Promoting Safe Walking and Cycling to Improve Public Health

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Linkages between Transport and Public Health

- ***Traffic deaths and injuries***

- ***Environmental impacts: Air, water, and ground pollution; climate change; noise; disruption of natural ecosystems***

- ***Impacts on levels of daily physical exercise***

- ***Accessibility crucial for economic and social integration***

- ***Source of public and political support for more sustainable transport policies***

Walking and Cycling:
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

YET, walking and cycling are woefully neglected modes of transport in most countries!

- Least funding of all travel modes
- Least roadway space
- Least priority in roadway use
- Least education and training efforts
- Inadequate rights vis-a-vis motorists

Cycling and walking can provide valuable physical activity for almost everyone

- Both for daily, practical travel and for recreation
- Cheaper, easier, and more dependable than formal exercise routines that require trips to gym, home exercise equipment, organized sports events
- Can be integrated into daily lifestyle since cycling and walking can be used for purposeful travel and thus achieve practical objectives
- Urgent need to increase physical activity levels of Americans

Crucial importance of regular physical exercise:

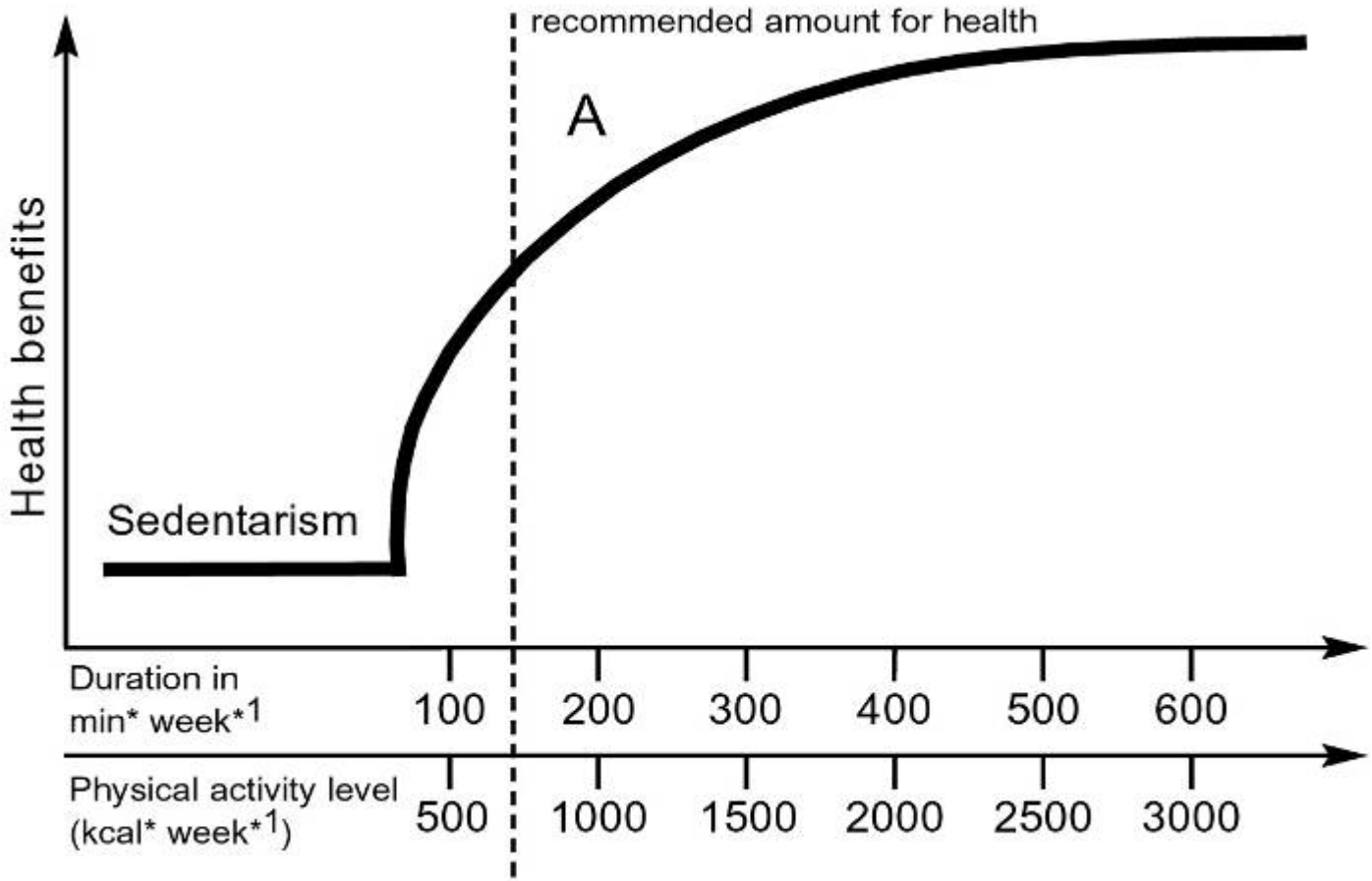
- **Obviously, the daily physical exercise of walking and cycling for practical travel helps burn up calories and helps avoid the problems of *overweight and obesity***

- **Moreover**:

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

Journal of Am. Med. Assoc. (1999)

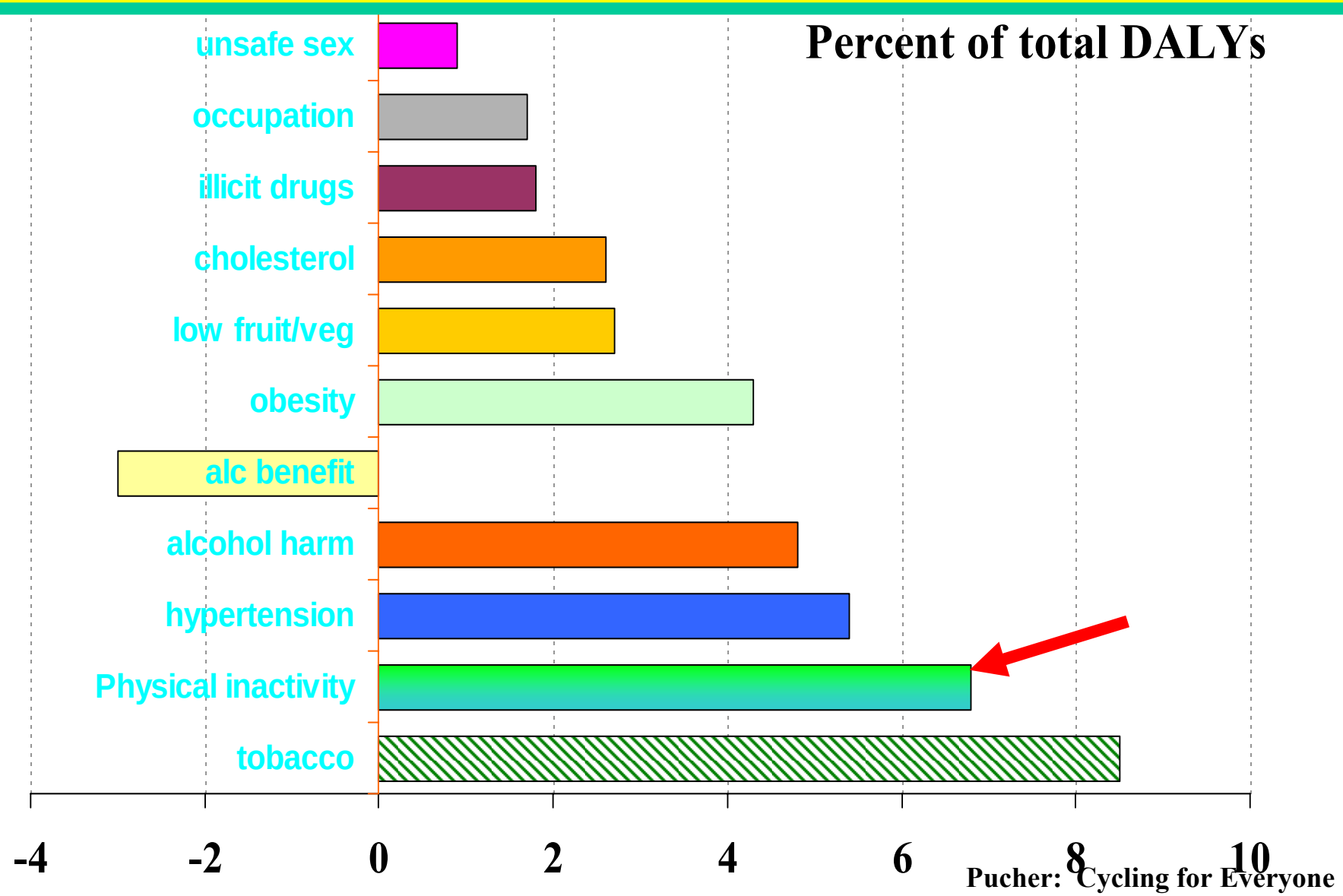
Huge Health Benefits of Even Small Increases in Physical Activity



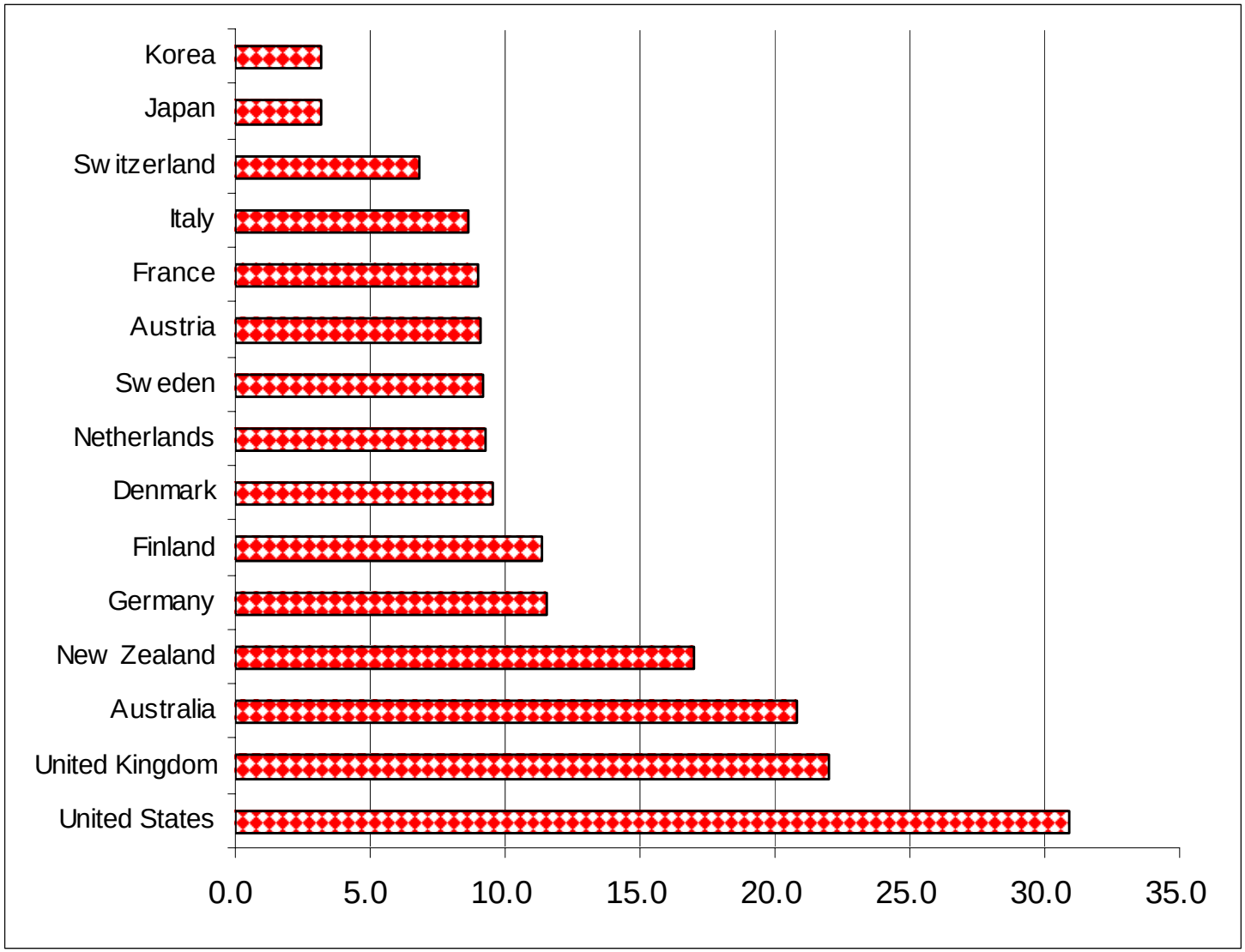
Bouchard C. Physical activity and health: introduction to the dose-response symposium. Medicine and Science in Sports and Exercise 2001; 33: S347-350

