Any number of subsets of the RAPID master data base may be established. User commands specify the variables and the logic. For example, the pedestrian accident record might become part of subsets for a statewide pedestrian analysis and for analysis of all accidents in the city.

Residing in a small subset, the data are now ready for quick processing through any of the RAPID processing options—frequencies, histograms, crosstabs, multivariant analyses, correlation analysis—or through any of the RAPSTAT options. Data may also be processed through the other RAPID specialized software options.

If a user wants to do many logical restrictions without going back to the RAPID master data base stored on tape, he or she can logically restrict from a previously created RAPID disk subset by using slightly modified commands. The process is quicker than creating the first subset. The result is referenced in the RAPID documentation as a restricted subset, which is processed immediately by the system and then deleted. An unlimited number of these restricted subsets can be created and processed simultaneously from any given subset.

The philosophy under which RAPID was developed is quite simple: to free the user from all unnecessary operations without sacrificing computer efficiency. There are many trade-offs among user flexibility, computer efficiency, and simplicity. Quite often an overemphasis on one will lead to a critical sacrifice of the other. By understanding what is actually taking place within RAPID as well as the reason for the current RAPID design, the user can better understand and employ the full resources at his or her disposal.

ACCIDENT DATA: A LIMITED TOOL FOR EVALUATION

A. James McKnight, National Public Services Research Institute

Accident statistics used for highway safety program evaluation have been criticized as long as they have been compiled. The charges leveled against them are that they are neither representative nor comprehensive nor accurate. They are also inadequate; other data are needed before accurate conclusions may be drawn.

Accident statistics do not include all of the accidents that occur. They are not supposed to. Minimum thresholds of property damage and injury are used in all accident reporting systems to keep the system from being swamped with statistics on minor accidents that would be of no real benefit to the practitioner or scientist.

The problem is that a large number of the accidents that are supposed to be reported are not. Drivers surveyed on their accident experience almost invariably list more reportable accidents than are shown on their official records. Only a third of all insurance claims appears on state motor vehicle records, even though police are called to the scene about three-fourths of the time. Can countermeasures directed at a population of accidents be legitimately evaluated through a sample of those accidents?

Data from accident reports are not comprehensive. They are limited to the number of variables that can be used to describe the accident. Police reports are limited by the many other duties the police must perform at the accident scene. Drivers' reports are limited by the amount of information the police can request without losing a driver's cooperation. Information provided in accident reports is often inaccurate. Few police have enough training in accident reconstruction to determine what really happened. Those that have the training often lack the time necessary to gather and analyze the available data. Data sources are often unreliable. Most of the information concerning speeds and direction, for example, comes from the people involved. Driver reports, both those given orally to the police and those submitted in written form, are frequently distorted by misperception, inability to recall, and simple bias.

Data other than accident data are needed to evaluate the impact of highway safety programs. Other factors such as exposure or outside causes may be responsible for changes in the number or severity of accidents.

When the effect of these factors cannot be controlled experimentally by the way the program is conducted, they must be controlled statistically through the use of data that describe their nature and magnitude. However, vehicle and driver records are kept for on-line, operational use—not for compiling statistics.

From the criticism, it might seem that accident data were inadequate to assess the impacts of highway safety programs. Actually, accident data have proven sufficiently representative, complete, and accurate to provide some measure of the impact of highway safety programs on the real accident experience of people, vehicles, and roads.

The problem arises when, in the evaluation, impact is not found. The effects of most safety programs are marginal; only rarely does a safety program achieve results that could be called dramatic. As we move from changes in the vehicle and highway to changes in the way people drive, we are lucky to find countermeasures that make a difference of more than a few accidents per thousand drivers.

The smaller the impact, the more precise the measure must be. Of the many programs that have produced no discernible impact, a substantial share could have been shown to be cost-effective had a more precise measure of impact been used. The same is true where outside factors are involved. A true impact may be masked by differences in exposure and other accident-related factors that could be identified and controlled with better data.

Despite their shortcomings, accident data are the best available criteria for evaluating program impact. Accidents define safety; for administrators and legislators they are the most convincing evidence of impact. Accidents are also the only common denominator in comparing programs with different immediate objectives and are the criteria most readily expressed in the dollar terms needed for cost/benefit analyses.

The issue is not whether accidents are acceptable criteria for evaluating highway safety programs; rather, it is what can be done to improve their reliability as a measure of program impacts. Some suggestions include (a) limiting the data, (b) making better use of driver reports, (c) consolidating files, and (d) collecting exposure data.

LIMITING THE DATA

We need to recognize that the agencies we rely on have functions other than serving as data pipelines. We have to do a better job of accommodating our requests to what they are able to provide.

The job of the traffic police is to keep the street safe. In an accident, they must protect the accident scene, take care of the injured, and see that damaged vehicles are cleared away so that traffic can start moving again. Serving as an arm of research and evaluation is the least of their concerns, and their priorities are not going to change. If we want reliable accident information, we must accommodate police responsibilities, not add to them.

