



## Hazard Screening Report

### Outdoor Activities and Equipment Generally Considered Children's Products, but also used by Adults

(Product codes 1283, 5033, 5040, 1242 – 1244,  
3219, 3246, 3273, 5035 – 5036, 5042, 1233 – 1234,  
1329, 1333, 3294, 3216 – 3217, 3255, 3297)

*This report and all others in this series are general overviews, which use data taken directly from the CPSC data files for the purpose of comparison among the products.*

*No recoding or adjusting of the data is performed. For this reason, estimates of injuries provided in this report will differ from estimates presented in other documents produced by Epidemiology staff working in specific program areas. The figures presented here are not intended to compare to other reports outside this series of hazard screening reports. The views expressed in this report are those of CPSC staff, have not been reviewed or approved by, and may not reflect the views of, the Commissioners.*

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# The Hazard Screening Project

As an aid in setting priorities, Consumer Product Safety Commission (CPSC) staff is preparing this series of Hazard Screening Reports. Each report covers a group of related products, such as nursery equipment, house wares, etc.

These reports follow a common format that allows readers to compare the risk for different types of products within a given category. Significantly, CPSC staff has also developed a measurement tool that allows comparisons of risks from products in different categories. This feature, called “Maximum Addressable Cost Estimates,” is explained more fully below. CPSC managers plan to use this information to set priorities for efficient use of resources.

Each Hazard Screening Report contains information on the estimated number of injuries and deaths associated with the type of products covered in that report. A graph shows the frequency of emergency-room treated injuries over time. This is followed by a pie chart showing the distribution of injuries by the source of the hazard, such as mechanical, fire, electrical, chemical and other. CPSC staff also estimates the total “cost” to society of each type of product. This includes the cost of injuries, deaths and property damage associated with the products.

To facilitate comparisons of risk between different types of products, CPSC staff has developed Maximum Addressable Cost Estimates. These build on the concept of “addressable” cost. Simply put, the “addressable” cost is the portion of the total cost that could possibly be reduced by some action that CPSC could take. Many of consumer injuries are not addressable. For example, if a boy trips over a rake in the driveway, any injury he suffers could be associated with the category of Yard and Garden Equipment. But it is very unlikely that such injuries could be prevented by changing the design of rakes. By eliminating these unaddressable costs from consideration, we are able to focus on what’s left -- the costs that we might be able to do something about. The name “Maximum Addressable Cost Estimates” is intended to emphasize that these estimates are upper limits of the cost that might be successfully addressed. It should also be stressed that the term does not necessarily mean that there is any existing method or technology for reducing the costs. For a more detailed explanation of this subject, please refer to the individual Hazard Screening Reports.

CPSC staff plans to complete 20 reports in 2005. As each report is completed there will be an active link to it on the CPSC website. All reports are in Portable Document Format (PDF). The 20 reports that will comprise the complete set are:

- Home Workshop Apparatus, Tools and Attachments
- Yard and Garden Equipment
- Toys
- Nursery Products
- Children’s Outdoor Activities and Equipment
- Major Team Sports
- Injuries to Persons 65 and Older

House wares and Kitchen Appliances  
Recreational Cooking and Camping Products  
Home Communication, Entertainment and Hobby Products  
General Household Appliances  
Home Furnishings and Fixtures & Home Alarm,  
Escape and Protection Devices  
Sports (minus major team sports)  
Personal Use Items  
Heating, Cooling and Ventilating Equipment  
Packaging and Containers for Household Products  
Miscellaneous Products  
Home Structures and Construction Materials  
Home and Family Maintenance Products – Household Chemicals  
Drugs

These reports will be useful to individuals and organizations who are seeking reliable information about estimated deaths, injuries, and costs associated with consumer products and to CPSC's staff and Commissioners, who need objective data to identify candidates for future activities to reduce deaths and injuries.

## CAUTION!

The report addresses the question of addressability of injuries by attempting to identify those injuries which are incidental and not addressable by mandatory or voluntary standards or by other action which the CPSC could take. Those injuries which remain are referred to as maximum addressable.

To know the actual addressability of the hazards associated with a product usually requires a detailed study of the problem, and the product. This level of study is not feasible for this type of overview report. What we do instead is try to eliminate those injuries and deaths which involve the product only marginally or incidentally. The remaining injuries are then run through the Injury Cost Model, to produce an estimate of *maximum* addressable costs.

**The maximum addressable cost estimate does not necessarily represent the injury and death costs that the CPSC might actually be able to prevent each year through some type of action. It represents only a target population from which any successful prevention will have to come.**

Therefore, while the report states that the maximum addressable percentage of the costs is about 41%, it would be incorrect to say that 41% of the injuries or 41% of the costs are addressable.

For example: If someone falls off of a skateboard, but we have no information about the presence or absence of safety equipment, such as a helmet, wrist guards or elbow guards, we would count that injury as in the maximum addressable category. It may not be addressable; we just don't have enough information to rule it out.

Maximum addressable injury estimates include every case that we could not clearly rule out as incidental. They do not represent the number or percent of injuries that could actually be prevented.

## **Introduction**

The group of products included in this report consists of equipment used by children for outdoor activities. The report provides several estimates that will allow the reader to compare products within this report as well as to compare with products in other categories in other hazard screening reports.

