

Community Design & Public Health

Rochester, Minnesota September 21, 2010



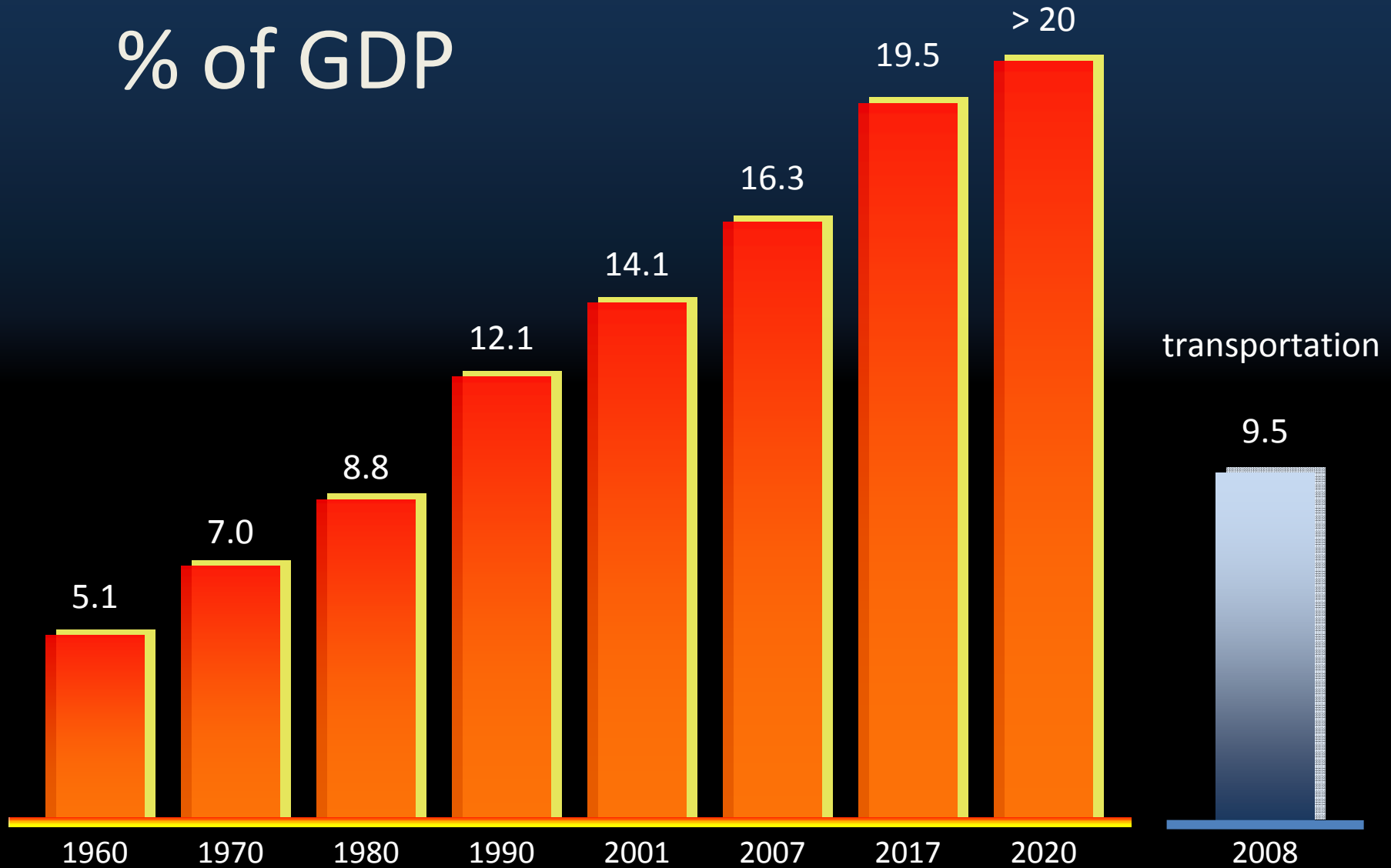
1



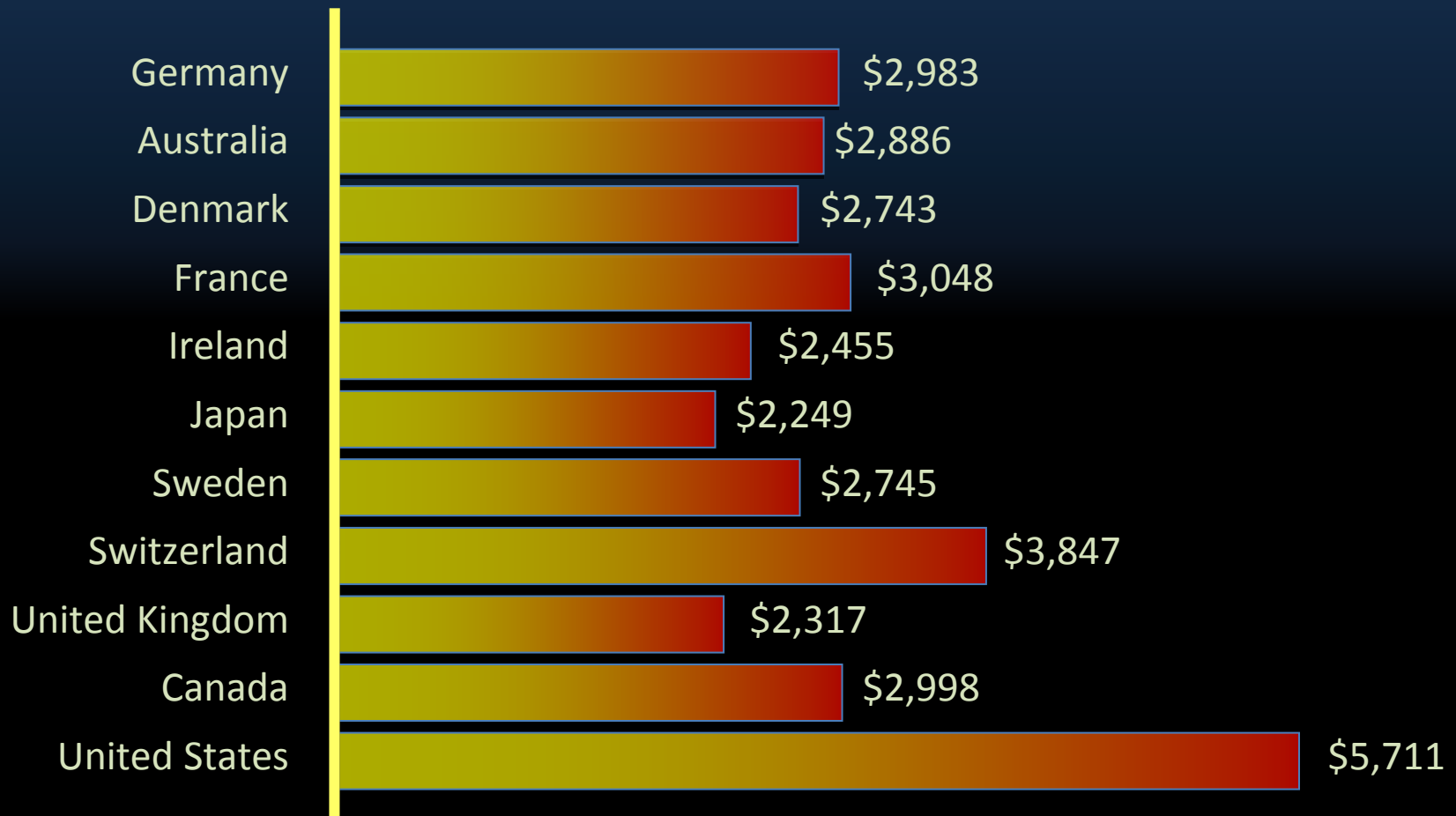
Photo: Dan Burden

Public Health

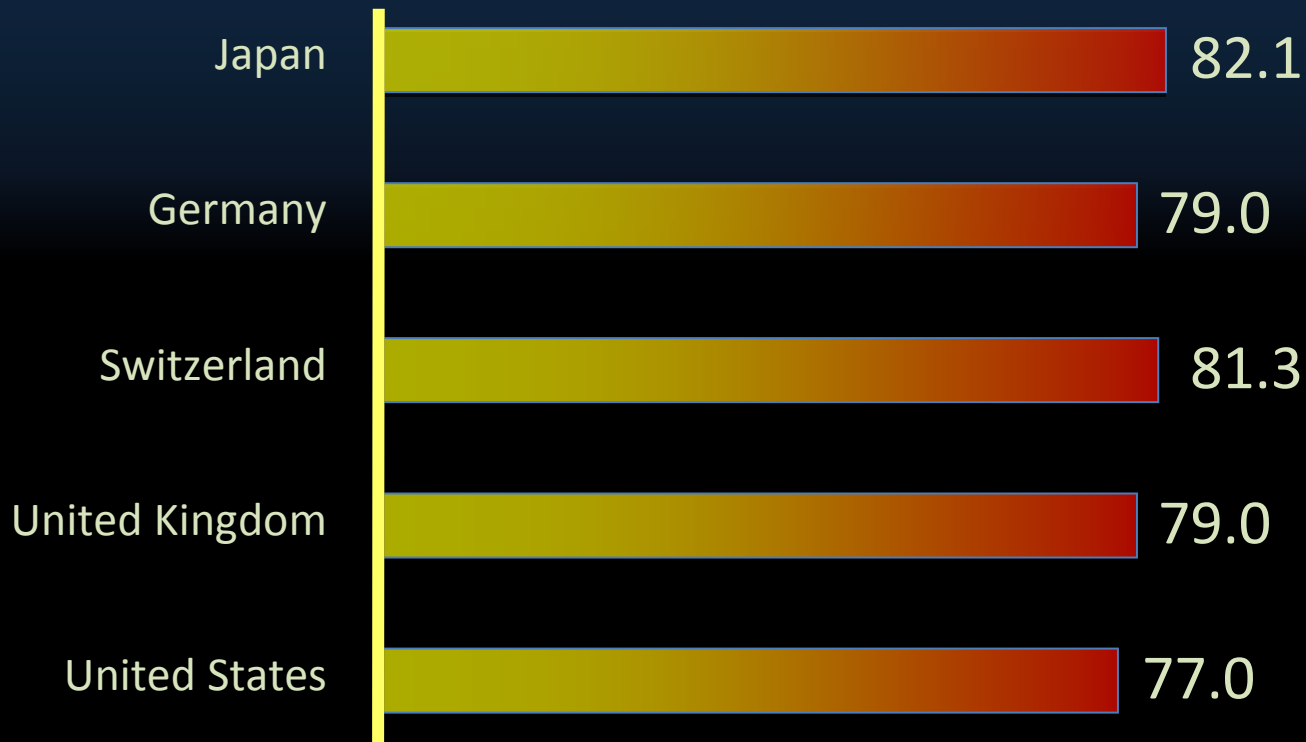
US Health Care % of GDP



Annual Health Care Costs/Capita

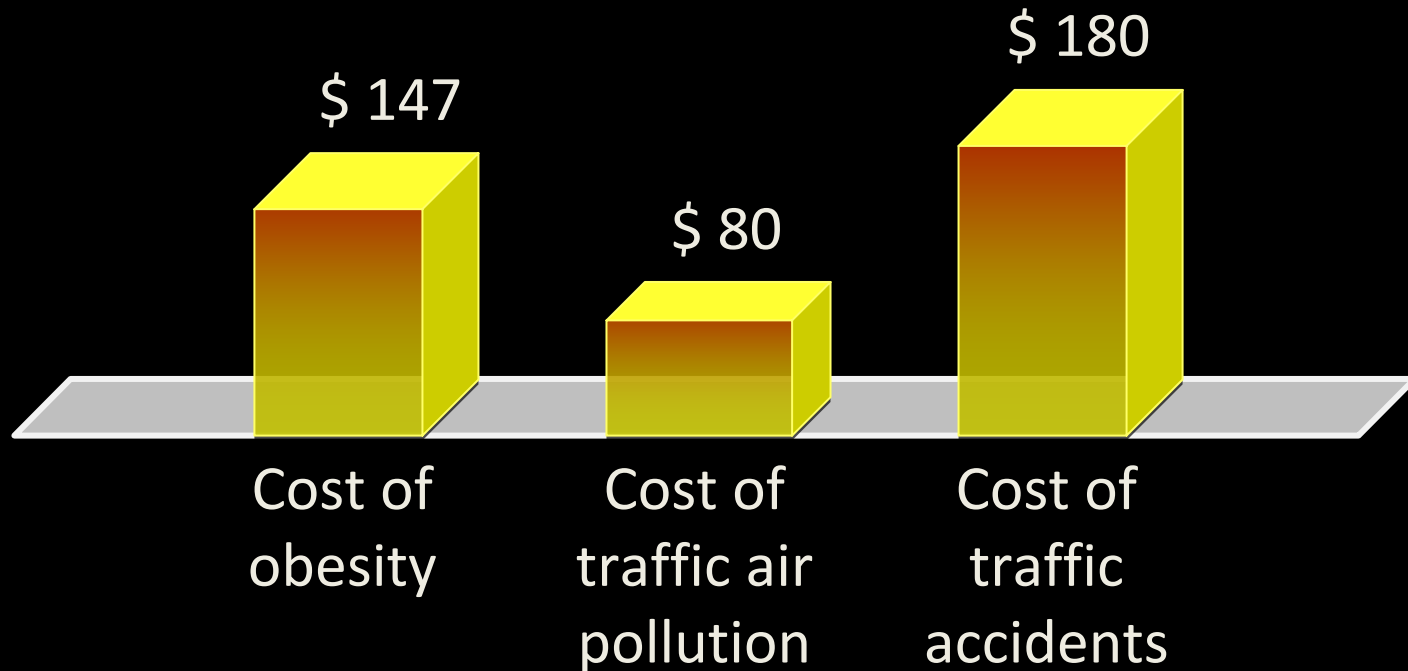


Average Life Expectancy



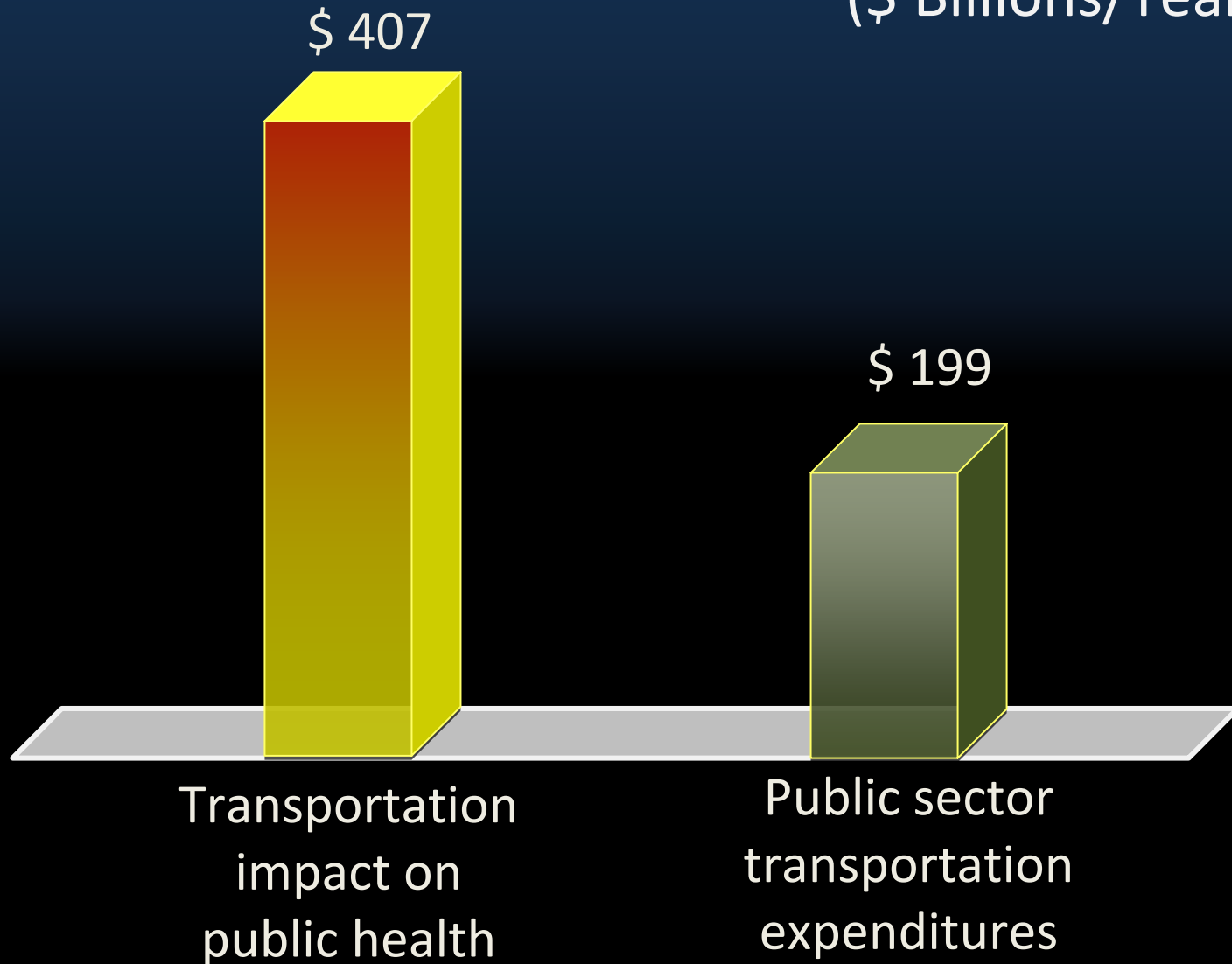
Scale – United States Economy

(\$ Billions/Year)



Scale – United States Economy

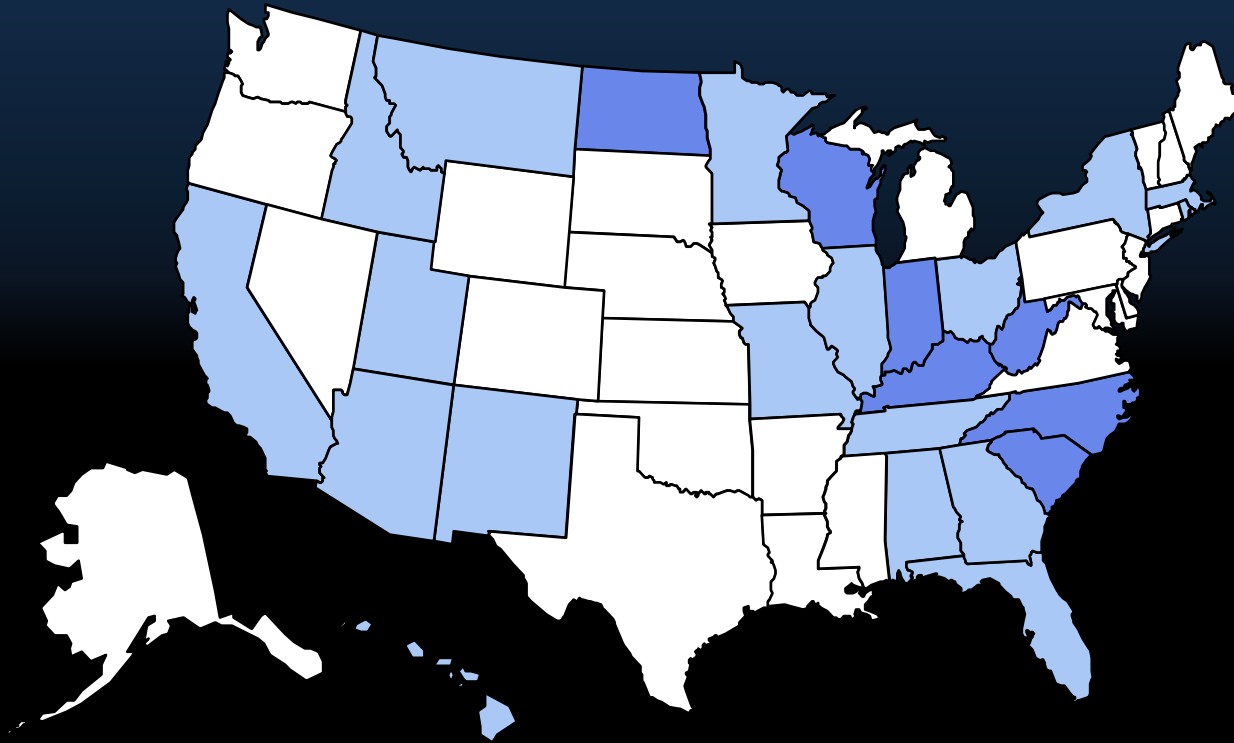
(\$ Billions/Year)



Obesity

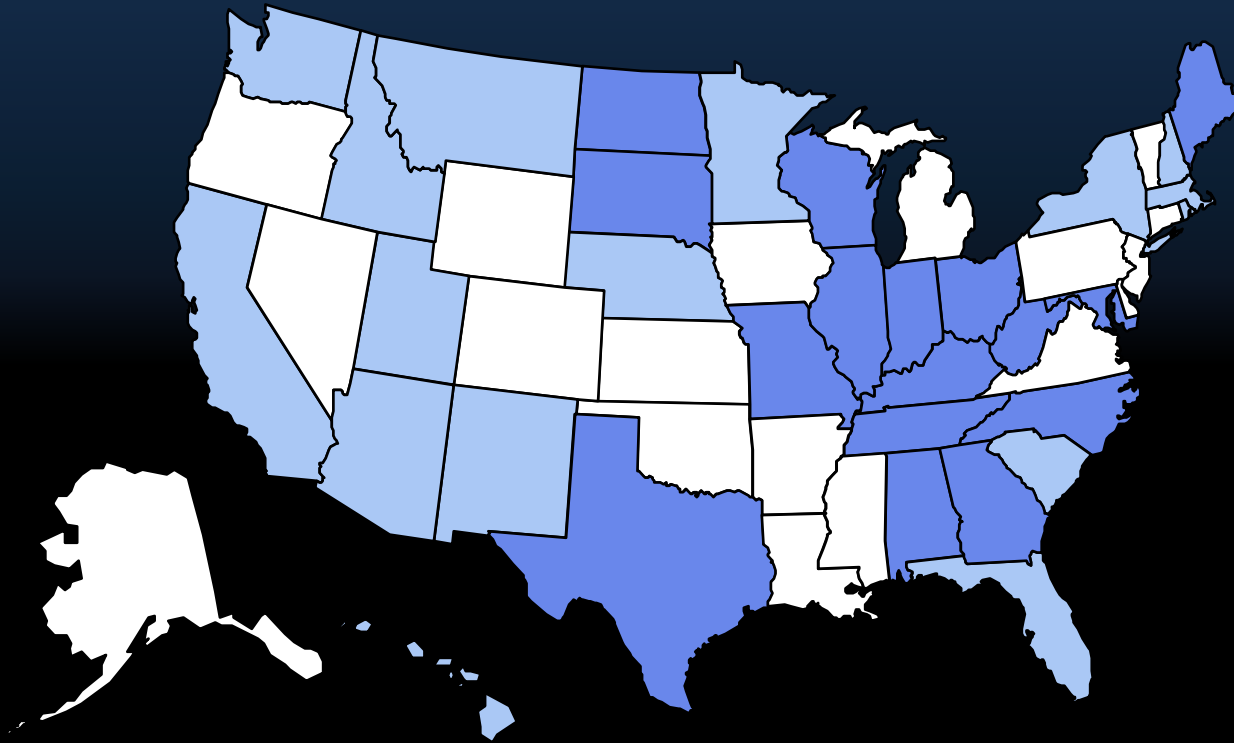


1986



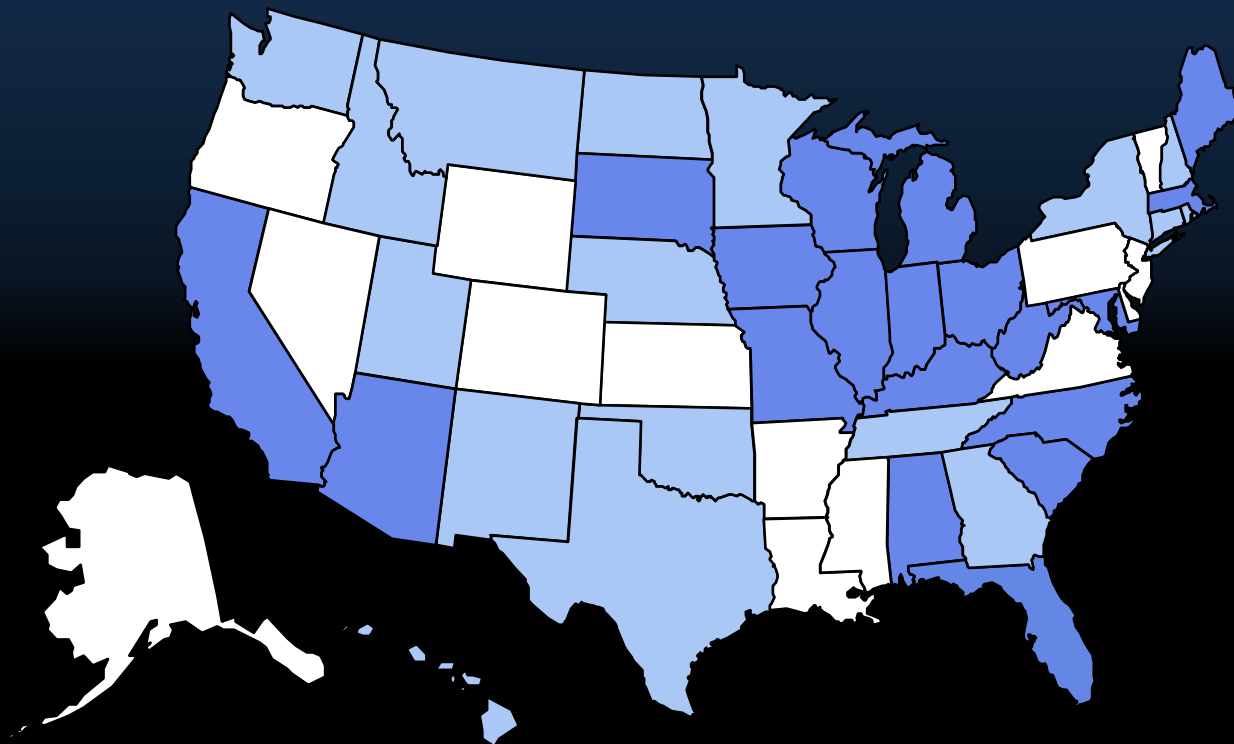
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1987



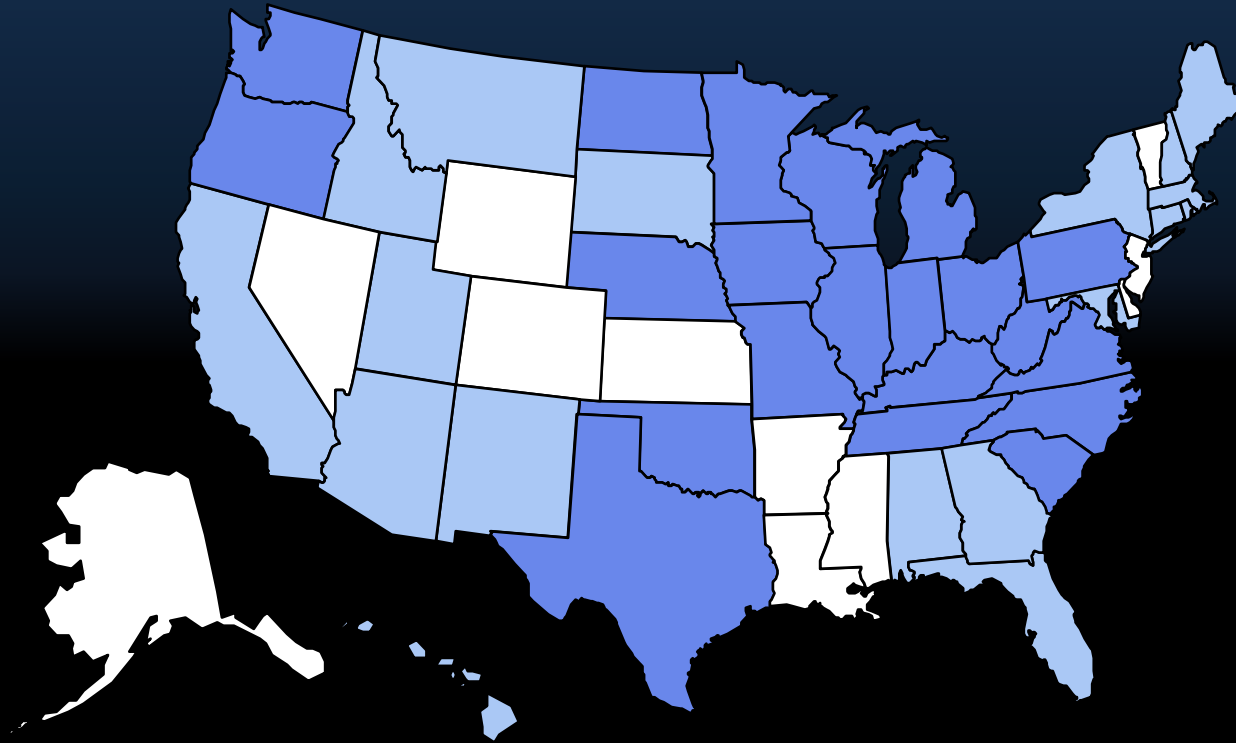
■ No Data ■ <10% ■ 10%-14%

1988



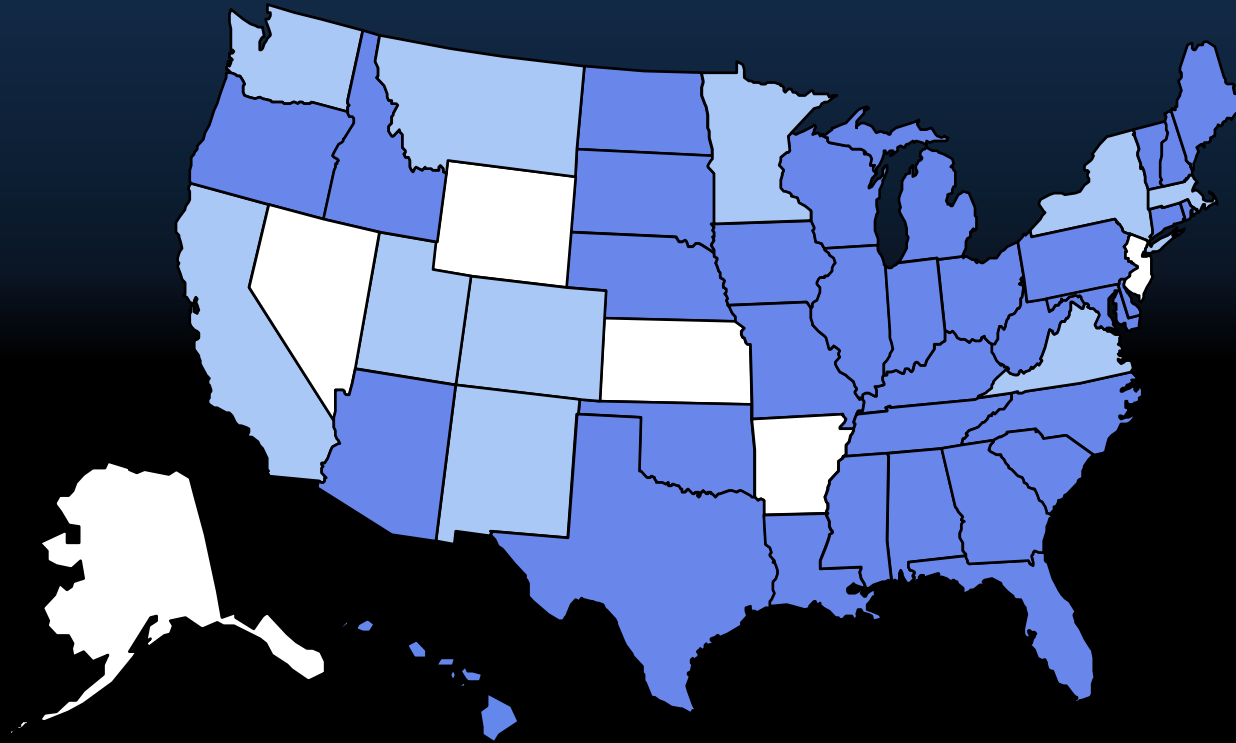
No Data
 <10%
 10%–14%

1989



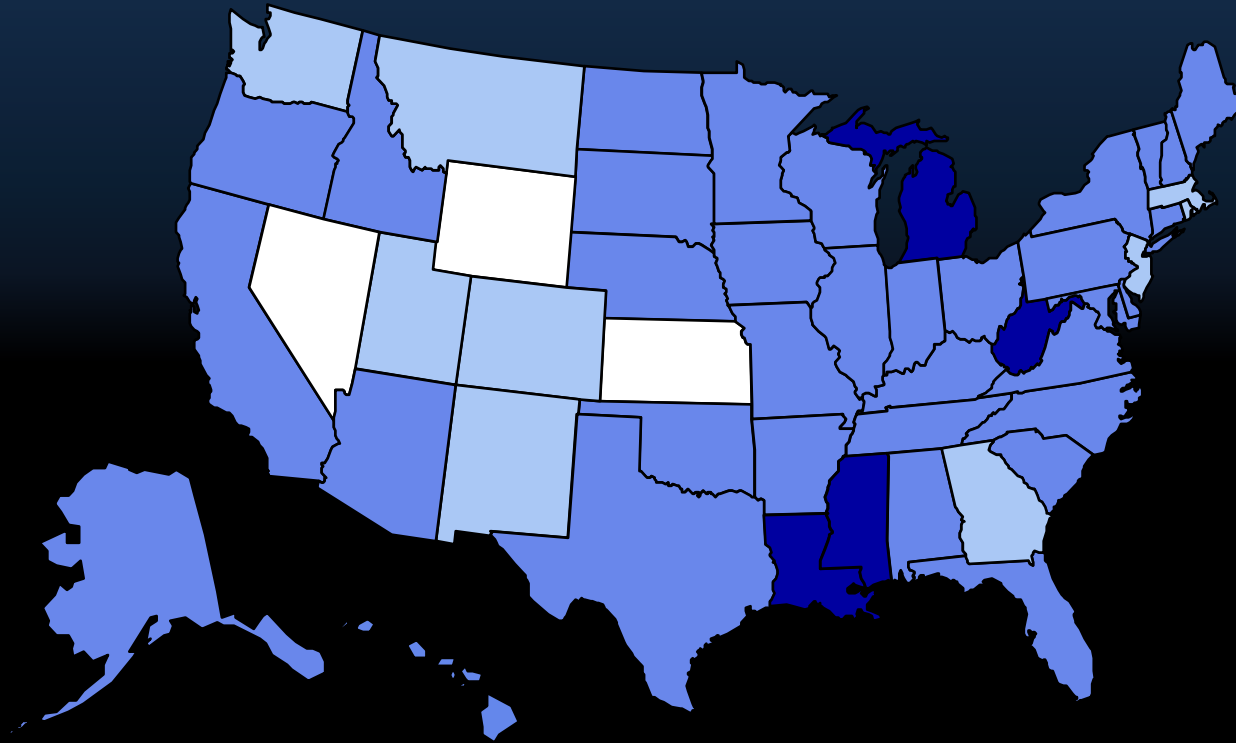
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1990



