



# Active Transport Is a Public Health Intervention, And Then Some

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**University of California, San Diego**

For TRB-ACSM: Moving Active Transportation to Higher Ground

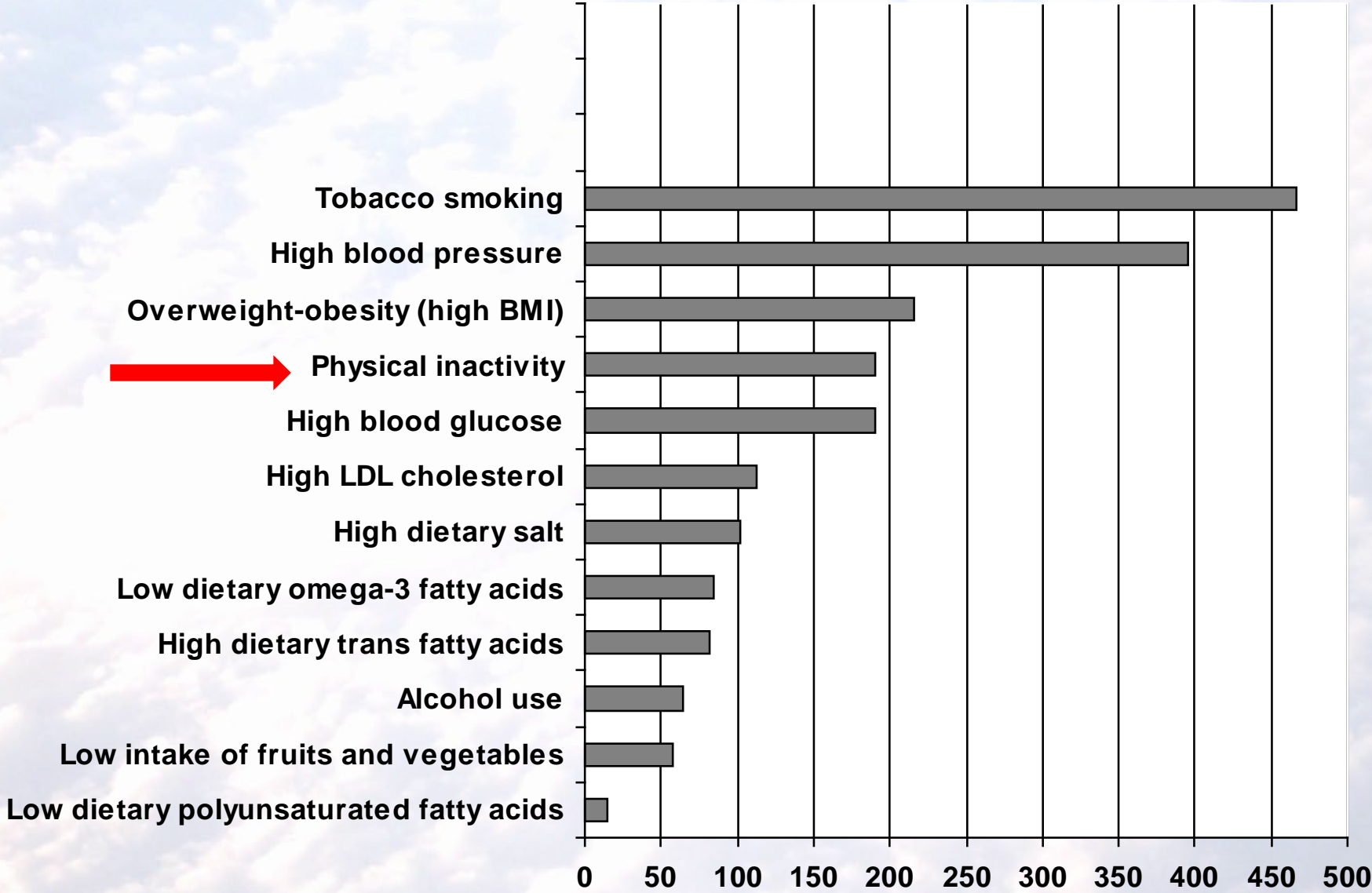
April 13, 2015

# Outline of Talk

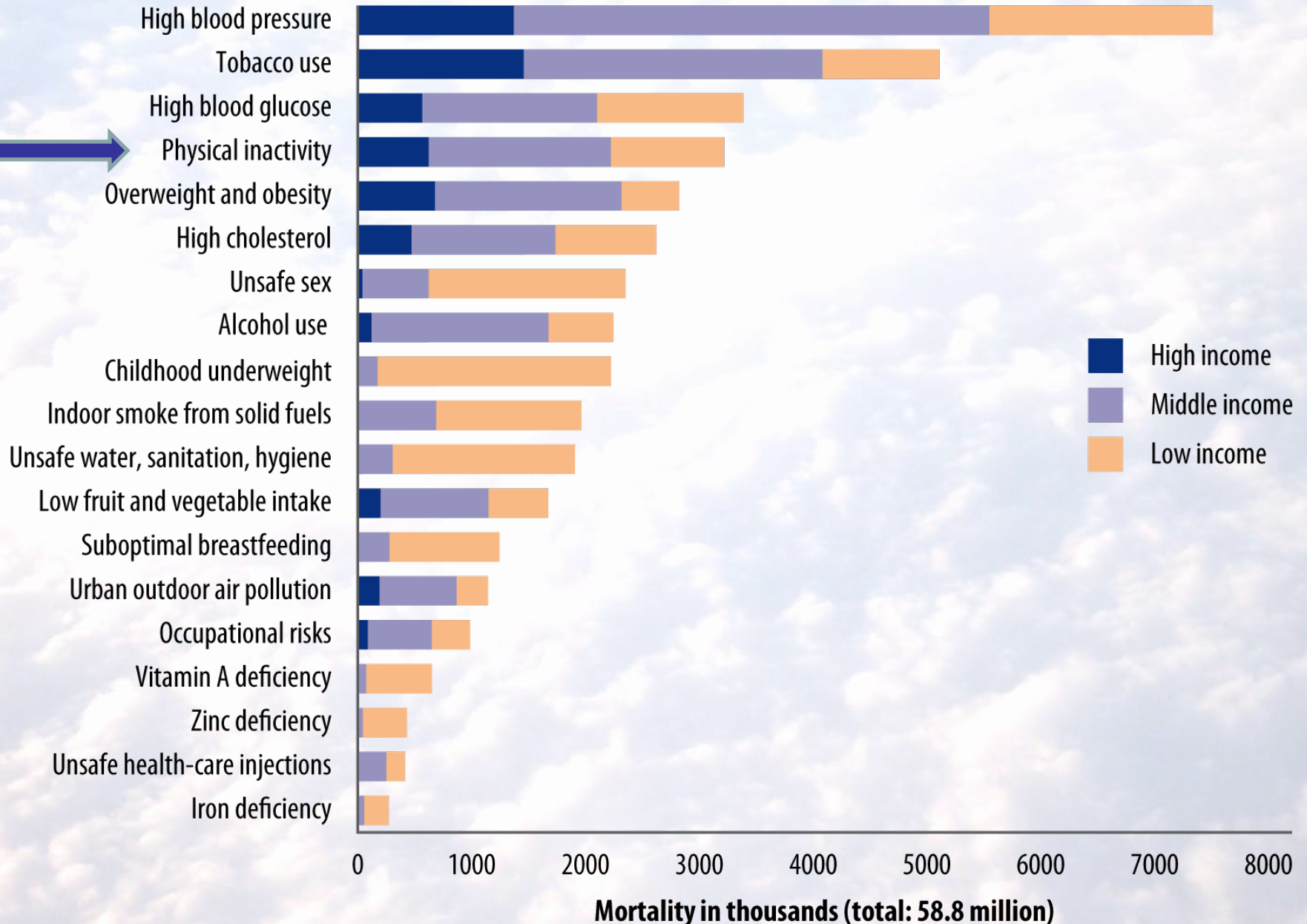
- Physical Activity is an urgent public health priority, especially in the US
- Transportation policies and investments affect physical activity
- Co-benefits of designing activity-friendly communities
- Safe Routes to School as an example of a transportation strategy that benefits health
- Next steps



