



Statistical Brief

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Preterm Birth Rate Trends in North Carolina, 1988–2012

by
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A preterm birth is an infant born alive with the delivery occurring in less than 37 weeks of pregnancy.¹ This report will examine trends in the rates, or percentages, of preterm births for North Carolina residents from 1988 to 2012 using information collected and recorded on the live birth certificate.

Methods

Preterm birth data in this report were obtained from the North Carolina birth certificate electronic files. The preterm birth rate is calculated as the live births delivered in less than 37 completed weeks of gestation per 100 total live births. Live births where the gestational age is unknown or the mother's residence is outside the state of North Carolina are excluded from the rates. The primary measure used to determine the gestational age of the newborn is the interval between the first day of the mother's last normal menstrual period (LMP) and the date of birth. The clinical or obstetric estimate of gestation is substituted where the LMP is missing or inconsistent with birthweight.² North Carolina added the medical data field "Clinical Estimate of Gestation (Weeks)" to the Certificate of Live Birth in 1988. During

2010, a revised version of the birth certificate was implemented, changing the data item from clinical estimate of gestation to obstetric estimate of gestation.³ Infant mortality data were obtained from the North Carolina death certificate and the linked birth/infant death electronic files.

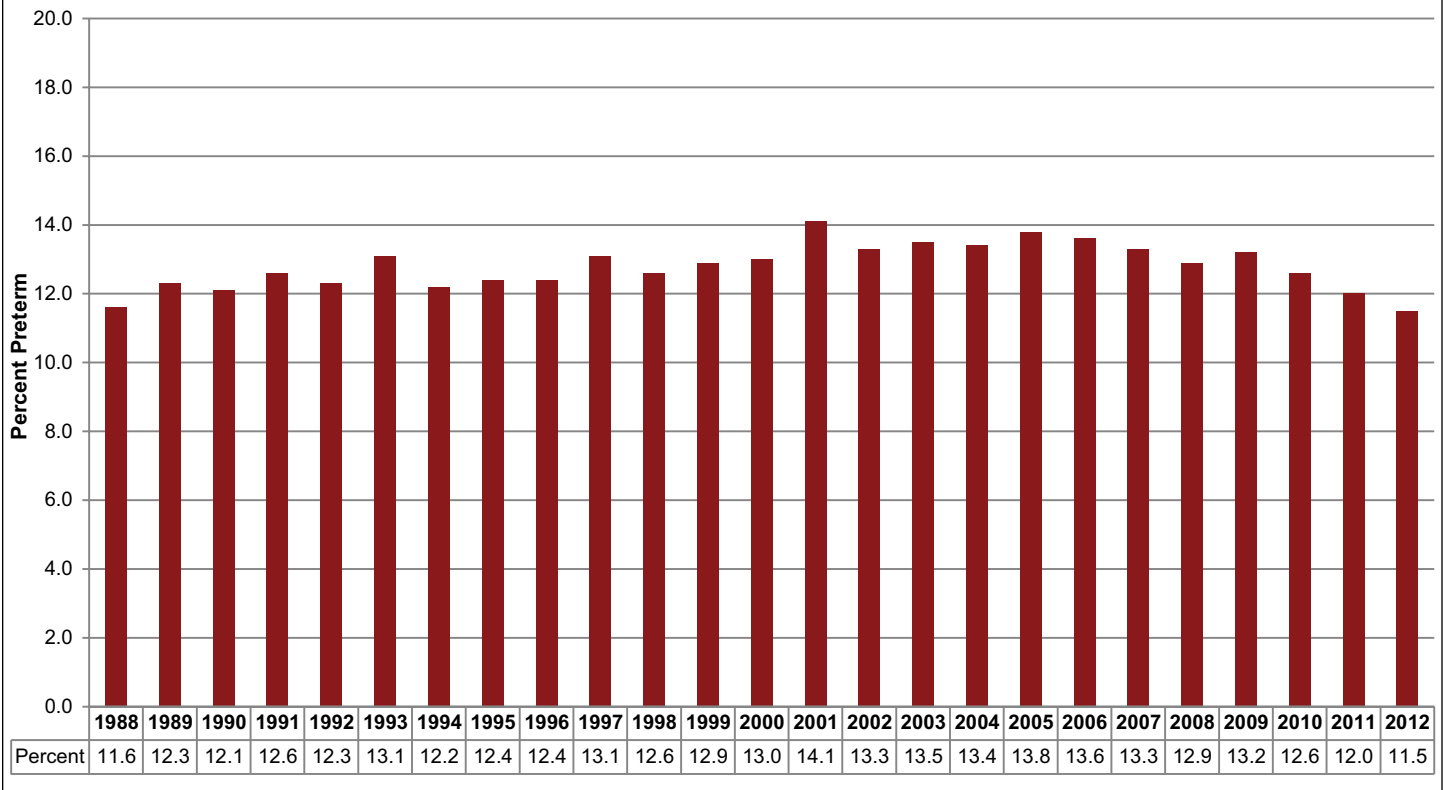
State Rates

Chart 1 displays the percentage of preterm births for North Carolina residents from 1988 to 2012. The highest rate during this period was in 2001 when 14.1 percent of live births were delivered preterm. Preterm rates have been lower since then, with a drop in recent years. From 2009 to 2012, the rates declined 12.9 percent (from 13.2 percent to 11.5 percent), making 2012 the lowest preterm birth rate in the 25 year period.

Mothers' Age

Teen mothers and mothers ages 40 and over have higher rates of preterm births than mothers in their 20s and 30s. Teen mothers had the highest rate from 1988 to 1992, but in 1993 mothers 40 and over had a 27 percent increase from 14.8 to 18.8 percent, and

Chart 1.
Percentage of Preterm Deliveries
North Carolina Resident Live Births, 1988–2012



continuously had the highest age group rate for the next 20 years. **Chart 2** shows the trends over time for each 10 year age group.

Marital Status

Throughout the 1988–2012 time period, married mothers had lower rates of preterm births than mothers who were unwed at the time of delivery. However, unwed mothers’ preterm birth rates have declined over time, from 18 percent in 1993 to 13.8 percent in 2012. Additionally, the difference between the married and unmarried rates narrowed in the 1990s. Preterm birth rates by marital status are displayed in **Chart 3**.

Race and Ethnicity

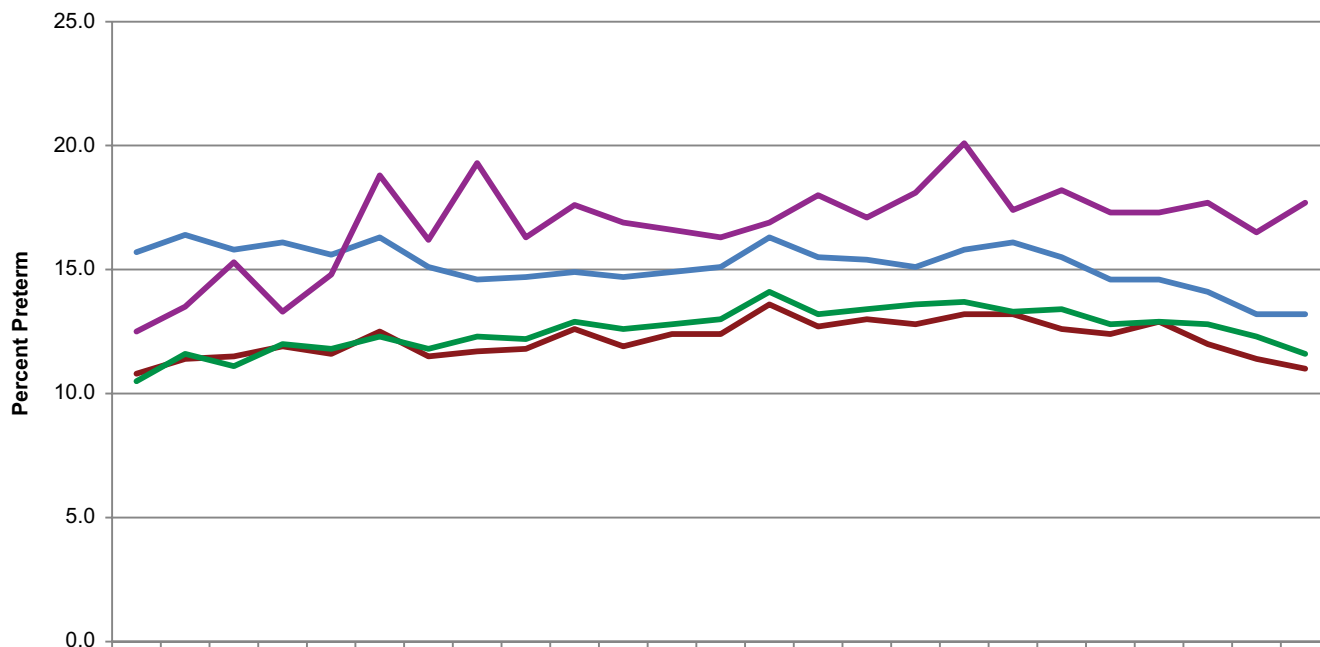
Non-Hispanic African American mothers have continuously had a significantly higher rate of preterm

