Pediatric Nutrition Surveillance

2007 Report

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

CDC
Nutrition

This report summarizes selected data on child health and nutrition indicators received from state, territorial, and tribal governments that contributed to the Centers for Disease Control and Prevention (CDC) *Pediatric Nutrition Surveillance 2007 Report*.

This report was developed with support from the following CDC offices.

Coordinating Center for Health Promotion

National Center for Chronic Disease Prevention and Health Promotion

Division of Nutrition, Physical Activity and Obesity

Nutrition Branch

Program Development and Evaluation Branch

Suggested Citation

Polhamus B, Dalenius K, Borland E, Mackintosh H, Smith B, Grummer-Strawn L. *Pediatric Nutrition Surveillance 2007 Report*. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2009.

Acknowledgments

We gratefully acknowledge and thank all contributors to the Pediatric Nutrition Surveillance System (PedNSS). The efforts of state surveillance coordinators, data processing staff, and local clinic staff in collecting data and using nutrition surveillance systems make the national PedNSS possible.

This report is available at http://www.cdc.gov/nccdphp/dnpa/pednss.htm.

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Pediatric Nutrition Surveillance

The Pediatric Nutrition Surveillance System (PedNSS) is a public health surveillance system that monitors the nutritional status of low-income children in federally funded maternal and child health programs. Data on birthweight, breastfeeding, anemia, short stature, underweight, overweight, and obesity are collected for children who attend public health clinics for routine care, nutrition education, and supplemental food.

Data are collected at the clinic level then aggregated at the state level and submitted to the Centers for Disease Control and Prevention (CDC) for analysis. A national nutrition surveillance report is produced by using PedNSS data. Surveillance reports also are produced for each contributor (defined as a state, U.S. territory, or Indian Tribal Organization [ITO]).

In 2007, a total of 51 contributors, including 44 states, the District of Columbia, Puerto Rico, and 5 tribal governments, participated in PedNSS (Figure 1) and submitted records for nearly 8 million children from birth to 5 years of age.

Data for the 2007 PedNSS were collected from children enrolled in federally funded programs that serve low-income children, including the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (85%) and non-WIC programs (15%) that include the Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) Program, the Title V Maternal and Child Health Program, and other federally funded programs.

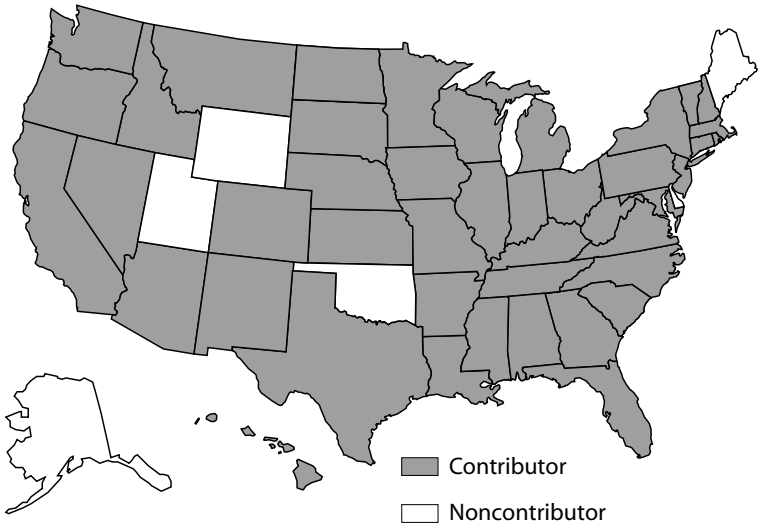
The goal of PedNSS is to collect, analyze, and disseminate surveillance data to guide public health policy and action. PedNSS information is used to set priorities and to plan, implement, and evaluate nutrition programs. This report summarizes 2007 data and highlights trends from 1998 through 2007.

Demographic Characteristics

In the 2007 PedNSS, 42% of the records were from Hispanic children, 32% were from non-Hispanic white children, 20% were from non-Hispanic black children, 3% were from Asian or Pacific Islander children, 1% were from American Indian or Alaska Native children, and 2% were from children of all other or unspecified races and ethnicities.

From 1998 through 2007, the proportion of records submitted to PedNSS for Hispanic children increased from approximately 27% to 41%, respectively. During the same period, the proportion of records for non-Hispanic and black children declined. Most PedNSS records (62%) were from children aged 1–5 years; 38% were from infants aged less than 1 year.

Figure 1. Contributors* to the 2007 Pediatric Nutrition Surveillance Report



* Includes the District of Columbia, Puerto Rico, and the following ITOs: Cheyenne River Sioux (SD), Rosebud Sioux (SD), Inter Tribal Council of Arizona, Navajo Nation (AZ), and the Three Affiliated Tribes (ND).

