

Better Understanding of the Spatial Extent of Motor Vehicle Fatalities Occurring in Rural Areas

Using Geo-coded FARS Data



Raj Subramanian

Office of Traffic Records and Analysis

The National Center for Statistics and Analysis

The National Highway Traffic Safety Administration

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Agenda

Background on rural fatalities

Research Question

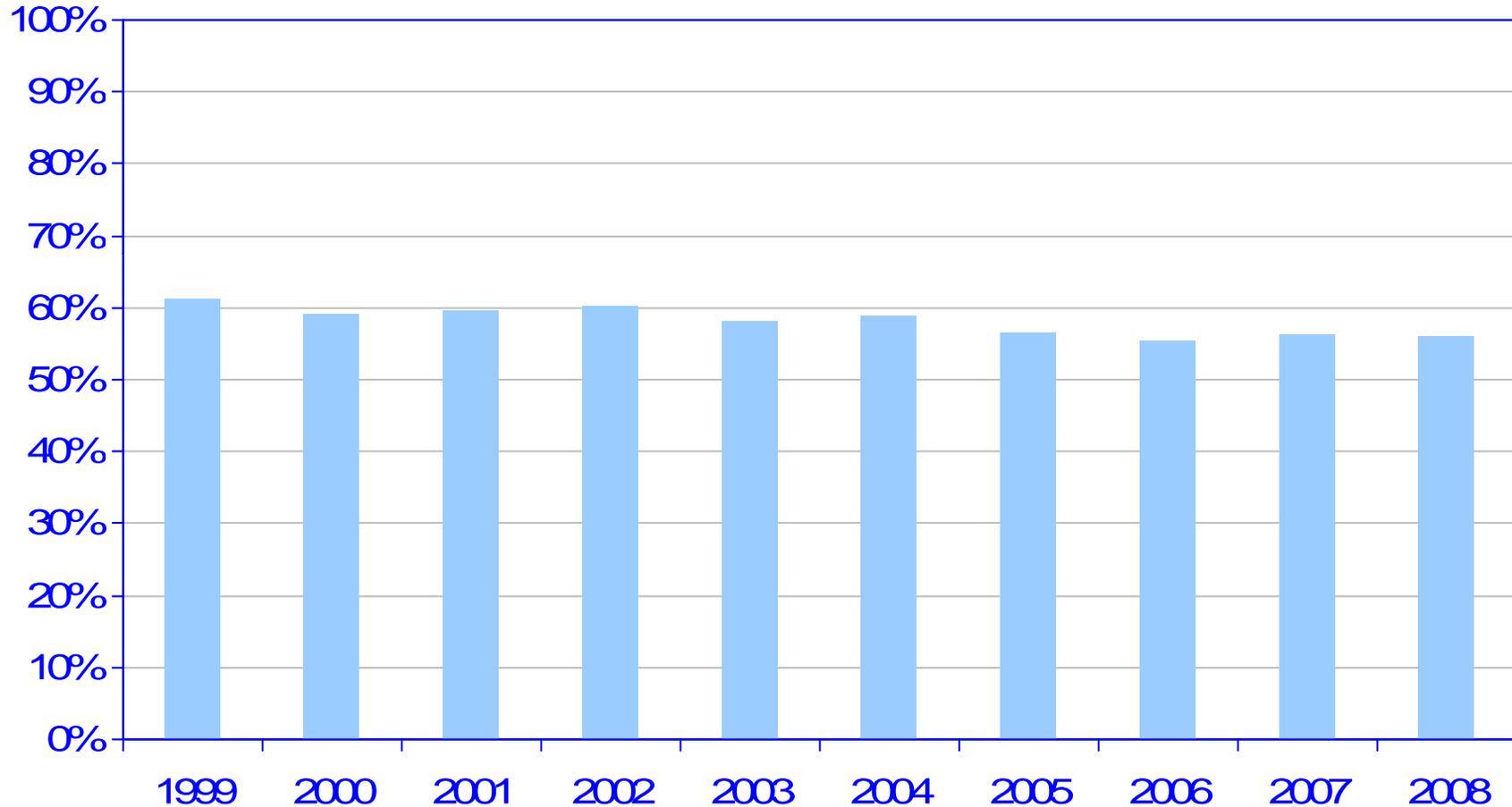
Data and Methodology

Results

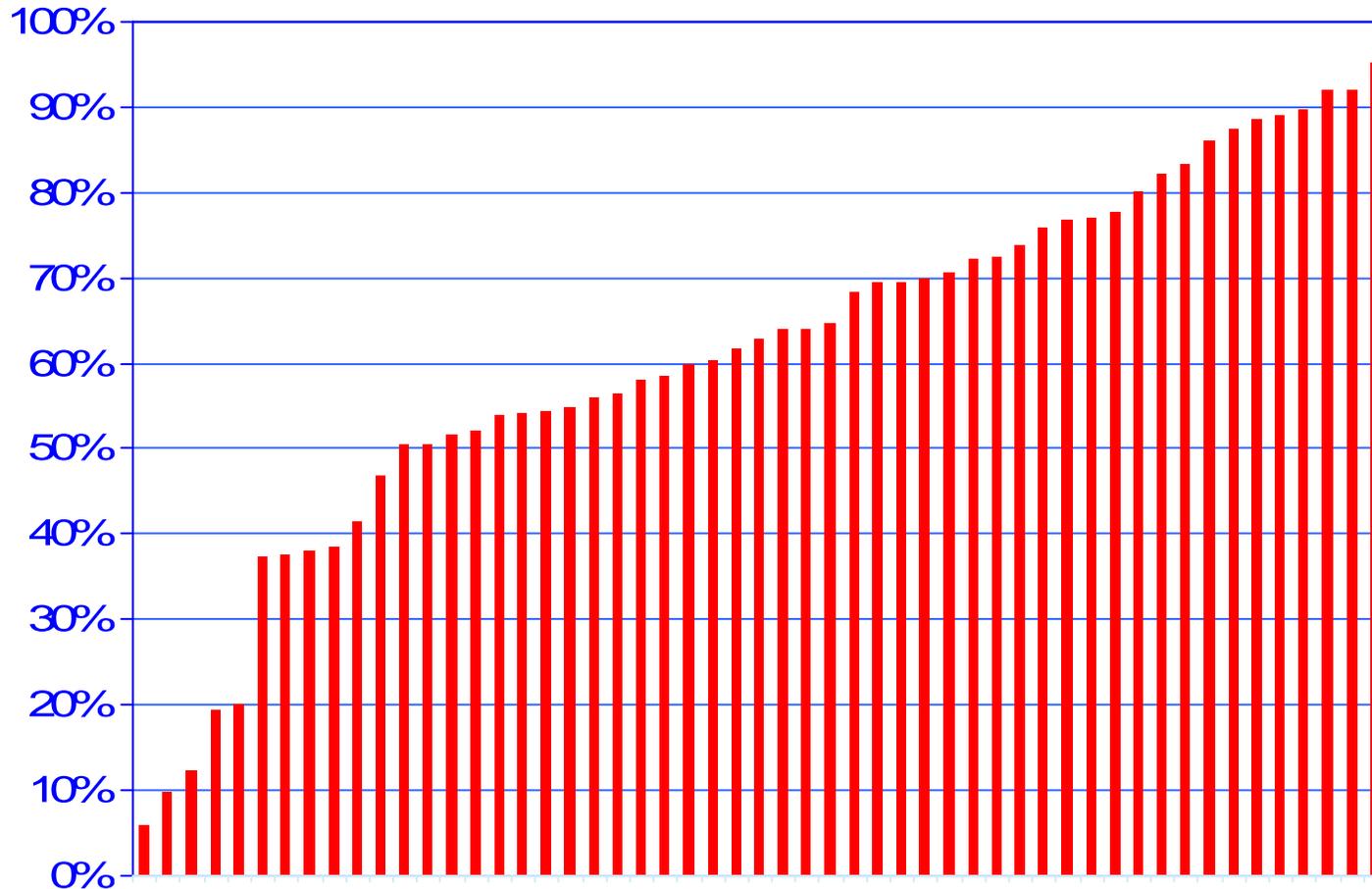
Further Studies



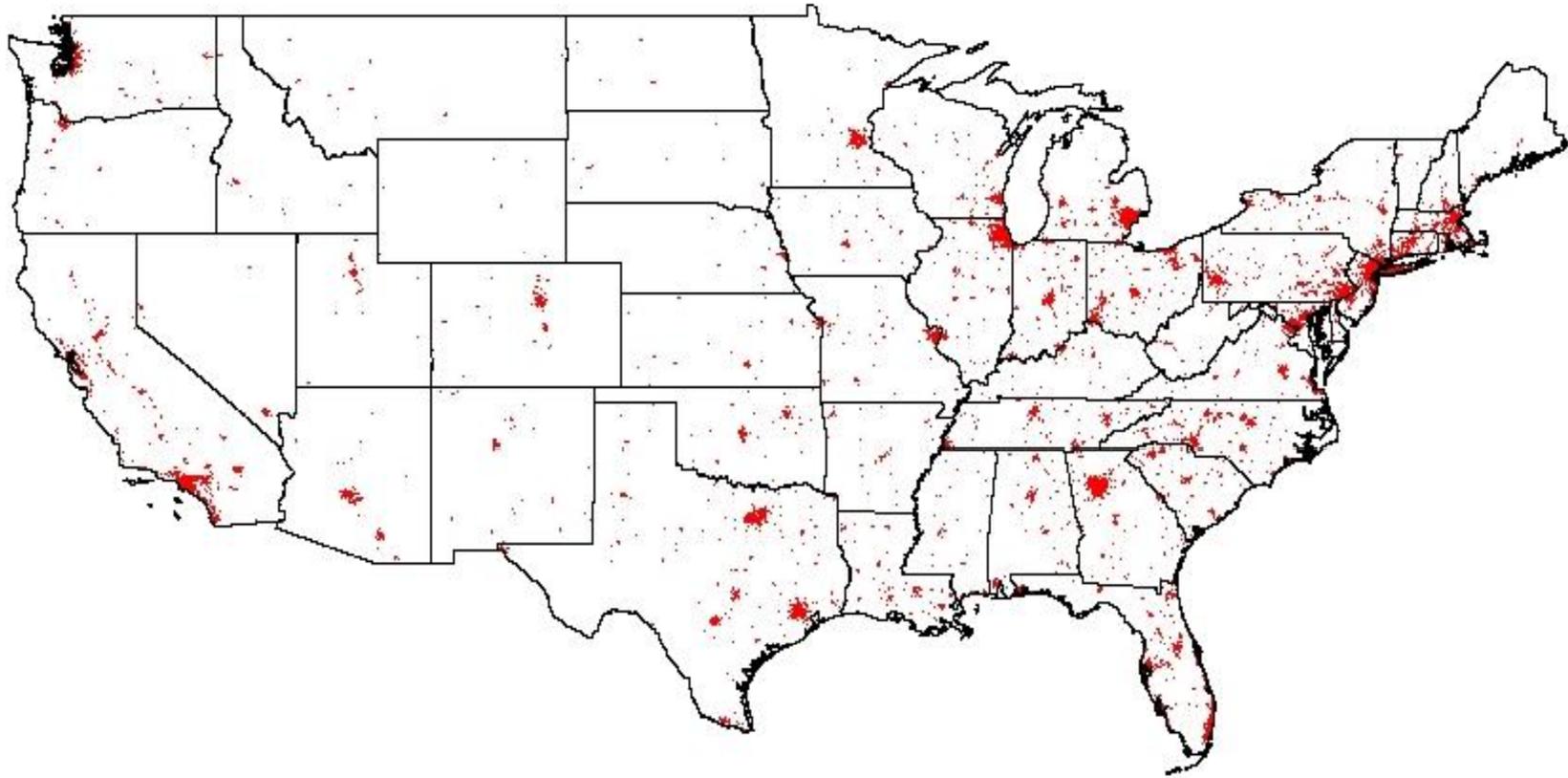
Percentage of Fatalities in Rural Areas



