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Obesity epidemiology trends by race/ethnicity, gender, and education: National Health Interview Survey, 1997–2012

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Summary

Obesity continues to be a public health concern across the globe. Obesity has a demonstrated association with health behaviors and health outcomes, such as diabetes, hypertension, and cancer. Over the past two decades, obesity has increased worldwide and remains highest in the US. It is critical to understand the definition of obesity, using body mass index (BMI) appropriately, recent estimates, and risk factors as a framework within which clinicians should work to help reduce the burden of obesity. This framework, including the Healthy People 2020 place-based approach to social determinants of health, are described in this chapter.

Keywords

Obesity; epidemiology; BMI; racial/ethnic disparities; social determinants of health

Introduction

Obesity continues to be a public health concern across the globe. Obesity has a demonstrated association with health behaviors^{1–8} and health outcomes, such as diabetes, hypertension, and cancer.^{9–14} Over the past two decades, obesity has increased worldwide and remains highest in the US. It is critical to understand the definition of obesity, using body mass index (BMI) appropriately, recent estimates, and risk factors as a framework within which clinicians should work to help reduce the burden of obesity and obesity-related health outcomes. This framework, including the Healthy People 2020 place-based approach to social determinants of health, are described in this chapter.

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Definition and measurement

BMI is the most common measure used for population and clinical screening for obesity. Weight and height are needed for BMI and usually determined using measured weight and height in clinical settings and self-reported weight and height in larger population health studies. BMI is calculated as one's weight in kilograms divided by one's height in meters (kg/m^2). While the definition of obesity is dependent upon the method used to determine the presence of obesity (i.e. BMI, waist circumference), for the purpose of this chapter, we define obesity based on the World Health Organization's international adult classification of BMI (See Table 1).

Currently, there is no consensus on an international classification of BMI for children. However, for our purposes, obesity is classified as BMI greater than or equal to the age- and sex-specific 95th percentile based on the 2000 Centers for Disease Control and Prevention growth charts.¹⁵

Obesity Worldwide¹⁶

- Over the past three and half decades, the prevalence of obesity has nearly doubled worldwide.
- .
- Among adults aged 18 years or older, 11% of men and 15% of women were obese in 2014.
- More than 42 million children under the age of 5 years were overweight in 2013.

Obesity in North America

- In the US, the prevalence of obesity among adults over the age of 20 is approximately 36%.¹⁷
- 38.3% of women and 34.3% of men in the US are obese and obesity prevalence in the US varies by gender (Figure 1), race/ethnicity (Figure 2), and socioeconomic status.¹⁷
- Canada has lower adult obesity prevalence than the US across gender (Figure 3).¹⁸
- Among children, the prevalence of obesity in the US was 17% in 2011–2014 and similar to adults prevalence also varies by gender, age (Figure 4) and race/ethnicity (Figure 5).¹⁷
- Canada also has lower childhood and adolescent obesity prevalence than the US across gender (Figure 6).¹⁹

Special consideration needs to be given to ethnic subgroups among Hispanics as there are cultural differences that may impact obesity in different ways. The Hispanic prevalence of obesity based on the NHANES estimates provided above are based on a sample of Mexican and Mexican Americans, the largest Hispanic subgroup in the US.²⁰ Studies have shown that

there are ethnic variations in obesity, behaviors, risk factors, demographics, and social determinants among Hispanics.^{21–27} These variations become masked in a pan-ethnic grouping and may impact both clinical and population interventions for obesity reduction and prevention targeted towards Hispanics in the US.^{21–23,25,26,28–31}

Obesity Risk Factors

- Energy imbalance between nutrition and physical activity^{32–35}
- Direct and indirect genetic effects^{36,37}
- Gene-environment interactions³⁸
- Social determinants of health (see Figure 7)³⁹

Social determinants of health are defined as the contexts of the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks.³⁹ In the context of that complex environment, social determinants of health include physical and social determinants. Examples of physical determinants of obesity include:³⁹

- Green spaces and other natural elements of the environment
- Parks, buildings, sidewalks, bike lanes and other aspects of the built environment⁴⁰
- Schools, recreation facilities & programs, and worksites
- Physical barriers limiting people with disabilities

Some examples of social determinants of obesity include:³⁹

- Socioeconomic conditions (i.e. concentrated poverty)
- Residential segregation
- Access to health care services
- Transportation options
- Availability of resources to meet daily needs
- Social support

For clinicians, patient obesity management and reduction instructions and programs should also take into account social determinants which could serve to improve patient capacity to make necessary behavioral changes. Clinicians, patients, and public health professionals should actively work together may use epidemiological evidence linking obesity to social determinants to advocate for policy-level interventions as well.

