



## Hazard Screening Report

### General Appliances

(Product codes 101-103, 106-108, 112-116,  
118-119, 125-127, 131-139)

*This report and all others in this series are general overviews, which use data taken directly from the data systems for the purpose of comparison among the products. No recoding or adjusting of data was performed. For this reason, estimates of injuries provided in this report will differ from other documents produced by Epidemiology staff working in specific program areas. This analysis was prepared by the CPSC staff, has 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, 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.

## Caveat

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. Maximum addressable costs were then generated by the Injury Cost Model 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 from which any successful prevention will have to come.**

Therefore, while the report states that the maximum addressable percentage of the costs is about 29.4%, it would be incorrect to say that 29.4% of the injuries or 29.4% of the costs are addressable.

For example: If an incident stated that a patient bent back his thumb a on washing machine, it would be included in the maximum addressable category since not enough information is provided to determine how the injury occurred, i.e., was the thumb stuck in the wringer of the washer, was it slammed by the lid, or did he fall into the washer. 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.

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.

## **Introduction**

The group of products included in this report consists of General Appliances. This report provides several pieces of information 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 injuries and deaths associated with General Appliances. The first information presented is a summary of the injury, death, and cost data for the entire class of products. A graph is presented which shows the frequency of emergency room-treated injuries from 1997 to 2002 (figure 1). This is followed by a pie chart showing the distribution of the injuries for this class of products by energy source of the hazard, i.e., mechanical, fire, electrical, chemical, or other (figure 2). There is also a summary table, which shows the injuries, deaths, and costs associated with each product group.

The report also considers addressability of the injuries, by attempting to identify those injuries which had only incidental product involvement and would not be addressable by mandatory or voluntary standards or by other action which the CPSC could take.

## **General Appliances**

### **Individual Product Categories**

Washing Machines (includes: washing machines without wringers or other dryers, wringer washing machines, washing machines with unheated spin dryers, washing machines (not specified), and washer-dryer combinations (with one frame))

Dryers (includes: electric clothes dryers without washers, gas clothes dryers without washers, and clothes dryers (not specified))

Floor Care Equipment (includes: vacuum cleaners, electric brooms, floor buffers, waxers, and rug shampoos)

Water Heaters (includes: gas water heaters, electric water heaters (excluding immersion heaters), other water heaters, and water heaters (not specified))

Automatic Doors (includes: automatic doors or door openers and automatic garage doors or door openers)

Electric Blankets (includes: electric blankets or sheets)

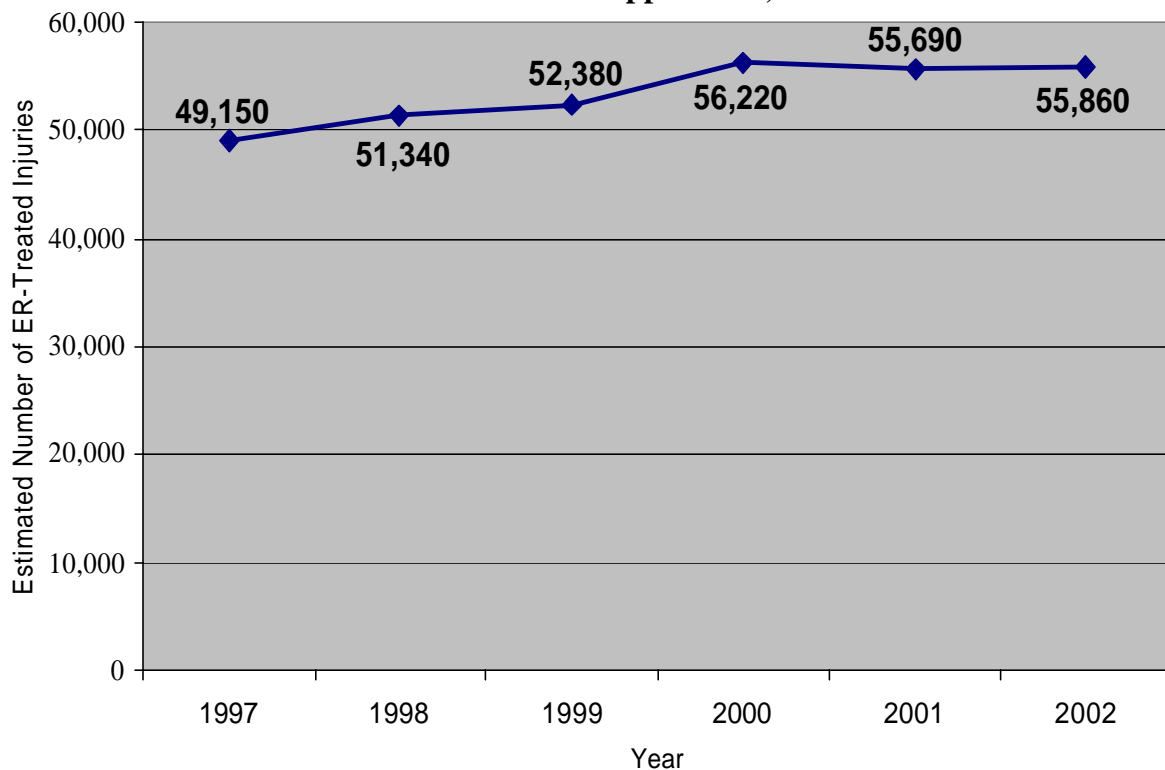
High Temperature Potential Appliances (includes: propane, LP, or butane gas tanks or fittings and incinerators)

