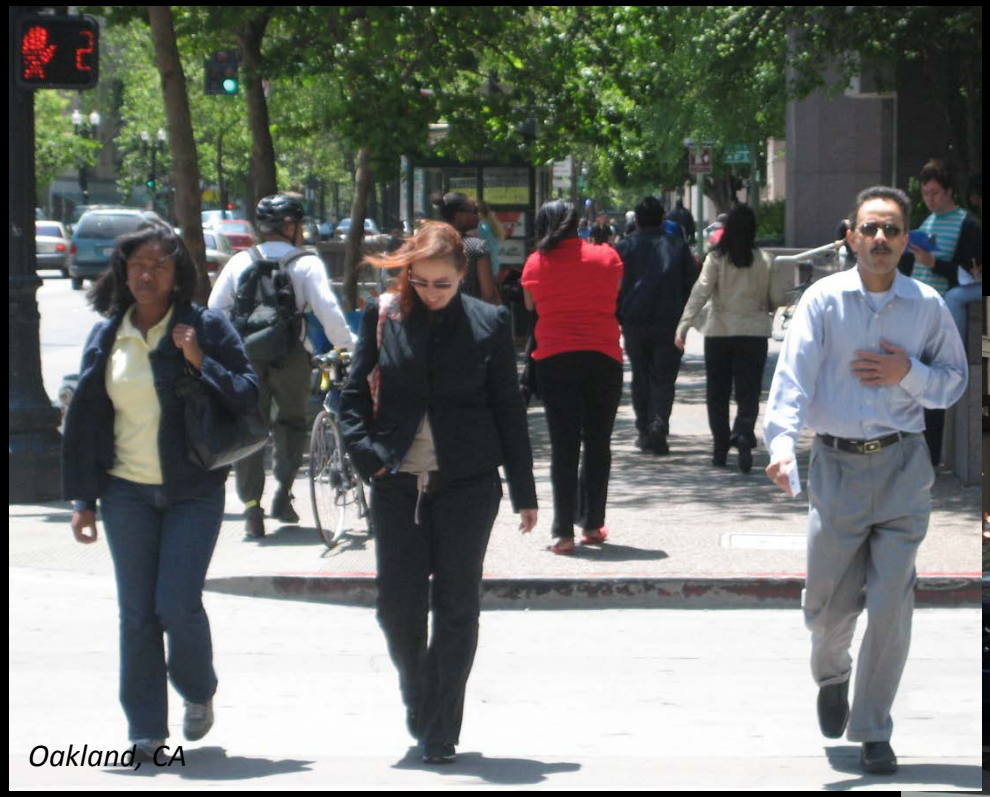
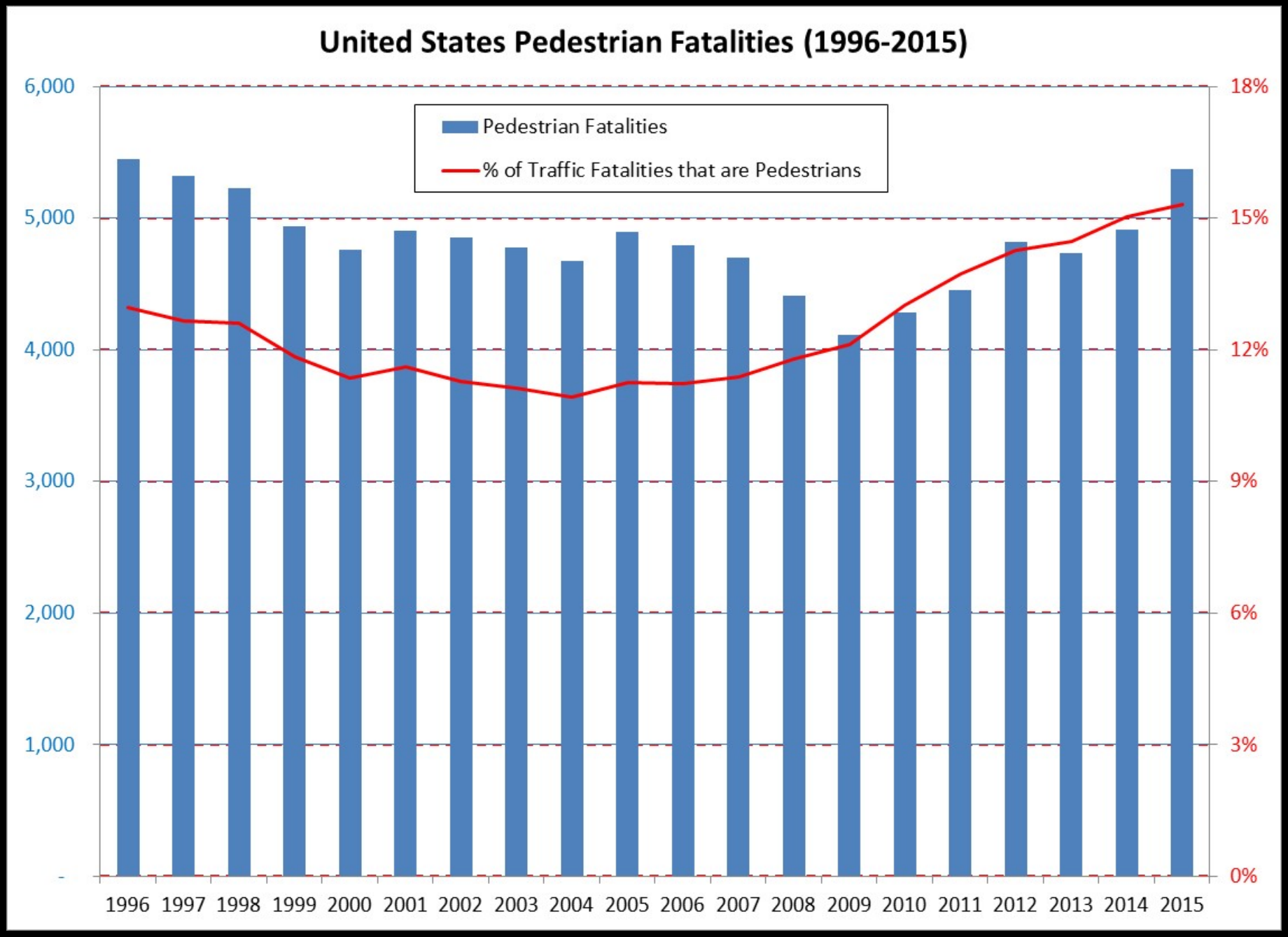
Comparison of Metropolitan Region Pedestrian & Bicyclist Fatality Risk

