

DEATHS AND INJURIES DUE TO NON-FIRE EXPOSURE TO GASES

**John R. Hall, Jr.
Fire Analysis and Research Division
National Fire Protection Association**

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**National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471
www.nfpa.org**

Abstract

In 2004, 629 people died of unintentional injuries due to non-fire exposure to gases (from NCHS death certificate database). Anoxia, which is injury involving oxygen deprivation, accounted for 33,500 hospital emergency room injuries in 2006.

Keywords: Gas, carbon monoxide, anoxia, injury, death, statistics

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National Fire Protection Association
One-Stop Data Shop
1 Batterymarch Park
Quincy, MA 02169-7471
www.nfpa.org
e-mail: osds@nfpa.org
phone: 617-984-7443

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In 2004, 629 people died of unintentional non-fire exposure to gases in the U.S.

Most of these deaths are due to carbon monoxide. For example, in 1998, the last year when separate results were provided, motor vehicle exhaust, which is always carbon monoxide, accounted for 35% of total unintentional-injury deaths due to poisoning by gases and vapors. (See Table 1.) Another 33% involved unvented carbon monoxide from consumer products such as home heating or cooking equipment.* For more information on fire department emergency responses to cases of non-fire carbon monoxide exposure, see Jennifer Flynn, *Non-Fire Carbon Monoxide Incidents Reported in 2005*, National Fire Protection Association, Quincy, MA, June 2007.

In 2004, 67 of the 629 unintentional injury deaths due to non-fire exposure to gas involved organic solvents or halogenated hydrocarbons, the products involved in drug abuse involving inhalants. This was 11% of the total, a typical percentage since these injuries began to be reported separately, in 1999.

Statistics are based on the national death certificate database. External cause codes X46-X47 are for unintentional injury deaths due to gas exposure, while codes X66-X67 are for deaths due to intentional injury to self using gas.

The risk of death from carbon monoxide poisoning is much greater in a temporary shelter than in any kind of home.

In 1999-2002, homes accounted for 68% of non-fire carbon monoxide poisoning deaths after allocation of unknowns, compared to 25% for temporary shelters,* such as tents and recreational vehicles. Because the population in homes exceeds the population in temporary shelters by much more than the 3-to-1 and 4-to-1 ratios seen for deaths, it can be stated with confidence that the risk is much higher in temporary shelters.

Portable generators and other equipment for dealing with power outages pose carbon monoxide risk.

Inadequate venting of exhaust from motor vehicles or from heating or cooking equipment accounts for most non-fire carbon monoxide deaths, but significant numbers of deaths are also associated with equipment designed for use in power outage emergencies, including camp stoves, lanterns, and portable electric generators.

If it were possible to adjust for the much smaller number of person-hours of usage and exposure for such equipment, compared to heating and cooking equipment and motor vehicles, the risk from generators and other power outage equipment would be more apparent.

Suicide deaths by gas (principally carbon monoxide) are about twice as numerous as unintentional injury deaths due to gas.

In 2004, there were 1,452 suicide deaths by gas compared to the 629 unintentional injury deaths due to exposure to gas.

* Debra S. Ascone and Natalie E. Marcy, *Non-fire carbon monoxide deaths associated with the use of consumer products*, U.S. Consumer Product Safety Commission, Bethesda, MD, July 12, 2005, and previous reports in series.

Table 1. Non-Fire Unintentional-Injury Deaths Due to Poisoning by Gases and Vapors

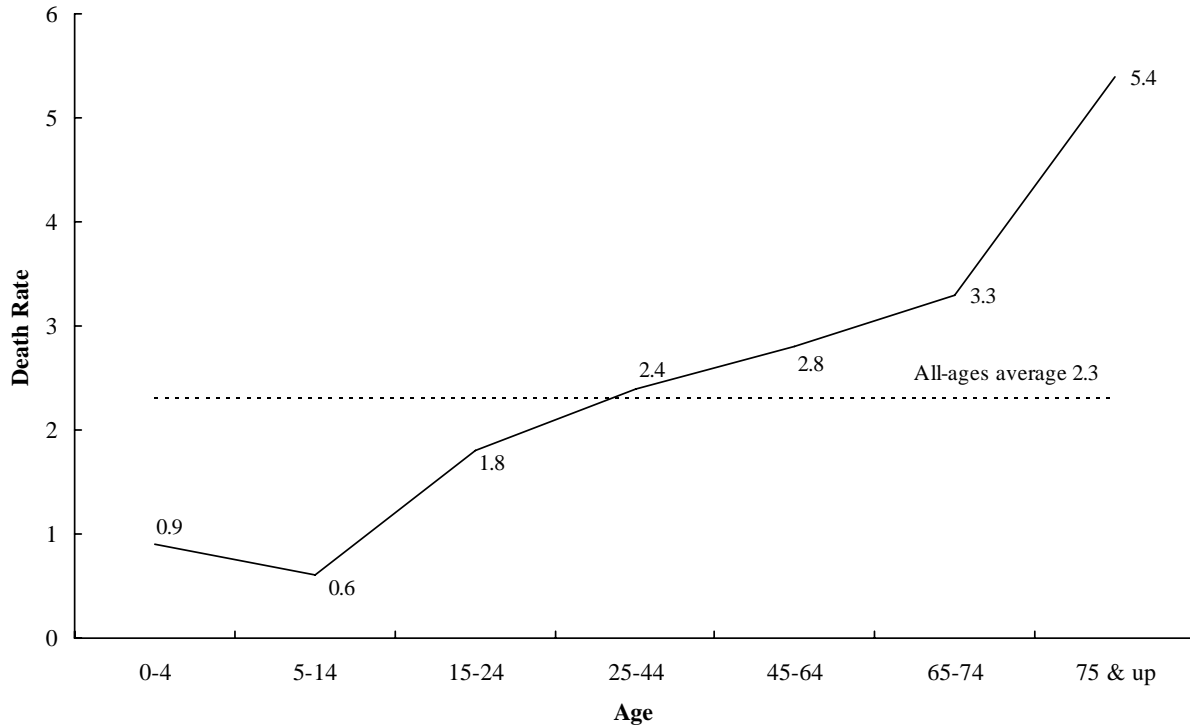
Year	Total	Gas From Pipeline	Motor Vehicle Exhaust Gas	Other Utility Gas or Carbon Monoxide	Other	Estimated Carbon Monoxide Poisoning Involving Consumer Products
1980	1,242	-	-	-	-	282
1981	1,280	-	-	-	-	311
1982	1,259	72	596	426	165	340
1983	1,251	82	580	414	175	323
1984	1,103	48	511	354	190	275
1985	1,079	49	488	392	150	284
1986	1,009	29	475	341	164	240
1987	900	53	402	288	157	232
1988	873	36	372	314	151	238
1989	921	48	355	353	165	296
1990	748	33	293	289	133	243
1991	736	20	278	316	122	250
1992	633	21	223	281	108	211
1993	660	14	245	290	111	214
1994	685	24	246	307	108	223
1995	611	27	234	272	78	201
1996	638	23	219	283	113	217
1997	576	13	208	251	104	180
1998	546	15	190	254	87	180
1999	597	-	-	-	-	109
2000	631	-	-	-	-	138
2001	656	-	-	-	-	130
2002	691	-	-	-	-	188
2003	690	-	-	-	-	154
2004	629	-	-	-	-	162

