

Public Health and Transit: Walking Associated with Public Transit Use

CDR Arthur Wendel, MD, MPH
NCEH/EEHS/HCDI

dvq6@cdc.gov

www.cdc.gov/healthyplaces

Authors: Amy L. Freeland, PhD, Shailendra N. Banerjee, PhD, Andrew L. Dannenberg, MD, MPH, and Arthur M. Wendel, MD, MPH

Rail~Volution, October 2012

National Center for Environmental Health (NCEH)

Division of Emergency and Environmental Health Services (EEHS)



Healthy Community Design Initiative (HCDI):

- ❑ **Mission: To understand and improve the relationship between community design and public health through:**
 - Surveillance
 - Health impact assessment and other mechanisms to improve policies
 - Research, evaluation and best practice dissemination

Case Patient – “Pete”

- ❑ **40 year old male sees his physician for a physical**

Problem List

- ❑ **Difficulty concentrating at work**
- ❑ **Overweight – BMI 29**
- ❑ **BP 137/89 (pre-hypertensive)**
- ❑ **Impaired fasting glucose (pre-diabetic)**
- ❑ **No exercise**
- ❑ **Symptoms of depression, but not meeting criteria**
- ❑ **Near daily intake of 20oz cola**



Treatment Plan

- ❑ **Join a gym**
- ❑ **Meet with nutritionist**



Three Month Follow-Up

- ❑ No major improvements**
- ❑ Gym requires 40 minutes more driving per day. Lack of time leads to fast food consumption**

15 Years Later

- ❑ On multiple medications for hypertension, diabetes, cholesterol
- ❑ Recently was hospitalized for angina



Turning Back Time: Transportation and Public Health Intervention

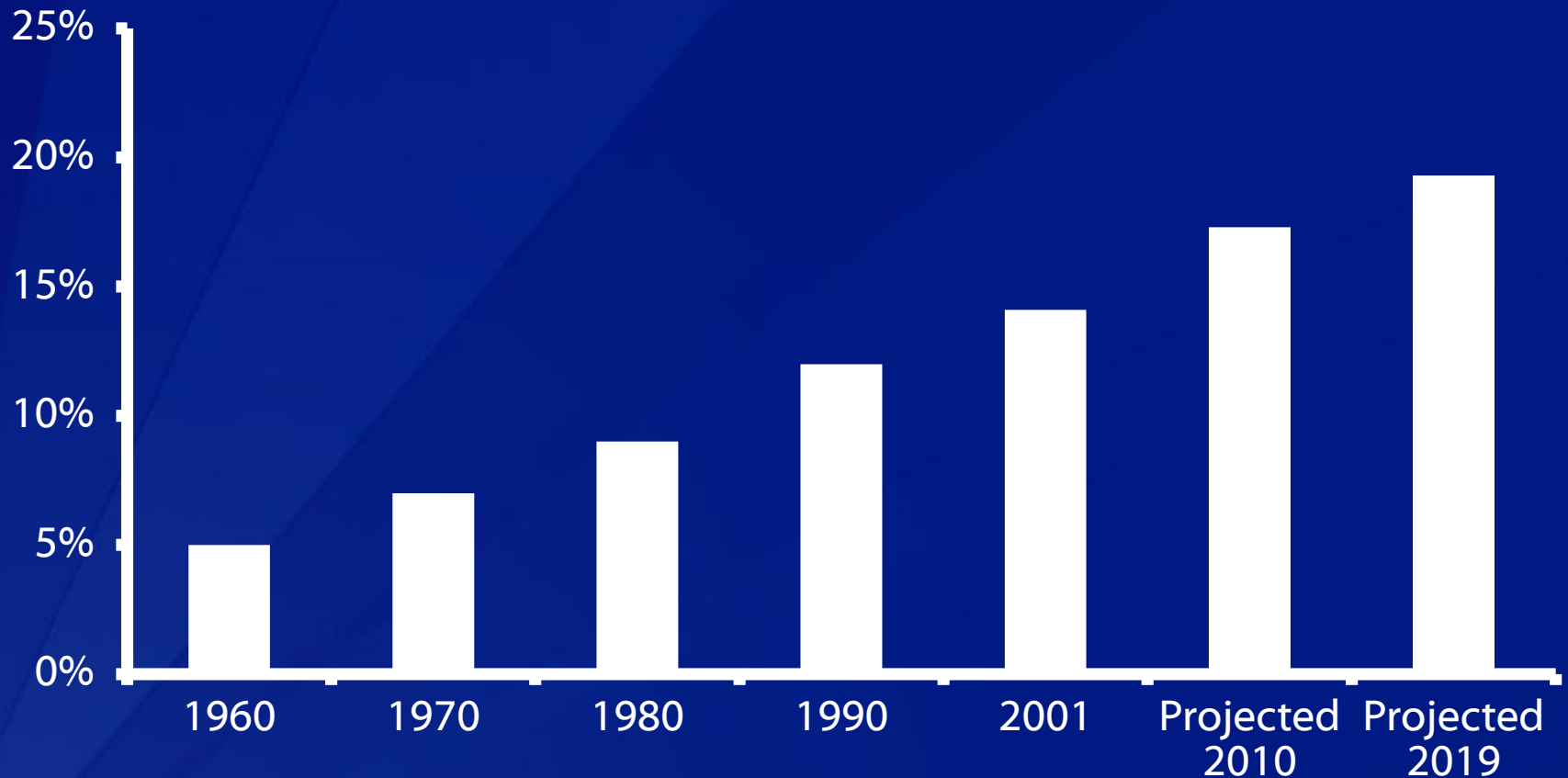
- ❑ A light rail station was constructed a mile from his home
- ❑ Pete decides to walk to the station for his commute to work