Miscellaneous Appliances (includes: mangle irons, sewing machines or accessories, water softeners or conditioners (appliances), and drinking fountains)

**General Appliances**  
(Product codes 101-103, 106-108, 112-116,  
118-119, 125-127, 131-139)

|  |           |  |           |
|--|-----------|--|-----------|
| ER-Treated Injuries 2002*  | 55,860    | Percent of Households                        | n/a       |
| Medically-Treated Injuries 2002*                                 | 158,460   | Number of Products in Use                    | n/a       |
| Percent of ER-Treated Hospitalized <sup>1</sup>                  | 4.4%      | Estimated Useful Life                        | n/a       |
| Deaths 2000  | 80        | Estimated Retail Price Range                 | n/a       |
| Number of Incident Reports 2003                                  | 828       | Death Costs (Millions)                       | \$400     |
| Cost of Medically-Treated Injuries<br>(Millions in 2002 dollars) | \$2,988.6 | Total Known Costs <sup>2</sup><br>(Millions) | \$3,388.6 |

**Figure 1: Estimated Number of Emergency Room-Treated Injuries  
Associated with General Appliances\*, 1997-2002**



Source: National Electronic Injury Surveillance System (NEISS), 1997–2002

From 1997 to 2002, the estimated number of emergency room-treated injuries increased by 6,710. This is a marginally statistically significant change ( $0.05 < p=0.07 < 0.1$ ).

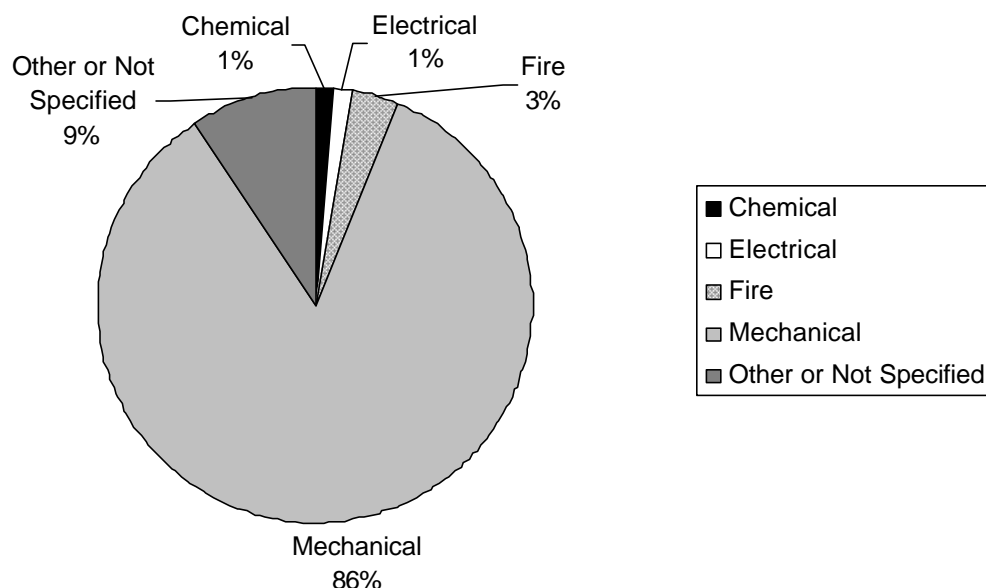
\* Estimates are rounded to the nearest 10.

n/a: Aggregate category estimates are not applicable.

