How Risky Is the Commute to School?

Deaths and Injuries by Transportation Mode

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In the United States, motor vehicle crashes are the leading cause of death among children (*1*). Although the laws mandating school attendance vary from state to state, all children must attend school until they are at least 16 years old. Because almost all children and youth 5 to 18 years old are enrolled in school, the school commute becomes an important source of exposure to the traffic environment.

In previous generations, many children walked or rode bicycles to school. In the early 1970s, for example, an estimated 66 percent of children walked to school. Since then, increased reliance on motor vehicles for transportation, changes in the commuting distance between housing and schools, and changes in zoning and building regulations have had an impact on the way children get to school.

The risk of injury or death during the school commute varies by mode of transportation. The Transportation Research Board's Special Report 269, *The Relative Risks of School Travel: A National Perspective and Guidance for Local Community Risk Assessment*,[1] documented findings that only 2 percent of student deaths were related to school buses and that a disproportionate share of passenger vehicle-related student deaths occurred when a teenager was driving (*2*).

Because the environment of school travel is

[1] www.TRB.org/publications/sr/sr269.pdf. To order, www.TRB.org/bookstore/.

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changing, a periodic assessment of the risks to children and youth during school commutes is important. Following is an examination of changes in injury risk over time by transportation mode.

Obtaining and Defining the Data

The data were obtained from three sources:

- The Fatality Analysis Reporting System (FARS), an annual census of all fatal crashes on public roadways in the United States—to identify the number of deaths (3);
- The National Automotive Sampling System's General Estimates System (GES), a nationally representative sample of all police-reported crashes—to estimate the number of nonfatal injuries (4); and
- The U.S. Census Bureau's population estimates—to calculate rates by dividing the number of deaths in a period by the number of children and youth in the period, multiplied by 100,000 (5).

The FARS and GES records do not specify the purposes of the trips. Therefore a weekday morning time period was defined during which travel by school-age children and youths was likely to be to school. Afternoon trips from school could be to home or to a variety of other locations—such as work or sports—and therefore were not addressed in the study.

All motor vehicle–related deaths and injuries involving school-age children and youth between September 1 and May 31—approximating the typical 9-month school year—and from Monday to Friday between 6:00 a.m. and 8:59 a.m. were assumed to have occurred on a trip to school. Data were reported for two 3-year periods:

- Period 1: September 1, 1993, to May 31, 1996; and
- Period 2: September 1, 1999, to May 31, 2002.

The 3-year periods increased the sample sizes for deaths and injuries by transportation mode. The larger samples were necessary for modes that have few deaths per year, such as buses.

Deaths and injuries were classified by mode of transportation. Children and youths could be injured as vehicle occupants or as pedestrians or bicyclists.

Motor vehicles were grouped as passenger vehicles—including cars, light trucks, and sport utility vehicles; school buses; other buses, such as transit; or all other vehicles—for example, motorcycles or recreational vehicles. Passenger vehicles were further classified as having young drivers under 21 years old or adult drivers 21 or more years old. Rates per 100,000 population were then compared across the 3-year periods.

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Determining Rates

More than 300 children and youths 5 to 18 years old were killed each year in motor vehicle crashes during the approximated trip to school. An estimated 40,000 to 50,000 were injured as vehicle occupants, pedestrians, or bicyclists. The rates of deaths and injuries varied by mode of transportation.

The highest death rate during the two 3-year periods was for occupants of vehicles driven by persons under 21 years old (0.36 per 100,000). The number of deaths in vehicles with drivers under 21 years old during the two periods was comparable, although the rates decreased slightly, from 0.36 in 1993–1996 to 0.33 in 1999–2002.

The death rates involving school buses, other buses, and other or unknown vehicles were based on small numbers and should be considered unstable. For example, school buses were involved in 12 deaths during Period 1 and in 7 deaths during Period 2; the rate for the 7 deaths in Period 2 was 0.004—a very small number that is lost when reporting to only two decimal places. Consequently, calculating a difference for school buses between Period 1 and 2 was not possible. The number of deaths decreased from 946 in Period 1 to 922 in Period 2 when data for all transportation modes were combined (see Table 1).

The rates for nonfatal injuries, like the rates for deaths, were highest for passenger vehicles driven by young drivers. The categories of other buses and other or unknown vehicles had the lowest injury rates. Between Periods 1 and 2, injury rates decreased for all transportation modes except other buses, for which

TABLE 1 Deaths and Injuries to Children 5 to 18 Years of Age from Motor Vehicle Crashes During Morning Hours,[a] Monday Through Friday, September Through May,[b] by Mode of Transportation, 1993–1996 and 1999–2002

