

# Creating Healthier Environments to Address Physical Inactivity, Obesity and Chronic Diseases



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## Environment and Health in Public Health History

## Today's Epidemics

## Environmental Solutions for Today's Epidemics

### Built Environment Initiatives at NYC DOHMH

- **Fit-City Conferences, with AIANY**
- **NYC Active Design Guidelines, with DDC, DCP, DOT**
- **Linking with Green/Sustainability Initiatives**
  - **PlaNYC**
  - **Leadership in Energy and Environmental Design (LEED)**
- **Stair Prompts**
- **Working with DOT on Summer Streets**
- **Tap Water Access**
- **Improving Supermarket and Healthy Food Access in Low-Income Neighborhoods**
- **NYC Food and Fitness Partnership**

# URBAN CONDITIONS WERE A BREEDING GROUND FOR 19<sup>TH</sup> CENTURY EPIDEMICS



A MEDICAL STREET-NIGHT.  
[Reproduced from a Photograph by Anthony.]

## **Over-crowding:**

By 1910, the average density in lower Manhattan was 114,000 people/ sq. mi; two wards reached densities > 400,000. (Today's density: 67,000/ sq. mi.)

+

**Inadequate systems** for garbage, water, and sewer, leading to pervasive filth and polluted water supplies.

## **Major epidemics:**

Air/Droplet-borne diseases:  
**TB**

Water-borne diseases:  
**Cholera**

Vector-borne diseases:  
**Yellow-fever**

# NYC'S 19<sup>TH</sup> & EARLY 20<sup>TH</sup> CENTURY URBAN DESIGN AS A RESPONSE TO THE ENVIRONMENTAL ASPECTS OF EPIDEMICS



1842 New York's **water system** established – an aqueduct brings fresh water from Westchester.

1857 NYC creates **Central Park**, hailed as “ventilation for the working man’s lungs”, continuing construction through the height of the Civil War

1881 Dept. of Street-sweeping created, which eventually becomes the **Department of Sanitation**



1901 **New York State Tenement House Act** banned the construction of dark, airless tenement buildings

1904 First section of **Subway** opens, allowing population to expand into Northern Manhattan and the Bronx

1916 **Zoning Ordinance** requires stepped building setbacks to allow light and air into the streets

# BY THE 1940'S THESE STRATEGIES HAD HELPED TO "CONQUER" INFECTIOUS DISEASE IN NYC



<b>Deaths</b>	<b>1880</b>	<b>1940</b>
<b>Infectious Diseases</b>	<b>57.1%</b>	<b>11.3%</b>
- Contagion	12.5%	0.2%
- Diarrhea	9.6%	0.5%
- Tuberculosis (TB)	20.8%	5.0%
- Pneumonia	13.2%	5.6%
- Typhoid	1.0%	0.003%

Today, ~9% of deaths in NYC are due to infectious diseases.

# ENVIRONMENTAL SOLUTIONS HELPED CURE 19<sup>TH</sup> C. EPIDEMICS AND WILL HELP SOLVE THE 21<sup>ST</sup> C. EPIDEMICS



## THE 19th CENTURY:

Infectious disease

19th Century codes, planning and infrastructure as weapons in the battle against contagious disease

These strategies were built into the city fabric, and they were effective

## THE 21st CENTURY:

Chronic Diseases, many of which are “Diseases of Energy”

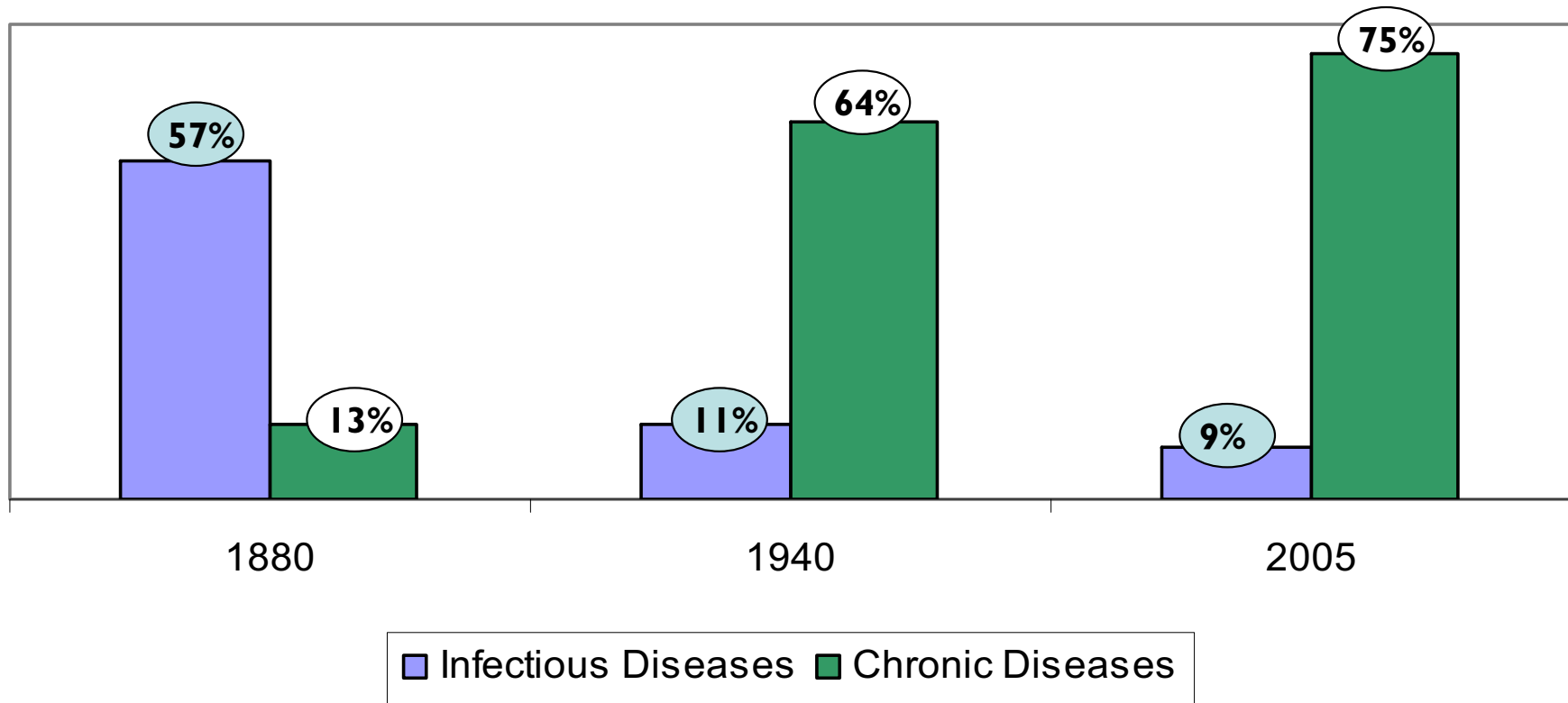
The emerging design solutions for health parallel sustainable design solutions

Effective designs will have to be an invisible, pervasive, and inevitable part of life

# CHRONIC DISEASES HAVE NOW REPLACED INFECTIOUS DISEASES AS THE PREDOMINANT CAUSE OF DEATH



## Percentage of deaths in NYC



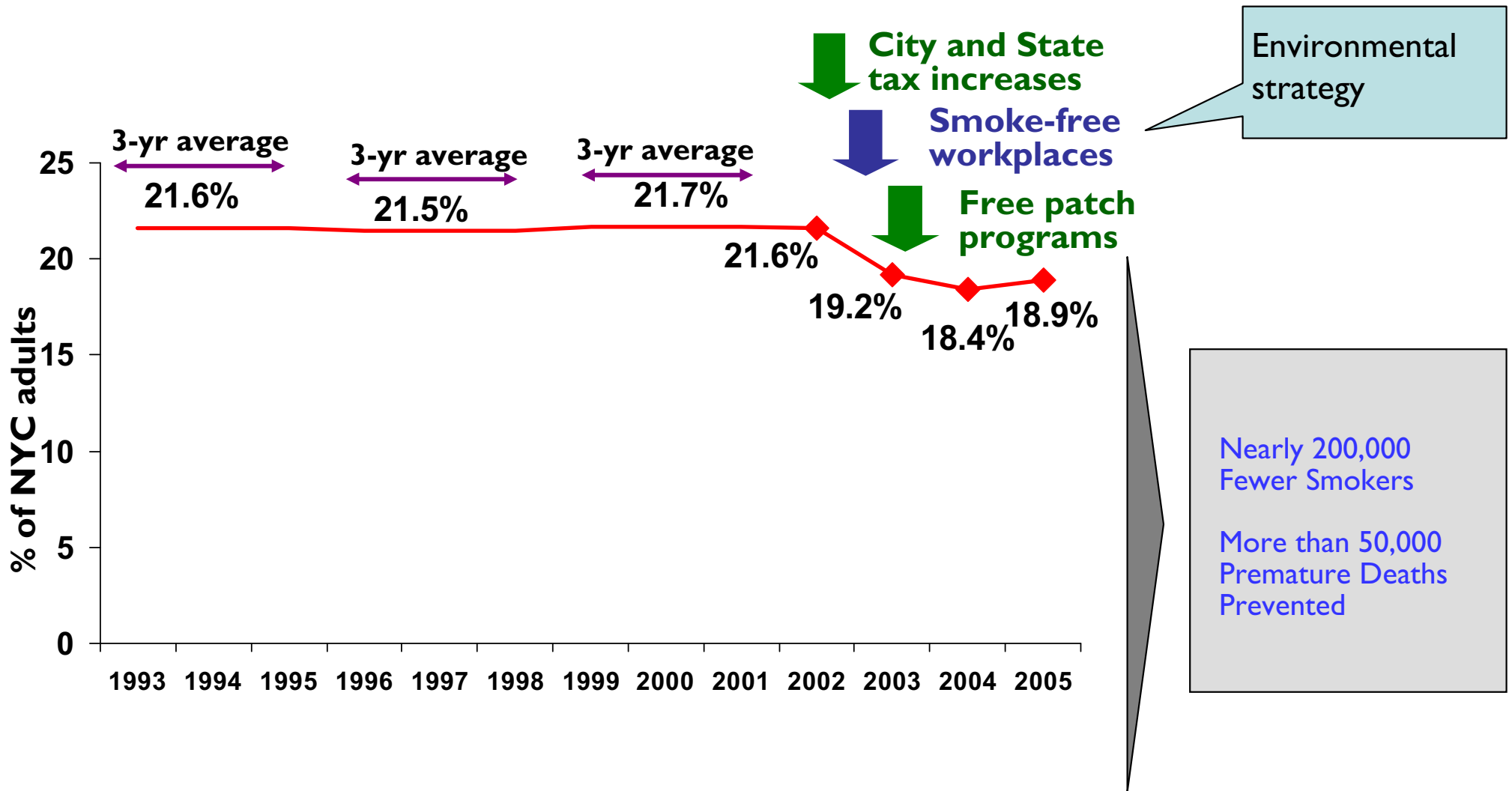
# CHRONIC DISEASES ARE NOW THE LEADING CAUSES OF DEATH



Deaths	1880	1940
<b>Chronic Diseases</b>	<b>12.6%</b>	<b>63.7%</b>
-Heart	10.4%	44.7%
-Cancer	2.0%	15.0%
-Diabetes	0.2%	4.0%

- Chronic diseases are the current leading causes of death in NYC, the U.S., Canada and increasingly internationally
- **Today, 75% of deaths in NYC are caused by chronic diseases** (heart disease, stroke, cancer, diabetes)
- Major driver of health care costs
- Leading risk factors: tobacco, physical inactivity, poor diets

# A CONCERTED PUBLIC HEALTH PROGRAM HAS HAD AN IMPACT ON DEATHS FROM TOBACCO



# NOW WE MUST ADDRESS THE GROWING OBESITY EPIDEMIC, WHICH HAS MULTIPLE, SERIOUS HEALTH CONSEQUENCES



## Prevalence

~60% of adults in NYC are overweight or obese  
43% of NYC elementary school students are  
overweight or obese

## Risk Factor for

Type 2 diabetes  
Cardiovascular diseases (#1 cause of death in NYC)  
Breast, colon and prostate cancers

Obesity and type  
2 diabetes are the  
two health  
problems getting  
worse in NYC

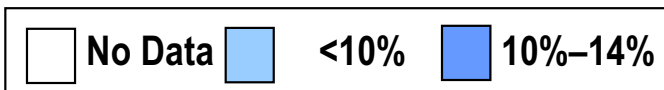
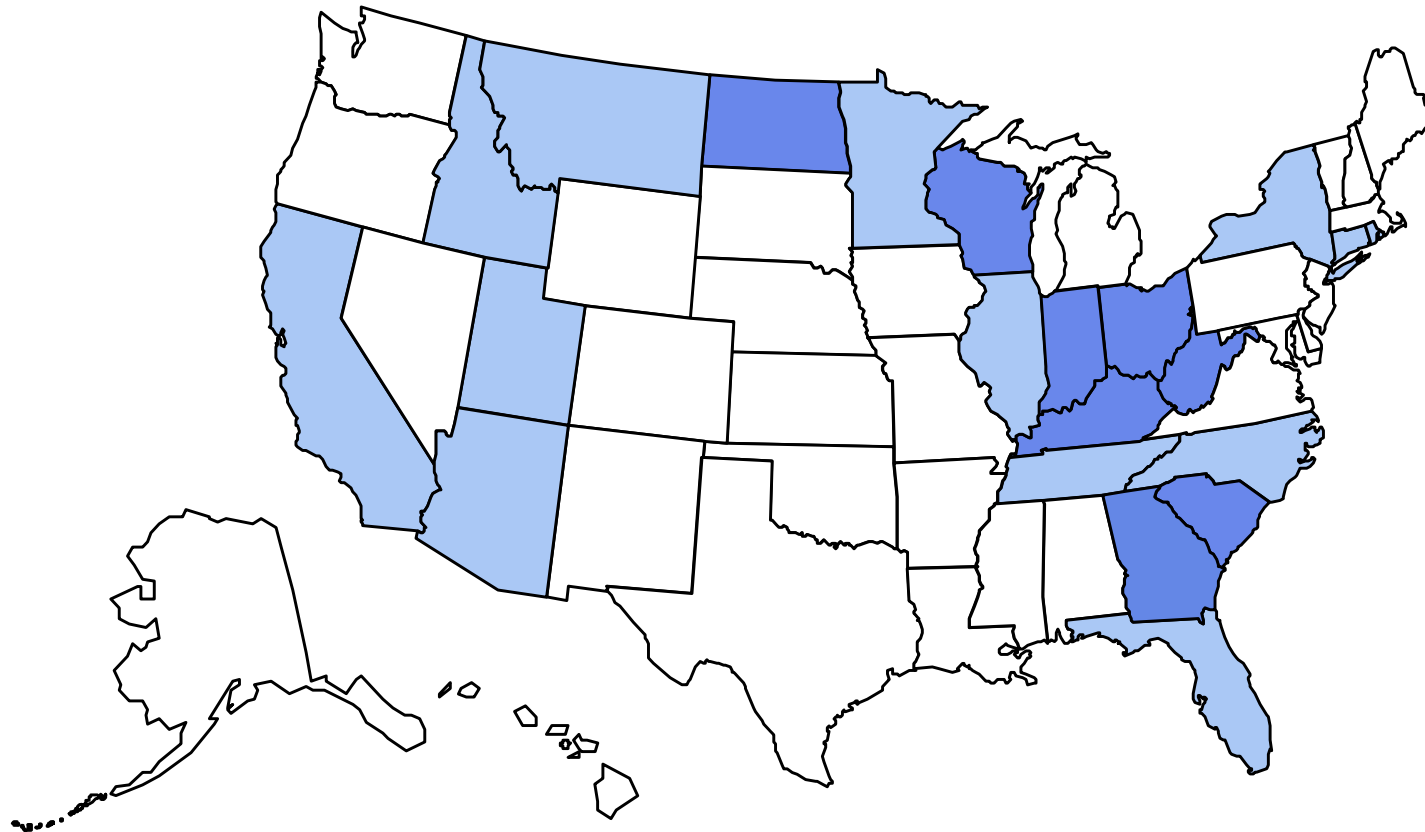
## Need to Address

