



## Hazard Screening Report

### Home and Family Maintenance Products – Household Chemicals

(904-905, 908-910, 913-915, 917, 920-921, 925-927,  
929-934, 936-938, 940-942, 945, 949, 951-984)

*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 comments expressed in this report are those of CPSC staff, have not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.*

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# The Hazard Screening Project

As an aid in setting priorities, U.S. Consumer Product Safety Commission (CPSC) staff prepared this series of Hazard Screening Reports. Each report covers a group of related products, such as nursery equipment, housewares, 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 can use this information as one of the many tools used 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 but is not confined to 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 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 term “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 has completed 18 reports. Each report has an active link to it on the CPSC website. All reports are in Portable Document Format (PDF). The 18 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
- Housewares and Kitchen Appliances

- Recreational Cooking and Camping Products
- Home Communication, Entertainment and Hobby Products
- General Household Appliances
- Home Furnishings and Fixtures and 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 and Family Maintenance Products – Household Chemicals

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.

## CAVEAT!

This 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 being “maximum addressable” injuries.

To know the actual addressability of the hazards associated with a product usually requires a detailed study of the problem, and the product. That level of study is not feasible for this type of overview report. What staff has done instead is try to eliminate those injuries and deaths which involve the product only marginally or incidentally. Maximum addressable costs are then generated by CPSC’s Injury Cost Model<sup>1</sup> using the remaining injuries.

**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 for future prevention efforts.**

Therefore, while the report states that the maximum addressable percentage of the costs is about 56.9%, it would be incorrect to say that 56.9% of the injuries or 56.9% of the costs are addressable.

For example: If a child was injured by ingesting a household chemical but no other information was recorded, that injury would be counted in the maximum addressable category. Though the injury may not actually be addressable, there is not enough information to rule it out.

In addition, addressability definitions are based on review by Epidemiology staff using information available at the time each report is prepared. These determinations should be considered general estimates for agency planning purposes, not definitive staff evaluations of whether a specific type of hazard might be prevented. The fact that a given hazard associated with a product was not considered addressable in one of these reports should not be construed as indicating that the hazard should never be reconsidered or addressed.

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<sup>1</sup> The Injury Cost Model is explained on page 19.

## **Introduction**

The group of product codes included in this report consists of Home and Family Maintenance Products – Household Chemicals. This overview is one of a series of hazard screening reports. Each report provides information in a similar format to allow product and hazard comparison, both within and among the reports.

This report shows an index of the number of the overall injuries and deaths associated with household chemicals. A summary of the injury, death and cost data for the entire class of products is presented in Table 1. Figure 1 shows the frequency of estimated emergency room-treated injuries since 1997. This is followed by a pie chart (Figure 2) showing the distribution of the injuries for this class of products by the hazard type, i.e., mechanical, fire, electrical, chemical, or other. There is also a summary table, which shows the injuries, deaths, and costs associated with each product group (Table 2). This report considers 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 actions which the CPSC could take.

# Home and Family Maintenance Products – Household Chemicals

## Individual Product Categories

### Automotive Supplies<sup>2</sup>

(Includes product codes for: automotive chemicals, other; antifreeze; windshield wiper fluids; and automotive waxes, polishes, and cleaners)

### Cleaners

(Includes product codes for: household ammonia; dishwasher detergents; pine oil cleaners and disinfectants; laundry soaps and detergents; toilet bowl products; abrasive cleaners; general purpose household cleaners; bleaches, wallpaper cleaners; detergents, not specified; spot removers or cleaning fluids; dishwashing liquid; and soaps)

### Deodorizers

(Includes product codes for: liquid room deodorizers or fresheners; solid room deodorizers or fresheners; and room deodorizers or fresheners - unspecified)

### Caustic Chemicals

(Includes product codes for: drain cleaners; acids; rust removers; oven cleaners; caustic chemicals; and lye)

### Fuels

(Includes product codes for: gasoline; charcoal; lighter fluids; fuels for chafing dishes or fondue pots; diesel fuels; kerosene; lamp oils; fuel oils, not-specified; fuel storage tanks, and gasoline cans)

### Polishes

(Includes product codes for: floor waxes; furniture polishes or waxes; metal polishes, tarnish removers, or preventatives; shoe polishes; other polishes; polishers, non-specified; and rust preventatives)

