

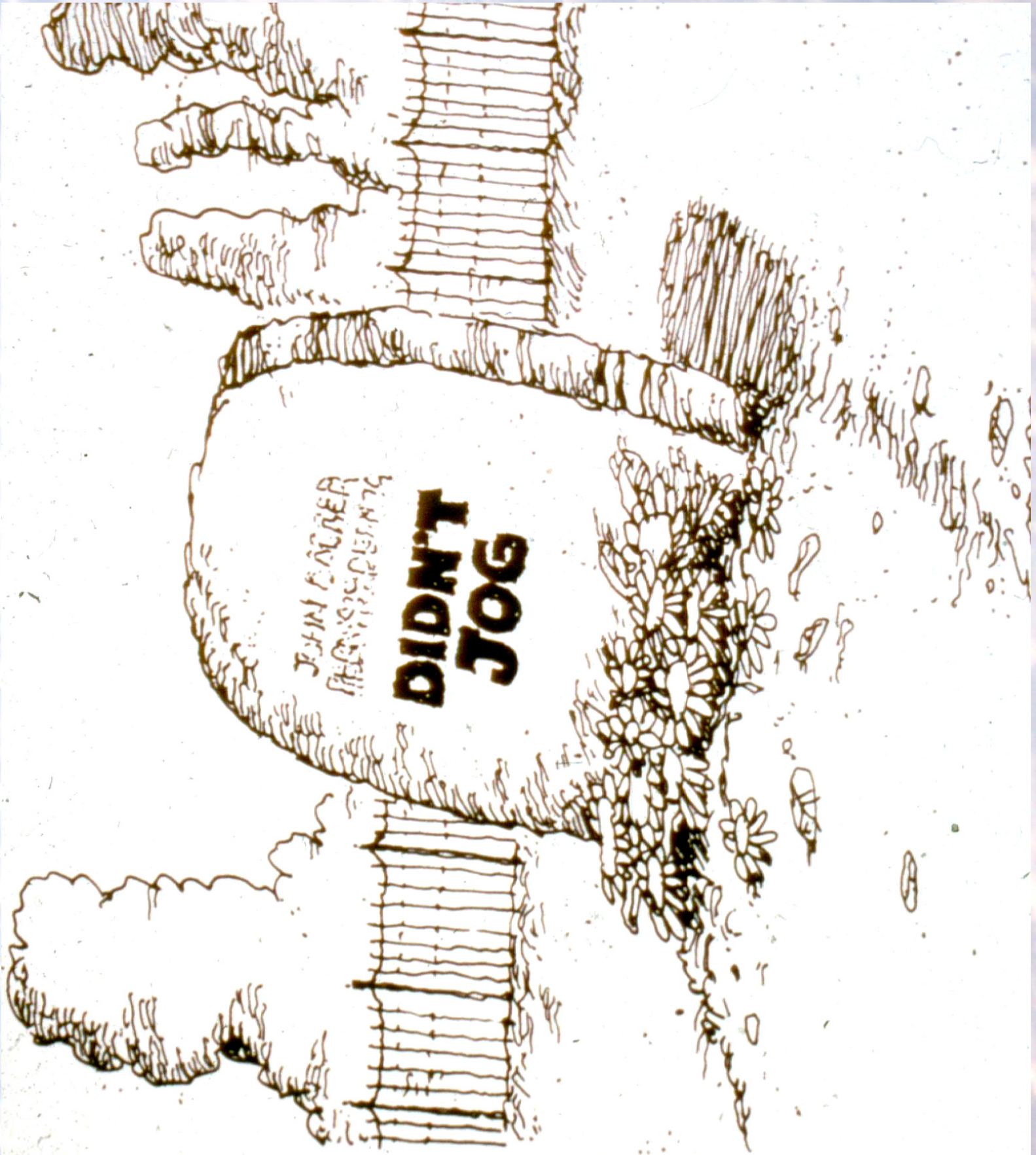


Physical Activity and Built Environments: International Research

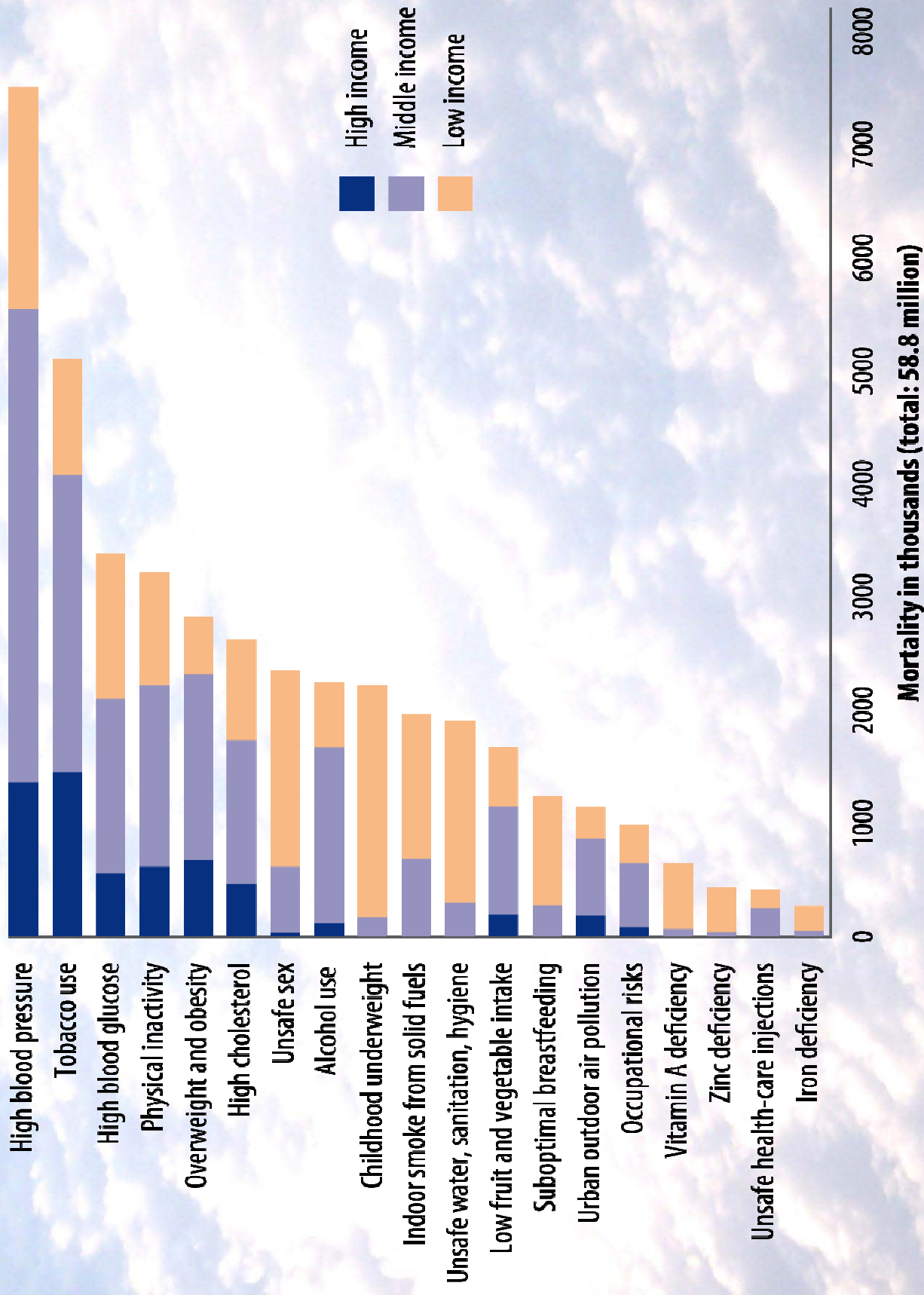
James Sallis

San Diego State University

