The Key Roles of Community & Building Environments in Protecting and Promoting Health

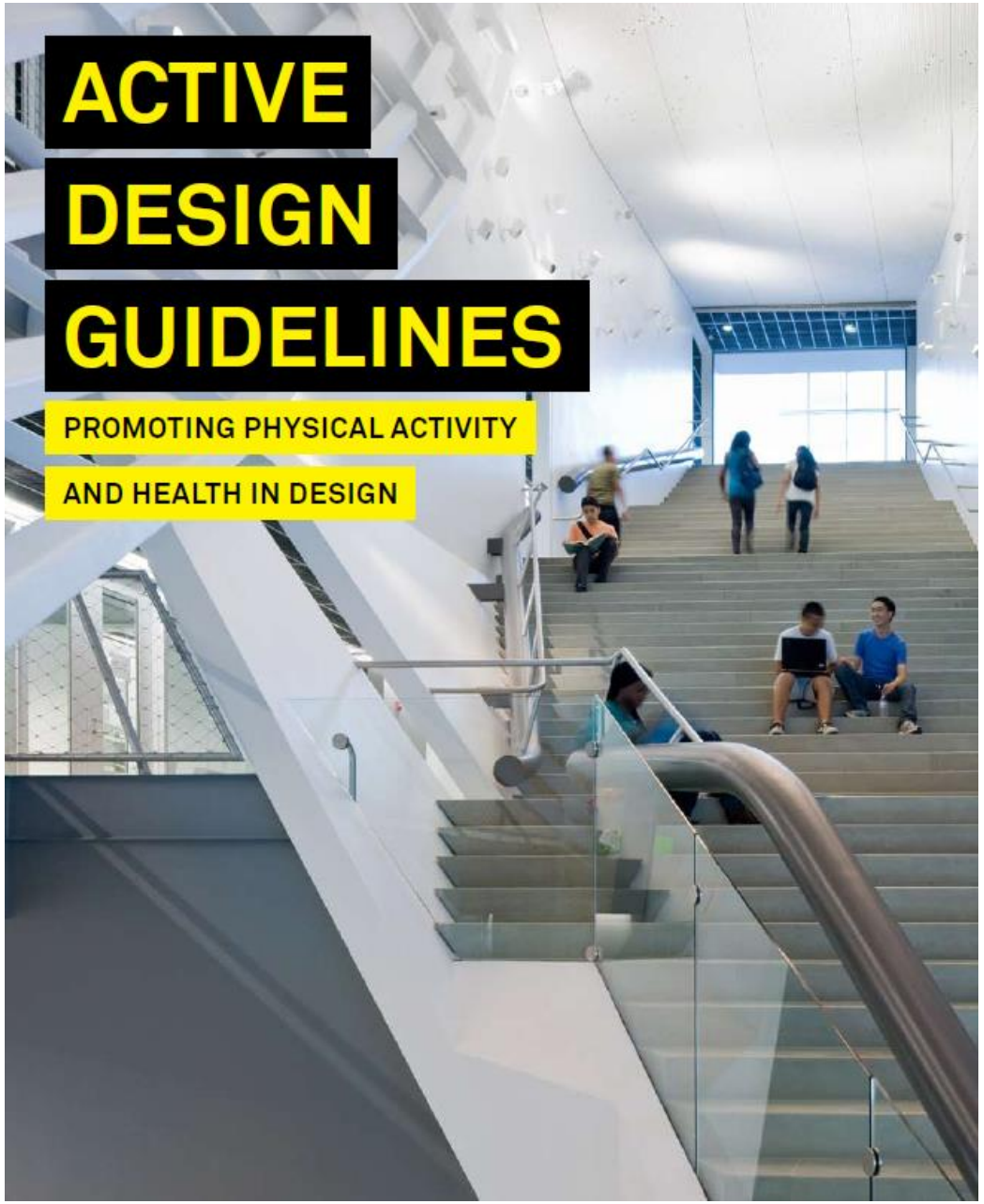
Karen K. Lee, MD, MHSc

HEALTHY CANADA by design

CLASP
COALITIONS LINKING ACTION & SCIENCE FOR PREVENTION

An initiative of:

CANADIAN PARTNERSHIP AGAINST CANCER
PARTENARIAT CANADIEN CONTRE LE CANCER



THE 19th CENTURY:

Infectious Diseases

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

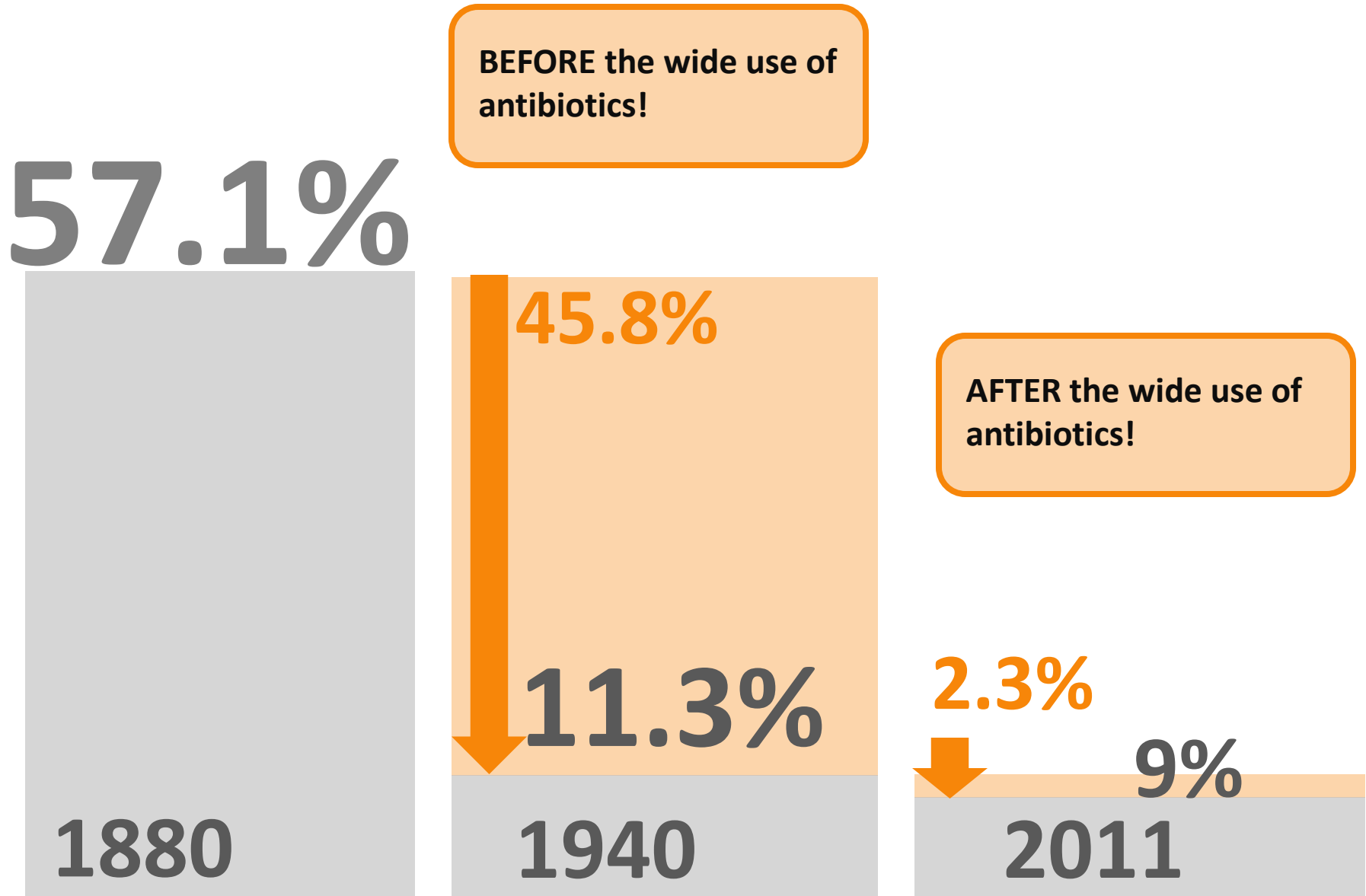
THE 21st CENTURY:

Chronic Diseases,
many of which are
"Diseases of Energy"

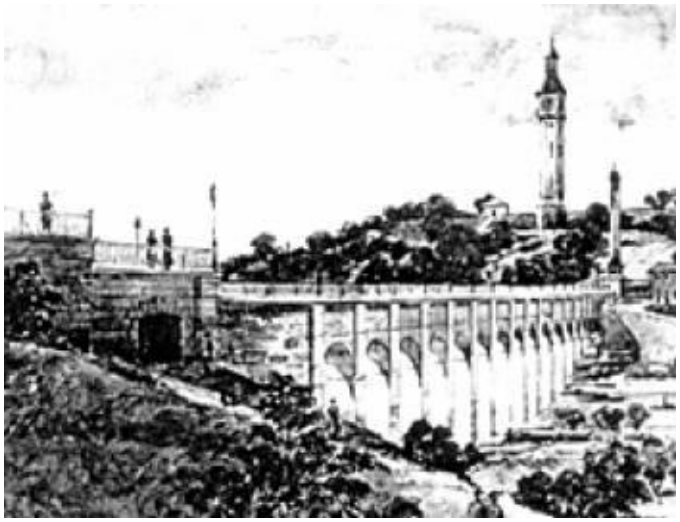
The emerging design solutions for health parallel sustainable design solutions

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

Infectious disease successes



Successes through infrastructure interventions



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 epidemics of today are:

CHRONIC DISEASES

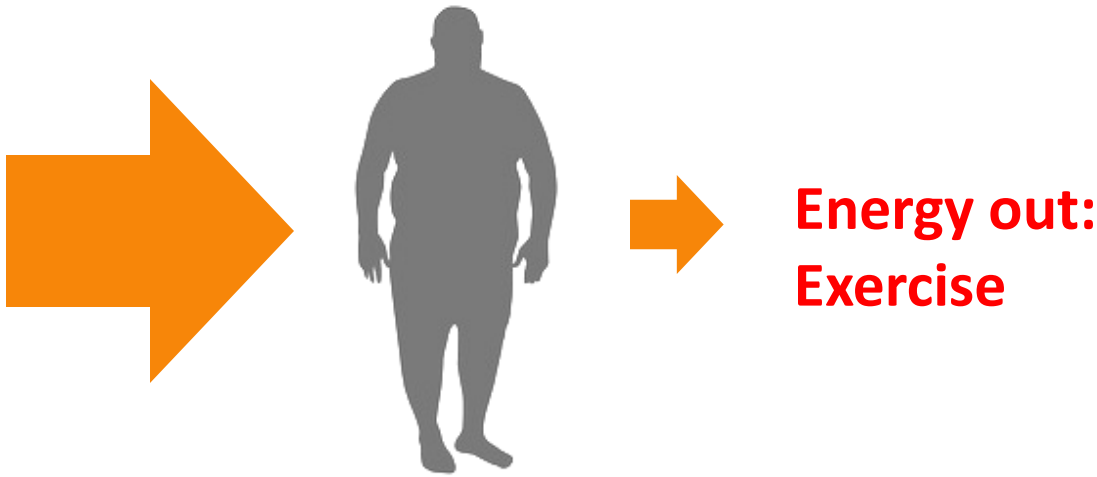
(obesity, diabetes, heart disease & strokes, cancers)

Chronic Diseases - #1 cause of death globally (36 million deaths/y).

Leading Risk Factors accounting for 80% of deaths_ (WHO 2011):

- Tobacco
- **Physical Inactivity**
- **Unhealthy Diets**
- Harmful Use of Alcohol

Energy in: Food

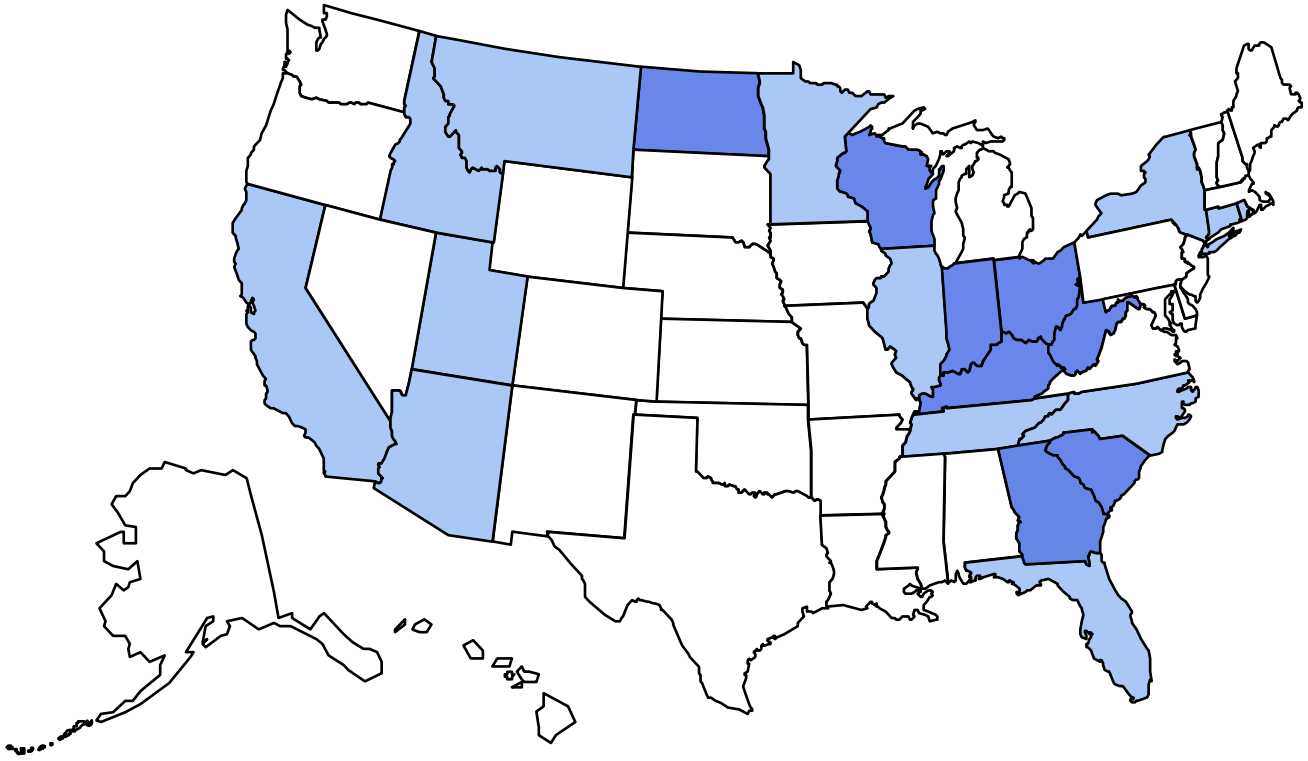


Energy out: Exercise

Obesity Trends* Among U.S. Adults

BRFSS, 1985

(*BMI ≥30, or ~ 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

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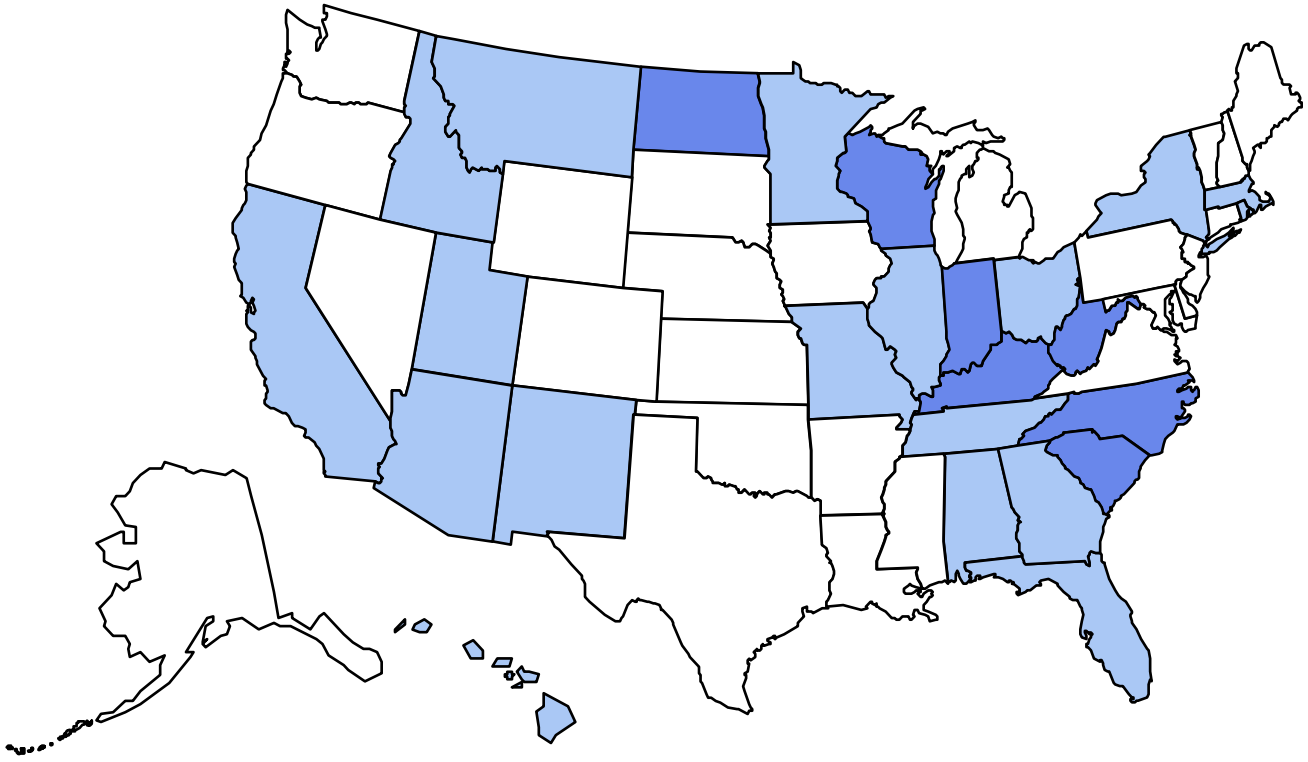

Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 1987

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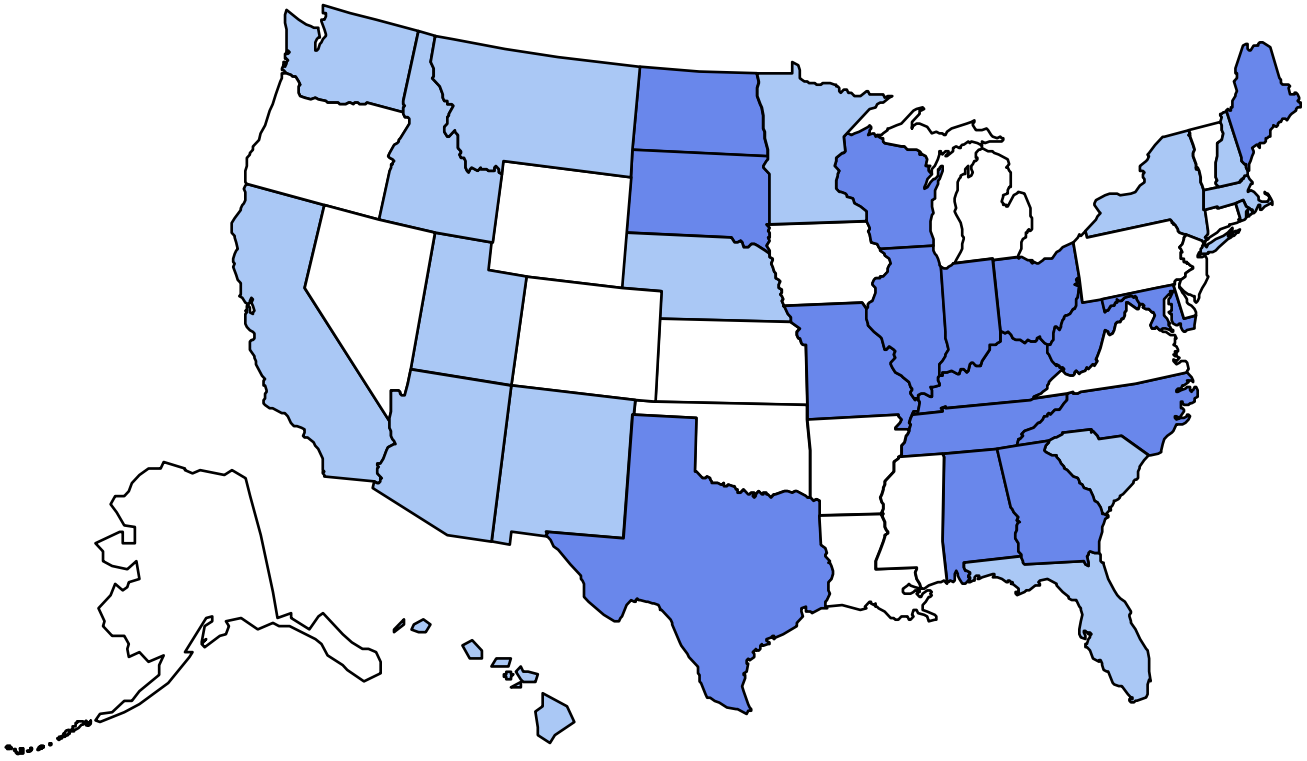

Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 1988

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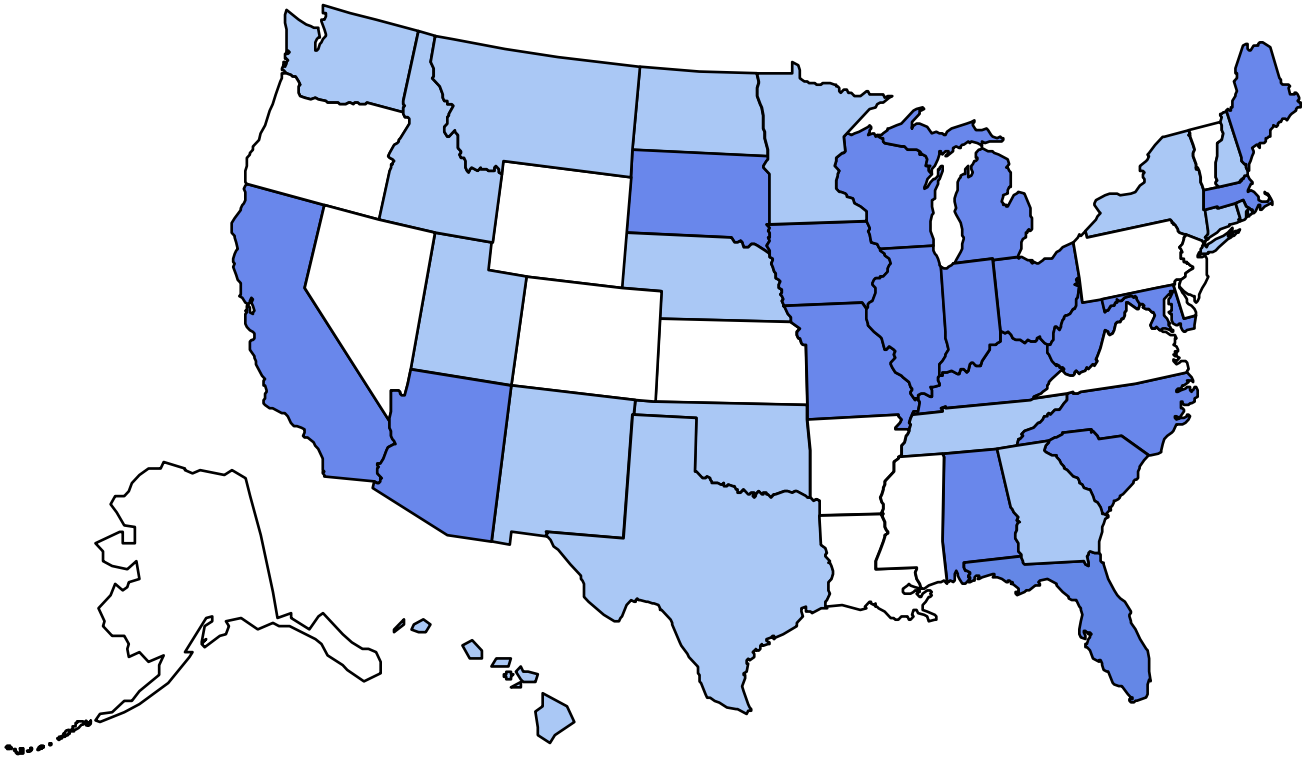

Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 1989

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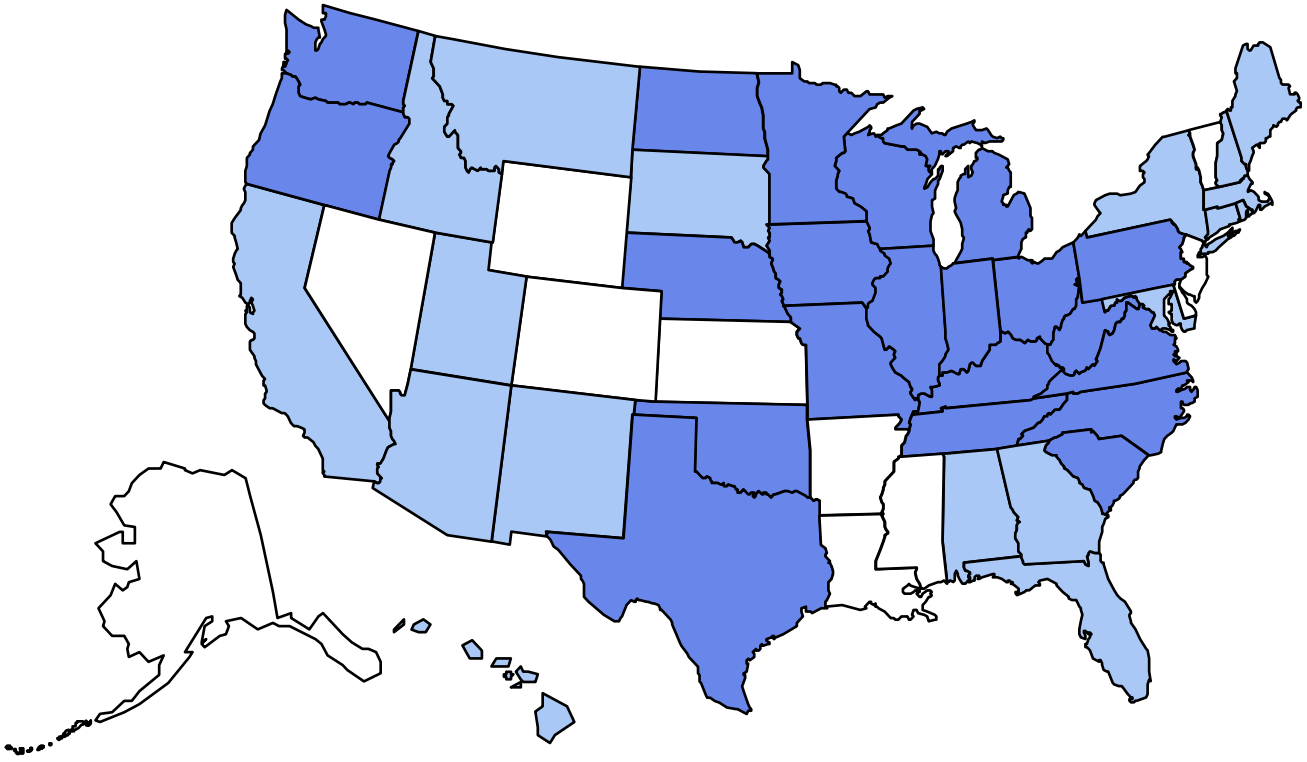

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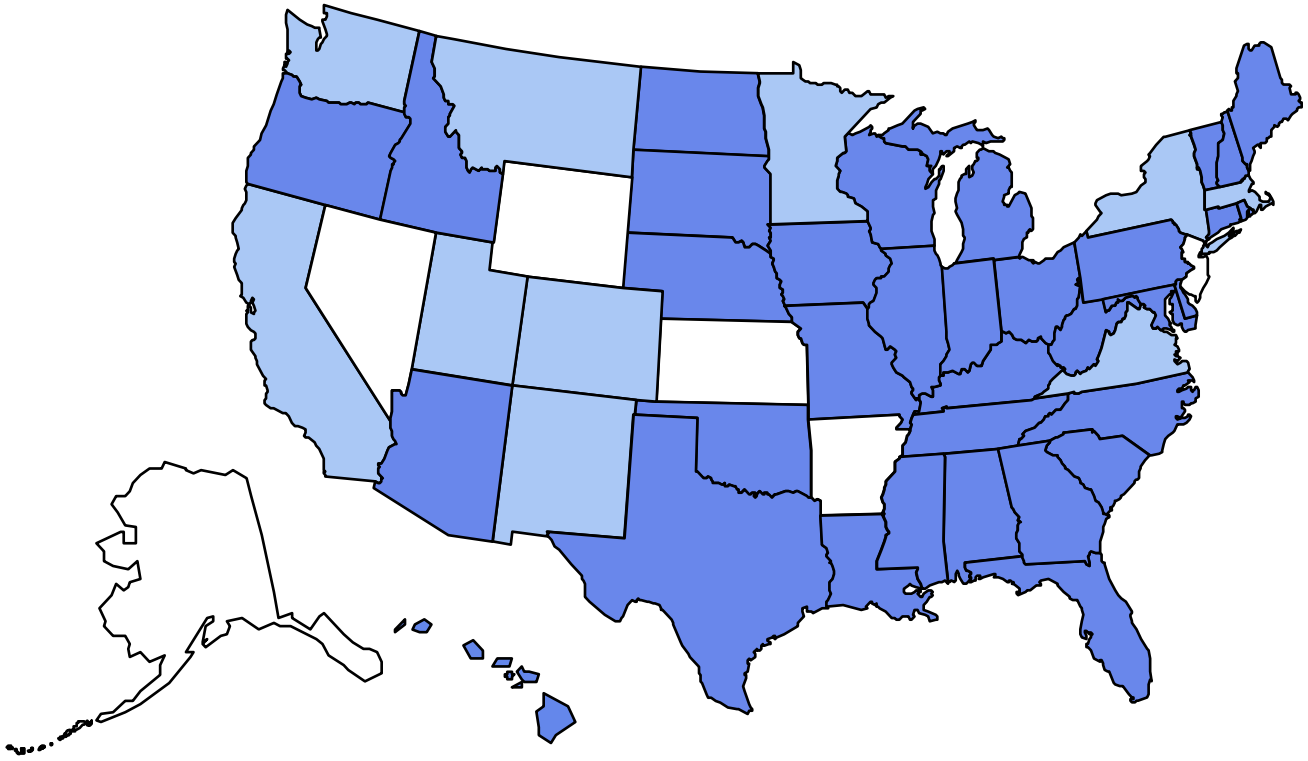

Source: U.S. Centers for Disease Control and Prevention (CDC)

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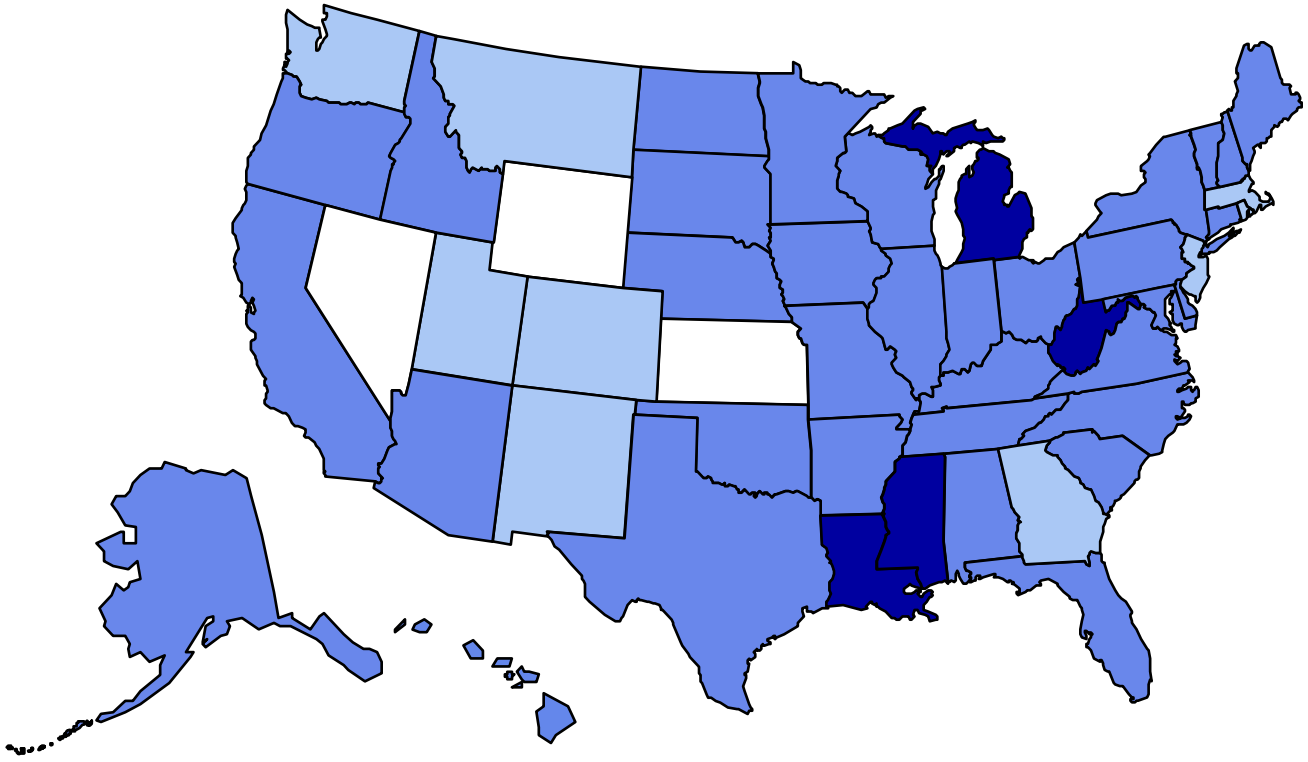

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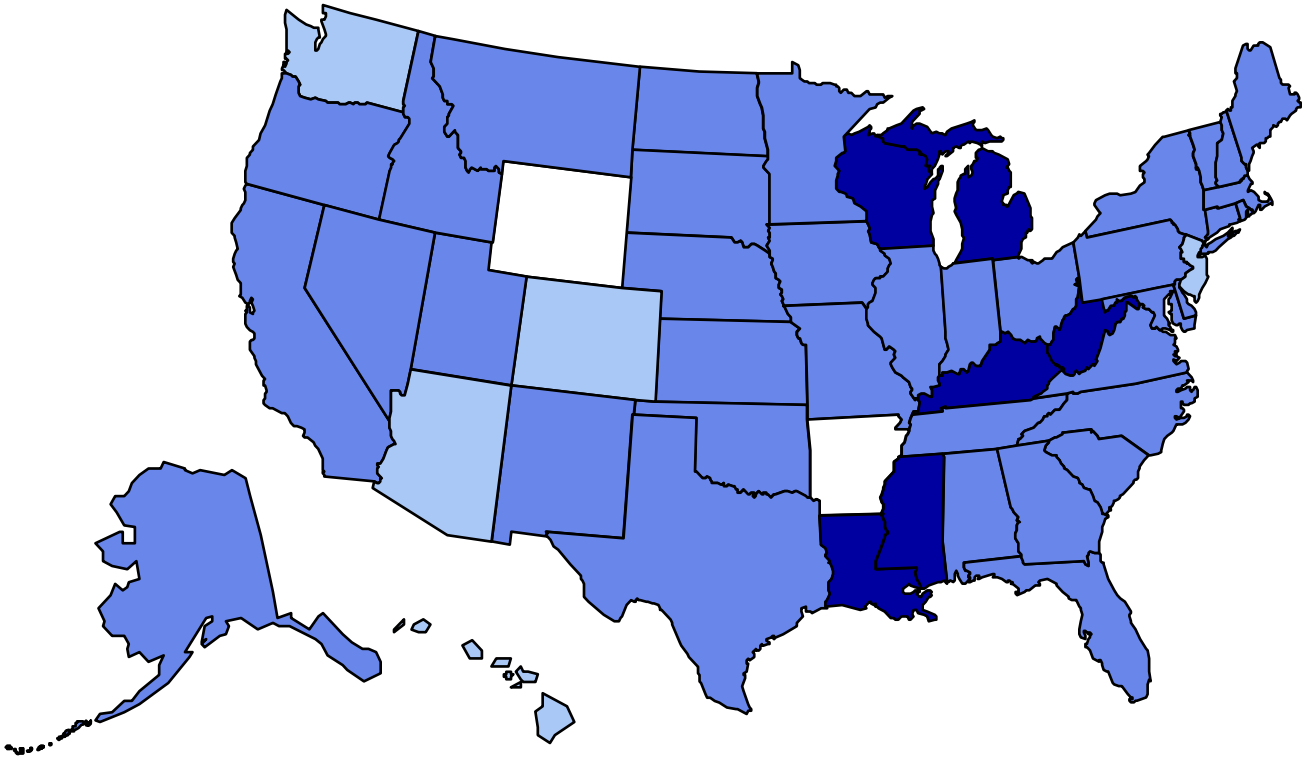

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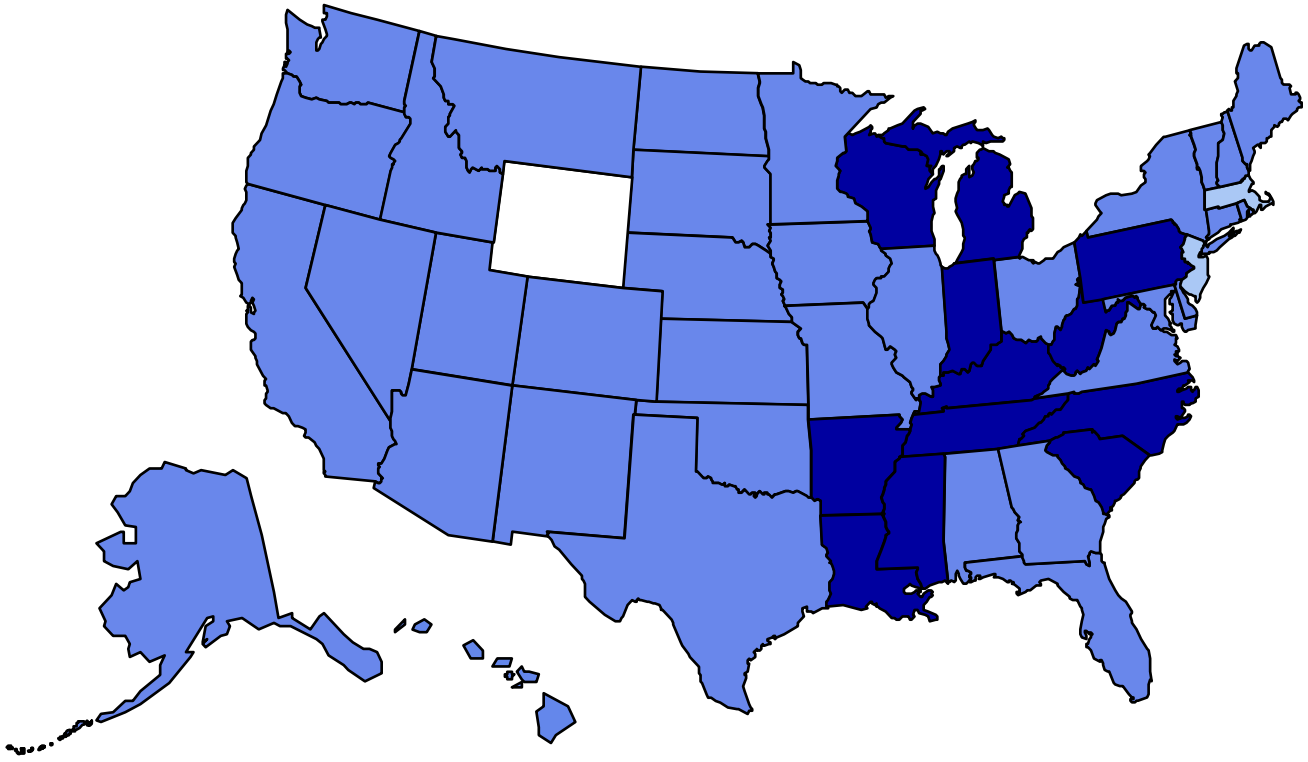

