1

Public Health

Photo: Dan Burden
US Health Care % of GDP

Year | % of GDP
--- | ---
1960 | 5.1
1970 | 7.0
1980 | 8.8
1990 | 12.1
2001 | 14.1
2007 | 16.3
2017 | 19.5
2020 | > 20
2008 | 9.5

transportation
Annual Health Care Costs/Capita

Germany $2,983
Australia $2,886
Denmark $2,743
France $3,048
Ireland $2,455
Japan $2,249
Sweden $2,745
Switzerland $3,847
United Kingdom $2,317
Canada $2,998
United States $5,711

Source: Kaiser Family Foundation, Visual Economics, 2010
<table>
<thead>
<tr>
<th>Country</th>
<th>Average Life Expectancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>82.1</td>
</tr>
<tr>
<td>Germany</td>
<td>79.0</td>
</tr>
<tr>
<td>Switzerland</td>
<td>81.3</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>79.0</td>
</tr>
<tr>
<td>United States</td>
<td>77.0</td>
</tr>
</tbody>
</table>

Source: Kaiser Family Foundation, Visual Economics, 2010
Scale – United States Economy

($ Billions/Year)

- Cost of obesity: $147
- Cost of traffic air pollution: $80
- Cost of traffic accidents: $180
Scale – United States Economy

Transportation impact on public health: $407

Public sector transportation expenditures: $199

($ Billions/Year)
Obesity
1985 Obesity Trends Among U.S. Adults

No Data <10% 10%-14%
Obesity Epidemic

- Significant differences between states
- Significant differences between local places
Health Indicators – Adult Obesity

**ARIZONA**
- Coconino: 22%
- Maricopa: 23%
- Pima: 21%
- Pinal: 28%

**NEW MEXICO**
- Sandoval: 22%
- San Miguel: 19%
- Santa Fe: 13%
- Torrance: 21%

**CALIFORNIA**
- Calaveras: 23%
- Mendocino: 20%
- San Bernardino: 27%
- San Luis Obispo: 22%

**COLORADO**
- Adams: 24%
- Fremont: 20%
- Larimer: 17%
- Mesa: 20%
Health Indicators – Poor or Fair Health

**ARIZONA**
- Coconino: 11%
- Maricopa: 15%
- Pima: 14%
- Pinal: 17%

**NEW MEXICO**
- Sandoval: 15%
- San Miguel: 24%
- Santa Fe: 13%
- Torrance: 23%

**CALIFORNIA**
- Calaveras: 23%
- Mendocino: 20%
- San Bernardino: 27%
- San Luis Obispo: 22%

**COLORADO**
- Adams: 18%
- Fremont: 15%
- Larimer: 10%
- Mesa: 12%
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

- 1980:
  - 18–44 years: 41%
  - 45–64 years: 20%
  - Under 18 years: 28%
  - 75 years and over: 7%

- 2007:
  - 18–44 years: 38%
  - 45–64 years: 25%
  - Under 18 years: 6%
  - 75 years and over: 6%

- 2050 (Projected):
  - 18–44 years: 34%
  - 45–64 years: 22%
  - Under 18 years: 9%
  - 75 years and over: 11%
Public health is of critical importance to the US economy and will continue to be an important political issue.
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
US Traffic Fatality Rate/HMVM

(hundred million vehicle miles)

Source: NHTSA, FHWA
US Traffic Fatality Rate/HMVM
(hundred million vehicle miles)

Source: NHTSA, FHWA
US Traffic Fatality Rate/HMVM

(hundred million vehicle miles)

AIR BAGS
- Ford – 1971
- Chevy – 1973
- Federal Req/Driver – 1989
- Federal Req/Pass - 1998

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

- Motor vehicle accidents: 31%
- Drowning: 27%
- Fires & burns: 14%
- Falls: 2%
- Suffocation: 8%
- Poisoning: 2%
- Other injuries: 15%