# Deaths (thousands) attributable to individual risk factors in both sexes



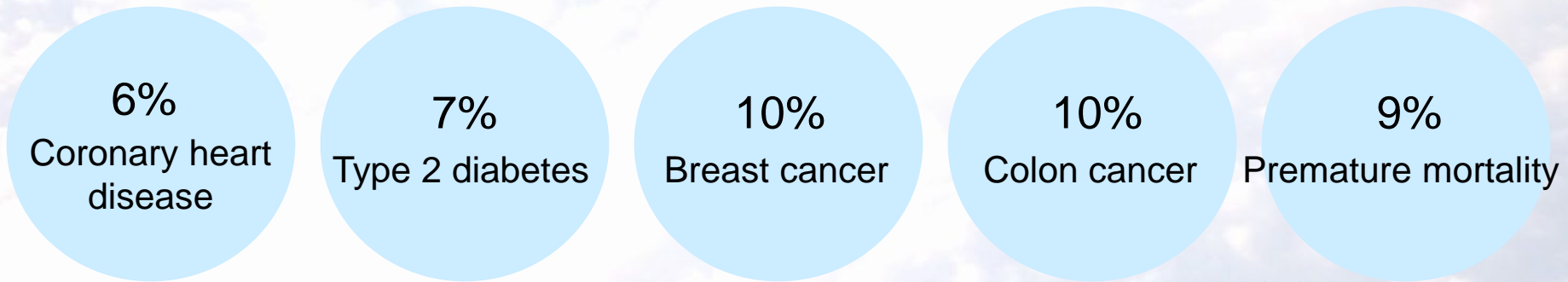
# Deaths attributed to 19 leading factors, by country income level, 2004



# Global Burden of Disease from Inactivity

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~ 6-10% of chronic diseases worldwide is attributable to physical inactivity



- 5.3 M deaths/y worldwide may be avoided by eliminating inactivity

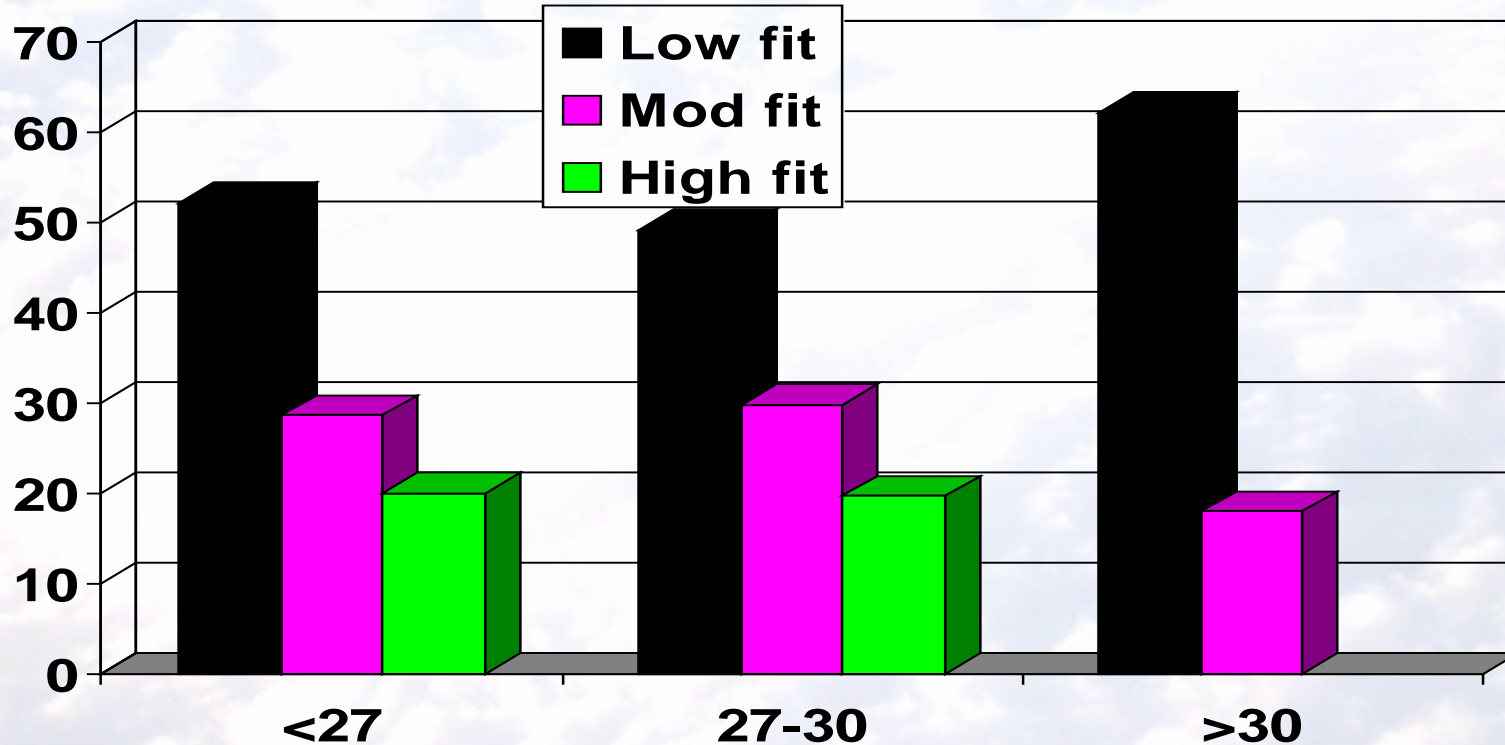


# David visits America: Focus Is on Obesity



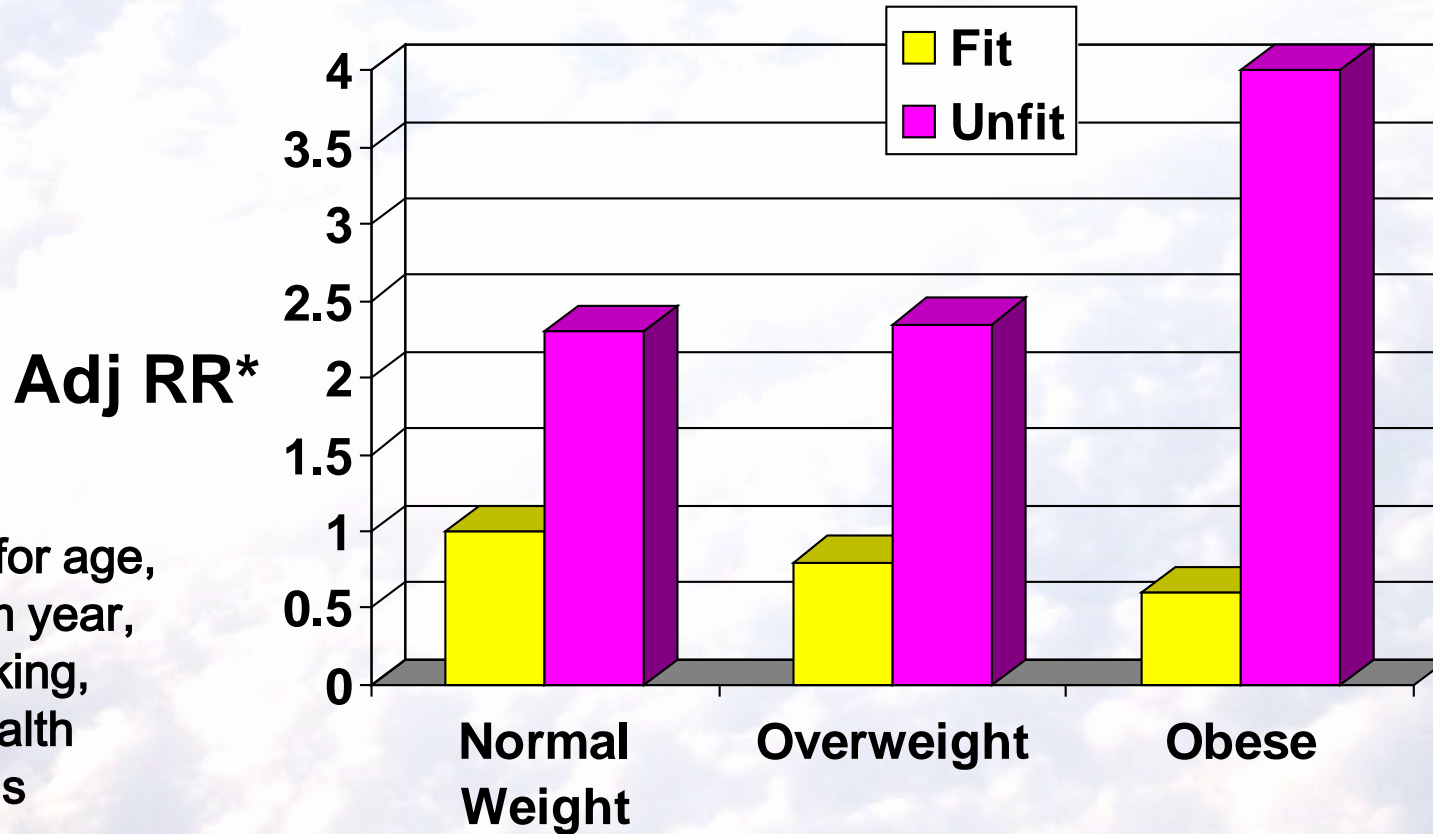
# Fit or Fat? Age-Adjusted Death Rates by Fitness and BMI Categories