Poor diets  
Lack of physical activity

# Obesity Trends\* Among U.S. Adults

## BRFSS, 1985

(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)

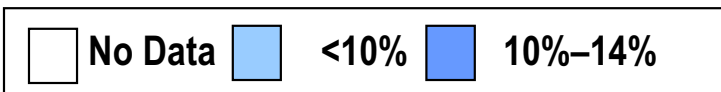
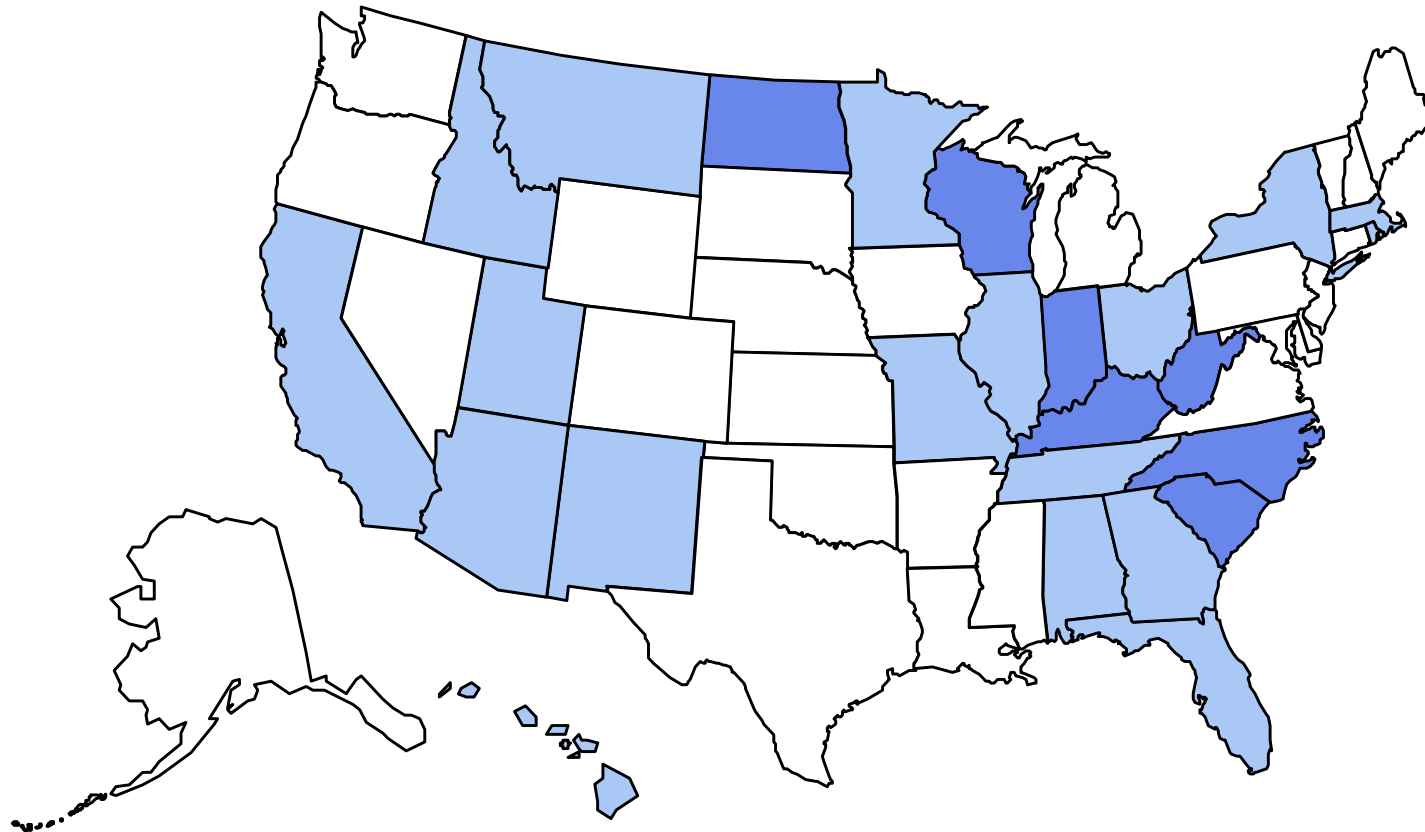


Source: U.S. Centers for Disease Control and Prevention (CDC)

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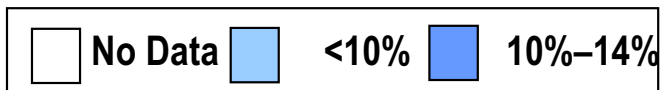
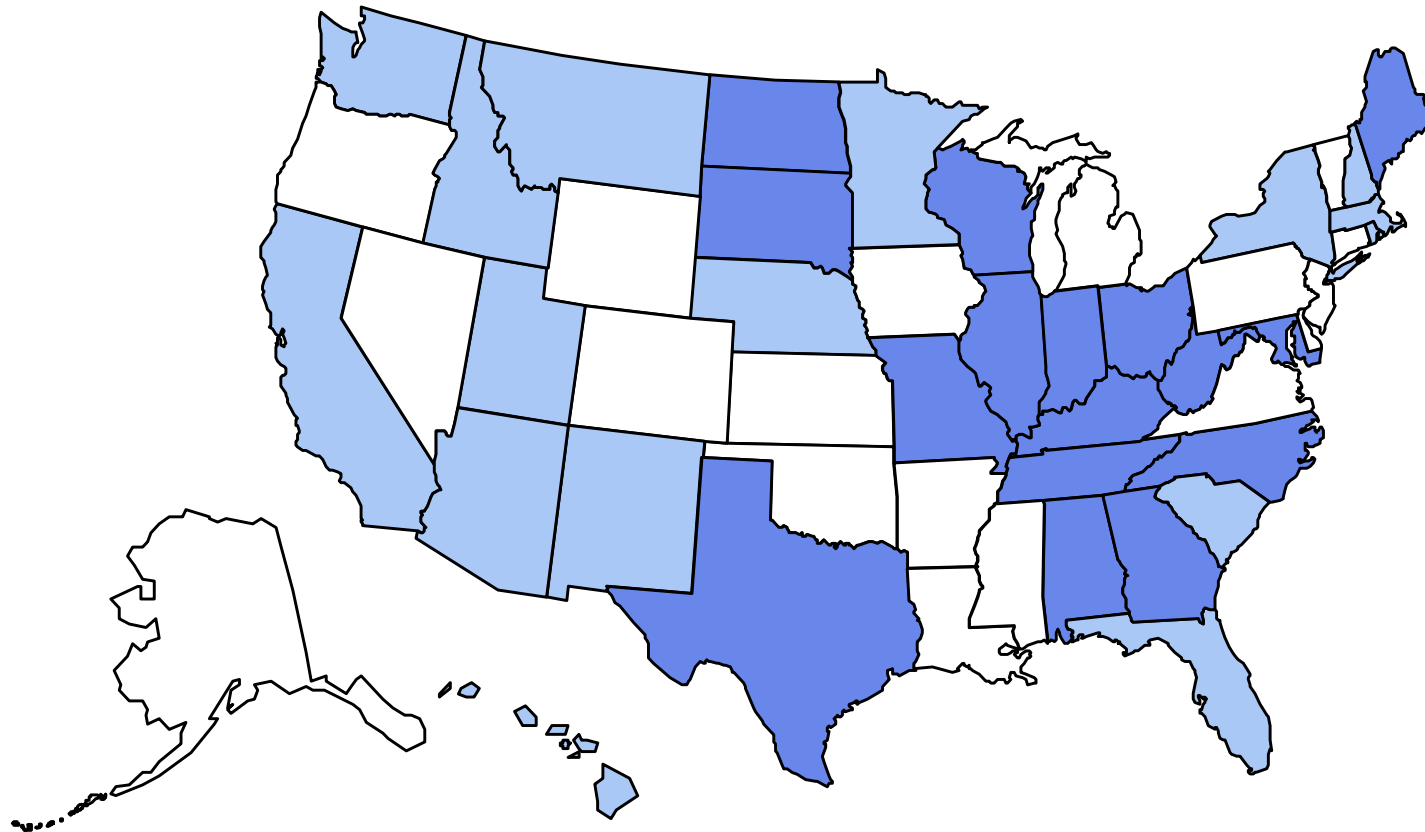


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

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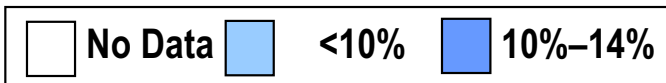
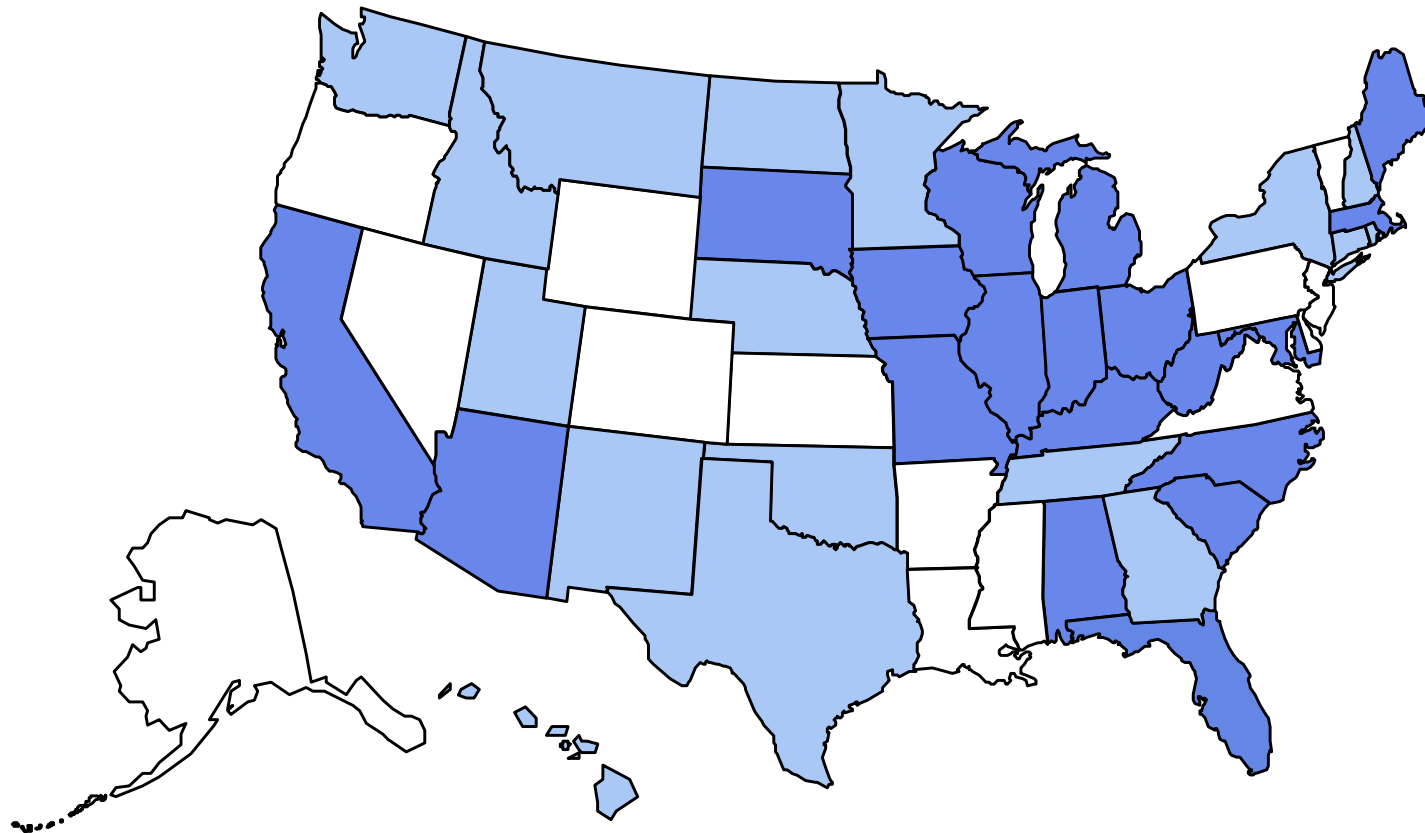