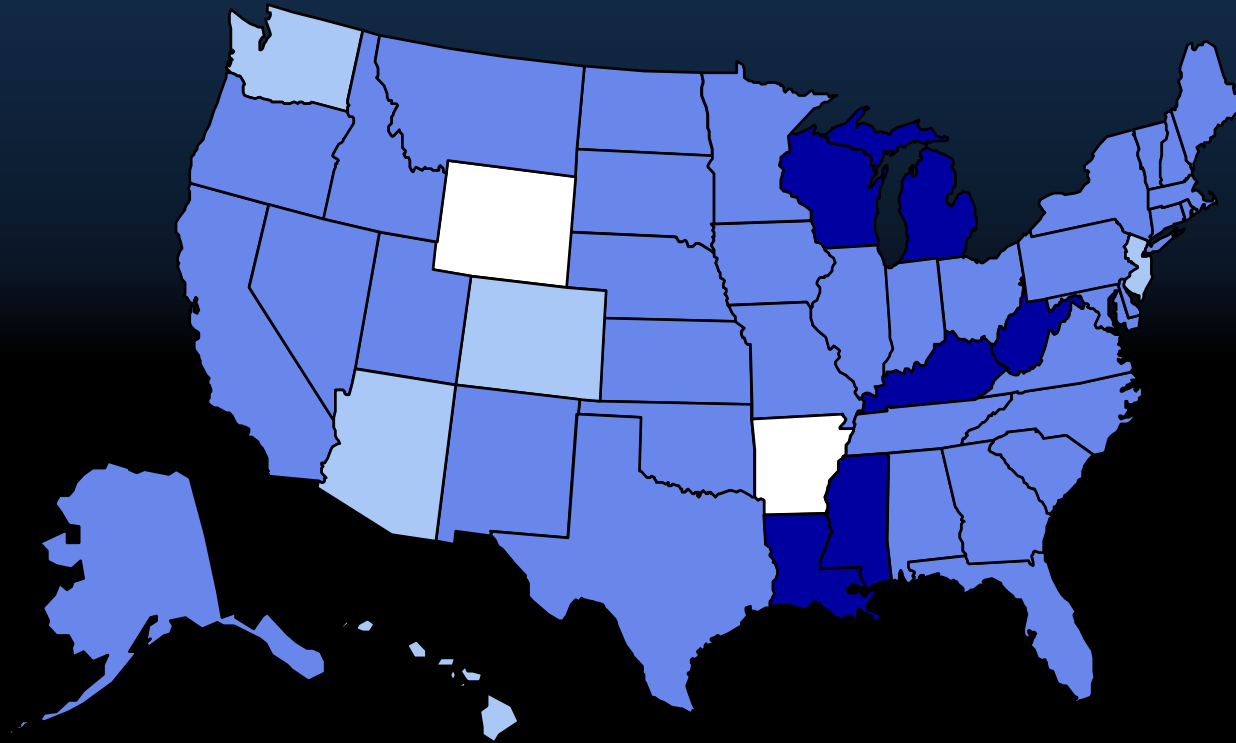
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1991



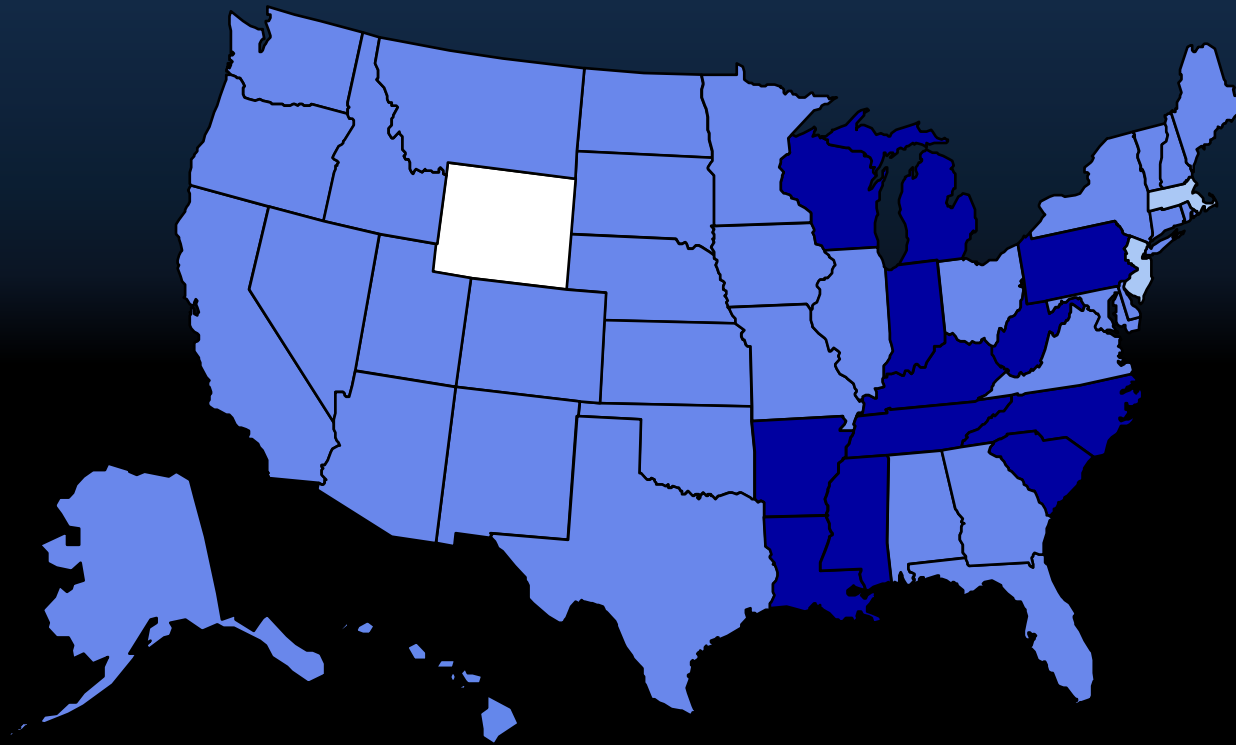
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1992

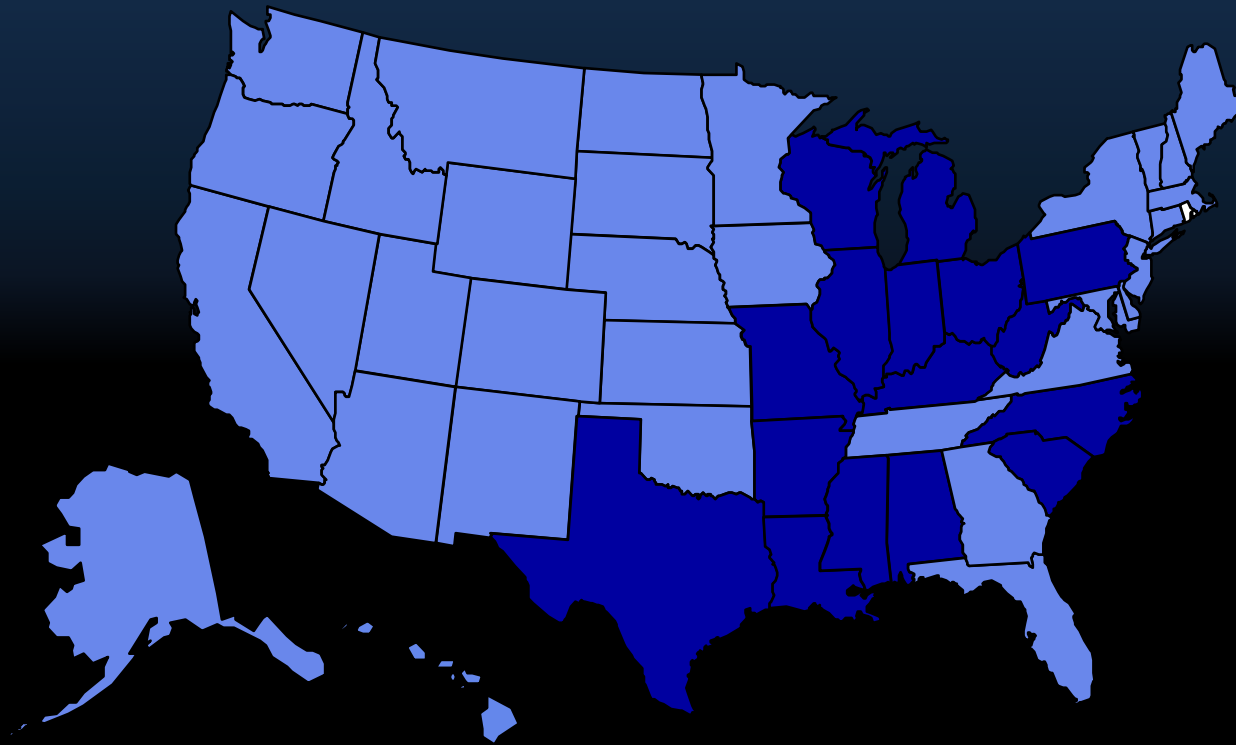


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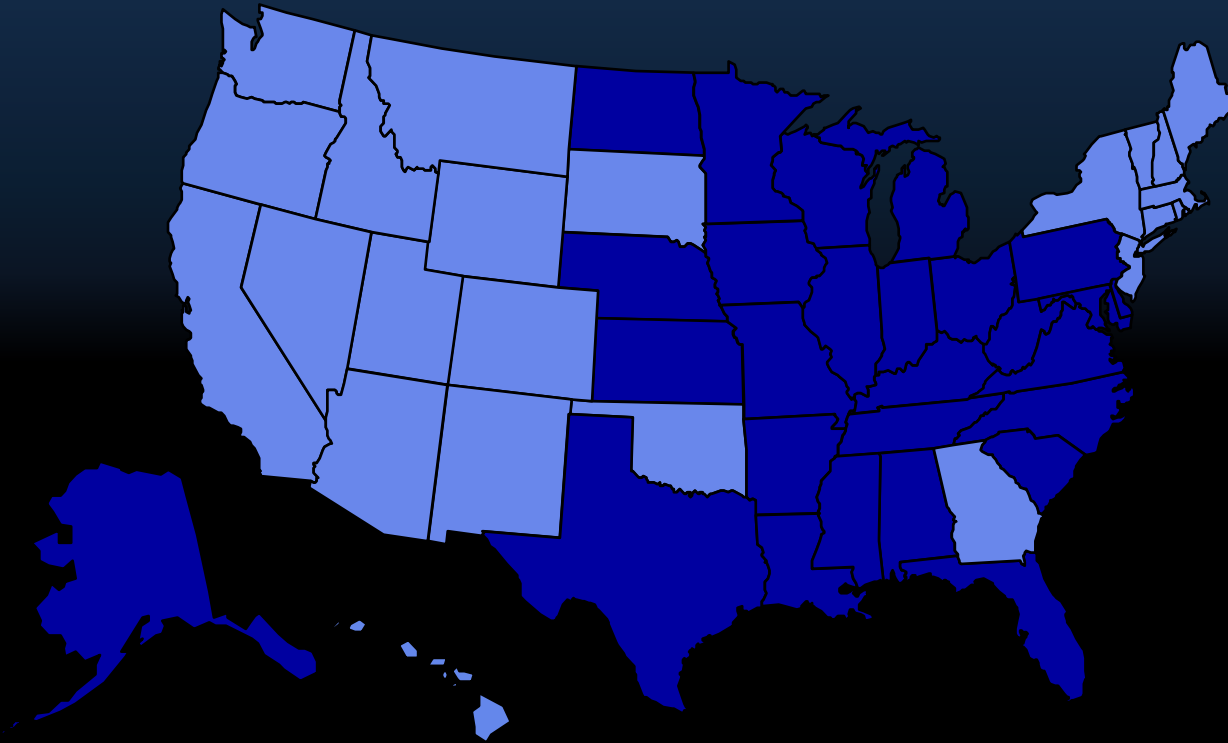
1993



1994

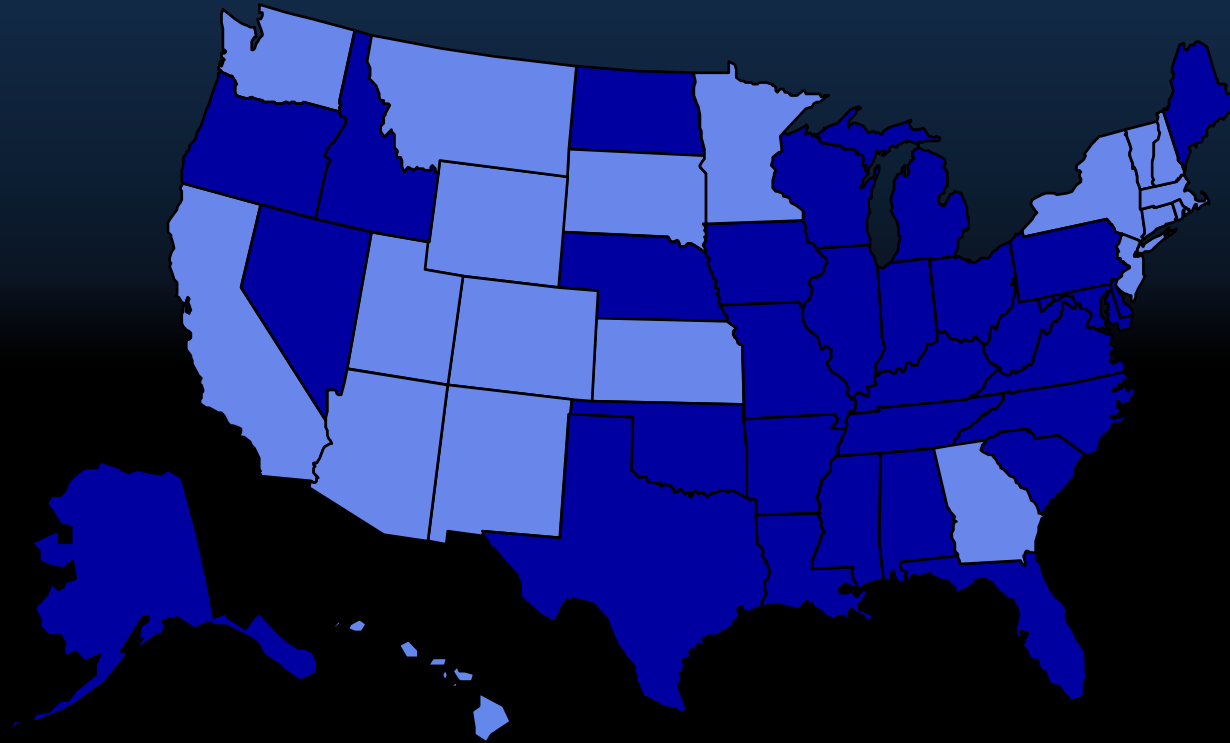


1995



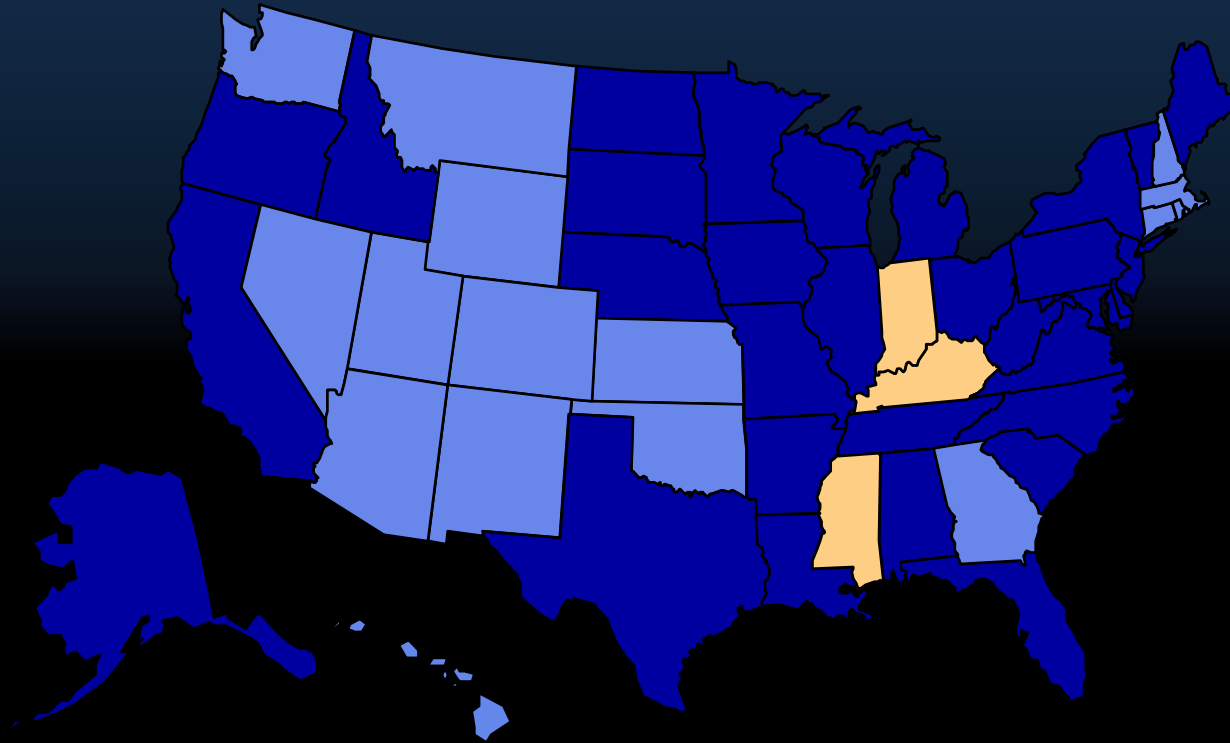
■ No Data ■ <10% ■ 10%–14% ■ 15%–19%

1996



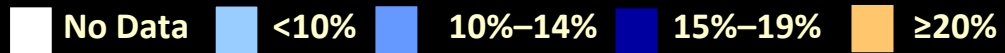
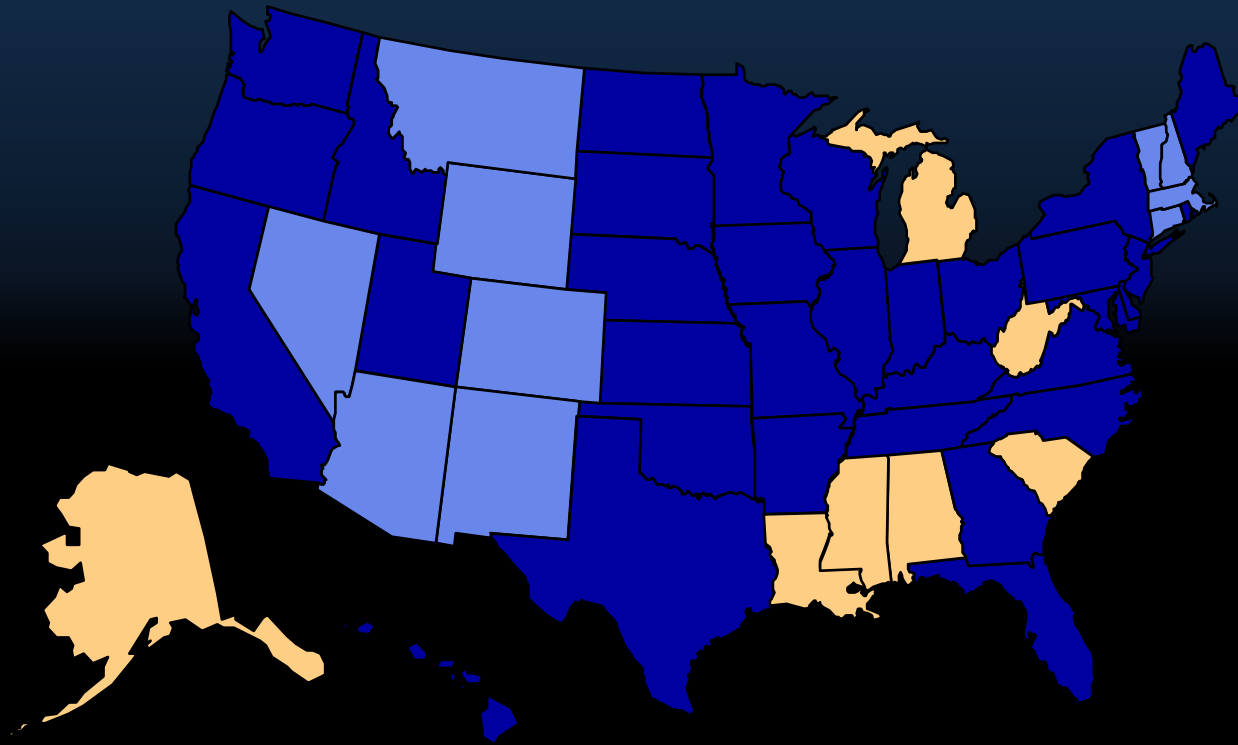
■ No Data ■ <10% ■ 10%–14% ■ 15%–19%

1997

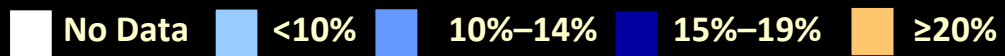
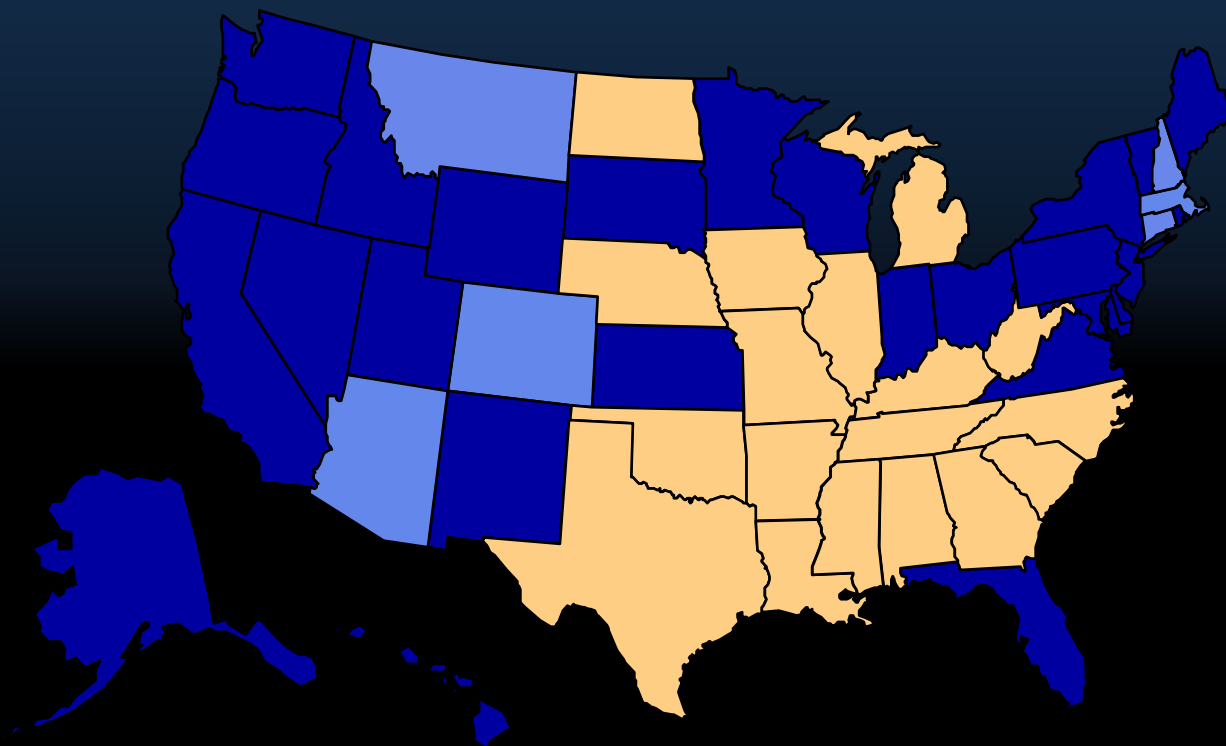


■ No Data ■ <10% ■ 10%–14% ■ 15%–19% ■ ≥20%

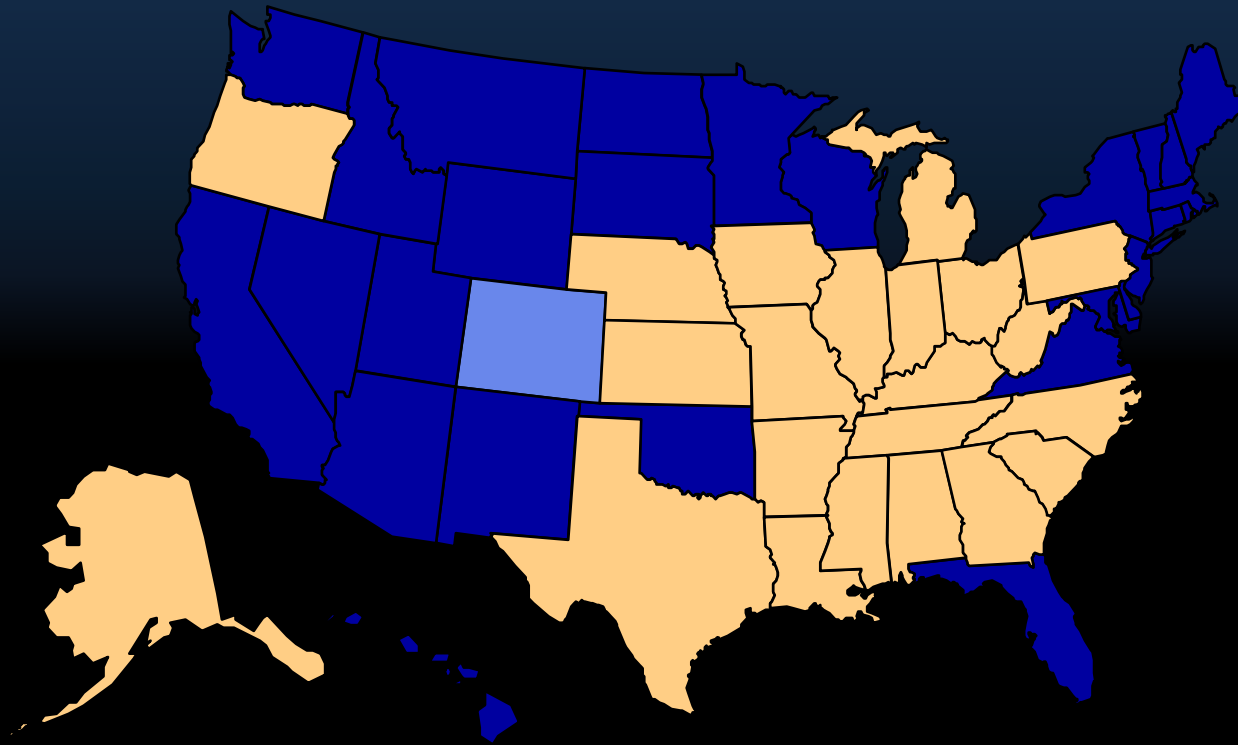
1998



1999

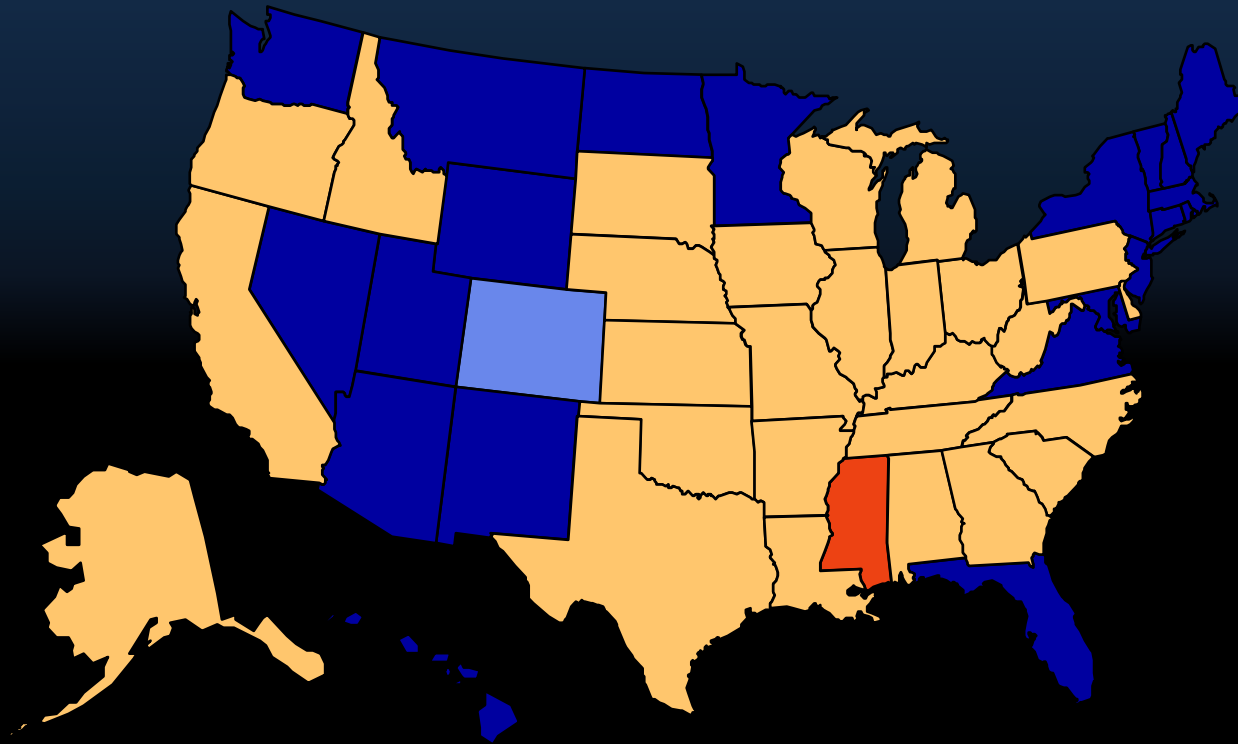


2000



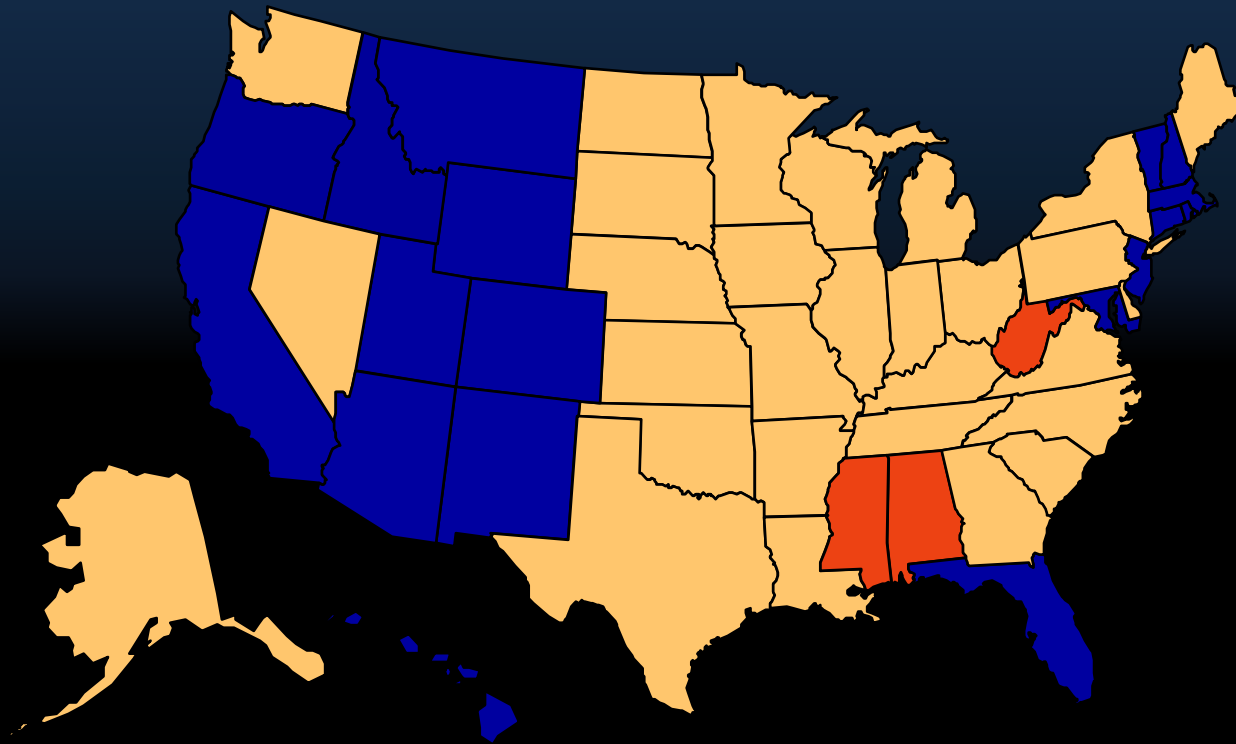
No Data <10% 10%–14% 15%–19% ≥20%

2001



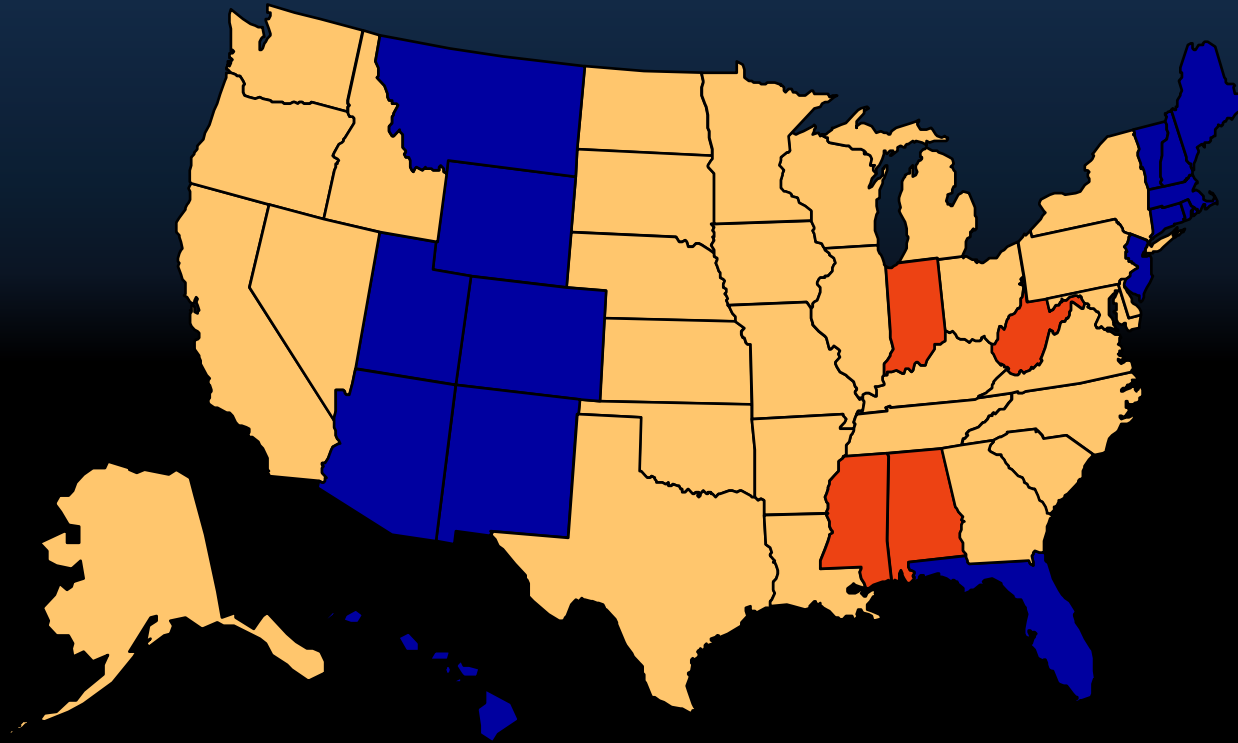
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2002



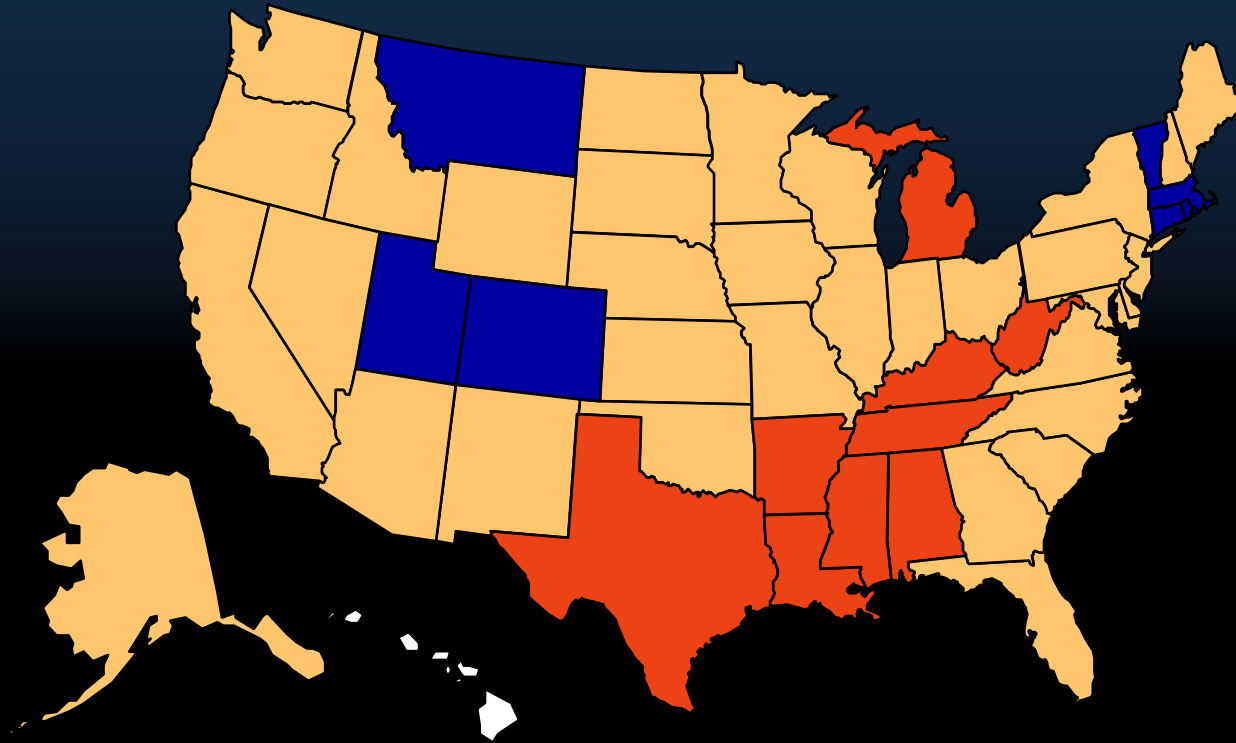
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2003



