Health and Transportation Partnerships: Integrating Health Data into Transportation Planning

PBIC Health + Transportation Webinar Series, Part 3

Ann Dellinger Centers for Disease Control and Prevention
Leslie Meehan Tennessee Department of Public Health
Katie Harmon University of North Carolina Highway Safety Research Center
Shamsi Soltani San Francisco Department of Public Health

Housekeeping

⇨ Submit your questions

⇨ Webinar archive: www.pedbikeinfo.org/webinars

⇨ Certificates and professional development hours

⇨ Follow-up email later today

⇨ Review previous episodes and sign up for upcoming sessions

Pedestrian and Bicycle Information Center

Webinar Series

Health and Transportation

Oct. 13: Confronting Power and Privilege for Equity

Oct. 15: Agency Structures for Collaboration

Oct. 22: Integrating Health Data

Oct. 27: Planning and Prioritizing Projects

Oct. 28: Bringing Health to Transportation Policy

#PBICWebinar

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Transportation and health intersect in many ways

Image Source: Toole Design Group/pedbikeimages.org

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Image Source: pedbikeimages.org

Image Source: Spencer Platt/Getty Images

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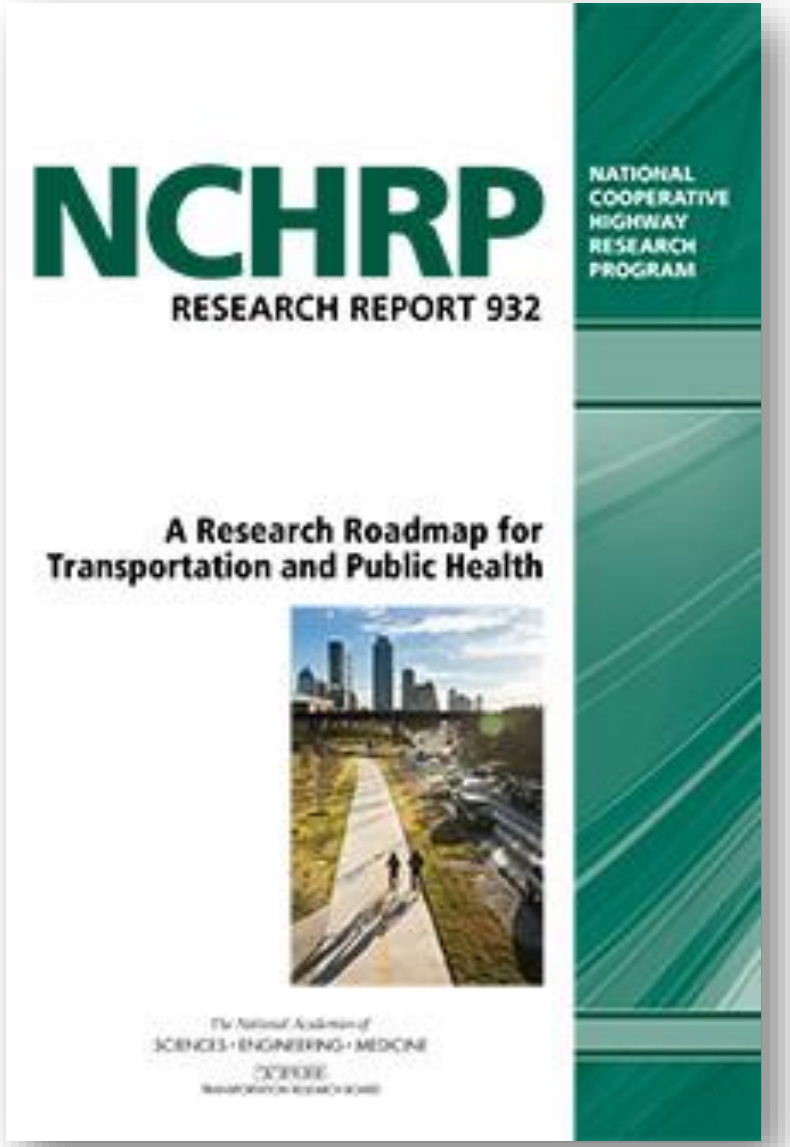


Series Motivation

- How are health and equity defined within the transportation community?
- How can transportation practices impact health?
- In what ways are transportation agencies considering health in current practices?
- What partnerships, research, and other resources are needed to improve practice?

Pathways to Health

Improving access to opportunities and services

Providing opportunities for physical activity

Mitigating human exposure to environmental risks (air and noise pollution)

Preventing injuries and improving safety

Supporting resiliency to disaster and extreme weather events

Promoting community connectedness and vitality

Meet the Panel

Ann Dellinger

Centers for Disease Control and Prevention

Leslie Meehan

Tennessee Department of Public Health

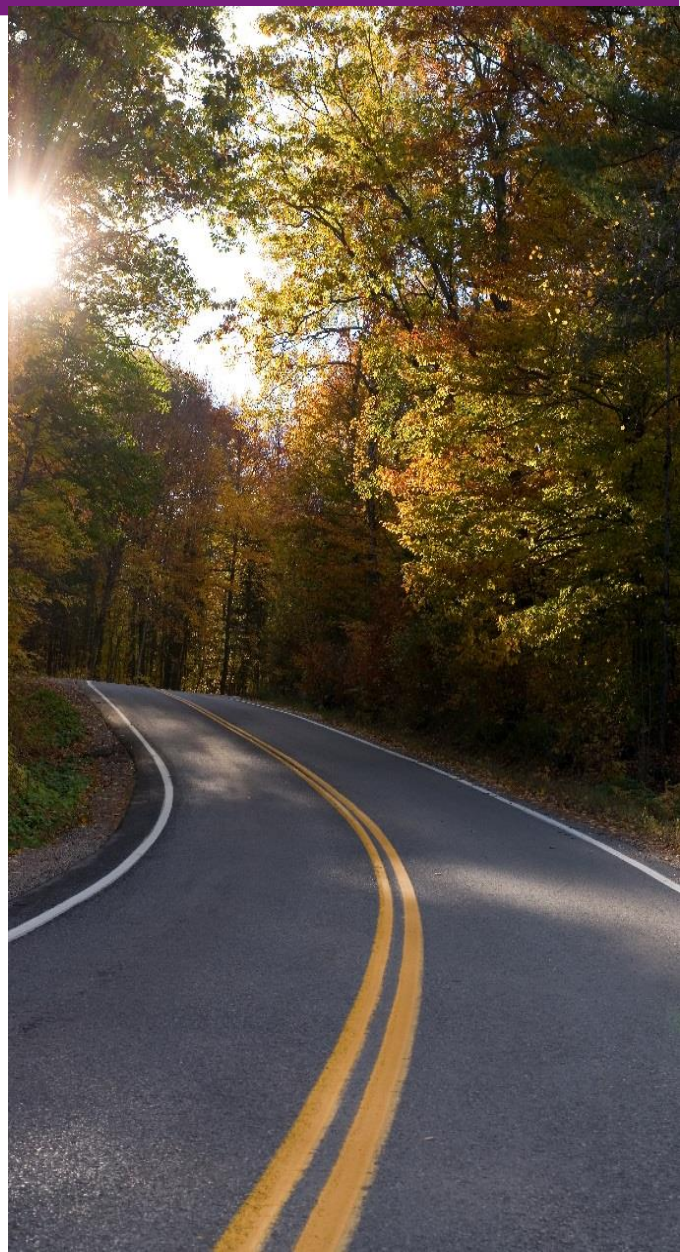
Katie Harmon

UNC Highway Safety Research Center

Shamsi Soltani

San Francisco Department of Public Health

CDC:
Public Health
Injury Prevention
Data, Burden
Applied Science
Evaluation
Strategic, Impact



Ann Dellinger, PhD, MPH
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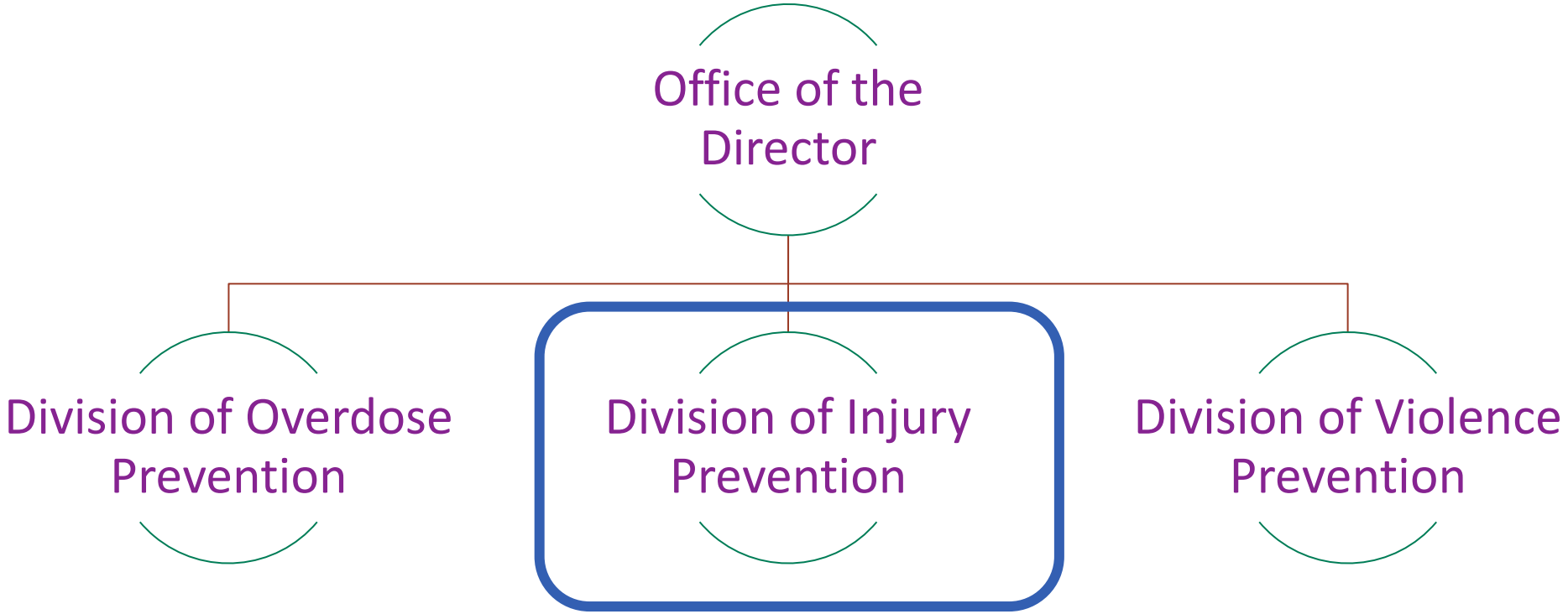
Before we get started…Chris Kochtitzky

CDC Foundation Memorial Fund-
bridging urban planning and public health

National Center for Injury Prevention and Control

Everyone, everywhere, every day—safe and free from injuries and violence.



Transportation Safety Team Priority Areas

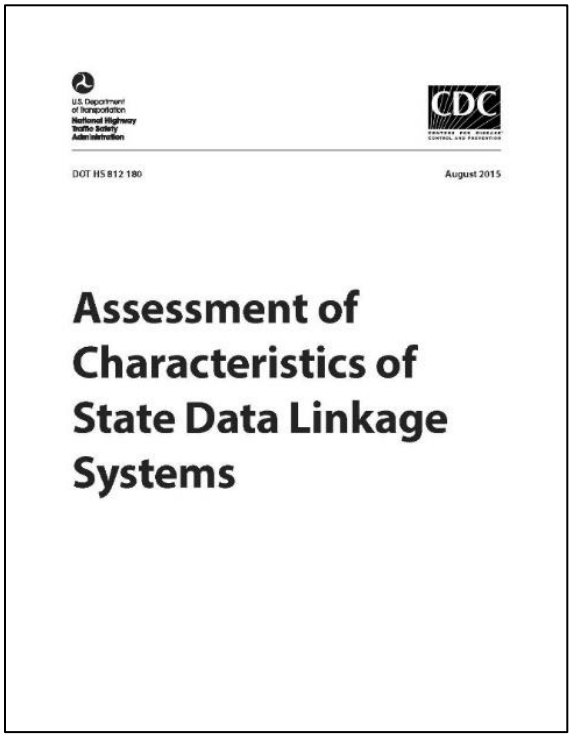
Restraints

Older Adult Mobility

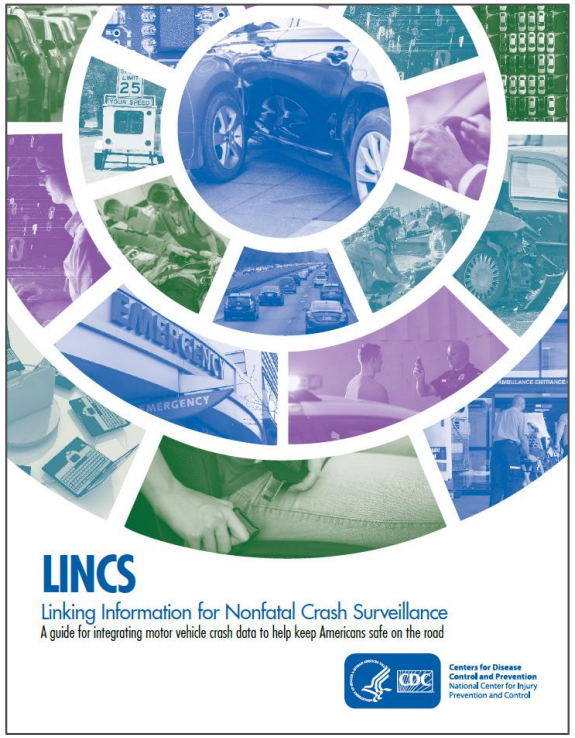
Impaired Driving

Data Linkage

Evaluation of Data Linkage Systems



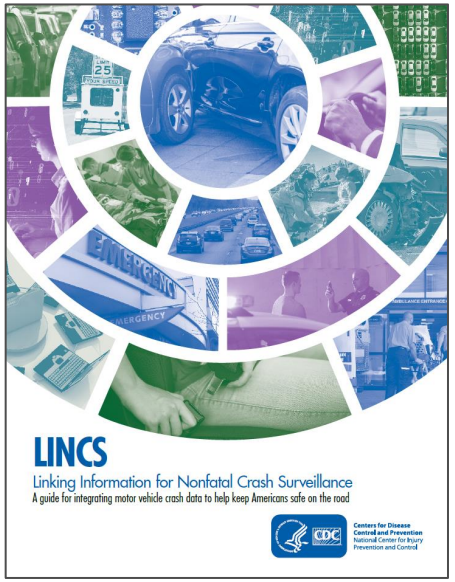
LINCS: Linking Information for Nonfatal Crash Surveillance



https://www.cdc.gov/motorvehiclesafety/linkage/index.html

What is the LINCS Guide?

- Helps states start or expand their data linkage program
- Presents key components of successful linkage programs and explains each step of the process.
- LINCS is based on:
  - Best practices and lessons learned from successful linkage programs
  - Updated environmental scans for data linkage research, methods, and tools
  - State data linkage pilot efforts

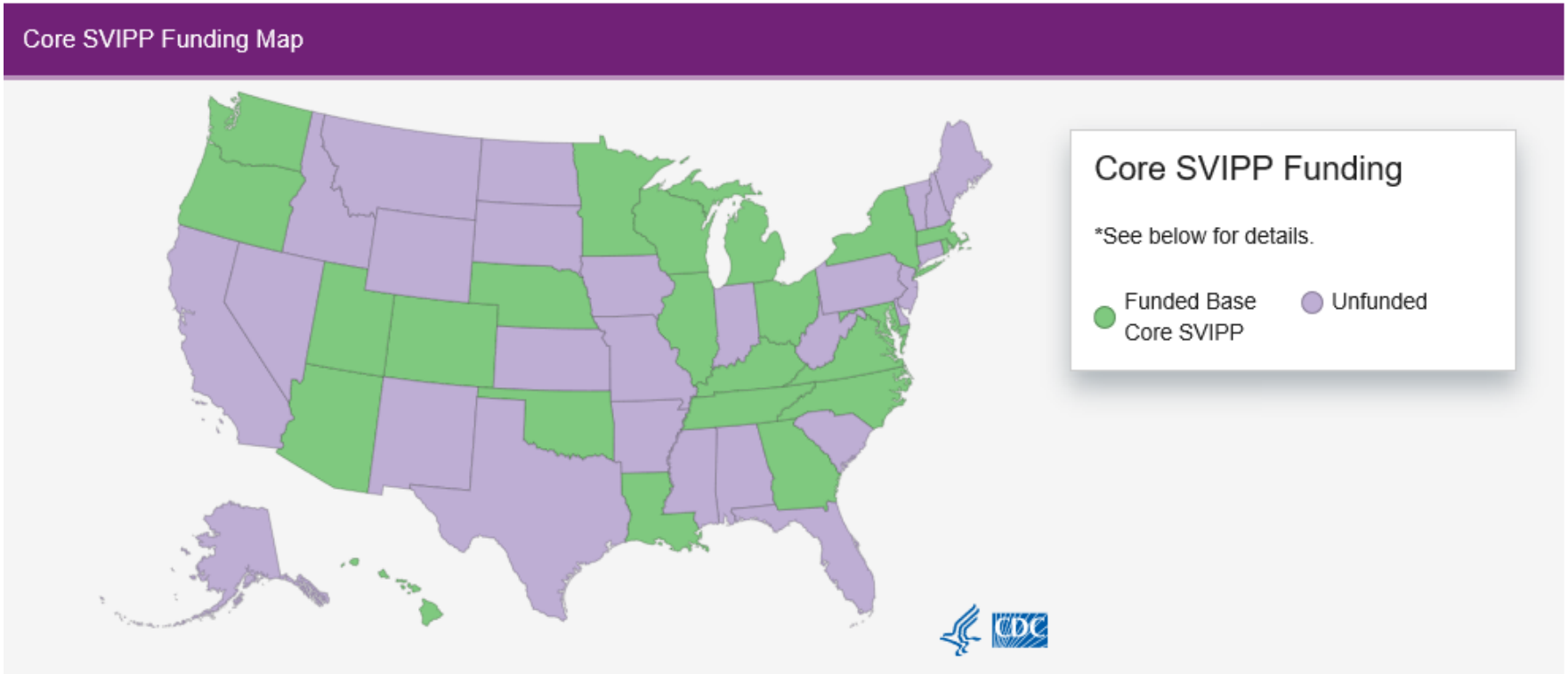


https://www.cdc.gov/motorvehiclesafety/linkage/index.html

National Governors Association: Data Linkage Learning Labs

- CDC partnered with NGA for two Data Linkage Learning Labs
  - Help states develop strategies to improve the access, sharing, analysis, and linkage of transportation, public safety, and medical data to strengthen crash response and inform decision-making.
- Maryland
  - Colorado, Connecticut, Louisiana, Maryland, Minnesota, Utah, Washington
- Utah
  - Illinois, Kentucky, Tennessee, Vermont, and Virginia

NGA
NATIONAL GOVERNORS ASSOCIATION



- 2019 Supplemental Funding to CO, IL, MA, and NC state health departments for motor vehicle crash data linkage
- Year 1: using data linkage methods and software to combine traffic and health data and evaluating the quality of the linkages
- Year 2: using the linked data to identify risk and protective factors and outcomes of non-fatal MVC injuries

Using Linked Data: NCIPC Extramural Research

- Funding to 4 institutions to probabilistically link hospital and crash data for analysis to better understand motor vehicle crash outcomes in older adults.
  - Utah, Maryland, Kentucky, and Ohio

- Recipients assessed older adult MVC injuries, factors related to injury severity, and costs.

