

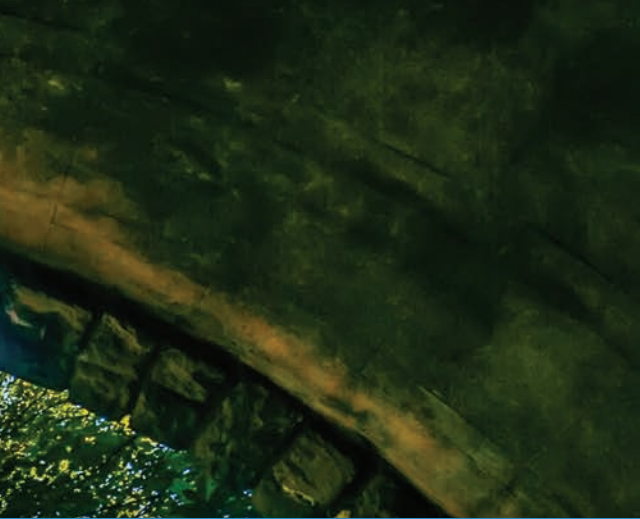
THE UNIVERSITY OF NORTH CAROLINA
**HIGHWAY SAFETY
RESEARCH CENTER**

ANNUAL REPORT **2013**



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MESSAGE FROM THE DIRECTOR

Information dissemination is more than just a few words in the UNC Highway Safety Research Center's (HSRC) mission statement; it is a core tenet integral to the work we do here every day. We must share findings from our research and communicate with our many projects' respective audiences if we are to accomplish the goal of helping "improve the safety, sustainability and efficiency of" transportation in communities. We're sharing information with local communities now more than ever before, and I want to share just a few of those activities from the past 12 months.

HSRC supported the North Carolina Department of Transportation's (NCDOT) launch of the Watch for Me NC public outreach and enforcement campaign, which aims to reduce the number of pedestrians hit and injured in crashes with vehicles in North Carolina. Through a website, bus ads, PSAs, bumper stickers and other avenues, the project is communicating the message that "we all share the responsibility to make sure North Carolina roads are safer."

We also helped the North Carolina Governor's Highway Safety Program celebrate the 20th anniversary of Click It or Ticket, a seat belt use enforcement and public information campaign which was adopted nationwide and resulted in a dramatic drop in the number of unbelted passengers in reported crashes. Some of the same HSRC staff who helped develop and launch this model campaign in 1993 were present at the 2013 media and celebration event to convey the legacy and impact of Click It or Ticket on the lives of citizens in North Carolina and across the country.



HSRC's Center for the Study of Young Drivers team has also been sharing research findings with an important group: parents of young drivers. We released Time to Drive, www.timetodriveapp.org, an iPhone app developed to support parents of young drivers as their teens are learning to drive. The basic and important research finding on which this digital tool is based: teens need to get lots of practice behind the wheel under increasing levels of difficulty, so they can become safer drivers.



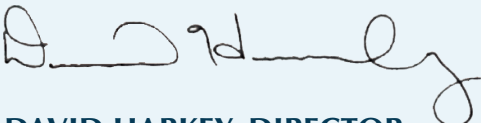
motorists, transit riders, pedestrians and bicyclists. We also provided training to local engineers and planners on the implementation of accessible pedestrian signals to accommodate pedestrians who are blind or have low vision. Our Child Passenger Safety team continually offers training opportunities to Child Passenger Safety Technicians, and two of our staff members, Technicians themselves, are often in the parking lot helping parents ensure their families are traveling safely in the car. When our office in Chapel Hill is quiet, it's often because so many of our staff members are out in the field training transportation colleagues across the state.

We continue to share the results of our research with transportation safety professionals. Center researchers shared their findings at several conferences throughout the year, published findings in academic journals and other publications, provided crash data analysis assistance to local communities, and shared state-of-the-practice knowledge on topics ranging from the design of safer pedestrian facilities to the operation of traffic signals. This year, HSRC researchers also played an important role in sharing public opinions about highway safety,

as we helped disseminate results from a statewide survey to those responsible for policy development and program implementation in North Carolina.

Looking at dissemination through a different lens, we were able to share the expertise of our staff through a variety of professional training courses. For example, through NCDOT-supported Complete Streets trainings, HSRC experts taught many workshops to state and local transportation professionals about designing roadways to safely accommodate all road users, including

HSRC remains committed to supporting transportation safety by disseminating information to a variety of audiences across North Carolina and the entire country. We look forward to the year ahead and leading the way for new and innovative research to achieve our most important goal: safety for all road users. Thank you for entrusting us with this invaluable mission.



DAVID HARKEY, DIRECTOR

OUR MISSION





The mission of HSRC is to improve the safety, sustainability and efficiency of all surface transportation modes through a balanced, interdisciplinary program of research, evaluation and information dissemination. For more than 45 years, HSRC has been a leading research institute that has helped shape the field of transportation safety.



HSRC CONTRIBUTIONS AT A GLANCE

- Released more than **50 publications and presentations** on a variety of topics, from research on graduated driver licensing to the safety of LED traffic signals.
- Answered approximately **120 requests** for North Carolina crash data from members of the public and media.
- Generated approximately **\$16 in revenue** for every \$1 of support provided by the state of North Carolina
- Awarded HSRC's **sixth annual scholarship** to encourage more interest in the field of highway safety among graduate students.
- Conducted **12 Complete Streets trainings**, which educate transportation professionals about how to make streets safe and comfortable for people using all modes of transportation.



CENTER HIGHLIGHTS





HSRC works on issues that affect all road users – from motorists and motorcyclists to bicyclists and pedestrians. Our ongoing research ensures the most current information is available to decision makers in North Carolina and across the nation. The following items highlight a selection of HSRC project accomplishments from the reporting period for this annual report (July 1, 2012-June 30, 2013).



DRIVER BEHAVIOR

In 2013, HSRC finished an exciting project that uses smartphone technology to provide guidance to parents of new teen drivers. Researchers from HSRC's Center for the Study of Young Drivers (CSYD) created Time to Drive, an iPhone app that helps to ensure teens get enough practice – and the right kind of practice – during the initial period of supervised driving. The idea for the app grew out of research conducted by the Center showing that many teens get relatively little driving practice in potentially challenging situations such as darkness, bad weather, rural roads and heavy traffic. Time to Drive encourages the parent-teen team to get more practice by setting driving goals in these situations. In addition, Time to Drive generates a printable log of the teen's practice driving times and conditions, tracks hard stops, and shows a map of past trips. Learn more about Time to Drive at www.timetodriveapp.com.

