HealthStatisticsCenter
West Virginia Department of Health and Human Resources

HSC Statistical Brief No. 25

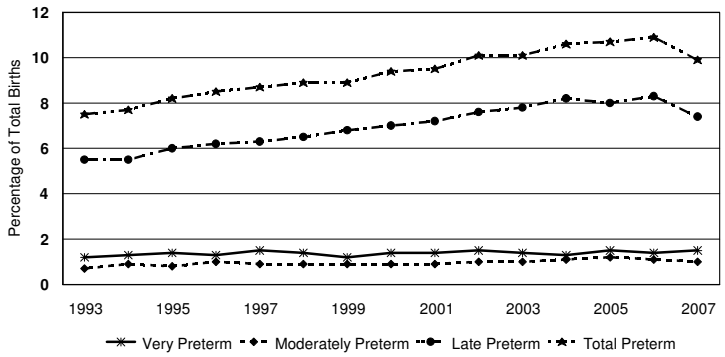
Selected Birth Certificate Data on Late-Preterm Births West Virginia, 1993-2007

There has been an increase in preterm, or premature, births (i.e., those occurring before 37 weeks of gestation) in both West Virginia and the United States. Analysis shows that these increases are primarily associated with increases in late-preterm births, those births that occur from 34 through 36 weeks. According to data from the National Center for Health Statistics, West Virginia ranked 5th in the nation in 2005 in the percentage of total singleton births that were born in the late-preterm period.[1]

Recent research points to increased risks of morbidity and mortality among late-preterm infants. While infants born from 34 to 36 weeks gestation can be the size and weight of some full-term infants, a report published by the American Academy of Pediatrics[2] notes that they are less physiologically and metabolically mature than infants born at 37+ weeks of gestation and are at higher risk of developing medical complications during and after birth. Cerebral palsy is three times more likely among these infants than among full-term infants. Respiratory problems are more common in late-preterm infants, as are feeding problems, jaundice, and rehospitalization during the neonatal period. A study published in the October 2008 *American Journal of Obstetrics and Gynecology* found increased risks of developmental, social, and neurocognitive deficits[3]among children who were late-preterm infants.

The West Virginia Health Statistics Center examined birth certificate data from singleton births from 1993 through 2007 in order to determine the scope of the problem of late-preterm birth in the state. As illustrated in Figure 1 below, the increase in these births was responsible for the increase in the overall rate of prematurity over the 15 years; the rates of very preterm (<32 weeks) and moderately preterm (32-34 weeks) births show little change. Table 1 on the following page presents the number and percentages of total births represented by very preterm, moderately preterm, and late-preterm births.

Figure 1. Preterm* Births by Percentage of Total Births
West Virginia Resident Births, 1993-2007



*Very Preterm = <32 weeks; Moderately Preterm = 32-33 weeks; Late Preterm = 34-36 weeks
Preterm = <37 weeks

[1] National Center for Health Statistics, 2005 natality data. Retrieved January 23, 2009, from www.marchofdimes.com/peristats
[2] www.pediatrics.org/cgi/doi/10.1542/peds.2007-2952
[3] www.doi:10.1016/j.ajog.2008.08.040

Table 1. Very, Moderately, and Late-Preterm Births, Number and Percentage of Total Births West Virginia Resident Singleton Births, 1993-2007								
Year	Very Preterm (<32 weeks)		Moderately Preterm (32-34 weeks)		Late Preterm (34-36 weeks)		Total Preterm (<37 weeks)	
	#	%	#	%	#	%	#	%
1993	254	1.2	155	0.7	1,150	5.5	1,559	7.5
1994	268	1.3	190	0.9	1,126	5.5	1,584	7.7
1995	275	1.4	170	0.8	1,204	6.0	1,649	8.2
1996	262	1.3	190	1.0	1,231	6.2	1,683	8.5
1997	299	1.5	183	0.9	1,243	6.3	1,725	8.7
1993-1997	**1,358**	**1.3**	**888**	**0.9**	**5,954**	**5.9**	**8,200**	**8.1**
1998	286	1.4	181	0.9	1,294	6.5	1,761	8.9
1999	236	1.2	173	0.9	1,347	6.8	1,756	8.9
2000	287	1.4	188	0.9	1,389	7.0	1,864	9.4
2001	280	1.4	183	0.9	1,420	7.2	1,883	9.5
2002	291	1.5	197	1.0	1,523	7.6	2,011	10.1
1998-2002	**1,380**	**1.4**	**922**	**0.9**	**6,973**	**7.0**	**9,275**	**9.3**
2003	275	1.4	210	1.0	1,576	7.8	2,061	10.1
2004	273	1.3	216	1.1	1,663	8.2	2,152	10.6
2005	297	1.5	238	1.2	1,622	8.0	2,157	10.7
2006	293	1.4	228	1.1	1,683	8.3	2,204	10.9
2007*	310	1.5	217	1.0	1,563	7.4	2,090	9.9
2003-2007	**1,448**	**1.4**	**1,109**	**1.1**	**8,107**	**7.9**	**10,664**	**10.4**
*provisional data								

Selected factors were examined to better understand the recent increase in late-preterm births, including delivery method, certain demographic characteristics of the mother, and the reporting of maternal medical risk factors. To provide adequate sample size for analysis, data were aggregated into three 5-year groupings: 1993-1997; 1998-2002, and 2003-2007.

