

Trends in Obesity Among Participants Aged 2–4 Years in the Special Supplemental Nutrition Program for Women, Infants, and Children — United States, 2000–2014

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Childhood obesity is associated with negative health consequences in childhood (1) that continue into adulthood (2), putting adults at risk for type 2 diabetes, cardiovascular disease, and certain cancers (1). Obesity disproportionately affects children from low-income families (3). Through a collaboration with the United States Department of Agriculture (USDA), CDC has begun to use data from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Participants and Program Characteristics (WIC PC) to replace the Pediatric Nutrition Surveillance System (PedNSS) (4,5) for obesity surveillance among young children from low-income families. CDC examined trends in obesity prevalence during 2000–2014 among WIC participants aged 2–4 years using WIC PC data. Overall obesity prevalence increased from 14.0% in 2000 to 15.5% in 2004 and 15.9% in 2010, and then decreased to 14.5% in 2014. During 2010–2014, the prevalence of obesity decreased significantly overall, among non-Hispanic whites, non-Hispanic blacks, Hispanics, American Indian/Alaska Natives and Asians/Pacific Islanders, and among 34 (61%) of the 56 WIC state agencies in states, the District of Columbia, and U.S. territories. Despite these declines, the obesity prevalence among children aged 2–4 years in WIC remains high compared with the national prevalence of 8.9% among children aged 2–5 years in 2011–2014. Continued initiatives to work with parents and other stakeholders to promote healthy pregnancies, breastfeeding, quality nutrition, and physical activity for young children in multiple settings are needed to ensure healthy child development.

To improve maternal and child health among women and children at risk for poor nutrition, WIC provides supplemental foods, nutrition education, and health care referral for low-income women who are pregnant, postpartum, or breastfeeding, and infants and children aged up to 5 years. WIC is administered in each state or territory by state health departments or Indian tribal organizations. WIC PC is a biennial census conducted by the USDA in even years that includes participants certified to receive WIC benefits in April of the reporting year. To be eligible for WIC, women, infants, and children have to meet residential, income (gross household income \leq 185% of the U.S. Poverty Level or adjunctively eligible for other child nutrition programs), and nutrition risk

requirements.* Children's weight and height were measured by clinic-trained staff members according to a standard protocol[†]; children's weight and height records during the most recent certification or recertification were included. Obesity was defined as sex-specific body mass index (BMI)-for-age \geq 95th percentile on the 2000 CDC growth charts.

JoinPoint regression was used to identify the inflection years when changes in the overall trend occurred. Log binomial regression adjusted for age, sex, and race/ethnicity was used to estimate prevalence ratios that represent relative changes in prevalence between two inflection years. Differences in adjusted prevalence were then calculated ($[\text{prevalence at beginning of period}] \times [\text{adjusted prevalence ratio}] - [\text{prevalence at beginning of period}]$). Changes in obesity prevalence were considered statistically significant if the 95% confidence intervals for differences in adjusted prevalence did not include zero.