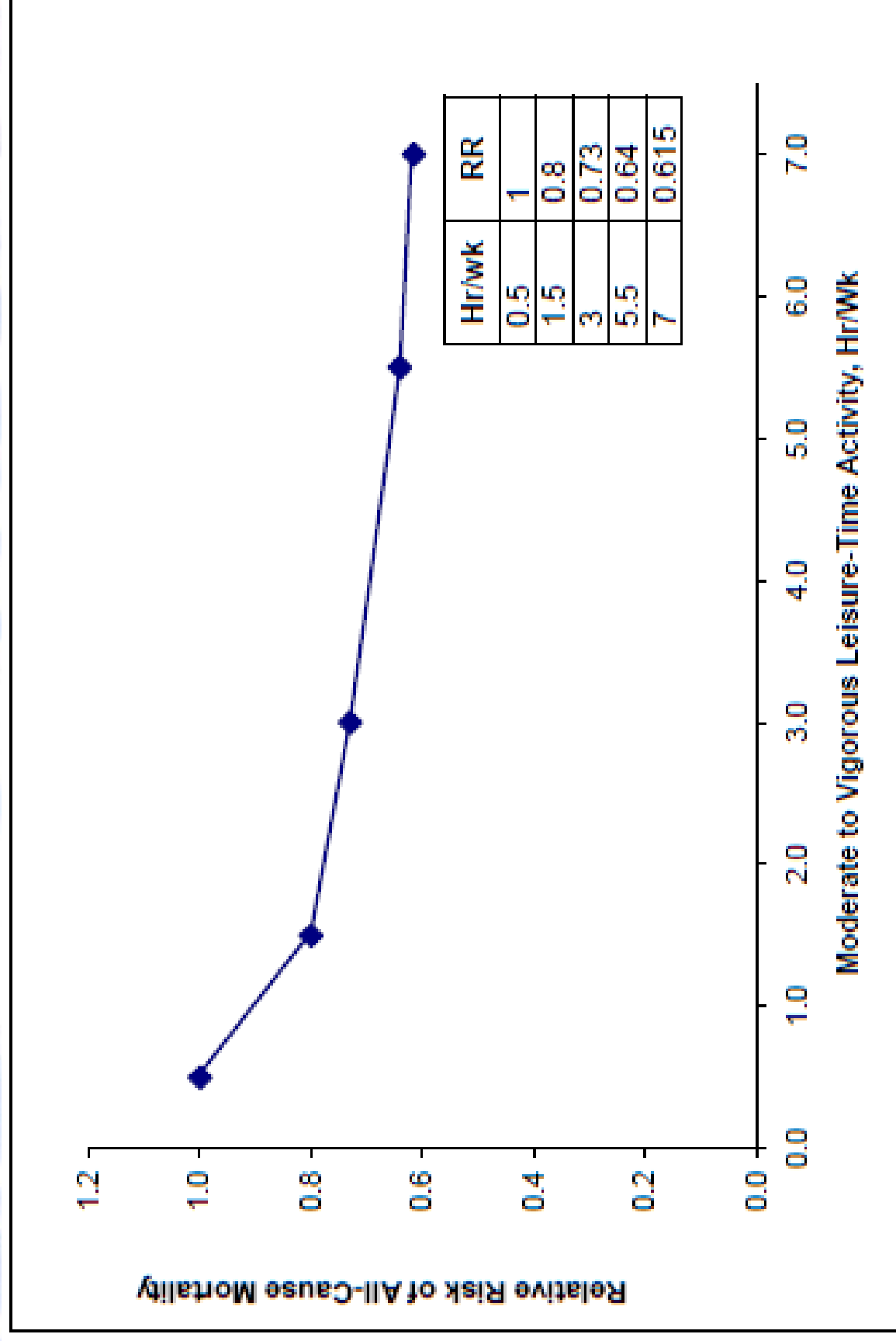
www.drjamesallis.sdsu.edu



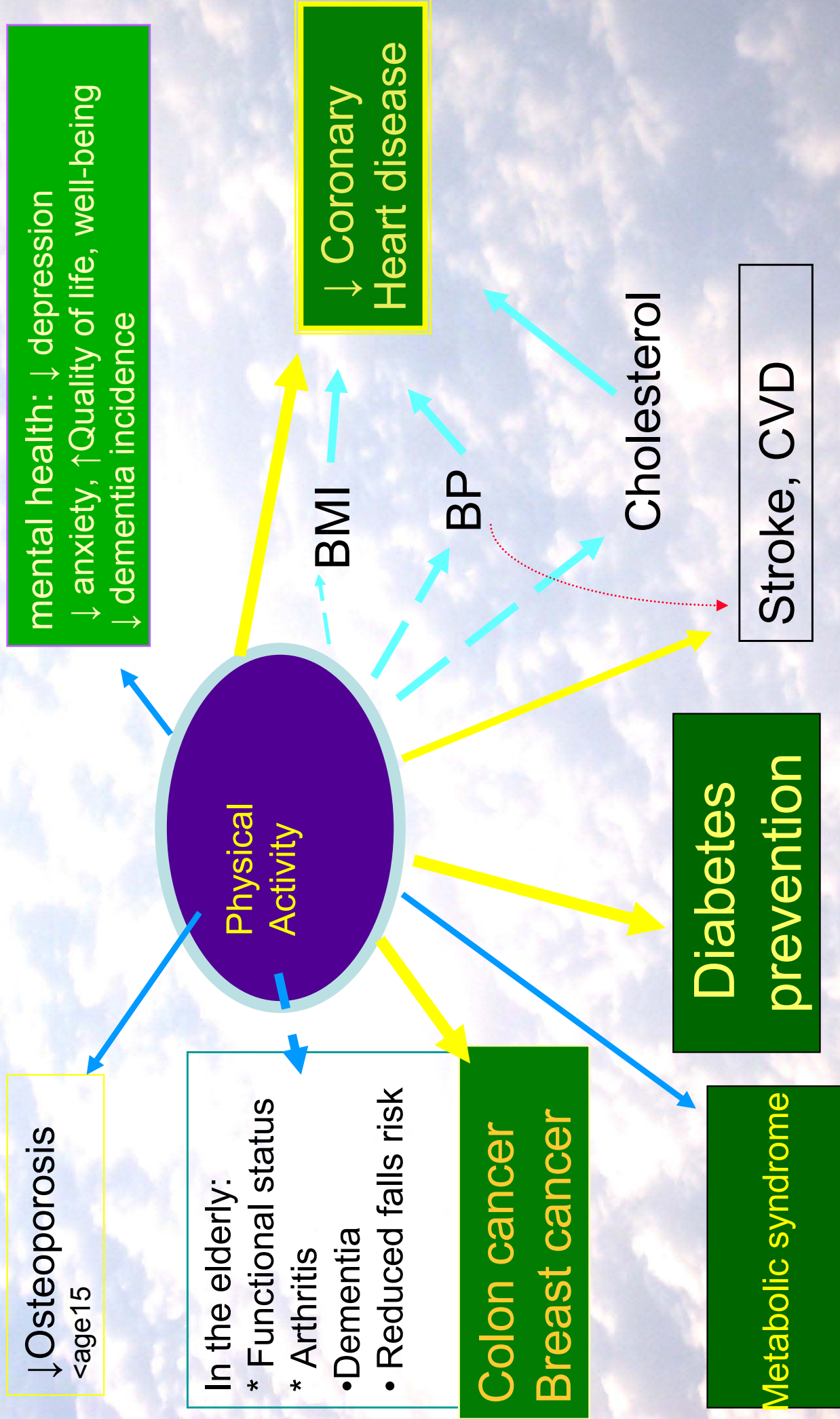
Deaths attributed to 19 leading factors, 2004 by country income level, 2004



