

Pedestrian Accidents in Kentucky

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When a pedestrian is hit by a motor vehicle, he is usually injured or killed; there is no protective cushion to absorb the impact. The high concentration of pedestrians in urban areas coupled with heavy vehicle traffic often results in large numbers of pedestrian accidents. In rural areas, there are considerably fewer pedestrians but traffic speeds are higher, and, therefore, accidents are more often fatal.

Pedestrian fatalities have increased in the United States from about 7800 in 1960 to approximately 10 500 in 1973 (1). There are 120 000 pedestrian accidents each year. Total traffic accidents in the United States number about 17 million annually with about 56 000 fatalities. Thus, pedestrian accidents account for less than 1 percent of the total traffic accidents nationwide but more than 18 percent of all fatal traffic accidents. Figures released by the National Safety Council in 1974 show that total accident costs from pedestrian accidents amount to more than \$1.2 billion annually (using \$3400 per injury and \$82 000 per fatality).

In 1973, there were an estimated 1500 pedestrian accidents in Kentucky; 167 pedestrians died in these accidents, giving a pedestrian death rate of 5.2 deaths per 100 000 population. The national rate is 5.0 (1). The pedestrian death rate in Kentucky has exceeded the national rate in 9 of the 14 years from 1960 to 1973. The number of pedestrian deaths in Kentucky has varied between 129 and 167 annually since 1960 (2). Total costs for pedestrian accidents in Kentucky amounted to more than \$18 million in 1973.

Kentucky is a predominantly rural state. Since 1960, most pedestrian fatalities have occurred in rural areas. However, only 342 out of an estimated 1500 pedestrian accidents in Kentucky in 1973 occurred on the rural state-maintained highway system. Nearly 30 percent of all rural pedestrian accidents were fatalities, whereas only 4 percent were fatalities in urban areas. There were virtually no property-damage-only pedestrian accidents

reported.

To obtain information on rural pedestrian accidents, files of rural accidents reported by state police for 1972 and 1973 were searched. To study pedestrian accidents in urban areas, data were obtained directly from the local police departments of cities—Louisville, Lexington, Covington, Owensboro, Bowling Green, Paducah, Ashland, Newport, and Frankfort. The populations of these cities range from about 362 000 (Louisville) to about 22 000 (Frankfort). The accident information was analyzed to determine the major causes and patterns of pedestrian accidents.

HUMAN FACTORS

Many traffic accidents result from errors in human judgment. Research indicates that about two out of every three pedestrians killed in traffic accidents violated a traffic law or committed an unsafe act (3). Thus, a reasonable approach to reducing traffic accidents of any kind is to analyze the nature and possible causes of human error and seek to remedy them. The human factors considered were the effect of the ages of the pedestrian and the driver, pedestrian action preceding the accident, and the cause of the accident.

The ages of pedestrians killed in traffic accidents were plotted against percentage of occurrence. Pedestrian fatalities were highest for ages under 9 and over 64. Most people killed in traffic accidents in Kentucky are between the ages of 15 and 44, which corresponds to the age range of the vast majority of drivers (4). The large percentage of deaths of very young pedestrians results from their lack of understanding of traffic dangers. The high percentage of fatalities among elderly pedestrians results from reduced mobility and failing eyesight or hearing. A plot of the annual fatality rate for ages of pedestrians from 1 to 75 years resulted in a U-shaped curve.

The most frequent pedestrian action preceding the fatal accidents involved crossing the street (69 percent). As expected, walking with traffic causes three times as many pedestrian fatalities as walking against traffic (15 to 5 percent). Standing, lying, or playing in the roadway was associated with 11 percent of the pedestrian fatalities.

Most pedestrian fatalities were the fault of the pedestrian (69 percent). A large percentage of fatalities (25 percent) involved children under 10 playing in or running across the street. Although a national study (3) indicated that about 23 percent of all pedestrians killed in accidents had been drinking, only 5 percent were so identified in Kentucky. It may be important to note also that, although 20 percent of all pedestrian fatalities occur at intersections, only 3 percent of them resulted from an illegal crossing of the intersection. The major driver fault was speeding or reckless driving (12 percent). Inattentiveness was a factor in 9 percent of the cases, and drinking caused 4 percent of the fatalities. The influence of alcohol, therefore, was responsible for about 9 percent of the pedestrian fatalities, compared with about 17 percent of all traffic fatalities in Kentucky.

ENVIRONMENTAL FACTORS

Environmental conditions associated with fatal pedestrian accidents are of particular importance because they give the engineer information that may be helpful in deciding which physical characteristics of the roadway may contribute to pedestrian fatalities. Particular environmental conditions considered here are road defects, road character, weather and light conditions, type and class of road, and area or county in which pedestrian fatalities are most prevalent.

