



# Pediatric Nutrition Surveillance



**2002 Report**



**2004**  
**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES**

This report summarizes selected data on child health and nutritional indicators received from state, territorial, and tribal governments that contributed to the Centers for Disease Control and Prevention (CDC) *Pediatric Nutrition Surveillance 2002 Report*.

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**For additional copies of this report, visit <http://www.cdc.gov/nccdphp/dnpa/pednss.htm>**

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# Pediatric Nutrition Surveillance

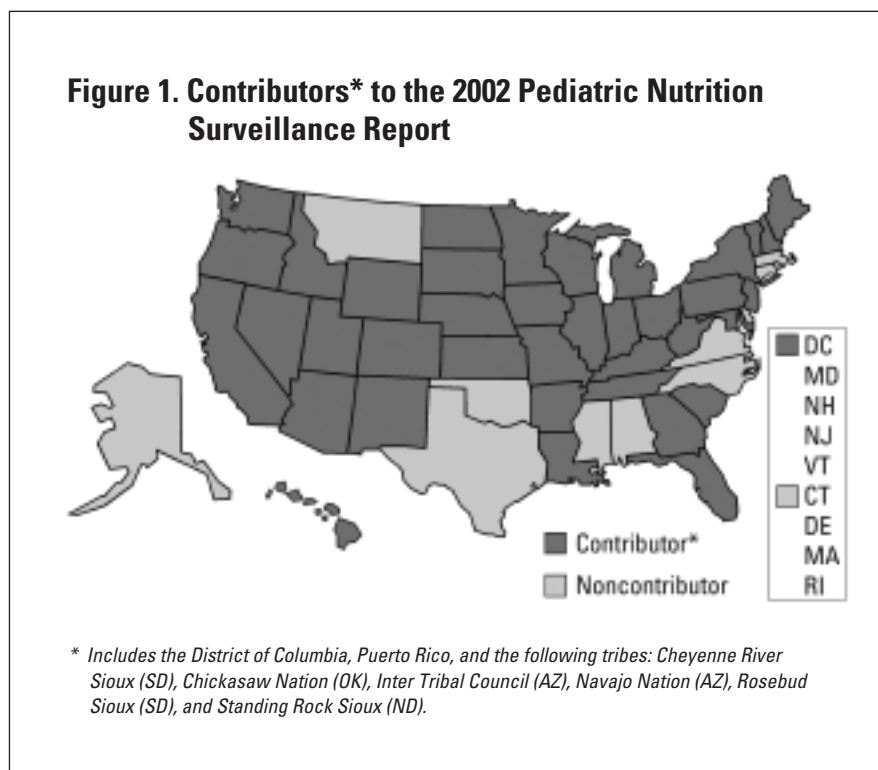
The Pediatric Nutrition Surveillance System (PedNSS) is a child-based public health surveillance system that monitors the nutritional status of low-income children in federally funded maternal and child health programs. Data on birthweight, short stature, underweight, overweight, anemia, and breastfeeding are collected for children who visit public health clinics for routine care and nutrition services, including education and supplemental food. Data are collected at the clinic level, and then aggregated at the state level and submitted to the Centers for Disease Control and Prevention (CDC) for analysis. When multiple records are submitted for a child during a year-long reporting period, CDC creates a unique child record that contains some data from all available records. CDC uses PedNSS data to produce national nutrition surveillance reports and surveillance reports for each contributor (defined as a state, U.S. territory, or tribal government). In 2002, a total of 38 states, the District of Columbia, Puerto Rico, and 6 tribal governments participated in PedNSS (Figure 1) and contributed records for more than 5 million children from birth to 5 years of age.

Data for the 2002 PedNSS were collected from children enrolled in federally funded programs that serve low-income children: the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (83%); the Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) Program (8%); the Title V Maternal and Child Health Program (5%); and Head Start and other programs (4%).

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 plan, implement, and evaluate nutrition programs. This report summarizes 2002 data and highlights trends from 1993 through 2002.

## Demographic Characteristics

In the 2002 PedNSS, 40% of the records were from non-Hispanic white children, 33% from Hispanic children, 21% from non-Hispanic black children, 3% from Asian or Pacific Islander children, 1% from American Indian or Alaska Native children, and 2% from children of all other or unspecified races and ethnicities. Most PedNSS records (63%) were from children aged 1 to 5 years; 37% were from infants aged less than 1 year. These proportions have been stable since 1993.



