Fatalities and injuries from road traffic crashes remain a major public health concern in the United States. In 2007, 41,059 people were killed as a result of road traffic crashes (1). This figure represents a 3.9 percent decline from the number of fatalities in 2006, and corresponds to 1.37 fatalities per 100 million vehicle miles traveled, a historic low.

Nonetheless, the 2007 fatality rate is well above the target of 1.0 deaths per 100 million vehicle miles traveled, set by the American Association of State Highway and Transportation Officials (AASHTO) in its 2005 Strategic Highway Safety Plan. In addition, approximately 2.49 million people were injured in road traffic crashes in the United States in 2007 (1).

Benefits, Opportunities, and Challenges

Research on road traffic safety over the past five decades has led to important reductions in death and injury rates. Properly used seat belts, for example, are one of the most effective measures for reducing death and injury, and the National Highway Traffic Safety Administration (NHTSA) estimates that approximately 147,000 lives were saved through seat belt use between 1975 and 2001 (2).

Other examples of research payoffs include the installation of median cable barriers on selected Interstates in Missouri after research conducted by the Missouri Department of Transportation (DOT) in the 1980s. On Interstate 70, the installation of 179 miles of median cable barrier reduced cross-median roadway fatalities to 2 in 2006, from a peak of 24 in 2002 (3). An assessment indicated that 21 technologies and methods produced by Texas DOT research programs will save 245 lives, reduce the number of crashes by more than 24,000, and save more than $322 million during the 10 years from 2003 to 2013 (4).

As the field of road safety improvement develops a foundation in science, with knowledge based on
high-caliber research studies instead of on conventional wisdom and observation of practice, many research opportunities are arising. The challenge is to determine which of these opportunities is likely to yield the greatest benefit in safety improvements and therefore deserves financial support.

The organizations that fund and conduct road safety research are under pressure to demonstrate the return on investment. Deciding how best to allocate scarce research funds requires not only identifying and prioritizing the best research opportunities, but also ensuring that the research produces reliable and useful results and avoids unnecessary duplication.

To assist the highway safety community in identifying research funding opportunities and priorities, the Federal Highway Administration (FHWA) and the state DOTs, through the National Cooperative Highway Research Program (NCHRP), requested the National Research Council to convene an expert committee under the auspices of the Transportation Research Board (see box, page 27). The committee was asked to provide an independent review and assessment of the processes for establishing research priorities and coordinating research activities in the area of highway infrastructure and operations safety. The committee also was charged with recommending an efficient and effective process for setting research priorities and coordinating research efforts and with commenting on strategies to improve research quality. The committee’s findings and recommendations are detailed in TRB Special Report 292, Safety Research on Highway Infrastructure and Operations: Improving Priorities, Coordination, and Quality.

Scientific Advisory Committee
The committee recommends that an independent scientific advisory committee (SAC), consisting primarily of experienced safety program managers and knowledgeable researchers, be charged with (a) developing a transparent process for identifying and prioritizing research needs and opportunities in highway safety, with emphasis on infrastructure and operations; and (b) using the process to recommend a national research agenda that focuses on highway infrastructure and operations safety. To conduct these tasks, the SAC would enlist the help of outside experts as needed.

One of the greatest challenges in developing a national research agenda for highway safety is prioritizing research opportunities. Each of the public and private organizations funding research establishes its own priorities in response to its mission and to the needs of its stakeholders. Because the highway safety research community in the United States is diverse and decentralized (see sidebar, page 26), obtaining consensus on research priorities appears unlikely.

Nonetheless, a national research agenda that lacks priorities would not be helpful for a funding organization that is deciding which topics and projects to support. In contrast, assigning priorities by taking a quantitative analytical approach—examining clearly defined criteria to determine the value of a research project or topic—could provide decisive information to those who allocate research funds, even when the organization’s priorities differ from those in the national agenda.

The committee identifies two possible approaches to setting priorities—one that could be considered traditional and one based on the methods of decision analysis. Both approaches merit further consideration by the SAC in developing a national research agenda. The choice of approach should take into account the needs of safety program managers, the state of knowledge, and the potential for research to solve the problem.

The SAC’s national research agenda therefore should be based on in-depth knowledge of current research, include a quantifiable measure of the value or benefit of a proposed research effort in terms of improved road safety, assess the ability of research to address the problem, and reflect expert judgment about the implementation of the findings.

