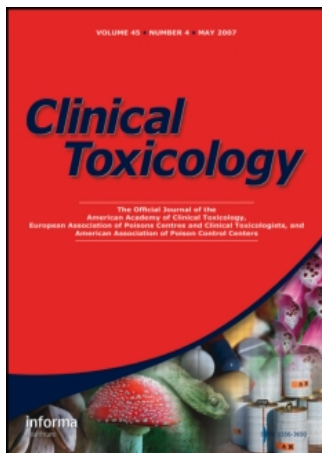


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### 2006 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS)

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AAPCC 2006 ANNUAL REPORT OF THE NPDS

# 2006 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS)

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## Abstract

**Background:** The American Association of Poison Control Centers (AAPCC; <http://www.aapcc.org>) maintains the National Poison Data System (NPDS). Today, 60 of the nation's 61 US poison centers upload case data automatically. Most upload every 1-60 minutes (median 11 minutes) to NPDS creating a real-time national exposure database and surveillance system.

**Methodology:** We analyzed the case data tabulating specific indices from NPDS. The methodology was similar to that of previous years. Where changes were introduced, the differences are identified. Fatalities were reviewed by a team of 27 medical and clinical toxicologists and assigned to 1 of 6 categories according to Relative Contribution to Fatality (RCF).

**Results:** Over 4 million calls were captured by NPDS in 2006: 2,403,539 human exposure calls, 1,488,993 information requests, and 128,353 nonhuman exposure calls. Substances involved most frequently in all human exposures were analgesics. The most common exposures in children less than age 6 were cosmetics/personal care products. NPDS documented 1,229 human fatalities.

**Conclusions:** Poisoning continues to be a significant cause of morbidity and mortality in the US. NPDS represents a valuable national resource to collect and monitor US poisoning exposure cases. It offers one of the few real-time surveillance systems in existence, provides useful data and is a model for public health surveillance.

**WARNING:** Comparison of exposure or outcome data from previous AAPCC Annual Reports is problematic. In particular, the identification of fatalities (attribution of a death to the exposure) differed from pre-2006 Annual Reports (see Fatality Case Review - Methods). Likewise, Table 22 (Exposure Cases by Generic Category) this year restricts the breakdown including deaths to single-substance cases to improve precision and avoid misinterpretation.

### Participating poison centers

The collection of data and compilation of this report is made possible by the individuals who staff the US Poison Centers (PCs) through their meticulous documentation of each case using standardized definitions and compatible computer systems. The 61 participating poison centers in 2006 were:

Mid-America Poison Center  
Alabama Poison Center  
Arizona Poison & Drug Center  
Arkansas Poison & Drug Information Center  
Banner Samaritan Poison Control Center  
Blue Ridge Poison Center  
California Poison Control System - Fresno/Madera Division  
California Poison Control System - Sacramento Division  
California Poison Control System - San Diego Division  
California Poison Control System - San Francisco  
Carolinas Poison Center  
Central Ohio Poison Center  
Central Texas Poison Center  
Children's Hospital of MI Regional Poison Center  
Cincinnati Drug and Poison Information Center

Connecticut Poison Control Center  
DeVos Children's Hospital Regional Poison Center  
Florida Poison Information Center - Miami  
Florida Poison Information Center - Tampa  
Florida/USVI Poison Information Center - Jacksonville  
Georgia Poison Center  
Greater Cleveland Poison Center  
Hennepin Regional Poison Center  
Illinois Poison Center  
Indiana Poison Center  
Iowa Statewide Poison Control Center  
Kentucky Regional Poison Center  
Long Island Poison Center  
Louisiana Poison Center  
Maryland Poison Center  
Mississippi Regional Poison Center  
Missouri Poison Center  
National Capital Poison Center  
Nebraska Regional Poison Center  
New Jersey Poison Information and Education System  
New Mexico Poison Center  
New York City Poison Control Center  
North Texas Poison Center  
Northern New England Poison Center  
Oklahoma Poison Control Center  
Oregon Poison Center  
Palmetto Poison Center  
Pittsburgh Poison Center  
Puerto Rico Poison Center  
Regional Center for Poison Control and Prevention  
Serving Massachusetts and Rhode Island  
Regional Poison Control Center - Alabama  
Rocky Mountain Poison & Drug Center  
Ruth A. Lawrence Poison and Drug Information Center  
South Texas Poison Center  
Southeast Texas Poison Center  
Tennessee Poison Center  
Texas Panhandle Poison Center  
The Poison Control Center at the Children's Hospital of Philadelphia  
University of Kansas Hospital Poison Control Center  
Upstate NY Poison Center  
Utah Poison Center  
Virginia Poison Center  
Washington Poison Center  
West Texas Regional Poison Center  
West Virginia Poison Center  
Western New York Poison Center  
Wisconsin Poison Center

### Recognition of surveillance and fatalities review teams

In addition to the poison center personnel who prepare and review fatality exposure cases at each center, 2 teams deserve special recognition.

Surveillance was carried out by a team of 4 medical and clinical toxicologists working across the country who provided daily monitoring of surveillance anomalies.

The 2006 AAPCC fatality review was carried out by 27 managing and medical directors who verified abstracts of clinical case data for all exposure related deaths.

These individuals are listed in Appendix A and are acknowledged for their commitment and contribution to the AAPCC and the public health.

## Introduction

American Association of Poison Control Centers (AAPCC) compiles real-time information reported from the 61 regional Poison Centers (PCs) into its National Poison Database System (NPDS).

Since the inception of the database in 1983, the number of exposures reported by the country's poison centers has grown dramatically. This increase has been due in large part to the AAPCC's regionalization initiative that has resulted in member poison centers serving the entire population of the 50 United States, American Samoa, District of Columbia, Federated States of Micronesia, Guam, Puerto Rico, and the US Virgin Islands. Additionally, the number of exposure and information calls continues to rise [Table 1A].

## Historical perspective

In 1953, the first US poison center opened in Chicago, Illinois.(1) This event marked the culmination of many pediatric

poison prevention initiatives dating back to the 1930's. AAPCC was chartered as a non-profit, nongovernmental association in 1958.(2) Although poison centers proliferated with a peak number of 661 by 1978, research-based poison exposure management and data on commercial and household products was limited. Over the ensuing years, many worked to develop product information databases for pharmaceutical and non-pharmaceutical products and create evidence based management guidelines. During the same period AAPCC began to meet the need to create standards for centers in tandem with the development of the specialized fields of clinical and medical toxicology.

While center maturation continued with regionalization, in the beginning bounded by state lines, there was no standardized data set used to document poison center calls and no centralized, codified national data system. To address this issue, in 1983, AAPCC launched a nascent data system, now known as the National Poison Data System (NPDS). Today, 60 of the nation's 61 US poison centers upload case data automatically. Most upload every 1- 60 minutes (median 11 minutes) to NPDS creating a real-time national exposure database and surveillance system.

While the initial impetus for the development of our national poison center system was a response to childhood exposures to pharmaceutical and nonpharmaceutical products, today it is clear that poison centers have an expanded responsibility. The infrastructure of poison centers, especially their data collection skills and clinical management guidance, represent a true public health response network.

AAPCC member centers represent an independent infrastructure that works closely with local and state health departments and a variety of local and state governmental and non-governmental groups, federal agencies including the Health Resources and Services Administration/Maternal and Child Health Bureau (HRSA/MCHB), Food and Drug Administration (FDA) and Environmental Protection Agency (EPA). AAPCC has a strong and vibrant partnership with the Centers for Disease Control and Prevention (CDC). NPDS has been a collaborative development between AAPCC and CDC to meet the challenge of forging a true national poison center system. This report summarizes NPDS data for 2006.

## Poisoning in the US – the context

The magnitude of the poisoning problem in the US was addressed in the 2004 Institute of Medicine (IOM) report.(1). Poison centers (highly skilled medical contact centers) provide telephone information to the public and health professionals. In a large percentage of cases (72.9% for 2006) the exposed patients are managed over the telephone and not treated directly by a health care professional. When appropriate, the poison center refers the patient to a health care facility and follows the course of the exposure until resolution. In some cases, a patient is taken to an emergency department or admitted to a hospital and the medical personnel involved

Table 1. Growth of the AAPCC population served and exposure reporting (1983–2006)

Year	No. of participating centers	Population served (in millions)	Human exposures reported	Exposures per thousand population
1983	16	43.1	251,012	5.8
1984	47	99.8	730,224	7.3
1985	56	113.6	900,513	7.9
1986	57	132.1	1,098,894	8.3
1987	63	137.5	1,166,940	8.5
1988	64	155.7	1,368,748	8.8
1989	70	182.4	1,581,540	8.7
1990	72	191.7	1,713,462	8.9
1991	73	200.7	1,837,939	9.2
1992	68	196.7	1,864,188	9.5
1993	64	181.3	1,751,476	9.7
1994	65	215.9	1,926,438	8.9
1995	67	218.5	2,023,089	9.3
1996	67	232.3	2,155,952	9.3
1997	66	250.1	2,192,088	8.8
1998	65	257.5	2,241,082	8.7
1999	64	260.9	2,201,156	8.4
2000	63	270.6	2,168,248	8.0
2001	64	281.3	2,267,979	8.1
2002	64	291.6	2,380,028	8.2
2003	64	294.7	2,395,582	8.1
2004	62	293.7	2,438,643	8.3
2005	61	296.4	2,424,180	8.2
2006	61	299.4	2,403,539	8.0
Total			43,482,940	

may not always contact a poison center. Since poison cases in general, are not required to be reported, the PC may not be called. The IOM committee, in preparing its report published in 2004, examined data from a number of sources such as the National Hospital Discharge Survey for 1997 – 2001 which reported 11,533 cases of poisoning, the National Health Interview Survey for 2000 - 2001 which reported 269 cases, the National Hospital Ambulatory Medical Care Survey Emergency Department File for 1997 – 2001 which reported 1,810 cases and several others including Mortality Vital Statistics. The committee concluded that a conservative estimate of the annual incidence of poisoning episodes in the United States is 4 million cases per year. These episodes are primarily exposures and 25% do not appear to lead to any direct treatment with only 7.5% hospitalized. AAPCC data for 2001 reported 2,267,979 exposures or 56% of the estimate made by the IOM. Applying this 56% to the 2,403,539 exposures for 2006 extrapolates to 4,292,034 exposures for the US for 2006.

The IOM 2004 report estimated fatalities from poisoning to be 24,173 from the National Center for Health Statistics and 30,800 when cases involving ethanol were included. AAPCC data for 2004 reported 1,190 fatalities. This 1,190 was not added to the NCHS total since it was assumed that they were already included. Using the 30,800 estimate, AAPCC data represented about 3.5% of the fatalities from poisoning in the US.

### Limitations and plans

As outlined above, the exposure reports which comprise NPDS are spontaneous, self-reported calls and reflect the limitations of this type of reporting system (see DISCLAIMER). Nonetheless scope and immediacy of these data have much to offer. The 24 year history offers a unique opportunity to assess the long term (secular) trends in poisonings.

There are a number of plans to improve the data system and reporting. Among the specific plans for 2007 and beyond:

- Improved data transmission architecture between the PCs and NPDS
- Improved validation process for data integrity during upload to NPDS
- Real-time geographic information system (GIS) options for appropriate data analyses and displays
- Use of a structured collection of the tissue, blood, plasma, serum, and vitreous concentration data along with units of measure and sampling times
- Implementation of a web-based infrastructure to support the ongoing fatality review
- A revised annual report format to maintain integrity of temporal data and improve the utility and accessibility of the information in the tables and text
- Presentation of tabular results for all data discussed in the annual report

### Dynamics of the database

NPDS classifies all calls as either EXPOSURE (concern about an exposure to a substance) or INFORMATION (no exposed human or animal). A call may provide information about one or more exposed persons or animals (receptors). The information reported in this article reflects only those cases classified as CLOSED, that is, the PC has determined that no further follow-up/recommendations are required or no further information is available. Cases are followed to as precise an outcome as possible. Most calls are “closed” within the first hours; some calls regarding hospitalized patients or fatalities may remain open for weeks or months depending on the case. Follow-up calls provide a proven mechanism for monitoring the appropriateness of management recommendations, augmenting patient guidelines, enabling continual updates of case information, and obtaining final medical outcome status to make the data collected as accurate as possible.

Information in the NPDS database is dynamic. Each year the database is locked prior to extraction of data to prevent inadvertent changes and insure consistent, reproducible reports. The 2006 database was locked 8 October 2007.

### Database record count summary

In 2006, the 61 participating PCs logged 4,033,279 total cases including 2,403,539 closed human exposure cases (Table 1A), 128,353 animal exposures (Table 1B), 1,488,993 information calls (Table 1C), 3,956 duplicate reports (reported by more than one PC), 7,476 human confirmed nonexposures, 366 animal confirmed nonexposures, and 596 human exposure calls still open at the time of preparation of this report.

The cumulative AAPCC database now contains over 43 million human exposure case records (Table 1A). A total of 8,026,812 information calls (as described below) have been logged by NPDS since year 2000.

The total of 3,892,532 human exposure cases and information calls reported to PCs in 2006 does not reflect the full extent of poison center efforts which also include activities such as poison prevention and education and poison center awareness.

Table 1B. Non-Human exposures by animal type

Animal	Number	%
Dog	114,599	89.3
Cat	12,002	9.4
Bird	482	0.4
Rodent / lagomorph	417	0.3
Horse	264	0.2
Sheep / goat	105	0.1
Cow	41	0
Aquatic	40	0
Other	403	0.3
Total	128,353	100

Table 1C. Distribution of information calls

Information call type	No. of calls	% of Info. calls
<b>Drug identification</b>		
Public inquiry: Drug sometimes involved in abuse	394,081	26.47
Public inquiry: Drug not known to be abused	234,784	15.77
Public inquiry: Unknown abuse potential	11,870	0.80
Public inquiry: Unable to identify	115,008	7.72
HCP inquiry: Drug sometimes involved in abuse	16,599	1.11
HCP inquiry: Drug not known to be abused	32,935	2.21
HCP inquiry: Unknown abuse potential	2,061	0.14
HCP inquiry: Unable to identify	15,036	1.01
Law Enf. Inquiry: Drug sometimes involved in abuse	65,674	4.41
Law Enf. Inquiry: Drug not known to be abused	38,496	2.59
Law Enf. Inquiry: Unknown abuse potential	2,003	0.13
Law Enf. Inquiry: Unable to identify	14,293	0.96
Other drug ID	5,215	0.35
Subtotal	948,055	63.67
<b>Drug information</b>		
Adverse effects (no known exposure)	17,053	1.15
Brand / generic name clarifications	5,600	0.38
Calculations	336	0.02
Compatibility of parenteral medications	265	0.02
Compounding	1,077	0.07
Contraindications	2,081	0.14
Dietary supplement, herbal, and homeopathic	1,483	0.10
Dosage	15,770	1.06
Dosage form / formulation	4,103	0.28
Drug use during breast-feeding	7,072	0.47
Drug-drug interactions	32,522	2.18
Drug-food interactions	1,807	0.12
Foreign drug	2,224	0.15
Generic substitution	1,032	0.07
Indications / therapeutic use	30,238	2.03
Medication administration	4,767	0.32
Medication availability	1,299	0.09
Medication disposal	1,158	0.08
Pharmacokinetics	3,758	0.25
Pharmacology	2,608	0.18
Regulatory	3,474	0.23
Stability / storage	3,849	0.26
Therapeutic drug monitoring	997	0.07
Other drug info	32,173	2.16
Subtotal	176,746	11.87
<b>Environmental information</b>		
Air quality	2,165	0.15
Carbon monoxide - no known patient(s)	1,171	0.08
Carbon monoxide alarm use	626	0.04
Chem / bioterrorism / weapons (suspected or confirmed)	46	0
Clarification of media reports of environmental contamination	58	0
Clarification of substances involved in a HAZMAT incident - no known victim(s)	159	0.01
General questions about contamination of air and / or soil	778	0.05
HAZMAT planning	341	0.02
Lead - no known patient(s)	1,236	0.08
Mercury thermometer cleanup	4,976	0.33
Mercury (excluding thermometers) cleanup	758	0.05
Notification of a HAZMAT incident - no known patient(s)	351	0.02
Pesticide application by a professional pest control operator	835	0.06
Pesticides (other)	3,334	0.22
Potential toxicity of chemicals in the environment	1,787	0.12
Radiation	102	0.01
Safe disposal of chemicals	1,934	0.13
Water purity / contamination	1,161	0.08
Other environmental	6,925	0.47
Subtotal	28,743	1.93
<b>Medical information</b>		
Dental questions	181	0.01
Diagnostic or treatment recommendations for diseases or conditions - non-toxicology	11,115	0.75
Disease prevention	1,058	0.07
Explanation of disease states	1,966	0.13
General first-aid	2,122	0.14
Interpretation of non-toxicology laboratory reports	200	0.01
Medical terminology questions	160	0.01
Rabies - no known patient(s)	465	0.03
Sunburn management	216	0.01
Other medical	15,326	1.03
Subtotal	32,809	2.2

(Continued)

Table 1C. (Continued)

Information call type	No. of calls	% of Info. calls
<b>Occupational information</b>		
Occupational treatment / first-aid guidelines - no known patient(s)	47	0
Information on chemicals in the workplace	320	0.02
MSDS interpretation	424	0.03
Occupational MSDS requests	1,583	0.11
Routine toxicity monitoring	74	0
Safe handling of workplace chemicals	167	0.01
Other occupational	337	0.02
Subtotal	2,952	0.2
<b>Poison information</b>		
Analytical toxicology	1,045	0.07
Carcinogenicity	175	0.01
Food poisoning - no known patient(s)	4,572	0.31
Food preparation / handling practices	8,659	0.58
General toxicity	41,406	2.78
Mutagenicity	115	0.01
Plant toxicity	7,969	0.54
Recalls of non-drug products (including food)	372	0.02
Safe use of household products	4,120	0.28
Toxicology information for legal use / litigation	361	0.02
Other poison	23,468	1.58
Subtotal	92,262	6.2
<b>Prevention / Safety / Education</b>		
Confirmation of poison center number	18,977	1.27
General (non-poison) injury prevention requests	1,257	0.08
Media requests	364	0.02
Poison prevention material requests	20,126	1.35
Poison prevention week date inquiries	131	0.01
Professional education presentation requests	539	0.04
Public education presentation requests	919	0.06
Other prevention	2,176	0.15
Subtotal	44,489	2.99
<b>Teratogenicity information</b>		
Teratogenicity	5,850	0.39
Subtotal	5,850	0.39
<b>Other information</b>		
Invalid/Missing	6	0
Other	42,520	2.86
Subtotal	42,526	2.86
<b>Substance Abuse</b>		
Drug screen information	9,790	0.66
Effects of illicit substances - no known patient(s)	591	0.04
New trend information	428	0.03
Withdrawal from illicit substances - no known patient(s)	363	0.02
Other substance abuse	1,656	0.11
Subtotal	12,828	0.86
<b>Administrative</b>		
Expert witness requests	43	0
Faculty activities	62	0
Funding	25	0
Personnel issues	1,092	0.07
Poison center record request	195	0.01
Product replacement / malfunction (issues intended for the manufacturer)	1,954	0.13
Scheduling of poison center rotations	258	0.02
Other administration	30,056	2.02
Subtotal	33,685	2.26
<b>Caller Referred</b>		
Immediate referral - animal poison center or veterinarian	15,203	1.02
Immediate referral - drug identification	11,380	0.76
Immediate referral - drug information	547	0.04
Immediate referral - health department	8,025	0.54
Immediate referral - medical advice line	1,397	0.09
Immediate referral - pediatric triage service	84	0.01
Immediate referral - pesticide hotline	389	0.03
Immediate referral - pharmacy	4,386	0.29
Immediate referral - poison center	7,398	0.50
Immediate referral - private physician	3,286	0.22
Immediate referral - psychiatric crisis line	237	0.02
Immediate referral - teratology information program	195	0.01
Other call referral	15,521	1.04
Subtotal	68,048	4.57
<b>Total</b>	<b>1,488,993</b>	<b>100.00</b>

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PCs made 4,028,727 follow-up calls in 2006. Follow-up calls were done in 44.4% of human exposure cases. One follow-up call was made in 22.4% of human exposure cases, and multiple follow-up calls (range 2–158) were placed in 22.0% of cases.

### Information calls to poison centers

Data from 1,488,993 information calls to PCs in 2006 (Table 1C) was transmitted to NPDS, including calls in optional reporting categories such as prevention/safety/education (44,489), administrative (33,685) and immediate referral (68,048). Overall, the volume of information calls handled by US PCs increased by 6.3% over the 1,400,904 calls handled in 2005.(3)

The most frequent information call was for drug identification, comprising 948,055 calls to PCs during the year. Of these, 144,337 (9.7%) could not be identified over the telephone. The majority of the drug identification calls were received from the public, followed by law enforcement and health professionals. Most of the drug identification requests involved drugs sometimes involved in abuse; however, these cases were categorized based on the abuse potential without knowledge of whether abuse was actually intended.

Drug information calls (176,746 calls) comprised 11.9% of all information calls. Of these, the most common questions were regarding drug-drug interactions, followed by therapeutic use and indications, and questions about adverse effects. Environmental inquiries comprised 1.9% of all information calls. Of these environmental inquiries, questions related to cleanup of mercury thermometers were most common followed by questions involving pesticides.

Of all the information calls, poison information comprised 6.2% of information calls, with calls involving food poisoning or food preparation practices the most common followed by questions involving plant toxicity.

### Trends in reported poisonings/exposures

The data do not directly identify a trend in the overall incidence of poisonings in the US because the percentage of actual exposures and poisonings reported to PCs is unknown (Fig. 1). The NPDS may be best considered “numerator data” since the “denominator” cannot be determined. An attempt has been made to better define the incidence of poisoning. For example, using the National Health Interview Survey (NHIS), the estimated number of poisoning episodes in the US for the year 2000 was estimated to be 1,575,000.(1). On the other hand NHIS data(1) underestimates the total number of poisoning exposures treated by health care providers at 1.2 million cases versus the 2.2 million reported during the same time period by AAPCC.

### AAPCC surveillance system

As previously noted, 60 of the 61 US PCs upload case data automatically. Most upload every 1-60 minutes (median

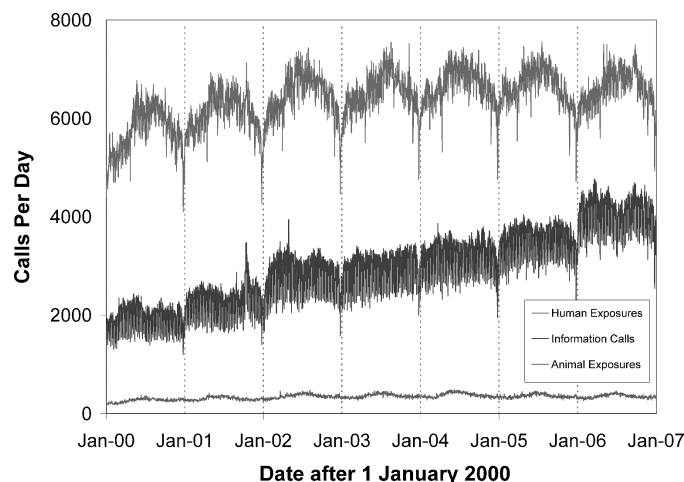


Fig. 1. Human Exposures, Information Calls and Animal Exposures by Day since 1 January 2000.

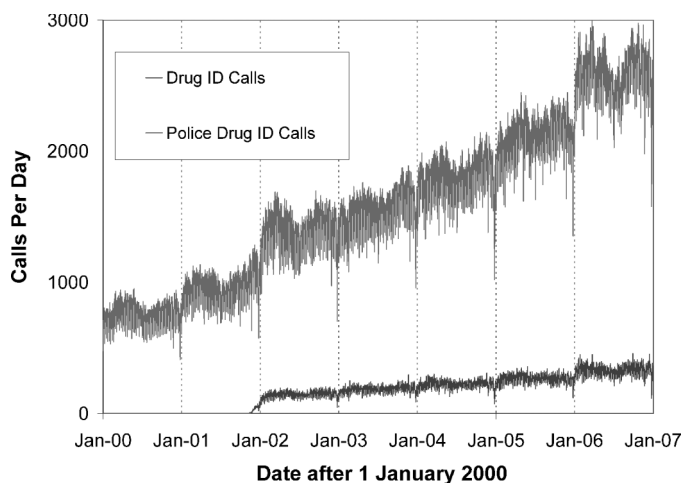


Fig. 2. Drug Identification and Law Enforcement Drug Identification Calls by Day since 1 January 2000.

11 minutes) to NPDS creating a real-time national exposure database and surveillance system. This unique real-time upload is the foundation of AAPCC’s surveillance system permitting both case volume and syndromic surveillance. NPDS software allows creation of volume and syndromic definitions at will. Definitions can be then applied to national, regional, state, or zip code coverage areas. For the first time this functionality is available not only to the AAPCC surveillance team, but to every regional poison center. Centers also have the ability to share NPDS real-time surveillance technology with their state and local health departments or other regulatory agencies. Another unique NPDS feature is the ability to generate system alerts on adverse drug events and other products of public health interest such as contaminated

food or product recalls. NPDS can thus provide real-time adverse event monitoring.

Surveillance definitions can be created to monitor a variety of volume parameters, any desired substance or commercial product, or syndromic case definitions using a variety of mathematical options and historical baseline periods. NPDS surveillance tools include:

#### 1. Volume alerts

- a. Total Call Volume
- b. Human Exposure Call Volume
- c. Clinical Effects (signs and symptom symptoms, or laboratory abnormalities) Volume

#### 2. Syndromic Surveillance Definitions

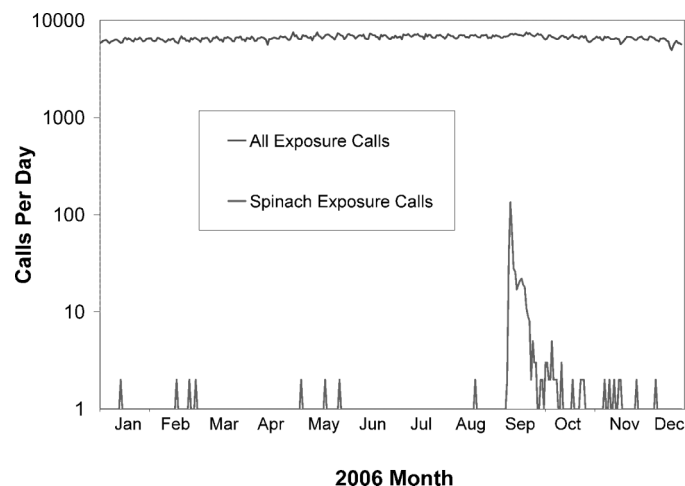
- a. Substance
- b. Clinical Effects
- c. Various NPDS data fields
- d. Combinations

Incoming data is monitored continuously around the clock and any anomalous signal detected generates an automated alert to the AAPCC's surveillance team or public health agency. These anomaly alerts are reviewed by the AAPCC surveillance team and/or the regional poison center that created them. When reports of potential public health importance are detected, additional information is obtained via e-mail or phone from reporting PCs. Public health issues are brought to the attention of the National Center for Environmental Health at the Centers for Disease Control and Prevention (CDC). Affected state or local health departments may also be alerted.

In 2006, real-time monitoring of cases submitted to the AAPCC's national database was expanded to include new surveillance case definitions, and enhanced surveillance at the regional PC level. Surveillance Anomaly 1 was generated at 2:00 pm EDT on 17 September 2006. This event marked the transition of AAPCC surveillance to NPDS. Since then more than 78,000 anomalies have been detected. At the time of this report, 220 surveillance definitions run continuously, monitoring case and clinical effects volume and a variety of syndromic case definitions from food poisoning to nerve agents.

Individual PCs have developed surveillance case definitions. Surveillance processes and anomaly definitions continue to be developed, refined, and evaluated.

On 13 September 2006, CDC learned about exposures to fresh spinach later found to be contaminated with *E. coli* O157:H7. Case clusters were reported from 26 states.(4) The first confirmed case occurred on 19 August 2006. During this period NPDS tracked 476 spinach exposure calls with the highest number of calls occurring on 15 September 2006. Although NPDS did not detect the index case, our case data clearly showed the pattern of exposures and provided situational awareness about the event (Fig. 3).



**Fig. 3.** All Exposure and Spinach Exposure Calls by Day 1 January to 31 December 2006.

#### Database enhancements

Launched in April of 2006, NPDS is in its second year of full use. NPDS is a complex project with enormous impact on AAPCC and the regional poison centers' public health mission. We have successfully transferred to the web-based NPDS. The system is used every day by the AAPCC member centers and a variety of public health agencies. Of note is the fact that the NPDS report generator provided all tables in this report except for the case listing (Table 21).

The new web-based software for querying, reporting and surveillance application allows AAPCC, its member centers and public health agencies to utilize US poisoning exposure data. Users are able to access local and regional data for their own areas and view national aggregate data. The new application allows for increased "drill-down" capability and mapping via a geographic information system (GIS). Custom surveillance definitions are available along with *ad hoc* reporting tools. The new system is designed to serve AAPCC well into the 21st century.

#### Characterization of participating poison centers

All 61 participating centers submitted data to AAPCC for 2006. Fifty-eight centers (95%) were certified by AAPCC at the end of 2006. The entire population of the 50 states, American Samoa, the District of Columbia, Federated States of Micronesia, Guam, Puerto Rico, and the US Virgin Islands was served by PCs in 2006.(5)

The average number of human exposure cases handled per day by all US poison centers was 6,937. Similar to other years, higher volumes were observed in the warmer months, with a mean of 7,246 cases per day in June compared with 6,524 per day in January. On average, ignoring the time of day and seasonal fluctuations, US PCs received one call concerning a suspected or actual human exposure every 13 seconds.

### *Management of calls – specialized poison emergency providers*

Calls received at US PCs are managed by healthcare professionals who have received additional training in managing exposure emergencies. Poison center operation as well as clinical education and instruction are directed by Managing Directors (most are PharmDs and RNs with American Board of Applied Toxicology (ABAT) board certification). Medical direction is provided by Medical Directors who are board-certified physician medical toxicologists. At some poison centers, the Managing and Medical Director positions are held by the same person.

Specialists in Poison Information (SPIs) are primarily pharmacists and registered nurses. They work under the supervision of a Certified Specialist in Poison Information (CSPI). SPIs must log a minimum of 2,000 calls over a 12 month period at a poison control center to become eligible to take the certifying examination for specialists in poison information.

Poison Information Providers (PIPs) are allied healthcare professionals. They manage information-type and non-medical (non-hospital) calls and work under the supervision of at least one CSPI. US PCs employ the full-time equivalent of 123 PIPs, 250 SPIs, and 615 CSPIs.<sup>(6)</sup> These dedicated individuals make NPDS possible.

### **Review of human exposure data**

No changes to the data collection format were implemented in 2006. Prior revisions had occurred in 1984, 1985, 1993, 2000, 2001, and 2002. Data reported after January 1, 2000, allow an unlimited number of substances for each case, a change that should be considered when comparing substance data with prior years.

### *Exposure site*

As shown in Table 2, of the 2,403,539 human exposures reported, 92.6% occurred at a residence (Own or Other). Exposures occurred in the workplace in 2.1% of cases, schools (1.5%), health care facilities (0.29%), and restaurants or food services (0.37%). Poison center peak call volumes were from 4 to 11 pm, although call frequency remained consistently high between 8 am and midnight, with the majority of calls logged during this 16-hour period.

**Table 2.** Site of call and site of exposure, human exposure cases

Site	Site of caller (%)	Site of exposure (%)
Residence		
Own	74.34	89.53
Other	2.22	3.05
Workplace	1.45	2.09
Health care facility	15.25	0.29
School	0.60	1.51
Restaurant / food service	0.03	0.37
Public area	0.37	1.16
Other	5.44	0.92
Unknown	0.31	1.08

### *Age and gender distribution*

The age and gender distribution of human poison exposure victims is outlined in Table 3. Children younger than 3 years were involved in 38.0% of exposures and 50.9% occurred in children younger than 6 years. A male predominance is found among recorded cases involving children younger than 13 years, but this gender distribution is reversed in teenagers and adults, with women comprising the majority of reported poison exposure victims.

### *Exposures in pregnancy*

Exposure during pregnancy occurred in 8,919 (0.37% of all human exposures) women. Of those with known pregnancy duration (N = 8,160), 31.7% occurred in the first trimester, 37.4% in the second trimester, and 29.8% in the third trimester. Most (74.4%) were unintentional and 19.6% were intentional.

### *Multiple patients*

In 2006, 10.3% (248,444) of human exposure cases involved multiple patients. Examples of these calls involve siblings sharing found medication, multiple victims of carbon monoxide exposure such as a family, or multiple patients inhaling vapors at a hazardous material spill.

### *Deaths and fatalities*

#### *Definitions of fatality and death*

This 2006 report distinguishes between the terms death and fatality. Death is a reported outcome. Fatality is a death that was judged by the Fatality Review Team to be related to the exposure. Of the 1,515 cases referred to the Fatality Review Team where death was the reported outcome, 213 cases did not contain the pertinent clinical information needed to complete an assessment of causality (Relative Contribution to Fatality category = 6-Unknown), 31 were judged to be definitely unrelated to the exposures (category = 5-Clearly not responsible), 26 were not coded and 16 were miscoded (not a human death) leaving 1,229 verified fatalities.

Table 3. Age and gender distribution of human exposures

Age (y)	Male		Female		Unknown Gender		Total		Cumulative Total	
	Number	% of age group total	Number	% of age group total	Number	% of age group total	Number	% of total exposures	Number	Col %
< 1 year	65,933	51.92	60,616	47.74	430	0.34	126,979	5.28	126,979	5.28
1 year	199,553	52.03	183,399	47.82	585	0.15	383,537	15.96	510,516	21.24
2 years	211,865	52.64	190,006	47.21	622	0.15	402,493	16.75	913,009	37.99
3 years	97,530	55.31	78,418	44.48	371	0.21	176,319	7.34	1,089,328	45.32
4 years	46,424	56.21	35,956	43.54	204	0.25	82,584	3.44	1,171,912	48.76
5 years	27,321	56.77	20,615	42.84	189	0.39	48,125	2.00	1,220,037	50.76
Unknown <= 5 years	1,772	46.90	1,522	40.29	484	12.81	3,778	0.16	1,223,815	50.92
Child 6 – 12 years	87,757	57.72	63,005	41.44	1,284	0.84	152,046	6.33	1,375,861	57.24
Teen 13 – 19 years	78,050	46.12	90,454	53.45	733	0.43	169,237	7.04	1,545,098	64.28
Unknown Child	2,704	41.54	2,424	37.24	1,381	21.22	6,509	0.27	1,551,607	64.56
Total children (< 20 y)	818,909	52.78	726,415	46.82	6,283	0.40	1,551,607	64.56	1,551,607	64.56
20 – 29 years	88,112	45.98	103,309	53.91	194	0.10	191,615	7.97	1,743,222	72.53
30 – 39 years	67,364	42.50	91,012	57.42	126	0.08	158,502	6.59	1,901,724	79.12
40 – 49 years	59,503	41.45	83,957	58.48	96	0.07	143,556	5.97	2,045,280	85.09
50 – 59 years	40,047	38.96	62,673	60.98	62	0.06	102,782	4.28	2,148,062	89.37
60 – 69 years	21,276	36.58	36,863	63.37	28	0.05	58,167	2.42	2,206,229	91.79
70 – 79 years	13,883	34.85	25,934	65.09	25	0.06	39,842	1.66	2,246,071	93.45
80 – 89 years	7,826	32.66	16,127	67.30	9	0.04	23,962	1.00	2,270,033	94.45
>= 90 years	1,145	27.86	2,961	72.04	4	0.10	4,110	0.17	2,274,143	94.62
Unknown adult	45,690	39.05	67,671	57.84	3,628	3.10	116,989	4.87	2,391,132	99.48
Total adults	344,846	41.08	490,507	58.43	4,172	0.50	839,525	34.93	2,391,132	99.48
Unknown age	4,305	34.70	5,147	41.48	2,955	23.82	12,407	0.52	2,403,539	100.0
Total	1,168,060	48.60	1,222,069	50.84	13,410	0.56	2,403,539	100.00	2,403,539	100.00

Summary of fatalities

Table 4 presents the age and gender distribution for these 1,229 fatalities. Although children younger than 6 years were involved in the majority of exposures, they comprised just 2.4% of the verified fatalities. Most (80%) of the poisoning fatalities occurred in 20-to 59-year-old individuals. Table 21A and B lists each of the 1,229 human fatalities along with all of the substances involved. Please note: the Substance listed in column 3 of Table 21 was chosen to be the most specific based the exact substances entered for that case and may not agree exactly with the categories used in the summary tables (including Table 22).

