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## **School Transportation Safety**

Committee on Injury, Violence, and Poison Prevention and Council on School Health

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American Academy of Pediatrics

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# School Transportation Safety

Committee on Injury, Violence, and Poison Prevention and Council on School Health

Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of All Children

## ABSTRACT

This policy statement replaces the previous version published in 1996. It provides new information, studies, regulations, and recommendations related to the safe transportation of children to and from school and school-related activities. Pediatricians can play an important role at the patient/family, community, state, and national levels as child advocates and consultants to schools and early education programs about transportation safety.

## INTRODUCTION

School transportation plays a consistent and long-term role in the lives of children from preschool through high school. Pediatricians can participate by serving as resources, educators, consultants, and advocates for school transportation safety at the local, state, and federal levels. This revised policy statement provides updated recommendations that can enhance community systems for addressing safe transportation for children to and from school and school-related activities.

Expectations for school transportation and school bus safety should be upheld in an ongoing commitment from communities and states to ensure that children travel to and from school safely. The National Highway Traffic Safety Administration (NHTSA) School Bus Safety Program is committed to reducing school bus crashes, injuries, and fatalities.<sup>1</sup> Congress has indicated that school transportation should be held to the highest level of safety.<sup>2</sup> In addressing school transportation, all modes of travel must be considered, and measures must be taken to promote safety for each mode.

### Modes of School Transportation

The Committee on School Transportation Safety of the Transportation Research Board studied the various modes of travel and associated risks for schoolchildren.<sup>3</sup> Estimates of trips per year by mode of transportation during school hours were: passenger vehicle with adult driver, 45%; school buses, 25%, other buses, 2%; passenger vehicle with teen driver, 14%; bicycle, 2%; and walking, 12%. These estimates are limited, because they do not include school bus travel for extracurricular activities during or after normal school hours or during vacations. School bus crashes occur disproportionately on high-speed roads at night during transportation to and from extracurricular activities.<sup>4</sup>

Annually during normal school travel hours, 23.5 million children are transported on 457 000 school buses, totaling 5.8 billion student trips and 3.13 billion miles.<sup>5</sup> Each child who uses school bus transportation travels, on average, 1300 miles per school year. These estimates do not include school or school-related travel during nonschool hours.

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#### Key Words

school transportation, school bus, travel on school bus, getting to and from school

#### Abbreviations

NHTSA—National Highway Traffic Safety Administration

NTSB—National Transportation Safety Board

FMVSSs—federal motor vehicle safety standards

AAP—American Academy of Pediatrics

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### School Transportation Injury

Annually, there are, on average, 815 student deaths and 152 250 injuries related to school travel during normal school travel hours. (These data are underestimates, because they do not include school-related trips or school bus crashes outside of school hours, and reporting is voluntary.) Two percent of the deaths and 4% of the injuries occurred in school buses. Seventy-five percent of the deaths and 84% of the injuries occurred in passenger vehicles. The fatality rates descend in the following order: (1) passenger vehicles with teen drivers, 55%; (2) passenger vehicles with adult drivers, 20%; (3) walking (pedestrians), 16%; (4) bicyclists, 6%; and (5) school and other buses, 2%. The injury rates descend in the following order: (1) passenger vehicles with teen drivers, 51%; (2) passenger vehicles with adult drivers, 33%; (3) walking (pedestrian), 6%; (4) bicycles, 5%; and (5) school and other buses, 5%.<sup>3</sup>

