

# Creating Healthy Communities Through Design

Webinar | Tuesday, June 28, 2011 | 3:30-5:00pm



41 Cooper Square, Morphosis Architects. © Iwan



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## Why Active Design?

- **Brief History of Health and the Built Environment**
- **Today's Epidemics: Obesity and Chronic Disease**
- **Benefits of Healthy, Active Communities**

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Director, Built Environment Program  
NYC Department of Health & Mental Hygiene

# History of health and the built environment

- 100+ years ago, urban conditions in U.S. cities were a breeding ground for disease epidemics



A TYPICAL RIVER-SIDE  
(Reprinted from a Photograph by ARTHUR.)

## **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**

# The design & policy response



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

# The results

| Deaths                     | 1880         | 1940         |
|----------------------------|--------------|--------------|
| <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:** 70% of deaths in U.S. each year are from chronic diseases.

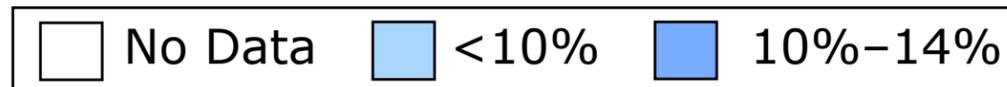
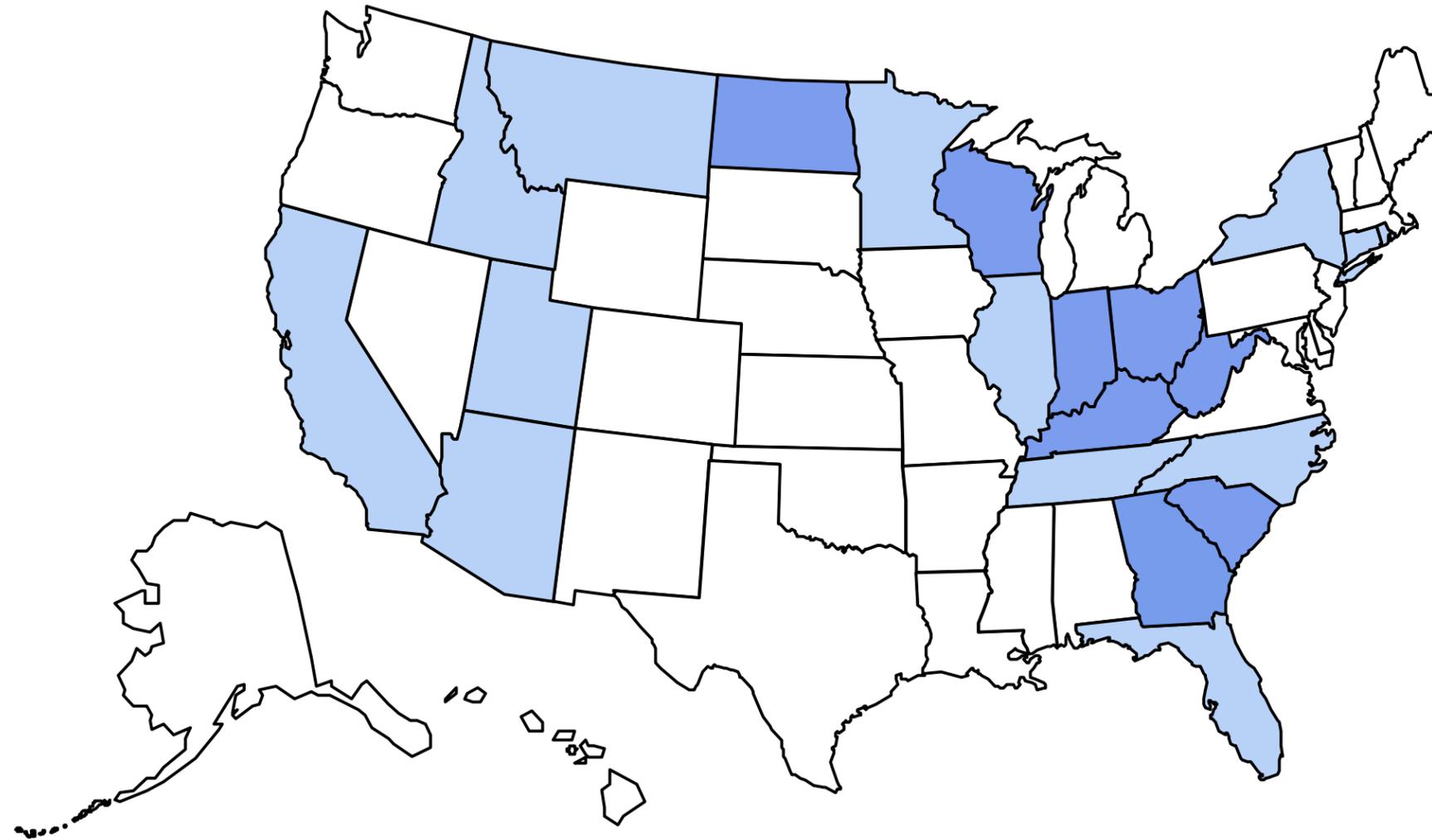
In 2005, **133 million Americans** – almost **1 out of every 2 adults** – had at least one chronic illness.

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

# Obesity Trends\* Among U.S. Adults

## BRFSS, 1985

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

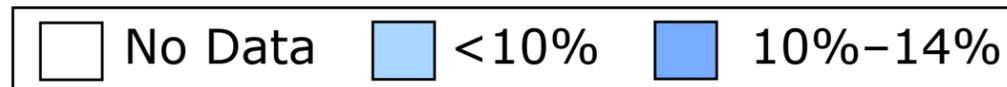
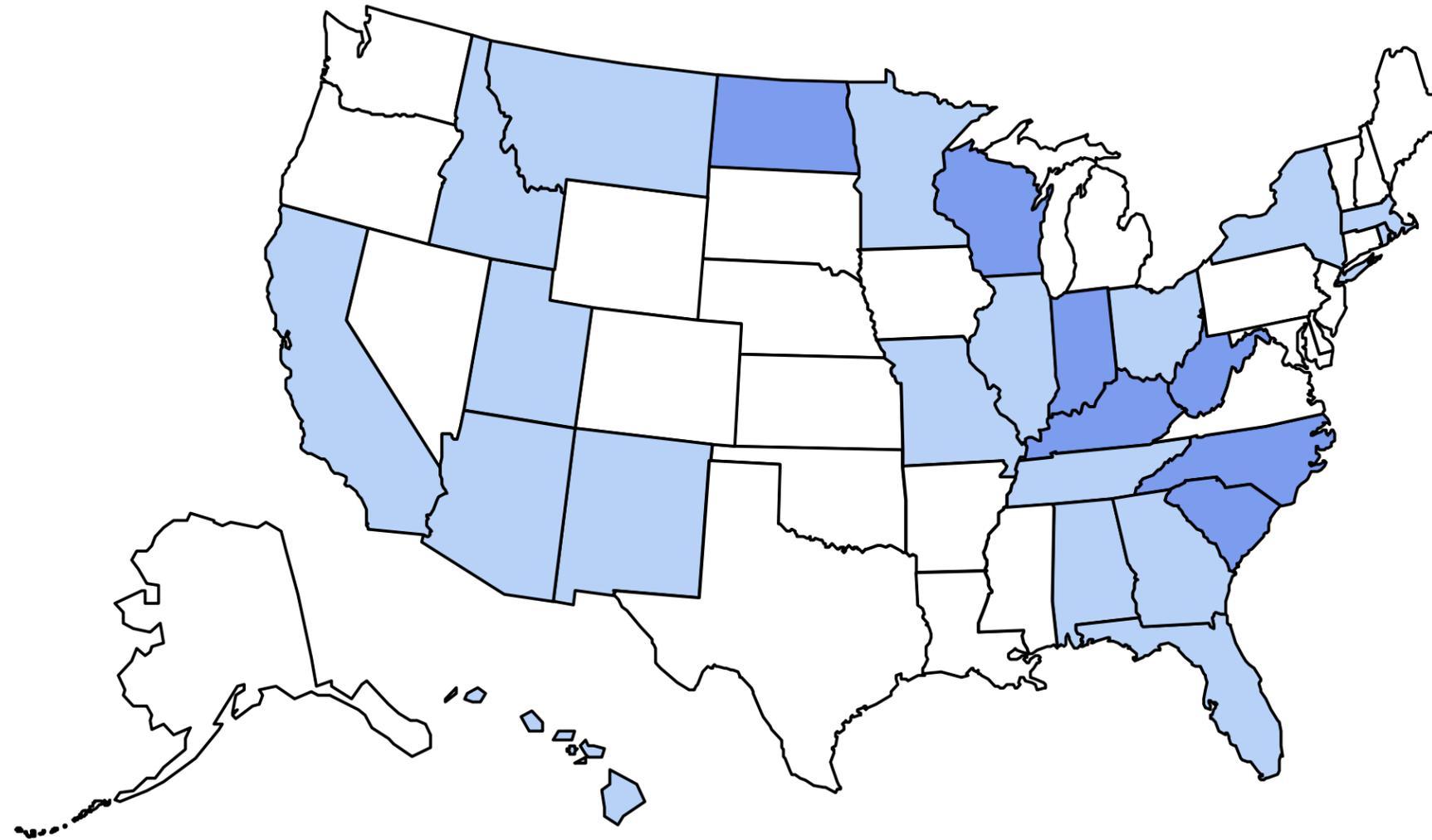