Physical Activity Dose-response for All-cause Mortality

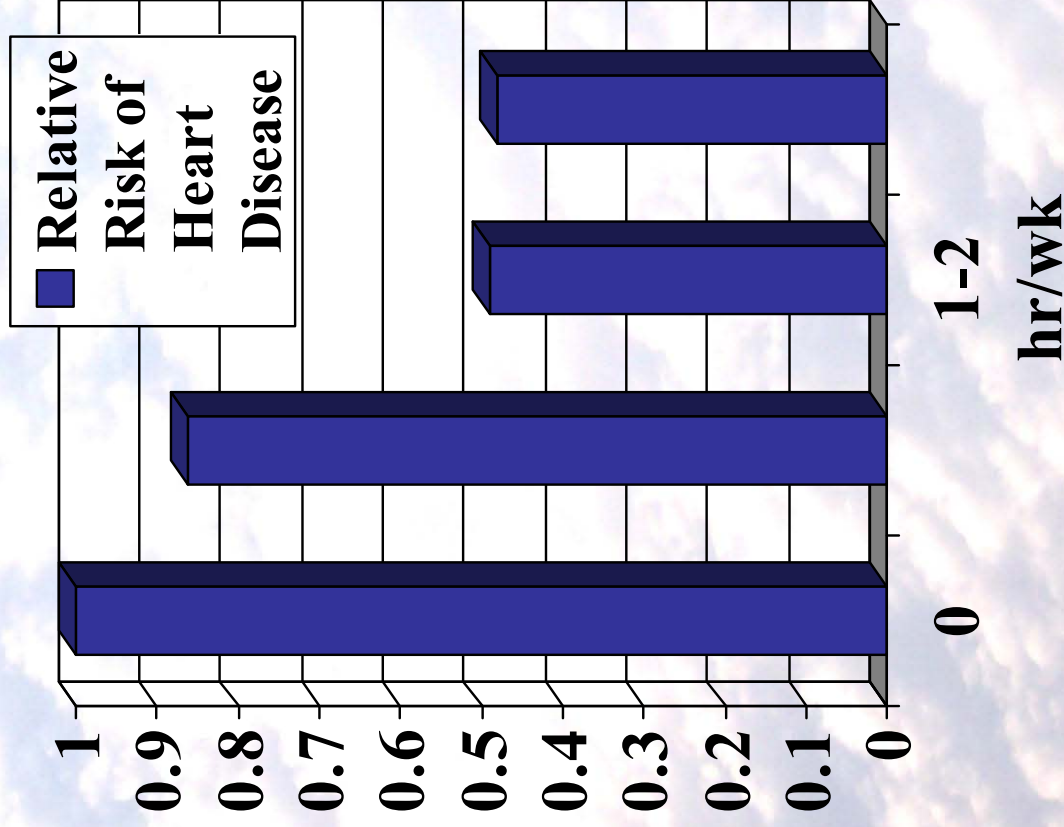


Health benefits of physical activity

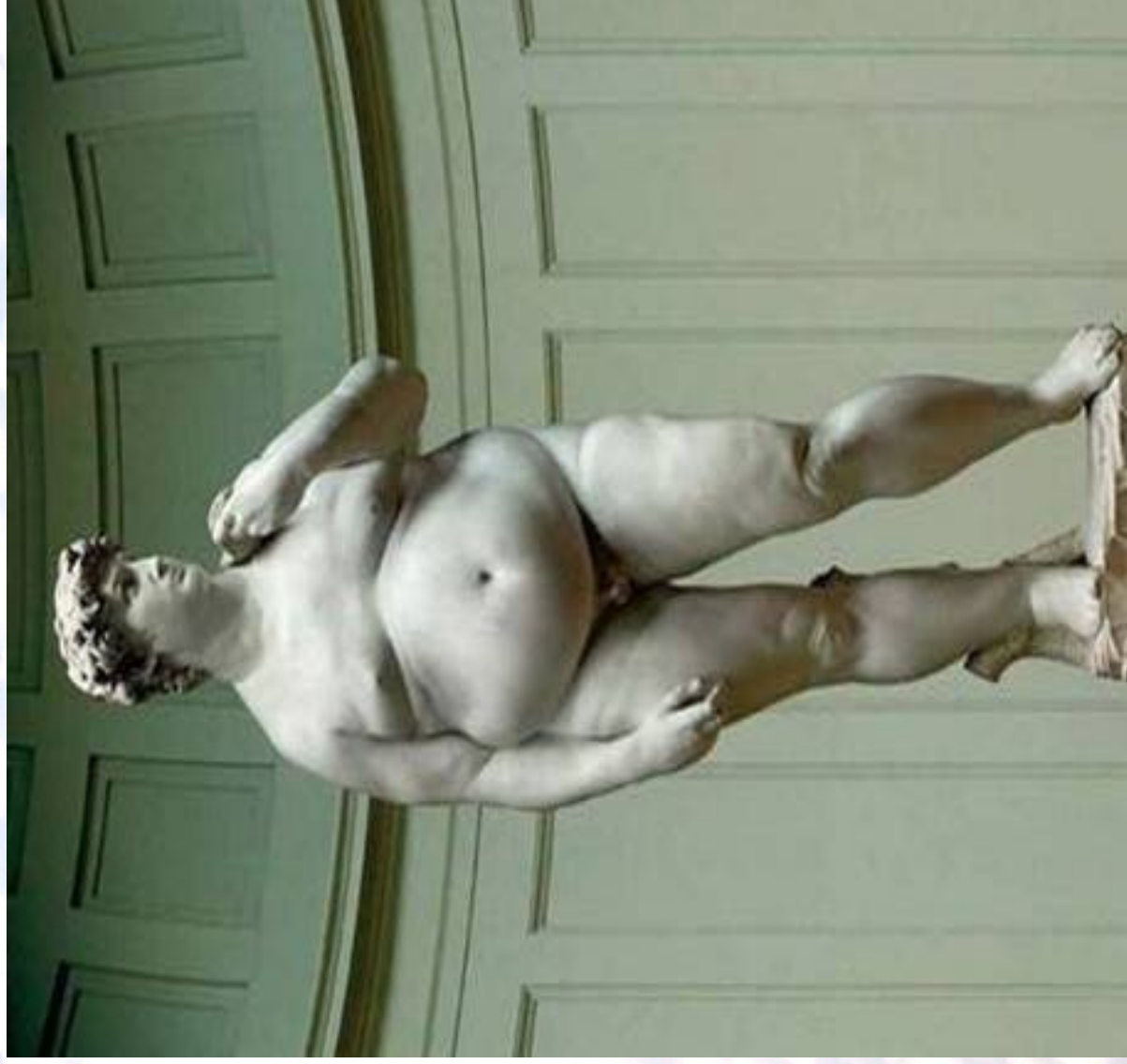


Walking Reduces Heart Disease Risk

- Lee studied 5826 women (JAMA, 2001)
- Walking at least 1 hr/wk reduced risk by 50%
- Results adjusted for other risk factors



David visits America

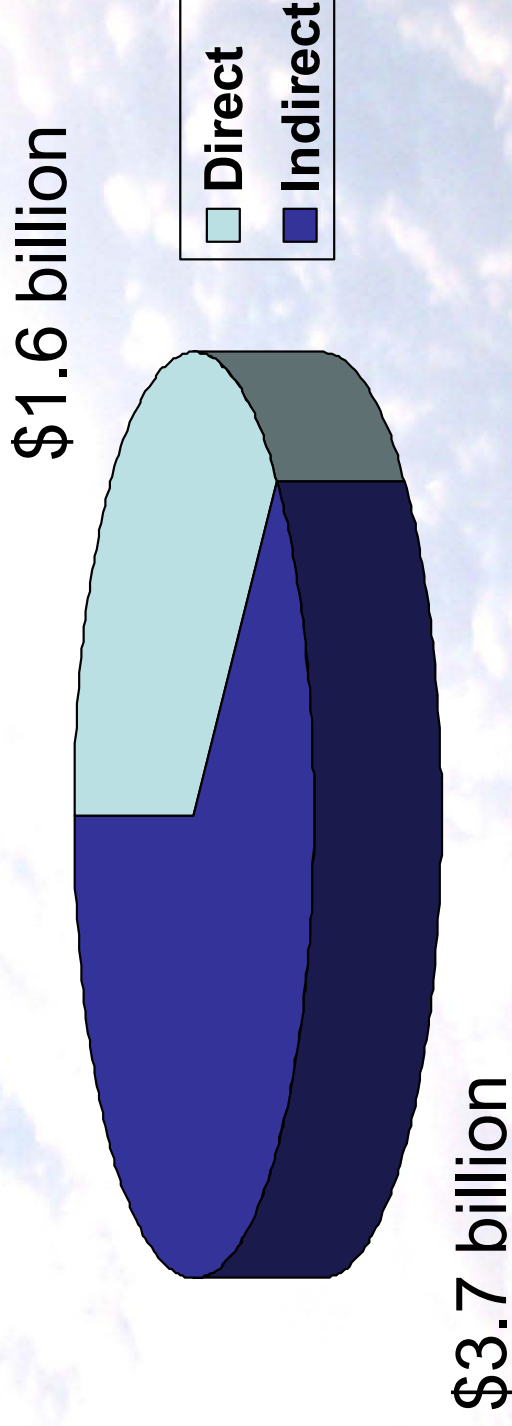


Costs of Inactivity & Obesity

- Physical activity costs at least \$77 Billion annually in health care costs in the 1980s (Wang)
 - 4-6% of health care costs
- Obesity costs about \$147 Billion annually in health care costs in the US (Finkelstein, 2009)
 - Almost 10% of medical spending
 - Responsible for about 1/3 of increase in medical spending

Economic Cost of Physical Inactivity in Canada

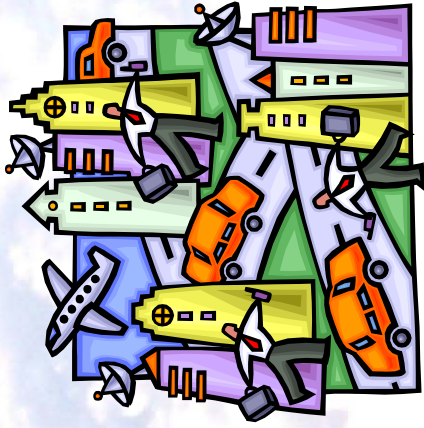
Total: \$5.3 billion



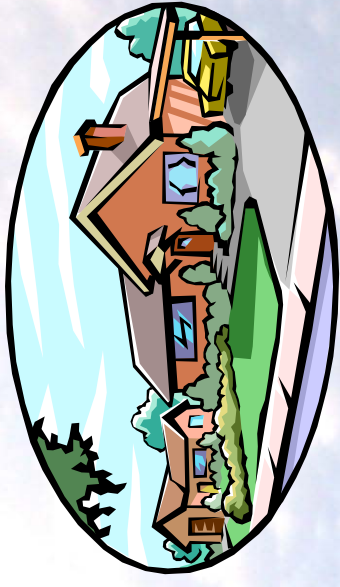
Direct costs include medical costs to treat coronary heart disease, hypertension, stroke, breast cancer, colon cancer, type 2 diabetes, and osteoporosis.