Source: CDC National Vital Statistics System, 2000 - 2005
Traffic accidents are the leading cause of unintentional injury death in children age 5 – 9.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor vehicle accidents</td>
<td>53%</td>
</tr>
<tr>
<td>Drowning</td>
<td>13%</td>
</tr>
<tr>
<td>Fires &amp; burns</td>
<td>13%</td>
</tr>
<tr>
<td>Falls</td>
<td>1%</td>
</tr>
<tr>
<td>Suffocation</td>
<td>4%</td>
</tr>
<tr>
<td>Poisoning</td>
<td>1%</td>
</tr>
<tr>
<td>Other injuries</td>
<td>15%</td>
</tr>
</tbody>
</table>

Source: CDC National Vital Statistics System, 2000 - 2005
Traffic accidents are the leading cause of unintentional injury death in children age 10 – 14

- Motor vehicle accidents: 58%
- Drowning: 10%
- Fires & burns: 6%
- Falls: 2%
- Suffocation: 4%
- Poisoning: 2%
- Other injuries: 18%

Source: CDC National Vital Statistics System, 2000 - 2005
Traffic accidents are the leading cause of unintentional injury death in children age 15 – 19.

- Motor vehicle accidents: 76%
- Drowning: 5%
- Fires & burns: 1%
- Falls: 1%
- Suffocation: 4%
- Poisoning: 7%
- Other injuries: 9%

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

- Vehicle Occupants: 64%
- Pedestrians: 15%
- Motorcyclists: 18%
- Bicyclists: 2%
- Other: 1%
US Injury Rate: Pedestrians Hit by Motor Vehicles
(rate/100,000 population)

Source: NHTSA, 2008
US Fatality Rate: Pedestrians Hit by Motor Vehicles
(rate/100,000 population)

Age Group

- < 5: 0.45
- 5 - 9: 0.39
- 10 - 15: 0.59
- 16 - 20: 1.33
- 21 - 24: 1.61
- 25 - 34: 1.42
- 35 - 44: 1.58
- 45 - 54: 1.97
- 55 - 64: 1.62
- 65 - 74: 1.79
- 75 - 85: 2.28
- 85+: 2.55

Source: NHTSA, 2008
pedestrian survival rates & vehicle speed

20mph: 95% survive, 5% die
30mph: 55% survive, 45% die
40mph: 15% survive, 85% die
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

- Traffic Volume
- Traffic Conflicts
- Traffic Speed
- Crash Frequency
- Crash Severity

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
Street/Urban Design

Mid-Block Crashes/100 MVMT

<table>
<thead>
<tr>
<th>Category</th>
<th>&quot;Livable&quot; Section</th>
<th>Comparison Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>95</td>
<td>102</td>
</tr>
<tr>
<td>Injury</td>
<td>54</td>
<td>69</td>
</tr>
<tr>
<td>Fatality</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Lanes</th>
<th>Bar Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 lane</td>
<td>110</td>
</tr>
<tr>
<td>3 lane TWLTL</td>
<td>180</td>
</tr>
<tr>
<td>4 lane undivided</td>
<td>230</td>
</tr>
</tbody>
</table>

Commercial Land Uses

<table>
<thead>
<tr>
<th>Lanes</th>
<th>Bar Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 lane</td>
<td>270</td>
</tr>
<tr>
<td>3 lane TWLTL</td>
<td>210</td>
</tr>
<tr>
<td>4 lane undivided</td>
<td>260</td>
</tr>
</tbody>
</table>

Source: Hummer and Lewis, FHWA/NC/2000-003, NCSU
Accident Rates + Access Management

<table>
<thead>
<tr>
<th>Intersections/Corridor Mile</th>
<th>Undivided</th>
<th>TWLTL</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20</td>
<td>3.8</td>
<td>3.4</td>
<td>2.9</td>
</tr>
<tr>
<td>20 – 40</td>
<td>7.3</td>
<td>5.9</td>
<td>5.1</td>
</tr>
<tr>
<td>40 – 60</td>
<td>9.4</td>
<td>7.9</td>
<td>6.8</td>
</tr>
<tr>
<td>&gt; 60</td>
<td>10.6</td>
<td>9.2</td>
<td>8.2</td>
</tr>
</tbody>
</table>

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”
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

Driving is a risk factor for obesity

Lopez-Zetina, Health and Place, 2006
### States with the Highest Rates of Physical Inactivity

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

*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”


