

# West Virginia 1998 Pregnancy Nutrition Surveillance Summary

This report summarizes selected indices of nutritional status, received from every regional WIC Program in West Virginia, as contributors to a program of nutrition surveillance in West Virginia



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## SUMMARY

Maternal health behaviors, including nutrition practices, contribute to pregnancy outcome and maternal and infant well-being. The leading causes of low birthweight, infant morbidity, and infant mortality are closely associated with behavioral choices. Nutrition-related factors that affect maternal and infant health include maternal prepregnancy weight, weight gain during pregnancy, anemia, and infant-feeding method. Other influential behavioral factors include alcohol use, tobacco use, and time of entry into prenatal care. Research shows participation in food assistance programs, such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC program) has a positive effect on pregnancy outcome. In addition, birthweight is affected by many sociodemographic factors, including maternal race or ethnicity, socioeconomic status, age, and marital status.

Few national data are continuously collected on the distribution of these factors among pregnant women in the general population. The CDC Pregnancy Nutrition Surveillance System (PNSS) has monitored behavioral and nutritional risk factors among low-income pregnant women enrolled in public health programs in participating states since 1979. This report presents 1998 data for West Virginia. In 1998, all areas of the state participated in the surveillance system and contributed over 15,000 records. Data were complete for many data elements, but incomplete for others such as smoking status, alcohol use, and infant-feeding practices. Caution is recommended in interpreting the results for these data elements.

In the 1998 West Virginia PNSS, 25.9% of mothers were teenagers. About 84% of mothers enrolled in the WIC program while pregnant; the proportion entering the program in the first trimester was 42%. Prepregnancy body mass index (BMI) was assessed for each pregnant woman; the prevalence of overweight (BMI>26.0) was about 41%. About 16% of women were underweight when they became pregnant, and 25% gained less weight during pregnancy than is recommended. Both of these factors were associated with risk for having a low birthweight infant. In 1998, 3%, 4%, and 17% of women had anemia in the first, second, and third trimesters, respectively. About 34% of women smoked during pregnancy. Rates of maternal behavioral and nutritional risk factors varied by region.

In 1998, 8.8% of infants born to women in the West Virginia PNSS were low birthweight (<2,500 grams) and 9% were high birthweight (>4,000 grams). About 37% of infants were breastfed in the early postpartum period.

A comparison of the West Virginia PNSS 1998 data with the Healthy People 2010 national health objectives shows that the objective for decreasing the incidence of very low birthweight babies is close to being met in the PNSS population. However, to achieve objectives pertaining to teenage pregnancy, overweight among women aged 20 years or older, prevention of anemia among low income women in the third trimester, smoking abstinence during pregnancy, decreased incidence of low birthweight, and increased breastfeeding, concerted efforts are needed to convey nutrition and health promotion messages and to strengthen delivery of support services.

## INTRODUCTION

### Features of the System

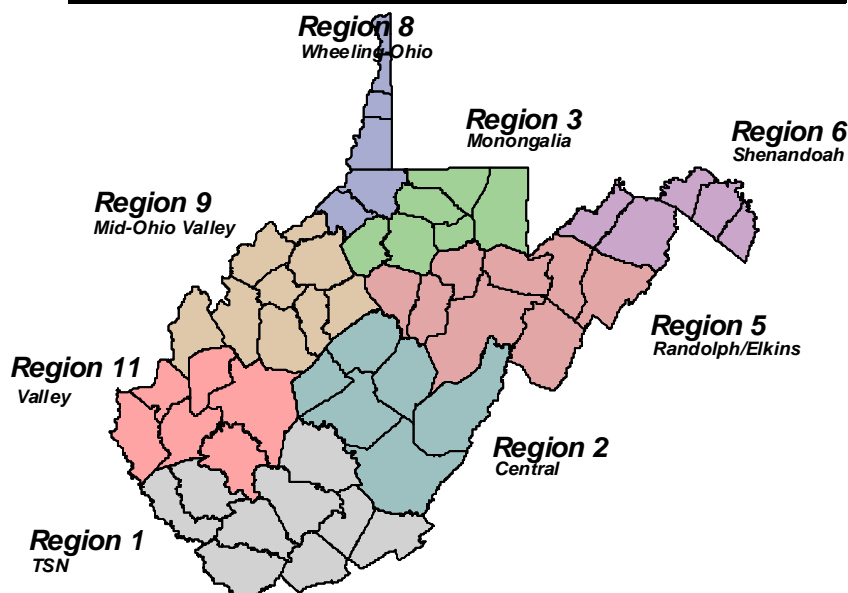
The CDC Pregnancy Nutrition Surveillance System (PNSS) monitors the prevalence of nutrition problems and behavioral risk factors among women at risk for adverse pregnancy outcomes who are enrolled in public health programs in participating states and tribal governments. The PNSS collects prenatal and postpartum information about these women and outcome information about their infants. This data is contributed by public health programs (such as the Special Supplemental Nutrition Program for Women, Infants, and Children [WIC program] and prenatal clinics funded by the Maternal and Child Health Services Block Grant to state or tribal governments, which in turn aggregate the data and submit it to CDC quarterly. Women in these programs are low income women. In West Virginia, the WIC Program contributes 100% of the PNSS data.

The demographic data collected includes maternal birth date, race or ethnicity, marital status, and educational level. Information about monthly income, household size, and participation in food and medical assistance programs (e.g., Food Stamp Program or Medicaid) is collected as well. Other data collected includes mother's height and pre-pregnancy weight, hemoglobin level, total weight gain during pregnancy, parity, and estimated initiation of prenatal care. Information is collected on smoking and alcohol consumption three-months before, during, and after pregnancy. Data collected about infants includes date of birth, birthweight, number of siblings during same birth, sex, status at birth and at the postpartum visit, breastfeeding status, and age at introduction to formula (1).

During 1998, all eight WIC Local Agencies (regions) participated in the West Virginia PNSS. (Figure 1). Nationwide, 21 states, a US Territory, and two tribal governments participated in the PNSS. An additional six to eight states, several U.S. territories, and three to four tribal governments have since begun implementing the PNSS.

FIGURE 1

#### WV WIC Local Agencies - Regions of Coverage



In 1998, 15,225 surveillance records were included in the West Virginia PNSS (Table 1). The WIC program, which contributed all of the records in 1998, has consistently been the primary source of surveillance records nationwide.

**TABLE 1. Number of records in the 1998 West Virginia PNSS, by region**

<b>WV Regions</b>	<b>Total Records</b>
Region 1	3,194
Region 2	1,066
Region 3	1,942
Region 5	1,113
Region 6	1,339
Region 8	1,275
Region 9	1,692
Region 11	3,604
WV TOTAL	15, 225
ALL STATES	650,927

CDC generates a series of annual tables for each state agency or tribal government that summarize nutritional status and behavioral risk factors by age and race or ethnicity. Additional tables are produced for participating regions, counties and clinics. This data provides state and community health professionals information for program planning and intervention.

### **Limitations of the System**

The criteria for eligibility differs among public health programs, and data collection methods differ among health clinics. Consequently, the quantity and quality of data between states differ substantially among variables in the PNSS. Some women who are served by programs while pregnant cannot be served postpartum because of enrollment policies. Some women move into or out of a service area while pregnant (2). In addition, because women come to clinics at different times during and after their pregnancies, information is not always available for the complete pregnancy of all women. In West Virginia, some variables specific to pregnancy are only collected for pregnant women, so that women who solely participate in WIC postpartum cannot be included in the analysis of those variables. These variables include the estimated delivery date, the mother's pre-pregnancy weight, the mother's smoking status, and the date her medical care began. About 15% of records were missing this information. Fortunately, in 1998, about 75% of West Virginia PNSS records included both prenatal and postpartum data.

CDC evaluates the quality of the data submitted, and also evaluates the quantity of missing data. In 1998, West Virginia had missing data in significant percentages for the following variables: the mother's number of previous pregnancies (about 35%), the mother's number of previous live births, and the date her last pregnancy ended (about 45% each). The effect of the missing data on the results was not assessed; however, bias may have been introduced. Consequently, care must be taken in interpreting some data results for the variables noted above.

Other factors that can affect estimates include changes in the number of regions or counties consistently reporting data to the system and variability in program enrollment criteria between years. West Virginia's reporting regions have remained stable for many years, but such factors affect estimates between states. Because not all low-income women participate in programs that contribute data to the PNSS, this system does not represent all low-income women in West Virginia or in other participating states. Because many states do not participate in the PNSS, the "national" data do not reflect all such women in the United States, at least in part due to large demographic and other differences between states (4).

When using PNSS data to assess progress in achieving Healthy People 2010 national health objectives, limitations of the system must be considered, but the estimates are nonetheless useful. Although the objectives are for the general U.S. population, a rigorous test of the nation's and of the state's progress in maternal and child health is in the achievement of objectives in populations at risk for poor pregnancy outcome and infant morbidity.

Throughout the report, PNSS rates are also compared with similar indices from other data sources to illustrate differences between the PNSS population and the general U.S. maternal population. Estimates of key indicators, such as low birthweight and maternal smoking, are comparable between the PNSS and other sources (3).