Table 4. Distribution of age\* and gender for fatalities

Age(y)	Male	Female	Unknown	Total (%)	Cumulative Total (%)
< 1	3	5	0	8 (0.7%)	8 (0.7%)
1	7	0	1	8 (0.7%)	16 (1.3%)
2	3	3	0	6 (0.5%)	22 (1.8%)
3	2	1	0	3 (0.2%)	25 (2.0%)
4	1	2	0	3 (0.2%)	28 (2.3%)
5	0	1	0	1 (0.1%)	29 (2.4%)
6–12	3	2	1	6 (0.5%)	35 (2.9%)
13–19	37	25	0	62 (5.0%)	97 (7.9%)
Unknown Child	0	0	2	2 (0.2%)	99 (8.1%)
20–29	131	69	0	200 (16.3%)	299 (24.3%)
30–39	111	96	0	207 (16.8%)	506 (41.2%)
40–49	128	129	0	257 (20.9%)	763 (62.1%)
50–59	109	123	0	232 (18.9%)	995 (81.0%)
60–69	43	46	0	89 (7.2%)	1,084 (88.2%)
70–79	25	37	0	62 (5.0%)	1,146 (93.3%)
80–89	19	26	0	45 (3.7%)	1,191 (96.9%)
>= 90	3	6	0	9 (0.7%)	1,200 (97.6%)
Unknown adult	16	7	0	23 (1.9%)	1,223 (99.5%)
Unknown age	4	2	0	6 (0.5%)	1,229 (100.0%)
Total	645	580	4	1,229 (100.0%)	1,229 (100.0%)

\*Age columns include both actual and estimated ages (e.g., Age 20–29 include 20s, Age 30–39 includes 30s, ...).

Enhancements in the Table 21 information in 2006 compared to previous years include: identification of cases for which an autopsy report was reviewed, inclusion of the relative contribution of fatality, and inclusion of all (rather than only 3) of the substances identified in each case.

A single substance was implicated in 91.1% of reported human exposures, and 5.9% of patients were exposed to 2 or more drugs or products (Table 5). In contrast, 673 (54.8%) of fatal case reports involved exposure to 2 or more substances.

Although there is useful information in the fatality experience, one should interpret total numbers with caution. Please see the section Poisoning in the US – the Context in the INTRODUCTION provides a perspective on the numbers.

Chronicity

The overwhelming majority of human exposures, 2,192,297 (91.2%) were acute cases (single, repeated or continuous exposure occurring over ≤ 8 hours) compared to 652 acute cases of 1,229 fatalities (53.1%). Chronic exposures (continuous or repeated exposures occurring over > 8 hours) comprised 1.9% (45,662) of all human exposures. Acute-on-chronic exposures (single exposure that was preceded by

Table 5. Number of substances involved in human exposure cases

No. of substances	No. of cases	% of cases
1	2,189,772	91.1
2	141,391	5.9
3	42,001	1.8
4	16,386	0.7
5	6,915	0.3
6	3,191	0.1
7	1,635	0.1
8	882	0
>= 9	1,366	0.1
Total	2,403,539	100.0

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a continuous, repeated, or intermittent exposure occurring over a period greater than eight hours) numbered 142,954 (6.0%).

### Reason for exposure

Specialists in Poison Information (SPIs) coded the reasons for exposure reported by callers to PCs according to the following definitions:

**Unintentional general:** All unintentional exposures not otherwise defined below:

**Environmental:** Any passive, nonoccupational exposure that results from contamination of air, water, or soil. Environmental exposures are usually caused by manmade contaminants.

**Occupational:** An exposure that occurs as a direct result of the person being on the job or in the workplace.

**Therapeutic error:** An unintentional deviation from a proper therapeutic regimen that results in the wrong dose, incorrect route of administration, administration to the wrong person, or administration of the wrong substance. Only exposures to medications or products used as medications are included. Drug interactions resulting from unintentional administration of drugs or foods which are known to interact are also included.

**Unintentional misuse:** Unintentional improper or incorrect use of a nonpharmaceutical substance. Unintentional misuse differs from intentional misuse in that the exposure was unplanned or not foreseen by the patient.

**Bite/sting:** All animal bites and stings, with or without envenomation, are included.

**Food poisoning:** Suspected or confirmed food poisoning; ingestion of food contaminated with microorganisms is included.

**Unintentional unknown:** An exposure determined to be unintentional, but the exact reason is unknown.

**Suspected suicidal:** An exposure resulting from the inappropriate use of a substance for reasons that are suspected to be self-destructive or manipulative.

**Intentional misuse:** An exposure resulting from the intentional improper or incorrect use of a substance for reasons other than the pursuit of a psychotropic or euphoric effect.

**Intentional abuse:** An exposure resulting from the intentional improper or incorrect use of a substance where the victim was likely attempting to achieve a euphoric or psychotropic effect. All recreational use of substances for any effect is included.

**Intentional unknown:** An exposure that is determined to be intentional, but the specific motive is unknown.

**Contaminant/tampering:** The patient is an unintentional victim of a substance that has been adulterated (either maliciously or unintentionally) by the introduction of an undesirable substance.

**Malicious:** This category is used to capture patients who are victims of another person's intent to harm them.

**Withdrawal:** Effect related to decline in blood concentration of a pharmaceutical or other substance after discontinuing therapeutic use or abuse of that substance.

**Adverse reaction:** An adverse event occurring with normal, prescribed, labeled, or recommended use of the product, as opposed to overdose, misuse, or abuse. Included are cases with an unwanted effect because of an allergic, hypersensitive, or idiosyncratic response to the active ingredients, inactive ingredients, or excipients. Concomitant use of a contraindicated medication or food is excluded and coded instead as a therapeutic error.

The term "accidental" has been used widely in the past primarily to define children under the age of 6 who may be exposed to a toxic agent. It is not currently utilized in this context.

The term "intentional" and "unintentional" are utilized in this context in the judgment of the poison center specialist. Virtually none of the cases are subject to a psychological review in this regard and therefore the use of these terms should be considered on a relative basis without further weight to the term.

Most (83.4%) of poison exposures were unintentional; suicidal intent was suspected in 8.3% of cases (Table 6A). Therapeutic errors accounted for 10.2% of exposures (244,511 cases), with unintentional nonpharmaceutical product misuse comprising 4.3% of exposures. The types of therapeutic errors observed in each age group are summarized in Table 6B. Of the 244,510 therapeutic errors, scenarios included: double-dosing in 76,506 (31.3%), other incorrect dose (14.3%), more than 1 product with the same ingredient (2.7%), dispensing cup errors (2.4%), iatrogenic or errors

**Table 6A.** Reason for human exposure cases

Reason	Number	% Exposures
Unintentional		
General	1,447,757	60.2
Therapeutic error	244,511	10.2
Misuse	103,052	4.3
Bite / sting	75,773	3.2
Environmental	59,880	2.5
Occupational	35,615	1.5
Food poisoning	35,326	1.5
Unknown	3,393	0.1
Subtotal	2,005,307	83.4
Intentional		
Suspected suicide	198,578	8.3
Misuse	47,918	2.0
Abuse	45,831	1.9
Unknown	16,156	0.7
Subtotal	308,483	12.8
Adverse Reaction		
Drug	43,260	1.8
Other	11,664	0.5
Food	5,600	0.2
Subtotal	60,524	2.5
Unknown		
Unknown reason	12,593	0.5
Subtotal	12,593	0.5
Other		
Malicious	9,883	0.4
Contamination / tampering	5,672	0.2
Withdrawal	1,077	0.0
Subtotal	16,632	0.7
Total	2,403,539	100

Table 6B. Scenarios for therapeutic errors by age\*

Description of Scenario	No. of cases	<6y (row %)	6–12 y (row %)	13–19 y (row %)	>19 y (row %)	Unknown (row %)
Inadvertently took/given medication twice	76,504	24.4	12.3	5.5	57.5	0.3
Other incorrect dose	34,902	37.8	11.9	7.2	42.9	0.3
Wrong medication taken/given	33,645	17.7	12.3	6.6	63.1	0.4
Inadvertently took/given someone else's medication	23,618	21.3	18.7	7.0	52.7	0.3
Medication doses given/taken too close together	20,542	25.5	10.2	7.1	56.9	0.3
Other/unknown therapeutic error	14,188	24.9	10.9	7.4	56.0	0.8
Incorrect dosing route	11,933	10.9	4.8	3.3	79.9	1.1
Confused units of measure	10,671	58.9	16.5	5.6	18.8	0.2
Incorrect formulation or concentration given	6,599	52.6	16.4	4.7	25.9	0.4
More than 1 product containing same ingredient	6,592	31.6	15.2	11.7	41.3	0.2
Dispensing cup error	5,882	64.3	17.3	4.4	14.0	0.1
Health professional/iatrogenic error (pharmacist/nurse/physician)	5,410	30.2	10.3	6.0	52.2	1.3
Incorrect formulation or concentration dispensed	1,664	44.4	14.8	5.7	34.7	0.5
10-fold dosing error	1,365	66.9	5.7	3.2	23.9	0.3
Drug interaction	1,249	11.1	6.7	7.3	74.3	0.6
Exposure through breast milk	169	89.4	0.0	0.0	7.7	3.0

\*Age columns include both actual and estimated ages. >19 y includes "Unknown Adults". "Unknown" includes both "Unknown Child" and Unknown Age.

Table 7. Distribution of reason for exposure by age\*

Reason	< 6 y		6 – 12 y		13 – 19 y		> 19 y		Unknown		Total	
	No.	Row %	No.	Row %	No.	Row %	No.	Row %	No.	Row %	No.	Col %
Unintentional	1,215,647	60.6	137,217	6.8	79,656	4.0	559,843	27.9	12,944	0.6	2,005,307	83.4
Intentional	977	0.3	9,158	3.0	79,798	25.9	214,508	69.5	4,042	1.3	308,483	12.8
Adverse reaction	5,125	8.5	3,196	5.3	4,978	8.2	46,468	76.8	757	1.3	60,524	2.5
Other	1,369	8.2	1,677	10.1	2,909	17.5	10,340	62.2	337	2.0	16,632	0.7
Unknown	697	5.5	798	6.3	1,896	15.1	8,366	66.4	836	6.6	12,593	0.5
Total	1,223,815	50.9	152,046	6.3	169,237	7.0	839,525	34.9	18,916	0.8	2,403,539	100.0

\*Age columns include both actual and estimated ages. > 19 yr column also includes "Unknown Adult". "Unknown" column includes both "Unknown Child" and "Unknown Age".

(2.2%), incorrect formulation or concentration (0.7%), and 10-fold dosing errors (0.6%).

Most (83.4%) exposures were unintentional and unintentional exposures outnumbered intentional poisonings in all age groups (Table 7). In contrast, of the 1,229 human poisoning fatalities reported, all of the fatalities in < 13 y-olds were unintentional while most fatalities in adults (older than 19 years) were intentional (Table 8).

### Route of exposure

Ingestion was the route of exposure in 77.1% of cases (Table 9), followed in frequency by dermal, inhalation/nasal, and ocular routes. For the 1,229 fatalities, ingestion, inhalation/nasal, and parenteral were the predominant exposure routes.

### Clinical effects

The AAPCC database allows for the coding of up to 131 different clinical effects (signs, symptoms, or laboratory abnormalities) for each case. Each clinical effect can be further defined as related, not related, or unknown if related. Clinical effects were coded in 718,828 (29.9%) cases. (16.0% had 1 effect, 7.7% had 2 effects, 3.9% had 3 effects, 1.4% had 4

effects, 0.5% had 5 effects, and 0.4% had >5 effects coded). Of clinical effects coded, 80% were deemed related to the exposure(s) 9.0% were considered not related, and 11.0% were coded as unknown if related.

### Case management site

The majority of cases reported to poison centers (PCs) were managed in a non-health care facility (72.9%), usually at the site of exposure, primarily the patient's own residence (Table 10). This includes the 1.9% of cases that were referred to a health care facility but refused to go. Treatment in a health care facility was rendered in 23.5% of cases.

Of the 564,159 cases managed in a health care facility, 284,983 (50.5%) were treated and released without admission, 83,563 (14.8%) were admitted for critical care, and 8.4% were admitted for noncritical care.

The percentage of patients treated in a health care facility varied considerably with age. Only 11.5% of children younger than 6 years and only 14.3% of children between 6 and 12 years were managed in a health care facility compared with 53.3% of teenagers (13–19 years) and 43.6% of adults (age>19 years).

**Table 8.** Distribution of reason for exposure and age\* for fatalities

Reason	< 6 y	6–12 y	13–19 y	>19 y	Unknown age	Total
Unintentional						
General	13	1	2	34	1	51
Environmental	2	1	7	22	0	32
Occupational	0	0	0	24	0	24
Therapeutic error	6	0	2	24	0	32
Misuse	0	0	0	7	0	7
Bite / sting	0	0	0	6	0	6
Food poisoning	0	0	0	1	0	1
Unknown	0	0	0	12	1	13
Subtotal	21	2	11	130	2	166
Intentional						
Suspected suicide	0	0	26	583	2	611
Misuse	0	0	2	40	0	42
Abuse	0	0	16	112	2	130
Unknown	0	0	5	87	1	93
Subtotal	0	0	49	822	5	876
Other						
Malicious	4	2	0	5	0	11
Withdrawal	0	0	0	1	0	1
Subtotal	4	2	0	6	0	12
Adverse reaction						
Drug	0	1	1	54	0	56
Other	0	0	0	2	0	2
Subtotal	0	1	1	56	0	58
Unknown						
Unknown reason	4	1	1	110	1	117
Subtotal	4	1	1	110	1	117
Total	29	6	62	1,124	8	1,229

\*Age columns include both actual and estimated ages. >19y includes "Unknown Adults".  
 \*\*\*Unknown Age" includes both "Unknown Child" and "Unknown Age".

**Table 9.** Route of exposure for human exposure cases

Route	All cases		Outcome of death	
	Number	%	Number	%
Ingestion	1,948,339	77.1	1,221	75.3
Dermal	188,948	7.5	21	1.3
Inhalation/nasal	145,939	5.8	130	8.0
Ocular	136,534	5.4	2	0.1
Bite/sting	75,768	3.0	9	0.6
Parenteral	14,273	0.6	66	4.1
Unknown	8,422	0.3	145	8.9
Otic	2,617	0.1	0	0.0
Other	2,406	0.1	7	0.4
Aspiration (with ingestion)	1,545	0.1	20	1.2
Vaginal	859	0	1	0.1
Rectal	848	0	0	0

Table 11 displays the medical outcome of the human poison exposure cases distributed by age, showing a greater incidence of severe outcomes in the older age groups. Table 12 compares medical outcome and reason for exposure and shows a greater frequency of serious outcomes in intentional exposures. Table 13 demonstrates an increasing duration of the clinical effects observed with more severe outcomes.

### Medical outcome definitions

NPDS Medical Outcome categories are as follows:

**No effect:** The patient did not develop any signs or symptoms as a result of the exposure.

**Table 10.** Management site of human exposures

Site of Management	Number	%
Managed on site, nonhealth care facility	1,752,607	72.9
Managed in healthcare facility		
Treated/evaluated and released	284,983	11.9
Patient lost to follow-up / left AMA	103,639	4.3
Admitted to critical care unit	83,563	3.5
Admitted to noncritical care unit	47,639	2.0
Admitted to psychiatric facility	44,327	1.8
Unspecified level of care	8	0
Subtotal (managed in HCF)	564,159	23.5
Refused referral	44,962	1.9
Other	28,610	1.2
Unknown	13,201	0.6
Total	2,403,539	100.0

**Minor effect:** The patient developed some signs or symptoms as a result of the exposure, but they were minimally bothersome and generally resolved rapidly with no residual disability or disfigurement. A minor effect is often limited to the skin or mucus membranes (e.g., self-limited gastrointestinal symptoms, drowsiness, skin irritation, first-degree dermal burn, sinus tachycardia without hypotension, and transient cough).

**Moderate effect:** The patient exhibited signs or symptoms as a result of the exposure that were more pronounced, more prolonged, or more systemic in nature than minor symptoms. Usually, some form of treatment is indicated. Symptoms were not life-threatening, and the patient had no residual disability or disfigurement (e.g., corneal abrasion, acid-base disturbance, high fever, disorientation, hypotension that is rapidly responsive to treatment, and isolated brief seizures that respond readily to treatment).

**Major effect:** The patient exhibited signs or symptoms as a result of the exposure that were life-threatening or resulted in significant residual disability or disfigurement (e.g., repeated seizures or status epilepticus, respiratory compromise requiring intubation, ventricular tachycardia with hypotension, cardiac or respiratory arrest, esophageal stricture, and disseminated intravascular coagulation).

**Death:** The patient died as a result of the exposure or as a direct complication of the exposure.

**Not followed, judged as nontoxic exposure:** No follow-up calls were made to determine the outcome of the exposure because the substance implicated was nontoxic, the amount implicated was insignificant, or the route of exposure was unlikely to result in a clinical effect.

**Not followed, minimal clinical effects possible:** No follow-up calls were made to determine the patient's outcome because the exposure was likely to result in only minimal toxicity of a trivial nature. (The patient was expected to experience no more than a minor effect.).

**Unable to follow, judged as a potentially toxic exposure:** The patient was lost to follow-up, refused follow-up, or was not followed, but the exposure was significant and may

Table 11. Medical outcome of human exposure cases by patient age\*

Outcome	<6 y		6-12 y		13-19 y		>19 y		Unknown		Total	
	No.	% <6 y	No.	% 6-12 y	No.	% 13-19 y	No.	% >19 y	No.	% Unknown Age	No.	% Total
No effect	300,183	24.5	25,338	16.7	26,044	15.4	95,909	11.4	2,507	13.3	449,981	18.7
Minor effect	99,317	8.1	23,810	15.7	42,454	25.1	185,141	22.1	2,156	11.4	352,878	14.7
Moderate effect	10,318	0.8	3,992	2.6	19,331	11.4	86,482	10.3	599	3.2	120,722	5
Major effect	744	0.1	256	0.2	2,088	1.2	14,439	1.7	63	0.3	17,590	0.7
Death	32	0	9	0	63	0	1,299	0.2	12	0.1	1,415	0.1
No follow-up, nontoxic	254,394	20.8	23,603	15.5	9,266	5.5	55,495	6.6	1,671	8.8	344,429	14.3
No follow-up, minimal toxicity	520,562	42.5	67,335	44.3	48,390	28.6	292,723	34.9	5,814	30.7	934,824	38.9
No follow-up, potentially toxic	20,885	1.7	4,094	2.7	17,093	10.1	72,742	8.7	5,554	29.4	120,368	5
Unrelated effect	17,373	1.4	3,607	2.4	4,497	2.7	35,218	4.2	536	2.8	61,232	2.6
Death, indirect report	7	0	2	0	11	0	76	0	4	0	100	0
Total	1,223,815	100	152,046	100	169,237	100	839,525	100	18,916	100	2,403,539	100

\*Age columns include both actual and estimated ages. > 19 yr column also includes "Unknown Adult". "Unknown" column includes both "Unknown Child" and "Unknown Age".

Table 12. Medical outcome by reason for exposure in human exposures

Outcome	Unintentional		Intentional		Other		Adverse Reaction		Unknown		Total	
	No.	Col%	No.	Col%	No.	Col%	No.	Col%	No.	Col%	No.	Col%
No effect	392,611	19.6	52,781	17.1	2,232	13.4	1,285	2.1	1,072	8.5	449,981	18.7
Minor effect	249,443	12.4	83,696	27.1	3,748	22.5	13,970	23.1	2,021	16.0	352,878	14.7
Moderate effect	48,904	2.4	60,892	19.7	1,086	6.5	7,709	12.7	2,131	16.9	120,722	5.0
Major effect	3,029	0.2	12,847	4.2	116	0.7	758	1.3	840	6.7	17,590	0.7
Death	170	0.0	973	0.3	13	0.1	83	0.1	176	1.4	1,415	0.1
No follow-up, nontoxic	337,158	16.8	4,879	1.6	1,057	6.4	1,086	1.8	249	2.0	344,429	14.3
No follow-up, minimal toxicity	871,550	43.5	33,795	11.0	5,383	32.4	22,303	36.8	1,793	14.2	934,824	38.9
No follow-up, potentially toxic	57,974	2.9	52,981	17.2	1,887	11.3	4,455	7.4	3,071	24.4	120,368	5.0
Unrelated effect	44,432	2.2	5,599	1.8	1,107	6.7	8,872	14.7	1,222	9.7	61,232	2.5
Death, indirect report	36	0.0	40	0.0	3	0.0	3	0.0	18	0.1	100	0.0
Total	2,005,307	100.0	308,483	100.0	16,632	100.0	60,524	100.0	12,593	100.0	2,403,539	100.0

Table 13. Duration of clinical effects by medical outcome

Duration of effect	Percent of patients in the category		
	Minor effect	Moderate effect	Major effect
>8 hours, <=24 hours	17.4	31.9	25.7
>1 week, <=1 month	0.4	1.5	5.3
Unknown	11.7	14.3	9.0
>1 month	0.2	0.4	0.8
<=2 hours	38.3	6.1	1.9
>24 hours, <=3 days	5.0	17.9	31.9
>2 hours, <=8 hours	25.3	21.5	6.4
>3 days, <=1 week	1.5	6.2	16.7
Anticipated permanent	0.2	0.2	2.3
Total	100.0	100.0	100.0

have resulted in a moderate, major, or fatal outcome. Unrelated effect: The exposure was probably not responsible for the effect.

Confirmed nonexposure: This outcome option was coded to designate cases where there was reliable and objective evidence that an exposure initially believed to have occurred actually never occurred (e.g., all missing pills are later located). All cases coded as confirmed nonexposure are excluded from this report. Death, indirect report A reported death is coded as "indirect" if no inquiry was placed to the poison center. For example, if the case was obtained from a medical examiner who queries the PC about interpretation of post mortem reports.

Tables 14 and 15 outline the use of decontamination procedures, specific antidotes, and measures to enhance elimination in the treatment of patients reported in this database. These must be interpreted as minimum frequencies because of the limitations of telephone data gathering.

Table 16 demonstrates the continuing decline in the use of ipecac-induced emesis in the treatment of poisoning. Ipecac was administered in only 1,337 (0.1%) human poison exposures in 2006. The continued decrease in ipecac syrup use in 2006 compared was observed, likely as a result of ipecac use guidelines issued in 1997 by the American Academy of Clinical Toxicology; European Association of Poisons Centres and Clinical Toxicologists and updated in 2004 (7, 8). In a separate report, the American Academy of Pediatrics concluded not only that ipecac should no longer be used

Table 14. Decontamination and therapeutic interventions

Therapy	No of Patients	%
Decontamination only	1,091,376	45.4
Therapeutic Intervention only	170,416	7.1
Decontamination+ other therapy	411,784	17.1
Other therapy	729,963	30.4
Total	2,403,539	100.0



**Table 15.** Therapy provided in human exposures by age\*

Therapy	<6 y	6–12 y	13–19 y	>19 y	Unknown	Total
<b>Decontamination</b>						
Dilute/irrigate/wash	629,456	68,916	45,679	267,362	4,728	1,016,141
Charcoal, single dose	23,597	1,797	20,697	61,635	202	107,928
Cathartic	5,465	537	7,040	21,518	63	34,623
Lavage	431	73	1,935	7,542	14	9,995
Other emetic	4,171	470	834	3,813	57	9,345
Whole bowel irrigation	192	35	497	2,012	4	2,740
Ipecac	1,337	121	182	528	8	2,176
<b>Measures to enhance elimination</b>						
Charcoal, multiple doses	246	37	729	2,409	2	3,423
Hemodialysis	11	8	121	1,879	4	2,023
Hemoperfusion	0	0	3	32	0	35
Extracorporeal, other	4	0	2	25	0	31
<b>Other Interventions</b>						
Food/snack	127,696	10,262	5,514	28,988	335	172,795
Fluids, IV	5,031	1,211	16,117	70,199	138	92,696
Fresh air	7,980	6,579	6,699	59,213	1,737	82,208
Oxygen	1,370	566	2,768	27,399	151	32,254
Antibiotics	6,476	1,680	2,192	15,418	98	25,864
Antihistamines	3,117	1,929	2,018	12,593	98	19,755
Intubation	410	113	1,317	14,018	36	15,894
Ventilator	349	101	1,113	12,093	27	13,683
Antiemetics	357	200	2,563	5,973	14	9,107
Alkalinization	122	48	1,695	6,787	19	8,671
Sedation (other) <sup>a</sup>	231	76	865	7,463	13	8,648
Steroids	756	452	607	5,287	37	7,139
Bronchodilators	517	229	431	4,304	36	5,517
Vasopressors	79	17	201	3,413	7	3,717
Glucose, > 5%	282	23	158	1,949	5	2,417
Antihypertensives	15	7	80	1,303	2	1,407
Neuromuscular blocker	42	8	132	1,114	3	1,299
Anticonvulsants <sup>a</sup>	84	23	119	664	0	890
CPR	22	4	55	499	3	583
Antiarrhythmic	9	2	53	464	1	529
Hyperbaric oxygen	30	39	38	309	2	418
Cardioversion	3	0	13	156	0	172
Pacemaker	4	0	5	157	0	166
Transplantation	1	0	2	22	0	25
ECMO	4	1	2	0	0	7
<b>Specific antidote administration</b>						
<b>Benzodiazepines</b>						
Naloxone	621	87	1,342	11,634	28	13,712
NAC, PO	223	64	2,996	8,882	24	12,189
Calcium	8,123	390	231	1,805	11	10,560
NAC, IV	160	63	2,285	6,665	18	9,191
Atropine	4,371	562	737	3,431	22	9,123
Flumazenil	73	19	189	1,696	6	1,983
Fomepizole	109	11	105	1,255	5	1,485
Antivenin (Fab fragment)	158	134	123	931	13	1,359
Glucagon	23	6	32	944	2	1,007
Insulin	9	6	53	829	1	898
Phytonadione	44	5	50	560	1	660
Folate	10	1	25	576	0	612
Fab fragments	33	21	30	498	0	582
Pyridoxine	19	16	87	369	0	491
Antivenin/antitoxin <sup>b</sup>	46	50	34	318	1	449
Ethanol	10	0	19	288	1	318
Octreotide	43	3	13	180	1	240
Succimer	92	7	11	76	0	186
Physostigmine	0	5	55	114	0	174
Methylene blue	23	3	6	80	0	112
2-PAM	11	2	5	64	0	82
Deferoxamine	13	0	28	28	0	69
EDTA	51	5	1	8	0	65
Sodium thiosulfate	2	1	3	59	0	65
BAL	21	4	1	17	0	43
Sodium nitrite	1	0	1	28	0	30
Amyl nitrite	0	0	0	15	0	15
Nalmefene	1	0	2	10	0	13
Penicillamine	0	0	0	3	0	3
Hydroxocobalamin	0	0	0	2	0	2

\*Age columns include both actual and estimated ages. >19y includes "Unknown Adults". "Unknown" includes both "Unknown Child" and "Unknown Age".

<sup>a</sup>excludes benzodiazepines.

<sup>b</sup>excludes Fab fragments.

routinely as a home treatment strategy, but also recommended disposal of ipecac currently in homes.(9)

Table 17A presents the most common 25 substance categories involved in human exposures, listed by frequency of

exposure. Tables 17B and 17C present similar data for children and adults, respectively, and show the differences between pediatric and adult poison exposures.

Table 18 lists the substance categories associated with reported fatalities -- sedative/hypnotics/antipsychotics, opioids, and cardiovascular drugs lead this list. Although sedative/hypnotics/antipsychotics ranks 4<sup>th</sup> and cardiovascular 8<sup>th</sup> among the most frequent exposures (Table 17A), there is otherwise little correlation between the frequency of exposures to a substance and the number of fatalities. Note that this Table accounts for all substances to which a patient was exposed (i.e., a patient exposed to an opioid may have also been exposed to 1 or more other product).

Table 19 shows the modest variation over the past 2 decades in the percentage of cases reported to the NPDS's national database that are fatal poisonings and in the percentage of reported fatalities as a result of suicide.

Table 20 provides a summary of plant exposures for those species and categories most commonly involved.

#### Fatality case review – methods

Each fatality case was abstracted by the reporting poison center and verified for accuracy. These cases were systematically reviewed by a project Case Review Teams (CRT). Each CRT consisted of the following members:

Author – the PPC medical director or their designee responsible for the case data entered, the abstract, and the initial choices of Relative Contribution to Fatality (RCF) and SUBSTANCES;

Lead Reviewer – Medical Director or Managing Director (assigned from a PC other than the center from which the individual case originated using pseudorandom numbers) to provide the primary review of the case;

Peer Reviewer – Managing Director (if the lead reviewer was a Medical Director) or Medical Director (if the lead reviewer was a Managing Director) assigned (using pseudorandom numbers) to provide the second (complementary) review of the case;

Manager – Louis Cantilena (east coast) or Daniel A. Spyker (west coast) assigned by PC zip code.

The fundamental classification for the NPDS fatalities reporting is whether the toxic exposure caused the death. The review teams assessed the following parameters for each fatality case:

1. Relative contribution of the toxic exposure to the death, RCF (see grading system below);
2. Abstract scoring (see scoring system below);
3. Degree of agreement between the Abstract and the NPDS database entries for that case;
4. Degree of agreement and if resolution was required between determinations made by members of the Case Review Team

Table 16. Decontamination trends (1985–2006)

Year	Human exposures reported	Ipecac administered (% of all exposures)	Activated charcoal administered (% of all exposures)	Exposures involving children <6 y (% of all exposures)	Ipecac administered (% of child exposures)	Activated charcoal administered (% of child exposures)
1985	886,389	132,947 (15.0)	41,063 (4.6)	568,691 (64.2)	94,919 (10.7)	14,718 (1.7)
1986	1,095,228	145,516 (13.3)	56,481 (5.2)	690,137 (63.0)	99,688 (9.1)	18,191 (1.7)
1987	1,164,648	117,840 (10.1)	60,310 (5.2)	730,228 (62.7)	83,443 (7.2)	18,507 (1.6)
1988	1,364,113	114,654 (8.4)	88,876 (6.5)	843,106 (61.8)	80,749 (5.9)	26,118 (1.9)
1989	1,578,968	110,545 (7.0)	101,368 (6.4)	963,924 (61.0)	79,192 (5.0)	30,345 (1.9)
1990	1,646,946	98,986 (6.0)	108,341 (6.6)	999,751 (60.7)	73,469 (4.5)	31,579 (1.9)
1991	1,836,364	94,877 (5.2)	129,092 (7.0)	1,099,179 (59.9)	73,069 (4.0)	36,177 (2.0)
1992	1,862,796	79,493 (4.3)	135,625 (7.3)	1,094,256 (58.7)	63,486 (3.4)	38,937 (2.1)
1993	1,747,147	65,078 (3.7)	127,893 (7.3)	978,560 (56.0)	50,834 (2.9)	35,791 (2.0)
1994	1,926,992	51,356 (2.7)	138,247 (7.2)	1,042,651 (54.1)	41,489 (2.2)	35,670 (1.9)
1995	2,023,089	47,359 (2.3)	155,880 (7.7)	1,070,472 (52.9)	38,372 (1.9)	38,095 (1.9)
1996	2,155,952	39,376 (1.8)	157,331 (7.3)	1,137,263 (52.7)	32,622 (1.5)	37,986 (1.8)
1997	2,192,088	32,098 (1.5)	156,213 (7.1)	1,150,931 (52.5)	26,536 (1.2)	35,856 (1.6)
1998	2,241,082	26,653 (1.2)	152,134 (6.8)	1,180,989 (52.7)	22,247 (1.0)	34,302 (1.5)
1999	2,201,156	21,942 (1.0)	145,853 (6.6)	1,154,799 (52.5)	18,326 (0.8)	33,812 (1.5)
2000	2,168,248	18,177 (0.8)	145,911 (6.7)	1,142,796 (52.7)	15,239 (0.7)	31,554 (1.5)
2001	2,267,979	16,058 (0.7)	149,442 (6.6)	1,169,478 (51.6)	13,389 (0.6)	30,367 (1.3)
2002	2,380,028	13,555 (0.6)	149,527 (6.3)	1,227,381 (51.6)	11,163 (0.5)	30,340 (1.3)
2003	2,395,582	9,284 (0.4)	140,412 (5.9)	1,245,584 (52.0)	7,310 (0.3)	28,888 (1.2)
2004	2,438,643	4,701 (0.2)	135,969 (5.6)	1,250,536 (51.3)	3,366 (0.1)	28,335 (1.2)
2005	2,424,180	3,027 (0.1)	123,263 (5.1)	1,233,695 (50.9)	1,999 (0.1)	26,338 (1.1)
2006	2,403,539	2,176 (0.1)	111,351 (4.6)	1,223,815 (50.9)	1,337 (0.1)	23,843 (1.0)

Table 17A. Substances most frequently involved in human exposures (Top 25)

Substance	Number	%*
Analgesics	284,906	11.9
Cosmetics/personal care products	214,780	8.9
Cleaning substances (household)	214,091	8.9
Sedative/hypnotics/antipsychotics	141,150	5.9
Foreign bodies/toys/miscellaneous	120,752	5.0
Cold and cough preparations	114,559	4.8
Topical preparations	108,308	4.5
Pesticides	96,811	4.0
Antidepressants	95,327	4.0
Bites and envenomations	82,133	3.4
Cardiovascular drugs	80,426	3.3
Alcohols	76,531	3.2
Antihistamines	75,070	3.1
Food products/food poisoning	66,115	2.8
Antimicrobials	66,017	2.7
Plants	64,236	2.7
Vitamins	63,331	2.6
Hormones and hormone antagonists	51,875	2.2
Gastrointestinal preparations	50,914	2.1
Hydrocarbons	49,526	2.1
Chemicals	47,557	2.0
Stimulants and street drugs	46,239	1.9
Anticonvulsants	40,476	1.7
Fumes/gases/vapors	39,586	1.6
Arts/crafts/office supplies	37,990	1.0

\*Percentages are based on the total number of human exposures (2,403,539) rather than the total number of substances.