**Table 1. State-specific prevalence of selected nutritional indicators of children aged < 5 years, 2002 Pediatric Nutrition Surveillance System**

Contributor	LBW*	HBW†	Short Stature‡	Overweight§	Anemia	Ever Breastfed	Breastfed at 6 Months
Arizona	8.7	7.3	6.5	11.4	21.8	65.4	29.0
Arkansas	9.5	6.8	7.2	11.6	10.5	43.7	10.8
California	6.7	9.1	4.9	17.3	13.1	na	na
Cheyenne River Sioux (SD)	8.2	13.6	2.1	20.9	10.3	41.5	na
Chickasaw Nation (OK)	5.7	9.8	6.2	11.7	17.3	55.6	15.3
Colorado	9.8	5.0	8.4	8.7	7.4	70.7	25.7
District of Columbia	11.9	5.9	6.9	12.8	20.3	46.4	20.9
Florida	9.4	6.6	4.5	13.3	15.4	61.5	23.8
Georgia	9.9	6.7	7.0	11.9	12.7	48.6	16.0
Hawaii	9.2	7.6	7.6	10.3	11.7	54.1	19.9
Idaho	7.1	7.9	6.8	11.6	11.0	79.2	31.7
Illinois	9.1	6.9	7.7	14.0	11.9	52.3	18.1
Indiana	8.8	7.2	6.5	12.7	15.9	50.4	20.5
Inter Tribal Council (AZ)	7.0	9.9	6.2	20.8	12.2	79.9	16.5
Iowa	8.1	9.1	5.9	13.6	8.8	55.7	23.2
Kansas	8.0	6.7	6.8	12.0	10.0	63.0	20.7
Kentucky	10.0	7.5	7.6	16.8	11.6	na	na
Louisiana	11.7	5.8	10.7	13.5	14.6	21.9	2.2
Maine	7.7	11.3	7.4	15.6	12.2	49.6	23.0
Maryland	10.2	6.4	8.1	14.0	23.4	54.5	32.3
Michigan	9.5	8.2	7.0	12.4	13.0	46.7	13.6
Minnesota	7.5	10.4	4.4	13.2	9.0	na	na
Missouri	9.3	7.3	6.6	12.5	16.5	47.5	29.4
Navajo Nation (AZ)	6.7	8.8	5.7	13.4	6.9	na	na
Nebraska	8.4	8.1	6.3	13.1	12.2	60.0	21.8
Nevada	6.6	9.3	8.4	12.4	8.6	54.6	35.4
New Hampshire	7.6	10.4	7.3	15.1	15.0	59.3	19.0
New Jersey	9.0	7.2	6.1	17.5	17.8	55.0	34.6
New Mexico	7.2	5.5	8.2	9.3	5.3	na	na
New York	7.4	8.2	4.5	16.8	14.9	62.0	30.4
North Dakota	6.8	10.6	4.4	11.2	7.2	57.0	21.7
Ohio	10.1	6.6	6.0	11.1	14.1	38.5	14.1
Oregon	5.8	20.8	5.7	14.0	11.4	na	na
Pennsylvania	10.0	7.2	6.5	12.4	15.0	29.3	12.0
Puerto Rico	11.6	3.0	11.9	24.2	10.0	51.7	7.3
Rosebud Sioux (SD)	7.4	8.5	3.2	18.5	17.9	59.2	32.6
South Carolina	11.9	6.4	10.6	12.1	10.9	na	na
South Dakota	8.1	10.0	5.8	12.5	7.0	56.1	25.1
Standing Rock (ND)	7.8	9.3	1.9	16.9	9.4	31.9	na
Tennessee	10.1	6.3	5.1	11.3	7.3	na	na
Utah	8.2	6.4	7.4	8.8	11.7	75.9	39.6
Vermont	7.6	9.8	4.9	13.1	12.3	64.7	30.4
Washington	6.5	10.9	na	na	8.6	80.4	35.1
West Virginia	9.9	6.7	4.7	11.9	5.9	40.5	12.7
Wisconsin	8.5	8.7	5.5	11.8	12.7	55.0	22.6
Wyoming	9.8	4.2	8.8	8.6	9.9	58.8	23.8
<b>National PedNSS</b>	<b>8.9</b>	<b>7.6</b>	<b>6.3</b>	<b>14.3</b>	<b>13.1</b>	<b>52.5</b>	<b>20.8</b>

\* Low birthweight: < 2,500 grams.

