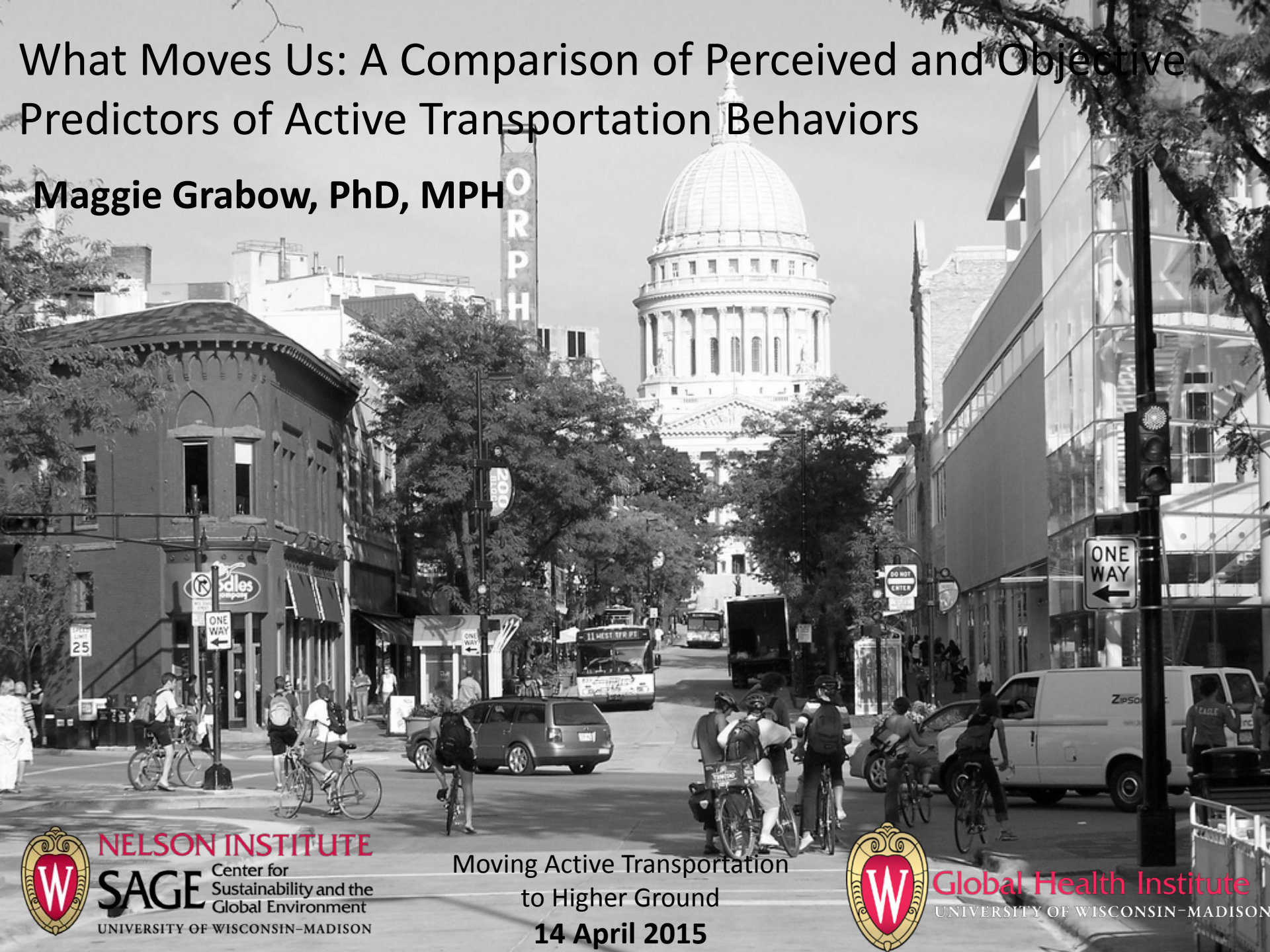


What Moves Us: A Comparison of Perceived and Objective Predictors of Active Transportation Behaviors