Table 1. State-specific prevalence of selected nutrition indicators for children aged <5 years, 2007 Pediatric Nutrition Surveillance System

Contributor	LBW*	HBW†	Ever Breastfed	Breastfed 6 Months	Anemia‡	Short Stature§	Obesity‖
Alabama	11.9	4.5	34.8	NA	19.6	6.3	13.8
Arizona	8.0	6.8	61.9	30.9	16.4	7.4	14.4
Arkansas	10.1	5.5	46.8	11.4	19.2	7.9	14.2
California	6.4	7.3	NA	NA	14.2	5.1	17.4
Cheyenne River Sioux (SD)	6.6	8.4	32.1	NA	22.5	1.2	18.6
Colorado	10.1	4.5	74.3	26.8	12.6	8.0	9.7
Connecticut	8.8	6.5	60.6	24.0	9.7	3.9	16.2
District of Columbia	11.5	4.8	46.9	21.8	32.1	8.4	14.6
Florida	9.5	5.9	67.1	25.5	17.7	4.7	14.3
Georgia	10.2	5.2	52.2	18.6	14.6	7.1	14.6
Hawaii	8.8	7.0	77.3	35.8	12.3	6.4	9.2
Idaho	7.6	6.9	80.4	27.8	14.5	7.1	12.2
Illinois	9.4	6.1	61.9	19.2	11.4	7.3	14.5
Indiana	9.3	6.2	60.7	18.9	15.8	6.8	14.1
Inter Tribal Council (AZ)	7.2	8.4	64.0	26.5	13.0	6.1	23.9
Iowa	8.1	8.1	NA	NA	8.9	5.6	14.9
Kansas	8.4	6.6	67.3	21.6	12.2	6.7	13.6
Kentucky	10.3	6.1	36.3	8.6	12.7	6.0	15.6
Louisiana	12.7	3.5	25.9	10.1	24.0	9.5	13.8
Maryland	10.4	6.1	56.3	39.0	23.7	6.6	15.4
Massachusetts	8.7	7.7	70.0	25.8	11.6	4.7	16.8
Michigan	9.6	7.2	51.8	15.3	14.6	6.8	13.7
Minnesota	7.8	8.7	71.2	31.2	11.8	5.0	13.3
Mississippi	NA	NA	NA	NA	15.8	11.2	15.0
Missouri	8.8	6.5	53.5	15.5	18.2	6.7	13.7
Montana	8.2	8.6	73.3	32.2	9.0	5.7	12.1
Navajo Nation (AZ)	6.4	6.1	74.1	34.8	8.8	5.1	17.3
Nebraska	8.4	6.9	68.2	25.0	16.3	5.9	13.5
Nevada	8.4	6.1	56.9	26.5	10.1	7.3	12.6
New Hampshire	7.6	10.2	65.4	23.7	13.7	6.5	15.8
New Jersey	9.3	6.1	59.3	33.0	18.8	5.9	18.0
New Mexico	9.7	4.3	71.1	22.0	12.0	8.1	12.0
New York	8.7	6.7	72.0	39.7	11.9	4.1	14.6
North Carolina	9.9	6.5	58.3	20.6	13.4	5.8	15.3
North Dakota	8.2	10.4	60.3	20.7	9.2	4.9	13.4
Ohio	10.7	5.9	44.6	15.9	13.9	6.5	12.1
Oregon	6.6	9.5	90.3	43.0	14.9	4.9	14.5
Pennsylvania	10.4	6.2	43.7	17.0	20.5	6.0	10.9
Puerto Rico	11.5	2.4	54.4	NA	5.4	10.6	18.6
Rhode Island	9.2	7.4	53.4	23.3	16.4	6.3	17.0
Rosebud Sioux (SD)	9.5	6.7	58.7	NA	31.1	1.6	21.9
South Carolina	NA	NA	NA	NA	19.5	NA	NA
South Dakota	7.7	7.5	57.4	22.4	8.0	6.2	15.2
Tennessee	10.6	5.6	40.8	14.5	8.1	6.0	13.5
Texas	8.9	5.8	68.5	38.6	19.6	7.1	15.9
Three Affiliated Tribes (ND)	NA	NA	NA	NA	10.3	1.5	24.4
Vermont	6.8	10.1	70.4	30.9	6.4	5.1	13.5
Virginia	10.2	6.3	58.2	24.6	16.4	6.5	17.4
Washington	7.1	9.5	84.1	37.8	11.6	5.3	14.3
West Virginia	10.5	6.0	41.8	11.8	5.8	5.3	13.1
Wisconsin	8.7	7.5	63.2	26.6	11.3	5.4	13.1
National PedNSS	9.1	6.4	59.8	25.4	15.0	6.2	14.9

* Low birthweight: <2,500 grams.
† High birthweight: >4,000 grams.
‡ Children aged 6 months to 2 years: hemoglobin (Hb) <11.0 g/dL or hematocrit (Hct) <32.9%. Children aged 2–5 years: Hb <11.1 g/dL or Hct <33.0%. Adjusted for altitude.
§ <5th percentile length-for-age for children aged <2 years or height-for-age for children aged 2 years or older using the 2000 CDC growth chart.
|| ≥95th percentile BMI-for-age for children aged 2 years or older using the 2000 CDC growth chart.