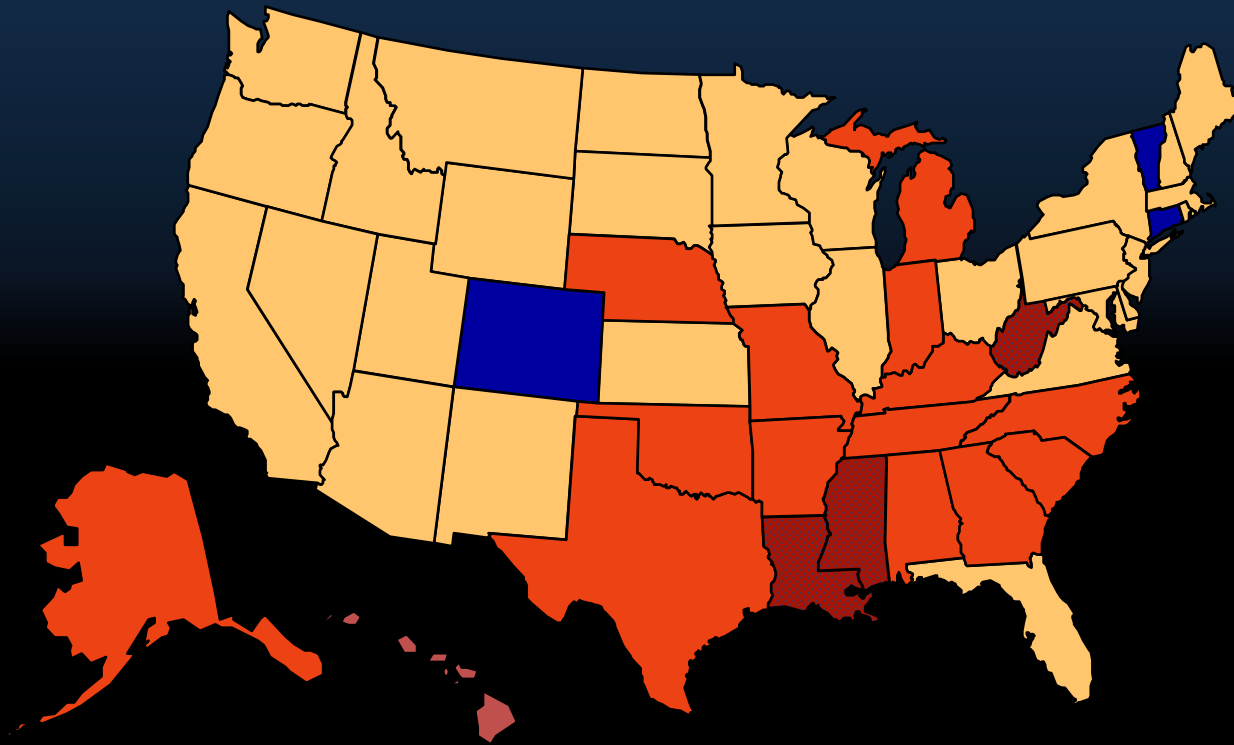
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2004



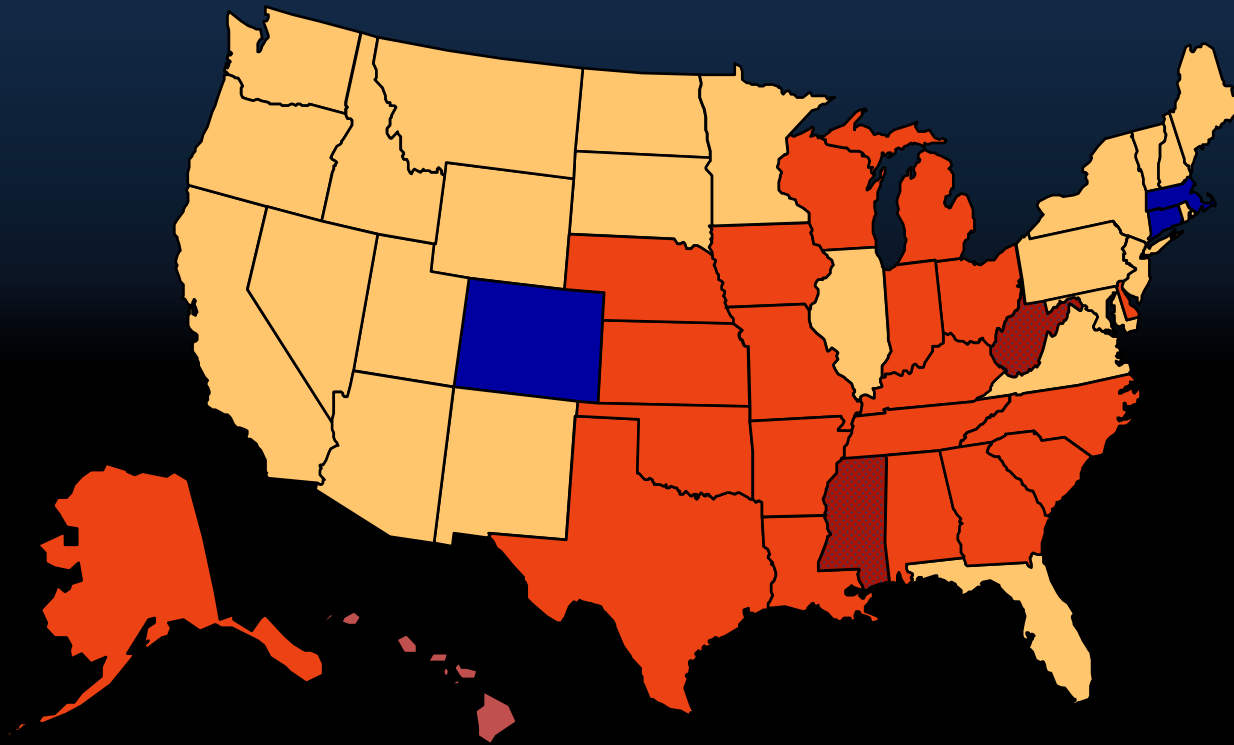
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2005



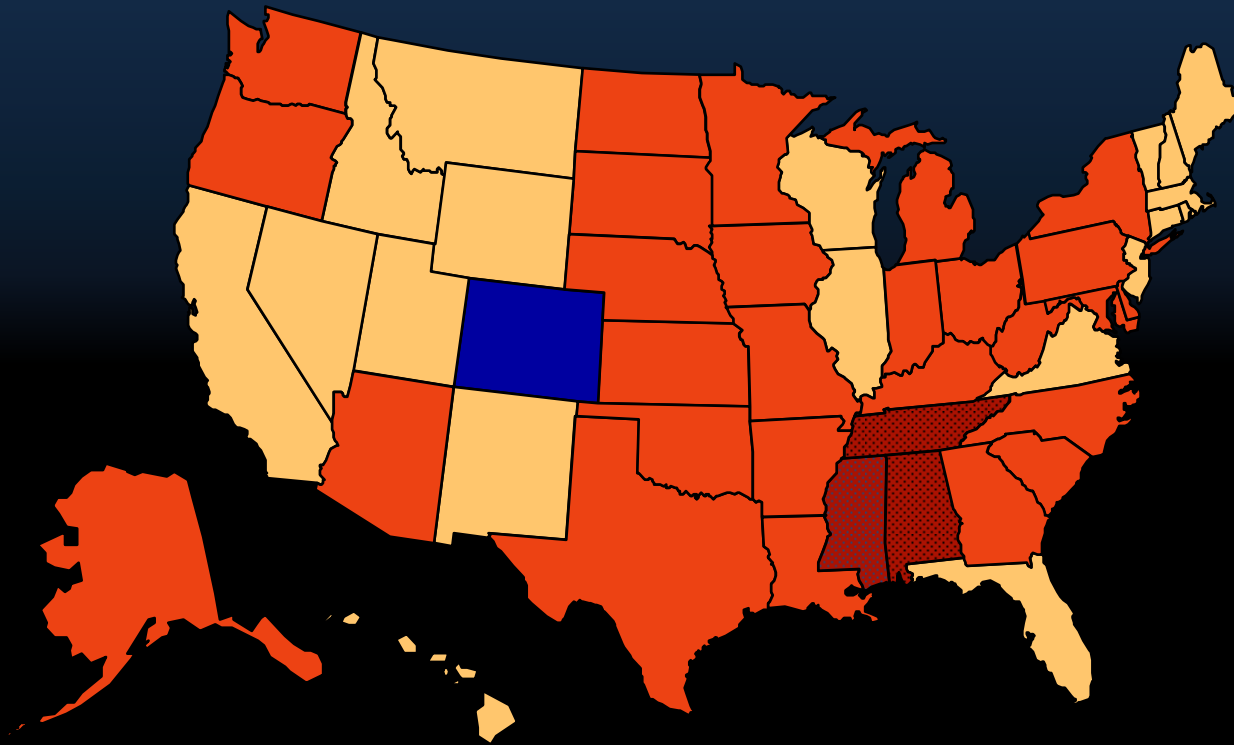
No Data <10% 10%–14% 15%–19% 20%–24% 25%–29% ≥30%

2006



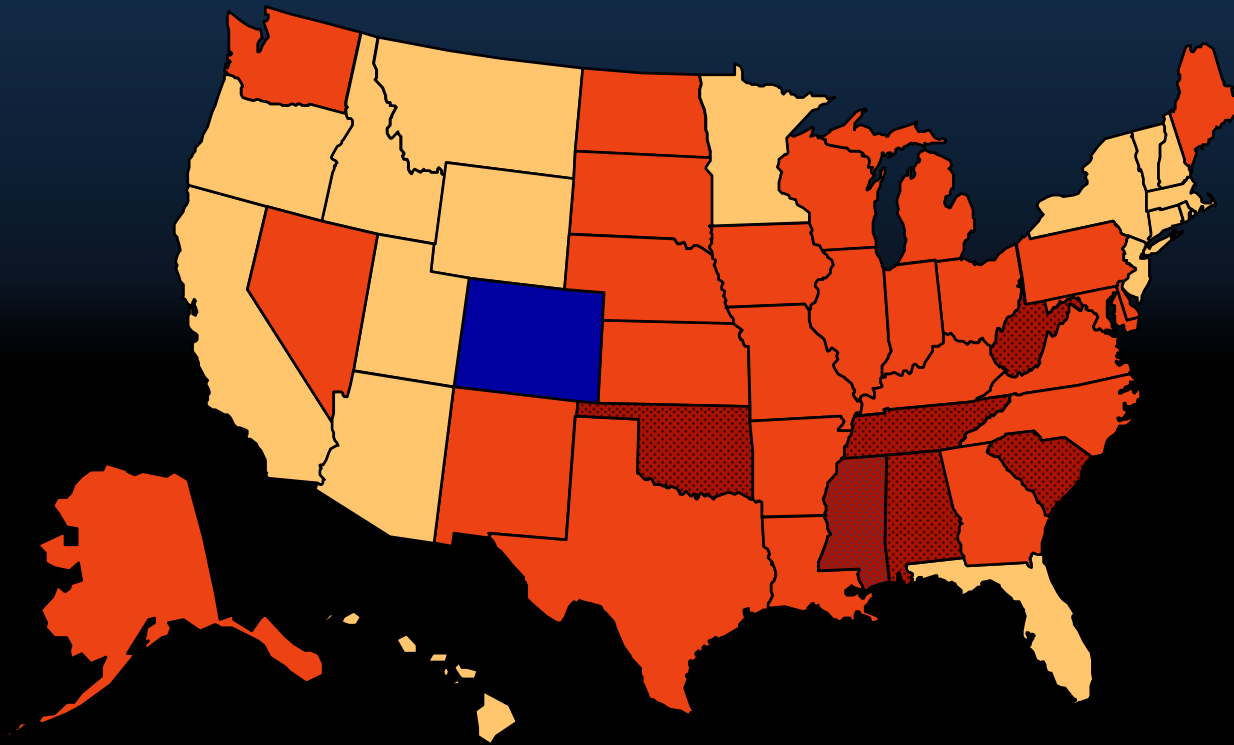
■ No Data ■ <10% ■ 10-14% ■ 15-19% ■ 20-24% ■ 25-29% ■ ≥30%

2007



No Data <10% 10%–14% 15%–19% 20%–24% 25%–29% ≥30%

2008



No Data <10% 10%–14% 15%–19% 20%–24% 25%–29% ≥30%

Obesity Epidemic

- Significant differences between states
- Significant differences between local places

Health Indicators – Adult Obesity

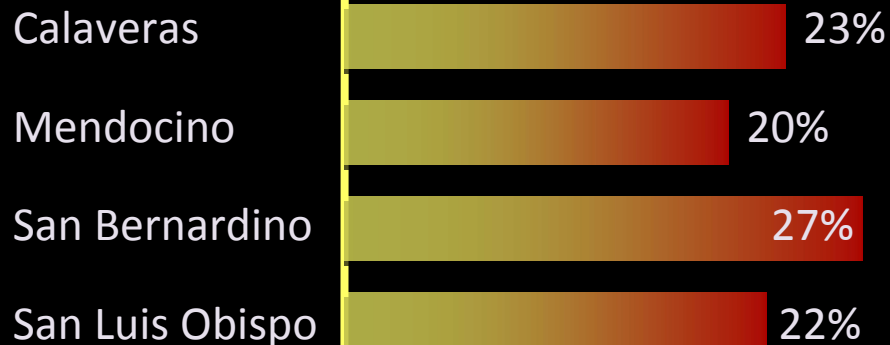
ARIZONA



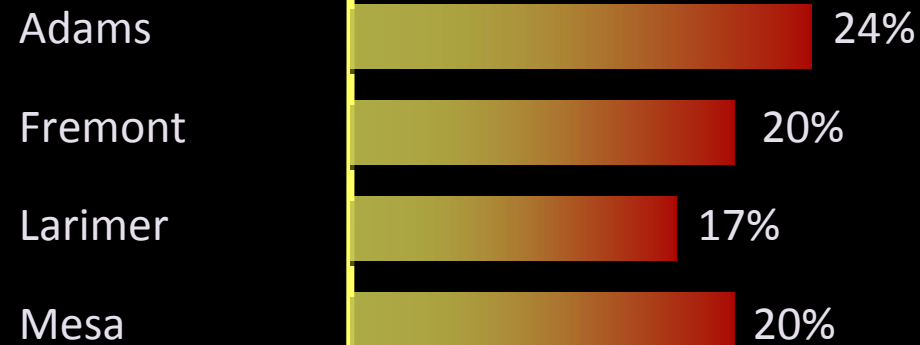
NEW MEXICO



CALIFORNIA



COLORADO

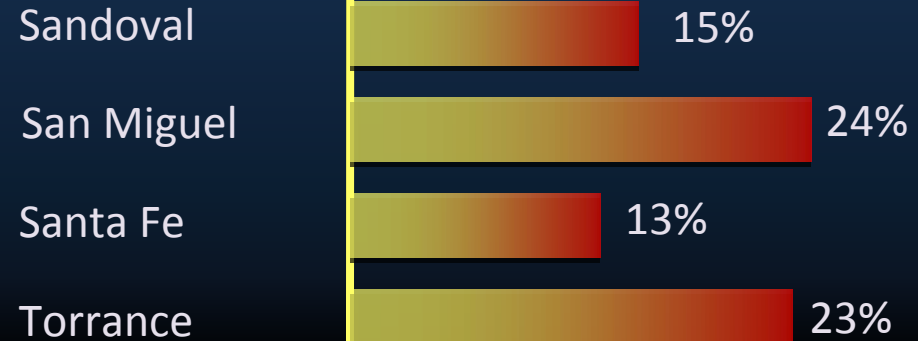


Health Indicators – Poor or Fair Health

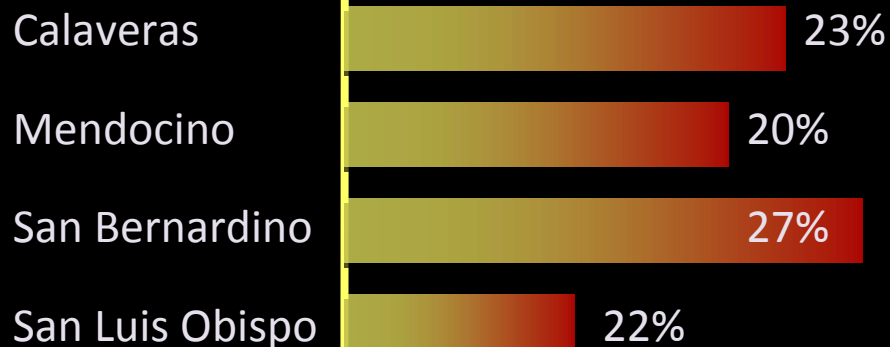
ARIZONA



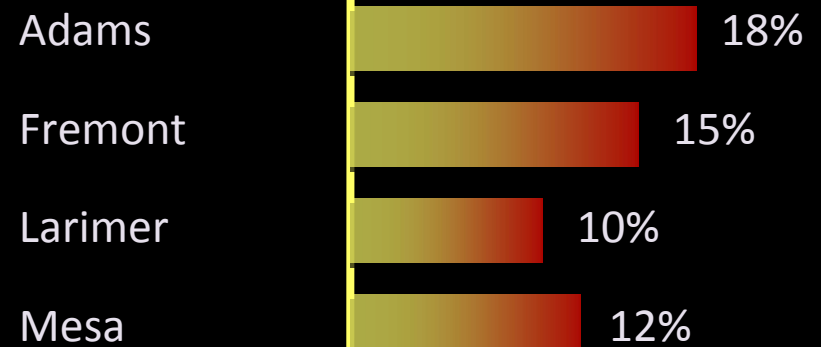
NEW MEXICO



CALIFORNIA



COLORADO



Issues Influencing How Americans Vote

(% Very Important + Somewhat Important)

Economy ----- 96%

Government Ethics ---- 96%

National Security ----- 92%

Social Security ----- 89%

Taxes ----- 88%

Education ----- 88%

Health Care ----- 87%

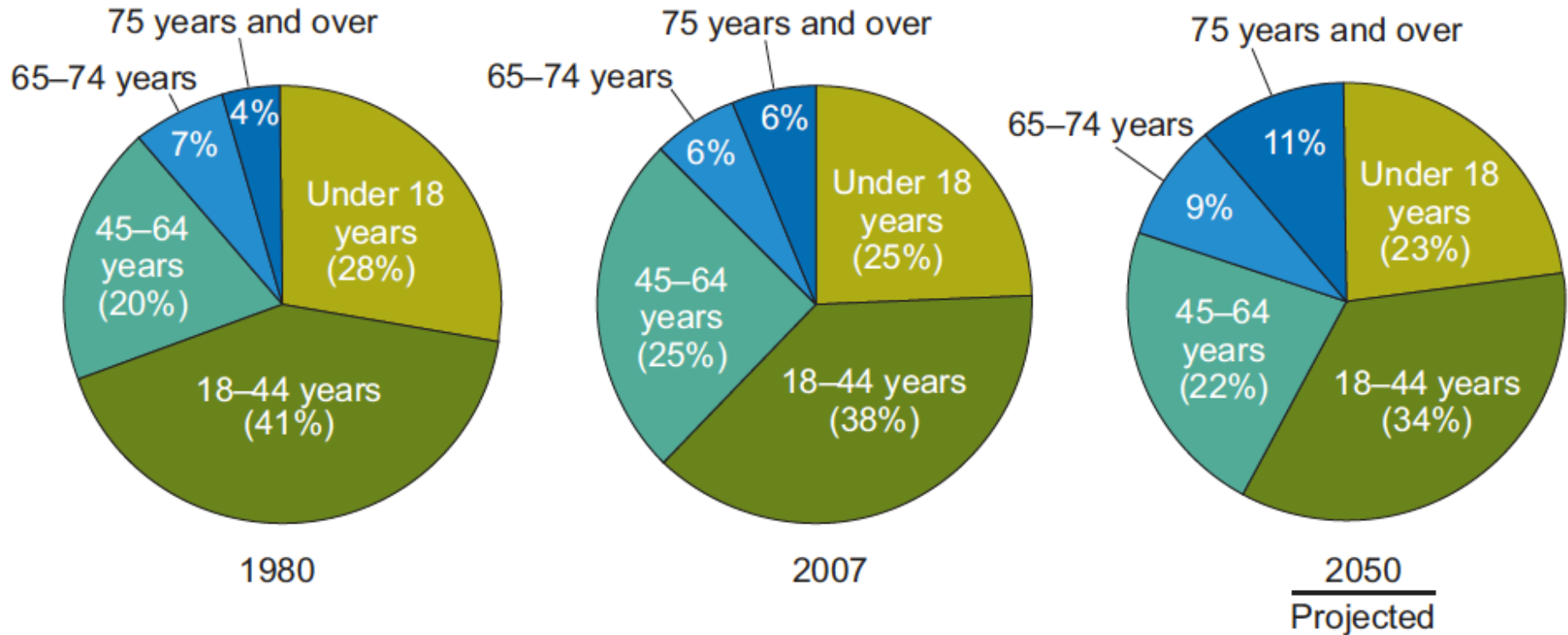
Immigration ----- 87%

War in Iraq ----- 83%

Abortion ----- 64%

Increased Exposure to Health Care Costs

Figure 1B. Percent distribution of the total population, by age: United States, 1980, 2007, 2050



BOTTOM LINE

Public health is of critical importance to the US economy and will continue to be a key public policy issue.



2



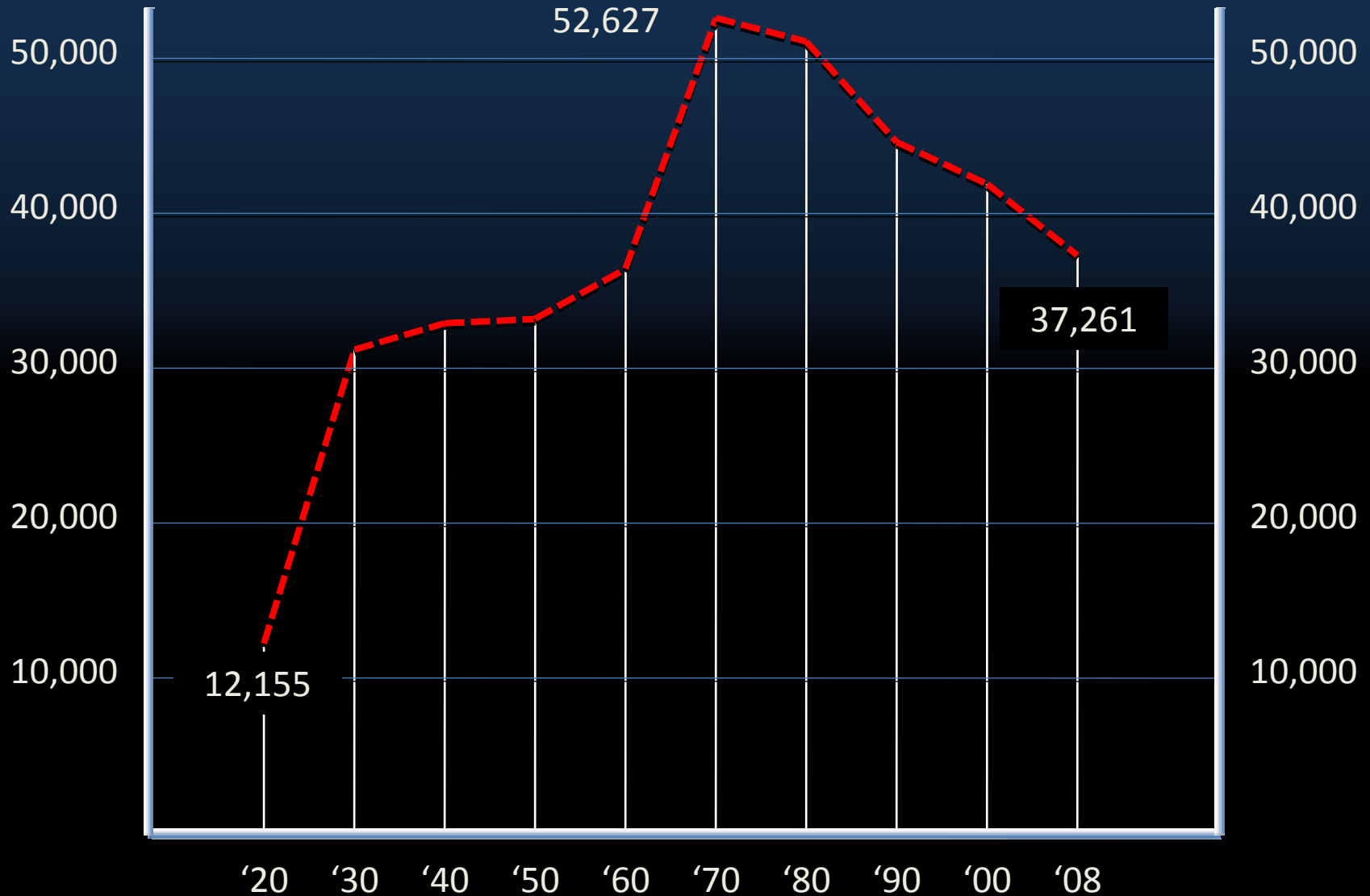
Transportation & Public Health

Transportation & Public Health

Traffic Safety + Personal Health

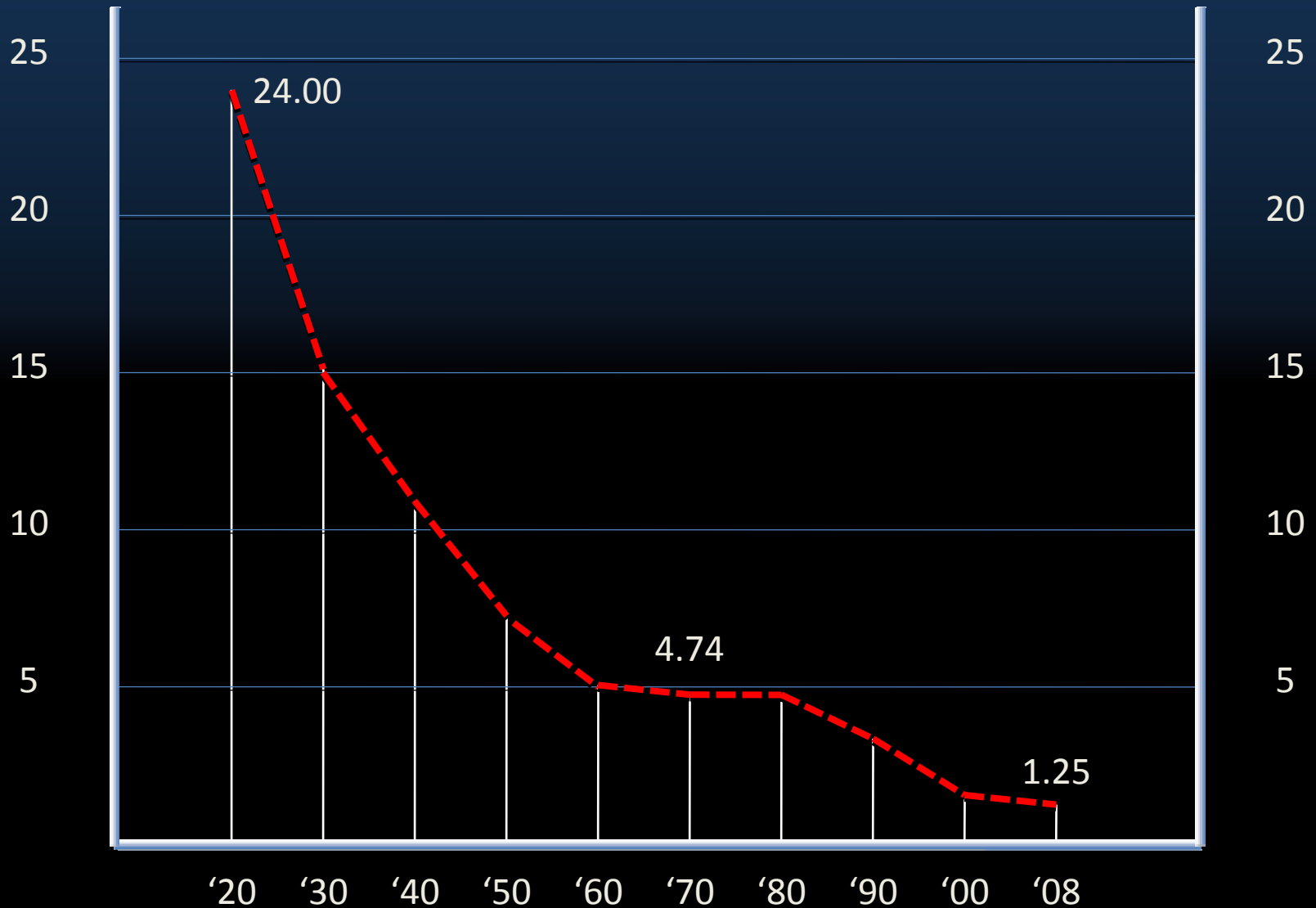


Annual US Traffic Fatalities



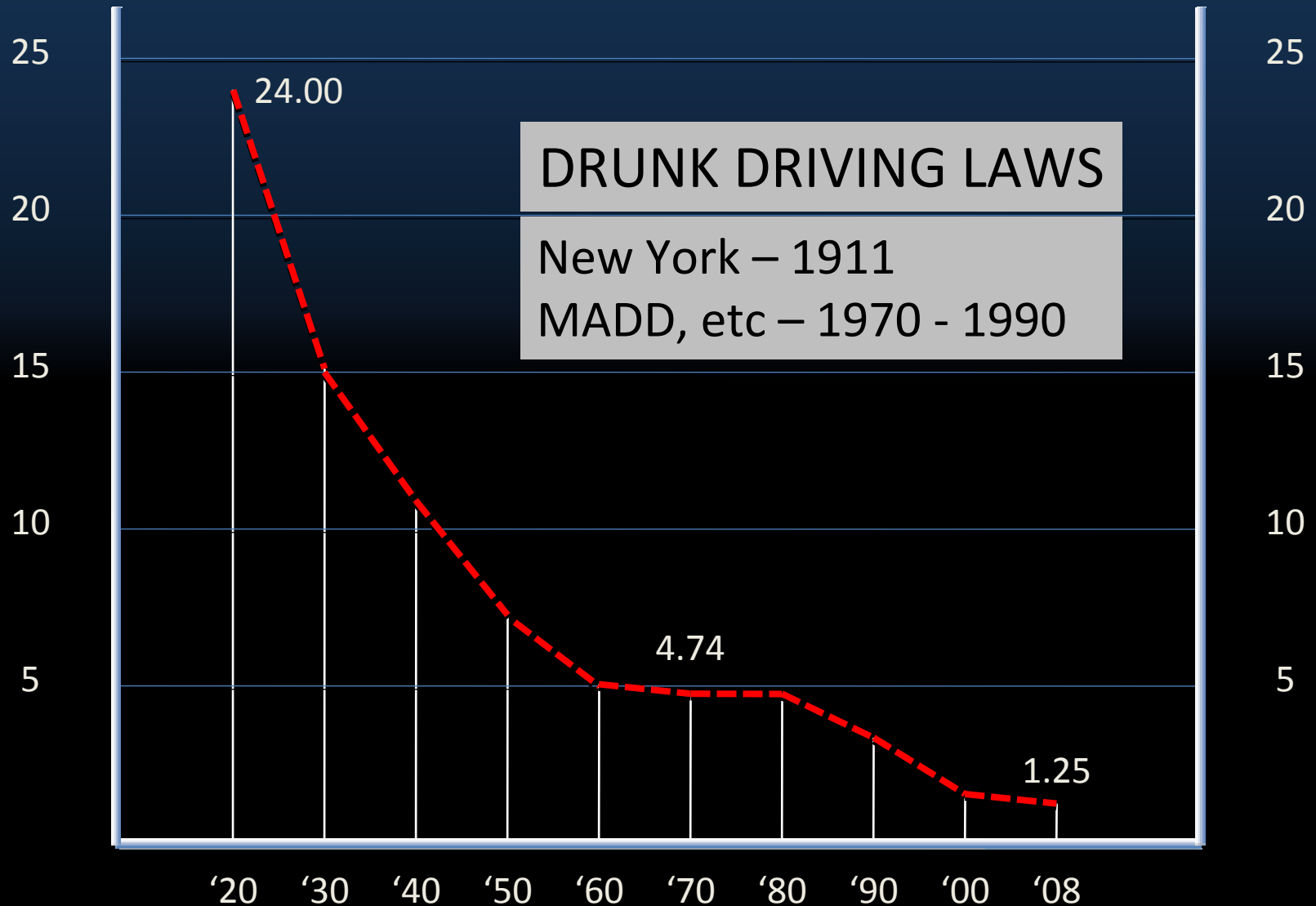
US Traffic Fatality Rate/HMVM

(hundred million vehicle miles)



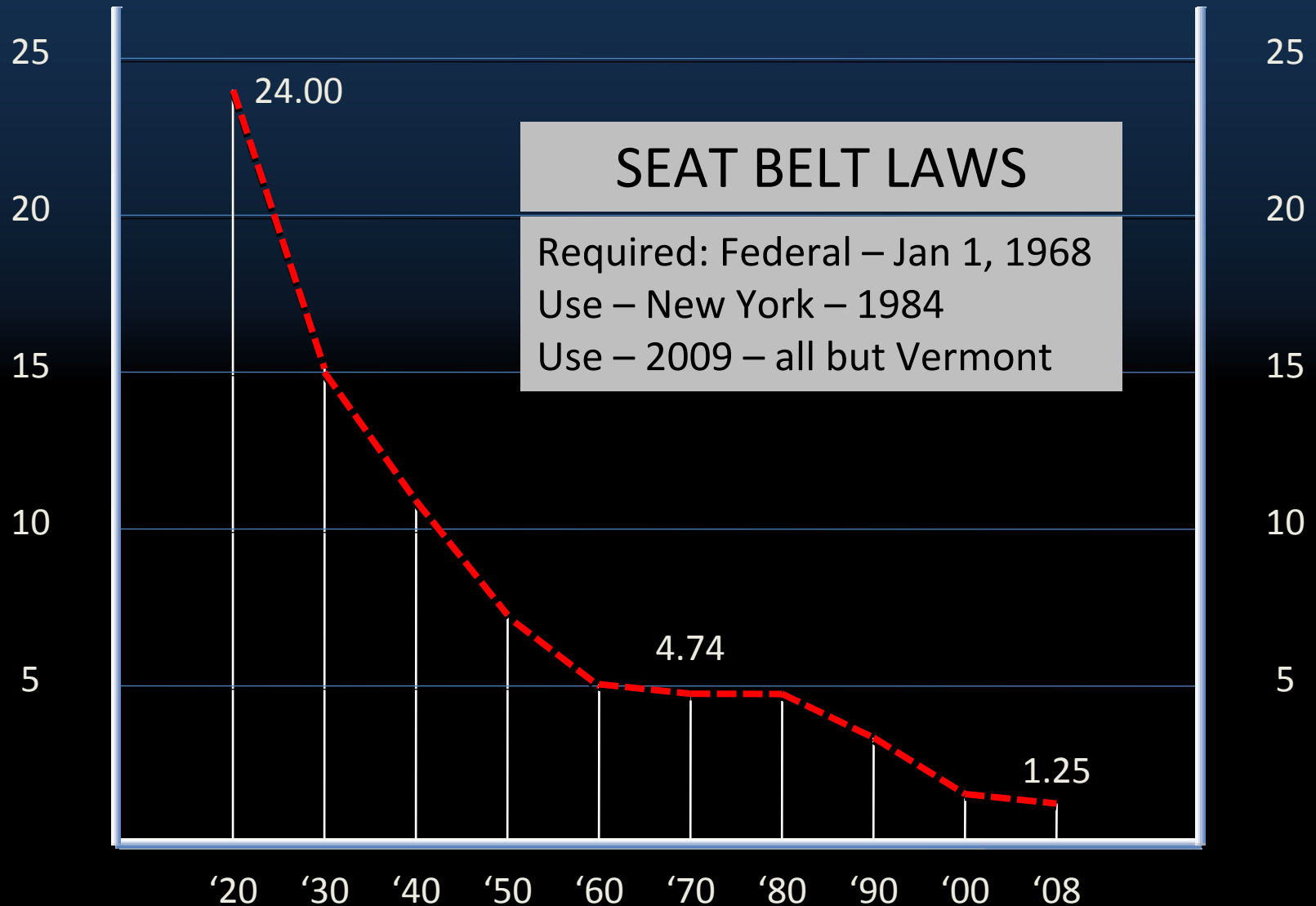
US Traffic Fatality Rate/HMVM

(hundred million vehicle miles)



