



2004 ELECTROCUTIONS ASSOCIATED WITH CONSUMER PRODUCTS*

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Directorate for Epidemiology
April 2009

* This analysis was prepared by the CPSC staff. It has not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.

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Executive Summary

Estimates of the number of product-related electrocutions reflect a change to the previously employed procedure for determining incidents that are within the scope of U.S. Consumer Product Safety Commission's (CPSC) jurisdiction. Scope determination is based on information contained in the death certificates of electrocution victims and, when available, is augmented by CPSC incident reports in the In-depth Investigation (INDP) File and the Injury or Potential Injury Incident (IPII) File. Prior to this year, CPSC staff had access to only a subset of all electrocution-related death certificates for review. These were matched to death certificate records from the National Center for Health Statistics (NCHS) which maintains a database of all U.S. death certificates. National estimates of consumer product-related electrocutions were imputed for the unmatched NCHS records based on the observed proportion of in-scope cases in the CPSC records.

Beginning with this report, CPSC staff has access to the majority of the electrocution death certificates in the United States since 2002, which can be reviewed for scope determination. A comparison of CPSC death certificate records with the NCHS records indicates that almost 95 percent of the electrocution-related death certificates from the years 2002 through 2004 are available for CPSC staff review. In prior years, CPSC staff had access to less than half of the death certificates for review. The result is that national estimates can be generated relying on a much smaller percentage of imputed data, yielding more accurate estimates.

The additional benefit of being able to review each death certificate is that factors affecting scope assessment can be determined in many cases. Key factors that can be assessed through review of the death certificates are work-related status and product involvement. In prior reports, any consumer product-related electrocution that occurred in a residential, recreational, or farm location was assumed to be in scope. Now that analysts can review nearly all electrocution death certificates, each case can be assessed individually and there is no need to rely on the assumption of scope based on location of the incident. Farm incidents are reviewed on a case-by-case basis for consumer product involvement.

It is important to note that the electrocution incidents covered in this report were associated with a consumer product but not necessarily caused by the product¹.

Some of the key findings in this report are:

- The impact of the change in the scope determination approach is substantial. Using the previous approach, the estimated consumer product-related electrocutions for 2002 and 2003 were 180 and 160, respectively (rounded to the nearest 10). Under the

¹ Not all of these fatalities are addressable by an action the CPSC could take; however, it was not the purpose of this report to evaluate the addressability of the incidents but rather to update the estimates of the number of consumer product associated electrocutions.

new scope determination approach, the estimates drop to 60 and 60, respectively, for the same years, rounded to the nearest 10. The estimate for 2004 by the new approach is 60 deaths, rounded to the nearest 10.

- There was an estimated average of 60 electrocution fatalities associated with consumer products per year over the three-year period from 2002 through 2004. Using the previous approach, the estimated annual average for 2001 through 2003 was approximately 170 per year.
- The age-adjusted death rate for electrocutions due to consumer product use was 0.62 and 0.55 per million population for 2002 and 2003, respectively, using the previous scope determination approach. Under the new approach, the rates for the same years are 0.19 and 0.21. The age-adjusted death rate for electrocutions for 2004 was 0.20 per million population.
- Since this report only covers three years, there is insufficient information to determine if there is a trend over time.
- There seems to be little evidence that age of the victim is a major factor. The estimated age-adjusted death rate for ages 40 through 59 is slightly higher than that for the other age groups. This appears to be caused by a possible anomaly in 2004 where there were nearly twice as many electrocutions in this age range than the next most numerous age range.
- Gender of the victim does seem to be a major factor with greater than four times more male consumer product-related electrocutions than female electrocutions over the years 2002 through 2004.

Introduction

This report was prepared by U.S. Consumer Product Safety Commission (CPSC) staff and contains estimates of the number of electrocutions involving consumer products and the corresponding age-adjusted death rates from 2002 through 2004.

All death certificates filed in the U.S. are compiled by the National Center for Health Statistics (NCHS) into multiple cause mortality data files. The mortality data files contain demographic information on the deceased as well as codes to classify the underlying cause of death and up to 20 contributing conditions. The data are compiled in accordance with the World Health Organization instructions, which request that member nations classify causes of death according to the current Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death. The tenth revision of the International Classification of Diseases (ICD-10) was implemented in 1999.