Elements of An Active Living Community

**Community Design
Destinations**



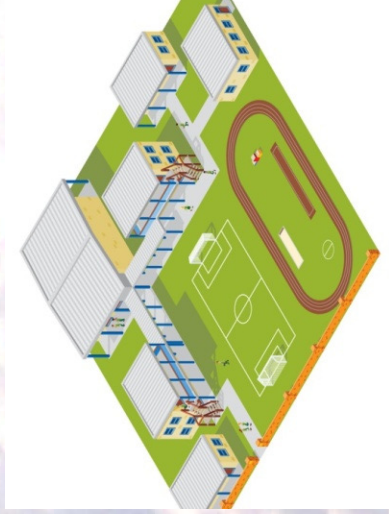
Home



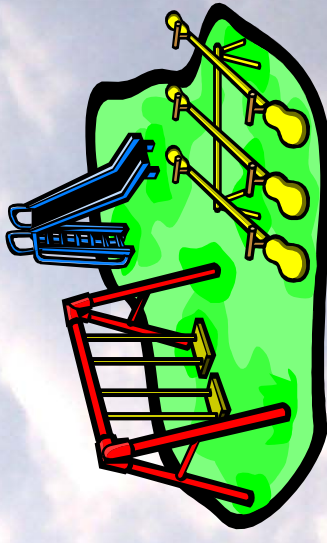
Transportation System



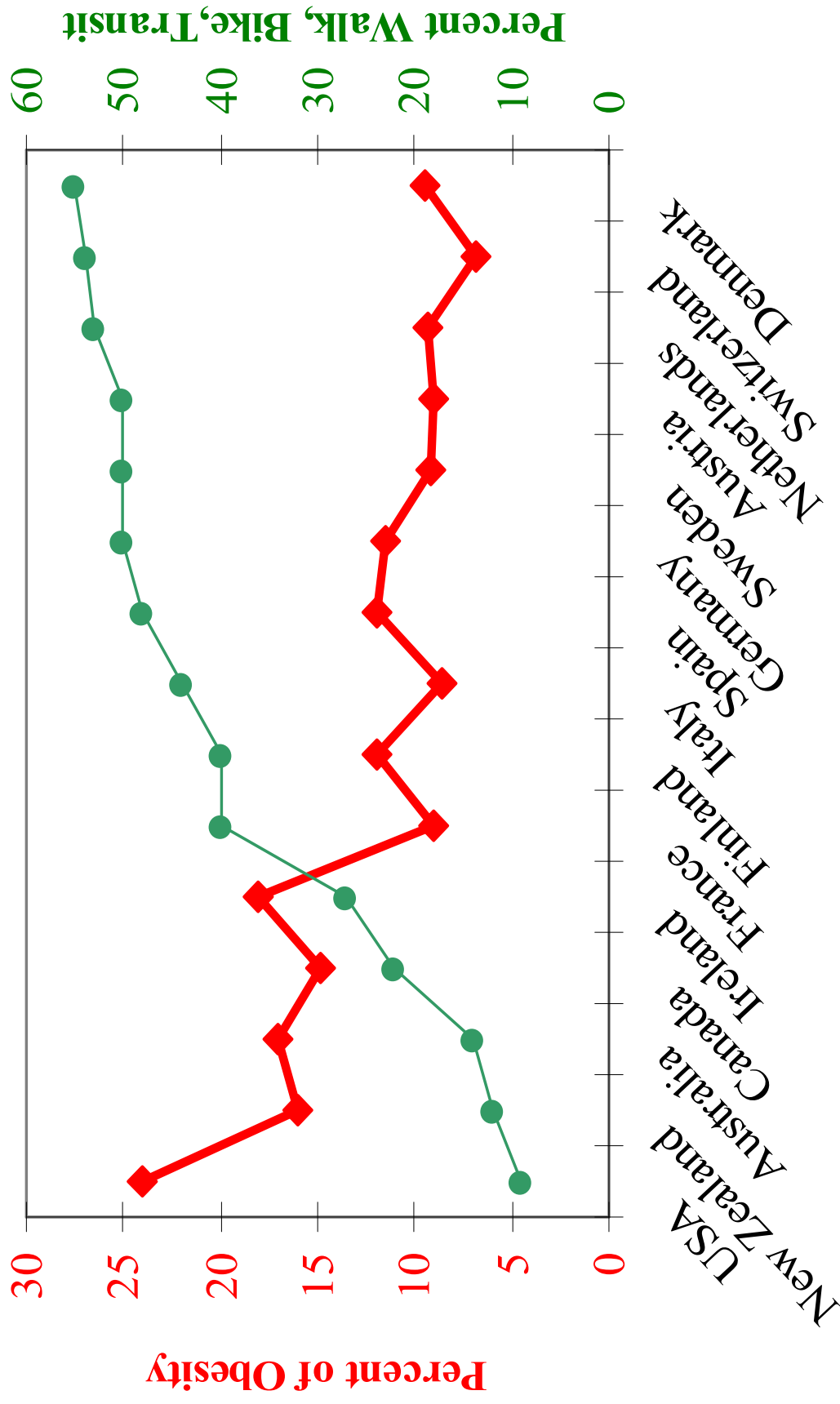
School & Worksite



Park & Rec



Does car dependence make us fat? Obesity falls sharply with increased walking, cycling, and transit use!





“Walkable”: Mixed use, connected, dense



Not "walkable"



street connectivity and mixed land use

Neighborhood Walkability and Income: Associations with Physical Activity & Overweight

James F. Sallis, Brian E. Saelens, Lawrence
D. Frank, Donald J. Slymen, Terry L.
Conway, Kelli Cain, & James C. Chapman

San Diego State University; University of
Washington; University of British Columbia

NQLS Neighborhood Categories

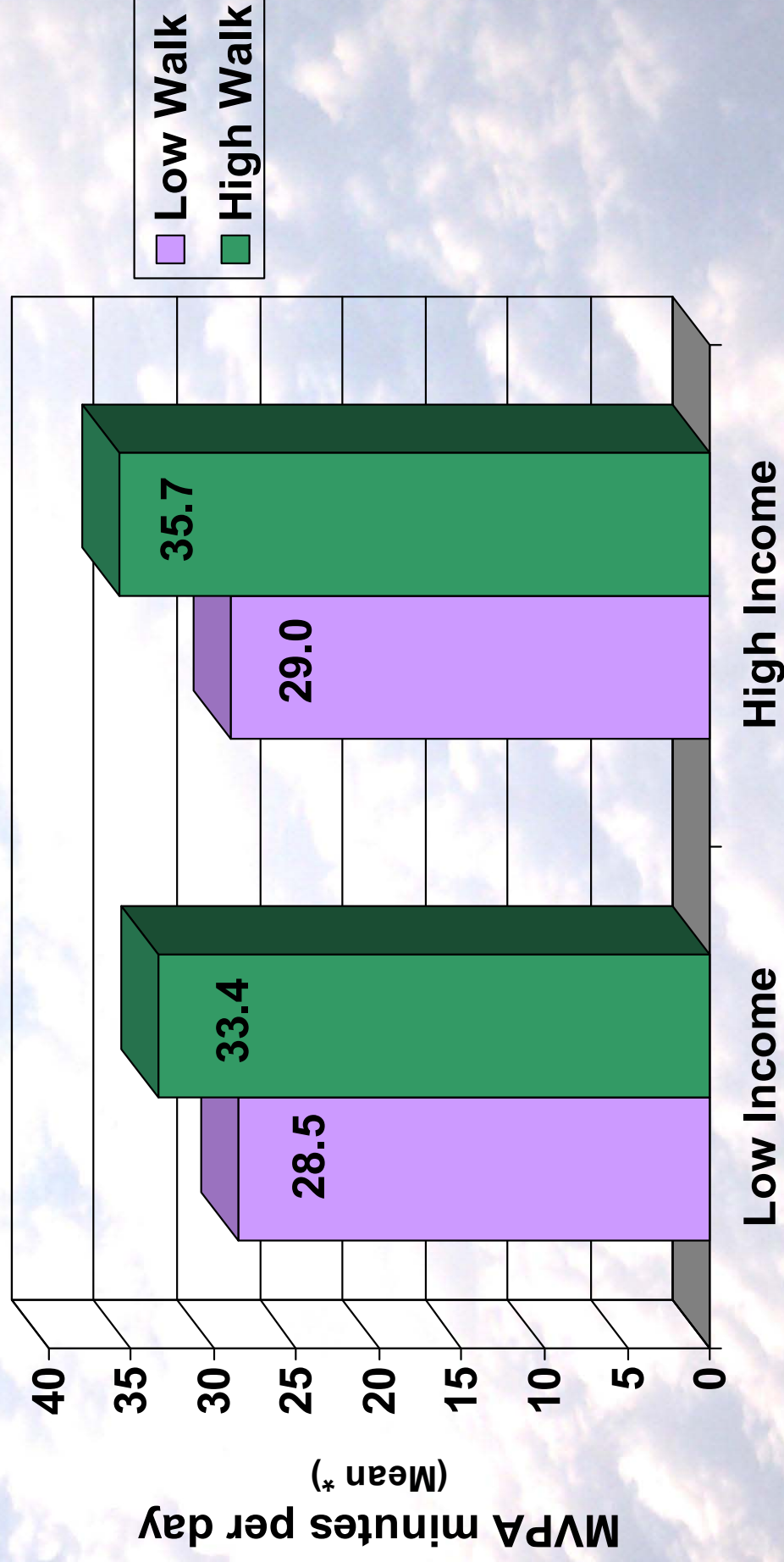
Walkability		Socioeconomic Status	
Low	High	Low	High
4 per region		4 per region	
4 per region		4 per region	

