2019 North Carolina Strategic Highway Safety Plan

December 2019

Image Credit: NCDOT

December 10, 2019

The 2019 North Carolina Strategic Highway Safety Plan (SHSP) demonstrates the State's commitment to the safety of all road users. This data-driven Plan serves as a roadmap for Federal, State, local, and other agencies who strive to reduce all crashes, serious injuries, and fatalities on our roadways. As a Vision Zero State, we used a 4E—Engineering, Education, Enforcement, and Emergency Services—approach to develop strategies and supporting actions.

In 2014, North Carolina set a goal to cut the fatalities and serious injuries in North Carolina in half by the year 2030. While this was an ambitious goal when it was developed, we have seen decreases in total fatalities and the fatality rate over the last 5 years and the fatality rate per vehicle miles traveled has steadily declined. This updated Plan builds on the success of the 2014 Plan and continues the Vision Zero approach to reach our goal of reducing fatalities and serious injuries by half by 2035, moving towards zero by 2050.

The 2019 SHSP is the culmination of the work of more than 50 safety partners from agencies all over the State. Working together, the safety partners identified the 11 most significant contributing factors to fatalities and serious injuries and developed Emphasis Area Action Plans for each. The Emphasis Area Action Plans address the relationships between contributing factors and identify strategies and supporting actions to improve safety on North Carolina roadways. The Executive Committee for Highway Safety (ECHS) will monitor progress in achieving the goal of the SHSP and in implementing the strategies of the Emphasis Areas at regular intervals throughout the year.

Please join us as we work together to achieve our goal to reduce fatalities and serious injuries and protect our road users in North Carolina. By signing this document, the signatories agree to support North Carolina's Vision, Mission, and Goals and implement the highway safety strategies.

Date 5 Feb 20

James H. Trogdon III
Secretary
North Carolina Department
of Transportation

Date 5 February 2020

John F. Sullivan, III, P.E.
Division Administrator
Federal Highway Administration
North Carolina Division

NORTH CAROLINA STRATEGIC
HIGHWAY SAFETY PLAN

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Acknowledgments

The 2019 North Carolina Strategic Highway Safety Plan (SHSP) is a result of the collaboration of safety stakeholders from across the State. Partners representing diverse organizations and agencies developed strategies and supporting actions to reduce crashes and the resulting fatalities and serious injuries. They are committed to implementing the Plan for the next 5 years, and beyond.

AAA Carolinas

AARP

ABC Education Outreach

American Traffic Safety Services Association (ATSSA)

Bike Law North Carolina

BikeSafe NC

BikeWalk NC

Capital Area Metropolitan Planning Organization (CAMPO)

Carolinas Medical Center

Charlotte Department of Transportation

City of Asheville

City of Durham

City of Greensboro

Eastern Carolina Council

East Carolina University, Department of Occupational Therapy

Executive Committee for Highway Safety (ECHS)

Federal Highway Administration (FHWA)

Federal Motor Carrier Safety Association (FMCSA)

Independent Insurance Agents of North Carolina

Isothermal Rural Planning Organization

Johnston County District Attorney

MidEast Rural Planning Organization

North Carolina Association of Metropolitan Planning Organizations (NCAMPO)

North Carolina Coalition on Aging

North Carolina Council on Developmental Disabilities

North Carolina Conference of District Attorneys

North Carolina Department of Health and Human Services (NC DHHS)

North Carolina Department of Insurance (NCDOI)

- Injury Prevention
- Safe Kids

North Carolina Department of Public Instruction (NCDPI)

North Carolina Department of Public Safety – North Carolina State Highway Patrol (NCSHP)

North Carolina Department of Transportation (NCDOT)

- Integrated Mobility Division
- Division of Mobility and Safety
- Division of Transportation Planning

North Carolina Governor's Highway Safety Program (GHSP)

North Carolina Office of EMS (NCOEMS)

North Carolina Office of State Human Resources (NCOSHR)

North Carolina State University (NCSU) – Institute for Transportation Research and Education (ITRE)

Poe Center for Health Education

Regional Transportation Alliance

Safe Routes to School Wake County

Southeastern Healthcare of North Carolina

Students Against Destructive Decisions (SADD)

University of North Carolina Highway Safety Research Center (UNC-HSRC)

Visit North Carolina

Wake County Sheriff's Office

Watch for Me NC

NORTH CAROLINA STRATEGIC
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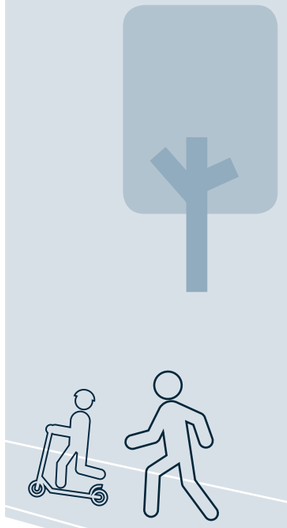
Acronyms

4 Es	Education, Enforcement, Engineering, and Emergency Services
ABC	Alcoholic Beverage Control
ARIDE	Advanced Roadside Impaired Driving Enforcement
BAC	Blood Alcohol Content
CAMPO	Capital Area Metropolitan Planning Organization
CPS	Child Passenger Safety
DWI	Driving While Impaired
ECHS	Executive Committee for Highway Safety
EMS	Emergency Medical Services
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
GDL	Graduated Driver Licensing
GHSP	Governor's Highway Safety Program
HSIP	Highway Safety Improvement Program
ICE	Intersection Control Evaluation
ITRE	Institute for Transportation Research and Education
MPO	Metropolitan Planning Organization
NCAOC	North Carolina Administrative Office of the Courts
NC DHHS	North Carolina Department of Health and Human Services
NCDMV	North Carolina Division of Motor Vehicles
NCDOI	North Carolina Department of Insurance
NCDOT	North Carolina Department of Transportation
NCDPI	North Carolina Department of Public Instruction
NCOEMS	North Carolina Office of EMS
NC OSBM	North Carolina Office of State Budget and Management
NCOSHR	North Carolina Office of State Human Resources
NCSHP	North Carolina State Highway Patrol
NHTSA	National Highway Traffic Safety Administration
OSFM	Office of State Fire Marshall
RSA	Road Safety Audit
RPO	Rural Planning Organization
SADD	Students Against Destructive Decisions
SaFID	Safest Feasible Intersection Design
SHSP	Strategic Highway Safety Plan
STIP	State Transportation Improvement Program
TRCC	Traffic Records Coordinating Committee
TSMO	Transportation Systems Management and Operations
UNC-HSRC	University of North Carolina Highway Safety Research Center
V2I	Vehicle to Infrastructure
V2V	Vehicle to Vehicle
VMT	Vehicle Miles Traveled



NORTH CAROLINA STRATEGIC
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2019

Vision, Mission, and Goal

North Carolina is a Vision Zero State; even one fatality or serious injury on our roadways is unacceptable. The vision provides the long-range ideal. The mission expresses the safety stakeholders' motivation and commitment to this Plan. The goal is both ambitious and achievable with a clear timeline for accomplishment.

Vision

Through our partnerships, we foster safety awareness and provide safe access throughout North Carolina for all users and modes of travel such that everyone arrives safely at their destination.

Mission

Establish a collaborative, strategic approach to the identification and implementation of safety improvement programs and policies to achieve the statewide goals to reduce fatalities and serious injuries related to crashes on North Carolina's transportation system.

Goal

Reduce fatalities and serious injuries by half by 2035, moving towards zero by 2050.

Image Credit: Wes Hicks on Unsplash

Introduction

History of the Plan

The North Carolina Strategic Highway Safety Plan (SHSP) (herein referred to as the Plan) is essential to addressing highway safety in our State. The Plan is a key component of North Carolina's Highway Safety Improvement Program (HSIP), a core-Federal-aid program directed at reducing fatalities and serious injuries on all public roads. North Carolina's Executive Committee for Highway Safety (ECHS) first developed the SHSP in 2004. Updates in 2006 and 2014 were implementation focused, identifying significant contributing factors in crashes and implementation strategies with the most potential to address those crashes. In 2015, the Federally-funded legislation Fixing America's Surface Transportation (FAST) Act continued the requirements that States develop an SHSP that is data- and multidisciplinary stakeholder-driven and that analyzes highway safety concerns and identifies opportunities to improve safety on all public roads.

The SHSP is a North Carolina Department of Transportation (NCDOT)-led Plan that relies on participation and contributions from stakeholders representing the 4 Es—Engineering, Education, Enforcement, and Emergency Services. Perspectives for this Plan include local, regional, and statewide safety partners. The SHSP establishes statewide goals, objectives, and key Emphasis Areas to focus implementation efforts for safety programs and countermeasures. Together, safety partners identify infrastructure and behavioral countermeasures for reducing fatalities and serious injuries for all users on our State's roadways.

The 2019 Plan is an update to the 2014 Plan and the fourth iteration of the Plan since 2004, and the first 5-year update under recent Federal regulations.

Achievements

The 2014 Plan detailed nine safety emphasis areas with the greatest opportunity to achieve the SHSP goals:

1. **Demographic Considerations**
2. **Driving While Impaired**
3. **Emerging Issues and Data**
4. **Intersection Safety**
5. **Keeping Drivers Alert**
6. **Lane Departure**
7. **Occupant Protection/Motorcycles**
8. **Pedestrians and Bicyclists**
9. **Speed**

The *Watch for Me NC* program led to a total **reduction of pedestrian crashes by 12.8%** with a **21.7%-reduction in nighttime crashes.**[1]

Since the release of the 2014 Plan, North Carolina safety stakeholders carried out many actions that supported the selected emphasis areas to improve highway safety. These include:

- Under the HSIP, NCDOT created a new systemic program to implement wide edge lines, enhanced curve warning signs, and safety edge treatments to reduce roadway departure crashes.
- NCDOT's State Transportation Improvement Program (STIP) funded rumble strips, guardrails, median barriers, roundabouts, reduced conflict intersections, signal and lighting improvements at selected locations, and bicycle and pedestrian safety projects such as sign improvements and high-visibility crosswalks to improve access management and visibility of pedestrians.
- NCDOT institutionalized the *Watch For Me NC* safety program, providing free training to law enforcement agencies and Action Planning Workshops for local coalitions to develop implementation plans.
- NCDOT used a variety of Transportation Systems Management and Operations (TSMO) and major incident response strategies and was recognized nationally for Hurricane Florence preparation and response.
- The NC Board of Transportation adopted a resolution in support of implementing amendments to the *Complete Streets Policy*. NCDOT developed an Implementation Guide providing guidance for incorporating the approach into planning, programming, design, and maintenance processes.
- North Carolina's Governor's Highway Safety Program (GHSP) assisted with creating post-licensure curricula and integrating additional driver education within the Graduated Driver Licensing (GDL) process to reduce young driver crashes.
- NC Federal Motor Carrier Safety Administration (FMCSA) created the *NC Public Education Awareness Program* to decrease the number and severity of commercial vehicle crashes. The program also provides outreach to law enforcement agencies and the judicial community and monitors public, teen, and older drivers to educate them on safety issues, regulations, and seat belt use.
- The Alcoholic Beverage Control (ABC) Commission *Talk It Out Campaign* helps parents talk to kids about the dangers of underage drinking and collaborates with law enforcement to address key issues related to fake IDs.
- Students Against Destructive Decisions (SADD) created the *Rock the Belt* campaign to raise awareness, education, and engagement among students by stressing the importance of occupant restraint use.
- The NC Child Fatality Task Force developed a recommendation to support legislation allowing for primary enforcement of all unrestrained back seat passengers and increase the fine for unrestrained back seat passengers from $10 to $25.
- AARP implemented programs—such as the *Smart Driver* course, *CarFit* program, and comprehensive driving evaluation and resources—to target safety for older drivers.
- The NC Conference of District Attorneys established the *Traffic Safety Resource Prosecutor Program* to improve the prosecutor's ability to prosecute driving while impaired (DWI), vehicular homicide, and other traffic cases and established an NC Traffic Law forum, which allows prosecutors and law enforcement officers to share information about traffic safety violations like DWI.
- In 2015, North Carolina passed a safe passing law allowing motorists to cross a double yellow line to pass cyclists provided (1) they give 4 feet of space or change lanes to pass, and (2) they can do so safely.
- In 2019, North Carolina once again upheld the universal helmet law for motorcyclists first enacted in 1968.

1 UNC HSRC (2018). *Crash based evaluation of the Watch for Me NC Program*. https://www.watchformenc.org/wp-content/uploads/2019/02/2018-38-Final-Report-NCDOT-WFMEVAL.pdf.

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New in This Plan

The Plan continues to build upon the momentum of the 2014 Plan and expands the Plan to account for changes in data trends, emerging technologies, and new approaches to highway safety.

Notable changes in the Plan include:

- Consideration of emerging topics and trends such as technologies and travel mode options.
- Revised number and focus of Emphasis Areas from 9 Emphasis Areas in the 2014 Plan to 11 in this 2019 Plan.
- Addition of five Focus Areas to group Emphasis Areas by topic to facilitate collaborative approaches for implementation.
- Expanded stakeholder engagement to include regional perspectives and more representation from all 4 Es.

Highway Safety in North Carolina

The goal of this Plan is to decrease fatalities and serious injuries by half, based on 2018 crash data. At the time of the 2014 Plan, North Carolina was experiencing a significant decrease in roadway fatalities and serious injuries. Evidence suggests fatalities and the fatality rate—calculated as the number of fatalities per 100 million vehicle miles traveled (VMT)—declined dramatically both nationwide and statewide. However, we have not experienced the same continued success over the last 5 years. Since reaching a low in 2011, fatalities steadily increased to 1,445 in 2018 (Figure 1). When adjusted for the amount of travel on North Carolina's roadways, the fatality rate has steadily declined, and the rate is currently estimated as 1.19 fatalities per VMT.

Figure 1. Total Fatalities & Fatality Rate - Last Decade

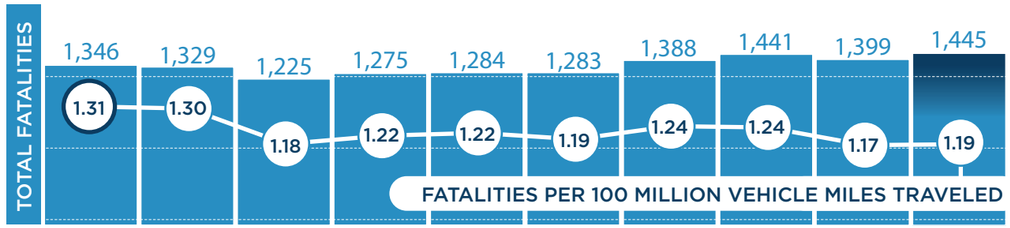
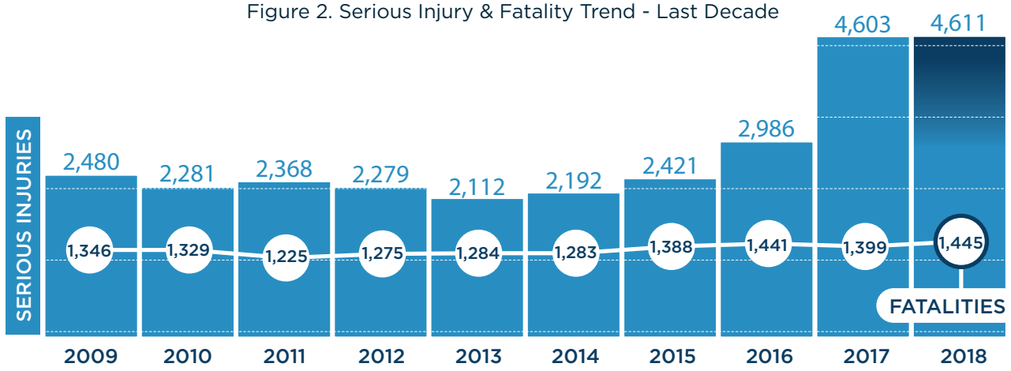


Figure 2 presents total serious injuries from motor vehicle crashes from 2009 to 2018 in North Carolina. The yearly increase in serious injuries is similar to that of fatalities until 2015. However, in September 2016 NCDOT revised the definition of a serious injury to match Federal crash reporting guidelines. The new definition is more inclusive, detailing seven specific injury types that qualify as suspected serious injuries. **The revised definition had an immediate impact on crash severity reporting, thereby limiting the ability to make long range observations about the trends.** Two full years of data collection since the revised definition shows the number of serious injuries is flat.

Figure 2. Serious Injury & Fatality Trend - Last Decade

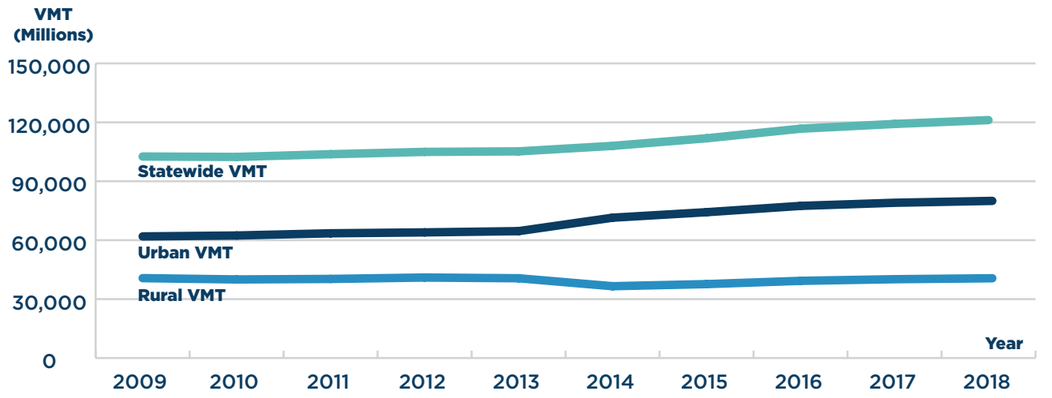


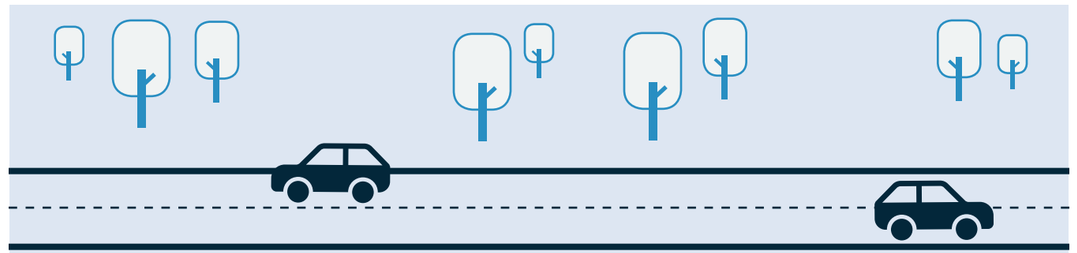
This Plan includes crashes reported in North Carolina's Crash Database as of November 2019. The numbers presented herein may differ slightly from other data summaries, as the Crash Database is amended on a continual basis and will fluctuate slightly. Nonetheless, the data analyses provide a good overall understanding of the magnitude of the problem and the relative importance of each emphasis area.

Safety programs, policies, and projects alone do not contribute to the fluctuations in crash statistics. There is evidence that suggests the significant decrease experienced in the late 2000s was a result of economic fluctuations (e.g., fewer vehicles on the road), vehicle enhancements, and continued safety efforts. As the Plan sets the course for the next 5 years, it is important to evaluate external factors and the characteristics that make North Carolina unique.

North Carolinians are driving more miles now than 10 years ago (Figure 3), and most of that travel is occurring in urban areas. **Between 2014 and 2018, approximately 60 percent of all crashes occurred in an urban setting, while 70 percent of fatalities occurred on rural roads**. An estimated 2.2 million North Carolinians live in rural communities. Census data from 2010 show that 14 counties are entirely rural, with an additional 50 counties with over 50 percent of the population living in rural areas.[2]

Figure 3. Change in VMT (2009-2018)





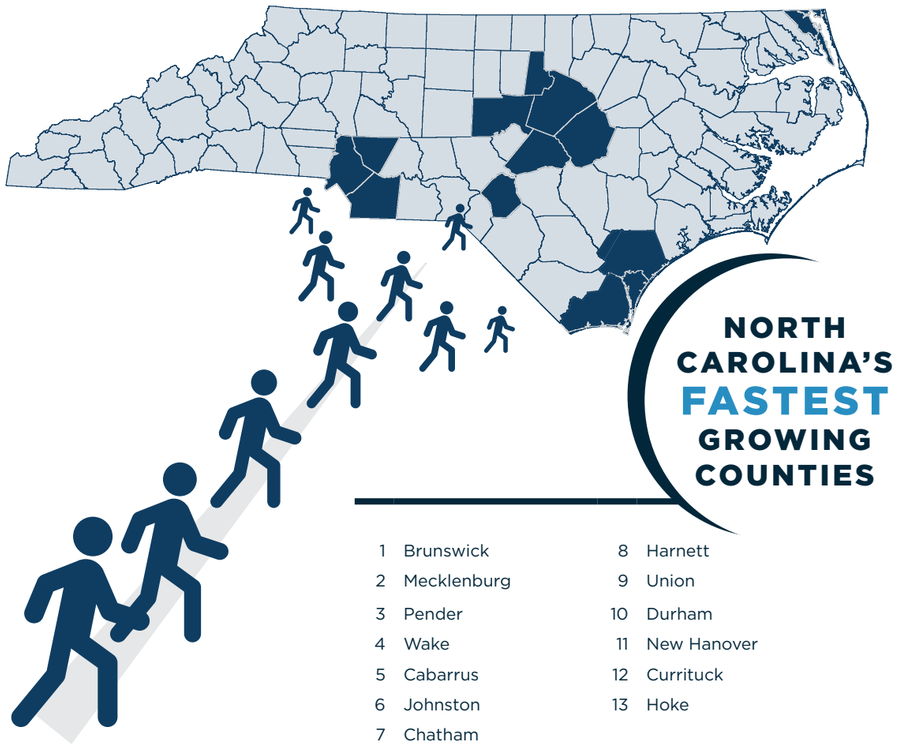
In 2017, North Carolina had the **3rd highest number of rural, non-interstate fatalities**, as well as the **3rd highest number of rural, non-interstate vehicle miles traveled, despite being only the 23rd highest State** in terms of rural, non-interstate road mileage.[3]

2 NC OBSM (2018). *The Urban and Rural Faces of North Carolina*. https://files.nc.gov/ncosbm/documents/files/2018ACSNC.pdf.
3 National Highway Traffic Safety Administration (NHTSA) FARS and Federal Highway Administration (FHWA) Highway Statistics Tables HM-20 and VM-2.

Over the last 5 years, the proportion of fatalities and crashes is growing more quickly in urban areas than rural. Identifying the contributing factors like driver behavior, crash types, vehicle size, increased VMT, and crash locations in either setting is an important step in achieving North Carolina's safety goals. One contributing factor may be increased commuting from rural or suburban settings to urban downtown settings for job opportunities. More North Carolinians are crossing county lines for work in 2018 than 10 years ago. In 2015, there were only 17 counties where 50 percent or more of the residents lived and worked in their home county.

North Carolina's 2018 population was estimated to be nearly 10.4 million—the ninth most populous State in the nation. North Carolina has also experienced the fourth largest population growth rate between 2010 and 2018. Statewide projections estimate continued growth of this size will add the equivalent traffic and population of an additional city the size of Winston-Salem to our State by 2021. Just over 16 percent of the population currently is at least 65 years old, although this number is expected to grow to 1 in 5 North Carolinians by 2030.[4]

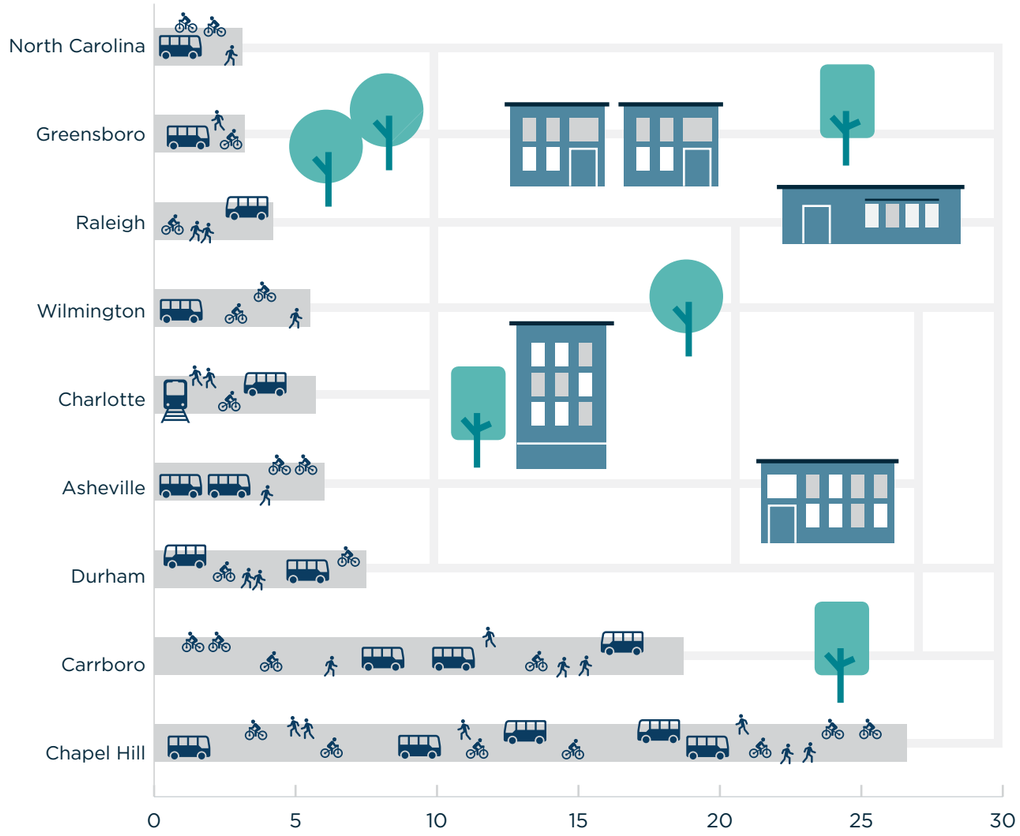
Figure 4. Counties that have Grown at Least 12% Between 2010 and 2017
(NC Office of State Budget and Management)



4 Budget and Management (NC OSBM) (2019). *Population Dynamics*. https://files.nc.gov/ncosbm/documents/files/REC2019-21_Population Summary.pdf.

Traffic and population growth are not the only change in the State over the last 5 years. Micromobility options, such as dockless bicycles and electric scooters that are rented to the public through mobile applications, seemed to appear in our communities overnight. In 2014, just one micromobility system was established in Charlotte. As of 2019, nine official systems were established in every region of the State with at least one more in the planning stages. While fewer than 5 percent of North Carolinians report using transit, bicycling, and/or walking as their preferred commute modes, the percentage is significantly higher in urban areas like Charlotte, Durham, and Chapel Hill. With growing urbanization, demand for safe transportation alternatives will increase in the near future.