Table 17B. Substances most frequently involved in pediatric\* (≤ 5 years) exposures (Top 25)

Substance	Number	%**
Cosmetics/personal care products	162,514	13.3
Cleaning substances (household)	120,250	9.8
Analgesics	103,189	8.4
Foreign bodies/toys/miscellaneous	90,906	7.4
Topical preparations	85,079	7.0
Cold and cough preparations	69,645	5.7
Vitamins	47,997	3.9
Pesticides	45,848	3.7
Plants	44,710	3.7
Antihistamines	36,591	3.0
Gastrointestinal preparations	34,099	2.8
Antimicrobials	33,832	2.8
Arts/crafts/office supplies	27,404	2.2
Hormones and hormone antagonists	23,972	2.0
Electrolytes and minerals	22,956	1.9
Cardiovascular drugs	22,868	1.9
Alcohols	21,577	1.8
Deodorizers	16,984	1.4
Food products/food poisoning	16,964	1.4
Hydrocarbons	15,989	1.3
Dietary supplements/herbals/homeopathic	15,511	1.3
Asthma therapies	15,474	1.3
Antidepressants	13,785	1.1
Sedative/hypnotics/antipsychotics	13,656	1.1
Other/unknown nondrug substances	12,504	1.0

\*Includes all children with actual or estimated ages ≤ 5 years old. Results do not include "Unknown Child" or "Unknown Ages."

\*\*Percentages are based on the total number of exposures in children (1,223,815) rather than the total number of substances.

Similar to past AAPCC annual reports, a listing of cases (Table 21 A and B) and summary of cases (Tables 4, 18 and 19) is provided for fatal cases for which there exists reasonable confidence that the death was a result of that exposure. Therefore, these listings do not include cases in which the RCF was determined to be definitely unrelated to the exposures (31 cases) or cases where the clinical information did not permit an assessment (RCF unknown, 212 cases).

The primary basis of the case classification and abstract evaluations were the:

Clinical Case Evidence – included all information surrounding the case. It included, but was not limited to, the data

entered into the AAPCC case data and, when available, the medical examiner’s report.

Medical Examiner’s Report –the postmortem examination results, autopsy report or the coroner’s report, was always sought, and, when available, became an important part of fatality case review.

**Relative contribution to fatality (RCF)**

The definitions used for the Relative Contribution to Fatality (RCF) classification were as follows:

**Table 17C.** Substances most frequently involved in adult\* (> 19 years) exposures (Top 25)

Substance	Number	%**
Analgesics	127,135	15.1
Sedative/hypnotics/antipsychotics	106,705	12.7
Cleaning substances (household)	74,926	8.9
Antidepressants	64,145	7.6
Bites and envenomations	53,715	6.4
Cardiovascular drugs	50,643	6.0
Alcohols	45,448	5.4
Pesticides	41,487	4.9
Food products/food poisoning	37,497	4.5
Cosmetics/personal care products	33,633	4.0
Chemicals	28,525	3.4
Anticonvulsants	27,108	3.2
Fumes/gases/vapors	26,691	3.2
Hydrocarbons	25,745	3.1
Antihistamines	24,341	2.9
Hormones and hormone antagonists	23,506	2.8
Antimicrobials	23,381	2.8
Stimulants and street drugs	22,949	2.7
Cold and cough preparations	20,576	2.5
Muscle relaxants	18,209	2.2
Topical preparations	17,193	2.0
Gastrointestinal preparations	13,036	1.6
Miscellaneous drugs	12,620	1.5
Foreign bodies/toys/miscellaneous	11,121	1.3

\*Includes all adults with actual or estimated ages > 19 years old. Results also include "Unknown Adult" but do not include "Unknown Ages"

\*\*Percentages are based on the total number of human exposures (2,403,539) rather than the total number of substances.

**Table 18.** Categories associated with largest number of fatalities (Top 25)

Substance	Number	% of all exposures in category
Sedative/hypnotics/antipsychotics	382	0.280
Opioids	307	1.030
Cardiovascular drugs	252	0.310
Acetaminophen in combination	214	0.300
Antidepressants	210	0.250
Stimulants and street drugs	203	0.450
Alcohols	139	0.210
Acetaminophen only	138	0.200
Muscle relaxants	98	0.410
Anticonvulsants	93	0.230
Cyclic antidepressants	75	0.720
Fumes/gases/vapors	69	0.170
Antihistamines	66	0.090
Aspirin alone	61	0.350
Other nonsteroidal anti-inflammatory drugs	55	0.060
Unknown drug	49	0.280
Chemicals	38	0.100
Oral hypoglycemics	35	0.300
Miscellaneous drugs	27	0.120
Diuretics	25	0.240
Automotive/aircraft/boat products	25	0.180
Antihistamine/decongestant, without phenylpropranolamine	22	0.040
Hormones and hormone antagonists	20	0.050
Anticoagulants	18	0.290

1. Undoubtedly responsible (and Proximate Cause of Death) – In the opinion of the Case Review Team the Clinical Case Evidence established beyond a reasonable doubt that the SUBSTANCES actually caused the death.
2. Probably responsible – In the opinion of the Case Review Team the Clinical Case Evidence suggests that the SUBSTANCES caused the death, but some reasonable doubt remained.
3. Contributory – In the opinion of the Case Review Team the Clinical Case Evidence establishes that the SUBSTANCES contributed to the death, but did not solely

**Table 19.** Comparisons of fatality data (1985–2006)

Year	Total fatalities		Suicides		Pediatric death	
	No.	% of cases	No.	% of deaths	No.	% of deaths
1985	328	0.037	174	(53.0)	20	(6.1)
1986	406	0.037	223	(54.9)	15	(3.7)
1987	398	0.034	227	(57.0)	22	(5.5)
1988	544	0.040	296	(54.4)	30	(5.5)
1989	590	0.037	323	(54.7)	24	(4.1)
1990	553	0.034	320	(57.9)	21	(3.8)
1991	764	0.042	408	(53.4)	44	(5.8)
1992	705	0.038	395	(56.0)	29	(4.1)
1993	626	0.036	338	(54.0)	27	(4.3)
1994	766	0.040	410	(53.5)	26	(3.4)
1995	724	0.036	405	(55.9)	20	(2.8)
1996	726	0.034	358	(49.3)	29	(4.0)
1997	786	0.036	418	(53.2)	25	(3.2)
1998	775	0.035	421	(54.3)	16	(2.1)
1999	873	0.040	472	(54.1)	24	(2.7)
2000	921	0.042	477	(51.8)	20	(2.2)
2001	1085	0.048	553	(51.0)	27	(2.5)
2002	1169	0.049	635	(54.3)	27	(2.3)
2003	1109	0.046	592	(53.4)	35	(3.2)
2004	1190	0.049	642	(53.9)	27	(2.3)
2005	1,261	0.052	623	(49.4)	24	(1.9)
2006	1,229	0.050	611	(49.7)	29	(2.4)

**Table 20.** Frequency of plant exposures (Top 25)

Botanical name	Number
<i>Spathiphyllum species</i>	2,133
<i>Euphorbia pulcherrima</i>	1,615
<i>Ilex species</i>	1,572
<i>Philodendron spp</i>	1,514
<i>Phytolacca americana</i>	1,358
<i>Toxicodendron radicans</i>	1,194
<i>Schlumbergera bridgesii</i>	705
<i>Ilex opaca</i>	608
<i>Crassula argentea</i>	604
Plants-cardiac glycosides	583
<i>Malus species</i>	582
<i>Taraxacum officinale</i>	581
Pepper mace	566
<i>Epipremnum aureum</i>	566
Plants-cyanogenic glycosides	555
Plants-pokeweed	543
Mold	538
<i>Caladium spp</i>	533
<i>Nandina domestica</i>	530
<i>Narcissus pseudonarcissus</i>	474
<i>Spinacia oleracea</i>	467
Cactus (Unknown type or name)	460
<i>Rosa spp</i>	450
<i>Quercus spp</i>	447
<i>Hedera helix</i>	446

cause the death. That is, the SUBSTANCES alone would not have caused the death, but combined with other factors, were partially responsible for the death.

4. Probably not responsible – In the opinion of the Case Review Team the Clinical Case Evidence, established to a reasonable probability, but not conclusively, that the SUBSTANCES associated with the death did not cause the death
5. Clearly not responsible (and Not Contributory) – In the opinion of the Case Review Team the Clinical Case Evidence establishes beyond a reasonable doubt that the SUBSTANCES did not cause this death.
6. Unknown – In the opinion of the Case Review Team the Clinical Case Evidence was insufficient to impute or refute a causative relationship for the SUBSTANCES in this death.

**Table 21A.** Listing of fatal nonpharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
<b>Acids</b>							
1 p	20+y M	cyanuric chloride	A	Inhalation	Occupational	1	
2 a	48 y M	formic acid	A	Instg-Asp	Sus. suicide	1	
3 p	24 y M	hydrochloric acid	A	Inhal+Derm	Occupational	2	
		hydrogen sulfide	A				
4 p	24 y M	hydrochloric acid	A	Inhal+Derm	Occupational	2	
		hydrogen sulfide	A				
5	28 y M	hydrochloric acid	A	Ingestion	Intent. Unk	1	
6	74 y M	hydrochloric acid	A	Ingestion	Sus. suicide	1	
7 a	22 y M	sulfuric acid	A	Instg+Inhal	Sus. suicide	1	
		gasoline	A				
8 h	47 y M	sulfuric acid	A	Ingestion	Sus. suicide	1	
See also case 225							
<b>Air fresheners</b>							
9 ipa	15 y F	air freshener	A	Inhalation	Environmental	1	
10 ip	26 y M	air fresheners	A	Inhalation	Abuse	1	
See also case 38							
<b>Alcohols</b>							
11	66 y F	alcohol	U	Ingestion	Sus. suicide	2	
12 ip	16 y M	ethanol, beverage	A	Ingestion	Abuse	1	
13	19 y M	ethanol, beverage	A	Instg+Unk	Sus. suicide	2	320 mg/dL in ns @ autopsy
		paroxetine					
		valproic acid					
		cocaine					
		heroin					
14 pa	23 y M	ethanol, beverage	U	Ingestion	Intent. Misuse	3	161 mg/dL
15 p	26 y M	ethanol, beverage	U	Unknown	Unknown	3	178 mg/dL
		unknown drug					
16 p	32 y M	ethanol, beverage	A	Ingestion	Intent. Unk	1	450 mg/dL
17	32 y F	ethanol, beverage	A	Ingestion	Sus. suicide	2	
		acetaminophen					
18	34 y M	ethanol, beverage	A/C	Ingestion	Abuse	1	134 µg/mL in ns
19 pa	36 y M	ethanol, beverage	U	Ingestion	Intent. Unk	3	252 mg/dL in ns
20 p	41 y M	ethanol, beverage	U	Ingestion	Intent. Misuse	2	340 mg/dL @ autopsy
21 h	42 y M	ethanol, beverage	A	Ingestion	Intent. Unk	2	499 mg/dL
22	44 y M	ethanol, beverage	A	Unknown	Intent. Unk	3	
		diazepam					
		hydrocodone					
23 ph	46 y M	oxycodone/acetaminophen	A/C	Ingestion	Sus. suicide	3	alcohol 525 mg/dL
24 pa	50 y M	ethanol, beverage	A	Ingestion	Sus. suicide	2	
		ethanol, beverage					
		zolpidem					
		clavamox (veterinary)					
		corticosteroid					
25 pa	51 y M	ethanol, beverage	U	Unknown	Unknown	1	40 mg/dL @ autopsy
26	52 y M	ethanol, beverage	A/C	Ingestion	Abuse	3	249 mg/dL in ns
27	52 y M	ethanol, beverage	C	Ingestion	Abuse	3	144 mg/dL in ns
28 a	57 y F	ethanol, beverage	C	Ingestion	Abuse	3	146 in ns
29	67 y M	ethanol, beverage	A	Ingestion	Sus. suicide	3	460 mg/dL
		aspirin			44 mg/dL		
		acetaminophen					
30 p	21 y F	methanol	U	Ingestion	Sus. suicide	1	100 mg/dL in ns
		methanol					
		disulfiram					
		lithium					
<b>31 ha</b>	29 y M	methanol	A	Ingestion	Unknown	2	348 mg/dL in ns
		ethanol, beverage					
32	30 y F	methanol	A	Ingestion	Sus. suicide	2	
33	35 y M	methanol	A	Ingestion	Abuse	1	108 mg/dL in ns
34	38 y M	methanol	A	Ingestion	Sus. suicide	1	
35	43 y F	methanol	A	Ingestion	Unknown	3	64 mg/dL in ns
36	44 y M	methanol	U	Ingestion	Abuse	1	288 mg/dL
37	47 y M	methanol	A	Ingestion	Unknown	2	292 mg/dL in ns
38	50 y F	methanol	A/C	Instg+Inhal	Sus. suicide	1	184 mg/dL in ns

(Continued)

Table 21A. Listing of fatal nonpharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Alcohols, continued							
39	51 y M	air fresheners	A	Ingestion	Sus. suicide	1	347 mg/dL
40 p	52 y M	methanol methanol acetaminophen	A	Ingestion	Sus. suicide	2	77 µg/mL in ns
See also cases 31, 59, 96, 107, 126, 196, 197, 200, 211, 220, 229, 240, 249, 258, 265, 271, 273, 277, 283, 305, 321, 322, 326, 329, 338, 357, 365, 366, 367, 379, 383, 390, 401, 402, 406, 412, 429, 432, 436, 443, 474, 478, 493, 499, 500, 510, 530, 541, 543, 568, 574, 582, 589, 594, 609, 618, 626, 628, 678, 721, 728, 742, 783, 790, 801, 803, 808, 818, 848, 873, 903, 908, 917, 918, 923, 958, 962, 964, 967, 979, 986, 987, 989, 990, 1008, 1018, 1019, 1027, 1030, 1032, 1045, 1047, 1069, 1078, 1079, 1081, 1086, 1093, 1102, 1103, 1106, 1109, 1123, 1141, 1156, 1162, 1175							
Amino acids							
41	3 y M	L-arginine	A	Parenteral	Thera. error	2	
Automotive/aircraft/boat products							
42	47 y M	brake fluid	A	Ingestion	General	1	ethylene glycol 38 mg/dL in ns @ dy 3
43	21 y F	ethylene glycol	A	Ingestion	Sus. suicide	3	
44	27 y F	ethylene glycol carisoprodol	U	Ingestion	Sus. suicide	2	
hydrocodone/acetaminophen							
45 a	28 y M	ethylene glycol	A	Ingst-Asp	Intent. Unk	1	
unknown nondrug							
46	29 y M	ethylene glycol	A	Ingestion	Sus. suicide	1	
47	30 y M	ethylene glycol	A	Ingestion	Sus. suicide	1	49.7 mg/dL
acetaminophen							
48	31 y F	ethylene glycol	U	Ingestion	Sus. suicide	1	
49	32 y M	ethylene glycol	A	Ingestion	Intent. Unk	2	
50	32 y F	ethylene glycol	A	Ingestion	Unknown	1	27 mg/dL
cocaine							
51 h	35 y F	ethylene glycol	A	Ingestion	Sus. suicide	1	
52 pa	36 y M	ethylene glycol cocaine	A	Ingst+Unk	Sus. suicide	1	
amphetamine							
53 a	38 y M	ethylene glycol	A	Ingestion	Sus. suicide	1	226 mg/dL in ns
54 a	40 y M	ethylene glycol	A	Ingestion	Sus. suicide	1	17 mg/dL in ns
55 ph	43 y M	ethylene glycol diazepam	A	Ingestion	Sus. suicide	2	
tramadol							
56	47 y M	ethylene glycol	A	Ingestion	Sus. suicide	2	
57	47 y M	ethylene glycol	A	Ingestion	Sus. suicide	1	159 mg/dL in ns
58	50 y M	ethylene glycol	A	Ingestion	Unknown	2	
59	51 y M	ethylene glycol ethanol, beverage	A	Ingestion	Sus. suicide	2	
60	56 y M	ethylene glycol	A	Ingestion	Sus. suicide	1	1,540 mg/dL in ns
61 p	68 y M	ethylene glycol	A	Ingestion	Sus. suicide	1	
62	71 y F	ethylene glycol	A	Ingestion	Sus. suicide	1	158 mg/dL in ns
63	38 y M	hydrocarbon	Unknown	Ingst-Asp	Unknown	3	
64	28 y M	methanol	C	Ingestion	Sus. suicide	2	
65	40 y F	methanol ethylene glycol	A	Ingestion	Sus. suicide	1	268 mg/dL in ns @ 10 hr
See also case 721							
Bacterial food poisoning (documented)							
66 ha	66 ha	botulism	U	Ingestion	Food poisoning	4	
Bites & envenomations							
67 a	43 y F 34 y F	bites & envenomations antihistamine/decongestant	A	Bite/sting	Bite / sting	2	
Botanical products							
68	43 y F	ma huang/ephedra ma huang/multi-botanical ephedrine	C	Ingestion	Intent. Misuse	2	
See also cases 68, 778, 1135							
Building and construction products							
69 p	57 y M	building and construction products	A	Inhalation	Environmental	1	
Chemicals							
70 h	61 y M	alkali, corrosive	A	Ingestion	General	4	
71 i	14 y M	ammonia	A	Inhalation	Intent. Unk	3	
72	53 y M	cocaine	A	Ingestion	Intent. Misuse	1	
73 p	>20 y M	cyanide	A	Ingestion	Sus. suicide	2	
74	24 y M	cyanide	A	Ingestion	Sus. suicide	1	
75 a	27 y M	cyanide	A	Ingestion	Sus. suicide	1	7.3 µg/mL in gastric
76 ph	32 y M	cyanide	A	Ingestion	Sus. suicide	1	>500 µg/dL

Table 21A. Listing of fatal nonpharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Chemicals, continued							
77 a	44 y M	cyanide	A	Ingestion	Intent. Unk	1	
78 pa	44 y M	cyanide	A	Ingestion	Intent. Unk	1	7.2 mg/L
79 pa	64 y M	cyanide	A	Ingestion	Sus. suicide	1	
80 a	30 y M	ethylene glycol	A	Ingestion	Unknown	1	308 mg/dL in ns
81 pha	30 y M	ethylene glycol	A	Ingestion	Sus. suicide	2	
82	38 y M	ethylene glycol	A	Ingestion	Sus. suicide	2	
		diphenhydramine					
83 a	39 y M	ethylene glycol	A	Ingest+Par	Sus. suicide	1	45 mg/dL @ autopsy
84	42 y M	ethylene glycol	U	Ingestion	Unint. Unk	1	ethylene glycol 63 mg/dL in vit @ autopsy
85 pa	45 y F	ethylene glycol	U	Ingestion	Sus. suicide	2	89 mg/dL in ns
86	46 y M	ethylene glycol	A	Ingestion	Sus. suicide	3	
87 h	50 y M	ethylene glycol	U	Ingestion	Unknown	1	
88	52 y F	ethylene glycol	A	Ingestion	Sus. suicide	2	
89 pa	54 y F	ethylene glycol	A/C	Ingestion	Sus. suicide	1	0.85 µg/mL @ autopsy
90 ph	56 y F	ethylene glycol	A	Ingestion	Sus. suicide	1	ethylene glycol 36.3 mg/24 gm in gastric @ autopsy
		propoxyphene					
91 ha	62 y M	propoxyphene/acetaminophen	U	Ingestion	Unknown	3	ethylene glycol 203 mg/dL in ns
		ethylene glycol					ethylene glycol 1.78 mg/mL @ autopsy
92	63 y M	ethylene glycol	U	Unknown	Unknown	1	
93 h	69 y M	ethylene glycol	A	Ingestion	Sus. suicide	1	6 mg/dL in ns
94	75 y F	ethylene glycol	A	Ingestion	Sus. suicide	2	448 µg/mL
95	76 y M	ethylene glycol	C	Ingestion	General	1	
96	31 y M	propylene glycol	A	Unknown	Unknown	1	
		methamphetamine					
		cocaine					
97 pa	64 y F	methanol	U	Unknown	Sus. suicide	1	1100 ng/mL @ autopsy
98 p	56 y M	strychnine	A	Unknown	Occupational	4	
		toluene diisocyanate					
		See also cases 65, 99, 315, 495, 733, 884, 990, 1112, 1191					
Cleaning substances (household)							
99 pha	49 y M	carpet/upholstery cleaner	U	Ingest-Asp	Sus. suicide	1	isopropanol 36 mg/dL @ autopsy
		pine oil					
		strychnine					
Cosmetics/personal care products							
100 h	55 y M	hydrogen peroxide	A	Ingestion	Unknown	1	
101	2 y M	lithium	A	Ingestion	General	1	
102 pa	6 y M	pine oil	A	Ingestion	Malicious	3	isopropanol 23 mg/dL in ns @ autopsy
103	51 y M	drain cleaner (alkali)	A	Ingestion	General	1	
		cocaine					
104	65 y F	opioids/opioid antagonist	A	Ingestion	Sus. suicide	2	
105	83 y M	drain cleaner (alkali)	A	Ingestion	Sus. suicide	2	
106	28 y M	drain cleaner (alkali)	A	Ingestion	Sus. suicide	1	
107	35 y M	drain cleaner (hydrochloric acid)	A	Ingestion	Sus. suicide	1	
		drain cleaner (hydrochloric acid)					
108 ha	52 y M	drain cleaner (sulfuric acid)	A	Ingestion	Sus. suicide	1	ethanol 130 mg/dL in ns
Foreign bodies/toys/miscellaneous							
109 pa	4 y F	foreign body	A	Ingestion	General	1	
		pyrethroid					
Fumes/gases/vapors							
110 h	31 y M	carbon disulfide	A	Inhal+Oc+Derm	Occupational	3	
111 ph	18 m M	carbon monoxide	A	Inhal+Derm	Environmental	3	
112 p	2 y M	carbon monoxide	A	Inhal+Derm	Environmental	1	0.74 in ns
113 p	6 y U	carbon monoxide	A	Inhalation	Environmental	2	
114 p	15 y F	carbon monoxide	C	Inhalation	Environmental	1	
115 pa	16 y M	carbon monoxide	A	Inhalation	Environmental	1	0.54 in ns @ autopsy
116 ph	16 y M	carbon monoxide	A	Inhalation	Environmental	1	>60% in ns
117 ip	17 y M	carbon monoxide	A	Inhalation	Environmental	1	
118 p	18 y M	carbon monoxide	C	Inhalation	Environmental	1	

(Continued)

Table 21A. Listing of fatal nonpharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Fumes/gases/vapors, continued							
119 ip	19 y M	carbon monoxide	A	Inhalation	Environmental	1	
120 p	>20 y M	carbon monoxide	A	Inhalation	Environmental	1	
121 p	>20 y M	carbon monoxide	A	Inhalation	Environmental	1	
122 p	>20 y F	carbon monoxide	A	Inhalation	General	2	61% in ns
123 ip	28 y M	carbon monoxide	C	Inhalation	Occupational	1	
124 p	28 y M	carbon monoxide	U	Inhalation	Environmental	2	
125 p	30+y M	hydrogen sulfide	A	Inhalation	Occupational	1	
126 p	32 y M	carbon monoxide ethanol, beverage	A	Ings++Inhal	Sus. suicide	1	0.58
sertraline							
127 pa	33 y F	carbon monoxide	A	Inhalation	Sus. suicide	2	
128 ip	39 y M	carbon monoxide	C	Inhalation	Occupational	1	
129 ip	39 y M	carbon monoxide	C	Inhalation	Occupational	2	
130 p	40 y M	carbon monoxide	A	Inhalation	Environmental	2	
131 ip	42 y M	carbon monoxide cocaine	A	Ings++Inhal	Environmental	1	
methamphetamine							
132 p	42 y M	carbon monoxide	C	Inhalation	Environmental	2	
133 ip	44 y M	carbon monoxide	C	Inhalation	Occupational	1	
134	50 y M	carbon monoxide	A	Inhalation	Sus. suicide	1	
135 ip	50 y M	carbon monoxide	C	Inhalation	Occupational	1	
136 pa	50 y F	carbon monoxide	U	Unknown	Sus. suicide	1	0.44 @ autopsy
137 ip	51 y M	carbon monoxide	C	Inhalation	Occupational	1	
138 ip	51 y M	carbon monoxide	C	Inhalation	Occupational	2	
139 ip	52 y M	carbon monoxide	C	Inhalation	Occupational	1	
140	52 y F	carbon monoxide	A	Inhalation	Unknown	1	0.34 in ns
toxic combustion products							
141 ip	52 y F	carbon monoxide	A	Inhalation	Sus. suicide	1	
142 ip	54 y M	carbon monoxide	C	Inhalation	Occupational	1	
143	55 y F	carbon monoxide toxic combustion products smoke	A	Ings++Inhal+Derm	Unknown	2	0.43 in ns
venlafaxine							
144 ip	55 y M	amphetamine	A	Inhalation	Environmental	1	
145 p	55 y M	carbon monoxide	C	Inhalation	Environmental	1	
146 ip	56 y M	carbon monoxide	C	Inhalation	Occupational	1	
147	58 y M	carbon monoxide zolpidem	A	Ings++Inhal	Sus. suicide	2	
alprazolam							
estrogen							
148 ip	59 y M	escitalopram	C	Inhalation	Occupational	1	
149 p	60 y F	carbon monoxide	A	Inhalation	Environmental	2	
150 ip	61 y M	carbon monoxide	C	Inhalation	Occupational	1	
151 p	61 y M	carbon monoxide	A	Inhalation	Occupational	4	
152 ip	62 y M	carbon monoxide	A	Inhalation	Environmental	1	0.23 in ns
153 ip	66 y M	carbon monoxide	A	Inhalation	Environmental	1	
154 ipa	74 y M	carbon monoxide	A	Inhalation	Environmental	1	
155 ipa	75 y F	carbon monoxide	A	Inhalation	Environmental	1	
156 pha	81 y F	carbon monoxide	A	Inhalation	Environmental	1	
157 p	88 y M	carbon monoxide	A	Inhalation	Sus. suicide	1	
158 ip	91 y M	carbon monoxide	A	Inhalation	Environmental	3	
159 p	>20 y M	chlorine (acid/hypochlorite)	A	Inhalation	General	1	0.43 @ autopsy
160 a	78 y F	chlorine gas	A	Inhalation	Unint. Misuse	3	0.46 @ autopsy
161	34 y M	hydrogen sulfide sewer gas	A	Inhalation	Occupational	2	
162 pa	34 y M	hydrogen sulfide carbon dioxide	A	Inhalation	Environmental	1	
163 pa	37 y M	hydrogen sulfide carbon dioxide	A	Inhalation	Environmental	1	
164 a	53 y M	hydrogen sulfide	A	Inhalation	Occupational	2	
165 pa	58 y M	hydrogen sulfide carbon dioxide	A	Inhalation	Environmental	2	

Table 21A. Listing of fatal nonpharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
166 pa	18 y M	propane	A	Inhalation	Abuse	1	
167 p	38 y M	propane	A	Inhalation	Intent. Misuse	1	
See also cases 3, 4, 125, 140, 143, 161, 162, 163, 165, 781							
Fungigants							
168 pha	20+y M	aluminum phosphide	A	Ingestion	Unknown	1	
Hand dishwashing							
169	83 y F	hand dishwashing cleaner	A	Ingestion	General	4	
Heavy metals							
170	68 y M	cadmium	U	Unknown	Unknown	4	
171 i	4 y M	lead	A	Ingestion	General	1	180 µg/dL
172 h	18 y F	magnesium	A	Parenteral	Thera. error	1	
173	73 y F	magnesium	U	Ingestion	Drug	1	10.7 mg/dL
Herbicides (includes algicides, defoliants, dessiccants, plant growth regulators)							
174	>20 y M	glyphosate	A	Ingestion	Sus. suicide	2	
175	46 y M	glyphosate	A	Ingestion	Sus. suicide	1	
176 i	47 y M	glyphosate	A	Ingestion	Sus. suicide	2	
177	62 y F	glyphosate	A	Ingestion	Sus. suicide	1	
178	70 y F	herbicide	A	Ingestion	Sus. suicide	1	
179	22 y M	paraquat	A	Ingestion	Sus. suicide	1	
180	83 y M	pesticide	A	Ingestion	Sus. suicide	2	
See also case 194							
Hydrocarbons							
181 pa	73 y M	1,1,1-Trichloroethane	A	Inhalation	Occupational	1	
182 p	15 y M	fluorochlorocarbon propellant	U	Inhalation	Abuse	1	
183 ip	18 y F	fluorochlorocarbon propellant	U	Inhalation	General	2	
184 p	19 y F	fluorochlorocarbon propellant	A	Inhalation	Abuse	2	
185 p	24 y M	fluorochlorocarbon propellant	A	Inhalation	Abuse	1	
186 pa	25 y M	fluorochlorocarbon propellant	A	Inhalation	Abuse	1	
187 pa	39 y M	fluorochlorocarbon propellant	A	Inhalation	Abuse	1	
188	30 y F	gasoline	A	Ingestion	Sus. suicide	1	
189 a	15 m M	hydrocarbon	A	Ingst-Asp	General	1	
190	1 y M	1 y M	A	Ingst-Asp	General	1	
191	24 y M	24 y M	A	Ingst-Asp	Sus. suicide	2	
See also case 7							
Industrial cleaners							
192 i	88 y F	cleaner, industrial (alkali)	A	Ingestion	General	1	
Insecticides (includes insect growth regulators, molluscicides, nematocides)							
193	71 y M	carbamate insecticides	A	Ingestion	Sus. suicide	2	
194	74 y F	carbamate insecticides	A	Ingestion	Sus. suicide	2	
195	90 y M	glyphosate	A	Ingestion	Unint. Unk	2	
196 p	31 y M	carbamate insecticides	A	Ingestion	Sus. suicide	2	
197 p	55 y M	methomyl	A	Ingestion	Sus. suicide	2	
198	37 y M	ethanol, beverage	A	Ingestion	Unknown	2	
199 a	37 y F	ethanol, beverage	A	Ingestion	Sus. suicide	2	
200	41 y M	organophosphate	A	Ingestion	Sus. suicide	1	
201	57 y F	organophosphate	A	Ingestion	Sus. suicide	2	
202 a	28 y M	ethanol, beverage	A	Ingestion	Sus. suicide	3	
203	84 y F	pyrethroid	C	Inhalation	Environmental	4	
See also case 109							
Insects							
204 pa	29 y M	bee/wasp/hornet	A	Bite/sting	Bite / sting	1	
Laundry detergents							
205 a	89 y F	laundry detergent, liquid	A	Ingst-Asp	Unint. Misuse	1	
Miscellaneous cleaners							
206 h	75 y M	cleaning agent, cationic	A	Ingst-Asp	General	2	
Mouthwash							
207	65 y M	ethanol isopropanol	A/C	Ingestion	Abuse	3	

(Continued)



Table 21A. Listing of fatal nonpharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
See also case 586 Mushrooms 208 a	10 y F	mushrooms-cyclopeptides activated charcoal penicillin mushrooms-cyclopeptides	A	Ingestion	General	2	
<b>209 h</b> See also case 795 Other/unknown nondrug substances	74 y F	unknown nondrug	A	Ingestion	General	1	
210 h	43 y M	unknown nondrug	A	Unknown	Unknown	4	
211 pta	58 y F	lorazepam	A	Ingestion	Sus. suicide	4	
212	70 y F	ethanol, beverage unknown nondrug	A	Par+Unk	Unknown	4	
See also case 45 Repellents	73 y F	repellent (bird, dog, deer)	A	Inhalation	Environmental	2	
Rodenticides	87 y M	zinc phosphide	A	Ingestion	Sus. suicide	1	
214	>20 y M	isopropanol	A	Ingestion	Abuse	1	isopropano 250 mg/dL @ autopsy
216	58 y M	isopropanol	A	Ingestion	Intent. Unk	2	isopropanol 338 mg/dL in vit @ autopsy
217	77 y F	isopropanol	A	Other	Unint. Misuse	2	
See also case 207 Rust removers	36 y F	hydrofluoric acid	A	Ingestion	Sus. suicide	1	
218	40-y M	crotaline: unknown	A	Bite/sting	Bite / sting	2	
Snakes	35 y M	rattlesnake	A	Bite/sting	Bite / sting	1	
219 a	41 y M	ethanol, beverage	A	Bite/sting	Bite / sting	1	
220	48 y F	rattlesnake	A	Bite/sting	Intent. Misuse	1	
221	65 y M	rattlesnake	A	Bite/sting	Bite / sting	4	
222 ia	53 y M	spiders, other	A	Bite/sting	Occupational	1	
Spiders	23 y M	gum bluing	A	Ingestion	Occupational	2	
223	23 y M	methylene chloride phosphoric acid	A	Inhalation	Occupational	2	
Sporting equipment	35 y M	methylene chloride	A	Inhalation	Environmental	2	
224	56 y F	toilet bowl cleaner (acid)	A	Ingestion	Sus. suicide	1	
Stripping agents		alprazolam					
225 p		hydrocodone/acetaminophen benzodiazepine					
226 p		wall/floor/tile cleaner (acid)	A	Inhalation	General	1	
Toilet bowl cleaners		wall/floor/tile cleaners (anionic/nonionic)	A	Ingestion	Sus. Suicide	2	
227		ethanol, beverage clonidine					
Wall/floor/tile cleaners							
228 pa	71 y F						
229 p	39 y M						

**Case: Bolded case number**= Abstract provided for this case in Appendix B. **F**=case was reported to poison center indirectly (by coroner, medical examiner, or other) after the fatality occurred, **p**=prehospital cardiac and/or respiratory arrest, **h**=hospital records reviewed, **a**=autopsy report reviewed, **20**-y=age reported as 20s (20 or more years of age), **30**-y for 30 years of age, ... **ote**=over the counter (non-prescription) medication.  
**Chronicity:** C=chronic exposure, A=acute exposure, **AVC**=acute on chronic, U=unknown.  
**Route:** Derm=Dermal, **Oc**=ocular, **Ot**=otic, **Inhal**=inhalation, **Ingst**=Ingestion, **Par**=Parenteral.  
**Reason:** Intent=Intentional, **Sus**=Suspected, **Ther**=Therapeutic, **Unint**=Unintentional, **Unk**=unknown.  
**RCF (Relative Contribution to Fatality):** 1=Undoubtedly responsible, 2=Probably responsible, 3=Contributory, 4=Probably not responsible.  
**Blood Concentrations:** Concentrations are from blood serum or plasma unless otherwise specified, **dy**=hospital day, **vit**=vitreous humor concentration, **ns**=tissue source was not specified, most are probably blood or plasma.

