# 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

#### **United States Pedestrian Fatalities (1996-2015)**



#### **United States Pedestrian Fatalities (1996-2015)**



#### **United States Bicyclist Fatalities (1996-2015)**



#### **United States Bicyclist Fatalities (1996-2015)**



## **Overview**

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



## **Common Risk Measure**

# Incidents

# Exposure

# **Pedestrian or Bicyclist Fatality Risk**

# Fatalities (FARS)

Trips, Distance, or Time (NHTS)

# **Pedestrian or Bicyclist Fatality Risk**

# Fatalities (FARS)

# 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)



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

5	

(49 more people)

MinneapolisSt. Paul, MNWI	0.043	
PortlandSalem, ORWA	0.046	N
SeattleTacomaBremerton, WA	0.050	Do
ChicagoGaryKenosha, ILINWI	0.052	Pe
Pittsburgh, PA	0.056	per
New YorkNorthern New JerseyLong Island, NYNJCTPA	0.060	
Salt Lake CityOgden, UT	0.061	
San FranciscoOaklandSan Jose, CA	[] 0.069	
DenverBoulderGreeley, CO	0.084	
NorfolkVirginia BeachNewport News, VA-NC	0.087	
WashingtonBaltimore, DCMDVAWV	0.093	
Rochester, NY	0.096	
GreensboroWinston-SalemHigh Point, NC	0.146	
San Antonio, TX	0.148	
Phoenix Mesa, AZ	0.151	
RaleighDurhamChapel Hill, NC	0.176	
HoustonGalvestonBrazoria, TX	0.179	
Nashville, TN	0.195	
West Palm BeachBoca Raton, FL	0.195	
TampaSt. PetersburgClearwater, FL	0.224	
MiamiFort Lauderdale, FL	0.226	
Las Vegas, NVAZ	0.238	
Orlando, FL	0.254	
Jacksonville, FL	0.299	



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



0.0

0.1

0.2

0.3

0.4

0.5

0.6

0.7

0.8

0.9

1.0

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



#### MSAs with Low and High Pedestrian Fatality Rates



Map Source: http://www.lib.utexas.edu/maps/united\_states/usa\_blank.jpg

#### MSAs with Low and High <u>Bicyclist</u> Fatality Rates



Map Source: http://www.lib.utexas.edu/maps/united\_states/usa\_blank.jpg

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

**Bicyclist** 

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

Pedestrian

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

Bike Friendly Communities

	Pedestrian		Bicyclist	
Low Fatality Rates	Cleveland Milwaukee Minneapolis New York City Norfolk Pittsburgh Portland Rochester San Francisco Seattle	S S	Chicago Minneapolis Washington, DC	Bike Friendly Communities (Pucher & Buebler 2016)
High Fatality Rates	Houston Jacksonville Las Vegas Miami Orlando San Antonio Tampa	BS	Greensboro New York City Tampa	

	2007-201	11 Pec	lestrian Fa	tality	Rate Mode	els <sup>1,2</sup>	2007	-2011	Bicyclist Fa	atality	Models <sup>1,2</sup>	6
	Per Million Per Millio		llion	Per Million		Per Million		Per Mi	llion	Per Mi	llion	
Explanatory Variables	Trips		Km		Min	utes		<b>Frips</b>	Km		Minutes	
Constant	-1.660	**	-1.460		-4.373	**	-0.187		0.369		-3.561	*
Pedestrian Trip Mode Share <sup>3</sup>	-13.398	**	-13.334	**	-13.648	**						
Bicyclist Trip Mode Share <sup>4</sup>							-70.423	**	-93.311	**	-71.368	**
Proportion Foreign-Born⁵	2.921	**	2.476	**	2.229	**	3.450	**	1.418		2.441	
Proportion College Graduates <sup>6</sup>	-0.806		-1.278		-0.996		-3.680	*	-7.616	*	-3.976	
Proportion in Poverty <sup>7</sup>	1.966		1.388		3.015		-6.585		-3.310		0.912	
Proportion Over Age 64 <sup>8</sup>	3.172		1.985		3.300		6.716	**	3.915		5.659	
Population per Sq. Km (in 1,000s) <sup>9</sup>	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 variab	. Loglinear model (dependent variable in each model is the natural log of the fatality rate measure at the top of each column). (n=46)											

	2007-201	L1 Pec	destrian Fa	tality	Rate Mode	els <sup>1,2</sup>	2007-2011 Bicyclist Fatality Models <sup>1,2</sup>						
Explanatory Variables	Per Million Trips		Per Million Km		Per Mi Min	llion utes	Per Mi	llion Frips	Per Mi	llion Km	Per Mi Min	llion utes	
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#### Trip-Based Pedestrian Fatality Rate vs. Mode Share (2007-11)



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



Pedestrian & Bicyclist Fatality Risk







**Environmental & Social Context** 

Behavior/Interaction

Pedestrian & Bicyclist Fatality Risk

Safety Policies & Programs Engineering Education Enforcement Encouragement/ Mode Shift

Pedestrian & Bicyclist Activity

**Environmental & Social Context** 

Behavior/Interaction

Pedestrian & Bicyclist Fatality Risk









# Thanks...more research needed!

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