Of the 321 reports of fatal pedestrian accidents that we examined, only 12 indicated any road defect that could have contributed to the accident. Of the 12 road defects, 5 were defective shoulders and 2 were road construction zones. One defect was described as holes, ruts, or bumps in the roadway. Other defects included a dirt road and mud, sand, and other loose material on the road surface.

The most common characteristic of locations of fatal pedestrian accidents was a straight, level roadway (41 percent). Other types with appreciable numbers of fatalities were intersections (20 percent), straight roads on a grade (14 percent), and alleys and driveways (13 percent). The remaining fatalities occurred on curves (8 percent), in parking lots (2 percent), and at interchanges and bridges (1 percent each).

A summary of weather and light conditions showed that most (52 percent) pedestrian fatalities occurred during daylight hours (46 percent on dry pavements and 6 percent on wet pavements). Lighted streets accounted for only 12 percent (7 percent on dry and 5 percent on wet pavements) and dark street conditions existed during 36 percent (28 percent on dry and 8 percent on wet pavements) of the fatal pedestrian accidents. Dry highway surfaces were reported in 81 percent of these accidents.

The percentage of fatalities by type of location (rural, small urban, and large urban) and number of lanes was also determined. Two-lane roads accounted for 75 percent of these fatalities, and about 61 percent were in rural areas. Interstate highways and parkways accounted for 9 percent even though pedestrians are prohibited on these facilities.

TIME FACTORS

The relationship between the time of day and the percentage of fatal pedestrian accidents in Kentucky was also determined. The greatest percentage of occurrences was noted at approximately 4:00 p.m. and the smallest at 4:00 a.m. However, there was a large increase in pedestrian fatalities between 7:00 and 8:00 p.m., corresponding either to dusk or early nighttime hours when the pedestrian is particularly hard to discern. Much of the pedestrian activity normally subsides after

10:00 p.m.

The relationship between the day of the week and the percentage of pedestrian fatalities shows a broad peak from Wednesday through Saturday, with the lowest percentages of pedestrian fatalities on Mondays and Tuesdays. The exposure of school children to motor vehicles before and after school on weekdays, combined with weekday pedestrian shopping trips, tends to smooth the curve of pedestrian fatalities over the week.

PEDESTRIAN ACCIDENT CONCENTRATIONS

The urban pedestrian accidents in 1972 and 1973 included 1650 that occurred in the nine largest cities in Kentucky. In the larger cities there are large numbers of accidents due to congestion. There were more than 20 000 traffic accidents within the city limits of Louisville in 1973, compared with about 30 000 accidents reported over the entire rural highway system in Kentucky by state police in 1973. There were 476 pedestrian accidents in Louisville in 1973, compared with 342 over the statewide rural highway system.

The annual number of pedestrian accidents is shown in Figure 1 as a function of population by city. The plot shows a uniform increase in pedestrian accidents as population rises from 22 000 to 360 000. As can be seen, a straight line closely represents six of the nine cities. Covington and Newport, therefore, have a more serious pedestrian accident problem than the other cities. The annual rates of occurrence for pedestrian accidents per 100 000 population also showed Newport (208) and Covington (169) to be high in relation to the other cities. Paducah showed a slightly lower pedestrian accident rate for its population.

The 120 Kentucky counties were divided into nine groups by population. The number of fatalities per county, the average population of the counties in each group, and the fatality rates for each of the groupings were computed. The rate of fatal pedestrian accidents decreases with increasing population because of the high percentage of deaths in predominantly rural counties. The higher vehicle speeds in pedestrian-related accidents on rural roads present a greater likelihood of a fatality. Because of the large number of pedestrian accidents in urban areas, combined with a high risk that any pedestrian accident will result in a fatality, the pedestrian death rate was highest in Jefferson County, the most highly populated. The average annual number of pedestrian fatalities increased from about 0.5 in sparsely populated counties to about 40 in Jefferson County, which has a population of more than 600 000 (Figure 2).

COUNTERMEASURES

Because of the random occurrence of pedestrian accidents and their low numbers compared with other types of accidents, cost-effective countermeasures are not always possible. The pedestrian accident problem must be handled in the planning stages of highway networks instead of being treated only after a concentration of such accidents is noted at a particular location. Some measures that have been used successfully in reducing the potential for pedestrian accidents include

1. Prohibition of vehicle parking,
2. Designation of one-way streets,
3. Improvements in overhead street lighting,
4. Use of crosswalks,
5. Installation of pedestrian signals,
6. Use of pedestrian barriers,

Figure 1. Relationship between annual number of pedestrian accidents and population in major Kentucky cities.