Percentage of Fatalities in Rural Areas Variation across States



Urbanized Area Boundaries in the US



Urban Areas in Red, any area outside classified as Rural



Research Question

Vast stretches of rural areas and roadways

Spatial extent of rural fatalities

Fatalities in rural areas near urban areas

- **Commuting ties**
- **Urban sprawl**



Why Do This?

Isolate problem areas within vast rural expanse

Better focus rural enforcement



Urban Roadways



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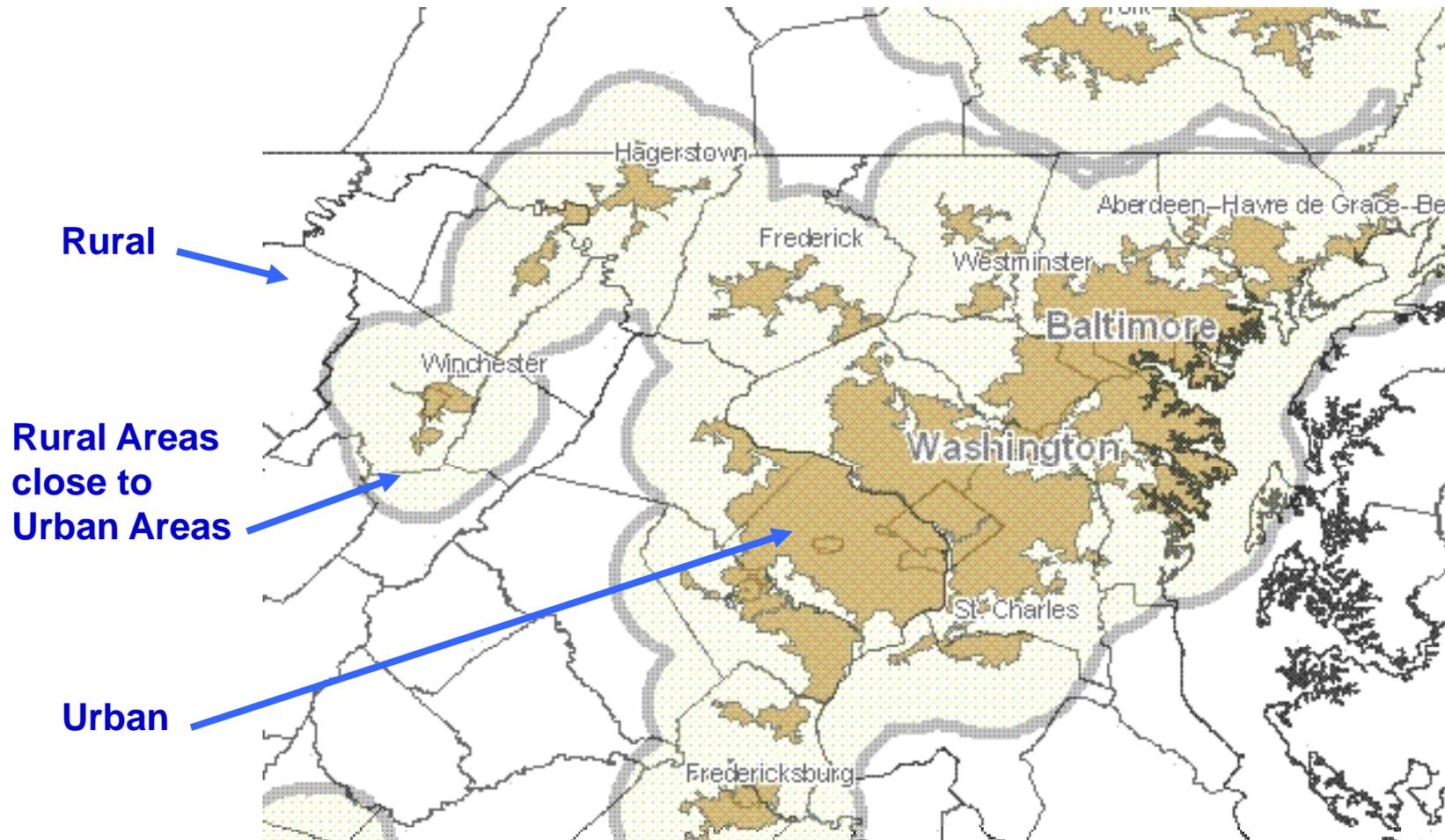
'Sub-Urban' Roadways



Rural Roadways



Rural Areas close to Urban Areas



Analytical Interest

How many rural fatalities occur in close proximity to Urban Areas

Compute percent of overall fatalities within 2.5, 5, 7.5 and 10 mile buffers around urban areas

**Compute percentages for each state
Examine variation**

**Guidance to Highway Safety Planners /
Enforcement involved in Rural Highway Safety**



Data and Methodology Used

FARS only codes Binary Indicator of Land Use (Rural versus Urban)

No way to capture fatalities close to urban areas with FARS variable

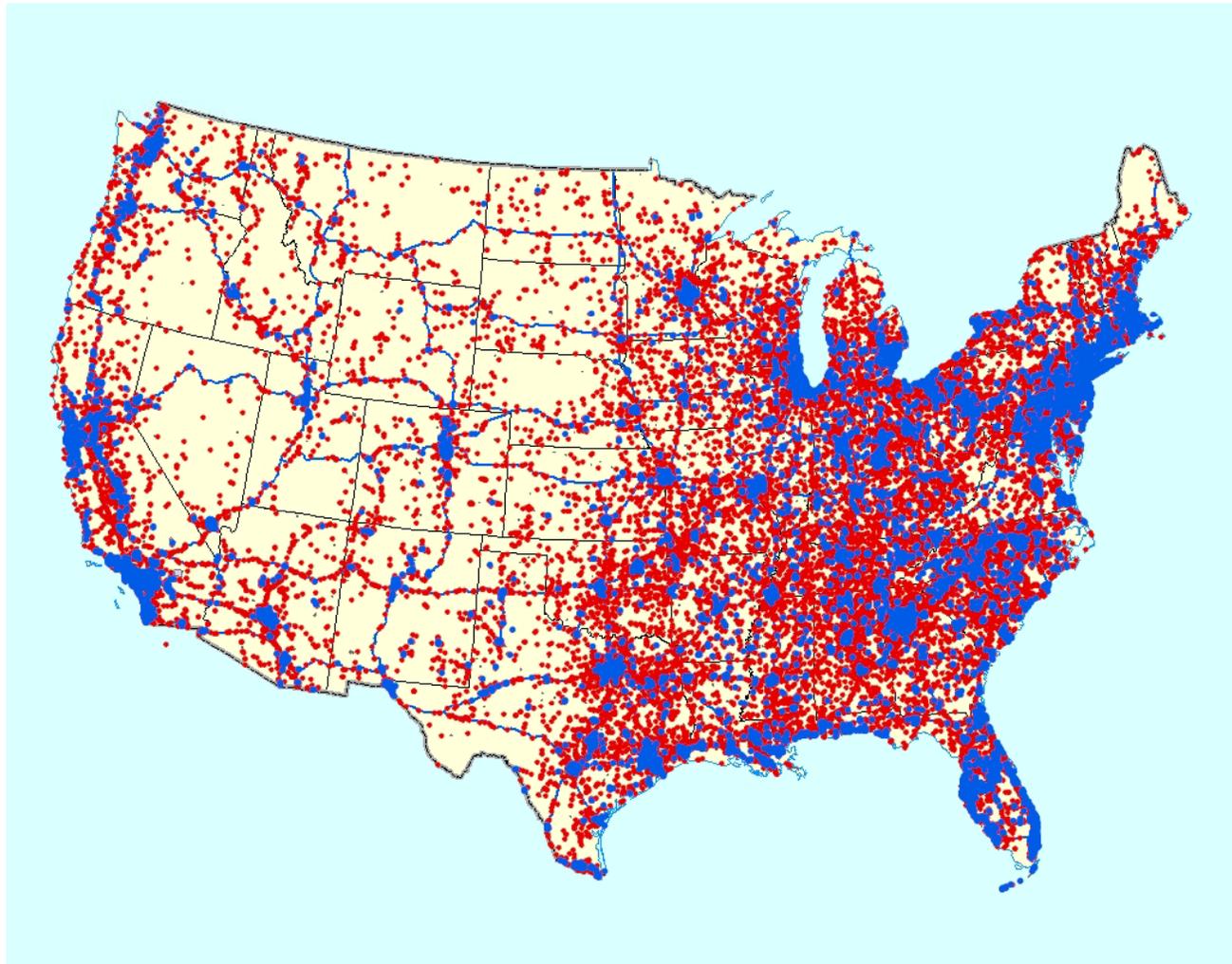
FARS has latitude/longitudes

Use GIS software to determine spatial extent of rural fatalities

- **Especially proximity to Urbanized Areas**



Rural versus Urban Fatalities



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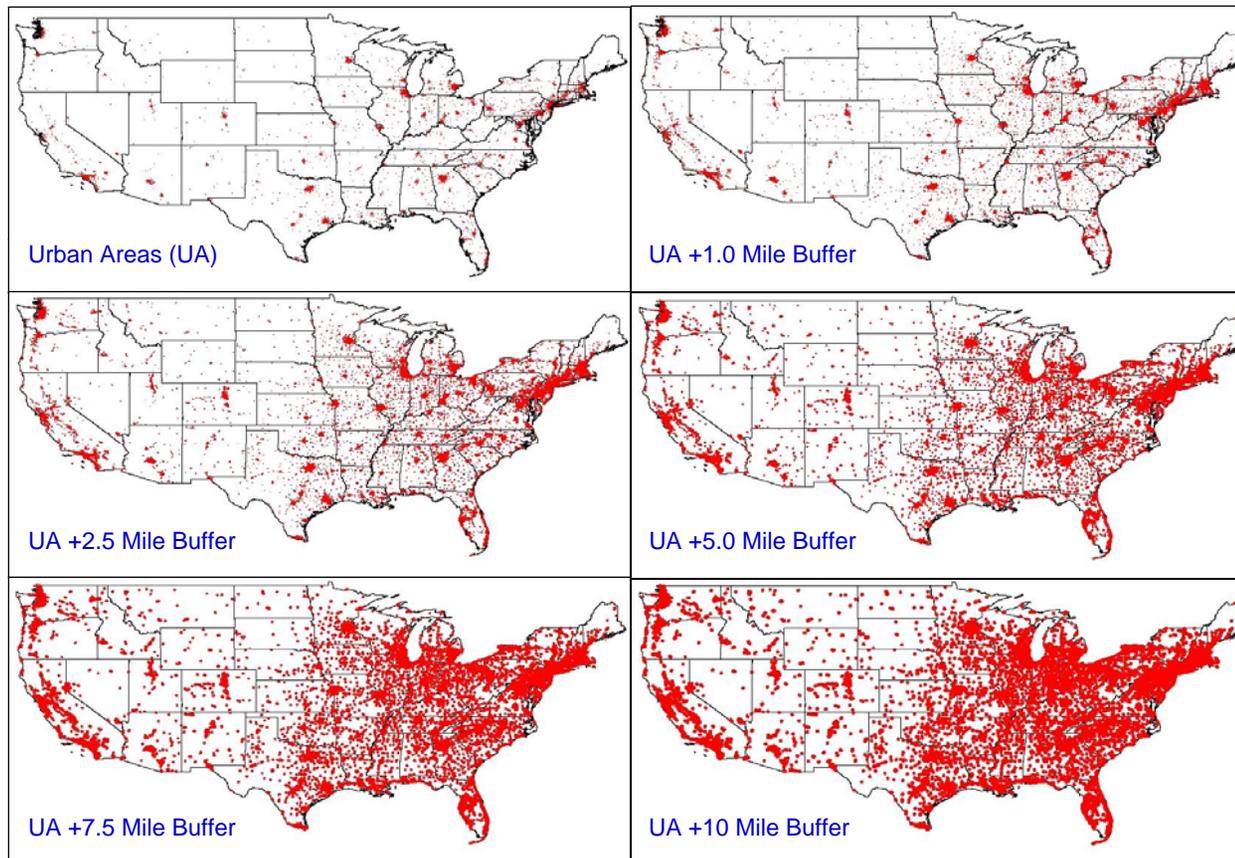
Fatalities in Urban Areas by various sub-categories