Deaths/10,000 MY



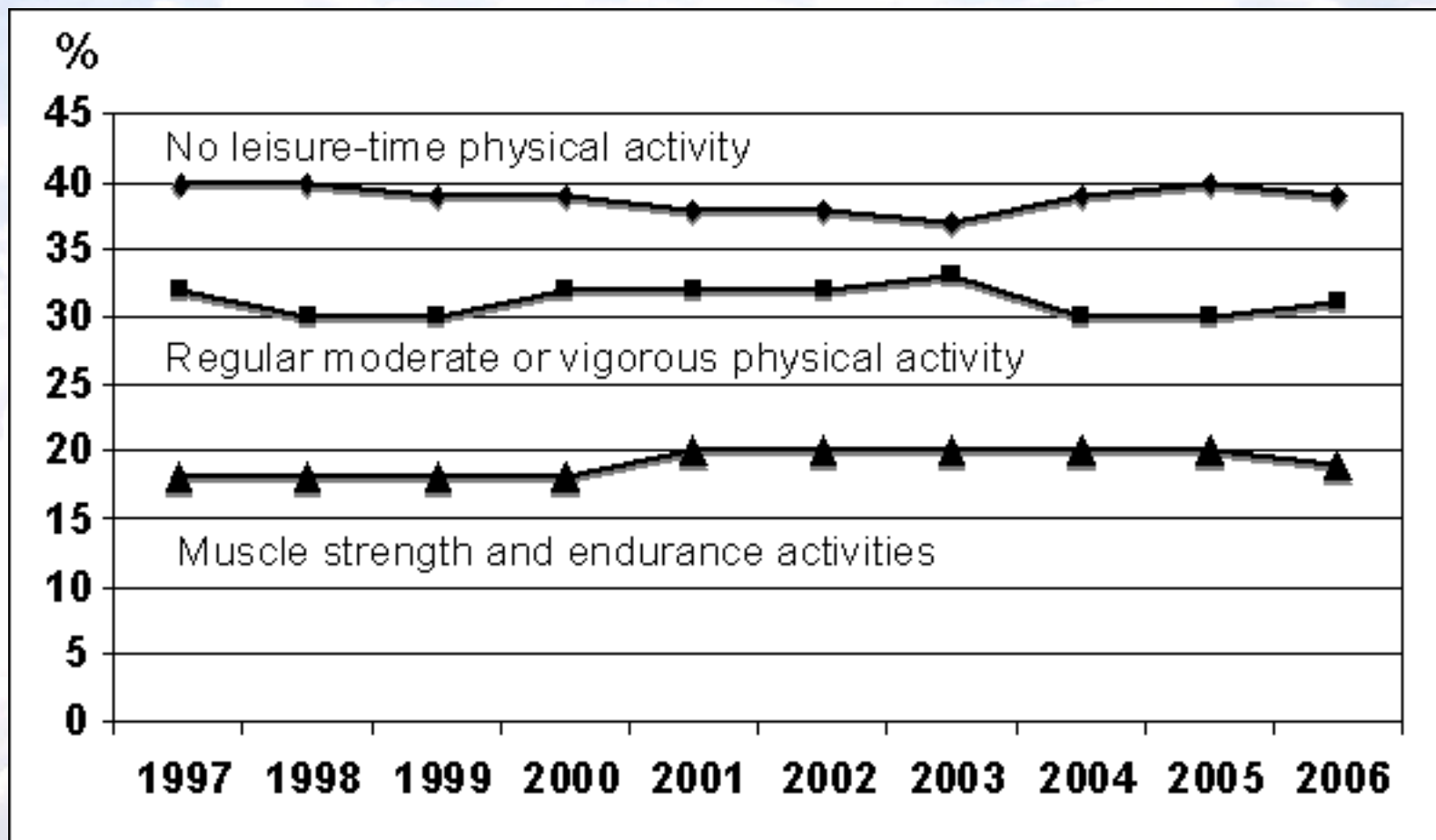
Results held after adjustment for health status, smoking, glucose, cholesterol, & BP