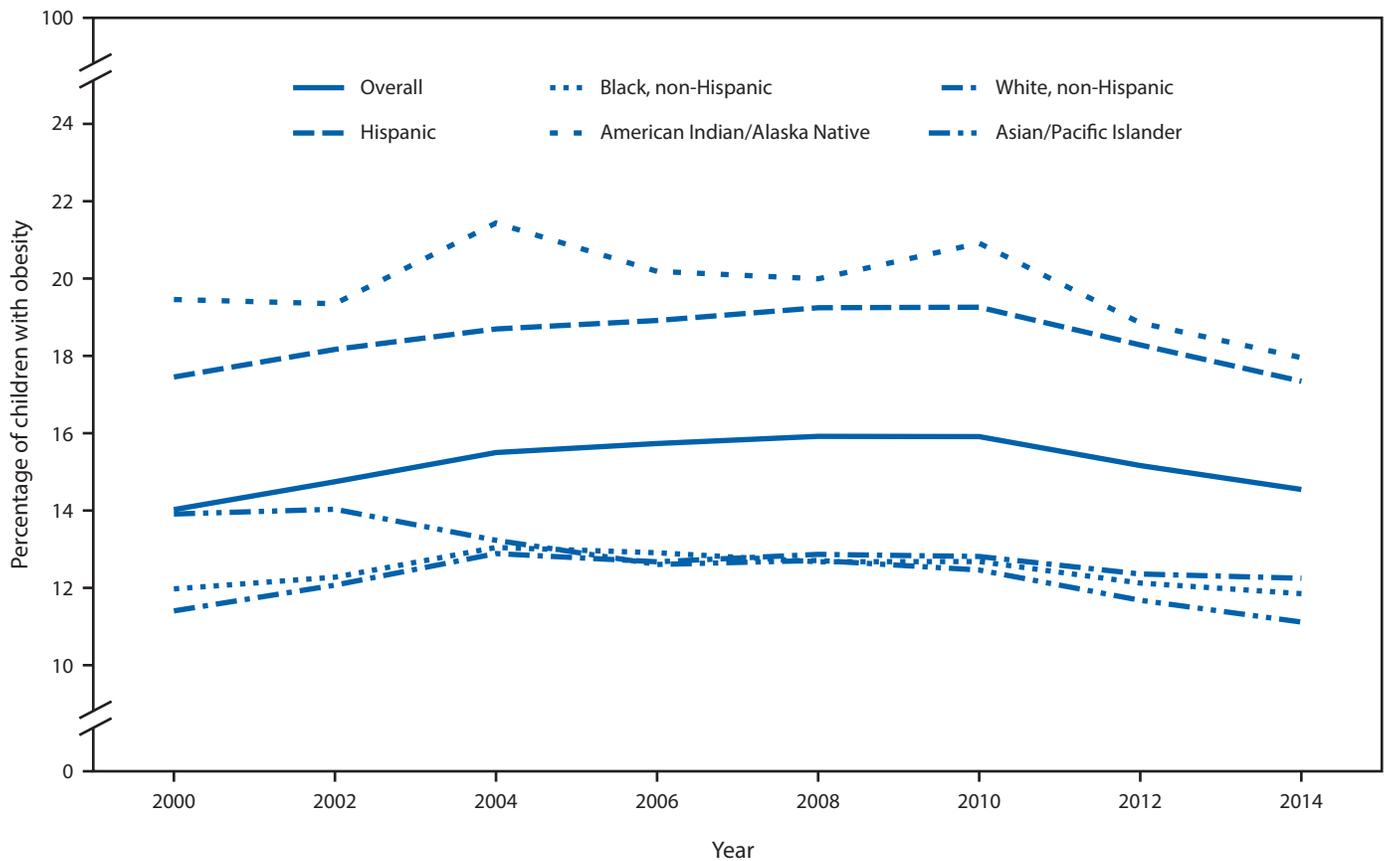
Data from the WIC state agencies in 50 states, the District of Columbia, and five U.S. territories are included in the analyses. Approximately 90% of participants lived in households with gross incomes \leq 185% of the U.S. Poverty Level. Approximately 75% of the anthropometric data were collected within 6 months before April of the reporting year. Data on 24,472 (0.11%) children from Hawaii in 2002 and 2004 were excluded because these prevalence estimates differed by >10 percentage points from the values predicted by a robust regression model, as were children whose weight and height were measured >1 year before the reporting year ($n = 1,062$ [0.005%]) or whose sex, weight, height, or BMI were missing or biologically implausible (194,526 [0.85%]) (6). The final analytic sample included 22,553,518 children aged 2–4 years from 56 WIC state agencies.

During 2000–2010, overall obesity prevalence increased significantly from 14.0% (2000) to 15.5% (2004) and 15.9% (2010); during 2010–2014, obesity prevalence decreased significantly to 14.5% (2014) (Figure) (Table). In a sensitivity analysis to assess the impact on the effect from Hawaii and the Northern Mariana Islands, which did not have consistent, reliable data during 2000–2014, the overall prevalence remained the same during 2000, 2004, and 2010 and increased slightly

* www.fns.usda.gov/wic/wic-eligibility-requirements.

[†] https://wicworks.fns.usda.gov/wicworks/Sharing_Center/PA/Anthro/lib/pdf/Anthropometric_Training_Manual.pdf.

FIGURE. Prevalence of obesity* among WIC participants aged 2–4 years, overall and by race/ethnicity — United States,† 2000–2014



Abbreviation: WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

* Defined as sex-specific body mass index-for-age \geq 95th percentile based on 2000 CDC growth charts.

