



Active Living: Using Research to Inform Policy and Practice

James Sallis

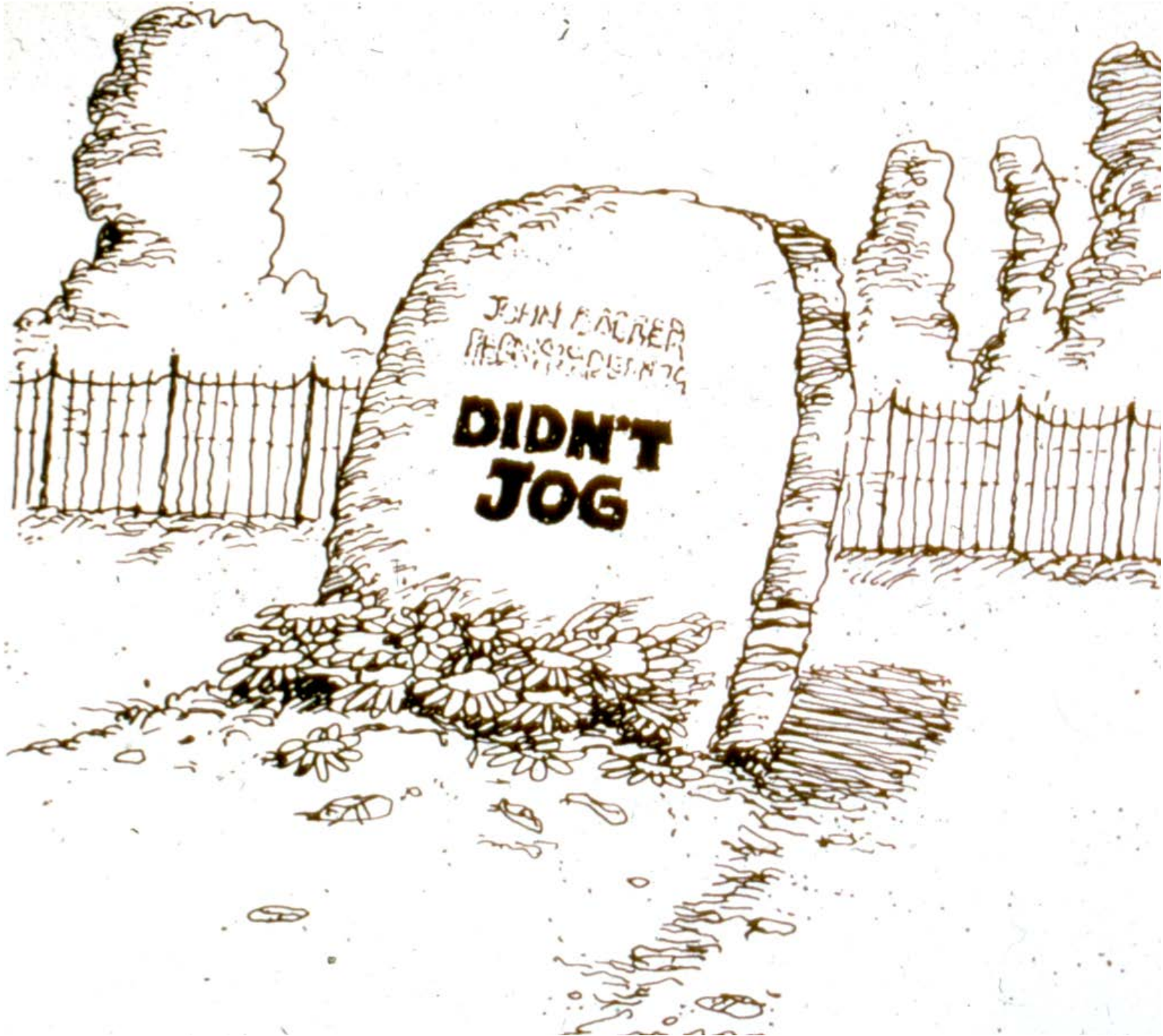
UCSD, Active Living Research

<http://sallis.ucsd.edu>

Society for Nutrition Education and Behavior. July 30, 2016

Outline

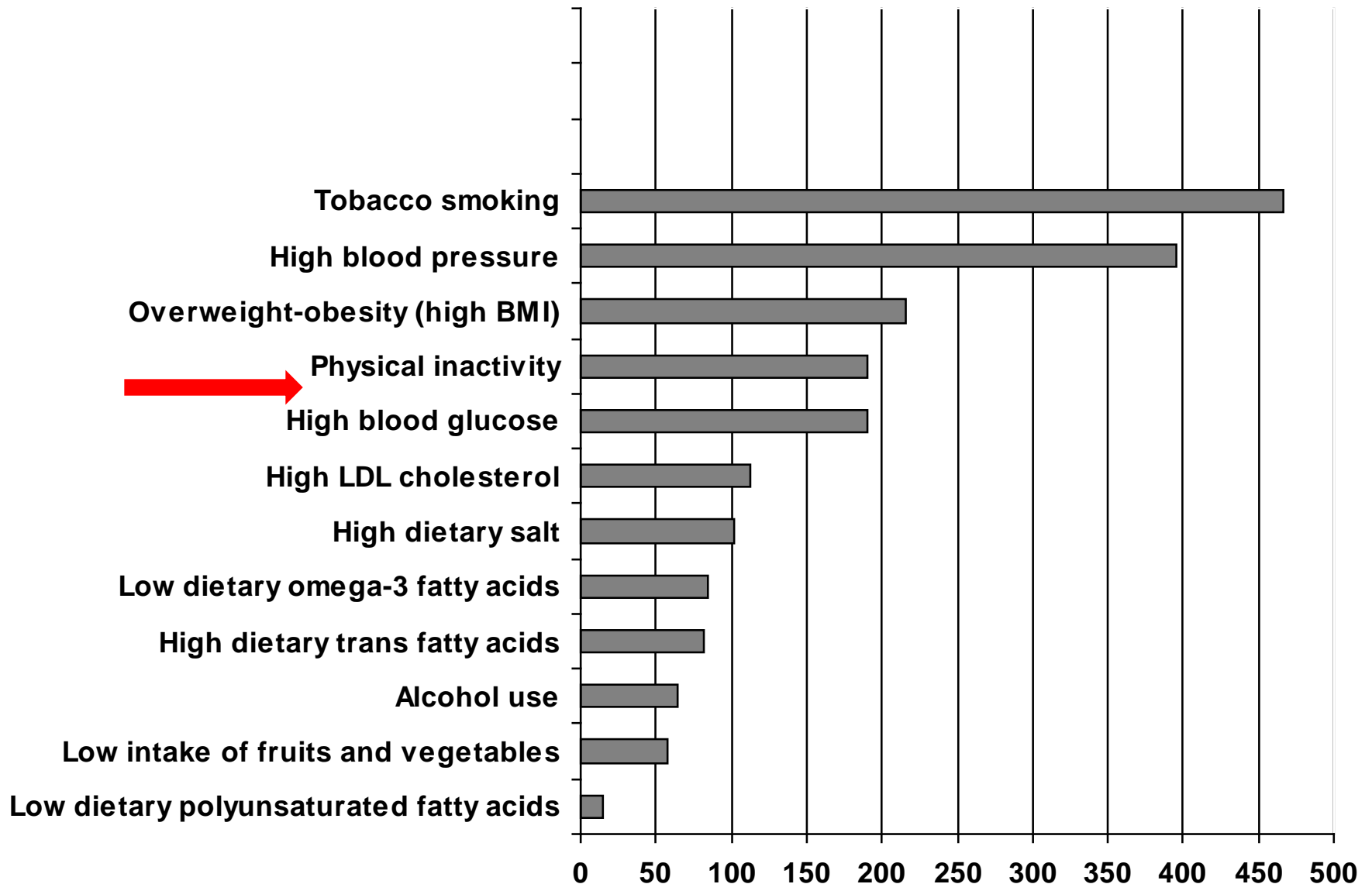
- Why physical activity?
- What is evidence about the role of environments and policies in active living?
- Examples of effective PSE strategies
- How to improve our translation of research to policy and practice



JOHN SACRED
FEBRUARY 1924 - DECEMBER 1976

**DIDN'T
JOG**

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

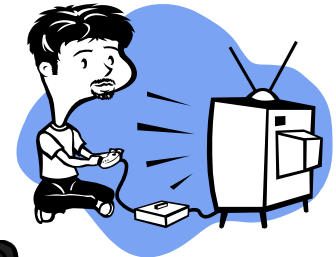


How Did We Become Inactive?