Pediatric Health Indicators

Low Birthweight

Low birthweight (<2,500 grams) is an important determinant of neonatal and postneonatal mortality.[1] Low-birthweight infants who survive are at increased risk for health problems that range from neurodevelopmental disabilities to respiratory disorders.[2] In the 2007 PedNSS, 9.1% of infants were low birthweight compared with 8.3% of U.S. infants.[3]

In PedNSS, the prevalence of low birthweight was higher for black (13.4%) infants than for white (8.7%), Asian or Pacific Islander (8.1%), American Indian or Alaska Native (7.9%), and Hispanic (7.3%) infants. *Healthy People 2010* Objective 16-10a proposes reducing low birthweight to no more than 5% of all live births.[4]

While the overall prevalence of low birthweight remained stable from 1998 (8.9%) through 2007 (9.1%), increases were seen among racial and ethnic groups (Figure 2). During this 10-year period, increases in low birthweight were seen among black (0.8%), Hispanic (0.6%), and white (0.6%) infants. The reason these increases were not reflected in the overall prevalence was because during this 10-year reporting period the number of Hispanic children more than doubled and Hispanic children in this population generally have better low birth weight rates.

Low Birthweight: Less than 2,500 grams at birth.

High Birthweight

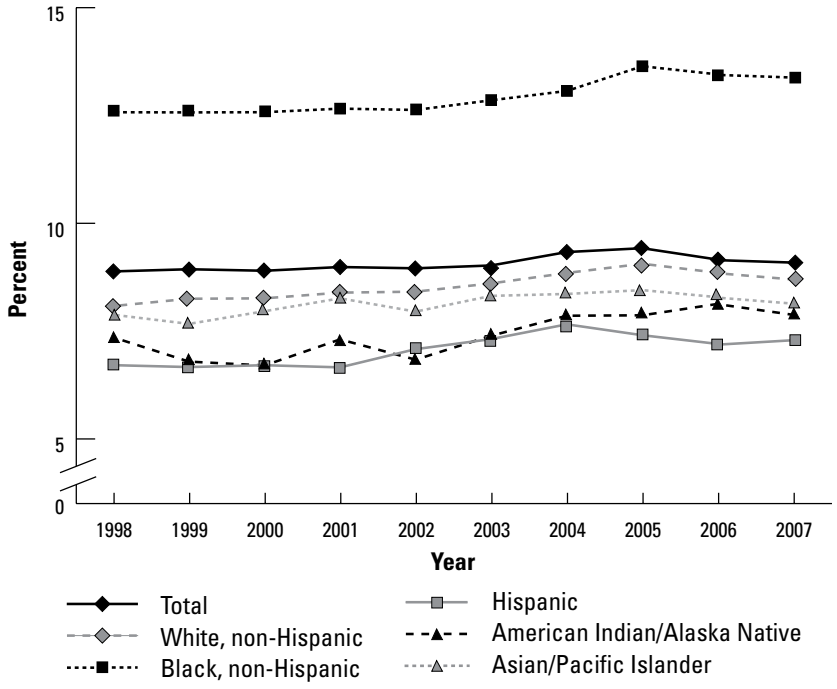
High birthweight (>4,000 grams) puts infants at increased risk for death and birth injuries, such as shoulder dystocia.[5] In the 2007 PedNSS, 6.4% of infants were high birthweight compared with 8.5% in 1998. The high birthweight rate for PedNSS was lower than the most recent U.S. rate (8.5%).[6] In 2007, the prevalence of high birthweight was higher for American Indian or Alaska Native (8.7%) infants than for white (7.4%), Hispanic (6.6%), Asian or Pacific Islander (4.6%), and black (4.1%) infants. The largest decreases in high birthweight during the 10-year period occurred among American Indian or Alaska Native (3.6%) and white (2.6%) infants.

High Birthweight: More than 4,000 grams at birth.

Breastfeeding

The nutritional, immunologic, and economic advantages of breastfeeding are well recognized.[7] In the 2007 PedNSS, 59.8% of infants were ever breastfed, 25.4% were breastfed for at least 6 months, and 17.5% were breastfed for at least 12 months.

Figure 2. Trends in prevalence of low birthweight,* by race and ethnicity



* <2,500 grams, among infants born during the reporting period. Year 2010 target: reduce low birthweight to 5% of live births.

