CAN ACCIDENTAL TRAUMA BE PREVENTED?*

George M. Wheatley, M.D., M.P.H.
Third Vice-President
Metropolitan Life Insurance Company
New York City

We are all aware of the remarkable achievements in disease therapy and prevention in the past several decades. Preventive medicine has become a practical reality in every day practice. Most infectious diseases have been controlled and some virtually eliminated. This has created a new order in the causes of death and disability. New health problems command the attention of the practicing physician as well as the medical investigator. One of these is accidental trauma.

Vital statistics show that in 1950 some 90,000 deaths in the United States were the result of accidents, a mortality rate of 60 per 100,000 population. Only cardiovascular disease and cancer deaths now exceed those due to accidents. The number of accidental deaths last year was about 4½ times the total number of Americans killed and missing in action so far in Korea. If we consider all battle casualties in World War II, the number of those killed, wounded, and taken prisoner combined were about one-eighth of the accidental injuries last year in the United States.

Accidents are now the leading cause of death from ages 1 to 25; second to heart disease in the broad age group 25 to 44; and fifth among persons 45 and over. Expressed in another way, fatal accidents cut off more years from the working life of the American people than any other single cause of death.

Like the visible portion of an iceberg, fatalities tell only a small fraction of the story of social and economic loss. For the beneath-the-surface portion, estimates only can be made. For every fatal accident, there are probably 100 serious enough to disable the individual for a day or more and many of these require medical attention.

Treatment of accidental trauma is an important part of the average doctor's daily practice. Despite this, physicians generally do not think of accident prevention as a part of preventive medicine. Once the injury has been treated, the essential facts obtained to satisfy the requirements of an insurance company, or the death certificate filled out, the physician is apt to consider his responsibility at an end. However, since accidents are growing in importance as causes of death and disability, it is necessary for physicians to determine their responsibility for the prevention of accidents as well as for the treatment of injuries.

---

* Presented at the Second General Session, Massachusetts Medical Society, Hotel Statler, Boston, May 23, 1951.

Why Does Accident Prevention Concern the Physician?

The finest tradition of the medical profession is its sincere effort to prevent sickness and death. The present shining example of success, of course, is the progress made in preventing the diseases of childhood. Immunization and application of the science of nutrition have been major factors. General practitioners have played and are continuing to play a major role in this phase of preventive medicine. More than 70 percent of the child care given in the United States is in the hands of general practitioners[1]. There is every reason to believe that, as public health continues to improve, medical practice will be oriented, to an increasing degree, around prevention rather than treatment. There are two age groups which the physician has the best chance of reaching with accident prevention efforts and which are comparatively inaccessible to organized safety programs. These are the very old and the very young. This discussion will focus attention on only one of these -- children.

Accidents are now by far the most frequent cause of death among children. Every year, 11,000 children between the ages of 1 to 14 lose their lives by accidents. The highest accident fatality rate is between ages 1 and 5. Accidents kill twice as many of these young children as measles, scarlet fever, whooping cough, diphtheria, dysentery, tuberculosis, and poliomyelitis combined.

The marked changes in the ranking of principal causes of death is also most apparent in the young. Chart 1 shows the leading causes of death, ages 1 to 4,