Percent of Fatalities by Buffers Around Urban Areas, by Category of Fatalities, U.S.					
Category	Urban	Urban+2.5 mi.	Urban+5.0 mi.	Urban+7.5 mi.	Urban+10 mi.
Total	44%	?	?	?	?
Speeding-Related	43%	?	?	?	?
Motorcyclist	53%	?	?	?	?
Pedestrian	74%	?	?	?	?
Involving Large Trucks	35%	?	?	?	?
Alcohol-Impaired Driving Fatalities	44%	?	?	?	?
Unbelted Passenger Vehicle Occupants	37%	?	?	?	?
Fatalities during the Weekend	45%	?	?	?	?
Nighttime Fatalities	49%	?	?	?	?

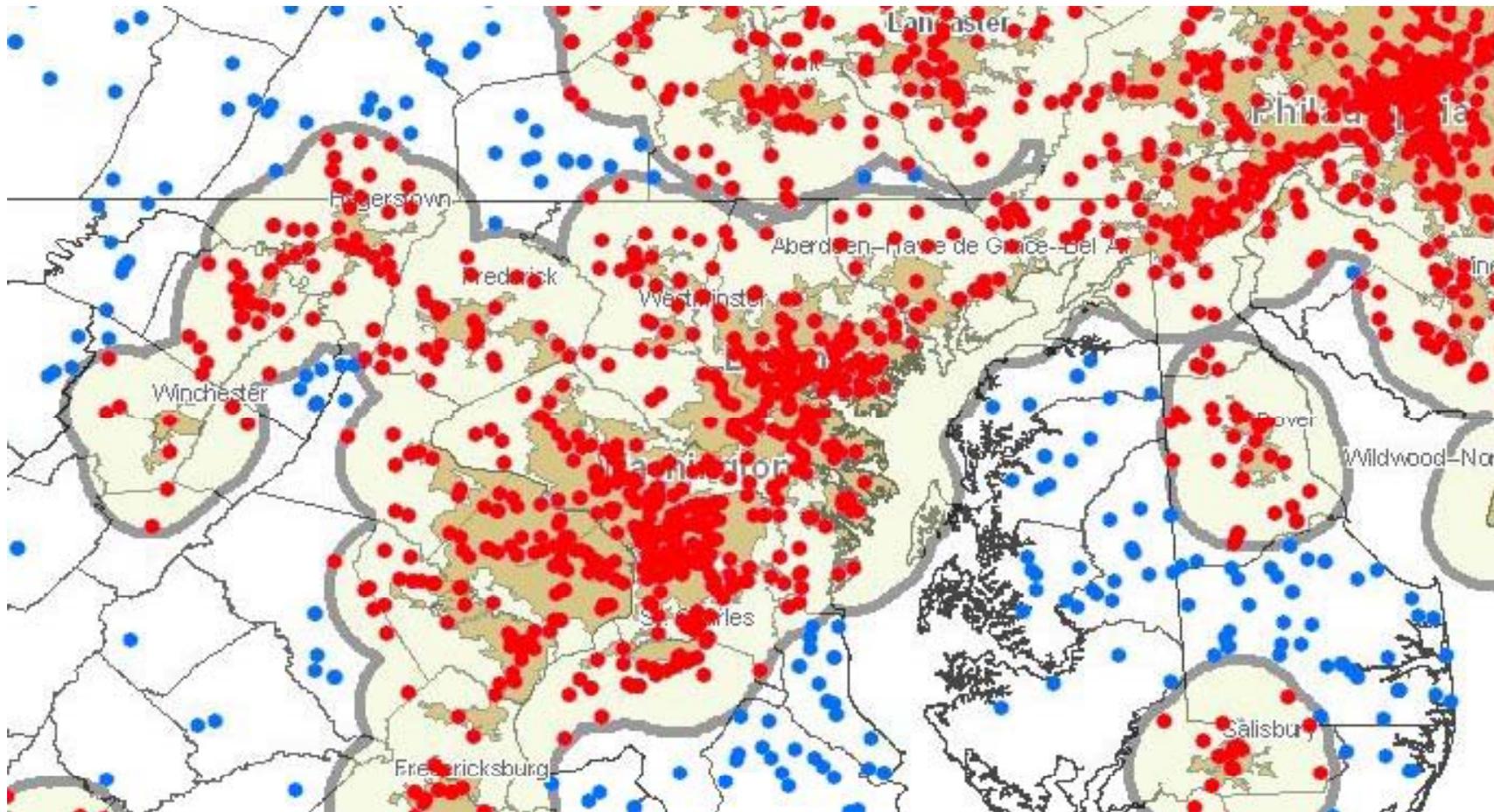


Buffers around Urbanized Areas

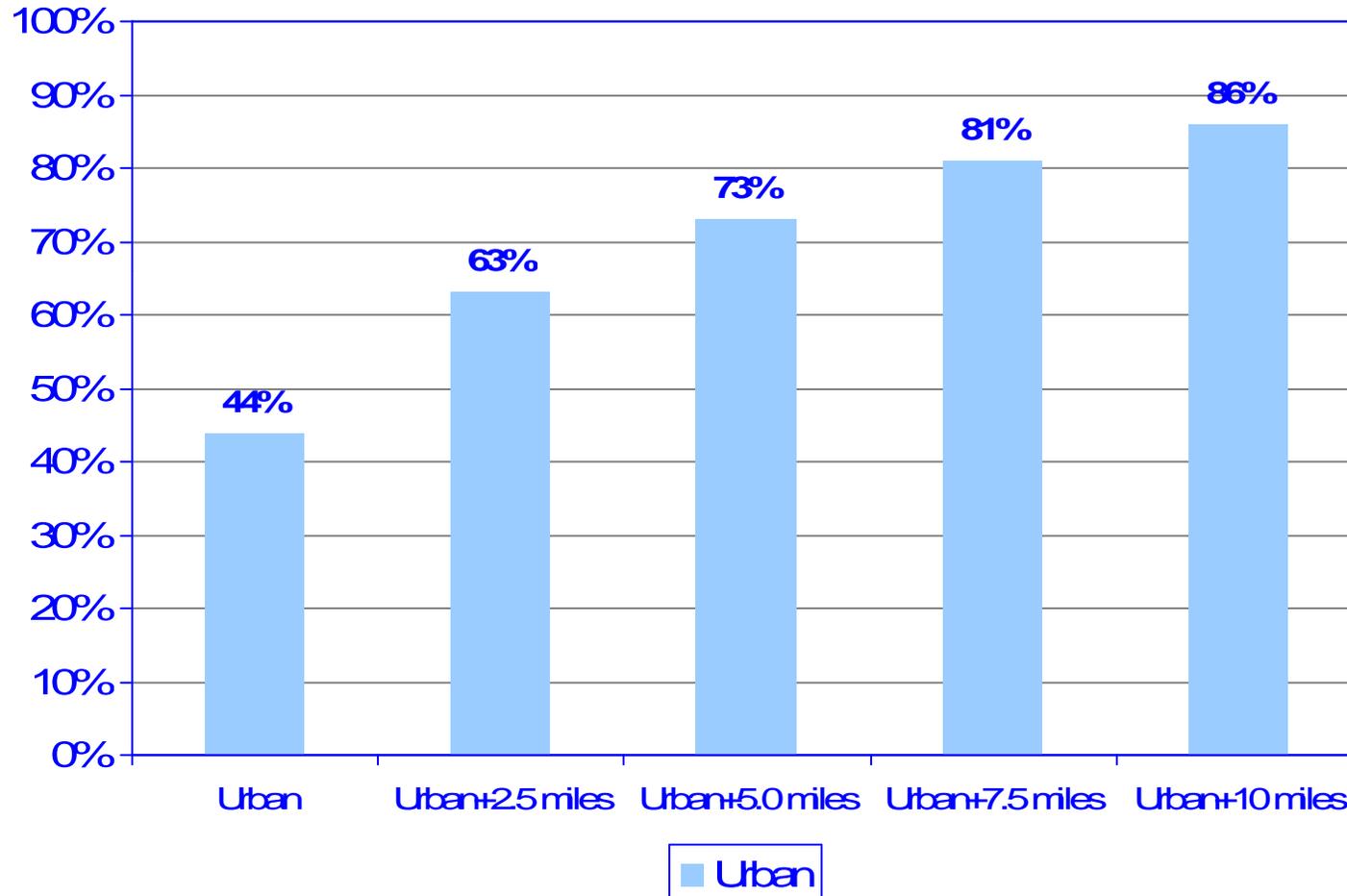
Created Using Buffering Tool in GIS Software (ESRI)