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Acetaminophen in combination							
230	46 y F	acetaminophen	A	Ingestion	Sus. suicide	1	
231	48 y F	acetaminophen	A	Ingestion	Sus. suicide	1	
232	70 y F	acetaminophen	A/C	Ingestion	Sus. suicide	3	1.9 µg/mL in ns
233	33 y F	acetaminophen in combination fluoxetine antihistamine/decongestant	A	Ingestion	Sus. suicide	3	61 µg/mL
234	38 y F	acetaminophen in combination	A	Ingestion	Sus. suicide	1	241 µg/mL in ns
235	27 y M	acetaminophen/aspirin	A	Ingestion	Sus. suicide	2	91 µg/mL in ns @ 2 dy
236	14 y F	acetaminophen/diphenhydramine	A	Ingestion	Sus. suicide	1	
237	14 y F	acetaminophen/diphenhydramine	A	Ingestion	Sus. suicide	1	50 µg/mL in ns
238 h	16 y F	acetaminophen/diphenhydramine isoniazid	A/C	Ingestion	Sus. suicide	1	127 µg/mL in ns
239	>20 y F	acetaminophen/diphenhydramine	A	Ingestion	Sus. suicide	1	206 µg/mL in ns @ 24 hr
240	24 y M	acetaminophen/diphenhydramine ethanol, beverage	A/C	Ingestion	Intent. Misuse	1	493 mg/L in ns
241 p	26 y M	acetaminophen/diphenhydramine lamotrigine zyprexa	A/C	Ingestion	Sus. suicide	1	
		acetaminophen venlafaxine					365 mg/L in ns
242	34 y F	acetaminophen/diphenhydramine hydrocodone/acetaminophen	A	Ingestion	Sus. suicide	2	61.8 mg/L in ns @ 26 hr
243	35 y F	acetaminophen/diphenhydramine dextromethorphan pseudoephedrine	A	Ingestion	Sus. suicide	1	48 µg/mL in ns @ 24 hr
244	40 y F	acetaminophen/diphenhydramine	A	Ingestion	Sus. suicide	1	691 µg/mL in ns
245 h	42 y F	acetaminophen/diphenhydramine methadone	A	Ingestion	Sus. suicide	1	acetaminophen 620 µg/mL in ns
246	42 y M	acetaminophen/diphenhydramine antidepressants, tricyclic	A	Ingestion	Sus. suicide	1	
247 a	43 y M	acetaminophen/diphenhydramine	A	Ingestion	Sus. suicide	1	170 µg/mL @ 36 hr
248 ia	48 y F	acetaminophen/diphenhydramine oxycodone	A	Ingestion	Intent. Misuse	1	359 µg/mL in ns
249	50 y M	acetaminophen/diphenhydramine ethanol, beverage	A	Ingestion	Sus. suicide	3	602 µg/mL in ns @ >36 h 150 mg/dL in ns
250 h	53 y F	acetaminophen/diphenhydramine	A	Ingestion	Sus. suicide	2	350 µg/mL
251	54 y F	acetaminophen/diphenhydramine	A	Ingestion	Sus. suicide	2	29 mg/L in ns @ ~3 dy
252 p	55 y F	acetaminophen/diphenhydramine benzodiazepine phenytoin	A	Ingestion	Sus. suicide	2	
253 h	57 y F	acetaminophen/diphenhydramine	A	Ingestion	Sus. suicide	2	
254	60 y F	acetaminophen/diphenhydramine acetaminophen	C	Ingestion	Intent. Misuse	1	
255	63 y M	acetaminophen/diphenhydramine propoxyphene/acetaminophen	A/C	Ingestion	Intent. Unk	1	25 µg/mL in ns 60 µg/mL in ns
256	39 y M	acetaminophen/hydrocodone carisoprodol metaxalone	A	Ingestion	Sus. suicide	2	
257	39 y F	acetaminophen/opioids	U	Ingestion	Intent. Unk	4	60 µg/mL in ns
258	63 y F	aspirin in combination ethanol, beverage	C	Ingestion	Intent. Misuse	3	24 mg/dL in ns @ chronic
259	29 y M	butalbital/acetaminophen/caffeine	A	Ingestion	Sus. suicide	1	375 µg/mL in ns @ 8 hr
260	39 y F	butalbital/acetaminophen/caffeine hydrocodone/acetaminophen	C	Ingestion	Sus. suicide	1	>300 µg/mL in ns
261	56 y F	butalbital/acetaminophen/caffeine amitriptyline	A	Ingestion	Sus. suicide	1	
262 a	59 y F	butalbital/acetaminophen/caffeine morphine oxycodone	C	Ingestion	Intent. Unk	2	acetaminophen 42 µg/mL acetaminophen 28 µg/L @ autopsy 28 µg/L @ autopsy oxycodone 0.1 mg/L @ autopsy morphine 81 ng/dL @ autopsy
263	39 y F	codeine	A/C	Ingestion	Unknown	2	
264 h	56 y F	codeine	A/C	Ingestion	Sus. suicide	3	
265	57 y M	codeine ethanol, beverage	A	Ingestion	Sus. suicide	1	
266 a	59 y M	codeine lisinopril nitroglycerin antihistamine/decongestant calcium	A/C	Ingestion	Sus. suicide	2	0.90 mg/L @ autopsy diphenhydramine 0.09 mg/L @ autopsy acetaminophen 66 µg/L in ns
267	2 y F	hydrocodone cocaine	A	Ingestion	General	2	
268 pa	>20 y M	hallucinogenic amphetamine hydrocodone carbamazepine	U	Unknown	Intent. Unk	2	0.22 mg/L @ autopsy 25 mg/L @ autopsy
269 pa	23 y F	hydrocodone trazodone	U	Ingestion	Sus. suicide	1	0.13 mg/L @ autopsy 13 mg/L @ autopsy
270 ha	24 y F	zolpidem hydrocodone carisoprodol alprazolam	U	Ingestion	Sus. suicide	2	1.2 mg/L @ autopsy

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Acetaminophen in combination, continued							
271 h	35 y F	hydrocodone ethanol, beverage	C	Ingestion	Intent. Misuse	2	
272	41 y F	hydrocodone methadone	A	Ingestion	Intent. Misuse	2	
273 h	46 y F	hydrocodone skeletal muscle relaxants methylphenidate temazepam lorazepam cocaine ethanol, beverage	A/C	Ingestion	Sus. suicide	1	
274 h	48 y M	hydrocodone	A	Ingestion	Intent. Unk	2	
275 h	49 y F	eszopiclone hydrocodone methadone	A	Ingestion	Unknown	1	
276 a	51 y F	hydrocodone haloperidol quetiapine methamphetamine	A	Ingestion	Intent. Unk	2	0.28 mg/kg in liver @ autopsy  amphetamine 0.95 mg/L @ autopsy amphetamine 2.90 mg/kg in liver @ autopsy
277	53 y F	hydrocodone ethanol, beverage	U	Ingestion	Unknown	1	
278 pa	62 y M	hydrocodone methadone amitriptyline cyclobenzaprine	U	Ingestion	Unknown	2	01.8 µg/mL @ autopsy 0.52 µg/mL @ autopsy 1.3 µg/mL @ autopsy 0.07 µg/mL @ autopsy
279	86 y F	hydrocodone	U	Ingestion	Unint. Unk	3	
280 p	1 y U	hydrocodone/acetaminophen tramadol	A	Ingestion	Malicious	2	
281 p	17 y F	hydrocodone/acetaminophen citalopram mirtazapine	A	Ingestion	Sus. suicide	2	
282	18 y F	hydrocodone/acetaminophen aspirin	C	Ingestion	Sus. suicide	1	acetaminophen 5 mg/mL in ns 25 mg/mL in ns
283 p	30 y M	hydrocodone/acetaminophen alprazolam ethanol, beverage	C	Ingestion	Abuse	2	46 mg/dL in ns
284 a	31 y F	hallucinogenic amphetamine hydrocodone/acetaminophen acetaminophen/diphenhydramine	C	Ingestion	Intent. Misuse	1	acetaminophen 168 µg/mL in ns @ chronic
285 p	32 y M	hydrocodone/acetaminophen benzodiazepine skeletal muscle relaxants	A	Ingestion	Sus. suicide	2	acetaminophen 9 µg/mL in ns
286 pa	33 y M	hydrocodone/acetaminophen	A	Ingestion	Sus. suicide	1	acetaminophen 11.4 µg/mL in ns hydrocodone 0.08 mg/L @ autopsy
287 ph	35 y M	cocaine alprazolam carisoprodol hydrocodone/acetaminophen benzodiazepine trazodone	A	Ingestion	General	1	0.02 mg/L @ autopsy acetaminophen 230 µg/mL in ns
288	36 y F	hydrocodone/acetaminophen	A	Ingestion	Sus. suicide	2	acetaminophen 55 µg/mL in ns
289	37 y F	hydrocodone/acetaminophen alprazolam cocaine	A/C	Ingestion	Sus. suicide	2	
290 pa	39 y M	hydrocodone/acetaminophen	A	Ingestion	Sus. suicide	2	acetaminophen 40 mg/L hydrocodone 0.3 mg/L
291	39 y F	clonazepam skeletal muscle relaxants hydrocodone/acetaminophen	A	Ingestion	Unknown	1	
292 a	39 y F	hydrocodone/acetaminophen	A/C	Ingestion	Sus. suicide	2	
293 h	42 y F	hydrocodone/acetaminophen carisoprodol fentanyl	A/C	Ingestion	Abuse	1	acetaminophen 19.9 µg/mL in ns
294	43 y F	hydrocodone/acetaminophen trazodone clonazepam	A	Ingestion	Sus. suicide	1	acetaminophen 181 µg/mL in ns @ >2dy
295	43 y F	hydrocodone/acetaminophen	A/C	Ingestion	Sus. suicide	2	acetaminophen 25 µg/mL in ns
296	44 y F	hydrocodone/acetaminophen alprazolam	U	Ingestion	Sus. suicide	1	
297	45 y F	hydrocodone/acetaminophen bupropion	A/C	Ingestion	Sus. suicide	1	
298 p	45 y F	hydrocodone/acetaminophen carisoprodol alprazolam ibuprofen	U	Ingestion	Sus. suicide	2	acetaminophen 38 µg/mL in ns
299 h	45 y F	hydrocodone/acetaminophen	U	Ingestion	Intent. Unk	2	acetaminophen 152 µg/mL in ns
300 ha	47 y F	hydrocodone/acetaminophen alprazolam	A/C	Ingestion	Sus. suicide	1	acetaminophen 19 µg/mL
301	48 y M	hydrocodone/acetaminophen	C	Ingestion	Intent. Misuse	1	acetaminophen 24 µg/mL in ns @ chronic
302	48 y F	hydrocodone/acetaminophen	A	Ingestion	Sus. suicide	2	acetaminophen 48 mg/L in ns

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Acetaminophen in combination, continued							
303 a	48 y F	hydrocodone/acetaminophen	C	Ingestion	Intent. Unk	1	acetaminophen 252 mg/L in ns hydrocodone 0.14 mg/L
304	49 y F	clonazepam hydrocodone/acetaminophen	A/C	Ingestion	Sus. suicide	1	
305	49 y F	aspirin hydrocodone/acetaminophen benzodiazepine	A	Ingestion	Sus. suicide	2	
306 h	50 y M	ethanol hydrocodone/acetaminophen ibuprofen	U	Ingestion	Intent. Misuse	2	ethanol 9 mg/dL in ns acetaminophen 11 µg/mL in ns
307	51 y F	hydrocodone/acetaminophen oxycodone lorazepam carisoprodol	A/C	Ingestion	Sus. suicide	1	
308 a	52 y F	antidepressants, tricyclic oxycodone/acetaminophen hydrocodone/acetaminophen benzodiazepine	A	Ingestion	Sus. suicide	3	acetaminophen 269 µg/mL in ns
309	55 y F	hydrocodone/acetaminophen	A	Ingestion	Sus. suicide	1	acetaminophen 25 µg/mL in ns
310	55 y M	hydrocodone/acetaminophen cyclobenzaprine tramadol	A/C	Ingestion	Sus. suicide	2	
311 a	56 y M	hydrocodone/acetaminophen diazepam temazepam fluoxetine barbenyl benzodiazepine	A	Ingestion	Abuse	3	acetaminophen 6.3 mg/L @ autopsy 0.31 mg/L @ autopsy 0.05 mg/L @ autopsy 0.06 mg/L @ autopsy phenobarbital 2.3 mg/L @ autopsy
312 a	56 y M	hydrocodone/acetaminophen	A/C	Ingestion	Intent. Misuse	1	acetaminophen 10.0 mg/L @ autopsy hydrocodone 0.19 mg/L @ autopsy 12.7 mg/L @ autopsy
313 ha	58 y F	carisoprodol alprazolam hydrocodone/acetaminophen carisoprodol	C	Ingestion	Intent. Misuse	2	alprazolam 0.05 mg/L @ autopsy acetaminophen 56 mg/L in ns @ chronic
314	59 y F	hydrocodone/acetaminophen cyclobenzaprine	A/C	Ingestion	Unknown	3	
315	68 y F	hydrocodone/acetaminophen clonazepam diazepam carbon black	A	Ingestion	Sus. suicide	3	acetaminophen 110 µg/mL in ns @ 2 h
316	71 y F	hydrocodone/acetaminophen	A	Ingestion	Intent. Unk	1	330 µg/mL in ns
317 pha	78 y F	hydrocodone/acetaminophen diltiazem	A	Ingestion	Sus. suicide	2	1000 µg/mL
318	18 y F	oxycodone/acetaminophen	A	Ingestion	Sus. suicide	1	
319	26 y F	oxycodone/acetaminophen ibuprofen cyclobenzaprine	C	Ingestion	Intent. Unk	4	
320 p	34 y F	oxycodone/acetaminophen alprazolam	A/C	Ingestion	Sus. suicide	1	
321 h	35 y M	oxycodone/acetaminophen acetaminophen ethanol, beverage	C	Ingestion	General	1	46.4 µg/dL
322 p	35 y M	oxycodone/acetaminophen alprazolam ethanol, beverage marijuana	A/C	Ingestion	Abuse	2	
323	40 y F	oxycodone/acetaminophen carisoprodol alprazolam oxycodone	A/C	Ingestion	Sus. suicide	1	
324 p	43 y M	oxycodone/acetaminophen	U	Ingestion	Unknown	2	
325	43 y M	oxycodone/acetaminophen	U	Ingst-Asp	Sus. suicide	1	acetaminophen 12 µg/dL in ns @ dy 3
326 pa	45 y M	oxycodone/acetaminophen	A	Ingestion	Sus. suicide	1	acetaminophen 2.4 mg/L @ autopsy acetaminophen 140 mg/L @ autopsy ethanol 0.08% (w/v) @ autopsy oxycodone 0.80 µg/mL @ autopsy 2.8 µg/mL @ autopsy
327 pa	46 y F	ethanol, beverage oxycodone/acetaminophen doxepin skeletal muscle relaxants	A/C	Ingestion	Thera. error	2	
328	47 y F	oxycodone/acetaminophen hydrocodone acetaminophen carisoprodol	A	Ingestion	Sus. suicide	3	
329	48 y F	oxycodone/acetaminophen ethanol, beverage	A	Ingestion	Sus. suicide	1	acetaminophen 54.9 µg/mL in ns @ 16 h
330	50 y M	oxycodone/acetaminophen acetaminophen dextromethorphan	A/C	Ingestion	Abuse	3	69.6 µg/mL in ns
331 pa	51 y F	oxycodone/acetaminophen hydrocodone	U	Ingestion	Intent. Unk	2	

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Acetaminophen in combination, continued							
332	54 y F	oxycodone/acetaminophen	C	Ingestion	Sus. suicide	1	acetaminophen 8.2 mg/L in ns
333 a	54 y F	oxycodone/acetaminophen hydrocodone/acetaminophen venlafaxine	U	Ingestion	Sus. suicide	1	acetaminophen 162 µg/mL in ns @ >24 h
334	55 y M	oxycodone/acetaminophen	U	Ingestion	Intent. Unk	2	
335 p	57 y F	oxycodone/acetaminophen	A	Ingestion	Sus. suicide	1	>200 µg/mL in ns
336 h	71 y M	oxycodone/acetaminophen	U	Ingestion	Unknown	2	
337	75 y F	oxycodone/acetaminophen	A/C	Ingestion	General	1	
338	36 y M	propoxyphene/acetaminophen cocaine ethanol, beverage	A	Ingestion	Sus. suicide	2	
339 a	40 y F	propoxyphene/acetaminophen	U	Ingestion	Sus. suicide	2	propoxyphene 3.5 mg/L in ns @ autopsy acetaminophen 287 µg/mL in ns
340 pa	43 y F	propranolol acetaminophen/diphenhydramine propoxyphene/acetaminophen	A	Ingst+Unk	Sus. suicide	1	propoxyphene 2.34 mg/L acetaminophen 148 µg/mL in ns 0.35 mg/L
341 ph	49 y F	cocaine propoxyphene/acetaminophen diazepam zyprexa venlafaxine mirtazapine codeine gabapentin metoprolol	A	Ingestion	Abuse	2	
342 p	51 y M	propoxyphene/acetaminophen benzodiazepine heroin	A	Ingestion	Sus. suicide	1	44 µg/mL in ns
343	72 y F	propoxyphene/acetaminophen trandolapril/verapamil	A/C	Ingestion	Sus. suicide	2	
344 p	76 y M	propoxyphene/acetaminophen	A/C	Ingestion	Sus. suicide	1	
345	81 y F	propoxyphene/acetaminophen	A	Ingestion	Sus. suicide	3	acetaminophen 86 µg/mL in ns
346	60 y M	tramadol diazepam	A	Ingestion	Intent. Misuse	2	
347	82 y F	tramadol	C	Ingestion	Unknown	3	
See also cases 22, 44, 90, 227, 242, 255, 260, 284, 307, 328, 331, 333, 339, 341, 360, 374, 385, 388, 397, 407, 416, 417, 423, 440, 445, 523, 524, 543, 561, 572, 580, 612, 619, 622, 627, 667, 670, 715, 718, 735, 737, 741, 748, 752, 769, 805, 806, 807, 809, 810, 811, 817, 820, 835, 841, 885, 900, 904, 913, 918, 924, 932, 960, 970, 978, 996, 1026, 1029, 1031, 1040, 1043, 1051, 1057, 1063, 1066, 1076, 1083, 1087, 1109, 1143, 1173, 1226							
Acetaminophen only							
348	<20 y U	acetaminophen	A	Other	Unknown	2	
349	>20 y M	acetaminophen	A/C	Ingestion	Thera. error	2	
350	21 y F	acetaminophen	A	Ingestion	Sus. suicide	1	37 µg/mL in ns @ ~48 hr
351	22 y F	acetaminophen	C	Ingestion	Sus. suicide	2	
352 a	22 y F	acetaminophen	A	Ingestion	Sus. suicide	1	400 µg/mL @ 30.5 hr
353	23 y M	acetaminophen aspirin	U	Ingestion	Intent. Unk	1	55 µg/mL in ns 2.2 mg/dL in ns
354 ph	25 y M	acetaminophen	A/C	Ingestion	Sus. suicide	2	12 µg/mL in ns
355	25 y F	acetaminophen alprazolam	A	Ingestion	Sus. suicide	1	195 µg/mL in ns @ 26 hr
356 a	26 y F	acetaminophen	A/C	Ingestion	Sus. suicide	1	196 µg/mL in ns
357 h	26 y F	acetaminophen ethanol, beverage	A	Ingestion	Sus. suicide	1	293 µg/mL in ns alcohol 38 mg/dL
358 a	28 y F	acetaminophen	A	Ingestion	Sus. suicide	1	170 µg/mL
359	29 y F	acetaminophen	C	Ingestion	Sus. suicide	1	
360 ha	29 y M	acetaminophen oxycodone/acetaminophen	C	Ingestion	Intent. Misuse	3	209 µg/mL in ns
361	30 y M	acetaminophen	A	Ingestion	Sus. suicide	1	89 µg/mL @ ~48 hr
362 pa	30 y M	acetaminophen alprazolam zolpidem	A	Ingestion	Sus. suicide	1	20.7 µg/mL in ns 0.034 mg/L
363	31 y F	acetaminophen cocaine	A	Ingestion	Sus. suicide	2	86 µg/mL in ns
364	31 y F	acetaminophen	A	Ingestion	Sus. suicide	4	615 µg/mL @ ~12 hr
365	33 y F	acetaminophen ethanol, beverage	A	Ingestion	Sus. suicide	1	
366 a	33 y F	acetaminophen ethanol, beverage	A	Ingestion	Sus. suicide	2	43 µg/mL in ns
367 ha	33 y F	acetaminophen ethanol, beverage cocaine aspirin	C	Ingst+Inhal	Intent. Misuse	2	78 µg/mL in ns 27 mg/dL in ns 222 µg/mL in ns
368 a	34 y M	acetaminophen	A	Ingestion	Sus. suicide	4	
369	34 y F	acetaminophen carisoprodol	A/C	Ingestion	Sus. suicide	2	
370	36 y M	acetaminophen	A/C	Ingestion	Sus. suicide	1	
371 h	36 y F	acetaminophen	C	Ingestion	Unint. Misuse	2	
372	36 y F	acetaminophen	A/C	Ingestion	Sus. suicide	1	
373 pa	36 y M	acetaminophen codeine cyclobenzaprine	U	Ingestion	Unknown	4	75.2 µg/mL 0.045 µg/mL @ autopsy 0.084 µg/mL @ autopsy

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Acetaminophen only, continued							
374 h	37 y F	acetaminophen hydrocodone/acetaminophen	C	Ingestion	Intent. Misuse	1	160 µg/mL in ns
375	38 y M	acetaminophen	A	Ingestion	Sus. suicide	1	131 µg/mL in ns @ >17 hr
376	39 y F	acetaminophen	A	Ingestion	Unknown	1	108 µg/mL in ns
377 h	39 y F	acetaminophen	A	Ingestion	Sus. suicide	3	
378 a	39 y F	acetaminophen quetiapine	A	Ingestion	Sus. suicide	1	420 mg/L @ >7 hr
379 p	39 y M	acetaminophen ethanol, beverage opioid	A	Ingestion	Sus. suicide	2	79.7 µg/mL in ns ethanol 330 mg/dL
380	39 y F	acetaminophen	A	Ingestion	Sus. suicide	1	30.4 µg/mL in ns
381	39 y F	acetaminophen	A	Ingestion	Unknown	1	30 mg/L in ns
382	39 y F	acetaminophen carisoprodol	A	Ingestion	Sus. suicide	2	171 µg/mL in ns
383	39 y M	acetaminophen aspirin acetaminophen lamotrigine zolpidem ethanol, beverage	A/C	Ingestion	Sus. suicide	2	6.3 µg/mL in ns 87.4 µg/mL in ns
384	39 y F	acetaminophen	A	Ingestion	Unknown	2	108 µg/mL
385	40 y F	acetaminophen hydrocodone/acetaminophen	U	Ingestion	Unint. Misuse	1	74 µg/mL in ns
386	40 y F	acetaminophen/diphenhydramine	A	Ingestion	Sus. suicide	2	
387 a	40 y M	acetaminophen	A/C	Ingestion	Sus. suicide	1	290 µg/mL @ autopsy
388	41 y F	acetaminophen acetaminophen/aspirin/caffeine	C	Ingestion	Intent. Unk	1	
389	41 y F	acetaminophen	A	Ingestion	Sus. suicide	1	162 µg/mL in ns @ >2 dy
390	42 y F	acetaminophen meclizine hydroxyzine verapamil ethanol, beverage	C	Ingestion	Sus. suicide	2	356 µg/mL in ns @ chronic
391	43 y M	acetaminophen famotidine ibuprofen diphenhydramine	A	Ingestion	Sus. suicide	3	
392 ha	43 y F	acetaminophen	U	Ingestion	Sus. suicide	2	
393	44 y F	acetaminophen	A	Ingestion	Unknown	1	30 µg/mL in ns
394 a	44 y M	acetaminophen dextromethorphan	C	Ingestion	Intent. Misuse	3	
395	44 y F	acetaminophen	A	Ingestion	Sus. suicide	2	55 mg/L in ns
396	44 y F	acetaminophen	A	Ingestion	Unknown	3	78.8 µg/mL
397 ha	44 y F	acetaminophen oxycodone hydrocodone/acetaminophen valproic acid	A	Ingestion	Sus. suicide	2	50 µg/mL in ns @ >20 hr
398	45 y M	acetaminophen	A	Ingestion	Sus. suicide	2	50 µg/mL in ns @ >20 hr
399	45 y F	acetaminophen antihistamine/decongestant pseudoephedrine	C	Ingestion	Intent. Misuse	1	
400 h	45 y F	acetaminophen	A	Ingestion	Intent. Unk	1	
401 ha	45 y F	acetaminophen ethanol, beverage cocaine aspirin	A	Ingestion	Sus. suicide	2	50 µg/mL in ns 43 mg/dL in ns
402 h	45 y F	acetaminophen ethanol, beverage	C	Ingestion	Intent. Misuse	1	107 µg/mL in ns 54.9 µg/mL in ns
403 ip	46 y F	acetaminophen aspirin benzodiazepine opioids/opioid antagonist	U	Ingestion	Unknown	1	0.23 g/dL in ns 49.6 µg/mL
404	46 y F	acetaminophen	A	Ingestion	Sus. suicide	1	
405	47 y M	acetaminophen	A	Ingestion	Intent. Misuse	1	124 µg/mL in ns
406	48 y F	acetaminophen ethanol, beverage	A/C	Ingestion	Abuse	1	21 µg/mL in ns ethanol 249 mg/dL in ns
407	50 y F	acetaminophen hydrocodone aspirin in combination	U	Ingestion	Unint. Unk	2	32 µg/mL in ns
408	50 y M	acetaminophen	C	Ingestion	Thera. error	1	
409	50 y F	acetaminophen	A	Ingestion	Sus. suicide	2	424 µg/mL in ns
410 a	50 y M	acetaminophen	C	Ingestion	Sus. suicide	1	269 µg/mL
411	50 y F	acetaminophen	U	Ingestion	Unknown	2	12 µg/dL in ns
412	51 y F	acetaminophen ethanol, beverage	A/C	Ingestion	Sus. suicide	1	121 mg/L in ns
413 h	52 y F	acetaminophen oxcarbazepine zyprexa benzodiazepine escitalopram trazodone	A	Ingestion	Intent. Unk	1	
414	54 y M	acetaminophen	A	Ingestion	Sus. suicide	2	

(Continued)

**Table 21B.** Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Acetaminophen only, continued							
415 h	55 y M	lisinopril acetaminophen ibuprofen	A/C	Ingestion	Intent. Misuse	3	
416 a	55 y F	acetaminophen hydrocodone escitalopram clonazepam lisinopril cocaine	A	Ingestion	Sus. suicide	1	>800 µg/mL in ns
417 ha	55 y M	acetaminophen oxycodone/acetaminophen opioids/opioid antagonist benzodiazepine	A	Ingestion	Sus. suicide	1	204 µg/mL in ns @ 8 hr
418	56 y F	acetaminophen	A	Ingestion	Sus. suicide	1	
419	56 y F	acetaminophen unknown drug	A	Ingestion	Sus. suicide	1	181 µg/mL in ns
420	56 y M	acetaminophen	A	Ingestion	Sus. suicide	1	11 µg/mL in ns
421	56 y F	acetaminophen	A	Ingestion	Sus. suicide	1	
422	57 y F	acetaminophen	A	Ingestion	Sus. suicide	2	490 µg/mL in ns
423 p	58 y M	acetaminophen oxycodone/acetaminophen	A	Ingestion	Unknown	2	63 µg/mL in ns
424	58 y F	acetaminophen	U	Ingestion	Unknown	2	
425 h	58 y F	acetaminophen	A/C	Ingestion	Sus. suicide	1	197 mg/L in ns
426	59 y M	acetaminophen	C	Ingestion	Thera. error	1	38.6 µg/mL in ns @ chronic
427 h	59 y F	acetaminophen	A/C	Ingestion	Unknown	1	30 µg/mL in ns
428	60 y F	acetaminophen	A	Ingestion	Sus. suicide	1	46 µg/mL in ns
429 a	61 y F	acetaminophen ibuprofen ethanol, beverage	C	Ingestion	Abuse	3	22 µg/mL in ns @ chronic
430 p	61 y F	acetaminophen benzodiazepine	U	Ingestion	Sus. suicide	1	49 µg/mL in ns
431 p	63 y F	acetaminophen ibuprofen	U	Ingestion	Sus. suicide	1	300 µg/mL in ns @ ~24 hr
432	63 y M	acetaminophen ethanol, beverage	U	Ingestion	Sus. suicide	2	acetaminophen 222 µg/mL in ns @ 12 h 111 mg/dL in ns
433 a	64 y F	acetaminophen	C	Ingestion	Unint. Unk	1	225 µg/mL in ns
434	66 y F	acetaminophen aspirin	A	Ingestion	Sus. suicide	2	
435 ha	66 y M	acetaminophen  doxepin citalopram aspirin	U	Ingestion	Intent. Unk	1	193 mg/L @ autopsy acetaminophen 300 mg/kg in liver @ autopsy 4.78 mg/L @ autopsy 0.02 mg/L @ autopsy aspirin 66.5 mg/L @ autopsy aspirin 68.2 mg/kg in liver @ autopsy
436	66 y F	acetaminophen ethanol, beverage	C	Ingestion	Thera. error	4	
437	68 y F	acetaminophen quetiapine primidone benzodiazepine gabapentin	A/C	Ingestion	Sus. suicide	1	189 µg/mL in ns
438	71 y M	acetaminophen	U	Ingestion	Sus. suicide	4	630 µg/mL in ns
439	72 y M	acetaminophen	A/C	Ingestion	Abuse	3	
440	75 y F	acetaminophen oxycodone/acetaminophen	A	Ingestion	Unknown	2	895 µg/mL in ns
441	78 y F	acetaminophen	A	Ingestion	Sus. suicide	1	584 µg/mL in ns
442	78 y M	acetaminophen	A	Ingestion	Thera. error	1	10.6 mg/L in ns
443 p	83 y M	acetaminophen ethanol, beverage	A	Ingestion	Sus. suicide	4	
444 h	86 y F	acetaminophen warfarin	C	Ingestion	Drug	4	10 µg/mL in ns
445	93 y F	acetaminophen hydrocodone/acetaminophen	A	Ingestion	Sus. suicide	3	35 µg/mL in ns
See also cases 17, 29, 40, 47, 254, 321, 328, 330, 463, 567, 568, 570, 579, 581, 588, 589, 594, 597, 606, 697, 701, 740, 753, 759, 767, 837, 846, 849, 975, 991, 996, 1001, 1005, 1076, 1130, 1157, 1195, 1197, 1214, 1219, 243, 330, 394							
Acetaminophen with decongestant/antihistamine, without phenylpropanolamine							
446 h	29 y F	dextromethorphan	A	Ingestion	General	1	
447	62 y F	dextromethorphan	C	Ingestion	Sus. suicide	2	
See also cases 243, 330, 394							
Analgesics							
448	28 y F	nonaspirin salicylate skeletal muscle relaxants	A	Ingestion	Sus. suicide	2	
Antibiotics							
449	Unk age M	tilmicosin	A	Parenteral	Sus. suicide	1	
450 p	36 y M	tilmicosin	A	Parenteral	Sus. suicide	1	
See also cases 24, 208, 510, 590, 755, 839, 919, 935, 1035, 1094, 1119							
Anticoagulants							
451	87 y F	clopidogrel aspirin	C	Ingestion	Drug	1	
452	73 y M	glycoprotein IIa/IIb inhibitor	A	Parenteral	Drug	2	
453 ih	2 d F	heparin	A/C	Parenteral	Thera. error	1	

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Anticoagulants, continued							
454 ih	5 day F	heparin	A/C	Parenteral	Thera. error	1	
455 ih	5 day F	heparin	A/C	Parenteral	Thera. error	1	
456	22 y F	heparin	U	Parenteral	Drug	3	
See also cases 444, 472, 650, 654, 676, 685, 689, 705, 712, 960, 1094							
Anticonvulsants							
457	26 y M	carbamazepine	U	Ingestion	Sus. suicide	1	119 mg/L in ns
458 a	38 y F	carbamazepine beta blocker trazodone antihistamine	U	Ingestion	Sus. suicide	2	41 mg/L  0.36 mg/L
459	47 y F	carbamazepine clonazepam	A/C	Ingestion	Sus. suicide	1	40 µg/mL in ns
460	54 y M	carbamazepine	C	Ingestion	General	3	24 µg/mL
461	43 y F	gabapentin quetiapine beta blocker bupropion albuterol fluoxetine spironolactone thyroid preparation furosemide naproxen cocaine	A/C	Ingestion	Sus. suicide	2	
462	26 y M	lamotrigine escitalopram pyrazolopyrimidine zolpidem ramelteon alprazolam ibuprofen	A	Ingestion	Sus. suicide	2	
463 pha	31 y F	lamotrigine paroxetine quetiapine acetaminophen diphenhydramine	A/C	Ingestion	Sus. suicide	1	92 µg/mL @ autopsy 0.88 µg/mL @ autopsy  51 µg/mL @ autopsy 1.9 µg/mL @ autopsy
464	44 y F	lamotrigine	A	Ingestion	Sus. suicide	4	
465 pa	49 y M	lamotrigine venlafaxine trazodone lisinopril/hydrochlorothiazide lisinopril sildenafil hydroxyzine furosemide gabapentin	U	Ingestion	Sus. suicide	1	29 µg/mL @ autopsy 2.10 µg/mL @ autopsy 1.13 mg/L @ autopsy
466 p	24 y M	oxcarbazepine	A/C	Ingestion	Sus. suicide	4	
467	18 y M	phenytoin	A/C	Ingestion	Drug	3	90 µg/mL in ns
468	57 y M	phenytoin	C	Ingestion	Sus. suicide	4	60 mg/l in ns
469	69 y F	phenytoin	C	Ingestion	Unint. Unk	4	
470	79 y M	phenytoin	C	Ingestion	Thera. error	3	33.4 µg/mL in ns
471	79 y F	phenytoin	U	Other	Unknown	4	55.7 mg/L in ns
472	80 y M	phenytoin warfarin	C	Ingestion	Thera. error	2	32 µg/mL @ chronic
473	91 y M	phenytoin	A	Ingestion	Drug	3	42.6 mg/L @ chronic
474	25 y F	valproic acid lorazepam fluoxetine ethanol, beverage	A/C	Ingst-Asp	Sus. suicide	1	368 µg/mL in ns
475 ha	27 y M	valproic acid unknown drug	U	Ingestion	Sus. suicide	1	ethanol 233 mg/dL in ns 1,200 µg/mL in ns @ ~24 hr
476	42 y M	valproic acid diphenhydramine phenergan guanfacine venlafaxine lamotrigine	A	Ingestion	Sus. suicide	1	184 mg/L in ns
477 a	43 y M	valproic acid	A	Ingestion	Sus. suicide	2	980 mg/L in ns valproic acid 376 µg/mL @ autopsy
478	51 y M	valproic acid ethanol, beverage	A/C	Ingestion	Sus. suicide	3	202 µg/mL in ns @ 2 dy
See also cases 13, 241, 252, 268, 341, 383, 397, 413, 437, 465, 476, 482, 487, 488, 494, 495, 497, 504, 509, 510, 511, 516, 523, 524, 527, 528, 529, 578, 584, 622, 640, 660, 668, 681, 695, 706, 708, 709, 710, 718, 744, 760, 793, 805, 839, 876, 896, 905, 910, 932, 934, 960, 976, 994, 999, 1024, 1033, 1035, 1036, 1057, 1067, 1077, 1094, 1098, 1174							
Antidepressants							
479	44 y F	SSRI antipsychotic, atypical antidepressants sulfonyleurea benzodiazepine diphenhydramine	A	Ingestion	Sus. suicide	2	