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

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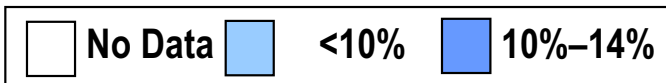
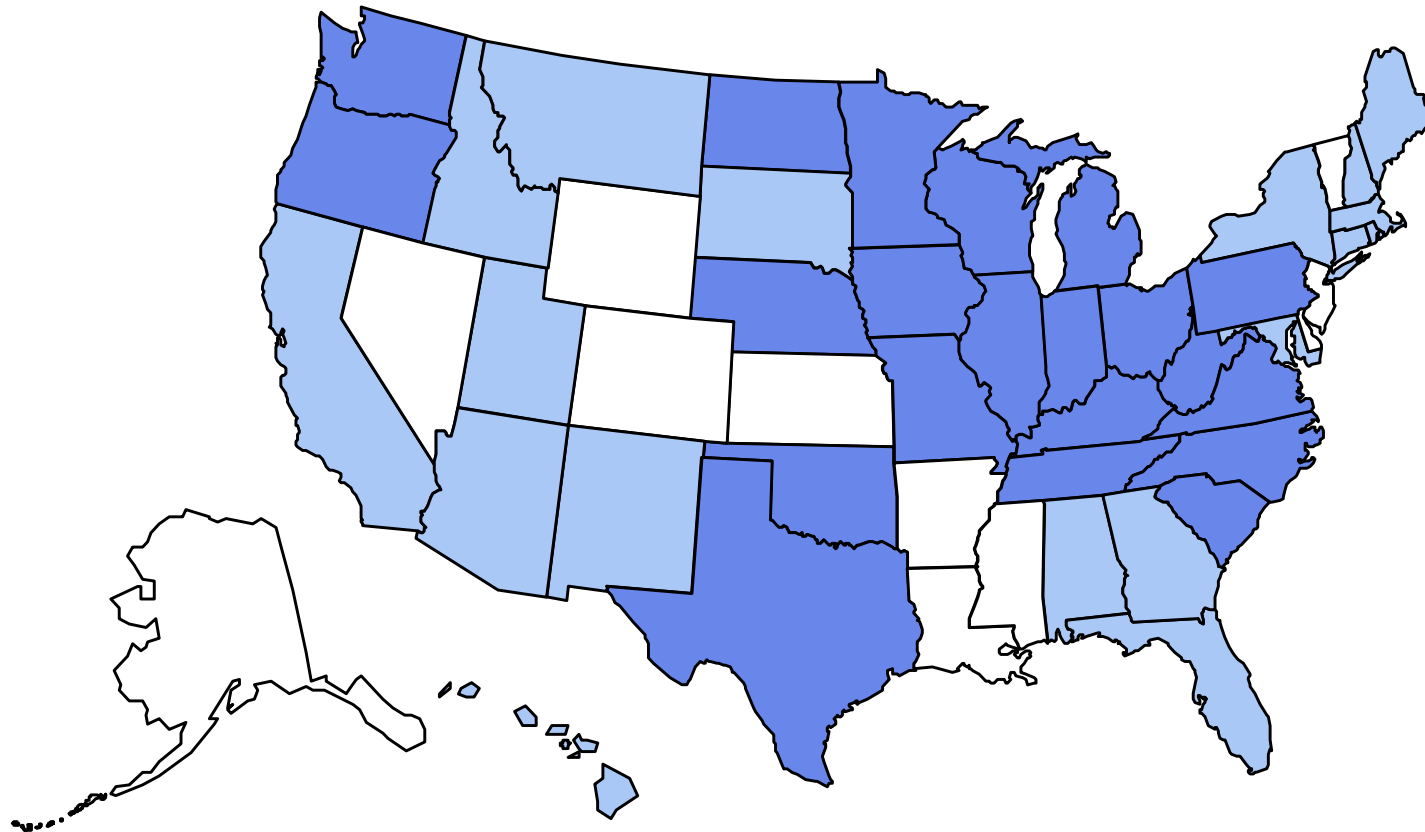


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

## BRFSS, 1989

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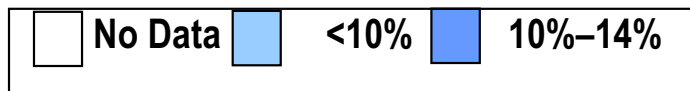
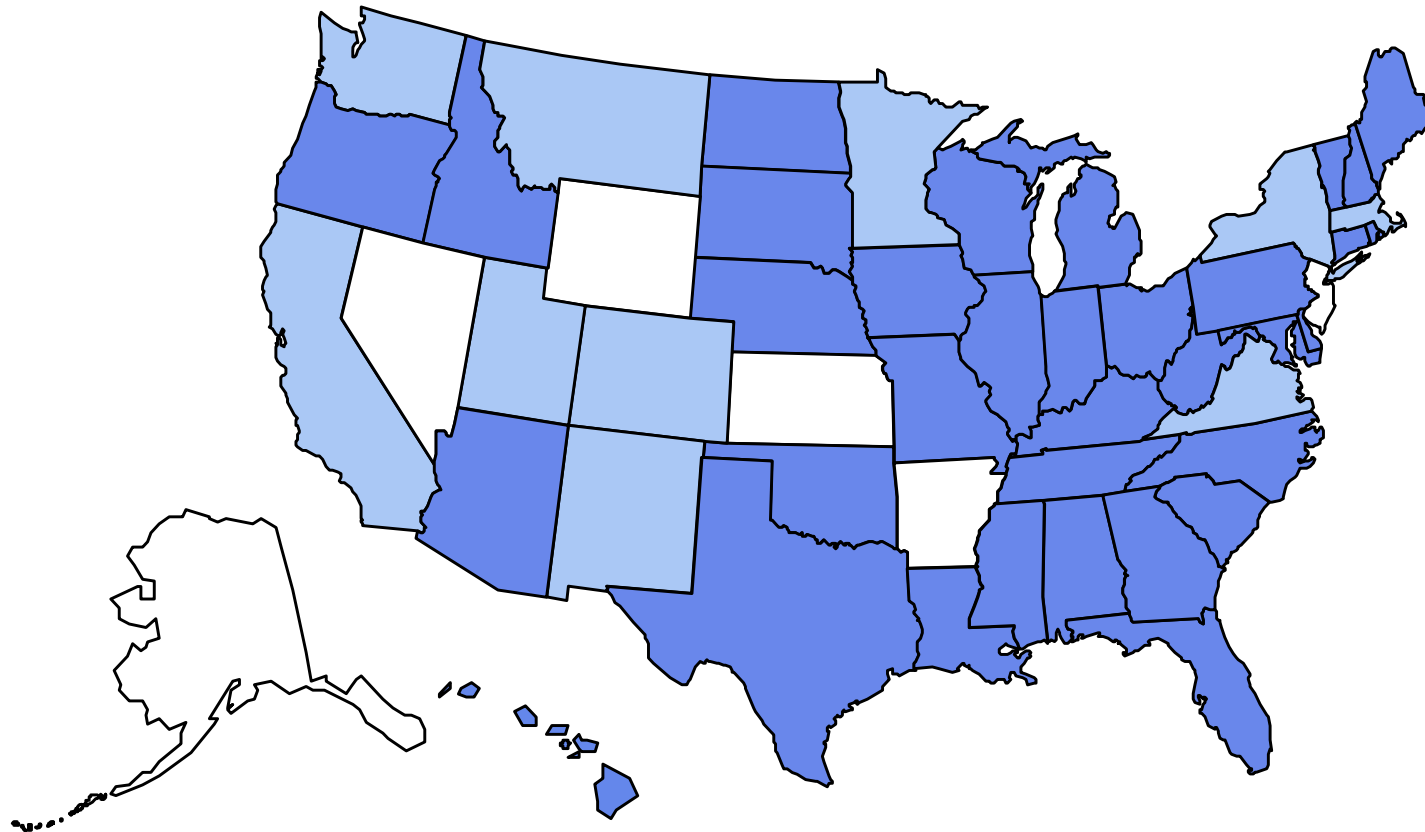


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

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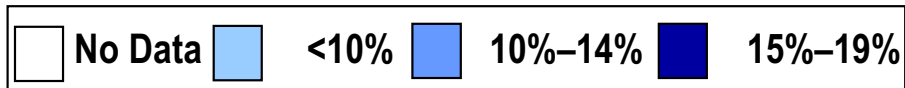
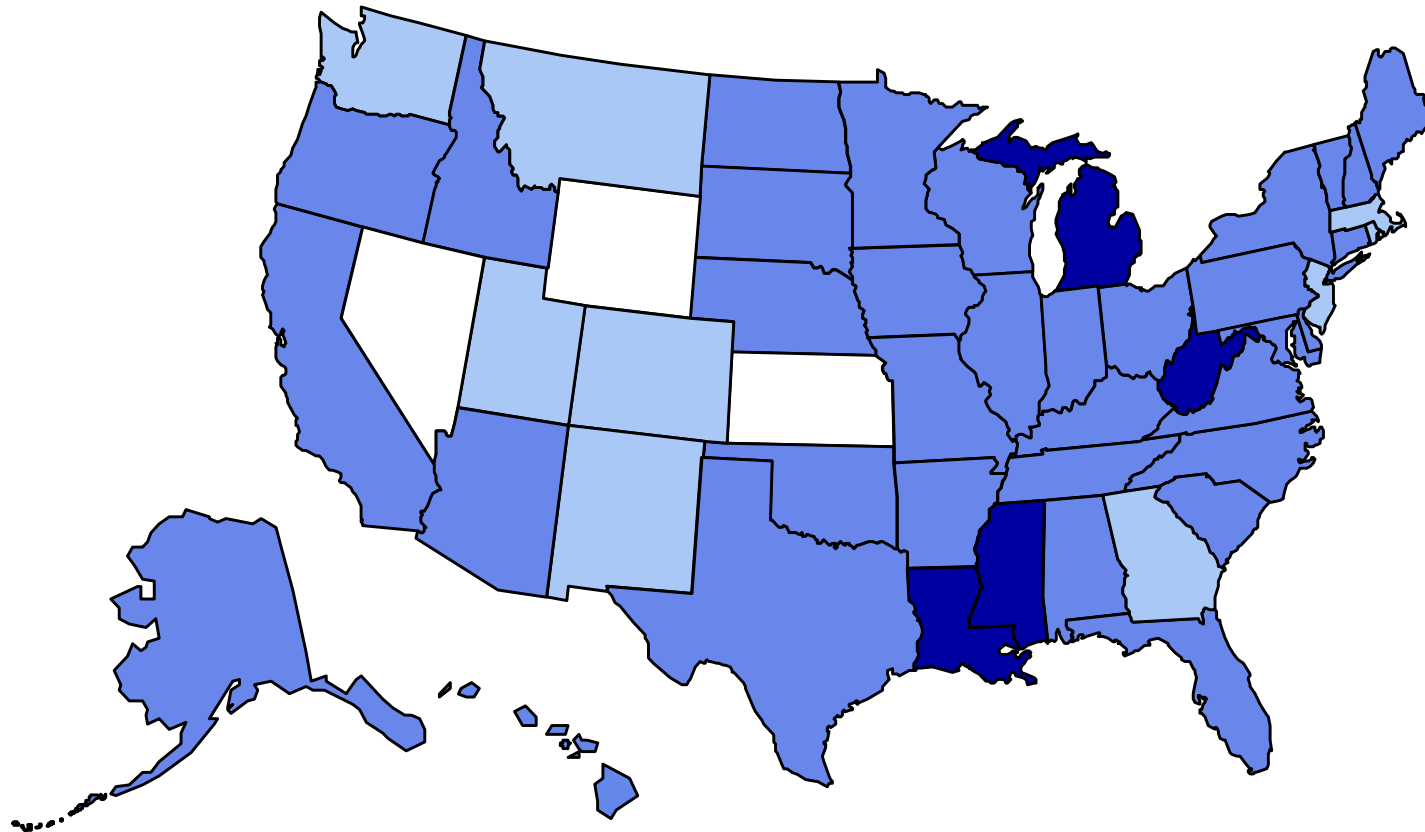


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

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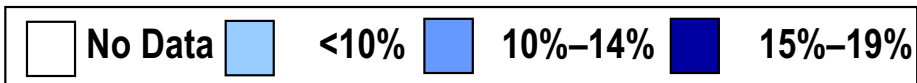
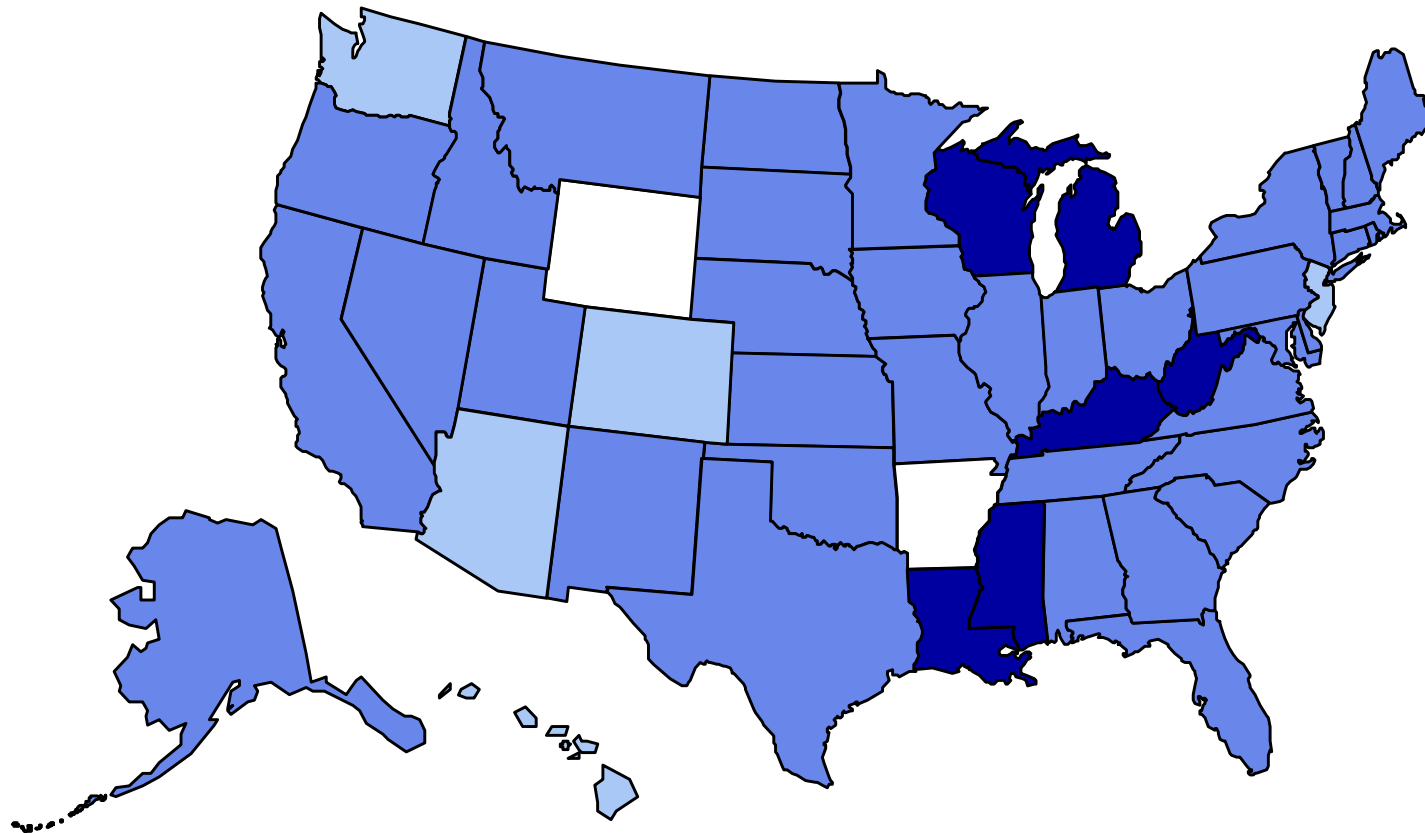


