



THE UNIVERSITY OF NORTH CAROLINA
HIGHWAY SAFETY RESEARCH CENTER
SAFETY • MOBILITY • INFORMATION



Annual Highlights

2002-2003



What is the UNC Highway
Safety Research Center
all about?

People

Our work at the UNC Highway Safety Research Center is not about seat belts or airbags. It's not about rural roads, city streets, or even highways.

Our work is about people. It's about conducting research and helping develop practical interventions aimed at making transportation safe and accessible for every traveler. Our research affects anyone who travels whether on foot, or by car, truck, school bus, motorcycle, bicycle or boat.



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HSRC Director
Dr. Doug Robertson

What has the Center **accomplished** this year?

Since being established by the North Carolina Legislature in 1965, the UNC Highway Safety Research Center (HSRC) has been conducting interdisciplinary research and developing practical interventions aimed at reducing deaths, injuries, and related societal costs of roadway crashes in North Carolina and the nation. This year, HSRC staff worked on approximately 70 different projects funded by a variety of private, federal, state, or local organizations.

HSRC's greatest asset is the knowledge, expertise, and experience of its staff. Many of the Center's researchers serve as chairs or as members of a variety of national and state transportation-related policy and technical advisory committees. HSRC researchers are continually invited to present at professional conferences. Over 30 presentations were made this year at international, national, state, and local conferences and meetings.

Overall, the Center brings in over nine competitive research dollars for every dollar that the state of North Carolina invests in us through the University.

The Center's revenue for fiscal year 2003 was \$4.2 million. The funding can be broken down as follows:

- 50 percent from federal sources
- 32 percent from state sources
- 11 percent from state appropriated sources
- 7 percent from private sources.

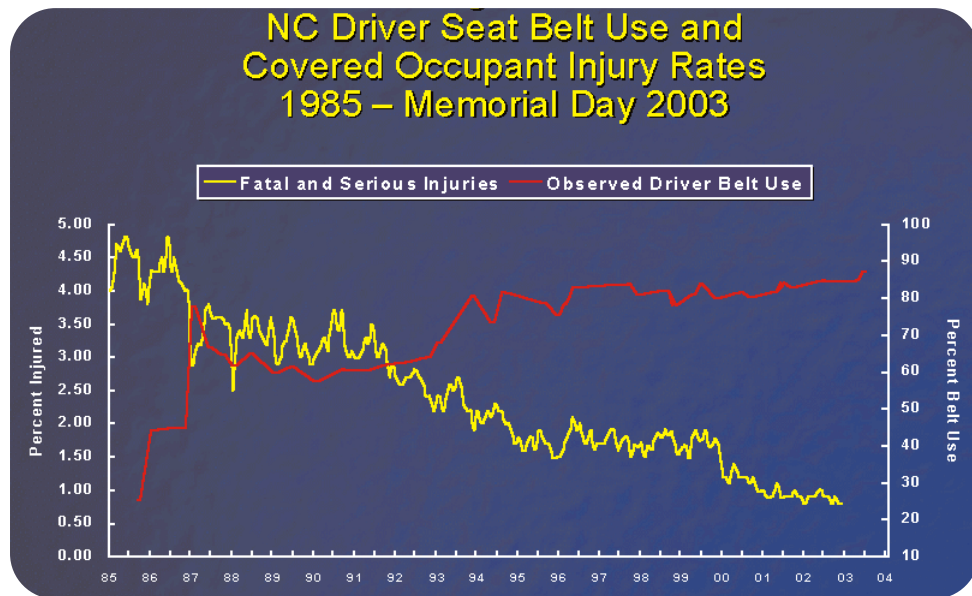
The public and the media continue to seek out the advice and expertise of the Center and its research staff. Center staff responded to several hundred calls and emails from television, newspaper, magazine, radio, and Internet reporters, as well as the general public. The Center also maintains approximately a dozen web sites, which currently average more than 40,000 visitors a month.

In the following pages, you will learn about a few of the HSRC's current areas of research and safety program development activities. At the back of the report, you will find a complete listing of research published by the Center in the past year. We also invite you to visit the main HSRC web site at <http://www.hsrc.unc.edu> to learn more about the Center and the important work going on within its doors. ♦

Learn more about the Center →

Are vehicle occupants buckling-up for safety?