- **Sleep**



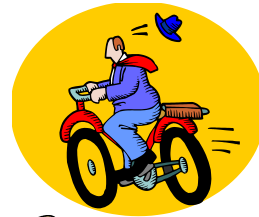
- **Leisure**



- **Occupation**



- **Transportation**



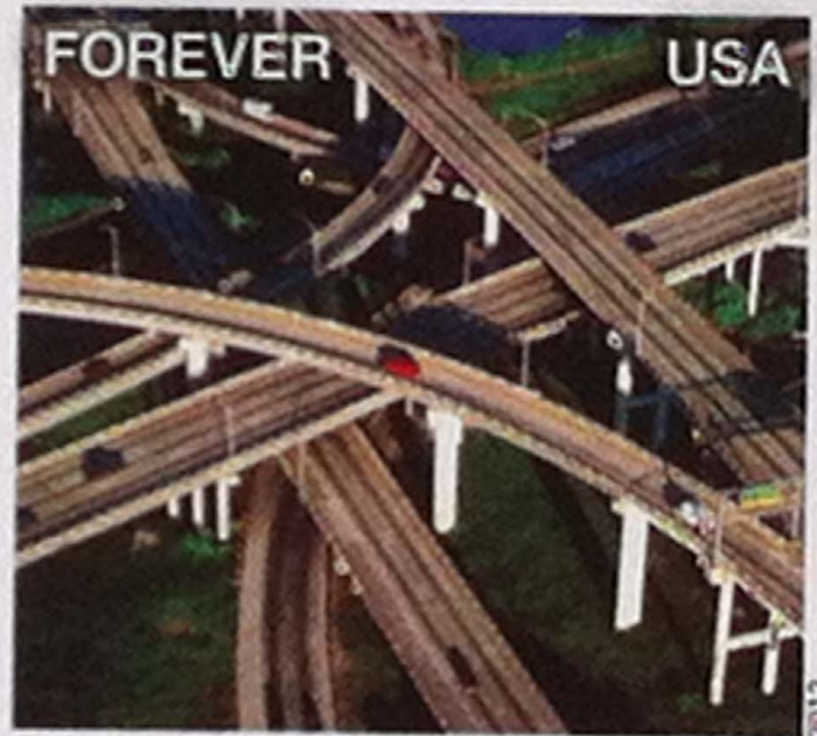
- **Household**



We have invested \$Billions to make active transport difficult or impossible



Residential subdivision

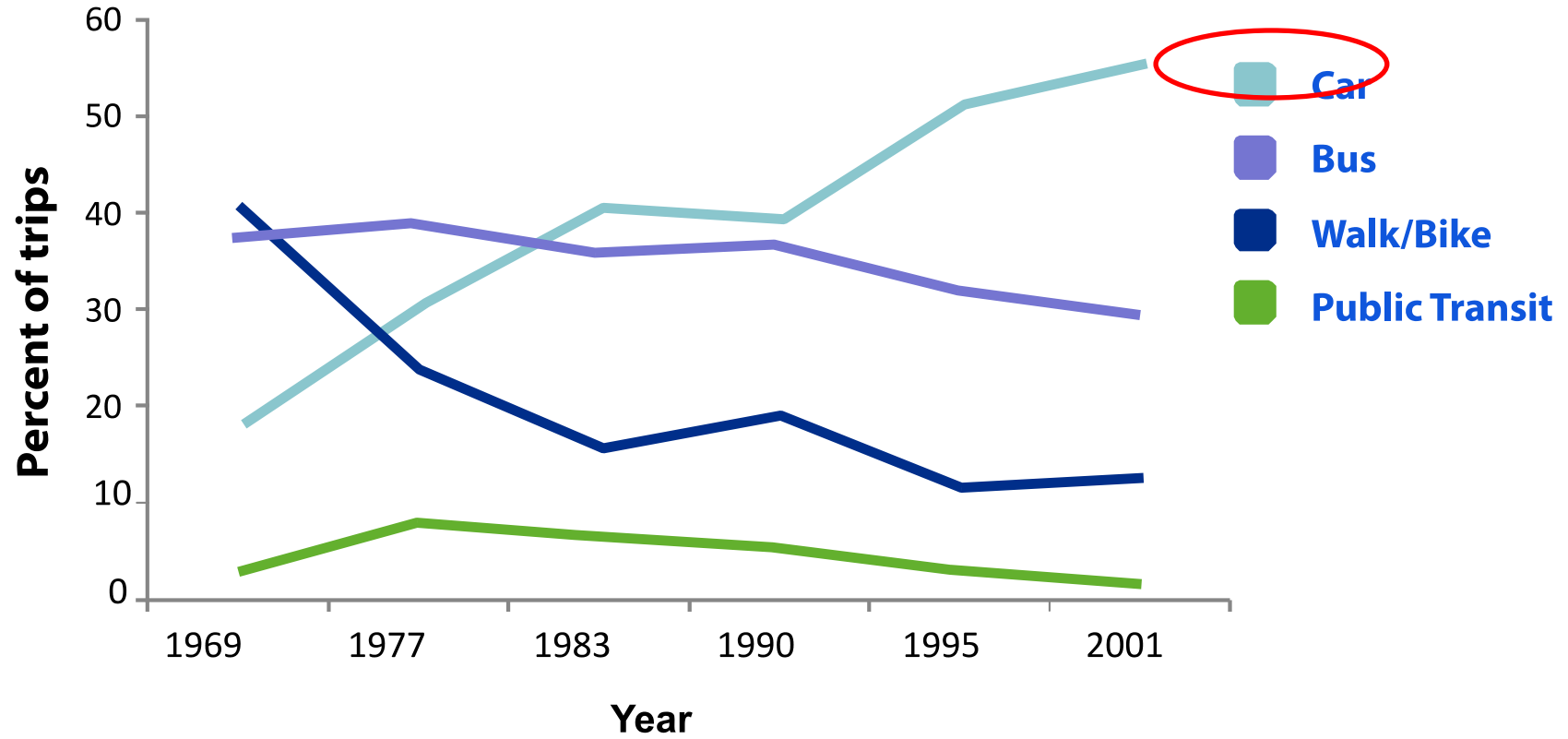


Highway interchange



Active Transportation by Youth has Decreased

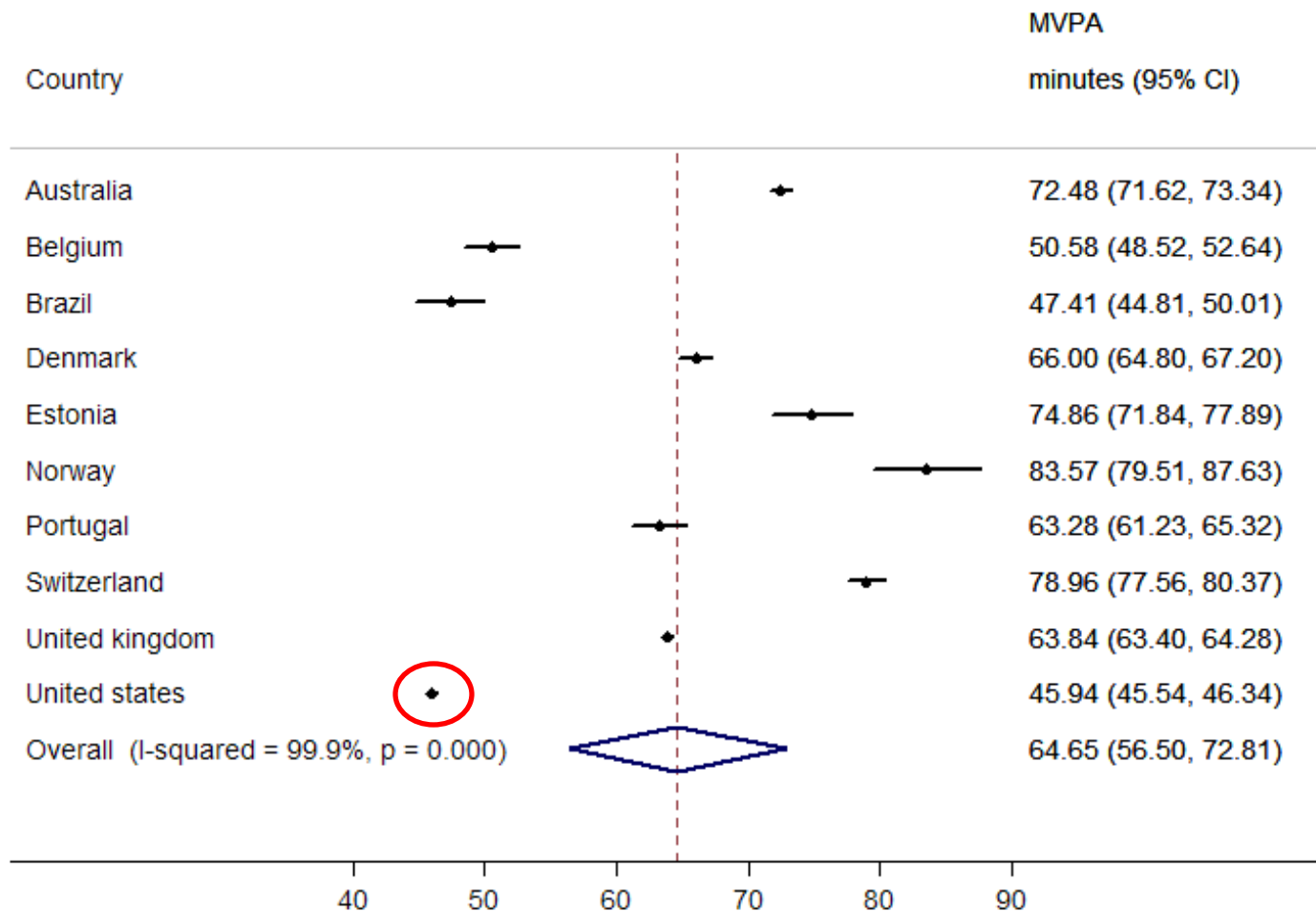
Mode for Trips to School – National Personal Transportation Survey



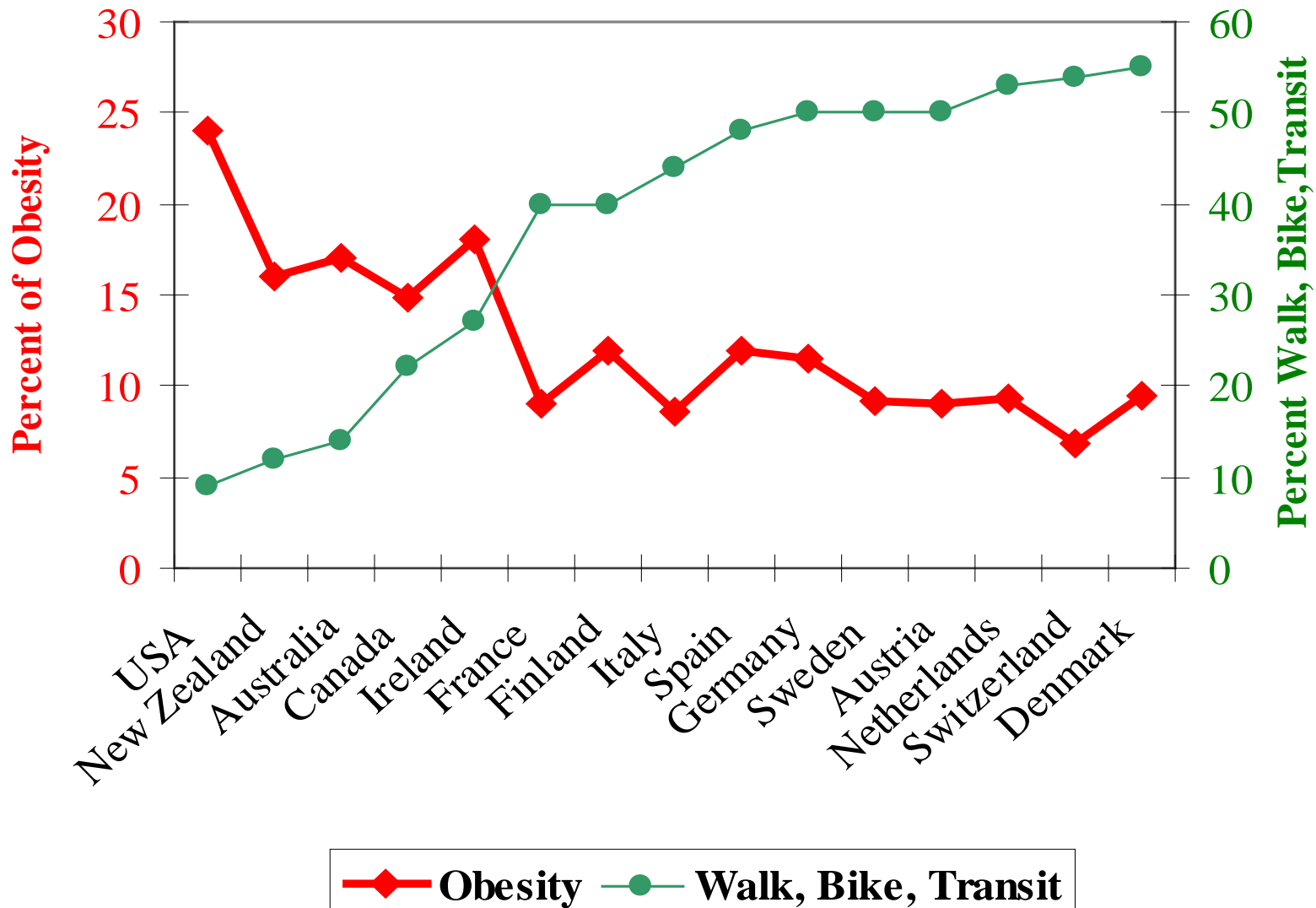
Accelerometer-based MVPA for Adolescents.

From Hallal, Lancet, 2012

Time Spent in MVPA adjusted for age, sex



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



Elements of An Active Living Community

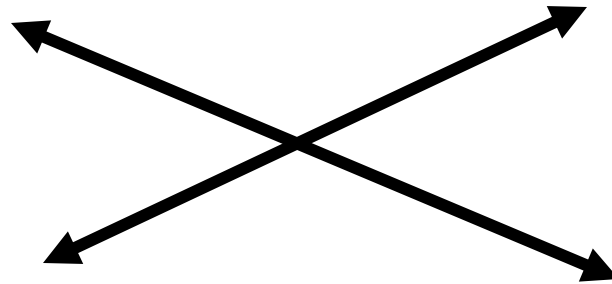
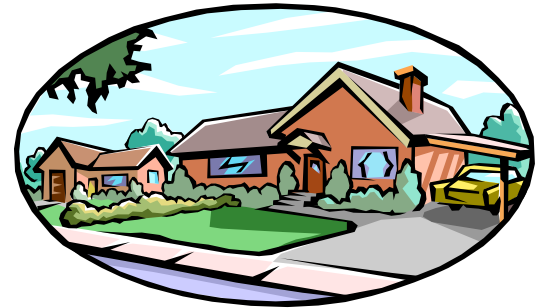
**Community Design
Destinations**



Transportation System



Home



School & Worksite



Park & Rec



Public Health Needs to Partner

Setting for PA

- Neighborhood
- Transportation facilities (sidewalks)
- Recreation facilities
- Schools & workplaces

Expertise for Policy, Practice

- Planners
- Transport engineers & planners
- Park & rec, landscape architects
- Educators, architects



The Neighborhood Quality of Life (NQLS) Study:
The Link Between Neighborhood Design and
Physical Activity
2001-2005

James Sallis, Ph.D.

Brian Saelens, Ph.D.

Lawrence Frank, Ph.D.

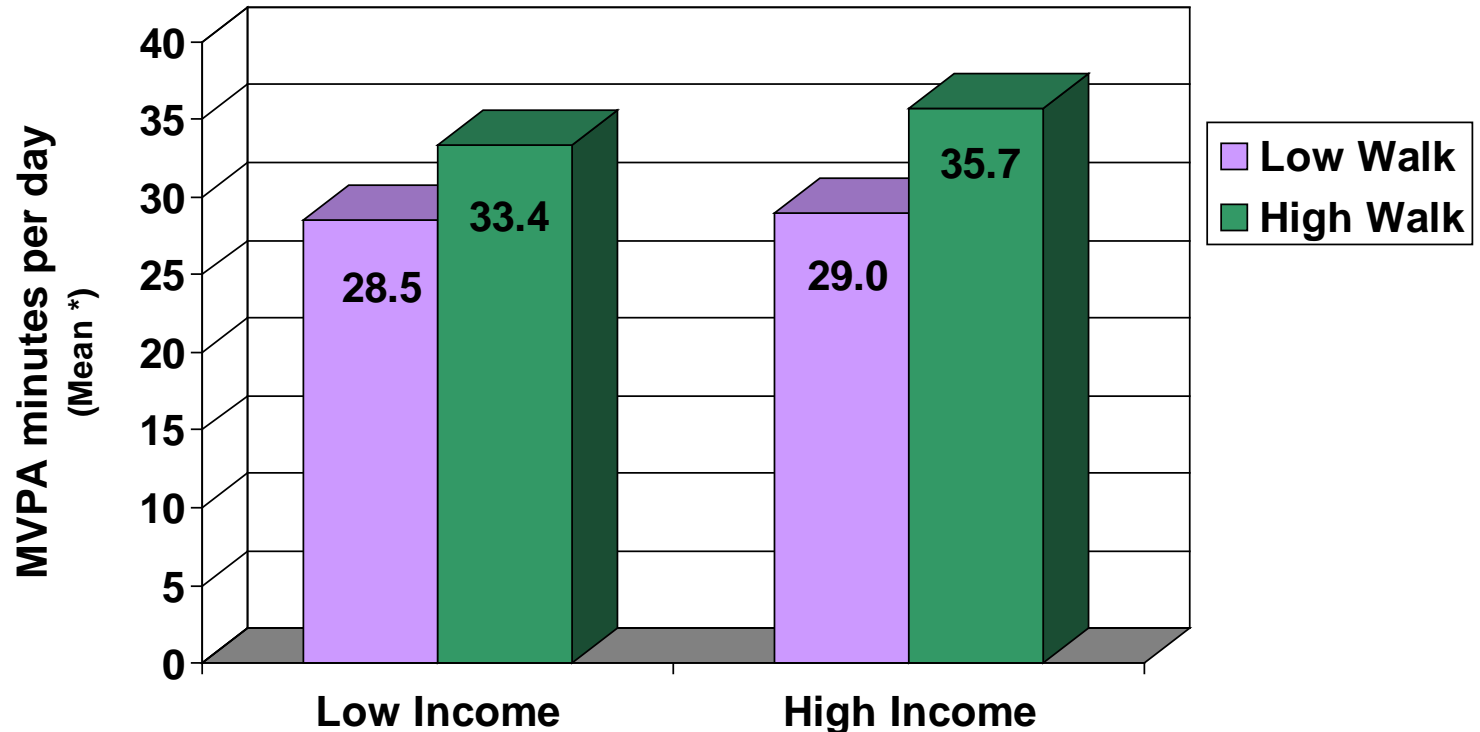
And team

Accelerometer-based MVPA Min/day in Walkability-by-Income Quadrants

Walkability: $p = .0002$

Income: $p = .36$

Walkability X Income: $p = .57$



* Adjusted for neighborhood clustering, gender, age, education, ethnicity, # motor vehicles/adult in household, site, marital status, number of people in household, and length of time at current address.