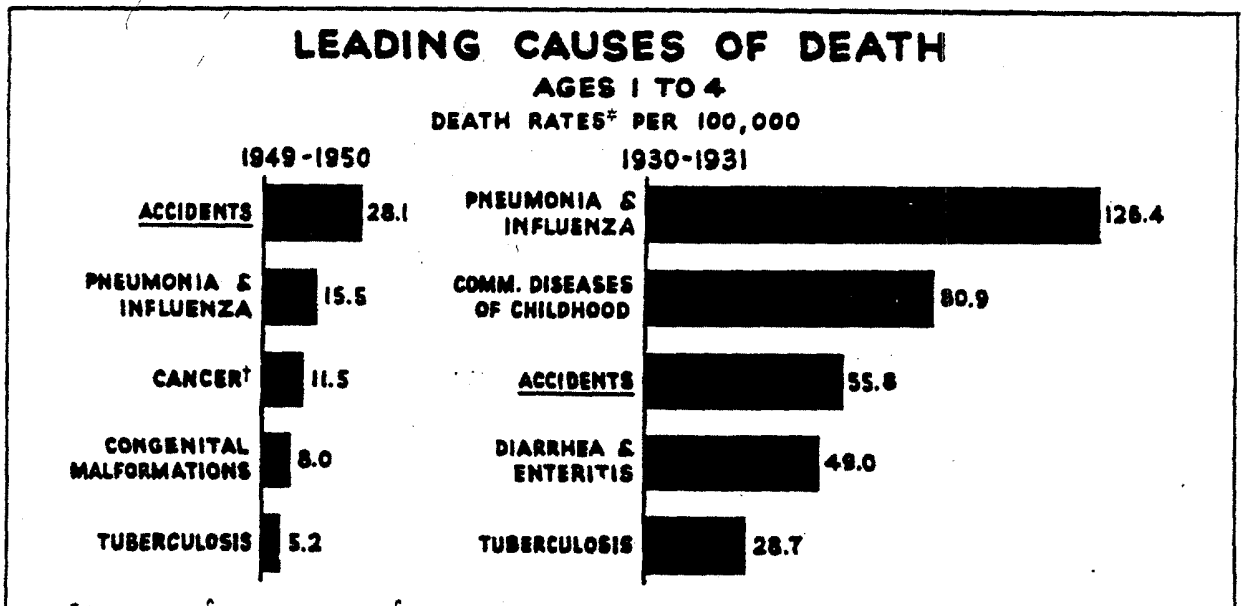

CHART 1

in 1949-50 as compared with 1930-31 among policyholders of the Metropolitan Life Insurance Company.

While the rate for accidents has not been standing still, the rates for various diseases have fallen at a terrific pace. The prominence of accident mortality is a product, in part at least, of this improvement in general mortality.