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

Walkability: $p = .0002$

Income: $p = .36$

Walkability X Income: $p = .57$



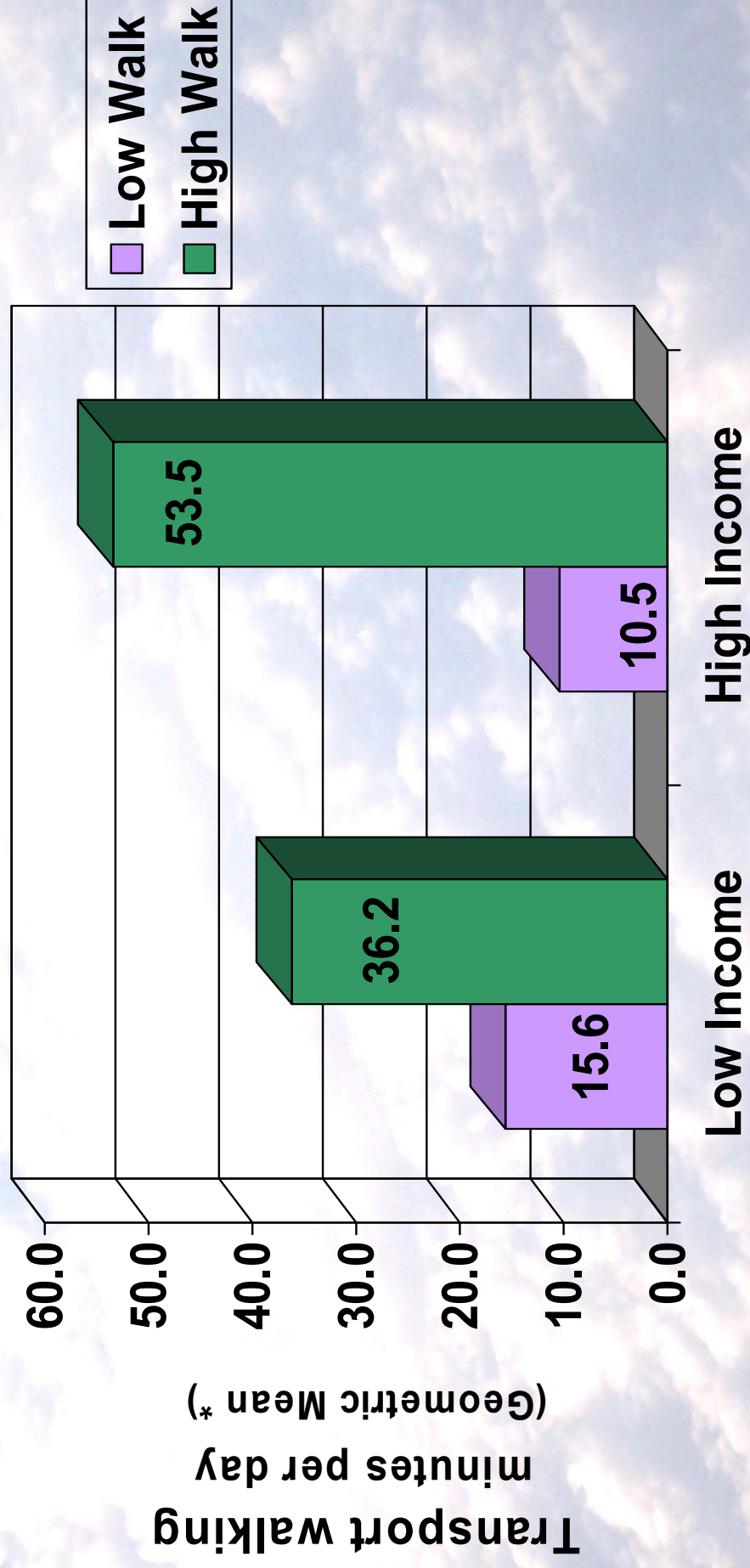
* Adjusted for neighborhood clustering, gender, age, education, ethnicity, # motor vehicles/adult in household, site, marital status, number of people in household, and length of time at current address.

Transport Walking Min/day in Walkability-by-Income Quadrants

Walkability: $p = <.0001$

Income: $p = .97$

Walkability X Income: $p = .027$



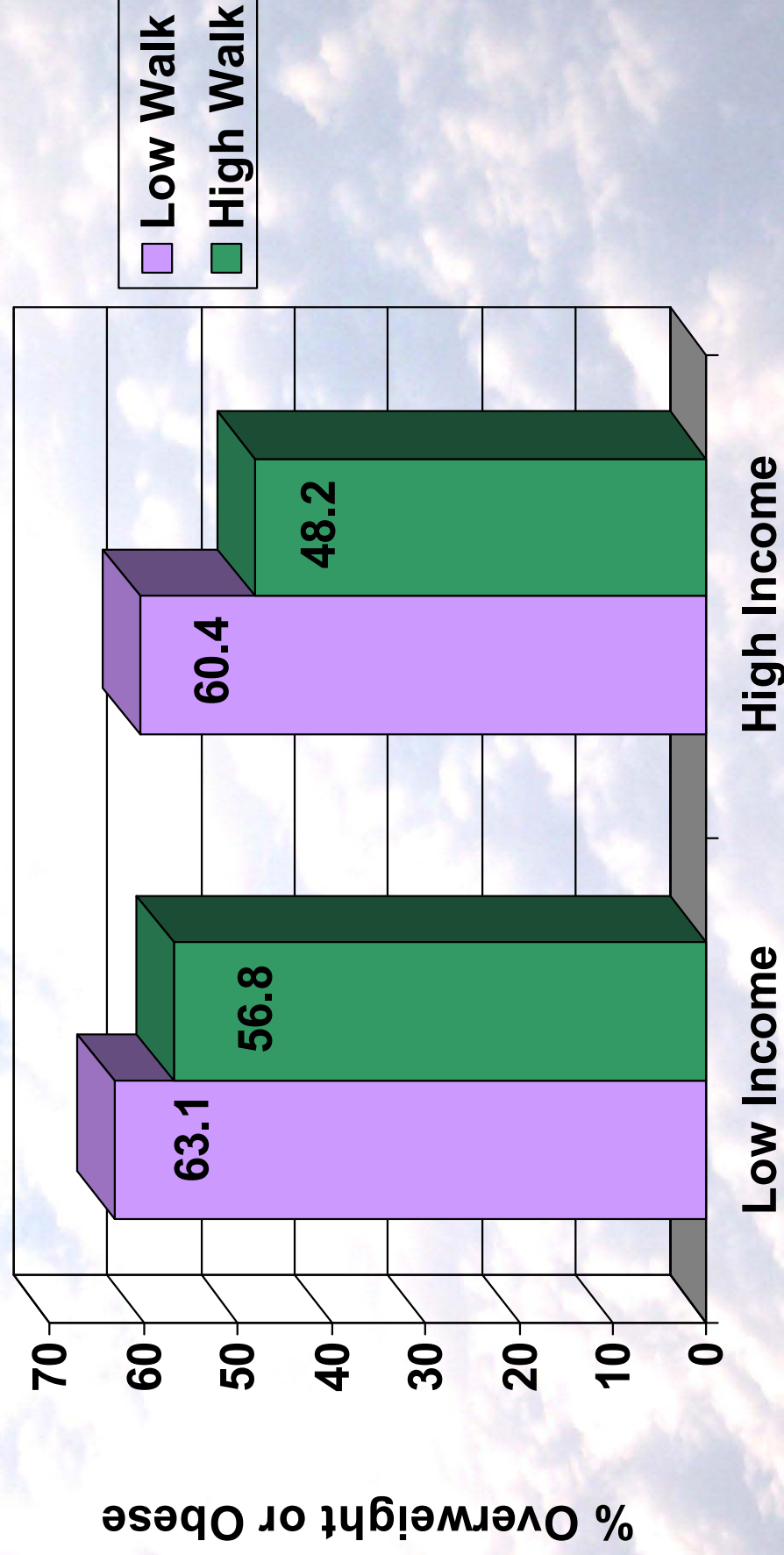
* Adjusted for neighborhood clustering, gender, age, education, ethnicity, # motor vehicles/adult in household, site, marital status, number of people in household, and length of time at current address.

