately reflected the data set (Braun & Clarke, 2006).

The fifth phase of thematic analysis began when I was happy with my thematic map. At that point I needed to define my themes and analyze the data within them by identifying the "'essence' of what each theme is about" (Braun & Clarke, 2006, p. 92).

The final phase of thematic analysis, according to Braun and Clarke (2006), is producing the final report, which must include sufficient evidence to convince the reader that the analysis has merit. This phase began when I had a set of fully developed themes and was ready to tell the story of my data.

Themes

After I had analyzed the data, four dominant themes emerged: feelings and perceptions of nurses, high risk–low frequency, educational needs assessment, and simulation as a nursing education strategy.

Feelings and perceptions of nurses. It was not a surprise that several of the studies reported that nurses felt fear, anxiety and apprehension when faced with managing a pediatric emergency (Butler, Veltre & Brady, 2009; Dowson et al., 2013; Monachino, 2005; Wodrich, Gilmartin & Fink, 2013). These feelings of anxiety were related to a lack of confidence in skills and knowledge about pediatric emergencies in general. In the qualitative component of their mixed methods study, Dowson et al. (2013) interviewed 20 nurses. They described initial fears of panic and feeling "out of their depth" (p. 614) as being common among their participants. The participants discussed feeling anxious and apprehensive about doing the wrong thing in an emergency situation, possibly making the situation worse and not knowing what to do or how to help, as well as being fearful about the possibility of the death of a child (Dowson, et al., 2013).

After conducting an educational needs assessment at the Children's Hospital of Philadelphia (CHOP) Monachino (2005) echoed this, finding that a lack of knowledge in

pediatric emergency management and resuscitation and/or a lack of confidence in clinical skills contributed significantly to feelings of anxiety and apprehension. Additionally, Monachino (2005) identified that nurses are often the first to respond to an in-hospital pediatric arrest, further adding to feelings of anxiety and fear. In their study of a rural hospital, Wodrich et al. (2013) found that the nursing staff reported that even events such as pediatric respiratory distress caused significant levels of anxiety and apprehension for the staff. Using a presurvey/postsurvey design they assessed the self-reported confidence and confidence of 65 nurses before and after a pediatric respiratory distress simulation scenario (Wodrich et al., 2013).

High risk–low frequency events. Many of the fears and anxieties that were felt by nurses related to pediatric emergencies are due to the fact that these events are considered to be high-risk–low-frequency events (Dowson et al., 2013; Wodrich et al., 2013). That is, pediatric resuscitations do not happen that frequently, but when they do happen, the stakes are extremely high (Birkhoff & Donner, 2010; Monachino, 2005). With many advances being made in medical science, infants and children are surviving critical illnesses, albeit with increased morbidity and mortality. This has led to an increase in the acuity level of children and infants who are hospitalized, placing them at higher risk for in-hospital respiratory or cardiopulmonary arrest (Birkhoff and Donner, 2010; Hunt et al., 2008). The lack of frequency of these events contributes to a lack of exposure to and experience in managing pediatric emergencies. As previously discussed, nurses and other members of the interdisciplinary team attain competence in managing pediatric emergencies by taking courses such as PALS and ENPC, but it is difficult to maintain competence when the skills are used infrequently. Children have excellent physiologic compensatory mechanisms, and the signs of deterioration can be subtle. Preparedness in these situations is critical, ensuring that nurses can identify children at risk of deterioration and can

manage them when they are critically ill (Dowson et al.,2013). The authors went on to suggest that nurses' skills in pediatric resuscitation are sometimes poor, a fact which may be explained by a lack of exposure and inexperience.

Of the eight articles included for review the themes of feelings and perceptions of nurses and high risk--low frequency were found in five (Birkhoff & Donner, 2010; Butler, Veltre & Brady, 2009; Dowson et al., 2013; Monachino, 2005; Wodrich, Gilmartin & Fink, 2013). Three of the articles reviewed were quantitative research studies, all examining how simulation affects a certain population of nurses such as qualified nurses in a rural setting (Wodrich et al., 2013), qualified pediatric nurses in a large teaching hospital (Dowson et al., 2013), or nursing students (Butler, Veltre & Brady, 2009). All three studies were carried out with small sample sizes, more suitable for pilot studies. Other limitations identified included attrition, challenges in finding validated survey tools (Wodrich et al., 2013), excitement using simulation potentially skewing self-reported measures (Butler et al., 2009), and difficulty in achieving large sample sizes due to competing clinical demands on time (Dowson et al., 2013). The need to replicate findings in the context of larger sample groups was identified as a major focus for further research in order to more fully contribute to the body of knowledge in this area of nursing education.

Monachino (2005) presented an educational needs assessment that was undertaken at CHOP that revolutionized how pediatric emergency management education was delivered at that facility. Birkhoff and Donner (2010) conducted a literature review addressing the American Heart Association guidelines for PALS, nursing clinical competencies, and advantages and disadvantages of simulation as an educational strategy. Both Monachino (2005) and Birkhoff and Donner (2010) recommend further research into whether or not simulation based education

improves patient outcomes or has an effect on long term learner objectives, and repeated needs assessments of current educational programs to ensure that they are meeting learners needs.

Educational needs assessment. It is clear, due to the rarity of pediatric emergencies, that there is a need to not only attain competency, but also to maintain it, and nurses are very aware of this. In their 2013 study Wodrich et al. reported that participants stated a desire to practice their advanced life support skills in a safe and supportive environment and to have increased amounts of hands-on practice time with critical equipment.

In 2005 the nurse educators at the Children's Hospital of Philadelphia (CHOP) conducted an educational needs assessment of the staff nurses and found that an update of emergency care, specifically mock codes, was the top priority (Monachino, 2005). As previously described, an existing mock code program was in place but required extensive updating. Evaluations indicated that staff nurses in the different units throughout the hospital had vastly differing needs. Nurses on medical-surgical units requested a focus on assessment and interventions prior to and while initiating a code; nurses working in critical care environments required more emphasis on advanced skills (Monachino, 2005).

But in my experience there is much more to pediatric emergency management than simply the advanced life support skills, or what happens during the resuscitation; there is also everything that happens before. Dowson et al. (2013) state that "the importance of nurses being skilled at recognizing and managing seriously ill children should not be underestimated" (p. 610). It is therefore fair to assume that any educational effort taken to address pediatric emergency management must include pre-arrest care as well. As with the literature regarding nurses perceptions of pediatric emergencies there appeared to be a paucity of literature regarding this theme, and it warrants further examination and research.

Simulation as nursing education strategy. Simulation-based education (SBE) was identified in the literature reviewed as one way to address the needs of nurses to maintain their competence in managing pediatric emergencies. Simulation is an integrative approach to teaching and learning that can assist learners with skill and knowledge acquisition and retention (Gates, Parr & Hughen, 2012). This was examined by the authors' study of 104 baccalaureate nursing students in their first medical-surgical nursing course and their performance on a content specific examination after participation in a simulated scenario (Gates et al., 2012). Nurse educators are constantly being challenged to find new and innovative ways to engage staff, and simulation has been identified as one educational technique that helps educators in promoting knowledge retention and improving competence (Bultas, Hassler, Ercole & Rea, 2014). Bultas et al. (2014) hypothesized that participating in high-fidelity simulation (HFS) would improve knowledge retention and skill performance. They conducted a pre-test/post-test experimental design study with 60 nurses enrolled in a PEARS course at a large Magnet hospital. The Pediatric Emergency Assessment, Recognition and Stabilization (PEARS) course is offered by the American Heart Association along with the American Academy of Pediatrics as a bridge between Basic Life Support (BLS) and PALS, the focus of PEARS is more on the systematic assessment and early recognition of deterioration in a pediatric patient (Ralston & Zaritsky, 2009).

There is evidence that using SBE in nursing education assists learners in bridging the gap between theory and practice by applying theoretical knowledge in practical situations (Butler et al., 2009). This was demonstrated by Butler et al. in their study of 31 pre-licensure nursing students who were assigned to either a low-fidelity simulation group (LFS) for a HFS group.

The benefits of SBE were highlighted by several of the articles in this review, benefits that included: allowing learners to provide care and observe the following sequelae without

causing harm to a patient; practice high-risk skills in a safe and supported environment; participate in high-risk–low-frequency events that are presented realistically and interactively; and foster interdisciplinary teamwork (Bultas et al., 2014; Butler et al., 2009; Dowson et al., 2013, Gates et al., 2012; Parker & Myrick, 2009; Wodrich et al., 2013). Birkhoff and Donner (2010) provided a comprehensive literature review of simulation based education, highlighting the advantages and disadvantages as described by the other studies in my review, as well as a description of incorporating high-fidelity simulation into a PALS certification course at a large teaching hospital in the United States. Learners who participated in the enhanced PALS course responded positively to the simulation aspect, stating that they appreciated the increased fidelity of the simulated patient and vital sign changes (Birkhoff and Donner, 2010). Additionally, several studies reported higher levels of learner satisfaction with SBE education than with more traditional pedagogical methods (Bultas et al., 2014; Butler et al., 2009; Dowson et al., 2013; Wodrich et al., 2013).

With the prevalence of SBE growing in both undergraduate nursing education and in hospital-based continuing clinical education, Parker and Myrick (2009) raised the concern that "technology rather than sound philosophically-based pedagogy is informing nursing education" (p. 322). They examined behaviourism and constructivism as the predominant philosophies that inform modern nursing curricula, and looked at how each might impact integration of high-fidelity SBE into the curricula. They further stated: "Scenario based human patient simulat(ion) is a powerful tool if properly utilized, but it is merely a tool, requiring knowledge of pedagogical principles for proper implementation" (Parker & Myrick, 2009, p. 325).

Behaviourism is described as forming the historical underpinnings of nursing pedagogy, where the mind is a bank for accumulated knowledge. Individuals learn through repetition, when

responses of others to behaviours lead to satisfying results (Parker & Myrick, 2009). The authors note that although traditional behaviourist pedagogy is becoming less prominent in nursing curricula, designing SBE that focuses on psychomotor skill acquisition with a behaviourist lens could be considered by nurse educators. In this case, the educator should make the scenarios very focused and not overly complex, as the desired learner outcome would not be critical thinking or problem solving; it would be learning and practicing a specific skill or task (Parker & Myrick, 2009).

In contrast to behaviourism, constructivism posits that learners create meaning through interaction with the environment. The constructivist learner builds and shapes knowledge from everything, connecting new information, personal attitudes and beliefs to previous knowledge (Parker & Myrick, 2009). Tomei (as cited in Parker & Myrick, 2009) states that using a constructivist approach to SBE is preferable, as it is exploratory and experiential in nature. A constructivist approach to SBE should provide learners with problem-solving scenarios and access to a variety of resources; this could be accomplished by designing a clinical scenario that is directed towards a specific learning objective, but allows the learners freedom to think critically and develop their own solutions to the problem (Parker & Myrick, 2009). More than simply encouraging psychomotor skills, creating SBE scenarios with a constructivist lens develops skills in collaboration, communication and teamwork.