Source: U.S. Centers for Disease Control and Prevention (CDC)

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BRFSS, 1994

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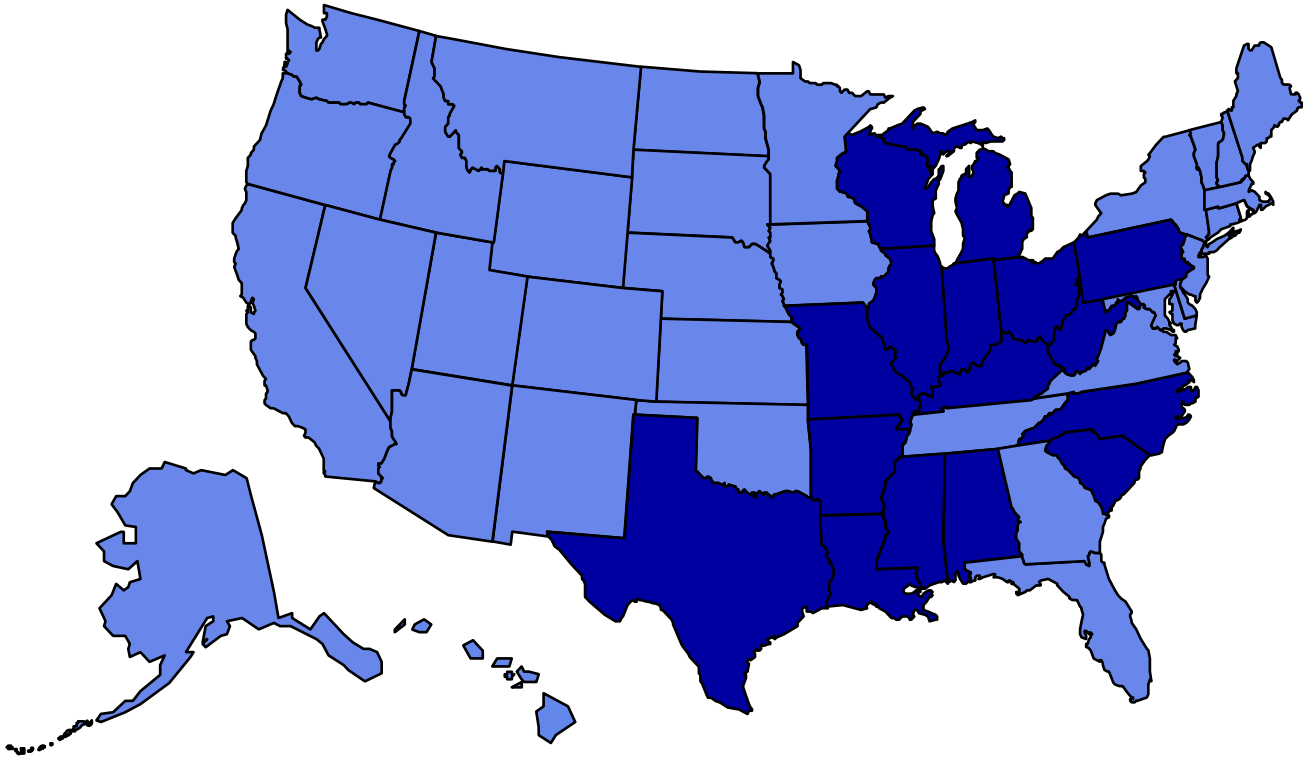

Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 1995

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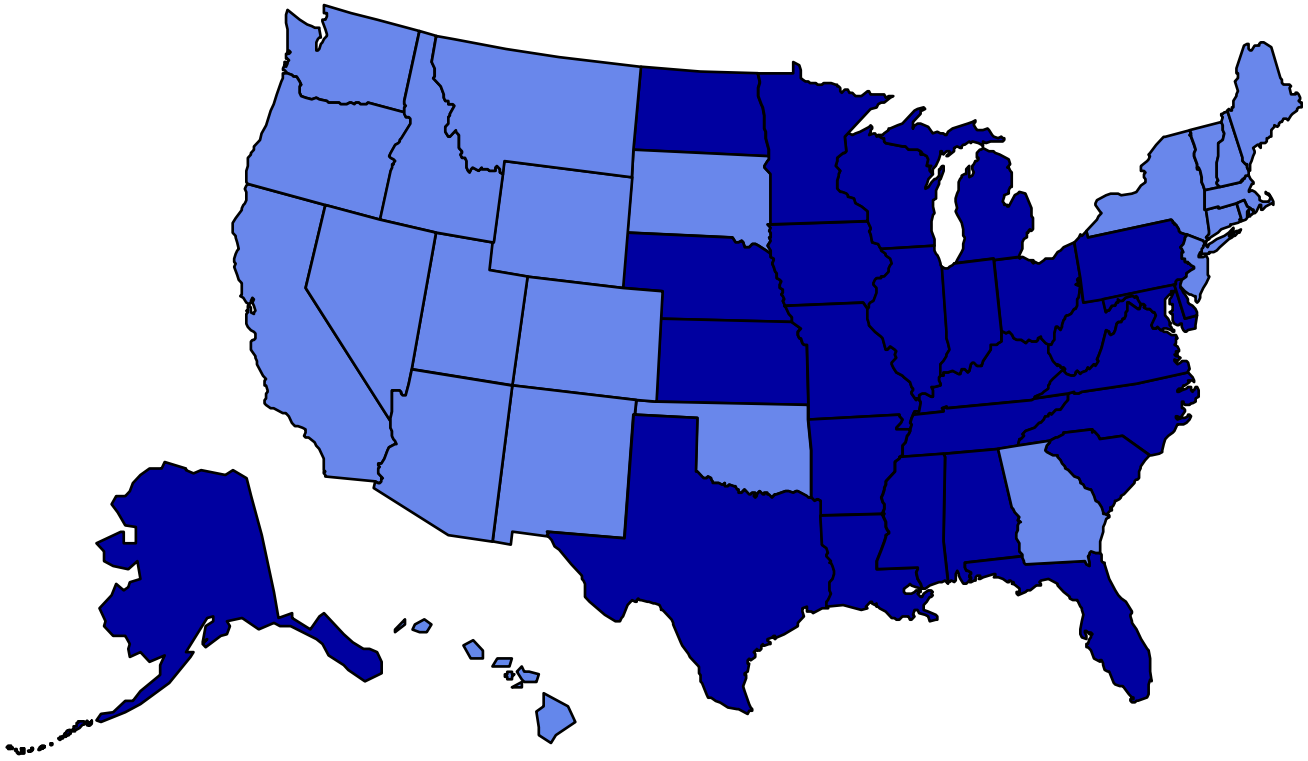

Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 1996

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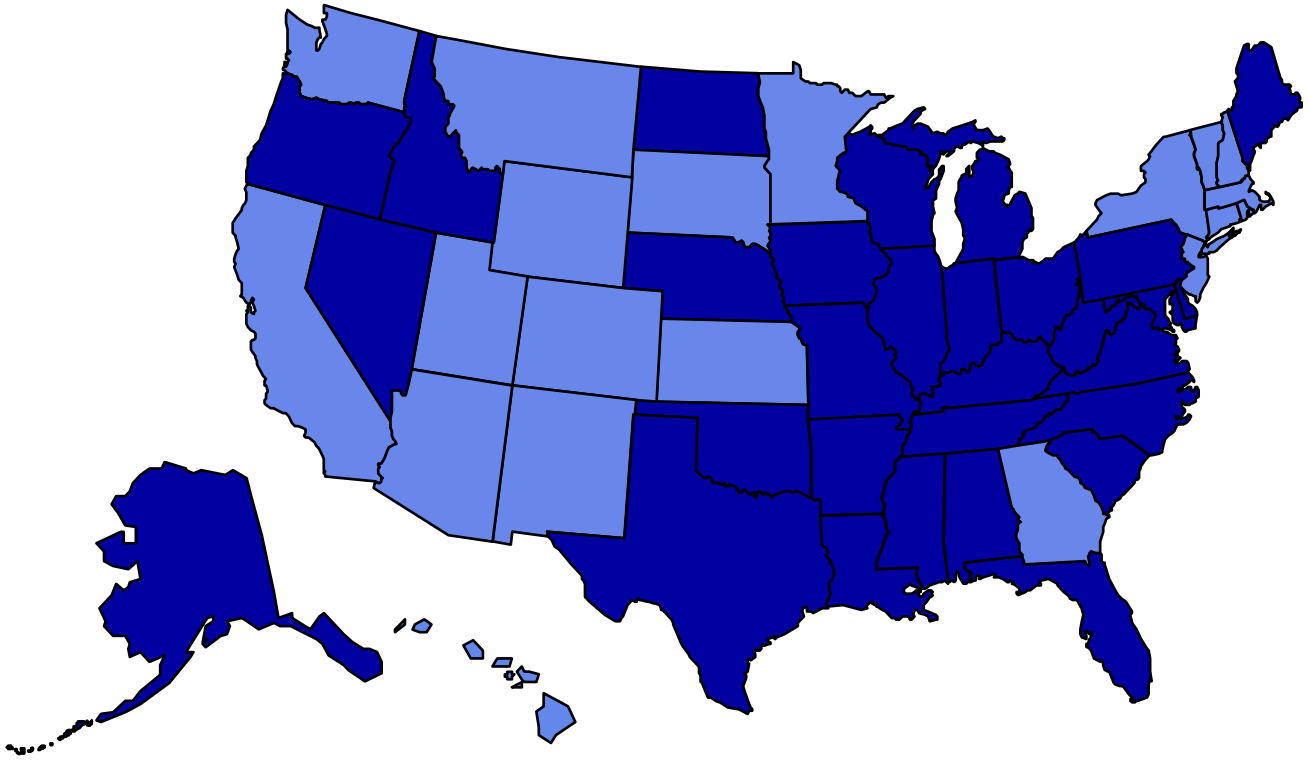

Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 1997

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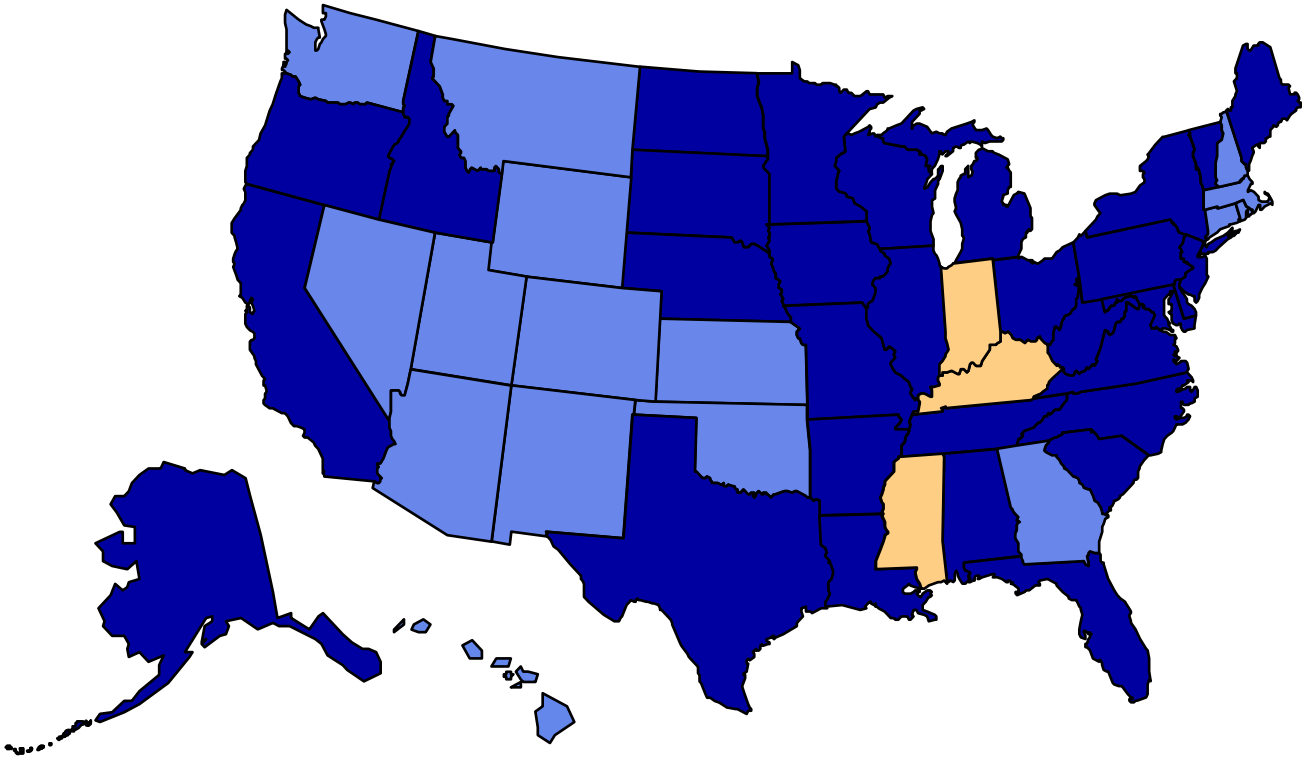

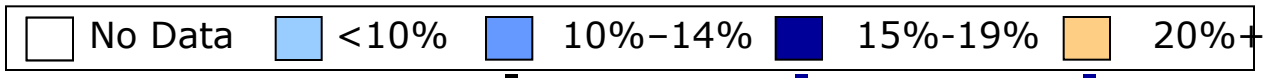

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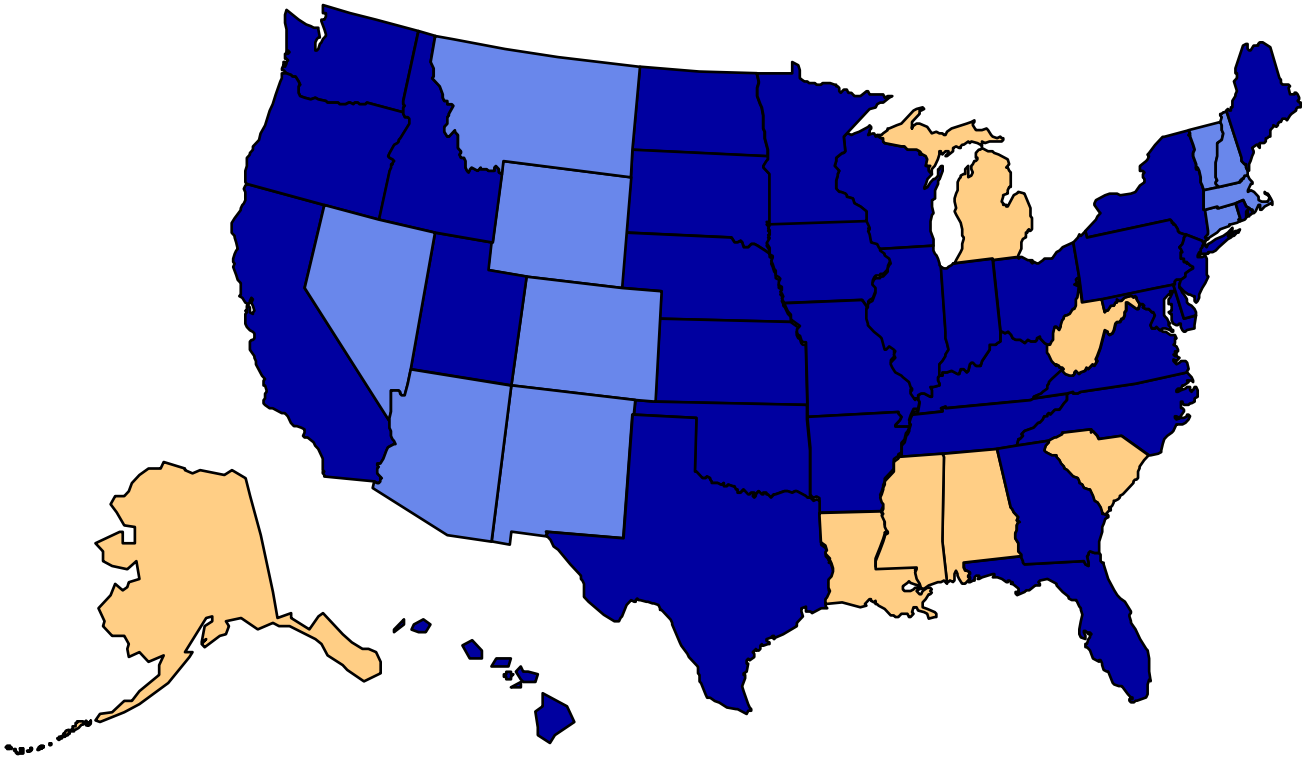

Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 1999

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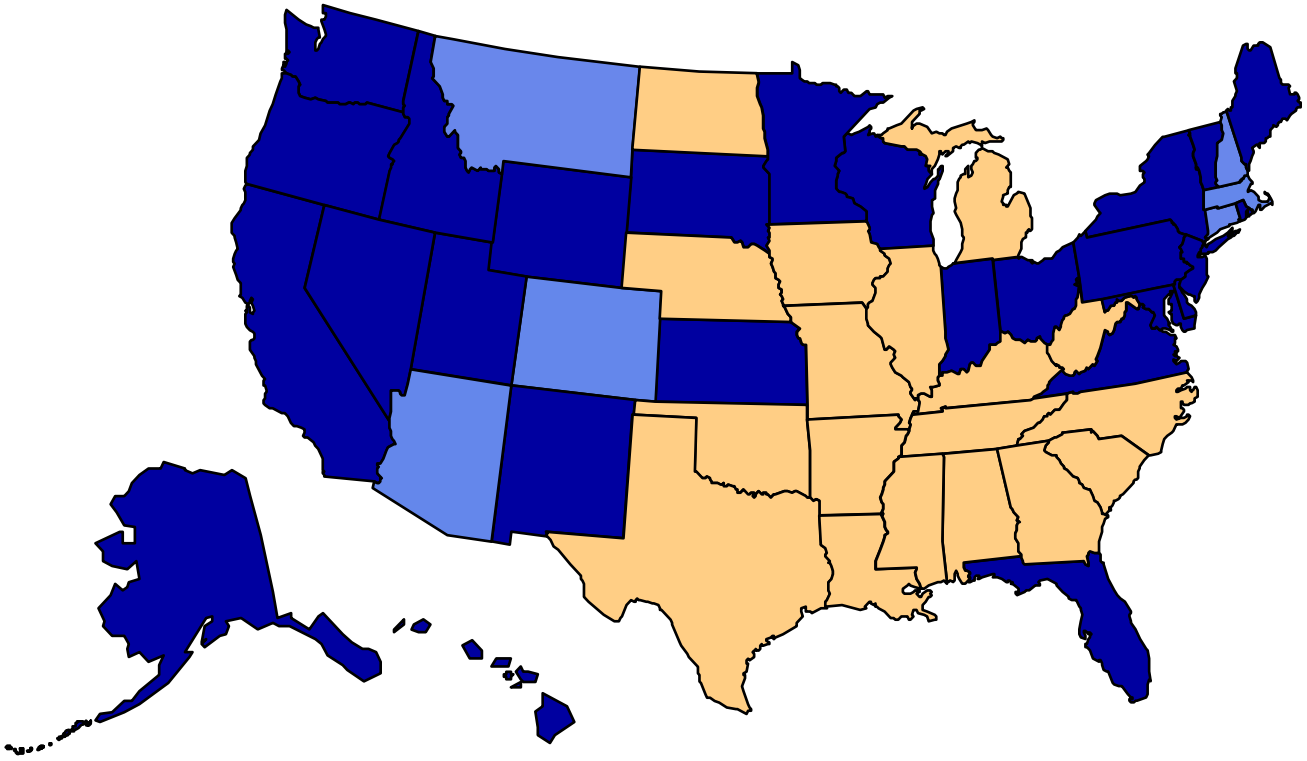
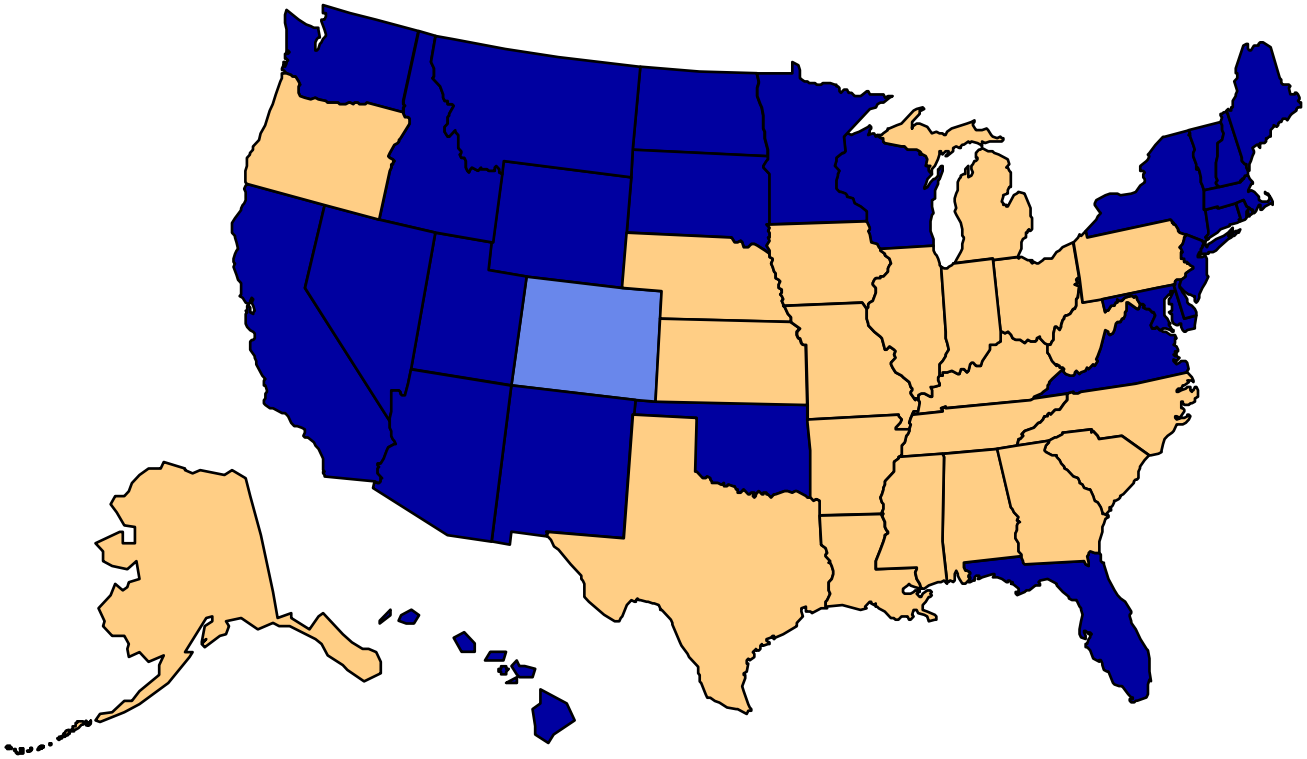


Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 2000

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” woman)

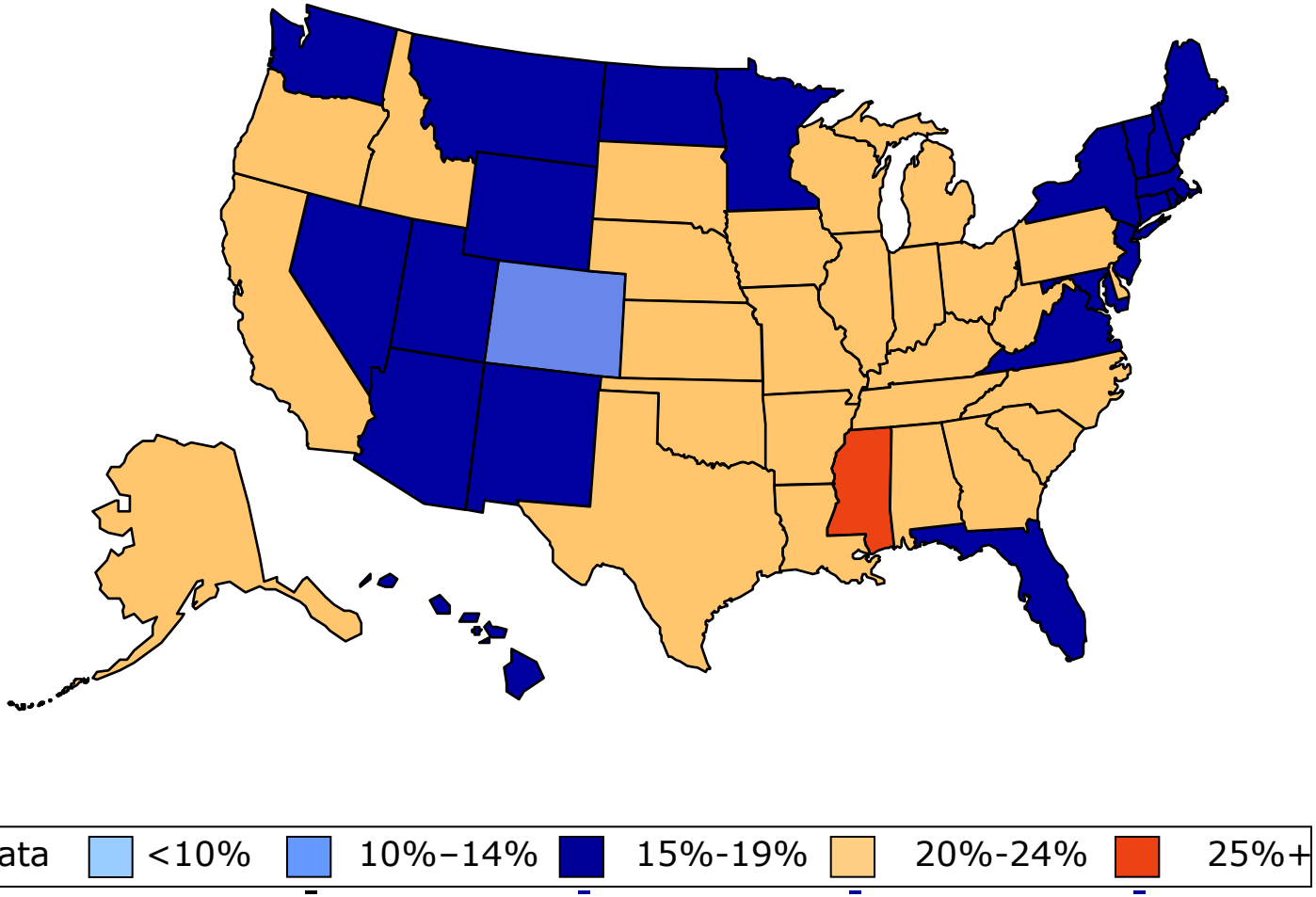


Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 2001

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” woman)

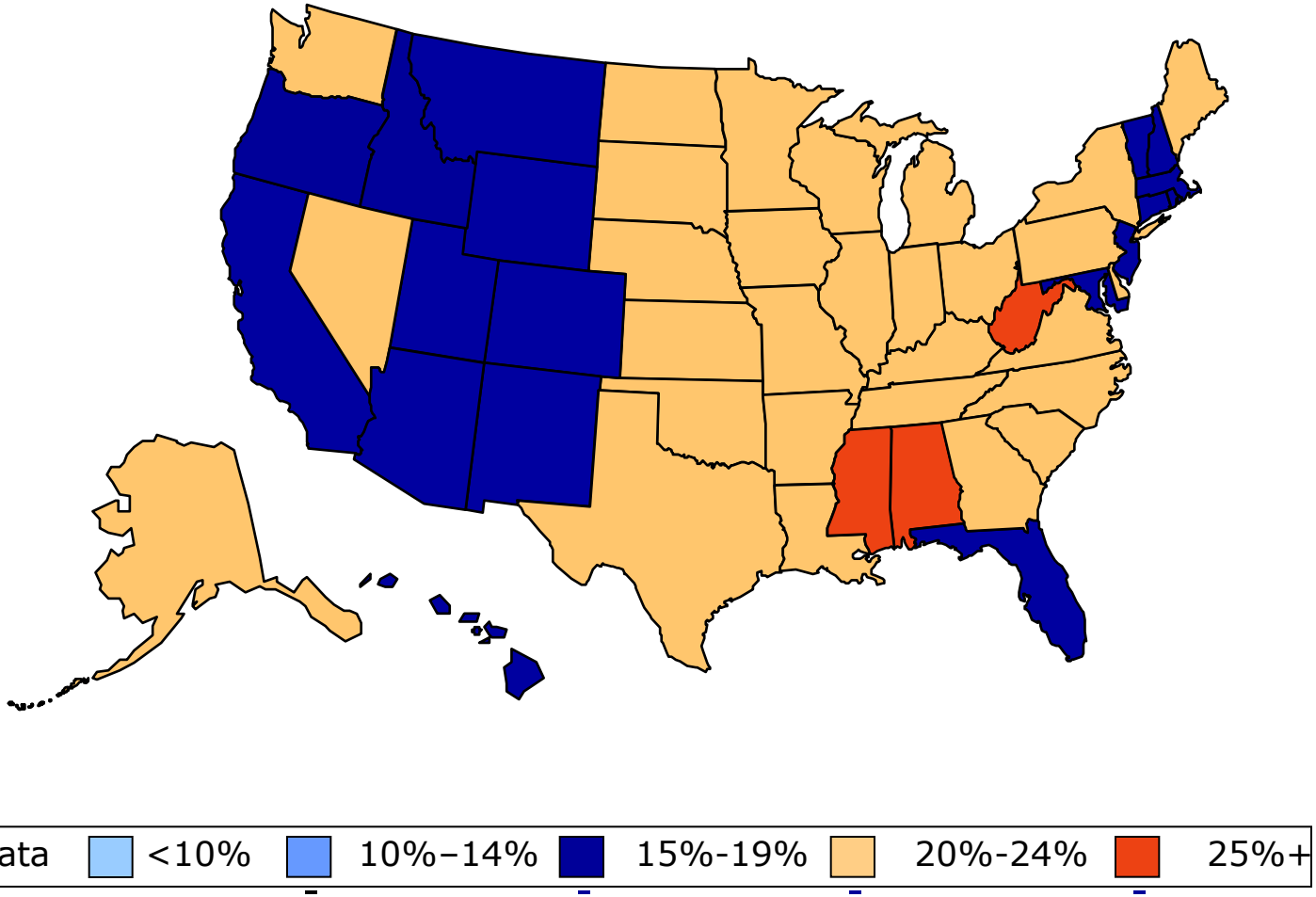


Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 2002

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” woman)



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

Obesity Trends* Among U.S. Adults

BRFSS, 2003

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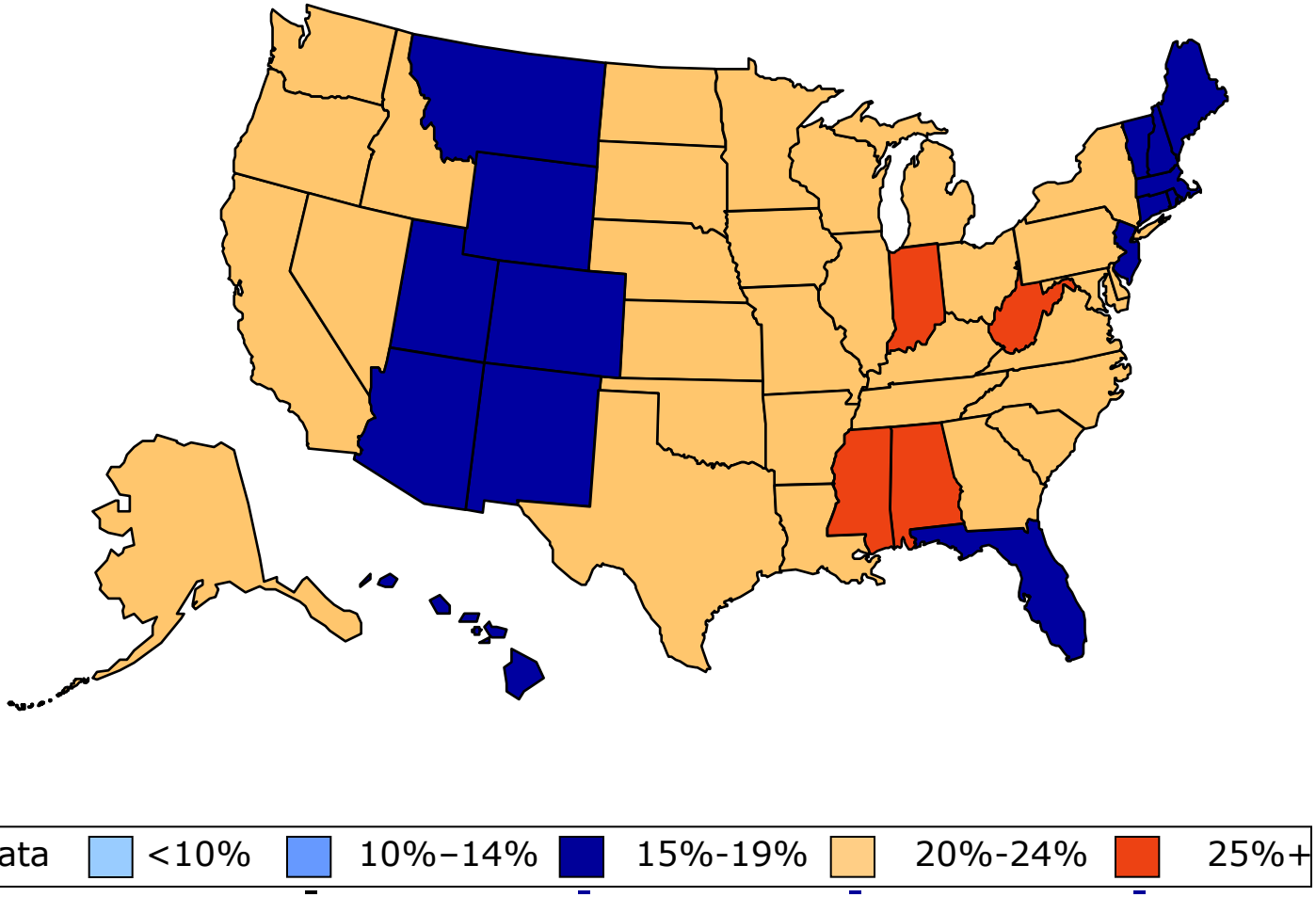

Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 2004

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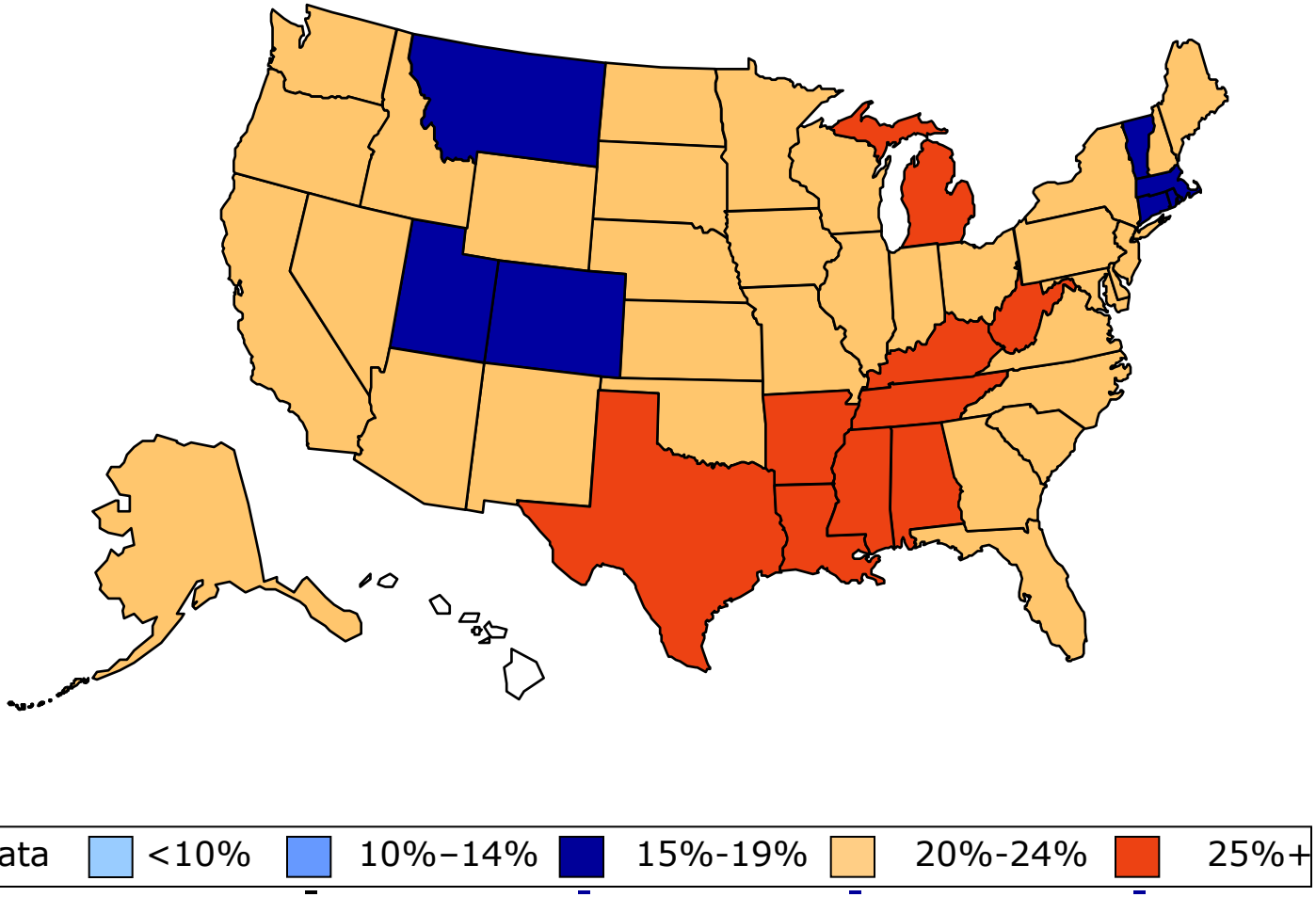

Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 2005

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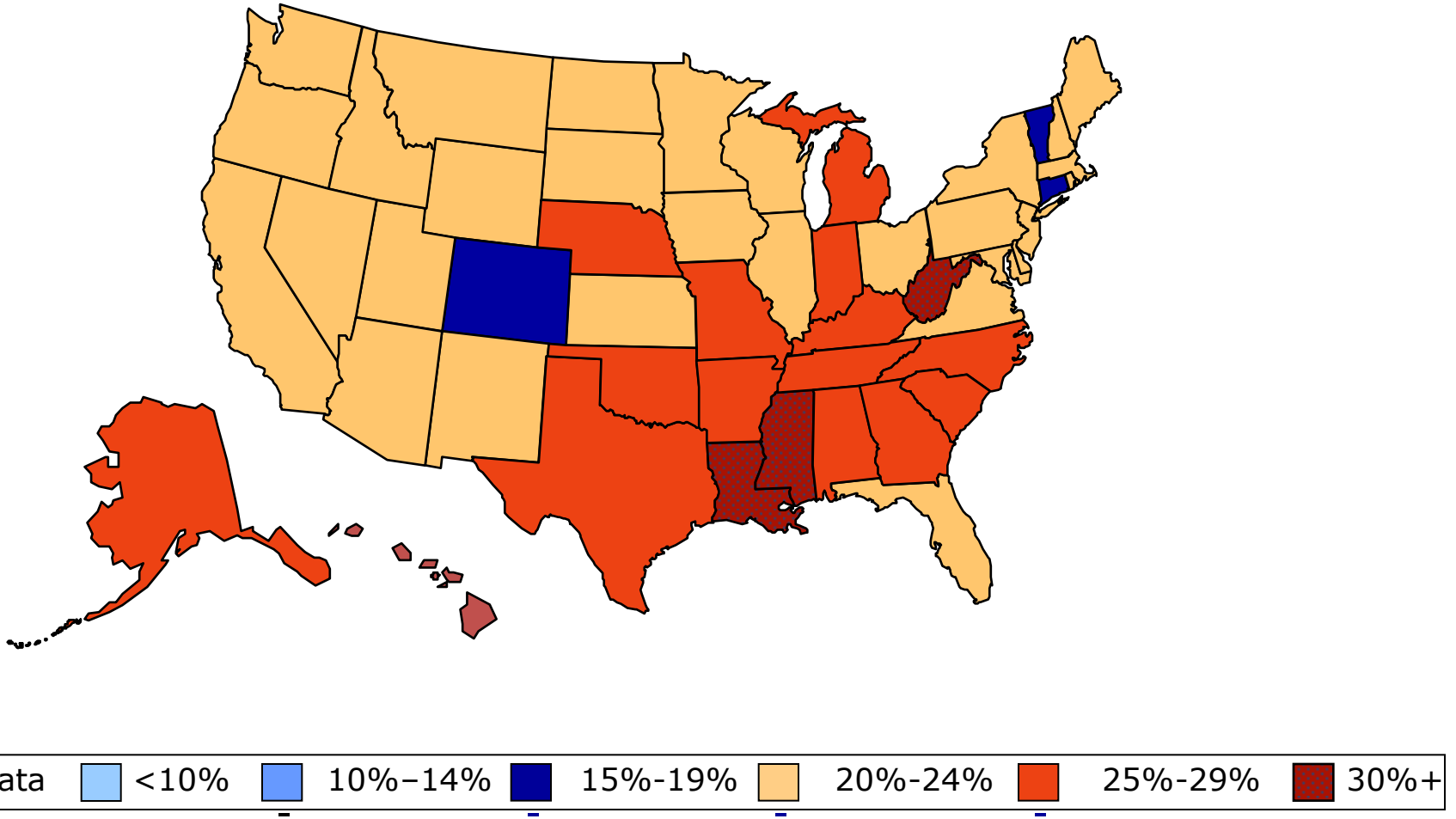

Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 2006

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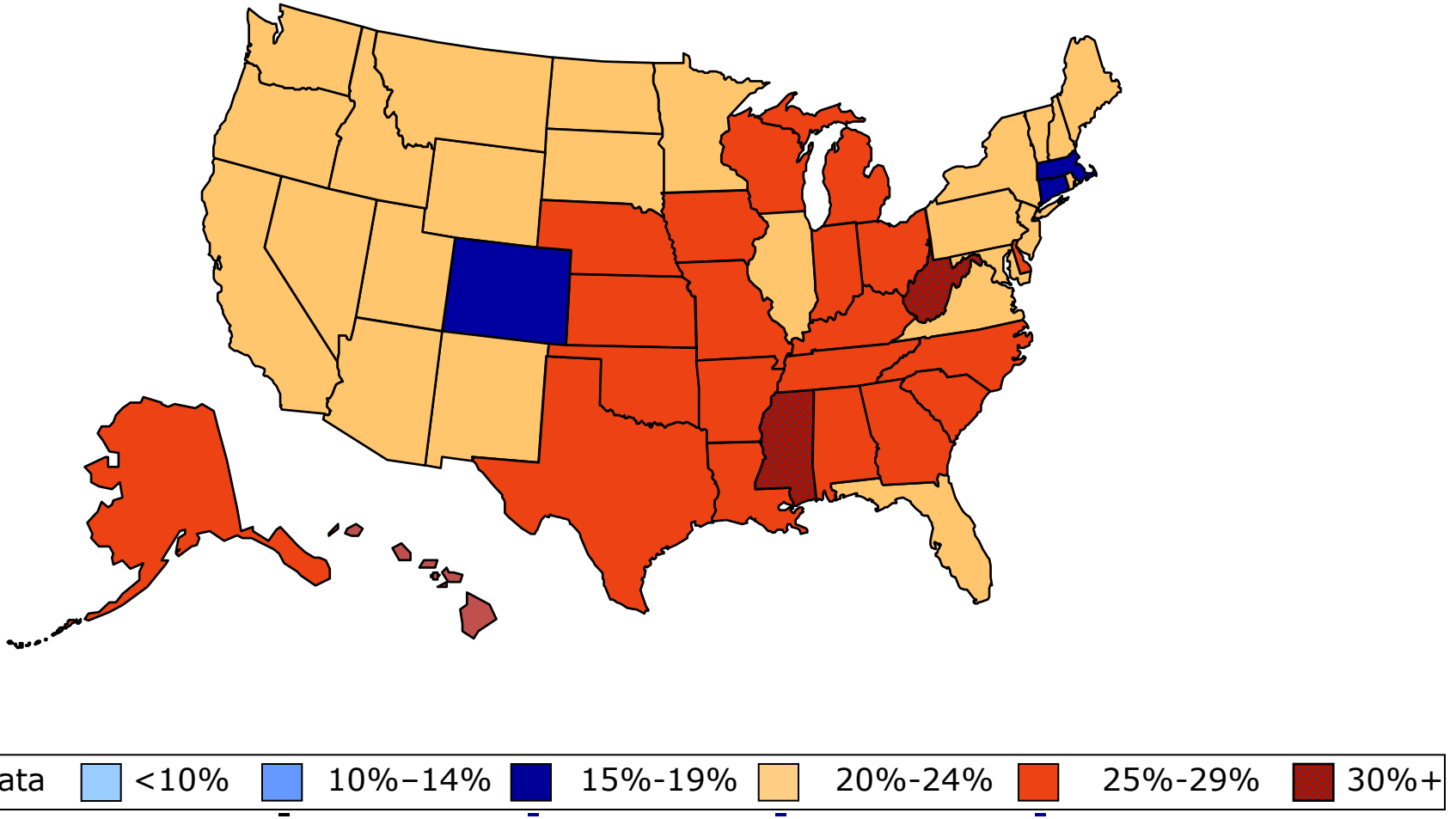
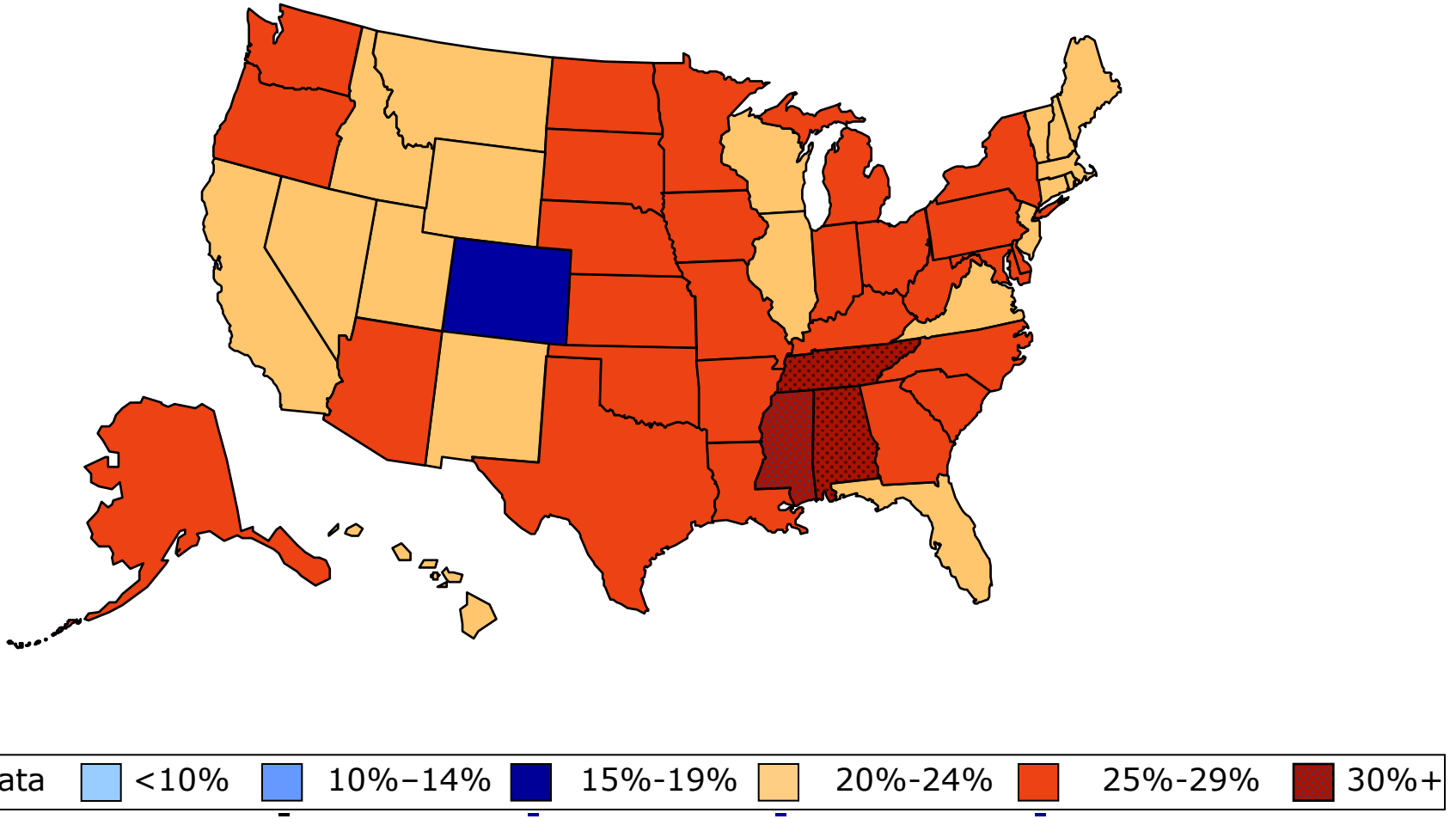


Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 2007

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” woman)

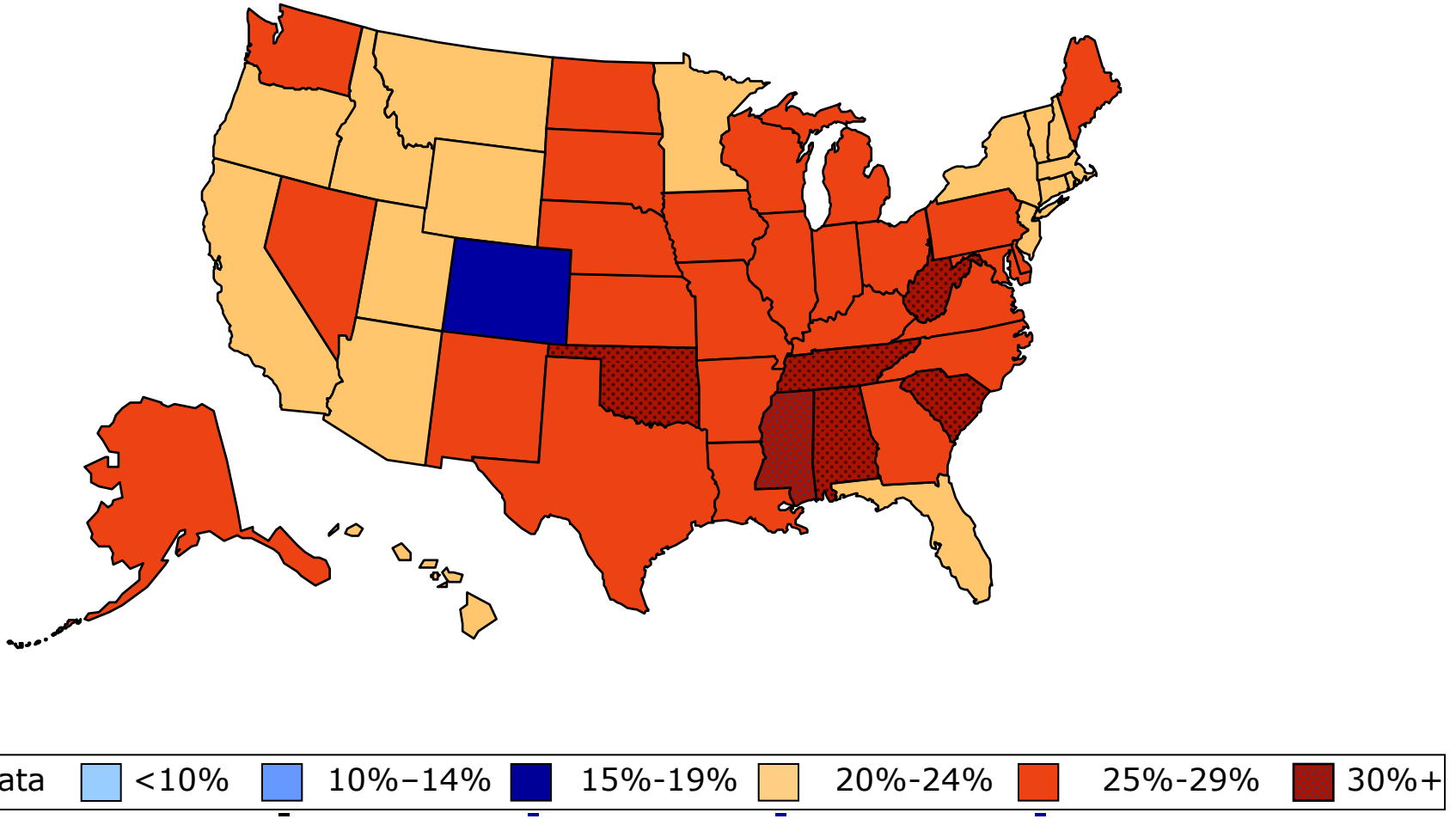


Source: U.S. Centers for Disease Control and Prevention (CDC)

Obesity Trends* Among U.S. Adults

BRFSS, 2008

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” woman)



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

Obesity Trends* Among U.S. Adults

BRFSS, 2009

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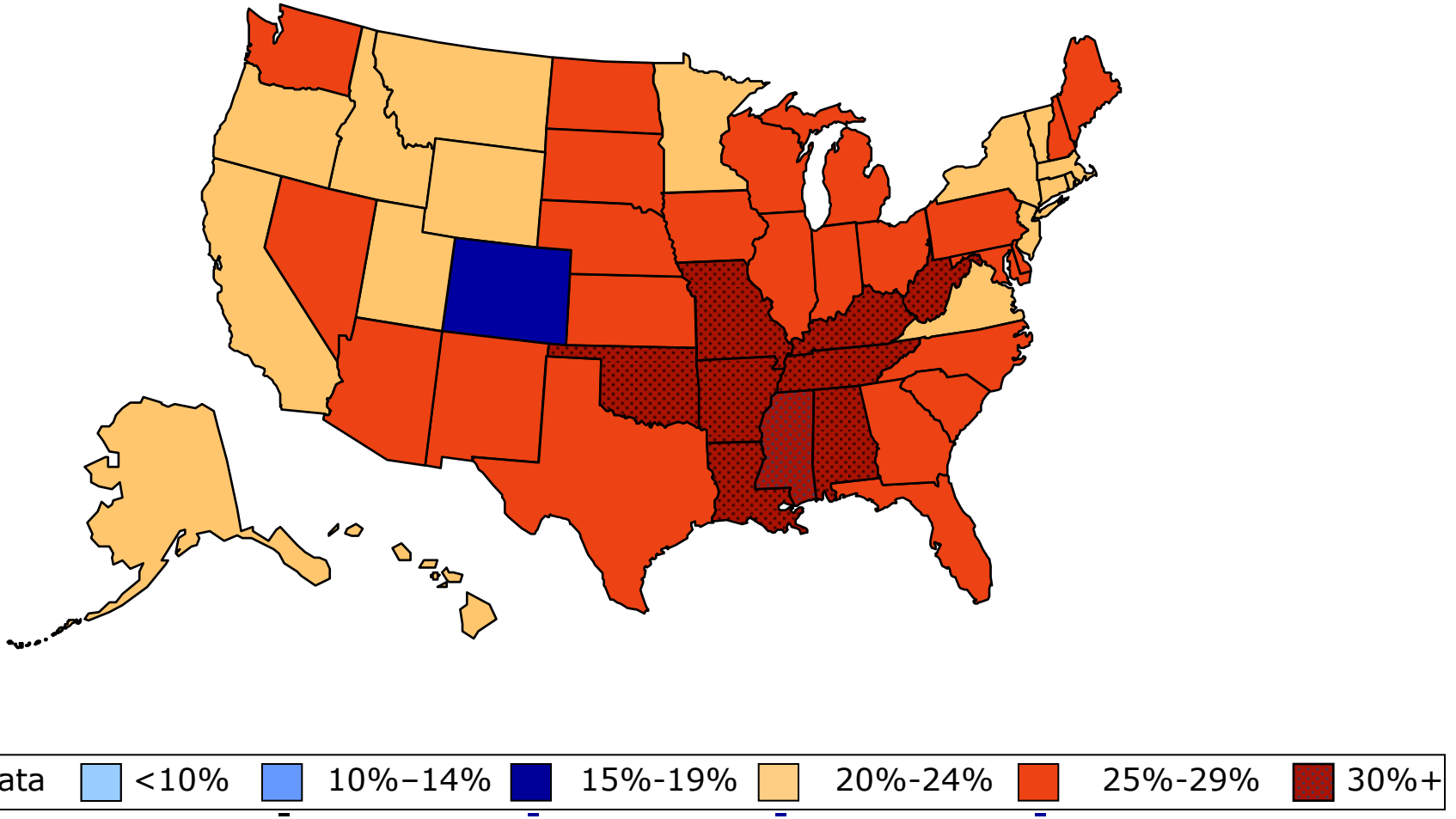
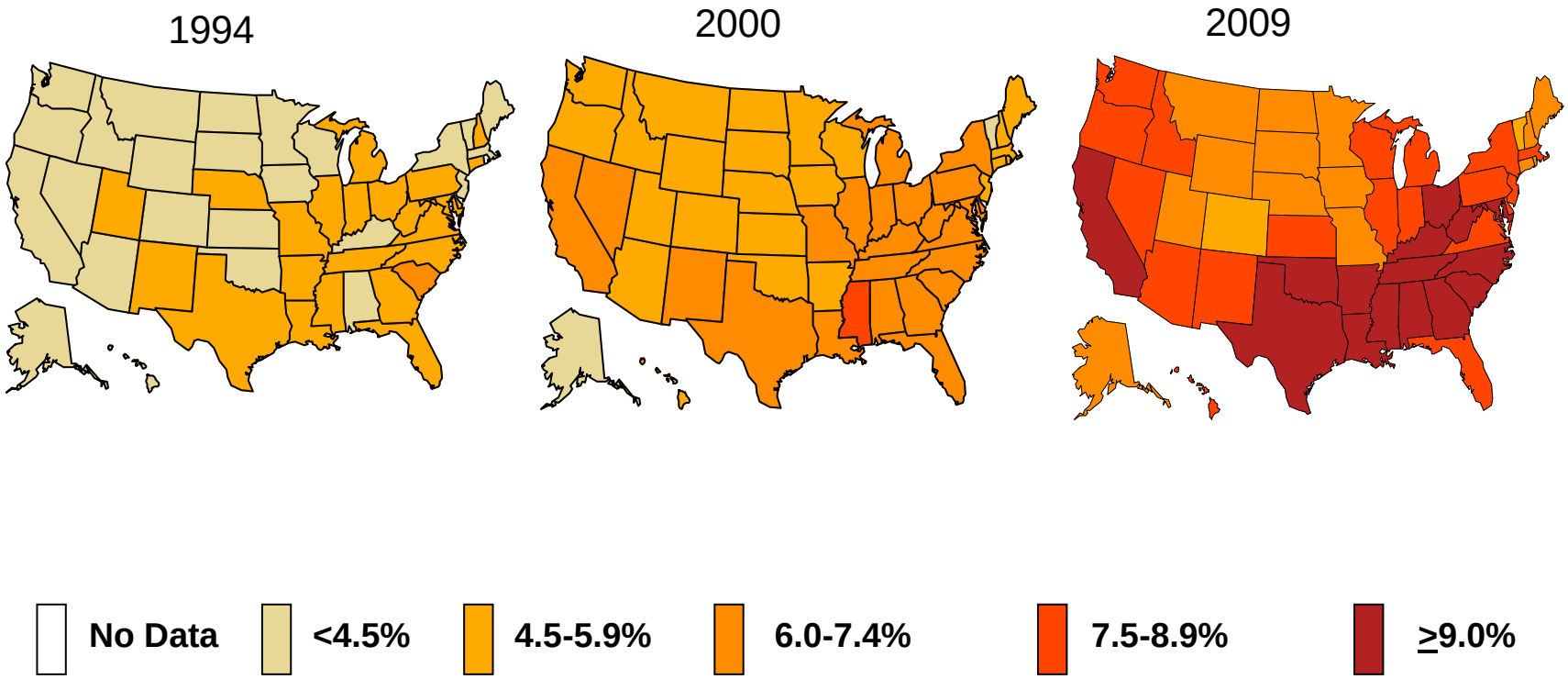


Source: U.S. Centers for Disease Control and Prevention (CDC)

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

According to the CDC……

the medical costs attributable to obesity today in the U.S. are estimated to be

$147 billion per year.

