Motor vehicle collisions resulted in 5,307 pedestrian fatalities in the United States during 1997. Although this number has fallen over 20% from nearly 7,000 in 1988 as shown in Fig. 22.1, pedestrian fatalities are still a significant problem, accounting for 13% of the nation’s total traffic fatalities. This problem is even larger in many other countries such as Japan and the United Kingdom, where nearly 30% of traffic fatalities are pedestrians. Other nonoccupants such as motorcyclists and pedal cyclists account for an additional 30% of traffic fatalities in Japan and 15% in the United Kingdom.

While pedestrians account for a significant portion of total traffic fatalities, nonfatally injured pedestrians number approximately 77,000 in the United States, accounting for only 2% of total traffic injuries. This discrepancy illustrates not only the relative severity of pedestrian crashes, but also the lack of emphasis placed on pedestrian injury reduction when compared with occupant protection. Historically, injury reduction has focused on pedestrian and driver education. Developing vehicle-based countermeasures to reduce the severity of this trauma has often been considered an intractable problem, consequently limiting efforts in this area. In recent years, however, field study data analyses have provided a more thorough understanding of the pedestrian crash environment. The most frequently and seriously injured body regions, as well as sources for those injuries have been identified. Based on this knowledge, research to reduce pedestrian trauma has begun to yield encouraging results.

Analysis of the Fatality Analysis Reporting System (FARS) and General Estimates System (GES) reveals that pedestrian crashes are largely an urban problem. About 80%, including 70% of fatalities, occur on urban and residential roads. Preimpact braking is present in 56% of these, reducing impact speeds an average of nearly 20 km/h. As a result, pedestrians are struck at relatively low impact speeds; 80% are at speeds of 48 km/h or less. The relatively low-speed nature of pedestrian collisions is encouraging, because the chances of reducing pedestrian trauma through vehicle modifications are much greater at these lower speeds. This information has provided research incentive to focus on impacts in the 0 to 48 km/h speed range.

Young people are overrepresented as pedestrian crash victims. Figure 22.2 shows that pedestrians under the age of 15 sustain 35% of all pedestrian injuries. Pedestrians account for 20% of all traffic fatalities in this age group, and approximately 30% of all traffic fatalities between the ages of 5 and 9 years. These facts show that child trauma is a significant part of the pedestrian problem and warrants serious attention.

The National Highway Traffic Safety Administration (NHTSA) conducted the Pedestrian Injury Causation Study (PICS) in the late 1970s to investigate many aspects of pedestrian crashes, including injury sources and vehicle-pedestrian interaction. This study was designed
22. Vehicle Interactions with Pedestrians

Figure 22.1. Ten-year pedestrian fatality trend. (From NHTSA.1)

Figure 22.2. Age distribution of pedestrian injuries. (From NHTSA.1)