This report shows an index of the size of the overall injury and death problem associated with Children's Outdoor Activities and Equipment. The first information presented is a summary of the estimated injury, death and cost data for the entire class of products. A trend graphic is presented which shows the estimated frequency of emergency room-treated injuries since 1997. This is followed by a pie chart showing the distribution of the injuries by energy source of the hazard, i.e., mechanical, fire, electrical, chemical, other. There is also a summary table, which shows the estimated injuries, deaths and costs associated with each product group included.

The report also addresses the question of addressability of the injuries, by attempting to identify those injuries which are incidental and not addressable by mandatory or voluntary standards or by other action which the CPSC could take.

## **Individual Product Categories**

Bicycles and Unicycles

(includes: bicycles, mountain bicycles, unicycles)

Playground Equipment

(includes: slides, swings, seesaws, climbing equipment, other playground equipment)

Powered Riding Products, Not Toys

(includes: minibikes, two-wheeled powered off-road vehicles, scooters/skateboards, powered)

Trampolines

Treehouses or Playhouses

Scooters, Unpowered

Skateboards

Water slides, backyard, home

Skating

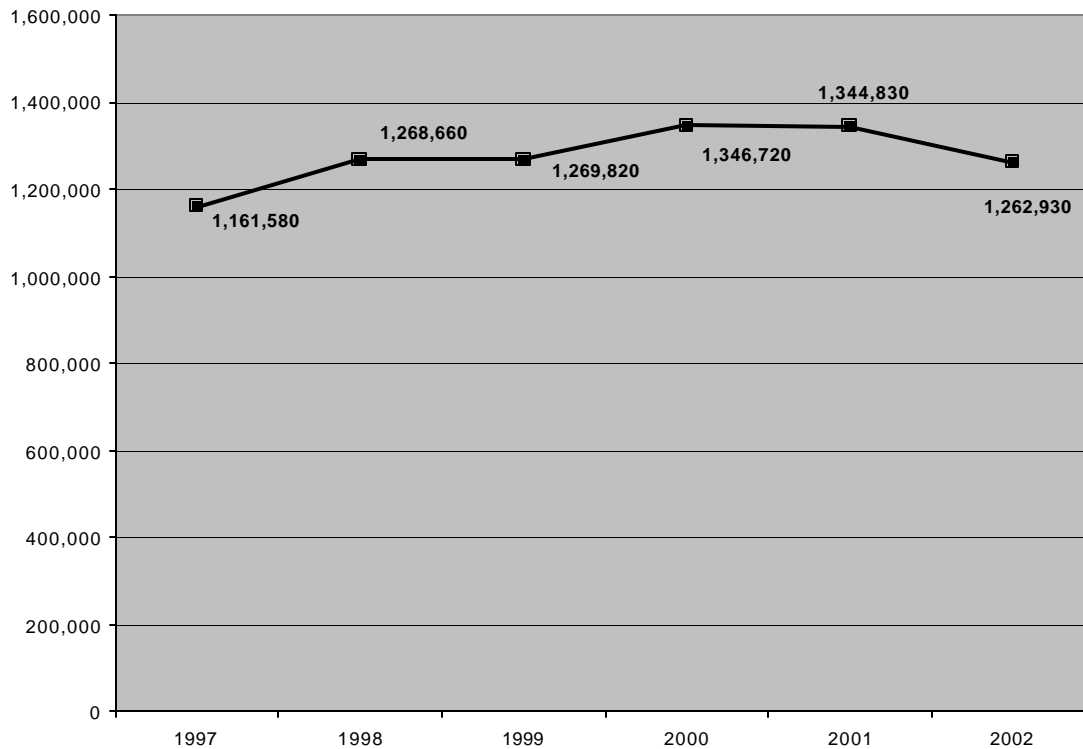
(includes: roller skating; in-line skating; ice skating)

Bookbags or Back Carriers

**Outdoor Activities and Equipment**  
**(1283, 5033, 5040, 1242, 1243, 1244, 3219, 3246, 3273, 5035, 5036, 5042,**  
**1233, 1234, 1329, 1333, 3294, 3216, 3217, 3255, 3297)**

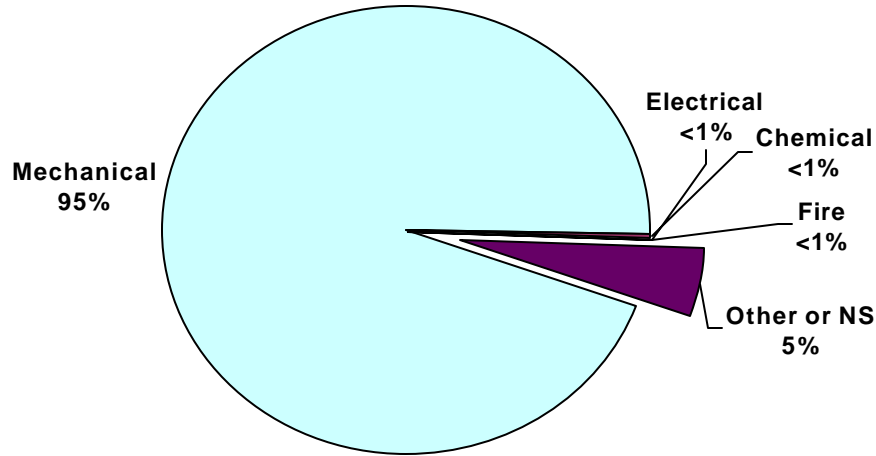
ER Treated Injuries 2002	1,262,930	Percent of Households	Not applicable
Medically Treated Injuries 2002	3,072,810	Number of Products in Use	Not applicable
Percent of ER Treated Hospitalized	5%	Estimated Useful Life	Not applicable
Deaths 2000	888	Estimated Retail Price Range	Not applicable
Number of Incident Reports 2002	1,139	Death Costs (Millions)	\$4,440.0
Cost of Medically Treated Injuries (Millions)	\$66,714.0	Total Known Costs (Millions)	\$71,154.0

**Figure 1. Estimated Number of Emergency Room-Treated Injuries Associated with Selected Outdoor Activities, by year 1997 - 2002**



Change from 1997 to 2002 is +101,350. This is not a statistically significant change ( $p = .14$ ).

