Comparing alcohol involvement among injured pedalcycle and motorcycle riders across three national public-use datasets

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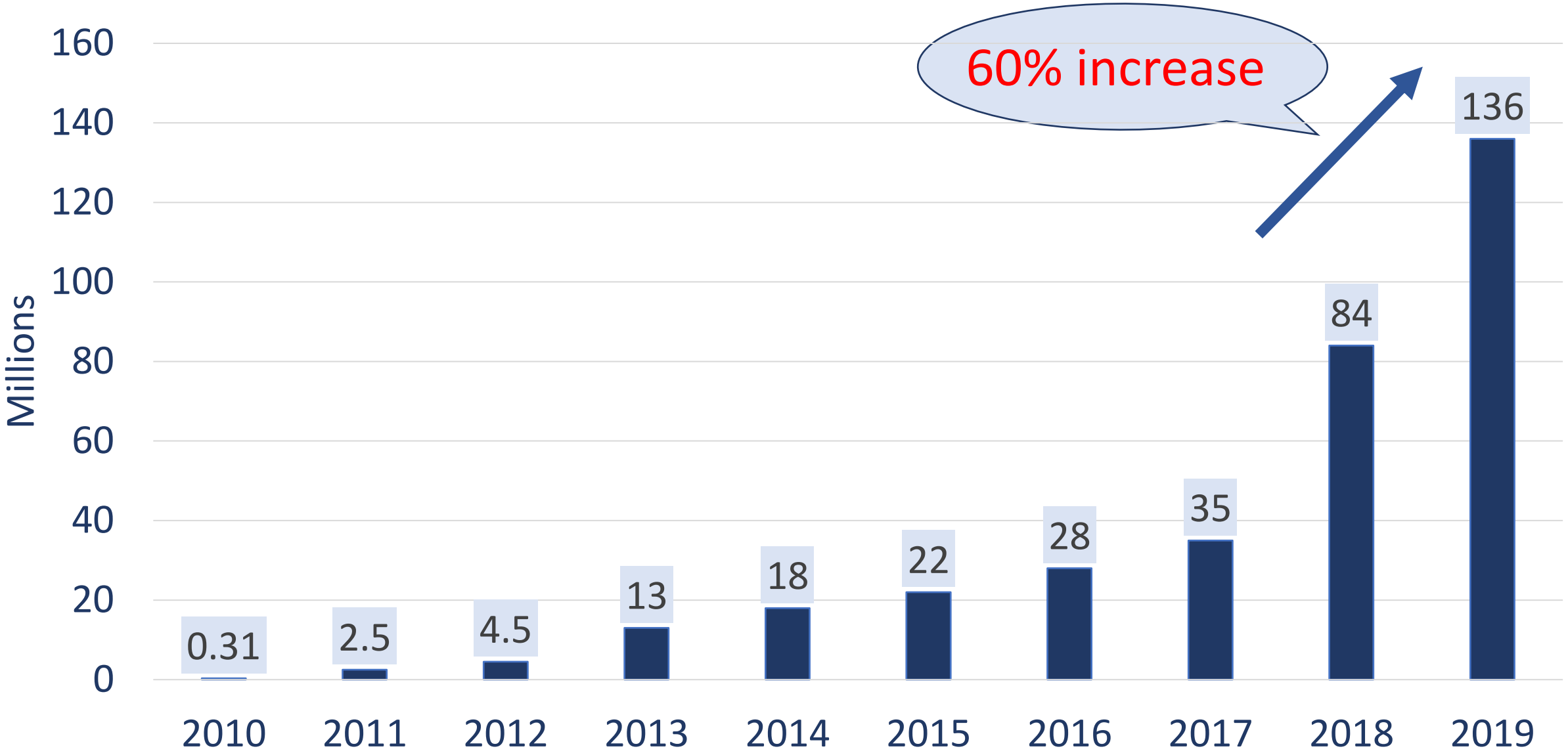
Background

- Each year **38% of motorcyclists** and **20% of bicyclists** killed in traffic crashes **are under the influence of alcohol.**
- Limited data on alcohol use in cyclist and motorcyclist injuries that **do not involve a motor vehicle or are non-fatal.**
- Robust injury surveillance is essential for guiding legislation and interventions, which are becoming increasingly important with the rise of micromobility usage.