By 2030,

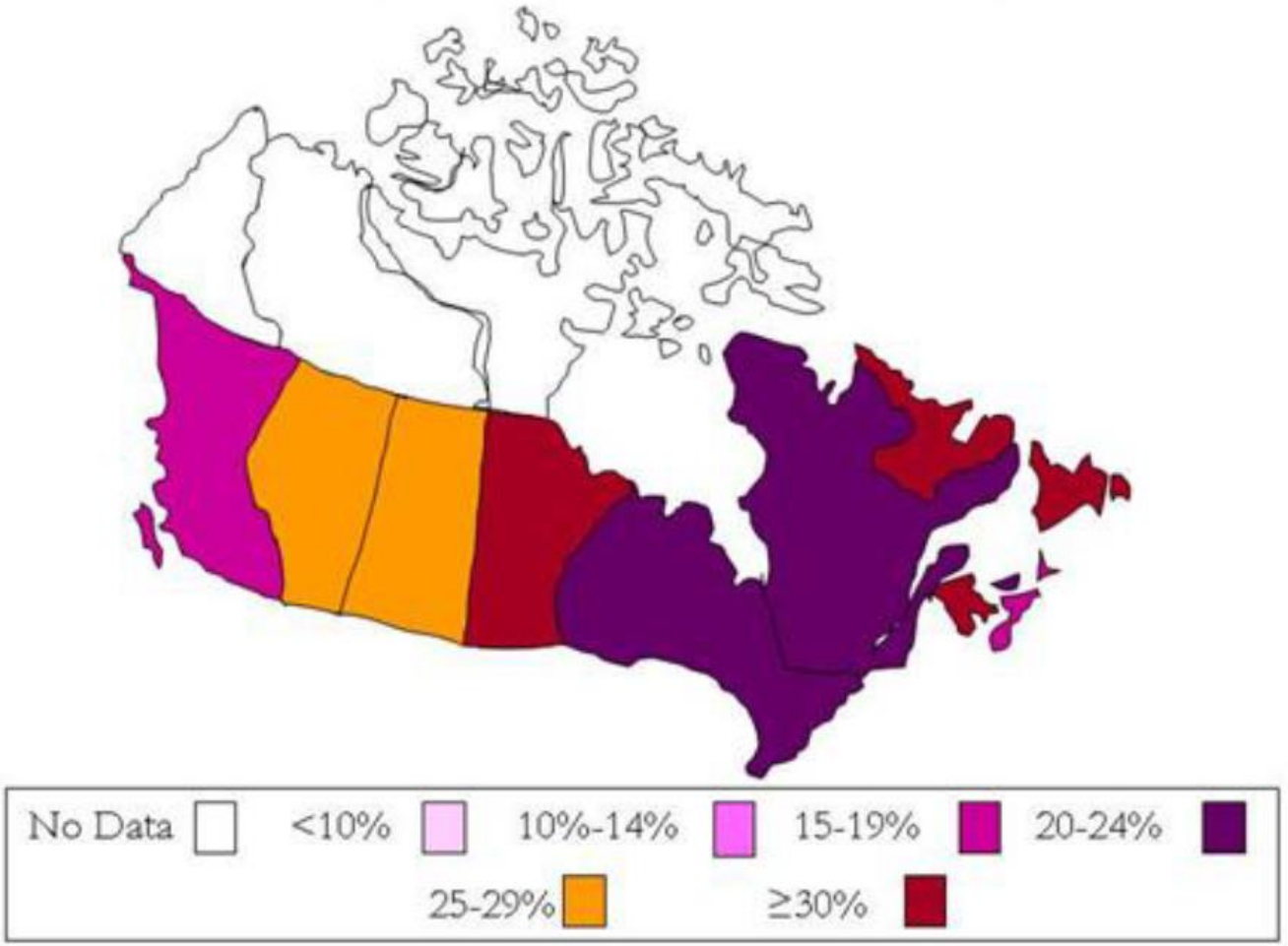
if obesity trends continue as shown,

the total attributable health-care costs will be

$860-$956 billion per year.

Obesity Trends Among Canadian Adults

CCHS, 2004 (MEASURED height & weight)



Source: M Tjepkema & M Shields, Statistics Canada. June 2005

Physical Inactivity

- 85% of Canadian Adults do not get the minimum 150 minutes of moderate-vigorous physical activity per week
- 91% of Canadian boys and 96% of Canadian girls (ages 6-19 years) do not get the 60 min of moderate-vigorous physical activity per day

•Physical Inactivity contributes to:

– 21,000 premature deaths (Canada, 1995)

Obesity and Diabetes have increased rapidly.
Our genetics have not changed in one generation, but our built environment has!

Evidence Base for Improving Health through Building, Street and Neighborhood Design

www.thecommunityguide.org/pa

Designing to increase active transportation

Walking, Bicycling and Transit-oriented development

Designs to improve street safety and aesthetics (less crime and traffic / more greening), having sidewalks and bike paths connected to destinations, mixed land use, high population density

Median increase in physical activity 35% to 161%

Designing to increase active recreation

Enhancing access to places for physical activity, such as creating walking trails or having onsite or nearby parks, playgrounds and exercise facilities (homes & worksites)

increases leisure-time activity and weight loss

Designing to increase stair use

Point-of-Decision stair prompts

Signs placed at elevators & escalators encouraging stair use, w/ info on benefits of stair use

Median 50% increase in stair use

Design and aesthetic interventions

Music & art in stairwells

Design stairs to be more convenient and visible

Skip-stop elevators

3300% increase in stair use

Addressing Healthy vs Unhealthy Food and Beverage Access

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

- Big 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 insixth-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, 1088-2004. Pediatrics 2008; 121(6): pp.1604-1614.
Muckelbauer R et al. Promotiona and provision of drinking water in schools for overweight prevention: randomized, controlled cluster trial. Pediatrics 2009; 123(4): pp. e661-7.

Co-benefits: Improve the Environment

	Fuel / Electricity Use	Air Quality	Obesity/Diabetes/ Heart Disease
Biking or walking rather than automotive transport	√	√	√
Stairs rather than elevators and escalators	√	√	√
Active recreation rather than television	√	√	√
Safe tap water rather than bottled and canned beverages	√	√	√
Fresh produce rather than unhealthy processed foods	√	√	√

Co-benefits: Create more accessible places for all

- Creating safer places to walk, take transit, & for wheelchair travel

- Making elevators more available for those who need them

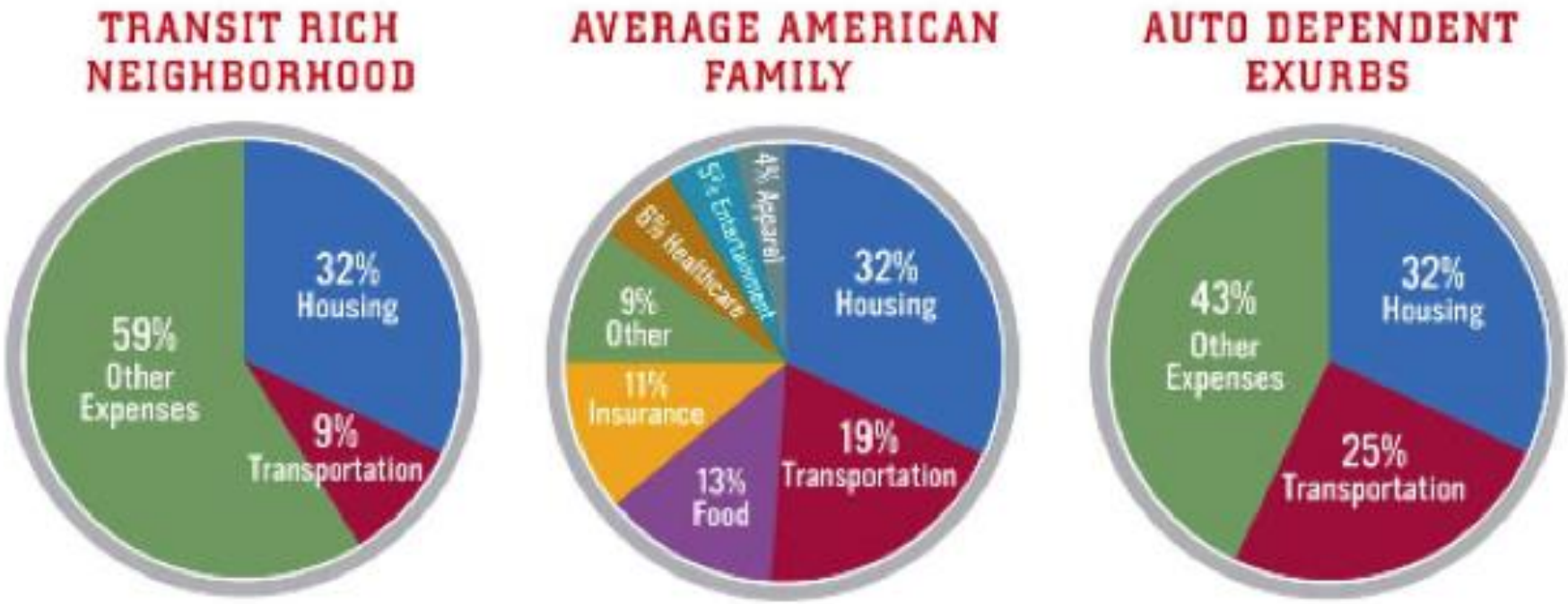
Co-benefits: Reduce infrastructure costs

More compact, walkable 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
Savings	**4,621,303**	**$12.6 (10.1%)**	**188,305**	**$109.7 (6.6%)**

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

Building bicycle and pedestrian infrastructure creates more jobs per dollar invested, compared to road infrastructure only

Source: Political Economy Research Institute: June 2011

Co-benefits: Create desirable places to live, work & play

Sprawl Community :

Preferred by 43%

There are **only single-family houses** on large lots

There are **no sidewalks**

Places such as shopping, restaurants, a library, and a school are within **a few miles** of your home and **you have to drive** most places

There is enough parking when you drive to local stores, restaurants, and other places

Public transportation, such as bus, subway, light rail, or commuter rail, is **distant or unavailable**

Smart Growth Community :

Preferred by 56%

There is a **mix** of single-family detached houses, townhouses, apartments, and condominiums on various sized lots

Almost all of the streets have **sidewalks**

Places such as shopping, restaurants, a library, and a school are within **a few blocks** of your home and **you can either walk or drive**

Parking is limited when you decide to drive to local stores, restaurants, and other places

Public transportation, such as bus, subway, light rail, or commuter rail, **is nearby**

Source: NAR National Poll, 2011 Q: In which community would you rather live?

U.S. - Built Environment & Health Initiatives

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

COMMUNITIES PUTTING PREVENTION TO WORK

Cross-Sector Partnerships in U.S. Cities

Key Intergovernmental Partners in Local Communities (n=15, incl. NYC):

- Public Health – 15
- Planning – 15
- Transportation – 14
- Education/School Construction – 12
- Parks and Recreation – 12
- Public Works – 8
- Housing Development or Management – 6
- Buildings – 3

Cross-Sector Partnerships

Non-Governmental Partnerships (n=15 communities, incl. NYC):

- Community-Based/Non-Profit Groups – 13
- Environmental Organizations – 9
- American Planning Association local chapter – 7
- American Institute of Architects local chapter – 5
- American Society of Landscape Architects local chapter – 3
- Local Architecture, Planning and Design Institutions – 3
- Building Owners and Managers Association – 1

The Canadian Context

HEALTHY CANADA by design

CLASP
COALITIONS LINKING ACTION & SCIENCE FOR PREVENTION
An initiative of:
CANADIAN PARTNERSHIP AGAINST CANCER / PARTENARIAT CANADIEN CONTRE LE CANCER

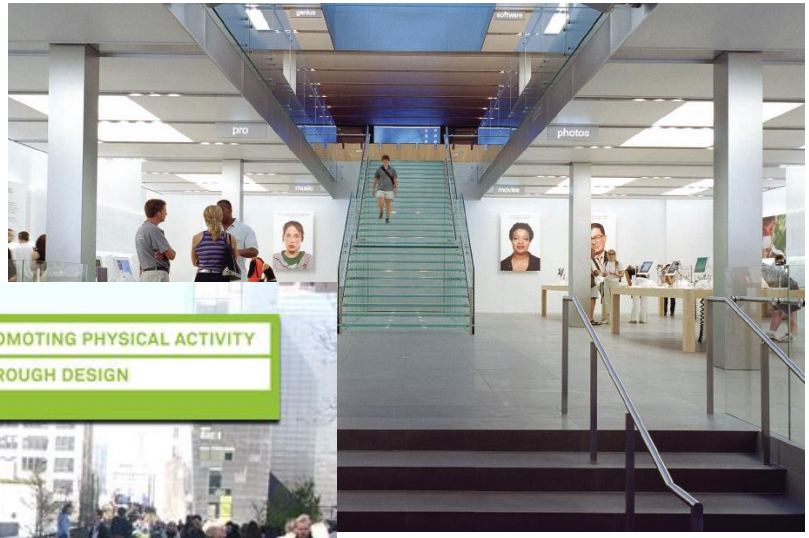
- Goal: creating healthy communities that support active transportation and physical activity

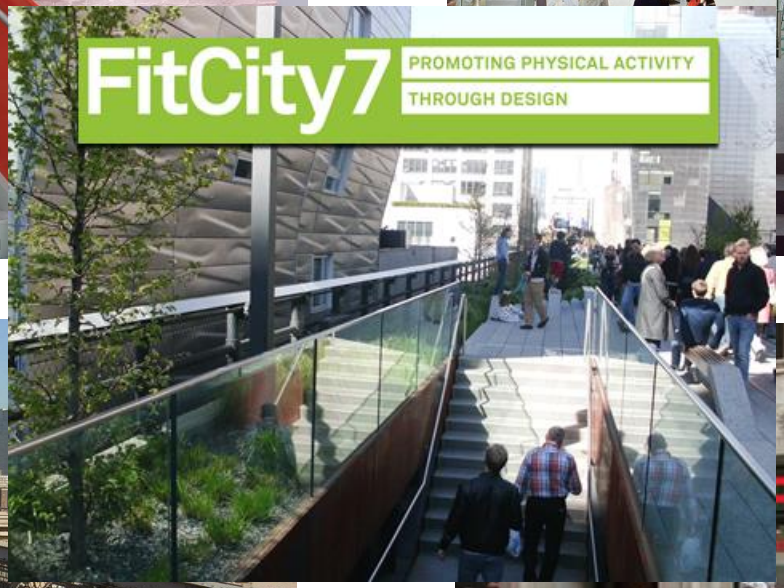
- Partnership: national health, planning and transportation organizations
  + non-governmental organizations + university researchers
  + regional and local health authorities in 8 of the 10 provinces:

    - B.C., Saskatchewan, Manitoba, Ontario, Quebec, Nova Scotia, New Brunswick, Newfoundland

THE CASE STUDY OF NEW YORK CITY

Fit City Conferences



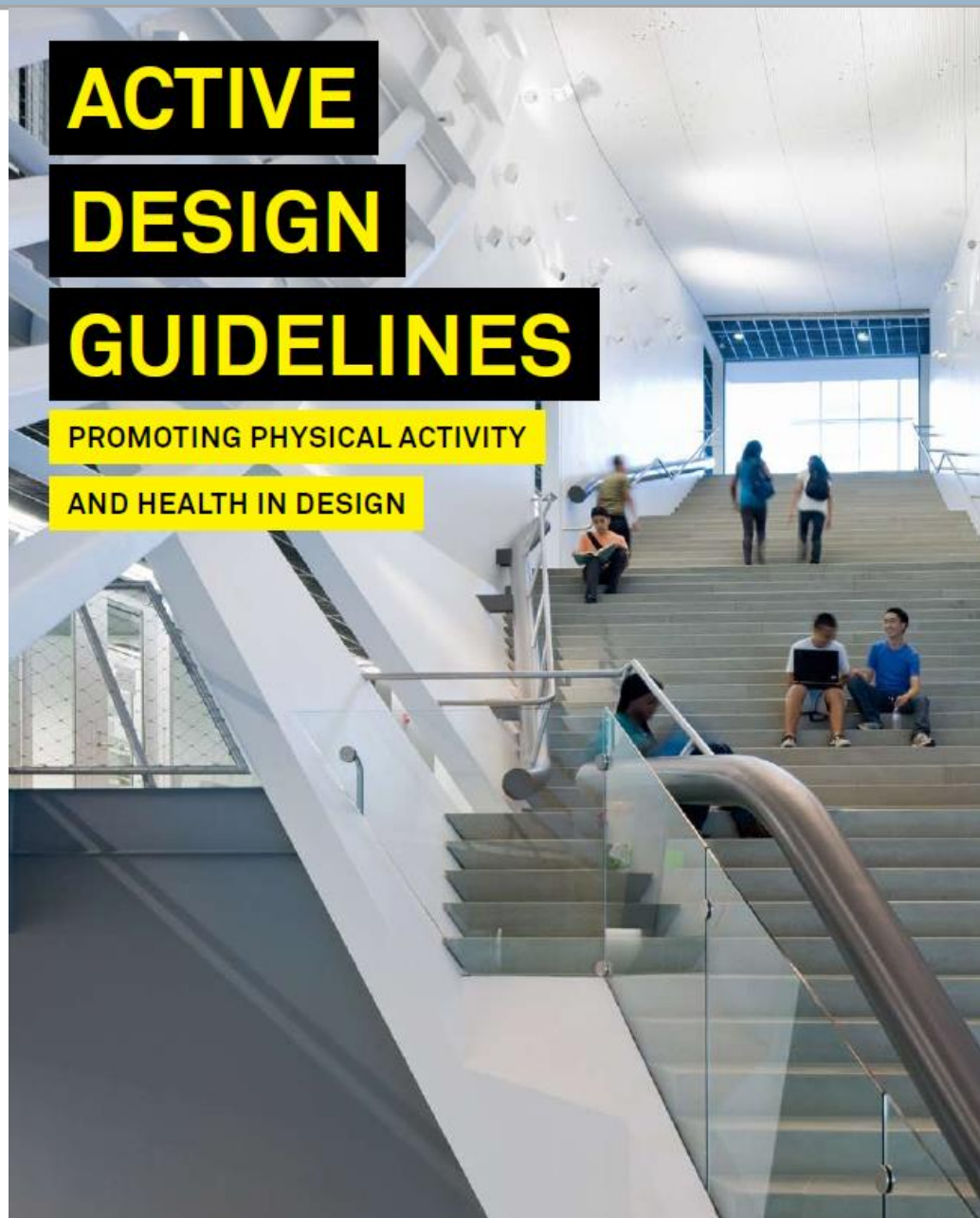


www.aiany.org/fitcity7

The Active Design Guidelines

Chapters

1) Environmental Design and Health: Past and Present
2) Urban Design: Creating an Active City
3) Building Design: Creating Opportunities for Daily Physical Activity
4) Synergies with Sustainable and Universal Design



