



Active Transportation and Health: An Equity Perspective

Lindsay M. Braun, PhD

Assistant Professor
Department of Urban and Regional Planning
University of Illinois at Urbana-Champaign

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February 25, 2020

**Is active transportation
healthy?**

**Is active transportation
healthy?**

**Can infrastructure investment
support public health?**

**Is active transportation
healthy?**

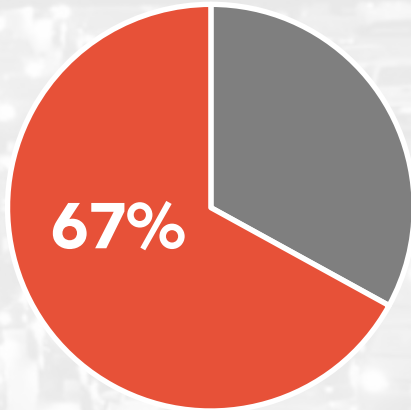
**Can infrastructure investment
support public health?**



Transportation and health

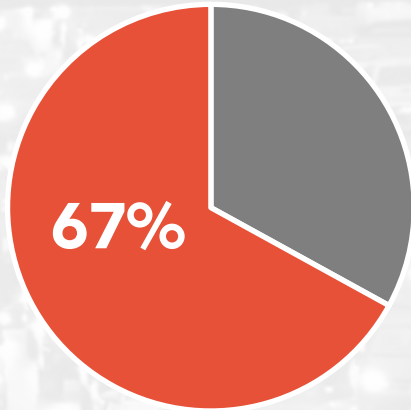


Transportation and health

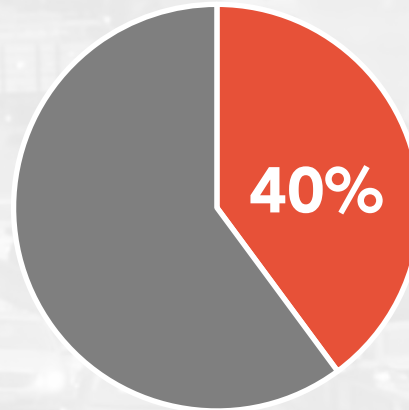


Physical inactivity

Transportation and health

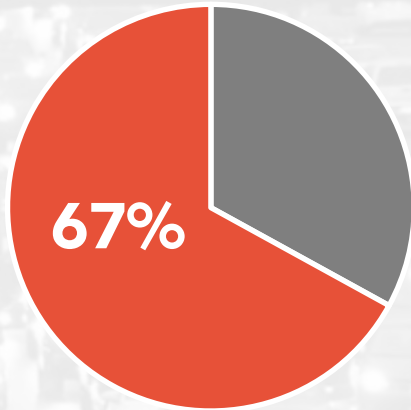


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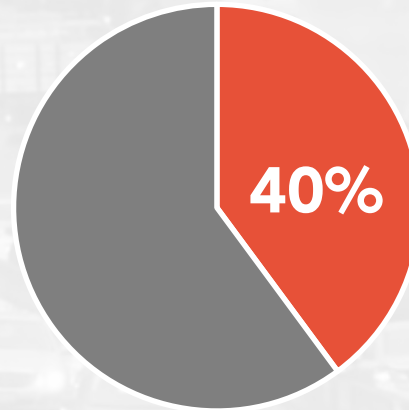


Obesity

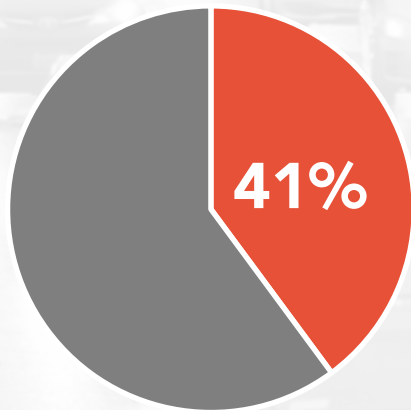
Transportation and health



Physical inactivity

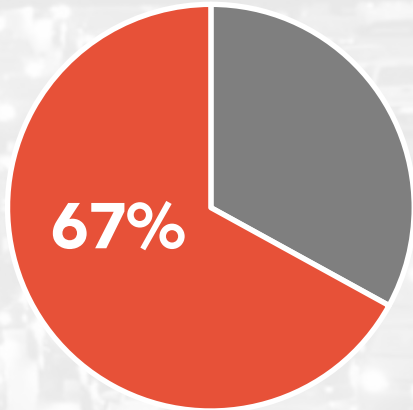


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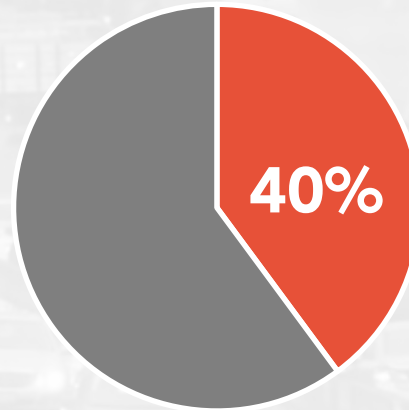