The CPSC purchases death certificates directly from all 50 states, the District of Columbia and New York City which meet certain specific criteria of interest to CPSC staff. When the death certificates are received from the states, CPSC staff screen the death certificates for product information. In general, if a consumer product can be readily identified, it is designated for the Death Certificate database (DTHS). Those in which a consumer product cannot be readily identified are designated for the Abbreviated Death Certificate database (ABDT). Minimal information was entered into the CPSC database for records designated for the ABDT. This was done for quality control purposes to enable CPSC staff to compare record counts by ICD-10 code versus NCHS records to determine the number of records missing from the CPSC database for specific causes of death. After a period of time, the death certificates were destroyed. In 2002 staff began to electronically scan the death certificates in the ABDT database. Death certificates received beginning October 1, 2002 designated for the ABDT were electronically scanned into the database prior to destruction. This made them available for review by CPSC's Directorate of Epidemiology analysts. Death certificates received prior to this date were not readily available for review and only minimal information was entered into the ABDT database. Over 91 percent of the 2002 death certificates and 100 percent of the 2003 and 2004 death certificates in the ABDT database can be reviewed. For 2001 electrocutions in the ABDT, only 33 percent can be reviewed, and for 2000, less than one percent. Thus, the CPSC files for electrocutions since 2002 contain more complete information.

Records from the DTHS and ABDT databases are compared with NCHS data to identify the number of death certificates that are missing (due to miscoding or some other reason) from the CPSC databases. The ratio of NCHS records to CPSC records was used to proportionately scale up the observed data to generate national electrocution estimates. The underlying assumption of this methodology is that the distribution of characteristics of the missing death certificates is similar to those of the CPSC databases so the allocation of the missing data should follow the same distribution.

National Estimates Using Proportional Allocation

National estimates are derived employing a proportional allocation procedure to scale up the in-scope consumer product-related electrocution counts to account for the death certificates missing from the CPSC databases. Appendix A presents the scope definition used for this report. Specifics of the scaling procedure can be found in Appendix B to this document. The NCHS database contains records of all death certificates filed in the United States. Therefore, the number of death certificates missing from the CPSC databases is the difference between the NCHS records and those of the combined DTHS and ABDT databases. Table 1 provides a summary of the number of electrocution records in the NCHS and CPSC databases. Table 1 also provides the national estimates for consumer product-related electrocutions for the years 2002 through 2004.

Table 1: National Estimates of Electrocutions Associated with Consumer Products, 2002 – 2004

Year	NCHS Electrocution Records	CPSC Electrocution Records	Estimated CPSC In- Scope Records ¹	CPSC Staff National Estimates ²	Percent of All Electrocutions
2002	432	397	51	60	13%
2003	377	344	56	60	16%
2004	387	358	56	60	16%
Total	1196	1099	163	180	15%
Average 2002-2004	399	366	54	60	--

¹ Estimated CPSC In-Scope Records represents proportionately scaled counts after allocation of electrocution incidents with unknown location and/or scope (See Appendix B for details).

² Estimates have been rounded to the nearest 10.

Because of the broad distribution of incidents over many products and product categories, the specific counts are small and would not show any change when applying scaling factors. Based on this fact, product and product category summaries in Table 2 are presented as actual observed frequencies in the DTHS and ABDT databases and are not national estimates.

There is no one product category that was associated with a large proportion of the consumer product-related electrocutions. The three most common product categories associated with electrocutions over the three-year period 2002 – 2004 were “Large Appliances” (19 deaths, or 15% of reported consumer product-related electrocutions), “Lighting Equipment” (13, 10%), and “Power Tools” (11, 8%). The most common scenario for electrocutions involving large appliances was the consumer being electrocuted while attempting to repair the appliance. The most common scenario for electrocutions involving lighting equipment was while the consumer was installing the equipment. The most common scenario for electrocutions involving power tools was the equipment coming in contact with electrical wires while the consumer was using the power tool.