Summary

Obesity is a global public health concern, with the highest rates found in the United States. Though obesity prevalence worldwide varies at the national level, there are also significant differences across gender, socioeconomic status, and race/ethnicity, particularly in the

United States where obesity is highest. Future clinical research should include capturing clinical data for more precise estimation of national, regional, and local trends over time by race/ethnicity and education to calculate estimates of obesity prevalence worldwide. Racial and ethnic variations in adult and youth obesity also require further research.²¹ For example, though the specific mechanisms by which education impacts obesity prevalence at the national level need further exploration, policy to improve high school graduation rates, college enrollment, retention and graduation can benefit all racial and ethnic groups. Additionally, there is an urgent need to evaluate the effectiveness of obesity interventions for prevention and control.¹⁶ Finally, clinicians should consider using epidemiological evidence linking obesity to social determinants to advocate for policy-level interventions to improve social and physical environment conditions for obesity prevention and intervention.

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Key Points (3–5)

- Trends in obesity prevalence over the past two decades have increased across the globe while remaining high in the US.
- Obesity, for screening purposes, is defined as a body mass index (BMI) greater than or equal to 30 kg/m² for adults and BMI above the age- and sex-specific age- and sex-specific 95th percentile of the CDC or WHO growth charts.
- Obesity is higher among women, racial/ethnic groups, and at lower levels of education and income.
- Data collection of ethnic subgroups across all races will improve our ability to monitor trends in obesity and potential other health outcomes over time.
- It is critical to consider both individual behaviors and social determinants of health for identifying at-risk populations to develop evidence-based, culturally relevant clinical and population interventions.

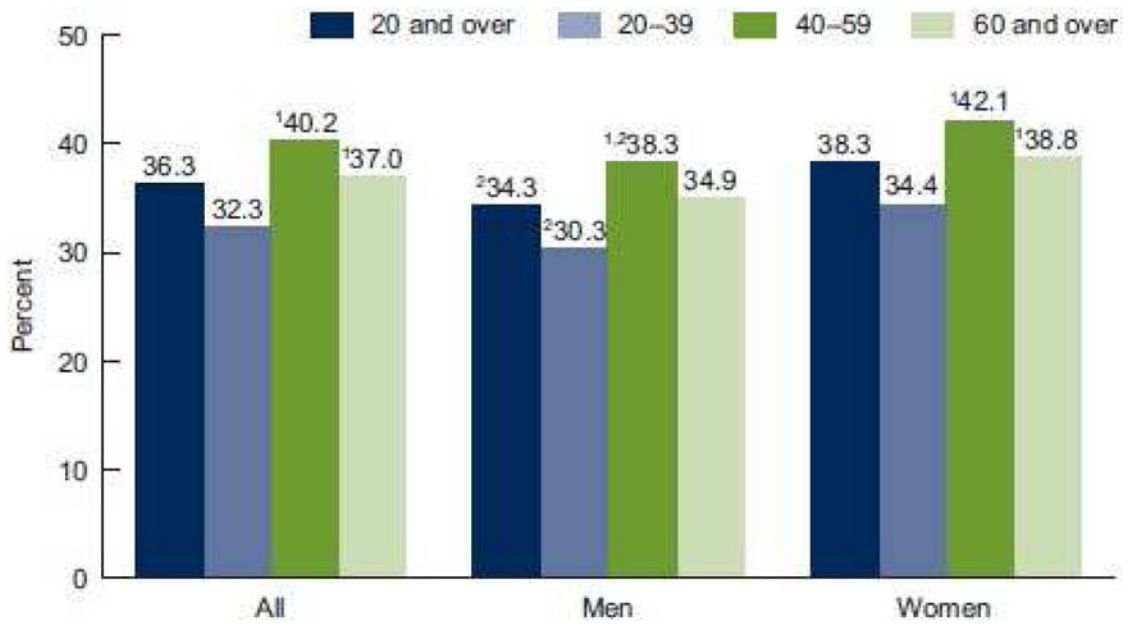


Figure 1. Obesity prevalence among adults aged 20 and over, by sex and age: National Health and Nutrition Examination Survey, 2011–2014

¹Significantly different from those aged 20–39

²Significantly different from women of the same age group.

NOTES: Totals were age-adjusted by the direct method to the 2000 U.S. census population using the age groups 20–39, 40–59, and 60 and over. Crude estimates are 36.5% for all, 34.5% for men, and 38.5% for women.