Maggie Grabow, PhD, MPH



Moving Active Transportation
to Higher Ground
14 April 2015



***We ought to plan the ideal of our city with an eye
to four considerations.***

***The first, as being the most indispensable, is
health.***

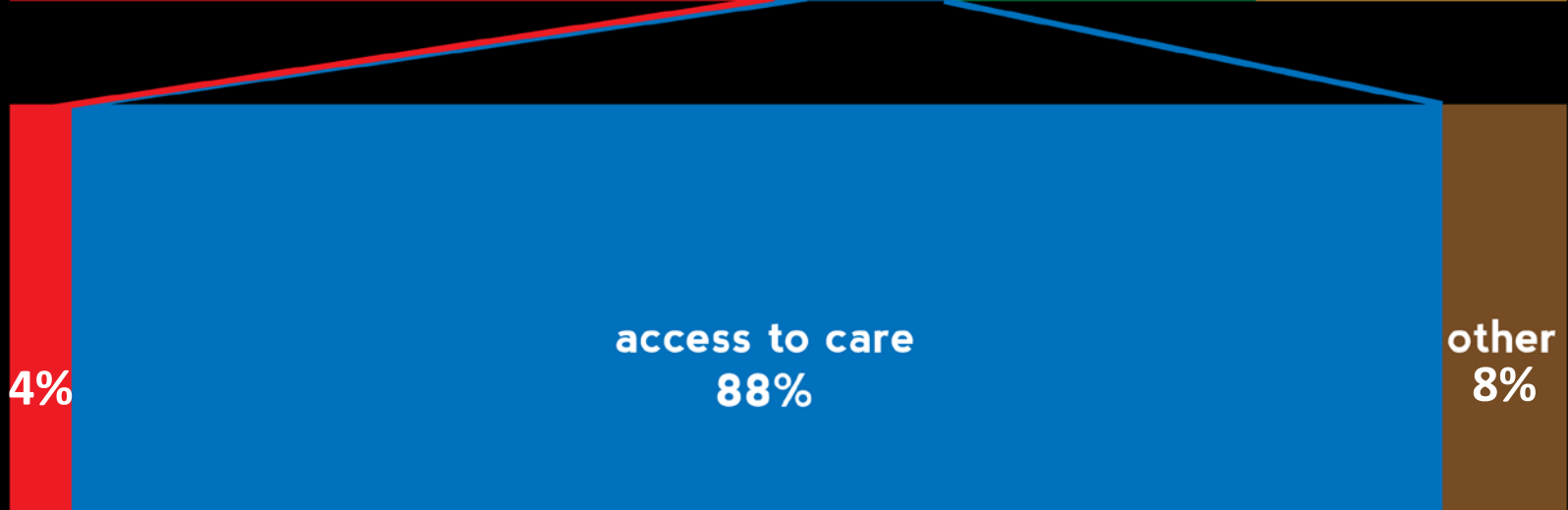
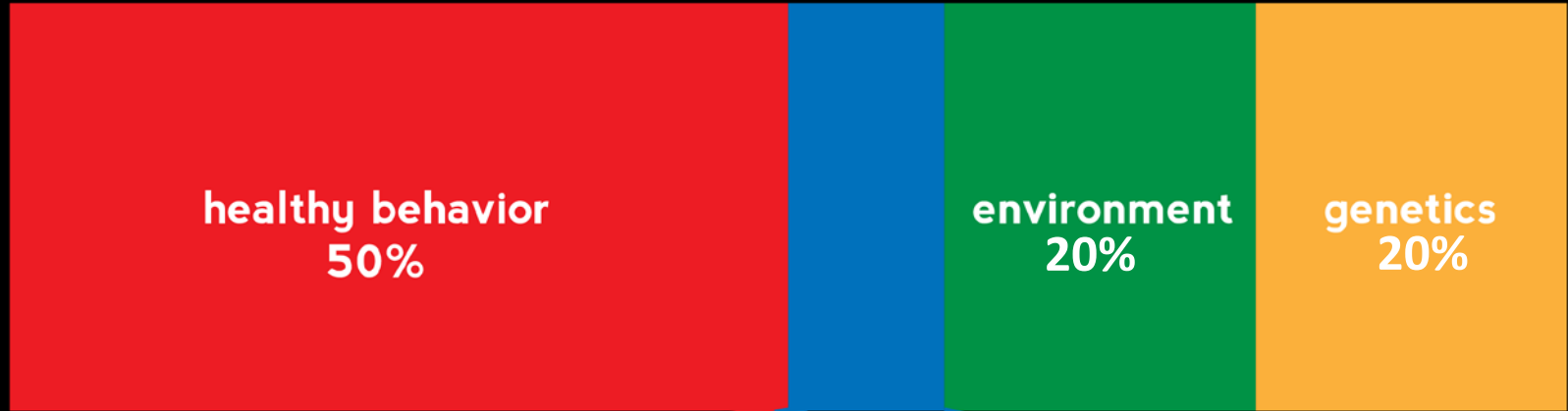
-- Aristotle (350 B.C.)