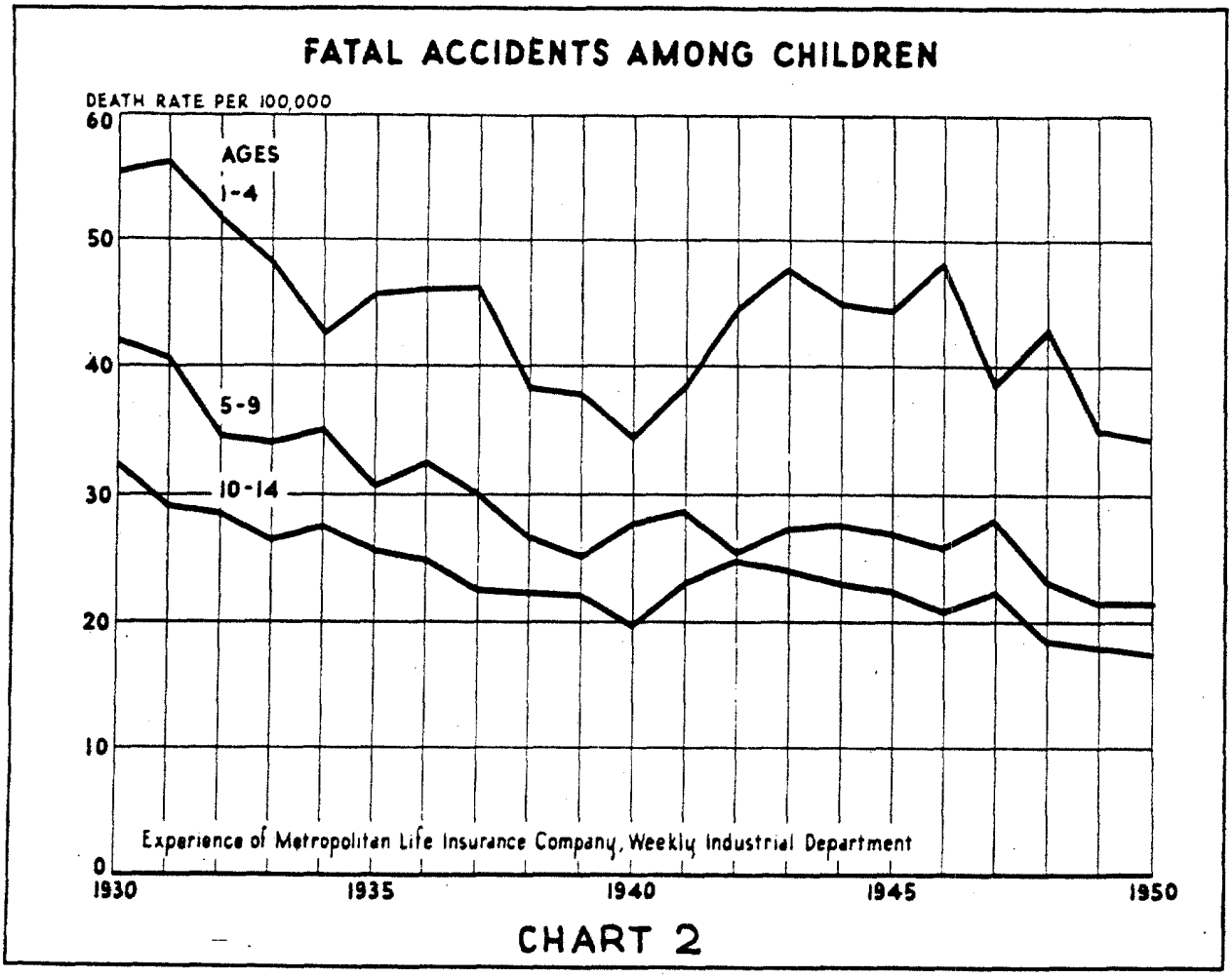

CHART 2

Chart 2 illustrates the trend in the past 20 years in three age groups: 1 to 4; 5 to 9; and 10 to 14. The highest accident rate is found, significantly, in the preschool-age group of 1 to 4 - a period during which children spend most of their time in the home environment, supposedly under care and supervision. In this connection, it is also interesting to note that, in the early years of World War II when the rates for all three age groups begin to rise, the sharpest rise is among the 1- to 4-year-olds. As we know, from 1940 to 1946, many families were disorganized by the war - with fathers away and mothers often working. This experience should be a warning now that we are once more entering a period when supervision of young children may be relaxed because of the need to call women back to industry.

Types of Accidents

Chart 3 shows some of the types of fatal accidents which occur most frequently in the 1 to 4 age group. About half of these occur in and around the home. Motor vehicles are the greatest single cause. A large percentage of motor vehicle fatalities strike children playing in the streets near their homes and too many occur in parents' or neighbors' driveways.