From Ogden CL, Carroll MD, Fryar CD, et al. Prevalence of Obesity among Adults and Youth: United States, 2011–2014. NCHS Data Brief 2015: No. 219; with permission.

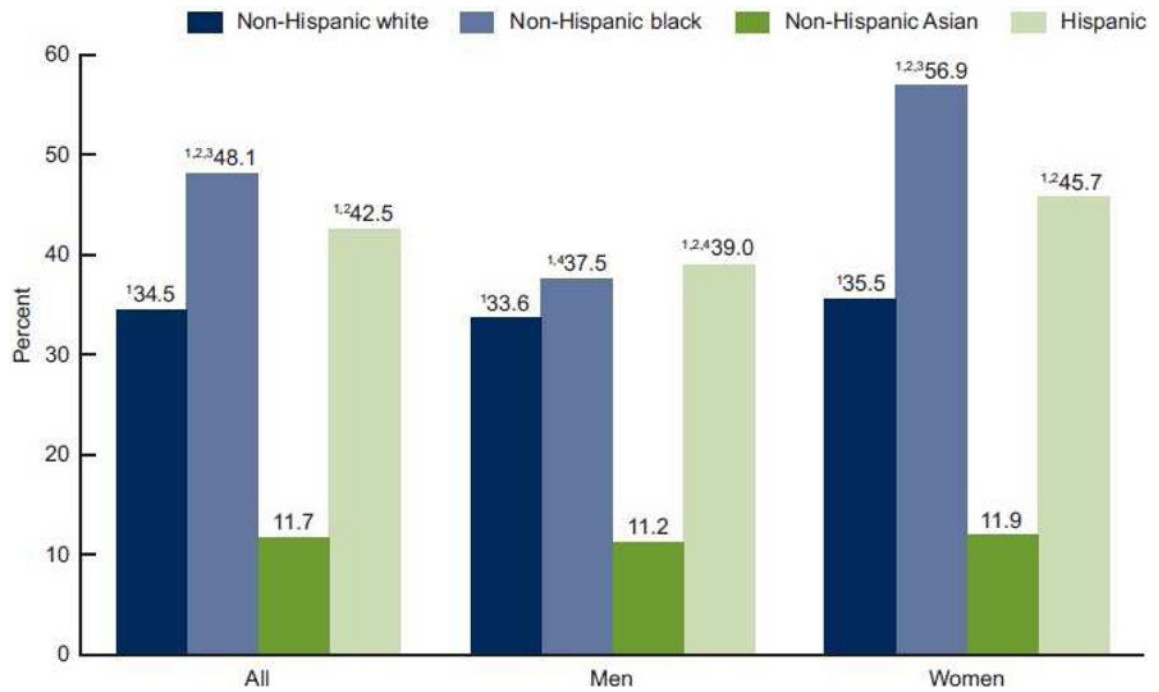


Figure 2. Obesity prevalence among adults aged 20 and over, by sex and race and Hispanic origin: United States, 2011–2014

¹Significantly different from non-Hispanic Asian persons.

²Significantly different from non-Hispanic white persons.

³Significantly different from Hispanic persons.

⁴Significantly different from women of the same race and Hispanic origin.

NOTE: All estimates are age-adjusted by the direct method to the 2000 U.S. census population using the age groups 20–39, 40–59, and 60 and over.

From Ogden CL, Carroll MD, Fryar CD, et al. Prevalence of Obesity among Adults and Youth: United States, 2011–2014. NCHS Data Brief 2015: No. 219; with permission.

