Community Design & Public Health

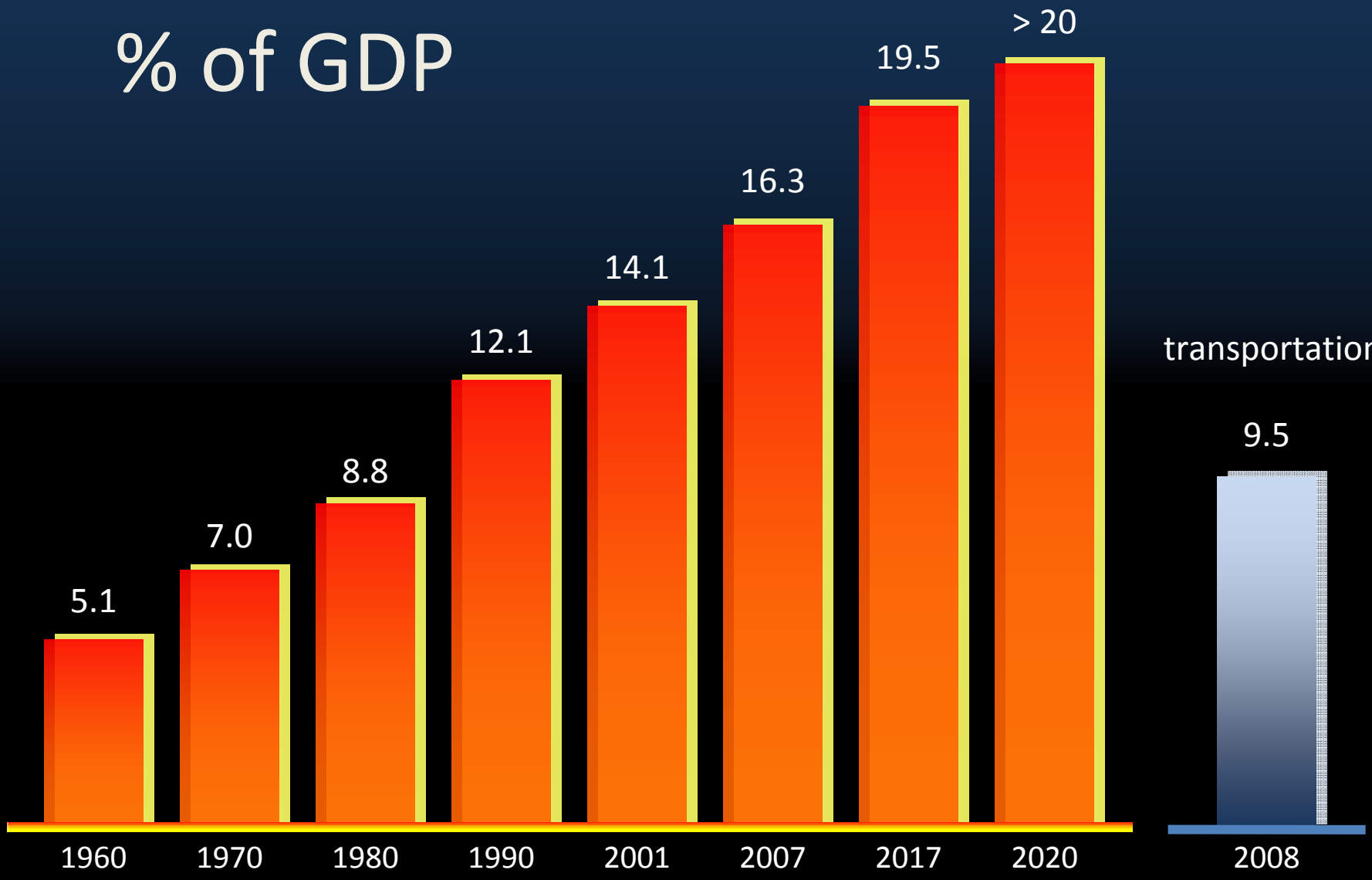
Rochester, Minnesota September 22, 2010

1

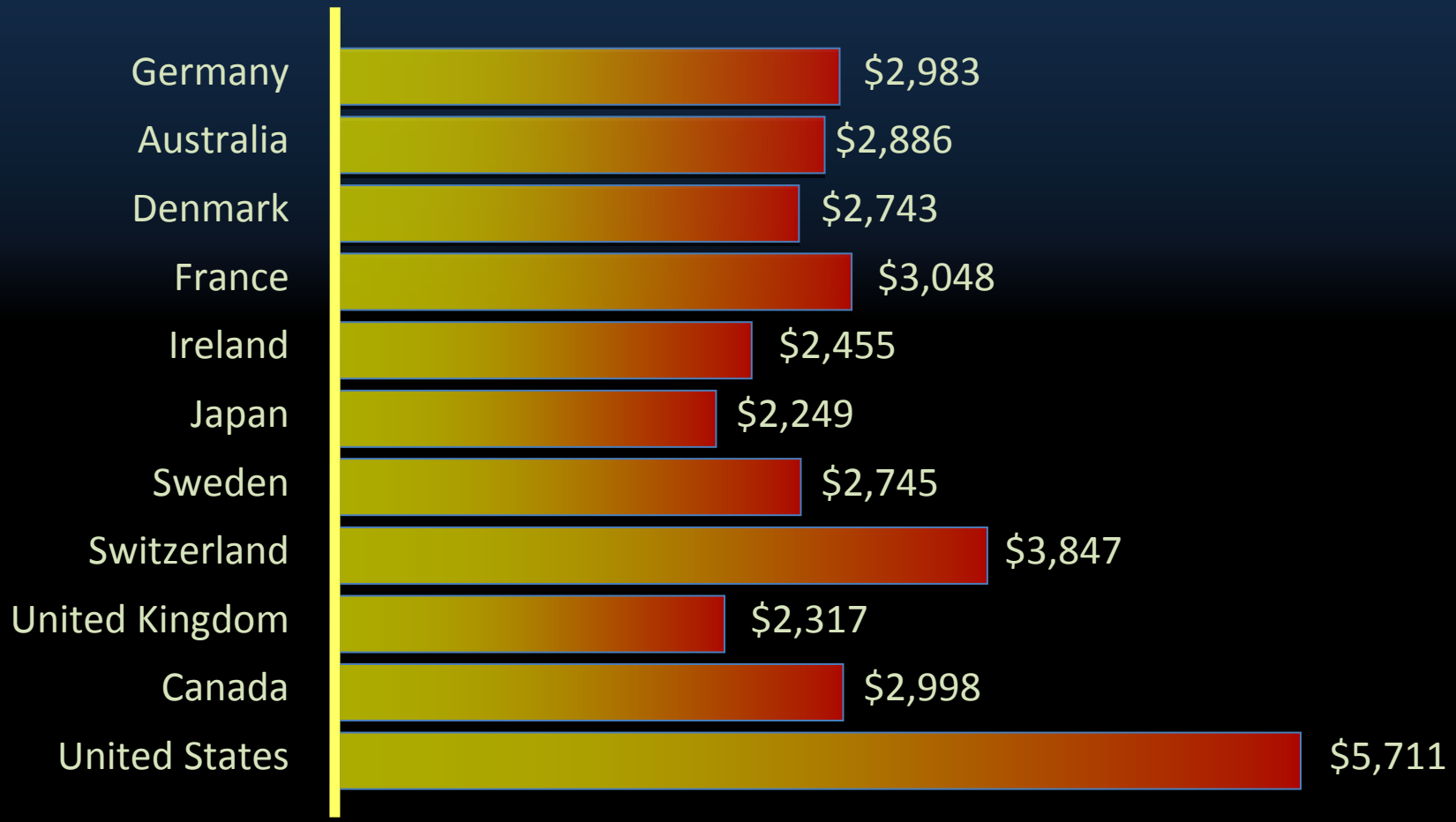
Photo: Dan Burden

Public Health

US Health Care
% of GDP

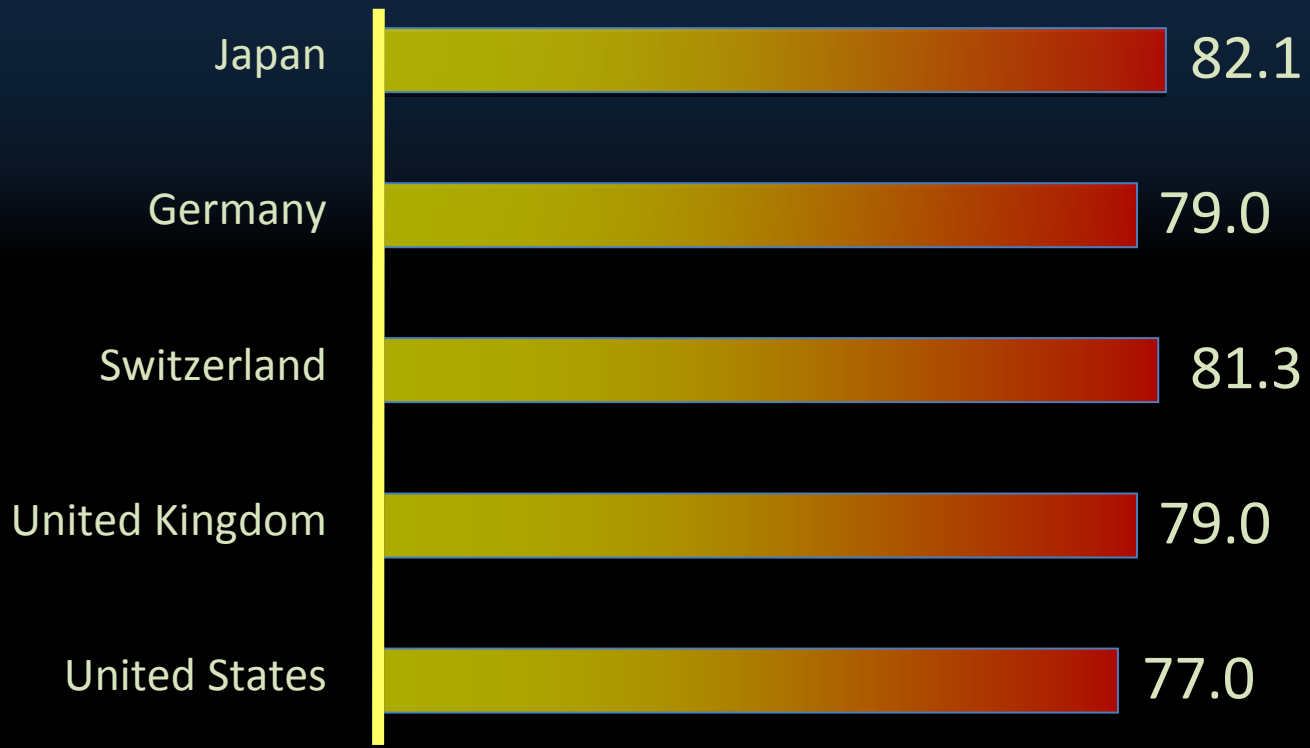


Annual Health Care Costs/Capita



Source: Kaiser Family Foundation, Visual Economics, 2010

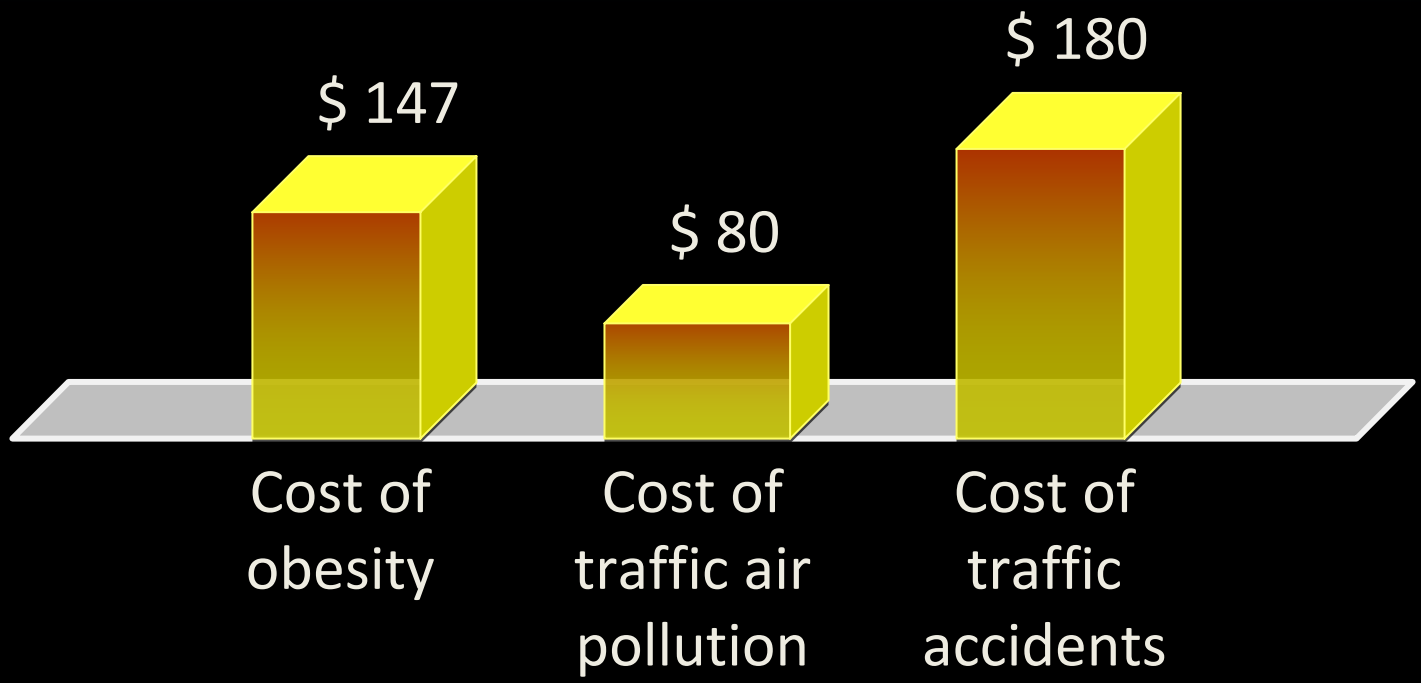
Average Life Expectancy



Source: Kaiser Family Foundation, Visual Economics, 2010

Scale – United States Economy

($ Billions/Year)



Scale – United States Economy

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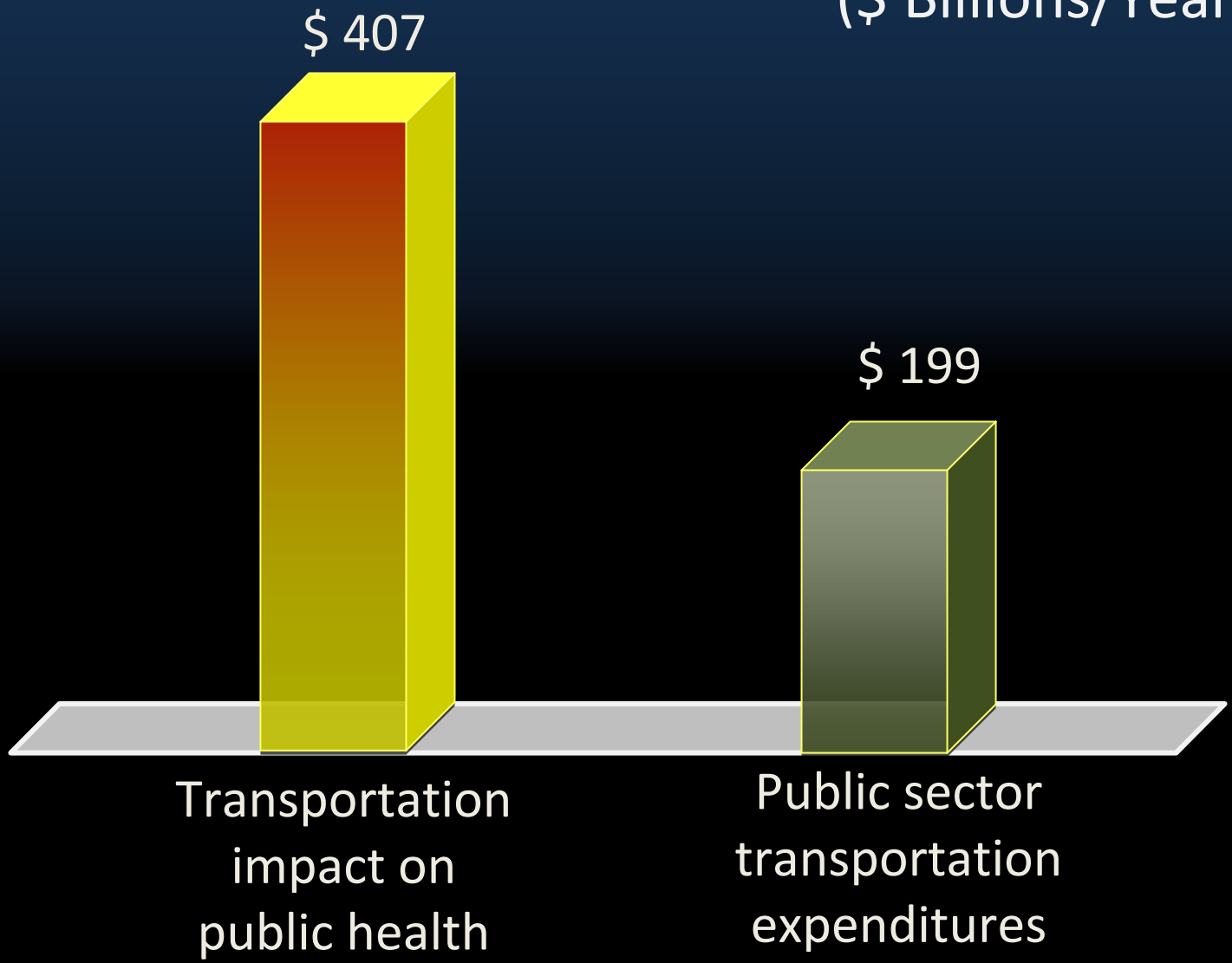
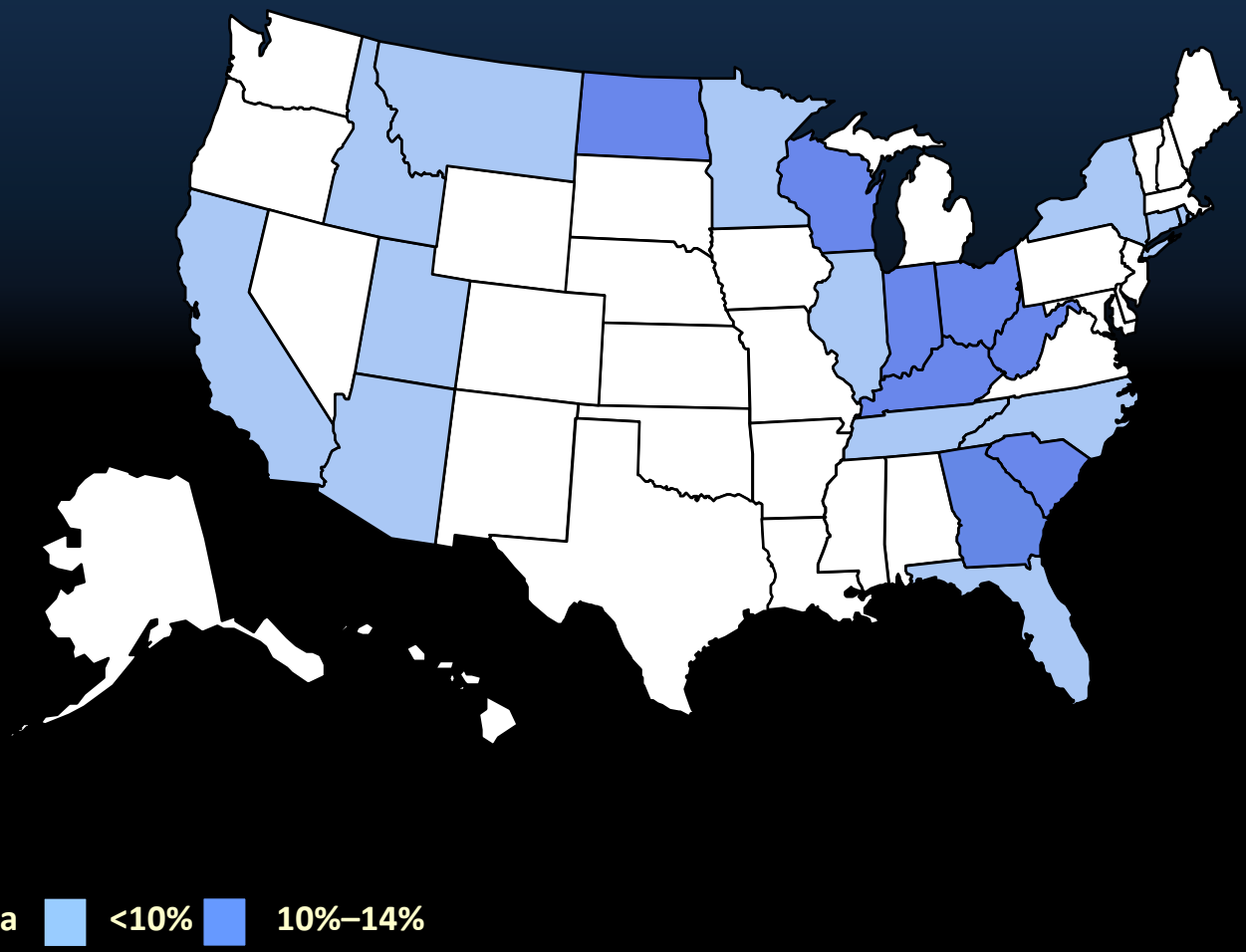


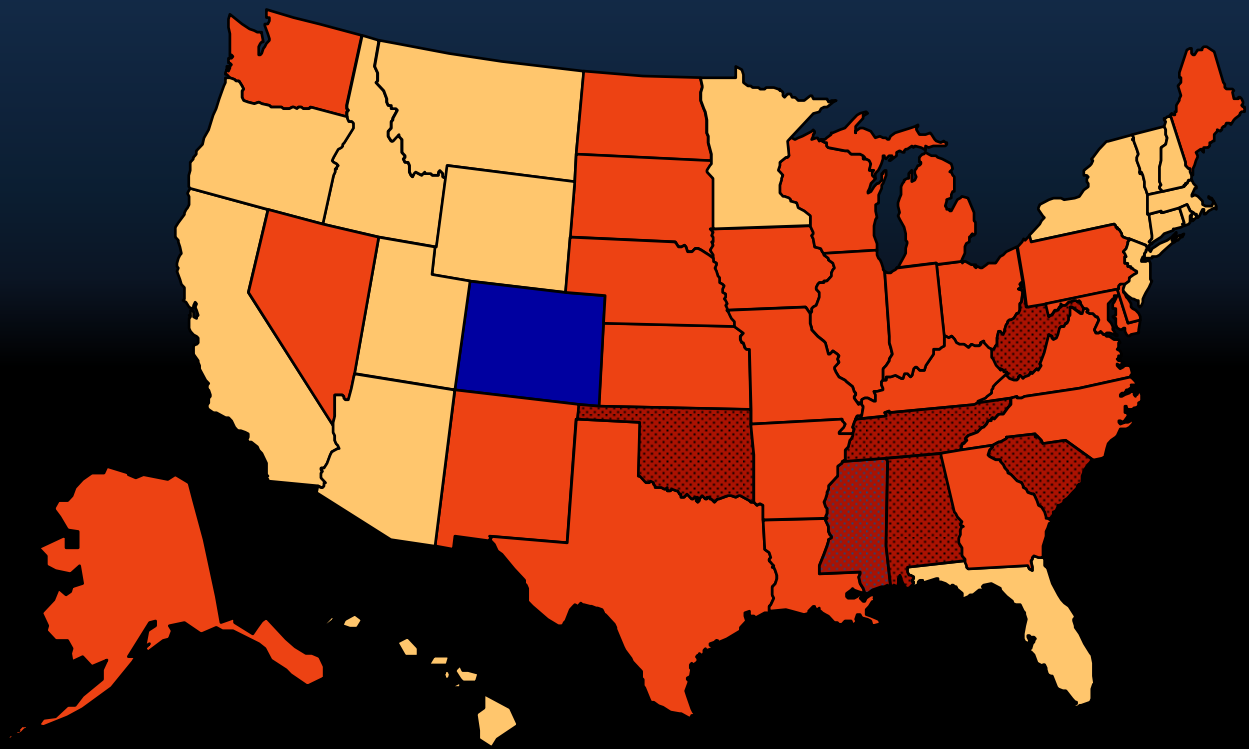
Obesity

1985

Obesity Trends Among U.S. Adults



2008

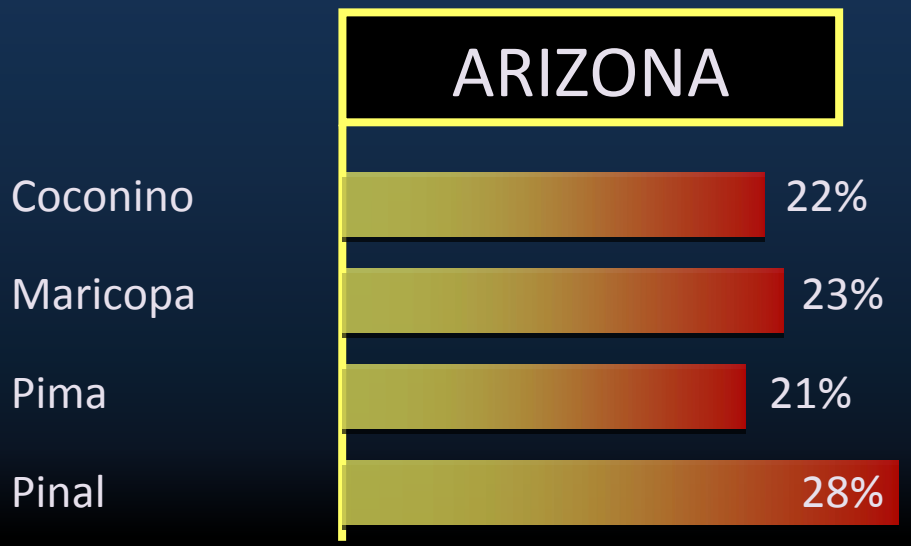


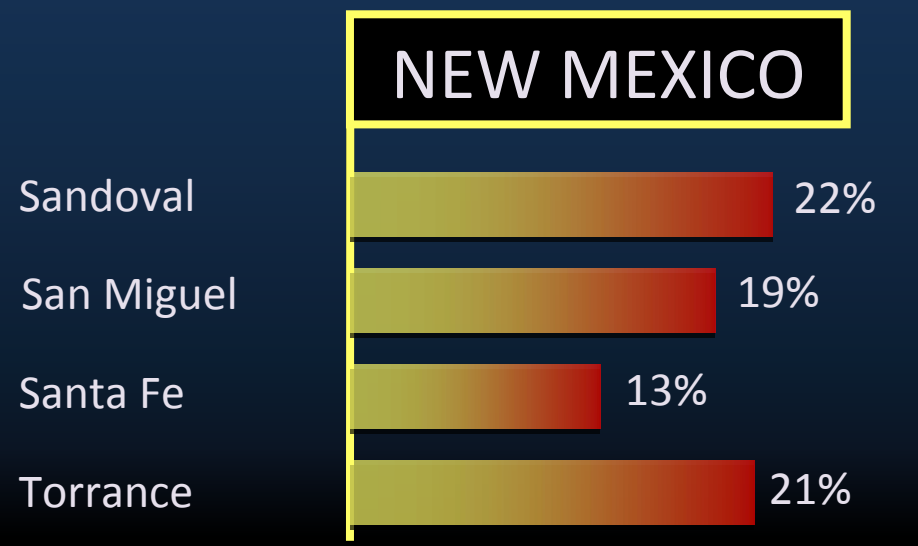
No Data | <10% | 10%–14% | 15%–19% | 20%–24% | 25%–29% | ≥30%

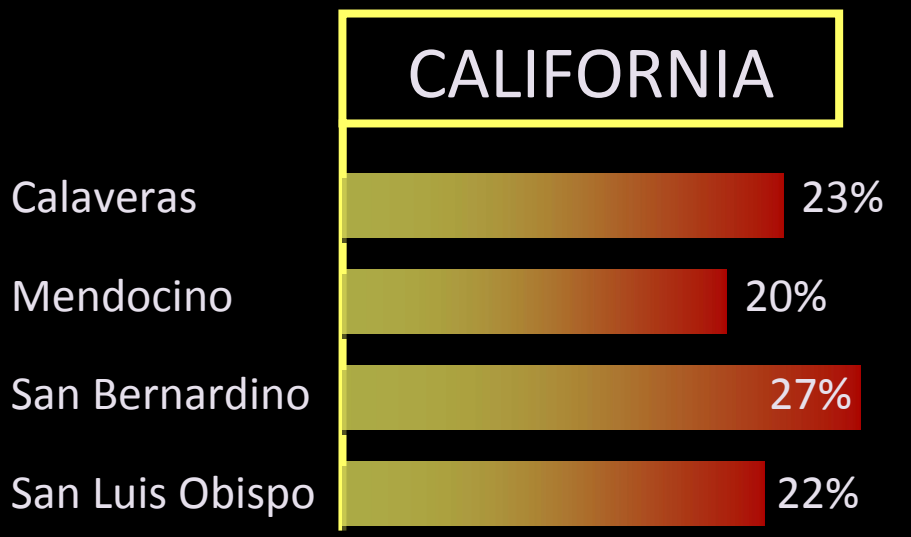
Obesity Epidemic

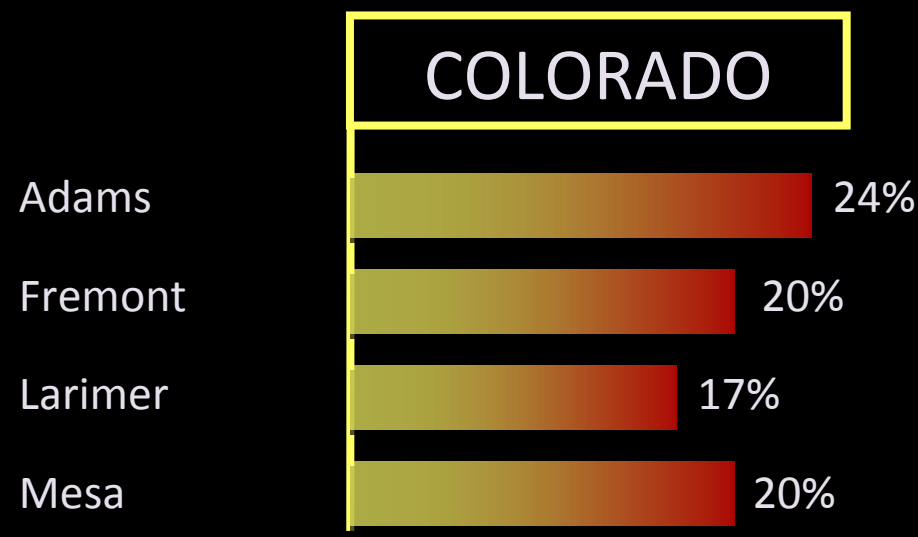
- Significant differences between states
- Significant differences between local places