For 25 years, HSRC has led North Carolina's efforts to improve seat belt use and child passenger safety. HSRC staff conduct statewide seat belt use surveys three times a year, including around Memorial Day and Labor Day. These surveys are an integral part of evaluating educational and enforcement programs designed to increase North Carolina's seat belt use. When evaluating the statewide "Click It or Ticket" campaign, a three week intensive series of media/enforcement programs conducted by the North Carolina Governor's Highway Safety Program in mid May 2003, HSRC's seat belt survey showed the seat belt usage rate increased by 2% from 84.1% before "Click It or Ticket" to 86.1% after "Click It or Ticket", the highest use rate achieved to date.



HSRC also serves as a technical and program resource for child passenger safety educational presentations and training programs for groups, reaching parents, teachers, doctors, and community leaders. Many programs are done in partnership with groups from around North Carolina, such as the North Carolina Department of Insurance and Orange County Safe Communities' "Growing Up Buckled Up" parenting classes. HSRC staff assist with the training of hundreds of child passenger safety professionals and provide updates and revisions to the NHTSA Child Passenger Safety Technician Certification curriculum.

The combined results of efforts throughout North Carolina have been shown to be very effective in protecting our youngest vehicle occupants. ♦

Would a Passenger Restriction

reduce crash rates

for teen drivers?

North Carolina Graduated Driver Licensing System

GDL Level 1:

Must be supervised by adult
12 months

GDL Level 2:

Limit of one passenger
Supervised night driving
(from 9 p.m. to 5 a.m.)
6 months

GDL Level 3:

No restrictions

Motor vehicle crashes are the most common cause of death among teenagers in the United States, according to the National Center for Injury Prevention and Control. The crash risk is highest among the youngest drivers. Inexperience and impulsive actions contribute to the greater crash propensity among beginning drivers.

HSRC research helped develop North Carolina's Graduated Driver Licensing system, one of the first in the nation in 1997, which continues to be a model for other states.

Since enactment of the original GDL law, HSRC researchers have focused on reducing teen crashes and working with our legislators to strengthen the current GDL structure for maximum safety benefit. In December 2002, the North Carolina General Assembly added a "Passenger Restriction" to the second level of the GDL system.



Restricting passengers in vehicles driven by teens was the direct result of an HSRC study. Published in the Oct. 3, 2001 issue of *The Journal of the American Medical Association*, this study demonstrated the initial results of GDL on crashes involving 16-year-old North Carolina drivers and uncovered the dangers of multiple passengers in cars driven by inexperienced teen drivers.

HSRC continues its commitment to young driver safety by working with lawmakers, educators, driver licensing personnel, and parents to improve and further evaluate North Carolina's GDL system. ♦

What distracts drivers?

An estimated 284,000 distracted drivers are involved in serious crashes each year, and HSRC's research has solidified its position as a national authority on this topic. After a 2001 study funded by AAA Foundation for Traffic Safety exposed the dangers of drivers performing multiple activities while behind the wheel, HSRC researchers conducted a second, revolutionary study in 2002 positioning cameras in vehicles to capture the frequency and type of driver distraction. The results of this groundbreaking study were released in August 2003.



In the first phase of a major study for the AAA Foundation for Traffic Safety, HSRC's Dr. Jane Stutts examined all forms of distractions to drivers, including children, radios, food and beverage consumption, cell phones, and occurrences outside the vehicle. The initial research found that cell phone use is just one of numerous non-driving activities that can lead to crashes. ♦

How **dangerous** is talking on a **cell phone** while driving?



With the increasing popularity and proliferation of cell phones, safety concerns surrounding drivers' use of cell phones have also escalated. HSRC's research aims to understand and examine the risk. A 2001 HSRC study supported by the Governor's Highway Safety Program revealed that 3.1% of North Carolinians were talking on cell phones at any given time.

In a follow-on study done in 2002 with the cooperation of the North Carolina State Highway Patrol, HSRC researchers determined that nearly 1,500 crashes per year in North Carolina were caused by drivers talking on cell phones and that the instances of cell phone use were most likely under-reported. HSRC research also showed that cell phone-related crashes were more likely to occur in urban areas and at signalized locations. They were less likely to result in fatalities or serious injuries than crashes not involving the devices. This is due to the often lower speeds at the time of the crash. ♦



How do social norms affect student drinking?