- Research will complete this year

Thank You

Let's get started!

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

TRANSPORTATION RESOURCES FOR LIVABLE COMMUNITIES

Leslie Meehan, MPA AICP

Director, Office of Primary Prevention

Tennessee Department Of Health

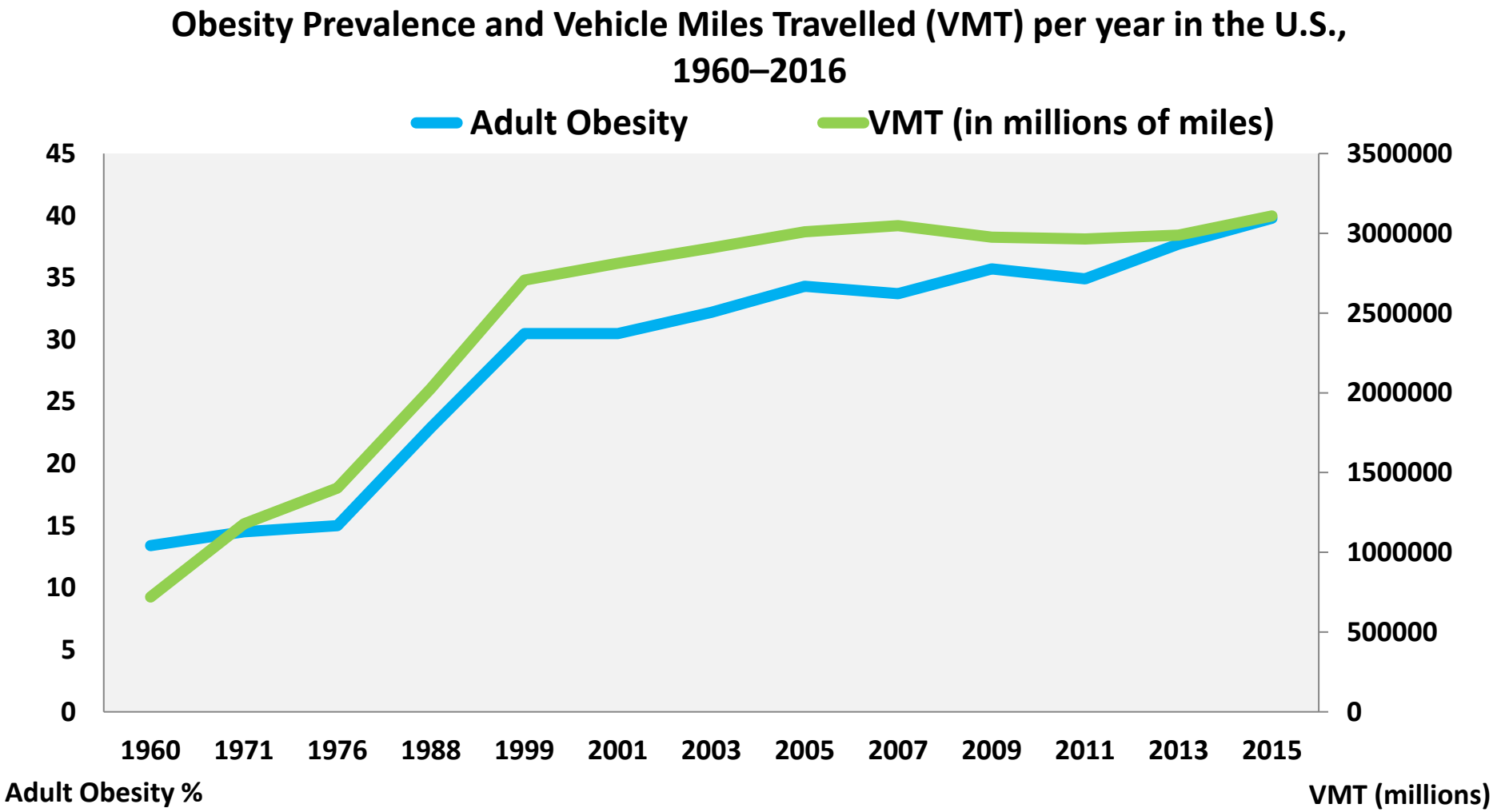
TN Department of Health

Building Bridges

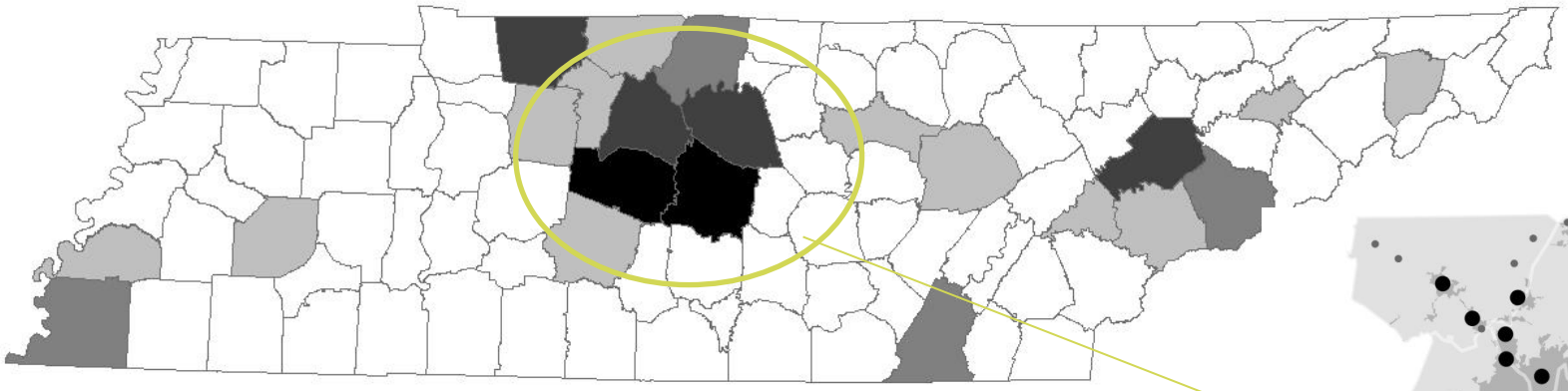
Our Streets Should be Public Assets

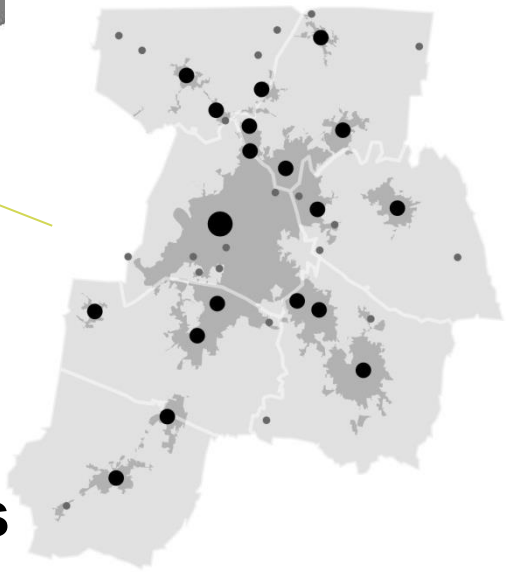
- Limited sidewalks
- No bicycle lanes
- Fast food, not fresh food
- Predatory lending
- Signs and electrical wires

The Role of Transportation



Nashville Area MPO





- 250,000+ new people
- 100,000 to 250,000
- 50,000 to 100,000
- 25,000 to 50,000
- < 25,000 new people

Home to 1.7 million

1.3 million growth
in Middle Tennessee 20 yrs

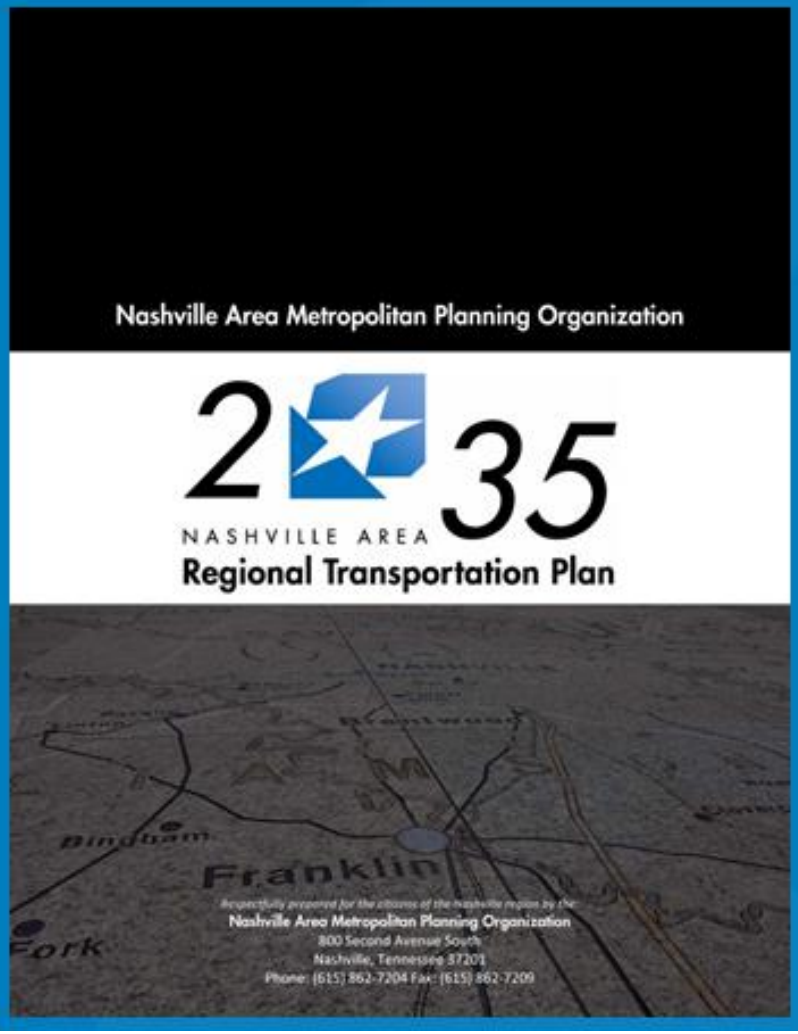
Policy: Public Opinion

1st choice: improve and expand mass transit options

2nd choice: make communities more walkable & bike-friendly

3rd choice: build new or widen existing roadways

Policy based on Public Opinion



#1
A Bold, New Vision for Mass Transit

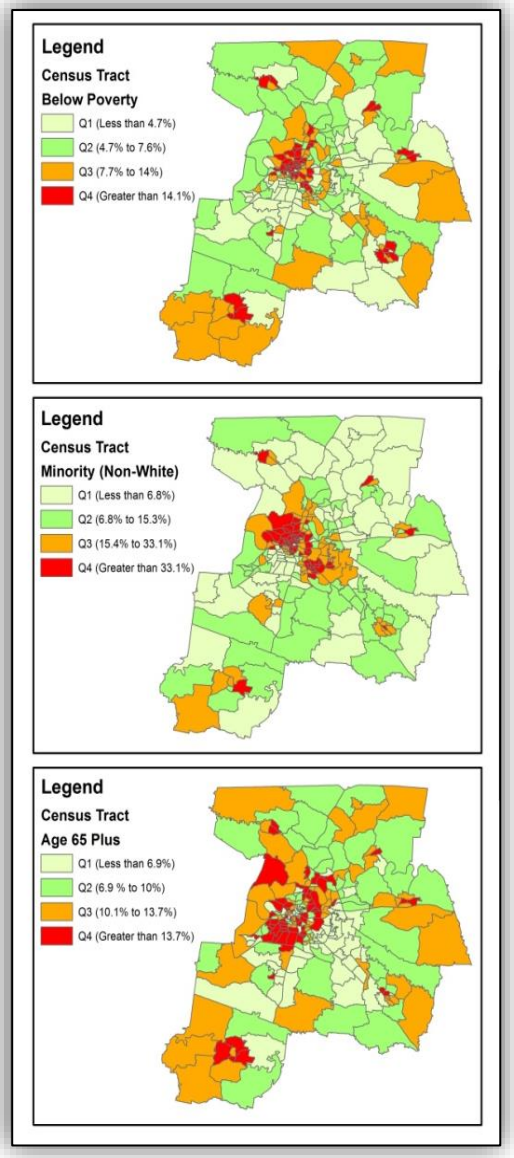
#2
Support for Active Transportation & Walkable Communities

#3
Preservation & Enhancement of Strategic Roadways

Project Scoring Criteria

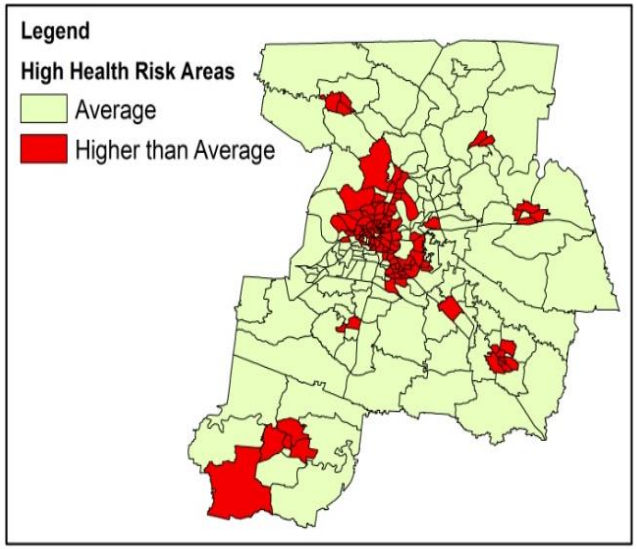
- **2040 Roadway Projects Scoring Criteria – 100 points**
  - Quality Growth and Sustainable Development – 15pts
  - Multi-Modal Options – 15pts
  - Health & Environment – **15pts**
  - Safety & Security – **20pts**
  - Congestion Management – **15pts**
  - System Preservation & Enhancement – 10pts
  - State & Local Support/ Investment – 5pts
  - Freight & Goods Movement – 5pts

Health Priority Areas



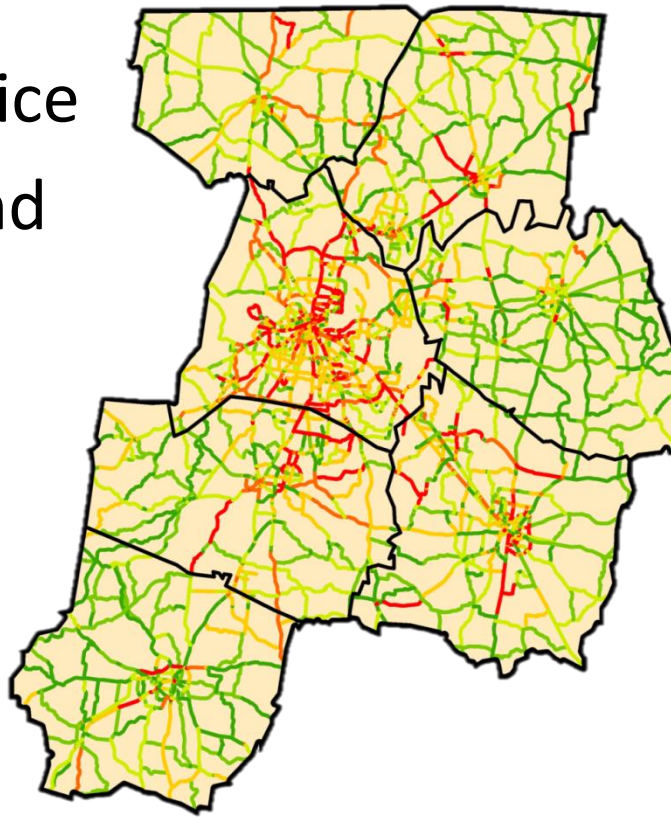
There is a strong link between the lack of physical activity and health (e.g. heart disease, obesity, and other chronic conditions).

