

PEDIATRIC NUTRITION SURVEILLANCE SYSTEM

**CENTERS FOR DISEASE CONTROL AND
PREVENTION (CDC) / MASSACHUSETTS
WOMEN, INFANTS AND CHILDREN (WIC)
NUTRITION PROGRAM**



**Massachusetts Department of Public Health
Bureau of Family Health and Nutrition
Nutrition Division
2011 PEDIATRIC DATA REPORT**



JANUARY 2015

PEDIATRIC NUTRITION SURVEILLANCE SYSTEM **CDC / MASSACHUSETTS WIC NUTRITION PROGRAM**

2011 Pediatric Data Report

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Introduction

Purpose of Nutrition Monitoring

Nutritional status affects every aspect of a child's health, including growth and development, physical activity, and response to serious illness. Nutritional assessment is an integral part of pediatric care, and all children should be screened routinely for abnormalities of growth. At the population level, child growth is an indicator of overall population health. Nutrition surveillance monitors trends and patterns of key indicators of childhood nutritional status in order to identify existing and emerging needs and to target and develop appropriate nutrition interventions. Key indicators of childhood nutritional status include height, weight, anemia, birth weight, as well as overweight, obesity and breastfeeding history and behavior characteristics.

National Pediatric Nutrition Surveillance

In 1973, the Centers for Disease Control and Prevention (CDC) began working with five United States (U.S.) states to develop a system for continuously monitoring the growth and nutritional status of low-income children in federally funded maternal and child health and nutrition programs. By 2011, the Pediatric Nutrition Surveillance System (PedNSS) had expanded to include 46 states, the District of Columbia, six Indian Tribal Organizations (ITOs) and two U.S. territories. The PedNSS collects and analyzes data on demographic characteristics, birth weight characteristics, indicators of nutritional status, and infant-feeding practices for children from birth to age 20 years. Other goals of the PedNSS include data interpretation and dissemination. Information from PedNSS is very useful in policy making, priority setting, planning, implementation and evaluation of nutrition programs. In 2011, 87.5% of national PedNSS data were obtained through the Special Supplemental Nutrition Program for Women, Infants and Children (the WIC Program), and the remaining data were obtained from the Early Periodic Screening Diagnosis and Treatment (EPSDT) program (4.1%), the Title V Maternal and Child Health (MCH) program (0.1%), and others such as Head Start (8.4%).

Pediatric Nutrition Surveillance in Massachusetts

Massachusetts (MA) has participated in the national PedNSS since 1993. All MA data are collected on infants and children up to age five years, who attend WIC clinics for routine care, nutrition education, and supplemental foods. These data are aggregated at the state level and submitted to CDC as transaction files for analysis, using a Secure Data Network. The CDC then produces a national nutrition surveillance report by using PedNSS data from MA and other states. The CDC also produces a surveillance report specific for the state of MA as one of the PedNSS contributors. As WIC participation is dependent upon income eligibility, nutrition risk eligibility criteria and other requirements, these data are not representative of the population of MA children as a whole. Furthermore, income eligibility for WIC

requires that applicants present income equal to or less than the federal guidelines. Adjunctive eligibility is based on participation in certain programs like Supplemental Nutrition Assistance Program (SNAP) formerly known as Food Stamps, Transitional Assistance to Needy Families (TANF) formerly known as Aid to Families with Dependent Children (AFDC), and Medicaid. Nutritional risk eligibility criteria include medically-based conditions (for example anemia, underweight, growth failure and poor pregnancy outcomes) and dietary-based conditions (such as nutrient deficiencies or inadequate food intake).

Purpose of the Report

Starting with the 2003 report, data analysis and chart preparation were provided by the CDC and not by the Office of Data Translation (ODT) at the Massachusetts Department of Public Health (MDPH). Consequently the 2011 data analysis and graphics were also done by the CDC. This report is a summary of all Massachusetts PedNSS data collected during the 2011 calendar year. It also highlights data trends from 2002 through 2011. The report serves two purposes: (1) It provides analyses of Massachusetts-specific data, and (2) it serves as an annual summary report for the Massachusetts WIC Program.

Regarding the first purpose, the 2011 MA PedNSS data are compared with the 2011 national PedNSS data, the most current national data available at the time of MA PedNSS data analysis. It should be noted that the national data are not representative of the total population of U.S. children. Comparison of the Massachusetts and national data can be informative only regarding the health and nutritional status of low to moderate-income children in Massachusetts relative to children in similar circumstances across the nation.

Regarding the second purpose, this report will assist the Massachusetts WIC Program in identifying specific risk factors and needs among the participant population. These data also support and facilitate the planning, implementation, and evaluation of specific nutrition interventions.

The data obtained for various indicators are usually compared to the Healthy People 2020 program benchmarks or targets (USDA HP 2020 published in 2010) to see whether the MA PedNSS infants and children are meeting these national targets and to determine areas that need improvement. For example, one of the HP 2020 Objectives is to reduce prevalence of low birth weight to no more than 7.8% of all live births; other targets aim to reduce total preterm births among low income children aged less than 5 years to 11.4%, and to increase prevalence of breastfeeding initiation to 81.9%.

Limitations

MA PedNSS data are exclusive to infants and children in the WIC program. Certain data on demographics, nutritional status, anemia and infant feeding practices should be interpreted with caution as they tend to be much different than the data for the general MA population published by the MA Department of Public Health. This discrepancy could occur because MA PedNSS data are based on low income infants and children participating in the WIC Program only and such data is not representative of the state of Massachusetts as a whole.

There were also small number limitations. The CDC does not generate statistics based on fewer than 100 records as the data will not be statistically stable. Therefore, the rates and proportions based on fewer than 100 observations are suppressed and should be interpreted cautiously. Statistics for some variables are missing for American Indian and multiple race MA PedNSS populations aged two years to less than five years if the group presented fewer than 100 records.

Some data such as income, birth weight, and mother's age and breastfeeding characteristics were not obtained from certain clients as the clients declined to report them. This lack of information will impact determination of household poverty, nutritional status, low birth weight and high birth weight as well as other factors that impact the health of the child.

Executive Summary

Demographic Characteristics

- The 2011 Massachusetts Pediatric Nutrition Surveillance System (MA PedNSS) report includes records representing 132,651 children ages zero (0) to 59 months (Table 1).
- Sixty-one percent (61.2%) of the 2011 MA PedNSS population were children of color compared to the national PedNSS population, where 68.3% were children of color (Figure 2).
- Majority of the PedNSS population were under one year of age: 31.8% of the 2011 MA PedNSS population compared to 33.8% of the 2011 national PedNSS population (Figure 3a).
- Over ninety eight percent (98.6%) of the MA PedNSS population were at or below 200% Federal Poverty Level (FPL) compared to almost 90% of the 2011 national PedNSS population (Figure 3b).
- One hundred percent of MA PedNSS population were participants of the WIC program, 39.8% were SNAP recipients, and 80.5% received Medicaid while 16.1% received TANF (Figure 3c).

Birth Weight Characteristics

- The overall prevalence of low birth weight (LBW) in 2011 MA PedNSS, defined as birth weight less than 2500 grams, was 8.7%. This rate was slightly lower than the 2011 national LBW prevalence of 8.9% (Figure 4a).
- Low birth weight in 2011 MA PedNSS was most prevalent among Black non-Hispanic (10.9%) children, but was least prevalent among multiple race (5.8%) children (Figure 4a).
- The overall prevalence of LBW has remained stable during the past ten years in MA PedNSS, from 8.8% in 2002 to 8.7% in 2011 (Figure 4b).
- The overall prevalence of high birth weight (HBW), defined as birth weight greater than 4000g, was 7.4% in 2011 MA PedNSS. This rate was slightly higher than the HBW prevalence of 6.4% in the 2011 national PedNSS (Figure 5a).
- In the past ten years, the overall trend showed a slight decrease in HBW, from 8.4% in 2002 to 7.4% in 2011 (Figure 5b).

Indicators of Nutritional Status

Short Stature

- The prevalence of short stature (height-for-age < 5th percentile) was 5.3% and 6.3%, among children represented in the 2011 MA PedNSS and their national counterparts respectively (Figure 6).
- Asian children aged less than five years had the highest prevalence of short stature (6.0%) in 2011 MA PedNSS while American Indian/Alaskan native children has the lowest prevalence of short stature (4.4%) (Figure 7a).
- Among the 2011 MA PedNSS population, children less than one year of age had the highest prevalence of short stature (8.6%) whereas four year old children have the lowest prevalence of short stature (2.7%) (Figure 7b).
- Overall, the percentage of MA PedNSS children with short stature has not changed significantly in the past ten years (from 5.0% prevalence in 2002 to 5.3% prevalence in 2011) (Figure 7c).

Underweight

- The prevalence of underweight (weight-for-height < 5th percentile as per CDC Growth Charts 2000) was 4.8% among all children represented in the 2011 MA PedNSS and 3.5% among children in the 2011 national PedNSS (Figure 8a).
- Multiple race children (6.3%) had the highest prevalence of underweight in 2011 MA PedNSS while Hispanic children had the lowest (4.4%) (Figure 8a).
- The highest prevalence of underweight (9.6%) in 2011 MA PedNSS was among the youngest age group, children aged less than one year, while children aged one to two years had the lowest prevalence (0.5%) of underweight (Figure 8b).
- The prevalence of underweight children decreased slightly among all race and ethnicity categories in MA PedNSS for the past ten years from 4.9% in 2002 to 4.8% in 2011 (Figure 8c).

Obesity and Overweight

- Children aged two years to less than five years in the 2011 MA PedNSS had a higher prevalence of obesity and overweight combined (33.0%) compared to children in the 2011 national PedNSS (30.4%) (Figure 11a).
- In the 2011 MA PedNSS, Hispanic children had the highest combined percentage (38.4%) of excessive weight in obesity (20.5%) and overweight (17.9%) while Asian children had the lowest combined percentage (20.7%) of obesity (9.3%) and overweight (11.4%) (Figure 11a).

-
- Four year old children had the highest combined percentage (35.7%) of obesity (18.5%) and overweight (17.2%) and two year old children had the lowest combined percentage (30.0%) of obesity (14.0%) and overweight (16.0%) in the 2011 MA PedNSS (Figure 11b).
 - The overall prevalence of overweight among MA PedNSS children aged two years to less than five years decreased slightly in the past ten years among all race/ethnicity categories from 16.8% in 2002 to 16.6% in 2011 (Figure 12). Similarly, the overall prevalence of obesity among MA PedNSS children aged two years to less than five years decreased slightly in the past ten years among all race/ethnicity categories from 17.0% in 2002 to 16.4% in 2011 (Figure 13).

Anemia

- The overall prevalence of anemia in 2011 for children represented in the MA PedNSS was 8.1%, compared to 14.4% in the 2011 national PedNSS (Figure 14a).
- Anemia prevalence in 2011 MA PedNSS varied by race and ethnicity and was highest among Black non-Hispanic children (11.8%), and lowest among White non-Hispanic children (6.5%) (Figure 14a).
- Anemia prevalence also varied by age in MA PedNSS and was highest among children aged 18 months to less than 24 months (10.4%) and lowest in children aged three years to less than five years (6.5%) (Figure 14b).
- The overall prevalence of anemia in MA PedNSS children aged less than five years decreased in the past ten years in all race/ethnicity categories (from 13.7% in 2002 to 8.1% in 2011) (Figure 15a). A decreasing trend was also observed in the various age groups (from 13.7% in 2002 to 8.1% in 2011). (Figure 15b).

Infant-Feeding Practices

- In 2011, 75.3% of all infants in the MA PedNSS were ever breastfed compared to 66.3% of infants in the 2011 national PedNSS (Figure 16a).
- Black non-Hispanic infants (83.8%) had the highest prevalence of breastfeeding initiation, while multiple race infants (67.8%) had the lowest breastfeeding initiation rate (Figure 16a).
- In the last ten years, the overall percentages of infants in the MA PedNSS that were breastfed increased for both initiation and duration. The percentage of ever breastfed infants increased from 66.1% in 2002 to 75.3% in 2011. For infants breastfed for at least 6 months, the percentage increased from 24.6% in 2002 to

27.6% in 2011. Lastly, the percentage of infants breastfed for at least 12 months increased from 14.9% in 2002 to 15.1% in 2011 (Figure 19).

- In 2011, 14.6% of all infants in the MA PedNSS were exclusively breastfed for three months while 9.1% were exclusively breastfed for six months. The prevalence of exclusive breastfeeding was lower in the 2011 national PedNSS where 10.8% of all infants in the national PedNSS were exclusively breastfed for three months while 6.3% were exclusively breastfed for six months (Figure 20).

Behavioral characteristics: Television Viewing and Household Smoking

- The overall prevalence of TV viewing for less than two hours per day in children aged two to less than five years was 80.7% among 2011 MA PedNSS while in the 2011 national PedNSS, the prevalence was 79.9% (Figure 21a).
- In the 2011 MA PedNSS, the prevalence of television viewing for two hours or less per day by children aged two years to less than five years was highest among White non-Hispanic children (83.8%), while the prevalence was the lowest among Hispanic children (78.2%) (Figure 21a).
- The prevalence of television viewing for two hours or less per day by children aged two years to less than five years varied by age and was highest among the two-year olds (83.2%) and lowest among the four-year olds (78.2%) in the 2011 MA PedNSS (Figure 21b).
- The overall prevalence of children aged less than five years exposed to household smoking was 6.0% among 2011 MA PedNSS while it was 7.9% among the 2011 national PedNSS (Figure 22a).
- Percentage of children aged less than five years who live in a household with smokers varied by race and ethnicity in the 2011 MA PedNSS. The highest percentage of children exposed to household smoking was observed in multiple race children (9.9%). The lowest percentage of children exposed to household smoking was observed in Black non-Hispanic children (3.8%) (Figure 22a).
- Exposure to household smoking also varied by age. In the 2011 MA PedNSS, the highest prevalence (6.2%) of household smoking exposure was observed among the children aged less than one year and those aged two years. The lowest prevalence (5.9%) of household smoking exposure was observed in children aged one year, three years and four years (Figure 22b).

Conclusions

Healthy People 2020 targets were set for a few of the nutritional status indicators for PedNSS children in 2011. The target for low birth weight was 7.8%. In 2011, neither Massachusetts PedNSS nor their national counterparts met the HP-2020 goal of 7.8% for low birth weight as the prevalence among the MA PedNSS was 8.7% while that for the national PedNSS was 8.9%. No targets were set in the HP-2020 goals for short stature or underweight.

Breastfeeding targets were set at 81.9% for breastfeeding initiation or ever breastfed, 60.6% for breastfeeding at 6 months and 34.1% for breastfeeding at 12 months, 46.2% for exclusive breastfeeding for 3 months and 25.5% for exclusive breastfeeding for six months. Neither MA PedNSS at 75.3% nor their national counterparts at 66.3% met this goal of 81.9% for ever breastfed infants. The prevalence of breastfeeding at 6 months was 27.6% in 2011 among the MA PedNSS so Massachusetts did not meet the HP 2020 goal of 60.6%. Lastly, the prevalence of breastfeeding for 12 months was 15.1% in 2011 among the MA PedNSS so Massachusetts did not meet the HP 2020 goal of 34.1%. Similarly, the prevalence for exclusive breastfeeding for three months (14.6%) and for six months (9.1%) in 2011 MA PedNSS did not meet the HP 2020 targets. More breastfeeding intervention is therefore required to increase breastfeeding initiation, duration and exclusivity so as to meet the HP 2020 targets.

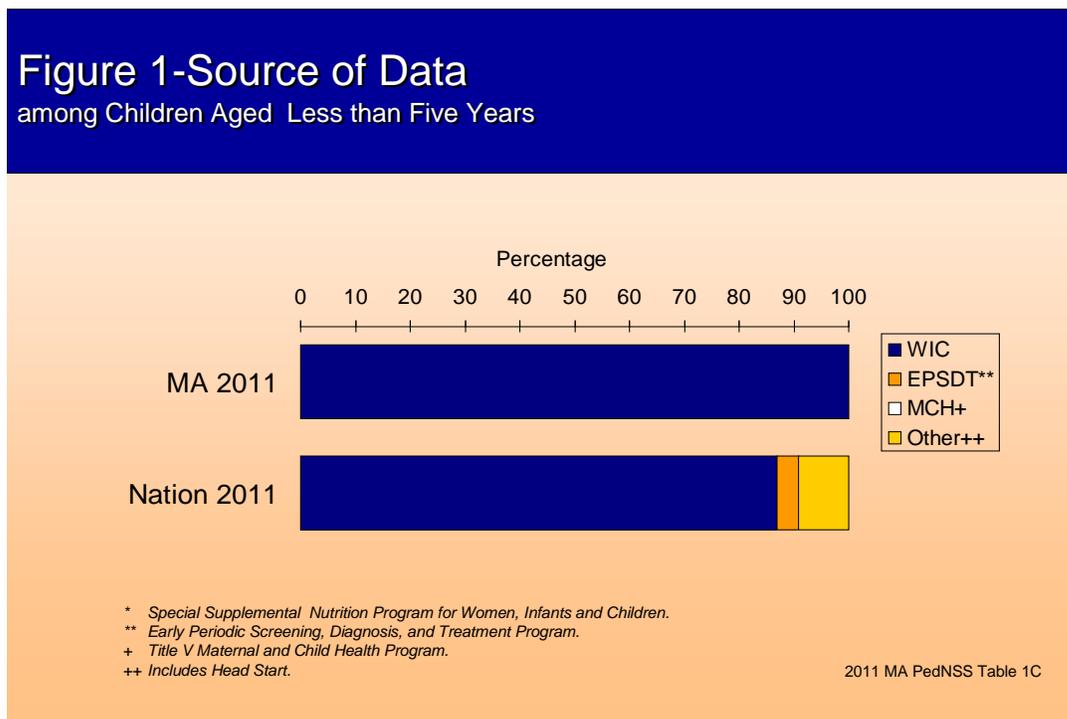
Healthy People 2020 targets were also set for childhood obesity and the goal was to decrease the prevalence of obesity to 9.4% among children aged two to less than 5 years. Neither MA PedNSS at 16.4% nor their national counterparts at 14.4% met this goal. More work needs to be done to decrease the prevalence of childhood obesity at the state and national level.

The HP target for anemia was to decrease the prevalence of anemia among children aged 1 to 3 years to 14.3%. Anemia targets were met in the 2011 MA PedNSS in younger children where the overall prevalence of anemia was 8.7%

Healthy People 2020 targets were set for TV viewing and the goal was to increase the proportion of children aged two to five years who view television, videos or play video games for no more than two hours a day to 83.2%.

The prevalence for less TV& video viewing or video game playing was 80.3% in MA PedNSS and 79.9% in the national PedNSS and neither group met this HP 2020 target.