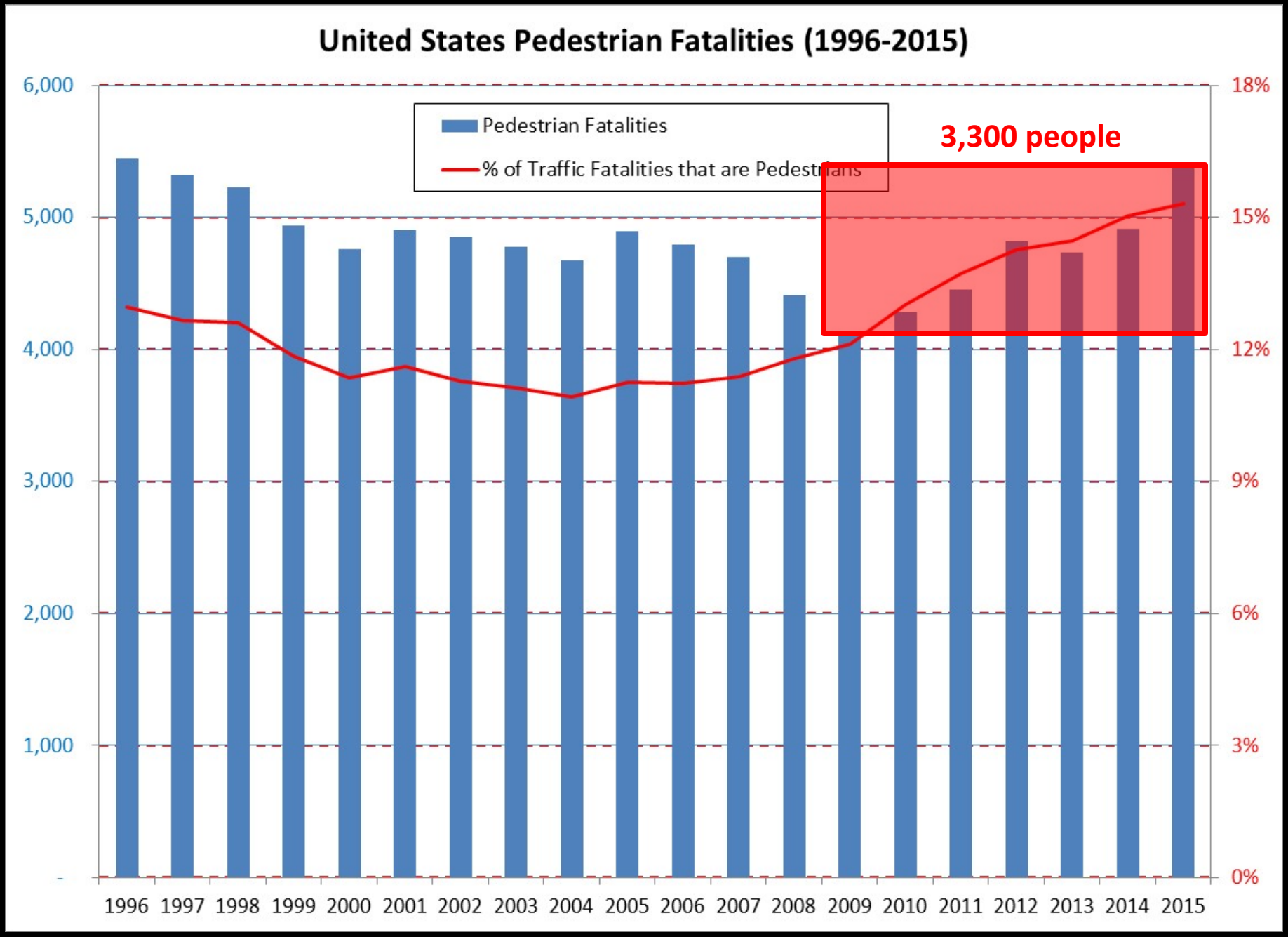


Robert Schneider, Jason Vargo, Aida Sanatizadeh, & Nancy McGuckin

UW-Milwaukee, UW-Madison, & Travel Behavior Analyst—December 2016



Data Source: Fatality Analysis Reporting System (FARS), 1996-2015



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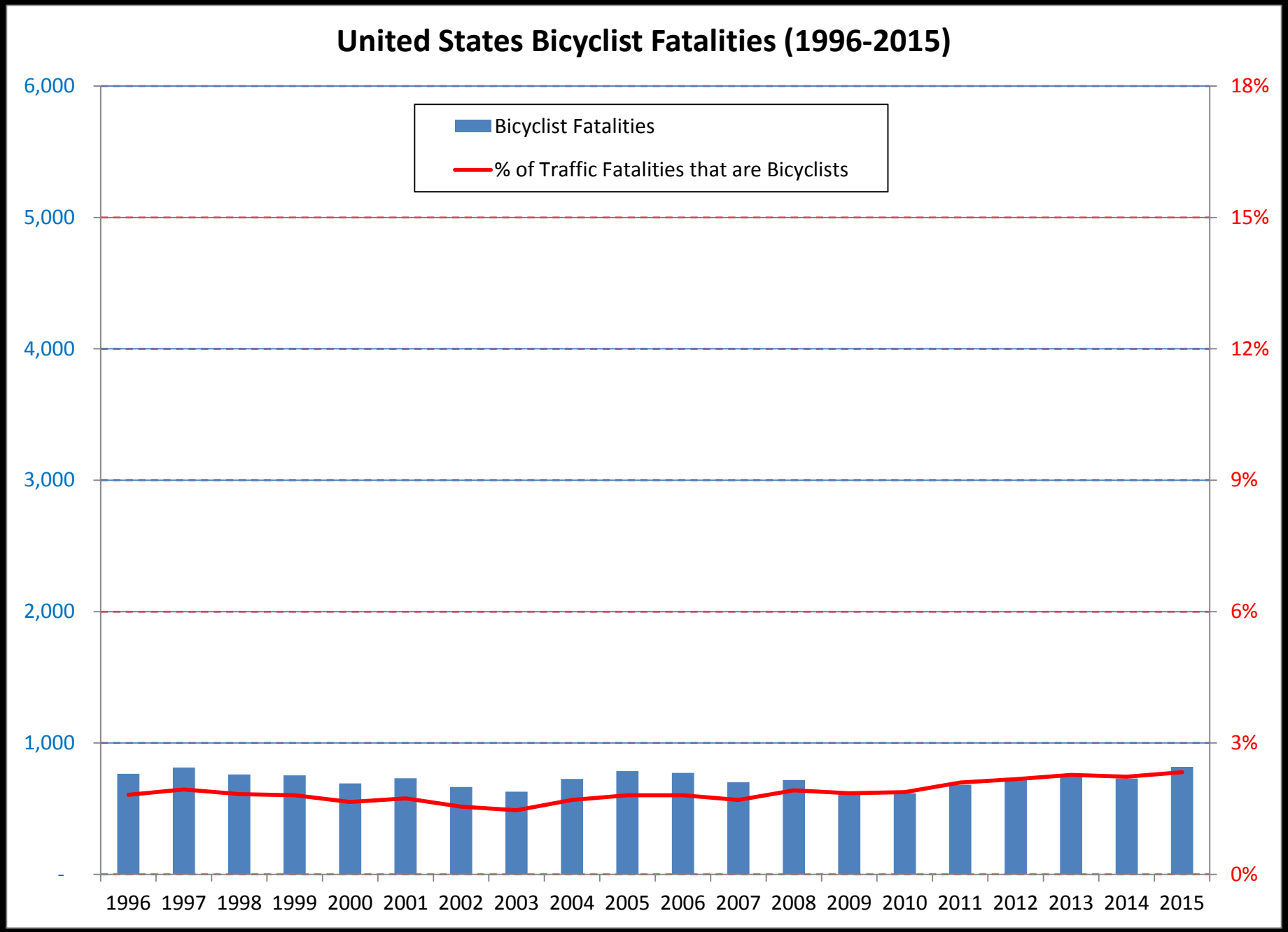

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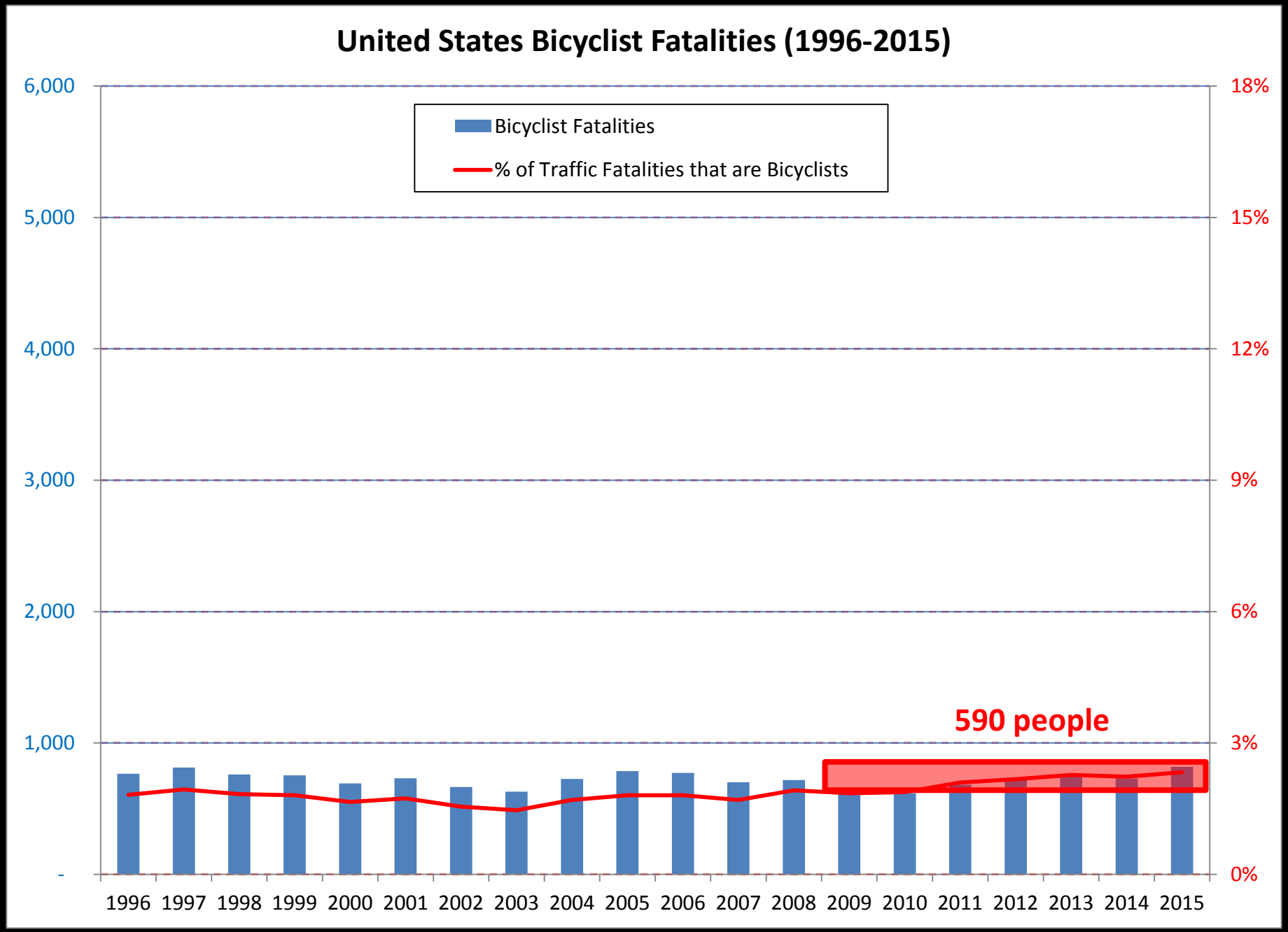

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Overview

- Is pedestrian and bicyclist fatality risk distributed evenly across metropolitan regions?
- Fatality risk
- Results
- Future Research

New York, NY

Common Risk Measure

$$= \frac{\text{Incidents}}{\text{Exposure}}$$

Pedestrian or Bicyclist Fatality Risk

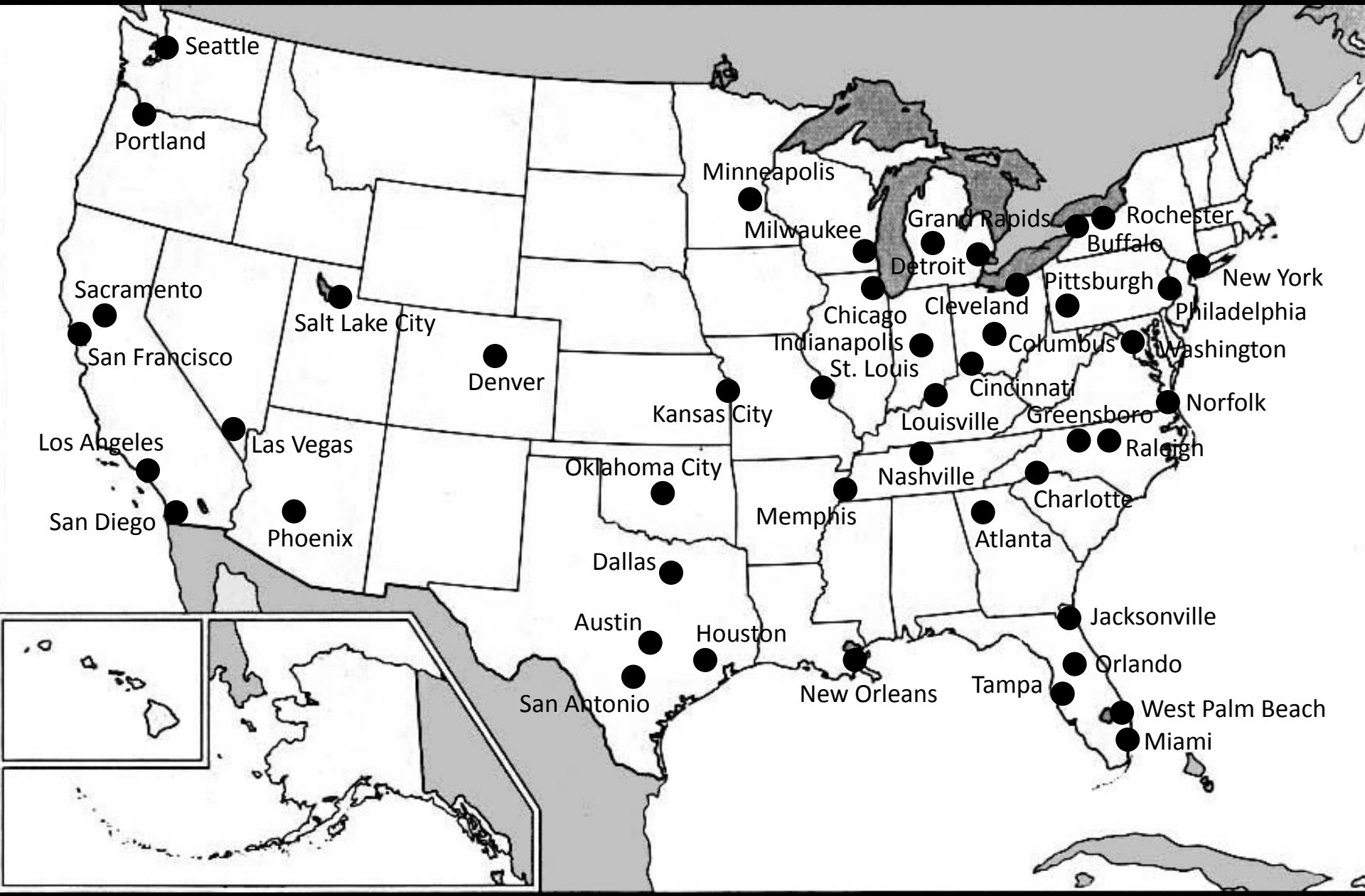
$$= \frac{\text{Fatalities (FARS)}}{\text{Trips, Distance, or Time (NHTS)}}$$