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

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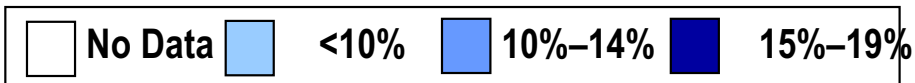
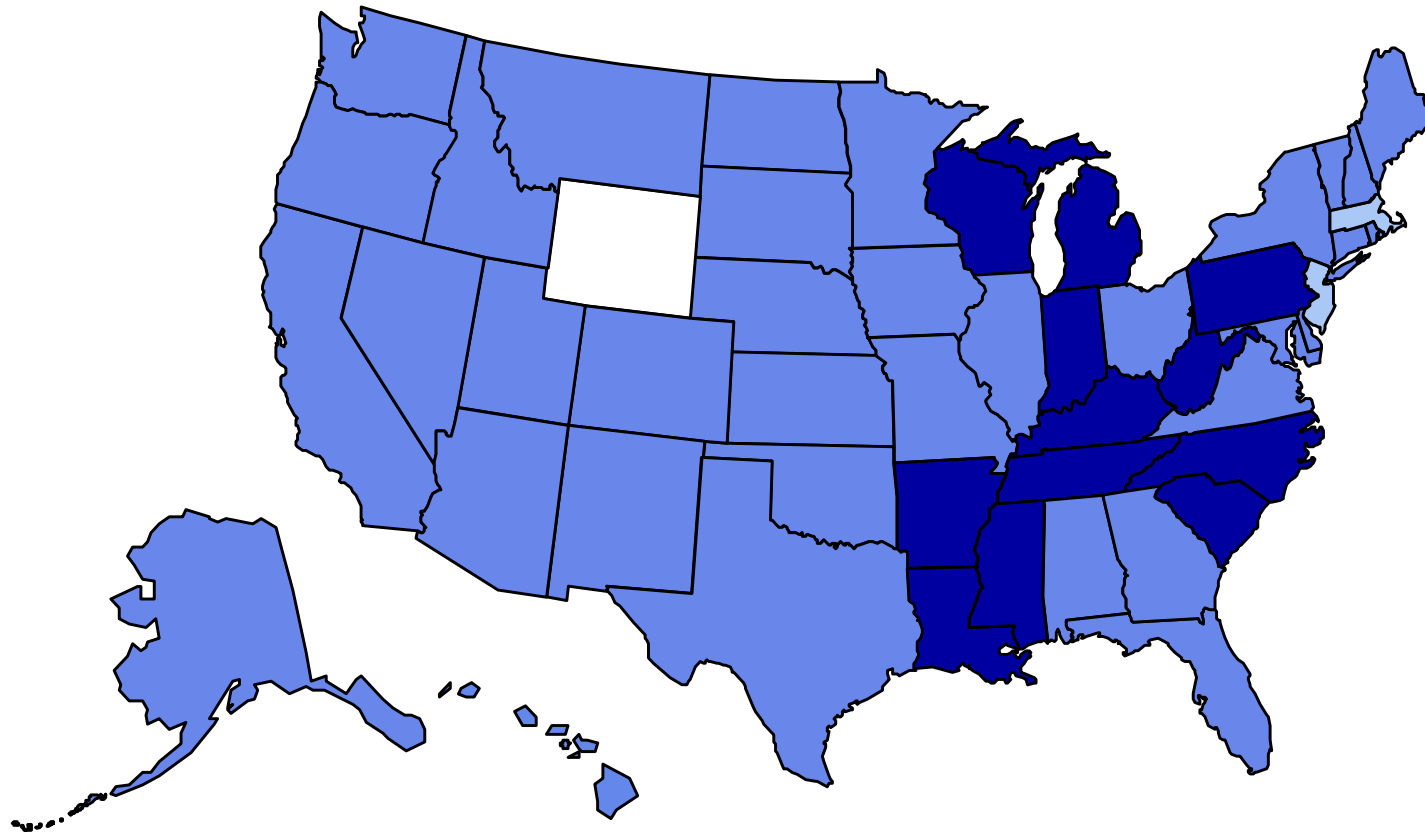


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

## BRFSS, 1993

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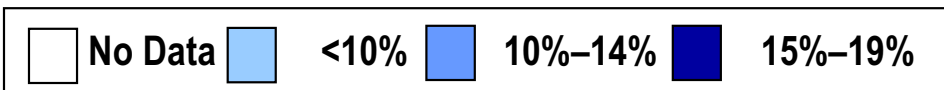
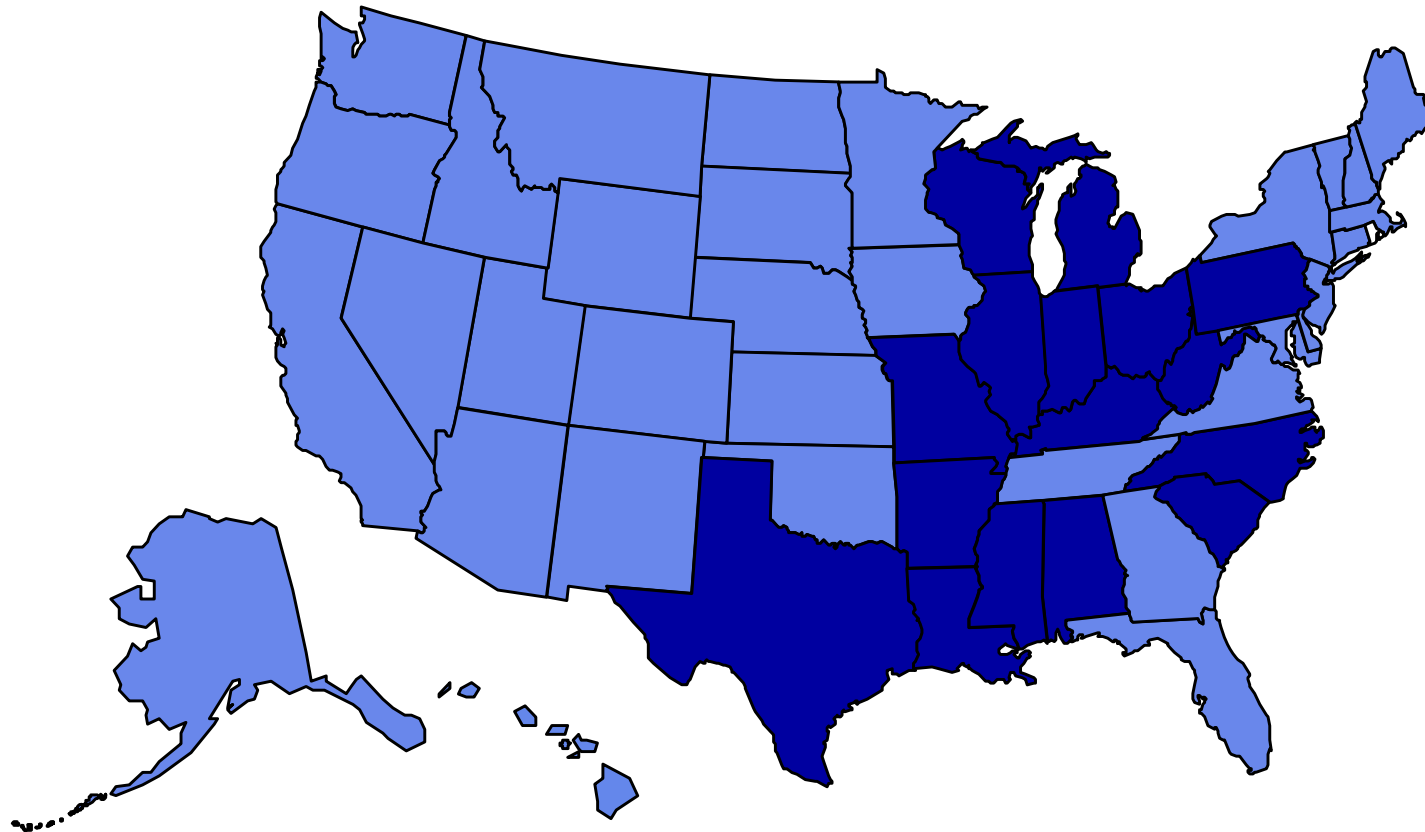


Source: U.S. Centers for Disease Control and Prevention (CDC)

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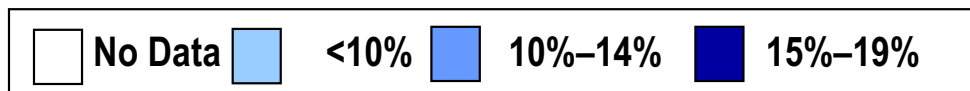
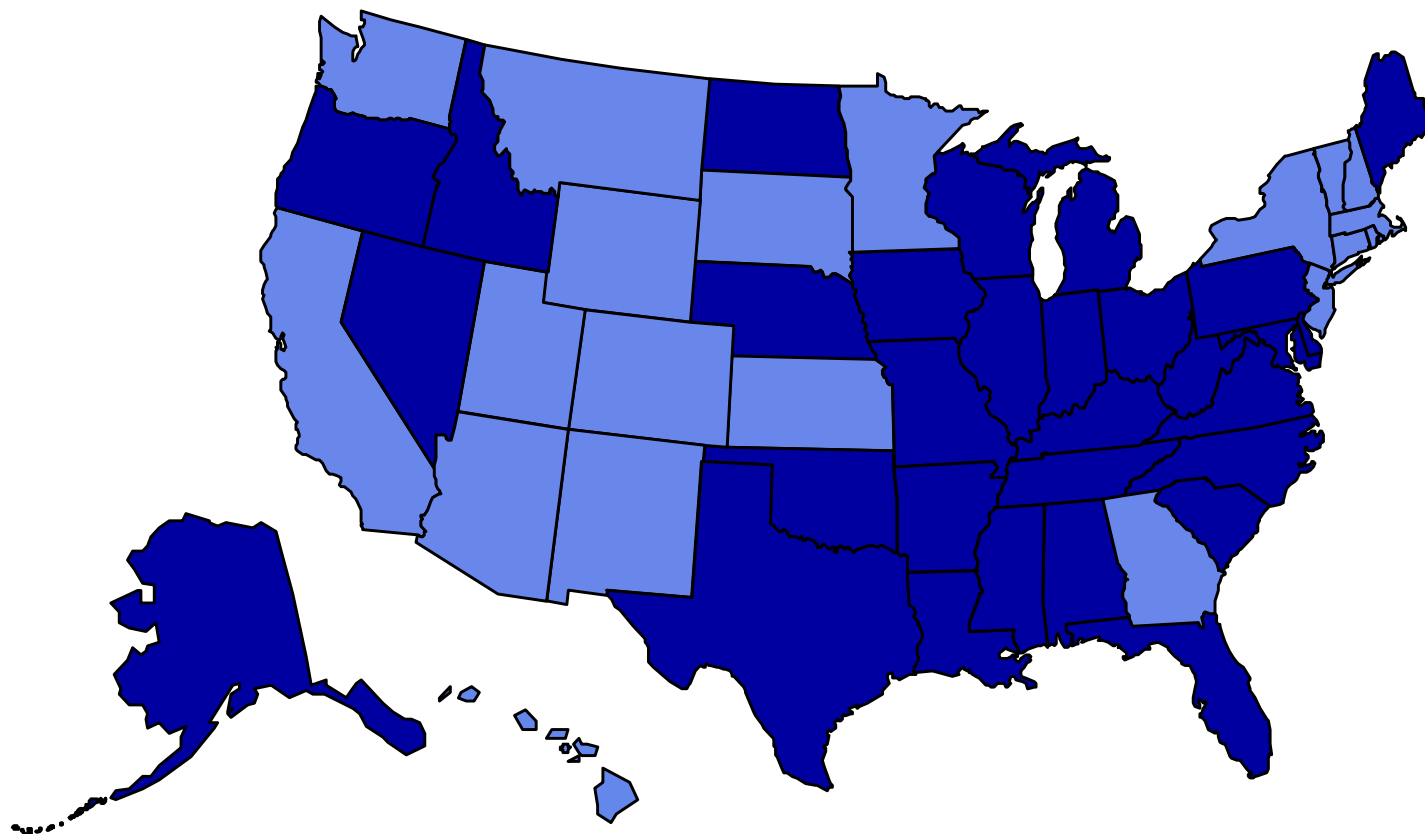
Source: U.S. Centers for Disease Control and Prevention (CDC)



# Obesity Trends\* Among U.S. Adults

## BRFSS, 1996

(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)

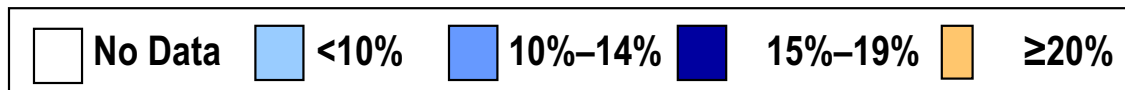
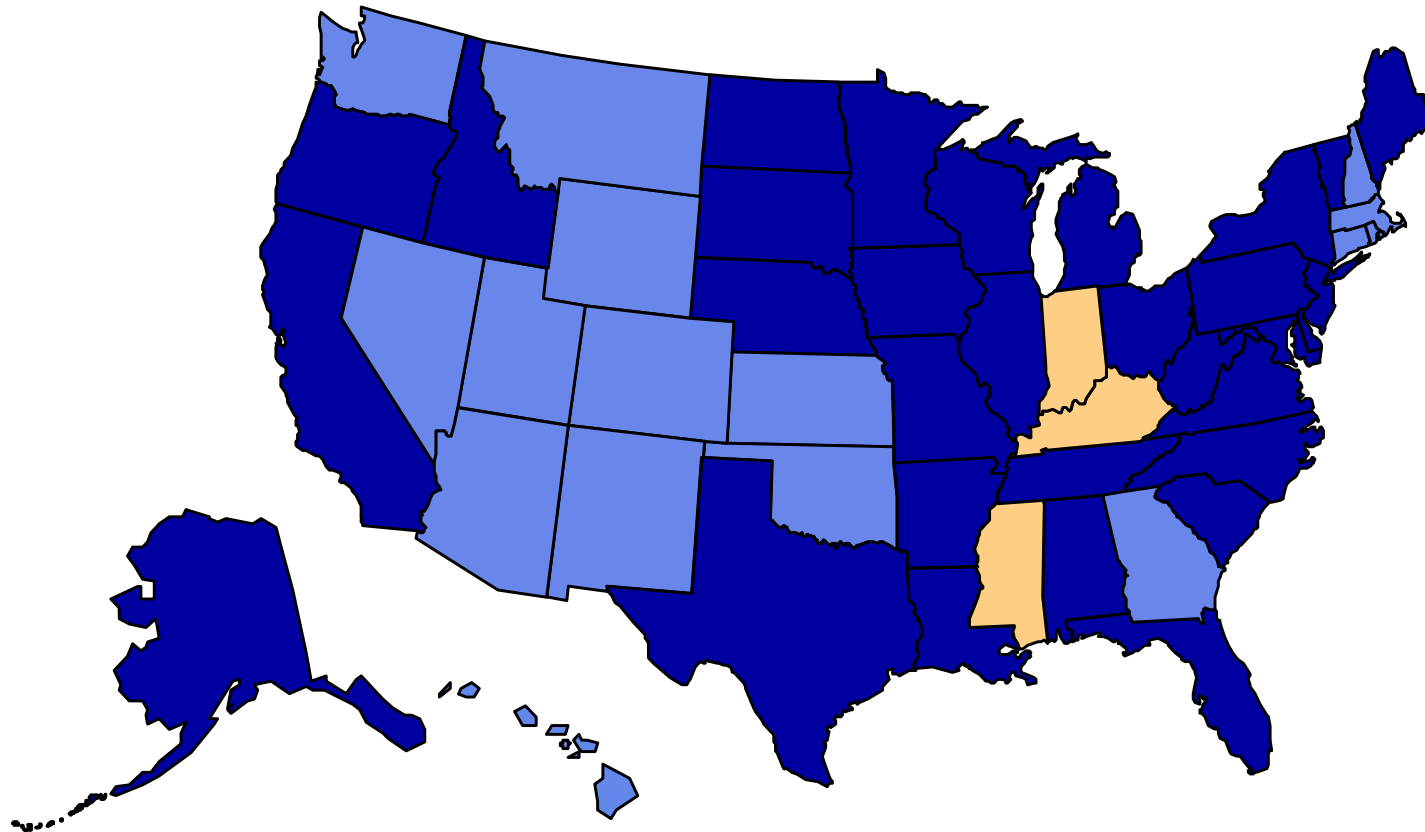