### Solvents

(Includes product codes for: paint or varnish removers; paints, varnishes, or shellacs; paint or varnish thinners; lubricants; methyl alcohol; turpentine; and solvents, other or not specified)

### Other or Specialty Items

(Includes product codes for: photographic chemicals; school laboratory chemicals; adhesives; tapes (with adhesive surfaces); swimming pool chemicals; caulking and spackling compounds; dyes (non-cosmetic); fabric treatment products (excluding spot removers, cleaning fluids, bleaches and dyes); chemicals, not classified elsewhere; and dry ice)

### Miscellaneous Household Items<sup>3</sup>

(Includes product codes for: manual paint brushes or rollers; and wallpaper steamers)

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<sup>2</sup> Some automotive supplies may not be within the jurisdiction of the CPSC.

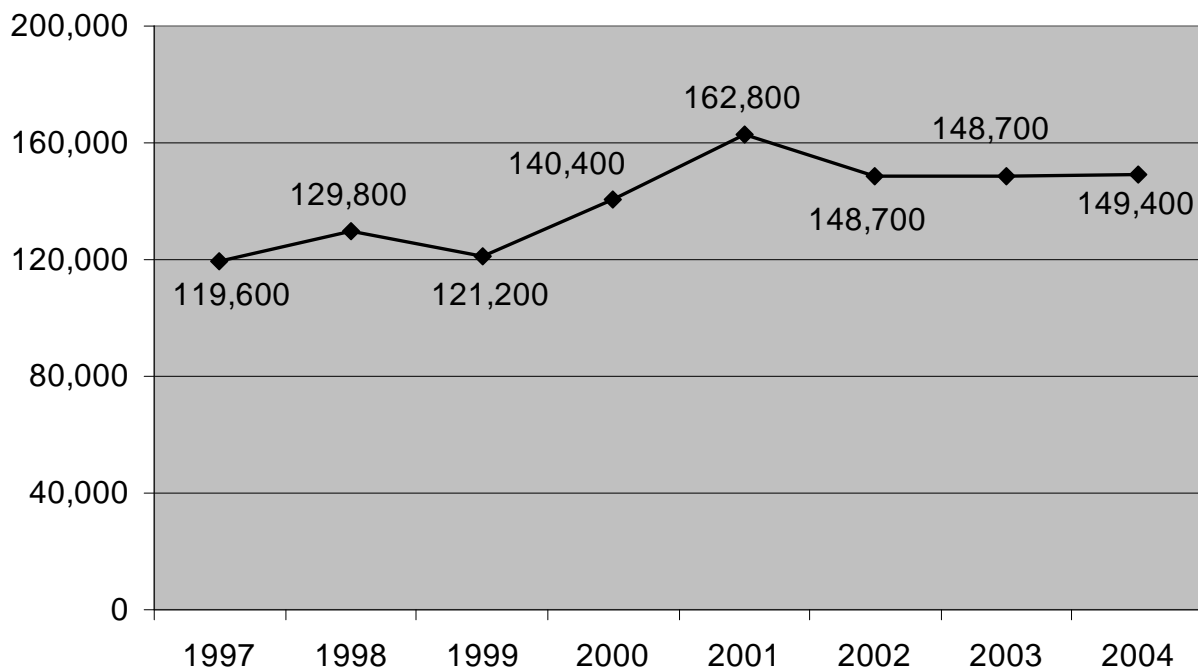
<sup>3</sup> Items included in this category are home and family maintenance products and, while not chemicals, were judged to best fit within this report as opposed to any of the other hazard screening reports.

**Table 1: Home and Family Maintenance Products – Household Chemicals  
(904-905, 908-910, 913-915, 917, 920-921, 925-927, 929-934, 936-938, 940-942, 945, 949,  
951-984)**

ER Treated Injuries 2004*	149,400	Percent of Households	not applicable
Medically Treated Injuries 2004*	372,300	Number of Products in Use	not available
Percent of ER Treated Hospitalized	5.8%	Estimated Useful Life	not applicable
Deaths 2001	250	Estimated Retail Price Range	not applicable
Number of Incident Reports	753	Death Costs (Millions)	\$1,250.0
Cost of Medically Treated Injuries (Millions in 2004 dollars)	\$6,901.3	Total Known Costs (Millions) <sup>4</sup>	\$8,151.3

