

# Crash and Health Outcome Data Linkage: Project Updates

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THE UNIVERSITY  
*of* NORTH CAROLINA  
*at* CHAPEL HILL

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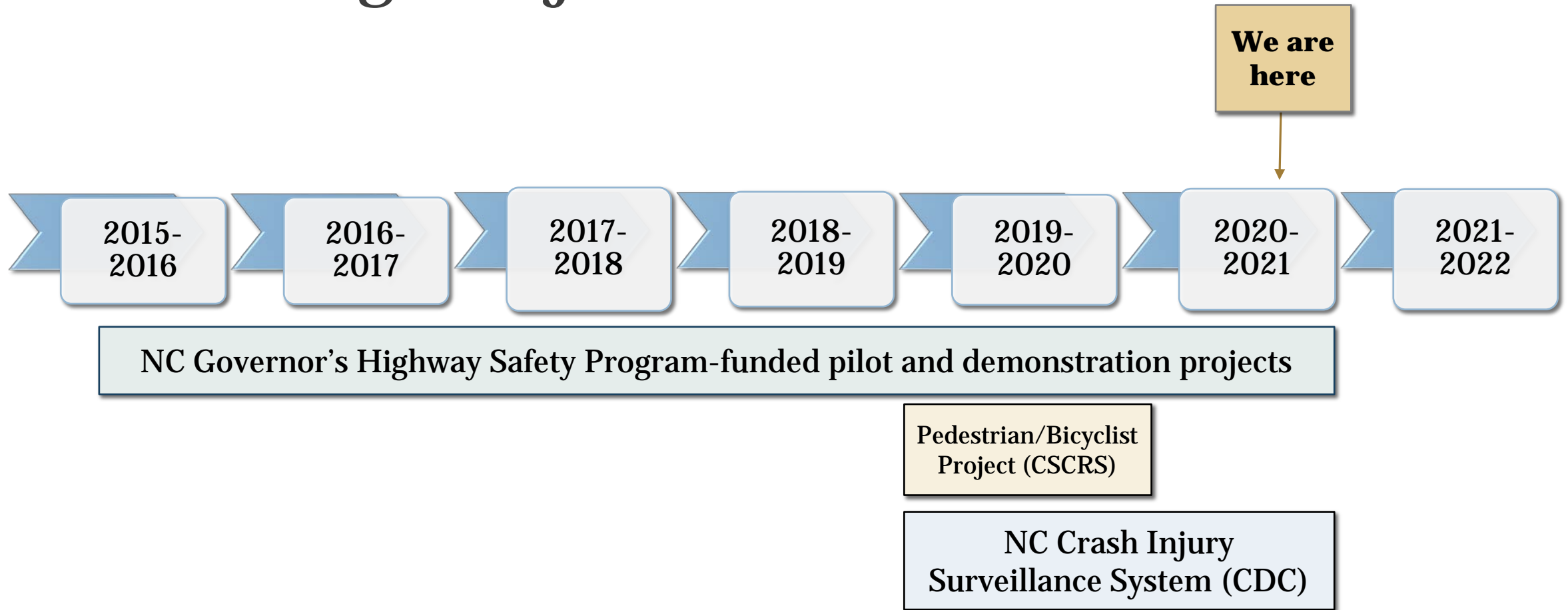
# Agenda

- Current projects
- A selection of our latest results
- What's next

# Project history

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# Data Linkage Project Timeline



# Data linkage methodology was designed to be ongoing.

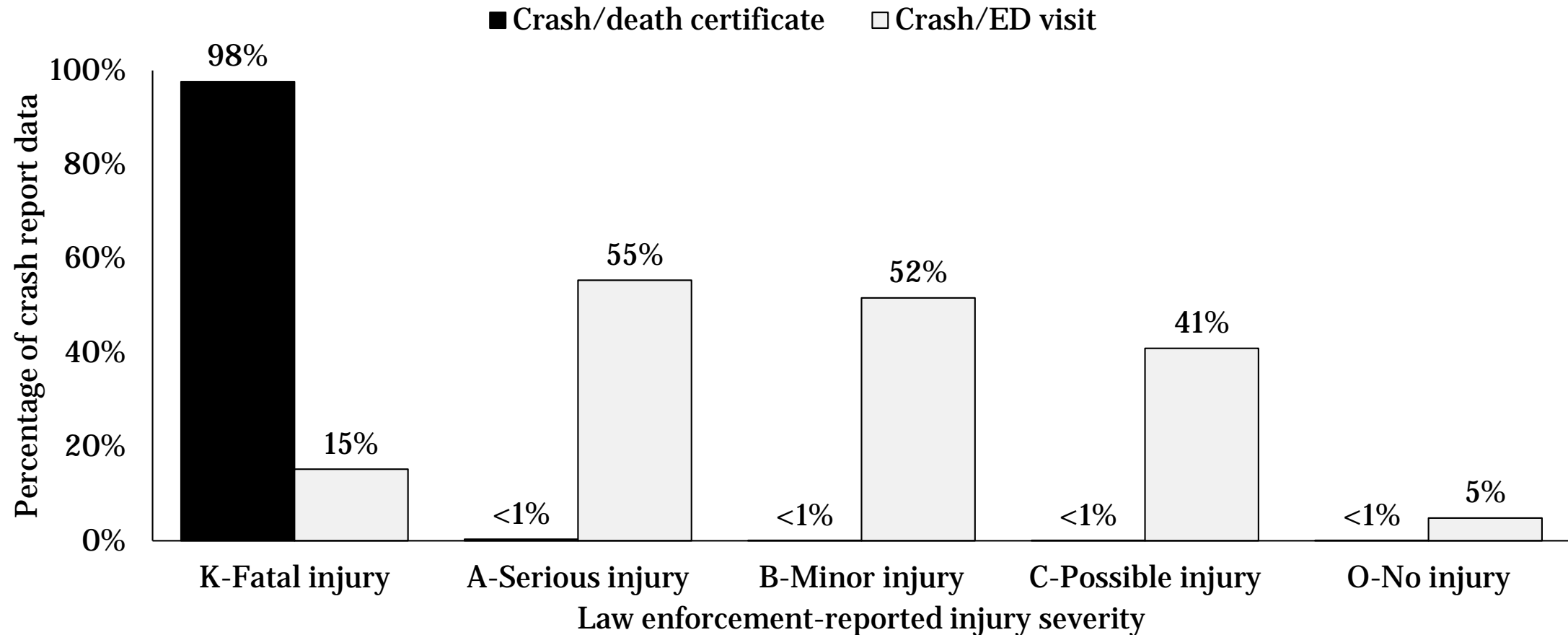
- Deterministic linkage methodology
- Linkages to ED visit data and death certificates coded by team member Mike Fliss.
- Linkage to the North Carolina Trauma Registry (NCTR) done by Sharon Schiro in consultation with Mike Fliss
- Linkage code available to link additional years of data