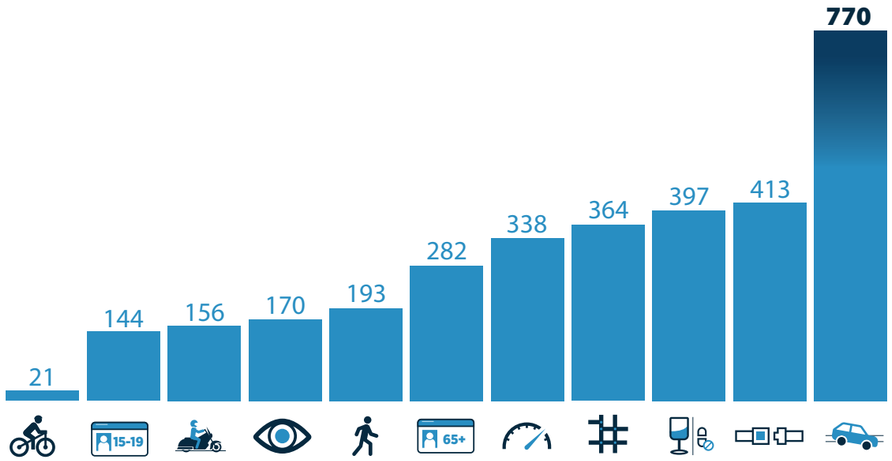
Figure 5. Percentage of Transit, Bicycle, and Walking Commuters
(U.S. Census Bureau, American Community Survey, 2013-2017 5-year estimates)



North Carolina's geography, weather, and tourist destinations are all factors that make the State unique. Both the mountains in the west and the beaches in the east are popular draws for local and out-of-State visitors. Weather events and seasonal changes also contribute to travel behaviors and patterns. Although predominately an eastern issue, hurricanes and associated road closures can lead to travel and service impacts statewide and into neighboring States. When GPS-enabled maps do not reflect frequently changing detour routes, both motorists and emergency personnel are challenged to maintain safety for everyone on the roadways. The mountains attract skiers in the winter, hikers in the summer, and long drives on the Blue Ridge Parkway in the fall. Yet mountainous roads, with their narrow lanes and tight turns, test the skills of drivers and cyclists.

These unique factors, combined with infrastructure and human behavior influences, can contribute to motor vehicle crashes. NCDOT maintains detailed records of crash types, severity, and locations. For example, a crash at an intersection that involved a driver who was not wearing a seat belt would be characterized as both an intersection crash and unbelted crash. Evaluating 5 years of statewide data trends revealed the most prominent crash types and factors contributing to fatalities on North Carolina's public roads. These crash types, shown in Figure 6, represent the most significant opportunities for improving highway safety.

Figure 6. Average Annual Fatalities by Emphasis Areas (2014-2018)



The results of detailed data analyses and contextual narrative set the framework for the Plan. In developing the Plan, contributors used these data, along with their perspectives as transportation stakeholders, as a foundation for building a SHSP that will carry North Carolina forward over the next 5 years.

NORTH CAROLINA STRATEGIC
HIGHWAY SAFETY PLAN

2019 Plan Process

The 4 Es Approach

Effective transportation planning, design, implementation, and maintenance relies on input from agencies representing the 4 Es:

Engineering

Education

Enforcement

Emergency Services

This approach was woven throughout the Plan process and development. Stakeholders representing the 4 Es provided feedback on the greatest highway safety needs in our State and used a 4 E approach to identify solutions and develop strategies.

In addition to the 4 Es, safety partners considered factors such as equity, evaluation, leadership, and policy. The diverse perspectives and approaches of the stakeholders are reflected in the Emphasis Area supporting actions.

A Safety Focused, Stakeholder-Driven Process

A single agency cannot achieve North Carolina's goal of zero roadway fatalities and serious injuries. The process began with three regional listening sessions that included regional and local representatives to gather input on highway safety in North Carolina and identify Emphasis Area specific concerns. These meetings were held in Charlotte at the North Carolina Association for Metropolitan Planning Organization Conference; in Hickory; and in Wilmington.

Next, over 60 partners from across the State and a variety of agencies gathered to discuss highway safety issues, goals, and strategies in support of the Plan. Partners reviewed regional input and statewide data trends and worked collaboratively to revise, refine, and strengthen the Emphasis Areas and SHSP goal.

Following the Safety Partners Workshop, nine Working Groups convened to further refine the Emphasis Areas and develop action plans. This Plan is the result of input from over 40 agencies, organizations, advocacy groups, and businesses.

Image Credit: NCDOT / VHB

Road Map to Achieving the Goal

Emphasis Areas

The first step to achieve the goal of reducing fatalities and serious injuries in North Carolina is to invest time and resources in projects, policies, and programs that target the most significant contributing factors to crashes. The SHSP Emphasis Areas represent contributing factors for fatal and serious-injury crashes in North Carolina. Each Emphasis Area includes a detailed action plan for safety partners to implement strategies and programs over the next 5 years.

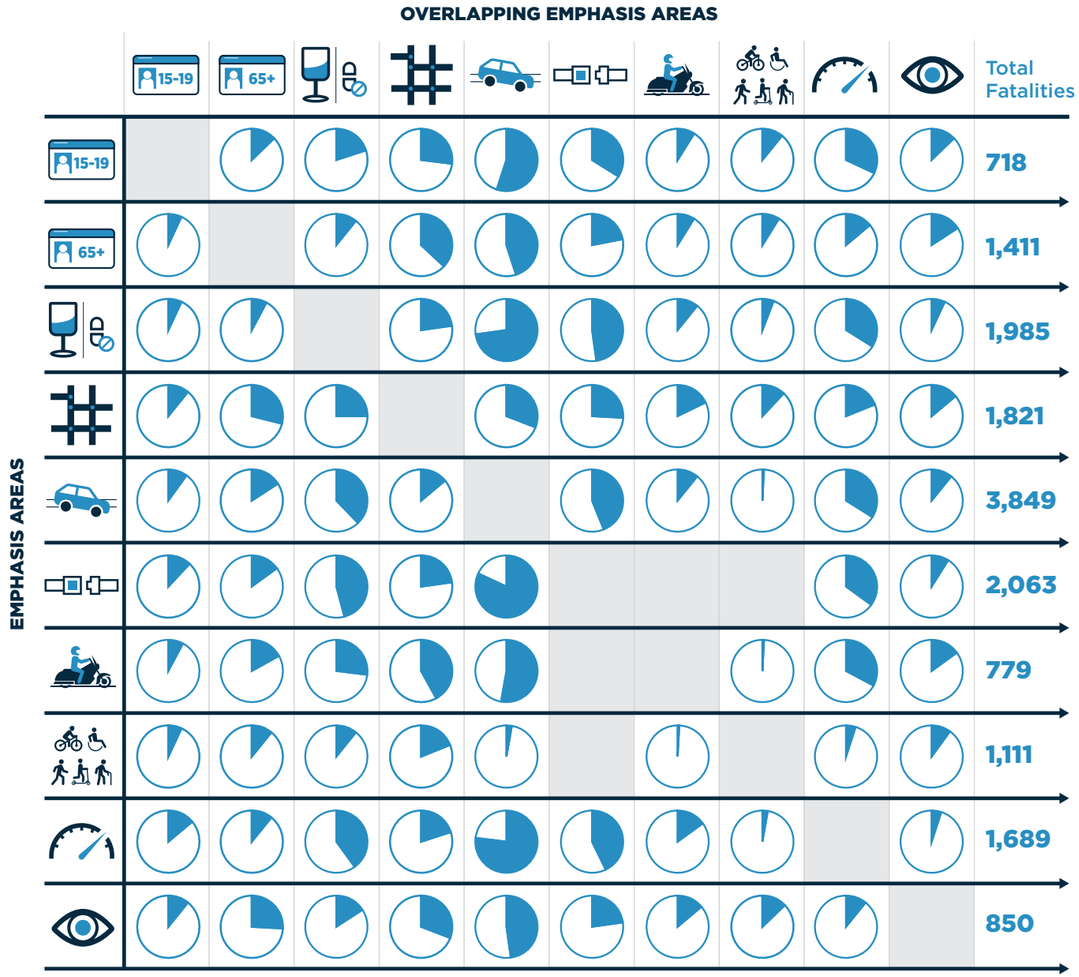
This Plan builds on the 2014 Plan and includes the following Emphasis Areas:

Emphasis Area Overlaps

It is challenging to pinpoint one cause of a crash—there are interacting behavioral, infrastructure, and environmental factors that may all contribute to a crash. For example, the combination of an inexperienced driver, speed, inattentiveness, and traffic control may all contribute to an intersection crash. For this reason, the interaction and overlap between Emphasis Areas is important to consider in developing strategies to effectively prevent crashes. To focus on intersections alone is difficult without some consideration of the bicyclists, pedestrians, and motor vehicles interacting at those locations.

Therefore, many safety partners participated in more than one Working Group to cross-collaborate and contribute perspectives from other Emphasis Areas. They also considered an analysis of contributing factors, shown in Figure 7. The link between lane departure and the other Emphasis Areas is evident, and any effort that addresses this connection will have positive impacts on serious injuries and fatalities.

Figure 7. Emphasis Area Overlap Percentages out of 100 (2014-2018)



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Focus Areas

The Plan is organized by Focus Areas, which group Emphasis Areas addressing similar crash types, road users, or other characteristics. This framework supports the importance of overlaps and provides a roadmap for implementation. Safety partners representing the Emphasis Areas will work together under the umbrella of the Focus Area to prioritize and implement the actions in each Emphasis Area Action Plan. The following briefly introduces the Focus Areas and corresponding Emphasis Areas.

- Roadway Infrastructure
- Human Behavior
- All Users
- Data and Evaluation
- Safety Culture

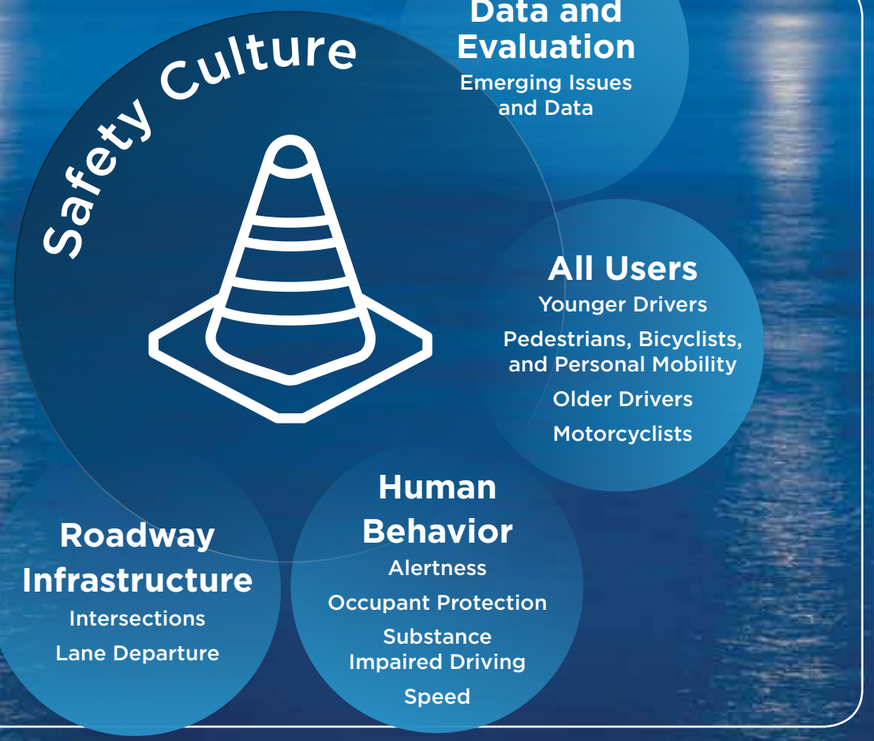
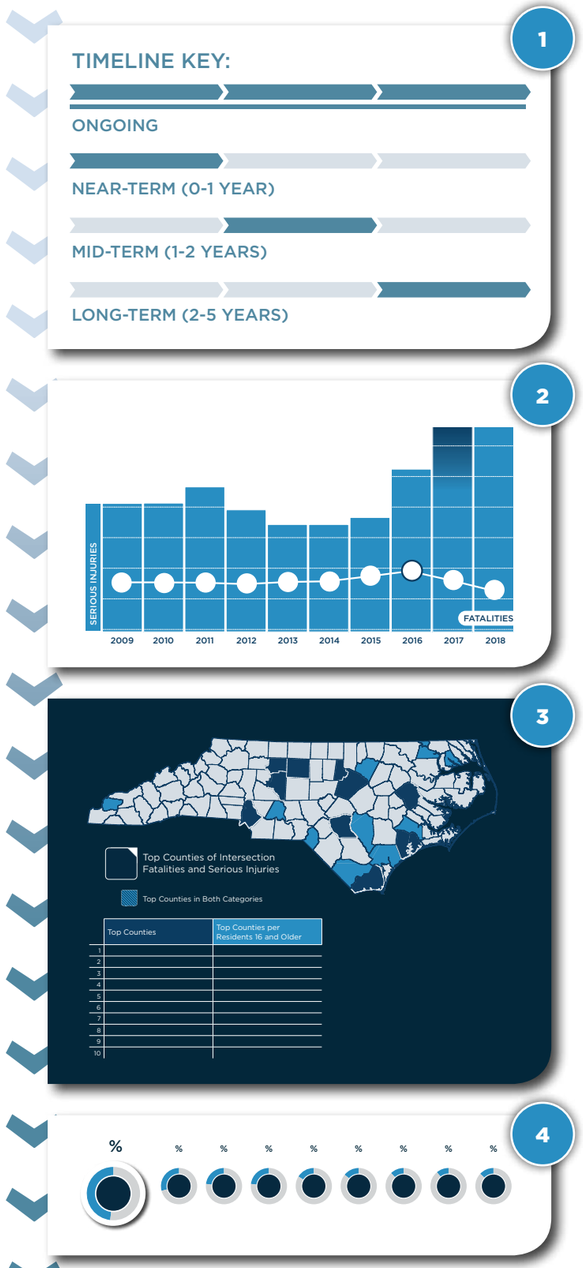


Image Credit: VisitNC.com

Emphasis Area Action Plans



The remainder of this document is dedicated to Emphasis Area Action Plans that outline specific strategies and supporting actions to reduce fatalities and serious injuries on North Carolina's roadways. Action Plans all include the following elements:

- *Focus Area* name.
- *Emphasis Area Definition* identifies the specific road characteristic, behavior, or user addressed.
- *Emphasis Area Goal* aligns with the overall SHSP goal.
- *Description of the Issue* provides contextual information, statistics, and the pre-, during-, and post-crash considerations that influenced the strategy development.
- *Strategies* represent the objectives, which are the framework for achieving the goal.
- *Supporting actions* are the specific steps to achieve the strategies and, ultimately, the goal.
- Safety partners identified *implementing agencies* as groups or organizations that have a role in implementing, tracking, or measuring the supporting action.

1 The *timeline* will guide prioritization and implementation.

Action Plans are supported with relevant *data analysis* results:

2 *10-Year Chart*: Total fatalities and total serious injuries from 2009 to 2018 per Emphasis Area, statewide.[5]

3 *Emphasis Area Magnitude* (map): ■ Top 10 counties for total EA fatalities and serious injuries and ■ top 10 counties for representing the highest total EA fatalities and serious injuries per relevant demographic (2016 estimates). Both based on crash data 2014 – 2018 (NCDOT).

4 *Emphasis Area Overlap*: Icons shaded with the percent overlap with the Emphasis Area of interest, in terms of fatalities.

5 Population estimates were obtained from the NC OSBM for 2016 and normalized by population. NC OBSM (2018). *Revised County Population Estimates for 2016*. https://files.nc.gov/ncosbm/demog/countygrowth_2016.html.

Roadway Infrastructure

Image Credit: VisitNC.com

Roadway Infrastructure

Of the 4 Es, the Roadway Infrastructure Focus Area has the most opportunity for Engineering solutions. The Emphasis Areas under this Focus Area—Intersections and Lane Departure—target roadway infrastructure features that contribute to specific crash types and severities. Infrastructure investments are an important element of this Focus Area. Over three-quarters of North Carolina's HSIP funding is invested in countermeasures to keep vehicles on the roadway, improve intersections for all users, and reduce the severity of crashes.

Considering interactions with other SHSP Emphasis Areas, infrastructure improvements have the potential to significantly impact other crash types. For example, safety practitioners implement strategies to reevaluate design speeds based on roadway conditions or explore countermeasures that naturally encourage and influence slower travel speeds. Both strategies may reduce speeds, which could ultimately reduce the frequency or severity of lane departure crashes. Infrastructure improvements provide an opportunity to consider all roadway users. Signage, striping, and road maintenance practices can impact motorcyclists, older drivers, bicyclists, and pedestrians and assist with driver alertness. Proactive strategies such as the use of Road Safety Audits (RSAs) and continued implementation of Complete Streets concepts can illuminate infrastructure or design needs preemptively, reducing the need for reactive projects.

The greatest impact may result from combining and aligning engineering treatments and approaches with behavioral efforts. Using data analysis to identify high-risk locations and then implementing proven engineering solutions paired with high visibility enforcement and education will reach an even wider array of road users. For example, implementing traffic calming infrastructure in conjunction with educational programming and law enforcement presence near high schools can be beneficial for younger driver safety but will also influence a broader group of road users.

The following Intersection and Lane Departure Action Plans detail specific actions for reducing the frequency and severity of these crash types.

INTERSECTIONS

LANE DEPARTURE

Intersections

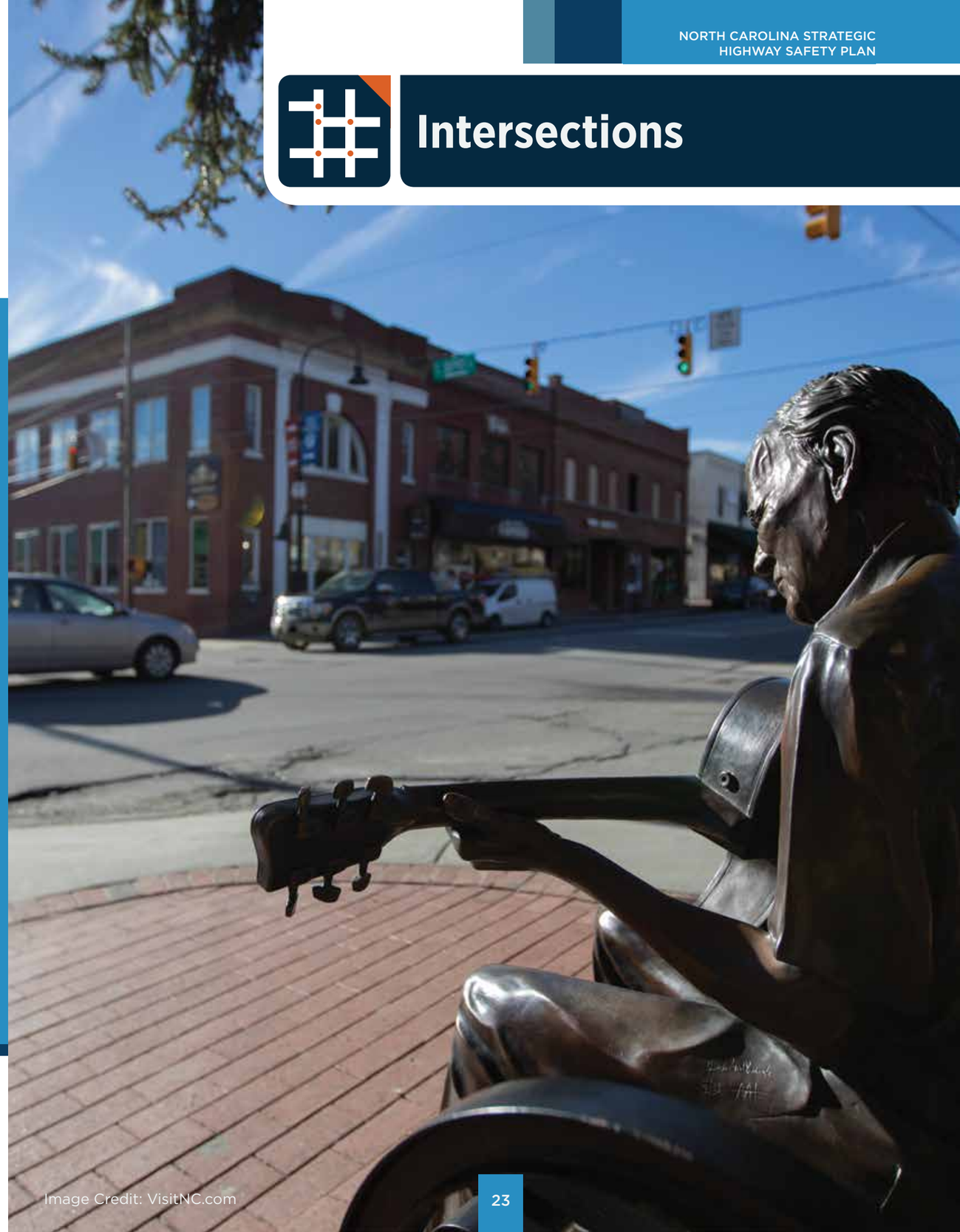


Image Credit: VisitNC.com

Intersections

FOCUS AREA: Roadway Infrastructure

EA DEFINITION: Crashes occurring at intersections or considered intersection-related, including driveways, alleys, and on- and off-ramp terminal cross roads.

EA GOAL: Reduce intersection-related fatalities and serious injuries by 50 percent by 2035, moving towards zero by 2050.

Description of the Issue

An intersection is a point at which the travel paths of various transportation modes (e.g., vehicles, pedestrians, bicyclists, buses) converge at one point. Intersection types—and the potential solutions to improve intersection safety—can vary by area (i.e., urban or rural), configuration, traffic control, and types of users.

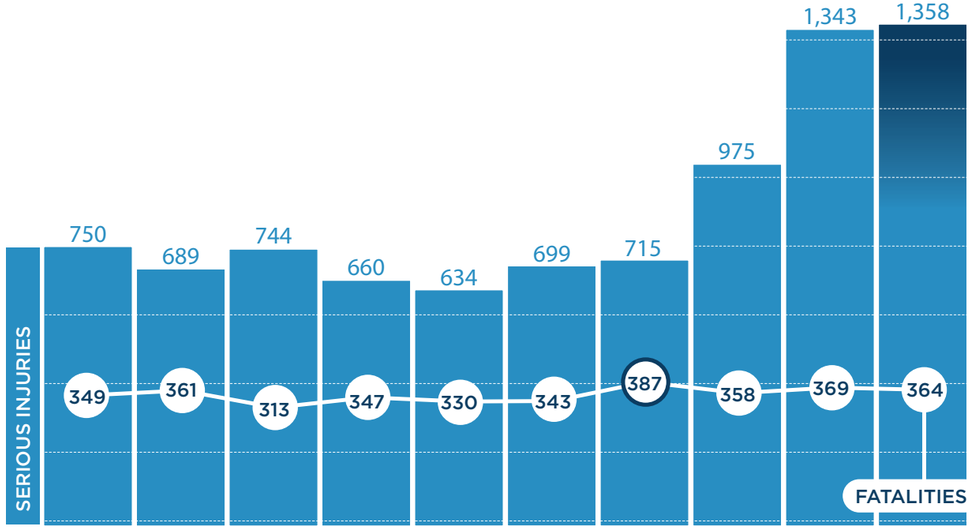
A traditional four-way intersection consists of 32 vehicle-to-vehicle conflict points—locations where vehicles can cross paths with each other that can lead to collisions. There are an additional 16 conflict points with pedestrians. At traditional intersections, certain movements can lead to crash types that are associated with higher severities, like head-on, angle, and left-turn crashes. To reduce opportunities for conflicts to occur, certain intersection designs restrict or eliminate through and left-turn movements. These intersection types are already in use in North Carolina and include roundabouts, Restricted Crossing U-Turn (RCUT) intersections, and Median U-Turn (MUT) intersections. These intersection types are designed with the knowledge that human drivers make mistakes, but by restricting certain movements the opportunities for fatalities or serious injuries are greatly reduced.

In North Carolina, 63 percent of intersection crashes occur in urban areas, but 59 percent of fatalities and 67 percent of serious injuries are in rural areas. Similarly, the highest number of intersection crashes (46 percent) occur at signalized intersections, but more fatal crashes occur at stop-controlled intersections (40 percent) than at traffic signals (30 percent). Rural intersections pose safety issues because of higher travel speeds; thus, when collisions do occur, higher-severity injuries are more likely. Roundabouts and all-way stop controlled intersections have been proven to decrease speeds and reduce severe injuries in rural areas and should continue being implemented. NCDOT also has an ongoing practice of implementing proven, evidence-based countermeasures at intersections throughout the State, like retroreflective backplates and pedestrian countdown signals.

Several States have developed and implemented Intersection Control Evaluation (ICE) policies, which ensure that various intersection alternatives are considered early in the project development process and based on objective criteria like operations, safety, and environmental impacts. North Carolina currently implements many alternative and innovative intersection types and is incorporating principles from ICE through its Safest Feasible Intersection Design (SaFID) charts. SaFID is a series of charts that use vehicular crash reduction values from high-quality research studies, traffic volumes, and number of lanes, to objectively present the SaFID for intersection projects. After identifying the SaFID, decision-makers would then consider other inputs like accommodations and safety for pedestrians and bicyclists, environmental impacts, and adjacent land use, to confirm or modify the proposed intersection design. Institutionalizing these charts will support the SaFID as the default choice for roadway designers and planners at all levels of government to ultimately reduce fatalities and serious injuries at intersections.

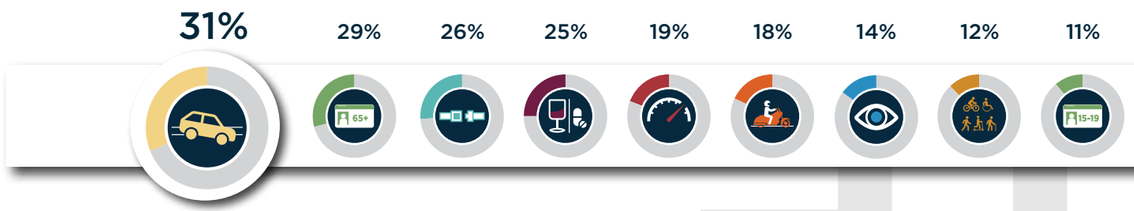
Data

Total Intersection-Related Fatalities & Serious Injuries (Last Decade)



Key Overlaps

The percentage of intersection-related fatalities that also include another Emphasis Area.



Implementing Agencies

- GHSP
- Local agencies
- Metropolitan Planning Organizations (MPOs)/ Rural Planning Organizations (RPOs)
- NCDOT Division of Highways
- NC Division of Motor Vehicles (NCDMV)
- NC Department of Public Instruction (NCDPI) Driver Education
- NCDOT Integrated Mobility Division
- NC Conference of District Attorneys
- NC Justice Academy
- NC Local Technical Assistance Program
- North Carolina State Highway Patrol (NCSHP) and other law enforcement
- Policy makers
- Professional organizations
- University and other research organizations

Strategies and Supporting Actions

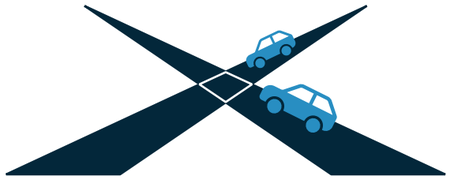
TIMELINE KEY:

ONGOING

NEAR-TERM (0-1 YEAR)

MID-TERM (1-2 YEARS)

LONG-TERM (2-5 YEARS)



More **intersection** related crashes occur in **urban areas**, but more **fatalities and serious injuries** occur in **rural areas**.

Engineering

Install the SaFID for all people, all modes, moving through an intersection in local, regional, and State projects.

Institutionalize SaFID as the default choice for new and existing intersection projects.

Research and implement new and innovative intersection countermeasures or designs based on data driven results.

Promote and support additional research on intersection turning movements related to pedestrian safety (e.g., leading pedestrian interval (LPI), right-turn, left-turn conflicts).

Enact an ICE policy.

Education

Educate road users, transportation professionals, and stakeholders at all levels of government about intersection safety.

Educate drivers and non-motorized users on how to navigate all types of intersections.

Educate pedestrians (especially young children) through skills-based practices such as *Let's Go NC!* curricula on how to cross safely at intersections.

Educate roadway designers, planners, and officials/decision-makers on intersection design principles proven to reduce fatalities and serious injuries.

Educate law enforcement agencies on transportation laws related to intersection safety, new traffic control devices, and alternative/innovative intersections so they are equipped to effectively enforce traffic laws at intersections.