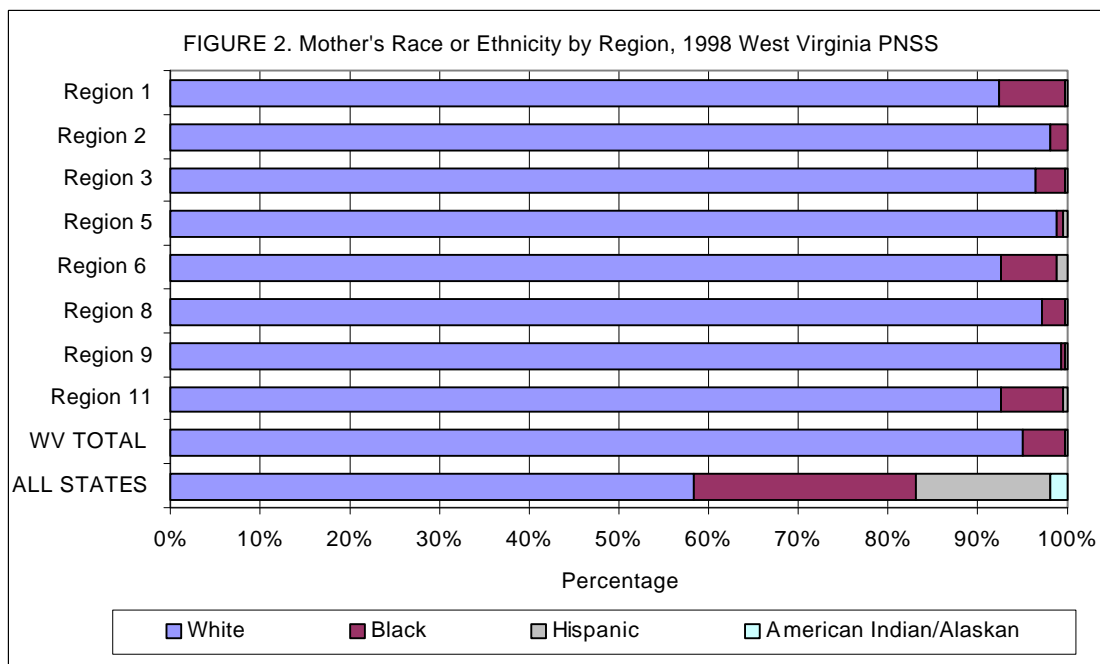
## REGION RESULTS

### Maternal Demographic Characteristics

The main demographic variables influencing pregnancy outcomes are race or ethnicity, maternal age, marital status, education, and socioeconomic status (6).

#### ***Race or Ethnicity***

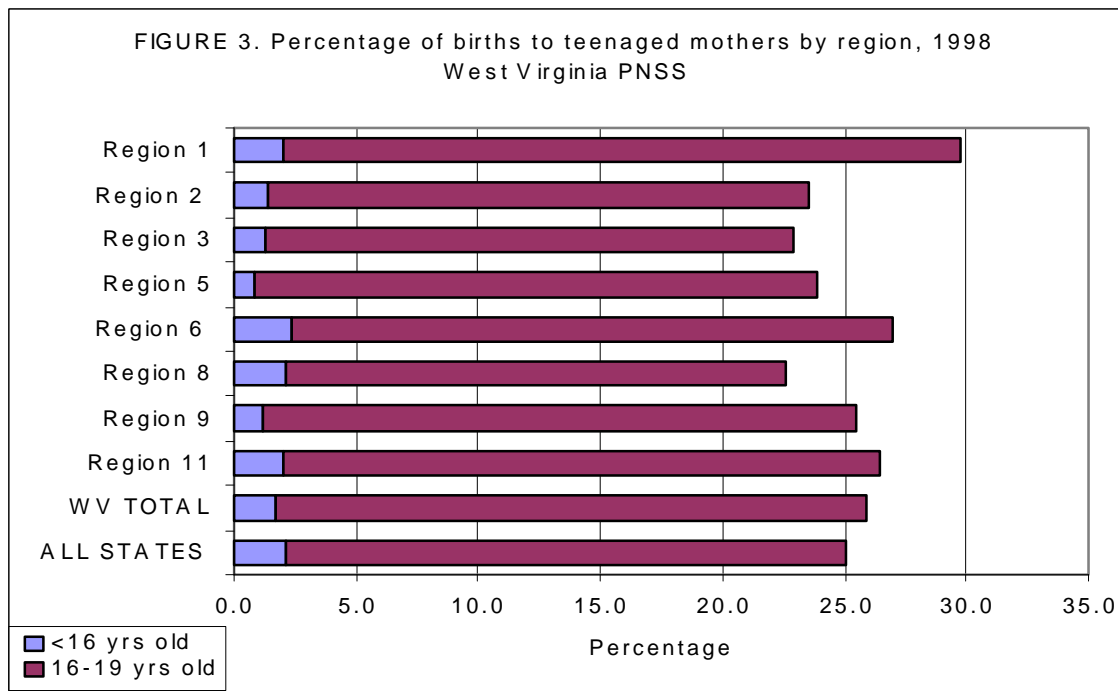
In 1998, 94.6% of women in the West Virginia PNSS were white, 4.6% black, 0.3% Hispanic, 0.2% Asian or Pacific Islander, 0.1% American Indian, and 0.3% of all other or unspecified race or ethnicity (Figure 2). Data for racial or ethnic groups other than white or black are in insufficient numbers in West Virginia to allow analysis, and will not be presented in this report.



Nationally, fifty-four percent of women participating in the system were white, 24% black, 17% Hispanic, 2% Asian or Pacific Islander, 1% American Indian, and 1% of all other or unspecified race or ethnicity. The proportion of white women (94.6%) is higher and the proportion of black women (4.6%) is lower in the 1998 West Virginia PNSS than in the general population of all U.S. women who gave birth in 1998 (79% and 15%, respectively) (8).

## Age

In 1998, 25.9% of all mothers in the West Virginia PNSS were teenagers, and most of these mothers were aged 16-19 years. The percentage of births to teenage mothers ranged from about 23% in Region 8 to about 30% in Region 1. (Figure 3).



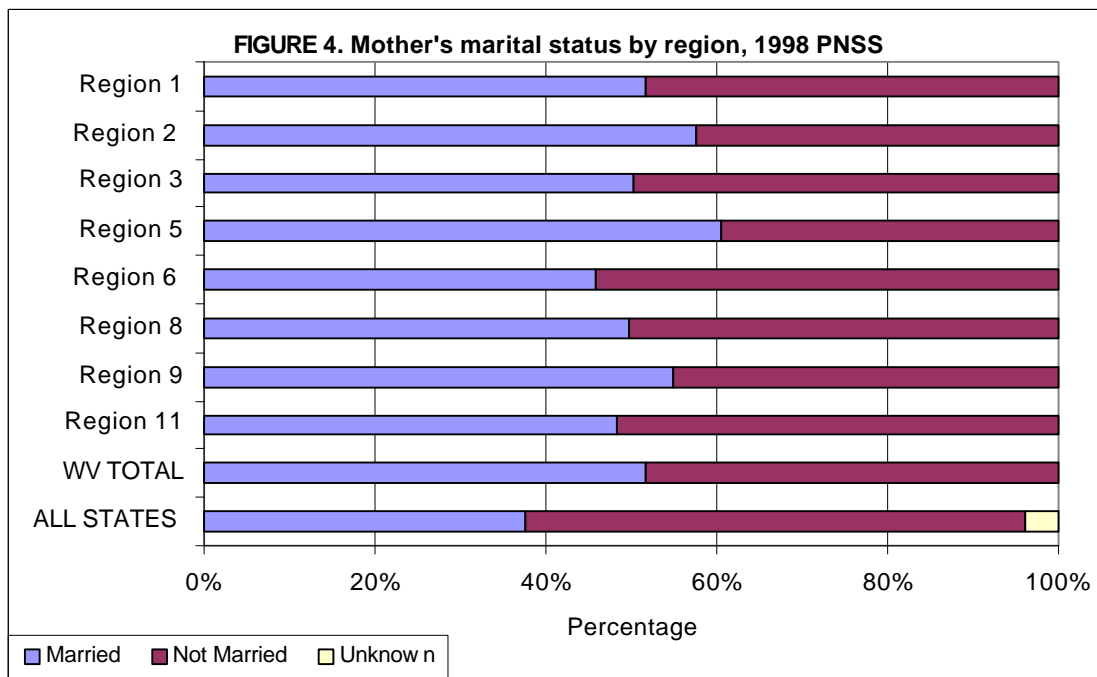
Nationally, about 25% of PNSS mothers participating in the system were teenagers. By contrast, about 12.5% of all women in the United States who gave birth in 1998 were aged 19 years or less, and about 4.6% were aged 17 years or less (8). West Virginia statistics for the general population for 1998 show that 15.5% of births in West Virginia were to teenagers (51). The Healthy People 2010 health objectives for the nation call for a reduction in teenage pregnancies to no more than 4.6 percent among girls aged 17 or younger (9).

Sixty-one percent of women in the 1998 West Virginia PNSS were 20-29 years of age, 12% were 30-39 years, and 1% were 40-49 years. Because this oldest age group has so few numbers, results will not be presented.

► **Almost 26% of all mothers in the 1998 West Virginia PNSS were teenagers.**

## Marital Status

In the 1998 West Virginia PNSS, 48.4% of mothers were unmarried and 51.6% were married (Figure 4). Data varied by region, about 54% of mothers were unmarried in region 6, and about 40% were unmarried in region 5.



For comparison, 58% of PNSS women in all states participating in the system were unmarried, and 33% of all U.S. women who gave birth in 1998 were unmarried (8). Of all West Virginia women who gave birth in 1998, 30% were unmarried (51).