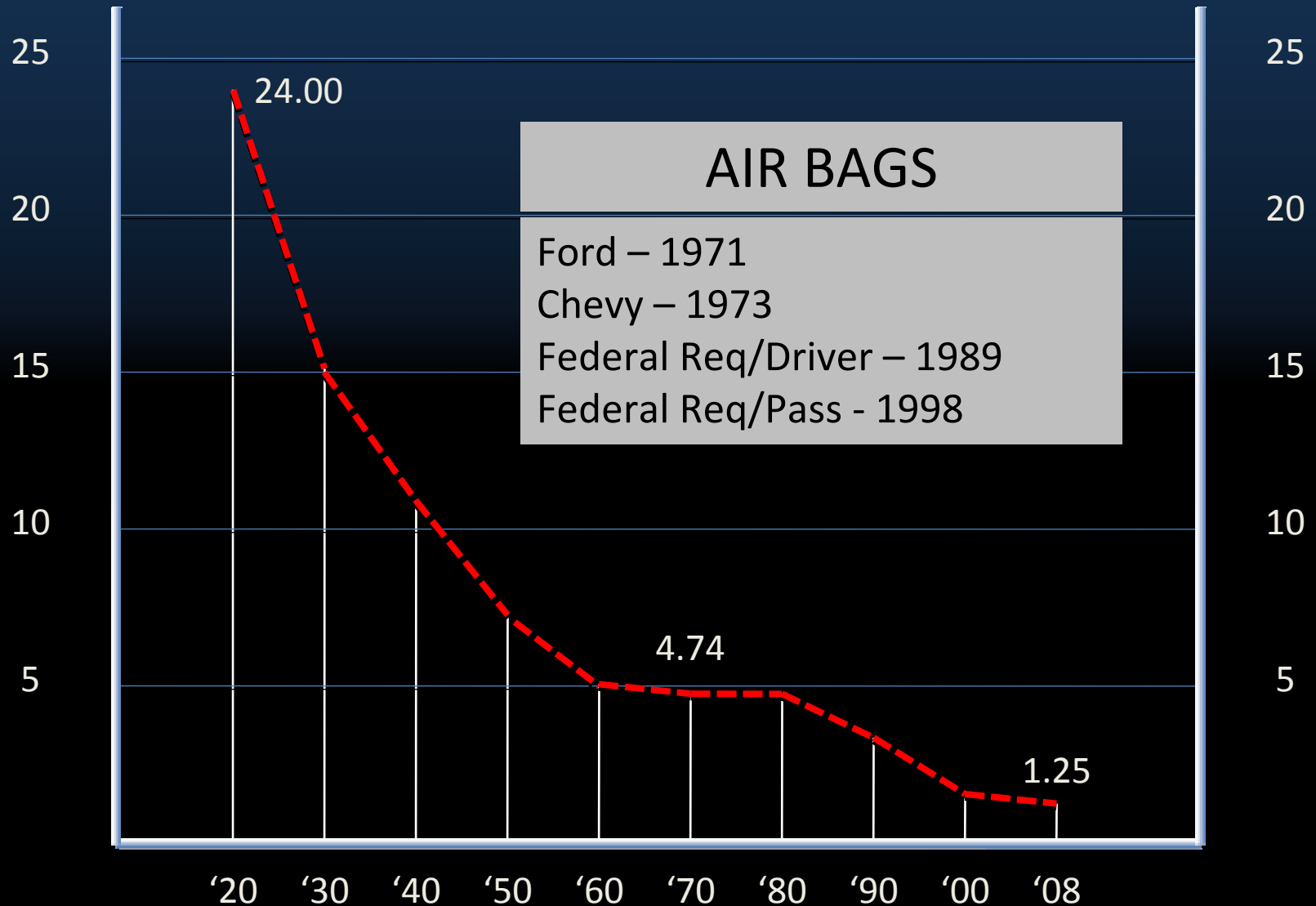
US Traffic Fatality Rate/HMVM

(hundred million vehicle miles)



US Traffic Fatality Rate/HMVM

(hundred million vehicle miles)

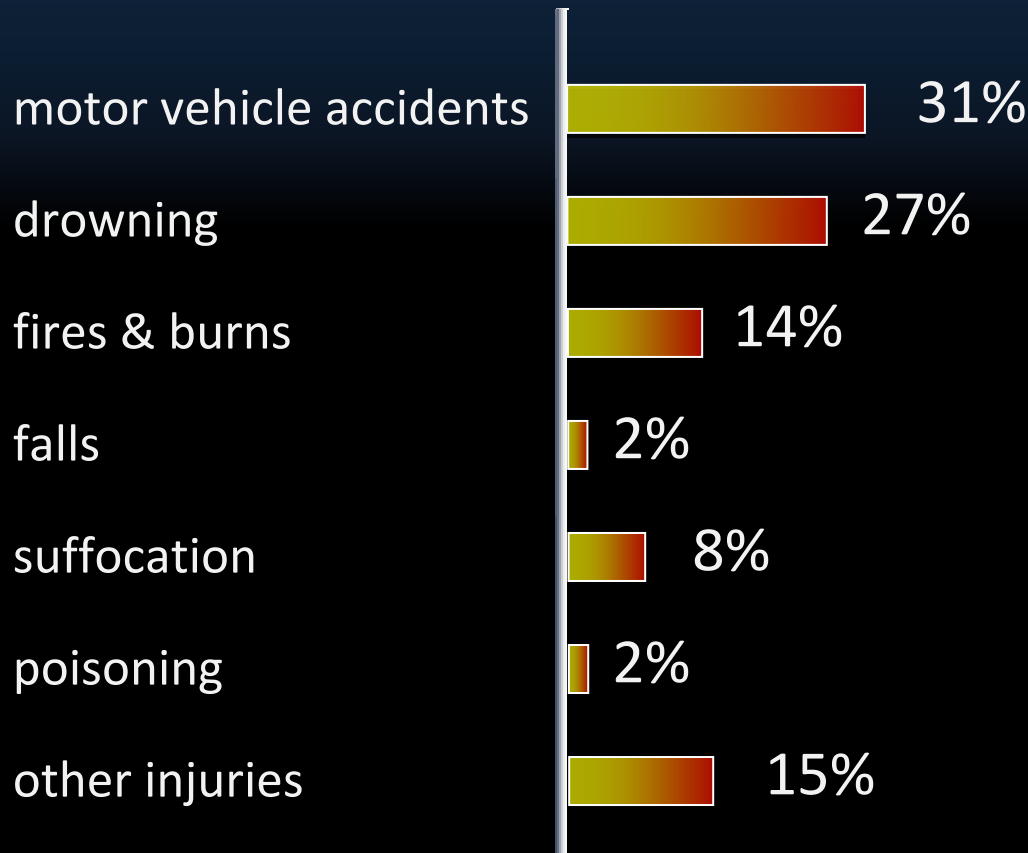


“Changes in highway infrastructure between 1984 and 1997 have not reduced traffic fatalities and injuries, and have even had the effect of increasing total fatalities and injuries.

Other factors, primarily changes in the demographic age mix of the population, increased seat belt usage, and improvements in medical technology are responsible for the downward trend in fatal accidents.”

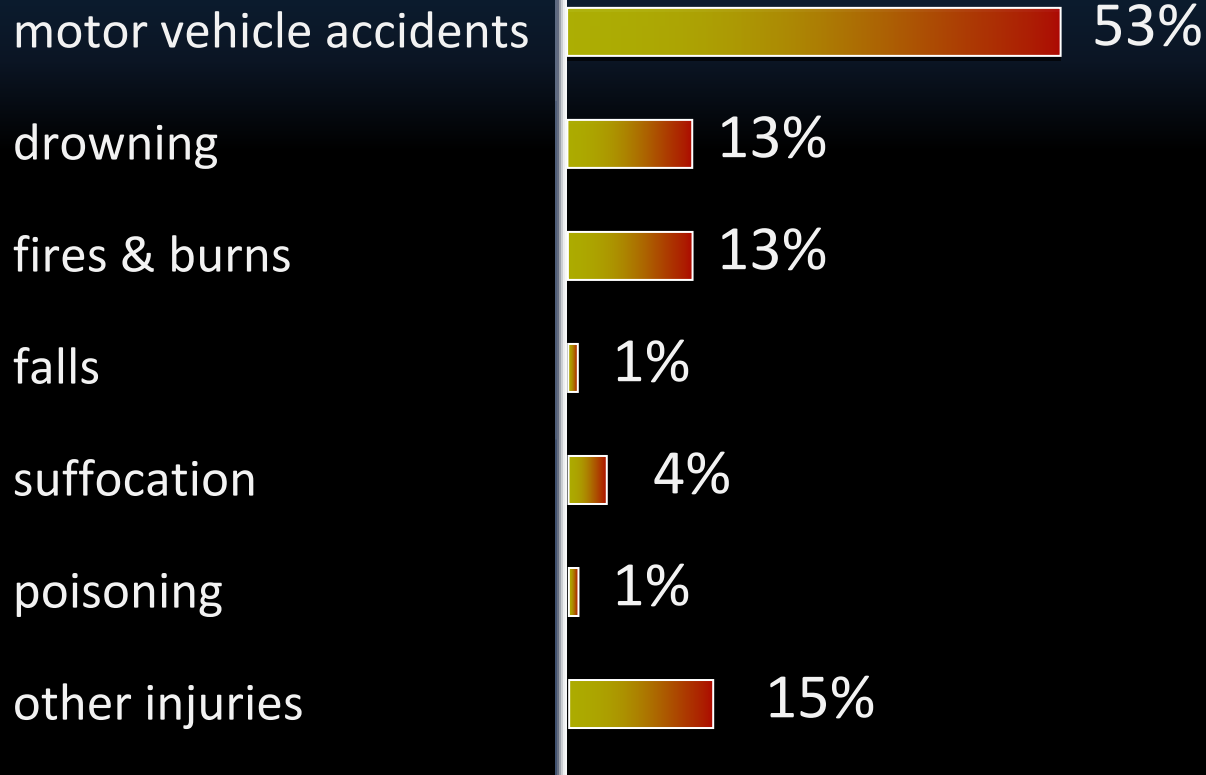
Traffic accidents are the leading cause of unintentional injury death in children

age 1 - 4



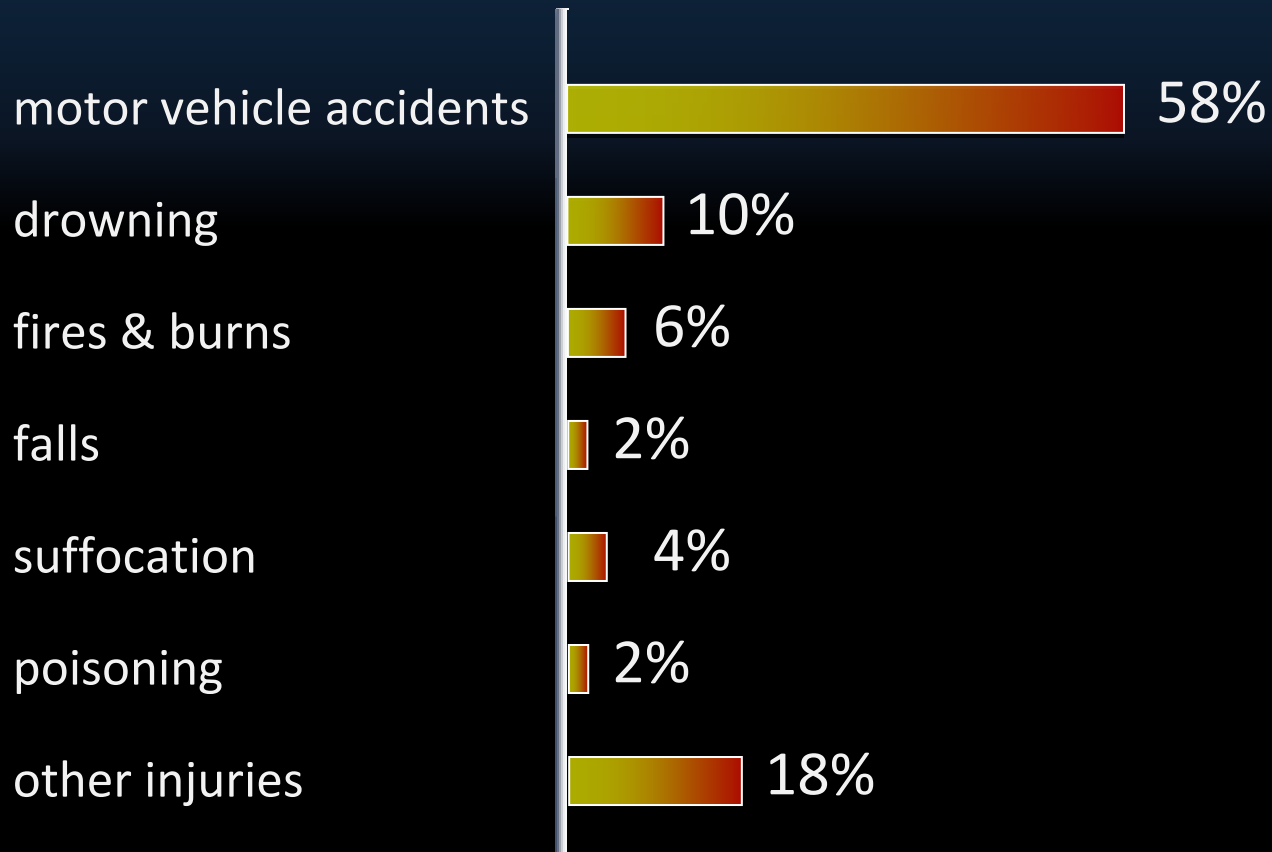
Traffic accidents are the leading cause of unintentional injury death in children

age 5 – 9



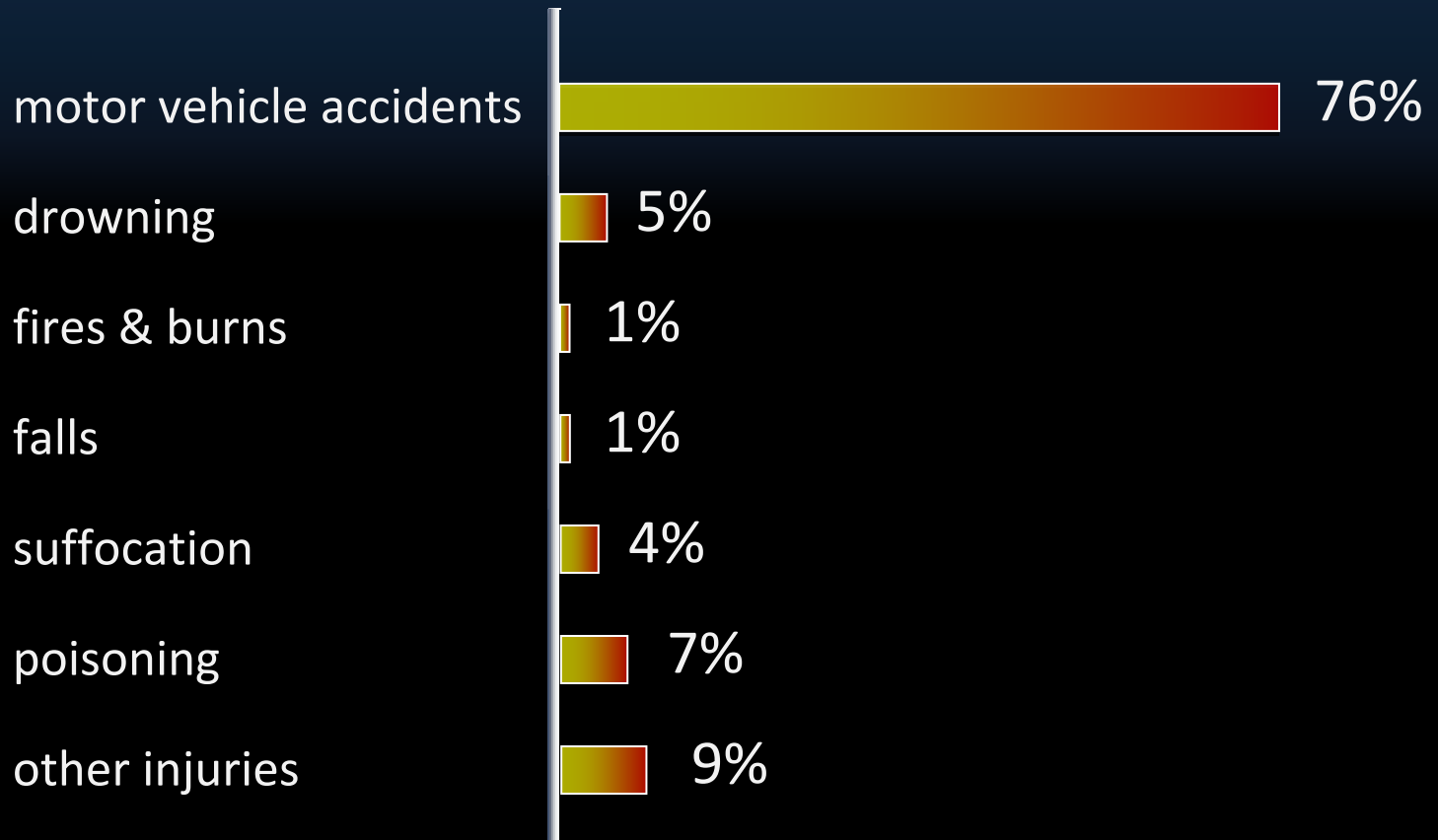
Traffic accidents are the leading cause of unintentional injury death in children

age 10 – 14



Traffic accidents are the leading cause of unintentional injury death in children

age 15 – 19



Five things that worry parents the most:

- ❑ Kidnapping
- ❑ School snipers
- ❑ Terrorists
- ❑ Dangerous strangers
- ❑ Drugs

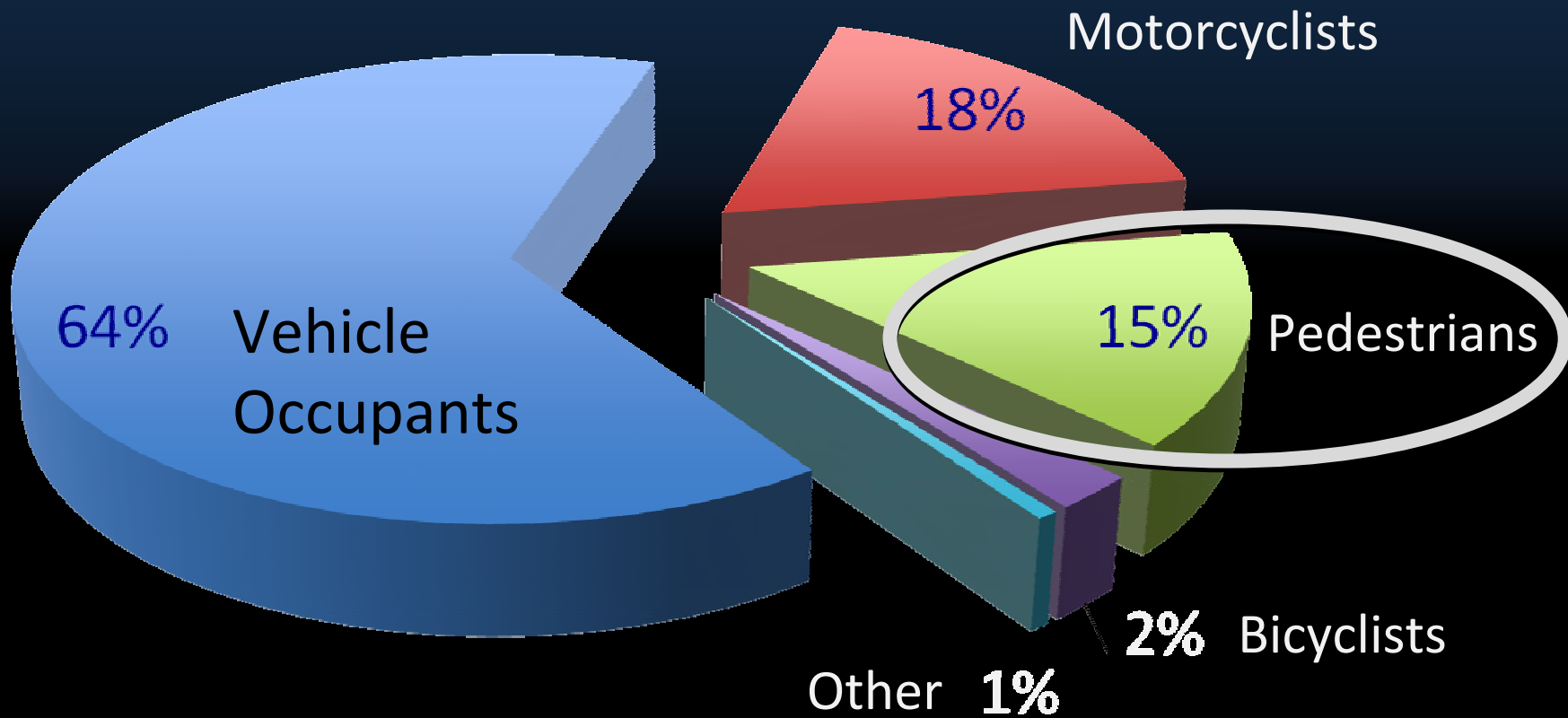
Five things most likely to cause injury or death (children < 18):

- ❑ Car accidents
- ❑ Homicide*
- ❑ Child abuse
- ❑ Suicide
- ❑ Drowning

* someone they know

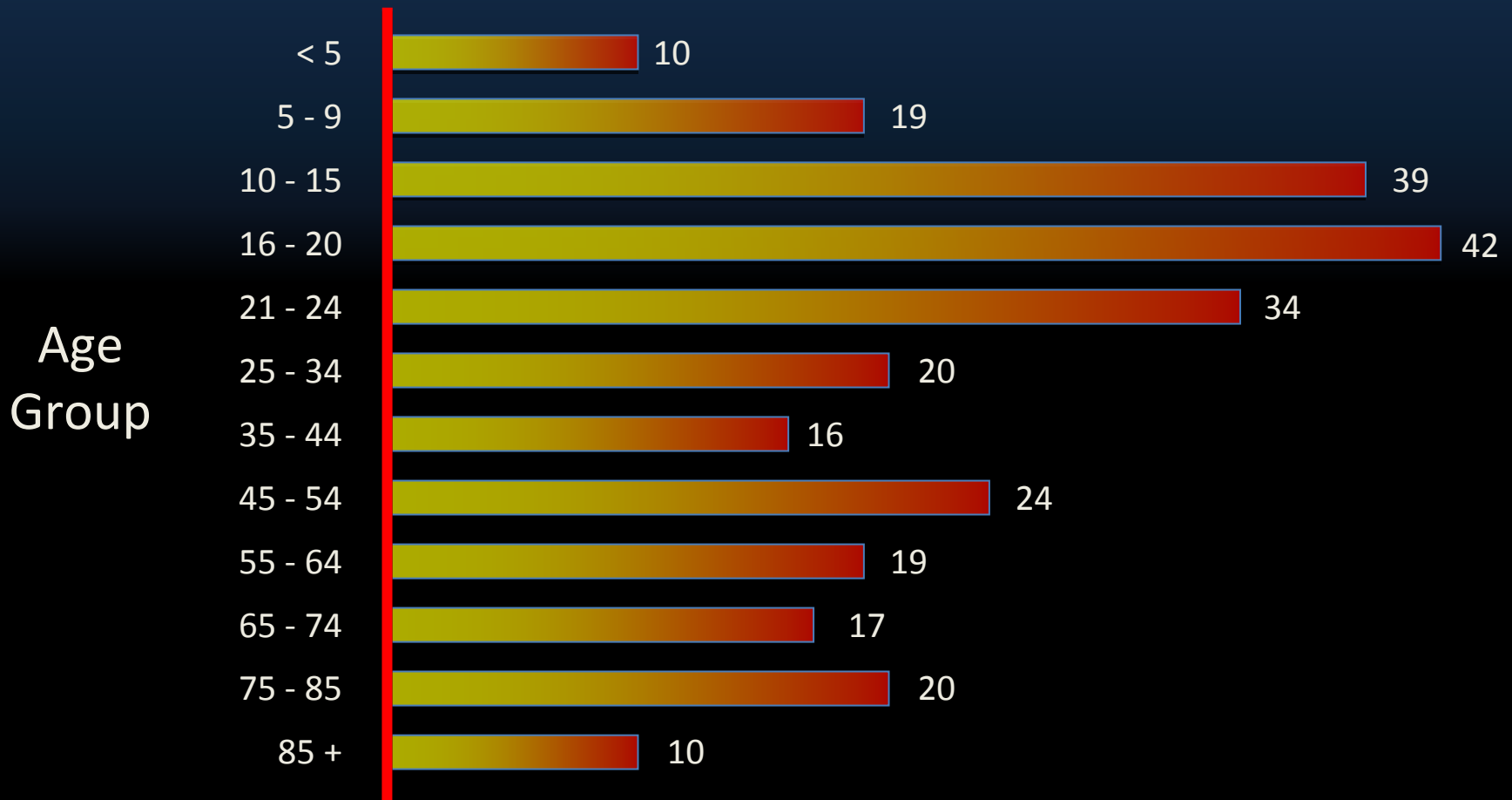
The most dangerous thing
your child does, statistically,
is get into a car with you.

2008 Fatalities



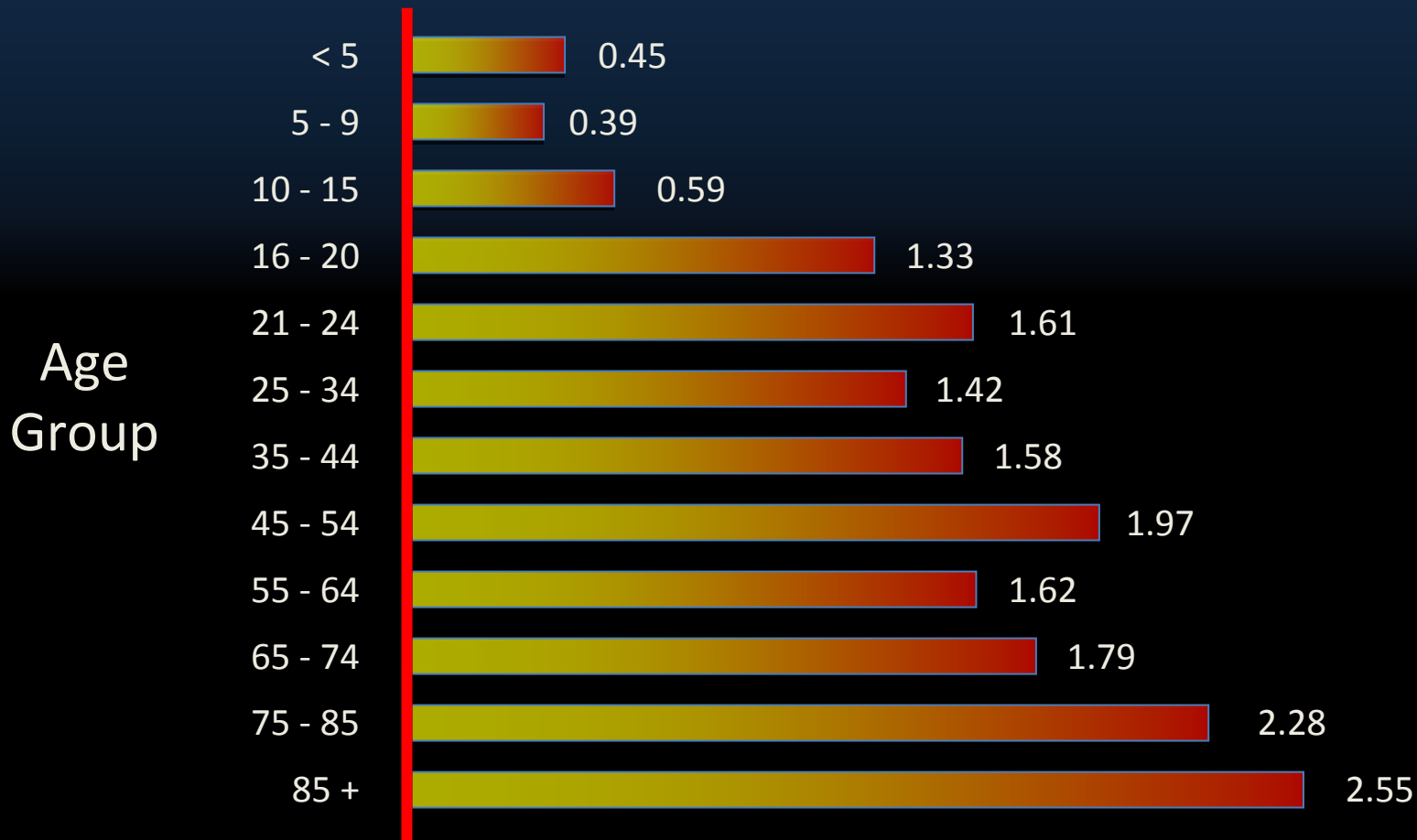
US Injury Rate: Pedestrians Hit by Motor Vehicles

(rate/100,000 population)



US Fatality Rate: Pedestrians Hit by Motor Vehicles

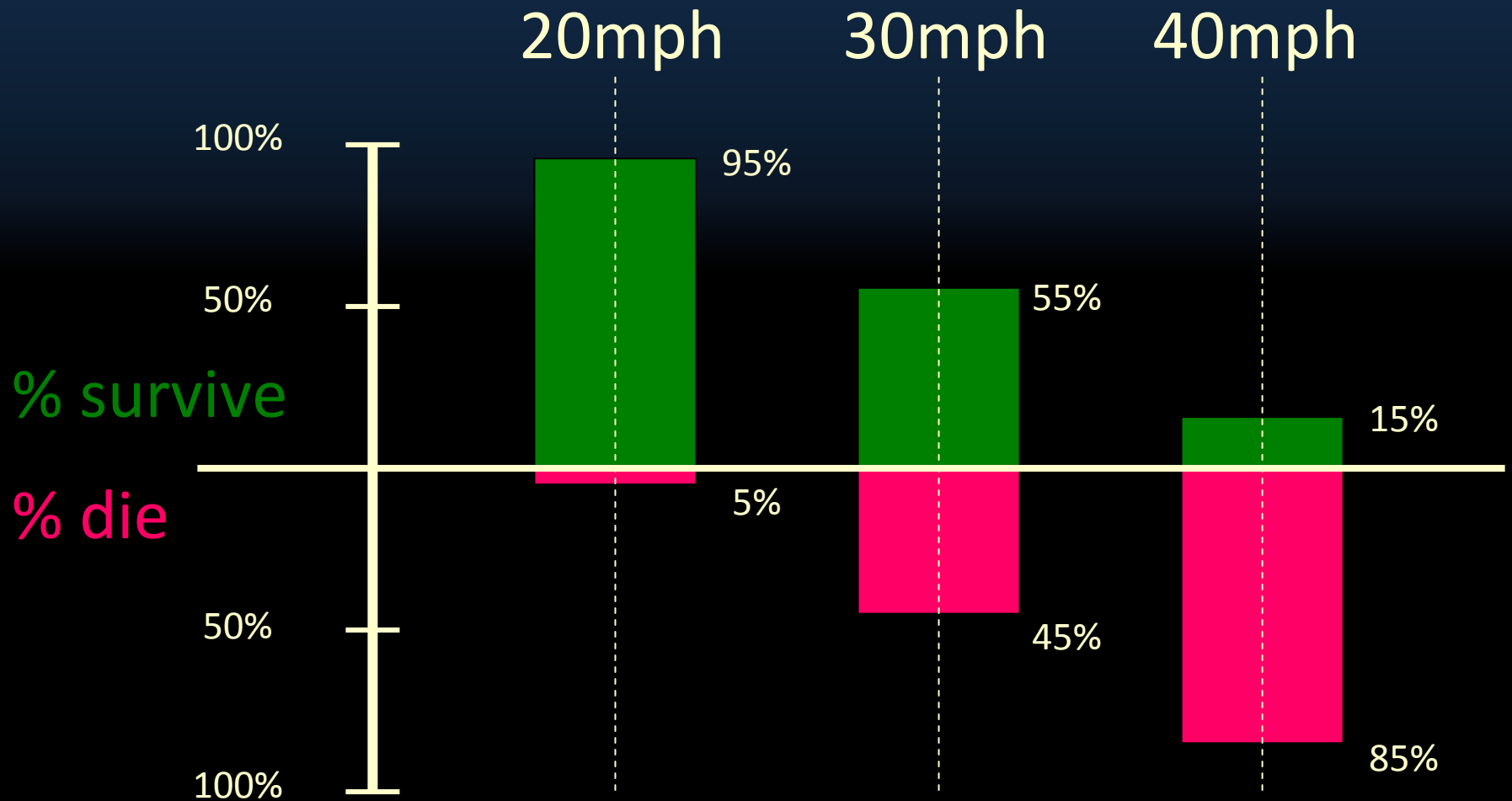
(rate/100,000 population)