Pollution exposure

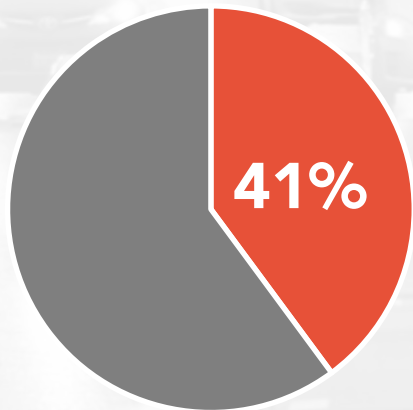
Transportation and health



Physical inactivity



Obesity



Pollution exposure

40,000

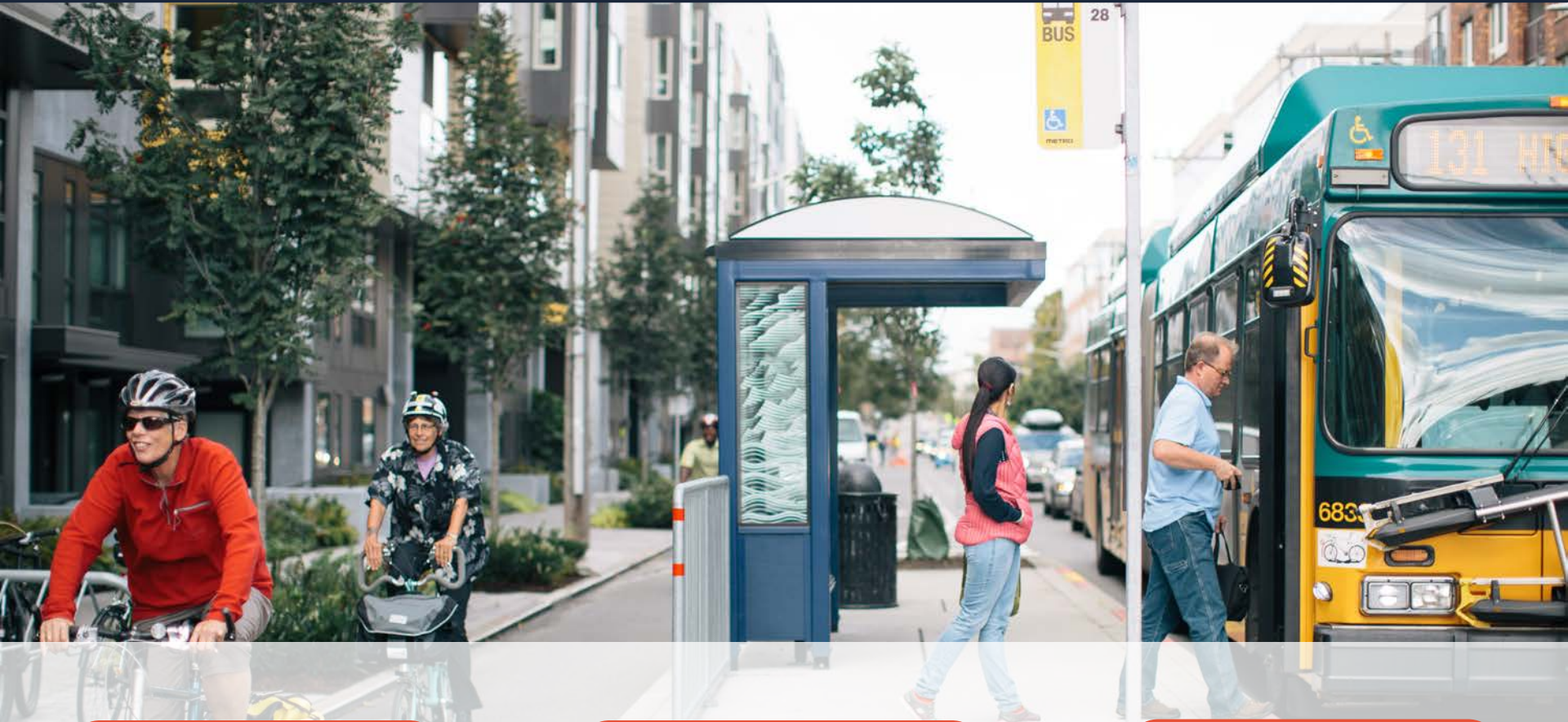
annual deaths

Traffic fatalities

Transportation and health



Transportation and health



**Built
environment**



**Active
transportation**



Public health

Transportation and health



SOCIAL EQUITY

**Built
environment**



**Active
transportation**



Public health

**Is active transportation
healthy?**

**Can infrastructure investment
support public health?**

Is active transportation
healthy for everyone?

Can infrastructure investment
support health equity?

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Can infrastructure investment
support health equity?

Why (and where) might cycling be unhealthy?



Why (and where) might cycling be unhealthy?



Why (and where) might cycling be unhealthy?



**Physical
activity**

**Pollution
exposure**

**Injury
risk**

Examining health tradeoffs

Health Impact Assessment (HIA)

**Physical activity
(PA)**

**Air pollution
(AP)**

Injury risk (IR)

Examining health tradeoffs

**Physical
activity**

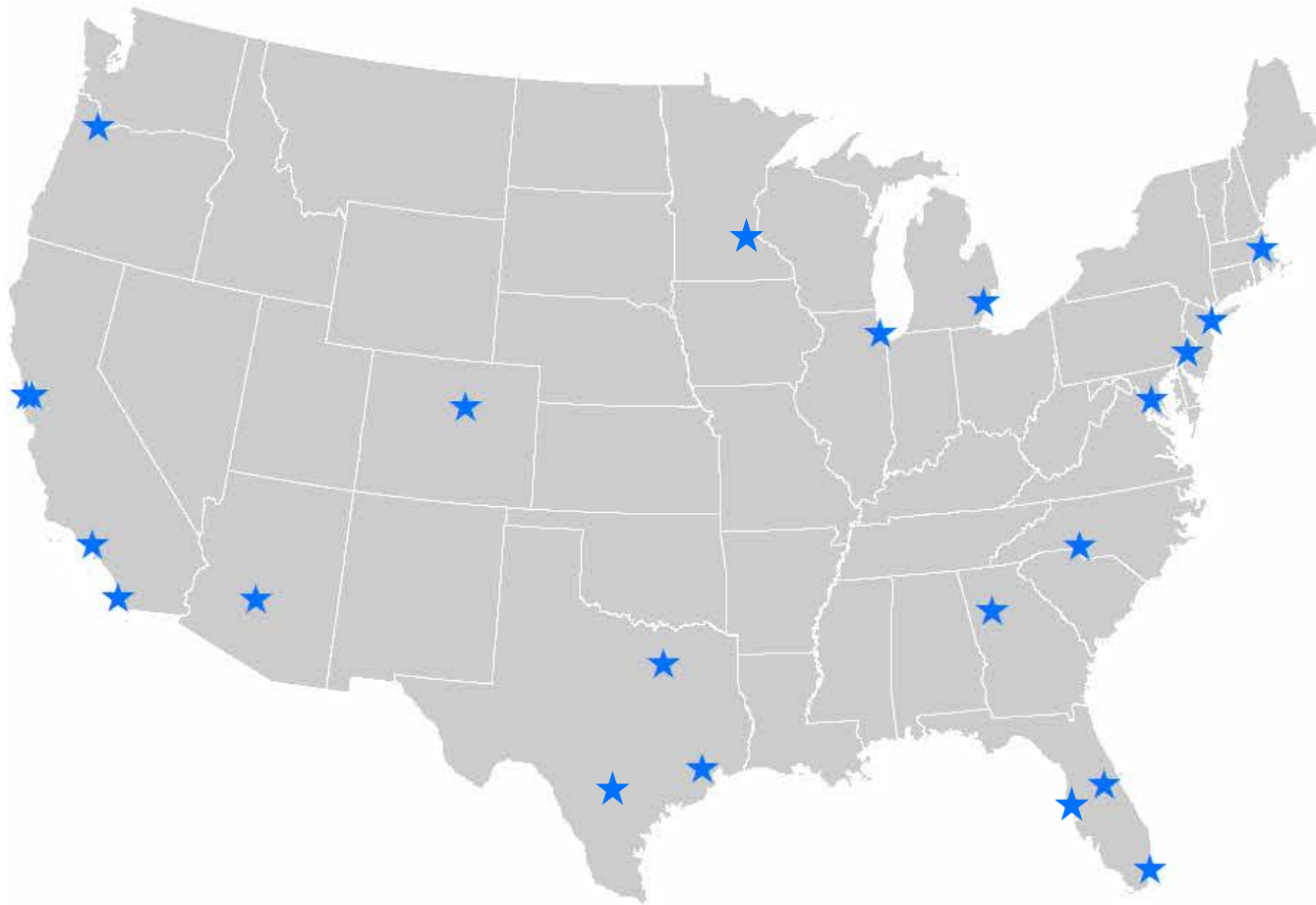
**Pollution
exposure**

**SOCIAL
EQUITY**

**Injury
risk**

Who has access to bike lanes?

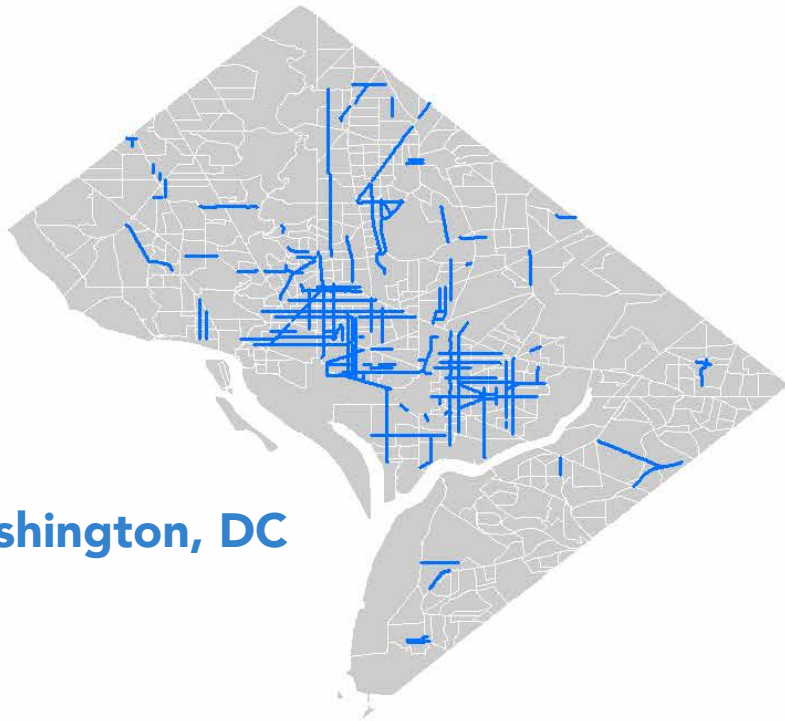
Associations between **bike lanes**, **sociodemographic advantage**, and **bicycle commuting** in 22 U.S. cities



New York, NY
Los Angeles, CA
Chicago, IL
Dallas, TX
Houston, TX
Washington, DC
Philadelphia, PA
Miami, FL
Atlanta, GA
Boston, MA
San Francisco, CA
Phoenix, AZ
Detroit, MI
Seattle, WA
Minneapolis, MN
San Diego, CA
Tampa, FL
Denver, CO
Charlotte, NC
Portland, OR
Orlando, FL
San Antonio, TX

Who has access to bike lanes?

- **Bike lanes:** Local/regional GIS websites (2012–2016) and longitudinal built environment database (1990–2010)



Washington, DC



San Francisco, CA

- **Sociodemographic characteristics and covariates:** American Community Survey and U.S. Census

Who has access to bike lanes?

		No lanes (n=12,487)	Any lanes (n=9,359)	p-value
SES variables	Race (% black)	25.1	20.9	0.00
	Ethnicity (% Hispanic)	31.0	26.3	0.00
	Poverty (% in poverty)	21.3	20.7	0.01
	Income (\$1000s)	56.7	61.1	0.00
	Education (% with BA/BS)	30.8	38.3	0.00
	Composite SES	-0.50	0.67	0.00

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- Bike lanes more common in areas with:
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 - Higher **income**, **educational attainment**, and composite **SES**

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 - Lower percentages of **black** and **Hispanic** residents and lower **poverty** rates
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- Many relationships persist after controlling for **other key determinants**

Who faces other environmental barriers?

2017 National Household Travel Survey (NHTS)

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Cycling behavior

Barriers to cycling

Health

**Sociodemographic
characteristics**

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- Cycling trips in the past week

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Barriers to cycling

- What keeps you from cycling more?***
 - Infrastructure barriers (trails, parks, sidewalks)
 - Safety barriers (traffic volumes/speeds, lighting)

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- Self-reported general health status

Sociodemographic characteristics

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Health

- Self-reported general health status

Sociodemographic characteristics

- Race and ethnicity, income, education

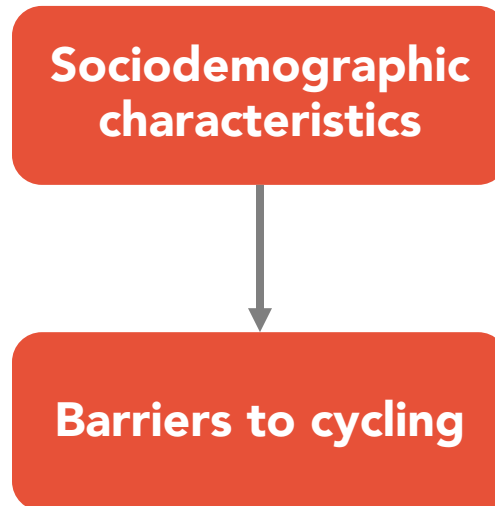
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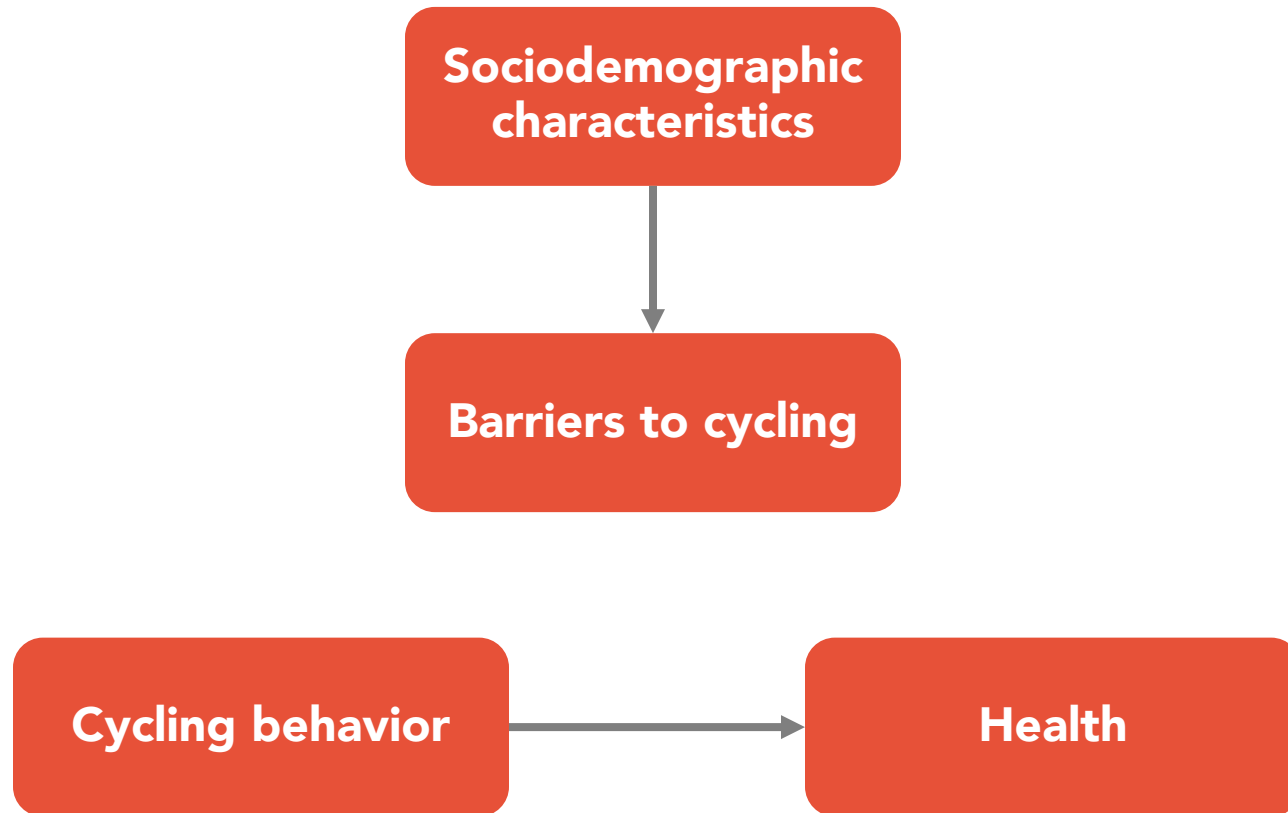
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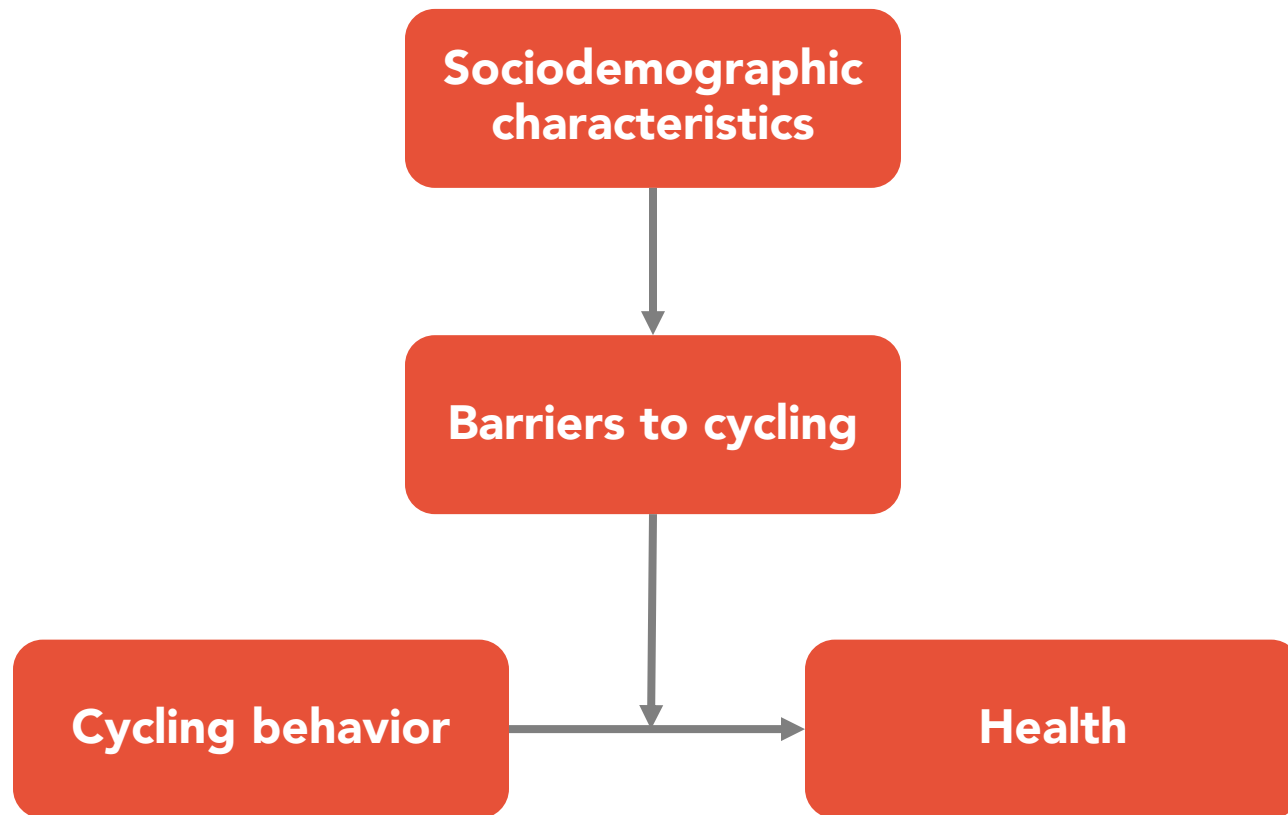
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- **8.3%** of respondents cycled
- **39%** of cyclists reported at least one environmental barrier
- Differences by race and ethnicity

	% who cycle
Non-Hispanic White	8.8
Non-Hispanic Black	6.6
Hispanic	7.7
Non-Hispanic Asian	7.5
Other	7.8

Who faces other environmental barriers?

- **8.3%** of respondents cycled
- **39%** of cyclists reported at least one environmental barrier
- Differences by race and ethnicity

	% who cycle	% who report barriers
Non-Hispanic White	8.8	36
Non-Hispanic Black	6.6	45
Hispanic	7.7	46
Non-Hispanic Asian	7.5	52
Other	7.8	41

Who faces other environmental barriers?

- **8.3%** of respondents cycled
- **39%** of cyclists reported at least one environmental barrier
- Differences by **income**

	% who cycle
< \$25,000	7.5
\$25,000–\$49,999	6.8
\$50,000–\$74,999	7.7
\$75,000–\$99,999	8.3
\$100,000–\$124,999	9.3
\$125,000 +	10.6

Who faces other environmental barriers?

- **8.3%** of respondents cycled
- **39%** of cyclists reported at least one environmental barrier
- Differences by **income**

	% who cycle	% who report barriers
< \$25,000	7.5	49
\$25,000–\$49,999	6.8	43
\$50,000–\$74,999	7.7	39
\$75,000–\$99,999	8.3	38
\$100,000–\$124,999	9.3	32
\$125,000 +	10.6	33

Who faces other environmental barriers?

- **8.3%** of respondents cycled
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- Differences by **educational attainment**

	% who cycle
Less than bachelor's	6.4
Bachelor's or more	10.9

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Who faces other environmental barriers?

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- Differences by educational attainment

	% who cycle	% who report barriers
Less than bachelor's	6.4	38
Bachelor's or more	10.9	40

- Respondents of color and low SES were (generally)...
 - Less likely to cycle
 - More likely to report environmental barriers

What are the implications for health?

- Associations between cycling/barrier status and health for:
 - Non-cyclists
 - Cyclists who don't report barriers
 - Cyclists who report barriers

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	Association with health
Non-cyclists	(ref)
Cyclists – no barriers	0.61***
Cyclists – barriers	0.35***

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	Association with health
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- Associations between cycling and health were *weaker* in the presence of barriers

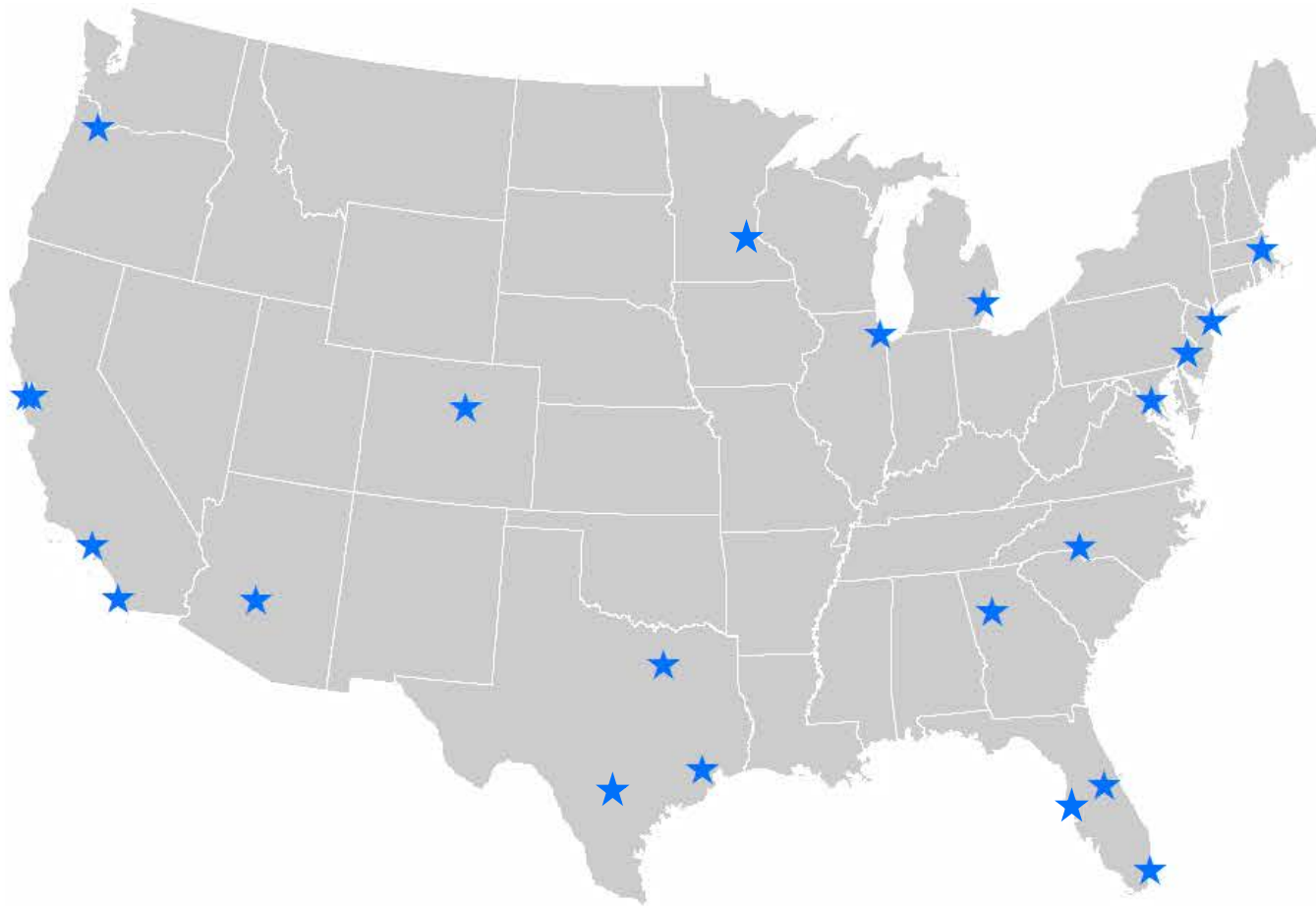
Is active transportation
healthy for everyone?

**Can infrastructure investment
support health equity?**

Could bike lanes have differential impacts?

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Associations between **bike lanes**, **sociodemographic advantage**, and **bicycle commuting** in 22 U.S. cities

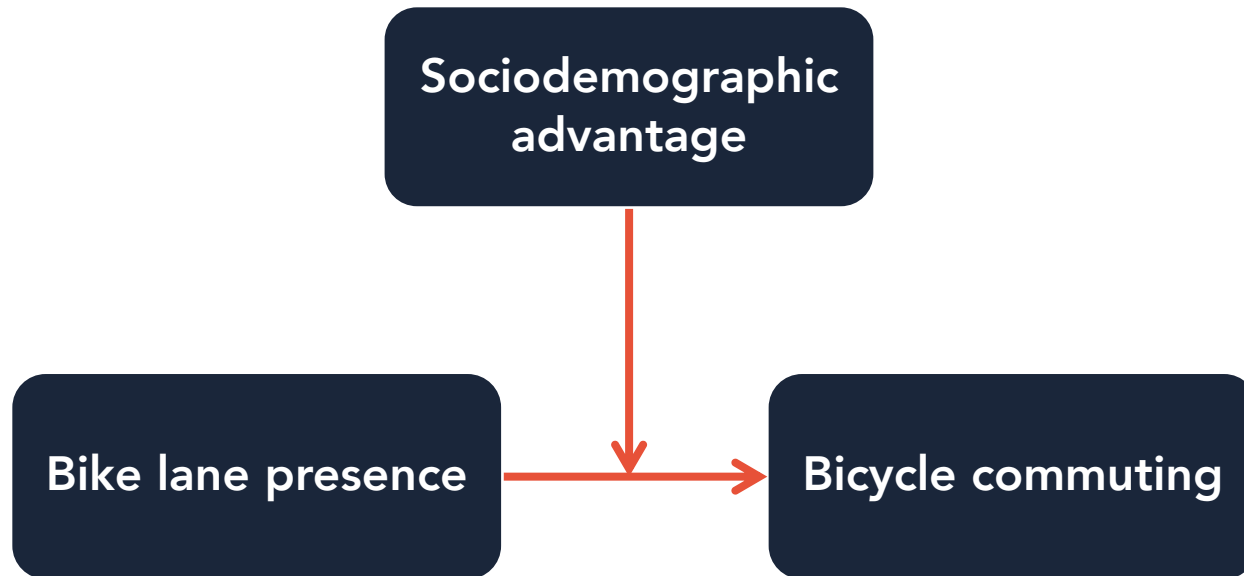


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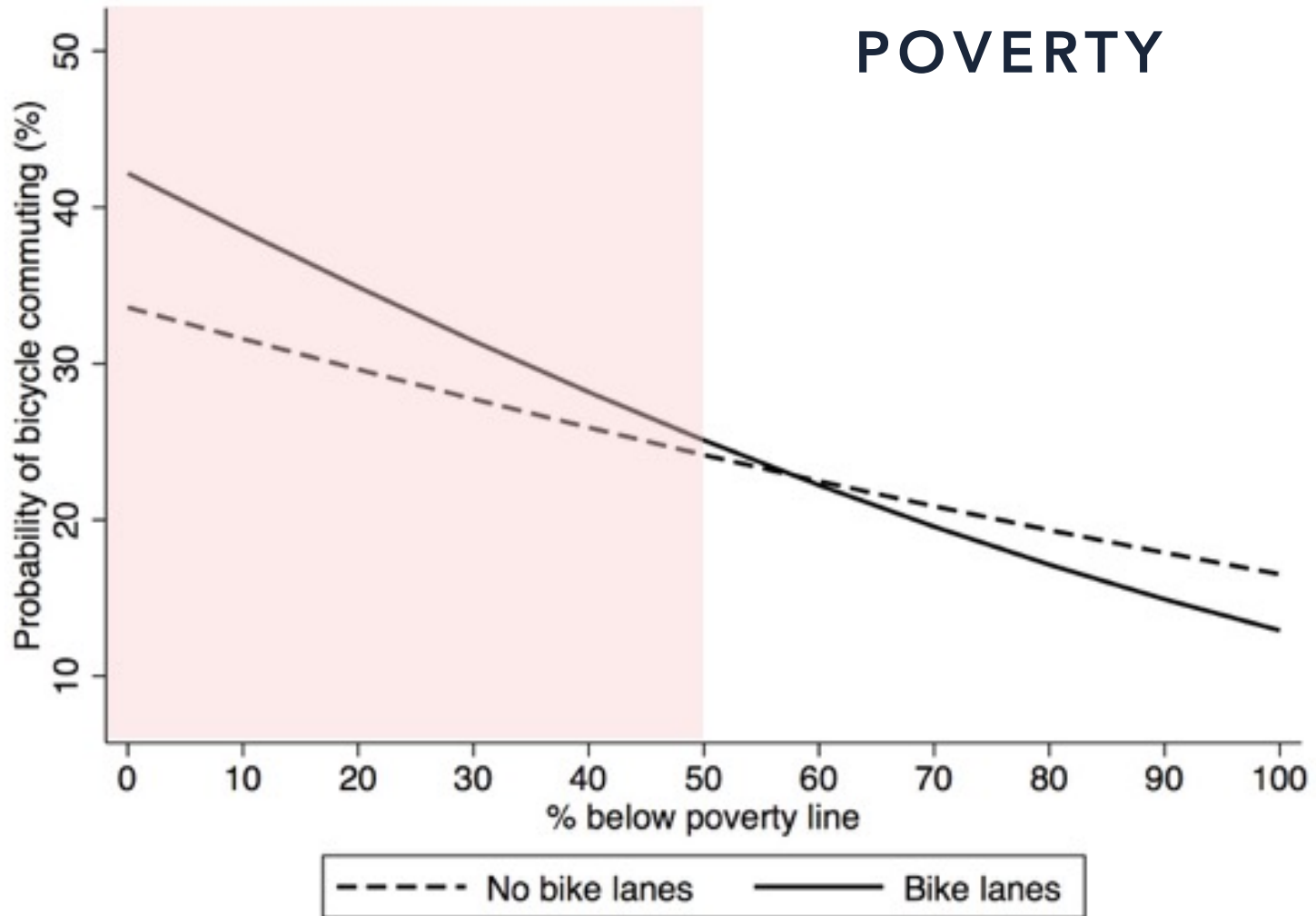
Could bike lanes have differential impacts?



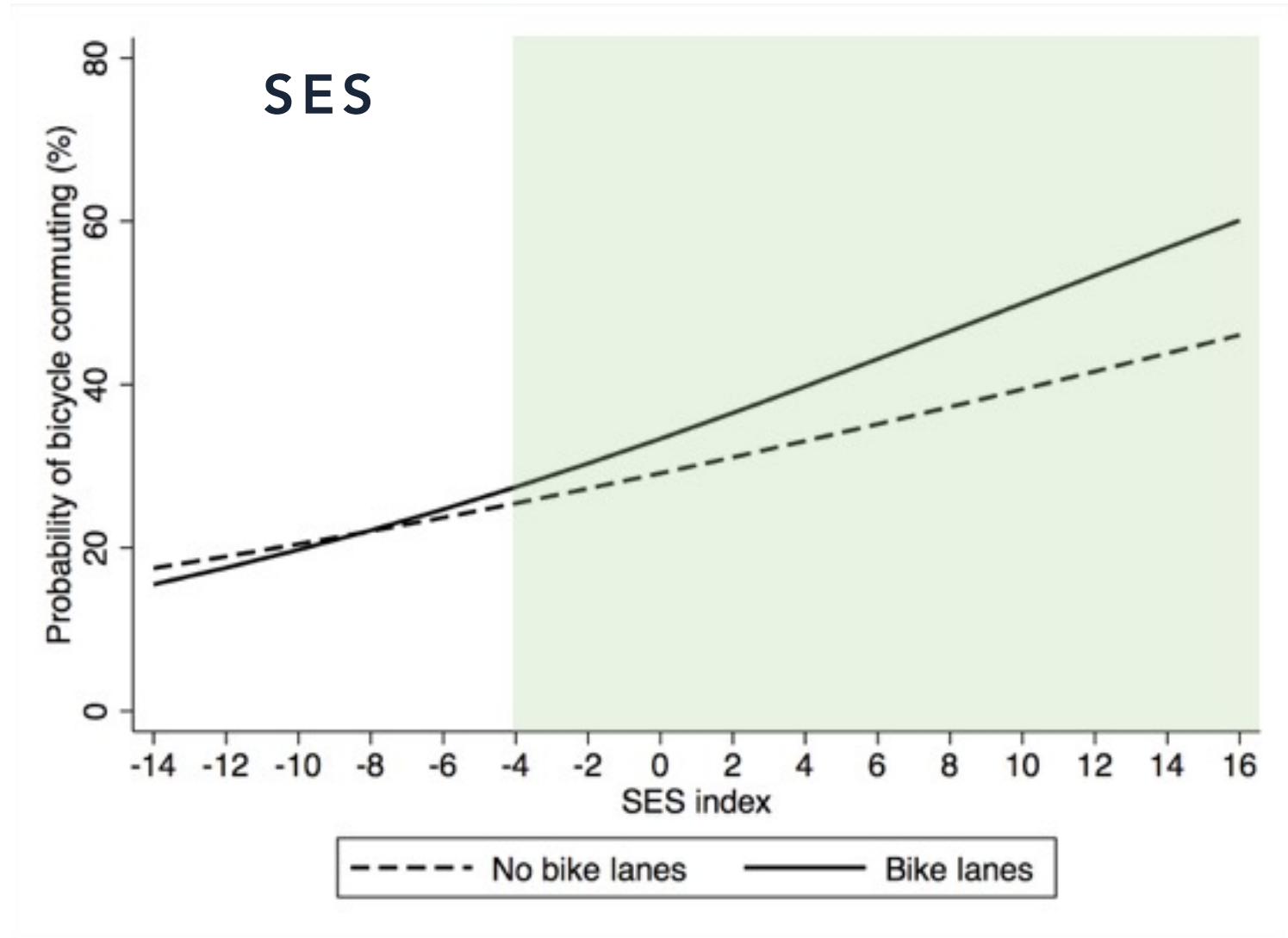
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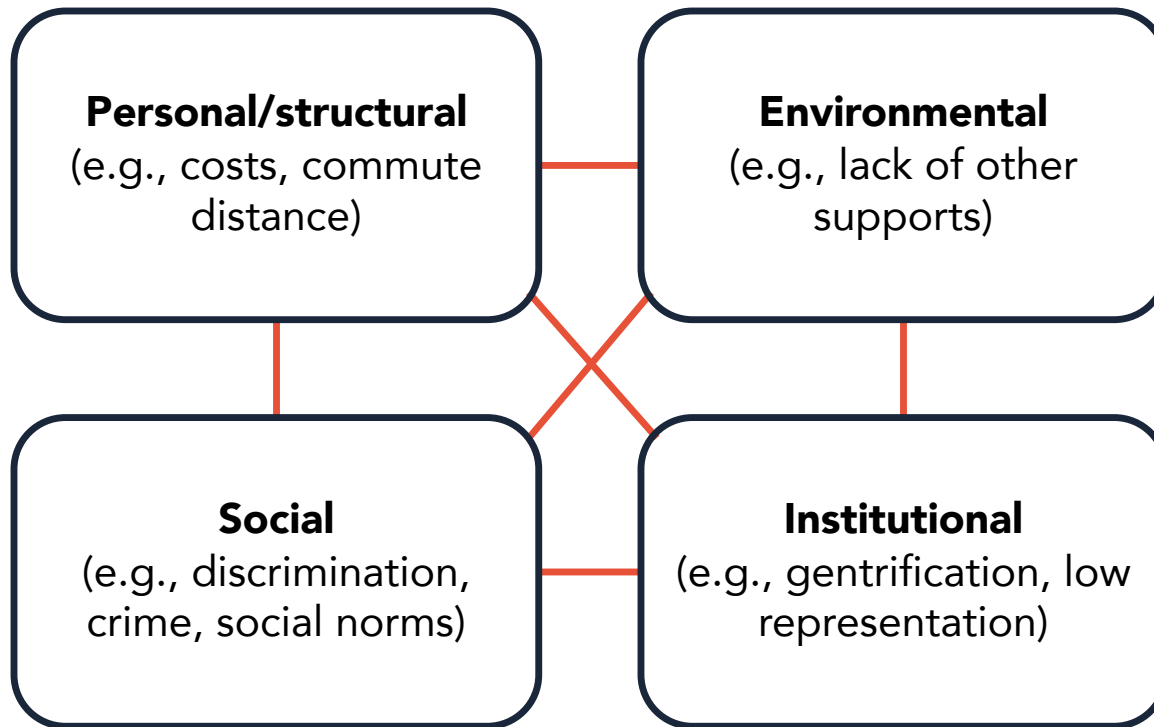