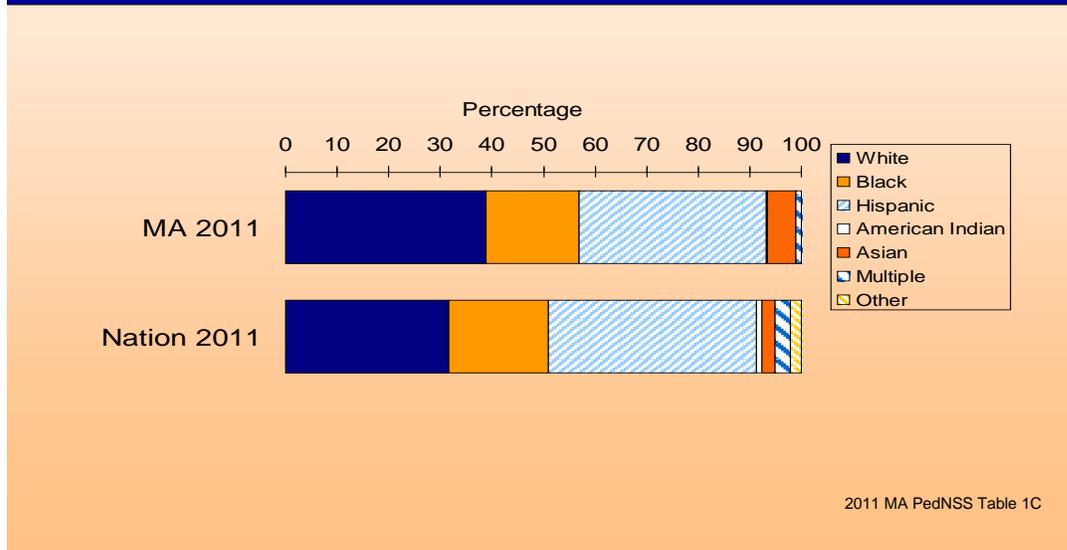
Demographics: Source of Data



- The 2011 MA PedNSS included records representing 132,651 children ages zero (0) to 59 months.
- In the 2011 MA PedNSS, the entire (100%) dataset was derived from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).
- Among the national PedNSS population, 87.0% of the 2011 dataset was based on data derived from WIC. Other data sources included the Early Periodic Screening Diagnosis and Treatment or EPSDT Program (3.8%), the Title V Maternal and Child Health Program or MCH (0.0%), and other programs including Head Start (9.2%).

Demographics: Race and Ethnicity

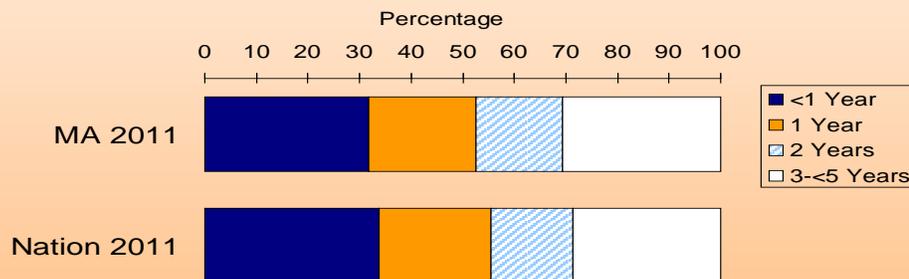
Figure 2-Racial and Ethnic Distribution
among Children Aged Less than Five Years



- In 2011, the racial and ethnic distribution of the MA PedNSS population was comprised of 38.8% White non-Hispanic, 36.4% Hispanic, 18.0% Black non-Hispanic, 5.4% Asian /Pacific Islander and 0.3% American Indian/Alaskan Native children as well as children of multiple (1.0%) races.
- In 2011, 61.2% of the MA PedNSS population consisted of children of color, whereas the national PedNSS population consisted of 68.3% children of color.
- While the proportion of Black non-Hispanic children varied only slightly between the 2011 MA PedNSS (18.0%) and the national PedNSS (19.3%), the MA PedNSS population had a larger proportion of White non-Hispanic (38.8%) and Asian (5.4%) children than the national PedNSS population (with 32.7% White non-Hispanic and 2.5% Asian children). However, there were a greater proportion of Hispanic children nationally (40.0%) than in the MA PedNSS population (36.4%).

Demographics: Age Distribution

Figure 3a-Age Distribution
among Children Aged Less than Five Years

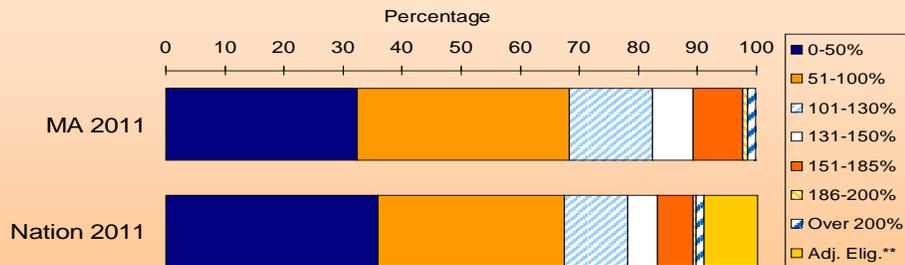


2011 MA PedNSS Table 1C

- Almost a third (31.8%) of the total 2011 MA PedNSS population was under one year of age, 20.7% were between one and two years old, 16.8% were between two and three years old, and 30.6% were between three and less than five years old.
- The 2011 national data displays a similar picture. However a greater proportion of children nationally (33.8%) were less than one year old compared to their counterparts in MA PedNSS.

Demographics: Income Distribution

Figure 3b-Income Distribution*
among Children Aged Less than Five Years



* Percent of poverty level.

** Adjunctive eligibility: eligible for Medicaid, Supplemental Nutrition Assistance Program, or other entitlement programs.

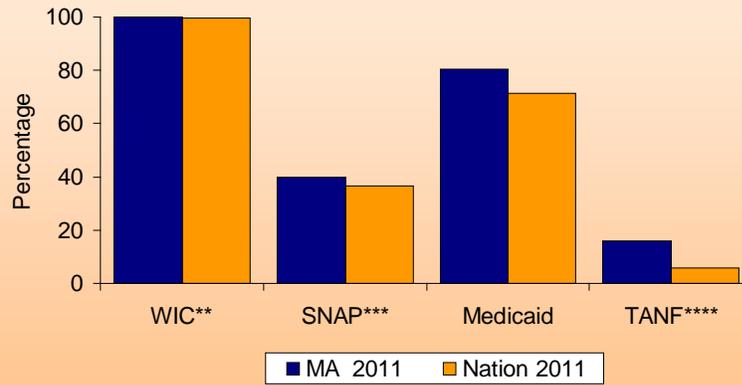
2011 MA PedNSS Table 1C

- WIC participation is dependent upon income eligibility, nutrition risk eligibility criteria and other requirements. It should be noted that for a participant to be income eligible for WIC Nutrition Program, applicants must have an income at or below a specified income level or standard set by the state agency or be determined adjunctively income-eligible based on participation in certain other income-based assistance programs.
- Nutritional risk eligibility criteria include medically-based conditions (for example anemia, underweight, growth failure and poor pregnancy outcomes) and dietary-based conditions (such as nutrient deficiencies or inadequate food intake).
- To be eligible for the WIC Nutrition Program, an applicant's gross income must be equal to or less than 185% of the 2011 US Department of Health and Human Services poverty guidelines (<http://aspe.hhs.gov/poverty/11pov>)
- Sometimes an applicant with a gross income greater than 185% of the 2011 US Department of Health and Human Services Poverty Guidelines may still qualify for the WIC Nutrition Program through adjunctive eligibility participation in SNAP, TANF, or Medicaid.

-
- In 2011, 32.4% of children in MA PedNSS lived in a household that were at or below 50% of the Federal Poverty Level (FPL) compared to the national PedNSS with 35.9% of children at or below 50% of the FPL. (Please refer to the following link for more information on poverty Guidelines- <http://aspe.hhs.gov/poverty/11poverty.htm>)
 - Over one third (35.9%) of children in MA PedNSS lived in a household that had a household income between 51% and 100% of the FPL, higher than the figure seen in their counterparts in the national PedNSS population (31.5%).
 - Similarly fourteen percent (14.0%) of children in MA PedNSS lived in a household that had a household income between 101% and 130% of the FPL, higher than the figure seen in their counterparts in the national PNSS population (10.8%).
 - Approximately seven percent (6.9%) of children in MA PedNSS lived in a household that had a household income between 131% and 150% of the FPL, higher than the figure seen in their counterparts in the national PNSS population (5.0%).
 - The percentage of children in MA PedNSS that lived in a household with income level ranging from 151% to 185% FPL was 8.5%, higher than the percentage observed in the national PNSS population (6.1%).
 - Similarly, the percentage of children in MA PedNSS at 186% to 200% FPL was 0.8%, higher than the percentage observed in the national PedNSS population (0.5%).
 - About one percent (1.3%) of MA PedNSS children as well as their national counterparts (1.3%) lived in a household that were over the 200% FPL.
 - Over ninety eight percent (98.5%) of the MA PedNSS population lived in households that were at or below 200% Federal Poverty Level (FPL) compared to 90% of the 2011 national PedNSS population.
 - Adjunctive Eligibility percent for MA PedNSS children were 0.1% and were much lower than the adjunctive eligibility observed in the national PedNSS population (9.0%).

Demographics: Program Participation

Figure 3c-Program participation*
among Children Aged less than Five Years



* Represents program participation among children enrolled in the PH program contributing PedNSS data.

** Special Supplemental Nutrition Program for Women, Infants and Children.

*** Supplemental Nutrition Assistance Program.

**** Temporary Assistance for Needy Families.

2011 MA PedNSS Table 1C

- One hundred percent of 2011 MA PedNSS population were participants of the WIC program, 39.8% were SNAP recipients, 80.5% of the MA PedNSS children received Medicaid while 16% received TANF.
- In the 2011 national PedNSS, 98.1% of the population were participants of the WIC program, 31.8% were SNAP recipients; 68.1% of the national PedNSS children received Medicaid while 5.8% received TANF.

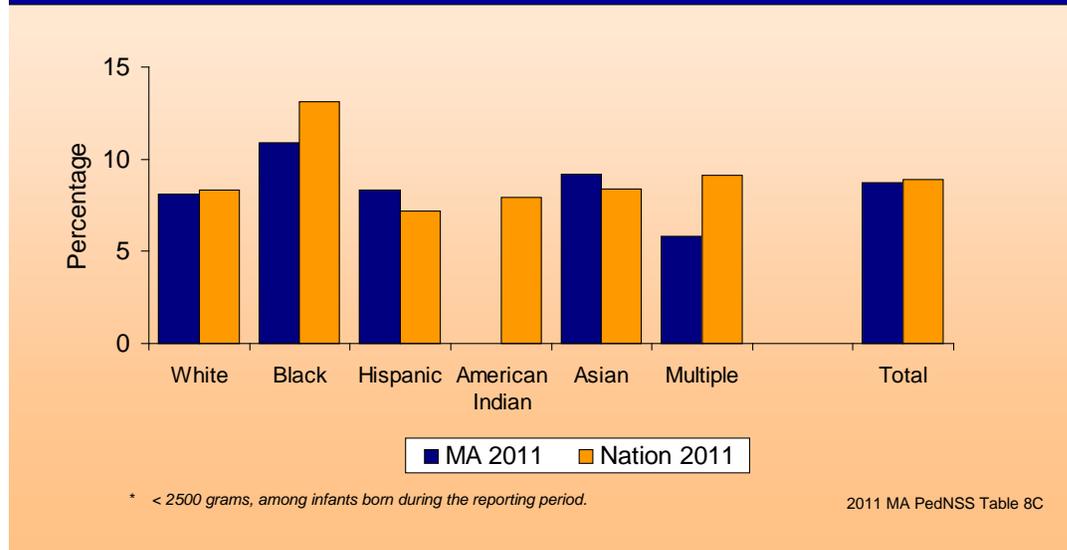
Demographics: Race/Ethnicity and Age Distribution of Children

Table 1. Race/Ethnicity and Age Distribution of Children Participating in the Massachusetts 2011 PedNSS

Race and Ethnic Distribution		Number	Percent
	White non-Hispanic	51, 502	38.8
	Black non-Hispanic	23, 907	18.0
	Hispanic	48,320	36.4
	American Indian	348	0.3
	Asian/Pacific Islander	7187	5.4
	Multiple Races	1387	1.0
	All Other	0	0.0
	Total	132,651	100.0
Age Distribution			
	0 - 5 months	32,108	24.2
	6 - 11 months	10,097	7.6
	12 - 23 months	27,519	20.7
	24 - 35 months	22,299	16.8
	36-59 months	40,628	30.6
	Total	132,651	100.0

Low Birth Weight: Race and Ethnicity

Figure 4a-Prevalence of Low Birth Weight*
by Race and Ethnicity



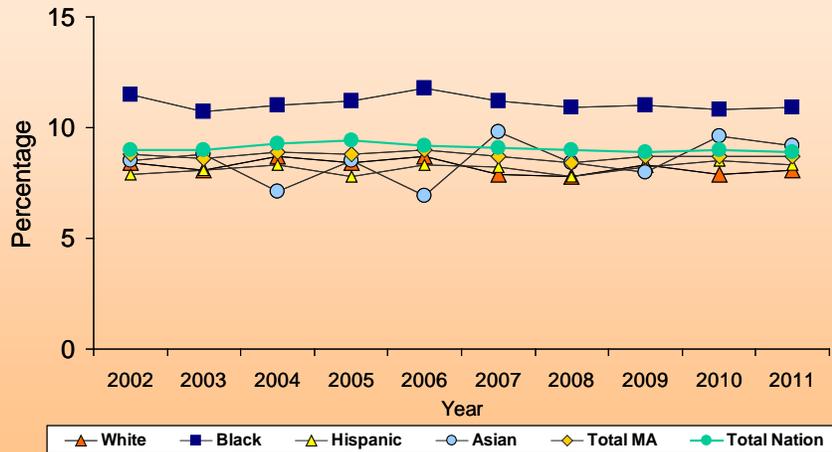
One of the important determinants of neonatal and post neonatal mortality is low birth weight (LBW), defined as birth weight less than 2500 grams (IOM 1985). Low birth weight infants are also at increased risk for neonatal mortality, developmental delay, and for other medical complications during infancy, that range from neuro-developmental disabilities to respiratory problems, and such children tend to fare worse when compared to peers of normal birth weight. Low birth weight infants are also at increased risk for conditions affecting the lower respiratory tract and future cognitive and behavioral difficulties (Phillip 1995, Taylor et al 2000, Hack et al 2002, Bhutta et al 2002, Reichman 2005, and Sharma & Mishra 2013).

- The overall prevalence of LBW in the 2011 MA PedNSS (8.7%) was higher than in the general MA population reported at 7.6% (according to the 2011 MA Birth Report published by MA Department of Public Health in 2011).
- The overall prevalence of LBW in the 2011 MA PedNSS was 8.7% while in the 2011 national PedNSS, it was 8.9%.
- Among the 2011 MA PedNSS population, the prevalence of LBW was highest for Black non-Hispanic infants (10.9%) compared to Asian (9.2%), Hispanic (8.3%) and White non-Hispanic (8.1%) infants. The lowest prevalence of LBW was among multiple race infants (5.8%).

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- Similarly, in the national PedNSS, the prevalence of LBW was higher for Black non-Hispanic infants (13.1%) than for infants with multiple races (9.1%), Asian (8.4%), White non-Hispanic (8.3%), American Indian (7.9%) and Hispanic (7.2%) infants.
 - The HP 2020 target is to reduce LBW to no more than 7.8% percent of all live births. Since the prevalence of LBW was high among all PedNSS infants both in MA (8.7%) and nationally (9.0%) with Black non-Hispanic having the highest prevalence, all such infants are at increased risk for various health problems and should be targeted for appropriate interventions.
 - No statistics for LBW are shown in 2011 for American Indian MA PedNSS populations aged less than five years as the group had fewer than 100 records. The CDC does not generate statistics based on fewer than 100 records as the data will not be statistically stable.

Low Birth Weight Trends: Race and Ethnicity

Figure 4b-Trends in Prevalence of Low Birth Weight*
by Race and Ethnicity

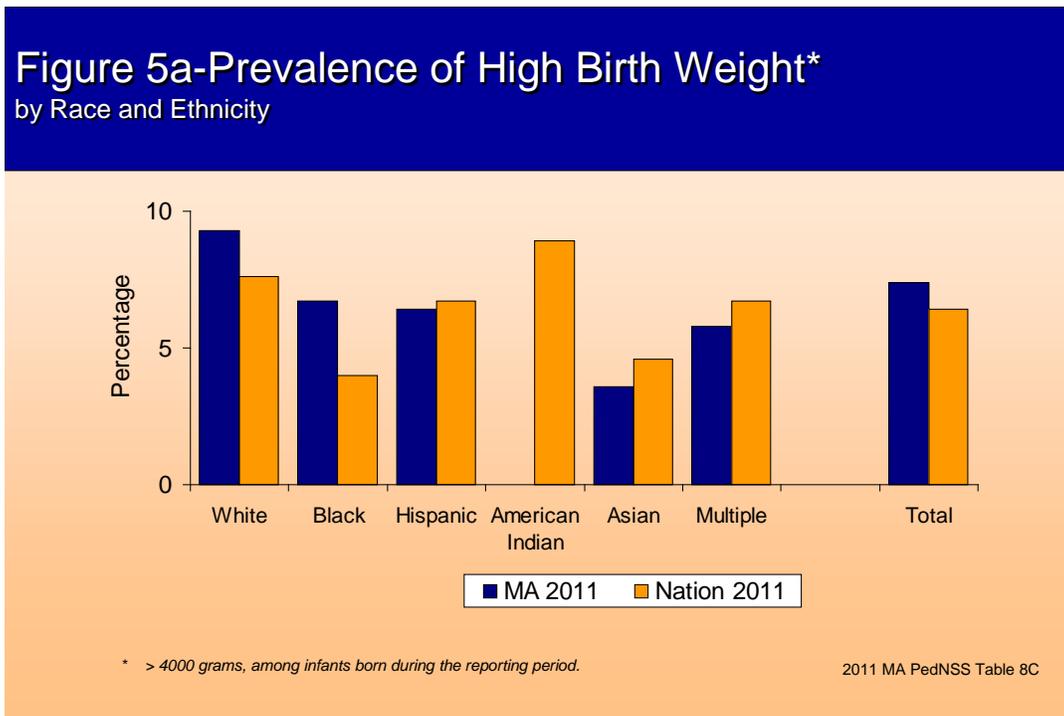


* LBW < 2500 grams, among infants born during the reporting period.

2011 MA PedNSS Table 18C

- In the MA PedNSS, the overall prevalence of LBW for infants aged less than five years has remained stable in the past ten years across all race/ethnicity categories, from 2002 (8.8%) to 2011 (8.7%).
- An increase (0.7%) in LBW was seen among Asian infants where the prevalence of LBW increased from 8.5% in 2002 to 9.2% in 2011.
- The prevalence of LBW among Black non-Hispanic infants showed a downward trend but has remained consistently high compared to other races from 2002 (11.5%) to 2011 (10.9%).