**Table 2: Number of Electrocutions Reported to CPSC
By Consumer Product Category and Year**

Product Category	Total	Average 2002-2004	2002	2003	2004
Amusement Ride	1	< 1	0	1	0
Antenna	6	2	4	0	2
Boat Lift	1	< 1	0	1	0
Electric Fence	5	2	1	3	1
Extension Cord	6	2	1	2	3
Holiday Lighting	3	1	1	1	1
Household Wiring	8	3	2	1	5
Ladder	6	2	2	0	4
Large Appliance	19	6	4	7	8
Lawn & Garden Equipment	6	2	2	2	2
Lighting Equipment	13	4	4	5	4
Miscellaneous Wiring	3	1	0	3	0
Other Household Appliance	4	1	2	2	0
Other Miscellaneous Product	1	< 1	0	0	1
Outdoor Wiring	7	2	4	3	0
Pole	9	3	5	2	2
Pool / Whirl Pool / Hot Tub	5	2	1	1	3
Power Tool	11	4	0	8	3
Recreational Equipment	2	1	0	0	2
Small Appliance	6	2	1	4	1
Unspecified Appliance	3	1	1	1	1
Unspecified Electrical Cord	4	1	2	2	0
Unspecified Tool	1	< 1	0	0	1
All Consumer Products	130	43	37	49	44

Table 3 provides the national consumer product-related electrocution estimates categorized by age group of the victims. Table 4 gives the age-adjusted death rates per one million population from electrocutions based on the standardized Year 2000 U.S. population. The Year 2000 population standard has been adopted for age-adjusting death rates in the United States by the National Center for Health Statistics, Centers for Disease Control and Prevention (CDC), the U.S. Department of Health and Human Services (HHS), as well as many state vital statistics programs. Using an age-adjusted death rate standardized to a specific year allows for direct comparison of death rates between years, compensating for the changes in population age distribution.

Table 3: National Estimates of Consumer Product Associated Electrocutions Categorized by Age of Victim, 2002 - 2004

Age of Victim	Total	Average 2002-2004	2002	2003	2004
0 - 19	34	11	14	15	6
20 - 39	42	14	15	11	15
40 - 59	59	20	15	15	29
60 and over	43	14	12	20	11
All	178	59	56	61	61

Note: Details may not sum to row and column totals due to rounding.

Table 4: Age-Specific and Age-Adjusted Electrocutation Rates (per 1,000,000)* Associated with Consumer Products, 2002 - 2004

Age of Victim	Average 2002-2004	2002	2003	2004
0 - 19	0.040	0.048	0.053	0.019
20 - 39	0.049	0.053	0.040	0.054
40 - 59	0.064	0.050	0.049	0.094
60 and over	0.049	0.042	0.068	0.037
Age-Adjusted Rate	0.202	0.193	0.210	0.204

* Standardized to Year 2000 Population

Table 5 presents the national estimates of electrocutions characterized by gender. As can be seen in the table, male victims comprise the large majority of electrocutions accounting for 81 percent (144 of 178) of all consumer product-related electrocutions over the three year period 2002-2004.

Table 5: National Estimates of Consumer Product Associated Electrocutions Categorized by Gender of Victim, 2002 - 2004

Gender of Victim	Total	Average 2002-2004	2002	2003	2004
Female	34	11	15	6	12
Male	144	48	41	55	49
All	178	59	56	61	61

Note: Details may not sum to row and column totals due to rounding.

APPENDIX A: CPSC Scope Assessments

CPSC has jurisdiction over thousands of consumer products used in and around the home, in sports, recreation and schools. In the cases of electrocutions the following determinate factors were used to assess if the case was in scope or not:

- All work-related incidents were determined to be out of scope.
- All incidents involving products outside CPSC jurisdiction were determined to be out of scope. Examples of these include, but are not limited to, autos, boats, direct contact with power lines, direct contact with household wiring with no other consumer product involvement, and industrial equipment.
- Incidents involving a product under CPSC jurisdiction which comes in contact with an electrical source such as power lines or household current (e.g., a drill or power saw cutting into an electrical wire) are considered in-scope.

When there was insufficient information to make a definitive determination of whether a case was in scope or out of scope, or where apparent contradictions exist, the following assumption was used:

- Incidents involving an individual apparently functioning in his/her regular occupation in which the death certificate indicates that the fatality was not work-related are assumed to be in error. In these cases, the incident was assumed to be work-related. For example, a tree-trimmer by profession was electrocuted while trimming trees at a residence, other than his own, yet was classified as not work-related on the death certificate. There are many reasons that could explain this discrepancy. First, the death certificate may simply have been miscoded, or the coder may have a different interpretation of the “work-related” question on the death certificate. On many death certificates, the work-related question field states something to the effect “Did the death occur at work?” Perhaps the coders interpreted “at work” as referring to an office or factory and working in a yard of a residence does not fit this interpretation. Finally, it may be possible that the individual may actually not be “working” and may have been helping out a friend or family member. Without evidence of this, however, it was assumed to be miscoded.