15 Years Later – Alternative Scenario

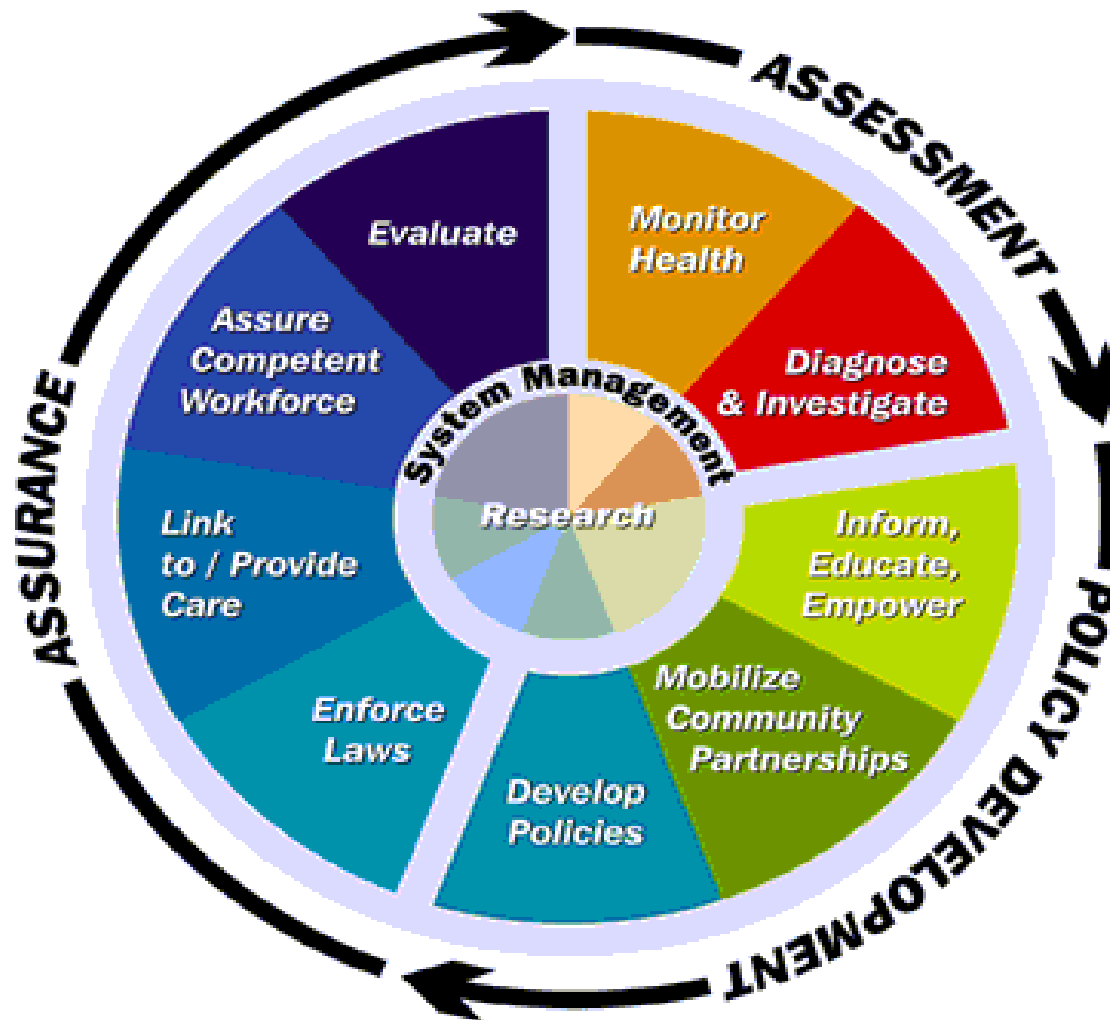
- ❑ Pete walks 5 days per week to transit and rides to work**
- ❑ Longer total daily commute time is 20 minutes longer, but Pete does not have to go to the gym**
- ❑ BMI 26**
- ❑ Regular check-ups indicate no need for medications**

Percent of U.S. GDP spent on Health Care



https://www.cms.gov/NationalHealthExpendData/25_NHE_Fact_Sheet.asp

The 10 Essential Public Health Services



Concordant Health Strategies

❑ CDC's Winnable Battles

- Motor vehicle injuries
- Nutrition, physical activity, and obesity

❑ National Prevention Strategy

- Creating safe and healthy community environments
- Active living
- Healthy eating
- Injury- and violence-free living



www.cdc.gov/winnablebattles

www.healthcare.gov/prevention/nphpphc/strategy/report.pdf

CDC's Transportation Policy Recommendations

- ❑ Make cars safer and less polluting**
- ❑ Support robust public transportation**
- ❑ Create infrastructure and programs to increase active transportation**
- ❑ Design communities for health – e.g. Complete Streets**
- ❑ Protect healthy choices**
- ❑ Require research and surveillance**
- ❑ Support professional development and job creation**

Background

- ❑ **Many health benefits related to physical activity (PA)**
- ❑ **About 40% of Americans do not meet 2008 PA Guidelines for aerobic PA**
- ❑ **Inadequate physical activity leads to 200,000 annual deaths in the United States***
- ❑ **Average medical expenditures are 32% lower among adults who get regular exercise****
- ❑ **Impact of community environment*****

*Danaei G, Ding EL, Mozaffarian D, et al. The preventable causes of death in the United States: comparative risk assessment of dietary, lifestyle, and metabolic risk factors. *PLoS Med.* 2009;6(4):e1000058

**Pratt M, Macera CA, Wang G. Higher direct medical costs associated with physical inactivity. *Phys Sportsmed.* 2000;28(10):63–70.

***Transportation Research Board. Does the built environment influence physical activity: examining the evidence. Report no. 282. Washington, DC: Transportation Research Board, 2005,.

2008 Physical Activity Guidelines

- ❑ **Duration: 150 minutes of aerobic PA per week**
- ❑ **Intensity: moderate intensity**
- ❑ **10-minute episodes**

Transit and Health Connections

- ❑ **Transit-walking is walking to/from transit**

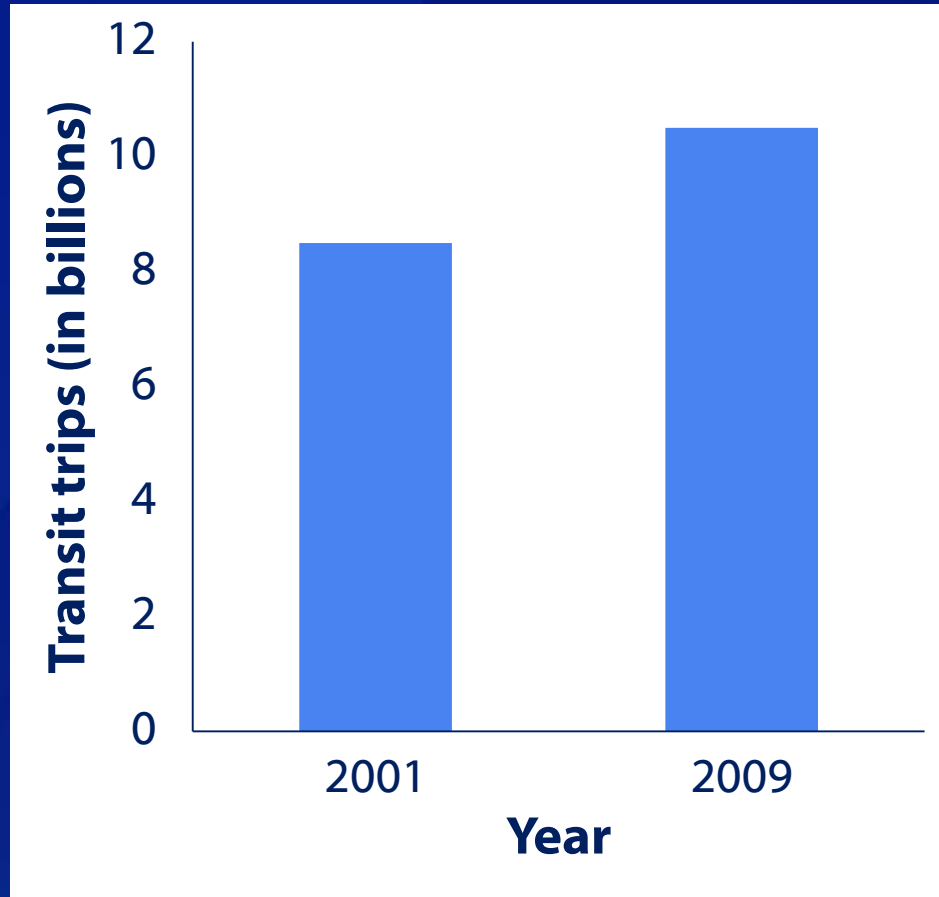
- ❑ **Previous research has linked transit with improved**
 - Walking*
 - Safety**
 - Body mass index (BMI)***

*Besser, Dannenberg (2005). *Am J Prev Med*, 29 (4).

**Beck LF, Dellinger AM, O'Neil ME. Motor vehicle crash injury rates by mode of travel, United States: using exposure-based methods to quantify differences. *Am J Epidemiol*. 2007;166(2):212–218.

**MacDonald JM, Stokes RJ, Cohen DA, Kofner A, Ridgeway GK. The effect of light rail transit on body mass index and physical activity. *Am J Prev Med*. 2010;39(2):105–112.

Increase in Transit Ridership Over Time



Study Design

- ❑ **Department of Transportation's National Household Travel Survey (NHTS)—2001 and 2009**
- ❑ **People ≥ 5 years**
 - Our study: adults (≥ 18 years)
- ❑ **Cross-sectional, nationally representative**
- ❑ **Sample size:**
 - 2001: 70K households
 - 2009: 150K households

National Household Travel Survey (NHTS)

- ❑ Information about travel**
- ❑ Phone interview, travel diary**
- ❑ Details about trips taken**

Definitions

- ❑ **Transit-walker: person who travels to/from public transit by walking**
- ❑ **Walk segment: segment between a place and transit entry/exit**
- ❑ **Daily transit walk time: total daily walking time to/from transit**

Analysis

- ❑ **Demographic characteristics in 2009**
- ❑ **Comparisons between 2001 and 2009**

Differences in Transit-walker Characteristics Compared to Total Survey Population

	Transit Walker	NHTS Population
Median Income	\$25K	\$46K
Non-White	55%	26%
Resided in city with rail and population >1M	65%	22%
No Household Vehicle	42%	6%

Transit-walkers were of a similar age, gender, and employment status to the general population

Transit-walking Time by Mode

Mode	Median Walk Time (minutes)	95% CI
Bus Only	18.2	14.2, 22.1
Train Only	19.3	18.6, 20.2
Mixed Mode	31.7	26.4, 36.9

Predictors of Walking 30 Minutes or More per Day by Walking To or From Transit

Variable	Multivariate analyses		
	Beta (SE)	AOR (95% CI)	P
Household income			.02*
<\$15,000	0.67 (0.20)	1.94 (1.31, 2.88)	
\$15,000–34,999	0.19 (0.28)	1.21 (0.70, 2.09)	
\$35,000–69,999	0.29 (0.21)	1.34 (0.88, 2.04)	
\$70,000–99,999	0.27 (0.25)	1.32 (0.79, 2.18)	
≥\$100,000 (Ref)			
Race/ethnicity			.03*
White (Ref)			
African American	0.31 (0.18)	1.37 (0.95, 1.97)	
Asian/Pacific Islander	0.69 (0.22)	1.98 (1.27, 3.09)	
Hispanic	0.12 (0.21)	1.13 (0.74, 1.73)	
Other	0.13 (0.50)	1.14 (0.43, 3.05)	
Urban size			.07
MSA and <500,000 (Ref)			
500,000–999,999	0.07 (0.46)	1.08 (0.43, 2.67)	
≥1 million without rail	0.07 (0.37)	1.07 (0.52, 2.21)	
≥1 million with rail	0.62 (0.31)	1.85 (1.00, 3.43)	
Not in urbanized area	0.31 (0.42)	1.37 (0.59, 3.17)	

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Transit-walking changes between 2009 and 2001

❑ 28% increase in transit-walkers

- 2001: estimated 7.5 million people
- 2009: estimated 9.6 million people

❑ 830,000 more people walk ≥ 30 minutes per day due to transit-walking

- 2001: estimated 2.6 million transit-walkers
- 2009: estimated 3.4 million transit-walkers

Conclusion

- ❑ Transit-walking contributes to health**
- ❑ Transit-walkers have similar demographic characteristics to populations with health disparities**
- ❑ Rail availability is associated with increased transit-walking**