Could bike lanes have differential impacts?

- Positive associations between bike lanes and bicycle commuting **become stronger** with increasing sociodemographic advantage

Could bike lanes have differential impacts?

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Are bike lanes associated with gentrification?

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- Resistance to bike lanes in traditionally disadvantaged neighborhoods
 - Albina (Portland, OR)
 - Humboldt Park (Chicago, IL)
 - Shaw (Washington, DC)

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Why are bike lanes such heated symbols of gentrification?



Stein 2015 (Washington Post)

Are bike lanes associated with gentrification?

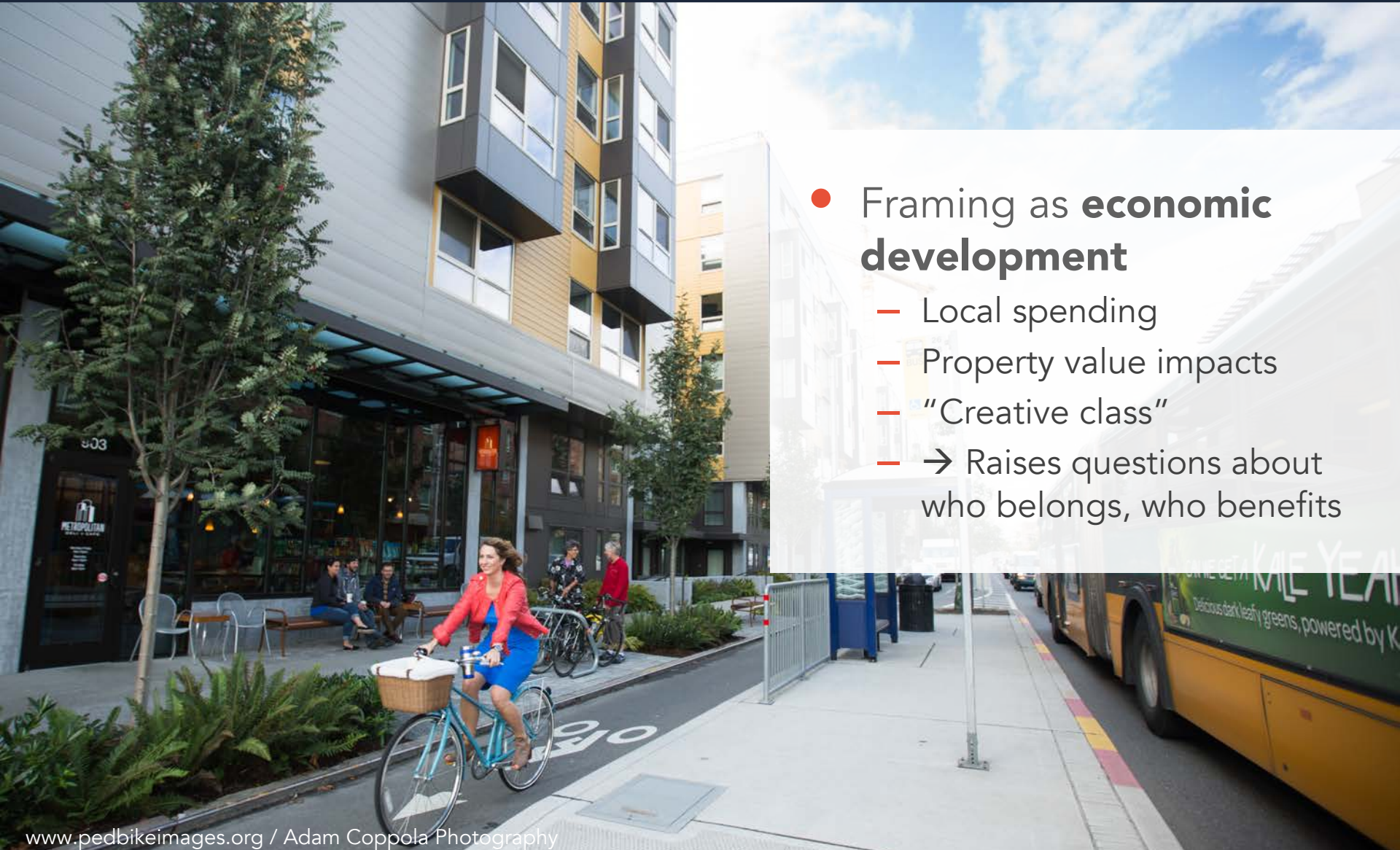
- Resistance to bike lanes in traditionally disadvantaged neighborhoods
 - Albina (Portland, OR)
 - Humboldt Park (Chicago, IL)
 - Shaw (Washington, DC)
- Gentrification concerns may:
 - Be literal or symbolic
 - Result from institutional factors
 - Result from framing

Why are bike lanes such heated symbols of gentrification?