# Adjusted Risk Ratios for All-Cause Mortality by Fitness and BMI, Women





# How are we doing in promoting PA?

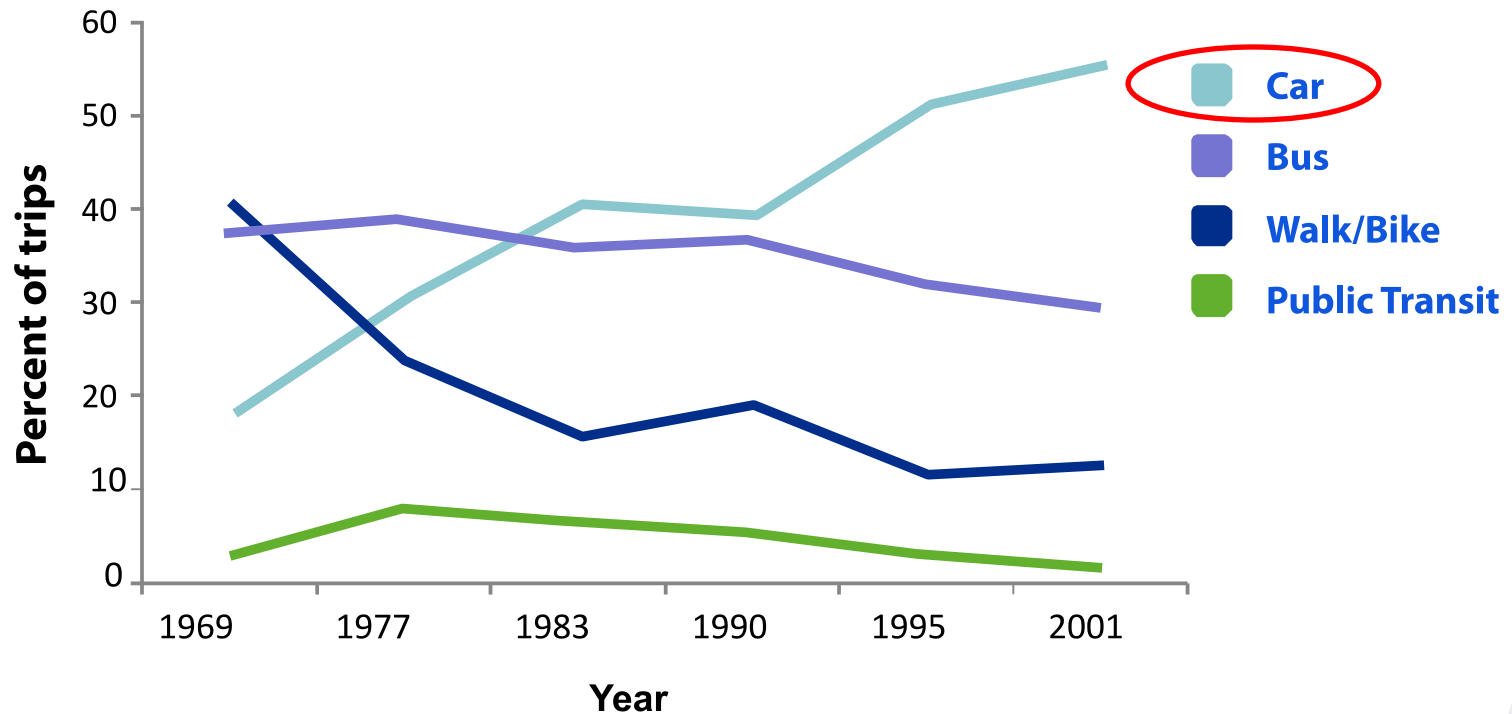


**Reported Physical Activity by Adults in the USA:  
1997-2006 The Healthy People 2010 Database**

Healthy People 2010 Database (DATA2010) for men and women combined

# Active Transportation by Youth has Decreased

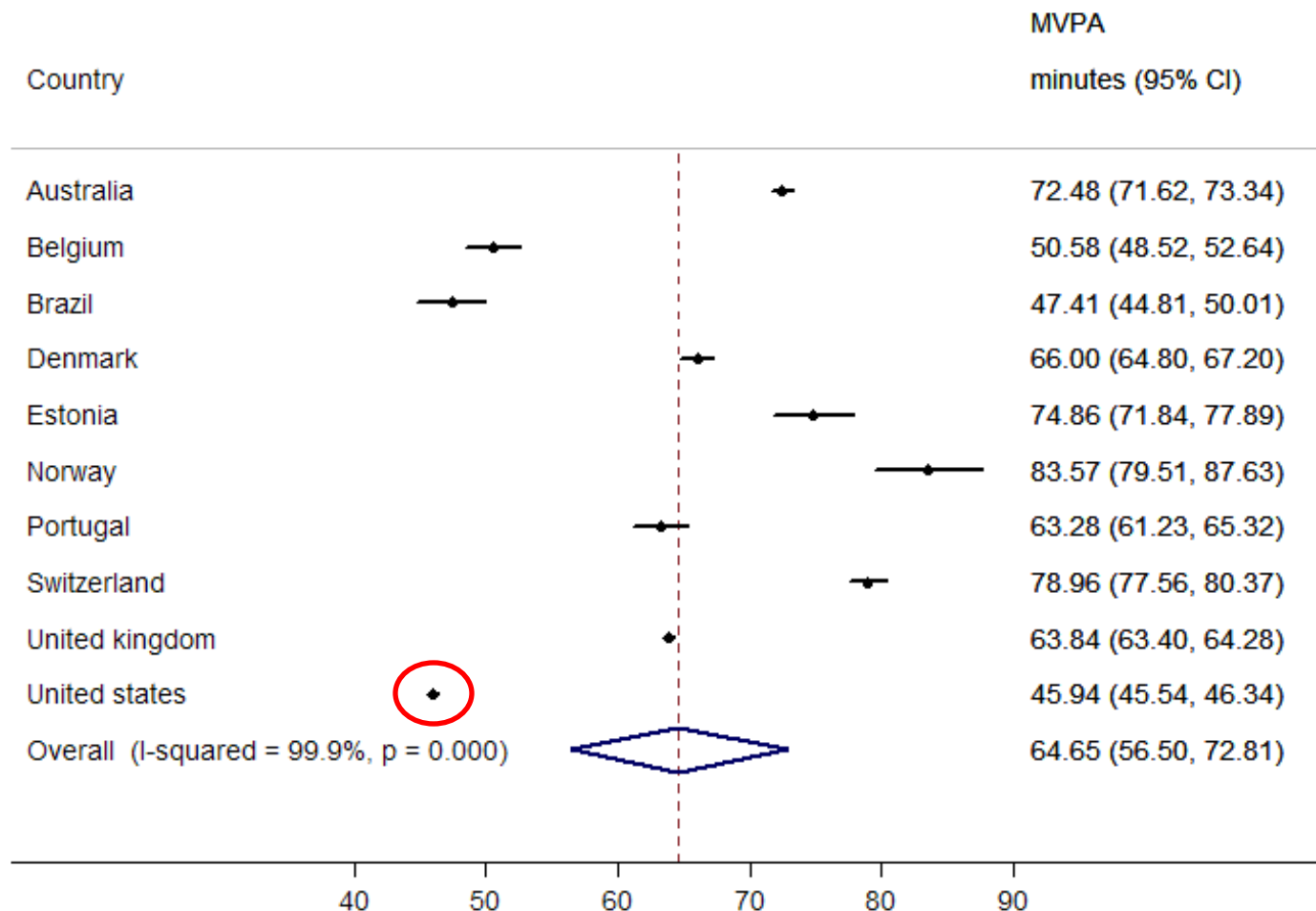
*Mode for Trips to School – National Personal Transportation Survey*



McDonald NC. Am J Prev Med 2007;32:509.

