

# Cause and Prevention of Accidents

C. L. WILBAR, Jr., M.D.

THE Pennsylvania Department of Health has two sections dealing with accidents. The section on traffic epidemiology deals with traffic accidents entirely, and the section on environmental safety is concerned with non-motor vehicle accidents.

In Pennsylvania, accidents have been the fourth leading cause of death since 1900 and remain firmly established in this position. In the early part of the century, they were preceded by infectious diseases. Now they are preceded by heart disease, cancer, and vascular lesions of the central nervous system.

But accidents lead the death picture during the first half of the lifespan. They constitute the leading cause from the 1st to the 35th birthday.

In 1958, 5,056 Pennsylvanians were accidentally killed. The death rate from accidents per 100,000 population in that year was 16.2 for motor vehicle accidents and 29.3 for nontraffic accidents.

The U.S. National Health Survey estimates that 3 people in each 10 suffer major accidental injuries each year. A major injury is defined as one which removes the individual 1 day or more from normal activity or causes him to seek medical treatment. In our State, with an estimated population in 1958 of 11,100,000, we would arrive at approximately 3,330,000 major injuries in Pennsylvania during the year, using this formula.

Accidents are prevented by first locating the causes. After having ascertained the causes,

steps are then taken to either correct or modify the environmental hazard or to change the attitudes and habits of the people involved, or both. The Pennsylvania Department of Health through its section of environmental safety is engaged in a survey of the types of accidents that bring people to hospitals.

Information on nonfatal injuries is gathered from 100 hospitals reporting accidental injuries treated to the health department. They show a difference compared to data on types of fatal accidents experienced. There is a higher rate of injuries from nonfatal falls in the middle years of life, but a higher rate of fatal falls in the early and late years. Cuts and piercing injuries seldom prove fatal, yet there are indications that these may be the major forms of non-fatal accidental injuries.

Most nontraffic accidents occur in the home, where the population spends more time than elsewhere. Probably accident prevention measures are less adequately applied in the home than in the working environment. That home accidents can be largely prevented has been shown by concentrated accident prevention programs in selected communities.

As to the personal factors in accident rates, there is a considerable variation in accordance with age. Most fatal injuries occur to persons in the very young and very old age groups, whereas most nonfatal accidents occur in the age group 15 through 24 years. Males have a much higher accident rate than females. Non-whites have a much higher rate than whites. Physical shortcomings which interfere with coordination, balance, and locomotion obviously predispose individuals having these shortcomings to accidents. So do certain visual and auditory abnormalities and conditions, which prevent the individual from having mental

---

*Dr. Wilbar is secretary of health, Pennsylvania Department of Health. This paper is a condensation of an address which he delivered to the junior-senior class of the Hahnemann Medical School in January 1960.*

control of his activities such as fainting, convulsions, heart attacks, cerebral hemorrhage, and such.

The mental and emotional makeup of the individual is undoubtedly a major factor as to his accident proneness. There is considerable controversy about the point at which a person becomes accident prone. However, it is clear that certain psychological factors in individuals cause them to be unusually likely to have accidents. An individual who is likely to worry or grieve predisposes himself to inattentiveness. An individual who is quick to anger is likely to lose the cautiousness which helps prevent accidents. Fatigue causes slowing of the reaction time, so that the chronically fatigued individual is more subject to accidents than others. The quality of judgment is difficult to measure, but certainly some individuals do better at judging their own skills and capabilities than others. Then there are, of course, those who have psychoses, psychoneuroses, or neuroses, some of which make them exceedingly accident prone. Accident proneness may not be constant; it may occur only for limited periods when physical or emotional conditions are acute.

Accidents can be prevented by the correction or modification of either environment or attitude. Carelessness, procrastination, disorderliness, confusion, and risks can be recognized and controlled. Correction of physical handicaps and reduction of emotional stress or tension are also possible. In our approach, we try to break the chain of events which leads to accidents. We tailor our educational messages for specific types of accidents and aim them particularly at the high-incidence groups. For example, to reduce gunshot wound accidents, we advise the public to store guns unloaded, to remove bolts before storing rifles, to keep firearms out of children's reach, to store guns in a dry dust-free place, to check the breech before cleaning, to keep loaded firearms out of the house, and to store ammunition separately from the gun or guns.

