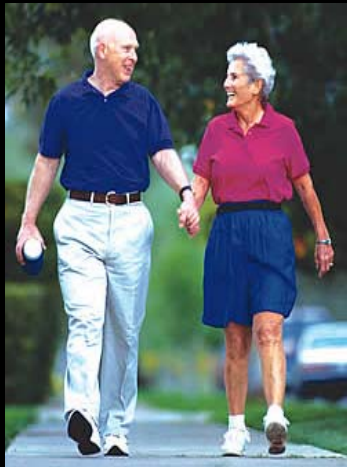


What do we know about effects of the neighborhood built environment on physical activity among older adults?



Philip J. Troped, PhD
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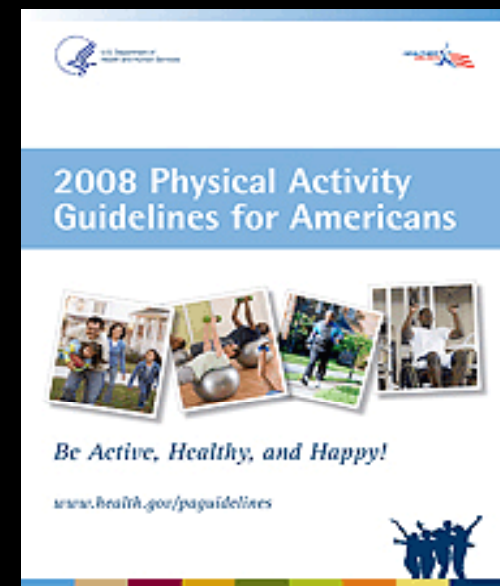
Disability and Health Partners Meeting
June 15, 2011

Outline

- Benefits of physical activity for older adults
- Current evidence on built environment and physical activity
- Brief overview of our work with Nurses' Health Study
- Future research directions

Physical Activity Guidelines for Americans

- First major review of science on benefits of physical activity in over 10 years
- Complements previous recommendations
- Information and guidance on types and amount of physical activity that provide substantial health benefits