# Accelerometer-based MVPA for Adolescents. From Hallal, Lancet, 2012

## Time Spent in MVPA adjusted for age, sex



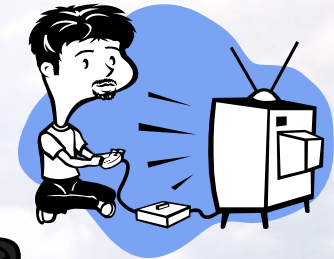


# How Did We Become Inactive?

- **Sleep**



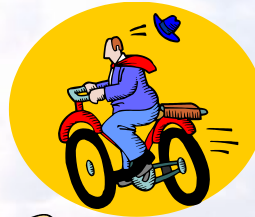
- **Leisure**



- **Occupation**



- **Transportation**



- **Household**



# Land Use and Transport Decisions Are Significant and Affect Health



Residential subdivision



Highway interchange



# Active Transport & Health

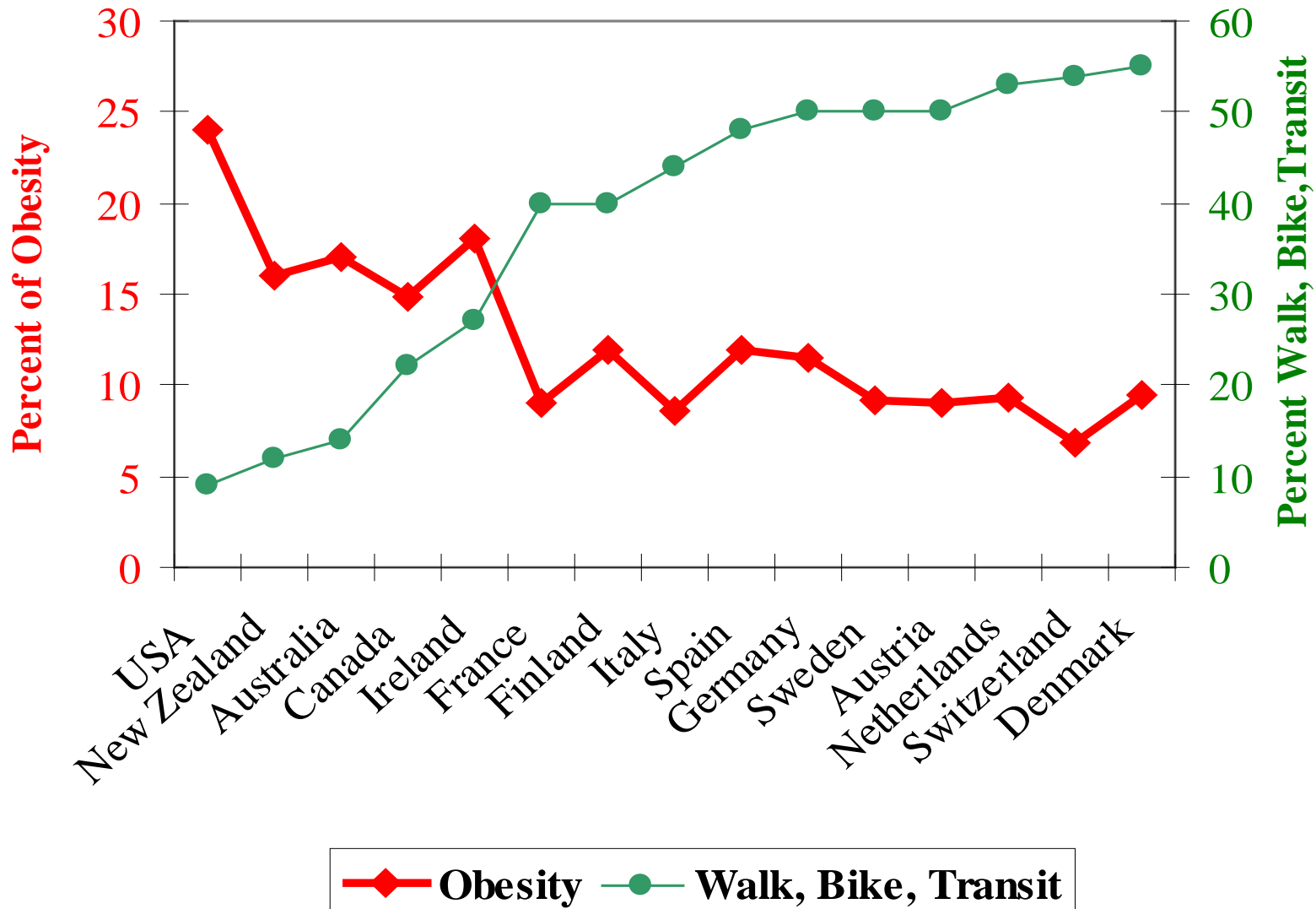
## Am J Public Health 2011

John Pucher & colleagues documented how active commuting related to health outcomes across all 50 US states. Similar results with biggest 47 cities.

% of adults in state who commute by walking & cycling correlated with:	Correlation
% meeting physical activity recommendations	.72**
% obese	-.45**
% diabetic	-.66**



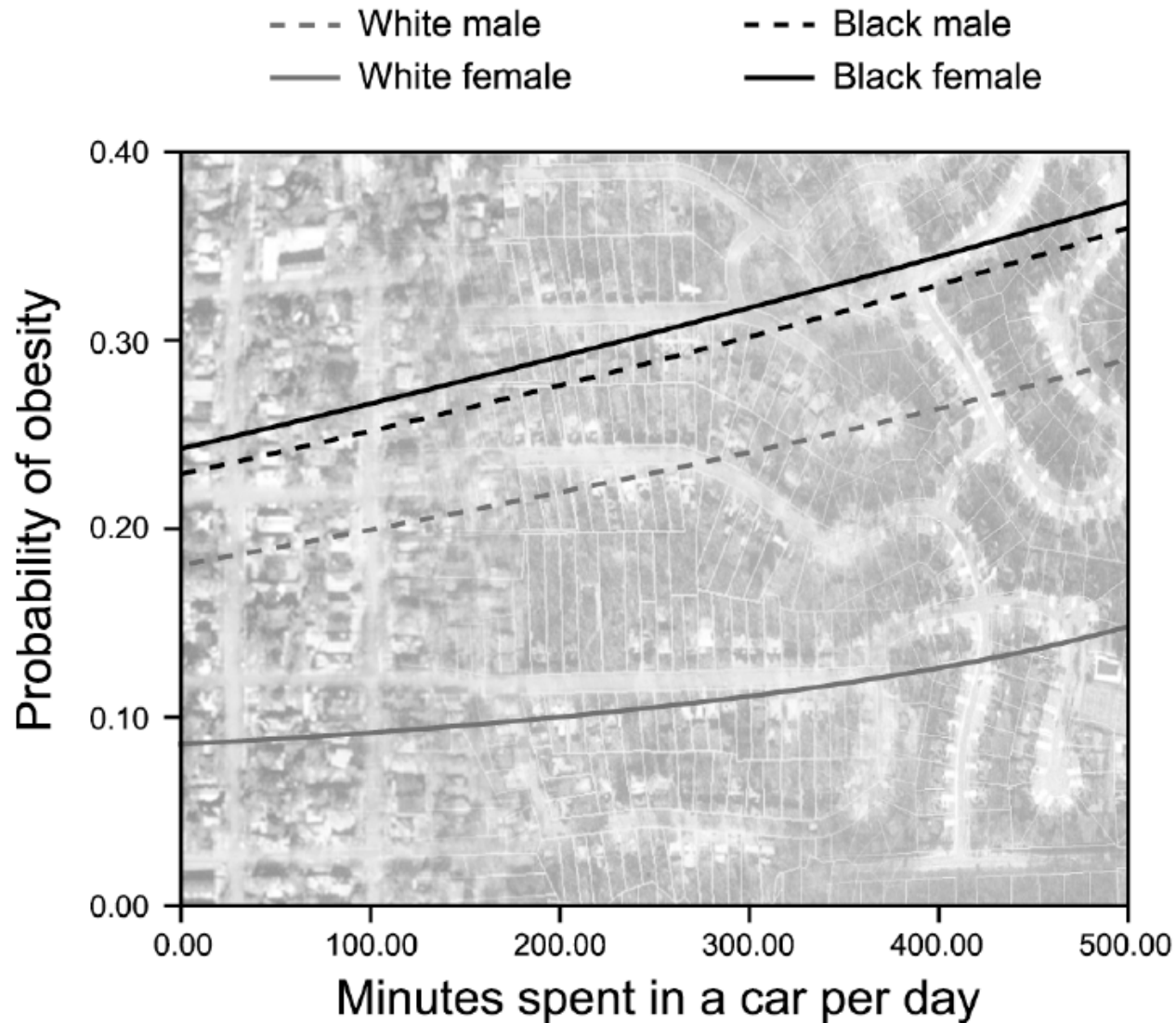
# Obesity is strongly related to walking, cycling, and transit use!