† Includes data from all the WIC state agencies in 50 states (except for Hawaii data in 2002 and 2004), the District of Columbia, and five U.S. territories.

from 14.5% to 14.6% in 2014, when data from Hawaii and the Northern Mariana Islands were excluded. Patterns in overall obesity trends remained the same.

Obesity prevalence in all years was highest among American Indians/Alaska Natives and Hispanics. Among non-Hispanic whites, non-Hispanic blacks, Hispanics, and American Indians/Alaska Natives, prevalence increased significantly during 2000–2004, then decreased significantly during 2010–2014. Among Asians/Pacific Islanders, prevalence decreased significantly throughout the study period (Figure). Patterns in obesity trends remained the same for all racial/ethnic groups if Hawaii and the Northern Mariana Islands were excluded.

The JoinPoint analysis identified 2004 and 2010 as the inflection years for overall obesity trend. Obesity prevalences by WIC state agency are observed at four time points (2000, 2004, 2010, and 2014), with comparisons in adjusted prevalence during 2004 and 2000, 2010 and 2004, and 2014 and 2010 (Table). Among the 54 state agencies with data for 2000 and 2004, an increase in obesity prevalence was observed in 48 (89%); among these, 38 (70%) were statistically significant; the largest increase occurred in

Kansas (from 11.8% to 16.7%). Obesity prevalence decreased for four (7%) WIC state agencies; Puerto Rico was the only WIC state agency with a significant decrease (from 22.1% to 21.3%) (Table).

Among the 54 WIC state agencies with data for 2004 and 2010, an increase in prevalence occurred in 26 (48%), including 17 (31%) that were statistically significant; a decrease occurred in 27 (50%) WIC state agencies, including 20 (37%) that were statistically significant. The largest increase in obesity prevalence occurred in New Mexico (from 11.0% to 15.7%) and the largest decrease occurred in Illinois (from 20.3% to 15.7%) (Table).

Among the 56 WIC state agencies with data for 2010 and 2014, only nine (16%) experienced an increase in obesity prevalence, including four (7%) in which the increase was statistically significant. The largest significant increase occurred in Nebraska (from 14.4% to 16.9%). In contrast, a decrease in obesity prevalence occurred in 45 (80%) WIC state agencies, including 34 (61%) in which the difference was statistically significant. The adjusted prevalence decreased by more than 3 percentage points in six WIC state agencies; the largest significant decrease was in Puerto Rico (from 20.3% to 13.9%).

TABLE. Prevalence of obesity* among WIC participants aged 2–4 years, by WIC state agency and year — United States, the District of Columbia (DC), and five U.S. territories, 2000–2014