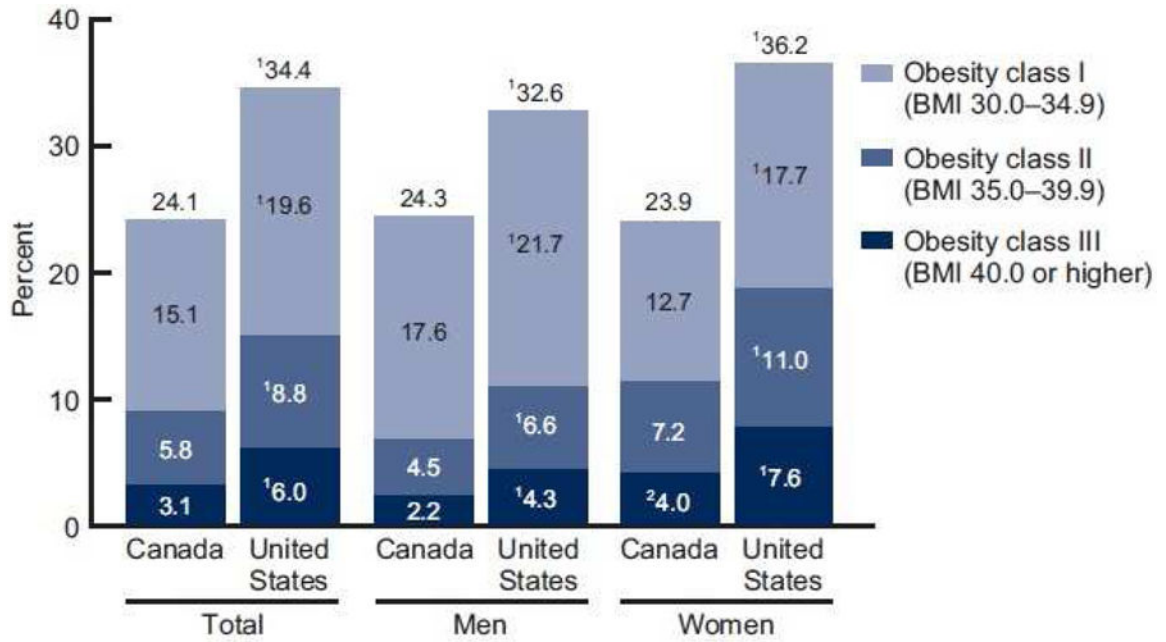


Figure 3. Obesity prevalence among adults aged 20–79 years, by sex: Canada, 2007–2009 and United States, 2007–2008

¹Statistically different from estimate for Canada ($p < 0.05$).

²Use with caution (coefficient of variation 16.6%–33.3%).

NOTES: BMI is body mass index. Estimates were age-standardized by the direct method to the 2000 United States Census population using age groups 20–39, 40–59, and 60–79. Pregnant women are excluded. Obesity class estimates do not sum to exact totals due to rounding.

From Shields M, Carroll MD, Ogden CL. Adult Obesity Prevalence in Canada and the United States. NCHS Data Brief 2011; No. 56; with permission.

