Overview

- Trends in Motorization and Car Use
- Unsustainable Urban Transport
- Urban Travel and Public Health
  - Safety
  - Air Quality
  - Physical Activity
- Policies and barriers to increase sustainable transport and improve public health

=> International comparison Western Europe and USA
Increasing Motorization in Western Countries, 1970-2008

Cycling, Walking, and Public Transport Share of Trips in Europe and USA

Source: Data collected by author from recent national travel surveys.
Select Indicators for Unsustainable Urban Transport

- CO$_2$ emissions and energy use
- Household expenditures
- Government expenditures
- Loss of environmental lands
- Loss of public space
- Traffic congestion
- Public health

- There are many synergies between making transport more sustainable and promoting public health
Sustainability 1: Walking, Cycling, and Public Transport are Related to Lower CO₂ Emissions per Capita

Demonstration on main street of Muenster how much space cars take compared to buses or bikes to transport the same number of people

Source: City of Muenster
Three Key Connections Between Sustainable Transport and Public Health

- Safety
- Air-quality
- Physical activity

⇒ *Equity cross-cutting issue*

Safety (traffic injuries and fatalities)

- Global problem
  - Worse in low and middle income countries than in high income countries
  - USA about 32,000 fatalities per year
  - USA improvement slower than in other countries
    - e.g. U.S. death rate per 100,000 population declined from 26 in 1970 to 10.4 in 2011, other OECD countries from ~25 to <5)

- Risk varies by mode of travel and population sub-group

Roadway Fatalities per 100,000 Population

Source: IRTAD, 2013. [Link to report]
Cyclist and Pedestrian Fatality and Injury Rates, 2007-2010

Trends in Cyclist Fatalities, 1970-2008

Trends in Pedestrian Fatalities, 1970-2008

‘Safety in Numbers’ Over Time

Speed Matters

Figure 1.1 Probability of fatal injury for a pedestrian colliding with a vehicle

Sources: World Health Organization (2008) and OECD Transport Research Centre (2006)
Air Quality

- Criteria pollutants regulated by EPA
  - Carbon Monoxide, Nitrogenoxide, Ozone, Particulate Matter, Sulphurdioxide, Lead
  - Exposure and risk varies by population sub-group (especially vulnerable: young, old, and poor)
  - Planning for air-quality and regional + state transportation planning are formally connected

- CO₂ emissions (31% from transportation sector in the U.S.)

Sources: Handy, S. 2013. Health and Travel. Springer Science
Physical Activity

- WHO recommends 150 min. of moderate physical activity per week
- Share of adults in ‘low physical activity’ category increases

- Walking and cycling can contribute to daily physical activity
- Help to protect against obesity, diabetes, and various other diseases
- Can improve individual health (and also help to reduce air pollution, carbon emissions, congestion, noise, and traffic dangers)
Obesity Trends* Among U.S. Adults
BRFSS, 1990, 2000, 2010
(*BMI ≥ 30, or about 30 lbs. overweight for 5’4” person)

Source: CDC 2013
Obesity Levels Fall with Increased Walking and Cycling

Share of Workers Commuting by Bicycle or Foot and Self-Reported Obesity Levels in 50 U.S. States and 47 Largest Cities, 2007

Correlations and Regression Equations

<table>
<thead>
<tr>
<th></th>
<th>State</th>
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<tbody>
<tr>
<td>Pearson's correlation</td>
<td>-0.45**</td>
<td>-0.55**</td>
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<td>Regression equation</td>
<td>0.13-0.09log(BW)</td>
<td>0.15-0.07log(BW)</td>
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<td>t-test BW coefficient</td>
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<td>Overall F</td>
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<td>19.44**</td>
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<td>N</td>
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BW= Bicycle + Walk Commute Share
*p<0.01; **p<0.001

Walking, Cycling, and Daily Physical Activity in Germany and the USA

Equity: Adjusted Odds Ratios for Achieving 30+ Minutes Cycling per Day

Equity: Adjusted Odds Ratios for Achieving 30+ Minutes Walking per Day

Active Travel and Physical Activity

- Daily walking and cycling can help a large proportion of the population to meet recommended physical activity levels.
- Active travel is much higher for all socioeconomic groups in Germany than in the U.S.
- Inequitable distribution of active travel in the U.S. suggests the need for targeted policies to increase walking and cycling among seniors, children, and women, in particular.
- Germany’s experience with such measures since the 1970s may help guide U.S. initiatives.

Policies to Increase Sustainability and Improve Public Health

- **Safety:**
  - Roadway design, vehicle design, driver behavior, speed limits

- **Air quality:**
  - Fuel formulation, vehicle technology, speed limits, ‘eco-driving’

- **Active travel:**
  - Land-use policies (keep trip distances short and densities high enough)
  - Infrastructure (bike paths, lanes, traffic calming, sidewalks, crosswalks)
  - Encouragement and events (Safe Routes to School, Ciclovias, etc.)
  - Deterrents to driving (speed limits, parking restrictions, increased cost, etc.)
  - Policy packages that integrate walk, bike, and transit as viable alternatives

- **Overall:**
  - Less driving and more trips by foot, bicycle, and public transport can increase the sustainability of the transport system and promote public health

Sources: Handy 2013; Dill et al. 2013, Buehler et al. 2011
Barriers to Promoting Sustainable Transport and Health in the U.S.

- Land use / spatial development patterns
- History of comparatively low cost of driving and subsidies for car use in the U.S.
- Car as status symbol
- Poor infrastructure for walking and cycling
- Poor traffic safety for walking and cycling
- Transit concentrated in large urban areas and during peak travel times
- Traditional focus on technological change (only some behavior change, such as seat belt laws)
- Poor data availability on walking and cycling
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Thank you!

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