

Infant Mortality: 1963 to Present Medical Developments and Legislative Changes

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On August 8, 1963 a premature infant boy, Patrick Bouvier Kennedy, was transferred from Otis Airforce Base near Hyannis Port to Boston Children's Hospital. He died the next day at age 39 hours from respiratory distress syndrome.

There was little we could do in 1963 to care for premature and low-birth weight babies. In many hospitals small prematures were kept warm, given oxygen and subcutaneous fluids and sometimes placed on "rocking" beds. Some even suggested that if kept cool they would better tolerate low-blood oxygen levels. As expected, many of the low-birth weight infants who survived were more likely to be "small for gestational age" than "premature."

High Infant Mortality Rates Led to Legislative Changes

In 1963, 31.1 out of every 1,000 babies born alive in North Carolina died before they reached their first birthday. The infant mortality rate for white infants was 22 and 50.6. There were premature nurseries but no real neonatal intensive care units. There were no ventilators designed for premature infants and there was no simple way to measure newborn blood gases. Vascular access through the umbilical cord was used mainly for exchange transfusions. The role of continuous positive airway pressure and surfactant were not generally understood. This was five years before Dr. J. F. Lucey published his article in *Pediatrics* regarding the use of "blue lights" for the treatment of neonatal hyperbilirubinemia.¹ Neonatal hypoglycemia was rarely considered.

Historically, North Carolina has always had one of the highest infant mortality rates in the country. In the early 1970s, the NC General Assembly and the Governors' Office tried to address this problem by establishing a regional perinatal care system and providing funds for maternity clinics, family planning and delivery services. Later, in the

mid-1980s, the General Assembly expanded Medicaid to increase coverage for pregnant women and infants. Reimbursement rates for delivery services and prenatal care were increased as well.

In the fall of 1989, the Centers for Disease Control and Prevention (CDC) reported that North Carolina had the worst infant mortality rate of any state in the nation (1988 provisional data). Governor Martin created the Governor's Commission on Infant Mortality and changed Medicaid policies to cover all pregnant teens, regardless of parental income, in an effort to encourage them to seek prenatal care. In 1990, the NC General Assembly implemented a four-year plan to reduce infant mortality by expanding access to prenatal care, primarily through the reduction of financial barriers to that care. This involved expanding Medicaid to cover women and infants with incomes up to 185% of the federal poverty guidelines and again increasing reimbursement for prenatal care and delivery. The Rural Obstetric Care Incentive program was expanded to help offset malpractice insurance premiums for providers who were willing to provide maternity care in medically underserved areas. Funding was provided for teams of nurse midwives to provide obstetrical services in these areas and a nurse midwifery program was created at East Carolina University.

Infant malnutrition became a rarity after the onset in 1974 of the federal Supplemental Nutrition Program for Women, Infants, and Children (WIC) Program. The WIC Program provides vouchers to low-income pregnant and post-partum women to purchase food for themselves, their infants and their children up to age five. The Legislature also created a birth defects registry and helped the March of Dimes fund a folic acid awareness program.

Although most infant deaths occur in the perinatal period, measures were taken to reduce the death rate and injury to older infants. Legislation was adopted requiring infant car seats for all infants and back to sleep programs

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for infants in childcare centers. Severe penalties were adopted for operating unlicensed childcare centers or for giving medications to children in childcare centers without parental permission. During this time North Carolina developed one of the best childhood immunization programs in America.

Medical Developments in Obstetrics and Neonatology

Since 1963 there has been a revolution in obstetrics and neonatology with technology leading the way. The use of ultrasound and fetal monitors are now routine procedures and amniocentesis has become a common tool in pregnancy management. The use of Rh (D) immune globulin has made exchange transfusions a rarity. The devastating effects of alcohol usage, smoking, and inadequate folic acid are generally understood.

A real revolution has occurred in the care of premature and sick newborns. A fantastic transport system now brings the medical centers' neonatal intensive care nursery into the local hospital. Pediatricians across the state are trained in the resuscitation and stabilization of sick newborns while awaiting transport teams. Blood gases can be measured percutaneously or with only a few drops of blood. The impact of assisted ventilation, continuous positive airway pressure, surfactant, hand washing, sepsis, hypoglycemia, and phototherapy on the survival of sick newborns is well recognized. Touch and loving care have been shown to increase the chances for survival so now we even encourage parents to touch and hold their ill newborns. This is a far cry from the days when parents weren't even allowed in the nurseries! The recognition of the importance of breast milk in nutrition and resistance to infections have also had a major impact on infant survival and well being.

We Have Reduced Infant Mortality Rates, but Challenges Remain

In 1963 there were 107,322 live births in North Carolina and there were 3,342 infant deaths (31.1 deaths per 1,000 live

births). In 2002 there were 117,307 live births with 957 infant deaths for an infant mortality rate of 8.2, the lowest ever recorded in North Carolina. Clearly, the advances in medical knowledge and expertise, coupled with policy changes that made it easier to access prenatal care have helped to improve the state's infant mortality rate. However, we cannot rest on these accomplishments. North Carolina still has a higher than average infant mortality rate. Nationally, there were seven infant deaths per 1,000 live births in 2002. Further, while North Carolina's infant mortality rate has improved for all races, the infant mortality rate is still more than two times higher for minorities (14.2 per 1,000 live births) than whites (7.0 per 1,000 live births).

Patrick Kennedy brought the difficulties faced by premature infants to the world's attention and made all of us in healthcare aware of the inadequacy of our knowledge, our technology, and our ability to provide the help that was needed. Surely some of the credit for the revolutionary advances in obstetrics and neonatology must be given to that tiny baby boy born to Jacqueline Kennedy at Otis Airforce Base in 1963.

Despite the advances in care and treatment, many questions remain only partially answered. What causes prematurity? What causes birth defects? What causes SIDS? What causes racial disparity? We do know that healthy lifestyles help prevent prematurity. We know that adequate folic acid prevents neural tube defects. We do know that placing infants on their backs to sleep reduces the incidence of sudden infant death syndrome. We know that lifetimes of poverty, stress, and subclinical infections may contribute to racial disparity in birth outcomes.

All of these partially answered questions and many more must remain on the front burner of our state and national government and on the front burner of all involved in providing healthcare to pregnant women and their infants. We must continue to find ways to improve North Carolina's unacceptable levels of infant mortality, and especially, racial disparities.

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