**Figure 2. Distribution of Emergency Room-Treated Injuries by Energy Source of the Hazard for Children’s Outdoor Activities and Equipment, 2002**



**Table 1. Age Distribution of Emergency Room-Treated Injuries**

Age Group <sup>1</sup>		
0 – 4 Years	5 – 14 Years	15 + Years
111,860	716,770	432,560
9%	57%	34%

## Deaths

There were over 800 deaths associated with bicycles, all ages, in 2000. Staff estimates that 386 of these were the result of head injuries or other hazards which were identified as addressable. Most of the bicycle-related deaths were the result of collisions with motor vehicles, but some involved falls and collisions with other bicycles. The remaining products included in this report were associated with 76 deaths for that year. Thirty-one of these 76 deaths were included in the maximum addressable category (see page 8 for description of this category). These included 5 of the playground equipment-related deaths, 11 of the powered riding products deaths, 3 of the unpowered scooter-related deaths, 5 of the skateboard-related deaths, and 7 of the skating-related deaths.

<sup>1</sup> Excludes cases for which victim age was unknown.



## Population Data

Two-thirds of the injuries associated with the products in this report were sustained by children less than 15 years of age. Most of these products are used predominantly by children. Tables A and B and Figure A provide a breakdown of the population under the age of 15 years, by year, for the years 1997 through 2002. There is no indication in the population data of a dramatic increase or decrease that might affect the yearly injury frequencies.

**Table A. Population of Children Under the Age of 15 Years, by Year, 1997 – 2002, Three Age Groups, (in thousands)**

	1997	1998	1999	2000	2001	2002
Under 5	19,099	18,989	18,942	19,212	19,364	19,609
5-9 Years	19,754	19,929	19,947	20,476	20,208	19,901
10-14 Years	19,097	19,242	19,548	20,601	20,910	21,136
Total	57,950	58,160	58,437	60,289	60,482	60,646

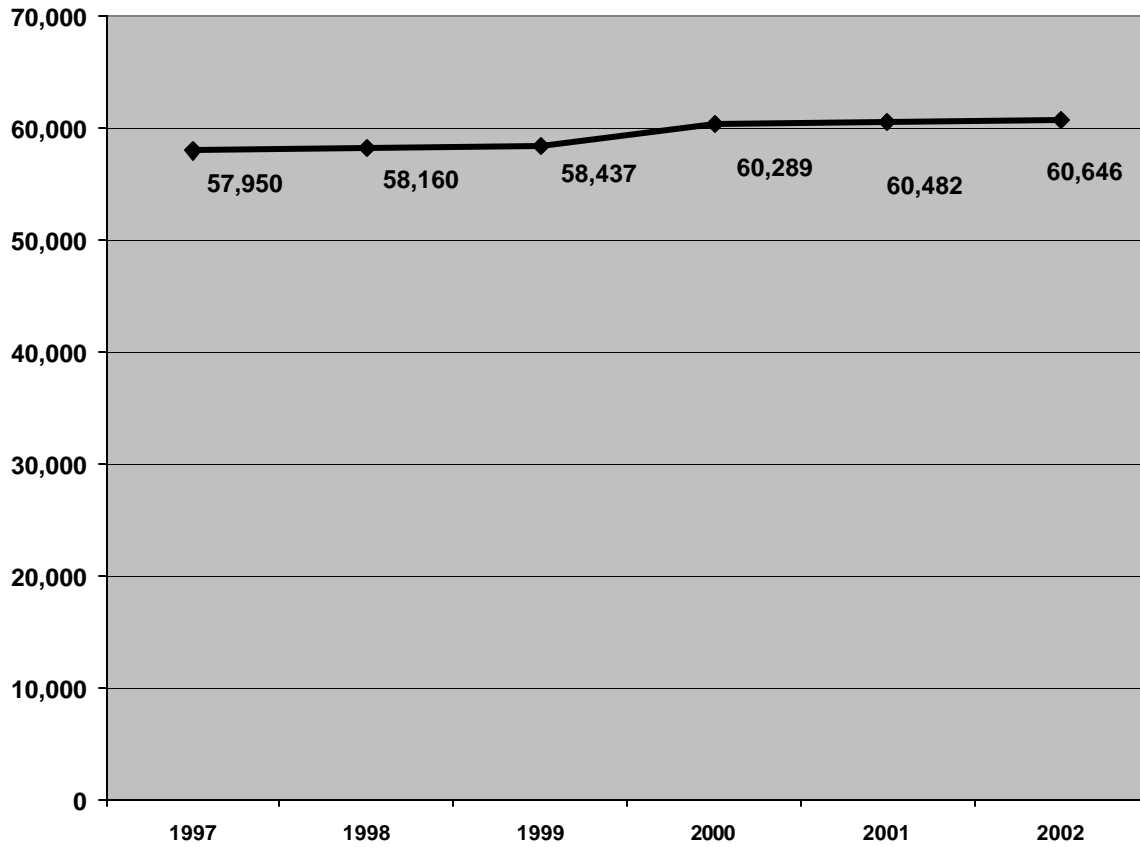
Source: U.S. Census Bureau. Annual Resident Population Estimates of the United States