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.

Multiple Pathways from Land Use to Health:

Frank et al. JAPA 2007

- 5% increase in walkability associated with:
 - 32% increase in walking for transport
 - $\frac{1}{4}$ point decrease in BMI (about 1.25 pounds)
 - 6.5% decrease in vehicle miles traveled
 - 5.6% decrease in oxides of nitrogen (NO_x) grams
 - 5.5% decrease in volatile organic compounds (VOC) grams
- County government is acting on results

Adolescents' Physical Activity as Related to Built Environments: TEAN Study in the US



James F. Sallis, PhD,¹ Lawrence D. Frank, PhD,^{3,4}
Terry L. Conway, PhD,¹ Jacqueline Kerr, PhD¹,
Brian E. Saelens, PhD,² Karen Glanz, PhD, MPH,⁵ Donald J. Slymen,
Ph.D.,¹ Kelli Cain, MA,¹ James C. Chapman, MSCE,⁴

¹San Diego State University; ²Children's Hospital Seattle; ³University of British Columbia; ⁴Urban
Design 4 Health; ⁵ University of Pennsylvania

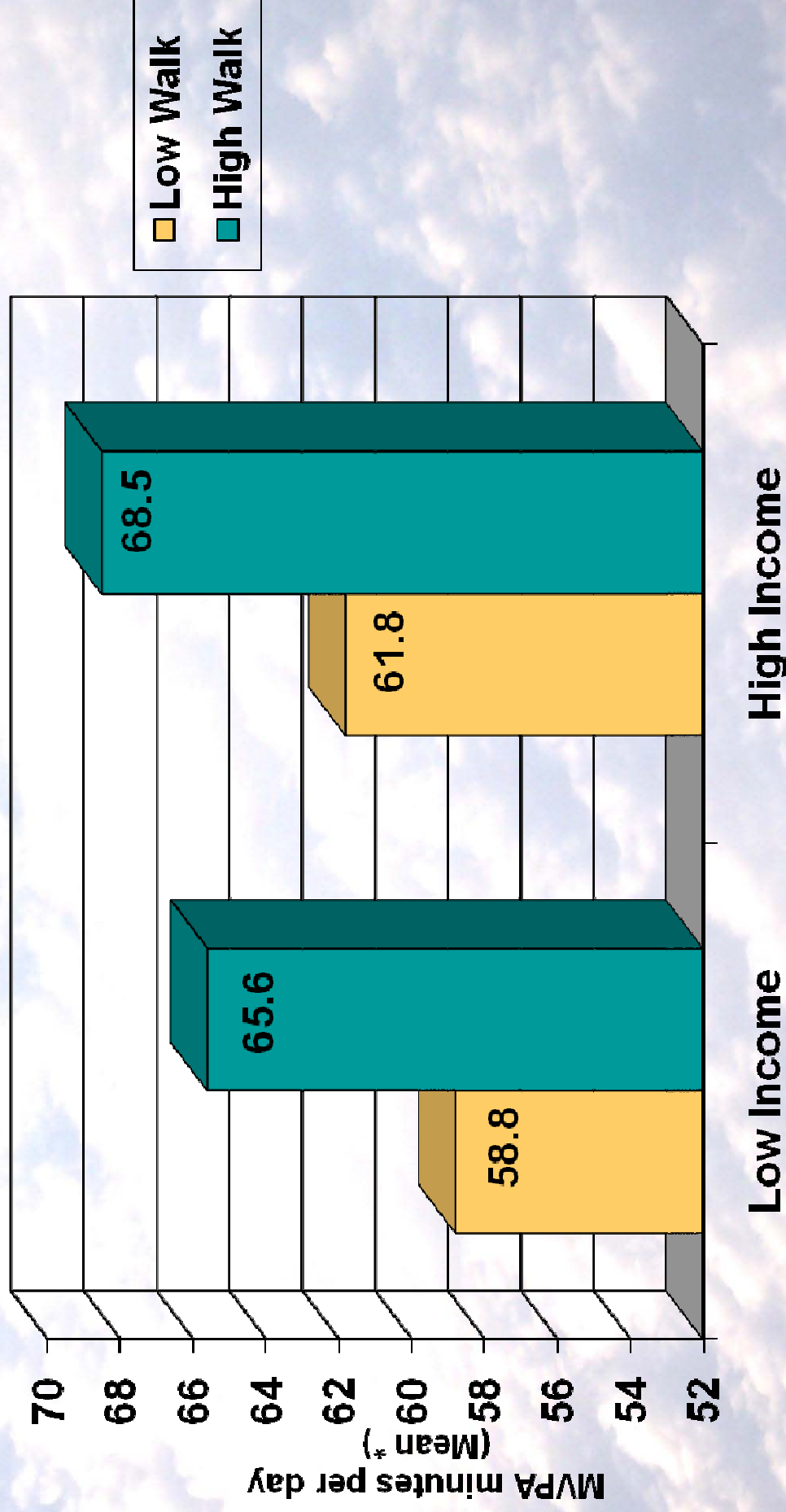
Funded by NIH/NHLBI 2007-2011; Grant HL083454

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: $F=.001$; $p=.981$



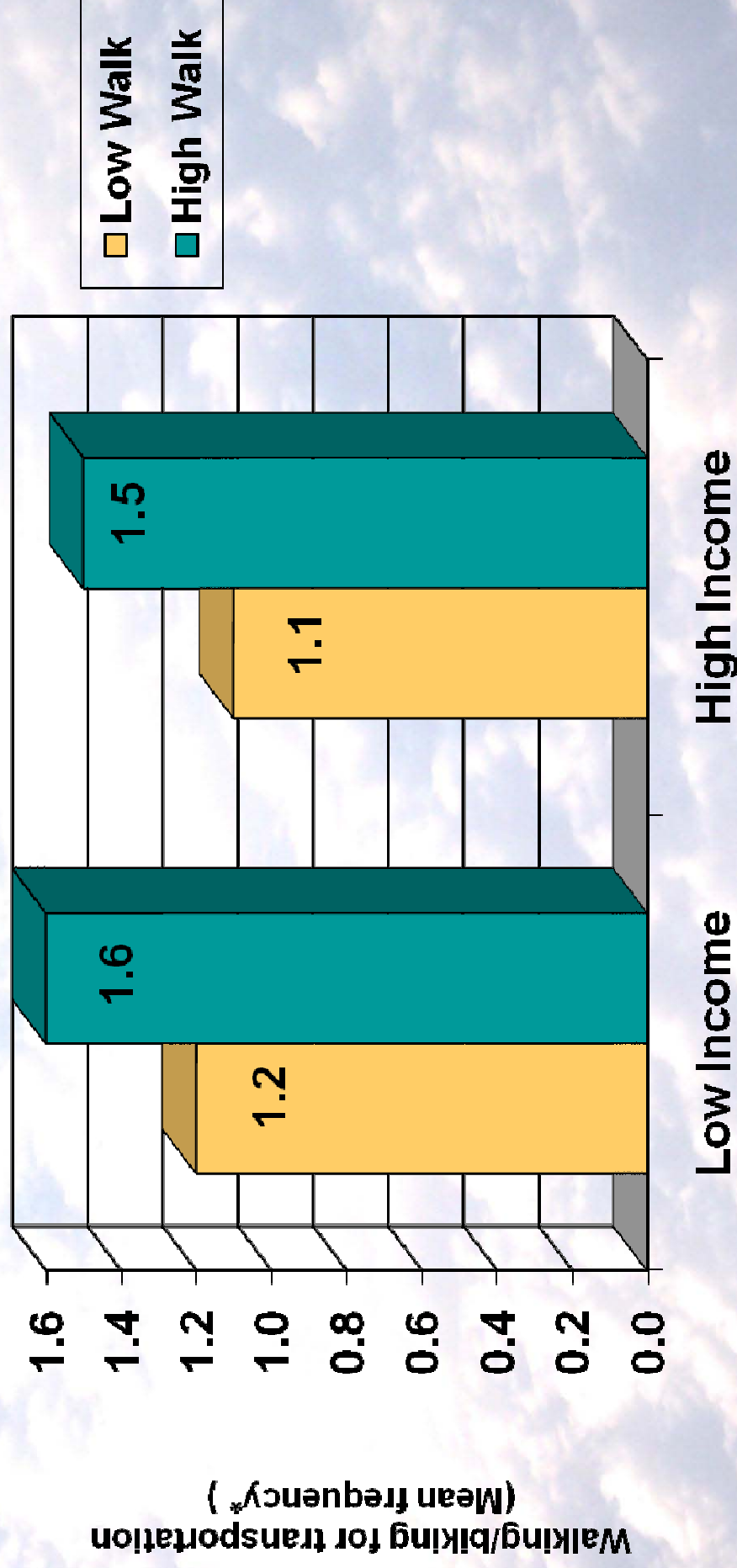
* Adjusted for gender and age

Walking/Biking for Transportation[†] in Walkability-by-Income Quadrants

Walkability: $F=46.5$; $p=.000$

Income: $F=1.50$; $p=.220$

Walkability X Income: $F=.048$; $p=.827$



[†] Likert 6-point frequency scale -- mean for 9 destinations (recreation center, friend/relative house, outdoor recreation, food, retail, non-school activity, public transport, work, other)