Improving Research Quality
The problems confronting road safety researchers are not easy. Motor vehicle crashes are complex events, the result of a combination of effects involv-
Crash statistics for highway intersections highlight the need for improvements in design and operation. Even at signalized intersections, drivers may be confused about the proper turn path. Delineation of turn paths has proved useful to drivers making opposing left-hand turns.

Researching crashes therefore requires elements of many disciplines, including civil and mechanical engineering, statistics, psychology, and public health. Crash research also relies on data that frequently are limited in quantity and varied in quality. In addition, controlled experiments are seldom possible, complicating efforts to determine how a given countermeasure is likely to affect crash frequency or severity.

This combination of a challenging research area and a need for multidisciplinary research teams, together with a shortage of trained researchers, suggests that measures to ensure high-quality research could have considerable payoff in more reliable and usable research results. The committee concluded that a well-conceived national agenda would be a primary strategy for improving research quality. The agenda also could help ensure that high-priority research issues are identified and funded on a continuing basis.

One strategy for improving research quality is to award funding competitively through the judgment of scientific peers. This proven strategy is likely to yield increasingly important benefits as highway safety research makes the transition to a science-based approach. In addition, the trained and independent researcher needs to be a more influential partner throughout the entire knowledge development process, working with the experienced safety program manager not only to formulate research programs and projects, shape proposals, and select researchers to perform the work, but also to monitor ongoing research and assess final results before publication. Finally, a portion of available funding could be set aside for investigator-initiated fundamental research to improve research methods and to explore innovative solutions to road safety problems.

Research Coordination
Research coordination helps ensure the effectiveness of research funds by eliminating unnecessary duplication and targeting high-priority research. Experience with safety-related projects under NCHRP shows that when state DOTs coordinate research efforts through a large-scale pooled-fund program—

Diverse Missions and Priorities

U.S. highway research is funded and conducted by a variety of public and private organizations, each with its own mission and related priorities. The Federal Highway Administration (FHWA) has the nation’s largest single highway research program, which includes an important safety component. Other federal agencies funding highway safety research include the National Highway Traffic Safety Administration, the Federal Motor Carrier Safety Administration, and the Centers for Disease Control and Prevention.

State departments of transportation fund highway safety research through state planning and research programs, individual state programs, the National Cooperative Highway Research Program, and FHWA’s Transportation Pooled-Fund Program. Nonprofit and private organizations, such as the AAA Foundation for Traffic Safety, the Insurance Institute for Highway Safety, and private insurance companies, also fund highway safety research, and automobile manufacturers conduct highway safety research for their products.

Federal agencies, state and local governments, industry, and nonprofit organizations fund highway safety research by University Transportation Centers. In addition to these varied, continuing sources of highway safety research funding, periodic efforts—such as the Strategic Highway Research Program 2, through its Safety focus area—provide concentrated resources for highway safety research over a short time.
instead of pursuing separate research programs with limited funding—higher-quality research can result. Nonetheless, any new coordination mechanism that requires a cumbersome, costly, and rigid administrative structure is likely to fail, because of limited resources and an inability to accommodate the goals and constraints of research funding organizations. The committee’s knowledge of the field and statements by representatives of key research funding agencies at a workshop hosted by the committee supported this observation.

The committee therefore proposes an informal approach to research coordination, with the SAC’s national research agenda as a unifying focal point. The SAC would host a one-day meeting each year for research funding organizations and other interested parties, including congressional staff, to discuss the national research agenda. The meeting would provide an opportunity to explore the potential benefits of coordinating research in the priority areas and topics identified by the SAC.

The committee was unable to obtain reliable estimates of the total funds currently applied to research in highway infrastructure and operations safety. An approximation was generated with data from TRB’s Research in Progress database. Excluding periodic efforts such as the ongoing Strategic Highway Research Program 2, the total came to $24 million a year. The cost of developing a national research agenda and hosting the first informal coordination meeting therefore would be less than 3 percent of total annual research expenditures on highway infrastructure and operations safety. The annual cost of a follow-on, informal research coordination meeting would be approximately one tenth of 1 percent of annual research expenditures.

Champion Needed
Starting up the SAC activity would require not only funding, but also an effective organizational strategy. In the committee’s view, having an influential champion with the necessary knowledge and expertise leading the effort could go a long way toward garnering support from the range of constituencies. AASHTO and FHWA would be strong candidates for this role.

References

Committee on Research Priorities and Coordination in Highway Infrastructure and Operations Safety
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