\* Estimates are rounded to the nearest 100

**Figure 1: Estimated Emergency Room-Treated Injuries  
Associated with Household Chemicals, 1997 - 2004**



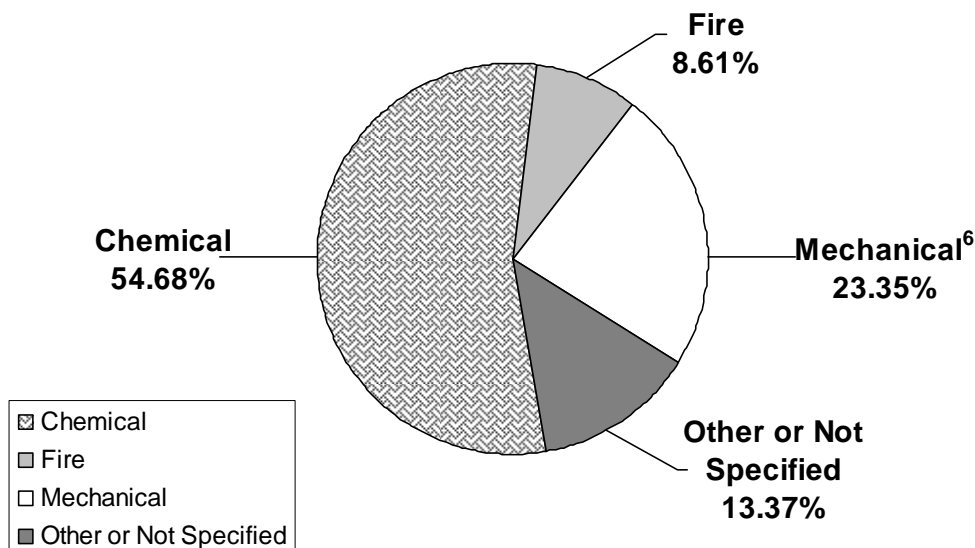
Source: National Electronic Injury Surveillance System (NEISS), 1997 – 2004

The change from 1997 to 2004 was +29,800. This change in estimated emergency room-treated injuries is statistically significant<sup>5</sup> ( $p = .0055$ ).

<sup>4</sup> This total represents an index rather than an actual single year estimate of costs, because injury costs are based on 2004 and death costs are based on 2001. At the time this report was prepared, these were the most recent years for which each of these cost items was available.

<sup>5</sup> The statistical test is with respect to the estimated number of injuries and not the rate of injuries per product in use.

**Figure 2. Distribution of Emergency Room-Treated Injuries for Household Chemicals by Hazard Category, 2004**



Source: National Electronic Injury Surveillance System (NEISS), 2004

## Deaths

For 2001, CPSC has reports of 250 deaths associated with household chemicals. Of these, 146 deaths were included in the maximum addressable category (see page 6 and page 16 for descriptions of this category). A reported 98 addressable deaths involved injuries from fires or explosions. The remaining deaths included in the maximum addressable category involved the following hazard patterns: 37 unintentional inhalations of toxic fumes, five poisonings via oral ingestions, four drownings in buckets filled with a chemical product, and two lethal chemical burns. The 104 deaths that were not included in the maximum addressable category were from intentional inhalation of toxic fumes for euphoric effects and various fatal injuries, such as from falls, from incidental product involvement. See Table 3 for the number of deaths in each product category included in the maximum addressable category.

<sup>6</sup> Some injuries in the mechanical category may not be within the jurisdiction of the CPSC.



## Overview

The increase of 29,800 injuries over the 8-year period, 1997 – 2004, was a statistically significant increase ( $p = .0055$ ).<sup>7</sup>

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-treated injuries that resulted in admission to the hospital, the number of incident reports received, the number of deaths reported, 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 the associated social cost might actually be addressed through some action. Many of the injuries treated in emergency rooms that were related to household chemical items may not be addressable because the injury had only incidental product involvement. To know the actual addressability of the hazards associated with a product usually requires detailed study of the problem, and the product. This level of study is not feasible for this type of overview report. What staff has done is to identify the portion of the injury and death costs that is not addressable through a case by case review. Maximum addressable costs were then generated by CPSC's Injury Cost Model<sup>8</sup> using the remaining injuries.