† High birthweight: > 4,000 grams.

‡ Short stature: Based on the 2000 CDC growth reference, < 5th percentile length-for-age for children younger than age 2 and height-for-age for children aged 2 or older.

§ Overweight: Based on the 2000 CDC growth reference for children aged 2 and older, BMI-for-age = 95th percentile.

|| Anemia: Based on 1998 CDC MMWR Recommendations to Prevent and Control Iron Deficiency in the United States, altitude adjusted, children aged 6 months or older included in the analysis.

## Pediatric Health Indicators

### Low Birthweight

The single most important factor affecting neonatal mortality and a significant determinant of postneonatal mortality is low birthweight (< 2,500 grams). Low-birthweight infants who survive are at increased risk for health problems ranging from neurodevelopmental disabilities to respiratory disorders. In the 2002 PedNSS, 8.9% of infants were low birthweight, compared with 7.8% of U.S. infants.<sup>1</sup> In PedNSS, the prevalence of low birthweight was higher for black infants (12.6%) than for white (8.4%), Asian or Pacific Islander (8.0%), Hispanic (7.1%), and American Indian or Alaska Native (6.6%) infants. One of the *Healthy People 2010* objectives (16-10a) calls for a reduction in low birthweight to no more than 5% of all live births.<sup>2</sup>

The overall prevalence of low birthweight decreased slightly from 9.2% in 1993 to 8.9% in 2002; however, variations were observed among racial and ethnic groups (Figure 2). During this time period, low-birthweight rates improved for Hispanic infants; remained the same for black, American Indian or Alaska Native, and Asian or Pacific Islander infants; and worsened for white infants.

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

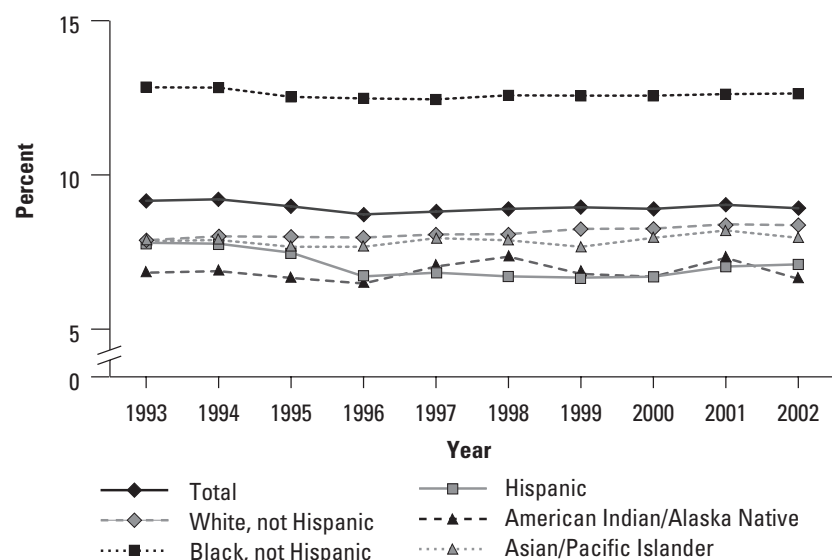
### High Birthweight

High birthweight (> 4,000 grams) puts infants at increased risk for death and birth injuries such as shoulder dystocia. In the 2002 PedNSS, 7.6% of infants were high birthweight, compared with 9.2% of U.S. infants.<sup>1</sup> Twenty-two PedNSS contributors had an overall prevalence higher than the national PedNSS rate (Table 1). The prevalence of high birthweight was higher for American Indian or Alaska Native (11.3%) infants than for white (8.8%), Hispanic (8.0%), Asian or Pacific Islander (6.2%), and black (4.9%) infants.

The overall prevalence of high birthweight decreased slightly from 1993 (8.4%) to 2002 (7.6%); however, the greatest decrease (1.4%) was among white infants. An increase of 1.0% occurred among Asian or Pacific Islander infants.