**Table B. Number of Live Births in the United States, by Year 1997 – 2002**

	1997	1998	1999	2000	2001	2002
Number of Live Births	3,880,894	3,941,553	3,959,417	4,058,814	4,025,933	4,019,280

Source: National Vital Statistics Report

**Figure A. Estimated Population, in Thousands, of Children Less than 15 Years of Age, by Year, 1997 - 2002**



Source: U.S. Census Bureau, Annual Resident Population Estimates of the United States

## Overview Summary

The change in estimated injury frequency over the 6-year period, 1997 – 2002, was +101,350. This is not a statistically significant change at the 95% confidence level ( $p = .14$ )

Table 2 provides a summary of all the product groups examined for this report. This table provides information on the number of emergency room-treated injuries, the number of medically-treated injuries, the percentage of the emergency room treatments that resulted in admission to the hospital, the number of incident reports received, the number of deaths reported, the number of products of each type in use, the estimated useful product life for each category, the costs associated with deaths and medically-treated injuries and the total of these two cost estimates.

### Addressability

While it is useful to know the number of injuries, deaths, and related costs associated with a product, it is also important to have an estimate of how much of that social cost might actually be addressed through some action. Many of the injuries treated in emergency rooms that were related to outdoor activities and equipment may not be addressable. To know the actual addressability of the hazards associated with a product usually requires a detailed study of the problem, and the product. This level of study is not feasible for this type of overview report. What we can do instead is try to identify that portion of the injury and death costs that is not addressable. The remaining injuries are then run through the Injury Cost Model, to produce an estimate of *maximum* addressable costs.

**The maximum addressable cost estimate does not necessarily represent the injury and death costs that the CPSC might actually be able to prevent each year through some type of action. It represents only a target population from which any successful prevention will have to come.**

The reason for doing this kind of review is to identify situations such as the following example and allow us to focus on the areas where CPSC action could have some effect:

Example: Skateboard injuries are almost all the result of riders falling off of the skateboard. CPSC already advocates the use of safety equipment to prevent many types of injury once such a fall occurs. In most cases, there is little that can be done to prevent the falls themselves. For skateboard-related injuries, the injuries identified as addressable are those which might have been prevented or mitigated through the use of wrist guards, elbow pads, or helmets. These products would only be effective, however, if riders can be convinced to use them while riding skateboards. Therefore, these injuries are counted as maximum possibly addressable, not necessarily preventable. A description of the criteria for maximum addressability for each of the products in this report is contained on pages 13 and 14 of this section.

The staff determined the percentage of injuries identified as maximum addressable by reviewing all of the emergency room injury report narratives for the full year 2002 for three of the categories studied. For each of the remaining categories studied, a random sample of 300 cases was selected from the cases for the year, and these narratives were reviewed to determine percentages of addressability. The cases identified as addressable from the sample and those identified as not addressable were then run through the Injury Cost Model, to determine the proportion of the costs which may be addressable. The percentages were then applied to the overall cost totals for the entire estimate for the product group to produce overall costs of injuries identified as maximum addressable.

Deaths were also reviewed and determined to be in either the not-addressable or maximum addressable category, and were valued at \$5 million dollars each. Because the death reports often have more information than the NEISS reports addressability was easier to determine. This value of \$5 million dollars for each death is consistent with current economic literature which usually expresses the value as ranging from \$3 million to \$7 million. For ease of tabulation, we have used the midpoint of this range. The maximum addressable cost estimate for medically attended injuries is added to the maximum addressable cost estimate for the deaths to obtain the total maximum addressable cost estimate.

Table 3 shows the percentage of injuries included in the maximum addressable category for each product group. It also shows how many of the deaths reported were included in the maximum addressable category.

Overall, after applying this process of review of the data to the entire category of Children's Outdoor Activities and Equipment, we find that the total maximum addressable injury and death cost is \$29.0 billion dollars, out of a total cost associated with these products of \$71.2 billion dollars, about 41% maximum possibly addressable.

Figure 3 shows the index<sup>2</sup> of estimated injury and death costs for each of the product categories and the estimated maximum addressability of those costs.

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<sup>2</sup> This total represents an index rather than an actual single year estimate of costs, because injury costs are based on 2002 and the death costs are based on 2000. These are the most recent years for which each of these cost items was available.