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

## BRFSS, 1986

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

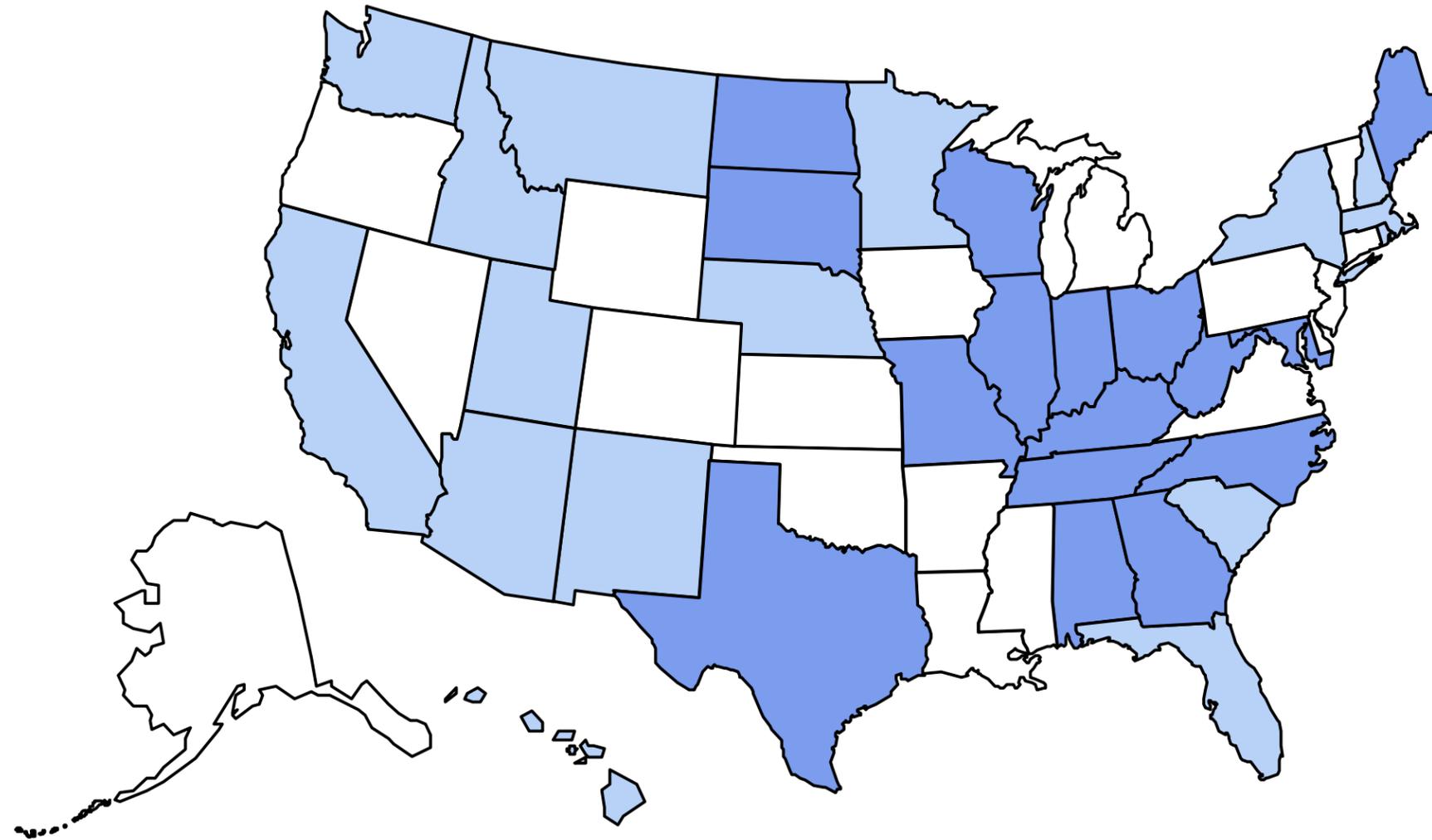


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

## BRFSS, 1987

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



□ No Data    ■ <10%    ■ 10%-14%

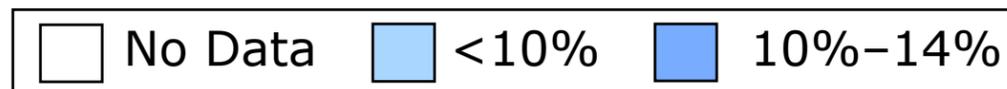
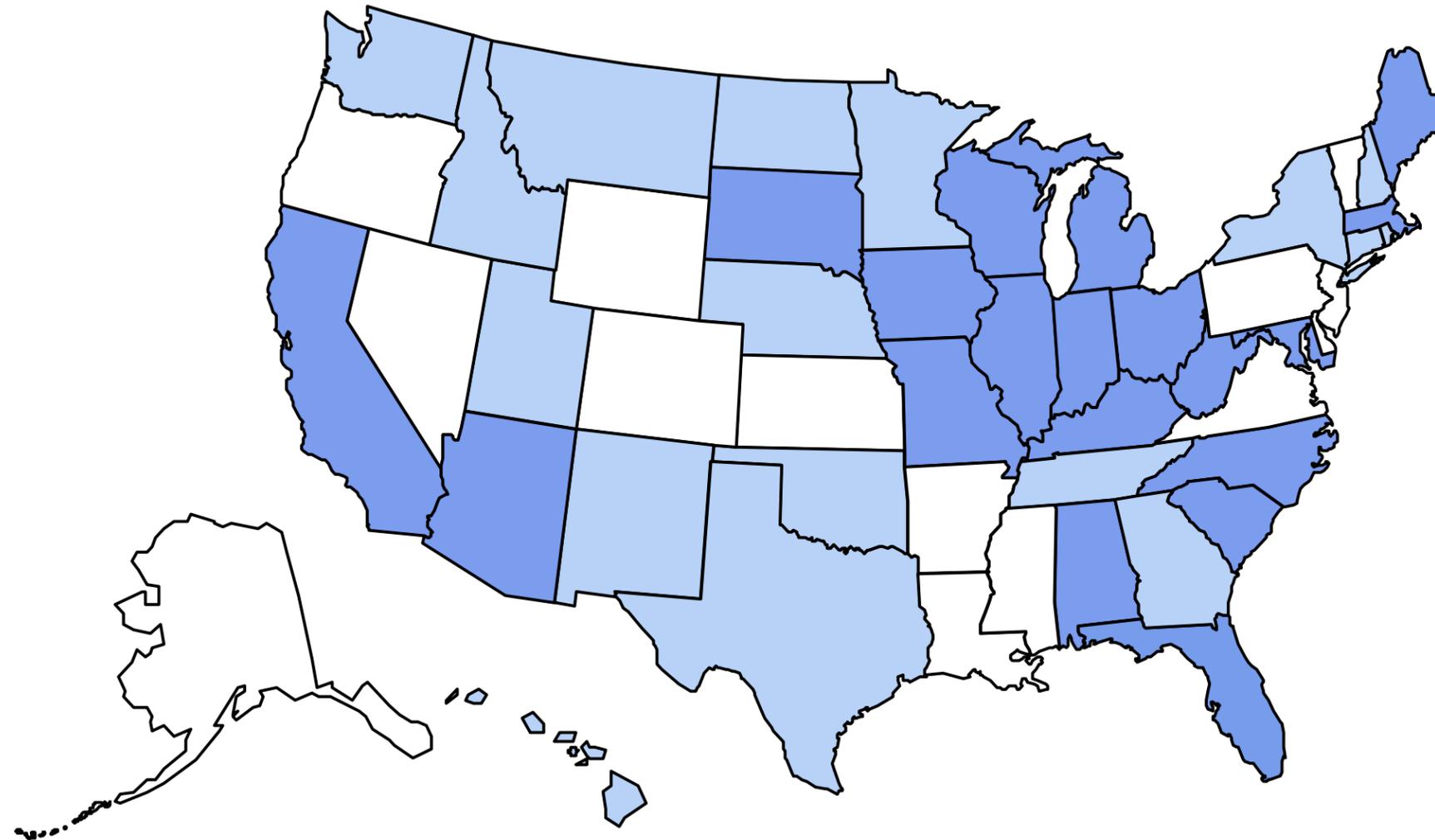
Source: U.S. Centers for Disease Control and Prevention (CDC)

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# Obesity Trends\* Among U.S. Adults

## BRFSS, 1988

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



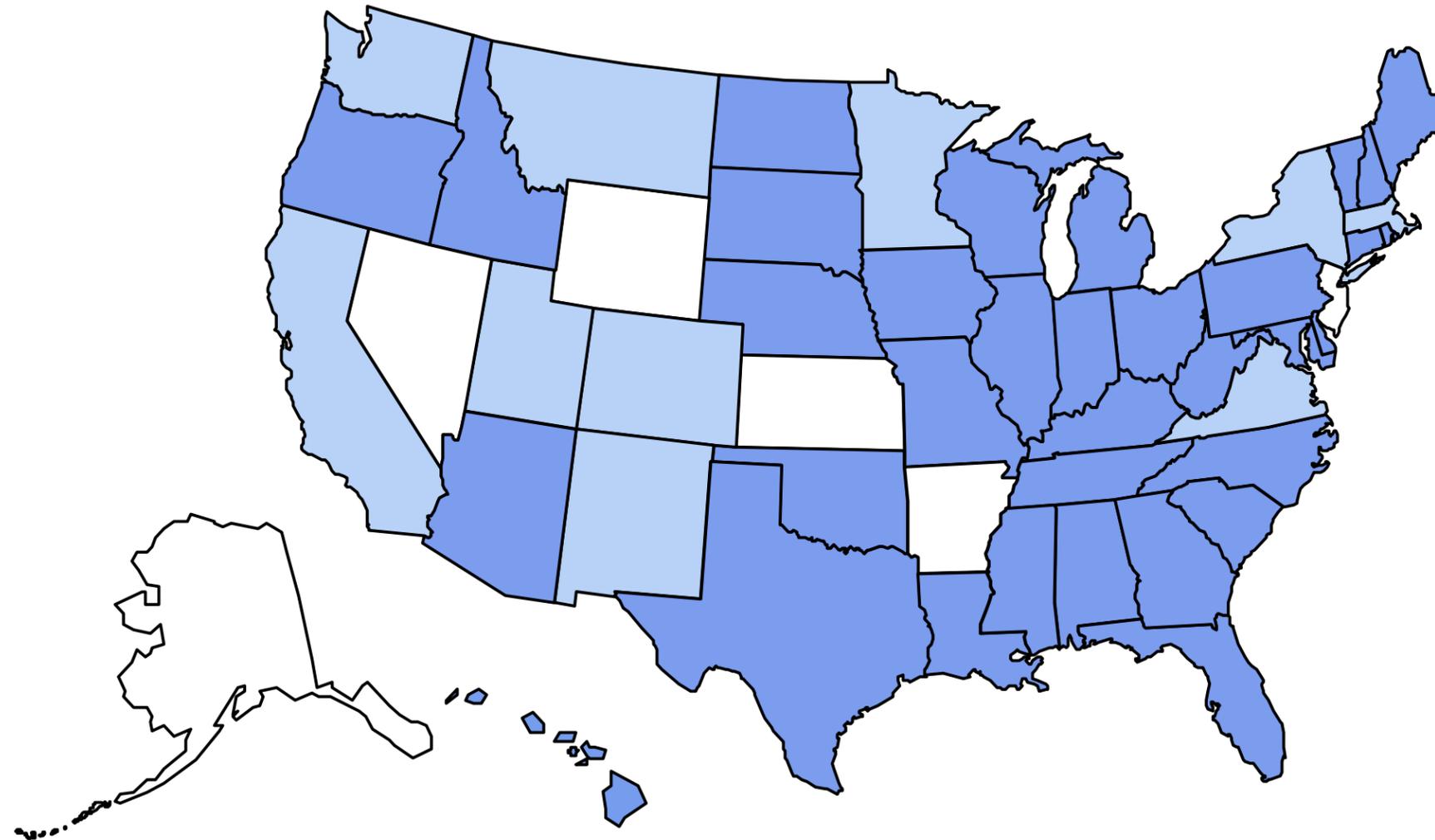
Source: U.S. Centers for Disease Control and Prevention (CDC)



# Obesity Trends\* Among U.S. Adults

## BRFSS, 1990

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



□ No Data    ■ <10%    ■ 10%-14%

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

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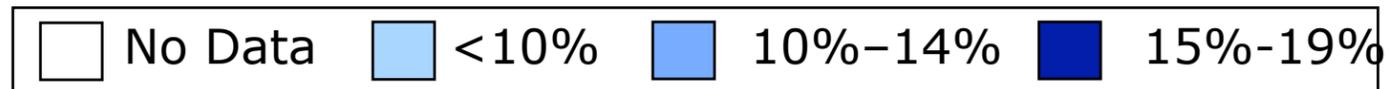
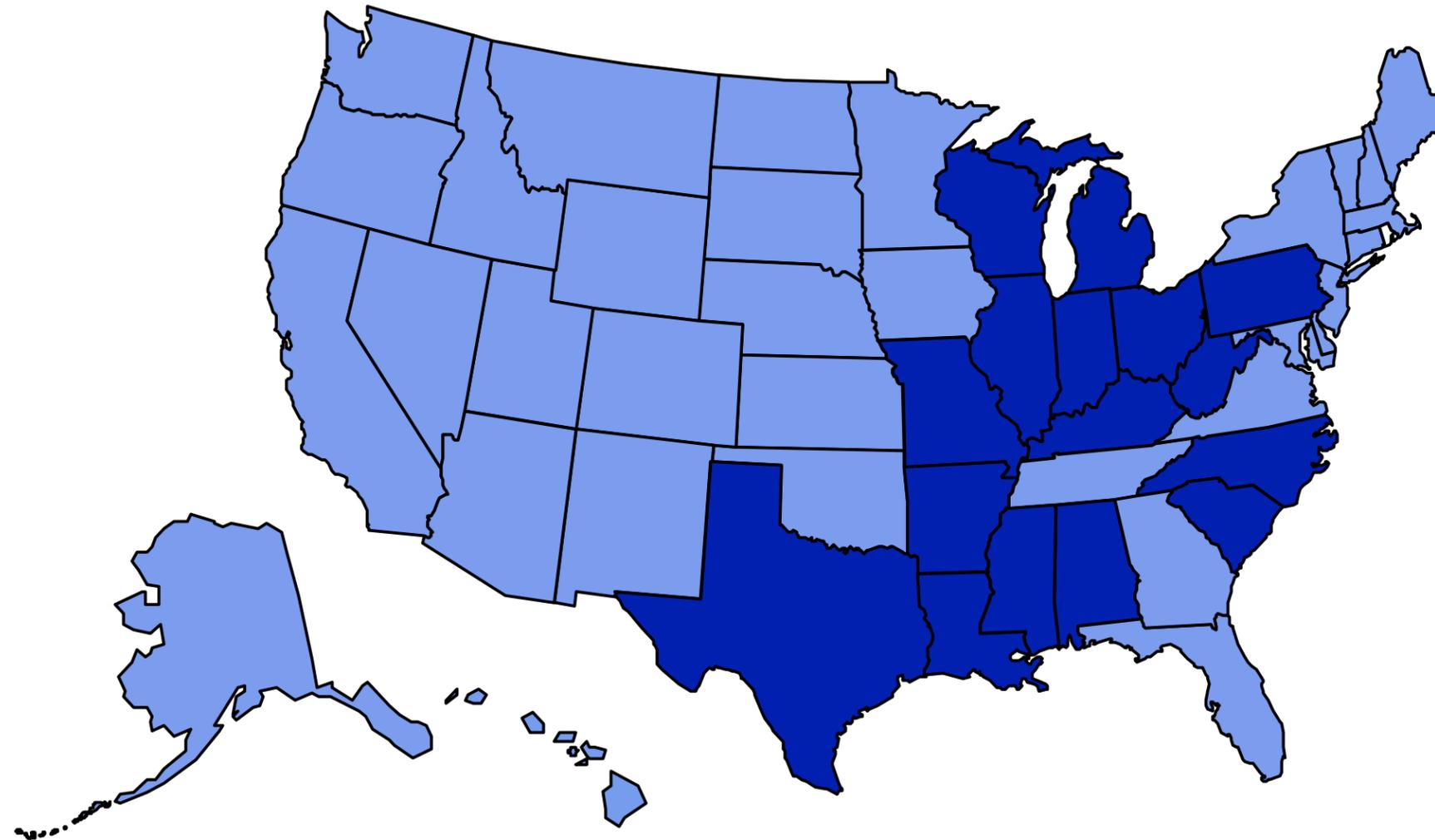




# Obesity Trends\* Among U.S. Adults

## BRFSS, 1994

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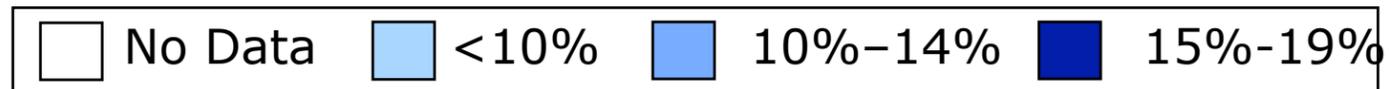
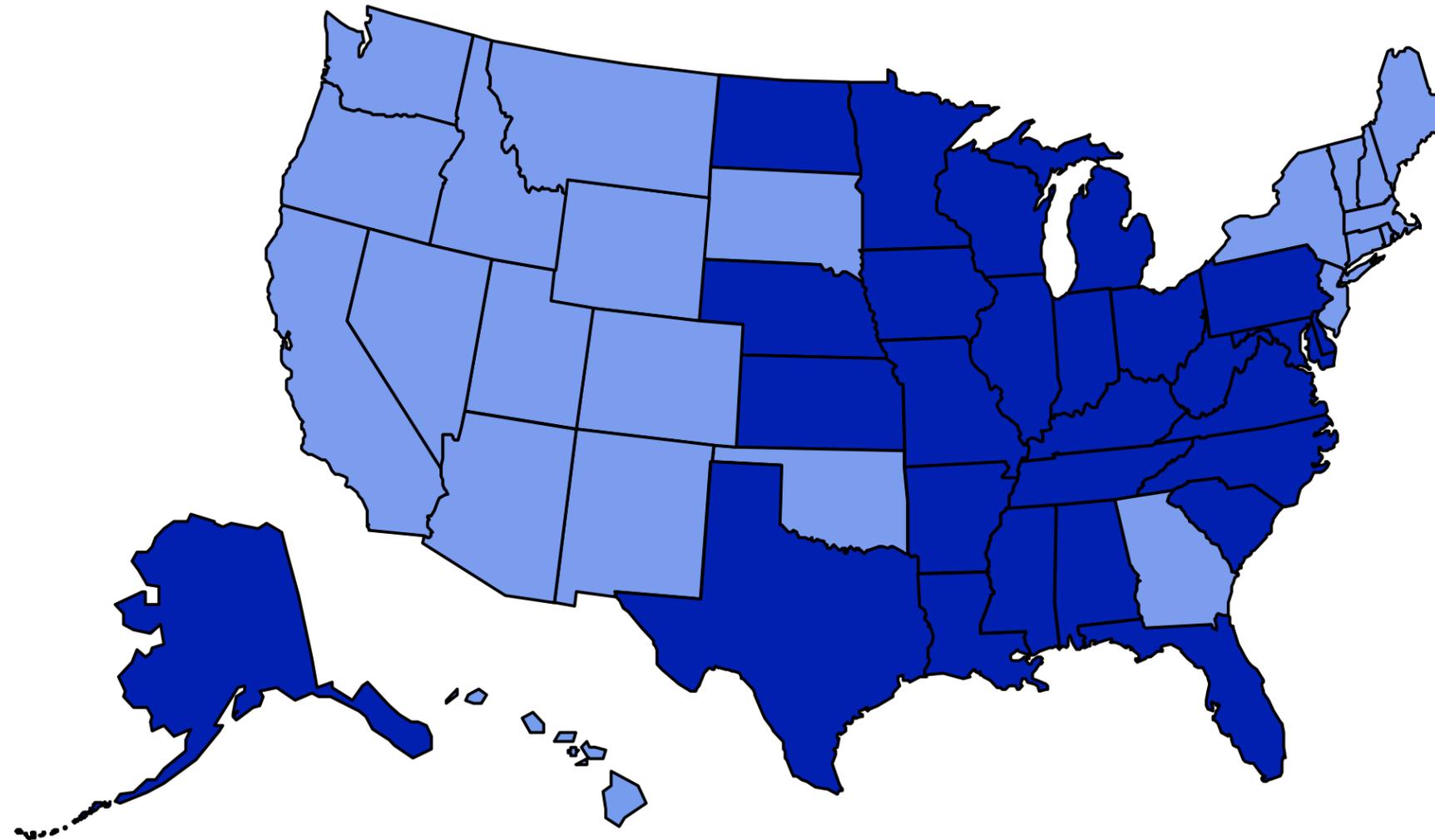