The Fatality Analysis Reporting System<sup>6</sup> includes fatality data on all school bus-related crashes, not just those during school hours. In the year 2001, 141 persons were killed. Of the fatalities, 16% were pedestrians, 9% were school bus passengers, 4% were school bus drivers, 3% were bicyclists, and the rest (68%) were occupants of other vehicles or other nonmotorists. Of the 22 child pedestrian fatalities, 82% were struck by the school bus. Data from the General Estimates System indicate that 13 000 persons are injured annually in school bus crashes.<sup>7</sup> Of those injured, 46% (5980) were school bus occupants, 8% were school bus drivers, 38% were occupants of other vehicles, and fewer than 0.05% each were pedestrians, pedal cyclists, and nonmotorists.<sup>8</sup> However, the National Transportation Safety Board (NTSB) determined that school bus crash data are incomplete and that injuries cannot be reliably estimated.<sup>9</sup> The first emergency department-based study of nonfatal school bus-related injuries found that the number of injuries (17 000 annually to children 0–19 years of age) greatly exceeded previously published estimates. Motor vehicle crashes were the most frequent injury mechanism.<sup>10</sup>

## RECOMMENDATIONS

### School Bus Travel

The National Traffic and Motor Vehicle Safety Act of 1966 and the upgrades in the School Bus Safety Amendments of 1974 authorize the Department of Transportation to issue minimum standards for new school buses manufactured for sale in the United States.<sup>11</sup> There are 35 federal motor vehicle safety standards (FMVSSs) that apply to school buses. Large school buses that carry more than 16 passengers are not required to be equipped with seat belts. The long-standing American Academy of Pediatrics (AAP) recommendation that seat belts be installed on all new school buses is further discussed later in this statement. Small school buses (weighing <10 000

pounds) built in accordance with FMVSSs are equipped with lap belts. Vehicles, including multipurpose vehicles that carry 11 or more persons that are sold or leased for transporting students to or from school or school-related events, are required to meet the FMVSS requirements applicable to school buses. States may prescribe additional regulations that apply to the use of any vehicle used to transport preprimary, primary, and secondary school students.<sup>12</sup>

The AAP recommends that all guidelines for safe transportation of all preschool- and school-aged children be applied during all school and school-related trips regardless of the hours of operation.

### Preschool-Aged Children

Many school systems provide transportation for preschool-aged children. The NHTSA studies demonstrated that preschool-aged children were safest when properly transported in child safety restraint systems that meet FMVSSs 213 and 225.<sup>13</sup> In January 2001, the Department of Health and Human Services issued transportation safety requirements for Head Start transportation. Within 5 years, transportation was limited to school buses or “allowable alternate vehicles.” This provision has since been extended to June 30, 2007. That is, on July 1, 2007, all Head Start children must be transported in a compliant vehicle, unless a waiver has been granted. All vehicles must be equipped with a communication system for emergencies, first aid kit, fire extinguisher, and seat belt cutter. Children weighing 50 pounds or less were required to travel in FMVSS 213–approved child restraints; this has since been updated to apply to children under the weight threshold of FMVSS 213 for approved child restraints (currently 65 pounds). As of January 2004, vehicles must be equipped to use child restraints. Retrofit of lap belts or child-restraint anchorage to properly secure the child safety restraint system to the school bus seat is allowed and must be reinforced according to the applicable FMVSS.<sup>13</sup> The driver must have a commercial driver’s license and undergo criminal background checks. As of January 2004, all vehicles must have a bus monitor. Each Head Start agency is required to provide pedestrian-safety education for parents and children. An extension to January 18, 2006, for implementation of the requirement to provide car safety seats and bus monitors was allowed for Head Start programs that filed an application by April 1, 2004. A final rule was published on October 4, 2006, authorizing the Department of Health and Human Services to issue waivers from this requirement to Head Start grantees. The NHTSA has a curriculum for child passenger safety technicians, materials available regarding proper use of child safety restraint systems in school buses, and child passenger training materials for school bus drivers.

The AAP has recommended and advocated that school districts provide height- and weight-appropriate

car safety seats and restraint systems that meet FMVSSs for all preschool-aged children. These systems include booster seats for which a 3-point belt is available for installation. The AAP also supports the Head Start transportation safety requirements.