**Table 2. Product Summary Table – Injury, Death, and Cost Estimates**

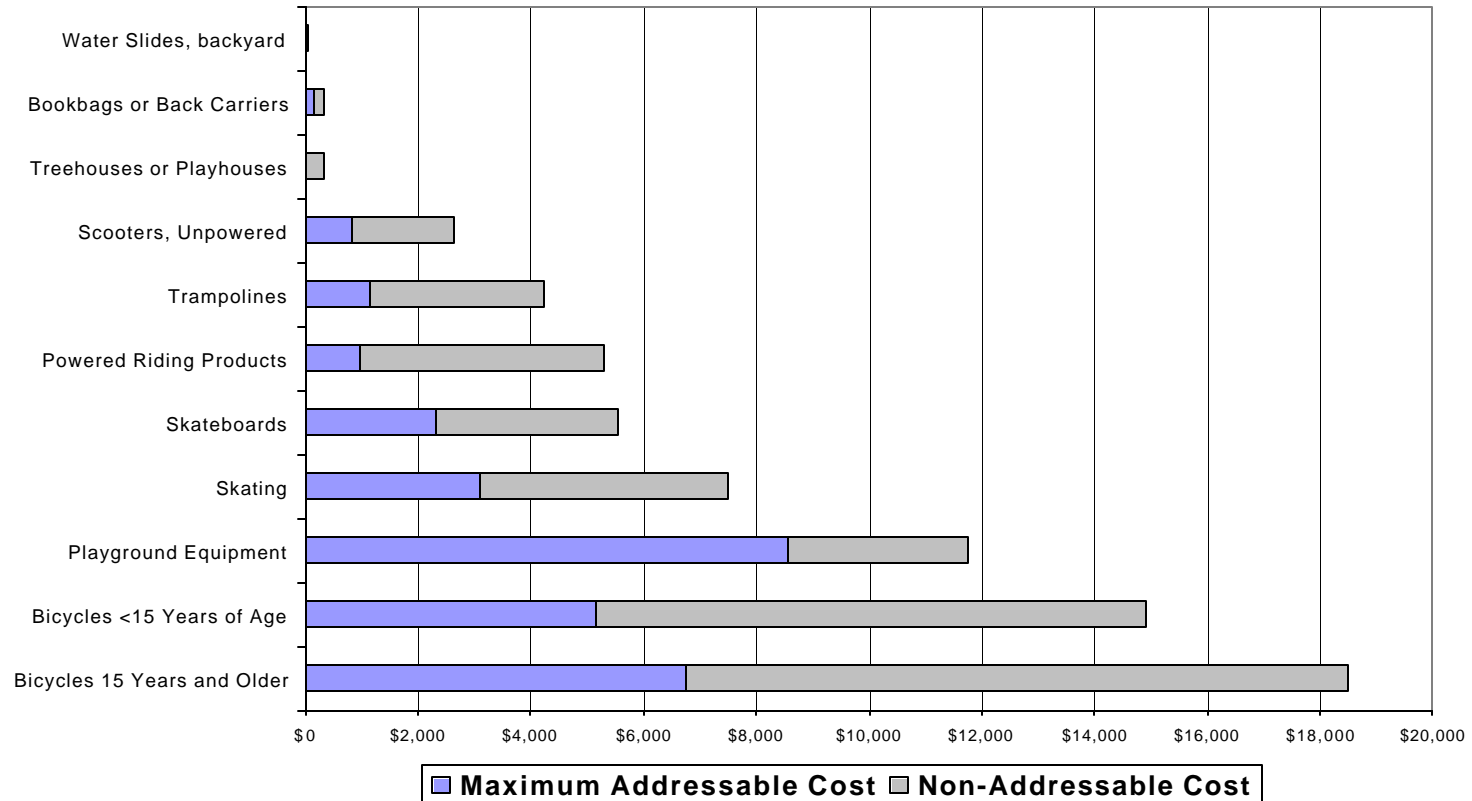
Product	Codes	ER Injuries 2002	Medically Treated Injuries 2002	Hosp.%	Incident Reports 2002	DTHS 2000	# of Participants 2001 (millions)	# of Products in Use (millions)	Estimated Useful Product Life (Years)	Death Costs (millions)	Med. Trtd. Injury Costs (millions \$)	Total Known Costs
Bicycles and Unicycles, Age Less than 15 Years	1283, 5033, 5040	307,120	703,810	4%	206	200	*	56.3	5	\$1,000.0	\$13928.9	\$14,928.9
Bicycles and Unicycles, Age 15 Years or Older	1283, 5033, 5040	232,620	633,740	6%	318	612	*	56.3	5	\$3,060.0	\$15430.5	\$18,490.5
Playground Equipment (Home and Public)	1242, 1243, 1244, 3219, 3246, 3273	228,350	515,020	4%	353	13	Unk.	27.9 (Home only)	5 – 7	\$65.0	\$11,700.4	\$11,765.4
Powered Riding Products, Not Toys	5035, 5036, 5042	72,040	183,930	9%	78	29	Unk.	N/A	N/A	\$145.0	\$5,145.4	\$5,290.4
Trampolines	1233	89,390	222,800	3%	22	4	Unk.	2.0	5	\$20.0	\$4,210.0	\$4,230.0
Treehouses or Playhouses	1234	4,820	10,680	9%	1	1	Unk.	N/A	N/A	\$5.0	\$348.8	\$353.8
Scooters, Unpowered	1329	59,910	140,680	2%	46	7	13.4	14.0	4	\$35.0	\$2,621.7	\$2,656.7
Skateboards	1333	113,180	281,960	4%	28	12	9.7	13.0	4	\$60.0	\$5,476.9	\$5,536.9
Water Slides, backyard, home	3294	1,800	4,180	-	3	0	Unk.	N/A	N/A	-	\$62.0	\$62.0
Skating	3216, 3217, 3255, 3297	153,700	383,030	3%	78	11	About 30.0 <sup>3</sup>	47.5	4	\$55.0	\$7,447.1	\$7,502.1
Bookbags or Back Carriers	5011	7,860	21,210	3%	6	1	Unk.	N/A	N/A	\$5.0	\$342.3	\$347.3

N/A – Information not available

\* Total Number of Bicycling Participants 41.4 million. These data are broken down by age, categories that are not directly comparable with the injury data. The National Sporting Goods Association (NSGA) estimates that there were 16.8 million participants 7– 17 years of age and 24.6 million participants 18 years of age or older in 2002. These estimates do not include unicycles, but the number of injuries and expected number of participants associated with unicycles are negligible.