[www.pedbikeimages.org](http://www.pedbikeimages.org) / Laura Sandt

# The linked datasets span the range of injury severity levels in the 2018 crash report data.

(N=1,479 crash/death; N=90,497 crash/ED visit data)\*



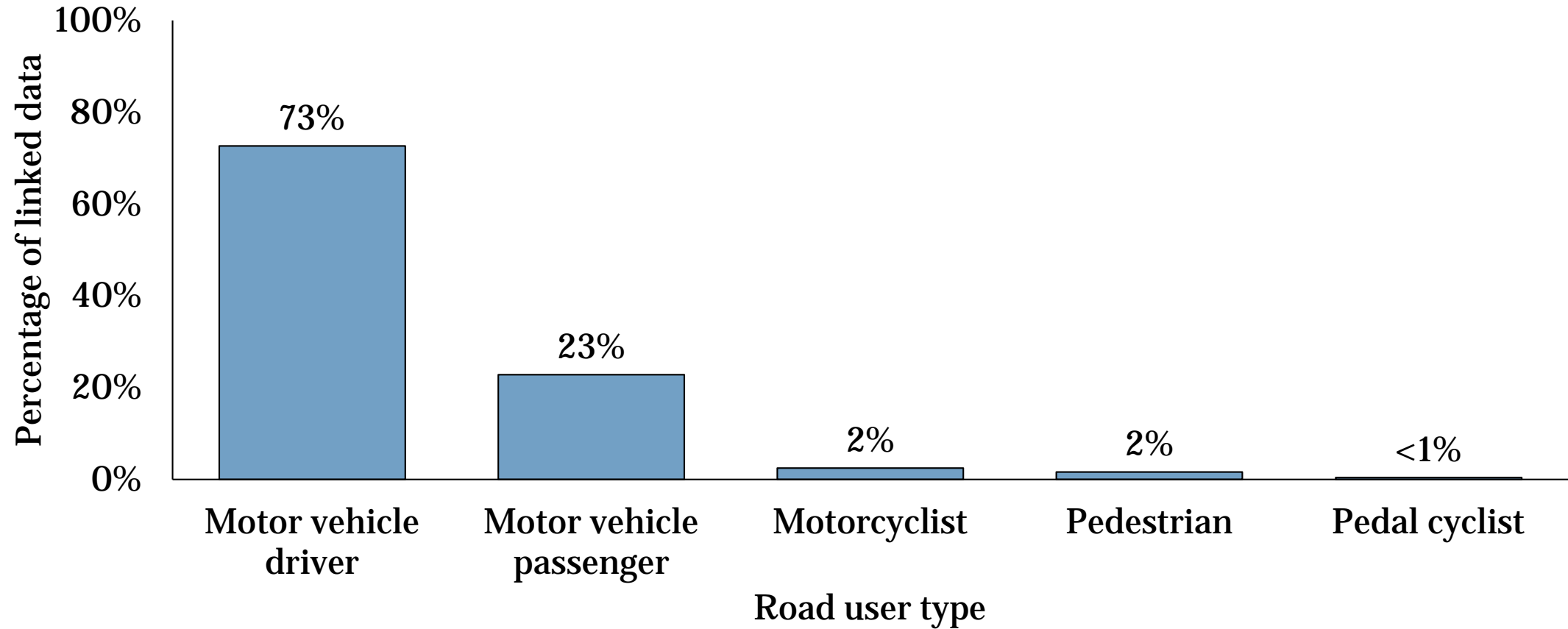
\*Excludes linked records missing law enforcement-reported injury severity