Health Determinants



Health Determinants

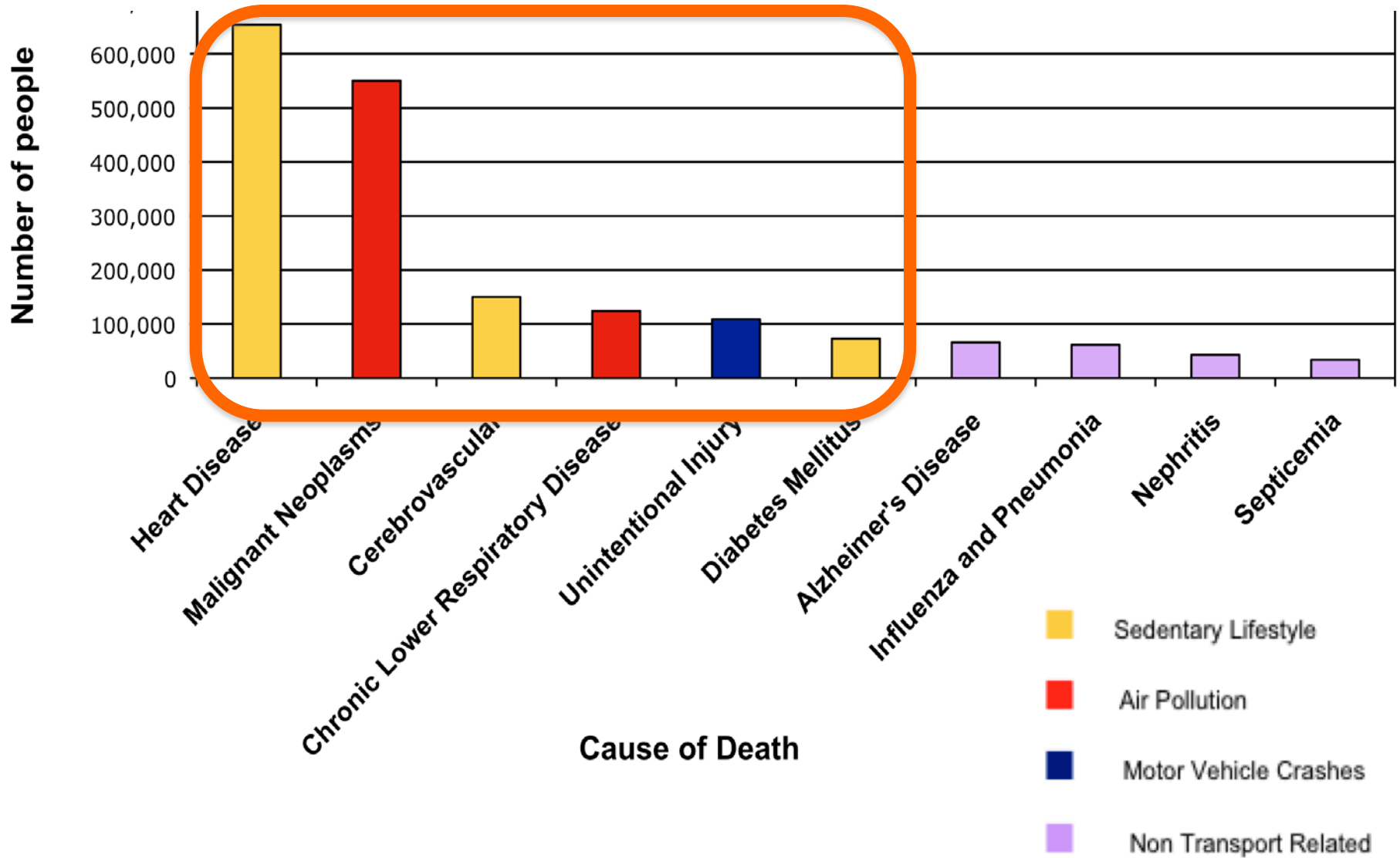


Health Expenditures

It is unreasonable to expect that people will change their behavior easily when so many forces in the social, cultural, and physical environment conspire against such change”

-Institute of Medicine (2000)