(Continued)



Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Antidepressants, continued							
480 a	18 y F	antidepressants	A/C	Ingestion	Sus. suicide	1	bupropion 4.42 µg/mL in ns @ ~24 hr
481	14 y M	bupropion	A/C	Ingestion	Sus. suicide	1	
482	15 y F	bupropion	A	Ingestion	Sus. suicide	1	
		clonidine					
		toptopiramateamax					
		fluoxetine					
		SSRI					
483 h	15 y F	bupropion	U	Ingestion	Sus. suicide	1	566 ng/mL in ns
		amitriptyline					
484 pa	18 y F	bupropion	U	Ingst+Derm	Sus. suicide	1	>20 mg/L @ autopsy
		MAO inhibitor					
485 a	20 y F	bupropion	A	Ingestion	Intent. Unk	1	>10,000 ng/mL in ns @ autopsy
		amphetamine					
		phencyclidine					
486 pa	21 y M	bupropion	A	Ingestion	Sus. suicide	1	2.0 mg/L @ autopsy
		dextromethorphan					2.6 mg/L @ autopsy
487 pa	21 y M	bupropion	A	Ingestion	Sus. suicide	1	
		lamotrigine					
488	24 y F	bupropion	A	Ingestion	Sus. suicide	1	
		quetiapine					
		duloxetine					
		lamotrigine					
489 a	27 y F	bupropion	A/C	Ingestion	Sus. suicide	1	
		cocaine					cocaine 2.3 mg/L @ autopsy
		amphetamine					methamphetamine 0.08 mg/L @ autopsy
490	31 y F	bupropion	A	Ingestion	Sus. suicide	2	
491	31 y F	bupropion	A	Ingestion	Sus. suicide	1	
492 ph	32 y F	bupropion	A/C	Ingestion	Sus. suicide	2	
		cyclobenzaprine					
		benzodiazepine					
493 p	34 y F	bupropion	U	Ingestion	Sus. suicide	1	
		ethanol, beverage					
		venlafaxine					
		clomiphene					
		naproxen					
		diclofenac					
		cold and cough preparations					
		pseudoephedrine					
494 ha	35 y M	bupropion	A	Ingestion	Sus. suicide	1	4.8 mg/L @ autopsy
		aripiprazole					
		lisinopril					
		citalopram					6.7 mg/L @ autopsy
		valproic acid					137 µg/mL in ns
495	36 y M	bupropion	A/C	Ingst-Asp	Sus. suicide	1	bupropion 3127 ng/mL @ autopsy
		beta blocker					metoprolol 167 ng/mL
		ibuprofen					
		lamotrigine					3.6 µg/mL @ autopsy
		carbon black					
496 pa	36 y F	bupropion	A	Ingestion	Sus. suicide	2	1.9 mg/L @ autopsy
497	36 y F	bupropion	A/C	Ingestion	Sus. suicide	1	
		clonazepam					
		toptopiramateamax					
		citalopram					
498	36 y M	bupropion	U	Ingestion	Sus. suicide	1	
		zyprexa					
499	38 y F	bupropion	A	Ingestion	Sus. suicide	1	
		ethanol, beverage					
500 a	40+y F	bupropion	A/C	Ingestion	Sus. suicide	1	0.2 mg/L in ns @ autopsy
		ethanol, beverage					0.164 g/dL in ns
501	45 y M	bupropion	A	Ingestion	Sus. suicide	1	
		sertraline					
502 a	50 y F	bupropion	A	Ingestion	Sus. suicide	1	0.06 mg/L @ autopsy
		cocaine					
		opioids/opioid antagonist					morphine 210 µg/mL @ autopsy
		antidepressants, tricyclic					
503	50 y M	bupropion	U	Ingestion	Sus. suicide	1	
		quetiapine					
		escitalopram					
504	54 y M	bupropion	A	Ingestion	Intent. Unk	2	
		erivastigmine					
		acamprosate					
		gabapentin					
		trazodone					
		benzodiazepine					
505 a	60 y M	bupropion	A/C	Ingestion	Sus. suicide	1	2.8 mg/L in ns
		diclofenac					0.16 mg/L in ns
506 h	61 y F	bupropion	A/C	Ingestion	Sus. suicide	1	3985 ng/mL @ <1 hr
507 h	79 y F	bupropion	A	Ingestion	Sus. suicide	2	
		zolpidem					
508 ha	40 y F	citalopram	A	Ingestion	Sus. suicide	2	1.1 mg/L in ns @ autopsy
		aspirin					
		benzodiazepine					

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Antidepressants, continued							
509	42 y F	duloxetine metaxalone methadone	A	Ingestion	Sus. suicide	1	
510 ph	44 y F	oxcarbazepine duloxetine bupropion ethanol, beverage thyroid preparation trazodone lamotrigine hydroxyzine ziprasidone cyproheptadine buspirone chlorpromazine penicillin chlordiazepoxide	A	Ingestion	Sus. suicide	1	
511	53 y F	duloxetine risperidone lamotrigine clonazepam zolpidem	A	Ingestion	Unint. Unk	2	
512	24 y M	escitalopram quetiapine alprazolam	U	Ingestion	Intent. Unk	2	
513	44 y F	lithium	C	Ingestion	Drug	3	
514 p	51 y M	lithium	A/C	Ingestion	Unknown	3	2.6 mEq/L
515	52 y F	lithium	A	Ingestion	General	2	4.0 mEq/L
516	55 y M	lithium aspirin valproic acid	U	Ingestion	Sus. suicide	3	3.9 meq/L in ns
517	62 y M	lithium	C	Ingestion	Drug	2	3.1 mEq/L in ns
518	75 y M	lithium	C	Ingestion	Drug	2	
519	77 y M	lithium	C	Ingestion	Thera. error	3	2.9 meq/L
520	Unk age M	paroxetine	U	Unknown	Intent. Unk	4	
521 pa	41 y M	paroxetine methadone alprazolam amitriptyline	A/C	Ingestion	Intent. Misuse	2	1782 ng/mL @ autopsy 35.7 ng/mL @ autopsy 122 ng/mL @ autopsy
522 ipa	53 y F	trazodone	U	Ingestion	Unknown	4	
523	Unk age M	venlafaxine gabapentin hydrocodone	A	Ingestion	Sus. suicide	1	
524 a	37 y F	venlafaxine hydrocodone/acetaminophen metformin & related diazepam glipizide gabapentin ramipril antihistamine/decongestant	A/C	Ingestion	Sus. suicide	2	10.4 µg/mL in ns
525	41 y F	venlafaxine	A	Ingestion	Sus. suicide	2	
526	47 y F	venlafaxine bupropion	A	Ingestion	Sus. suicide	2	
527 a	47 y F	venlafaxine phenytoin metoprolol benzodiazepine trazodone gabapentin	A/C	Ingestion	Sus. suicide	3	3.5 mg/L 12.6 mg/L in ns
528 ph	50 y F	venlafaxine valproic acid metformin atenolol	A	Ingestion	Sus. suicide	1	
529 ha	53 y F	venlafaxine tramadol pregabalin tizanidine	A/C	Ingestion	Sus. suicide	1	> 4 µg/mL @ autopsy > 4 µg/mL @ autopsy 14 µg/mL @ autopsy
530	54 y M	venlafaxine ethanol, beverage	A	Ingestion	Sus. suicide	2	
531	54 y M	venlafaxine	A/C	Ingestion	Sus. suicide	1	65.5 µg/mL in ns @ autopsy
532	55 y F	venlafaxine zolpidem atorvastatin thyroid preparation opioids/opioid antagonist benzodiazepine	A/C	Ingestion	Sus. suicide	2	
533 a	62 y F	venlafaxine bupropion alprazolam cetirizine	A	Ingestion	General	2	diazepam 0.99 mg/L

(Continued)

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**Table 21B.** Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
See also cases 13, 30, 126, 147, 233, 241, 269, 281, 287, 294, 297, 311, 333, 341, 413, 416, 435, 458, 461, 462, 463, 465, 474, 476, 479, 482, 484, 488, 493, 494, 497, 501, 503, 504, 510, 526, 527, 533, 541, 558, 584, 593, 595, 602, 615, 618, 619, 621, 622, 637, 650, 668, 672, 682, 684, 696, 700, 706, 708, 711, 718, 722, 727, 733, 749, 753, 755, 757, 760, 768, 769, 772, 773, 822, 828, 834, 835, 838, 839, 841, 844, 893, 895, 899, 907, 914, 917, 922, 935, 939, 955, 967, 968, 980, 981, 984, 985, 990, 992, 999, 1023, 1024, 1033, 1036, 1042, 1046, 1048, 1053, 1055, 1057, 1059, 1062, 1065, 1066, 1076, 1078, 1079, 1083, 1084, 1085, 1087, 1090, 1094, 1098, 1099, 1109, 1117, 1119, 1151, 1166, 1194, 1209							
Antihistamine/decongestant, without phenylpropanolamine							
534 ipa	2 y M	"antihistamine/decongestant"	A	Ingestion	Malicious	1	
535 a	16 y F	dextromethorphan	A	Ingestion	General	1	
536 p	20 y F	diphenhydramine	A	Ingestion	Sus. suicide	1	
537 i	<20 y U	pseudoephedrine	U	Ingestion	Unint. Unk	3	
See also cases 67, 233, 243, 266, 399, 486, 493, 524, 550, 569, 588, 590, 612, 901, 968, 980, 1062							
Antihistamines							
538	7 y M	antihistamine	U	Ingestion	Unknown	4	
539	11 m F	diphenhydramine	A	Ingestion	General	1	1.40 µg/mL in ns
540 a	12 m M	diphenhydramine	A	Ingestion	General	1	
541 p	24 y M	diphenhydramine SSRI	A	Ingestion	Sus. suicide	2	
542	27 y M	ethanol, beverage diphenhydramine	U	Ingestion	Sus. suicide	2	
543	32 y F	diphenhydramine codeine ethanol, beverage aspirin	A	Ingestion	Sus. suicide	2	
544 a	35 y M	diphenhydramine	A	Ingestion	Sus. suicide	1	16.6 µg/mL in ns @ autopsy
545 pa	36 y M	diphenhydramine	A	Ingestion	Sus. suicide	1	20.1 µg/mL
546 p	40 y F	diphenhydramine	A	Ingestion	Intent. Unk	2	
547 p	40 y M	diphenhydramine	A	Ingestion	Sus. suicide	2	
548	44 y M	cyclobenzaprine diphenhydramine	A	Ingestion	Sus. suicide	3	
549 pa	45 y M	diphenhydramine	U	Ingestion	Sus. suicide	1	13 mg/L @ autopsy
550 h	48 y M	diphenhydramine	A	Ingestion	Sus. suicide	1	
551 p	50+y F	antihistamine/decongestant diphenhydramine	U	Ingestion	Sus. suicide	2	
552	59 y M	diphenhydramine	A	Ingestion	Sus. suicide	2	
553 ip	61 y F	diphenhydramine	A	Ingestion	Sus. suicide	2	
554	4 y F	promethazine	C	Ingestion	Thera. error	3	
See also cases 82, 390, 391, 458, 463, 465, 476, 479, 510, 533, 560, 595, 625, 646, 682, 716, 750, 755, 772, 814, 831, 834, 841, 924, 938, 956, 960, 975, 994, 1023, 1045, 1076, 1077, 1087, 1090, 1116, 1132							
555	30+y M	antineoplastic antimicrobial, systemic	U	Parenteral	Drug	2	
556	54 y F	antineoplastic	C	Ingestion	Drug	2	
See also cases 623, 669, 994							
Antituberculars							
557	3 y M	isoniazid	C	Ingestion	General	2	
558 pa	49 y F	isoniazid fluoxetine	A/C	Ingestion	Sus. suicide	1	3.93 µg/mL in ns @ autopsy
See also case 238							
Antivirals							
559	30 y F	amantadine ziprasidone ibuprofen	A	Ingestion	Sus. suicide	1	
See also cases 555, 793, 1033, 1092, 1094							
Aspirin alone							
560 a	19 y F	acetaminophen diphenhydramine	A	Ingestion	Sus. suicide	2	
561	21 y F	acetaminophen hydrocodone/acetaminophen ibuprofen cyclobenzaprine	A	Ingestion	Sus. suicide	1	29 µg/mL in ns
562	36 y M	acetaminophen	A/C	Ingestion	Thera. error	1	
563 ha	41 y F	acetaminophen clonazepam	U	Ingestion	General	1	
564 a	71 y F	acetaminophen	C	Ingestion	Sus. suicide	1	
565 a	89 y M	acetaminophen	A	Ingestion	General	2	
566 p	14 y M	aspirin	A	Unknown	Unknown	4	5.5 mg/dL in ns
567	16 y F	aspirin amphetamine acetaminophen	A	Ingestion	Sus. suicide	1	aspirin 90 mg/dL in ns @ 5 h
568	19 y M	aspirin acetaminophen ethanol, beverage	A	Ingestion	Sus. suicide	2	90.3 mg/dL in ns @ 5 h 46.8 mg/d 542.3 µg/mL in ns ethanol 80 mg/dL in ns
569 pa	20 y M	ibuprofen aspirin pseudoephedrine	A	Ingestion	Sus. suicide	1	832 mg/L 5.30 µg/mL @ autopsy
570 a	22 y F	ibuprofen aspirin acetaminophen	A	Ingestion	Sus. suicide	1	1918 mg/L @ autopsy 44.6 mg/L @ autopsy
571	25 y M	belladonna alkaloids/phenobarbital venlafaxine aspirin	A	Ingestion	Sus. suicide	1	phenobarbital 11.7 mg/L @ autopsy 0.95 mg/L @ autopsy

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Aspirin alone, continued 572	26 y M	aspirin carisoprodol oxycodone/acetaminophen oxycodone	A	Ingestion	Sus. suicide	1	93 mg/dL in ns
573	30 y F	aspirin	A	Ingestion	Sus. suicide	1	88 mg/dL in ns
574	31 y M	aspirin cocaine ethanol, beverage cyclobenzaprine	A/C	Ingst+Inhal	Abuse	1	76 mg/dL
575 ha	31 y M	aspirin phenothiazine	A	Ingst+Par	Sus. suicide	1	109 mg/dL @ autopsy
576	33 y M	aspirin quetiapine clonazepam	A	Ingestion	Sus. suicide	1	122 mg/dL in ns aspirin 490 mg/L @ autopsy 0.1 mg/L @ autopsy
577 a	33 y M	aspirin	A	Ingestion	Sus. suicide	1	
578 h	33 y M	aspirin ziprasidone gabapentin	U	Ingestion	Sus. suicide	1	112 mg/dL in ns
579 a	35 y F	aspirin acetaminophen ibuprofen	A	Ingestion	Sus. suicide	1	96 mg/dL @ 12 hr 99 µg/mL @ 4.5 h
580 p	38 y F	aspirin hydrocodone/acetaminophen cyclobenzaprine	A	Ingestion	Abuse	4	50 mg/L in ns
581 ph	43 y F	aspirin acetaminophen	A	Ingestion	Sus. suicide	1	223 mg/dL in ns 91 mg/L in ns
582 ha	45 y F	aspirin	A	Ingestion	Sus. suicide	1	130 mg/dL in ns @ >3h aspirin 82 mg/dL @ autopsy
583	48 y F	ethanol, beverage aspirin	U	Ingestion	Sus. suicide	1	>120 mg/dL in ns
584	49 y M	benzodiazepine aspirin venlafaxine gabapentin amlodipine diazepam imipramine beta blocker lisinopril hydrochlorothiazide	A/C	Ingestion	Sus. suicide	2	
585 a	50 y F	aspirin unknown drug	U	Ingst+Unk	General	2	8.6 mg/dL in ns
586	50 y M	aspirin sodium bicarbonate ethanol benzodiazepine	A	Ingestion	Sus. suicide	1	97 mg/dL in ns @ 7-8 hr
587	52 y M	aspirin	A	Ingestion	Sus. suicide	1	99.3 mg/dL in ns
588	57 y M	aspirin antihistamine/decongestant acetaminophen	A	Ingestion	Sus. suicide	1	127 mg/dL diphenhydramine 0.24 mg/L 21.7 µg/mL
589	62 y F	aspirin acetaminophen ethanol, beverage	A	Ingestion	Sus. suicide	4	43 mg/dL in ns 210 µg/mL in ns 8 mg/dL
590 i	62 y M	aspirin ibuprofen pseudoephedrine amoxicillin dextromethorphan	A	Ingestion	Sus. suicide	2	
591	62 y M	aspirin	A	Ingestion	Sus. suicide	2	102 mg/dL in ns
592 h	65 y F	aspirin	A/C	Ingestion	Intent. Unk	1	> 80 mg/dL in ns
593	66 y F	aspirin quetiapine carvedilol citalopram	A/C	Ingestion	Sus. suicide	1	82 mg/dL in ns
594	66 y M	aspirin acetaminophen ethanol, beverage	A	Ingestion	Sus. suicide	1	84 mg/dL in ns 45 mg/L in ns
595	73 y F	aspirin venlafaxine diphenhydramine	A	Ingestion	Sus. suicide	1	47.2 mg/L in ns
596	79 y F	aspirin	A/C	Ingestion	General	2	54.9 mg/dL in ns
597 h	80 y F	aspirin acetaminophen	C	Ingestion	Intent. Misuse	2	69 mg/dL in ns 110 µg/mL in ns
598	83 y F	aspirin	A	Ingestion	Sus. suicide	3	57 mg/dL
See also cases 29, 241, 282, 304, 353, 367, 382, 401, 403, 434, 451, 508, 516, 543, 718, 775, 914, 952, 1076, 1195, 1219							
Aspirin in combination							
599	82 y M	aspirin in combination	C	Ingestion	Unknown	3	13.2 mg/dL in ns
600 a	53 y F	butalbital/aspirin/caffeine morphine hydrochlorothiazide	U	Ingestion	Sus. suicide	3	

(Continued)

**Table 21B.** Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
See also cases 705, 708, 787, 1200							
Asthma therapies							
601	46 y F	aminophylline/theophylline metoprolol diazepam quetiapine	A/C	Ingestion	Sus. suicide	1	79 µg/mL in ns
602	73 y F	aminophylline/theophylline corticosteroid paroxetine	A	Ingestion	Sus. suicide	1	71 mg/dL in ns
603	78 y F	aminophylline/theophylline	C	Ingestion	Unint. Unk	4	
604 p	63 y M	terbutaline	A	Other	Thera. error	4	
605	85 y M	theophylline/ephedrine	A	Ingestion	Sus. suicide	1	66 µg/mL in ns
See also cases 461, 769, 1094							
Barbiturates							
606	>20 y M	barbenyl acetaminophen	A/C	Ingestion	Sus. suicide	4	
607 p	41 y F	barbenyl	A/C	Ingestion	Intent. Unk	2	phenobarbital 4.5 mg/L
608 p	47 y M	barbenyl cocaine	A	Ingestion	Unknown	2	phenobarbital 52 µg/mL in ns
609	48 y M	barbiturates, long acting ethanol, beverage	A	Ingestion	Sus. suicide	2	
610 p	48 y M	phenobarbital temazepam zolpidem cocaine	U	Ingst+Unk	Sus. suicide	2	22.5 µg/mL in ns
611 p	51 y F	phenobarbital	A/C	Ingestion	Sus. suicide	3	
See also cases 311, 570, 627, 742, 767							
Cardiovascular drugs							
612 h	23 y F	ACE inhibitor pseudoephedrine acetaminophen/aspirin/caffeine	A/C	Ingestion	Sus. suicide	2	aspirin 18 mg/dL in ns @ ~15 h acetaminophen 48 µg/mL in ns @ ~15 h
613	29 y F	ACE inhibitor sedative/hypnotics/antipsychotics	A	Ingestion	Sus. suicide	2	
614 ph	11 y F	acebutolol	A	Ingestion	Malicious	2	
615 h	83 y F	amiodarone fluoxetine alprazolam atorvastatin	A/C	Ingst-Asp	Sus. suicide	2	
616	40 y F	amlodipine diltiazem alprazolam	A/C	Ingestion	Sus. suicide	1	
617 h	61 y M	amlodipine metoprolol amiodarone	C	Ingestion	Thera. error	2	
618	67 y M	amlodipine/benazepril citalopram ethanol, beverage	A/C	Ingestion	Sus. suicide	1	
619 a	89 y F	hydrochlorothiazide amlodipine/benazepril hydrocodone/acetaminophen nitrate, long-acting alprazolam	A/C	Ingestion	Sus. suicide	2	hydrocodone 0.23 mg/L 0.041 mg/L 0.40 mg/L
620 p	40 y M	citalopram atenolol lisinopril amphetamine	A	Ingestion	Sus. suicide	3	
621	56 y F	lorazepam atenolol clonazepam citalopram	A	Ingestion	Sus. suicide	1	
622 p	60 y F	atenolol citalopram valproic acid hydrocodone/acetaminophen	A/C	Ingestion	Sus. suicide	1	
623	61 y F	naproxen atenolol antineoplastic	A/C	Ingestion	Sus. suicide	2	
624	81 y M	atenolol	A/C	Ingestion	Thera. error	4	
625 a	36 y F	atenolol/chlorthalidone enalapril ranitidine androgen	A	Ingestion	Sus. suicide	1	
626 a	36 y F	beta blocker ethanol, beverage	U	Ingestion	Sus. suicide	1	propranolol 5.8 µg/mL ethanol 0.15 g%
627 p	43 y F	beta blocker barbiturates, long acting propoxyphene/acetaminophen	A/C	Ingestion	Sus. suicide	3	
628 ph	43 y M	beta blocker ethanol, beverage	A/C	Ingestion	Sus. suicide	2	
629 a	44 y M	beta blocker nifedipine	U	Ingestion	Sus. suicide	2	metoprolol 8.10 mg/L in liver @ autopsy

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Cardiovascular drugs, continued							
630 i	49 y F	beta blocker hydromorphone	A/C	Ingestion	Sus. suicide	2	
631 p	52 y M	beta blocker	A/C	Ingestion	Sus. suicide	2	
632	53 y M	beta blocker calcium antagonist angiotensin receptor blocker	A/C	Ingestion	Sus. suicide	1	
633	60 y F	beta blocker benzodiazepine	A	Ingestion	Sus. suicide	1	
634	69 y F	beta blocker	C	Ingestion	Drug	2	
635	85 y F	beta blocker nifedipine	A/C	Ingestion	Sus. suicide	2	
636 pa	Unk age F	calcium antagonist cardiac glycoside	U	Unknown	General	2	diltiazem 16 µg/mL @ autopsy
637 pa	20+y M	calcium antagonist citalopram	A	Ingestion	Sus. suicide	1	diltiazem 658 mg/mL @ autopsy 275.8 ng/mL @ autopsy
638 p	38 y M	calcium antagonist	A	Ingestion	Sus. suicide	1	
639	53 y F	calcium antagonist benzodiazepine	A	Ingestion	Sus. suicide	2	
640 ph	61 y M	cardiac glycoside phenytoin	U	Ingestion	Unint. Unk	3	digoxin 3.0 ng/mL in ns 6.4 µg/mL in ns
641 p	62 y M	cardiac glycoside	C	Ingestion	Drug	2	digoxin 2.4 ng/mL
642	66 y F	cardiac glycoside	U	Ingestion	Drug	3	digoxin 4.3 ng/mL
643	66 y F	cardiac glycoside	C	Ingestion	Unknown	4	digoxin 6.2 ng/mL
644	66 y M	cardiac glycoside	C	Ingestion	Drug	2	digoxin 4.3 ng/mL in ns @ chronic
645 h	68 y M	cardiac glycoside	A	Ingestion	Intent. Unk	2	digoxin 5.4 ng/mL in ns
646	71 y F	cardiac glycoside clonidine calcium antagonist lisinopril carvedilol atorvastatin famotidine	U	Ingestion	Drug	4	
647 p	70+y M	cardiac glycoside	A	Ingestion	Unint. Unk	3	digoxin 3.19 µg/L in ns
648	71 y M	cardiac glycoside	C	Ingestion	Thera. error	2	digoxin 10 ng/mL @ chronic
649 a	80 y M	cardiac glycoside	A/C	Ingestion	Drug	2	digoxin 3.2 ng/mL in ns
650	82 y M	cardiac glycoside carvedilol potassium ferrous sulfate furosemide amiodarone ramipril warfarin fluoxetine	U	Ingestion	Drug	4	
651	84 y F	cardiac glycoside	C	Ingestion	Drug	2	digoxin 4.2 ng/mL in ns
652 p	85 y F	cardiac glycoside	C	Ingestion	Drug	3	
653	85 y F	cardiac glycoside furosemide amitriptyline benzodiazepine oxycodone	A/C	Unknown	Unknown	4	digoxin 1.1 ng/mL
654	86 y M	cardiac glycoside warfarin	C	Ingestion	Drug	2	digoxin 4.8 ng/mL in ns
655 h	87 y F	cardiac glycoside	C	Ingestion	Drug	3	digoxin 5.2 ng/mL in ns @ chronic
656	89 y M	cardiac glycoside	C	Ingestion	Drug	4	digoxin 3.02 nmol/L in ns
657	91 y F	cardiac glycoside	C	Ingestion	Drug	3	digoxin 3.6 ng/mL
658	94 y F	cardiac glycoside	C	Ingestion	Drug	3	
659 h	99 y F	cardiac glycoside	C	Ingestion	Thera. error	4	digoxin 7.6 ng/mL in ns
660 p	25 y F	clonidine olmesartan pregabalin nitroglycerin ezetimibe	A	Ingestion	Sus. suicide	1	
661	66 y F	digoxin	C	Ingestion	Drug	2	4.4 ng/mL
662 h	70 y F	digoxin	A/C	Ingestion	Thera. error	3	
663	81 y M	digoxin	C	Ingestion	Drug	4	3.1 ng/mL @ chronic
664	87 y F	digoxin	A/C	Ingestion	Unknown	3	8.0 µg/mL in ns
665	19 y F	diltiazem	A	Ingestion	Sus. suicide	1	
666	19 y F	diltiazem	A	Ingestion	Sus. suicide	1	
667	>20 y M	diltiazem alprazolam hydrocodone/acetaminophen oxycodone/acetaminophen	A/C	Ingestion	Sus. suicide	2	
668	28 y F	diltiazem bupropion quetiapine clonidine ziprasidone gabapentin tizanidine duloxetine	A/C	Ingestion	Sus. suicide	1	

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Cardiovascular drugs, continued							
669 ha	36 y F	diltiazem quetiapine methotrexate diuretic opioids/opioid antagonist marijuana	A	Ingestion	Sus. suicide	1	
670	37 y M	diltiazem fosinopril celecoxib ramipril propoxyphene/acetaminophen olmesartan	A	Ingestion	Sus. suicide	2	
671	39 y M	diltiazem	A	Ingestion	Sus. suicide	1	
672	41 y F	diltiazem naproxen fluoxetine	A/C	Ingestion	Sus. suicide	2	
673 pa	42 y M	diltiazem propranolol	A	Ingestion	Sus. suicide	1	
674 pha	45 y F	diltiazem zolpidem	A/C	Ingestion	Sus. suicide	1	760 µg/mL in ns @ autopsy
675	47 y M	diltiazem	A	Ingestion	Sus. suicide	1	
676	47 y M	diltiazem cardiac glycoside warfarin atorvastatin hydrochlorothiazide ACE inhibitor	A/C	Ingestion	Sus. suicide	1	
677 a	50 y M	diltiazem metoprolol	A	Ingestion	Sus. suicide	1	400 ng/mL @ autopsy 24 mg/L @ autopsy
678 pa	50 y F	diltiazem	A/C	Ingestion	Sus. suicide	1	diltiazem 81 mg/kg in liver @ autopsy
679	52 y F	unknown drug ethanol, beverage diltiazem olanzapine/fluoxetine	A	Ingestion	Sus. suicide	1	75 mg/dL in ns
680	53 y M	diltiazem	C	Ingestion	Drug	3	
681 p	53 y F	diltiazem gabapentin clonazepam zolpidem	U	Ingestion	Unknown	3	
682	54 y F	diltiazem venlafaxine cyclobenzaprine hydroxyzine	A	Ingestion	Sus. suicide	1	
683 h	57 y M	diltiazem metoprolol ramipril	C	Ingestion	Sus. suicide	1	
684	67 y F	diltiazem nitrate, long-acting venlafaxine buspirone alprazolam tramadol	A/C	Ingestion	Sus. suicide	2	
685 h	76 y F	atorvastatin diltiazem atenolol thiazolidinedione clopidogrel thiazide thyroid preparation	A	Ingestion	Thera. error	3	
686 a	79 y F	diltiazem	A/C	Ingestion	Thera. error	2	
687	80 y F	diltiazem	A/C	Ingestion	Sus. suicide	1	
688 h	87 y F	diltiazem metoprolol benzodiazepine	A/C	Ingestion	Sus. suicide	1	
689	89 y M	diltiazem warfarin	A	Ingestion	Sus. suicide	1	
690 p	43 y F	flecainide	A	Ingestion	Sus. suicide	1	
691	50 y F	flecainide	C	Ingestion	Drug	1	4.02 µg/mL
692 h	61 y M	losartan atenolol glipizide atorvastatin metoprolol losartan	A/C	Ingestion	Sus. suicide	3	
693	25 y M	cardiac glycoside metoprolol disopyramide metoprolol lamotrigine	U	Ingestion	Sus. suicide	2	
694	27 y M	metoprolol	A/C	Ingestion	Sus. suicide	1	
695 p	36 y F	metoprolol lamotrigine	U	Ingestion	Unknown	4	

(Continued)

**Table 21B.** Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Cardiovascular drugs, continued							
696 ipa	42 y F	metoprolol tramadol sertraline	U	Ingestion	Unknown	2	0.41 µg/mL in ns @ autopsy 1.3 µg/mL in ns @ autopsy 20 µg/mL in ns @ autopsy
697 h	50 y F	metoprolol glipizide metformin & related acetaminophen	A/C	Ingestion	Sus. suicide	1	89 µg/mL in ns @ 3 h
698 p	52 y F	metoprolol amlodipine	U	Ingestion	Sus. suicide	2	
699 p	54 y F	metoprolol tizanidine	A/C	Ingestion	Sus. suicide	2	
700	>20 y F	nifedipine venlafaxine	A/C	Ingestion	Sus. suicide	2	
701	24 y M	quinapril nifedipine	A	Ingestion	Sus. suicide	2	
702 p	56 y M	acetaminophen nifedipine diazepam	A/C	Ingestion	Sus. suicide	3	
703	22 y M	glipizide propranolol propafenone cardiac glycoside beta blocker diltiazem	A/C	Ingestion	Sus. suicide	2	
704 h	39 y M	propafenone	C	Ingestion	Drug	3	
705 ph	52 y M	propafenone cardiac glycoside carvedilol acetaminophen/opioid temazepam oxazepam diuretic, potassium sparing warfarin	A	Ingestion	Sus. suicide	2	
706	29 y F	ibuprofen propranolol gabapentin bupropion clonazepam	A	Ingestion	Sus. suicide	1	
707	52 y F	trandolapril	A/C	Ingestion	Sus. suicide	1	
708	51 y M	valsartan finasteride dipyridamole/aspirin levetiracetam sertraline nitrate, long-acting furosemide ezetimibe/simvastatin metolazone	A/C	Ingestion	Sus. suicide	3	
709 h	35 y M	verapamil lisinopril lamotrigine cocaine	A/C	Ingestion	Sus. suicide	2	
710 ha	37 y F	verapamil pregabalin	A	Ingestion	Sus. suicide	1	5.3 mg/L in ns @ autopsy
711	42 y M	verapamil venlafaxine nitrate, long-acting	A/C	Ingestion	Sus. suicide	1	
712	49 y M	verapamil warfarin	A/C	Ingestion	Sus. suicide	1	
713 a	51 y F	verapamil	A/C	Ingestion	Sus. suicide	1	2.10 mg/L 4.80 mg/L in gastric @ autopsy
714	51 y M	alprazolam verapamil	A	Ingestion	Sus. suicide	1	
715 pha	52 y F	verapamil hydrocodone/acetaminophen amitriptyline	A/C	Ingestion	Sus. suicide	3	
716	53 y M	verapamil fosinopril diphenhydramine	A/C	Ingestion	Sus. suicide	2	
717	54 y F	verapamil	A/C	Ingestion	Sus. suicide	2	
718 ha	55 y M	verapamil gabapentin risperidone hydrocodone/acetaminophen mirtazapine acetaminophen pravastatin	A	Ingestion	Sus. suicide	2	
719	56 y F	verapamil	A	Ingestion	Sus. suicide	1	
720	56 y F	verapamil metoprolol diuretic	A	Ingestion	Sus. suicide	1	

(Continued)

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**Table 21B.** Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Cardiovascular drugs, continued							
721	57 y M	verapamil ethylene glycol ethanol, beverage	U	Ingestion	Sus. suicide	1	
722	58 y M	verapamil hydrochlorothiazide lisinopril sertraline clonazepam	A	Ingestion	Sus. suicide	2	
723	76 y F	verapamil beta blocker diazepam	A/C	Ingestion	General	2	
724 a	89 y F	verapamil potassium	A	Ingestion	Sus. suicide	1	6.7 mg/L @ autopsy
725	91 y F	verapamil	A/C	Ingestion	Sus. suicide	1	
726	91 y F	verapamil	A	Ingestion	Drug	2	
See also cases 266, 317, 339, 341, 343, 390, 414, 416, 458, 461, 465, 476, 482, 494, 495, 524, 527, 528, 532, 584, 593, 601, 615, 616, 617, 619, 620, 625, 629, 632, 635, 636, 646, 650, 660, 668, 670, 673, 676, 677, 683, 684, 685, 688, 692, 693, 694, 698, 700, 702, 703, 705, 708, 709, 716, 718, 720, 722, 723, 737, 740, 743, 744, 749, 750, 769, 773, 775, 776, 781, 800, 806, 807, 831, 834, 839, 902, 907, 910, 914, 918, 924, 934, 935, 986, 990, 1008, 1009, 1013, 1025, 1076, 1087, 1092, 1094, 1200							
Cold and cough preparations							
727 ip	23 y M	dextromethorphan escitalopram	A	Ingestion	Sus. suicide	2	
728 p	31 y M	dextromethorphan alprazolam ethanol, beverage	A	Ingestion	Abuse	1	
See also cases 493, 590, 1062, 1064, 1080							
Cultural medicines							
729	39 y F	dietary supplements/herbal	U	Ingestion	Unknown	2	
Cyclic antidepressants							
730 pa	2 y F	amitriptyline	A	Ingestion	General	1	1.3 mg/L amitriptyline 28 mg/kg in liver @ autopsy 5.2 mg/kg in liver @ autopsy
731	5 y F	cyclobenzaprine amitriptyline	A	Ingestion	Malicious	1	
732	20 y M	cyclobenzaprine amitriptyline methadone opioids/opioid antagonist marijuana	A	Ingst+Inhal	Sus. suicide	2	
733 p	30 y F	amitriptyline methadone cocaine escitalopram chloral hydrate clonazepam	A/C	Ingst+Par	Sus. suicide	1	
734	32 y F	amitriptyline	A/C	Ingestion	Sus. suicide	2	
735	42 y F	amitriptyline acetaminophen/diphenhydramine	A	Ingestion	Sus. suicide	2	
736	43 y F	amitriptyline	A	Ingestion	Sus. suicide	1	
737 pa	43 y F	amitriptyline metoprolol tramadol hydrocodone/acetaminophen metaxalone hydrochlorothiazide	A	Ingestion	Sus. suicide	1	
738 pha	43 y F	amitriptyline quetiapine alprazolam	A/C	Ingestion	Sus. suicide	1	4.98 µg/mL in ns @ autopsy
739 p	45 y F	amitriptyline	A/C	Ingestion	Sus. suicide	2	
740 a	46 y M	amitriptyline beta blocker amphetamine	A	Ingestion	Sus. suicide	1	0.005 mg/L in ns @ autopsy methamphetamine 0.063 mg/L in ns @ autopsy
741	48 y F	lisinopril acetaminophen amitriptyline hydrocodone/acetaminophen lorazepam	A/C	Ingestion	Unknown	2	
742	51 y M	butalbital/acetaminophen/caffeine amitriptyline dihydrocodone benzodiazepine butalbital	A	Ingestion	Unknown	2	114 ng/mL 565 ng/mL barbiturates, long acting 1.63 µg/mL
743	51 y M	ethanol, beverage caffeine ibuprofen amitriptyline clonidine metoprolol minoxidil	C	Ingestion	Unknown	4	
744 p	52 y F	amitriptyline	A/C	Ingestion	Sus. suicide	2	