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

## BRFSS, 1995

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



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

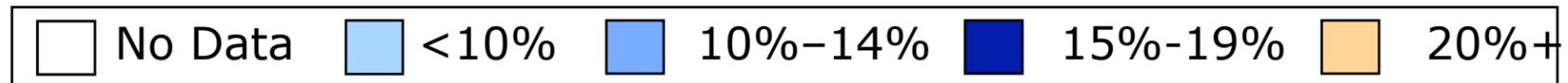
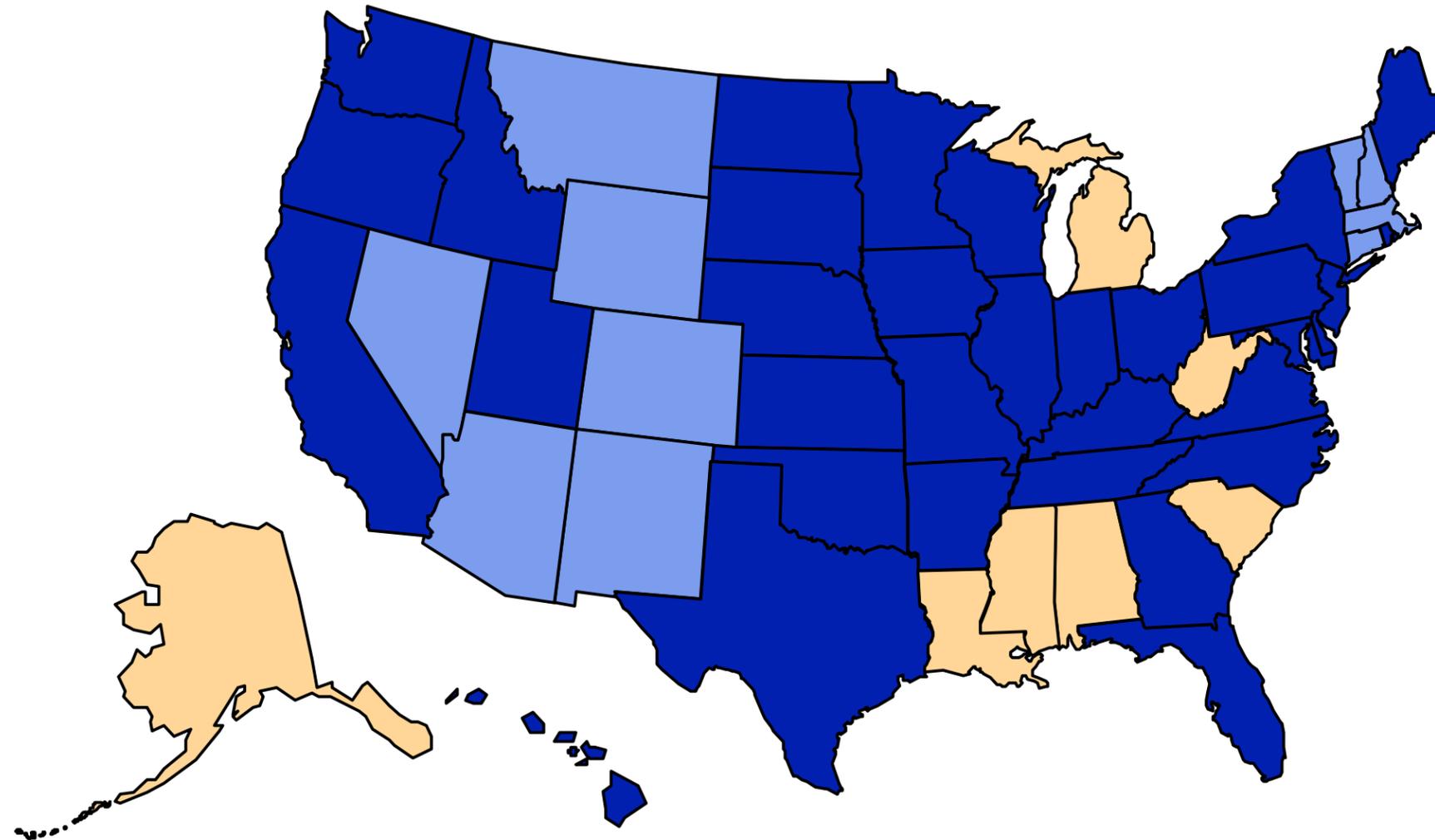




# Obesity Trends\* Among U.S. Adults

## BRFSS, 1998

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

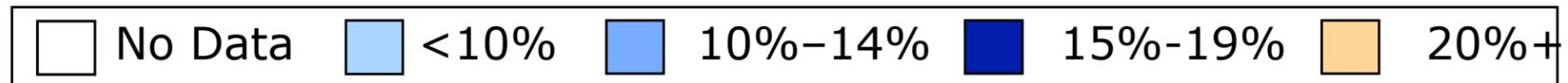
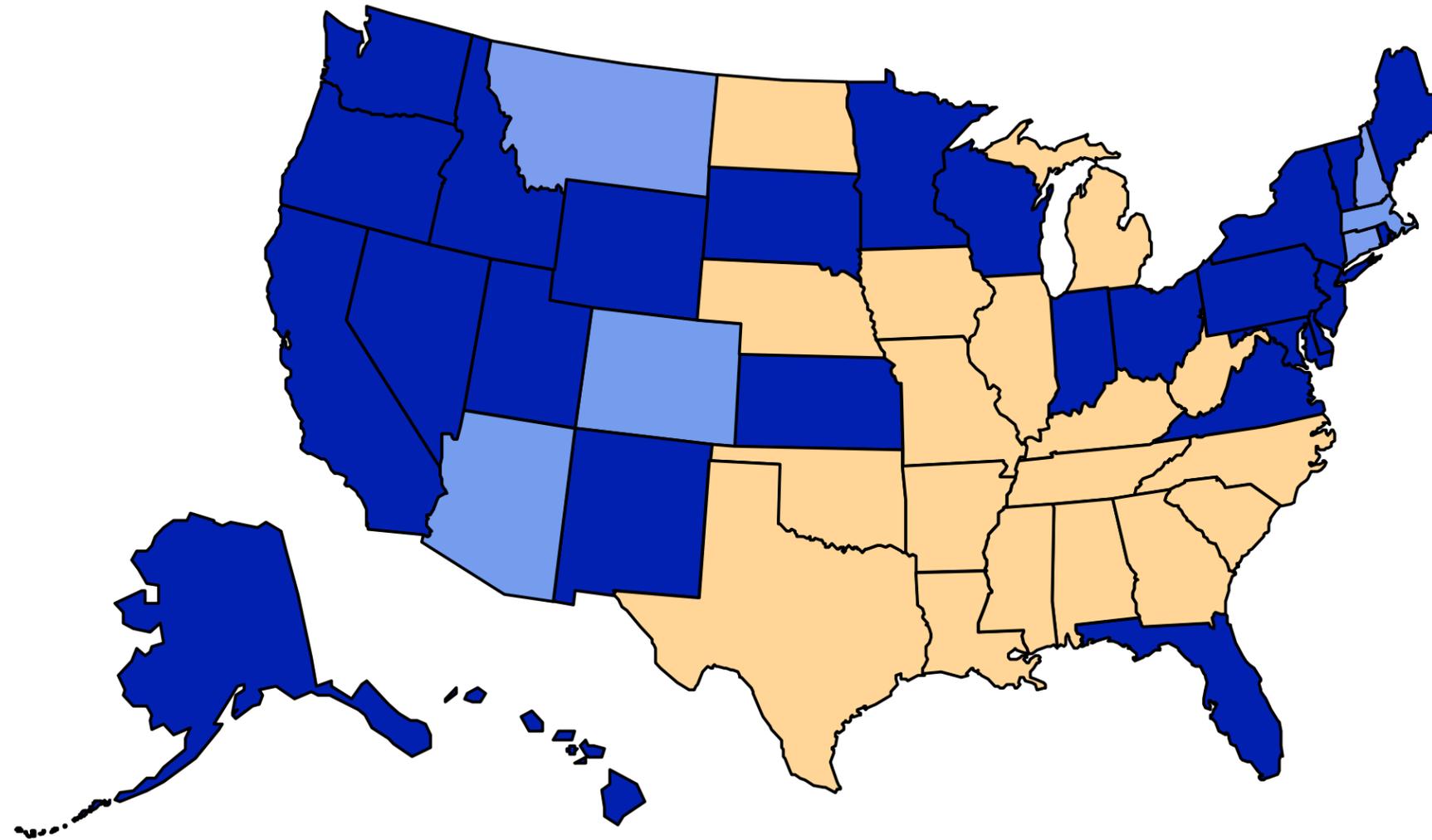


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

## BRFSS, 1999

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

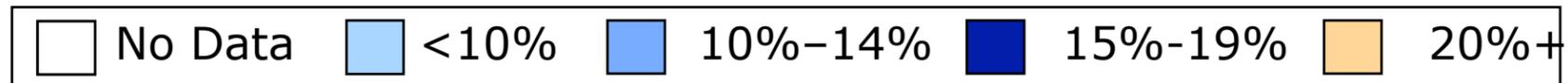
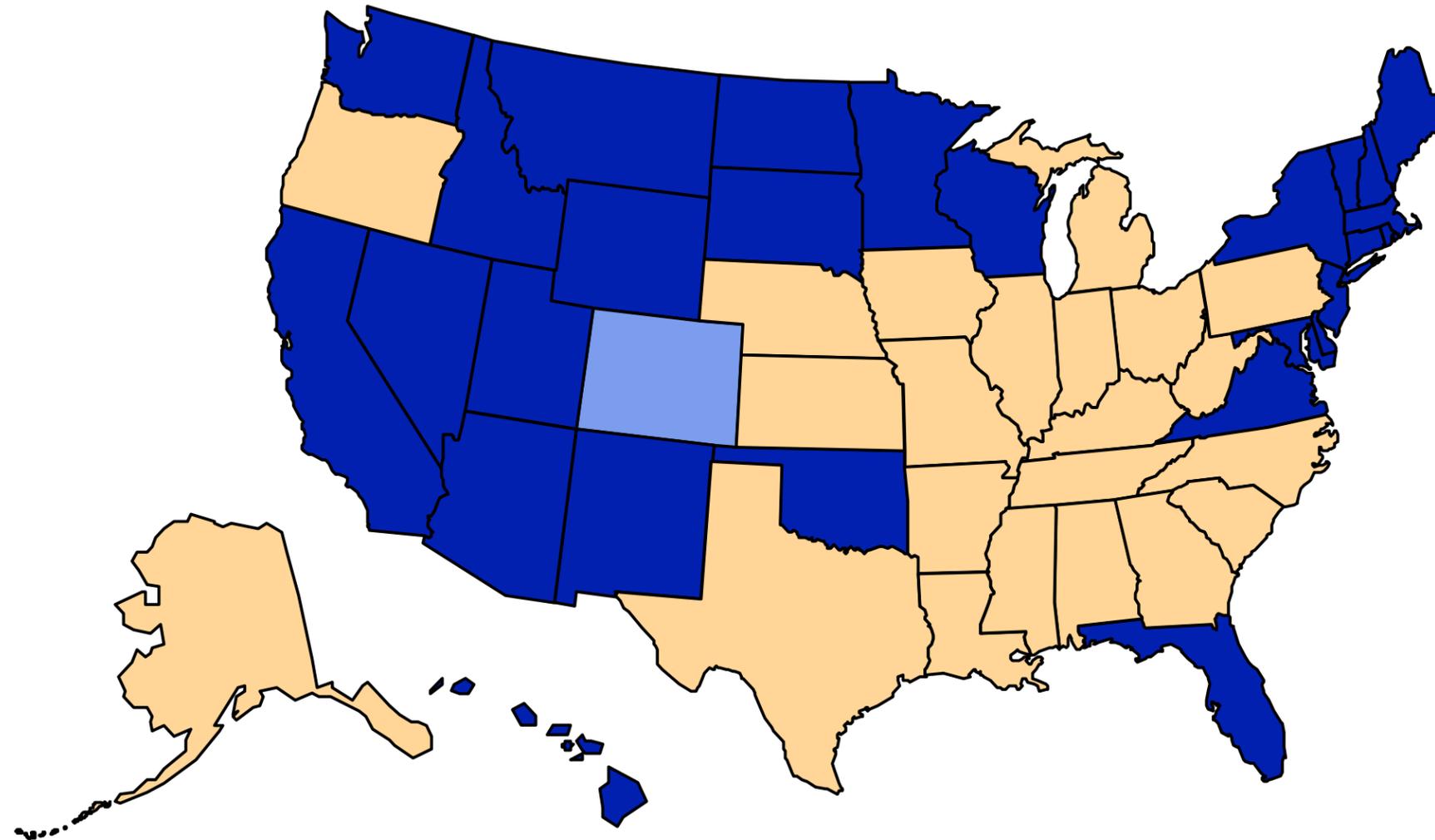