Develop an intersection-specific data visualization tool for showing intersections with high frequencies and severities of crashes.

Enforcement

Research and implement effective ways to enforce compliance with traffic control devices.

Identify proven or promising enforcement methods found in international, Federal, State, and local research, including automated signal enforcement.

Investigate the consistency of the court system process between counties, cities, and agencies across the State with upholding intersection-related violations, like speeding, red-light running, and non-yields.

North Carolina is a national leader in implementing innovative/alternative intersections. We have...

Over 400 Modern Roundabouts

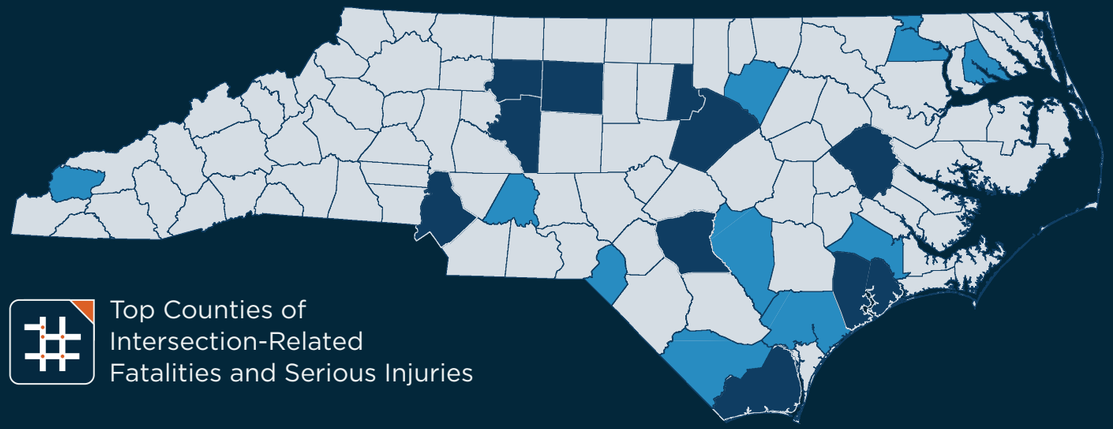
Over 80 Restricted Crossing U-Turn Intersections

11 Diverging Diamond Interchanges

2 Median U-Turn Intersections

2 Displaced Left-Turn Intersections[7]

6 NCDOT (2019). https://twitter.com/NCDOT/status/1175047466716225547.
7 Institute for Transportation Research and Education (ITRE) (2019). *Alternative Intersections and Interchanges*. https://www.google.com/maps/d/view?mid=1MMZKi0RdQqjZjtBxmSTznUVnurY&ll=46.4266985245422%2C-83.59794609999994&z=4.



Top Counties of Intersection-Related Fatalities and Serious Injuries

	Top Counties	Top Counties per Residents 16 and Older
1	Wake	Graham
2	Guilford	Stanly
3	Onslow	Sampson
4	Mecklenburg	Columbus
5	Davidson	Jones
6	Forsyth	Scotland
7	Cumberland	Perquimans
8	Pitt	Franklin
9	Durham	Pender
10	Brunswick	Hertford

TOP 10%

Working Group Members

Tom Bell, ATSSA
Hanna Cockburn, NCDOT
Eliud De Jesus, Mid-East Commission
Greg Ferrara, ITRE
Joe Furstenberg, NCDOT
Roger Henderson, BikeWalk NC
Joe Hummer, NCDOT
Melina Luetkehoelter, ITRE
Joe Milazzo, Regional Transportation Alliance
Sarah O'Brien, University of North Carolina Highway Safety Research Center (UNC-HSRC)
Chris Oliver, NCDOT
Heidi Perov Perry, BikeWalk NC
Leslie Tracey, City of Durham
Aaron Williams, FHWA

The **first Displaced Left-Turn intersection opened in North Carolina in 2019** at NC 16 (Brookshire Boulevard) and Mount Holly-Huntersville Road in Mecklenburg County.

Lane Departure

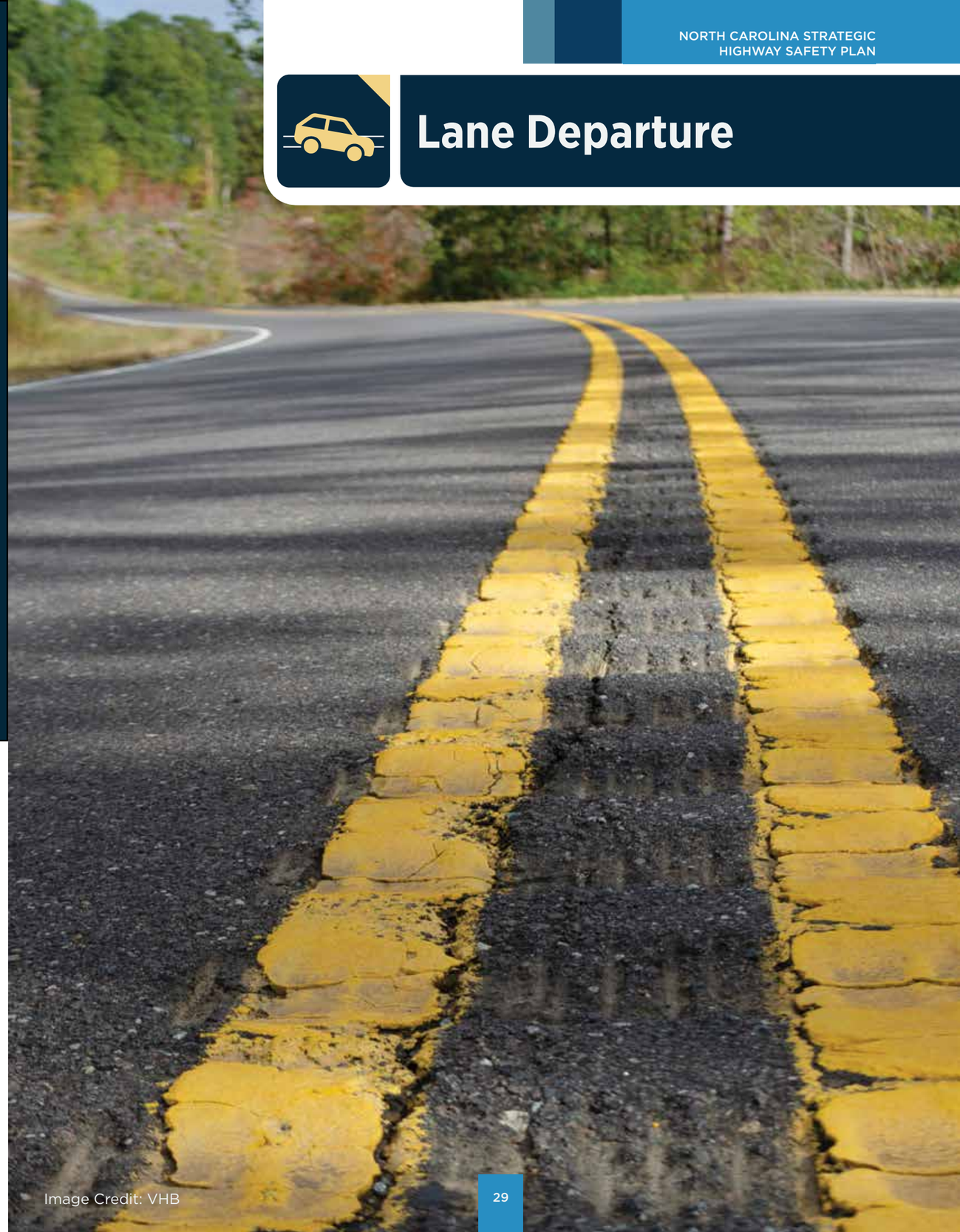


Image Credit: VHB

Lane Departure

FOCUS AREA: Roadway Infrastructure

EA DEFINITION: Crashes that occur due to a driver leaving their lane, and includes run-off-road, fixed object, head-on, rollover, and sideswipe crash types.

EA GOAL: Reduce lane departure-related fatalities and serious injuries by 50 percent by 2035, moving towards zero by 2050.

Description of the Issue

A lane departure event can result in different types of crashes, including run-off road, fixed object, head-on, rollover, and sideswipe. The consequences of a vehicle leaving its lane can be severe, sometimes resulting in a serious injury or death. These crash types can involve errant vehicles striking roadside objects, colliding with other vehicles, or overturning.

Lane departure crashes accounted for nearly 23 percent of all crashes and 52 percent of all fatalities on North Carolina roadways in 2018.[8] The number of lane departure crashes has risen steadily in recent years, increasing from approximately 50,000 crashes in 2011 to over 60,000 crashes in 2018.

One of the defining characteristics of lane departure crashes is that they occur predominately in rural areas. From 2014 to 2018, 64 percent of lane departure crashes in North Carolina occurred in rural areas. However, only 28 percent of North Carolina's population lives in rural areas.[9] Furthermore, crashes in these areas are more severe on average, with 80 percent of lane departure fatalities or serious injuries occurring in rural areas.

These statistics, along with the size of North Carolina's road system, mean it is crucial to use resources efficiently and effectively in mitigating the factors that contribute to lane departure crashes. North Carolina has invested heavily in addressing lane departure. These efforts include an ongoing safety evaluation of wide edge lines and edge lines with highly reflective elements on two-lane rural roadways. Preliminary results indicate a statistically significant reduction of lane departure crashes by about 10 percent following the installation of the new pavement markings. These results are supported by other research findings from across the U.S.

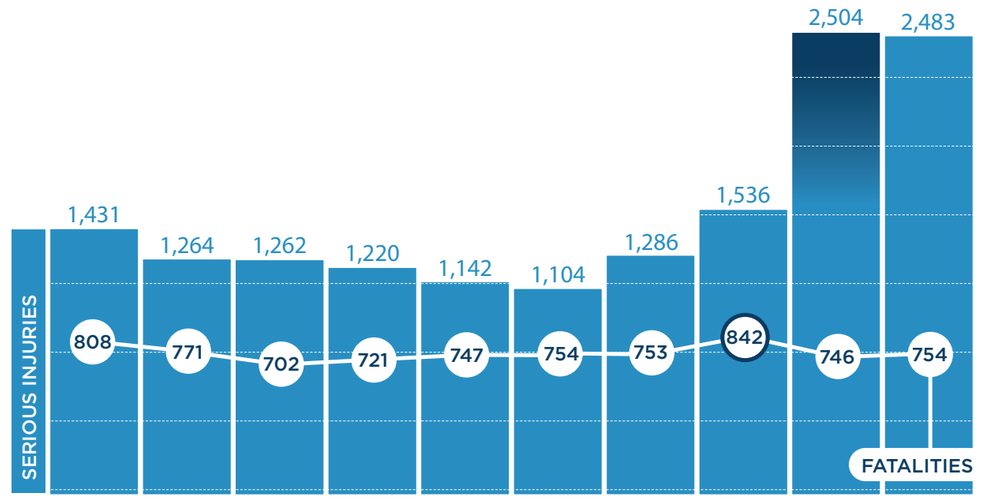
Law enforcement and other stakeholder agencies have worked to implement and continue several high-visibility campaigns focused on driver behaviors that contribute to the occurrence and severity of lane departure crashes. Effective programs include *Booze It & Lose It, Click It or Ticket* (the first of its kind in the U.S. and now the model for occupant protection campaigns), and *Speed a Little, Lose a Lot.* These enforcement and education programs speak to the multi-faceted nature of lane departure crashes.

Horizontal curve realignment can **decrease** lane departure **crashes** by **nearly 70%**.[10]

8 NCDMV (2019). *North Carolina 2018 Traffic Crash Facts.* https://connect.ncdot.gov/resources/safety/Crash%20Data%20and%20TEAAS%20System/Crash%20Data%20and%20Information/2018.pdf.
9 North Carolina State Data Center (2018). *The Urban and Rural Faces of North Carolina*. https://files.nc.gov/ncosbm/documents/files/2018ACSNC.pdf.
10 Srinivasan, R., Carter, D., Lyon, C., & Albee, M. (2018). *Safety Evaluation of Horizontal Curve Realignment on Rural, Two-Lane Roads [FHWA-HRT-17-066]*. https://www.fhwa.dot.gov/publications/research/safety/17066/17066.pdf.

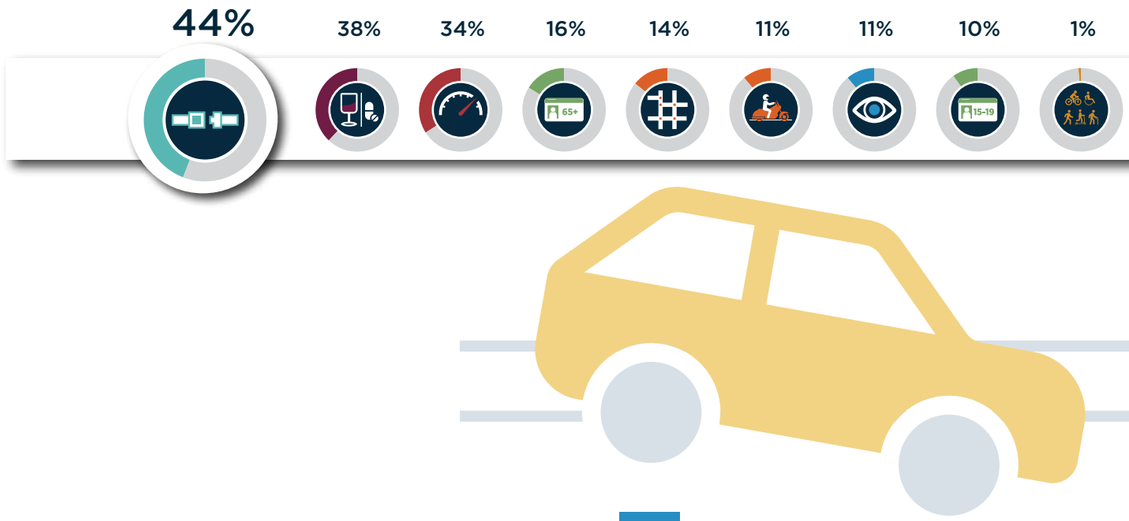
Data

Total Lane Departure-Related Fatalities & Serious Injuries (Last Decade)



Key Overlaps

The percentage of lane departure-related fatalities that also include another Emphasis Area.



Implementing Agencies

- GHSP
- NC Department of Commerce
- NCDMV
- NCDOT Division of Aviation
- NCDOT Division of Highways
- NCDOT Division of Highways' Maintenance & Operations Section
- NCDOT Office of Communications, Community Outreach, and Public Engagement
- NCDOT Roadside Environmental Unit
- NCDOT Roadway Design Unit
- NCDOT Transportation Mobility and Safety Unit
- NCDOT Traffic Safety Unit
- NCDPI
- North Carolina Office of EMS (NCOEMS)
- NCSHP
- Visit NC

Strategies and Supporting Actions

TIMELINE KEY:

ONGOING

NEAR-TERM (0-1 YEAR)

MID-TERM (1-2 YEARS)

LONG-TERM (2-5 YEARS)

Engineering

Keep vehicles from leaving their travel lane unlawfully or unexpectedly.

Continue to use evidence-based countermeasures to reduce crashes, such as long-life edgeline and centerline pavement markings, longitudinal rumble strips, paved shoulders, wider outside lanes, enhanced signage, and other low-cost systemic treatments.

Continue to evaluate the safety and operational performance of countermeasures geared toward lane departure crashes.

Implement guidelines that encourage design consistency, especially at locations with increased risk for lane departure crashes (curves and rural roads).

Reduce the potential for and severity of crashes when vehicles leave their lane.

Continue to apply and evaluate the effectiveness of low-cost treatments such as Safety Edge℠ technology, clear zone maintenance, median barriers, and guardrail.

Education

Support and enhance driver education and awareness programs.

Create an inventory of existing driver education programs and determine the extent to which curriculum and behind-the-wheel training address lane departure situations.

Develop education programs focused on raising awareness and familiarity with vehicle technologies that may affect lane departure crash causes, such as lane-keeping assistance and hands-free technology.

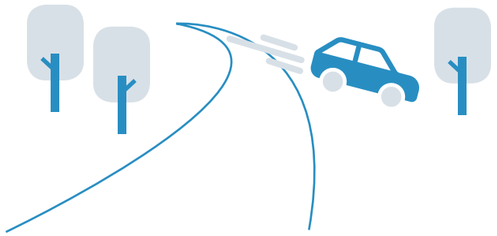
Provide educational materials and driving safety tips to drivers, such as tourists and travelers who are unfamiliar with North Carolina road types, as well as young and novice drivers.

Enforcement

Develop and implement coordinated campaigns to enforce traffic laws in areas with a higher share of lane departure crashes.

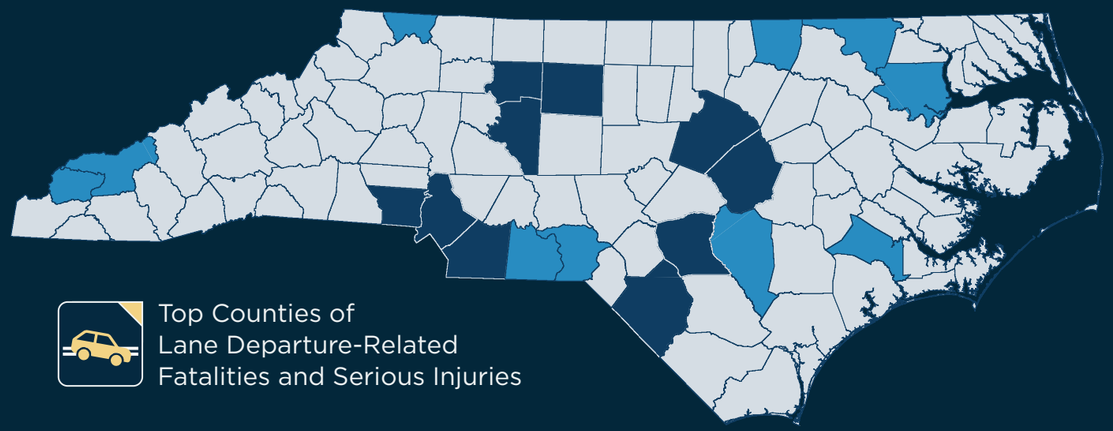
Identify target locations with a combination of high lane departure crash occurrence and noted driver behavior issues, primarily speeding, and enforce those behaviors.

Develop, implement, and track the effectiveness of a pilot campaign for speeding enforcement at the target locations.



Research on rural roads in North Carolina has shown that **seat belt non-use** and **horizontal road curvature** are found to significantly contribute to the **severity of single-vehicle lane departure crashes.**[11]

11 Gong, L. & Fan, W. (2017). *Modeling Single-Vehicle Run-Off-Road Crash Severity in Rural Areas: Accounting for Unobserved Heterogeneity and Age Difference.* Accident Analysis & Prevention. https://doi.org/10.1016/j.aap.2017.02.014.



Top Counties of
Lane Departure-Related
Fatalities and Serious Injuries

	Top Counties	Top Counties per Residents 16 and Older
1	Wake	Graham
2	Mecklenburg	Bertie
3	Guilford	Swain
4	Davidson	Anson
5	Forsyth	Northampton
6	Cumberland	Warren
7	Robeson	Jones
8	Johnston	Sampson
9	Gaston	Richmond
10	Union	Alleghany

TOP
10%

Working Group Members

Daniel Findley, ITRE
Chris Fresa, ATSSA
Joey Hopkins, NCDOT
Eric Howell, Eastern Carolina Council of Governments
Roger Kluckman, NCDOT
Chris Oliver, NCDOT
Renee Roach, NCDOT
Aaron Williams, FHWA

States that implemented **shoulder rumble strips** to deter distracted or drowsy related crashes reported **40 to 80%-reduction** in those crash types.[12]

12 FHWA. (2019). *Rumble Strips & Rumble Stripes*. https://safety.fhwa.dot.gov/roadway_dept/pavement/rumble_strips/cmrumblestrips/.

Human Behavior

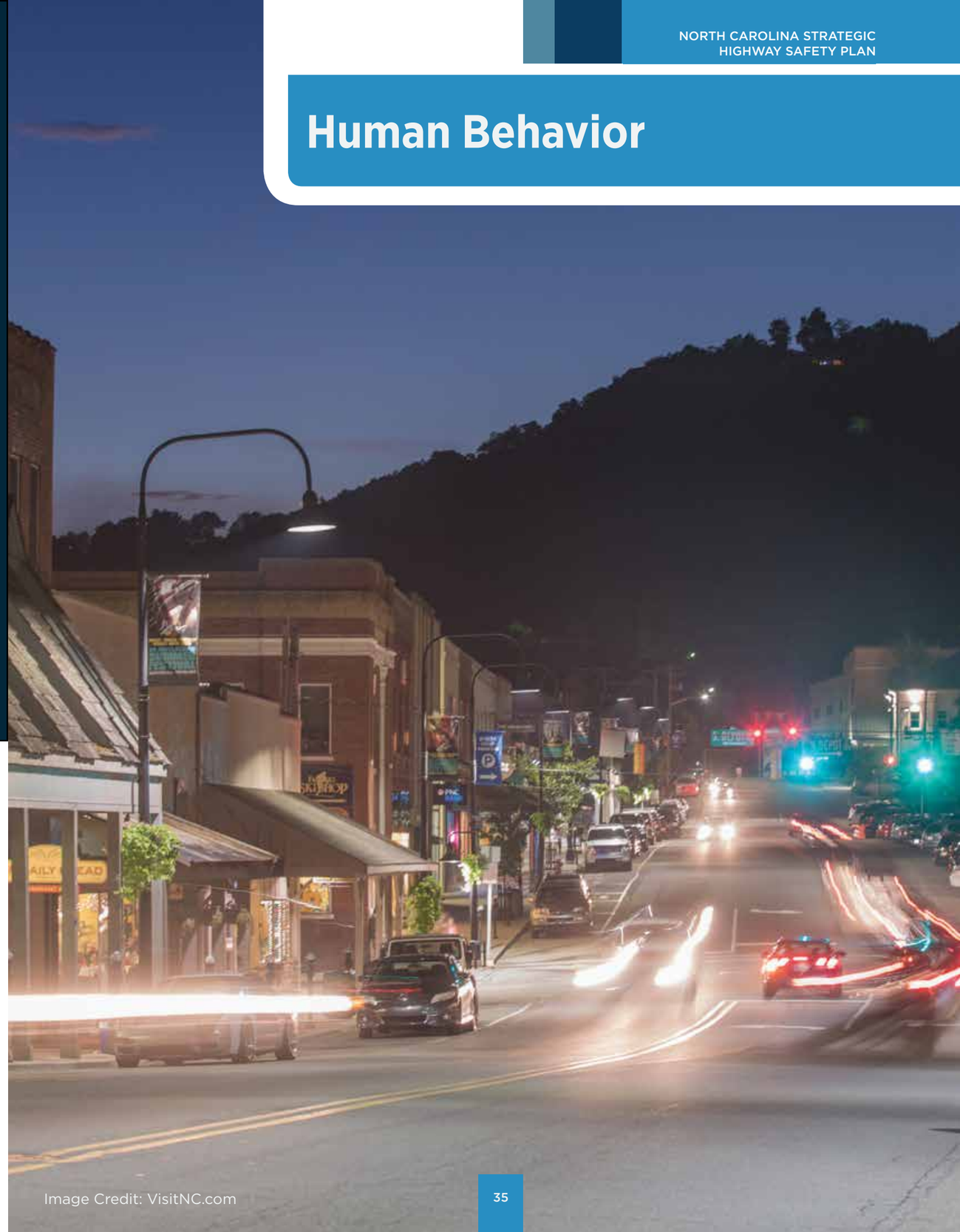


Image Credit: VisitNC.com

Human Behavior

Human behavior is a leading contributing factor in motor vehicle crashes. Some unsafe behaviors and decisions result from a lack of driving experience. These include misjudging gaps between vehicles and improper handling when in risky situations like hydroplaning or having a tire drop off the paved shoulder edge. Other external variables outside of the driver's control may also lead to poor decisions, such as vehicle malfunction; environmental factors like weather; or design and maintenance elements like obstructions, pavement deterioration and repair, and limited sight distance. While all are important considerations, this Focus Area and its constituent Emphasis Areas center on high-risk behaviors. These are the driver-conscious choices that increase the probability of a crash (Alertness), the choices that contribute to judgment errors (Substance Impaired Driving), and the choices that impact chances of survival or injury severity (Occupant Protection, Speed).

The two most represented Es in the strategies of this Focus Area are Education and Enforcement, concentrating on effective active partnerships and strong policies that discourage or prevent unsafe choices and reinforce safe choices. Engineering can assist drivers in making safe decisions. Angle crashes and left-turn crashes represent a notable proportion of fatal and serious injuries. Prioritizing intersection designs that reduce the number of conflict points (e.g., roundabouts) can reduce the decision points for the driver and the overall crash frequency and injury severity.

Although not explicitly included in this Focus Area, Lane Departure is most closely linked with this Focus Area. Driver behavior is a contributing factor in lane departure crashes. Additionally, Occupant Protection has a large impact on crash survivability—reducing the risk of fatality by almost 50 percent.[13]

Therefore, it is nearly impossible to address lane departure crashes without first addressing Alertness, Occupant Protection, Speed, and Substance Impaired Driving.

ALERTNESS

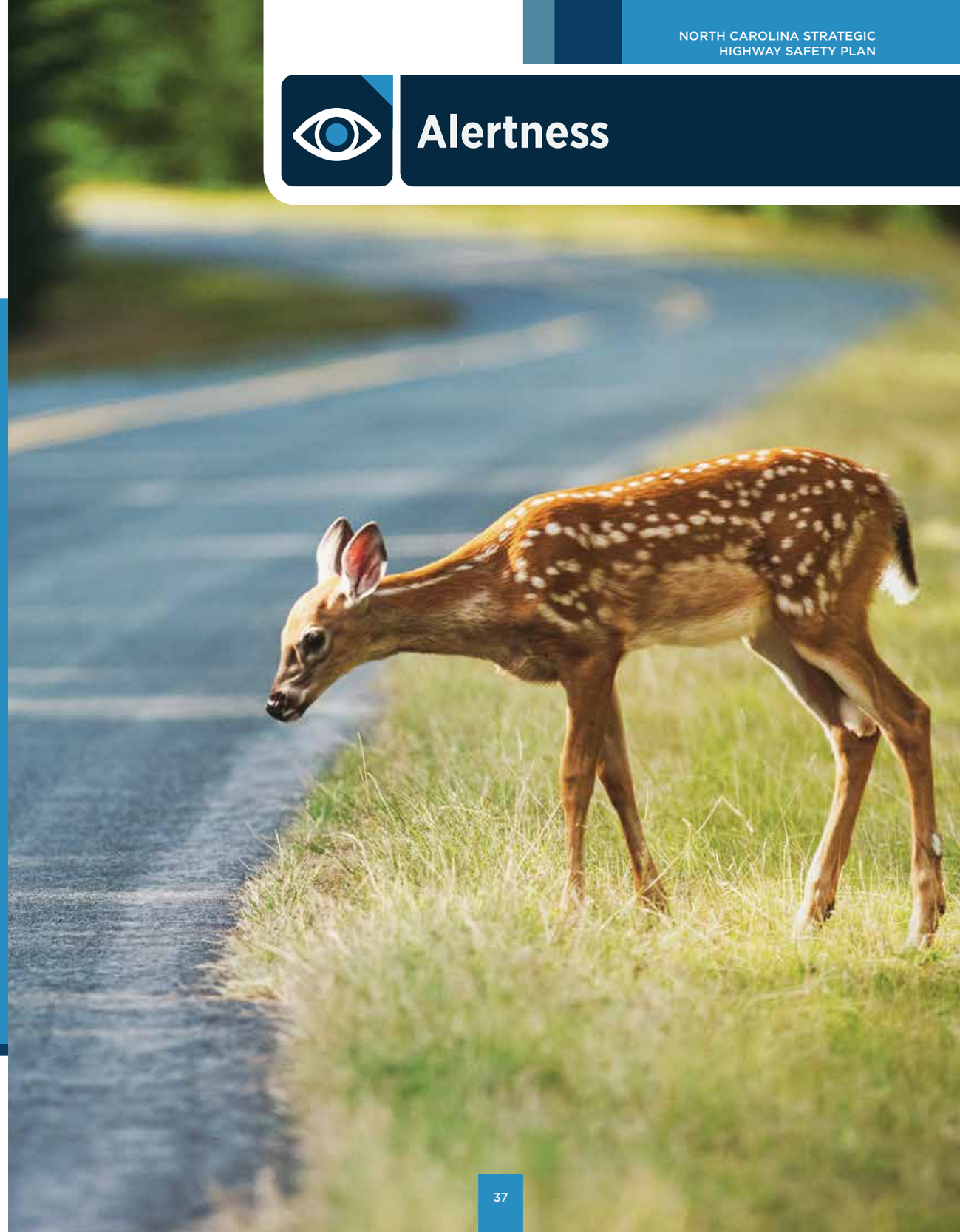
OCCUPANT PROTECTION

SPEED

SUBSTANCE IMPAIRED DRIVING

13 NHTSA (n.d.) *Seat Belts*. https://www.nhtsa.gov/risky-driving/seat-belts.

Alertness



Alertness

FOCUS AREA: Human Behavior

EA DEFINITION: Crashes where a person driving, walking, or rolling is distracted, drowsy, or otherwise not alert.