WIC state agency	No. WIC participants aged 2–4 years				Obesity prevalence (%) [†]				Difference in adjusted obesity prevalence		
	2000	2004	2010	2014	2000	2004	2010	2014	2004 vs 2000	2010 vs 2004	2014 vs 2010
									% Difference [§] (95% CI)	% Difference [§] (95% CI)	% Difference [§] (95% CI)
Overall [¶]	2,352,648	2,648,564	3,307,442	3,016,487	14.0	15.5	15.9	14.5	1.2** (1.2 to 1.3)	0.1** (0.1 to 0.2)	-1.3 ^{††} (-1.4 to -1.3)
Alabama	28,680	39,859	45,743	43,509	13.2	14.1	15.8	16.3	0.5 (0.0 to 1.0)	0.7** (0.2 to 1.2)	0.3 (-0.2 to 0.8)
Alaska	7,879	9,297	10,108	5,552	18.8	20.6	21.2	19.1	1.9** (0.7 to 3.2)	0.1 (-1.0 to 1.2)	-1.7 ^{††} (-2.9 to -0.4)
Arizona	37,898	50,484	72,933	53,044	11.3	12.1	15.0	13.3	0.7** (0.3 to 1.2)	2.7** (2.3 to 3.1)	-1.7 ^{††} (-2.1 to -1.3)
Arkansas	22,085	24,713	31,245	28,543	11.0	12.5	14.8	14.4	1.2** (0.6 to 1.8)	1.8** (1.2 to 2.4)	-0.4 (-1.0 to 0.1)
California	449,965	482,239	583,008	551,510	16.4	16.4	18.4	16.6	0.0 (-0.2 to 0.1)	1.7** (1.6 to 1.9)	-1.7 ^{††} (-1.8 to -1.6)
Colorado	20,972	25,835	39,612	33,057	8.4	9.8	9.6	8.5	0.9** (0.4 to 1.4)	-0.7 ^{††} (-1.1 to -0.2)	-1.0 ^{††} (-1.4 to -0.6)
Connecticut	17,973	18,421	22,988	19,839	16.9	17.8	17.1	15.3	0.7 (-0.1 to 1.5)	-1.0 ^{††} (-1.7 to -0.3)	-1.7 ^{††} (-2.4 to -1.1)
Delaware	4,475	5,993	7,650	7,251	14.9	15.5	18.4	17.2	-0.3 (-1.6 to 1.1)	1.6** (0.4 to 3.0)	-0.3 (-1.5 to 1.0)
DC	4,806	5,165	5,182	4,608	13.4	14.0	14.4	13.0	0.0 (-1.3 to 1.3)	-0.6 (-1.8 to 0.7)	-1.4 (-2.6 to 0.0)
Florida	96,465	127,203	194,924	182,567	13.2	14.5	14.6	12.7	0.8** (0.5 to 1.1)	-0.5 ^{††} (-0.7 to -0.2)	-1.7 ^{††} (-1.9 to -1.5)
Georgia	58,132	78,835	104,959	93,386	11.5	13.3	14.4	13.0	1.0** (0.6 to 1.4)	0.7** (0.4 to 1.0)	-1.3 ^{††} (-1.6 to -1.1)
Hawaii	12,377	NA	14,504	12,987	11.7	NA	9.7	10.3	NA	NA	0.6 (-0.1 to 1.3)
Idaho	11,729	12,563	18,704	15,087	10.8	12.3	11.9	11.6	1.4** (0.6 to 2.3)	-0.9 ^{††} (-1.5 to -0.2)	-0.5 (-1.1 to 0.2)
Illinois	76,596	78,564	108,762	96,060	16.2	20.3	15.7	15.2	3.3** (2.9 to 3.8)	-5.3 ^{††} (-5.6 to -5.0)	-0.1 (-0.4 to 0.3)
Indiana	37,253	40,746	63,220	54,717	12.5	14.6	15.1	14.3	1.4** (0.9 to 1.9)	0.3 (-0.2 to 0.7)	-0.8 ^{††} (-1.1 to -0.4)
Iowa	20,622	19,016	29,481	24,835	12.7	15.0	15.6	14.7	2.0** (1.3 to 2.7)	-0.2 (-0.8 to 0.5)	-0.7 ^{††} (-1.3 to -0.1)
Kansas	17,750	24,336	30,458	25,532	11.8	16.7	13.7	12.8	4.5** (3.7 to 5.3)	-3.3 ^{††} (-3.9 to -2.8)	-1.1 ^{††} (-1.6 to -0.5)
Kentucky	37,609	41,122	45,761	44,355	14.6	16.7	18.2	13.3	2.0** (1.4 to 2.5)	1.2** (0.7 to 1.8)	-5.0 ^{††} (-5.4 to -4.6)
Louisiana	28,800	35,556	48,145	39,507	12.4	14.8	13.8	13.2	2.4** (1.8 to 3.0)	-1.4 ^{††} (-1.8 to -0.9)	-0.8 ^{††} (-1.2 to -0.4)
Maine	7,325	7,722	10,410	9,034	14.1	16.7	15.2	15.1	2.5** (1.3 to 3.8)	-1.6 ^{††} (-2.6 to -0.5)	-0.2 (-1.1 to 0.9)
Maryland	26,943	34,104	51,280	49,008	13.3	14.9	17.1	16.5	0.8** (0.3 to 1.4)	0.6** (0.1 to 1.1)	-0.6 ^{††} (-1.1 to -0.2)
Massachusetts	43,334	42,986	49,178	44,350	16.3	18.1	17.1	16.6	1.5** (1.0 to 2.1)	-1.0 ^{††} (-1.5 to -0.5)	-0.7 ^{††} (-1.2 to -0.2)
Michigan	76,127	79,619	85,293	86,139	12.3	13.9	14.4	13.4	1.3** (0.9 to 1.6)	0.2 (-0.1 to 0.6)	-0.7 ^{††} (-1.0 to -0.3)
Minnesota	28,340	41,316	57,529	47,773	12.6	13.9	12.7	12.3	1.3** (0.8 to 1.9)	-1.8 ^{††} (-2.2 to -1.4)	-0.6 ^{††} (-1.0 to -0.2)
Mississippi	20,068	28,505	36,519	26,007	13.2	16.4	14.9	14.5	3.3** (2.6 to 4.1)	-1.8 ^{††} (-2.3 to -1.2)	-0.5 (-1.1 to 0.0)
Missouri	42,380	44,784	50,575	43,895	12.0	14.6	14.4	13.0	2.3** (1.8 to 2.8)	-0.2 (-0.6 to 0.2)	-1.5 ^{††} (-1.9 to -1.1)
Montana	7,435	7,509	7,194	7,288	10.5	12.2	13.4	12.5	1.5** (0.5 to 2.6)	0.9 (-0.1 to 2.1)	-0.9 (-1.9 to 0.1)
Nebraska	10,444	13,859	15,622	13,726	13.2	14.2	14.4	16.9	0.1 (-0.7 to 1.0)	-0.4 (-1.1 to 0.4)	2.5** (1.6 to 3.4)
Nevada	14,955	13,801	25,855	26,884	11.8	15.7	15.0	12.0	3.4** (2.6 to 4.3)	-0.9 ^{††} (-1.6 to -0.2)	-2.8 ^{††} (-3.3 to -2.2)
New Hampshire	5,667	5,707	7,263	5,551	14.2	14.8	15.0	15.1	0.4 (-0.9 to 1.7)	0.1 (-1.1 to 1.4)	0.0 (-1.2 to 1.3)
New Jersey	37,374	43,686	59,000	56,815	18.6	18.7	18.9	15.3	-0.3 (-0.8 to 0.2)	-0.5 ^{††} (-1.0 to -0.1)	-3.4 ^{††} (-3.8 to -3.0)
New Mexico	19,951	19,047	21,968	20,515	8.2	11.0	15.7	12.5	2.8** (2.1 to 3.5)	4.4** (3.7 to 5.2)	-3.3 ^{††} (-3.9 to -2.7)