Active Design Guidelines Team

Michael Bloomberg
MAYOR

David Burney
COMMISSIONER
Department of Design and Construction

Thomas Farley
COMMISSIONER
Department of Health and Mental Hygiene

Janette Sadik-Khan
COMMISSIONER
Department of Transportation

Amanda Burden
COMMISSIONER
Department of City Planning

New York City Staff*

Department of Design and Construction

David Burney, FAIA
Commissioner

Margo Woolley, AIA
Assistant Commissioner, Architecture and Engineering Division

Vitoria Milne, MID
Director, Office of Creative Services

Department of Health and Mental Hygiene

Karen Lee, MD, MHSc, FRCPC
Director, Built Environment

Sarah Wolf, MPH, RD
Built Environment Coordinator

Department of Transportation

Wendy Feuer, MA
Assistant Commissioner of Urban Design and Art, Division of Planning and Sustainability

Hanna Gustafsson
Former Urban Fellow, Division of Planning and Sustainability

Department of City Planning

Alexandros Washburn, AIA
Chief Urban Designer

Skye Duncan, MSAUD, BArch
Associate Urban Designer

Mayor's Office of Management and Budget
Joyce Lee, AIA, LEED AP
Chief Architect

Academic Partners

Craig Zimring PhD.
Professor, Georgia Institute of Technology
College of Architecture

Gayle Nicoll, M.Arch, PhD, OAA
Associate Professor and Chair, University of Texas at San Antonio
Department of Architecture

Julie Brand Zook, M.Arch
Researcher, Georgia Institute of Technology
College of Architecture

Reid Ewing, PhD
Professor, University of Utah, Department of
City and Metropolitan Planning

American Institute of Architects New York Chapter

Fredric Bell, FAIA
Executive Director

Sherida Paulsen, FAIA
2009 President

Editor

Irene Chang, March, MPhil
Cheng+Snyder

Community, Academic and Private Sector

Ernest Hutton, Hutton Associates, INC.
Ellen Martin, 1100 Architects
Linda Polack Marpillero Pollak, Architects
John Pucher, Bloustein School of Planning and Public Policy, Rutgers University
Jessica Spiegel, 1100 Architects
William Stein, Dattner Architects
Shin-Pei Tsay, Transportation Alternatives

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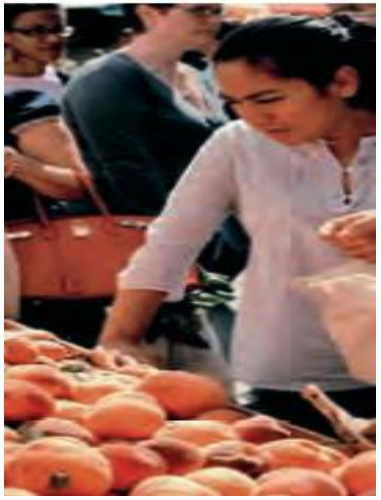
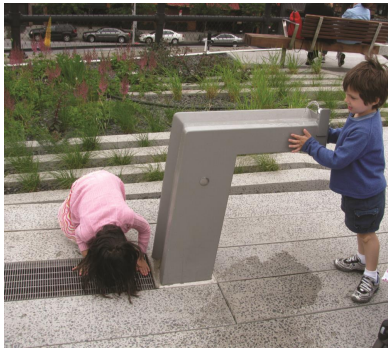
*We also thank the many city agencies that gave input including the Depts of Parks and Recreation, Buildings, Housing Preservation and Development, School Construction Authority, Aging, and Mayor's Offices of Long-Term Planning and Sustainability, and of People with Disabilities.



Community Design Strategies

- Land Use Mix
- Access to Supermarkets, Farmers Markets, Drinking Water
- Parks / Play Areas / Plazas
- Transit Access
- Pedestrian Friendly Environment
- Bicycle Network and Infrastructure



Building Design Strategies

- Bicycle Parking and Storage
- Active Recreation Spaces for Children + Adults
- Stairs: Accessibility, Visibility, Convenience
- Stairs: Aesthetics
- Stairs: Signage and Prompts
- Skip-Stop Elevators
- Improving Access to Drinking Water

General Approach

Added a Public Health Chapter:

"New York City is one of the healthiest cities in the United States, with a life expectancy that exceeds the national average.

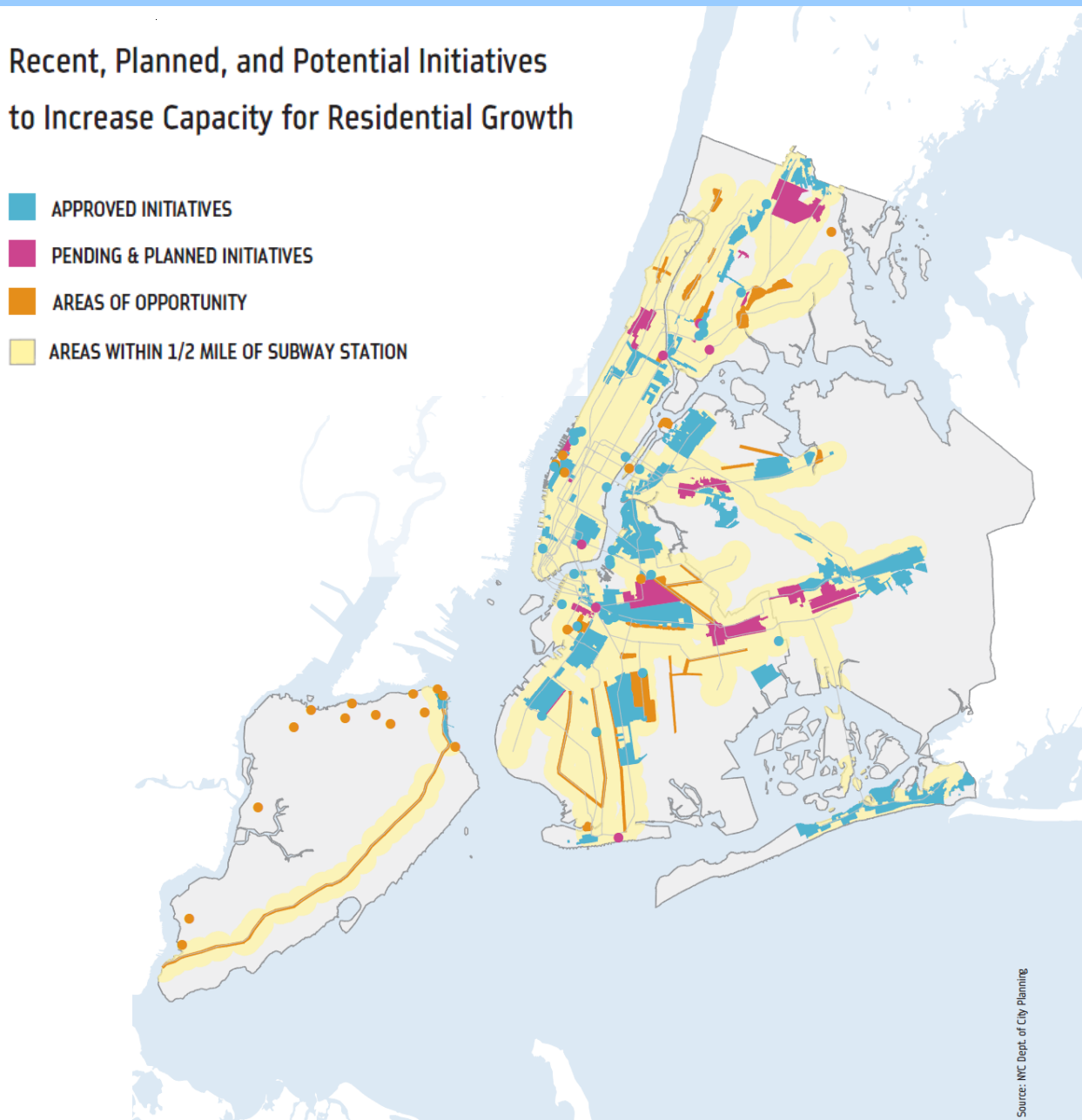
This achievement is the result of visionary planning and sustained investment……

…..Despite these successes, health challenges remain—and new ones are emerging—that require creative, modern shifts in how the city operates."

General Approach

Smart Growth

Focusing the development for 1 million new people by the year 2030 near public transit access.



Changing the form of the Public Right of Way

Public Plaza Program

89% OF THE ROAD SPACE FOR VEHICLES, 11% FOR PEOPLE


TOSHIBA
Kodak

Public Plaza Program

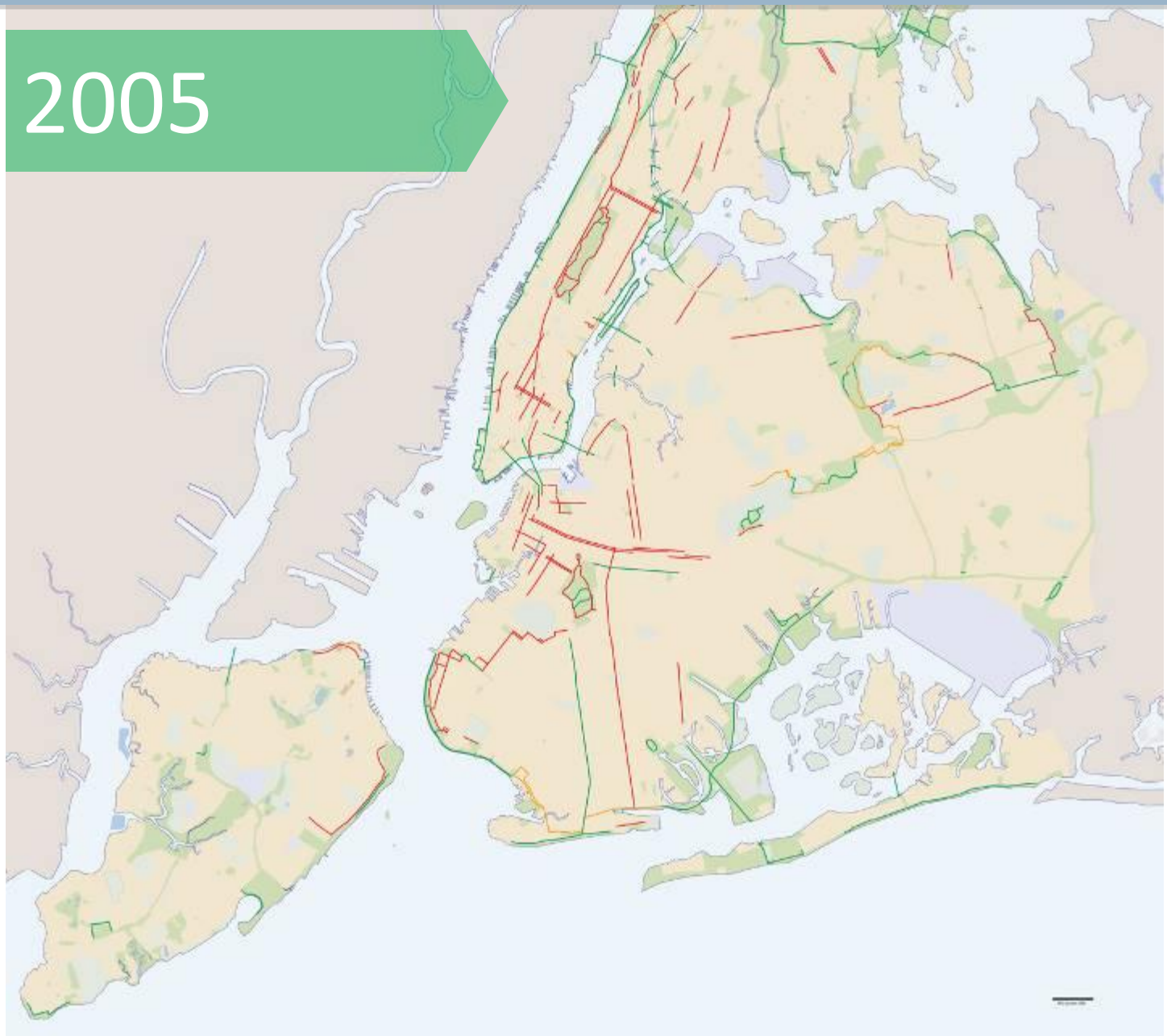
Pedestrian volumes up:

- 6% in Herald Square
- 11% in Times Square

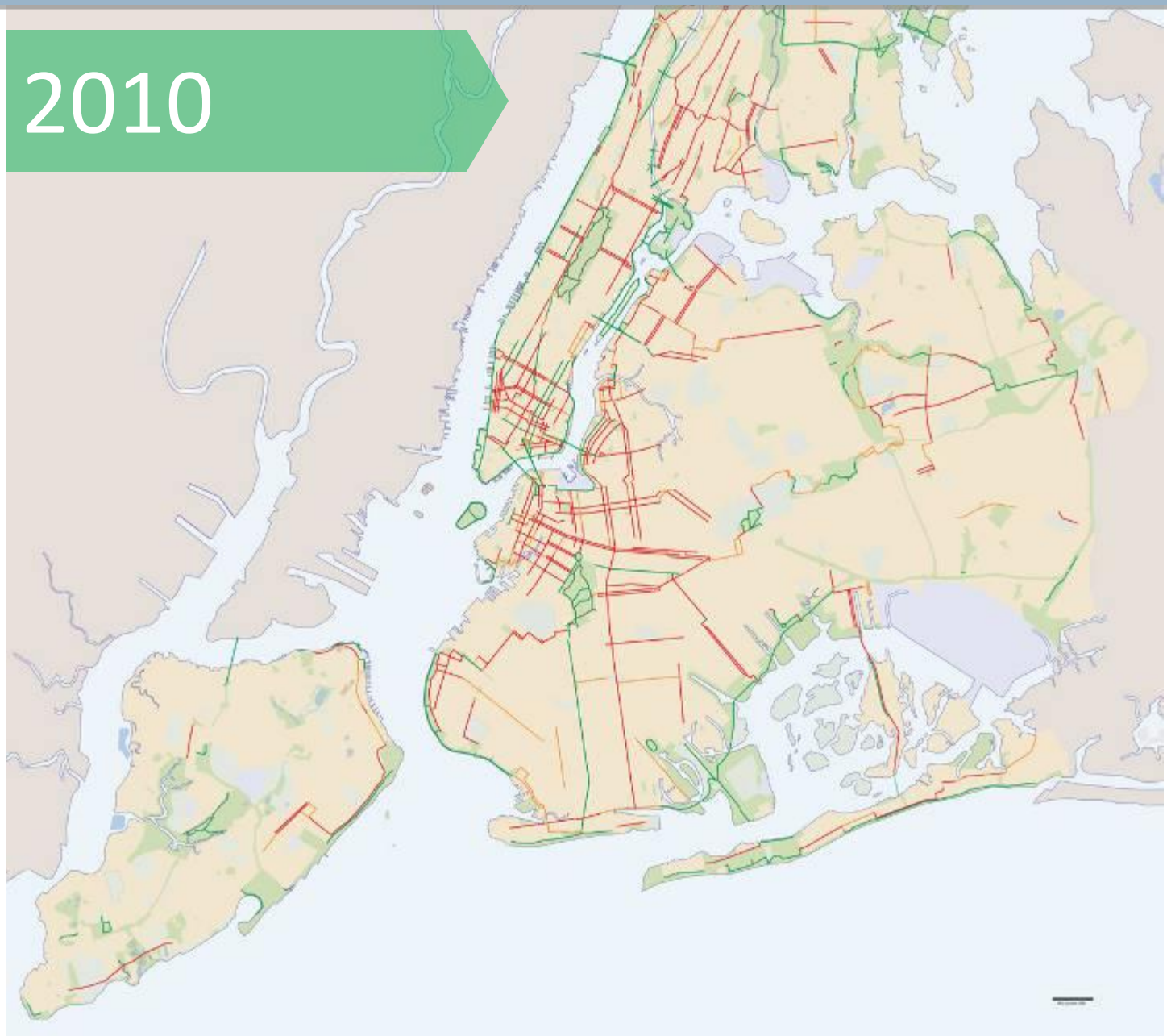
Retail up:

