

**Advancements in Neonatal Sepsis Management: The Nurse's Role in Early Detection and  
Intervention**

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According to an article entitled Early onset sepsis (EOS), written for the journal *Pediatric Clinics of North America*, “Neonatal sepsis is defined as a blood stream infection within the first 28 days of life” and is “a leading cause of infant mortality in the United States” (Dorrough et al. 2021). The journal article also highlights the incidence of neonatal EOS, which, in the year 2022, was about 0.5 out of 1000 live births (Dorrough et al. 2021). The role of the nurse in the event of neonatal sepsis is early detection and treatment, primarily to improve outcomes for the neonate, but also to improve the nursing practice as whole. This is important to the nursing practice because it can help to reduce mortality rates as well of cost of equipment used when neonatal sepsis advances to more serious conditions. As advancements in neonatal sepsis management are becoming increasingly effective, including tests for biomarkers, and using sepsis screening protocols, they are most effective when nurses feel educated enough and empowered to implement such tools and rapidly detect and respond to these situations.

The role of the nurse in identifying neonatal sepsis starts with being well educated on the risk factors that an infant may have. This includes risks specific to the infant and risks that pertain to the infant but come from the mother. In a table in the article Early onset sepsis (EOS), risk factors are sorted into low risk, not requiring empiric antibiotics nor laboratory monitoring; and high risk, which require blood culture and clinical monitoring (Dorrough et al. 2021). Low risk factors consist of indications for preterm labor, maternal pre-eclampsia, medical illness, placental insufficiency, induction of labor (IUL), cesarean section, and premature rupture of membranes (PROM); high risk factors include incompetent cervix, non-reassuring fetal heart patterns during labor, and intra-amniotic infection (Dorrough et al. 2021). In an article written in the journal *Fanaroff and Martin’s Neonatal-Perinatal Medicine*, these warning signs are what nurses need to be on the lookout for in an infant with suspected sepsis:

Danger signs include chest indrawing or fast breathing, not feeding, too hot or too cold, convulsions, no movement, yellow palms or soles of feet. [Fig. 7.13](#) shows an algorithm of the elements of observation and action based on common clinical findings: feeding, crying, variations in skin temperature on touch, activity, breathing pattern, and condition of the cord. These findings can be graded from mild to severe. (Carlo 2025)

Being vigilant to these signs can aid nurses and other healthcare professionals in early testing to determine presence and severity of neonatal sepsis, as well as implement early and effective treatment for the best outcomes for the neonate. Knowing the symptoms of a definitive sepsis diagnosis, or the clinical manifestations, is just as important as knowing these warning signs.

Clinical presentation is the objective data that the nurse can measure and observe on a client. Being vigilant and alert to these signs will help the nurse to initiate early treatments and interventions for the best outcomes. Neonates with sepsis may present differently, but some signs and symptoms that frequently occur together include:

Infants may demonstrate tachycardia, temperature instability, irritability, poor feeding, hypotonia, poor perfusion, anuria, lethargy, and apnea.<sup>1,3</sup> Preterm infants more commonly present with apnea, bradycardia, and cyanosis as initial signs of EOS and have a higher incidence of poor activity/lethargy and increased respiratory effort (Dorrough et al. 2021).

Taking frequent vital signs and performing thorough assessments are crucial when taking care of an infant presenting with symptoms of sepsis. In a typical Neonatal Intensive Care Unit (NICU) environment, assessments are done with each feeding, or every three to four hours, so it may be easier to detect in this setting; as for a baby on the sepsis pathway in a well-baby nursery, assessments are usually done every four hours for the first twenty-four hours of life, then every

eight hours for the duration of the hospital stay (The Nurse Natalie, 2020). As assessments become more spread out, the neonate's condition can decline and may go unnoticed until the next assessment, which is why assessments must be comprehensive and meticulous. As a nurse, after assessing risk factors and identifying these warning signs of sepsis, the cascade of confirming the diagnosis needs to start immediately.

Early detection is of highest priority when an infant under 28 days of life is suspected to be septic. Biomarkers are an objective way to test for bloodstream infection, they are defined as:

A biological molecule found in blood, other body fluids, or tissues that is a sign of a normal or abnormal process, or of a condition or disease. A biomarker may be used to see how well the body responds to a treatment for a disease or condition. Also called molecular marker and signature molecule (National Cancer Institute, n.d.).