Source: 2007 National PedNSS Data Table 18D. Available at http://www.cdc.gov/pednss/pednss_tables/tables_numeric.htm.

The Healthy People 2010 objective (16-19a-c) to increase the proportion of children ever breastfed to 75%, breastfed at 6 months to 50%, and breastfed at 1 year to 25%[4] is far from being achieved in the PedNSS population. However, Hawaii, Idaho, Oregon, and Washington met the *Healthy People 2010* objective for ever breastfeeding while several other contributors are close to meeting this objective (Table 1). Nationally representative data from the 2005 National Immunization Survey (NIS) indicate that 74.2% of infants were ever breastfed, 43.1% breastfed for 6 months, and 21.4% breastfed for 12 months.[8]

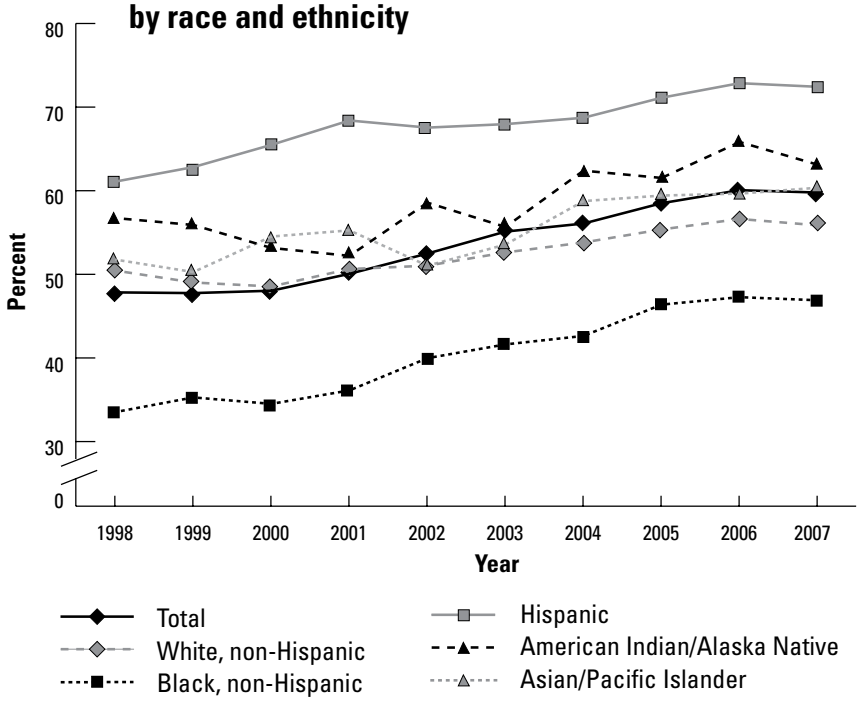
From 1998 to 2007, the absolute increase in the prevalence of breastfeeding initiation for infants in PedNSS was 12%. The breastfeeding initiation rate was 47.8% in 1998. Improved breastfeeding rates were evident among all racial and ethnic groups (Figure 3). Hispanic infants had the highest rates of breastfeeding initiation (72.4%), while black infants had the lowest rates of breastfeeding initiation (46.9%). Data from the NIS indicate that the ever breastfed rate in the United States increased from 68.3% in 1999 to 74.2% in 2005.[8]

Breastfeeding: Child ever breastfed, breastfed until 6 months of age, or breastfed until 12 months of age.

Anemia

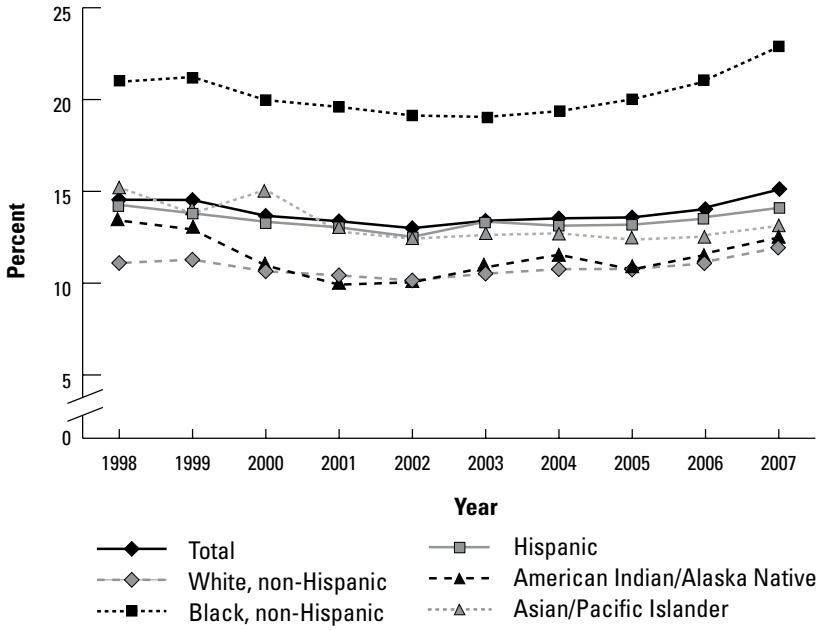
Anemia (low hemoglobin/hematocrit) is an indicator of iron deficiency, which is associated with developmental delays and behavioral disturbances in children.[9,10] In the 2007 PedNSS, the prevalence of anemia was 15%. The highest prevalence of anemia was in infants aged 6–11 months (17.8%) and children aged 12–17 months (18.5%);