Estimated Public Health Impact of Walkability

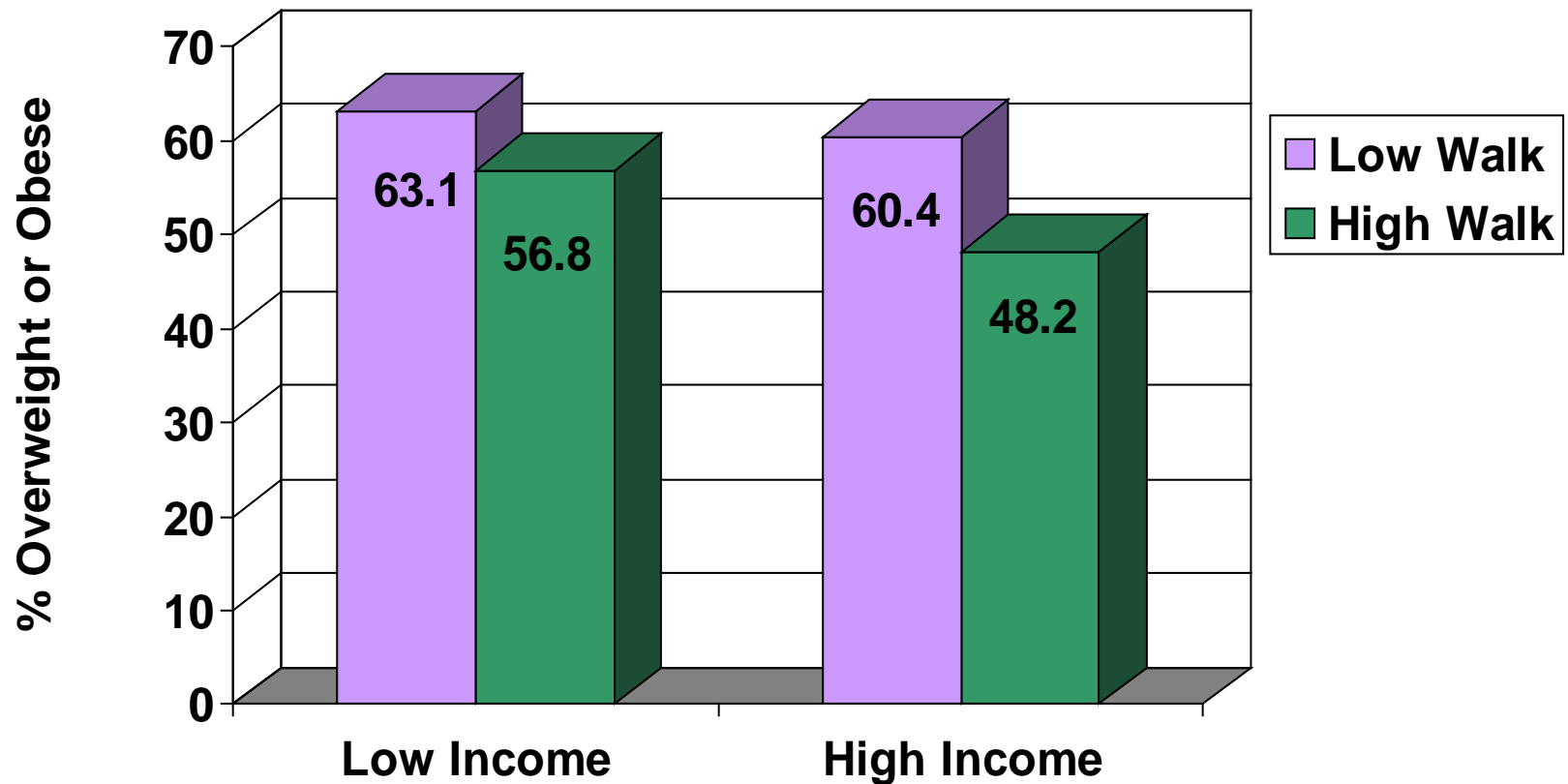
- 50 minutes per week = 2+ miles per week
- 2 miles per week = 100 miles per year
- 100 miles per year = 10,000 kcal per year
- 10,000 kcal per year = 2.9 pounds/1.3 kg
- More than the average adult weight gain per year in the U.S.

Percent Overweight or Obese (BMI > 25) in Walkability-by-Income Quadrants

Walkability: $p = .007$

Income: $p = .081$

Walkability X Income: $p = .26$



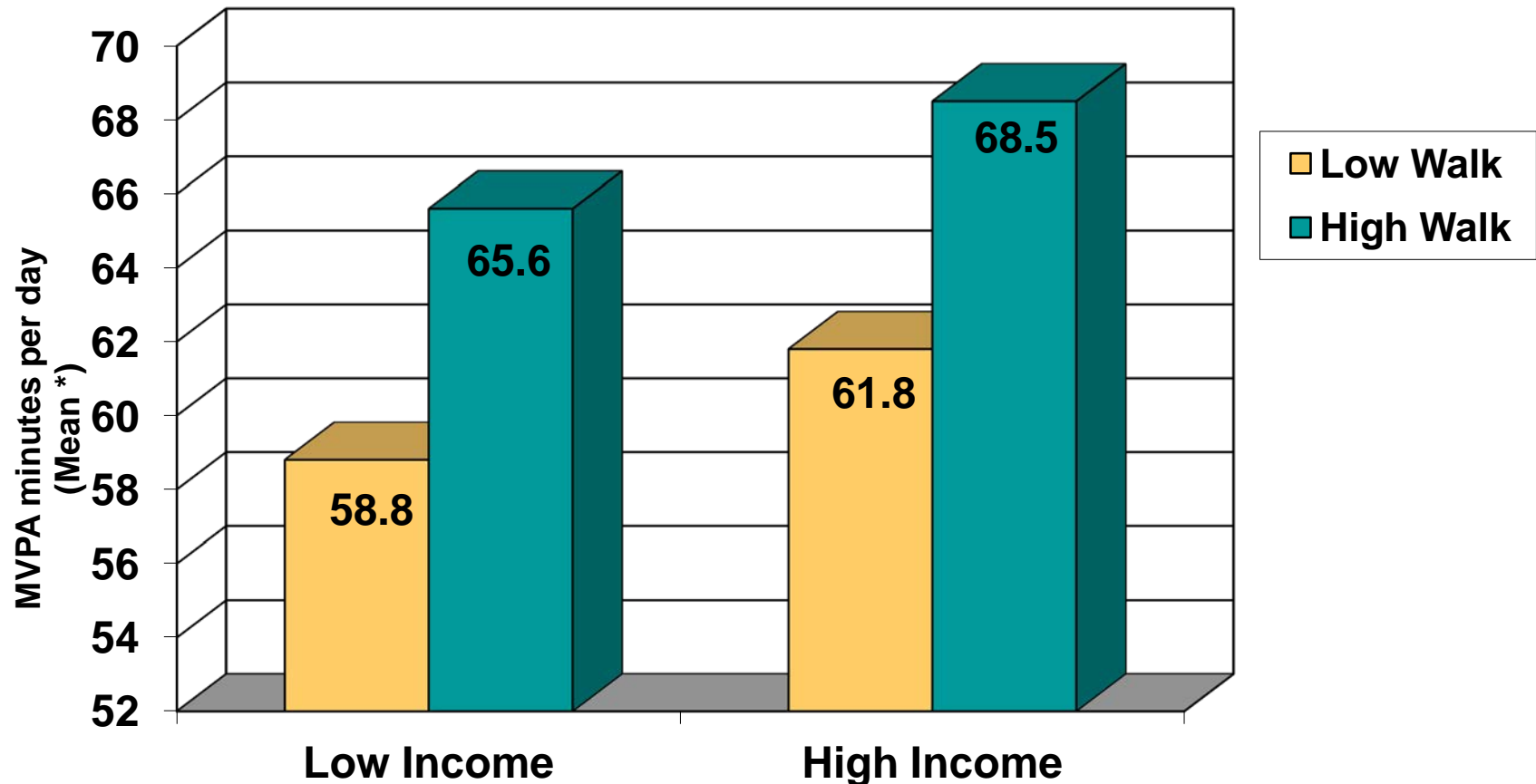
* Adjusted for neighborhood clustering, gender, age, education, ethnicity, # motor vehicles/adult in household, site, marital status, number of people in household, and length of time at current address.

Accelerometer-based MVPA Min/day in Walkability-by-Income Quadrants

Walkability: $F=13.74$; $p=.000$

Income: $F=2.59$; $p=.108$

Walkability X Income: $F=.001$; $p=.981$



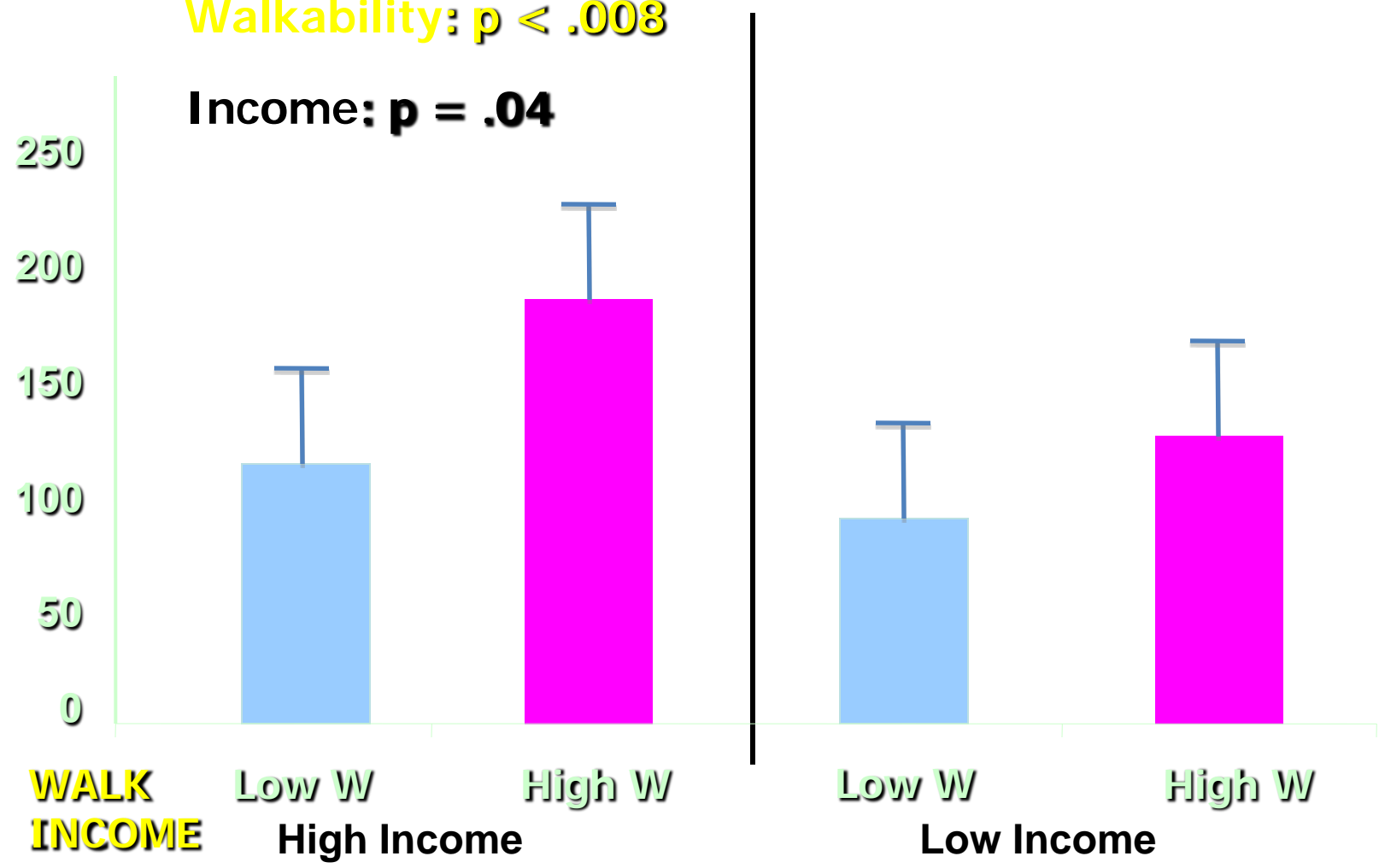
* Adjusted for gender and age

Outside Activities (except gardening) (min/wk)

(Adjusted for Time, Region, Demographics)

Walkability: $p < .008$

Income: $p = .04$



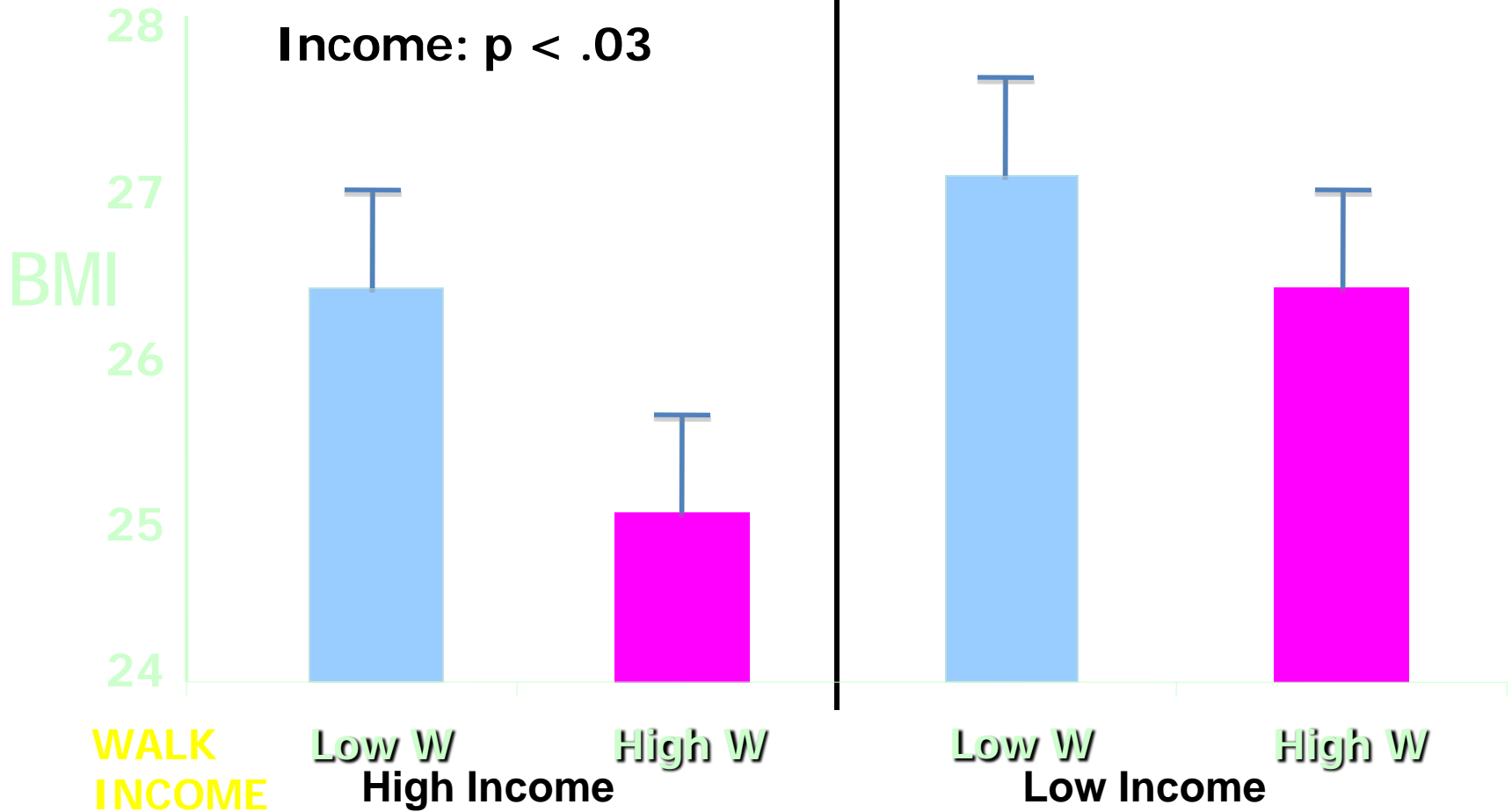


Body Mass Index (BMI)