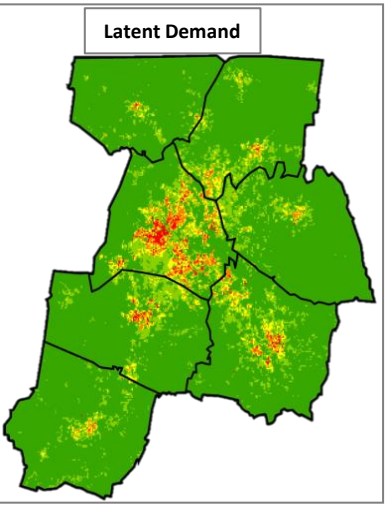
Research has also shown certain population groups have a higher disparity. These groups include:

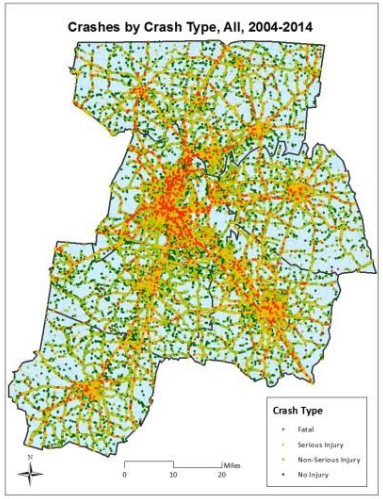


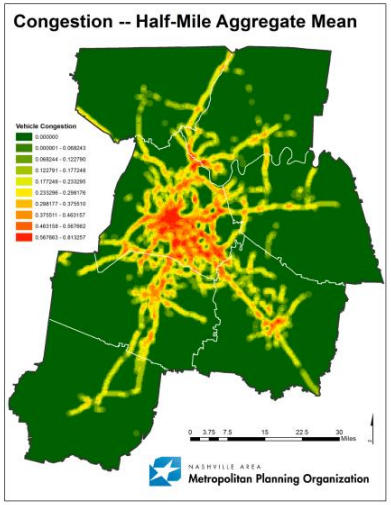
Evaluation Tools

- Bicycle and Pedestrian Levels of Service
- Bicycle and Pedestrian Latent Demand
- Congested Roadways
- Bicycle and Pedestrian Crashes
- Health Priority Areas

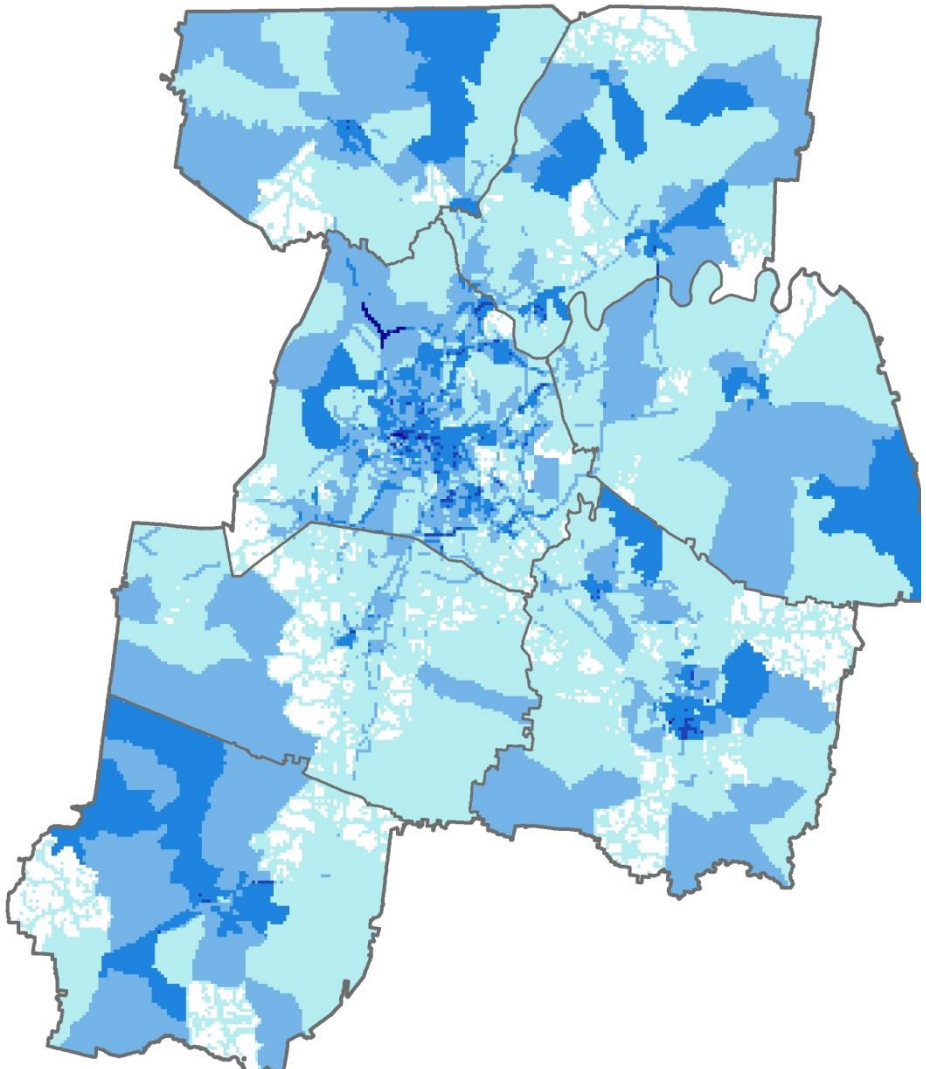


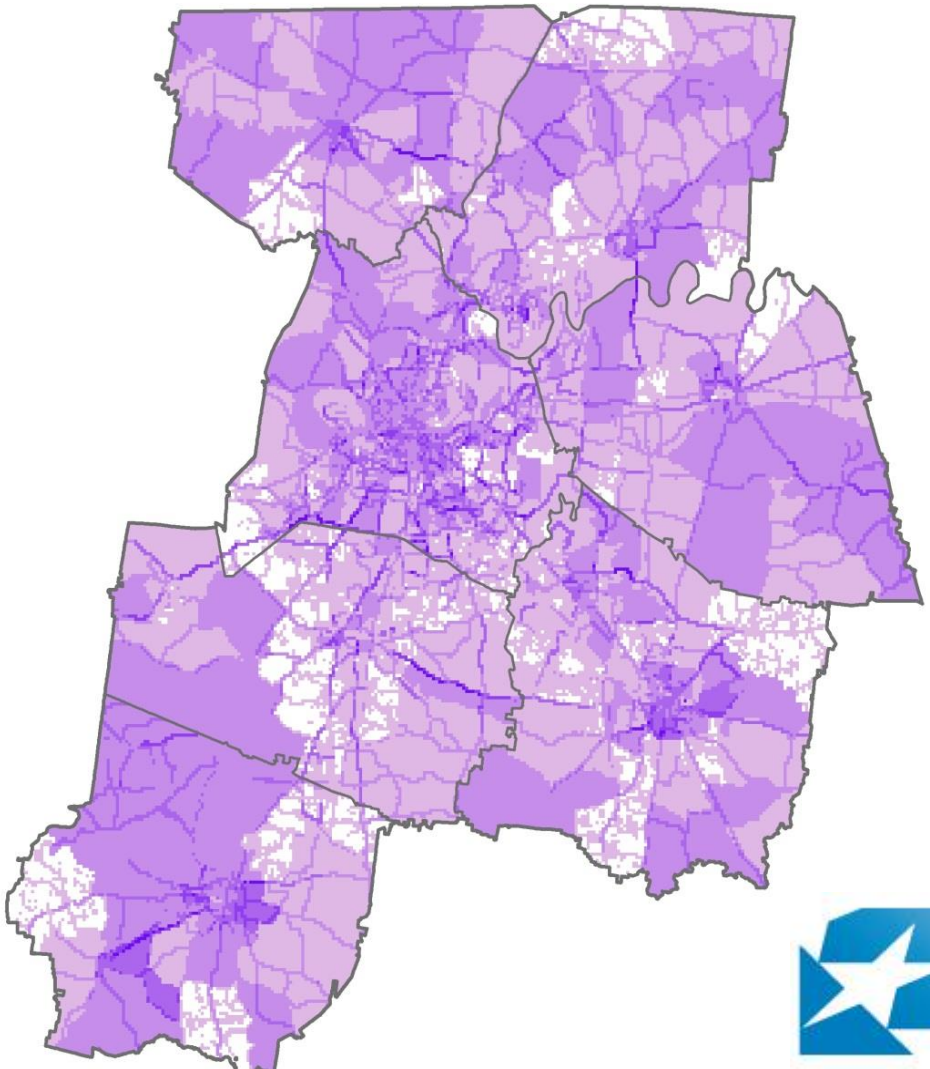






Composite Bike/Ped Priority Areas





Funding: STP Investment Strategy

- **70% - Roadway projects that improve health**
- 15% - Active Transportation Program
  - Sidewalks, bicycle lanes, greenways, transit stops; education, enforcement and encouragement
- 10% Mass Transit Program
  - Combined with FTA funds to help implement regional vision for mass transit
- 5% Regional ITS and Systems Operations
  - Using technology to manage traffic

Result: Increased Physical Activity

Active Transportation Projects:

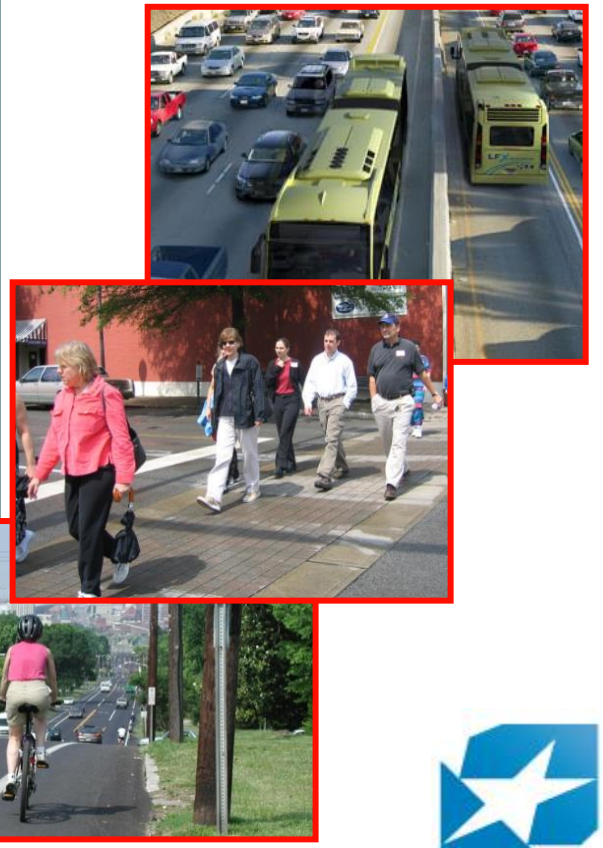
- 2030 Regional Tran Plan: 2%
- 2035 Regional Tran Plan: 67%
- 2040 Regional Tran Plan: 77%

2009 to 2014 Miles of:

Sidewalks: 57% increase
Bikeways: 19% increase
Greenways: 36% increase

Household Travel Survey

Transportation, Physical Activity and Health Data Collection and Analysis



Partnering with both CDC and US Department of Transportation

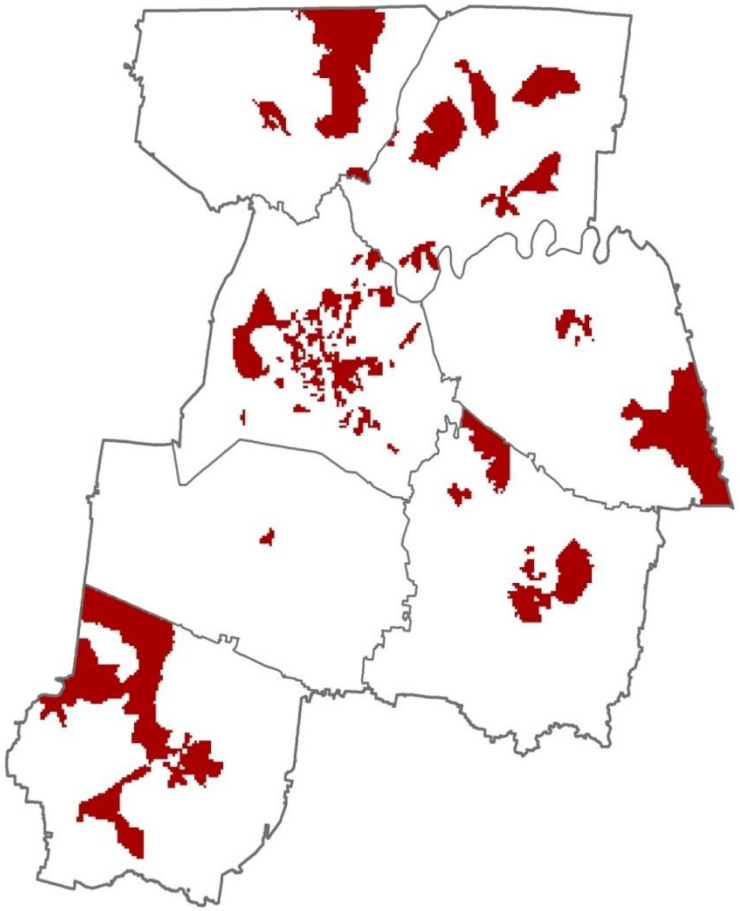
Updated Health Priority Areas

Based on Transportation and Health Study

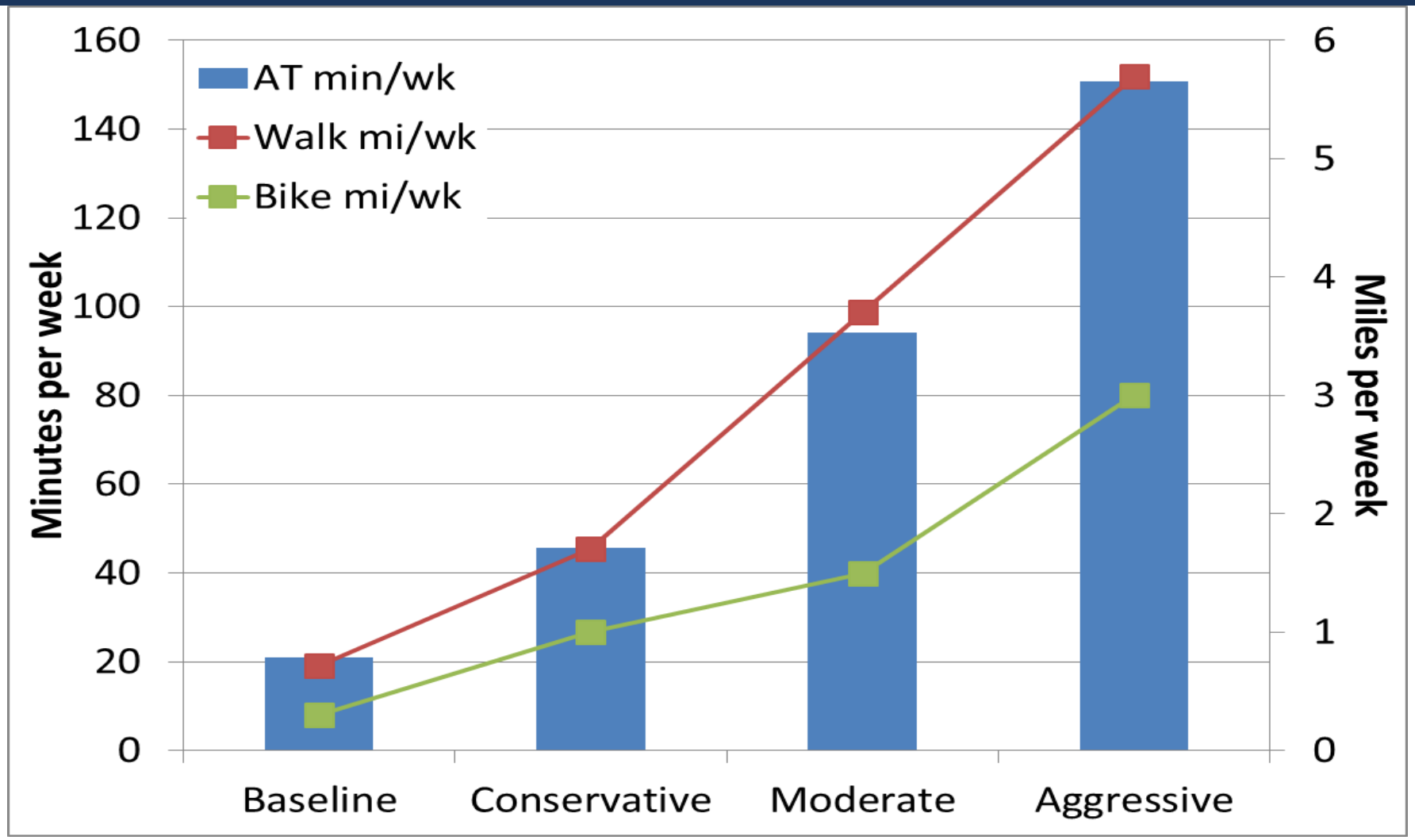
Health Priority Areas

3 out of 4:

- **Poverty**
- **Unemployment**
- **Carless Household**
- **Aging (over age 65)**



Transportation and Health Impact Model



Diseases and Exposures

Physical Activity	Air Pollution	Collisions	
Ischemic Heart Disease	Respiratory Infections	Auto	
Depression	Cardiovascular Disease	Bicycle	
Dementia	Hypertensive Heart Disease	Pedestrian	MODE
Diabetes	Inflammatory Heart Disease	Bus	
Colon Cancer	Lung Cancer	Truck	
Breast Cancer	Respiratory Disease (kids)	Highway	
All-Cause Mortality	Stroke	Arterial	ROAD TYPE
		Local	
		Fatal	
		Non-Fatal	SEVERITY

Health Impacts and Savings

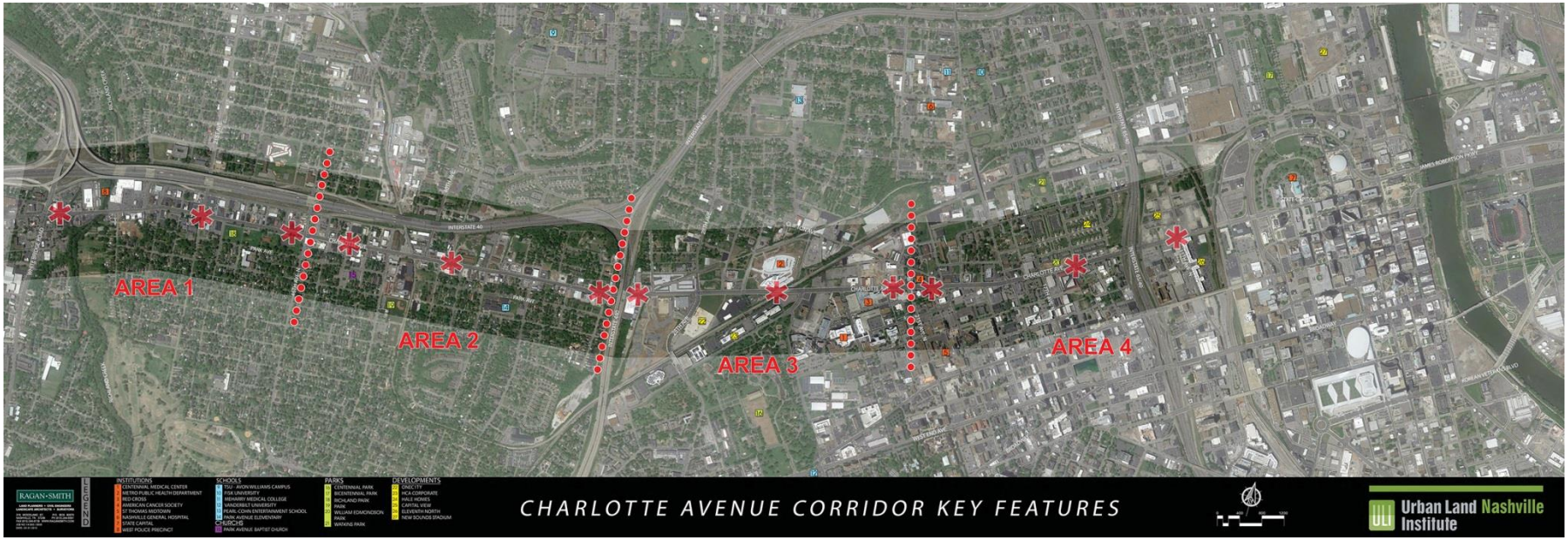
Moderate	Δ Disease Burden		Δ Premature Deaths / Year
Cardiovascular Diseases	-3.1%	↓	85.6
Diabetes	-3.0%	↓	9.3
Depression	-1.1%	↓	0.0
Dementia	-1.3%	↓	11.6
Breast Cancer	-1.2%	↓	2.2
Colon Cancer	-1.1%	↓	2.0
Road Traffic Crashes	0.0%	↔	0.0
Total	-1.0%	↓	112.3

Savings:

$116 Million

per year in healthcare costs

Working Together: Measures



Not just ADT, % Free Flow Speed and LOS

- Physical Activity Rates (Modeled for existing and future land uses and volumes)
- Presence of Sidewalks
- Sales and Property Tax Revenues
- Obesity Rates
- Poverty Rates
- Employment
- Educational Attainment
- Quality of Life Measures

Health and Transportation Partnerships

- Grant review committees (CMAQ & Healthy Built Environments)
- Health data (e.g. obesity) as part of grant applications
- Research
  - Pediatric Asthma and High-Volume Roadways
  - Transportation Access to Cancer Treatment Centers
  - Transportation Access to Substance Abuse Treatment (Opioids)
  - Multimodal Crash Risk Factors

Transportation Research Board (TRB)

The National Academies of
SCIENCES · ENGINEERING · MEDICINE

AME70 TRANSPORTATION AND PUBLIC HEALTH

- Review papers
- Assist with social media and communications
- Contribute to strategic planning
- Advance recommendations from the 2019 Conference on Health and Active Transportation
- Investigate research proposals from the Research Roadmap for Transportation and Public Health
- Promote Connecting Transportation and Public Health: A Guide to Communication and Collaboration

www.trbhealth.org

QUESTIONS?