► **Forty-eight percent of all mothers in the 1998 West Virginia PNSS were unmarried.**

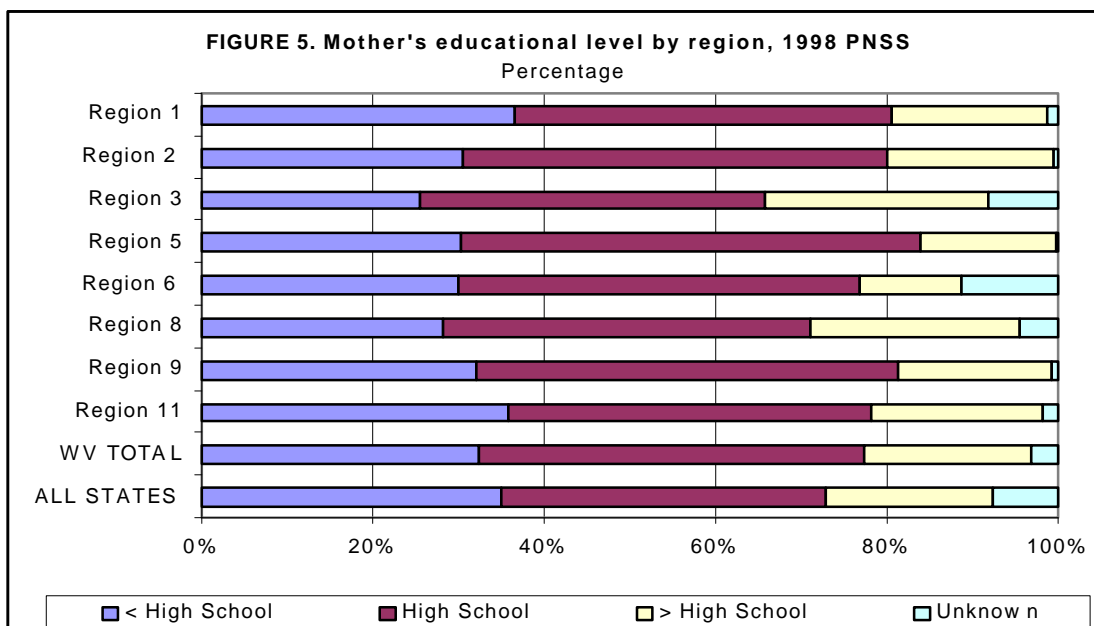
## Education

Mother's level of education can be used as a proxy for socioeconomic status (6). Twenty-two percent of all U.S. women who gave birth in 1997\*\* had less than a high school education (7), and 35% of PNSS women in all states participating in the system had less than a high school education.

\*\* Data not available for 1998.



In the 1998 West Virginia PNSS, this proportion was 32.4% (Figure 5), ranging from 25.5% in region 3 to more than 36% in region 1.



- ▶ **Thirty-two percent of all mothers in the 1998 West Virginia PNSS had less than a high school education.**

## Maternal Behavioral and Nutritional Risk Factors

### *Prenatal Care*

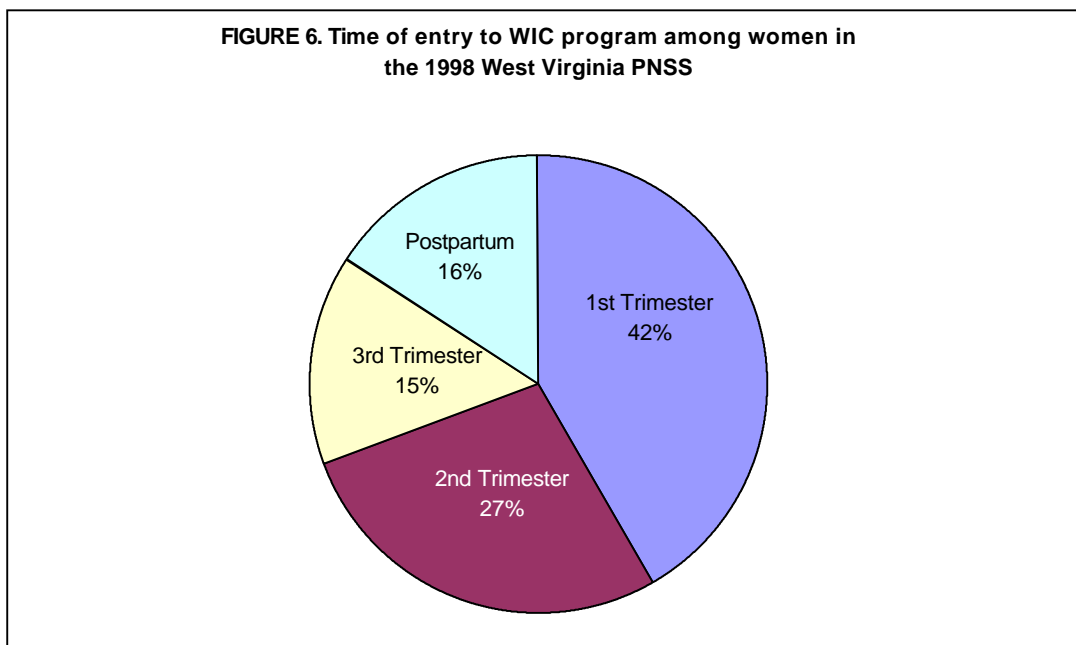
The quality, quantity, and timing of prenatal care influence pregnancy outcome. Inadequate care substantially increases a woman's risk for poor pregnancy course and outcome. Lack of prenatal care is closely associated with other risk factors, such as teenage birth, low income, and substance abuse. The earlier prenatal care is begun, the less likely a woman is to have a low birthweight infant (10). The Healthy People 2010 national health objectives call for 90% of pregnant women to initiate prenatal care in the first trimester (9).

For women for whom PNSS contained a pregnancy record, 85% of women in the 1998 West Virginia PNSS reported having begun prenatal care in the first trimester, 9.1% in the second trimester, and 1.2% in the third trimester. Four percent reported no prenatal care. Teenagers were less likely than older women to begin prenatal care in the first trimester, and white women were more likely to begin prenatal care in the first trimester than women of other races or ethnicities. Women who enter the WIC program late in pregnancy are likely to enter prenatal care late in pregnancy. Because timing of WIC entry among pregnant women varies by state, prenatal care rates not adjusted for time of entry are not comparable among states. Among regions in West Virginia, entry into prenatal care in the first trimester ranges from 82.1% in region 8 to 88.7% in region 5.

## Entry to WIC Program

Dietary intake and prenatal weight gain are better for women who enroll in the WIC program than for those who do not (11,12). Participants are more likely than nonparticipants to receive prenatal care early and their infants are less likely to be premature and low birthweight. All benefits are most apparent for women who enroll early in pregnancy (11,12).

Nearly 42% of women in the 1998 West Virginia PNSS enrolled in the WIC program during their first trimester, 27.4% in their second trimester, and over 14% in their third trimester or after delivery (Figure 6). Patterns of enrollment also varied by region (Table 2).



**TABLE 2. Timing of women's enrollment in the WIC program by region, 1998 West Virginia PNSS**

Region	1 <sup>st</sup> Trimester	2 <sup>nd</sup> Trimester	3 <sup>rd</sup> Trimester	Postpartum
Region 1	44.8	27.5	14.2	13.5
Region 2	46.5	24.8	14.5	14.2
Region 3	37.7	30.1	15.8	16.4
Region 5	45.9	26.2	11.4	16.5
Region 6	32.2	29.6	19.1	19.1
Region 8	40.6	25.9	16.1	17.4
Region 9	48.3	23.5	12.9	15.3
Region 11	39.4	28.6	15.4	16.6
WV TOTAL	41.8	27.4	14.9	15.9
ALL STATES	25.5	27.7	20.2	26.4

Enrollment rates among PNSS women in all participating states were 25%, 28%, 20% and 26% for the first, second, and third trimesters, and early postpartum period, respectively.

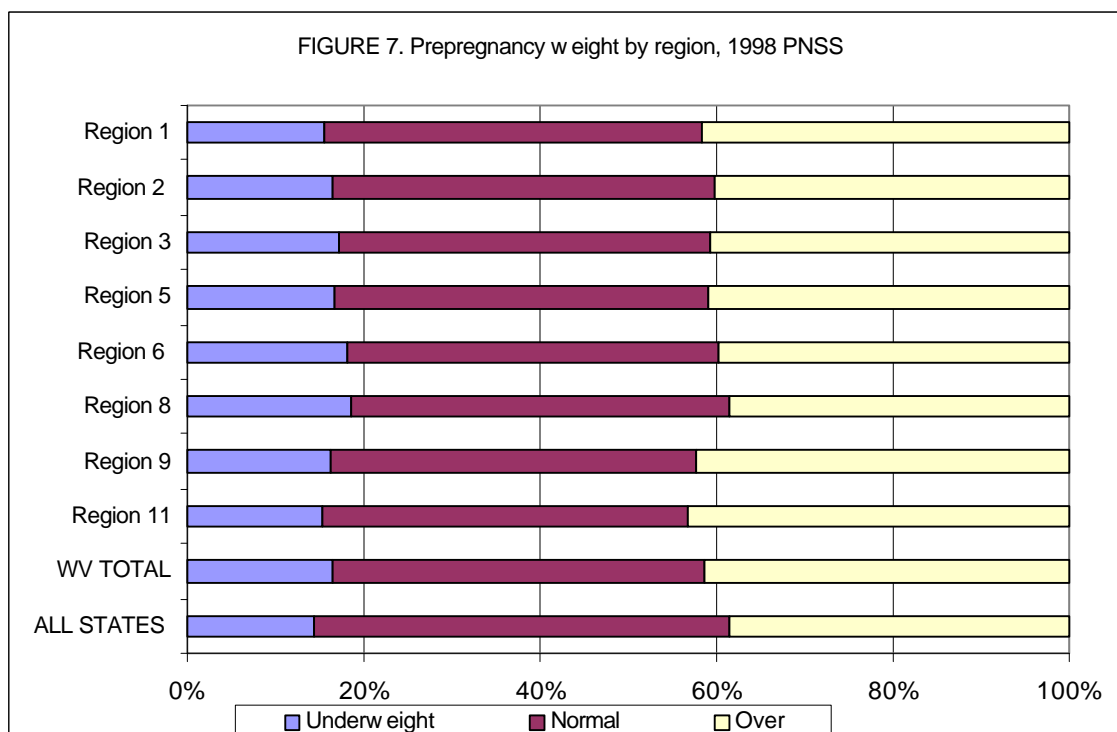
- ▶ **Over 41% of women in the 1998 West Virginia PNSS enrolled in the WIC program during their first trimester.**
- ▶ **70% of women enrolled during their first or second trimesters.**