Health Indicators – Adult Obesity

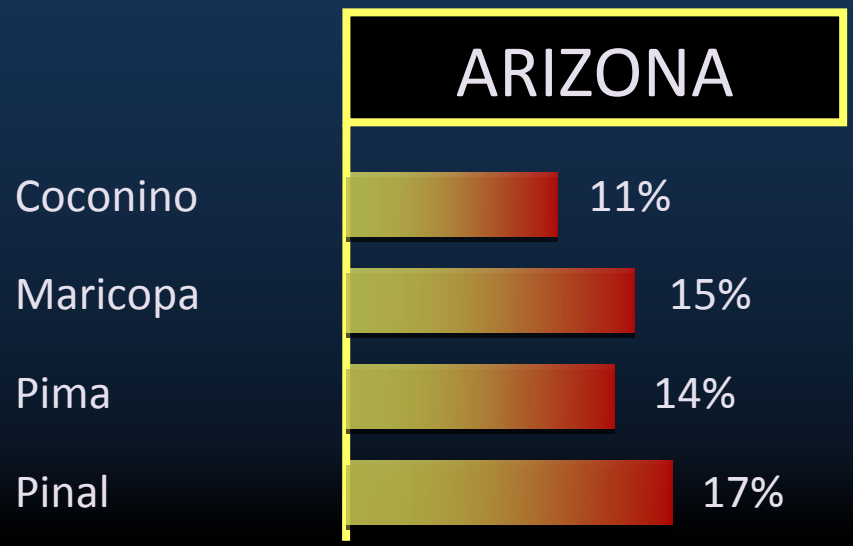


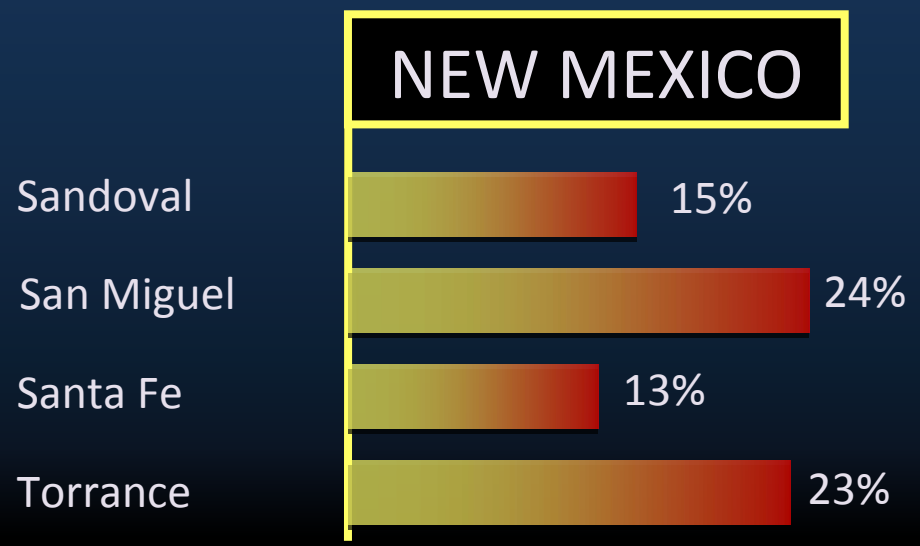


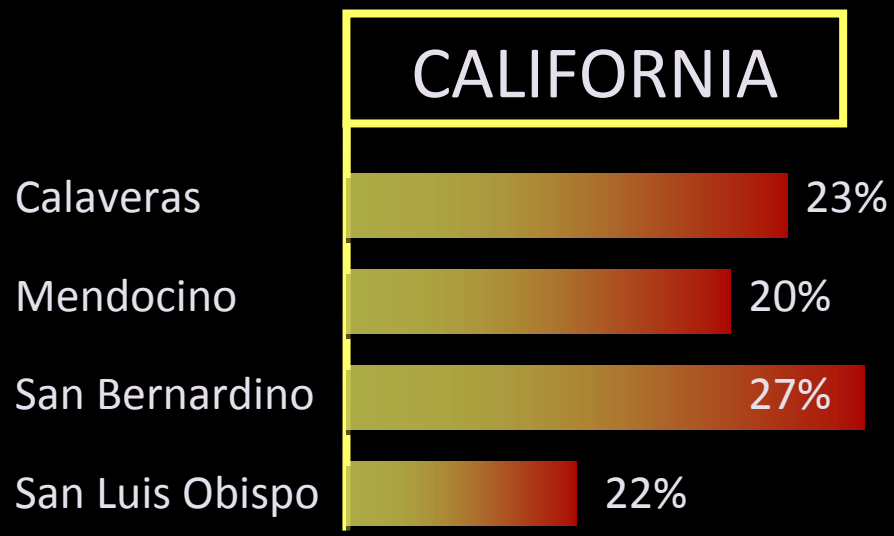


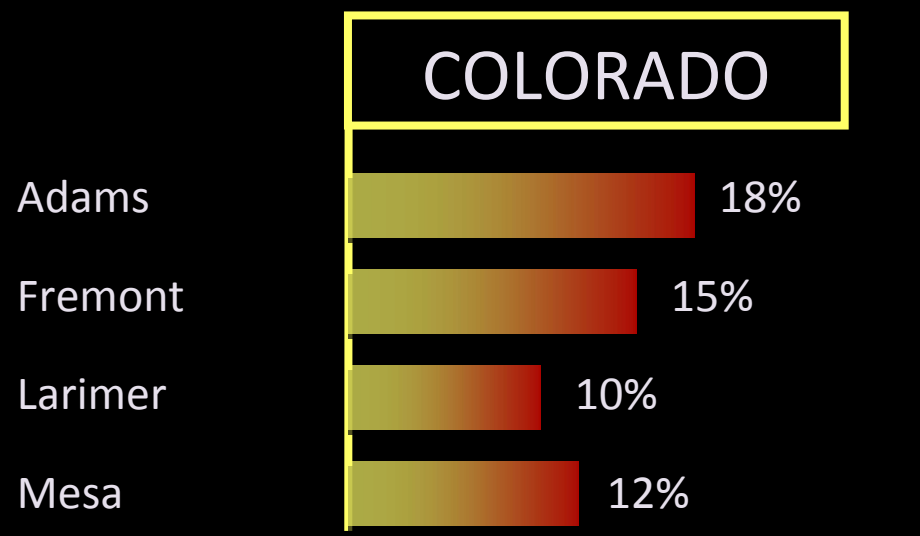


Health Indicators – Poor or Fair Health









Issues Influencing How Americans Vote

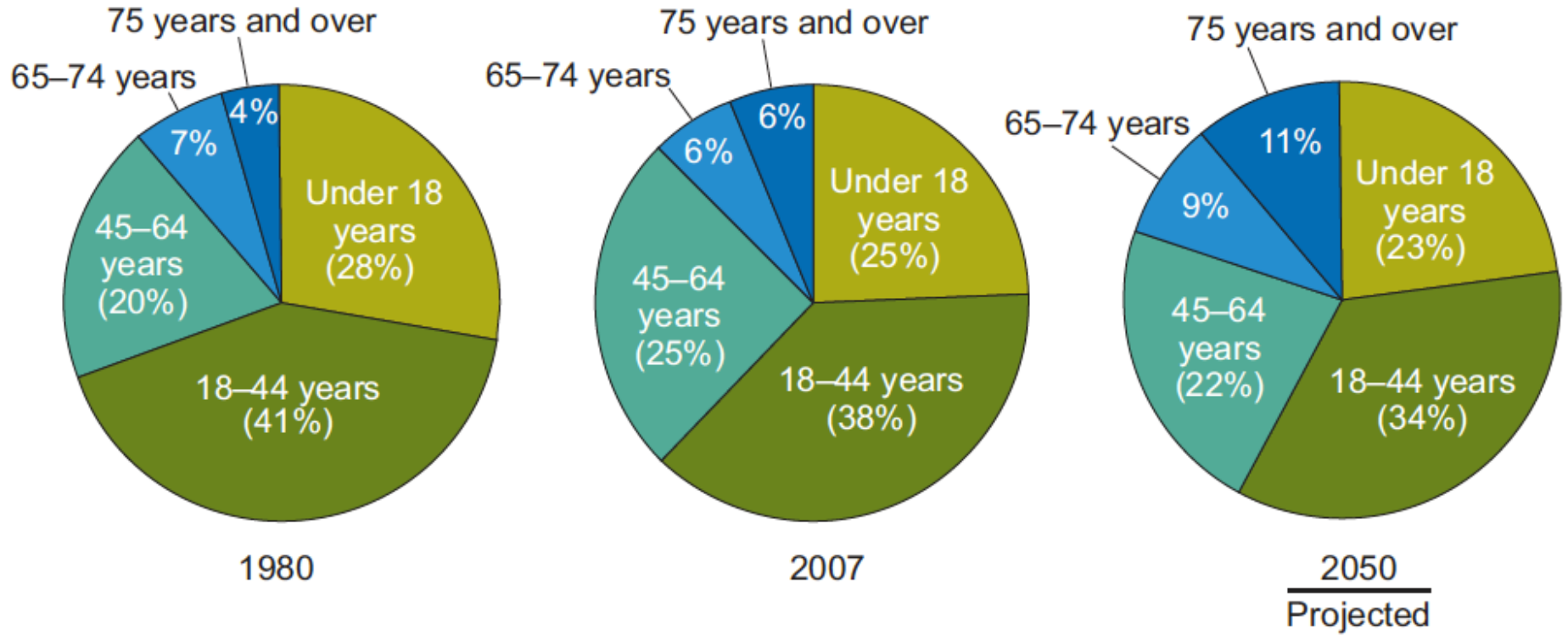
(% Very Important + Somewhat Important)

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%

Source: Rasmussen Reports, May 2010

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 an important political issue.

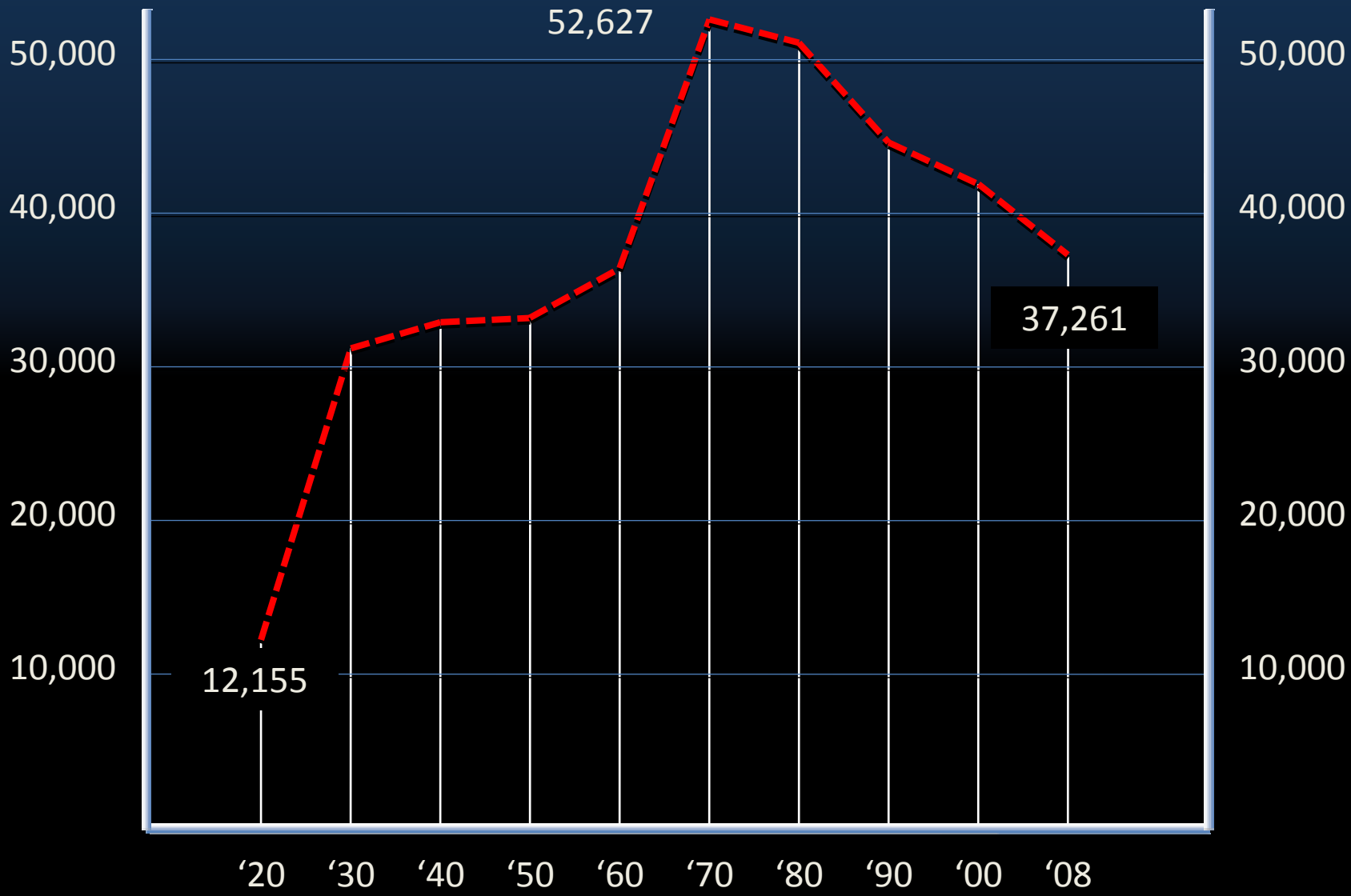
2

Transportation & Public Health

Transportation & Public Health

Traffic Safety + Personal Health

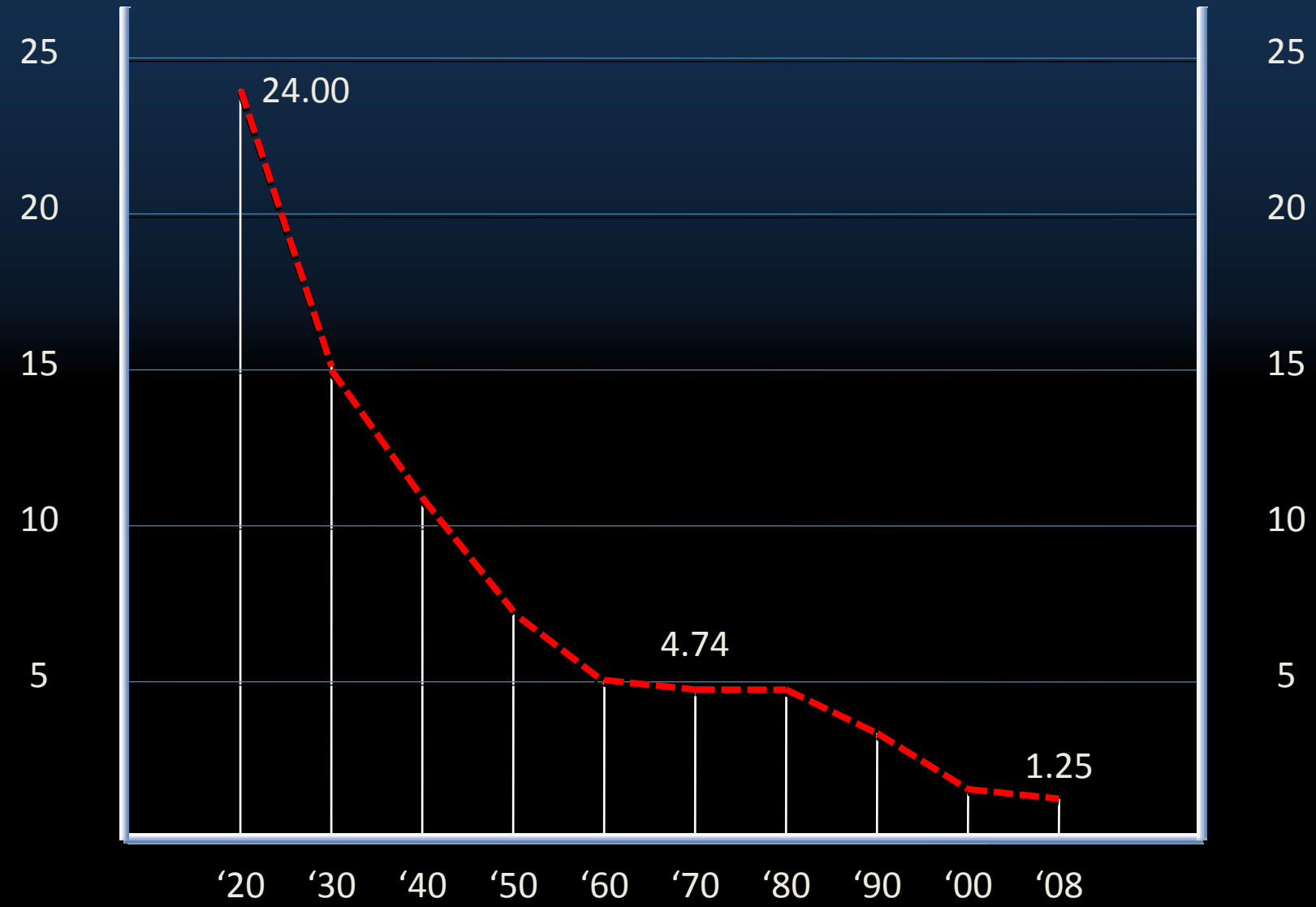
Annual US Traffic Fatalities



Source: NHTSA, FHWA

US Traffic Fatality Rate/HMVM

(hundred million vehicle miles)



Source: NHTSA, FHWA

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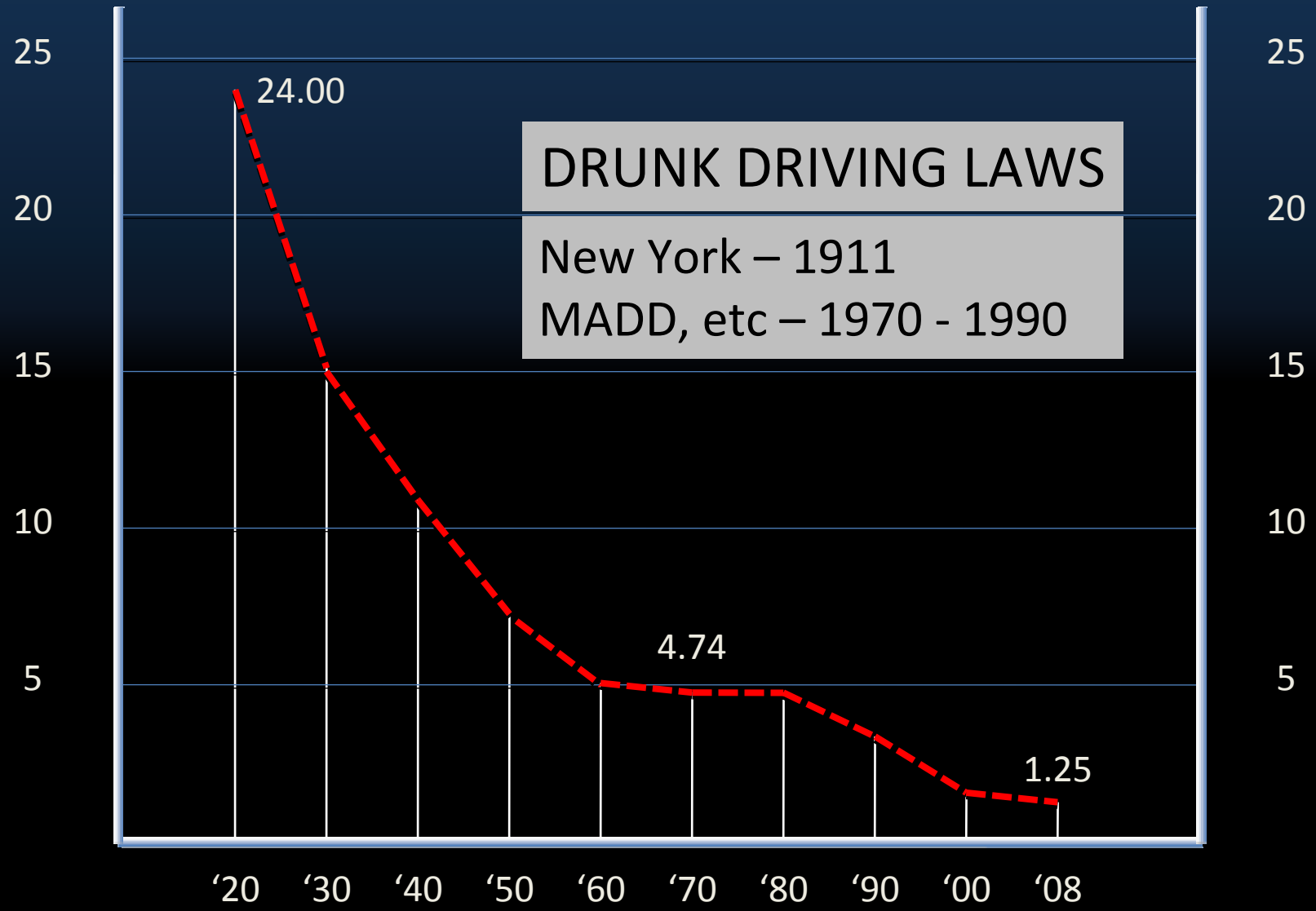
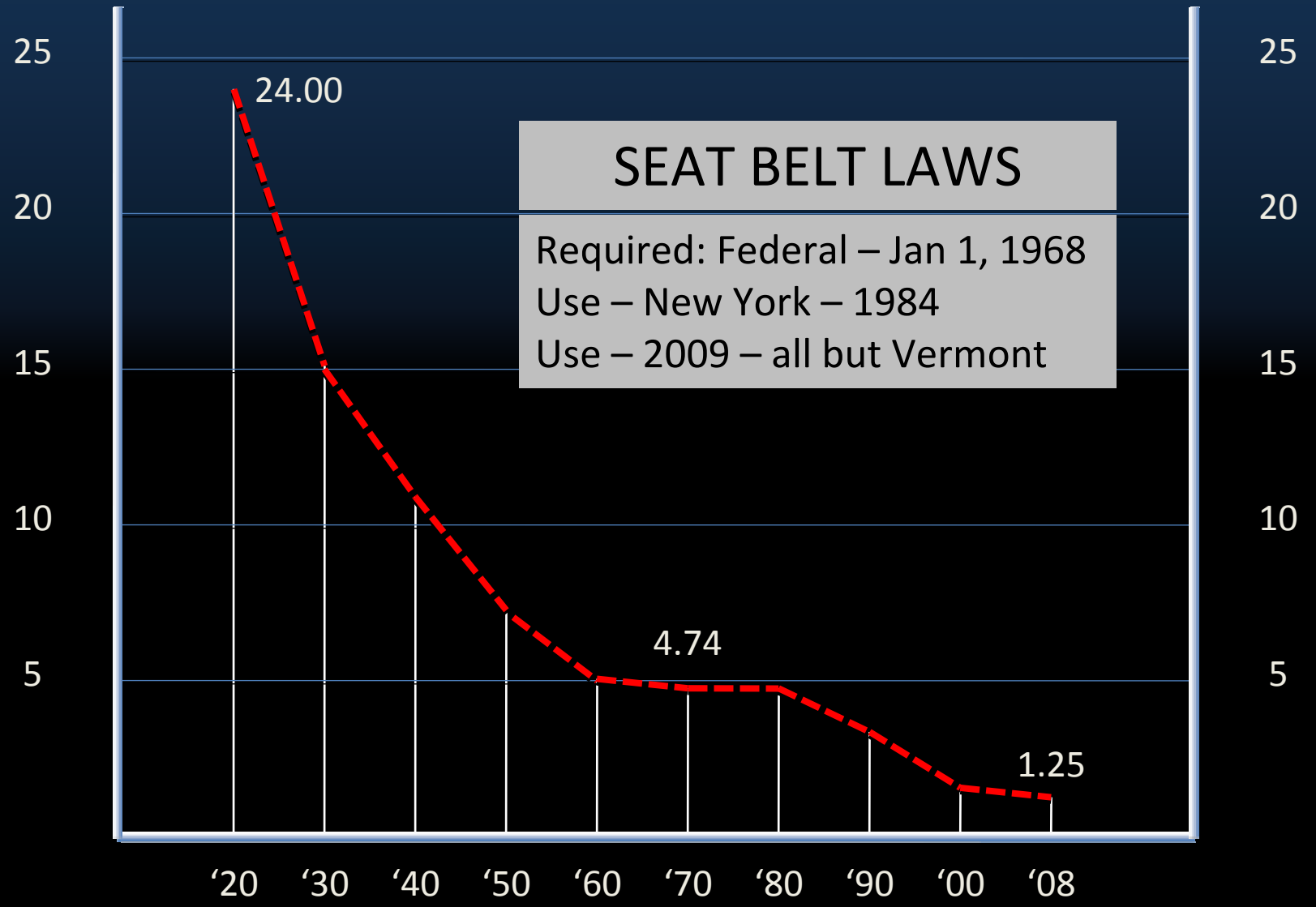


Source: NHTSA, FHWA

US Traffic Fatality Rate/HMVM



Source: NHTSA, FHWA

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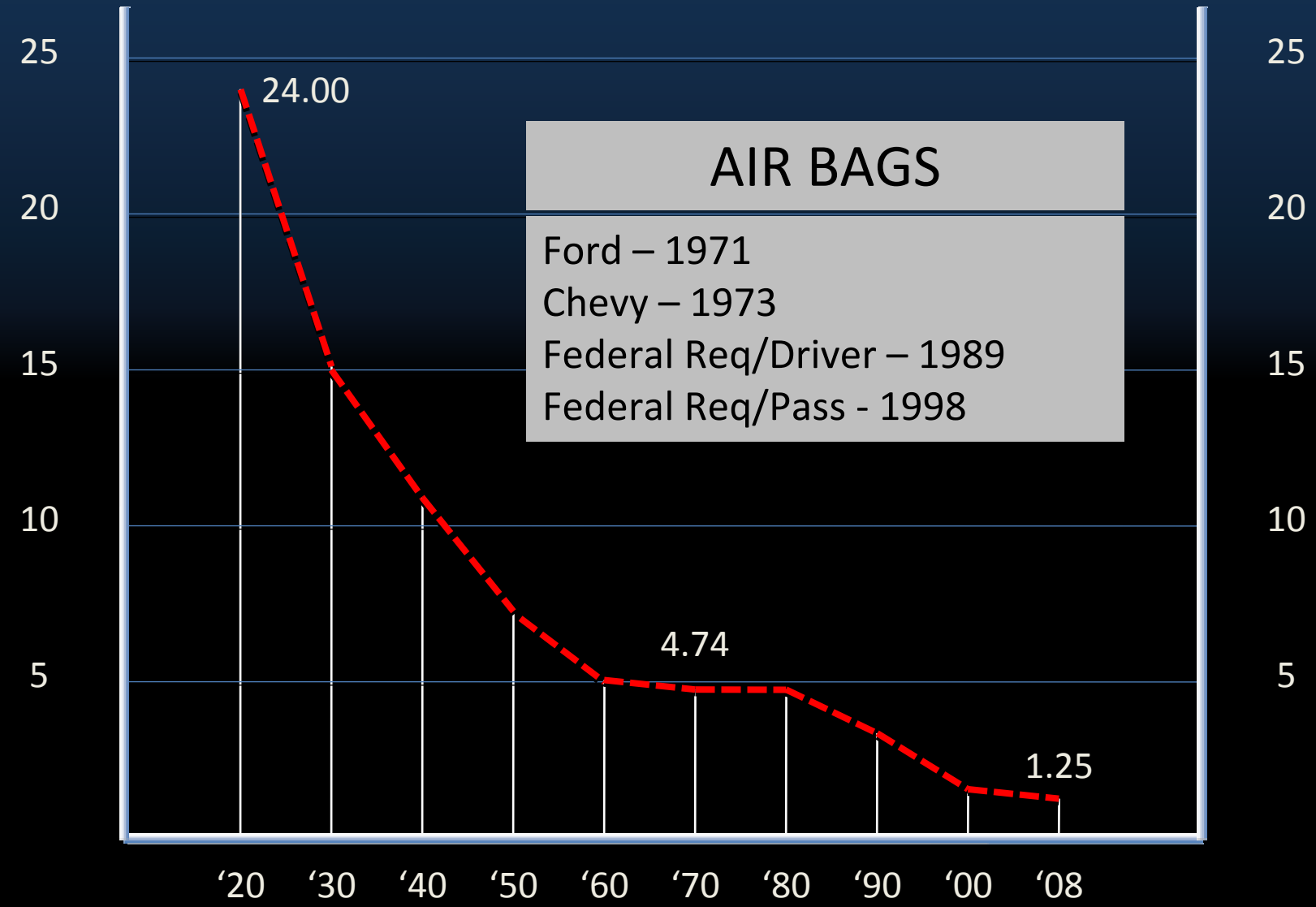
(hundred million vehicle miles)



Source: NHTSA, FHWA

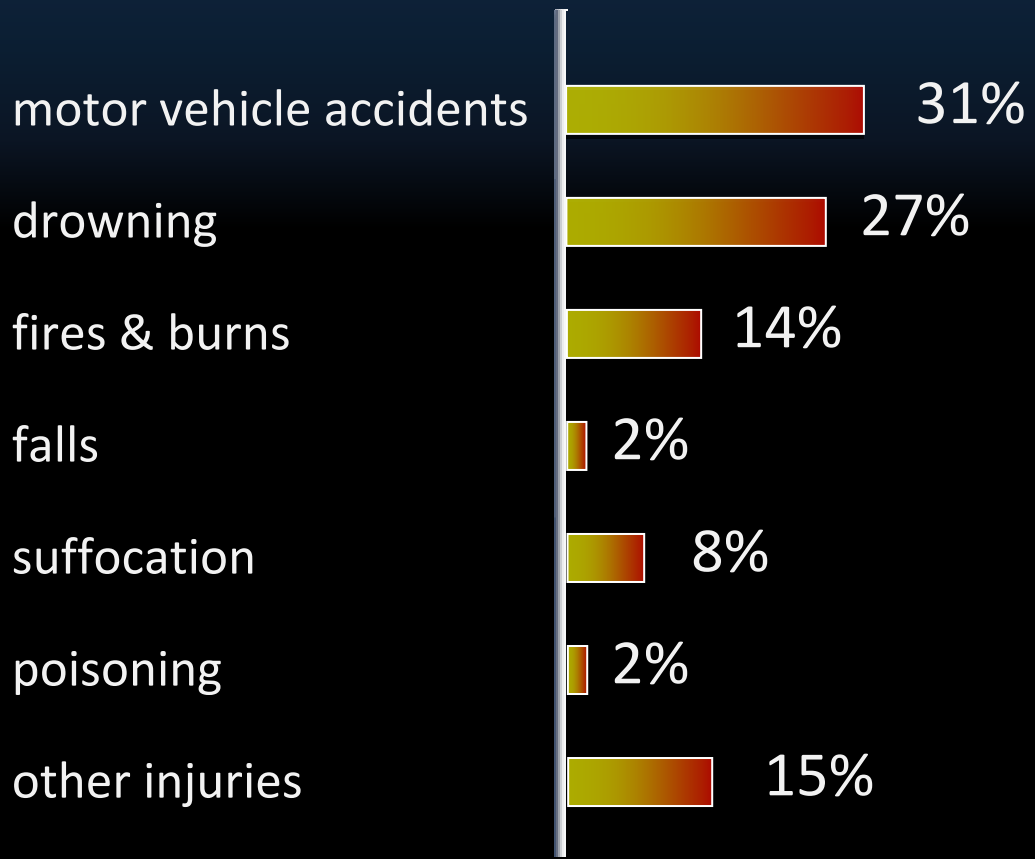
“Changes in highway infrastructure between 1984 and 1997 have not reduced traffic fatalities and injuries, and have even had the effect of increasing total fatalities and injuries.

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.”