TN Department of Health

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Health and Transportation: Part 3

Health and transportation partnerships: integrating health data into transportation planning

Katherine (Katie) Harmon
UNC HSRC

www.hsrc.unc.edu

October 22, 2020

Background

What is Data Linkage & Why is it Important?

THE UNIVERSITY OF NORTH CAROLINA
HIGHWAY SAFETY RESEARCH CENTER

www.hsrc.unc.edu

October 22, 2020

Definition: Data Linkage

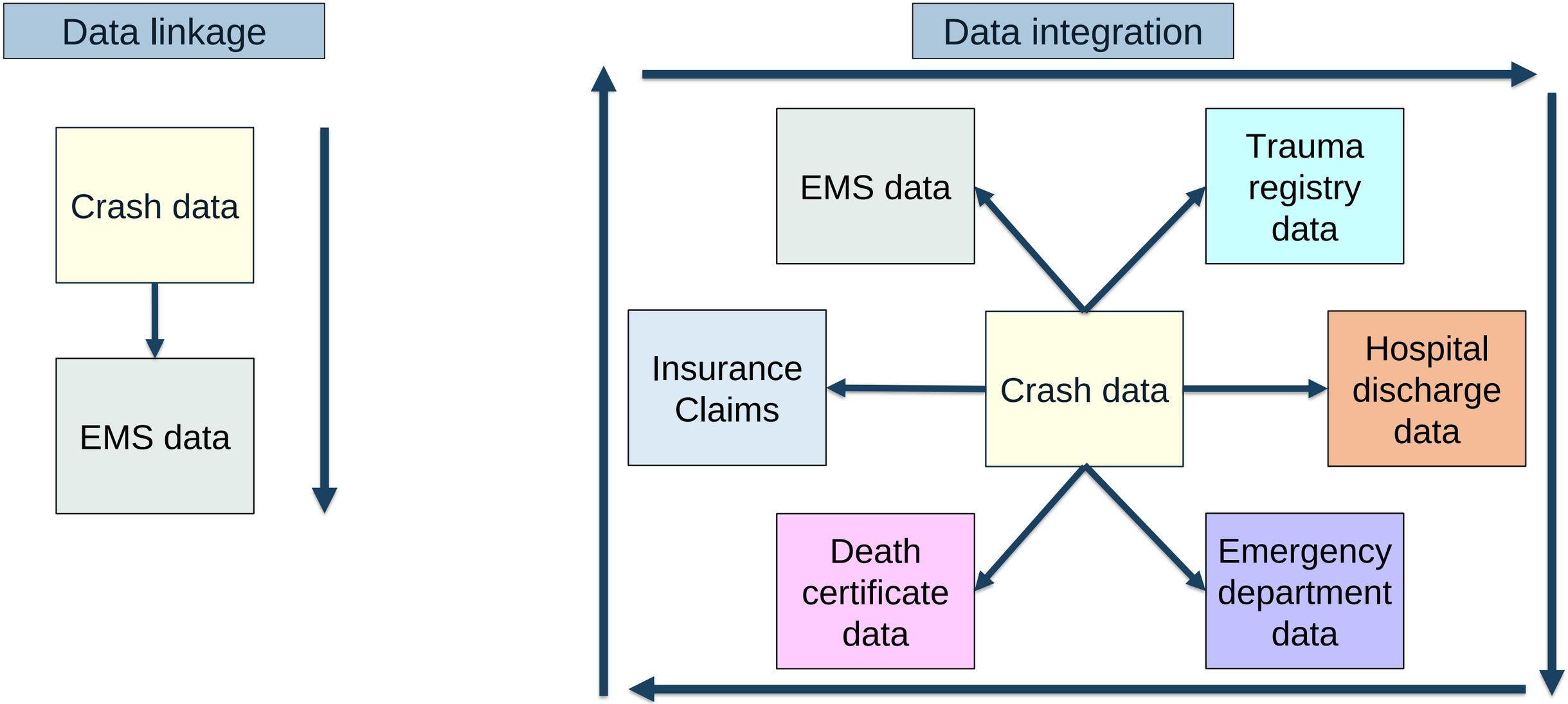
Definition: A process of combining information believed to be related to the same person (or place, family, event, etc.) from two or more separate data sources.

Data linkage is one step in the process of *data integration*, which is the ongoing, systematic linkage of data sources for the purpose of improved research, program management, evaluation, and policy development.

-However-

These terms are often used interchangeably.

Data Linkage Versus Integration



Hypothetical Linked Crash-Patient Record

Crash variables | **Linkage variables** | **Health outcome variables**

Time of Crash	Person Type	KABCO	Non-Motorist Location	Alc Test Status	Striking Vehicle	Name	DOB	Zip Code	Diag 1	Diag 2	Diag 3	Transport	Disposition	Payment	Charges
20:00	Pedestrian	B-Suspected Minor Injury	Marked crosswalk at intersection	No test	SUV	John Smith	1/9/1950	27705	S02.101 Fracture of base of skull, right side	Y90.5 - Blood alcohol level of 100-119 mg/100 ml	E11.9 Type 2 diabetes mellitus without complications	Ground ambulance	Admitted	Medicare	$95,000

Internal injuries not visible to LEO

BAC taken at hospital

Comorbidity – may complicate recovery

Mean US hospital charge for skull fracture (2010)[1]

*Marin JR, Weaver MD, Mannix RC. Burden of USA hospitals charges for traumatic brain injury. *Brain Inj* 2017; 31(1): 24-31.

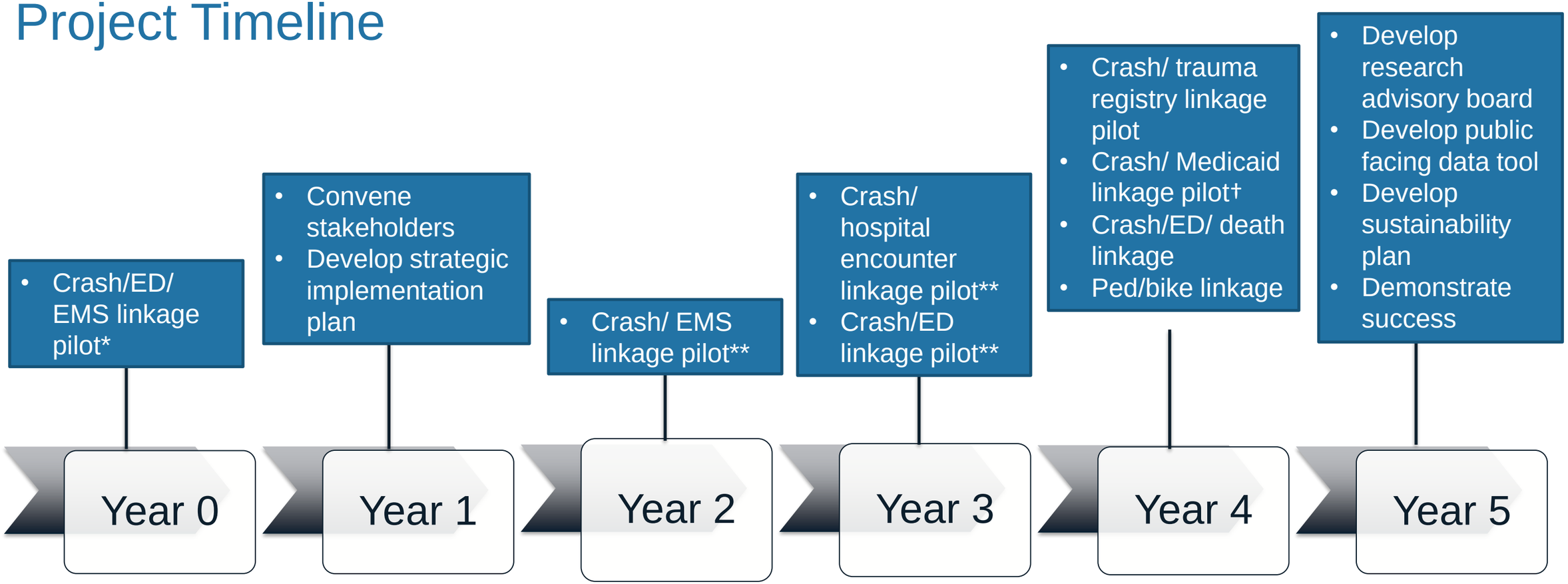
North Carolina Crash Injury Surveillance System
NC-CISS

Project Overview

www.hsrc.unc.edu

October 22, 2020

Project Timeline



Wake County Pilot Project (GHSP)

MVC Injury Data Linkage Project (GHSP)

NC Crash Injury Surveillance System (CDC)

Pedestrian/Bicyclist Project (CSCRS)

*Wake county MVCs, only.
**Pedestrians/bicyclists, only.
†Pedestrians/bicyclists/motorcyclists, only.

Collaboration Is Essential

- Project Staff
  - Investigators
  - Program managers
  - Statisticians
- Data owners
- Data users
  - State/Local departments of transportation
  - State/Local health departments
  - Investigators
- Community and advocacy groups
- Funders

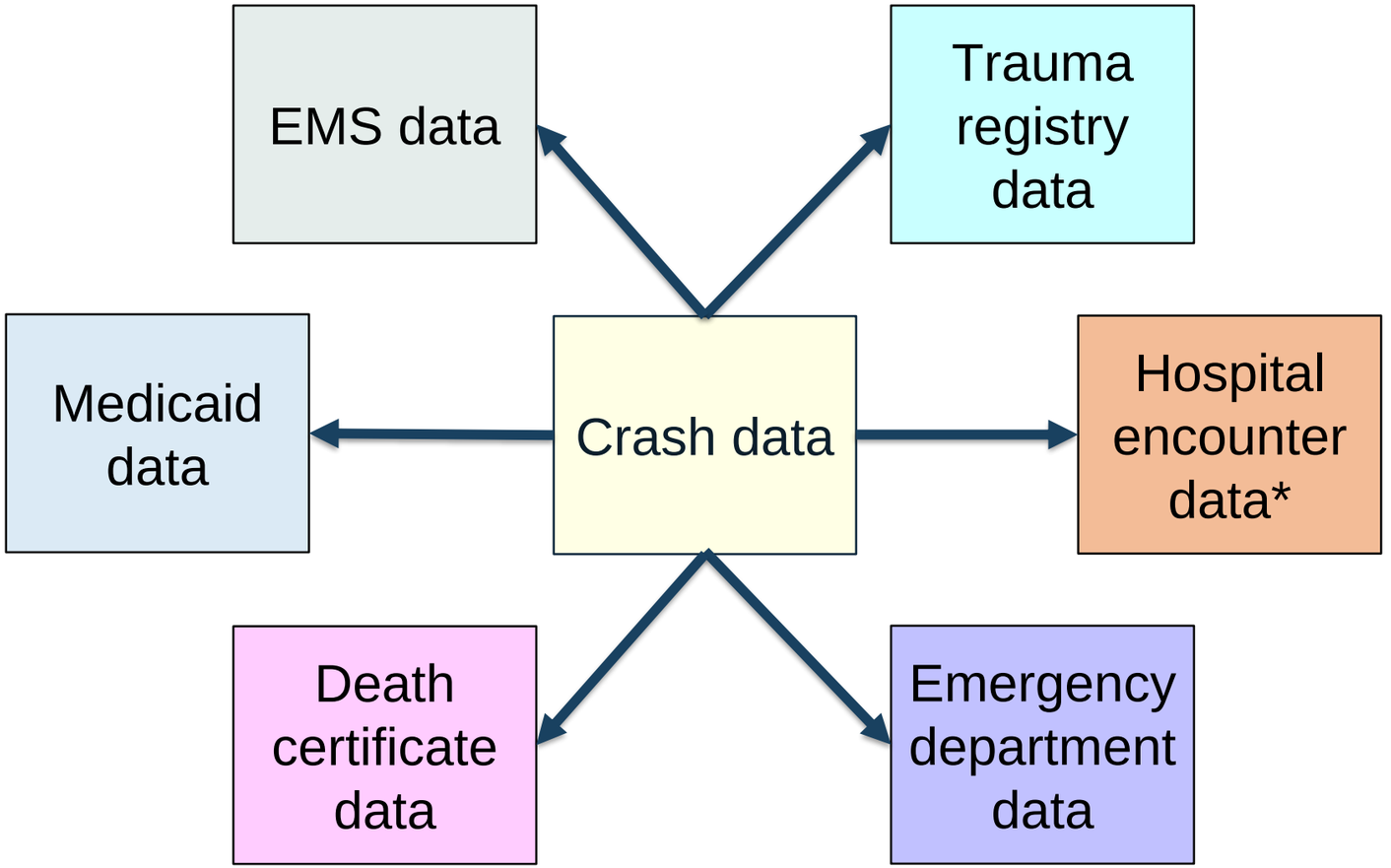
Centers for Disease Control and Prevention

North Carolina Department of Health and Human Services
- Injury and Violence Prevention Branch
- State Center for Health Statistics
- Communicable Disease Branch

North Carolina Department of Transportation
- Governor's Highway Safety Program
- Traffic Records Coordinating Committee

University of North Carolina – Chapel Hill
- Carolina Center for Health Informatics
- Highway Safety Research Center
- Injury Prevention Research Center

NC-CISS: Linked Data Sources



*Hospital encounter data: Linked hospital and emergency department data.

Linkage Methods

We investigated four different linkage methodologies but focused on deterministic linkage.

Linkage methods	Description
Hierarchical deterministic linkage w/ fuzzy matching	Matches records using a set of pre-defined shared identifiers over multiple passes or “cascades”; allows some flexing with matching variables (age +/- 1 year)
Recursive partitioning trees	Matches records using a calculated ‘distance’ between linkage variables
Probabilistic linkage	Matches records based on a pre-assigned probability that the match is correct (e.g. Linksolv)
Hand review	Matches records through manual review

Strengths:

- Easy to explain to a multi-disciplinary audience,
- High quality results,
- Fast,
- And replicable in many applications.

Challenge:

A sufficient & representative match rate.