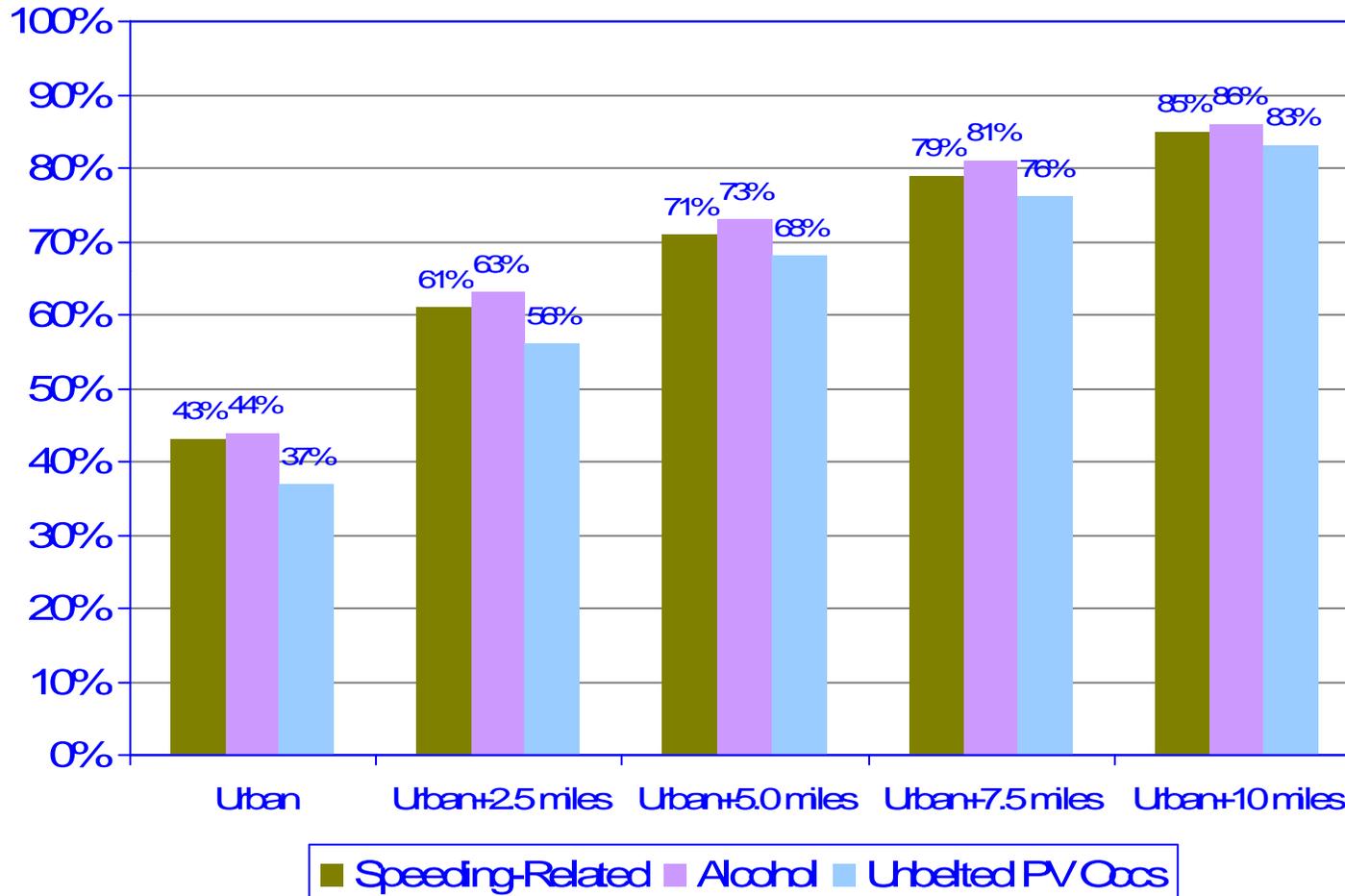
Fatalities within Urban Areas and Surrounding Buffers



% of Total Fatalities in Urbanized Areas and Various Buffers around the Urban Areas



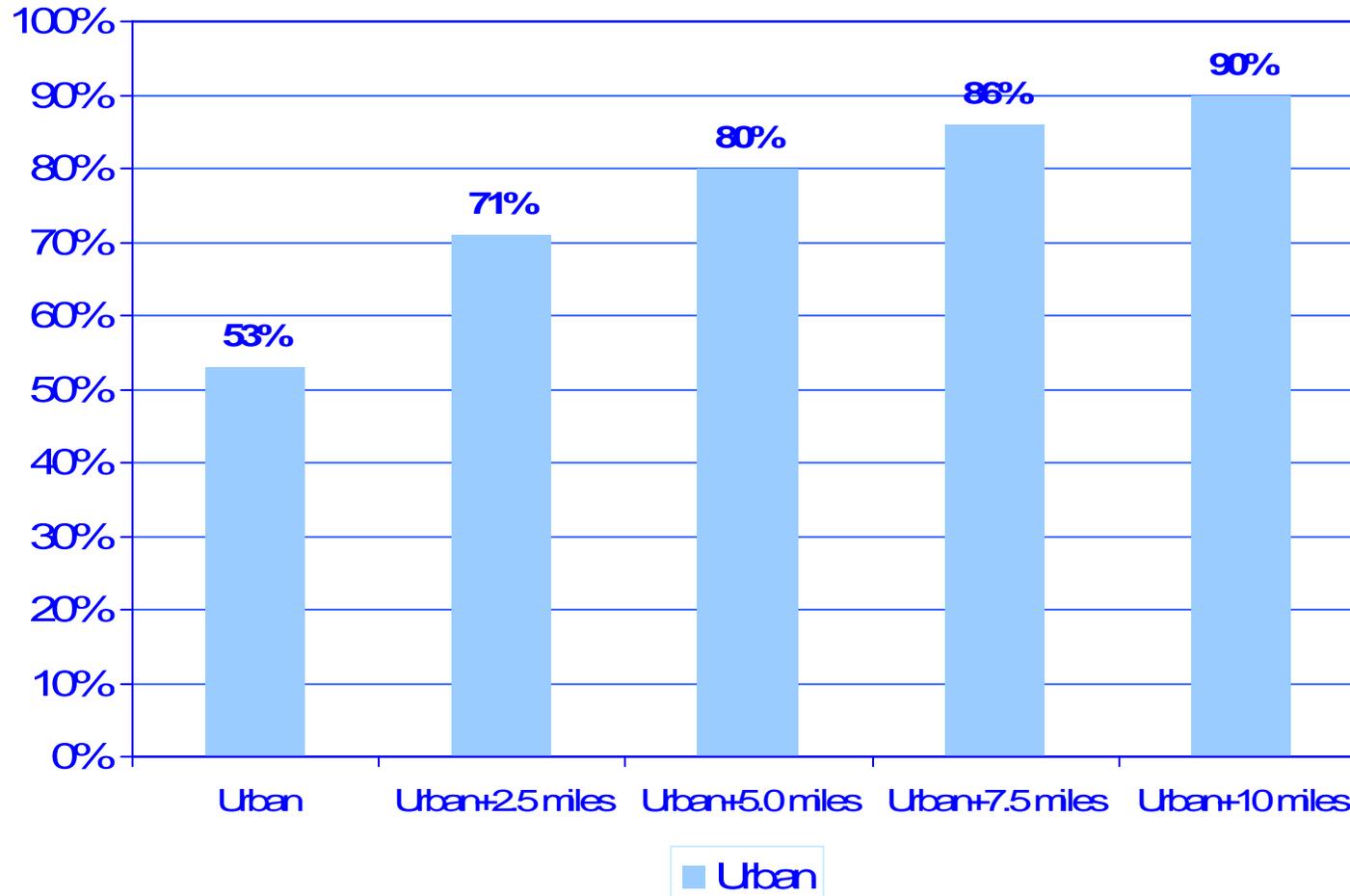
% of Speeding-Related, Alcohol-Impaired Driving and Unbelted PV Occupant Fatalities in Urbanized Areas and Buffers around the Urban Areas