In another project focusing on the parent-teen team, the CSYD developed a cutting edge, evidence-based program to help guide parents who will be supervising a new teen driver. The program focuses on how parents can



help their teen develop more quickly into an experienced, safer driver. In a small group setting, parents view and discuss video clips of real parents and teens during supervised driving. This exercise helps parents understand the

HOW DOES PARENT COACHING WORK?

Rather than presenting facts and statistics with participants acting as passive recipients of information, the parent coaching session follows well-established principles of adult learning, featuring structured discussions and problem solving activities. Parents are encouraged to draw upon and share their own experiences during discussions.

challenges they are likely to encounter with their own teens, and how they can best handle those situations. Parent-teen communication is another major focus of the sessions, with discussion about how parents can share their wisdom about spotting and avoiding potential dangers while driving. Initial testing suggested these coaching sessions were well received by parents. The next step in this research will examine the effect of the program on parents' supervisory behaviors.

Speeding is another driver behavior issue HSRC helped tackle in the past

year. Speeding is a major safety problem in the state, and more concerted and cooperative action is needed to address it. Nearly 5,000 people lost their lives in North Carolina in speeding-related crashes over the past decade. Building off of guidance and strategies discussed with experts at the North Carolina Speed Safety Symposium in 2011, HSRC researchers worked to identify best practices for speed management and recommended countermeasures for the state. Several promising innovative strategies were included among the recommendations, and HSRC will remain part of the team determined to reduce speed-related crashes in North Carolina.

The number of motorcycle crashes in North Carolina has been on the rise since the late 1990s, and HSRC has also been involved in several motorcycle research projects during that time, including in the past 12 months. HSRC researchers conducted a field investigation of a high motorcycle crash rate in Graham County, where the crash rate per registered motorcycle is 17 times that of the state average, and 4 times that of the county with the next highest rate. HSRC researchers conducted an exploratory investigation using crash data, automated traffic and speed



Optical speed bars are an intervention used in Graham County in which stripes painted along the side of the roadway are spaced at gradually decreasing distances to increase drivers' perception of speed.

counts, and measured characteristics of the motorcycling population to determine why this county stands out, even from others with similar population, demographics and roads. The conclusion was that the high crash

rates in Graham County appear to be due largely to its popularity as a travel destination for motorcyclists combined with a lack of rider experience with the riding conditions in this area. A pilot test of optical speed bars was conducted in an effort to reduce the number of riders entering two dangerous curves too fast. Optical speed bars combined with more prominent warning signs reduced the proportion of riders going into one of these curves at dangerously high speeds by half.

DRIVER AND OCCUPANT SAFETY

In May, the North Carolina Governor's Highway Safety Program (GHSP) celebrated the 20th anniversary of Click It or Ticket, a life-saving seat belt use enforcement and public information campaign. Since its inception in 1993, the campaign has resulted in a 38 percent increase in seatbelt use and a dramatic drop in the number of fatalities and injuries involving unbelted passengers in North Carolina car crashes. HSRC is proud to recognize its strong ties to the program; along with GHSP, the North Carolina Department of Insurance, the Insurance Institute for Highway Safety, the North Carolina State Highway Patrol, and local police and sheriff departments, HSRC researchers were involved in Click it or Ticket from day one. North Carolina's program was so successful that it became a model for the nation. By 2003, 43 states, the District of Columbia and Puerto Rico were participating. To learn more about Click It or Ticket, visit: www.ncdot.gov/programs/ghsp.

Beyond academic research and program development, HSRC researchers also play an important



Many of the original supporters of Click It or Ticket celebrated the program's 20 years of success at the anniversary event hosted by GHSP in May.

role of helping understand public opinion on certain topics. In 2013, HSRC worked with GHSP to survey North Carolina residents on various safety and transportation related issues. A notable finding from this effort was that, contrary to the belief of some, a large majority of

motorcyclists supported the state's requirement that all motorcycle riders wear safety helmets. Among survey respondents who had ridden a motorcycle during the past year, 78 percent supported the state's helmet requirement. Support was even greater among non-motorcyclists, with 93 percent favoring the requirement. HSRC having access to and sharing this kind of information with those responsible for policy development and program implementation is a valuable contribution to highway safety.



MAKING A DIFFERENCE

Since 1992, the year before the Click It or Ticket campaign started, seat belt use has increased while injury rates have declined.

SEAT BELT USE

1992 **65%**

2012 **90%**

FATAL AND SERIOUS INJURY RATE FOR CRASH-INVOLVED DRIVERS & OCCUPANTS

1992 **2.5%**

2012 **0.49%**

MOTORCYCLE HELMET USE IN NORTH CAROLINA

North Carolina has a universal helmet law, meaning all motorcycle riders must wear safety helmets.

#1 in the nation for lives saved and economic costs saved due to helmet use.

80 lives saved by helmet use per every 100,000 registered motorcycles in 2010.



A NATIONAL PERSPECTIVE

LIVES SAVED BY HELMET USE per 100,000 registered motorcycles, 2010

Average number of lives saved for states with a universal law:

36

Average number of lives saved for states with a partial law:

10

Average number of lives saved for states with no law:

4

ECONOMIC COSTS SAVED BY HELMET USE

per 100,000 registered motorcycles, 2010

Average money saved for states with a universal law:

\$73
million

Average money saved for states with a partial law:

\$21
million

Average money saved for states with no law:

\$9
million

Data according to the Centers for Disease Control and Prevention.

PEDESTRIAN AND BICYCLIST SAFETY

Pedestrian and Bicycle Information Center

It has been a busy year for the Pedestrian and Bicycle Information Center (PBIC), which is housed within HSRC. Along with releasing a three-part short course on pedestrian and bicycle planning and design for use by university instructors, the PBIC created a white paper series that provides a broad array of information about common topics of interest among engineers, public health officials, planners and advocates. PBIC continued offering free webinars, which are available for viewing on the Center's new YouTube channel, www.youtube.com/pedbikeinfo. The PBIC also released results from a comprehensive national study of current bike sharing programs in the U.S. "Bike Sharing the United States: State of the Practice and Guide to Implementation." This guide, based on an analysis of 12 existing and planned bike share programs, serves as a resource for a broad audience on how to plan, implement and measure the success of bike share programs in communities of all sizes. Download the guide and learn more about recent

NEW WALK FRIENDLY COMMUNITIES

Congratulations to the following cities that were awarded "Walk Friendly" status between July 1, 2012 and June 30, 2013:



Gold Level

Washington, D.C.