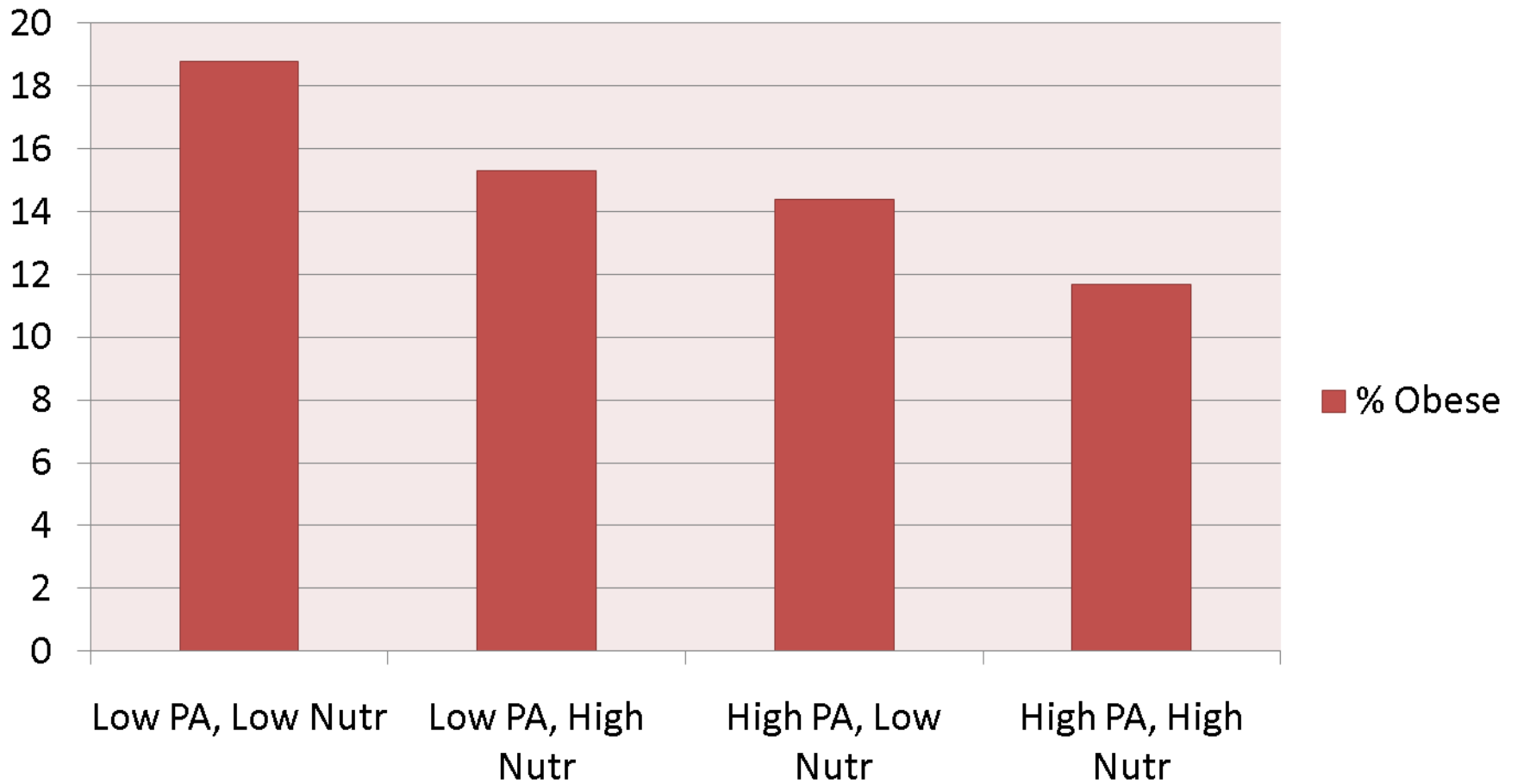
(Adjusted for Time, Region, Demographics)

Walkability: $p = .02$

Income: $p < .03$



% Obese by Neighborhood Type - Children



	Low PA, Low N	Low PA, High N	High PA, Low N	High PA, High N
BMI in 85 th percentile	34.4%	31.6%	28.7%	27.3%
BMI in 95 th percentile	18.8%	15.3%	14.4%	11.7%

2



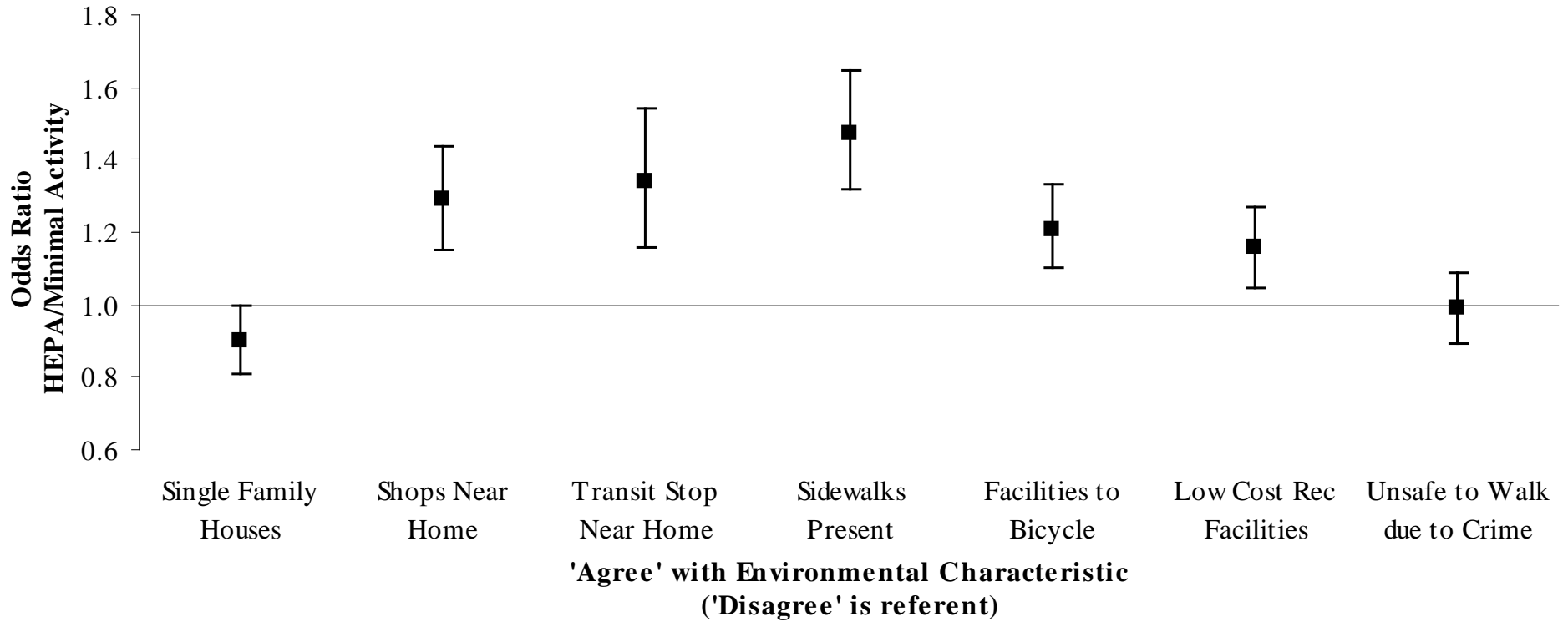
Atlanta, USA

Ghent, Belgium

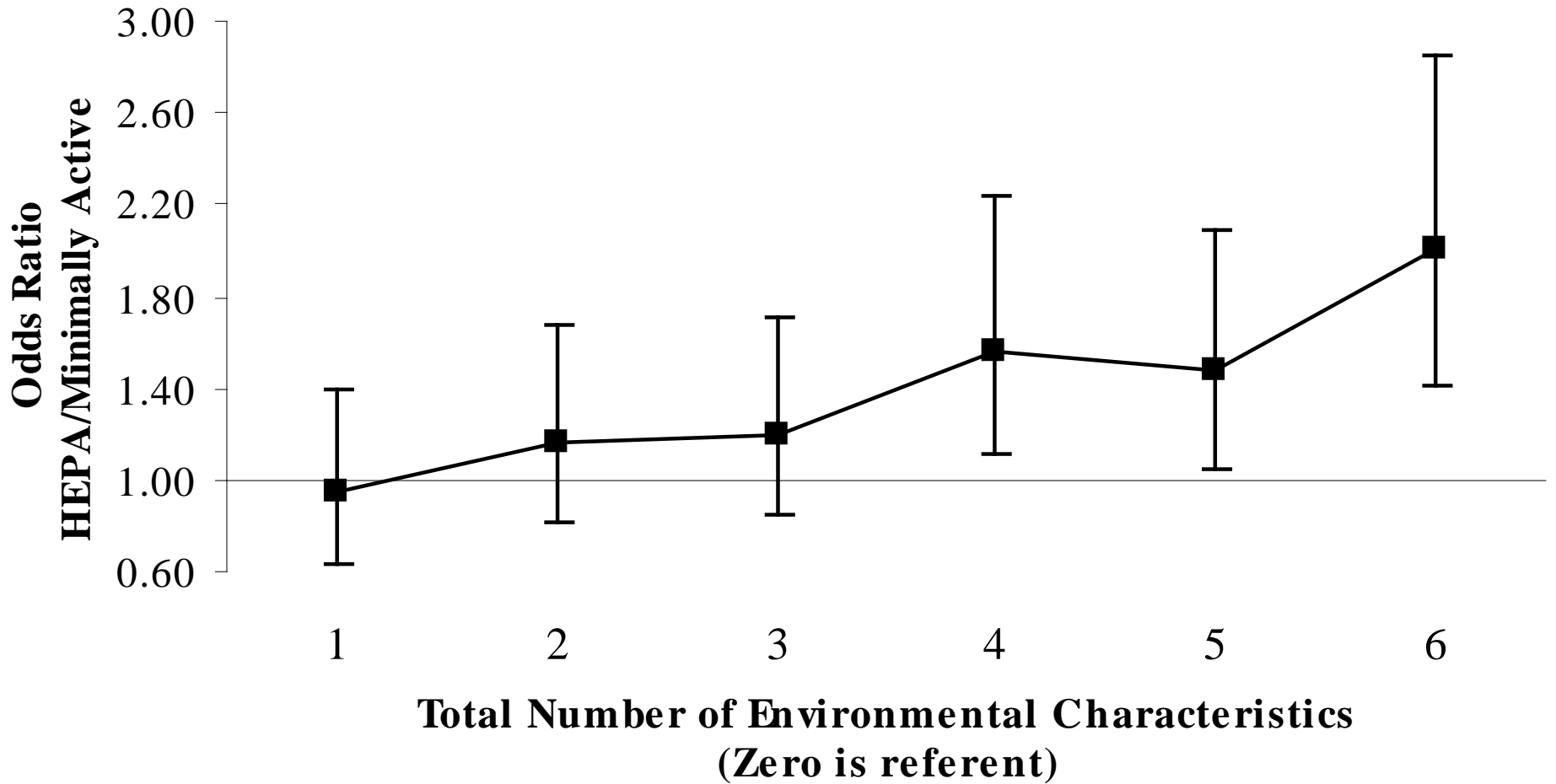
We can learn
from
international
studies



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



Dose Response between Number of Environmental Characteristics and HEPA/Minimal Activity (Pooled City Sample)