# Data Linkage Analysis: 2018 Crash/ED Visit Data

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N=91,766

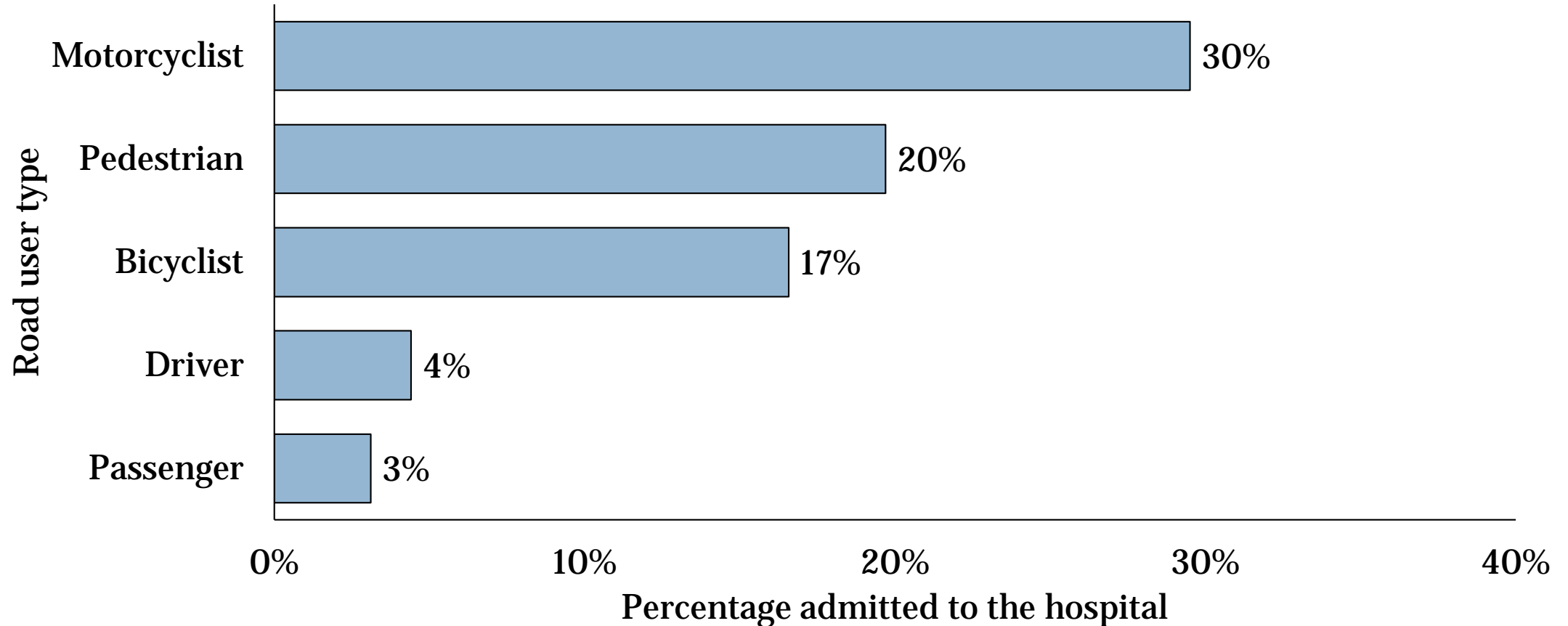
# 95% of linked crash/ED visit records were for motor vehicle occupants. (N=91,699\*)



\*67 records with 'other' or 'unknown' as the road user type were excluded



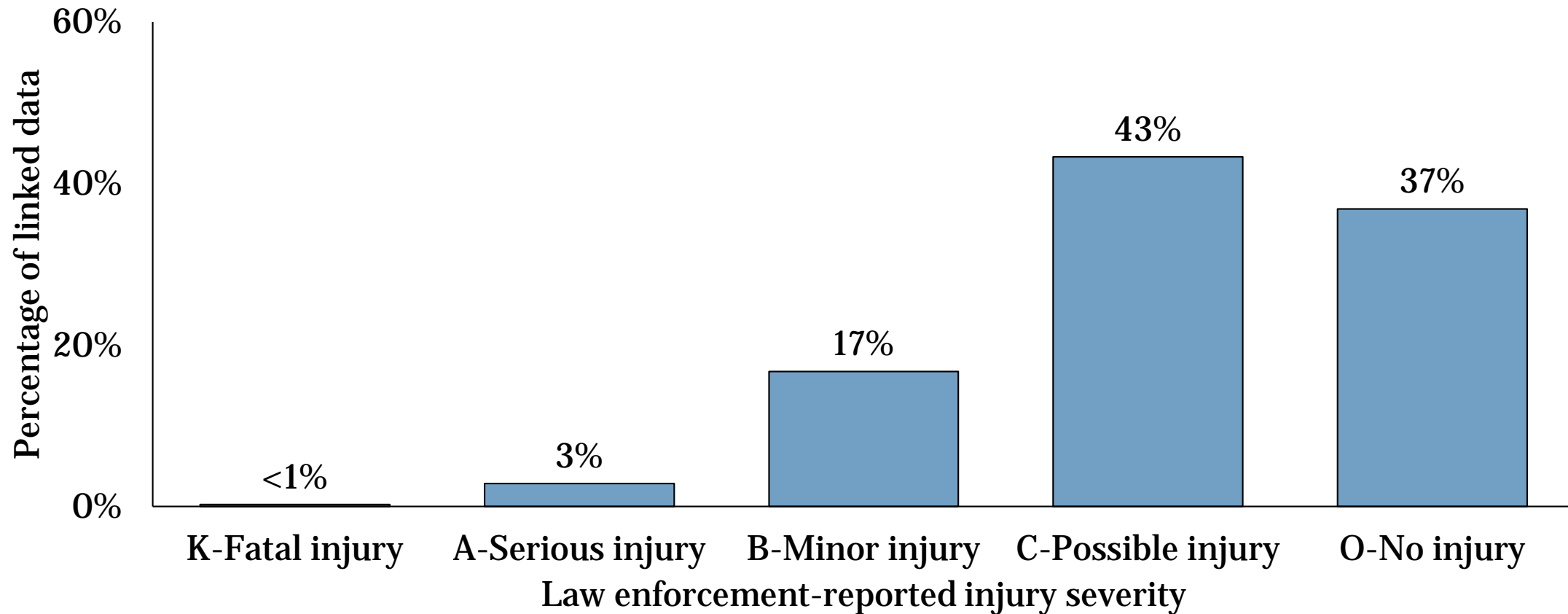
# Motorcyclists were the most likely road user type to be admitted to the hospital. (N=91,699\*)