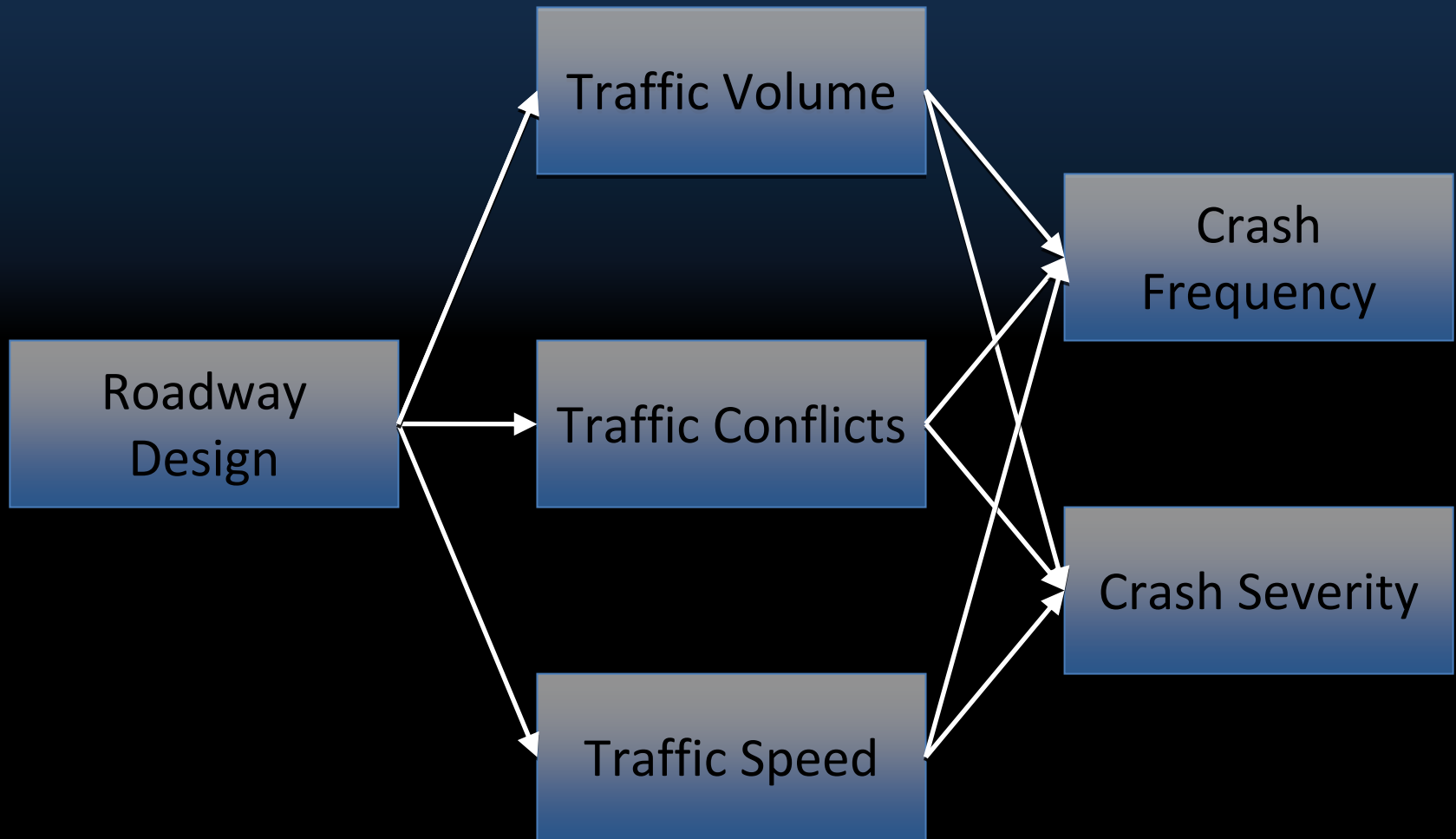
Honolulu

pedestrian survival rates & vehicle speed

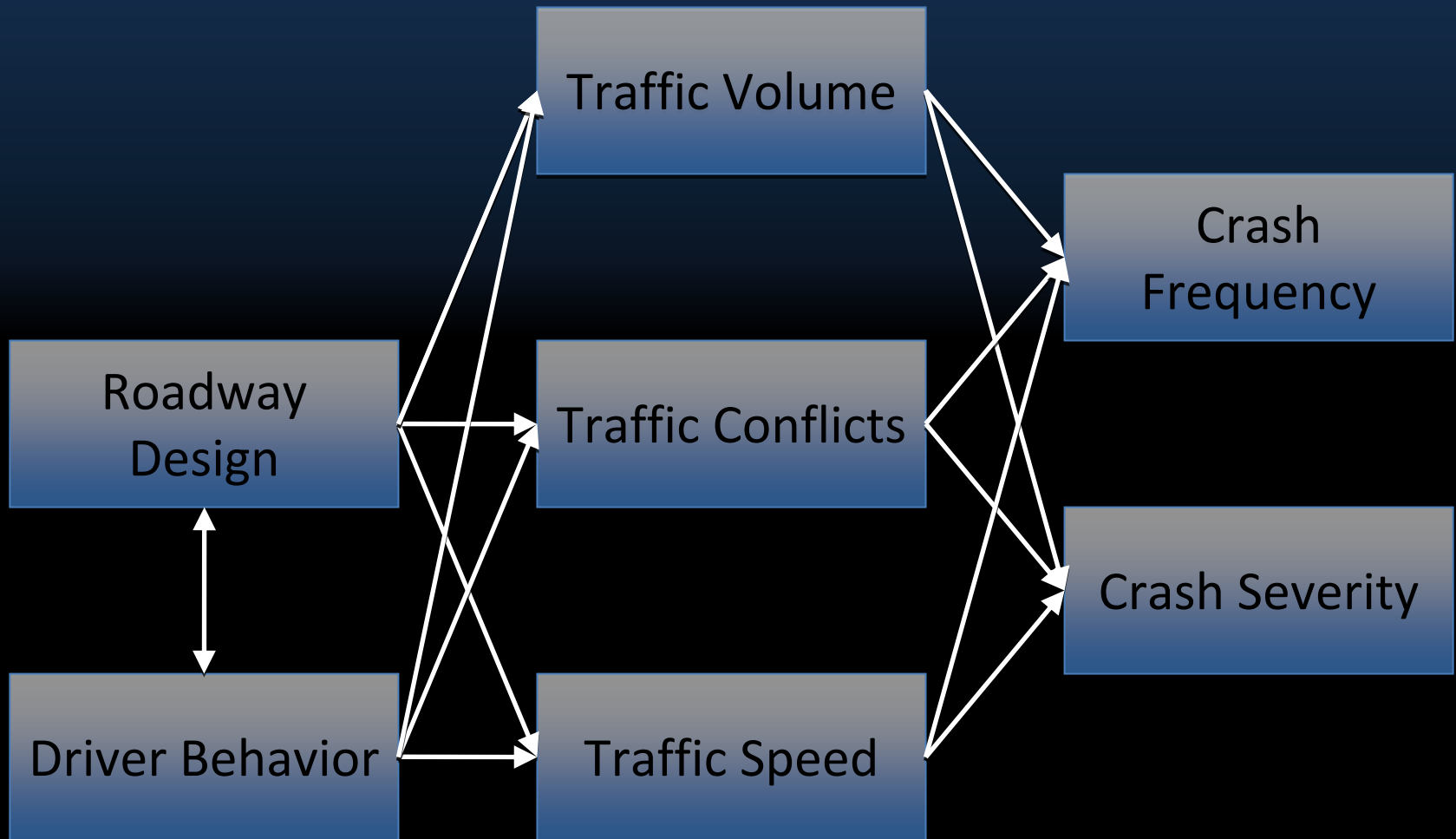




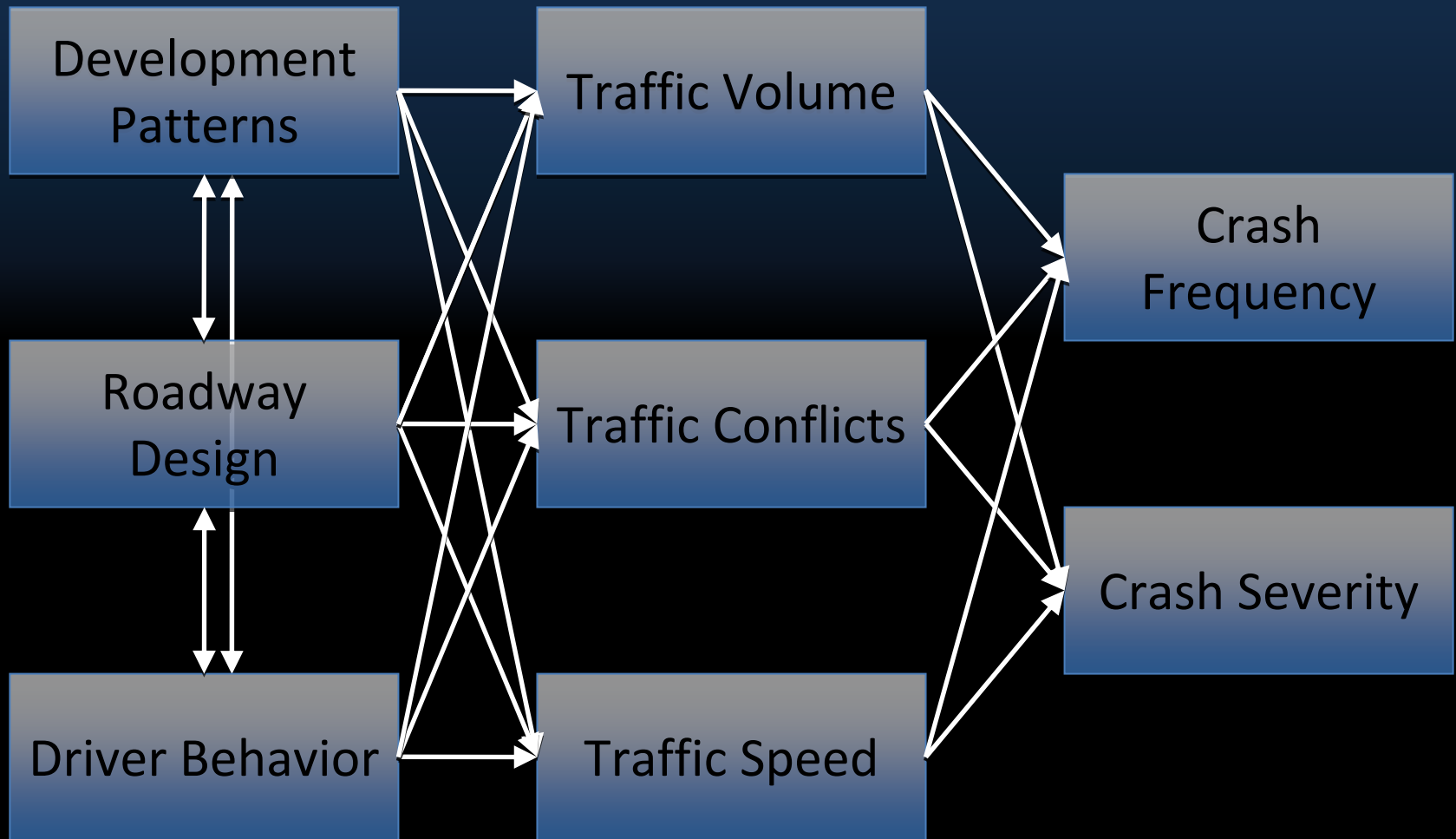
Pre-1950 Traffic Safety Model

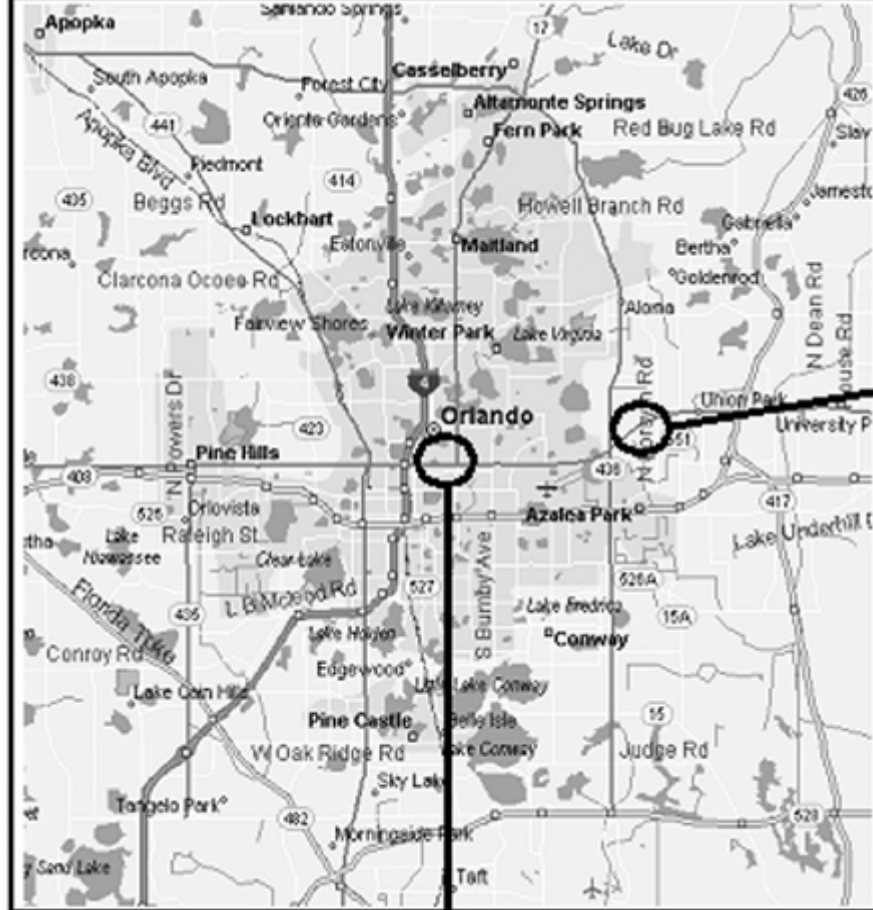


Traditional Traffic Safety Model



Context-Based Traffic Safety Model





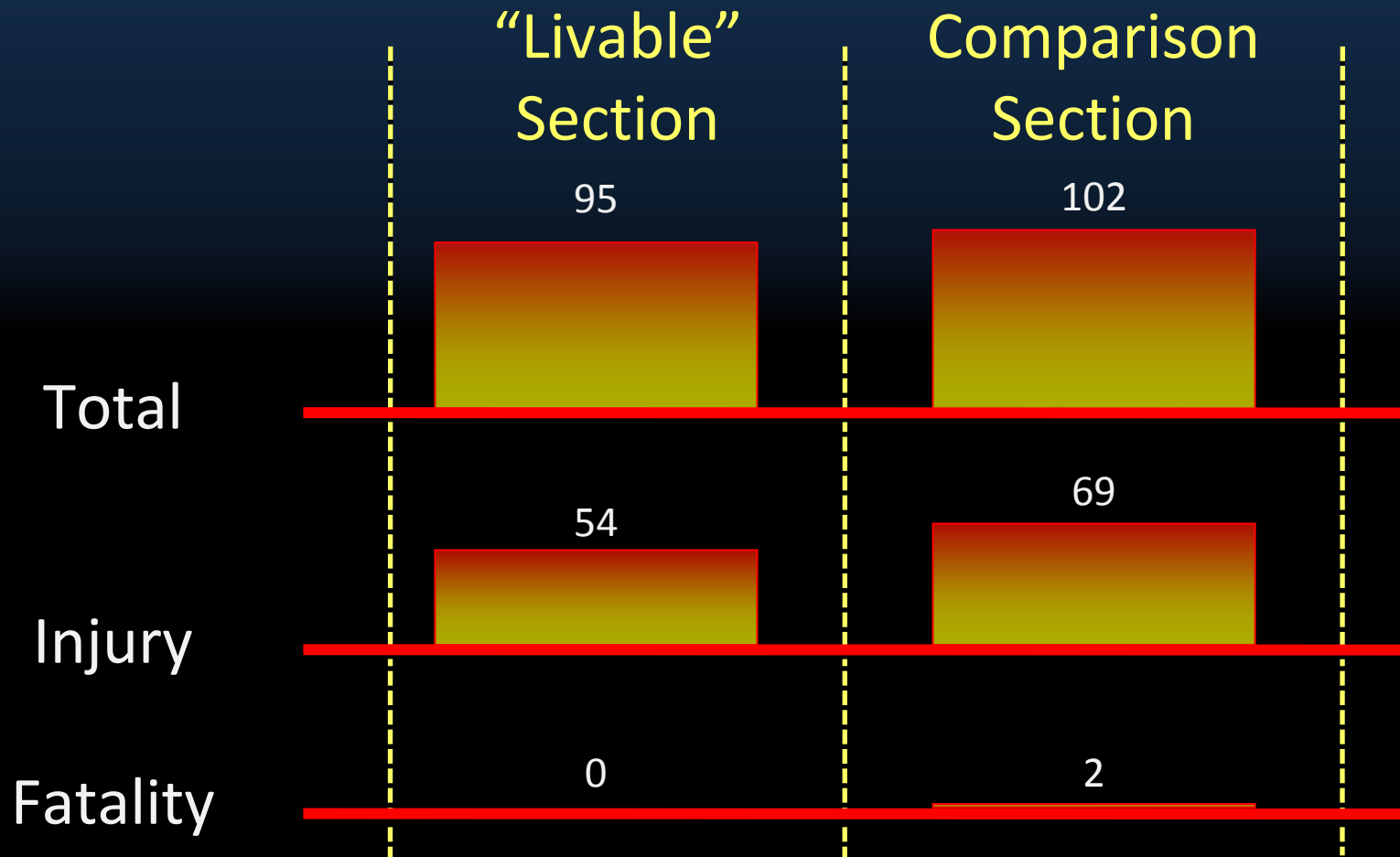
Colonial Drive: Comparison section



Colonial Drive: Livable section

Street/Urban Design

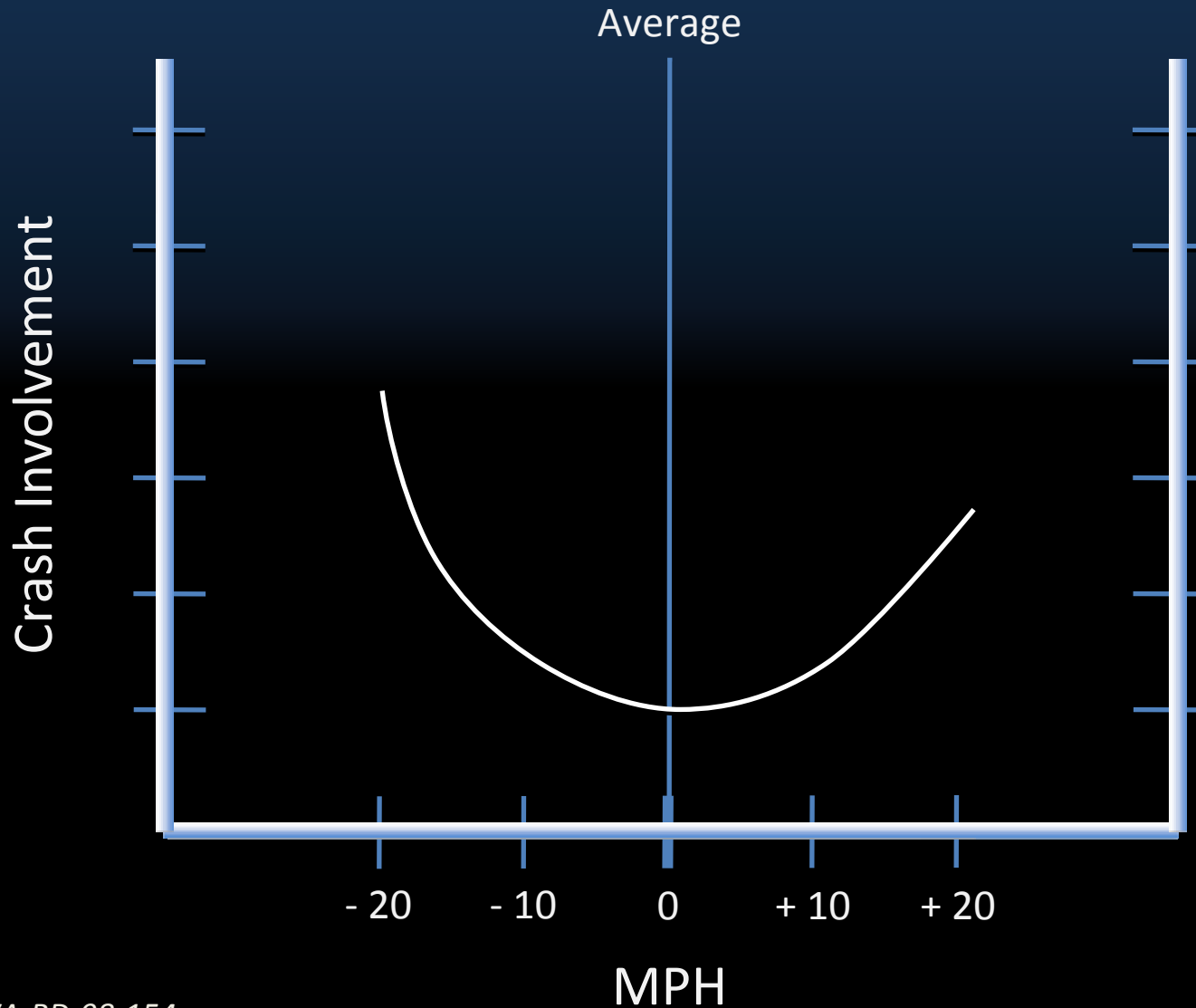
Mid-Block Crashes/100 MVMT



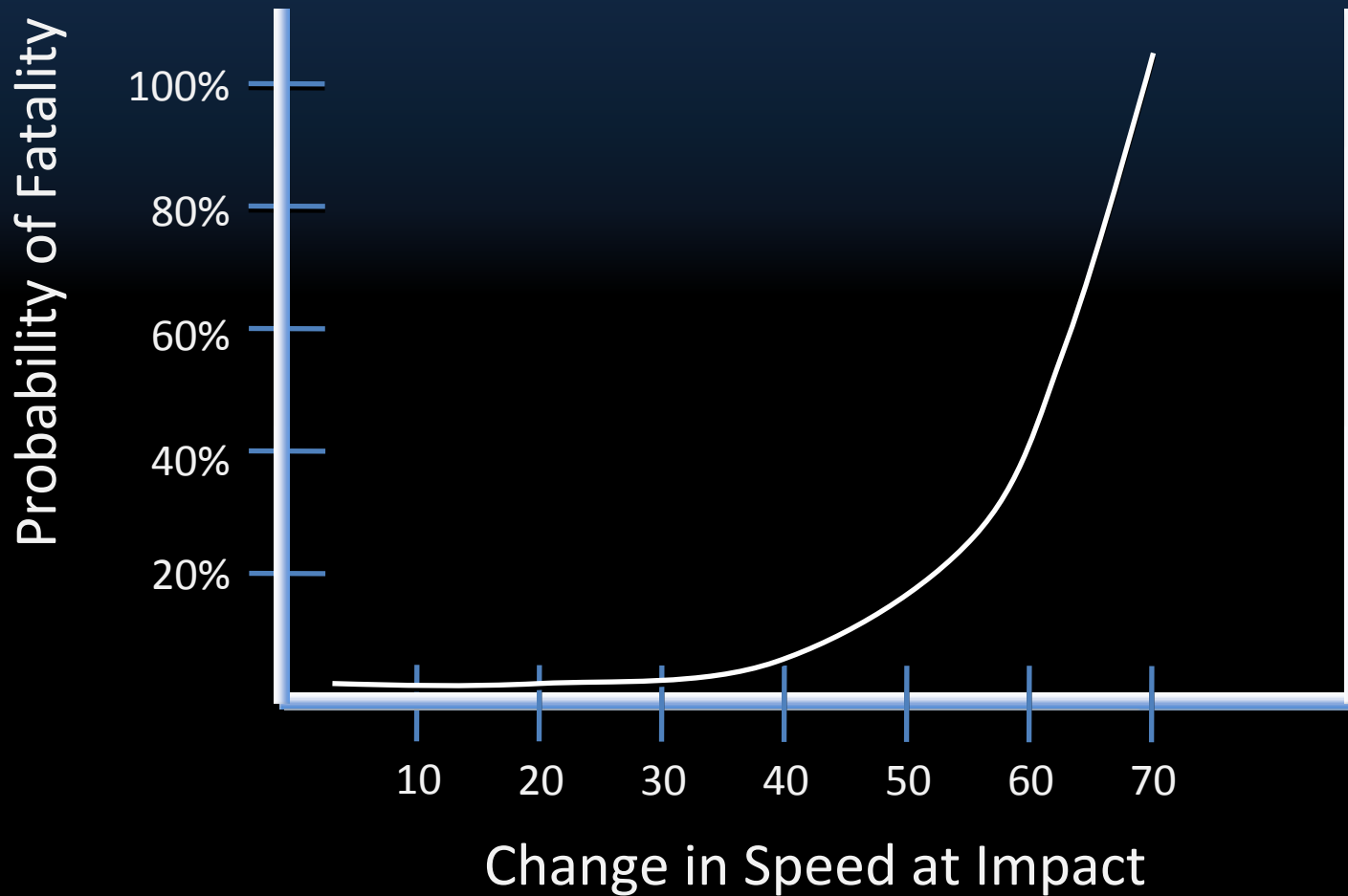
Speed



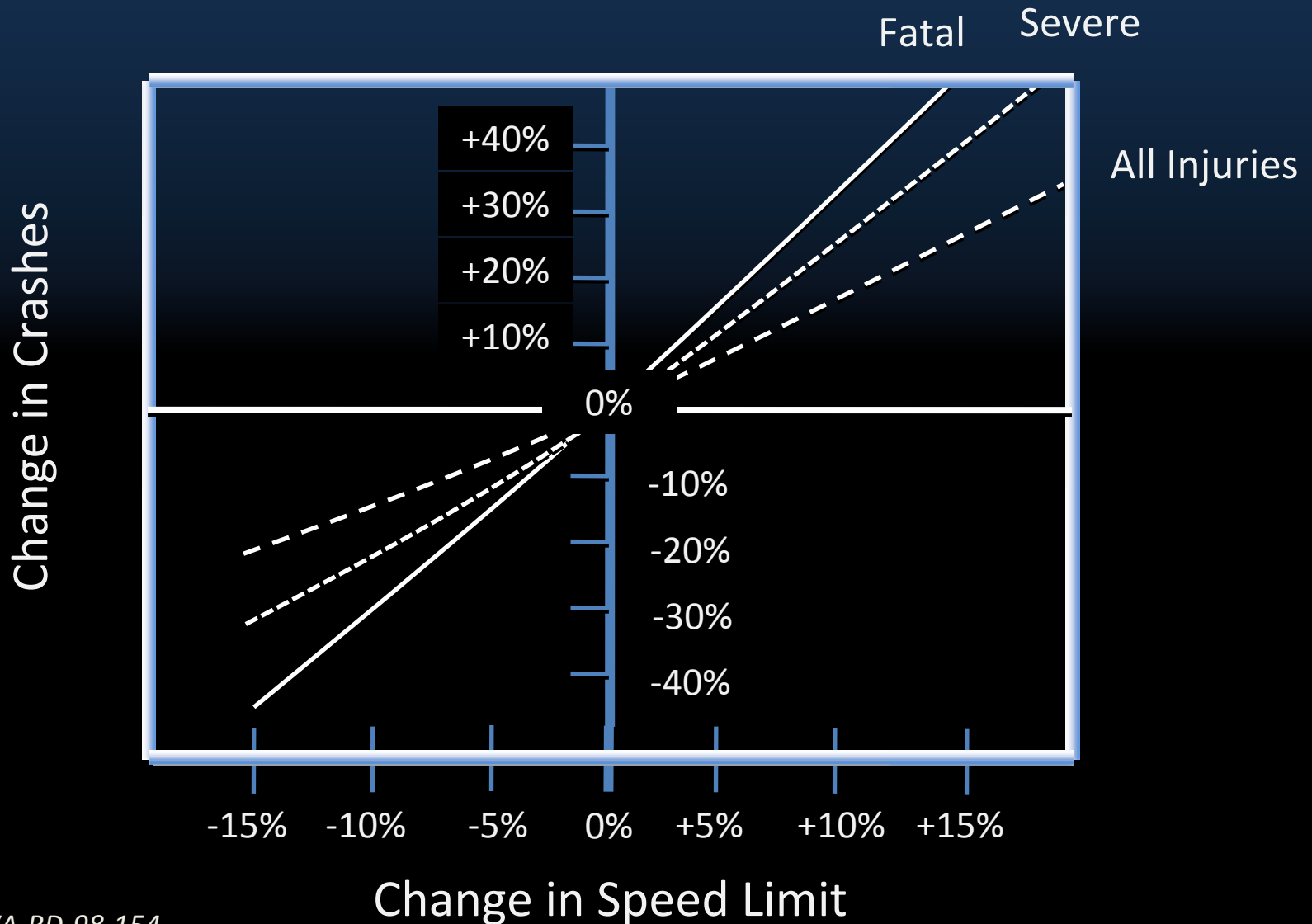
The U-Shaped Curve



Crash Severity



Changing Speed Limits

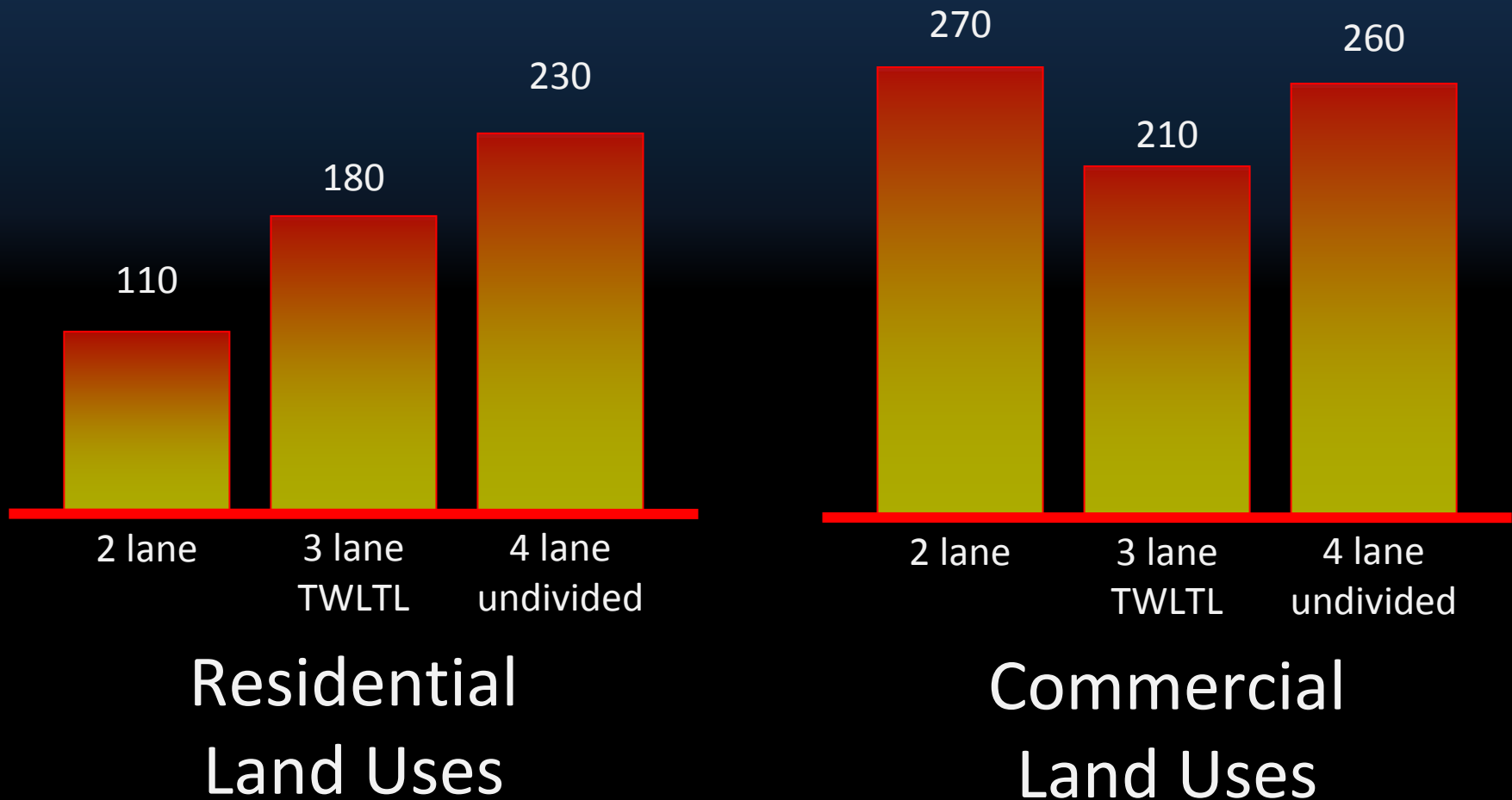


Cross Section

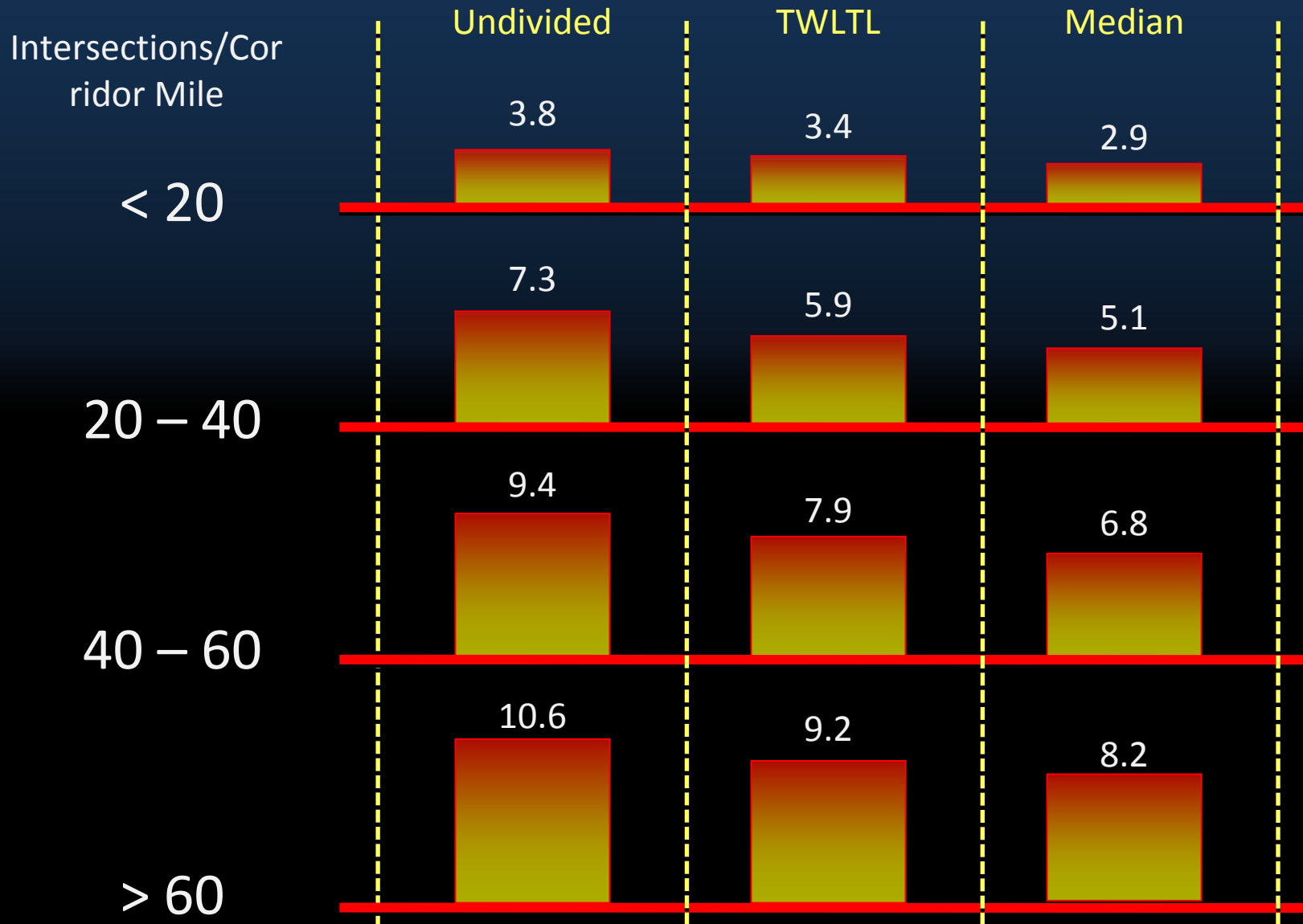


Number of Lanes

Collision Rates – Medium Density – Controlling for ADT



Accident Rates + Access Management



2 Primary Elements

Traffic Safety + Personal Health



Humans:

- recently descended from nomadic hunter/gatherers...
- walked & worked, burning calories
- experienced the world @ 2 – 3mph
- bodies were designed for collisions @ < 5 mph



we evolved as “walkers”



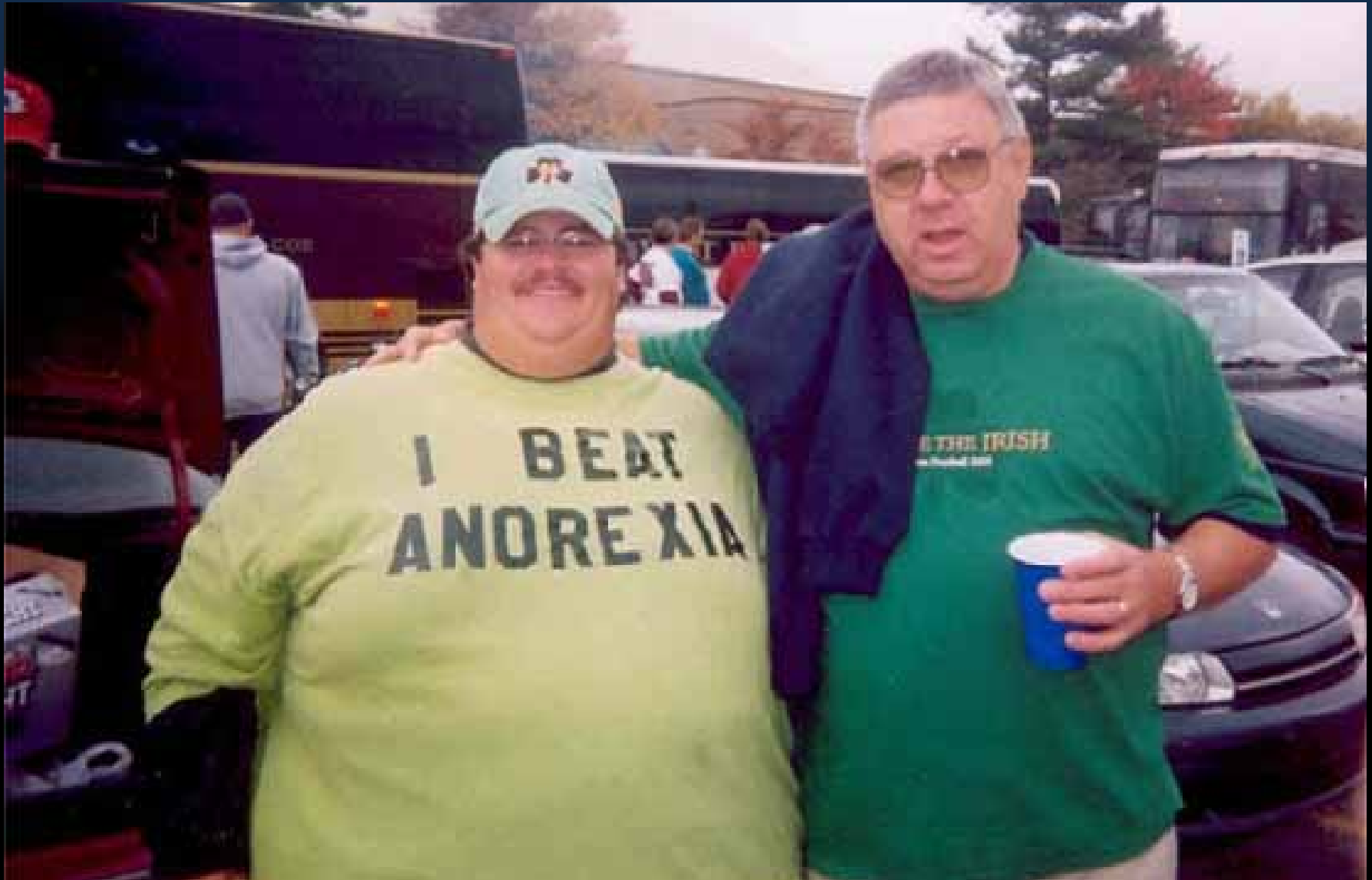
we are still “walkers”



human history



we cannot escape our DNA...



