UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

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THROUGH: Susan Ahmed, Ph.D., Associate Executive Director
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SUBJECT : 1998 Electrocutions Associated With Consumer Products

Attached is the Epidemiology report that contains estimates for electrocutions associated with the use of consumer products. The data contained in this memorandum is similar to that found in the April 30, 2001 memorandum of the same subject. The differences between this report and the previous memorandum include a new format and the substitution of age-adjusted death rates in place of crude death rates.

cc: N.J. Scheers

1998 ELECTROCUTIONS ASSOCIATED WITH CONSUMER PRODUCTS

July 2001

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Introduction

One of the U.S. Consumer Product Safety Commission's (CPSC) strategic goals involves reducing the death rate from consumer product-related electrocutions by 20 percent from 1994 to the year 2004. This report contains estimates and death rates for electrocutions associated with the use of consumer products in order to evaluate progress toward reaching the strategic goal.

Results

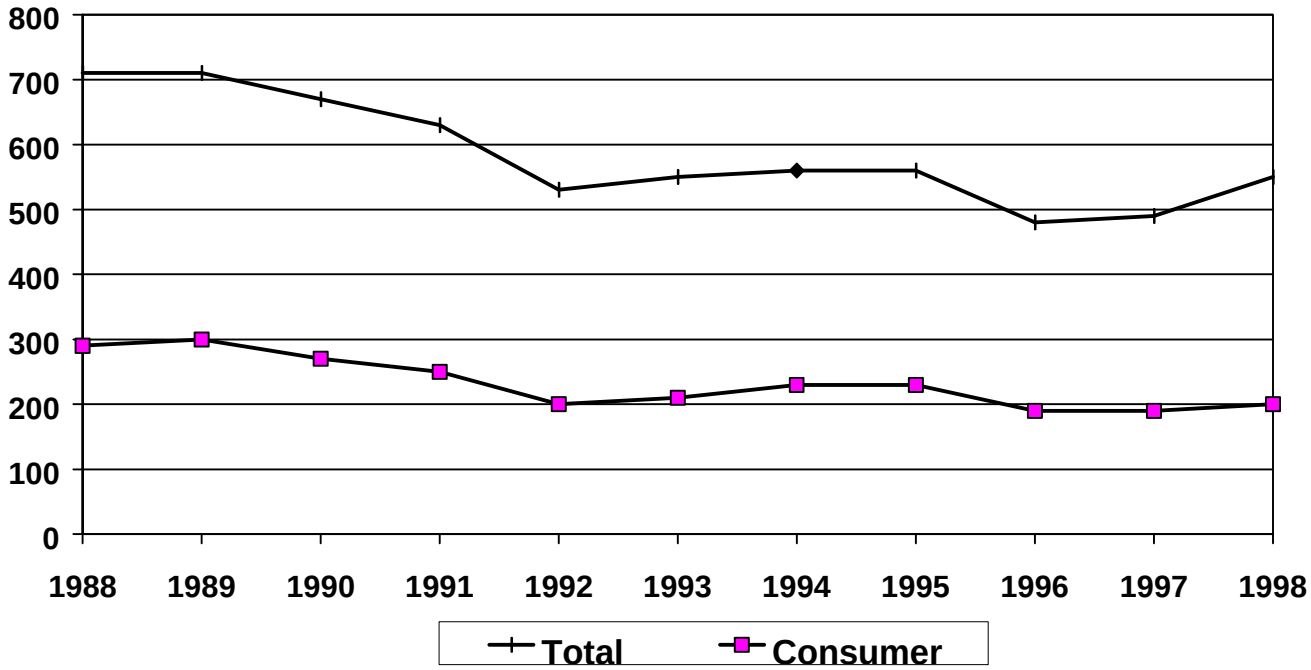
According to data from the National Center for Health Statistics (NCHS), total electrocutions in the U.S. have decreased from 710 deaths in 1988 to 550 in 1998, a reduction of 23 percent. Table 1 shows that during this period, the estimated electrocutions related to consumer products decreased from 290 in 1988 to 200 in 1998, a reduction of 31 percent. A regression showed a significant downward trend in both total electrocution deaths and consumer product-related electrocution deaths from 1988 to 1998 ($p < 0.05$, see Figure 1). Both the product-related electrocution crude death rates and the age-adjusted death rates were calculated and found to be similar (see Methodology). The age-adjusted death rates declined significantly from 1988 to 1998 ($p < 0.05$). In 1988, estimated consumer product-related electrocutions occurred at an age-adjusted rate of 1.18 per million U.S. population. In 1998, that rate was 0.74 per million, a reduction of almost 40 percent.