EA GOAL: Reduce alertness-related fatalities and serious injuries by half by 2035, moving towards zero by 2050.

Description of the Issue

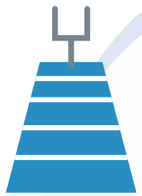
Alertness applies to drivers, pedestrians, and bicyclists who may be drowsy or distracted on the road. Drivers are not the only road users who face the challenge of keeping their eyes on the road and hands off their devices. It is also an ongoing challenge for pedestrians and bicyclists. Alertness takes different forms for all road users. Distraction can be visual—taking your eyes off the road; manual—taking your hands off the handle bars of your bike; or cognitive—day dreaming as you walk.[14]

In 2018, there were approximately 54,100 crashes and 120 fatalities related to distracted driving in North Carolina. Across the nation, 19 States ban all drivers from using a hand-held cell phone while driving.[15] As of 2019, North Carolina does not have a ban on hand-held cell phone use but does ban texting while driving. Crashes related to distraction are severely underreported. Current laws in North Carolina do not prohibit drivers from searching the internet, watching videos, or playing games on their handheld devices while driving. Strict privacy laws make it even more challenging for law enforcement to access phone records to determine if a driver was texting at the time of the crash.

Drowsiness is another contributing factor that impacts alertness. Drowsiness refers to fatigue or falling asleep while operating a vehicle.

In 2018, drowsy driving was reported in approximately 3,400 crashes and 22 fatalities in North Carolina, though it is thought these numbers are likely higher. Law enforcement faces similar challenges in identifying drowsy-related crashes as they do in identifying distracted-related crashes and typically relies on self-reporting of drowsy driving. When a fatality occurs, it is more difficult for law enforcement to determine if drowsiness was a contributing factor.

A hand-held cell phone ban combined with statewide enforcement would discourage distracted driving.[16] It is also important that North Carolina continue implementing countermeasures that have proven to be effective at mitigating distracted and drowsy-related crashes. Proven engineering countermeasures, such as rumble strips, can help distracted or drowsy drivers by alerting them as they begin to drift from their lane.

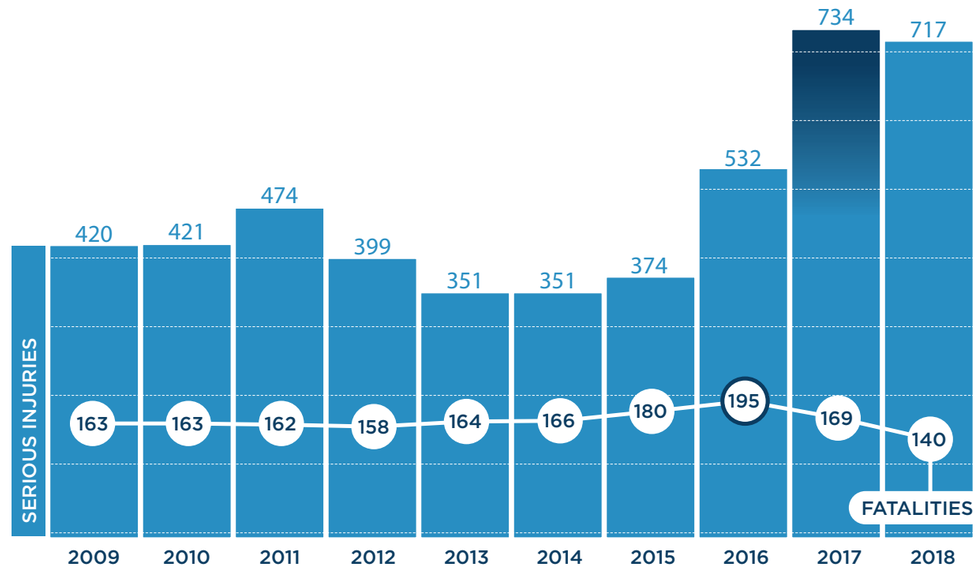


Sending or reading a text message takes your eyes off of the road for about **5 seconds**, which is long enough to **cover a football field while driving 55 mph.**[17]

14 CDC (2017). *Distracted Driving*. https://www.cdc.gov/motorvehiclesafety/distracted_driving/index.html.
15 GHSP (2019). *Distracted Driving*. https://www.ghsa.org/state-laws/issues/Distracted-Driving.
16 Atlanta Journal-Constitution (2019). *Study: Georgia cellphone law reduced distracted driving.* https://www.ajc.com/blog/commuting/study-georgia-cell-phone-law-reduced-distracted-driving/acnQYu13GIMSyJHkPdegoM/#.
17 End Distracted Driving (EndDD) (n.d.). *Learn the Facts About Distracted Driving*. https://www.enddd.org/the-facts-about-distracted-driving/.

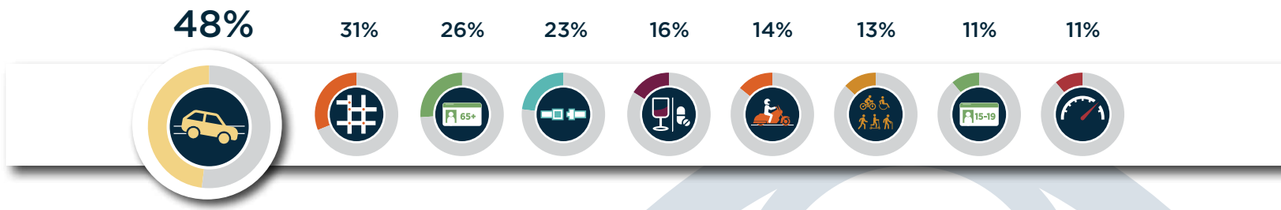
Data

Total Alertness-Related Fatalities & Serious Injuries (Last Decade)



Key Overlaps

The percentage of alertness-related fatalities that also include another Emphasis Area.



Implementing Agencies

- Independent Insurance Agents of North Carolina
- NC Better Business Bureau
- NC Department of Administration
- NC Department of Commerce
- NC Department of Insurance (NCDOI)
- NCDOT Division of Highways' Maintenance & Operations Section
- NCDOT Transportation Mobility & Safety Division
- NC Division of Public Health
- NC Healthcare Association
- NCOEMS
- North Carolina Office of State Human Resources (NCOSHR)
- NCSHP
- NC Trucking Association
- SADD
- University and other research organizations

Strategies and Supporting Actions

TIMELINE KEY:

ONGOING

NEAR-TERM (0-1 YEAR)

MID-TERM (1-2 YEARS)

LONG-TERM (2-5 YEARS)

Engineering

Implement proven countermeasures to alert distracted, drowsy, or inattentive drivers.

Continue the NCDOT policy of installing rumble strips on roads that are overrepresented in lane departure crashes statewide.

Investigate new and emerging technologies to keep road users alert.

Examine the available smartphone applications that discourage distraction among teen drivers and/or all drivers for large-scale implementation.

Create a single source repository of applications and technologies that keep road users alert.

Develop and pilot test effective technologies to reduce distracted driving.

Almost 75%
of drivers **support laws** against holding and talking on a cellphone while driving.[18]

18 AAA Foundation for Traffic Safety (2019). *2018 Traffic Safety Culture Index*. https://aaafoundation.org/wp-content/uploads/2019/06/19-0282_AAAFTS_TSCI-Fact-Sheet_r1.pdf.

Education

Enact a statewide handheld cell phone ban while operating a motor vehicle.

Identify additional champions in the legislature to advance proposed hands-free law.

Pending enactment of a hands-free law, educate road users about the law.

Develop and enact policies that reduce distracted driving.

Identify and promote employer-based policies banning cell phone use while operating a motor vehicle for State agencies, public health stakeholders, local government, and large local employers with vehicle fleets through targeted outreach with employees, visible reminders in vehicles, and collaboration with the Network of Employers for Traffic Safety.

Partner with businesses and nontraditional partners (e.g., trucking companies) with driver fleets to implement technologies that reduce distracted driving.

Enforcement

Investigate methods to improve consistency and visibility of distracted driving enforcement.

Establish a high-visibility enforcement campaign in North Carolina to deter drivers from texting while driving.

Provide training to law enforcement to improve the accuracy of recording distracted driving data in crash reports.

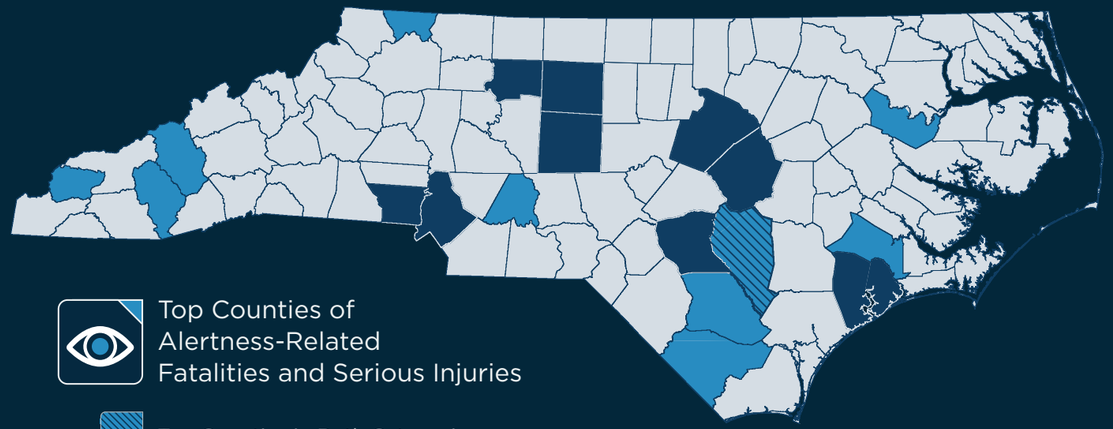
Legislate the collection of cell phone records for persons involved in a fatal crash.

Emergency Services

Strengthen the involvement of emergency services in addressing distracted and drowsy-driving related crashes.

Engage and incorporate emergency medical service (EMS) in fatal crash reviews.

Engage injury prevention coordinators and medical professionals on educational interventions for patients.



Top Counties of Alertness-Related Fatalities and Serious Injuries

Top Counties in Both Categories

	Top Counties	Top Counties per Residents 16 and Older
1	Wake	Graham
2	Mecklenburg	Sampson ■
3	Guilford	Stanly
4	Cumberland	Haywood
5	Forsyth	Bladen
6	Gaston	Jones
7	Sampson ■	Martin
8	Johnston	Alleghany
9	Onslow	Columbus
10	Randolph	Jackson

TOP 10%

Working Group Members

Tracy Anderson, NC Vision Zero/ITRE
Heather Banta, NCOSHR
Sharath Bhat, ITRE
Greg Ferrara, ITRE
Arthur Goodwin, UNC-HSRC
Eric Howell, Eastern Carolina Council of Governments
Chris Oliver, NCDOT
Harriett Southerland, SADD
Joe Stewart, Independent Insurance Agents of North Carolina
Aaron Williams, FHWA

Activity in the area of the brain that processes moving images **decreases by 1/3 when listening or talking on a phone.**[19]

19 North Carolina Vision Zero (NCVZ) (2019). *Distracted Driving.* https://ncvisionzero.org/safety-focus-areas/distracted-driving/?gclid=Cj0KCQjwwb3rBRDrARIsALR3XebsxGVaJojhf5_s5zxNifSMNukZG0jeJ4pb-BIontVqw2X_euL43sMaAmGnEALw_wcB.

Occupant Protection

Image Credit: NHSTA

Occupant Protection

FOCUS AREA: Human Behavior

EA DEFINITION: Crashes involving unrestrained or improperly restrained occupants.

EA GOAL: Reduce unrestrained-related fatalities and serious injuries by half by 2035, moving towards zero by 2050.

Description of the Issue

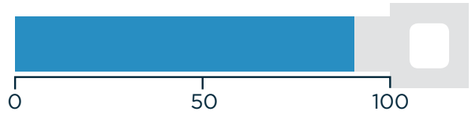
Wearing a seat belt is the best protection for an individual in the event of a crash. An estimated 600 lives are saved each year by passenger restraints in our State. In 2018, North Carolina was one of the many States with a seat belt usage rate over 90 percent; however, 1 in 10 front-seat occupants did not wear their seat belt. A comprehensive effort supported by strong leadership, partnerships, legislation, and effective strategies over the next 5 years will aim to increase the number of North Carolinians that are properly restrained on every trip.

Since 2007, the percent of passenger vehicle fatalities that are unrestrained has remained flat at 40 percent. Restraint use in North Carolina varies by geographic area, demographic and cultural differences, vehicle types, time of day, and other factors. Notably, over three-quarters of unrestrained fatalities occur in rural areas.

Widespread, high-visibility enforcement increases restraint use and reduces unrestrained-related fatalities. North Carolina was the first State to implement the *Click It or Ticket* campaign, which is now nationwide.[20] The campaign has been running in North Carolina for 26 years, but since 2013, restraint violations have decreased by approximately 20 percent.[21] Effective adjudication practices are needed to increase proper seat belt and car seat use. It is important to continue to identify and use new tools and strategies to reach drivers and passengers and develop new marketing campaigns, branding, and practices to refresh restraint use messaging.

Creating a culture and expectation of restraint use begins with North Carolina's youngest passengers. From 2014-2018, 60 unrestrained children (age 14 and under) were killed on North Carolina roadways. Promoting consistent and correct restraint use throughout all phases of life supports North Carolina's long-lasting commitment to the safe transport of all people. The strategies and actions included in this Emphasis Area support opportunities to implement a collaborative, data-driven process to reduce occupant protection related fatalities and injuries.

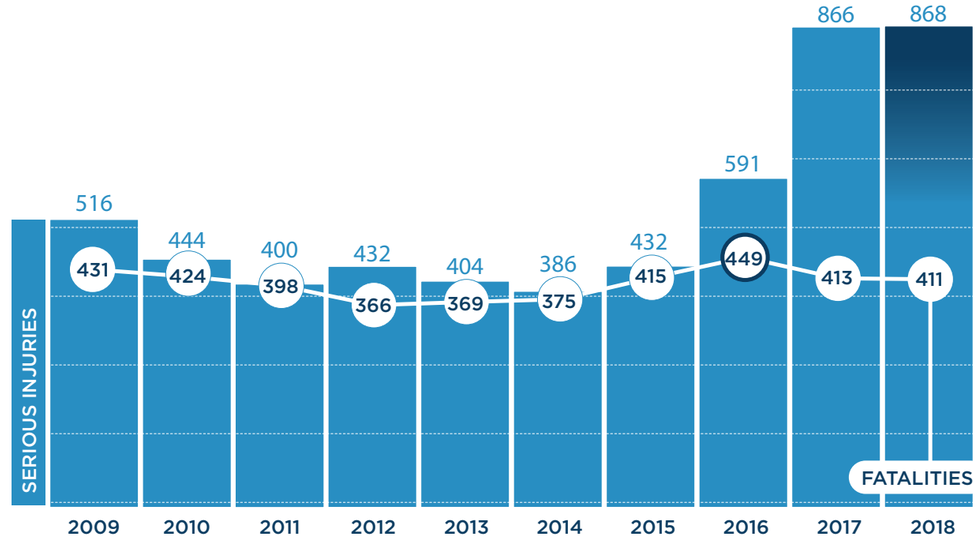
In 2018, North Carolina had a seat belt usage rate of **91.3%.**[22]



20 NCDOT (2013). *Governor's Highway Safety Program Celebrates 20th Anniversary of "Click It or Ticket.* https://www.ncdot.gov/news/press-releases/Pages/2013/Governor-s-Highway-Safety-Program-Celebr.aspx.
21 ITRE (2018). *Estimating the Effect of Standard Enforcement of a Rear Seat Belt Law for Rear Seat Fatality Prevention in North Carolina.* https://www.ncleg.gov/DocumentSites/Committees/NCCFTF/Presentations/2018-2019/RearSeatBelts_ITRE_20181021.pdf.
22 GHSP (2019). *Highway Safety Plan*. https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/nc_fy19_hsp.pdf.

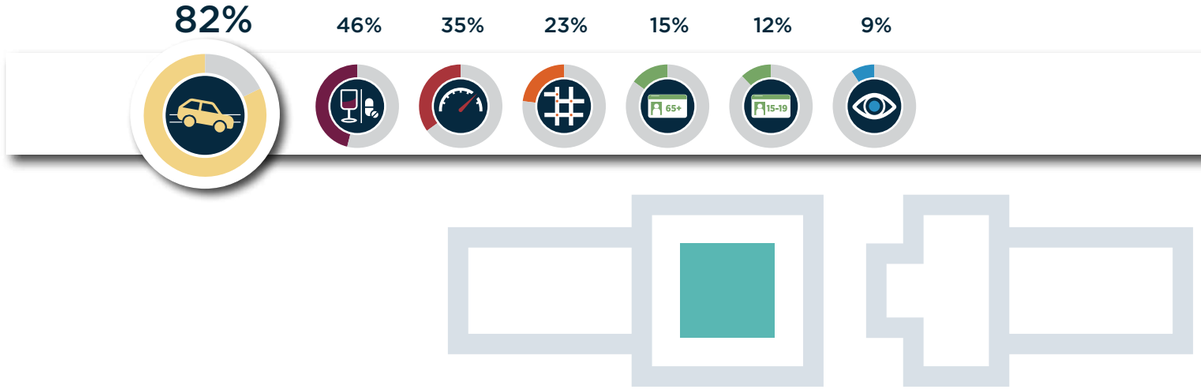
Data

Total Unrestrained-Related Fatalities & Serious Injuries (Last Decade)



Key Overlaps

The percentage of occupant protection-related fatalities that also include another Emphasis Area.



Implementing Agencies

- GHSP
- NC Conference of District Attorneys
- NC Department of Health and Human Services (DHHS) Injury and Violence Prevention Branch
- NC DOI/Office of State Fire Marshall (OSFM) Injury Prevention Division
- NCDMV
- NCDOT Office of Communications, Community Outreach, and Public Engagement
- University and other research groups

Strategies and Supporting Actions

TIMELINE KEY:

ONGOING

NEAR-TERM (0-1 YEAR)

MID-TERM (1-2 YEARS)

LONG-TERM (2-5 YEARS)

Education

Promote consistent and correct restraint use throughout all phases of life.

Examine current approaches to occupant protection and develop new marketing campaigns, branding, and practices to refresh messaging.

Increase public knowledge of the correct use of car seats, booster seats, and seat belts.

Integrate traffic safety into existing school education curriculum and student events and programs, including driver education.

Improve, integrate, and explore data sources and analysis methods to inform problem identification, countermeasures, and messaging.

Improve geocoding to support analysis of issues related to restraint use.

Integrate data sources to identify sub-group characteristics, behaviors, and other factors to inform countermeasures and messaging.

Improve crash data regarding the use of car seats.

Enforcement

Use effective enforcement strategies and adjudication practices to increase seat belt use overall and to encourage proper seat belt and car seat use.

Review successful enforcement efforts in rural areas throughout the U.S. and encourage use of effective practices to law enforcement.

Provide resources to support effective high-visibility enforcement efforts (e.g., messaging, engaging community partners) and demonstrate the benefits of traffic enforcement to agencies (e.g., reduction in criminal activity).

Expand existing occupant protection enforcement activities with the enforcement of other high-risk behaviors (e.g., impaired driving, speeding), coordinate multi-jurisdictional activities, and encourage resource sharing.

Investigate and address issues that may undermine law enforcement efforts and effectiveness related to occupant protection violations (e.g., dismissal of charges, identification of violations, fines).

Evaluate, improve, and expand diversion programs for child passenger safety and adult restraint violations, where appropriate.

Support effective legislation and policies to increase occupant restraint use.

Review existing legislation, policies, and countermeasures that contribute to increased use of occupant restraints.

Support primary seat belt enforcement with equal consequences for all seating positions in North Carolina.

Emergency Services

Train EMS personnel on best practices for transporting children of various ages via ambulance.

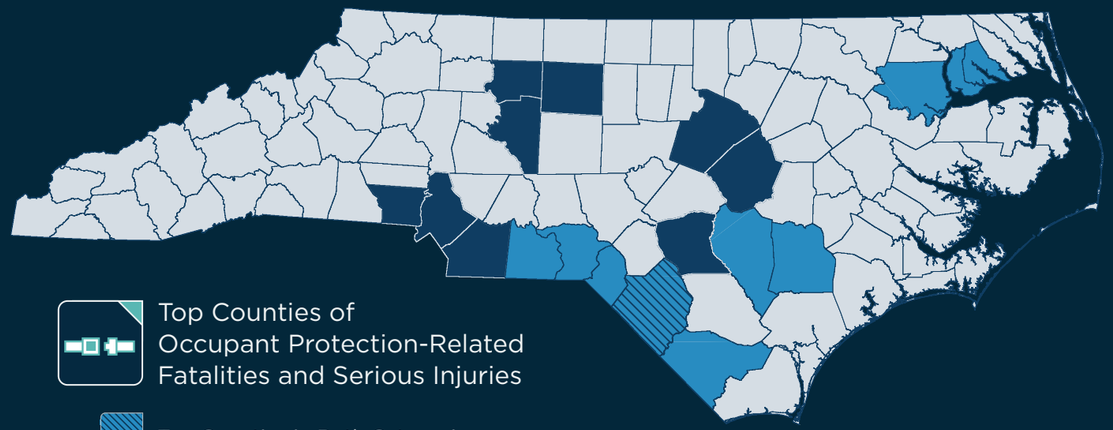
Evaluate emergency services training for transporting children via ambulance and recommend improvements, as needed.

In 2017, nearly

70%

of eligible child passenger safety (CPS) technicians completed their CPS recertification. This rate is 10% higher than the national average. North Carolina ranked first in the number of eligible technicians and third for the percentage who recertified.[23]

23 GHSP (2019). *Highway Safety Plan*. https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/nc_fy19_hsp.pdf.



Top Counties of Occupant Protection-Related Fatalities and Serious Injuries

Top Counties in Both Categories

	Top Counties	Top Counties per Residents 16 and Older
1	Wake	Bertie
2	Mecklenburg	Duplin
3	Guilford	Richmond
4	Robeson	Columbus
5	Forsyth	Sampson
6	Davidson	Robeson
7	Cumberland	Perquimans
8	Johnston	Anson
9	Gaston	Chowan
10	Union	Scotland

TOP 10%

Working Group Members

James Bradford, AARP
Mark Brown, MotoMark1
Catherine Bryant, NCDOT
Shannon Bullock, NCDOI/OSFM
Alan Dellapenna, NC DHHS
Cathy Hunt, Southeastern Health
Bevan Kirley, UNC-HSRC
Amin Mohamadi, NCDOT
Dana Orr, Poe Health
Chris Oliver, NCDOT
Sergeant James Pickard, NCSHP
Kristel Robison, UNC-HSRC
Trooper Jonathan Sherrill, NCSHP
Aaron Williams, FHWA

According to the American Academy of Pediatrics, children riding in car seats are **five times safer riding in a rear-facing car seat** than a forward-facing car seat.[24]

24 BuckleUpNC (2019). North Carolina Child Passenger Safety Law Frequently Asked Questions. http://www.buckleupnc.org/occupant-restraint-laws/child-passenger-safety-law-faqs/.

Speed

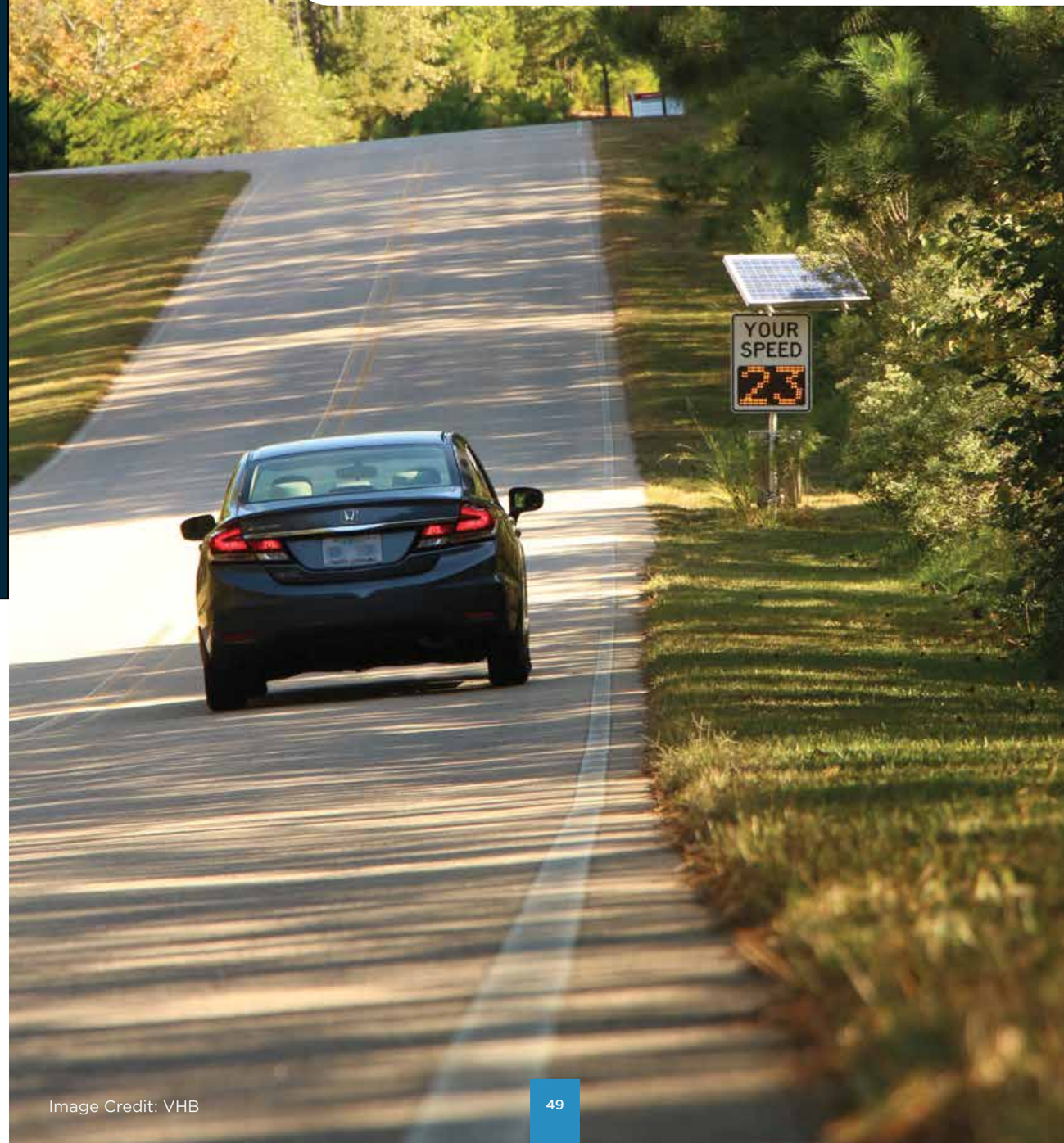


Image Credit: VHB

Speed

FOCUS AREA: Human Behavior

EA DEFINITION: Crashes where the reporting officer noted the driver's contributing circumstance as "exceeding authorized speed limit" or "exceeding safe speed for conditions."