Credit: John Pucher

# Obesity & Driving

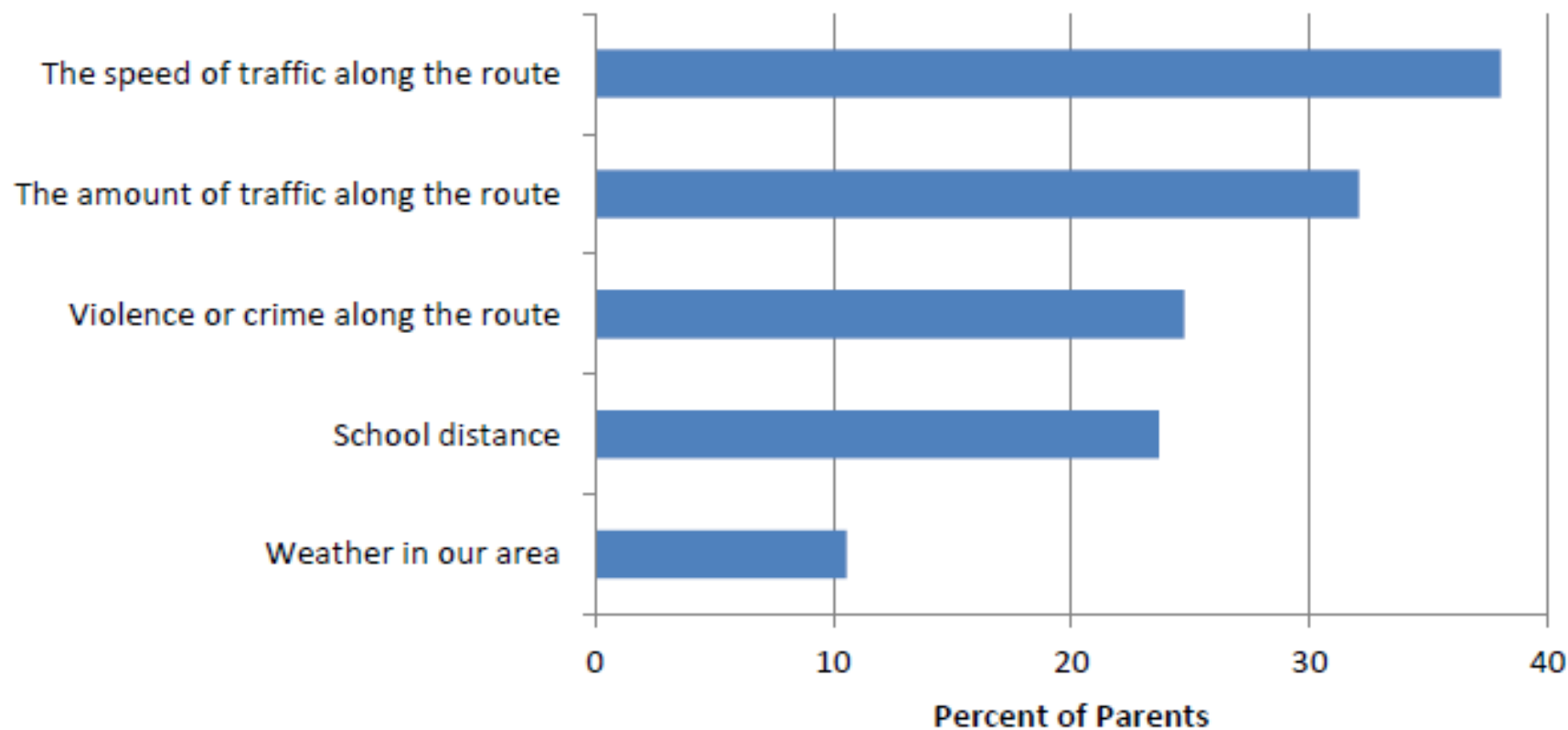
Frank et al. AJPM. 2005



# California Supplement to NHTS

Figure 11 Concerns of Parents of Children who Lived Within Two Miles of School but Did Not Walk or Bicycle to School

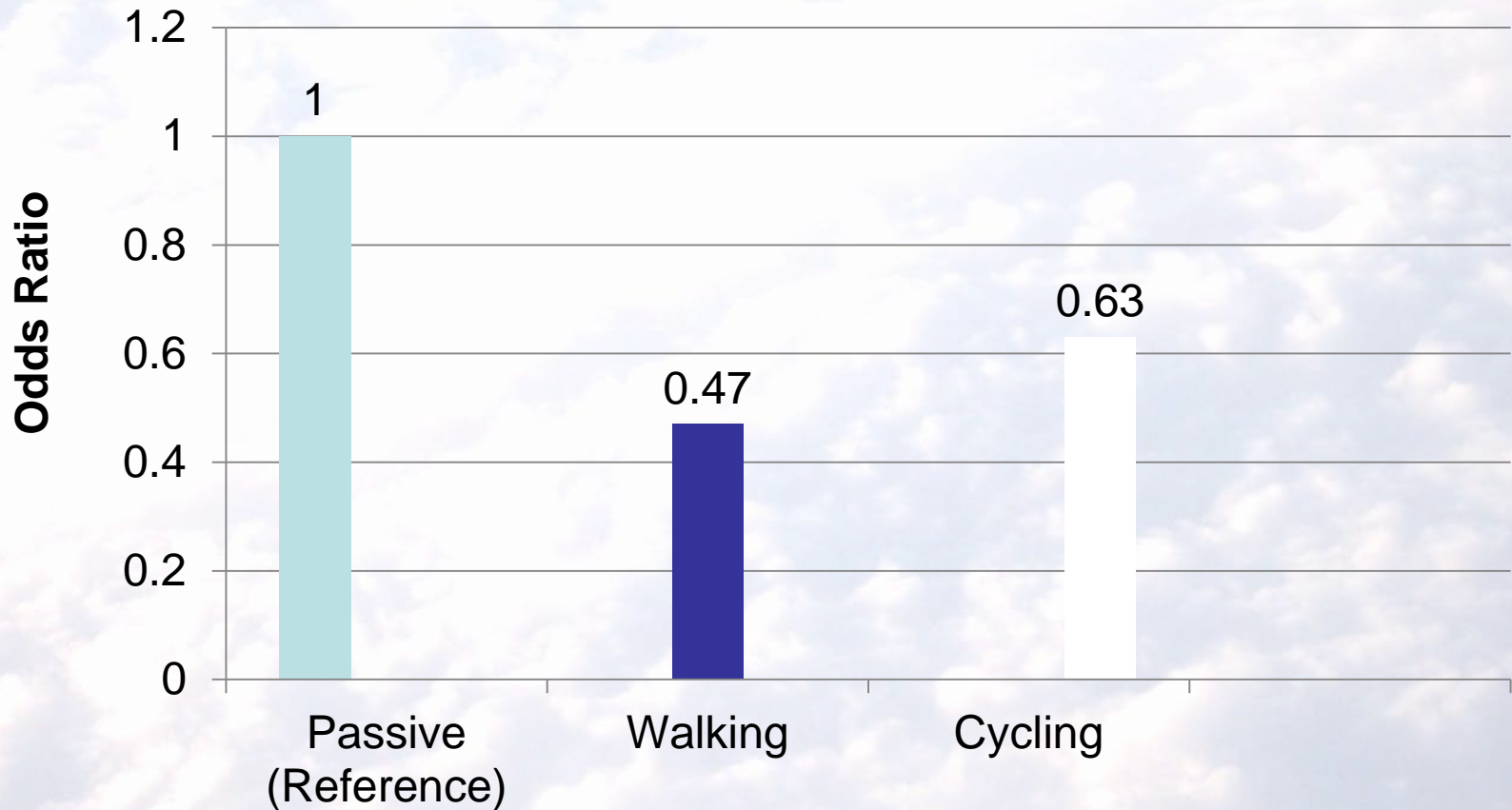
**Parents indicate these are serious issues:**





# Walking and Biking to School Reduces Odds of Being Overweight

A Danish study found that adolescents (N=3847) who walked or cycled to school were less likely to be overweight than those who rode to school.



Østergaard L. et al. Cycling to School Is Associated With Lower BMI and Lower Odds of Being Overweight or Obese in a Large Population-Based Study of Danish Adolescents. *Journal of Physical Activity and Health* 2012, 9: 617-625.



# *Making the Case for Active Cities*

The Co-Benefits of Designing for Active Living  
Supported by Nike

# Purpose of Literature Exploration

- Much research on the environmental attributes likely to contribute to physical activity
- Physical activity is likely not a priority for decision makers such as mayors who have to address many topics
- Understanding the potential co-benefits of environments designed for active living could raise the priority among decision makers
- The goal was to explore literature on potential co-benefits of environmental features with evidence of links to physical activity

Sallis, J.F., et al. (2015). Co-benefits of designing communities for active living: An exploration of literature. **International Journal of Behavioral Nutrition and Physical Activity**, 12: 30.