Silver Level

Bend, Ore.
Long Beach, Calif.

Redwood City, Calif.

Bronze Level

Essex Junction, Vt.
Fort Collins, Colo.
Gainesville, Fla.
Indiana, Pa.

Louisville, Ky.
Northampton, Mass.
Rochester, Minn.
Shorewood, Wisc.

PBIC activities and announcements at www.pedbikeinfo.org.

Walk Friendly Communities

The Walk Friendly Communities (WFC) program also continued to expand this year, indicating that more communities around the country are dedicated to not only considering but prioritizing pedestrians. Twelve communities were awarded Walk Friendly Community recognition in fiscal year 2013, bringing the total number with "Walk Friendly" status to three dozen. Each of these cities or towns showed success in improving a wide range of conditions related to walking, including safety, mobility, access and comfort. In November, WFC

published "Giving Cities Legs: Ideas and Inspirations from Walk Friendly Communities" to share knowledge and lessons learned from designated communities and to encourage other local communities to improve in these areas. WFC is funded by FedEx and FHWA. For more information, visit www.walkfriendly.org.

Watch for Me NC

In 2011, North Carolina's pedestrian fatality rate was the tenth highest in the U.S. at 1.66 fatalities per every 100,000 people, according to the National Highway Traffic Safety Administration's (NHTSA) Traffic Safety Facts. To address this public



Durham police officers give citations to drivers who failed to yield to pedestrians in crosswalks as part of the enforcement component of the Watch for Me NC campaign.

safety issue, HSRC worked with NHTSA, NCDOT, and local police and transportation agencies to implement Watch for Me NC, a comprehensive education and enforcement campaign aimed to reduce the number of pedestrians hit and injured in crashes with vehicles. Safety and educational

messages were developed to better inform drivers and pedestrians, and enforcement efforts by area police cracked down on violations. From October 2012 to March 2013, six police agencies conducted 37 enforcement operations, resulting in more than 450 warnings and 170 citations. The program received national attention with a visit from NHTSA's top official, Administrator David Strickland, and received funding from NCDOT to extend the campaign in the coming year. For more information, visit www.watchformenc.org.

WATCH FOR ME NC

Based on a review of five years of pedestrian crash reports that helped identify the common driver and pedestrian behaviors involved in crashes, the Watch for Me NC campaign communicated several key safety messages for drivers and pedestrians, including:

DRIVERS:

- Yield to people in crosswalks.



- Watch for people getting off the bus.
- Watch for people walking at night.
- Pay attention in parking lots.
- Watch for people when making a turn.

PEDESTRIANS:

- Cross safely when you exit the bus.
- Be visible at night.
- Pay attention in parking lots.
- Watch for turning cars.
- Walk facing traffic.



WHY DO YOUTH NEED SKILLS FOR SAFE WALKING?

Everyone needs physical activity and options for how they get around in their communities. Learning basic pedestrian safety may help prevent injuries and prepare children and youth for a lifetime of safe walking. As young people become drivers, it may also help them be more aware of pedestrians as they navigate their community's streets.

1,705 schools registered Bike to School Day events in 2013, an 80 percent increase as the event celebrated its second year. Representing all states and Washington, D.C., a record-breaking 4,281 events registered for Walk to School Day.

National Center for Safe Routes to School

In 2013, the National Center for Safe Routes to School, the clearinghouse for the federal Safe Routes to School program which is housed at HSRC, continued to break records, not only reaching a data milestone – receiving the one millionth Safe Routes to School

student travel behavior questionnaire (as of June 30, 2013, surpassing 1.22 million data records) – but also exceeding participation expectations for the Center's annual Walk to School and Bike to School days via www.walkbiketoschool.org. This year the National Center was also recognized with a Harvard Bright Ideas in Government award for its efforts to engage communities in school travel data collection and data-driven decision making. In addition, enhanced features to the National Center's data system now allow for a school to directly compare student travel counts from two data collection periods and test for statistically significant changes.

Pedestrian Safer Journey

HSRC researchers gave a makeover to FHWA's Pedestrian Safer Journey, a tool for teaching pedestrian safety to children and teens. The educational program features three age-appropriate modules (video and discussion resources), available in both English and Spanish, that can be used one-on-one or in the classroom. These modules address picking the safest places to walk and cross streets and the importance of being alert. Pedestrian Safer Journey is available to the public and can be found at www.pedbikeinfo.org/pedsaferjourney.

TRAFFIC OPERATIONS AND ROADWAY DESIGN



Much of HSRC’s research is conducted with an important end goal in mind: providing more and better safety information to professionals who plan, design, operate and maintain our roadways. Case in point, many transportation agencies across the country have been converting the bulbs in traffic signals from incandescent bulbs to light emitting diode (LED) bulbs over the past several years to meet ENERGY STAR requirements, and to decrease energy costs. However, a few studies with limited sample sizes found safety concerns in making this equipment change, and there was uncertainty as to the cost/benefit of this choice. Only after HSRC researchers conducted a large-scale before-and-after study did it become clear that the change to LED signals did not decrease the safety of intersections. Another HSRC traffic signal study found that converting late night flashing operation – a time saving measure in which traffic signals are operated in “flashing mode” when traffic volumes are low, typically during late night or early morning hours – to normal phasing operation resulted in a reduction of crashes. These two studies,

LATE NIGHT FLASH

Converting LNF operation to normal phasing resulted in: 48 percent reduction in total nighttime crashes, 53 percent reduction in nighttime crashes resulting in injury and fatalities, and a 57 percent reduction in nighttime frontal impact crashes.

TOTAL NIGHTTIME CRASHES

48% reduction

NIGHTTIME CRASHES RESULTING IN INJURIES AND FATALITIES

53% reduction

NIGHTTIME FRONTAL IMPACT CRASHES

57% reduction

conducted as a part of the FHWA Highway Safety Information System (HSIS) project, have helped inform best practices for traffic operations. For more information about HSIS and to access these studies, visit www.hsisinfo.org.

REACHING LOCAL COMMUNITIES

At the end of the day, research is only useful if it is disseminated to and applied by decision makers and practitioners. In 2013, HSRC ramped up efforts to share our research with the public – both in North Carolina and nationally. This outreach resulted in more than 100 inquiries from reporters, which lead to television news segments and printed articles in publications ranging from USA Today to Raleigh's News & Observer.