Noland, R. B. 2001, Transportation Research Board

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

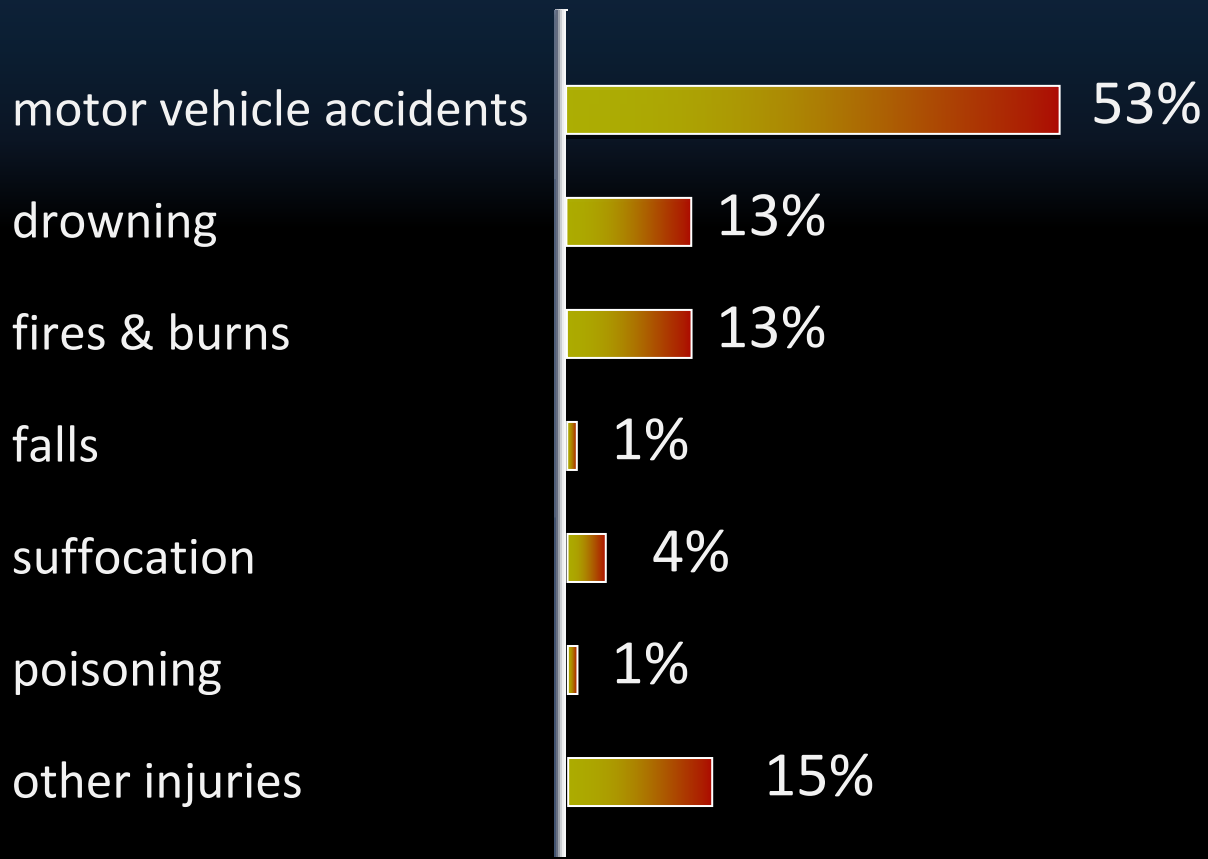
age 1 - 4



Source: CDC National Vital Statistics System, 2000 - 2005

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

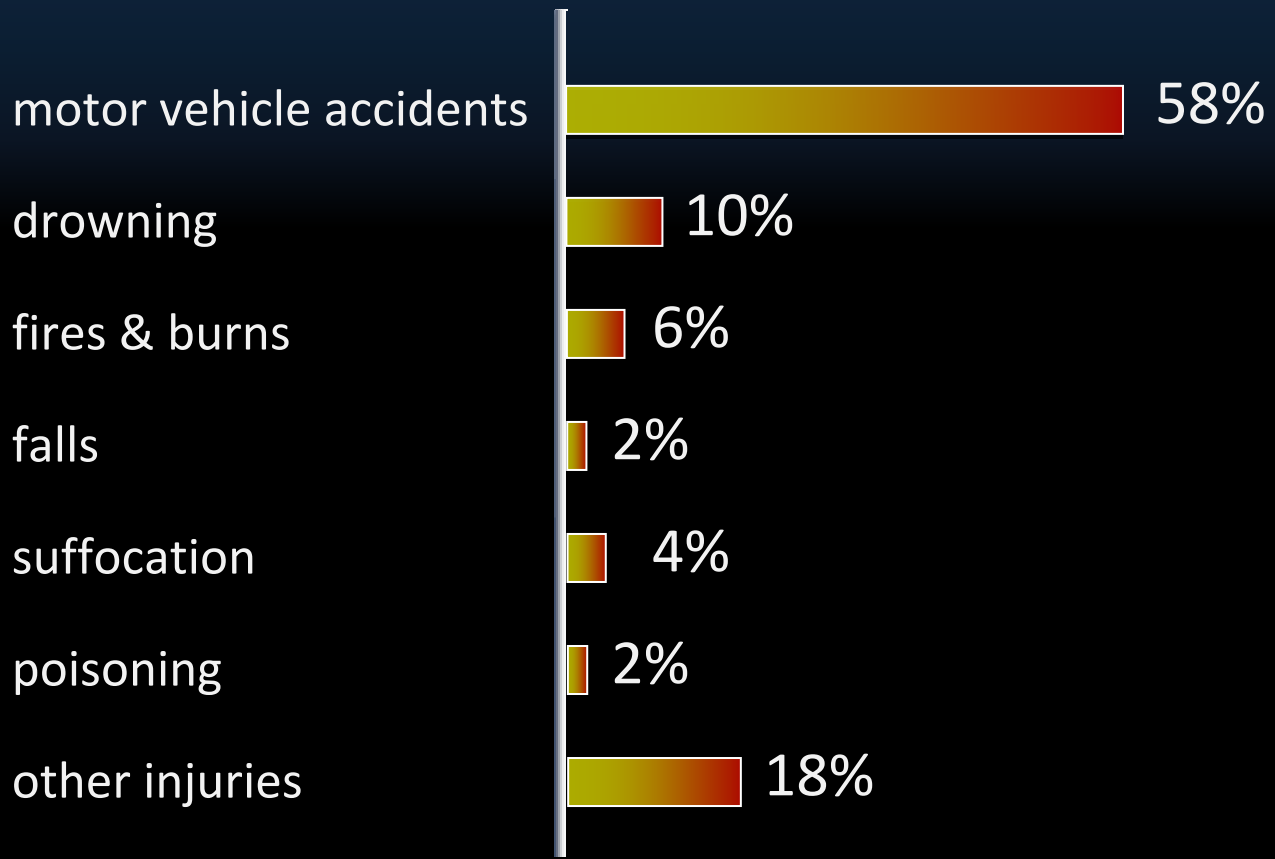
age 5 – 9



Source: CDC National Vital Statistics System, 2000 - 2005

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

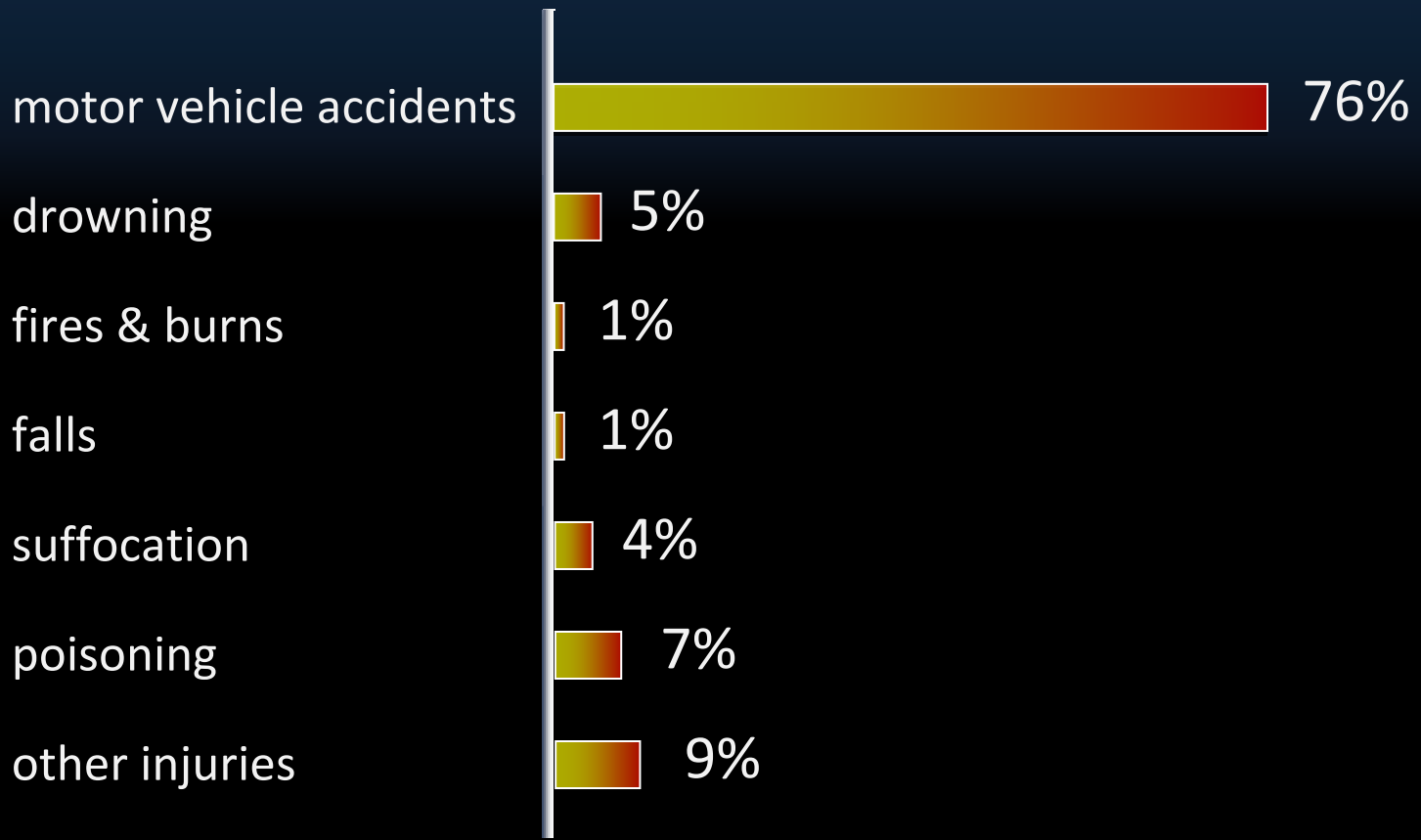
age 10 – 14



Source: CDC National Vital Statistics System, 2000 - 2005

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

age 15 – 19



Source: CDC National Vital Statistics System, 2000 - 2005

Five things that worry parents the most:

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

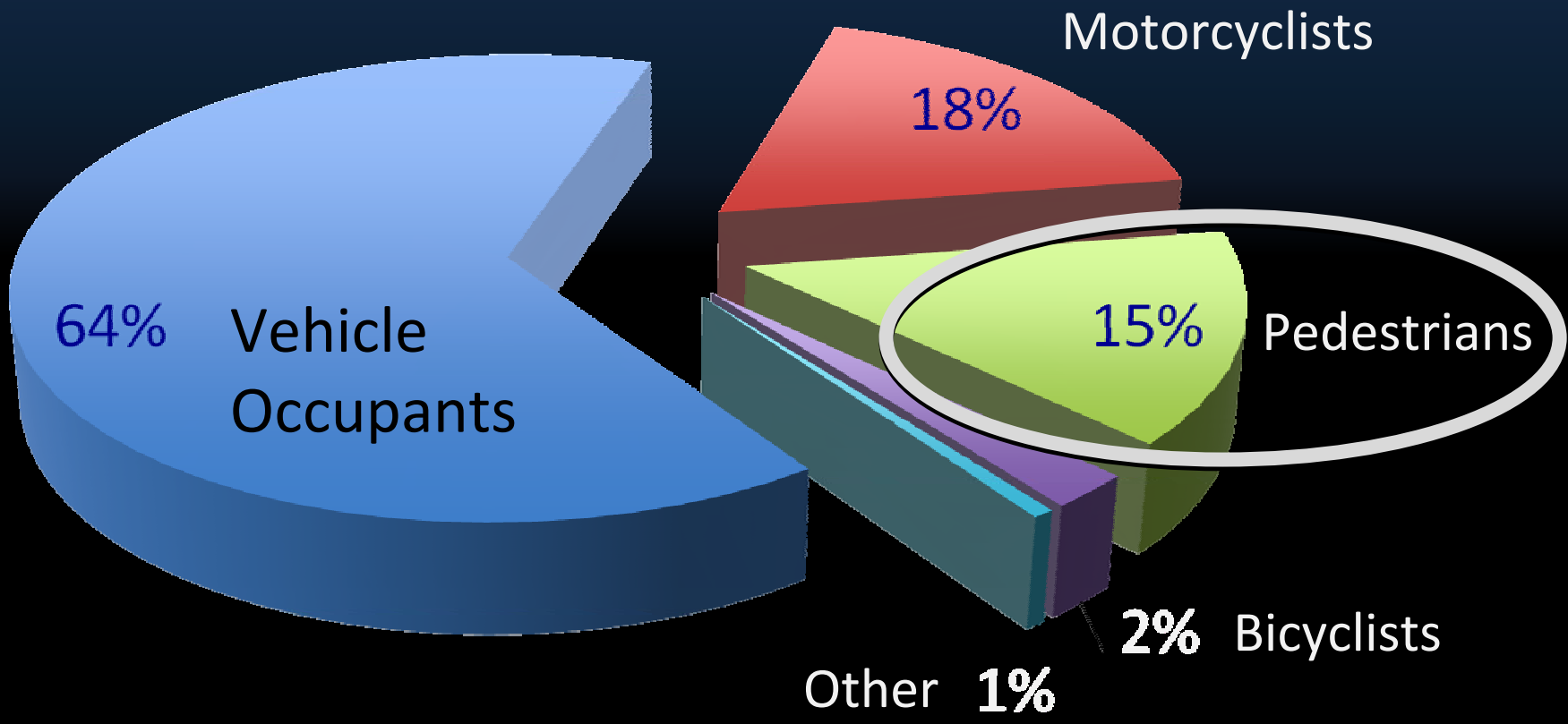
Five things most likely to cause injury or death (children < 18):

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

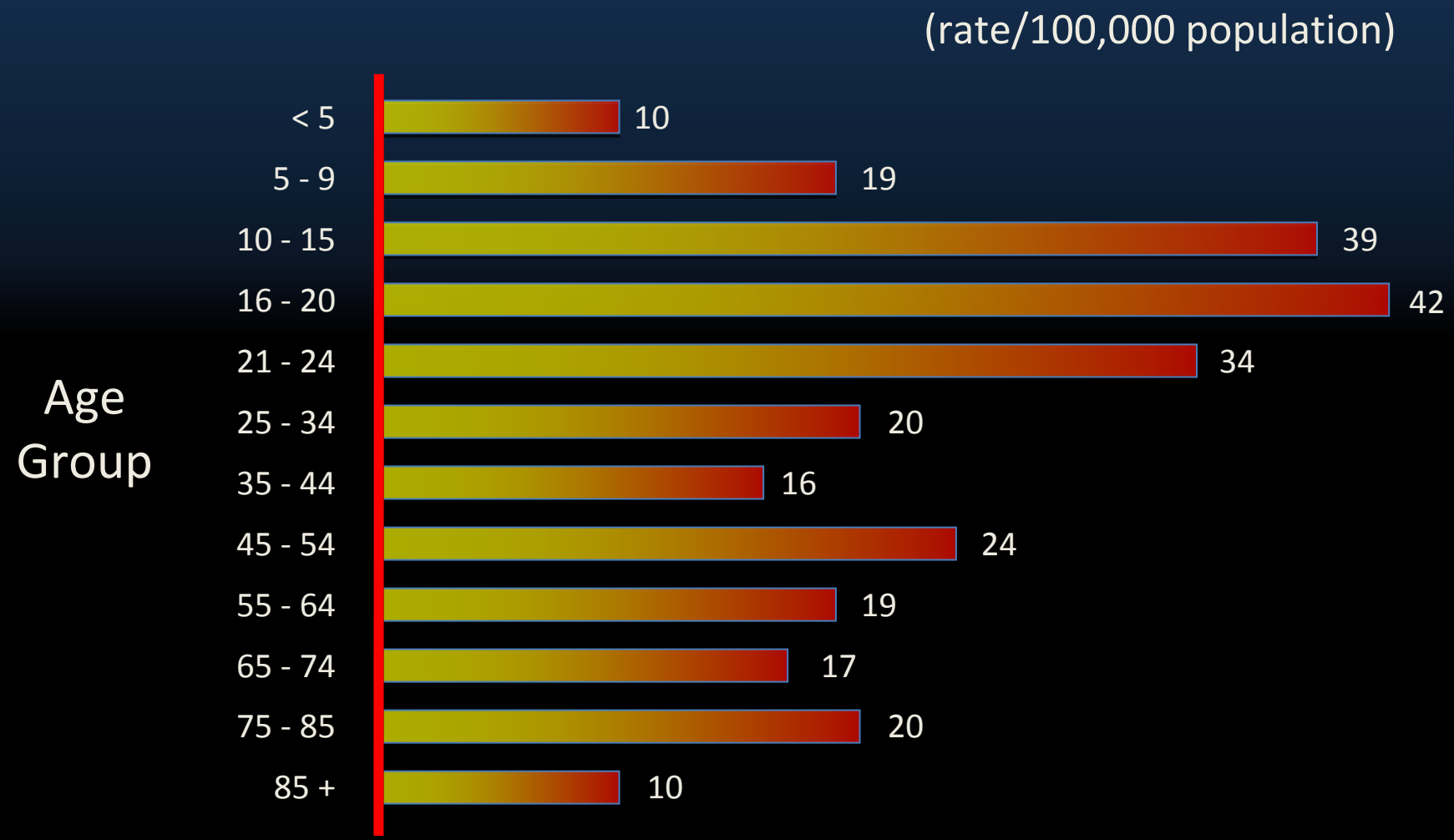
* someone they know

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

2008 Fatalities



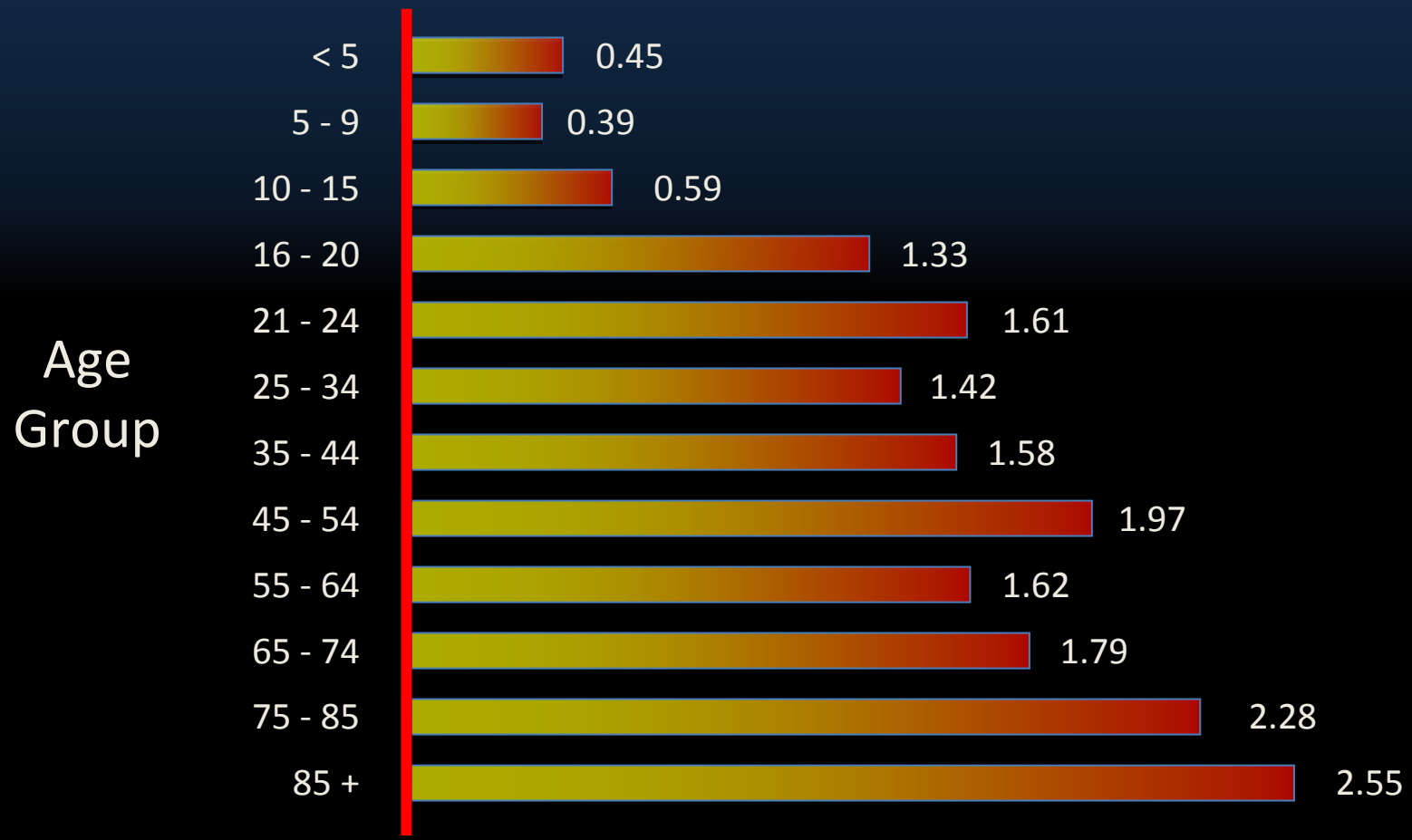
US Injury Rate: Pedestrians Hit by Motor Vehicles



Source: NHTSA, 2008

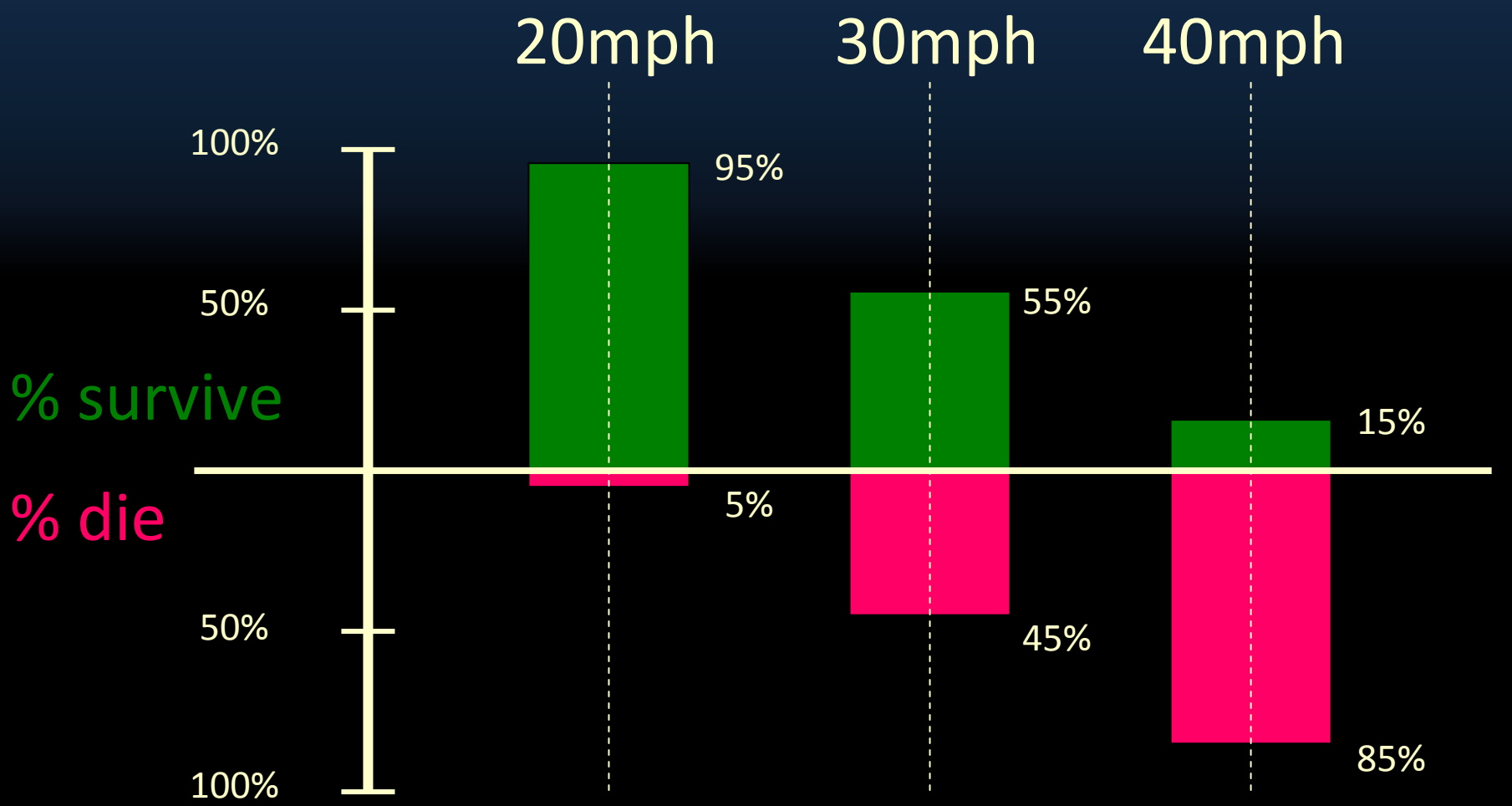
US Fatality Rate: Pedestrians Hit by Motor Vehicles

(rate/100,000 population)

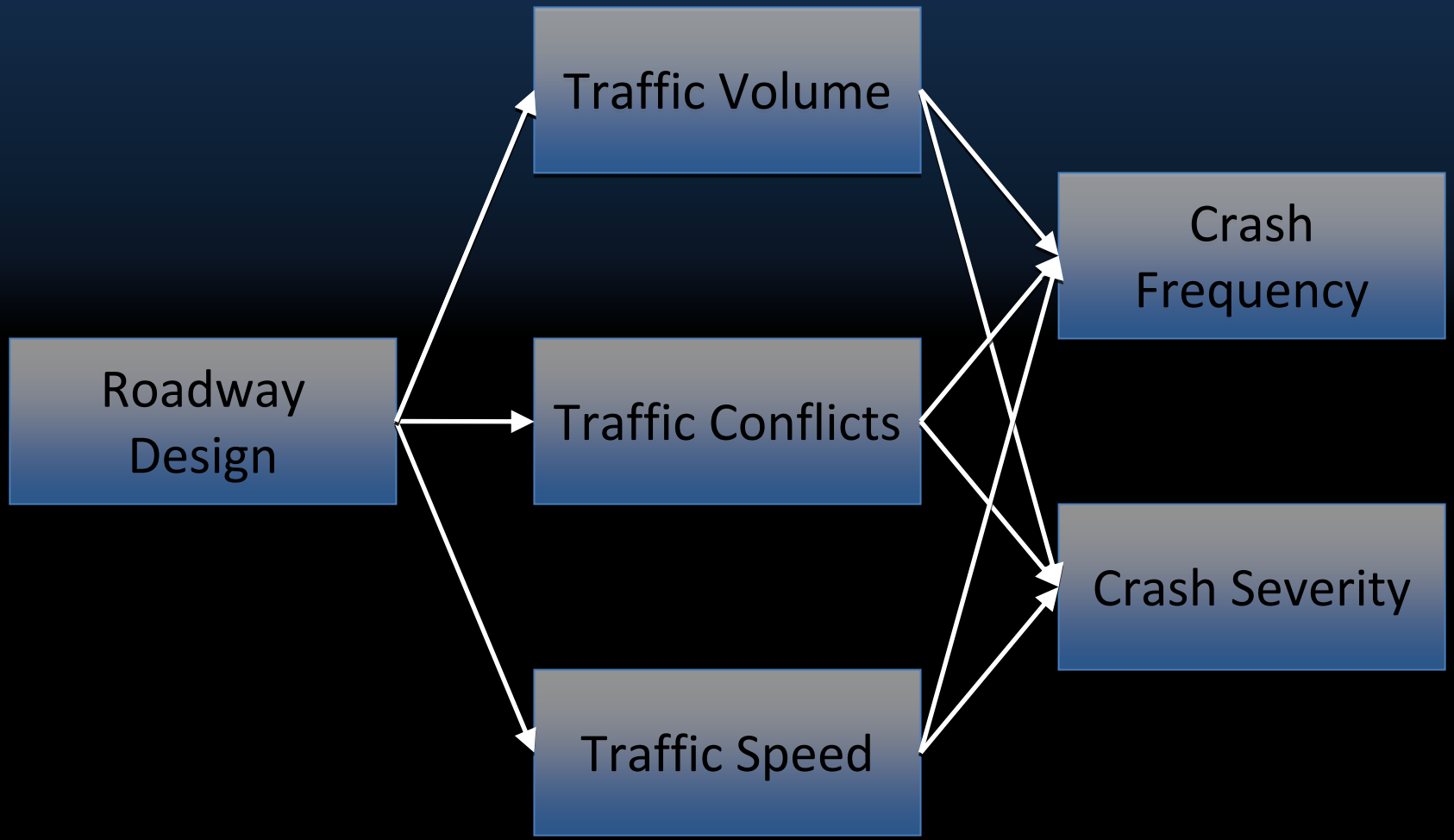


Source: NHTSA, 2008

pedestrian survival rates & vehicle speed

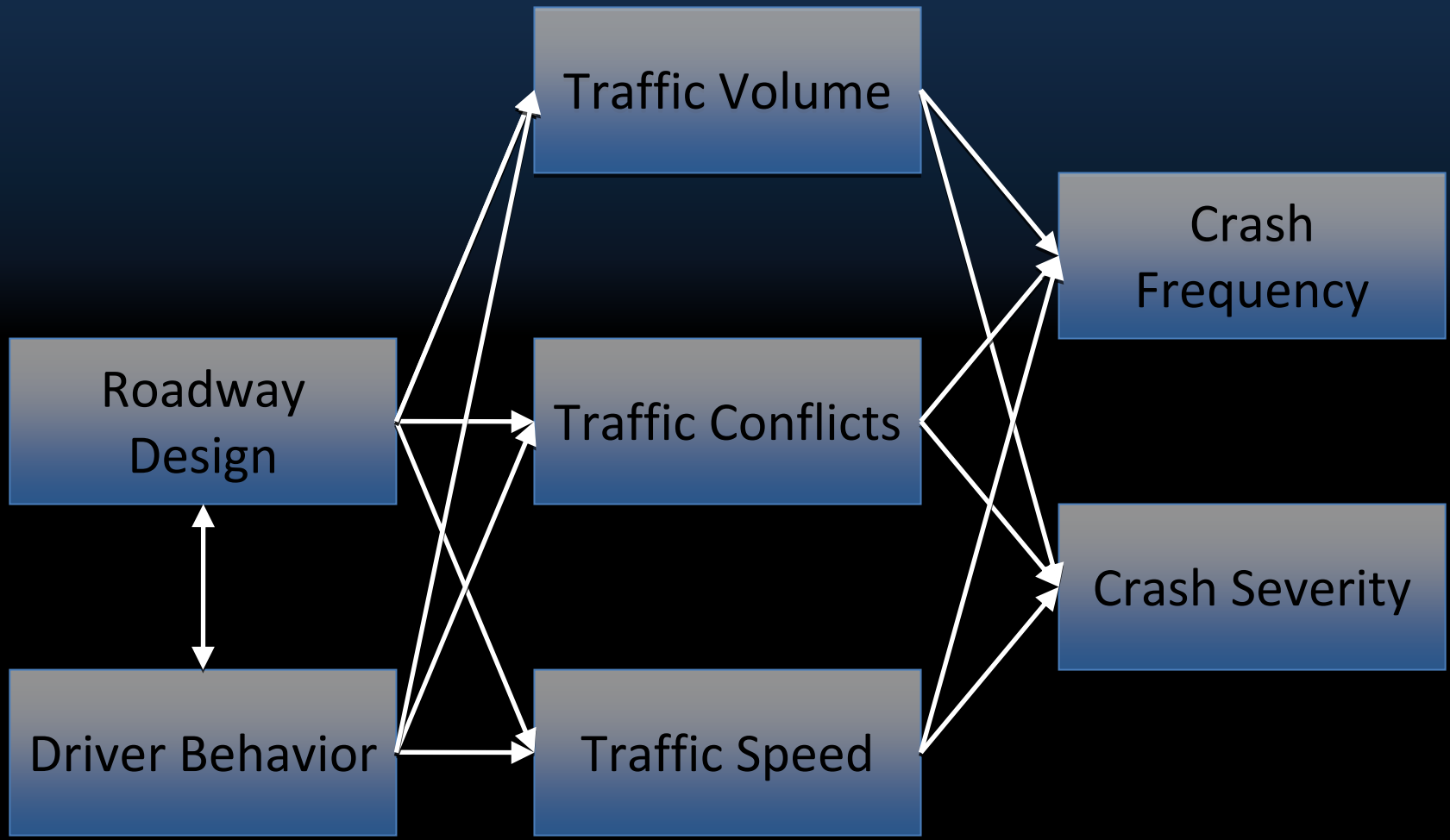


Pre-1950 Traffic Safety Model



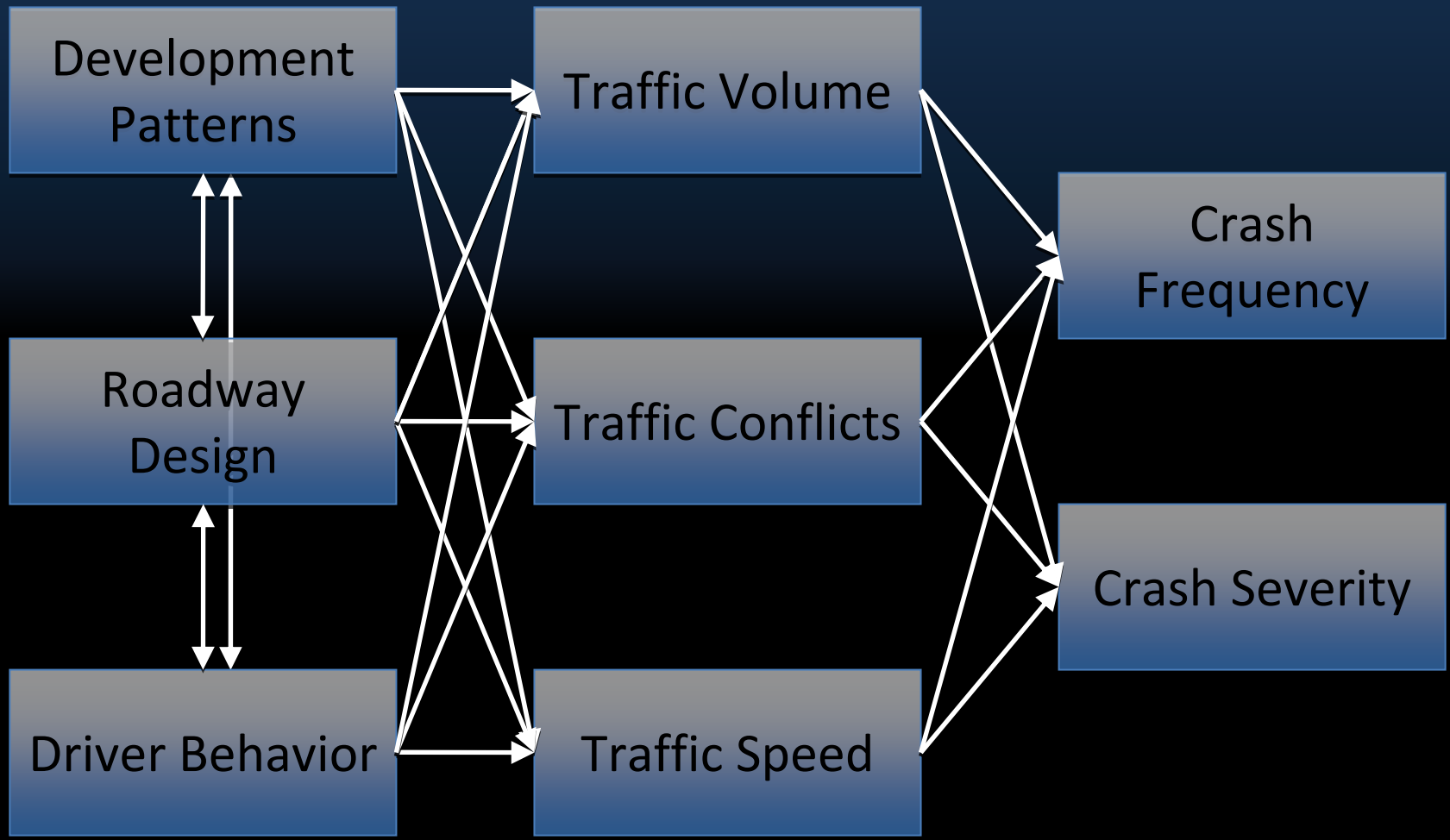
Based on and Revised from Ewing and Dumbaugh, Journal of Planning Literature, Vol. 23, No. 4