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

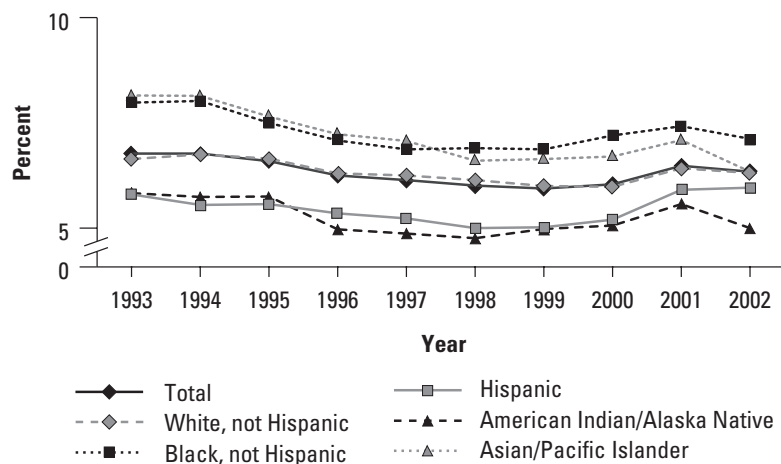
**Figure 2. Trends in prevalence of low birthweight,\* by race and ethnicity**



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

2002 National PedNSS Table 18D

**Figure 3. Trends in prevalence of short stature\* among children aged <5 years, by race and ethnicity**



\*  $\leq$  5th percentile length or height-for-age, CDC Growth Charts, 2000. Year 2010 target: reduce growth retardation (short stature) among low-income children under age 5 years to 5%.

2002 National PedNSS Table 18D

groups; the largest decrease was in Asian or Pacific Islander children (Figure 3). The highest prevalence of short stature was in black infants younger than age 1 (10.8%), which may reflect the high rate of low birthweight in this group.

*Short Stature: Based on the 2000 CDC 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 2 years of age or older.*

## Short Stature

Short stature (low length/height-for-age) may reflect the long-term health and nutritional status of a child or a population. Although short stature can be associated with short parental stature or low birthweight, it can also result from growth retardation due to chronic malnutrition caused by inadequate food intake, recurrent illness, or both. In the 2002 PedNSS, 6.3% of children from birth to age 5 were of short stature, compared with 2.3% of U.S. children (unpublished data, Dr. Zuguo Mei, CDC, 2003). The prevalence of short stature in PedNSS is somewhat above the expected level (5%) and does not meet the *Healthy People 2010* objective (19-4) to reduce growth retardation among low-income children under 5 years of age to 5%.<sup>2</sup> Ten contributors achieved this *Healthy People 2010* objective in 2002 (Table 1). The prevalence of short stature declined slightly from 6.8% in 1993 to 6.3% in 2002. A slight decrease in short stature was evident in all racial and ethnic

## Underweight

Data on underweight (low weight-for-length/BMI†-for-age) in children from birth to age 5 indicate that acute malnutrition is not a public health problem in the 2002 PedNSS population; the prevalence of 5.4% is similar to the expected level (5%). The prevalence of underweight for U.S. children in this age group is 4.8% (unpublished data, Dr. Zuguo Mei, CDC, 2003). The highest prevalence of underweight in PedNSS was in black children (6.6%). Black infants aged 0–11 months had an underweight rate of 8.7%, which may reflect the high rate of low birthweight in this group. The overall prevalence of underweight decreased from 6.7% in 1993 to 5.4% in 2002.

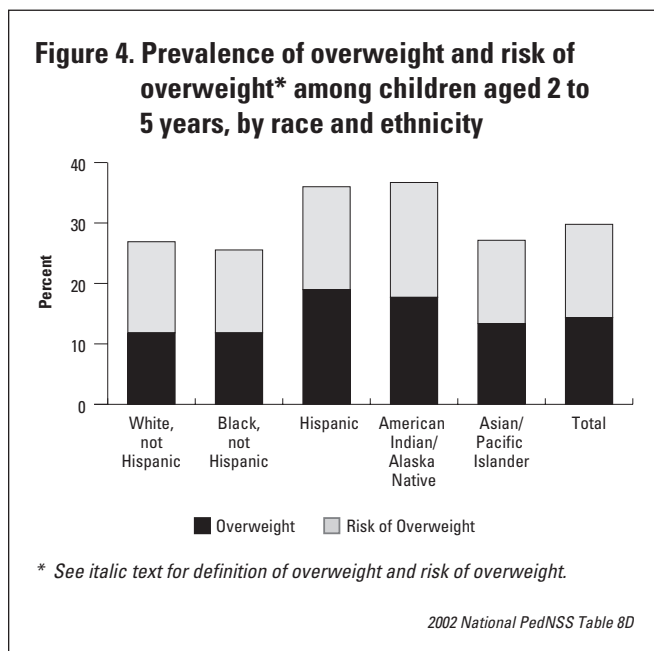
*Underweight: Based on the 2000 CDC growth chart percentiles of less than the 5th percentile weight-for-length for children younger than 2 years of age and less than the 5th percentile BMI-for-age for children 2 years of age or older.*