### ***Prepregnancy Weight Status***

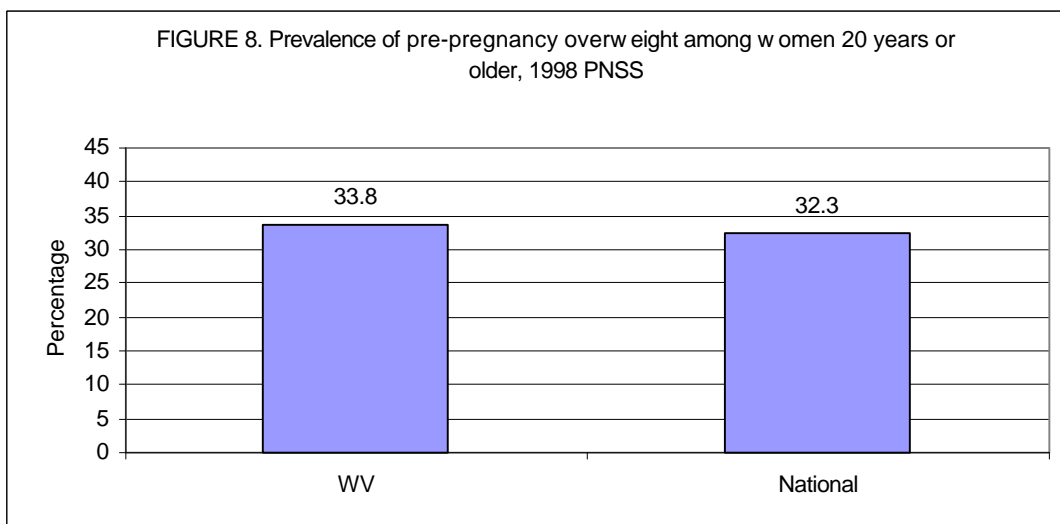
Prepregnancy weight is a major determinant of infant birthweight. Studies suggest a strong association between prepregnancy underweight and having a low birthweight baby (13). Overweight women are at increased risk for pregnancy-induced hypertension and gestational diabetes. These women are also more likely to deliver by cesarean section and to have a high birthweight infant (14).

A body mass index (BMI) was calculated for each woman in the 1998 PNSS. BMI was based on measured height and weight. Women were classified by the Institute of Medicine's BMI categories: underweight, <19.8; normal weight, 19.8-26.0; overweight, 26.1-29.0; very overweight, >29.0 (15). For this report, women in the overweight and very overweight categories were combined.

Sixteen percent of women in the 1998 West Virginia PNSS were underweight, 42% were normal weight, and 41% were overweight. Rates of underweight ranged from 15.3% for women in region 11 to 18.7% in region 8. (Figure 7).



The prevalence of overweight among women aged 20 years or older (33.8) exceeded the year Healthy People 2000 target of 25% (Figure 8) (52). The 2010 objectives for adults aged 20 and over sets a target of no more than 15% for obesity (BMI >30); in the West Virginia PNSS, 24% of women are very overweight (BMI > 29). A further 2010 objective sets a target for 60% of adults to fall in the normal BMI category; in the West Virginia PNSS, only 42% of women reported a comparable pre-pregnancy weight of normal. (9)



Trends of increasing mean BMI among women in the United States have been reported (16,17). The percentage of women in each weight category in the West Virginia PNSS varied by ethnicity and age. Women who were white or under 20 years of age were more likely to be underweight. Women who were black or over 29 years of age were more likely to be overweight (Table 3).

**TABLE 3. Percentage of women by prepregnancy weight status, ethnicity and age, 1998 West Virginia PNSS**

	Pre pregnancy weight status		
	Under weight	Normal weight	Over weight
<b>Ethnicity</b>			
White	16.5	42.2	41.3
Black	13.1	39.3	47.6
<b>Age</b>			
< 16 years	27.3	58.3	14.4
16 - 19	23.0	48.8	28.3
20 - 29	14.4	40.1	45.5
30 - 39	6.7	48.3	53.1

Caution is needed in interpreting prepregnancy weight status, which is based on self-reported prepregnancy weight data that may be biased (18). For example, overweight women are more

likely than underweight women to underestimate their prepregnancy weight. Similar patterns of under-reporting of past weight have been reported among nonpregnant women as well (19).

- ▶ **In the 1998 West Virginia PNSS, 16% of women were underweight and over 41% were overweight before pregnancy.**
- ▶ **The proportion of overweight women aged 20 years or older in the 1998 PNSS (33.8) exceeded the Healthy People 2000 target (25%).**
- **Mothers who were white or young were more likely than other mothers to be underweight.**

### ***Gestational Weight Gain***

The Institute of Medicine recommends prenatal weight gain as follows: 28-40 pounds for underweight women, 25-35 pounds for women of normal weight, and 15-25 pounds for overweight women (15).

Women who gain less than ideal weight during pregnancy are at increased risk for preterm birth and delivery of a low birthweight infant; women who gain more than ideal weight are at increased risk for delivery of a high birthweight infant. Women who gain excess weight may also have a difficult delivery and difficulty returning to their prepregnancy weight after delivery (15).

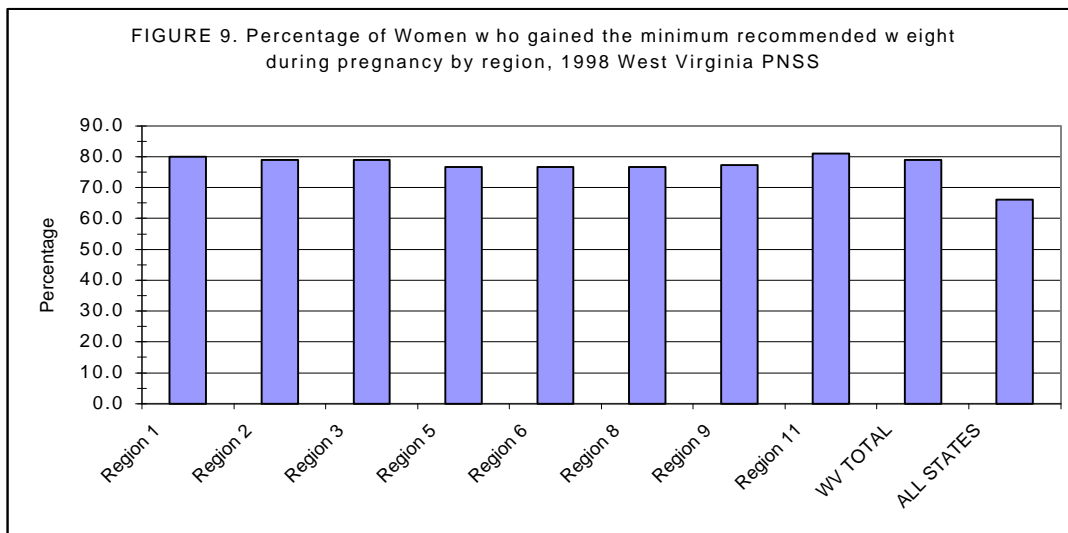
For women in the 1998 West Virginia PNSS, about 20% of women gained less weight during pregnancy than is recommended, about 48% gained the recommended amount, and about 32% gained more weight than is recommended. Rates among PNSS women in all states participating in the system were 32%, 40% and 28% respectively.

White women were likely to gain more weight than recommended. Women in the older age groups were more likely than younger women not to gain adequate weight (Table 4).

**TABLE 4. Percentage of women by gestational weight gain, ethnicity and age, 1998 West Virginia PNSS**

	<b>Gestational Weight Gain</b>		
	<b>Less than recommended</b>	<b>Recommended</b>	<b>More than recommended</b>
<b>Ethnicity</b>			
White	20.0	47.9	32.0
Black	21.0	53.6	25.3
<b>Age</b>			
< 16 years	16.9	29.9	53.1
16 - 19	17.9	41.2	40.8
20 - 29	20.3	50.1	29.4
30 - 39	23.7	55.9	20.2

The year 2000 objectives called for an increase to 85% in the proportion of women who gain the minimum recommended weight during pregnancy (52). About 79% of women in the 1998 West Virginia PNSS gained the minimum amount, but the objective was not achieved in the PNSS population in any region (Figure 9). For 2010, this is a developmental objective, with no target figure set (9).



Caution is needed in interpreting gestational weight gain because, like prepregnancy weight status, the results are based on self-reported data that may be biased.

- ▶ **Nearly 80% of women in the 1998 West Virginia PNSS gained the minimum recommended amount of weight during pregnancy, but the year 2000 goal was 85%.**
- ▶ **34% of women in the PNSS gained less than recommended weight during pregnancy and were at risk for preterm birth and delivery of a low birthweight infant.**
- ▶ **Over 27% of women in the PNSS gained more than recommended weight during pregnancy and were at risk for delivery of a high birthweight infant.**