Traditional Traffic Safety Model

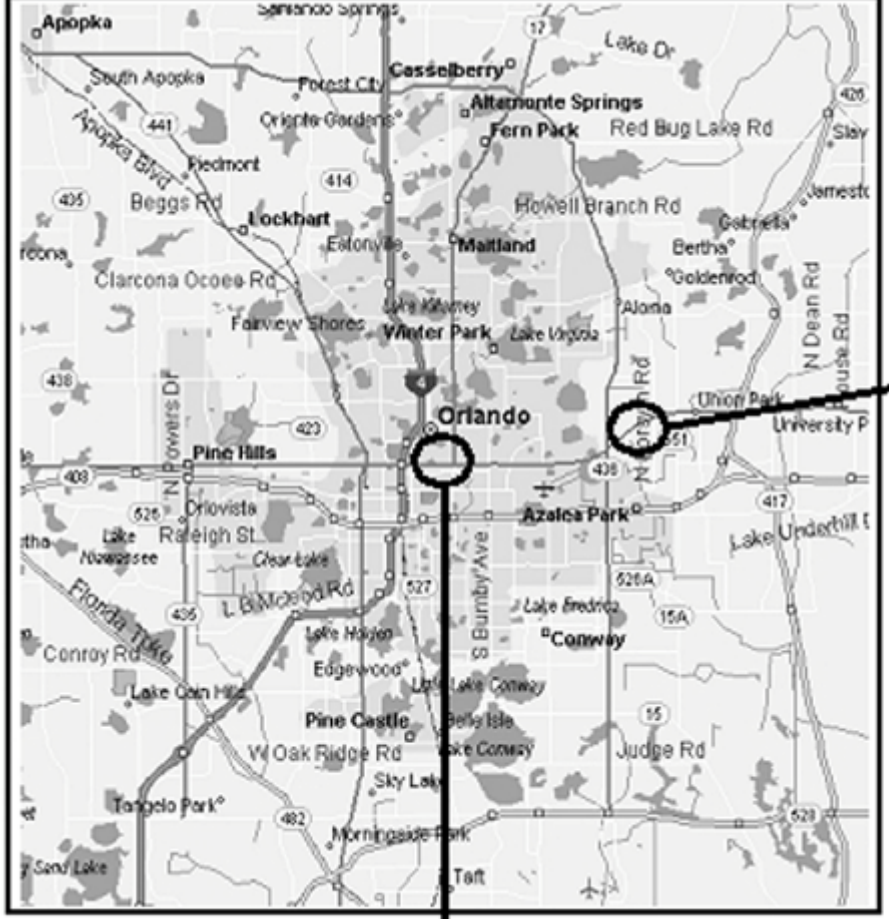


Based on and Revised from Ewing and Dumbaugh, Journal of Planning Literature, Vol. 23, No. 4

Context-Based Traffic Safety Model



Based on and Revised from Ewing and Dumbaugh, Journal of Planning Literature, Vol. 23, No. 4

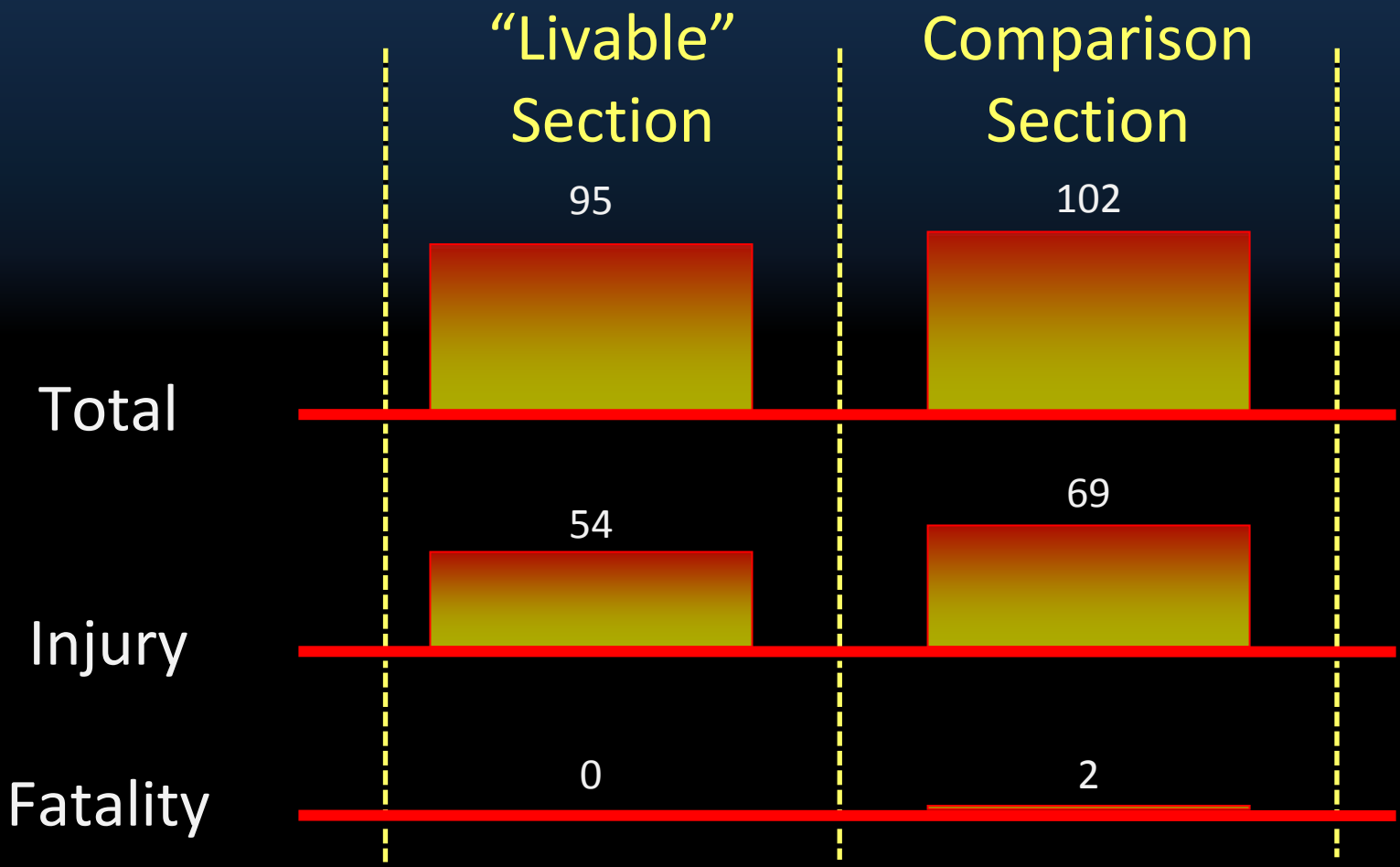


Colonial Drive:
Comparison section

Colonial Drive: Livable section

Street/Urban Design

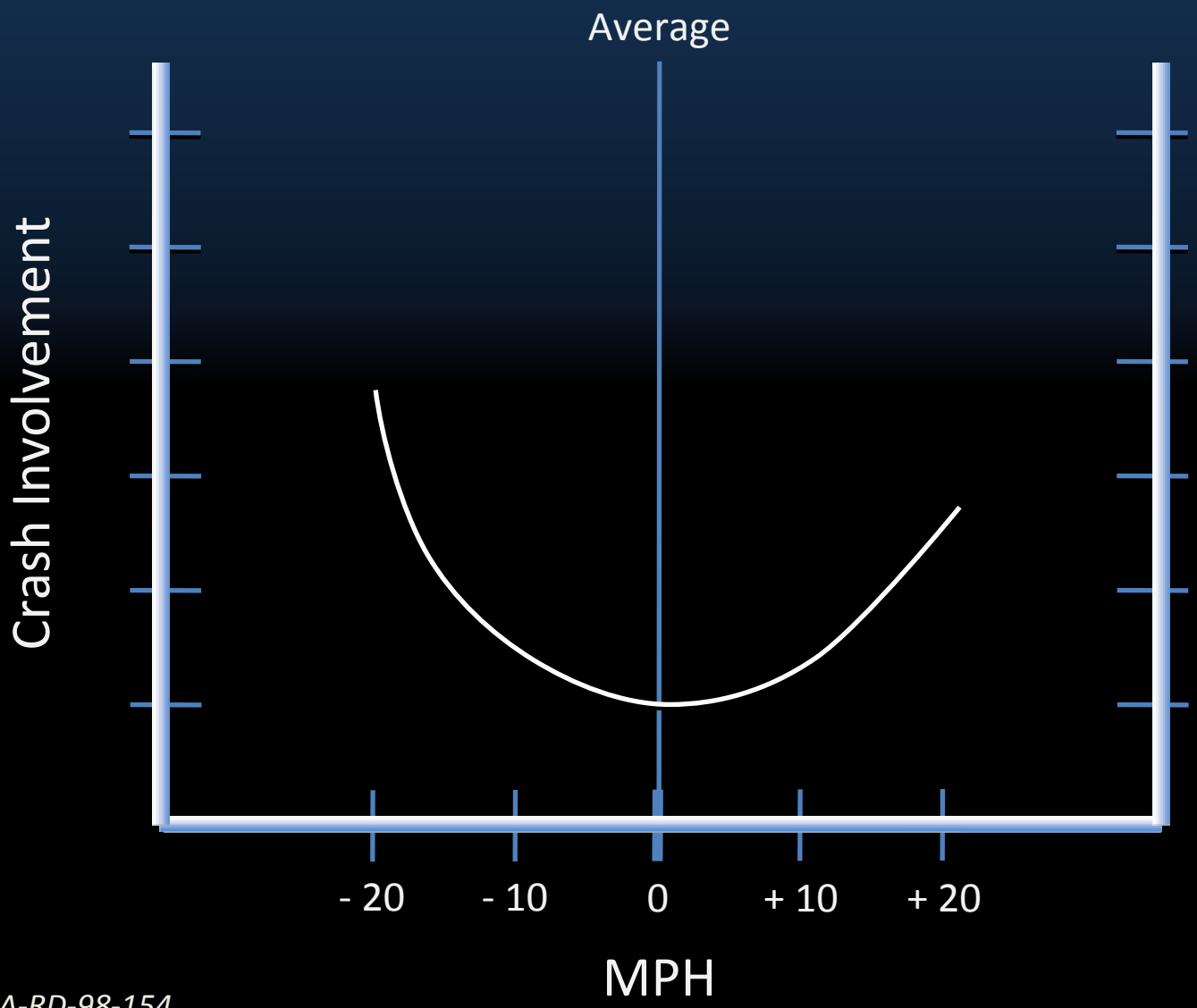
Mid-Block Crashes/100 MVMT



Source: Eric Dumbaugh, JAPA, Summer 2005, Vol. 71, No. 3

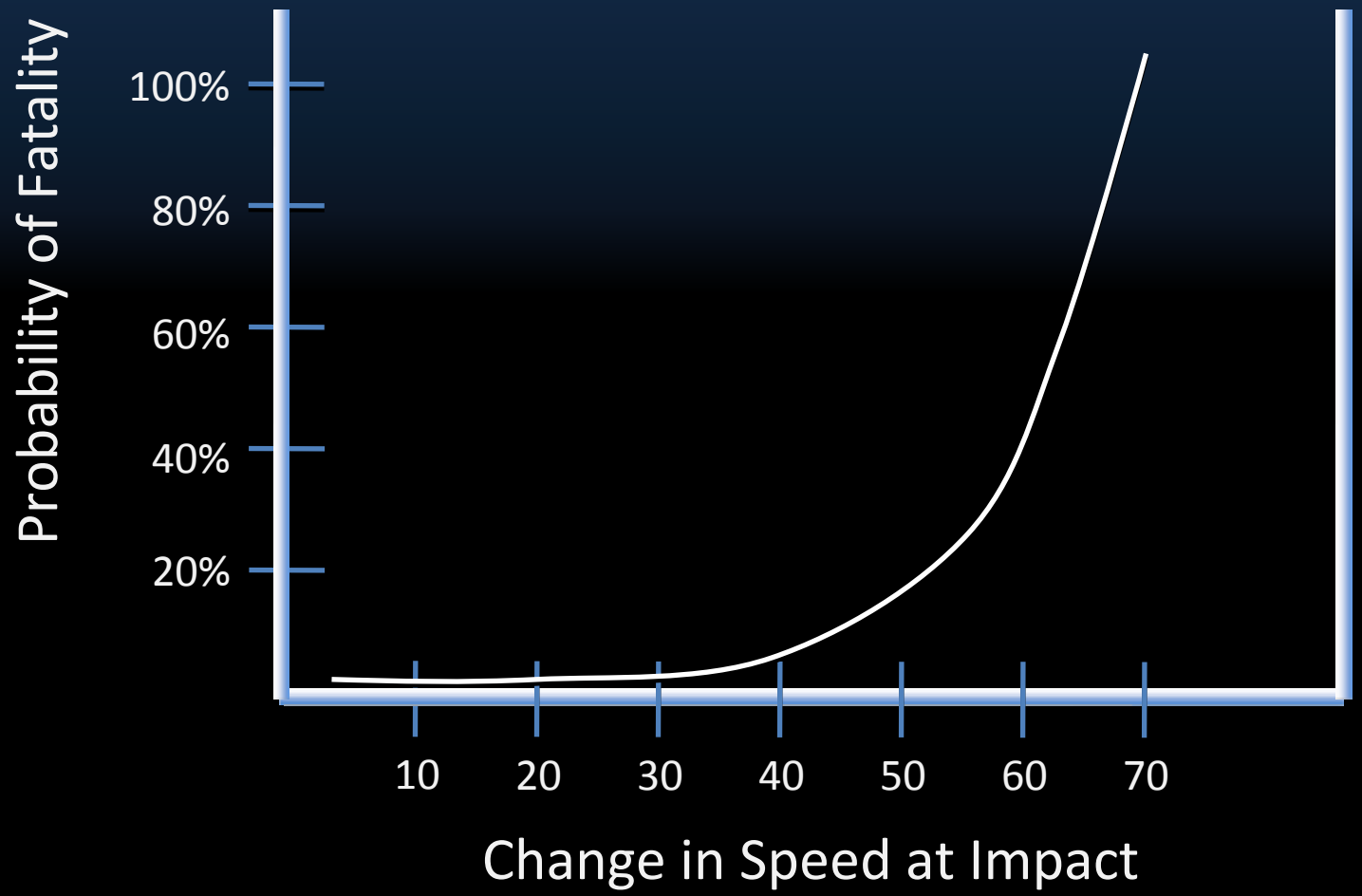
Speed

The U-Shaped Curve



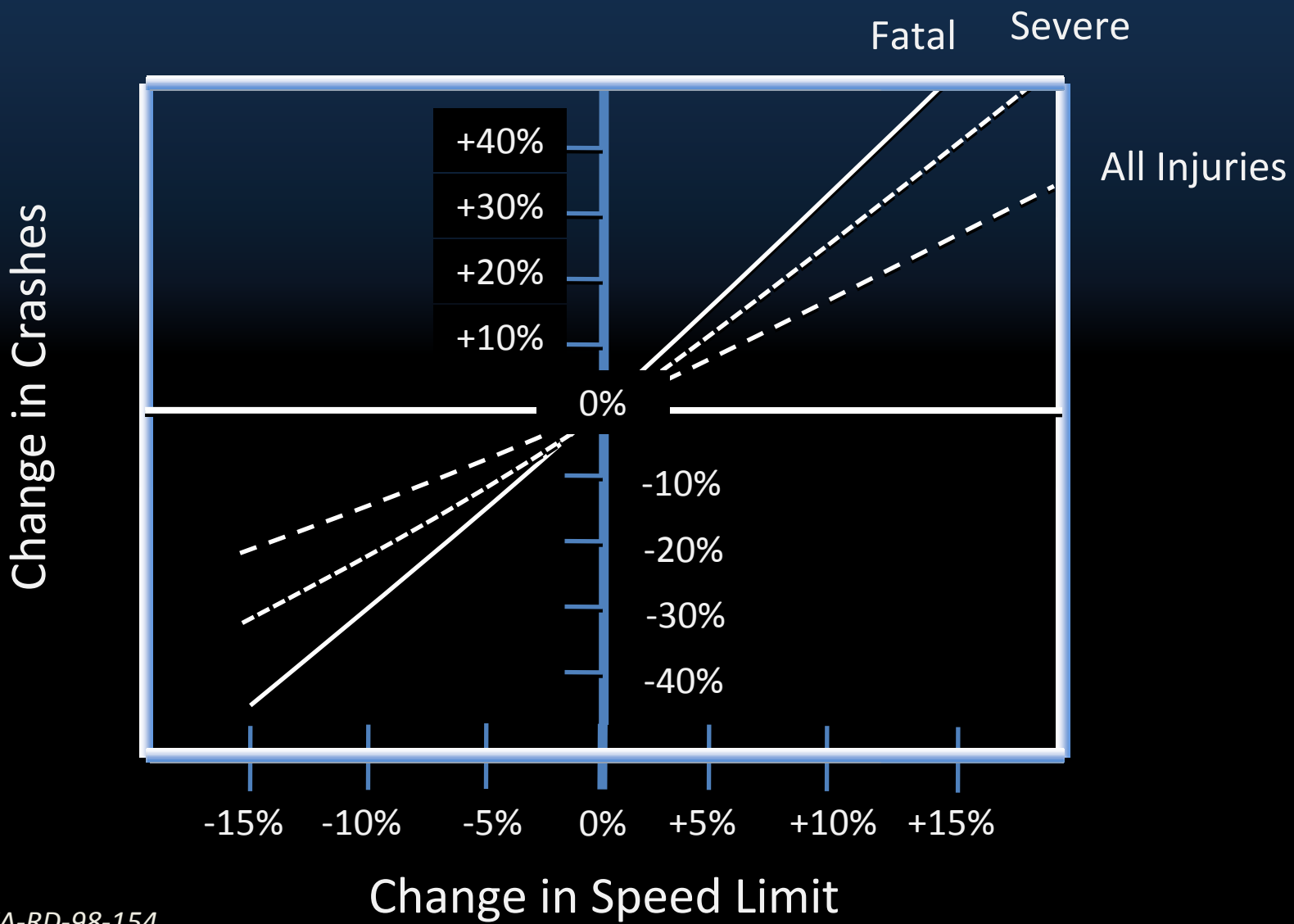
Source: FHWA-RD-98-154

Crash Severity



Source: FHWA-RD-98-154

Changing Speed Limits

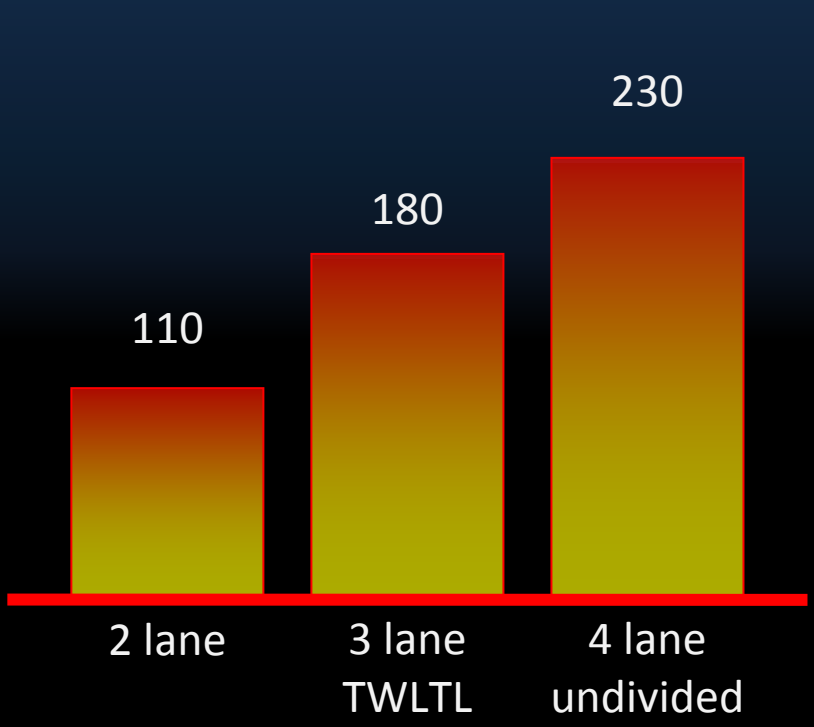


Source: FHWA-RD-98-154

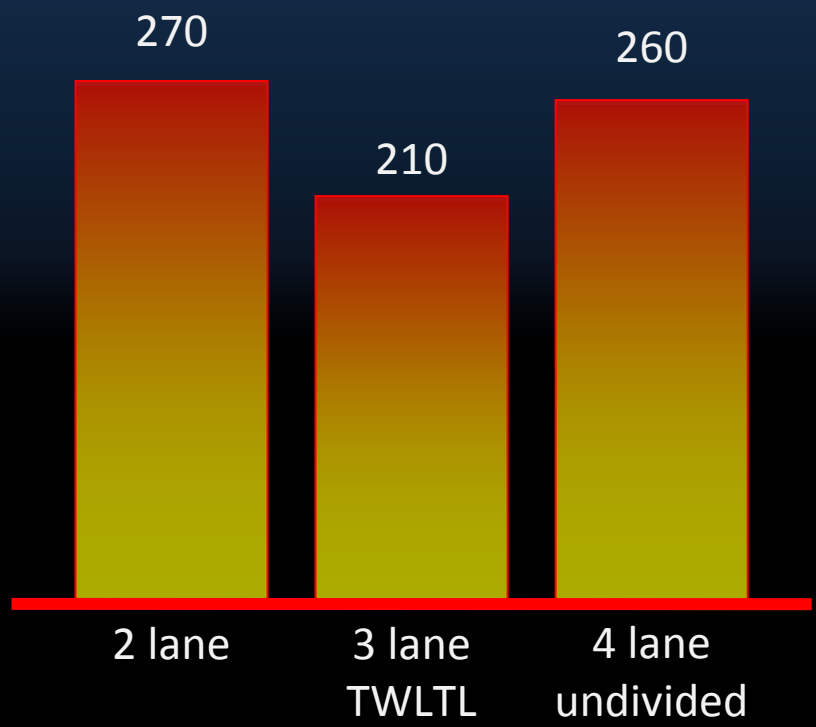
Cross Section

Number of Lanes

Collision Rates – Medium Density – Controlling for ADT



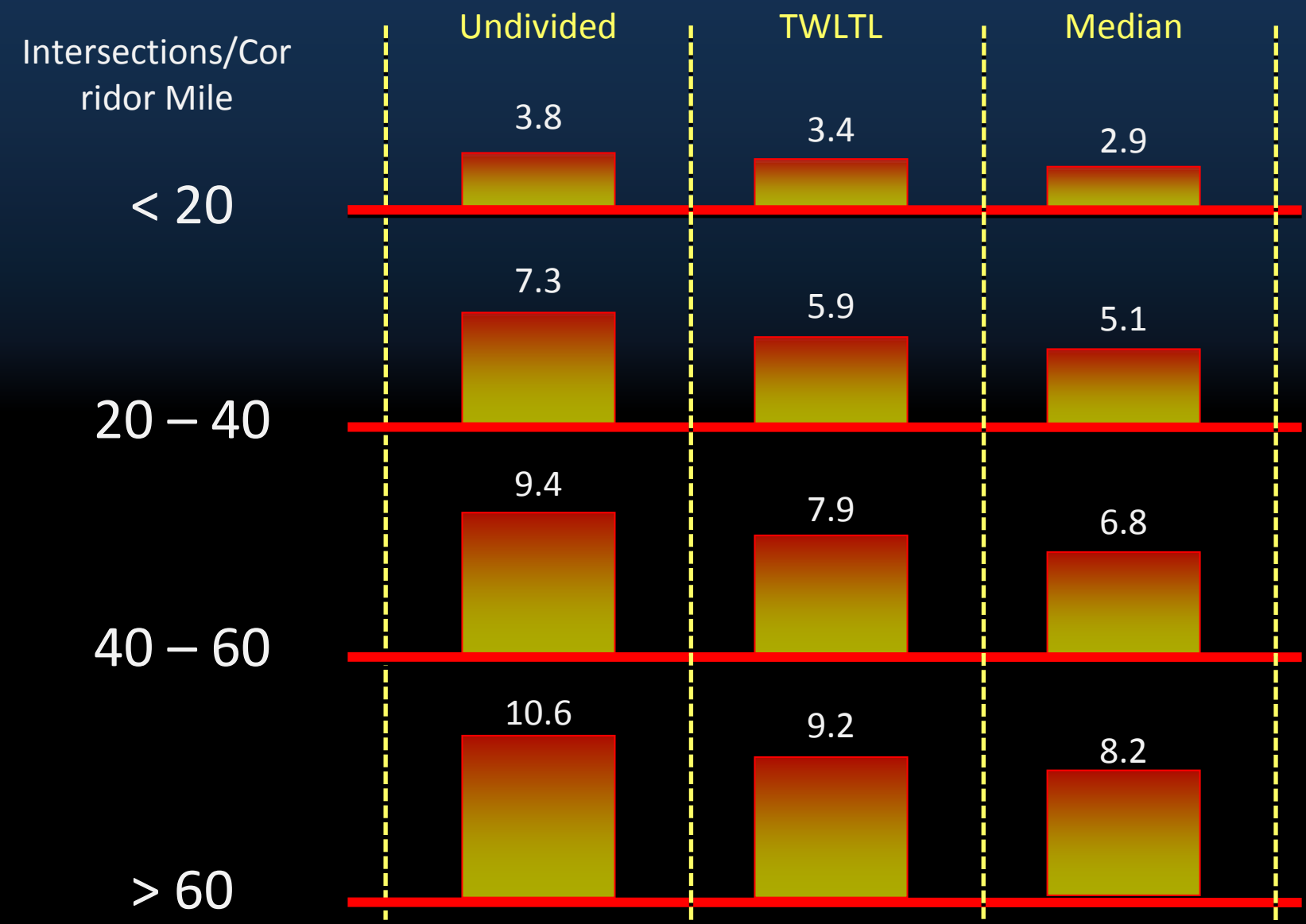
Residential Land Uses



Commercial Land Uses

Source: Hummer and Lewis, FHWA/NC/2000-003, NCSU

Accident Rates + Access Management



Source: Hummer and Lewis, FHWA/NC/2000-003, NCSU

2 Primary Elements

Traffic Safety + Personal Health

Humans:

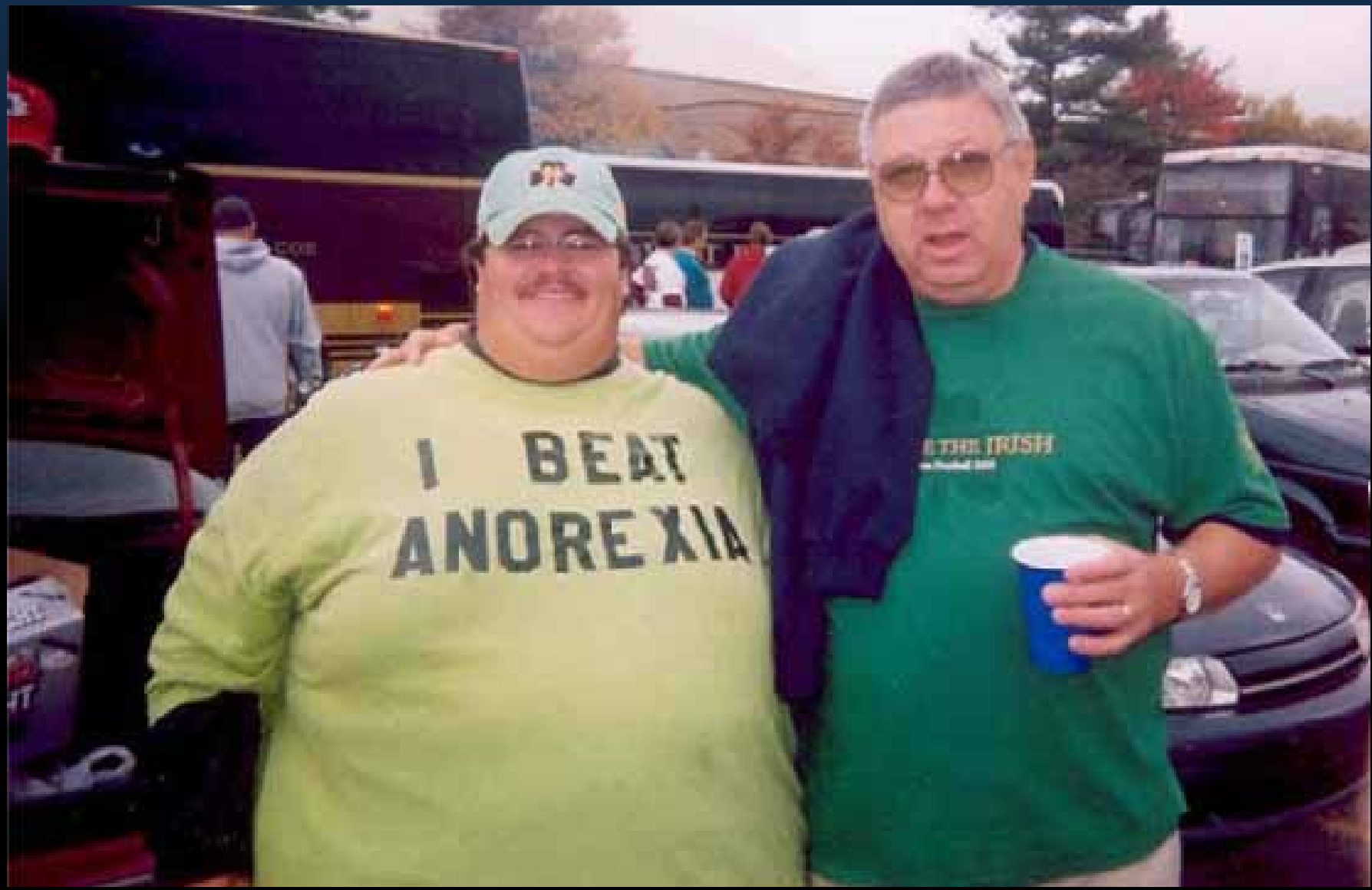
- recently descended from nomadic hunter/gatherers…
- walked & worked, burning calories
- experienced the world @ 2 – 3mph
- bodies were designed for collisions @ < 5 mph

we evolved as “walkers”

we are still “walkers”