There are also many cases where one or more key piece(s) of information are missing and a determination cannot be made from the known information. An imputation method (simple proportional adjustment) was applied to adjust the overall and categorical counts if possible. The key factors to determining scope are:

1. Work-related status,
2. Location of injury,
3. Profession of victim,
4. Age of victim (to assist in work-related status determination when this information is not provided),
5. Product involved, and
6. Activity engaged in when the incident occurred.

Even though there may be some missing key data, a determination can often be made with limited information. For example, all work-related incidents can be eliminated regardless of what other information is missing. As another example, if a child is injured, it would be assumed not to be a work-related injury even if work status were missing. In this latter case, the incident would be considered in scope unless some other factor would eliminate it, such as the product involved.

APPENDIX B: Derivation of National Estimates and Age Standardized Electrocutation Rate Calculations

This appendix describes the data sources and methodology used to compute the national estimates of electrocutions associated with the use of consumer products.

All death certificates filed in the United States are compiled by the National Center for Health Statistics (NCHS) into a multiple cause of mortality data file. The NCHS Mortality File contains demographic and geographic information, as well as the International Statistical Classification of Diseases and Related Health Problems codes for the underlying cause of death. Data are compiled in accordance with the World Health Organization instructions, which request that member nations classify causes of death by the current Manual of the International Statistical Classification of Diseases and Related Health Problems. The International Classification of Diseases, Tenth Revision (ICD-10) was implemented in 1999. Although the NCHS data contain cause of death codes that are helpful in identifying deaths due to electrocution, the data do not contain any narrative information that might indicate the involvement of a consumer product.

To complement the NCHS mortality data, the CPSC staff purchases death certificates from the 50 states, the District of Columbia, and New York City. Specifically, the CPSC staff purchases death certificates with certain cause of death codes for which there is a high probability that consumer products are involved. In addition to the cause of death codes and demographic and geographic information, the death certificate contains information about the incident location and a brief narrative describing the incident. Any references to consumer products are usually found in these narratives. The CPSC staff conducts follow-up in-depth investigations on selected deaths to confirm and expand upon the involvement of consumer products, as resources allow. The in-depth investigation reports, or IDIs, are contained within the CPSC In-depth Investigation (INDP) File. Additionally, information which may help the analyst in the determination of product involvement can sometimes be ascertained from the Injury or Potential Injury Incident (IPII) File which contains news articles and medical examiner reports associated with the incident.

Searches were conducted on both of the CPSC death certificate databases, Death Certificate (DTHS) File and Abbreviated Death Certificate (ABDT) File, and the NCHS database to retrieve all electrocution cases available within the timeframe of concern. The search criteria limited the death certificate records to those classified by ICD-10 codes as electrocution. These death certificates have one of the following ICD-10 cause of death codes:

- W85 - Accident caused by electric current: Electric transmission lines
- W86 - Accident caused by electric current: Other specified electric current
- W87 - Accident caused by electric current: Unspecified electric current

The search criteria also constrained the records to those fatalities which occurred between January 1, 2002 and December 31, 2004.

Step 1: Review of CPSC records for scope determination

The first step in computing the annual estimates of electrocutions associated with consumer products is to compile an electrocution dataset of all electrocution death certificates available to CPSC staff. The CPSC's DTHS File and the CPSC's ABDT File were both searched for cases associated with ICD-10 codes W85 through W87.

Each death found in the DTHS database coded as an electrocution was reviewed by an analyst and categorized as in scope, out of scope, or of unknown scope. In-scope cases are unintentional electrocutions associated with a consumer product under the jurisdiction of the CPSC. Out-of-scope cases are cases that involve products that are not under the jurisdiction of the CPSC, work-related incidents, or intentional electrocutions. The scope of a case was classified as unknown in incidents where a consumer product was possibly associated with the incident but could not be explicitly identified. An example of this scenario might be a consumer who was electrocuted in his home that was determined to not be work-related, but a product was not identified.