The AAP further recommends that school-based as well as non-school-based child programs follow guidelines for safe transportation. This includes all early education and child care programs and applies to car-pool transportation as well. The AAP Moving Kids Safely in Child Care program is the first national occupant-protection curriculum for child care providers and administrators; it provides detailed guidelines for safe transportation of all children.<sup>14</sup>

### **School-Aged Children: Occupant Protection on School Buses**

Compartmentalization has been the occupant-protection system for children in large school buses for more than 30 years and was the only available protection before child-restraint systems and seat belts were available for use in the school bus environment. Compartmentalization is provided by seats that are closely spaced with high, energy-absorbing seat backs. Data from real-world crashes comparing seat belt use versus compartmentalization only do not exist. However, recent studies have revealed that compartmentalization does not offer optimal protection and is not consistent with current technology and messages for children and families regarding the use of car safety seats and seat belts in all motor vehicles.<sup>9,15,16</sup>

The NTSB, through a series of crash investigations, determined that compartmentalization as a method of occupant protection on school buses is incomplete. Compartmentalization does not provide protection during lateral (side) impacts with vehicles of large mass or in rollover collisions, because passengers do not always remain completely within the compartment. The NTSB recommended the development and implementation of a seat and restraint system that restrains passengers in the seating compartment. The NTSB also recommended the development of performance standards and requirements for school bus occupant-protection systems on newly manufactured school buses. The NTSB further recommended on-board recording devices to facilitate improved data collection in crashes.<sup>9</sup> For optimal protection of all children, the AAP concurs with these recommendations.

The NHTSA conducted a study of school bus occupant protection in 2000 and determined that lap/shoulder belts on school buses performed best in dummy crash-testing compared with unbelted occupants, compartmentalization, and lap belts. Head-injury measurements were significantly lower with use of lap/shoulder belts than for use of compartmentalization or lap belts. In crash tests, the lap/shoulder belt restraint systems effectively kept the dummies in their seats.<sup>16</sup>

The State of California Vehicle Code requires newly manufactured school buses to have a lap/shoulder belt restraint system, effective 2004 for small school buses and 2005 for large school buses.<sup>17</sup> At the time of this publication, the states of Florida, Louisiana, New Jersey, and New York and many local school districts have passed school bus seat belt laws.<sup>18</sup>

The AAP recommends that all children travel in age-appropriate, properly secured child-restraint systems when transported in all motor vehicles, including school buses, to ensure the safest ride possible. The AAP further recommends that all newly manufactured school buses be equipped with lap/shoulder restraint systems that can also accommodate car safety seats, booster seats, and harness systems. The AAP recognizes the added benefit of improved student behavior and consistent habits of restraint use when traveling in motor vehicles. Policies on seat belt use have been found to improve student behavior and reduce driver distraction.<sup>4,19,20</sup> School districts must ensure the appropriate education of administrators, students, teachers, drivers, and parents in the use of occupant-protection devices.

### **School Bus Safety Features**

The AAP recommends that all school buses, including private, parochial, and contractual, that are used for school and all school-related activity transportation be in compliance with all applicable federal regulations. Buses built before 1977 should be retired from use, because they are deficient in several significant safety standards.<sup>4</sup>

Effective December 2, 1993, the FMVSSs were revised to require mirrors to improve driver visibility in front of and along both sides of school buses.<sup>21</sup> In addition, districts should consider installing strobe lights for use during reduced-visibility conditions, an external loud-speaker system to enable the driver to communicate with children outside the bus, and loading and backing alarms or pulsating backup horns.<sup>22</sup> School bus blind areas created by school bus bodies or mirrors are considerable.<sup>23</sup> Electronic sensor systems are available but have not been evaluated adequately to determine their effectiveness.<sup>4</sup> The AAP recommends that blind spots created by mirror systems and other vehicle-design aspects should be addressed by improved technology designed to decrease both crash and pedestrian injury risks because of limited visibility of a child by the bus driver.