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

## BRFSS, 2000

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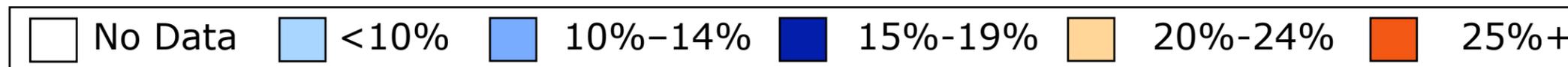
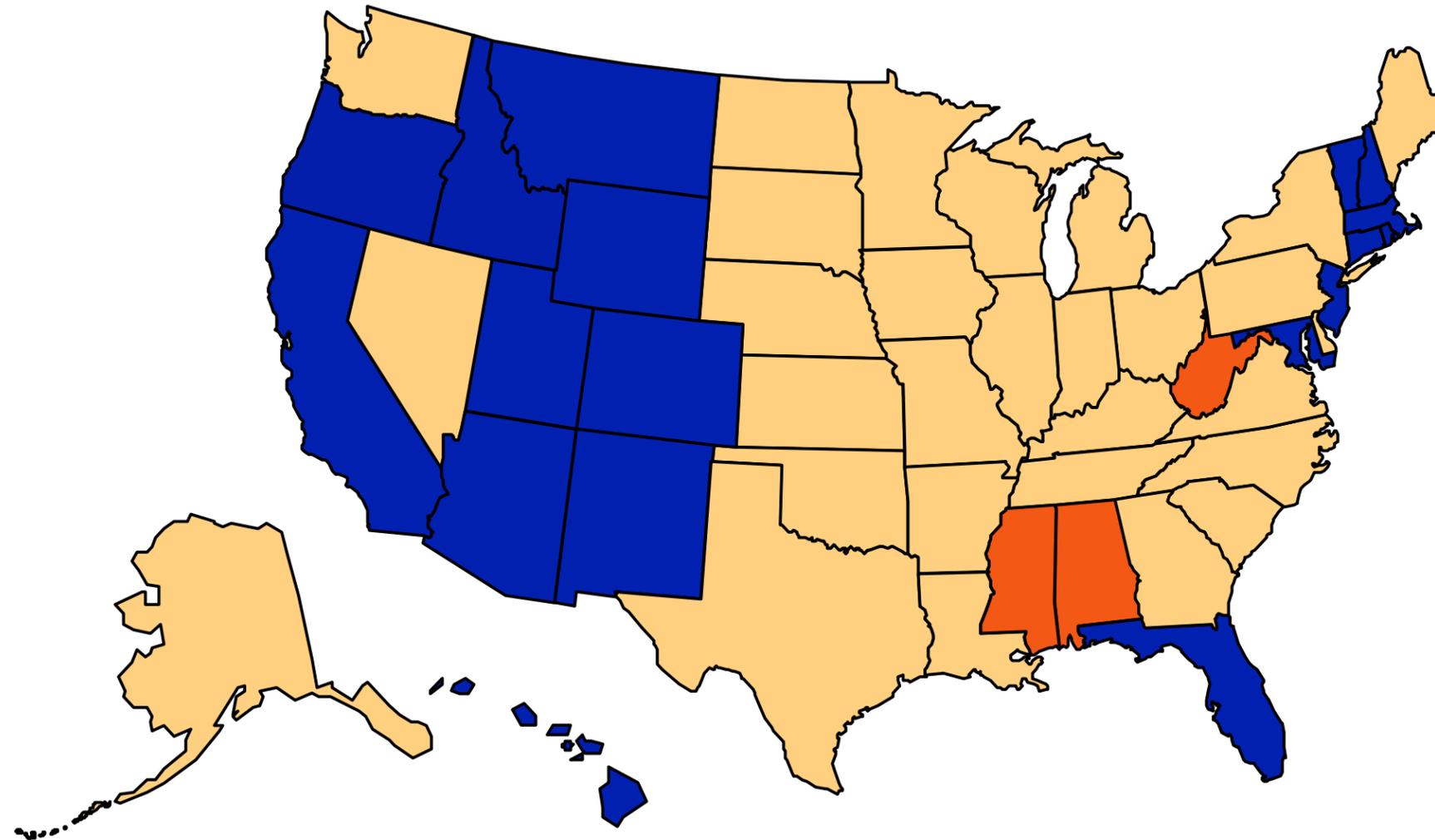
Source: U.S. Centers for Disease Control and Prevention (CDC)



# Obesity Trends\* Among U.S. Adults

## BRFSS, 2002

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



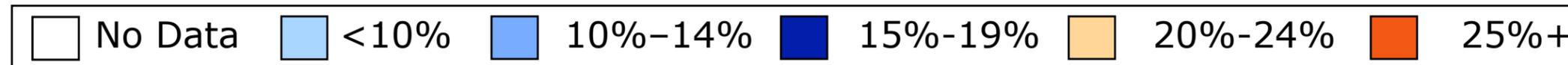
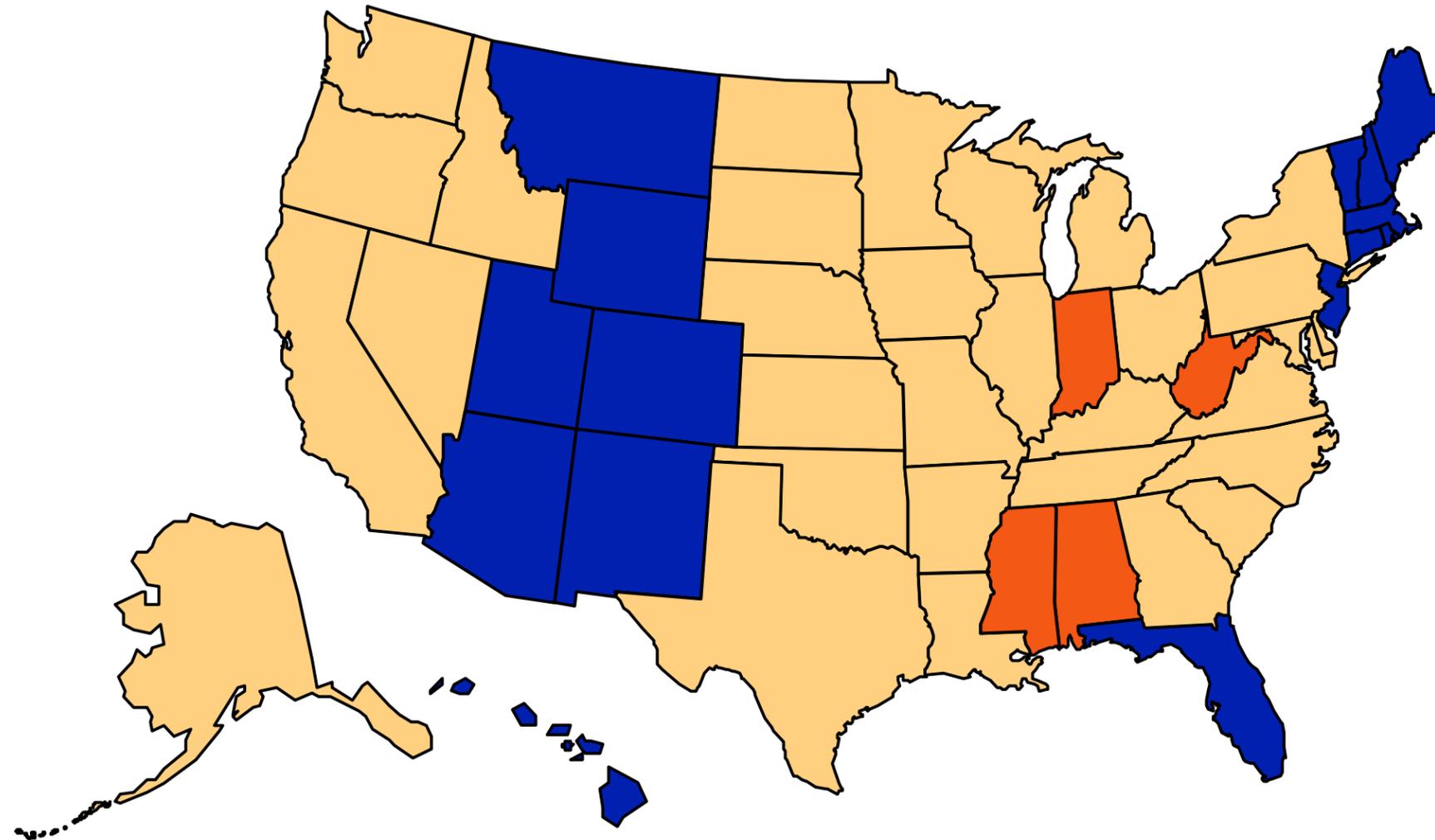
Source: U.S. Centers for Disease Control and Prevention (CDC)

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# Obesity Trends\* Among U.S. Adults

## BRFSS, 2003

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

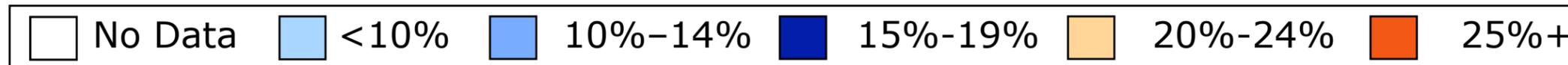
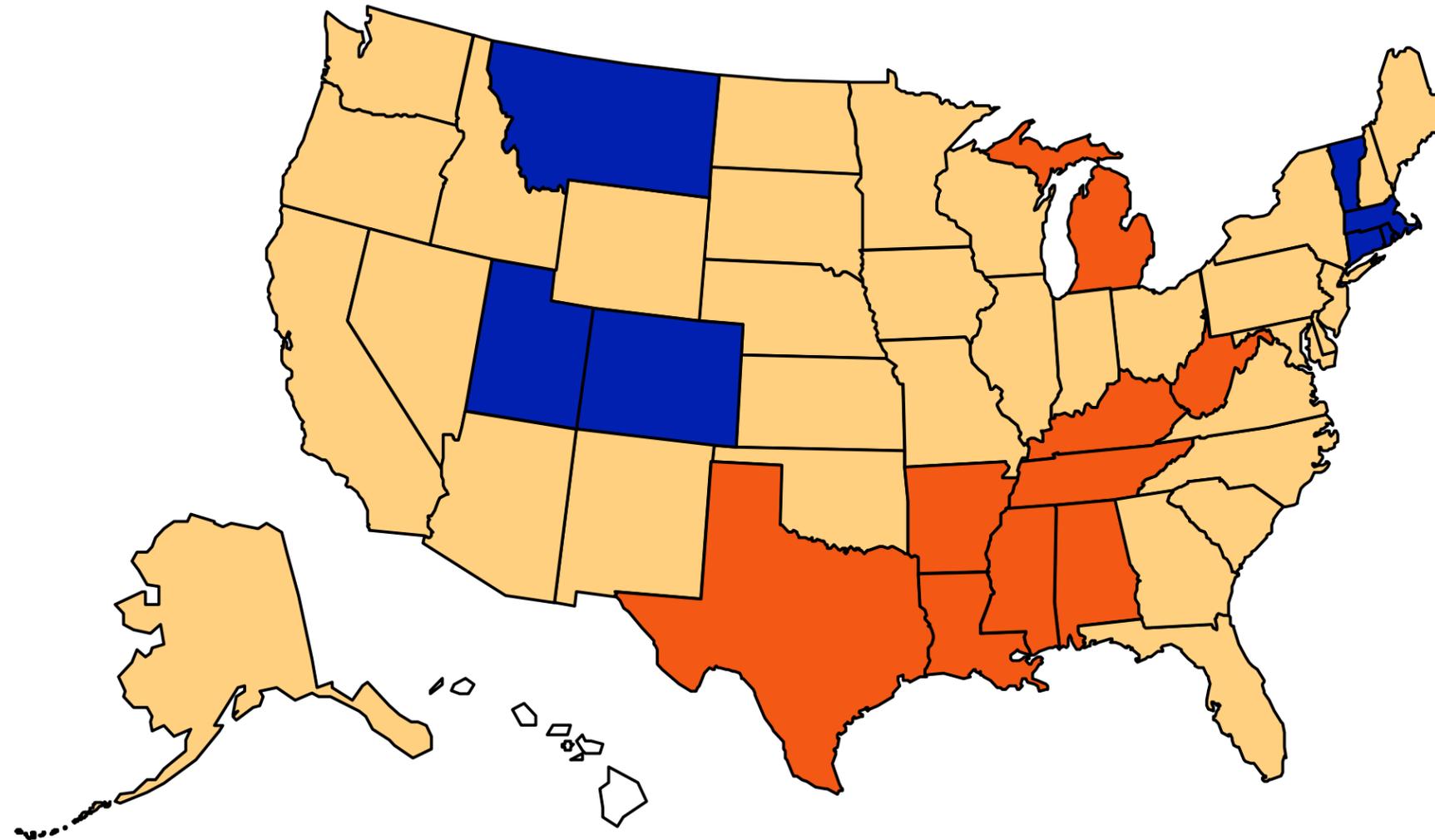


Source: U.S. Centers for Disease Control and Prevention (CDC)

# Obesity Trends\* Among U.S. Adults

## BRFSS, 2004

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



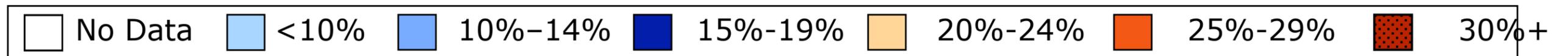
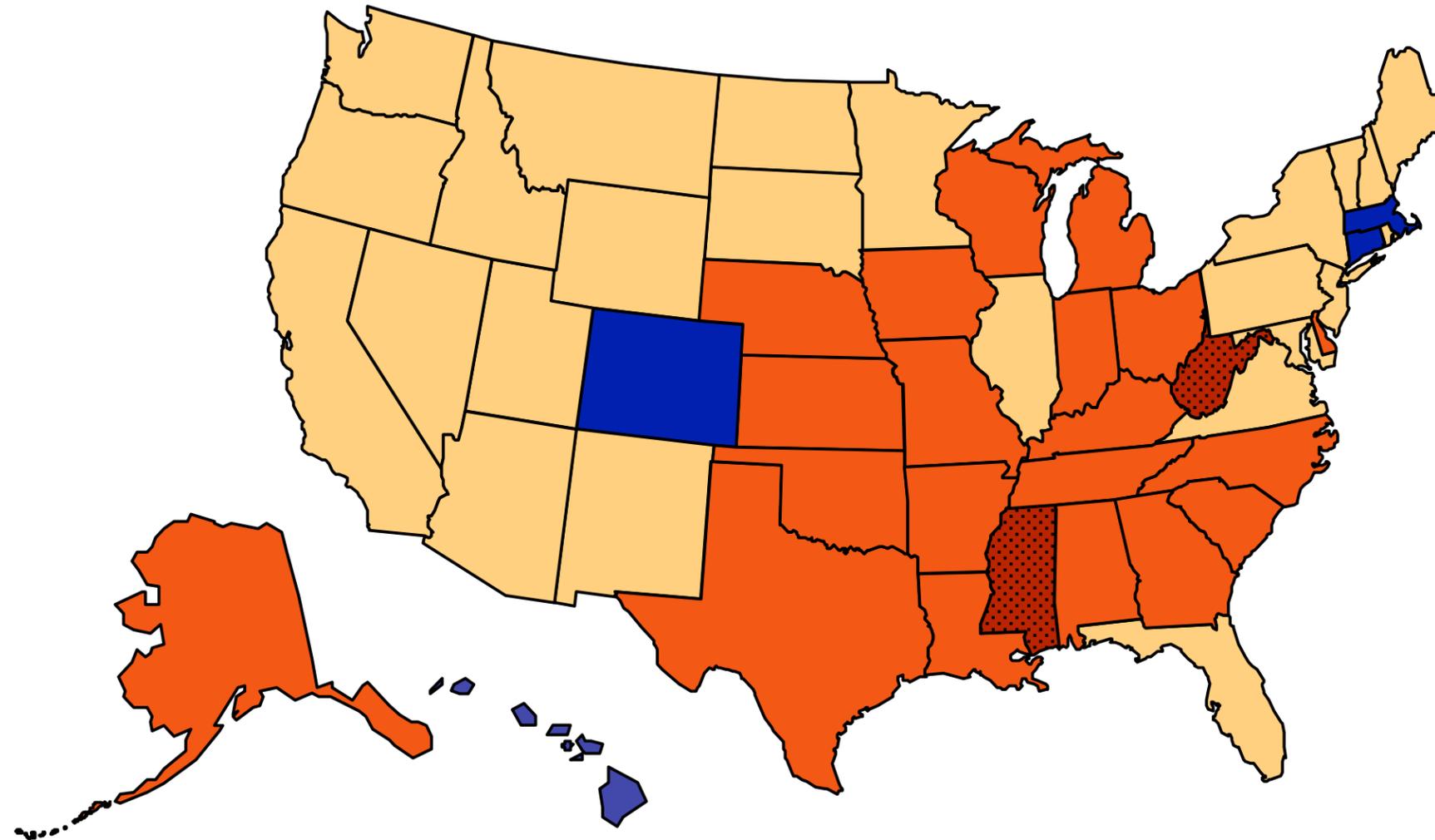
Source: U.S. Centers for Disease Control and Prevention (CDC)