High Birth Weight: Race and Ethnicity



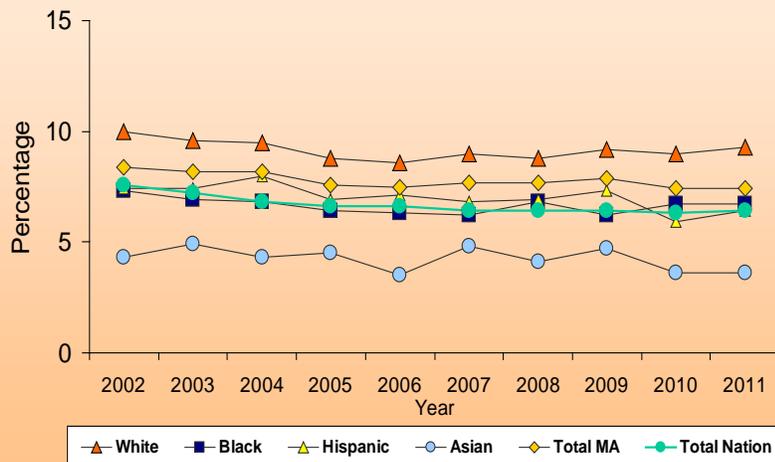
High birth weight (HBW), defined as birth weight >4000 grams, also called macrosomia, increases the risk for injury and or death during delivery. Such risks include birth injuries such as shoulder dystocia, broken clavicles, neurological damage, prolonged vaginal delivery associated with increased incidence of cesarean delivery, respiratory distress and fetal death due to asphyxia, and other medical complications including childhood asthma and inflammatory conditions. High birth weight infants are also at increased risk for conditions such as diabetes, childhood obesity, adult obesity, lower respiratory tract conditions, hypertension and future cardiovascular diseases (Jolly et al 2003).

The overall prevalence of high birth weight was 7.4% in the 2011 MA PedNSS while the 2011 national percentage was 6.4%.

White non-Hispanic (9.3%) infants had the highest prevalence of HBW in the 2011 MA PedNSS, while Asian (3.6%) infants had the lowest prevalence. The prevalence of HBW in other groups was as follows: Black non-Hispanic (6.7%) and Hispanic (6.4%) and multiple race children (5.8%). The prevalence of HBW for 2011 MA PedNSS was not calculated for American Indian /Alaskan Native, and hence was not displayed in the above graph because fewer than 100 records were available for analysis.

High Birth Weight Trends: Race and Ethnicity

Figure 5b-Trends in Prevalence of High Birth Weight* among MA PedNSS Children by Race and Ethnicity



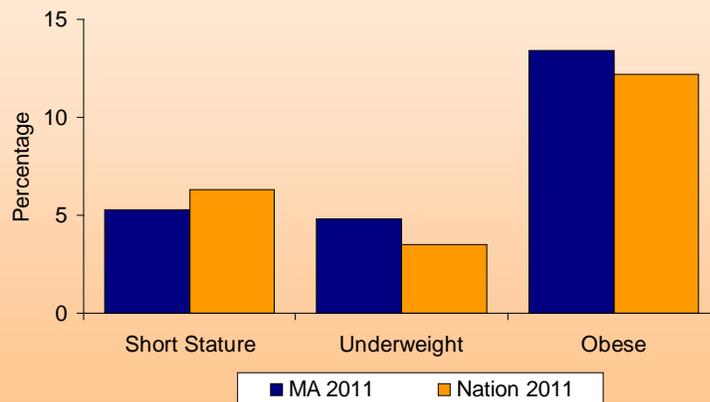
* > 4000 grams, among infants born during the reporting period.

2011 MA PedNSS Table 18C

- In the past ten years, the overall trend showed a slight decrease in HBW, from 8.4% in 2002 to 7.4% in 2011. Asian infants also experienced a small decrease in HBW from 4.3% in 2002 to 3.6% in 2011.
- Between 2002 and 2011, the prevalence of HBW for MA PedNSS was not calculated for American Indian /Alaskan Native and multiple race infants, and hence was not displayed in the above graph because fewer than 100 records were available for analysis.

Short Stature, Underweight and Obesity

Figure 6-Prevalence of Short Stature, Underweight, and Obesity* among Children Aged Less Than Five Years

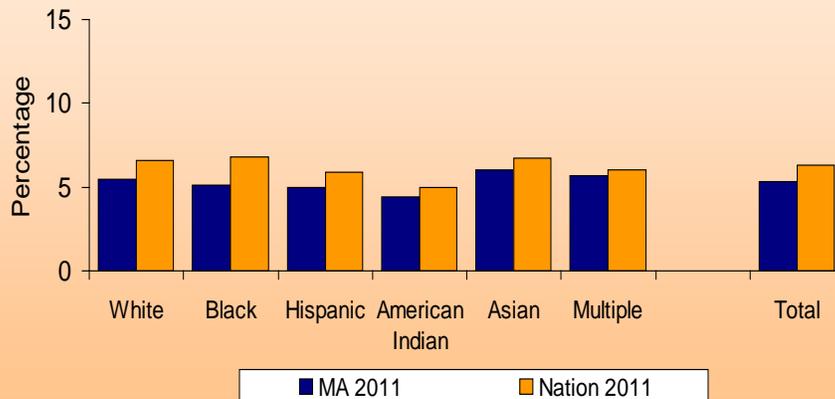


* Children aged < 2 years: short stature is defined as length-for-age \leq 2.3rd percentile, underweight is defined as weight-for-length \leq 2.3rd percentile, and obese is defined as high weight-for-length \geq 97.7th percentile, WHO Growth Charts, 2006. Children aged \geq 2 years: short stature is defined as height-for-age < 5th percentile, underweight is defined as BMI < 5th percentile, and obese is defined as BMI \geq 95th percentile, CDC Growth Charts, 2000. 2011 MA PedNSS Table 2C

- Among children aged less than five years in the 2011 MA PedNSS, 5.3% were of short stature, 4.8% were underweight and 13.4% were obese.
- The prevalence of short stature (5.3%) among 2011 MA PedNSS children less than five years of age was lower than the prevalence among national PedNSS children (6.3%). However, the prevalence of underweight was slightly higher in MA PedNSS children (4.8%) compared to their counterparts in the national PedNSS (3.5%) in the same year.
- The overall proportion of obese children was slightly higher among MA PedNSS children aged less than five years (13.4%) than among their national counterparts (12.2%).

Short Stature: Race and Ethnicity

Figure 7a-Prevalence of Short Stature* among Children Aged Less than five Years, by Race and Ethnicity



* Children aged < 2 years: length-for-age \leq 2.3rd percentile, WHO Growth Charts, 2006.
Children aged \geq 2 years: height-for-age < 5th percentile, CDC Growth Charts, 2000.

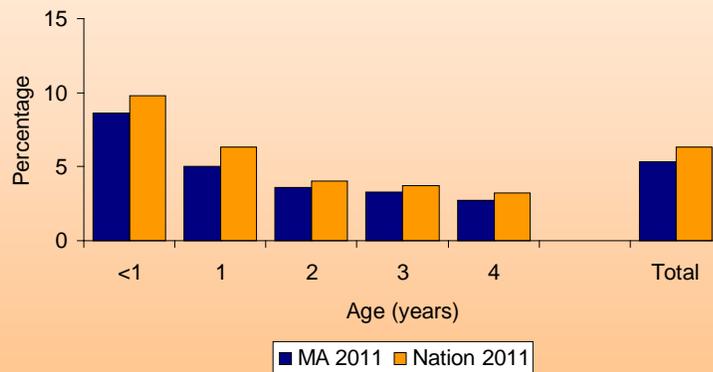
2011 MA PedNSS Table 8C

- Short stature, or growth retardation, is defined based on the 2000 CDC gender specific growth chart percentiles as stature of less than the 5th percentile height-for-age (measured standing) for children aged two years or older.
- For children aged less than two years, short stature is defined, based on the 2006 WHO growth chart percentiles, as stature equal to or less than the 2.3rd percentile length-for-age (measured recumbently).
- Short stature reflects the long-term health and nutritional status of a child or a population. It may reflect the normal variation of growth within a population; that is, five percent of healthy children are expected to fall below the established cutoff that defines short stature. Short stature may be associated with short parental stature or low birth weight, but it may also reflect growth retardation that results from chronic malnutrition due to inadequate food intake, recurrent illness, or both.
- The prevalence of short stature was consistently lower in the 2011 MA PedNSS (5.3%) in all race/ethnicity groups compared to 2011 national PedNSS data (6.3%).

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- The prevalence of short stature varied by race and ethnicity. Among the 2011 MA PedNSS population, Asian (6.0%) children had the highest prevalence of short stature. This was followed by multiple race (5.7%), White non-Hispanic (5.5%), Black non-Hispanic (5.1%) and Hispanic (5.0%). American Indian/Alaskan native (4.4%) children had the lowest prevalence of short stature.

Short Stature: Age Distribution

Figure 7b-Prevalence of Short Stature* among Children Aged Less than five Years, by Age



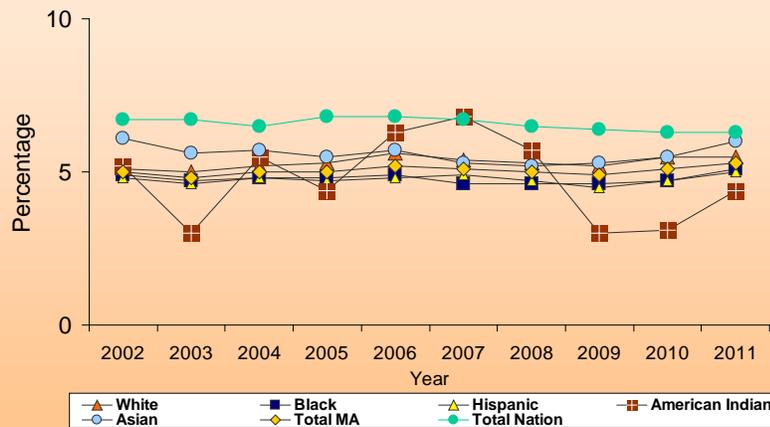
* Children aged < 2 years: length-for-age \leq 2.3rd percentile, WHO Growth Charts, 2006.
Children aged \geq 2 years: height-for-age < 5th percentile, CDC Growth Charts, 2000.

2011 MA PedNSS Table 8C

- Short stature also varied by age among children less than five years old.
- Among the 2011 MA PedNSS population, children less than one year of age had the highest prevalence (8.6%) of short stature compared to that for one year olds (5.0%), two-year olds (3.6%) and three-year old (3.3%) children. Four-year old (2.7%) children in MA PedNSS had the lowest prevalence of short stature.
- Among the national PedNSS population, children less than one year of age had the highest prevalence (9.8%) of short stature compared to that for one-year olds (6.3%), two-year olds (4.0%) and three-year old (3.7%) children. Four-year old (3.2%) children in national PedNSS had the lowest prevalence of short stature.

Short Stature Trends: Race and Ethnicity

Figure 7c-Trends in Prevalence of Short Stature* among MA PedNSS Children Aged Less than Five Years, by Race and Ethnicity



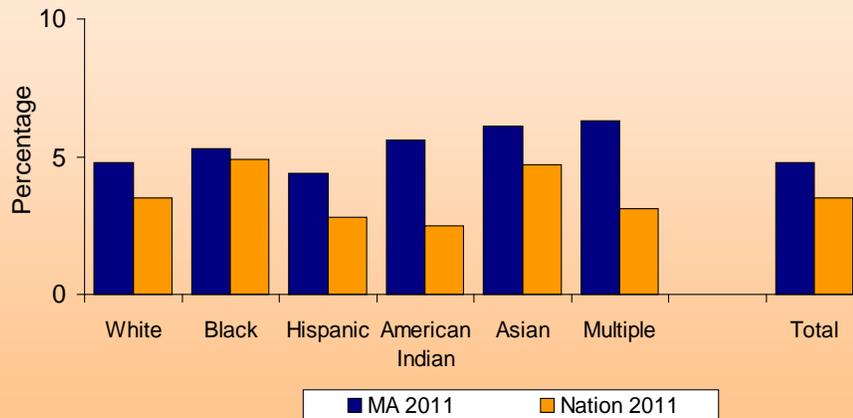
* Children aged < 2 years: length-for-age \leq 2.3rd percentile, WHO Growth Charts, 2006.
Children aged \geq 2 years: height-for-age < 5th percentile, CDC Growth Charts, 2000.

2011 MA PedNSS Table 18C

- Overall, the percentage of children with short stature has remained steady in the last ten years among all race/ethnicity groups (from 5.0% in 2002 to 5.3% in 2011).
- The proportion of short stature among American Indian children decreased from 5.2% in 2002 to 4.4% in 2011 MA PedNSS though their total population data has fluctuated from year to year.

Underweight: Race and Ethnicity

Figure 8a-Prevalence of Underweight*
among Children Aged Less than Five Years, by Race and Ethnicity



* Children aged < 2 years: weight-for-length \leq 2.3rd percentile, WHO Growth Charts, 2006.
Children aged \geq 2 years: BMI-for-age < 5th percentile, CDC Growth Charts, 2000.

2011 MA PedNSS Table 8C

Underweight in children is defined using the 2000 CDC gender-specific growth charts or the 2006 WHO growth charts depending on child's age. For children aged two years or older the CDC growth chart is used and underweight is defined as BMI-for-Age less than 5th percentile. For children aged less than two years, the 2006 WHO growth chart is used and underweight is defined as weight-for-length less than the 2.3rd percentile. Underweight is also referred to as low weight-for-height, thinness, or wasting and it is often associated with recent severe illness or acute malnutrition.

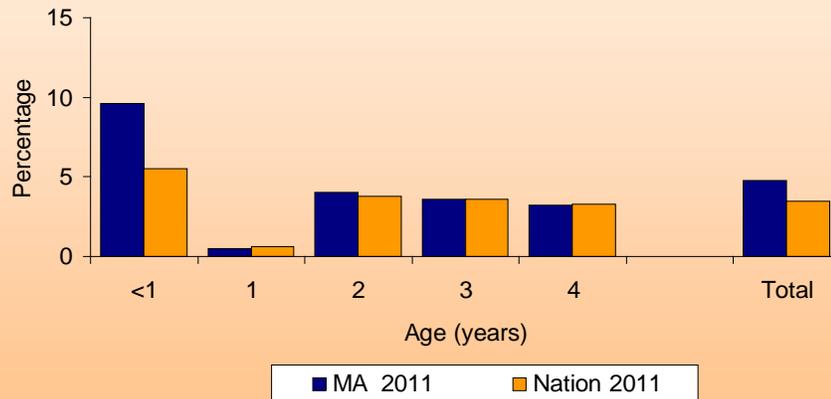
Underweight in children was compared between the 2011 MA and 2011 national PedNSS data among children aged less than five years by race and ethnicity.

- The overall prevalence of underweight was higher in children represented in the 2011 MA PedNSS (4.8%) compared to those in the 2011 national PedNSS (3.5%).
- Multiple race children (6.3%) had the highest prevalence of underweight in MA PedNSS, and were closely followed by Asian (6.1%), American Indian (5.6%) and Black non-Hispanic (5.3%) children aged less than five years.

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- Hispanic (4.4%), and White non-Hispanic (4.8%) children had the lowest prevalence of underweight among children aged less than five years in 2011 MA PedNSS.
 - In the 2011 national PedNSS, Black non-Hispanic (4.9%) and Asian (4.7%) children had the highest prevalence of underweight, while American Indian (2.5%) and Hispanic (2.8%) children had the lowest prevalence.

Underweight: Age Distribution

Figure 8b-Prevalence of Underweight*
among Children Aged Less than Five Years, by Age



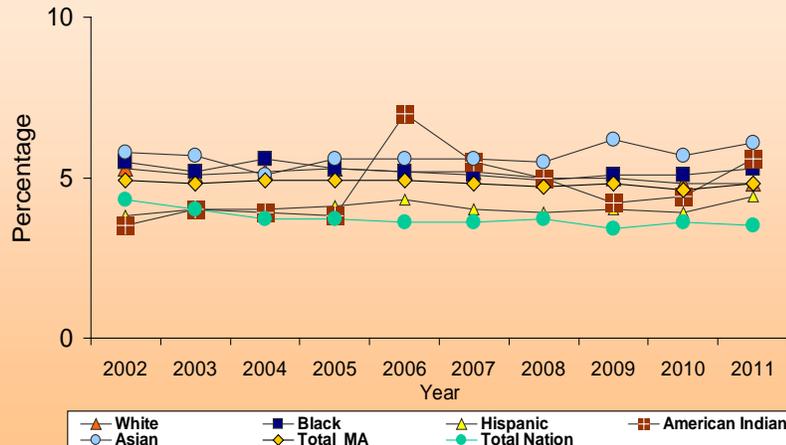
* Children aged < 2 years: weight-for-length \leq 2.3rd percentile, WHO Growth Charts, 2006.
Children aged \geq 2 years: BMI-for-age < 5th percentile, CDC Growth Charts, 2000.

2011 MA PedNSS Table 8C

- The HP 2010 goal was to reduce the prevalence of underweight among low income children aged less than five years to 5% or less but there was no target set for underweight in the HP 2020 objectives.
- With the exception of the youngest age group (aged less than one year) who had a prevalence of underweight of 9.6% in 2011 MA PedNSS, and 5.5% nationally; all age groups in the state and the nation had a prevalence of underweight below 5%.
- The high prevalence of underweight among the youngest age group is most likely attributable to infants who were born with a low birth weight, and who had not yet achieved catch-up growth in weight at the time of measurement.
- The lowest prevalence (0.5%) of underweight was observed among one to two year old children.

