



**Interprofessional Collaboration:
PEDIATRIC SIMULATION for Pre-licensure, Clinical nurse Specialist
and Nurse Practitioner Learners**

TITLE: Pediatric Interprofessional Practice across the Continuum of Care: Caring for Patients and Families with Congenital Heart Disease”

Case Overview Infant admitted to acute care with bronchiolitis, clinical deterioration requiring escalation of care due to undiagnosed congenital heart disease.

Brief Summary for Instructors

A 3-month old female infant is admitted from the ED with acute bronchiolitis. This diagnosis can be associated with or progress to a more serious illness in younger infants and/or in infants with underlying medical conditions/co-morbidities, such as with prematurity and/or associated lung disease or congenital heart disease.

It is especially important for the interprofessional healthcare team to work together to recognize and respond to early signs of clinical deterioration in pediatric patients, because delayed intervention may result in serious cardio-respiratory compromise and respiratory and cardiac arrest. Adverse outcomes resulting from complications of medical conditions and/or treatment in the healthcare setting is called failure-to-rescue. Improving the ability to rescue requires early recognition, teamwork, communication, and an organizational commitment to a culture of safety.

Learning Objectives

Pre-licensure students:

Pre-licensure students:

By the end of this simulation, the learner will be able to:

1. Identify the steps of a focused respiratory/cardiac assessment in an infant with respiratory distress.
2. Recognize signs and symptoms of respiratory distress.
3. Describe appropriate infection control measures.
4. Discuss appropriate interventions for an infant with respiratory distress.
5. Recognize priority signs of clinical deterioration.
6. Define the components of SBAR to be communicated with healthcare team members.
7. Discuss patient/family psychosocial support and teaching needs.

Clinical Nurse Specialist students:

By the end of this simulation, the learner will be able to:

1. Perform a focused respiratory/cardiac assessment on an infant with respiratory distress.
2. Analyze data obtained from a respiratory/cardiac assessment to determine differential diagnosis(es) and formulate a prioritized plan of care.
3. Provide consultation for nurses and obtain additional team input and resources necessary to facilitate progress toward achieving desired outcomes of the plan of care.
4. Promote the delivery of clinically competent care by health care team members, utilizing education, role modeling, team building, and quality monitoring/improvement interventions.
5. Facilitate incorporation of the unique contributions of all health care team members in care delivery to achieve health outcomes while practicing collegiality.
6. Use coaching and advanced communication skills to facilitate the development of effective interprofessional clinical teams.
7. Recognize priorities for intervention with clinical deterioration in an infant in respiratory distress

Nurse practitioner students:

1. Prioritize post-hospitalization needs of an infant diagnosed with congenital heart disease.
2. Promote interprofessional collaborative practice referrals and follow up.
3. Synthesize current best practice guidelines to implement a primary care practice plan for follow up care.
4. Model anticipatory guidance based on patient's age and determined neurodevelopmental stage.

Discuss the following **IPEC Core Competencies for Interprofessional Collaborative Practice***:

Competency 1: Values/Ethics

- VE1.** Work with individuals of other professions to maintain a climate of mutual respect and shared values.
- VE5.** Work in cooperation with those who receive care, those who provide care, and others who contribute to or support the delivery of prevention and health services and programs.
- VE6.** Develop a trusting relationship with patients, families, and other team members.
- VE10.** Maintain competence in one's own profession appropriate to scope of practice.

Competency 2: Roles/Responsibilities

- RR2.** Use the knowledge of one's own role and those of other professions to appropriately assess and address the health care needs of patients and to promote and advance the health of populations.
- RR3.** Engage diverse professionals who complement one's own professional expertise, as well as associated resources, to develop strategies to meet specific health and healthcare needs of patients and populations.
- RR5.** Use the full scope of knowledge, skills, and abilities of professionals from health and other fields to provide care that is safe, timely, efficient, effective and equitable.
- RR9.** Use unique and complementary abilities of all members of the team to optimize health and patient care.
- RR10.** Describe how professionals in health and other fields can collaborate and integrate clinical care and public health interventions to optimize population health.