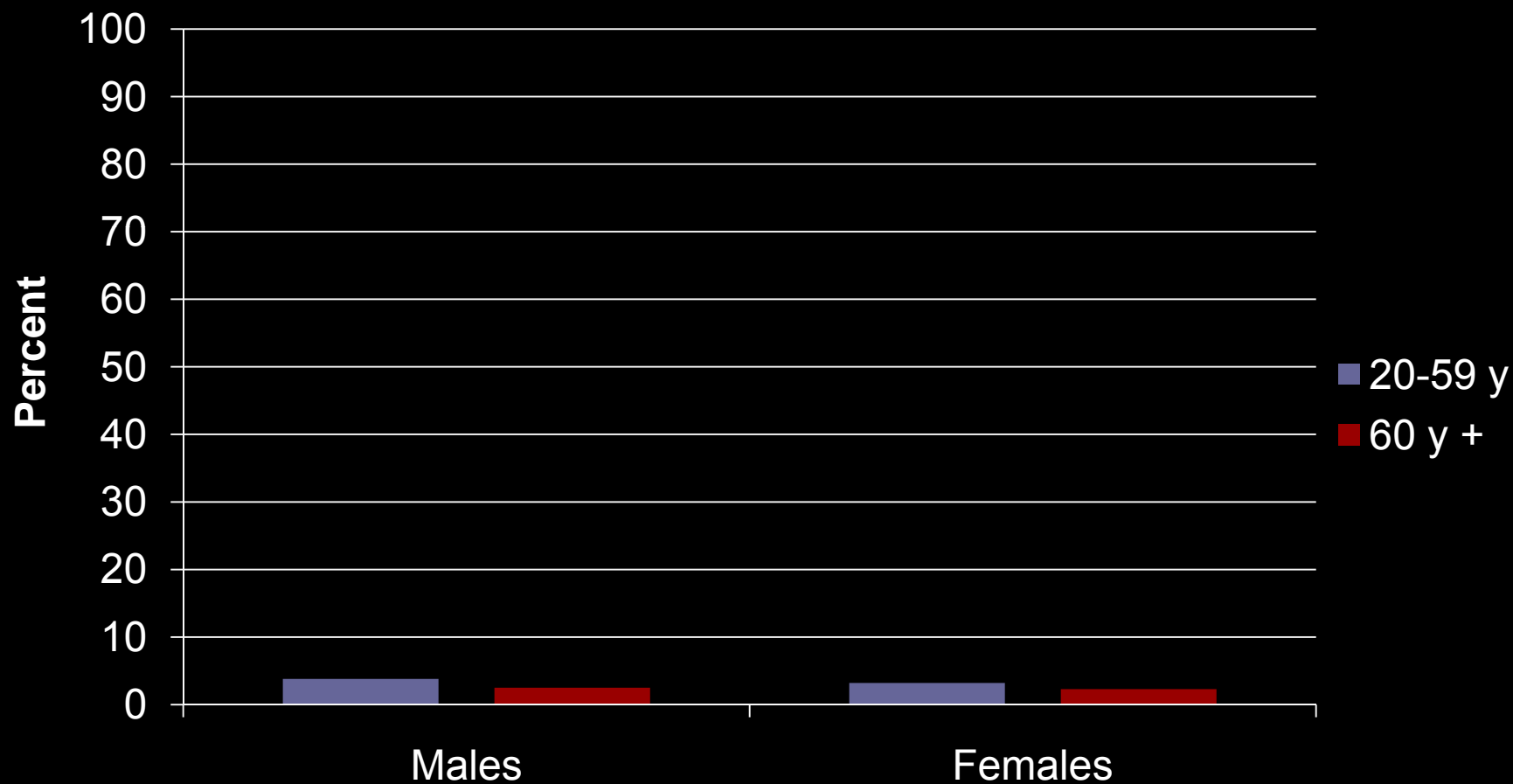


Benefits of physical activity

- Decreased risks
 - All-cause mortality
 - Coronary heart disease
 - Type 2 diabetes
 - Stroke
 - High blood pressure
 - Metabolic syndrome
 - Colon and breast cancers
- Promotes psychological well-being
- Weight control



U.S. adults meeting physical activity guidelines, NHANES



Troiano et al., 2008

What is the built environment? IOM definition

- Land-use patterns
 - Spatial distribution of human activities
- Transportation systems
 - Physical infrastructure and services that provide spatial links or connectivity among activities
- Design features
 - Aesthetic, physical, and functional qualities of built environment (e.g., design of buildings and streetscapes)

Environmental correlates of physical activity: older adults

- Proximity of facilities and businesses (King et al. 2005)
- Number of commercial establishments (Nagel et al. 2008)
- Land use mix, street connectivity, density of public transit (Li et al. 2008)
- Composite measure of neighborhood walkability (Berke et al. 2007)

Nurses' Health Study

- NCI-funded study with older women
- Cross-sectional design
- Transdisciplinary team from Purdue, MIT and Harvard School of Public Health
 - Behavioral science
 - Epidemiology
 - Environmental health
 - Urban planning
 - Geography

Primary aim

Examine associations between objective measures of neighborhood built environment and both physical activity and weight-related outcomes among older women in three states

Analytic sample

- NHS participants: MA, PA, CA
- Inclusion and exclusion criteria
 - Geocoded home address
 - Completed 2004 NHS questionnaire
 - Complete data on physical activity, BMI, and walking limitations
 - Excluded women unable to walk

Physical activity outcome

- Meeting USDHHS recommendations:
≥ 500 MET-minutes/week walking
 - Weekly duration of walking for exercise or walking to work during past year
 - Using reported pace and duration, calculated MET-minutes/week walking

Built environment variables

- Population density: # persons/km²
- Intersection density: # intersections/km of road
- Facility density: # facilities/km of road
 - Retail
 - Cafes/restaurants
 - Food stores
 - Services
 - Cultural/educational
 - Physical activity facilities



Population density and odds of meeting PA recommendations

Population density percentile	1200m home buffer
0-20 th (REF)	1.00
21-40 th	1.13 (1.02, 1.25)
41-60 th	1.12 (1.01, 1.25)
61-80 th	1.11 (1.00, 1.24)
81-90 th	1.11 (0.97, 1.26)
91-95 th	1.18 (1.00, 1.39)
96-100 th	1.28 (1.09, 1.51)

Intersection density and odds of meeting PA recommendations

# of intersections per km of road	1200m buffer
0-2 (REF)	
>2-4	1.18 (1.05, 1.34)
>4-6	1.28 (1.13, 1.45)
>6-8	1.27 (1.05, 1.53)
>8-10	1.04 (0.62, 1.75)
>10	0.40 (0.05, 3.54)