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Cyclic antidepressants, continued							
745 pa	52 y F	verapamil gabapentin prochlorperazine diazepam baclofen methadone amitriptyline	U	Unknown	Sus. suicide	1	2.40 µg/mL @ autopsy nortriptyline 1.00 µg/mL
746	53 y M	opioids/opioid antagonist piroxicam	A/C	Ingst-Asp	Sus. suicide	2	
747 p	54 y F	amitriptyline	U	Ingestion	Sus. suicide	2	
748 p	58 y F	benzodiazepine amitriptyline	A/C	Ingestion	Sus. suicide	1	antidepressants, tricyclic 1211 ng/mL acetaminophen 63 µg/mL
749	59 y F	propoxyphene/acetaminophen fentanyl thyroid preparation amitriptyline beta blocker escitalopram hydralazine amphetamine	U	Ingestion	Sus. suicide	1	
750 ha	65 y F	amitriptyline calcium antagonist antipsychotic, atypical buspirone oxycodone cox-2 inhibitor hydrochlorothiazide antihyperlipidemic antihistamine clonazepam	U	Ingestion	Sus. suicide	1	8.86 µg/mL @ autopsy  278 ng/mL @ autopsy
751 pa	67 y M	amitriptyline	A/C	Ingestion	Sus. suicide	1	4.1 mg/L @ autopsy nortriptyline 1.1 mg/L
752 p	68 y M	amitriptyline	A	Ingestion	Sus. suicide	2	
753 pa	74 y M	hydrocodone/acetaminophen amitriptyline and perphenazine venlafaxine propoxyphene clonazepam L-dopa & related morphine acetaminophen	A	Ingestion	Sus. suicide	2	
754	>20 y M	antidepressants, tricyclic	A	Ingestion	Sus. suicide	1	93 mg/L in ns
755	24 y M	antidepressants, tricyclic diphenhydramine paroxetine cephalexin	A/C	Ingestion	Sus. suicide	1	
756 p	32 y M	antidepressants, tricyclic opioids/opioid antagonist marijuana	A	Ingst+Inhal	Sus. suicide	2	
757 ha	39 y M	antidepressants, tricyclic fluoxetine	A	Unknown	Drug	2	
758 p	40 y M	antidepressants, tricyclic	A	Unknown	Unknown	2	
759	49 y F	antidepressants, tricyclic acetaminophen	A	Ingestion	Sus. suicide	2	
760	50 y F	antidepressants, tricyclic clozapine duloxetine lamotrigine	A/C	Ingestion	Sus. suicide	2	
761 p	54 y F	antidepressants, tricyclic benzodiazepine	A	Ingestion	Sus. suicide	2	
762	78 y F	cyclic antidepressant+phenothiazine	A/C	Ingestion	Sus. suicide	1	
763 ha	68 y M	desipramine	A/C	Ingestion	Sus. suicide	2	1.05 mg/L @ autopsy desipramine 154 mg/kg in gastric @ autopsy
764 p	>20 y F	doxepin trimethobenzamide	A	Ingestion	Sus. suicide	2	
765	27 y M	doxepin	A	Ingestion	Sus. suicide	2	
766 ha	29 y F	doxepin desipramine quetiapine	A	Ingestion	Sus. suicide	1	
767 h	33 y F	doxepin nortriptyline acetaminophen barbiturates, long acting benzodiazepine opioids/opioid antagonist	A/C	Ingestion	Sus. suicide	1	134 µg/mL in ns
768	49 y M	doxepin SSRI benzodiazepine	A	Ingestion	Sus. suicide	2	

(Continued)

**Table 21B.** Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Cyclic antidepressants, continued							
769 ph	54 y F	doxepin citalopram trazodone flurazepam acetaminophen duloxetine fluoxetine montelukast fenofibrate	A/C	Ingestion	Sus. suicide	2	
770	82 y F	doxepin	A	Ingestion	Sus. suicide	2	
771	23 y M	loxapine	A/C	Ingestion	Sus. suicide	2	
772	40 y F	nortriptyline cyproheptadine fluoxetine	A	Ingestion	Sus. suicide	3	
773	44 y M	diphenhydramine nortriptyline metformin & related glipizide lisinopril duloxetine	A/C	Ingestion	Sus. suicide	1	760 ng/mL @ autopsy metformin 12 µg/mL @ autopsy
See also cases 143, 245, 261, 278, 307, 327, 435, 483, 502, 521, 570, 584, 653, 715, 766, 767, 802, 839, 844, 919, 927, 937, 939, 947, 949, 981, 984, 992, 1041, 1058, 1160							
Diet aids							
774 pa	37 y F	stimulants and street drugs	U	Ingestion	Drug	3	amphetamine 0.51 mg/kg @ autopsy amphetamine 1.6 mg/kg in liver @ autopsy
See also case 995							
Diuretics							
775	64 y M	bumetanide ezetimibe/simvastatin potassium metformin acetaminophen	A	Ingestion	Sus. suicide	4	
776 p	50 y F	furosemide unknown drug ibuprofen	A	Ingestion	Sus. suicide	1	
777 h	78 y M	cardiac glycoside furosemide ibuprofen	C	Ingestion	Drug	3	digoxin 7.5 ng/mL in ns
See also cases 461, 465, 584, 600, 618, 650, 653, 669, 676, 685, 705, 708, 720, 722, 737, 750, 934, 938, 991, 1083							
Electrolytes and minerals							
778	35 y F	mineral/herbal supplement dietary supplements/herbal	C	Ingestion	Drug	4	
779 h	3 y F	sodium bicarbonate	A	Ingestion	Unknown	1	
780	20 d F	zinc	A	Parenteral	Thera. error	2	
See also cases 266, 586, 650, 724, 775, 938, 977							
Hormones and hormone antagonists							
781 p	21 y M	alprostadil isoflurane succinylcholine nitric oxide propofol fentanyl papaverine	A	Parenteral	Drug	1	
782 h	34 y F	insulin	A/C	Parenteral	Sus. suicide	1	
783 a	52 y M	insulin	A/C	Parenteral	Sus. suicide	2	
784 p	70 y M	ethanol, beverage insulin pyrazolopyrimidine	A/C	Ingst+Par	Sus. suicide	2	
785 h	78 y M	insulin	A/C	Parenteral	Malicious	4	
See also cases 24, 147, 461, 493, 510, 532, 602, 625, 685, 748, 901, 934, 938, 1087, 1094							
Inhalation anesthetics							
786	27 y M	isoflurane	A	Ingst+Inhal	Abuse	1	
787 ph	39 y M	sevoflurane codeine	A	Ingst+Inhal	Abuse	1	
See also case 781							
Local/topical anesthetics							
788 p	24 y F	lidocaine	A	Ingestion	Intent. Misuse	1	
Miscellaneous drugs							
789 h	54 y M	allopurinol colchicine probenicid disulfiram unknown drug ethanol, beverage	C	Ingestion	Drug	1	
790 ip	33 y M	unknown drug	A/C	Ingestion	Sus. suicide	3	
791 ip	48 y M	donepezil	U	Unknown	Unknown	2	
792	88 y M	donepezil	C	Ingestion	Drug	4	
793 h	44 y M	ropinirole lamotrigine donepezil tacrine amantadine metaxalone clonazepam	U	Ingestion	Drug	1	

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Miscellaneous drugs, continued							
794	56 y F	memantine bromocriptine succinylcholine	A	Inhalation	Drug	4	
See also cases 30, 208, 462, 504, 708, 753, 781, 789, 793, 861, 867, 903, 914, 968, 1013, 1024, 1065, 1092							
Muscle relaxants							
795 ha	29 y M	baclofen	A	Ingestion	Withdrawal	4	1.1 µg/mL
796 a	45 y F	mushrooms-hallucinogenic	A/C	Ingestion	Intent. Misuse	2	psilocin > 200 µg/L
797 p	23 y M	carisoprodol	A	Ingestion	Sus. suicide	2	0.45 µg/mL
798 p	24 y F	alprazolam methadone carisoprodol	A	Ingestion	Sus. suicide	1	
799 pa	40 y F	clonazepam alprazolam carisoprodol	A/C	Ingestion	Sus. suicide	1	39 mg/L @ autopsy 0.28 mg/L @ autopsy 0.64 mg/L @ autopsy
800 p	41 y M	alprazolam zolpidem carisoprodol	A	Ingestion	Sus. suicide	2	
801 pa	41 y F	clonidine carisoprodol	A/C	Ingestion	Sus. suicide	1	18 mg/L
802 ph	41 y F	ethanol, beverage carisoprodol antidepressants, tricyclic	A	Ingst+Inhal	Sus. suicide	2	104 mg/dL
803 pa	42 y F	marijuana benzodiazepine carisoprodol	A	Ingestion	Sus. suicide	1	
804	44 y F	ethanol, beverage carisoprodol	A/C	Ingestion	Sus. suicide	1	
805	53 y F	carisoprodol	A	Ingestion	General	3	
806 p	41 y M	acetaminophen/opioids gabapentin cyclobenzaprine unknown drug	A	Ingestion	Sus. suicide	2	
807 pa	43 y F	clonidine enalapril hydrocodone/acetaminophen cyclobenzaprine	U	Ingestion	Intent. Unk	2	0.12 mg/L @ autopsy 0.71 mg/L @ autopsy hydrocodone 0.24 mg/L @ autopsy
808	45 y M	olanzapine opioids/opioid antagonist acetaminophen gemfibrozil	A/C	Ingst-Asp	Intent. Unk	2	
809	46 y F	cyclobenzaprine ethanol, beverage cyclobenzaprine propoxyphene/acetaminophen	A	Ingestion	Sus. suicide	2	acetaminophen 268 µg/mL in ns
810 p	66 y F	zolpidem cyclobenzaprine	U	Ingestion	Sus. suicide	3	
811	69 y M	benzodiazepine hydrocodone/acetaminophen cyclobenzaprine	A/C	Ingestion	Unknown	3	
812 ip	45 y M	tramadol skeletal muscle relaxants hydrocodone oxycodone diazepam oxazepam benzodiazepine	A	Unknown	Abuse	2	carisoprodol 19.9 µg/ml @ autopsy 21 ng/mL in ns @ autopsy 94 ng/mL in ns @ autopsy 1061 ng/mL in ns @ autopsy 68 ng/m in ns @ autopsy clonazepam 47.8 ng/mL in ns @ autopsy
See also cases 44, 256, 270, 273, 278, 285, 286, 290, 293, 298, 307, 310, 312, 313, 314, 319, 323, 327, 328, 369, 373, 382, 448, 492, 509, 529, 547, 561, 572, 574, 580, 668, 682, 699, 730, 731, 737, 744, 793, 828, 831, 838, 839, 841, 891, 896, 906, 918, 922, 924, 934, 938, 960, 963, 965, 966, 967, 968, 970, 971, 975, 977, 979, 985, 986, 996, 1029, 1043, 1066, 1087, 1094, 1174, 1194							
Opioids							
813 p	2 y F	codeine	C	Ingestion	Unknown	3	1624 ng/mL @ autopsy
814 pa	22 y F	codeine hydrocodone meperidine propoxyphene diphenhydramine amphetamine	U	Ingestion	Intent. Unk	1	2.8 mg/L @ autopsy 0.26 mg/L @ autopsy 0.87 mg/L @ autopsy 1.14 mg/L @ autopsy 0.29 mg/L @ autopsy
815 pa	Unk age F	fentanyl heroin cocaine	A	Parenteral	Abuse	1	
816 p	6 y M	fentanyl	C	Dermal	Drug	3	
817 pa	18 y M	fentanyl	U	Ingst+Derm	Abuse	1	0.020 mg/L @ autopsy fentanyl 0.038 mg/kg in liver @ autopsy 0.042 mg/L @ autopsy
818 p	20 y F	hydrocodone fentanyl clonazepam ethanol, beverage	A	Ingestion	Abuse	2	ethanol 99 mg/dL
819	>20 y F	fentanyl	A/C	Dermal	Drug	2	10.1 ng/mL @ autopsy
820 pa	21 y M	fentanyl hydrocodone	A	Ingestion	Sus. suicide	2	
821 ph	22 y M	fentanyl	A	Inhalation	Abuse	1	

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Opioids, continued							
822 p	23 y M	cocaine fentanyl	A	Ingst+Derm	Sus. suicide	2	
823	23 y M	escitalopram morphine fentanyl methadone	A	Ingst+Inhal	Abuse	2	3 ng/mL 111 ng/mL
824 p	26 y M	benzodiazepine fentanyl	A/C	Ingestion	Intent. Unk	2	
825 pa	26 y M	fentanyl	A	Ingestion	Sus. suicide	1	5.4 ng/mL @ autopsy
826 pha	27 y M	fentanyl	A	Parenteral	Abuse	1	0.001 mg/L @ autopsy
827	27 y F	fentanyl	A	Ingst+Derm	Sus. suicide	2	
828 ipa	28 y M	propoxyphene fentanyl	U	Ingst+Derm	Abuse	1	
		oxycodone citalopram methocarbamol					
829 p	36 y F	fentanyl clonazepam	A/C	Ingestion	Abuse	2	
830 p	37 y M	fentanyl	A	Ingestion	Abuse	2	
831 pa	38 y F	fentanyl	U	Ingestion	Abuse	1	19 ng/mL @ autopsy 0.64 mg/L @ autopsy
		promethazine metaxalone simvastatin unknown drug zolpidem					
832 ipa	42 y M	fentanyl heroin	A/C	Unknown	Intent. Misuse	1	
833 p	43 y M	fentanyl	A/C	Ingestion	Sus. suicide	1	
834 pa	45 y F	fentanyl	U	Ingst+Derm	Unknown	1	8.4 ng/mL @ autopsy
		amlodipine/benazepril quetiapine citalopram mirtazapine diphenhydramine promethazine					
835 pa	46 y F	fentanyl fluoxetine oxycodone/acetaminophen	A	Ingst+Vag	Sus. suicide	1	34 mg/kg in liver @ autopsy
836 ip	46 y F	alprazolam fentanyl	A	Unknown	Abuse	2	20.8 ng/mL @ autopsy 105 ng/mL @ autopsy
837 a	47 y F	oxycodone fentanyl	U	Ingst+Derm	Sus. suicide	2	12 µg @ autopsy fentanyl 25 µg in brain @ autopsy fentanyl 66 µg in liver @ autopsy 190 mg/L
		acetaminophen amphetamine fentanyl propoxyphene trazodone					
838 pa	48 y F	cyclobenzaprine	U	Unknown	Unknown	2	8.5 ng/mL @ autopsy 2.7 mg/L @ autopsy 0.16 mg/L @ autopsy
839 pa	52 y F	fentanyl doxepin bupropion fluoxetine amoxicillin pregabalin methocarbamol atorvastatin oxycodone tizanidine ibuprofen	U	Ingestion	Intent. Unk	2	15.5 ng/mL @ autopsy 0.49 mg/L @ autopsy
840 p	53 y F	fentanyl	A/C	Ingestion	Sus. suicide	1	
841	56 y F	fentanyl hydrocodone/acetaminophen oxycodone carisoprodol diphenhydramine acetaminophen in combination citalopram bupropion trazodone	C	Ingestion	General	1	acetaminophen 36 µg/mL 0.3 mg/L 0.72 mg/L 5 ng/mL @ autopsy
842	73 y M	fentanyl	U	Dermal	Thera. error	2	
843 i	32 y M	fentanyl/droperidol	A	Inhalation	Abuse	1	
844 pa	24 y F	hydrocodone oxycodone alprazolam amitriptyline citalopram	A	Ingestion	Intent. Unk	2	0.76 mg/L @ autopsy 0.29 mg/L @ autopsy 0.23 mg/L @ autopsy 1.3 mg/L
845 pa	50 y F	hydrocodone	U	Ingestion	Intent. Unk	2	
846 a	61 y F	hydrocodone acetaminophen	A	Ingestion	Sus. suicide	2	275 µg/mL @ 1 dy

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Opioids, continued							
847 p	27 y M	hydrocodone/ibuprofen	U	Ingestion	Sus. suicide	2	
848 pa	45 y M	hydromorphone cocaine	A	Ingestion	Intent. Unk	1	
849	48 y M	ethanol, beverage hydromorphone acetaminophen	C	Ingestion	Drug	4	11 µg/mL in ns
850 p	50 y F	meperidine	A	Ingestion	Sus. suicide	1	
851 p	53 y M	meperidine	A	Parenteral	Drug	1	
852 p	Unk age M	methadone	A/C	Inhalation	Abuse	2	
853 pa	7 m M	methadone	U	Unknown	General	2	
854	11 m M	methadone	A	Ingestion	General	2	
855 p	12 m M	methadone	A	Ingestion	Unknown	1	
856 ph	20 m M	methadone	A	Ingestion	General	1	
857 p	14 y M	methadone	A	Ingestion	Thera. error	1	
858 p	15 y M	methadone	A	Ingestion	Sus. suicide	2	
859	15 y M	methadone unknown drug	A	Ingestion	Intent. Unk	1	
860 p	18 y M	methadone	A	Ingestion	Sus. suicide	1	
861 p	18 y M	alprazolam methadone alprazolam flumazenil	U	Ingestion	Sus. suicide	2	
862 pa	19 y M	methadone	A	Ingestion	Abuse	1	0.3 mg/L @ autopsy
863 p	20 y F	methadone cocaine benzodiazepine marijuana	A	Unknown	Intent. Unk	2	
864	20 y M	methadone	A	Ingestion	Abuse	2	
865 pa	>20 y M	methadone	U	Unknown	Abuse	2	
866 pa	>20 y F	methadone	U	Ingestion	Unknown	3	0.96 mg/L @ autopsy methadone 5.5 mg/kg in liver @ autopsy
867 ip	21 y M	methadone ondansetron diazepam zolpidem morphine	U	Ingst+Unk	Sus. suicide	1	
868	21 y M	methadone	A/C	Unknown	Unknown	2	
869 p	22 y M	methadone	A	Parenteral	Abuse	2	
870 p	22 y M	methadone benzodiazepine cocaine marijuana	A/C	Ingst+Inhal	Unknown	2	
871 pa	22 y M	methadone	A	Ingestion	Abuse	1	0.31 mg/L @ autopsy
872 pa	23 y F	methadone cocaine	U	Ingestion	Intent. Unk	1	0.70 mg/L @ autopsy
873	24 y M	methadone oxycodone heroin	A	Ingst+Par+Unk	Intent. Unk	2	
874 a	24 y M	ethanol, beverage methadone alprazolam	A	Ingestion	Abuse	1	130 ng/mL @ autopsy
875 p	24 y F	methadone	A	Ingestion	Sus. suicide	2	
876 ph	25 y F	methadone hydrocodone eszopiclone valproic acid	A/C	Ingestion	Sus. suicide	4	2096 ng/mL 42.3 µg/mL in ns
877	26 y M	methadone	A	Parenteral	Malicious	3	
878 p	26 y M	methadone clonazepam	A/C	Ingestion	Sus. suicide	2	
879 pa	26 y M	cocaine methadone alprazolam ibuprofen	U	Ingestion	Intent. Unk	1	1.0 mg/L @ autopsy
880 pa	26 y F	methadone cocaine fentanyl/droperidol	U	Unknown	Abuse	1	0.11 mg/L @ autopsy 0.1 mg/L @ autopsy fentanyl 8 ng/mL @ autopsy
881 p	26 y M	methadone alprazolam	A/C	Ingestion	Sus. suicide	1	
882 p	27 y M	methadone	A	Ingestion	Unint. Unk	2	
883	27 y F	methadone	A/C	Ingestion	Abuse	1	
884 p	27 y M	methadone	U	Ingestion	Unknown	2	0.18 mg/L @ autopsy methadone 1.2 mg/kg in liver @ autopsy
885 pa	28 y F	propylene glycol methadone cocaine	U	Ingestion	Intent. Unk	1	0.53 mg/L @ autopsy 1.1 mg/L @ autopsy
886	28 y F	isometheptene/dichloralphenazone/acetaminophen methadone	A	Ingestion	Abuse	2	400 ng/mL
887 pa	29 y M	amphetamine methadone cocaine opioids/opioid antagonist	A/C	Ingestion	Sus. suicide	2	

(Continued)

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Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Opioids, continued							
888 pa	30 y M	benzodiazepine marijuana methadone	U	Inhalation	Abuse	1	
889 p	31 y F	alprazolam	A	Ingestion	Sus. suicide	2	
890 pa	32 y M	methadone	U	Unknown	Intent. Unk	2	0.16 mg/L @ autopsy hydrocodone 0.10 mg/L @ autopsy
891 pa	32 y M	opioids/opioid antagonist unknown drug methadone	U	Ingestion	Abuse	1	0.63 mg/L @ autopsy
892 pa	33 y F	carisoprodol metaxalone alprazolam methadone	U	Unknown	Intent. Unk	1	0.31 mg/L @ autopsy
893 ia	34 y M	cocaine methadone	C	Ingestion	Unknown	3	0.3 mg/L in ns 0.37 mg/L in ns
894 ph	34 y F	venlafaxine	U	Ingestion	Abuse	2	
895 pa	34 y F	methadone	A/C	Ingestion	Intent. Unk	1	0.68 mg/L @ autopsy methadone 3.1 mg/kg in liver @ autopsy 0.29 mEq/L @ autopsy
896 ph	38 y M	lithium methadone	U	Ingestion	Sus. suicide	2	
897 p	40 y M	diazepam carisoprodol pregabalin	A	Ingestion	Unknown	2	
898 p	41 y F	methadone zolpidem	A/C	Ingestion	Sus. suicide	2	
899 pa	41 y M	alprazolam methadone	U	Unknown	Intent. Unk	1	
900 ha	41 y M	trazodone methadone	C	Unknown	Drug	4	
901 ipa	42 y F	morphine acetaminophen/diphenhydramine methadone	U	Ingestion	Sus. suicide	1	1.1 mg/L @ autopsy 0.08 mg/L @ autopsy
902 pa	44 y M	oxycodone antihistamine/decongestant thyroid preparation methadone	U	Ingestion	Unknown	2	1.6 mg/L @ autopsy
903	45 y F	olmesartan methadone	U	Ingestion	Intent. Unk	4	1.44 mg/dL in ns
904 pa	45 y M	ethanol, beverage sumatriptan methadone	U	Unknown	Intent. Unk	2	0.28 mg/L @ autopsy
905	46 y M	hydrocodone unknown drug methadone	A/C	Ingestion	Sus. suicide	1	
906 pa	46 y M	benzodiazepine risperidone tiagabine topiramate marijuana methadone	U	Ingestion	Unknown	1	0.23 mg/L @ autopsy 0.14 mg/L @ autopsy 0.28 mg/L @ autopsy
907 pa	46 y M	diazepam cyclobenzaprine methadone	U	Ingestion	Unknown	2	
908 p	47 y M	buspirone paroxetine simvastatin methadone	A	Ingestion	Abuse	1	
909 pa	47 y M	benzodiazepine ethanol, beverage methadone	A	Ingestion	Sus. suicide	1	0.28 mg/L @ autopsy diazepam 0.50 mg/L @ autopsy hydrocodone 0.12 mg/L @ autopsy 0.12 mg/L @ autopsy 0.33 mg/L @ autopsy
910 pa	47 y F	opioids/opioid antagonist alprazolam methadone	U	Ingestion	Unknown	2	
911	47 y M	risperidone gabapentin metoprolol zolpidem	A	Ingestion	Sus. suicide	3	
912 pa	48 y M	methadone	U	Ingestion	Intent. Unk	2	0.44 mg/L @ autopsy
913 pa	49 y F	methadone	A/C	Ingestion	Intent. Unk	2	
914 pa	49 y M	codeine unknown drug methadone	U	Ingestion	Unknown	1	0.75 mg/L @ autopsy
		acetaminophen citalopram quinine unknown drug lisinopril					

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Opioids, continued							
915 p	53 y M	mirtazapine methadone opioids/opioid antagonist	C	Ingestion	General	4	
916 pa	56 y M	methadone	A	Ingestion	Intent. Misuse	2	1.1 mg/L @ autopsy
917 pa	58 y F	methadone ethanol, beverage fluoxetine	A	Ingestion	Sus. suicide	1	0.54 mg/L 70 mg/dL 0.36 mg/L
918 h	58 y F	methadone skeletal muscle relaxants metoprolol alprazolam hydrocodone/acetaminophen acetaminophen/diphenhydramine ethanol, beverage	C	Ingestion	Intent. Misuse	1	
919 a	64 y F	methadone amitriptyline sulfamethoxazole and trimethoprim	U	Ingestion	Intent. Unk	2	0.86 mg/L @ autopsy 0.15 mg/L @ autopsy
920 p	66 y F	methadone	U	Ingestion	Sus. suicide	2	
921 p	24 y M	morphine	A	Ingestion	Abuse	1	
922 pa	25 y M	morphine	U	Ingestion	Unknown	1	0.2 mg/L @ autopsy morphine >100 mg/L in bile @ autopsy 0.02 mg/L @ autopsy
923 pha	30 y M	methamphetamine trazodone methocarbamol morphine ethanol, beverage	U	Parenteral	Abuse	1	
924 pa	32 y F	morphine	U	Ingestion	Intent. Unk	2	0.06 mg/L @ autopsy morphine 25 mg/L in bile @ autopsy 0.12 mg/L @ autopsy
925 ph	33 y M	oxycodone unknown drug acetaminophen diphenhydramine verapamil promethazine cyclobenzaprine temazepam zolpidem carisoprodol morphine clonazepam	A	Ingestion	Sus. suicide	2	
926 pa	37 y M	morphine	A/C	Ingestion	Intent. Misuse	2	301 ng/mL @ autopsy
927 pa	37 y M	morphine opioids/opioid antagonist amitriptyline	U	Unknown	Unknown	2	
928	39 y M	morphine alprazolam	U	Ingestion	Intent. Unk	2	
929 p	39 y F	morphine	C	Ingestion	Abuse	2	
930 p	43 y F	morphine methadone	A/C	Ingestion	Sus. suicide	3	
931 pa	46 y F	morphine alprazolam	A/C	Ingestion	Abuse	1	354 ng/mL benzodiazepine 183 ng/mL
932 pa	46 y F	morphine pregabalin clonazepam	U	Ingestion	Unknown	2	1.5 mg/L @ autopsy
933 p	50 y M	propoxyphene/acetaminophen morphine	A/C	Unknown	Unknown	2	
934 a	50 y F	morphine benzodiazepine thiazolidinedione thyroid preparation furosemide quinapril pravastatin pregabalin baclofen	A/C	Ingestion	Intent. Unk	1	>100 mg/L in bile @ autopsy
935 p	52 y F	morphine losartin citalopram bactrim	A	Ingestion	Sus. suicide	2	
936 pa	52 y F	morphine cocaine	U	Ingestion	Sus. suicide	1	1024 ng/mL @ autopsy 2227 ng/mL @ autopsy
937 pa	52 y M	morphine amitriptyline diazepam	U	Ingestion	Intent. Unk	3	3.5 mg/L @ autopsy
938 ph	58 y F	naproxen morphine methocarbamol methadone lorazepam corticosteroid flecainide	A/C	Ingestion	Unknown	2	

(Continued)



Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Opioids, continued							
939 pa	58 y F	metolazone potassium morphine doxepin citalopram	U	Unknown	Unknown	1	0.78 mg/L @ autopsy
940	68 y M	morphine	A/C	Ingst+Par	Thera. error	4	
941 p	70 y F	morphine	A	Ingestion	Drug	2	
942	84 y M	morphine	A	Ingestion	Thera. error	3	
943 ph	35 y M	opioid opioids/opioid antagonist benzodiazepine	A	Ingst+Par	Abuse	2	
944 p	51 y F	opioid	A	Unknown	Abuse	4	
945 p	14 y M	opioids/opioid antagonist benzodiazepine	A	Ingestion	Sus. suicide	2	
946 pa	20 y M	opioids/opioid antagonist benzodiazepine	C	Ingestion	Abuse	2	
947	>20 y M	opioids/opioid antagonist cocaine benzodiazepine	A	Ingestion	Intent. Unk	2	
948 p	22 y M	antidepressants, tricyclic opioids/opioid antagonist	C	Unknown	Abuse	1	
949	29 y M	opioids/opioid antagonist amitriptyline	A	Ingestion	Sus. suicide	1	
950 p	31 y M	opioids/opioid antagonist	A	Ingestion	Abuse	2	
951	33 y M	opioids/opioid antagonist	U	Parenteral	Abuse	3	
952 pa	40 y F	opioids/opioid antagonist acetaminophen	U	Ingestion	Sus. suicide	1	
953	41 y M	opioids/opioid antagonist	A	Ingestion	General	1	
954	43 y M	opioids/opioid antagonist	A	Par+Unk	Sus. suicide	2	
955 pa	46 y F	opioids/opioid antagonist trazodone lorazepam	U	Unknown	Unknown	2	2.3 mg/L @ autopsy
956 p	16 m M	oxycodone tramadol diphenhydramine naproxen H2 antagonist	A	Ingestion	Unknown	2	
957 ia	16 y M	oxycodone morphine meprobamate	C	Unknown	Abuse	2	521 ng/mL @ autopsy 156 ng/mL @ autopsy 10.9 µg/mL @ autopsy
958 pa	17 y M	oxycodone alprazolam hydrocodone ethanol, beverage	U	Ingestion	Abuse	1	0.021 µg/mL @ autopsy 81 ng/mL @ autopsy < 0.05µg/mL @ autopsy 0.03% W/V @ autopsy
959 i	>20 y F	oxycodone	A	Unknown	Abuse	2	
960 pa	>20 y M	oxycodone carisoprodol hydrocodone warfarin pregabalin diphenhydramine ibuprofen	U	Unknown	Unknown	1	0.24 mg/L @ autopsy 0.03 mg/L @ autopsy
961 p	22 y M	oxycodone alprazolam marijuana	A	Ingestion	Sus. suicide	2	
962 ip	23 y M	oxycodone ethanol, beverage	A	Ingst+Inhal	Abuse	2	
963	25 y M	oxycodone hallucinogenic amphetamine carisoprodol	A	Ingestion	Intent. Unk	2	
964 ip	28 y M	oxycodone ethanol, beverage	A	Ingst+Inhal	Abuse	1	
965 pa	34 y F	oxycodone carisoprodol	U	Ingestion	Intent. Unk	2	0.42 mg/L @ autopsy 17 mg/L @ autopsy
966 p	35 y M	oxycodone	A	Ingestion	Sus. suicide	2	
967 pa	36 y F	cyclobenzaprine oxycodone ethanol, beverage cyclobenzaprine	A/C	Ingst+Par	Sus. suicide	2	0.59 µg/mL @ autopsy 0.15% w/v in vit @ autopsy
968 pa	37 y M	trazodone oxycodone olanzapine methocarbamol zolpidem modafinil antihistamine/decongestant citalopram	A	Ingestion	Intent. Unk	2	
969 pa	38 y M	oxycodone	U	Ingestion	Unknown	2	0.56 mg/L @ autopsy
970 pa	38 y M	oxycodone cyclobenzaprine alprazolam	A/C	Ingestion	Abuse	1	0.44 µg/m @ autopsy 72 ng/mL @ autopsy

(Continued)

**Table 21B.** Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Opioids, continued							
971 h	39 y F	hydrocodone oxycodone carisoprodol unknown drug	A	Ingestion	Sus. suicide	1	alprazolam 60 ng/mL @ autopsy 0.22 µg/mL @ autopsy
972 p	42 y M	oxycodone	A	Ingestion	Intent. Unk	1	
973 ph	43 y M	oxycodone morphine clonazepam	A	Ingestion	Sus. suicide	1	
974 h	43 y M	oxycodone	A	Parenteral	Intent. Unk	2	
975 pa	43 y M	oxycodone ibuprofen tizanidine acetaminophen carisoprodol promethazine	U	Ingestion	Intent. Unk	1	0.72 mg/L @ autopsy
976 p	44 y F	oxycodone benzodiazepine pregabalin naproxen	U	Ingestion	Malicious	1	74.0 µg/mL in ns @ autopsy
977 pa	45 y F	oxycodone skeletal muscle relaxants	A	Ingestion	Sus. suicide	1	1.5 mg/L @ autopsy carisoprodol < 2mg/L @ autopsy
978 pa	45 y F	lorazepam quetiapine potassium oxycodone hydrocodone/acetaminophen	A/C	Ingst-Asp	Sus. suicide	3	
979 h	45 y F	oxycodone cyclobenzaprine	U	Ingestion	Sus. suicide	2	
980 a	46 y M	ethanol, beverage oxycodone antihistamine/decongestant	U	Ingestion	Intent. Unk	2	0.36 mg/L @ autopsy diphenhydramine 0.80 mg/L @ autopsy
981 pa	47 y M	bupropion sertraline ibuprofen oxycodone benzodiazepine citalopram amitriptyline	U	Ingestion	Unknown	2	0.3 mg/L @ autopsy diazepam 0.2 mg/L @ autopsy 0.07 mg/L @ autopsy
982	49 y M	oxycodone	A/C	Ingestion	Sus. suicide	2	
983 a	49 y M	oxycodone cocaine	A	Unknown	Unknown	1	34 mg/L in ns @ perimortem 46 mg/L in ns @ perimortem
984	53 y F	alprazolam oxycodone doxepin	A	Ingestion	Sus. suicide	2	
985 p	53 y F	sertraline oxycodone duloxetine trazodone alprazolam	U	Ingestion	Sus. suicide	2	
986 pa	60 y F	skeletal muscle relaxants oxycodone methadone benzodiazepine ethanol, beverage carisoprodol amlodipine olmesartan	U	Ingestion	Intent. Unk	2	0.19 mg/L @ autopsy 0.14 mg/L @ autopsy diazepam 0.10 mg/L @ autopsy 30 mg/dL @ autopsy
987 p	60 y F	oxycodone ethanol, beverage	U	Ingestion	Sus. suicide	2	
988	81 y F	oxycodone	A/C	Ingestion	Sus. suicide	1	
989	44 y M	propoxyphene ethanol, beverage	U	Ingestion	Sus. suicide	2	5000 ng/mL in ns @ autopsy
990 pa	54 y M	propoxyphene cocaine ethanol, beverage valsartan zolpidem trazodone sildenafil	A	Ingestion	Sus. suicide	1	>1.0 mg/L 340 mg/dL
991 ha	83 y F	propoxyphene chlordiazepoxide acetaminophen furosemide	A	Ingestion	Sus. suicide	1	13.0 mg/L @ autopsy 0.056 mg/L @ autopsy 155 µg/mL in ns
992 pa	40 y M	tramadol bupropion amitriptyline temazepam	U	Ingestion	Sus. suicide	1	
993 p	50 y F	tramadol	A	Ingestion	Sus. suicide	2	
994 p	52 y M	tramadol	A/C	Ingestion	Sus. suicide	2	