\*67 records with 'other' or 'unknown' as the road user type were excluded

# 37% of the linked crash-ED visits were for persons who appeared uninjured at the crash scene.

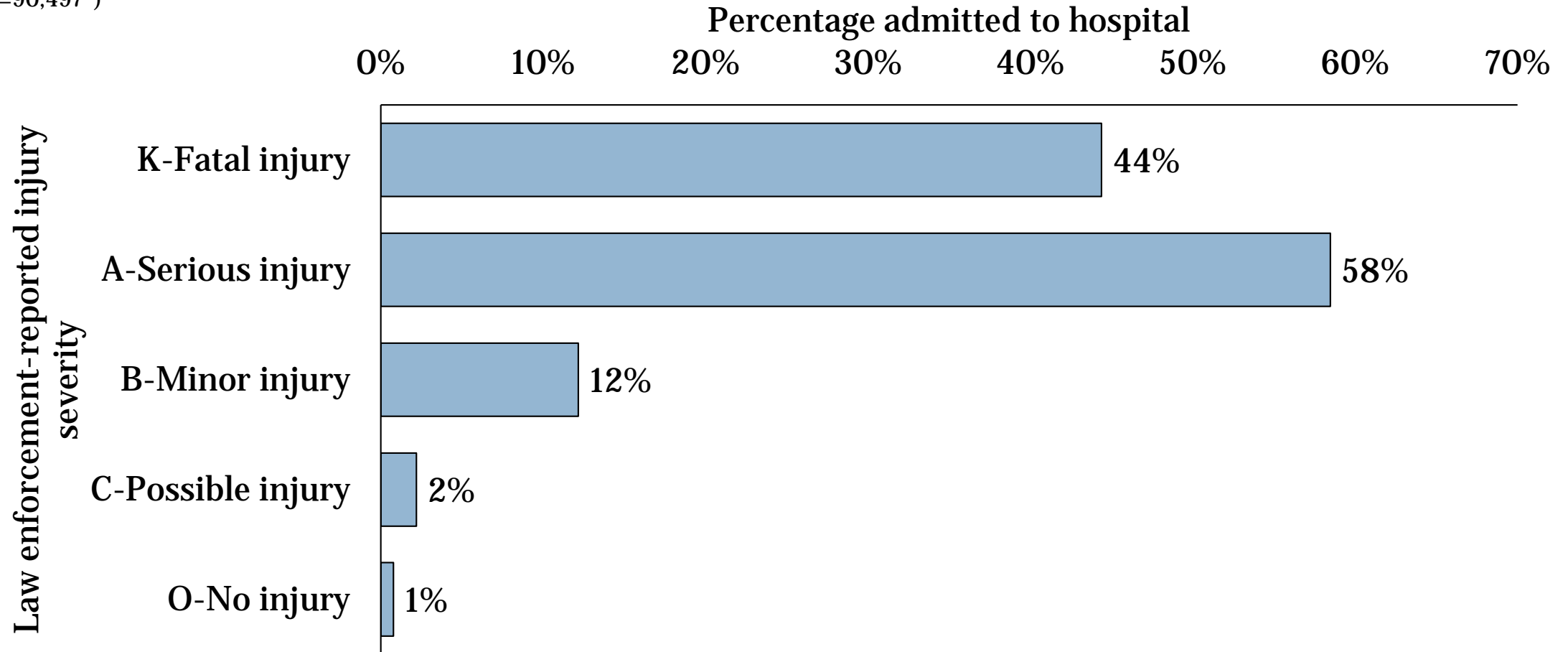
(N=90,497\*)