births than mothers of other racial and ethnic origins. However, in recent years the rates have declined for African American mothers by 16.9 percent, from 18.9 percent in 2006 to 15.7 percent in 2012. American Indian mothers had the second highest preterm rate from 1994 to 2012. **Chart 4** illustrates trends in preterm birth rates by race and ethnicity categories of white non-Hispanic, African American non-Hispanic, American Indian non-Hispanic, other race non-Hispanic and Hispanic/Latina.

Plurality

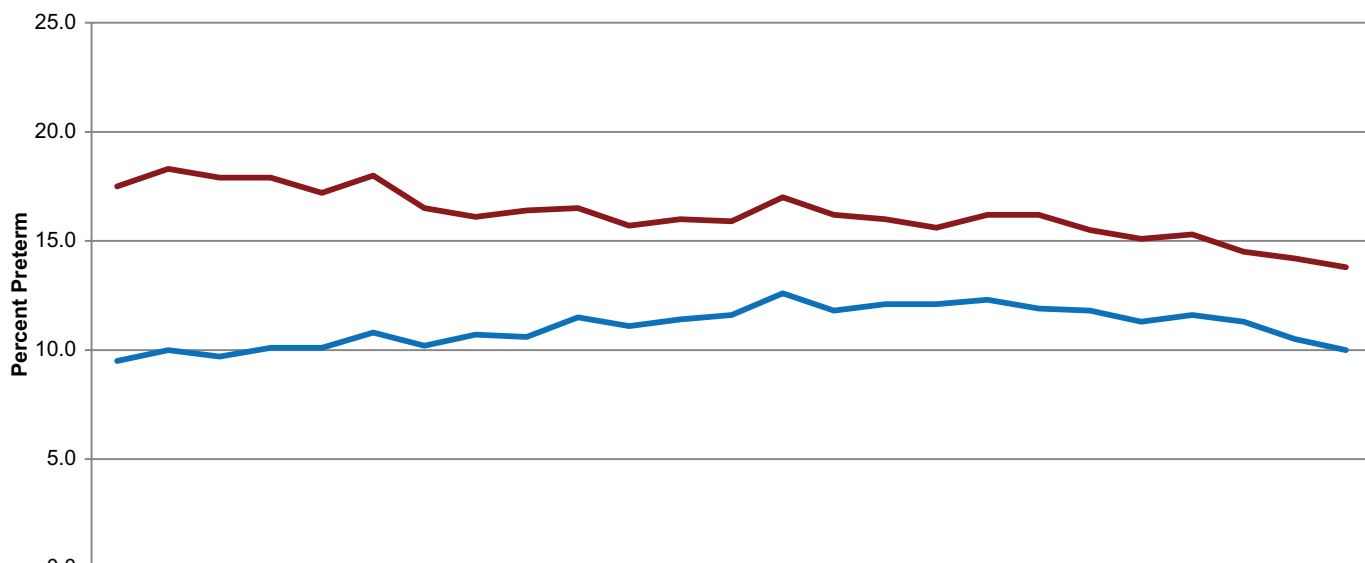
Twins and higher order multiple births tend to be born earlier than single births.⁴ **Chart 5** displays preterm rates for single births, twin births and higher order births (triplets or more). While approximately one in 10 singleton deliveries occurred at less than 37 weeks of gestation, about half of all twin deliveries were preterm during this time period.