Link to paper, report, and data tables:

<http://activelivingresearch.org/making-case-designing-active-cities>



# Settings

**Built Environment Settings:** That support physical activity in these areas



- A short list of features was identified for each setting, and co-benefits of those features were searched in scientific and gray literature
- Level of evidence for co-benefits was coded

# Summary of Co-Benefits by Setting: Summing Across Features

**Table 13: Quantitative Estimates of Co-Benefits by Setting**

Built Environment Attribute	Physical Health	Mental Health	Social Benefits	Environmental Sustainability	Safety / Injury Prevention	Economic Benefits
Open spaces / Parks / Trails	57.5+ 3.5(0)	93+	42.5+ 4(0)	20+ 4(0)	23+	19+ 4(0)
Urban design / Land use	105+ 54(0) 19-	31+ 4-	80.5+ 29(0)	265.5+ 45.5(0) 3.5-	13.5(0) 18.5-	69+ 10.5(0) 4-
Transportation systems	7+ 3.5-	3+ 3.5(0)	23+	70+ 21(0) 3-	67+ 14(0) 4-	56+ 3.5(0) 4-
Schools	19.5+ 3.5(0)	21+	11+	21.5+	4+ 3-	15+
Workplaces / Buildings	55+ 3.5(0)	18.5+ 4-		20.5+		48+ 3.5(0)

# Activity-Friendly Urban Design/Land Use Features: Co-benefits

Table 9: Urban Design / Land Use Summary Scores

Built Environment Attribute	Physical Health	Mental Health	Social Benefits	Environmental Sustainability	Safety / Injury Prevention	Economic Benefits
Residential density	19+ 21.5(0) 7.5-		13.5+ 14.5(0)	88+ 21(0) 3.5-	4.5(0) 7.5-	15+ 3.5(0)
Mixed land use	28+ 17(0) 4-	4.5+ 4-	33+ 11(0)	95+ 21(0)	4.5(0) 11-	22.5+ 3.5(0) 4-
Streetscale pedestrian design	7.5+		7.5+	7.5+		7+
Greenery	20.5+ 3.5(0)	26.5+	12+	39.5+		12+
Accessibility & Street connectivity	30+ 12(0) 7.5-		14.5+ 3.5(0)	35.5+ 3.5(0)	4.5(0)	12.5+ 3.5(0)

**202 entries. Of 30 cells, 8 had strong evidence of co-benefits, 5 had good evidence, and 6 had moderate evidence of positive effects. 5 cells with net negative effects.**



# Designing for Active Transportation: Co-benefits

Table 10: Transportation Systems Summary Scores						
Built Environment Attribute	Physical Health	Mental Health	Social Benefits	Environmental Sustainability	Safety / Injury Prevention	Economic Benefits
Pedestrian / Bicycle facilities		3+	7+	10.5+ 3.5(0)	27.5+ 4(0)	22.5+ 3.5(0)
Crosswalk markings					6(0) 4-	
Traffic calming	3.5+	3.5(0)	3+	3+ 3-	23+	3+
Public Transportation	3.5-			28.5+ 17.5(0)		20+ 4-
Traffic speed/ Volume	3.5+		3+	14+	7+	7+
Safe routes to school			3+	3.5+	9.5+ 4(0)	
Ciclovia / Play streets			7+			3.5+
Managed parking				10.5+		

**81 entries. Of 48 cells, 5 had strong evidence of co-benefits, 2 had good evidence, and 6 had moderate evidence of positive effects. 1 cells with negative effects.**



# Designed for Active Travel





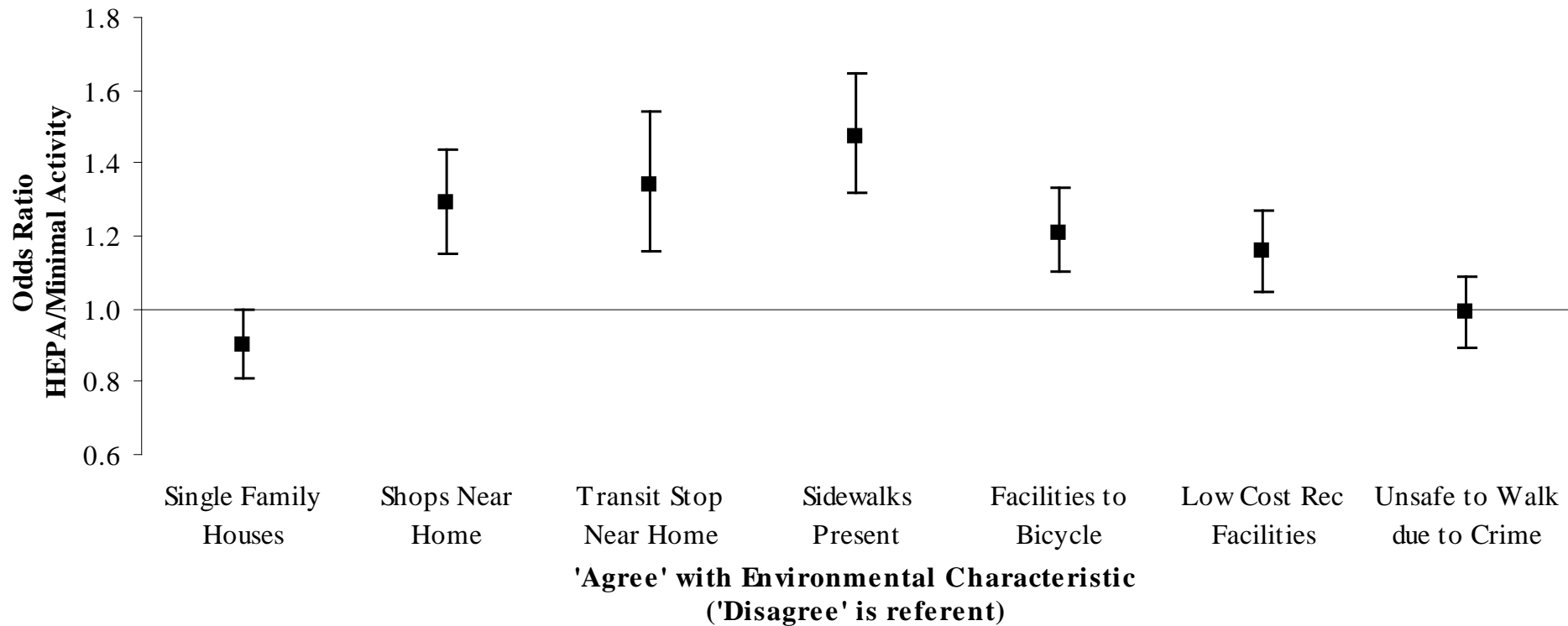
# Not designed for active travel





# Association of Environmental Attributes & PA in 11-Country Study

Associations Between Individual Environmental Characteristics and HEPA/Minimal Activity Among Respondents who Live in Cities with Population  $\geq 30,000$