Percent of total burden of disease attributed to selected risk factors

Burden of Disease study, AIHW 1999



Obesity Rate by Country (Body Mass Index ≥ 30)



Sources: Centers for Disease Control and Prevention, U.S. Department of Health and Human Services; World Health Organization, International Obesity Task Force; Organization for Economic Cooperation and Development, Public Health Statistics.

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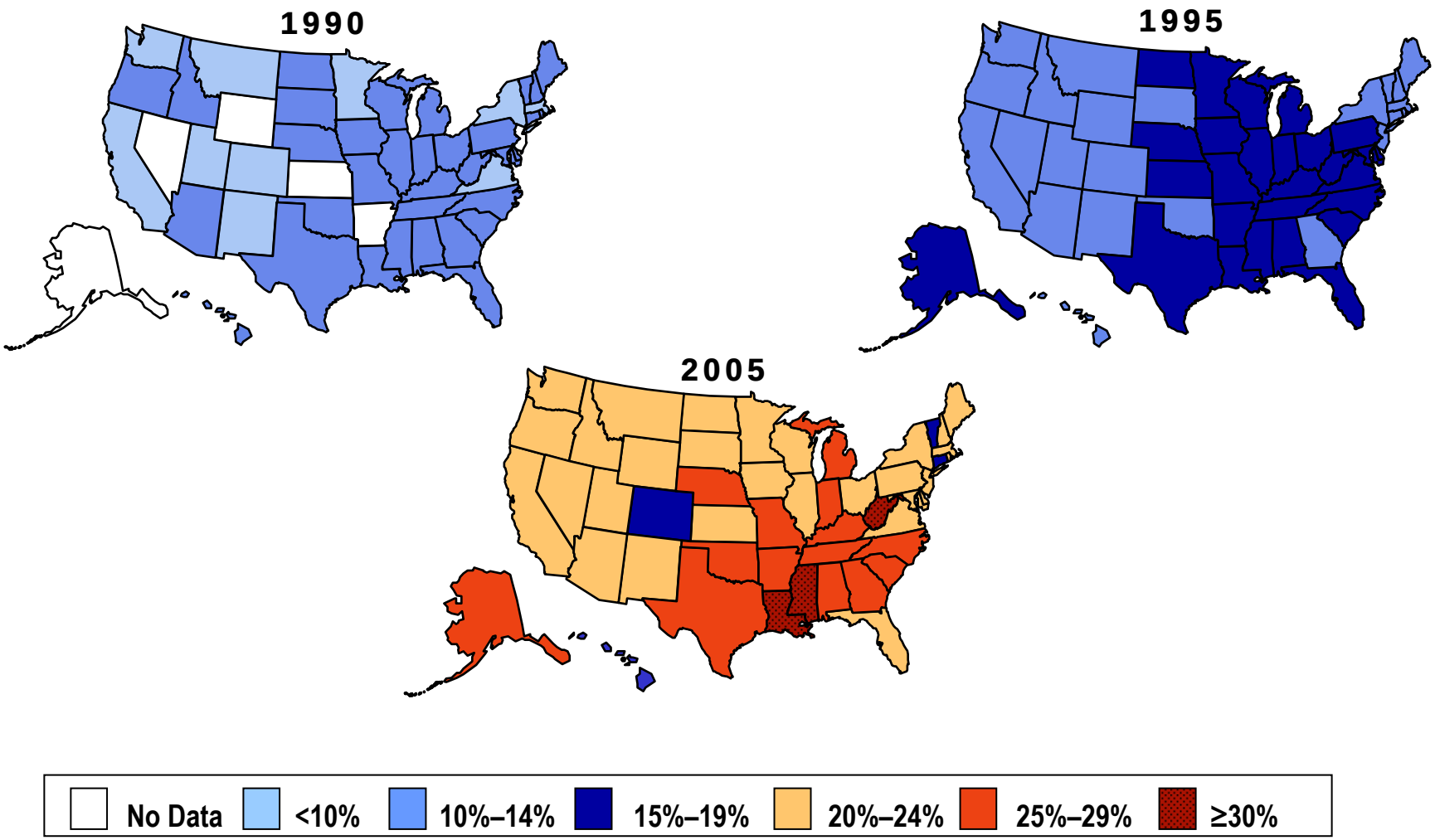
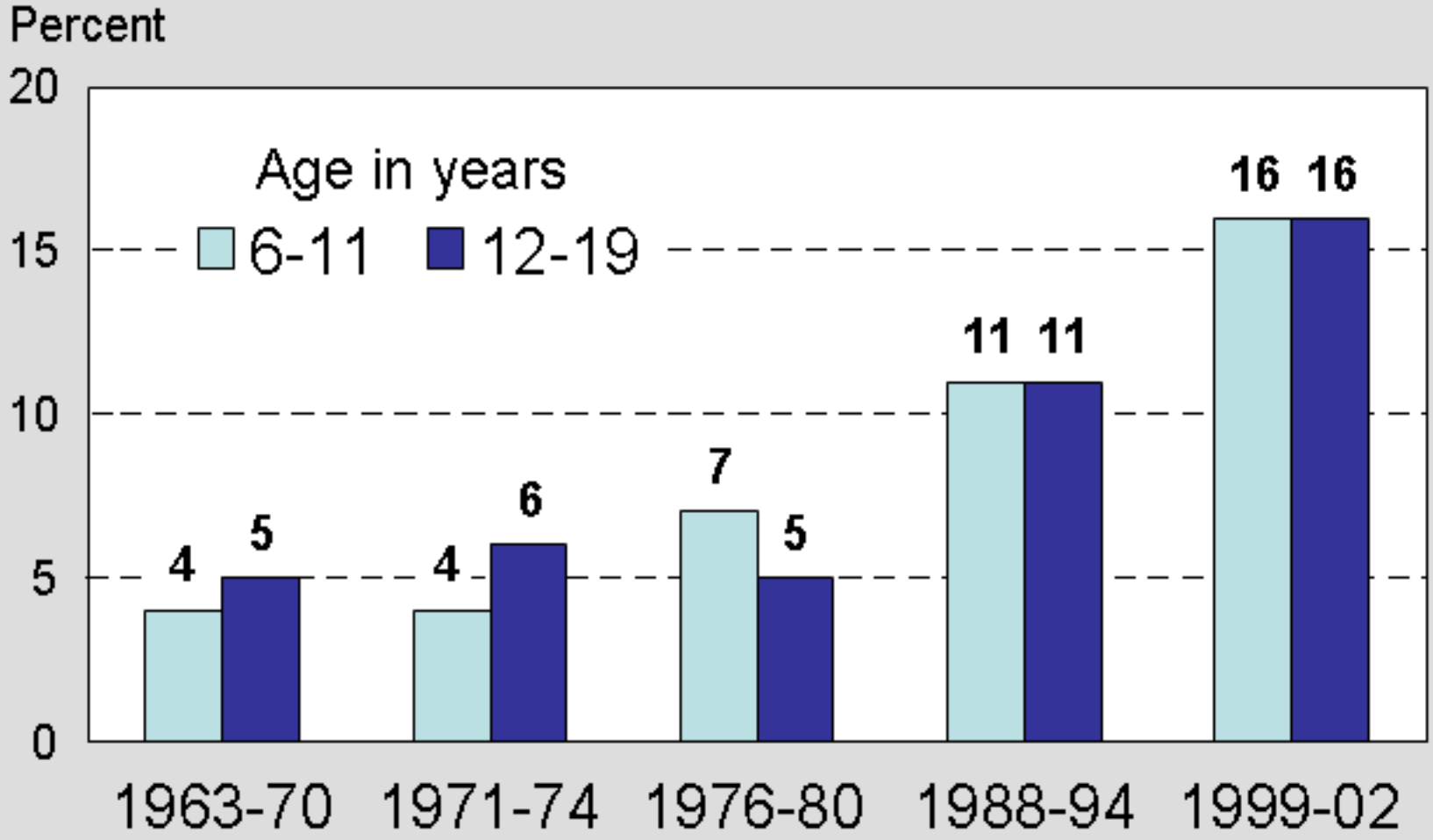
Obesity Trends* Among U.S. Adults

BRFSS, 1990, 1995, 2005

(*BMI ≥30, or about 30 lbs overweight for 5'4" person)