**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 for future prevention efforts.**

The reason for doing this kind of review is to allow staff to focus on the areas where CPSC action could have some effect.

For instance, the category of solvents ranks third in total costs but fifth in maximum addressable costs (see Table 4). If the injuries coded in NEISS associated with this class of products were incidental injuries such as straining one's back or ankle while using the product, there is very little action CPSC could take to reduce these types of injuries, so they are not included in the maximum addressable category.

The staff reviewed the narratives included in National Electronic Injury Surveillance System (NEISS) injury reports, and reviewed the death reports.<sup>9</sup> Because the NEISS narratives are brief and often do not provide much detail, cases were categorized as "not addressable" only if it was

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<sup>7</sup> The statistical change does not take into account the number of products in use and therefore may under or overestimate the significance of the change.

<sup>8</sup> See Methodology Section for a description of this model.

<sup>9</sup> See Methodology Section for a description of these databases.

clear that the injury was incidental or not related to the product; all other cases were considered “addressable.” If, for example, a child ingested a household chemical product but no other information was recorded, this case would be considered addressable because there was not enough information to conclude that the case wasn’t addressable. Unlike the injury reports, the death reports often had more information, allowing for better determination of addressability.

To control for the possibility that there may be a difference between costs associated with addressable injuries and costs associated with non-addressable injuries, the Injury Cost Model (ICM) was used to obtain cost estimates for all medically-treated injuries and the medically-treated injuries in the maximum addressable category. Deaths were valued at \$5 million dollars each. 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, staff has 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 medically-treated injuries and deaths included in the maximum addressable category for each product group.

The total maximum addressable injury and death cost for the category of household chemicals is \$4.6 billion dollars, out of a total cost associated with these products of \$8.2 billion dollars, which is about 56.9% of the total<sup>10</sup>. Note that the percentage of addressable injuries is different than the percentage of addressable costs. The cost estimates are derived from a number of variables associated with each injury<sup>11</sup>, so two cases may have the same weight but different cost estimates. Thus, the cost estimates do not have a one-to-one relationship with the injury estimates.

Figure 3 shows the index<sup>12</sup> of estimated injury and death costs for each of the product categories.

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<sup>10</sup> Based on the more precise totals presented in Table 4.

<sup>11</sup> See Methodology Section for more description of how the cost estimates are computed.

<sup>12</sup> This total represents an index rather than an actual single year estimate of costs, because injury costs are based on 2004 and the death costs are based on 2001. At the time this report was prepared, these were the most recent years for which that data was complete.

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

Product	Codes	ER Injuries <sup>†</sup> 2004	All Medically Treated Injuries <sup>†</sup> 2004	Hosp. % 2004	Incident Reports 2004	Deaths 2001	Death Costs (millions)	Med. Trtd. Injury Costs (millions)	Total Known Costs (millions)
Automotive Supplies <sup>13</sup>	955, 966, 967, 978	4,000	9,000	6.7%	33	3	\$15.0	\$167.2	\$182.2
Cleaners	930, 934, 945, 949, 951, 953 – 954, 956, 970, 976 – 977, 979, 983	62,000	154,500	2.9%	198	13	\$65.0	\$1,629.0	\$1,694.0
Deodorizers	973 – 975	2,100	5,300	**	69	3	\$15.0	\$51.5	\$66.5
Caustics Chemicals	929, 936 – 937, 942, 968 – 969	6,200	13,700	5.7%	24	7	\$35.0	\$306.9	\$341.9
Fuels	910, 917, 940 – 941, 962 – 965, 980 – 981	24,900	56,300	14.2%	276	162	\$810.0	\$2,605.6	\$3,415.6
Polishes	904 – 905, 931 – 932, 958 – 959, 961	1,300	3,700	**	4	0	\$0.0	\$56.0	\$56.0
Solvents	908, 913, 915, 933, 960, 972, 984	21,100	62,800	5.4%	72	24	\$120.0	\$1,183.3	\$1,303.3
Other or Specialty Items	909, 914, 920 – 921, 926 – 927, 938, 952, 957, 982	27,800	66,800	5.4%	90	39	\$195.0	\$904.6	\$1,099.6
Miscellaneous Household Items	925, 971	1,000	2,700	**	0	0	\$0.0	\$60.8	\$60.8
Total <sup>14</sup>		149,400	372,300	5.8%	753	250	\$1,250.0	\$6,901.3	\$8,151.3