EA GOAL: Reduce speed-related fatalities and serious injuries by 50 percent by 2035, moving towards zero by 2050.

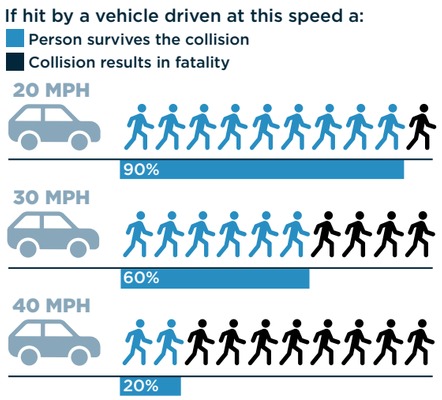
Description of the Issue

In North Carolina, crashes are considered "speed-related" if a driver contributing circumstance included "exceeding authorized speed limit" or "exceeding safe speed for conditions" on the Crash Report Form (Form DMV-349). Speed limits are set based on roadway design, anticipated traffic volume, and other characteristics, like travel speed. On existing State-owned roads, if a speed limit change is requested, a traffic engineer considers characteristics like road geometry, adjacent land use, presence of curves, crash history, and operating speeds to determine if a change is appropriate. Over 75 percent of speed-related crashes involved a single vehicle and 77 percent of speed-related fatalities involved a vehicle leaving the travel lane.

Establishing a culture of safe speeds is a vital component in reducing fatalities and serious injuries in North Carolina. The effects of speed are fundamental in a crash outcome. The human body has a limit to the forces it can withstand before sustaining an injury. It is a matter of physics that in a crash, higher speeds result in higher forces.

Drivers must use judgment when choosing appropriate speeds to safely navigate the conditions of the roadway. In North Carolina, there are more than twice as many rural roads than urban roads, meaning the concept of safe speeds will differ in these area types. Although speed limits are highest on Interstates, there are more speed-related crashes (including fatalities and serious injuries) on State secondary routes in rural areas and local roads in urban areas. This illustrates that speed in and of itself is not the primary issue, but the selection of appropriate speeds based on the context of the roadway and its users. For example, a downtown corridor may have a posted speed limit of 35 mph, but a "condition" of high pedestrian activity at nighttime should necessitate drivers reduce speeds. In a rural context, a speed limit may be set at 55 mph on a two-lane road, but the presence of sharp curves (especially at night or in wet conditions) should necessitate drivers to reduce speeds.

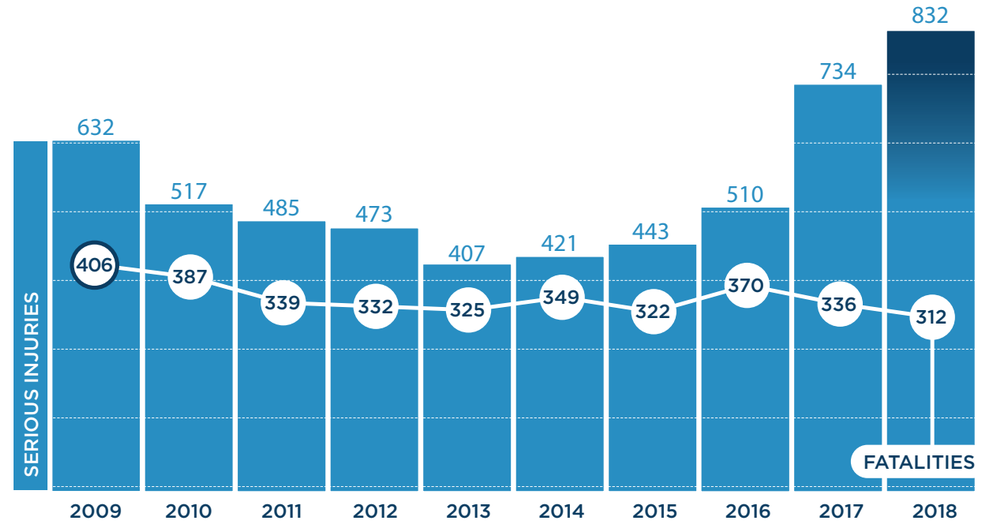
A pedestrian's chance of survival exponentially increases at lower speeds.[25]



25 Coral Gables Public Works Department (n.d.). *Traffic Calming (COPY 1)*. https://www.coralgables.com/traffic-calming-copy-1.

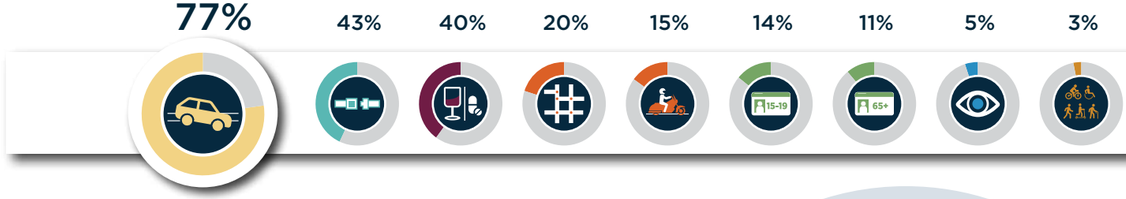
Data

Total Speed-Related Fatalities & Serious Injuries (Last Decade)



Key Overlaps

The percentage of speed-related fatalities that also include another Emphasis Area.



Implementing Agencies

- ECHS
- GHSP
- Law enforcement (NCSHP and municipal agencies)
- Local transportation departments
- Local public schools
- MPOs/RPOs
- NCDOT Integrated Mobility Division
- NCDOT Transportation Mobility & Safety Unit
- NC Conference of District Attorneys
- Policy makers
- University and other research groups

Strategies and Supporting Actions

TIMELINE KEY:

ONGOING

NEAR-TERM (0-1 YEAR)

MID-TERM (1-2 YEARS)

LONG-TERM (2-5 YEARS)

Engineering

Implement infrastructure projects and lower-cost countermeasures to reduce the number and severity of speed-related crashes.

Use speed-related crash data to identify locations with the most potential for safety improvement to address speed-related crashes and implement evidence-based countermeasures.

For new and existing roads, establish a safe limit and designs within a Complete Streets framework.

Identify safety zones (e.g., school zones, high-pedestrian activity locations, work zones) through local partnerships and implement speed countermeasures.

Evaluate speed limits for existing roads (and reset if necessary).

Determine appropriate speed limits based on the purpose and need of the roadway, traffic volumes, roadway characteristics, roadway setting, number of access points, crash history, and pedestrian/bicyclist activity.

Develop a statewide speed management plan.

Develop a context-sensitive, stakeholder inclusive speed management planning, design, implementation, and enforcement program.

Coordinate high-visibility speed enforcement in areas with high pedestrian/bicyclist activity and risk of injury.

Education

Educate transportation engineers, planners, policymakers, and general public on the effects of speed on safety for all roadway users.

Use existing resources (like ITE Resource Hub) to develop and implement training for transportation engineers and planners about countermeasures that reduce vehicle speeds and/or are proven to reduce speed-related crashes.

Develop and implement a campaign that helps the public to see speeding as a dangerous behavior and normalize safe speeds by spreading the message that lower speeds save lives.

In 2017, **over 516,000 speeding citations were issued in North Carolina**.
Wake County led the way with 34,029.[26]

Enforcement

Implement automated speed enforcement.

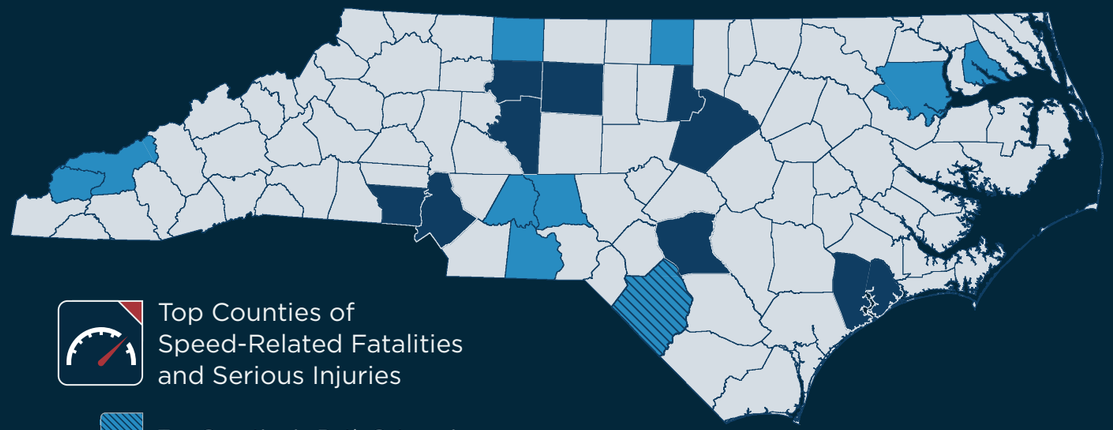
Develop a Task Force/Committee including members that work closely with legislators to identify barriers to automated enforcement (on the statewide and local level).

Implement automated speed enforcement in targeted areas to focus on vulnerable people, including school zones, work zones, and areas of high pedestrian activity.

Make speeding violations more likely to be upheld in court.

Identify actions that can be implemented based on the findings of the Secretary of Transportation's Safety Work Group that is reviewing the process for handling speeding tickets.

26 The News & Observer (2018). *NC issued half a million speed tickets in 2017. These counties led the State*. https://www.newsobserver.com/news/local/crime/article201607874.html.



Top Counties of Speed-Related Fatalities and Serious Injuries

Top Counties in Both Categories

	Top Counties	Top Counties per Residents 16 and Older
1	Mecklenburg	Graham
2	Wake	Anson
3	Guilford	Perquimans
4	Forsyth	Bertie
5	Cumberland	Montgomery
6	Davidson	Person
7	Robeson	Stanly
8	Onslow	Robeson
9	Gaston	Swain
10	Durham	Stokes

TOP 10%

Working Group Members

Tracy Anderson, NC Vision Zero/ITRE

Catherine Bryant, NCDOT

Bill Judge, City of Durham

Barb Mee, City of Asheville

Terry Lansdell, BikeWalk NC

Chris Lukasina, Capital Area MPO/ North Carolina Association of MPOs

Chris Oliver, NCDOT

Heidi Perov Perry, BikeWalk NC

Anne Phillips, City of Durham

SPEED LIMIT 40

A crash on a road with a speed limit of 65 mph or higher is more than twice as likely to result in a fatality as a crash where the speed limit is 45 or 50 mph, **and nearly five times as likely as a crash where the speed limit is below 40 mph.**[27]

27 North Carolina Department of Transportation (2019). *Speed a Little. Lose a Lot.* https://www.ncdot.gov/initiatives-policies/safety/speed-a-little-lose-a-lot/Pages/default.aspx.

Substance Impaired Driving

Image Credit: VHB

Substance Impaired Driving

FOCUS AREA: Human Behavior

EA DEFINITION: Crashes that involve a driver in which alcohol or drug impairment is suspected or detected.

EA GOAL: Reduce substance impaired driving-related fatalities and serious injuries by half by 2035, moving towards zero by 2050.

Description of the Issue

Substance impaired driving involves drivers who may be impaired by alcohol and/or drugs. Between 2014 and 2018, nearly 400 people died each year in crashes involving an alcohol- or drug-impaired driver. Previous impaired driving strategies and actions in North Carolina have primarily focused on alcohol-impaired driving. This Emphasis Area also considers drug impairment, which includes over-the-counter medication, prescription medication, and illegal drugs.

Any level of driver impairment erodes the physical and cognitive skills needed for safe driving. Effective enforcement and adjudication practices provide a level of deterrence against driving while impaired. Between 2014 and 2017, impaired driving and implied consent charges (e.g., aid and abet and open container) declined by 15 percent.[28] It is important for North Carolina to maintain strong alcohol legislation and evaluate potential outcomes of all proposed changes. As of 2019, North Carolina House Bill 971 proposes privatization of alcohol distribution in North Carolina. This bill would increase accessibility to alcohol and could lead to negative societal and economic impacts.[29] Policy and legislative actions need to be investigated and pursued to restrict access, decrease consumption, deter behaviors, and provide intervention strategies to reduce impaired driving-related crashes.

The prevalence of legal and illegal drug use and the impact on highway safety is also a concern in North Carolina. The complex nature of circumstances related to drug use requires a collaborative management approach to ultimately reduce the occurrence of substance impaired driving. Drug Recognition Experts follow a twelve-step process to accurately determine impairment by different types of drugs.[30] Advanced Roadside Impaired Driving Enforcement (ARIDE) training extends the knowledge of Standard Field Sobriety Test training to better prepare officers to detect all types of impairment. Establishing a requirement for ARIDE training as a minimum standard would better equip law enforcement to identify and apprehend drivers impaired by any substance.

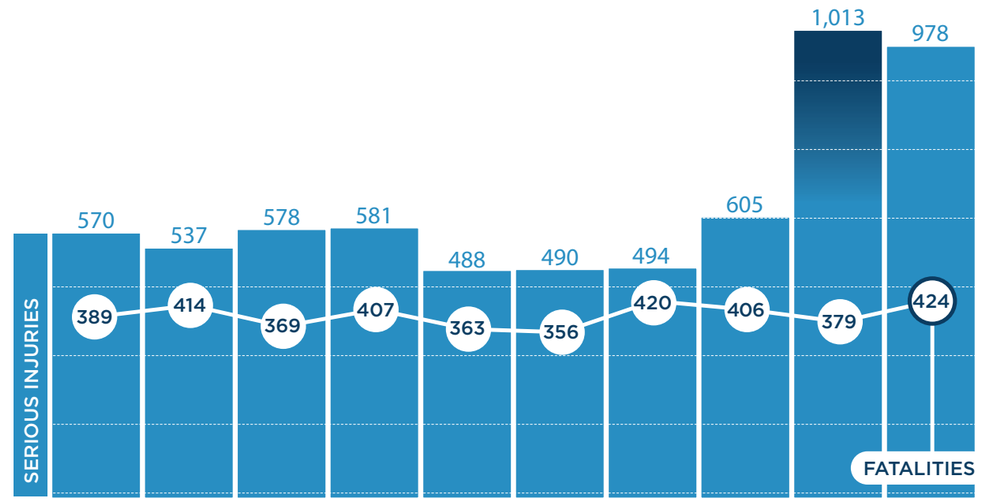
Effective and consistent intervention strategies through policy and legislation are needed to bridge the gap between an impaired driving violation and adjudication to reduce recidivism. A change is needed in the perspective of the public, law enforcement officers, prosecutors, and judges that impaired driving does not always mean alcohol impaired driving. Education of officers, prosecutors, and judges on the signs and symptoms of drug impairment while emphasizing that the concern is not the type of impairing substance but the impaired driving is also needed. The strategies and supporting actions in this Plan support opportunities to enhance legislation, policies, and programs to reduce the negative health outcomes of driving while impaired.

28 NC Judicial Department (n.d). *Court Data and Statistics*. https://www.nccourts.gov/about/data-and-statistics.
29 NC Department of Health and Human Services (n.d.) *Alcohol & the Public's Health in North Carolina*. https://public.tableau.com/profile/nc.injury.and.violence.prevention.branch#!/vizhome/NCAlcoholDataDashboard/Story.
30 GHSA (2018). *Drug-Impaired Driving: Marijuana and Opioids Raise Critical Issues for States*. https://www.ghsa.org/resources/DUID18.

NORTH CAROLINA STRATEGIC
HIGHWAY SAFETY PLAN

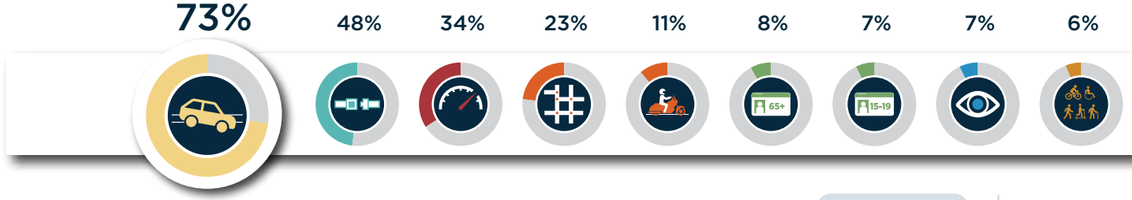
Data

Total Substance Impaired Driving-Related Fatalities & Serious Injuries (Last Decade)



Key Overlaps

The percentage of substance impaired driving-related fatalities that also include another Emphasis Area.



North Carolina is 1 of 17 States with **State-controlled alcohol sales**.[31]

31 NC Injury and Violence Prevention Branch (2019). *Alcohol & the Public's Health in North Carolina*. public.tableau.com/profile/nc.injury.and.violence.prevention.branch#!/vizhome/NCAlcoholDataDashboard/Story.

Implementing Agencies

- NC ABC Commission
- NC ABC Commission Education Outreach Section
- NC ABC Commission Permit Division
- NC Alcohol Law Enforcement
- North Carolina Administration Office of the Courts (NCAOC)
- NC Conference of District Attorneys
- NC DHHS Division of Public Health Forensic Tests for Alcohol
- NCDMV
- NCDOT Office of Communications, Community Outreach, and Public Engagement
- NC Justice Academy
- NC Opioid and Prescription Drug Abuse Advisory Committee

Strategies and Supporting Actions

TIMELINE KEY:

ONGOING

NEAR-TERM (0-1 YEAR)

MID-TERM (1-2 YEARS)

LONG-TERM (2-5 YEARS)

Engineering

Conduct safety investigations in geographic areas or along corridors where impaired driving is a factor and consider engineering solutions to support other strategies.

Partner with other agencies or groups where lane departure or other crash countermeasures are planned to encourage a multi-disciplinary approach to reducing impaired driving crashes.

Education

Implement a community health approach for educating the public on the concerns of impairing substances, health outcomes, and alternative choices to reduce substance impaired driving.

Promote the use of ride sharing and other options that provide an alternate ride home and expand access beyond urban areas.

Promote a collective impact model to address the issue of excessive alcohol use and drinking while driving.

Engage the public health community to understand risk factors associated with negative health outcomes and their relation to other risk-taking behavior (e.g., substance abuse and impaired driving).

Support implementation of North Carolina's Opioid Action Plan 2.0.

Education continued

Engage traditional and non-traditional partners to develop, integrate, coordinate, and support programs, resources (e.g., the NC DHHS Injury and Violence Prevention Branch – Alcohol Data Dashboard), activities, and messaging regarding the use of impairing substances and related outcomes, especially with existing community-based programs.

Establish and/or improve communication channels (e.g., doctors, pharmacists, print and electronic resources) to educate persons taking multiple medications, certain prescriptions, or over-the-counter medications about risks associated with driver impairment.

Establish or enhance policies and legislation aimed at reduced consumption and access to alcohol or other impairing substances.

Examine and revise policies related to alcohol consumption at private establishments, sporting events, and other social gatherings.

Assess the impact potential privatization of the distribution and sale of spirituous liquor could have on highway safety in North Carolina and communicate that impact to legislators.

Enforcement

Provide a system to deter impaired driving events.

Increase the number, accessibility, and retention of certified Drug Recognition Experts.

Increase the number of officers receiving ARIDE training.

Improve processes to reduce DWI violation processing time, including updating and integrating data systems and implementing e-search warrants for blood tests.

Inform high-visibility DWI enforcement through data analysis to focus efforts and increase the reach of messaging.

Examine national best practices to inform the development of program, policy, and legislative changes in North Carolina.

Investigate outcomes and effectiveness of countermeasures in States that have legalized marijuana.

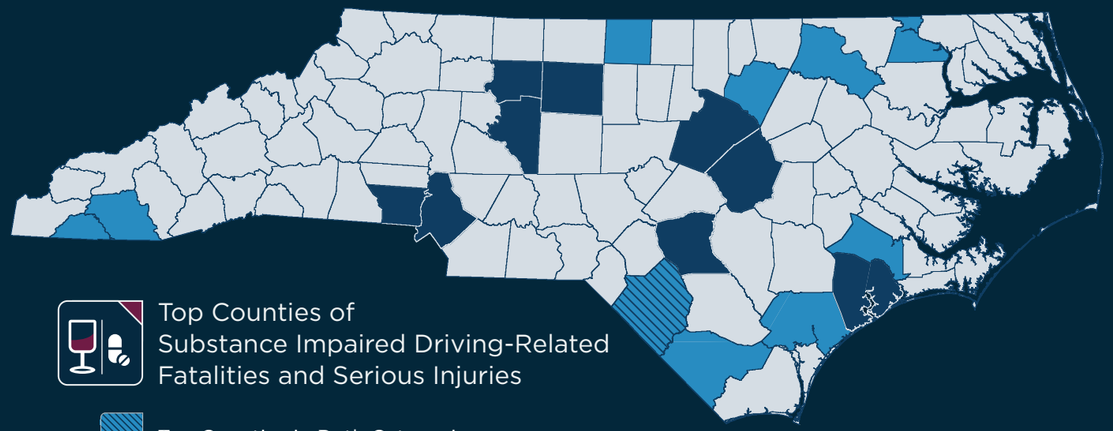
Investigate outcomes and effectiveness of countermeasures in States that have strong per se (over 0.08 blood alcohol content [BAC] you can be charged regardless of proof of impairment), deterrence, adjudication policies, and legislation to inform the development of policies and legislation in North Carolina.

Improve intervention policies and strategies that bridge the gap between violation and conviction or disposition, and that aim to reduce recidivism.

Reassign the administration of licensing determination to the NCDMV, including limited driving privileges and driving restrictions (e.g., ignition interlock devices).

Increase the use of ignition interlock devices and support strengthened legislation to require ignition interlock devices for all offenders charged with an alcohol-related offense.

Work with vendors, NCDMV, and the NCAOC to access, monitor, and research data regarding interlock devices and continuous monitoring technology to better understand implementation and outcomes in North Carolina.



Top Counties of
Substance Impaired Driving-Related
Fatalities and Serious Injuries

Top Counties in Both Categories

	Top Counties	Top Counties per Residents 16 and Older
1	Wake	Hertford
2	Mecklenburg	Columbus
3	Guilford	Pender
4	Forsyth	Caswell
5	Cumberland	Clay
6	Davidson	Robeson ■
7	Robeson ■	Jones
8	Gaston	Macon
9	Johnston	Halifax
10	Onslow	Franklin

TOP
10%

Working Group Members

Ike Avery, NC Conference of District Attorneys
Pam Baden, Regional Transportation Alliance
Alan Dellapenna, NC DHHS
Susan Doyle, Johnston County Courts
Michael Eisen, NC DHHS
Sharon Freeman, NCDOT
Keith Gordon, Johnston County Courts
Eric Hinderliter, Johnston County Courts
Chris Oliver, NCDOT
Amy Pavlic, ABC Commission
Amy Prokopowicz, NC DHHS
Jim Van Hecke, ABC Commission
Aaron Williams, FHWA

Since North Carolina's Opioid Action Plan was launched in June 2017, **opioid dispensing has decreased by**

24%[32]

32 NCDHHS (2019). *North Carolina's Opioid Action Plan*. https://www.ncdhhs.gov/about/department-initiatives/opioid-epidemic/north-carolinas-opioid-action-plan.

All Users

Image Credit: VisitNC.com

All Users

Our transportation system is intended to serve people of all ages and abilities. However, some road users are more at risk on the roadway by nature of the user's vulnerability to motor vehicles. A person's age, socio-economic status, physical abilities, and health may influence mode choice or exposure within the transportation system. The elements that make individuals unique also influence how roadway users interact with each other and their surrounding environments. The Emphasis Areas in the All Users Focus Area address infrastructure and behavioral strategies for special roadway users.

The significant interactions between the Emphasis Areas within this Focus Area highlight a need for a holistic approach to improve highway safety by reaching all road users throughout their lifespan. Education efforts can begin at an early age—teaching the fundamentals of navigating the road as a pedestrian or bicyclist will ingrain the rules of the road for all transportation modes. Expanding driver education courses to include lessons on all modes, such as transit and other non-driving options, may increase an individual's awareness and understanding of options and users systemwide.

Education is not limited to just younger drivers but should also include novice drivers; younger drivers who are waiting longer to obtain their license; transplants to North Carolina who are pursuing a State driver's license, potentially for the first time; and aging drivers that may need re-education.

Education also extends to law enforcement training on how to recognize and address needs of older drivers with medical or cognitive concerns, how older pedestrians interact with the roadway, and other ability-based concerns like Americans With Disabilities Act accommodations. Alertness and attentiveness are not just limited to drivers; enforcement can play an important role in educating and monitoring distractions while walking, bicycling, and using personal mobility.

The built environment influences decision making on the roadway. The relationship between other Emphasis Areas and this Focus Area is important to highlight. Small increases in motor vehicle speed have a significant impact on driver reaction times required to avoid conflicts with vehicles and vulnerable users. Any situation where vulnerable road users are exposed to vehicles, the risk of a fatality or serious injury increases significantly.

The following Emphasis Area Action Plans—Motorcyclists; Older Drivers; Pedestrians, Bicyclists, and Personal Mobility; and Younger Drivers—address strategies for increasing awareness of and for all road users, regardless of transportation mode.

MOTORCYCLISTS

OLDER DRIVERS

YOUNGER DRIVERS

PEDESTRIANS, BICYCLISTS, AND PERSONAL MOBILITY

Motorcyclists

Image Credit: VHB

Motorcyclists

FOCUS AREA: All Users

EA DEFINITION: Crashes involving motorcyclists.

EA GOAL: Reduce motorcyclist-involved fatalities and serious injuries by half by 2035, moving towards zero by 2050.

Description of the Issue

North Carolina's weather, large network of scenic roads, and topography support a robust motorcycle riding population and attract many riders from around the U.S. The average motorcyclist in North Carolina rides mostly for recreational purposes and less than 2,000 miles per year. In 2016, motorcycles made up less than 2.5 percent of registered motor vehicles but accounted for 13 percent of traffic fatalities in North Carolina.[33] Motorcyclist fatalities increased slightly from 2013, reaching a total of 169 in 2018, with 67 percent of the fatalities occurring in rural areas.[34]

Motorcyclists' physical exposure and vulnerability to larger vehicles is similar to that of pedestrians and bicyclists, but they share the same roadways and speeds as motor vehicles. Generally, the infrastructure is designed to accommodate cars and trucks and the specific needs of motorcyclists are not considered. Protecting motorcyclists requires legislation and education that influences driver behavior and protection, as well as infrastructure improvements to enhance safety.

Currently, North Carolina is one of 19 States with a universal helmet law. Despite the strong statewide legislation, North Carolina is one of many States that does not require a motorcycle-specific GDL or riding courses. Skills training and assessments for both novice and experienced riders are essential for increasing hazard perception, situational awareness, and general rider awareness. Developing policies and resources to support life-long education for riders will aim to enhance riding skills and cognitive abilities throughout licensure to increase the safety of motorcyclists.

Any level of impairment decreases the judgment and physical abilities of any person operating a motorized vehicle. However, it is estimated that even at a BAC of 0.03, motorcyclists have three times the fatality risk compared to sober riding.[35] In North Carolina, the BAC limit for a Commercial Driver's License is 0.04, which is half the legal limit for Class C Driver's Licenses. Lowering the BAC limit for motorcyclists, similar to Commercial Driver's Licenses, is a legislative opportunity to reduce motorcyclist fatalities and serious injuries in North Carolina.