Delivery Method. The percentage of all births that were delivered by Cesarean section increased over the time period among both preterm and term infants, as illustrated in Figure 2. The percentage of late-preterm births delivered by Cesarean section increased at a faster rate, however, than either very to moderate preterm or term births. Between 1993-1997 and 2003-2007, the overall Cesarean rate among late-preterm births increased 45.5% (27.5% to 40.0%); primary C-sections increased 29.0% (19.3% to 24.9%) and repeat C-sections increased 84.1% (8.2% to 15.1%) (Figure 3).

Figure 2. Percentage of Very/Moderately Preterm, Late-Preterm, and Term Births Delivered by Cesarean Section West Virginia 1993-1997, 1998-2002, and 2003-2007

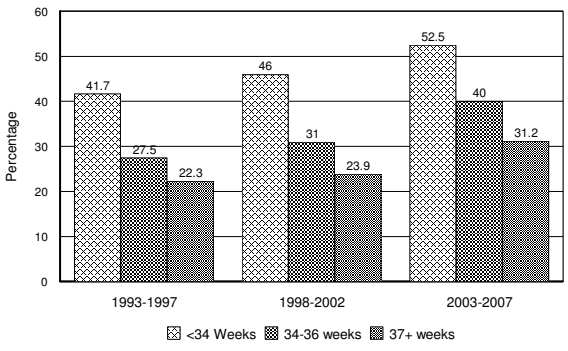
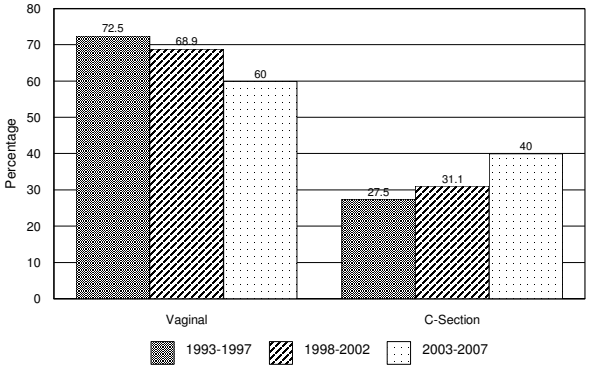


Figure 3. Late-Preterm Births by Delivery Method West Virginia 1993-1997, 1998-2002, and 2003-2007



Maternal Characteristics. Late-preterm births increased among all maternal age groups examined (Figure 4). Mothers aged 40 and older were more likely to have a late-preterm delivery than younger women in all three time periods; however, the proportion of late-preterm births increased at a higher rate among younger women: 31.1% among teenage mothers (6.1% to 8.0%) and 38.6% among mothers aged 20-39 (5.7% to 7.9%), compared with 17.1% among older mothers (8.2% to 9.6%). By 2003-2007, nearly 1 in 10 births to older women were born between 34 and 36 weeks of gestation.

Figure 4. Late-Preterm Births by Age of Mother
West Virginia 1993-1997, 1998-2002, and 2003-2007

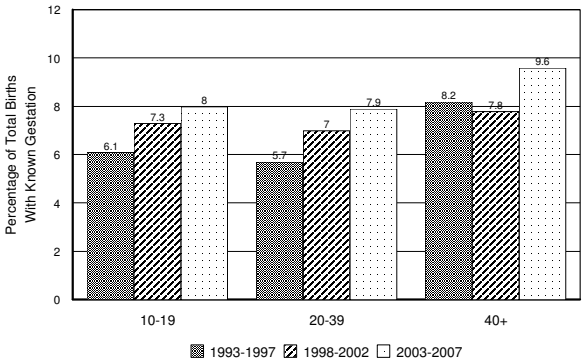
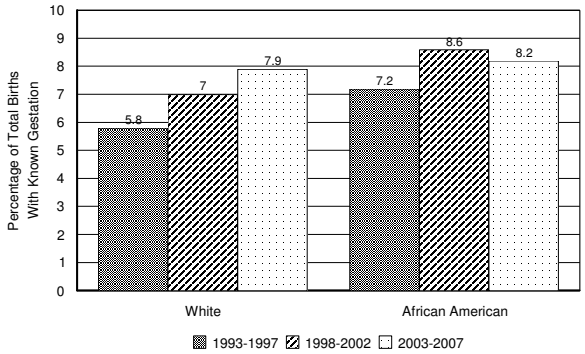