The Children's School Bus Exposure Study, prepared for the California Air Resources Board, found that diesel buses can have significantly higher on-board diesel-related pollutant concentrations than other vehicles because of intrusion of the bus's own exhaust into the cabin.<sup>24</sup> Increased exposure from commuting by school bus was estimated to increase a child's lifetime cancer risk by approximately 4%, increase the incidence of lower respiratory symptoms by approximately 6%, and increase daily hospitalizations for asthma by approxi-

mately 1%. Several states and local governments have adopted airborne toxic control measures that limit school bus idling and idling at schools.<sup>25,26</sup> Bus idling also contributes to poor indoor air quality inside schools from unfiltered air that enters through open doors. The AAP recommends that states adopt measures to protect school-aged children from exposure to toxic air contaminants.<sup>27</sup> Additional measures to reduce children's exposure to vehicle-related pollutants include replacement of older buses, use of alternate-fueled or particulate-trap-equipped buses, retrofitting buses with better emission-control technologies, minimizing bus caravanning, use of cleaner buses on longer routes, having passengers sit at the front of the bus if it is not full, and minimizing idling.<sup>24,28</sup>

### **School Bus Transportation of Children With Special Medical Needs**

Children with special needs and who are older than the preschool-aged child and require special restraint systems should be evaluated individually to determine the most appropriate system that meets their needs for positioning during travel, regardless of their age, weight, and height. Specific recommendations are outlined in the AAP policy statement on school bus transportation of children with special needs.<sup>29</sup>

The use of wheelchairs is common for school bus transportation of children with disabilities. The AAP recommends that states adopt the requirements for use of wheelchairs on school buses outlined in the 1995 National Standards for School Buses<sup>22</sup> and the AAP policy statement on school bus transportation of children with special needs.<sup>29</sup>

### **School Bus Driver Selection, Training, and Performance**

The Transportation Research Board stated that variations in school bus driver recruitment, selection, training practices, and rates of pay are likely to be associated with variations in driver safety performance.<sup>3</sup> In another report, the Transportation Research Board recommended that all states provide formal training for school bus drivers, including training on school bus driver responsibility in ensuring safety of the children inside the bus and in loading zones.<sup>4</sup>

The AAP believes that national standards for the selection, training, and regulation of school bus drivers should be established and implemented to ensure optimal driver performance.

To meet basic requirements, school bus drivers should:

- maintain a valid commercial driver's license;
- be at least 21 years of age;
- show proof of an annual health history, assessment, and physical examination, including vision and hearing assessments, that document the absence of condi-

tions that may compromise driving and child supervision;

- successfully complete a written or oral test covering driver duties, bus-operating procedures, traffic and school bus laws and regulations, record keeping, emergency and crash-related procedures, first aid, basic appreciation of the developmental stages and needs of preschool and school-aged children, child-supervision responsibilities, and transportation of passengers with special needs;
- maintain a satisfactory driving record as determined by the school district;
- successfully pass a review for a criminal record (including convictions of child sexual abuse and incidents or arrests for driving under the influence of alcohol or other drugs) that is reviewed annually; and
- pass a test for illicit drugs and alcohol as required by the district (mandatory testing is recommended if it is not already required).

To demonstrate operational and driving skills, school bus drivers should:

- pass a driving performance test and demonstrate safe loading and unloading procedures;
- demonstrate physical capability to successfully accomplish student evacuation; and
- demonstrate correct use of all occupant-protection systems that may be available on the school bus, including use of car safety seats, seat belt systems, and occupant-protection systems that are used by children with special medical or health needs.

Children with conditions such as anaphylactic allergies, severe asthma, diabetes, attention-deficit/hyperactivity disorder, autism or pervasive developmental disorder, and other chronic conditions may have health and safety issues during transport to and from school and school-related events. For that reason, the following are important:

- Drivers should be included in school plans for children with special medical and transportation needs.
- School bus drivers need to be aware of and prepared to intervene appropriately to ensure the safety of the individual child as well as all children on the trip. Interventions may require training beyond basic first aid.