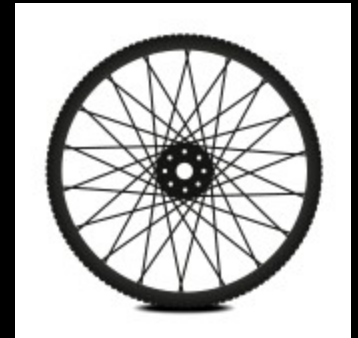
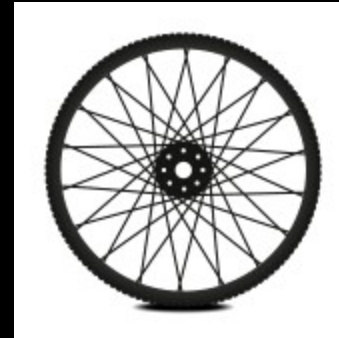
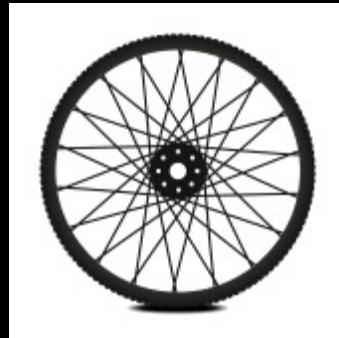
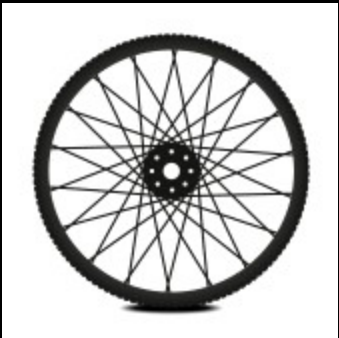
Ten Leading Causes of US Deaths per Year (CDC, 2004)



(ONE) SOLUTION:

Active transportation:

transport of person(s) and/or goods using human muscle power



Bicycling or walking with purpose to get somewhere, not just recreation

**BUT HOW THE BUILT ENVIRONMENT IS
DESIGNED MAY DETERMINE FEASIBILITY
OF ACTIVE TRANSPORT**

Research on Active Living

- Test hypotheses about relationships between
 - Physical (built) environment
 - actual and/or perceived

And

- Health outcomes
 - physical activity levels, BMI, etc.

What we know:

- At the city level, bicycling infrastructure is strongly associated with overall levels of bicycling, especially with bicycling to work

What we're still learning:

- What type of infrastructure is most effective at increasing bicycling for daily travel



Active Living Research

WHAT COMMUNITY FEATURES SUPPORT BICYCLING & WALKING?

Survey of the Health of Wisconsin

SHOW

WASABE

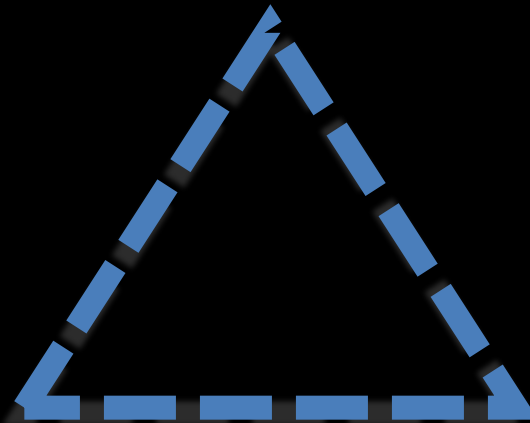




Built Environment Audit



SHOW Questionnaire



SHOW Physical Exam

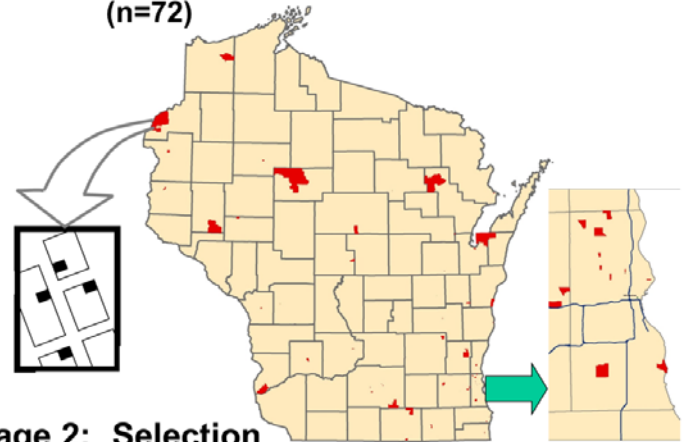
SHOW: Making Connections between Health and the Community

SHOW: The Sample

- Independent **annual surveys**
 - **Representative samples** of state residents and communities
 - Recruit **800-1,000 participants** (21-74 years old) each year
-
- **3,200 participants** 2008-2014
 - **1,000 questions** each!