Chart 2.
Preterm Rates by Age of Mother, 1988–2012



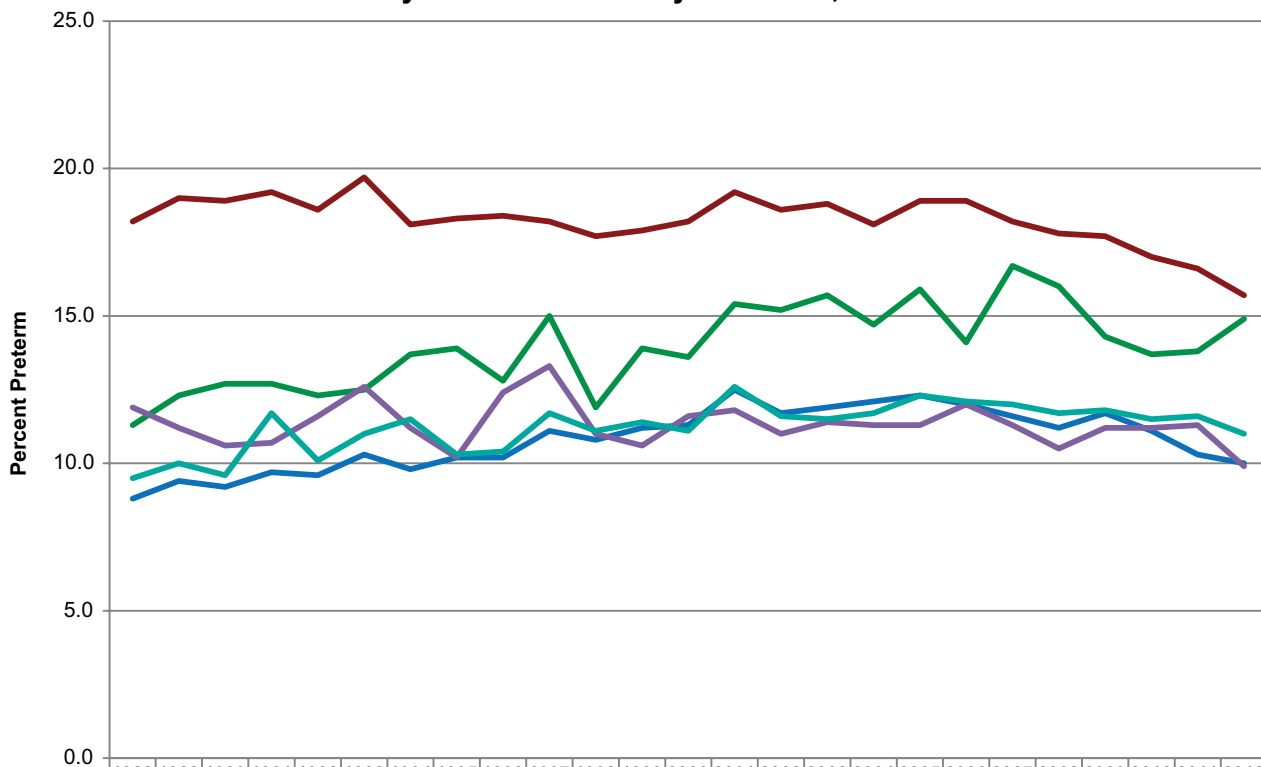
| | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 19 & under | 15.7 | 16.4 | 15.8 | 16.1 | 15.6 | 16.3 | 15.1 | 14.6 | 14.7 | 14.9 | 14.7 | 14.9 | 15.1 | 16.3 | 15.5 | 15.4 | 15.1 | 15.8 | 16.1 | 15.5 | 14.6 | 14.6 | 14.1 | 13.2 | 13.2 |
| 20–29 | 10.8 | 11.4 | 11.5 | 11.9 | 11.6 | 12.5 | 11.5 | 11.7 | 11.8 | 12.6 | 11.9 | 12.4 | 12.4 | 13.6 | 12.7 | 13.0 | 12.8 | 13.2 | 13.2 | 12.6 | 12.4 | 12.9 | 12.0 | 11.4 | 11.0 |
| 30–39 | 10.5 | 11.6 | 11.1 | 12.0 | 11.8 | 12.3 | 11.8 | 12.3 | 12.2 | 12.9 | 12.6 | 12.8 | 13.0 | 14.1 | 13.2 | 13.4 | 13.6 | 13.7 | 13.3 | 13.4 | 12.8 | 12.9 | 12.8 | 12.3 | 11.6 |
| 40 & over | 12.5 | 13.5 | 15.3 | 13.3 | 14.8 | 18.8 | 16.2 | 19.3 | 16.3 | 17.6 | 16.9 | 16.6 | 16.3 | 16.9 | 18.0 | 17.1 | 18.1 | 20.1 | 17.4 | 18.2 | 17.3 | 17.3 | 17.7 | 16.5 | 17.7 |