The most used biomarkers for detecting neonatal sepsis are complete blood count (CBC) with differential, C-reactive protein (CRP), and procalcitonin (Cantey et al. 2021). These are blood labs that can be drawn and sent to the lab for a comprehensive look at what is going on in the infant's bloodstream. When looking at an infant's CRP, less than 0.5 mg/dL is considered normal or acceptable (EBSCO Information Services, n.d.). Anything above this value would indicate a nonspecific inflammation in the body. CRP, or "an acute phase reactant made in the liver in response to inflammatory cytokines" is essentially the body showing that there is inflammation happening in some region of the body but is unspecific and has a history of a high rate of false positive tests (Cantey et al. 2021). The same findings are seen for procalcitonin and CBC, and that is that they are not definitive testing for diagnosis of neonatal sepsis (Cantey et al. 2021). The most popular and trustworthy method of diagnosing neonatal sepsis is through a blood culture (Carlo, 2025). A blood culture is done by collecting blood, usually two milliliters,

and using a petri dish over a period to see if any organisms, bacterial in nature, grow on the dish (Woodford et al. 2021). In the article Biomarkers for the diagnosis of neonatal sepsis, this statement is made, “Bacterial cultures of blood [and urine, cerebrospinal fluid, or other sterile sites for late-onset sepsis] are the reference standard for neonatal sepsis” (Cantey et al. 2021). If growth is seen, interventions need to be prompt and pertinent to the patient’s condition.

After confirming a diagnosis of sepsis in a neonate, the following actions of the nurse are crucial and to be done in a timely manner. Empiric antibiotics are the treatment of choice for this specific diagnosis and should be started upon positive laboratory evaluation (Dorrrough et al. 2021). Ampicillin and Gentamycin are two very common antibiotics used, since they can fight against an array of pathogens, including Group B *streptococcus* (GBS), most *Streptococcus* and *Enterococcus* species, *Escherichia coli*, and *Listeria monocytogenes* (Dorrrough et al. 2021). Once treatment is started, ongoing monitoring is still necessary to determine effectiveness, “blood cultures should be performed daily until microbiologic sterility is documented [often within 48–72 hours]” (Dorrrough et al. 2021). While the antibiotics stated above are the most common treatment, there are alternative regimens that can be used. In an article written for the Cochrane Database of Systemic Reviews, a series of studies were done to evaluate risks versus benefit of different antibiotic regimens, consisting of five trials of different pairings of antibiotics; the clinical trials showed no difference in adverse effects, respiratory and circulatory support, mortality, nephrotoxicity, ototoxicity, necrotizing enterocolitis, or neurological developmental impairment (Korang et al. 2021). This led to the conclusion, “Current evidence cannot confirm or reject one antibiotic regimen being superior to another” (Korang et al. 2021). This means that while Ampicillin and Gentamycin are the most common, that does not make them better than the other regimens, they are just used most because of their broad-spectrum

qualities.

The topic of neonatal sepsis management affects not only nurses and medical staff, but families of patient's as well. In 2021, the incidence of neonatal sepsis was 55,174.5 out of 100,000 population, with the mortality rate being 9,920.3 out of 100,000 population (GBD 2021 Global Sepsis Collaborators (2025)). This rate is down from 2019, in which the incidence was 58,013.4 out of 100,000 population, and the mortality was 10,585.8 per 100,000 population (GBD 2021 Global Sepsis Collaborators (2025)). This statistic alone shows the direct relationship between advancements in the healthcare, including screening protocols and treatment methods, and improved outcomes for neonates who develop sepsis. The incidence of neonatal sepsis affects hospitals globally by cost of care alone, but also by use of resources, and decreased amount of beds when neonates have a prolonged stay due to sepsis. This problem takes a whole new meaning to families of these neonates, who are facing anywhere between \$767.40 United States dollars (USD) and \$2,037.87 USD in NICU costs alone, and on top of that about \$549.85-\$1,058.59 USD per day for the NICU stay alone (Guan et al., 2024). Financial costs are a burden as is, and that is without mentioning the emotional burden placed on nurses and families taking care of these sick infants.

Overall, evidence suggests that the more confident nurses are in their ability to promptly detect and treat neonatal sepsis, the better the outcomes will be for the neonates affected. This confidence come from knowing the risks, including maternal and fetal ailments, and being prepared to follow up with proper testing and screening. It is then important for nurses to be vigilant to clinical manifestations of the disease and treat accordingly. Testing and screening are to be done as soon as sepsis is suspected to ensure treatment starts as soon as possible and is as effective as it can be. Treatment most commonly includes empiric antibiotics, and the nurse

should feel empowered to communicate with the provider in getting orders for these promptly. It is crucial that nurses implement these interventions to improve the outcomes of neonates in coming years.

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