Simulations in Neonatal Training
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The use of various forms of “simulations” has become the new norm to enhance training in procedurally oriented medical specialties. However, this approach is really not new to neonatology. After all, the Neonatal Resuscitation Program (NRP) was a pioneer in the area of in the mid-1970s, as we all combines simulated delivery traditional book and test standard approach to resuscitation. Recognition of practicing scenarios, in real-life situation, has never neonatologists and has had a huge impact on training providers of delivery room care at all levels.

Now in the 21st century, simulations have taken on a whole new approach with cutting-edge technology and neonatology is on the front line. Newer simulations techniques have improved the training of pediatric/family practice/obstetric residents, obstetric and neonatal nurses, neonatal nurse practitioners (NNPS), neonatal fellows and neonatologists. In this council’s corner, I would like to share some of the successes we have had with simulations in our program. For many of you, I will be preaching to the choir, as you already have more experience in this area than we do. Children’s Hospital of Philadelphia makes extensive use of simulations in their fellowship orientation block and our own council member Renate Savich was part of fabulous simulation program at the 2012 PAS, just to name a few. What I offer is my limited perspective and a few ideas that are easy for any one to integrate into their training programs.

In 2008, Dr. Kari Roberts (Assistant Professor in neonatology) joined the advisory board of the PeriOperative Learning), the center for the departments within Medical School (1). Neonatal Simulation consisting of and fellows, neonatal respiratory therapist, practitioners. SimPORTAL (Simulation Resource for Training and primary simulation training procedurally oriented the University of Minnesota. She rapidly developed the Core Team (NSCT), interested neonatal faculty registered nurses, a neonatal and neonatal nurse
This group works with the core SimPORTAL technician team to create and run a variety of different simulations using the SimBaby® manikin (2). This fabulous advanced infant patient simulator with realistic anatomy and clinical functionality continually amazes me. After all my years of teaching NRP and having to tell the trainees what color the old-fashioned manikin baby was, or whether there were breath sounds or a heart rate present, it is fantastic to see that the SimBaby® can actually replicate real life. Trainees can actually hear for themselves the heart rate and breath sounds, so there is no “leading on” of the trainee by the trainer. With the input of the clinical expertise of this team, the portal technicians can program real-life delivery room and NICU emergency situations. Each scenario is created electronically and run from a computer in an adjacent area, where the performance is monitored by team members who can adjust the response of the SimBaby® to the interventions provided. In addition, every event is filmed and retained for review and assessment at the conclusion of each training session — a very valuable tool, there is nothing like watching yourself in action to help learn.

To augment resident education and NICU staff continuing education, the NSCT runs simulation training every other week for the residents rotating through the NICU, along with our nurses. The residents LOVE this experience and find it a key feature of their NICU training. The nurses and RTs also appreciate the opportunity to keep up their critical resuscitation skills.

Dr. Roberts explains, “Initiating appropriate resuscitation in the first few minutes of life is crucial to the ultimate outcome of a sick infant. The goal of our efforts with simulation-based training is to provide a safe-learning environment where medical providers can practice and become competent in critical care and communication skills. By having the house-staff, nurses, NNPs and respiratory therapists participate, we are able to create an environment which closely matches the “real life” situation on the NICU.”

Dr. Roberts writes: “Advantages of this team-based format include:

• Because the scenarios are created in the NICU or delivery room, as opposed to a lab, In Situ Simulation facilitates the highest degree of fidelity for the participants and provides both the expertise and unique perspective specific to neonatology, while providing the advantage of multiple professionals providing input to reduce individual error.

• The process strengthens communication and clarifies roles at each “critical juncture” in an event, which typically involves a crowded room, multiple caregivers and the hand-off of critical information. Communication breakdown is the attributable cause in the majority of neonatal deaths and injuries.

• Opportunities for identifying “weak links,” common “near misses” and other areas requiring improvement are a natural by-product of team-based simulation training.
• Trainees of all levels learn by doing, as opposed to pure observation and listening. Because knowledge comes from repeating an experience, medical professionals learn better, and better retain what they learn, though hands-on experience.

• Video-taping simulation training, followed by assessment and debriefing, is advancing specialized critical care education while breaking down caregiver hierarchies and improving patient safety.”

I might add that a key component is taking the simulations beyond just the “normal” delivery room and basic NRP – making for great learning experiences for the fellows/faculty/NNPs. As program director, I find this aspect of neonatal simulation training most effective. Many of you, who like me began training in the pre-surfactant and pre-noninvasive ventilation era, remember that opportunities for performing neonatal procedures were never lacking. Like it or not, most infants were intubated and many received chest tubes. In addition, before the advent of widespread prenatal diagnostic ultrasounds, we often walked into the delivery room without a prenatal diagnosis of life-threatening conditions (such as congenital diaphragmatic hernia, CDH) further complicating difficult resuscitations. We no longer live in the era of “see one, do one, teach one.” Currently, new fellows enter our programs with variable degrees of experience and training in neonatal procedures.

To address this need, Dr. Roberts and her team have created a number of advanced neonatal resuscitation scenarios for fellows (and faculty) to participate in to develop/improve/refresh their skills. These range from complex DR situations (i.e. CDH) to on the NICU codes and ECMO cannulation /decannulation – complete with common complications. In addition, her team has developed an “advanced skills lab,” where fellows/faculty/NNPs can learn or practice common neonatal procedures such as difficult intubations, laryngeal mask airway placement, tracheostomy changes, chest tube placement, thoracentesis, pericardiocentesis, suprapubic taps, intraosseous vascular access, neonatal cardioversion. We offer this opportunity at least annually at our institution and Dr. Roberts recently brought this advanced skills labs as a workshop to the regional District VI AAP Perinatal section meeting. Though a new grant to our SimPORTAL, bioengineers are currently working with Dr. Roberts to develop manikins specifically designed to facilitate training of these procedures that will make future workshops even more realistic and useful. So stay tuned, this promises to be a great new experience.

On the slightly lower tech side, simulations can also be useful for training fellows in communication skills. In conjunction with our Chaplaincy and Social Work departments, we have developed scenarios, using actors, to simulate difficult family
conference situations or difficult interpersonal work situations with colleagues. These can be very challenging, as there is not always one correct approach (as there often is with the manikin simulations) but are ultimately rewarding and useful. The fellows tell me that, while somewhat uncomfortable at first, they have been able to draw on the lessons learned when they encounter similar real-life situations.

Finally, the simulation experience can be a great scholarly activity for the fellow who is interested in medical education. For the preceding three years, one of our fellows worked with Dr. Roberts to develop and run simulation scenarios, as well as provide the debriefing and follow-up education. The development of such a program, complete with the assessment piece could be an acceptable work product. We now expect all our fellows to participate in running a certain number of the resident simulations throughout their fellowship, in order to solidify their own knowledge base and to give them experience in training and supervising other care providers. They all appreciate this experience.

As program director, I have found that adding simulations to our program has greatly enhanced the training of our fellows and improved communication among the entire NICU care team. Having the support of a team of bioengineers and technicians through the SimPORTAL has enhanced our experience greatly, but the real key is having a dedicated faculty member, such as Kari Roberts, who will make it happen for your program. The imagination of you and your faculty are the only limitations on how you can use this technology for education. She would be happy to offer advice to anyone wishing to expand/develop a simulation program and can be reached at: rober694@umn.edu

References: