



THE UNIVERSITY OF NORTH CAROLINA
**HIGHWAY SAFETY
RESEARCH CENTER**

ANNUAL REPORT **2014**



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MESSAGE FROM THE DIRECTOR

In an era of shrinking transportation budgets and continued pressures on departments of transportation to provide safe and efficient facilities for all road users, it is more important than ever to spend safety resources wisely.

Data are at the heart of a cost-efficient, high-quality safety management process. Whether one is identifying a safety problem, deciding on the most appropriate countermeasure or program, or evaluating the effectiveness of an intervention, good data are essential.



HSRC Director David Harkey (upper left) leads a planning meeting with staff.

Safety is an imperative investment for everyone – not just transportation researchers. Our feature story in this year’s report highlights examples of HSRC programs and projects that collect, manage, analyze and use data to help road safety professionals make better decisions.

Data have been at the center of our work here since the inception of the UNC Highway Safety Research Center (HSRC) in 1965. I was reminded of this very fact in a recent visit with our founding director, Dr. Robert J. Campbell. He recalled that in the early years of the Center there hadn’t yet been a study of injury outcomes linked to specific makes and models of passenger vehicles.

To address that gap of knowledge in the field, Dr. Campbell and other HSRC researchers gathered the vehicle identification numbers (VIN) and occupant injury data from police crash reports and used VIN decoding software to determine the make and models of the vehicles involved in the crashes. This groundbreaking research was important to begin understanding the strengths and limitations of particular vehicles, and it was one of the first examples of using original data to assess vehicle safety.

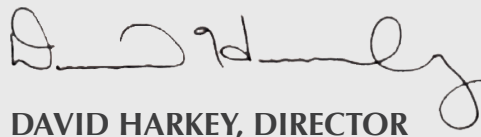
Dr. Campbell was asked to testify at a Congressional hearing, fielded vehicle-safety related media inquiries, and welcomed representatives from automobile manufacturers who were interested in learning more about this original research and how it could be used to inform the industry.

As HSRC progresses toward 50 years of service to the state of North Carolina and the national and global road safety community, data continues to be at the center of our efforts. Our staff continues working to improve the quantity and quality of data available for road safety efforts – through research and participation on national and local committees – every day.



Data have remained at the forefront of HSRC's work since the Center was founded with Dr. B.J. Campbell (center) as director in 1965.

We look forward to a successful 2015, and to the opportunities new and better data will bring to our safety efforts in the years ahead.

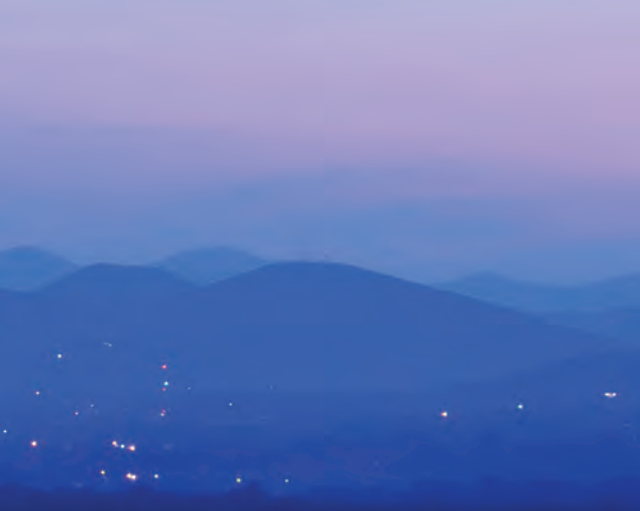

DAVID HARKEY, DIRECTOR





OUR MISSION





The mission of HSRC is to improve the safety, security, access and efficiency of all surface transportation modes through a balanced, interdisciplinary program of research, evaluation and information dissemination. We conduct our everyday work with that ideal at the forefront. For nearly 50 years, HSRC has helped shape the field of transportation safety as a leading research institution.

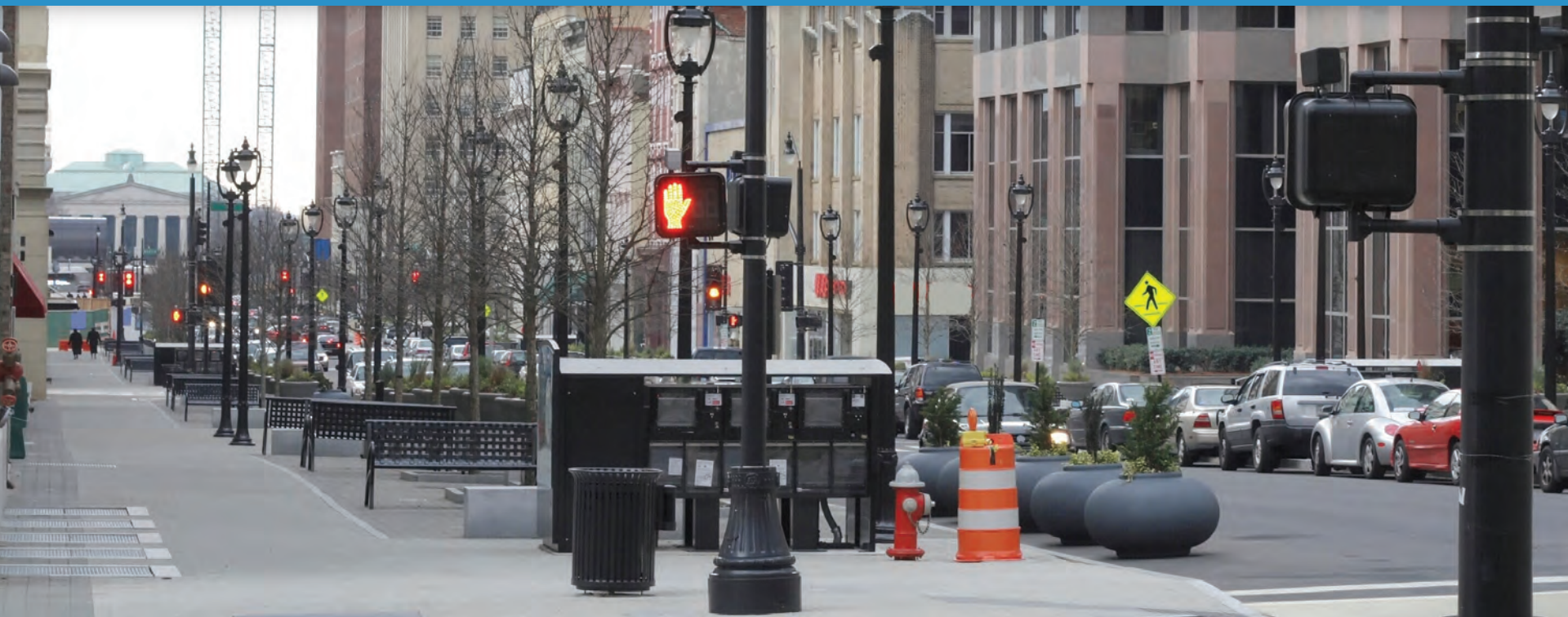


HSRC CONTRIBUTIONS AT A GLANCE

- Released more than **30 publications and presentations**, sharing insight on a variety of topics from distracted driver behavior research, to the costs for pedestrian and bicycle infrastructure improvements.
- Generated more than **\$15 in revenue** for every \$1 of support provided by the state of North Carolina.
- Surpassed participation records for National Bike to School Day and International Walk to School Day, with **2,222** and **4,447** events, respectively.
- Answered approximately **145 requests** for North Carolina crash information and other materials from transportation professionals and members of the media.



CENTER HIGHLIGHTS





HSRC researchers and staff work tirelessly on issues that affect all road users — from motorists and motorcyclists to bicyclists and pedestrians, and our efforts don't end with a published study or completed evaluation. Helping translate research into practice is an important aspect of our work, and we aim to ensure the most current transportation safety information is available to decision-makers and citizens across the state and the entire country.



AREAS OF RESEARCH

This year (July 1, 2013-June 30, 2014), HSRC staff reached many project milestones. This section of the annual report highlights some of those accomplishments in the following categories:

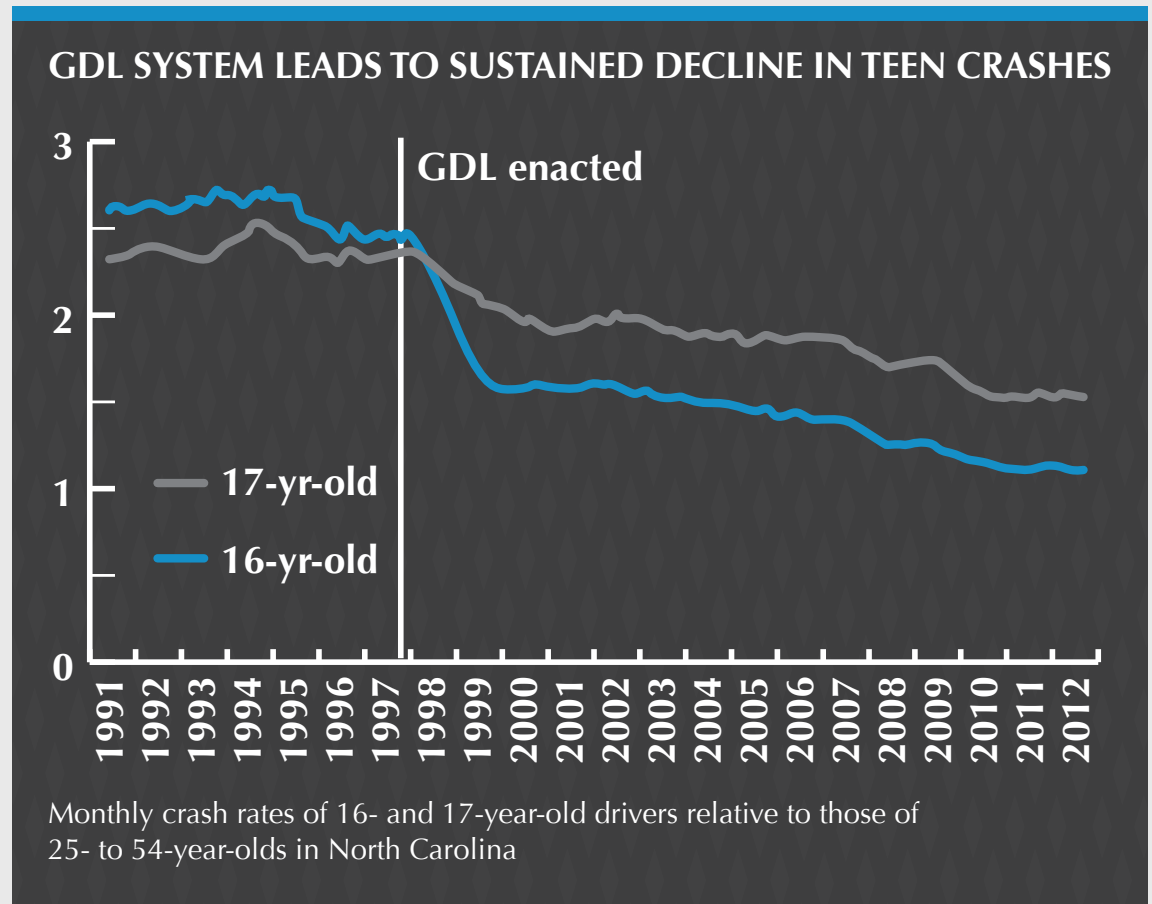
- DRIVER BEHAVIOR
- PEDESTRIAN AND BICYCLIST SAFETY
- THE BUILT ENVIRONMENT
- SHAPING THE FUTURE OF TRANSPORTATION SAFETY

DRIVER BEHAVIOR

Humans are remarkably complex. People don't always operate the way we think they will, and their behavior is not easily changed. This reality is a challenge for transportation safety, especially when youth and inexperience are added to the equation.

Graduated driver licensing (GDL) programs have been highly successful in reducing motor vehicle crashes among young drivers. However, crashes remain the leading cause of death among teens. Researchers at HSRC's Center for the Study of Young Drivers, including several who have a background in psychology, work tirelessly to identify and better understand the factors that contribute to this risk and to develop strategies to help teens and parents prepare for supervised driving.

As the birthplace of the GDL system and home to some of the nation's top teen driver experts, HSRC is often called upon to assist with supervised driving programs across the U.S. This year, Center researchers completed a five-year project to assist coalitions in several states in improving their young



driver licensing systems. They also provided guidance on navigating state policy-making processes to ensure the success of these systems.

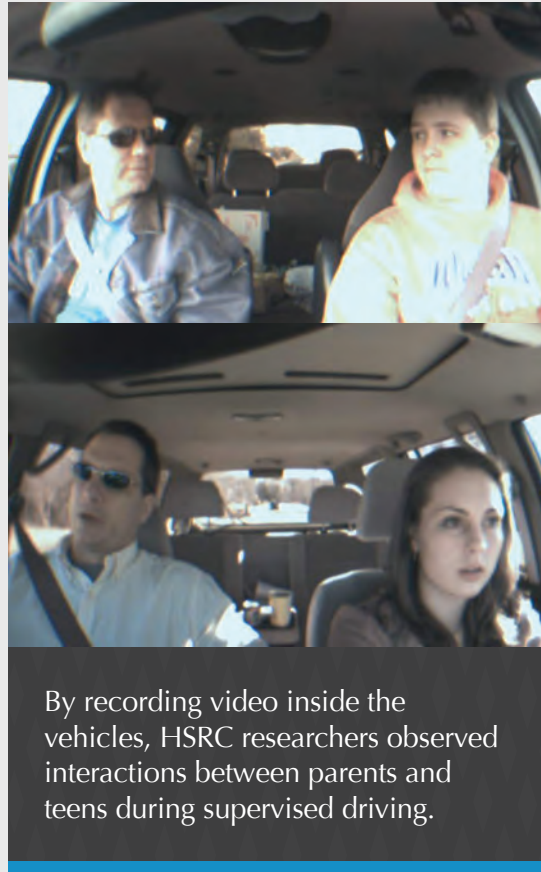
In North Carolina, HSRC researchers completed an analysis of the state's

GDL program to measure the program's overall effectiveness in reducing crash rates of young novice drivers. This analysis showed that the initial dramatic effect of the GDL system identified several years ago – a 38 percent decline in crashes involving

16-year-old drivers – has been sustained at a 37.4 percent decline. The analysis also found that benefits extended to 17-year-old drivers, with evidence that, in addition to the lengthy learner period during which teens begin to understand the complexities of driving, night and passenger restrictions both contributed to additional crash reductions for young drivers.

Technology has changed the way we do almost everything these days, including transportation research. HSRC researchers were the first to use in-vehicle recording technology to directly observe teens in real time. Unlike previous studies that relied on drivers to self-report behavior, this naturalistic observation allowed for more precise measurement. Over the course of the study, cameras recorded approximately 32,000 20-second segments of driving.

HSRC researchers reported findings from analysis of these data in two articles published in 2014 – one focusing on driver distraction among teens who were licensed to drive unsupervised, and another on parent-teen communication during the supervised driving period.



The first report, “Distracted driver behaviors and distracting conditions among adolescent drivers: Findings from a naturalistic driving study,” was published in the May 2014 Supplement to the *Journal of Adolescent Health*. Researchers found that adolescent drivers are six times more likely to be involved in an incident requiring an evasive maneuver to avoid a crash when

passengers in the vehicle are engaged in loud conversation, and nearly three times more likely to be involved in an incident when passengers are engaged in horseplay. A general conclusion from these findings is that actions the driver alone controls (like reaching for radio controls, texting, using a phone and eating) seem less likely to lead to a serious incident than actions they cannot control, like how others in the car behave.

“Forty-three states currently restrict newly licensed drivers to no more than one young passenger in their vehicle,” said Robert Foss, director of the Center for the Study of Young Drivers. “The results of this study illustrate the importance of such restrictions, which increase the safety of drivers, their passengers and others on the road by reducing the potential chaos that multiple passengers can create.”

A second set of findings from these naturalistic data concerned parent-teen communication. Most U.S. states require adult supervision for 6-12 months before teens can begin driving independently, allowing them to safely gain experience with support from an experienced adult. However, until recently, what parents do during

“ To help a teen develop into a safer driver, parents should strive to share the wisdom, awareness and understanding they’ve developed over many years of driving. These are the sorts of things, far more than vehicle handling skills, that prevent crashes. ”

- Arthur Goodwin,
senior research associate at HSRC’s
Center for the Study of Young Drivers

supervised driving, and the type of conversation that takes place, was largely unknown.

Using video clips of actual parent-teen interactions while driving, HSRC researchers found that parents are highly engaged supervisors of young beginning drivers, but they tend to focus on basics such as vehicle handling, rather than more complex issues like how to anticipate when another driver might do something dangerous. The report, “Parent comments and instruction during the first four months of supervised driving: An opportunity missed?” was published in the August issue of *Accident Analysis & Prevention*.



During Time to Drive coaching sessions, parents watch video clips of driving sessions and discuss how to handle situations they may encounter with their teens. Dr. Lew Margolis (standing), a pediatrician and faculty member in UNC’s Department of Maternal and Child Health, collaborated with the HSRC research team on this project.

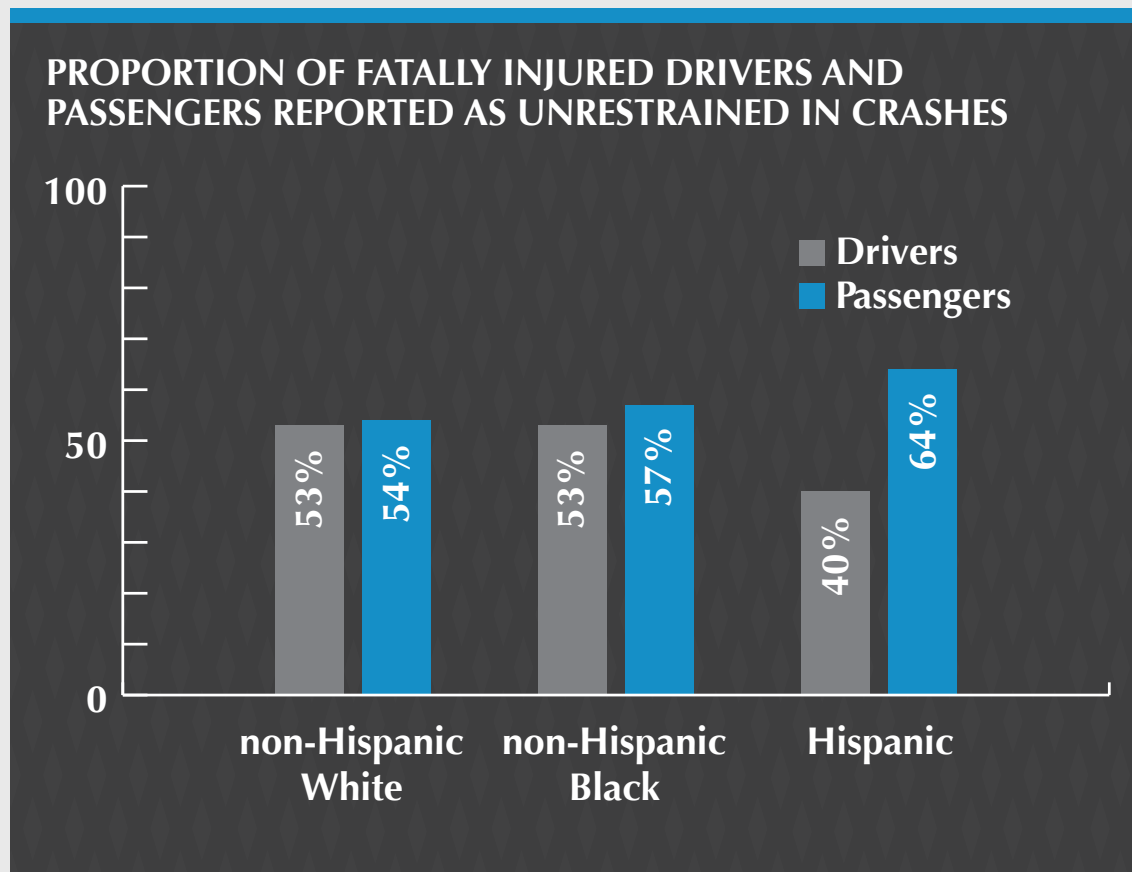
Researchers from the Center for the Study of Young Drivers were able to use what they learned in this study to

inform another project. The researchers developed a program called Time to Drive to coach and provide guidance to parents as they supervise a novice teen driver. During two-hour, in-person small-group sessions, parents view and discuss video clips collected from the in-vehicle cameras showing parents and teens during supervised driving. The goal is to help parents understand the situations and challenges that are likely to occur and how to best handle those situations. Communication, and how parents can share the driving wisdom they have

developed during their many years of experience, is also a major focus.

HSRC has also been working to identify the safety needs of another subset of the population – North Carolina’s large and diverse Hispanic population. As part of this study, HSRC researchers found that seat belt use differed among racial/ethnic groups, especially among people age 15-29. Fatally injured Hispanic drivers were more likely than non-Hispanics to be wearing a seatbelt at the time of a crash; however, the opposite was true for passengers. Sixty-four percent of fatally injured Hispanic passengers age 15-29 were unrestrained, compared to 54 percent of non-Hispanic Whites and 57 percent of non-Hispanic Blacks.

To learn more about seat belt use in the Hispanic population, researchers at HSRC spoke with members of this community about existing public service announcement (PSA) marketing campaigns encouraging seat belt use to determine which type of messaging they preferred. While no one type of marketing campaign can resonate with all people of any community, a few common recommendations emerged from our focus group with Hispanic North Carolinians:



- Create materials for the intended audience. Use actors that represent the target group and film the materials in the appropriate language.
 - Avoid stereotypes and show diversity. Focus group participants often commented on how they did not see themselves represented in the materials.
 - While humor is often used to target this age group, participants often felt that humor was not appropriate for this serious topic.
- The results from this study can inform safety outreach campaigns to this population in the future.

PEDESTRIAN AND BICYCLIST SAFETY

Our work in the field of pedestrian and bicyclist safety continued in 2014 – with both original research and the expansion of ongoing projects.

An analysis released this year by the National Center for Safe Routes to School showed that more kindergarten through eighth grade students are walking to and from school.

The National Center, the clearinghouse for the federal Safe Routes to School program housed at HSRC, collected data from parent surveys gathered by nearly 4,700 U.S. schools from 2007 to 2012.

The percentage of K-8 children who walked to school in the morning increased from 12.4 percent to 15.7 percent. Similarly, the percentage of K-8 children who walked from school in the afternoon increased from 15.8 percent to 19.7 percent. Another significant finding of this research was that the percentage of parents who reported that their child's school supported walking and bicycling for the school commute rose from 24.9 percent to 33 percent. The full report, with additional findings, is available

MORE STUDENTS WALKING TO SCHOOL

IN THE MORNING

2007 12.4%

2012 15.7%

IN THE AFTERNOON

2007 15.8%

2012 19.7%

on the National Center's website www.saferoutesinfo.org.

The National Center promotes safe walking and biking to school throughout the year, punctuated by National Bike to School Day in May and International Walk to School Day in October. This year, Schwinn supported Bike to School Day via their helmet encouragement program, Helmets on Heads. A partnership was formed to provide resources to local event organizers, specifically a chance

for ten schools to win a set of ten bikes and twenty helmets each to start or continue biking programs in their local communities. To participate in the Helmets on Heads giveaway, schools shared how they could use the bikes and helmets on their campuses. A few inspiring ideas included developing a school-wide bike share program with a "traveling journal" of stories and photos, enhancing bicycling opportunities for children who are homeless, and establishing a fitness club.

Eleven new Walk Friendly Communities were designated in fiscal year 2014, bringing the total number to 47. Walk Friendly Communities, a national recognition program developed by HSRC and supported by FedEx and FHWA, encourages towns and cities across the U.S. to establish or recommit to a high priority for supporting safer walking environments.

Safety is the primary concern at HSRC, so work to revise Federal Highway Administration's Bicycle Safer Journey aligns with our mission. The online educational tool helps caregivers and



educators start a conversation with children and teens to prepare them for a lifetime of safe cycling. Bicycle Safer Journey - www.pedbikeinfo.org/bicyclesaferjourney - consists of videos, quizzes and discussion guides for three specific age groups: 5-9, 10-14 and 15-18 year olds. An educator's resource library is also provided.

National Bike to School Day in May and International Walk to School Day in October both hit a record number of events registered this year: 2,222 and 4,447, respectively!

Bicycle Safer Journey can be used as an introduction to a bicycle safety skills course, or to augment a comprehensive curriculum already

BICYCLE SAFER JOURNEY Skills for Safe Bicycling for Ages 5 to 18

Use in the classroom or one-on-one. To start, click on an age group below:

Ages 5-9 **Ages 10-14** **Ages 15-18**

What is Bicycle Safer Journey?
 Bicycle Safer Journey helps educators, parents and others who care about bicycle safety to get the conversation started with children and youth. Three videos — one for each of three age groups — accompanied by a quiz or discussion and an educator's resource library can be used as an introduction to

Bicycle Safer Journey prepares children and teens for a lifetime of safe cycling. Find it at www.pedbikeinfo.org/bicyclesaferjourney.

in place. The age-appropriate videos, which are available in English and Spanish, address picking the safest places to bicycle and the importance of being alert. This resource is the second part of an FHWA effort to better inform children and teens about safe non-motorized travel. Pedestrian Safer Journey, www.pedbikeinfo.org/pedsaferjourney, which was also created by HSRC, was released in 2013 to offer similar educational tools directed toward walking.

THE BUILT ENVIRONMENT

Over the past several years, HSRC has played an important role in shaping the national safety research agenda in the area of highway infrastructure and operation. As part of the National Cooperative Highway Research Program (NCHRP), HSRC helped prioritize U.S. safety research needs. A forum for coordinated and collaborative research, NCHRP addresses issues integral to state departments of transportation and other transportation professionals at all levels of government and the private sector.

Using quantitative ranking methods, a team at HSRC developed a process for identifying the field's most pressing safety research needs and established a ranked list of these opportunities. This list provides the transportation community, including funders, with information needed to focus research in the particular areas where it can provide the most benefit. In addition, the project team developed a detailed plan for establishing an ongoing, sustainable and dynamic national safety infrastructure research agenda for years to come. The NCHRP 756 report is available on the Transportation Research Board website.



One of the most pressing transportation safety research needs, according to HSRC researchers' assessment in the NCHRP 756 report, involves the safety effects of providing a sidewalk on an arterial roadway in place of a shoulder.

Another effort that was completed this year supports the safety decision-making process. Roadway engineers as predict the number of annual crashes that will occur at a given location

using safety performance functions (SPFs). The estimated crash frequency can then be used as a baseline when considering the implementation, or when evaluating the success, of a countermeasure. FHWA funded HSRC to create guidebooks to help local and state agencies develop jurisdiction-specific SPFs and advise agencies on how to calibrate and apply SPFs that appear in the Highway Safety Manual to their own regions. The guidebooks created from this effort will help

road safety professionals for years to come. They are available on the CMF Clearinghouse website, www.cmfclearinghouse.org.

As more people walk and bike to get from place to place in their communities, there is a growing need to build pedestrian- and cyclist-friendly infrastructure. HSRC, in collaboration with Vanasse Hangen Brustlin, Inc., updated FHWA's Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE) this year. PEDSAFE includes: a guide to better understand the issues facing pedestrians; a comprehensive list of engineering countermeasure options; case studies that document how countermeasures have been successfully implemented; and an interactive selection tool which proposes treatment options with engineer input about a basic safety problem and site conditions. PEDSAFE can be found at www.pedbikesafe.org/PEDSAFE.

Another tool designed and developed by HSRC to help improve the built environment for pedestrians and cyclists is the web-based North Carolina Pedestrian and Bicycle Crash Data Tool, www.pedbikeinfo.org/pbcats_nc/, developed for NCDOT. This



Costs for Pedestrian and Bicyclist Infrastructure Improvements

A Resource for Researchers, Engineers, Planners, and the General Public

Authors: Max A. Bushell, Bryan W. Poole, Charles V. Zegeer, Daniel A. Rodriguez

UNC Highway Safety Research Center

Prepared for the Federal Highway Administration and supported by the Robert Wood Johnson Foundation through its Active Living Research program

October, 2013



The Costs for Pedestrian and Bicyclist Infrastructure Improvements report helps transportation professionals make more informed infrastructure decisions based on cost.

tool provides data that help roadway engineers, educators, and others identify and prioritize appropriate treatments to make roadways safer. To make the data even more useful to municipal and regional planning organizations, cities, and counties across North Carolina, HSRC also coded the locations of pedestrian and bicycle crashes statewide for the most recent six years. These data

help engineers and planners identify high crash locations and the types of crashes, times of day and other factors present at those locations.

“Approximately 1,000 bicyclists are involved in police-reported crashes with motor vehicles each year in North Carolina. On average, around 20 are killed and an additional 60 are seriously injured,” said Libby Thomas, HSRC senior research associate. “By providing up-to-date pedestrian and bicyclist crash data, cities and towns are able to identify and assess problem areas and target those areas for improvements. These efforts make our communities safer for everyone.”

New infrastructure costs money, and that is something researchers, engineers, planners and officials must take into account when selecting any infrastructure improvement. Researchers in HSRC's Pedestrian and Bicycle Information Center (PBIC) recently completed a study identifying cost ranges for more than 77 pedestrian and bicycle infrastructure treatments, based on more than 1,700 projects across the nation. With this information, decision makers will be able to make more informed choices and dedicate funds in a cost-effective manner.

SHAPING THE FUTURE OF TRANSPORTATION SAFETY

Throughout our nearly 50 years of existence, HSRC has made a special effort to share our expertise and research with communities, students, researchers and practitioners. This year was no exception. By assisting with more than 145 data requests and information from media, transportation professionals and private citizens, presenting at conferences and publishing research findings in journals and other publications (see [page 28](#) for a complete list of this year's publications and presentations), HSRC continued to promote multi-disciplinary interest in highway safety.

HSRC planned and, in July, delivered a Complete Streets Summit on behalf of the North Carolina Department of Transportation (NCDOT). This one-day event provided transportation and planning professionals and policy makers across the state with an opportunity to learn more about improving conditions and accessibility for people using all modes of transportation, whether by foot, bicycle, transit or in a motor vehicle. Presentations focused on areas where NCDOT and local, county and regional



Carl Sundstrom, HSRC senior research associate, moderates a session on best practices for on-road bicycle facilities at the 2014 Complete Streets Summit in Charlotte, NC.

partners can work together to promote Complete Streets implementation.

In addition to coordinating dozens of free webinars for researchers and practitioners in 2014, PBIC announced the release of new bicycle

and pedestrian planning modules for teaching undergraduate students. This material was designed to augment courses in basic civil engineering or transportation planning. The teaching modules were developed, pilot tested and evaluated by an interdisciplinary team from HSRC, the UNC-Chapel Hill Department of City and Regional Planning, and Auburn University's Department of Civil Engineering. While PBIC offers several semester-long courses for students studying civil engineering, this is a first-of-its-kind

supplemental curricula designed to fit within existing university courses. It is geared toward developing more well-rounded transportation professionals by introducing students to pedestrian and bicycle planning and design basics in relevant courses.

HSRC continued its tradition of recognizing and supporting North Carolina-based students with innovative ideas in the field of transportation. The Center's selection committee named East Carolina University (ECU) student Lauren Cochran as the recipient of the 2014 Megan Cornog Memorial Highway Safety Scholarship. Cochran is pursuing a master's degree in occupational therapy, with an interest in wayfinding (ways in which people orient themselves in physical space and navigate from place to place) for the older adult community. In addition to her studies at ECU, Cochran has been certified as a technician in the CarFit program, which helps educate older drivers about adjustments they can make to their seats, mirrors and driving technique to improve safety or driving performance.

The scholarship is named in memory of a former HSRC staff member, Megan Cornog, who died in 2010 after a courageous battle with cancer.



HSRC Director David Harkey congratulates Lauren Cochran as she accepts the 2014 Megan Cornog Memorial Highway Safety Scholarship. Before accepting the award, Cochran shared specifics about her work in wayfinding and driving performance with HSRC staff.

This year the Patricia F. Waller Lecture, an annual lecture sponsored by HSRC, the UNC Injury Prevention Research Center and the UNC-Chapel Hill Department of Psychology, welcomed Dr. Jean T. Shope to Chapel Hill to discuss the translation of teen driver injury prevention research into practice. Dr. Shope, a research professor at the



Dr. Jean T. Shope presents Reducing Teen Motor Vehicle Crash Deaths at the 2014 Patricia F. Waller Lecture.

University of Michigan Transportation Research Institute and School of Public Health, spoke about the lack of evidence-based approaches to reduce teen motor vehicle crash deaths and injuries. She shared a series of four projects testing the efficacy, effectiveness and translation of the evidence-based Checkpoints program for parents of new teen drivers, as well as implications for policy and practice.

The Waller Lecture is held annually in memory of Patricia F. Waller, a professor who worked for nearly two decades as a researcher at HSRC, where she helped developed the concept for graduated licensing which was later adopted nationwide. Dr. Waller was a pioneer in injury prevention research.

HSRC: Building on a foundation of data

Knowledge is power, as the saying goes. This is very much the case when it comes to transportation safety and decision making.

Good data are the foundation of transportation safety, and, now more than ever before, researchers and practitioners in this field have better access to many different types of information: crash, roadway inventory and traffic volume data, driver records and driver behavior information. These data give researchers, transportation practitioners, public officials and other professionals the ability to identify trends and develop plans, programs and interventions intended to improve safety.

Many of HSRC's projects and efforts are conducted with the important end goal of increasing and improving access to data. Data can have many faces in the transportation world, and

HSRC uses many kinds of data – across disciplines and topics – in different ways. A successful project for HSRC – research or program related – is one that provides more and better safety information to professionals who plan, design, operate and maintain our roadways. And we are working every day to make this goal a reality.

More than numbers

HSRC makes local- and national-level roadway data accessible and provides analysis for transportation engineers, administrators and practitioners.

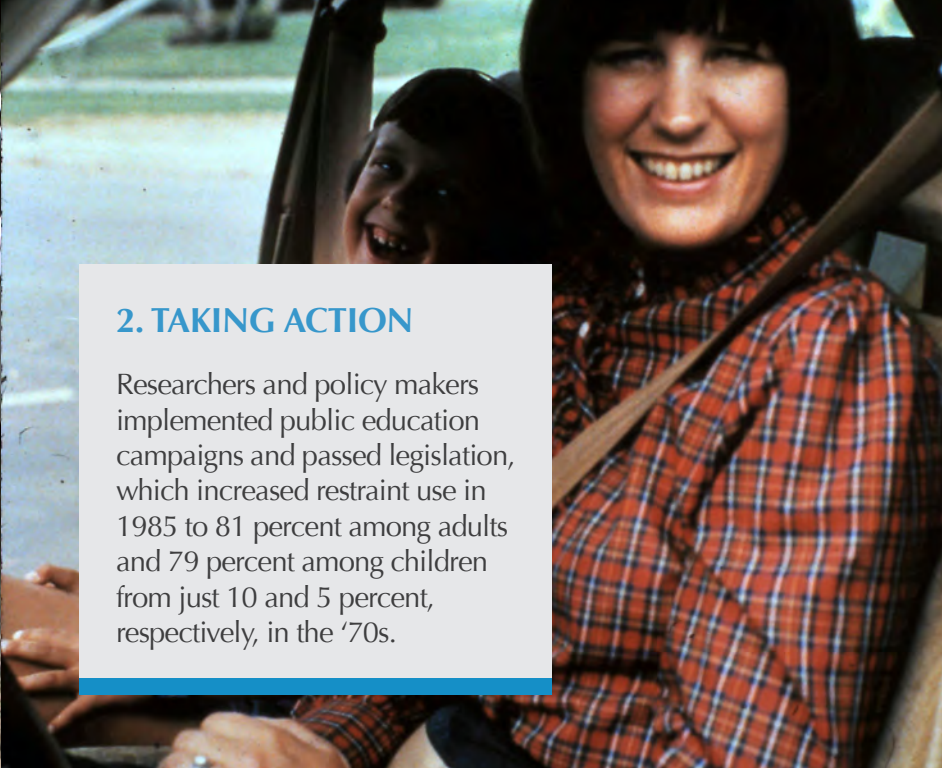
Specifically, the Center maintains a series of online resources that make data available to the public. In North Carolina, this includes: the North Carolina Crash Data Query Website; North Carolina Alcohol Facts (a website containing statewide and local information about crashes involving alcohol); and a pedestrian and bicyclist crash typing database.