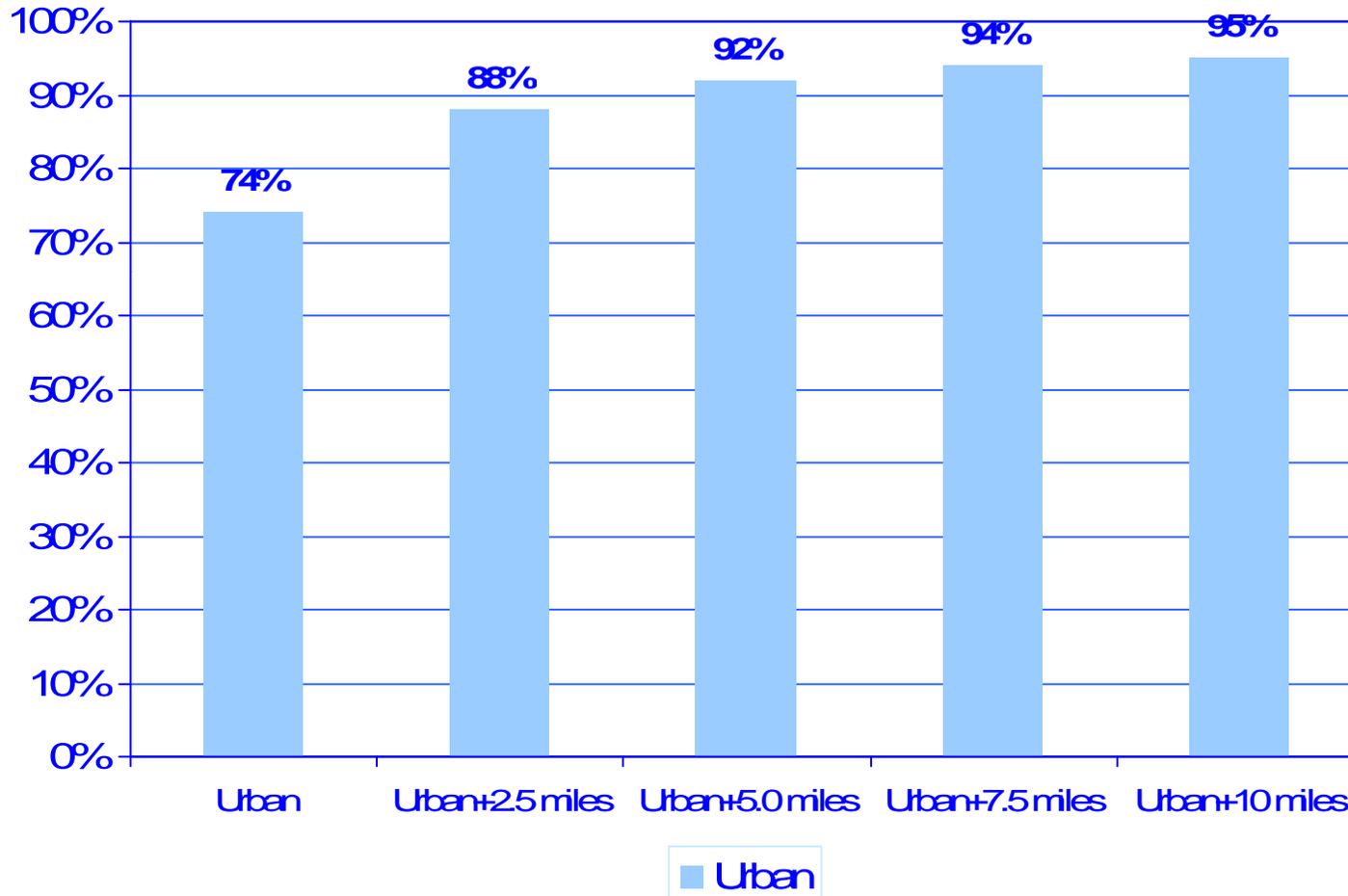
2006 Final FARS File



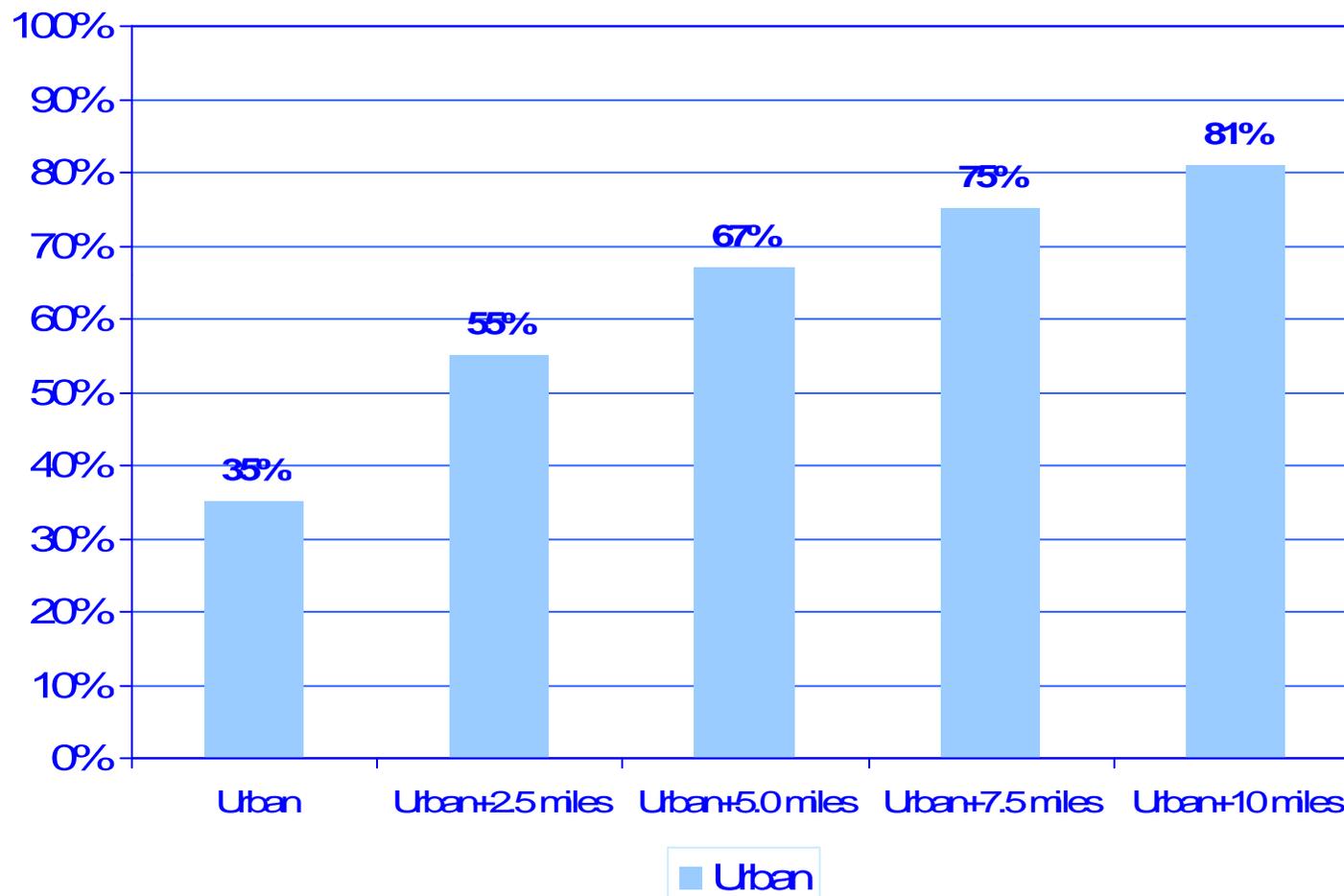
% of Motorcyclist Fatalities in Urbanized Areas and Buffers around the Urban Areas



