

## **FHWA's Highway Safety Information System (HSIS)**

Mike Griffith  
Team Leader, Safety Management Team  
FHWA Office of Safety R&D HRDS-06  
Turner-Fairbank Highway Research Center  
6300 Georgetown Pike  
McLean, VA 22101  
202-493-3316

[Mike.Griffith@fhwa.dot.gov](mailto:Mike.Griffith@fhwa.dot.gov)

Project Agencies: FHWA Office of Safety Research and Development and UNC Highway Safety Research Center

Highway engineers and administrators are continually faced with decisions concerning safety on the highway. These decisions can be very broad, such as the safety impacts of proposed programs or policies, or very specific, such as the design of a particular intersection or section of highway. Effective transportation decision-making requires knowledge of the safety impacts of a decision so that they will be considered along with traffic flow, the environment, cost, and other factors. Knowledge of such safety impacts can at times be based on crash-only databases such as the Fatal Analysis Reporting System (FARS) and the NASS General Estimation System (NASS-GES). However, the development of knowledge concerning how roadway design factors (e.g., curvature, lane width, roadside design) affect the level of safety requires study of not only the “failures” (i.e., crashes) that occur, but also the “successes” – the miles of highway with certain design and operational features where the crash rate is either zero or very low. Thus, the database must include linkable files of crash, roadway inventory, and traffic flow data. The one national database that has been designed to include and link all these components is found in FHWA's Highway Safety Information System (HSIS).

Linkable files of crash, inventory, and traffic information usually exist at the state level. Even with a relatively large database in an individual state, it is often the case that the development of relationships between safety and, geometric and operations-related factors (e.g., large truck crashes as a function of roadway design on a certain road type) cannot be adequately done due to limitations in sample sizes. Even more importantly, there is a need to determine whether a safety relationship or problem based on one state database can be shown to hold for other states/jurisdictions. Since HSIS uses data collected by eight states – California (CA), Illinois (IL), Maine (ME), Michigan (MI), Minnesota (MN), North Carolina (NC), Utah (UT) and Washington (WA) – and since the data for five states has been included since 1985 and the other four since 1991, the system can provide both a large sample of data and the opportunity for multi-state verification of findings. Recent research efforts using HSIS data have involved

the characteristics of intersections that are related to red-light-running crashes, freeway work zone crash rates, and research supporting the development of FHWA's Interactive Highway Safety Design Module (a tool to allow engineers to estimate safety levels for various roadway design alternatives). In addition, HSIS researchers and research resources have been used in the development of GIS safety analysis tools and pedestrian and bicycle safety tools.

In addition to use by HSIS staff, FHWA staff, and FHWA contractors, extract files of HSIS data are made available at no cost for use by any researcher who is conducting research for the general public interest that will be published in a scientific journal or other national publication. HSIS staff will work with the researcher in fine-tuning the data request, and will then extract, link and format the data as requested. Non-FHWA researchers have used such extract files in over 55 studies in the past four years.

In summary, FHWA's Highway Safety Information System provides the only national data base which incorporates and links crash data with roadway inventory and traffic data such that safety effects of roadway characteristics can be adequately studied. The multi-state data are collected, documented, and checked for quality by the HSIS staff and are made available to other safety researchers, further enhancing safety research practices across the US.

### **How FHWA's Highway Safety Information System is a "Best Practice"**

The FHWA Office of Safety Research and Development and the University of North Carolina Highway Safety Research Center feel that FHWA's Highway Safety Information System (HSIS) represents a national traffic records "Best Practice" for the following reasons:

- HSIS provides the only national (multi-state, multi-year) database that incorporates linkable crash, roadway inventory, traffic and other related files such that the safety effects of roadway design characteristics can be adequately studied. Unlike other national crash-only databases, it includes both the roadway "failures" (sites with crashes), and successes (sites without crashes). Since multi-state in nature, it can be used to verify problems and findings across different states circumstances.
- Extract files of the data are provided at no cost to any researcher doing research in the general public interest that will be published in a national journal or report. These files are tailored to the researcher's needs through communication between the researcher and the HSIS staff.
- HSIS is a working example of state data file linkage within multiple states, including both route/milepost systems and a link/node system.
- Before inclusion in HSIS, annual data from each state file undergo additional quality control checks (e.g., comparison of changes across years within each code of each key variable). Because of the number of

- files collected, computerized tools have been developed to assist in this QC effort.
- Each variable in each file is documented in a state “Guidebook.” This documentation includes not only file and variable formats, but also variable-specific notes concerning data accuracy and issues that are important to researchers and other users. These notes are based on quality-control checks, state inputs, and information developed from past usage of the data.
  - HSIS researchers are involved in the development of “cutting edge” traffic data tools, including pedestrian and bicycle safety planning tools and tools which incorporate GIS into safety analyses.
  - HSIS is a “safety information system” which provides not only a unique national database, but also research and database expertise which is used to both conduct research for FHWA on questions of national interest, but also to assist others in both their research and database development/modification issues.

In summary, we feel that HSIS has now reached the level of development where it is truly a “Best Practice” in your categories related to “Traffic Data Systems” and “Data Linkage/Sharing”. We will be pleased to provide any additional information needed, and would very much like to present a presentation on HSIS. We do plan to have an HSIS booth at the Forum, which we assume will meet the “poster requirement”. Thank you for your consideration of this nomination.