Most deaths found in the ABDT database were categorized as out-of-scope cases. Most of the ABDT File contains death certificates for electrocutions that involve non-consumer situations, such as a lineman being electrocuted while working on power lines, or involve non-consumer products such as motor vehicles and industrial equipment. Occasionally, an analyst review of an ABDT case resulted in a case being reassessed as being either in CPSC jurisdiction or possibly in CPSC jurisdiction. The former cases were included as in-scope deaths and the latter cases were identified as "unknown scope" and used in the allocation of unknown scope phase (Step 3).

Step 2: Allocation of unknown location cases to known location categories

After review of the death certificate records in the two databases (DTHS and ABDT) for scope determination the two databases were combined. Location of the incident is an important factor in the likelihood that an incident would be in scope or not. For example, based on CPSC records, a significant proportion of residential electrocutions was determined to be in scope (consumer product- and non-work-related), while virtually no industrial incidents were within CPSC scope. Table B1 provides a summary of the CPSC electrocution death certificates categorized by location and scope for each of the years 2002 through 2004.

**Table B1: Scope Characterization by Year and Location
of Death in the CPSC Database Records**

2002	Scope			
Location	In	Out	Unknown	Total
Farm	0	23	2	25
Recreational	0	5	0	5
Residential	36	80	18	134
School	0	6	0	6
Public Land	1	73	0	74
Industrial	0	68	0	68
Street	0	46	0	46
Auto or Boat	0	2	0	2
Unknown	0	6	31	37
2002 Total	37	309	51	397

2003	Scope			
Location	In	Out	Unknown	Total
Farm	0	13	1	14
Recreational	2	3	3	8
Residential	46	83	11	140
School	0	1	0	1
Public Land	0	36	0	36
Industrial	0	82	0	82
Street	0	41	1	42
Auto or Boat	0	6	0	6
Unknown	1	8	6	15
2003 Total	49	273	22	344

2004	Scope			
Location	In	Out	Unknown	Total
Farm	0	16	2	18
Recreational	1	11	1	13
Residential	42	62	26	130
School	0	0	0	0
Public Land	0	41	0	41
Industrial	0	80	0	80
Street	1	52	0	53
Auto or Boat	0	4	0	4
Unknown	0	13	6	19
2004 Total	44	279	35	358

Source: U.S. Consumer Product Safety Commission / EPHA.
CPSC Death Certificate File, In-Depth Investigation File, Injury or Potential Injury Incident File,
Abbreviated Death Certificate File.

The totals for death certificates where a location of the death could not be identified were then allocated proportionately amongst the known location categories based on the observed frequency of occurrence by location. The results of the proportional allocation are given in Table B2. It should be noted that, in order to minimize rounding error, the individual cell counts were kept as fractional numbers until the last stage of the estimation process and are presented to two decimal places in the tables.

Table B2: Allocation of “Unknown” Location Electrocutions to Known Location Categories

2002	Scope			
Location	In	Out	Unknown	Total
Farm	0.00	23.46	5.10	28.56
Recreational	0.00	5.10	0.00	5.10
Residential	36.00	81.58	45.90	163.48
School	0.00	6.12	0.00	6.12
Public Land	1.00	74.45	0.00	75.45
Industrial	0.00	69.35	0.00	69.35
Street	0.00	46.91	0.00	46.91
Auto or Boat	0.00	2.04	0.00	2.04
Unknown				
Grand Total	37.00	309.00	51.00	397.00

2003	Scope			
Location	In	Out	Unknown	Total
Farm	0.00	13.39	1.38	14.77
Recreational	2.04	3.09	4.13	9.26
Residential	46.96	85.51	15.13	147.59
School	0.00	1.03	0.00	1.03
Public Land	0.00	37.09	0.00	37.09
Industrial	0.00	84.48	0.00	84.48
Street	0.00	42.24	1.38	43.61
Auto or Boat	0.00	6.18	0.00	6.18
Unknown				
Grand Total	49.00	273.00	22.00	344.00