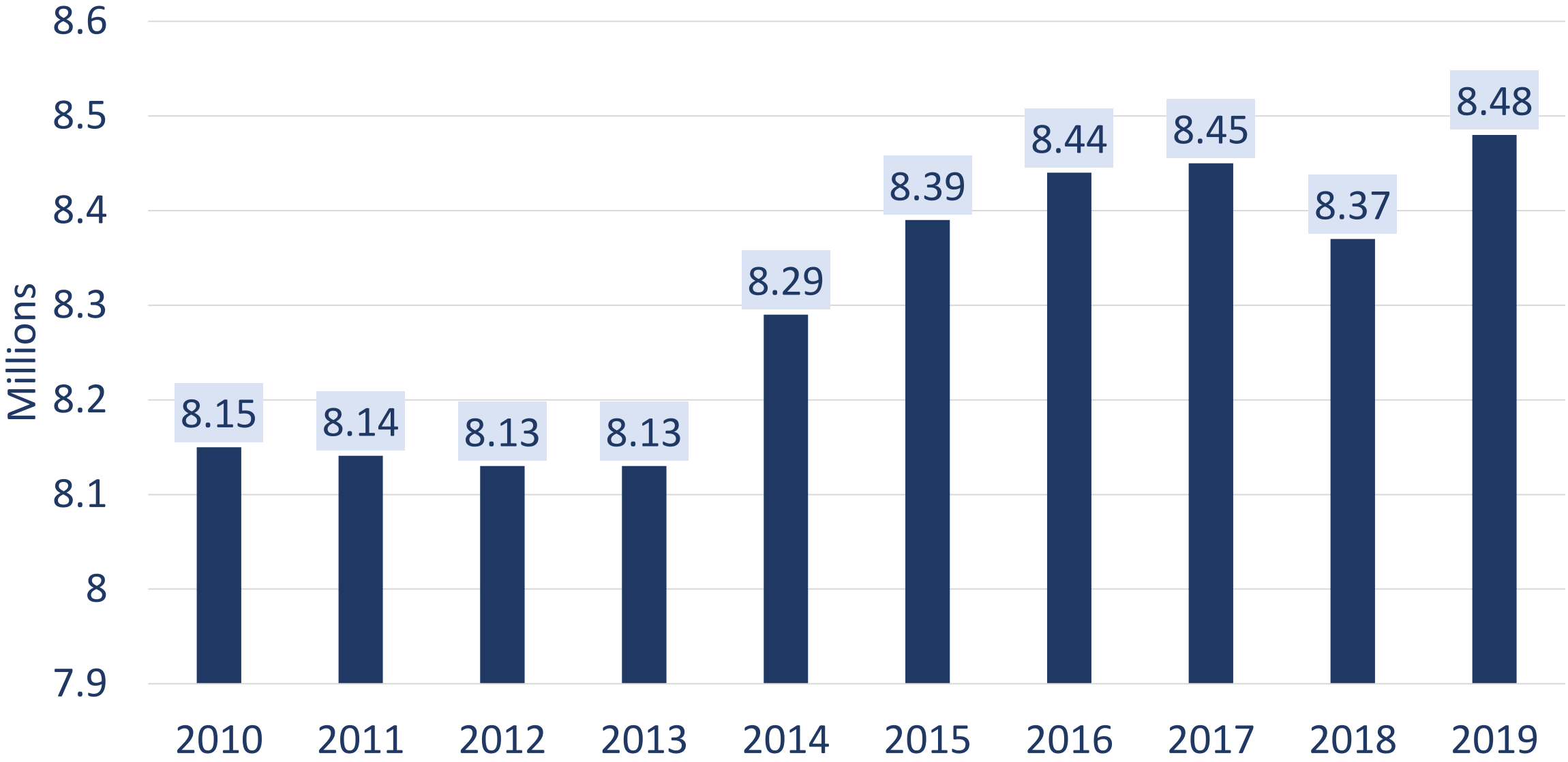
Source: National Center for Statistics and Analysis. 2021a. Bicyclists and other cyclists. [place unknown]: National Highway Traffic Safety Administration; National Center for Statistics and Analysis. 2021b. Motorcycles: 2021 data. [place unknown]: National Highway Traffic Safety Administration.

Shared Micromobility Trips in US, 2010-2019



Source: National Association of City Transportation Officials. 2022. Shared Micromobility in the U.S. 2020-2021. National Association of City Transportation Officials [Internet]. https://nacto.org/shared-micromobility-2020-2021; Teoh E. 2023. Motorcycles registered in the United States, 2002–2023. Arlington, VA: Insurance Institute for Highway Safety

Motorcycles registered in the US, 2010-2019



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Study Aim

Determine the **role of alcohol involvement** among **fatally** and **non-fatally injured pedalcycle and motorcycle riders** and to compare these findings across the **2019 NEMSIS, NEISS, and FARS** national public-use datasets.