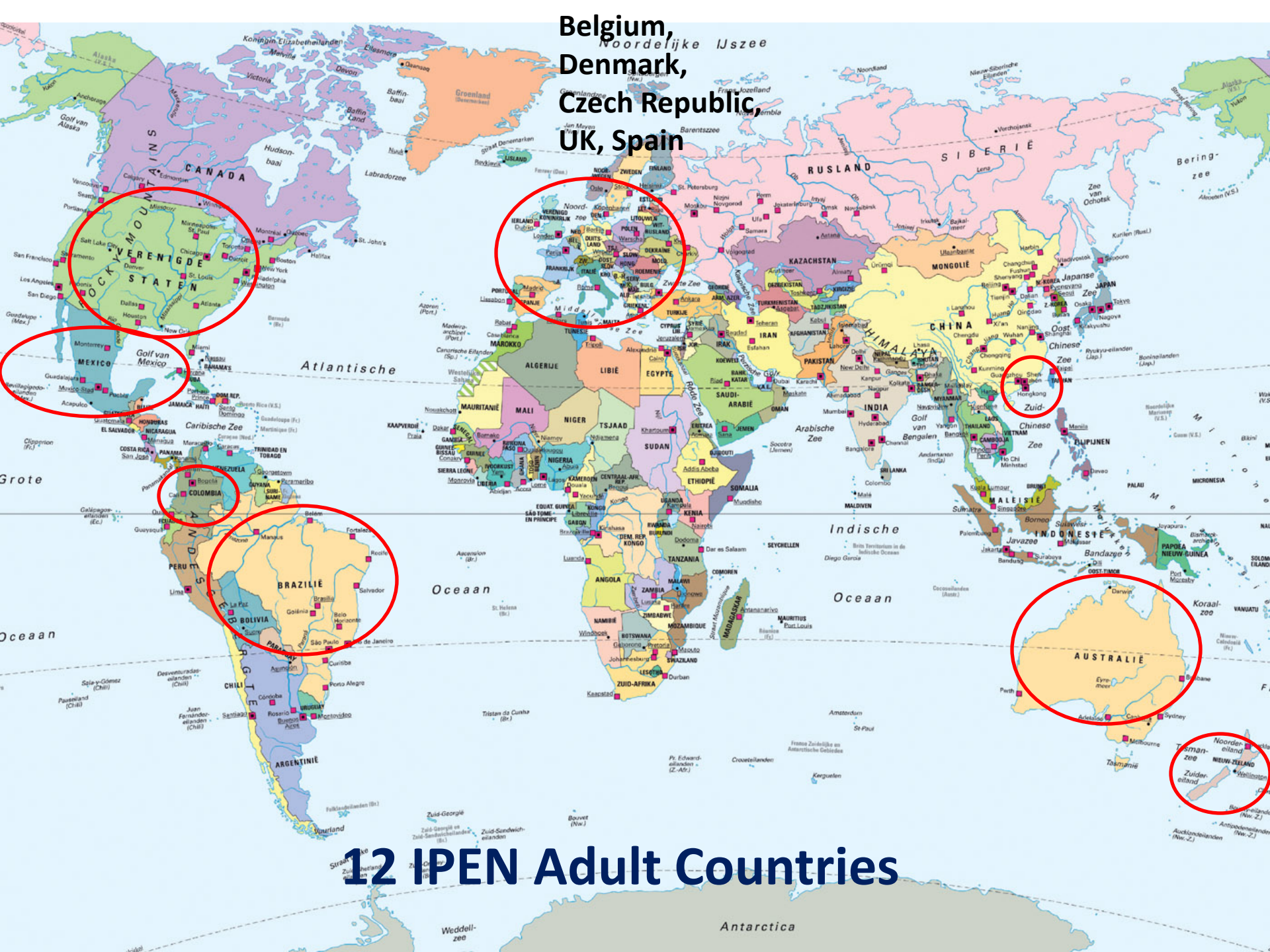




www.ipenproject.org

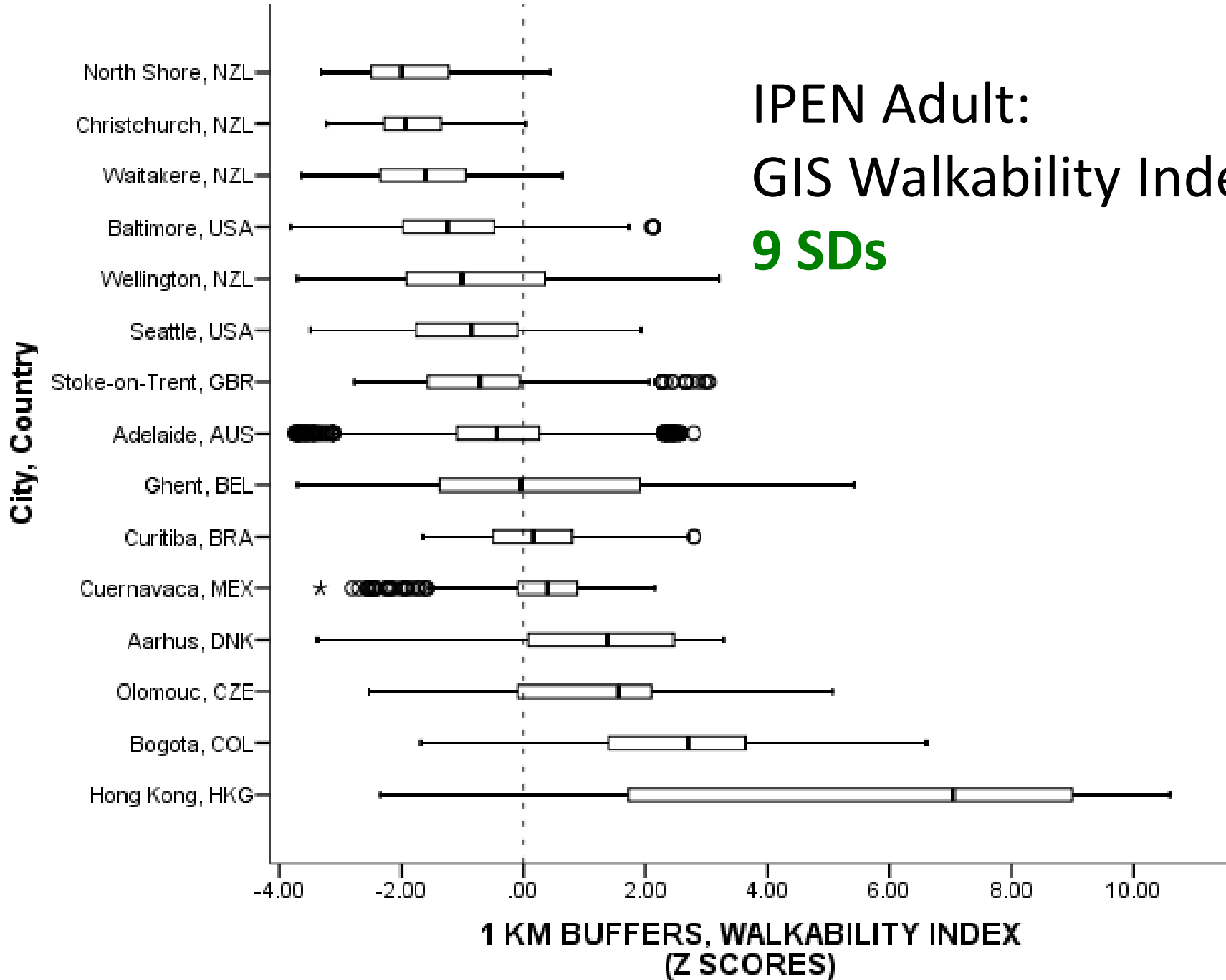
- Encourage environment and policy research on physical activity worldwide
- Develop & encourage use of common measures and methods
- Support investigators to obtain internal funding
- Coordinate international studies
 - IPEN Adult, funded by NCI
 - IPEN Adolescent, funded by NHLBI
- Communicate findings to decision makers

Belgium,
Denmark,
Czech Republic,
UK, Spain



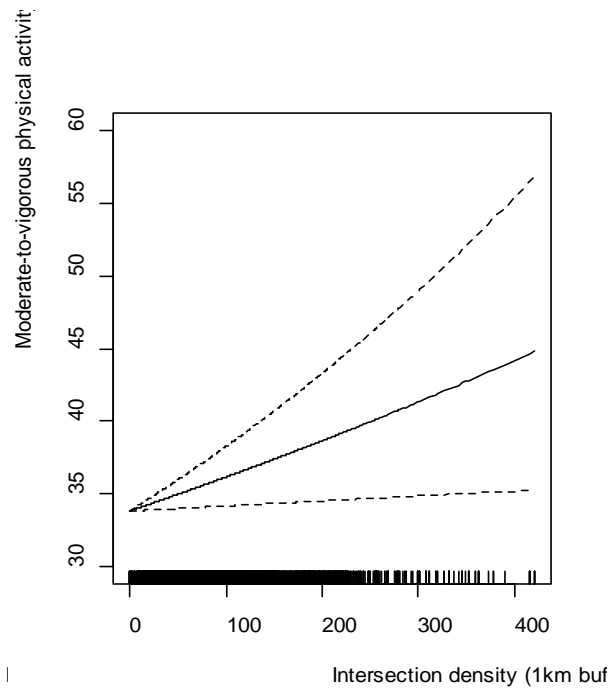
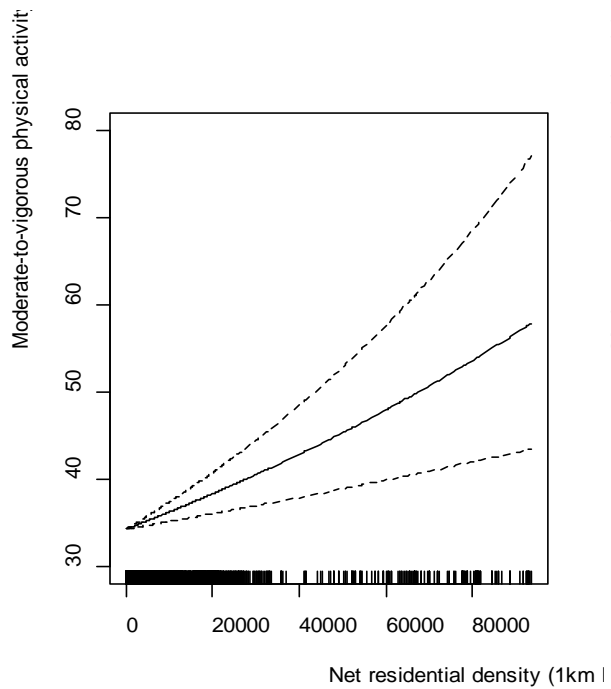
12 IPEN Adult Countries

IPEN Adult: GIS Walkability Index 9 SDs

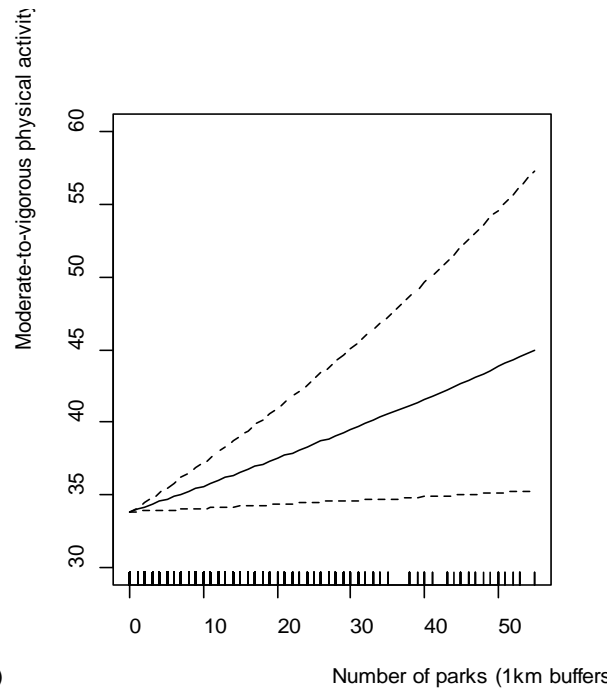
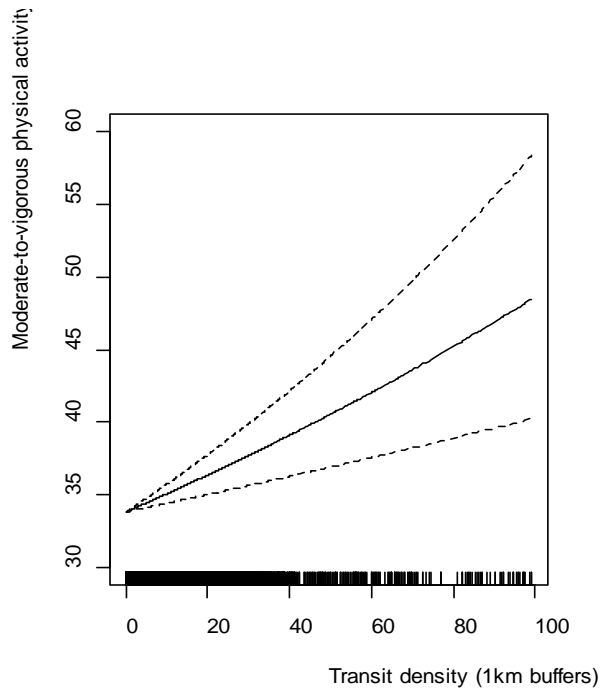


Results: Environmental Attributes + MVPA Min/Week

GIS-based Environmental Variable	Single variable model	Final adjusted model
Net residential density 1km	***	***
Intersection density 1km	*	NS
Mixed land use 1km (retail & civic)	NS	NS
Public transit density 1km	**	*
Number of parks 0.5km	**	*



Associations of environmental variables based on 1 km buffers with accelerometry-based estimates of daily minutes of moderate-to-vigorous physical activity



Comparing MVPA by Lowest & Highest Cities on Environmental Variables

- Adults living in the most activity-friendly cities did 68-89 more minutes of MVPA per week compared to those in the least activity-friendly cities
- Living in the most activity-friendly environments could help the average resident achieve 32-59% of the 150 minute/week physical activity guidelines



Design of streetscapes matters

www.activelivingresearch.org



What is the role of streetscape design?

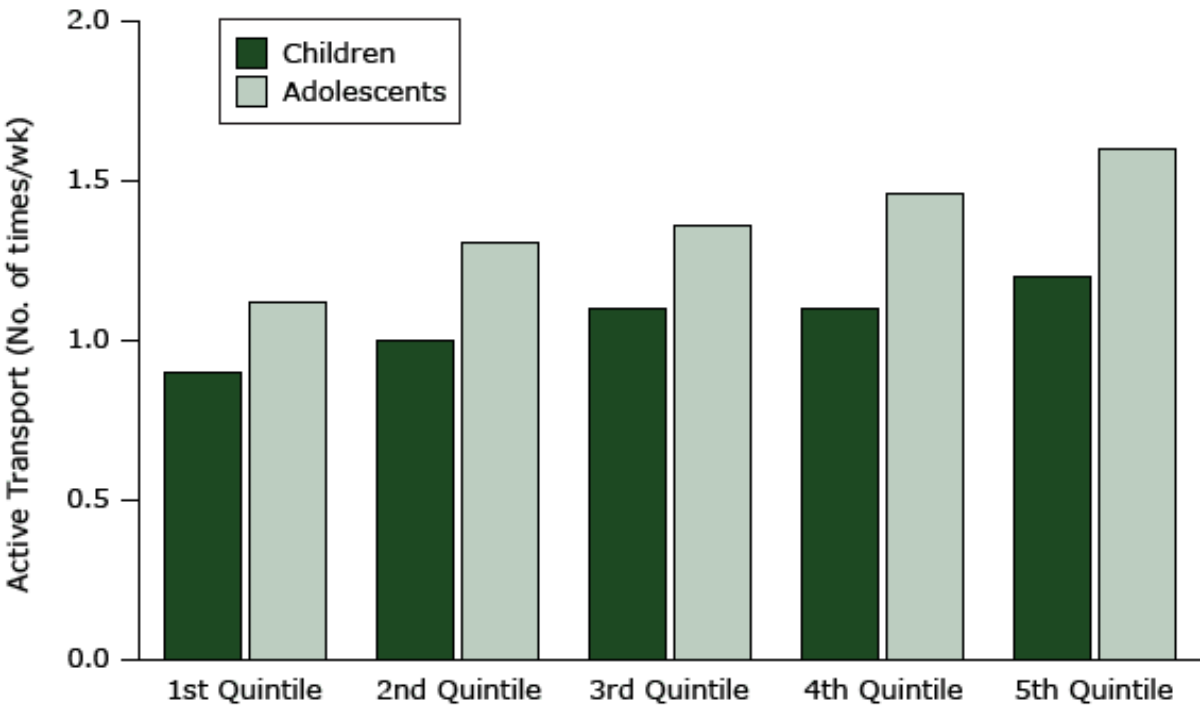
MAPS Mini

- **15-item MAPS-Mini was designed for practitioners and advocates**
 - Reduced from 120 items
- Items were selected based on
 - Correlations with physical activity
 - Guidelines and recommendations
 - Modifiability
- Evaluated for validity in 3677 children, teens, adults, older adults
 - 3 regions