\*\* Sample size is too small to report percentage

<sup>†</sup>Estimates are rounded to the nearest 100

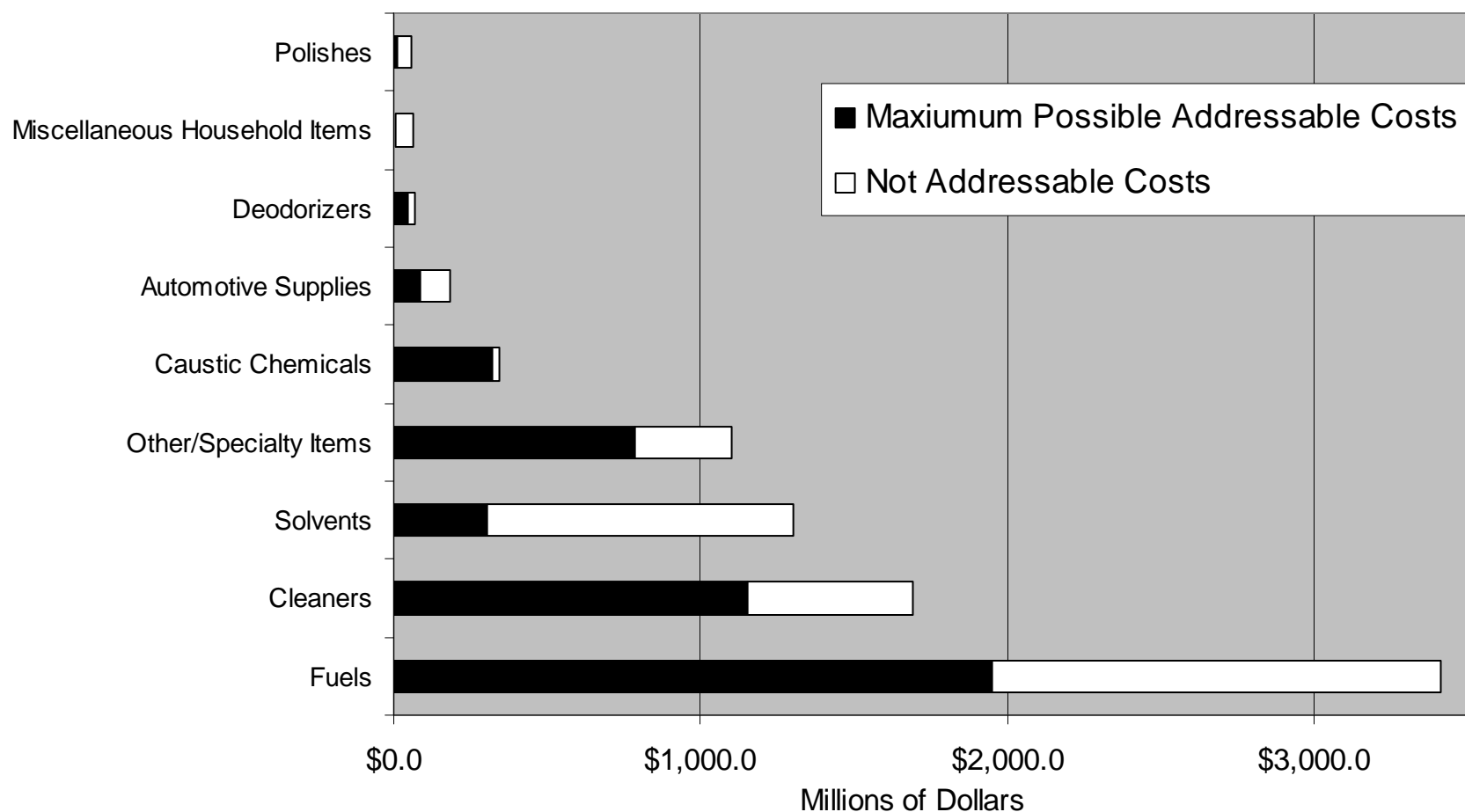
Descriptions of how these estimates were derived can be found in the Methodology Section.