Dowson et al. (2013) examined how participating in in-situ simulations affected pediatric nurses' clinical confidence. The researchers conducted a quasi-experimental, mixed-methods study to evaluate if the intervention (i.e., participation in simulation training) had any beneficial effect on nurses' confidence levels. They used a questionnaire and semi-structured interviews to collect their data, hoping to gain insight using both quantitative and qualitative data. They found

that for the intervention group there was statistically significant improvement in confidence scores in all areas (technical confidence, non-technical confidence and total score) over the time of testing, while in the control group there was improvement only in the non-technical score, suggesting that the intervention did have a beneficial effect. The semi-structured interviews that the authors conducted revealed themes such as the nurses' feeling nervous, panicked and fearful in the face of a pediatric emergency due to a lack of experience and exposure and a fear of "doing the wrong thing" or "not knowing what to do or how to help" (Dowson et al., 2013, p. 614). The nurses interviewed spoke positively about their experiences with the simulation, expressing that they appreciated the opportunity to practice skills in a safe setting, and to learn from and with staff who had had real-life experience. The authors stated: "Every nurse in the intervention group felt that the simulation training had prepared them for real life by providing insight, clarifying their role and improving their knowledge and use of emergency equipment" (Dowson et al., 2013, p. 615).

While there has been much research about simulation-based education in pediatric nursing education, there is more work to be done. The majority of studies that I reviewed were pilot studies with small sample sizes, it would be beneficial to replicate these studies with much larger sample groups. Additionally, much of the literature about simulation based education comes from medicine rather than nursing. It is imperative that nurses continue to explore and research simulation based education from a nursing perspective.

Summary of the Literature

A review of the literature revealed there is scant research available that is directly about the perceptions and feelings of nurses caring for children in emergent or resuscitation scenarios; it was necessary to look into the simulation literature to find it. I was not surprised to find that,

due to the high-risk–low-frequency nature of pediatric emergencies, many nurses feel fearful, anxious and apprehensive when faced with this situation (Butler et al, 2009; Dowson et al., 2013; Monachino, 2005; Wodrich et al., 2013). While it is necessary to continue to offer courses such as PALS and ENPC to teach nurses skills and competencies in pediatric emergency management, it is also necessary to offer opportunities for continuing education to refresh, update and maintain competency (Monachino 2005). SBE offers clinical educators a viable option for delivering this education in a risk-free environment, although they must use caution to ensure that simulation is viewed as a tool, not a pedagogy (Butler et al., 2009; Parker & Myrick, 2009).

As previously stated, it was evident that there was a paucity of literature about nurses perceptions of pediatric emergency management, and in regards to pediatric emergency management in general. The majority of research in this area was from medicine, specifically the literature regarding simulation and SBE. In order to fully understand the implications of incorporating SBE into nursing clinical education further studies must be undertaken by nurse researchers and nurse educators. These studies must include work related to exploring the feelings and perceptions about nurses caring for children in high risk – low frequency situations, how to support these caregivers and evaluations of currently existing curricula for pediatric emergency management.

Perceptions of Local Nurses

In addition to my review of the literature, I wanted to ensure that my curriculum for pediatric emergency management would meet the needs of the nurses at the hospital where I work as the Pediatric Clinical Nurse Educator (CNE). At a Pediatric Education Day in October 2013 I distributed a brief survey to the participants, explaining that I was looking for their perceptions about pediatric emergency management education. I described my project and stated

that I was hoping their answers would guide me in developing a curriculum that I could implement at our facility. I received 20 surveys back from 23 participants and was encouraged to create an online version of my survey to distribute to staff on the Pediatric unit and ED who were unable to attend. I created a survey on the website Survey Monkey© and received 14 further responses for a total of 34 responses to my survey. Between the Pediatric unit and the ED the survey reached 95 nurses, for a response rate of 36%.

The first question on the survey asked respondents to rate on a 0-5 Likert scale (0 = not at all prepared, 5 = extremely prepared) how prepared they felt they were to manage pediatric emergencies. There were responses in each category. The descriptive statistics for the responses (n=34) were nearly identical: the mean response was 2.9, the median and the mode were both 3. Overall, 62% of the responses fell between 0 and 3, and only 38% of the responses fell in the higher range (4 and 5), indicating that the majority of nurses who responded to the survey do not feel that they are overly prepared to manage pediatric emergencies with the education that they have received thus far.

The second question on the survey asked respondents to describe the education they have received or participated in already to prepare them to manage pediatric emergencies, and when that education occurred. The majority of the respondents indicated that they had taken ENPC at some point, although many had taken it several years ago and no longer held a current certification in it. Fewer respondents had taken PALS; some were current and some were not. Other responses included ED Skills Days that have had a pediatric focus, and the British Columbia Institute of Technology (BCIT) Emergency Nursing Specialty Course, which has a pediatric module that many ED nurses have taken. One respondent stated: “I have received on the job training. Overall we have very poor pediatric education so far.”

The third and final question asked respondents to describe what kind of education they would like to receive to better prepare them to manage pediatric emergencies. The responses to this question were categorized into four main themes: pediatric skills, simulations and mock codes, funded courses and education days, and in situ training. Respondents asked for more hands-on training in pediatric-specific skills, such as pediatric assessment, intravenous insertion, intraosseous insertion, airway management, pediatric medication dosing and administration, catheter insertion, pediatric pre-arrest management, and use of the Broselow tape and pediatric crash cart. They felt that these were skills they did not have enough time to practice and were not confident about in the event of an emergency. Simulations and mock codes were also a common request and is one that I have heard frequently since I began my position as a CNE. One respondent wanted to see "Simulations – practice codes for example, or practice a major trauma. Using a doll or something that makes the team go through the motions – as close to real life as possible."

After analyzing the results of the survey, I realized that what I found in my literature review was echoed by my colleagues at the hospital. The nurses who responded to my survey generally feel underprepared to respond to pediatric emergencies, and do not feel that their education has been adequate thus far. They are eager for more education, and are calling for something to be done about it.

Review of Existing Curricula

In an effort to understand what other educators in hospitals in Canada were offering for continuing education in pediatric emergency management, I reached out by email to CNEs in both children's hospitals and regional hospitals of comparable size to the one in which I am based. I received information from five sites: Chinook Regional Hospital in Lethbridge, Alberta;

Victoria General Hospital in Victoria, British Columbia; Stollery Children's Hospital in Edmonton, Alberta; Alberta Children's Hospital in Calgary, Alberta; and Pasqua Hospital in Regina, Saskatchewan.

Most sites do not currently have any formal program to address continuing education needs in pediatric emergency management. In speaking with a CNE from the Stollery Children's Hospital who previously worked on the pediatric unit at Chinook Regional Hospital, I learned that neither facility has a specific program (J. Sieuraj, personal communication, May 10, 2014). She described how the CNE in Lethbridge would run in situ mock codes and education days, but there was no formal schedule or consistency in who would attend. She noted a similar problem with what is currently happening at the Stollery. The education team at the Stollery offers PALS courses and is piloting the Pediatric Emergency Assessment, Recognition and Stabilization program in Canada (offered through the American Heart Association). It is also currently working on a program to address the continuing education needs of the staff.

Scenarios in Victoria and Regina are similar. At Victoria General Hospital (VGH), PALS courses are offered relatively frequently due to VGH's status as the pediatric tertiary care center on Vancouver Island. The VGH CNE offers in situ mock codes and SBE when she can, but due to competing demands from the health authority, this is often not viewed as a priority for education (E. Carrick, personal communication, May 12, 2014). VGH is currently developing its simulation capacity, so she is hopeful there will be increased opportunity for pediatric simulation in the future.

The CNE in the Emergency Department at the Pasqua Hospital in Regina offers pediatric education as part of the staff orientation. The duration of the orientation is only two weeks, so the amount of time spent on pediatrics is limited. Orientation is supplemented with mock codes and

simulation as time and resources allow (T. Batiuk, personal communication, May 13, 2014). This CNE described a recent pediatric sepsis simulation that was very well received by the staff, mentioning that she finds the staff she works with "crave extra education, especially in pediatrics," as it is a source of anxiety for them.

Of the sites surveyed, the facility that has the most robust program for continuing education in pediatric emergency management is Alberta Children's Hospital in Calgary. The hospital has an extensive state-of-the-art simulation suite called KidSim, which at this time is the largest pediatric simulation facility in Canada (Alberta Children's Hospital, n.d.). Through KidSim, Alberta Children's Hospital runs a range of programs that can meet a variety of needs, including teaching management of pediatric emergencies to adult ED nurses, a mock code program, inpatient pediatric interprofessional education, Just-in-Time training, and outpatient simulation programs.

Just-in-Time training is a unique program that focuses on inpatient interdisciplinary teams that include nurses, respiratory therapists and pediatric residents. It takes place approximately twice monthly on each unit, and the simulation scenarios are designed around admitted "real" patients, identified by the team as being high risk for deterioration; the scenario is designed around what the potential deterioration of that patient would look like (Alberta Children's Hospital, n.d.). W. Bissett, the CNE for the Pediatric Intensive Care Unit, described it as "where you look at the sickest kid on the unit and pull that nurse from the bedside for a simulation scenario based on the deterioration of (what) that child would look like and how to manage it" (personal communication, May 9, 2014). Each Just-in-Time scenario is designed to incorporate one teamwork objective and one medical objective, and the participants are the actual

members of the care team providing care to that patient. The hope is that any deterioration in the actual patient would be better managed or avoided completely as a result of the practice.

Although the return of information from sites across Canada was small, I suspect they are reflective of what is happening across the country. Although each site is doing something to address the continuing education needs of staff, there is a lack of time and resources to do so in an organized and formal manner. Alberta Children's Hospital is fortunate to be well resourced, with a simulation facility and dedicated staff that can support the educational needs of the entire interdisciplinary team. Apart from resources, time is a factor, and there must be a commitment from management to ensure that the continuing education in pediatric emergency management is a priority for staff. I heard from each educator I connected with that mock codes were only done when there was time and extra staff, and there is very rarely extra time and additional staff. Competing demands on the time of the CNE also present a challenge to making education in pediatric emergency management a priority, as health authorities are asking educators to implement more required institutional education. My hope is to create a curriculum for a workshop to help address some of these challenges.

Development of Curriculum

Curriculum is defined by Keating (2011) as "the formal plan of study that provides the philosophical underpinnings, goals, and guidelines for the delivery of a specific educational program." (p. 1). Currently the emphasis in nursing curricula is on the learner and on creating learner-centred experiences. The curriculum for pediatric emergency education that I am proposing is underpinned and guided by the theoretical perspectives of constructivism, social constructivism and Benner's novice-to-expert model. Fink's taxonomy of significant learning and his Integrated Course Design model will also guide me in curriculum development (Fink, 2013).

In this section I will outline my theoretical perspective and conceptual framework, and will describe my curriculum blueprint. I will also discuss two specific pedagogical methods used in the curriculum: story-based learning and simulation-based education.

Theoretical Perspective

Constructivism and Social Constructivism

As a novice nurse educator I am drawn to the constructivist perspective of teaching and learning, which views the learner's prior knowledge as foundational to the learning process, and views knowledge as socially constructed (Young & Maxwell, 2007). When considering a curriculum for pediatric emergency education, I believe that recognizing and acknowledging the prior learning and previous experience of the learners will be critical. Many staff from across the disciplines have taken training in responding to pediatric emergencies, and it is important to recognize that they will be viewing any additional education through the lens of their previous experience. It is my goal to build upon the knowledge that each learner brings to the table. I believe that we have a tremendous opportunity to come together as a team, to learn from each other and to grow as professionals. This belief aligns closely with the assumptions of social constructivism.