Chart 3.
Preterm Rates by Marital Status of Mother, 1988–2012



| | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Wed | 9.5 | 10.0 | 9.7 | 10.1 | 10.1 | 10.8 | 10.2 | 10.7 | 10.6 | 11.5 | 11.1 | 11.4 | 11.6 | 12.6 | 11.8 | 12.1 | 12.1 | 12.3 | 11.9 | 11.8 | 11.3 | 11.6 | 11.3 | 10.5 | 10.0 |
| Unwed | 17.5 | 18.3 | 17.9 | 17.9 | 17.2 | 18.0 | 16.5 | 16.1 | 16.4 | 16.5 | 15.7 | 16.0 | 15.9 | 17.0 | 16.2 | 16.0 | 15.6 | 16.2 | 16.2 | 15.5 | 15.1 | 15.3 | 14.5 | 14.2 | 13.8 |

Chart 4.
Preterm Rates by Race and Ethnicity of Mother, 1988–2012



| | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| White | 8.8 | 9.4 | 9.2 | 9.7 | 9.6 | 10.3 | 9.8 | 10.2 | 10.2 | 11.1 | 10.8 | 11.2 | 11.3 | 12.5 | 11.7 | 11.9 | 12.1 | 12.3 | 12.0 | 11.6 | 11.2 | 11.7 | 11.1 | 10.3 | 10.0 |
| African American | 18.2 | 19.0 | 18.9 | 19.2 | 18.6 | 19.7 | 18.1 | 18.3 | 18.4 | 18.2 | 17.7 | 17.9 | 18.2 | 19.2 | 18.6 | 18.8 | 18.1 | 18.9 | 18.9 | 18.2 | 17.8 | 17.7 | 17.0 | 16.6 | 15.7 |
| American Indian | 11.3 | 12.3 | 12.7 | 12.7 | 12.3 | 12.5 | 13.7 | 13.9 | 12.8 | 15.0 | 11.9 | 13.9 | 13.6 | 15.4 | 15.2 | 15.7 | 14.7 | 15.9 | 14.1 | 16.7 | 16.0 | 14.3 | 13.7 | 13.8 | 14.9 |
| Other | 11.9 | 11.2 | 10.6 | 10.7 | 11.6 | 12.6 | 11.2 | 10.2 | 12.4 | 13.3 | 11.0 | 10.6 | 11.6 | 11.8 | 11.0 | 11.4 | 11.3 | 11.3 | 12.0 | 11.3 | 10.5 | 11.2 | 11.2 | 11.3 | 9.9 |
| Hispanic | 9.5 | 10.0 | 9.6 | 11.7 | 10.1 | 11.0 | 11.5 | 10.3 | 10.4 | 11.7 | 11.1 | 11.4 | 11.1 | 12.6 | 11.6 | 11.5 | 11.7 | 12.3 | 12.1 | 12.0 | 11.7 | 11.8 | 11.5 | 11.6 | 11.0 |

Among higher order deliveries, the preterm rate approached 100 percent.