Pedestrian or Bicyclist Fatality Risk

$$= \frac{\text{Fatalities (FARS)}}{\text{Trips, Distance, or Time (NHTS)}}$$

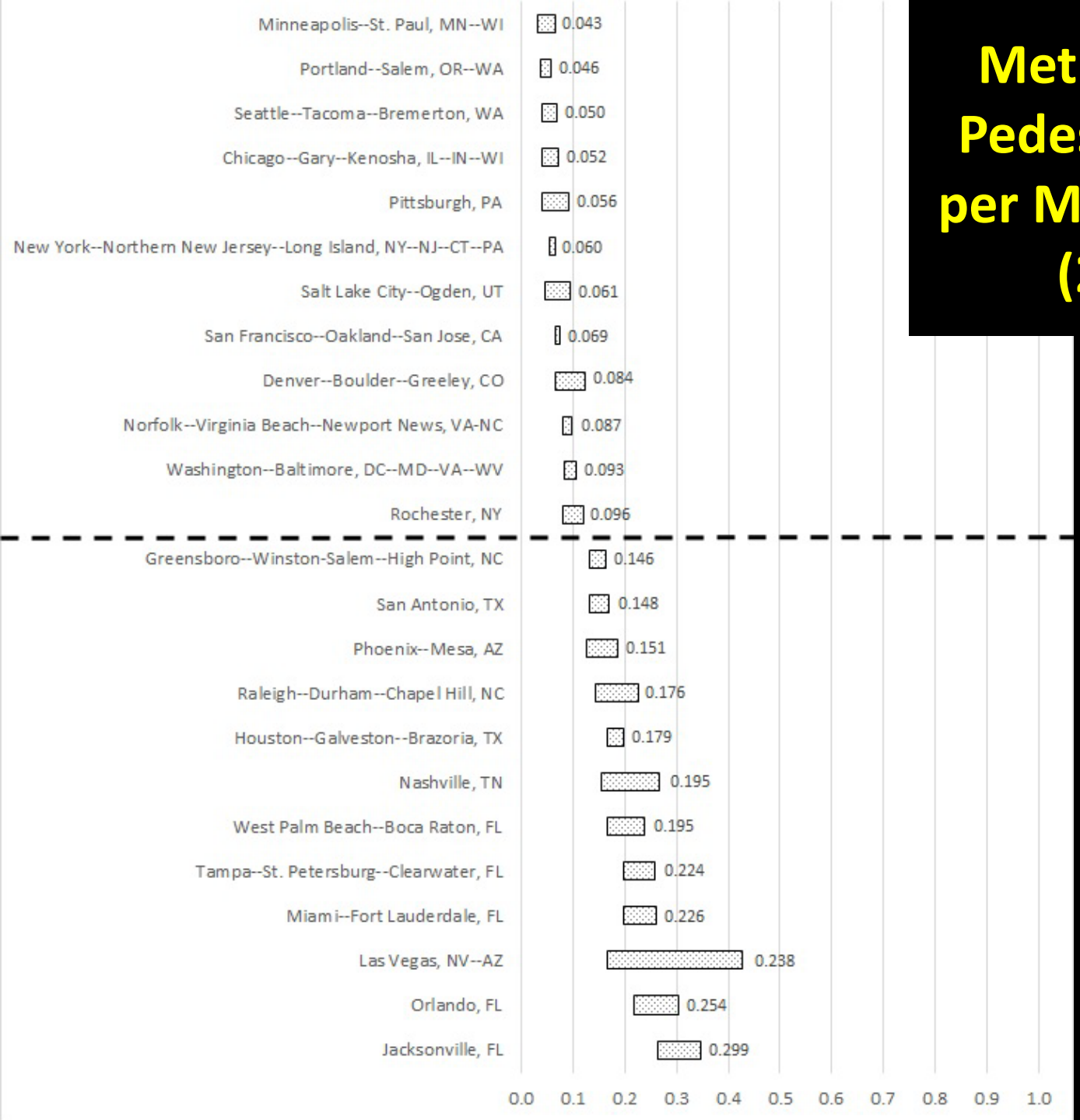
Time Periods: **1999-2003** & **2007-2011**

Metropolitan Statistical Areas (MSAs) Studied



Map Source: http://www.lib.utexas.edu/maps/united_states/usa_blank.jpg

Metropolitan Area Pedestrian Fatalities per Million Walk Trips (2007-2011)



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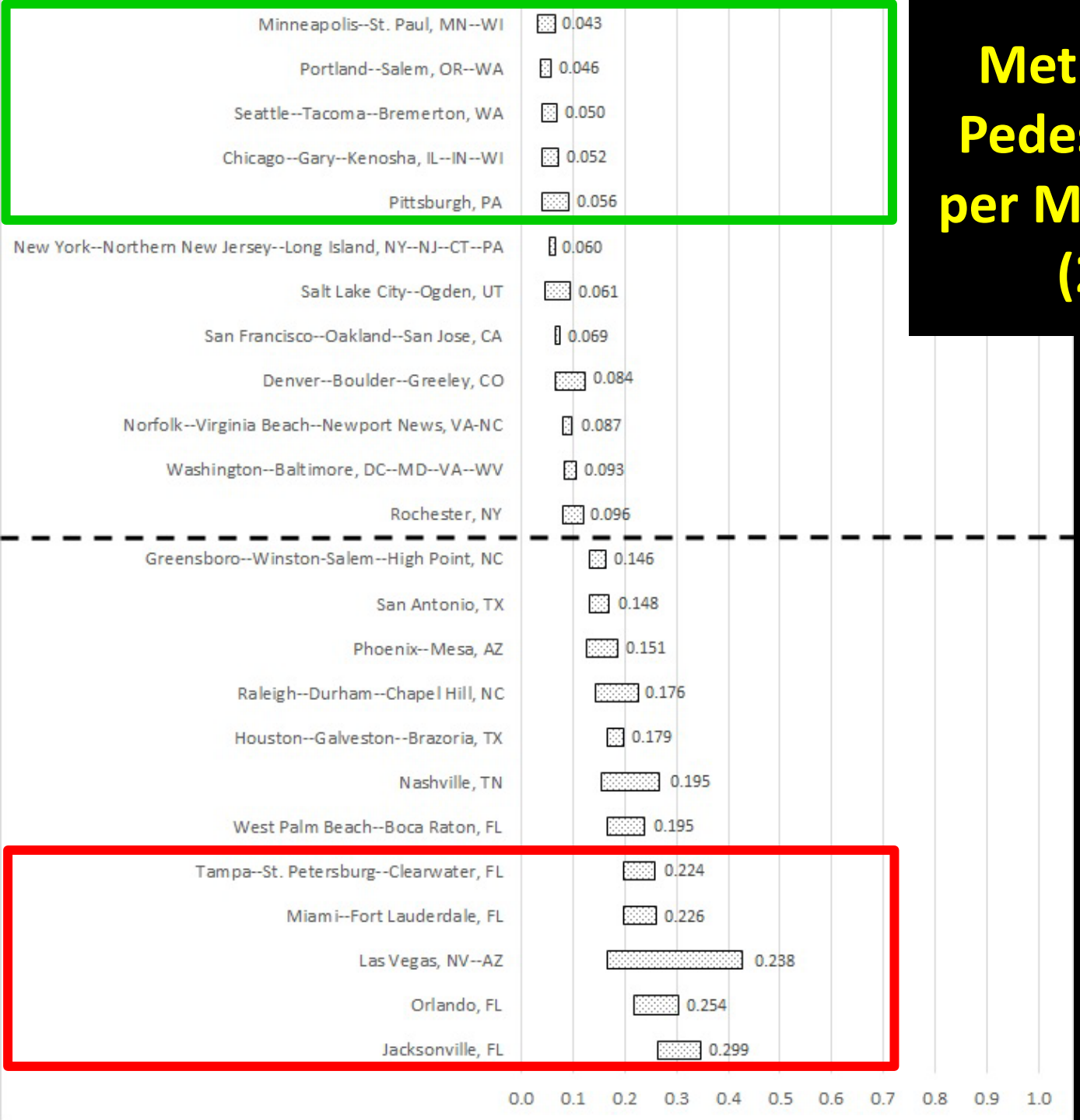
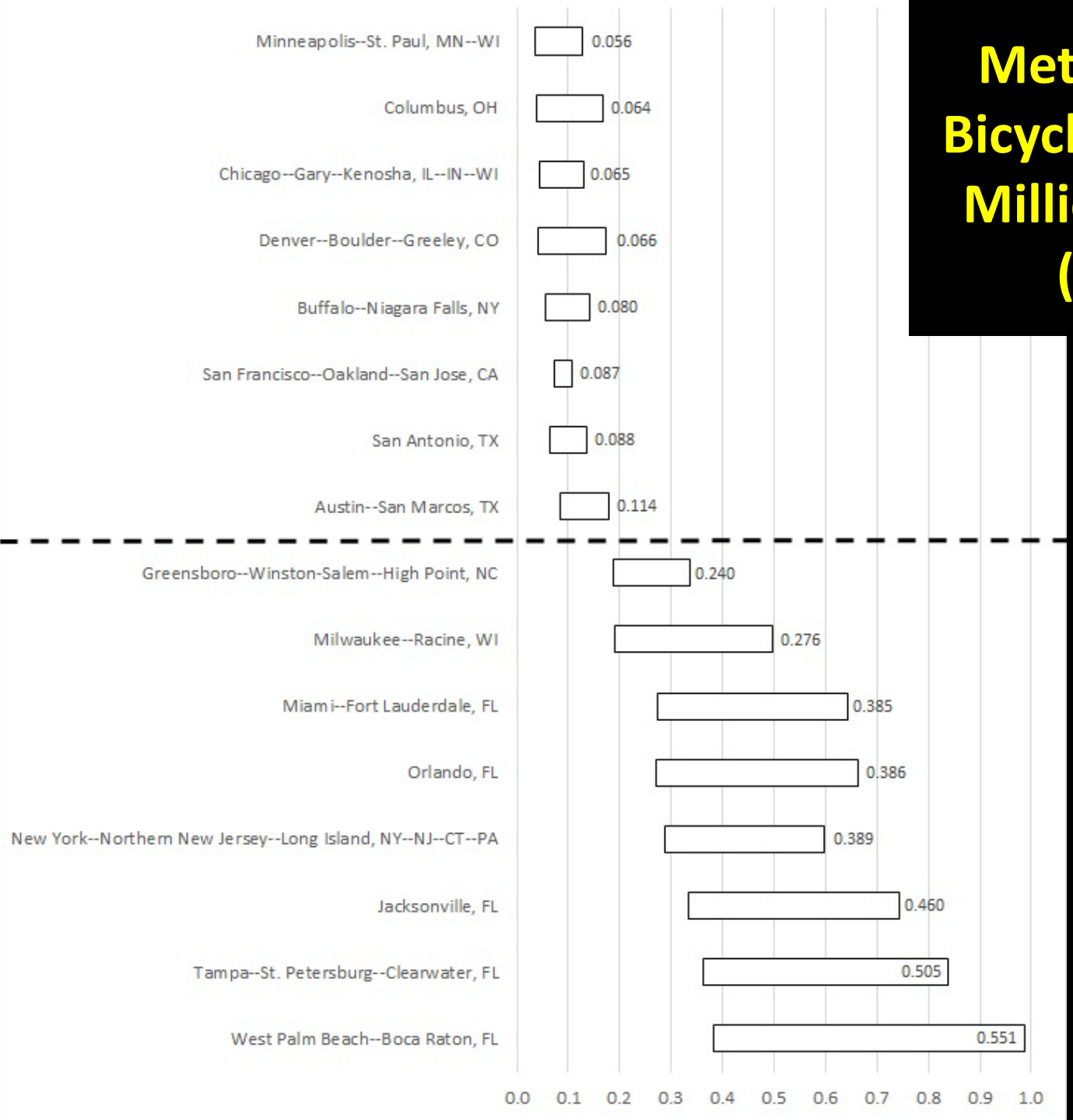