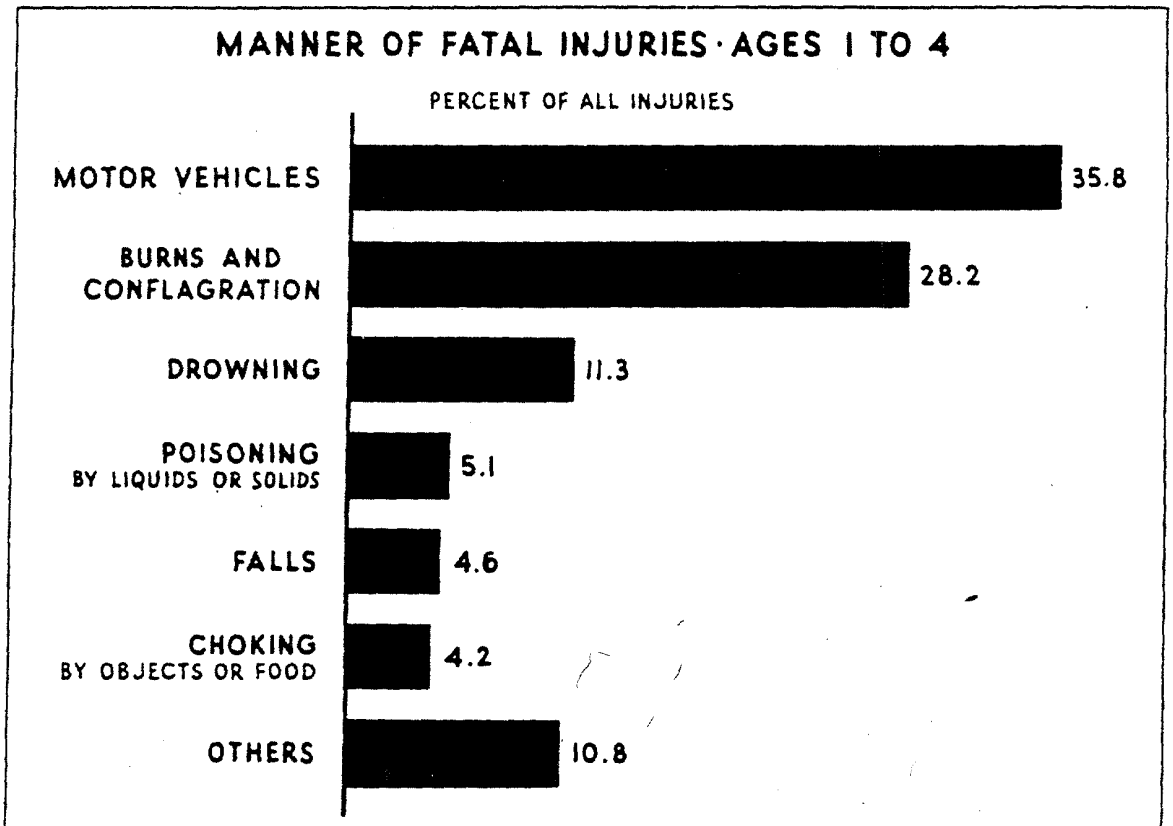

CHART 3

In a recent study of non-fatal home accidents by Armstrong and Cole,[2] 40 percent of the accidents to children under 5 years of age were the result of falls. Fatal falls in very young children are frequently due to rolling out of cribs or off places where they have been left without proper protection. When the child reaches the walking and toddling age, falls down stairs and out of windows contribute largely to this type of fatality.

Burns and conflagrations combined rank second to motor vehicles as causes of accidental deaths in the 1 to 4 age group, but rank first by a considerable margin among youngsters 1 year of age. Many preschool children lose their lives by being trapped in burning buildings. Between the ages 1 and 2 a large percentage of deaths are caused by children upsetting or falling into hot liquids. At the later

preschool ages, playing with matches and clothing ignited at open fires contribute materially to the death toll.

Drowning is one of the more frequent causes of accidental death in young children, particularly among 1- and 2-year-olds. About 400 deaths in these two ages are reported annually. Many of these fatalities occur in ponds or pools near the children's homes or sometimes in their own back yards.

Fatalities due to choking are by no means rare. Twenty-six deaths in 1946 to 1947 among boys and girls 1 to 4 in our experience occurred from the aspiration or swallowing of foreign bodies. Poisoning accounts for about 5 percent of all fatal accidents to young children. Many of these occur between ages 1 and 3, the inquisitive and "hand-to-mouth" period. The incidence of child poisoning is inadequately represented by mortality rates. For example, in a study of admissions to the Children's Hospital, Washington, D.C., covering a 4-year period, there were only two deaths, but 250 cases[3].

Lead poisoning is not a prominent cause of mortality in this age group but since the Baltimore City Health Department[4] has reported an increase in childhood plumbism in that city, more attention is being given to its study and prevention. This is a somewhat different category from most other accidental poisonings in children. It does not have the dramatic or clearcut relationship between cause and effect. The diagnosis is frequently made without adequate laboratory or epidemiological study to verify that the child has ingested and absorbed lead. For example, at the Children's Medical Center, Boston, where Byers[5] has been making a careful investigation of suspected lead poisoning cases of 33 children referred because of lead poisoning in the past three years, the diagnosis has been confirmed in 18 cases; the condition was not present in 8; and in 7 the diagnosis as yet has not been determined. More knowledge is needed about childhood plumbism. Physicians in New England can contribute by referring suspected cases to the Children's Medical Center for study. Efforts are being made in Baltimore, Cincinnati, and elsewhere to create special facilities to aid physicians in the diagnosis of this serious and frequently ill-defined condition.

