

AMERICAN ACADEMY OF PEDIATRICS

Committee on Injury and Poison Prevention

Snowmobiling Hazards

ABSTRACT. Snowmobiles continue to pose a significant risk to children younger than 15 years and adolescents and young adults 15 through 24 years of age. Head injuries remain the leading cause of mortality and serious morbidity, arising largely from snowmobilers colliding, falling, or overturning during operation. Children also were injured while being towed in a variety of conveyances by snowmobiles. No uniform code of state laws governs the use of snowmobiles by children and youth. Because evidence is lacking to support the effectiveness of operator safety certification and because many children and adolescents do not have the required strength and skills to operate a snowmobile safely, the recreational operation of snowmobiles by persons younger than 16 years is not recommended. Snowmobiles should not be used to tow persons on a tube, tire, sled, or saucer. Furthermore, a graduated licensing program is advised for snowmobilers 16 years and older. Both active and passive snowmobile injury prevention strategies are suggested, as well as recommendations for manufacturers to make safer equipment for snowmobilers of all ages.

ABBREVIATIONS. NEISS, National Electronic Injury Surveillance System; CPSC, US Consumer Product Safety Commission; AAP, American Academy of Pediatrics.

The popularity of snowmobiles in the snowbelt has increased¹⁻³ along with their size and speed. The National Electronic Injury Surveillance System (NEISS) of the US Consumer Product Safety Commission (CPSC) reported that there has been no decline in snowmobile injuries during the past 10 years. The average annual number of snowmobile injuries treated in emergency departments in 1997 and 1998 was more than 10 000. Of these injuries, 10% occurred in children younger than 15 years, and another 25% occurred in adolescents and young adults 15 through 24 years of age. Between January 1992 and December 1997, the Death Certificate Data Files of the CPSC recorded 51 deaths in children younger than 16 years that were directly attributable to snowmobiles. This number is almost certainly an undercount. The CPSC does not routinely acquire death certificates involving collisions with licensed motor vehicles.

For both the number of reported deaths and injuries, males were 3 times more likely than females to be the victims. Head injuries were the leading cause

of injury and death.³⁻⁵ Most deaths and serious injuries occurred as a result of the operators striking fixed objects, such as a tree, cable or wire, or another vehicle.³ Children younger than 16 years were injured or killed when they fell from their snowmobiles, had the vehicle roll over them, or crashed the snowmobile into other snowmobiles, vehicles, or stationary objects (D. Tinsworth, written communication, January 21, 2000). Near-drowning events in children younger than 16 years were infrequent, and only 1 child drowned after encountering thin ice, in contrast to the prominence of drowning as a cause of death for older teenagers and adults.^{4,5} Frostbite and hypothermia, recognized hazards,^{6,7} were reported infrequently. Other injuries occurred during loading and unloading the snowmobile and when the body of the operator struck different parts of the snowmobile during sudden stops. Burns associated with refueling also have been documented.

More than 50 children in the NEISS sample were injured while being towed when their sled, tube, tire, or saucer overturned, struck an object, or was hit by another vehicle. In general, children younger than 8 years who were injured or killed from incidents involving snowmobiles tended to be passengers on snowmobiles or sleds.

Other problems associated with snowmobile operation that were reported in the literature include hearing loss from prolonged exposure to excess engine noise⁸ and white finger syndrome arising from the effects of cold weather and hand/arm vibration from the handlebars of the snowmobiles.⁹ Common factors identified in other studies and contributing to snowmobile incidents include operator error, speeding, traveling on inappropriate terrain, nighttime operation, and alcohol use.^{1,5,10-12}

Most, but not all, states require that off-road vehicles be registered. Many states require a valid driver's license to operate a snowmobile on public lands or, where permitted, on roads. Some states mandate that children and youth be directly supervised or accompanied by an adult on the snowmobile or have successfully completed an approved snowmobile safety course. Such certification not only allows for children as young as 8 years to ride alone in some states but also permits certificate holders who are 14 years and older to serve as substitutes for adults to supervise inexperienced and noncertified child operators. In some states, there are no age restrictions. A few states have made helmets mandatory for operators younger than 16 years. Snowmobiling on private property is exempt from restrictions.³

Evidence is lacking that operator safety certifica-

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

PEDIATRICS (ISSN 0031 4005). Copyright © 2000 by the American Academy of Pediatrics.

tion courses adequately educate children and youth to operate snowmobiles safely. The influence of sanctioned courses on snowmobile-related injuries to individuals younger than 16 years has not been assessed. In jurisdictions where this option is available, scientifically rigorous evaluations should be performed.

