

Neonatal and Perinatal Infections



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KEYWORDS

- Neonatal sepsis • Neonatal morbidity • Neonatal mortality • Maternal health
- Maternal infection • Younger-than-5 mortality • Antimicrobial resistance

KEY POINTS

- Globally, 2.6 million neonates die each year, with preterm birth, infections, and intrapartum-related conditions being the leading causes.
- Maternal, environmental, and infant factors are closely linked to neonatal health and influence acquisition of infection in the perinatal and neonatal period.
- Evidence-based preventive and therapeutic interventions have been identified that address risk factors and underlying causes of neonatal infections.
- The emergence of new infections, such as Zika, and increasing antimicrobial resistance present challenges that must be addressed to achieve substantial reductions in neonatal mortality.

BURDEN AND EPIDEMIOLOGY

Significant progress has been made toward reducing child mortality in low- and middle-income countries (LMIC). Younger-than-5 deaths have decreased from 12.7 million in 1990 to 5.8 million in 2015, of which 2.6 million were neonates.¹ In spite of a notable reduction in younger-than-5 mortality, the decrease in neonatal mortality has been unsatisfactory. Forty-five percent of younger-than-5 mortality now occurs in the first month of life.² In addition to 2.6 million newborn deaths, there are an

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estimated additional 2.6 million still births, of which an estimated 12% are attributable to fetal infections.³

In 2015, the world transitioned from Millennium Development Goals to Sustainable Development Goals (SDGs). Along with intrapartum causes and preterm birth complications, infections are a major direct cause of neonatal deaths.⁴ Preventing and managing neonatal infections are crucial to achieve subgoal 3.2 of SDGs, which aims to end preventable deaths of newborns and children younger than 5 years by 2030.

This article addresses neonatal infections that are primarily acquired in the perinatal period (late pregnancy, intrapartum, and postnatal period) (Table 1) and manifest clinically in the perinatal and neonatal period. Maternal infections acquired by the neonate early in pregnancy, such as rubella, syphilis, and toxoplasmosis, are not considered.

Conventionally, the perinatal period begins at 22 completed weeks of gestation and ends 7 days after birth. The neonatal period represents the first 28 days of life. The relative lack of structural barriers and an immature immune system put neonates at greater risk of infection and mortality. Preterm birth (36%), infections (23%), and intrapartum-related conditions, such as birth asphyxia (23%), are responsible for the greatest number of neonatal deaths⁴ (Fig. 1). However, in the late neonatal period (>7 days), 48% of deaths are attributable to infections, the leading cause of death in this period⁴ (see Fig. 1).

RISK FACTORS FOR NEONATAL AND PERINATAL INFECTIONS

Maternal Health and Infections

Poor maternal health and inadequate access to health care are determinants for neonatal outcomes.

Maternal infections

Infections during pregnancy are associated with spontaneous abortion, stillbirth, preterm delivery, and low birth weight (LBW).⁵ Moreover, some infections are transmitted to the fetus, resulting in neonatal morbidity or fetal loss. Transmission can occur hematogenously from mother to baby or as an ascending infection via the uterine cervix. Early onset sepsis (EOS) and most infections in the perinatal period are associated with maternal factors. A neonate's immature immune system depends on maternal

	Early Pregnancy	Midpregnancy	Late Pregnancy	Intrapartum	Postnatal
Rubella	+	—	—	—	—
Toxoplasmosis	+	+	—	—	—
Syphilis	—	+	+	—	—
Cytomegalovirus	+	+	+	+	+
Zika virus	++	+	+	—	—
Chickenpox	—	—	+	+	+
Herpes simplex virus	—	—	—	+	—
HIV	—	—	+	++	+
Hepatitis B	—	—	—	+	—
Group B streptococcus	—	—	—	+	—

Abbreviation: HIV, human immunodeficiency virus.

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