

must provide the facts needed to identify problems resulting from the changing vehicle mix, to design countermeasures, and to develop, implement, and evaluate highway safety programs. To get these facts, we may need to modify our present record systems.

In spite of progress and increased need, recent gains may be eroding. Although state and federal financial resources have remained relatively constant over the past few years, inflation has reduced real buying power. States can afford only essential and effective highway safety improvements, and these uses must compete with other highway budget items for available funds.

At the same time, the administration has stated its intention to return decision-making authority to state and local governments and has eliminated separate funding categories that require a prescribed level of funding for specific program areas. This seeming reduced emphasis on safety has led some states to tighten their budgets by reducing the data to be included in their records systems.

This is a false economy. Every effort should be made to improve rather than reduce information going into records systems. Since safety programs will now have to compete with alternative uses, management has an increased need for records systems that will help identify problems, evaluate results, and provide justification for highway safety improvements. The challenge to the state highway safety agencies is clear. To improve their decision-making capability they must

- Increase the usefulness and responsiveness of accident, traffic, and highway records systems. Records systems must provide information needed for good safety management and justification of countermeasures. This information must be in a form that will allow meaningful analysis.
- Make full use of available information. States cannot afford to wait until they have the ideal records system. Most states have better information than decision makers have traditionally used. States must use the best information now available to improve decisions, work closely with the records system staff to identify what information is available, and begin using information even while it is being refined and improved.
- Improve communication between decision makers and records systems management. The records system should serve decision makers, but management does not always communicate its needs to the records systems staff. Nor do the records staff always tell management when they find a problem.
- Include property-damage-only accidents in the records systems. Under pressure to reduce expenses and in response to reductions in federal funding for categorical safety improvements, some states have considered the elimination of property-damage-only accidents from the records systems. This would be a mistake. The effectiveness of the accident records system in helping to identify high-hazard locations and to design appropriate countermeasures would be drastically reduced. Several injuries (and perhaps fatalities) would have to occur before the hazardousness of a specific location would be recognized.
- Assess the potential for success before systems are implemented. Knowing the accident problem does not always help identify appropriate countermeasures. For example, driver errors and alcohol are often identified as major factors in traffic accidents, but trying to convince drivers that they should not make errors or drink alcohol is not necessarily an effective solution. Modifying human behavior is an expensive and difficult task and, in fact, it has been ineffective in reducing the

accident toll. Effective and efficient use of available resources requires that countermeasures be implemented, not where the problem is greatest but rather where the countermeasure will produce the most benefit.

- Improve the compatibility of state records systems. The hindsight of some states can serve as the foresight of others. Pitfalls can be avoided and more rapid progress can be made at a considerable savings. Good identification of safety needs and comprehensive evaluations are expensive. Each state should not need to prove the extent of each problem or the worth of each solution. By improving the compatibility of state records systems, states can share information and avoid unnecessary expense. The Office of Highway Safety will work with interested states to develop compatible records systems.
- Identify "most hazardous elements" for safety upgrading. State records systems must be used to detect hazardous elements as well as high accident locations. States must give more attention to preventing accidents involving highway elements that have been identified through accident records as being hazardous.

The Office of Highway Safety is working to enhance traffic records capabilities of state and local governments. Efforts will be concentrated on providing technical assistance (including assistance in developing training programs), serving as a clearinghouse for new technology, and initiating multistate analyses to identify problems and evaluate results.

We have made a tremendous investment in state traffic records systems. Now it is time to make that investment pay dividends. We must increase the use of the data we already have and continue to plug the data gaps. We must work together across state and local lines. We must share our experience and support each other in this effort.

We have a common goal—to make our safety programs more effective. Our records systems can help us accomplish this goal. The FHWA is committed to supporting improvement of traffic records systems through increased technical support.

**CHALLENGE TO THE CONFERENCE:
THE NHTSA PERSPECTIVE
Robert B. Voas, National Highway
Traffic Safety Administration**

The task before this conference is simple and compelling. We are here to help states plan their safety programs scientifically on the basis of accident data, that is, to help them put safety efforts and funds where objective data indicate the safety problem is worst.

Two recent developments have made this task critical: the 60 percent reduction in the FY 1982 budget for the state and community highway safety program and the recent U.S. General Accounting Office criticism of the current problem identification process prescribed by NHTSA.

The reduction in funding has required limiting federal support to a few areas. Federal funds can still be used for state data systems, but the funding of administrative costs for all highway safety programs is no longer permitted. As a result, program planning activities will probably be shifted to state budgets. This may mean less money for problem

identification; however, if this activity can be shown to increase the efficiency with which safety funds are spent, it should survive the transition from federal to state support.