See table footnotes on the next page.

Discussion

The prevalence of obesity among young children from low-income families participating in WIC in U.S. states and territories was 14.5% in 2014. This estimate was higher than the national estimate (8.9%) among all U.S. children in a slightly different age group (2–5 years) based on data from the 2011–2014 National Health and Nutrition Examination Survey (7). Since 2010, statistically significant downward trends in obesity prevalence among WIC young children have been observed overall, in all five racial/ethnic groups, and in 34 of the 56 WIC state agencies, suggesting that prevention initiatives are making progress, potentially by impacting the estimated excess of calories eaten versus energy expended for this vulnerable group (8).

Nutrition during pregnancy and early childhood is critical for healthy child growth and development. A recent review of factors contributing to childhood obesity identified risk factors present during pregnancy and the first 2 years of life,

including high maternal prepregnancy BMI, excess maternal gestational weight gain, gestational diabetes, high infant birth weight, and rapid infant weight gain that can influence the risk for obesity in later childhood (9). The USDA WIC program reaches low-income mothers and children with nutritional risk during this critical developmental period. WIC promotes healthy eating and provides nutrition education that emphasizes the nutritional needs of women who are pregnant, postpartum, or breastfeeding, and children aged up to 5 years. In 2009, the WIC food packages were revised[§] to align with the Dietary Guidelines for Americans and the infant feeding practice guidelines of the American Academy of Pediatrics. The revisions promote and support breastfeeding, provide WIC participants with a wider variety of healthy food options, and improve availability of and access to healthy foods in communities (10).

[§] <http://www.fns.usda.gov/wic/final-rule-revisions-wic-food-packages>.