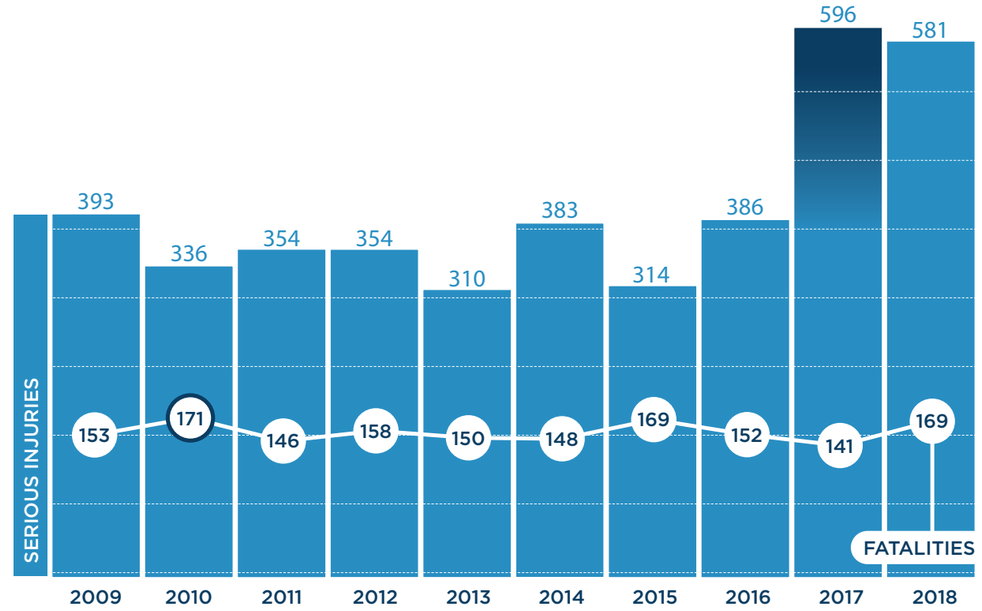
Nearly **190,000 motorcycles** are registered in North Carolina.[33]

33 GHSP (2019). *Highway Safety Plan*. https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/nc_fy19_hsp.pdf.
34 NCGHSP (2016). *FY19 HSP.*
35 Michael D. Keall, Belinda Clark & Christina M. Rudin-Brown (2012). *A Preliminary Estimation of Motorcyclist Fatal Injury Risk by BAC Level Relative to Car/Van Drivers.* Traffic Injury Prevention. https://www.tandfonline.com/doi/abs/10.1080/15389588.2012.678510.

NORTH CAROLINA STRATEGIC
HIGHWAY SAFETY PLAN

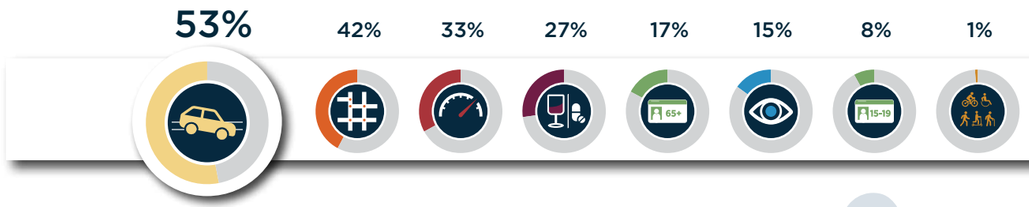
Data

Total Motorcyclist-Involved Fatalities & Serious Injuries (Last Decade)



Key Overlaps

The percentage of motorcyclists-involved fatalities that also include another Emphasis Area.



Implementing Agencies

- GHSP
- NCAOC
- NC DHHS Injury and Violence Prevention Branch
- NCDMV
- NCDOT Office of Communications, Community Outreach, and Public Engagement
- NCDPI
- NC Motorcycle Safety Education Program
- NCSHP
- Private motorcyclists programs and course vendors

Strategies and Supporting Actions

TIMELINE KEY:

ONGOING

NEAR-TERM (0-1 YEAR)

MID-TERM (1-2 YEARS)

LONG-TERM (2-5 YEARS)

Engineering

Consider the unique vulnerabilities and characteristics of motorcyclists when designing or improving the transportation infrastructure.

Review best practices in roadway design and maintenance to improve the safety of motorcyclists and implement when applicable.

Identify locations or roadway characteristics where motorcycle crashes are overrepresented and use targeted countermeasures, such as motorcycle friendly barriers, to improve safety at those locations.

Improve data sources and analysis methods to inform problem identification, countermeasures, and messaging.

Improve geocoding of motorcycle crashes and other data to support analysis of issues related to motorcyclist fatalities and serious injuries.

Integrate data sources to identify sub-group characteristics and behaviors to inform countermeasures and messaging.

Improve crash data regarding non-compliant helmet use.

Education

Implement and promote effective education, communication, and outreach practices to improve the safety of motorcyclists in North Carolina.

Education continued

Provide opportunities for riders to improve riding skills, hazard perception, and situational awareness by participation in advanced rider courses, including expanding the BikeSafe NC program.

Customize messaging and communication strategies based on motorcycle type, rider demographics, or other characteristics to promote safety practices (e.g., helmet use) and reflect specific safety concerns (e.g., impaired riding).

Develop and expand relationships with rider groups and other partners to improve programs and communication.

Review and improve driver education training curriculum, course delivery, and testing related to motorcyclists.

Develop a framework that details the policies and resources needed to promote life-long education and skill advancement to improve the safety of motorcyclists (e.g., GDL for new riders, required beginning rider course, endorsement renewal requirements).

Enforcement

Increase law enforcement awareness of important issues regarding motorcyclist safety such as impaired riding detection and legal helmet identification.

Provide law enforcement with training and materials on how to identify impaired riding and DOT approved helmets.

Support effective legislation, policies, and countermeasures to improve motorcyclist's safety.

Review best practices in legislation, policies, and countermeasures to inform practices in North Carolina (e.g., lower BAC, GDL for motorcyclists).

Evaluate, improve, and expand rider diversion through the BikeSafe NC program.

Continue to support and promote North Carolina's strong universal motorcycle helmet law, including communicating estimated economic savings to key decision makers.

Emergency Services

Support and deploy resources to rural high-crash areas to improve incident response and treatment for motorcyclists.

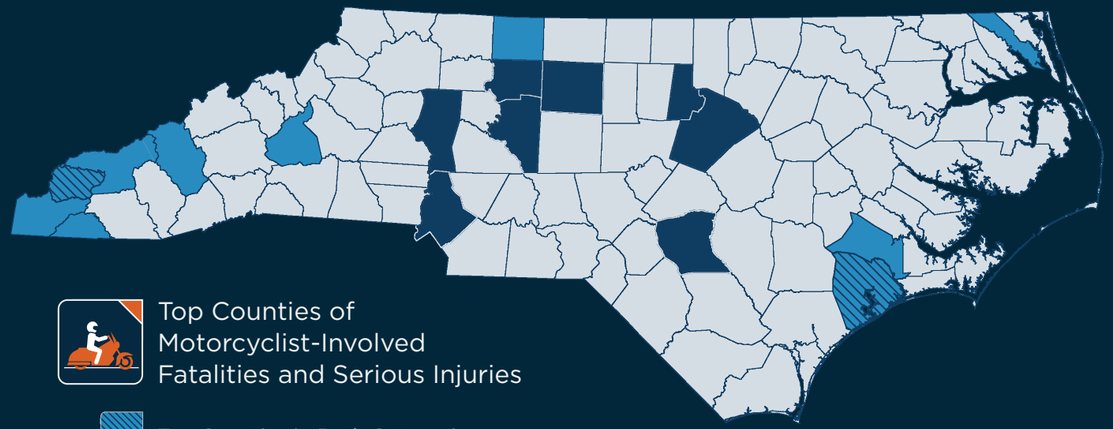
Train EMS personnel on treatment related to motorcyclist injuries (e.g., helmet removal, spinal injuries), especially in rural areas.

Examine existing programs to inform the application of motorcyclist medic programs in North Carolina.

28

A 2016 survey found that North Carolinian motorcyclists **averaged 28 years of riding experience**.[36]

36 National Center for Statistics and Analysis (2019). *Motorcycles: 2017 data (Updated, Traffic Safety Facts. Report No. DOT HS 812 785)*. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812785.



Top Counties of Motorcyclist-Involved Fatalities and Serious Injuries

Top Counties in Both Categories

	Top Counties	Top Counties per Residents 16 and Older
1	Wake	Graham
2	Mecklenburg	Swain
3	Cumberland	Haywood
4	Onslow	Jones
5	Guilford	McDowell
6	Forsyth	Camden
7	Graham	Onslow
8	Davidson	Stokes
9	Iredell	Cherokee
10	Durham	Clay

TOP 10%

Working Group Members

James Bradford, AAA Carolinas
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Shannon Bullock, NCDOI/OSFM
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Chris Oliver, NCDOT
Dana Orr, Poe Health
Sergeant James Pickard, NCSHP
Kristel Robison, UNC-HSRC
Trooper Jonathan Sherrill, NCSHP
Aaron Williams, FHWA

NHTSA estimates that **for every 100 unhelmeted motorcyclist fatalities, 37 lives would have been saved** if they were wearing **a helmet.**[37]

37 National Center for Statistics and Analysis (2019). *Motorcycles: 2017 data (Updated, Traffic Safety Facts. Report No. DOT HS 812 785)*. https://crashstats.nhtsa.dot.gov/Api/Public/View Publication/812785.

65+

Older Drivers

Older Drivers

FOCUS AREA: All Users

EA DEFINITION: Crashes involving older drivers (ages 65 and older).

EA GOAL: Reduce older driver-involved fatalities and serious injuries by half by 2035, moving towards zero by 2050.

Description of the Issue

In 2018, 20 percent of drivers in North Carolina were age 65 and older, a 5-percent increase from 2008.[38] North Carolina is one of the top 5 destinations for retirees age 60 and older.[39] The number of crashes involving this group has also increased steadily from 14 percent in 2009 to 18 percent in 2018.

National research notes three common impairments for older drivers that affect driving ability: vision, cognition, and motor function.[40] As humans age, these impairments may contribute to common crash types at intersections, curves, and when overtaking other vehicles or merging lanes.[41] Implementing proven engineering countermeasures, such as larger typeface for signage on roads and brighter lighting at intersections, can assist with driver vision and cognition. These types of countermeasures not only improve the driving experience for older drivers but improve the driving experience for all driving populations.

This Emphasis Area focuses on supporting older drivers who can and desire to keep driving. Part of this support includes improving the license renewal process so older drivers who would like to continue to drive continue to remain safe on the road. North Carolina law currently requires drivers age 66 and older to renew their license every 5 years. The State also programs an effective Medical Review Unit at the NCDMV to assess older adults' fitness to drive. However, with only six locations statewide that can perform the assessment, there is often a long waiting period.

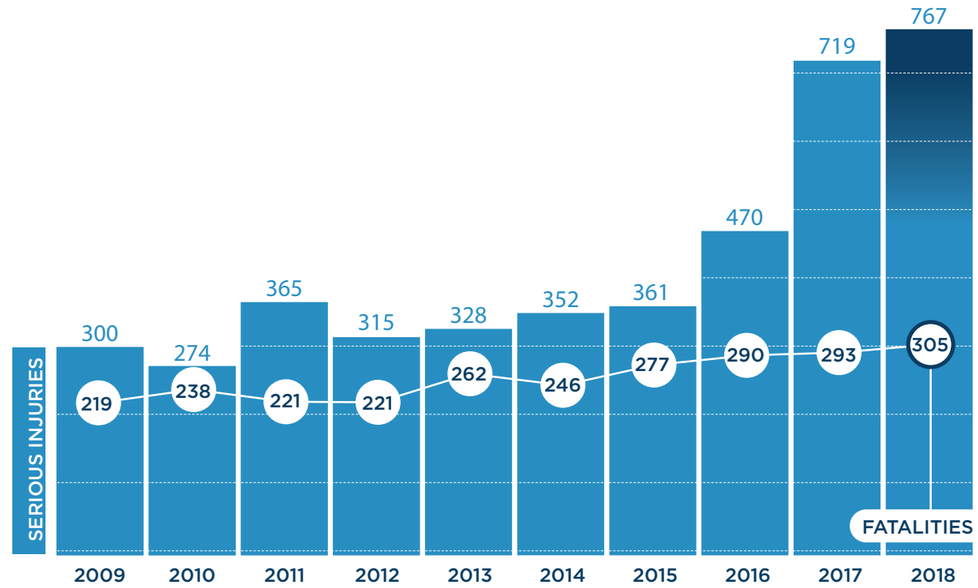
The Older Drivers Emphasis Area also supports older adults who are transitioning or have transitioned out of driving to establish a plan for alternative transportation options. This includes designing walkable and transit-oriented communities and marketing alternative transportation options for older adults. Many social and service agencies offer transportation services and provide additional assistance to aging adults. Service agencies need to be connected at the State level to NCDOT Division of Integrated Mobility and at the local level to MPOs and RPOs to coordinate how to best provide support to aging adults.

North Carolina requires drivers age 66 and older to **renew their license every 5 years.**[42]

38 FHWA. (2019). *Highway Statistics Series*. https://www.fhwa.dot.gov/policyinformation/statistics.cfm.
39 Allen, K. (2019). *Arizona Narrows Gap with Florida Retirement Destination*. https://www.aarp.org/retirement/planning-for-retirement/info-2019/retirement-most-popular-states-florida-arizona.html.
40 GHSA. (2019). *Mature Drivers*. https://www.ghsa.org/issues/mature-drivers.
41 Insurance Institute for Highway Safety, Highway Safety Loss Data Institute. (2019). *Older Drivers*. https://www.iihs.org/topics/older-drivers.
42 AAA Senior Driving (2019). *North Carolina State Laws*. https://seniordriving.aaa.com/states/north-carolina/.

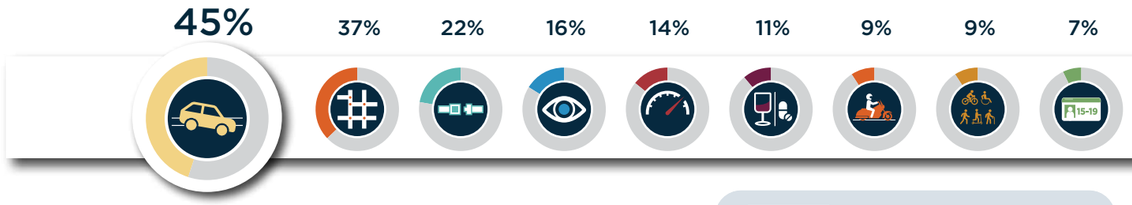
Data

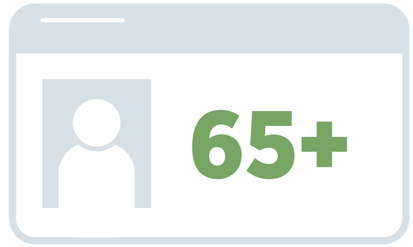
Total Older Driver-Involved Fatalities & Serious Injuries (Last Decade)



Key Overlaps

The percentage of older driver-involved fatalities that also include another Emphasis Area.





Implementing Agencies

- AARP
- GHSP
- NCDMV
- NCDOT Roadway Design Unit
- NCDOT Transportation Mobility & Safety Unit
- NCDOT Signing & Delineation Unit
- NC Healthcare Association
- NC Public Transportation Association
- NC Coalition on Aging
- University and other research groups

Strategies and Supporting Actions

TIMELINE KEY:

ONGOING

NEAR-TERM (0-1 YEAR)

MID-TERM (1-2 YEARS)

LONG-TERM (2-5 YEARS)

Engineering

Identify and implement proven countermeasures, including those related to roadway design and signage, to accommodate the needs of older drivers.

Identify concentrations of older driver populations and locations with crashes involving high proportions and frequency of older drivers for potential application of targeted strategies.

Implement proven design practices to accommodate older road users, such as those from FHWA's Handbook for Designing Roadways for the Aging Population.

Focus transit route expansion on locations with high concentrations of older adults.

By 2025, **1 in 5** North Carolinians will be age **65 or older**.[43]

43 North Carolina Coalition on Aging. (2019). *North Carolina is Aging!*. http://www.nccoalitiononaging.org/pdfFiles/NCStateAgingProfile2017.pdf.

Education

Develop programs to help older drivers to decide whether to continue driving and identify adequate alternatives to driving.

Expand programs for medical providers to evaluate older driver fitness for driving.

Provide resources and guidance to older drivers to determine if they are continuing to be safe drivers and communicate the available transportation options.

Promote alternative transportation options (e.g., rideshare, public transit) to older drivers.

Create marketing materials advertising how to use ride share and distribute materials in doctor offices, senior centers, and at the DMV.

Market free and/or discounted fares of public transportation for older adults.

Enforcement

Research programs, policies, and strategies similarly employed elsewhere in the U.S. to address both the medical review process and license renewal requirements for older drivers.

Digitize older driver medical assessment and driver licensing records to facilitate effective linkages between medical professionals and the NCDMV.

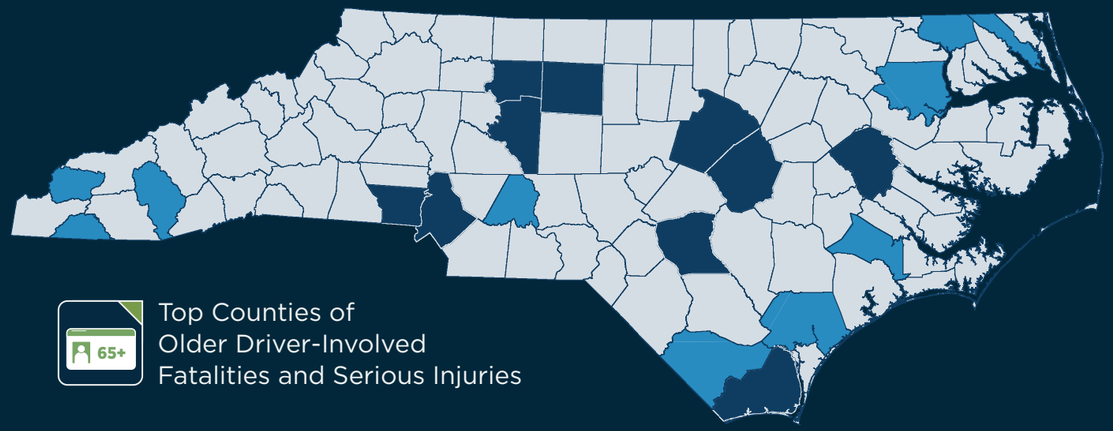
Promote greater understanding by law enforcement of older driver issues.

Provide training to law enforcement on interacting with older drivers and identifying physical and cognitive deficiencies affecting safe road use.

Emergency Services

Strengthen emergency services involvement in prevention of older driver-related crashes.

Engage injury prevention coordinators and medical providers on educational counseling to older patients who have been hospitalized after a crash.



65+

Top Counties of
Older Driver-Involved
Fatalities and Serious Injuries

	Top Counties	Top Counties per Residents 65 and Older
1	Wake	Graham
2	Mecklenburg	Clay
3	Guilford	Bertie
4	Forsyth	Jones
5	Brunswick	Gates
6	Davidson	Jackson
7	Cumberland	Pender
8	Johnston	Columbus
9	Gaston	Stanly
10	Pitt	Camden

TOP
10%

Working Group Members

Leslee Breen, NC DHHS

Gia Dang, NC DHHS

Anne Dickerson, Research for Older Adult Driving Initiative

Fred Fontana, AARP

Karyl Fuller, Isothermal RPO

Arthur Goodwin, UNC-HSRC

Karl Logan, NC DPI

Major Greg Newkirk,
Wake County Sheriff's Office

Sarah O'Brien, UNC-HSRC

Chris Oliver, NCDOT

Anne Phillips, City of Durham

Kristel Robison, UNC-HSRC

Captain Patsy Simmons,
Wake County Sheriff's Office

Carrie Simpson, NCDOT

Lieutenant Greg Street,
Wake County Sheriff's Office

Harriett Southerland, SADD

Pedestrians, Bicyclists, and Personal Mobility

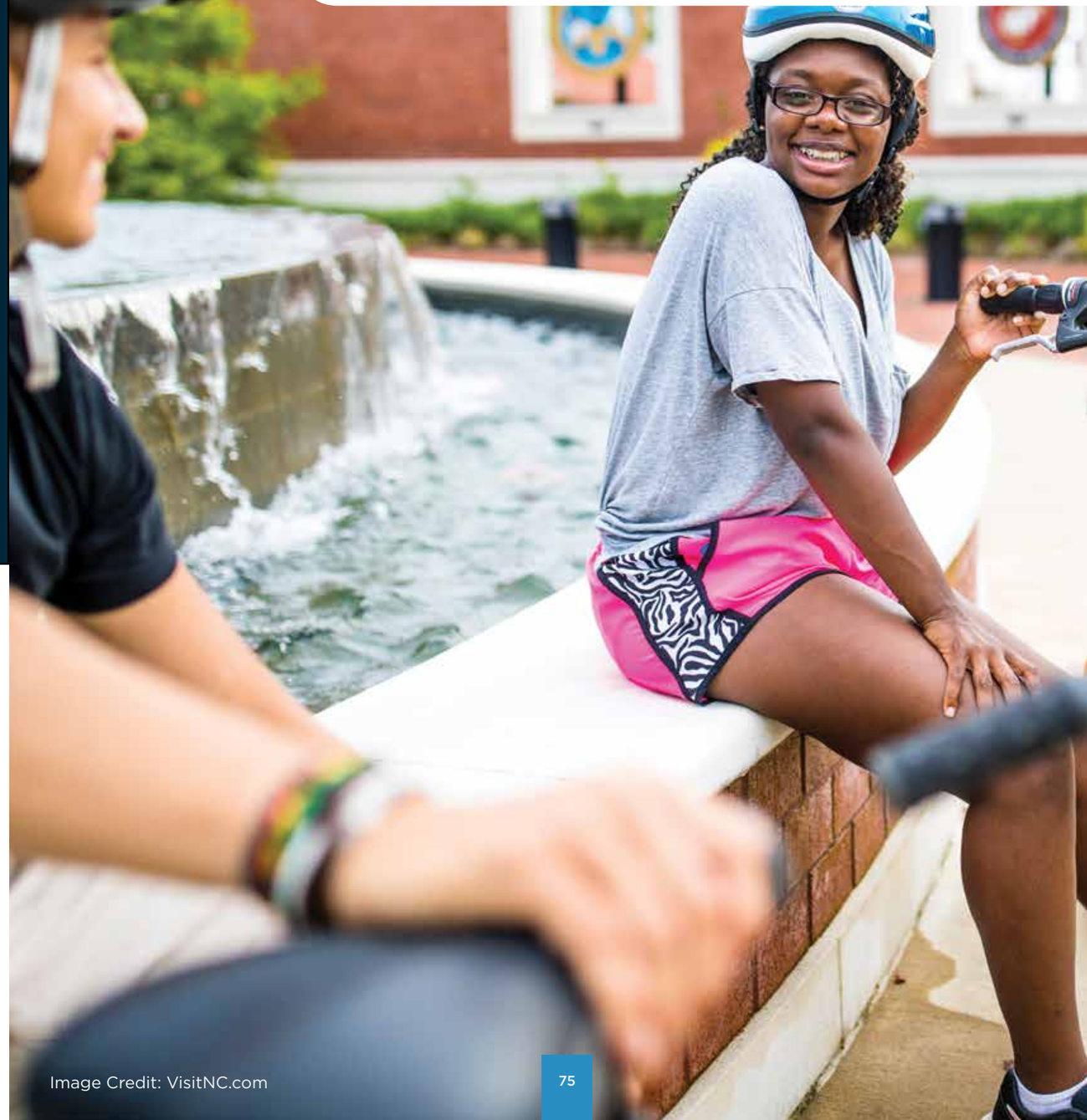


Image Credit: VisitNC.com

Pedestrians, Bicyclists, and Personal Mobility

FOCUS AREA: All Users

EA DEFINITION: Crashes involving pedestrians, bicyclists, and personal mobility, which includes other non-motorized and non-vehicle modes of transportation that lack physical protection from other vehicles. These include individuals with disabilities, children and older adults, and alternative modes of transportation such as scooters, skateboards, assistive devices, and other emerging mobility options.

EA GOAL: Reduce pedestrian and bicyclist-involved fatalities and serious injuries by half by 2035, moving towards zero by 2050.

Description of the Issue

Almost every North Carolinian is a pedestrian, bicyclist, or person using personal mobility at some point during their life—from walking from a parked car to a shopping center, riding a bicycle through a trail in the woods, or riding an e-scooter around a park. Walking, bicycling, and other personal modes of transportation (e.g., scooters, assistive devices, skateboards) reduce congestion on our roadways, promote an active lifestyle, are environmentally friendly, and are cost effective for all populations. Within pedestrian and bicycling populations, there are subgroups of vulnerable users such as children, older adults, and individuals with disabilities that are limited in their ability to safely navigate the transportation network. All users represented in this Emphasis Area are at higher risk for fatalities or serious injuries due to their natural lack of protection from the size and weight of the other modes of transportation.

Many people with disabilities, elderly adults, and those who do not own or drive personal automobiles rely on walking, bicycling, personal mobility, and transit as their primary modes of transportation. Not all populations have access to walkable neighborhoods and transit, including those in rural areas or areas with a lack of affordable housing where this infrastructure exists. All areas within the State need access to safe pedestrian, bicyclist, and transit facilities.

Pedestrian fatalities continue to increase both nationwide and in North Carolina. Pedestrian fatalities increased in the State from 176 in 2014 to 266 in 2018. Researchers have hypothesized several explanations for the rising trend, such as increasing vehicle size and vehicle speed. National data also shows that the most at-risk pedestrians are people of color, low-income people, and older pedestrians.[44] Safety partners from all 4 Es will need to continue to work together to identify the contributing factors specific to North Carolina.

Location and lack of access to safe networks are not the only factors for pedestrian fatalities and serious injuries. From 2014 to 2018 in North Carolina, 11 percent of pedestrian and bicyclist fatalities involved an alcohol impaired driver. Additionally, approximately 31 percent of pedestrian and bicyclist fatalities involved an impaired (alcohol or drug-related) pedestrian or bicyclist. This illustrates the need for coordination between multidisciplinary teams made of community leaders and advocates.

44 Smart Growth America (2019). *Dangerous By Design 2019*. https://smartgrowthamerica.org/dangerous-by-design/.

NORTH CAROLINA STRATEGIC
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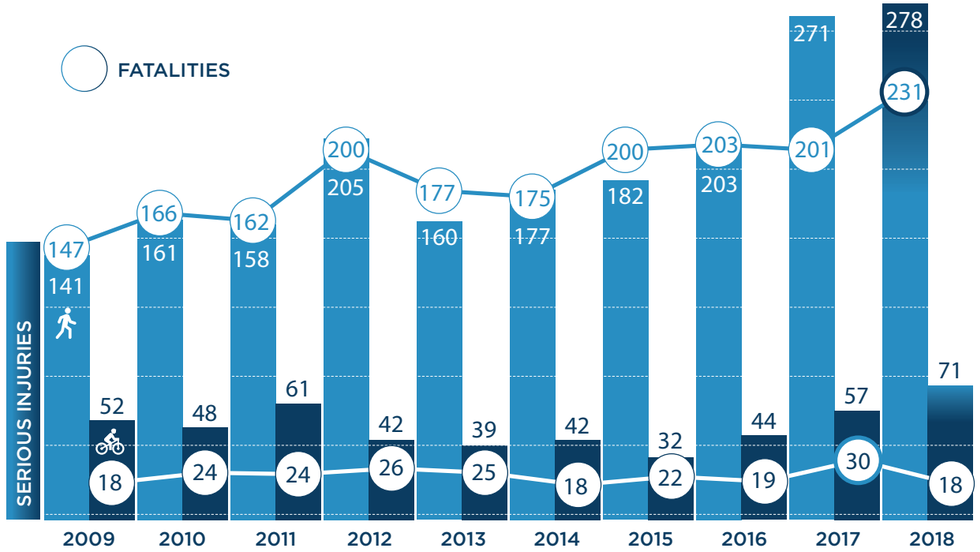
Personal micromobility, like e-scooters and bike share, are on the rise. Shared micromobility agencies have emerged in larger cities across North Carolina. Before 2014, there was only one micromobility system in place in the State; however, from 2014 to 2018, nine micromobility systems were established across North Carolina. Additional mode choices benefit personal mobility and can improve access to employment, healthcare, social activities, and other local amenities. With this rapid increase of micromobility systems, local and State agencies are navigating the best methods for capturing data on usage and safety. Defining micromobility and including it on the crash report form will allow researchers and NCDOT to collect data on this mode and determine how to keep users safe.