Social constructivism is the theoretical approach that focuses on the psychological aspects of learning, while rejecting individual-oriented cognitive constructionism (Young & Maxwell, 2007). Many of the ideas of social constructivism are rooted in the work of Russian psychologist L.S. Vygotsky, who emphasized the social context of learning and the importance of culture in cognitive development (Moura, 2005). Unlike Swiss psychologist Jean Piaget, who felt that knowledge was built through the way an individual interacts with the world, Vygotsky found that development was social in origin (Moura, 2005; Young & Maxwell, 2007). Within the

framework of social constructivism, both the learner and the instructor are active and involved elements of the learning process (Moura, 2005). Cooperative learning draws inspiration from social constructivism, where "the underlying idea…is that when students work through problems in situations of social interaction – groups – they are able to call on problem-solving capacities… that they would be likely be unable to evoke if working on the same problem independently" (Young & Maxwell, 2007, p. 15). It has been my experience that many nurses view educational experiences as social as well as educational, and are appreciative of the opportunity to participate in learning activities that are collaborative and allow time to engage in discussion. Creating a curriculum with a social constructivist lens encourages this, and using diverse learning activities such as concept mapping and problem-based learning would promote collaboration and social interaction between learners (Young & Maxwell, 2007). Additionally, as previously discussed, simulation-based education lends itself well to a constructivist approach to teaching and learning when the scenarios are designed to allow the learners to problem-solve freely, think critically and work collaboratively (Parker & Myrick, 2009).

Constructivism and social constructivism are theoretical perspectives that are congruent with theoretical perspectives on nursing. For example, the Quality Caring Model was developed by Dr. Joanne Duffy (2010) to guide practice and research. This model consists of four main concepts, two of which speak to constructivism. The first is *humans in relationship*, which refers to the idea that humans are multidimensional with characteristics that make them unique (Duffy, 2010). It is my belief that our previous experiences and knowledge are among these characteristics. The second is that of *relationship-centered professional encounters*, referring to the notion that there is an independent relationship between the nurse and the patient/family, and

that the collaborative relationship that nurses form with each other and the other members of the interprofessional team are meaningful (Duffy, 2010).

Novice to Expert. In creating a curriculum for pediatric emergency education I was guided by Benner's model of novice to expert (Benner, 1982). Based on the Dreyfus model of skill acquisition, Benner's model posits there are five levels of proficiency that one passes through in the acquisition of skills: novice, advanced beginner, competent, proficient and expert. These levels of change reflect movement in aspects of skill performance, such as the move away from reliance on abstract principles to the use of concrete experience as a paradigm (Benner, 1982; Benner, 2001). Novices have little to no experience with the situations in which they are expected to learn tasks, while the expert has an intuitive grasp of the situation (Benner, 1982). While it is possible that many members of the team who are responding to pediatric emergencies are expert clinicians, very few are experts in pediatric resuscitation. Benner (as cited in Cangelosi, Crocker & Sorrell, 2009) describes a process where considerable tension is felt when experts move from an area that is well known to them into an area that is new. This shift places them back into the role of novice, causing anxiety and tension (Cangelosi et al., 2009).

Benner also addressed the need for different instructional strategies and approaches for each level of skill acquisition. Novice and advanced beginner nurses can benefit from a preceptorship model of support in the clinical setting, where they are matched closely to a more advanced nurse to work, and they rely on clear guidelines to help guide their practice (Benner, 2001). The competent nurse will benefit from games that test decision making, and simulations that provide practice in working through complex care scenarios. Proficient nurses benefit from case-based learning, where they are asked to work through complex situations and are required to provide context and cite their experience. Benner states that "the proficient performer is best

taught inductively, by beginning with a clinical situation and having the performer supply his or her ways of understanding the situation." (Benner, 2001, p. 30). The expert nurse, who has an intuitive grasp on situations, is best used as a resource to provide consultation and support to other nurses. This is not to say that the expert nurse does not require any education at all, as a hallmark of the nursing profession is lifelong learning. According to Benner, the expert clinician benefits from knowledge exchange, clinical case studies and opportunities to participate in research (Benner, 2001). The implications of this part of Benner's model on the curriculum that I have developed is that I will be reaching clinicians at all skill levels, including experienced pediatric nurses, novice emergency room nurses and competent adult nurses who infrequently care for pediatric patients. It is imperative that I am aware of this as I present the curriculum, and that I modify the learning plans to suit the needs of the learners. One of the benefits to a curriculum that is developed and offered in-house is that it is easily adaptable to each learner group, facility and situation.

Taxonomy of Significant Learning. Using an educational taxonomy in curriculum development assists the designer in classifying, categorizing and defining goals by providing a common language (Candela, 2011). The use of taxonomies at every level of education has provided a way for educators to develop, communicate and evaluate learner goals and learning objectives, and to shift the focus to what learners are expected to learn (Candela, 2011). In 2003, L. Dee Fink, the former director of the Instructional Development Program at University of Oklahoma, developed a taxonomy of significant learning (Fink, 2007). Building upon the work of Benjamin Bloom, his taxonomy has six general categories of learning:

- Foundational Knowledge – The basic knowledge and understanding that is necessary for other kinds of learning (Fink, 2013, p. 35).

- Application – In addition to learning new facts, learners may learn new skills that may be physical (inserting a urinary catheter), social (communication techniques), or intellectual (critical thinking). Application learning allows other types of learning to be useful (Fink, 2013, p.36).
- Integration – When learners see the connections between all the different things they have learned, and different ideas, a critical part of significant learning has been achieved (Fink, 2013).
- Caring – This can result from a learning experience that has changed the way a learner cares about something, which can be reflected in new feelings, values or interests (Fink, 2013).
- Learning How to Learn – Refers to the process of the learner learning about the process of learning (Fink, 2013). This type of learning speaks to the lifelong learning that is inherent in nursing.
- Human Dimension - When learners discover the personal or social implications of what they have learned, they are able to function and interact more effectively. This type of learning "informs students about the human significance of what they are learning" (Fink, 2007, p. 36).

Rather than the hierarchical approach taken by Bloom, the taxonomy of significant learning is interactive (Appendix 3).

The basic premise of the taxonomy is that any course or program can address all six types of learning; the more of the six that are addressed, the more significant the learning experience (Fink, 2007; Fink, 2013). Fink describes an approach to designing courses called Integrated Course Design (ICD), which ensures that courses are learner-centered, systematic and integrated

(Fink, 2007; Fink, 2013). The process of ICD involves four key steps. The first is examining the situational factors, such as the specific context of the course, expectations of others and the nature of the subject. The second step is developing learning goals that go beyond simply wanting learners to learn about the topic at hand; these goals should be more challenging and exciting (Fink, 2007). To help formulate these challenging goals, a sentence-completion exercise is recommended, where the educator completes the sentence "By the end of the course, my hope is that students will…" (Fink, 2007, p. 15). After the learning goals have been determined using the principles of active learning, learning activities are created to help the learners achieve the goals. Evaluation and assessment are the next steps in ICD, where the educator uses a framework to evaluate the learners themselves, and the course (Fink, 2007). The final step of ICD is integration, where the educator ensures that the learning goals, the learning activities and the evaluative opportunities support and reflect each other (Fink, 2007).

I believe that the taxonomy of significant learning is congruent not only with my beliefs about teaching and learning, but also with my view of nursing. As the taxonomy is interactive rather than hierarchical, it lends itself to the shift in power dynamics that is taking place both in nursing and in nursing education. Nursing education is shifting away from the traditional teacher-centered model to one that is student-centered, with the instructor as a facilitator and guide. This paradigm shift mirrors the shift that nursing has made to a model that is client/patient centered, away from the traditional nurse-centered model (Young & Maxwell, 2007). Nursing is an interactive, dynamic, interpersonal and caring profession (Young & Maxwell, 2007); thus the interplay between each category of learning in the taxonomy of significant learning mimics the dynamic nature of nursing.

Novice to Expert and Taxonomy of Significant Learning. During a previous course in this program I was privileged to work in a group to develop a curriculum for pediatric education for nurses working in rural settings. We were guided by both Benner's model of novice to expert and Fink's taxonomy of significant learning. We found that they both contributed significantly to the organizational framework of the curriculum in the way they could enhance student engagement and student learning (Samwel, Scarisbrick & Sieuraj, 2012). Benner's model addresses higher skill acquisition, while Fink's taxonomy of learning addresses higher learning acquisition (Benner, 2001; Fink, 2013). To achieve the skills required to reach the level of expert, the nurse must also achieve a state of higher learning. We felt that placing Benner's model at the center of Fink's taxonomy, where significant learning occurs, reflected this congruence between the two models (Samwel et al., 2012). As this framework lends itself to learners who have strong foundational knowledge, improved skill acquisition and the ability to create lifelong learning experiences, I felt it would provide my curriculum for pediatric emergency management with a strong foundation (Appendix 4).

Curriculum Blueprint for Workshop

From the literature reviewed and the staff surveyed, the need for a plan to address the needs of continuing education in pediatric emergency management was clear. Competency in pediatric assessment, recognition in deterioration, pediatric-specific skills and interventions are critical for managing a pediatric emergency. I planned to create the curriculum for a one day workshop that would address these competencies as well as other aspects of emergency management such as family-centered care (FCC) and communication and teamwork. My intent is to offer this workshop annually at each smaller site that falls within my portfolio, and biannually at the larger site that I am based out of. I hope to reach the largest number of staff this way. As

pediatric resuscitation is not exclusive to nursing I intend to offer this workshop to the multidisciplinary team once I have had the opportunity to coordinate with all the key stakeholders in the different departments.

I wrote the overall goal of the curriculum using Fink's sentence-completion exercise: "By the end of the workshop my hope is that nurses will demonstrate increased comfort with pediatric assessment, recognition of signs of a deteriorating pediatric patient, and management of a pediatric resuscitation" (Appendix 5). The description and objectives of the curriculum highlight that this workshop is not meant to replace courses such as PALS or ENPC, but to provide nurses with an opportunity to continually refresh their knowledge and practice skills learned in these courses. The curriculum description emphasizes the guiding framework as being constructivist and student-centered. The six learner outcomes tell workshop faculty and participants in detail what will be expected of them by the end of the day (Appendix 5). I chose to have assigned pre-readings about FCC and trauma informed care for the learners to complete prior to beginning the workshop. FCC and trauma informed care will be familiar concepts to the majority of nurses who participate in the workshop, but reading these brief articles will provide all participants with a common language to build on during that session.

The eight-hour workshop is divided into three sessions, followed by three simulation scenarios (Appendix 7). The three sessions include a review of pediatric knowledge and skills, family-centered care, and communication and teamwork. These topics were selected as all are significant factors in pediatric emergency management. In the workplace there is often only a focus on the physical tasks and skills required in an emergency situation, but family-centered care and communication and team dynamics are equally important. Both FCC and communication and teamwork are addressed in PALS and ENPC (AHA, 2011; ENA, 2012). Each of the three

sessions has learning activities that will engage participants in the workshop of differing learning styles. These include brief lectures, small and large group discussions, story-based learning activities, hands-on skills practice, team-building activities, mind mapping and simulation scenarios. The simulation scenarios offered will include an infant scenario, child scenario and adolescent scenario (Appendix 7). Both the skill stations and simulation scenarios should be alternated in subsequent offerings of the workshop to ensure that learners are experiencing different learning situations. It is my hope that by offering such diverse teaching and learning methods, learners of all learning types and at all proficiency levels will be engaged and come away from the day with a high level of satisfaction.