<sup>1</sup> This may include cases with dispositions equal to treated and transferred to another hospital, treated and admitted for hospitalization (within same facility), and held for observation.

<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 death costs are based on 2000. These were the most recent figures, at the time this report was prepared.

**Figure 2: Distribution of Emergency Room-Treated Injuries by Energy Source of the Hazard for General Appliances<sup>3</sup>, 2002**



## Deaths

There were 80 reported deaths that occurred in 2000 associated with General Appliances. Staff categorized 69 of these deaths in the maximum addressable category (see page 7 for the description of this category). Over 35 percent (29 of the 80) of the reported deaths were associated with high temperature appliances. More specifically these deaths were associated with propane or butane gas tanks or fittings. These deaths most frequently involved a gas explosion. Water heaters were associated with 19 of the 29 deaths. The majority of these deaths were associated with a water heater and a fire, often involving the water heater ignition of flammable liquids or gas<sup>4</sup>. Eighteen deaths were associated with dryers. Fifteen of the 18 deaths involved fires and three deaths involved electrocutions. The following categories were associated with 10 or fewer deaths: washing machines, floor care equipment, automatic doors, and electric blankets. There were no reported deaths associated with miscellaneous appliances.

<sup>3</sup> Energy source groupings are based on the case's diagnosis code. See Appendix A for more details.

<sup>4</sup> While these deaths were included in the maximum addressable category, this water heater ignition hazard has been addressed by the most recent version of the ANSI voluntary standard that went into effect July 1, 2003.



## Overview Summary

The increase of 6,710 injuries over the 6-year period, 1997 – 2002 was a marginally statistically significant change ( $0.05 < p=0.07 < 0.1$ ).

Table 1 provides a summary of all the product groups examined for this report. This table provides information on the estimated number of emergency room-treated injuries, the estimated number of medically-treated injuries, the percentage of the estimated 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 estimated 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 General Appliances may not be addressable. 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 we can do instead is try to identify that portion of the injury and death costs that is not addressable. Maximum addressable costs were then generated by the Injury Cost Model 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 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: The category Floor Care Equipment is the top ranked category with regard to total injury cost. For the most part, consumers were injured by falling over vacuums or cords, parts of the vacuum falling on them, or straining their backs or shoulders while vacuuming. There is virtually no product contribution to these injuries other than its presence. These cases are considered incidental. A description of the criteria for maximum addressability for each of the products in this report is contained on pages 12 and 13 of this section.

The staff reviewed the narratives included in the National Electronic Injury Surveillance System (NEISS) injury reports. Because the NEISS narratives are very short and do not provide much detail, cases were categorized as ‘not addressable’ only if it was clear that the injury was incidental or not specifically related to the product. For example, an incident that states that a patient bent back a thumb on washing machine would be included since not enough information was provided to determine how the injury occurred, i.e., was the thumb stuck in the wringer of

the washer, was it slammed by the lid, or was there a fall into the washer. Such cases would be left in the ‘maximum addressable’ category.

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 also reviewed and determined to be in either the not-addressable or maximum addressable category, and were valued at \$5 million each. This value of \$5 million 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-treated injuries is added to the maximum addressable cost estimate for the deaths to obtain the total maximum addressable cost estimate. Table 2 shows the percentage of medically-treated 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 General Appliances, we find that the total maximum addressable injury and death cost<sup>5</sup> is about one billion dollars, out of a total cost associated with these products of 3.4 billion dollars.

Figure 3 shows the index<sup>5</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>5</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 1 – Product Summary Table – Injury, Death, and Cost Estimates**