Table 1. Electrocutions Related to Consumer Products and Death Rates Based on U.S. Population, 1988 – 1998

Year	U.S. Total Electrocutions	Consumer Product Related Electrocutions		Death Rates per Million U.S. Population[1]
		Number	Percent of Total	Age-Adjusted Rate
1988	710	290	41%	1.18
1989	710	300	42%	1.21
1990	670	270	40%	1.09
1991	630	250	40%	0.99
1992	530	200	38%	0.78
1993	550	210	38%	0.82
1994	560	230	41%	0.89
1995	560	230	41%	0.88
1996	480	190	40%	0.72
1997	490	190	39%	0.71
1998	550	200	36%	0.74

Source: National Center for Health Statistics.
[1]Death rates are for consumer product-related electrocutions; population data from:
U.S. Census Bureau. Statistical Abstracts of the United States. 2000, No. 12, Resident Population by Age and Sex: 1980 to 1999, <http://www.census.gov/prod/2001pubs/statab/sec01.pdf>.

Figure 1. Total Electrocutions and Electrocutions Associated with Consumer Products, 1988 - 1998



Source: National Center for Health Statistics.

In terms of CPSC's strategic goal, the electrocution death rate has been declining since 1994. The age-adjusted death rate for consumer product-related electrocutions was 0.89 deaths per million U.S. population in 1994. In 1998, this rate has fallen to 0.74 electrocution deaths per million U.S. population, a reduction of about 17 percent. In order to reduce the electrocution death rate by 20%, the death rate needs to consistently fall to 0.71 or below.

Table 2 shows that small appliances including extension cords, microwaves, and battery chargers were the most frequently reported group of products (24%) involved in consumer product-related electrocutions in 1998. Large appliances such as air conditioners, pumps, and generators were the next most frequently reported group of products (19%), followed by power tools such as saws, drills, and pressure washers, which were involved in 14 percent of the consumer product-related electrocutions. Installed household wiring accounted for 13 percent of the deaths, and lighting equipment, mainly lamps and light fixtures, was responsible for 9 percent of the deaths. Antennas and ladders that came in contact with power lines accounted for 6 percent and 5 percent of the electrocution deaths, respectively. Farm and lawn and garden equipment accounted for 2 percent of the electrocutions and other products including pipes, poles, fences, and amusement rides accounted for the remaining 11 percent.

Table 2. Electrocutions Involving Consumer Products, 1998

Type of Consumer Product	Estimate	Percent
Total Number of Deaths	**200**	**100%**
Small Appliances	**47**	**24%**
Extension Cords	12	
Microwaves	12	
Battery Chargers	6	
Fans	4	
Radio, Television, Stereo Equipment	4	
Hair, Hygiene Equipment	2	
Other	8	
Large Appliances	**37**	**19%**
Air Conditioners	19	
Pumps / Generators	8	
Electric Stoves	4	
Water Heaters	4	
Refrigerators / Freezers	2	
Power Tools	**27**	**14%**
Power Saws	10	
Power Drills	8	
Pressure Washers	6	
Other	4	
Installed Household Wiring	**25**	**13%**
Lighting Equipment	**18**	**9%**
Lamps, Light Fixtures	12	
Work Lights	6	
Antennas	**12**	**6%**
Ladders	**10**	**5%**
Garden/Farm Equipment	**4**	**2%**
Other Products	**21**	**11%**
Pipes, Poles, Fences	19	
Amusement Rides	2	

Source: U.S. Consumer Product Safety Commission / EPHA

Note: The number of electrocutions associated with each consumer product is an adjusted count. The methodology section describes the estimation process in more detail. Detail may not add to total due to rounding.

Methodology

All death certificates filed in the U.S. are compiled by the National Center for Health Statistics (NCHS) and are available annually as public use mortality data files. The multiple cause mortality data files contain demographic and geographic information as well as the International Classification of Diseases codes for 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 by the current Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death. The International Classification of Diseases, Ninth Revision was implemented in 1979 and was in effect between 1988 and 1998, the years for which data are presented in this report.