Teaching and Learning Methods

Story-based learning. When looking for a pedagogical tool to explore the concepts of family-centered care (FCC) with learners in the workshop, I was drawn to story-based learning (SBL). Story-based learning is adapted from the problem-based learning model, differing in that it uses narratives rather than traditional case studies to draw attention to sociopolitical factors in the story (Young, 2007). The narratives are stories of the challenges, tensions or dilemmas of the nurse or the patient. The stories seek to contextualize the situation and draw emotion from the learner so that the lived experience can be better understood. Learners engaged in SBL need to be grounded in an "ethic of caring" (Young, 2007, p. 170), where they can be fully engaged and caring enough to attend to writing or reading a narrative and caring enough to acquire the knowledge needed to practice. Young (2007, p. 170) outlines the six-phase process of engagement of SBL as:

1. Attending to the story.
2. Determining what is going on in the story.

3. Identifying patterns of wholeness and disruption.
4. Envisioning nursing support.
5. Reflecting on learning and interpretations.
6. Returning to a "new" story.

The learner builds knowledge through interactions with the group and with the facilitator in a process that requires attention to detail, accessing resources, and dialogue (Young, 2007). In Fink's taxonomy of significant learning, SBL addresses learning in the caring, human dimension, and integration domains.

It is important to recognize that facilitating SBL is a skill that must be learned and mastered, it is not as simple as reading a textbook and trying it out. In order to learn how to facilitate SBL I will need to seek out opportunities for education and mentorship in delivering SBL. It is my hope that I will be able to look to nearby post-secondary institutions for these opportunities. As with any skill it is important to not only attain competency, but also maintain competency so facilitating SBL sessions with regularity will be important. As a facilitator I will also be asking the learners for feedback on the sessions and incorporating it into subsequent offerings of the session. If possible, I would like to find a mentor who is skilled in SBL and connect with him or her on a regular basis. It would be beneficial for them to come and observe a session as well, to offer feedback and suggestions to improve the learning experience.

I hope to use SBL to open a pedagogical space where learners can bring their prior experiences with family-centred care and explore them further through the use of narratives. I imagine that this learning activity will initially be uncomfortable for many learners, as many will not have experienced problem-based learning or story-based learning in their undergraduate education. Most are familiar with a traditional case study, where they are asked to examine

information and solve a problem. Bruce (2007) states that pedagogical openings "recognize student vulnerability, uncertainty, and not knowing as natural processes in learning that can also be valued. Therefore, trusting in these open spaces (i.e. pedagogical openings) allows room for critical reflection, analysis, and insight to occur." (Bruce, 2007, p. 423).

Although it is difficult to build trust in a one day workshop, it is expected that the participants in the workshop will know each other from working in the same facilities and departments. It is my hope that the trusting relationships that these colleagues bring to the workshop will be strengthened and enhanced by working together through the SBL activities. Additionally, it would be important for the facilitator to look into the unique aspects of the work environment prior to conducting the workshop be speaking to the unit manager(s) or specific CNE. The facilitator would want to be aware if there were any recent events, such as a pediatric resuscitation, that would be traumatic for the staff to talk about. Discovering these unit specific contexts will allow the facilitator an opportunity to develop strategies to accommodate and maintain a safe learning space.

As SBL is an active learning strategy, I felt that this method of teaching and learning would be a good fit for engaging learners in a topic they might have very polarized thoughts and beliefs about. Many health care providers continue to feel uncomfortable with parents and caregivers of children being present during resuscitations or invasive procedures, citing concerns such as family members distracting the team, getting in the way of resuscitative efforts and thereby prolonging the resuscitation, or even becoming more inclined to take legal action against the health care team, although this is not reflected in the literature (Dudley et al, 2009; O'Malley, Brown & Krug, 2008). The National Emergency Nurses Association (NENA) has released a position statement supporting family presence at the bedside during resuscitation and invasive

procedures (NENA, 2014). By having workshop participants engage in SBL and engage with the narratives, I felt that they would be able to explore their current knowledge and perceptions of FCC and build new knowledge to take forward into their practice.

Simulation-based education. As shown in the literature, the use of simulation in nursing education is being widely explored, and is recognized as a valuable tool for teaching and learning (Campbell & Daley, 2013). SBE fits in well with philosophical and theoretical foundations of nursing education, such as Tanner's model of clinical judgment, and within Fink's taxonomy of significant learning (Campbell & Daley, 2013; Fink, 2013). Tanner's model is particularly relevant to SBE because of the role that decision making and clinical judgment play in simulation (Campbell & Daley, 2013). Tanner emphasizes the importance of reflection in clinical reasoning, which in the context of simulation could equate to debriefing (Campbell & Daley, 2013). Within the six categories of learning that Fink describes in his taxonomy of significant learning, simulation can contribute to learning in all categories, and the debriefing of a simulation scenario allows for the opportunity to integrate all categories of learning (Campbell & Daley, 2013; Fink, 2007).

Recognizing the value of simulation-based education, the British Columbia Simulation Task Force was convened by the Dean of the Faculty Medicine of the University of British Columbia (UBC) to bring together key health care providers and academic stakeholders to design a model for SBE for the province (Qayumi et al., 2012). Representatives on this task force recognized the prevailing thinking that SBE is becoming an integral part of health care education, and is superior to traditional didactic teaching methods. A large component of the proposed curriculum for pediatric emergency education is simulation based, as this allows for skills in pediatric resuscitation to be practiced in an environment that is safe and supportive.

Simulation has long been used as an educational modality in high-risk industries such as commercial aviation, nuclear power and the military, where training in the real world would be either too costly or potentially too dangerous (Cheng, Duff, Grant, Kissoon & Grant, 2007). When it became apparent that the traditional model of "see one, do one, teach one" became impractical in medical education, simulation was able to fill the gap. Nursing education has followed suit and has started to use simulation-focused pedagogy to develop reflexive practitioners who can demonstrate excellent critical thinking, problem solving and decision making skills (Campbell & Daley, 2013).

Simulation scenarios are designed to approximate real situations as closely as possible. The reality of the simulation is enhanced through use of higher fidelity simulators, which can facilitate participant interaction by providing feedback to participants in the form of physical findings such as cardiac and breath sounds, pulses that are palpable, blinking eyes, and speech (Cheng et al., 2007). Although it is challenging for the educator to make the scenario completely realistic, and participants must suspend their disbelief to a certain extent, simulation educators should make every effort to match the amount of realism to the learning objectives of the simulation session (Campbell & Daley, 2013; Cheng et al., 2007).

The use of SBE in pediatric tertiary care centres in Canada has grown rapidly since 2005 (Cheng et al., 2007), as has the amount of research being done about SBE. The benefits of simulation address many of the concerns uncovered in my review of the literature and in the survey I conducted. SBE provides an opportunity to participate in high-risk–low-frequency events in a completely risk-free environment, and to gain practice with hands-on skills in an environment that mimics the real world as closely as possible (Campbell & Daley, 2013; Cheng et al., 2007; Cheng, Lang, Starr, Pusic & Cook, 2014). By practicing in an immersive

environment, learners can gain confidence and competence in pediatric emergency management, thereby decreasing feelings of fear, anxiety, and apprehension when faced with these scenarios in the real world.

Evaluation

When developing a curriculum for continuing education, evaluation of the curriculum must be considered – that is, not only evaluation of the learners, but also of the curriculum itself. In this section I will outline my strategy for evaluating my curriculum for pediatric emergency management.

Evaluation of Learners

As this workshop is not a graded course, there is no formal assessment of learners in terms of testing. Their knowledge and skills in pediatric emergency management will be tested "on the job" when they are next faced with a situation in their practice. I hope that by participating in the learning activities and simulation scenarios offered in the workshop, they will be more confident managing a pediatric emergency. It is also my hope that the facilitator for the workshop is able to engage with the participants as a co-learner throughout the day, working through the narratives in the story-based learning, for example, or assisting with the mind-mapping exercise. However, there might be times when it is apparent to a facilitator that a participant is struggling with a particular skill or concept. If is apparent that further education or practice is required, it would be necessary for the facilitator to communicate with both the participant and the Clinical Nurse Educator to ensure that follow-up can be arranged and the participant's learning need is addressed outside the workshop.

Evaluation of the Curriculum

Evaluation of the curriculum is essential to ensure that it is meeting the needs of both the learners and the organization, and to improve its effectiveness (Young, Maxwell, Paterson & Wolff, 2007). Each learning session and simulation scenario offered at the workshop will be evaluated by the learners to ensure that it met their expectations and achieved the stated learning objectives. Additionally, each assessment of the teaching and learning sessions will include an evaluation of the session facilitator. This provides feedback to instructors to assist them in their own growth as educators. Fink (2013) remarks: "Every time you teach, you have an opportunity to learn about teaching and about yourself as a teacher" (p. 159).

Opportunity for Research

As part of the effort to demonstrate to the organization that the proposed curriculum for pediatric emergency management is a sound use of resources, the curriculum as a whole must be evaluated. I believe that this evaluation could take the form of a research project that examines nurses' perceptions and feelings about providing care to pediatric patients in emergency situations, and analyzes how this educational opportunity can address concerns about maintaining competence. This research study could be as simple as a pre-test post-test design, where nurses are asked to complete a survey about their previous education and experience with pediatric emergency management, as well as a self-assessment of their skill level and competence. They could also be asked to rate their confidence level in caring for children in an emergency situation. After completing the workshop, the same survey could be repeated. A full proposal for this research project is beyond the scope of this project, but if completed it would add to nursing knowledge about continuing education in pediatric emergency management.

Dissemination of Curriculum and Future Steps

I believe that when families on Vancouver Island need our services, they have the expectation that we can provide them with expert, efficient and compassionate care, regardless of the situation. I believe that they deserve to know that the health care providers who work in the hospitals can deliver care to the children of Vancouver Island competently and confidently in an emergency situation. In my role as the Regional Pediatric Clinical Nurse Educator for Central and North Vancouver Island, I believe that I am well positioned to make this happen. By creating a curriculum for pediatric emergency education, I will be able to implement a program that gives nurses an opportunity to review and refresh knowledge and skills in pediatric emergency management, and to practice these skills in an environment that is safe and supportive. There is the potential for this curriculum to move throughout the facilities operated by Island Health, and I would be pleased if this happened.

When considering how to bring my curriculum to a wider audience upon completion, I was drawn to the work of Gafney and Varma-Nelson (2008), who proposed a dissemination model. Their model was discussed in the context of disseminating a college-level initiative, but I feel that it is applicable to the scope of my project. Their dissemination model follows four steps: 1) stimulating an interest, 2) creating a deeper understanding, 3) successful implementation and 4) developing scholarship and new leadership (Gafney & Varma-Nelson, 2008). It is my belief that any initiative is only as good as the education that accompanies it, so I feel that a clear strategy for disseminating my work and implementing the curriculum is absolutely critical.

As I write this project, I will be keeping in mind the possibility of publishing this work so that others can take the ideas, either in part or in their entirety, and utilize them to improve the quality of care that children receive. I feel that my work could be of interest to several nursing journals, including *Pediatric Nursing, Nursing Children and Young People, Journal of Nursing*

Education, *Journal of Pediatric Nursing*, and *Journal of Emergency Nursing.* Although publishing is not the primary focus of my project, I believe that in order for my work to be of any significance to nursing, it is important that it is available for others to read about and access.