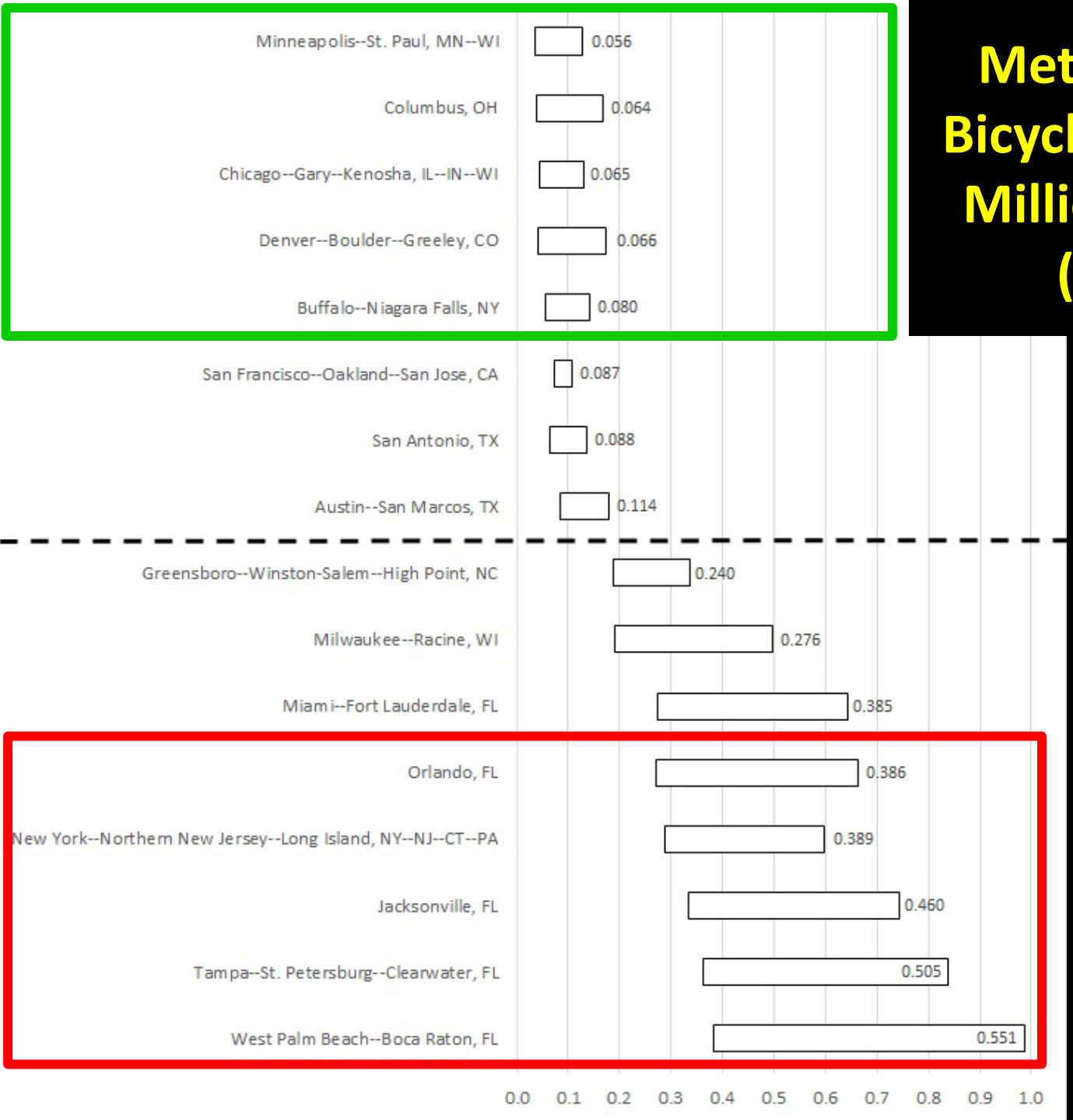
5X

(49 more people)

Metropolitan Area Bicyclist Fatalities per Million Bicycle Trips (2007-2011)



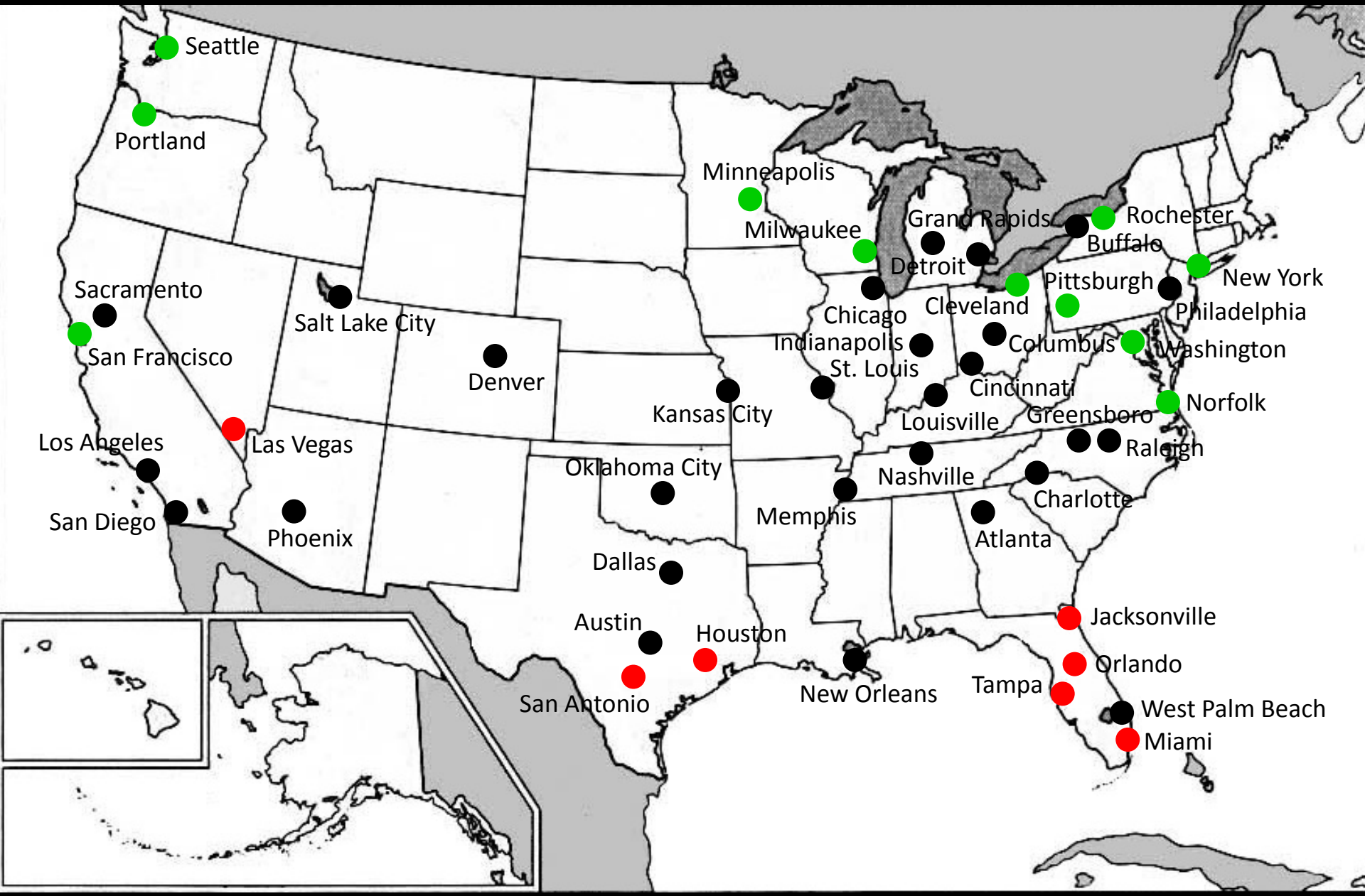
Metropolitan Area Bicyclist Fatalities per Million Bicycle Trips (2007-2011)