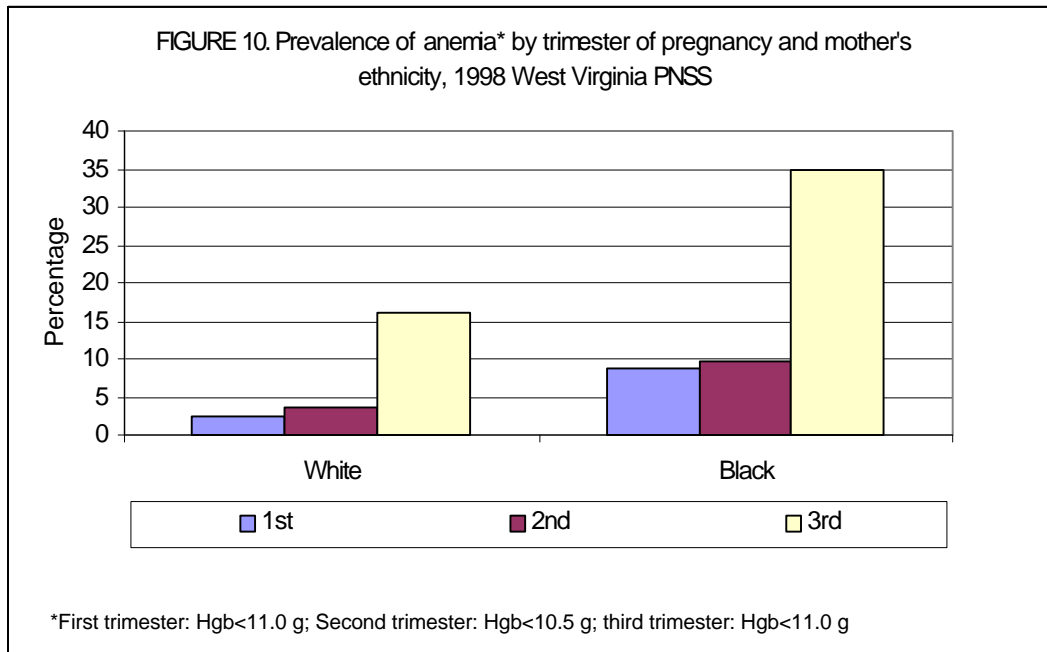
## Anemia

The most common nutritional deficiency during pregnancy is iron deficiency. Less than half of nonpregnant women have iron stores adequate to meet their requirements should they become pregnant. In addition, the high iron requirements during pregnancy are difficult to meet by dietary sources; hence, iron supplementation is required (20). Because of poor compliance (related to side effects) or late enrollment in prenatal care, many women do not receive adequate iron (15). Iron deficiency anemia during the first two trimesters of pregnancy has been associated with inadequate gestational weight gain, a twofold risk for preterm delivery, and a threefold risk for delivering a low birthweight infant (21).

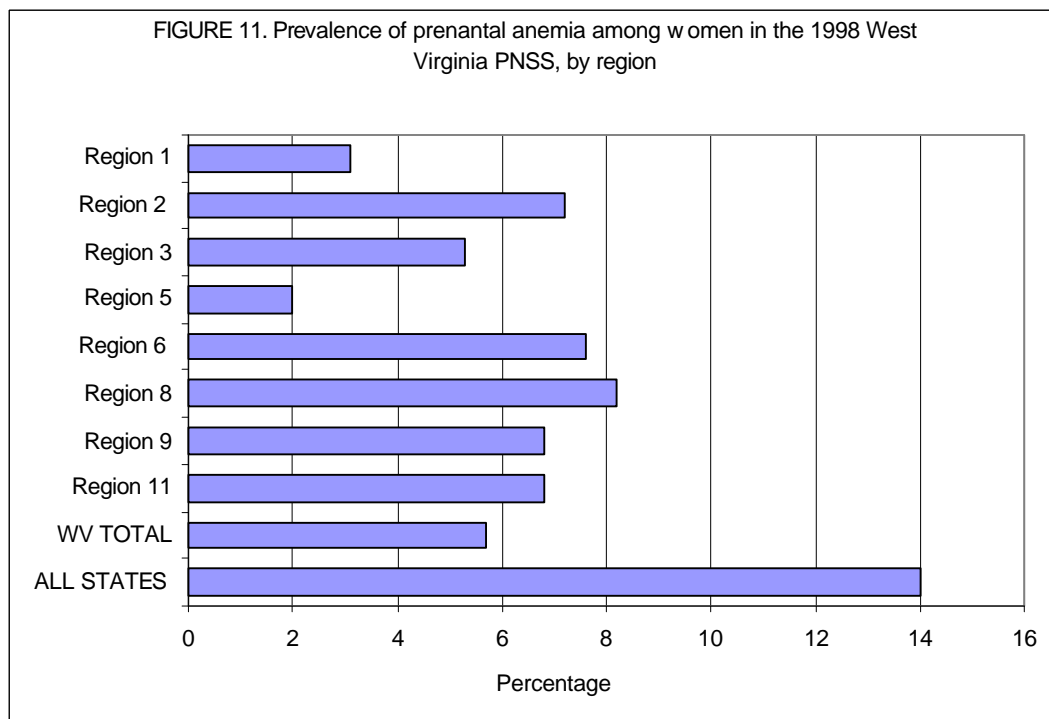
Anemia, defined by a low hemoglobin (Hgb) and/or low hematocrit (Hct) level, is an indicator of iron deficiency. The CDC reference criteria for anemia during pregnancy are as follows: first trimester, Hgb <11.0 g/dL or Hct <33%; second trimester, Hgb <10.5 g/dL or Hct <32%; third trimester, Hgb <11.0 g/dL or Hct <33% (22).

In the 1998 West Virginia PNSS, 2.8% and 3.8% of women had anemia in the first and second trimesters, respectively. Substantially more women (17.0%) had anemia in the third trimester. This pattern of increasing prevalence of anemia may suggest worsening iron status throughout pregnancy.

In all trimesters of pregnancy, the rate of anemia was higher among teenage mothers than older mothers. The rate was also higher for black women than for women of other racial or ethnic groups (Figure 10). The Healthy People 2000 objectives called for a reduction in anemia to 20% among black, low-income women in the third trimester of pregnancy (52). This objective is far from being met in the 1998 PNSS population: 35% of black women had anemia during the third trimester. Although rates are lowest for white women, 17% had anemia in the third trimester. The third-trimester rates are for women who enrolled in the WIC program during their third trimester and are therefore likely to have entered prenatal care late in pregnancy.



Rates of prenatal anemia (first, second and third trimesters combined) ranged from 2.0% in some regions to 8.2% in others (Figure 11).

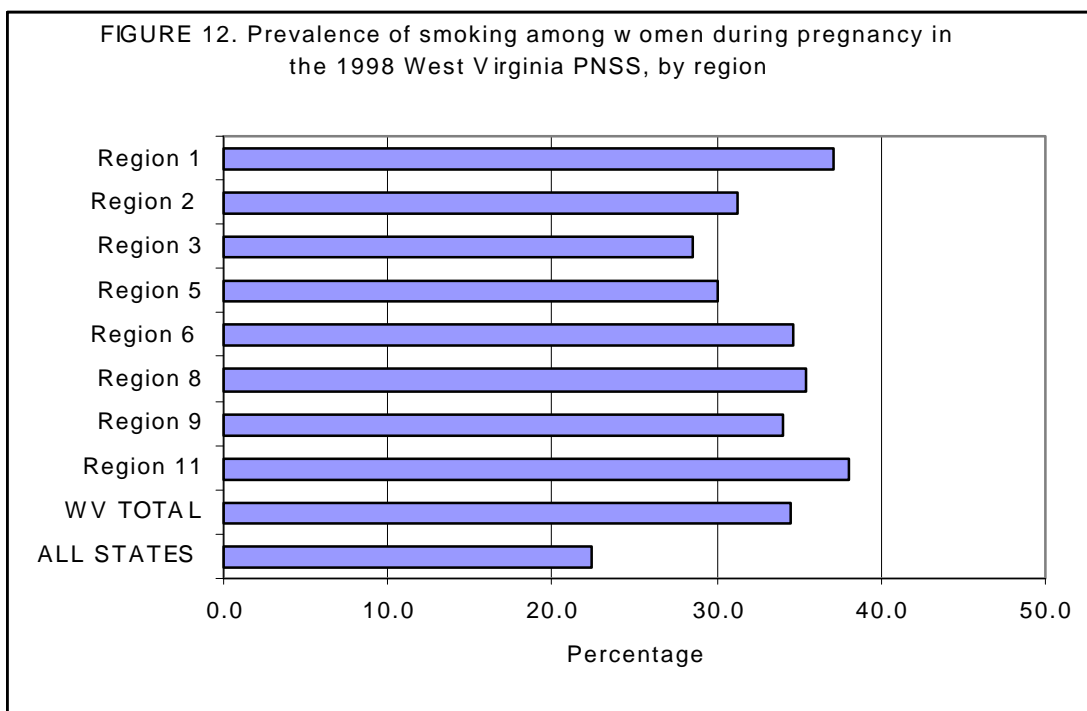


The Third National Health and Nutrition Examination Survey (NHANES III) found that iron deficiency is more common among women who are of racial or ethnic minority groups, are poor, have less than a high school education, or who have had two or three prior pregnancies (23). Most women in the PNSS meet one or more of these criteria. No change in the prevalence of iron deficiency or iron deficiency anemia among young women is evident in NHANES data for the past 18 years (23).

- ▶ ***About 3%, 4%, and 17% of women in the 1998 West Virginia PNSS had anemia in the first, second, and third trimesters, respectively.***
- ▶ ***The pattern of increasing prevalence of anemia as pregnancy progresses may suggest worsening iron status throughout pregnancy.***
- ▶ ***The year 2000 national health objectives called for reducing anemia among low-income black women in the third trimester of pregnancy to at least 20%, but the prevalence was 35% in the 1998 PNSS.***

### ***Cigarette Smoking***

If all pregnant women stopped smoking, the number of fetal and infant deaths could be reduced by about 10% (24). Maternal smoking during pregnancy doubles the risk of delivering a low birthweight infant and is a contributing factor in 20% to 40% of low birthweight infants born in the United States (25). Maternal smoking doubles the risk for sudden infant death syndrome and increases the risk for spontaneous abortion (26,27). Smoking by women over 25 years of age is associated with a higher incidence of preterm delivery, when compared with smoking by women aged 25 years or younger (28). Passive smoke exposure among pregnant women who do not smoke may increase the risk of having a low birthweight infant (29). Further, the effect of smoking during pregnancy on birthweight depends not only on the number of cigarettes smoked but also on the tar, nicotine, and carbon monoxide yield of the cigarettes smoked (30).



About 50% of women in the 1998 West Virginia PNSS reported smoking before pregnancy, and about 34% reported smoking during pregnancy (Figure 12). Of these women, 75% reported smoking less than one-half pack per day, 22% reported smoking one-half to one pack per day,



and about 3% reported smoking more than one pack. By comparison, about 34% of PNSS women in all states participating in the system reported smoking before pregnancy, and 23% during pregnancy.