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

## BRFSS, 1997

(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)



Source: U.S. Centers for Disease Control and Prevention (CDC)



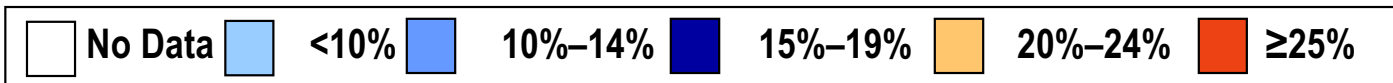
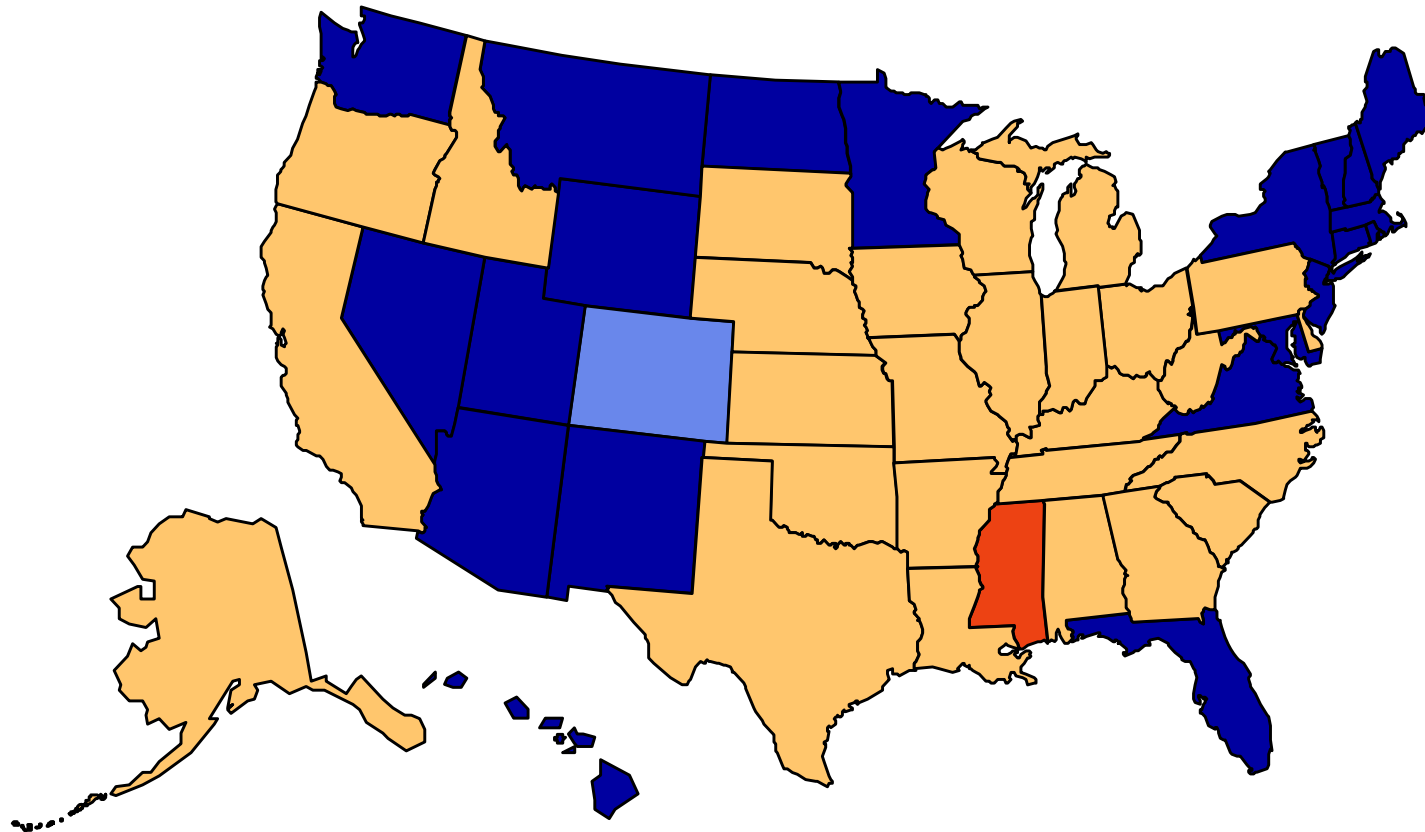




# Obesity Trends\* Among U.S. Adults

## BRFSS, 2001

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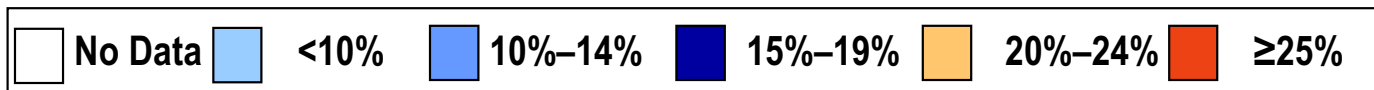
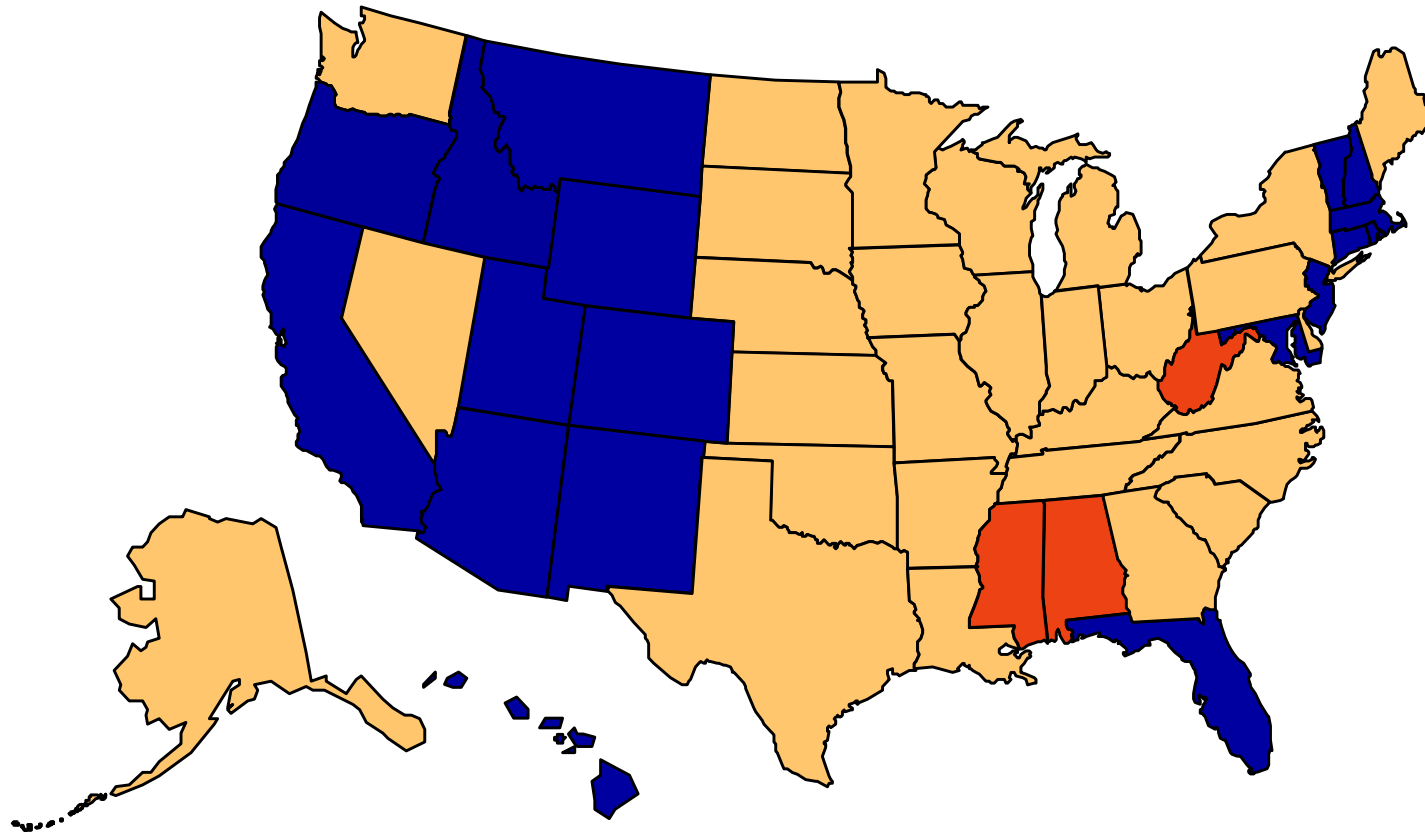


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

## BRFSS, 2002

(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)



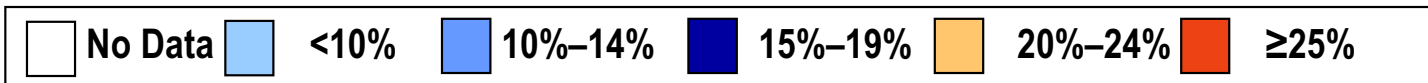
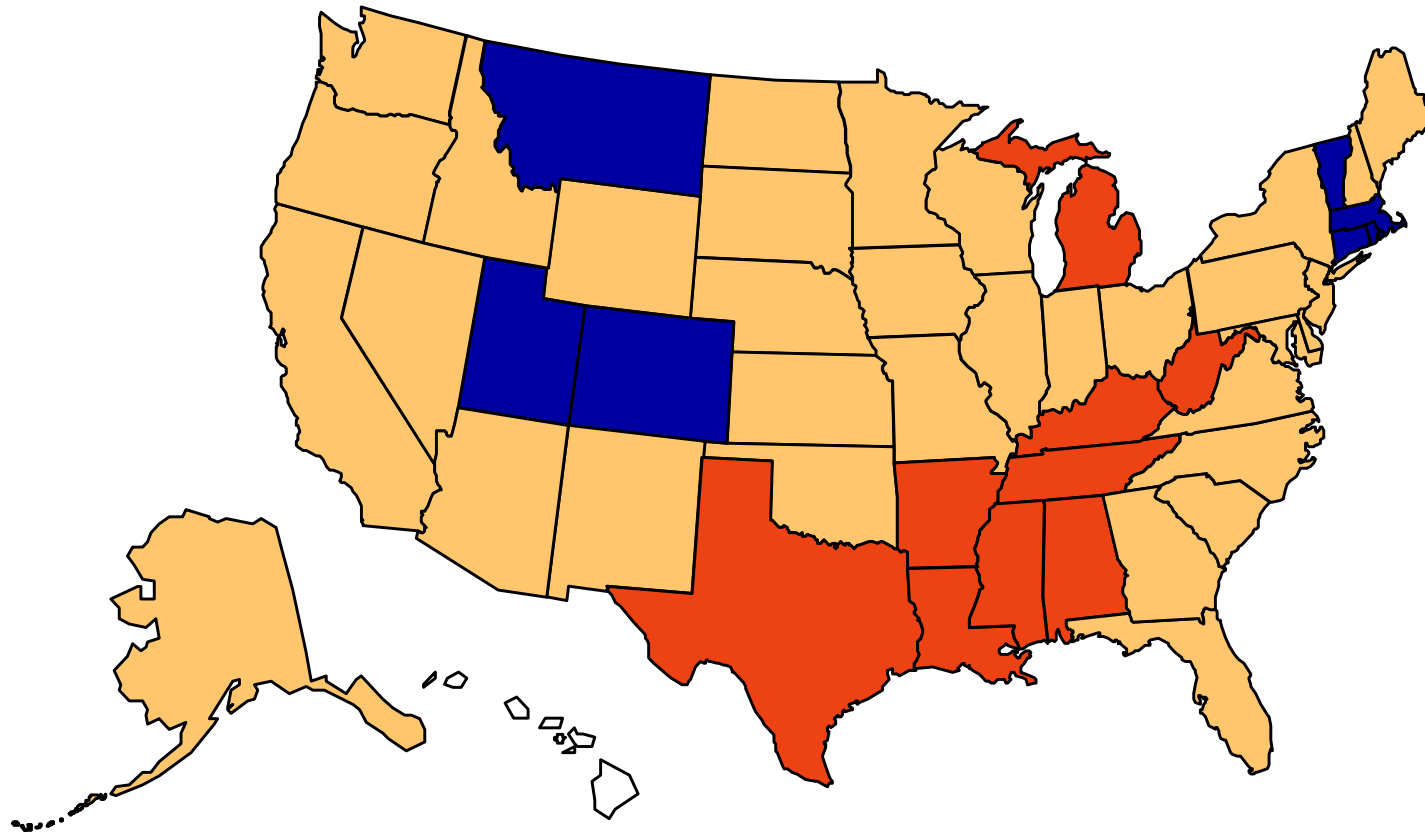
Source: U.S. Centers for Disease Control and Prevention (CDC)