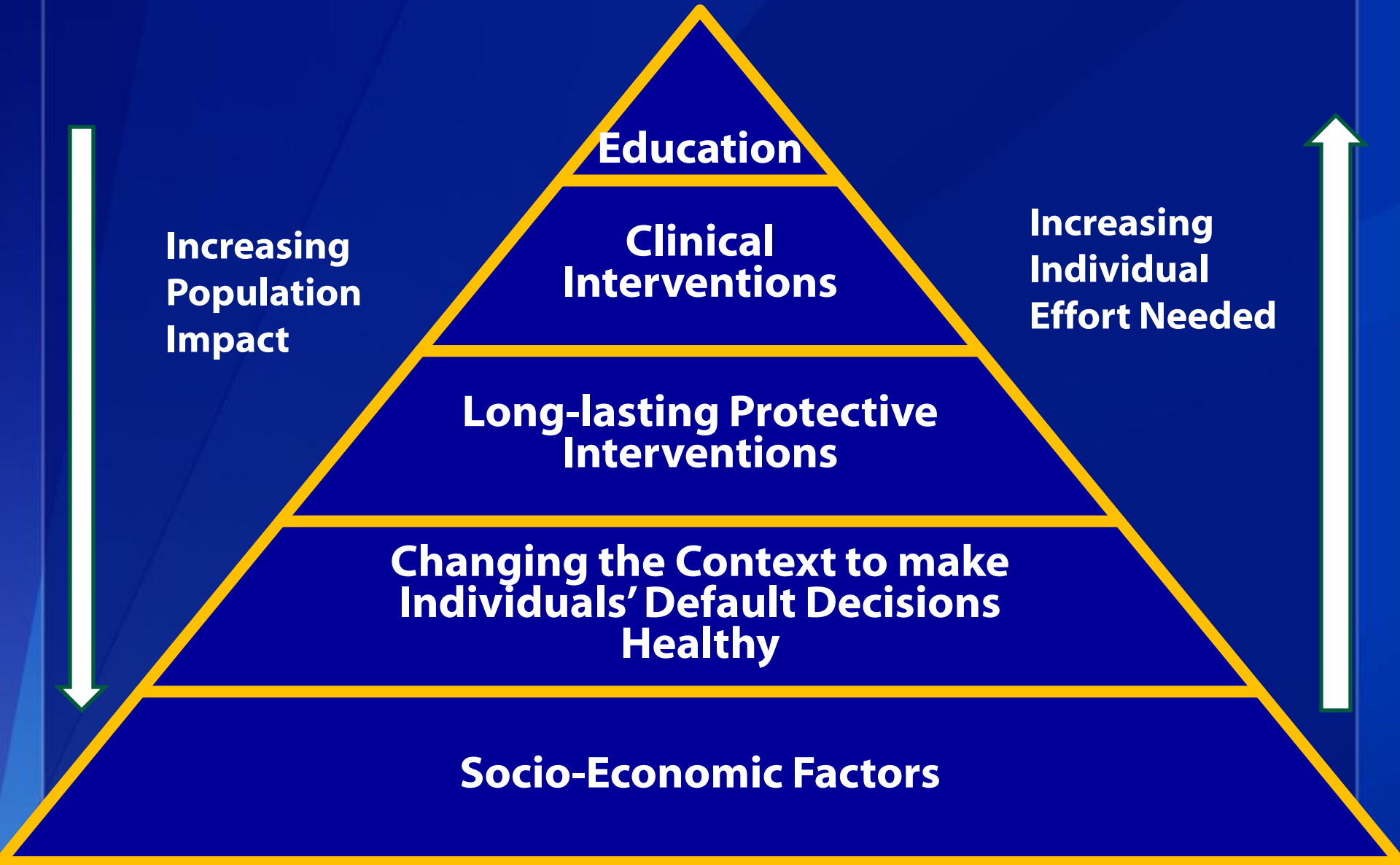
Limitations

- ❑ **Data from only one day of travel**
- ❑ **Other changes during the time period**
 - Improvements in transit service
 - Increased unemployment rates
 - Increased travel costs
 - Improved public health messaging

Recommendations

- ❑ Public health officials should recognize role of transportation in healthy choices**
- ❑ Departments of transportation and public health should work together to align goals**
- ❑ Public health officials should continue to promote physical activity incorporated into daily activity**
- ❑ Researchers should examine barriers of transit-walking**

Health Impact Pyramid



Thank You

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Authors: Amy L. Freeland, PhD, Shailendra N. Banerjee, PhD, Andrew L. Dannenberg, MD, MPH, and Arthur M. Wendel, MD, MPH

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov Web: www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

National Center for Environmental Health
Division of Emergency and Environmental Health Services