Stage 1: Selection of **Census Blocks Groups** (n=72)



Stage 2: Selection of **Households** (n=28/BG)

How does SHOW measure Health?

- Behaviors – diet, exercise, smoking
- **People characteristics** – sex, age, married, employed
- Life experiences – good or bad
- **Physical Health** – blood pressure, diabetes, asthma, cancer
- **Mental Health** – depression, stress, anxiety
- **Access to Health Care** – insurance, a regular doctor
- **Beliefs** – trust in health care, neighborhood assets, interest in being a part of a community
- **Neighborhood Environment**– access to food, jobs, places to exercise and play
- **Community supports and organizations**

Built Environment Audit tools

- GIS-Based Measures (e.g. population density)



Perceived (Self-Reported) Measures (**SHOW**)



Observational Measures (Community Audits)

- **Wisconsin Assessment of the Social and Built Environment Audit Tool (WASABE)**



...capturing community characteristics

WASABE

- Direct, observational audit tool
- Assessing built and social environments around SHOW households in Wisconsin
- Walkable distance: 400 m. (1/4 mile) for urban, suburban, and rural areas



8. Please answer the following questions regarding bicycling conditions and follow the skip patterns

Bicycle Transportation/Commuting			
On-Road Biking Conditions	Yes, both sides	Yes, one side	No
a. Is there an on-street, paved, marked bike lane?			
i. If Yes [for Q.8(a.)]: Are there any obstructions in the marked bike lane (e.g., drainage gates, parked cars, etc.)? <i>Continue on to Q.8(a.)(ii).</i>			
ii. If Yes [for Q.8(a.)]: Are there any parts of the bike lanes that are missing or worn off? <i>If Yes: Skip to Q.9</i>			
iii. If No [for Q.8(a.)]: Is the outermost lane wide enough (~15 ft.) that it would reasonably fit a motorized vehicle and a cyclist side by side? <i>If No: Skip to Q.9</i>			
iv. If Yes [for Q.8(a.)(iii.)]: Are there obstructions in the outermost part of the lane (e.g., drainage gates, parked cars, etc.)?			

9. Are sidewalks present in the segment?
Choose one description below that is the best fit.

Sidewalk Analysis			
<input type="checkbox"/> Sidewalk is present in the entire segment			
<input type="checkbox"/> Sidewalk is present, but missing some parts in the segment			
<input type="checkbox"/> Sidewalk is completely or mostly missing (Skip to Q.10)			
Sidewalk Features	Yes > 1/2	Yes ≤ 1/2	No
a. Grassy or other buffer area between street/curb and sidewalk			
b. Major misalignments or cracks in the sidewalk			

Neighborhood Characteristics (2/2)	0	1-2	3+	NA
f. Litter				
i. Careless/Harmless				
ii. Hazardous				
iii. Cigarette Butts* (see manual)				
g. Broken/boarded up windows				

11. Are any of the following publicly available amenities present within the segment?

Publicly Available Amenities	Yes	No
a. Public trash cans (nonresidential)		
b. Seating/benches		
c. Bike rack		
d. Public art (e.g., murals, sculptures, urban furniture, neighborhood kiosks, public fountain, etc.)		
e. Public attractive natural features (e.g., notable public landscaping, gardens, parks or green spaces, pond)		

12. Are the following signs visible in the segment?

Neighborhood Signs	0	1-2 sm	1+ lg or 3+ sm
a. Neighborhood/social/cultural message or event			
b. Political message or event			
c. Religious message or event			
d. Fast food ads (e.g., billboards, signs outside restaurants—other than logo/name only, etc.)			
e. Alcohol ads (e.g., billboards, special offer ads, neon signs, etc.)			
f. Tobacco ads (e.g., special offer ads, signs outside stores, etc.)			
g. Security warning sign or message that suggests crime or risk of crime in the area (e.g., abduction flier, neighborhood watch, no trespassing sign, no loitering sign, etc.)			