Competency 3: Interprofessional Communication

- CC2.** Communicate information with patients, families, community members, and health team members involved in a form that is understandable, avoiding discipline-specific terminology when possible.
- CC3.** Express one's knowledge and opinions to team members involved in patient care and population health improvement with confidence, clarity and respect, working to ensure common understanding of information, treatment, care decisions, and population health programs and policies.
- CC5.** Give timely, sensitive, instructive feedback to others about their performance on the team, responding respectfully as a team member to feedback from others.
- CC7.** Recognize how one's own uniqueness (experience level, expertise, culture, power, and hierarchy within the health team) contributes to effective communication, conflict resolution, and positive interprofessional working relationships.
- CC8.** Communicate the importance of teamwork in patient-centered care and population health programs and policies.

Competency 4: Teams & Teamwork

- TT3.** Engage health and other professionals in shared patient-centered and population-focused problem-solving.
- TT4.** Integrate the knowledge and experience of health and other professions to inform health and care decisions, while respecting patient and community values and priorities/preferences for care.
- TT7.** Share accountability with other professions, patients, and communities for outcomes relevant to prevention and health care.
- TT10.** Use available evidence to inform effective teamwork and team-based practices.
- TT11.** Perform effectively on teams and in different team roles in a variety of settings.

other fields in a responsive and responsible manner that supports a team approach to the population health improvement with confidence, clarity, and respect, working to ensure

Scenario overview

R. Smith is a 3-month old black female infant admitted from the ED with acute bronchiolitis. The infant was born by NSVD at 40 weeks gestation, birth weight was 3.2 kg, pregnancy and delivery were uncomplicated, although the mother has a history of hypothyroidism. The baby's parents who are young are struggling financially and living with the baby's father's parents. The infant has received routine well-child care and vaccines. The mother reports that the infant has a 3- day history of tactile fevers, cough, runny nose, in irritability, and decreased feeding. She brought the baby to the ED because "her breathing didn't look right" and the infant had also been fussy and "spitting up" at every feed for the past 3 or 4 weeks. She has been breastfeeding for about 10 minutes on each side every 3-4 hours, but "is always sweaty". The mother reported that the baby has soft, yellow, seedy stools 3-4 times per day, sometimes with a small amount of visible bright red blood. Weight: 4.05 kg (<3rd %tile), length 57cm (10th %tile), OFC 39 cm (25th %tile). Temp: 38.8 HR 185 RR 80 BP 72/48 SaO2 89%

The RN admits the baby and notes that she is thin and irritable and has mild diaper dermatitis. Moderate intercostal and suprasternal retractions are noted, and her mother states, "She always breathes hard when she's upset". Breath sounds are noted with coarse rhonchi and crackles throughout and expiratory wheezing. The heart sounds are difficult to hear with the respiratory sounds, but a murmur may be present. There is brisk capillary refill with strong peripheral pulses. The abdomen is soft and nontender, with active bowel sounds. A peripheral IV is placed, infusing maintenance fluids.

The RN checks admission orders from ED, pages the pediatric resident to come and see the patient, and pages Respiratory Therapy; RT saw the baby and after starting her on 2 liters oxygen by nasal cannula, the saturation rate increased from 89% to mid-90's. The baby and mother fell asleep after breastfeeding.

The pediatric resident and NP examined the patient, reviewed the lab results and talked about the differential diagnosis. The respiratory viral panel was positive for RSV and adenovirus.

A few hours later, a pulse oximeter alarm sounded at 88%. The baby was asleep, but the respiratory rate was 90-100, and she continued to have moderate intercostal and suprasternal retractions with nasal flaring. When listening to lung sounds, coarse rhonchi and expiratory wheezing was heard.