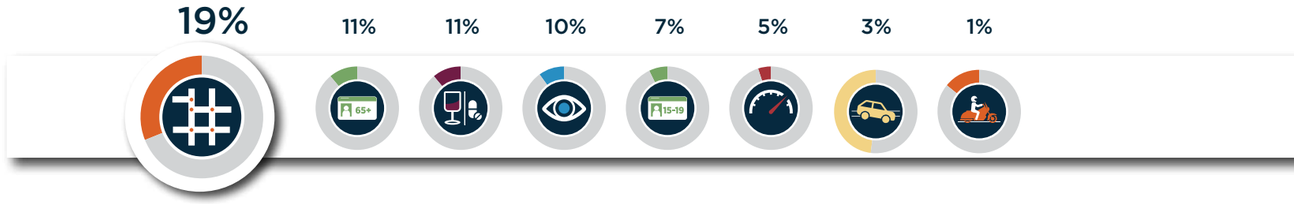
Data

Total Pedestrian and Bicyclist-Involved Fatalities & Serious Injuries (Last Decade)



Key Overlaps

The percentage of pedestrian and bicyclist-involved fatalities that also include another Emphasis Area.



Implementing Agencies

- BikeWalk NC
- GHSP
- Local governments
- Local municipalities
- MPOs/RPOs
- NC DHHS
- NCDMV
- NCDOT Division of Highways
- NCDOT Division of Highways' Technical Services
- NCDOT Division of Highways' Maintenance & Operations Section
- NCDOT Integrated Mobility Division
- NCDOT Office of Communications, Community Outreach, and Public Engagement
- NCDOT Roadway Design Unit
- NCDOT Transportation Planning Division
- NCDOT Transportation Safety & Mobility Unit
- NCDPI
- NC Driver & Traffic Safety Education Association
- NCOSHR
- NCSHP
- University and other research groups
- Visit NC
- Walk Bike NC

Strategies and Supporting Actions

TIMELINE KEY:

ONGOING

NEAR-TERM (0-1 YEAR)

MID-TERM (1-2 YEARS)

LONG-TERM (2-5 YEARS)

Engineering

Identify high-risk locations and contributing factors for pedestrian, bicyclist, and personal mobility crashes.

Use the Pedestrians and Bicyclists Infrastructure Network and/or other data sources (such as transit and land use data) to create a tool for estimating pedestrian and bicyclist facility demand for all transportation projects.

Integrate bicycle and pedestrian focused RSAs and Reviews into NCDOT's pre-design phases and use RSA results to inform future designs.

Expand implementation of FHWA's Safe Transportation for Every Pedestrian (STEP) countermeasures and training in North Carolina to understand how to select, evaluate, and maintain safety countermeasures (including LPI and other treatments).

Continue to construct safe pedestrian and bicycle networks.

Update NCDOT's roadway cross section guidance to incorporate separated bike lane design best practices.

Engineering continued

Work with local municipalities statewide to improve or construct safe pedestrian connections to public transit in zones with affordable housing, high proportion of older adults/children, people with disabilities, and other transit-dependent residents.

Improve community and organizational engagement around engineering issues.

Work with legislators to update the "local match" requirements so that more Federal funds can be made available, particularly to support projects in rural or economically distressed communities.

Form a task force to examine disparities in pedestrian and bicycle safety infrastructure investments and develop a plan to improve the process.

Education

Continue to develop communication and leadership support for pedestrian, bicyclist, and other vulnerable road users.

Promote *Make Room for Bikes* marketing materials that educate the public on safe passing distance for bicyclists.

Coordinate with NCDPI to include pedestrian and bicyclist interactions in driver education curriculum.

Provide training to law enforcement on drivers' yield requirements for persons on, or crossing, the roadway.

Implement and promote programs that provide education to all users of infrastructure.

Continue investment in Complete Streets and Safe Routes to School, including training to State and local transportation professionals.

Continue to expand targeted education and enforcement activities under the *Watch for Me NC* program and resources to provide technical assistance, training, and program coordination.

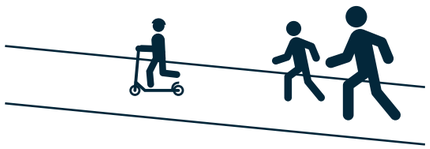
Promote the *Walk Smart NC* program and support training for all State employees on awareness when they are driving and walking.

Implement the *Let's Go NC* curriculum in afterschool programs statewide.

Enforcement

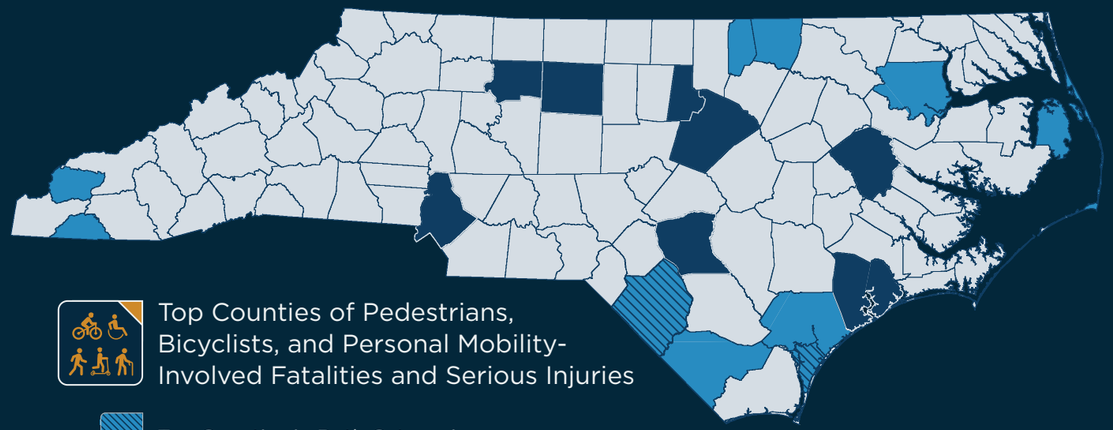
Improve law enforcement's collection of crash data on pedestrian, bicyclist, and other personal mobility data.

Revise the NC crash report form to include the unit type options of e-scooter and e-bike, as part of the update to DMV's crash system database.



Installing walkways for pedestrian use can **reduce crashes** by as much as **89%**.[45]

45 FHWA (2017). *Walkways*. https://safety.fhwa.dot.gov/provencountermeasures/walkways/.



Top Counties of Pedestrians, Bicyclists, and Personal Mobility-Involved Fatalities and Serious Injuries

Top Counties in Both Categories

	Top Counties	Top Counties per total residents
1	Mecklenburg	Graham
2	Wake	Bertie
3	Guilford	Columbus
4	Cumberland	Robeson
5	Forsyth	Pender
6	New Hanover	Warren
7	Durham	Dare
8	Robeson	Clay
9	Onslow	Vance
10	Pitt	New Hanover

TOP 10%

Working Group Members

Heather Banta, NCOSHR

Ellen Beckman, City of Durham

Angela Berry, Charlotte DOT

Mary Bethel, NC Coalition on Aging

Eliud De Jesus, MidEast RPO

Jennifer Delcourt,
Safe Routes to School Wake County

Ann Groninger, Bike Law NC

Karen Hamilton, NC Council of Developmental Disabilities

Katherine Harrison, NCDOT

Terry Lansdell, BikeWalk NC

Sarah O'Brien, UNC-HSRC

Chris Oliver, NCDOT

Laura Sandt, UNC-HSRC

Wit Tuttell, Visit NC

Wearing a properly fitted bicycle helmet can **reduce the risk of head injury** by as much as **85%** and the risk of **brain injury** by as much as **88%**.[46]

46 NCVZ (n.d.). *Bicycle*. https://ncvisionzero.org/safety-focus-areas/bicycle/.

15-19

Younger Drivers

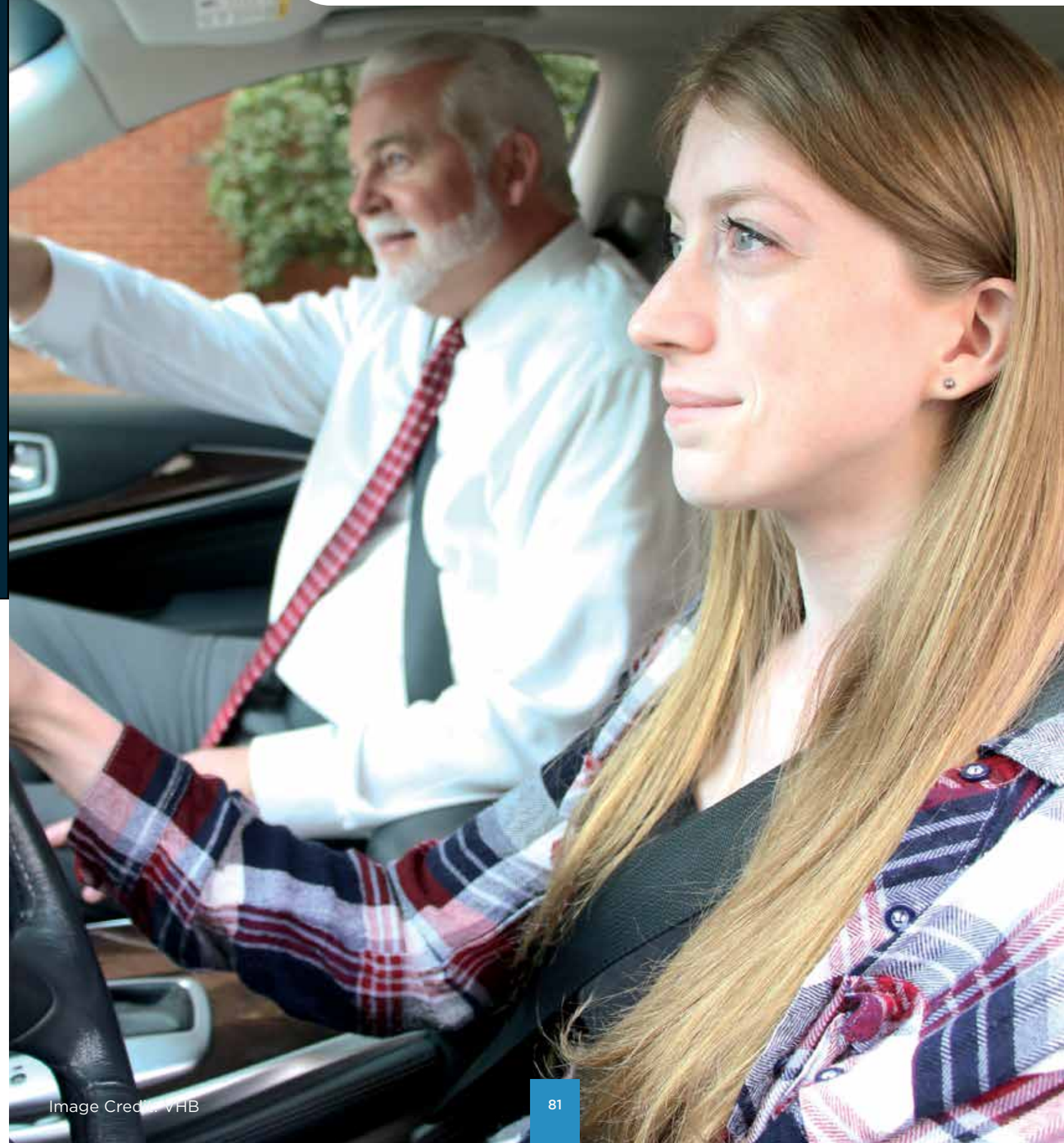


Image Credit: VHB

Younger Drivers

FOCUS AREA: All Users

EA DEFINITION: Crashes involving younger drivers (ages 15 to 19).

EA GOAL: Reduce younger driver-involved fatalities and serious injuries by half by 2035, moving towards zero by 2050.

Description of the Issue

Motor vehicle crashes are the leading cause of death among North Carolinians ages 15 to 19.[47] This is primarily due to inexperience on the road. Since 2008, the percentage of crashes in North Carolina involving a younger driver has consistently been between 18 and 20 percent.[48] Given that younger drivers make up less than four percent of all licensed drivers in North Carolina, they are severely overrepresented in crashes.[49] From 2014 to 2018, younger drivers in North Carolina were in involved in an average of 150 fatal crashes and 450 serious injury crashes per year.

North Carolina's GDL program is one of the premiere initiatives to improve younger driver safety across the State. The program follows a three-tiered structure of restrictions designed to encourage younger drivers to attain an adequate level of on-the-road driving experience before earning full driving privileges. It includes several proven components, such as an extended learner period, a supervised hours requirement, an early night restriction, a strong limit on passengers, and a cell phone ban.[50] Prior research by NHTSA found that comprehensive GDL programs are associated with a 20-percent reduction in fatal crashes involving 16-year-old drivers.[51] Analysis of North Carolina's GDL showed a 10-percent reduction in crashes during the first 5 years of unsupervised driving for drivers licensed at the age of 16, compared to pre-GDL statistics.[52] However, there is concern that many teens are waiting until after they turn 18 to obtain their driver license, effectively avoiding the restrictions that would be placed on them under the GDL program. Research in other States indicates there may be benefits to extending the GDL requirements to cover 18, 19, and even 20-year-old drivers.[53]

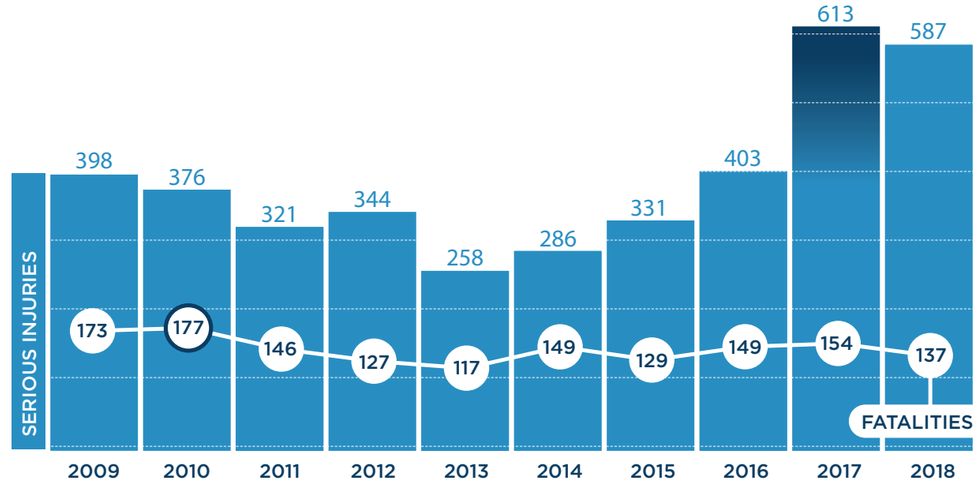
Another issue is the distinction between younger drivers and novice drivers (who may be any age but are new to driving). There is little existing knowledge on the difference in crash risk between these two groups; however, research suggests that learning to drive involves a steep learning curve and that an additional year of licensure represents a greater benefit in terms of crash risk than an additional year of age.[54]

One of the foundational tools to support younger drivers is the driver education program. North Carolina's driver education program consists of both a classroom portion and a driving portion and is required for anyone between the ages of 15 and 17 enrolled in school or working toward a high school diploma or GED. To maximize the effectiveness of the driver education program, it is important that the curriculum and instruction are consistent and thorough, use proven techniques, and engage a variety of stakeholders to develop the material. Additionally, the driver education program should take into account the special needs of young people with Attention-Deficit/Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder (ASD). Existing research has shown that younger drivers with ADHD are 1.4 times more likely to be involved in a crash[55] and younger drivers with ADHD or ASD perform poorer on visual-motor integration and make more errors in driving simulator tests.[56]

47 NCGHSP (2018). *FY2018 Annual Report*. https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/nc_fy2018_ar.pdf.
48 NCDOT (2019). *North Carolina 2018 Traffic Crash Facts*. https://connect.ncdot.gov/business/DMV/DMV%20Documents/2018%20Crash%20Facts.pdf.
49 FHWA (2019). *Highway Statistics Series*. https://www.fhwa.dot.gov/policyinformation/statistics.cfm.
50 Children's Hospital of Philadelphia Research Institute (n.d.). *Recommended GDL Requirements*. https://www.teendriversource.org/thinking-of-driving/recommended-minimum-gdl-requirements.

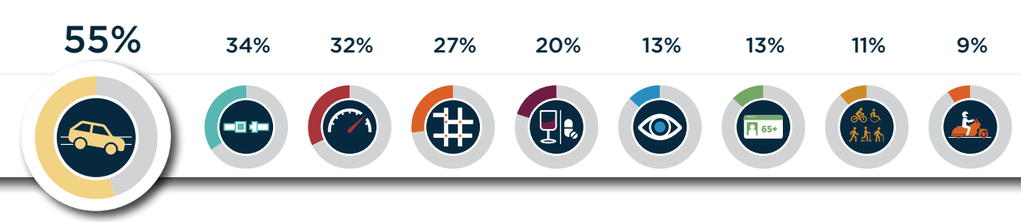
Data

Total Younger Driver-Involved Fatalities & Serious Injuries (Last Decade)



Key Overlaps

The percentage of younger driver-involved fatalities that also include another Emphasis Area.



51 Baker, S.P., Chen, L., & Li, G. (2006). *National Evaluation of Graduated Driver Licensing Programs [DOT-HS-810-614]*. https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/gdl_6-20-2006_0.pdf.
52 Masten, S.V. & Foss, R.D. (2010). *Long-Term Effect of the North Carolina Graduated Driver Licensing System on Licensed Driver Crash Incidence: A 5-Year Survival Analysis*. Accident Analysis & Prevention. https://doi.org/10.1016/j.aap.2010.04.002.
53 Curry, A.E., Metzger, K.B., Williams, A.F., & Tefft, B.C. (2017). *Comparison of Older and Younger Novice Driver Crash Rates: Informing the Need for Extended Graduated Driver Licensing Restrictions*. Accident Analysis & Prevention. https://doi.org/10.1016/j.aap.2017.08.015.
54 McCartt, A.T., Mayhew, D.R., Braitman, K.A., Ferguson, S.A., & Simpson, H.M. (2009). *Effects of Age and Experience on Young Driver Crashes: Review of Recent Literature*. Traffic Injury Prevention. https://www.tandfonline.com/doi/abs/10.1080/15389580802677807.
55 Curry, A.E., Metzger, K.B., & Pfeiffer, M.R. (2017). *Motor Vehicle Crash Risk Among Adolescents and Young Adults with Attention-Deficit/Hyperactivity Disorder*. JAMA Pediatrics. https://doi.org/10.1001/jamapediatrics.2017.0910.
56 Classen, S., Monahan, M., Brown, K.E., & Hernandez, S. (2013). *Driving Indicators in Teens with Attention Deficit Hyperactivity and/or Autism Spectrum Disorder*. Canadian Journal of Occupational Therapy. https://doi.org/10.1177/0008417413501072.

Implementing Agencies

- Local governments
- NCDMV
- NCDOT Transportation Safety & Mobility Unit
- NCDPI
- University and other research groups

Strategies and Supporting Actions

TIMELINE KEY:

ONGOING

NEAR-TERM (0-1 YEAR)

MID-TERM (1-2 YEARS)

LONG-TERM (2-5 YEARS)

Engineering

Make transportation safety a top priority in the design of high schools and other locations frequented by younger drivers.

Review transportation plans for new high schools (or existing high school expansions) and encourage safety-minded design features, such as separation between student parking lots and drop-off/pick-up locations, adequate sight distance, protected left-turns, speed bumps, one-way roads, angled parking spaces, and pedestrian safety countermeasures.

Coordinate with NCDOT Municipal School Transportation Assistance, school officials, and local municipalities to review the school traffic operations process to identify opportunities to further address safety concerns, specifically bicycle and pedestrian.

The concept of a graduated drivers license system was first conceived in North Carolina. In 1997, North Carolina became one of the first states to implement GDL. Since that time, all 50 States have implemented full or partial GDL systems.[57]

57 HSRC (2000). *HSRC researchers examine North Carolina's new graduated driver licensing law.* https://www.hsrc.unc.edu/directions/2000/gdl.htm.

Education

Implement a standardized curriculum and assessment for high school driver education courses.

Support an ongoing NCDPI initiative to collect data on the effectiveness of the driver education curriculum.

Improve instructor training and professional development to encourage consistent delivery of driver education courses.

Improve the breadth of the driver education curriculum to address students with Special Education needs.

Explore and implement best practices from existing programs for Special Education driver education curricula.

Encourage younger drivers and their parents/guardians to choose a safe vehicle.

Develop an approach to make younger drivers and their parents/guardians aware of safe vehicle options and to encourage safe selection of vehicles at various price points.

Enforcement

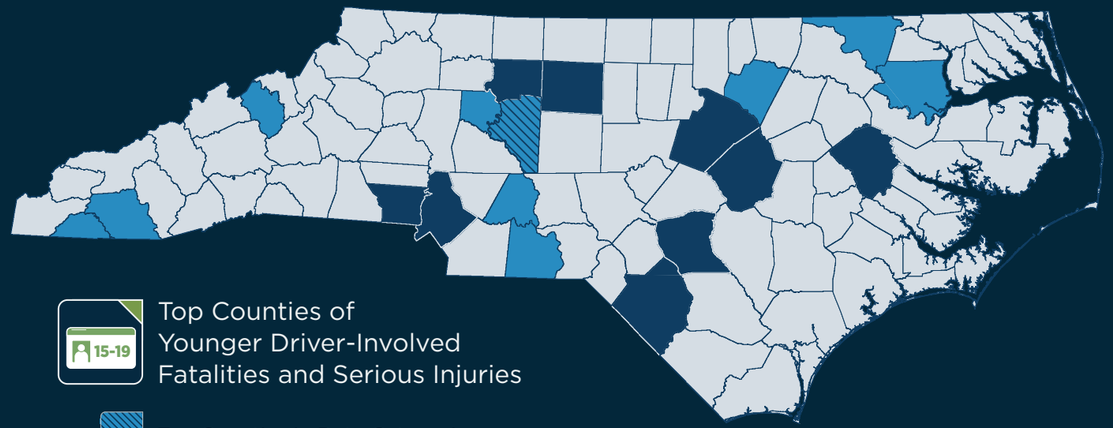
Enhance North Carolina's existing GDL system.

Require parent/guardian involvement in the GDL process.

Explore GDL expansion to include novice drivers ages 18 to 20.

Young drivers between the ages of 16 and 17 can obtain a Level 2: Limited Provisional License after meeting certain eligibility criteria, including **holding a Limited Learner Permit for 12 months and not having any convictions of motor vehicle violations, seat belt infractions, or mobile telephone infractions within the preceding 6 months.**[58]

58 NCDOT. (2019). *Graduated Licensing*. https://www.ncdot.gov/dmv/license-id/driver-licenses/new-drivers/Pages/graduated-licensing.aspx.



Top Counties of Younger Driver-Involved Fatalities and Serious Injuries

Top Counties in Both Categories

	Top Counties	Top Counties per Residents 15 to 19
1	Wake	Clay
2	Mecklenburg	Anson
3	Davidson	Davie
4	Guilford	Northampton
5	Johnston	Stanly
6	Cumberland	Yancey
7	Pitt	Bertie
8	Robeson	Franklin
9	Gaston	Davidson
10	Forsyth	Macon

TOP 10%

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Kristel Robison, UNC-HSRC

Captain Patsy Simmons, Wake County Sheriff's Office

Carrie Simpson, NCDOT

Harriett Southerland, SADD

Lieutenant Greg Street, Wake County Sheriff's Office

Data and Evaluation

Image Credit: VHB

Data and Evaluation

Engineers, transportation planners, and researchers rely on data to make a significant portion of transportation decisions and recommendations. Data-driven decision making extends to elected officials, commissioners, policy makers, and others that influence funding decisions and pass laws related to highway safety. Problem identification and countermeasure selection rely on timely, complete, and accurate information on crash location and characteristics.

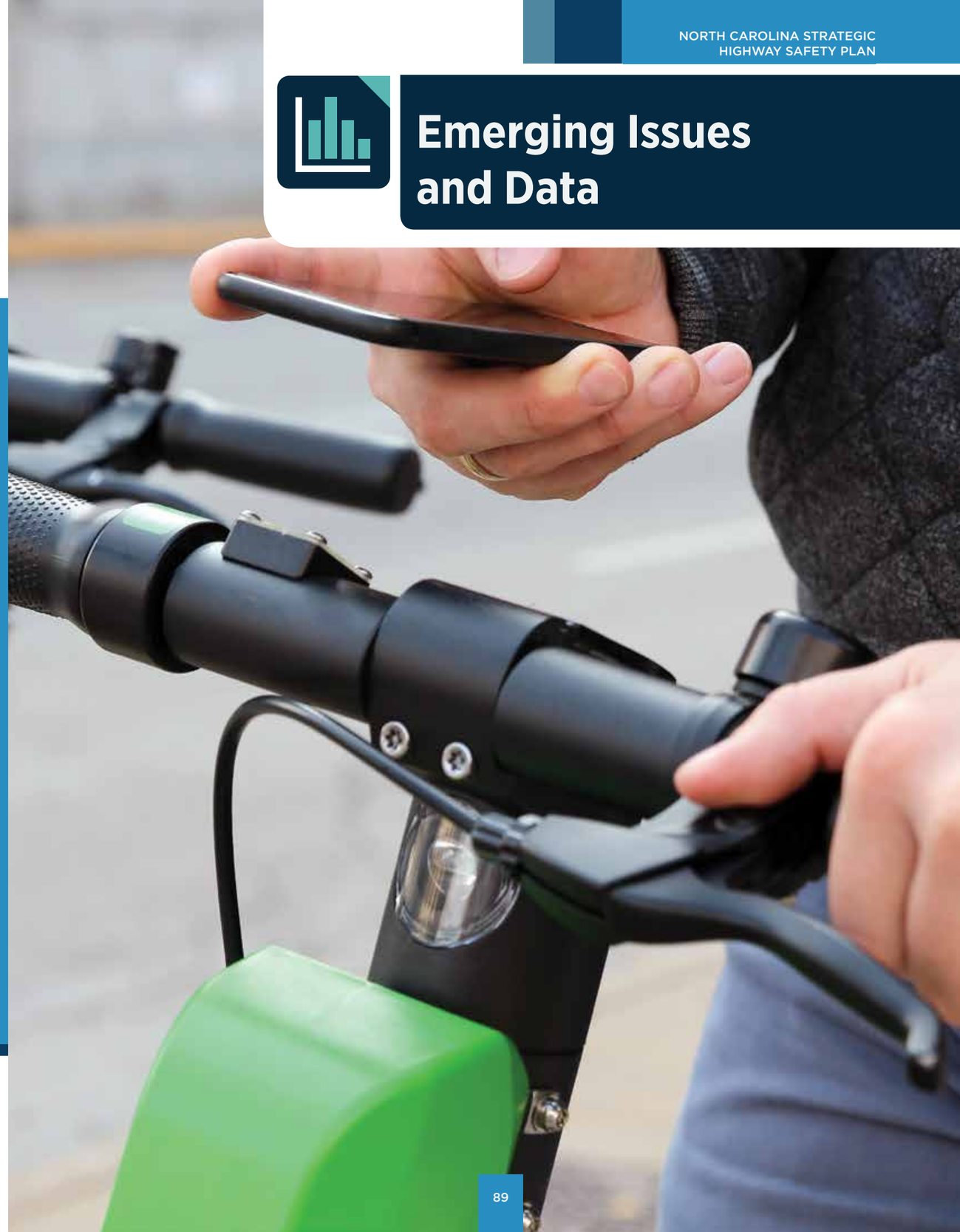
North Carolina has wisely invested in quality crash and roadway data. However, gaps in the data remain. For example, the true impact of distraction is difficult to account for in crash data, but the evidence supports a strong relationship with lane departure crashes. The greatest opportunities for improving data analysis procedures lie in greater integration between existing data sources. The emergence of personal mobility options presents additional data that can offer insight into where and how individuals travel within the transportation network. Other personal devices like cell phones and activity tracking applications can allow access to traffic data maps and provide similar data points on different travel modes and routes. Overlaying these data with zoning and other land use layers can help local jurisdictions gain a greater understanding of the transportation network. In turn, this may inform project identification and development efforts. Enhancing the North Carolina crash database to include these emerging data sources can have significant impact on engineering solutions and education efforts.