| Product                               | Codes              | ER-Treated Injuries 2002* | Medically Treated Injuries 2002* | ER-Treated Injuries Hosp. 2002 (%) <sup>+</sup> | Incident Reports 2003 | DTHS 2000 | Percent of Households (%) | Number of Products in Use (Millions) | Estimated Useful Product Life (Years) | Death Costs (Millions) | Medically-Treated-Injury Costs (Millions) | Total Known Costs (Millions) |
|---------------------------------------|--------------------|---------------------------|----------------------------------|---|-----------------------|-----------|---------------------------|--------------------------------------|---------------------------------------|------------------------|---|------------------------------|
| Washing Machines                      | 101-103, 126, 135  | 13,500                    | 39,600                           | 3.3%  | 45                    | 2         | 94%                       | 99                                   | 12                                    | \$10                   | \$753.9                                   | \$763.9                      |
| Clothing Dryers                       | 106, 107, 127      | 6,790                     | 20,110                           | 2.5%  | 333                   | 18        | 80%                       | 87                                   | 13                                    | \$90                   | \$346.8                                   | \$436.8                      |
| Floor Care Equipment                  | 113-116            | 20,910                    | 62,410                           | 4.0%  | 71                    | 4         | 98%                       | 159                                  | 8                                     | \$20                   | \$1,059.5                                 | \$1,079.5                    |
| Water Heaters                         | 118, 119, 133, 134 | 2,660                     | 7,320                            | 4.1%  | 191                   | 19        | 100%                      | 151                                  | 9-11                                  | \$95                   | \$184.8                                   | \$279.8                      |
| Automatic Doors                       | 137, 138           | 5,320                     | 13,150                           | 10.5%   | 26                    | 3         | n/a                       | n/a                                  | n/a                                   | \$15                   | \$325.1                                   | \$340.1                      |
| Electric Blankets                     | 132                | **                        | **                               | **  | 81                    | 5         | n/a                       | n/a                                  | n/a                                   | \$25                   | \$16.2 <sup>Y</sup>                       | \$41.2                       |
| High Temperature Potential Appliances | 131, 139           | 2,660                     | 6,300                            | 10.1%   | 75                    | 29        | n/a                       | n/a                                  | n/a                                   | \$145                  | \$178.4                                   | \$323.4                      |
| Miscellaneous Appliances              | 108, 112, 125, 136 | 4,430                     | 11,240                           | 0.9%  | 17                    | 0         | n/a                       | n/a                                  | n/a                                   | \$0                    | \$160.0                                   | \$160.0                      |

\* Estimates are rounded to nearest 10.

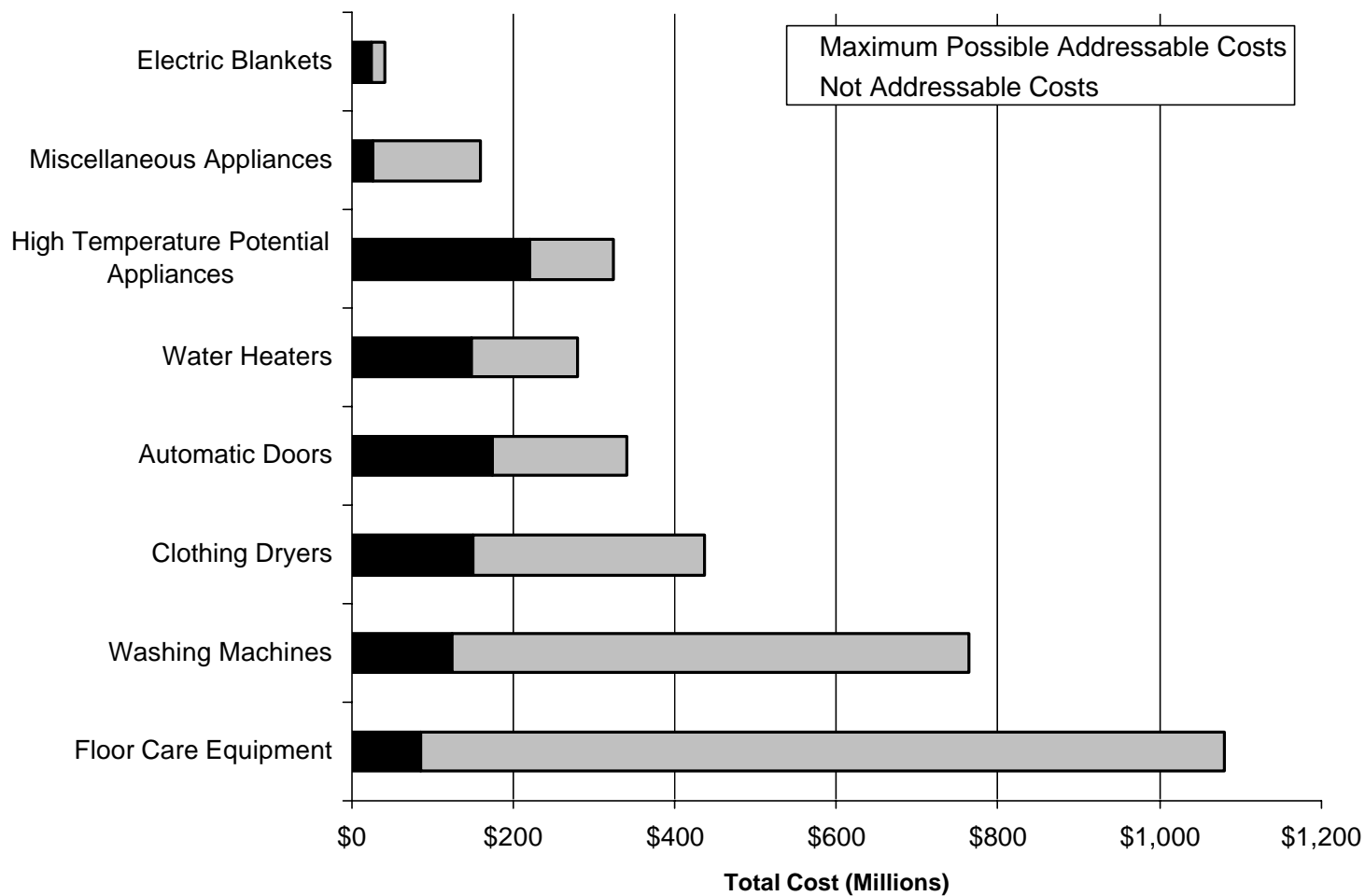
n/a: Estimates are not available.