Although the focus of this project was on the acute biomedical deterioration of children, it is important to acknowledge that this is not the only gap in education that exists. Mental health in children and adolescents is a growing concern, an estimated one in seven children in British Columbia experience mental illness serious enough to disrupt their functioning at home or in school (British Columbia Ministry of Children and Family Development, 2008). There is a significant lack of specialized resources for these children and families, and they often present in the ED and on general pediatric units. In the future I plan to repeat this project and create a curriculum for a workshop with the same theoretical underpinnings and conceptual framework, with the focus of the education being on child and adolescent mental health.

Conclusion

Caring for children in emergency situations is stressful for health care providers at the best of times. As demonstrated by both my review of the literature and my survey of local staff nurses, there is a demand for increased education in pediatric emergency management. Although nurses do have opportunities to attain competence in the skills and knowledge required to manage pediatric emergencies – through courses such as the Emergency Nursing Pediatric Course and Pediatric Advanced Life Support – there are limited options for maintaining competence, as pediatric emergencies are relatively infrequent. By creating a curriculum for a workshop for continuing education in pediatric emergency management, I hope to provide nurses with such an option.

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Appendix 1

Review of Literature Summary

Article Citation	Purpose	Methods	Setting and Sample	Findings
Birkhoff, S.D., & Donner, C. (2010). Enhancing pediatric clinical competency with high-fidelity simulation. *The Journal of Continuing Education in Nursing, 41*(9), 418-423. doi: 10.3928/00220124-20100503-03	This article provides a review of American Heart Association (AHA) guidelines for Pediatric Advanced Life Support (PALS), evaluation of PALS, nursing competencies, communication among teams, advantages and disadvantages of simulation based education, incorporation of high fidelity simulation into pediatric practice, and suggestions for the future.	The authors present a literature review and discussion of American Heart Association (AHA) guidelines for Pediatric Advanced Life Support (PALS), nursing clinical competencies and critical thinking, communication among multidisciplinary team members, and incorporating high-fidelity simulation into pediatric practice. They also describe a project where a PALS course was run incorporating high-fidelity simulation for the first time as a partnership between two large university hospitals in the United States.	N/A	The authors highlight several benefits to using high-fidelity simulation as a tool for teaching and learning such as providing a risk free environment to incorporate theory and practice, creation of a highly realistic simulated patient experience, and providing the learner with instant feedback to actions through visual, auditory, or tactile changes in the simulator. High-fidelity simulation can be used to create a learning environment that can improve communication and teamwork skills among health care professionals, while decreasing the safety risks to patients. Clinical competency is essential in all aspects of nursing practice, but particularly vital in pediatric resuscitation, which is high risk but not encountered frequently. The authors refer to studies that lend support to the theory that when a simulation has been performed that incorporates complexities of critical thinking skills, the registered nurse should be able to recognize these situations in reality and manage them appropriately.
Bultas, M.W., Hassler, M., Ercole, P.M., &Rea, G. (2014). Effectiveness of high-fidelity	In this pilot study, researchers were interested in	In this pre-test/post-test design participants were all enrolled in a Pediatric Emergency Assessment, Recognition & Stabilization	• Staff nurses from non-critical areas in	From their results, the researchers felt that they had achieved the first aim of the study, and demonstrated that HFS

simulation for pediatric staff nurse education. *Pediatric Nursing, 40*(1), 27-32.	investigating whether the use of high fidelity simulation (HFS) as compared to a static mannequin teaching methods would improve the ability of pediatric staff nurses to assess and intervene if a patient was deteriorating. The researchers hypothesized that HFS would provide a more meaningful learning experience and improve recall of information.	(PEARS) course. All participants completed the didactic portion of the course together, and then participated in simulation based on the group that they were assigned. The participants were evaluated using three tools; the PEARS written examination, the PEARS Behavioural Measures Check-off Tool (BMCT), and the Mayo High Performance Teamwork Scale (MHPTS). Demographic information and qualitative feedback were also obtained from each participant. Because the qualitative feedback was obtained informally, and not every participant left this feedback a thematic analysis was not done. Six months after the PEARS course, participants returned to the simulation center for follow-up testing, where both the control group and experimental group were kept separate from each other. Each group participated in the Respiratory and Circulatory HFS scenario in an effort to determine if long-term retention of skills learned at the PEARS course could be compared at the six-month mark.	a large metropolitan pediatric Magnet hospital. • 60 nurses enrolled in a PEARS initial certification course were initially recruited. Due to attrition, 33 nurses completed the study. • Participants were randomized to either the experimental group (HFS intervention) or the control group (traditional static mannequin).	was effective as a teaching method for pediatric staff nurses as the experimental group performed better than the control group in both recognizing and intervening in the patient scenarios. The second aim of the study was to examine knowledge retention after using HFS as an educational tool, the researchers hypothesized that knowledge and skills would be maintained for nurses who participated in the HFS scenarios. This was found true for the circulatory scenario, and improved for the respiratory scenario. The written test scores declined for both groups, but the amount of decline was greater in the control group than in the experimental group. The third aim was to evaluate team performance and confidence levels in nurses. Although not significant, the experimental group had higher levels of teamwork performance as measured using the MHPTS.
Butler, K.W., Veltre, D., & Brady, D. (2009). Implementation of Active learning pedagogy comparing low-fidelity simulation versus high-fidelity simulation in pediatric nursing education. *Clinical Simulation in Nursing,*	This study compared the implementation of active learning pedagogy using low-fidelity simulation and high-fidelity simulation in a pediatric fluid and	In this pilot study a convenience sample of 31 pre-licensure nursing students were randomly assigned to either the low-fidelity simulation (LFS) or the high-fidelity simulation (HFS) group in a two group experimental design. Inclusion criteria were students who had completed the pediatric course, which included 105 hours of pediatric	• 31 Nursing students • Pre-licensure nursing students, AND program (2nd semester of 4 semester	On the Simulation Design Scale (SDS) there was a significant relationship between the type of simulation and the perception of how closely the scenarios mimicked real life with the HFS group reporting higher scores. In spite of this, both groups perceived that the simulation experience increased their

5, e129-e136. doi: 10.1016/j.ecns.2009.03.118	electrolyte scenario.	clinical experience (offered in the second semester of a four semester program). The Nursing Education Simulation Framework (NESF) provided the theoretical framework for the study. A 20-minute simulation session was given to each group, followed by a 10-minute debriefing session. Students self selected roles within the scenario to increase comfort. Each participant then completed 3 survey instruments developed by the National League for Nursing (NLN) and Laerdal for their 3-year multi-site study.	program) • Students had completed a pediatric nursing course and 105 clinical hours in pediatrics.	problem solving ability. This may reflect the use of simulation-based education as opposed to traditional lecture format, which is consistent with literature on student preference of active learning. On the Educational Practices Questionnaire the HFS group perceived best educational practice elements (i.e. active learning, collaboration, diverse ways of learning etc.) to be present in a greater degree than the LFS group did. The authors concluded that participants in the HFS group felt that their experience with simulation had a greater impact on problem solving ability, resembled real life, and made their learning time more active and productive than the LFS group did. They felt that this study demonstrated the time and expense involved in creating high-fidelity simulation experiences for students is worth the investment as the students highly value the experience
Dowson, A, Russ, S., Sevdalis, N., Cooper, M., & DeMunter, C.(2013). How insitu simulation affects paediatric nurses' clinical confidence. *British Journal of Nursing*, *22*(11), 610-617.	This study examined in situ simulation training in pediatric emergencies with pediatric nurses. The authors hoped to establish that simulation based training resulted in an increase in clinical confidence as compared to regular resuscitation	The investigators of this mixed-methods study used a quasi-experimental, longitudinal design to determine if simulation training (the intervention) had any positive effect on the confidence levels of nurses. The study ran over four months. For the quantitative component at month one all participants completed a Clinical Confidence Rating Scale (CCRS) to rate their confidence in managing paediatric emergencies. The CCRS consisted of 20 questions that were designed to evaluate the participants confidence level in pediatric emergencies – 15 questions	• 20 qualified nurses – divided evenly between the two groups so that the groups were evenly matched on number of years qualified and level of experience and	Statistical analysis showed that for the control group there was no significant improvement in the technical confidence score, total confidence score, or the total score over the three months, but there was a significant improvement in the non-technical score. The intervention group had statistically significant improvement in all three scores over the three month period. At month one there was a statistically significant difference between the two groups, with the

	education.	focused on technical skills, four questions on non-technical skills, and one question asking participants to rate their overall confidence. Theoretical and content validity of the CCRS was achieved through a literature review, expert input from a pediatric intensive care consultant, and pediatric educators, and expert input from a patient safety expert. The intervention group participated in three simulation sessions over the next three months, while the control group continued in their clinical practice. The simulation sessions used an intermediate-fidelity mannequin, a replica of the ward's crash cart, and were done insitu. The sessions involved one physician and one nurse and lasted 30 minutes. Prior to the sessions beginning a demonstration of the mannequin was done. The nurse was given a patient history, and expected to act as if the situation was real. Following each session a debriefing was conducted. At the end of month three both groups repeated the same CCRS as they did in month one. The qualitative portion of the study was conducted during the fourth month of the study, where researchers conducted semi-structured interviews with the participants to gain a better understanding of who and how the intervention worked, or did not work. The interviews were designed to develop an understanding of how nurses felt about being in pediatric emergencies, their understanding of confidence, and how it applies to their clinical practice.	training. • Participants were recruited from two paediatric units (general medicine and hematology/infectious diseases) in a large teaching hospital.	control group being higher in all areas except for non-technical skills. The same test at month three showed that after simulation training, there was no difference in confidence scores between the two groups. For the data analysis of the qualitative portion of the study, the 20 interview transcripts were analyzed. Two main themes with three subcategories emerged. The first theme was real life emergencies, and the sub-themes were managing a sick child, confidence, and team working. The second theme was simulation experience, and the sub-themes that emerged were realism, preparation for real life, and feedback.
Gates, M.G., Parr, M.B., & Hughen, J.E. (2012). Enhancing nursing knowledge using high-	This study examined the effects of participation in HFS on	This study used a two group experimental design. Participants were randomly assigned to participate in either a pulmonary embolism	• 104 undergraduate	The findings of this study have helped develop an evidence base indicating that there are benefits in knowledge