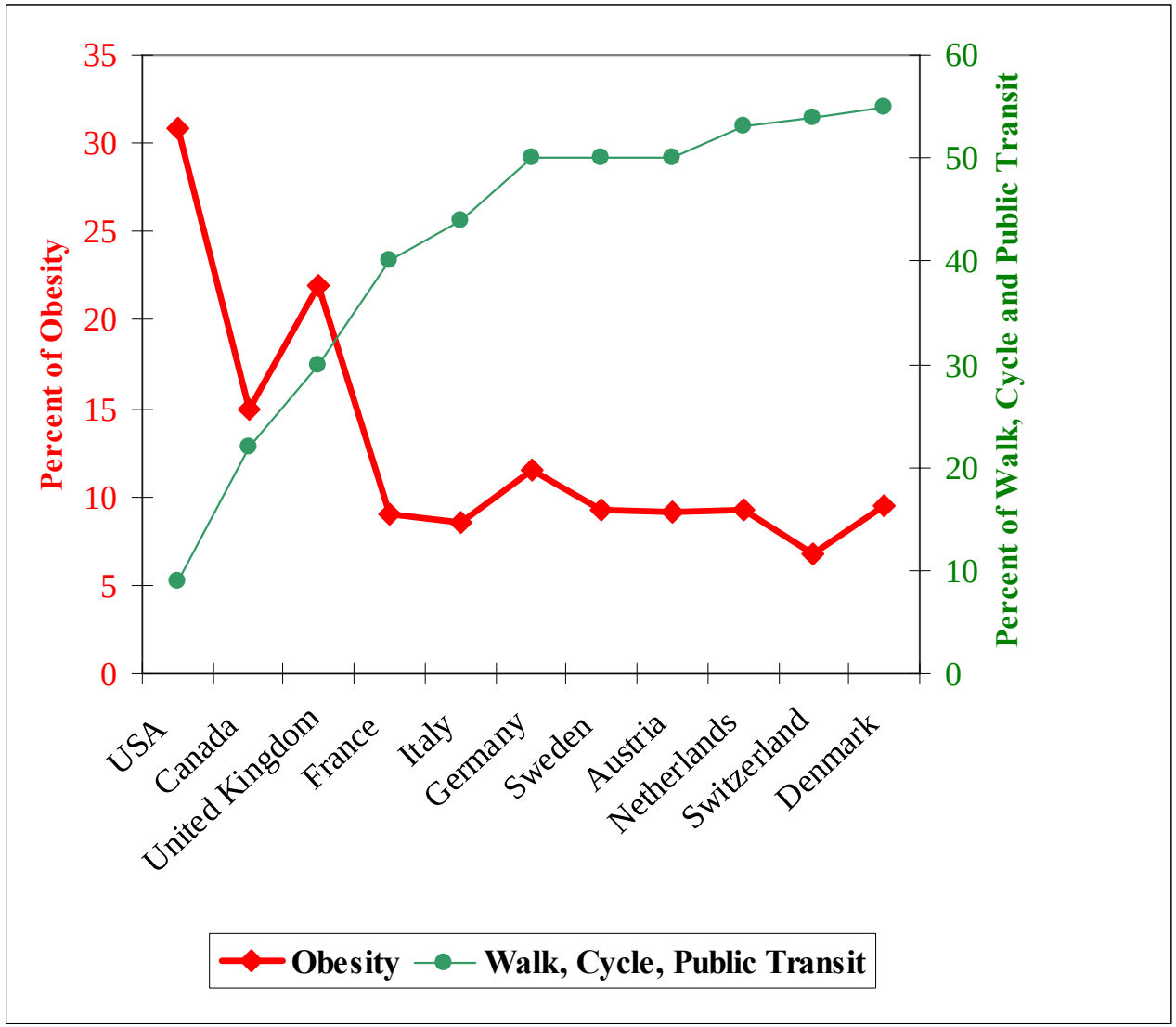


Worsening Obesity Epidemic among American Children and Adolescents, 1963-2002 (% with body mass index of 30+)



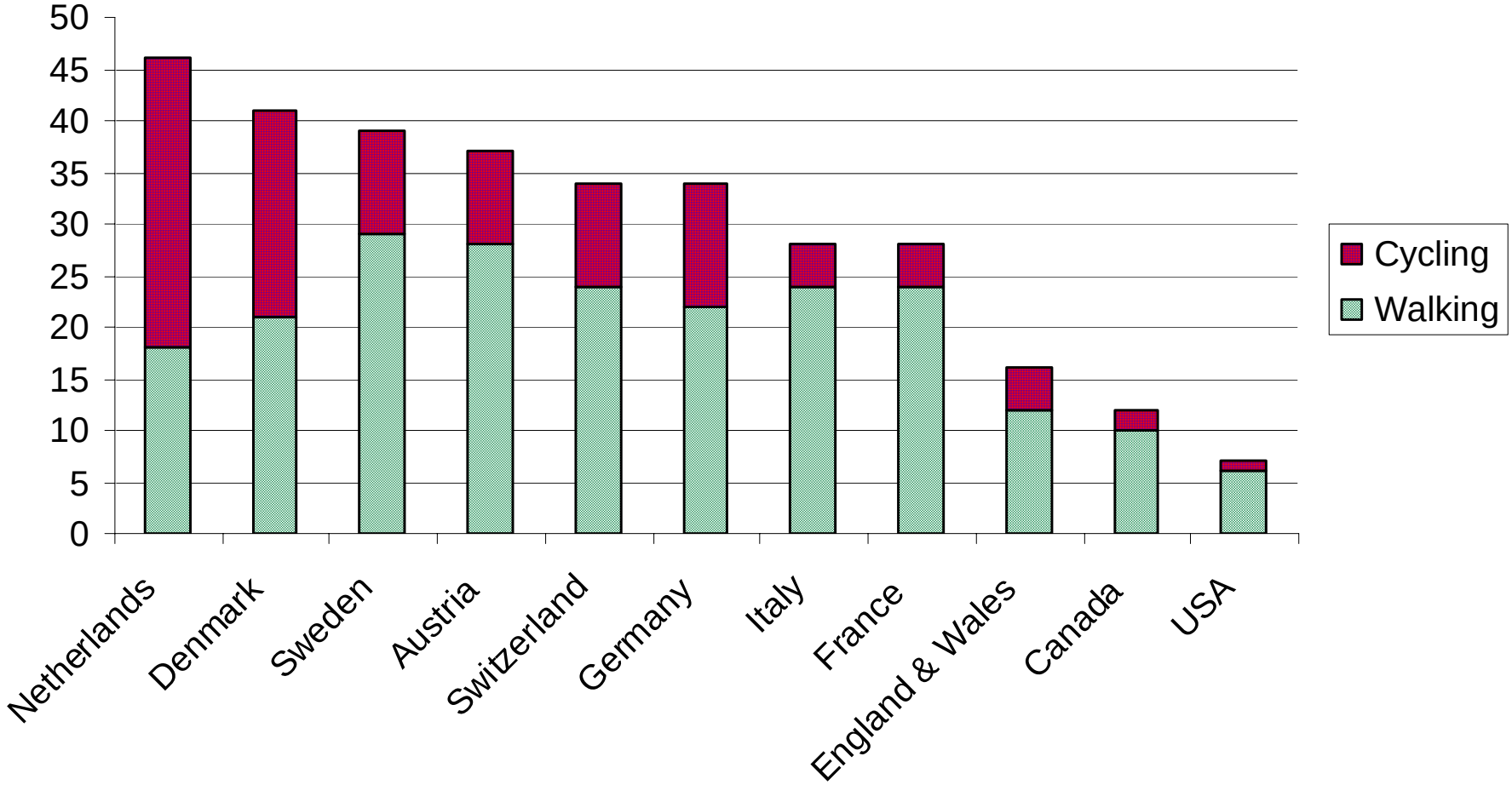
NOTE: Excludes pregnant women starting with 1971-74. Pregnancy status not available for 1963-65 and 1966-70. Data for 1963-65 are for children 6-11 years of age; data for 1966-70 are for adolescents 12-17 years of age, not 12-19 years.
SOURCE: CDC/NCHS, NHES and NHANES

Does auto-dependency make us fat? Obesity falls sharply with increased walking, cycling, and transit use!



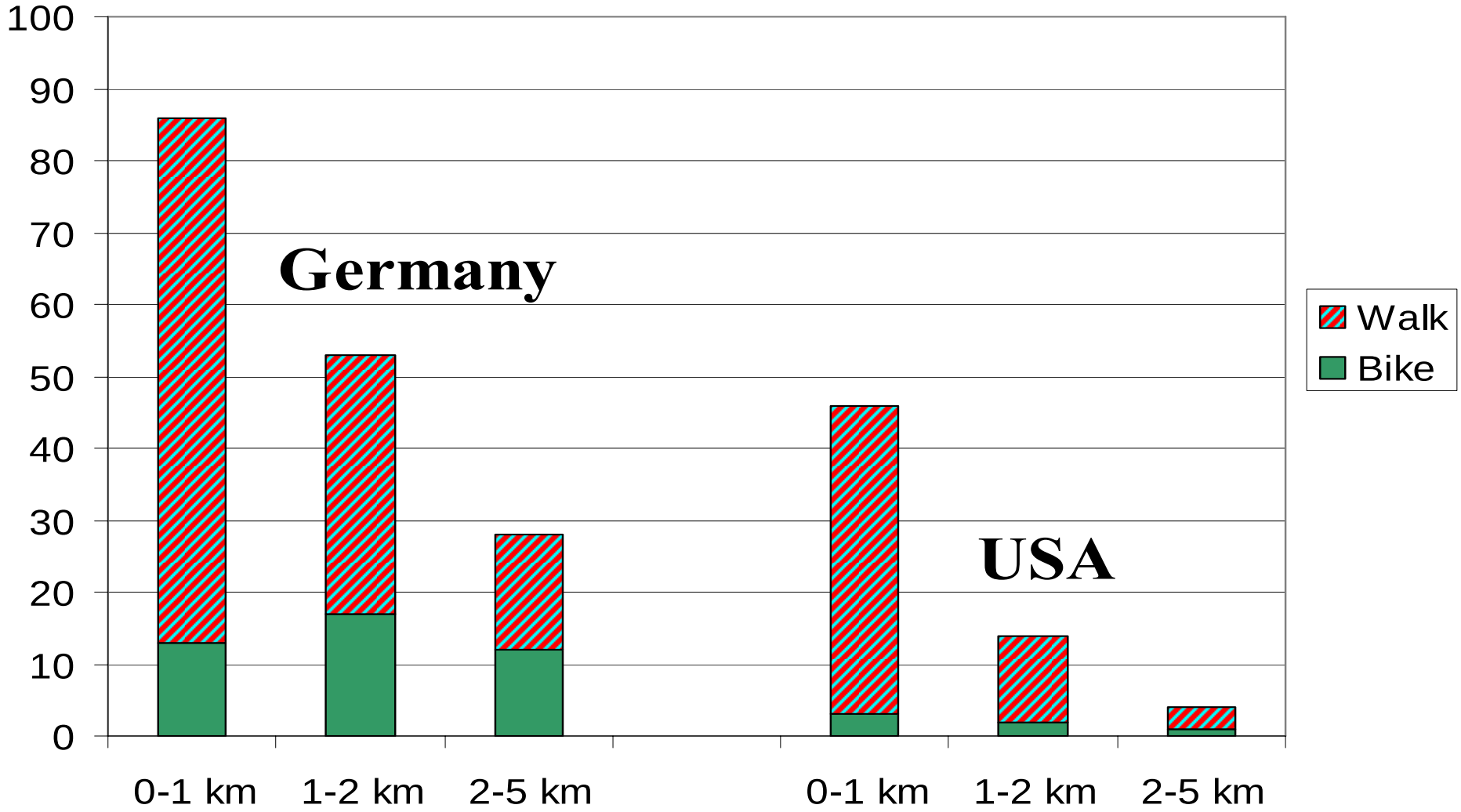
Source: Pucher and Dijkstra, "Promoting Safe Walking and Cycling to Improve Public Health, *Am Journal of Public Health*, September 2003.

Cycling and Walking Shares of Urban Trips in Europe and the USA, 1995



Source: Pucher and Dijkstra, "Promoting Safe Walking and Cycling to Improve Public Health: Lessons from the Netherlands and Germany," American Journal of Public Health, September 2003, Vol. 93, No. 9, pp. 1509-1516.