\*\* Estimates are associated with a small sample size and large variability therefore they are not reported.

<sup>+</sup> This includes cases with dispositions equal to treated and transferred to another hospital, treated and admitted for hospitalization (within same facility), and held for observation.

<sup>Y</sup> Estimate is based on a sample size of seven and is presented for comparison purposes only. It should be interpreted with extreme caution.

**Figure 3. Estimated Cost Index, in Millions of Dollars, General Appliances, by Total Cost and Maximum Possible Addressable Cost**



- The estimate of maximum addressable cost does not necessarily represent the cost that 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 come.
- The data presented in this graph are also contained in Table 3, under the heading “Total injury and death costs” and “Total maximum addressable cost.”

**Table 2 – Product Hazard Addressability**

| <b>Product</b>                        | <b>Codes</b>       | <b>Percentage of ER treated injuries included in Maximum Addressable</b> | <b>Maximum Number of Addressable Deaths/ Total Deaths Reported</b> |
|---------------------------------------|--------------------|--|--|
| Washing Machines                      | 101-103, 126, 135  | 22%  | 1 of 2   |
| Clothing Dryers                       | 106, 107, 127      | 25%  | 17 of 18   |
| Floor Care Equipment                  | 113-116            | 12%  | 3 of 4   |
| Water Heaters                         | 118, 119, 133, 134 | 35%  | 18 <sup>7</sup> of 19  |
| Automatic Doors                       | 137, 138           | 69%  | 0 of 3   |
| Electric Blankets                     | 132                | 0%   | 5 of 5   |
| High Temperature Potential Appliances | 131, 139           | 42%  | 25 of 29   |
| Miscellaneous Appliances              | 108, 112, 125, 136 | 33%  | 0 of 0   |
| <b>Total</b>                          |                    | <b>26%</b>   | <b>69 of 80</b>  |

The percentages represented in this table are the percents of the estimated number of emergency room-treated injuries, not costs, included in the maximum addressable category for the year 2002. These percentages cannot be directly compared to the 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 the cost estimates are derived, refer to the methodology section at the end of this report.

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<sup>7</sup> While these deaths were included in the maximum addressable category, this water heater ignition hazard has been addressed by the most recent version of the ANSI voluntary standard that went into effect July 1, 2003.

**Maximum Addressability Definitions used for each class of products<sup>8</sup> - Injuries  
(patterns that appeared in the NEISS data)**

**Washing Machines** - cut on, hit by falling lid, caught in, electrical shock, or burn.

**Clothing Dryers** - cut on, burn, electric shock, strain or contusion from moving parts, shut in door, or exposure to fire or smoke.

**Floor Care Equipment** - foreign body, cut on, electric shock, body part (including hair) caught in or hit by moving part, or burn.

**Water Heaters** - cut on, burn, carbon monoxide or raw gas exposure, or exposure to fire or smoke.

**Automatic Doors** - cut on, body part (including hair) or clothing caught in, or door closed on.

**Electric Blankets** - burn or exposure to fire or smoke.

**High Temperature Potential Appliances** - cut on, burn, gas explosion, exposure to fire or smoke, or raw gas inhalation.