Under the State health department's plan for prevention and control of the nontraffic type of accidents, a central office advisory committee, composed of a representative of each of the professions and occupations in the department

concerned with accidents, helps to determine and guide the total control program. We have a regional accident prevention program representative on a full-time basis in each of our seven regional offices.

The reporting of accidents by the hospitals is cited above. Mortality reporting comes not only from the hospital but also from death certificates, all of which are filed and analyzed by the Pennsylvania Health Department. Compilation of data on morbidity, mortality, cause and cure, and studying followup of these data collectively and sometimes individually, supports an epidemiological study of accidents.

At the regional level, we need a regional staff steering committee, a home safety inventory, and especially do we need the formation of local safety councils, consisting of interested and able individuals and groups of individuals who will help collect data and bring about the educational know-how for the prevention of accidents in their communities. These councils provide a bridge or vehicle between the technical groups and the general public, and they should be comprehensive in their scope. They can have such subcommittees as home, farm, occupational, recreational, school, and traffic.

Motor vehicle accidents are given secondary attention here because a number of other agencies have been and are continuing to give much time and effort to traffic accident correction. These agencies, however, concern themselves mainly with the safety of the vehicle, the street and highway, and with mass education.

There has been too little concern, in my opinion, with the type of human beings who cause traffic accidents. Only recently have motor vehicle administrators turned to health departments for aid in this area. Since 1958, the section of traffic epidemiology has been headed by a full-time physician, but we are one of only a few State health departments which have such a unit. The job of the health department in this area is: (a) assisting in the establishment of physical standards by acting as liaison agency between the motor vehicle administrators and medical personnel within the State; (b) conducting statistical research, using records now reposing in State motor vehicle agency offices; (c) conducting applied

research to help delineate the human factors which cause accidents; (d) encouraging and stimulating universities and other groups and institutions to engage in research; and (e) assisting in obtaining medical and related consultation for State motor vehicle administrators to help solve individual problems posed by drivers having an alleged physical, mental, or emotional defect.

Consultation toward solving problems of individual drivers who have frequent accidents and are alleged to have some defect has been in effect for a number of years in Pennsylvania. However, in the past we have mainly attempted to establish physical standards for drivers and the periodicity to which drivers should be subject to testing for these physical standards. The Pennsylvania Medical Society has a number of special committees working on standards, and a report was submitted to the Governor's Traffic Safety Council and to the secretary of health. These standards have recently been officially adopted by the Governor and will be enforced by the department of revenue.

Some of our drivers had never received any medical examination and most others had received only one eye examination. We found drivers picked up after accidents who were on the blind pension roll of the State or who had severe heart trouble, severe epilepsy, or other physical conditions which made them completely unfit for driving and most hazardous to themselves and to others. Periodic physical examinations, now required in the State by executive order, are not completely comprehensive but deal mainly with those parts of the body and those conditions which are particularly significant as far as driving a motor vehicle is concerned. It is hoped these examinations will reduce the deaths and injuries from motor vehicle accidents in our Commonwealth.

We are also finding that alcoholism and drug addiction seem to play a major role in motor vehicle accidents. Further study is needed in this area, but obviously such studies will yield significant data.

The skill and industry of private physicians have made possible the control of many of the once prevalent communicable diseases. The

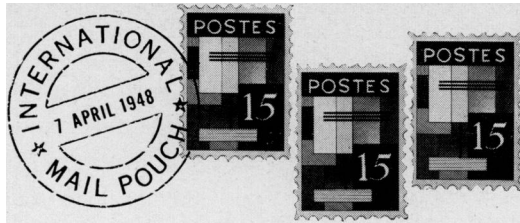
same skill and industry, redirected toward reduction of accident rates, can be depended on confidently to achieve a great deal. Health departments, safety councils, police departments, motor vehicle administrators, and others do at best a shotgun type of education for all of the public. It is the private physician who can determine the accident-prone individual and take the necessary steps to educate him or his family to the extent of appreciably reducing his chances of being harmed.