Facility density and PA, stratified by population density

	Overall	Q1	Q2	Q3	Q4	Q5	Q6	Q7
All facilities	1.04*	1.13	1.00	1.03	0.99	0.98	1.16*	1.08*
Retail/stores	1.10*	1.38	0.98	1.04	0.98	0.98	1.36*	1.18*
Services	1.52*	1.21	0.84	1.29	1.08	0.63	2.17	3.67*
Cultural/educational	1.15*	1.09	0.92	1.14	0.83	0.81	1.48	1.44*
Physical activity	1.45	1.39	1.28	0.66	0.78	0.58	15.74*	7.64*
Restaurants/cafes	1.01*	1.05*	1.01	1.01	1.00	1.00	1.03*	1.01*
Food stores	1.06*	1.09	1.05	1.06	1.00	1.04	1.18*	1.05

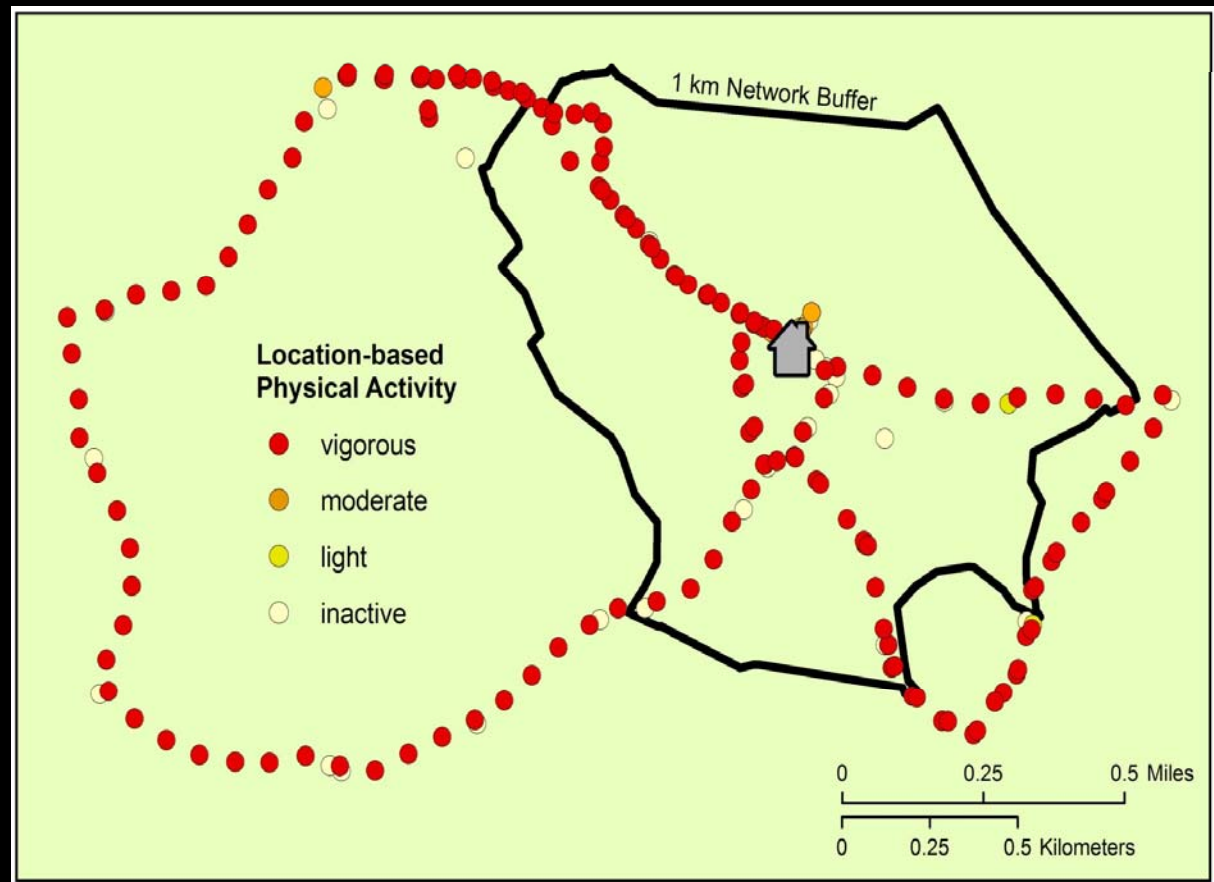
*Significant at $P \leq 0.05$

Conclusions for NHS analyses

- Facility variables showed stronger associations in higher population density areas
- Intersection density may be a good thing, but only to a point for older adults
- Findings “generally” consistent with existing literature