...no matter how hard we try

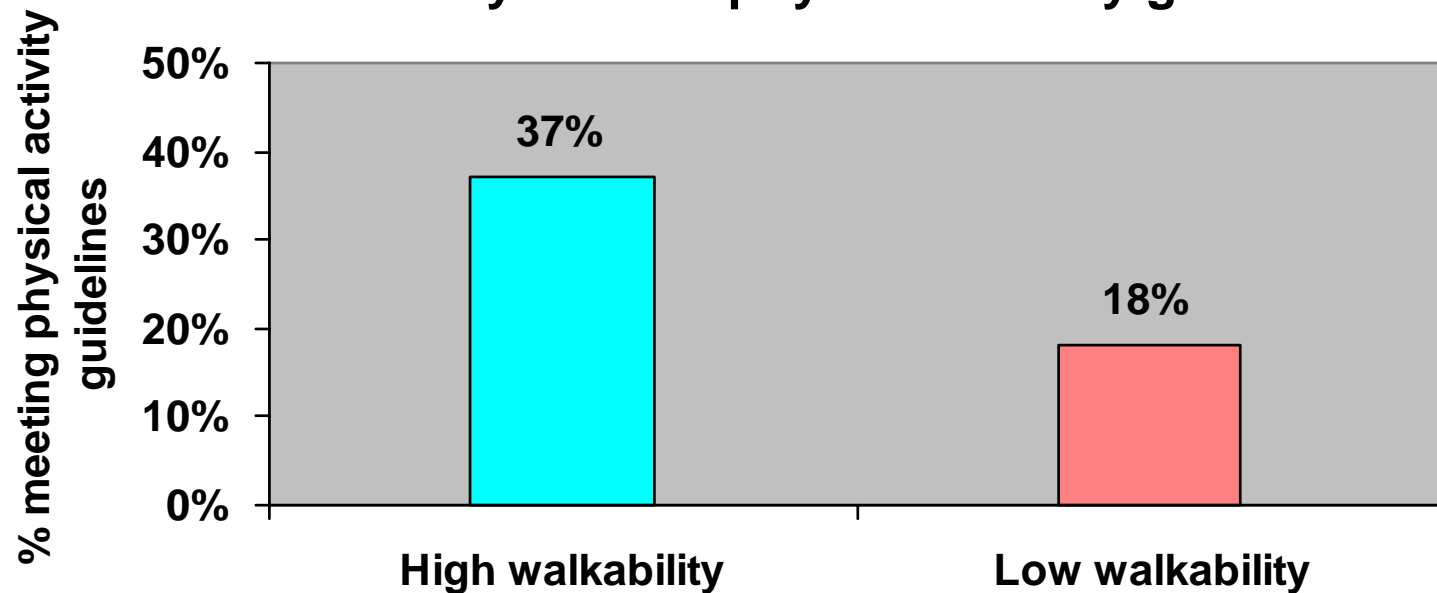


Research

- US Centers for Disease Control
- Robert Wood Johnson Foundation

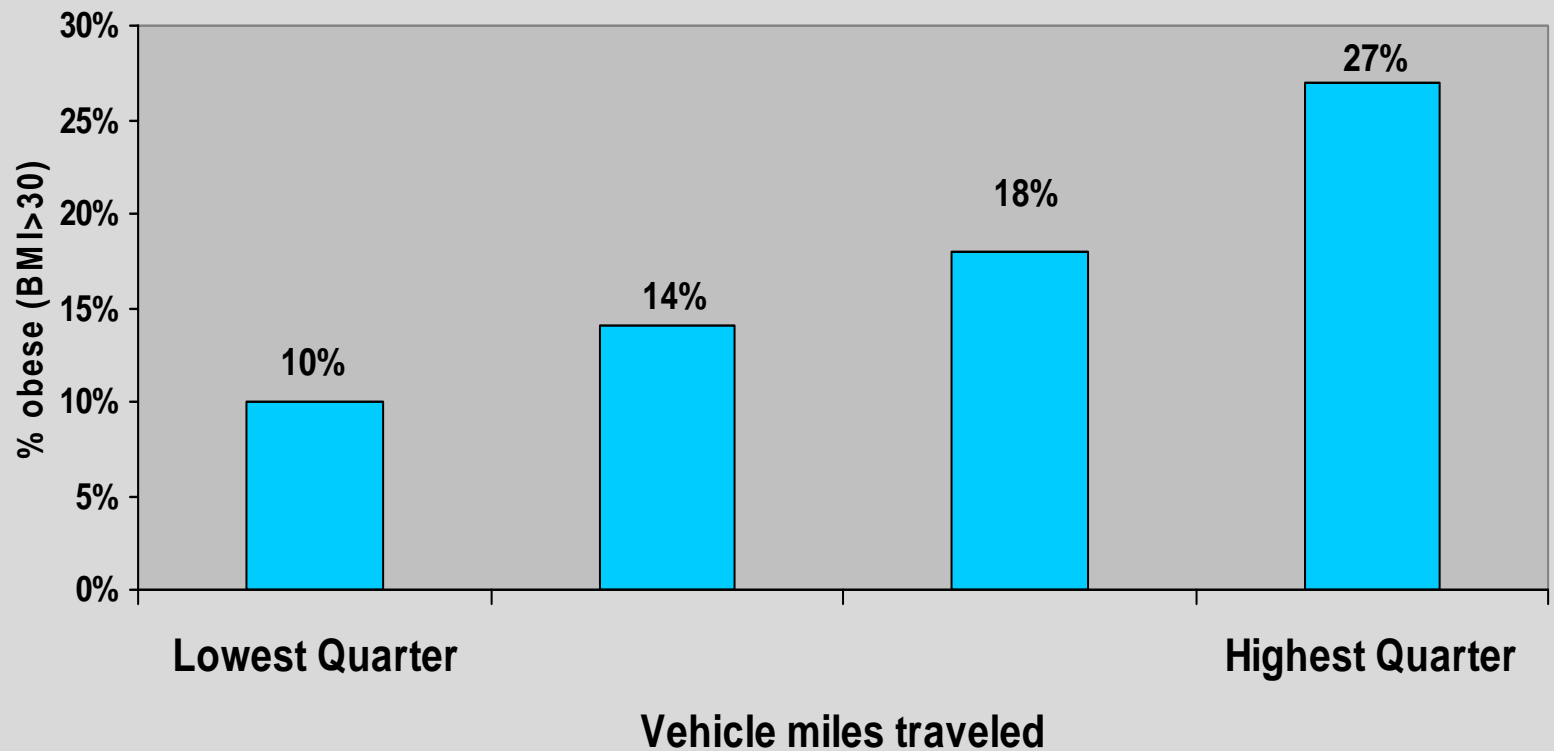
Extensive Research

Residents of walkable neighborhoods were more likely to meet physical activity guidelines



Extensive Research

Driving is a risk factor for obesity



Extensive Research

States with the Highest Rates of Physical Inactivity

Rank	State	Percentage of Adult Physical Inactivity (Based on 2006-2008 Combined Data, Including Confidence Intervals)	Obesity Ranking
1	Mississippi	31.8% (+/-0.9)	1
2	Kentucky	30.4% (+/-1.0)	7
3 (tie)	Louisiana	30.3% (+/-0.9)	8
3 (tie)	Oklahoma	30.3% (+/-0.8)	6
5	Tennessee	29.8% (+/-1.2)	4
6	Alabama	29.5% (+/-1.0)	2
7	Arkansas	28.8% (+/-0.9)	10
8	Texas	28.4% (+/-0.9)	14
9	West Virginia	28.3% (+/-1.0)	3
10	New Jersey	26.7% (+/-0.8)	42

*Note: For rankings, 1 = Worst Health Outcome. 1 = Highest Rates of Physical Inactivity.

Research Conclusion #1:

People who are active as part of a
regular daily routine
are less obese and are healthier

“Active Living...”

Research Conclusion #2:

People who live where walking and bicycling are convenient, safe and comfortable are much more active.

“...by Design”



“Active Living by Design”

“Public Transit Systems Contribute to Weight Loss and Improved Health”

August 2010, American Journal of Preventive Medicine (Research by Univ of Pennsylvania, Drexel Univ & RAND Corp)

“Public Transit Users Three Times More Likely To Meet Fitness Guidelines”

March 2009, Journal of Public Health Policy (Research by Ugo Lachapelle and Assoc. Prof. Lawrence Frank, Univ of British Columbia)

Air Pollution & Health

	MAJOR SOURCES	HEALTH EFFECTS	ENVIRONMENTAL EFFECTS
SO₂	Industry	Respiratory and cardiovascular illness	Precursor to acid rain, which damages lakes, rivers, and trees; damage to cultural relics
NO_x	Vehicles; industry	Respiratory and cardiovascular illness	Nitrogen deposition leading to over-fertilization and eutrophication
PM	Vehicles; industry	Particles penetrate deep into lungs and can enter bloodstream	Visibility
CO	Vehicles	Headaches and fatigue, especially in people with weak cardiovascular health	
Lead	Vehicles (burning leaded gasoline)	Accumulates in bloodstream over time; damages nervous system	Fish/animal kills
Ozone	Formed from reaction of NO _x and VOCs	Respiratory illness	Reduced crop production and forest growth; smog precursor
VOCs	Vehicles; industrial processes	Eye and skin irritation; nausea; headaches; carcinogenic	Smog precursor

Air Pollution & Health

- Importance of proximity
- Accumulation over time: children
- Tie to equity & environmental justice
- \$80 million/year



BOTTOM LINE:

Transportation planning & design are major determinants of public health.



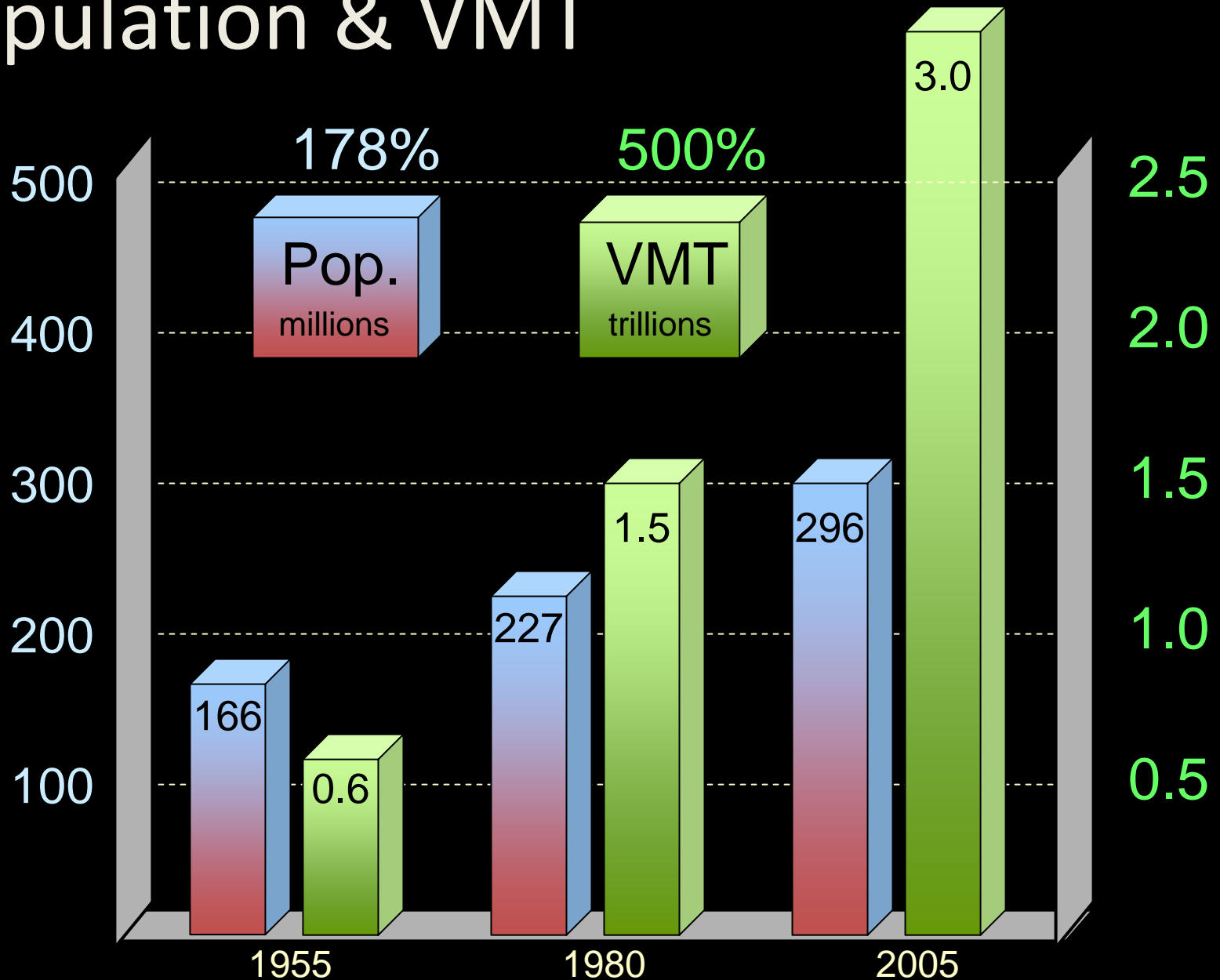
3



Community Design

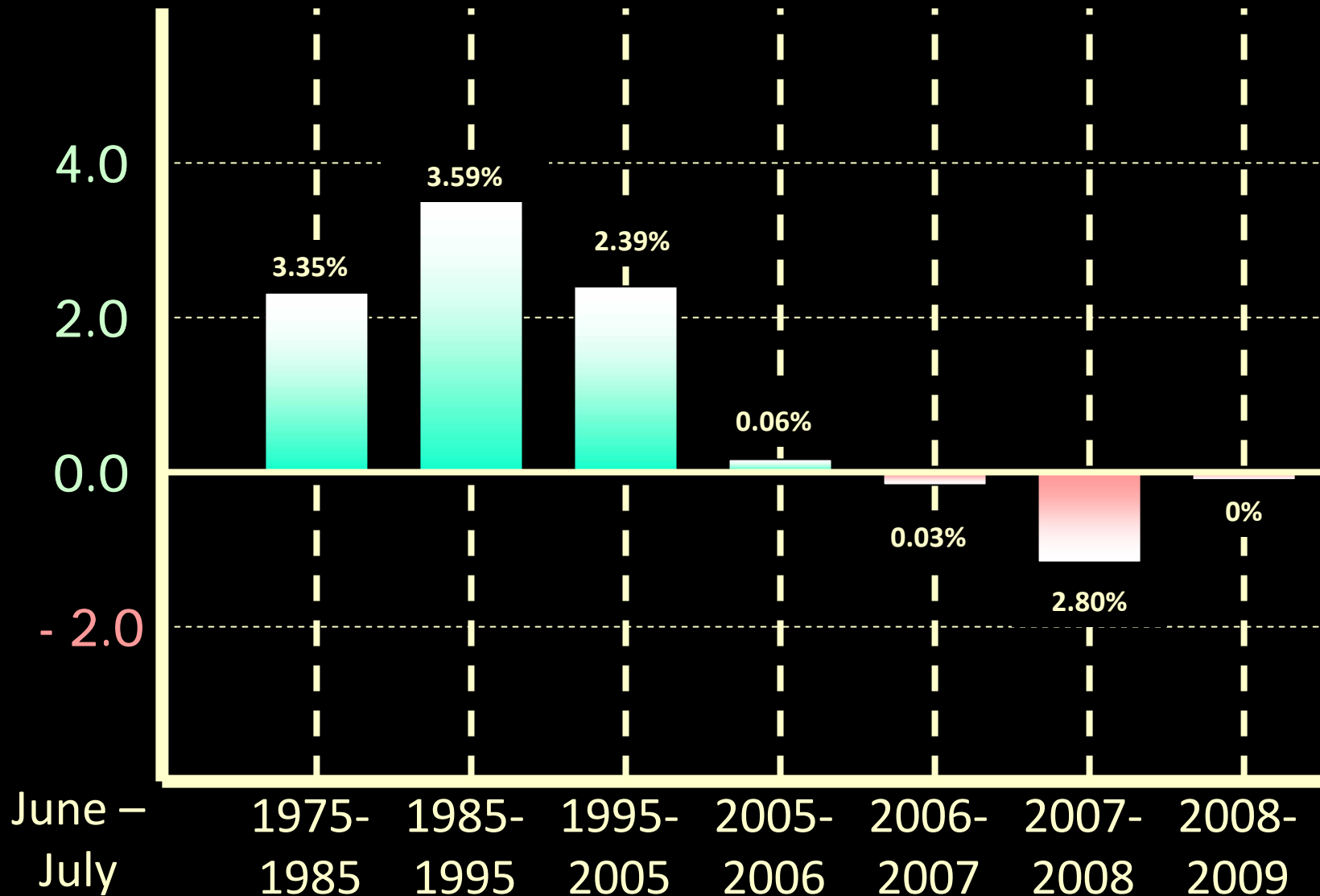
United States

Population & VMT

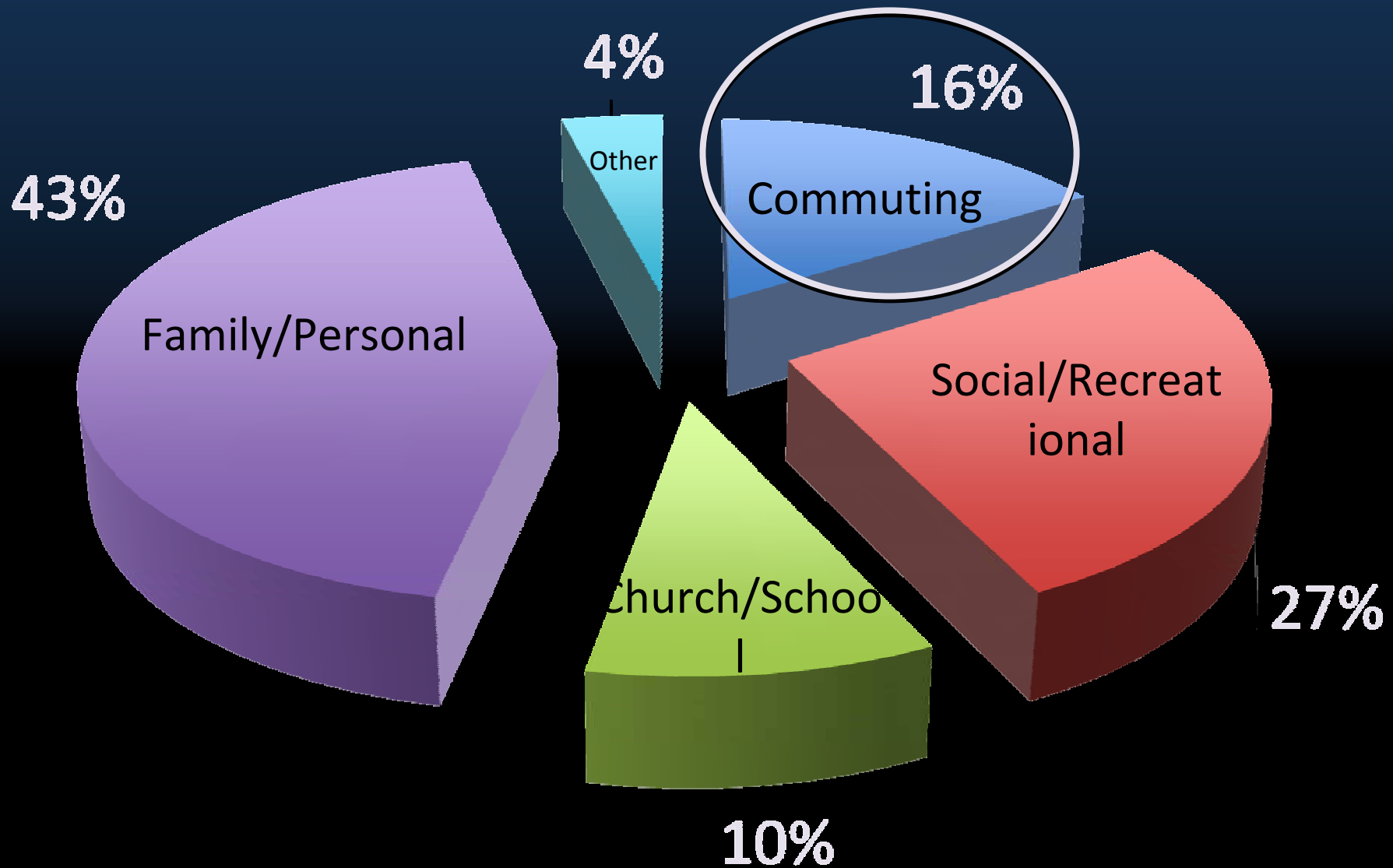


United States

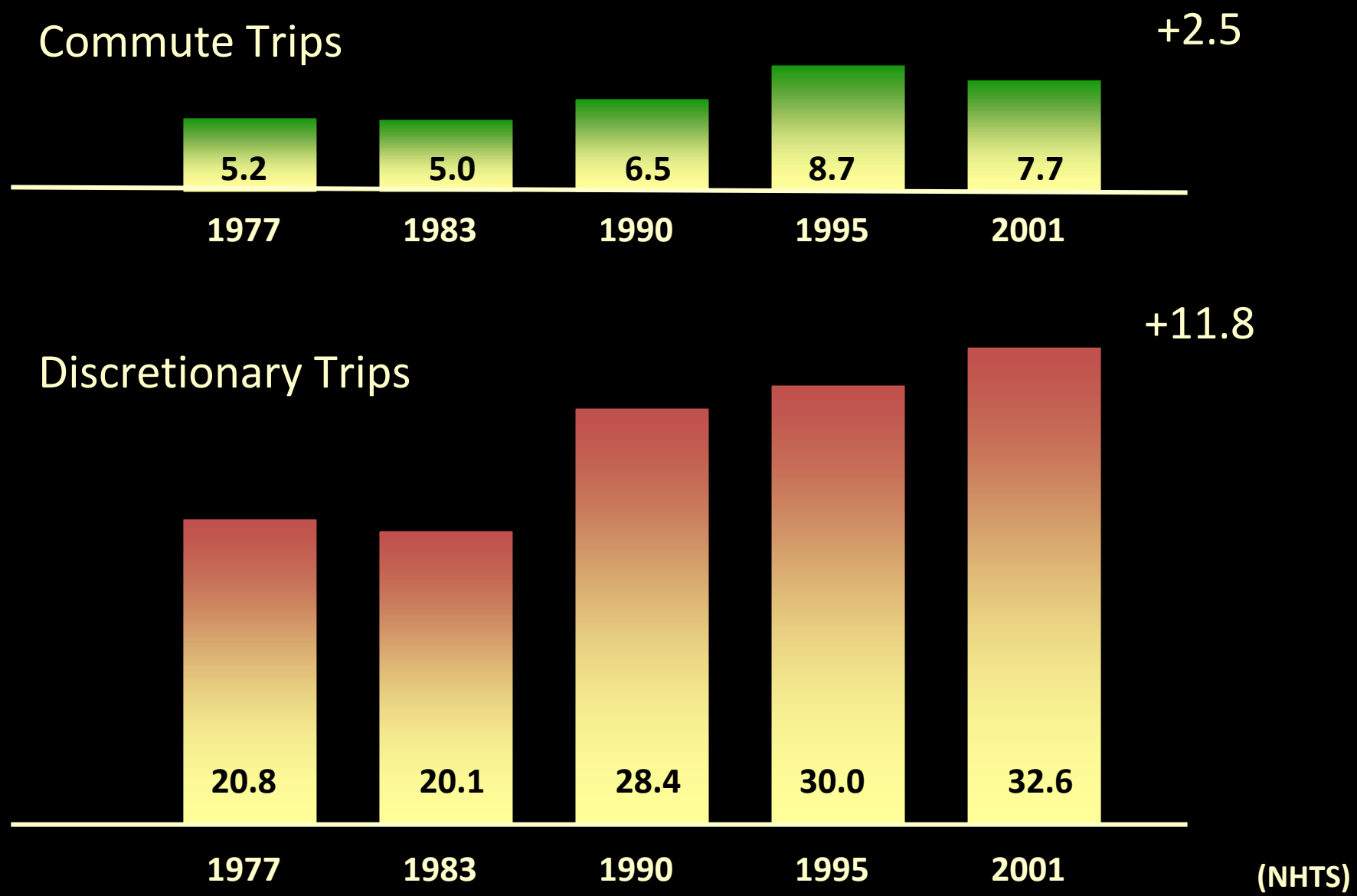
Annual Rate of Change in VMT



Daily Per Capita Travel



Daily Miles of Travel Per Capita



“Mobility”

Elements

TRAVEL

Moving over distances

CIRCULATION

Moving within areas

ACCESS

Getting in the door

Facilities

TRAVEL

Freeways, arterials, rail transit, express bus lanes

CIRCULATION

Collectors, connectors, transit routes, bike trails and lanes

ACCESS

Local streets, parking, sidewalks and crosswalks

Built for...



Seattle



Redmond

...travel

Built for...



Denver



Boulder

...travel

Built for...



Flagstaff

...circulation

Redmond

Portland

Built for...



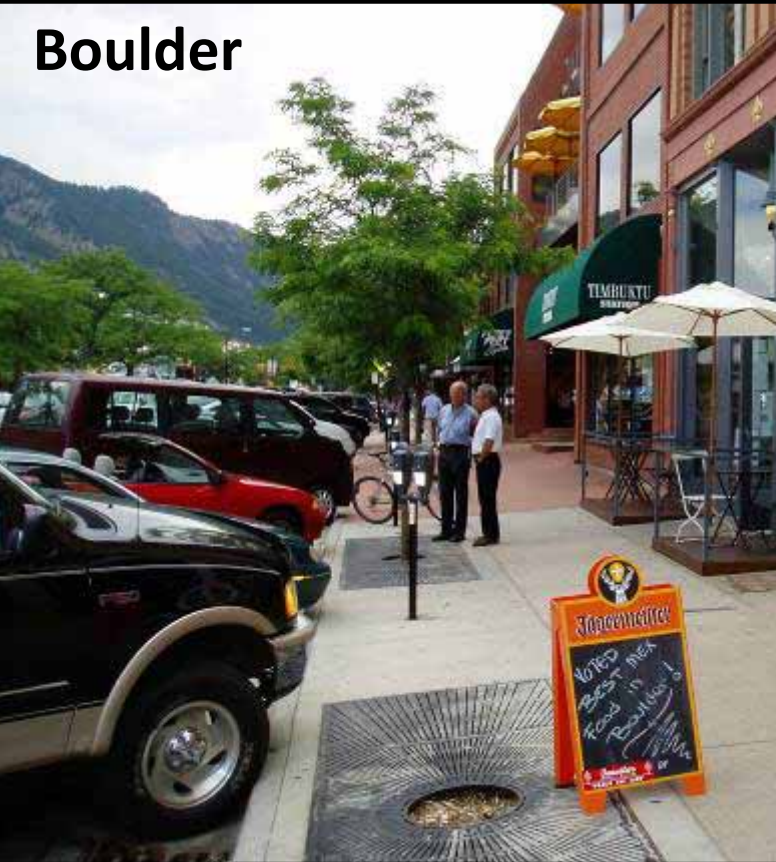
Boulder



...circulation

Built for...

Boulder

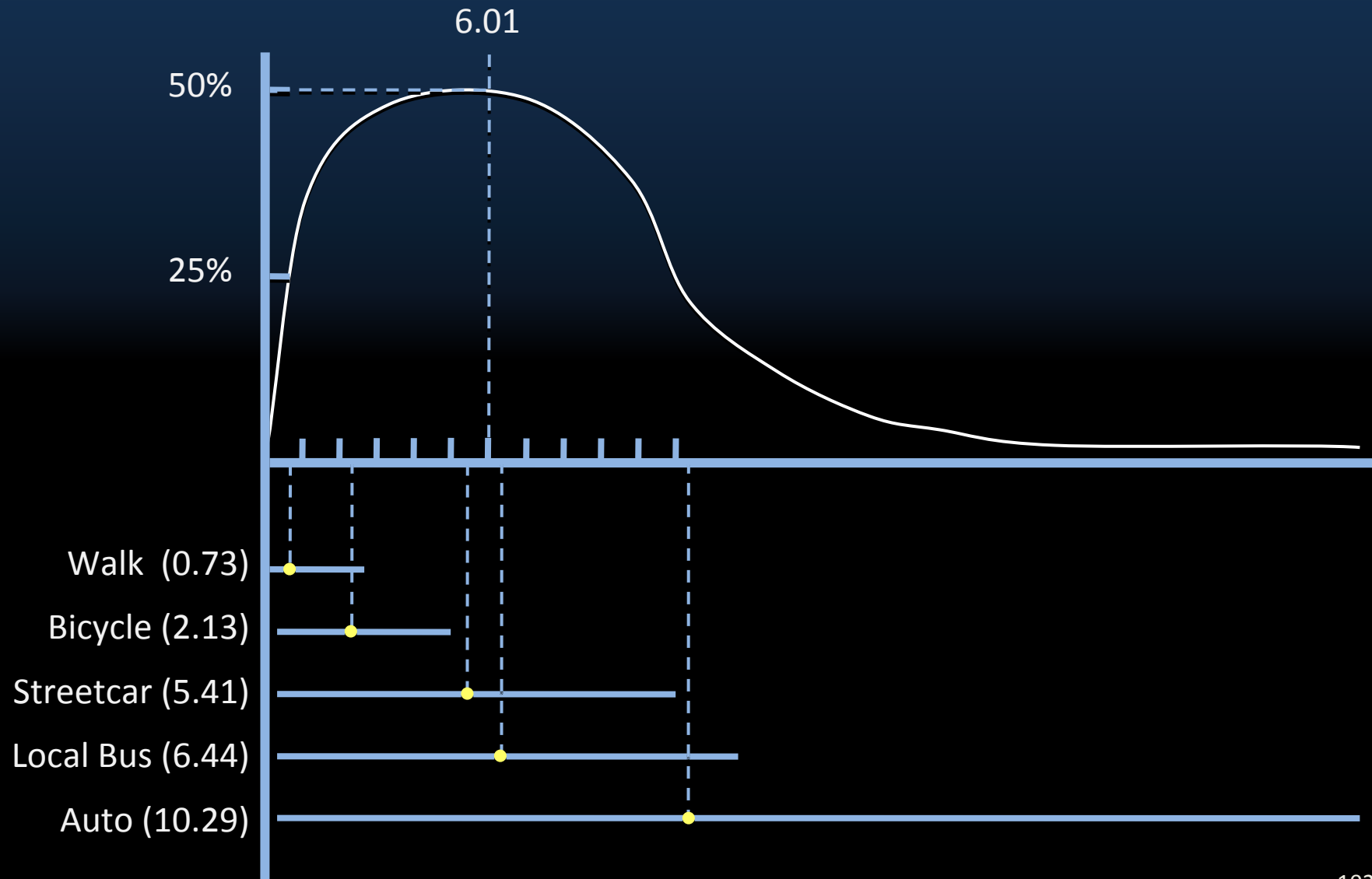


Winter Park, Fl

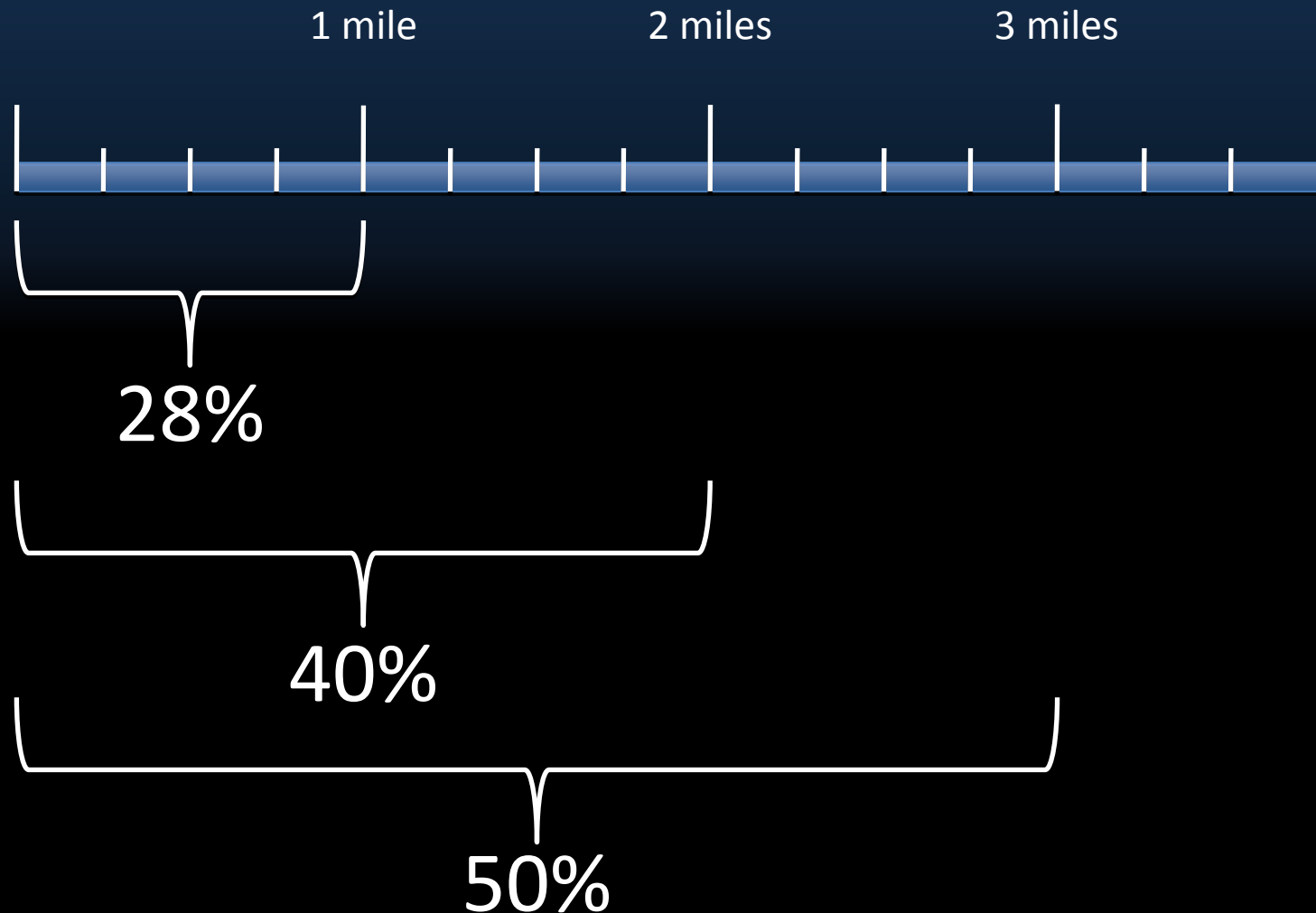
...access



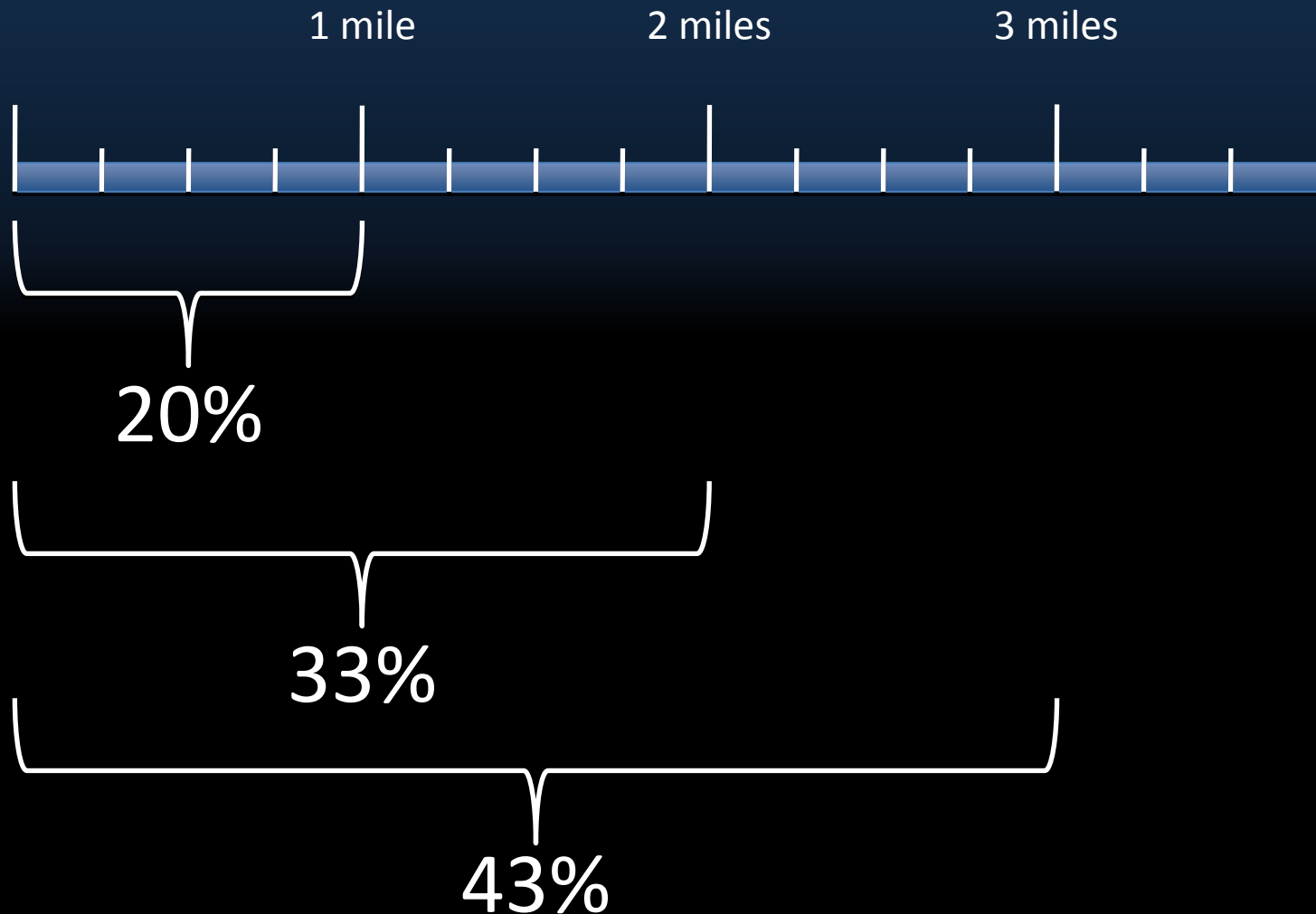
Average Trip Lengths



Trip Length – All Trips



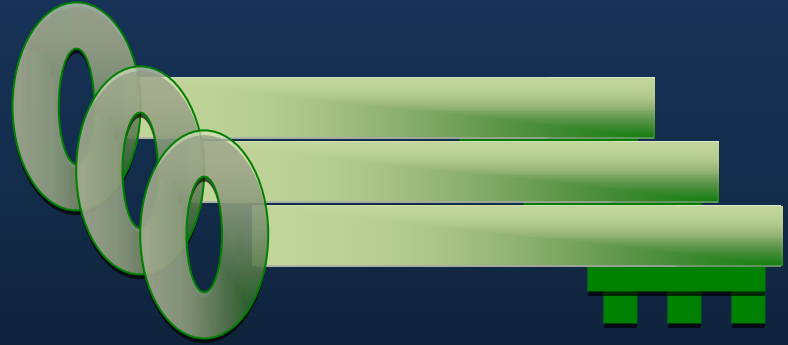
Trip Length – Driving Trips



BOTTOM LINE

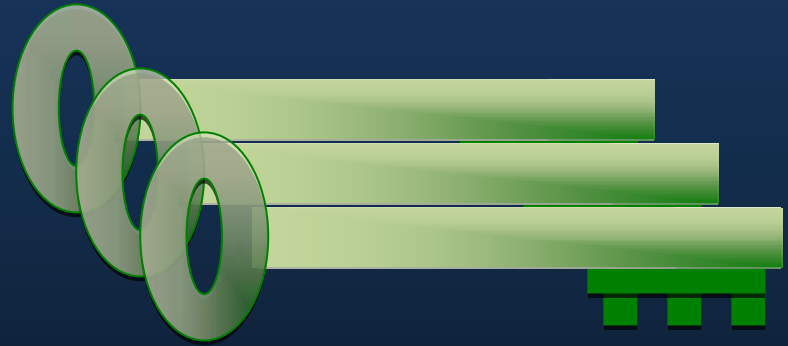
Most trips are short and
most travel is discretionary.