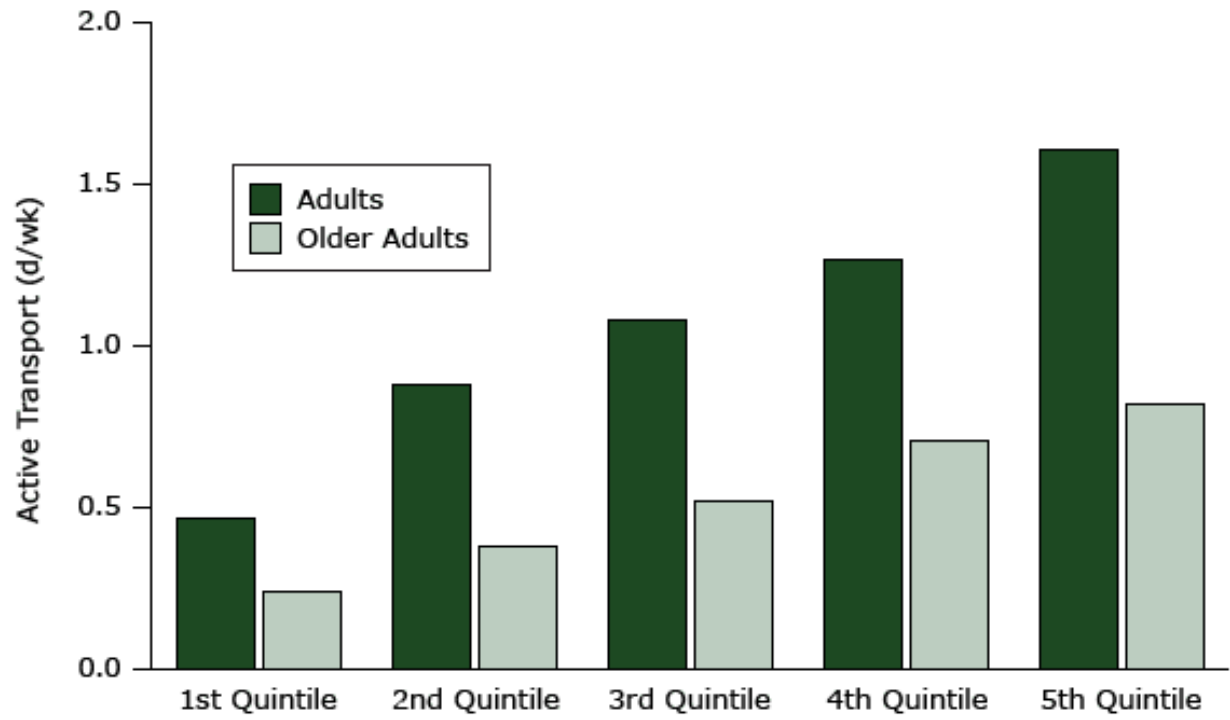


How do MAPS-Mini scores relate to active transportation? ADJUSTED

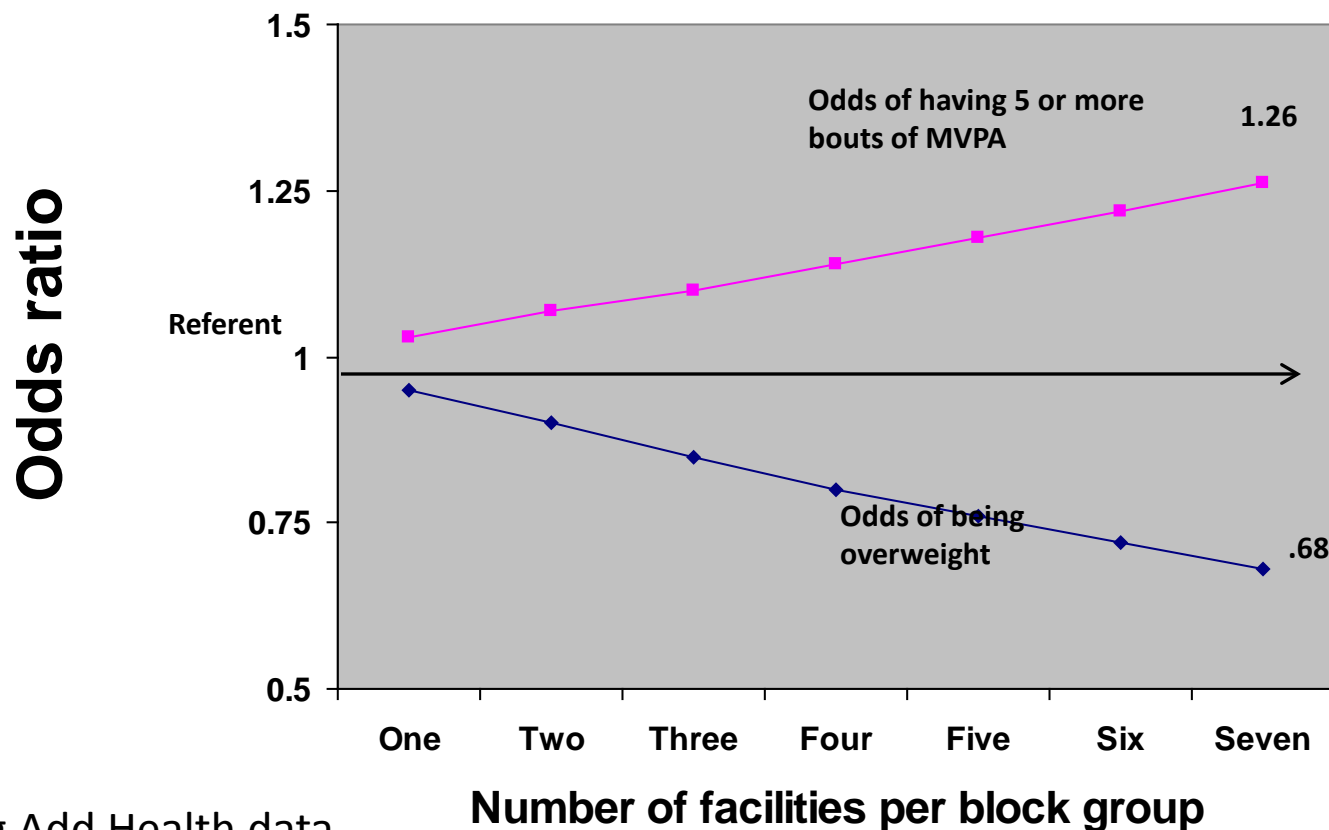
MAPS Mini Score	Children	Adolescents	Adults	Seniors
Commercial Segments				N/A
Public Parks				
Transit Stops				
Street Lights				
Benches				
Building Maintenance				
Absence of Graffiti				
Sidewalk				
Buffer				
Tree, Awning Coverage				
Absence of Trip Hazards				
Marked Crosswalk				
Curb Cuts				
Crossing Signal				
GRAND SCORE				
GRAND SCORE (for Active Transport)				



**Dose-response of
MAPS-Mini total
scores and active
transport
Frequency for
4 age groups**



A national study of US adolescents (N=20,745)* found a greater number of physical activity facilities is directly related to physical activity and inversely related to risk of overweight



*using Add Health data

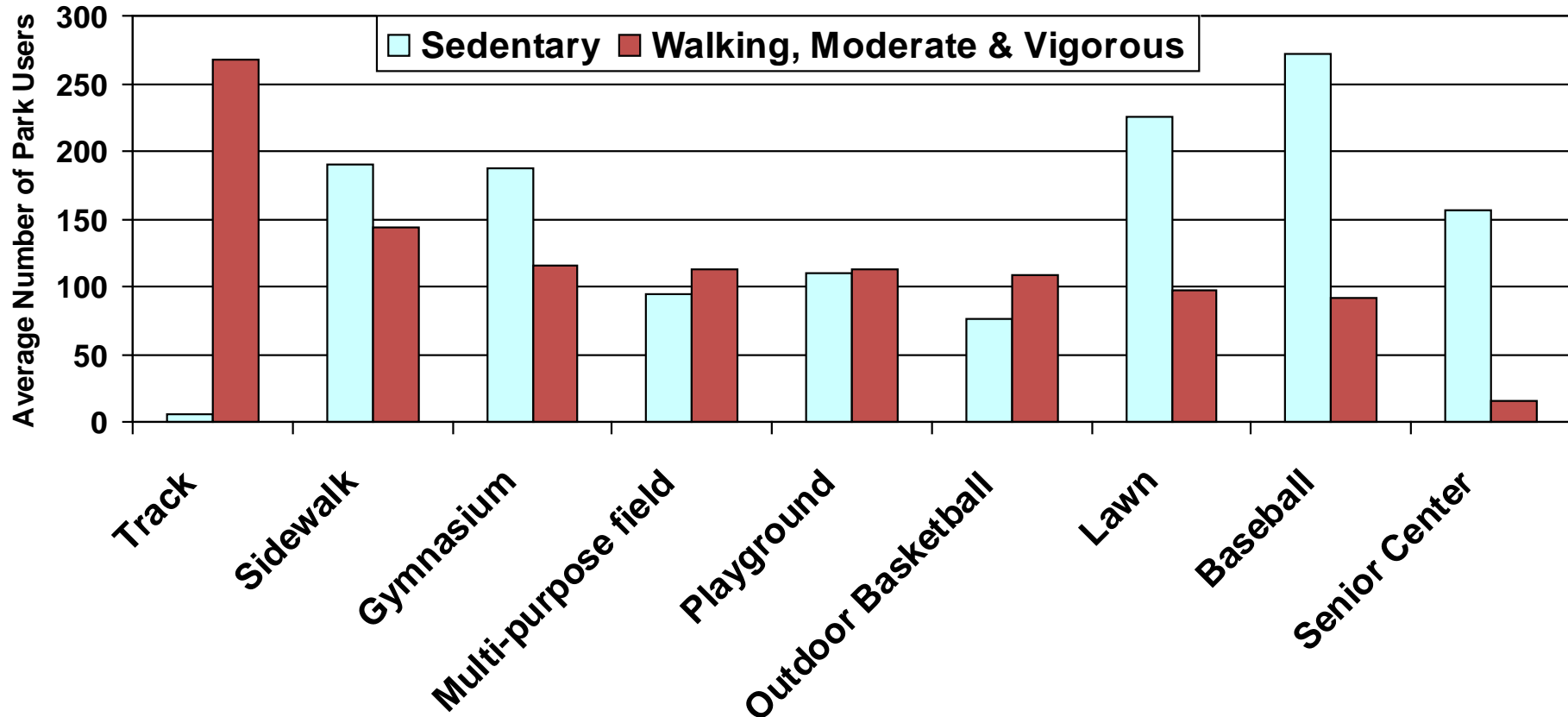
Gordon-Larsen et al, Pediatrics, 2006

<http://www.pediatrics.org/cgi/content/full/117/2/417>
www.activeivingresearch.org





People are Most Active on Tracks and Walking Paths



Multistate Evaluation of Safe Routes to School Programs

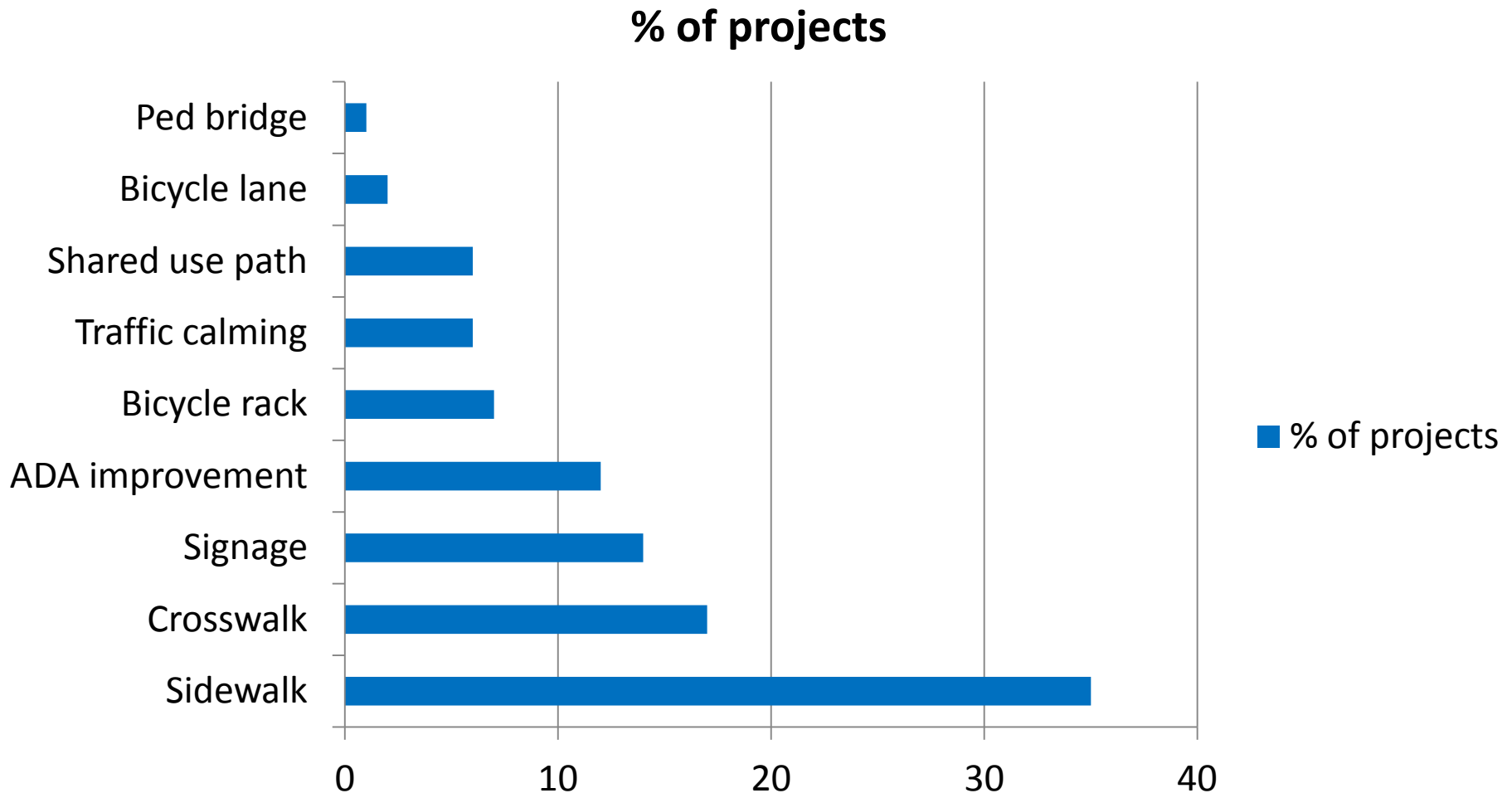
Orion Stewart, MUP; Anne Vernez Moudon, Dr Es Sc; Charlotte Claybrooke, MS