<sup>13</sup> Some automotive supplies may not be within the jurisdiction of the CPSC.

<sup>14</sup> Some cases appear in more than one category. Thus, numbers may not add to totals.

Table 4 lists the product groups ranked in descending order by the Total Injury and Death Costs Index. This table also shows the total maximum addressable cost for each product category. For those product categories where there was an estimate of number of products in use, the maximum addressable cost per unit was calculated by dividing the maximum addressable cost estimate by the number of products in use. Rankings of the product categories on totals costs, maximum addressable costs, and maximum addressable cost per unit are also provided.

Figure 3: Estimated Cost Index of Household Chemical Categories, by Total Costs



Source: National Electronic Injury Surveillance System (NEISS), 2004, Death Certificate database (DCRT), 2001

NOTE: This estimate of maximum addressability does not necessarily represent the number of injuries or deaths or 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 costs”

**Table 3: Product Hazard Addressability**

<b>Product</b>	<b>Codes</b>	<b>Percentage of Injuries Included in Maximum Addressable</b>	<b>Maximum Number of Addressable Deaths/ Total Deaths Reported</b>
Automotive Supplies	955, 966, 967, 978	58%	0/3
Cleaners	930, 934, 945, 949, 951, 953 – 954, 956, 970, 976 – 977, 979, 983	78%	8/13
Deodorizers	973 – 975	67%	1/3
Caustic Chemicals	929, 936 – 937, 942, 968 – 969	92%	4/7
Fuels	910, 917, 940 – 941, 962 – 965, 980 – 981	49%	107/162
Polishes	904 – 905, 931 – 932, 958 – 959, 961	28%	0/0
Solvents	908, 913, 915, 933, 960, 972, 984	30%	12/24
Other or Specialty Items	909, 914, 920 – 921, 926 – 927, 938, 952, 957, 982	81%	15/39
Miscellaneous Household Items	925, 971	**	0/0
<b>Total<sup>15</sup></b>		<b>66%</b>	<b>146/250</b>

\*\* Sample size too small to provide a percentage

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 derived from the 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.

In the two pages that follow, the maximum addressable definitions for each product category are presented. While reading the injury/death narratives to determine addressability, hazard patterns were also coded. The hazard patterns determined to be not-addressable were removed and those that remained make up the maximum addressable definitions.

<sup>15</sup> Numbers may not add to total because some of the deaths fell in more than one product group. Thus, they are listed in two groups but only counted once in the total.

## **Maximum Addressability Definitions Used for Each Class of Products – Injuries**

Automotive Supplies<sup>16</sup>: dermal and ocular injuries; ingestions by children under 5

Cleaners: allergic reactions<sup>17</sup>; dermal and ocular injuries; ingestions by children under 5; inhalations of toxic fumes; other assorted injuries without a consistent hazard pattern

Deodorizers: inhalations of noxious fumes; ingestions by children under 5; dermal and ocular injuries; allergic reactions

Caustic Chemicals: dermal and ocular injuries; inhalations of toxic fumes; ingestions by children under 5; eruption of drain cleaner following use to unclog drain

Fuels: injuries when product accidentally ignited or exploded; injuries (mostly burn injuries) from fires caused by flammable products (e.g., lighter fluid); fire-related injuries from clothing that was exposed to a flammable liquid and caught fire; ocular injuries when product splashed in face; inhalations of toxic fumes; ingestions by children under 5

Polishes: ingestions by children under 5; dermal and ocular injuries; inhalations of noxious fumes; allergic reactions

Solvents: dermal and ocular injuries; inhalations of toxic fumes; allergic reactions; ingestions by children under 5; injuries from fires caused by product; other assorted injuries without a consistent hazard pattern

Other or Specialty Items: dermal and ocular injuries; inhalations of toxic fumes; ingestions by children under 5; allergic reactions; injuries from fire, explosions or burns; other assorted injuries without a consistent hazard pattern

Miscellaneous Household Items<sup>18</sup>: steam burns while using wallpaper steamer

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<sup>16</sup> Some automotive supplies may not be within the jurisdiction of the CPSC.