7X

(11 more people)

MSAs with Low and High Pedestrian Fatality Rates



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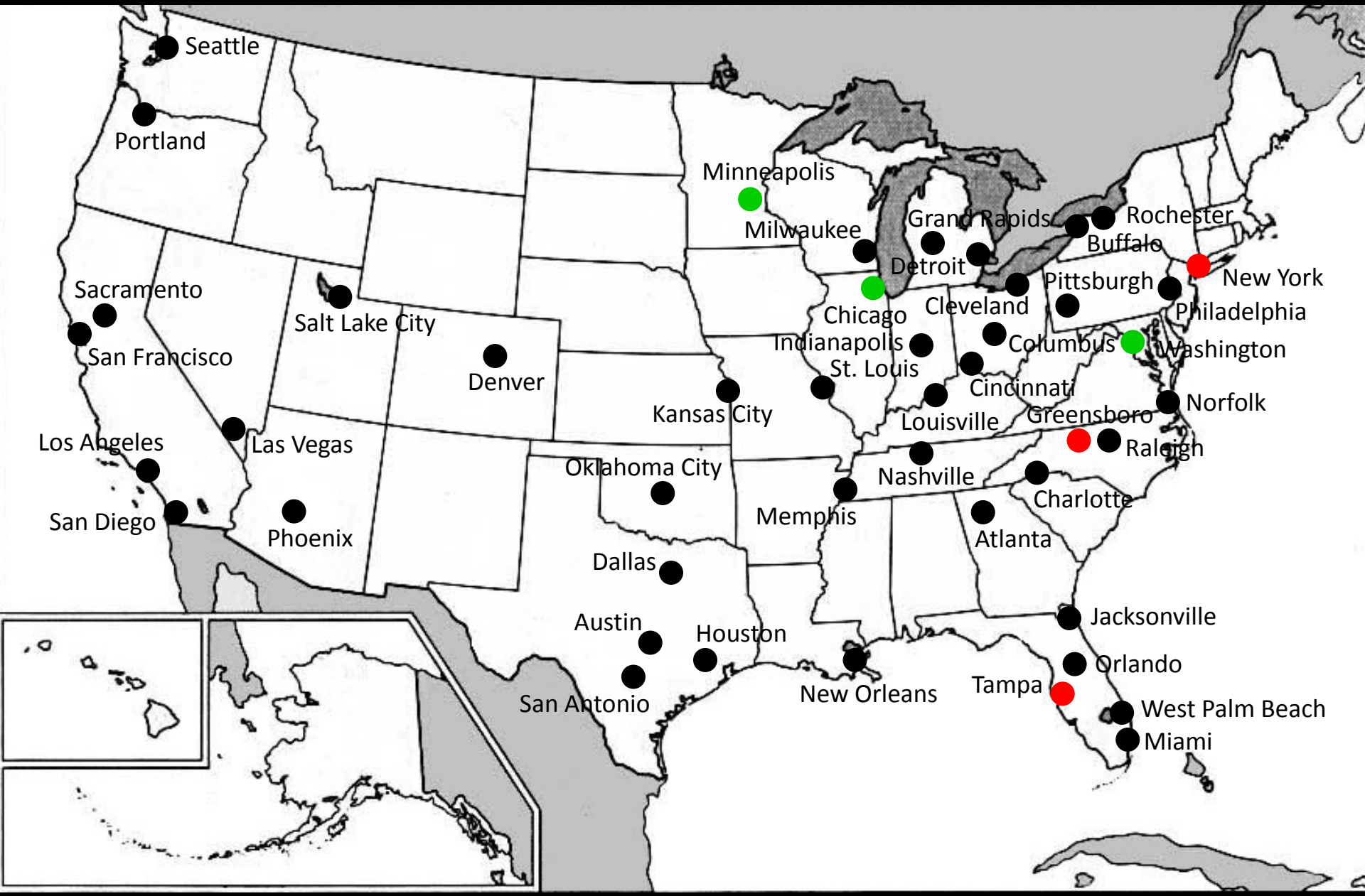
MSAs with Low and High Bicyclist Fatality Rates



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Metropolitan Areas with Low and High Fatality Rates

	Pedestrian	Bicyclist
Low Fatality Rates	Cleveland Milwaukee Minneapolis New York City Norfolk Pittsburgh Portland Rochester San Francisco Seattle Washington, DC	Chicago Minneapolis Washington, DC
High Fatality Rates	Houston Jacksonville Las Vegas Miami Orlando San Antonio Tampa	Greensboro New York City Tampa

Metropolitan Areas with Low and High Fatality Rates

Walk Friendly Communities

		Pedestrian	Bicyclist
Low Fatality Rates		Cleveland	Chicago
		Milwaukee	Minneapolis
	G	Minneapolis	Washington, DC
		New York City	
		Norfolk	
		Pittsburgh	
		Portland	
		Rochester	
	G	San Francisco	
	P	Seattle	
	G	Washington, DC	
High Fatality Rates		Houston	Greensboro
		Jacksonville	New York City
		Las Vegas	Tampa
		Miami	
		Orlando	
		San Antonio	
		Tampa	

Metropolitan Areas with Low and High Fatality Rates

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	Portland		
	Rochester		
	San Francisco		
	Seattle		
	Washington, DC		
High Fatality Rates	Houston	B	Greensboro
	Jacksonville	S	New York City
	Las Vegas		Tampa
	Miami		
	Orlando		
	San Antonio		
	Tampa		

Bike Friendly Communities

Metropolitan Areas with Low and High Fatality Rates

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	Milwaukee	G	Minneapolis
	Minneapolis	S	Washington, DC
	New York City		
	Norfolk		
	Pittsburgh		
	Portland		
	Rochester		
	San Francisco		
	Seattle		
	Washington, DC		
High Fatality Rates	Houston	B	Greensboro
	Jacksonville	S	New York City
	Las Vegas		Tampa
	Miami		
	Orlando		
	San Antonio		
	Tampa		

Bike Friendly Communities

(Pucher & Buehler 2016)

MSA Pedestrian & Bicyclist Fatality Rate Models

Explanatory Variables	2007-2011 Pedestrian Fatality Rate Models[1,2]			2007-2011 Bicyclist Fatality Models[1,2]		
	Per Million Trips	Per Million Km	Per Million Minutes	Per Million Trips	Per Million Km	Per Million Minutes
Constant	-1.660 **	-1.460	-4.373 **	-0.187	0.369	-3.561 *
Pedestrian Trip Mode Share[3]	-13.398 **	-13.334 **	-13.648 **			
Bicyclist Trip Mode Share[4]				-70.423 **	-93.311 **	-71.368 **
Proportion Foreign-Born[5]	2.921 **	2.476 **	2.229 **	3.450 **	1.418	2.441
Proportion College Graduates[6]	-0.806	-1.278	-0.996	-3.680 *	-7.616 *	-3.976
Proportion in Poverty[7]	1.966	1.388	3.015	-6.585	-3.310	0.912
Proportion Over Age 64[8]	3.172	1.985	3.300	6.716 **	3.915	5.659
Population per Sq. Km (in 1,000s)[9]	0.373	0.873	0.714	-0.595	-0.527	-0.896
Model Adjusted R-Squared Value	**0.609**	**0.484**	**0.529**	**0.507**	**0.310**	**0.213**

1. Loglinear model (dependent variable in each model is the natural log of the fatality rate measure at the top of each column). (n=46)
2. Asterisks indicate statistical significance of each parameter estimate: * indicates $p < 0.10$; ** indicates $p < 0.05$.