Figure 3. Trends in percentage of infants ever breastfed,* by race and ethnicity



* Among infants born during the reporting period. Year 2010 target: increase the proportion of mothers who breastfeed their babies in the early postpartum period to 75%.
Source: 2007 National PedNSS Data Table 19D. Available at http://www.cdc.gov/pednss/pednss_tables/tables_numeric.htm.

Figure 4. Trends in prevalence of anemia* among children aged <5 years, by race and ethnicity

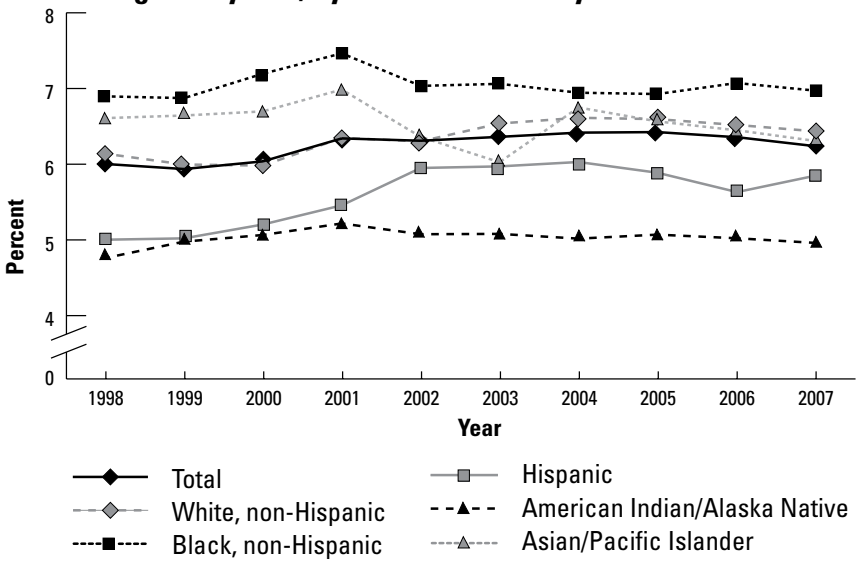


* Hb or Hct <5th percentile. CDC. Recommendations to prevent and control iron deficiency in the United States. *MMWR Recomm Rep* 1998;47(RR-3):1–29.
Source: 2007 National PedNSS Data Table 18D. Available at http://www.cdc.gov/pednss/pednss_tables/tables_numeric.htm.

the lowest prevalence was in children aged 3–5 years (10.9%). The overall prevalence of anemia in PedNSS children increased from 14.5% in 1998 to 15% in 2007. During this 10-year period, the overall prevalence of anemia improved to 13% in 2002 followed by consistently worsening rates after that time.

The prevalence of anemia varied among racial and ethnic groups in PedNSS. In 2007, the highest rate was among black children (22.8%) while the lowest prevalence was among white children (11.9%). An increase during the 10-year period was seen among all racial and ethnic groups with the exception of Asian or Pacific Islander and American Indian or Alaska Native children who experienced declines of 2.2% and 1%, respectively (Figure 4). For most racial and ethnic groups, prevalence rates were lowest in 2002 followed by consistently increasing rates up to 2007. Since 2002, black children experienced a 3.7% increase in the prevalence of anemia, the largest increase among racial and ethnic groups.

Figure 5. Trends in prevalence of short stature* among children aged <5 years, by race and ethnicity



* ≤5th percentile length or height-for-age, CDC growth charts, 2000. Year 2010 target: reduce short stature among low-income children aged <5 years to 5%.
Source: 2007 National PedNSS Data Table 18D. Available at http://www.cdc.gov/pednss/pednss_tables/tables_numeric.htm.