<sup>†</sup> To calculate BMI (body mass index):  $\text{Weight (kg)} \div \text{Stature (cm)} \div \text{Stature (cm)} \times 10,000$  or  $\text{Weight (lb)} \div \text{Stature (in)} \div \text{Stature (in)} \times 703$ .

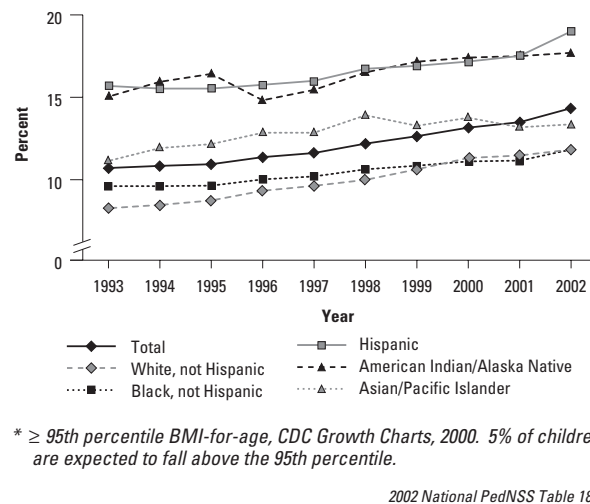
## Overweight and Risk of Overweight

Overweight (high weight-for-length/BMI-for-age) in children and adolescents has reached epidemic proportions in recent years. In the 2002 PedNSS the prevalence of overweight in children from birth to age 5 is 13.5%. Overweight in children younger than age 2 does not pose the same risk as it does for children aged 2 or older because a weak association has been found between their weight and increased risk for adult obesity.<sup>3</sup> Expert committees have recommended a two-level screening for overweight in children aged 2 years or older. The recommendations are to use BMI-for-age at or above the 95th percentile to define overweight and between the 85th and 95th percentiles to define risk of overweight.<sup>4-6</sup>

In PedNSS, the prevalence of overweight in children aged 2 to 5 years was 14.3%. The highest rates were among Hispanic (19.0%) and American Indian or Alaska Native (17.7%) children; the lowest (11.8%) were among both black and white children (Figure 4). Of particular concern is that the prevalence of overweight in children aged 2 to 5 has steadily increased from 10.7% in 1993 to 14.3% in 2002 (Figure 5). This is a relative increase in overweight of 34% between 1993 and 2002. Overweight has



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



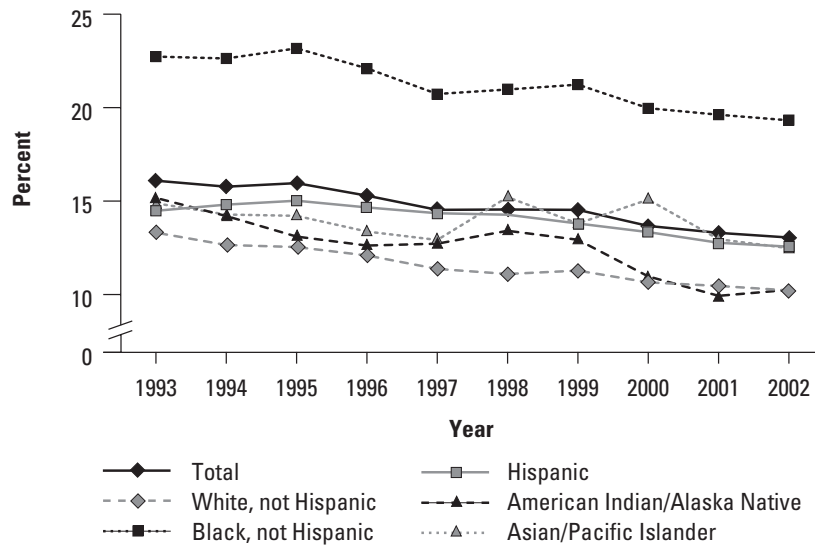
increased among all racial and ethnic groups; however, the greatest increase occurred among white children. In PedNSS, only four states had a prevalence of overweight less than 10% (Table 1).