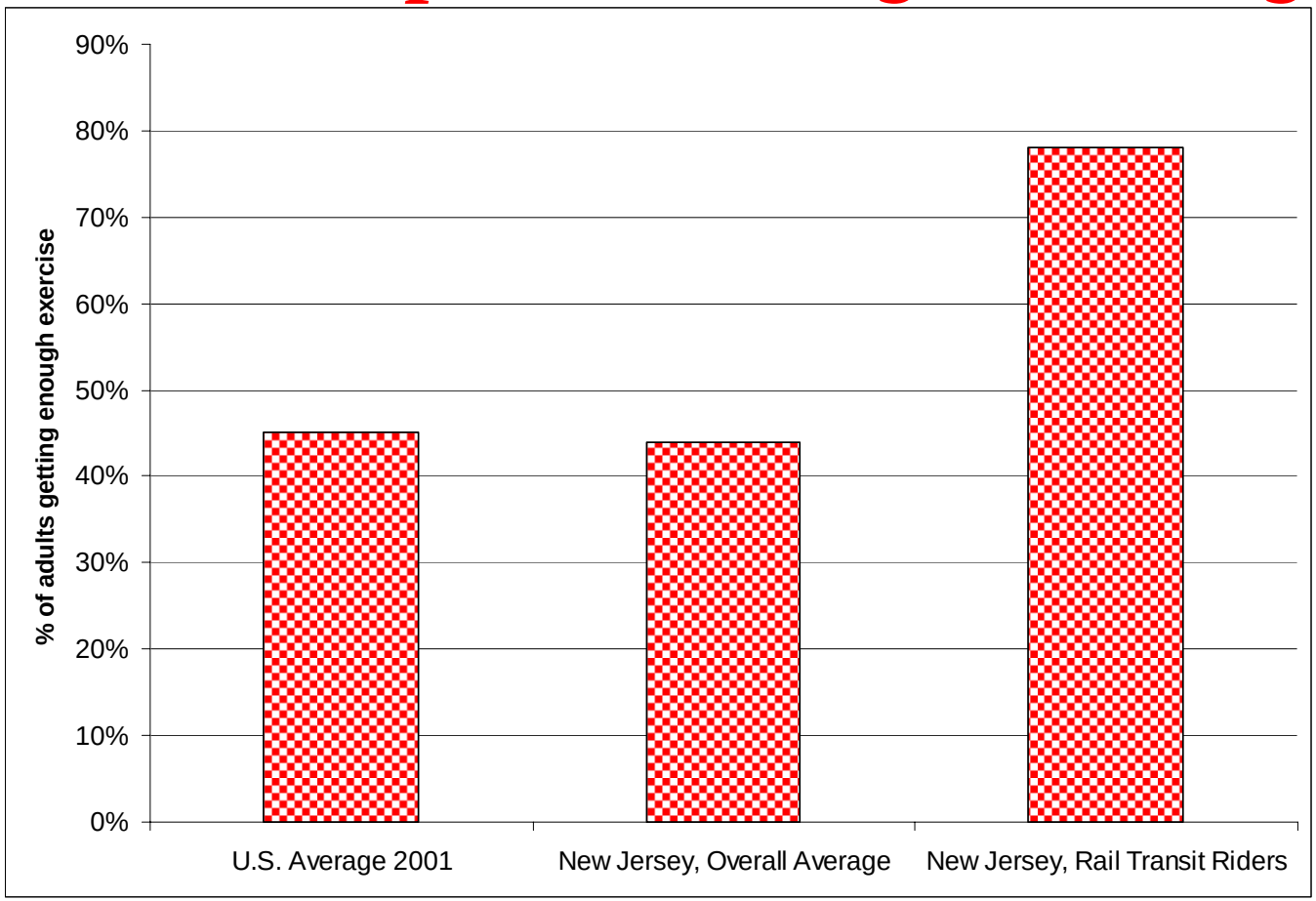
Percentage of Short Trips Made by Walking and Cycling in Germany and the USA



Source: Ralph Buehler, "Travel Behavior in Germany and the USA"

Average Weekly Levels of Physical Exercise in the USA, 2002 (% of adults getting CDC's recommended levels of exercise)

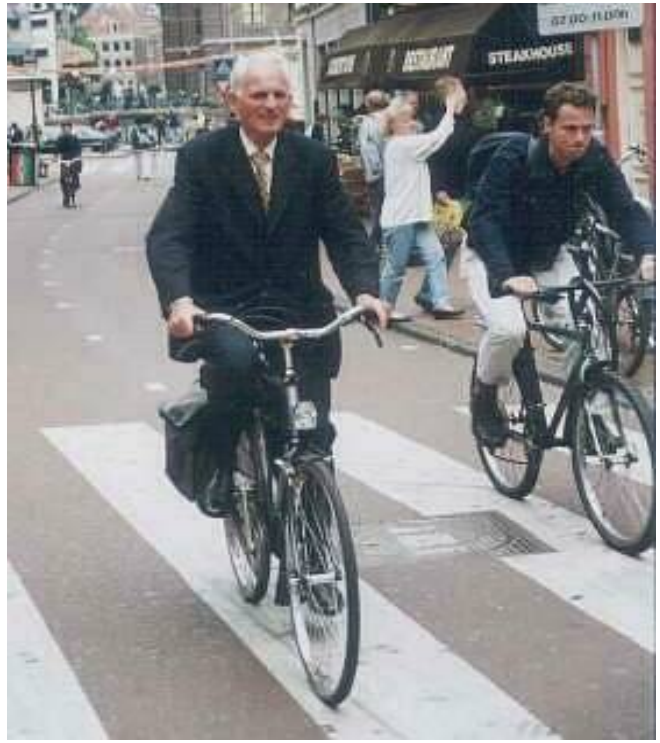
Public transport encourages walking!



90% of all transit trips in the USA include walk trips to access transit stops, and those walk trips are longer than other kinds of walk trips!

Note: CDC sets minimum standard as at least 5 days a week of moderately intense activity (small rise in breathing or heart rate) for 30 minutes a day OR at least 3 days a week of vigorous exercise (large rise in breathing or heart rate) for 20 minutes a day.

Cycling can start at a very young age indeed



And we can keep cycling all life long!!!

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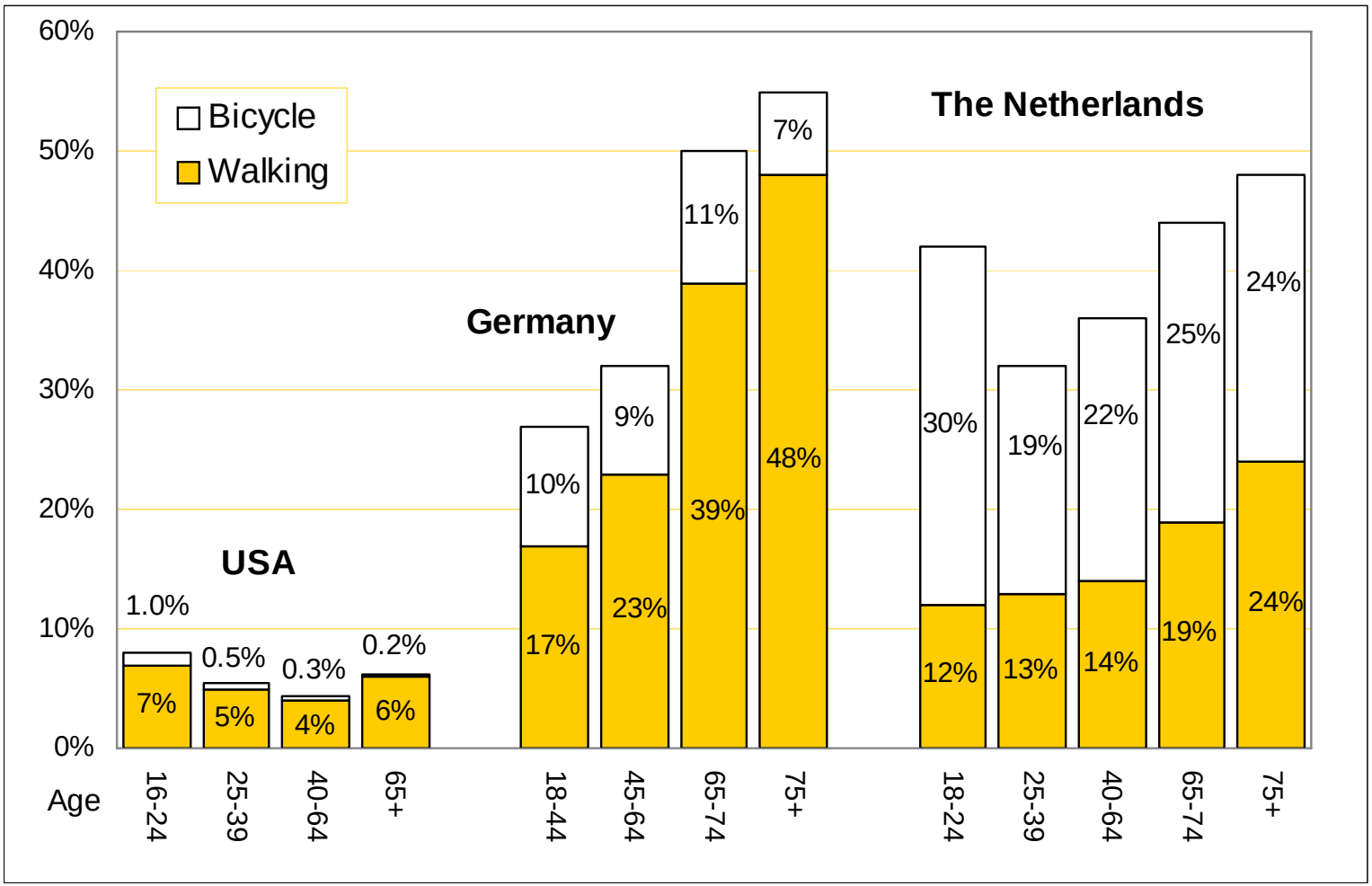
Walking and Bicycling Shares of Urban Travel by Age Group in the USA, Germany and The Netherlands, 1995