**Miscellaneous Appliances** - cut on, puncture, foreign body, or electric shock.

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<sup>8</sup> Note: For all categories, cases that involved an individual working on an appliance or fixing an appliance were considered non-addressable.

**Maximum Addressability Definitions used for each class of products<sup>9</sup> - Deaths  
(patterns that appeared in the death data)**

**Washing Machines** - exposure to fire or smoke.

**Clothing Dryers** - exposure to fire or smoke or electrocution.

**Floor Care Equipment** - exposure to fire or smoke (ignition of flammable liquids).

**Water Heaters** - exposure to fire or smoke, carbon monoxide poisoning, or electrocution.

**Automatic Doors** - none reported.

**Electric Blankets** - burn or exposure to fire or smoke.

**High Temperature Potential Appliances** - burn, gas explosion, or exposure to fire or smoke.

**Miscellaneous Appliances** - none reported.

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<sup>9</sup> Note: For all categories, deaths that were associated with working on an appliance or fixing an appliance were considered non-addressable.

**Table 3 - Calculation of Indices Using Cost Estimates from Injury Cost Model, Death Certificates File, and Estimates of Number of Products in Use.**

| Title                                 | Medically Attended Injury Costs (Millions) | Total Death Costs (Millions) | Total Injury and Death Costs <sup>N</sup> (Millions) | Total Maximum Addressable Costs <sup>N</sup> (Millions) | Rank on Total Costs | Rank on Maximum Addressable Costs | Products in Use (Millions) | Maximum Addressable Costs per Unit <sup>N</sup> | Rank on Maximum Addressable Costs per Unit <sup>10</sup> |
|---------------------------------------|--|------------------------------|--|---|---------------------|-----------------------------------|----------------------------|---|--|
| Washing Machines                      | \$754                                      | \$10                         | \$764  | \$123   | 2                   | 5                                 | 99                         | \$1.25  | 2  |
| Clothing Dryers                       | \$347                                      | \$90                         | \$437  | \$151   | 3                   | 3                                 | 87                         | \$1.73  | 1  |
| Floor Care Equipment                  | \$1,059                                    | \$20                         | \$1,079  | \$86  | 1                   | 6                                 | 159                        | \$0.54  | 4  |
| Water Heaters                         | \$185                                      | \$95                         | \$280  | \$148   | 6                   | 4                                 | 151                        | \$0.98  | 3  |
| Automatic Doors                       | \$325                                      | \$15                         | \$340  | \$174   | 4                   | 2                                 | n/a                        | n/a   | n/a  |
| Electric Blankets                     | \$16.2 <sup>ψ</sup>                        | \$25                         | \$41   | \$25  | 8                   | 8                                 | n/a                        | n/a   | n/a  |
| High Temperature Potential Appliances | \$178                                      | \$145                        | \$323  | \$221   | 5                   | 1                                 | n/a                        | n/a   | n/a  |
| Miscellaneous Appliances              | \$160                                      | \$0                          | \$160  | \$26  | 7                   | 7                                 | n/a                        | n/a   | n/a  |

<sup>∇</sup> These estimates are indices, not actual estimates of expected injury cost reduction. This is because injury cost estimates are based on 2002 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 2002. Estimates of number of products in use are also 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.

n/a: Estimates are not available

<sup>10</sup> Rank is based on a group of four. This is because there is an estimate for the products in use available for only four of the eight categories.

<sup>ψ</sup> Estimate is based on a sample size of seven and is presented for comparison purposes only. It should be interpreted with extreme caution.



## **Methodology**

### **National Electronic Injury Surveillance System (NEISS)**

The Commission operates the National Electronic Injury Surveillance System, 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>11</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. The result is neither a statistical sample nor a complete count of product-related deaths, nor does it constitute a national estimate. The database provides only counts of product-related deaths from a subset of E-codes. For this reason, these counts tend to be underestimates of the actual numbers of product-related deaths.

Death certificate collection from the states takes time. Data for 2001, 2002, and 2003 were not complete when this report was prepared.

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

IPII is a 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.

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<sup>11</sup> Kessler, Eileen and Schroeder, Tom. The NEISS Sample (Design and Implementation). U.S. Consumer Product Safety Commission. Washington DC. 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 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.

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 its 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 National Electronic Injury Surveillance System (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 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. 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, Expected useful life, and Expected number in use.

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

Expected Useful Life: The useful life was reported by industry sources for some products. Available studies were also used, if no industry sources were 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.