human history

we cannot escape our DNA…

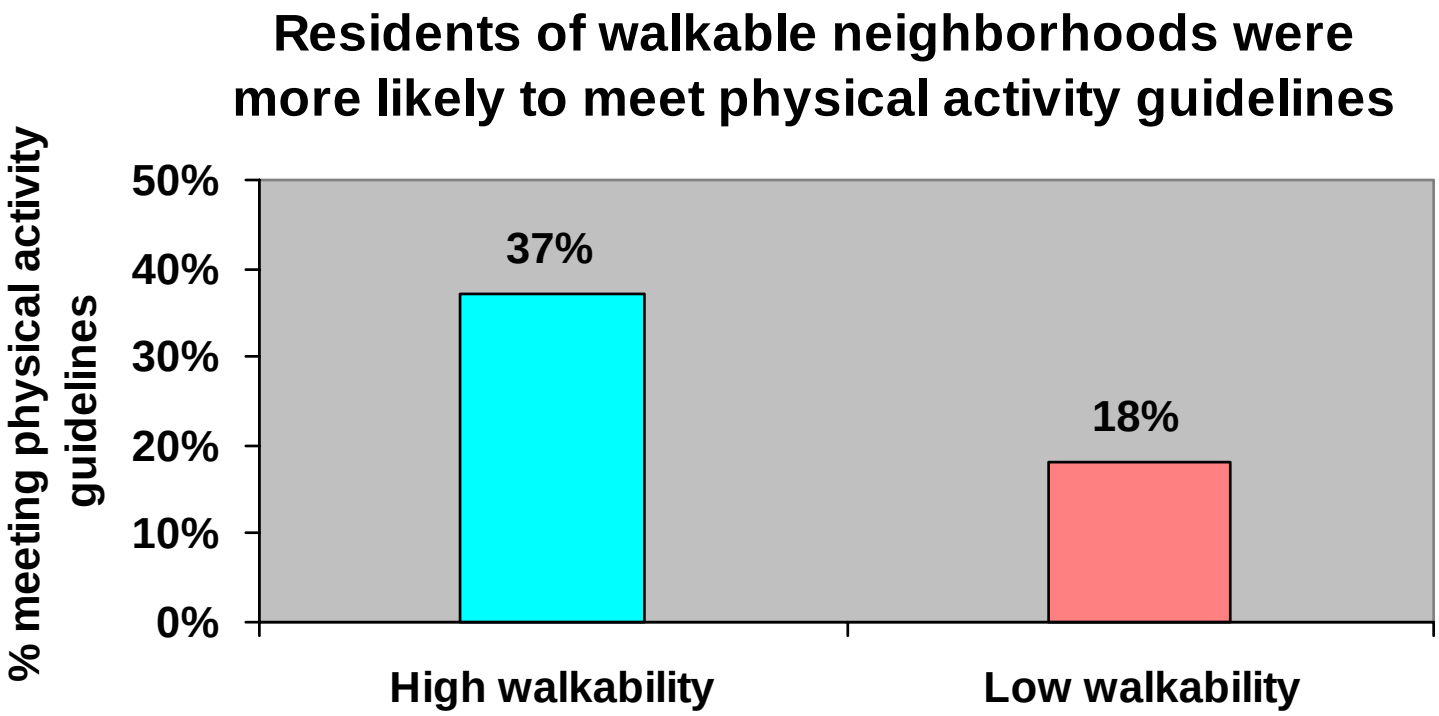


…no matter how hard we try

Research

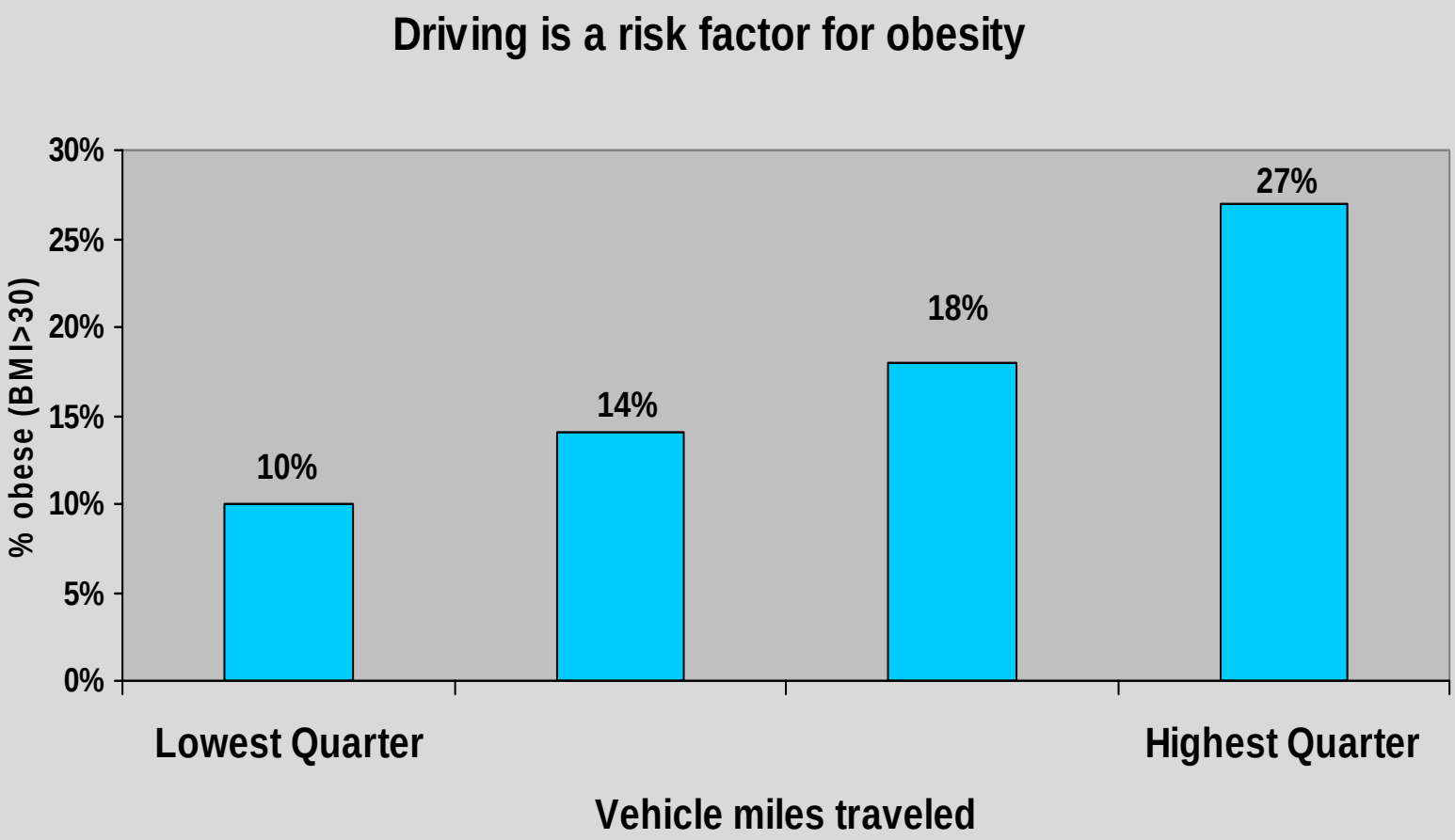
- US Centers for Disease Control
- Robert Wood Johnson Foundation

Extensive Research



Frank, Schmid, et al., Am J Prev Med, 2005

Extensive Research



Lopez-Zetina, Health and Place, 2006

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
SO_2	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:

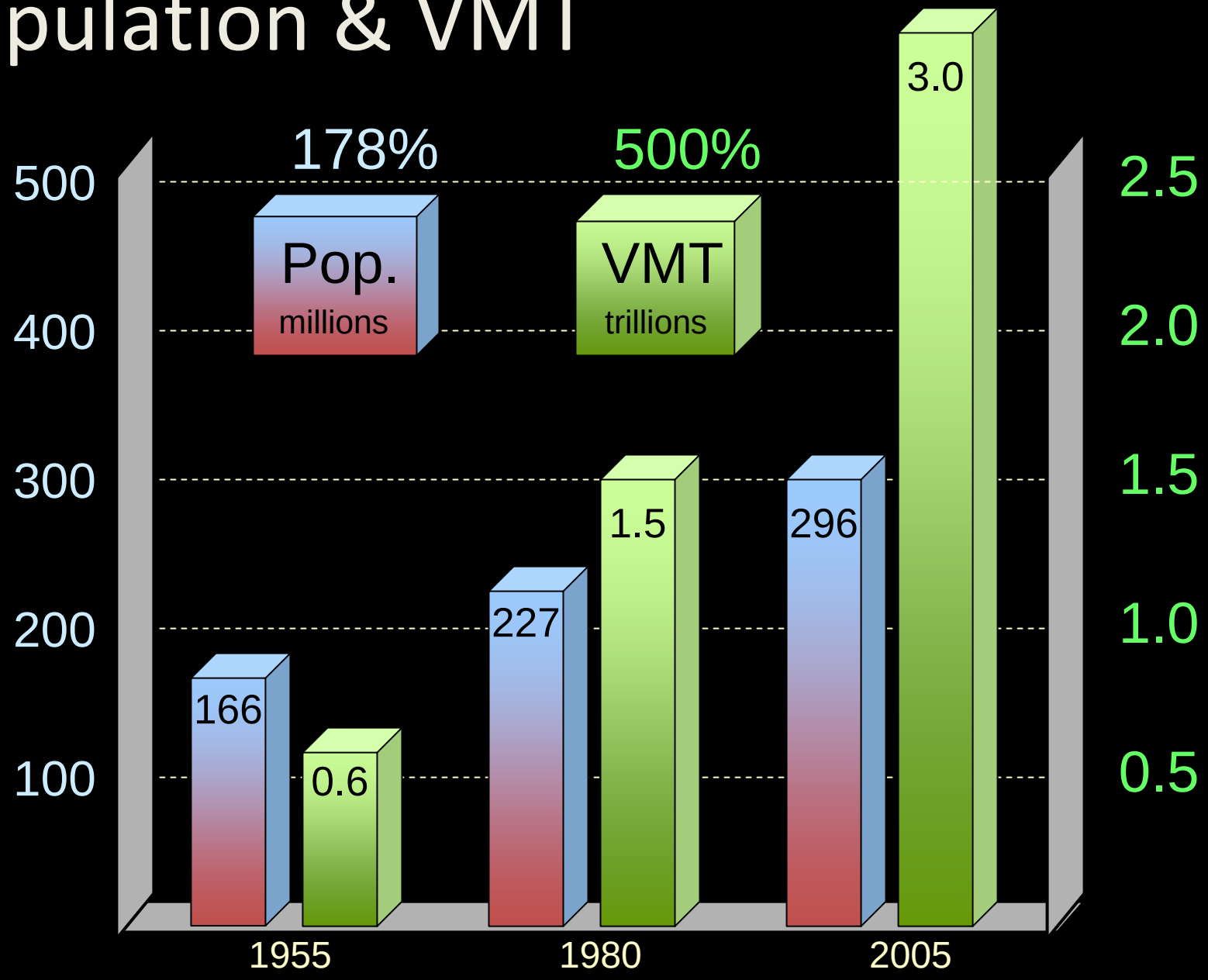
Transportation planning & design are major determinants of public health.

3

Community Design

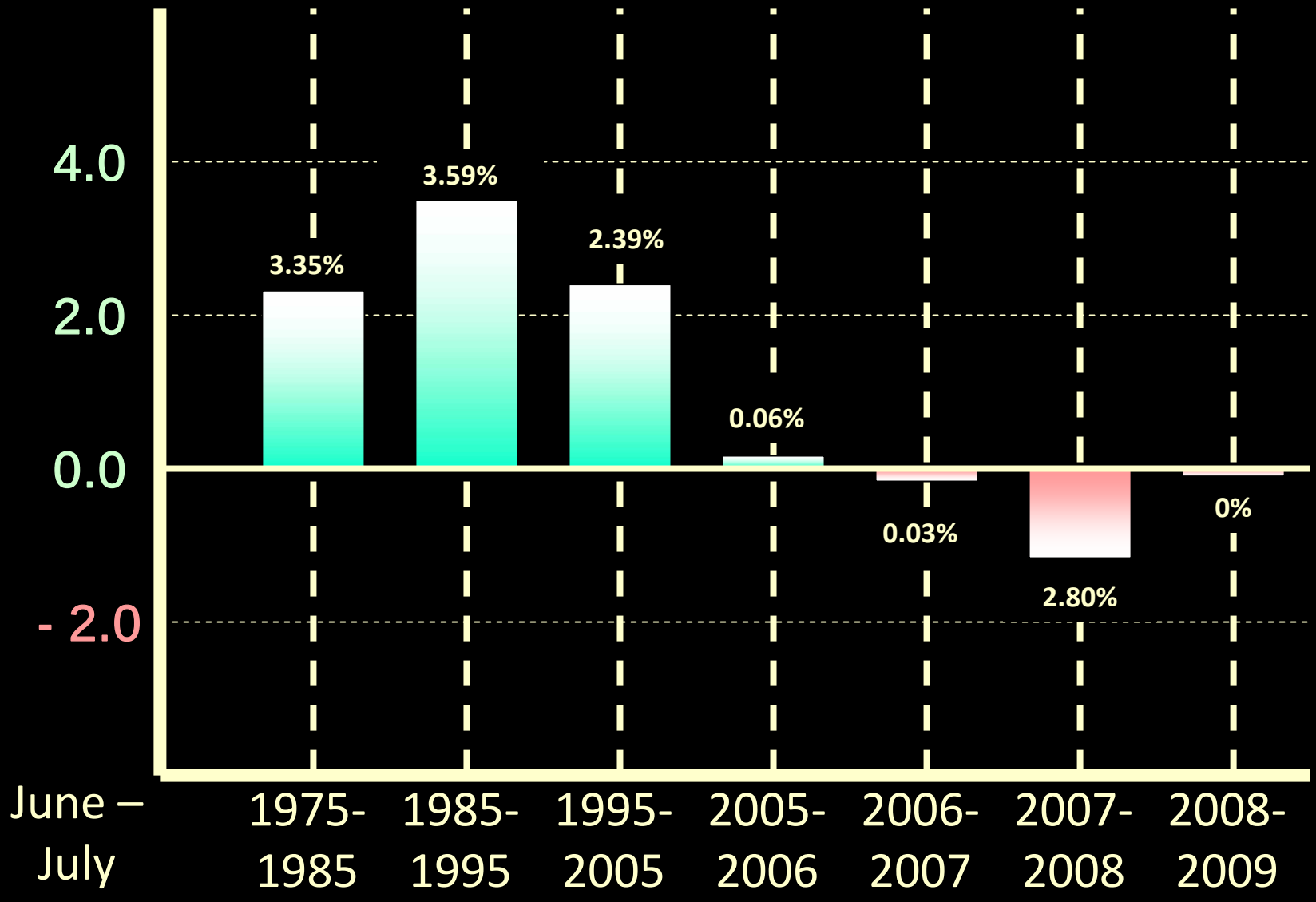
United States

Population & VMT

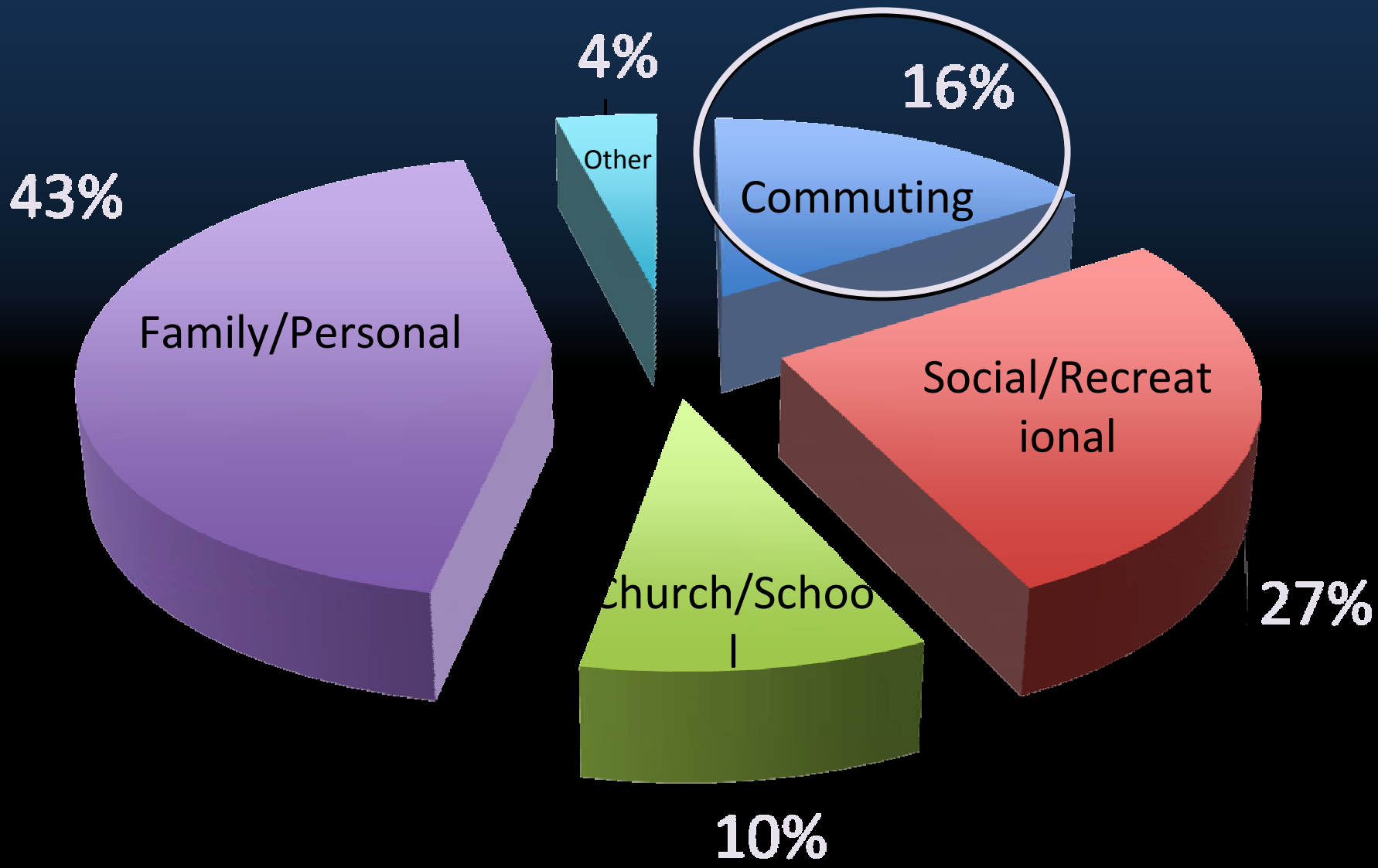


United States

Annual Rate of Change in VMT

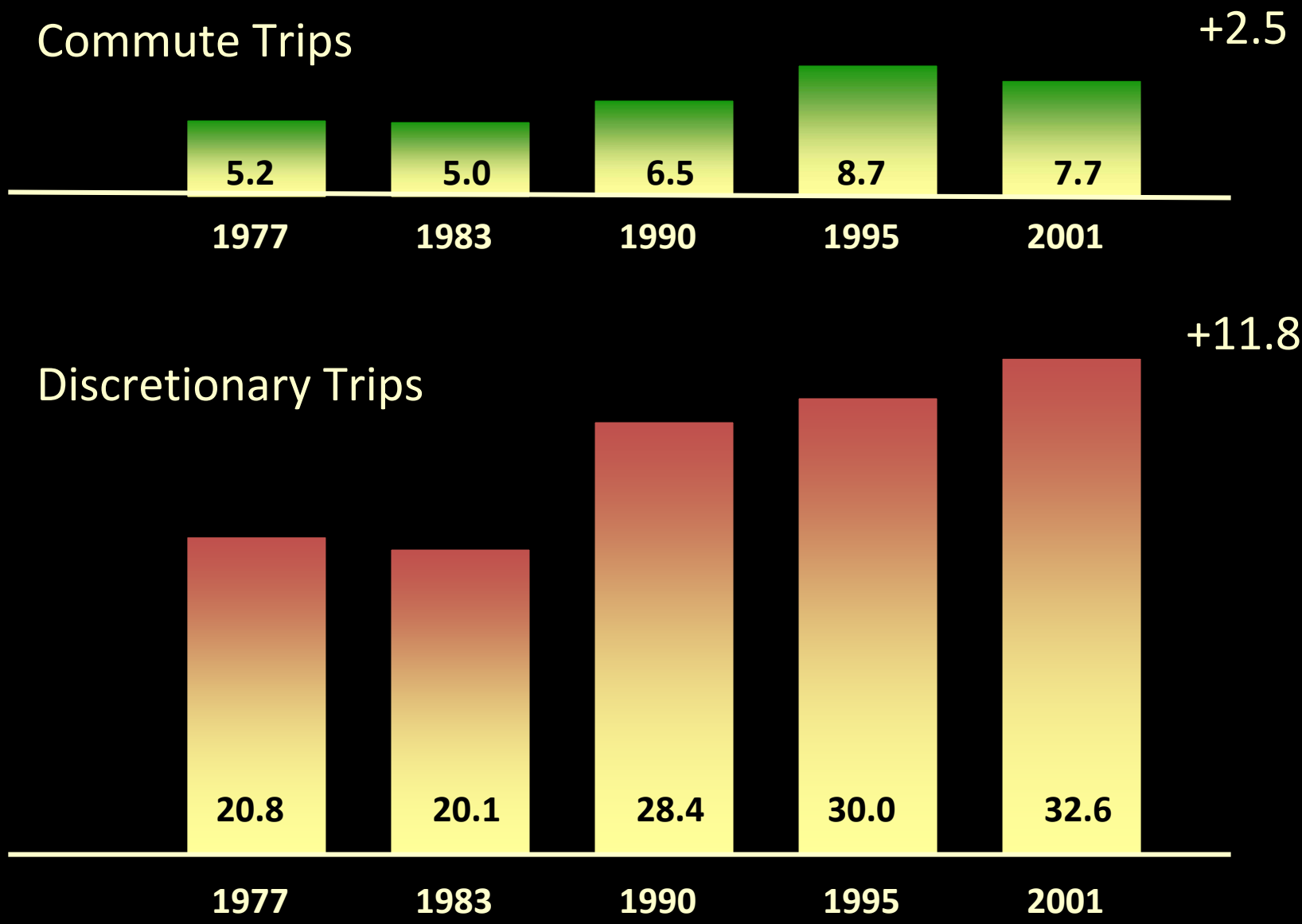


Daily Per Capita Travel



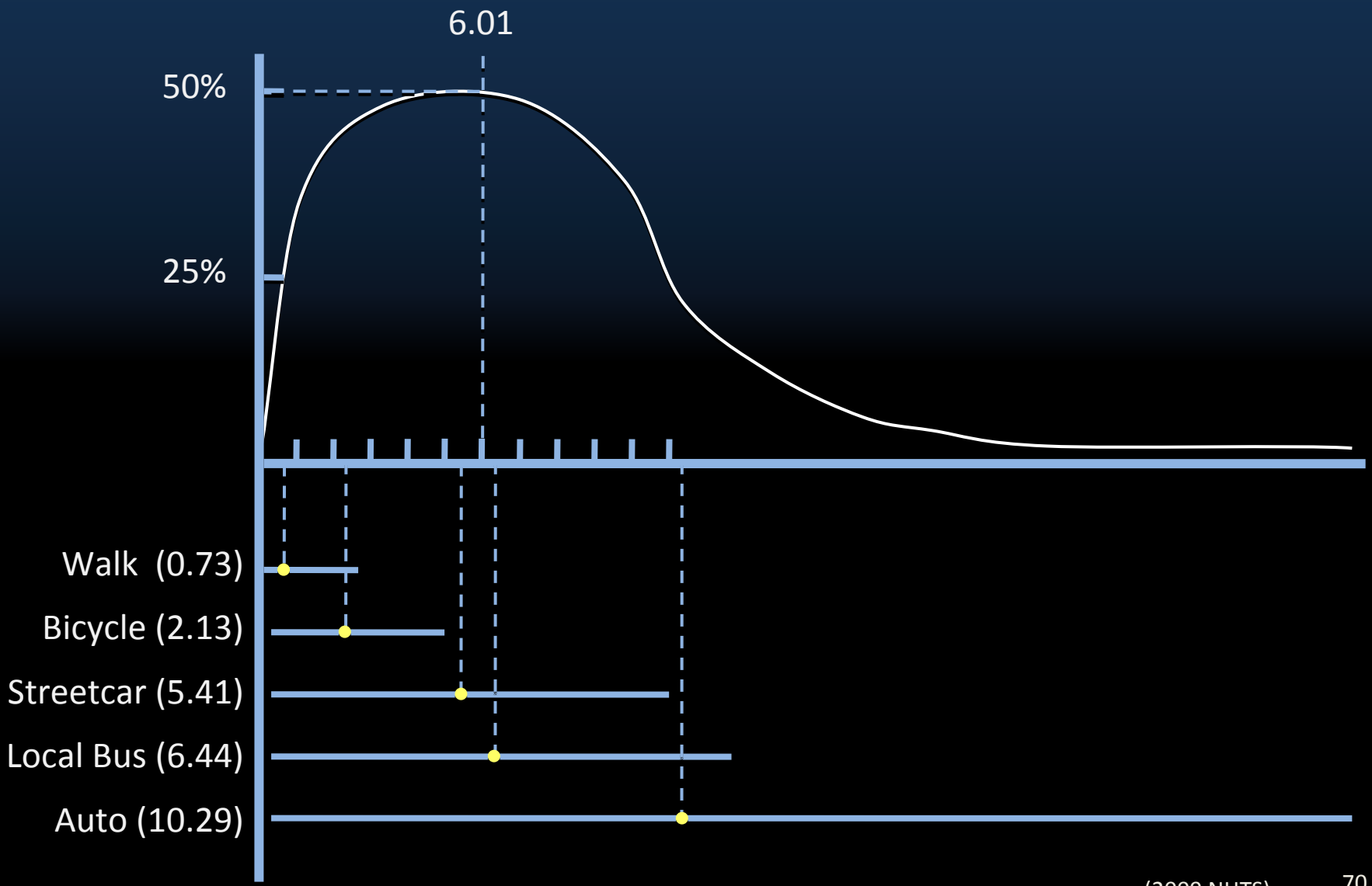
Source: 2001 NHTS

Daily Miles of Travel Per Capita



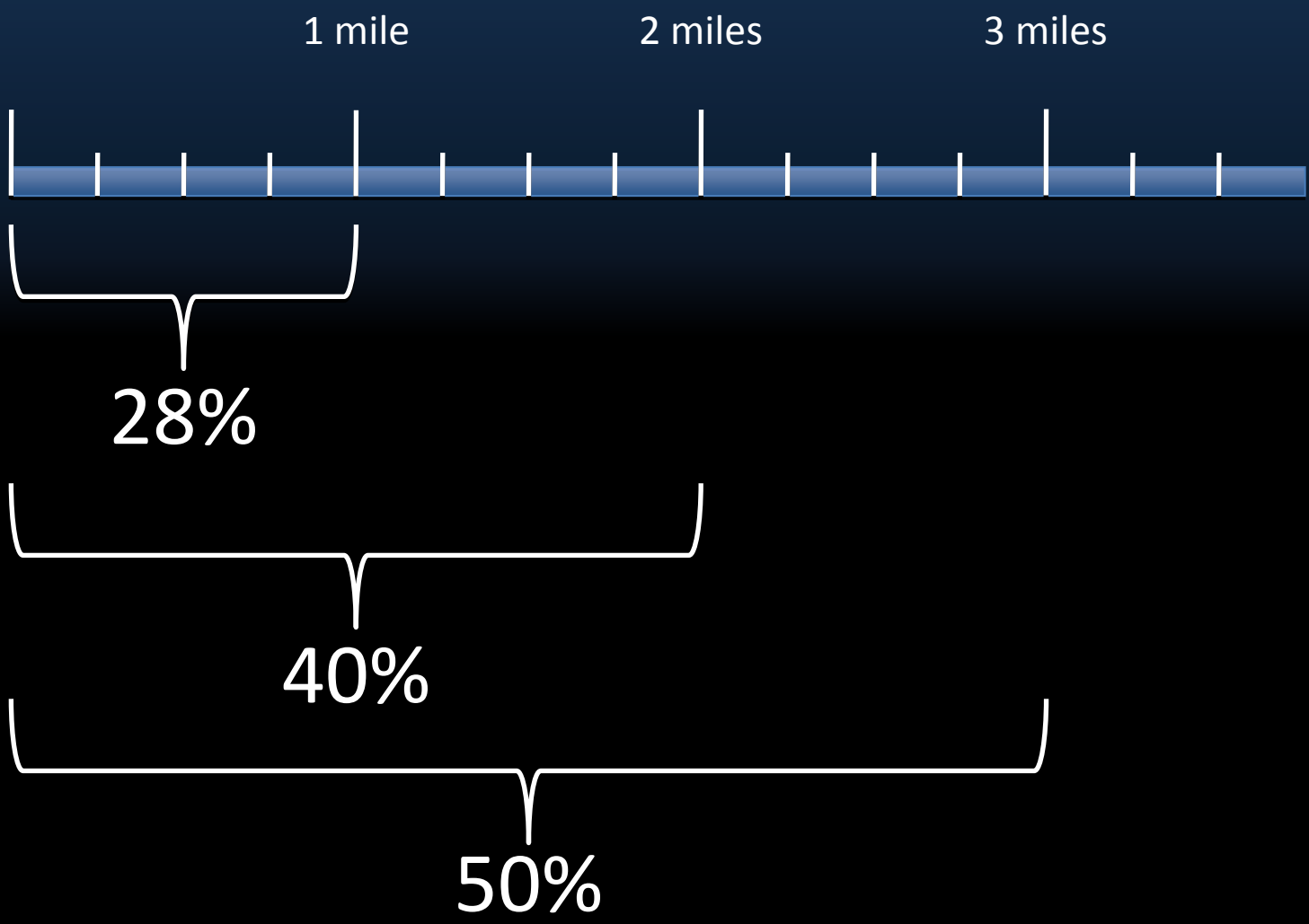
(NHTS)

Average Trip Lengths



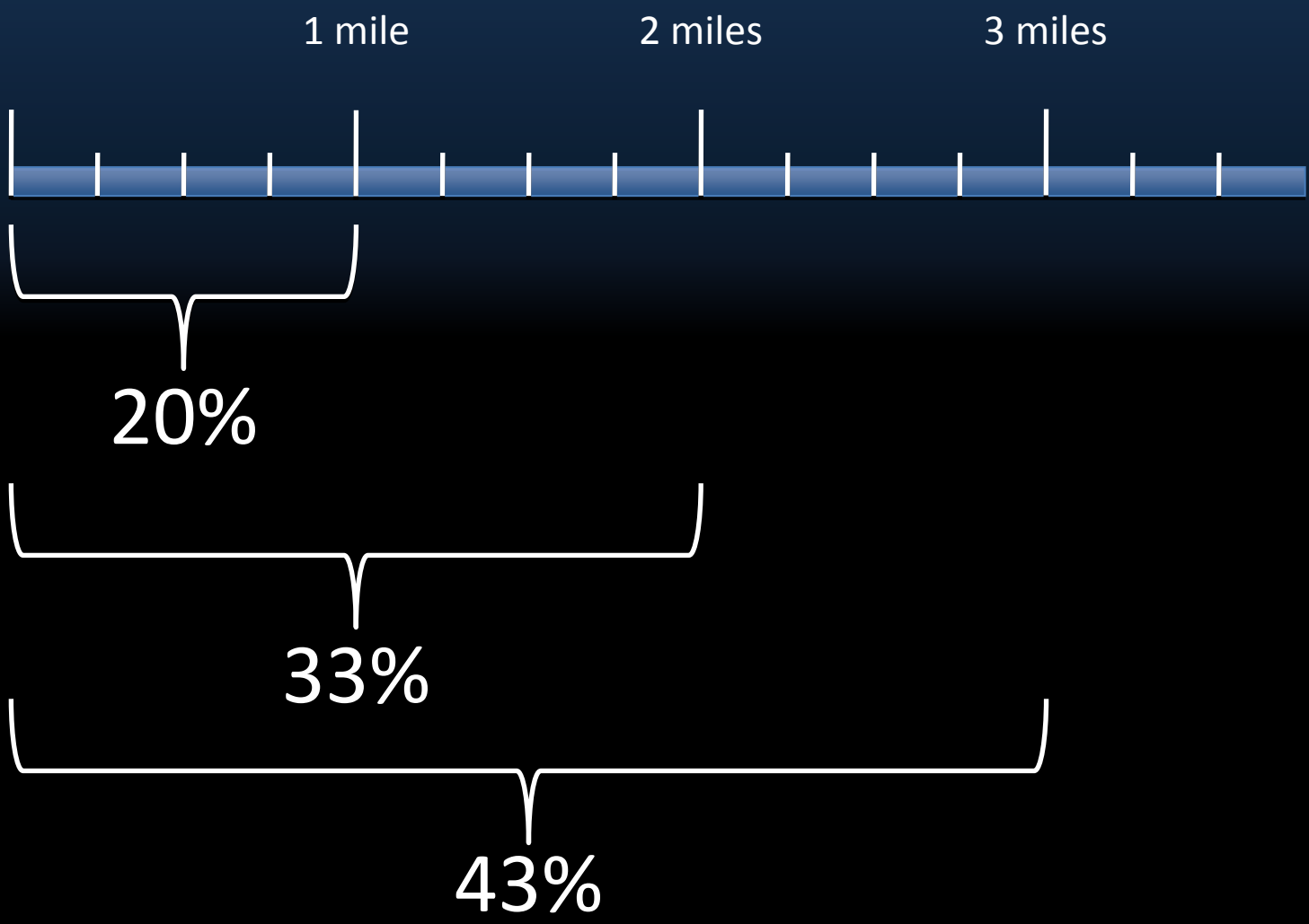
(2009 NHTS)