# Multistate Evaluation of Safe Routes to School Programs

*Orion Stewart, MUP; Anne Vernez Moudon, Dr Es Sc; Charlotte Claybrooke, MS*

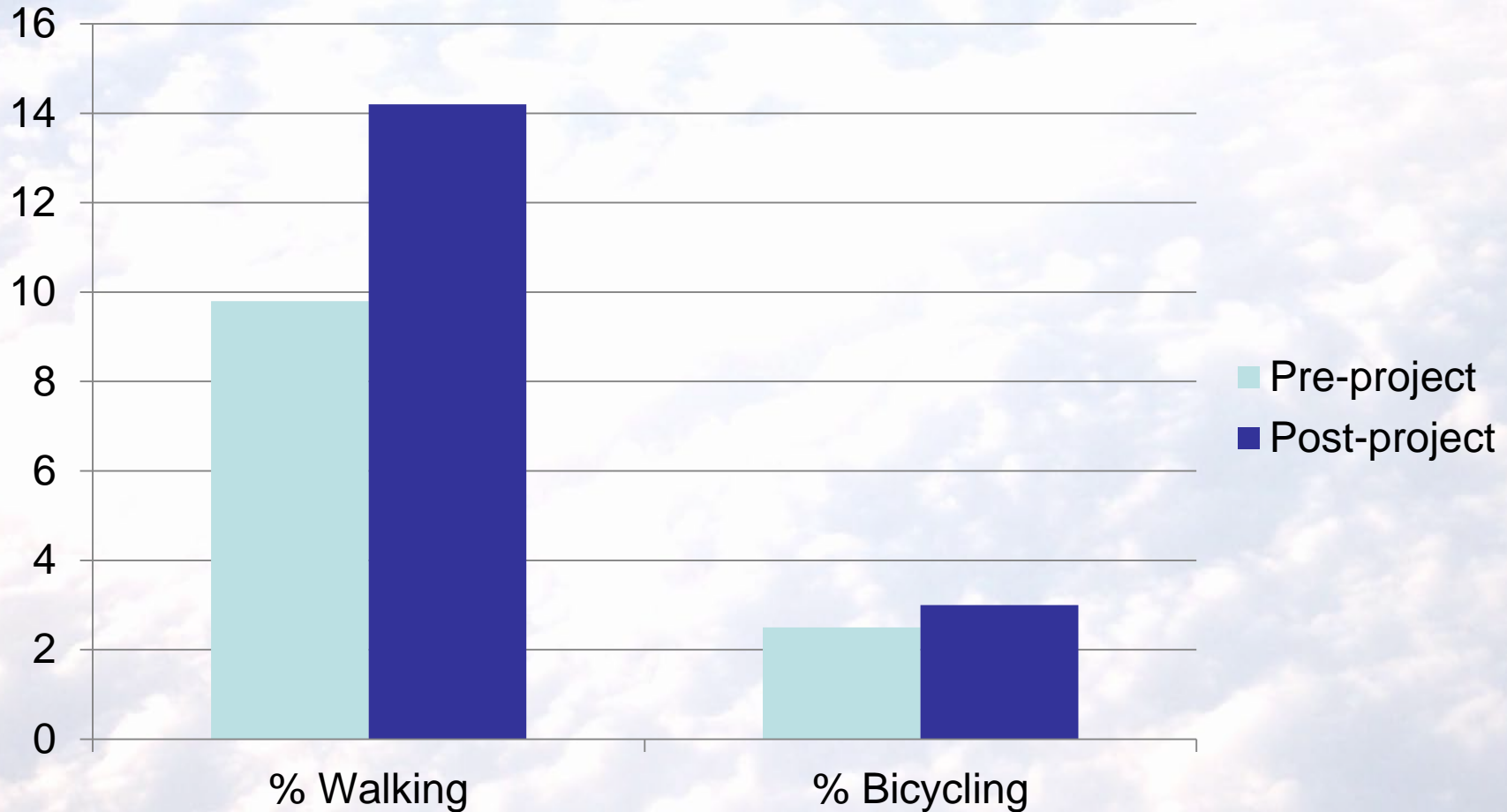
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S89

# Walking & Cycling to School Pre & Post SRTS Projects in 5 States



Moving Forward: WASH DOT.

<http://www.wsdot.wa.gov/research/reports/fullreports/743.3.pdf>



# Next Steps

- Include public health content in transportation training, and vice versa
- Continuing education to strengthen collaborations of transportation and public health practitioners and researchers
- TRB, USDOT, and NIH fund more studies of health effects of transportation and innovative solutions
- MPOs and DOTs routinely measure active travel, improve travel models, & consider health outcomes
- Change goals of transportation from moving cars to moving people.
- States adopt and implement Health in All Policies



AMERICAN COLLEGE  
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LEADING THE WAY



# ActivEarth

***Move More. Inspire Change. Transform Communities.***

ActivEarth advocates for effective and innovative policies and programs that support active transportation and its co-benefits.

**[www.activeearth.org](http://www.activeearth.org)**

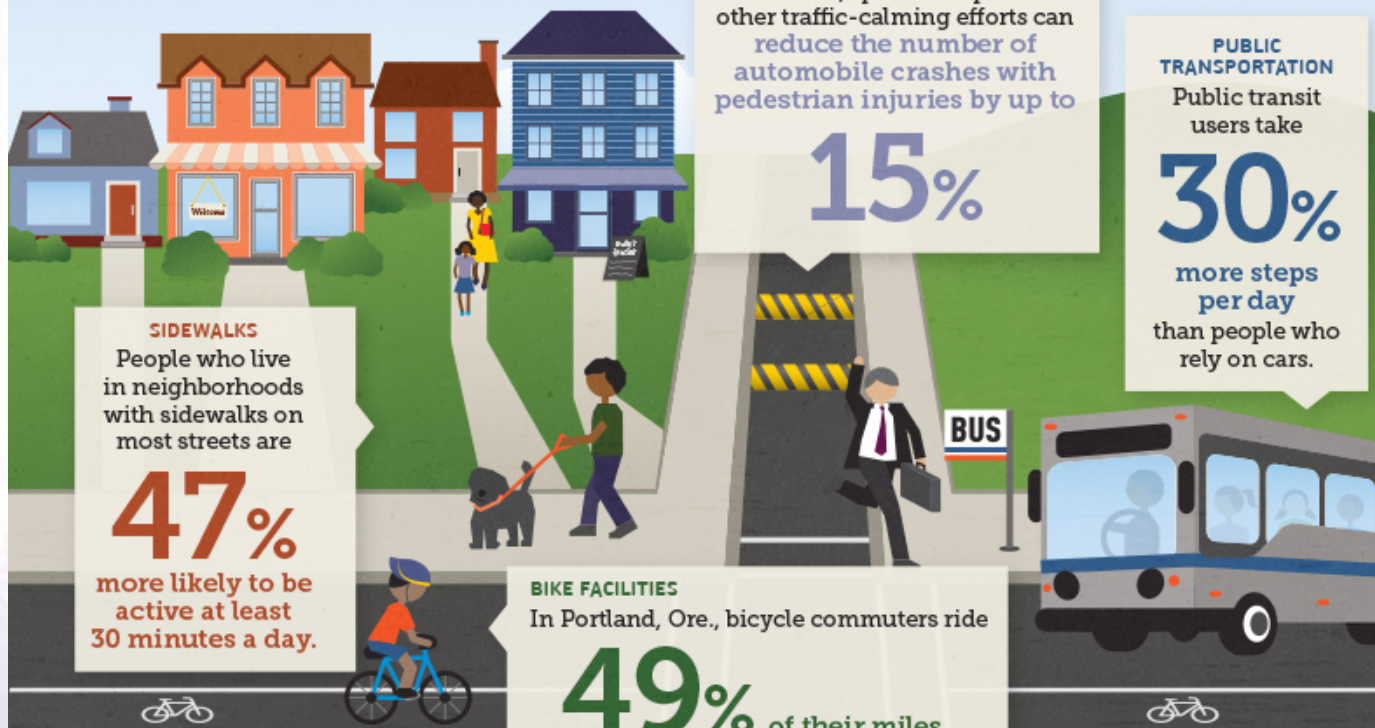


# Resources at [www.activelivingresearch.org](http://www.activelivingresearch.org)

THE ROLE OF

## Transportation

IN PROMOTING PHYSICAL ACTIVITY



Active Living Research  
[www.activelivingresearch.org](http://www.activelivingresearch.org)

Sources: SIDEWALKS: Sallis J, Bowles H, Bauman A, et al. "Neighborhood Environments and Physical Activity among Adults in 11 Countries." *American Journal of Preventive Medicine*, 36(6): 484-490, June 2009. BIKE LANES: Dill J et al. "Bicycling for Transportation and Health: The Role of Infrastructure." *Journal of Public Health Policy* (2009) 30, 595-5110. doi:10.1057/jphp.2008.56). TRAFFIC CALMING: Bunn F, Collier T, Frost C, et al. "Area-Wide Traffic Calming for Preventing Traffic Related Injuries." *Cochrane Database of Systematic Reviews* (1), January 2003; Elvik R. "Area-Wide Urban Traffic Calming Schemes: A Meta-Analysis of Safety Effects." *Accident Analysis and Prevention*, 33(3): 327-336, May 2001. PUBLIC TRANSPORTATION: Edwards R. "Public Transit, Obesity, and Medical Costs: Assessing the Magnitudes." *Preventive Medicine*, 46(1): 14-21, January 2008.