In the 1998 West Virginia PNSS, the highest prevalence of self-reported smoking during pregnancy was found among white women, women aged 30-39 years, women with a high school education or less, and unmarried women (Table 5).

**TABLE 5. Percentage of women who smoked during pregnancy by ethnicity, age, educational level and marital status, 1998 West Virginia PNSS**

<b>Ethnicity</b>	<b>Percentage of Smokers</b>
White	35.2
Black	21.9
<b>Age</b>	
< 16 years	32.6
16 - 19	35.1
20 - 29	33.9
30 - 39	36.6
<b>Educational Level</b>	
< High School	48.5
High School	30.4
> High School	18.8
<b>Marital status</b>	
Married	29.7
Not married	39.4

Although 21% of records lacked data on smoking before pregnancy, the overall results were comparable with those from other sources. For example, in the 1995 National Health Interview Survey (NHIS), nearly 23% of women reported smoking (31). The prevalence was higher for women aged 25-44 years (nearly 27%), women with 9-11 years of education (about 34%), and women below the poverty level (almost 30%) (31).

The Healthy People 2000 national health objectives called for an increase in smoking cessation during pregnancy so that at least 90% of women abstain from smoking in pregnancy(52). The 2010 objectives call for the rate of abstinence during pregnancy to increase to 98%(9).

► ***Over 50 % of women in the 1998 West Virginia PNSS reported smoking before pregnancy; 34.5 reported smoking during pregnancy.***

## **Alcohol Use**

Prenatal exposure to alcohol is associated with a wide range of infant outcomes, from fetal alcohol syndrome (FAS) to very subtle or no adverse effects. Women who consume more than three ounces of absolute alcohol per day near the time of conception are at highest risk of delivering an infant with FAS (32). Whether lower levels of alcohol consumption and different timing of alcohol use affect the infant is not clear. The critical period of increased risk is near conception and during the first few weeks after conception, when many women do not know they are pregnant (33). Altered brain development and growth retardation in the fetus have occurred when heavy drinking persists into the third trimester. Although structural malformations associated with drinking in early pregnancy are irreversible, reduced drinking by midpregnancy can modify some delays in growth and development (34).

About 75% of records in the 1998 West Virginia PNSS contained information about alcohol use. Underreporting of alcohol use is evident in the PNSS, as in other data sources (35,36). In the 1998 PNSS, 8.6% of women reported drinking during the three months before pregnancy, and 0.1% reported drinking during pregnancy (all trimesters combined). Rates among PNSS women from all states participating in the system were 13.5% and 1.8% respectively. By contrast, in four states participating in the Pregnancy Risk Assessment Monitoring System in 1988 and 1989, 34% to 58% of women reported drinking during the three months before pregnancy, and 7% to 16% reported drinking during the last three months of pregnancy (35). Because of the extent of incomplete information in the PNSS (in contrast to the much higher rates of alcohol use established in other data), the PNSS data on alcohol use are unreliable and therefore not presented.

Although a national estimate is not yet available, alcohol consumption by pregnant women is believed to be declining (37).

- ▶ ***The Healthy People 2010 national health objectives call for 94% of pregnant women to abstain from alcohol, an increase from the 1996-97 baseline data of 86% (9).***

## **Birth Outcomes**

### **High Birthweight**

High birthweight (>4,000 g) can increase an infant's risk for obstetric injury, such as shoulder dystocia (38). One study suggests that high birthweight infants are likely to be taller and heavier than other children throughout childhood (39). Several studies have associated high birthweight with subsequent obesity in children and adults; however, none have controlled for maternal prepregnancy weight (40-42).

In the 1998 West Virginia PNSS, about 9% of infants were of high birthweight, as were 9% of infants born to PNSS women in all states participating in the system.

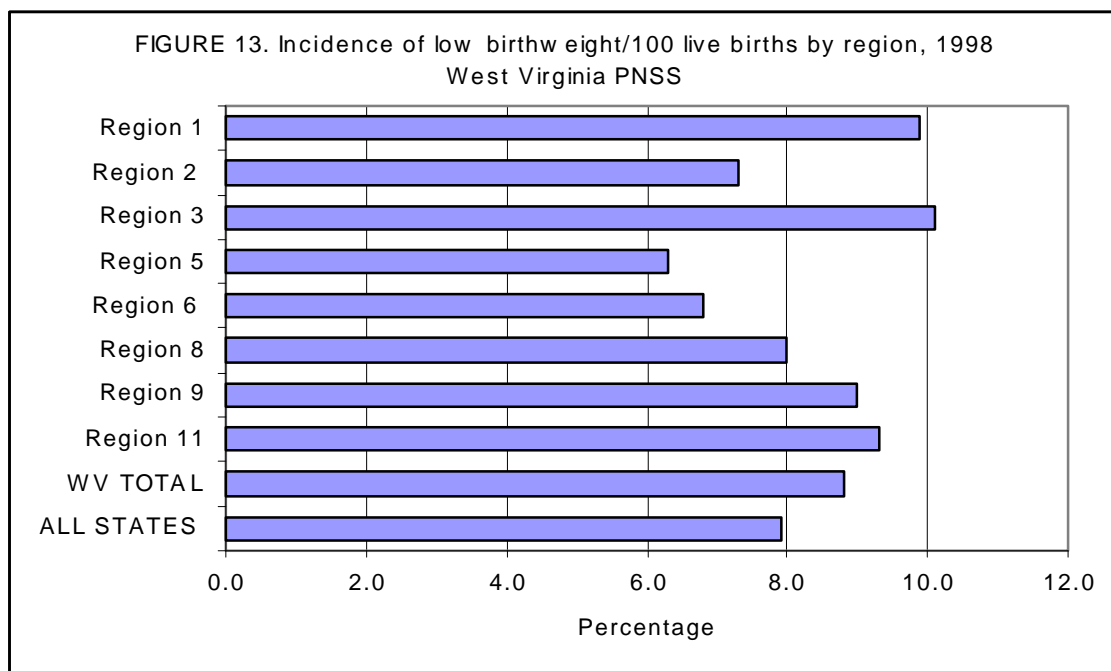
- ▶ ***The rate of high birthweight was nearly 9% in the 1998 West Virginia PNSS.***

## Low Birthweight

Low birthweight (<2,500 g or 5.5 lbs.) is the single most important factor affecting neonatal mortality and is a determinant of postneonatal mortality (53). Infants weighing 2,500 grams or less are almost 40 times more likely to die during their first four weeks of life than are infants of normal birthweight. Low birthweight infants who survive are at increased risk for health problems ranging from neurodevelopmental handicaps to lower respiratory tract conditions (43).

Although the infant mortality rate in the United States declined from 26 per 1,000 live births in 1960 to 8 per 1,000 live births in 1994, the nation ranks behind most industrialized countries on this health indicator (44). Low birthweight is a major determinant of infant mortality in the United States (53). Finding effective ways to prevent low birthweight is important to further reducing infant mortality.

In the 1998 West Virginia PNSS, 8.8% of infants were low birthweight, of which 1.1% were also very low birthweight (<1,500 g). The low birthweight rate ranged from about 6% in region 5 to around 10% in regions 1 and 3. (Figure 13). The low birthweight rate for infants born to PNSS mothers in all states participating in the system in 1998 was 7.7%, and 0.9% were very low birthweight. Of all infants born in the United States in 1998, 7.6% were low birthweight (8). The 1998 West Virginia Vital Statistics reports 8.1% of births were low birthweight (51).



A Healthy People 2010 national health objective seeks to reduce the incidence of low birthweight to no more than 5% of all live births and very low birthweight to no more than 0.9% (9). No region in West Virginia in the 1998 PNSS met the objective for low birthweight. However, the objective related to very low birthweight was almost achieved statewide (1.1%).

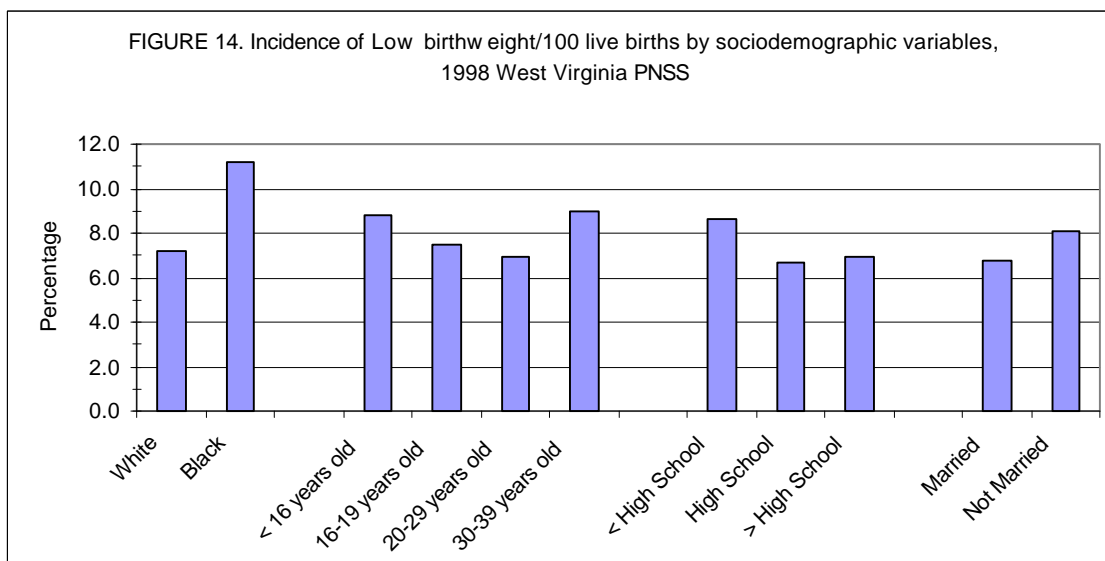
- ▶ ***In the 1998 West Virginia PNSS, about 8.8% of infants were low birthweight, and 1.1% of these were very low birthweight.***
- ▶ ***The Healthy People 2010 objectives call for a reduction in low birthweight to no more than 5% of births and very low birthweight to no more than 0.9% of births.***

## Risk Factors Associated with Low Birthweight

One way to reduce the incidence of low birthweight is to identify women at risk of bearing low birthweight infants and provide them with preventive and therapeutic services. Factors associated with low birthweight include sociodemographic characteristics such as race or ethnicity, age, marital status, and income, as well as nutritional and behavioral factors such as weight gain, smoking, and alcohol consumption (5). The risks for low birthweight are widely distributed throughout the population, and a substantial number of low birthweight infants will continue to be born to women not considered at high risk. These circumstances highlight the need for improved understanding of risk and causation and should not minimize the value of targeting interventions to women at greatest risk (5).