Trip Length – All Trips



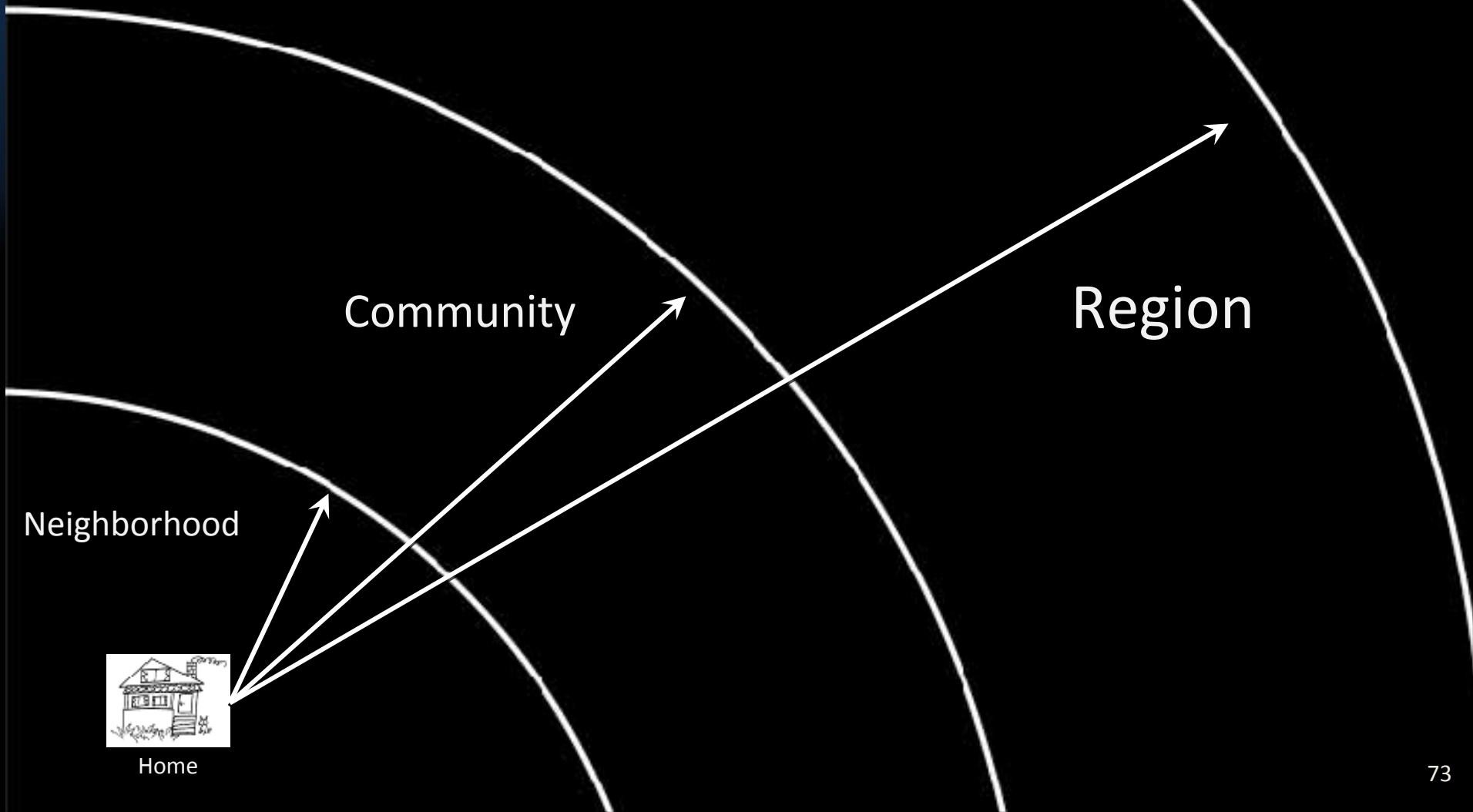
(2009 NHTS)

Trip Length – Driving Trips



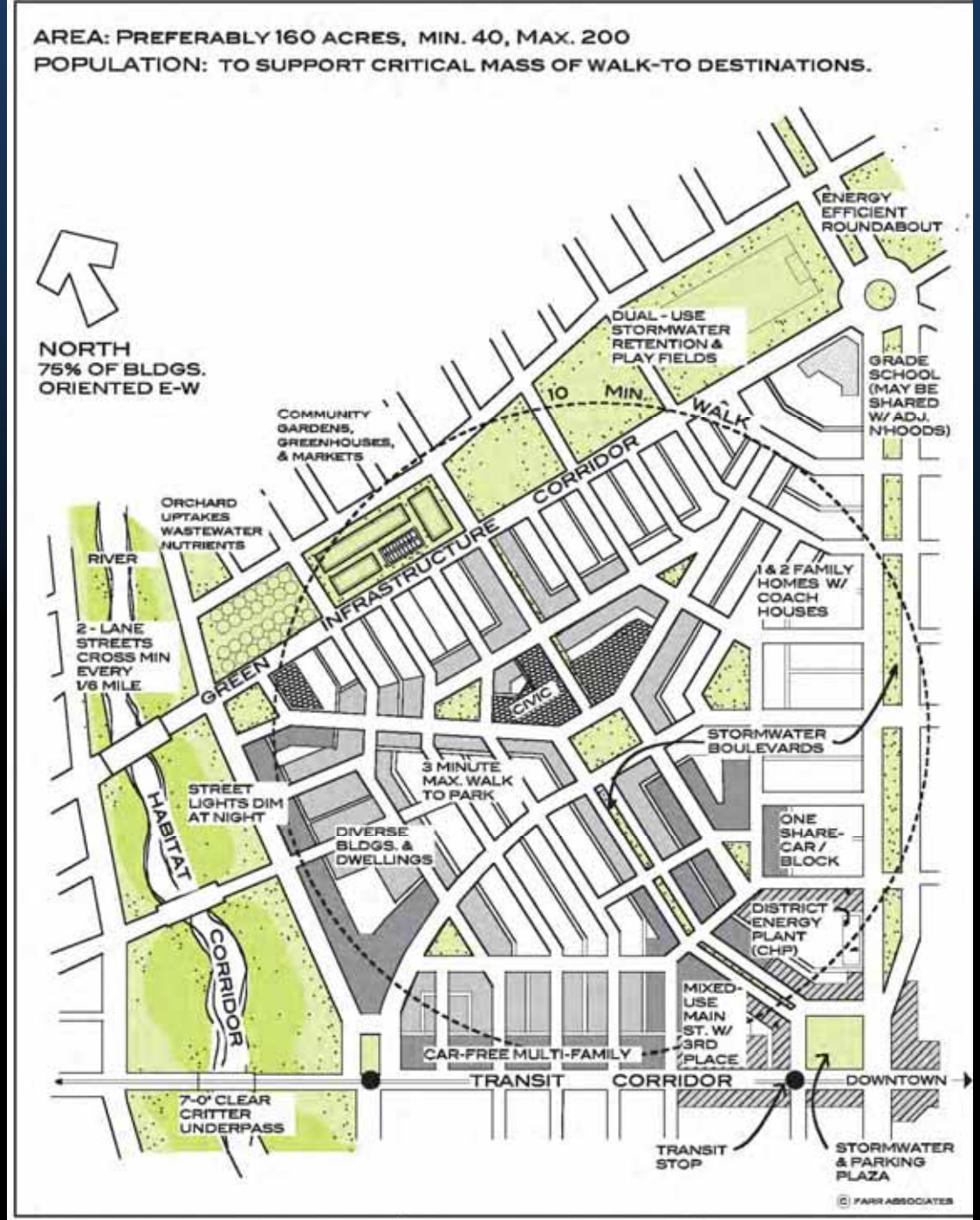
(2009 NHTS)

Spatial Relationships



the neighborhood

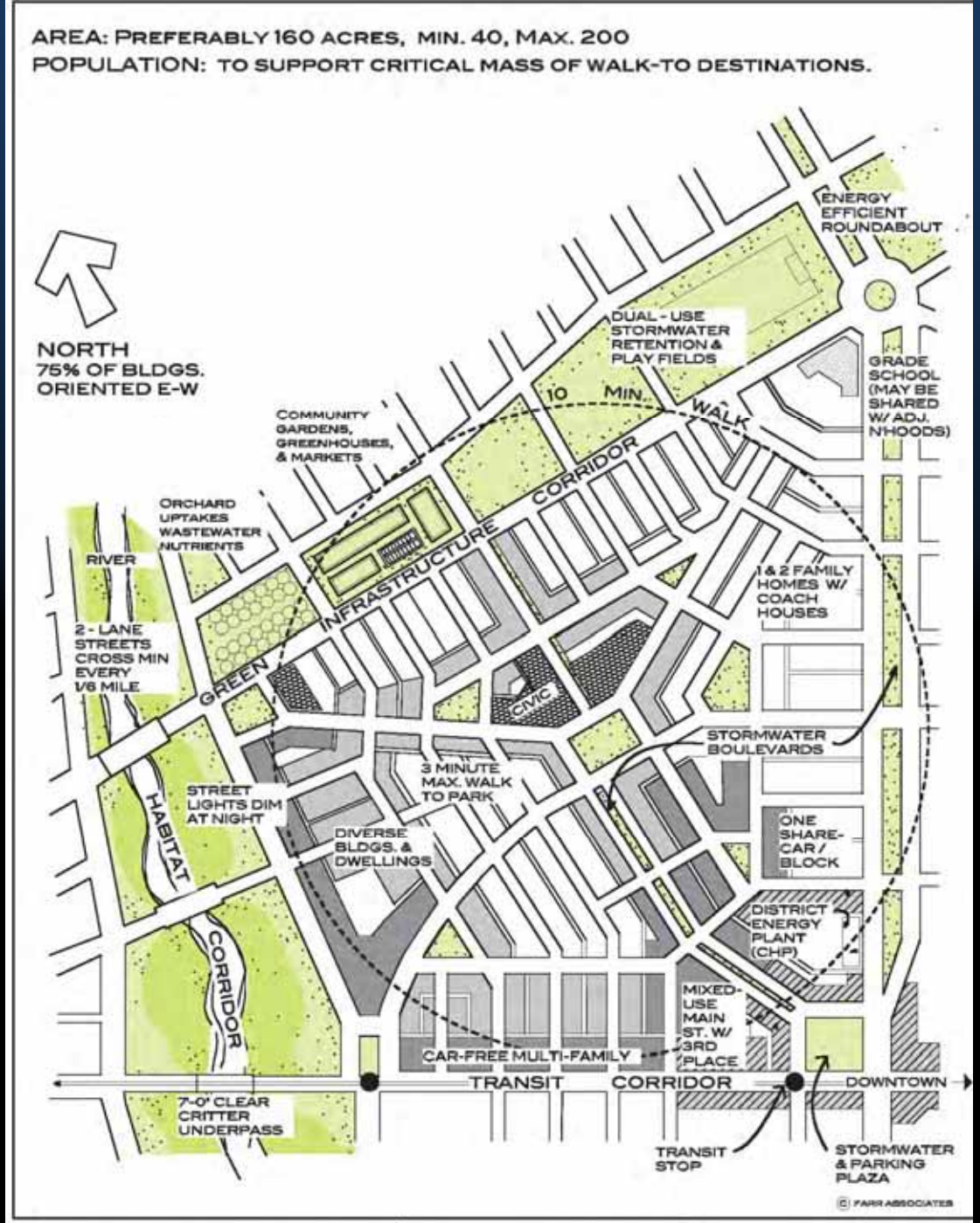
- ¼ mile radius
- 160 – 200 acres



Graphic: Doug Farr, Sustainable Urbanism

the complete neighborhood

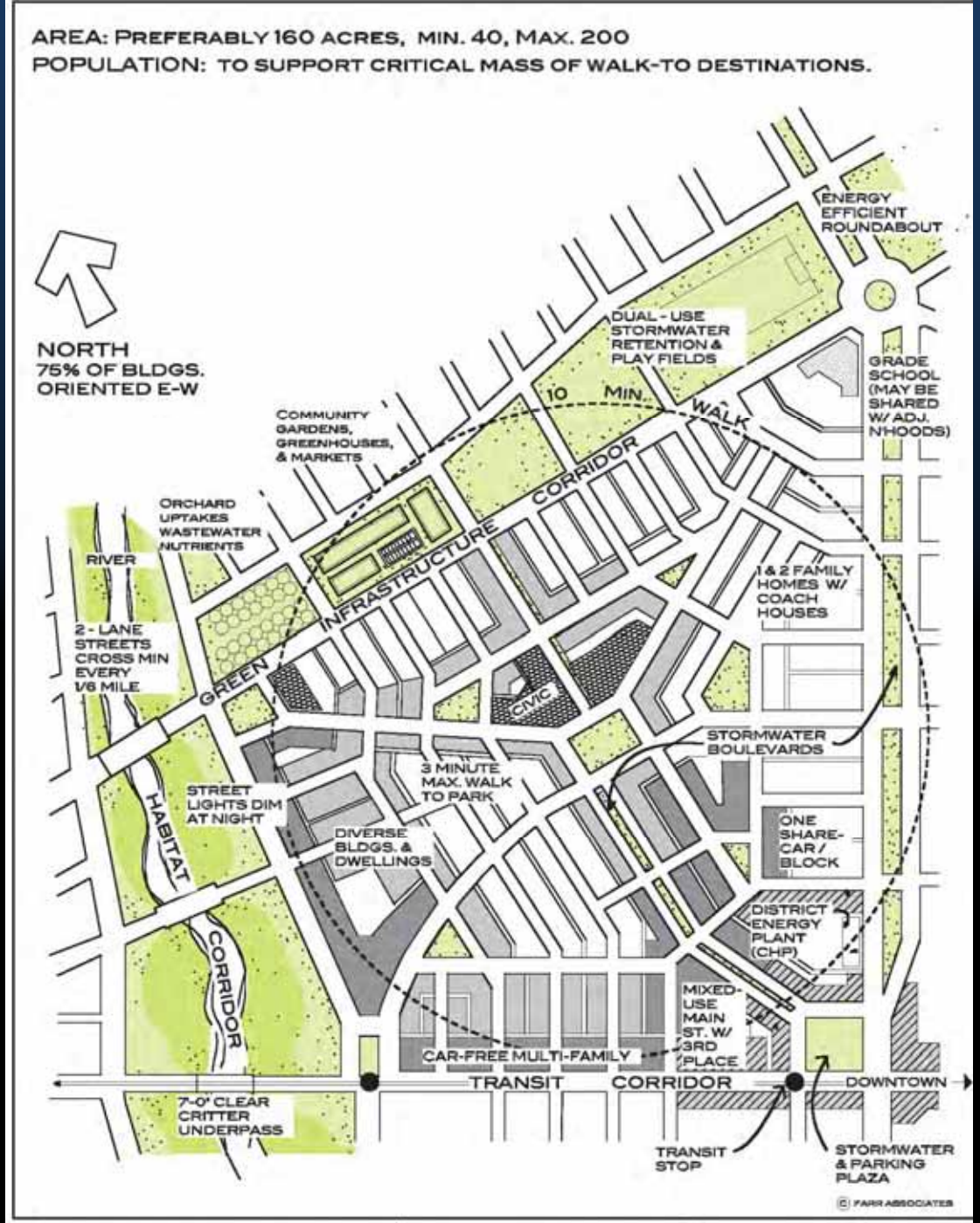
- schools
- local retail
- services
- parks
- diverse housing
- transit



Graphic: Doug Farr, Sustainable Urbanism

the complete neighborhood

- walkable
- mixed-use
- transit-served



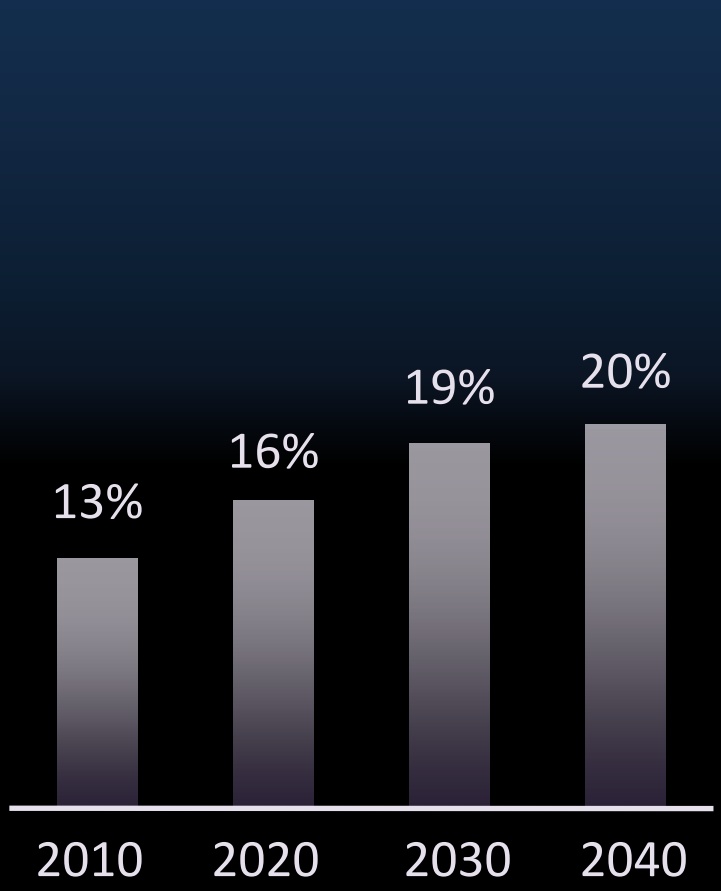
Graphic: Doug Farr, Sustainable Urbanism

BOTTOM LINE

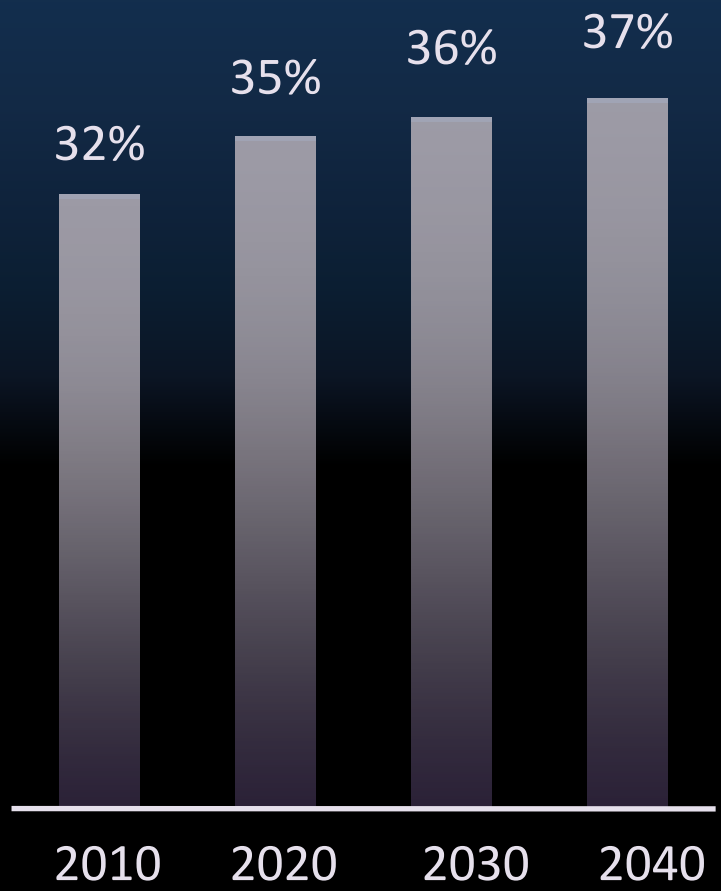
Most trips are short and most travel is discretionary.

Example: Senior Mobility

aging of the US population



% over 65

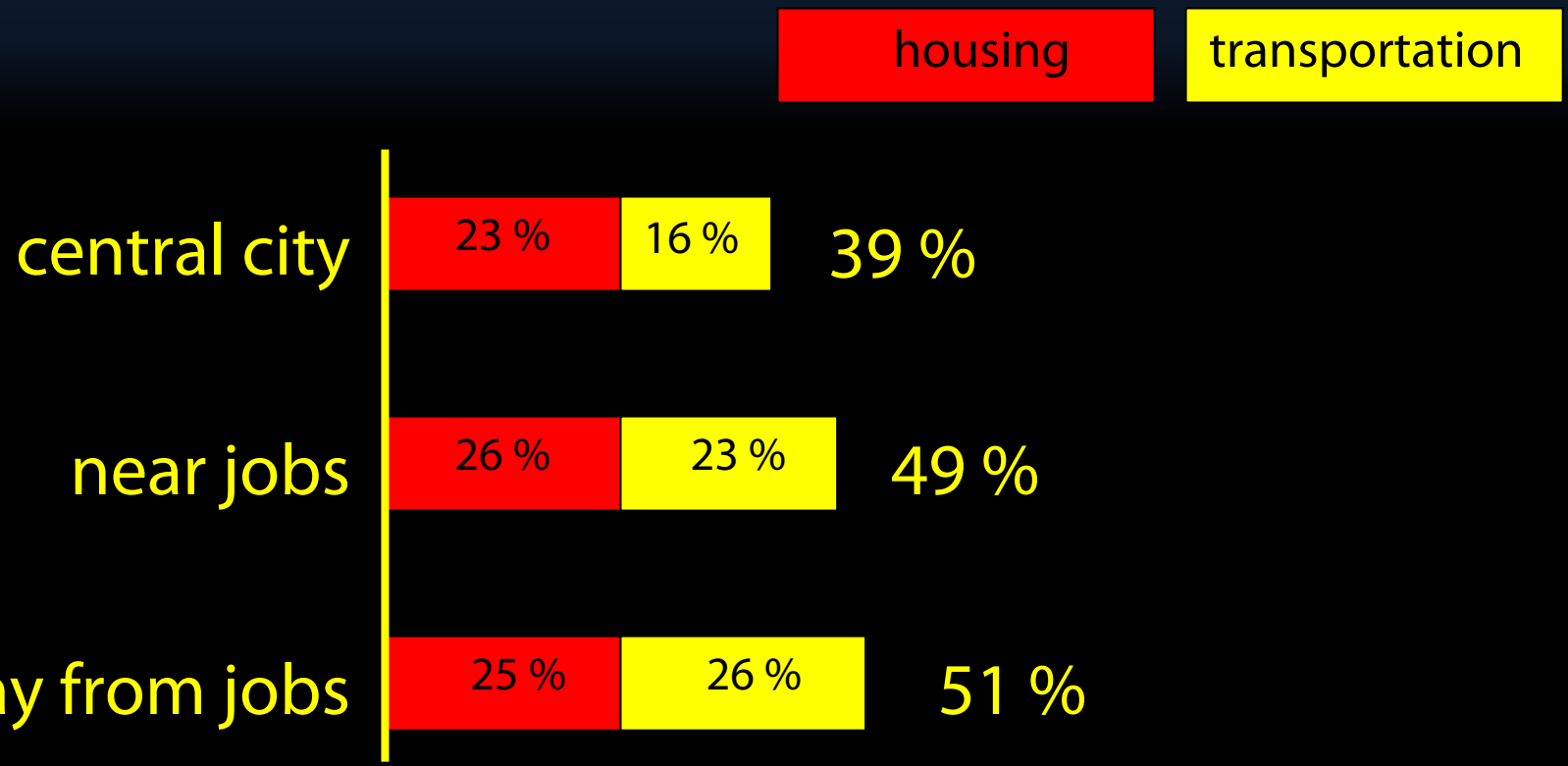


% over 50

Source: Population Division, U.S. Census Bureau Release Date: August 14, 2008

share of family income spent on housing & transportation

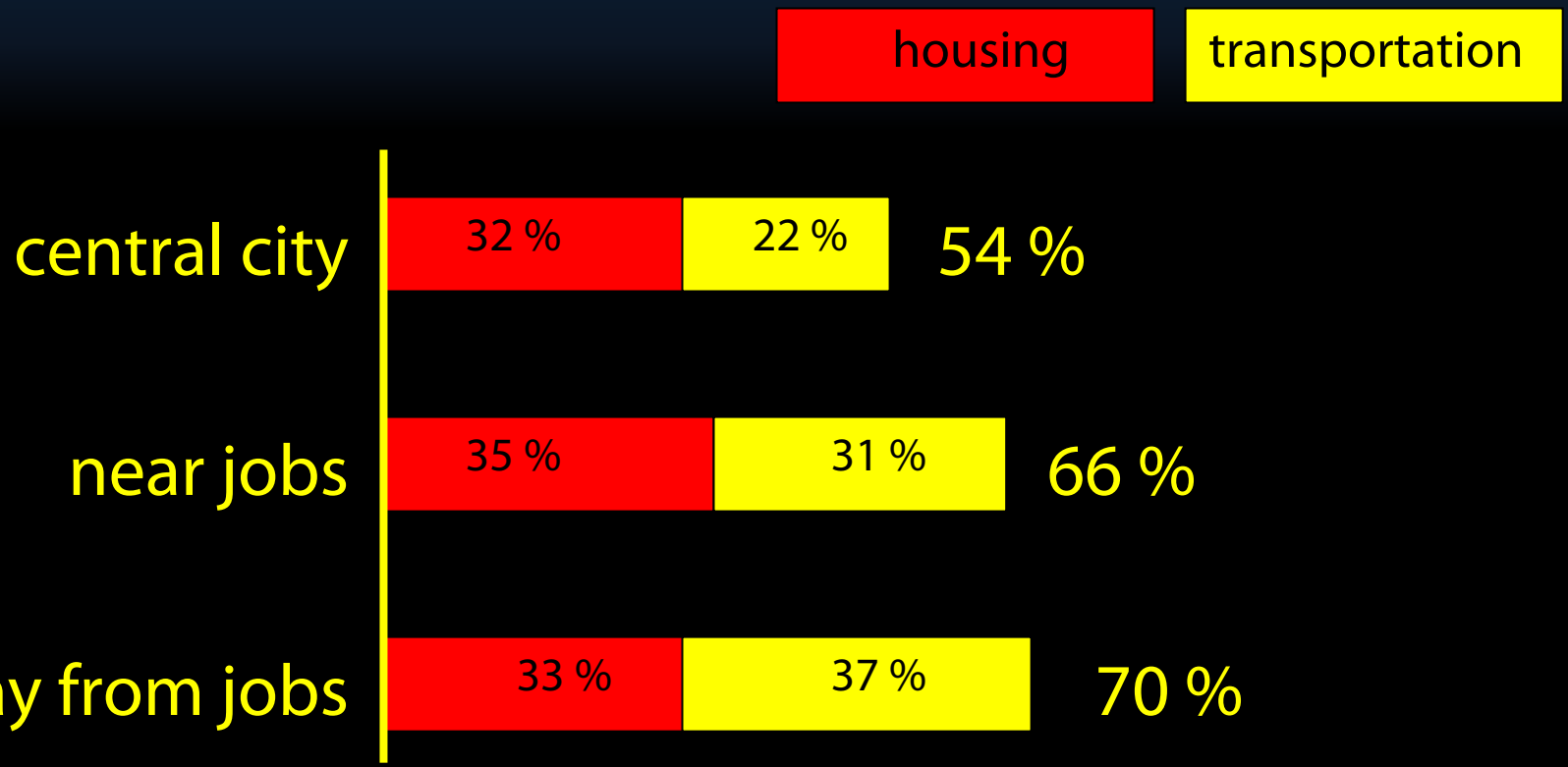
family income = $35,000 - $50,000



Source: A Heavy Load, Center for Neighborhood Technology

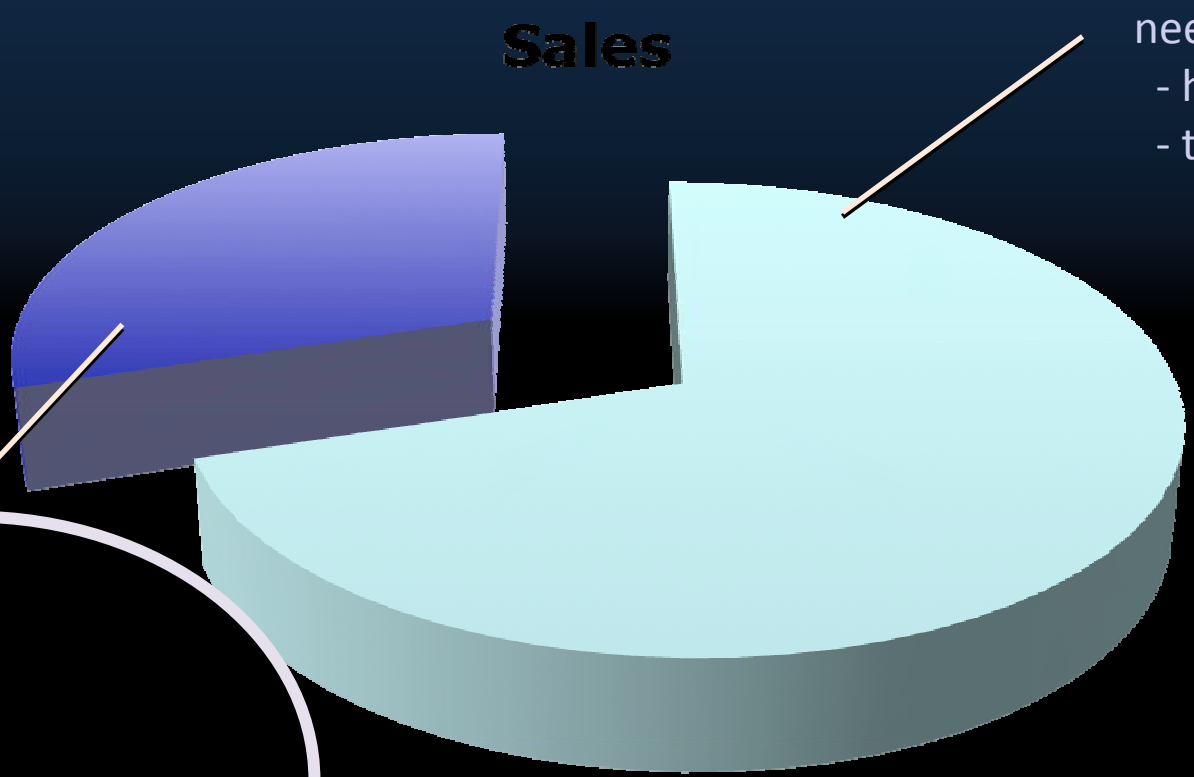
share of family income spent on housing & transportation

family income = $20,000 - $35,000



Source: A Heavy Load, Center for Neighborhood Technology

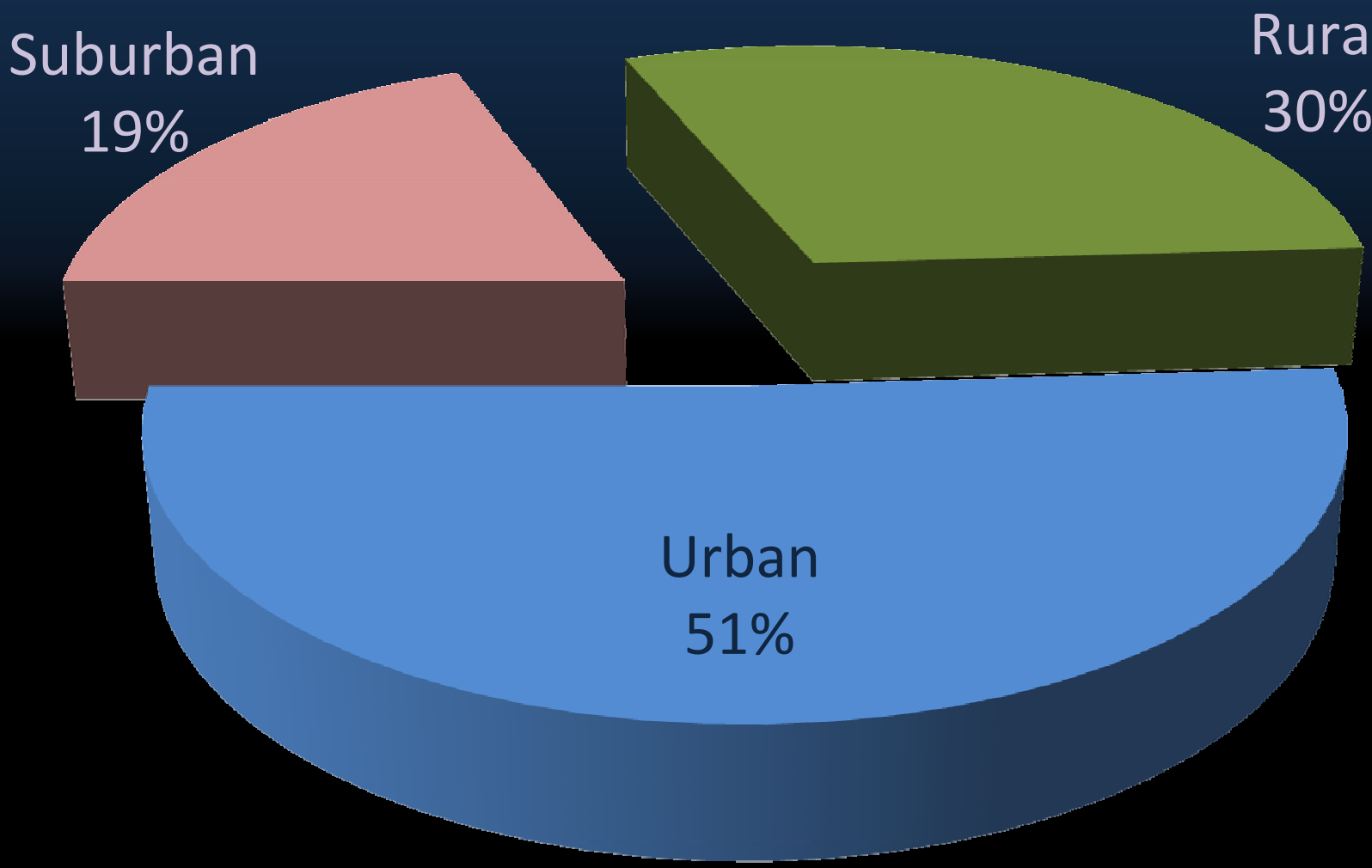
household economics



needed for:
- housing
- transportation

available for:
- food
- health care
- education
- consumer expenditures
- recreation
- savings

Retirement Preferences



Source: National Association of Realtors and Smart Growth America American Preference Survey 2004

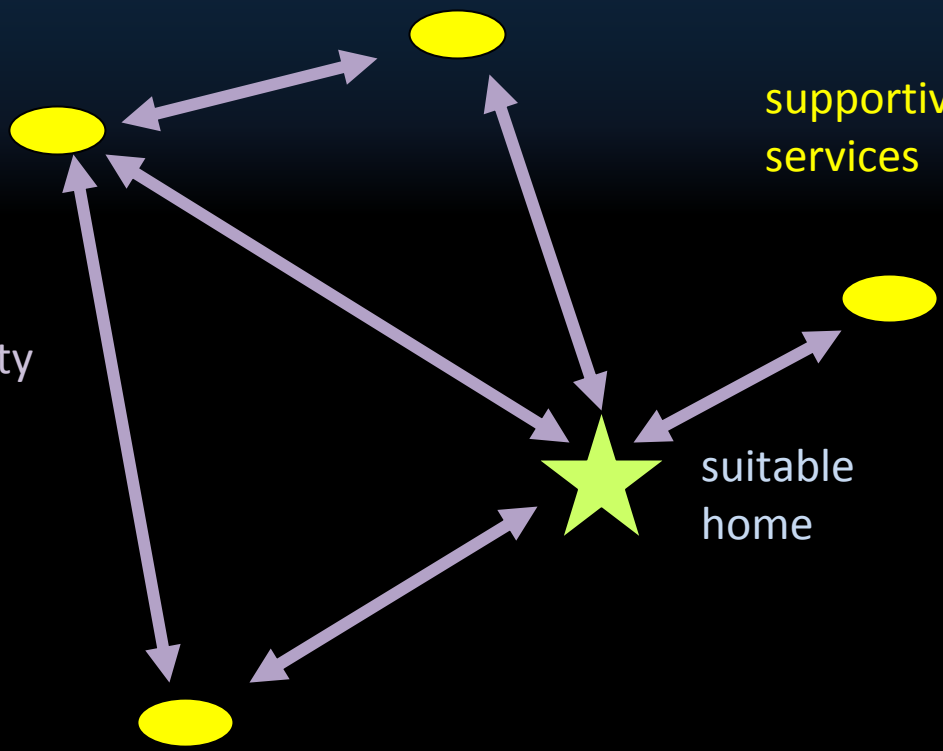
4 essentials: elder mobility

AARP: a livable community has…

- affordable & appropriate housing
- supportive community features & services
- adequate mobility options

…which together facilitate personal independence and the engagement of residents in civic and social life.