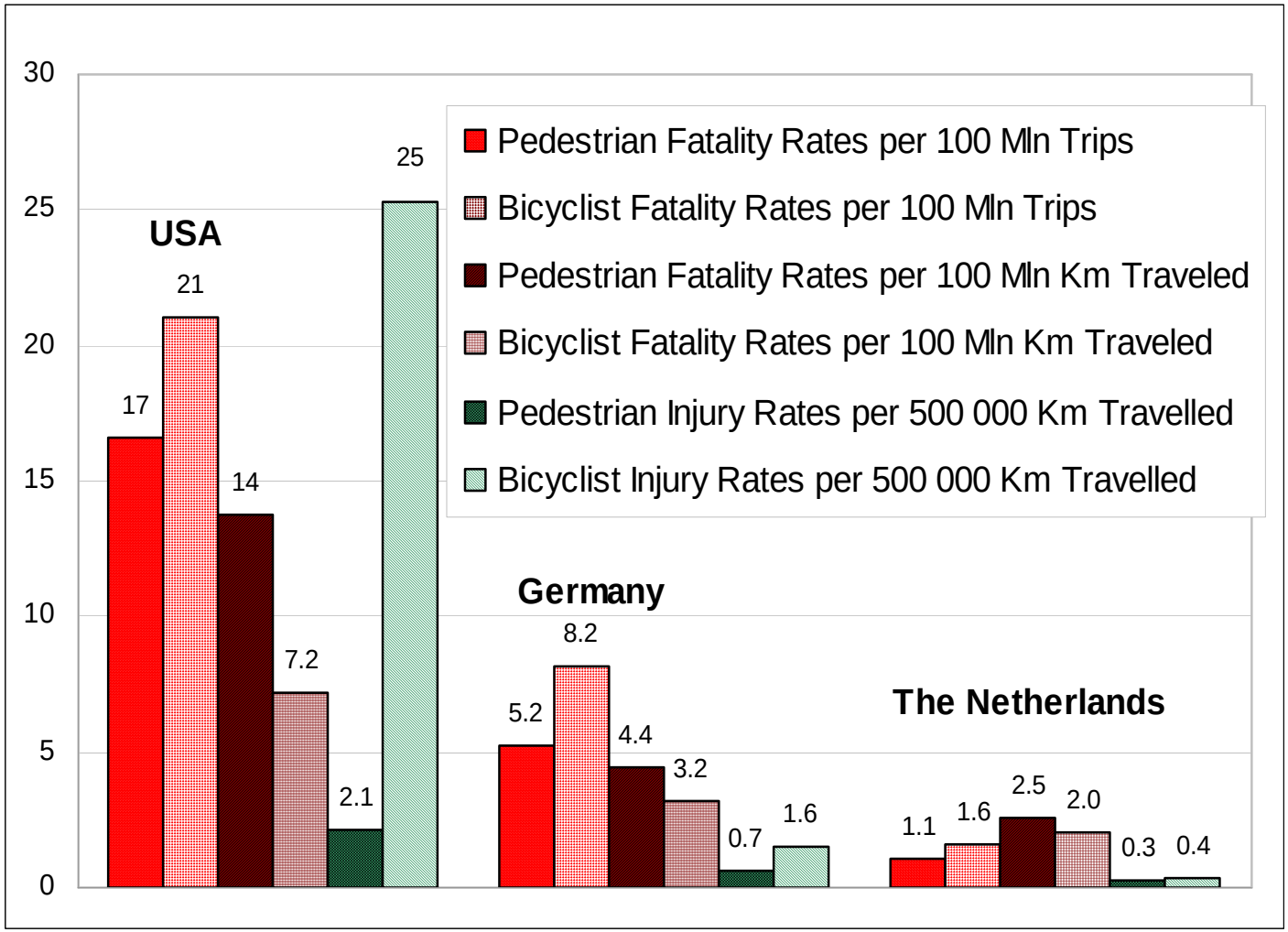


Source: Pucher and Dijkstra, "Promoting Safe Walking and Cycling to Improve Public Health: Lessons from the Netherlands and Germany," American Journal of Public Health, September 2003, Vol. 93, No. 9, pp. 1509-1516.

Make Cycling and Walking Safe for Everyone !

- *Cycling and walking safety is important for everyone, but especially crucial for the young, the old, for anyone with disabilities, for the timid or risk-averse*
- *Women generally are more sensitive to safety than men*
- *Improving safety would greatly enhance the attractiveness of cycling and walking to a broad spectrum of society*
- *The much greater safety of cycling and walking in Northern Europe might explain why so many children, elderly, and women cycle*

Walking and Cycling CAN be made very safe, as in the Netherlands



Fatality Rates and Non-Fatal Injury Rates in the USA, Germany and the Netherlands, 2000

Source: Pucher and Dijkstra, "Promoting Safe Walking and Cycling to Improve Public Health: Lessons from the Netherlands and Germany," American Journal of Public Health, September 2003, Vol. 93, No. 9, pp. 1509-1516.

SAFETY IN NUMBERS

- ***As levels of cycling and walking increase, injury and fatality rates per trip and per km traveled fall dramatically***

- **Fatality rates per trip and per km are much lower for countries and cities with high bicycling and walking shares of total travel, and fatality rates fall for any given country or city as cycling and walking levels rise**

- **THUS, *it is quite likely that increased cycling and walking in Australia, Canada, and the USA would be safer than they are today.***

Jacobsen, "Safety in Numbers," *Injury Prevention*, 2003, 9: 205-209

We *CAN* increase walking and cycling !

- ***The necessary measures are <u>known and proven</u>***
- ***Many successful policies and programs in cities around the world that have greatly increased walking and cycling***
- ***Northern Europe has been at the forefront of best policies, but there have been isolated successes in North America and Australia as well***
- ***The <u>SAME</u> policies that make cycling and walking more convenient, faster, more pleasant, and more attractive <u>ALSO</u> make cycling and walking safer for everyone***
- ***Rest of talk will explain and illustrate the most important measures***

How to Encourage More Cycling and Walking 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
- Traffic regulations and enforcement

Better cycling and walking facilities

•***Bike paths and lanes*** with exclusive rights of way, providing a ***connected, integrated, comprehensive bike route*** network that serves all parts of the metro area

•Wide, well-lit ***sidewalks*** with benches and plants

•Clearly marked, well-lit ***crosswalks***, often raised and with curb extensions and pedestrian-activated traffic signals

•***Auto-free zones and special bicycling streets*** covering much of city center

•***Make <u>all</u> streets more bikeable*** to enhance route network

•***Extensive, secure, sheltered bike parking*** at appropriate locations

•***Intersection modifications*** that minimize dangers for cyclists making turns and crossing roads

•***Advance green lights*** for cyclists (to cross intersections before motor vehicles)

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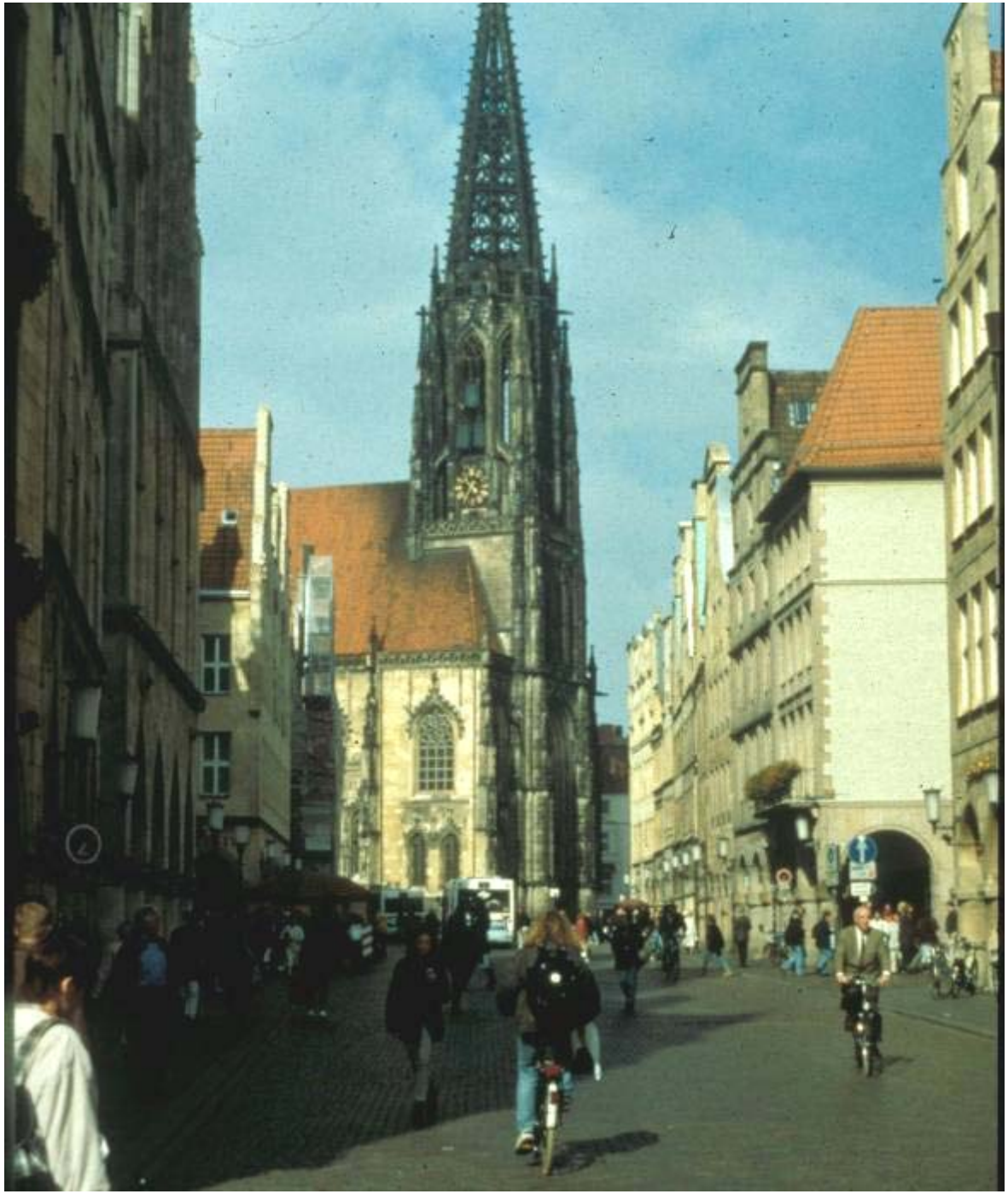

Most European cities have extensive car-free districts ideal for walking and cycling, such as here in Muenster, Germany

Extensive car-free zone includes most of Muenster's center, providing ideal walking and cycling conditions

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Bikes and buses take up much less space than cars!!

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

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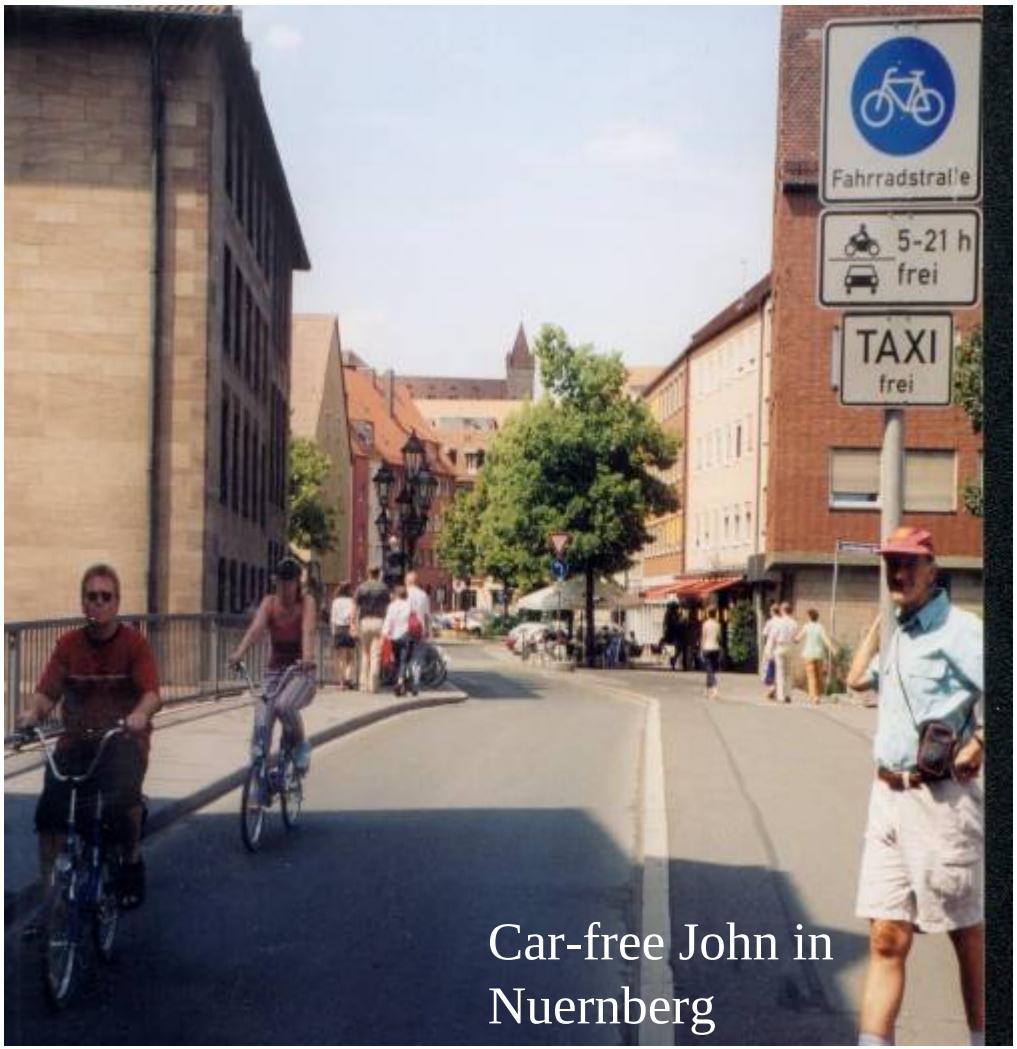
Old Town Square in Warsaw, Poland:

Not a single car to be seen!!