The prevalence of risk of overweight in children aged 2 to 5 years increased from 13.6% in 1993 to 15.4% in 2002. This increase was seen among all racial and ethnic groups. American Indian and Alaska Native children have a prevalence of risk of overweight (19.0%) that is consistently higher than all other groups. Findings from PedNSS are consistent with trends of increasing overweight in children aged 2 to 5 years in the U.S. population; however, the prevalence of overweight (10.4%) and risk of overweight (10.2%) is considerably lower for U.S. children aged 2 to 5 years.<sup>7</sup>

*Overweight: Based on the 2000 CDC growth chart percentiles of greater than or equal to the 95th percentile weight-for-length for children less than 2 years of age and greater than the 95th percentile BMI-for-age for children 2 years of age or older.*

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

**Figure 6. 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).

2002 National PedNSS Table 18D

PedNSS declined from 16.1% in 1993 to 13.1% in 2002. While a decline was observed among all racial and ethnic groups, black and Asian or Pacific Islander children had the smallest declines during this period (Figure 6).

*Anemia: Children aged 1 to 2 years are considered anemic if their hemoglobin (Hb) concentration is less than 11.0 g/dL or their hematocrit (Hct) level is less than 33.0%; children aged 2 to 5 years are considered anemic if their Hb concentration is less than 11.1 g/dL or their Hct level is less than 33.3%.<sup>8</sup>*

## Anemia

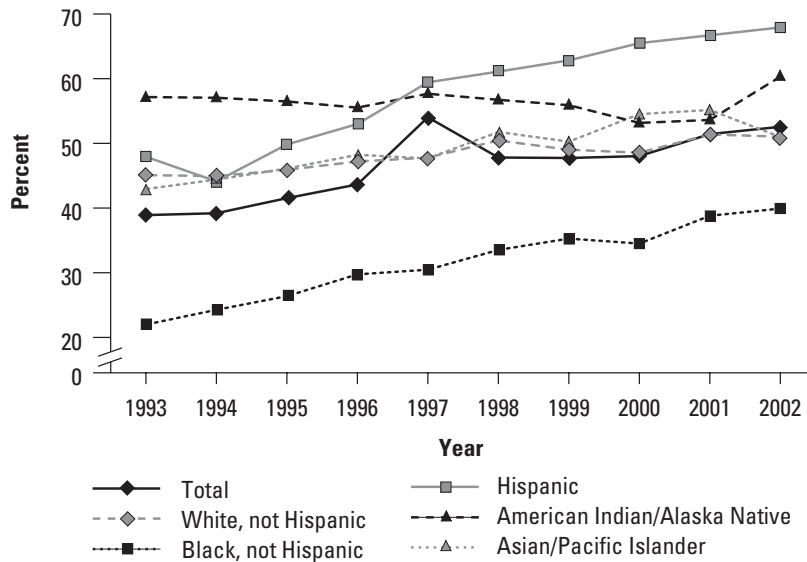
Anemia (low hemoglobin/hematocrit) is an indicator of iron deficiency, the most common known nutrient deficiency in the world. Iron deficiency in children is associated with developmental delays and behavioral disturbances. In the 2002 PedNSS, the prevalence of anemia was 13.1%, compared with 2.8% for U.S. children less than 5 years of age (unpublished data, Dr. Zuguo Mei, CDC, 2003), indicating a wide difference between these populations. The highest prevalence of anemia in both PedNSS and U.S. children is in children younger than age 2; the prevalence decreases as children get older. In PedNSS, the highest prevalence of anemia was in infants aged 6–11 months (16.3%), followed by children aged 12–17 months (15.1%); the lowest prevalence was in children aged 3 to 5 years (9.6%). The prevalence of anemia also varies among racial and ethnic groups in PedNSS; black children have the highest prevalence (19.3%). The overall prevalence of anemia in