Methods: 3 national public-use datasets

	Data source	Sample
FARS	National Highway Traffic Safety Administration (NHTSA)	50 states and 2 territories
NEISS	U.S. Consumer Product Safety Commission	Probability sample of 96 hospitals in the US and its territories that contain at least 6 beds and an emergency department (ED)
NEMSIS	NHSTA Office for emergency medical services (EMS)	44 states and 3 territories

NEMSIS: National Emergency Medical Services Information System Public-Release Research Dataset
NEISS: National Electronic Injury Surveillance System
FARS: Fatality Analysis Reporting System

Methods: injury coding

	Injury Type	Coding
FARS	Fatal injuries in motor vehicle traffic crashes	American National Standard Institute's Manual on Classification of Motor Vehicle Traffic Crashes
NEISS	Consumer product-related injuries and deaths resulting in ED visit	Consumer product codes
NEMSIS	Injuries resulting in EMS activation	ICD-10 codes

Methods: road user codes

	Motorcycle	Bicycle
FARS	• Minibike • Moped • Motor scooter • Motorcycle (2 or 3 wheeled, on-or off- road) • Pocket bike	• Bicyclist • Other cyclist (unicycles or tricycles)
NEISS*	• Mopeds or power-assisted cycles • Minibikes • Two-wheeled, powered, off-road vehicles	• Bicycles or accessories • Mountain or all-terrain bicycles or accessories
NEMSIS	• Moped • Motor scooter • Motorcycle (2 wheeled) • Motorized bicycle • Speed-limited motor-driven cycle	• Bicycle • Tricycle

*NEISS data do not include measure for motorcycle

Methods: alcohol measure and definitions

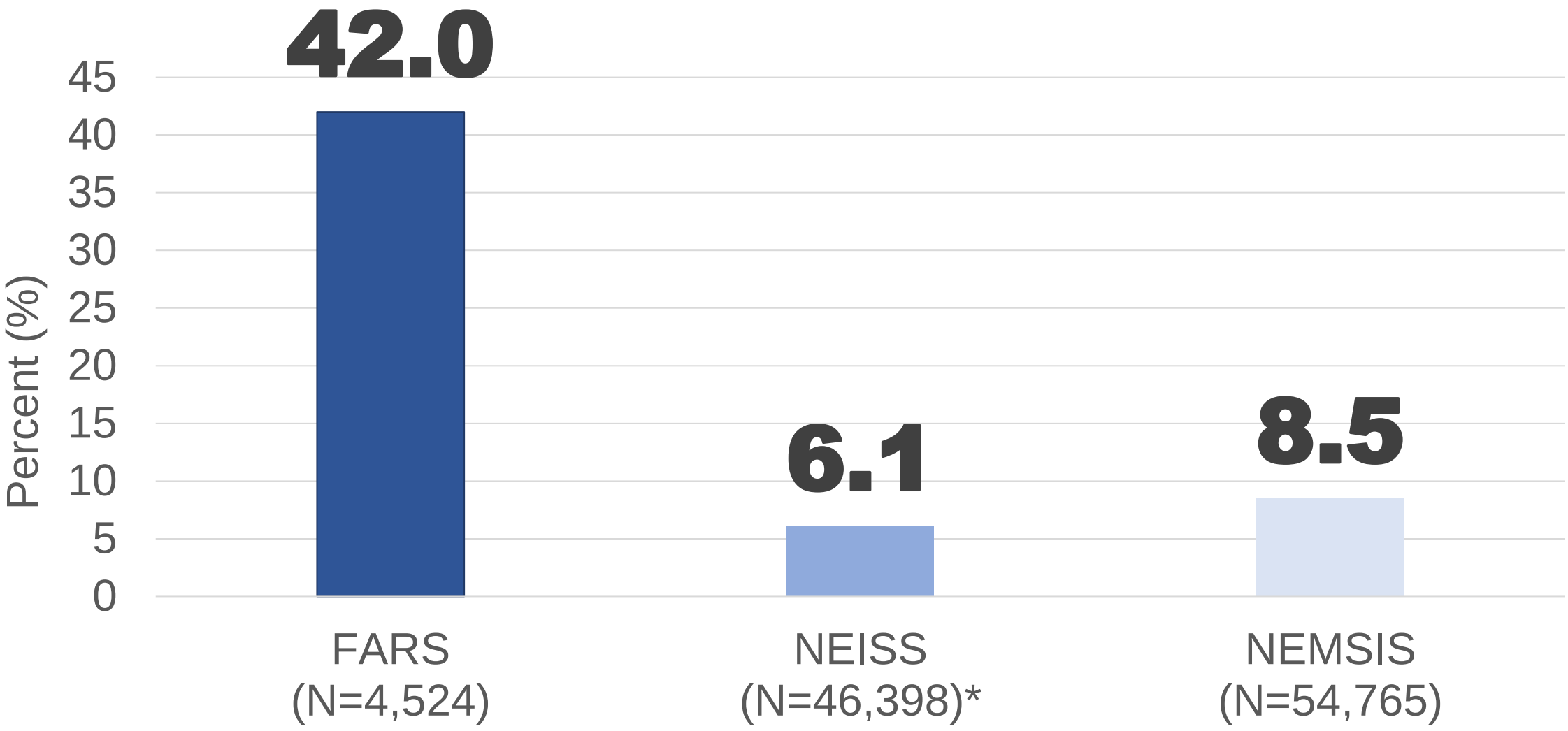
	Measure	Definition
FARS	Blood alcohol content (BAC) levels collected from police administered breath-tests or toxicology reports from Medical Examiner's office	• Alcohol involvement (rider): BAC of .01 to .07 g/dL • Alcohol impairment (rider): BAC of .08 g/dL or higher • No alcohol involvement
NEISS*	Medical record report often include BAC level	• ED record indicates patient consumed alcohol prior to or during incident
NEMSIS*	EMS clinician's evaluation at scene	• Alcohol containers/paraphernalia at scene • Patient admits to alcohol use • Smell of alcohol on breath • Positive levels from law enforcement or hospital record