HSRC researchers provided information and data on a wide range of topics, including:

- Child passenger safety
- Distracted driving
- Motorcycle safety
- Pedestrian and bicyclist infrastructure and safety
- Speeding and speed limits
- Young drivers and graduated driver licensing

In addition, our researchers assisted with more than 120 crash data requests this year, and took time to share research at conferences and through



HSRC researchers are able to lend their voice to promote highway safety issues. Bill Hall, manager of HSRC's occupant protection program, is seen here sharing his expertise on occupant protection with a reporter from ABC11-WTVD.

submitting findings to journals and other publications. See page 28 for a complete list of this year's publications and presentations.

HSRC also continued its tradition of recognizing and supporting North Carolina-based students with innovative ideas in the field of highway safety. In July, HSRC awarded the 2012 Megan Cornog Memorial Highway Safety Scholarship to Laura Peoples, a UNC-Greensboro student pursuing a master's degree in public health education with an emphasis on community health education. After graduation, she plans to work to improve bicyclist

STAY INFORMED

HSRC keeps North Carolina citizens, safety practitioners, legislators and other researchers up-to-date on the Center's work through our quarterly e-newsletter, Directions. Sign up to receive Directions at www.hsrc.unc.edu/email_list.

and pedestrian infrastructure in North Carolina. The purpose of the annual scholarship is to foster the education and professional development of graduate students with an interest in transportation safety related areas. It is named in memory of a former HSRC staff member, Megan Cornog, who died in 2010 after a courageous battle with cancer.

In October, HSRC, along with the UNC Injury Prevention Research Center and the UNC-Chapel Hill Department of Psychology, welcomed speakers Daniel Webster, co-director, Johns Hopkins Center for Gun Policy and Research, and Tard Carter, outreach supervisor, Safe Streets East Baltimore, to the UNC-Chapel Hill campus. They presented the 2012 Patricia F. Waller Lecture topic: "Changing the Code



Daniel Webster (second from left) and Tard Carter (fourth from left), Waller Lecture guest speakers, are pictured with the Waller family.

of the Street in Baltimore: Effects of a Replication of CeaseFire – A Public Health Program to Reduce Shootings," which attracted attendees from departments across the university and local police officers.

The lecture is held annually in memory of Patricia Waller, a professor who worked for nearly two decades as a researcher at HSRC, where she developed the concept for graduated licensing, which became adopted nationwide. Dr. Waller was also a pioneer in injury control.



HSRC Director David Harkey congratulates Laura Peoples as she accepts the 2012 Megan Cornog Memorial Highway Safety Scholarship.

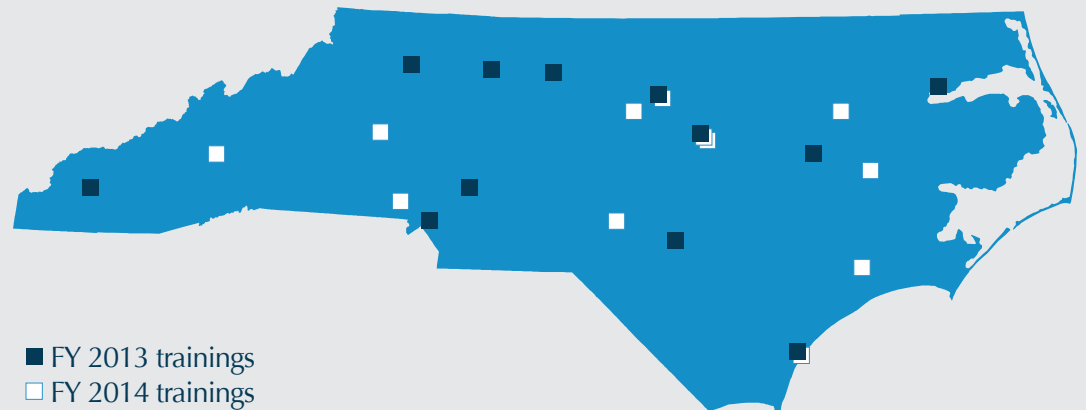
Complete Streets: HSRC Researchers Share a Vision of Safety for All

Imagine a city where pedestrians, cyclists and drivers are all able to share the road. A community where it feels safe to ride your bike to the grocery store, to walk and take the bus to work, and where people with mobility issues have access to uninterrupted sidewalks. This city is a reflection of what a policy called Complete Streets aims to accomplish, and HSRC researchers are helping make this model a reality across North Carolina.

“The demand and necessity for safer, more accessible streets in North Carolina is growing, which is why Complete Streets is a priority for the North Carolina Department of Transportation,” said Lauren Blackburn, director of the NCDOT

COMPLETE STREETS WORKSHOPS AROUND THE STATE

In Fiscal Year 2013, HSRC researchers completed four regional workshops, conducted 12 trainings and planned an additional 12 trainings for FY 2014 across North Carolina. By the end of 2013, it is anticipated that more than 500 people will have participated.



Division of Bicycle and Pedestrian Transportation. “We’re excited to be working with HSRC researchers to provide transportation professionals across the state with a strong foundation to improve future transportation decisions.”

For the last 50 years, streets have generally been designed to serve

one mode of transportation – motor vehicles – and often have been designed without sidewalks or bike facilities. In contrast, Complete Streets are intended to be safe and comfortable for people using all modes of transportation. These streets include sidewalks, bike lanes, transit stops, appropriate street widths and speeds, and are well-integrated with



In Complete Streets training field exercises, participants use wheelchairs to help understand the needs of individuals with disabilities and evaluate the local areas' deficiencies.

WHAT IS COMPLETE STREETS?

Complete Streets is defined by North Carolina as the state's "approach to interdependent, multi-modal transportation networks that safely accommodate access and travel for all users." The policy was adopted by NCDOT in 2009 (design guidelines were released in 2012). Below, see an example of a recent Complete Streets project on Charlotte's East Boulevard, in which the road was reduced to three lanes for motor vehicles, and bicycle lanes and medians were added.

BEFORE



AFTER



surrounding land uses. Complete Streets design elements that emphasize safety, mobility and accessibility for multiple modes may also include crosswalks, bus lanes, landscaping, lighting, signaling systems and adequate separation between sidewalks and streets.

Complete Streets helps to establish transportation choices and support

transportation safety, economic development, public health and environmental goals. The following statistics may be surprising:

- 25-30 percent of the U.S. population is not able to drive due to cost, permanent or temporary disability, or age. However, they may be able to walk, bike or take public transportation.