Underweight Trends: Race and Ethnicity

Figure 8c-Trends in Prevalence of Underweight*
among MA PedNSS Children Aged Less than Five Years, by Race and Ethnicity

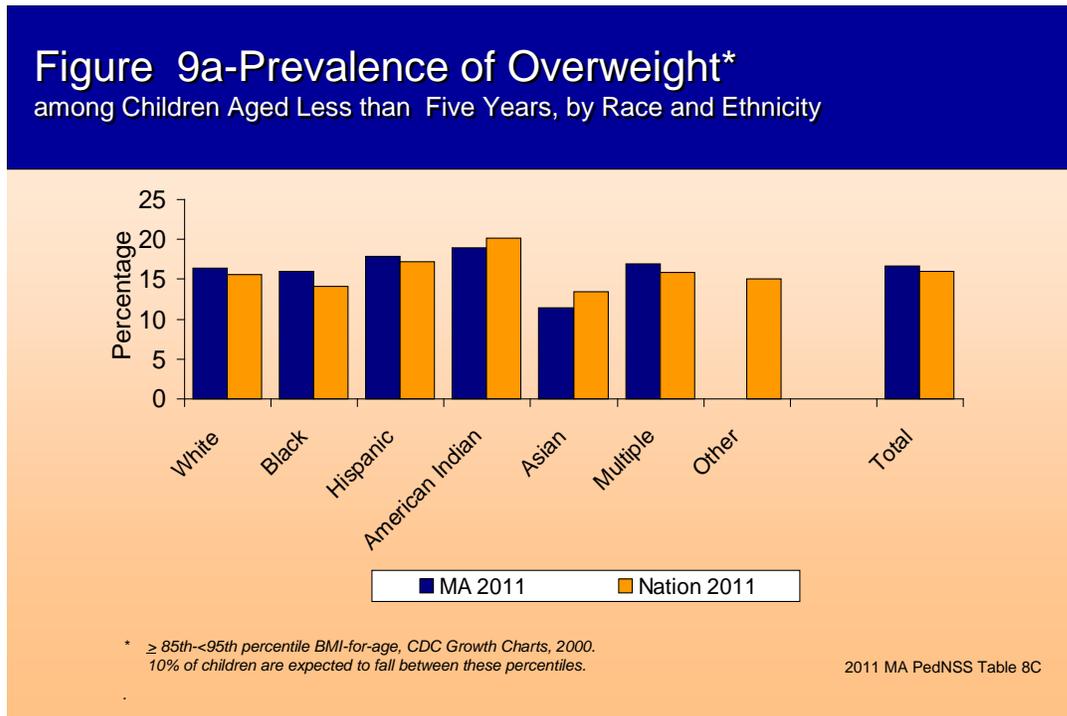


* Children aged < 2 years: weight-for-length \leq 2.3rd percentile, WHO Growth Charts, 2006.
Children aged \geq 2 years: BMI-for-age < 5th percentile, CDC Growth Charts, 2000.

2011 MA PedNSS Table 18C

- Overall, the proportion of underweight children decreased slightly among all race/ethnicity categories in MA PedNSS in the past ten years, from 4.9% in 2002 to 4.8% in 2011.
- Although a decreasing overall trend was observed, the percentage of underweight was consistently higher among Asian MA PedNSS children (from 5.8% in 2002 to 6.1% in 2011) than the percentage for the total state PedNSS population in the same time period.
- The prevalence of underweight was consistently low among the Hispanic MA PedNSS population, although there was a small increase over the reference period (from 3.8% in 2002 to 4.4% in 2011).

Overweight: Race and Ethnicity



Overweight in children is defined using the 2000 CDC or the WHO gender-specific growth charts depending on child's age.

For children aged 2 years or older the CDC growth chart is used. "Overweight" is defined as BMI-for-Age less than 95th percentile but equal to or greater than 85th percentile.

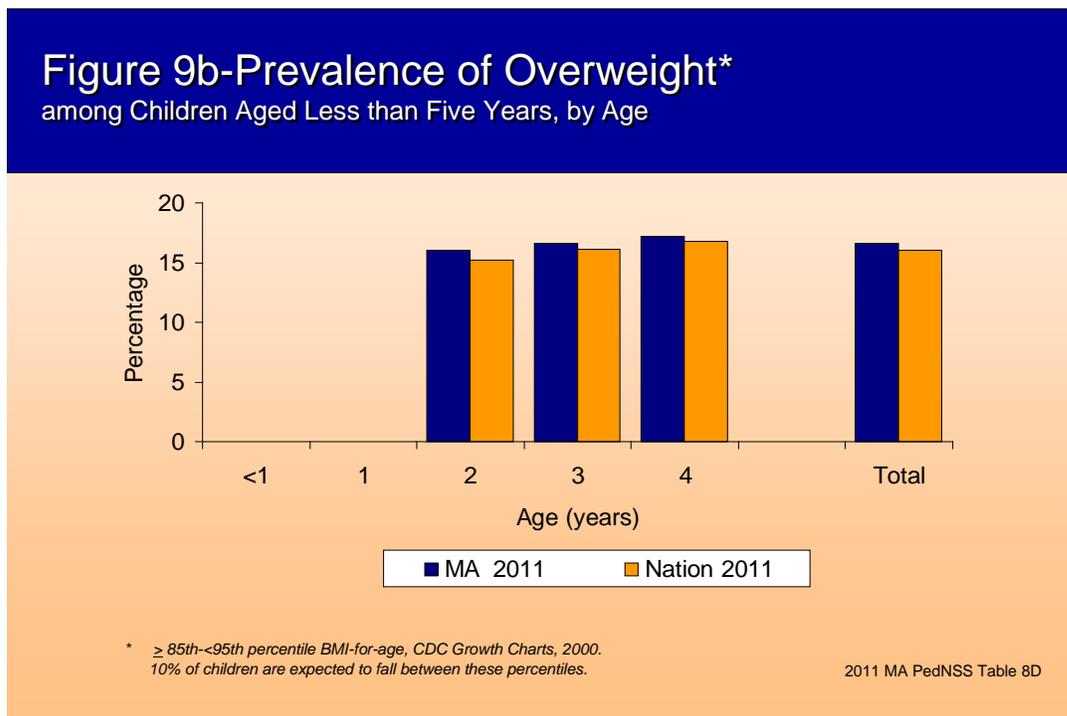
For children aged less than 2 years, the 2006 WHO growths chart is used. "High weight-for-length" is the preferred terminology for describing "overweight", which is defined as weight for length equal to or greater than 97.7th percentile.

Overweight, also called high weight-for-height, may indicate excess energy intake, low energy expenditure, or both. Overweight in young children has increased nationally in recent decades. Major health problems associated with childhood overweight include cardiovascular disease, diabetes, glucose intolerance, orthopedic disorders and obesity in adulthood (American Academy of Pediatrics Committee on Nutrition 2003). The risk for overweight denotes concern that a child may become overweight based on his/her current weight status relative to age and sex-matched peers (Fowler-Brown and Kahwati 2004). It should be recognized, however, that 10% of normal, healthy children aged two years or older are expected to have a weight-for-height between the 85th and less than 95th percentiles (overweight), and 5% of children are expected to have a weight-for-height at or above the 95th percentile ("obese").

Overweight in children was compared between the 2011 MA and 2011 national PedNSS data among children aged less than five years by race and ethnicity.

- The overall prevalence of overweight was slightly higher in children represented in the 2011 MA PedNSS (16.6%) compared to those in the 2011 national PedNSS (16.0%).
- American Indian (19.0%) children aged less than five years had the highest prevalence of overweight, followed closely by Hispanic (17.9%), multiple race (17.0%), White non-Hispanic (16.4%) and Black non-Hispanic (16.0%) children among the 2011 MA PedNSS population; no data was recorded for children designated as “other” races in MA PedNSS.
- Asian (11.4%) children aged less than five years of age had the lowest prevalence of overweight in 2011 MA PedNSS.
- In the 2011 national PedNSS, American Indian (20.0%), Hispanic (17.2%), multiple race (15.9%) and White non-Hispanic (15.6%) children showed the highest prevalence of overweight.
- Asian (13.5%) and Black non-Hispanic (14.1%) children aged less than five years had the lowest prevalence of overweight in the 2011 national PedNSS.

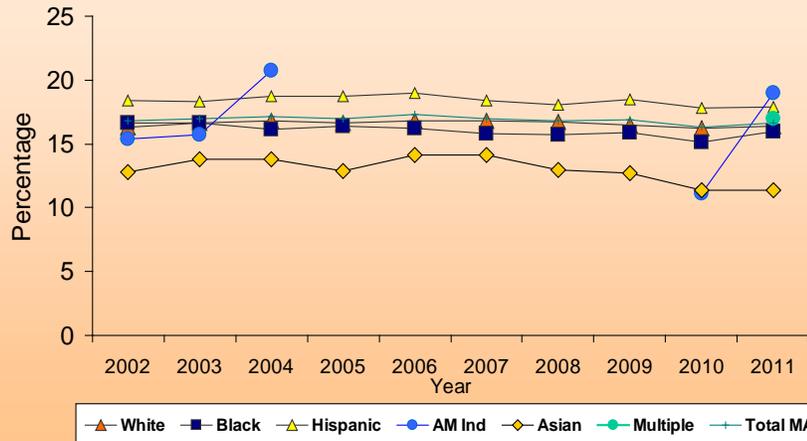
Overweight: Age Distribution



- With the exception of the youngest age group (aged one year or less) who had no records in 2011 MA PedNSS, and nationally; all age groups in the state and the nation had a prevalence of overweight above 15%
- The highest prevalence of overweight was observed among the four year old children in MA (17.2%) and nationally (16.8%).
- The lowest prevalence of overweight was observed among the two year old children in MA (16.0%) and nationally (15.2%).

Overweight Trends: Race and Ethnicity

Figure 9c-Trends in Prevalence of Overweight* among MA PEDNSS Children Aged Less than Five Years, by Race and Ethnicity



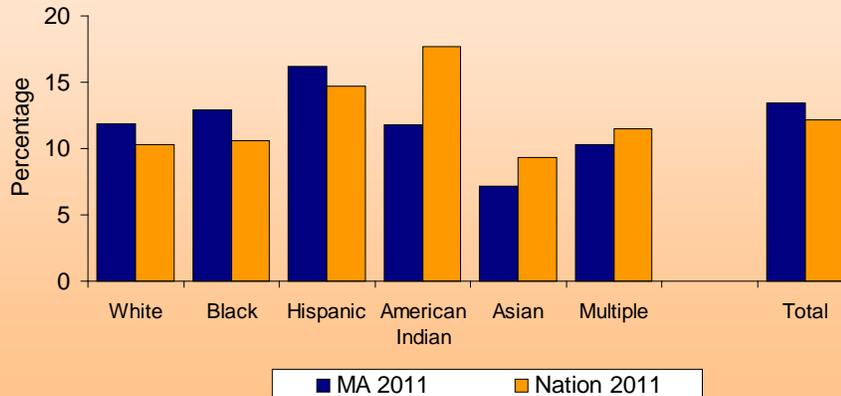
* \geq 85th- $<$ 95th percentile BMI-for-age, CDC Growth Charts, 2000.
10% of children are expected to fall between these percentiles.

2011 MA PedNSS Table 18C

- Overall, the proportion of overweight children decreased slightly among all race/ethnicity categories in MA PedNSS in the past ten years, from 16.8% in 2002 to 16.6% in 2011.
- Although a decreasing overall trend was observed, the percentage of overweight was consistently higher among Hispanic MA PedNSS children (from 18.4% in 2002 to 17.9% in 2011) than the percentage for the total state PedNSS population in the same time period.
- The prevalence of overweight consistently increased among the American Indian MA PedNSS population (from 15.4% in 2002 to 19.0% in 2011).

Obesity: Race and Ethnicity

Figure 10a-Prevalence of Obesity*
among Children Aged Less than Five Years, by Race and Ethnicity



* Children aged < 2 years: weight-for-length \geq 97.7th percentile, WHO Growth Charts, 2006 (high weight-for-length).
Children aged \geq 2 years: BMI-for-age \geq 95th percentile, CDC Growth Charts, 2000. 2011 MA PedNSS Table 8C

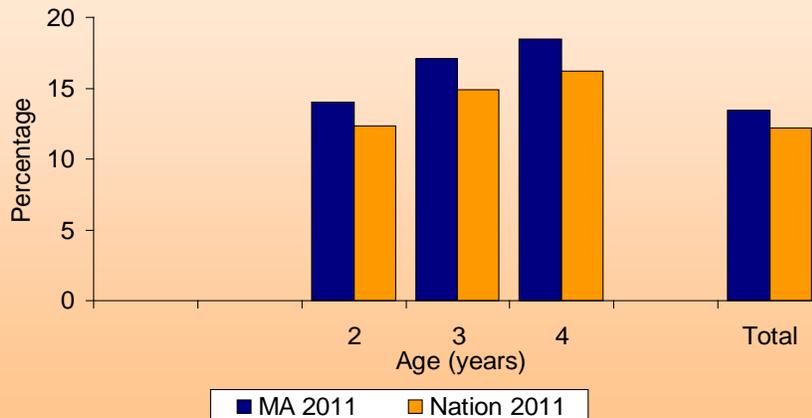
Obesity in children (aged two years and older up to age 20 years) is defined as BMI-for-age equal to or greater than the 95th percentile based on the 2000 CDC gender-specific growth charts. Children aged less than 2 years are not categorized as obese by the 2006 WHO growth charts. Rather the WHO chart describes this group as having high weight-for-length. Obesity in young children has increased in recent decades and major health problems associated with childhood obesity include adult obesity, cardiovascular diseases, diabetes, glucose intolerance, and orthopedic disorders (American Academy of Pediatrics Committee on Nutrition 2003, Anderson and Butcher 2006, Cali and Caprio 2008, Ford and Mokdad 2008, Lee 2008 Ogden et al 2008).

The concern around childhood obesity is grounded in the notion that an obese child is more likely to become an obese adult based on his/her current weight status relative to age-and sex-matched peers. It should be recognized, however, that about 5% of children are expected to have a weight-for-height or BMI-for-age above the 95th percentile, and 10% should fall between the 85th and 95th percentile according to the CDC.

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- Overall, the prevalence of obesity among all children aged less than five years participating in the 2011 MA PedNSS (13.4%) was slightly higher than that of their 2011 national PedNSS counterparts (12.2%) in all race/ethnicity categories.
 - The prevalence of obesity among the 2011 MA PedNSS children was highest among Hispanic children (16.2%), followed by Black non-Hispanic (12.9%), White non-Hispanic (11.9%), American Indian (11.8%) and multiple race children (10.3%).
 - Asian (7.2%) children had the lowest prevalence of obesity in the 2011 MA PedNSS.
 - Among the 2011 national PedNSS children aged less than five years, the prevalence of obesity was highest among American Indian children (17.7%), followed by Hispanic (14.9%), multiple race (11.6%), Black non-Hispanic (10.8%) and White non-Hispanic children (10.4%).
 - In the 2011 national PedNSS, the lowest obesity rates were observed in Asian children (9.3%).

Obesity: Age Distribution

Figure 10b-Prevalence of Obesity*
among Children Aged Less than Five Years, by Age

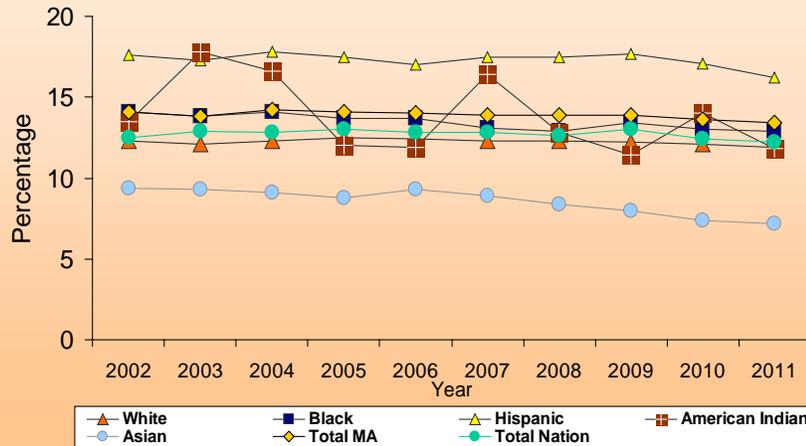


* Children aged < 2 years: weight-for-length \geq 97.7th percentile, WHO Growth Charts, 2006 (high weight-for-length). Children aged \geq 2 years: BMI-for-age \geq 95th percentile, CDC Growth Charts, 2000. 2011 MA PedNSS Table 8C

- In both the 2011 MA PedNSS and the 2011 national PedNSS, obesity also varied by age. The overall prevalence of obesity in children aged less than five years was 13.4% among MA PedNSS while it was 12.2% among national PedNSS children.
- The greatest proportion of children categorized as obese in 2011 MA PedNSS was observed among the four-year olds (18.5%), followed by children who were three years old (17.1%), and two years old (14.0%)..
- In the national 2011 PedNSS, 16.2% of children who were four years old, 14.9% of those who were three years old, and 12.3% of those who were two years old were described as obese.
- Children in the MA PedNSS population had higher overall prevalence of obesity when compared to their counterparts in the national PedNSS population for all the sampled age groups.

Obesity Trends: Race and Ethnicity

Figure 10c-Trends in Prevalence of Obesity*
among MA PEDNSS Children Aged Less than Five Years, by Race and Ethnicity

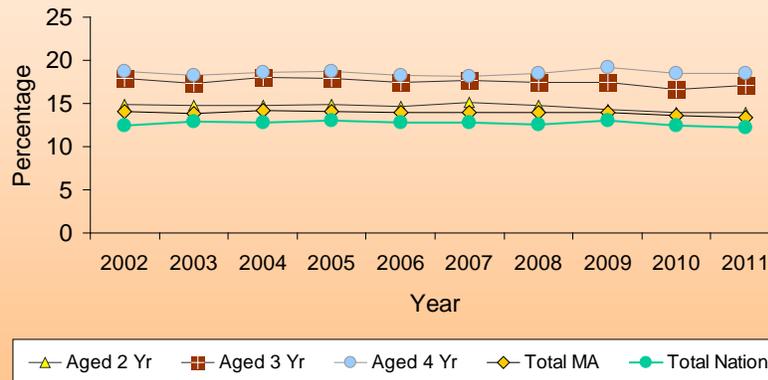


* Children aged < 2 years: weight-for-length \geq 97.7th percentile, WHO Growth Charts, 2006 (high weight-for-length).
Children aged \geq 2 years: BMI-for-age \geq 95th percentile, CDC Growth Charts, 2000. 2011 MA PedNSS Table 18C

- Overall, the proportion of obese children decreased slightly among all race/ethnicity categories in MA PedNSS in the past ten years, from 14.1% in 2002 to 13.4% in 2011.
- Although an overall decreasing trend was observed, the percentage of obese children was consistently higher among Hispanic MA PedNSS children (from 17.6% in 2002 to 16.2% in 2011) than the percentage for the total state PedNSS population in the same time period.
- The prevalence of overweight consistently increased among the American Indian MA PedNSS population (from 15.4% in 2002 to 19.0% in 2011).