1. IDENTIFYING THE PROBLEM

In the 1970s, car crashes were the leading cause of death for children and young adults in NC. Lack of restraint use among occupants was directly associated with a high number of fatalities and injuries.

HSRC also manages the Federal Highway Administration's (FHWA) Highway Safety Information System (HSIS). As a part of this project, HSIS hosts a multi-agency database that contains data on crashes, roadway inventories and traffic volumes at the state or municipal level. This information serves as a real-world data resource for safety professionals who are responsible for making improvements to the highway system. Most importantly, HSIS is a unique compilation of safety data that are linkable and available in one location,



2. TAKING ACTION

Researchers and policy makers implemented public education campaigns and passed legislation, which increased restraint use in 1985 to 81 percent among adults and 79 percent among children from just 10 and 5 percent, respectively, in the '70s.

DATA'S ROLE IN NC OCCUPANT PROTECTION

Today, 90 percent of North Carolinians buckle up, but that hasn't always been the case. Researchers and transportation professionals have made great efforts over the past several decades to increase seatbelt use based on data showing its importance in preventing fatal and serious injuries in crashes. In fact, the value of data can be seen at every step in the process of addressing important issues like occupant protection.



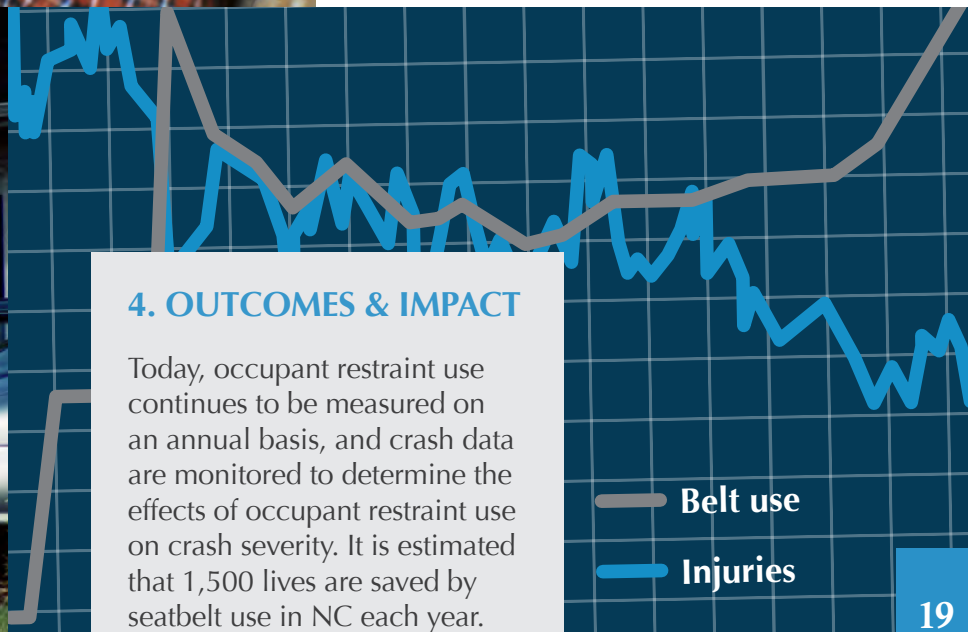
3. MEASURING CHANGE

When roadside seat belt observation data revealed a drop in restraint use among adults in the '90s, "Click It or Ticket," a high visibility enforcement campaign, was implemented. This helped to once again raise occupant protection rates to 81 percent.



4. OUTCOMES & IMPACT

Today, occupant restraint use continues to be measured on an annual basis, and crash data are monitored to determine the effects of occupant restraint use on crash severity. It is estimated that 1,500 lives are saved by seatbelt use in NC each year.



PUTTING TRANSPORTATION INFORMATION INTO PRACTICE



CRASH MODIFICATION FACTORS CLEARINGHOUSE

Once a roadway location is identified as needing an improvement, transportation professionals must use good data to understand what changes could be made and the expected safety implications of those interventions. This is where the FHWA Crash Modification Factors (CMF) Clearinghouse becomes a part of the decision making process.

The CMF Clearinghouse, a large data tool maintained by HSRC, represents a unique type of data and an opportunity for transportation professionals to learn about potential safety impacts of decisions based on another state or community's experience. It allows users to search a database for a CMF for a particular roadway treatment that best matches their location and scenario to determine the potential benefit of implementing that change.

enabling users to analyze a large number of safety problems.

“Researchers, engineers and policymakers can use these linked data to examine the size and extent of a particular safety problem, and design models that help predict future crashes, given specific roadway and traffic characteristics,” said Daniel Carter, HSRC senior engineering research associate. “Factors such as the geometric design of roadways, the selection and placement of roadside hardware, the use of traffic control measures, and the needs and abilities of highway users, all inform these safety decisions.”

Insight into behavior

Data in transportation safety goes beyond the numbers, as does the work conducted by HSRC faculty and staff. HSRC is at the forefront in using naturalistic observation data –collecting information about behavior in its natural setting – for teen driver research.

This year, HSRC's Center for the Study of Young Drivers team published findings from a groundbreaking study that used in-vehicle video and audio recording to observe novice teen drivers. This study involved a dramatic

improvement in the precision and validity of measurement compared to previous studies, which relied heavily on self-reported behavior.

“Until very recently, there wasn't a way to measure driver distraction with the precision necessary for high quality scientific work,” said Rob Foss, director of the Center for the Study of Young Drivers. “By installing video, audio and kinematic recording devices in the cars of study participants, we were able to directly observe driver behavior and measure important variables more precisely and validly than ever before.”

Program evaluation

Data can also be used to evaluate the success of a transportation project's public education and outreach programs. The National Center for Safe Routes to School is an example of a program at HSRC that has used these types of data to inform its efforts and to illustrate program progress over time. This past year, the National Center supported anecdotal claims that more families had begun to choose active transportation for trips to and from school with data from parent surveys. This same survey identified opportunity for growth of the program.

“Survey data are important to the National Center and the Safe Routes to School movement as a whole. Data can be used to help make decisions, to create realistic goals, and to determine barriers that are faced and how to adjust efforts to address these barriers in the future,” said Lauren Marchetti, director of the National Center for Safe Routes to School. “Data that illustrate a program’s progress over time are very powerful information points. They can help funding agencies justify continuing or expanding funding for a program, and galvanize community support around an effort.”

Looking forward

Data being an even bigger part of the process in the future isn’t just something HSRC researchers are forecasting. HSRC and the transportation research community as a whole will only see the use of data continue to grow. In fact, the country’s current transportation legislation, MAP-21, places a much larger focus on data collection and its use for transportation safety and research.

Improvements in methods for data collection, sharing and analysis have always enabled better scientific understanding. Continued work

THE POWER OF DATA

The National Center for Safe Routes to School’s database currently houses:



1.3 million

Parent Surveys

and more than

250,142

Student Travel Tally questionnaires

from

12,564

schools

located in the 50 states and Washington, DC

conducted by HSRC and other leading transportation organizations to enhance the quality and analysis of the many kinds of data used in traffic safety research promises to open doors to greater insights and ultimately to safer travel.

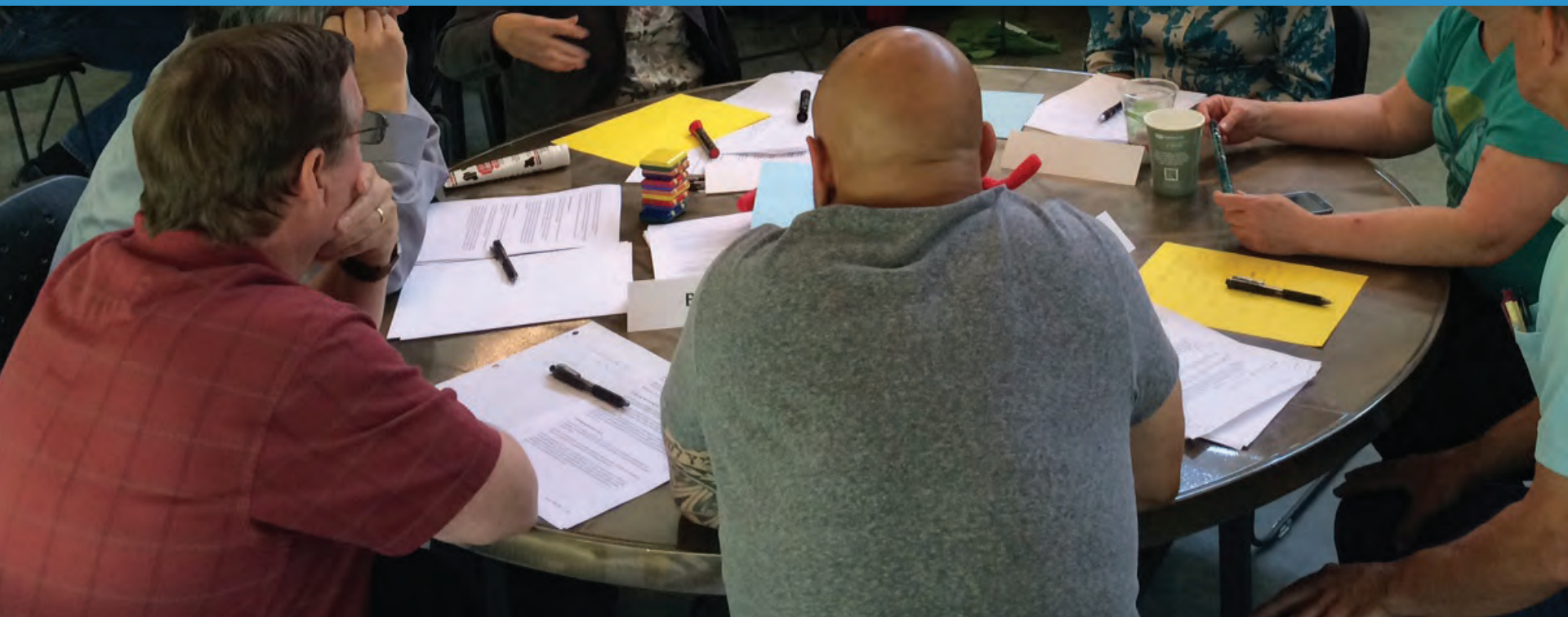
In addition, new sources of data – naturalistic driving data, traffic operations data, vehicle-to-infrastructure data and vehicle-to-vehicle data – as well as improved linkage between data typically managed by separate agencies (for example, police-reported crash data and medical outcomes data), will help create a more accurate and robust view of traffic safety.