## Breastfeeding

The nutritional, immunologic, allergenic, economic, and psychologic advantages of breastfeeding are well recognized. In the 2002 PedNSS, 52.5% of infants were ever breastfed, 20.8% were breastfed for at least 6 months, and 12.3% were breastfed for at least 12 months. The *Healthy People 2010* objective (16-19a-c) to increase the proportion of children ever breastfed to 75%, of children breastfed at 6 months to 50%, and at 1 year to 25%<sup>2</sup> is far from being achieved in the PedNSS population. However, Idaho, the Inter Tribal Council of Arizona, Utah, and Washington met the *Healthy People 2010* objectives for ever breastfeeding (Table 1), and Missouri and New Jersey met the *Healthy People 2010* objectives for breastfeeding at 12 months. National data from other sources indicate that 70.1% of mothers ever breastfed; 33.2% were still breastfeeding at 6 months, and 19.7% at 12 months.<sup>9</sup>



**Figure 7. Trends in percentage of infants ever breastfed,\* by race and ethnicity**



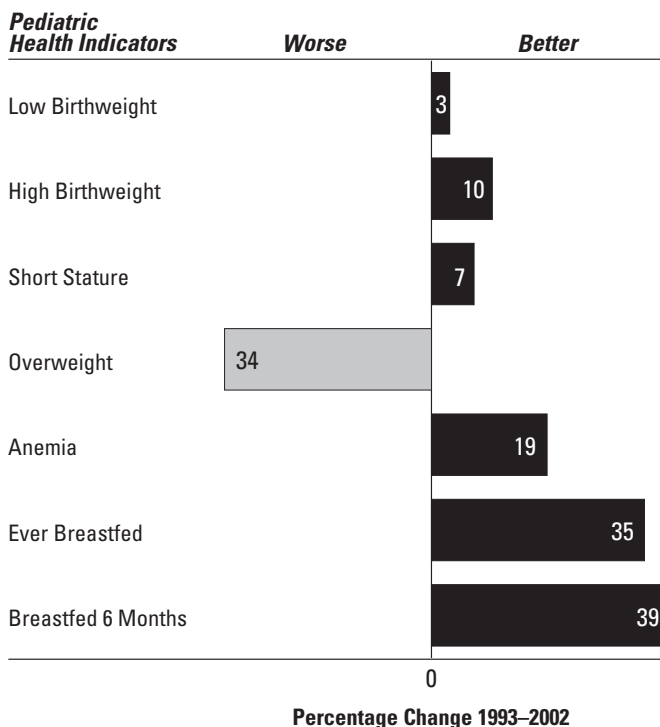
\* Among infants born during the reporting period. Year 2010 target: increase the proportion of mothers who breastfeed their babies in the early postpartum period to 75%.

2002 National PedNSS Table 19D

The prevalence of breastfeeding for children in PedNSS has increased more than 35% from the 1993 rate of 38.9%, and these improved breastfeeding rates are evident among all racial and ethnic groups (Figure 7). Although black infants still have the lowest prevalence of breastfeeding (39.9% in 2002), this prevalence has increased by more than 80% since 1993, when the rate was 22.0%. National data from other sources indicate that the ever breastfed rate for all U.S. mothers increased from 55.9% in 1993 to 70.1% in 2002.<sup>9</sup>

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

**Figure 8. Infant and child health status: percentage change 1993–2002**



2002 National PedNSS Table 2D

## Infant and Child Health Advances and Concerns

Several advances in nutrition and health indicators were observed in the PedNSS population from 1993 to 2002 (Figure 8). Small improvements were made in both low and high birthweight, with the largest improvement in low birthweight among Hispanic infants. Short stature decreased slightly, with the greatest improvement among Asian or Pacific Islander children. Major reductions occurred in the prevalence of anemia. A decrease occurred among all racial and

ethnic groups, with the greatest change among white and Hispanic children. Major improvements have occurred in both the prevalence of infants ever breastfed and those breastfed for at least 6 months. While the prevalence of breastfeeding remains lowest for black infants, this group showed the largest improvement in prevalence of ever breastfed and breastfed for at least 6 months.