<sup>3</sup> Estimates for in-line skating are from 2002; those for 2 x 2 roller skating and for ice skating are for 2001. Products are surveyed in alternate years.

**Figure 3. Estimated Cost Index, in Millions of Dollars, Outdoor Activities and Equipment, by Total Cost and Maximum Possible Addressable Cost**



- The estimate of maximum addressable cost does not necessarily represent the costs that the CPSC might actually be able to prevent each year through some type of action. It represents only a target population from which any successful prevention will have to come.
- The data presented in this graphic are also contained in Table 4, under the headings “Total injury and death costs” and “Total maximum addressable cost.”

**Table 3. Product Hazard Addressability**

Product	Codes	Percentage of injuries included in Maximum Addressable	Maximum Number of Addressable Deaths/ Total Deaths Reported
Bicycles and Unicycles <15 Years of Age	1283, 5033, 5040	19%	87 of 200 SEE NOTE
Bicycles and Unicycles 15 Years and Older	1283, 5033, 5040	11%	299 of 612 SEE NOTE
Playground Equipment	1242, 1243, 1244, 3219, 3246, 3273	68%	5 of 13
Powered Riding Products, Not Toys	5035, 5036, 5042	13%	11 of 29
Trampolines	1233	30%	0 of 4
Treehouses or Playhouses	1234	5%	0 of 1
Scoters, Unpowered	1329	9%	3 of 7
Skateboards	1333	36%	5 of 12
Water Slides, backyard, home	3294	5%	0 of 0
Skating	3216, 3217, 3255, 3297	31%	7 of 11
Bookbags or Back Carriers	5011	45%	0 of 1

NOTE: The death estimates for bicycles for the under 15 year age group and the 15 and older age group were calculated using different methodologies.

- For children less than 15 years of age, considerable work has been done using data from the NCHS public use data discs. Counts of deaths for this age group represent a count of all deaths reported associated with bicycles. Addressable cases are those for which the staff was able to determine that the victim probably died from a head injury.
- Death data for the population 15 years of age and older, was identified from CPSC death certificates and incident reports received during 2000. These databases are not as complete as the NCHS data. Therefore the count for the older population is an undercount of bicycle related deaths. The same criteria for addressability was used in reviewing these deaths as for the population of children, i.e. the victim died of a head injury and no other major injury was reported.

The percentages presented in this table are the percents of injuries, not costs, included in the maximum addressable category. These percentages cannot be directly compared to maximum addressable costs because the costs, while deriving from these same cases, take into account a number of variables, not just case weight. For more information on how these cost estimates are derived, refer to the methodology section at the end of this report.

## Maximum Addressability Definitions used for each class of products - Injuries

<b>Bicycles –</b>	Failures, head injuries or handlebars to abdomen
<b>Playground Equipment -</b>	Cut on, equipment failure, fell off, hanging, hit by, protrusion
<b>Skating -</b>	Addressable with wrist guards, addressable with helmets (roller skating and in-line skating only, not ice skating)
<b>Riding Products, Not Toys –</b>	Cut on, product failures, head injuries, hot surfaces
<b>Backyard Water Slides –</b>	Cut on
<b>Skateboards –</b>	Addressable with wrist guards, elbow pads, helmets
<b>Scooters -</b>	Head injuries or pinched in scooter
<b>Trampolines -</b>	Fell off or struck frame
<b>Bookbags and Back Carriers -</b>	Strains, instability, and any other patterns indicating bag too heavy
<b>Treehouses/Playhouses -</b>	Failures, entrapment, protrusions



## Maximum Addressability Definitions used for each class of products - Deaths

<b>Bicycles –</b>	Head injuries, product failures
<b>Playground Equipment -</b>	Equipment failure, strangled by clothing, strangled on equipment
<b>Skating -</b>	Head injuries (roller skating and in-line skating only, not ice skating)
<b>Riding Products, Not Toys –</b>	Head injuries, except collisions with large vehicles or cases which state that victim was wearing a helmet.
<b>Backyard Water Slides –</b>	None reported
<b>Skateboards –</b>	Head injuries
<b>Scoters -</b>	Head injuries
<b>Trampolines -</b>	Fell off or struck frame
<b>Bookbags and Back Carriers -</b>	None
<b>Treehouses/Playhouses -</b>	None

Two product categories appeared most likely to be deserving of additional work by CPSC staff beyond that which is done routinely. These were:

- **Bicycle injuries and deaths to persons 15 years of age and older** – This age group has approximately the same number of bicycling participants or slightly more participants than does the population under 15 years of age. However, over the period from 1997 through 2002, injuries to the younger group decreased significantly, while injuries to this age group were stable or increased slightly. In 2000, there were three times as many deaths to persons 15 years or older than there were to persons less than 15 years-of-age. The costs associated with bicycle-related injuries and deaths to the older age group are \$3.56 billion greater than the costs incurred by the younger group. CPSC has emphasized the importance of helmet use for children for many years. Many states and localities have passed laws requiring helmets for bicyclists. Most of these laws make some reference to persons under a certain age. Based on what we see in the injury and death data, CPSC may want to take steps to encourage helmet use by adults.
- **Bookbags and Back Carriers** – This category may be worth further study. The products have increased in popularity, and injuries have increased significantly. Over half of the injuries reported were identified as not addressable, and no clear product hazards have been identified. Some physicians and public health officials are concerned about chronic back injuries and pain as a result of the weight of backpacks, but this hazard is not an acute one likely to be treated in a hospital emergency room. CPSC staff looked into these chronic injuries in 2001, and no feasible product modification was identified. With regard to the acute injuries, Emerging Hazards plans to assign a limited number of investigations from NEISS to get a better idea of product involvement. If this inquiry indicates that there are product problems that could be addressed, further study using a larger sample of investigations based on NEISS injury data, including follow up with the victims, may be appropriate.