### Demographic factors.

The Healthy People 2000 target for low birthweight was exceeded in the 1998 West Virginia PNSS in all demographic groups (Figure 14). In the United States, race or ethnicity is an important predictor of low birthweight (5). The proportion of low birthweight infants born to black women (about 11%), exceeds that of white women in West Virginia (about 7%). For all states that participate in PNSS, the risk for low birthweight was nearly double for black women (10.2%) than for women of other racial or ethnic groups. Why rates are higher for black women is unclear; further research is needed to improve understanding and prevention efforts (5).



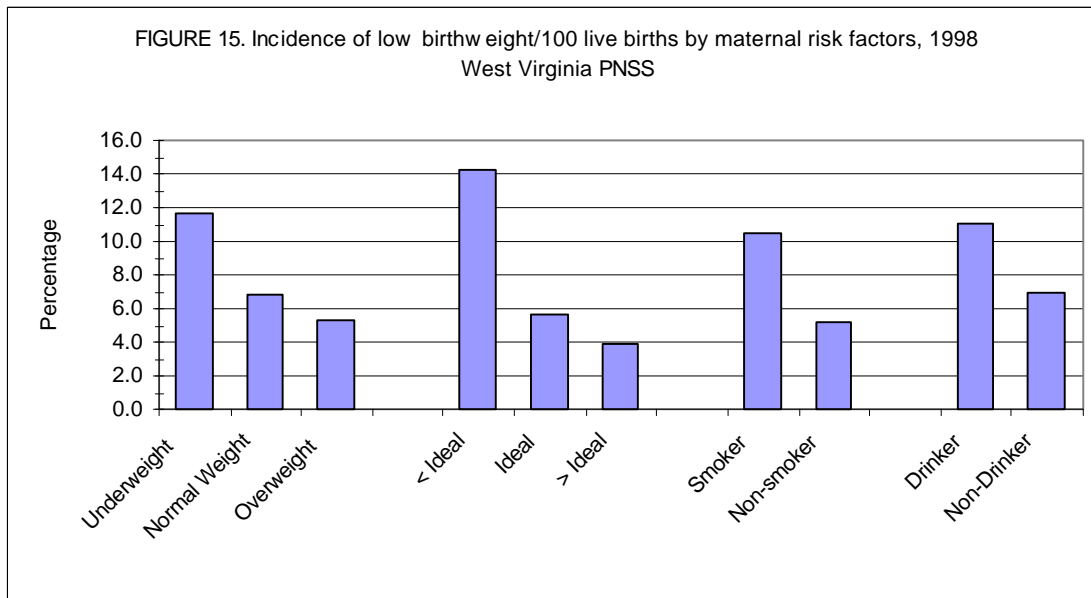
The risk for having a low birthweight infant was higher for women aged 16-19 years, and similarly high for women aged 30-39 years. (Figure 14).

Studies have shown an independent association between socioeconomic status, education, and low birthweight (5). In the 1998 West Virginia PNSS, the risk for low birthweight was highest for mothers having less than a high school education (Figure 14). Unmarried women are also at a consistently higher risk of delivering a low birthweight infant than are women who are married. This finding was true for unmarried women in the 1998 PNSS (Figure 14).

- **Women who were black, were aged less than 16 years or were 30 years or older, had less than a high school education, and were unmarried in the 1998 West Virginia PNSS were at higher risk of delivering a low birthweight infant than were their counterparts.**

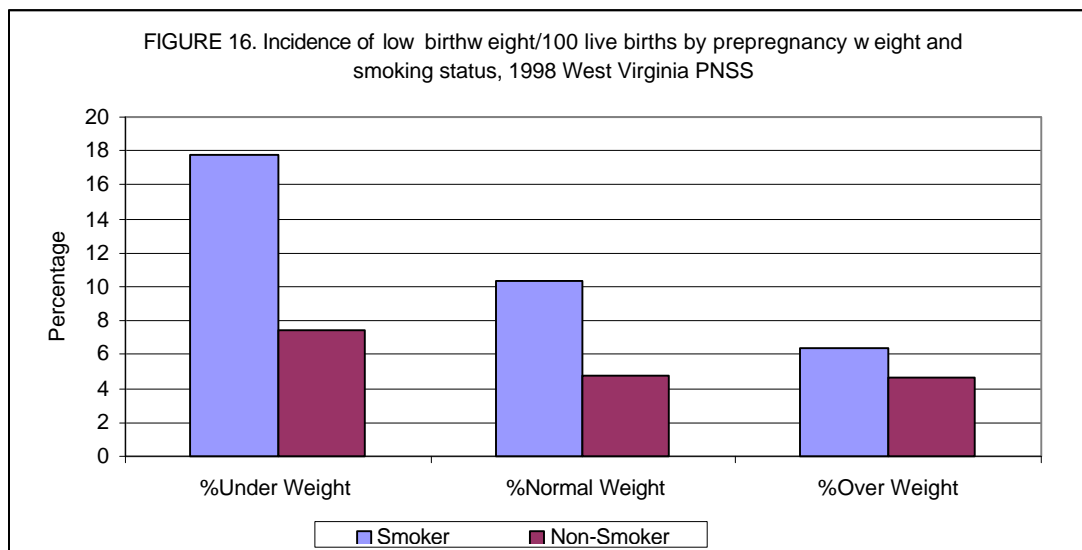
## Nutritional and behavioral factors.

Risk factors for delivering a low birthweight infant include prepregnancy underweight and gaining less weight than recommended during pregnancy (5,45). In the 1998 West Virginia PNSS, the risk of delivering a low birthweight infant was nearly double for both underweight women and women who did not gain adequate weight during pregnancy, when compared with their counterparts (Figure 15).



Babies born to women who smoke during pregnancy weigh, on average, 200 grams less than babies born to comparable women who do not smoke (46). In the PNSS, the incidence of low birthweight was increased among infants born to women who smoked during pregnancy (Figure 15). Although the quality of data on alcohol consumption during pregnancy was poor, this behavior was also associated with low birthweight (Figure 15).

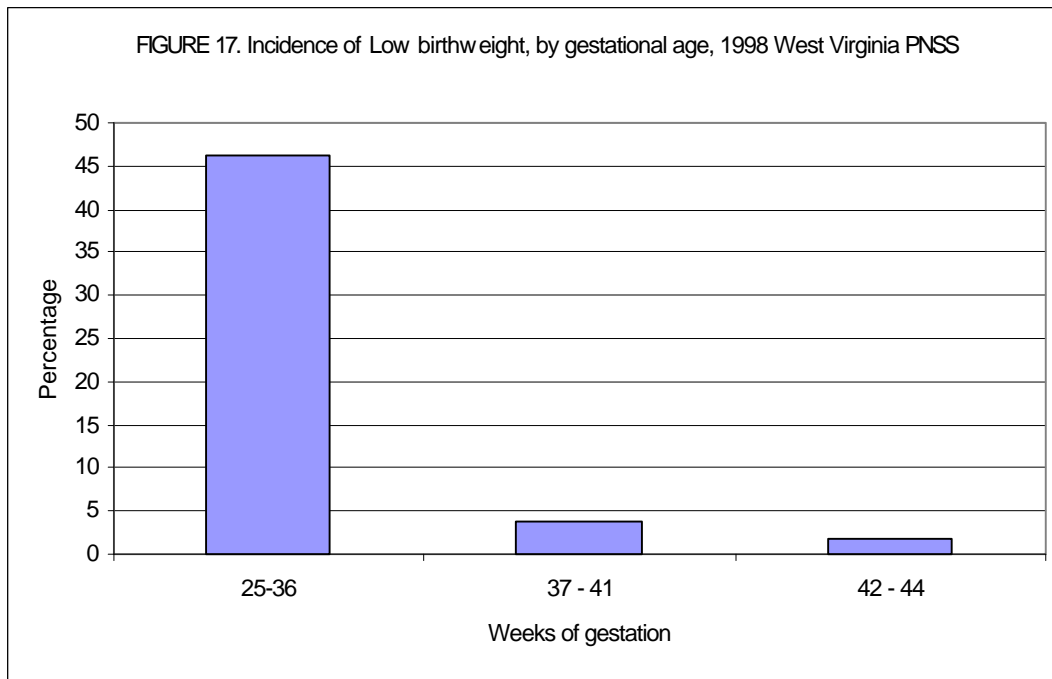
Severe iron deficiency anemia among pregnant women is associated with increased risk of delivering preterm and low birthweight infants. Maternal anemia in the first or second trimesters appears to be associated with risk; this association is attenuated in the third trimester (21). Women who have multiple risk factors are of greatest concern. For example, the incidence of delivering a low birthweight infant was much higher for underweight women who smoked (17.8%) than for normal weight women who do not smoke (4.8%) (Figure 16).