(Continued)

**Table 21B.** Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Opioids, continued							
995 pa	53 y F	trifluoperazine hydroxyzine methotrexate alprazolam clonazepam benzodiazepine lamotrigine tramadol risperidone diazepam phenylpropanolamine	U	Ingestion	Sus. suicide	1	15 mg/L @ autopsy
996 pa	56 y F	lorazepam tramadol cyclobenzaprine acetaminophen celecoxib	U	Ingestion	Sus. suicide	2	14.5 mg/L @ autopsy 0.12 mg/L @ autopsy
997 p	59 y F	oxycodone/acetaminophen tramadol	A	Ingestion	Sus. suicide	4	
See also cases 55, 90, 103, 245, 248, 262, 272, 275, 278, 280, 293, 307, 310, 323, 373, 379, 397, 403, 417, 502, 509, 521, 529, 532, 572, 600, 630, 653, 669, 684, 696, 732, 733, 737, 742, 744, 745, 748, 750, 753, 756, 767, 781, 797, 807, 812, 814, 822, 823, 827, 828, 836, 838, 839, 841, 844, 867, 873, 876, 880, 887, 890, 900, 901, 909, 915, 924, 927, 930, 938, 943, 956, 957, 958, 973, 986, 1001, 1025, 1026, 1038, 1039, 1049, 1051, 1053, 1057, 1060, 1063, 1067, 1082, 1086, 1094, 1104, 1105, 1106, 1115, 1127, 1131, 1133, 1137, 1143, 1152, 1160, 1161, 1164, 1175, 1190, 1191, 1195, 1212							
Oral hypoglycemics							
998	46 y F	glipizide	A/C	Ingestion	Sus. suicide	2	
999	60 y M	clorazepate benzodiazepine glipizide lithium valproic acid alcohol	A	Ingestion	Sus. suicide	1	1.9 mEq/L 99 mg/L
1000	22 y F	metformin	A	Ingestion	Sus. suicide	2	
1001	49 y M	metformin acetaminophen cocaine opioid	A	Ingestion	Sus. suicide	2	33.5 µg/mL in ns
1002	49 y M	metformin	C	Ingestion	Drug	2	
1003 a	53 y M	metformin	U	Ingestion	Sus. suicide	1	30 mg/L @ autopsy
1004	58 y F	metformin	U	Ingestion	Sus. suicide	2	
1005	72 y M	metformin acetaminophen	A/C	Ingestion	Sus. suicide	2	
1006	77 y M	metformin	A	Ingestion	Drug	1	
1007	52 y F	metformin & related	A/C	Ingestion	Sus. suicide	2	
1008	54 y M	metformin & related repaglinide	A/C	Ingestion	Sus. suicide	2	
1009	60 y F	ethanol, beverage atorvastatin metformin & related thiazolidinedione	A	Ingestion	Sus. suicide	2	
1010 h	69 y F	lisinopril metformin & related	C	Ingestion	Drug	2	
1011	35 y M	nitrate, long-acting	A/C	Ingestion	Intent. Misuse	2	
1012 pa	59 y F	sulfonylurea alprazolam zolpidem	U	Unknown	Sus. suicide	1	
1013 a	48 y M	thiazolidinedione vardenafil nitrate, long-acting lovastatin lisinopril	A	Ingestion	Sus. suicide	1	
See also cases 479, 524, 528, 685, 692, 697, 702, 708, 711, 773, 775, 934, 1008, 1009, 1013, 1022							
Other nonsteroidal anti-inflammatory drugs							
1014	67 y M	colchicine	A	Ingestion	Unint. Misuse	3	
1015	78 y F	colchicine	A	Parenteral	Thera. error	2	
1016	85 y M	colchicine	C	Parenteral	Thera. error	4	
1017 p	35 y F	diclofenac	A	Ingestion	Sus. suicide	2	
1018 h	25 y M	ibuprofen	A	Ingestion	Sus. suicide	2	
1019	41 y M	ethanol, beverage ibuprofen	A/C	Ingestion	Sus. suicide	3	
1020	48 y F	ibuprofen	A	Ingestion	Sus. suicide	2	
1021 a	26 y M	naproxen	A	Ingestion	Intent. Unk	3	
1022	56 y M	nonsteroidal anti-inflammatory metformin & related	C	Ingestion	Unknown	3	
See also cases 298, 306, 319, 391, 415, 429, 431, 461, 462, 493, 495, 505, 559, 561, 568, 569, 579, 590, 622, 670, 672, 705, 742, 745, 750, 776, 777, 789, 839, 879, 937, 956, 960, 975, 976, 980, 996, 1052, 1076, 1077, 1083, 1084, 1116, 1188							
Sedative/hypnotics/antipsychotics							
1023 pha	1 d M	alprazolam diphenhydramine	U	Other	Malicious	3	0.11 mg/L @ autopsy 0.44 mg/L @ autopsy

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Sedative/hypnotics/antipsychotics, continued							
1024 ph	20 y M	zolpidem fluoxetine alprazolam pregabalin eszopiclone ramelteon venlafaxine valproic acid	A	Ingestion	Sus. suicide	1	
1025 pa	24 y M	alprazolam oxycodone codeine olmesartan rosuvastatin	U	Ingst+Inhal	Abuse	2	0.07 mg/L @ autopsy 0.15 mg/L @ autopsy 0.20 mg/L @ autopsy
1026 pa	25 y M	alprazolam oxycodone/acetaminophen hydrocodone	U	Unknown	Intent. Unk	2	0.10 mg/L @ autopsy oxycodone 0.08 @ autopsy 0.04 mg/L @ autopsy
1027	27 y M	alprazolam cocaine	A	Ingestion	Sus. suicide	2	
1028 p	27 y M	ethanol, beverage alprazolam	A	Ingestion	Sus. suicide	2	
1029	32 y F	alprazolam	A	Ingestion	Sus. suicide	2	
1030 p	33 y F	skeletal muscle relaxants hydrocodone/acetaminophen alprazolam	A	Ingestion	Sus. suicide	2	
1031 p	40 y F	ethanol, beverage alprazolam hydrocodone clonazepam	A	Ingestion	Abuse	2	
1032 pa	40 y M	unknown drug alprazolam ethanol, beverage	A	Ingestion	Unknown	1	281 µg/mL @ autopsy 215 mg/dL @ autopsy
1033	59 y F	lorazepam haloperidol gabapentin amantadine bupropion	A	Ingestion	Sus. suicide	2	
1034 pha	24 y F	antipsychotic, atypical	A/C	Ingestion	Sus. suicide	1	
1035	43 y F	antipsychotic, atypical valproic acid benzodiazepine antimicrobial, systemic	A	Ingestion	Sus. suicide	3	
1036	50 y M	aripiprazole lamotrigine trazodone clonazepam buspirone	A/C	Ingestion	Sus. suicide	2	
1037 p	28 y F	benzodiazepine	A	Ingestion	Sus. suicide	4	
1038	29 y F	benzodiazepine opioids/opioid antagonist	A/C	Ingestion	Sus. suicide	2	
1039 i	37 y M	benzodiazepine methadone oxycodone oxymorphone	U	Ingestion	Unknown	2	
1040 pa	63 y F	benzodiazepine hydrocodone/acetaminophen	A	Ingestion	Sus. suicide	1	acetaminophen 26 µg/mL in ns
1041 p	30+y M	buspirone amitriptyline	A	Ingestion	Intent. Unk	2	
1042 p	38 y F	buspirone sertraline	A	Ingestion	Sus. suicide	2	
1043 pa	26 y M	chloral hydrate hydrocodone cyclobenzaprine	A/C	Ingestion	Sus. suicide	1	7.1 µg/mL
1044 p	39 y F	chloral hydrate	A	Ingestion	Sus. suicide	1	
1045 p	55 y M	chlordiazepoxide phenergan	C	Ingestion	Unknown	1	
1046	45 y M	ethanol, beverage chlorpromazine pyrazolopyrimidine fluoxetine	A/C	Ingestion	Sus. suicide	1	
1047 h	23 y M	clonazepam ethanol, beverage marijuana	U	Ingst+Inhal	Sus. suicide	2	
1048	42 y F	clonazepam olanzapine/fluoxetine	A/C	Ingestion	Sus. suicide	2	
1049 ph	46 y F	clonazepam fentanyl	A/C	Ingestion	Sus. suicide	3	
1050	55 y F	clonazepam	A	Ingst-Asp	Sus. suicide	2	
1051	71 y M	clonazepam hydrocodone/acetaminophen fentanyl	A	Ingestion	Sus. suicide	1	acetaminophen 58 µg/mL in ns @ 1h

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures Table 21B.

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Sedative/hypnotics/antipsychotics, continued							
1052 a	35 y M	clozapine	A/C	Ingst-Asp	Sus. suicide	2	
1053 ipa	44 y F	colchicine	A	Ingestion	Sus. suicide	2	0.05 mg/L @ autopsy morphine 0.02 mg/L in vit @ autopsy
		benzodiazepine					
1054	47 y F	diazepam	A	Ingestion	Sus. suicide	3	
	58 y F	eszopiclone	A	Ingestion	Sus. suicide	3	
1056	41 y F	paroxetine	C	Parenteral	Abuse	2	
	1057 p	zolpidem					
1058	56 y M	fluphenazine	A	Ingestion	Sus. suicide	2	
		lorazepam					
1059	58 y F	venlafaxine	A/C	Ingestion	Sus. suicide	2	
		tramadol					
1060 a	59 y F	hydrocodone	A	Ingestion	Sus. suicide	2	4000 ng/mL @ autopsy 2157 ng/mL @ autopsy 85 ng/mL @ autopsy 400 ng/mL in ns @ autopsy
		gabapentin					
1061	73 y F	lorazepam	A/C	Ingestion	Sus. suicide	3	
	1062 pa	meprobamate	A	Ingestion	Sus. suicide	1	180 mg/L @ autopsy
1063	55 y F	bupropion	A/C	Ingestion	Sus. suicide	2	0.19 mg/L @ autopsy diphenhydramine 0.35 mg/L @ autopsy 0.11 mg/L @ autopsy
		antihistamine/decongestant					
1064	18 y M	dextromethorphan	U	Ingestion	Sus. suicide	2	
		methadone					
1065	19 y M	hydrocodone	U	Ingestion	Sus. suicide	2	
		quetiapine					
1066	24 y F	dextromethorphan	U	Ingestion	Sus. suicide	2	
		quetiapine					
1067 a	28 y F	escitalopram	U	Ingst+Unk	Sus. suicide	1	15 mg/dL in ns
		atomoxetine					
1068	29 y F	quetiapine	A/C	Ingestion	Sus. suicide	1	3650 ng/mL @ autopsy
		quetiapine					
1069 p	30 y M	ethanol, beverage	A/C	Ingestion	Unknown	3	~200 mg/dL @ autopsy
		quetiapine					
1070 p	30+y F	quetiapine	A/C	Ingestion	Sus. suicide	2	
1071 a	37 y M	sleep aid (otc)	A	Ingestion	Sus. suicide	1	
		quetiapine					
1072 pha	38 y F	quetiapine	A	Ingestion	Sus. suicide	2	2.52 mg/L in ns
1073	38 y M	benzodiazepine	A/C	Ingestion	Sus. suicide	3	
		quetiapine					
1074 a	38 y F	quetiapine	A/C	Ingestion	Unknown	2	4.2 mg/L in ns @ perimortem quetiapine 9.2 mg/L @ autopsy
		quetiapine					
1075	38 y F	zolpidem	A	Ingestion	Sus. suicide	1	
		quetiapine					
1076 p	39 y F	quetiapine	A	Ingestion	Sus. suicide	2	
		quetiapine					
1077 a	40 y M	angiotensin receptor blocker	A/C	Ingestion	Sus. suicide	1	8800 ng/mL @ autopsy 430 ng/mL @ autopsy alprazolam 140 ng/mL @ autopsy 49 µg/mL @ autopsy
		butalbital/acetaminophen/caffeine					
1077 a	40 y M	aspirin	A/C	Ingestion	Sus. suicide	1	43 mg/dL in ns @ 14 h 153 mg/L in ns @ 6 h
		acetaminophen					
1077 a	40 y M	ibuprofen	A/C	Ingestion	Sus. suicide	1	
		escitalopram					
1077 a	40 y M	caffeine	A/C	Ingestion	Sus. suicide	1	
		naproxen					
1077 a	40 y M	fexofenadine	A/C	Ingestion	Sus. suicide	1	
		quetiapine					
1077 a	40 y M	diazepam	A/C	Ingestion	Sus. suicide	1	
		benzodiazepine					
1077 a	40 y M	lamotrigine	A/C	Ingestion	Sus. suicide	1	
		lamotrigine					

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Sedative/hypnotics/antipsychotics, continued							
1078	40+y M	zolpidem ibuprofen loratadine tiagabine quetiapine ethanol, beverage	U	Ingestion	Sus. suicide	2	300 ng/mL @ autopsy 61 µg/mL @ autopsy
1079 a	41 y M	sertraline quetiapine	A	Ingestion	Sus. suicide	1	7.3 mg/L @ autopsy quetiapine 16 mg/kg in liver @ autopsy
1080	45 y M	venlafaxine ethanol, beverage	A/C	Ingestion	Sus. suicide	2	185 mg/dL in ns
1081 p	47 y F	cold and cough preparations quetiapine	A/C	Ingestion	Sus. suicide	1	
1082	49 y M	ethanol, beverage quetiapine	A	Ingestion	Sus. suicide	4	
1083 pa	50 y F	eszopiclone methadone quetiapine oxycodone/acetaminophen	U	Unknown	Unknown	2	1.4 mg/L @ autopsy oxycodone 0.16 mg/L @ autopsy 0.11 mg/L @ autopsy 1.2 mg/L @ autopsy
1084 p	52 y M	diazepam venlafaxine ibuprofen hydrochlorothiazide quetiapine risperidone	A	Ingestion	General	2	
1085 ph	53 y M	citalopram benzodiazepine diclofenac quetiapine mirtazapine	A	Ingestion	General	4	
1086 pa	55 y M	quetiapine propoxyphene ethanol, beverage	U	Ingestion	Sus. suicide	1	2400 ng/mL in ns @ autopsy 0.302 mg/L in ns @ autopsy 0.211 g/100ml in ns @ autopsy
1087 p	56 y F	quetiapine metoprolol metaxalone alprazolam venlafaxine ezetimibe/simvastatin	A/C	Ingestion	Sus. suicide	2	
1088 p	56 y F	chlorpheniramine fexofenadine estrogen butalbital/acetaminophen/caffein	U	Ingestion	Sus. suicide	2	
1089 p	61 y F	quetiapine	A/C	Ingestion	Sus. suicide	1	
1090 h	64 y F	quetiapine venlafaxine diphenhydramine	U	Ingestion	Drug	4	
1091 p	48 y M	famotidine risperidone	C	Ingestion	Drug	4	
1092 a	49 y M	risperidone atenolol alpha blocker amantadine L-dopa & related	A/C	Ingestion	Sus. suicide	2	
1093 p	50 y F	risperidone quetiapine	U	Ingestion	Sus. suicide	2	
1094	65 y M	ethanol, beverage risperidone metaxalone heparin oxycodone escitalopram bupropion clonidine corticosteroid methadone albuterol haloperidol acyclovir vancomycin lamotrigine	C	Ingestion	Drug	4	161 mg/dL
1095 ha	16 y M	sleep aid (otc)	A	Ingestion	Sus. suicide	2	
1096 ip	24 y M	zolpidem	U	Ingestion	Sus. suicide	2	
1097 ph	22 y F	zyprexa	U	Ingestion	Unknown	4	
1098 h	25 y F	zyprexa lamotrigine duloxetine	A/C	Ingestion	Sus. suicide	1	
1099 pa	27 y M	zyprexa	A/C	Ingestion	Unknown	2	

(Continued)

**Table 21B.** Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Sedative/hypnotics/antipsychotics, continued							
		diazepam					0.7 mg/L @ autopsy
		sertraline					
See also cases 22, 24, 55, 147, 211, 227, 241, 252, 269, 270, 273, 274, 276, 283, 285, 286, 287, 289, 290, 294, 296, 298, 300, 303, 305, 307, 308, 311, 312, 315, 320, 322, 323, 341, 342, 346, 355, 362, 378, 383, 403, 413, 416, 417, 430, 437, 459, 461, 462, 463, 474, 479, 488, 492, 494, 497, 498, 503, 504, 507, 508, 510, 511, 512, 521, 524, 527, 532, 533, 559, 563, 575, 576, 578, 583, 584, 586, 593, 601, 610, 613, 615, 616, 619, 620, 621, 633, 639, 653, 667, 668, 669, 674, 679, 681, 684, 688, 702, 705, 706, 713, 718, 722, 723, 728, 733, 738, 741, 742, 744, 747, 750, 753, 760, 761, 764, 766, 767, 768, 769, 781, 784, 793, 797, 798, 799, 802, 807, 809, 810, 812, 818, 823, 829, 831, 834, 835, 844, 860, 861, 863, 867, 870, 874, 876, 878, 879, 881, 887, 888, 891, 896, 897, 898, 905, 906, 907, 908, 909, 910, 918, 924, 925, 928, 931, 932, 934, 937, 938, 943, 945, 946, 947, 955, 957, 958, 961, 968, 970, 973, 976, 977, 981, 983, 985, 986, 990, 991, 992, 994, 995, 998, 1012, 1023, 1024, 1031, 1033, 1035, 1036, 1046, 1052, 1053, 1055, 1059, 1060, 1066, 1071, 1072, 1074, 1077, 1082, 1083, 1084, 1087, 1093, 1094, 1099, 1105, 1109, 1113, 1117, 1127, 1149, 1156, 1160, 1164, 1166, 1168, 1178, 1182, 1187, 1188, 1190, 1192, 1200, 1209, 1219							
Serums, toxoids, vaccines							
1100 a	68 y F	vaccine, toxoid, serum	A	Parenteral	Drug	4	
Stimulants and street drugs							
1101 p	20 y M	GHB, analog/precursor	A	Ingestion	Abuse	1	
1102 pa	56 y F	GHB, analog/precursor	A	Ingst-Asp	Intent. Unk	1	1135 mg/L @ 3.5 h GHB 4.71 mg/L @ autopsy GHB in vit 6.91 mg/L @ autopsy 237 mg/dL @ 3 h
1103 p	56 y F	ethanol, beverage GHB, analog/precursor	A	Ingestion	Abuse	2	ethanol 237 mg/dL in ns
1104 p	13 y M	alcohol	U	Unknown	Abuse	1	
1105 p	15 y M	amphetamine	U	Ingestion	Abuse	2	
1106 p	17 y M	oxycodone benzodiazepine zolidem amphetamine methadone cocaine	A/C	Ingst+Inhal	Abuse	2	
1107 pha	21 y M	ethanol, beverage	A	Unknown	Abuse	1	
1108 pa	25 y F	amphetamine	A	Ingestion	Unknown	1	1732 ng/mL @ autopsy
1109 a	34 y M	amphetamine bupropion propoxyphene/acetaminophen	A	Ingestion	Sus. suicide	1	methylphenidate 1.1 mg/L @ autopsy 4.1 mg/L @ autopsy propoxyphene 0.6 mg/L @ autopsy acetaminophen 56 µg/mL in ns
1110	38 y M	benzodiazepine	A	Unknown	Abuse	3	ethanol 0.02% (w/v) @ autopsy
1111 ha	38 y M	ethanol	A	Unknown	Abuse	2	
1112 pha	40 y M	amphetamine	A	Unknown	Abuse	2	
1113 ia	46 y F	amphetamine cocaine	A	Ingestion	Sus. suicide	3	201 ng/mL @ autopsy methamphetamine 1356 ng/mL @ autopsy
1114	47 y M	quetiapine	A	Ingestion	Abuse	1	
1115	56 y M	clonazepam	A	Unknown	Intent. Unk	4	
1116	25 y M	amphetamine opioids/opioid antagonist caffeine	A	Ingestion	Sus. suicide	2	
1117 a	53 y M	diphenhydramine ibuprofen caffeine	A	Ingestion	Sus. suicide	1	157 mg/L @ autopsy
1118 i	56 y M	ephedrine	A	Ingestion	Drug	2	
1119 pa	16 y M	trazodone clonazepam flvoxamine caffeine	A	Ingestion	Abuse	3	
1120	17 y M	cocaine	A	Unknown	Intent. Unk	1	
1121 pa	17 y F	cocaine	A	Unknown	Intent. Unk	1	1.10 mg/L
1122 p	18 y F	cocaine	A	Ingst+Unk	Abuse	1	
1123	19 y M	unknown drug cocaine	A	Ingestion	Intent. Misuse	1	
1124 p	19 y M	ethanol, beverage	A	Ingestion	Intent. Misuse	2	
1125 p	19 y M	cocaine	A/C	Inhalation	Abuse	3	
1126	20 y M	marijuana	A	Ingestion	Abuse	2	
1127 p	20 y F	cocaine methadone benzodiazepine	A	Unknown	Intent. Unk	1	
1128	21 y M	marijuana	A	Ingestion	Abuse	2	
1129 pa	21 y M	cocaine cocaine marijuana	A/C	Ingst+Inhal	Intent. Misuse	1	8200 ng/mL @ autopsy
1130	21 y F	cocaine	A	Ingestion	Abuse	2	

(Continued)

Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Stimulants and street drugs, continued							
1131 pa	22 y M	amphetamine acetaminophen cocaine opioids/opioid antagonist unknown drug	U	Ingestion	Abuse	2	methamphetamine 7.5 ng/mL in ns 0.03 mg/L in ns @ autopsy
1132 a	23 y M	cocaine hallucinogenic amphetamine phenergan	A	Ingst+Unk	Sus. suicide	1	
1133 pa	23 y M	cocaine methadone stimulants and street drugs	U	Unknown	Abuse	1	12 mg/L @ autopsy 3.1 mg/kg in liver @ autopsy
1134 a	24 y F	cocaine marijuana	U	Unknown	Intent. Unk	2	
1135	24 y F	cocaine ma huang/ephedra	A	Unknown	Abuse	3	
1136 p	25 y M	cocaine	U	Unknown	Abuse	1	
1137 ph	25 y M	cocaine opioids/opioid antagonist	U	Unknown	Abuse	1	
1138 h	26 y M	cocaine	A	Ingestion	Abuse	1	
1139 pa	26 y M	cocaine	U	Ingestion	Unknown	1	
1140 pa	27 y F	cocaine	A	Ingestion	Intent. Unk	2	
1141 p	27 y F	cocaine ethanol, beverage	A	Ingst+Inhal	Abuse	1	
1142 pa	28 y M	cocaine	A	Ingestion	Malicious	1	8.8 mg/L @ autopsy
1143 pa	28 y M	cocaine oxycodone aspirin in combination	U	Ingestion	Abuse	2	0.8 mg/L @ autopsy 0.37 mg/L @ autopsy
1144 pa	28 y F	cocaine	A	Inhalation	Abuse	1	0.065 µg/mL @ autopsy
1145 h	28 y M	cocaine marijuana	A	Ingst+Inhal	Intent. Misuse	1	
1146 ph	29 y M	cocaine	A	Ingst+Inhal	Unknown	4	
1147 p	29 y F	cocaine amphetamine	A	Ingestion	Intent. Unk	2	
1148 ph	35 y M	cocaine	A	Unknown	Abuse	2	
1149 p	35 y M	cocaine amphetamine marijuana benzodiazepine	A	Ingst+Unk	Abuse	1	
1150 a	37 y F	cocaine	U	Inhalation	Abuse	2	
1151 ha	37 y M	cocaine escitalopram	U	Ingst+Inhal	Intent. Unk	1	
1152	39 y F	cocaine opioids/opioid antagonist	U	Unknown	Intent. Unk	2	
1153	40 y M	cocaine	U	Unknown	Abuse	2	
1154 pha	40 y M	cocaine	A	Unknown	Abuse	2	
1155	42 y M	cocaine	A	Ingestion	Intent. Unk	1	
1156	44 y M	cocaine alprazolam ethanol, beverage	U	Ingst+Unk	Abuse	1	
1157	44 y M	cocaine acetaminophen	A	Ingst+Inhal	Abuse	2	
1158 p	47 y M	cocaine	A	Ingst+Inhal	Sus. suicide	2	230 µg/mL in ns @ >12h
1159	50+y M	cocaine	U	Ingestion	Intent. Misuse	1	
1160 h	52 y F	cocaine amphetamine opioids/opioid antagonist benzodiazepine antidepressants, tricyclic	A	Ingestion	Unknown	2	
1161	52 y F	cocaine opioids/opioid antagonist marijuana	A	Ingestion	Sus. suicide	2	
1162 p	53 y M	cocaine ethanol, beverage	U	Ingestion	Unknown	2	
1163 pha	53 y M	cocaine	A	Unknown	Abuse	1	35 mg/dL in ns
1164 pa	54 y M	cocaine oxycodone alprazolam	A/C	Ingestion	Intent. Unk	1	0.33 µg/dL @ autopsy 3.2 mg/L @ autopsy 0.26 mg/L @ autopsy
1165 a	57 y M	cocaine	A	Ingestion	Intent. Misuse	3	0.99 mg/L @ autopsy
1166	53 y M	ephedrine benzodiazepine clonazepam fluvoxamine trazodone	A	Ingestion	Sus. suicide	1	
1167	21 y M	hallucinogenic amphetamine	A	Ingestion	Abuse	2	
1168 p	25 y F	hallucinogenic amphetamine benzodiazepine	A	Ingestion	Abuse	2	
1169 a	30 y M	hallucinogenic amphetamine	A	Ingestion	Sus. suicide	1	
1170 a	17 y M	heroin	A	Parenteral	Abuse	2	
1171 ipa	18 y F	heroin	A	Parenteral	Intent. Unk	1	
1172 ip	18 y F	heroin	U	Unknown	Abuse	2	

(Continued)



Table 21B. Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Stimulants and street drugs, continued							
1173 ip	20 y M	heroin	A	Unknown	General	2	
1174 pa	23 y F	acetaminophen/opioids	U	Ingst+Par	Abuse	1	
1175 pa	24 y F	heroin cocaine carisoprodol gabapentin	U	Unknown	Abuse	1	morphine 41 mg/L in bile @ autopsy 0.1 mg/L @ autopsy 140 mg/dL @ autopsy
1176 ipha	24 y F	heroin	A	Parenteral	Abuse	2	morphine 0.051 mg/L @ autopsy
1177 pa	25 y M	heroin	A	Parenteral	Abuse	1	
1178 ph	25 y M	heroin	A/C	Ingst+Inhal+Par	Abuse	1	
1179 pa	25 y F	benzodiazepine marijuana heroin methamphetamine	U	Ingestion	Intent. Unk	1	
1180 p	25 y M	cocaine	A	Parenteral	Abuse	2	
1181 p	30 y F	heroin	A	Inhalation	Abuse	1	
1182 p	32 y F	heroin	U	Ingestion	Abuse	1	
1183	36 y F	cocaine	C	Inhalation	Sus. suicide	2	
1184 p	40 y M	benzodiazepine	A	Unknown	Abuse	2	
1185 p	42 y M	heroin	A	Unknown	Abuse	1	
1186 p	43 y M	heroin	C	Parenteral	Abuse	1	
1187	47 y M	heroin	A/C	Inhalation	Abuse	1	
1188 pa	48 y M	benzodiazepine cocaine heroin	U	Unknown	Intent. Unk	1	morphine >100 mg/L @ autopsy morphine 0.6 mg/L in bile @ autopsy
1189 p	53 y M	ibuprofen risperidone	A	Parenteral	Abuse	2	
1190 pa	53 y M	heroin	U	Ingestion	Abuse	2	morphine 0.03 mg/L @ autopsy 2.6 mg/L @ autopsy 0.3 mg/L @ autopsy
1191 a	20 y M	cocaine oxycodone alprazolam	A	Ingst+Inhal	Abuse	2	0.06 µg/mL
1192 p	21 y M	methamphetamine morphine	A	Ingestion	Sus. suicide	2	0.04 µg/mL
1193 pa	33 y M	methamphetamine	A	Parenteral	Sus. suicide	1	7.7 mg/L @ autopsy
1194 a	63 y F	methylphenidate	A/C	Ingestion	Sus. suicide	1	0.04 mg/L
1195	48 y F	bupropion cyclobenzaprine phencyclidine	A/C	Ingestion	Sus. suicide	1	0.057 mg/L 22 ng/mL
		aspirin acetaminophen oxycodone					
See also cases 13, 50, 52, 68, 96, 103, 131, 143, 267, 273, 276, 283, 286, 289, 322, 338, 340, 342, 363, 367, 401, 416, 461, 485, 489, 502, 567, 574, 608, 610, 620, 669, 709, 732, 740, 742, 749, 756, 802, 814, 815, 821, 832, 837, 848, 863, 870, 872, 873, 878, 880, 885, 886, 887, 892, 905, 922, 936, 947, 961, 963, 983, 1001, 1027, 1047, 1066, 1067, 1076, 1106, 1117, 1119, 1125, 1127, 1129, 1130, 1132, 1133, 1134, 1145, 1147, 1149, 1160, 1161, 1174, 1175, 1178, 1179, 1182, 1187, 1190, 1207, 1209, 1210							
Topical preparations							
1196 i	37 y M	camphor	A	Ingestion	Unknown	3	
Unknown drug							
1197	15 y F	unknown drug	A	Ingestion	Sus. suicide	2	
1198 pha	20 y M	acetaminophen	A	Ingestion	Unknown	2	
1199 p	>20 y M	unknown drug	A	Parenteral	Abuse	2	
1200 p	>20 y M	unknown drug	U	Unknown	Unknown	4	
1201	21 y M	moexipril	A	Parenteral	Unknown	4	
1202	23 y M	dipyridamole/aspirin	A	Inhalation	Drug	1	
1203 a	24 y F	atorvastatin	A	Parenteral	Thera. error	1	
1204 p	25 y F	zolpidem	U	Unknown	Unknown	2	
1205 pha	27 y M	unknown drug	A	Unknown	Unknown	4	
1206	28 y M	unknown drug	A	Ingestion	Abuse	2	
1207	30 y M	unknown drug	U	Inhal+Unk	Intent. Unk	1	
1208 p	31 y M	cocaine	A	Ingestion	General	2	
1209 ip	33 y F	unknown drug	U	Unknown	Unknown	1	
		citalopram quetiapine benzodiazepine heroin					

(Continued)

**Table 21B.** Listing of fatal pharmaceutical exposures

Case	Age	Substances	Chronicity	Routes	Reason	RCF	Blood Concentration @ Time
Unknown drug, continued							
1210 p	38 y M	unknown drug marijuana	A/C	Ingestion	Abuse	4	
1211	40 y M	unknown drug	A	Inhalation	Drug	4	
1212 pa	41 y M	unknown drug methadone	U	Ingestion	Unknown	2	
1213 ph	41 y F	unknown drug	A	Ingestion	Intent. Unk	2	
1214	44 y F	unknown drug acetaminophen	U	Ingestion	Sus. suicide	2	
1215	47 y F	unknown drug	A	Ingestion	Sus. suicide	2	
1216 pha	48 y F	unknown drug	A	Unknown	General	4	
1217 p	48 y F	unknown drug	A	Unknown	Unknown	4	
1218 p	51 y M	unknown drug	A	Unknown	Unknown	1	
1219	53 y F	unknown drug acetaminophen aspirin risperidone	A/C	Ingestion	Sus. suicide	2	
1220 p	55 y F	unknown drug	U	Ingestion	Unknown	2	
1221 h	56 y F	unknown drug	U	Unknown	Unknown	4	
1222	58 y F	unknown drug	A/C	Ingestion	Intent. Misuse	1	
1223	61 y M	unknown drug	A	Unknown	Other	3	
1224	64 y M	unknown drug	A	Ingestion	General	4	
1225 p	73 y F	unknown drug	A/C	Ingestion	Sus. suicide	2	
1226 h	78 y F	unknown drug oxycodone/acetaminophen	U	Ingestion	Unint. Unk	2	
See also cases 15, 419, 475, 585, 678, 776, 790, 806, 831, 859, 890, 904, 913, 914, 924, 971, 1031, 1122, 1131							
Veterinary drugs							
1227	51 y F	veterinary drug	A	Ingestion	Unint. Misuse	2	
1228 p	17 y M	veterinary euthanasia injection	A	Parenteral	Sus. suicide	1	
Vitamins							
1,229 a	33 y M	vitamins	A	Other	Other	4	

**Case:** **Bolded case number**=Abstract provided for this case in Appendix B **i**=case was reported to poison center indirectly (by coroner, medical examiner, or other) after the fatality occurred, **p**=prehospital cardiac and/or respiratory arrest, **h**=hospital records reviewed, **a**=autopsy report reviewed, **20+y**=age reported as 20s (20 or more years of age), **30+y** for 30 years of age, ... **otc**=over the counter (non-prescription) medication.

**Chronicity:** C=chronic exposure, A=acute exposure, A/C=acute on chronic, U=unknown.

**Route:** Derm=Dermal, Oc=ocular, Ot=otic, **Inhal**=Inhalation, **Ingst**=Ingestion, **Par**=Parenteral,

**Reason:** **Intent**=Intentional, **Sus**=Suspected, **Ther**=Therapeutic, **Unint**=Unintentional, **Unk**=unknown.

**RCF (Relative Contribution to Fatality):** 1=Undoubtedly responsible, 2=Probably responsible, 3=Contributory, 4=Probably not responsible.

**Blood Concentrations:** Concentrations are from blood serum or plasma unless otherwise specified, **dy**=hospital day, **vit**=vitreous humor concentration, **ns**=tissue source was not specified, most are probably blood or plasma.

### Review team procedure

A total of 26 review teams (28 individuals) volunteered to participate in the review. Half (13 teams) were Managing Directors and 13 teams were Medical Directors. Names and affiliations of the reviewers are listed in Appendix A. Training and communication included weekly teleconferences, written guidance documents, spreadsheets (for assignment and reporting), the NPDS-Fatality Module (NPDS-FM) and individual telephone contacts. The initial 1514 fatalities were randomly assigned such that each of the 26 review teams served as Lead Reviewer on 58 or 59 cases and peer reviewed another similar number of cases for the other (Lead) reviewers. For each fatality assigned, the **Lead Reviewer**:

1. Recorded their independent assessment of the Relative Contribution to Fatality;
2. Recorded their assessment of the author's listing and ranking of the SUBSTANCE(S):edited the case abstract (removed all references to names, dates, locations, specific health care facilities or other information which would allow identification of the case; use generic product names; assure all lab data was associated with correct units and times where available and that the abstract and all conclusions were supported by the clinical evidence).