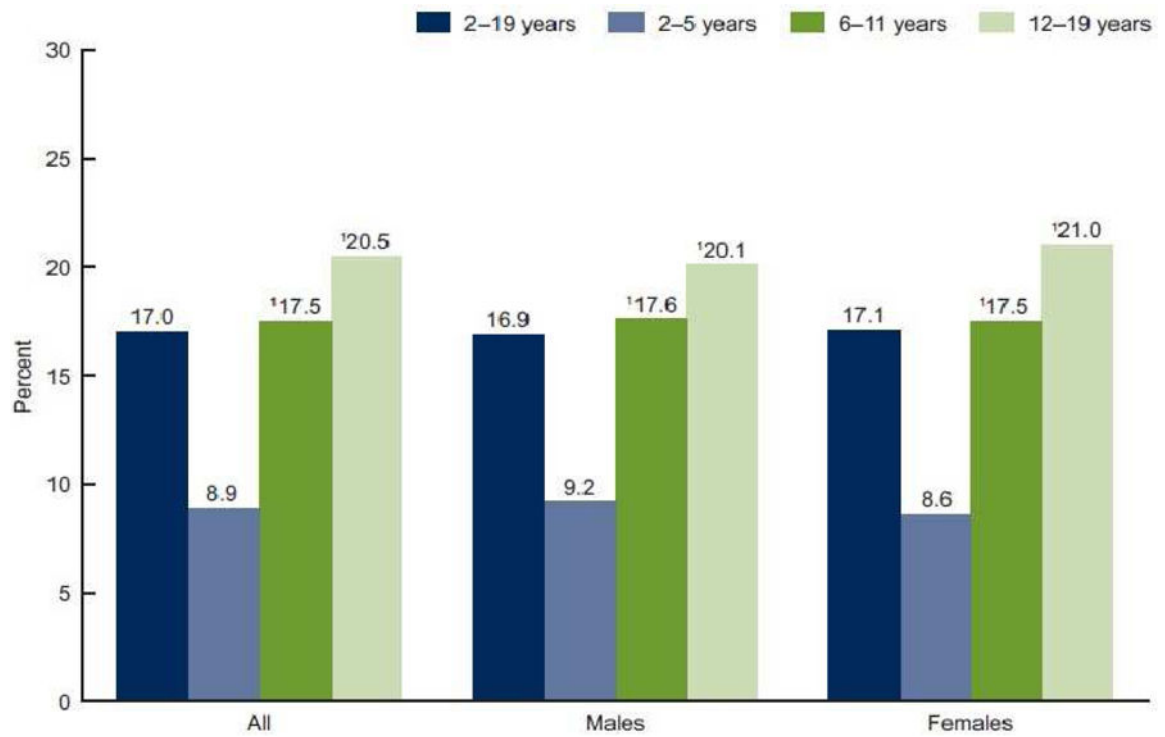


Figure 4. Obesity prevalence among youth aged 2–19 years, by sex and age: National Health and Nutrition Examination Survey, 2011–2014

¹Significantly different from those aged 2–5 years.

From Ogden CL, Carroll MD, Fryar CD, et al. Prevalence of Obesity among Adults and Youth: United States, 2011–2014. NCHS Data Brief 2015; No. 219; with permission.

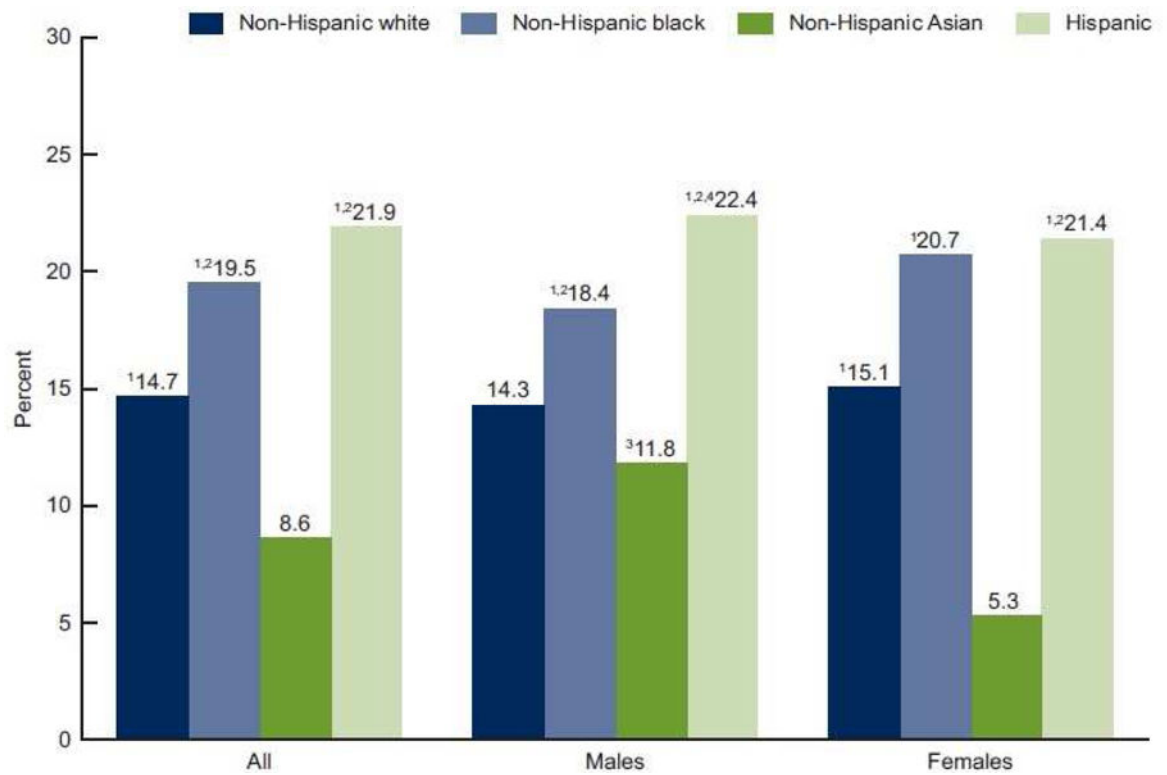


Figure 5. Obesity prevalence among youth aged 2–19 years, by sex and race and Hispanic origin: National Health and Nutrition Examination Survey, 2011–2014

¹Significantly different from non-Hispanic Asians.

²Significantly different from non-Hispanic whites.

³Significantly different from females of the same race and Hispanic origin.

⁴Significantly different from non-Hispanic blacks.

From Ogden CL, Carroll MD, Fryar CD, et al. Prevalence of Obesity among Adults and Youth: United States, 2011–2014. NCHS Data Brief 2015: No. 219; with permission.

