# Neonatal Stabilization and Postresuscitation Care

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**KEYWORDS**

• Neonatal resuscitation • Neonatal stabilization • Education • Post-resuscitation care • Neonatal mortality

**KEY POINTS**

- Neonatal resuscitation alone does not address most causes of neonatal mortality, such as prematurity, low birth weight, respiratory distress, and infections. To address these, caregivers need to be trained in both neonatal resuscitation and stabilization.
- Neonatal stabilization requires caregivers to evaluate whether babies are at-risk or unwell, to decide what interventions are required, and to act on those decisions.
- A number of programs address neonatal stabilization in a variety of levels of care in both well-resourced and limited health care environments. They address institutional, clinical, and human factors to varying degrees.
- This article suggests a shift in clinical, educational and implementation science from a focus on resuscitation to one on the resuscitation-stabilization continuum.

## INTRODUCTION

Neonatal mortality continues to be a significant health concern across the world. Of note, preterm birth complications, intrapartum-related complications, and sepsis or meningitis are the leading causes of neonatal death.[1] Although effective neonatal resuscitation training for health providers is vital for improved survival, one should not underestimate the need for training in neonatal care and stabilization after birth to identify and manage these conditions.

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Conflicts of interest: Dr Aziz is an author of the *Acute Care of at-Risk Newborns* textbook and volunteers as Board Member of the ACoRN Neonatal Society, a not-for-profit society that owns copyright to the ACoRN Program. He makes no financial gain from ACoRN materials. He has no other conflicts to declare. Dr Ringer is a member of the Newborn Resuscitation Program Steering Committee of the American Academy of Pediatrics and an Assistant Editor of the *Textbook of Neonatal Resuscitation,* 6th edition. He makes no financial gain from these activities, and has no other conflicts to declare.

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Health care providers around the world, irrespective of level of care, are faced with the possibility that a baby may be at-risk or unwell at birth or soon after. It should also be appreciated that most babies in the world are born outside high-risk neonatal centers, even in countries with highly developed perinatal services. For example, in Alberta, Canada, with a highly regionalized health care system, only one-quarter of babies are born in level III centers, with the remainder born in an assortment of level II and I units (K. Aziz, personal communication, August 2012). In many countries, such as Ethiopia, 9 of 10 babies are born at home.[2] Even when born in hospital, rural facilities in China have been shown to have up to 4 times the neonatal mortality of urban perinatal centers.[3] Clearly, outside high-risk centers, health care providers have limitations in how they might respond to an at-risk or unwell baby; these limitations may be, first, in their ability to recognize risk for or signs of illness; second, in access to training and resources to provide this care; or third, in transportation to where the care may be provided.

How valuable is a neonatal resuscitation program if, a few minutes after effective resuscitation, a health care provider is unable to identify at-risk or sick babies, and unable to provide effective stabilization? In answering this question, it seems clear that 2 populations of patients are important: those requiring postresuscitation care, and those who are well at birth but may become ill. Among babies who require substantial resuscitation but seemingly recover by 5 minutes of age, Frazier and Wert-hammer[4] found that 62% had short-term complications requiring evaluation and treatment. Even among babies whose resuscitation needs at birth are less pronounced, the need for assessment and treatment often continues.

This article describes the key principles of effective stabilization, evaluation, and initial postbirth treatment. We focus primarily on the term and late preterm infants.

## IDENTIFYING BABIES WHO ARE UNWELL OR AT RISK FOR BECOMING UNWELL

Looking at the leading causes of neonatal death worldwide, many of them may be identifiable before birth, or very shortly after. We know that approximately 1 in 10 babies in the world are born preterm[1]; we are often well aware of intrapartum complications, such as abruption and antepartum bleeding; and neonatal sepsis, pneumonia, and meningitis all present with very abnormal clinical signs.

In developing an approach to help caregivers appropriately care for babies after birth, a reasonable first step is to educate them about the risk factors for instability. Knowing, for example, that short gestation or maternal fever is more likely to lead to a preterm or sick baby may lead to earlier intervention in labor, or perhaps transfer to a birthing center with adequate resources. This approach has been successfully protocolized in North America for the prevention of early-onset sepsis.[5] After birth, for example, providers should clearly identify low birth weight as a warning sign of future instability, even if the child is well.

Triage is one of the most important aspects of health care provider training. In neonatal resuscitation we have identified “vital” signs that determine whether a baby should remain in its mother’s arms or should be introduced to the initial steps of resuscitation: providers are trained that a baby is well if the baby is breathing, active, and developing normal color and tone. Similarly, providers may be taught the “vital signs for stabilization” as a means of triage.

What might these “vital signs for stabilization” be? As with resuscitation, they should reflect a transition to extrauterine vital organ function. Respiratory stability might be indicated by lack of distress and a regular, quiet breathing pattern. Cardiovascular stability might be confirmed by normal heart rate, color, and perfusion. A baby who