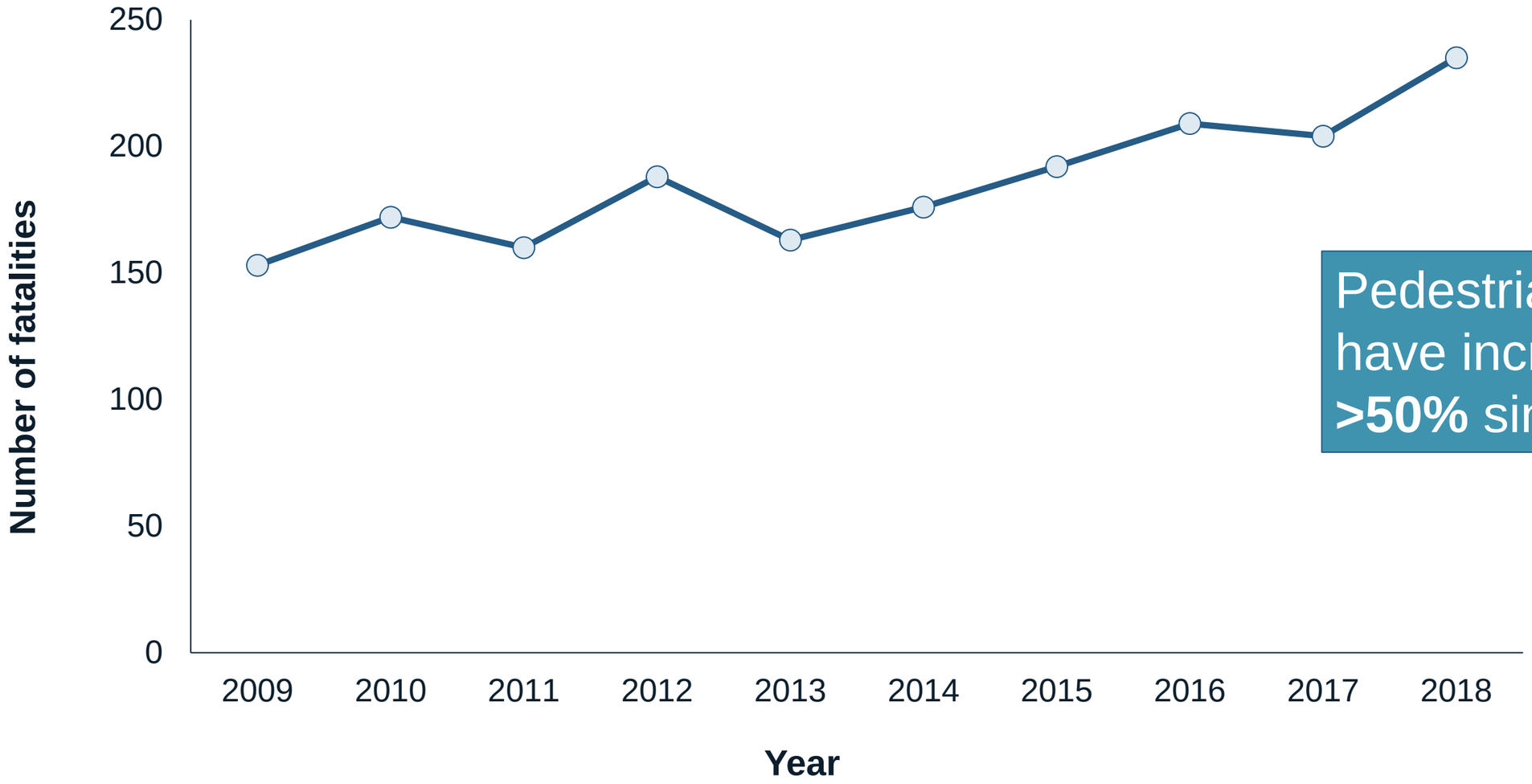
Selected Project Results

Pedestrian Injuries & Fatalities

www.hsrc.unc.edu

October 22, 2020

Number of NC pedestrian fatalities: 2009-2018*

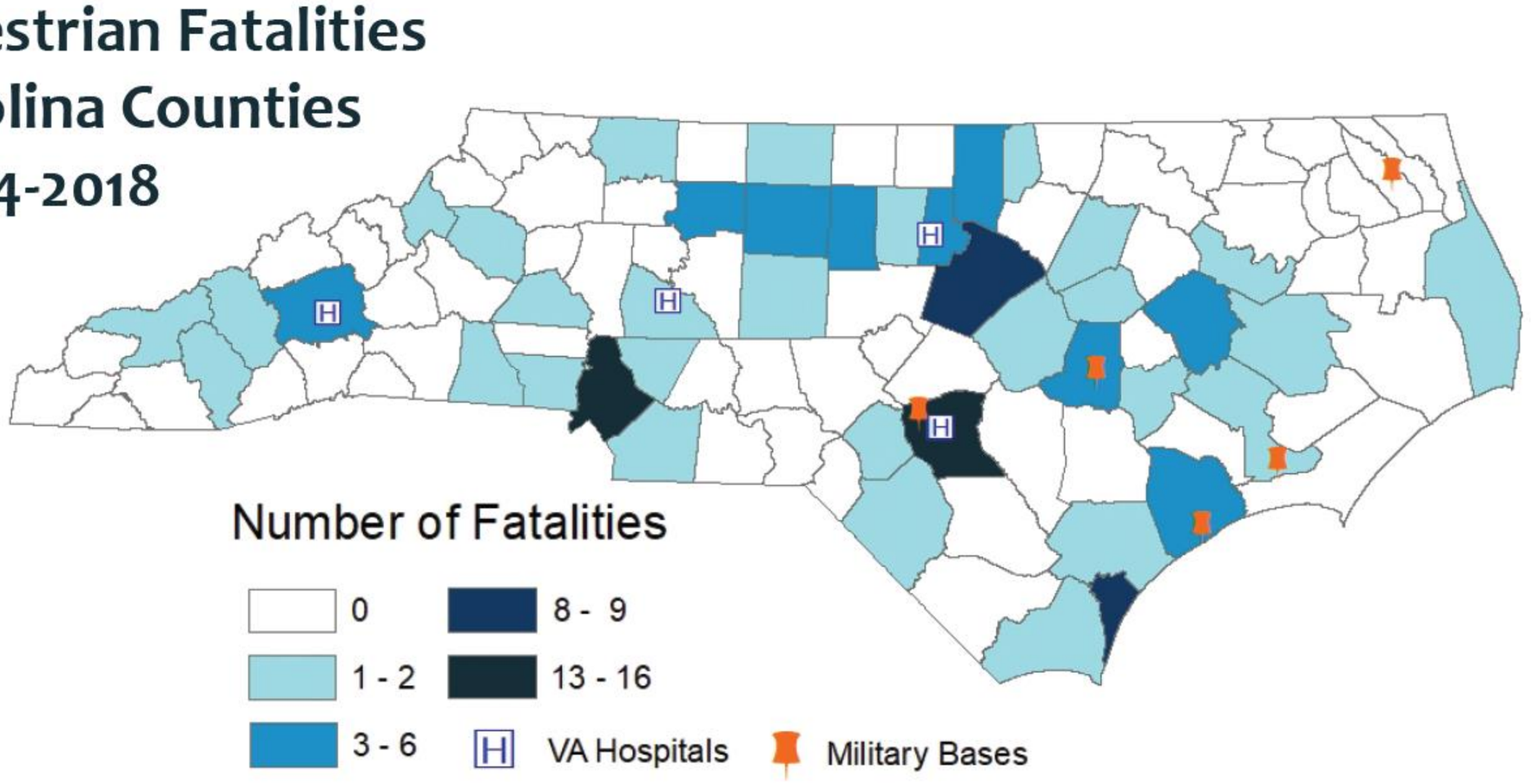


Pedestrian fatalities have increased by **>50%** since 2009

*NHTSA. 2018 Ranking of state pedestrian fatality rates. FARS. https://www-fars.nhtsa.dot.gov/States/StatesPedestrians.aspx. Updated 2020. Accessed Apr 23, 2020.

Why Link to Death Certificate Data?

Veterans make up **11%** of NC pedestrian fatalities, but only **9%** of NC's population are veterans.*



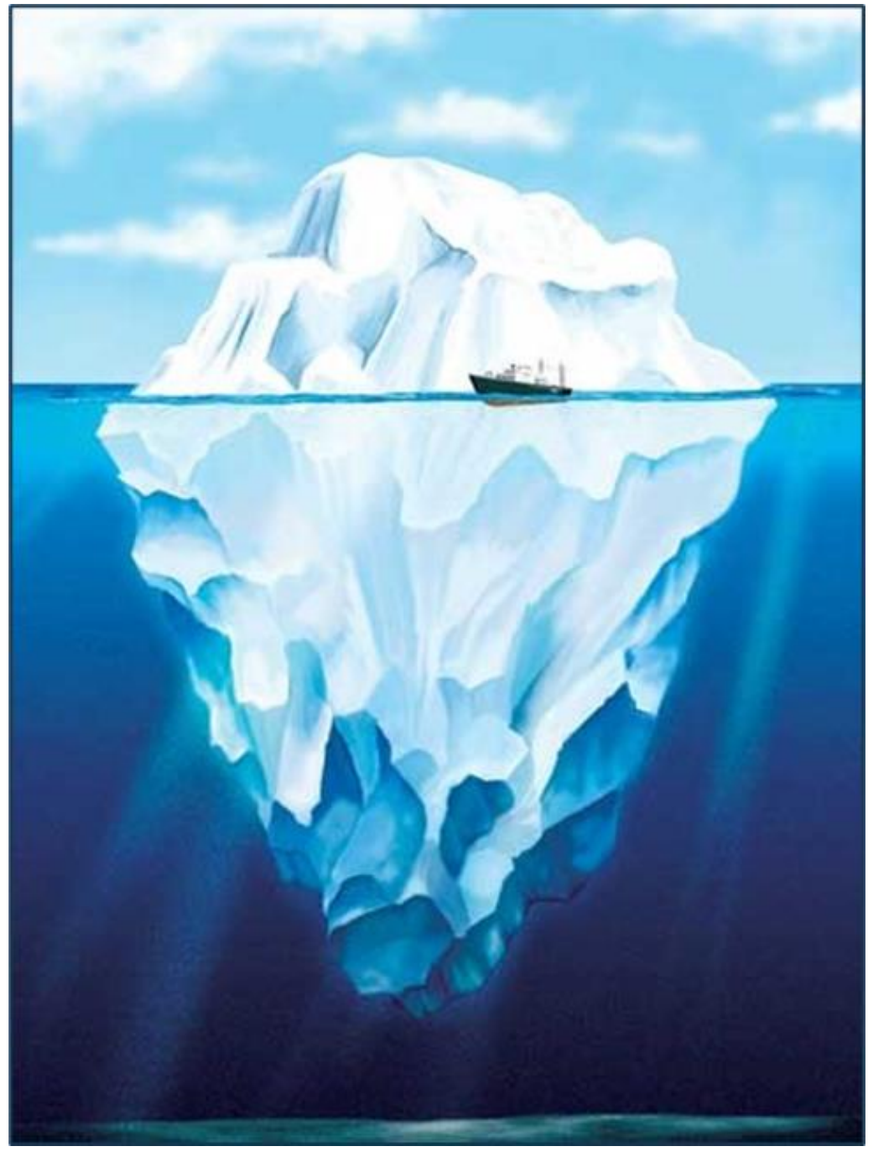
Collaborative Sciences Center for ROAD SAFETY

*US Census Bureau. Selected social characteristics in the United States: North Carolina. ACS 5-Year Estimates Data Profiles. https://data.census.gov/cedsci/table?t=Veterans&g=0400000US37&d=ACS%205-Year%20Estimates%20Data%20Profiles&tid=ACSDP5Y2018.DP02&hidePreview=true. 2018. Accessed Oct 9, 2020.

Fatalities are just part of the problem

For each pedestrian fatality,

7-10 pedestrians are treated in the emergency department (ED).*†

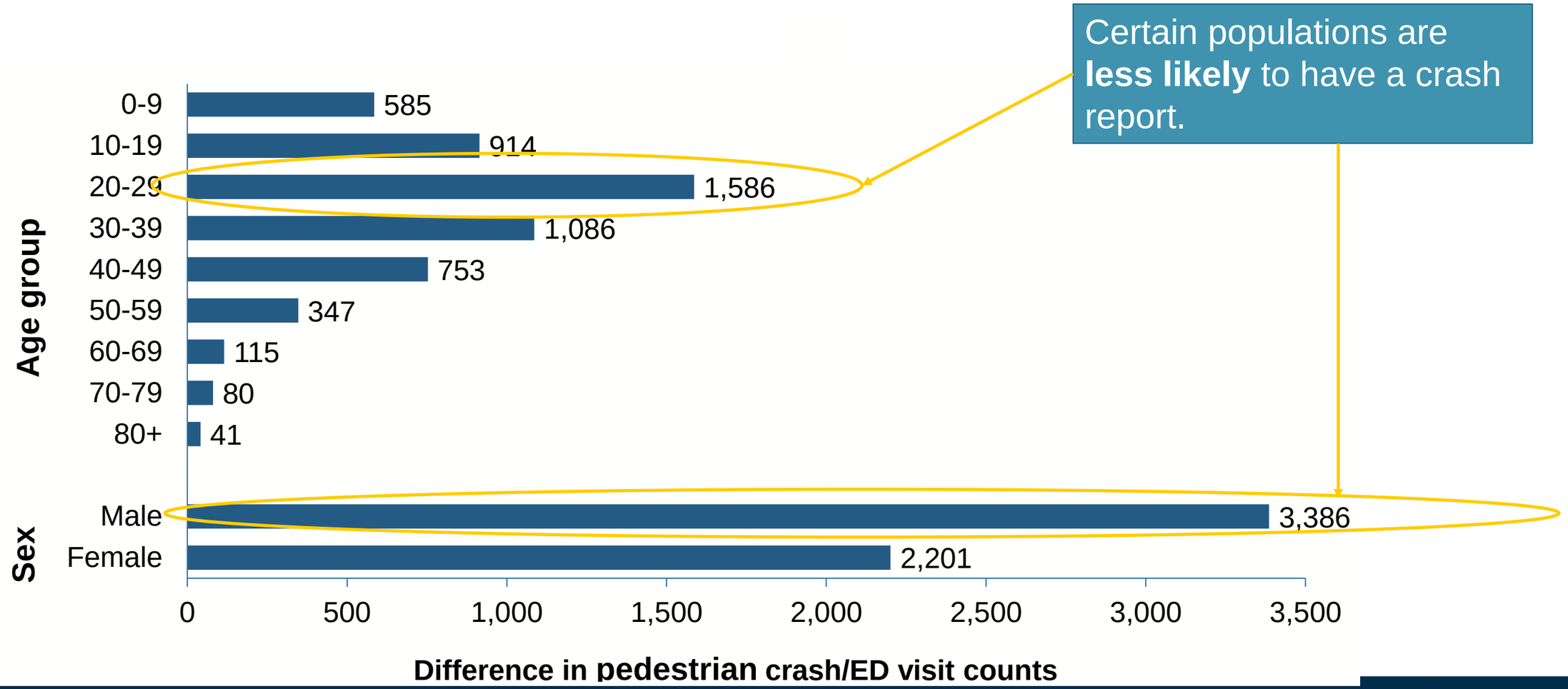


*Police-reported crashes, only.

†Based on NC data linkages performed by study authors (estimate varies by ED visit data source).

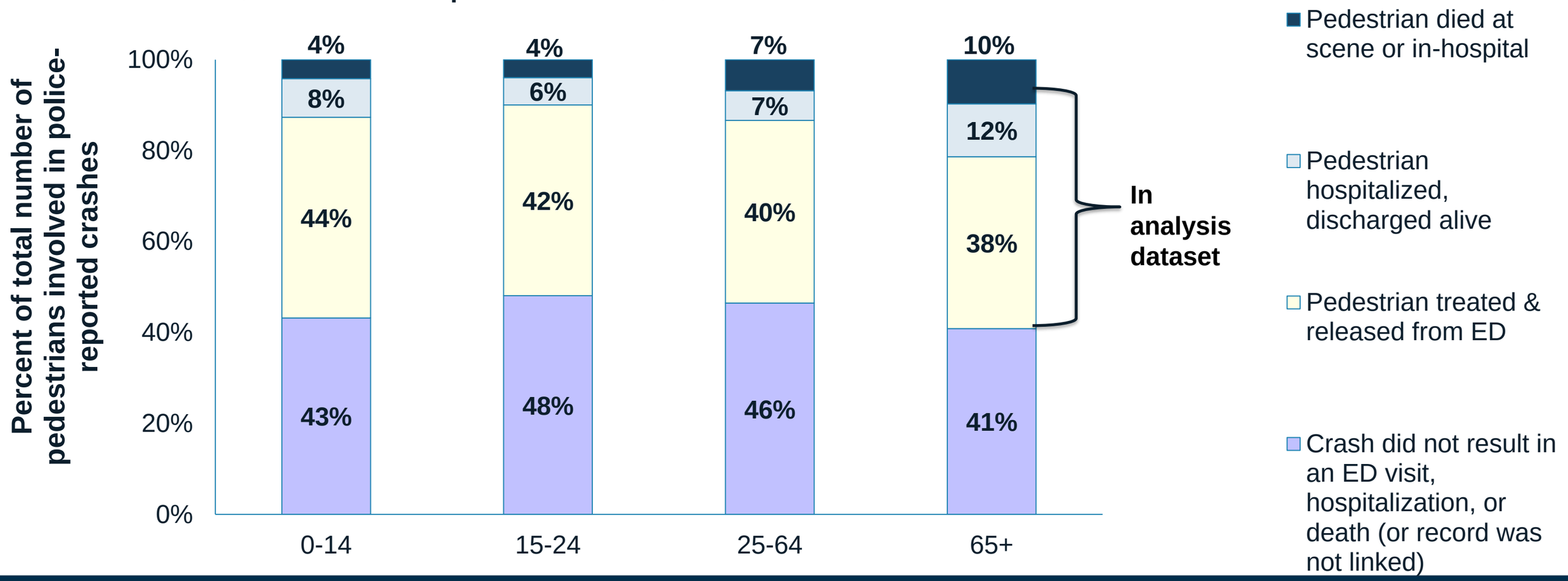
NC Pedestrian Injuries: CSCRS, 2010-2015 (N=14,264 [Crash Report], N =19,599 [ED])

NC crash data underestimates the total number of pedestrian injuries by 32%.

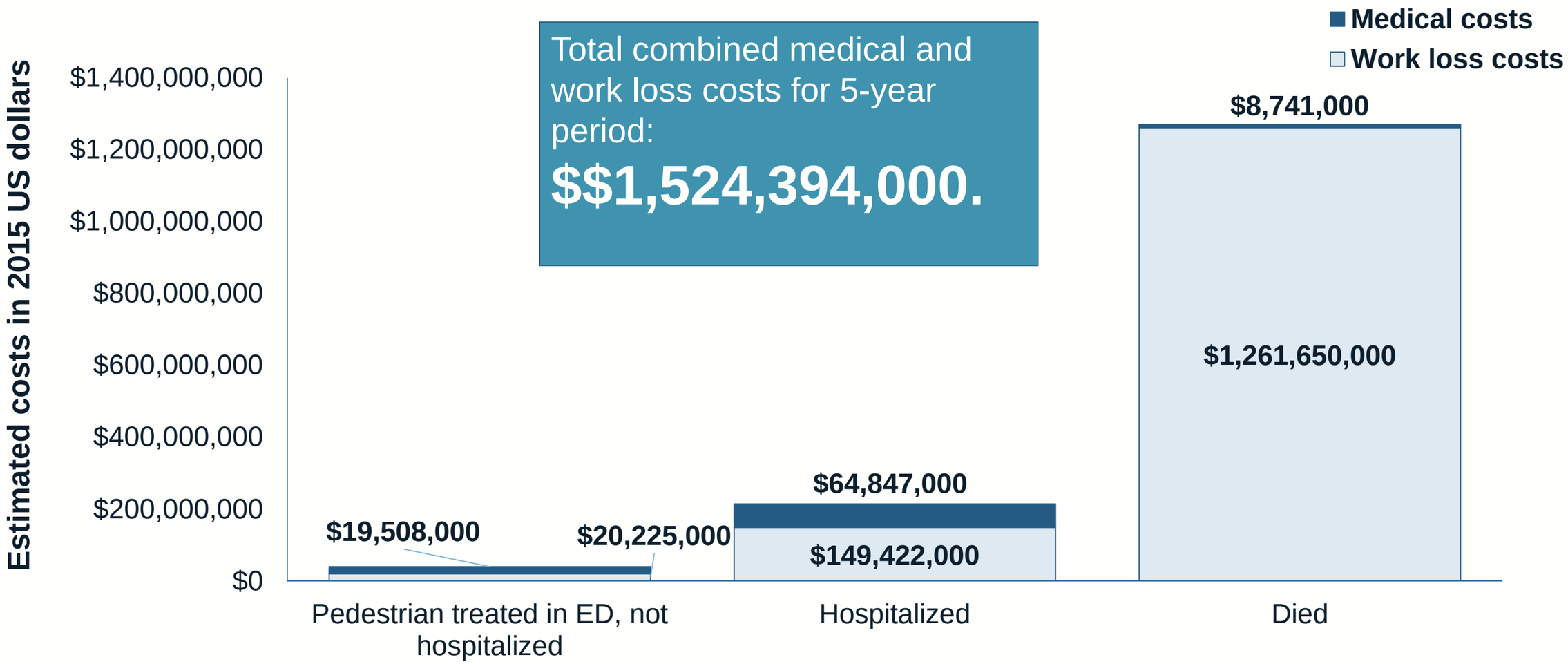


Study Population: CSCRS, 2010-2015

A total of 6,919 crash records for pedestrians involved in police-reported traffic crashes linked to incident NC emergency department visit records for the period October 1, 2010 – September 30, 2015.