- ▶ ***In the 1998 West Virginia PNSS, underweight women and women who gained less weight than recommended during pregnancy had nearly double the risk of delivering a low birthweight infant.***
- ▶ ***Women who reported smoking or drinking during pregnancy were at increased risk of delivering a low birthweight infant.***
- ▶ ***Women who have multiple nutritional and behavioral risk factors are at highest risk for having a low birthweight infant.***

## **Prematurity**

Nutritional problems of premature infants include immature sucking and swallowing, digestion and absorption, necrotizing enterocolitis, and small gastric capacity (43). In the 1998 West Virginia PNSS, using records only from mothers who participated in WIC both prenatally and postpartum and excluding multiple births, almost 9% of infants were born preterm (prior to 37 weeks gestation). These infants were ten times more likely to be low birthweight than were infants born at term (Figure 17). Preterm, low birthweight infants are 2- to 3-times more likely to die in the first year of life compared with full-term, low birthweight infants (47).



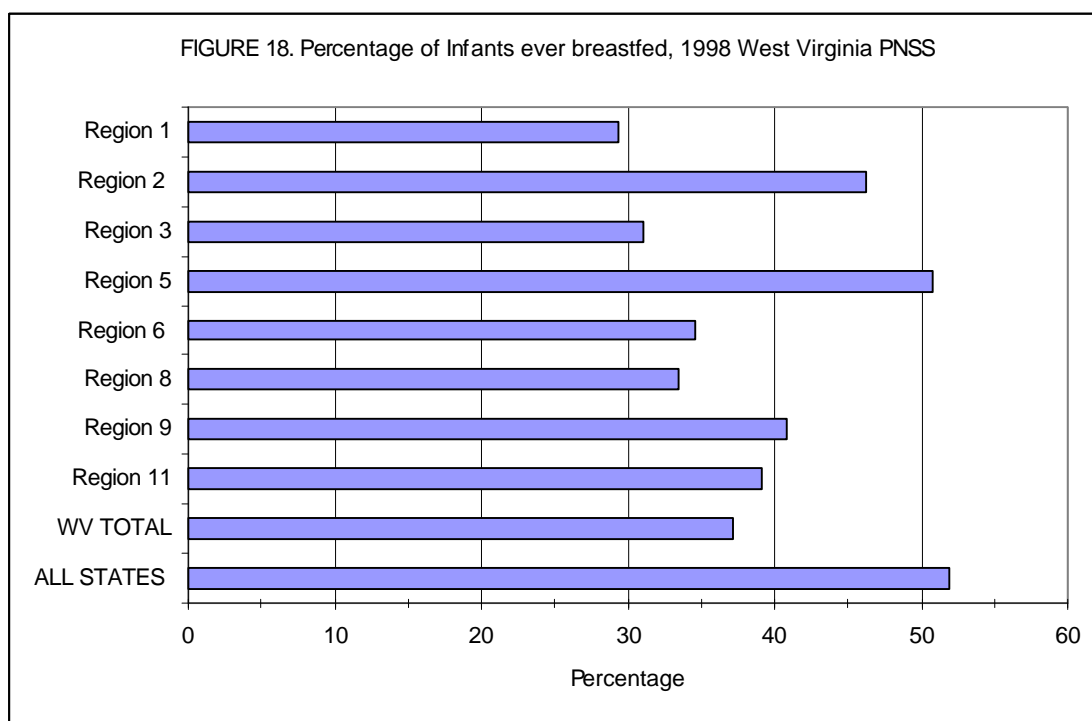
- ▶ ***About 9% of infants born to women in the 1998 West Virginia PNSS were premature (<37 weeks gestation).***
- ▶ ***In the 1998 PNSS, premature infants were more than 10 times as likely to be low birthweight than were infants born at term.***
- ▶ ***A Healthy People 2010 national health objective is for no more than 7.6% of births to be premature.***

## Infant Feeding Practices

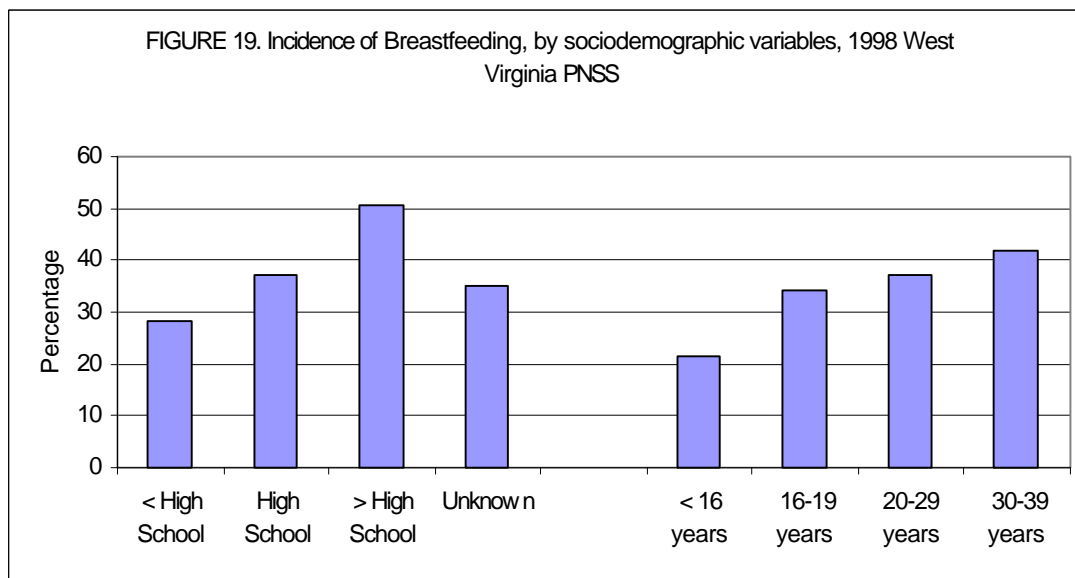
### Breastfeeding

The nutritional, immunologic, allergenic, economic, and psychological advantages of breastfeeding are well recognized. Breast milk is nutritionally superior to any alternative milk supply; provides immunity to many viral and bacterial diseases; enhances infants' immunologic defenses; prevents or reduces risk for respiratory and diarrheal diseases; promotes correct development of jaws, teeth, and speech patterns; decreases tendency toward childhood obesity; and facilitates maternal-infant attachment (48).

About 37% of infants born to women in the 1998 West Virginia PNSS were initially breastfed. The percentage varied by region: 50% in region 5 to 29% in region 1. (Figure 18). By comparison, 51% of infants born to PNSS mothers in all states participating in the system were initially breastfed.



There was not much variation by race or ethnicity in breastfeeding. Thirty-three percent of black mothers breastfed, as compared to 36% for white mothers. Almost 70% of Hispanic mothers breastfed, but the numbers of this group are so low in West Virginia as to be unreliable. By way of comparison, in the national PNSS, about 40% of black mothers breastfed, and 50% of white mothers breastfed. Hispanic or American Indian mothers had the highest incidence of breastfeeding, 70% and 57% respectively. The incidence of breastfeeding increased with educational level and age. (Figure 19).



The Healthy People 2010 national health objective for breastfeeding is to increase to at least 75 percent the proportion of mothers who breastfeed their babies in the early postpartum period (9). This objective was not achieved in the PNSS population in any region.

The prevalence of breastfeeding among PNSS mothers in all states participating in the system has changed little since 1989. This stability, however, represents a halt to the decline in breastfeeding rates that occurred among low-income women in the middle to late 1980s (49). Other data sources indicate that the rate for all U.S. women has increased somewhat—from 52% in 1989 to 60% in 1995 (50).

- ▶ ***Only 37% of infants born to women in the 1998 West Virginia PNSS were initially breastfed.***
- ▶ ***The Healthy People 2010 health objectives call for an increase to at least 75% in the proportion of mothers who breastfeed their babies in the early postpartum period.***

## CONCLUSIONS AND RECOMMENDATIONS

The 1998 West Virginia PNSS data demonstrate that progress has occurred in several areas of maternal and child health among low-income women and their infants. The Healthy People 2000 national health objective for the incidence of very low birthweight (no more than 1%) has nearly been achieved in the PNSS population. The proportion of women receiving early prenatal care was within five percent of the 2000 objective. West Virginia rates of anemia are lower than rates among other states participating in the PNSS.

However, national health objectives for Healthy People 2000 pertaining to teen pregnancy, prepregnancy overweight among women aged 20 years or older, achievement of minimum recommended weight gain during pregnancy, anemia among black women in the third trimester



of pregnancy, smoking cessation during pregnancy, incidence of low birthweight, and prevalence of breastfeeding were not achieved in the West Virginia PNSS population.

### **State and Community Nutritional and Behavioral Risk Factor Reduction**

The PNSS data indicate that state and community public health programs are needed to support the following nutritional and behavioral interventions.

#### **Nutritional Interventions:**

1. Provision of preconception nutrition care, integrated into primary care, to address prepregnancy nutritional risks such as underweight, obesity, and anemia.
2. Outreach activities promoting early identification of pregnancy and early entry into comprehensive prenatal care, including WIC program services.
3. Encouragement of recommended pregnancy weight gain, based on prepregnancy weight status, particularly for underweight women and teenagers.
4. Promotion of adequate iron intake during pregnancy and anemia screening to identify women at risk for iron deficiency.
5. Establishment of breastfeeding as a societal norm. Continued development and implementation of effective strategies to promote breastfeeding.
6. Implementation of innovative strategies to reverse the rising trend of overweight among women, including the prevention of overweight before reproductive age and the reduction of postpartum weight retention among overweight women.

#### **Behavioral Interventions**

1. Continued efforts to improve the effectiveness of teenage pregnancy prevention initiatives.
2. Provision of smoking cessation services for all pregnant women, especially those who are underweight.
3. Encouragement of abstinence from alcoholic beverages during pregnancy. Access to alcohol rehabilitation services for all women who need them.

### **Nutrition Services and Research**

Improvement of the nutrition-related behaviors and outcomes for pregnant women and infants will not be achieved through clinical interventions alone. The following service and research components are needed.

1. Broad-based public health initiatives comprising mass media campaigns, environmental changes, service delivery improvements, and social support networks.
2. Intervention research to determine which strategies are successful in reducing risk and achieving the nutritional and behavioral interventions described above.

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