# Obesity Trends\* Among U.S. Adults

## BRFSS, 2006

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



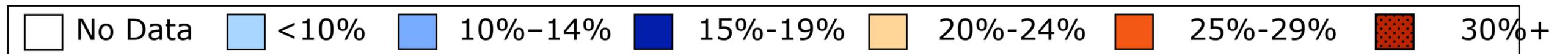
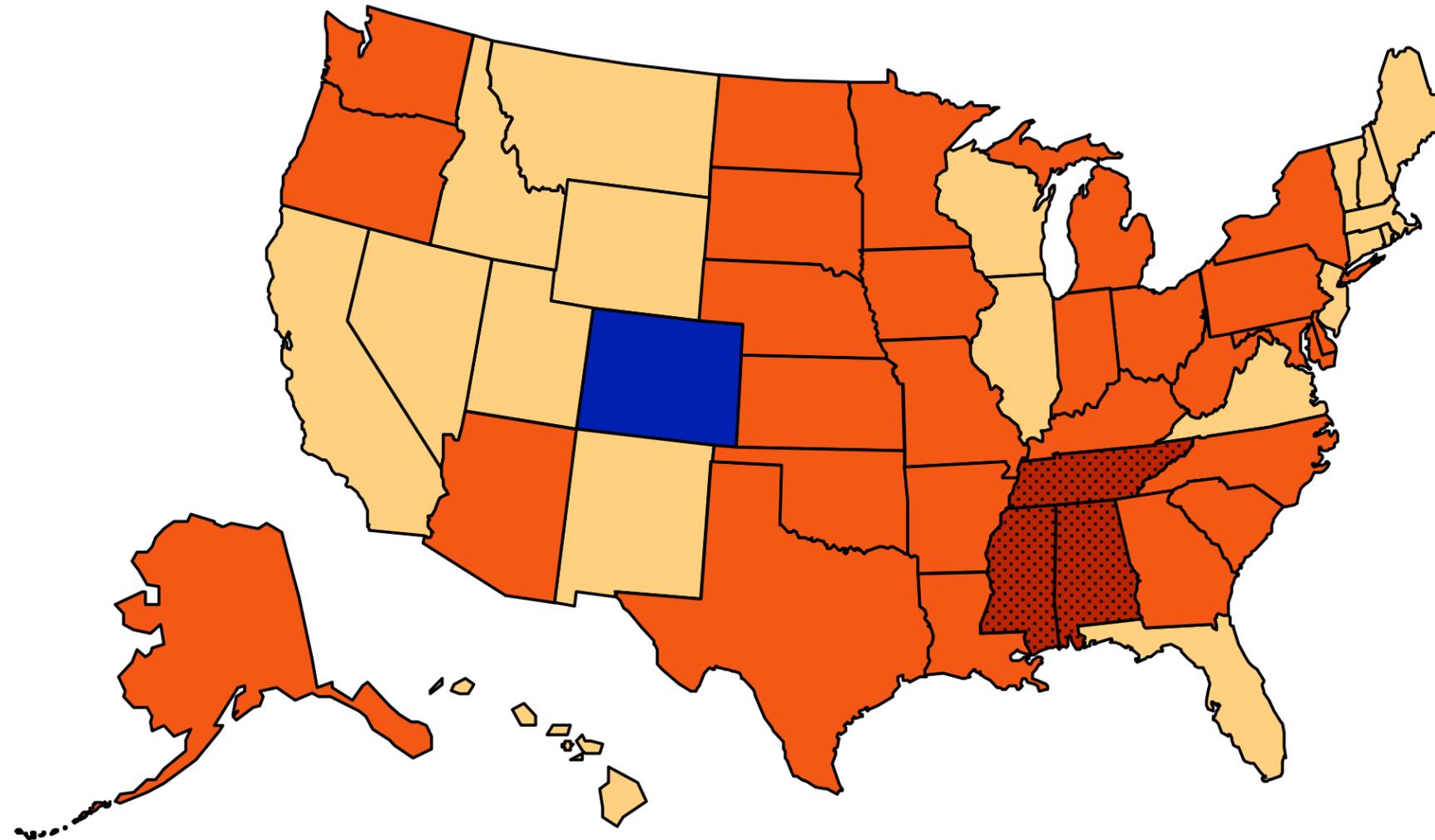
Source: U.S. Centers for Disease Control and Prevention (CDC)

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# Obesity Trends\* Among U.S. Adults

## BRFSS, 2007

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



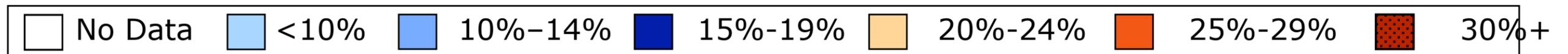
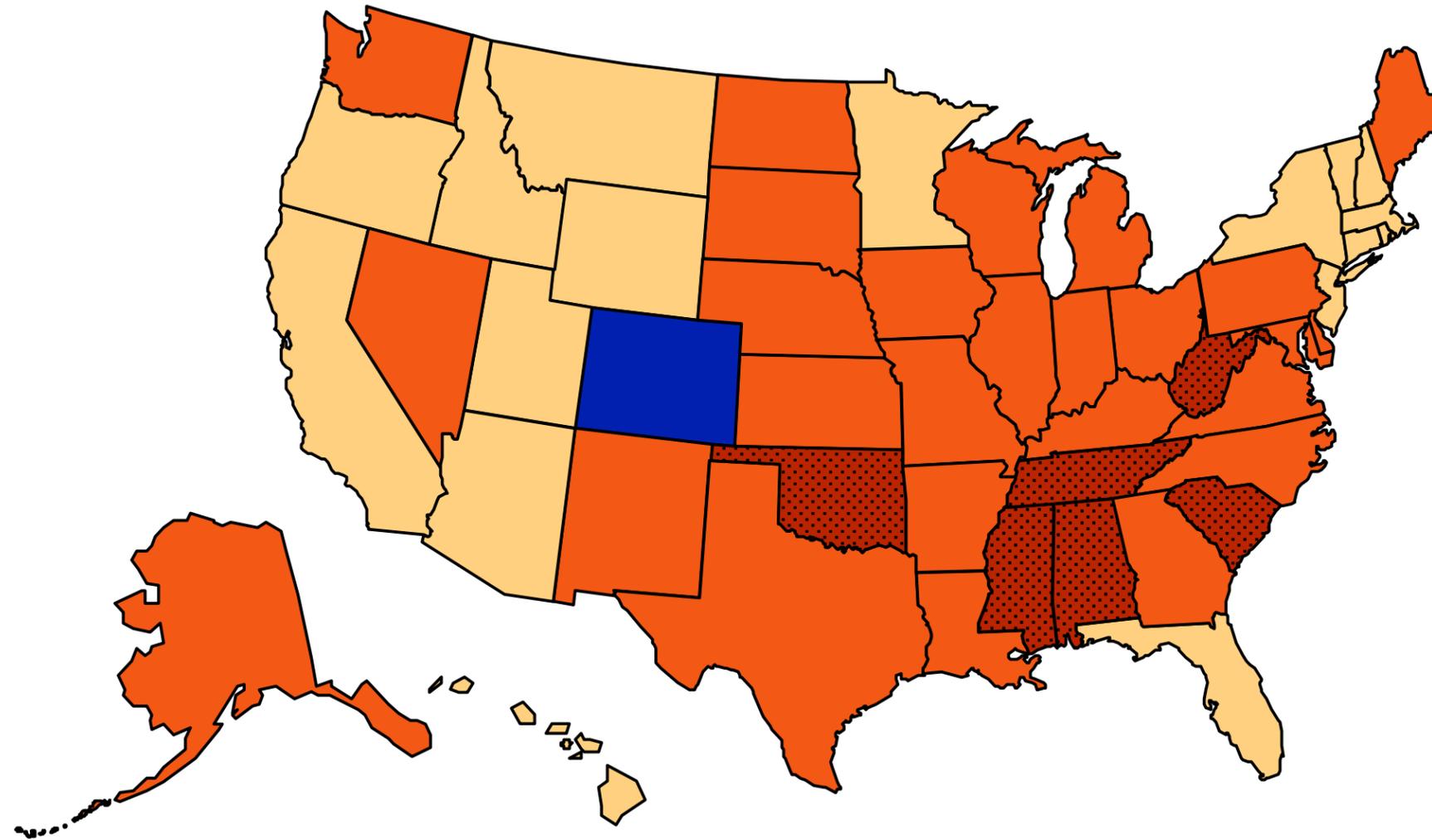
Source: U.S. Centers for Disease Control and Prevention (CDC)

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# Obesity Trends\* Among U.S. Adults

## BRFSS, 2008

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



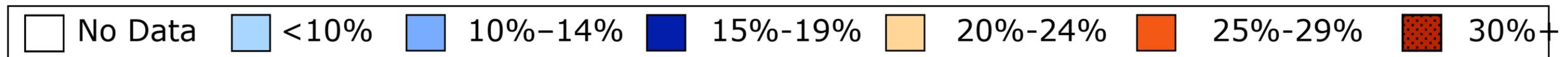
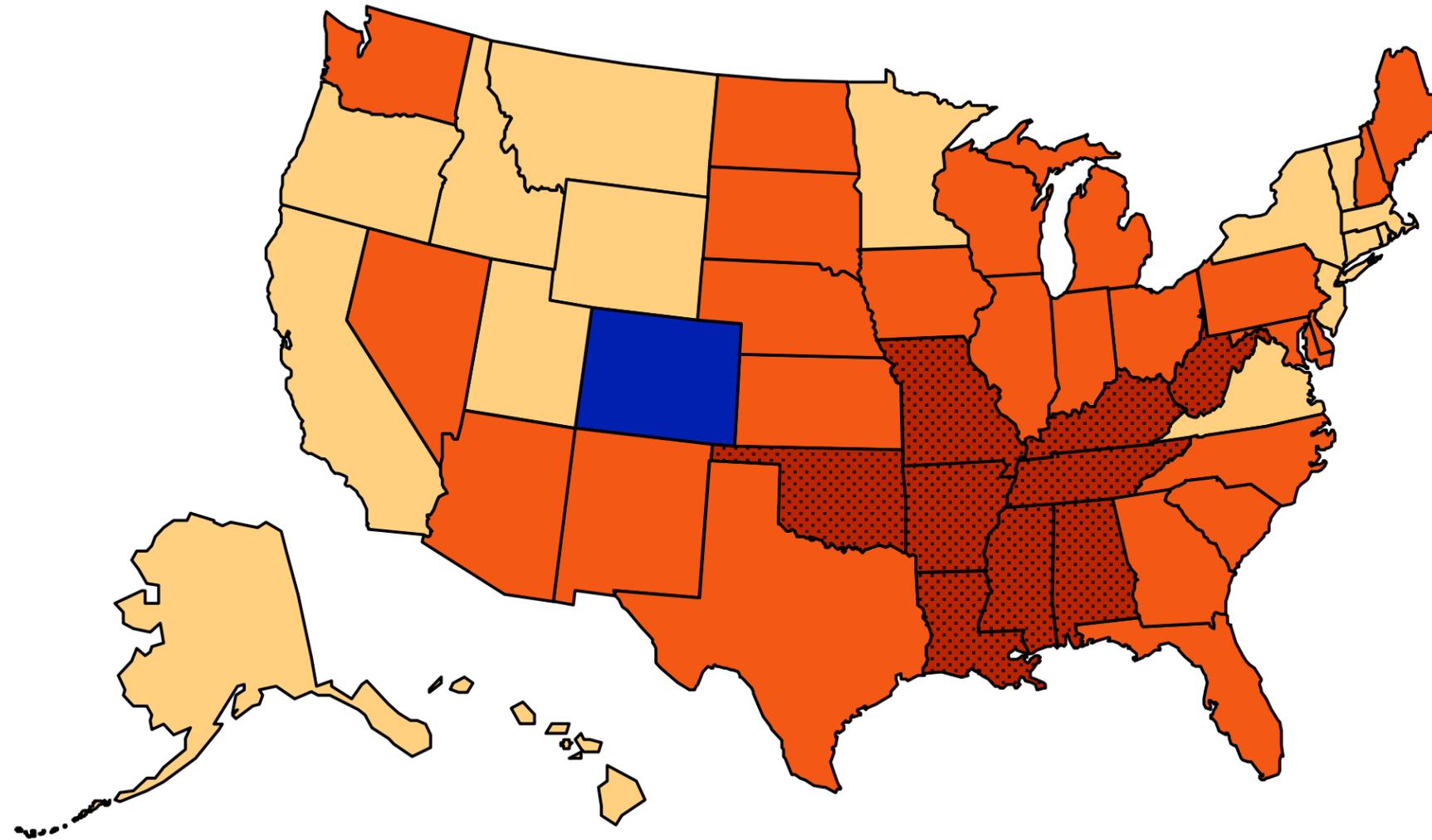
Source: U.S. Centers for Disease Control and Prevention (CDC)

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# Obesity Trends\* Among U.S. Adults

## BRFSS, 2009

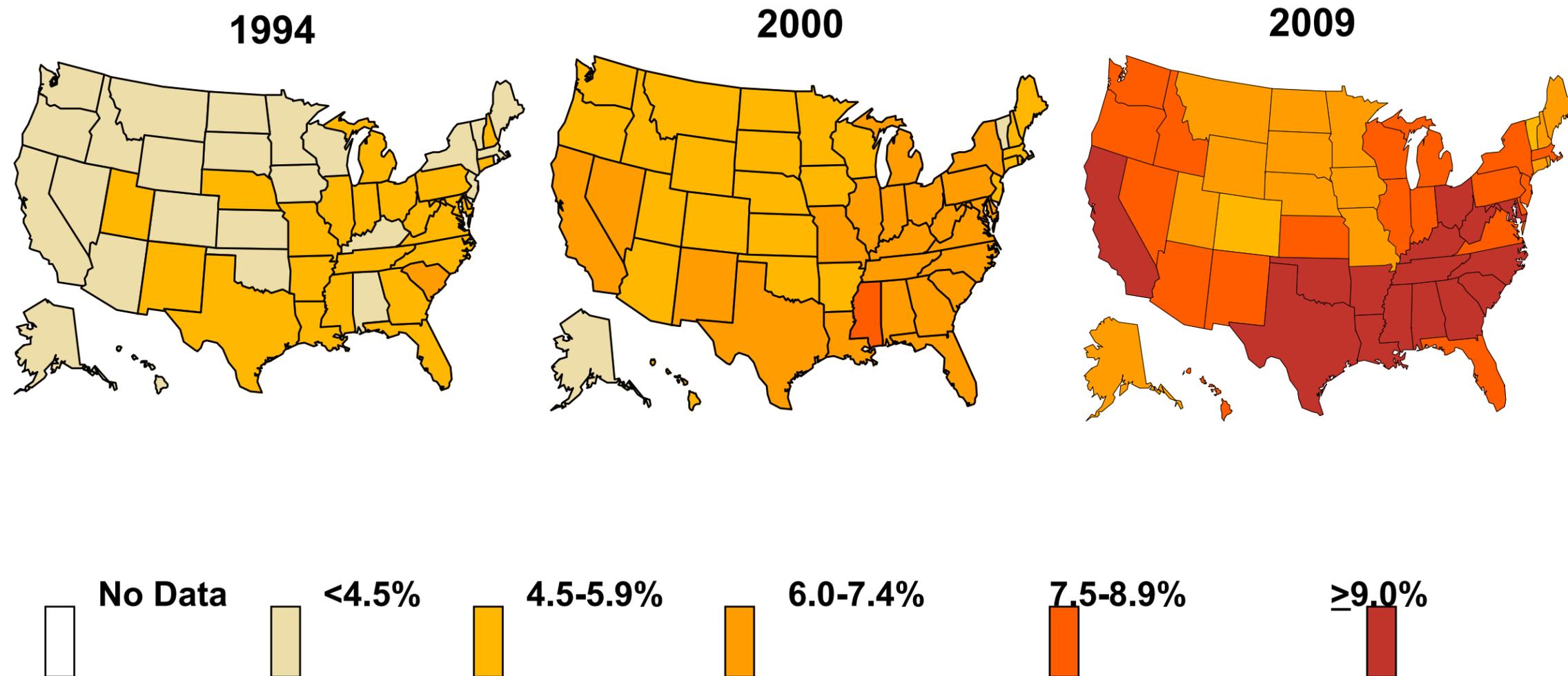
(\*BMI  $\geq 30$ , or  $\sim 30$  lbs overweight for 5' 4" woman)