<sup>17</sup> Allergic reactions may actually be irritant reactions. Furthermore, the substance that induced the allergic or irritant reaction is reported by the consumer, and is not necessarily confirmed by medical personnel.

<sup>18</sup> Items are included in this category because they are home and family maintenance products.

## **Maximum Addressability Definitions Used for Each Class of Products – Deaths**

Cleaners: children under 5 drowned in buckets; poisonings by ingestion; poisonings by inhalation

Deodorizers: poisonings by ingestion (a child ingested air freshener)

Caustic Chemicals: poisonings by inhalation (e.g., man inhaled acid fumes while working on a clogged drain, man inhaled acid fumes while cleaning a well); death from dermal exposure to caustic chemical

Fuels: explosions of flammable liquids, man caught fire while igniting a fire, child caught fire when gasoline ignited, flammable liquid ignited and started fire; man died from dermal burns from an explosion of an oil pump; poisonings by inhalation of gasoline fumes; CO poisonings

Solvents: poisonings by inhalation (e.g., toxic inhalation of paint primer, paint stripper, paint, paint with toluene); paint thinner, lacquer, paint ignited and caused fatal fire or explosion

Other or Specialty Items: poisonings by inhalation; poisonings by ingestion; chemical fire, fatal explosion when vapor from a chemical (e.g., glue) ignited

None of the deaths associated with the Automotive Supplies category were included in the maximum addressable category. There were no reported deaths associated with Polishes or Miscellaneous Household Items in 2001. These groups are not included in the list above.



**Table 4: Calculation of Indices using Cost Estimates from Injury Cost Model, and Death Certificates File.**

Title	Medically Attended Injury Costs (Millions)	Total Death Costs (Millions)	Total Injury and Death Costs (Millions)	Total Maximum Addressable Costs (Millions)	Rank on Total Costs	Rank on Maximum Addressable Costs
Fuels	\$2,605.6	\$810.0	\$3,415.6	\$1,949.1	1	1
Cleaners	\$1,629.0	\$65.0	\$1,694.0	\$1,152.1	2	2
Solvents	\$1,183.3	\$120.0	\$1,303.3	\$305.8	3	5
Other or Specialty Items	\$904.6	\$195.0	\$1,099.6	\$787.2	4	3
Caustics Chemicals	\$306.9	\$35.0	\$341.9	\$318.7	5	4
Automotive Supplies	\$167.2	\$15.0	\$182.2	\$86.2	6	6
Deodorizers	\$51.5	\$15.0	\$66.5	\$43.6	7	7
Miscellaneous Household Items	\$60.8	\$0.0	\$60.8	\$4.1	8	9
Polishes	\$56.0	\$0.0	\$56.0	\$13.4	9	8
Total	\$6,901.3	\$1,250.0	\$8151.3	\$4,635.7		

These “total injury and death costs” estimates and “total maximum addressable costs” estimates are indices, not actual estimates of cost and expected injury cost reduction. This is because injury cost estimates and addressability estimates are based on 2004 emergency room-treated injury reports, and death cost estimates are based on deaths reported which occurred in 2001. Some cases appear in more than one category; thus, numbers may not add to total. These cost figures were developed, using the data available, to provide indices for the purpose of comparison. They do not represent an actual estimate of the costs associated with any of the product groups for a specific year.

## Methodology

### NEISS

The Commission operates the National Electronic Injury Surveillance System (NEISS), a probability sample of about 100 U.S. hospitals with 24-hour emergency rooms (ERs) with 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>19</sup>

### 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 database (discussed below). The cases were then reviewed to eliminate duplicates and determine addressability.

Death certificate collection from the states takes time. Data for 2002 until present were not complete when 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>19</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 was hospitalized, held for observation, transferred, or treated and released. The ICM also uses empirically derived relationships between emergency department injuries and those treated in other settings (e.g., doctors' 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 the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) (which includes 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<sup>20</sup>. Maximum addressable costs were then generated by the Injury Cost Model using the remaining injuries.

#### Variables Associated with Products in Use Estimates

Inputs needed for number of products in use estimates include: annual sales and expected useful life.

**Annual Sales:** The annual sales data are from trade sources, from published information and association estimates. CPSC Directorate for 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, CPSC Division of 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.

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<sup>20</sup> See page 9, the discussion on addressability for more information on this process.