Keys to

Community Design & Public Health



- Bike Systems
- Pedestrian Environments
- Complete Neighborhoods



Bike Systems





Bike Systems

*networks +
entrepreneurial
planning*

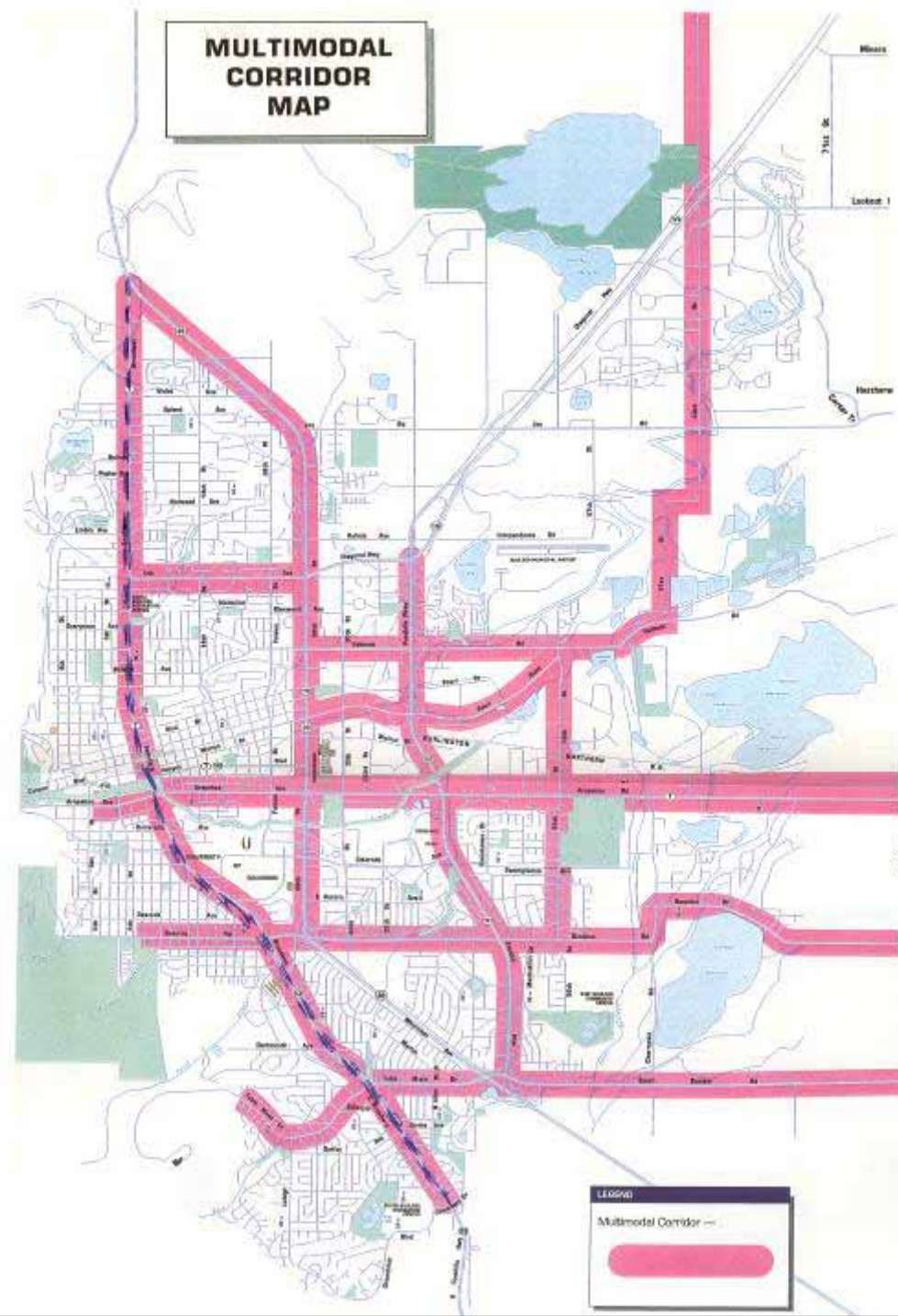
No System



1996

Transportation Master Plan

- Increase non-auto mode share
- Hold VMT at 1994 level



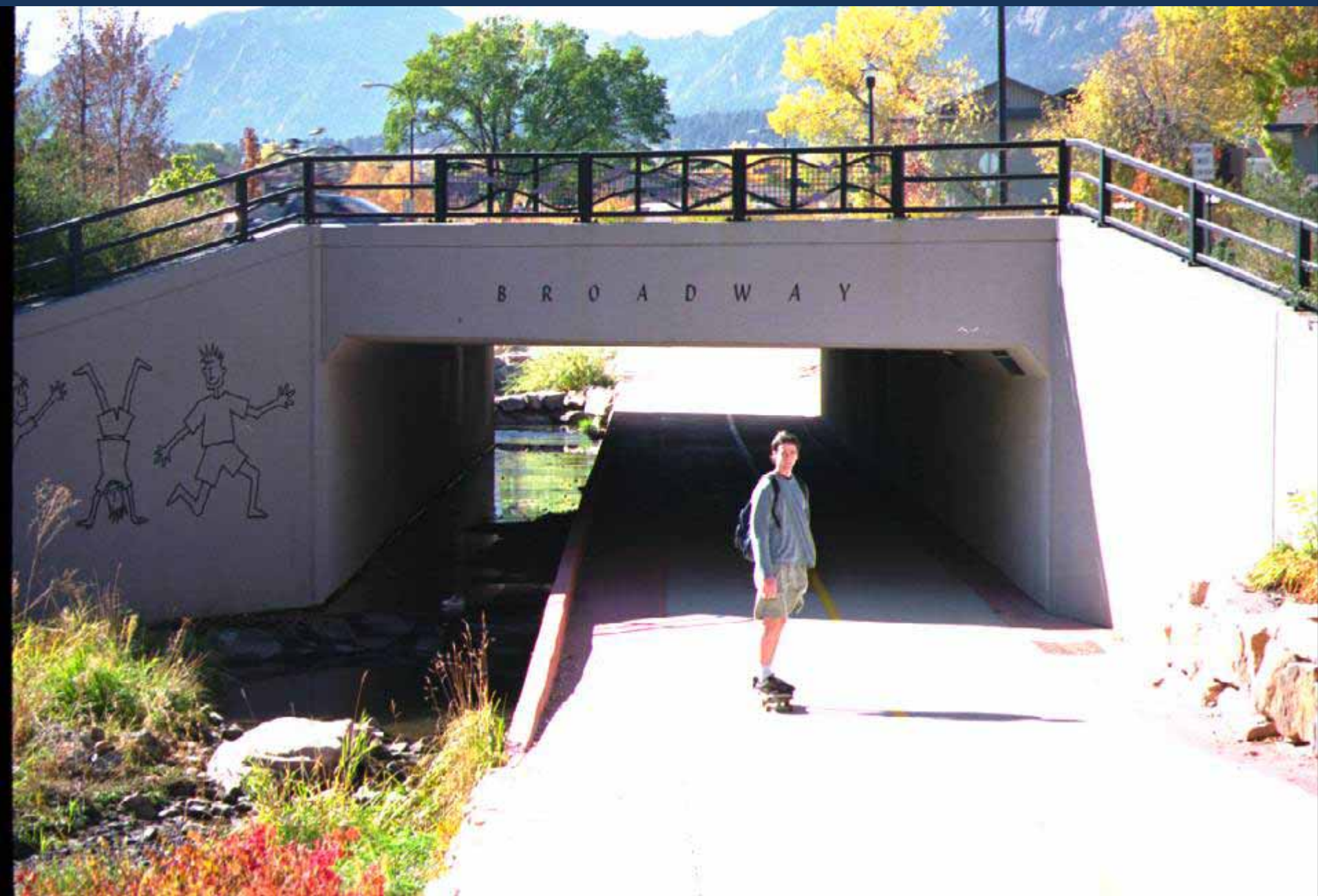








Budget: \$440,000 annually











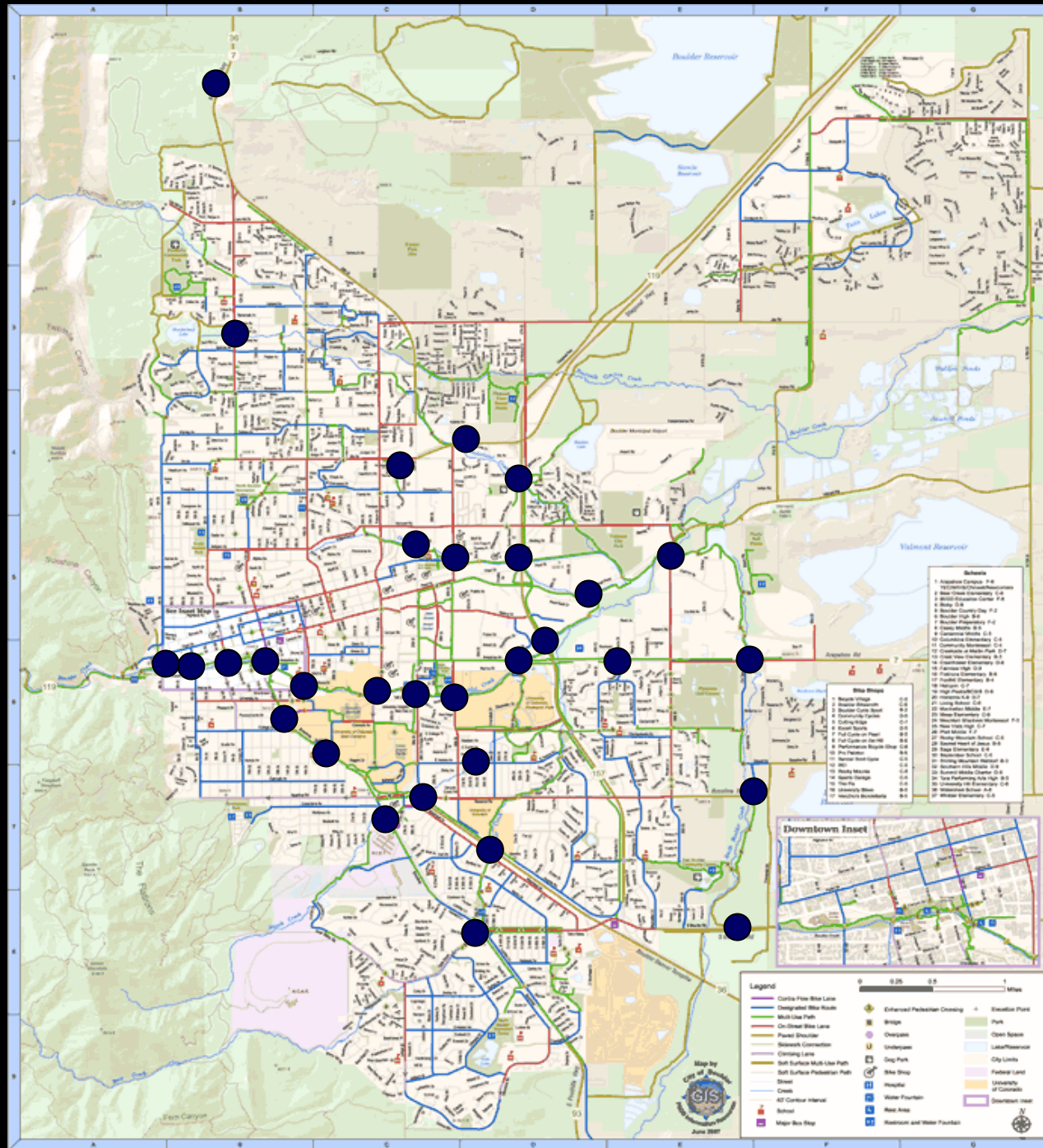




Martin Dr.

Plan: 17
grade
separations by
2020

Actual: 32
grade
separations in
2009





Bike Systems



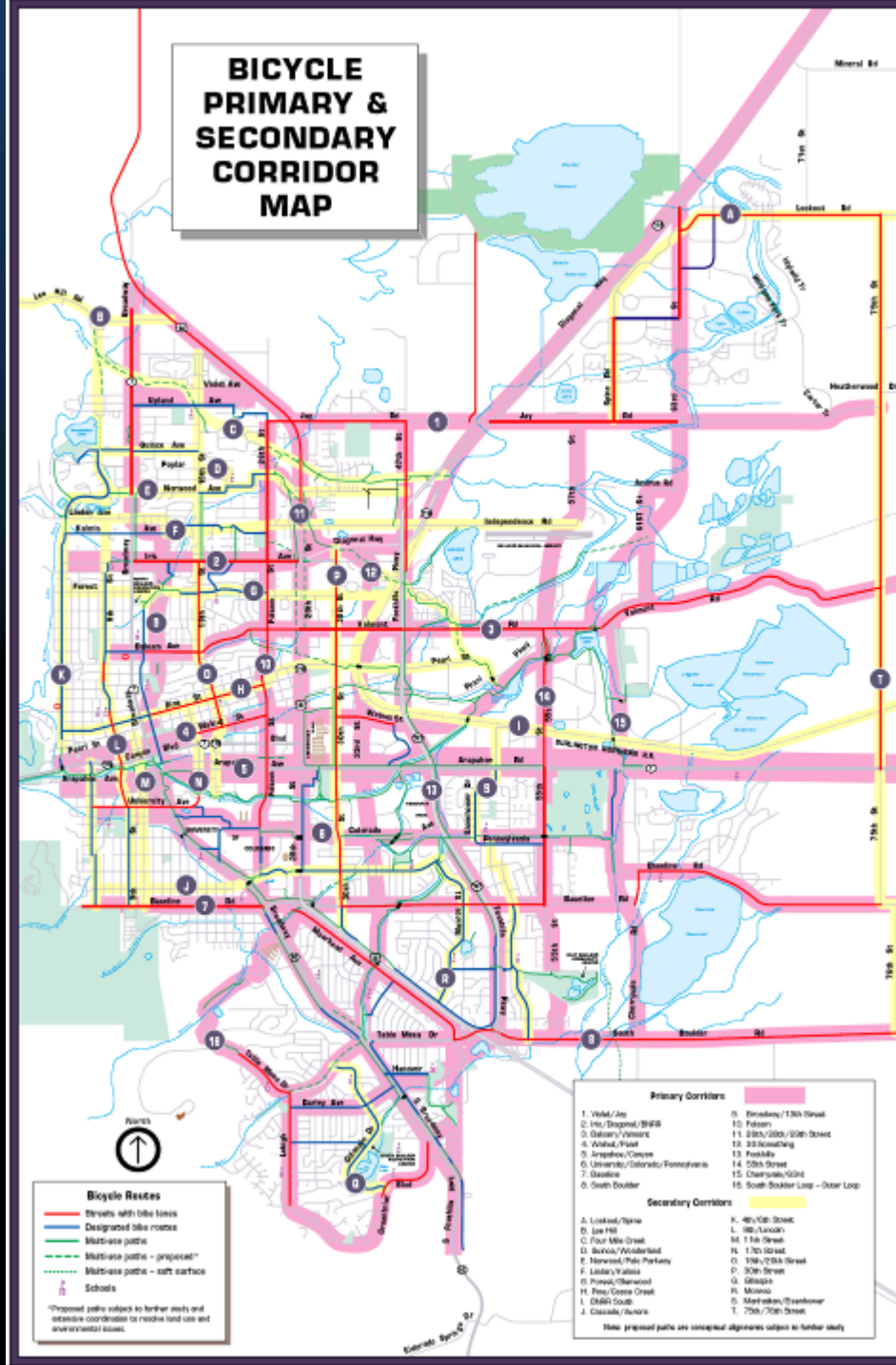


Bike Systems

*spine corridor +
priorities*

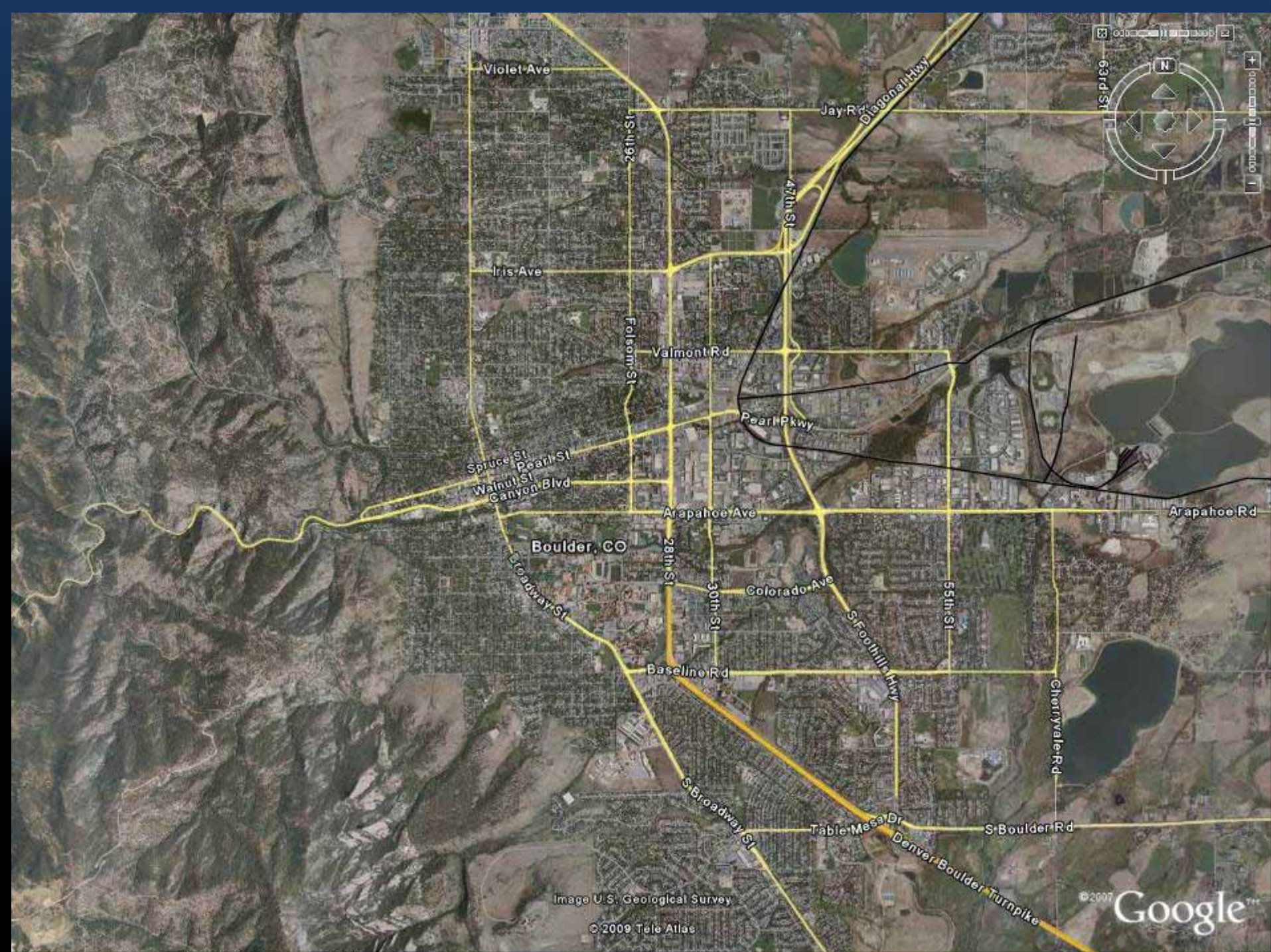
1995

Boulder Transportation Master Plan





Boulder Creek Path



Violet Ave

Jay Rd

Diagonal Hwy

47th St

Iris Ave

I-25

Folsom St

Valmont Rd

Pearl Pkwy

Spruce St
Pearl St
Walnut St
Canyon Blvd

Arapahoe Ave

Arapahoe Rd

Boulder, CO

28th St
30th St

Colorado Ave

55th St

Broadway St

S Foothills Hwy

Baseline Rd

Cherryvale Rd

S Broadway St

Table Mesa Dr

S Boulder Rd

Denver Boulder Turnpike

Image U.S. Geological Survey

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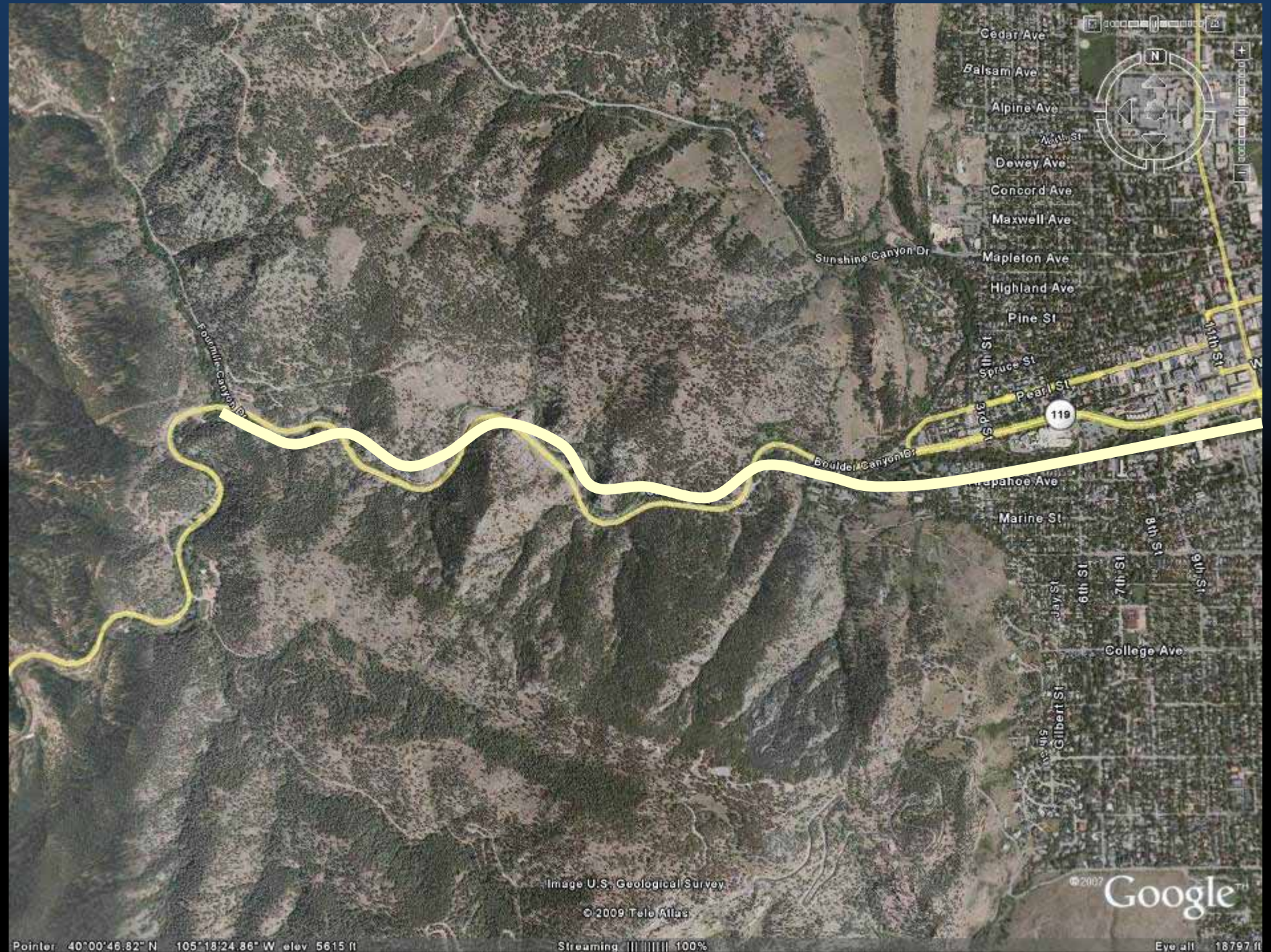


Image U.S. Geological Survey

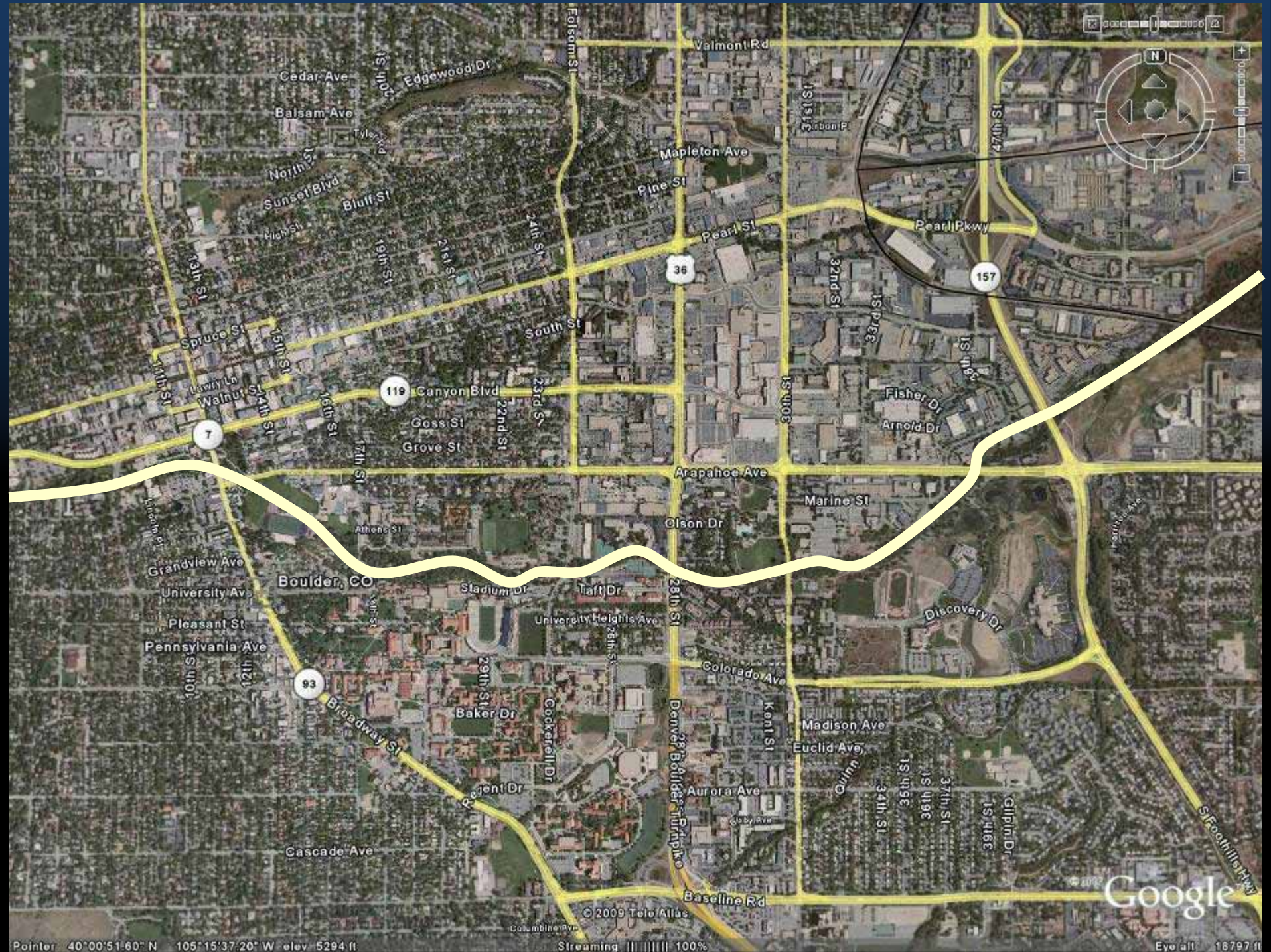
© 2009 Tele Atlas

© 2007 Google™

Pointer 40°00'46.82" N 105°18'24.86" W elev 5615 ft

Streaming 100%

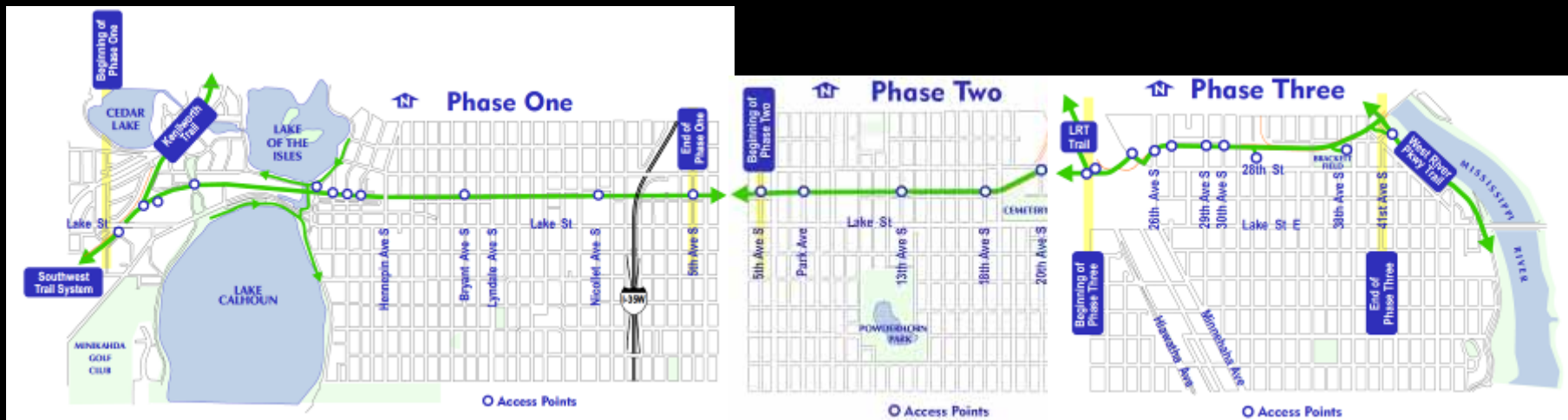
Eye alt 18797 ft





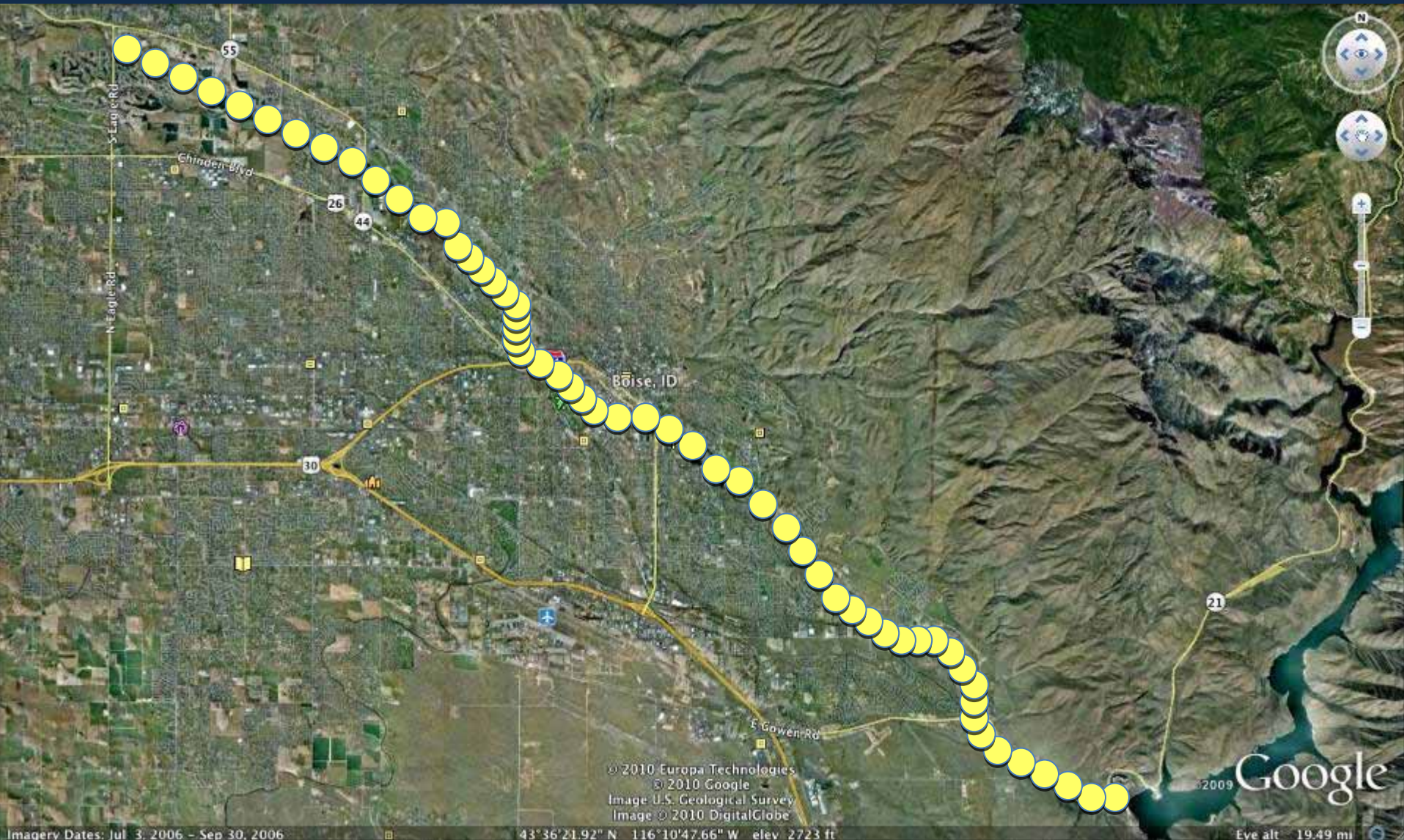
Minneapolis/Hennepin Midtown Greenway

- 5.66 miles long
- St Louis Park City Limits to West River Pkwy
- 2000 (Phase 1), 2004 (Phase 2), 2006 (Phase 3)



Boise River Greenway & Trail

- 16 miles long, both sides of river



Bike Systems

- Networks & Priorities
- Spine Corridor

Boulder

Bike Mode Share – All Resident Trips

1990  9.1 %

A horizontal bar chart showing the bike mode share for all resident trips in Boulder. The bar for 1990 is green and represents 9.1%.