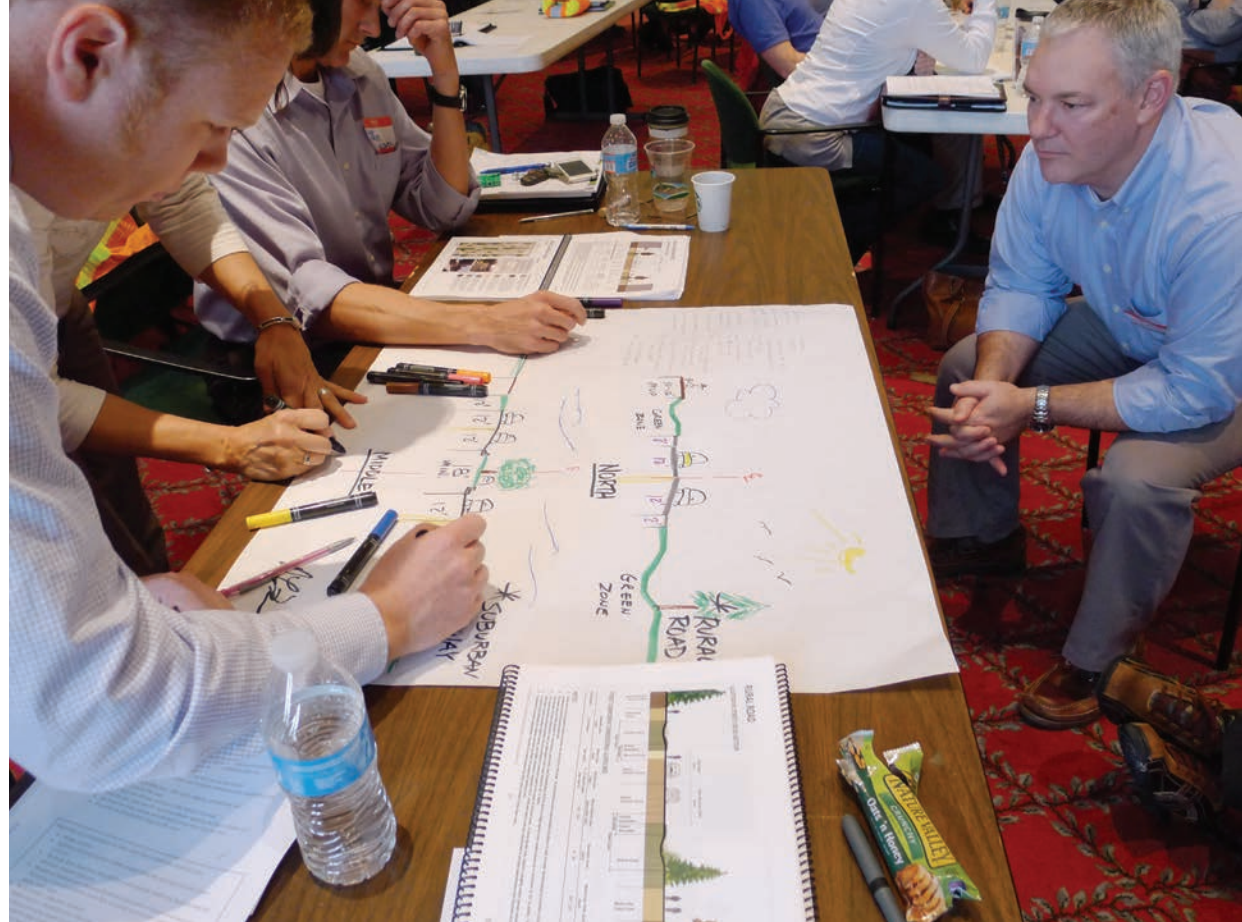
- In North Carolina, 2,454 pedestrians were struck in 2010 (72 killed), 941 bicyclists were struck in 2010 (20 killed) and research shows that many more pedestrian and bicycle crashes are unreported.
- Studies in various cities show that investment in bicycle, pedestrian and transit accommodations positively impact business development, tax revenue and property values.
- Nationwide research links sedentary lifestyles to heart disease, diabetes, depression and other negative health outcomes.
- 13 percent of children in the U.S. walked or biked to school in 2009, compared to 48 percent in 1969.
- A short, four-mile round trip by bike (instead of by car) can keep 15 pounds of pollutants out of the air we breathe.

In an effort to encourage more transportation professionals to include Complete Streets methods in their designs, NCDOT tasked HSRC researchers to conduct four workshops and 24 trainings across the state in FY 2013 and FY 2014. These two-day interactive sessions provide detailed information about specific

steps transportation professionals can take to incorporate Complete Streets into a variety of projects at various stages in the planning and design process. Attendees include a wide variety of North Carolinians, including engineers, planners and public health practitioners.

“The two-day courses provide real-world examples and go in depth about how to determine what transportation modes best serve the area, what facilities are needed, and how to incorporate Complete Streets into a community’s long-term plans,” said Carl Sundstrom, HSRC senior research associate and Complete Streets training instructor. “The goal of the training is not only to help community leaders recognize the importance of Complete Streets, but also to learn how to anticipate and integrate specific community needs from day one.”

NCDOT’s Complete Streets policy is part of a national movement. The federal Complete Streets Act of 2009 was adopted in recognition of the significant influence that street design has on safety, environmental integrity, public health, economic vitality and community livability. The federal bill directs state Departments



Training participants used an actual roadway project to practice and apply what they learned in Complete Streets training.

of Transportation and Metropolitan Planning Organizations to adopt policies that support inclusive and innovative transportation planning policies and apply these policies to future federally funded transportation

projects. As a result of this legislation, many state and local Complete Streets policies are now emerging. North Carolina’s commitment to this policy is illustrated by the state’s extensive training program at the local level, led by HSRC researchers.

For more information about Complete Streets and HSRC’s trainings, visit www.completestreetsnc.org.

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 been able to achieve success.

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
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Senior Manager of Communications,
Education and Outreach

Ryan Downs, M.S.S.
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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

Bill Hunter, M.C.E.
Research Associate

Patty Harrison
Communications Coordinator

Bevan Kirley, M.S.
Research Associate

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National Center for Safe Routes to School

Bo Lan, Ph.D.
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Richard Lytle
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Lauren Marchetti
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Libby Thomas, M.S.
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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

SPECIAL ACCOMPLISHMENTS

Charlie Zegeer, HSRC associate director for engineering and planning and director of the Pedestrian and Bicycle Information Center (PBIC), received a Lifetime Achievement Award from the Association of Pedestrian and Bicycle Professionals. Charlie and the PBIC team also received the 2013 Award of Excellence in Safety Research from the CDC National Center for Injury Prevention and Control and Active Living Research for the presentation, "Countermeasure Cost Database for Pedestrian and Bicycle Treatments."