Figure 5. Late-Preterm Births by Race of Mother
West Virginia 1993-1997, 1998-2002, and 2003-2007



When race was examined, there were different findings for white and African-American mothers. Among white mothers, a consistent increase was noted in late-preterm births over the three time periods; this was not found among African American mothers (Figure 5). A 36.2% increase in the proportion of late-preterm births occurred among white women (5.8% to 7.9%), compared with an increase of 13.9% among African American women (7.2% to 8.2%). The rate among African American women actually decreased slightly between 1998-2002 and 2003-2007.

Information on maternal income was unavailable from the birth certificates, but maternal educational level was obtainable. While late-preterm deliveries were consistently most likely to occur among women with the least education (<12 years) and least likely to occur among college-educated women, the rate of late-preterm birth increased over the study period among all levels of educational attainment (Figure 6). Women with more education (i.e., 13-15 and 16+ years) showed the largest increases in proportion of births occurring from 34 through 36 weeks (44.9%: 4.9% to 7.1%).

Figure 6. Late-Preterm Births by Maternal Education
West Virginia 1993-1997, 1998-2002, and 2003-2007

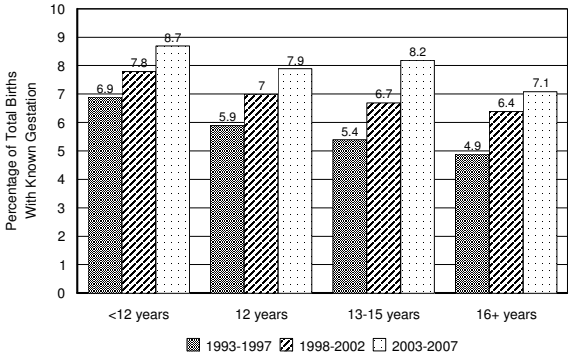
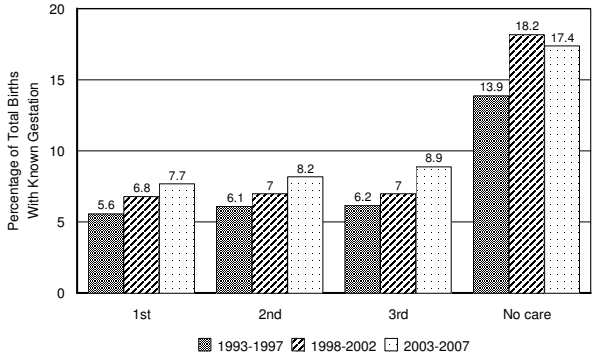


Figure 7. Late-Preterm Births by Prenatal Care
West Virginia 1993-1997, 1998-2002, and 2003-2007



An increased rate of late-preterm birth over the 15 years was found regardless of the trimester in which a woman began prenatal care (Figure 7). Women who received no prenatal care were much more likely to have a late-preterm birth than other women in all three time periods. Little difference in rate was noted, however, between women who began care in the first, second, or even third trimester of their pregnancies, with a similar increase in rate noted for each group.

While late-preterm deliveries were more likely among mothers who smoked during pregnancy, the percentage of infants born from 34 through 36 weeks rose among both women who smoked and those who did not (Figure 8). Nearly 1 in 10 (9.0%) women who reported smoking during pregnancy delivered a late-preterm infant in 2003-2007, an increase of 30.4% from 6.9% in 1993-1997. The percentage of late-preterm births increased at an even higher rate (36.4%) among women who did not smoke (5.5% to 7.5%).

Figure 8. Late-Preterm Births by Maternal Smoking Status during Pregnancy
West Virginia 1993-1997, 1998-2002, and 2003-2007

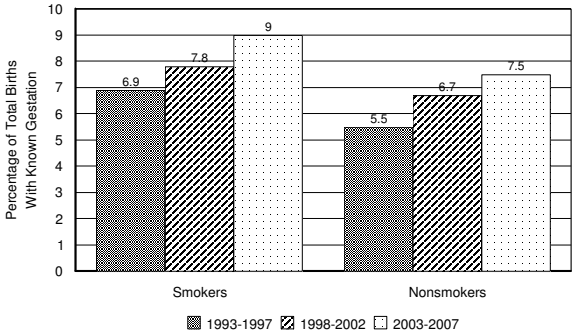
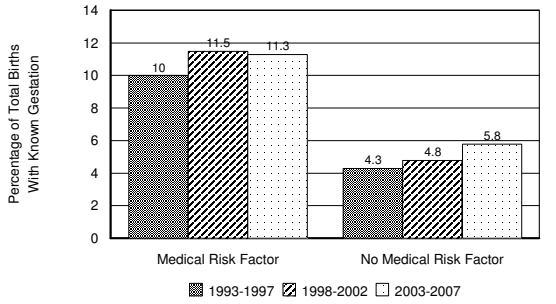