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

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# Diabetes trends among U.S. adults



Source: CDC's Division of Diabetes Translation. National Diabetes Surveillance System available at <http://www.cdc.gov/diabetes/statistics>

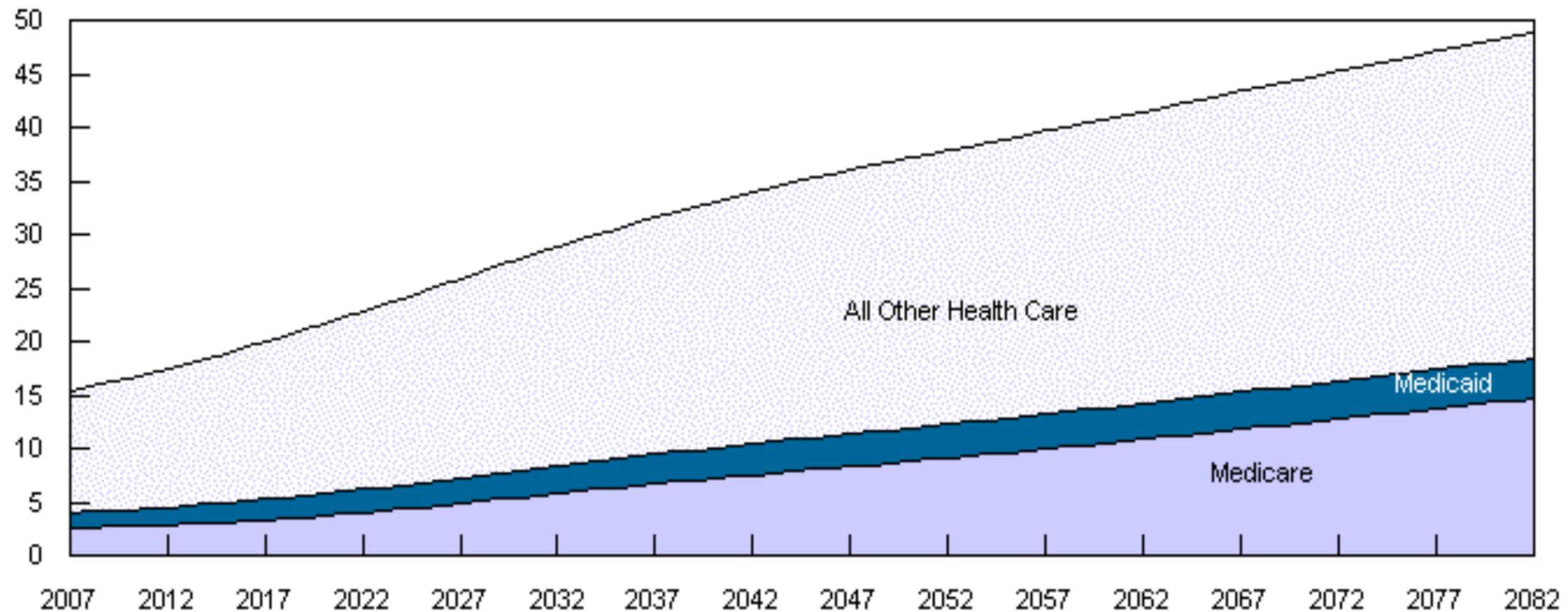
# The costs of obesity

- According to the CDC, the medical costs attributable to obesity in the U.S. are estimated to be **\$147 billion per year**.
- **By 2030**, if obesity trends continue as shown, **86% of adults** will be overweight or obese and total attributable health-care costs will be **\$860-956 billion per year**.
- City of Dallas: medical costs of an obese city employee are up to **6 times** that of a normal weight employee.



# The costs of obesity

## Projected Spending on Health Care as a Percentage of U.S. Gross Domestic Product



Source: Congressional Budget Office

# Risk factors contributing to obesity and chronic disease

Risk Factors must be addressed:

- **Poor diets (food and beverages)**
- **Physical inactivity**
- **TV viewing / Screen time**
- **Not breastfeeding**



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# Physical activity recommendations

- **Recommendations:**
  - Adults: **150 minutes of moderate activity** or **75 minutes of vigorous activity** per week
  - Children: 60+ minutes of physical activity daily
- **Less than half** of US adults meet recommendations



**People have not  
changed – our  
environment has**

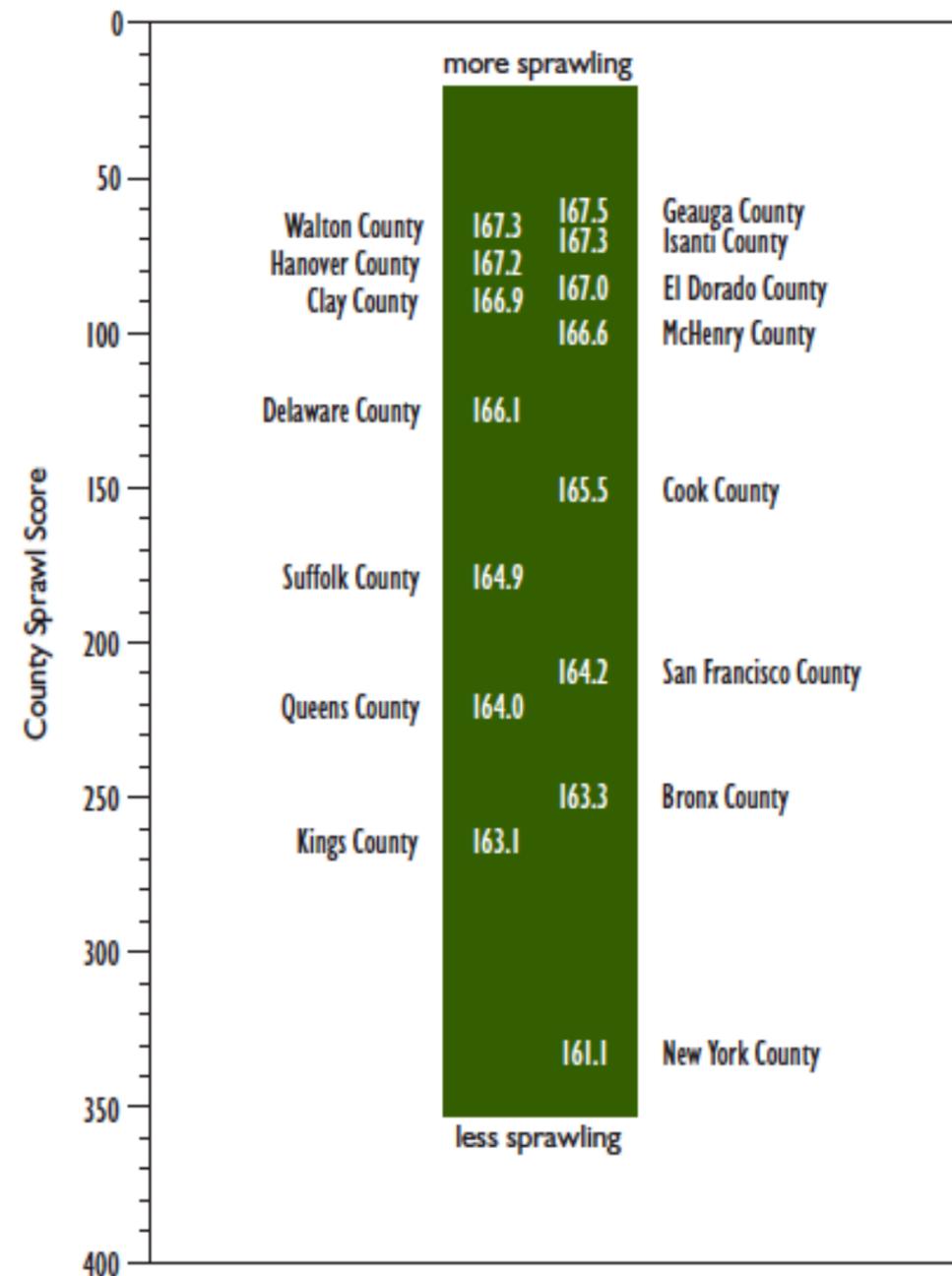


**If you go with the flow, you get overweight or obese**

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# Design and physical activity

FIGURE 1. Sprawl and Weight  
Expected Weight for a 5'7" Adult (lbs.)



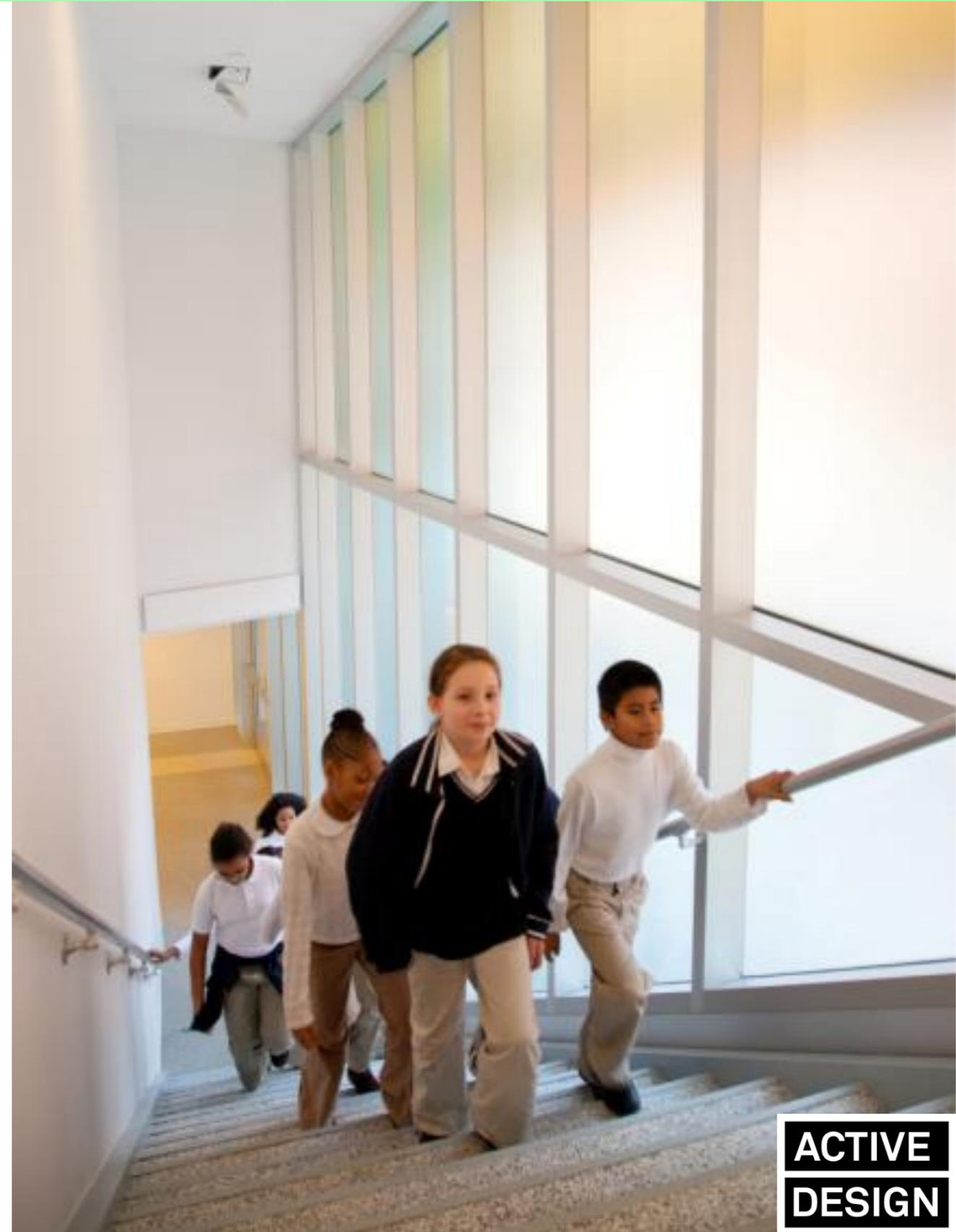
Less walkable,  
compact communities  
associated with higher  
rates of obesity

Source: Measuring the Health  
Impacts of Sprawl (2003)

# Design & physical activity

## Encouraging stair use & active transportation

- Just **2 minutes** (about 6 floors) of stair climbing a day burns enough calories to prevent average U.S. adult annual weight gain
- Men climbing 20-34 flights of stairs per week have a **29% lower risk of stroke.**
- Just **15 minutes of cycling** (2.5 miles) twice a day burns the equivalent of 10 lbs per year.