Anemia: Children aged 6 months to 2 years are considered anemic if their hemoglobin (Hb) concentration is less than 11.0 g/dL or hematocrit (Hct) level is less than 32.9%; children aged 2–5 years are considered anemic if their Hb concentration is less than 11.1 g/dL or Hct level is less than 33.0%. Values are adjusted for altitude. Hb concentration and Hct level are not reported for children younger than 6 months.[11]

Short Stature

Short stature (low length/height-for-age) may reflect the long-term health and nutritional status of a child or a population.[12] Although short stature can be associated with short parental stature or low birthweight, it can also result from growth retardation due to chronic malnutrition, recurrent illness, or both. In the 2007 PedNSS, 6.2% of children from birth to age 5 were of short stature, compared with 3.7% of U.S. children.[13]

Short stature was considerably higher in the PedNSS population than in the general population, which may reflect the nutritional risk of children participating in the WIC program. The prevalence of short stature in PedNSS was above the expected level (5%) and the *Healthy People 2010* objective (19-4) of 5% among low-income children younger than 5 years of age.[4] Nine contributors achieved this *Healthy People 2010* objective in 2007 (Table 1).

The prevalence of short stature remained stable from 1998 (6.0%) to 2007 (6.2%). Some variation in short stature was evident among racial and ethnic groups. Short stature increased among white and Hispanic children, decreased among Asian and Pacific Islander children, and remained stable among black and American Indian or Alaska Native children (Figure 5). The highest prevalence of short stature was among black infants younger than 1 year of age (10.9%), which may reflect the high rate of low birthweight in this group.

Short Stature: Based on the 2000 CDC gender-specific growth chart percentiles of less than the 5th percentile length-for-age for children younger than 2 years of age and less than the 5th percentile height-for-age for children aged 2 years or older.

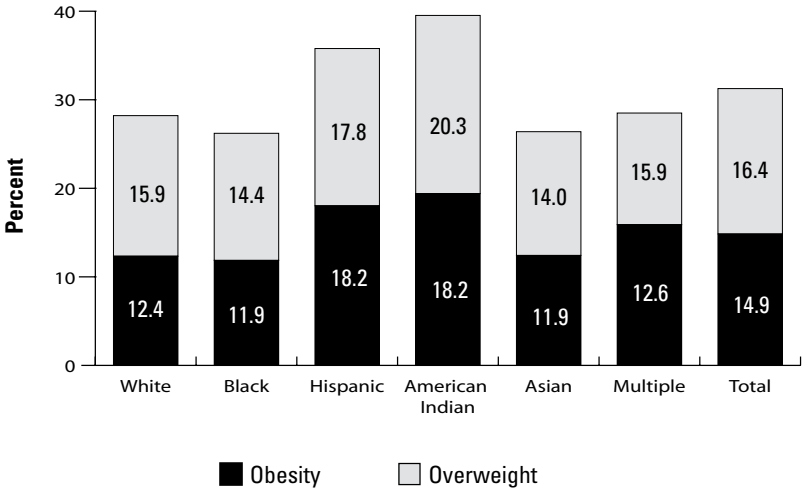
Underweight

Data on underweight (low weight-for-length/BMI*-for-age) in children from birth to age 5 years indicate that acute malnutrition was not a public health problem in the PedNSS population. In 2007, the prevalence of underweight (4.5%) was less than the expected level (5%). The prevalence of underweight for all U.S. children in this age group was 3.4%.[13]

The highest prevalence of underweight in PedNSS occurred among black (5.9%) and Asian and Pacific Islander (6.1%) children. Black infants less than 1 year of age had an underweight rate of 7.7%, which may reflect the high rate of low birthweight in this group. The overall prevalence of underweight decreased from 5.9% in 1998 to 4.5% in 2007.

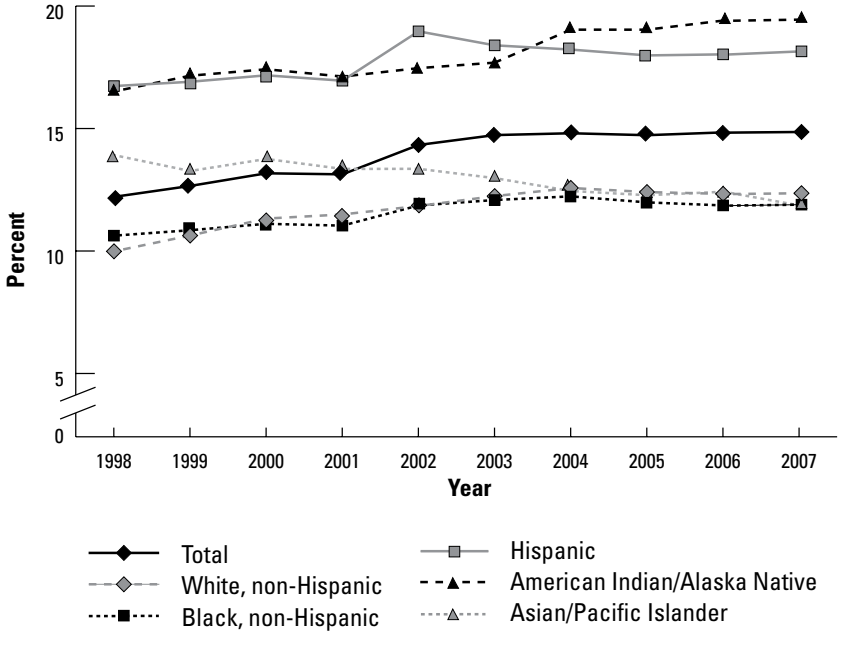
Underweight: Based on the 2000 CDC gender-specific growth chart percentiles of less than the 5th percentile weight-for-length for children younger than 2 years of age and less than the 5th percentile BMI-for-age for children aged 2 years or older.