Method of Delivery

Live births delivered by a surgical procedure known as Cesarean section had higher rates of preterm compared to vaginal deliveries from 1988 to 2012. The preterm rates of Cesarean births increased through the 1990s, and peaked at 19 percent in 2001. Rates have declined in recent years, for both Cesarean and vaginal deliveries. In 2012, vaginal births had the lowest preterm rate during this period at 9.6 percent. **Chart 6** shows trends in preterm birth rates by method of delivery.

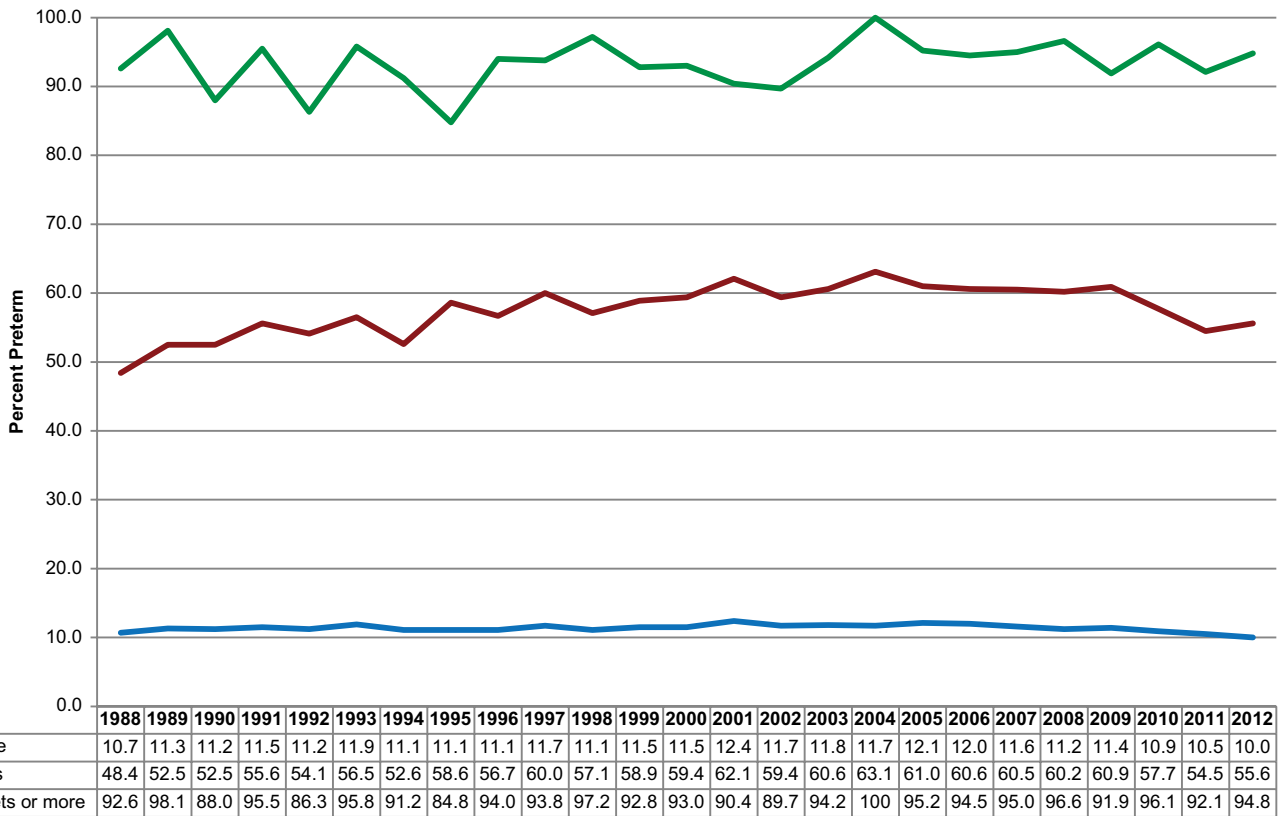
County Rates

Figure 1 displays North Carolina resident preterm birth rates by county for the five-year period 2008–2012.