% of Pedestrian Fatalities in Urbanized Areas and Buffers around the Urban Areas



% of Fatalities in Large Truck Crashes in Urbanized Areas and Buffers around the Urban Areas



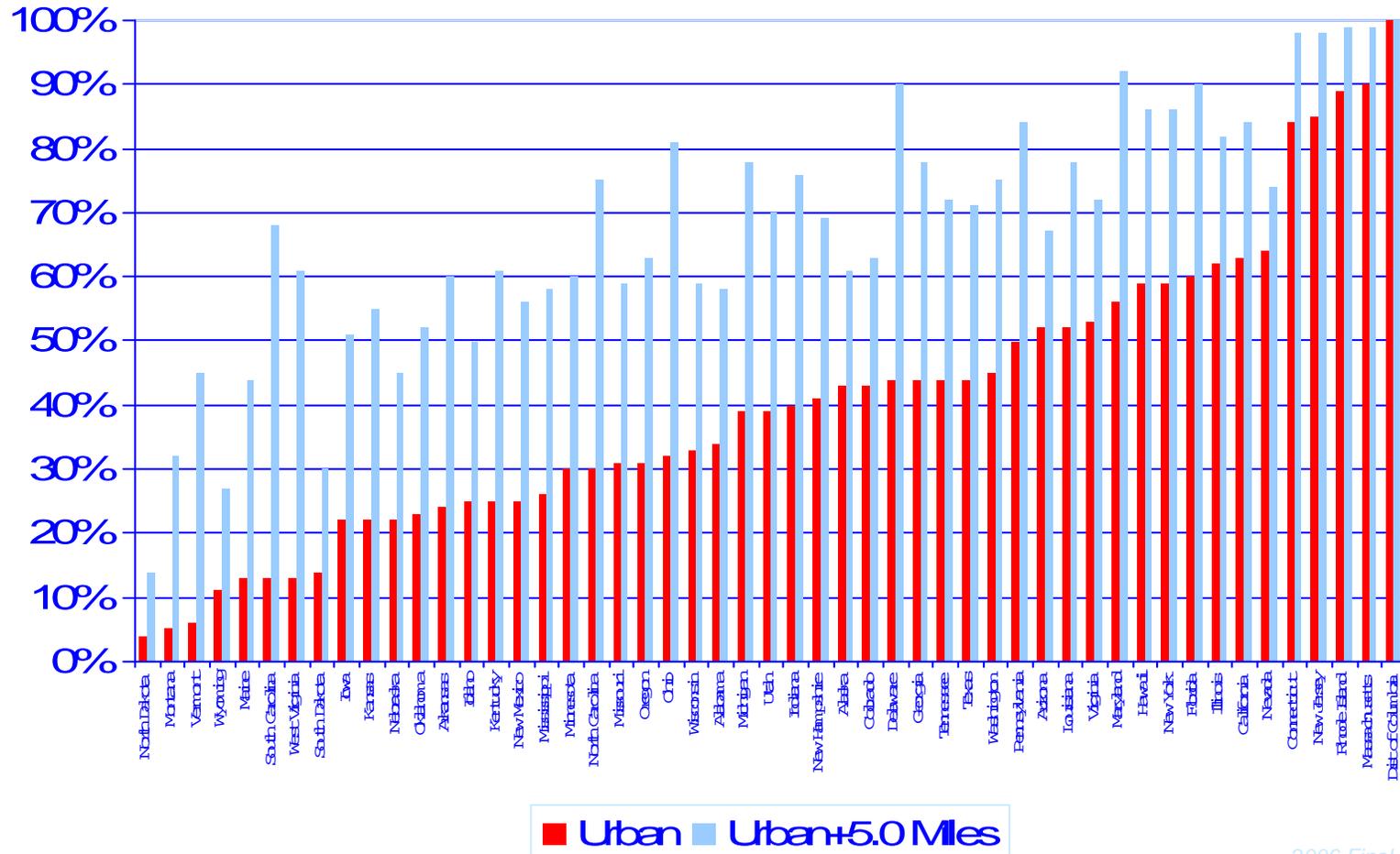
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Category	Urban	Urban+2.5 mi.	Urban+5.0 mi.	Urban+7.5 mi.	Urban+10 mi.
Total	44%	63%	73%	81%	86%
Speeding-Related	43%	61%	71%	79%	85%
Motorcyclist	53%	71%	80%	86%	90%
Pedestrian	74%	88%	92%	94%	95%
Involving Large Trucks	35%	55%	67%	75%	81%
Alcohol-Impaired Driving Fatalities	44%	63%	73%	81%	86%
Unbelted Passenger Vehicle Occupants	37%	56%	68%	76%	83%
Fatalities during the Weekend	45%	64%	73%	81%	86%
Nighttime Fatalities	49%	67%	77%	84%	88%