After the RN called RT, deep suctioning, hypertonic saline nebulizer treatments were given, but the baby continued to have retractions and distress.

The RN asked the Clinical Nurse Specialist (CNS) to come and assist, and the CNS talked with the RN throughout the assessment about potential actions. The mother was very concerned, saying "I thought you said the oxygen would help her, she's getting worse." A decision was made to call a rapid response. The CNS talked with baby's mother to address her concerns.

The Rapid Response Team arrived (ICU RN, RT, peds resident and NP). Respiratory treatments and suctioning continued and breath sounds improved. The pediatric resident (MD) listened to the chest, noting that the wheezing and rhonchi improved, but she also heard a grade 2-3 medium pitched holosystolic murmur present at the left lower sternal border (LLSB). Upon further questioning, the mother said that a heart murmur was noted at birth and that a cardiologist told her the baby was fine and would "grow out of" the murmur. Chest x-ray is done and cardiomegaly is noted. Lasix 4 mg IV push was ordered after the Pharmacist reviewed K⁺ and renal output. The decision was made to transfer the baby to Pediatric ICU. An echocardiogram was ordered and a large ventral septal defect (VSD) was identified.

Curricular information

Pre-licensure Nursing Students: child health nursing course

Clinical Nurse Specialist Students: Clinical Judgment course (2 or 3)

NP: pediatric didactic/clinical

Pharmacist: pediatric didactic/clinical

Medical Students: pediatric rotation

Educational Rationale and Need:

Recognition of clinical deterioration is an important skill for novice as well as more experienced healthcare providers in order to prevent adverse events, referred to as “failure-to-rescue”, or death following a complication (Vincent et al., 2018). Strategies to detect clinical deterioration in early stages include the use of respiratory monitoring technology such as pulse oximetry or capnography, early warning scores, and rapid response programs (Vincent et al., 2018). However, more subtle changes may trigger concern even before changes in vital sign parameters, so it is important to teach novice healthcare providers to recognize these signs. Changes in respiratory pattern, circulation, or mentation may be early signals of clinical deterioration (Douw et al., 2015).

One population at high risk of morbidity and mortality from lower respiratory tract illness are infants with congenital heart disease (CHD), due to pre-existing pulmonary compromise related to CHD physiology (Geskey & Cyran, 2012; Healy et al., 2012). Respiratory Syncytial Virus (RSV) is the most common cause of acute lower respiratory infections worldwide (Silbert-Flagg & Pillitteri, 2018). When an infant develops RSV, their oxygen delivery can be severely limited and the work of breathing increased. Infants with CHD can be even further compromised due to limited cardiac reserve and impaired oxygen uptake (Checchia et al., 2017). These infants are at risk for hospitalizations and sometimes ICU admissions, which can result in mortality during the acute period.

Treatment for RSV is primarily supportive and there is no vaccine for the illness, so prevention is extremely important in this population. Identification of risk factors for RSV and targeted prophylaxis is important to reduce the risk of severe disease for the patient. High risk infants should receive RSV prophylaxis with palivizumab monthly during the RSV season (Checchia et al., 2017). Infants with undiagnosed CHD or untreated CHD may have increased mortality risk and succumb to an infection, especially if the need for palivizumab prophylaxis has not yet been identified.

Not all infants with significant heart disease are diagnosed in the neonatal period due to various reasons, which leads to delays in appropriate treatment and may complicate other childhood illnesses (Mahle et al., 2012; Thangaratnam et al., 2012). Although many types of critical or ductal-dependent problems are now diagnosed in the neonatal period due to pulse oximetry screening programs, these tests are not designed to diagnose less serious CHD such as ventricular septal defects (Mahle et al., 2012). Ventricular septal defect is the most common type of CHD, accounting for 15-20% of all CHD (Peterson & Pike, 2018). Although many small VSDs close spontaneously, large VSD's often result in heart failure in infants due to the large left-to-right shunt that typically develops in the first 6-8 weeks of life as neonatal pulmonary vascular resistance falls to more normal levels (Peterson & Pike, 2018).