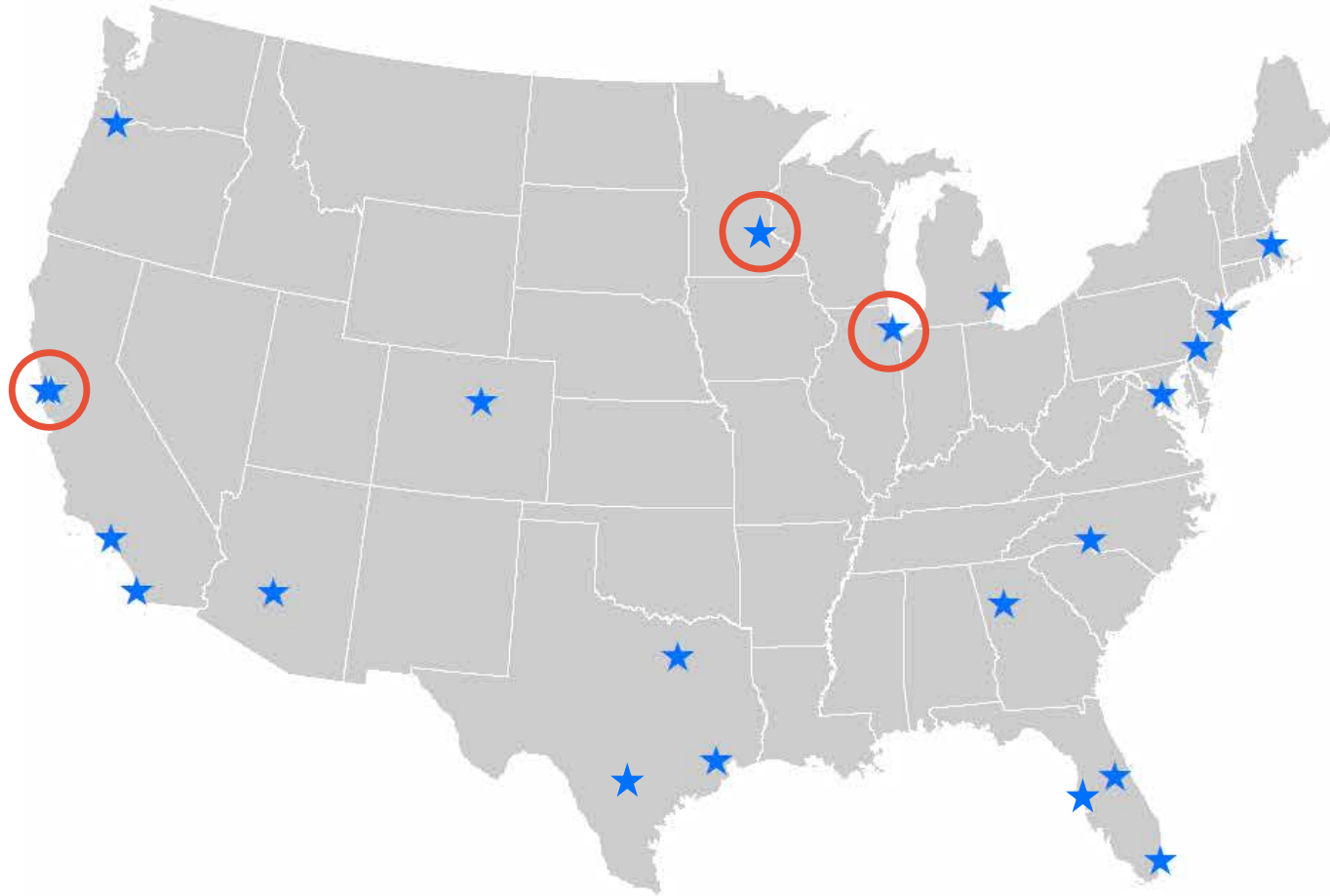
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Are bike lanes associated with gentrification?



- Framing as **economic development**
 - Local spending
 - Property value impacts
 - “Creative class”
 - → Raises questions about who belongs, who benefits

Are bike lanes associated with gentrification?



Are bike lanes associated with gentrification?

		Chicago	Minneapolis	Oakland
1990-2000	Disadv. but not gentrifying			
	Already advantaged			
	Gentrifying			
2000-2010	Disadv. but not gentrifying			
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Are bike lanes associated with gentrification?

	Chicago	Minneapolis	Oakland
Gentrification indicator			
Disadvantaged but not gentrifying	(ref)	(ref)	(ref)
Already advantaged			—
Gentrifying	—		

Are bike lanes associated with gentrification?

	Chicago	Minneapolis	Oakland
Gentrification indicator			
Disadvantaged but not gentrifying	(ref)	(ref)	(ref)
Already advantaged			—
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- Some evidence of more bike lane investment in places that were either **already** advantaged or **becoming** more advantaged over time

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Gentrification indicator			
Disadvantaged but not gentrifying	(ref)	(ref)	(ref)
Already advantaged			—
Gentrifying	—		

- Some evidence of more bike lane investment in places that were either **already** advantaged or **becoming** more advantaged over time
- Other results suggest that gentrification occurs **before** or during the **same decade** as bike lane investment

Is active transportation
healthy for everyone?

Can infrastructure investment
support health equity?

Is active transportation healthy for everyone?

- Disparities in access to bike lanes

Is active transportation healthy for everyone?

- Disparities in access to bike lanes
- Disparities in other environmental barriers

Is active transportation healthy for everyone?

- Disparities in access to bike lanes
- Disparities in other environmental barriers
- Environmental barriers may weaken the health impacts of cycling

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→ **Critical need: Examine health tradeoffs through the lens of social equity**

**Can infrastructure investment support
health equity?**

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- Associations between bike lanes and bicycle commuting **stronger** in more advantaged places

Can infrastructure investment support health equity?

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- Potential associations with **gentrification** (problematic even if not causal)

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→ **Critical needs: Address non-infrastructure barriers and proactively address gentrification concerns**



Thank you!

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Imbraun@Illinois.edu

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