Walking and Cycling for Healthy Cities

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Walking and Bicycling: the *MOST* sustainable transport modes

- **MOST environmentally friendly:**
  > Virtually no pollution at all
  > Almost no nonrenewable resources used

- **MOST equitable:**
  > Financially affordable by virtually everyone
  > Physically possible by all but the severely disabled

- **MOST economical:**
  > Minimal private and public costs
  > Although they take more time, they provide exercise that reduces medical costs and greatly extends our healthy life expectancy
WALKING AND CYCLING ARE HEALTHY!

• GREAT source of physical activity:
  • Both for daily travel and for recreation
  • Cheaper, easier, and more dependable than formal exercise routines
  • Can be integrated into daily lifestyle to achieve practical travel needs
Crucial importance of regular physical exercise:

- Obviously, the daily physical exercise of walking and cycling for practical travel helps burn up calories and helps avoid the problems of *overweight and obesity*.

- Moreover:

  “Whether normal-weight, overweight, or obese, physically inactive persons are 2 to 3 times more likely to die prematurely.”

Huge Health Benefits of Even Small Increases in Physical Activity

Obesity Trends* Among U.S. Adults
(*BMI ≥ 30, or about 30 lbs. overweight for 5'4" person)

Source: Behavioral Risk Factor Surveillance System, CDC.
Worsening Obesity Epidemic among American Children and Adolescents, 1963-2002 (% with body mass index of 30+)

SOURCE: CDC/NCHS, NHES and NHANES
Obesity Rate by Country (Body Mass Index $\geq 30$)

(percentage of adults)
Does car dependence make us fat? Obesity falls sharply with increased walking, cycling, and transit use!
Share of Trips by Cycling and Walking

*data for commute only*
Daily Distance Walked and Cycled Per Person

<table>
<thead>
<tr>
<th>Country</th>
<th>Walking</th>
<th>Cycling</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>0.1</td>
<td>0.4</td>
</tr>
<tr>
<td>UK</td>
<td>0.8</td>
<td>0.2</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.9</td>
<td>0.1</td>
</tr>
<tr>
<td>Spain</td>
<td>1.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Greece</td>
<td>1.1</td>
<td>0.2</td>
</tr>
<tr>
<td>France</td>
<td>1.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Ireland</td>
<td>1.0</td>
<td>0.4</td>
</tr>
<tr>
<td>Italy</td>
<td>1.1</td>
<td>0.4</td>
</tr>
<tr>
<td>Austria</td>
<td>1.2</td>
<td>0.5</td>
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<tr>
<td>EU-15 Average</td>
<td>1.1</td>
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<tr>
<td>Sweden</td>
<td>1.1</td>
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<td>Finland</td>
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<td>Belgium</td>
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<tr>
<td>Germany</td>
<td>1.3</td>
<td>1.1</td>
</tr>
<tr>
<td>Denmark</td>
<td>1.1</td>
<td>1.5</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.8</td>
<td>2.4</td>
</tr>
</tbody>
</table>
Lots of Potential for Increased Walking and Cycling in the USA:

Many daily trips in American urban areas are short enough to make by bike!

- 25% of all trips ≤ 1 mile
- 40% of all trips are ≤ 2 miles
Share of Short Trips by Cycling and Walking

Percent of trips by foot and bike:

- **USA**
  - 0<2.5km: 36
  - 2.5km<4.5km: 6
  - 4.5km-6.5km: 2

- **Germany**
  - 0<2.5km: 52
  - 2.5km<5km: 14
  - 5km<10km: 7

- **Denmark**
  - 0<2.5km: 31
  - 2.5km<4.5km: 24
  - 4.5km-6.5km: 18

- **Netherlands**
  - 0<2.5km: 29
  - 2.5km<5km: 35
  - 5<7.5km: 10

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**Legend**

- **Walking**
- **Cycling**
Lots of Potential for Increased Walking and Cycling in the USA:

• Possible at any age, except for very young and very old

• Women as well as men

• Possible for wide range of skills and physical fitness

• Affordable by everyone
Women’s Share of Bike and Walk Trips in Europe and North America

<table>
<thead>
<tr>
<th>Country</th>
<th>Cycling</th>
<th>Walking</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>25%</td>
<td>52%</td>
</tr>
<tr>
<td>UK</td>
<td>27%</td>
<td>53%</td>
</tr>
<tr>
<td>Canada</td>
<td>30%</td>
<td>56%</td>
</tr>
<tr>
<td>Denmark</td>
<td>49%</td>
<td>55%</td>
</tr>
<tr>
<td>Germany</td>
<td>49%</td>
<td>56%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>56%</td>
<td>56%</td>
</tr>
</tbody>
</table>
Cycling can start at a very young age
And we can keep cycling all life long!!!
Mother and kids cycling together in Amsterdam
Parents and kids cycling together in Portland
Make Walking and Cycling Safe for Everyone!