TABLE. (Continued) Prevalence of obesity* among WIC participants aged 2–4 years, by WIC state agency and year — United States, the District of Columbia (DC), and five U.S. territories, 2000–2014

WIC state agency	No. WIC participants aged 2–4 years				Obesity prevalence (%) [†]				Difference in adjusted obesity prevalence		
	2000	2004	2010	2014	2000	2004	2010	2014	2004 vs 2000	2010 vs 2004	2014 vs 2010
									% Difference [§] (95% CI)	% Difference [§] (95% CI)	% Difference [§] (95% CI)
New York	151,124	161,904	186,760	195,413	16.5	17.4	16.1	14.3	0.7** (0.4 to 1.0)	-1.5 ^{††} (-1.7 to -1.3)	-1.7 ^{††} (-1.9 to -1.5)
North Carolina	52,651	62,956	89,798	92,407	11.6	13.6	13.9	15.0	1.3** (0.9 to 1.7)	-0.4 ^{††} (-0.7 to -0.03)	1.3** (1.0 to 1.6)
North Dakota	5,049	4,848	5,484	4,586	10.8	12.7	14.5	14.4	1.5** (0.2 to 2.9)	1.2 (-0.1 to 2.6)	0.0 (-1.3 to 1.4)
Ohio	78,769	88,873	102,803	81,440	11.6	12.1	12.6	13.1	0.3 (0.0 to 0.6)	0.4** (0.1 to 0.7)	0.3** (0.03 to 0.6)
Oklahoma	28,650	27,244	37,849	32,754	11.1	13.7	15.4	13.8	2.0** (1.4 to 2.6)	1.2** (0.6 to 1.8)	-1.7 ^{††} (-2.2 to -1.2)
Oregon	23,948	33,521	43,209	38,378	14.7	14.8	15.8	15.0	-0.4 (-1.0 to 0.2)	0.5** (0.03 to 1.0)	-0.7 ^{††} (-1.2 to -0.2)
Pennsylvania	77,518	81,491	96,762	84,996	12.1	12.6	12.8	12.9	0.2 (-0.1 to 0.5)	0.0 (-0.3 to 0.3)	0.1 (-0.2 to 0.4)
Rhode Island	7,005	7,498	10,783	8,853	17.3	18.3	16.4	16.3	0.8 (-0.4 to 2.1)	-1.9 ^{††} (-2.9 to -0.8)	-0.3 (-1.3 to 0.8)
South Carolina	27,083	28,169	39,785	32,346	12.3	15.6	13.3	12.0	2.8** (2.2 to 3.4)	-2.8 ^{††} (-3.2 to -2.3)	-1.4 ^{††} (-1.8 to -0.9)
South Dakota	6,274	6,697	7,884	5,179	12.0	14.9	17.3	17.1	3.1** (1.8 to 4.5)	1.5** (0.3 to 2.8)	-0.5 (-1.7 to 0.9)
Tennessee	43,309	48,114	57,153	54,429	11.8	13.5	16.0	14.9	1.2** (0.7 to 1.6)	1.7** (1.3 to 2.2)	-1.0 ^{††} (-1.4 to -0.6)
Texas	255,124	306,999	361,823	307,498	12.5	15.9	16.9	14.9	3.3** (3.1 to 3.5)	0.7** (0.5 to 0.8)	-1.6 ^{††} (-1.8 to -1.5)
Utah	19,555	21,345	26,045	22,919	10.3	12.3	12.5	8.2	2.0** (1.3 to 2.7)	-0.7 ^{††} (-1.2 to -0.1)	-4.3 ^{††} (-4.7 to -3.8)
Vermont	5,848	6,308	6,964	5,574	12.5	14.6	13.8	14.1	2.0** (0.7 to 3.3)	-0.7 (-1.8 to 0.6)	0.1 (-1.1 to 1.4)
Virginia	45,135	42,233	48,920	57,983	14.0	18.3	21.5	20.0	3.8** (3.2 to 4.3)	1.7** (1.2 to 2.2)	-1.5 ^{††} (-2.0 to -1.1)
Washington	56,173	63,851	78,336	76,564	13.4	14.5	14.9	13.6	0.7** (0.3 to 1.1)	-0.3 (-0.7 to 0.1)	-1.4 ^{††} (-1.7 to -1.1)
West Virginia	15,654	17,687	17,669	14,902	11.9	13.7	14.4	16.4	1.6** (0.9 to 2.4)	0.8** (0.1 to 1.6)	1.9** (1.1 to 2.8)
Wisconsin	35,780	39,710	48,511	39,965	11.6	14.4	15.2	14.7	2.5** (2.0 to 3.0)	0.2 (-0.2 to 0.7)	-0.6 ^{††} (-1.1 to -0.2)
Wyoming	3,596	3,658	4,413	3,731	8.1	10.0	11.8	9.9	2.1** (0.7 to 3.7)	1.0 (-0.3 to 2.5)	-2.1 ^{††} (-3.2 to -0.8)
Territory											
American Samoa	2,028	3,157	3,221	3,160	16.5	16.8	14.6	16.3	0.4 (-1.6 to 2.7)	-2.3 ^{††} (-3.9 to -0.6)	1.6 (-0.1 to 3.6)
Guam	1,415	1,842	3,248	2,737	10.7	11.6	11.4	8.7	0.7 (-1.3 to 3.2)	-0.1 (-1.8 to 1.9)	-2.8 ^{††} (-4.1 to -1.4)
Northern Mariana Islands	NA	NA	2,157	1,808	NA	NA	14.1	9.0	NA	NA	-5.3 ^{††} (-6.7 to -3.5)
Puerto Rico	75,865	85,711	70,699	74,118	22.1	21.3	20.3	13.9	-1.0 ^{††} (-1.4 to -0.6)	-1.1 ^{††} (-1.4 to -0.7)	-6.4 ^{††} (-6.7 to -6.1)
Virgin Islands	2,686	2,156	2,093	1,816	11.4	12.0	12.4	11.9	0.5 (-1.2 to 2.5)	0.4 (-1.5 to 2.5)	-0.5 (-2.4 to 1.7)