fidelity simulation. *Journal of Nursing Education, 51*(1), 9-15. doi: 10.3928/01484834-20111116-01	knowledge acquisition in undergraduate nursing students. The authors hypothesized that students who participated in HFS would receive higher scores on an examination of course content than students who did not participate in the simulation.	(PE) or gastrointestinal (GI) bleed scenario, based on their clinical group. These scenarios had been selected because they had been successfully pretested in the previous semester. The simulation scenarios were scripted. Each group served as control for the other. Prior to participation, students had been asked to prepare for the simulation as though they were preparing for a typical clinical experience, and demonstrate an understanding of the patient history, medication, laboratory findings, etc. Clinical instructors were asked to assign their groups of 7-10 students into groups of 3, 4, or 5 students and then randomly assign students to the various roles within the simulation (i.e. Primary RN, Charge RN, Recorder, Observer). The students were given an end of shift report by their clinical faculty to begin the simulation. Faculty were instructed to not intervene. At the conclusion of the scenario there was a structured debriefing (lasting approximately 1 hr). After all clinical groups had completed their simulations and been debriefed two content-specific 10-item examinations were given to the class, one on PE and one on GI bleed.	nursing students enrolled in their second semester medical-surgical course • Students were randomly assigned to either the PE or the GI bleed simulation scenario • All simulation experiences were conducted in the simulation laboratory on campus.	acquisition when participating in high-fidelity simulation. The study found that there was an 8% increase in examination performance for students who participated in high-fidelity simulation when compared with those who did not. The authors concluded that as a result of this study that high-fidelity simulation could be considered as an option instead of traditional learning, but did not explore to what extent simulation could replace clinical experiences. They also concluded that simulation is an engaging pedagogy that can be included in the transformation of nursing education. Questions for further research were identified – does simulation affect lower and higher preforming students differently? Would the results have been different if students were not required to prepare for the patient they would be taking care of during the simulation?
Monachino, A.M. (2005). Pediatric code readiness. *Journal for Nurses in Staff Development, 21*(3), 126-131.	This paper describes how a group of nurses from the Children's Hospital of Philadelphia (CHOP) addressed the need for improvement in how nurses are trained to manage pediatric emergencies in their	As a quality improvement initiative, an educational needs assessment was conducted in 2002 that indicated that an update and review of emergency care was required, specifically mock codes. The existing program was examined, and based on feedback from participants there was a need for two different programs – one for ICU nurses, and one for non-ICU nurses. The medical-surgical nurses asked for more focus	• Nurse educators at CHOP involved staff nurses who had an interest in emergency care to restructure their current	Their program was conducted as an "Emergency Care Day", and the curriculum addressed topics such as physiological developments and warning signs, recognizing a deteriorating patient, code team roles, review of code medications, equipment for airway stabilization, documentation, and hands on skills stations. The education day finished

	facility.	on assessment and interventions in initiating a code, and less emphasis on advanced management skills. As a result of this assessment, two different programs were designed for nurses at CHOP.	program	with several mock code scenarios to pull together all the material covered during the day. Nurses also identified that they would like more time and opportunity to practice their new skills. As a response to this need, educators developed a travelling mock-code program to supplement the learning from the Emergency Care Day. The author identified the outcomes from this program as being increased confidence and competence in the nurses who participated, the promotion of teamwork during the mock codes, an increase in knowledge base and experience, contributions to the professional development of the staff nurses, and a template for other units to develop similar programs.
Parker, B.C., & Myrick, F. (2009). A critical examination of high-fidelity human patient simulation within the context of nursing pedagogy. *Nurse Education Today, 29*(3), 322-329. doi: 10.1016/j.nedt.2008.10.012	This article presents an examination of simulation based education through a behaviourist and constructivist lens.	The authors offer a clear overview of human patient simulation and nursing pedagogy. The raise the concern that technology not philosophy-based pedagogy is informing nursing education.	N/A	After a thorough review of the principles of high-fidelity human patient simulation, and an examination of behaviourism and constructivism as they pertain to simulation, the authors conclude that simulation is a tool that must be guided by a sound philosophy, and that nurse educators need to inform themselves with "appropriate pedagogical utilization of simulation" (p. 327), for it to be an effective tool. They refer to Dewey who stated that curricula designed without philosophy leaves educators "at the mercy" of technological fads and educational trends.
Wodrich, E., Gilmartin, H., & Fink, R.M. (2013). Simulation	The two purposes of this study were to pilot	A 20 question pre-simulation survey was emailed to all nurses 2 weeks prior to	• A 58-bed rural	There was a significant increase in nurse confidence (self-reported) after

to the rescue! Caring for a pediatric patient in the rural setting. *Journal for Nurses in Professional Development, 29*(4), 197-201. doi: 10.1097/NND.0b013e31829aebf6	test and evaluate a simulation program in a rural hospital in the United States. A secondary aim of the study was to evaluate the reaction to and acceptance of the staff to simulation as a learning method.	attending the simulation scenario. Fifteen questions concerned nurse confidence and competence related to pediatric assessment and interventions, and five questions asked about nurse characteristics (age, years of experience as a nurse, degree achieved, and unit). A survey with three questions was distributed to participants at the simulation scenario asking about past experience with simulation, and participants were asked for reactions to the simulation exercise after it was completed. One month after the simulation scenario a 15-item survey was emailed to participants to assess competence and confidence. The researchers conducted thirteen simulation sessions over a period of six months, with Pediatric Simulation Days that consisted of a two hour session with a maximum of six participants. Each session consisted of an introduction to simulation and orientation to the high-fidelity simulator, use of the cardiac monitor, diagnostic tests, a 30 minute scenario, and 15 minute debriefing at the conclusion of the scenario. After the debriefing, the participants were given an opportunity to repeat the scenario and the debriefing. The scenario that the participants were given to work with was a pediatric respiratory distress scenario that was conducted insitu.	hospital in western Colorado. Educators from the hospital partnered with the local community college to access their high-fidelity simulator. • 65 nurses completed the pre-simulation survey • 41 nurses completed the post-simulation survey	the simulation training with the high-fidelity simulator. Nurses reported increased skills in pediatric assessment (i.e. assessing blood pressure in children, recognizing stridor) and in using pediatric skills (i.e. using a bag-valve mask, nasopharyngeal suctioning an infant). Participants reported that the simulation scenarios helped them feel comfortable identifying and using pediatric equipment in an emergency situation, 99% of participants reported that they would recommend simulation training to others, and when asked if simulation was an effective training tool there was a statistically significant positive increase from the pre-simulation survey to the post-simulation survey. Based on results, the researchers concluded that using high-fidelity simulation with nurses in rural settings was both a feasible and effective strategy for increasing nurse confidence and competence in caring for pediatric patients in respiratory distress. The qualitative data from the study indicated that the staff that participated responded very positively to their simulation experiences and felt that they were better prepared to attend to pediatric respiratory distress situations. Participants reported that actually handling and working with the pediatric equipment was invaluable experience.

Appendix 2

Strength of Evidence Table

Article Reference	Evidence Level	Quality Rating
Birkhoff, S.D., & Donner, C. (2010). Enhancing pediatric clinical competency with high-fidelity simulation. *The Journal of Continuing Education in Nursing, 41*(9), 418-423. doi: 10.3928/00220124-20100503-03	5	A
Bultas, M.W., Hassler, M., Ercole, P.M., &Rea, G. (2014). Effectiveness of high-fidelity simulation for pediatric staff nurse education. *Pediatric Nursing, 40*(1), 27-32.	1	B
Butler, K.W., Veltre, D., & Brady, D. (2009). Implementation of Active learning pedagogy comparing low-fidelity simulation versus high-fidelity simulation in pediatric nursing education. *Clinical Simulation in Nursing, 5*, e129-e136. doi: 10.1016/j.ecns.2009.03.118	1	B
Dowson, A, Russ, S., Sevdalis, N., Cooper, M., & DeMunter, C.(2013). How insitu simulation affects paediatric nurses' clinical confidence. *British Journal of Nursing, 22*(11), 610-617.	2	B
Gates, M.G., Parr, M.B., & Hughen, J.E. (2012). Enhancing nursing knowledge using high-fidelity simulation. *Journal of Nursing Education, 51*(1), 9-15. doi: 10.3928/01484834-20111116-01	1	B
Monachino, A.M. (2005). Pediatric code readiness. *Journal for Nurses in Staff Development, 21*(3), 126-131.	5	B
Parker, B.C. & Myrick, F., (2009). A critical examination of high-fidelity human patient simulation within the context of nursing pedagogy. *Nurse Education Today, 29*(3), 322-329. doi: 10.1016/j.nedt.2008.10.012	5	A
Wodrich, E., Gilmartin, H., & Fink, R.M. (2013). Simulation to the rescue! Caring for a pediatric patient in the rural setting. *Journal for Nurses in Professional Development, 29*(4), 197-201. doi: 10.1097/NND.0b013e31829aebf6	3	B

Evidence Rating Scale

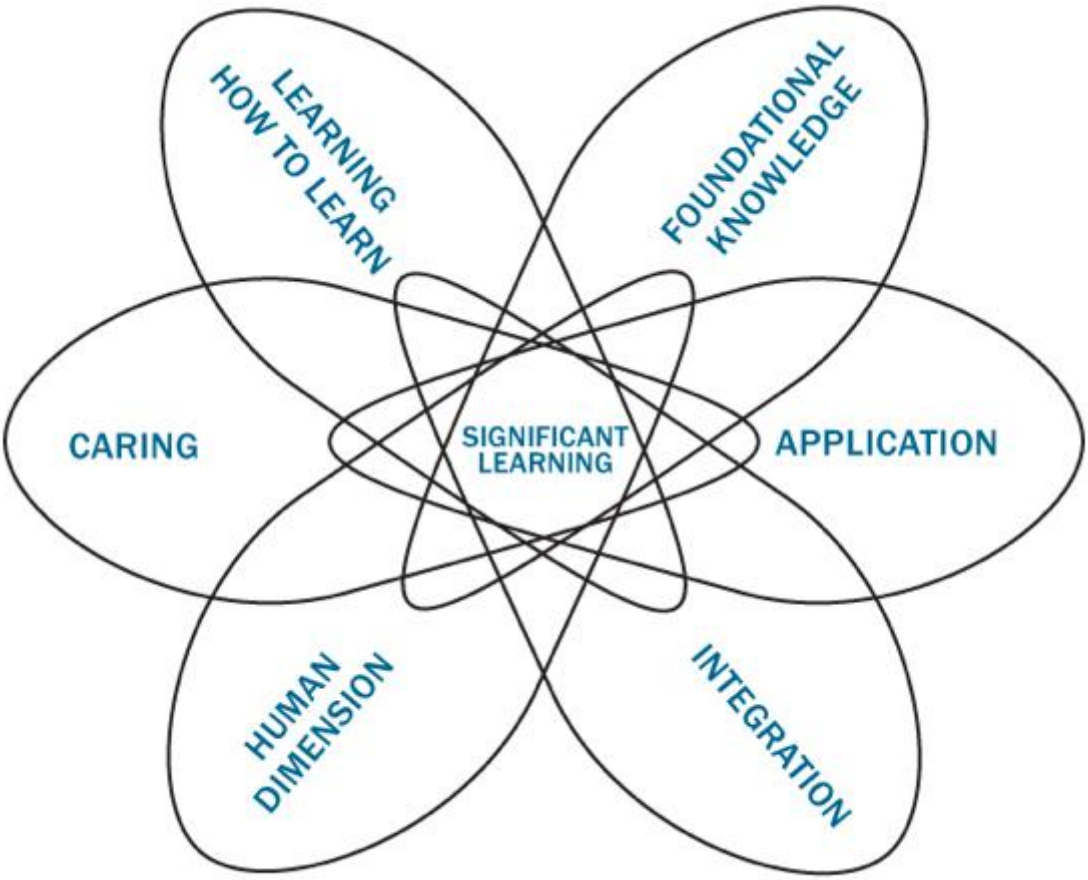
Strength of the Evidence	
Level 1	Experimental study/randomized controlled trial (RCT) or meta analysis of RCT
Level 2	Quasi-experimental study
Level 3	Non-experimental study, qualitative study, or meta-synthesis
Level 4	Opinion of nationally recognized experts based on research evidence or expert consensus panel (systematic review, clinical practice guideline)
Level 5	Opinion of individual expert based on non-research evidence. Includes case studies, literature review, organizational experience (e.g. quality improvement and financial data, clinical expertise, or personal experience)

