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ACCIDENT STUDY METHODS - HOSPITAL AND OTHER DATA SOURCES

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During the last decade or so, substantial progress has been made in accident studies involving the collaboration of physicians and engineers. Their objectives and methods, described briefly below, are well defined and hardly call for comment. However, the use made of them does not meet certain requirements and may give rise to hasty interpretations on the part of organizations which keep medical data separate from accident-related data. This is a shortcoming which needs to be corrected.

Summary of the objectives of accident study

The study of accidents has the following objectives:

- to classify accidents by category, each being distinguished from the others by the protective measures appropriate to it (frontal impact, lateral impact, etc.), and to determine the frequency and severity of each;
- to assign to each accident category and to each degree of impact force a degree of risk in relation to the various parts of the body of those involved; this means designating parts of the body which have to be protected in each impact situation and establishing the maximum impact force for which protective systems should be effective in order to save a given proportion of road users;
- to quantify the effectiveness of existing protective measures (helmets, safety belts, etc.);
- to evaluate the injurious or protective effect, direct or indirect, of the various components of vehicles and to calculate the frequency of their involvement in each of the accident categories listed.

Methodological principles

To achieve these objectives, accident studies observe certain essential methodological principles:

- the information gathered must be absolutely reliable;
- the acquisition of information must be exhaustive, so as to provide all data which might in the future have uses that were not originally foreseen;
- technical information and medical information are complementary; where either is lacking, uses are very limited and may result in error;

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- the classifications adopted for grouping technical and medical data should conform with internationally agreed definitions: definition of lateral impact, definition of "slight injury", or, in more detail: VDI (Vehicle Deformation Index), AIS (Abbreviated Injuries Scale), for example.

This standardization makes it possible to compare one country's results with those of another and to benefit from the experience gained by each country.

Selection of accidents to be studied

The major methodological problem is that of the selection of accidents to be studied. In the light of the objectives mentioned above, it would appear justifiable to take as the selection criteria for studies the hospitalization of at least one injured person. In this case, it should not be forgotten that the possibilities for generalizing results obtained during a given period of observation are relatively limited. For instance, it will not be possible to calculate correctly, by the number of victims, the benefit achieved by introducing or improving a given safety measure: this is a matter beyond the scope of accident studies.

Some teams choose to analyse any accident where there is a need to tow away the vehicle involved, or which gives rise to material repairs costing over a certain sum. By selecting these criteria a large number of cases are obtained. One must then have available a very large team, unless one reduces considerably the limits of the area surveyed; however, there is then the risk of only including a limited number of types of accident, specific to the section of the road network under consideration. It is better to cover a fairly wide area and to base the survey on only a sample (1/3, 1/5 or even 1/10) of the accidents reported. This criterion, based on the material damage, has the great advantage of covering a range of accidents which can be used for statistical purposes. In particular, it makes it possible to determine trends in physical risks associated with accidents and to assess the influence of any safety measure on these risks more adequately than can be done with national statistics, which only cover accidents which result in victims. However, this criterion should be adopted only in those countries where there is a high level of motor traffic.

Data utilization

Insufficient stress has been placed on the use of medical data gathered over a number of years by accident study teams. There is a need to draw up detailed lists which record specific lesions and lesion patterns for each category of road users, and the main types of accidents sustained, specifying the protective systems used. Admittedly some countries, including France, only in exceptional cases carry out autopsies of persons killed in road accidents, thus greatly diminishing the usefulness of medical records. Such lists would make it possible, *inter alia*, to verify the validity of certain calculations, e.g. that relating to the increase in the number of persons with multiple injuries (cf. summary report of the Ad Hoc Technical Group on Road Traffic Accidents, Prague, 26-28 September 1978).

It would be incorrect to think that useful information can be derived directly from medical data collected by hospital accident departments which do not participate in accident studies. Generally speaking, there is very little or no knowledge of the types of collision in which these victims have been involved, and this may lead to simplistic or even harmful uses. Thus, one can encounter alarmist publications circulating in France on the supposed risks to the cervical vertebra from safety belts.

Such information, in short, is detrimental to safety, in so far as it causes the public to doubt the validity of decisions which call for their collaboration, such as the wearing of helmets and safety belts.

On the other hand, medical records which do not cover the technical aspects of accidents could well be used to connect each type of injury and each representative clinical picture with some of the economic consequences of such injuries, namely, total duration of temporary disability and rate of permanent partial disability. These indices should be related to the profession, age and sex of accident victims. This use calls for the cooperation of insurance companies. So far, little has been done in this field. Nevertheless, information of this kind would supplement the medical data obtained by accident study surveys and would make it possible to determine more precisely the priority action needed with regard to road safety and the benefits to be expected.

Mechanism of injuries - biomechanical research

The study of accidents is not in a position to identify all the injury mechanisms observed. Some of them (e.g. visceral and cerebral lesions) call for experiments to be conducted with a view to explaining them. In this context, the international collaboration that has been established should help to bring about rapid advances in knowledge aimed at optimizing protective measures and determining adequate criteria for injuries.