2004	Scope			
Location	In	Out	Unknown	Total
Farm	0.00	16.78	2.41	19.20
Recreational	1.00	11.54	1.21	13.74
Residential	42.00	65.03	31.38	138.41
School	0.00	0.00	0.00	0.00
Public Land	0.00	43.00	0.00	43.00
Industrial	0.00	83.91	0.00	83.91
Street	1.00	54.54	0.00	55.54
Auto or Boat	0.00	4.20	0.00	4.20
Unknown				
Grand Total	44.00	279.00	35.00	358.00

Step 3: Allocation of unknown scope cases to known scope categories within location categories
 In this step, the “unknown scope” summary counts are allocated to the known scope categories. This is performed using the observed in-scope and out-of-scope ratios within location categories because of the rationale previously stated in regards to the probability that an in-scope case is dependent on the location of the incident. Table B3 presents the number of death certificates summarized from the two CPSC databases by scope determination (after allocation of unknowns) and the total number of electrocution records in the NCHS database.

Table B3: Allocation of “Unknown” Scope Electrocutions to Known Scope Categories

2002	Scope			
Location	In	Out	Unknown	Total
Farm	0.00	28.56		28.56
Recreational	0.00	5.10		5.10
Residential	50.05	113.43		163.48
School	0.00	6.12		6.12
Public Land	1.00	74.45		75.45
Industrial	0.00	69.35		69.35
Street	0.00	46.91		46.91
Auto or Boat	0.00	2.04		2.04
Unknown				
Grand Total	51.05	345.95		397.00

2003	Scope			
Location	In	Out	Unknown	Total
Farm	0.00	14.77		14.77
Recreational	3.68	5.57		9.26
Residential	52.32	95.27		147.59
School	0.00	1.03		1.03
Public Land	0.00	37.09		37.09
Industrial	0.00	84.48		84.48
Street	0.00	43.61		43.61
Auto or Boat	0.00	6.18		6.18
Unknown				
Grand Total	56.00	288.00		344.00

2004	Scope			
Location	In	Out	Unknown	Total
Farm	0.00	19.20		19.20
Recreational	1.10	12.65		13.74
Residential	54.31	84.10		138.41
School	0.00	0.00		0.00
Public Land	0.00	43.00		43.00
Industrial	0.00	83.91		83.91
Street	1.00	54.54		55.54
Auto or Boat	0.00	4.20		4.20
Unknown				
Grand Total	56.41	301.59		358.00

Step 4: Generating national estimates of consumer product-related electrocutions

The proportion of death certificates found in the CPSC databases associated with electrocutions and associated with consumer products was applied to the NCHS totals to calculate the total estimated number of electrocutions associated with consumer products. In theory, the NCHS totals comprise all death certificates in the U.S. and the same proportion of in-scope cases should exist in the death certificates that are missing from the combined CPSC Death Certificate and Abbreviated Death Certificate files. Applying the proportion of in-scope cases to the NCHS database totals should, therefore, provide an estimate on in-scope cases nationwide. This was done in the following way and was done for each year separately.

1. The number of in-scope deaths in the CPSC's Death Certificate File coded as W85, W86, or W87 that were associated with an accidental, non-work related electrocution and a consumer product was identified (n_1).

2. The total number of deaths in the CPSC’s Death Certificate File and the Abbreviated Death Certificate File coded as W85 through W87 was summed separately for each year (n_2).
3. The total number of deaths in the NCHS data associated coded as W85 through W87 was counted (n_3).
4. The estimate of the number of accidental, non-work related electrocutions associated with consumer products in codes W85 through W87 was calculated separately for each year using the formula:

$$N = (n_1 / n_2) * n_3$$

The proportion (n_1/n_2) represents the number of in-scope cases found in the CPSC’s files divided by the total of in-scope and out-of-scope cases in the CPSC data files.

The ratio (n_3 / n_2) represents the weighting factor used to calculate the annual estimates. The CPSC’s Death Certificate File does not contain death certificates for all deaths listed in the NCHS file; therefore, a weighting factor was calculated to account for those death certificates that are missing. The weighting factor is used to scale up the CPSC counts to compensate for the records missing in the CPSC databases. Under the assumption that the characteristics of the deaths not contained in the CPSC database follow the same proportions as those in which CPSC has records, this weighting factor allows for the computation of national estimates of electrocutions by consumer products and by other characteristics collected by CPSC about each death by scaling up the data observed in the CPSC subset.