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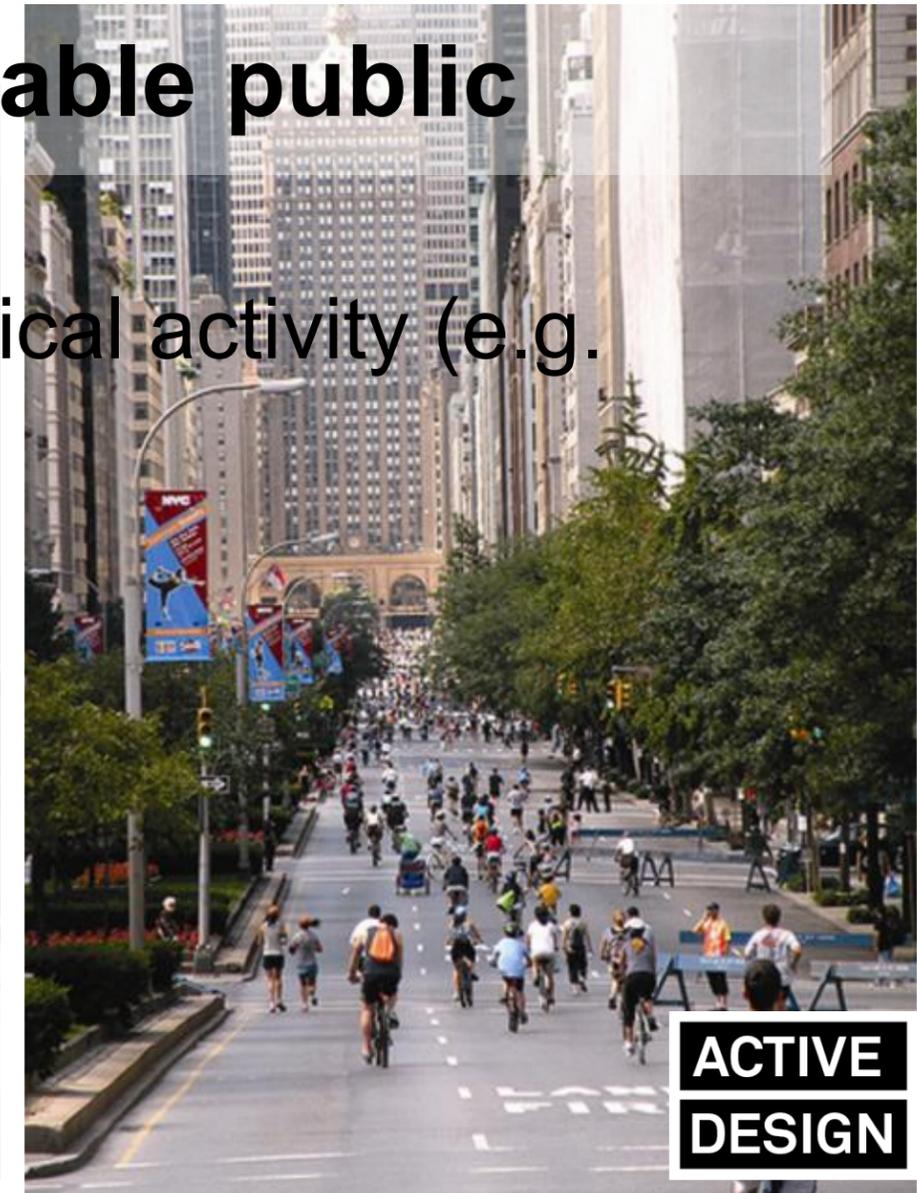
# Design and physical activity

## Creating or improving access to places for physical activity

- Can result in **25% increase** in number of people who exercise at least 3 times per week

## Creating a more enticing and walkable public realm

- Can result in **35-161% increase** in physical activity (e.g. walking)

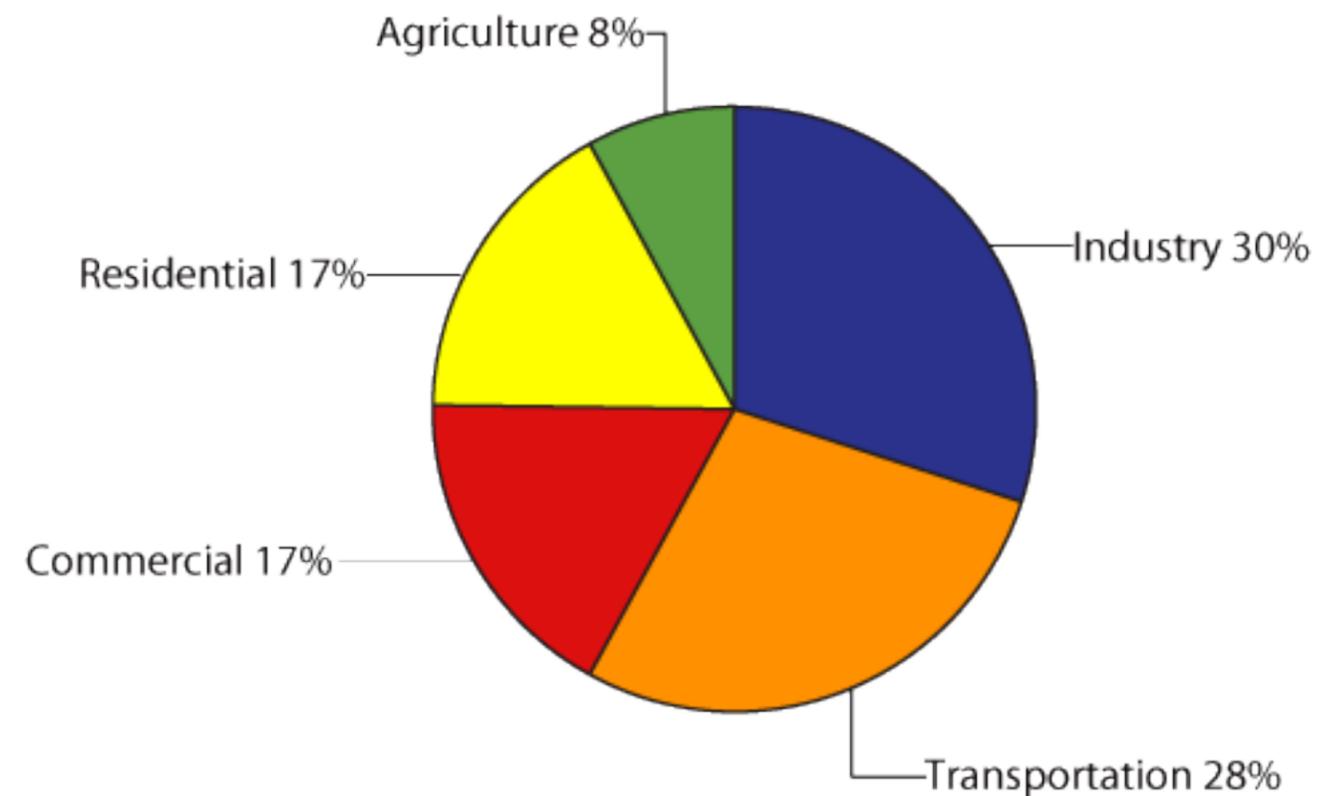


# Co-benefits: Improve the environment

- Transportation is responsible for **70% of U.S. oil consumption** and **28% of greenhouse gas emissions**
- Elevators account for **3-10% of a building's energy use**
- An **escalator running 24/7** can generate **approximately 4 cars worth of CO<sub>2</sub> yearly**

## Greenhouse Gas Emissions by Sector

United States, 2004



Total Emissions\* = 7,074 MMT CO<sub>2</sub>E

\* Net Emissions (Sources + Sinks) = 6,204 MMT CO<sub>2</sub>E

\*\* High GWP Gases include: HFCs, PFCs, and SF<sub>6</sub>

Data expressed in Million Metric Tons of Carbon Dioxide Equivalents (MMT CO<sub>2</sub>E)

Source: US EPA Inventory of Greenhouse Gas Emissions and Sinks, 2006.

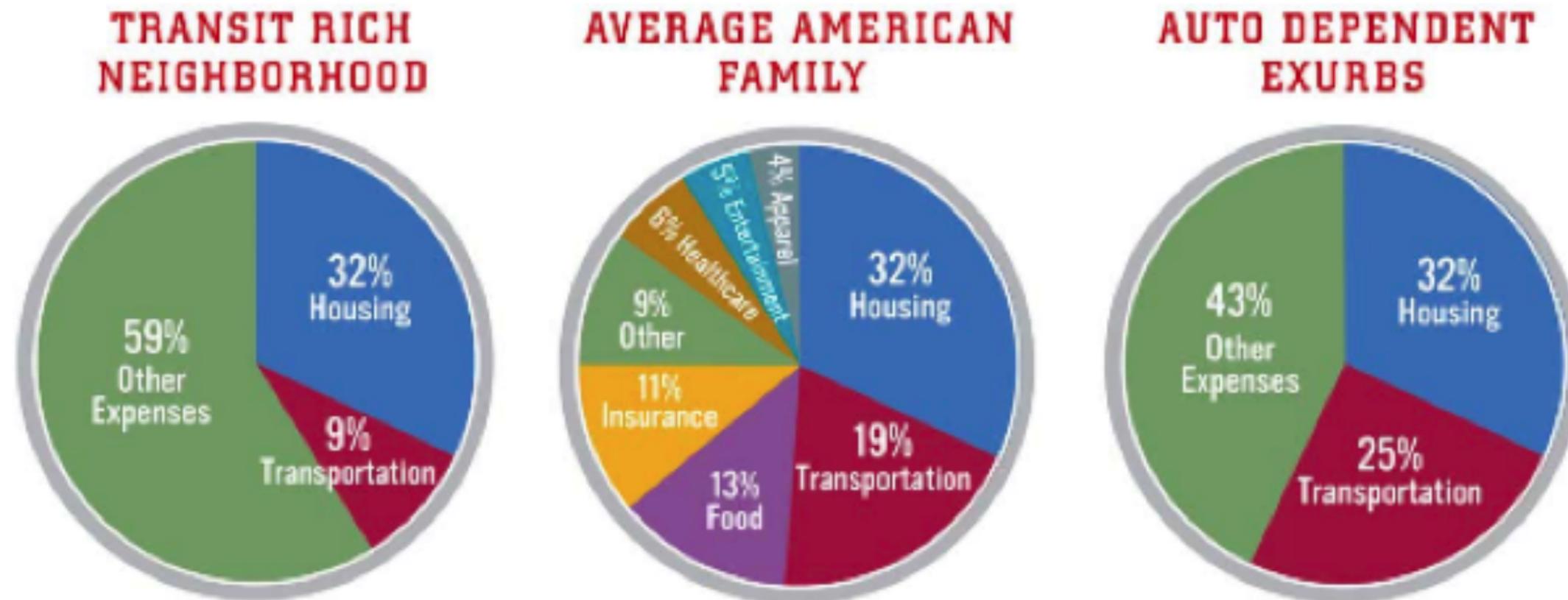
# Co-benefits: Strengthen our economy

## More compact development patterns save money on avoided infrastructure costs

|                         | Water & Sewer Laterals Required | Water & Sewer Costs (billions) | Road Lane Miles Required | Road Land Miles Costs (billions) |
|-------------------------|---------------------------------|--------------------------------|--------------------------|----------------------------------|
| Sprawl Growth Scenario  | 45,866,594                      | \$189.8                        | 2,044,179                | \$927.0                          |
| Compact Growth Scenario | 41,245,294                      | \$177.2                        | 1,855,874                | \$817.3                          |
| <b>Savings</b>          | <b>4,621,303</b>                | <b>\$12.6<br/>(10.1%)</b>      | <b>188,305</b>           | <b>\$109.7<br/>(6.6%)</b>        |

Sprawl Costs: Economic Impacts of Unchecked Development, Robert W. Burchell, Anthony Downs, Barbara McCann and Sahan Mukherji, Island Press, 2005

# Co-benefits: Save people money



People in walkable, transit-rich neighborhoods spend only 9 percent of their monthly income on transportation costs; those in auto-dependent neighborhoods spend 25 percent.

Source: Center for Transit-Oriented Development

# Co-benefits: Create jobs

| Project type  | Road | Bicycle | Pedestrian | Off-street trail | Number of projects | Direct jobs per \$1 million | Indirect jobs per \$1 million | Induced jobs per \$1 million | Total jobs per \$1 million |
|---|------|---------|------------|------------------|--------------------|-----------------------------|-------------------------------|------------------------------|----------------------------|
| Total, all projects   |      |         |            |                  | 58                 | 4.69                        | 2.12                          | 2.15                         | 8.96                       |
| Bicycle infrastructure only   |      | •       |            |                  | 4                  | 6.00                        | 2.40                          | 3.01                         | 11.41                      |
| Off-street multi-use trails   |      |         |            | •                | 9                  | 5.09                        | 2.21                          | 2.27                         | 9.57                       |
| On-street bicycle and pedestrian facilities (without road construction) |      | •       | •          |                  | 2                  | 4.20                        | 2.20                          | 2.02                         | 8.42                       |
| Pedestrian infrastructure only  |      |         | •          |                  | 10                 | 5.18                        | 2.33                          | 2.40                         | 9.91                       |
| Road infrastructure with bicycle and pedestrian facilities              | •    | •       | •          |                  | 13                 | 4.32                        | 2.21                          | 2.00                         | 8.53                       |
| Road infrastructure with pedestrian facilities                          | •    |         | •          |                  | 9                  | 4.58                        | 1.82                          | 2.01                         | 8.42                       |
| Road infrastructure only (no bike or pedestrian components)             | •    |         |            |                  | 11                 | 4.06                        | 1.86                          | 1.83                         | 7.75                       |



Source: Political Economy Research Institute: June 2011

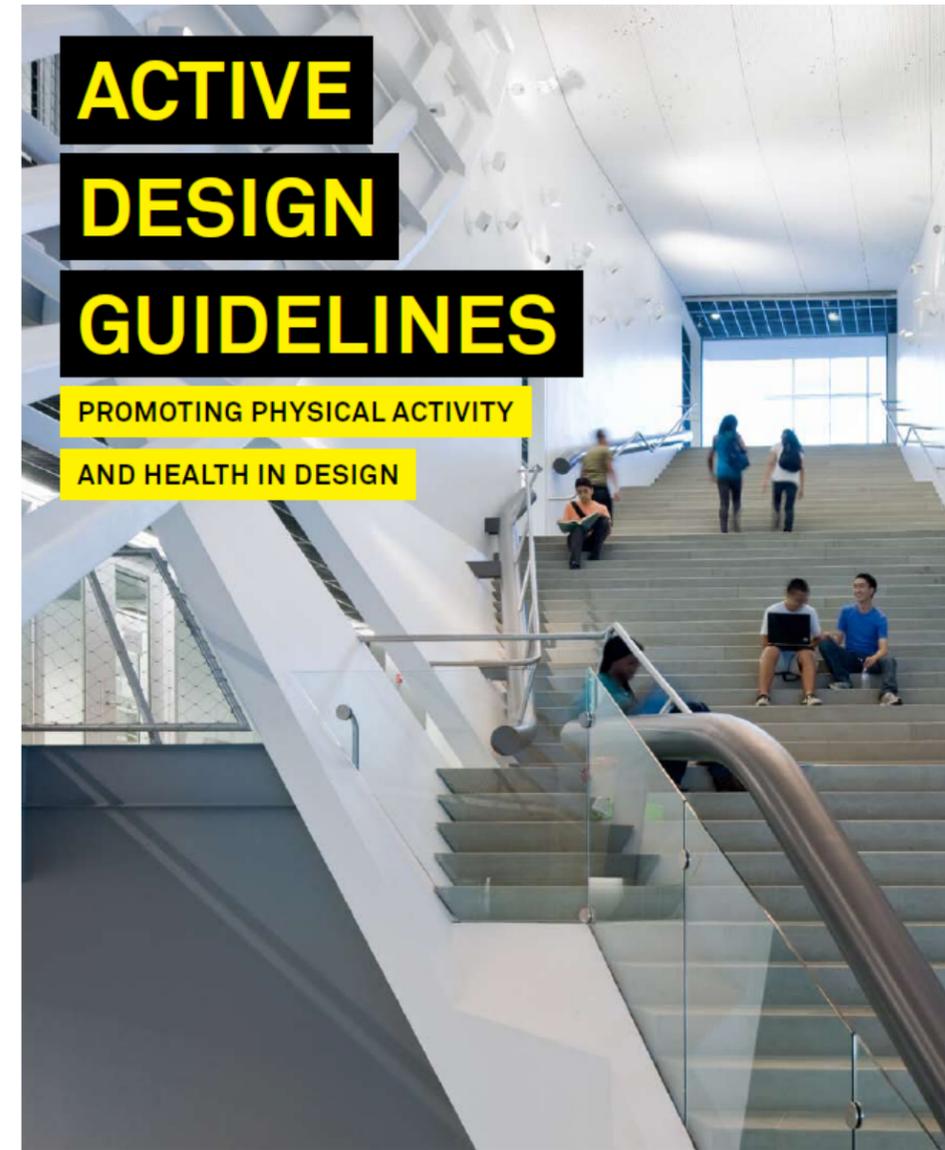
# Co-benefits: Synergizes with accessibility goals

