Why Do We Treat Obesity?

Epidemiology
Epidemiology of Obesity

U.S. Epidemic
More than Two Thirds of US Adults Are Overweight or Obese

NHANES Data
US Adults Age ≥20 Years
(Crude Estimate)

Population (%)


BMI ≥30
BMI 25-29

1.7-fold increase in obesity since 1962

BMI = body mass index (in kg/m²); NHANES = National Health and Nutrition Examination Survey (x-axis lists last year of each survey).

Obesity Rates Are Increasing Across the United States

BFRSS Data

Adults with BMI ≥30 kg/m²

- No data
- <10%
- 10%–14%
- 15%–19%
- 20%–24%
- 25%–29%
- ≥30% (2010)
- 30%–34% (2011-2013)
- ≥35%

*BFRSS methodology changed in 2011 and data from 2010 and earlier cannot be compared to data from 2011 onward.

BFRSS = Behavioral Risk Factor Surveillance System; BMI = body mass index.

Prevalence of Obesity Varies With Race, Ethnicity, and Sex

NHANES Data
US Adults Age ≥20 Years With BMI ≥30


BMI = body mass index (in kg/m²); NHANES = National Health and Nutrition Examination Survey (x-axis lists last year of each survey).

Epidemiology of Obesity

Worldwide Trends
Worldwide Prevalence of Obesity 2015

Women, Age ≥18 Years

Men, Age ≥18 Years

WHO. Global Health Observatory Map Gallery. Available at: http://gamapserver.who.int/mapLibrary/app/searchResults.aspx.
Obesity Increase Is Associated with Rising Rates of Diabetes Worldwide

Current estimated prevalence: 415 million worldwide
By 2040, 642 million people worldwide are expected to have diabetes

Strong Association Between Weight Gain and Diabetes: Rural India

Obesity*

Diabetes

*BMI ≥25 kg/m².
BMI = body mass index.
The Increase in Diabetes Parallels the Increase in Obesity in the United States

**Obesity***

- **1998:** 17.9%
- **2012:** 35.1%
- **Increase:** 96%

**Diabetes**

- **1998:** 6.5%
- **2014:** 9.3%
- **Increase:** 43%

*BMIs ≥30 kg/m².

BMI = body mass index.

Epidemiology of Obesity

Impact on Clinical Outcomes
Increased abdominal adiposity is highly correlated with insulin resistance and type 2 diabetes.
Prevalence of Weight-Related Comorbidities in the US

NHANES 2007-2010
US Adults Age ≥18 Years (N=12,175)

Normal weight = BMI 18 to <25 kg/m²; overweight = BMI 25 to <30 kg/m²; obese = BMI ≥30 kg/m²
BMI = body mass index; DM = diabetes mellitus; DBP = diastolic blood pressure; HDL-C = high density lipoprotein cholesterol; HT = hypertension; SBP = systolic blood pressure.

Mortality Increases with BMI

Cancer Prevention Study II
(N=1,046,154)

CVD death risk significantly increased

CVD death risk significantly increased

* Cox proportional hazards model adjusted for age at enrollment, education, physical activity, alcohol use, marital status, aspirin use, fat consumption, vegetable consumption, and use estrogen replacement therapy in women.

All-Cause Mortality Increases with BMI

National Institutes of Health AARP Cohort Study, 1996-2009 (N=109,947 Never-Smokers)

Multivariate hazard ratio* for BMI categories:

- <18.5: Men 1.28, Women 1.2
- 18.5-22.4 (Referent)
- 22.5-24.9: Men 1.02, Women 1.15
- 25.0-27.4: Men 1.25, Women 1.46
- 27.5-29.9: Men 1.7, Women 2.13
- ≥30.0: Men 2.43, Women 2.59

P<0.0005 for linear trend

*Regression analyses adjusted for age, race/ethnicity, education, leisure-time physical activity, and alcohol consumption.

Earlier Weight Gain Increases Total Mortality Risk

National Institutes of Health AARP Cohort Study, 1996-2009
(N=109,947 Never-Smokers)

*Regression analyses adjusted for age, race/ethnicity, education, leisure-time physical activity, and alcohol consumption.

Racial Differences in BMI-Mortality Association

National Health Interview Survey, 1997-2006

Never Smokers (N=32,975)

Ever Smokers (N=38,700)

Age-standardized all-cause mortality rates for persons aged 35-75 years without a history of heart disease or cancer at baseline. Bars indicate upper or lower 95% confidence intervals.

Epidemiology of Obesity

Economic Impact
The Effect of Weight on Healthcare Costs

![Graph showing the relationship between body mass index and medical expenditures. The graph illustrates that as body mass index increases from underweight to obese, medical expenditures also increase. The population distribution and confidence intervals are also shown.](image)

Obesity-Related Illness Accounts for One-Fifth of U.S. Healthcare Costs

**Obesity Costs**
U.S. Adults Age ≥18 Years

- Total: $923.2 billion
- Obesity: $190.2 billion (20.6% of total costs)

**Diabetes Costs**
U.S. Residents, All Ages

- Total: $1,300 billion
- Diabetes: $176 billion (13.5% of total costs)

Medicare Spending Is Rising Significantly Faster in the Overweight Population

Annual Increase in Medicare Expenditures
1997-2006

After adjustment for obesity-related chronic conditions, interactions were no longer significant

Obesity Significantly Increases Medicare Expenditures

Mean Expenditures in 2003
Individuals >65 Years of Age

*Includes dental and other costs not shown. **P \leq 0.001 vs normal weight.

BMI = body mass index in kg/m².

Weight Loss Reduces Lifetime Healthcare Costs

**Projected Lifetime Healthcare Expenditures**

Obese Individuals <45 Years of Age

- **Cost offsets**
  - Prolonged life
  - Improved health

- 5% Weight Loss for 2 Years
  - Total Benefit: $334

- Permanent 5% Weight Loss
  - Total Benefit: $3150

- Permanent 10% Weight Loss
  - Total Benefit: $6400

Summary

- Obesity is increasing globally
  - Rates of obesity have risen dramatically in the United States over the past 4 decades
  - The increase in obesity is strongly associated with the increase in diabetes in the U.S. and worldwide

- Obesity is costly