Laura Sandt, HSRC senior research associate and Pedestrian and Bicycle Information Center associate director, became secretary of the Transportation Research Board Pedestrian Committee.

Bevan Kirley, HSRC research associate, was appointed chair of the Transportation Research Board Safety and Systems Users Group Young Members Council.

HSRC RESEARCHERS AND STAFF

Advisory Board

The HSRC Advisory Board consists of the following group of distinguished professionals, and serves to assist in the identification of strategies and program direction for the Center.

Herb Garrison, M.D., M.P.H., FACEP
Advisory Board chairperson
Director, Eastern Carolina
Injury Prevention Program,
University Health Systems of Eastern Carolina

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

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Policy Studies, UNC-Charlotte

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UNC-Chapel Hill

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

Nagui Roupail, Ph.D.
Director, Institute for Transportation
Research & Education, NC State University

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

Ex officio members

David Harkey, Ph.D., P.E.
Director, UNC Highway Safety
Research Center

STAFF MILESTONES

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

Lauren Marchetti, director, National Center for Safe Routes to School, **40 years of service***

Paulette McKoy, senior contracts specialist, **30 years of service**

Richard Lytle, web applications programmer, **20 years of service**

Raghavan Srinivasan, senior transportation research engineer, **10 years of service***

Matthew Glassman, technical support analyst, **5 years of service**

Natalie O'Brien, research associate, **5 years of service***

Carl Sundstrom, engineering research associate, **5 years of service***

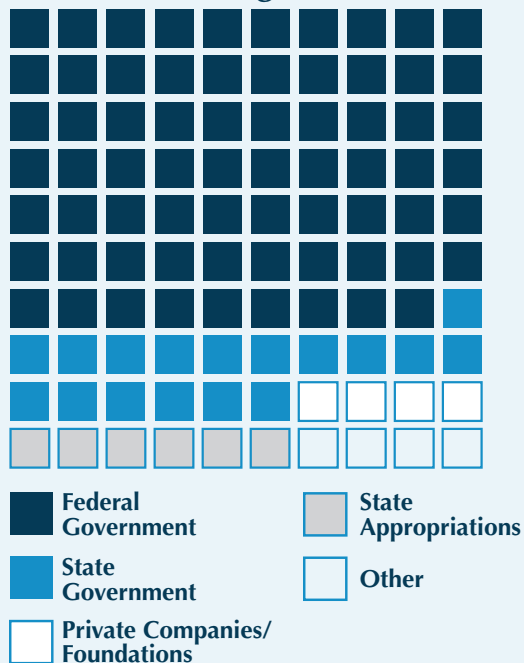
* All years of service at HSRC

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 FY13, HSRC staff generated \$16 in research and program funding. External revenues to support the mission of HSRC were received from contracts, grants, cooperative agreements and donations.

FY2013 Funding Sources



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

U.S. and international government sponsors

- American Association of State Highway and Transportation Officials
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- Kansas Turnpike Authority
- Land Transport New Zealand/The Beca Group
- National Institutes of Health
 - National Institute on Alcohol Abuse and Alcoholism
 - National Institute of Child Health and Human Development
- New York Department of Transportation
- 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
- 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
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- Wisconsin Department of Transportation

Corporate and foundation sponsors

- AAA Foundation for Traffic Safety
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- Motorcycle Safety Foundation
- National Safety Council
- 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 2013 (July 1, 2012 to June 30, 2013). To learn more about current and past research publications of HSRC, visit www.hsrc.unc.edu/research_library.

Chen, L., Chen, C., Ewing, R., McKnight, C., Srinivasan, R., & Roe, M. (2013). Safety countermeasures and crash reduction in New York City—Experience and lessons learned. *Accident Analysis and Prevention, 50*, 312-322. doi: 10.1016/j.aap.2012.05.009

Chen, L., Chen, C., Srinivasan, R., McKnight, C., Ewing, R., & Roe, M. (2012). Evaluating the safety effects of bicycle lanes in New York City. *American Journal of Public Health, 102*(6), 1120-1127. doi: 10.2105/AJPH.2011.300319

Foss, R. (2012, July). *Thinking clearly about graduated driver licensing*. Presented to the American Public Health Association, webinar series on health & equity in transportation.

Foss, R. (2012, November). *Driving after drinking: Problem, prevalence & prevention*. Presented to the University of North Carolina School of Government Magistrate Training on DWI, Chapel Hill, NC.

Foss, R. (2012, October). *Using research to influence young driver licensing policy: North Carolina and beyond*. Presented to the University-based Child and Family Policy Consortium Research Webinar, Duke University Center for Child and Family Policy, Durham, NC.

Foss, R. (2012, September). *Teenagers' transition to driving: Behavior, risk & intervention*. Presented to the North Carolina Injury Free Academy, Chapel Hill, NC.

Foss, R. (2013, April). *Outcomes for 18-year-old drivers following implementation of graduated driver licensing: Opening remarks*. Presented to the Lifesavers National Conference on Highway Safety Priorities, Denver, CO.

Foss, R. (2013, January). *Outcomes for 18-year-old drivers following implementation of graduated driver licensing: Opening remarks*. Presented to the 92nd Annual Meeting of the Transportation Research Board, Washington, D.C.

Foss, R. (2013, June). *Public opinion and the NC motorcycle helmet law*. Presented to the North Carolina Brain Injury Advisory Council, Raleigh, NC.

Foss, R. (2013, March). *Teen motor vehicle crashes*. Presented to the South by Southwest Injury Prevention Network Annual Meeting, Chapel Hill, NC.

Foss, R., & Martell, C. (2013, April). *Did graduated driver licensing increase the number of newly licensed 18-year-old drivers in North Carolina?* Presented to the Lifesavers National Conference on Highway Safety Priorities, Denver, CO.

Foss, R., & Martell, C. (2013, January). *Did graduated driver licensing increase the number of newly licensed 18-year-old drivers in North Carolina?* Presented to the 92nd Annual Meeting of the Transportation Research Board, Washington, D.C.

Gelinne, D. (2012, October). *Walk this way: Building safer communities for child pedestrians*. Presented to the Walk 21 Conference, Mexico City, Mexico.

Goodwin, A.H. (2013, January). *Defining and measuring communication during the learner stage of GDL*. Presented to the Transportation Research Board Workshop: Recent Advancements in Young Driver Research, Washington, D.C.