### **School Bus Passenger Instruction**

Passengers of all ages need to be taught safe riding and pedestrian behavior regardless of the frequency of school bus use. Instruction should include safe pedestrian practices going to and from the bus stop; safe behavior while waiting for the bus; safe practices for boarding and dis-

embarking the bus; safe behavior on the bus, including the use of child-restraint systems and seat belts when present; and procedures for emergency situations. Escort services for children crossing streets and roads should be considered.<sup>30</sup>

### **School Bus Passenger Supervision**

Adult supervision on school buses should focus on ensuring that passengers stay seated and use age-appropriate car safety seats, seat belts, and other occupant-protection systems; ensuring that passengers keep their arms and heads inside the windows; assisting in emergency circumstances; assisting passengers with special needs; and escorting children across roadways. A second adult (other than the driver) serving as a monitor on the school bus can best meet these objectives. The Transportation Research Board states that it is generally agreed that monitors would enhance safety and reduce injuries by 25% to 75%; however, the cost estimate is high (\$1.9 billion).<sup>4</sup>

### **School Bus Routes and Stops**

Bus routes should be planned so that the bus does not have to back up, traffic disruptions are minimized, good fields of vision are provided at all stops, and the need for children to cross a street to board or leave the bus is minimized.<sup>4</sup> Escorting children across streets has the greatest potential for injury reduction.<sup>4</sup> Roads, traffic flow, traffic-control devices, and speed-limit enforcement should be maintained to optimize the safety of children.

### **Bicyclist and Pedestrian Travel to and From School**

The motor, cognitive, and behavioral characteristics and abilities and limitations of children of different ages must be considered when assessing supervision needs necessary for students walking to and from school. There is no evidence that generic pedestrian-safety education is effective in reducing pedestrian injury. Bicyclists should be required to wear bicycle helmets properly.<sup>31</sup> Children using nonmotorized vehicles for school and school-related trips should be required to use safety equipment, including helmets.<sup>32</sup> Bicycle helmet use laws and enforcement increase helmet use.<sup>33</sup> Driver education in school zones, including drivers who drop off and pick up students, must be addressed. Most drivers exceed speed limits in school zones.<sup>34</sup> Safe Routes to School, an international movement, promotes infrastructure, environmental measures, enforcement, policy change, and education to enhance and promote safe walking.<sup>35</sup>

### **School-Zone Improvements**

School-zone improvements would enhance the safety of all schoolchildren whether they walk, bike, take the school bus, or are dropped off and picked up with a passenger vehicle. These measures include marked drop-off and pick-up areas that are separate from school buses, school-zone speed-limit enforcement at 25 miles/

hour, development of safe routes to school, and well-trained adult crossing guards. Crossing guards have been effective in improving pedestrian safety and have improved speed compliance and traffic control.<sup>36</sup> The NHTSA issued guidelines for a uniform approach for traffic controls for school areas that were designed to enhance the safety of pedestrians. These guidelines further recommend that a school-route travel plan be developed systematically by school, law enforcement, and traffic officials.<sup>37</sup> A multidisciplinary approach, involving school administrators, parent-teacher organizations, city planners, and law enforcement that includes infrastructure design as well as education of both students and drivers, offers potential to decrease death and injury to children in school zones.<sup>38</sup>

The AAP recommends the implementation of measures to improve the environmental infrastructure, including student supervision and crossing guards.

### **The Pediatrician's Role**

The pediatrician should promote school transportation safety at 4 levels: patient and family, community, state, and national. Pediatricians can serve as child advocates and consultants to child care and schools about transportation safety.

For school bus travel, the AAP emphasizes its longstanding position that seat belts be installed on all newly manufactured school buses. Three-point seat belts provide the best protection for school-aged children who have outgrown car safety seats.

