

Deaths of extremely premature infants decrease, fewer dying of breathing complications

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In a large, national study of extremely premature infants, researchers found that death rates decreased from 2000 to 2011. An analysis of specific causes found that deaths attributed to immaturity or pulmonary causes and complicated by infection or central nervous system injury all decreased; however, deaths attributed to necrotizing enterocolitis increased. Necrotizing enterocolitis is an intestinal complication resulting from prematurity.

The study results are published in the Jan. 22 issue of the *New England Journal of Medicine*.

Survival among premature infants has improved substantially over the

last 50 years, but prematurity is still a leading contributor to [newborn deaths](#) in the United States. Approximately one in four extremely premature infants born at 22 to 28 weeks of gestation does not survive the birth hospitalization. Mortality rates decrease with each additional week of gestation.

"By understanding the causes and timing of [death](#) in premature infants, we can make more informed decisions as clinicians, better counsel families, and conduct more in-depth research to continue improving survival and [long term health](#) of premature infants," says Ravi Mangal Patel, MD, MSc lead author of the study and an assistant professor of pediatrics at Emory University School of Medicine and Children's Healthcare of Atlanta.

The research team prospectively analyzed data from 6,075 deaths among 22,248 live births, with gestational ages of 22 to 28 weeks, approximately 12 to 18 weeks before their expected due date. The infants were born in hospitals within the 25-center Neonatal Research Network, supported by the Eunice Kennedy Shriver National Institute of Child Health and Human Development of the National Institutes of Health. Researchers compared overall and cause-specific [mortality](#) across three periods—2000-2003, 2004-2007, and 2008-2011.

Enrolled infants were actively followed from birth to age 120 days, death, hospital discharge, or transfer to another center. Infants who remained hospitalized for more than 120 days were evaluated for death until 1 year of age.

The number of deaths per 1000 [live births](#) was 275 between 2000 and 2003, and 285 between 2004 and 2007. There were 258 deaths between 2008 and 2011, a decrease of 9.6 percent over the earlier time period. Overall, 40.4 percent of deaths occurred within 12 hours after birth, and 17.3 percent occurred after 28 days. The largest absolute declines in

mortality from 2000-2003 to 2008-2011 were in infants born at 23 or 24 weeks of gestation.

The decrease in deaths attributed to [respiratory distress syndrome](#) and bronchopulmonary dysplasia accounted for 53 percent of the overall reduction in mortality from 2000-2003 to 2008-2011. In 2008-2011, there also were decreases in deaths attributed to immaturity and deaths complicated by infection or central nervous system injury. There were, however, more deaths in 2008-2011 attributed to [necrotizing enterocolitis](#), and those deaths offset the overall reduction in mortality by 26 percent.

From 2000 to 2011, death within 12 hours after birth was most commonly attributed to immaturity. Deaths after 12 hours were most commonly attributed to respiratory distress syndrome. From 15 to 60 days, necrotizing enterocolitis was the most common cause of death, and after 60 days, bronchopulmonary dysplasia was the predominant cause of death.

Extremely premature infants who died were two weeks younger in gestational age than surviving infants. Also, mothers whose infants died were less likely to have received prenatal glucocorticoids - a steroid hormone therapy sometimes given to mothers at risk for delivering extremely [premature infants](#).

The study authors noted several factors in prenatal medicine that changed between 2000 and 2011 and that may have played a potential role in their findings. They noted increases in the percentage of women receiving prenatal care, increases in the use of prenatal glucocorticoids, and an increase in C-sections, and a decrease in the percentage of women who received prenatal antibiotic treatment. They also noted an increase in the use of high-frequency ventilation for infants born at 22 to 23 weeks gestation, and a decrease in the frequency of a below-normal

maternal temperature at admission, a factor previously associated with increased neonatal mortality. The increase in mortality attributed to necrotizing enterocolitis may be related to improvements in the early survival of infants who would otherwise have died before the typical age of its occurrence, the authors said.

"Our findings underscore the continued need to identify and implement strategies to reduce potentially lethal complications of prematurity," says study author Barbara J. Stoll, MD, George W. Brumley, Jr., Professor and Chair, Department of Pediatrics, Emory University School of Medicine and director, The Pediatric Center of Emory and Children's Healthcare of Atlanta. "Ultimately, strategies to reduce the high rates of extreme prematurity are needed to make a significant impact on infant mortality."

Provided by Emory University

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