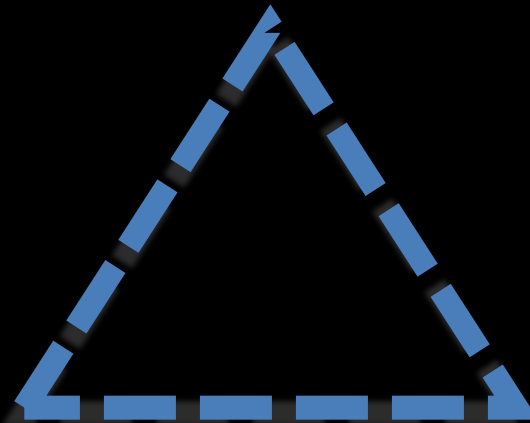
Built Environment Audit



SHOW Questionnaire



SHOW Physical Exam



SHOW: Making Connections between Health and the Community

People in their Built Environment

What predicts their active transportation behavior?

- Physical Observations (WASABE)
- Answers from surveys (SHOW)





Sample and Methods

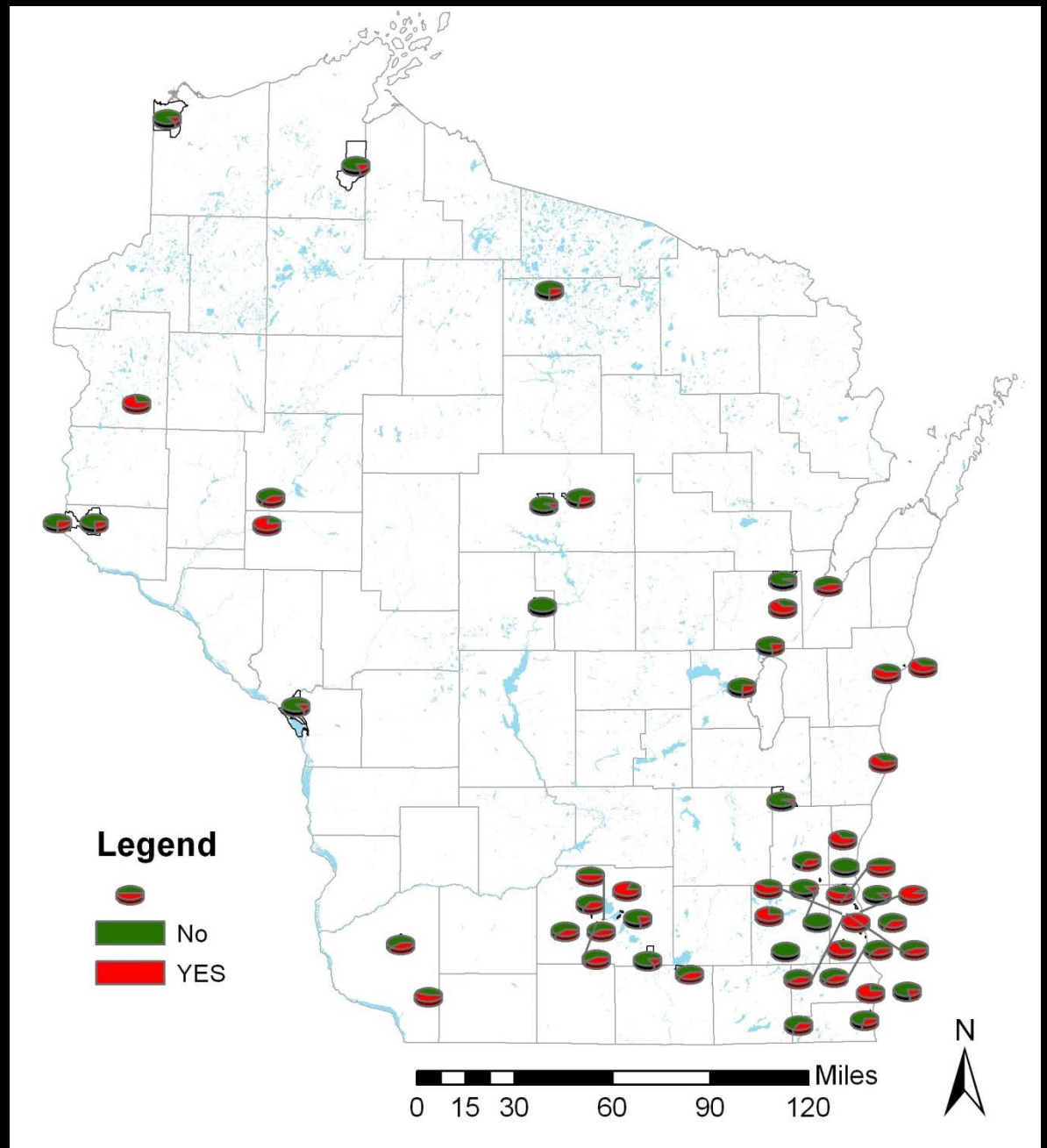
- 1,029 Wisconsin residents in urban, suburban, and rural communities
- SHOW Survey – Demographics, Active Transportation Questionnaire, Perceptions of Community
- WASABE Survey – Observational, Objective Audit of corresponding neighborhood features within 400 m street-network buffer
- GIS Information