The following table contains the values for the variables used in the calculation as well as the final computed 2002 through 2004 estimates of electrocutions associated with consumer products.

Table B5: Derivation of Consumer Product Associated Electrocution National Estimates

	2002	2003	2004
n_1	51.05	56.00	56.41
n_2	397	344	358
n_3	432	377	387
<i>Weighting Factor (n_3/n_2)</i>	1.0882	1.0959	1.0810
N	55.55	61.38	60.98

Source: U.S. Consumer Product Safety Commission / EPHA.
 CPSC Death Certificate File, In-Depth Investigation File, Injury or Potential Injury Incident File,
 Abbreviated Death Certificate File, National Center for Health Statistics Mortality File, 2002-2004.

Step 5: Generating national estimates of consumer product-related electrocutions by age group and calculating age-adjusted death rates

These weighting factors derived above for adjusting the counts for the number of missing records in the CPSC databases were also applied to the age and gender categorizations to develop

national estimates by these characterizations. A second weighting factor is also needed to make the age and gender category estimates consistent with the national estimates generated previously. The second weighting factor is a weight to accommodate the scaling up procedure for the “unknowns” outlined in Steps 2 and 3 above. This weight is simply the ratio of the number of in-scope CPSC records after allocation of “unknowns” for a given year to the number of CPSC records where scope and location are known for the same year. The two weights are both multipliers so they can be combined into one factor by multiplying one by the other. Table B6 shows the calculation of the weighting factor. Table B7 shows the CPSC in-scope records characterized by age group. Table B8 shows the national estimates after the combined weighting factor was applied.

Table B6: Consumer Product Associated Electrocution Death Certificates in the NCHS Database and the Combined CPSC Databases After Allocation of Unknowns

	2002	2003	2004
Observed In-Scope Records	37	49	44
In-Scope Records After Allocation of “Unknowns”	51.05	56.00	56.41
“Unknowns” Allocation Weight	1.3798	1.1429	1.2820
Weighting Factor (from Table B5)	1.0882	1.0959	1.0810
Combined weight	1.5015	1.2526	1.3859

Table B7: Consumer Product Associated Electrocution Death Certificates in the CPSC Database Characterized by Age Group

Age Group	Total	Average 2002-2004	2002	2003	2004
0 - 19	25	8	9	12	4
20 - 39	30	10	10	9	11
40 - 59	43	14	10	12	21
60 and over	32	11	8	16	8
ALL	130	43	37	49	44

Source: U.S. Consumer Product Safety Commission / EPHA.
 CPSC Death Certificate File, In-Depth Investigation File, Injury or Potential Injury Incident File,
 Abbreviated Death Certificate File.

**Table B8: National Estimates of Consumer Product Associated Electrocutions
Characterized by Age Group After Weights were Applied
Prior to Rounding to Nearest Whole Number**

Age Group	Total	Average 2002-2004	2002	2003	2004
0 - 19	34.09	11.36	13.51	15.03	5.54
20 - 39	41.53	13.84	15.01	11.27	15.24
40 - 59	59.15	19.72	15.01	15.03	29.10
60 and over	43.14	14.38	12.01	20.04	11.09
ALL	177.91	59.30	55.55	61.38	60.98

The crude death rate is typically defined as the number of deaths in a given population during a given time period divided by the total population and multiplied by one thousand (or some other population scaler). Crude death rates are a widely used measure of mortality which can be used to compare subpopulations within the greater population of incidents. However, crude death rates are not the best measure when comparing year to year death rates. In a National Vital Statistics Report titled “Age Standardization of Death Rates: Implementation of the Year 2000 Standard” a rationale for age-adjusting death rate is stated: “...crude death rates are influenced by age composition of the population. As such, comparisons of crude death rates over time or between groups may be misleading if the populations being compared differ in age composition. This is relevant, for example, in trend comparisons of U.S. mortality given the aging of the U.S. population.” For this report, the electrocution incidents were characterized into subpopulations by year of death and age group and by year of death and gender. The death rates by year/age are presented as standardized death rates using the 2000 U.S. population as the standard. In August 1998 the use of the Year 2000 standard population was established in a policy statement from the Secretary of the Department of Health and Human Services (DHHS) which directed all DHHS agencies, including NCHS and the Centers for Disease Control and Prevention (CDC), to use this standard.