	Deaths			Injuries[c]		
	Period 1 Number (3-year Rate)[d]	Period 2 Number (3-year Rate)[d]	Rate Change	Period 1 Number (3-year Rate)[d]	Period 2 Number (3-year Rate)[d]	Rate Change
School Bus	12 (0.01)	7 (0.00)	Unable to calculate	9,576 (6.08)	5,085 (2.96)	Decrease
Other Bus	0 ( )	0 ( )	No deaths	1,101 (0.70)	2,094 (1.22)	Increase
Pedestrian	165 (0.11)	136 (0.08)	Decrease	9,628 (6.11)	8,698 (5.06)	Decrease
Bicyclist	22 (0.01)	11 (0.01)	No change	5,064 (3.21)	2,920 (1.70)	Decrease
Passenger Vehicle Driver Age ≤ 20	565 (0.36)	566 (0.33)	Decrease	76,868 (48.79)	62,944 (36.63)	Decrease
Passenger Vehicle Driver Age ≥ 21	168 (0.11)	189 (0.11)	No change	48,990 (31.10)	41,228 (23.99)	Decrease
Other/Unknown	14 (0.01)	13 (0.01)	No change	1,027 (0.65)	577 (0.34)	Decrease
Total	946 (0.63)	922 (0.54)	Overall decrease	152,253 (96.6)	123,546 (71.9)	Overall decrease

[a] *6:00 a.m.–8:59 a.m.*

[b] *Period 1 includes the 9-month approximated school years from September 1, 1993, through May 31, 1996. Period 2 includes the 9-month approximated school years from September 1, 1999, through May 31, 2002.*

[c] *Numbers and rates of injuries are based on estimates from a nationally representative sample of crashes.*

[d] *Rates per 100,000 population.*

the injury rate increased. The school bus and bicyclist categories had the largest decreases. Taking all modes together, total injuries decreased from 152,253 in Period 1 to 123,546 in Period 2 (see Table 1).

Managing the Risks

The risk of death or injury on the trip to school varied by mode of transportation—with the highest death and injury rates for children in passenger vehicles. These data also indicated some decrease in risk between 1993 and 2002.

Assessing the practical change in rates, however, is difficult with the small sample sizes. For example, the injury rate for pedestrians changed from 6.11 in Period 1 to 5.06 in Period 2—a 17 percent decrease. Yet when projected to the nation as a whole, this change represented only one fewer injury per 100,000 students.

Recently, in an effort to curb obesity in children, the public health community has encouraged walking and bicycling to school. These modes of transportation have obvious physical health benefits, but safety concerns also must be acknowledged and addressed.

The solution may be as simple as having adults walk children to school or ensuring that bicyclists wear helmets. Similarly, on every trip, those who travel in passenger vehicles should encourage all occupants to use proper restraints—such as safety belts, child safety seats, or booster seats.

Since the 1993–1996 school years, few meaningful changes have emerged in the rates of deaths and injuries related to school travel. Those charged with protecting the safety of schoolchildren can apply the recommendations in TRB Special Report 269 to select safe modes of transportation and to manage the risks for each mode under a variety of strategies. Evaluating and identifying interventions that are effective and that can be replicated widely can help achieve the complementary goal of safe school transportation.

References

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3. *Fatality Analysis Reporting System: Fatal Crash Data Overview*. DOT-HS-809-726, National Highway Traffic Safety Administration, U.S. Department of Transportation, 2004.
4. *National Automotive Sampling System (NASS) General Estimates System (GES): Analytical User's Manual, 1988–2002*. National Highway Traffic Safety Administration, U.S. Department of Transportation, 2004.
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Child Passenger Safety Restraints in School Buses

Update on Regulations and Training

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Recent changes in recommendations and regulations have affected the use of child restraint systems (CRS) in school buses. A major challenge is training parents, bus drivers, and assistants to install the systems correctly. Making a CRS compatible with the school bus seat may require special solutions, such as changing the webbing length of the school bus seat belt so that the buckle does not interfere with the CRS installation.

To help school transportation providers and educators deal with these problems, the National Highway Traffic Safety Administration (NHTSA) has developed an 8-hour workshop, Child Passenger Safety Training for School Bus, based on the Standardized Child Passenger Safety Training program. A certified child passenger safety instructor or technician must teach the course, which is offered in partnership with the National Association of State Directors of Pupil Transportation Services. NHTSA's website soon will post a list of state contacts.[1]

PHOTO: SAFEGUARD BUS SEATS

Heritage Christian School in Indianapolis, Indiana, installed lap shoulder belts in its fleet of 11 school buses.

NHTSA has issued several regulations and recommendations that affect the use of CRSs on school buses. For example, the Lower Anchors and Tethers for Children (LATCH) system, which connects a car seat to anchors mounted in the vehicle, has been required in two seating positions on all school buses of 10,000 pounds or less (gross vehicle weight rating) since September 2002; the tether connection, however, is not required. The system is optional on larger school buses.

In 2004, NHTSA issued a final rule that allowed safety vests to be attached directly to school bus seat backs. Safety vests use a strap that wraps around the back of the seat, for attaching to the harness system. The new rule warns that the seat immediately behind should be vacant or the occupant restrained by a safety belt or other CRS.

NHTSA also has updated a recommendation on the reuse of CRSs after a vehicle crash. The update, however, does not address school buses directly, and NHTSA is reviewing the recommendation to provide more specific guidance. The revised guideline is scheduled for release this summer.

[1] www.nhtsa.dot.gov

PHOTO: SAFEGUARD BUS SEATS

Sled test of "seat within a seat" design (SafeGuard's SmartFrame) gauges effectiveness of lap-shoulder restraint for buckled students, as well as extent of maintaining protection for unbuckled students.

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