\*Excludes 1,269 records with no law enforcement-reported injury severity

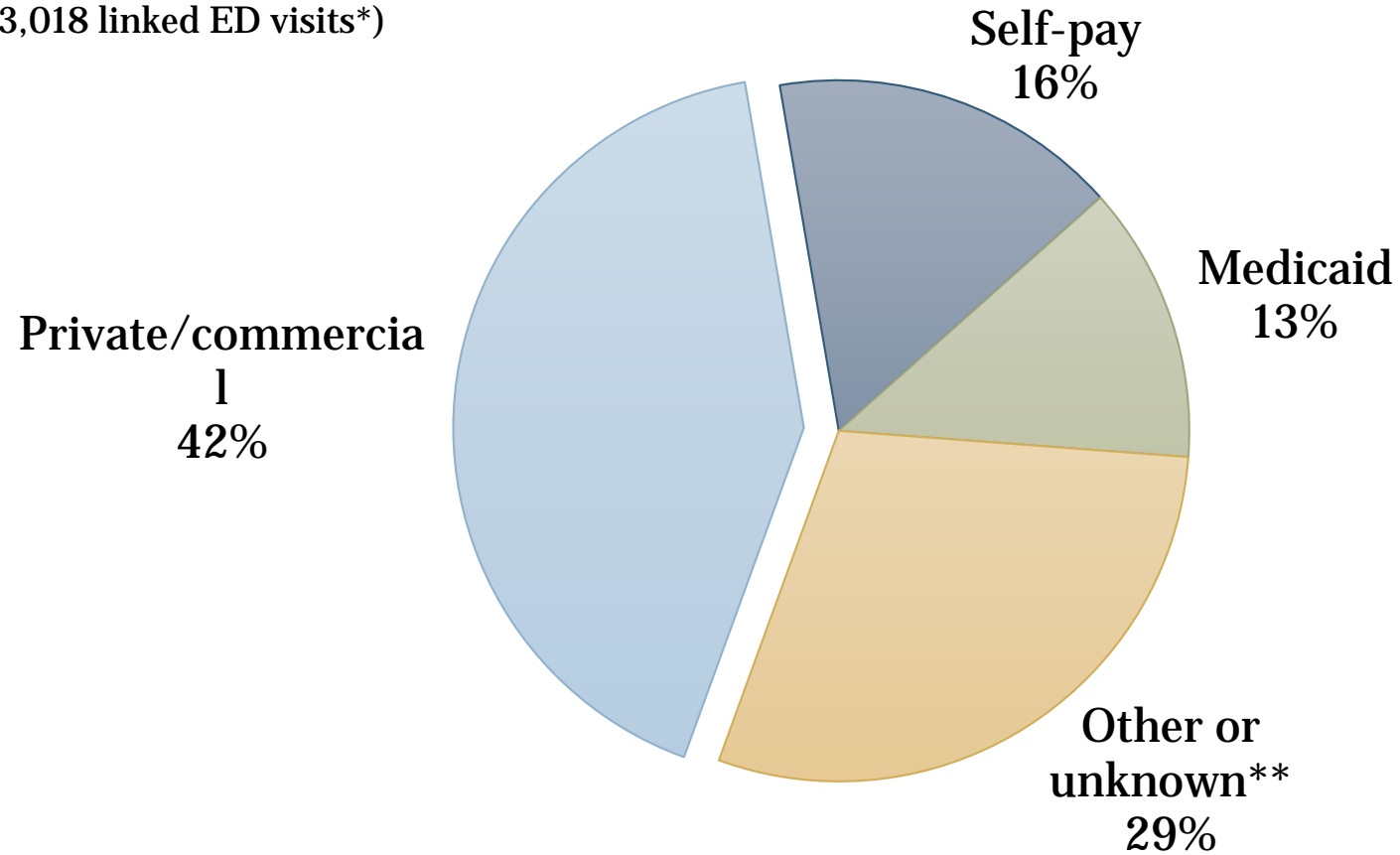
# Admittance to hospital broadly reflects law enforcement-reported injury severity, but misses some serious injuries.

(N=90,497\*)



\*Excludes 1,269 records with no law enforcement-reported injury severity

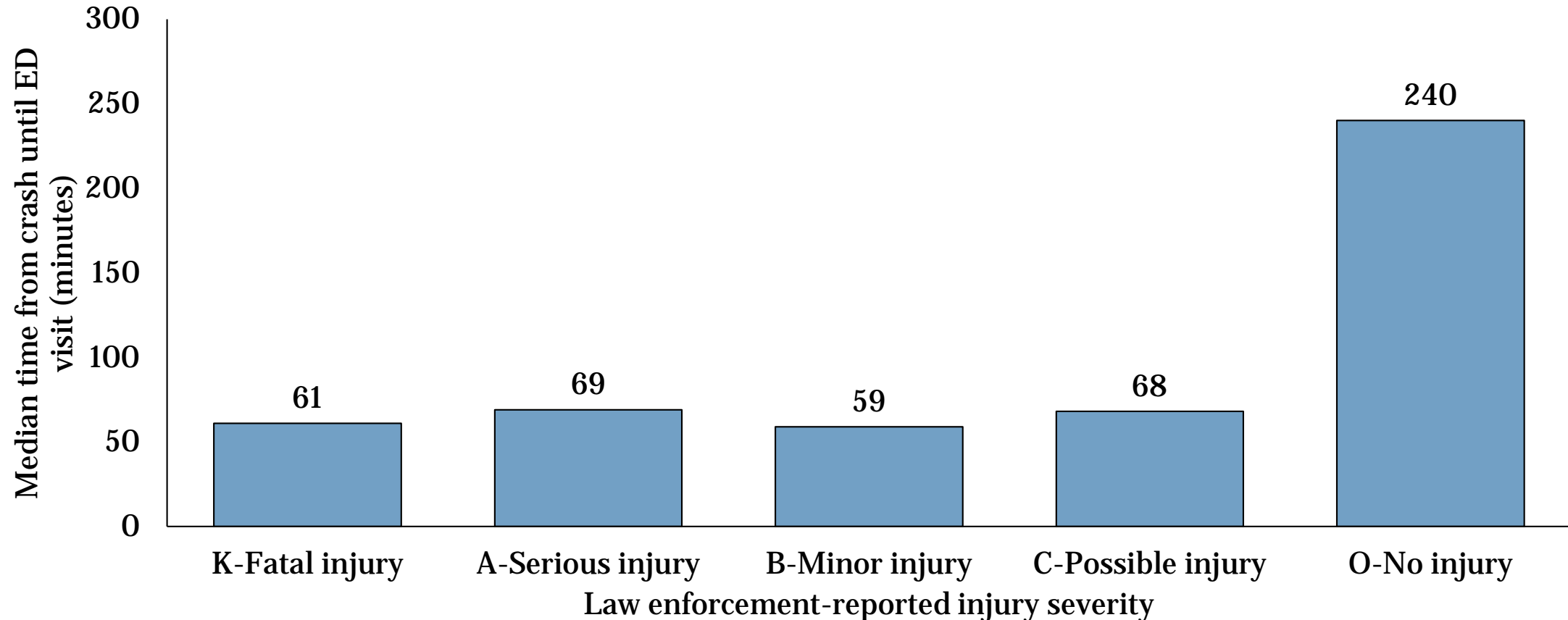
# Only 42% of linked crash-ED visits for patients younger than 65 had private insurance as the primary payor. (N=83,018 linked ED visits\*)