Note: Detailed breakdowns were not provided prior to 1982 or after 1998. The last column has estimates from the U.S. Consumer Product Safety Commission.

Source: National Safety Council, *Accident Facts and Injury Facts*, 1981-2007 editions, 1121 Spring Lake Drive, Itasca, IL 60143; <http://www.cdc.gov/nchs>; Matthew V. Hnatov, *Non-fire carbon monoxide deaths associated with the use of consumer products*, U.S. Consumer Product Safety Commission, Bethesda, MD, August 8, 2007, and previous reports in the series; <http://www.nchs.gov>. The national death certificate database, maintained by the U.S. National Center for Health Statistics (NCHS), is coded according to the International Classification of Diseases (ICD), which was substantially revised in 1999. These modifications changed the categories that can be used to analyze trends in deaths involving gases.

Older adults are a high-risk age group for fatal injury from unintentional non-fire exposure to gases and vapors, but children are not.
See Figure 1.

**Figure 1. Non-Fire Deaths Due to Unintentional Poisoning
by Gases and Vapors (Principally Carbon Monoxide)
2000-2004 Deaths per Million Population, by Age**



Note: Rates based on average 2002 resident population.

Source: Death certificate tables from <http://www.nchs.gov>.

Anoxia, which is injury involving oxygen deprivation, accounted for 33,500 hospital emergency room injuries in 2006.

Anoxia can occur as a result of smoke inhalation (principally carbon monoxide) in a fire or as a result of other circumstances where oxygen is displaced by other gases, most of which would also qualify as poisonings by the other gases. It is not clear whether some, most, all, or none of the carbon monoxide poisoning injuries would also appear as anoxia injuries. (See Table 2.)

Table 2. Anoxia and Carbon Monoxide Poisoning Injuries Reported to Hospital Emergency Rooms

Year	Anoxia	Non-Fire Carbon Monoxide Poisoning
1991	19,600	-
1992	20,700	-
1993	20,900	8,300
1994	22,700	9,800
1995	30,800	9,200
1996	38,200	15,100
1997	31,400	11,000
1998	27,000	7,700
1999	30,100	7,900
2000	36,700	-
2001	36,200	-
2002	30,700	-
2003	36,000	-
2004	35,000	-
2005	34,400	-
2006	33,500	-

Notes: These are projections from a sample of U.S. hospital emergency rooms. The sample was changed in 1997, and published estimates for previous years have been adjusted by CPSC for more valid comparison with post-1997 estimates. The data base was expanded in 2000-2001 to include all injuries, not just injuries involving consumer products. Non-fire carbon monoxide poisoning injuries are based on special CPSC analyses that were not available after 1999 and not readily available before 1993.

Source: National Electronic Injury Surveillance System (NEISS), queried on <http://www.cpsc.gov>; Jean C. Mah, *Non-fire carbon monoxide deaths and injuries associated with the use of consumer products*, U.S. Consumer Product Safety Commission, Bethesda, MD, October 2000, and previous reports in series.

Data Sources And Methodology

The national death certificate database, maintained by the U.S. National Center for Health Statistics (NCHS), is coded according to the International Classification of Diseases (ICD), which was substantially revised in 1999. These modifications changed the categories that can be used to analyze trends in deaths involving gases.

The U.S. Consumer Product Safety Commission (CPSC) maintains the National Electronic Injury Surveillance system (NEISS), which provides sample-based estimates of injuries reported to hospital emergency rooms.