Goodwin, A.H., Kirley, B., Sandt, L., Hall, W., Thomas, L., O'Brien, N., & Sumerlin, D. (2013). *Countermeasures that work: A highway safety countermeasure guide for state highway safety offices* (Seventh Edition). Publication No. 811 727. Washington, DC: National Highway Transportation Safety Administration.



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.

Goodwin, A.H., O'Brien, N.P., & Foss, R.D. (2012). Effect of North Carolina's restriction on teenage driver cell phone use two years after implementation. *Accident Analysis and Prevention, 48*, 363-367. doi: 10.1016/j.aap.2012.02.006

Gross, F., Lyon, C., Persaud, B., & Srinivasan, R. (2013). Safety effectiveness of converting signalized intersections to roundabouts. *Accident Analysis and Prevention, 50*, 234-241. doi: 10.1016/j.aap.2012.04.012

Harkey, D.L. (2012, October). *Does intersection angle matter?* Presented to the Association of Transportation Information Professionals' 38th International Forum on Traffic Records and Highway Safety Systems. Biloxi, MS

Harkey, D.L. (2012, September-October). *Speed management on North Carolina roads: Draft recommendations*. Presented to the 1) NCDOT Operations and Safety Technical

Roundtable, 2) NCDOT Executive Committee for Highway Safety, and 3) Child Fatality Task Force of the North Carolina General Assembly, Raleigh, NC.

Harkey, D.L. (2013, January). *The latest on intersection angle and safety*. Presented to the Intersections Subcommittee Meeting of the Transportation Research Board. Washington, D.C.

Hauer, E., Bonneson, J.A., Council, F.M., Srinivasan, R., & Bahar, G. (2012). Value of research on safety effects of actions. *Transportation Research Record, 2280*, 68-74. doi: 10.3141/2280-08

Hauer, E., Bonneson, J.A., Council, F.M., Srinivasan, R., & Zegeer, C. (2012). Crash modification factors: Foundational issues. *Transportation Research Record, 2279*, 67-74. doi: 10.3141/2279-08

Hunter, W.W., Srinivasan, R., & Martell, C. (2012). Evaluation of the rectangular rapid flash beacon at a Pinellas Trail crossing in St. Petersburg, Florida. *Transportation Research Record, 2314*, 7-13. doi: 10.3141/2314-02

LaJeunesse, S. & Palmer, M. (2012, September). *Motivated to move: Fostering*

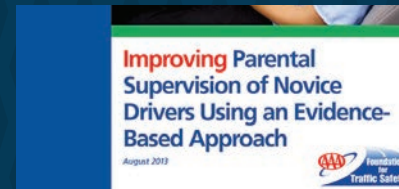
students' intrinsic motivation for active school travel. Presented to the Pro Walk/Pro Bike/Pro Place Conference, Long Beach, CA.

LaJeunesse, S. & Rodríguez, D.A. (2012). Mindfulness, time affluence, and journey-based affect: Exploring relationships. *Transportation Research Part F: Traffic Psychology and Behaviour, 15*(2), 196-205. doi: 10.1016/j.trf.2011.12.010

Lan, B. & Srinivasan, R. (2013, January). *Safety evaluation of discontinuing late night flash operations at signalized intersections*. Presented to the 92nd Annual Meeting of the Transportation Research Board, Washington, D.C.

Marchetti, L. (2012, September). *Plenary remarks on accomplishments of SRTS coordinators*. Presented to the Pro Walk/Pro Bike/Pro Place Conference, Long Beach, CA.

Masten, S.V., Foss, R.D., & Marshall, S.W. (2013). Graduated driver licensing program component calibrations and their association with fatal crash involvement. *Accident Analysis & Prevention, 57*, 105-113. doi: 10.1016/j.aap.2013.04.013



Nicholas, D. (2012). Walk this way: From coast to coast, SROs utilize program to improve safety of students who walk or bike to school. *The Journal of School Safety, Winter 2012*, 30-33.

O'Brien, N.P., Foss, R.D., Goodwin, A.H., & Masten, S.V. (2013). Supervised hours requirements in graduated driver licensing: Effectiveness and parental awareness. *Accident Analysis & Prevention, 50*, 330-335. doi: 10.1016/j.aap.2012.05.007

Persaud, B., Gross, F., & Srinivasan, R. (2012). Evaluation of two treatments for reducing crashes related to traffic signal change intervals. *Transportation Research Record, 2298*, 38-45. doi: 10.3141/2298-05

Poole, B. (2012). An overview of automated enforcement systems and their potential for improving pedestrian and bicyclist safety. Pedestrian and Bicycle Information Center White Paper Series.

Pullen-Seufert, N. (2012, August). *Improving conditions for pedestrians*. Presented to the Governor's Highway Safety Association Annual Meeting, Baltimore, MD.

Pullen-Seufert, N. (2012, September). *Making tough choices easier: Prioritizing*

pedestrian infrastructure. Presented to the Pro Walk/Pro Bike/Pro Place Conference, Long Beach, CA.

Pullen-Seufert, N. (2013, April). *Bike and pedestrian safety partnerships and initiatives for children/teens, moderator*. Presented to the Lifesavers Conference, Denver, CO.

Pullen-Seufert, N. (2013, April). *Walking and bicycling to school: Maximizing opportunities for physical activity*. Presented to the American Alliance for PE, Health, Recreation and Dance National Convention, Charlotte, NC.

Qi, Y., Srinivasan, R., Teng, H., & Baker, R. (2013). Analysis of the frequency and severity of rear-end crashes in work zones. *Traffic Injury Prevention, 14*(1), 61-72. doi: 10.1080/15389588.2012.675109

Sandt, L. (2012, August). *From soup to nuts: Building a pedestrian safety campaign in North Carolina*. Presented to the Governor's Highway Safety Association Annual Meeting, Baltimore, MD.

Sandt, L. (2012, September). *From soup to nuts: Building a pedestrian safety campaign in North Carolina*. Presented to the Pro Walk/Pro Bike/Pro Place Conference, Long Beach, CA.

Sandt, L. (2012, September). *Implementing education and enforcement components of a pedestrian safety action plan, part 1 (state level coordination)*. Presented to the Pro Walk/Pro Bike/Pro Place Conference, Long Beach, CA.

Sandt, L. (2013, April). *Applying best practices in developing an education and enforcement program: Lessons from a pedestrian injury prevention campaign in North Carolina*. Presented to the Lifesavers Conference, Denver, CO.