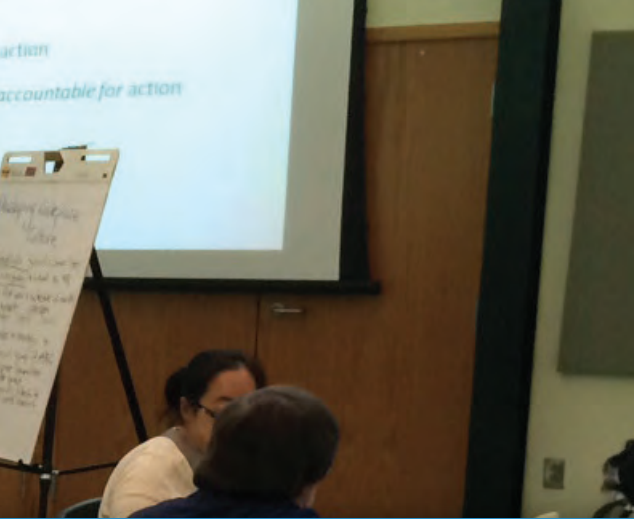
“As the amount of data available continues to increase, it will provide a challenge in data management. But it will also provide researchers valuable new information,” said David Harkey, HSRC director. “Looking forward, the Center will be engaged in the opportunities these data present for new analysis and new avenues of research.”

For more information about the projects highlighted in this feature article, be sure to read the Center Highlights section of this HSRC Annual Report. For more on HSRC’s young driver research, see [page 8](#). For more on the efforts of the National Center for Safe Routes to School, see [page 12](#).



HSRC RESEARCHERS AND STAFF





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HSRC RESEARCHERS AND STAFF



Our researchers and staff are truly the foundation of HSRC. It is through their creativity, passion, energy and expertise that the Center has been able to achieve success.

HSRC doesn't just research and promote safe bicycling – we participate too! In May, HSRC celebrated Bike to Work Day by walking and biking to the Center together.

Business services

Matthew Glassman
Technical Support Analyst

Daniel Harper
Contract Specialist

Dianne Harrington
Senior Accounting Specialist

Harvey Hou
Information Technology Systems Manager

Jean Justice
Administrative Support

Paulette McKoy
Senior Contracts Specialist

Jeana Nickerson
Business Officer

Linette Tyson
Human Resources Manager and
Executive Administrative Assistant

Research programs

Pam Barth, M.R.P.
Research Associate and Project Manager,
National Center for Safe Routes to School

Daniel Carter, M.S.C.E., P.E.
Senior Engineering Research Associate

Forrest Council, Ph.D.
Senior Research Scientist

Ryan Downs, M.S.S.
Data Specialist, National Center
for Safe Routes to School

Rob Foss, Ph.D.
Senior Research Scientist and Director,
Center for the Study of Young Drivers

James Gallagher, M.A.
Communications Manager,
Pedestrian and Bicycling Programs

Dan Gelinne
Project Coordinator

Arthur Goodwin, M.A.
Senior Research Associate

Bill Hall, M.A.
Manager, Occupant Protection Program

David Harkey, Ph.D., P.E.
Director

Stephanie Harrell, M.A.
Project Coordinator

Patty Harrison
Communications Coordinator

Kate Hill, M.A.
Librarian

Bevan Kirley, M.S.
Research Associate

Seth LaJeunesse, M.C.R.P.
Research Associate and Program Coordinator,
National Center for Safe Routes to School

Bo Lan, Ph.D.
Research Associate

Kristen Langford
Research Associate

Daniel Levitt
Research Associate

Richard Lytle
Web Applications Programmer

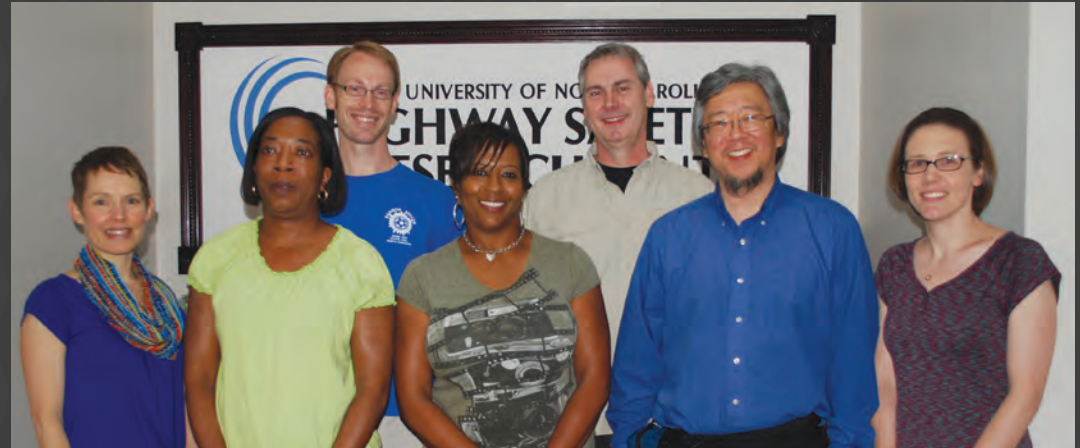
Lauren Marchetti
Director, National Center for
Safe Routes to School

Carol Martell
Senior Applications Specialist

Caroline Mozingo
Senior Manager of Communications,
Education and Outreach

STAFF MILESTONES AND AWARDS

The following staff members reached milestones in their service to the state of North Carolina in 2014.



From left: Nancy Pullen-Seufert, Linette Tyson, Daniel Carter, Dianne Harrington, David Harkey, Harvey Hou, Bevan Kirley. Not pictured: Jeana Nickerson.

Daniel Carter, senior engineering research associate, **10 years of service***

David Harkey, director, **20 years of service***

Dianne Harrington, senior accounting specialist, **15 years of service**

Harvey Hou, information technology systems manager, **15 years of service***

Bevan Kirley, HSRC research associate, was awarded with a **UNC-CH Star Heel Award** for her "outstanding efforts on behalf of the University and the State of North Carolina."

Jeana Nickerson, business officer, **30 years of service**

Nancy Pullen-Seufert, senior research associate and associate director, National Center for Safe Routes to School, **10 years of service***

Linette Tyson, human resources manager and executive administrative assistant, **20 years of service**

* All years of service at HSRC

HSRC RESEARCHERS AND STAFF

Natalie O'Brien, M.S.
Research Associate

Nancy Pullen-Seufert, M.P.H.
Senior Research Associate and Associate Director,
National Center for Safe Routes to School

Eric Rodgman, M.P.H.
Senior Database Analyst

Graham Russell
Graphic Designer

Laura Sandt, M.R.P.
Senior Research Associate and Associate Director,
Pedestrian and Bicycle Information Center

Sarah Smith
Engineering Research Associate

Raghavan Srinivasan, Ph.D.
Senior Transportation Research Engineer

Carl Sundstrom, M.S.C.E., P.E.
Senior Research Associate

Donna Suttles
Research Assistant

Libby Thomas, M.S.
Senior Research Associate

ADVISORY BOARD

The HSRC Advisory Board serves to assist in the identification of strategies and program direction for the Center. It is comprised of distinguished professionals from both within and outside the field of transportation research.