\*Excludes 443 linked records with no entry for the primary payor

\*\*Includes 371 'no charge' ED visits

# Crash victims with no reported injury took longer to visit the ED\* . (N=89,386 linked ED visits\*)



\*\*Excludes 1,234 records with an unreported injury severity rating

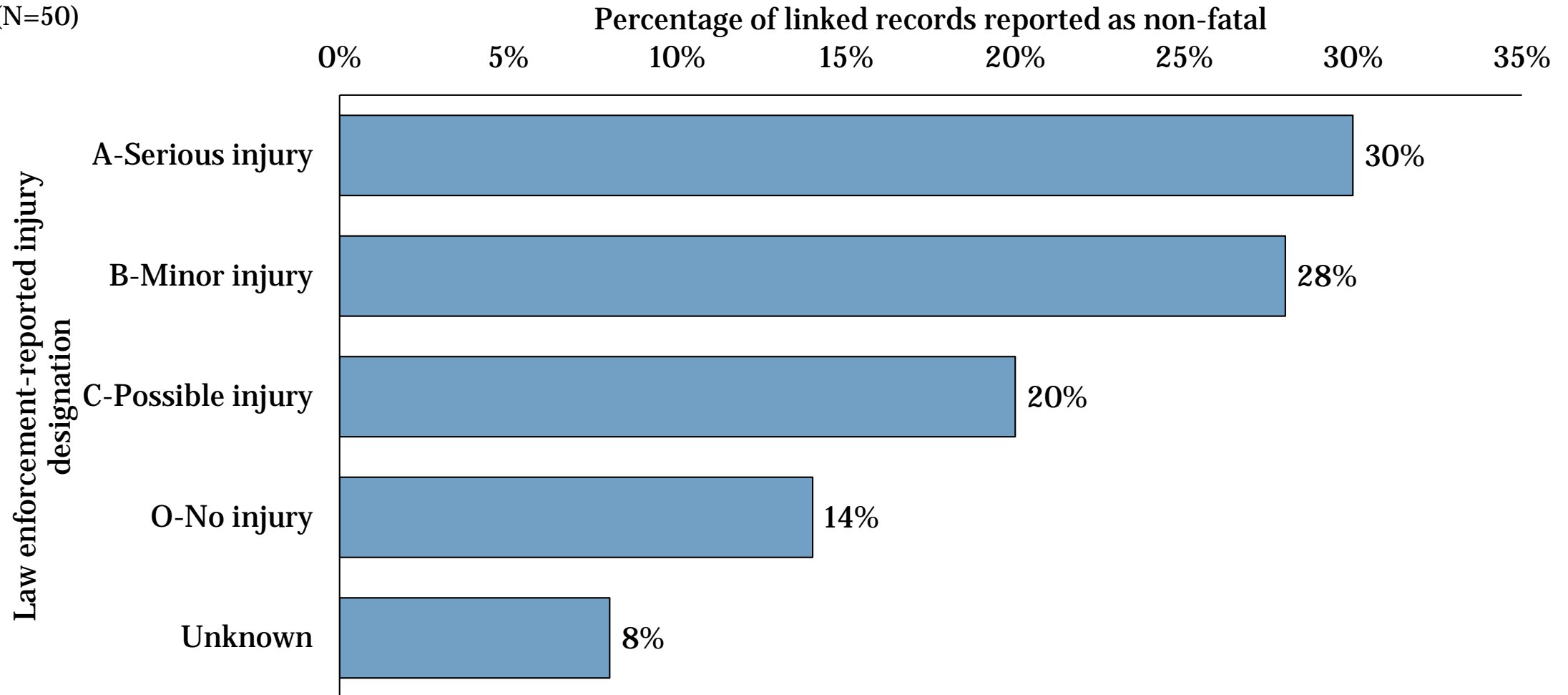
# Data Linkage Analysis: 2018 Crash/Death Certificate data