2006 Final FARS File



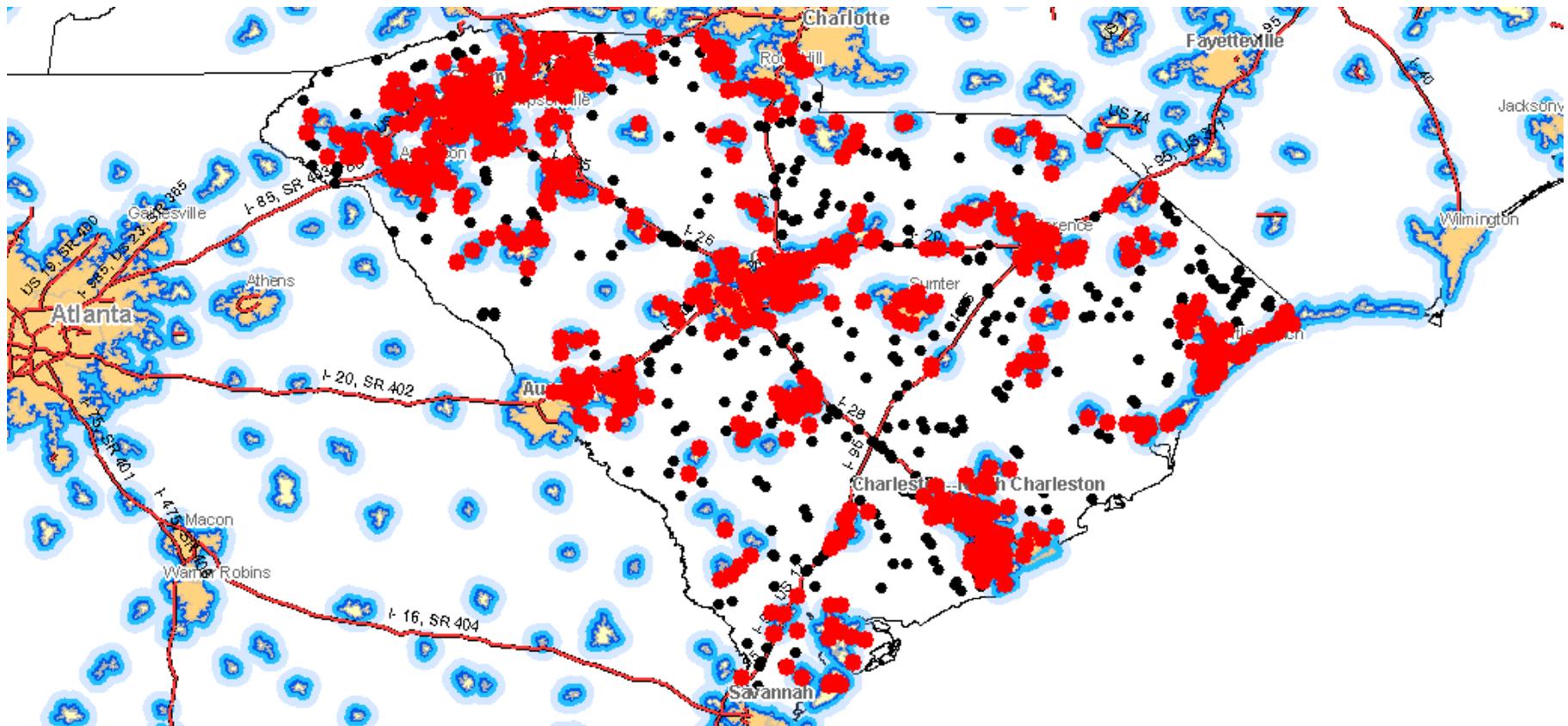
% of Fatalities in Urbanized Areas and 5.0 Mile Buffer



2006 Final FARS File



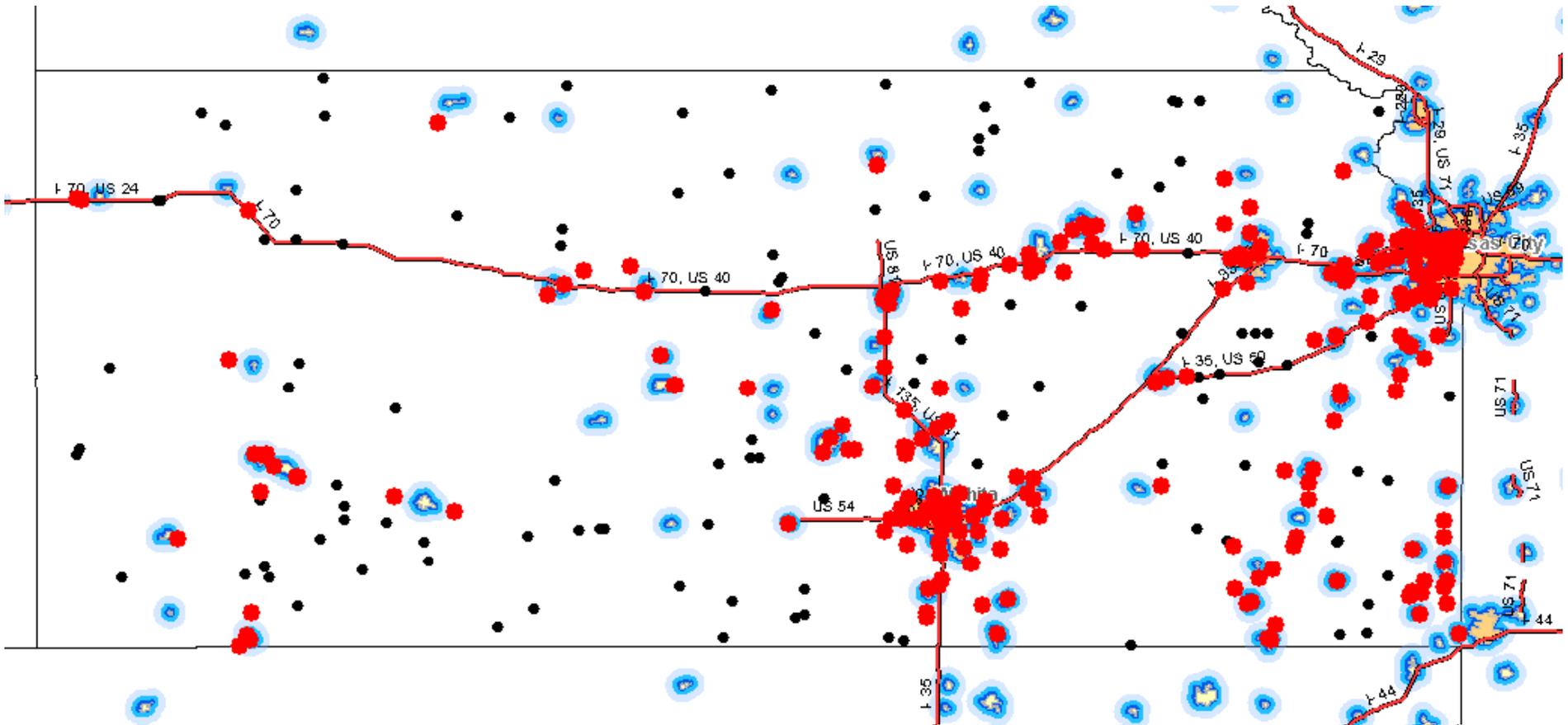
South Carolina – Fatalities in Urban Areas



2006 Final FARS File



Kansas – Fatalities in Urban Areas



2006 Final FARS File



Technical Report

DOT HS 811 196

State by State breakdowns

Methodology

Identifies states with largest changes between
Urban and Urban+Buffer



U.S. Department
Of Transportation



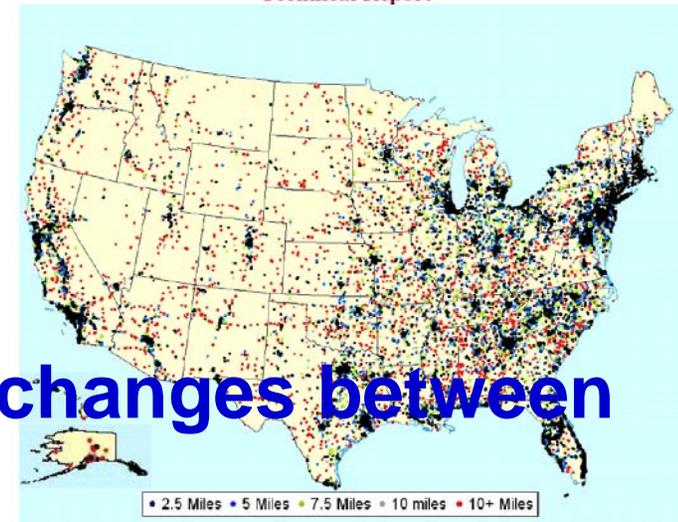
National Highway Traffic Safety Administration

DOT HS 810 ***

June 2009

Geo-spatial Analysis of Rural Motor Vehicle Traffic Fatalities

Technical Report



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This document is available to the public from the National Technical Information Service, Springfield, VA 22161



Useful NHTSA Resources

STSI: State Traffic Safety Information

- <http://www-nrd.nhtsa.dot.gov/departments/nrd-30/ncsa/STSI/USA%20WEB%20REPORT.HTM>

CATS: Customer Automated Tracking System

- <http://www-nrd.nhtsa.dot.gov/cats/index.aspx>

STSI Google-Earth Maps (e.g., Arizona)

- http://www-nrd.nhtsa.dot.gov/departments/nrd-30/ncsa/STSI/4_AZ/2008/Arizona_Map_1_GIS_DATA_2008.HTM

GIS Resources

- www.gis.com