Sandt, L. (2013, February). *Applying best practices in developing an education and enforcement program: Lessons from a pedestrian injury prevention campaign in North Carolina*. Presented to the Active Living Research Conference, San Diego, CA.

Sandt, L. & Foss, R. (2013, January). *Teen driver trip characteristics before and after graduated driver licensing*. Presented to the 92nd Annual Meeting of the Transportation Research Board, Washington, D.C.

Sandt, L., Pullen-Seufert, N., LaJeunesse, S., & Gelinne, D. (2012, May-June). Leveraging the health benefits of active transportation: Creating an actionable agenda for transportation professionals. *TR News, 2012-5*, 18-25.

Using Health Impact Assessments to Evaluate Bicycle and Pedestrian Plans

January 2013

Laura Wagner
Graduate Research Assistant
Pedestrian and Bicycle Information Center



Reducing Crashes Related to Traffic Signal Change Intervals

Bhagwant Persaud, Frank Gross, and Raghavan Srinivasan

You often see a yellow light when you approach a signalized intersection. Usually, the yellow phase should be such that vehicles within the safe stopping distance of the stop bar should be able to clear the intersection safely during the yellow phase when they are traveling at the approach speed. Then, inadequate yellow and all-red phases can lead to safety issues. For example, yellow phases that are too short may create a dilemma area, for which the phase change interval is such that a vehicle in the vicinity of reaching the stop bar may pass safely through the intersection and late close to stop before the intersection. Yellow phases that are too long may result in excessive red light duration if a vehicle does not stop during the yellow



Srinivasan, R. (2012, October). *Safety evaluation of two treatments at signalized intersections in North Carolina*. Presented to the 38th International Forum on Traffic Records & Highway Information Systems, Biloxi, MS.

Srinivasan, R. (2013, April-May). *Expert systems for recommending speed limits in speed zones*. Presented to Edmonton's 5th International Conference on URBAN TRAFFIC SAFETY, Edmonton, Canada.

Srinivasan, R., Carter, D., Smith, S., & Lan, B. (2013, January). *Safety evaluation of converting traffic signals from incandescent to LED bulbs*. Presented to the 92nd Annual Meeting of the Transportation Research Board, Washington, D.C.

Srinivasan, R., Hunter, W.W., Jones, K., Dickson, C., Thomas, L., Martell, C., Harrison, P., Weisenfeld, J., Russell, G., & Lytle, R. (2013). Comprehensive Safety Document/Product, Report FHWA/NC/2011-10. North Carolina Department of Transportation, June 2013.

Srinivasan, R., Lyon, C., Persaud, B., Baek, J., Gross, F., Smith, S., & Sundstrom, C. (2012) Crash modification factors for changing left turn phasing. *Transportation*

Research Record, 2279, 108-117. doi: 10.3141/2279-13

Srinivasan, R., Persaud, B., Eccles, K., Carter, D., & Baek, D. (2012). Safety impacts of signing delineation for horizontal curves in rural two-lane roads. *Journal of Transportation of the Institute of Transportation Engineers*, 3(1), 51-66.

Staplin, L., Lococo, K. H., Brooks, J. O., & Srinivasan, R. (2013). Validation of rehabilitation training programs for older drivers. Report No. DOT HS 811-749. Washington, DC: National Highway Traffic Safety Administration.

Sundstrom, C. (2012, September). *Getting to Platinum: Walk Friendly Seattle*. Presented to the Pro Walk/Pro Bike/Pro Place Conference, Long Beach, CA.

Thomas, L. (2013, April). *Speed management action planning for Randolph County, NC*. Presented to the National Rural Transportation Peer Learning Conference, Greenville, SC.

Thomas, L. (2013, April-May). *Using BIKESAFE: Bicycle countermeasure selection system to create safer streets for cycling*. Presented to Edmonton's 5th

International Conference on URBAN TRAFFIC SAFETY, Edmonton, Canada.

Thomas, L. (2013, May). *Speed management action planning for Randolph County, NC*. Presented to the Annual North Carolina Association of Metropolitan Planning Organizations Conference, "Mapping the Future - Two Years at a Time," Winston-Salem, NC.

Wagner, L. (2013). Using health impact assessments to evaluate bicycle and pedestrian plans. Pedestrian and Bicycle Information Center White Paper Series.

Zegeer, C. (2012, September). *Pedestrian Safety Action Plan (PSAP) Implementation*. Presented to the Pro Walk/Pro Bike/Pro Place Conference, Long Beach, CA.

Zegeer, C. & Gelinne, D. (2013, June). *Changes that Save Lives: Making Safer Routes for Kids*. Presented to the Safe Kids Worldwide Childhood Injury Prevention Conference, Washington, D.C.

Zegeer, C., Thomas, L. & Sundstrom, C. (2012, September). *Toward Zero Deaths for Pedestrians and Bicyclists*. Presented to the Pro Walk/Pro Bike/Pro Place Conference, Long Beach, CA.

WEBSITES

HSRC maintains dozens of websites for various highway safety related projects and tools. To the right, we highlight websites that are newly created or that have undergone major design changes in the last year. Other websites maintained by HSRC are also listed below and on the following page.

Center for the Study of Young Drivers

www.csyd.unc.edu

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

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

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

HSRC ONLINE

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

International Walk to School

www.iwalktoschool.org

Information about International Walk to School Month, recognized in October across the globe

National Center for Safe Routes to School

www.saferoutesinfo.org

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

North Carolina Alcohol Facts

www.hsrb.unc.edu/ncaf

Provides statewide and county-specific data for North Carolina regarding DWI arrests and convictions as well as alcohol involvement in crashes

North Carolina Child Passenger Safety Resource Center

www.buckleupnc.org

Information about North Carolina occupant restraint laws as well as tips for choosing and using child occupant protection

North Carolina Crash Data Query

www.hsrb.unc.edu/crash

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

NEWLY CREATED AND REDESIGNED SITES



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.



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

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

Information about 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.



Watch for Me NC

www.watchformenc.org

About the Watch for Me NC education and enforcement campaign aimed to reduce the number of pedestrians hit and injured in crashes with vehicles.

Pedestrian and Bicycle Information Center

www.pedbikeinfo.org

www.pedbikeimages.org

National clearinghouse of pedestrian and bicycle information about health and safety, engineering, advocacy, education, enforcement and access, and mobility

U.S. Walk and Bike to School

www.walkbiketoschool.org

Information about Walk and Bike to School events in the U.S., how to get involved and resources to help plan a walk in your community

Walk Friendly Communities

www.walkfriendly.org

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

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