Areas of concern remain, however. No racial or ethnic group achieved the *Healthy People 2000*<sup>10</sup> objective to reduce the low-birthweight prevalence to 5%, and increases in low birthweight occurred among white infants. Although there has been a decrease in the prevalence of anemia, it is still high among all racial and ethnic groups. Very few states achieved the *Healthy People 2000*<sup>10</sup> objective that 75% of infants initiate breastfeeding. Overweight is a major public health problem that has steadily increased; 34% more children aged 2 to 5 years are overweight than in 1993. Although Hispanic and American Indian or Alaska Native children have the highest prevalence of overweight, increases occurred among all racial and ethnic groups, with the largest increase among white children aged 2 to 5 years.

## Pediatric Nutrition Recommendations

PedNSS data indicate that national and state public health programs are needed to support the following actions:

- Implement innovative strategies to reverse the rising trend of overweight in young children by increasing breastfeeding, increasing physical activity, promoting increased consumption of fruits and vegetables, and decreasing television viewing.
- Promote and support breastfeeding through medical care systems, work sites, and communities.
- Promote adequate dietary iron intake and the screening of children at risk for iron deficiency.
- Prevent low birthweight by providing preconception nutrition care and outreach activities to promote early identification of pregnancy and 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.

Additional recommendations are as follows:

- Expand participation of states, U.S. territories, and tribal governments in PedNSS and increase collaboration between CDC and participating government agencies to establish and maintain nutrition surveillance systems and improve data quality.
- Routinely screen for overweight and risk of overweight using BMI-for-age as recommended by the American Academy of Pediatrics Policy Statement.<sup>11</sup>

## References

1. Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Menacker F, Munson ML. Births: final data for 2002. *National Vital Statistics Reports* 2003; 52(10):1-114. Available at [http://www.cdc.gov/nchs/data/nvsr/nvsr52/nvsr52\\_10.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr52/nvsr52_10.pdf).
2. U.S. Department of Health and Human Services. *Healthy People 2010*. 2nd edition. Two volumes. Washington, DC: U.S. Government Printing Office; 2000. Available at <http://www.healthypeople.gov/Publications/>.
3. Whitaker RC, Wright JA, Pepe MS, Seidel KD, Dietz WH. Predicting obesity in young adulthood from childhood and parental obesity. *New England Journal of Medicine* 1997;337(13):869-873.
4. Bellizzi MC, Dietz WH. Workshop on childhood obesity: summary of the discussion. *American Journal of Clinical Nutrition* 1999;70(1):173S-175S.
5. Barlow SE, Dietz WH. Obesity evaluation and treatment: expert committee recommendations. *Pediatrics* (serial online) 1998;102(3):e29. Available at <http://www.pediatrics.org/cgi/content/full/102/3/e29>.
6. Himes JH, Dietz WH. Guidelines for overweight in adolescent preventive services: recommendations from an expert committee. The Expert Committee on Clinical Guidelines for Overweight in Adolescent Preventive Services. *American Journal of Clinical Nutrition* 1994;59(2):307-316.
7. Ogden CL, Flegal KM, Carroll MD, Johnson CL. Prevalence and trends in overweight among U.S. children and adolescents, 1999-2000. *Journal of the American Medical Association* 2002;288(14):1728-1732.
8. Centers for Disease Control and Prevention. Recommendations to prevent and control iron deficiency in the United States. *Morbidity and Mortality Weekly Report Recommendations and Reports* 1998;47(RR-3):1-30.
9. Mothers Survey, Ross Products Division, and Abbott Laboratories. Breastfeeding Trends Through 2002. Columbus, OH: Abbott Laboratories; 2003.
10. U.S. Public Health Service. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*. Washington, DC: U.S. Department of Health and Human Services, Public Health Service; 1991. Publication No. PHS 91-50212.
11. American Academy of Pediatrics Committee on Nutrition. Policy statement. Prevention of pediatric overweight and obesity. *Pediatrics* (serial online) 2003;112(2):424-430. Available at [http://aappolicy.aappublications.org/cgi/content/full/pediatrics;112/2/424?fulltext=pediatrics+overweight&searchid=QID\\_NOT\\_SET](http://aappolicy.aappublications.org/cgi/content/full/pediatrics;112/2/424?fulltext=pediatrics+overweight&searchid=QID_NOT_SET).