- Especially important for the young, the old, for anyone with disabilities, for the timid or risk-averse
- Women more sensitive to safety than men
- Safety of walking and cycling in the Netherlands, Denmark, and Germany helps explain high levels of walking and cycling there
Cyclist and Pedestrian Fatality and Injury Rates

- Cyclists killed per 100 million km cycled 2008
- Cyclists injured per 10 million cycled 2008
- Pedestrians killed per 100 million km walked
- Pedestrians injured per 10 million km walked

Cyclists killed per 100 million km cycled 2008:
- NL: 1.1
- DK: 1.6
- GER: 4.7
- UK: 5.7
- USA: 33.5

Cyclists injured per 10 million cycled 2008:
- NL: 1.6
- DK: 1.5
- GER: 1.9
- UK: 3.6
- USA: 5.5

Pedestrians killed per 100 million km walked:
- NL: 1.3
- DK: 1.3
- GER: 2.4
- UK: 3.3
- USA: 9.7

Pedestrians injured per 10 million km walked:
- NL: 1.6
- DK: 1.3
- GER: 3.3
- UK: 3.3
- USA: 13.7
Trends in Cyclist Fatalities

Total cyclist fatalities relative to 1970 (=10)

- USA
- UK
- Denmark
- Germany
- Netherlands
Trends in Pedestrian Fatalities

Total pedestrian fatalities relative to 1970 (=10)

- USA
- UK
- Denmark
- Germany
- Netherlands
SAFETY IN NUMBERS

• As levels of cycling increase, injury and fatality rates per trip and per km traveled fall dramatically.

• Thus, if we can increase cycling, it will almost inevitably be safer.
Public Policies **Crucial**

to Increase Cycling

- Pro-car policies in European cities in 1950s and 1960s caused huge decline in cycling
- Dramatic policy turn-around since 1970s to limit car use and promote cycling, walking, and public transport in Dutch, Danish, and German cities
Bridge in Freiburg BEFORE and AFTER reforms
Typical residential street in Freiburg BEFORE traffic calming reforms

Typical residential street in Freiburg AFTER traffic calming reforms
Cathedral Square in Freiburg BEFORE transport and urban planning reforms

Cathedral Square in Freiburg AFTER transport and urban planning reforms
Transformation of German Urban Planning and Transport Policies since 1950s

In 1953, prior to massive car use

Lots of cycling and few cars in city center

Lörrach, Turmstrasse 1953

Source: Archives, City of Lörrach
In 1972, just before urban planning and transport reforms
In 2006, after car-restrictive reforms, return to civility, keeping out cars completely and reserving city center for pedestrians and cyclists.

Lörrach, Turmstrasse 2006
## German Cycling Boom Engineered by Explicit Shifts in Transport Policy in 1970s

<table>
<thead>
<tr>
<th>City</th>
<th>Time Period</th>
<th>Change in Bicycle Modal Split Share</th>
<th>Percentage Increase in Bicycle Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Munich</td>
<td>1976 to 1996</td>
<td>6% to 13%</td>
<td>+117%</td>
</tr>
<tr>
<td>Nuremberg</td>
<td>1976 to 2001</td>
<td>4% to 9%</td>
<td>+125%</td>
</tr>
<tr>
<td>Cologne</td>
<td>1976 to 1998</td>
<td>6% to 12%</td>
<td>+100%</td>
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<tr>
<td>Freiburg</td>
<td>1976 to 1998</td>
<td>12% to 19%</td>
<td>+58%</td>
</tr>
<tr>
<td>Stuttgart</td>
<td>1976 to 2000</td>
<td>2% to 6%</td>
<td>+200%</td>
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<tr>
<td>Bremen</td>
<td>1976 to 1997</td>
<td>16% to 21%</td>
<td>+31%</td>
</tr>
<tr>
<td>Muenster</td>
<td>1976 to 2001</td>
<td>29% to 35%</td>
<td>+21%</td>
</tr>
<tr>
<td>Average for all urban areas in Western Germany</td>
<td>1972 to 2002</td>
<td>8% to 10%</td>
<td>+25%</td>
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</tbody>
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Increase in Bike Share of Trips in Cities Around the World