Obesity Trends: Age Distribution

Figure 10d-Trends in prevalence of obesity*
among MA PEDNSS Children Aged Less Than Five Years, by Age

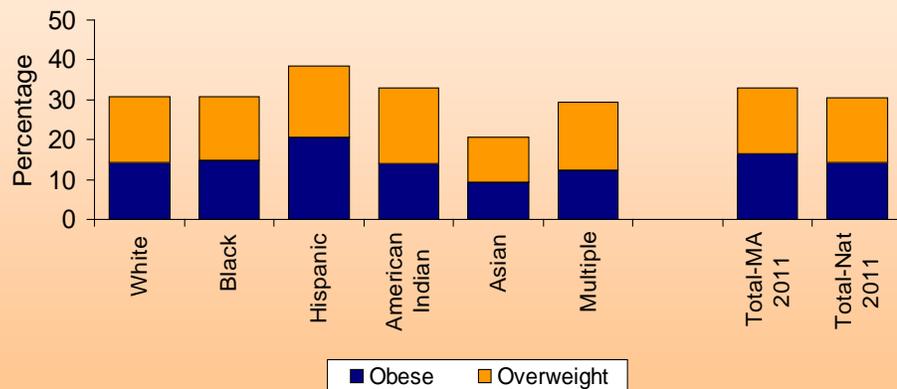


* Children aged < 2 years: weight-for-length \geq 97.7th percentile, WHO Growth Charts, 2006 (high weight-for-length).
Children aged \geq 2 years: BMI-for-age \geq 95th percentile, CDC Growth Charts, 2000. 2011 MA PedNSS Table 20C

- In the MA PedNSS, the overall prevalence of obesity among children aged less than five years decreased in the past ten years from 14.1% in 2002 to 13.4% in 2011.
- The lowest prevalence in obesity in MA PedNSS occurred among children aged two years (from 14.9% in 2002 to 14.0% in 2011).
- Although rates decreased over time, children aged four years to less than five years consistently experienced the highest prevalence in obesity in MA PedNSS during the ten year period (from 18.7% in 2002 to 18.5% in 2011).
- Children aged three years also had a high prevalence of obesity which decreased slightly from 17.9% in 2002 to 17.1% in 2011.

Obesity and Overweight Combined: Race and Ethnicity

Figure 11a-Prevalence of Obesity and Overweight*
among Children Aged Two to Less than Five Years, by Race and Ethnicity



* Obese: \geq 95th percentile BMI-for-age; overweight: \geq 85th- $<$ 95th percentile BMI-for-age, CDC Growth Charts, 2000. 15% of children are expected to fall above the 85th percentile (5% above the 95th percentile and 10% between the 85th and 95th percentiles).

2011 MA PedNSS Table 8C

- Children aged two years to less than five years in the 2011 MA PedNSS had a higher prevalence of obesity and overweight combined (33.0%), compared to children of the same age represented in the 2011 national PedNSS whose prevalence of obesity and overweight combined was 30.4%.
- In the 2011 MA PedNSS, the prevalence of obesity and overweight combined varied by race and ethnicity. More than one in five Hispanic children (20.5%) between two and less than five years old were obese and 17.9% were overweight, with the highest combined percentage (38.4%) of both overweight and obesity among all race/ethnicity categories reported for MA PedNSS.
- In comparison, 9.3% of Asian children aged two to less than five years in MA PedNSS were obese and 11.4% were overweight, with the lowest combined percentage (20.7%) of both overweight and obese children among all race/ethnicity categories reported for MA PedNSS.

Obesity and Overweight Combined: Age Distribution

Figure 11b-Prevalence of Obesity and Overweight* among Children Aged Two to Less Than Five Years, by Age



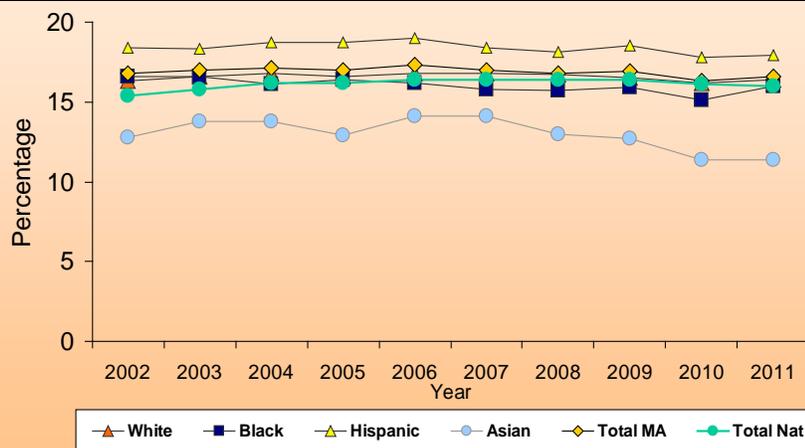
* Obese: \geq 95th percentile BMI-for-age; overweight: \geq 85th- $<$ 95th percentile BMI-for-age, CDC Growth Charts, 2000. 15% of children are expected to fall above the 85th percentile (5% above the 95th percentile and 10% between the 85th and 95th percentiles).

2011 MA PedNSS Table 8C

- Children aged two years to less than five years in the 2011 MA PedNSS had a higher prevalence of obesity and overweight combined (33.0%), compared to children of similar age group represented in the 2011 national PedNSS, with an overall combined prevalence of obesity and overweight at 30.4%.
- The highest proportion of children categorized as obese in MA PedNSS was observed among the four year olds (18.5%), followed by children at three years old (17.1%) and two years old (14.0%).
- The proportion of children categorized as overweight in MA PedNSS was 17.2% among the four-year olds, 16.6% among the three year olds and 16.0% among the two year olds.
- The combined prevalence of overweight and obesity for the various age groups in 2011 MA PedNSS were as follows: 30.0% for the two year olds, 33.7% for the three olds, and 35.7% for the four year olds.
- The prevalence of excessive weight (obesity and overweight combined) among children appeared to increase with increasing age in MA PedNSS population. A similar prevalence was observed in the national PedNSS population in previous studies (Barlow 2007, Krebs and Jacobson 2003).

Overweight Trends: Race and Ethnicity

Figure 12-Trends in Prevalence of Overweight* among MA PEDNSS Children Aged Two to less than Five Years, by Race and Ethnicity



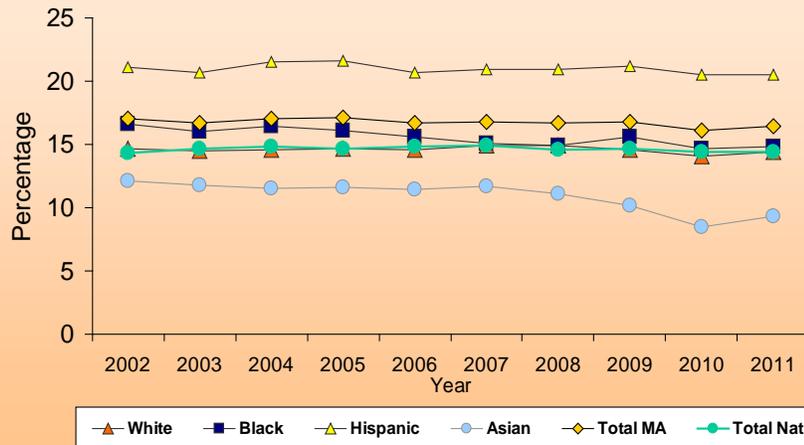
* $\geq 85^{\text{th}}$ - $<95^{\text{th}}$ percentile BMI-for-age, CDC Growth Charts, 2000.
10% of children are expected to fall between these percentiles.

2011 MA PedNSS Table 18C

- In the MA PedNSS, the prevalence of overweight among children aged two to less than five years slightly decreased in the past ten years for all race/ethnicity categories (from 16.8% in 2002 to 16.6% in 2011).
- The highest prevalence of overweight among MA PedNSS children was observed in Hispanic children whose prevalence ranged from 18.4% in 2002 to 17.9% in 2011.
- The lowest prevalence of overweight among MA PedNSS children was observed in Asian children whose prevalence ranged from 12.8% in 2002 to 11.4% in 2011.
- There were less than 100 records for American Indian children between 2002 and 2011; hence the CDC did not generate data on overweight for this population group.

Obesity Trends: Race and Ethnicity

Figure 13-Trends in Prevalence of Obesity*
among MA PEDNSS Children Aged Two to Five Years, by Race and Ethnicity



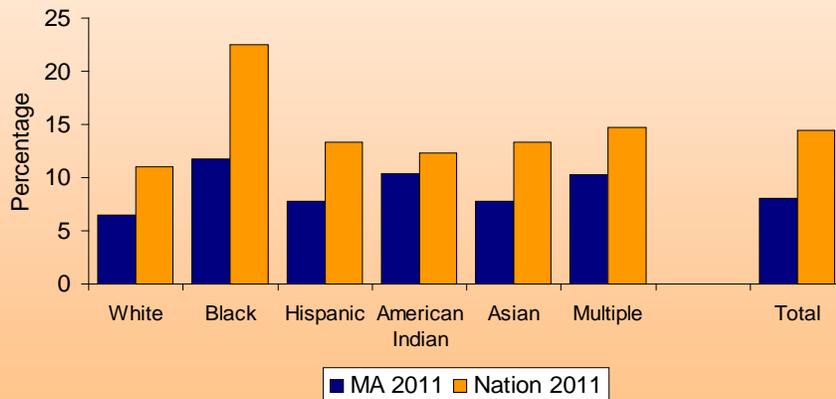
* \geq 95th percentile BMI-for-age, CDC Growth Charts, 2000.
5% of children are expected to fall above the 95th percentile.

2011 MA PedNSS Table 18C

- In the MA PedNSS, the overall prevalence of obesity among children aged two to less than five years slightly decreased in the past ten years from 17.0% in 2002 to 16.4% in 2011.
- Hispanic children aged two to less than five years experienced the greatest prevalence of obesity in each year from 21.1% in 2002 to 20.5% in 2011, though the trend was going down.
- Asian children had the lowest prevalence of obesity from 12.1% in 2002 to 9.3% in 2011
- American Indian PedNSS population had fewer than 100 records in each of these years, so no data were generated for them between 2002 and 2011 according to the CDC guidelines stated earlier.

Anemia: Race and Ethnicity

Figure 14a-Prevalence of Anemia*
among Children Aged Less than Five Years, by Race and Ethnicity



* Hb or Hct < 5th percentile, CDC MMWR vol. 47 (No. RR-3), 1998.

2011 MA PedNSS Table 8C

Anemia is a blood disorder and an indicator of iron deficiency, the most common nutrient deficiency in the world. Anemia occurs when blood has fewer red blood cells than normal, or when the hematocrit (percentage of red blood cells in a specific volume of blood) is low, and/or when there is a low blood concentration of hemoglobin (the iron-bearing blood protein that carries oxygen from lungs to the tissues). Anemia can develop from excessive blood loss (hemorrhage), deficient production of red blood cells or excessive destruction of red blood cells. Whenever the three blood parameters - hematocrit, hemoglobin or heme iron- is reduced, the ability of blood to carry oxygen to the tissues is reduced and this causes a condition called hypoxia (low oxygenation of tissues).

Anemia in children is defined as a hemoglobin level of less than the 5th percentile for age (Janus and Moeschel 2010). Iron deficiency in children is associated with developmental delays and behavioral disturbances (Pollitt 1993, Lozzoff et al 2000, Saloojee and Pettifor 2001, WU et al 2002). However, not all types of anemia are caused by iron deficiency; anemia can be caused by other nutritional deficiencies (e.g. folate or vitamin B12, or vitamin C deficiency), hereditary hemoglobinopathies (e.g., thalassemia or sickle cell disease), recent or current infection, certain medications (e.g. cancer drugs), chemical toxins and chronic inflammation.

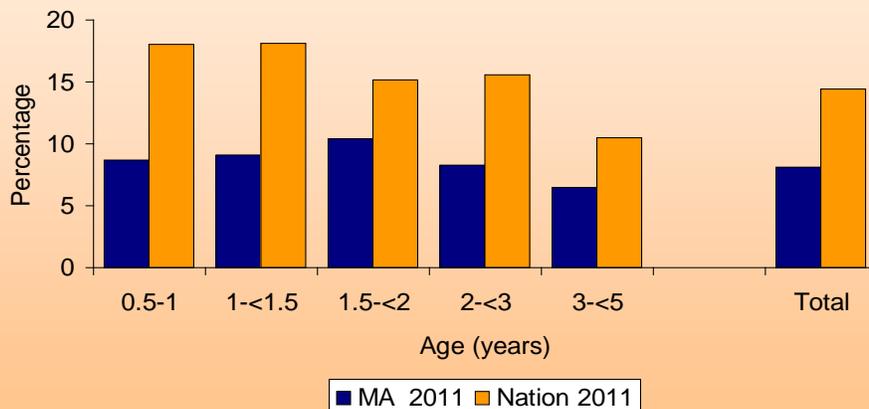
According to the CDC's 2007 PedNSS Report, children aged six months to two years are considered anemic if their hemoglobin (Hgb) is less than 11.0 g/dL or their hematocrit (Hct) level is less than 32.9%; children aged two to five years are considered anemic if their Hgb concentration is less than 11.1g/dL or Hct level is less than 33.0%. Values are adjusted for altitude. The Hgb concentration and Hct level are not reported for children younger than six months (CDC 1998).

Anemia results varied in both MA and national PedNSS for children aged less than five years.

- Overall, 8.1% of children in the 2011 MA PedNSS were anemic, compared to 14.4% in the 2011 national PedNSS.
- The prevalence of anemia varied by race/ethnicity in MA PedNSS population with Black non-Hispanic children having the highest prevalence (11.8%) followed by American Indian (10.4%) and multiple race children (10.3%).
- White non-Hispanic children have the lowest prevalence (6.5%), followed by Asian (7.8%) and Hispanic children (7.8%).
- A similar observation was made in the national PedNSS population with Black non-Hispanic children having the highest prevalence of anemia (22.5%), while White non-Hispanic children had the lowest prevalence (11.0%).

Anemia: Age Distribution

Figure 14b-Prevalence of Anemia*
among Children Aged Less than Five Years, by Age

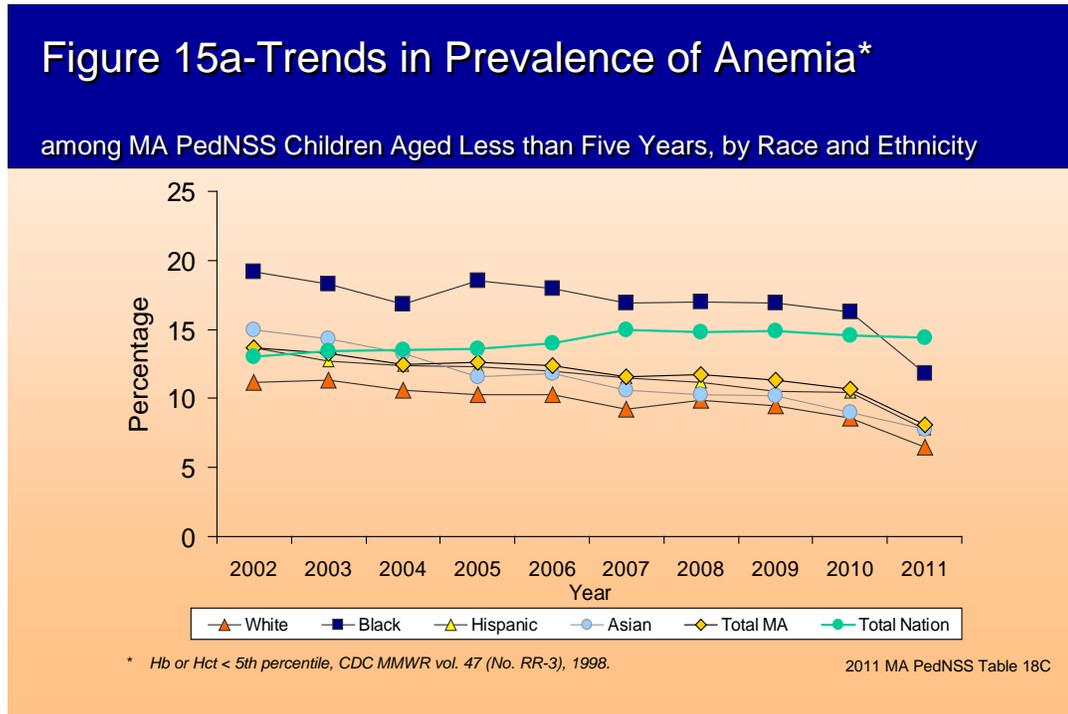


* Hb or Hct < 5th percentile, CDC MMWR vol. 47 (No. RR-3), 1998.

2011 MA PedNSS Table 21C

- Anemia prevalence varied by age in 2011 MA PedNSS and was highest among children aged 18 to less than 24 months (10.4%) and lowest in children aged three years to less than five years (6.5%).
- In the 2011 national PedNSS, the prevalence of anemia was highest in children aged 12 to less than 18 months (18.1%), followed by children aged 6 to 12 months (18.0%) but lowest in children aged three years to less than five years (10.5%).

Anemia Trends: Race and Ethnicity

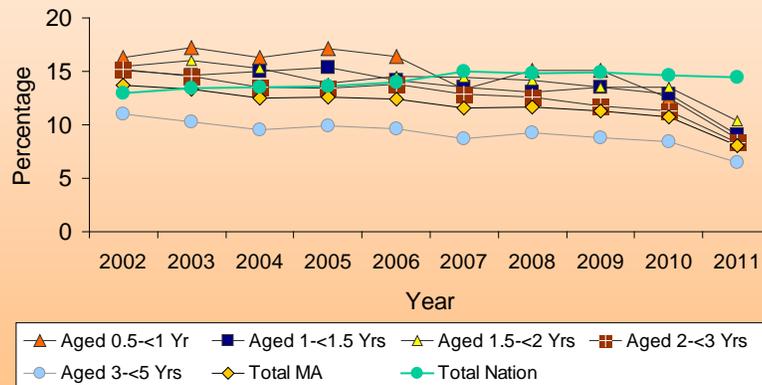


- In the MA PedNSS, the overall prevalence of anemia among all race and ethnicities decreased in the past ten years from 13.7% in 2002 to 8.1% in 2011.
- The greatest decrease in prevalence of anemia was observed among Asian children in MA PedNSS where prevalence of anemia fell from 15.0% in 2002 to 7.8% in 2011.
- White non-Hispanic children consistently had the lowest prevalence of anemia over the past 10 years, where the prevalence decreased from 11.2% in 2002 to 6.5% in 2011.
- Black non-Hispanic children consistently had the highest prevalence of anemia but improved from 19.2% in 2002 to 11.8% in 2011.