This year marked the conclusion of HSRC's multi-year BAC Study. The study began in 1997, when a nighttime survey was conducted to assess student drinking on the University of North Carolina-Chapel Hill (UNC-CH) campus. The results of the survey, which included blood alcohol concentration (BAC) measurements, showed that even on traditional "party" nights (Thursdays, Fridays and Saturdays), two out of three UNC students returned home late at night with a 0% BAC. A "social norms" campaign was developed based on this finding to reduce misperceptions about student drinking at UNC-CH by alerting students to the fact that moderate or non-drinking is the norm.

Based on this research the "2 out of 3 .00 BAC" campaign was launched in the summer of 1999. This comprehensive campaign was carried out over four years and included a variety of standard promotional venues including posters, newspaper ads, and incentives for displaying posters or knowing facts, as well as some less common outlets such as multi-media and interactive presentations to all incoming students during orientation. Additional surveys were conducted in fall 1999 and 2002 to assess short- and long-term effects of the campaign. Overall, 6,300 undergraduate UNC students were interviewed during the study.

Results of the surveys showed that student recognition of the "2 out of 3 .00 BAC" campaign was very high in both 1999 (72%) and 2002 (91%), and moreover, a number of changes in student drinking were observed over the course of the study. Self-reported alcohol use and heavy drinking (5 or more drinks) on the night of the interview decreased from 1997 to 2002. Significant decreases were also found for the direct measure of student drinking, BACs. Specifically, the percentage of students with a BAC of .05% or higher decreased from 19% in 1997 to 14% in 2002. At the same time, the proportion of students registering a zero BAC increased. These results provide support for the effectiveness of the "2 out of 3 .00 BAC" social norms campaign in reducing student alcohol use on the UNC-CH campus. ♦

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How can we improve truck safety

in North Carolina?

In 1998, North Carolina ranked fourth in the nation in terms of the number of fatal crashes involving large commercial trucks. HSRC was asked to develop a prevention program and provide evaluation services by two state agencies responsible for commercial truck safety, the NC Motor Carrier Safety Assistance Program (MCSAP) and the NC Governor's Highway Safety Program. Working closely with MCSAP personnel, Center staff analyzed existing data on truck related crashes. Together they developed program goals, objectives and crash prevention strategies that are incorporated in the state's Commercial Vehicle Safety Plan.

The Federal Motor Carrier Safety Administration (FMCSA) has established a 10-year strategic goal that calls for states to achieve a 50 percent reduction in fatal truck-involved crashes by the beginning of year 2010. Currently, North Carolina is ahead of schedule in terms of the progress made toward meeting the goal.

HSRC researchers, in collaboration with the Institute for Transportation Research and Education at NC State, perform ongoing Global Information System (GIS) analyses of North Carolina's Commercial Motor Vehicle (CMV) crashes and related enforcement activity. Using GIS tools, HSRC found that the areas of the state with the highest probability of fatal truck-involved crashes are not the same as those having the highest overall number of truck-involved crashes. This information helps the NC State Highway Patrol (NCSHP) precisely target limited enforcement resources to optimize their effectiveness in reducing serious CMV-involved crashes.

HSRC's analyses and program evaluations have been especially helpful during the 2003 merger of the NC Division of Motor Vehicles CMV Enforcement Patrol with the NCSHP. HSRC remains responsible for the evaluation of the prototype Global Positioning System data capture system and its integration with GIS. HSRC expects to play an even larger role under the new NCSHP organization in applying new technologies to CMV safety and enforcement.

HSRC is also working closely with MCSAP to increase the utilization of carrier safety information reported on the FMCSA Analysis and Information Online web site. ♦



How are data used to improve roadway design and traffic safety?

Highway engineers and administrators are continually faced with decisions concerning the design and operation of the highway system. An important part of the decision-making process is the potential impact on the safety of the highway users. HSRC research into highway design has led to partnerships with local, state, national, and international agencies.

Funded by the Federal Highway Administration and developed and managed by HSRC, the Highway Safety Information System (HSIS) is the only national database that incorporates and links crash data with roadway inventory and traffic data so that safety effects of roadway design can be studied. HSIS currently uses data collected by nine states - California, Illinois, Ohio, Maine, Michigan, Minnesota, North Carolina, Utah and Washington.