The cause in young children is usually due to pica and the source of lead is usually lead-containing paint on window sills, play yards, toys, etc., which have been repainted by amateurs. Inside woodwork is rarely painted with a lead-containing paint by professional painters and reputable toy and juvenile furniture manufacturers do not use toxic paints on their products. Prevention must be centered chiefly on educating parents about the danger of permitting children to chew or suck on painted objects or surfaces.

What Can The Physician Do About Prevention?

We are mindful of the immense amount of work done in nearly every community through the organized safety movement led by the National Safety Council. Safety education, engineering, and law enforcement reaches industry, the schools, motorists and many other individuals and groups.

The physician's special contribution is education of parents of infants and young children whom he sees in his daily practice and in health supervision activities. Accident prevention teaching can be made a natural part of advice to parents during child guidance and development discussions with mothers.

For young children, child accident prevention is, in a sense, a form of immunization produced not by the antigen of a vaccine but by the antigen of education. It is not given directly to the child, but to his parents.

Safety immunization must fit the needs of the individual child and his environment. This need can be anticipated by the physician who understands the home situation and is familiar with the child's growth and development. The vaccine is intended to increase parents' knowledge, understanding, and confidence in child management and care. Its administration should be timed to help parents anticipate risks for which reasonable precautions can be taken at various stages of development. Accident prevention education handled in this way becomes a natural part of the child-rearing program and is not likely to produce attitudes of anxiety, fear, and over-protection. The "dose" and the "technique" of safety education is a matter of professional judgment. The child's personality, his muscular coordination, his physical environment, and the parents' emotional attitude toward the child and the doctor, are factors which determine <u>what</u>, <u>when</u> and <u>how much</u> should be given.

Many physicians already include this immunization in their guidance of parents. Here are some illustrations. First, concerning the risk of rolling off things: As soon as the baby can wiggle, the mother must understand she cannot leave him alone for a moment to do anything else, unless she leaves him on nothing higher than the floor. Second, on susceptibility to falls, when the child is learning to walk: This is a calculated risk and parents should be told that the only sensible thing to do is to safeguard the child's practice area. This means gates on stairs, screens before fireplaces, avoiding table cloths when hot things are on the table. Then the baby should be let alone to enjoy himself. Bruises and bumps are part of the learning process. Third, on poisonings: A child at the exploring age - which begins as soon as he can crawl - will sample everything in his cruising range. Poisons must be kept under lock and key. Medicines of all kinds must be kept out of reach. So should cleaning materials like carbon-tetrachloride, kerosene, etc.

Two drives characteristic of child development frequently lead to accidents if they are not recognized and directed into constructive activity. These are: the child's impulse to imitate behavior observed in others and his fondness for repetition of an act. If parents are heedless in their actions, the child may follow suit. If the child does a hazardous thing and avoids disaster, he is likely to repeat the procedure. An illustration of this tendency to repetition was seen recently when a 2-year-old was killed in a fall from a second story balcony. The father said the child had been observed repeatedly climbing up - yet nothing had been done to prevent what any person with knowledge of child behavior could have predicted would end tragically.

A recent fatal case of acute lead encephelitis was traced to eating paint over a period of 6 to 8 weeks. The parents had observed the child eating chips of paint but "didn't know there was any harm in it."

Press[6] has suggested that physicians give parents a home safety check list about the time the child is 8 months old. At this age, the accident hazard begins to increase and it also coincides with the baby's disease immunization series. A thorough check list on home safety can be obtained free from the local health department or safety council. Such a list, presented to the mother and taken home, filled out carefully, and at a subsequent visit discussed with her, will do much to impress the whole family with the importance of the subject. There are several educational booklets for parents on child safety which can be made available in waiting rooms. The Children's Hospital of Boston has published a useful booklet on the prevention and first-aid handling of pediatric emergencies which every home with children should have.

Kleimschmidt[7] urges the doctor to take mothers on a tour of inspection in their own households from garret to cellar. Finding and advising corrective measures for such accident breeders as a carelessly placed roller skate, a medicine cabinet easily accessible to little hands or an unguarded stair or window may be as significant a contribution to preventive medicine as recommending the removal of a pair of diseased tonsils. Such "environmental inspection" is an effective way to educate. Most people must have their attention directed to hazards before they recognize them.