“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

<table>
<thead>
<tr>
<th>MAJOR SOURCES</th>
<th>HEALTH EFFECTS</th>
<th>ENVIRONMENTAL EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SO₂</strong></td>
<td>Industry</td>
<td>Precursor to acid rain, which damages lakes, rivers, and trees; damage to cultural relics</td>
</tr>
<tr>
<td><strong>NOₓ</strong></td>
<td>Vehicles; industry</td>
<td>Nitrogen deposition leading to over-fertilization and eutrophication</td>
</tr>
<tr>
<td><strong>PM</strong></td>
<td>Vehicles; industry</td>
<td>Visibility</td>
</tr>
<tr>
<td><strong>CO</strong></td>
<td>Vehicles</td>
<td>Headaches and fatigue, especially in people with weak cardiovascular health</td>
</tr>
<tr>
<td><strong>Lead</strong></td>
<td>Vehicles (burning leaded gasoline)</td>
<td>Accumulates in bloodstream over time; damages nervous system</td>
</tr>
<tr>
<td><strong>Ozone</strong></td>
<td>Formed from reaction of NOₓ and VOCs</td>
<td>Respiratory illness</td>
</tr>
<tr>
<td><strong>VOCs</strong></td>
<td>Vehicles; industrial processes</td>
<td>Reduced crop production and forest growth; smog precursor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Smog precursor</td>
</tr>
</tbody>
</table>
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.
Community Design
Population & VMT

United States

<table>
<thead>
<tr>
<th>Year</th>
<th>Pop. (millions)</th>
<th>VMT (trillions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1955</td>
<td>166</td>
<td>0.6</td>
</tr>
<tr>
<td>1980</td>
<td>227</td>
<td>1.5</td>
</tr>
<tr>
<td>2005</td>
<td>296</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Population increased by 178% from 1955 to 2005.
VMT increased by 500% from 1955 to 2005.
United States
Annual Rate of Change in VMT

June – July
1975-1985 3.35%
1985-1995 3.59%
1995-2005 2.39%
2005-2006 0.06%
2006-2007 0.03%
2007-2008 2.80%
2008-2009 0%
Daily Per Capita Travel

- Family/Personal: 43%
- Social/Recreational: 27%
- Church/School: 10%
- Commuting: 16%
- Other: 4%

Source: 2001 NHTS
Daily Miles of Travel Per Capita

Commute Trips
- 1977: 5.2
- 1983: 5.0
- 1990: 6.5
- 1995: 8.7
- 2001: 7.7
Increase: +2.5

Discretionary Trips
- 1977: 20.8
- 1983: 20.1
- 1990: 28.4
- 1995: 30.0
- 2001: 32.6
Increase: +11.8

(NHTS)
Average Trip Lengths

<table>
<thead>
<tr>
<th>Mode</th>
<th>Average Trip Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walk</td>
<td>0.73</td>
</tr>
<tr>
<td>Bicycle</td>
<td>2.13</td>
</tr>
<tr>
<td>Streetcar</td>
<td>5.41</td>
</tr>
<tr>
<td>Local Bus</td>
<td>6.44</td>
</tr>
<tr>
<td>Auto</td>
<td>10.29</td>
</tr>
</tbody>
</table>

(2009 NHTS)
Trip Length – All Trips

1 mile: 28%
2 miles: 40%
3 miles: 50%

(2009 NHTS)
Trip Length – Driving Trips

1 mile: 20%
2 miles: 33%
3 miles: 43%

(2009 NHTS)
Spatial Relationships

- Home
- Neighborhood
- Community
- Region
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
Most trips are short and most travel is discretionary.
Example: Senior Mobility
aging of the US population

% over 65

2010: 13%
2020: 16%
2030: 19%
2040: 20%

% over 50

2010: 32%
2020: 35%
2030: 36%
2040: 37%

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

<table>
<thead>
<tr>
<th>Location</th>
<th>Housing</th>
<th>Transportation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central city</td>
<td>23%</td>
<td>16%</td>
<td>39%</td>
</tr>
<tr>
<td>Near jobs</td>
<td>26%</td>
<td>23%</td>
<td>49%</td>
</tr>
<tr>
<td>Away from jobs</td>
<td>25%</td>
<td>26%</td>
<td>51%</td>
</tr>
</tbody>
</table>

Source: A Heavy Load, Center for Neighborhood Technology
Family income is $20,000 - $35,000

% of family income spent on:

- Housing: 32%, 35%, 33%
- Transportation: 22%, 31%, 37%

In the central city, 32% of family income is spent on housing and 22% on transportation, totaling 54%.