*NEISS and NEMSIS do not have a "no alcohol involvement" response option.

Methods: statistical analysis

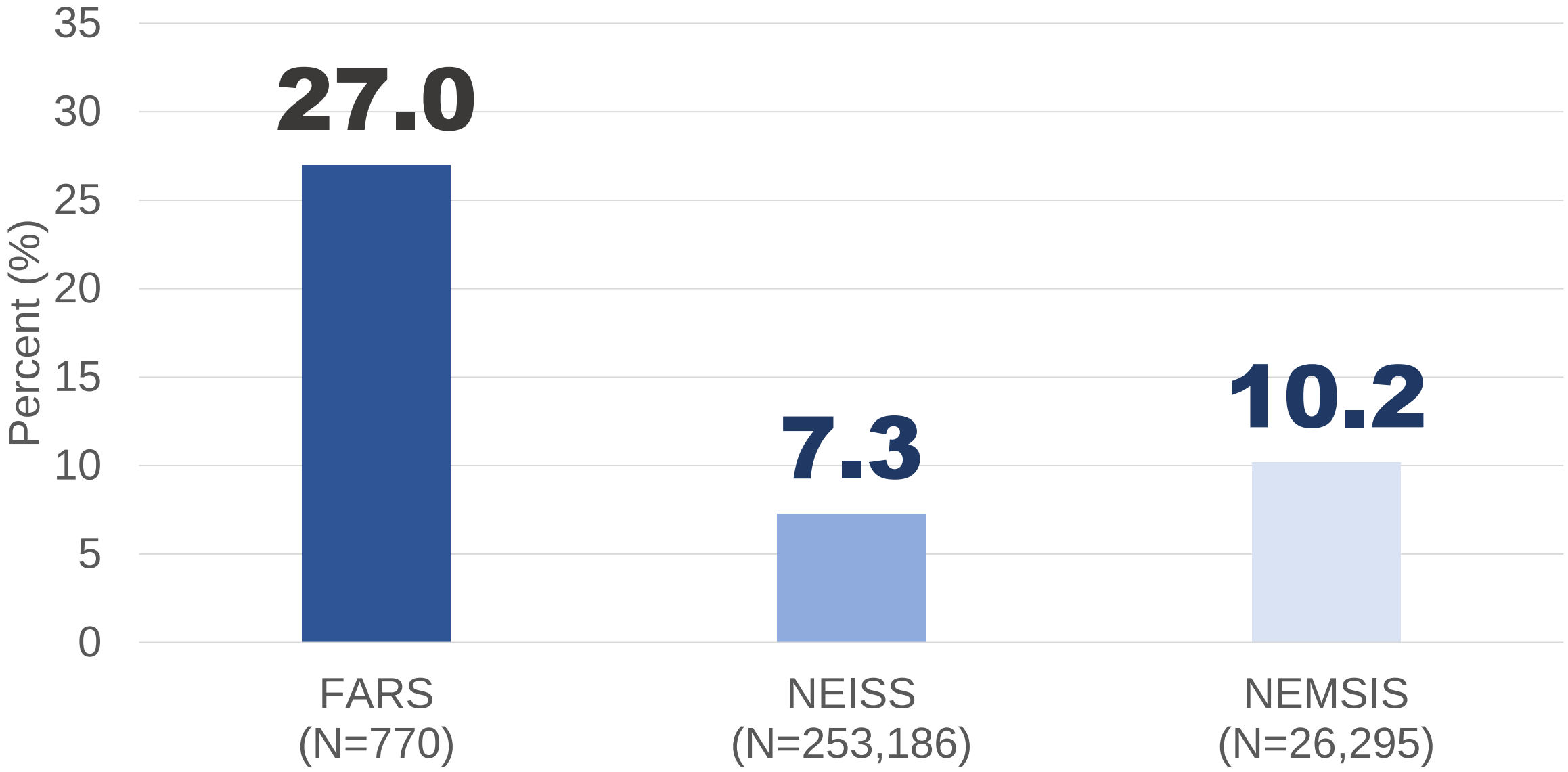
- Descriptive statistics by alcohol involvement
  - Only included adults ages 21+ yrs
- NEISS data are weighted survey estimates (include 95% CI)