# Obesity Trends\* Among U.S. Adults

## BRFSS, 2004

(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)

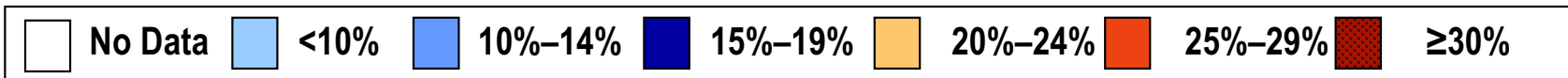
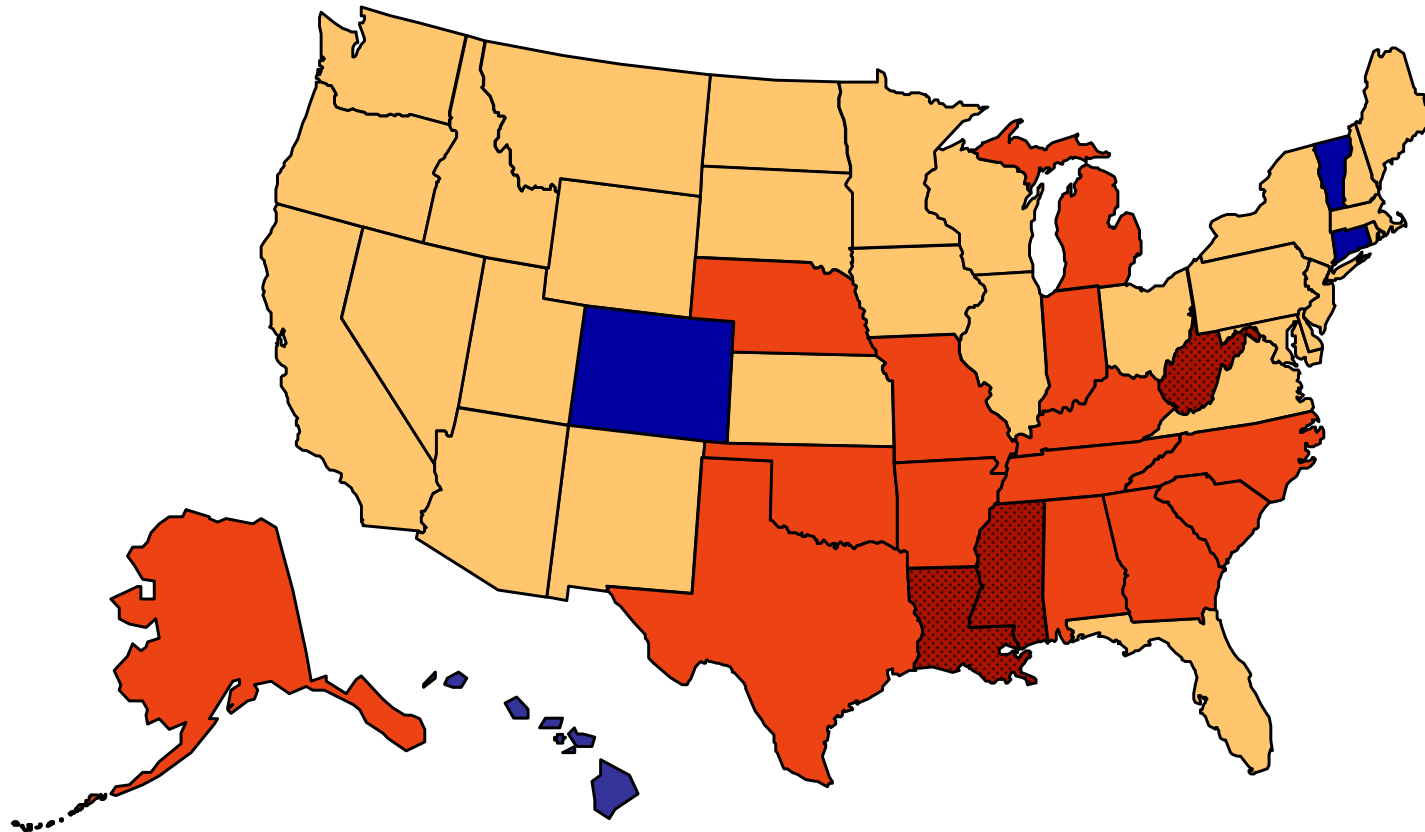


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

## BRFSS, 2005

(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" person)

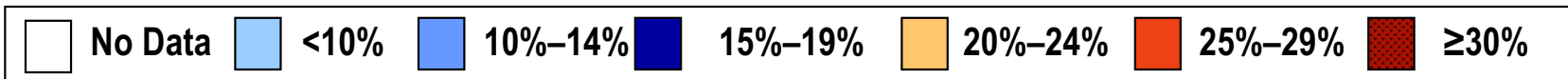
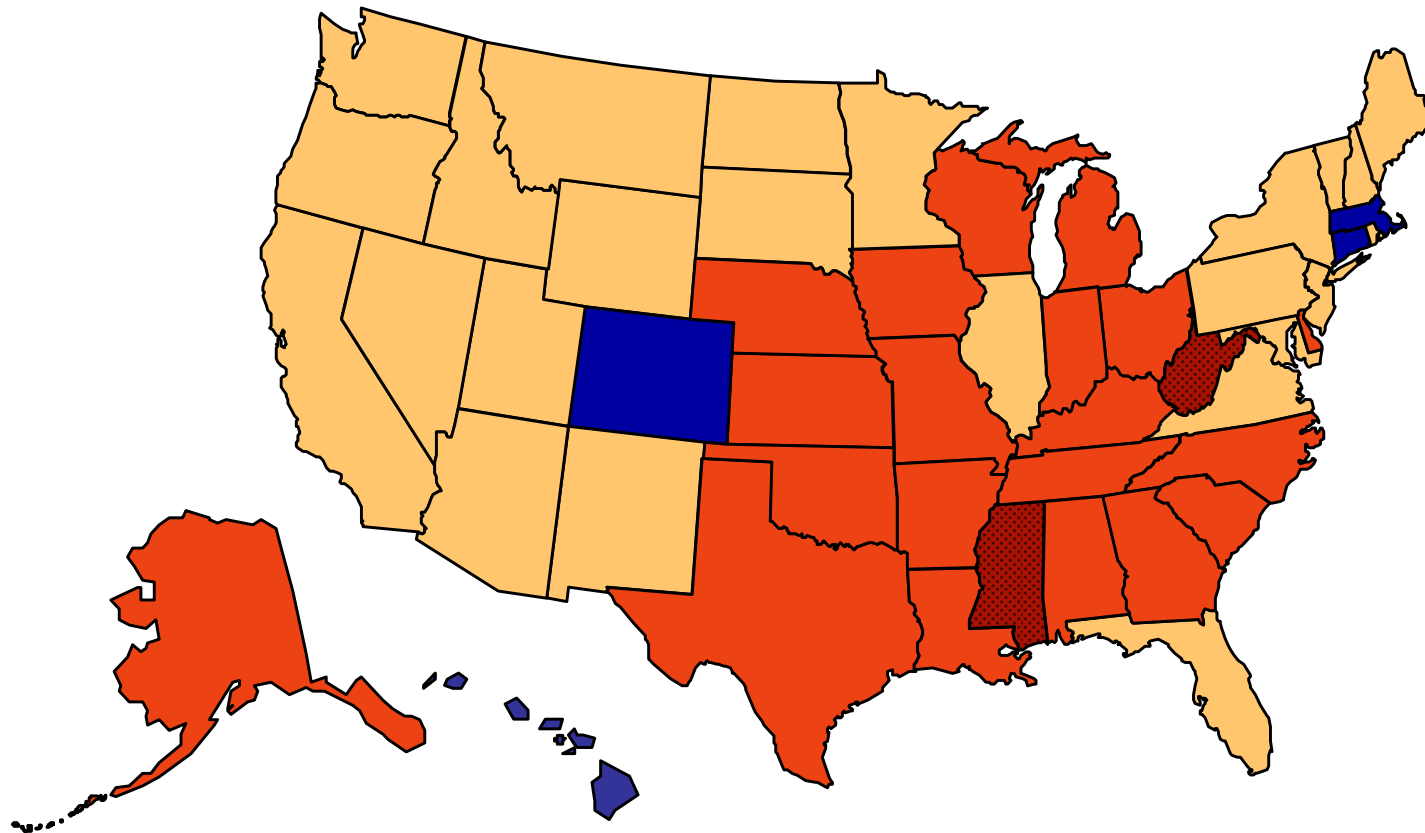


Source: U.S. Centers for Disease Control and Prevention (CDC)

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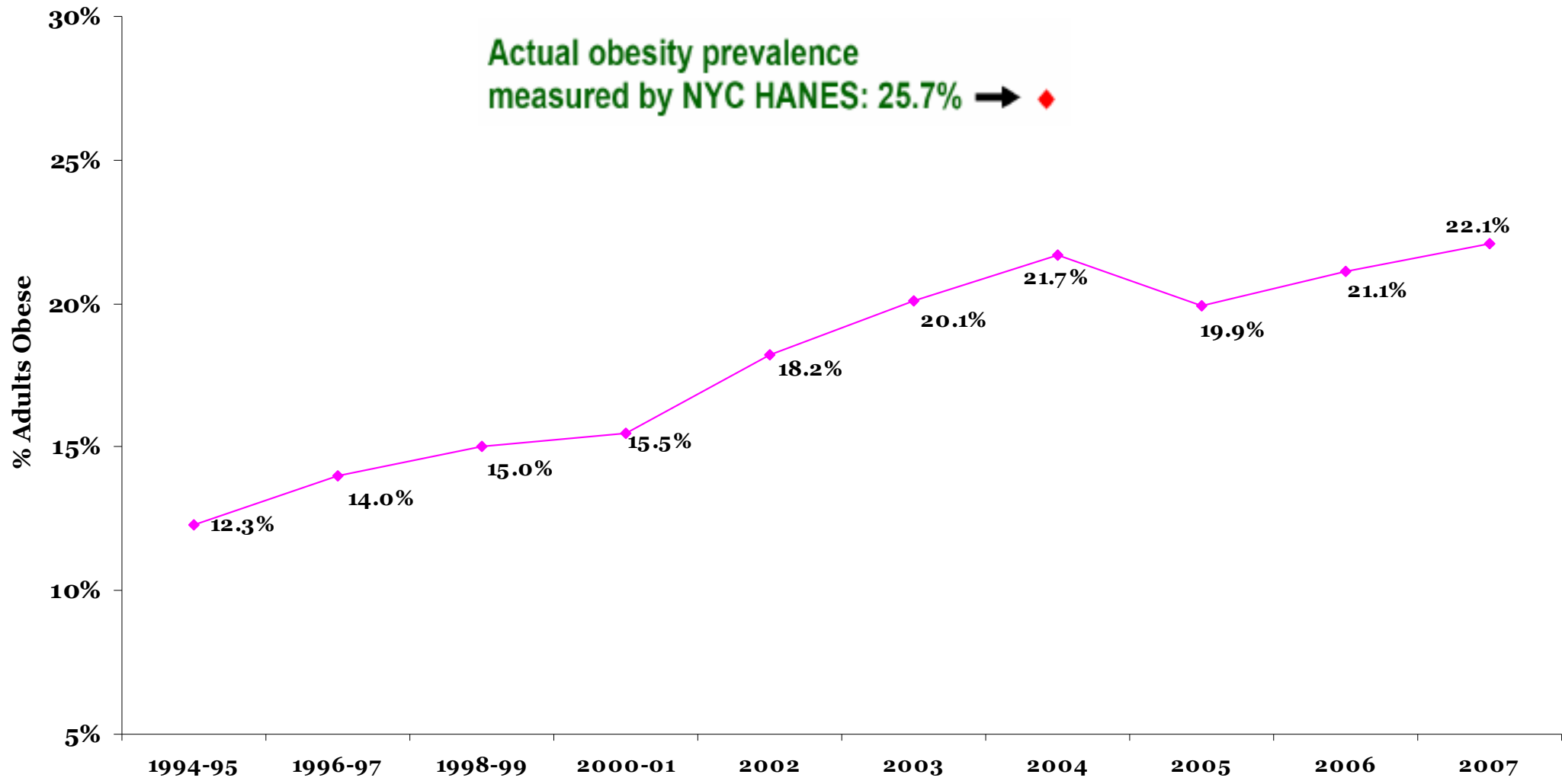


Source: U.S. Centers for Disease Control and Prevention (CDC)



# EPIDEMIC OF OBESITY IN NYC

## Adults with Self Reported Obesity, 1994-2007

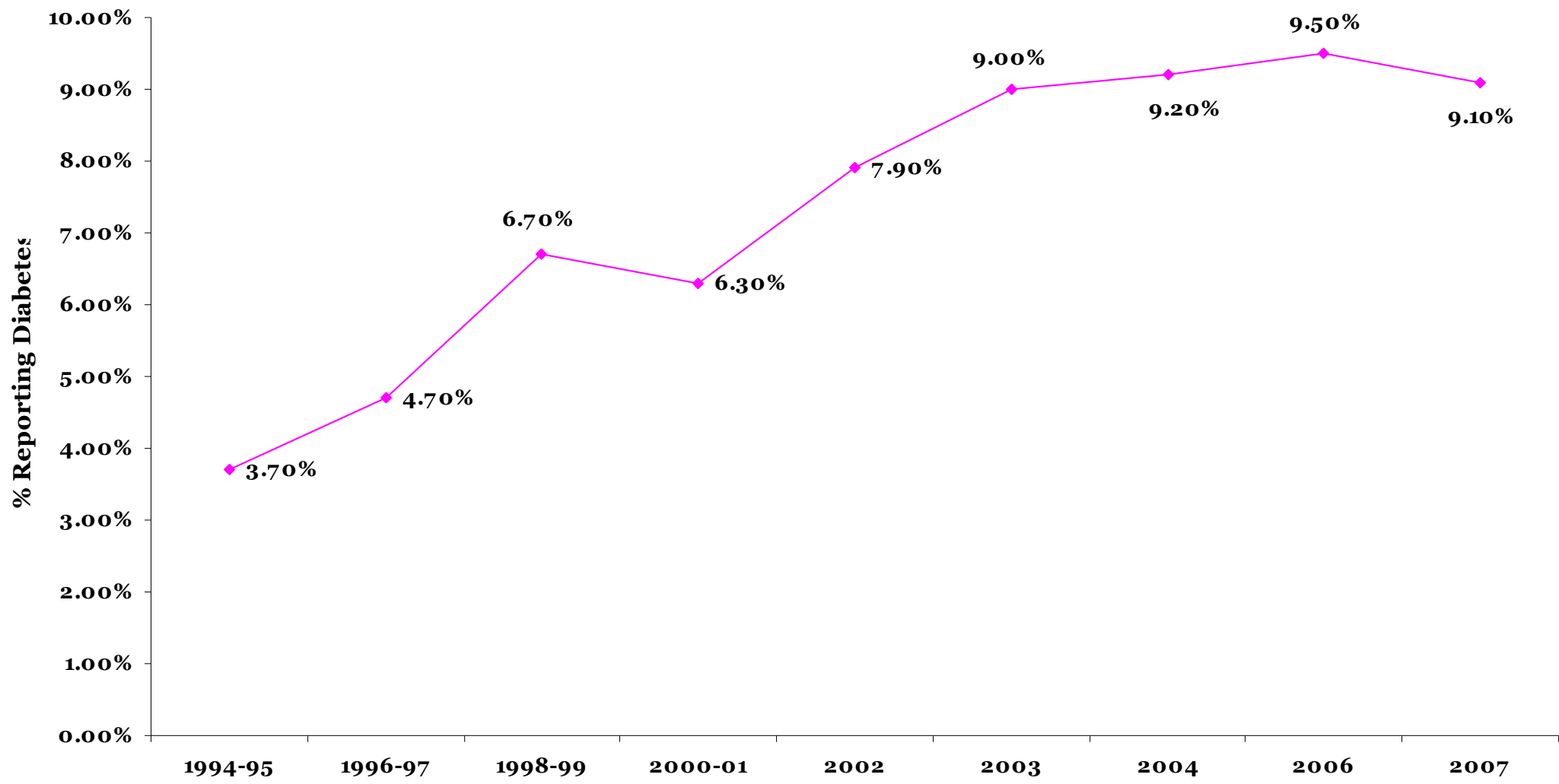


Sources: Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention, 1994-2001; NYC Community Health Survey, New York City Department of Health and Mental Hygiene, 2002-2004; NYC Health and Nutrition Examination Survey, New York City Department of Health and Mental Hygiene, 2004