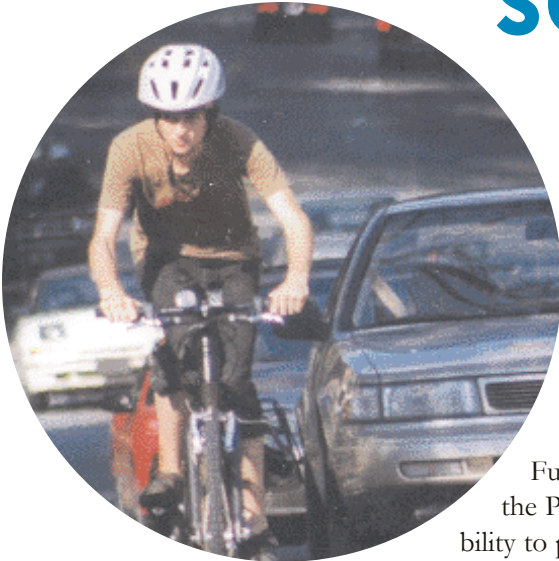
Utility poles are the second leading fixed-object hazard contributing to highway deaths, and HSRC research into roadside hazards, completed in 2002, has produced ways to identify and reduce the potential for fixed-object crashes. The research results will assist utility companies, states, and local transportation professionals in targeting the most hazardous objects, such as trees and utility poles, for removal or relocation. HSRC research in this area has contributed to the development of "best practices" for inclusion in the American Association of State Highway and Transportation Officials (AASHTO) Strategic Highway Safety Plan and has made HSRC an important partner in this national initiative.



In 2002, HSRC also completed a study, funded by the North Carolina Department of Transportation, to evaluate the effect of median barriers on driver speeds and the response times of emergency medical services. Prompted by concerns of law enforcement and emergency medical services, the study examined a variety of median barriers in the state, along with median barrier policies from other states, to determine if infrequent crossover locations entice speeding and/or delay response times to motorist calls for assistance. The results of the HSRC's research are shaping NCDOT policy on future design and placement of median barriers and crossovers. ♦



How can we build **communities** that are **safe** for **walking** and **bicycling**?



In July 2001, the Pedestrian and Bicycle Information Center (PBIC) officially became a center within the UNC Highway Safety Research Center. The mission of the PBIC is to improve the quality of life in communities through the increase of safe walking and bicycling as means of transportation and physical activity.

Funded primarily by the US Department of Transportation (USDOT), the PBIC serves as an information clearinghouse for increasing accessibility to pedestrian and bicycle facilities and promoting their safe use. In FY '02-'03, nearly a half million people, over 40,000 per month, came to the PBIC looking for information via the various PBIC web sites, e-mail, and telephone hotline.

PBIC staff also expanded their work to include a greater emphasis on the public health consequences of inactive lifestyles, supported by new funding from the Centers for Disease Control and Prevention, the Robert Wood Johnson Foundation, and most recently, the US Environmental Protection Agency.

Check out the following web sites to learn more about what PBIC does:

www.walkinginfo.org
www.bicyclinginfo.org
www.walktoschool.org
www.iwalktoschool.org

Drawing upon HSRC's expertise in the field of pedestrian and bicycle research, the Center's work in 2002-2003 included the continuing development of the AASHTO Pedestrian Safety Guide and Countermeasure Selection System. The AASHTO Pedestrian Safety Guide for city planners, engineers, educators and police will include examples of successful procedures used in California, Florida, Pennsylvania, and the District of Columbia to reduce pedestrian injury. The Pedestrian Safety Guide and Countermeasure Selection System is an online tool being developed to help communities determine which designs and treatments are best suited for their situations.



HSRC is also researching the modification of the Accessible Pedestrian Signals (APS) guidance to ensure that the information being provided is consistent to allow sight and hearing impaired users to safely, efficiently, and independently cross at a signalized intersection. The training materials developed will enable practitioners and engineers to understand when, where, and how APS devices should be installed and operated. ♦

How do we encourage safe walking on campus?



In partnership with the UNC-Chapel Hill Department of Public Safety, HSRC continued its “Yield to Heels” educational safety campaign. Developed after a UNC student was fatally injured by a car while crossing a campus street at a marked crosswalk, the campaign encourages pedestrians, bicyclists, and drivers to "Be Aware, Be Safe, and Be Considerate" as they travel about the the University of North Carolina at Chapel Hill campus.

Informal briefings and special awareness events such as "Yield to Heels" days were conducted throughout the year. Combined with enforcement efforts and engineering improvements, and participation from a campus-wide pedestrian safety committee, the awareness campaign is part of an overall program to reduce the risk of travel-related injuries on campus. ♦

How do we develop programs for safe school travel?