Hospitalization and medical “crisis” inflicts stress on the parents and family; thus, pediatric healthcare providers must be adept at providing support and education in order to practice patient and family-centered care. The team approach to comprehensive care is the gold standard, so the inclusion of all healthcare team members is vital to promoting this teamwork following licensure. One key element of the team approach and comprehensive care is discharge planning and communication with the primary care provider. Effective discharge planning with the interdisciplinary team can result in reduction in care failures and improvement in family readiness for discharge (Wu et al., 2016). Social determinants of health are important modulators of family coping and stress during adaptation to the crisis of a child's hospitalization, but when these are not addressed, they may also impact outcomes (Tallon et al., 2017).

Reference Materials

- Checchia, P. A., Paes, B., Bont, L., Manzoni, P., Simões, E. A. F., Fauroux, B., Figueras-Aloy, J., & Carbonell-Estrany, X. (2017). Defining the risk and associated morbidity and mortality of severe respiratory syncytial virus infection among infants with congenital heart disease. *Infectious Diseases and Therapy*, 6(1), 37–56. <https://doi.org/10.1007/s40121-016-0142-x>
- Douw, G., Schoonhoven, L., Holwerda, T., Huisman-de Waal, G., van Zanten, A. R. H., van Achterberg, T.,

- & van der Hoeven, J. G. (2015). Nurses' worry or concern and early recognition of deteriorating patients on general wards in acute care hospitals: A systematic review. *Critical Care*, 19(1), 230. <https://doi.org/10.1186/s13054-015-0950-5>
- Geskey, J. M., & Cyran, S. E. (2012). Managing the morbidity associated with respiratory viral infections in children with congenital heart disease. *International Journal of Pediatrics*, 2012, 1–8. <https://doi.org/10.1155/2012/646780>
- Healy, F., Hanna, B. D., & Zinman, R. (2012). Pulmonary complications of congenital heart disease. *Paediatric Respiratory Reviews*, 13(1), 10–15. <https://doi.org/10.1016/j.prrv.2011.01.007>
- Mahle, W. T., Martin, G. R., Beekman, R. H., Morrow, W. R., Rosenthal, G. L., Snyder, C. S., Minich, L. L., Mital, S., Towbin, J. A., & Tweddell, J. S. (2012). Endorsement of Health and Human Services recommendation for pulse oximetry screening for critical congenital heart disease. *Pediatrics*, 129(1), 190–192. <https://doi.org/10.1542/peds.2011-3211>
- Peterson, J. K., & Pike, N. A. (2018). Alterations in Cardiovascular Function in Children. In K. McCance & S. Huether (Eds.), *Pathophysiology: The Biologic Basis for Disease in Adults and Children* (8th ed.). Elsevier.
- Silbert-Flagg, J., & Pillitteri, A. (2018). *Maternal & child health nursing: Care of the childbearing & childrearing family* (Eighth edition). Wolters Kluwer.
- Tallon, M. M., Kendall, G. E., Priddis, L., Newall, F., & Young, J. (2017). Barriers to addressing social determinants of health in pediatric nursing practice: An integrative review. *Journal of Pediatric Nursing*, 37, 51–56. <https://doi.org/10.1016/j.pedn.2017.06.009>
- Thangaratnam, S., Brown, K., Zamora, J., Khan, K. S., & Ewer, A. K. (2012). Pulse oximetry screening for critical congenital heart defects in asymptomatic newborn babies: A systematic review and meta-analysis. *The Lancet*, 379(9835), 2459–2464. [https://doi.org/10.1016/S0140-6736\(12\)60107-X](https://doi.org/10.1016/S0140-6736(12)60107-X)
- Vincent, J.-L., Einav, S., Pearse, R., Jaber, S., Kranke, P., Overdyk, F. J., Whitaker, D. K., Gordo, F., Dahan, A., & Hoefft, A. (2018). Improving detection of patient deterioration in the general hospital ward environment: *European Journal of Anaesthesiology*, 35(5), 325–333. <https://doi.org/10.1097/EJA.0000000000000798>
- Wu, S., Tyler, A., Logsdon, T., Holmes, N. M., Balkian, A., Brittan, M., Hoover, L., Martin, S., Paradis, M., Sparr-Perkins, R., Stanley, T., Weber, R., & Saysana, M. (2016). A quality improvement collaborative to improve the discharge process for hospitalized children. *Pediatrics*, 138(2). <https://doi.org/10.1542/peds.2014-3604>