Figure 6. Prevalence of obesity* and overweight† among children aged 2 to <5 years, by race and ethnicity



* Obesity: ≥95th percentile BMI-for-age.
† Overweight: ≥85th to <95th percentile BMI-for-age, CDC growth charts, 2000.
Source: 2007 National PedNSS Data Table 8D. Available at http://www.cdc.gov/pednss/pednss_tables/tables_numeric.htm.

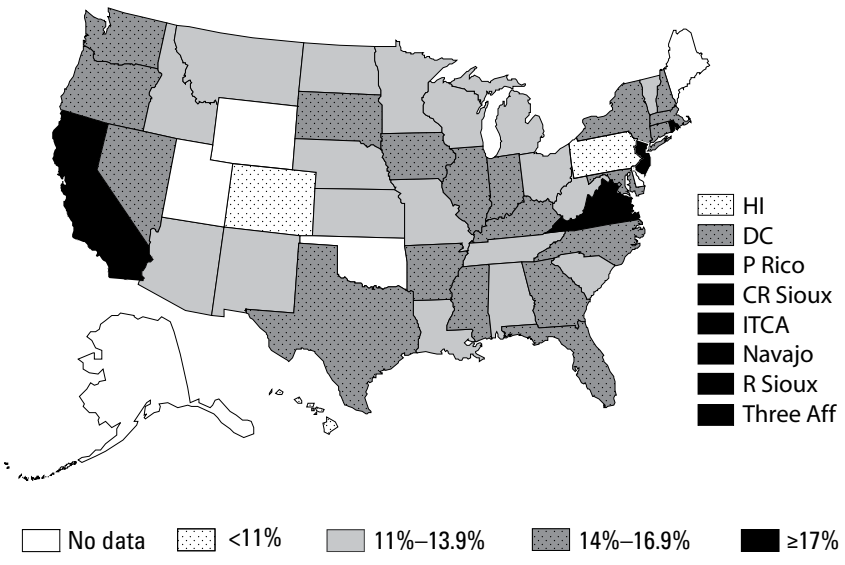
Figure 7. Trends in prevalence of obesity* among children aged 2 to <5 years, by race and ethnicity



* ≥95th percentile BMI-for-age, CDC growth charts, 2000.
Source: 2007 National PedNSS Data Table 18D. Available at http://www.cdc.gov/pednss/pednss_tables/tables_numeric.htm.

* To calculate BMI (body mass index): Weight (kg) ÷ Stature (cm) x 10,000 or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703.

Figure 8. Prevalence of obesity* among children aged 2 to <5 years, by contributor, 2007



* ≥95th percentile BMI-for-age, CDC growth charts, 2000. 5% of children are expected to fall above the 95th percentile.

Source: 2007 National PedNSS Data Table 6D. Available at http://www.cdc.gov/pednss/pednss_tables/tables_numeric.htm.

were among white (12.4%), black (11.9%), and Asian or Pacific Islander (10.8%) children (Figure 6).

Of particular concern is that the prevalence of obesity among children aged 2–5 years increased from 12.2% in 1998 to 14.9% in 2007 (Figure 7). Obesity increased among all racial and ethnic groups with the exception of Asian or Pacific Islander children during the 10-year period. However, overall obesity rates have not increased since 2003 (14.7%), and this trend was observed among all racial and ethnic groups with the exception of American Indian or Alaska Native children who have experienced a 1.8% increase in obesity rates.

Overweight and Obesity

Overweight and obesity in young children have increased in recent decades and the associated health consequences warrant preventive efforts.[14] The Expert Committee on the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity[15] recommends the use of two cutoff points to screen for overweight and obesity in children aged 2 years or older. Children whose BMI-for-age is at or above the 95th percentile are considered obese, and those with a BMI-for-age between the 85th and 95th percentiles are considered overweight.[15]

In the 2007 PedNSS, the prevalence of obesity among children aged 2–5 years was 14.9%, compared with 12.4% for U.S. children of a similar age.[16] In PedNSS, the highest obesity rates were among American Indian or Alaska Native (19.5%) and Hispanic (18.2%) children; the lowest rates

The data in the 2007 prevalence map illustrating obesity among children in PedNSS by contributor (Figure 8) show that only Colorado, Hawaii, and Pennsylvania had a prevalence of obesity less than 11%, while 11 contributors had a prevalence of obesity equal to or greater than 17%. Although the map shows no clear geographic pattern of obesity prevalence, it is notable that all five tribal governments that participated in PedNSS were in the category with the highest rate. No contributor had a prevalence of obesity at or less than the expected level of 5% (Table 1).