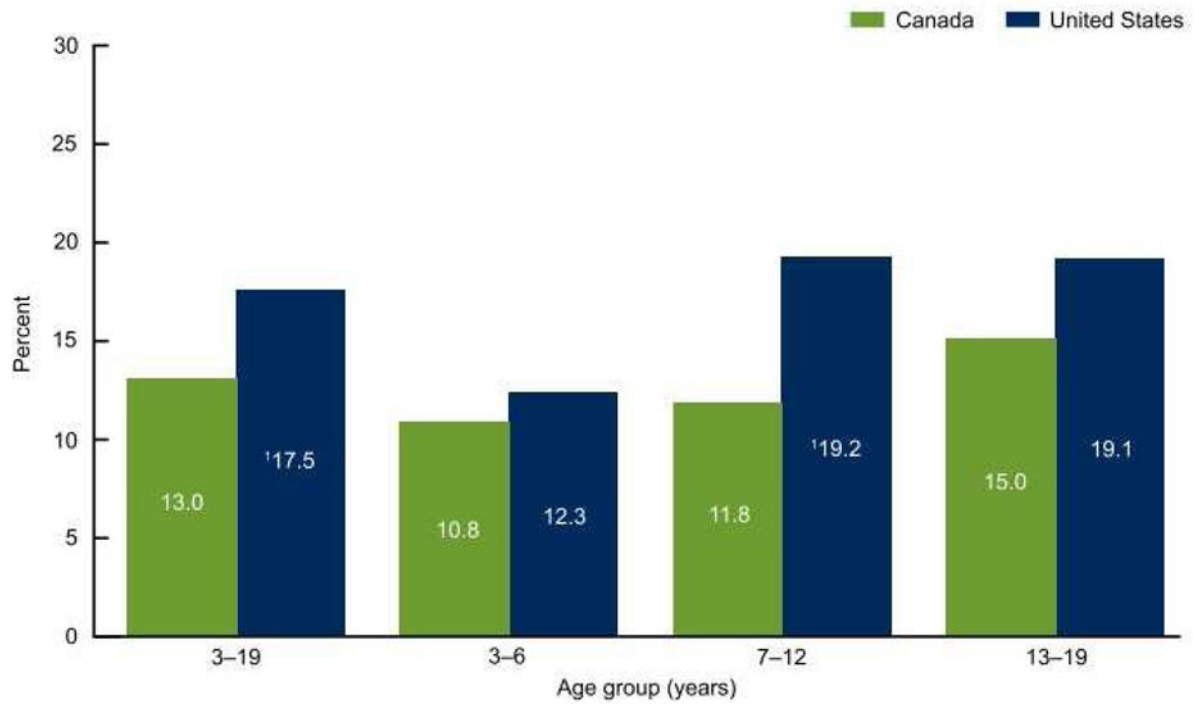


Figure 6. Obesity prevalence among children and adolescents aged 3–19 years, by sex: Canada, 2009–2013, and United States, 2009–2012

¹Statistically significant difference compared with Canada ($p < 0.05$).

NOTE: Pregnant girls are excluded.

From Carroll MD, Navaneelan T, Bryan S, et al. Prevalence of Obesity among Children and Adolescents in the United States and Canada. NCHS Data Brief 2015; No. 211; with permission.



Figure 7. Healthy People 2020 place-based framework on social determinants of health
From Office of Disease Prevention and Health Promotion. Social Determinants of Health. Heal People 2020. 2014. Available at: <https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health>. Accessed July 7, 2016; with permission.

Table 1

International Classification of adult underweight, overweight and obesity according to BMI

Classification	BMI(kg/m ²)	
	Principal cut-off points	Additional cut-off points
Underweight	<18.50	<18.50
Severe thinness	<16.00	<16.00
Moderate thinness	16.00 – 16.99	16.00 – 16.99
Mild thinness	17.00 – 18.49	17.00 – 18.49
Normal range	18.50 – 24.99	18.50 – 22.99
		23.00 – 24.99
Overweight	25.00	25.00
Pre obese	25.00 – 29.99	25.00 – 27.49
		27.50 – 29.99
Obese	30.00	30.00
Obese class I	30.00 – 34.99	30.00 – 32.49
		32.50 – 34.99
Obese class II	35.00 – 39.99	35.00 – 37.49
		37.50 – 39.99
Obese class III	40.00	40.00

From World Health Organization. BMI Classification. 2016. Available at: http://apps.who.int/bmi/index.jsp?introPage=intro_3.html. Accessed July 26, 2016; with permission.