A third product, **trampolines**, has been the subject of work by CPSC's Office of Compliance and CPSC staff has worked with industry and others to strengthen the voluntary standard for these products to reduce the hazards. The injury frequency associated with trampolines increased significantly from 1997 to 2000, but the two years since have shown enough of a decline that the change from 1997 to 2002 is not significant. Even with this decline, however, trampolines rank first among all product categories in this report in maximum addressable costs per unit of product in use. Maximum addressable costs for trampolines were estimated at \$568.35 per trampoline in use. It is possible that our estimate of number of trampolines in use is an underestimate, with the undercount being in the large, high-end trampolines used in schools and recreation centers. The estimated cost per unit associated with trampolines is more than three times the cost per unit associated with the second highest product. Staff does not believe the undercount to be large enough to offset this difference. This product should be watched closely because of the high costs associated with it.

**Table 4. Calculation of Indices<sup>4</sup> using cost estimates from Injury Cost Model, Death Certificates File, and Estimates of Number of Products in Use**

Title	Medically Attended Injury Costs	Total Death Costs	Total Injury and Death Costs	Total Maximum Addressable Costs	Rank on Total Costs	Rank on Maximum Addressable Costs	Products in Use (Millions)	Maximum Addressable Costs per Unit	Rank on Maximum Addressable Costs per Unit
Bicycles and Unicycles < 15 years-of-age	13,928,865,740	1,000,000,000		<b>5,170,800,000</b>	2	3	56.3*	\$91.84	4
Bicycles and Unicycles 15 years-of-age and older	15,430,504,350	3,060,000,000	<b>18,490,504,350</b>	<b>6,741,400,000</b>	1	2	56.3*	\$119.74	3
Playground Equipment	11,700,434,290	65,000,000	<b>11,765,434,290</b>	<b>8,566,300,000</b>	3	1	Only have data on home equipment.	N/A	-
Powered Riding Products, Not Toys	5,145,431,190	145,000,000	<b>5,290,431,190</b>	<b>723,900,000</b>	6	8	N/A	N/A	-
Trampolines	4,209,955,030	20,000,000	<b>4,229,955,030</b>	<b>1,136,700,000</b>	7	6	2.0	\$568.35	1
Treehouses/ Playhouses	348,835,480	5,000,000	<b>353,835,480</b>	<b>17,400,000</b>	9	10	N/A	N/A	-
Scooters, Unpowered	2,621,671,490	35,000,000	<b>2,656,671,490</b>	<b>827,700,000</b>	8	7	14.0	\$59.12	6
Skateboards	5,476,940,030	60,000,000	<b>5,536,940,030</b>	<b>2,325,300,000</b>	5	5	13.0	\$178.87	2
Water Slides, backyard, home	62,011,900	0		<b>3,100,000</b>	11	11	N/A	N/A	-
Skating	7,447,071,960	55,000,000			4	4	47.5	\$65.02	5
Bookbags or Back Carriers	342,266,830	5,000,000			10	9	N/A	N/A	-

\* The staff does not have data on number of bicycles in use broken down by users under 15 years old and users 15 and older. The NSGA participation data allows a breakdown by ages 7 – 17 and 18 and older. These groups omit any riders less than 7 years-of-age, and the younger group includes children 15 through 17 years of age. These data can, therefore only provide an approximation of the number of riders in the <15 and 15+ age groups. According to the NSGA data, persons 7 – 17 are about 40% of the riders. The NEISS data show that persons less than 15 years-of-age represent over 50% of the injuries. The NSGA data show that children ride more frequently than adults. Because these imprecise measures of number of riders do not allow us to apportion the number of products in use by each age group, staff has used 50% of the total number of bicycles in use in each of the two groups.

<sup>4</sup> These estimates are indices, not actual estimates of expected injury cost reduction. This is because injury cost estimates are based on 2001 emergency room-treated injury estimates, death cost estimates are based on deaths reported which occurred in 2000, and addressability estimates of injuries are based on review of NEISS comments for 2001. Estimates of number of products in use are also very imprecise estimates. The cost figures in the table do not represent an actual estimate of the costs associated with any of the product groups for a specific year. They were developed, using the data available, to provide indices for the purpose of comparison.

## Methodology

### NEISS

The Commission operates the National Electronic Injury Surveillance System (NEISS), a probability sample of 98 U.S. hospitals with 24-hour emergency rooms (ERs) and more than six beds. These hospitals provide CPSC with data on all consumer product-related injury victims seeking treatment in the hospitals' ERs. Injury and victim characteristics, along with a short description of the incident, are coded at the hospital and sent electronically to CPSC.

Because NEISS is a probability sample, each case collected represents a number of cases (the case's *weight*) of the total estimate of injuries in the U.S. The weight that a case from a particular hospital carries is associated with the number of hospitals in the U.S. of a similar size. NEISS hospitals are stratified by size based on the number of annual emergency-room visits. NEISS comprises small, medium, large and very large hospitals, and includes a special stratum for children's hospitals.<sup>5</sup>

This analysis uses NEISS data for the period 1/1/1997 through 12/31/2002.