The following methodology was used to determine electrocutions associated with the use of consumer products. The first step in the estimation process is searching the NCHS data for the following external cause of death codes (Ecodes):

925.0 Accident caused by electric current: Domestic wiring and appliances
925.1 Accident caused by electric current: Electric power generating plants, distribution, stations, transmission lines
925.2 Accident caused by electric current: Industrial wiring, appliances and electrical machinery
925.8 Accident caused by electric current: Other
925.9 Accident caused by electric current: Unspecified

To estimate the total number of consumer product-related electrocutions annually from the NCHS file, electrocution deaths which occurred in homes, residential institutions, sports and recreational areas, and farms were assumed to be consumer product-related. These four location categories were summed for the Ecodes above. Assuming that electrocutions occurring in unspecified locations followed the same distribution as the known electrocutions of all location categories, a relative proportion of the unspecified electrocutions was added to the known electrocution counts for each of the Ecodes. The adjusted counts were summed to produce the estimated total number of electrocutions associated with consumer products that occurred in homes, residential institutions, sports and recreational areas, and farms.

The next step in the estimation procedure was to examine CPSC product-related databases, since the NCHS data does not provide a distribution of the deaths by product. CPSC collects copies of death certificates involving electrocutions and other deaths from individual states. The death certificates that include enough information to identify a related consumer product are coded and maintained in the Death Certificate database (DCRT). Also, CPSC maintains the Injury or Potential Injury Incident database (IPII) which contains data from sources such as letters, telephone calls, newspaper clippings, and reports from consumers, coroners, medical examiners, and fire and police departments. These reports describe deaths, injuries, and "near miss" incidents involving consumer products.

The Death Certificate File (DCRT) and the Injury or Potential Injury Incident File (IPII) were searched for incidents involving electrocutions. The electrocution incidents in the DCRT file and the IPII file were compared by date of death, state, sex, and age to determine if there were duplicate reports of the same death. The CPSC records were then matched to the consumer product-related electrocutions that occurred in homes, residential institutions, farms, sports and recreational areas, and unknown locations in the NCHS database. Narratives were reviewed for the matching CPSC cases that occurred in unknown location, according to NCHS, to determine if each case could be considered a consumer product-related electrocution.

The counts of the matching records from the two CPSC databases were summed to provide the total number of CPSC-collected electrocutions and then tabulated by specific consumer product. To estimate the number of electrocutions associated with each product, the percentage of the CPSC database total for each product category was applied to the total number of estimated consumer product-related electrocutions obtained from the NCHS data. These estimates are shown in Table 2.

The electrocution estimates were combined with postcensal estimates of the U.S. resident population from the U.S. Census Bureau to calculate annual mortality rates. A commonly used mortality rate is the unadjusted (or crude) mortality rate (i.e., the total number of deaths in a specific year divided by the population for that year). However, it is common knowledge that the distribution of the U.S. population has been shifting over time due to the aging of the "baby boomer" population. For example, the percentage age distributions of the U.S. resident population in 1980 and 1998 compare as follows: 32% vs. 28.7% in the under 20 age group, 25.8% vs. 20.9% in the 20-34 age group, and 42.2% vs. 50.4% in the 35 and older age group, respectively [1].

While a crude death rate accounts for the number of events that occur in a population, it will not account for the changing age structure of the population over a specified time period. An alternative measure that can be used to address such changes in the age composition of the population is the age-adjusted (or standardized) rate. The age-adjusted rate is particularly useful when comparing mortality rates over time, since the age distribution of a population is held constant so that any changes in the age distribution over time can be eliminated from the analysis [2]. Therefore, age-adjusted rates are better indicators than crude rates for showing trends in mortality rates when the age distribution is changing over time. The crude mortality rates, on the other hand, reflect the actual burden in a community and are appropriate to use for the purposes of planning, policy making, and resource allocation.

For the years 1988 through 1998, the direct method of adjustment was used to calculate the age-adjusted rates presented in this report with the 2000 U.S. resident population as the standard [3]. Direct adjustment entails weighting annual age-specific rates (i.e., crude rates within specific age groups) by the distribution of the standard population. Regression analysis was then used to analyze the presence or absence of a trend in the data.

References

1. U.S. Census Bureau. Statistical Abstracts of the United States. 2000, No. 12, Resident Population by Age and Sex: 1980 to 1999, <http://www.census.gov/prod/2001pubs/statab/sec01.pdf>.

2. Curtin, L.R. and Klein, R.J. Direct Standardization (Age-Adjusted Death Rates), Healthy People 2000 Statistical Notes. Centers for Disease Control and Prevention and the National Center for Health Statistics, Number 6, March 1995.

3. Anderson, R.N. and Rosenberg, H.M. Age Standardization of Death Rates: Implementation of the Year 2000 Standard. Centers for Disease Control and Prevention and the National Center for Health Statistics, Volume 47, Number 3, October 1998.