The personal physician who is best acquainted with the physical, mental, and emotional needs of his patient can best advise against accidents in accordance with individual limits. Who better than the family physician can advise a husband or his wife that it is no longer safe for an oldster, living with them, to go up and down stairs? Who better than the family physician would be in a position to observe the repetition of accidents in a household and the need for referral to the health department for a discreet investigation of the circumstances existing in that household? The physician who has the prevention of home accidents uppermost in his mind will evaluate the patient's accident proneness even as he examines him for signs of disease.

In our State, poison information centers are now available in hospitals within reach of all of our physicians. Poison treatment centers are available in a number of our hospitals. A number of our county medical societies have accident prevention committees.

I believe that hospitals can provide accident prevention information to their patients and their staffs. I would like to see the day when at least one hospital in each major community has a poison treatment center as well as a poison information center. Hospitals can be helpful by recording accidental injuries, analyzing these data for study, and using them for accident prevention within their institutions and their communities.

On the premise that most accidents are preventable, all persons in the health professions can work together and enlist public support with assurance that the toll can be reduced.



### **Kalinga Prize**

Jean Rostand, French geneticist, won the \$2,800 Kalinga Prize for his 105-page book, "Can Man be Modified?" The prize is awarded by the Kalinga Foundation of India under the auspices of the United Nations Educational, Scientific, and Cultural Organization in recognition of an outstanding contribution to the interpretation of science for the general public. The author of some 50 other books, Rostand is known for his experiments in artificially induced parthenogenesis in animals and in directed mutation of toads and frogs by chilling their eggs to alter the chromosome structure.

### **Working Conditions**

Workers in the antimalarial campaign in Surinam face hazardous working conditions in some areas. Casualties have included a drowning in river rapids, a death from an accidental gunshot while hunting for food, vampire bat bites which required treatment for rabies, and bites of poisonous snakes.

—ROBERT BREWER, *sanitary engineer, formerly with the U.S. Operations Mission, Surinam.*

### **Free of Yaws**

Laos is now considered virtually free of yaws after 4 years of effort by two physicians and three teams of technicians. In the southern Provinces, they examined 463,165 persons and treated 16,990 with penicillin, an incidence of less than 4 percent. The technicians found few cases at altitudes of more than 800 meters. One team of workers will continue surveillance.

The World Health Organization delegated a physician to direct the yaws project, the Government of Laos paid the Lao personnel, and the U.S. Operations Mission provided supplies and supplementary stipends for the Lao employees.

—MANLY B. DONALDSON, M.D., *chief, public health division, U.S. Operations Mission, Laos.*

### **Water for Libya**

Developing domestic water systems in Libya requires ingenuity and a range of techniques because of the scarcity of resources common to arid regions and the extensive saline ground water aquifers underlying many towns. Individual dug wells, standard municipal well sources and distribution systems, and modern electrolysis demineralization plants are among the engineer's choices.

For example, to establish a municipal water supply to serve 10,000 persons in Misurata, 1 year of exploratory drilling and ground water studies was necessary to locate an adequate source of acceptable quality. The system, completed in July 1959, consists of three dug wells, a storage reservoir, 8 miles of supply mains, and an extensive municipal distribution system.

In planning a municipal system for Sierte, where the ground water underlying the area is saline, two sources and methods of development are being considered. One would use long galleries to skim the shallow layer of fresh water atop the salt water in sand dunes along the sea; the other would require drilling deep wells in areas remote from the ocean.

For the new hospital in Tobruk, a dual plumbing system carries both potable and saline water. An electrolysis demineralization plant produces 5,000 gallons of treated water per day. The potable water serves medical, drinking, and cooking purposes and the hot water system where it is necessary to conserve heating units and pipes. The saline water is used for general sanitation.

—PAUL AGNANO, *chief sanitary engineer, health and sanitation division, U.S. Operations Mission, Libya.*

### **Maps and Malaria Eradication**

Malaria eradication activities in Nepal are hampered by a scarcity of adequate maps. We obtained a few sheets from the Army Map Service and private sources, which were prepared in 1929 by the Surveyor General of India. They are already out of date and the scale, 1 inch to 4 miles, is much too small. Many villages are not on the maps and some that are marked are not named. As a stopgap solution, we've enlarged them with a pantograph and corrected them as fieldwork progresses.

—RAYMOND E. STANNARD, M.D., *chief, public health division, U.S. Operations Mission, Nepal.*