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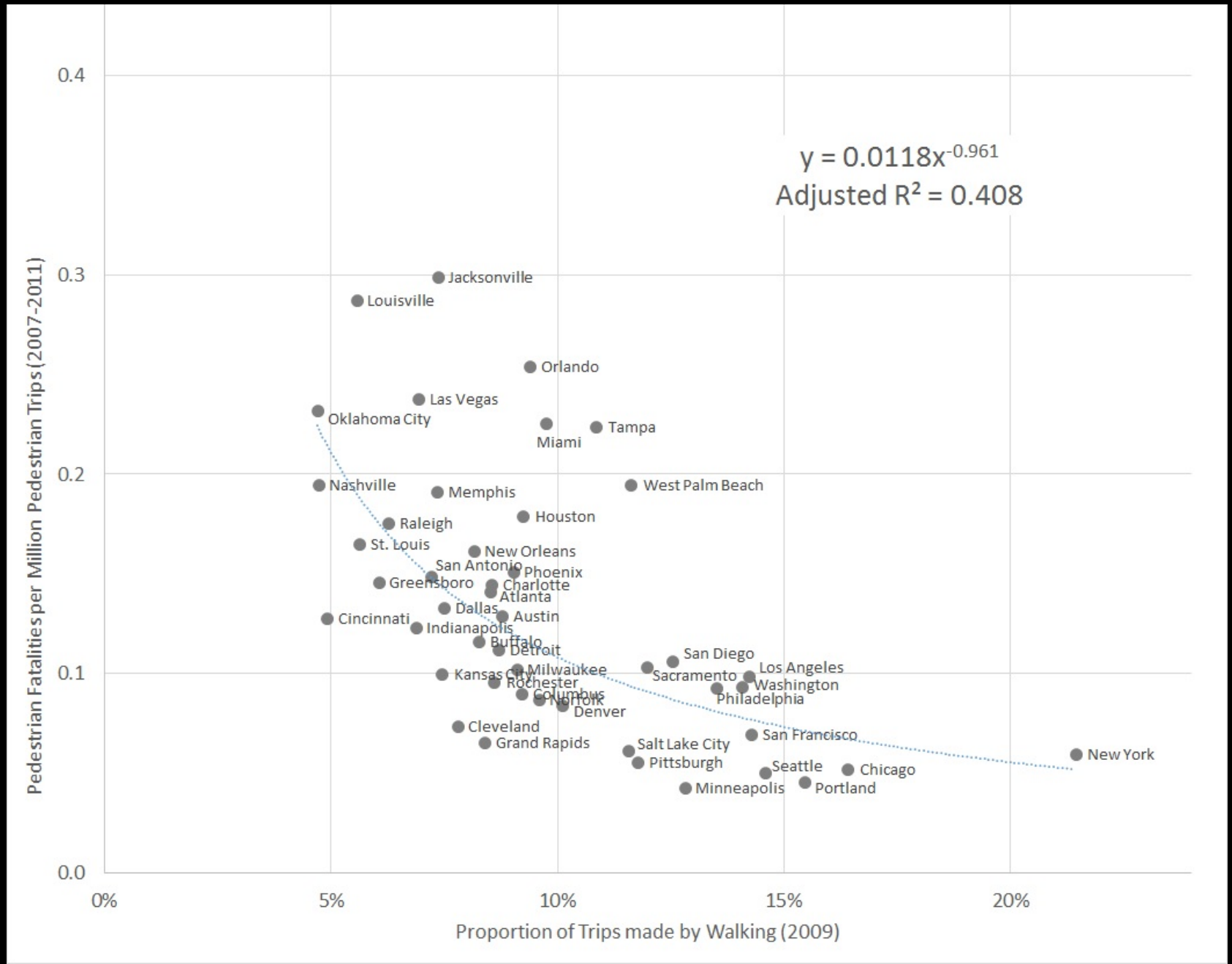
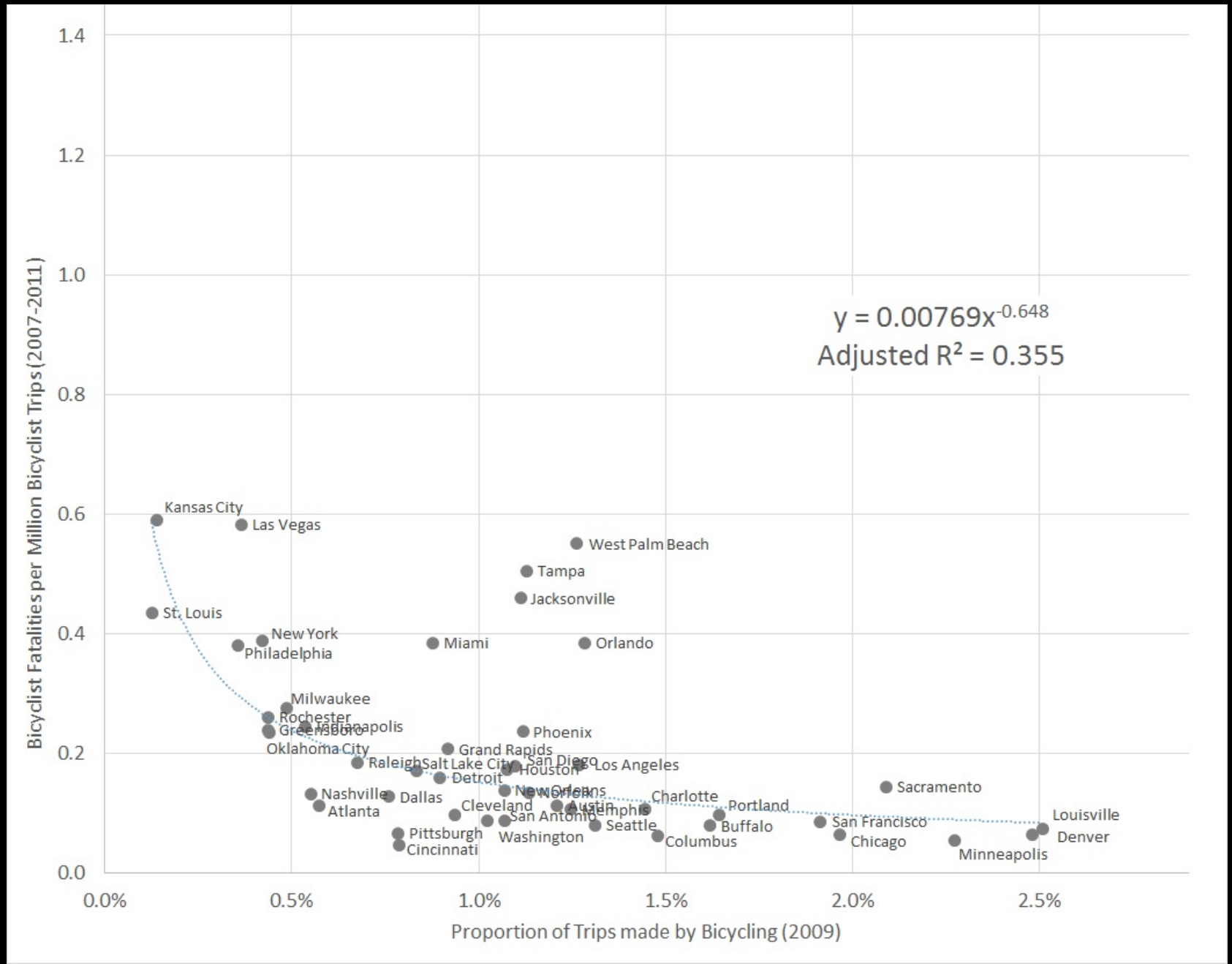
Trip-Based Pedestrian Fatality Rate vs. Mode Share (2007-11)



Trip-Based Bicyclist Fatality Rate vs. Mode Share (2007-11)



Possible Influences on Metropolitan Region Pedestrian and Bicyclist Fatality Risk

Pedestrian & Bicyclist Fatality Risk

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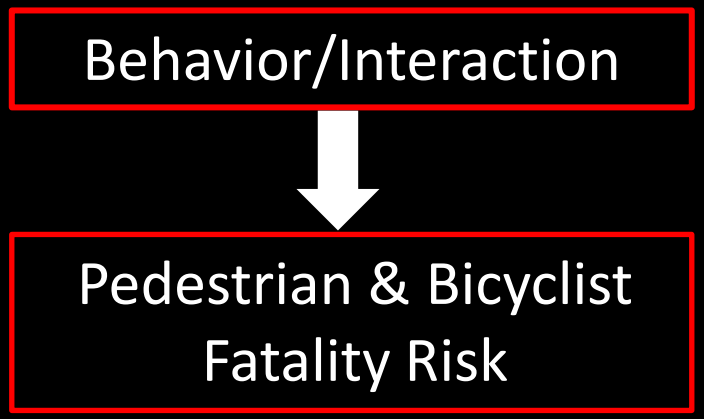

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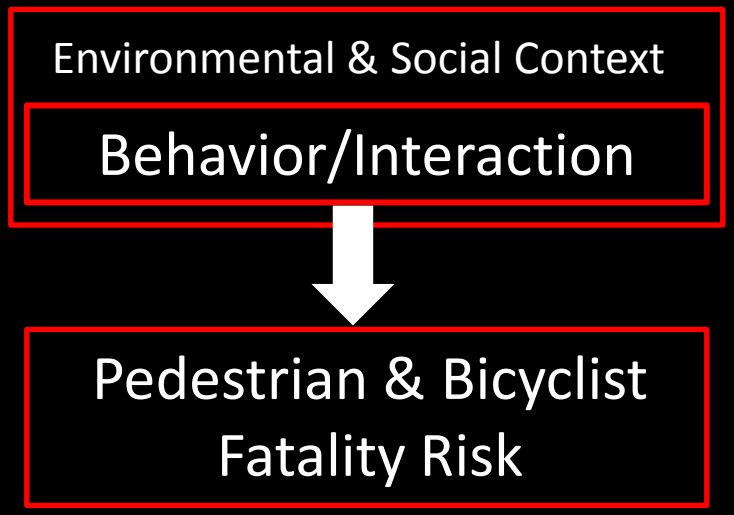

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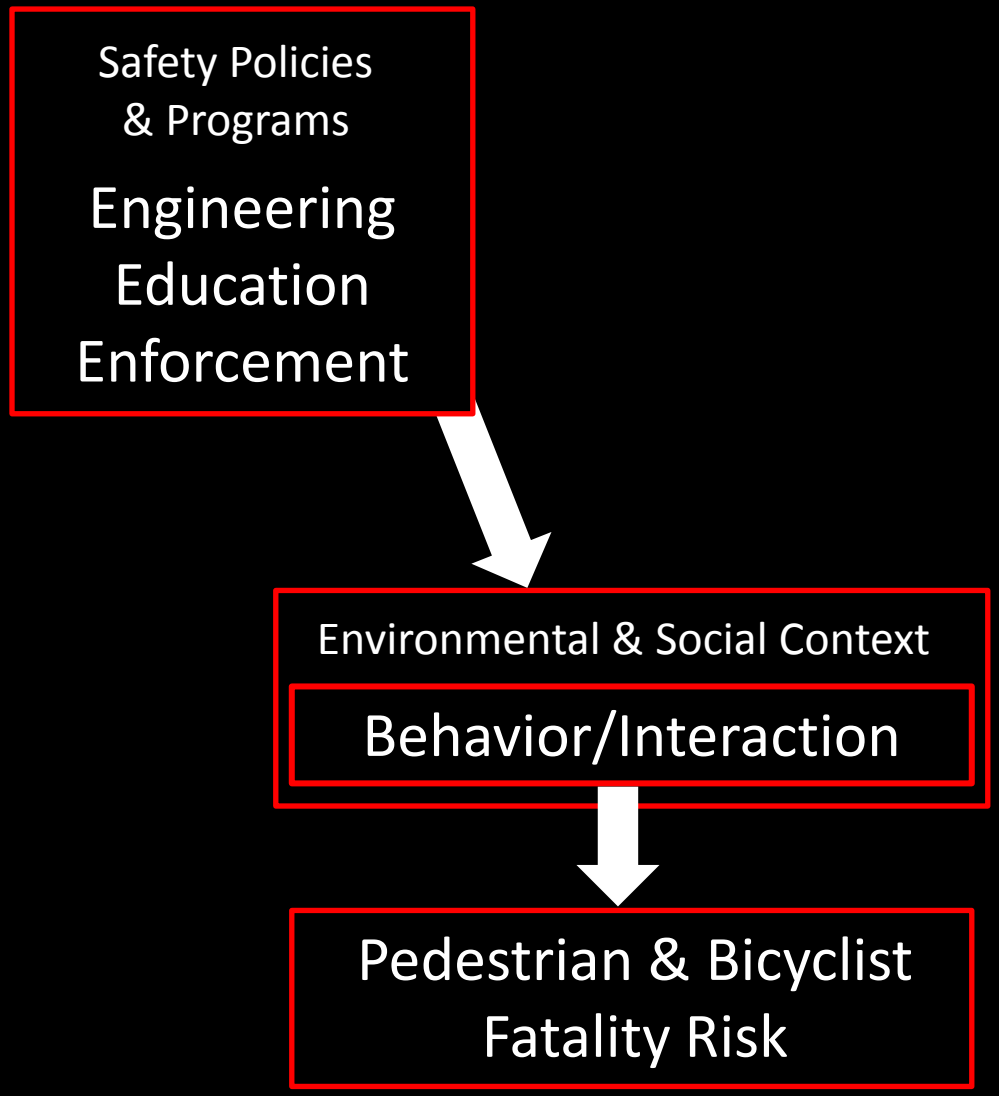