Krakow, Poland

Fahrradstrassen in Germany, **bicycle streets** where cyclists have absolute priority over cars for entire width of roadway



Car-free John in Nuernberg

Muenster

Bicycle expressway-beltway in Muenster, Germany

This 6 km beltway encircles central city and connects 16 major bike paths radiating outward toward the suburbs and 26 bike paths and lanes leading to Cathedral Square.

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Car-free zones in the USA: Davis, California

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Peaceful co-existence of trams, bicyclists, and pedestrians in Freiburg's center

German Cycling Boom Engineered by Explicit Shifts in Transport Policy in 1970s

City	Time Period	Change in Bicycle Modal Split Share	Percentage Increase in Bicycle Share
Munich	1976 to 1996	6% to 13%	+117%
Nuremberg	1976 to 2001	4% to 9%	+125%
Cologne	1976 to 1998	6% to 12%	+100%
Freiburg	1976 to 1998	12% to 19%	+58%
Stuttgart	1976 to 2000	2% to 6%	+200%
Bremen	1976 to 1997	16% to 21%	+31%
Muenster	1976 to 2001	29% to 35%	+21%
Average for all urban areas in Western Germany	1972 to 2002	8% to 10%	+25%

Sources: Broeg and Erl, *Mobilitaet und Verkehrsmittelwahl.* Muenchen: Socialdata, 2003; Deutsches Institut fuer Wirtschaftswissenschaften, *Mobilitaet in Deutschland, 2002*. Berlin: Bundesministerium fuer Verkehr, 2004.

Bicycling facilities in Berlin, Germany's capital and largest city

- 860 km of completely separate bike paths
- 60 km of bike lanes on streets
- 70 km of combined bike/bus lanes on streets
- 100 km of combined pedestrian/bike paths
- 3,800 km of city streets (72%) are traffic calmed, with speed limit of 30km/hr or less, and thus ideal for cycling on street, without any special lanes or paths

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Muenster offers 280 km of separate bike lanes and paths, and shared bus-bike lanes

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Bike lanes and paths in Amsterdam designed to reduce traffic conflicts with other modes

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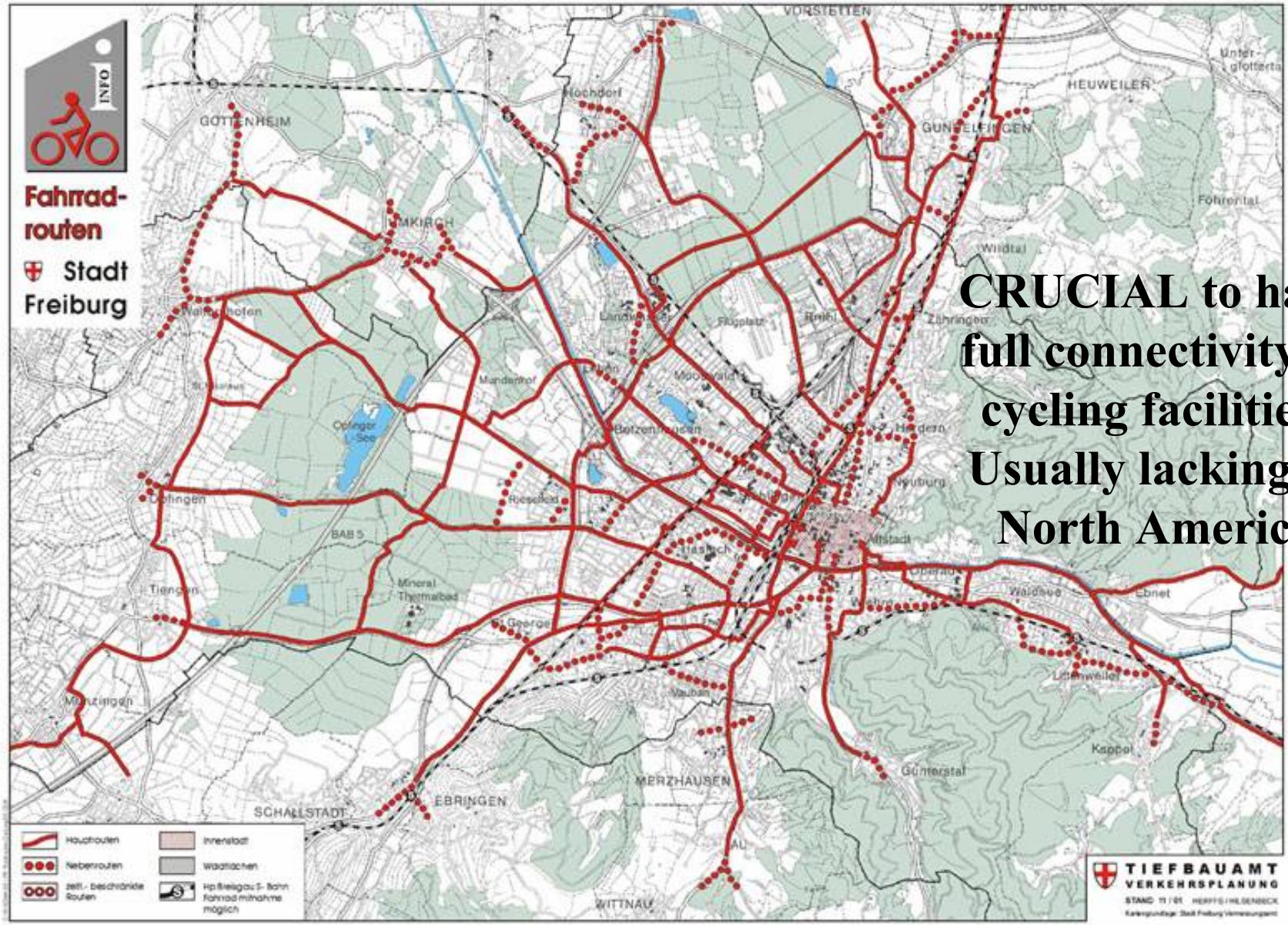
Extensive, fully-integrated bikeway network in Freiburg, Germany



CRUCIAL to have full connectivity of cycling facilities! Usually lacking in North America

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Foto by Peter Berkeley

Convenient bike cut-thru for cyclists in Melbourne

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Some Australian successes: Extensive ped-bike cut-throughs and dead-ends for cars in Newtown (Sydney)

Bikeable European suburbs!

Every new suburban development around Muenster has sidewalks and cycle paths

This new design further separates cyclists from motor vehicles

Bike paths and lanes must be promptly cleared of snow in winter, as here in Muenster

Regular laser inspection of bikeway surfaces for preventive maintenance!

Bike lanes sprayed with salt water and cleared before rest of roadway!

Convenient, safe, and attractive cycling facilities such as the Goodwill Bridge in Brisbane encourage all age groups to cycle

Brisbane's floating bikeway

Special traffic signals and signs give priority to cyclists

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Giving cyclists the green light in Canada

Toronto, Vancouver, and Victoria have been installing bike-activated sensors in road surfaces at intersections to trigger green lights for cyclists

Highly visible red bike lanes for intersection crossings on all four sides, connected with red brick sidepaths on both sides of every road

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Denmark: Ubiquitous short-cuts for right-hand turns and full-speed ahead for cyclists at red lights at T-intersections

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Three lanes for cyclists, two for cars

It's all a matter of priorities !!!

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Bike lane, advance stop line, and priority signal for cyclists in Muenster

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Troels Andersen, "Cycling in Odense, Denmark"

Green wave for cyclists in Odense, Denmark:

Traffic lights synchronchized for *cyclist* speeds!!

Troels Andersen, "Cycling in Odense, Denmark"

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Pacific Ocean Walk in Sydney:

Rounding the bend on the Coastal Walk in Tamarama as I walk from Bondi to Bronte every day on my way to work at Sydney Uni

Crosswalks in North Bondi, Sydney

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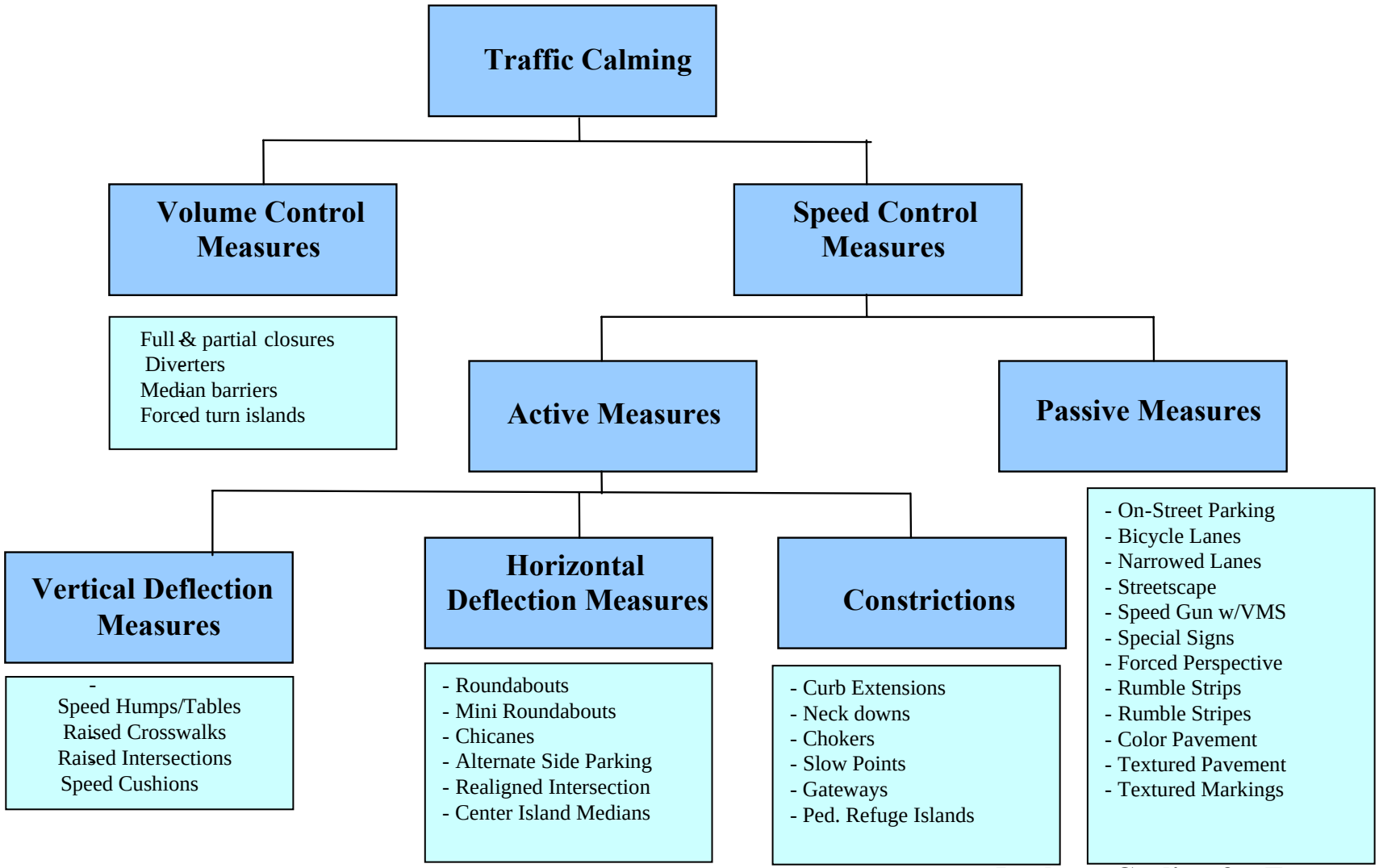
Traffic Calming of Residential Neighborhoods