October 2, 2002 marked the sixth Walk to School Day event spearheaded by HSRC staff. On this day, 2800 schools in all 50 states joined nearly 3 million walkers in 28 countries around the world to celebrate International Walk to School Day. In recognition of its global impact, International Walk to School Day received the prestigious Stockholm Partnerships for Sustainable Cities Award in 2002 from His Majesty, the King of Sweden.

Recognition:
In June 2002, the International Walk to School Day initiative in the United Kingdom won a Stockholm Partnerships Award for innovative solutions for sustainable development in metropolitan areas.

International Walk to School Day in the United States is sponsored by the Partnership for a Walkable America (PWA). The Pedestrian and Bicycle Information Center is a founding member of the PWA, maintains both the international and US Walk to School Day web sites, and coordinates online registration for the annual event.

To find out more about Walk to School Day in the United States, go to www.walktoschool.org. For information about International Walk to School Day, go to www.iwalktoschool.org. ♦

Want to know more?
Here's a listing of
research
published in
2002 and 2003.

"Driver Risk Factors for Sleep-Related Crashes." J.C. Stutts, J.W. Wilkins, J.S. Osberg and B.V. Vaughn. *Accident Analysis and Prevention*. Vol. 35, No. 3, 2003; p. 321-331.

"Enhancing the Effectiveness of Graduated Driver Licensing Legislation." R. D. Foss and A. Goodwin. *Journal of Safety Research*. Vol. 34, No.1, 2003; p. 79-84.

"Growing Demand for Safe Walking and Bicycling: The Perspective of the Pedestrian and Bicycle Information Center." A Four Year Report. C.V. Zegeer and L. Marchetti. Chapel Hill, NC: Pedestrian and Bicycle Information Center of the University of North Carolina Highway Safety Research Center, 2003.

"The Safety of Older Drivers: The U.S. Perspective." J.C. Stutts. in *Aging Independently: Living Arrangements and Mobility*, K.W. Schaie and H.W. Wahl, editors. New York: Springer Publishing Company, 2003. p. 192-204.

"Visualization: Where Should Our Direction Lie?" Working Paper submitted to the TRB Visualization in Transportation Task Force. R.G. Hughes. Transportation Research Board, National Academy of Sciences, Washington, DC, 2003.

"Alcoholic Beverage Preference, Diet, and Health Habits in the UNC Alumni Heart Study." J. C. Barefoot, M. Gronbaek, J. R. Feaganes, R.S. McPherson, R. B. Williams, and I. C. Siegler. *American Journal of Clinical Nutrition*. Vol. 76, No. 2, Aug. 2002: p. 466-472.

"An Analysis of Factors Contributing to 'Walking Along Roadway' Crashes: Research Study and Guidelines for Sidewalks and Walkways." P.J. McMahon, C.V. Zegeer, C. Duncan, R.L. Knoblauch, J.R. Stewart, and A.J. Khattak. McLean, VA : Federal Highway Administration, 2002. Report No. FHWA-RD-01-101.

"An Application of GIS and GPS to Enforcement 'Targeting.'" R.G. Hughes, G. Gray, and H. Higgins. In *Proceedings of the 9th ITS World Congress*, Chicago, IL, October 2002. Washington, D.C. : ITS America, Inc., 2002.

"Bicycle Facility Selection. A Comparison of Approaches." M. King. Chapel Hill, NC: Pedestrian and Bicycle Information Center of the University of North Carolina Highway Safety Research Center, 2002.

"Bike Lane Design Guide: Chicago's Bike Lane Design Manual." B. Gombert and N. Jackson. Chapel Hill, NC: The Pedestrian and Bicycle Information Center, the City of Chicago and the Chicagoland Bicycle Federation, 2002.

"Cell Phone Use While Driving in North Carolina: 2002 Update Report Final Project Report to the North Carolina Governor's Highway Safety Program." J. C. Stutts, H. F. Huang, and W. W. Hunter. Chapel Hill, N.C.: University of North Carolina Highway Safety Research Center, 2002.

"Educating Young Drivers in North Carolina: A Review of Current Practices." J. C. Stutts and L. J. Thomas. Chapel Hill, NC : University of North Carolina Highway Safety Research Center, 2002. Report prepared for the North Carolina Governor's Highway Safety Program.

"The Effects of 'Road Diets' on Traffic Crashes and Injuries." H.F Huang. In *Transportation Challenge: Meeting Our Customers' Expectations*, 2002 Spring Conference and Exhibit Compendium of Technical Papers. Washington, D.C. : Institute of Transportation Engineers, 2002.