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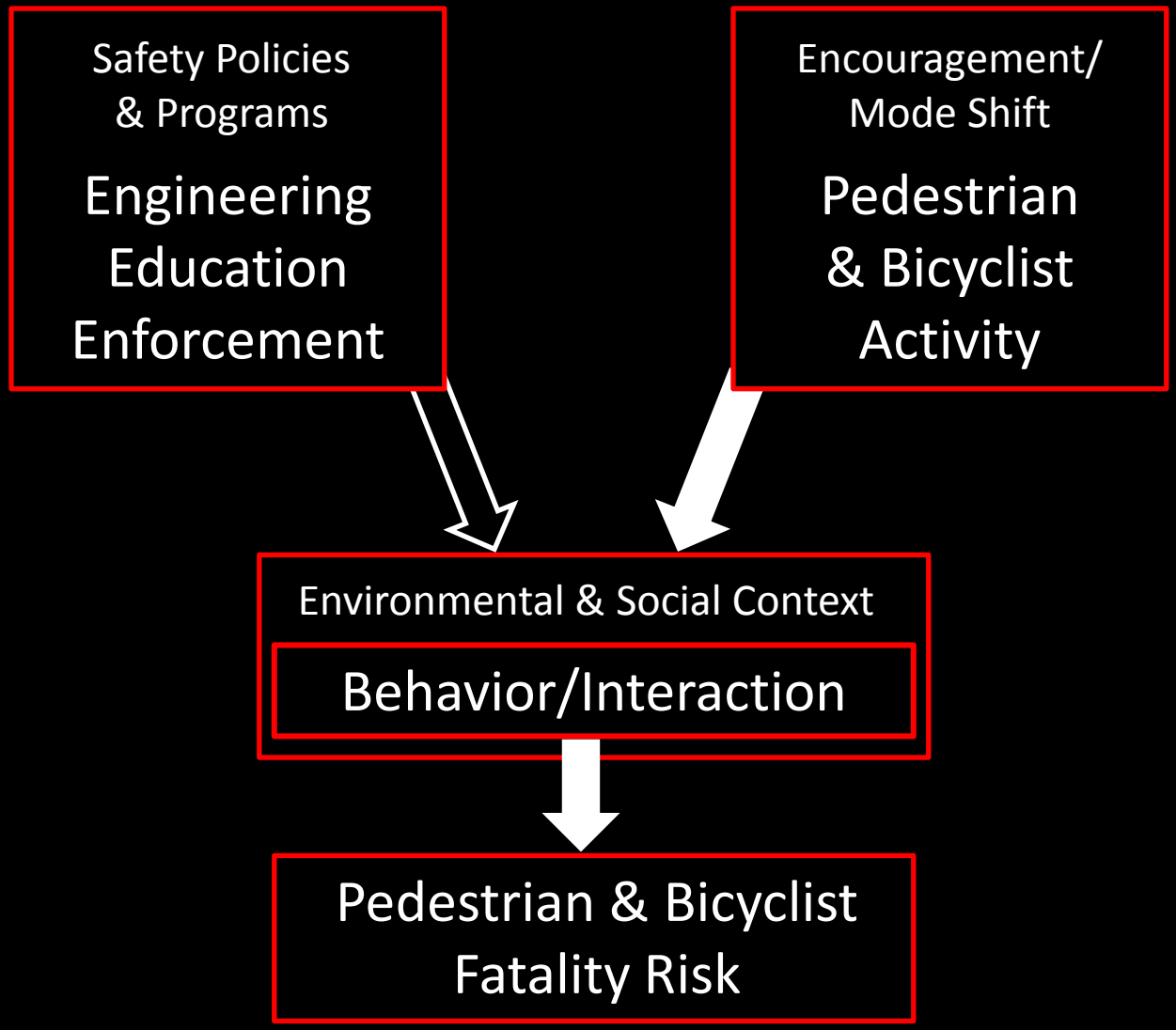

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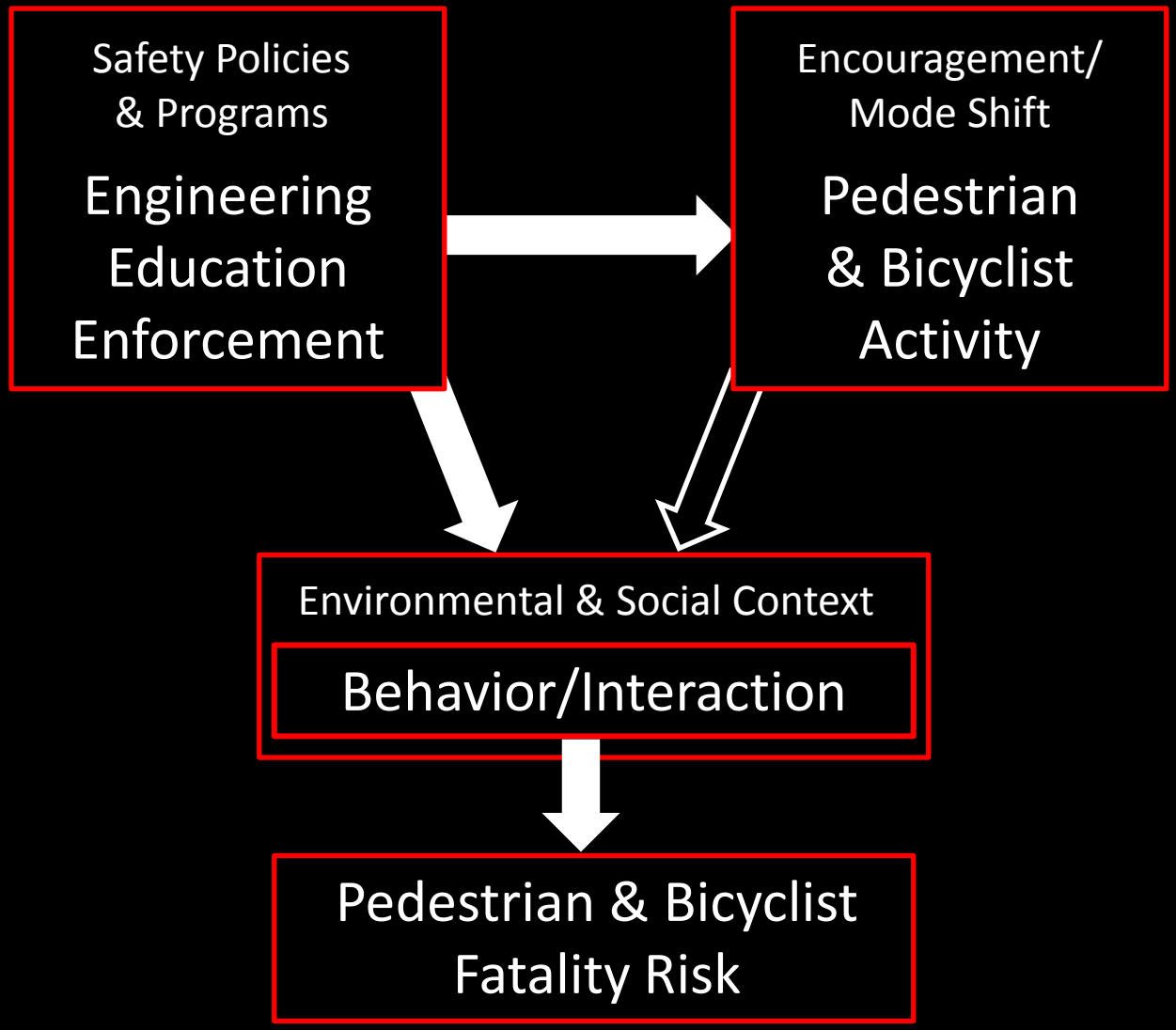