Near jobs, 35% is spent on housing and 31% on transportation, totaling 66%.

Away from jobs, 33% is spent on housing and 37% on transportation, totaling 70%.

Source: A Heavy Load, Center for Neighborhood Technology
Available for:
- food
- health care
- education
- consumer expenditures
- recreation
- savings

Needed for:
- housing
- transportation
Retirement Preferences

- Urban: 51%
- Suburban: 19%
- Rural: 30%

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

- Supportive community features & services
- Suitable home
- Adequate mobility options

Features & services may include: suitable home, supportive community features & services, adequate mobility options.
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
<table>
<thead>
<tr>
<th>Supportive Community Features &amp; Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. active living</td>
</tr>
<tr>
<td>2. third places</td>
</tr>
<tr>
<td>3. convenience retail</td>
</tr>
<tr>
<td>4. provisions &amp; services</td>
</tr>
<tr>
<td>5. family</td>
</tr>
<tr>
<td>6. shopping</td>
</tr>
<tr>
<td>7. medical</td>
</tr>
<tr>
<td>8. cultural</td>
</tr>
</tbody>
</table>
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
<table>
<thead>
<tr>
<th>destinations</th>
<th>daily</th>
<th>weekly</th>
<th>monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. active living</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. third places</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. convenience</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. provisions</td>
<td></td>
<td>X</td>
<td></td>
</tr>
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<td>5. family</td>
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</tr>
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<td>8. cultural</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
## Destinations

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<th></th>
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<th>Weekly</th>
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</tr>
<tr>
<td>8. cultural</td>
<td></td>
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</table>

*should be within walking distance*
## Destinations

<table>
<thead>
<tr>
<th></th>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
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</thead>
<tbody>
<tr>
<td>1. Active living</td>
<td>X</td>
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<td></td>
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<tr>
<td>2. Third places</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Convenience</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>4. Provisions</td>
<td></td>
<td>X</td>
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<tr>
<td>5. Family</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>6. Shopping</td>
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<td>X</td>
<td></td>
</tr>
<tr>
<td>7. Medical</td>
<td></td>
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<td>X</td>
</tr>
<tr>
<td>8. Cultural</td>
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<td></td>
<td>X</td>
</tr>
</tbody>
</table>

- Accessible by walking and fixed route transit
neighborhood completeness
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
St. Louis region
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

utilitarian trips

- 100% at 5 Min
- 50% at 7 Min
- 0% at 10 Min
- 0% at 15 Min
- 0% at 20 Min
walk distances @ 250 fpm

- 5,000’ in 20 min
- 3,750’ in 15 min
- 2,500’ in 10 min
- 1,250’ in 5 min

- 1 mile in 15 min
- ½ mile in 10 min
- ¼ mile in 5 min
walk distances @ 100 fpm

- 500 feet in 5 minutes
- 1,000 feet in 10 minutes
- 1,500 feet in 15 minutes
- 2,000 feet in 20 minutes
path index

shortest feasible route on streets & trails

straight line distance (as the crow flies)
5 – 7 minute walk

- Home
- Active living
- Third places
- Convenience retail
5 – 7 minute walk

path index: 1.4

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

home

¼ mile
5 – 7 minute walk

path index: 4.5

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

home
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”
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
Public Health
US Health Care
% of GDP

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<td>7.0</td>
<td>8.8</td>
<td>12.1</td>
<td>14.1</td>
<td>16.3</td>
<td>19.5</td>
<td>&gt; 20</td>
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</tbody>
</table>
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
Transportation planning & design are major determinants of public health.
3

Community Design
Trip Length – All Trips

- 1 mile: 28%
- 2 miles: 40%
- 3 miles: 50%

(2009 NHTS)
the complete neighborhood

- walkable
- mixed-use
- transit-served

Graphic: Doug Farr, Sustainable Urbanism
Most trips are short and most travel is discretionary.
Thank You

www.charlier.org