Anemia Trends: Age Distribution

Figure 15b-Trends in Prevalence of Anemia*

among MA PedNSS Children Aged Less Than Five Years, by Age

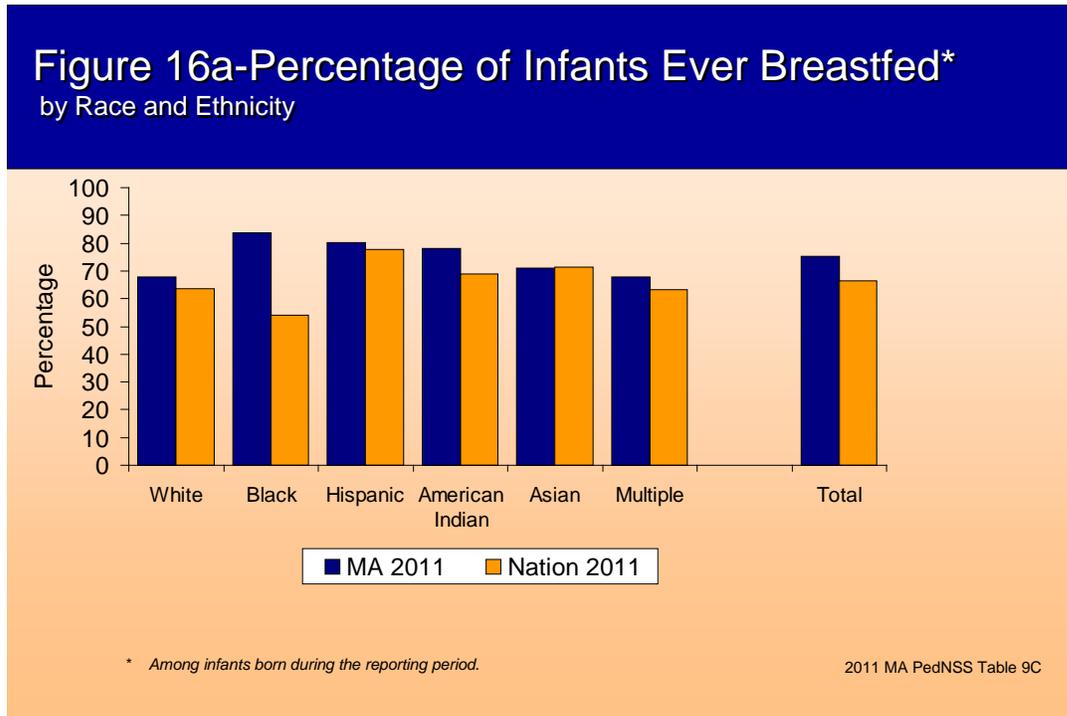


* Hb or Hct < 5th percentile, CDC MMWR vol. 47 (No. RR-3), 1998.

2011 MA PedNSS Table 21C

- In the MA PedNSS, the overall prevalence of anemia among children aged less than five years decreased in the past ten years from 13.7% in 2002 to 8.1% in 2011.
- The largest decrease in anemia prevalence in MA PedNSS occurred among children aged three years to less than five years (from 11.0% in 2002 to 6.5% in 2011) and in children aged two years to less than three years (from 15.2% in 2002 to 8.3% in 2011).
- Although rates decreased over time, children aged six months to less than one year consistently experienced the highest prevalence in anemia in MA PedNSS during the ten year period (from 16.3% in 2002 to 8.7% in 2011).

Ever Breastfed: Race and Ethnicity



Breastfeeding is regarded as one of the most important contributors to infant health because human breast milk presents the most complete form of nutrition for infants. Breastfeeding is known to contribute nutritional, immunologic, developmental, allergenic, economic and psychological advantages to both the infant and the mother and can also protect infants against some childhood diseases (American Academy of Pediatrics, 2012).

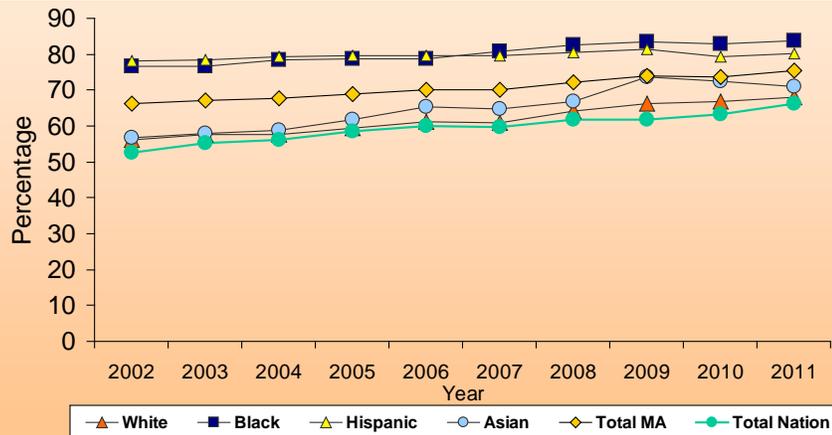
The HP 2020 targets are that the proportion of children ever breastfed be increased to 81.9%, the proportion of children breastfed for at least six months be increased to 60.6% and the proportion of children breastfed for at least one year be increased to 34.1% (HP 2020 in 2010). "Ever breastfed" includes those infants whose mothers initiated breastfeeding, including both those who were breastfed exclusively and those who were supplemented with formula, based on maternal self-reports at the WIC certification visit. "Initiation" is defined as having breastfed at least one time.

Breast feeding initiation varied in both MA and national PedNSS populations.

-
- In 2011, 75.3% of infants of all races represented in the MA PedNSS were ever breastfed. In comparison, only 66.3% of infants in the 2011 national PedNSS were ever breastfed.
 - Black non-Hispanic infants (83.8%) in the MA PedNSS had the highest prevalence of ever breastfeeding, followed by Hispanic infants (80.1%), American Indian (78.0%) and Asian infants (70.9%).
 - White non-Hispanic (68.0%) and multiple race infants (67.8%) had the lowest prevalence of ever breastfeeding.
 - Overall, the state of Massachusetts (75.3%) did not meet the new HP 2020 target of 81.9%. Only Black non-Hispanic infants (83.8%) met the HP 2020 goal of 81.9%.

Ever Breastfed Trends: Race and Ethnicity

Figure 16b-Trends in the Percentage of MA PedNSS Infants Ever Breastfed* by Race and Ethnicity



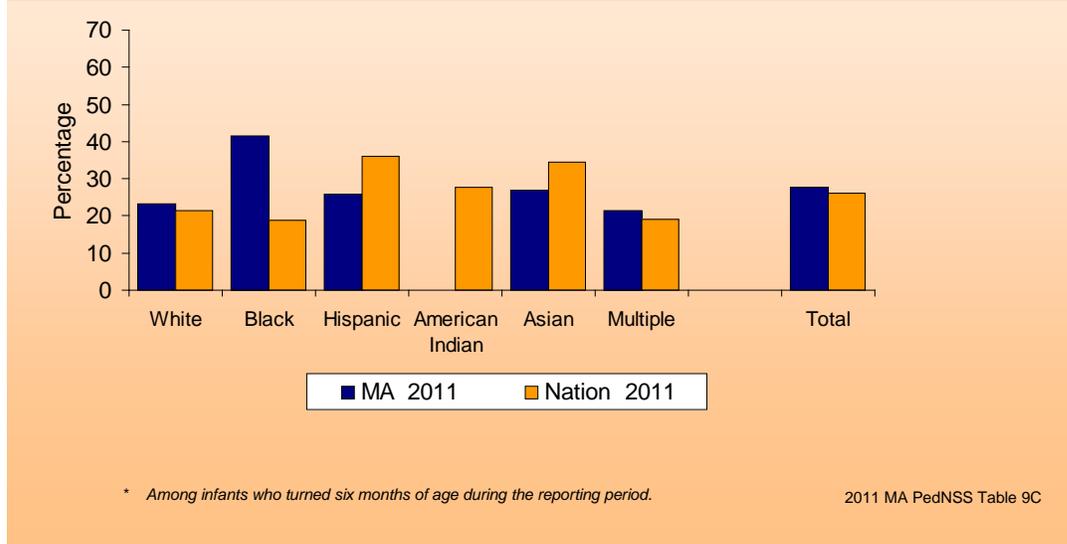
* Among infants born during the reporting period.

2011 MA PedNSS Table 19C

- In the last ten years, the overall percentage of infants in the MA PedNSS that were ever breastfed has increased from 66.1% in 2002 to 75.3% in 2011.
- The prevalence for infants ever breastfed in the past ten years was consistently high among Hispanic infants whose breastfeeding prevalence increased from 78.0% in 2002 to 80.1% in 2011.
- The prevalence of ever breastfeeding in MA PedNSS infants also increased among Black non-Hispanic infants, whose prevalence jumped from 76.6% in 2002 to 83.9% in 2011; Black non-Hispanic infants showed the largest improvement for breastfeeding initiation.
- The ever breastfed trends were higher in MA PedNSS (from 66.1% in 2002 to 75.3% in 2011) compared to their counterparts in the national PedNSS (from 52.5% in 2002 to 66.3% in 2011).

Breastfed At Least Six Months: Race and Ethnicity

Figure 17a-Percentage of Infants Breastfed at Least Six Months* by Race and Ethnicity

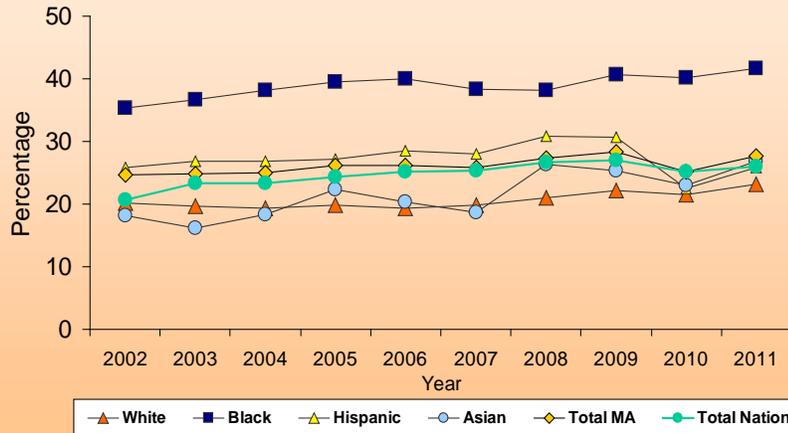


- The overall proportion of infants in 2011 MA PedNSS that were breastfed for at least six months was 27.6% while the proportion of such infants in the 2011 national PedNSS was 26.0%.
- In the 2011 MA PedNSS, the greatest prevalence of breastfeeding for at least six months occurred among Black non-Hispanic infants (41.6%), followed by Asian (26.8%) and Hispanic (25.9%) infants while White non-Hispanic (23.2%) and multiple race (21.5%) infants had the lowest proportion of infants that breastfed for at least six months.
- In the 2011 national PedNSS, the greatest prevalence of breastfeeding for at least six months occurred among Hispanic infants (36.0%), followed by Asian (34.4%), American Indian (27.6%), and White non-Hispanic infants (21.5%).
- Multiple race (19.0%) and Black non-Hispanic (18.8%) infants had the lowest proportion that breastfed for at least six months in the national PedNSS.
- Neither the Massachusetts PedNSS population, nor their national counterparts met the HP 2020 goal of breastfeeding for at least six months set at 60.6%.

Breastfed for At Least Six Months Trends: Race and Ethnicity

Figure 17b-Trends in the Percentage of MA PedNSS Infants Breastfed at Least Six Months*

by Race and Ethnicity



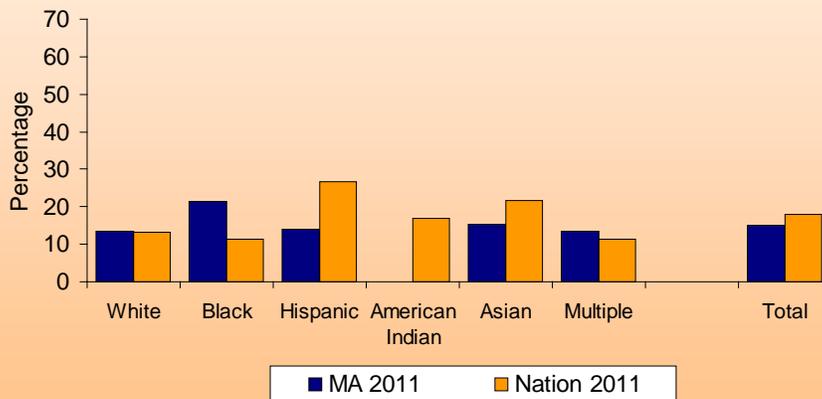
* Among infants who turned six months of age during the reporting period.

2011 MA PedNSS Table 19C

- The percentage of all infants that were breastfed for at least six months has increased over the past ten years among infants participating in the MA PedNSS from 24.6% in 2002 to 27.6% in 2011.
- The largest improvement in breastfeeding for at least six months was observed among Asian infants with a prevalence of 18.1% in 2002 and a prevalence of 26.8% in 2011.
- The second largest improvement in breastfeeding for at least six months was observed in Black non-Hispanic infants in the MA PedNSS, with a prevalence of 35.4% in 2002 and a prevalence of 41.6% in 2011.
- The children breastfed for six months had an overall trend that was higher in MA PedNSS (from 24.6% in 2002 to 27.6% in 2011) compared to the national PedNSS (from 20.7% in 2002 to 26.0% in 2011).

Breastfed At Least 12 Months: Race and Ethnicity

Figure 18a-Percentage of Infants Breastfed at Least 12 Months* by Race and Ethnicity



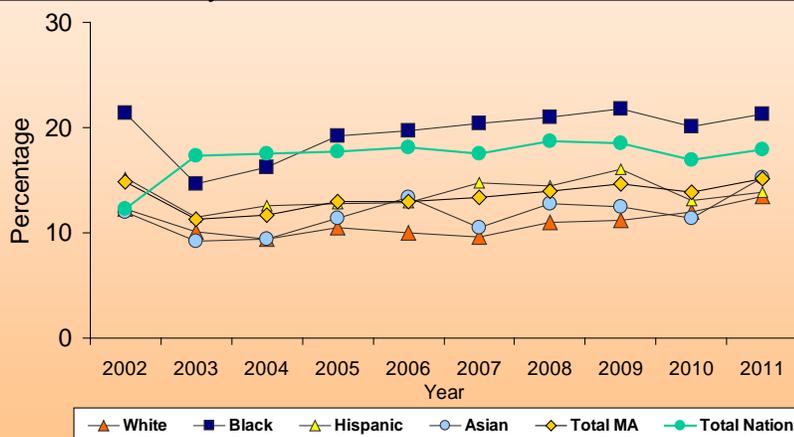
* Among infants who turned twelve months of age during the reporting period.

2011 MA PedNSS Table 9C

- The overall proportion of 2011 MA PedNSS infants that have been breastfed for at least 12 months was 15.1% while the proportion in the 2011 national PedNSS was 17.9%.
- In the 2011 MA PedNSS, the highest prevalence of breastfeeding for at least 12 months was among Black non-Hispanic infants (21.3%), followed by Asian (15.2%), Hispanic (13.9%) and White non-Hispanic infants (13.5%).
- Multiple race infants (13.4%) had the lowest prevalence of breastfeeding for at least 12 months.
- In the 2011 national PedNSS, the highest prevalence of breastfeeding for at least 12 months occurred among Hispanic infants (26.8%), followed by Asian (21.7%), American Indian (16.8%) and White non-Hispanic infants (13.3%), while multiple race (11.3%), and Black non-Hispanic infants (11.4%) had the lowest prevalence of breastfeeding for at least 12 months.
- The HP 2020 goal of 34.1% for breastfeeding at least 12 months was not met by either the MA or the national PedNSS populations.

Breastfed at Least 12 Months Trends: Race and Ethnicity

Figure 18b-Trends in the Percentage of MA PedNSS Infants Breastfed at least 12 Months* by Race and Ethnicity



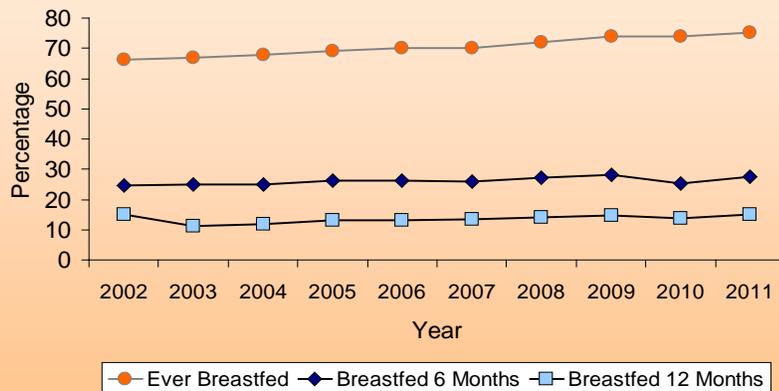
* Among infants who turned twelve months of age during the reporting period.

2011 MA PedNSS Table 19C

- Since 2002, the overall proportion of MA PedNSS infants that have been breastfed for at least 12 months has increased slightly, from 14.9% in 2002 to 15.1% in 2011.
- The greatest increase in the prevalence of breastfeeding for at least 12 months during the ten year period occurred among Asian infants, from 12.0% in 2002 to 15.2% in 2011, an increase of 3.2 percentage points above the 2002 baseline.
- The lowest increase in prevalence of breastfeeding for at least 12 months during the ten year period was observed among White non-Hispanic infants, whose prevalence increased from 12.3% in 2002 to 13.5% in 2011, an increase of 1.2 percentage points above the 2002 baseline.
- The breastfed for 12 months overall trend was lower in MA PedNSS (from 14.9% in 2002 to 15.1% in 2011) compared to the national PedNSS (from 12.3% in 2002 to 17.9% in 2011).

Breastfeeding Initiation and Duration Trends

Figure 19-Trends in the Percentage of MA PedNSS Infants Ever Breastfed, and Breastfed at Least Six and 12 Months

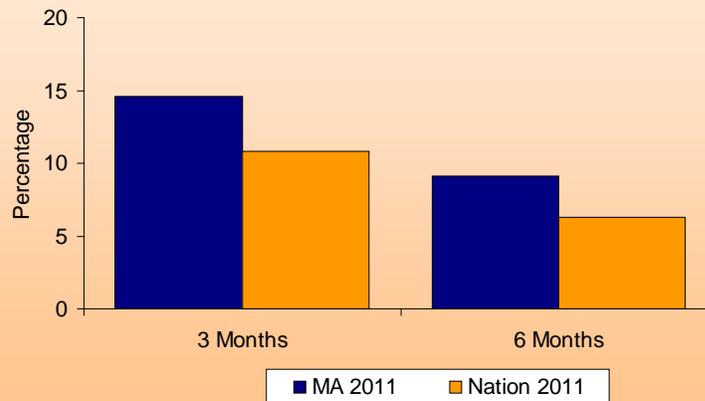


2011 MA PedNSS Table 13C

- In the 2011 MA PedNSS, both the initiation and the duration of breastfeeding have increased in the past ten years.
- The prevalence of children who were ever breastfed increased in the last ten years from 66.1% in 2002 to 75.3% in 2011.
- The prevalence of children who were breastfed for at least six months, increased in the last ten years from 24.6% in 2002 to 27.6% in 2011.
- The prevalence of children who were breastfed for at least 12 months increased in the past ten years from 14.9% in 2002 to 15.1% in 2011.