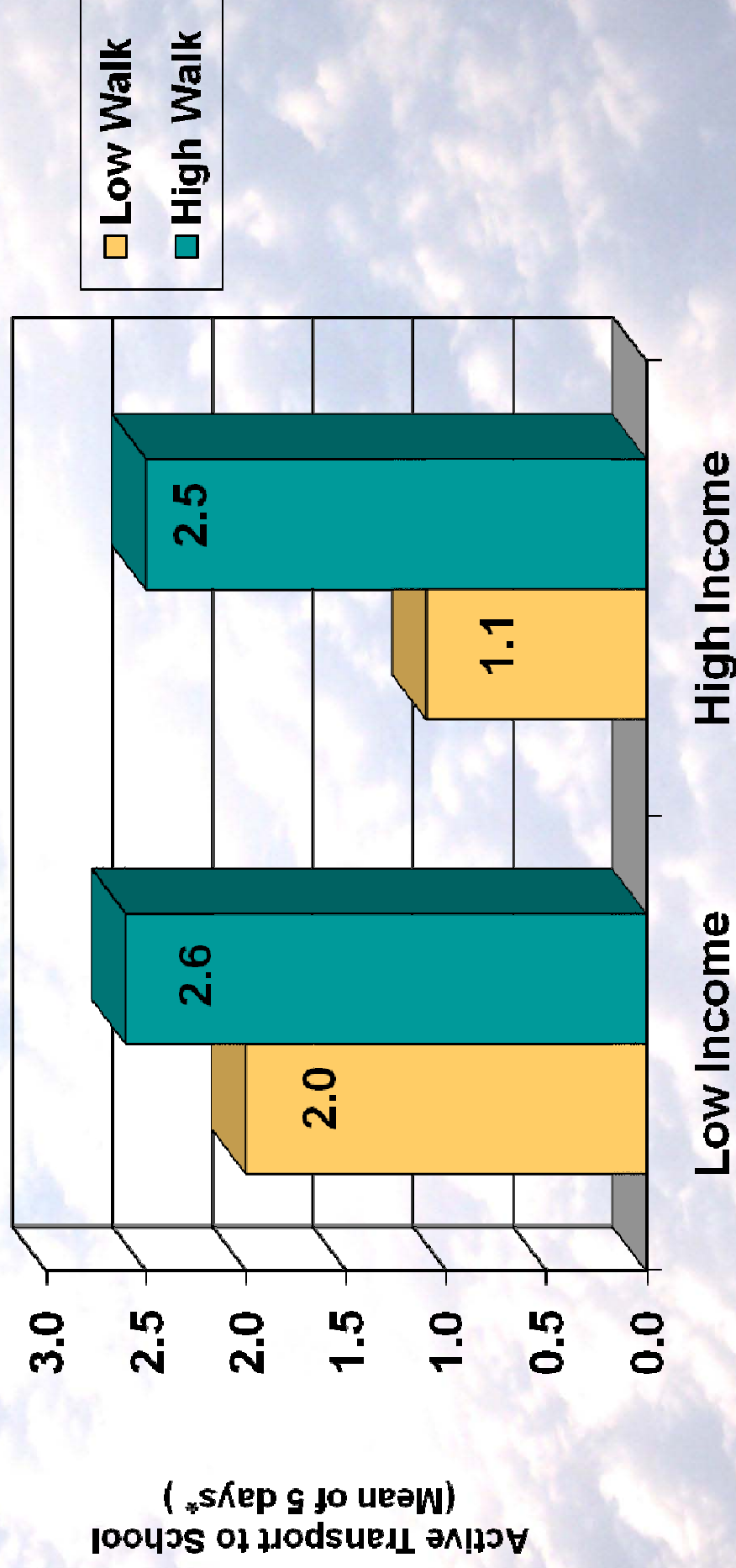
* Adjusted for gender and age

Active Transport to School[†] --Trips Per Week in Walkability-by-Income Quadrants

Walkability: $F=21.2$; $p=.000$

Income: $F=4.02$; $p=.045$

Walkability X Income: $F=3.5$; $p=.062$



[†] Includes walking, biking, and skateboarding to and from school

* Adjusted for gender and age

Need for International Research on Environment + PA

- Ecological models of behavior teach that policy & environmental factors have the broadest & longest-lasting impacts
- WHO global strategy & national PA plans emphasizes environment & policy change
- Research on PA environments is limited in all countries and absent in most
- Local data can stimulate & guide local change