Safety problem identification takes place at the national, state, and community levels. At NHTSA headquarters, new safety problems are detected and analyzed as part of the research and development efforts, and state data and national trends are analyzed to assist states with their problem identification programs. In state planning agencies, highway safety problems are studied for the state as a whole and for the counties and districts applying for safety grants. In the counties and communities selected for grants, problems are analyzed to specify local problems and to help plan police patrols, roadway improvements, and educational programs. If record systems are adequate, if methods of accessing these systems and analyzing data are effective, and if competent personnel are available at each of these three levels, then the problem identification process can be an effective means of managing the nation's safety program.

But there are a number of difficulties inherent in the problem identification process. These can be grouped into three areas: administrative, mechanical, and technical.

ADMINISTRATIVE ISSUES

1. Pressure for Concrete Results

Safety specialists have always been under some pressure to demonstrate concrete results; however, in the past, they have been able to justify programs on the basis of such intangible goals as the improvement of driver knowledge or the efficiency of safety systems. These justifications are not likely to be adequate for management that relies on objective statistical data. Once the problem identification process has isolated a target group and if funds are provided for safety programs on the basis of this analysis, administrators, legislators, and the public will naturally expect a reduction in the number of accidents involving this target group. Programs will have to produce tangible results.

2. Reduced Emphasis on Support Activities

This problem is a corollary of the first. If success is to be judged by reductions in accidents, support activities will be deemphasized. It is difficult to demonstrate the accident-reducing potential of a better driver licensing data system, an improved police communication system, or a better breath tester. Such projects will lose out to selective traffic enforcement projects that are more clearly defined in the problem identification process and can show a measurable impact on accidents.

3. Emphasis on Large Rather than Small Projects

The problem identification process can lead to an over-emphasis on large projects. Because most safety programs can achieve a 10 or 15 percent improvement at most, the projects must cover a large number of accidents to produce a statistically significant reduction in crashes. If accident reduction is the criteria for program support, then small projects in small communities will be out, and large projects in major urban areas will be in.

4. Inadequate Opportunity for Program Evaluation

Careful analysis of the causes of accidents and the isolation of target groups may improve program evaluation; however, the many practical restraints to evaluating programs are likely to remain and may even be made worse by recent reductions in funds. Having performed a sophisticated analysis to plan a project, the scientist may find that the project is carried out in a manner that makes evaluation impractical or that funding for evaluation or the collection of control data is inadequate. However, the need for continued scientific research should not be allowed to

conflict with state safety program goals. For example, researchers have been critical of the ASAP program for failing to fund control sites and carry out research designs. They saw the project as a research effort. NHTSA, on the other hand, saw ASAP as an action program designed to stimulate state attention to the alcohol problem.

MECHANICAL PROBLEMS

1. Incomplete Data

According to a recent report comparing insurance claims with state accident data, one-third of reportable crashes goes unreported. Because the reporting of property-damage-only accidents is known to be incomplete and because the required reporting levels are affected by inflation and legislative changes, most states have relied on injury-accident rather than total accident data. These data are by definition incomplete.

Incomplete reporting is not necessarily highly biased reporting. For example, we have been studying blood alcohol concentration (BAC) reports sent to state accident reporting systems. In 10 states, BAC data were available on 80-85 percent of fatally injured drivers; in the remaining 40 states, information was available on 30-35 percent. Despite the large difference in percent reporting, the proportions of drivers with an illegal BAC were approximately the same.

On the other hand, selective reporting can result in misleading data. For example, the accidents of women and older drivers tend to be reported less often than the accidents of younger, male drivers. Differences such as these could be particularly misleading in problem analysis.

2. Lack of Exposure Data

The lack of adequate exposure data for normalizing accident information is a major limitation to problem identification. Driver licensing, vehicle registration, and vehicle miles of travel (VMT) are the most frequently used information for normalizing accident data. However, the number of smaller cars on our roadways has made suspect any VMT estimates based on gasoline taxes. Numbers of licensed drivers and licensed vehicles are frequently not available for political subdivisions below the state level and for some types of vehicles, such as motorcycles. Accurate data on numbers of vehicles are frequently not available even at the state level.

3. Lack of Appropriately Trained Personnel

Many state safety offices use both data analysts, who call up data for the use of others, and highway safety management specialists, who are responsible for planning but have little experience with data systems or data analysis. A complete set of skills is needed for problem identification. To get around this problem, many states use a team planning approach.

4. Lack of Adequate Access System

A good state highway safety record system is the foundation for problem analysis, but the usefulness of such a system is limited by the ability of the planners to access and analyze data. This conference will consider several access systems that have been developed especially for highway safety research and management and for standard statistical packages available for data analysis.

TECHNICAL ISSUES

1. Variations in Data Treatment

Highway safety problems can be defined through a number of different methods: through statistical comparisons between areas or time series comparisons within a single area; through absolute number of crashes or accident rates

based on normalizing data; and through trends or changes in trends. Each method provides a different result.