Increase in Bike Share of Trips in Cities Around the World

Increasing Bicycle Use in Portland

1992: 83 miles of bikeways 2,850 daily trips

2007: 271 miles of bikeways 14,563 daily trips
Decreasing Crash Rate in Portland

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Crashes</th>
<th>Crash Rate</th>
<th>Bridge Bicycle Traffic</th>
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<tbody>
<tr>
<td>1991</td>
<td>100</td>
<td>2,500</td>
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<tr>
<td>1992</td>
<td>150</td>
<td>5,000</td>
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<td>200</td>
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<tr>
<td>2005</td>
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Portland vs. Dallas

- **Bike share of trips in Dallas FELL:**
  - 0.15% in 1990
  - 0.05% in 2008

- **Bike share of trips in Portland ROSE 5-fold:**
  - 1.15% in 1990
  - 6.20% in 2008

**Differences in cycling policies:**
- Almost no bikeway facilities in Dallas
- Quadrupling in bikeway facilities in Portland
How to Encourage More Walking and Cycling while Improving Safety

• Better cycling and walking facilities
• Integration of walk/bike with public transport
• Traffic calming of residential neighborhoods
• Mixed-use zoning and improved urban design
• Restrictions on motor vehicle use
• Traffic education and Safe Routes to School
• Traffic regulations and enforcement
Most European cities have extensive car-free districts ideal for walking and cycling.
Lively, safe, pleasant car-free zone in central Copenhagen
Which crosswalk do YOU think is safer?
Stress-free cycling in Amsterdam
Kids can ride safely on traffic-protected bike paths
Bike paths such as these make it safe and comfortable for all to bike: including women, children, and seniors.
55% of all bike trips in Denmark are by women.
Denmark: Ubiquitous short-cuts for right-hand turns and full-speed ahead for cyclists at red lights at T-intersections
Bicycle expressway-beltway in Muenster, Germany

- 38% of all trips in Muenster are by bike
- 58% of bike trips are by women
- One injury per 608,000 bike trips
Santa Barbara coastal path: Safe and attractive both for cyclists and pedestrians.

Conversion of two car lanes to bike path and wider sidewalk.
Traffic-protected cycle track on 9th Avenue, NYC

- 250 mi of new bike lanes and paths since 2005
- Doubling in bike trips
- Halving of cyclist fatalities from 28 to 14
From 1996 to 2006, bike share of trips rose from 25% to 38%; fatalities fell 60%
Bike access lane approaching intersection in Dutch city

Netherlands has a cyclist fatality rate only a fifth as high as in the USA
Using special markings to raise visibility and safety of crossing
Improving safety of cycle tracks at road crossings
Contraflow lane in Strassbourg, France
Bike bridge along Yarra River in Melbourne

Bike bridge along Ems River in Muenster
Extensive, fully-integrated bikeway network in Freiburg, Germany

CRUCIAL to have full connectivity of cycling facilities! Usually lacking in North America
Special traffic signals and signs give priority to cyclists.
Bike crossing signal in Amsterdam
Four-way all-green signal for cyclists in Portland

How to Use the New Bicycle Signal

1. TO GET A GREEN LIGHT
   Place your bicycle on the marking on the sidewalk, with your wheels directly on the lines.

2. When the bicycle signal here is green...
   ...cyclists can cross the intersection as shown here.

3. Bike sensor in pavement

Questions? Comments?
Call City of Portland Bicycle Program 503-823-3230.
Bike sensors in pavement to trigger green light for cyclists in Richmond, Metro Vancouver, BC
Raised curb protects bike path from cars

Green wave for *cyclists* in Odense, Denmark

Troels Andersen, “Cycling in Odense, Denmark”
Good bike route signage is crucial
Convenient air pumps for bikes throughout Odense
Traffic Calming of Residential Neighborhoods

• Speed limited *by law* to 30km per hour (19mph) or less

• *Physical measures* that force cars to slow down:
  
  • Road narrowing, zigzag routing, chicanes
  
  • Raised intersections and crosswalks
  
  • Traffic circles
  
  • Speed humps and bumps
  
  • Mid-block closures and artificial dead-ends
  
  • Bulb-outs at intersections and crosswalks, with sidewalk widening
Why Traffic Calming Saves Lives

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

Speed Humps

Chokers

Traffic Circle

Raised Crosswalk
Traffic calming in Vancouver that promotes cycling while discouraging car use

One-way for cars, two-way for bikes

Foto: Rich Drdul
Convenient bike cut-thru for cyclists in Melbourne
3,800 km of traffic-calmed streets in Berlin: ideal for cycling
Traffic Calming in Freiburg, Germany
Improves safety and encourages more walking and cycling
Bike Boulevards in Portland

Traffic calming turns these streets into bikeways

Fotos: Jonathan Maus
Fahrradstrassen in Germany, bicycle streets where cyclists have absolute priority over cars for entire width of roadway.
Over 50,000 buses in the USA now come equipped with bike racks
Trend in Percentage of Buses with Exterior Bicycle Racks in the USA, 2001-2008