# EPIDEMIC OF DIABETES IN NYC

## Adults with Self Reported Diabetes, 1994-2007

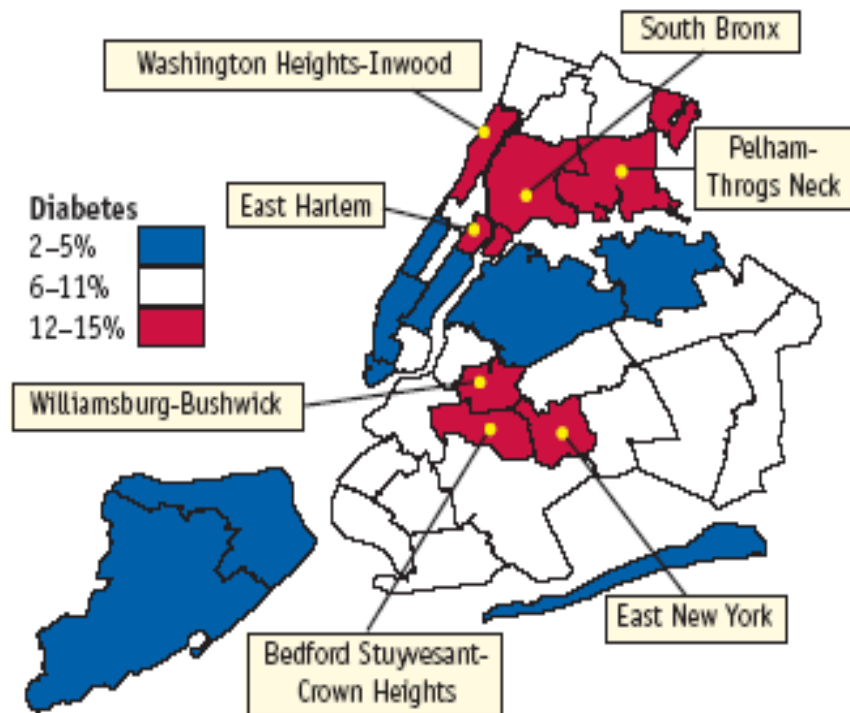




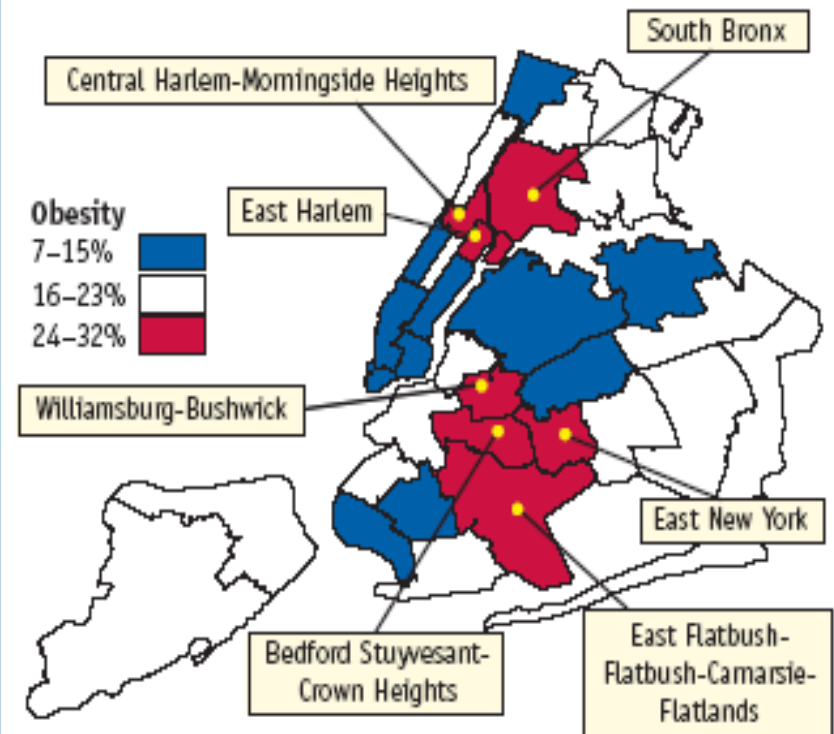
# OBESITY AND DIABETES RATES, BY NEW YORK CITY NEIGHBORHOOD

## Neighborhoods with more obesity have more diabetes

*Diabetes in NYC's Neighborhoods*



*Obesity in NYC's Neighborhoods*

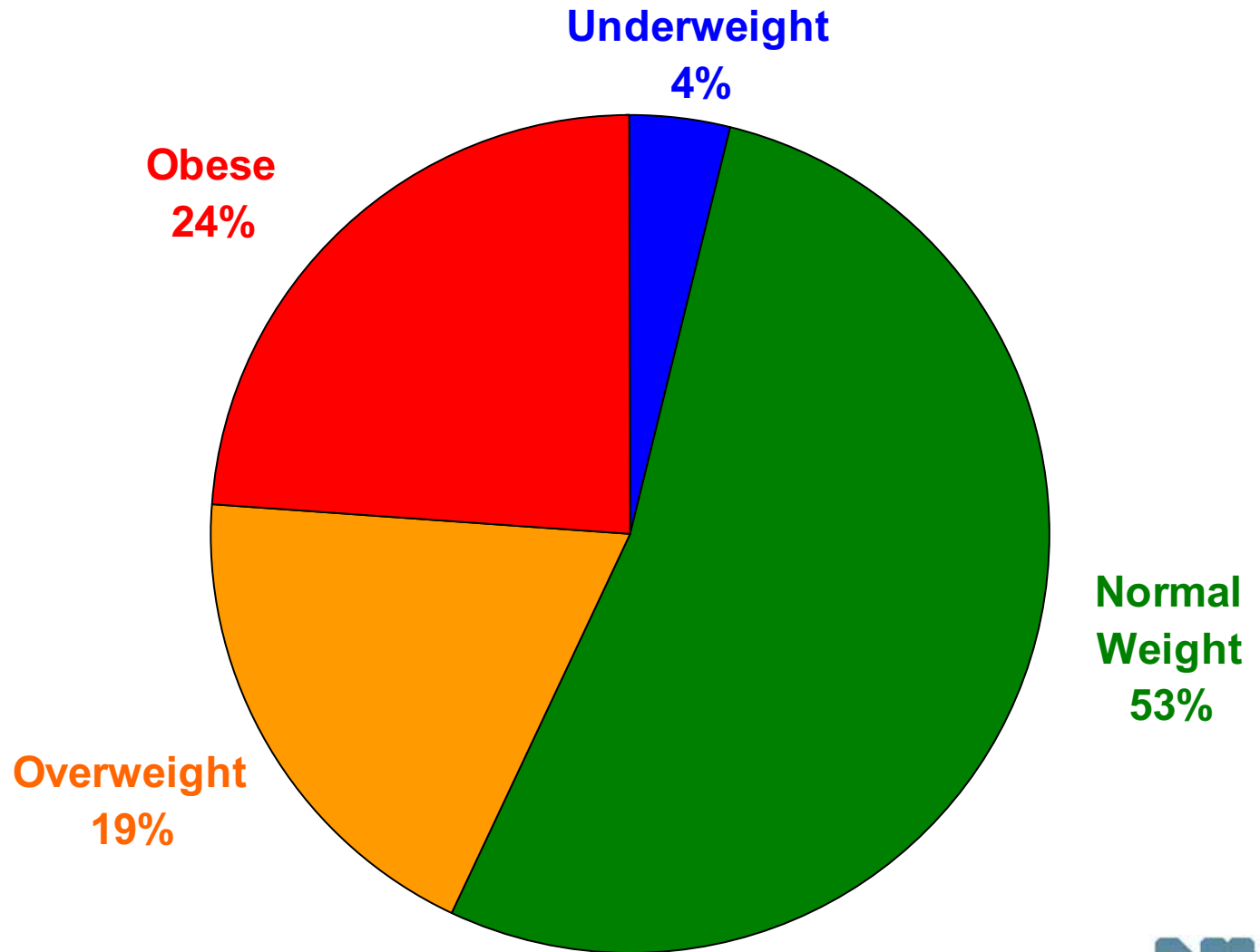


Source: NYC Community Health Survey, NYC Department of Health and Mental Hygiene

# Very High Rates of Childhood Overweight & Obesity in NYC

*Only Half of NYC's Elementary School Children Are at a Healthy Weight*

**More than 4  
in 10 are  
overweight  
or obese in  
Grades K-5**

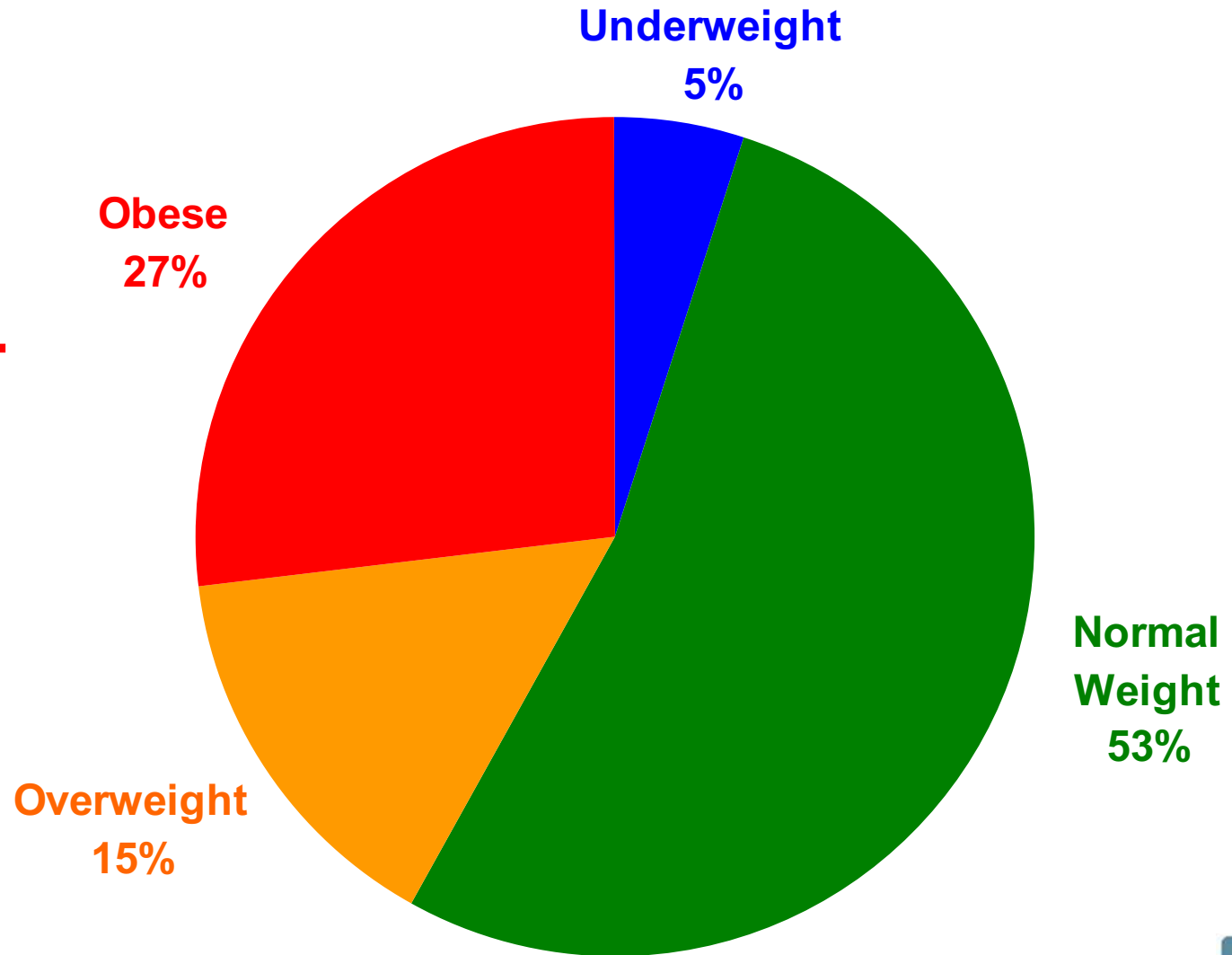


Source: NYC Department of Health and Mental Hygiene, NYC Vital Signs, 2003.

# Obesity Begins Very Early

*Only Half of New York City 2-4 Year Olds in Head Start Are at a Healthy Weight*

**More than 4  
in 10 are  
overweight  
or obese at  
ages 2-4**



Source: NYC Department of Health and Mental Hygiene, NYC Vital Signs, 2006.