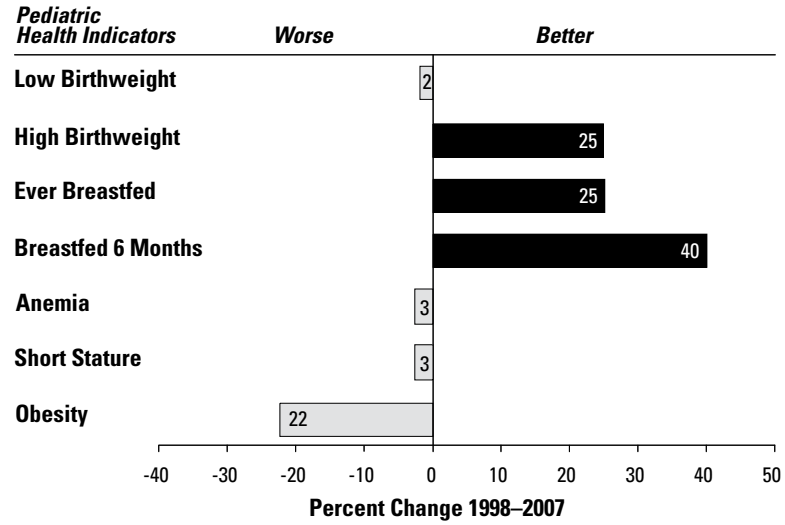
Obesity: Based on the 2000 CDC gender-specific growth chart percentiles of equal to or greater than the 95th percentile BMI-for-age for children 2 years of age or older.

Overweight: Based on the 2000 CDC gender-specific growth chart percentiles of the 85th to the 95th percentile BMI-for-age for children 2 years of age or older.

Pediatric Health Progress Review

Advances in nutrition and health indicators were observed in the PedNSS population from 1998 through 2007 (Figure 9). The prevalence of high birthweight decreased, with the greatest improvement occurring among American Indian or Alaska Native and white children. Substantial improvements occurred in the prevalence of infants ever breastfed. The largest absolute improvement in the prevalence of ever being breastfed occurred among black children. Overall, short stature remained stable during the 10-year period.

Figure 9. Changes in infant and child health status, 1998–2007



Some areas are still of concern. While the low birthweight rate was stable during the 10-year period, it remained high. The *Healthy People 2010* objective to reduce the low birthweight prevalence to 5%[4] continues to be unmet. The prevalence of anemia increased and remains high among all racial and ethnic groups.

Obesity is a major public health problem that has increased; 2.7% more children aged 2–5 years were obese in 2007 than in 1998. This change is a relative increase of 22%. Although Hispanic and American Indian or Alaska Native children had the highest prevalence of obesity, increases occurred among all racial and ethnic groups with the exception of Asian and Pacific Islander children. While overweight and obesity rates increased among 2–5 year olds during the 10-year period, the prevalence has remained stable since 2003.

While advances have been made in breastfeeding initiation, few contributors achieved the *Healthy People 2010* objective that 75% of infants are ever breastfed.[4] The prevalence of breastfeeding remained lowest for black infants.

Pediatric Nutrition Recommendations

PedNSS data indicate that public health programs need to support the following actions:

- Prevent low birthweight by promoting preconception nutrition care and outreach activities to identify pregnancy in its early stages and foster early entry into comprehensive prenatal care, including the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and the Title V Maternal and Child Health Program.
- Promote and support breastfeeding interventions through public health programs, medical care systems, work sites, and communities.
- Promote adequate dietary iron intake and screening of children at risk for iron deficiency.
- Implement promising approaches to prevent obesity and chronic diseases recommended by CDC's Division of Nutrition, Physical Activity and Obesity. These recommendations include increasing breastfeeding initiation, duration, and exclusivity; increasing physical activity; increasing the consumption of fruits and vegetables; decreasing the consumption of sugar-sweetened beverages; reducing the consumption of high energy dense foods; and decreasing television viewing.

- Promote routine screening of weight status by physicians or allied health care providers in all children for obesity (BMI ≥95th percentile for age and sex) and overweight (BMI ≥85th percentile to <95th percentile for age and sex) based on the Expert Committee recomendations.[15]

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January 2009

CS124288