- **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

Traffic Calming Measures



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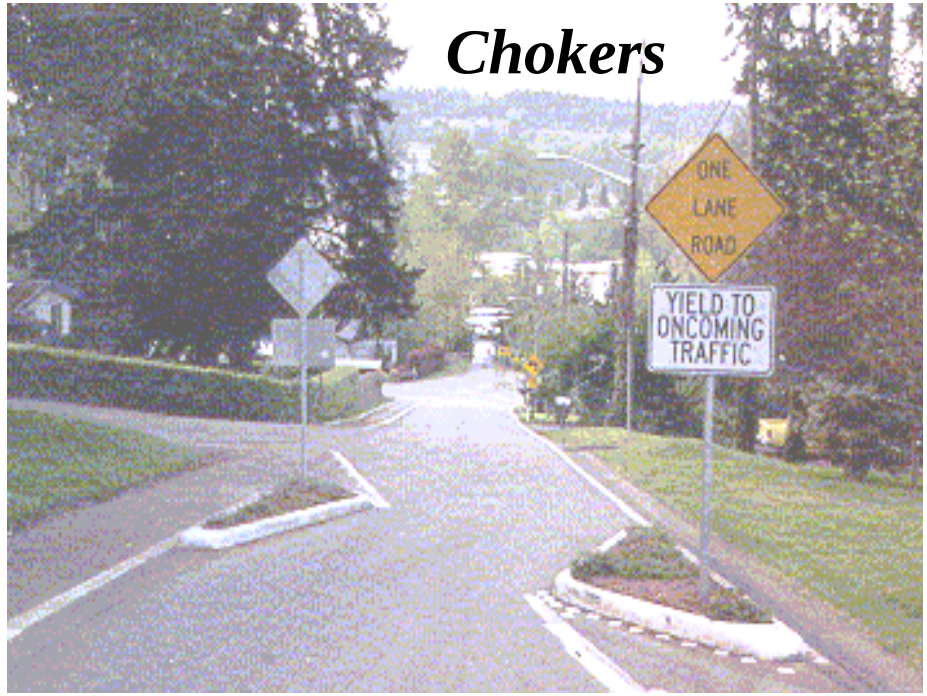

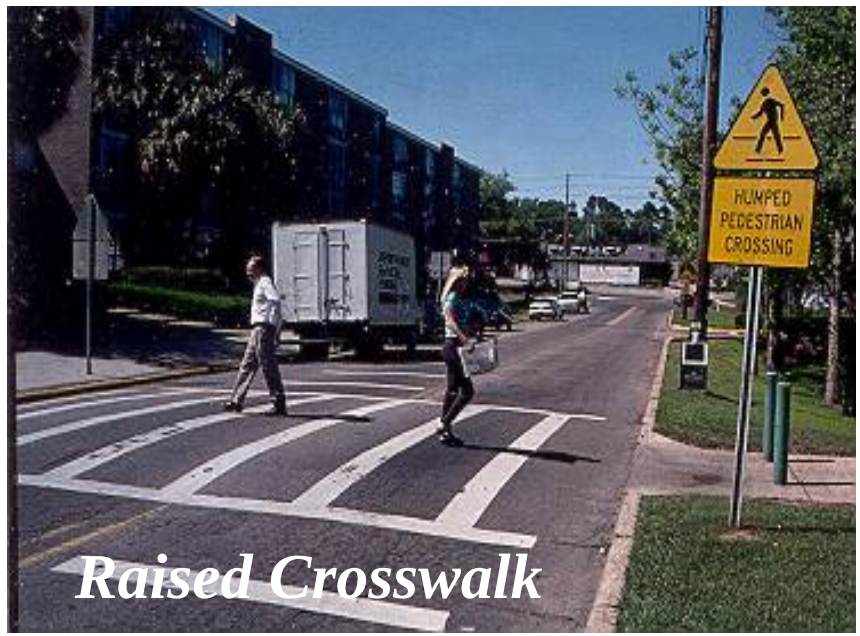

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Traffic-calmed neighborhood in Amsterdam

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Woonerfs (super traffic calming) in the Netherlands and Germany

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Bike and Ride in Germany

for metros, trams, and suburban rail

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Extensive bike parking facilities at all train stations, including state-of-the-art bike parking garages with bike rentals, bike repairs, and direct access to train platforms

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On-street car parking in German and Dutch cities often replaced by bike parking

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Conversion of car parking to bike parking in San Francisco!

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- **<u>Every year</u>, the City of Toronto installs 1,000 of its famous post-and-ring bike stands as part of its long-range bicycling plan.**

- **Over 15,000 such bike stands so far, the most bike parking in North America**

Many potential uses of bikes

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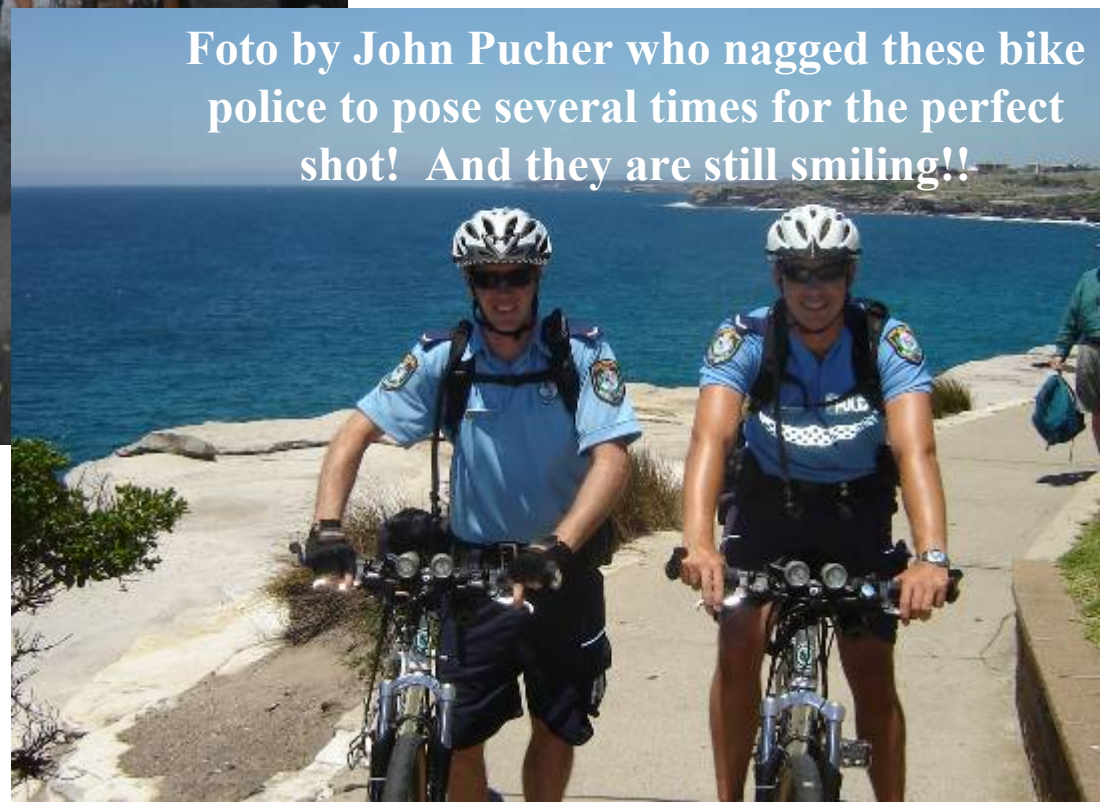
Police are friendlier and more effective on bikes!

Melbourne Bike Police



NSW Police patrolling coastal path from Bondi to Coogee

Postal deliveries by bike in Germany and Denmark

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For Employees: Company bicycles provided by firms for free for commute to work

Cycling, eating, and drinking wine along 80km of the *car-free* German Wine Route every August

On Sundays in August, cars are banned from 80km of the German Wine Route connecting dozens of scenic wine villages in southwest Germany