2009  15.9 %

A horizontal bar chart showing the bike mode share for all resident trips in Boulder. The bar for 2009 is green and represents 15.9%.

Boulder

Bike Mode Share – Resident Commute Trips

1990



10.6 %

2009



23.3 %



Pedestrian Environments





Pedestrian Environments

*hierarchy of
place types*

“pedestrian-friendly”



“not pedestrian-friendly”





pedestrian place

pedestrian place



Boulder

Miami Beach, FL

pedestrian place



pedestrian supportive

Mt. Vernon, IA

pedestrian supportive





Redmond

pedestrian supportive

Longmont



pedestrian supportive

Longmont - Prospect



pedestrian supportive

pedestrian tolerant

Redmond

pedestrian tolerant





pedestrian tolerant

pedestrian tolerant

Kapalua, Maui

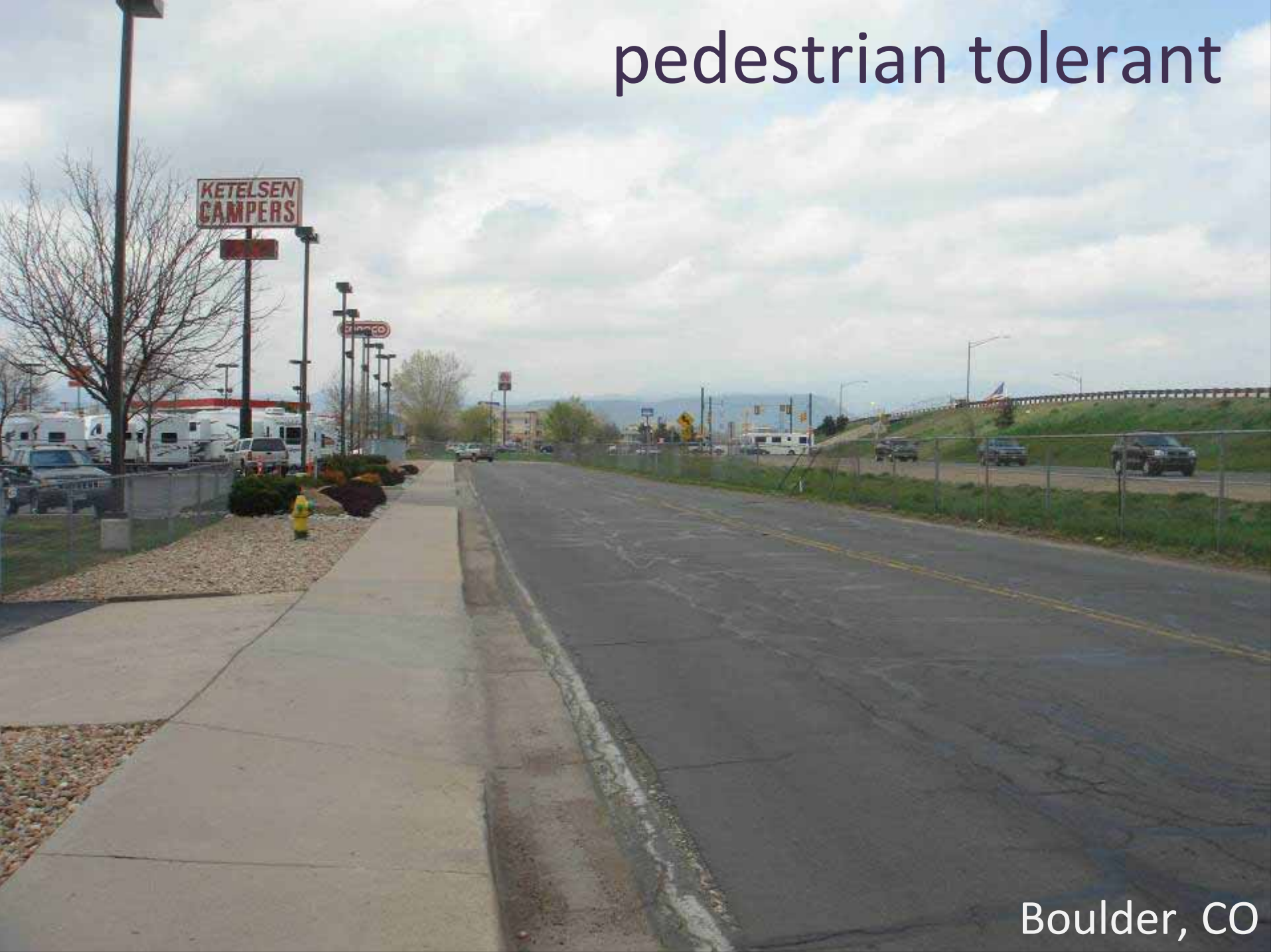


Wailuku, Maui



pedestrian tolerant

pedestrian tolerant



Boulder, CO

pedestrian intolerant

Longmont



pedestrian intolerant

Longmont

pedestrian intolerant



Kahalui



pedestrian intolerant

Jackson



pedestrian intolerant

Kahalui



pedestrian intolerant

Flagstaff, AZ

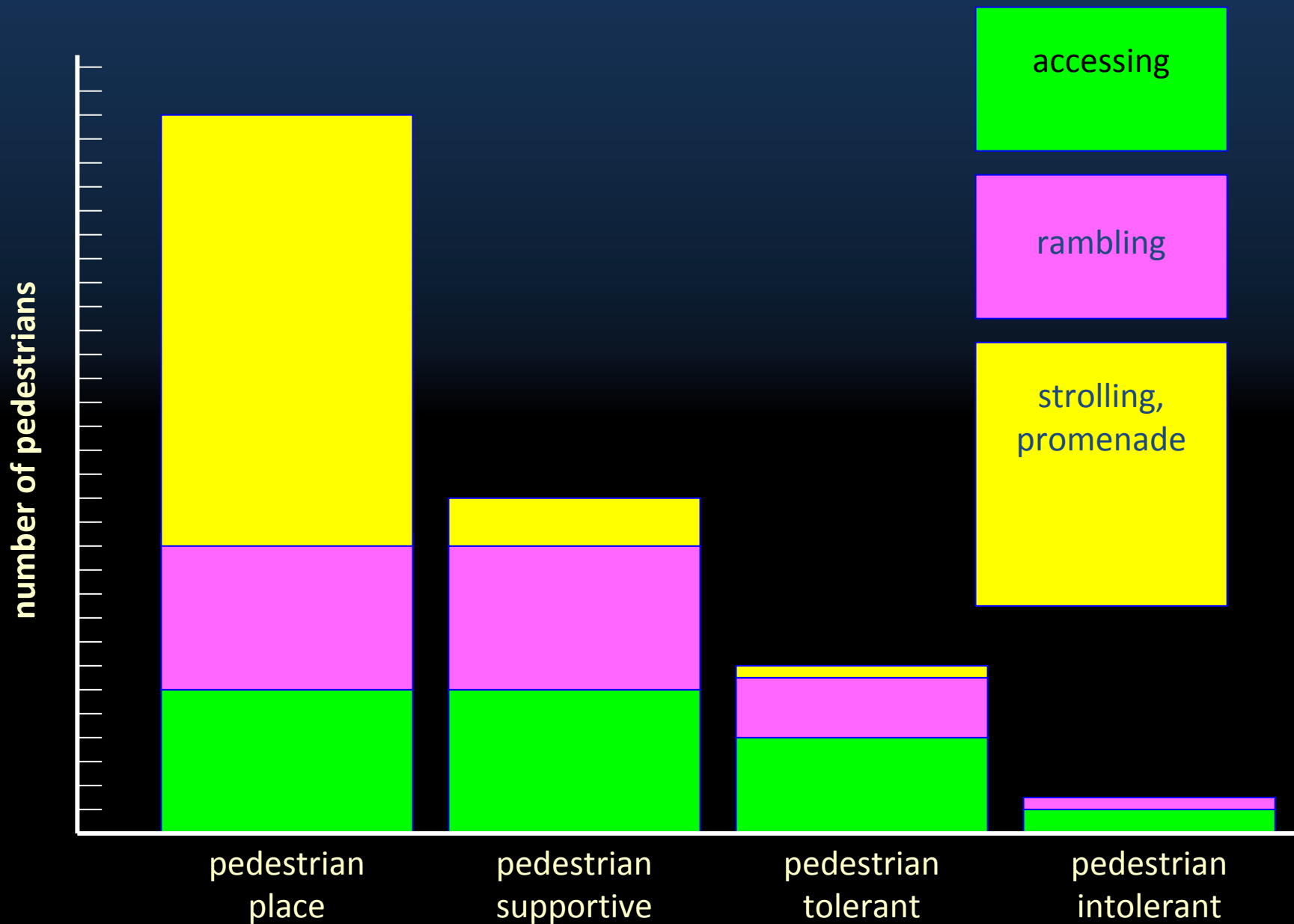


pedestrian tolerant

pedestrian intolerant



Flagstaff, AZ





Pedestrian Environments





Pedestrian Environments

*walking
destinations =
multimodal*



SPEED
LIMIT
35

Boulder



Boulder



Boulder



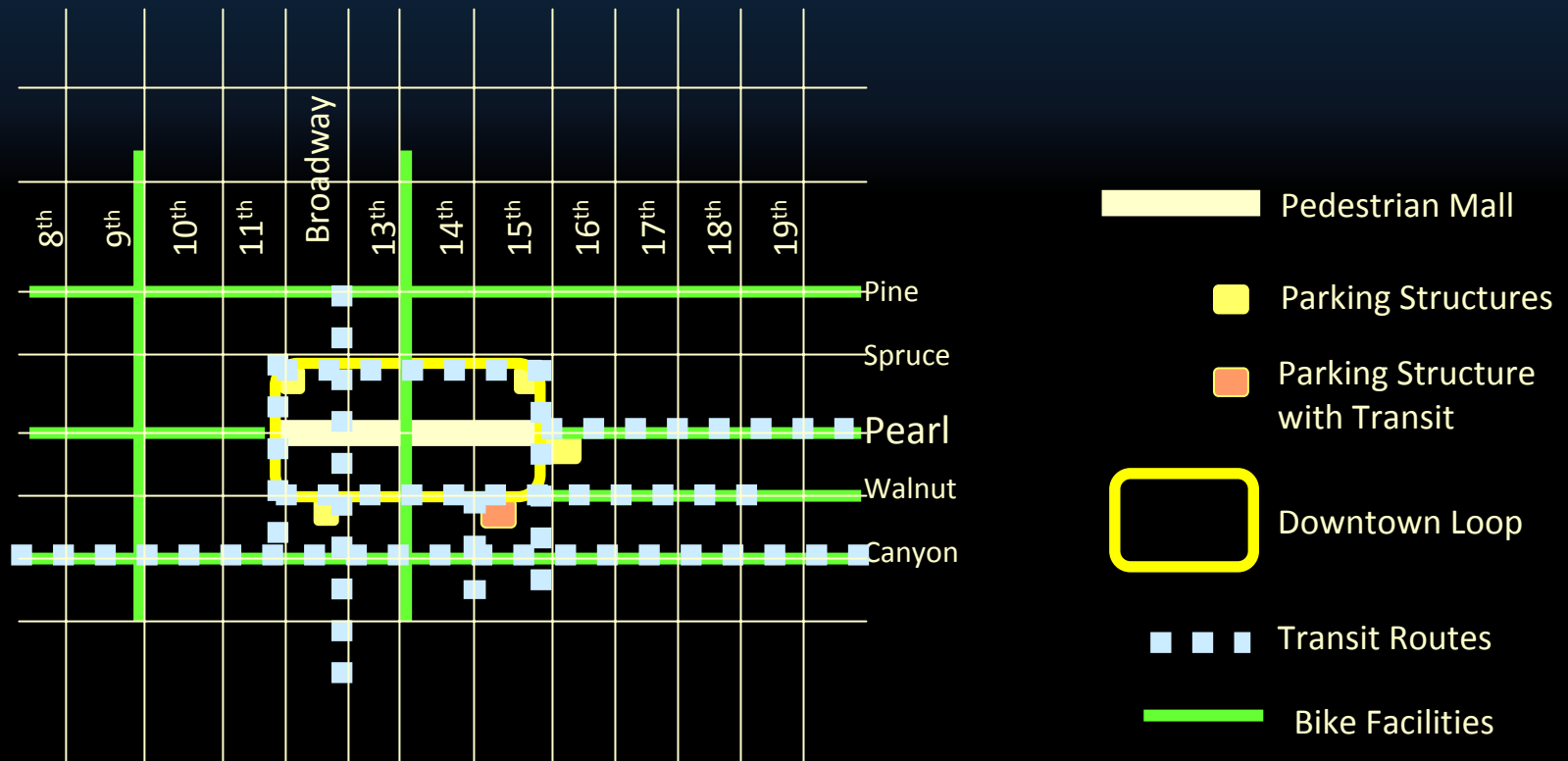








Pearl Street “Pedestrian Mall”





Boulder



Boulder



Boulder



Boulder



Boulder



Boulder





HOMEMADE
ICE CREAM

Voted Best in Boulder

"More of the good stuff"

FREE
SAMPLES

COLD
BOTTLED
WATER
\$1.00

Homemade Ice Cream, Yogurt & Sorbet
Made Daily in Boulder

BOULDER
ARTS &
COOPER





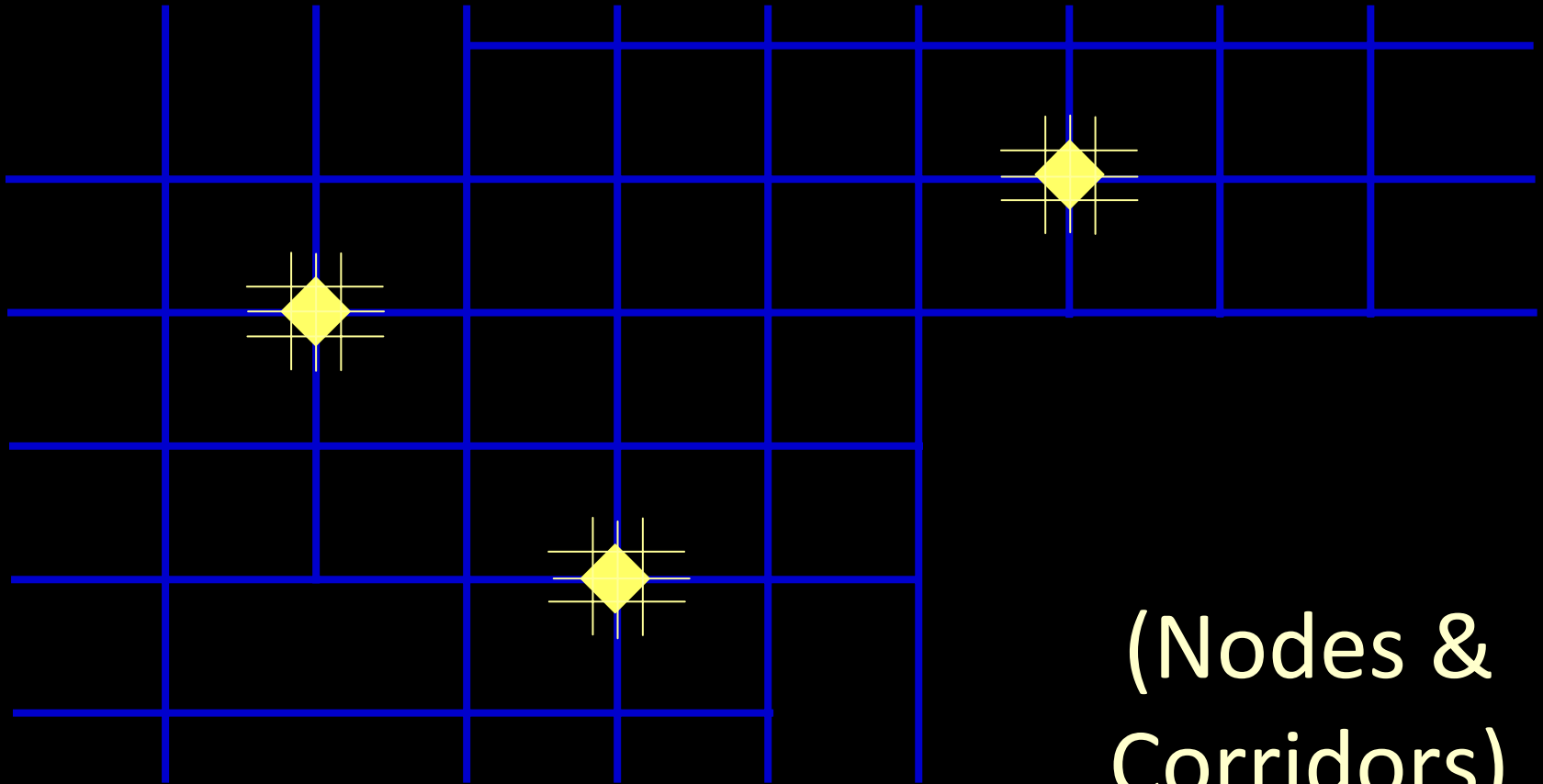


Boulder

Boulder's "pedestrian mall"
works because ...

... it is an integral part of an
intermodal system

Strategic Approach to Pedestrian Environments



(Nodes &
Corridors)



Complete Neighborhoods

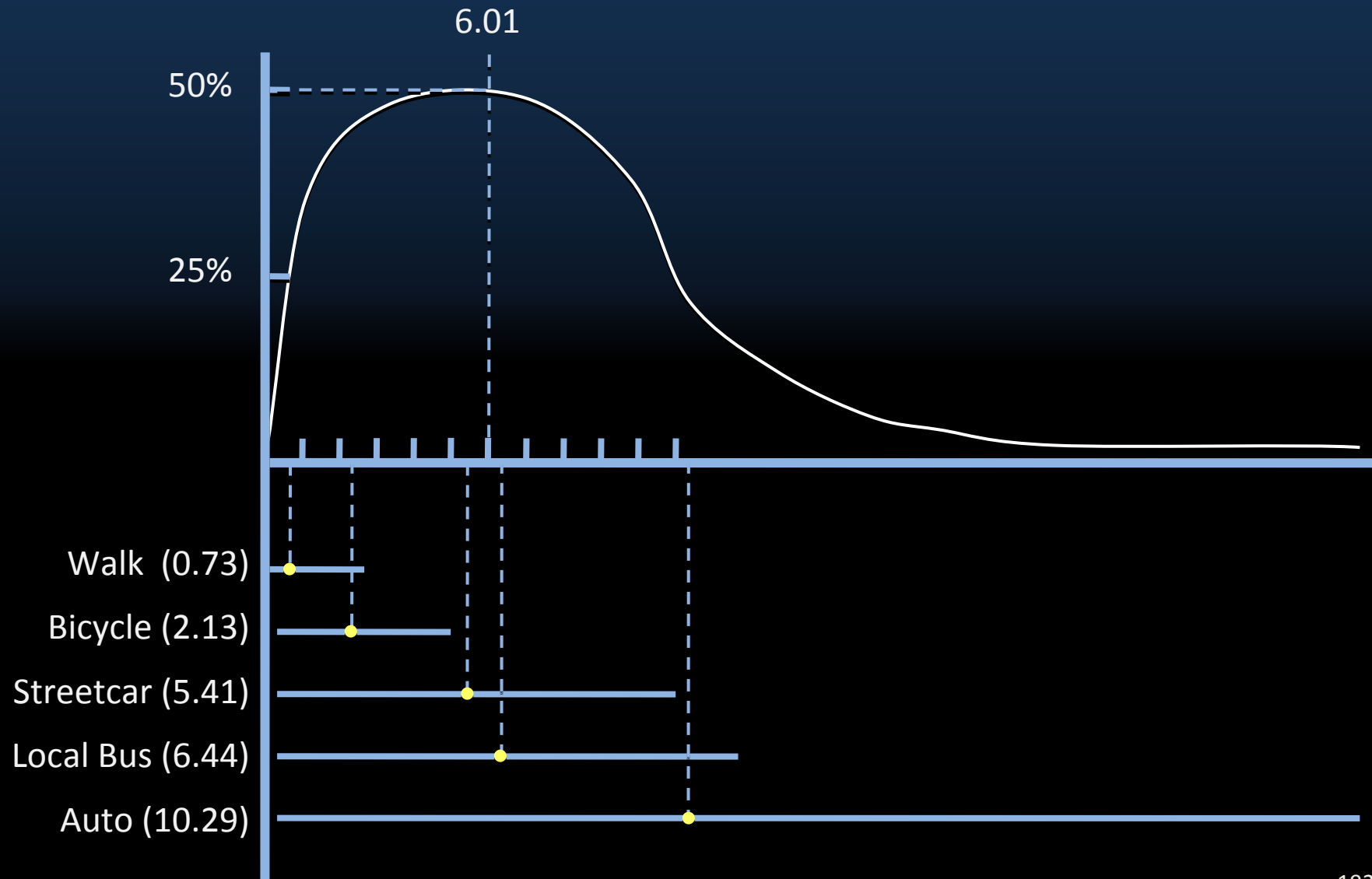




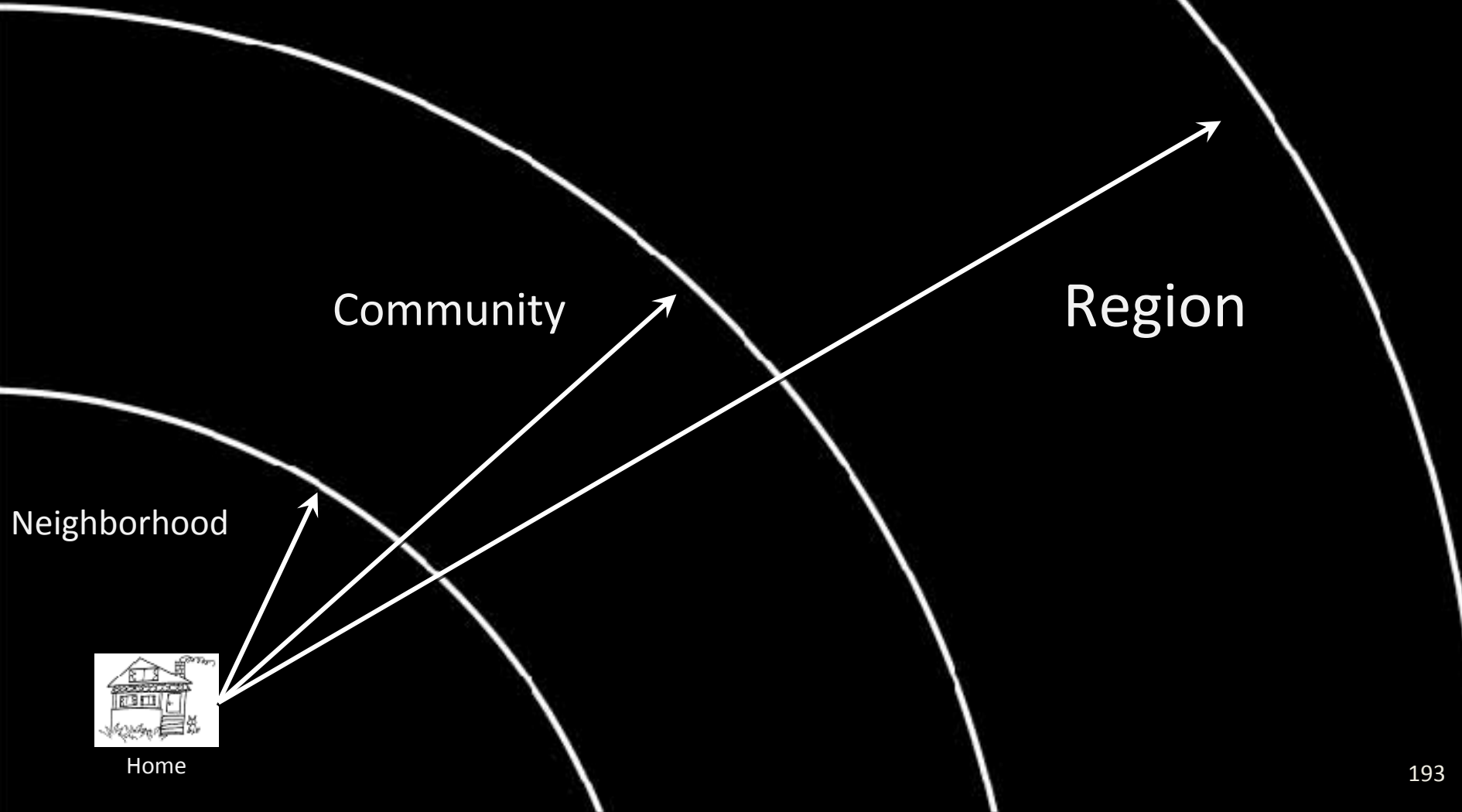
Complete Neighborhoods

*horizontal
mixed use*

Average Trip Lengths



Spatial Relationships



the neighborhood

- ¼ mile radius
- 160 – 200
acres

the complete neighborhood

- schools
- local retail
- services
- parks
- diverse
housing
- transit

the complete neighborhood

- walkable
- mixed-use
- transit-served

Wrap Up

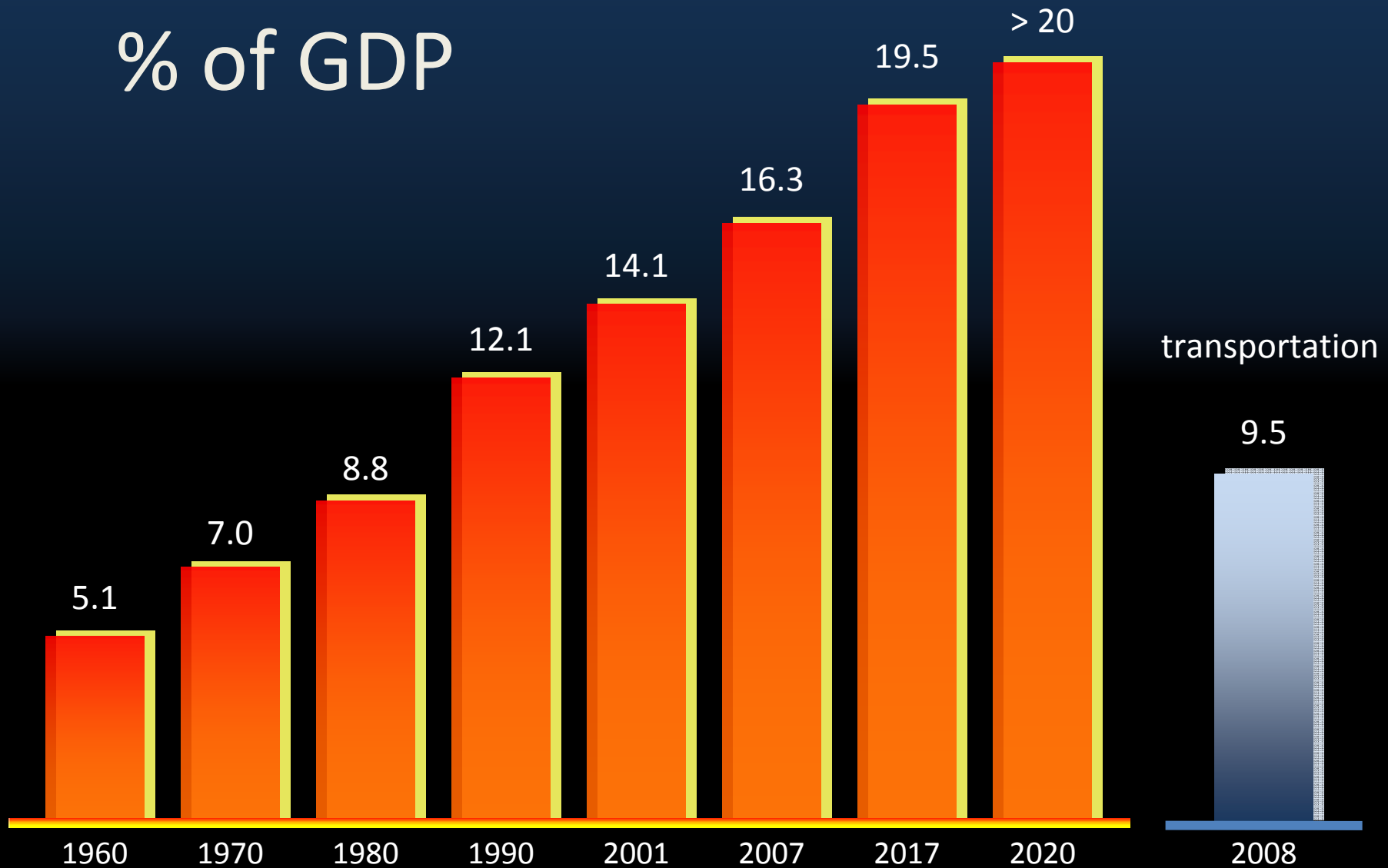
1



Photo: Dan Burden

Public Health

US Health Care % of GDP



BOTTOM LINE

Public health is of critical importance to the US economy and will continue to be a key public policy issue.



2



Transportation & Public Health

Transportation & Public Health

Traffic Safety + Personal Health



BOTTOM LINE:

Transportation planning & design are major determinants of public health.

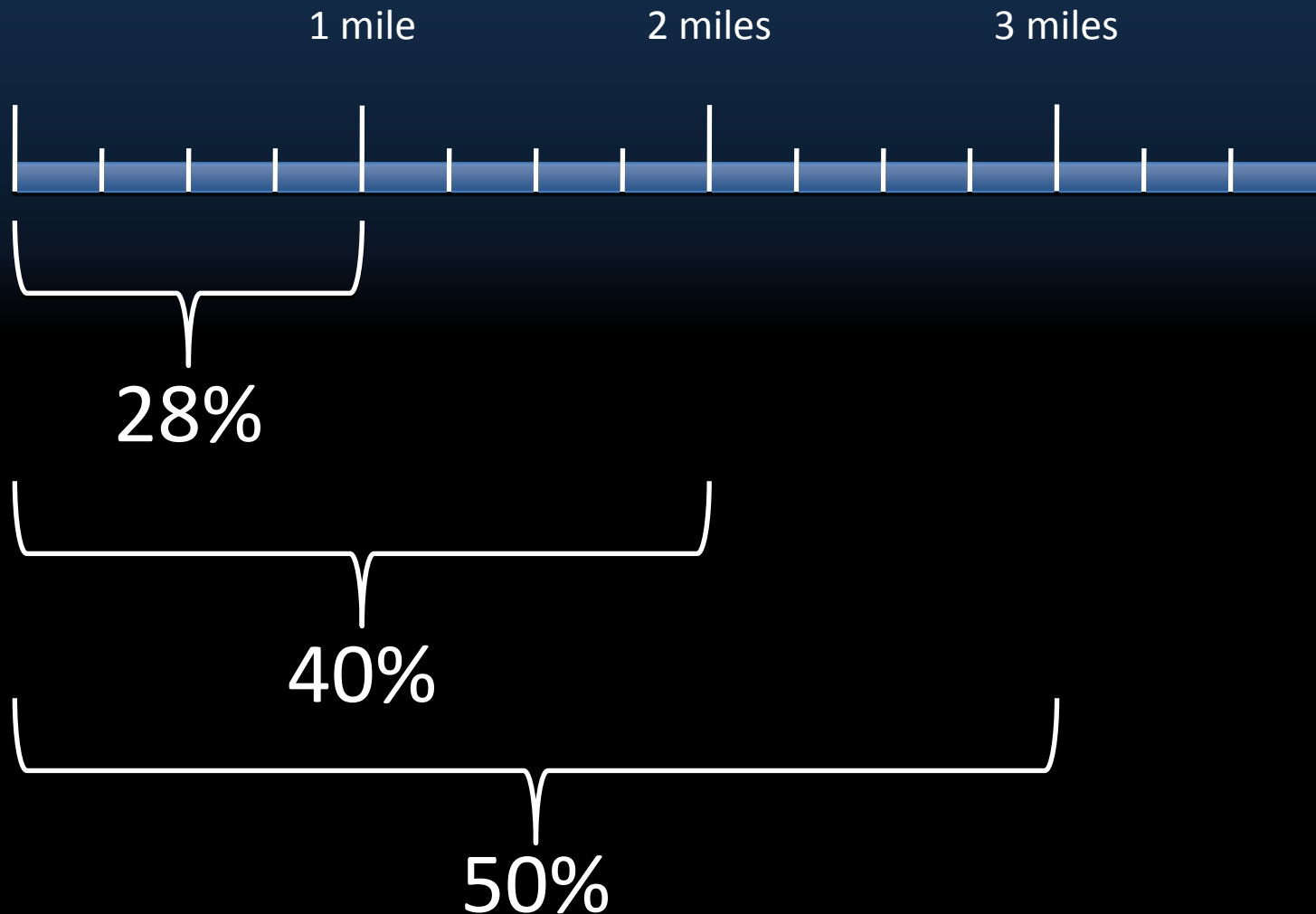


3



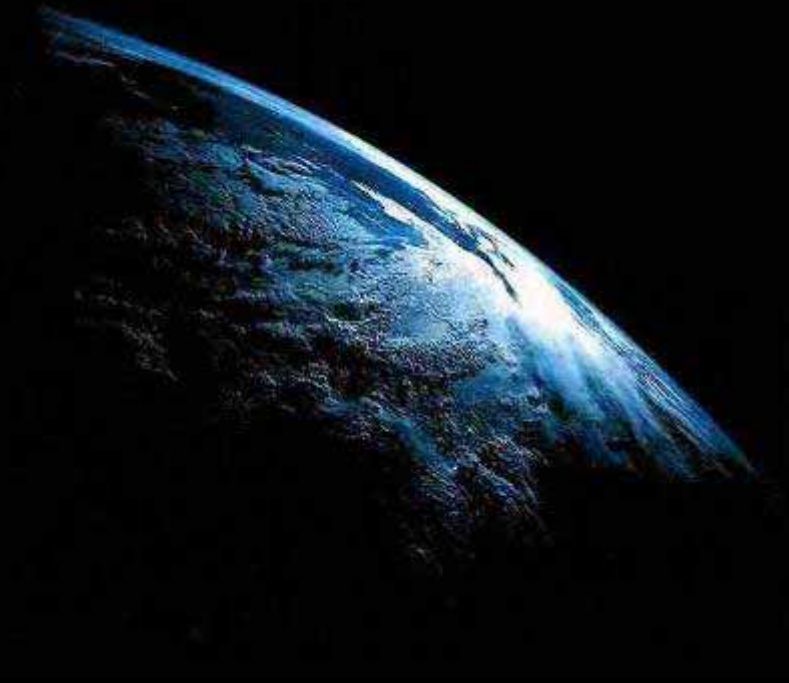
Community Design

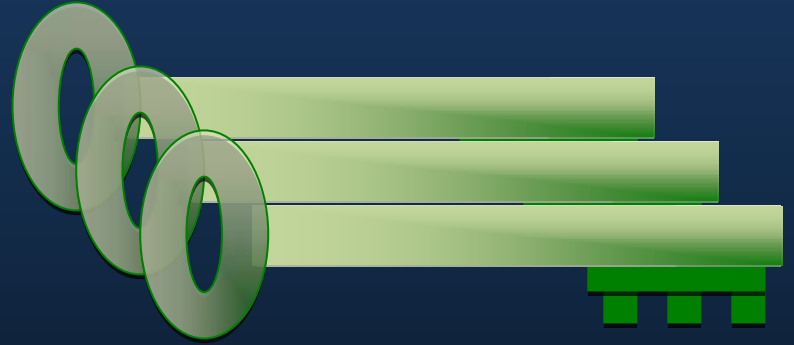
Trip Length – All Trips



BOTTOM LINE

Most trips are short and
most travel is discretionary.





Keys to

Community Design & Public Health



Bike Systems





Pedestrian Environments





Complete Neighborhoods



Thank You

www.charlier.org