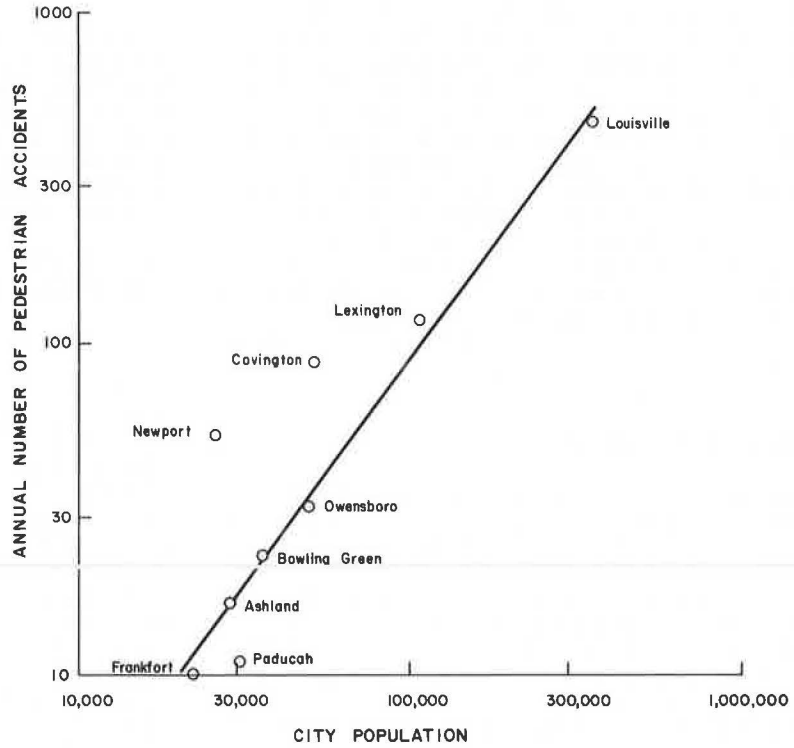
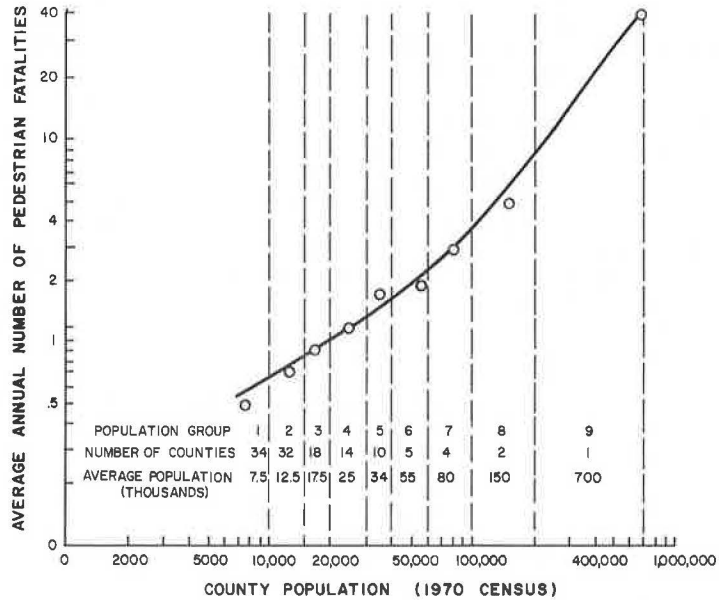


Figure 2. Relationship between county population and average annual pedestrian fatalities.



- 7. Prohibition of pedestrians (on Interstate high-ways),
 - 8. Improvements in driver regulations,
 - 9. Installation of pedestrian refuge islands,
 - 10. Use of reflectorized apparel for pedestrians,
 - 11. Installation of special pedestrian signing and markings,
 - 12. Widening of shoulders (in rural areas),
 - 13. Installation of sidewalks,
 - 14. Grade separation of crossings,
 - 15. Construction of pedestrian malls,
 - 16. Construction of playgrounds (in urban areas),
 - 17. Conducting of pedestrian education programs,
- and

- 18. Increased enforcement of pedestrian and driver regulations.

REFERENCES

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2. Standard Summary of Motor Vehicle Accidents in Kentucky. Kentucky State Police, Frankfort, 1960 to 1973 Eds.
3. Facts About Pedestrians. American Automobile Association, Washington, D.C., May 1973.
4. Kentucky Fatal Accident Facts. Kentucky Bureau of Highways, Frankfort, 1972 and 1973 Eds.