(Source: APTA, Public Transportation Factbook 2008, Table 23)
Convenient and secure parking for 3,500 bikes at main train station in Muenster

Bike and Ride
Bike Wash at Muenster
Bike Station
Conversion of car parking to bike parking in San Francisco

Also being adopted in other US cities
Bike Parking Corrals in Portland
• Improved motorist training, with much more emphasis on how to avoid endangering pedestrians and cyclists

• Compulsory traffic safety lessons for all school children by the age of 10, with testing by traffic police on actual traffic test courses, to ensure safe and defensive walking and cycling by an early age (as in the Netherlands and Germany)
German traffic laws generally favor cyclists and pedestrians over motorists.
Most German and Dutch children take cycling lessons by the 3\textsuperscript{rd} or 4\textsuperscript{th} grade and must pass a police-administered cycling safety test!
MARKETING CYCLING TO ALL SOCIAL GROUPS

• Very diverse needs of different groups

• Need to tailor cycling facilities, policies, and programs to serve this broad range

• Be as inclusive as possible

• Need good facilities as well as active marketing of cycling, with different approaches to each potential group of cyclists
Cycling Duckie for very young kids in Odense, Denmark

Troels Andersen, “Cycling in Odense, Denmark”
Cycling competitions for somewhat older kids in Odense, Denmark

Troels Andersen, “Cycling in Odense, Denmark”
Cycling training course for adults in Metro Vancouver

You are never too old to learn!!!

Foto: Bonnie Fenton

Foto: Amy Walker
GIVE EMPLOYEES FREE BIKES INSTEAD OF FREE PARKING!

The perfect zero emissions vehicles!

Troels Andersen, “Cycling in Odense, Denmark”
“Get rid of the sack” Campaign aimed at overweight middle-aged men with pot bellies
Guided Bicycle Tours for Seniors
Safe Routes to School:
Enable Children to Walk or Bike to Schools!

• Two thirds of American children who live within a mile of their school travel there by car

• Only 13 percent of children in the USA walked or biked to school in 2001, compared to 60 percent in 1974

• Most European children walk or bike to school, some ride transit, virtually *none* get chauffered by their parents or drive themselves

• Need improved walking and cycling facilities to prevent dangerous conflicts with motor vehicles, especially at crossings and intersections
Good crosswalks crucial near schools!
Trend in Obese Children vs. Rate of Biking and Walking to School

- Percent of kids who bike or walk to school
- Percent of kids who are obese


- 1966-69:
  - Bike/Walk: 45%
  - Obese: 10%

- 1972-77:
  - Bike/Walk: 30%
  - Obese: 5%

- 1978-83:
  - Bike/Walk: 15%
  - Obese: 5%

- 1990-91:
  - Bike/Walk: 5%
  - Obese: 20%

- 2001:
  - Bike/Walk: 10%
  - Obese: 25%
Walking School Bus in California

These kids are actually having fun and getting good exercise, too!
How kids get to school in the Netherlands
Bike to School Day in California
Mixed-Use Zoning and Better Urban Design

• Inclusion of *sidewalks and bikeways or bike lanes* in all new suburban developments and retrofitting of existing developments, where possible

• *Mixed land use zoning* so that residential units are within easy walking or cycling distance of cultural facilities, shopping, and service establishments

• Encouragement of *compact, mixed-use development around transit stops* to facilitate walking/bicycling communities (transit-oriented development) through subsidies, mortgage bonuses, and zoning.

• *Restrict parking lots* to locations behind buildings rather than between buildings and the street (as with most strip mall development in USA).
Traffic Regulations and Enforcement

- **Revise traffic laws to place burden of proof on motorists**, with the assumption that motorist is guilty unless it can be shown otherwise, especially when children or elderly are involved in crashes (forcing motorists to be extra careful to avoid crashes with pedestrians and cyclists).

- **Enforce existing legal rights of pedestrians and cyclists**, with strict penalties and fines for motorist violations of ped/bike rights of way in crosswalks, bike lanes, intersection crossings.

- **Traffic cameras at intersections to photograph motorists** failing to stop or yield when required to do so, with automatic ticketing for violations.
CONCLUSIONS:

• Broad range of public health benefits of walking and cycling have potential to provide widespread political support for more sustainable transport policies

• Almost everyone could walk and cycle more on a daily basis, and thus reap these health benefits

• Many local trips in American cities are short enough to cover by walking or cycling

• Crucial to design ped-bike facilities and programs for everyone! Be as inclusive as possible!

• Public information campaign needed to emphasize both direct and indirect public health benefits of walking and cycling
For any questions or further information, please contact:

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