- Creating safer places to walk & for wheelchair travel
- Making elevators more available for those who need them



# Current Active Design Initiatives in New York City

- **Fit City**
- **Active Design Guidelines Development**
- **Active Design Guidelines Implementation**
  - Trainings & Outreach
  - Policy Efforts
    - LEED Physical Activity Innovation Credit
    - City Policies



Download the Guidelines at:  
[www.nyc.gov/adg](http://www.nyc.gov/adg)

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# Current Active Design Initiatives in New York City: Fit City



**Fit-City:**  
Promoting Physical Activity Through Design



**Fit-City 2:**  
Promoting Physical Activity through Design



**Fit-City 3:**  
Promoting Physical Activity Through Design



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# CDC-Funded Health & the Built Environment Partner Communities Effort



Boston MA ~ Cherokee Nation OK ~ Chicago IL ~ Cook County IL ~  
Douglas County NE ~ Jefferson County AL ~ King County WA ~ Louisville KY ~  
Miami-Dade County FL ~ Multnomah County OR ~ Nashville TN ~  
Philadelphia PA ~ Pima County AZ ~ San Diego CA

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# LEED Physical Activity Innovation Credit

## APPENDIX: LEED PHYSICAL ACTIVITY INNOVATION CREDIT

The chart below details the requirements set forth in a LEED innovation credit entitled "Design for Health through Increased Physical Activity," developed by New York City and approved by the USBGC in 2009. The recommended strategies are based on current evidence and research. Included in the chart below are references to the scientific research underlying each strategy.

### Prerequisite Element—Required

| ITEM | DESIGN CASE                            | MEASUREMENT / DOCUMENTATION METHOD  | BASE CASE— GENERAL CODE MINIMUM |   |
|------|--|---|---------------------------------|---|
| 1    | Minimum accessible floors <sup>1</sup> | Occupants are granted access between the stairs and their own floor as well as other common use floors. | Door hardware schedule          | In commercial buildings, stair access doors may be locked on the stair side, except at intervals of four stories or less. |

### Credits— 17 of 24 Required

#### Design for Increased Stair Use

##### STAIR DOOR OPERATION

|   |   |  |                        |  |
|---|---|--|------------------------|--|
| 1 | Locking operation <sup>1</sup>                      | Universal stair access shall be granted to and from all floors, with no limits on reentry.   | Door schedule          | In commercial buildings, stair access doors may be locked on the stair side except at intervals of four stories or less. |
| 2 | Transparency from corridor (material) <sup>2</sup>  | Majority of stair entry doors to be clear glass (fire-rated as required by code), allowing stairs to be visible from building corridors.           | Door schedule          | Not required   |
| 3 | Transparency from corridor (operation) <sup>2</sup> | Stair entry doors to be held open by magnetic catches (released through fire alarm system), allowing stairs to be visible from building corridors. | Door hardware schedule | Not required   |

##### STAIR LOCATION

|   |  |   |  |                             |
|---|--|---|--|-----------------------------|
| 4 | Visibility <sup>2,3</sup>                                | Position at least one stair to be visible from the building's main lobby. A maximum of 25 feet travel and no turns should be required to reach stairs from the building's main entry. | Plan drawing highlighting lobby and stair            | Exact location not mandated |
| 5 | Location with respect to elevators—priority <sup>2</sup> | Position at least one stair before access to elevators from the main building lobby, along the principal path of travel.  | Plan drawing highlighting lobby, stair, and elevator | Exact location not mandated |
| 6 | Location with respect to                                 | Position at least one stair within the  | Plan drawing highlighting                            | Exact location not mandated |

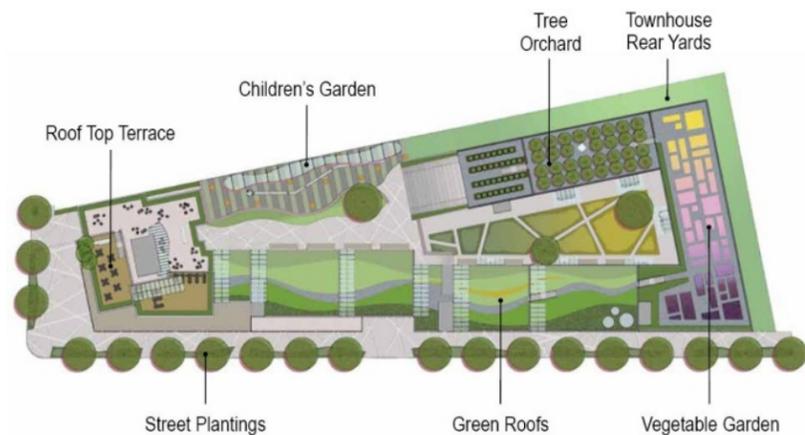
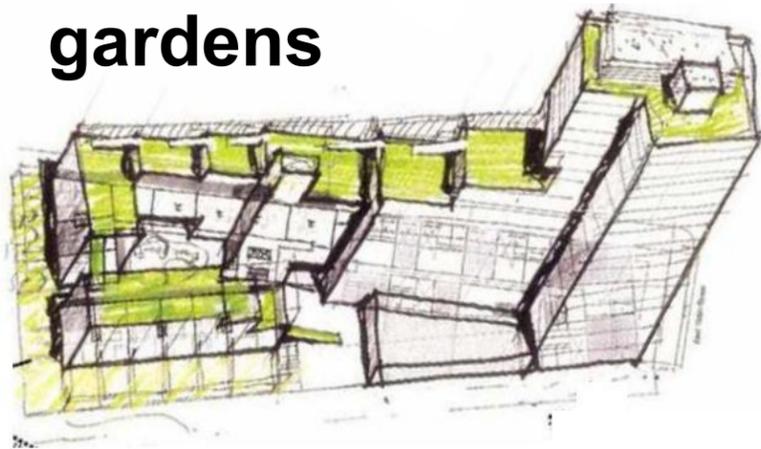


[www.nyc.gov/adg](http://www.nyc.gov/adg)

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# LEED and Active Design: Affordable Housing Project

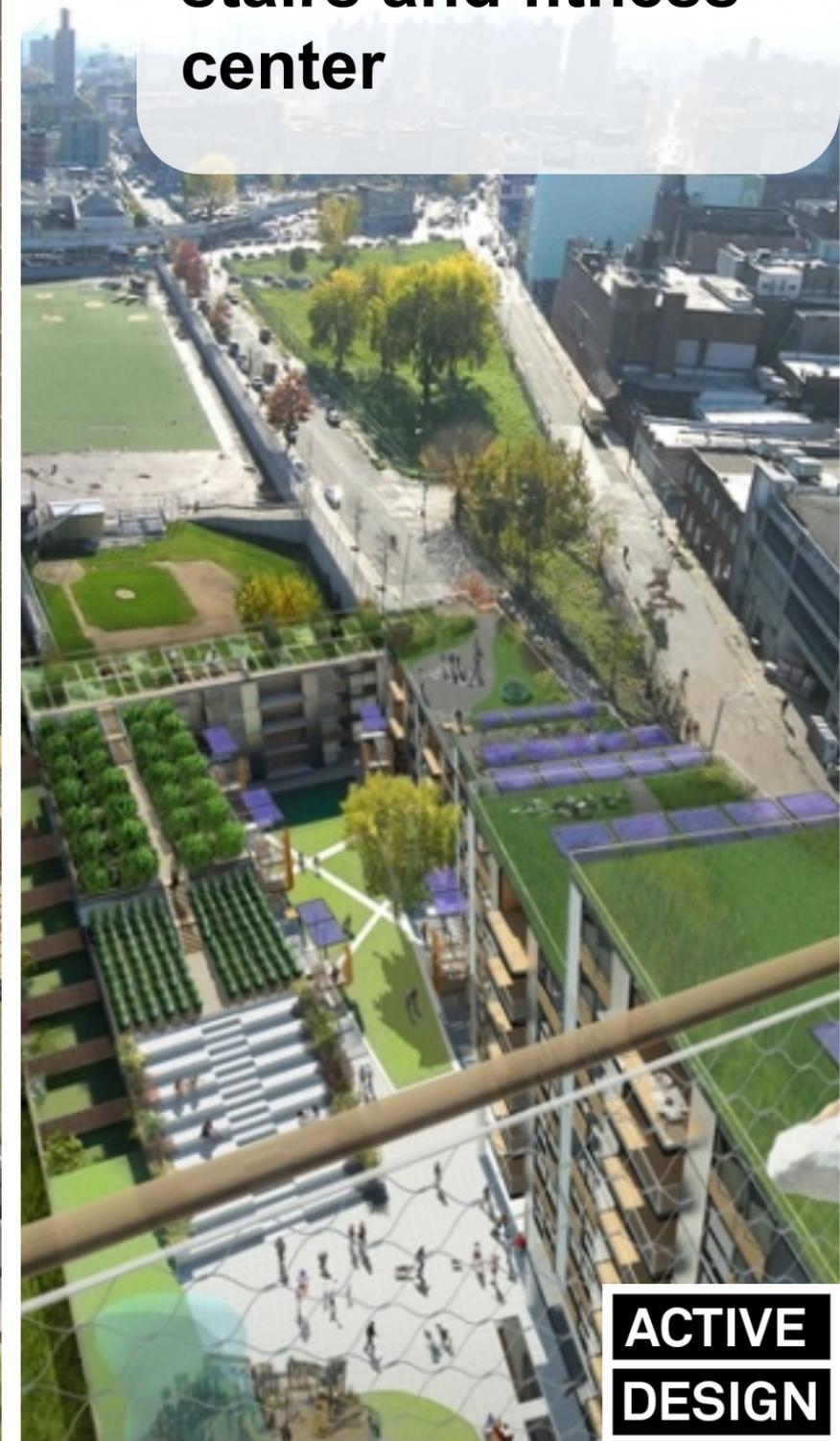
Programmed outdoor spaces including **community roof gardens**



18-story tower will **harvest rainwater** for growing food



Will include prominent **stairs and fitness center**



**ACTIVE  
DESIGN**

# Current Active Design Initiatives in New York City

- **Fit City**

- **Active Design Guidelines Development**

- **Active Design Guidelines Implementation**

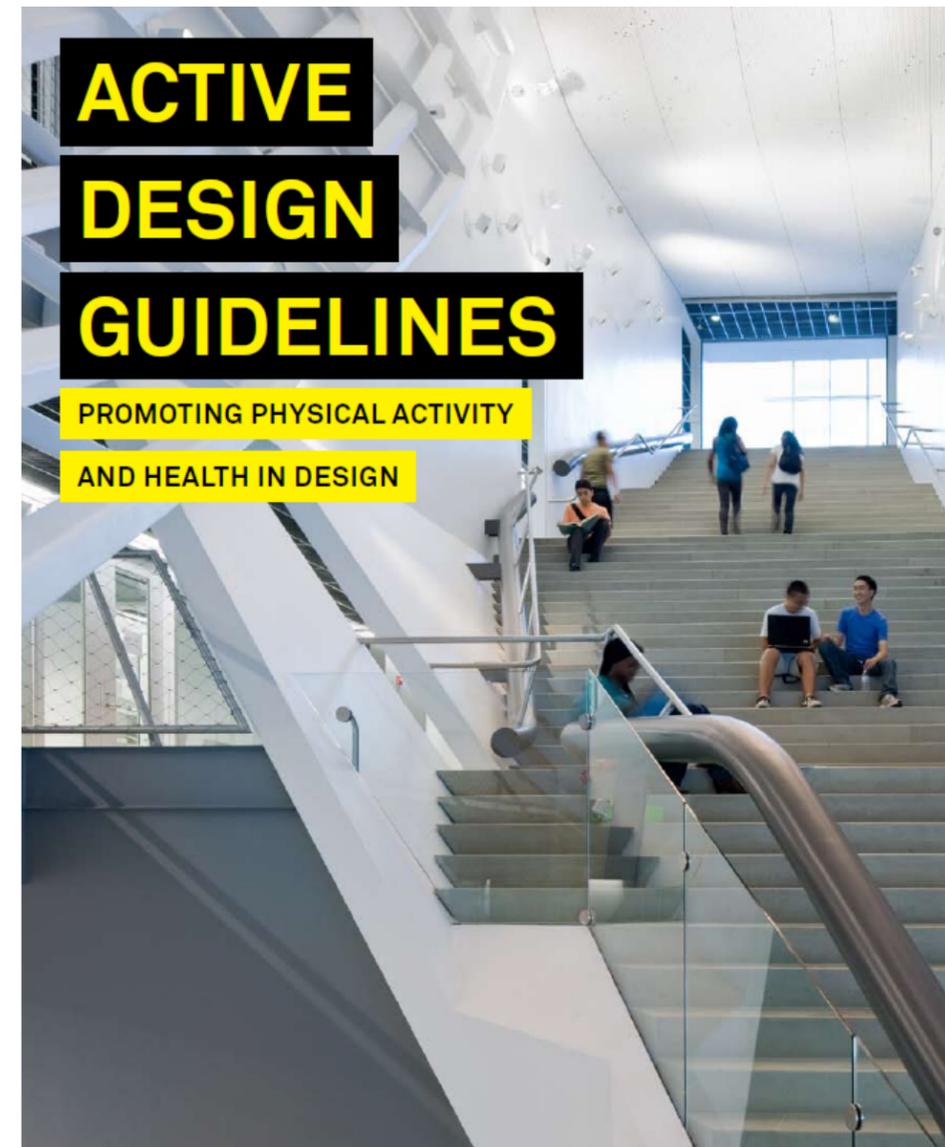
- Trainings & Outreach

- Policy Efforts

- LEED Physical Activity Innovation Credit

- City Policies

- City Policies



**Download the Guidelines at:**  
[www.nyc.gov/adg](http://www.nyc.gov/adg)

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