Anticipating the next wave of technology—and the potential impacts on safety—is extremely challenging. Vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) technologies are here, and widespread introduction of connected and automated vehicles is quickly approaching. The positive impacts of these technologies are evident, such as controlling speeds and helping vehicles stay within lanes. However, the unknown effects on driver attentiveness, technology malfunction, driver education, driver skills, vehicle interaction with non-vehicles, and so much more are yet to be determined. That is why this Focus Area establishes strategies that allow for flexibility in planning and engineering approaches to account for these changes.

Improving data collection, evaluation methods, and analytics will improve our understanding of the interactions between Emphasis Areas, assist in tracking and measuring implementation efforts, and maintain forward-thinking strategies when planning for emerging technologies and issues. This Focus Area includes one Emphasis Area, Emerging Issues and Data, in addition to considerations from the other 10 Emphasis Areas.

EMERGING ISSUES AND DATA

Emerging Issues and Data



Emerging Issues and Data

FOCUS AREA: Data and Evaluation

EA DEFINITION: This emphasis area addresses the need to continually collect, analyze, and monitor transportation safety data to support highway safety efforts in North Carolina.

EA GOAL:

1. Increase the quality, accuracy, and integration of the State's existing data, data systems, and data sharing capabilities to communicate emerging safety concerns and move toward zero fatalities and serious injuries on North Carolina's roadways.
2. Identify and leverage new data sources that can assess the impacts of emerging technologies, transportation safety needs, and current data gaps as the State progresses towards zero fatalities and serious injuries on roadways by 2050.

Description of the Issue

Data is a fundamental component of highway safety planning and engineering. Data-driven processes help State and local practitioners and elected officials make informed decisions about locations that need safety improvements, characteristics of safety concerns, and the performance of improvements once in place. By integrating existing data sources, including—roadway, traffic, driver, and crash information—NCDOT can efficiently allocate resources on infrastructure and behavioral programs that contribute to North Carolina's goal of zero fatalities and serious injuries.

While there is a wealth of data already being collected, processed, and analyzed by NCDOT and its local partners, there are still more sources of data that are not fully integrated into the analysis process. These resources can help improve the completeness and accuracy of data available to NCDOT and its partners.[59] Furthermore, there are many datasets emerging in the transportation system that have not been fully integrated into the safety management and planning process.

With the rise of connected technologies and personal mobility, more data sources are emerging every year. These emerging capabilities affect all dimensions of the transportation system and often require integration and cooperation between State, local, and third-party partners. Multi-disciplinary forums, like the Traffic Records Coordinating Committee, offer opportunities for the State and its partners to discuss and coordinate data-related activities.

Safety stakeholders in North Carolina identified measures of exposure, real-time traffic applications, and connected and autonomous vehicle technologies as the emerging data issues that need to be addressed in the State.

Road User Data and Exposure

Data on each transportation mode allow safety decision makers to identify locations of elevated crash risk by mode. This is not limited to vehicular traffic, but also includes bicyclists, pedestrians, and other mobility options like transit, micromobility, and shared services. A partnership between State, metropolitan, county, municipal, and rural planning agencies, as well as the proprietors of shared mobility systems, is needed to acquire a complete picture of the transportation system.

Real-Time Traffic Data

Real-time routing applications and traffic monitoring not only provide NCDOT with a means to dynamically monitor traffic fluctuations, but they also have a reciprocal effect on the behavior of actual transportation users. That is, individuals may choose alternate routes, travel times, or modes based on the information delivered to them through routing applications. We can benefit from understanding the effects of these technologies on transportation demand and the associated impact on safety.

Connected and Autonomous Technologies

In 2017, the North Carolina General Assembly passed House Bill 469 that allows the State to implement and regulate connected and autonomous vehicle technologies on North Carolina roads. Since that bill's passage, certain corridors have been retrofitted to test V2I technology, and private original equipment manufacturers have tested truck platooning on the Triangle Expressway proving ground. As these technologies mature and more is understood about their operational and safety implications, there is an opportunity to develop policies, standards, and infrastructure for the registration and practical operation of these vehicles on the State's roads.

Beyond these few examples, the purpose of this Emphasis Area is to position NCDOT and its partners to improve existing datasets, efficiently manage data partnerships between agencies, and fully integrate any emerging datasets and technologies into the existing data ecosystem. Incorporating this data will not only broaden NCDOT's analytical capabilities, but it will also improve the ability of State and local transportation planners to make informed decisions in short- to long-range applications. This will inform policies, funding, and official planning documents that communicate a vision for the future of the transportation system to the public.

Implementing Agencies

- MPOs/RPOs
- Municipal/county agencies
- NC DHHS
- NCDMV
- NCDPS
- NC GHSP
- NCDOT GIS Unit
- NCDOT Integrated Mobility Division
- NCDOT Traffic Safety Unit
- NCDOT Traffic Survey Group
- NCDOT Traffic Systems Operations
- NCDOT Transportation Planning Division
- NCDPI Driver Education
- NCOEMS

As of March 2019, **79%** of all **crash reports were electronically delivered to NCDMV**.[60]

59 NHTSA (2011). *Model Performance Measures for State Traffic Records Systems*. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/811441.

60 NCDMV (2019).

Strategies and Supporting Actions

Data and emerging technologies affect all dimensions of the transportation system and are not easily confined to engineering, enforcement, education, or emergency services alone. For instance, timely electronic crash reporting and linkages with hospital records is a strategy that requires coordination between law enforcement and emergency services, and it requires technical education on appropriate reporting methods. While the following strategies and actions are not defined by the 4 Es, they are important elements to each component of transportation safety.

TIMELINE KEY:

ONGOING

NEAR-TERM (0-1 YEAR)

MID-TERM (1-2 YEARS)

LONG-TERM (2-5 YEARS)

Improve the quality and usefulness of crash data.

Increase the percentage of crashes reported electronically.

Improve the ease and accuracy of recording more precise impact or crash location.

Evaluate the value of linking medical and crash data.

Improve the completeness and accuracy of roadway inventory data, including bicycle and pedestrian facilities.

Continue collection of Model Inventory of Roadway Elements Fundamental Data Elements, particularly for non-State-maintained facilities, per FHWA requirements.

Continue development of linear referencing system attribute data for all public roads.

Improve data on roadway user exposure and expand the locations where bicycle and pedestrian volumes are collected and monitored.

Identify and improve stakeholder access to behavioral data.

Collect and maintain data on driver education programs.

Support the use of observational data (such as RSAs and other site-specific reviews) to inform policy and engineering adjustments.

Increase agencies' access and ability to use existing traffic safety data.

Increase the use of analytical tools and expertise.

Emphasize data sharing capabilities and forums between local agencies and the State.

Share crash data trends and high-crash locations with the traveling public.

Integrate existing and emerging data to inform local transportation planning efforts and long-range planning.

Work with partners to identify and access their datasets that may supplement existing public data on transportation safety.

Accommodate new issues that emerge in the field of highway safety.

Build the data infrastructure necessary to monitor existing and emerging safety concerns and technologies.

Evaluate the influence of real-time navigation data on travel behavior and safety outcomes.

Evaluate the safety impacts of TSMO strategies emerging in the State.

Monitor and identify V2I and V2V data sources on NC corridors.

Conduct a policy review of commercial licensure to assess the State's readiness for interconnected commercial fleets.

Engage the State's Fully Autonomous Vehicle Committee to identify emerging data sources and actively participate in discussions concerning new technologies (e.g., connected vehicle and automated vehicle manufacturer reporting requirements and technical skills of State employees that will evaluate data).

Continue to improve EMS response time and increase access to medical facilities, especially in rural areas.

Map EMS and treatment facility resources and evaluate response times in rural areas.

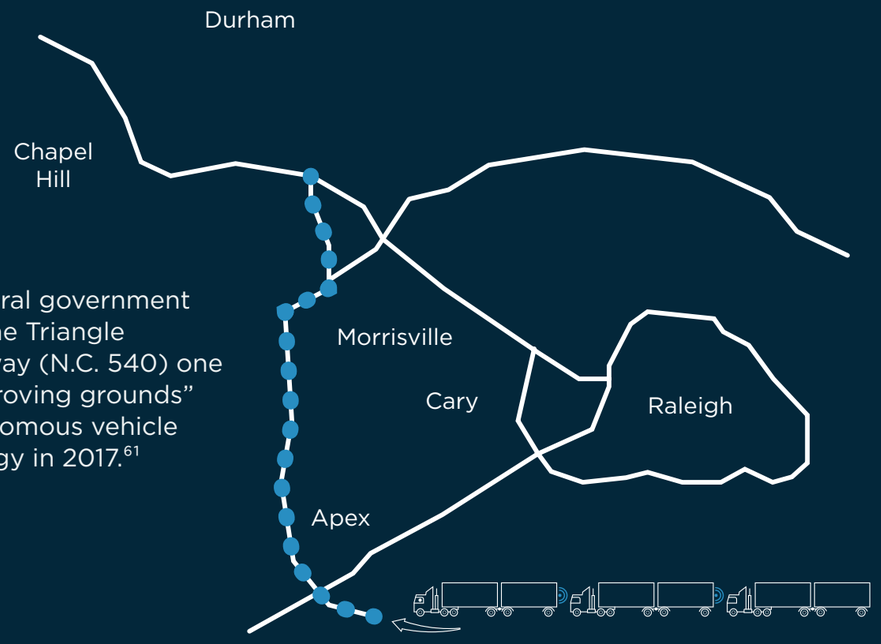
Work with NCDOT and EMS partners to fund a study to examine the quality of cell phone service and ability to call 911 in rural areas.

Improve first response, air lift, in-transport/pre-hospital care services and coordinated hospital receiving services for pedestrian, bicyclist, motorcyclist, and motor vehicle crashes.

Foster collaboration and encourage reciprocal agreements between rural counties and municipalities to increase access to remote locations.

Identify opportunities to coordinate with North Carolina representatives from the Federal Aviation Administration Unmanned Aircraft System Integration Pilot Program to develop emergency medical response applications of unmanned aircraft technology in rural areas.

Improve communication services (such as cell phone service coverage) in rural areas to assist emergency services personnel in locating and responding to remote crashes.



The Federal government named the Triangle Expressway (N.C. 540) one of the "proving grounds" for autonomous vehicle technology in 2017.[61]

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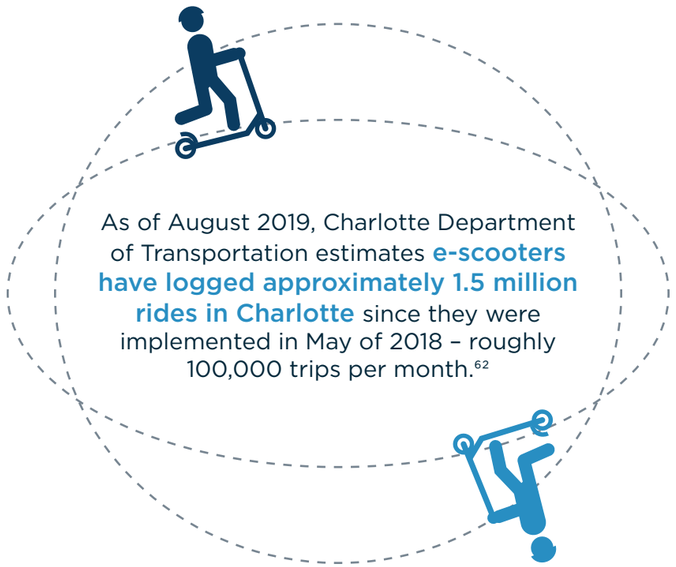

As of August 2019, Charlotte Department of Transportation estimates **e-scooters have logged approximately 1.5 million rides in Charlotte** since they were implemented in May of 2018 – roughly 100,000 trips per month.[62]

61 Stradling, Richard (2019). *Ever Heard of Truck Platooning? It's Happening on the Triangle Expressway*. The News and Observer. https://www.newsobserver.com/news/local/article213915609.html.

62 Henderson, Bruce (2019). *Lime Says Charlotte e-Scooter Riders Have Passed the Million-Mile Mark*. The Charlotte Observer. https://www.charlotteobserver.com/news/local/traffic/article233794772.html.

Safety Culture

Image Credit: VisitNC.com

Safety Culture

This Plan focuses on Emphasis Areas that address the prevailing crash circumstances in North Carolina. We must also recognize the importance of all the nuanced and interacting variables that influence motor vehicle crashes to achieve the SHSP goal. This will require systemic changes in North Carolina's societal norms and how we, as residents and visitors, view and practice safe behaviors.

Unlike the other Focus Areas, this one does not include specific Emphasis Areas. Rather, Safety Culture is the cross-section of all the pieces that make our communities and people unique. Here, the input from safety stakeholders and results from broader transportation safety research are combined with the overlapping Emphasis Area considerations to highlight cross-cutting needs. Change will not result from funding and infrastructure improvements alone but rather in concert with policies, programs, and projects that influence the choices and actions of people.

The following sections outline several approaches to addressing and enhancing Safety Culture in North Carolina. The approaches are not mutually exclusive. Each is important to achieve our State's SHSP goal, and each is dependent upon the others; thus, success in one approach often translates to success in another in a cyclical nature.

Safe Systems Approach

A Safe Systems approach acknowledges the fact that humans do make mistakes and crashes will occur, but it is possible to manage those crashes to minimize the impact on human lives. At its core, Safe Systems is about physics, as it shifts the focus from crash frequency to the management of energy transferred to the people involved in those crashes. Less energy transferred to people should yield less harm. This approach emphasizes and prioritizes safety in design and project planning. Any effort that either directly (e.g., HSIP projects) or indirectly (e.g., long range transportation plans) addresses the frequency and severity of crashes can incorporate Safe Systems principles.

One of the key tenets to Safe Systems is "safer speeds." As one of the primary crash factors in North Carolina and an Emphasis Area in this Plan, addressing speed through infrastructure and behavioral changes has the potential to yield significant positive changes in our State. The other three tenets of Safe Systems—safer roads, safer vehicles, and road use/function—align with the remaining Emphasis Areas and the overlapping strategies and supporting actions.

This paradigm shift to a Safe Systems approach is a process and begins with educating representatives from the 4 Es. The addition of the Focus Areas structure to this Plan underscores the interrelation between crash factors and is one step towards implementing this approach in our State.

Policy, Practice, Enforcement, and Adjudication

Statewide and local policy and legislation are primed to have wide-reaching influences on safety. Policies can address both behavior and infrastructure and range from preventative (pre-crash) to post-crash mitigation. Part of Safety

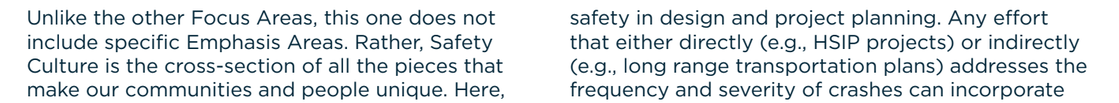


Image Credit: VisitNC.com

Culture is a willingness to look at existing success stories within North Carolina, from other States, and even outside the country to inform and guide policy making. Behavior-related policies with proven success include universal helmet laws, GDL programs and continued education for motorcycle endorsements, and primary seat belt laws for all seating positions. Mandatory ignition interlock systems for DWI offenders after a violation has also proven successful at mitigating repeat offenders.

Growth and change do not come without challenges, and legislation with the greatest potential for safety gains can often be the most contentious. Shifting both the design approach and cultural acceptance of proven safety countermeasures will be no different. This point can be illustrated through intersection design. Roundabouts have proven to have the greatest reduction in fatal and serious injury crashes, but they also have the most public pushback. However, NCDOT's SaFID process or a similar change in design practices (like an ICE policy) shifts the countermeasure from an alternative design to a primary choice. Coupled with education on the benefits, policy shifts may lead to changes in public perception and adoption.

Policy extends beyond design and behavior and should include common practices that may have implications for motorcycles and other special users. As an example, roadway maintenance practices should consider the needs of all users, even temporarily. This includes guidance and legislation for roadway maintenance practices such as signage alerting motorcyclists of slick surfaces and providing bicyclists and pedestrians with safe alternative detour routes. Similar concerns exist for protecting employees in and around work zones and first responders in action.

Law enforcement's influence and reach are multi-directional. They are largely responsible for collecting the data that direct much of the highway safety decision making, while also implementing and enforcing said decisions. Transforming our safety culture requires support from all aspects of the adjudication process. When traffic citations are reduced or thrown out entirely in the court system, the negative results are twofold: the offending parties are given little motivation to change their behaviors, and the enforcement community that places itself at risk with each citation can become discouraged by a system that fails to hold offenders accountable. Engaged enforcement and individual change rely on consistent, strong judiciary decisions.

Considering Land Use, Road Function, and Context

The transportation network does not end at the road right-of-way for widespread adoption of a Safety Culture. Understanding the context of trip generators, destinations, and modes requires evaluating entire communities, connectivity to adjacent communities, and their plans that support these trips.

One way to accomplish this is to consider zoning regulations and land use policies that influence decisions on how a community is built and shaped. Building practices, sidewalk and street connectivity, aesthetic characteristics, proximity and density of destinations, access to goods and services like health care and full-service grocery stores, and availability of transit are all outcomes of these policies. As a result, these characteristics are often linked to positive outcomes like increased physical activity and less dependence on the personal vehicle. Incongruent zoning and land use policies can lead to the opposite effects. Building a grocery store in a neighborhood should be supported by safe street crossings, transit stops, and connected sidewalks to encourage multimodal transportation and access. These practices and policies are long term visions and beyond the scope of the 5-year Plan. However, changing our culture on how these practices are approached can have a long-term positive impact on safety.

The rural versus urban context is also important for consideration in addressing specific safety challenges. As previously discussed, speed management in an urban setting focuses on interactions between vehicles and other users while speed in rural settings should consider countermeasures that minimize the impacts of vehicles departing the roadway (e.g., shoulder widths, rumble strips, occupant protection). Other rural considerations like gaps in cell phone service

Image Credit: NCDOT

and the proximity of health care and trauma service facilities that may inhibit emergency response times can be addressed through context-sensitive land use policies and investments in technology and improved tactics and training for first responders.

Transportation planning efforts—long range transportation planning and metropolitan transportation plans, among others—provides an opportunity to formalize a Safety Culture in a community's development process. Prioritizing safety in these plans can result in real projects that address safety through design and outreach, further institutionalizing these concepts within the larger community. MPOs/RPOs and NCDOT should also continue to coordinate throughout project development processes. From formal project scoping and design review to project prioritization and selection, every step presents an opportunity to include safety.

Outreach

As engineers, planners, and decision makers adopt and actively employ a Safe Systems approach, citizens and visitors also need to embrace a culture of safety. Outreach and education efforts are opportunities to promote and model a Safety Culture by reaching individuals through various media and messaging, permeating the places and spaces where North Carolinians and visitors live, work, play, and travel.

The universities, colleges, and large employers in North Carolina offer excellent opportunities to provide education and training related to all Emphasis Areas. Educational institutions are unique microcosms complete with all modes of transportation and significant populations of younger and older adults. Programming and training for both students and staff can shape the campus culture and translate to lifelong skills and knowledge. More generally, workplace safe driving policies and educational programs further institutionalize safe behaviors and broaden understanding of all roadway users' needs. If an individual restricts cell phone use while driving in the workplace, this behavior could continue in personal vehicles where their behaviors are observed and replicated by family and friends.

Individuals are motivated differently, and the transportation safety community can learn from successful messaging and delivery models in other sectors. For instance, public health behavior change models may provide insight into appropriate messages for addressing outcomes associated with unsafe or destructive behaviors, similar to smoking cessation campaigns. Delivery methods may include paid and earned media buys to reach broader audiences. These strategies will also need to include an evaluation component to assess the reach and public perception and measure general attitude regarding safety messaging and behaviors, beyond monitoring crash trends.

Vision Zero Approach

The Vision Zero approach,[63] a strategy to eliminate all traffic fatalities and serious injuries, is gaining momentum in North Carolina. Similar to Safe Systems, Vision Zero acknowledges human error

Image Credit: NCDOT

and views traffic deaths as preventable. This is a fundamental shift in how the 4 Es approach highway safety and puts a stronger emphasis on collaboration.

As of 2019, five North Carolina cities and one county are developing or implementing Vision Zero plans. Similar to the SHSP, the plans use data-driven safety analyses and stakeholder input to identify the primary highway safety concerns and develop strategies for eliminating fatalities. Local-level emphasis areas will likely align with the statewide Emphasis Areas identified in this Plan; therefore, the lead agencies should look to the SHSP for a baseline of strategies and supporting actions to include in their Vision Zero plan. The resulting plans are a culmination of the other safety elements—detailing tangible projects, outreach efforts, programs, and local-level policy efforts that will build synergy and lead to real changes. Local implementation of these strategies will result in larger gains statewide, create more visibility for both efforts, and reinforce shifts in our Safety Culture.

63 Vision Zero Network (2018). *What is Vision Zero?* https://visionzeronetwork.org/about/what-is-vision-zero/.

NORTH CAROLINA STRATEGIC
HIGHWAY SAFETY PLAN

Looking To 2024

The following recommendations for implementation were developed based on safety partner feedback throughout the Plan process:

- **Evaluate what works – and double down**
  This document is an update of the 2014 Plan and retains proven strategies detailed in prior years. The Plan is also forward facing, including new strategies to address emerging trends, while maintaining the focus on programs, projects, and policies that work. NCDOT is committed to monitoring progress toward the statewide goals and tracking fatality and serious injury data. The implementing agencies, safety partners, and ECHS will also measure the effectiveness and reach of safety-related projects and programs.
- **Coordinate transportation planning**
  The Plan is one of many State and local plans that help shape transportation safety in North Carolina. Over the 5-year lifespan of this Plan, safety partners will work together to implement the supporting strategies and actions. This is also the time to coordinate transportation and strategic planning processes to more effectively and broadly prioritize safety.
- **Adopt proactive approaches**
  Historically, highway safety issues are addressed using a reactive approach at locations that have demonstrated a high frequency of crashes. North Carolina is a front-runner in proactive, systemic applications of several proven countermeasures—treatments applied across many locations that share the same risk factors for specific crash types. The Plan continues to promote these strategies in coordination with other preventative behavioral and educational measures.
- **Coordinate funding sources**
  HSIP is the core Federal-aid program for safety-related infrastructure. NCDOT also manages the STIP, which identifies construction funding for transportation projects. There are many other potential sources for funding—both NCDOT-related and beyond. Focus Area teams can identify solutions for sharing resources and create joint ventures to maximize financial and resource investments in improving highway safety.

Image Credit: VisitNC.com

Glossary

Affordable Housing
Government provided housing that is determined to be affordable no matter what someone's income may be. The U.S. Government clarifies that one's housing is determined to be "affordable" if its cost is 30 percent or lower than their income.

Collective Impact Model
The commitment of a group of actors from different sectors to a common agenda for solving a specific social problem, using a structured form of collaboration. Initiatives must meet five criteria to be considered collective impact: common agenda, shared measurement system, mutually reinforcing activities, continuous communication, and backbone organization.

Countermeasure
A proposed improvement that can be provided along a roadway or at an intersection that may address a current safety concern. A countermeasure usually has research that supports its use for a specific type of roadway segment or intersection.

Driving While Impaired (DWI)
Operating a motor vehicle while under the influence of alcohol or drugs to the point that renders a driver incapable of operating the motor vehicle safely.

Fatality
Deaths resulting from injuries sustained in a specific road vehicle crash (Fatality Accident Reporting System [FARS] reporting – within 30 days after the crash, NC reporting – within 12 months after the crash).

Fatality Analysis Reporting System (FARS)
A nationwide census providing NHTSA, Congress, and the American public yearly data regarding fatal injuries suffered in motor vehicle traffic crashes.

Federal Highway Administration (FHWA)
An agency within the USDOT that supports the construction, maintenance, and preservation of the nation's highways, bridges, and tunnels.

Graduated Driver Licensing (GDL)
A program of tiered restrictions designed to allow young drivers to safely gain driving experience before obtaining full driving privileges.

High-Risk Rural Road (HRR)
A rural collector (major or minor) or a rural local road that has a significant risk as identified through a field review, safety assessment, road safety audit, or local knowledge and experience.

Highway Safety Improvement Program (HSIP)
A Federal-aid program with the goal of reducing fatalities and serious injury crashes on all public roadways.

Metropolitan/Rural Planning Organization (MPO/RPO)
A Federally mandated and Federally funded policy-making organization that is made up of local officials and governmental transportation authorities in a region. The organization is responsible for prioritizing and determining future transportation projects that would be beneficial to the future growth and prosperity of the region.

Lane Departure
Any crash that occurs due to a driver leaving their lane and includes run-off-road, fixed object, head-on, rollover, and sideswipe crash types.

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Micromobility
A mode of transportation that can be provided by a very light vehicle, such as a shared bicycle, an electric scooter, or an electric skateboard.

Modern Roundabout
A circular intersection characterized by yield-control (where entering vehicles must yield to circulating traffic) and smaller radii to achieve slower entry and circulating speeds, when compared to older styles of rotaries and traffic circles.

National Highway Traffic Safety Administration (NHTSA)
An agency within the USDOT with the goal of saving lives and preventing injuries from vehicle-related crashes.

Older Driver
Any driver at least 65 years of age or older.

Per se
An impaired driving law that allows drivers to be charged regardless of proof of impairment if BAC is 0.08 or higher.

Personal Mobility
When a person traveling uses a vehicle or device fit for a singular person's use. For example, walking or the use of a bicycle can be considered personal mobility.

Safety Culture
The shared values, actions, and behaviors that demonstrate a commitment to safety.

State Transportation Improvement Program (STIP)
A Federally-mandated program operated by the NCDOT that identifies the schedule and funding for planned roadway projects throughout the State.

Suspected Serious Injury
An injury other than a fatality that results in one or more of the following:

- Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood.
- Broken or distorted extremity (arm or leg).
- Crush injuries.
- Suspected skull, chest, or abdominal injury other than bruises or minor lacerations.
- Significant burns (second and third degree burns over 10 percent or more of the body).
- Unconsciousness when taken from the crash scene.
- Paralysis.

Unrestrained
A driver or passenger not held in place by a seat belt, device, or other restraint systems.

Vehicle Miles Traveled (VMT)
A measure used in transportation planning. It measures the amount of travel for all vehicles in a geographic region over a given period of time, typically a one-year period.

Vision Zero/Towards Zero Deaths
A traffic safety program in many States and municipalities with the goal of reducing all crash-related fatalities and serious injuries to zero.

Younger Driver
Any driver ages 15 to 19.

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