# TODAY'S EPIDEMICS AND CLIMATE CHANGE ARE LINKED



Behaviors Affected by Our Built Environments	Petro-chemical / Electricity use	Air Quality	Obesity/Diabetes
Using automotive transport rather than biking or walking	√	√	√
Taking elevators and escalators rather than stairs	√	√	√
Watching television rather than engaging in physical activity	√	√	√
Drinking bottled and canned beverages rather than tap water	√	√	√
Eating unhealthy processed foods rather than fresh local produce	√	√	√

# ENVIRONMENTAL SOLUTIONS

# Trans Fat Regulation Restricting Use in Restaurants

- 2005 Voluntary Education Campaign
- 2006 Proposed regulations passed
- July 1, 2007: Phase I: Fry oils and spreads
- July 1, 2008: Phase II: All other foods

# Calorie Posting in Restaurants



**LUNCH**

	Calories	Price
Grilled Chicken	390	\$3.99
Hamburger	280	\$0.99
Cheeseburger	300	\$1.39
Fish Filet	450	\$3.29
Fries – Small	300	\$1.00
Fries – Large	600	\$1.79
Soda – Small	150	\$1.00
Soda – Large	300	\$1.89



## BENEFITS

- **Prevention of weight gain**
- **Weight loss when combined with diet**
- **Reduced depression**
- **Better cognitive function (older adults)**
- **Prevention of falls**
- **Lower risk of:**
  - Heart disease
  - Stroke
  - Type 2 diabetes
  - High blood pressure
  - Adverse blood lipid profile
  - Colon and breast cancers



## **Creating / improving access to places for physical activity**

- increases energy expenditure and leisure-time physical activity
- weight loss and decreases in body fat are also reported in most of these studies

## **Improving walkability through community-scale and street-scale design**

- improving community design - mixed use, density, connectivity
- improving street design – increased traffic and crime safety, enhancing street aesthetics
- associated with 35-161% increase in physical activity (e.g. walking)

## **Increasing stair use**

- just 2 minutes of stair climbing a day burns enough calories to prevent average U.S. adult annual weight gain
- men climbing 20-34 floors of stairs per week (~3-5 floors per day) had a >20% lower risk of stroke
- (elevators also routinely account for 3-10% of a building's energy use)

Sources: U.S. Centers for Disease Control and Prevention (CDC), *The Guide to Community Preventive Services*,

<http://www.thecommunityguide.org/pa/environmental-policy/index.html>

Zimring C. Influences of building design and site design on physical activity: research and intervention opportunities. *AJPM*, 2005. 28(2S2): pp. 186-193.

Lee I, Paffenbarger RS. Physical activity and stroke incidence: the Harvard Alumni Health Study. *Stroke* 1998; 29: pp. 2049–2054.

U.S. Dept of Energy, <http://www1.eere.energy.gov/femp/pdfs/29267-5.7.4.pdf>



Designing to increase stair use

## **Stair access**

### **Stairwell prompts**

Signs placed at elevators & escalators encouraging stair use w/ info on benefits of stair use - increase stair use (median ~50%)

### **Aesthetic interventions in stairwells**

Music & art in stairwells increase stair use

### **Stair visibility / location / convenience**

Design stairs to be more visible and convenient/ elevators less –

- see stairs before elevators
- see stairs but not elevators from entrance
- stairs within 25 ft of entrance
- stairs are on and visible from main path of travel on each floor

### **Elevator design**

Skip stop elevators

Slowing elevator door opening and closing times



## Food Retail – Supermarkets vs Fast Food

- Supermarket availability is associated with lower rates of neighborhood obesity.
- High density of fast food restaurants is associated with increased weight and obesity in area residents.

## Community Gardens

- People with a household member who participated in a community garden ate more fruits and vegetables per day.
- Garden-based nutrition education improved adolescent fruit and vegetable intake.

## Access to Tap Water vs Caloric Beverages

- Biggest source of calories in the US diet (**9%** of calories) are from carbonated and non-carbonated soft drinks; Children & Adolescents are getting **10-15%** of total calories from sugar-sweetened beverages and 100% fruit juice.
- Water fountain installation + education in elementary schools in deprived neighborhoods reduced risk of overweight in children.

Sources: Moreland K et al., *Supermarkets, other food stores, and obesity*. *AJPM* 2006; 30(4): pp. 333-339.

Mehta NK, Chang VW. *Weight status and restaurant availability: a multi-level analysis*. *AJPM* 2008; 34(2): pp. 127-133.

Alaimo K, Packnett E, Miles RA, Kruger DJ. *Fruit and vegetable intake among urban community gardeners*. *J Nutr Educ Behav*. 2008; 40(2): pp. 94-101. McAleese JD, Rankin LL. *Garden-based nutrition education affects fruit and vegetable consumption in sixth-grade adolescents*. *J Am Diet Assoc*. 2007 Apr; 107(4):662-5.

Block G. *Foods contributing to energy intake in the US: data from NHANES III and NHANES 1999–2000*. *J Food Comp Anal*. 2004; 17: pp. 439–47.

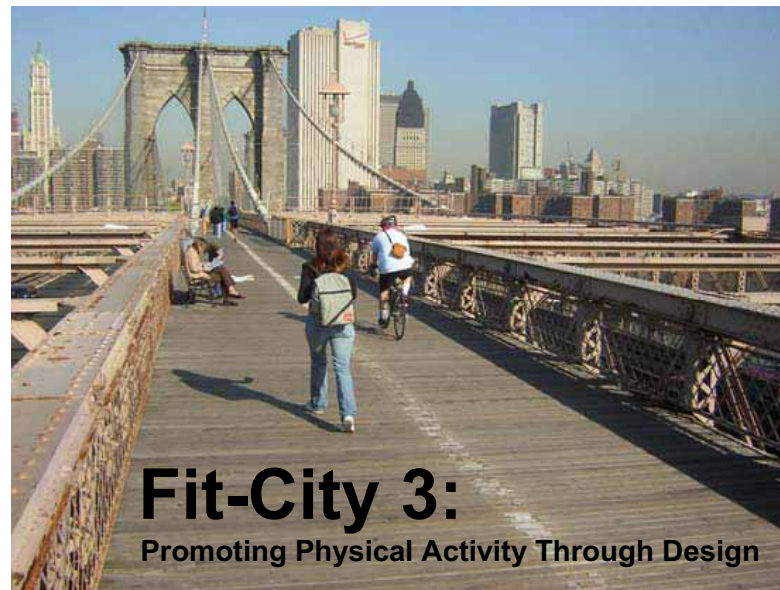
Wang Y, Bleich S, Gortmaker S. *Increasing caloric consumption from sugar-sweetened beverages and 100% fruit juices among US children and adolescents, 1988-2004*. *Pediatrics* 2008; 121(6): pp. 1604-1614.

Muckelbauer R et al. *Promotion and provision of drinking water in schools for overweight prevention: randomized, controlled cluster trial*. *Pediatrics* 2009; 123(4): pp. e661-7.



# FIT-CITY: PROMOTING PHYSICAL ACTIVITY THROUGH DESIGN

*A Strategy to Open Dialogue with Architectural, Planning and Design Communities*

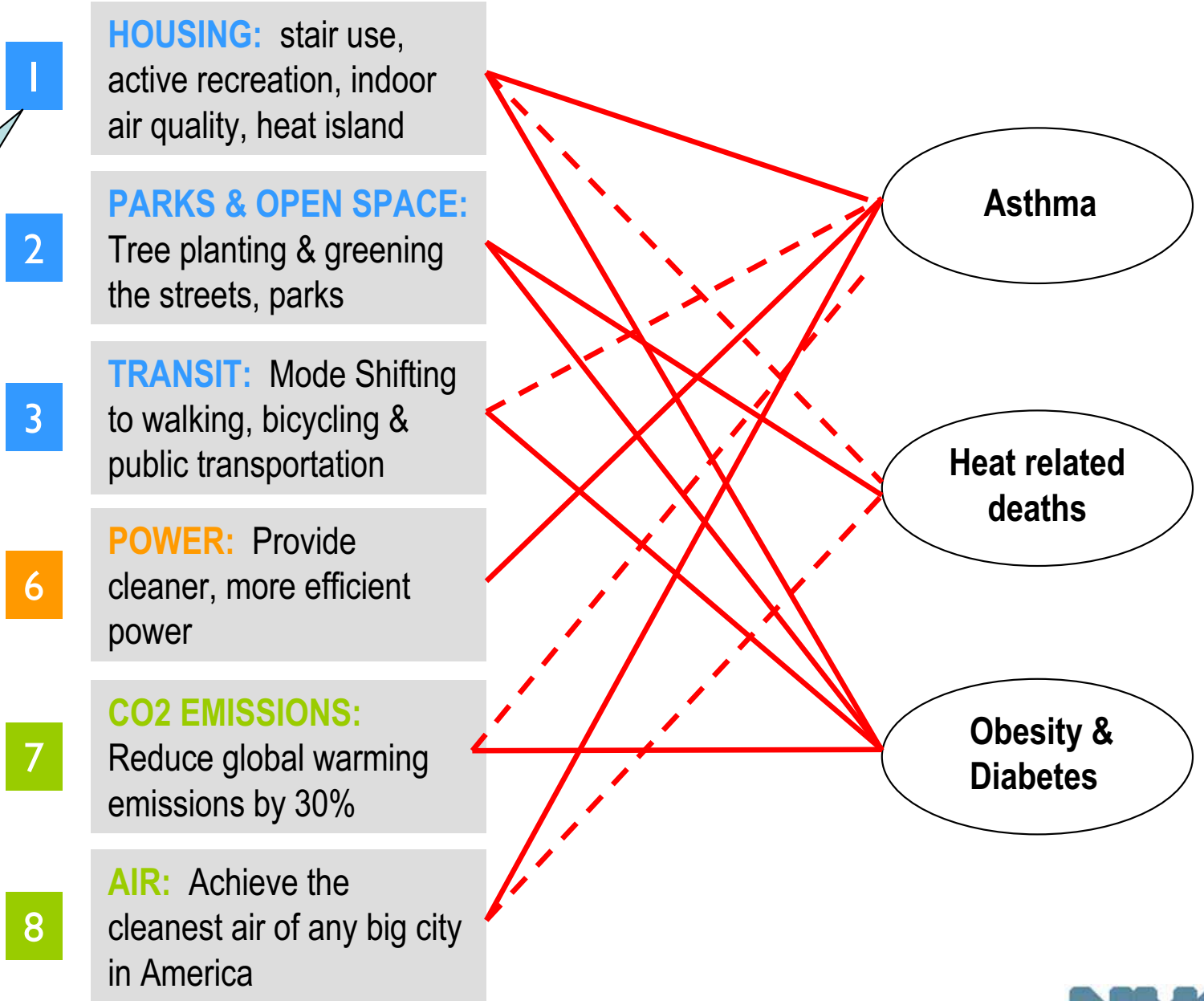




- **Guidelines for physical activity promoting design**
  - **Buildings, streets, and neighborhoods**
- **NYC DOHMH working with DDC, DCP, DOT**
- **Initiated at Fit-City 2 Conference by DDC Commissioner**
- **Focus of Fit-City 4 Conference (June 8, 2009)**
- **Panel presentation at AIA National Convention in San Francisco, April 30, 2009**



There are many opportunities to address chronic health issues in the design of housing





## LEED NC (New Construction and Major Renovations)

- **Local Law 86 in NYC requires City construction (new constructions and major renovations) >\$2 million to be LEED certified**
- **Existing points which promote physical activity**
  - **Bicycle storage and shower facilities**
  - **Proximity to public transit**
  - **Community connectivity and walkability**
- **APPROVED! Innovation Credit (IC) Proposal**
  - **For NYC DOHMH HC, proposed IC to promote physical activity**
    - **Stair design, elevator operations, increasing access to places for recreational physical activity**

## LEED ND (Neighborhood Development)



## Dissemination:

- Free to all building owners, managers, tenants who call 311 to order

## Evaluation:

- 3-story DOHMH Health Clinic in Northern Manhattan; 8-story university building in Brooklyn; and 10-story affordable housing building in South Bronx
  - Stair use increased significantly in all

**Burn Calories,  
Not Electricity**

**Take the Stairs!**

Walking up the stairs just 2 minutes a day helps prevent weight gain. It also helps the environment.

Learn more at [www.nyc.gov](http://www.nyc.gov) or call 311.

Michael R. Bloomberg Mayor NYC REBNY

The poster features a white silhouette of a person walking up a set of stairs on a green background. The text is in white and black, providing a clear call to action.

# SUMMER STREETS PROGRAM



- DOT closed streets to traffic from Brooklyn Bridge to Central Park and the Upper East Side on 3 consecutive Saturdays in August 2009
- Modeled after other successful programs, such as Bogota's Ciclovía
- Evaluation for potential physical activity and health benefits (DOHMH working with DOT)
  - cyclists averaged 6.7 miles; runners 4.2 miles; walkers 3.5 miles (40-80 minutes of moderate to vigorous physical activity)
  - 24% are people who don't meet recommendations for weekly physical activity





## Promoting Consumption of NYC Tap Water

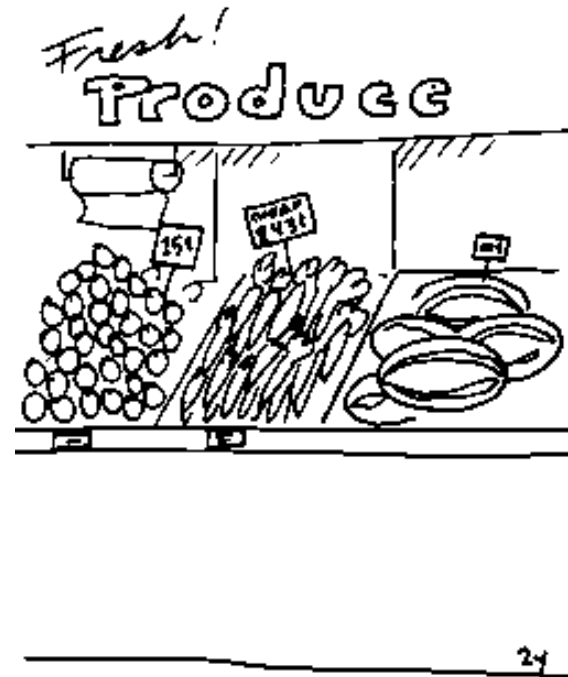
- Effort with DEP, Parks, DOT, Mayor's Office and other City agencies
- 3 components
  - Education
  - New water bottles
  - Increasing tap water availability – in daycares, schools, and public spaces





## Business Development Initiative

- Effort with City Planning, EDC and Mayor's Office
- Working to create financial and zoning incentives for improving supermarket and healthy food access in low-income neighborhoods



# NYC FOOD AND FITNESS PARTNERSHIP



- **Working to improve the food and active living environments, and to decrease geographic disparities in NYC**
- **>100 Organizations**
- **Involvement of city agencies, non-profits, community groups, academic institutions**
- **5 Action Teams, including Built Environment, Food Retail, Youth Settings, Adult Settings, and Clinical Settings Action Teams**