### CPSC's Death Certificate Database

CPSC purchases death certificates from all 50 states, New York City, the District of Columbia and some territories. Only those certificates in certain E-codes (based on the World Health Organization's International Classification of Diseases ICD-10 system) are purchased. These are then examined for product involvement before being entered into CPSC's death certificate database. This is not a statistical sample and therefore cannot be used to estimate the number of deaths in the U.S. associated with each product. The number of deaths for each product is at least a minimum count. To obtain a count of fatalities associated with each product category, the death certificate data was combined with the deaths found in the IPII (discussed below) database. The cases were then reviewed to eliminate duplicates and determine addressability.

Death certificate collection from the states takes time. Data for 2001 and 2002 were not complete at the time this report was prepared.

### CPSC's Injury or Potential Injury Incident File (IPII)

IPII is a CPSC database containing reports of injuries or potential injuries made to the Commission. These reports come from news clips, consumer complaints received by mail or through CPSC's telephone hotline or web site, Medical Examiners and Coroners Alert Program (MECAP) reports, letters from lawyers, and similar sources. While the IPII database does not constitute a statistical sample, it can provide CPSC staff with guidance or direction in investigating potential hazards. Since cases in this database may come from a variety of sources, some cases may be listed multiple times. To obtain a more accurate count of the number of reported incidents associated with each product, they were reviewed to eliminate duplicates.

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<sup>5</sup> Kessler, Eileen and Schroeder, Tom. The NEISS Sample (Design and Implementation). U.S. Consumer Product Safety Commission. October 1999.

## CPSC's Injury Cost Model

The Injury Cost Model (ICM) is a computerized analytical tool designed to measure the direct and indirect costs associated with consumer product-related injuries. In addition to providing a descriptive measure of injury hazards in monetary terms, the ICM is also used to estimate the benefits of regulatory actions designed to reduce consumer product injuries and to assist the Commission in planning, budgeting, and evaluating projects.

The ICM is structured to measure the four basic categories of injury costs: medical costs, work losses, pain and suffering, and product liability and legal costs. Medical costs include doctor and hospital-related costs as well as costs for diagnostic procedures, prescription drugs, equipment, supplies, emergency transportation, follow-up care, and administrative costs. Both the initial treatment costs and the costs of long term care are included in the medically-treated injury costs.

Work-related losses represent the value of lost productivity, the time spent away from normal work activities as the result of an injury. Work-related losses include both the short-term losses resulting from being absent from work and the long-term losses resulting from permanent partial or total disability and their impact on lifetime earnings. They also include the value of work lost as a result of caring for injured children, the value of housework lost due to an injury, and the loss to the employer resulting from the disruption of the workplace.

Pain and suffering represents the intangible costs of injury, and is based on jury verdicts for consumer product-related injuries. Product liability and legal costs represent the resources expended in product liability litigation. These costs include the costs of administering the product liability insurance system (including the plaintiff's legal costs and the costs of defending the insured manufacturer or seller), the costs of claims investigation and payment, and general underwriting and administrative expenses; however, medical, work loss, and pain and suffering compensation paid to injury victims and their families is excluded, thus avoiding double counting.

The ICM estimates the costs of injuries reported through the NEISS, a national probability sample of hospital emergency departments. The injury cost estimates depend on a number of factors, and vary by the age and sex of the injured person, the type of injury suffered, the body part affected, and whether or not the victim is hospitalized or treated and released. The ICM also uses empirically derived relationships between emergency department injuries and those treated in other settings (e.g. doctor's offices, clinics) to estimate the number of injuries treated outside hospital emergency departments and the costs of those injuries.

A number of databases are used to calculate the four cost categories. National discharge data and discharge data from six states are used to estimate the costs of hospitalized injuries. Data from Department of Defense medical records from almost two million retirees and civilian dependents of military personnel and several National Center for Health Statistics surveys dealing with costs of treatment in different medical settings are used to calculate medical costs for injuries where the victim is treated and released from the emergency department or treated in a clinic or doctor's office. Other major data sources include the Annual Survey of Occupational Illnesses and Injuries and the Detailed Claims Information (DCI) database for work loss estimates; and the Jury Verdicts Research data for pain and suffering estimates. Product liability and legal costs are derived analytically from insurance industry information and several studies of product liability.

To determine the maximum addressable cost estimate, the injury narratives were read to determine which would not be addressable. The remaining injuries were then run through the Injury Cost Model, producing the estimate of maximum addressable costs.

#### Variables Associated with Products in Use Estimates

Inputs needed for number of products in use estimates include: Annual sales, Retail price range, Expected useful life, and Expected number in use.

**Annual Sales:** The annual sales data are from trade sources, from published information and association estimates. Economic Analysis Staff used the average of unit sales as reported by appropriate industry sources.

**Retail Price Range:** The retail price range was reported by industry trade groups for some categories. For others Economic Analysis Staff used information from retail stores and information developed from internet searches..

**Expected Useful Life:** The useful life was reported by industry sources for some products. Available studies are also used, if no industry sources are found. In some cases, Human Factors staff was consulted to determine appropriate age groups, and thus, the length of time a product may remain in use.

**Expected Number in Use:** There is often not sufficient data available to conduct a Product Population Estimate for a class of products. As a surrogate in these cases, Economic Analysis Staff used average sales multiplied by the useful life estimate. This will understate the number of products in use for products that have seen substantial growth in sales, and overstate the number in use for products that have seen substantial decreases in sales in recent years.