For example, according to absolute numbers, male drivers between the ages of 16 and 35 are highly overrepresented in weekend nighttime accidents. But if the data are normalized, then teenage drivers are overrepresented on a per-vehicle-mile basis and older drivers are overrepresented because they drive more frequently at night. Normalized data also suggest different countermeasures. For the teenage driver, the problem is one of skill or attitude, and training may be a useful countermeasure. For the male driver between 20 and 35, the problem is one of nighttime exposure, and the countermeasure would involve reducing that exposure. For the elderly driver, the problem is a combination of low exposure with increased risk per mile or unit of exposure.

Different data treatments can determine the success or failure of a safety program. For example, NHTSA has pointed to the declining fatality rate per 100 million vehicle miles as evidence of the success of national highway and motor vehicle safety programs; in its critique of the grant program, the U.S. General Accounting Office emphasized the increase in absolute numbers of fatalities since 1965 and therefore questioned the value of the program.

Policy considerations may also differ, depending on whether the focus is on total exposure or on risk per unit of exposure. For example, a recent study claimed that driver education was causing teenage fatalities. While teenagers in fact have a higher rate of accidents per mile driven, most of the increase in fatalities cited in the study was due not to a change in risk per mile, but rather to increased exposure resulting from the availability of high school driver education.

How then shall we use accident records for problem analysis and planning? The accident record systems lend themselves to analysis of total numbers of accidents, and our methods of correcting the exposure are relatively weak. If we use total numbers of accidents as our measure of success, we may find ourselves defining alternative transportation systems (mass transit) as highway safety programs. This may be appropriate; then again, we may not want to spend our limited safety funds on mass transit.

In all probability, there is no single measure applicable to all situations. But it will be our task to find appropriate ways of using accident statistics to define problems and to manage highway safety programs.

a substantial retreat from the commitments of resources to highway safety that began in 1966-1967. And we need to ask, Have we in the state and community programs done our jobs so well that further effort is not needed? Or have we done so poorly that further financial commitment seems, in investment terms, a poor risk? I am afraid that the answer is, We don't know.

I believe that the U.S. General Accounting Office noted in its October 1980 report to Congress that the state and community highway safety programs are a poor investment alternative in these days of lowered expectations of government.

If we were business people meeting here today to discuss the condition of our companies or our industries and the prospects were for 65-70 percent reductions in operating revenues, it is almost a certainty that we would know precisely how and why we had come to this position. We would be working on recovering our lost markets and lost customers.

But those of us promoting and selling improved highway transportation safety through the state and community grants program do not know what has been successful and what has not. I think part of the problem derives from the fact that we have not recognized that the bits and pieces of highway safety information we collect and maintain must be organized into a management information system to effectively plan, analyze, and oversee the highway transportation system. We have not defined our problems clearly enough and identified those factors amenable to countermeasures through the grant system.

Industry spends millions analyzing its products and its markets and carefully tailoring its short- and long-range plans to the changing environment. In comparison, we spend a pittance on identifying and analyzing those characteristics of the highway traffic crash problem so that we can sharply focus on the goals and objectives of our spending programs.

If we are ever to sharpen the focus of our programs, we must find a way to make our management information systems more useful. We hope this conference will provide a start.

TRAFFIC RECORDS ANALYSIS IN TEXAS

Barry Lovelace and John Staha, Texas State Department of Highways and Public Transportation

INTRODUCTION AND CONFERENCE PURPOSE

Wayne S. Ferguson, Virginia Highway and Transportation Research Council

When the need for this conference was established by the Transportation Research Board's Committee about a year and one-half ago, we did not envision the environment in which highway safety practitioners would find themselves today. Certainly the need to curb inflation and to promote real economic growth is of such national significance that, if deep cuts in federal spending are now necessary in many areas of federal activity, we would not argue that this program alone ought to be exempted. We would maintain, I believe, that unsuccessful programs ought to be cut and successful ones sustained. Have we been successful? Apparently, many people think not. We need to assess both where we are and how we get here.

To be sure, things are not as bad as they might be. But the funding levels proposed for FY 1982 and beyond reflect

In Texas we use the traffic record as a source of data for three levels of problem identification and analysis: macro, midrange, and micro. This three-layer concept has been adopted as a means for "layering" into problem identification for decision making. The purpose of the macro level is for statewide comparisons and problem assessment. It consists of problem identification by using the Fatal Accident Reporting System (FARS) at a gross level and will not be discussed here. The midrange level is the basis for resource allocation; the micro level is used for treatment. Texas uses different techniques for each:

- SAVE CITY/SAVE COUNTY is a decision model used for midrange analyses. Cities and counties are rank-ordered by accident count and rate to form a basis for resource allocation.
- CASESTUDY and Traffic Accident Profile (TAP) are two computer programs used for microlevel analyses. The purpose of CASESTUDY is to retrieve information on individual accidents to identify problems in specific areas. TAP melds