Exclusive Breastfeeding

Figure 20-Percentage of Infants Exclusively Breastfed at Least Three and Six Months*



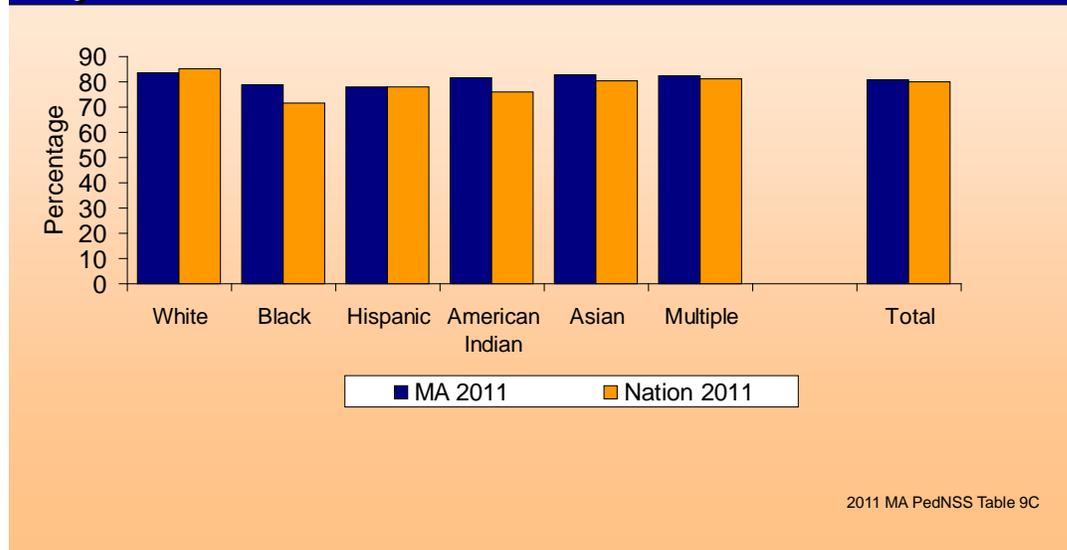
* Among infants who turned three and six months of age respectively during the reporting period.

2011 MA PedNSS Table 3C

- The overall proportion of 2011 MA PedNSS infants that have been breastfed exclusively for at least three months was 14.6% while the proportion in the 2011 national PedNSS was 10.8%.
- The overall proportion of 2011 MA PedNSS infants that have been breastfed exclusively for at least six months was 9.1% while the proportion in the 2011 national PedNSS was 6.3%.
- The HP 2020 targets for exclusive breastfeeding were 46.2% for exclusive breastfeeding for 3 months and 25.5% for exclusive breastfeeding for six months. Neither MA PedNSS nor national PedNSS met the HP 2020 targets for exclusive breastfeeding in 2011.

TV Viewing: Race and Ethnicity

Figure 21a-Percentage of Children Aged Two to Less than Five Years Who View TV for 2 Hours or Less per Day by Race and Ethnicity

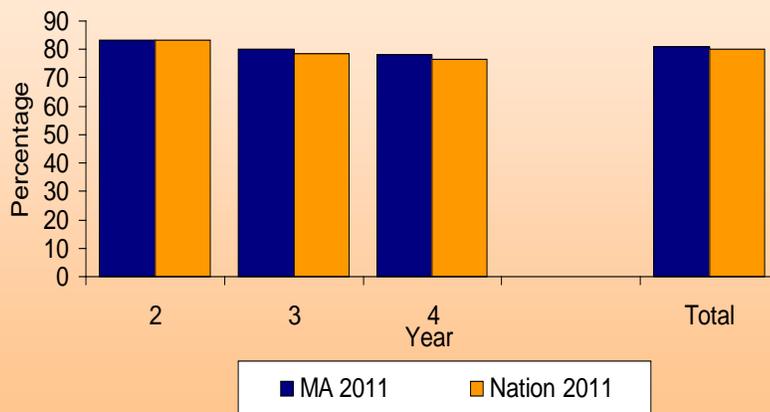


The percentage of TV viewing at two hours or less per day among children aged two to less than five years varied by race and ethnicity in both the 2011 MA PedNSS and the 2011 national PedNSS.

- The overall prevalence of two hours or less per day of TV viewing in children aged two to less than five years was 80.7% among MA PedNSS while it was 79.9% among the national PedNSS children.
- White non-Hispanic children (83.8%) had the highest prevalence of lower TV viewing in MA PedNSS, and were closely followed by Asian (82.9%), multiple race (82.5%), American Indian (81.8%) and Black non-Hispanic (78.8%) children aged two years to less than five years.
- Hispanic (78.2%) children in MA PedNSS had the lowest prevalence of less than two hours of TV viewing.
- In the 2011 national PedNSS, White non-Hispanic (85.3%) children also had the highest prevalence of lower TV viewing, and were closely followed by multiple race (81.2%), Asian (80.6%), Hispanic (78.1%) and American Indian (76.2%) children aged two years to less than five years.
- Black non-Hispanic (71.8%) children in the national PedNSS had the lowest prevalence of reduced TV viewing.

TV Viewing: Age Distribution

Figure 21b-Percentage of Children Aged Two Years to Less than Five Years Who View TV For Two Hours or Less Per Day by Age

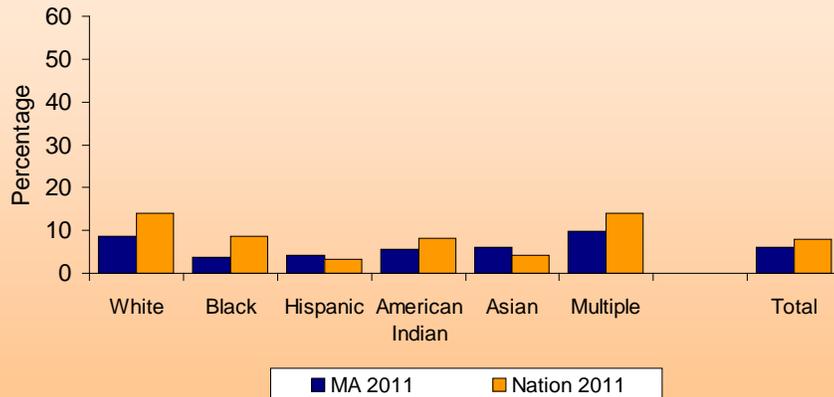


2011 MA PedNSS Table 9C

- In the 2011 MA PedNSS, as well as the reference 2011 national PedNSS, TV viewing also varied by age. The overall prevalence of less than two hours of TV viewing in children aged two years to less than five years was 80.7% among MA PedNSS while it was 79.9% among the national PedNSS children.
- The highest prevalence of lower TV viewing was observed among the two year olds (83.2%), followed by children who were three years old (80.2%). Children aged four years old had the lowest prevalence of less than two hours of TV viewing (78.2%) in the 2011 MA PedNSS.
- In the 2011 national PedNSS, 83.3% of children who were two years old, 78.6% of those who were three years old, and 76.6% of those who were four years old were described as watching TV for two hours or less per day. It appears that time spent watching TV increases as the children got older.
- Children in the MA PedNSS population had higher overall prevalence of less than two hours of TV watching when compared to their counterparts in the national PedNSS population for all the sampled age groups.

Household Smoking: Race and Ethnicity

Figure 22a-Percentage of Children Aged Less than Five Years Who Live in Households with Smokers* by Race and Ethnicity

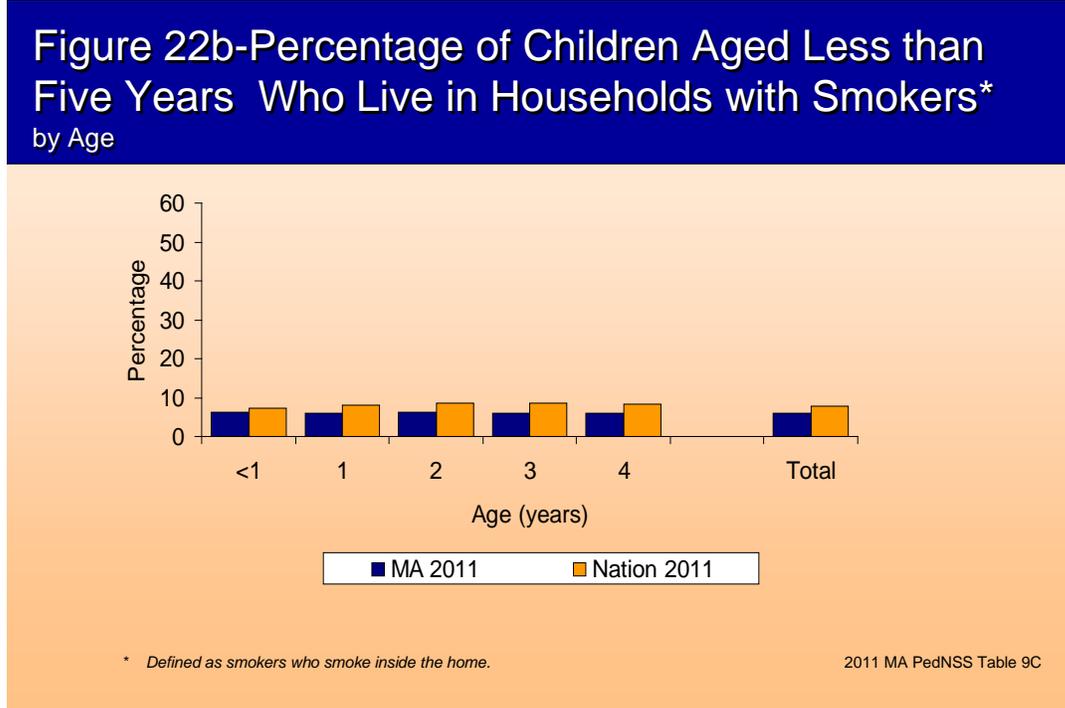


* Defined as smokers who smoke inside the home.

2011 MA PedNSS Table 9C

- In the 2011 MA PedNSS, as well as the reference 2011 national PedNSS, household smoking varied by race and ethnicity. The overall prevalence of children aged less than five years exposed to household smoking was 6.0% among MA PedNSS while it was 7.9% among the national PedNSS children.
- Multiple race (9.9%) and White non-Hispanic (8.6%) children aged less than five years had the highest prevalence of exposure to household smoking in MA PedNSS, and were closely followed by Asian (6.1%), American Indian (5.6%) and Hispanic (4.3%) children.
- Black non-Hispanic (3.8%) children had the lowest prevalence of exposure to household smoking among children aged less than five years in MA PedNSS.
- In the 2011 national PedNSS, White non-Hispanic (13.9%) and multiple race (13.9%) children had the highest prevalence of exposure to household smoking, and were followed by Black non-Hispanic (8.6%) and American Indian (8.2%) children.
- Hispanic (3.3%) and Asian (4.1%) children aged less than five years old had the lowest prevalence of exposure to household smoking in the national PedNSS.

Household Smoking: Age Distribution



- In the 2011 MA PedNSS, as well as the reference 2011 national PedNSS, exposure to household smoking also varied by age. The overall prevalence of household smoking exposure in children aged less than five years was 6.0% among MA PedNSS while it was 7.9% among the national PedNSS children, for all the sampled age groups. The HP 2020 target for reducing cigarette smoking by adults was 12%. Both MA PedNSS and national PedNSS met the targets for reducing smoking by adults in the household.
- In the 2011 MA PedNSS, the highest prevalence of household smoking exposure was observed among the children aged less than one year (6.2%) and those aged two years (6.2%). The lowest prevalence (5.9%), of household smoking exposure was observed in the children aged one year, three years and four years.
- In the 2011 national PedNSS, children who were two years old and those who were three years old had the highest prevalence (8.5%) of smoking exposure. They were closely followed by four-year olds (8.2%), and one year olds (8.0%). The lowest prevalence of household smoking exposure (7.4%) was observed in the children aged less than one year old in the national PedNSS.

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APPENDIX 1: 2011 Participating WIC Programs in MA

Local WIC Programs:

1. Berkshire North
2. Berkshire South
3. Blue Hill Corridor
4. Brighton/Roslindale
5. Brockton
6. Cambridge/Somerville
7. Cape Cod
8. Chelsea/Revere
9. Dorchester North
10. Dorchester South
11. East Boston
12. Fall River
13. Framingham/Waltham
14. Franklin/ Hampshire/No Quabbin
15. Holyoke/Chicopee
16. Jamaica Plain
17. Lawrence
18. Lowell
19. New Bedford
20. North Central
21. North Shore
22. North Suburban
23. Northern Essex
24. Outer Cape
25. Plymouth
26. Quincy
27. Roxbury
28. South Boston
29. South Central
30. South Cove
31. South End
32. Springfield North
33. Springfield South
34. Taunton/Attleboro
35. Worcester

APPENDIX 2: STATE MAPS OF COUNTY DATA

MASSACHUSETTS

Children Aged <5 Years

2011

Pediatric Nutrition
Surveillance System



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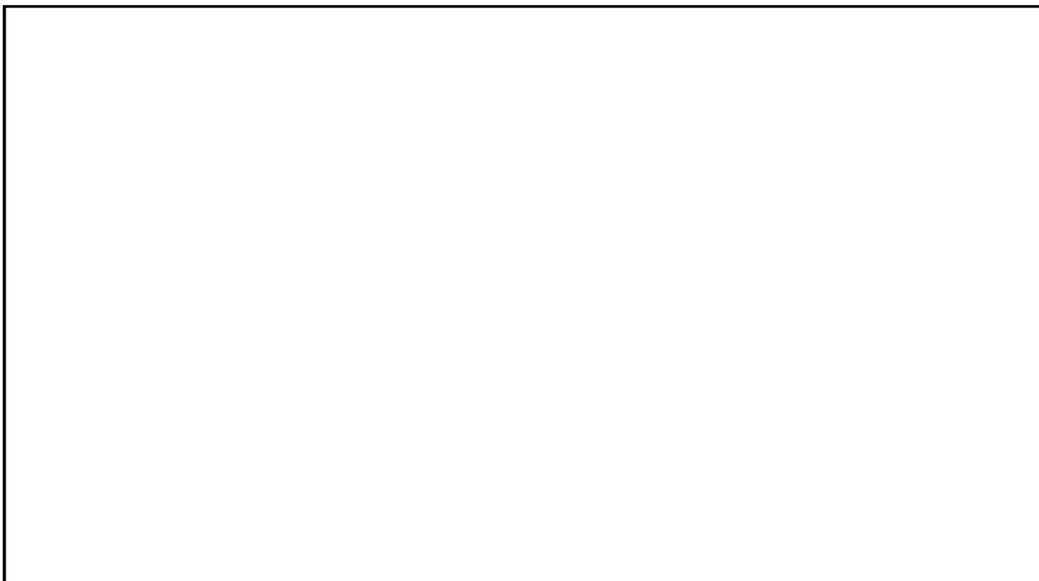
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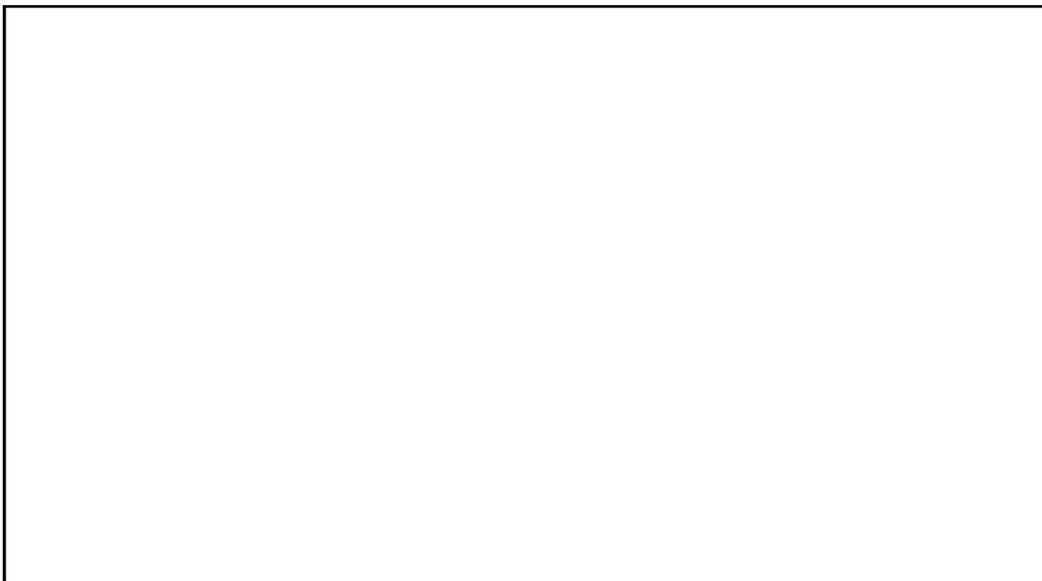
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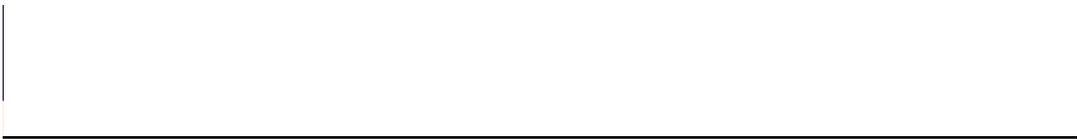


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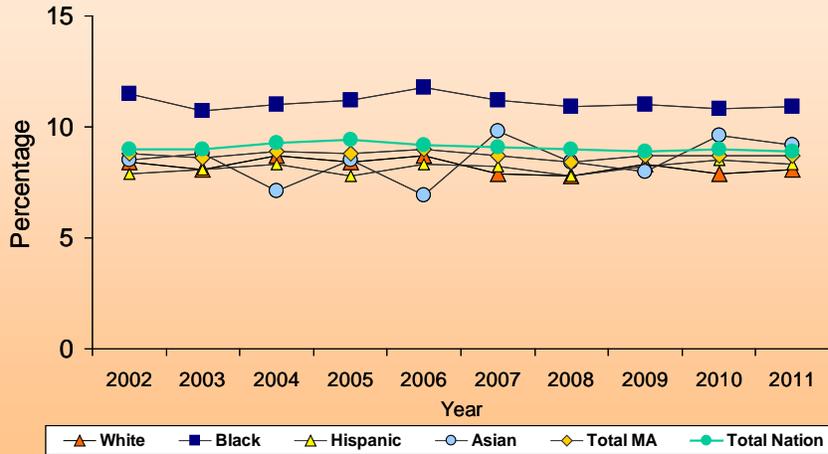






APPENDIX 3: TRENDS CHARTS FOR 2011 PEDNSS

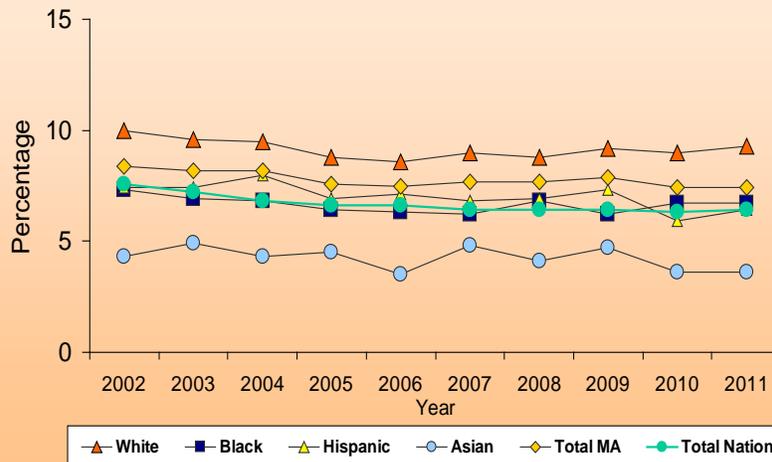
**Trends in prevalence of low birthweight*
by race and ethnicity**



* < 2500 grams, among infants born during the reporting period.