Herb Garrison, M.D., M.P.H.
Advisory Board chairperson
Director, Eastern Carolina
Injury Prevention Program, Greenville

Alice Ammerman, DrPH, RD
Director, Center for Health Promotion &
Disease Prevention, UNC-Chapel Hill

Alan Dellapenna, R.S., M.P.H.
Branch head, NC Department of Health
and Human Services

Jo Anne Earp, ScD
Professor, Health Behavior/Health
Education, UNC-Chapel Hill

Colonel William J. Grey
North Carolina Highway Patrol

Edd Hauser, Ph.D., M.R.P., P.E.
Director, Transportation Policy Studies,
UNC-Charlotte

Stephen W. Marshall, Ph.D.
Director, Injury Prevention Research
Center, UNC-Chapel Hill

Richard F. Pain, Ph.D.
Transportation Safety Coordinator,
Transportation Research Board

Nagui Rouphail, Ph.D.
Director, Institute for Transportation
Research & Education, N.C. State
University

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

Colleen Vasu
Communications Manager,
Safe Routes to School Programs

Jonathon Weisenfeld
Design Services Manager

Carolyn Williams, M.B.A.
Senior Applications Specialist

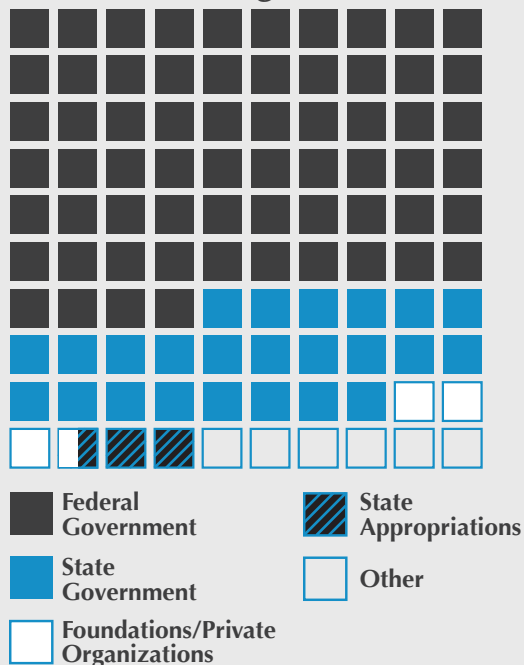
Charles Zegeer, M.S.C.E., P.E.
Associate Director for Engineering and Planning
and Director, Pedestrian and Bicycle
Information Center

FINANCIAL REPORT

HSRC is a part of the UNC system, located on the UNC-Chapel Hill campus. Work is funded through state and national level project monies.

For each dollar appropriated to HSRC by the state of North Carolina in FY14, HSRC staff generated \$15 in research and program funding. External revenues to support the mission of HSRC were received from contracts, grants, cooperative agreements and donations.

FY2014 Funding Sources



HSRC is pleased to have the opportunity to work with a diverse group of government, non-government, corporate and foundation sponsors during the past several years, including:

U.S. and international government sponsors

- American Association of State Highway and Transportation Officials
- British Columbia Ministry of Transportation
- California Department of Transportation
- Florida Department of Transportation
- Kansas Bureau of Traffic Safety
- Kansas Turnpike Authority
- Land Transport New Zealand/
The Beca Group
- National Institutes of Health
 - National Institute of Child Health and Human Development
 - National Institute on Alcohol Abuse and Alcoholism
- New York Department of Transportation
- North Carolina Department of Health and Human Services
- North Carolina Department of Transportation
- North Carolina Governor's Highway Safety Program
- Traffic Injury Research Foundation of Canada
- Transportation Research Board of the National Academies
 - National Cooperative Highway Research Program
- University of North Carolina at Chapel Hill
- U.S. Centers for Disease Control and Prevention
- U.S. Department of Transportation
 - Federal Highway Administration
 - National Highway Traffic Safety Administration
 - Research and Innovative Technology Administration
- U.S. Environmental Protection Agency
- Volpe National Transportation Systems Center
- Wisconsin Department of Transportation

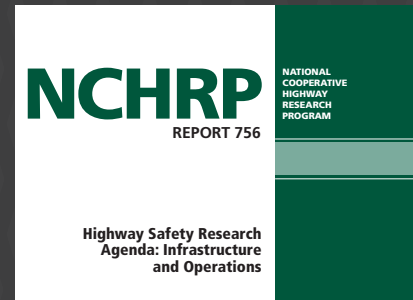
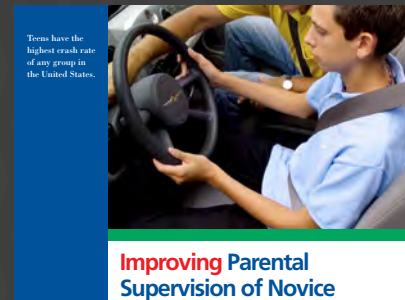
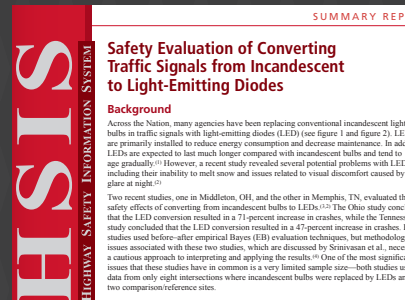
Corporate and foundation sponsors

- AAA Foundation for Traffic Safety
- AAA Kansas
- FedEx Corporation
- General Motors
- Insurance Institute for Highway Safety
- John Rex Endowment
- Motorcycle Safety Foundation
- National Safety Council
- Pacific Cycle, Inc.
- Robert Wood Johnson Foundation
- Safe Kids Worldwide
- Society for the Advancement of Violence and Injury Research
- State Farm Insurance Company

PUBLICATIONS AND PRESENTATIONS

This listing includes publications and presentations by HSRC staff produced during fiscal year 2014 (July 1, 2013 to June 30, 2014). To learn more about current and past research publications of HSRC, visit www.hsrc.unc.edu/research_library.

- Bushell, M.A., Poole, B.W., Zegeer, C.V., & Rodriguez, D.A. (2013). Costs for pedestrian and bicycle infrastructure improvements: A resource for researchers, engineers, planners, and the general public. Pedestrian and Bicycle Information Center White Paper.
- Carter, D. (2013, August). *Designing and retrofitting intersections for accessible pedestrian signals*. Presented to the International ITE Annual Meeting, Boston, MA.
- Foss, R.D. (2014, February). *Structuring an integrated approach to control alcohol-impaired driving: Keeping the big picture in mind*. Presented to North Carolina Governor's Task Force on Driving While Impaired, Raleigh, NC.
- Foss, R.D. (2014, January). *Why do GDL systems mandate extensive supervised driving? Workshop on supervision of young drivers during the learner license period: Evidence, efforts & evaluation*. Presented to the 93rd Annual Meeting of the Transportation Research Board, Washington, DC.
- Foss, R.D. (2014, March). *Protecting our children 10 years down the road: The UNC Teen Driver Resource Center*. Presented to the BuckleUpNC Conference, Raleigh, NC.
- Foss, R.D. (2014, May). *The UNC social norms project to reduce college student drinking*. Presented to the Carrboro-Chapel Hill-UNC Town-gown Task Force on Underage Drinking, Chapel Hill, NC.
- Foss, R. D., & Goodwin, A. H. (2014). Distracted driver behaviors and distracting conditions among adolescent drivers: Findings from a naturalistic driving study. *Journal of Adolescent Health, 54*(5, Suppl.), S50-S60. doi:10.1016/j.jadohealth.2014.01.005
- Goodwin, A.H. (2014, January). *The nature of parental supervision: Findings from a naturalistic study*. Invited presentation to the Transportation Research Board Workshop: Supervision of young drivers during the learner license period: Evidence, efforts & evaluation, Washington, DC.
- Goodwin, A.H. (2014, January). *Jurisdiction-wide approaches to optimize the benefits of lengthy learner periods*. Invited presentation to the Transportation Research Board workshop: Supervision of young drivers during the learner license period: Evidence, efforts & evaluation, Washington, DC.
- Goodwin, A. H., Foss, R. D., Margolis, L. H., & Harrell, S. (2014). Parent comments and instruction during the first four months of supervised driving: An opportunity missed? *Accident Analysis & Prevention, 69*, 15-22. doi:10.1016/j.aap.2014.02.015
- Goodwin, A.H., Margolis, L.H., Foss, R.D., Harrell, S., O'Brien, N.P., & Kirley, B. (2013). *Improving parental supervision of novice drivers using an evidence-based approach*. Washington, DC: AAA Foundation for Traffic Safety.
- Kirley, B. (2014, March). *Summary of moped/scooter crashes in North Carolina*. Presented to the North Carolina Child Fatality Task Force Unintentional Death Committee, Raleigh, NC.



Kirley, B., Foss, R., Goodwin, A., O'Brien, N., & Harrell, S. (2014, January). *Investigating a unique motorcycle crash cluster*. Presented to the 93rd Annual Meeting of the Transportation Research Board, Washington, D.C.

LaJeunesse, S. (2013, August). *Walking and rolling to school in the US: Six year travel trends*. Presented to the Safe Routes to School National Conference, Sacramento, CA.

Lan, B. & Srinivasan, R. (2013). *Safety evaluation of discontinuing late-night flash operations at signalized intersection; HSIS summary report*. (Report No. FHWA-HRT-13-069). Washington, DC: Federal Highway Administration.

Lan, B. & Srinivasan, R. (2014). Safety evaluation of discontinuing late night flash operations at signalized intersections. *Transportation Research Record, 2398*, 1-9. doi: 10.3141/2398-01

McDonald, N.C., Barth, P.H., Steiner, R.L. (2013). Assessing the distribution of Safe Routes to School program funds, 2005-2012. *American Journal of Preventive Medicine, 45*(4), 401-406. doi:10.1016/j.amepre.2013.04.024

Pratt, M.P., Bonneson, J.A., & Zegeer, C.V. (2014, January). *Limiting access at intersections: Sample application of value-of-research evaluation*. Presented to the 93rd Annual Meeting of the Transportation Research Board, Washington, D.C.

Smith, S. (2013). *HSIP national summary baseline report 2009-2012* (Report No. FHWA-SA-14-006). Washington, DC: Federal Highway Administration.