The crude death rate is determined by dividing the total number of deaths for a specific characterization by the mid-year population for the same characterization. The standardized age-adjusted death rate is calculated by multiplying each age-specific category rate by a standardized weight which represents the proportion of the population in the specific subpopulation for the given standard year (year 2000). The products of the age-specific rates and the weights are then summed over age group to produce the age-adjusted rate. Table B9 presents the U.S. population subdivided by age group for the years 2002 through 2004. Table B10 provides the standardized age group weights based on the Year 2000 U.S. Population. Table B11 provides a summary of the calculations to determine age-adjusted death rates for the years 2002 through 2004 standardized to Year 2000 population.

Table B9: U.S. Population (1,000,000's)

Age Group	2002	2003	2004
0 - 19	80.977	81.216	81.552
20 - 39	81.883	82.008	82.055
40 - 59	77.995	79.512	81.165
60 and over	47.085	48.053	48.883
ALL	287.940	290.789	293.655

Source: U.S. Census Bureau, Statistical Abstract of the United States: 2006

Table B10: Standardized Age Group Weights based on Year 2000 U.S. Population

Age Group	Std. Wt. (Year 2000)
0 - 19	0.28599
20 - 39	0.28983
40 - 59	0.26147
60 and over	0.16271

Source: U.S. Census Bureau, Statistical Abstract of the United States: 2006

**Table B11: Age-Specific and Age-Adjusted Electrocutation Rates
Standardized to Year 2000 Population, 2002-2004**

Year 2002 Age Group	Estimated Number of Deaths	Population: 2002	Rate Within and Across Age Group*	Std. Wt. (Year 2000)	Product of Rate x Weight*
0 - 19	13.51	80.977	0.1669	0.28599	0.0477
20 - 39	15.01	81.883	0.1834	0.28983	0.0531
40 - 59	15.01	77.995	0.1925	0.26147	0.0503
60 and over	12.01	47.085	0.2551	0.16271	0.0415
Total	55.55	287.94	0.1929 ^a	1.00000	0.1927 ^b

Year 2003 Age Group	Estimated Number of Deaths	Population: 2003	Rate Within and Across Age Group*	Std. Wt. (Year 2000)	Product of Rate x Weight*
0 - 19	15.03	81.216	0.1851	0.28599	0.0529
20 - 39	11.27	82.008	0.1375	0.28983	0.0398
40 - 59	15.03	79.512	0.1890	0.26147	0.0494
60 and over	20.04	48.053	0.4171	0.16271	0.0679
Total	61.38	290.789	0.2111 ^a	1.00000	0.2101 ^b

Year 2004 Age Group	Estimated Number of Deaths	Population: 2004	Rate Within and Across Age Group*	Std. Wt. (Year 2000)	Product of Rate x Weight*
0 - 19	5.54	81.552	0.0680	0.28599	0.0194
20 - 39	15.24	82.055	0.1858	0.28983	0.0538
40 - 59	29.10	81.165	0.3586	0.26147	0.0938
60 and over	11.09	48.883	0.2268	0.16271	0.0369
Total	60.98	293.655	0.2077 ^a	1.00000	0.2039 ^b

* Death rate is presented on a *per million population* basis.

^a Crude rate

^b Age-adjusted rate

Table B12 provides a summary of the consumer product-related electrocutions characterized by gender of victim. Table B13 provides the national estimates categorized by gender after application of the combined weight calculated above (derivation shown in Table B6 above).

Table B12: Electrocution Death Certificates Associated with Consumer Products in the CPSC Databases Characterized by Gender of Victim

Gender of Victim	Total	Average 2002-2004	2002	2003	2004
Female	24	8	10	5	9
Male	106	35	27	44	35
All	130	43	37	49	44

Source: U.S. Consumer Product Safety Commission / EPHA.
CPSC Death Certificate File, In-Depth Investigation File, Abbreviated Death Certificate File.

Table B13: National Estimates of Electrocutions Associated with Consumer Products Categorized by Gender of Victim Prior to Rounding to Nearest Whole Number

Gender of Victim	Total	Average 2002-2004	2002	2003	2004
Female	33.75	11.25	15.01	6.26	12.47
Male	144.16	48.05	40.54	55.11	48.51
All	177.91	59.30	55.55	61.38	60.98

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