### *Patient and Family Counseling*

1. When addressing child passenger safety, inform families that the AAP has guidelines and policy statements for safe transportation of schoolchildren in school buses and other vehicles used for preschool, school, and child care transportation. In particular, inform parents that the AAP recommends that all children who travel in school buses use age- and size-appropriate child-restraint systems and 3-point seat belts when they have outgrown child-restraint systems. Pediatricians should nevertheless counsel parents that large school buses, even when not equipped with seat belts, are the safest mode of school transportation.
2. Inform patients and families about the importance of bicycle helmets and other safety measures for children riding bicycles.
3. Inform parents that teens traveling together, especially with a teen driver, to and from school and to school-related events are at high risk of crash involvement and injury.
4. Promote passage and parent and community enforcement of graduated driver licensing laws, which

reduce fatal crash involvement of 16-year-old drivers by 16% to 21%.<sup>39,40</sup>

#### *Community Role*

5. Serve as a consultant to local parent groups, transportation directors, or school boards on the physical, cognitive, and psychosocial development of children as related to school transportation. Provide AAP guidelines and policy statements related to school transportation and teen driving.
6. Provide resources for communities to address safe routes for children who walk or bike to school.
7. Promote mandatory requirements for children to use bicycle helmets.
8. Advocate implementation of the recommendations of applicable policy statements at local school district meetings. Advocate for school districts to enforce graduated driver licensing laws.
9. Work with communities to plan for the transportation of children in planning new school sites and modifying existing sites.
10. Advocate for 3-point seat belt systems in all newly manufactured school buses

#### *State Role*

11. Serve as a consultant to state directors of school transportation to ensure that children's needs and AAP guidelines are addressed in school transportation plans.
12. Advocate for mandatory bicycle helmet use laws and enforcement.
13. Share information from AAP policy statements.
14. Serve as a resource and consultant to the state department of education regarding training of bus drivers in areas relating to child passenger safety and child development and behavior.
15. Serve as a resource and consultant to the state department of education on pedestrian and bicycle safety for schoolchildren.

#### *National Role*

16. Encourage research to support continued improvement in school bus design and school-zone safety.
17. Advocate for mandated complete collection and reporting of data on fatalities and injuries by school districts and school bus transportation companies for all crash and noncrash events involving the school bus and multipurpose vehicles.

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### RESOURCE LIST

- American Academy of Pediatrics, American Public Health Association, National Resource Center for Health, Safety in Child Care. *Caring for Our Children: National Health and Safety Performance Standards—Guidelines for Out-of-Home Child Care Programs*. Elk Grove Village, IL: American Academy of Pediatrics; 2002 [Guidelines for transportation of children are given.]
- American Academy of Pediatrics, Healthy Child Care America. *Moving Kids Safely in Child Care*. Elk Grove Village, IL: American Academy of Pediatrics; 2002 [A curriculum for child care providers and administrators that covers seat restraints, route planning, air bag safety, car safety seats, booster seats, and more is provided.]
- American Academy of Pediatrics. *Safe Transportation of Children With Special Needs: A Guide for Families*. Elk Grove Village, IL: American Academy of Pediatrics; 2002 [Information applicable to the safe transportation of children with special needs is provided.]
- US Department of Transportation, Federal Highway Administration. Safe routes to school Web site. Available at: <http://safety.fhwa.dot.gov/saferoutes> [The goal of Safe Routes to School is to empower communities to get more children traveling safely to school on foot or bike with greater frequency. Available resources include, but are not limited to, information on federal funding, state contacts, and links to other Web sites including the National Safe Routes to School Clearinghouse.]
- International Walk to School Web site. Available at: [www.iwalktoschool.org](http://www.iwalktoschool.org)
- US Environmental Protection Agency. Clean school bus USA. Available at: [www.epa.gov/otaq/schoolbus](http://www.epa.gov/otaq/schoolbus) [provides clinicians and communities information on how to reduce pollution caused by school buses]

## School Transportation Safety

Committee on Injury, Violence, and Poison Prevention and Council on School Health

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