Future directions: built environment research (1)

Integrated GPS
and
accelerometer
monitoring to link
environment to
physical activity
behaviors



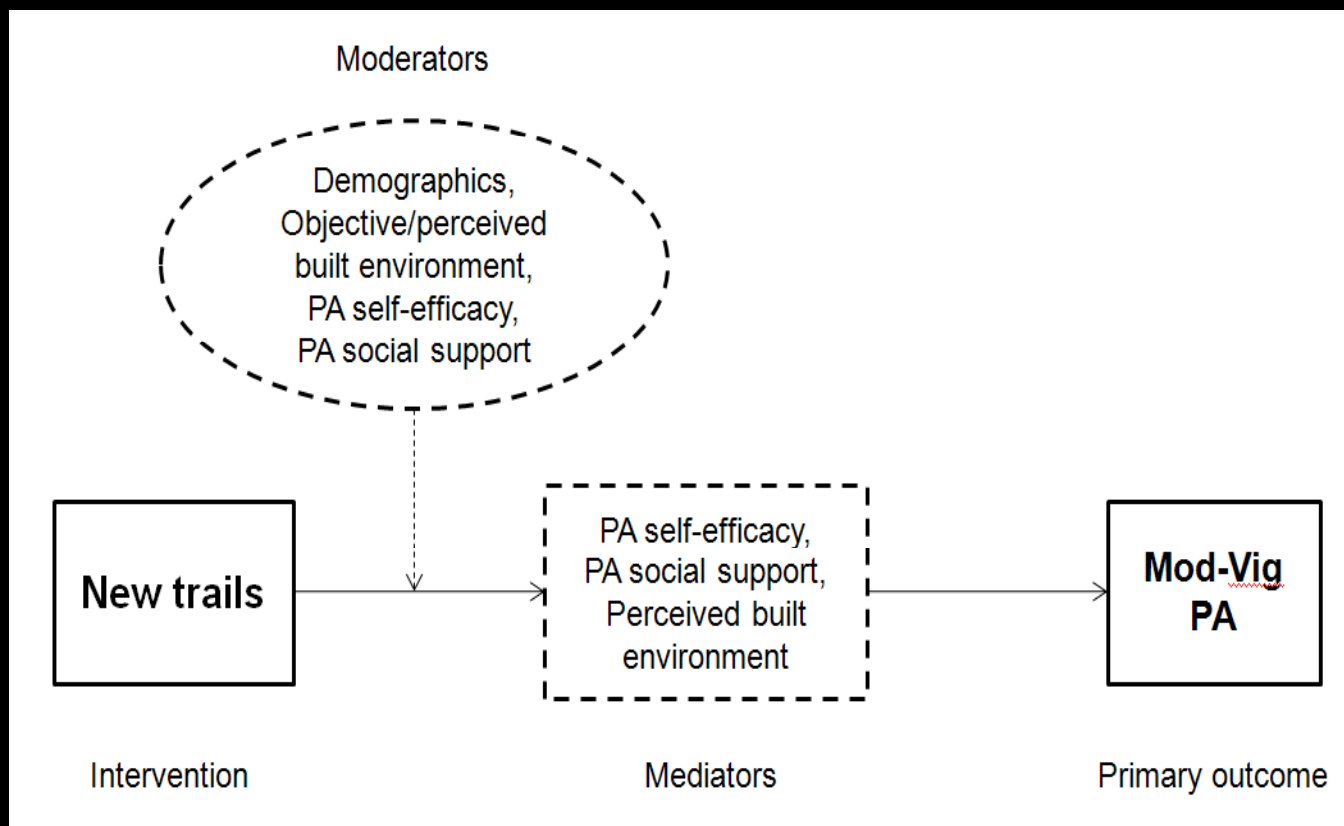
Troped et al., AJPM, 2010

Future research directions (2)

- Evaluating “natural experiments”
 - Improvements to pedestrian infrastructure (e.g., sidewalks, crosswalks)
 - Construction of trails
 - Modifications to indoor environments
- Development and testing of interventions that use environmental strategies

Future research directions (3)

- Testing mediators and moderators



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