Conclusion

As outlined in this report, from 1988 to 2012, North Carolina’s preterm birth rates have remained relatively stable, ranging from a low of 11 percent in 2012, to a high of 14 percent in 2001. Preterm rates were consistently higher for teenage mothers, mothers ages 40 and over, unmarried mothers, African American mothers, higher order deliveries (twins and higher) and infants delivered by Cesarean section.

**Chart 5.
Preterm Rates by Plurality, 1988–2012**



Preterm birth is a major risk factor for infant mortality.⁵ In 2012, 64 percent of North Carolina infant deaths were preterm deliveries. Of the 883 resident infant deaths, the classified underlying cause was determined as prematurity for 203, or 23 percent.

Decreasing infant mortality is related to decreasing preterm births.⁶ State-based efforts to reduce preterm births, such as the Perinatal Quality Collaborative of North Carolina’s “39 Weeks” project and its efforts to eliminate unnecessary elective deliveries under 39 weeks’ gestation, can result in improvements in the health and wellbeing of newly born infants.⁷

Acknowledgments

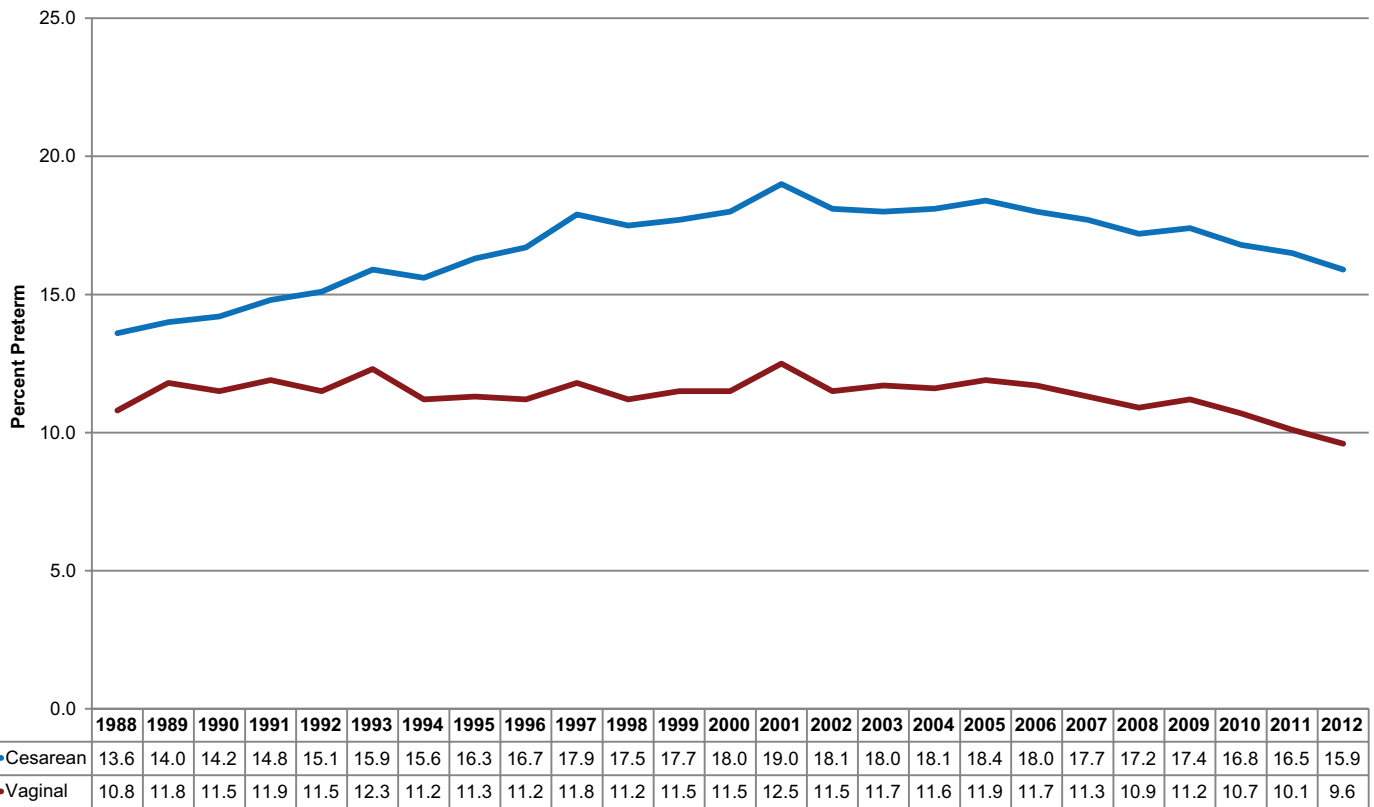
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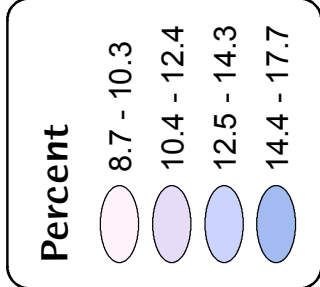
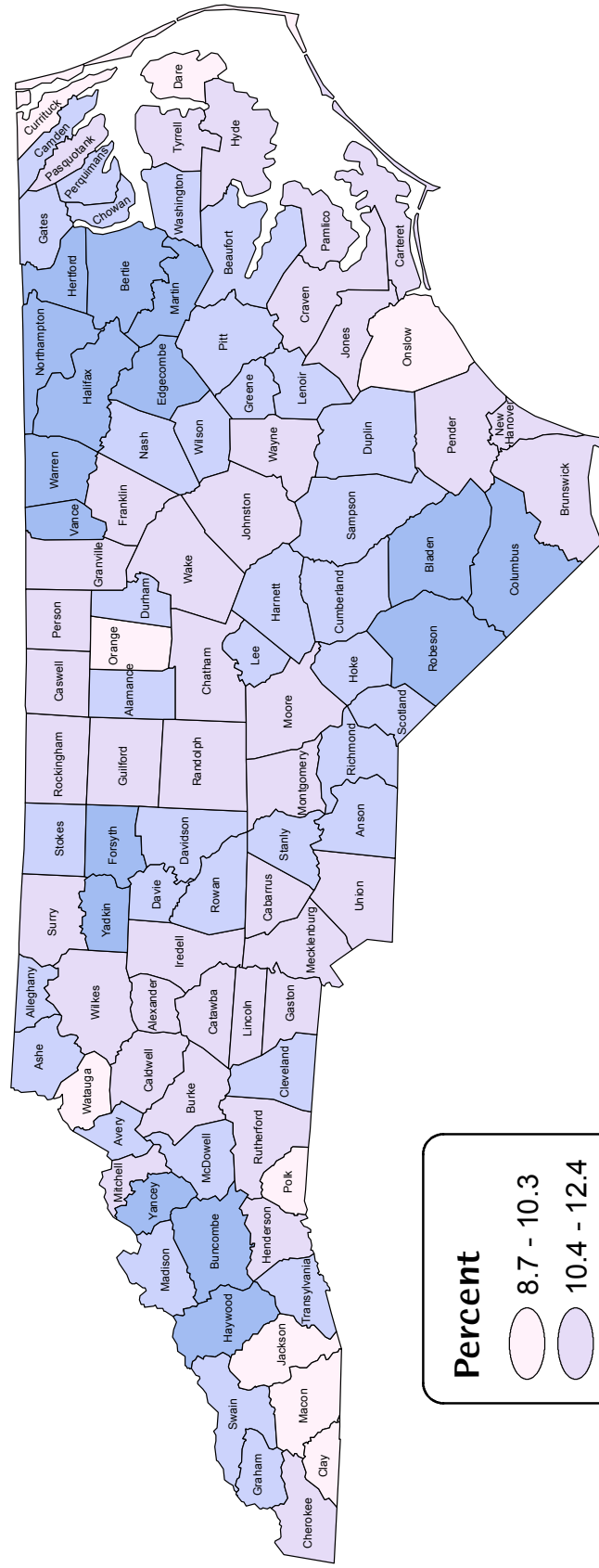
**Chart 6.
Preterm Rates by Method of Delivery, 1988–2012**



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Figure 1

**North Carolina
Percent Preterm Delivery Births
2008-2012**



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