Atlanta, USA

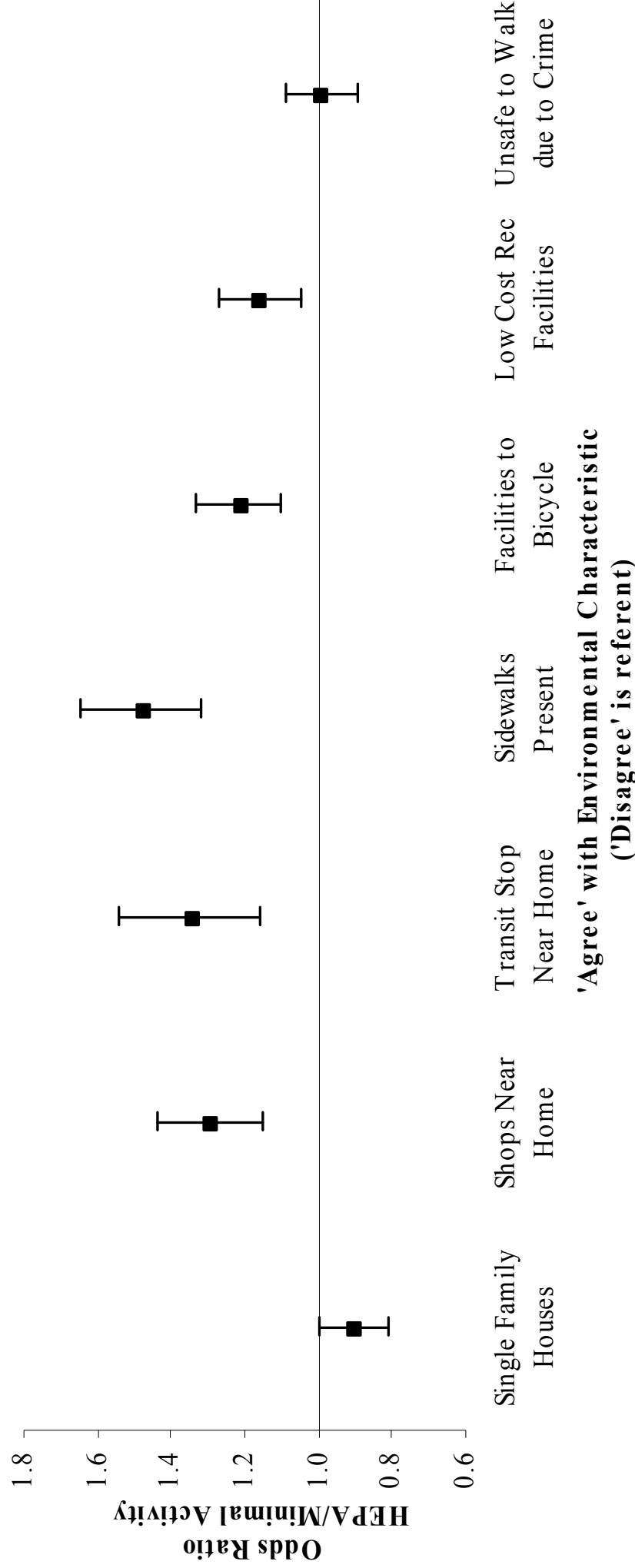
Ghent, Belgium



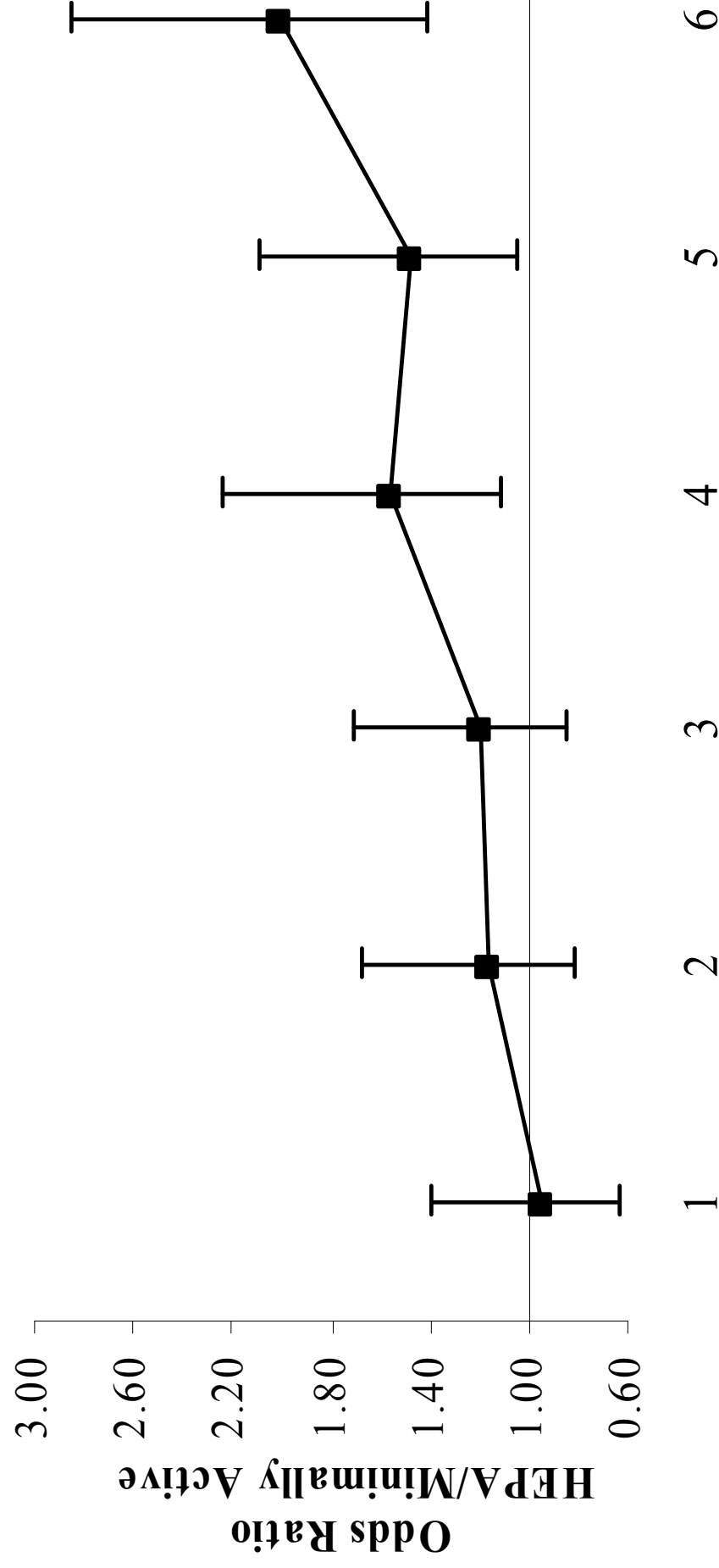
We can learn
from
international
studies

Results of an 11-country study linking neighborhood \ attributes with meeting physical activity guidelines

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 HEP A/Minimal Activity (Pooled City Sample)



Total Number of Environmental Characteristics
(Zero is referent)



Studies in US, Australia, and Belgium indicated that a common study design and measures were feasible, so the goal was to apply methods to other countries, improving on IPS study

Main NCI Study Aims

- IPEN study funded by NCI 2009—2013
- Main aims:
 1. Support countries to collect or enhance data according to common protocol
 2. Transfer data to central dataset
 3. Study co-ordination, quality control, & pooled analyses
 4. Support the network more widely
 5. Advance science through pooled analyses
 6. Use results to inform policy internationally

IPEN participating countries (so far)

- Australia
- Belgium
- Brazil
- Denmark
- Columbia
- Czech Republic
- Hong Kong

- Mexico
- New Zealand
- Spain
- UK
- USA

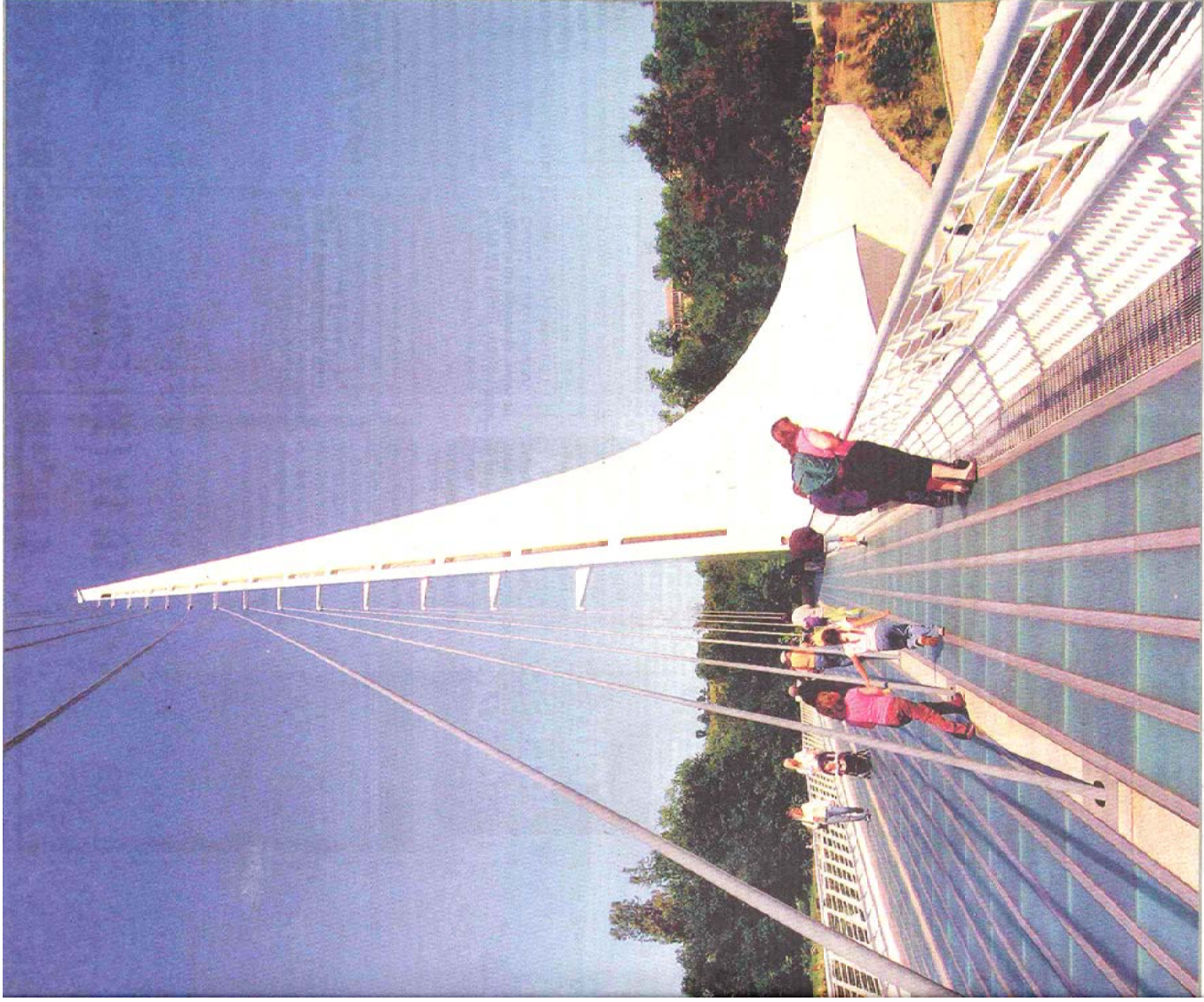


For every \$1 spent on trails, there was an estimated \$3 savings in direct medical costs



For every \$1 spent on sidewalks, the payoff in medical savings was about \$4

There are economic reasons to invest in walking facilities



Pedestrian Bridge
Redding, CA.
“The \$23.5 million
Pedestrian bridge
Is now Redding’s
No. 1 tourist
Attraction.”
Mayor Dick
Dickerson.
LA Times 6/3/07

Time to Act on the Evidence

- WHO strategy to promote PA relies on environment and policy change
- National PA Plans in many countries are trying to act on the evidence
- Collaboration across multiple sectors is required, along with citizen advocacy



NON COMMUNICABLE DISEASE PREVENTION:

Investments that Work for Physical Activity

- 7 strategies for increasing physical activity are recommended
- 2. Transport policies and systems that prioritise walking, cycling and public transport
- 3. Urban design regulations and infrastructure that provide for equitable and safe access for recreational physical activity, and recreational and transport-related walking and cycling across the life course
- 6. Community-wide programs involving multiple settings and sectors and that mobilize and integrate community engagement and resources

- www.globalpa.org.uk/investmentsthatwork

Resources at
www.activelivingresearch.org