AARP livable communities model




MARCELLA MANOR

4 essentials: elder mobility

- land use mix
- pedestrian supportive environment
- connected street network
- high frequency transit service

4 essentials: elder mobility

- land use mix
- pedestrian supportive environment
- connected street network
- high frequency transit service

land use mix

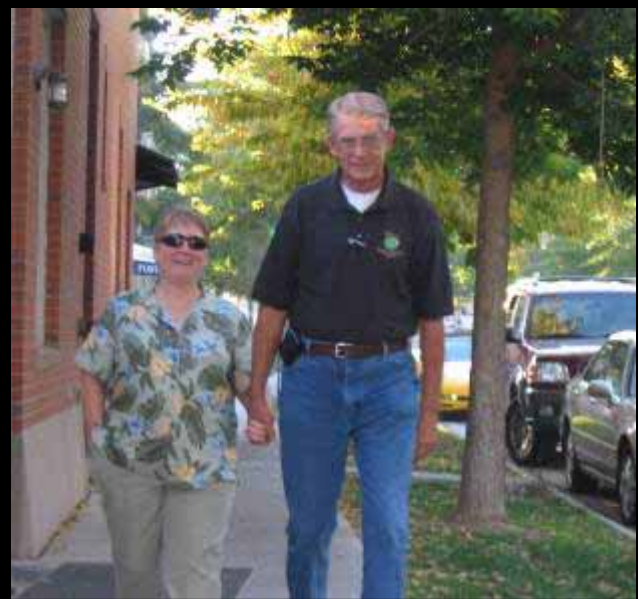
4 essentials: elder mobility

supportive community features & services

1. active living
2. third places
3. convenience retail
4. provisions & services
5. family
6. shopping
7. medical
8. cultural

1. active living

- pedestrian-oriented environments
- trails, parks and open space
- gyms and exercise facilities



2. third places

- coffee shops, cafes
- bookstores, libraries
- churches
- bars
- plazas, parks
- senior centers

3. convenience retail

- corner market
- convenience store

4. provisions & services

- grocery
- bank
- cleaners

5. family

- grandchildren
- other family

6. shopping

- hardware
- clothing
- book store
- optical
- electronics

7. medical

- clinics, doctors
- hospitals
- pharmacy
- physical therapy
- opticians
- other specialists

8. cultural

- theater
- movie Theater
- museums
- symphony
- art gallery
- restaurants

destinations

	daily	weekly	monthly
1. active living	X		
2. third places	X		
3. convenience	X		
4. provisions		X	
5. family		X	
6. shopping		X	
7. medical			X
8. cultural			X

destinations

	daily	weekly	monthly
1. active living	X		
2. third places	X		
3. convenience	X		
4. provisions		X	
5. family		X	
6. shopping		X	
7. medical			X
8. cultural			X

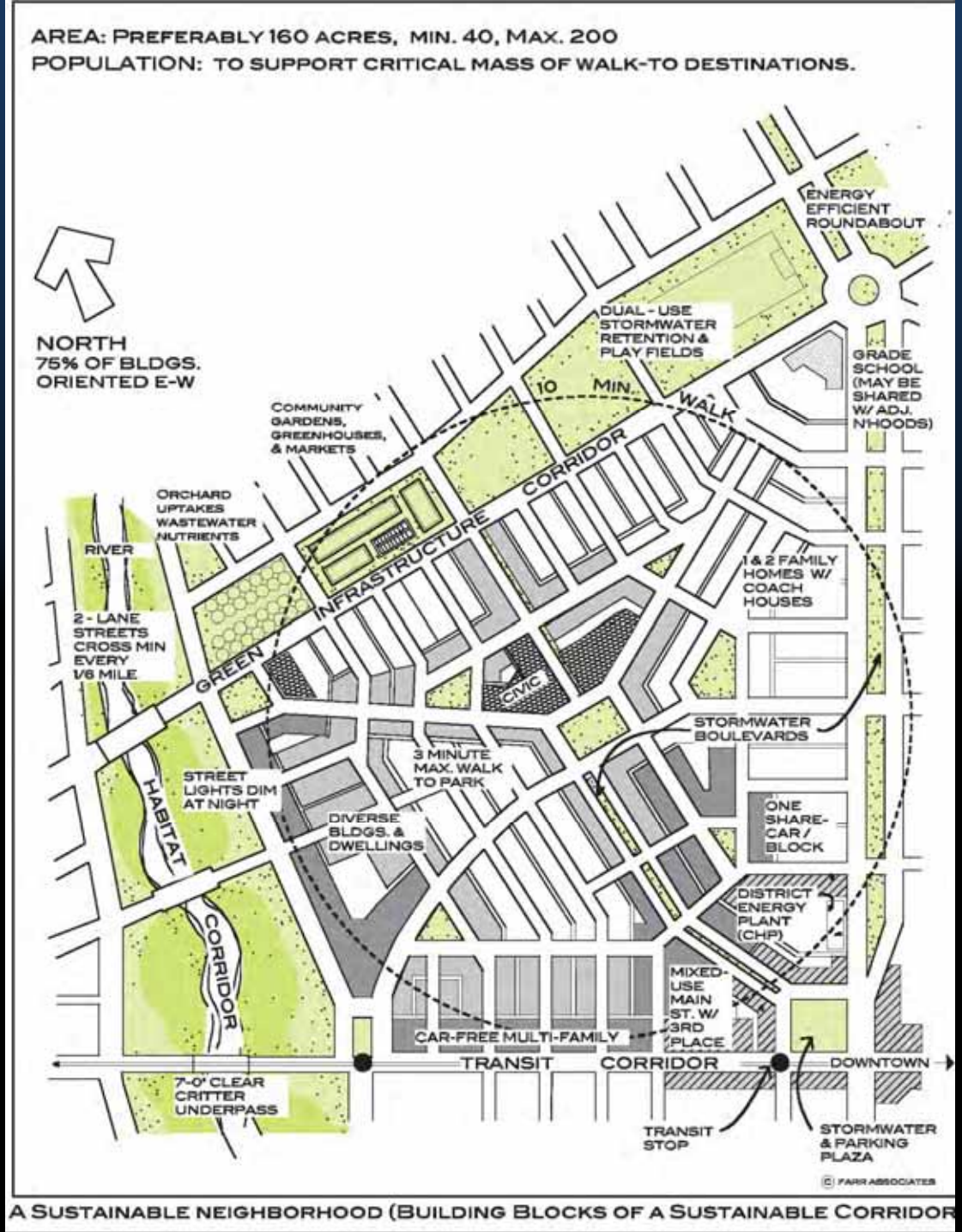
should be within walking distance

destinations

	daily	weekly	monthly
1. active living	X		
2. third places	X		
3. convenience	X		
4. provisions		X	
5. family		X	
6. shopping		X	
7. medical			X
8. cultural			X

accessible by walking and fixed route transit

neighborhood completeness



A SUSTAINABLE NEIGHBORHOOD (BUILDING BLOCKS OF A SUSTAINABLE CORRIDOR

Portland “20-minute neighborhood”

4 essentials: elder mobility

- land use mix
- pedestrian supportive environment
- connected street network
- high frequency transit service

note: ADA & universal design

elderly walking environment factors

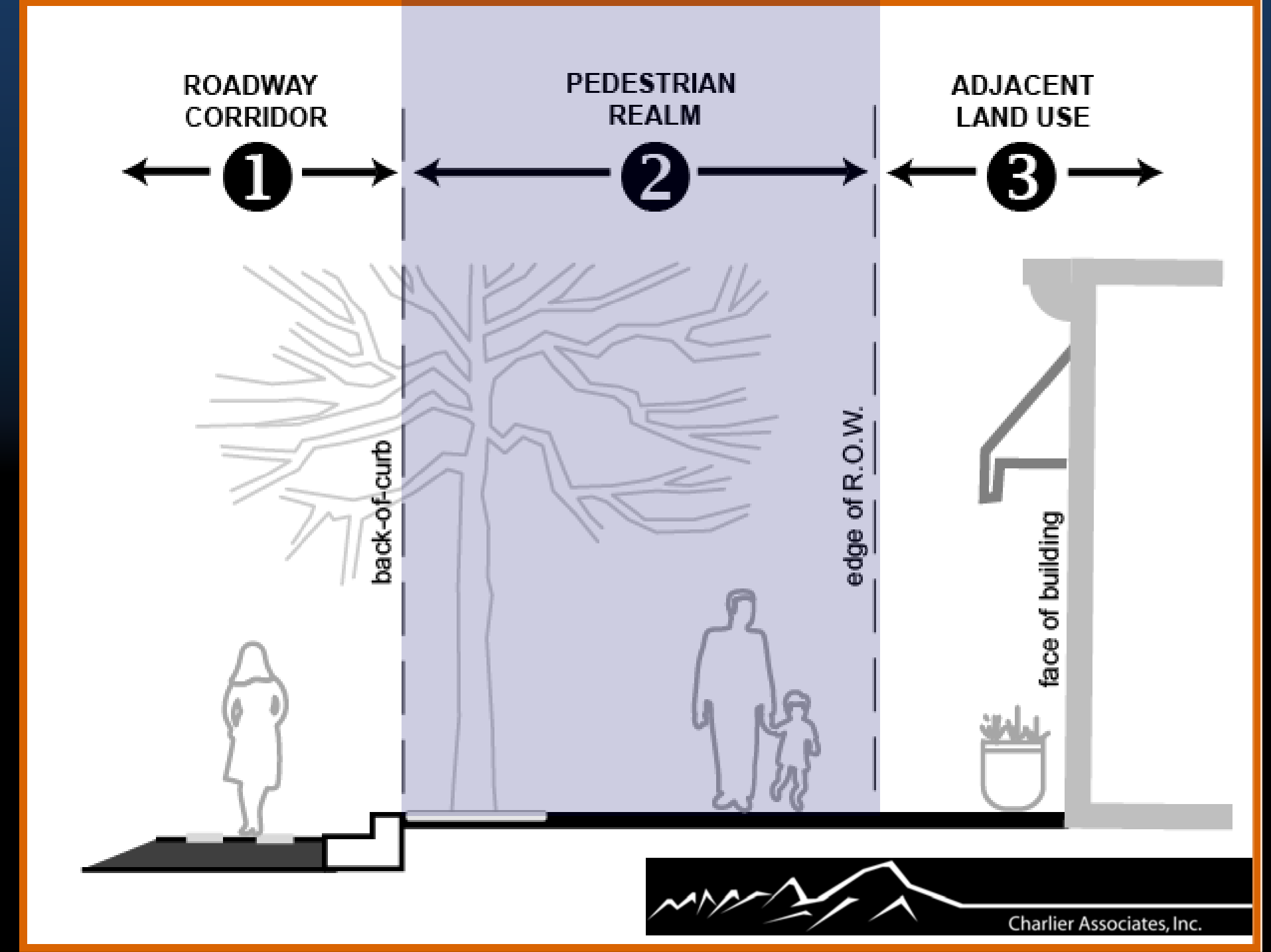
- safety & security
- street crossings
- universal access
- street design – scale, speed
- pedestrian realm – scale, layout
- urban design – street walls, building scale
- land use mix
- trees, canopies, awnings

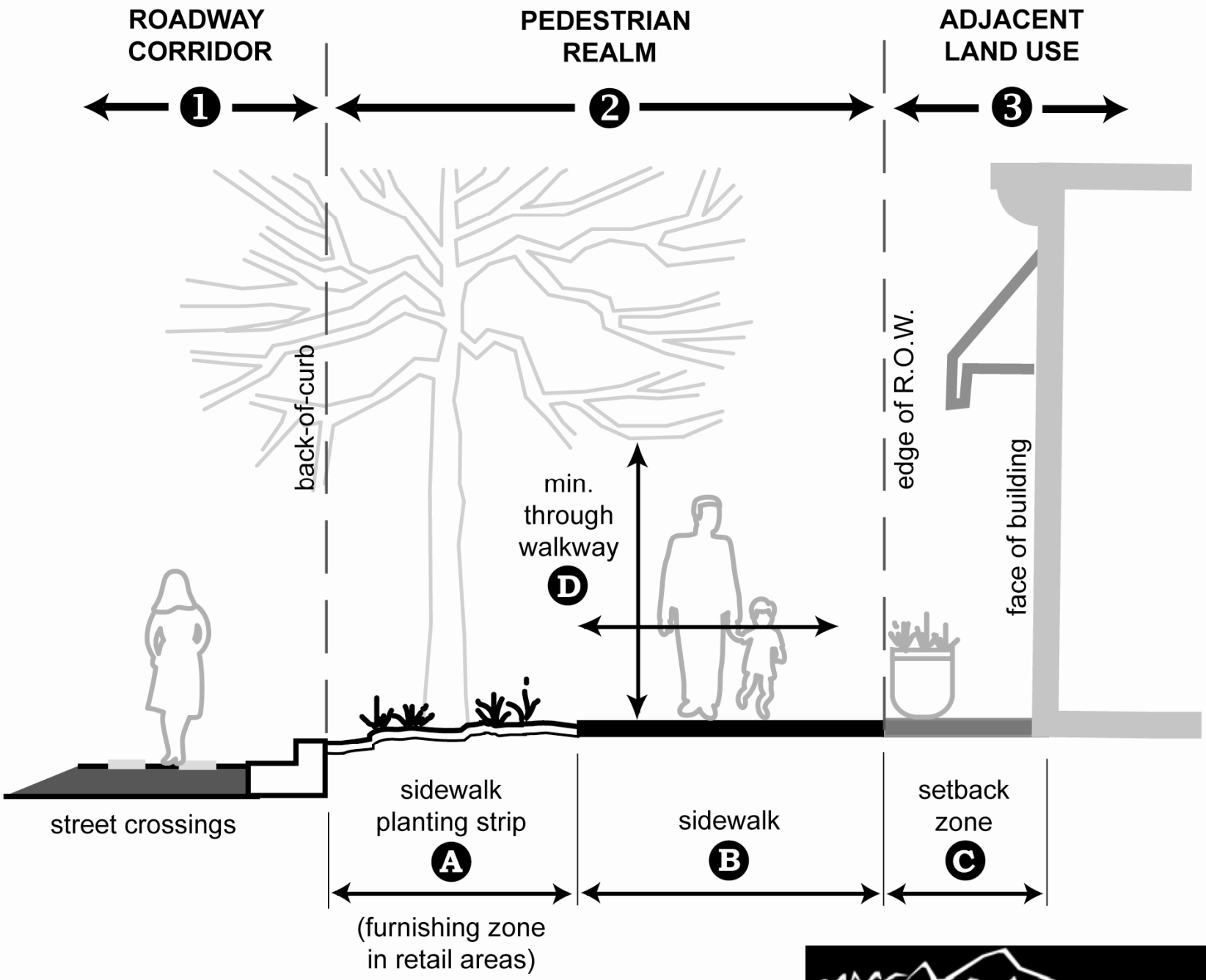
Honolulu

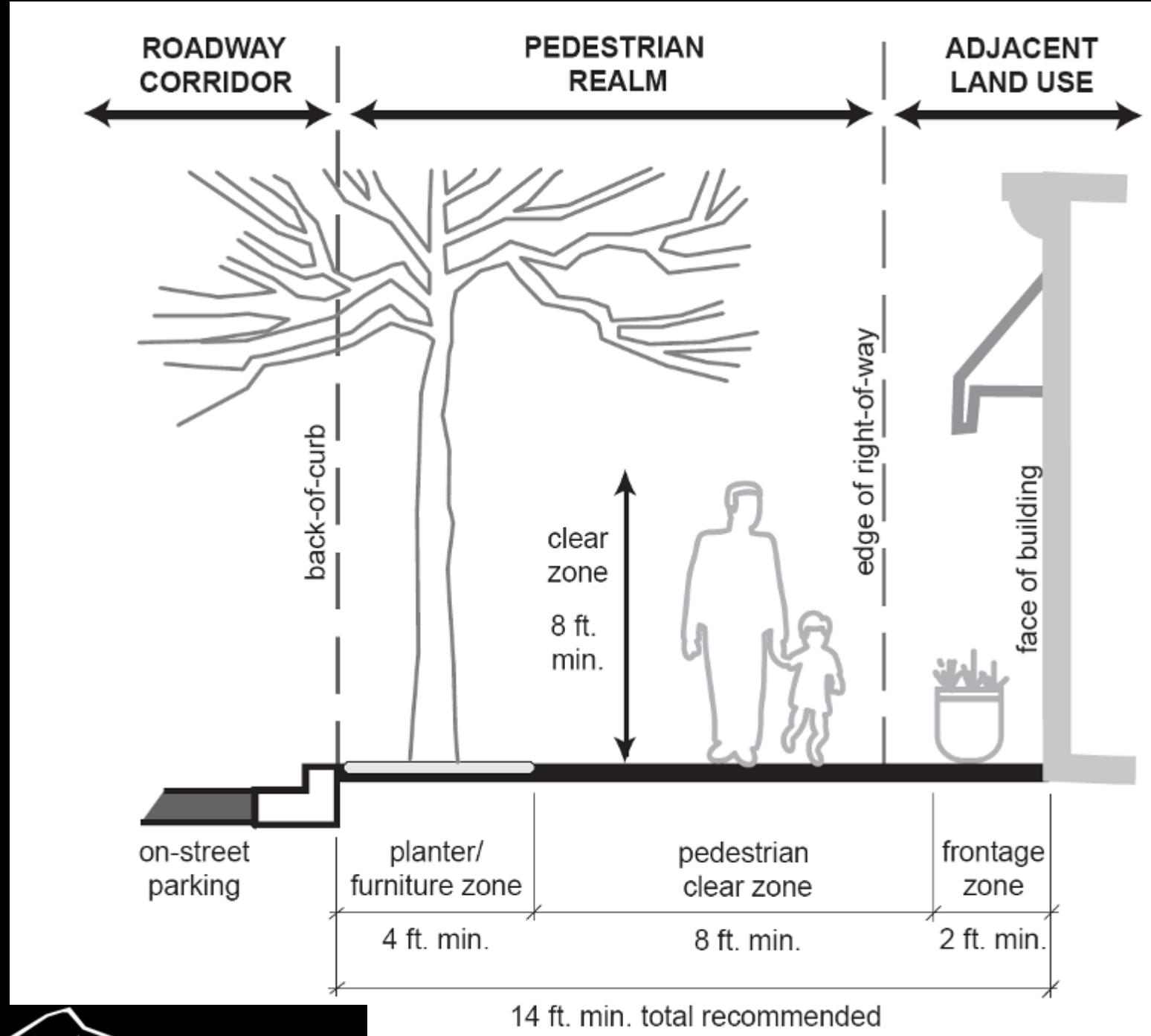

SPEED
LIMIT
45

Redmond, WA

St. Louis region


ROADWAY CORRIDOR
1
PEDESTRIAN REALM
2
ADJACENT LAND USE
3
back-of-curb
edge of R.O.W.
face of building
Charlier Associates, Inc.




ROADWAY CORRIDOR
PEDESTRIAN REALM
ADJACENT LAND USE
back-of-curb
clear zone
8 ft. min.
edge of right-of-way
face of building
on-street parking
planter/ furniture zone
pedestrian clear zone
frontage zone
4 ft. min.
8 ft. min.
2 ft. min.
14 ft. min. total recommended

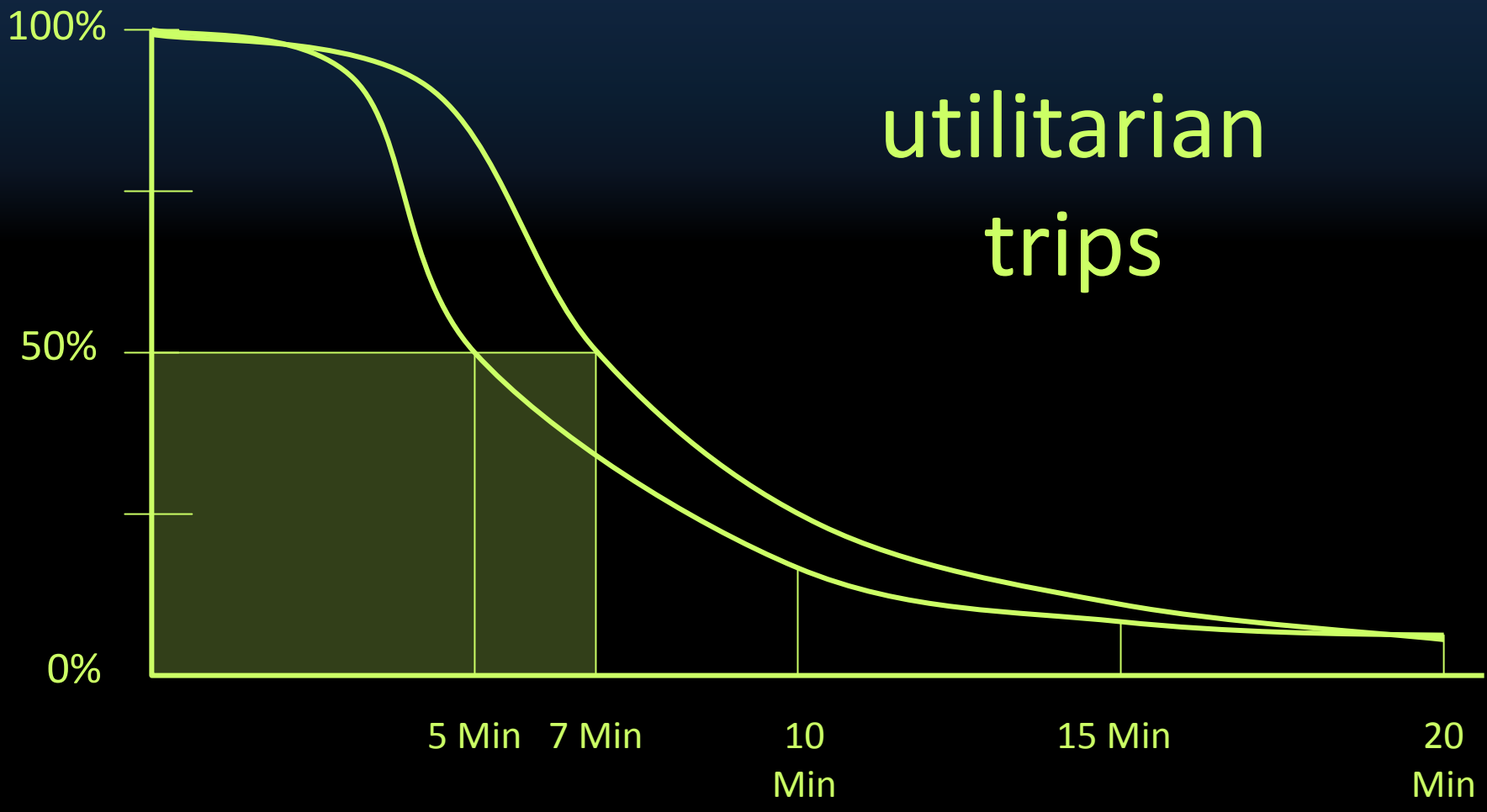
4 essentials: elder mobility

- land use mix
- pedestrian supportive environment
- connected street network
- high frequency transit service

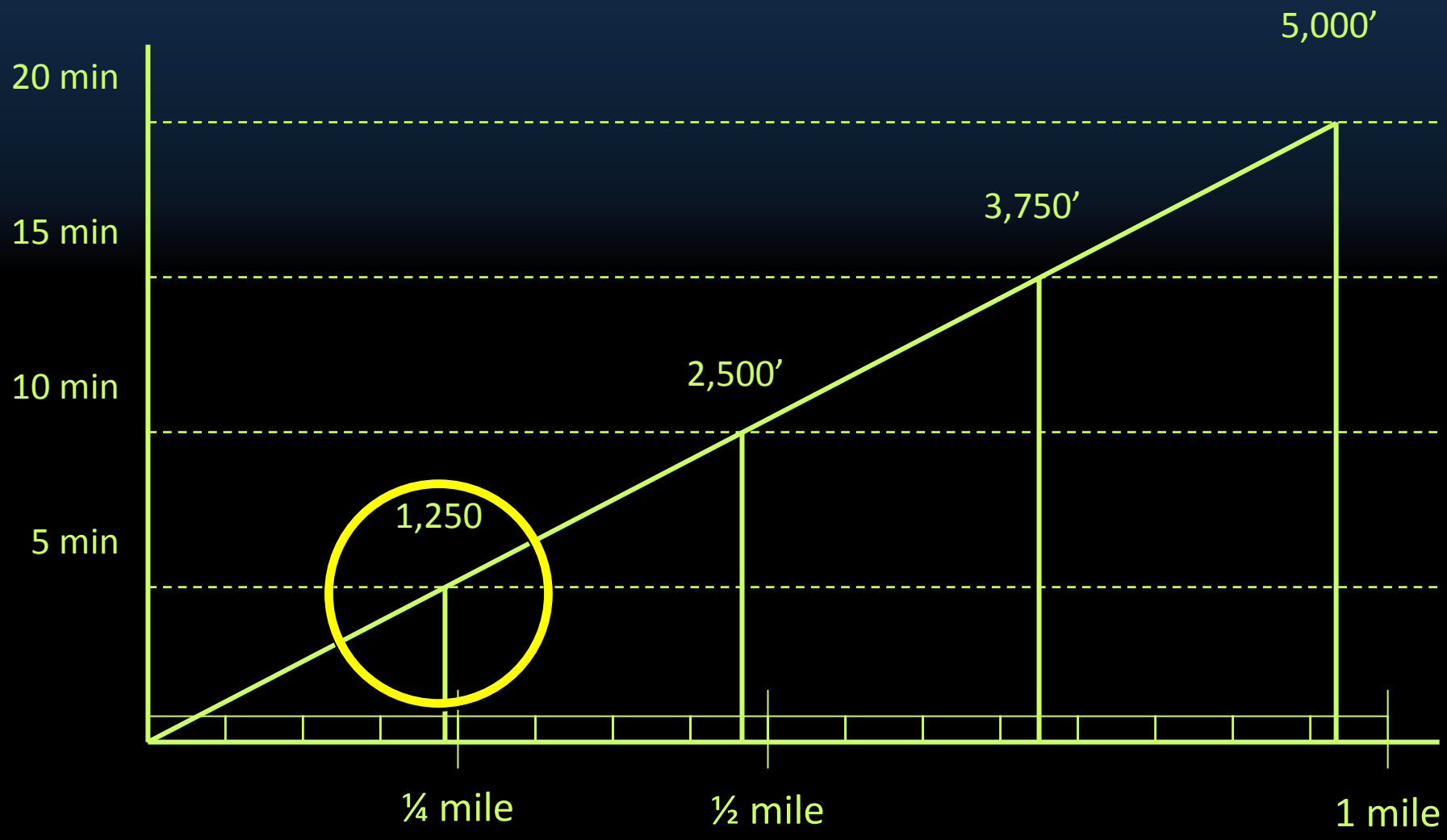
Windsor, CO – Old Town

Windsor, CO – after 1990

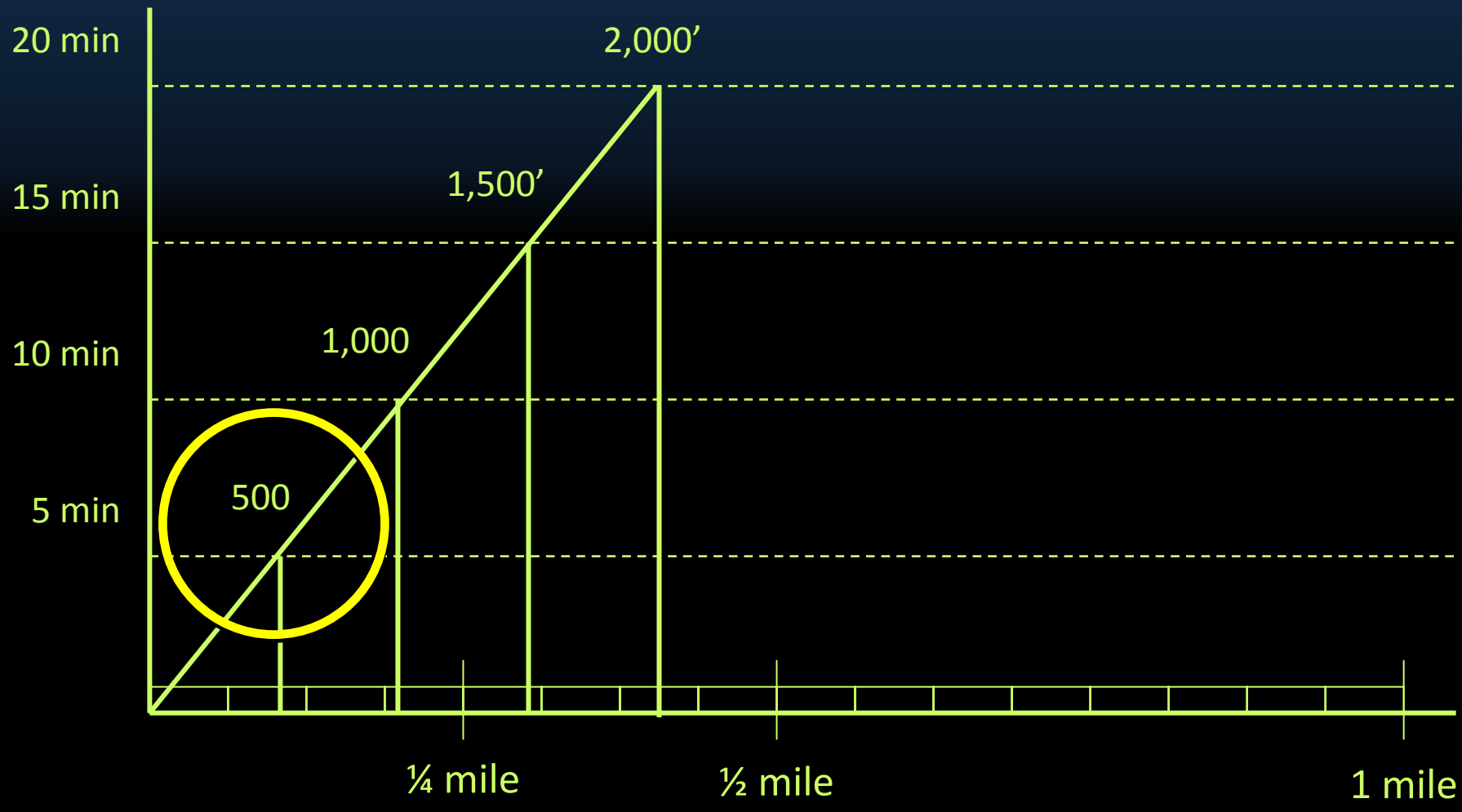
walk propensity



walk distances @ 250 fpm



walk distances @ 100 fpm



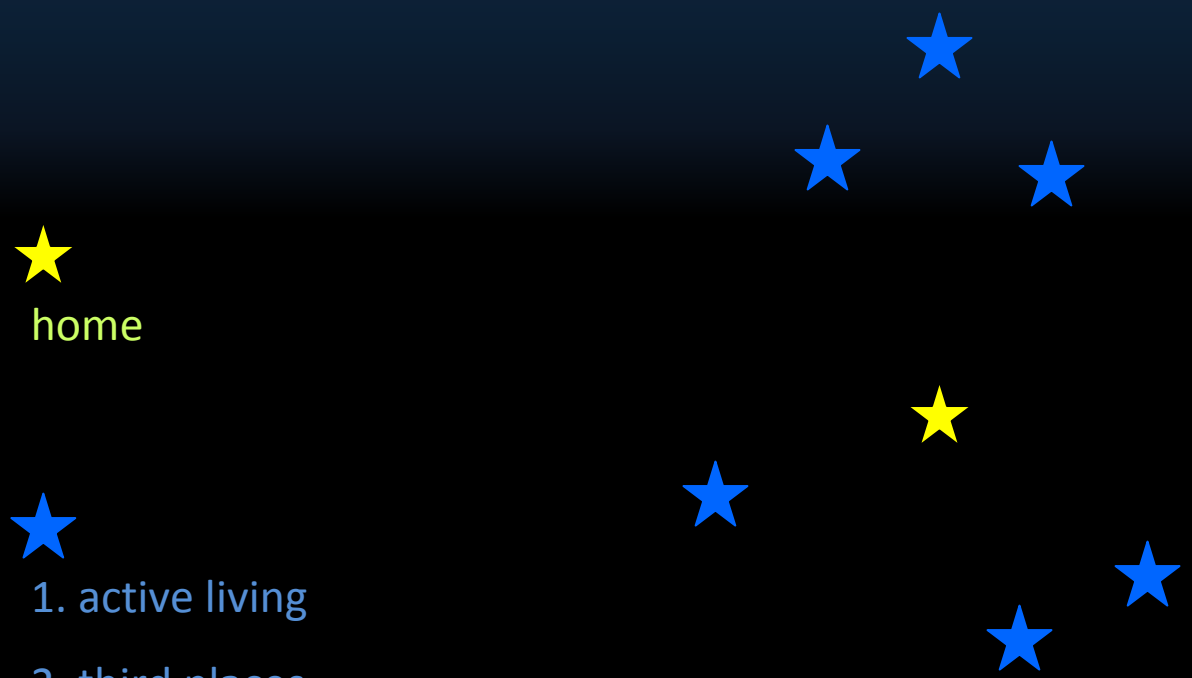
path index

shortest feasible route on streets & trails

straight line distance (as the crow flies)