Abbreviation: NA = No data collected, or data were considered unreliable if sample size was <50 or prevalence changed by >10 percentage points from previous year.

* Defined as sex-specific body mass index-for-age \geq the 95th percentile on the CDC growth charts.

[†] Crude prevalence of obesity.

[§] Calculated as [prevalence at beginning of period] \times [adjusted prevalence ratio] – [prevalence at beginning of period]. The adjusted prevalence ratios that represent relative changes in obesity prevalence between two inflection years were calculated from log binomial regression models adjusted for age, sex, and race/ethnicity.

[¶] Includes data from all the WIC state agencies in 50 states, DC, and five U.S. territories, except for Hawaii data in 2002 and 2004.

** Statistically significant increase based on log binomial regression model adjusted for age, sex, and race/ethnicity.

^{††} Statistically significant decrease based on log binomial regression model adjusted for age, sex, and race/ethnicity.

Other factors also might be contributing to the modest declines in obesity among WIC young children. Local, state, and national obesity initiatives and reports such as Let's Move,[¶] the White House Childhood Obesity Task Force report,^{**} and the Institute of Medicine recommendations^{††} have raised awareness and drawn the attention of stakeholders, including parents, early care and education (ECE) providers, community and business leaders, industry, health care providers, and public health officials. A number of federal initiatives have provided support to states and localities to assist ECE programs to improve nutrition, breastfeeding support, physical activity, and screen time standards. For example, CDC supports states in embedding these standards in their ECE systems

[¶] <http://www.letsmove.gov>.

** http://www.letsmove.gov/sites/letsmove.gov/files/TaskForce_on_Childhood_Obesity_May2010_FullReport.pdf.

^{††} <https://www.nap.edu/read/13275/chapter/1>.

through various mechanisms, including the State Public Health Actions^{§§} and the ECE Obesity Prevention cooperative agreements.

The findings in this report are subject to at least two limitations. First, findings might not be generalizable to all young children from low-income families, because the study includes only young children who participated in WIC and only about 50% of WIC eligible young children were enrolled in the program.^{¶¶} Second, findings of this study are not directly comparable to those based on the older PedNSS data, which also included WIC participants (4,5). Data collected by PedNSS in January–December calendar years included participants from some other child nutrition programs (<20%), in addition to WIC, but did not have consistent data for all WIC state agencies over time.

^{§§} <https://www.cdc.gov/chronicdisease/about/state-public-health-actions.htm>.

^{¶¶} http://www.fns.usda.gov/sites/default/files/WICEligibles2000-2009Vol2_0.pdf.