Figure 9. Late-Preterm Births by Maternal Medical Risk Factor Status*
West Virginia 1993-1997, 1998-2002, and 2003-2007

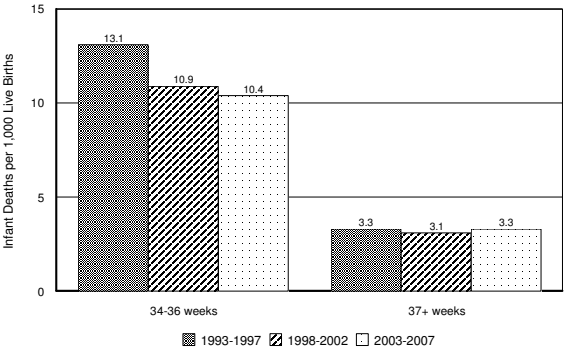


*As noted on the birth certificate

Maternal Medical Risk Factors. Women who had at least one medical risk factor noted on the infant's birth certificate were approximately twice as likely to have a late-preterm delivery as women with no medical risk factors. However, there was an increase in the rate of late-preterm birth among both mothers who had a medical risk factor and those for whom no medical risk factor was noted (Figure 9). The rate among women with no medical risk factors increased 34.9% (4.3% to 5.8%) between 1993-1997 and 2003-2007, compared with a smaller increase of 13.0% (10.0% to 11.3%) among women with at least one medical risk factor.

Infant Mortality. The infant mortality rate among late-preterm infants was approximately fourfold that of infants born at 37 weeks or more in 1993-1997 (Figure 10). The gap in the infant death rate between late-preterm and term infants closed slightly in 1998-2002 and 2003-2007. While the infant mortality rate among term infants showed no change between 1993-1997 and 2003-2007, the rate among late-preterm infants decreased by 20.6%, from 13.1 infant deaths per 1,000 live births in 1993-1997 to 10.4 in 2003-2007.

Figure 10. Infant Death Rates for Late-Preterm (34-36 weeks) And Term (37+ weeks) Infants
West Virginia 1993-1997, 1998-2002, and 2003-2007



Discussion. An examination of West Virginia birth certificate data showed a marked increase since 1993 in the rate of births occurring at 34 through 36 weeks of gestation. The rate of Cesarean delivery among late-preterm births increased at a faster pace than that among other births over the study period. An increase in late-preterm deliveries was found regardless of maternal age, educational attainment, trimester of initiation of prenatal care, or smoking status during pregnancy. The increase in percentage of late-preterm births was greater among white mothers than African American mothers. The rate of increase was greater among women with no maternal medical risk factors than among those with at least one medical risk factor noted on the birth certificate. While the infant mortality rate has declined among late-preterm infants, it still far exceeds that among term infants.

The risks associated with births occurring at 34 through 36 weeks of gestation noted at the beginning of this paper are concerning. The fact that the rate of these births has increased substantially in West Virginia over the past 15 years causes even greater concern. In addition, a recent study published in the *New England Journal of Medicine* suggests that elective Cesarean deliveries occurring even later, at 37 and 38 weeks of gestation, also face increased health risks for the infant.[4] The study, which analyzed 13,258 elective Cesarean sections performed at 37 and 38 weeks between 1999 and 2002 on women who had no reported maternal medical risk factors, found an increased occurrence of respiratory problems among these infants compared with infants born at 39 weeks, as well as higher risks of infections, five or more days of hospitalization, and a need for cardiac resuscitation. According to the American College of Obstetricians and Gynecologists, "elective c-sections should occur at 39 weeks or later if no medical concerns are present for the woman or infant."

The birth certificate data presented in this brief confirm a growing problem of late-preterm births in West Virginia, pointing to a need for a more comprehensive examination of these births. The emerging evidence of problems with infants delivered by elective Cesarean sections at 37 and 38 weeks needs to be examined among West Virginia births as well. Additional sources such as hospital discharge data, data gathered by the Pregnancy Risk Assessment Monitoring System, birth score data, and data from early childhood intervention programs could provide valuable information on the range of problems and costs to the state associated with these births.

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[4] http://www.medicalnewstoday.com/articles/134874.php.