Study Sample Characteristics

Characteristic		# using AT	% using AT
Gender	Male	163	50%
	Female	163	50%
Race	White	285	88%
	Non-White	39	12%
Marital Status	Married	175	54%
	Not Married	150	46%
Education	High school	7	2%
	Some college	181	58%
	College or beyond	125	40%
Body Mass Index	< 25	129	40%
	25 < BMI < 30	112	34%
	> 35	85	26%
Chronic Disease	Without	125	42%
	With	171	58%

% of Sample Actively Transporting

n=326



Methods: Statistical Modeling

- Multivariate Logistic Regression: Odds of active transport
- Confounding variables: Age, gender, race/ethnicity, marital status, years of residency in household, urbanicity (urban, suburban, rural), household income, education, history of chronic disease (SHOW)
- Stepwise Modeling – 1st “reality” (WASABE) then add “perceptions” (SHOW)

Primary Predictors of Active Transportation

REALITY

- Bicycle Lanes / Bicycle Supportive Streets
- Sidewalks
- Recreational Facilities
- Bicycling / Walking Trails
- Destinations (non-residential)

PERCEPTION

- Safe from traffic for bicycling and walking?
- Community well-maintained?
- Community ranking on physical activity?
- Proximity to bicycling / walking trails
- Many destinations within walking/bicycling distance?

Findings

	Model 1 - Reality		Model 2: Reality + Perception	
	OR	p-value	OR	p-value
Education	1.27	0.0002	1.262	0.0013
Chronic Disease Diagnosis	1.505	0.0363	1.787	0.0046
Physically Active	2.724	<0.0001	2.859	<0.0001
Bicycle Friendly Streets	1.01	0.0002	1.01	0.0095
Sidewalk Availability	2.426	0.0014	1.807	0.0539
Non Residential Destinations	1.047	0.0036	1.064	0.0006
Perception of Many Destinations			1.362	0.0317

Findings: REALITY + PERCEPTION

Odds of Active Transportation are greater if:

- You are physically active, more educated, or have existing chronic disease diagnosis
 - Surrounding streets are supportive of bicycling
 - Ample sidewalk availability within neighborhood
 - Presence of non-residential destinations
 - Trails exist within walking distance from home
- You *perceive* many non-residential destinations in your neighborhood

What about AT by urban/non-urban classification?

URBAN

- **Physically Active**
(OR=2.517, p=0.002)
- **Non Residential Destinations**
(OR=1.05, p=0.03)
- **Greater Physical Activity Rating** (OR=1.8, p=0.01)

- = Demographic Info
- = Actual Built Environment
- = Perception

NON-URBAN

- **Physically Active**
(OR=3.512, p=0.003)
- **Overweight (BMI 25-30)**
(OR=2.1, p=0.008)
- **Chronic Disease Diagnosis**
(OR=2.504, p=0.04)
- **Educated**
(OR=1.501, p=0.0004)
- **Non-Residential Destinations**
(OR= 1.07, p=0.05)
- **Bicycle Supportive Streets**
(OR=1.01, p=0.04)

What does this tell us about AT Behavior in Wisconsin?

- Features that predict AT are independent of how people perceive their environment
- **Trails, Sidewalks, Bicycle Supportive Streets, & Destinations** – important predictors
- **Urban Areas** – Proximity to Destinations and perception of physical activity supports
- **Non-Urban Areas**- Overweight status, Education, Destinations, and Bicycle Supportive Streets

Limitations

- Cross-sectional → cannot infer causality
- Incongruity of WASABE “neighborhood” and SHOW “community”
- Self-Reported Physical Activity → rather than accelerometer data + risk for recall error and/or reporting bias
- Self-Selection?