2011 MA PedNSS Table 18C

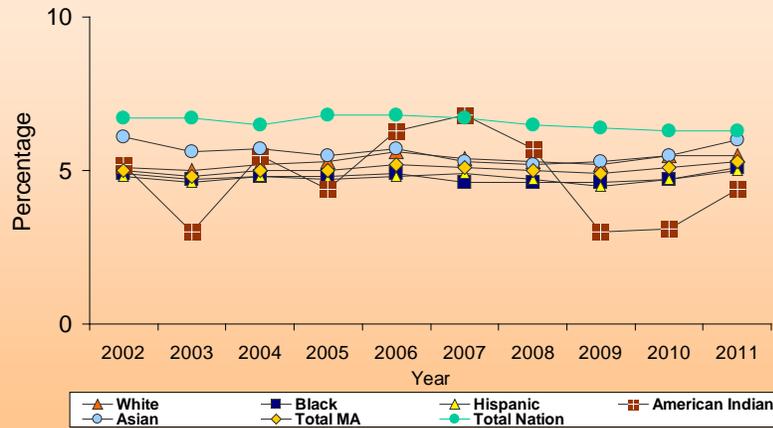
**Trends in prevalence of High Birth Weight*
among MA PedNSS Children by Race and Ethnicity**



* > 4000 grams, among infants born during the reporting period.

2011 MA PedNSS Table 18C

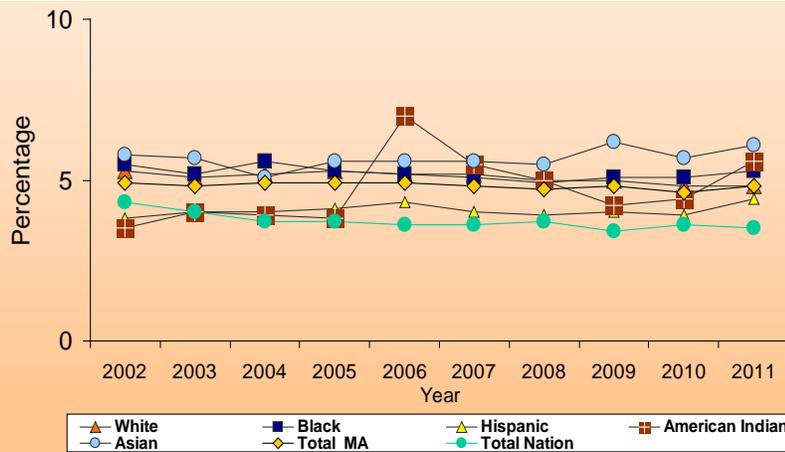
Trends in prevalence of short stature* among MA PedNSS Children Aged <5 Years, by Race and Ethnicity



* Children aged < 2 years: length-for-age \leq 2.3rd percentile, WHO Growth Charts, 2006.
Children aged \geq 2 years: height-for-age < 5th percentile, CDC Growth Charts, 2000.

2011 MA PedNSS Table 18C

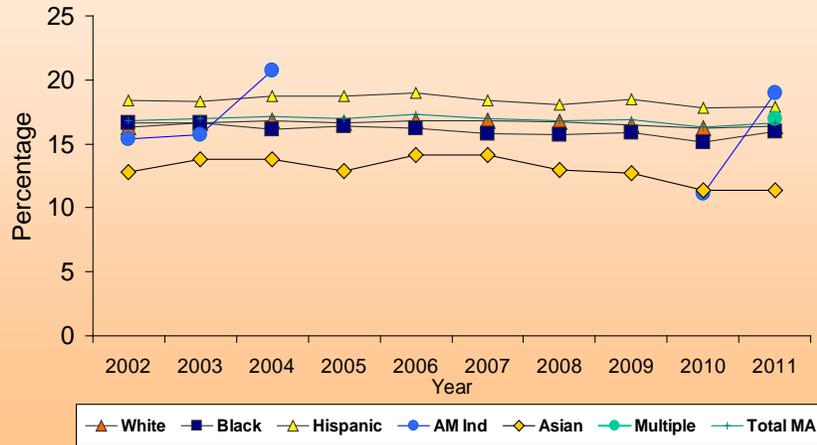
Trends in Prevalence of Underweight* among MA PedNSS Children Aged Less than Five Years, by Race and Ethnicity



* Children aged < 2 years: weight-for-length \leq 2.3rd percentile, WHO Growth Charts, 2006.
Children aged \geq 2 years: BMI-for-age < 5th percentile, CDC Growth Charts, 2000.

2011 MA PedNSS Table 18C

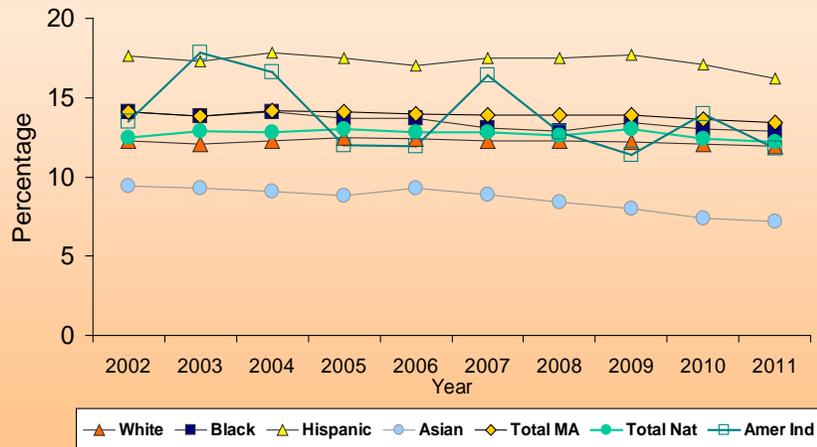
Trends in prevalence of overweight* among MA PEDNSS Children Aged Less than 5 Years, by Race and Ethnicity



* ≥ 85th- < 95th percentile BMI-for-age, CDC Growth Charts, 2000.
10% of children are expected to fall between these percentiles.

2011 MA PedNSS Table 18C

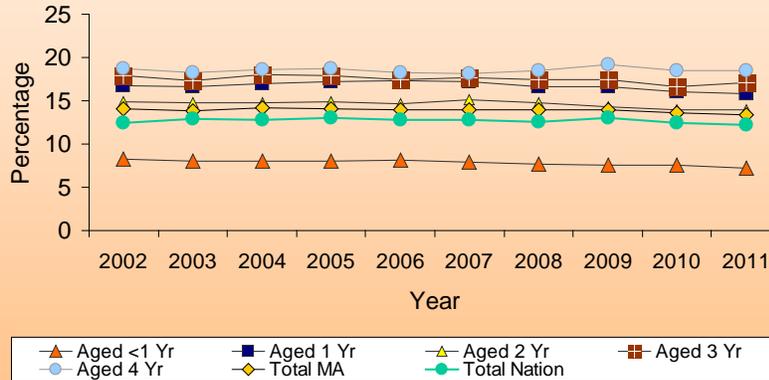
Trends in Prevalence of Obesity* among MA PEDNSS Children Aged less than Five Years, by Race and Ethnicity



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

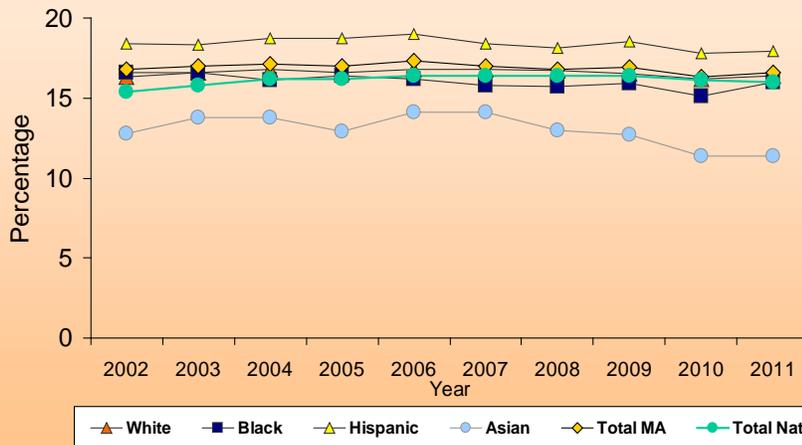
2011 MA PedNSS Table 18C

Trends in prevalence of obesity* among MA PEDNSS Children Aged <5 Years, by Age



* Children aged < 2 years: weight-for-length \geq 97.7th percentile, WHO Growth Charts, 2006 (high weight-for-length). Children aged \geq 2 years: BMI-for-age \geq 95th percentile, CDC Growth Charts, 2000. 2011 MA PedNSS Table 20C

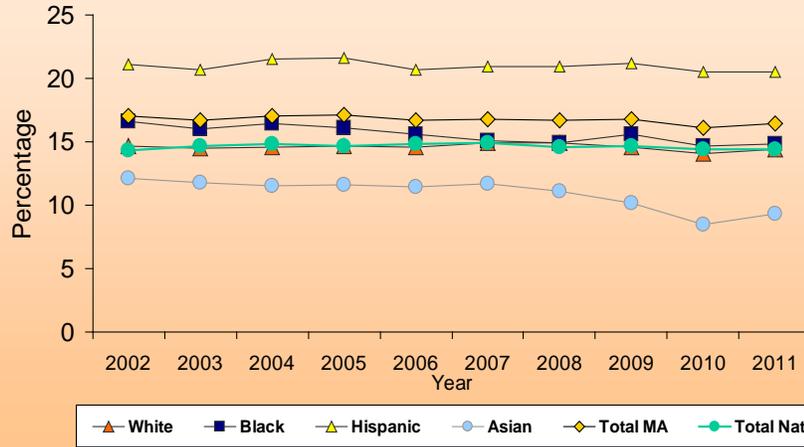
Trends in prevalence of overweight* among MA PEDNSS Children Aged 2 to <5 Years, by Race and Ethnicity



* \geq 85th- $<$ 95th percentile BMI-for-age, CDC Growth Charts, 2000. 10% of children are expected to fall between these percentiles. 2011 MA PedNSS Table 18C

Trends in Prevalence of Obesity*

among MA PEDNSS Children Aged Two to Five Years, by Race and Ethnicity

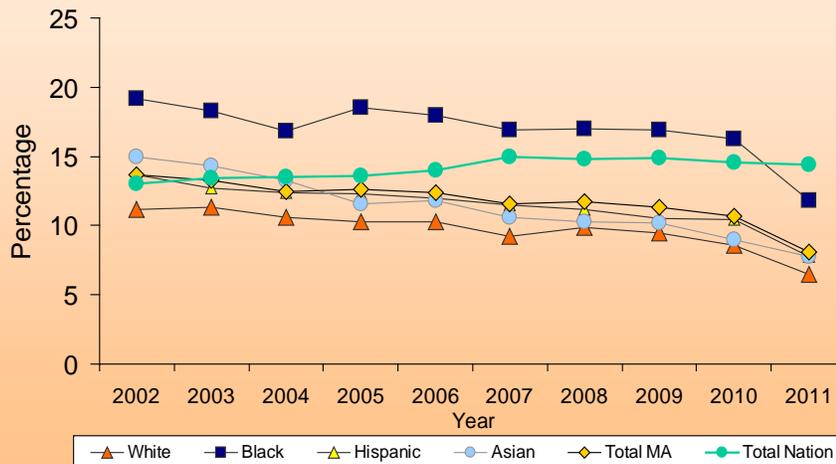


* \geq 95th percentile BMI-for-age, CDC Growth Charts, 2000.
5% of children are expected to fall above the 95th percentile.

2011 MA PedNSS Table 18C

Trends in Prevalence of Anemia*

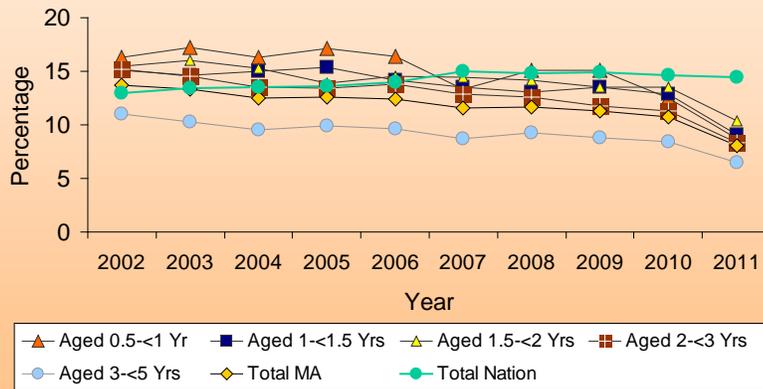
among MA PedNSS Children Aged Less than Five Years, by Race and Ethnicity



* Hb or Hct < 5th percentile, CDC MMWR vol. 47 (No. RR-3), 1998.

2011 MA PedNSS Table 18C

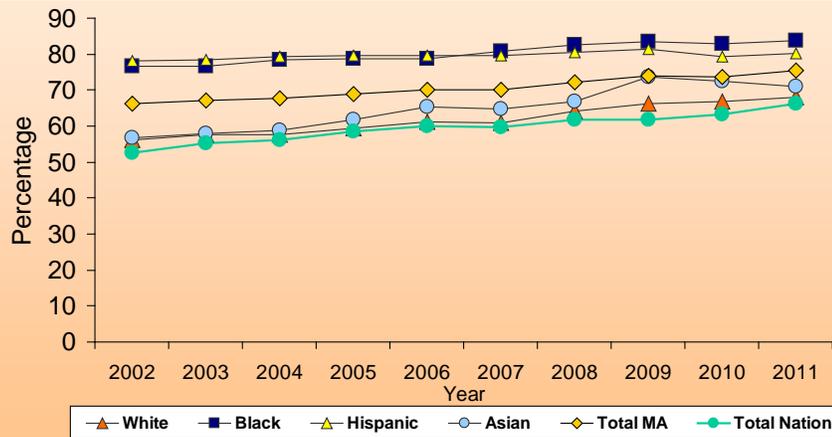
Trends in Prevalence of Anemia* among MA PedNSS Children Aged Less Than Five Years, by Age



* Hb or Hct < 5th percentile, CDC MMWR vol. 47 (No. RR-3), 1998.

2011 MA PedNSS Table 21C

Trends in the Percentage of MA PedNSS Infants Ever Breastfed* by Race and Ethnicity

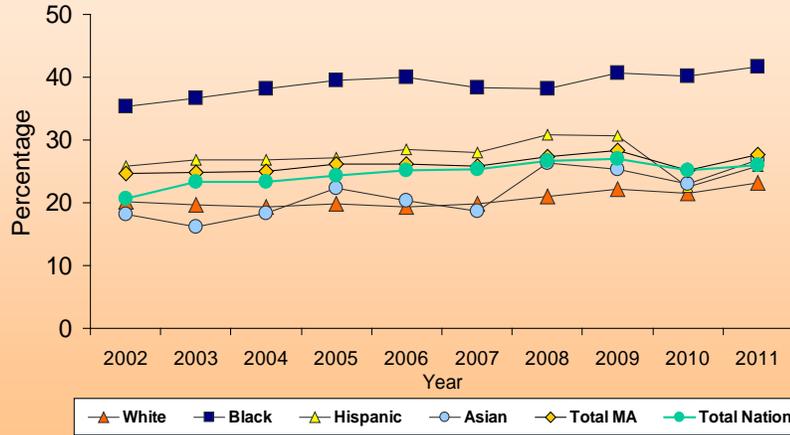


* Among infants born during the reporting period.

2011 MA PedNSS Table 19C

Trends in the Percentage of MA PedNSS Infants Breastfed at Least Six Months*

by Race and Ethnicity

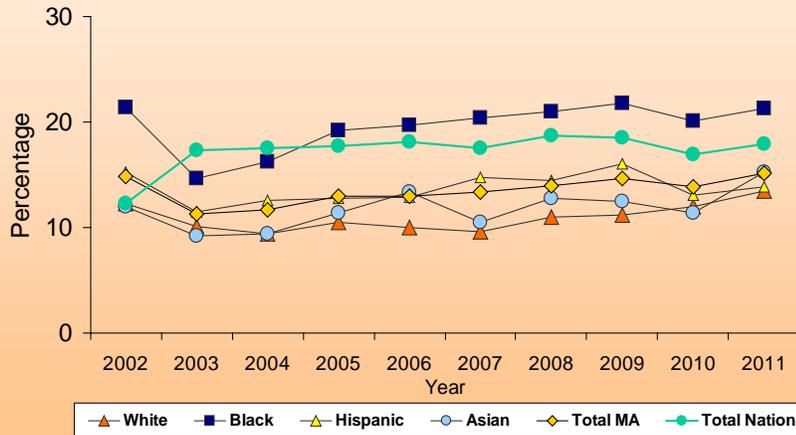


* Among infants who turned six months of age during the reporting period.

2011 MA PedNSS Table 19C

Trends in the Percentage of MA PedNSS Infants Breastfed at least 12 Months*

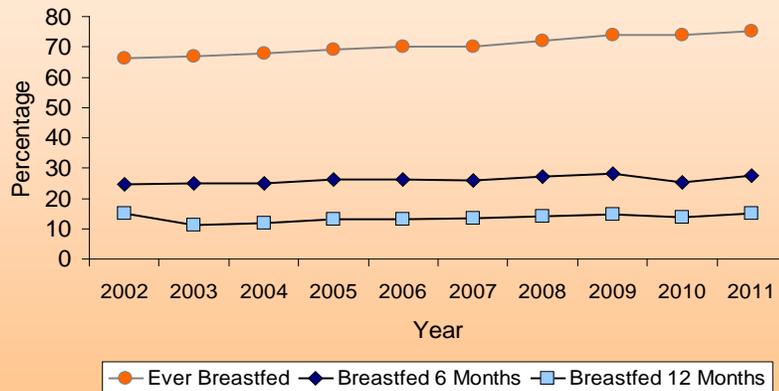
by Race and Ethnicity



* Among infants who turned twelve months of age during the reporting period.

2011 MA PedNSS Table 19C

Trends in the Percentage of MA PedNSS Infants Ever Breastfed, and Breastfed at Least 6 and 12 Months



2011 MA PedNSS Table 13C

MASSACHUSETTS

Children Aged <5 Years

2011

Pediatric Nutrition
Surveillance System