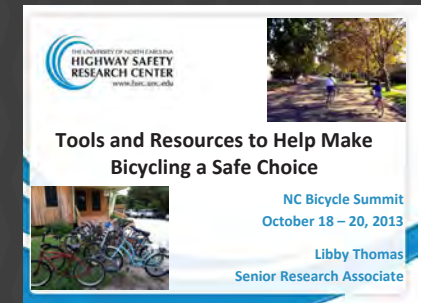
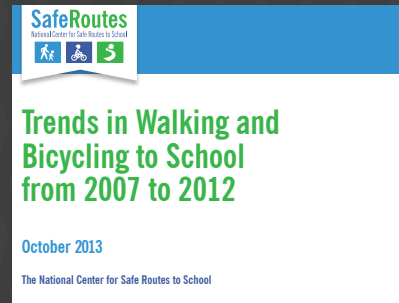
Srinivasan, R., Carter, D., Smith, S., & Lan, B. (2013). *Safety evaluation of converting traffic signals from incandescent to light-emitting diodes; HSIS summary report* (Report No. FHWA-HRT-13-070). Washington, DC: Federal Highway Administration.

Srinivasan, R., Carter, D., Smith, S., Lan, B. (2014). Safety evaluation of converting traffic signals from incandescent to LED bulbs. *Transportation Research Record, 2398*, 9-18. doi: 10.3141/2398-02

Srinivasan, R. (2013, October). *Development of safety performance functions: New resources*. Presented at the 39th International Forum on Traffic Records and Highway Information Systems, St. Paul, MN.

Srinivasan, R., Carter, D., & Bauer, K. (2013). *Safety performance function decision guide: SPF calibration versus SPF development* (Report No. FHWA-SA-14-004). Washington, D.C.: Federal Highway Administration.

Srinivasan, R., & Bauer, K. (2013). *Safety performance function development guide: Developing jurisdiction-specific SPFs* (Report No. FHWA-SA-14-0050). Washington, D.C.: Federal Highway Administration.



The National Center for Safe Routes to School. (2013). *Advancing transportation and health: Approaches from the federal Safe Routes to School Program that offer broad application*. Retrieved from http://saferoutesinfo.org/sites/default/files/news/transportation_health_d4.pdf

The National Center for Safe Routes to School. (2013). *Trends in walking and bicycling to school from 2007 to 2012*. Retrieved from http://saferoutesinfo.org/sites/default/files/Trends_in_Walking_and_Bicycling_to_School_from_2007_to_2012_FINAL.pdf

Thomas, L., Levitt, D., & Farley, E. (2013). *Bicycle and pedestrian crash facts and crash types summary reports, 2008-2012 (four reports)*. For NCDOT Pedestrian and Bicycle Crash Data Web Tool and Geo-locating. Available at: www.pedbikeinfo.org/pbcat/index.cfm

Thomas, L., Srinivasan, R., Lan, B., Hunter, W.W., Martell, C., & Rodgman, E. (2013). *Speed and safety in North Carolina* (Report No. FHWA/NC/2011-08). Raleigh, NC: North Carolina Department of Transportation.

Thomas, L., Srinivasan, R., Hunter, W.W., & Rodgman, E. (2013). North Carolina speed management: Recommendations for action. NCDOT white paper, prepared in conjunction with Speed and Safety in North Carolina project.

Thomas, L. (2014, April). *Speed management in a Toward Zero Deaths framework*. Presented to the LifeSavers National Conference on Highway Safety Priorities, Nashville, TN.

Thomas, L. (2013, October). *Tools and resources to help make bicycling a safe choice*. Presented to the NC Bike Summit, Carrboro, NC.

Zegeer, C., Srinivasan, R., Carter, D., Council, F., Gross, F., Sawyer, M., Hauer, E., Bonneson, J., & Bahar, G. (2013). *Highway safety research agenda: Infrastructure and operations* (Report No. NCHRP 756). Washington, D.C.: The National Academies.

Zegeer, C. Nabors, D., Lagerwey, P. (2013). Pedestrian Safety Guide and Countermeasure Selection System. www.pedbikesafe.org/PEDSAFE/

WEBSITES

HSRC maintains dozens of websites for various highway safety related projects and programs. In this section of the annual report, we highlight newly created websites or websites that have undergone major design changes in 2014, as well as a selection of other sites that continue to be maintained by HSRC. For a complete list of Center websites, please visit www.hsrc.unc.edu/websites.

Accessible Pedestrian Signals: A Guide to Best Practices

www.apsguide.org

A comprehensive source of information on Accessible Pedestrian Signals (APS), including recommended or required features, and how to design intersection corners to accommodate APS appropriately.

Center for the Study of Young Drivers

www.csyd.unc.edu

A website that provides insight into why motor-vehicle crashes are the leading cause of death among teenagers and information on the research being conducted at the Center to investigate this issue.

HSRC ONLINE

Many HSRC resources, including this annual report, are available online. Explore projects, staff biographies, news and more at www.hsrc.unc.edu.

Crash Modification Factors Clearinghouse

www.cmfclearinghouse.org

A searchable database of Crash Modification Factors (CMFs), helpful tools in evaluating road safety engineering countermeasures.

Highway Safety Information System

www.hsisinfo.org

A multi-state database that contains crash, roadway inventory and traffic volume data for a select group of states and urban centers.

International Walk to School

www.iwalktoschool.org

An informational site about International Walk to School Month, recognized in October across the globe.

National Center for Safe Routes to School

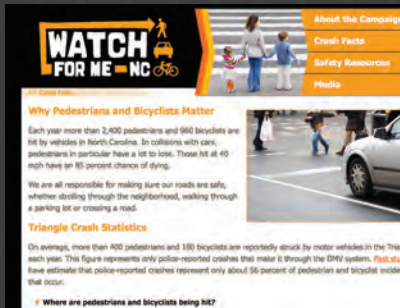
www.saferoutesinfo.org

A clearinghouse of information that includes steps on starting a Safe Routes to School program, frequently asked questions, helpful links and a list of sample programs currently in place across the country.

National Child Passenger Safety Board

www.cpsboard.org

A site that provides program direction and technical guidance to states, communities and organizations as a means to maintain a credible, standardized child passenger training and certification program.



North Carolina Alcohol Facts

www.hsrc.unc.edu/ncaf

A data tool that provides NC statewide and county-specific DWI arrest and conviction information, as well as alcohol involvement in crashes.

North Carolina Crash Data Query

www.hsrc.unc.edu/crash

A data analysis tool to create tables reflecting crash, vehicle and driver/occupant information for crashes in North Carolina.

Pedestrian Safer Journey

www.pedbikeinfo.org/pedsaferjourney/

Curriculum for teaching pedestrian safety to children and teens, available in both English and Spanish.



Safe Kids Orange County

www.safekidsorangenc.org

A website created for Safe Kids Orange County, which provides the Orange County, NC, community with information and resources to decrease injury, disability and death, and the costs to the community that are associated with injuries.

Time to Drive

www.timetodriveapp.com

A website supporting Time to Drive, HSRC's app for the parents of teen drivers that helps to ensure teens get enough practice – and the right kind of practice – during the initial period of supervised driving.



Walk and Bike to School

www.walkbiketoschool.org

A website with information about National Walk and Bike to School events in the U.S., how to get involved and resources to help plan an event in your community.

Walk Friendly Communities

www.walkfriendly.org

A website that recognizes communities that are working to improve a wide range of conditions related to walking, including safety, mobility, access and comfort.

Watch for Me NC

www.watchformenc.org

A website about the Watch for Me NC education and enforcement campaign aimed to encourage safety among pedestrians, bicyclists and drivers.



NEWLY CREATED AND REDESIGNED SITES



Bicycle Safer Journey

www.pedbikeinfo.org/bicyclesaferjourney

An online educational tool with age-specific videos, quizzes and discussion guides that can be used as an introduction to a bicycle safety skills course or to augment a comprehensive curriculum.



BuckleUpNC.org

www.buckleupnc.org

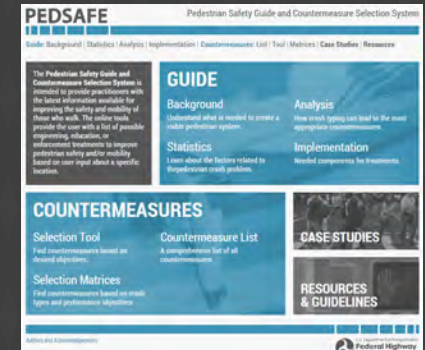
A comprehensive website that provides information about North Carolina's seat belt and child passenger safety laws as well as tips for choosing and using car seats. The site also provides a listing of locations across the state where families can go for education and assistance with car seat installation.



Pedestrian and Bicycle Information Center

www.pedbikeinfo.org

A newly reorganized and redesigned, user-friendly clearinghouse for pedestrian and bicycle resources, with information about health and safety, engineering, advocacy, education, enforcement and access, and mobility.



PEDSAFE Guide and Countermeasure Selection System

www.pedbikesafe.org/PEDSAFE

An online guide intended to provide practitioners with the latest information, including engineering, education or enforcement treatments, for improving the safety and mobility of pedestrians.

THE UNIVERSITY OF NORTH CAROLINA HIGHWAY SAFETY RESEARCH CENTER

730 MARTIN LUTHER KING JR. BLVD., SUITE 300

CAMPUS BOX 3430

CHAPEL HILL, N.C. 27599-3430

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