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N=1,483

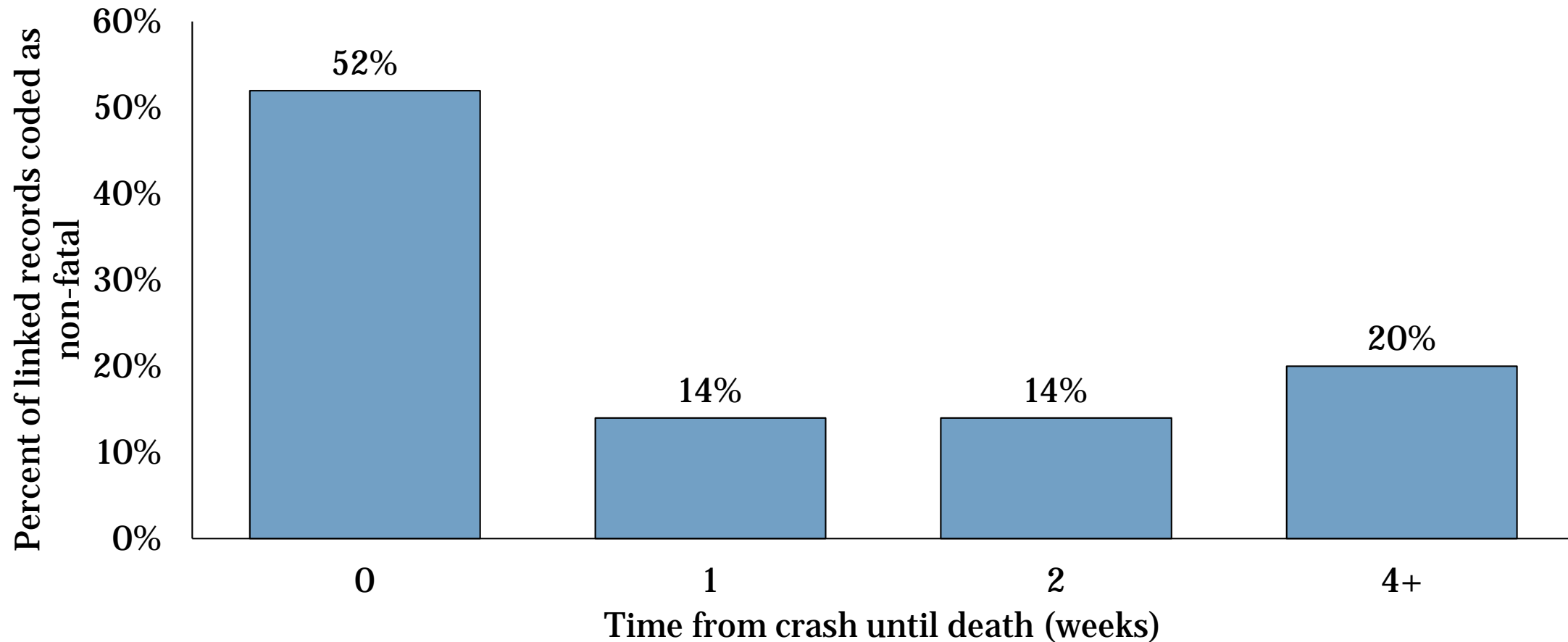
# 50 fatalities were reported as non-fatal in the crash reports.

(N=50)



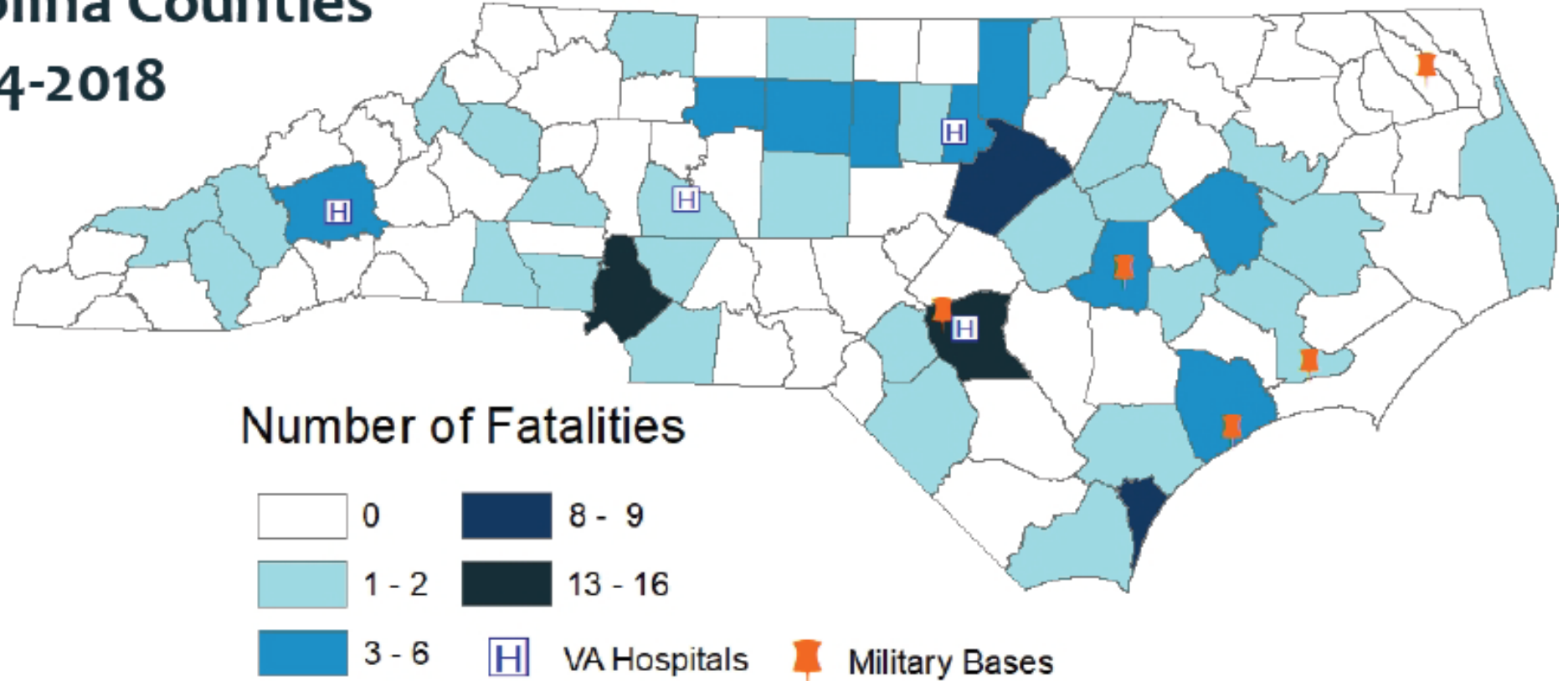
# Almost half of 50 missed fatalities had dates of death a week or more after the crash.