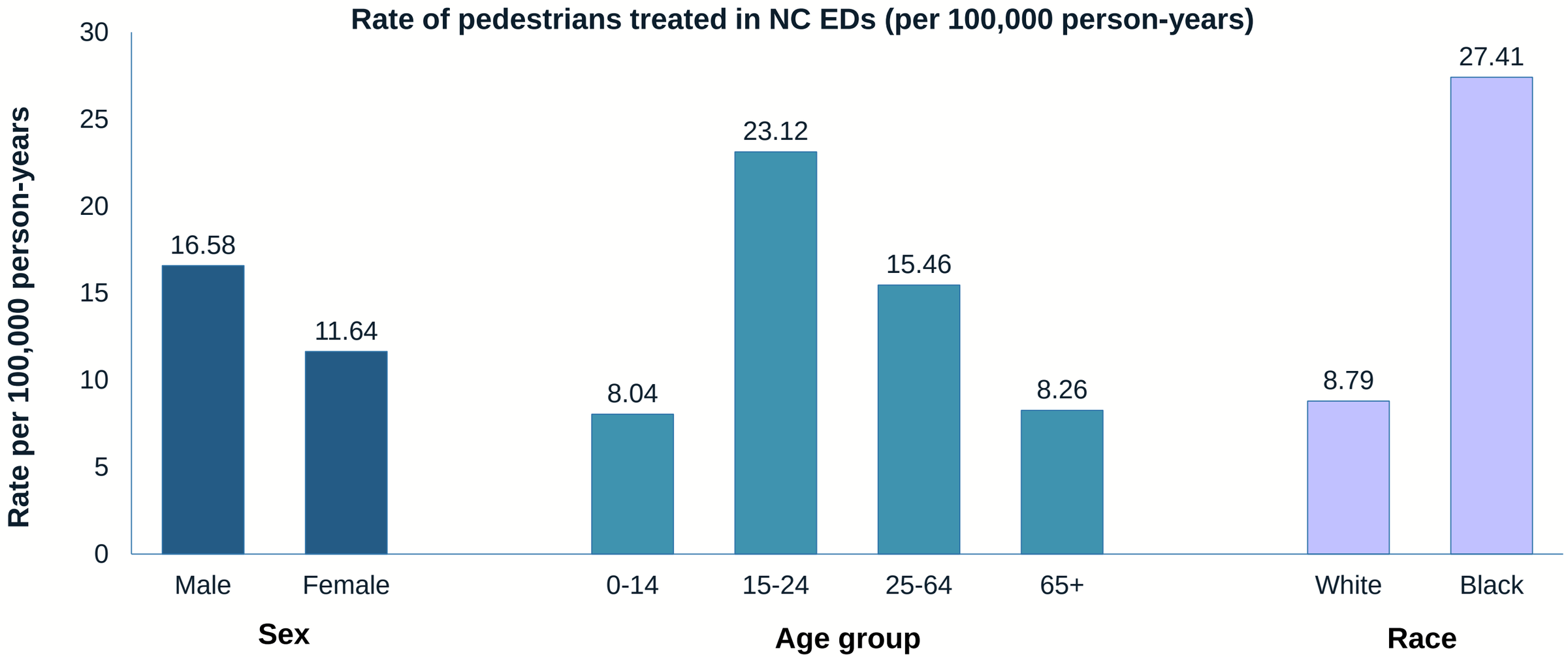


Total Estimated Combined Medical & Work Loss Costs for NC Pedestrian Injuries & Fatalities: CSCRS, 2010-2015*

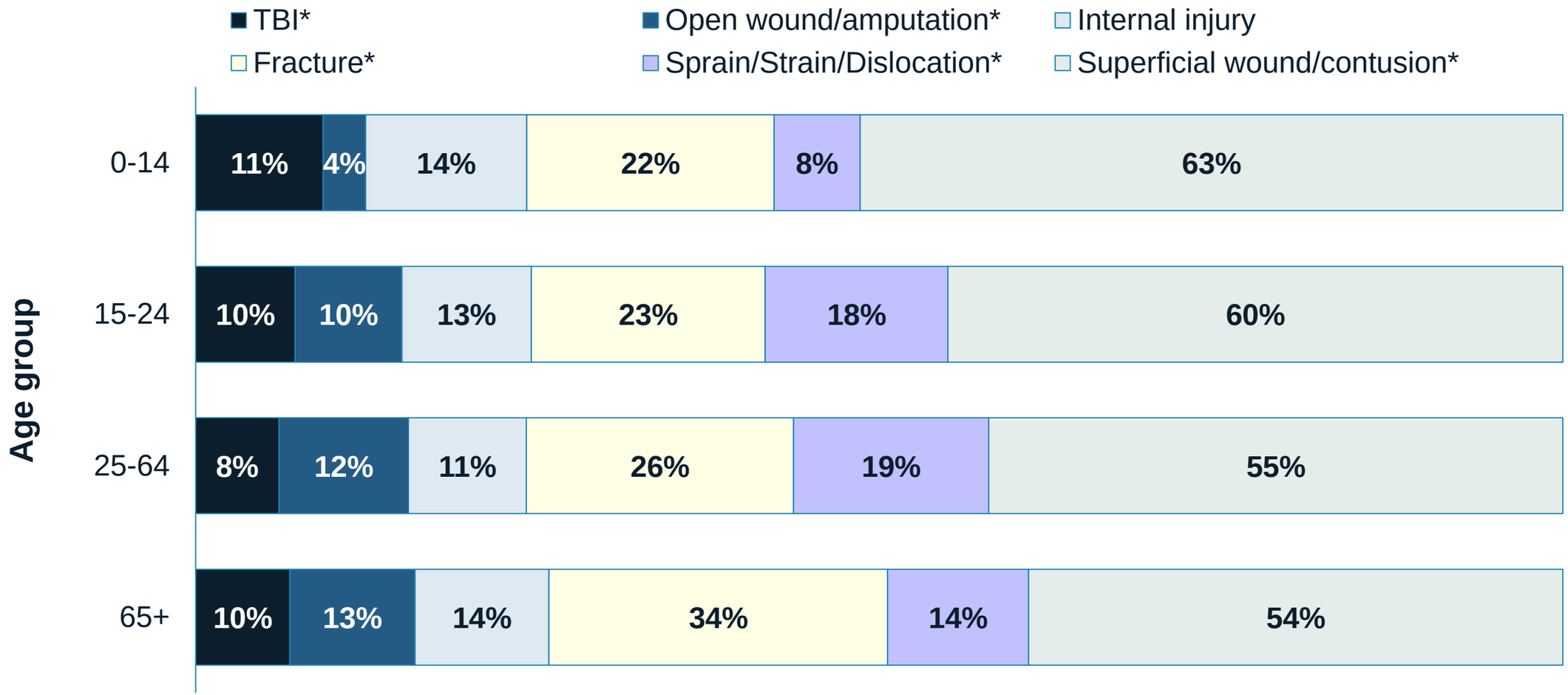


*NCIPC, CDC. Data & Statistics (WISQARS™): Cost of Injury Reports. https://wisqars.cdc.gov:8443/costT/. September 2014. Accessed Oct 12, 2020.

NC Pedestrian Injury-Related Emergency Department Visits: CSCRS, 2010-2015



Injury Diagnoses among Injured NC Pedestrians: CSCRS, 2010-2015†



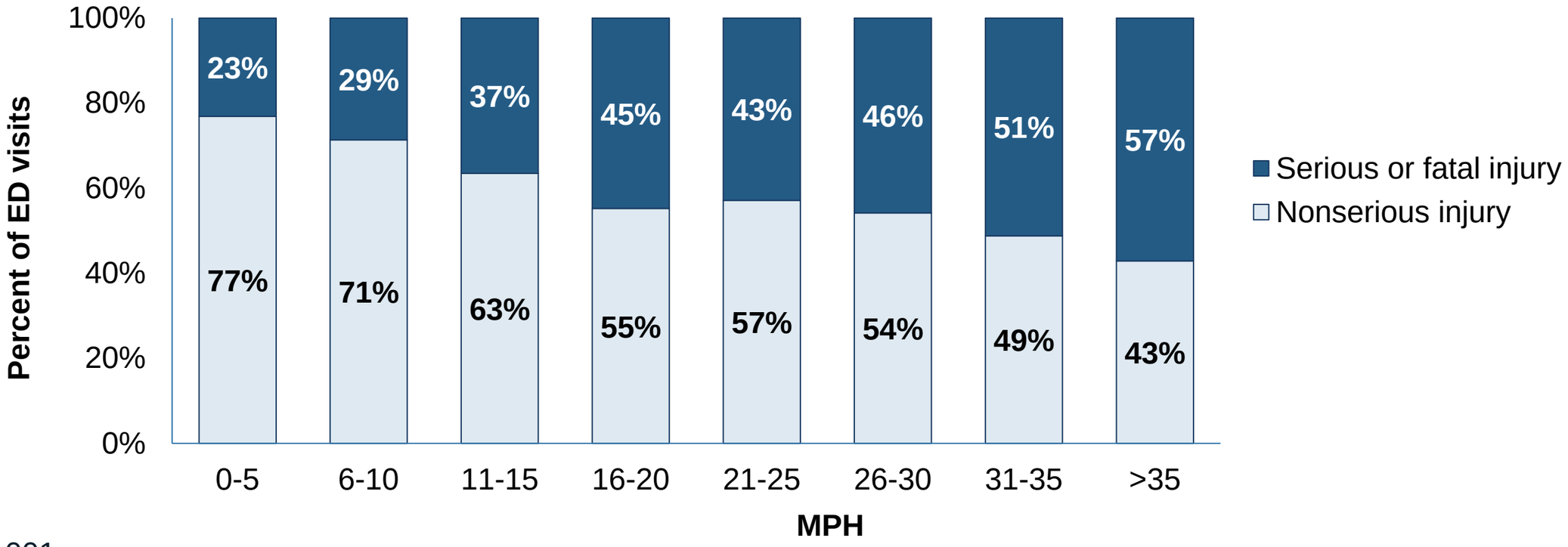
Abbreviations: TBI, traumatic brain injury

**P*-value = <.05

†Patients may have more than one injury; therefore percentages do not sum to 100%.

NC Pedestrian Injury Severity & Estimated Driver Speed at Impact: CSCRS, 2010-2015*†

Pedestrian injury severity: Defined according to clinical characteristics, not law enforcement assessment (i.e. KABCO).‡



*Significant at p <.001.
†Speed at impact estimated by investigating law enforcement officer.
‡Fatal/serious injury based on NTSB definition: NTSB. https://www.ntsb.gov/Documents/6120_1web_Reader.pdf.

CSCRS R22: www.roadsafety.unc.edu/research/projects/2019r22

CCHI Transportation and Health Data: http://cchi.web.unc.edu/transportation-health-data/

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
Anna E. Waller, ScD
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

TABLE 1. Injury Data Available By Data Source

	DMV crash data	EMS data from EMSPIC	ED data in NC DETECT	Trauma Registry data
KABCO	✓			
Primary impression		✓		
Triage notes			✓	
Primary symptom		✓		
Chief complaint		✓	✓	✓
Diagnostic codes			✓	✓
Disposition		✓	✓	✓
Glasgow Coma Scale (GCS)		✓		✓
Injury Severity Scores (AIS/ISS)				✓

TABLE 2. Results with Deterministic Linkage

Project / Description	Data Sources: Crash	Data Sources: Pre-Hospital	Data Sources: Hospital	Linkage Fields Used: Unique ID	Linkage Fields Used: Patient Data	Linkage Fields Used: Timing	Linkage Fields Used: Location	Results of Linkage (% Matched)
Pilot Project Describe and integrate three data sources: crash report, EMS and ED for Wake County, NC	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 (18%)
Demonstration Project I Describe & integrate pedestrian & bicycle involved MVCs using two sources: EMS and crash report data	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	Patient county of residence (same) OR destination hospital (same)	**3:** Crash to EMS data (14%)
Quality Improvement Project I Evaluation of pedestrian/bicycle crash custom event reports available in NC DETECT			ED visit data in NC DETECT + data from a level I trauma center	Medical record # (same)		ED arrival date/time (+/- 1 hour)		**4:** Trauma to ED visit data (99%)

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 crash injury stakeholders (crash data owners, crash data users, etc.).

Then, we held two half-day meetings with NC MVC crash injury stakeholders to identify and discuss potential health outcome data sources for integration.

Finally, we performed a series of demonstration and quality improvement projects using NC DMV crash report and health outcome data sources. Many of these projects are on-going.

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.

Demonstration Project I

1. Document methods used to perform data linkage.
2. Improve quality of health outcome data captured by NC OEMS.

Quality Improvement Project I

1. Improve injury mechanism coding in NC DETECT data for the improvement of pedestrian/bicycle crash injury surveillance.
2. Explore the use of keyword-based definitions for identifying pedestrian/bicycle crash-related NC DETECT ED visits.

TABLE 3. Other Motor Vehicle Crash-Health Outcome Data Integration Projects

	Description	Status (April 2019)
Demonstration Project 2	Crash Report -> NC DETECT ED visit data integration	Completed; linkage undergoing review & evaluation
Demonstration Project 3	Crash Report -> NC trauma center data integration	Linkage in progress
Demonstration Project 4	Crash Report -> NCHA hospital encounter data integration	Completed; results of linkage available at http://go.unc.edu/thdata

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 receiving permission to utilize these fields, which often contain personal identifying information) has been a challenge.

Acknowledgments

We would like to acknowledge the Governor's Highway Safety Program (GHSP), UNC Highway Safety Research Center (HSRC), the UNC Injury Prevention Center (IPRC), EMS Performance Improvement Center (EMSPIC), North Carolina Healthcare Association (NCHA), NC Division of Public Health (NC DPH), and the National Highway Traffic Safety Administration (NHTSA) GO Team.

This poster was supported by Project Number M3DA-18-14-03 from the Governor's Highway Safety Program.

Data 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.

Acknowledgments: Project Team

- **PI:** Anna Waller
- **Project Managers:** Kathy Peticolas & Erika Redding
- **Carolina Center for Health Informatics:** Clifton Barnett, Dennis Falls, Amy Ising
- **NC Division of Public Health:** Alan Dellapenna, Mike Dolan Fliss, Scott Proescholdbell
- **NC Trauma Registry:** Sharon Schiro
- **UNC HSRC:** Kari Hancock, Seth LaJeunesse, Nancy Lefler, Eric Rodgman, Laura Sandt, Libby Thomas
- **UNC Injury Prevention Research Center:** Steve Marshall, Becky Naumann
- **Contributions from ~50 Project Stakeholders**

Acknowledgments: Funding Sources

- 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.

Questions & Contact Information

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HIGHWAY SAFETY RESEARCH CENTER

www.hsrc.unc.edu

October 22, 2020

VISION ZERO SF

Through Vision Zero SF we commit to working together to prioritize street safety and eliminate traffic deaths in San Francisco.

Health and Transportation Partnerships: Integrating Health Data into Transportation Planning in San Francisco, CA

Pedestrian & Bicycle Information Center
Health and Transportation Webinar Series | October 22, 2020

Shamsi Soltani, MPH
Vision Zero Epidemiologist, San Francisco Department of Public Health

TRAFFIC INJURY IN SAN FRANCISCO: A PUBLIC HEALTH PROBLEM

~30 **Fatalities per year**

~500 **People hospitalized with severe injuries annually in our public hospital**

$35M **in medical costs *alone* per year**

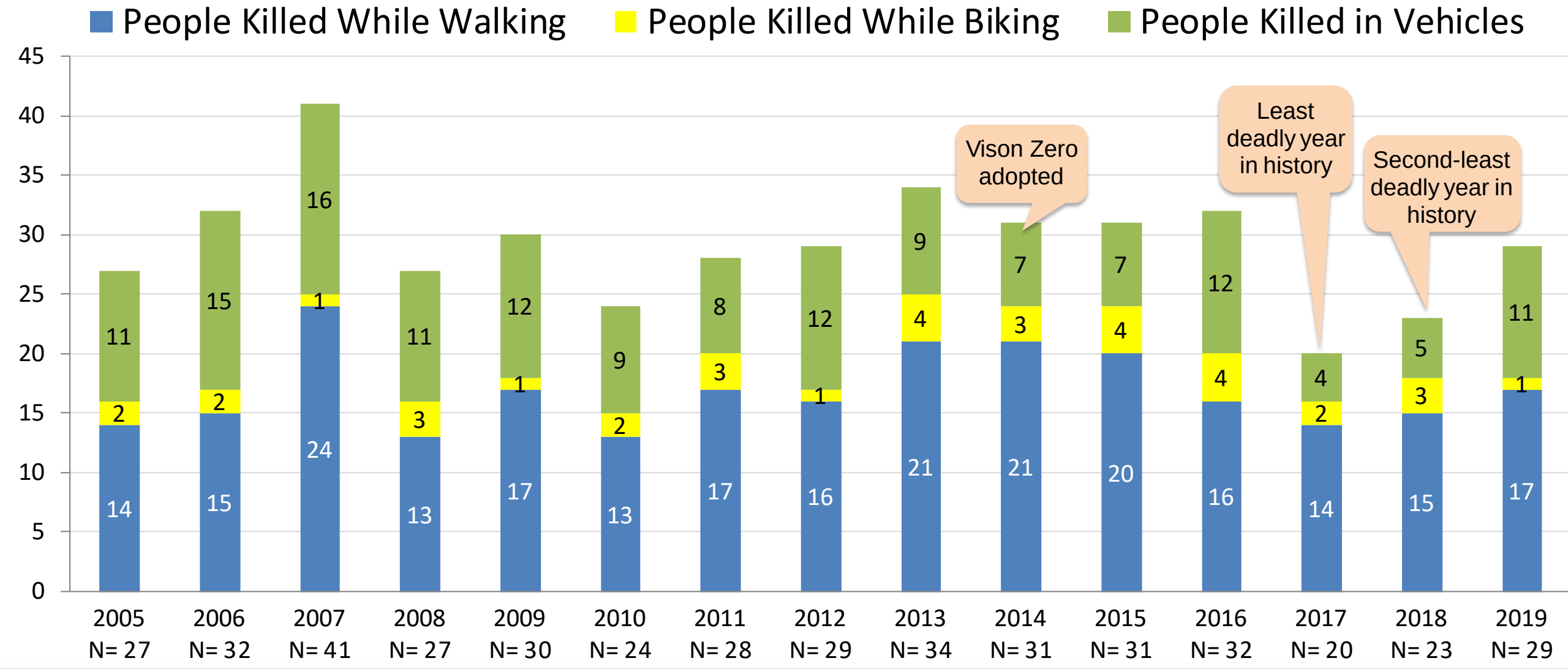
On average, City Trauma Surgeons respond to a serious traffic injury **every 17 hours.**

~50% of the patients seen at **Zuckerberg San Francisco General's Trauma Center** *are* ***people injured in traffic collisions.***