Dietrich[8] recommends gradually substituting learning experiences under parental supervision for the complete protection given the child in the first year of life. The runabout child should be given opportunities to acquire practical concepts of pain, heat, gravity, non-edibility, etc. Properly handled, split lips, technicolor bruises, chipped teeth and bloody scalps, can be of tremendous and lasting educational value.

One of the physician's most valuable allies in such educational efforts in many communities is the public health nurse. She is often able in repeated visits to give parents guidance for which the physician has neither time nor opportunity.

In her own care and instruction, such as bathing the new baby, demonstrating the preparation of the formula, etc., she can impress upon the family proper techniques which may avoid accidents. She is also in a position to know individual home conditions and to point out constructive action in regard to hazardous situations.

Accidents don't "just happen." It has been estimated that 90 percent of accidents are preventable, and that four-fifths of the accidents involving children are due to acts of omission or commission by adults. Emotional disturbances such as worry, fear, grief, anxiety, and anger cause preoccupation that interferes with alertness and tends to reduce reaction time. Obviously the accident risk under these circumstances is greater not only to adults but to children who may be under their supervision.

Physicians, with their special access to the very young and the very old among whom the home accident problem is greatest, have a responsibility and opportunity to prevent accidental trauma. Parents with young children particularly will value this guidance from their physician. Briefly, and in summary, the following activities are suggested:

1. Observing, on home calls, hazardous conditions in and around the house and suggesting corrective measures.

2. Giving careful instruction when prescribing medications to reduce the risk of overdosage or careless handling in the home. Elimination of sugar-coated pills which may tempt young palates.

3. Studying the causes of medical emergencies and accidents particularly where the individual appears "accident susceptible" and using this knowledge with the family and with others to help prevent a similar condition in the future.

4. Utilizing accident-case presentations in hospital or medical society to emphasize ways to prevent accidents as well as to treat them.

5. Helping to develop community educational programs in cooperation with health departments and voluntary agencies and by presenting the facts to the community and local medical society.

Finally, we have stressed the physician's role in safety guidance of parents, because we believe the possibilities for prevention are greatest in young children. There are five factors which have to be taken into account in applying the vaccine of safety education in everyday practice.

1. We have to know the common or likely hazards at certain months or years of age. We have some data on this but more needs to be

accumulated through research. We must develop effective means of discussing these hazards with parents in a manner which will encourage constructive action without creating unnecessary fear or alarm.

2. We must be familiar with the characteristic behavior and drives at certain ages.

3. We must understand the emotional attitude and behavior of the parents toward the child and toward each other. The effect of a disregard of safety practices on the part of the parents should be pointed out. The value of a good example cannot be overestimated.

4. We must know the physical, emotional and intellectual capacities of the individual child.

5. We must know the environment, not only the physical setting, but the emotional climate in which the child is living.

Immunization, dietetics, and antibiotics have greatly enhanced the content of preventive medicine, especially in the health supervision of young children. General practitioners have had a large share in these life-saving efforts because they care for 70 percent of the children in this country. We propose adding a new immunization to the health supervision program of children -- the vaccine of safety education.

REFERENCES

1. Child Health Services and Pediatric Education. Report of the American Academy of Pediatrics.
   Commonwealth Fund, New York. 1949.

2. Armstrong, Donald B., and Cole, W. Graham: Persistent Hazards in the Home Accident Pattern.
   American Journal of Public Health, November 1949.

3. Rubin, Milton B. and Recinos, Jr., Adrian: Report on Child Poisoning Cases Admitted to Hospital.
   Children's Hospital, Washington, D.C. 1949.

4. Baltimore Health Department Study.
   Credit Lines, American Journal of Public Health, September 1949.

5. Byers, R.K., Children's Hospital, Boston. Personal communication.

6. Press, Edward: The Accident Problem.
   Journal of American Medical Association, November 29, 1947.

7. Kleinschmidt, H.E.: Accident Prevention in Medical Practice.
   New York State Journal of Medicine, August 15, 1948.

8. Dietrich, Harry F.: Accidents, Childhood's Greatest Physical Threat, Are Preventable.
   Journal of American Medical Association, December 2, 1950.