Quality of the Evidence		
A - High	Research	Consistent results with sufficient sample size, adequate control, and definitive conclusions; consistent recommendations based on extensive literature review that includes thoughtful reference to scientific evidence.
	Summative Reviews	Well-defined, reproducible search strategies; consistent results with sufficient numbers of well defined studies; criteria-based evaluation of overall scientific strength and quality of included studies; definitive conclusions.
	Organizational	Well-defined methods using a rigorous approach; consistent results with sufficient sample size; use of reliable and valid measures.
	Expert Opinion	Expertise is clearly evident.
B - Good	Research	Reasonably consistent results, sufficient sample size, some control, with fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence.
	Summative Reviews	Reasonably thorough and appropriate search; reasonably consistent results with sufficient numbers of well defined studies; evaluation of strengths and limitations of included studies, fairly defined conclusions.
	Organizational	Well-defined methods, reasonably consistent results with sufficient numbers; use of reliable and valid measures, reasonably consistent recommendations.
	Expert Opinion	Expertise appears to be credible.
C – Low quality or major flaws	Research	Little evidence with inconsistent results, insufficient sample size, conclusions cannot be drawn.
	Summative Reviews	Undefined, poorly defined or limited search strategies; insufficient evidence with inconsistent results; conclusions cannot be drawn.
	Organizational	Undefined, or poorly defined methods; insufficient sample size, inconsistent results, undefined. Poorly defined or measures that lack reliability or validity.
	Expert Opinion	Expertise is not discernable or is dubious.

(Newhouse, et al., 2007, p. 198)

Appendix 3

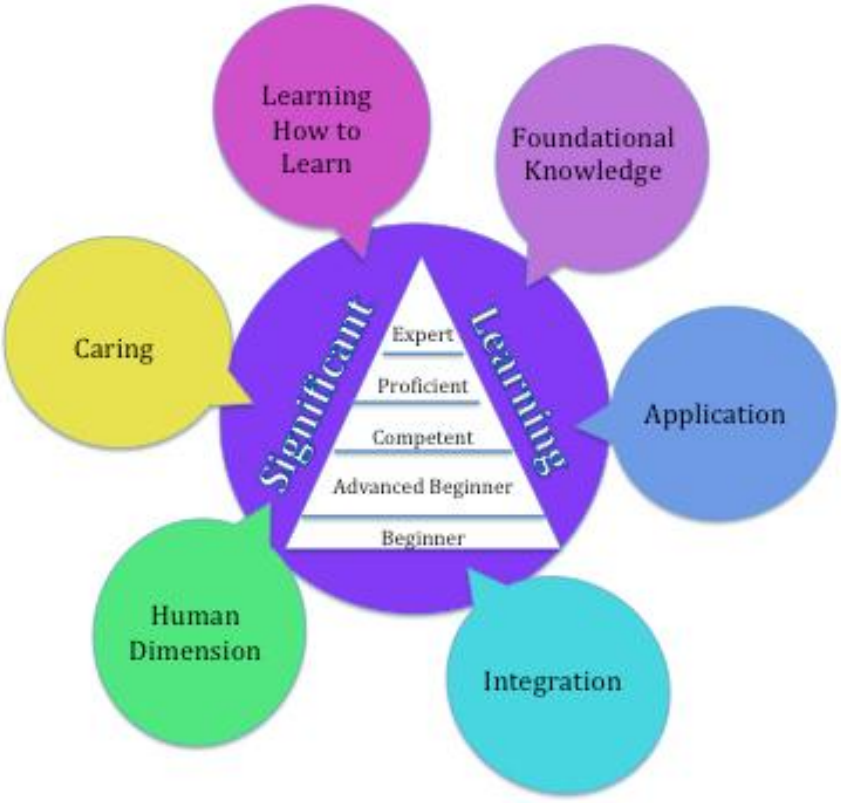
Taxonomy of Significant Learning



(Fink, 2013)

Appendix 4

Taxonomy of Significant Learning and Novice to Expert



Adapted from Benner (2001) and Fink (2013)

Appendix 5

Curriculum Blueprint: Pediatric Emergency Management

Curriculum Goal

The purpose of this workshop is to build upon prior knowledge, skills, and experiences of learners in all areas of practice who may need to manage a pediatric emergency. Participants who complete this program will demonstrate increased comfort with pediatric assessment, recognition of signs of a deteriorating pediatric patient, and increased proficiency in managing a pediatric resuscitation.

Curriculum Description

This program consists of three didactic and interactive sessions and three high-fidelity simulation scenarios (infant, child, and adolescent). The intent of the workshop is not to replace courses such as Pediatric Advanced Life Support (PALS) or the Emergency Nursing Pediatric Course (ENPC), but to provide an opportunity for participants to refresh their knowledge and practice skills in pediatric emergency management on a continuing basis. The workshop is intended to be offered annually. The guiding framework ensures that the workshop is delivered in a student-centered, constructivist model.

Objectives

To supplement the knowledge and skills learned in courses such as PALS and ENPC, and provide an opportunity for continuing education in pediatric emergency management. To provide staff who have not had an opportunity to attend PALS or ENPC an opportunity to learn about pediatric emergency management and begin to develop some familiarity with the required skills. Previous attendance at either a PALS or an ENPC course is not a pre-requisite for attending this workshop.

Workshop Participants

Participants in the workshop can include staff members from any department who are expected to care for pediatric patients in emergent situations (i.e. pediatric inpatient unit, Emergency Department, combined maternity-child unit, medical-surgical unit accepting pediatric patients). At present the workshop is being offered to nursing staff, but will be offered to members of the interprofessional team in the future.

Learner Outcomes

Upon completion of the workshop the learner will be able to:

- Describe stages of growth and development and how they inform physiological deterioration in children and pediatric emergency management;
- Demonstrate increased knowledge and skill with physiological deterioration in children and pediatric emergency management;
- Demonstrate increased comfort with assessment and interventions specific to the physiological deterioration in children and pediatric emergency management;

- Discuss and apply principles of Family Centered Care and how it is relevant to caring for children when there is physiological deterioration and/or pediatric emergency management ;
- Become aware of concepts of crisis resource management, and begin to integrate them into practice
- Apply skills of effective team communication
- Participate in debriefing sessions after each simulation scenario

Pre-reading

Brown, K., Mace, S.E., Dietrich, A.M., Knazik, S., & Schamban, N.E., (2008). Patient and family-centered care for pediatric patients in the emergency department. *CJEM: Journal of the Canadian Association of Emergency Physicians, 10*(1), 38-43.

Kassam-Adams, N., Rzucidlo, S., Campbell, M., Good, G., Bonifacio, E., Slouf, K.,… & Grather, D. (2014). Nurses' views and current practice of trauma-informed pediatric nursing care. *Journal of Pediatric Nursing,* (in press). doi: 10.1016/j.pedn.2014.11.008

Rationale for readings: The first article provides a brief overview of the principles of family-centered care (FCC), its applicability to the emergency department environment. By reading this article prior to beginning the workshop, each participant will have a common language regarding the basic definitions of FCC and the core concepts of FCC. The second article provides a brief overview of trauma informed care and how it relates to pediatric nursing care in the hospital setting. The session on FCC will build upon this knowledge, and use story based learning to explore the concepts and their application in pediatric emergency scenarios further.
**Learning How to Learn*

Session 1 – Family Centered Care

Overview

Family-centered care (FCC) is an approach to care that is grounded in the in the mutually beneficial partnership between patients, families, and health care providers (O'Malley, Brown, & Krug, 2008).

By the end of this session learners will:

- Discuss and apply principles of Family Centered Care and how it informs pediatric emergency management

Learning Activity 1(1) What is Family Centered Care?

Building on the previous knowledge that learners have of FCC and on the pre-reading that they have done, in small groups learners will explore their personal meaning of FCC by creating a mind-map. Key to this discussion is that nursing care is not limited to the patient at hand, but it also encompasses families, groups, populations and communities. At the end of the activity, the smaller groups can report back to the larger groups if they wish. It might be preferable to not assign the learners into smaller groups due to the more personal nature of the discussions, participants may feel more comfortable in their discussions if they choose their own groups.
** Foundational Knowledge*

* *Nursing*
* *Caring*
* *Human Dimension*
* *Integration*

Learning Activity 1(2) Exploration of Stories

Learners will explore narratives of children and families through a trauma informed lens by participating in story-based learning. The large group will be divided into smaller groups, preferable the groups from the previous activity. The facilitator must be available to the groups, and will engage with each group as a co-learner. If more than one facilitator is available, that would be preferable.

* *Caring*
* *Human Dimension*
* *Integration*

Learning Activity 1(3) Facilitating Family Presence During Emergencies

The facilitator of the session will facilitate a large group discussion about family/caregiver presence at the bedside during emergencies/resuscitations/invasive procedures. This can be a polarizing topic, so the facilitator needs to be able to "read" the group and be sensitive to the group dynamics.

- Optional activity if time permits "One Voice" activity (duration – 5 minutes). This brief activity demonstrates to the group how chaotic and overwhelming it can be to have many people speak over and around you. Often, having a familiar caregiver at the bedside of a child during an invasive procedure (being the one voice) can be a helpful, calming influence.

* *Foundational Knowledge*
* *Nursing*
* *Caring*
* *Human Dimension*
* *Integration*

Session 2 – Review of Pediatric Knowledge and Skills

Overview

It is widely recognized by health care providers that children are not simply tiny adults, their physiology is different, and their growth and development affect how care is given.

By the end of this session learners will:

- Describe stages of growth and development and how they inform physiological deterioration in children and pediatric emergency management;
- Demonstrate increased comfort in pediatric assessment and interventions specific to the physiological deterioration in children and pediatric emergency management.