- in Times Square
- 49% drop in vacant storefronts in Union Square

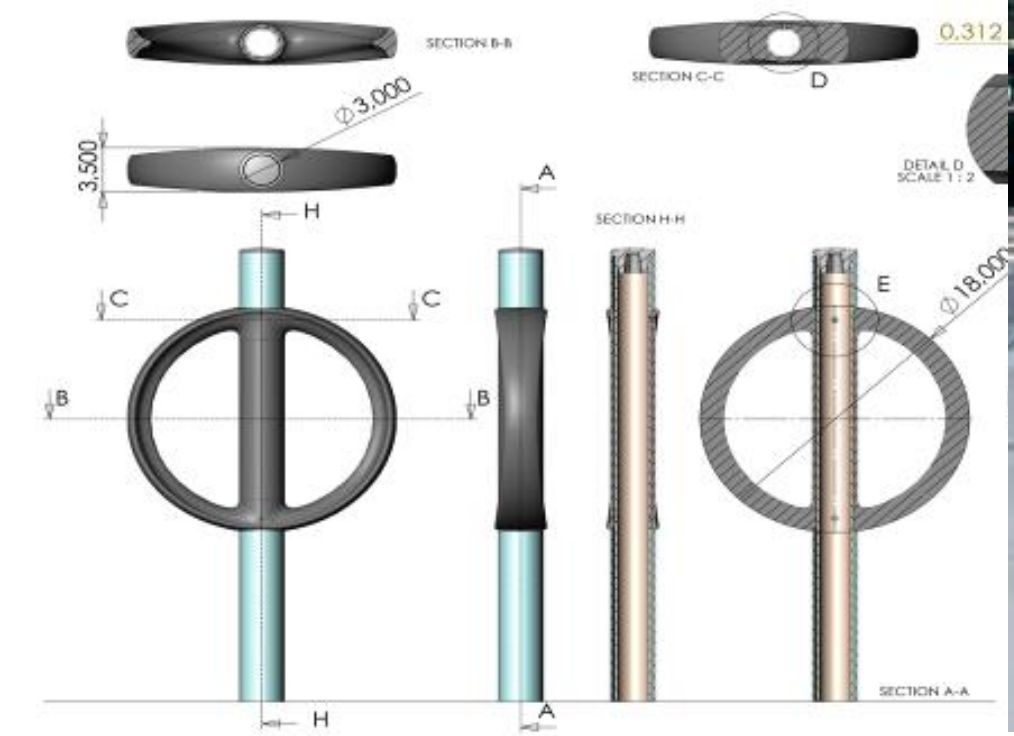
Bicycle Network



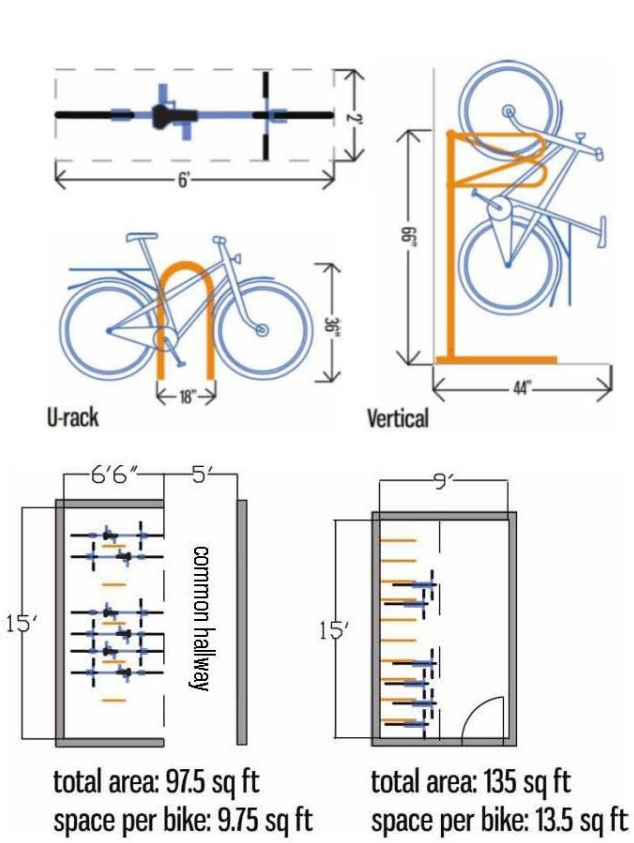
Bicycle Network

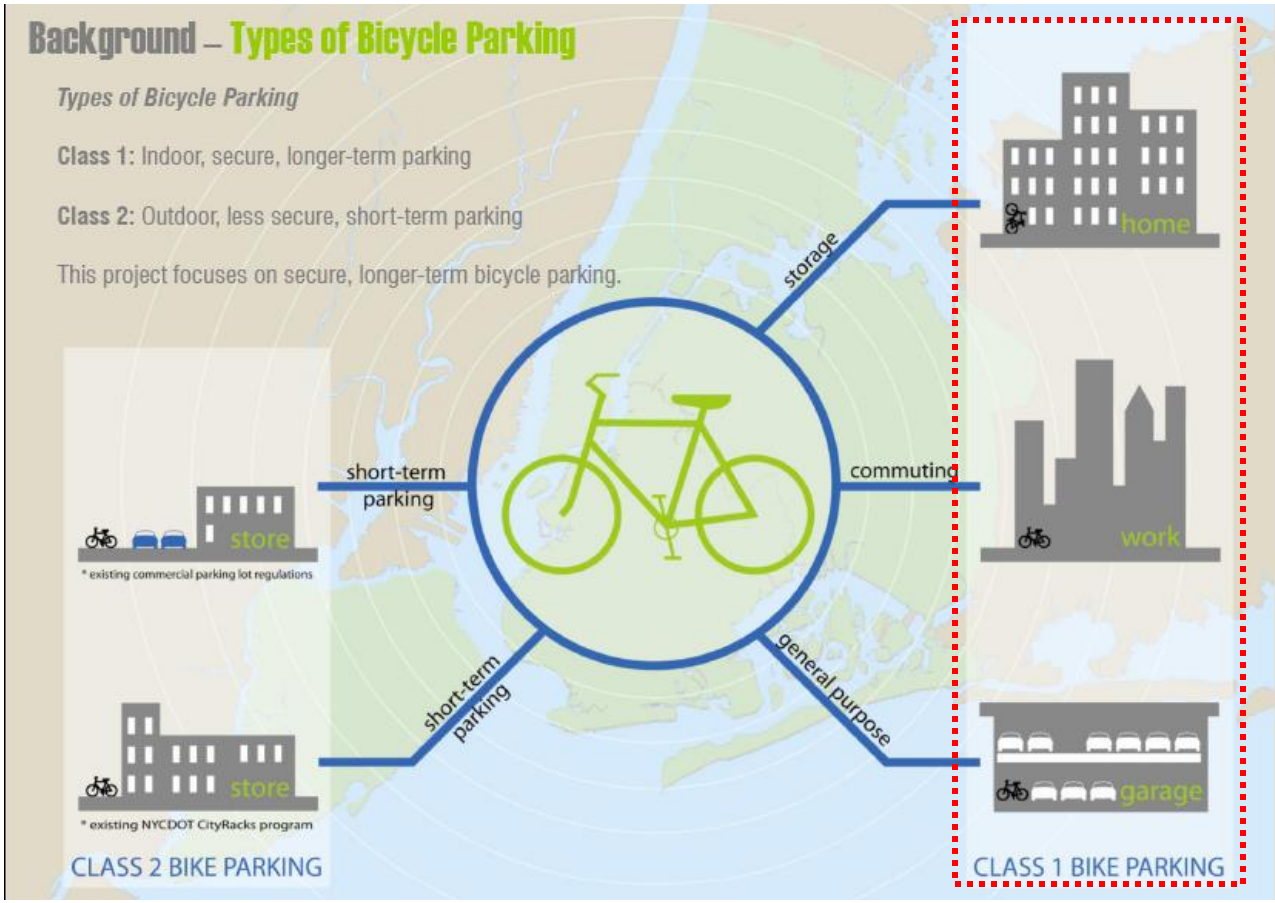


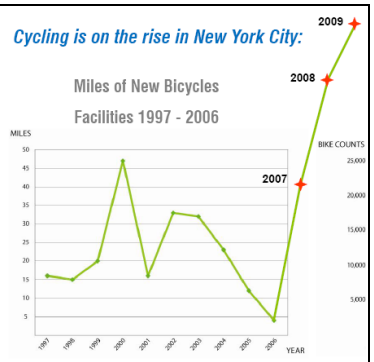
Bicycle Infrastructure



Zoning for Bicycle Parking





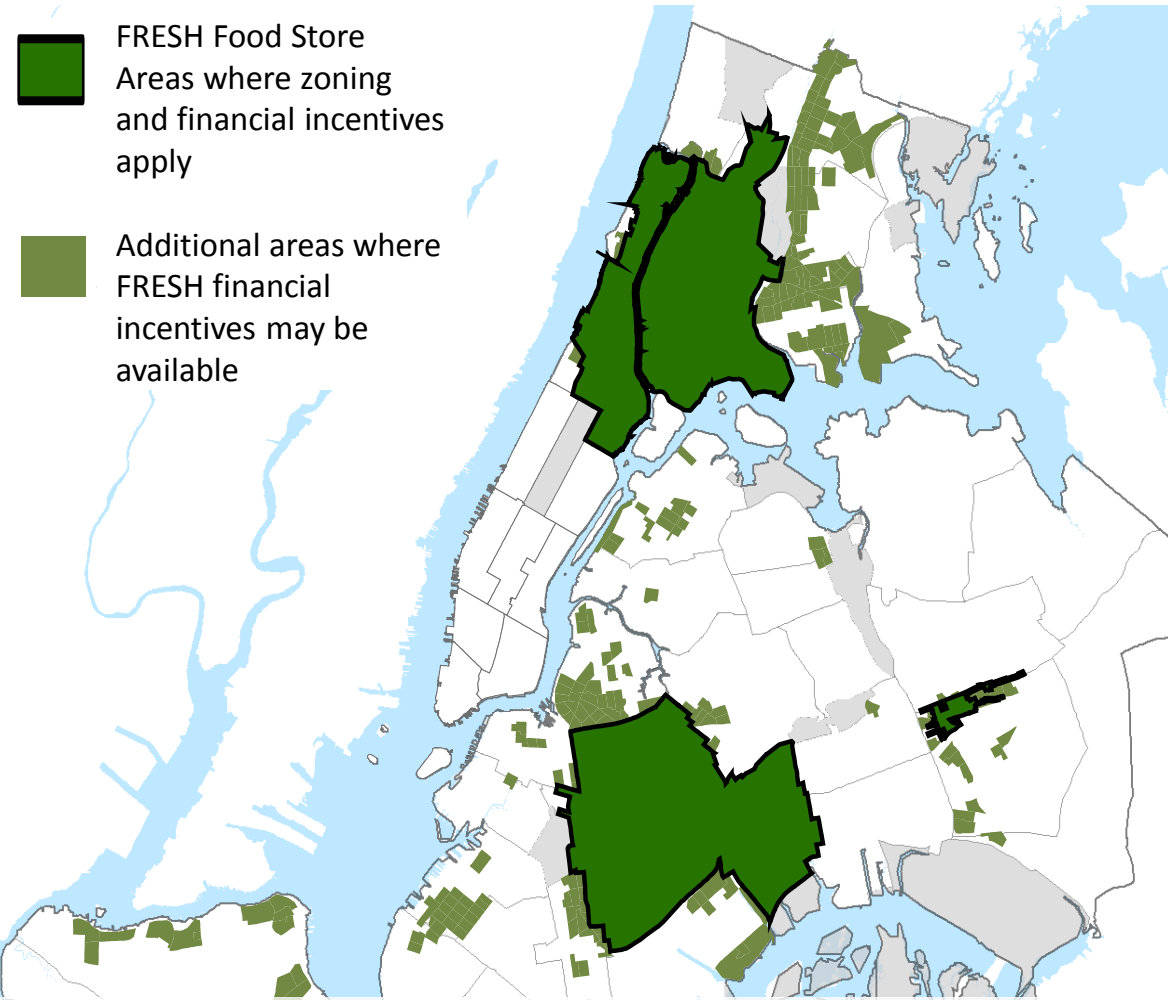


Bicycle parking now required for new buildings, enlargements, conversions and public parking garages

NYC Bike Share

- Started 2013
- 10,000 bicycles, 600 stations – Manhattan, Queens, Brooklyn (including Brooklyn DPHO)
- Bike Share Health Evaluation – Chronic Disease, Injury, Environmental Health

Food Retail Expansion to Support Health (FRESH)

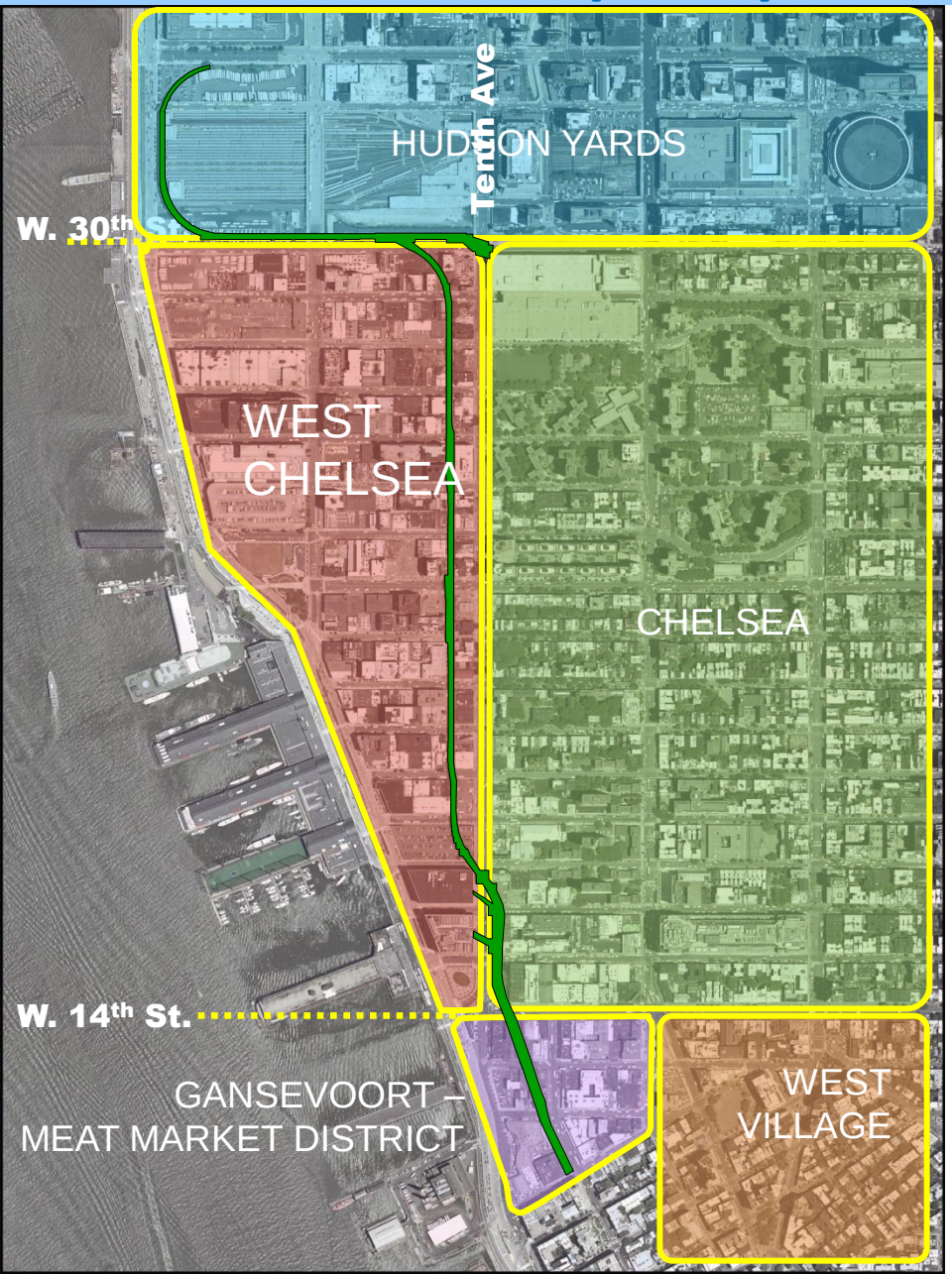


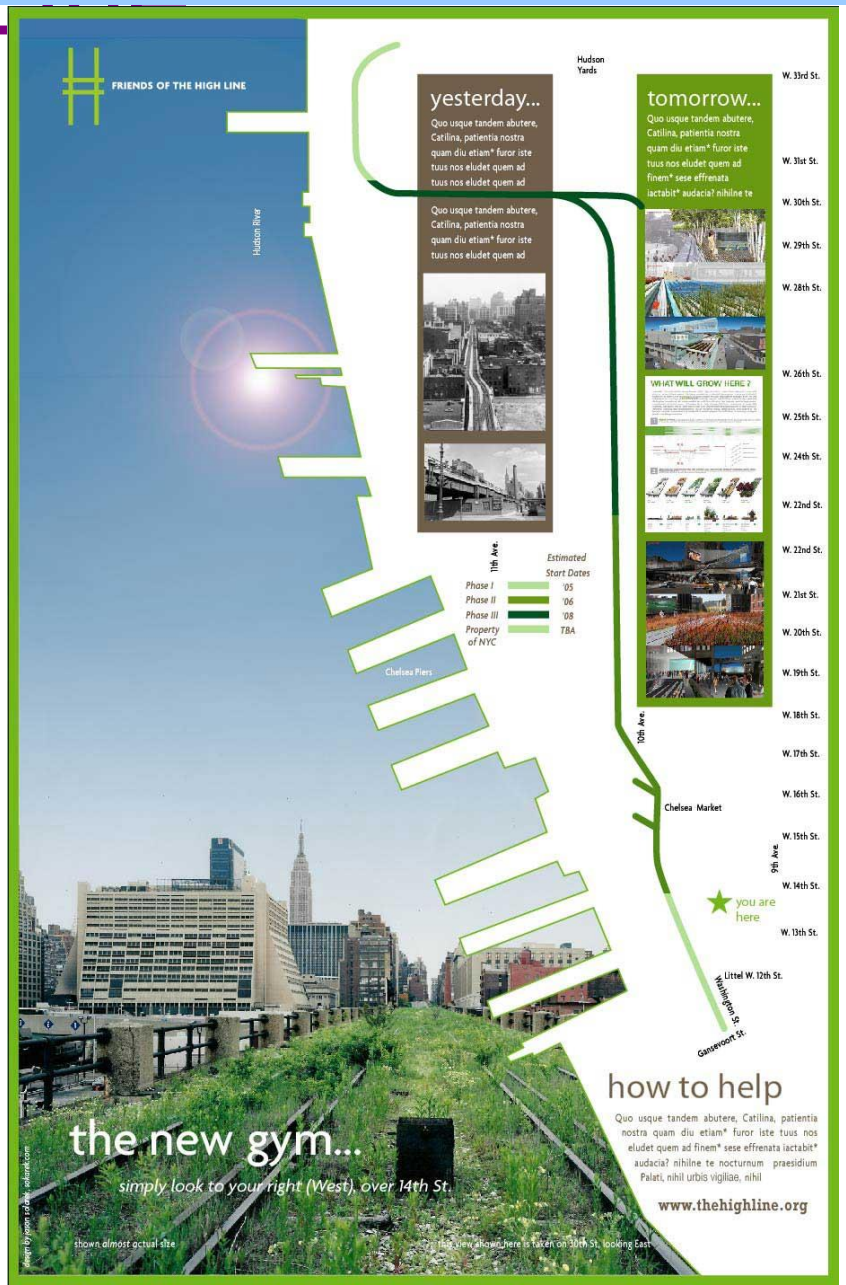
NYC FRESH Program:

Zoning and tax incentives for providing fresh food options in the city's underserved areas

www.nyc.gov/fresh

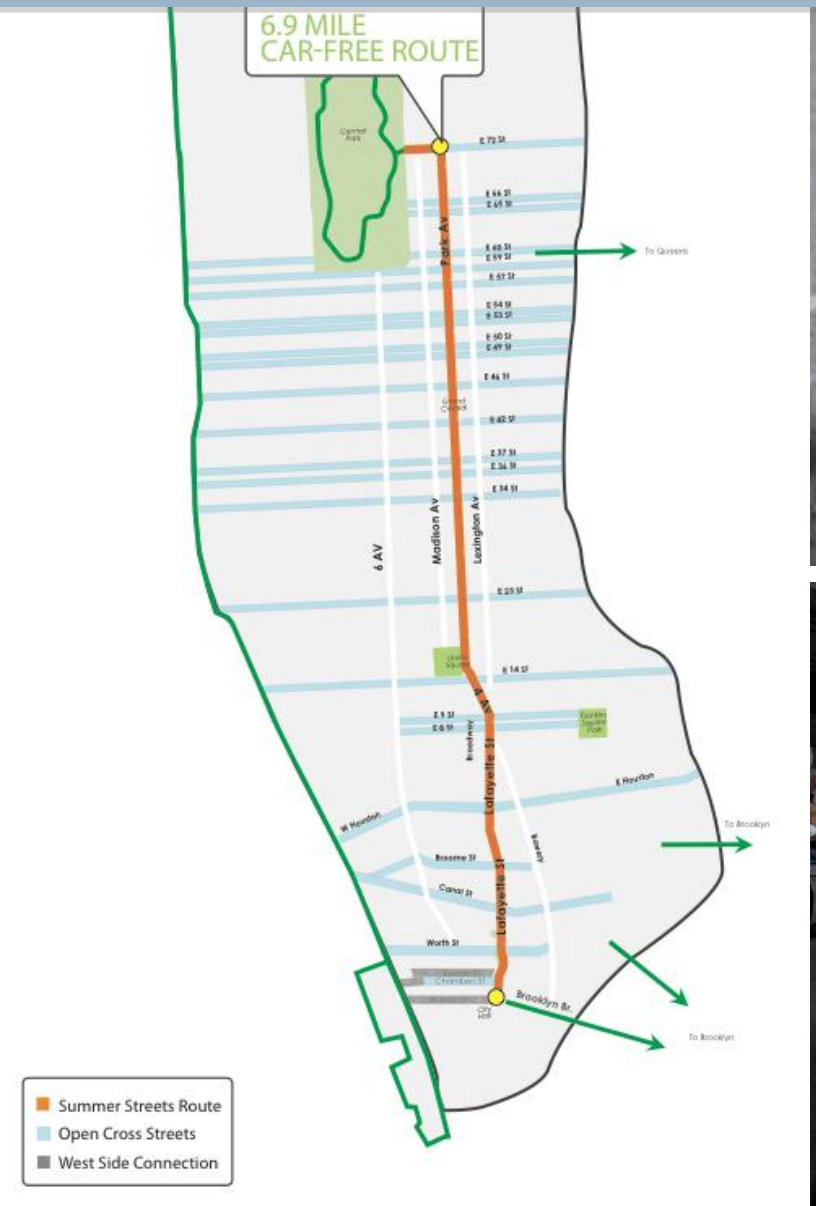
Public Parks and Open Spaces





Vision 2020: Comprehensive Waterfront Plan

Programming Streets for Active Recreation and Non-Car Mode Uses: Summer Streets and Play Streets



Improved Access to Tap Water - Public Realm & Buildings

City Policy + Implementation

Stair Promotion

- Better designed buildings
- >30,000 stair prompt signs distributed to owners and managers of >1,000 buildings

Impacts in NYC

- Increased:
  - Pedestrian volumes through pedestrian plazas
  - Stair use, where stair prompts are posted
  - Commuter cycling – up 289%
  - Bus and subway ridership – up 10%
  - Places for children's play - >60 new Play Streets permitted; >180 schoolyards to playgrounds opened

- Decreased:
  - Traffic fatalities 37%
  - Traffic volumes 1.5%
  - Car registrations 5%

- Started Reversing Childhood Obesity (also in Philadelphia & San Diego!)
- Positive Environmental and Economic Impacts