



UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: May 5, 2006

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SUBJECT : 2006 Pool Drowning Memorandum¹

This memorandum contains information on pool drowning incidents of children under five years old. An estimate of emergency department-treated submersion injuries is presented, along with per capita injury rates. This is followed by a count of deaths. The deaths are for 2001-2003 and the injury estimates are for 2000-2005, in both cases using the latest available data.

Emergency Department-Treated Injuries

For 2000-2005, there were on average an estimated 2,200 children under five years old treated in U. S. hospital emergency departments for injuries associated with pool submersion. Estimates are shown in table 1. Emergency department-treated injuries varied from 1,600 in 2002 to 3,300 in 2000. Rates varied from 8.2 emergency department-treated injuries per 100,000 children to 17.1 per 100,000 children averaging 11.4 per 100,000 children.

¹ 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

Table 1
Estimated Emergency Department-Treated Pool Submersion Injuries to Children under 5
2000-2005

Year	Estimated Emergency Department Treated Injuries	Emergency Department Injuries Per 100,000 Population ²
Average	2,200	11.4
2005	2,100	10.1
2004	2,400	11.8
2003	1,800	8.9
2002	1,600	8.2
2001	2,400	12.2
2000	3,300	17.1

Source: U. S. Consumer Product Safety Commission: National Electronic Injury Surveillance System (NEISS). The data for 2005 are not complete at the present time and may be subject to small changes. The estimates include all cases with the diagnosis of submersion (diagnosis code 69) with at least one of the following product codes: swimming pools, not specified (1284), above ground swimming pools (3221), built in swimming pools (3251) or wading pools (1246). NEISS is a probability sample of U. S. hospitals that have emergency departments.

Over the 6 year period shown above in table 1, 61 percent of the injuries were to males and 39 percent to females.³ The age distribution was as follows: 6 percent were under one year, 27 percent were more than one year but less than two years, 31 percent were two years old, 23 percent were three years old and 13 percent were four years old.

These injuries resulted in the following dispositions: 29 percent were treated and released, 52 percent were admitted to the hospital, 8 percent were treated and transferred, and 3 percent were held for observation. Also 7 percent died in the emergency department or died before arrival at the hospital. These deaths are also counted in the deaths in the next section.

The majority of the incidents (62 percent) that led to these emergency department visits occurred at home. Eight percent occurred at a recreation or sports place, and 8 percent occurred at a public place, such as a community swimming pool or a hotel swimming pool. The location of the injury was not recorded for the remaining 22 percent of the injuries.

² U. S. population for children under five from <http://www.census.gov/ipc/www/usinterimproj/usproj2000-2050.xls>.

³ Percentages may not add to 100 percent due to rounding.

Deaths

Table 2 shows the number of pool-related drowning deaths. There were 838 children under five years old who died in 2001-2003.

Table 2
Pool Submersion Deaths to Children under 5
2001-2003

Year	Deaths ⁴	Deaths per 100,000 Population ⁵
Average	280	1.4
2003	287	1.4
2002	282	1.4
2001	269	1.4

Source: CPSC databases including NEISS (See Table 1 above), IPII (Injury and Potential Injury Incidents), DTHS (Deaths) and INDP (In Depth Investigations). IPII is a mixture of various types of information including newspaper clippings, consumer complaints and reports from other government agencies such as medical examiners/coroners. Information is voluntarily submitted to IPII, so that staff cannot be sure that information on all the deaths has been received. Source documents were checked to eliminate duplicate incident reports.

Two thirds of the deaths were males and one-third were females, about the same as the injuries. The age distribution was as follows: 3 percent less than one year, 34 percent one year, 33 percent two years, 17 percent three years, and 12 percent four years. These patterns are similar to the age and sex distribution for injuries.

Like injuries, most of the deaths (90 percent) occurred at home. Of the remainder, 2 percent occurred at public or non-residential pools and 8 percent did not have the location reported. For the type of pool, 64 percent did not have the type recorded. Of the remainder, 18 percent involved in-ground pools, 14 percent involved above ground pools, and 4 percent involved portable pools.

⁴ The methodology for counting deaths is different from that used in previous years. A full description is in the appendix.

⁵ U. S. population for children under five from <http://www.census.gov/ipc/www/usinterimproj/usproj2000-2050.xls>.

Appendix Methodology for Estimating Pool Drowning Deaths and Injuries

In last year's Annual Drowning Memorandum,⁶ swimming pool drowning deaths were estimated at 248 for 2002 and 230 for 2001. These estimates were smaller than shown in this year's report. The difference between the estimates resulted from using a revised methodology to estimate deaths.

Problems with obtaining death certificates and the way that ICD-10 codes have been assigned to death certificates has required various approaches over the years to arrive at the most accurate count of swimming pool related drowning deaths.

Prior to 1999, pool drowning deaths were estimated by CPSC staff using capture-recapture methods, because there was no external cause of death code for swimming pool drowning. In 1999, the new ICD-10 system created two codes for swimming pool drowning, W67 (submersion while in swimming pool) and W68 (submersion following fall into a swimming pool). This would have made counting swimming pool deaths simple except that these codes were not used consistently. From reviewing death certificates, staff discovered that other codes could be used for swimming pool deaths, notably W73 (other specified drowning and submersion), W74 (unspecified drowning and submersion), W16 (diving or jumping into water causing injury other than drowning or submersion), and Y86 (sequelae of other accidents). To correct for this, staff reports in previous years adopted the following approach:

- The initial count of drowning deaths was the total number of cases in the National Center for Health Statistics (NCHS) data file coded as W67 and W68.
- Staff reviewed all death certificates in the CPSC DTBS database that were coded as W73 and W74, to find those that mentioned swimming pool drowning as the cause of death.
- Staff then compared the demographic information in the NCHS data for W73 and W74 coded deaths to see if any matched those staff had discovered in the DTBS database as swimming pool cases that had been coded as W73 and W74. The matches were then added to the pool drowning deaths reported in the NCHS data in W67 and W68.

For example, of the 248 swimming pool deaths counted in 2002 and included in last year's memorandum, 10 were coded in the NCHS data as W73 or W74.

This methodology, although relatively simple to implement, was likely to result in an undercount of pool drowning deaths for two reasons. First, staff does not believe that it receives all the W73 and W74 death certificates. Second, other codes (e.g., W16 and Y86) are occasionally used for swimming pool drowning in addition to other causes of death.

⁶ Memorandum from Debra Ascone to Jacqueline Elder, subject "2005 Annual Drowning Memorandum," May 2, 2005. See also Debra Ascone, "Methodology for Annual Drowning Memorandum," U. S. Consumer Product Safety Commission 2002.

The method in use for this year results in a more accurate count. Staff examined source documents for all incidents in all CPSC databases including NEISS, IPII, DTHS and INDP for pool-related drowning incidents involving children under five. Information from these cases was extracted into an Excel spreadsheet and sorted by date and incident location. As pool drowning incidents are notable events in the community where they occur, there were often multiple news reports (IPII), a medical examiner's report (IPII), a death certificate (DTHS), an in-depth investigation (INDP) and, less frequently, a hospital emergency department report (NEISS) for a single incident. These database entries and the underlying source documents were examined to resolve and eliminate duplicates.

Also, last year's report did not include wading pools (product code 1246) in the NEISS injury estimates. This product was associated with an estimated 280 injuries between 2000 and 2005. We included this product code in this year's estimates because the distinction between wading pools and swimming pools may not be clear, especially if the wading pool is a pool reserved for children in a larger pool complex. Wading pools are also included in the pool-related deaths.