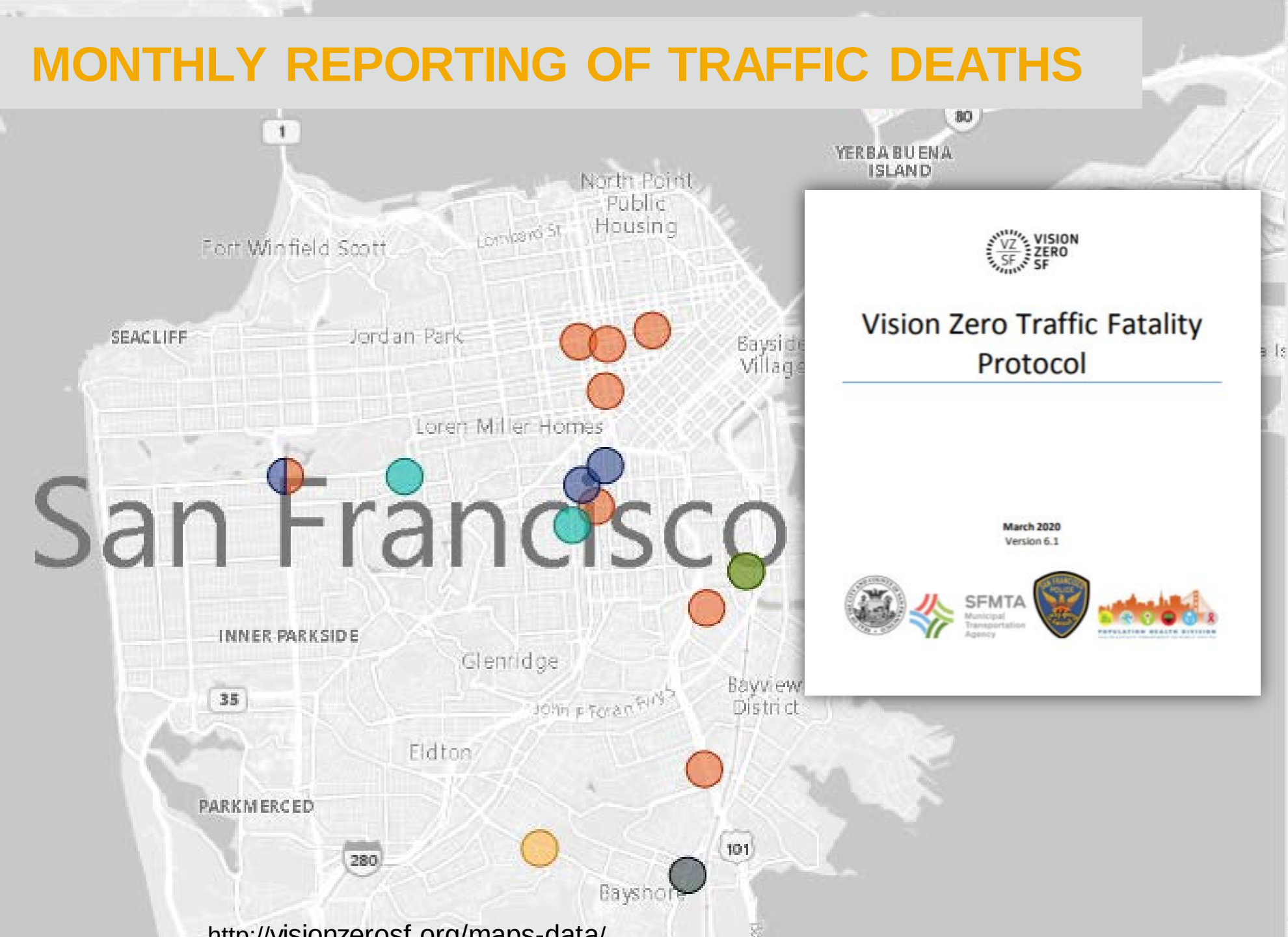
PUBLIC HEALTH IS INTEGRAL TO VISION ZERO SF

Vision Zero Role	Public Health Approach
Co-Chair of Mayor's Citywide Vision Zero Task Force with SF Municipal Transportation Agency	Multi-sector ***Partnerships***, ***Stakeholder Engagement***
Lead for **Data Systems**	Data-Driven to Prevention - Focus on: • ***Most Severe Health Outcomes*** • ***Comprehensive Data*** • ***Emerging Issues***
Community Engagement and Education	Engaging with ***Vulnerable Communities*** ***Coordinated Crisis Response*** for ***Victims' Families***
Policy	***Doctors as Critical Voices for Change*** ***Evidence-Based Policy*** ***Addressing Structural Issues***
Elevating Equity	***Equity is Core to Public Health***

TRAFFIC-RELATED DEATHS IN SAN FRANCISCO



MONTHLY REPORTING OF TRAFFIC DEATHS



Choose a Year:

- [ ] 2014
- [ ] 2015
- [ ] 2016
- [ ] 2017
- [ ] 2018
- [ ] 2019
- [x] 2020

Choose a Fatality Type:

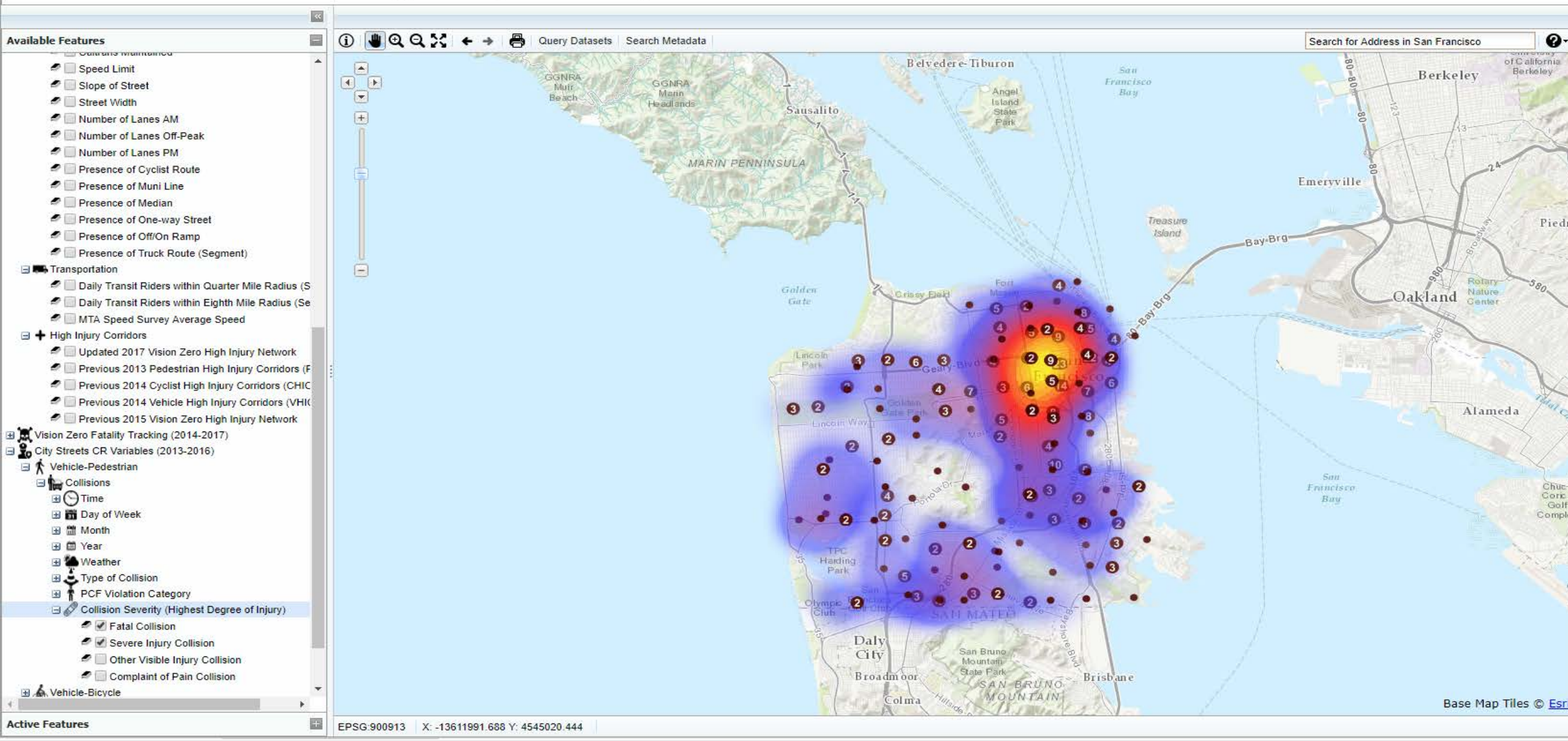
- [x] Select all
- [x] Pedestrian
- [x] Driver
- [x] Passenger
- [x] Cyclist
- [x] Motorcyclist
- [x] Exterior Passenger

Choose a Street Type:

http://visionzerosf.org/maps-data/

TransBASE: Linking Transportation Systems to Our Health

TRANSBASESF.ORG



VISION ZERO INJURY PREVENTION RESEARCH COLLABORATIVE (VZIPR)

Working since 2014 to develop, institutionalize and utilize **comprehensive injury data** in support Vision Zero SF's **data-driven, evidence-based approach** to saving lives.

Diverse group:

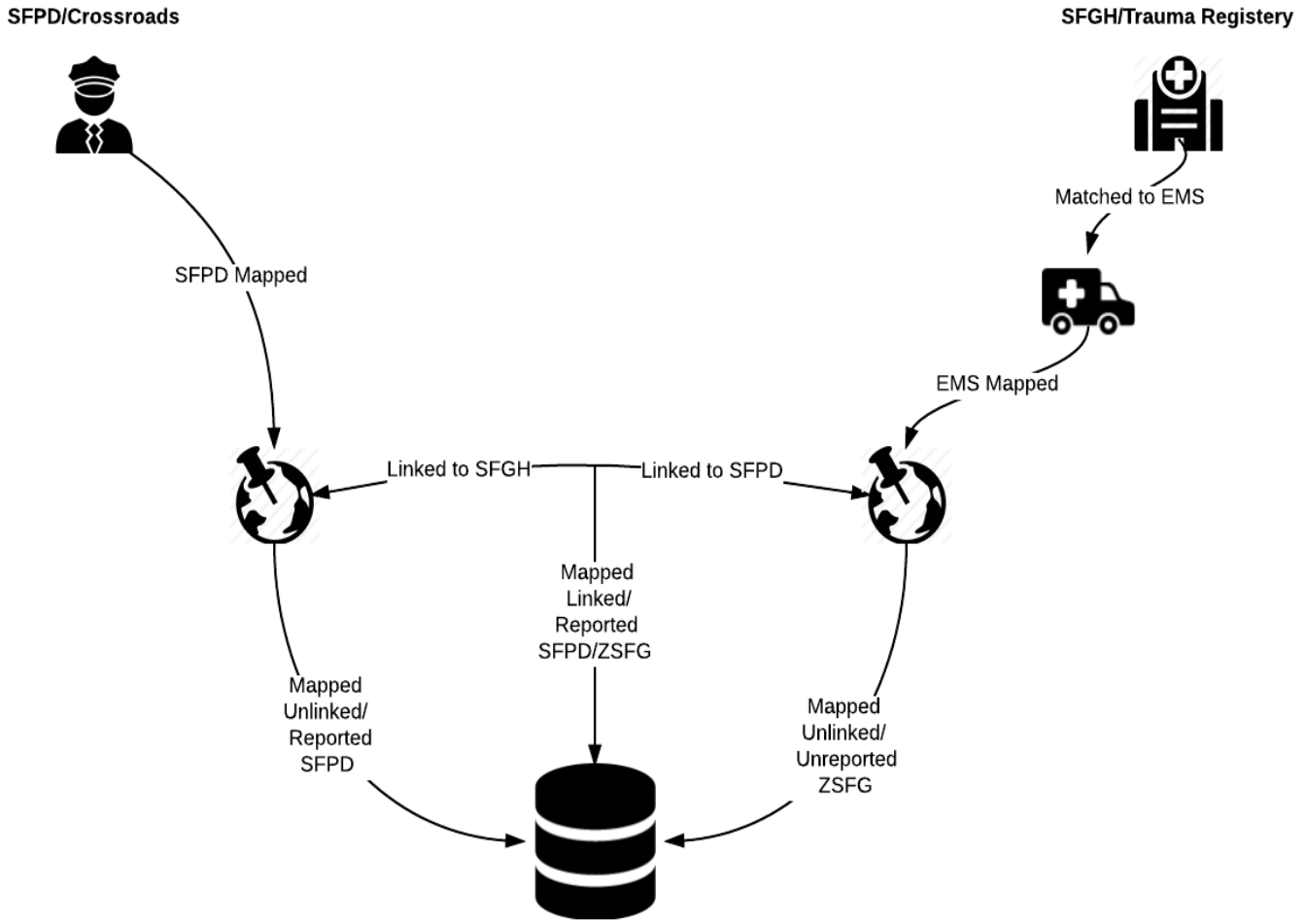
- Vision Zero Epidemiologist *funded by SFMTA*
- Trauma Surgeons and Nurses
- Emergency Physicians
- Geospatial Analysts
- & other key staff

ZUCKERBERG SAN FRANCISCO GENERAL Hospital and Trauma Center

VZ SF

POPULATION HEALTH DIVISION
SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH

LINKING HOSPITAL AND POLICE DATA: TRANSPORTATION RELATED INJURY SURVEILLANCE



Transportation Injury Surveillance System (TISS)

IMPROVING INJURY SURVEILLANCE FOR TARGETED INTERVENTIONS

Standard Practice: Police Reported Injury Collisions

- Detailed data about **crash characteristics**
- Little data on injury severity (4 levels of injury severity classification)
- **Underreporting** of injuries
  - 21% underreporting of pedestrian injuries (Sciortino et al 2005)
  - 27% underreporting of cyclist injuries (Lopez et al 2012)

Unintentional Injury: Hospital Medical Records

- Improved **injury severity assessment** and detailed health outcome data
- **Comorbidities** (mental illness, hypertension, etc)
- **Disability** status
- **Demographics** (race/ethnicity, insurance type)
- **Homelessness**
  - Little data on cause, injury location
    - Mechanism of injury code
    - No location info
    - No cause of crash info

Police Definition:
Visual Assessment

b. Suspected Serious Injury. A suspected serious injury is any injury other than fatal which results in one or more of the following:

(1) Severe laceration resulting in exposure of underlying tissues/muscles/organs or resulting in significant loss of blood.

(2) Broken or distorted extremity (arm or leg).

(3) Crush injuries.

(4) Suspected skull, chest or abdominal injury other than bruises or minor lacerations.

(5) Significant burns (second and third degree burns over 10% or more of the body).

(6) Unconsciousness when taken from the collision scene.

(7) Paralysis.

CHP 555 Collision Investigation Manual

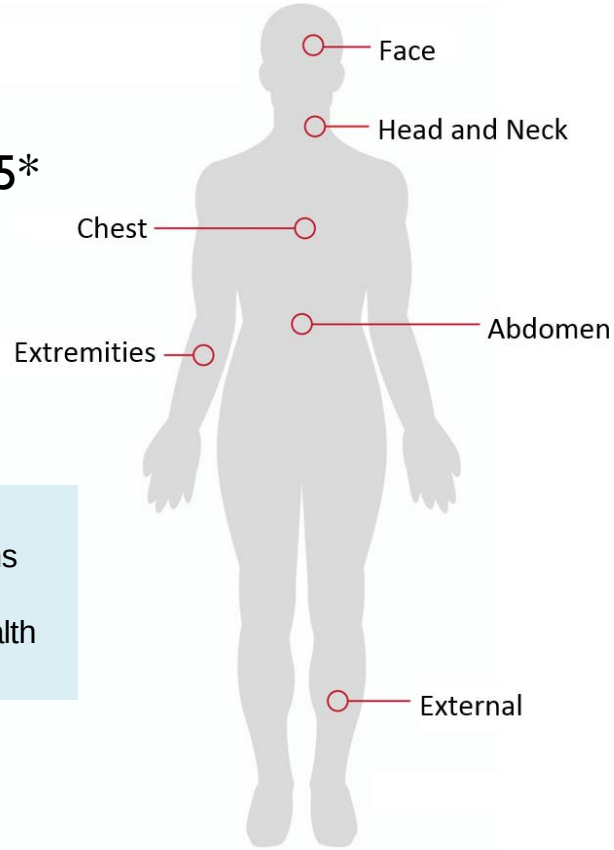
Hospital-Based Definition:
Clinical Examination

Severe Injury:

Admitted to ZSFGH

and/or

Injury Severity Scale (ISS) > 15*



Consistent with:
- American College of Surgeons
- National Trauma Data Bank
- California Dept. of Public Health
- World Health Organization

Different Severe Injury Definitions = *Changes in Severity Classification in Linked Data*

** Injury Severity Scale (ISS) score correlates linearly with mortality, morbidity, hospital stay and other measures of severity.*

WHO IS TRANSPORTED TO HOSPITAL BUT NOT REFLECTED IN POLICE REPORTS?

Severely-injured bicyclists

39%

Severely-injured pedestrians

24%

Severely-injured people in vehicles

28%

More information available at: https://www.sfdph.org/dph/EH/PHES/PHES/TransportationandHealth.asp

HIGH INJURY NETWORK

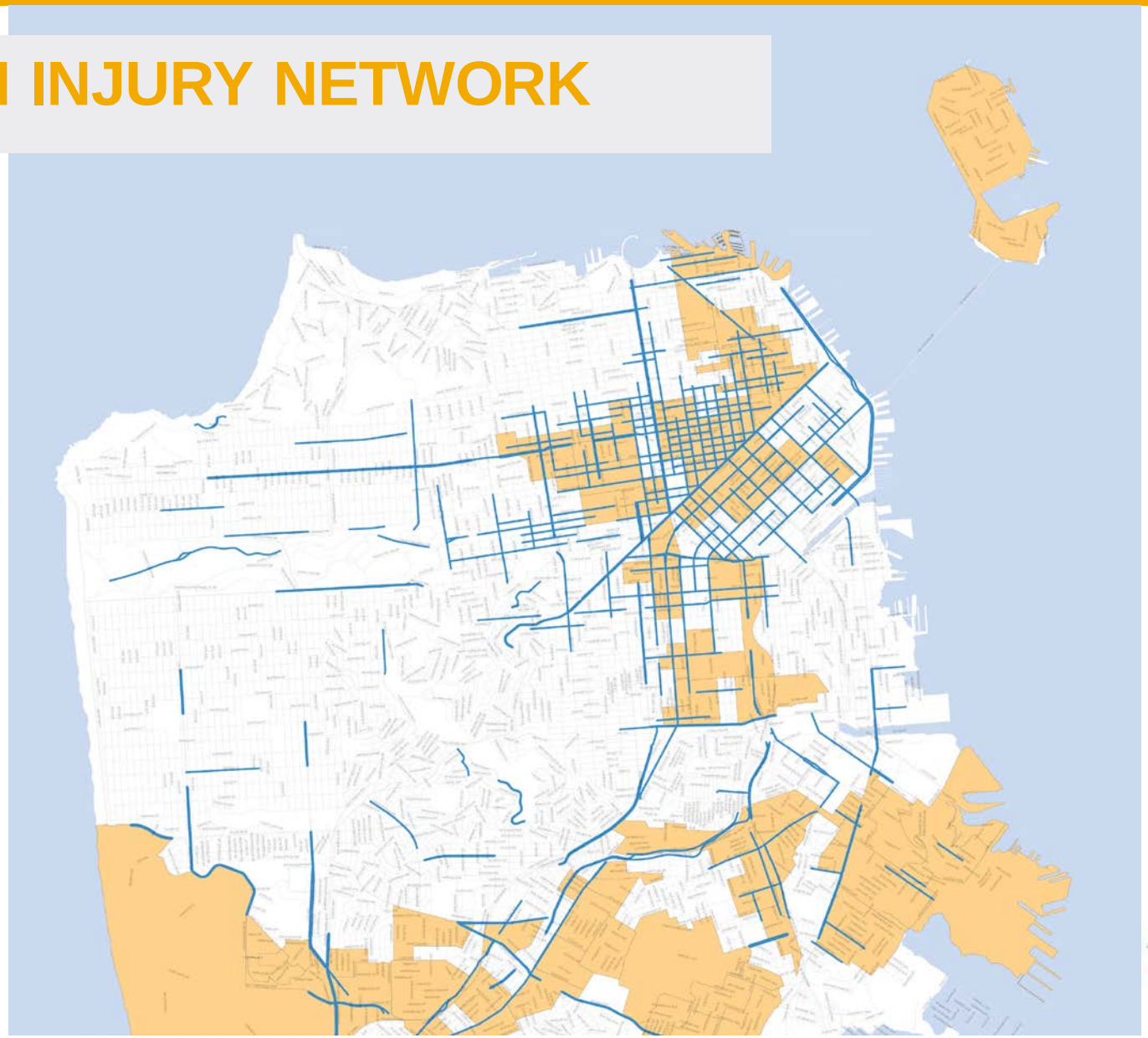
SEVERE AND FATAL INJURY BY DATA SOURCE (2013-2015)