"Estimating Safety by the Empirical Bayes Method: A Tutorial." E. Hauer, D.W. Harwood, F.M. Council and M.S. Griffith. in *Transportation Research Record No. 1784, Statistical Methodology Applications to Design, Data Analysis, and Evaluation; Safety and Human Performance*. Washington, DC: Transportation Research Board, 2002. pp. 126-131.

"Evaluation and Application of Pedestrian Modeling Capabilities Using Computer Simulation." R.G. Hughes, D.L. Harkey, N. M. Roupail, B. Wan and K. S. Chae. Chapel Hill, N.C.: University of North Carolina Highway Safety Research Center, 2002.

"Evaluation of Lane Reduction 'Road Diet' Measures on Crashes and Injuries". H.F. Huang, J.R. Stewart, and C.V. Zegeer. in *Transportation Research Record No. 1784, Statistical Methodology Applications to Design, Data Analysis, and Evaluation; Safety and Human Performance*. Washington, DC: Transportation Research Board, 2002. pp. 80-90.

"Graduated Driver Licensing: What Works?" Discussion Paper. R.D. Foss. *Injury Prevention* Vol. 8, Supplement II, (2002): p. 36-38.

"Helmet Use in North Carolina Following a Statewide Bicycle Helmet Law." Final Project Report. L. Thomas, W. W. Hunter, J. R. Feaganes, and R. D. Foss. Chapel Hill, NC: University of North Carolina Highway Safety Research Center, 2002. Submitted to the North Carolina Governor's Highway Safety Program.

"On the Integrated Application of Modeling, Simulation, and 3D/4D Visualization: The Concept of a Laboratory for Non-Motorized Travel Research." R.G. Hughes, S. Turner, and H. Landphair. In *Proceedings of the 9th ITS World Congress, Chicago, IL, October 2002*. Washington, D.C. : ITS America, Inc., 2002.

"Pedestrian Facilities Users Guide." C. V. Zegeer, C. Seiderman, P. Lagerwey, M. Cynecki, M. Ronkin, and R. Schneider. McLean, VA ; Federal Highway Administration, 2002. Report no. FHWA-RD-01-102.

"The Relative Risks of School Travel. A National Perspective and Guidance for Local Community Risk Assessment." Transportation Research Board Committee on School Transportation Safety. H. D. Robertson, Chair. Washington, DC: Transportation Research Board, 2002. TRB Special Report No. 269.

"Run-Off-Road Crash Prevention in AASHTO's Strategic Highway Safety Plan," F.M. Council, H.W. McGee, L. Prothe, and K.A. Eccles. In *Compendium of Technical Papers, Institute of Transportation Engineers 2002 Annual Meeting and Exhibit*. Washington, D.C. : Institute of Transportation Engineers, 2002.

"Safety Effects of Marked Vs. Unmarked Crosswalks at Uncontrolled Locations: Executive Summary and Recommended Guidelines." C.V. Zegeer, J. R. Stewart, H. Huang, and P. Lagerwey. McLean, VA ; Federal Highway Administration, 2002. Report No. FHWA-RD-01-075.

"Southeast Regional Fatal Study-A Causal Chain Analysis in North Carolina." Final Report. J. K. Lacy. University of North Carolina Highway Safety Research Center, 2002. Prepared for the North Carolina Department of Transportation.

"Distractions in Everyday Driving." J.C. Stutts, J. Feaganes, E. Rodgman, C. Hamlett, T. Meadows, D.W. Reinfurt, K. Gish, M. Mercadante, and L. Staplin. AAA Foundation for Traffic Safety. Washington, DC, 2003.

Access to the full text of many of the research publications listed above is available at HSRC's web site at: <http://www.hsrc.unc.edu/publications/publications1.htm>. For questions about HSRC research publications, e-mail HSRC's librarian, Mary Ellen Tucker, at metucker@email.unc.edu



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Looking for an expert on a specific topic? Here are just a few of the topics HSRC researchers have expertise in. Call HSRC at (919) 962-2202 to talk to any of the experts listed below.

Topic

Alcohol
Car seats & Seat Belts
Cell phones
Commercial Motor Vehicles
Crash data & statistics
Distracted & Drowsy Drivers
Driver education & Young Drivers
Driver license data & statistics
Older Drivers
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