RECOMMENDATIONS

Previous American Academy of Pediatrics (AAP) recommendations¹³ have been updated.

Recommendations for children younger than 16 years include the following:

1. Recreational operation of snowmobiles is inappropriate for children and younger adolescents. Children younger than 16 years should not operate snowmobiles. Furthermore, children younger than 6 years do not have the strength or stamina to be transported safely as passengers on snowmobiles. Winter recreational activities for children should be developmentally appropriate.
2. Advertisements that promote snowmobiling should not be directed toward young adolescents, and advertisements should not depict young adolescents driving snowmobiles.

Recommendations for the protection of snowmobilers 16 years and older include the following:

1. Graduated licensing for snowmobile operators is recommended, consistent with the AAP policy on graduated licensing for motor vehicle drivers.¹⁴ Although no direct evidence exists for the effectiveness of graduated licensing on teenage motor vehicle operators of snowmobiles, graduated licensing has been shown to be effective in reducing motor vehicle-related deaths among teenagers. Newly licensed operators should be restricted to snowmobiling during daylight hours on groomed trails only, with zero tolerance for alcohol consumption. To operate a snowmobile safely, persons should acquire a learner's permit by taking a state-sanctioned course.
2. Snowmobilers should travel at safe speeds, especially on unfamiliar or rugged terrain where hazards, such as difficult-to-see barbed wire, may be encountered. A speed-limiting governor, to limit the maximum speed, is suggested for newly licensed operators.
3. Irrespective of age, snowmobilers should avoid the use of alcohol or other drugs before or during the operation of a snowmobile. Adults should reinforce this message by setting a good example.
4. Snowmobilers should wear well-insulated protective clothing, including goggles and waterproof snowmobile suits, gloves, and rubber-bottomed boots. All drivers and passengers should wear helmets approved by Snell or another standards organization for use while operating motorized vehicles such as motorcycles and snowmobiles. Operators should carry a first aid kit, a survival kit that includes flares, and if practical, a cellular

phone. Snowmobilers should travel in groups of 2 or more and only on designated, marked trails away from roads, waterways, railroads, and pedestrian traffic. The weather forecast should be checked before snowmobiling. Operators should know the signs of hypothermia and regularly check for frostbite.

5. Snowmobilers should avoid snowmobiling on ice if they are uncertain about its thickness or condition. The condition of the trails also should be determined, and where appropriate, avalanche danger should be ascertained.
6. Snowmobilers should not carry more than 1 passenger. Headlights and taillights should be on at all times to improve the visibility of the snowmobile to other vehicle operators.
7. Use of a saucer, tube, tire, sled, or skis to pull someone behind a snowmobile is not recommended. If the need should arise to tow a person, the risk of injury is reduced by using a sled or cutter attached to the snowmobile by a rigid bar connection. The driver should travel at a slow speed over level terrain away from trees, rocks, and other vehicles, and a spotter should be used to watch the individual(s) being towed.
8. Snowmobiles must be well-maintained. Appropriate precautions should be taken by persons when fueling snowmobiles to avoid burns and when loading snowmobiles on and off trailers to prevent strains and crush injuries.

Recommendations for manufacturers include the following:

1. Snowmobile manufacturers should incorporate mechanical enhancements such as seating and handlebar design to improve rider comfort and safety, as well as to reduce hand-arm vibration to minimize white finger syndrome and numbness. Manufacturers should also attenuate sound levels generated by snowmobiles, improve headlight luminance, and add a Global Positioning System device (overhead satellites provide exact current latitudes and longitudes) to all snowmobiles. Manufacturers are urged to improve snowmobile braking, steering, and stability. Emission standards for snowmobiles should be improved.
2. Helmet designs need to be improved to minimize visor fogging and improve hearing protection. Safety standards for snowmobile helmets should be developed, and snowmobile helmets should be formally certified. Helmet manufacturers should consider adding features, such as built-in radio channels for communication and weather monitoring.