Travel Smart: Individualized Marketing of Sustainable Transport

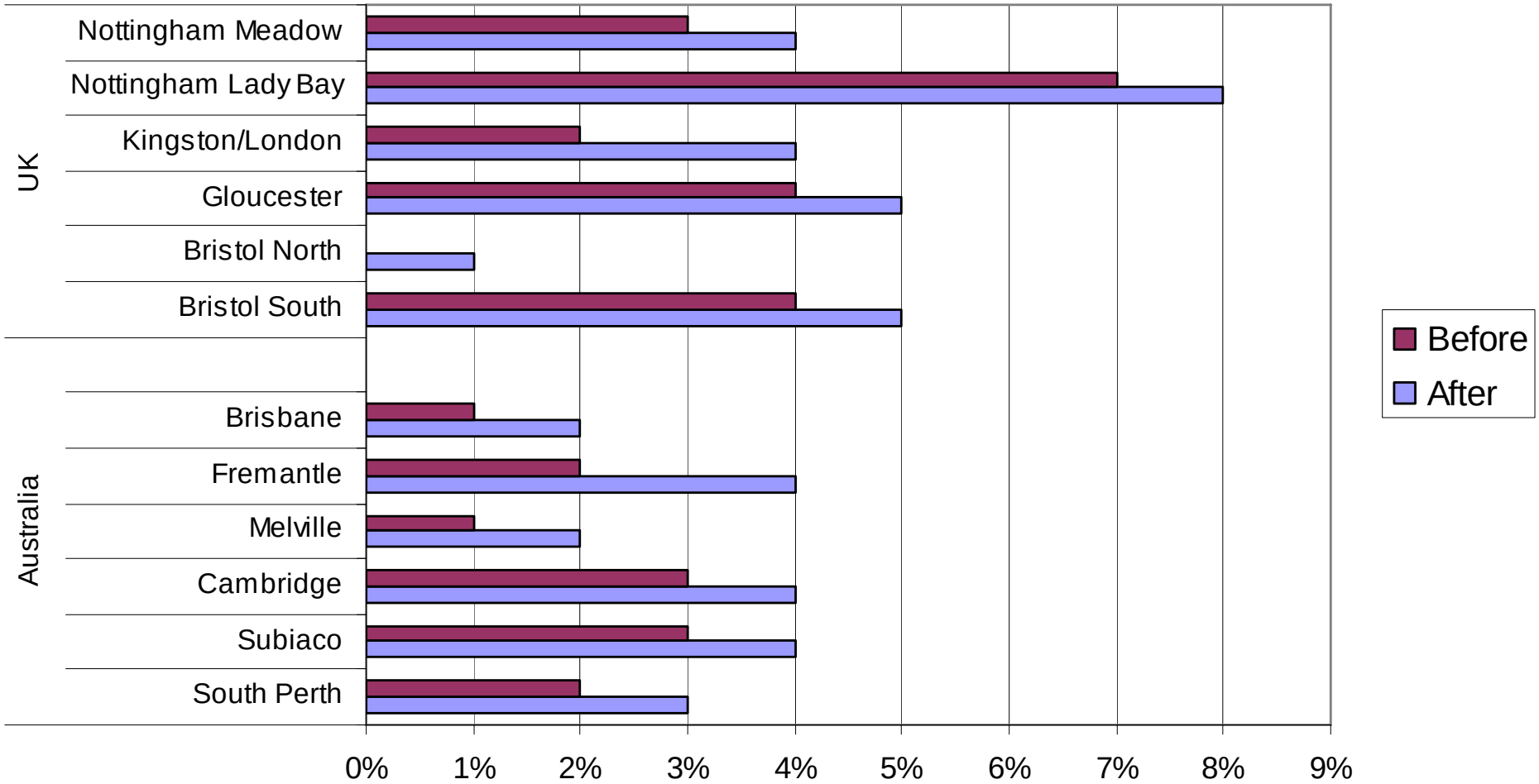
•Personalized advice to each household on how it can walk, bike, and take transit more often

•Results suggest considerable success throughout the world

•Bike share of travel has generally risen by one or two percentage points

•Must have good cycling facilities and bikeable roads first, but Travel Smart can be a valuable complement to any pro-bike programs

Increase in Bike Mode Share due to Travel Smart Programs in the UK and Australia



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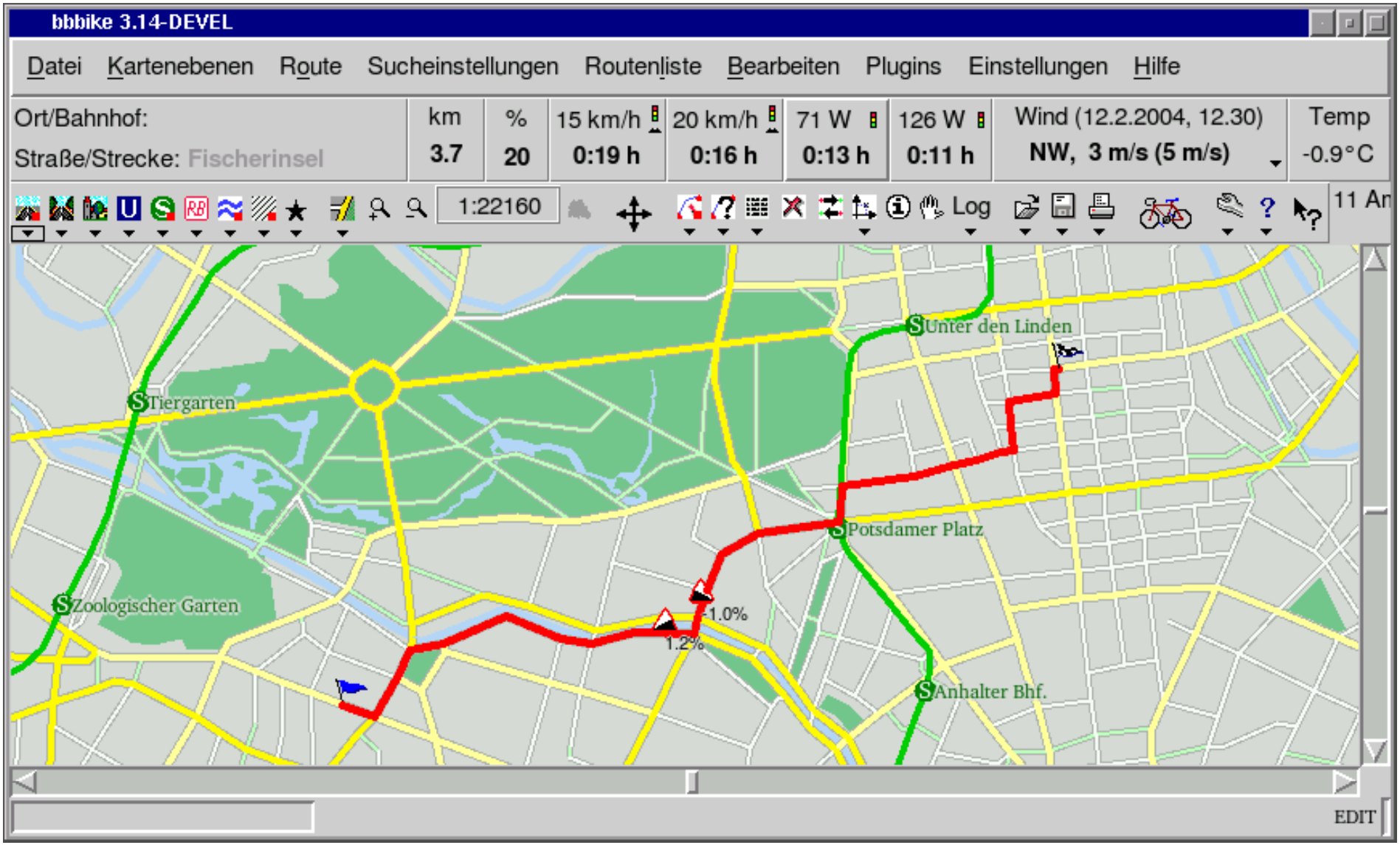
Free internet bike trip planning in Berlin

- Cyclists enter origin, intermediate stops and final destination of their intended bike trips
- Cyclists can indicate preferences for route speeds, whether main streets or side roads, type of pavement, whether on separate bikeways, light or heavy traffic, through parks, etc.
- Program determines optimal route, shows route on map, and provides exact directions, segment by segment
- For recommended route, program calculates the total trip length, total trip time, and number of traffic lights encountered

Recommended route appears in red on computer screen, as shown below, along with trip details shown at top of screen



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Bike Route Planning by Mobile Phone, with suggested route shown on LCD display

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Traffic Education

•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)

Cycling training and testing course in Berlin

All German and Dutch children take cycling lessons by the 3rd or 4th grade and must pass a police-administered cycling safety test!

German traffic laws generally favor cyclists and pedestrians over motorists

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 <u>everyone</u>! Be as inclusive as possible!***
- ***Must cater to huge range of cycling preferences and meet the diverse needs of different groups***
- ***Huge 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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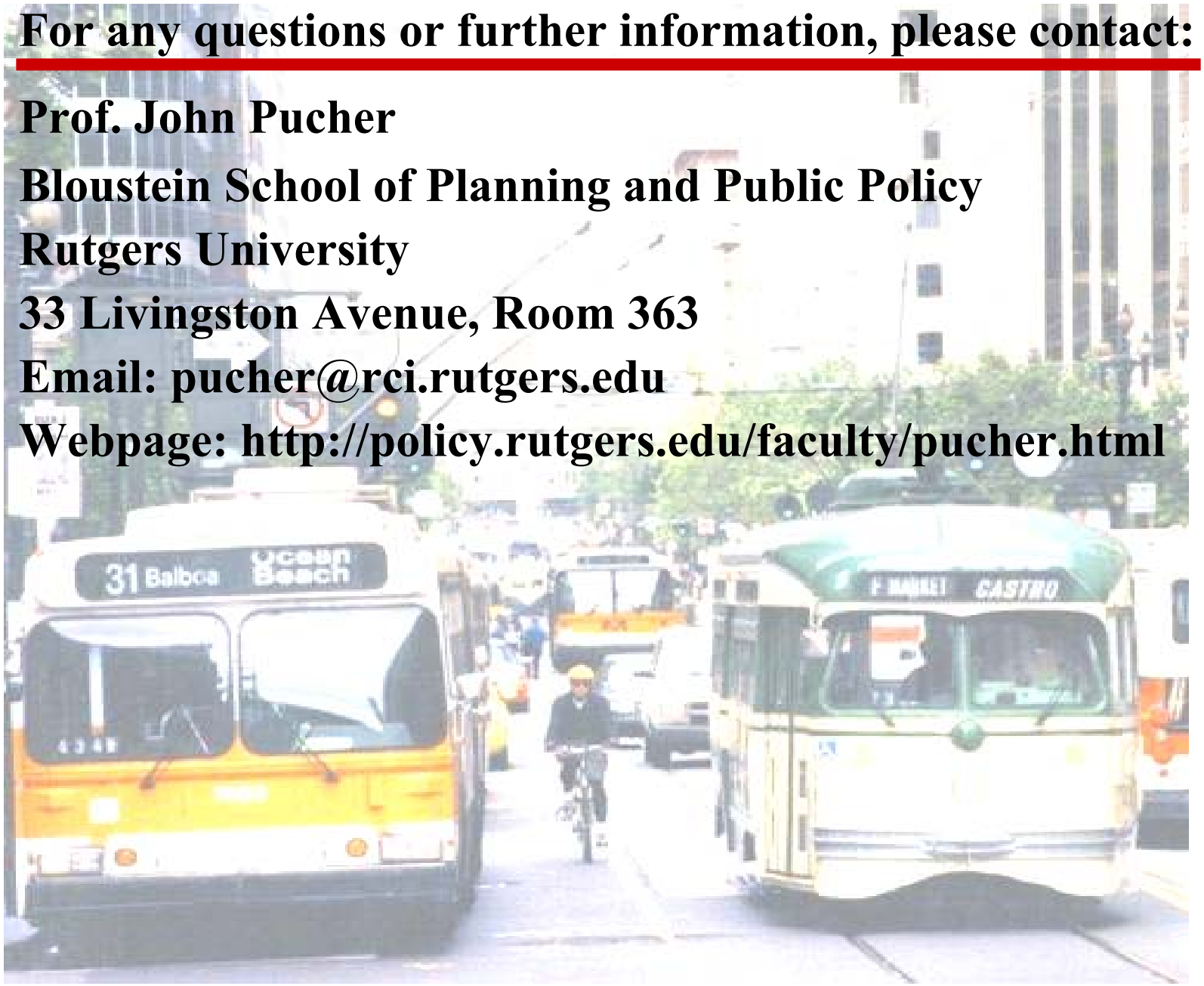
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