Learning Activity 2(1) – Review of Ages and Stages
The facilitator will review normal growth and development, and ages and stages (brief PowerPoint, Prezi or PowToons presentation may be used). Learners can be divided into smaller groups to discuss how growth and development informs pediatric deterioration and emergency management, and come up with ideas how to approach children in a developmentally supportive manner. After small group work, each group will report back to the larger group.
** Foundational Knowledge*

Learning Activity 2(2) – Physiological Differences Between Adults and Children
The facilitator will review the anatomical and physiological differences between adults and children (brief PowerPoint, Prezi or PowToons presentation may be used) by body system (i.e. respiratory, circulatory, neurological, etc.). Learners will divide into groups, be assigned a body system or two and explore how these differences impact how pediatric patients respond to illness, injury, and medical interventions. Smaller groups will report back to the larger group.
** Foundational Knowledge*

Learning Activity 2(3) – Recognition of a Deteriorating Patient
The facilitator will demonstrate a complete head to toe physical assessment of a pediatric patient, using the simulator doll (child). The demonstration will include discussion of normal pediatric vital sign parameters and recognition of the subtle signs of deterioration in a pediatric patient. The importance of a systematic approach to pediatric assessment and trending vital signs will be highlighted.
** Foundational Knowledge*
** Application*

Learning Activity 2(4) – Pediatric Skills Stations
Learners will need to divide into three groups, and will rotate between three skills stations. The skills stations may include:

- Bag-valve mask ventilation
- Use of defibrillator
- Calculating and drawing up critical infusions
- Bolusing via different methods (i.e. stopcock, pump, etc.)
- Airway management
- Intravenous/Intraosseous access
- Accessing and using the Broselow crash cart
- Weight based dosing
- Code management (running a code)

It is important that the participants have as much hands on time as possible, with the correct equipment required to do each task. Subsequent offerings of the workshop should offer different skill stations, dependent on learner needs.
** Foundational Knowledge*
** Application*
** Integration*

Session 3 – Communication and Teamwork

Overview
Communication and teamwork are essential but often overlooked aspects of pediatric emergency management. Clear definitions of roles and responsibilities, and principles of crisis resource management will assist health care providers in effective and safe provision of care during pediatric emergencies.
By the end of this session learners will:

- Become aware of concepts of crisis resource management, and begin to integrate them into practice
- Apply skills of effective team communication

Learning Activity 3(1) Team Building Activity
Learners will participate in the "Paper chain activity". Designed by Kimberly Stone, MD and Jennifer Reid, MD from Seattle Children's Hospital.
** Integration*

Learning Activity 3(2) Crisis Resource Management
Bridging in from the team building activity, the facilitator will present a brief presentation about the principles and core concepts of crisis resource management (CRM) and its application to the health care environment, specifically resuscitation and emergency situations. The facilitator will engage the large group in a discussion about principles of CRM and how they can be integrated into nursing practice.
** Foundational Knowledge*
** Human Dimension*
** Application*

Simulation Scenarios

Overview
Learners will participate in three simulated pediatric resuscitation scenarios, one infant, one child, one adolescent. Each simulation session will be followed by a debriefing session.
By the end of this session learners will:

- Demonstrate increased knowledge and skill in managing pediatric emergency management
- Demonstrate increased comfort in pediatric assessment and interventions
- Become aware of concepts of crisis resource management, and begin to integrate them into practice
- Apply skills of effective team communication

Orientation to Simulator
Prior to beginning the simulation scenarios each learner will be provided an opportunity to be introduced to the equipment that will be used during the scenarios, including the simulator. This will ensure that the learners will be aware of the capabilities of what the simulator can do, and what to expect from the simulator during the scenario. It is important that this orientation not be cut in the interest of time should the previous sessions run long.

** Foundational Knowledge*

Simulation Scenarios

Learners will be divided into three groups for the simulation scenarios, and will rotate through three simulations. The three simulations will be run concurrently. It would be preferable to have six faculty to facilitate the simulations and debriefings. The scenarios offered will include one infant, one child, and one adolescent. Suggestions for scenarios include:

Infant Scenario	**Child Scenario**	**Adolescent Scenario**
• Respiratory distress/failure • Supraventricular tachycardia • Non-accidental trauma • Sepsis • Unresponsive infant	• Non-accidental trauma • Sepsis (i.e. febrile neutropenia) • Status epilepticus • Shock • Trauma • Hypovolemic shock	• Diabetic ketoacidosis • Toxic ingestion/overdose • Trauma • Sepsis • Medication error (i.e. post-operative hydromorphone vs. morphine)

It may not be possible for every member in the group to participate in the simulation, so every effort should be made by the facilitator to have them observe with intent, and have them participate in the debriefing. Each simulation session should run for about 15 minutes, followed immediately by a debriefing of approximately 30 minutes. Learners will then move to the next simulation station, where learners who did not participate as active members of the simulation should, and those who participated actively in the simulation should now observe with intent. In subsequent offerings of the workshop different scenarios should be offered dependent on learner needs.

** Foundational Knowledge*
** Nursing*
** Caring*
** Human Dimension*
** Integration*
** Application*
** Learning How to Learn*

Appendix 6

Simulation Scenario – Child - Hypovolemia

Overview of Scenario

A pale eight year old child is brought in to the Emergency Department (ED) by her parents. Mom states that the child has been unwell for the past four days, she has been vomiting, febrile, and not taking in fluids well. She has not been going to the bathroom as often as she normally does. Today, appears to be "sleepier" than usual, and is not responding when her parents speak to her. She has no previous medical history, no allergies, and her immunizations are up to date.

Learning Objectives

- Practice of systematic head to toe assessment of pediatric patient.
- Facilitation of parental presence at bedside during resuscitation.

Skills to be Reviewed

- Assessment of pediatric patient
- Use of length-based resuscitation tape
- Fluid resuscitation of pediatric patient
- IV and IO placement and insertion

Materials Required

- Child simulator (medium to high fidelity if possible)
- IV set-up/ IV fluid
- IO driver/needle
- Broselow cart
- Glucometer
- Bag-valve mask

Confederates

- Parent(s) of child

Event or Assessment	**Required Action**	**Completed**
Child is brought to ED by parents.	Child is recognized as sickest on Pediatric Assessment Triangle and brought to the treatment room immediately (ENPC, 2012).	
Child is brought into treatment room. • Airway is patent. • Breathing spontaneously, but respirations are shallow. Lungs are clear bilaterally. Respiratory rate is 32 breaths per minute. SpO2 is 93% on room air.	Child is exposed for assessment. • Weight should be estimated by length based resuscitation tape. • Blood sugar obtained. • Oxygen is applied per face mask.	

• Capillary refill is 4 seconds centrally, 5 seconds peripherally. Heart rate is 128 beats per minute. Pulses are strong centrally but thready peripherally. • Child is lethargic, but rouses to painful stimuli. • She has poor skin turgor and very dry skin.	• Child placed on cardiorespiratory monitoring equipment. • IV placement attempted. • Child reassessed.	
Parent asking questions about status of child.	• Team member should be assigned to parents to provide information and updates, ideally to stay with them for duration of the event.	
• Monitor shows heart rate of 100, respiratory rate of 18. • Child is now unresponsive. • Point of care blood glucose is 3.2.	• IV placement is unsuccessful. • IO placement attempted.	
Child becomes bradycardic, with apneic periods lasting 15-20 seconds.	• Child requires support with respirations using bag-valve mask (BVM) ventilation. Rate = 20/min • Reassessment of breathing shows good chest rise and fall, good lung sounds bilaterally, SpO2 is 100%.	
Child's pulses are weak centrally and peripherally. Child is centrally cyanotic. Extremities are mottled.	• IO is successfully established. • NS fluid bolus is ordered at 20mg/kg rapidly (learners should calculate and state amount of bolus and demonstrate method of delivery they have chosen to deliver it – stop-cock method, syringe pump, large-volume infusion pump etc.)	
Parents become upset unless they have been updated at the significant change		

in the status of their daughter.		
Circulation is reassessed. • Heart rate is 130 beats per minute. • Cap refill is 4 seconds centrally and peripherally. • Central cyanosis persists. • Extremities remain cool and pale.	• NS bolus of 20 mg/kg should be repeated	
Temperature is assessed for 36°C	Warming measures should be considered.	
Circulation is reassessed. • Heart rate is 124 beats per minute. • Cap refill is 3-4 seconds. centrally and peripherally. • Extremities are warmer to touch.	• Third NS 20 mg/kg bolus may be considered.	
Reassessment of child: • Airway is patent. • Breathing – apneas have ceased, respirations are spontaneous, but still remain slightly shallow. • Heart rate is now 98 beats per minute, capillary refill is 3 seconds centrally and peripherally. Skin is pale pink, and warmer to touch. • Child is now responsive to touch.	• Child can be placed on O2 by face mask or nasal cannula. • Calculate maintenance fluid requirements and select maintenance fluid (D5NS). • Ensure that parents are at the bedside.	
Update parents on the status of the child.		
Preparation for admission and transfer of child.	• Demonstration of report for staff receiving child.	

<u>Points to Consider for Debriefing</u>

- Did the team assign a member to stay with the family member? How did that go? How did the team feel about having the family present at the bedside?
- How was the communication among team members during the resuscitation? Were decisions being communicated clearly?

Appendix 7

Agenda for Workshop

Topic		Materials	Time
Introduction	Welcome Introductions • Workshop faculty • Learners Housekeeping Items • Location of washrooms, exits etc. • Parking Lot (items to be addressed) • Classroom guidelines	✓ PowerPoint Slide ✓ Copies of agenda ✓ Nametags ✓ Flip chart and marker	10 min
Family Centered Care	LA 1(1) – What is family centered care? (10 min) • Creation of mind maps LA 1(2) – Exploration of stories (45 min) LA 1(3) – Facilitating family presence during emergencies (10 min)	✓ Flip chart and markers	95 min
Review of Pediatric Knowledge and Skills	LA 2(1) – Review of Ages and Stages (10 min) LA 2(2) – Physiological differences between adults and children (10 min) LA 2(3) – Recognition of a deteriorating pediatric patient (20 min) LA 2(4) – Pediatric Skills Stations (3) (45 min) *May choose from*: • Bag-valve mask ventilation • Use of defibrillator • Calculating and drawing up critical infusions • Bolusing via different methods (i.e. stopcock, pump, etc.) • Airway management • Intravenous/Intraosseous access • Accessing and using the Broselow crash cart • Weight based dosing • Code management (running a code)	✓ PowerPoint/Prezi presentation ✓ Laptop ✓ Projector ✓ Flip chart and markers ✓ Reference materials (current ENPC manual, PALS manual, access to Internet) ✓ Bag valve mask ✓ Appropriate sized doll ✓ Defibrillator ✓ Laryngeal mask airways (various sizes) ✓ IV cannula and tubing ✓ Calculators ✓ IV fluids ✓ Oral pharyngeal airways (various sizes) ✓ Nasal pharyngeal airways (various sizes) ✓ Endotracheal tubes (various sizes) ✓ Broselow crash cart	65 min

Communication and Teamwork	LA 3(1) – Team building exercise (15 min) • Paper chain activity LA 3(2) – Crisis Resource Management (30 min)	✓ Stack of white paper ✓ Stack of blue paper strips (marked with stamps) ✓ Stack of pink paper strips ✓ Stack of yellow paper strips ✓ Scissors (one pair per group) ✓ Roll of tape (one per group) ✓ Copies of instructions for each group	45 min
Orientation to Simulator	Each learner must be oriented to the simulator prior to beginning the simulation scenarios.	✓ Simulator ✓ Broselow crash cart	10 min
Simulation 1	Infant Scenario and Debriefing *May choose from:* • Respiratory distress/failure • Supraventricular tachycardia • Non-accidental trauma • Sepsis • Unresponsive infant	✓ Infant simulator ✓ Broselow crash cart ✓ Moulage ✓ PALS algorithms ✓ Other equipment as per specific simulation scenario	45 min
Simulation 2	Child Scenario and Debriefing *May choose from:* • Non-accidental trauma • Sepsis (i.e. febrile neutropenia) • Status epilepticus • Shock • Trauma	✓ Child simulator ✓ Broselow crash cart ✓ Moulage ✓ PALS algorithms ✓ Other equipment as per specific simulation scenario	45 min
Simulation 3	Adolescent Scenario and Debriefing *May choose from:* • Diabetic ketoacidosis • Toxic ingestion • Trauma • Sepsis • Medication error (i.e. post-operative hydromorphone vs. morphine)	✓ Adult simulator ✓ Broselow crash cart ✓ Moulage ✓ PALS algorithms ✓ Other equipment as per specific simulation scenario	45 min
Evaluation and Wrap up	Check Out	✓ Evaluation Forms	10 min