COMMITTEE ON INJURY AND POISON PREVENTION,
2000–2001

Marilyn J. Bull, MD, Chairperson
Phyllis Agran, MD, MPH
H. Garry Gardner, MD
Danielle Laraque, MD
Susan H. Pollack, MD
Gary A. Smith, MD, DrPH

Howard R. Spivak, MD
Milton Tenenbein, MD

LIAISONS

Ruth A. Brenner, MD, MPH
National Institute of Child Health and
Human Development
Stephanie Bryn, MPH
Health Resources and Service
Administration/Maternal and
Child Health Bureau
Cheryl Neverman, MS
National Highway Traffic Safety
Administration
Richard A. Schieber, MD, MPH
Centers for Disease Control and Prevention
Richard Stanwick, MD, MSc
Canadian Paediatric Society
Deborah Tinsworth
US Consumer Product Safety Commission

SECTION LIAISONS

Victor Garcia, MD
Section on Surgery
Robert R. Tanz, MD
Section on Injury and Poison Prevention

CONSULTANTS

Murray L. Katcher, MD, PhD
Susan B. Tully, MD

STAFF

Heather Newland

REFERENCES

1. Centers for Disease Control and Prevention. Injuries associated with use of snowmobiles—New Hampshire, 1989–92. *MMWR Morb Mortal Wkly Rep.* 1995;44:1–3
2. Centers for Disease Control and Prevention. Injuries and deaths associated with use of snowmobiles—Maine, 1991–96. *MMWR Morb Mortal Wkly Rep.* 1997;46:1–4
3. Rice MR, Alvanos L, Kenney B. Snowmobile injuries and deaths in children: a review of national injury data and state legislation. *Pediatrics.* 2000;105:615–619
4. Hedberg K, Gunderson PD, Vargas C, Osterholm MT, MacDonald KL. Drownings in Minnesota, 1980–85: a population-based study. *Am J Public Health.* 1990;80:1071–1074
5. Rowe B, Milner R, Johnson C, Bota G. Snowmobile-related deaths in Ontario: a 5-year review. *Can Med Assoc J.* 1992;146:147–152
6. Virokannas H, Anttonen H. Thermal responses in the body during snowmobile driving. *Arctic Med Res.* 1994;53(suppl 3):12–18
7. Nissen ER, Melchert PJ, Lewis EJ. A case of bullous frostbite following recreational snowmobiling. *Cutis.* 1999;63:21–23
8. Bess FH, Poynor RE. Snowmobile engine noise and hearing. *Arch Otolaryngol.* 1972;95:164–168
9. Anttonen H, Virokannas H. Hand-arm vibration in snowmobile drivers. *Arctic Med Res.* 1994;53(suppl 3):19–23
10. Reid DC, Saboe L. Spine fractures in winter sports. *Sports Med.* 1989;7:393–399
11. James EC, Lenz JO, Swenson WM, Cooley AM, Gomez YL, Antonenko DR. Snowmobile trauma: an 11-year experience. *Am Surg.* 1991;57:349–353
12. Rowe B, Milner R, Johnson C, Bota G. The association of alcohol and night driving with fatal snowmobile trauma: a case-control study. *Ann Emerg Med.* 1994;24:842–848
13. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Snowmobile statement. *Pediatrics.* 1988;82:798–799
14. American Academy of Pediatrics, Committee on Injury and Poison Prevention and Committee on Adolescence. The teenage driver. *Pediatrics.* 1996;98:987–990

Snowmobiling Hazards
Committee on Injury and Poison Prevention
Pediatrics 2000;106;1142
DOI: 10.1542/peds.106.5.1142

Updated Information & Services

including high resolution figures, can be found at:
<http://pediatrics.aappublications.org/content/106/5/1142>

References

This article cites 14 articles, 4 of which you can access for free at:
<http://pediatrics.aappublications.org/content/106/5/1142#BIBL>

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):
Current Policy
http://www.aappublications.org/cgi/collection/current_policy
Council on Injury, Violence, and Poison Prevention
http://www.aappublications.org/cgi/collection/committee_on_injury_violence_and_poison_prevention
CME
<http://www.aappublications.org/cgi/collection/cme>
Injury, Violence & Poison Prevention
http://www.aappublications.org/cgi/collection/injury_violence_-_poison_prevention_sub

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
<http://www.aappublications.org/site/misc/Permissions.xhtml>

Reprints

Information about ordering reprints can be found online:
<http://www.aappublications.org/site/misc/reprints.xhtml>

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN®



PEDIATRICS[®]

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Snowmobiling Hazards
Committee on Injury and Poison Prevention
Pediatrics 2000;106;1142
DOI: 10.1542/peds.106.5.1142

The online version of this article, along with updated information and services, is
located on the World Wide Web at:
<http://pediatrics.aappublications.org/content/106/5/1142>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 345 Park Avenue, Itasca, Illinois, 60143. Copyright © 2000 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 1073-0397.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN[®]