Summary**What is already known about this topic?**

Previous analyses using Pediatric Nutrition Surveillance System (PedNSS) data found that during 2008–2011, obesity prevalence among children aged 2–4 years who participated in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and other nutrition and health programs declined slightly overall, among non-Hispanic whites, non-Hispanic blacks, Hispanics, and Asians/Pacific Islanders, and in 19 of 43 states and U.S. territories.

What is added by this report?

The WIC Participants and Program Characteristics (WIC PC) census data replaces the PedNSS system to report obesity prevalence among low-income young children from more jurisdictions consistently. This is the first study to use WIC PC data to examine early childhood obesity among low-income WIC young children. Modest declines in obesity prevalence from 2010 to 2014 were observed overall and in all five racial/ethnic groups. Among the 56 WIC state agencies in states, the District of Columbia, and U.S. territories, 34 had statistically significant declines. Despite the recent downward trends, the overall obesity prevalence among WIC children aged 2–4 years remains high at 14.5% in 2014.

What are the implications for public health practice?

Continued obesity prevention initiatives at the national, state, and local levels are needed. Policy and practice changes in key settings (community, early care and education, and health care), and initiatives that support pregnant women, parents, and key care providers to promote healthy pregnancies, breastfeeding, quality nutrition, and physical activity for young children are needed to further reduce the prevalence of early childhood obesity.

Despite the recent declining trends, the obesity prevalence for young, low-income children in WIC remains high at 14.5% in 2014. To reduce the high prevalence of early childhood obesity among low-income families, new and continued implementation of evidence-based measures are needed to support and educate pregnant women, ensure parents and families have the appropriate information about healthy behaviors, and encourage stakeholders across various settings and sectors to create supportive nutrition and physical activity environments.

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References

1. CDC. Overweight and obesity. Atlanta, GA: US Department of Health and Human Services, CDC; 2015. <http://www.cdc.gov/obesity/>
2. Simmonds M, Llewellyn A, Owen CG, Woolacott N. Predicting adult obesity from childhood obesity: a systematic review and meta-analysis. *Obes Rev* 2016;17:95–107. <http://dx.doi.org/10.1111/obr.12334>
3. Freedman D. Obesity—United States, 1988–2008. In: CDC. CDC Health Disparities and Inequalities Report—United States, 2011. *MMWR Suppl* 2011;60(No. Suppl 1).
4. CDC. Vital signs: obesity among low-income, preschool-aged children—United States, 2008–2011. *MMWR Morb Mortal Wkly Rep* 2013;62:629–34.
5. Pan L, McGuire LC, Blanck HM, May-Murriel AL, Grummer-Strawn LM. Racial/ethnic differences in obesity trends among young low-income children. *Am J Prev Med* 2015;48:570–4. <http://dx.doi.org/10.1016/j.amepre.2014.11.009>
6. CDC. A SAS program for the 2000 CDC Growth Charts (ages 0 to <20 years). Atlanta, GA: US Department of Health and Human Services, CDC; 2016. <http://www.cdc.gov/nccdphp/dnpao/growthcharts/resources/sas.htm>
7. Ogden CL, Carroll MD, Fryar CD, Flegal KM. Prevalence of obesity among adults and youth: United States, 2011–2014. *NCHS Data Brief* 2015;219:1–8.
8. Wang YC, Hsiao A, Orleans CT, Gortmaker SL. The caloric calculator: average caloric impact of childhood obesity interventions. *Am J Prev Med* 2013;45:e3–13. <http://dx.doi.org/10.1016/j.amepre.2013.03.012>
9. Woo Baidal JA, Locks LM, Cheng ER, Blake-Lamb TL, Perkins ME, Taveras EM. Risk factors for childhood obesity in the first 1,000 days: a systematic review. *Am J Prev Med* 2016;50:761–79. <http://dx.doi.org/10.1016/j.amepre.2015.11.012>
10. Lu W, McKyer EL, Dowdy D, et al. Evaluating the influence of the revised Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Food Allocation Package on healthy food availability, accessibility, and affordability in Texas. *J Acad Nutr Diet* 2016;116:292–301. <http://dx.doi.org/10.1016/j.jand.2015.10.021>