Pre-simulation learning activities:

Required readings:

Pre-licensure Students:

Silbert-Flagg J, Pillitteri A. (2018). *Maternal & Child Health Nursing: Care of the Childbearing and Childrearing Family*. Philadelphia: Walters Kluwer. (or similar pediatric nursing textbook for pre-licensure students)

Chapter 36. Nursing care of the family with an ill child

Chapter 40. Nursing care of the family when the child has a respiratory disorder

Chapter 41. Nursing care of the family when the child has a cardiovascular disorder

Clinical Nurse Specialists Students:

Bolick BN, Reuter-Rice K, Madden MA, Severin PN (Eds) (2021). *Pediatric Acute Care: A Guide for Interprofessional Practice*. St. Louis, Elsevier. (or similar pediatrics textbook for advanced practice nursing)

Chapter 22 Cardiac disorders, pages 215-248 Congenital heart lesions

Chapter 8 Patient and Family-Centered Care

Chapter 35 Pulmonary disorders, pages 929-932 Bronchiolitis

- Doupnik SK, Hill D, Palakshappa D, Worsley D, Bae H, Shaik A, Qiu M, Marsac M, Feudtner C. (2017). Parent coping support interventions during acute pediatric hospitalizations: A meta-analysis. *Pediatrics*. ;140(3):e20164171
- Stremler R, Haddad S, Pullenayegum E, Parshuram C. (2017). Psychological outcomes in parents of critically ill hospitalized children. *Journal of Pediatric Nursing*.;34:36-43.

Nurse Practitioner Students:

- Burns, et al (2020). *Pediatric Primary Care*. St Louis, MO: Elseiver. Ch 38.
- Knutson, S., Kelleman, M. S., & Kochilas, L. (2016). Implementation of developmental screening guidelines for children with congenital heart disease. *The Journal of Pediatrics*, 176, 135-141.
- Lantin-Hermoso, M. R., Berger, S., Bhatt, A. B., Richerson, J. E., Morrow, R., Freed, M. D., & Beekman, R. H. (2017). The care of children with congenital heart disease in their primary medical home. *Pediatrics*, 140(5), e20172607.
- Kostopoulou, E., Dimitriou, G., & Karatza, A. (2019). Cardiac Murmurs in Children: A Challenge For The Primary Care Physician. *Current pediatric reviews*, 15(3), 131-138.

Key teaching/debriefing points:

After assigning students to view the *Pediatric Simulation Video*, faculty will conduct a de-briefing using the Interprofessional Education (IPE) collaborative practice de-briefing tools. In addition, faculty will address the following clinical teaching competencies:

Pre-licensure Students:

1. Perform full respiratory and cardiac assessment on an infant
2. Recognize signs of clinical deterioration and act appropriately
3. Discuss actions, side effects, purpose of medications ordered.
4. Utilize correct steps of safe medication administration

Advanced Practice Students: Clinical Nurse Specialists and Nurse Practitioners

1. Discuss the differential diagnosis of respiratory distress in the infant
2. Review the pathophysiology and treatment options for infant heart failure due to left-to-right intracardiac shunt

All Students:

1. Deliberate strategies to engage in interprofessional communication related to escalations of care.
2. Discuss support of patient and family during crises with escalation of care.
3. Customize care delivery based on developmental stage.