American Journal of Health Promotion

January/February 2014, Vol. 28, No. 3 Supplement

S89

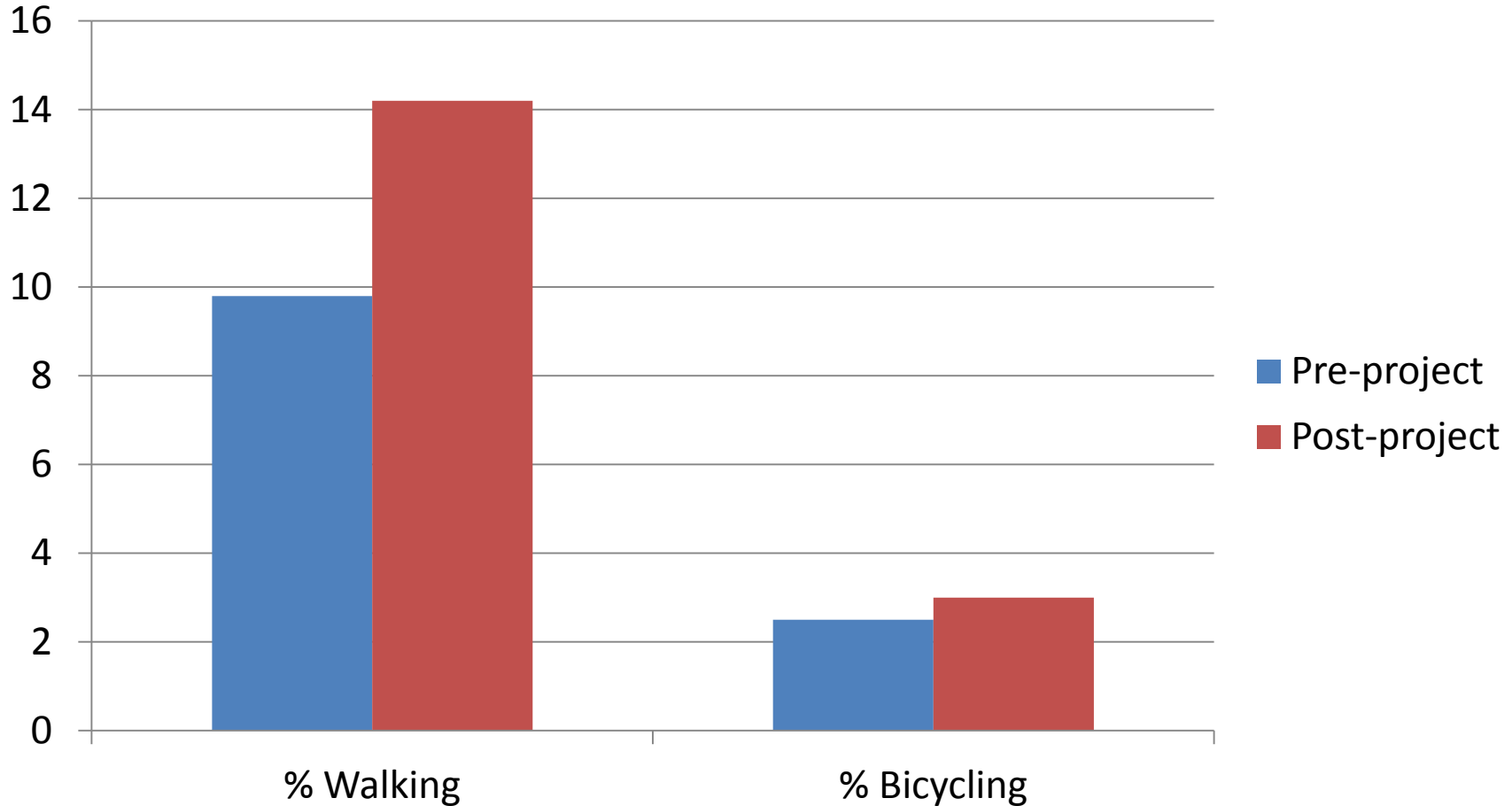
% of SRTS Projects, By Type



Moving Forward: WASH DOT.

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

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>

Can we increase bicycling? According to controlled studies, single cycling interventions don't work

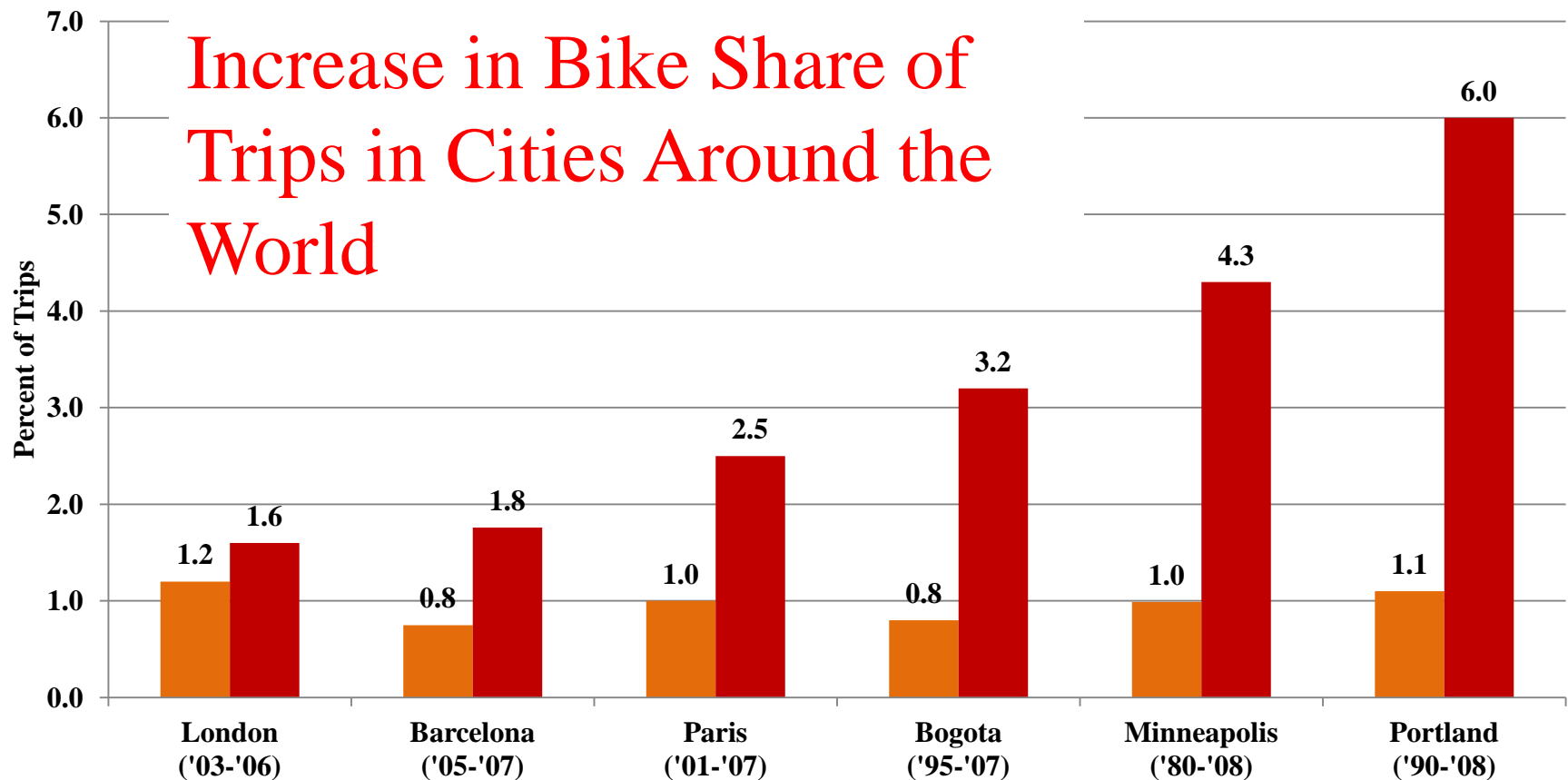
BMJ



Interventions to promote cycling: systematic review

Lin Yang, PhD student Shannon Sahlqvist, career development fellow Alison McMinn, career development fellow Simon J Griffin, assistant director David Ogilvie, clinical investigator scientist

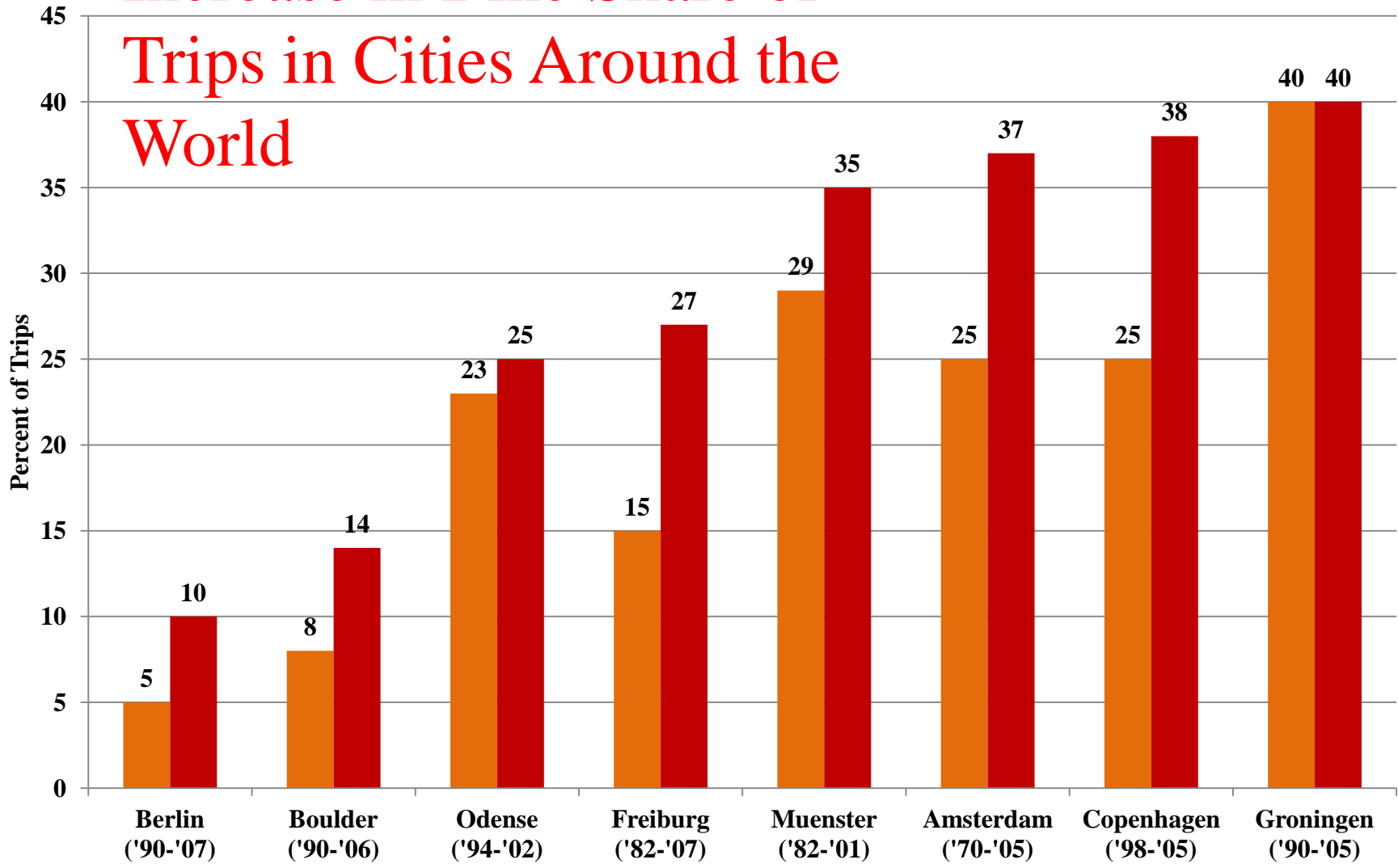
Case studies of multi-level, multi-component, multi-year interventions suggest a different conclusion



Source: Pucher, Dill, and Handy, "Infrastructure, Programs, and Policies to Increase Bicycling," *Preventive Medicine*, Jan 2010, Vol. 50, S.1, pp. S106-S125.



Increase in Bike Share of Trips in Cities Around the World



Source: Pucher, Dill, and Handy, "Infrastructure, Programs, and Policies to Increase Bicycling," *Preventive Medicine*, Jan 2010, Vol. 50, S.1, pp. S106-S125.