Results: alcohol involved motorcycle injuries



*NEISS data do not include measure for motorcycle, instead these data represent moped/power-assisted cycle/minibike/two-wheeled, powered, off-road vehicle involved injuries

Results: alcohol involved bicycle injuries



Discussion

- **Take-away**
  - Estimates for alcohol involved bicyclist and motorcyclist injuries considerably smaller for NEISS (6-8%) and NEMSIS (8-10%) compared to FARS (27-42%)
- **Methodological differences**
  - Only FARS has complete alcohol data
  - Denial of coverage to patients, time constraints, safety, patient condition, and training are all barriers to alcohol screening in clinical setting

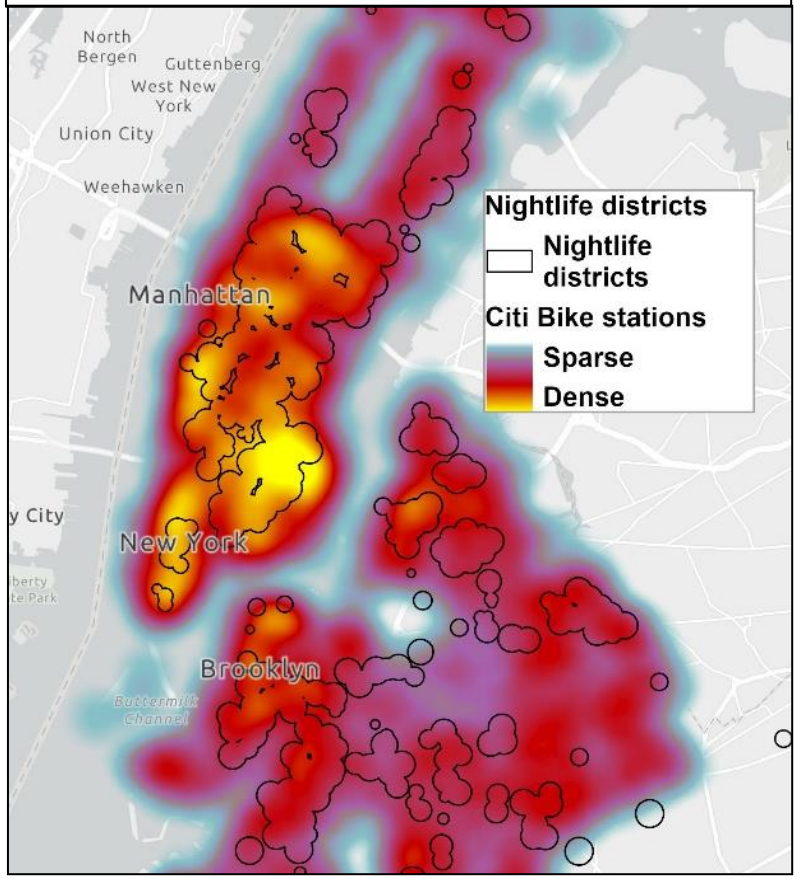
Dataset limitations

- **Selection bias**
  - FARS and NEISS include BAC level, NEMSIS includes EMS clinician's evaluation of alcohol use
  - Capture most severe injuries
- **Measurement error**
  - Injury coding

Conclusion

- **Current/future work**
  - BUI laws may be difficult to pass, enforce, understand to prevent these injuries
    - Examine the link between alcohol-related environments and micromobility injuries
  - What about e-bike and e-scooter injuries?
    - Check-out our recently published paper in AJPH!

Heat map of Citi bike stations in nightlife district clusters in Manhattan and Brooklyn, 2024



Thanks!

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