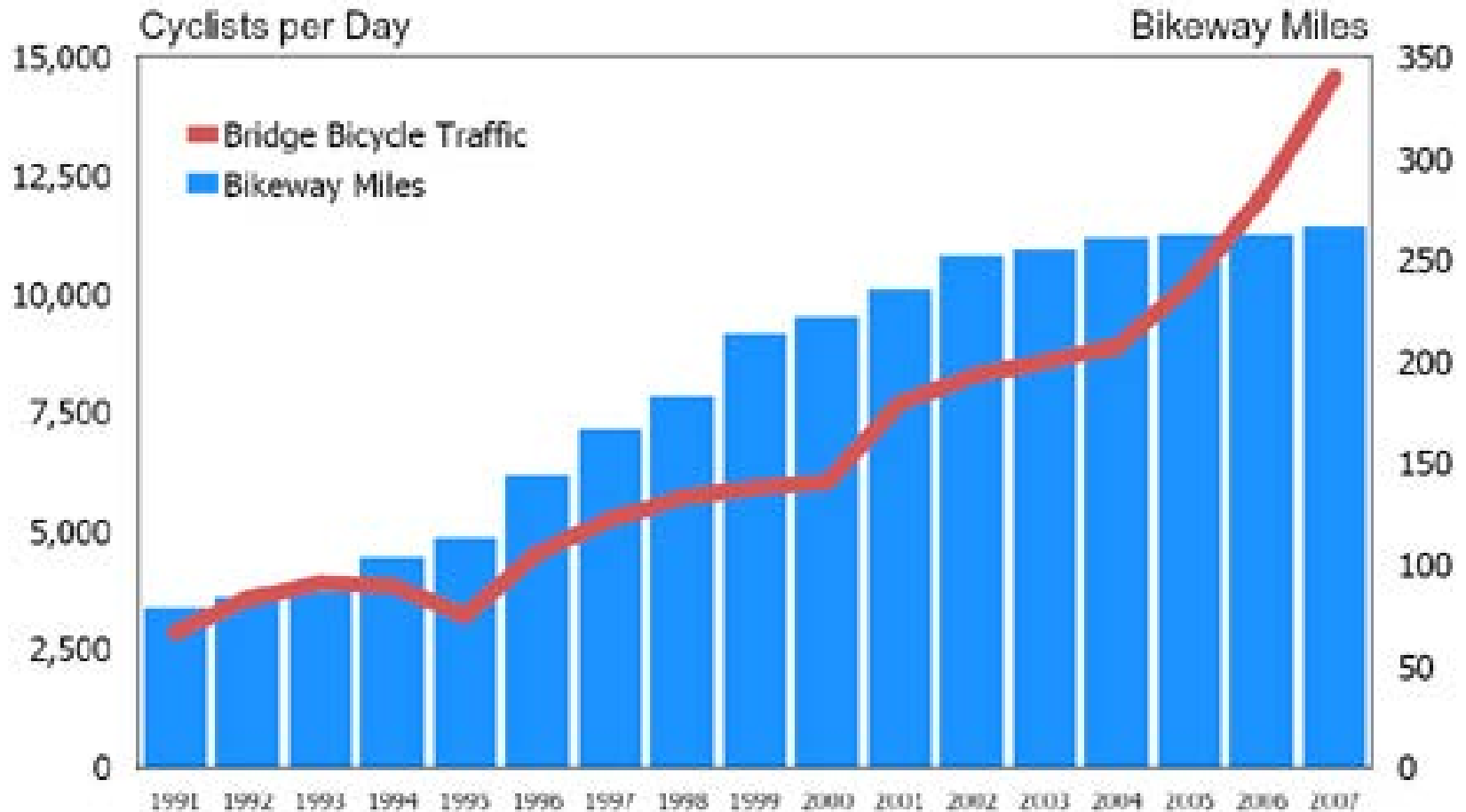
Strengths

- Examination of active transportation rather than walking or bicycling alone
- Level of scrutiny → WASABE objective observation on the ground vs. GIS
- Population – representative sample from urban, suburban, and rural areas across Wisconsin

IMPLICATIONS

- **Smart-growth Potential:** Proximity to destinations → mixed-use neighborhoods
- **Public Policy Implications:** Trails, Sidewalks, and Bicycle Supportive Streets → zoning, subdivision regulation, street engineering standards, Complete Streets legislation

If you build it, they will use it!



INTEGRATION OF ALL MODES – Making the healthy choice the easy choice



Photo Credit: Dr. Michael Murdoch

Eindhoven, Netherlands



Global Health Institute
UNIVERSITY OF WISCONSIN-MADISON



NELSON INSTITUTE
Center for
Sustainability and the
Global Environment
UNIVERSITY OF WISCONSIN-MADISON

Thank you!
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Luton 2007