59% Linked Police and Hospital (N=883)

28% Hospital Only (N=411)

7% Police Only (N=104)

6% Medical Examiner (N=96)



13% of the city's street miles

75% of all severe and fatal injuries

77% of pedestrian severe and fatal injuries

71% of cyclist severe and fatal injuries

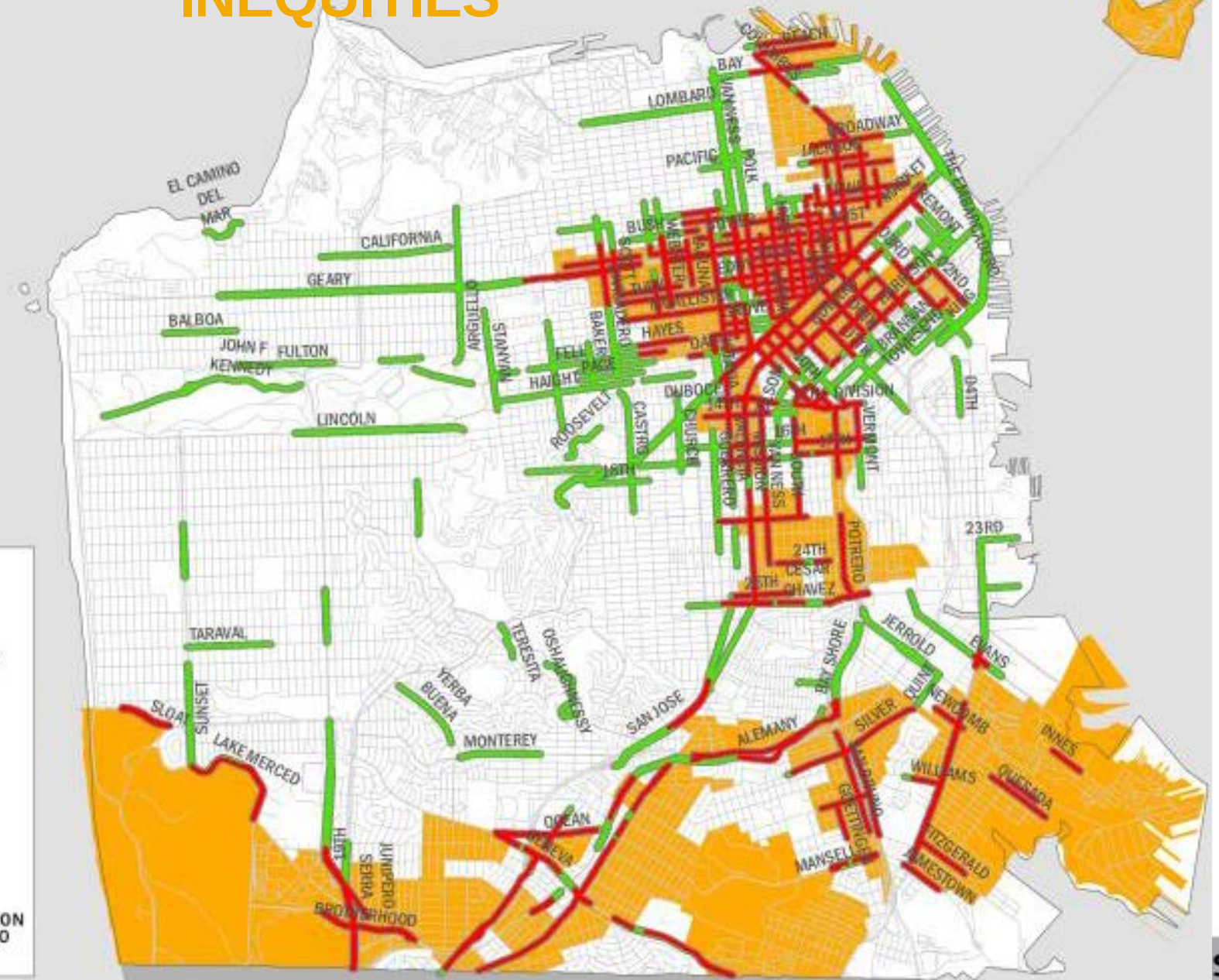
75% of vehicle severe and fatal injuries

61% of all transportation-related injuries

IDENTIFYING VULNERABLE COMMUNITIES AND INEQUITIES

31% of Surface Streets

51% of the High Injury Network



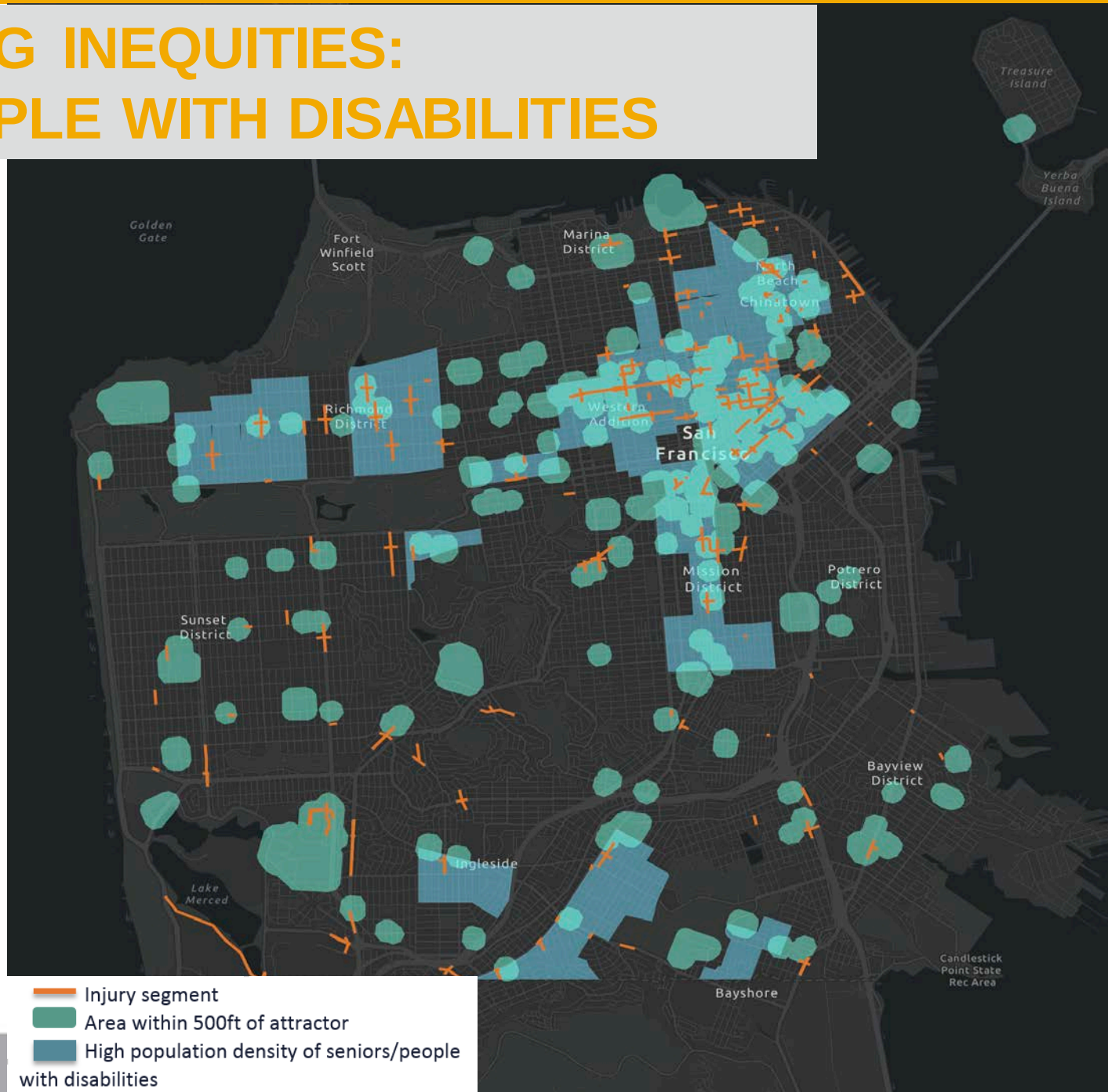
TARGETING INEQUITIES: SENIORS AND PEOPLE WITH DISABILITIES

Injury Segments in Priority Areas:

- 75% of severe/fatal injuries
- 57% on the VZ High Injury Network
- 35% on **Traffic Calm-able Streets**

Priority Areas: **Where Seniors and People with Disabilities Live and Travel**, e.g.:

- Census Tracts with the highest 1/3 of population density
- Senior Centers
- Public Libraries
- Paratransit Drop Off/Pick Up Locations
- Public Health Facilities



DEMAND FOR INJURY DATA

The New York Times

WHEELS

Health Officials Prepare to Track Electric Scooter Injuries

After a brief absence, shared electric scooters will soon return to San Francisco, and the city and its doctors want to track the injuries that result — from skinned knees to head trauma. Jason Henry for The New York Times

STREETSBLOG CHICAGO

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What Can We Do to Make Dockless Electric Scooters Safer?

Atlanta appears to lead nation in e-scooter-related fatalities

Activists have said it's a sign the city needs better transportation infrastructure

By Sean Keenan | @ThatSeanKeenan | Aug 9, 2019, 9:50am EDT

CNBC

CDC says there's an epidemic of e-scooter injuries that could easily be prevented

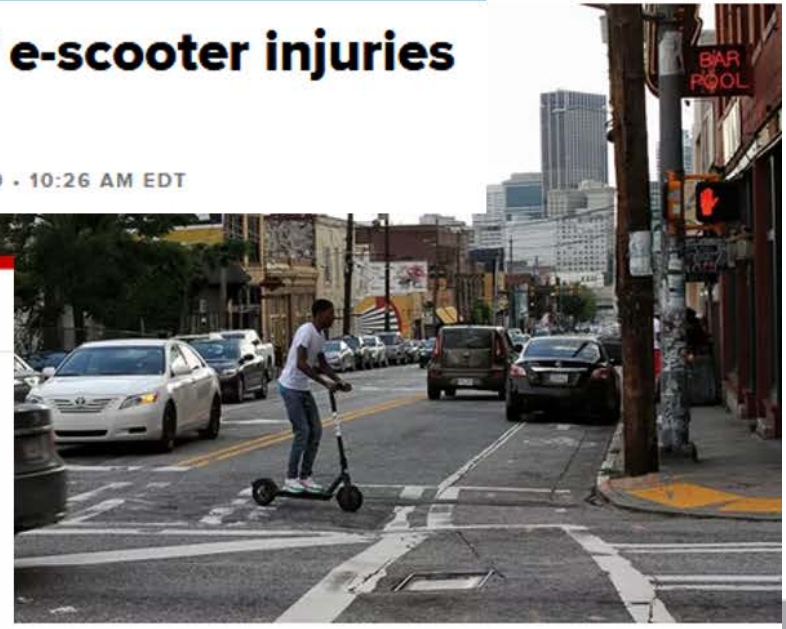
PUBLISHED WED, MAY 1 2019 • 7:30 AM EDT UPDATED WED, MAY 1 2019 • 10:26 AM EDT

CNN health • LIVE TV

Injuries prompt CDC investigation into e-scooters

By Sharon Jayson, Kaiser Health News

Updated 3:57 AM ET, Mon March 4, 2019



An e-scooter patron and blocked bike lane at Edgewood Avenue. | Shutterstock

CAPTURING EMERGING VEHICLE TYPES AT ZSFG TRAUMA CENTER

- Congruent with CHP/SFPD categories
- Balance desire for data with capacity to collect data
- Specific enough to respond to data and reporting needs

How to Classify New Modes of Transportation

What we're doing: SFDPH and SFPD are working to better **capture and track injuries involving newer vehicle types** and methods of transportation access (e.g. vehicle sharing programs and app-accessed ride hail) to inform injury prevention measures.

The ask: Pre-hospital and ER staff collect crucial information about collisions that patients may not be able to report themselves. To assist **we ask that you include any of the following terms that may apply to a collision in the narrative description**. Example images are included for clarity:

Electric bicycle (or e-bicycle, e-bike)	
Powered standup scooter (or e-scooter)	
Moped or motor-driven cycle	
Electric skateboard (or e-skateboard)	
Hoverboard, electric unicycle, other electrically motorized board	
Segway-type vehicle	
Ride-hail vehicle, Transportation Network Company car (TNCs; e.g. Uber, Lyft)	
Autonomous vehicle	

PARTNERSHIP PUBLICATIONS

EMERGING MOBILITY INJURY MONITORING IN SAN FRANCISCO, CALIFORNIA UTILIZING HOSPITAL TRAUMA RECORDS: A METHODOLOGY

VERSION 1.0
SAN FRANCISCO, CALIFORNIA
JANUARY 2019

Vision Zero SF Injury Prevention Research Collaborative
A Collaboration between the
San Francisco Department of Public Health's Program on Health, Equity and Sustainability
and the Zuckerberg San Francisco General Hospital and Trauma Center

Points of Contact:

Shamsi Soltani, MPH shamsi.soltani@sfdph.org
Rebecca Plevin, MD rebecca.plevin@ucsf.edu

Recommended Citation:

Vision Zero SF Injury Prevention Research Collaborative. 2019. *A Methodology for Emerging Mobility Injury Monitoring in San Francisco, California Utilizing Hospital Trauma Records: Version 1.0.* San Francisco, CA. Available at: https://www.sfdph.org/dph/EH/PHES/PHES/TransportationandHealth.asp

E-SCOOTER COLLISION AND INJURY ANALYSIS

SAN FRANCISCO, CALIFORNIA
APRIL 2019

Vision Zero SF Injury Prevention Research Collaborative
A Collaboration between the
San Francisco Department of Public Health's Program on Health, Equity and Sustainability
and the Zuckerberg San Francisco General Hospital and Trauma Center

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Rebecca Plevin, MD rebecca.plevin@ucsf.edu

Recommended Citation:

Vision Zero SF Injury Prevention Research Collaborative. 2019. *E-Scooter Collision and Injury Analysis.* San Francisco, CA. Available at: https://www.sfdph.org/dph/EH/PHES/PHES/TransportationandHealth.asp

Both reports available at: https://www.sfdph.org/dph/EH/PHES/PHES/TransportationandHealth.asp

SUCCESSFUL ADVOCACY TO CDC

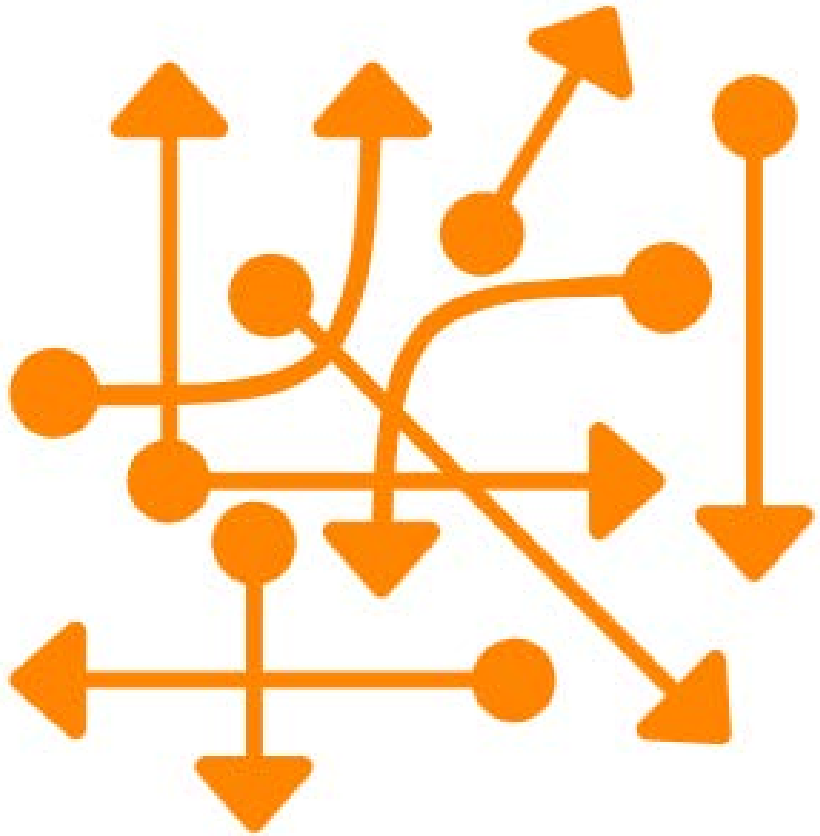
- National patient injury codes close a gap in transportation injury data
- Implemented just this month, for the first time injury associated with micromobility devices will be routinely collected

DATA LINKAGE: ADDED VALUE

- **More accurate, comprehensive data** for decision-making.

Local police data alone:

- Underestimate injury severity
- Miss between 24-39% of ***severe injuries alone*** seen at the hospital, depending on mode



- Leverage strengths of **different data sources**

PARTNERING WITH PUBLIC HEALTH: ADDED VALUE

- Interdisciplinary approach – **clinical expertise and testimony**
- **Access data** to inform **targeted prevention efforts** to save lives, reduce injury severity
- **Understand vulnerabilities** to inform targeted policies: e.g. people with disabilities, people experiencing homelessness.

Acknowledgements

Zuckerberg San Francisco General Hospital
San Francisco Municipal Transportation Agency
San Francisco Police Department
San Francisco Office of the Medical Examiner
San Francisco Fire Department
American Medical Response
King -American Ambulance Company
San Francisco Transportation Authority
San Francisco Department of Public Works
San Francisco Planning Department

Community Partners and Advocates

Thank you!

Contact

VISION ZERO EPIDEMIOLOGIST

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Discussion

- ⇨ Send us your questions
- ⇨ Follow up with us:
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  - ⇨ Katie Harmon harmon@hsrc.unc.edu
  - ⇨ Shamsi Soltani shamsi.soltani@sfdph.org
  - ⇨ General Inquiries pbic@pedbikeinfo.org
- ⇨ Archive at www.pedbikeinfo.org/webinars