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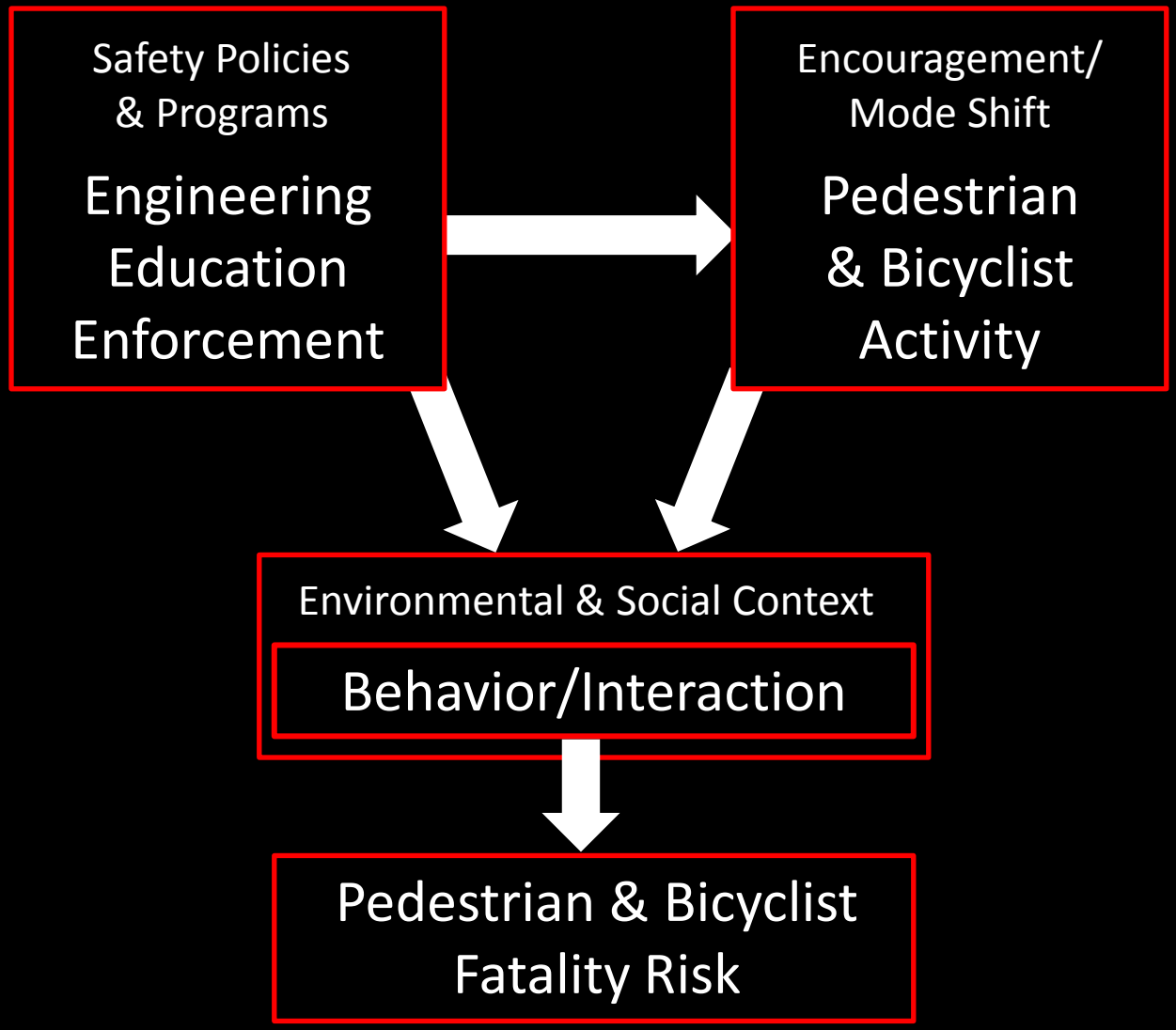

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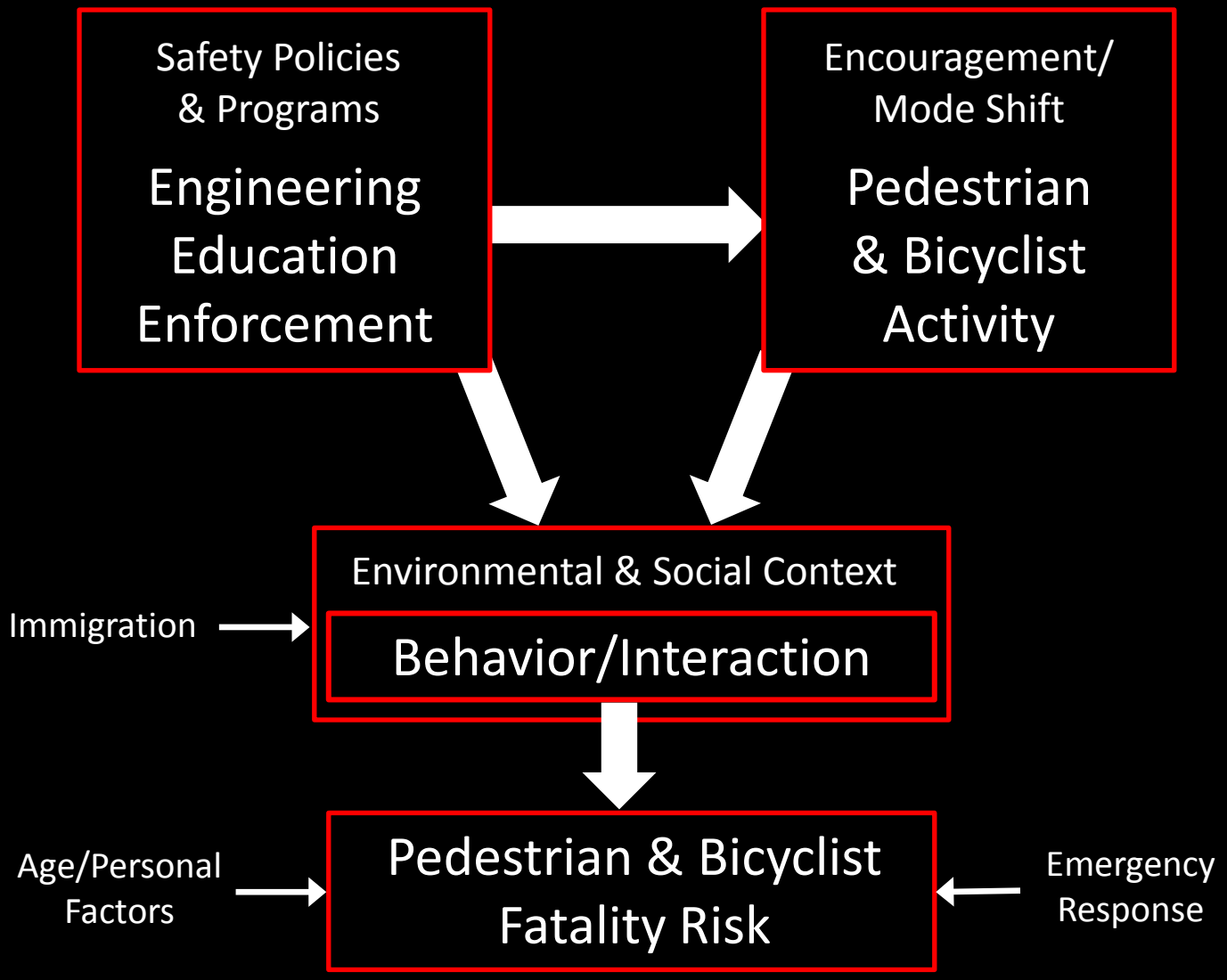

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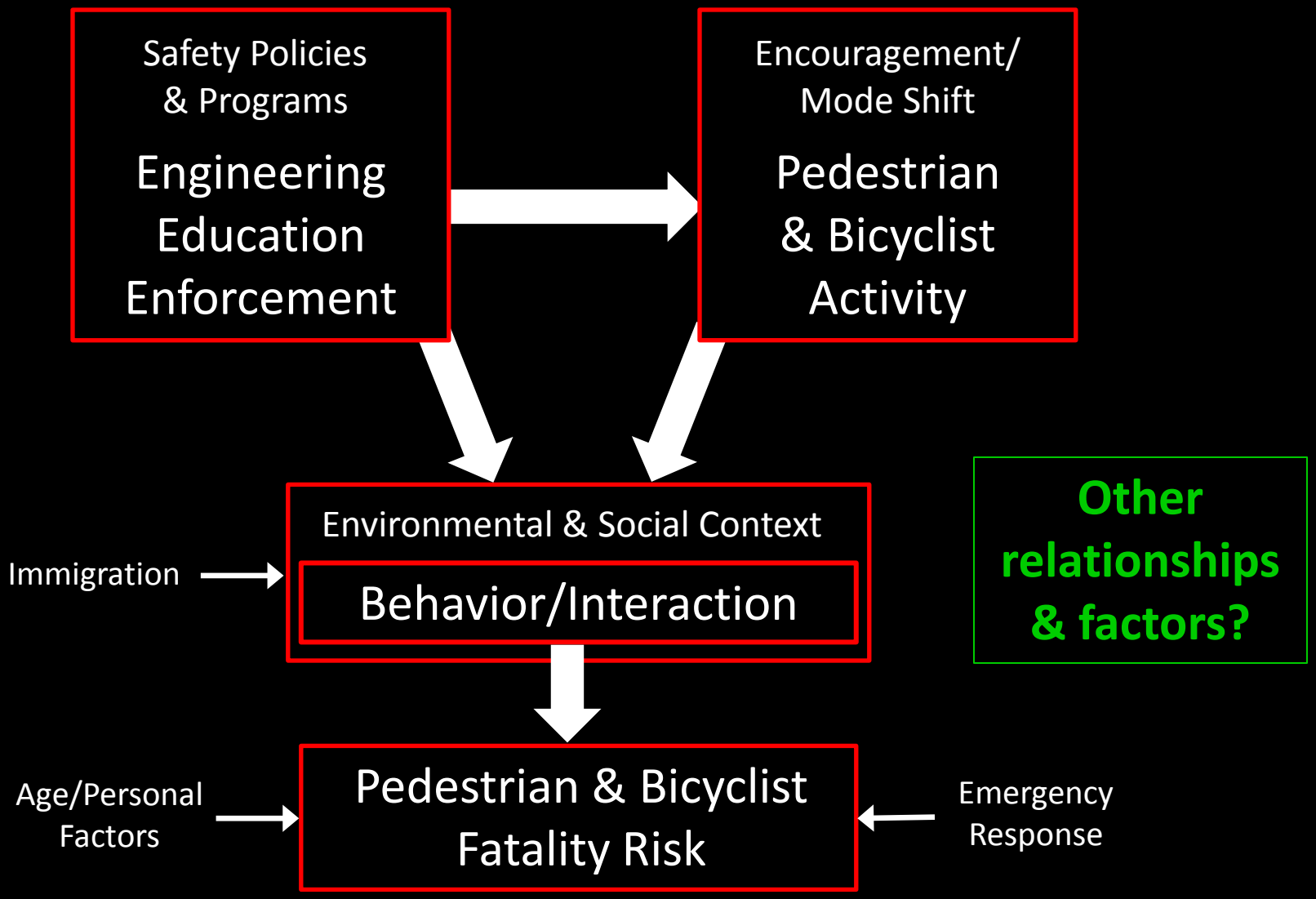

Thanks…more research needed!

Robert Schneider, PhD
University of Wisconsin-Milwaukee
Department of Urban Planning
E-mail: rjschnei@uwm.edu
www.robertjschneider.com