2100 feet
500 feet
Path Index: 4.2

5 – 7 minute walk

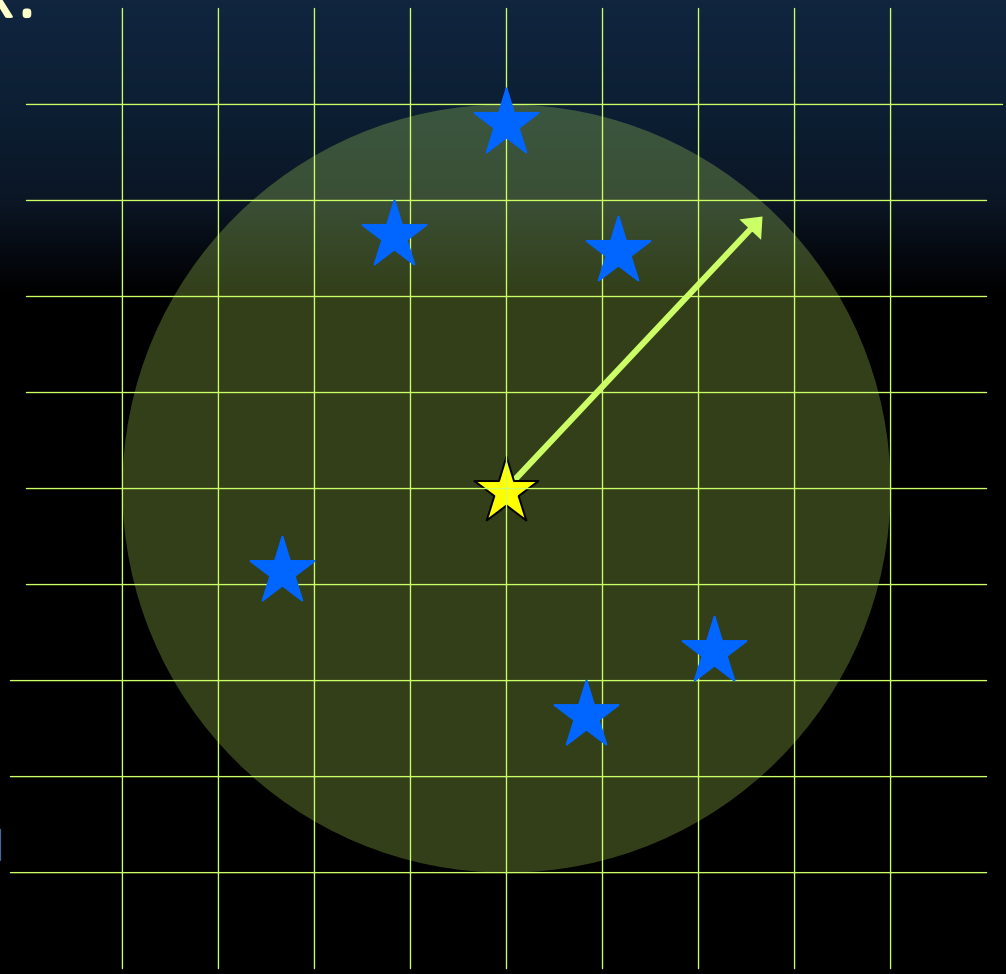


home

1. active living
2. third places
3. convenience retail

5 – 7 minute walk

path index:
1.4



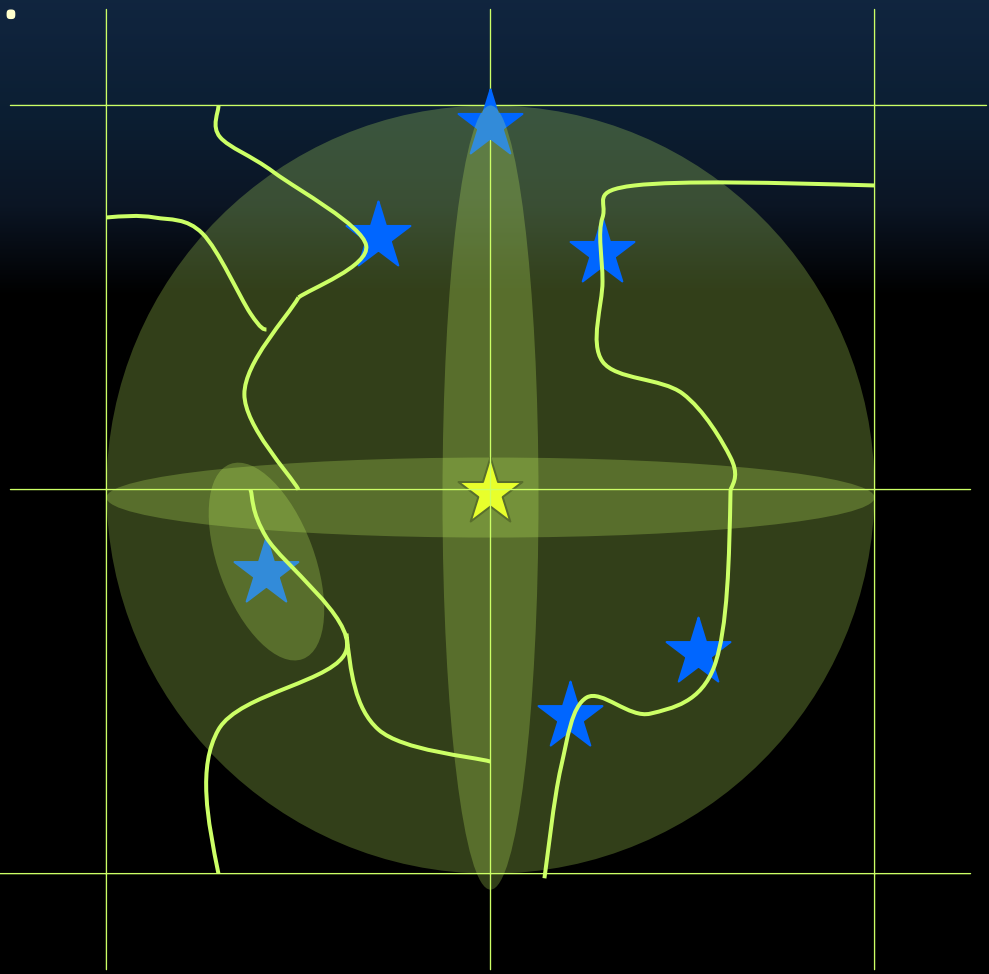
home

1. active living
2. third places
3. convenience retail

¼ mile

5 – 7 minute walk

path index:
4.5

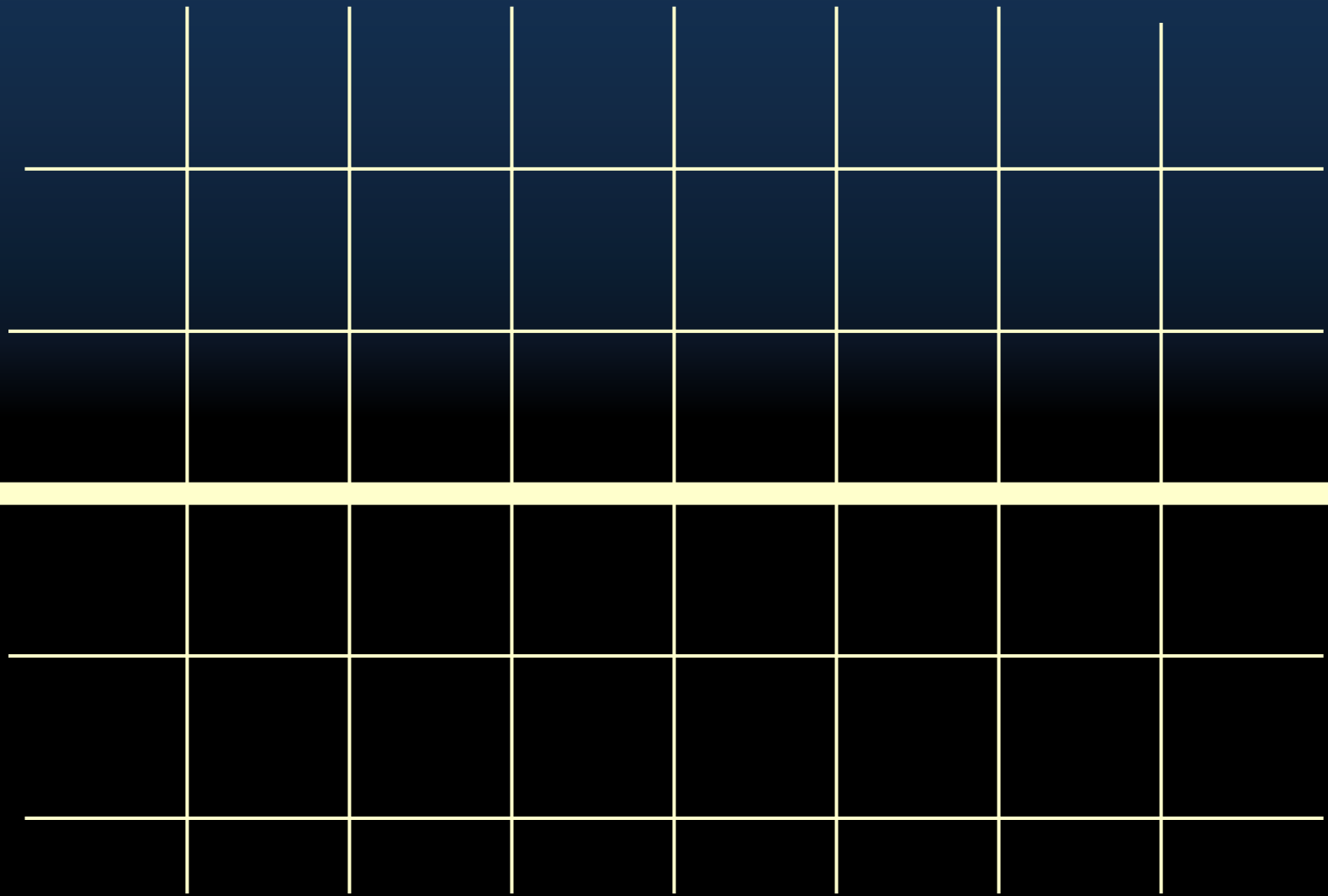


home

1. active living
2. third places
3. convenience retail

good connectivity expands the range of walking trips, increasing pedestrian activity

optimum block size for efficient traffic flow



330’ to 528’

common connectivity standards

- intersections/square mile (min 200)
- maximum block perimeter (1400’ – 1800’)
- block length (330’ – 528’)
- links/nodes

4 essentials: elder mobility

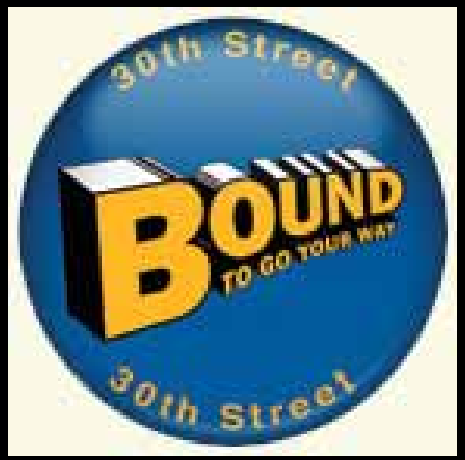
- land use mix
- pedestrian supportive environment
- connected street network
- high frequency transit service

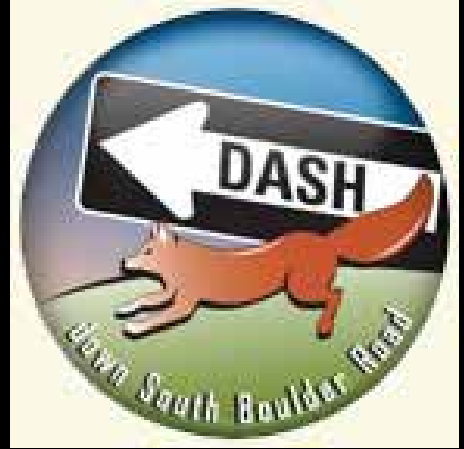
high frequency transit networks

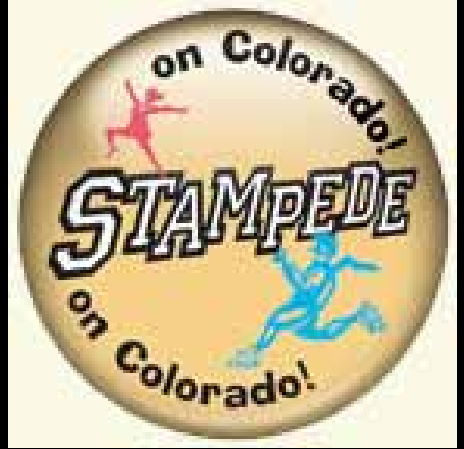
- peak service < 15 minute headways
- network of routes
- accessible vehicles
- easy access to stops and stations

boulder community transit network

community transit network

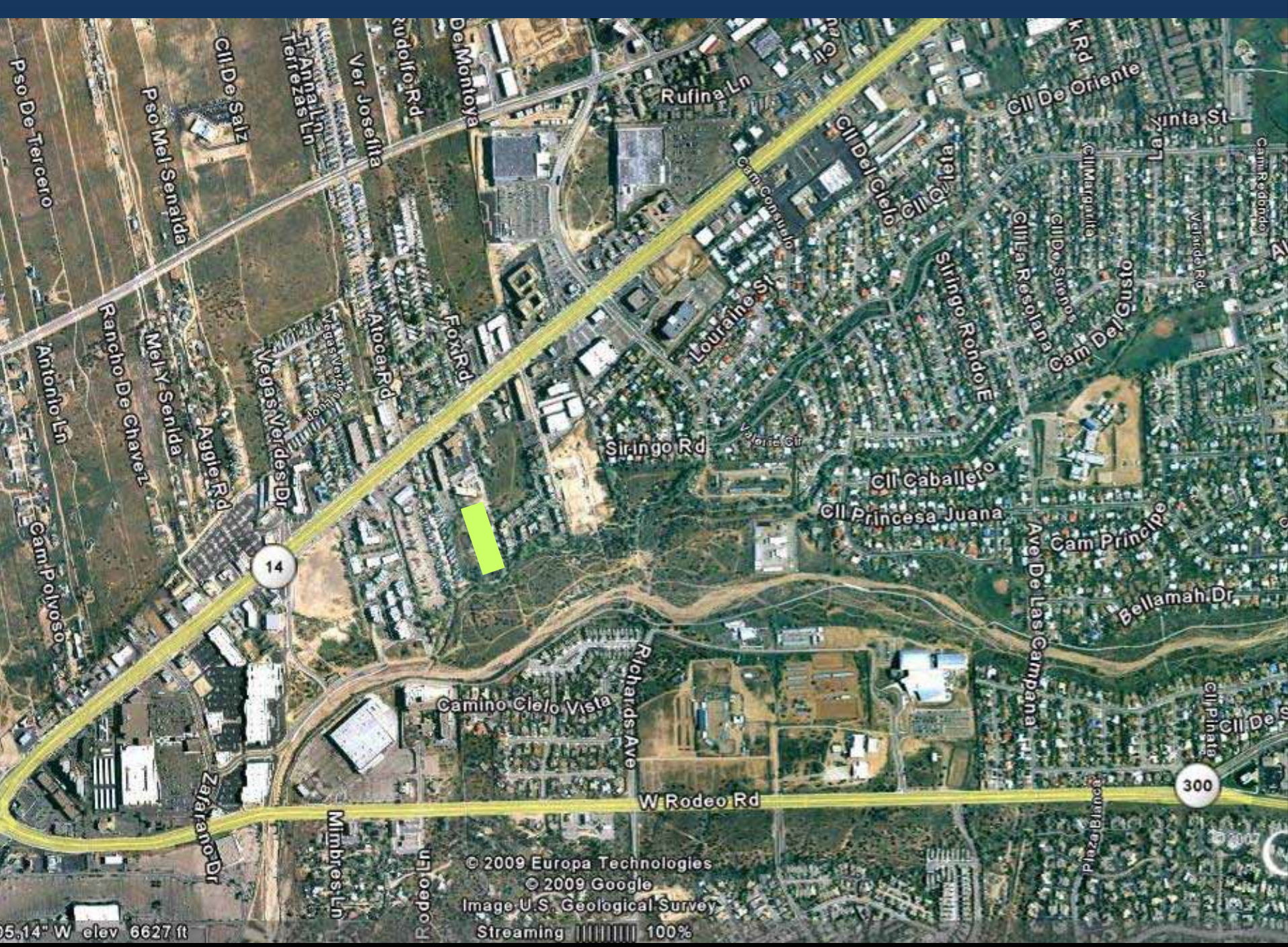






Portland, Oregon

example: Santa Fe “Elder Grace”


Pso De Tercero
Cll De Salz
Pso Mel Senalda
Ver Josefita
Rudolfo Rd
De Montoya
Rufina Ln
Cll De Oriente
Cll Del Cielo
Cam Consuelo
Lourdes St
Cll La Resolana
Cll Margarita
Cll De Suenos
Cam Del Gusto
Valverde Rd
Cam Redondo
Antonio Ln
Rancho De Chavez
Mel-Y-Senalda
Aggie Rd
Vegas Verdes Dr
Alpca Rd
Fox Rd
Siringo Rondo E
Siringo Rd
Valerie Cir
Cll Caballero
Cll Princesa Juana
Cam Principe
Ave De Las Campana
Bellamah Dr
Cam Polvoso
14
Richards Ave
Camino Cielo Vista
Cll Pinata
300
W Rodeo Rd
Zarate Dr
Mimbres Ln
Rodeo Ln
© 2009 Europa Technologies
© 2009 Google
Image U.S. Geological Survey
Streaming 100%
05.14" W elev 6627 ft

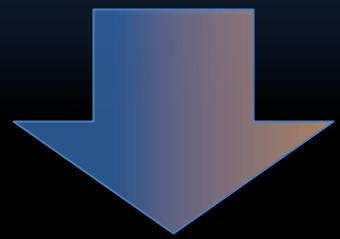

Cerrillos Rd
© 2009 Europa Technologies
© 2009 Google
Image U.S. Geological Survey
Streaming 100%
00'17.09" W elev 6630 ft


© 2009 Google

mobility criteria: ElderGrace

- mixed use development pattern – limited
- pedestrian supportive environment - no
- connected networks – no
- high frequency transit network - no

elder mobility



“universal mobility”

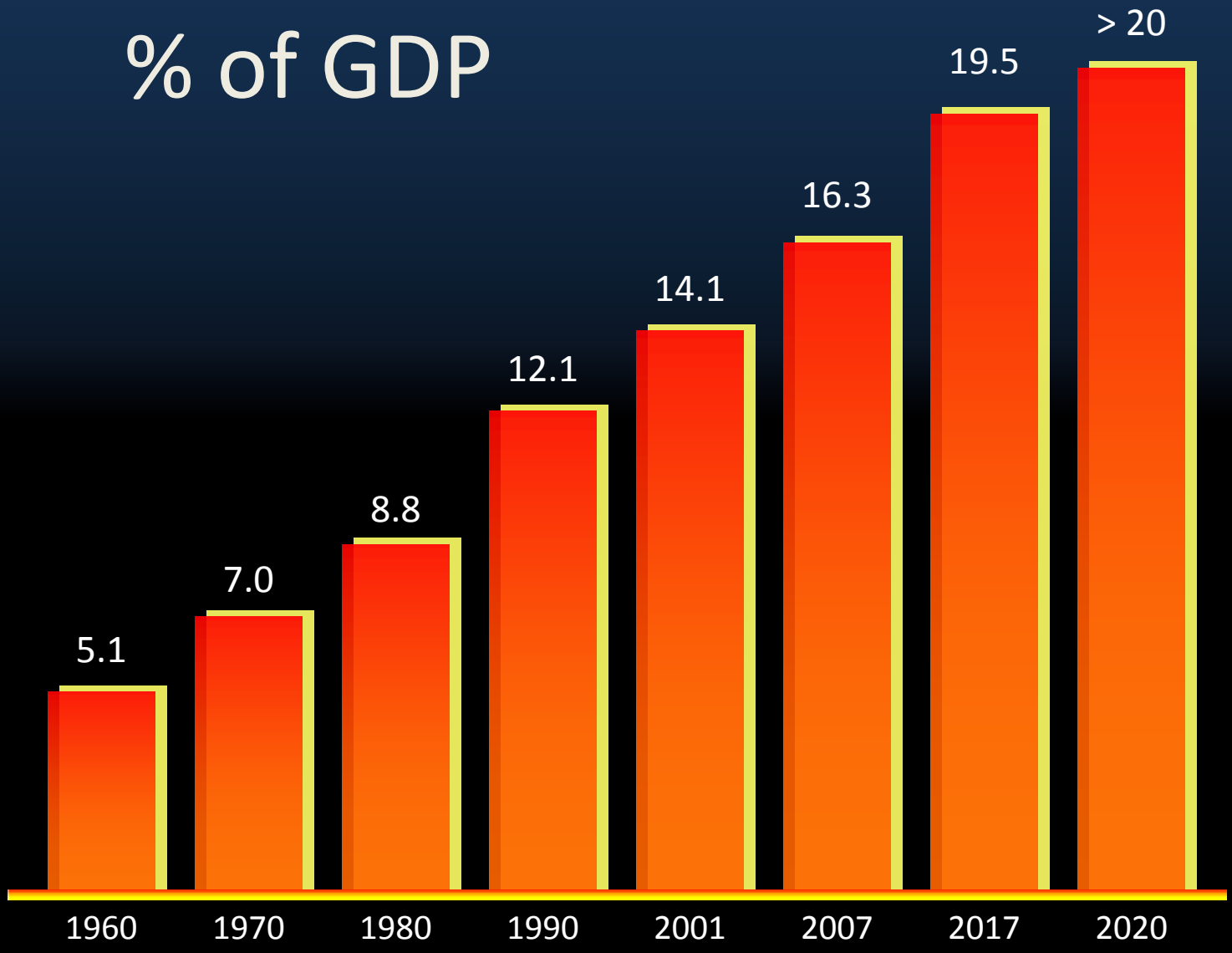
Wrap Up

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 an important political issue.

2

Transportation & Public Health

Transportation & Public Health

Traffic Safety + Personal Health

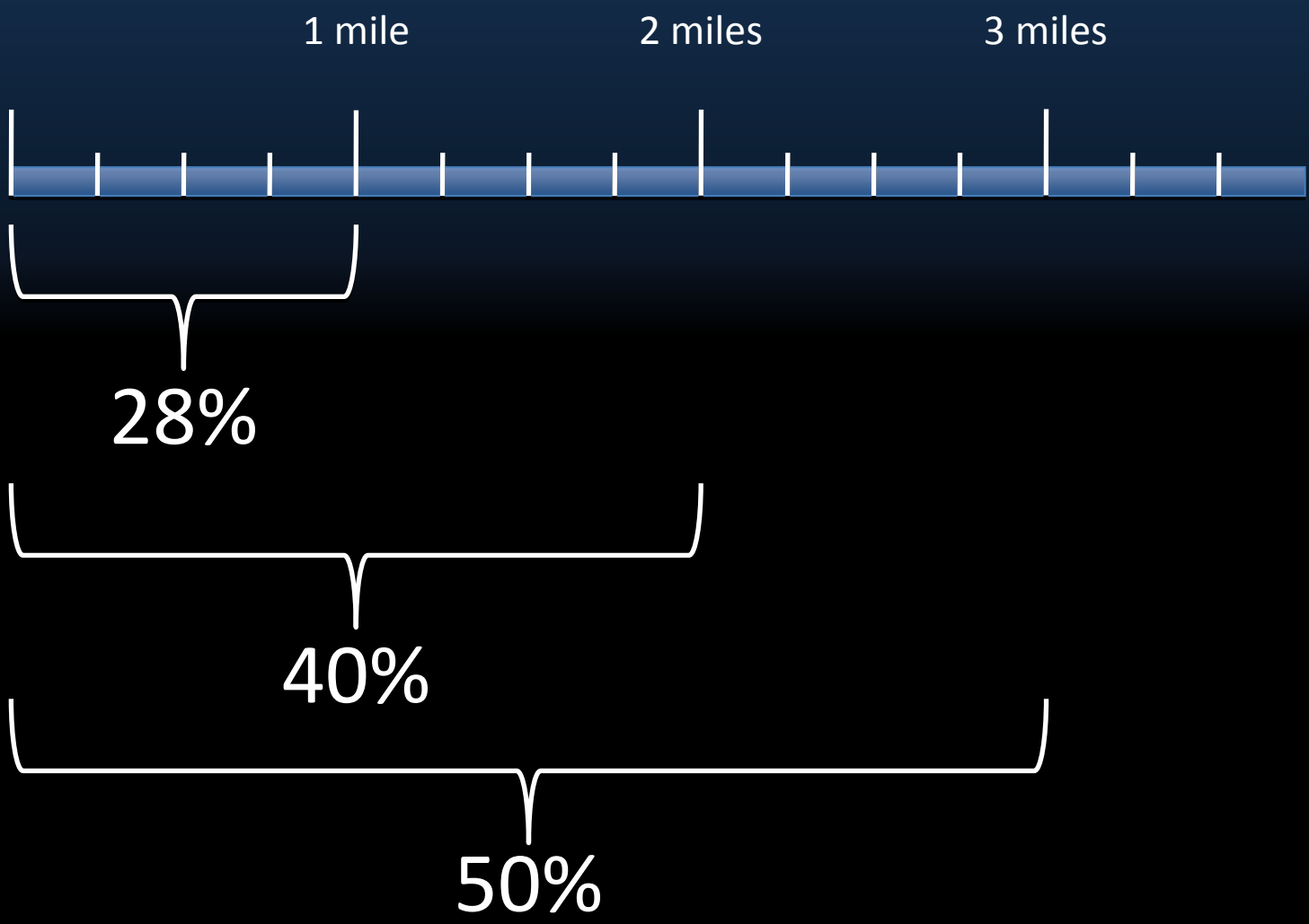
BOTTOM LINE:

Transportation planning & design are major determinants of public health.

3

Community Design

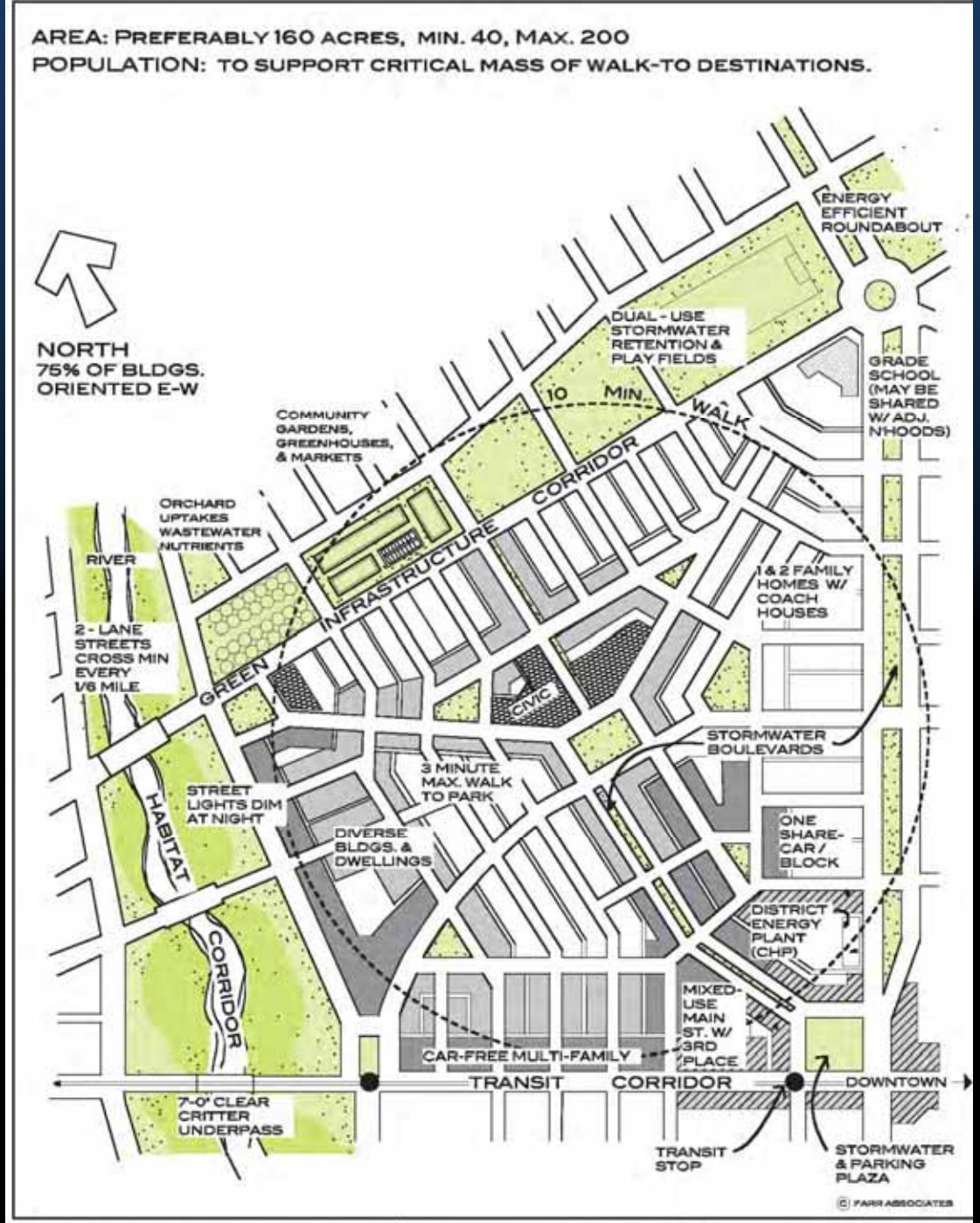
Trip Length – All Trips



(2009 NHTS)

the complete neighborhood

- walkable
- mixed-use
- transit-served



Graphic: Doug Farr, Sustainable Urbanism

BOTTOM LINE

Most trips are short and most travel is discretionary.


MARCELLA MANOR

Thank You

www.charlier.org