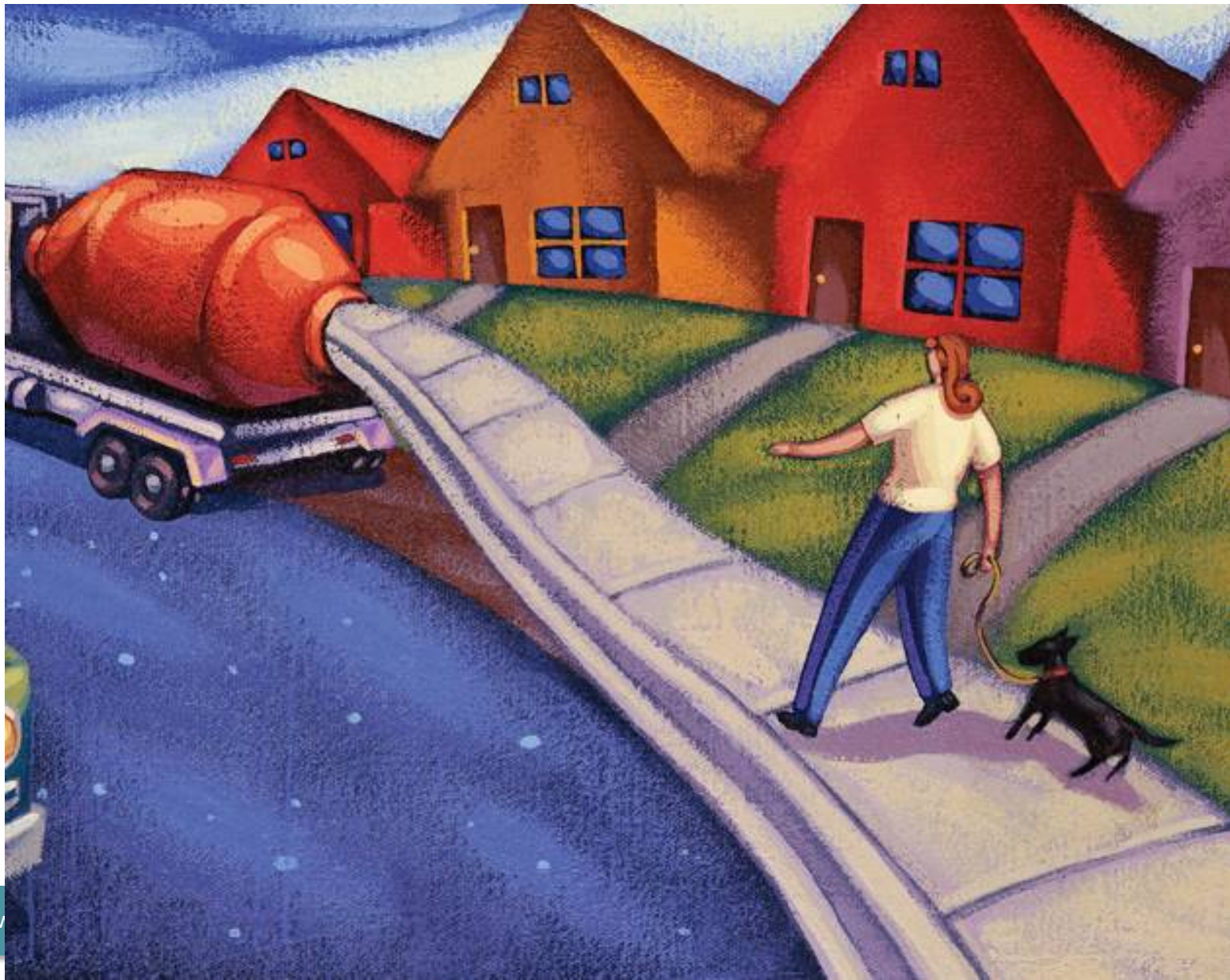
Policy Recommendations

- Zoning/planning laws that require or favor mixed-use, high density development
- Change transportation goals
 - High quality pedestrian and bicycle facilities
- Count pedestrians and bicyclists
- More investment in active transport
- Parks in every neighborhood
- Parks designed to promote activity in all ages
- Invest first in lower-income neighborhoods

Conclusions

- Active cities are designed with walkable neighborhoods, inviting streetscapes, proximal and well-designed parks, safe places to bicycle, and good access to public transit
- The more activity-friendly the city, the more physical activity
- The more activity-friendly the city, the more co-benefits, including economic
- Please advocate for a more active America, but how?

Research is not easy to put into practice



What info do policy makers & advocates need?

- Evidence relevant to CURRENT policy debates
- Evidence of what works
- Evidence relevant to local communities & populations at highest risk
- Evidence communicated in accessible ways
- Follow the money: how much does it cost & what is ROI?

Co-Benefits of Designing Activity-Friendly Environments

	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	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-
Transport 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)

Sallis, J.F., et al. (2015). Co-benefits of designing communities for active living:

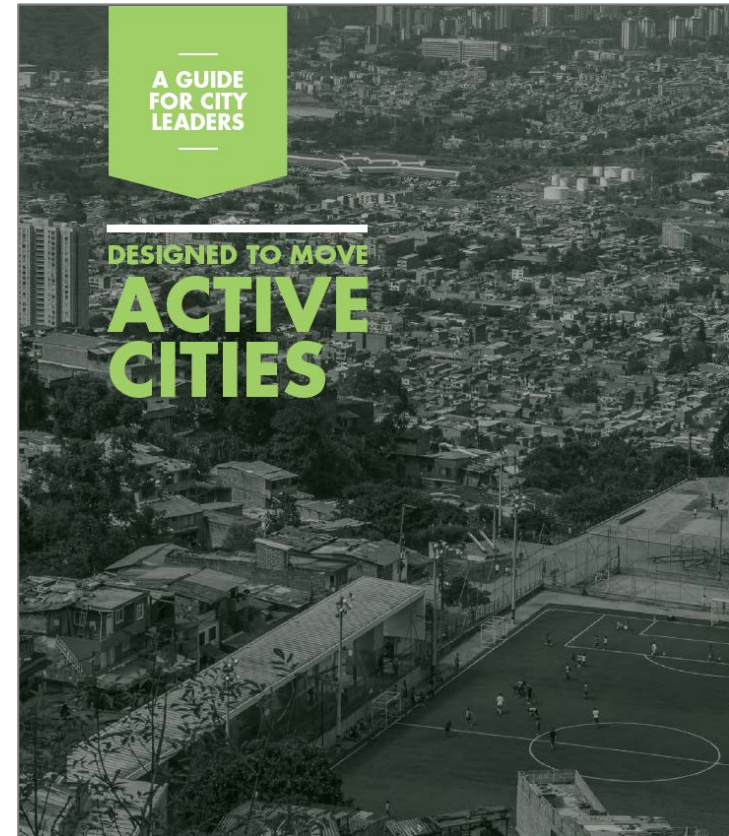
An exploration of literature. *International Journal of Behavioral Nutrition and*

Physical Activity, 12: 30.

Designed to Move: Active Cities

Blueprint for city leaders to create an active city

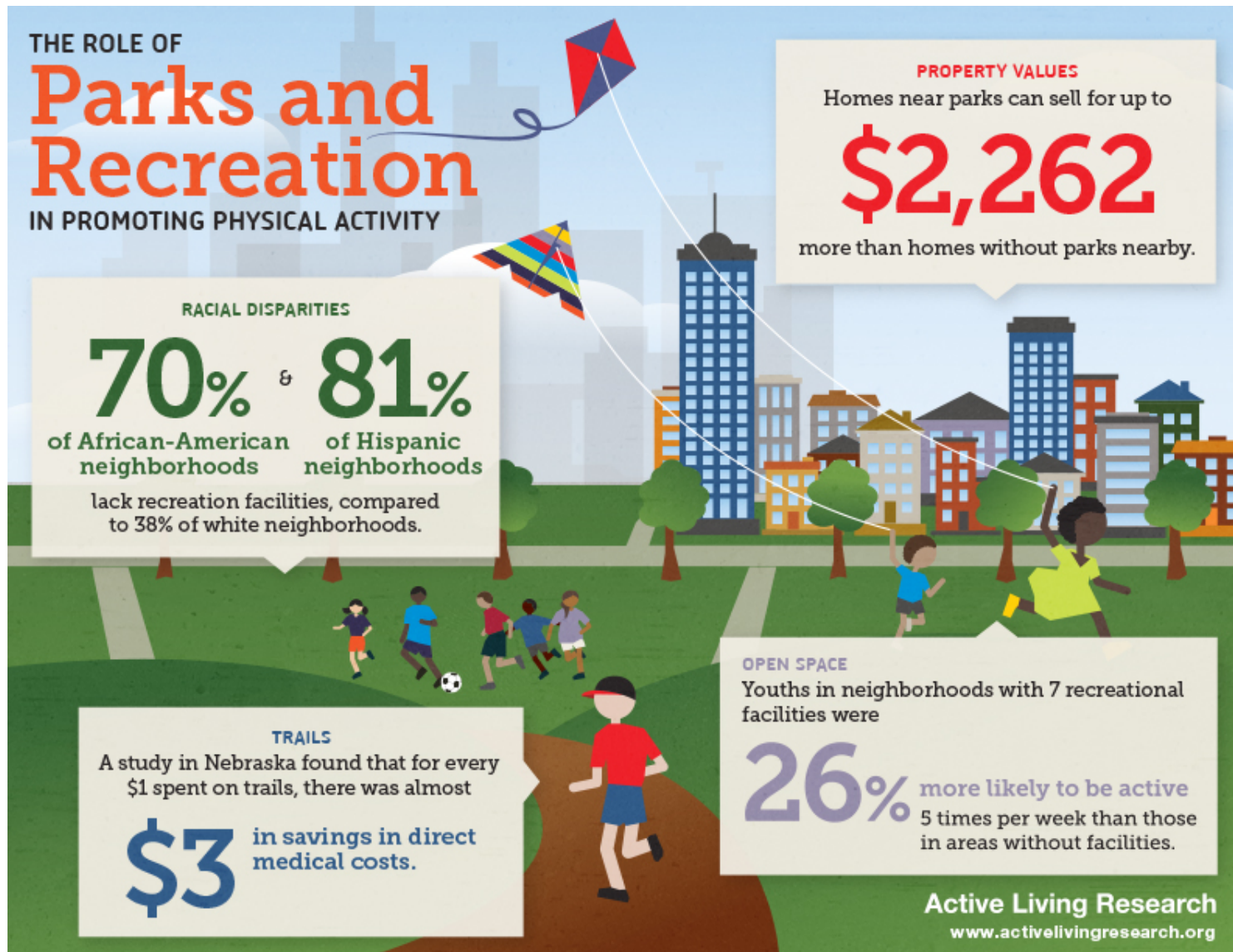
- Comprehensive summary of the evidence base on co-benefits
 - Proven interventions
 - Recommendations, checklists, practical steps/ideas, sample metrics
 - Talking points for city leaders
 - Case studies of ‘bright spots’
-
- www.designedtomove.org/resources



ALR: Communicating Results to Non-Researchers

- Website: about 12,000 visits per month
 - Research briefs are widely downloaded
 - MOVE blog
- Webinar series: www.dialogue4health.org
- ALR electronic Newsletter to list of 5000+
- Facebook, Twitter, Youtube
- Partnerships, presentations

Good feedback from infographics



Sources: RACIAL DISPARITIES: Moore LV, Diez Roux AV, Evenson KR, et al. "Availability of Recreational Resources in Minority and Low Socioeconomic Status Areas." *American Journal of Preventive Medicine*, 34(1): 16-22, 2008. PROPERTY VALUES: Boltz B and Netusil N. "The Impact of Open Spaces on Property Values in Portland, Oregon." *Journal of Environmental Management*, 59(3): 185-193, July 2000. OPEN SPACE: Gordon-Larsen P, Nelson M, Page P, et al. "Inequality in the Built Environment Underlies Key Health Disparities in Physical Activity and Obesity." *Pediatrics*, 117(2), 417-424, 2006. TRAILS: Wang G, Macera CA, Scudder-Soucie B, et al. "A cost-benefit analysis of physical activity using bike/pedestrian trails." *Health Promotion Practice*, 6(2): 174-179, 2005.

Research Translation Grant: Active Transport to School: Keshia Pollack

- Audiences
 - School principals
 - City elected officials
 - City agency directors
 - School and City police
 - Community members
- Messages
 - Routes to school have physical hazards and violence
 - Feasible solutions are Walking School Buses, streetscape improvements
- Tactics
 - Package findings for key audiences.
 - Briefing with City Council.
 - Meeting with Schools and City Police.
 - Write Op Ed

Lessons We Are Learning

- It is difficult to communicate research. Simplify results. Collaborate with communication professional/journalist
- Select researchers with interest & skill in communication. We consulted quarterly to provide frequent input.
- Some investigators are uncomfortable in translation role
- Create permanent products in multiple media
- Promote via traditional & new media
- Partnerships with key organizations, not just promotion
- Difficult to evaluate

Resources at www.activelivingresearch.org

¿Hay Lugares Seguros Para Que TODOS los Niños Puedan Realizar Actividades Físicas?

Las comunidades de color y/o de bajos ingresos tienen tasas mayores de obesidad. Además, carecen de lugares atractivos, convenientes y seguros para actividades físicas.

FALTA DE INSTALACIONES RECREATIVAS
70% y **81%**
de los vecindarios afroamericanos
de los vecindarios hispanos
carecen de instalaciones recreativas.

MENOS RECREO
159%
más probable
que los niños que viven por debajo del nivel de pobreza se vean privados del recreo.

ACERAS DE BAJA CALIDAD
38 veces más probable
que las aceras en los vecindarios afroamericanos sean de baja calidad.

CONDICIONES PELIGROSAS
Cada año, las comunidades hispanas sufren
3.6 y **45.5**
más accidentes por milla de calle
más delitos por acre
comparadas con las comunidades blancas.

Para mayor información, vea nuestra síntesis de investigación www.activelivingresearch.org/disparities

Active Living Research
www.activelivingresearch.org

Salud America!
www.salud-america.org

Referencias: FALTA DE INSTALACIONES RECREATIVAS: Moore, L.V. et al. (2008). Availability of Recreational Resources in Minority and Low Socioeconomic Status Areas. American Journal of Preventive Medicine, 34(1): 16-22. MENOS RECREO: Roth, J.L. et al. (2003). What Happens during the School Day? Time Diaries from a National Sample of Elementary School Teachers. Teachers College Record, 105 (3): 317-343. ACERAS DE BAJA CALIDAD: Kelly, C.M. et al. (2007). The Association of Sidewalk Walkability and Physical Disorder with Area-Level Race and Poverty. Journal of Epidemiology and Community Health, 61:978-985. CONDICIONES PELIGROSAS: Zhu, X. and Lee, C. (2008). Walkability and Safety around Elementary Schools: Economic and Ethnic Disparities. American Journal of Preventive Medicine, 34(4): 282-290.

THE ROLE OF Transportation IN PROMOTING PHYSICAL ACTIVITY

TRAFFIC CALMING
Medians, speed bumps and other traffic-calming efforts can reduce the number of automobile crashes with pedestrian injuries by up to

15%

PUBLIC TRANSPORTATION
Public transit users take

30%

more steps per day than people who rely on cars.

SIDEWALKS
People who live in neighborhoods with sidewalks on most streets are

47%
more likely to be active at least 30 minutes a day.

BIKE FACILITIES
In Portland, Ore., bicycle commuters ride

49% of their miles on roads with bike facilities, even though these are only 8% of road miles.

Active Living Research
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, S95-S110. doi:10.1093/jphp/30.09.S5. 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.