One way to do this is to reduce the amount of information requested. For evaluation, it is most important to know who, what, where, and how bad. If we can collect this information reliably, we can assess the involvement of the people, vehicles, and roads toward which our programs are directed. Other information, such as whether the sun was out, what direction cars were traveling, or where the

vehicle was hit, is not generally critical to evaluation; when it is, it can be obtained from other sources.

We can also limit the kinds of information officers are required to report. We need to eliminate information that officers cannot collect accurately because they have neither the training nor the time. Cutting out information that cannot be reliably gathered will reduce the amount of information to be collected without sacrificing the usefulness of the reports.

If paperwork is reduced, police will be more willing to prepare reports. Therefore, the number of reported accidents will increase.

MAKING BETTER USE OF DRIVER REPORTS

In most states, drivers involved in accidents that meet minimum damage thresholds are required to furnish reports of accidents to their insurance agencies. These reports duplicate the content if not the format of the police reports. Prepared under less trying circumstances than the police report, they could be used to provide information now currently furnished by the police. Such information would include weather conditions, speed, and the use of restraints. Drivers' reports could also be used to collect information not currently collected, such as amount of driving experience, destination, and annual mileage. Certainly, any expansion of the content of the accident reports should be directed toward drivers' reports rather than police reports.

In addition, supplementary drivers' reports could be used to collect a greater depth of information for selected classes of accidents. Drivers would be selected on the basis of information provided in the routine reports. Selection of forms and addressing of letters would be completely automated.

CONSOLIDATING FILES

Traffic records are currently maintained in a number of files by a number of different agencies. The most common files are

1. An accident file consisting of police reports, generally maintained by the state police;
2. A driver file containing information about drivers and traffic violations, maintained by the agency that issues licenses;
3. A vehicle file containing information about the vehicle, maintained by the agency that registers motor vehicles; and
4. A road file containing information about road segments and locations, maintained by state and local highway departments.

It would be helpful if accident data collected from police reports were made a part of the driver, vehicle, and road files. If the accident information were sufficiently limited, it could be recorded in its entirety. This consolidation would have the following advantages:

- Increased Amount of Information—Since the data in each file would be available, more information could be obtained about the people, vehicles, and roads involved in each accident than could be obtained from accident reports.
- Limited Data Collection—The accident report would only provide positive identification of the people, vehicles, and locations. All other information, such as driver age, vehicle engine size, and roadway surface, would be drawn from the appropriate files.
- Control of Exposure—Every time accidents were analyzed, we would know exactly the population on which the accidents were based. Analysis could be made on a per-driver, per-vehicle, and per-road-location, or per-road-mile basis. This would provide control over changes in the numbers of people, vehicles, and road location or miles occurring between groups being compared in the evaluation.

Most road files already contain a volume of accident information, but the agencies responsible for driver and vehicle files may not welcome the addition of accident information. The highway safety agency could periodically duplicate these files for their own use and add the accident information. With their own files, evaluators could analyze information without having to work around operational uses of the file.

COLLECTING EXPOSURE DATA

Research studies are designed to control differences in exposure among groups being compared. In evaluation studies, the differences in exposure must be adjusted. In the past, changes in exposure were fairly gradual and predictable from trends of previous years. More recently, however, wide fluctuations in the availability and cost of fuel have produced substantial and unsystematic variations in exposure. Until now, exposure data have been collected almost as an afterthought, but now it must be accorded the same priority as the collection of accident data.

Highway departments have done well in determining exposure of various road segments. This is so largely because the same information (traffic counts) is used for operational purposes.

Some states have begun to collect odometer readings as a renewal registration requirement to provide estimates of annual vehicle mileage. For drivers, estimates of miles traveled could be obtained as part of the license renewal process. This source would furnish a third to a quarter sample of the driver population each year. Estimates of total exposure would be generated from this sample.

None of these suggestions will solve problems that limit the usefulness of accident data for evaluation. We are not seeking solutions but ways of ameliorating these problems so that our truly cost-effective programs will be recognized.

MINIMUM RESOURCES REQUIRED FOR PROBLEM IDENTIFICATION, GOAL SETTING, AND PROGRAM EVALUATION

Jerry G. Pigman, Kentucky Transportation Research Program, University of Kentucky

The minimum resources needed to use accident statistics and other data effectively for highway safety program administration are directly related to the problem identification, goal setting, and evaluation tasks outlined in the Highway Safety Program. This program is expected to undergo a number of changes in FY 1982 as activities are streamlined to keep budgets within new funding limits.

The new NHTSA guidelines call for significant reduction in all activities. Specifically, the problem identification or analysis portion of the state's highway safety plan will be required to be only a three- to five-page summary broadly describing the state's highway safety problem, statewide evaluation plans will no longer be required, and the past requirement for one in-depth evaluation each year has been waived. However, administrative evaluation of each project will still be required to determine whether projects meet their objectives. In addition, all impact projects will be subjected to some form of impact evalua-