(N=50)





# Veteran Pedestrian Fatalities North Carolina Counties 2014-2018



# We are posting our results online!

14 Reports

7 Factsheets

7 Presentations/  
Posters

Data Document  
Linking Crashes  
in North Carolina

Katherine Peticola

Carolina Center for Health Informatics October 2019

## EMS Response to Motor Vehicle Crashes in North Carolina

Based on 2018 North Carolina NEMSIS version 3.3.4 data from ESO Solutions for 911-call initiated EMS responses with a mechanism of injury between V00.0 to V79.9, n=41,827  
All percentages have been rounded to the nearest integer value, so percentage totals may not sum to 100%


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Emergency Medical Services (EMS) are often the first line of care for those

### North Carolina Data Integration for Motor Vehicle Crash Injury Research: The Long Road Ahead

**Katherine J. Harmon, PhD**  
UNC Highway Safety Research Center

**Katherine Peticolas, PMP, MPS**  
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UNC Carolina Center for Health Informatics



**Background**

Motor vehicle crashes (MVCs) are one of the leading causes of fatal and nonfatal injuries. 1,450\* people were killed and 130,137\*\* people were non-fatally injured in North Carolina MVCs in 2016.

The NC Traffic Records Coordinating Committee (TRCC) has an interest in a statewide MVC injury surveillance system. The ability to integrate safety information from a variety of sources has the potential to improve safety outcome analysis and inform policy and safety programs.

\* 2016 NHTSA FARS data \*\* 2016 NC DMV data

	DMV crash data	EMS data from EMSPIC	ED data in NC DETECT	Trauma Registry data
KABCO	✓			

Project / Description	Data Sources			Linkage Fields Used			Results of Linkage (% Matched)
	Crash	Pre-Hospital	Hospital	Unique ID	Patient Data	Timing	
<b>Pilot Project</b> <small>Describe and integrate three data sources: crash report, EMS and ED for Wake County, NC</small>	NC DMV crash data	EMS data from Wake EMS	ED visit data in NC DETECT		Date of birth (DOB) (same) + sex (same)	Crash date/time +/- 30 min. (EMS), Crash date/time +2 hrs (ED)	1: Crash to EMS data (55%) 2: Linked Crash-EMS to ED visit data (8%)
<b>Demonstration Project I</b> <small>Describe &amp; integrate pedestrian &amp; bicycle involved MVCs using two sources: EMS and crash report data</small>	NC DMV crash report data	EMS data from EMSPIC			DOB: 2 of 3 date elements: day, month, or year + sex (same)	Crash date/time +/- 3 hours	3: Crash to EMS data (14%)
<b>Quality Improvement Project I</b> <small>Evaluation of pedestrian/bicycle crash custom event reports available in NC DETECT</small>			ED visit data in NC DETECT + data from a level 1 trauma center	Medical record # (same)		ED arrival date/time (+/- 1 hour)	4: Trauma to ED visit data (1%)

**Methods**

First, we performed a pilot project linking all NC Division of Motor Vehicles (NC DMV) crash report data with Emergency Medical Services (EMS) and NC DETECT emergency department (ED) visit data in Wake County, NC.

Next, we identified and interviewed NC MVC

**Recommendations**

**Pilot Project**

1. Add a yes/no variable to DMV crash reports to indicate if EMS responded to the scene.
2. Include a unique personal identifier on all MVC injury data sources.
3. Improve capture of transport mode in ED visit data.

**Conclusion**

NC contains many health outcome data sources that are suitable for integration with NC DMV crash data. These health outcome data sources provide a more detailed characterization of MVC injuries as compared to the crash report data.

Finding appropriate fields for linkage (and

<http://cchi.web.unc.edu/transportation-health-data/>

# Next steps

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# FY 2020-2021

- **GHSP-funded work:**
  - Establish a **Motor Vehicle Crash and Health Data Advisory Group**
  - Develop a public facing, interactive **Web-based dashboard**
  - Analyze crash/North Carolina Trauma Registry data and share results
  
- **CDC-funded work:**
  - **Analyze 2018 data**, linked in the 2019-2020 project year, to assess health outcomes, risk and protective factors, and/or evaluations of data linkage activities
  - **Disseminate findings** through reports and other products
  - Take steps to **add additional years of data**

# Funding Acknowledgment

- North Carolina Governor's Highway Safety Program, 2016-2021.
- Centers for Disease Control & Prevention, 2019-2021.
- Collaborative Sciences Center for Road Safety, 2019-2020.
- This project is also supported by the North Carolina Traffic Records Coordinating Committee.

## NC DPH Data Attribution & Disclaimer

NC DETECT is a statewide public health syndromic surveillance system, funded by the NC Division of Public Health (NC DPH) Federal Public Health Emergency Preparedness Grant and managed through collaboration between NC DPH and UNC-CH Department of Emergency Medicine's Carolina Center for Health Informatics. The NC DETECT Data Oversight Committee does not take responsibility for the scientific validity or accuracy of methodology, results, statistical analyses, or conclusions presented.

# Thank You!

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