3. Scored the 6 elements of the abstract using a project scoring scale (hospital records' contribution to this fatality case assessment (0–2); postmortem / contribution of the medical examiner's report's to this fatality case assessment (0–2); the contribution of blood levels to fatality case assessment; quality / completeness, e.g., a measure of the overall quality and completeness of the case information (0–3); novelty value, e.g., a measure of how unusual/interesting the case was and outcome of this case (0–3); educational value, e.g., a measure of the teaching value (diagnosis, treatment, and response) to our colleagues (0–3).
4. Evaluated the degree of agreement between the abstract and the NPDS database entries for that case;
5. Led the resolution of any questions with the Case Review team and Manager as required.

For each fatality assigned, the **Peer Reviewer**:

1. Recorded the agreement between the abstract and the NPDS database as described above for the Lead reviewer ;
2. Reviewed the decisions of the Lead Reviewer (steps 1–4) and recorded their agreement with the Lead Reviewer.

Final decisions as to the fatality category and involved substances involved and sequence were derived from the

Clinical Case Evidence. In most cases, the three members of the Case Review Team were able to reach consensus. Decisions, which could not be resolved within the Case Review Team, were queried to the responsible Manager for review and discussion.

Cases judged Unknown (Category 6) required an abstract and included a clear statement of the basis for judging them as Unknown:

“The available data do not permit determination of cause of death in this case. No conclusion regarding causality is implied or inferred by the publication of this abstract.”

All but 1 (25 of 26) teams completed their assigned reviews – the unfinished assigned cases were reviewed by the other 25 teams or the Managers.

### ***Selection of abstracts for publication***

The 88 abstracts included in Appendix B were selected for publication in a 3-stage process consisting of qualifying, ranking and reading. Qualifying was based on the Relative Contribution to Fatality (RCF). Project reviewers recommended qualifying only RCF = 1, 2 or 3 (Undoubtedly, Probably or Contributory) as eligible for publication. Qualifying cases thus numbered 1151. Ranking was based on the number of substances (33%) and weighted abstract scores (67%). The weightings were the averages chosen by the review teams (step 4 described above). Each was multiplied by the respective factors to obtain a weighted publication score: Hospital records \* 4.43 + Postmortem \* 7.6 + Blood levels \* 6.9 + Quality /Completeness \* 6.4 + Novelty \* 5.4 + Educational value \* 6.0.

The top ranked 150 abstracts were each read by 5 of the individual reviewers (Alsop, Beuhler, Bottei, Geller and Scharman) and the 2 managers (Cantilena and Spyker). Each reader judged each abstract as “publish” or “omit” and all abstracts receiving 4 or more publish votes were selected, further edited and cross-reviewed by the 2 managers.

### ***Fatality listing and abstracts***

Of 1,514 fatalities reported to U.S. Poison Centers in 2006, for 212 cases the clinical information did not permit an assessment of causality, 31 were judged to be definitely unrelated to the exposures, 26 were not coded and 16 were miscoded. Tables 21A (Nonpharmaceuticals) and 21B (Pharmaceuticals) provide a case listing of these 1,229 fatal human exposures. Deaths are sorted in this listing according to the category, substance (deemed most likely responsible for the death), and patient age. Please note: the Substance listed in column 3 of Table 21 was chosen to be the most specific based the exact substances entered for that case and may not agree exactly with the categories used in the summary tables (including Table 22). Additional agents implicated are listed below the primary agent. The fatality cases involved a single substance in 556 cases (45.2%), 2 substances in 272

cases (22.1%), 3 in 170 cases (13.8%), and 4 or more in the balance of the cases. The cross-references at the end of each major category section list all cases that identify this substance in other than the primary substance.

The Case number is bold to indicate that the abstract for that case (N=88) is included in Appendix B.

The letters following the Case number include: i=reported to poison center indirectly (by coroner, medical examiner, or other) after the fatality occurred in 69 cases (5.6%), p=pre-hospital cardiac and/or respiratory arrest in 482 (39.2%), h=hospital records reviewed in 178 cases (14.5%), a=autopsy report reviewed in 341 cases (27.7%).

RCF (Relative Contribution to Fatality): 1=Undoubtedly responsible in 552 cases (44.9%), 2=Probably responsible in 479 cases (39.0%), 3=Contributory in 120 cases (9.8%), 4=Probably not responsible in 78 cases (6.3%).

Chronicity: A=acute exposure in 652 (53.1%), A/C= acute on chronic in 233 (19.0%), C=chronic exposure in 120 (9.8%) and U=unknown in 224 (18.2%).

Route of exposure was: Ingestion alone in 930 cases (75.7%), Inhalation/nasal in 80 cases (6.5%), Parenteral in 39 cases (3.2%) and multiple routes or unknown in the balance.

Reason was: Suspected suicide in 611 cases (49.7%), Intentional-unknown in 93 cases (7.6%), Intentional-Misuse in 42 cases (3.4%), Environmental in 32 cases (2.6%), Therapeutic error in 32 cases (2.6%), Occupational in 24 cases (2.0%), and Malicious in 11 cases (0.89%).

Tissue Concentrations for 1 or more related analytes were reported in 627 cases (50.6%).

### ***Pediatric fatalities – age less than 6 years***

There were 29 fatalities reported in children younger than 6 years, similar to numbers reported over the last decade (Table 19). These pediatric cases represented 2.4% of total reported fatalities, similar to percentages reported over most of the last 8 years. The percentage of pediatric fatalities related to total pediatric exposures was 29/1,223,184=0.0024%. By comparison, 1,129/851,932=0.13% of all adult exposures involved a fatality. Of the reported deaths in children younger than 6 years of age, 21 were reported as unintentional (Table 8). Four deaths in children younger than 6 years of age were coded as resulting from malicious intent. Of the 21 pharmaceutical-associated fatalities, 6 involved opioids, 3 involved heparin and 3 antihistamines. The 8 nonpharmaceuticals included 2 carbon monoxide, 2 hydrocarbons and 1 each lead, mineral spirits, disc battery and other foreign body.

### ***Pediatric fatalities – ages 6–12 years***

In the age range 6 to 12 years, there were 6 reported fatalities (Table 8) involving 6 different substances including acebutolol, antihistamine, carbon monoxide, fentanyl, mushrooms-cyclopeptides and pine oil.

**Table 22A.** Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	No. of Case Mentions	No. of Single Exposures	Age*				Reason				Outcome				
			<6	6-19	>19	Unintentional	Intent	Other	Adv Rxn	Treated in Health Care Facility			Major	Death	
										None	Minor	Moderate			
Adhesives/glues	17,996	17,890	8,209	3,044	5,578	15,951	1,508	101	293	4,207	1,707	3,049	687	45	0
Cyanoacrylate	679	614	210	45	288	597	8	2	7	170	101	141	46	2	0
Epoxy	1,689	1,579	1,083	381	1,486	1,486	79	4	9	59	178	11	11	1	0
Non-toxic	653	619	375	51	166	595	18	1	5	110	159	112	18	2	0
Toluene/xylene	4,286	4,074	1,975	561	1,202	3,842	99	38	84	782	734	715	130	4	0
Unknown	25,303	24,776	11,852	4,082	7,323	22,471	1,712	146	398	5,328	2,879	4,095	892	54	0
Category Total:	44,306	43,805	19,225	6,599	12,426	37,499	2,237	232	680	13,666	5,004	7,069	1,519	169	10
Alcohols	13,860	12,845	10,027	1,272	1,292	12,317	357	136	22	637	2,938	983	88	5	0
Ethanol: beverage	218	174	104	9	49	164	8	1	0	37	44	32	5	0	0
Ethanol: other	7,317	6,714	4,005	551	1,813	5,877	718	67	20	1,314	1,737	1,100	236	46	0
Higher alcohol	855	686	178	73	377	573	84	7	1	367	179	124	52	25	7
Isopropanol	469	445	335	40	53	432	11	0	2	38	112	46	1	0	0
Methanol	644	254	75	53	103	158	81	5	6	82	22	45	30	2	1
Other	3	3	0	0	0	3	0	0	0	0	1	0	0	0	0
Unknown	201	195	132	19	43	180	14	1	0	29	55	33	5	0	0
Rubbing alcohols	340	325	229	31	61	301	21	2	0	68	112	46	5	2	0
Ethanol with methyl salicylate	8,205	7,735	4,955	569	1,891	6,930	711	57	13	1,144	1,777	1,217	175	18	4
Ethanol without methyl salicylate	113	104	45	16	37	83	20	1	0	27	15	23	3	0	0
Isopropanol with methyl salicylate	76,531	37,565	21,213	4,692	9,785	29,093	7,571	436	246	7,409	7,796	4,918	1,373	267	22
Isopropanol without methyl salicylate	3,032	2,912	2,135	360	335	2,831	57	9	13	103	407	153	18	2	0
Unknown rubbing alcohol	1,625	1,598	1,445	98	45	1,570	20	4	2	36	205	35	4	0	0
Category Total:	2,430	2,401	2,101	200	68	2,354	40	1	4	72	244	67	5	0	0
Artists/office supplies	2,067	2,006	1,757	155	73	1,978	25	0	2	36	205	35	4	0	0
Artist paint, non-water color	132	130	40	49	33	124	6	0	0	16	27	14	3	1	0
Chalk	245	242	123	29	68	229	5	4	2	21	38	27	6	1	0
Clay	5,824	5,515	4,298	633	454	5,371	101	17	21	239	770	280	26	1	0
Crayon	16,623	16,325	11,041	4,495	513	15,648	564	50	49	389	2,049	447	29	0	0
Glaze	2,786	2,750	1,368	1,129	169	2,598	98	39	5	232	110	215	10	0	0
Office supplies: miscellaneous	1,975	1,942	1,442	325	129	1,846	67	19	2	124	482	134	6	0	0
Other	157	148	104	32	10	141	5	0	2	6	23	4	2	0	0
Pen/ink	1,094	1,068	938	92	31	1,047	17	2	2	7	118	22	0	0	0
Pencil	37,990	37,037	26,792	7,597	1,928	35,737	1,005	145	104	1,159	4,800	1,437	111	4	0
Typewriter correction fluid	1,244	1,193	345	91	637	1,127	54	6	3	420	274	344	61	9	1
Water color	5,343	4,955	511	642	3,191	4,122	684	87	18	1,909	869	894	351	152	17
Category Total:	182	169	48	39	67	154	9	3	2	46	41	48	6	0	0
Automotive/aircraft/boat products	2,488	2,388	1,118	211	79	2,229	7	2	0	56	60	36	4	0	0
Brake fluid	2,824	2,645	1,079	336	989	2,463	134	34	7	724	605	749	126	4	1
Ethylene glycol	1,209	1,101	258	169	576	938	136	19	2	498	297	267	79	17	1
Glycol and methanol	12	11	9	1	1	11	0	0	0	0	3	1	1	0	0
Glycol: other	2,439	2,340	806	346	998	2,246	46	17	21	669	418	866	159	3	1
Hydrocarbon	222	208	61	33	94	196	8	2	2	90	30	60	15	3	0
Methanol	13,723	12,860	3,235	1,678	6,632	11,486	1,078	170	55	4,412	2,597	3,265	802	188	21
Non-toxic	989	976	54	137	629	957	4	7	7	294	58	321	109	2	0
Other	5,220	5,144	2,783	1,069	959	4,822	266	22	19	757	1,223	835	136	2	0
Category Total:	121	120	33	26	40	116	4	0	0	21	22	13	5	0	0
Batteries	100	100	42	17	28	99	1	0	0	8	23	16	5	0	0
Automotive battery	253	249	162	50	21	233	9	2	0	175	139	25	9	0	0
Dry cell battery	159	94	24	24	44	60	27	0	7	31	11	11	17	4	1
Other	7	7	5	0	2	7	0	0	0	4	4	1	0	0	0
Disc batteries	5	5	2	0	2	5	0	0	0	1	1	1	0	0	0
Alkaline (MnO2)	14	13	11	1	0	13	0	0	0	9	7	2	0	0	0
Lithium	39	39	24	5	10	38	1	0	0	32	24	5	1	0	0
Mercuric oxide	3,155	3,119	2,163	673	233	3,030	70	10	2	2,116	1,390	118	46	6	0
Nickel cadmium															
Other															
Silver oxide															
Unknown															

(Continued)

Table 22A. Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	No. of Case Mentions	No. of Single Exposures	Age*			Reason				Outcome					
			<6	6-19	>19	Unintent	Intent	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Zinc-air	88	87	37	7	38	84	2	0	0	0	61	4	1	0	0
Category Total:	10,150	9,953	5,340	2,009	2,006	9,464	384	41	35	3,544	2,983	1,352	329	14	1
Bites and envenomations															
Aquatic															
Coelenterate	735	725	92	334	257	718	4	2	1	120	10	201	49	0	0
Fish	1,077	1,066	38	187	742	1,063	2	0	1	356	16	318	138	1	0
Other/unknown	348	335	178	57	78	327	4	0	4	59	39	50	11	0	0
Nonpoisonous snake	1,547	1,540	154	553	735	1,530	2	7	1	462	39	625	57	3	0
Other/unknown bite/envenomation	377	373	47	78	206	370	0	0	1	126	2	106	43	1	0
Reptile: other/unknown	836	822	277	296	198	800	13	1	8	146	53	224	27	0	0
Unknown insect or spider	5,616	5,578	855	984	3,404	5,562	8	4	2	688	28	606	166	5	0
Unknown snake	1,699	1,679	101	486	954	1,675	2	1	0	1,132	62	698	271	26	0
Exotic snakes															
Nonpoisonous	115	114	8	49	50	114	0	0	0	49	3	34	6	0	0
Poisonous	69	68	5	8	52	67	1	0	0	54	4	16	29	3	0
Unknown if poisonous	8	8	0	3	1	8	0	0	0	6	1	3	0	0	0
Insects															
Ant/fire ant	1,891	1,834	620	262	792	1,818	3	7	5	193	48	439	87	3	0
Bee/wasp/hornet	9,333	9,196	1,752	1,664	4,879	9,189	5	0	1	983	72	2,764	524	11	1
Caterpillar	1,425	1,419	340	342	640	1,387	20	1	10	163	36	407	55	0	0
Centipede/millipede	1,592	1,586	205	283	930	1,582	1	2	1	126	30	520	51	2	0
Mosquito	413	399	107	76	167	399	0	0	0	80	4	78	19	0	0
Other	12,726	12,535	2,361	1,987	6,403	12,367	25	95	28	2,383	278	2,515	745	12	1
Scorpion	16,231	16,214	1,435	3,099	10,648	16,212	2	0	0	1,211	85	2,450	540	32	0
Tick	2,160	2,126	471	406	1,005	2,123	1	0	0	389	50	284	47	0	0
Mammals															
Bat	647	624	84	135	270	620	2	0	1	392	115	65	5	0	0
Cat	797	790	97	136	431	787	0	0	2	452	5	170	43	0	0
Dog	1,718	1,709	330	577	635	1,709	0	0	0	1,217	8	392	133	6	0
Fox	20	20	0	2	15	20	0	0	0	1	0	1	2	0	0
Human	47	44	11	9	18	41	2	1	0	15	1	10	1	0	0
Other	959	953	118	262	446	945	0	4	1	463	58	195	35	1	0
Raccoon	118	118	10	17	72	115	2	0	1	71	6	22	6	0	0
Rodent/lagomorph	1,728	1,716	385	489	636	1,693	5	12	6	462	70	354	32	0	0
Skunk	251	249	43	51	104	233	3	12	0	10	24	49	2	0	0
Snakes															
Copperhead	1,065	1,053	39	209	744	1,049	4	0	0	986	21	323	514	43	0
Coral	98	97	0	19	74	97	0	0	0	87	7	43	26	2	0
Cottonmouth	198	198	5	40	142	197	0	0	1	170	8	67	74	10	0
Crotaline: unknown	423	418	23	89	288	417	0	1	0	371	8	142	180	19	1
Rattlesnake	1,253	1,235	66	183	905	1,228	4	1	1	1,118	25	263	560	108	3
Spiders															
Black widow	2,522	2,496	196	354	1,750	2,488	4	0	3	879	97	651	372	19	0
Brown recluse	1,900	1,880	128	250	1,235	1,878	1	0	1	702	27	412	366	20	0
Necrotizing spider:other	233	230	28	48	125	229	1	0	0	75	7	75	37	1	0
Other spider	9,861	9,811	1,103	1,607	5,939	9,794	7	2	3	1,836	149	2,206	618	11	1
Tarantula	97	96	14	25	46	93	2	0	1	17	2	30	5	0	0
Category Total:	82,133	81,354	11,726	15,656	46,016	80,944	130	153	84	18,067	1,498	17,808	5,876	339	7
Building and construction products															
Caulking compound and putty	2,386	2,301	1,661	140	380	2,256	19	3	21	197	468	174	28	0	0
Cement, concrete	1,780	1,722	448	131	948	1,675	17	2	26	658	181	390	267	11	0
Other	2,898	2,631	1,276	206	912	2,543	37	9	37	490	391	416	144	3	1
Soldering flux	356	345	152	51	126	339	2	2	2	94	63	108	18	2	0
Unknown	155	141	28	8	56	136	2	1	2	36	20	48	12	0	0
Insulation															
Asbestos	642	567	52	69	315	560	4	0	3	104	44	33	11	0	0
Fiberglass	1,230	1,172	494	183	390	1,124	8	3	36	135	105	230	23	0	0
Other	106	104	38	11	40	102	0	1	1	24	17	15	1	0	0
Unknown	105	99	44	12	27	97	1	0	1	15	11	8	2	0	0
Urea/formaldehyde	77	73	34	4	22	73	0	0	0	9	13	18	3	0	0
Category Total:	9,735	9,155	4,227	815	3,216	8,905	90	21	129	1,762	1,313	1,440	509	16	1

Table 22A. Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	Age*										Reason				Outcome			
	No. of Case Mentions		No. of Single Exposures		<6	6-19	>19	Unintentional	Intentional	Other	Adv Rxn	Treated in Health Care Facility		None	Minor	Moderate	Major	Death
<b>Chemicals</b>																		
<b>Acids</b>																		
Hydrochloric	2,763	2,368	139	428	1,462	2,280	41	14	24	864	177	782	282	10	2			
Hydrofluoric	954	832	26	41	669	812	10	2	3	649	86	294	209	9	0			
Other	5,838	5,076	615	817	2,846	4,858	120	39	42	1,777	579	1,530	568	39	3			
<b>Alcohols</b>																		
Acetone	225	204	18	23	134	196	2	4	0	79	8	69	36	2	0			
Alkali	1,140	965	280	95	474	903	33	15	11	275	145	269	37	3	0			
Ammonia	4,392	3,814	640	640	1,958	3,648	63	46	36	1,813	341	1,104	629	53	1			
Borate/boric acid	3,878	2,927	785	396	1,387	2,787	81	20	27	929	326	885	263	10	1			
Chlorate	2,436	2,197	1,074	210	746	2,040	87	30	32	396	480	214	30	3	1			
Cyanide	53	38	10	12	13	36	2	0	0	10	4	16	1	0	0			
Dioxin	215	157	6	6	103	118	23	11	3	90	27	32	12	5	7			
Ethylene glycol	7	3	0	0	2	3	0	0	0	0	0	0	0	0	0			
Formaldehyde/formalin	792	653	52	69	460	407	200	5	1	395	100	88	55	117	17			
Glycol: other	974	899	101	224	398	832	37	14	12	325	78	286	63	3	0			
Ketone	1,054	827	327	108	309	761	30	7	23	270	181	178	33	6	0			
Methylene chloride	612	508	162	34	266	492	8	3	5	232	104	146	57	2	0			
Nitrate and nitrite	318	266	52	35	148	262	4	0	0	105	32	94	16	1	0			
Other	1,435	1,337	403	502	345	1,176	119	26	10	253	270	206	30	5	0			
Other: unknown if toxic	14,659	12,054	4,211	1,888	4,606	10,768	731	219	280	3,171	1,872	2,264	728	64	3			
Phenol/cresote	72	71	62	3	4	70	0	1	0	2	2	0	0	0	0			
Strychnine	479	442	35	51	274	430	2	0	8	190	26	149	50	3	0			
Toluene diisocyanate	41	27	6	1	15	16	6	2	0	13	6	5	3	0	1			
Unknown	678	635	136	70	321	615	12	1	7	169	69	115	44	2	1			
Category Total:	4,542	4,227	995	515	1,898	3,549	87	350	142	1,354	515	958	306	17	2			
Category Total:	47,557	40,527	10,135	6,168	18,838	37,059	1,698	809	666	13,361	5,428	9,684	3,452	354	39			
<b>Cleaning substances (household)</b>																		
<b>Automatic dishwasher detergents</b>																		
Granular	4,606	4,541	3,811	152	448	4,494	15	24	7	155	1,357	566	21	0	0			
Liquid or gel	3,729	3,683	3,168	99	353	3,656	14	11	2	134	1,193	492	13	1	0			
Other/unknown	3,779	3,757	3,430	65	194	3,736	10	6	4	141	1,072	542	20	5	0			
Rinse agent	1,066	1,049	924	24	80	1,044	5	0	0	105	212	201	15	0	0			
Tablet	1,472	1,464	1,368	32	50	1,454	3	7	0	61	480	194	8	0	0			
<b>Bleaches</b>																		
Borate	321	273	167	21	66	259	10	1	1	38	62	60	5	0	0			
Hypochlorite	41,201	35,199	14,922	3,571	14,190	33,004	1,401	441	241	6,439	5,624	9,495	1,054	31	0			
Nonhypochlorite	746	653	264	68	260	623	15	6	7	106	91	157	28	0	0			
Other/unknown	428	363	157	34	145	333	17	9	2	102	37	102	16	1	0			
Ammonia cleaner	1,617	1,248	478	144	519	1,186	43	5	11	227	221	307	38	1	0			
Carpet/upholstery cleaner	5,088	4,764	3,584	269	738	4,642	48	24	46	507	1,053	767	76	1	0			
Starch/fabric finish/sizing	528	512	428	33	41	504	5	0	2	18	107	49	1	0	1			
Wheel cleaner: HF/bifluoride	74	70	12	11	39	67	1	1	0	53	8	31	11	0	0			
<b>Cleansers</b>																		
Antionic/nonionic	3,180	2,872	2,287	130	364	2,809	32	15	14	222	723	345	30	1	0			
Other/unknown	2,305	2,050	1,159	153	495	1,957	44	16	19	380	428	347	67	3	0			
<b>Disinfectants</b>																		
Hypochlorite	12,563	10,493	4,121	1,169	4,111	9,785	429	142	84	2,276	1,485	2,693	454	13	0			
Other/unknown	7,601	7,185	4,724	746	1,334	6,863	202	64	44	722	1,542	1,573	128	7	0			
Phenol	1,184	1,134	691	161	246	1,066	37	25	2	163	215	248	31	2	0			
Pine oil	4,540	4,129	2,453	317	1,197	3,867	196	32	19	732	1,204	1,009	66	9	1			
<b>Drain cleaners</b>																		
Acid: hydrochloric	567	253	35	28	172	236	12	0	4	48	78	111	10	3	1			
Acid: other/unknown	63	57	6	7	32	56	0	1	0	14	4	15	8	0	0			
Acid: sulfuric	413	337	31	30	320	320	6	8	3	129	20	120	68	3	1			
Alkali	3,583	2,871	1,134	490	212	1,738	264	23	23	813	388	760	297	37	2			
Other/unknown	833	624	112	41	360	578	25	4	10	175	89	138	48	4	0			
<b>Fabric softeners/antistatic agents</b>																		
Aerosol/spray	170	169	141	12	8	164	5	0	0	10	42	29	0	0	0			
Dry/powder	8	8	6	2	0	8	0	0	0	0	3	1	0	0	0			
Liquid	1,006	950	752	40	138	916	16	5	13	83	203	120	11	0	0			
Other/unknown	14	13	6	2	3	12	0	1	0	4	1	3	0	0	0			
Solid/sheet	478	468	393	21	36	444	9	2	12	15	82	25	0	0	0			
<b>Glass cleaners</b>																		
Ammonia	5,384	4,877	4,026	349	413	4,661	153	50	4	351	1,160	653	14	4	0			
Antionic/nonionic	382	336	258	29	40	319	11	4	1	33	84	44	6	0	0			
Isopropanol	2,458	2,245	1,765	151	274	2,153	72	10	4	190	508	297	17	0	0			
Other/unknown	1,194	1,081	774	109	154	1,018	48	9	3	131	241	134	9	1	0			

(Continued)

Table 22A. Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	Age*				Reason				Treated in Health Care Facility				Outcome				
	No. of Case Mentions		No. of Single Exposures		<6	6-19	>19	Unintentional	Intentional	Other	Adv Rxn	Care Facility	None	Minor	Moderate	Major	Death
Hand dishwashing																	
Anionic/nonionic	5,954	5,431	3,626	387	1,188	5,198	93	83	53	332	659	940	41	0	1	0	
Other/unknown	2,932	2,718	1,748	216	644	2,584	50	48	33	138	338	441	18	0	0	0	
Laundry additives																	
Bleach/brightening agent	70	51	26	5	18	47	0	1	3	6	8	9	1	0	0	0	
Detergent booster	37	32	20	2	9	31	0	0	1	3	9	7	3	0	0	0	
Enzyme/microbiological additive	65	60	34	6	15	59	0	1	0	13	5	17	1	0	0	0	
Other/unknown	2,112	2,023	1,679	150	555	1,971	25	19	8	141	436	228	25	0	0	0	
Water softener	36	36	19	4	9	33	1	0	2	3	7	2	2	0	0	0	
Laundry detergents																	
Granular	4,267	4,035	3,205	174	530	3,946	55	13	19	420	821	859	70	2	0	0	
Liquid	4,772	4,540	3,222	251	906	4,403	99	14	19	527	768	969	79	1	1	1	
Other/unknown	128	114	76	11	21	105	5	0	4	27	26	17	5	0	0	0	
Soap	92	78	53	5	12	73	3	1	1	3	12	13	0	0	0	0	
Laundry prewash/stain removers																	
Dry solvent-based	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Dry surfactant-based	215	206	183	8	11	203	2	1	0	15	50	24	1	0	0	0	0
Liquid solvent-based	844	816	645	40	97	792	10	8	6	116	276	118	16	0	0	0	0
Liquid surfactant-based	2,528	2,376	2,112	71	145	2,343	15	11	4	288	453	399	73	0	0	0	0
Other/unknown	2,555	2,421	1,799	111	422	2,372	12	22	15	267	470	554	45	1	0	0	0
Other/unknown solvent-based	103	100	85	3	8	97	1	2	0	12	19	15	4	0	0	0	0
Other/unknown surfactant-based	128	120	100	6	10	118	1	0	1	7	31	19	2	0	0	0	0
Spray solvent-based	456	444	388	15	31	437	2	4	0	80	82	99	9	0	0	0	0
Spray surfactant-based	320	314	281	10	16	311	1	1	1	62	61	66	14	2	0	0	0
Miscellaneous cleaners																	
Acid	1,929	1,781	974	91	586	1,737	24	5	13	353	431	424	86	5	0	0	0
Alkali	10,071	9,199	5,735	608	2,427	8,844	202	73	65	1,591	1,904	1,675	331	8	0	0	0
Anionic/nonionic	6,371	5,784	4,062	384	1,094	5,554	135	42	46	741	1,153	970	115	2	0	0	0
Cationic	2,595	2,424	1,114	278	842	2,285	87	17	29	616	428	594	122	4	1	0	0
Ethanol	656	641	476	86	58	625	9	4	2	33	117	89	7	0	0	0	0
Glycols	1,117	1,047	647	139	209	993	27	11	13	141	214	213	23	0	0	0	0
Isopropanol	1,825	1,778	1,144	368	212	1,706	40	21	6	167	388	292	24	1	0	0	0
Methanol	22	20	7	1	10	20	0	0	0	4	6	4	2	0	0	0	0
Other/unknown	5,297	4,879	3,112	553	942	4,620	136	73	35	771	1,073	1,040	140	5	0	0	0
Phenol	4	4	0	1	3	4	0	0	0	1	2	1	0	0	0	0	0
Oven cleaners																	
Acid	27	25	14	3	7	23	2	0	0	3	11	3	0	0	0	0	0
Alkali	2,530	2,417	521	327	1,236	2,263	36	85	29	895	379	672	342	9	0	0	0
Detergent	39	34	15	3	16	33	0	0	0	4	11	8	1	0	0	0	0
Other/unknown	352	332	61	56	177	313	2	7	10	103	29	76	36	2	0	0	0
Rust removers																	
Alkali	8	8	1	1	4	8	0	0	0	4	1	3	2	0	0	0	0
Anionic/nonionic	2	2	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0
Hydrofluoric acid	331	317	39	16	238	303	10	2	1	144	70	151	35	2	1	0	0
Other acid	724	634	283	38	256	612	13	5	2	121	147	166	33	0	0	0	0
Other/unknown	255	229	40	15	147	212	1	2	14	55	29	68	21	0	0	0	0
Spot removers/dry cleaning agents																	
Anionic/nonionic	269	250	198	16	33	245	4	1	0	26	53	41	3	0	0	0	0
Glycol	341	327	222	22	73	316	4	3	4	56	65	67	5	0	0	0	0
Isopropanol	49	47	36	5	3	46	0	1	0	5	7	9	0	0	0	0	0
Other halogenated hydrocarbon	45	44	28	3	13	43	0	1	0	13	16	7	2	0	0	0	0
Other nonhalogenated hydrocarbon	755	708	336	69	255	674	14	8	10	195	120	193	35	1	0	0	0
Other/unknown	177	167	121	11	32	161	1	0	5	21	38	21	2	1	0	0	0
Perchloroethylene	18	17	11	1	3	17	0	0	0	3	4	3	0	0	0	0	0
Toilet bowl cleaners																	
Acid	5,500	3,562	1,235	359	1,656	3,398	110	16	29	703	764	1,414	217	13	0	0	0
Alkali	2,425	2,152	1,428	93	498	2,107	37	4	2	321	417	417	62	3	0	0	0
Other/unknown	2,667	2,229	1,557	110	431	2,169	32	14	13	252	533	302	40	1	0	0	0
Wall/floor/tile cleaners																	
Acid	3,401	2,898	1,850	159	741	2,820	35	17	21	481	766	776	99	5	1	0	0
Alkali	8,890	7,793	4,950	540	1,900	7,489	165	53	72	1,246	1,896	1,659	288	9	0	0	0
Anionic/nonionic	7,906	7,118	4,519	496	1,769	6,798	212	56	34	1,147	1,556	1,179	126	8	0	0	0
Cationic	2,562	2,272	1,482	179	501	2,171	77	9	7	340	395	474	39	0	0	0	0

**Table 22A.** Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	Age*										Reason				Outcome							
	No. of Case Mentions		No. of Single Exposures		<6		6-19		>19		Unintent	Intent	Other	Adv Rxn	Treated in Health Care Facility		None	Minor	Moderate	Major	Death	
Ethanol	116	105	90	4	8	104	0	0	0	1	5	21	12	1	0	0	0	0	0	0	0	0
Glycol	2,152	1,919	1,506	109	239	1,877	25	5	5	10	154	480	263	1	0	0	0	0	0	0	0	0
Isopropanol	874	803	679	35	76	784	11	1	1	6	57	222	99	6	2	0	0	0	0	0	0	0
Other/unknown	1,593	1,436	949	95	319	1,380	33	11	11	11	213	379	296	41	0	0	0	0	0	0	0	0
Category Total:	214,091	191,046	115,687	14,981	49,715	182,758	4,908	1,722	1,242	1,242	28,024	38,834	40,105	5,293	215	11	11	11	11	11	11	11
Cosmetics/personal care products																						
Baby oil	2,257	2,191	2,022	40	101	2,149	24	4	4	10	168	582	177	14	0	0	0	0	0	0	0	0
Bath oil/bubble bath	4,257	4,163	3,794	203	135	4,101	25	6	6	31	138	738	360	16	0	0	0	0	0	0	0	0
Cream/tonic/make-up	25,025	24,096	20,633	1,133	1,886	23,477	207	54	54	339	785	3,662	1,314	88	1	0	0	0	0	0	0	0
Deodorant	22,822	22,530	20,154	1,241	898	21,844	250	79	79	349	567	3,000	1,581	80	2	0	0	0	0	0	0	0
Deplatory	1,612	1,581	350	327	739	1,058	72	13	13	437	314	3,000	440	164	3	0	0	0	0	0	0	0
Douche	115	115	87	7	17	105	3	2	2	5	8	28	13	1	0	0	0	0	0	0	0	0
Eye product	1,419	1,310	1,123	53	100	1,271	9	4	4	24	52	188	77	15	0	0	0	0	0	0	0	0
Lipstick/balm: with camphor	1,006	980	888	58	23	959	13	1	1	6	22	204	48	3	0	0	0	0	0	0	0	0
Lipstick/balm: without camphor	4,108	3,945	3,678	156	80	3,874	35	2	2	34	63	3,263	117	7	0	0	0	0	0	0	0	0
Perfume/cologne/aftershave	11,249	10,856	12,729	1,252	825	14,480	348	110	110	25	1,099	3,263	3,070	124	3	0	0	0	0	0	0	0
Peroxide	2,678	2,617	2,260	131	182	2,552	41	15	15	9	265	1,666	1,805	160	11	1	0	0	0	0	0	0
Powder: talc	2,125	2,078	1,898	78	76	2,040	22	10	10	6	115	510	536	46	1	0	0	0	0	0	0	0
Powder: without talc	18,785	18,090	13,799	1,477	2,312	17,356	335	127	127	255	764	2,457	2,050	99	2	0	0	0	0	0	0	0
Soap	11,845	11,657	10,493	621	433	11,427	44	16	16	164	381	1,671	1,450	75	2	0	0	0	0	0	0	0
Suntan/sunscreen	1,476	1,453	237	61	1,030	1,416	26	4	4	4	78	295	118	4	0	0	0	0	0	0	0	0
Dental care products	3,542	3,484	1,550	703	1,028	3,249	51	9	9	171	180	560	459	24	1	0	0	0	0	0	0	0
Denture cleaner	22,168	21,640	19,522	903	972	20,988	226	79	79	330	313	4,189	1,038	45	0	0	0	0	0	0	0	0
Toothpaste with fluoride	1,636	1,575	1,349	66	125	1,514	12	6	6	43	21	289	73	4	0	0	0	0	0	0	0	0
Hair care products																						
Coloring agent	2,212	2,114	818	205	889	1,788	29	8	8	287	413	351	506	105	1	0	0	0	0	0	0	0
Curl activator	43	38	27	3	6	34	1	0	0	3	5	9	8	1	0	0	0	0	0	0	0	0
Oil	238	231	193	16	17	227	2	1	1	1	35	59	33	5	0	0	0	0	0	0	0	0
Other	2,959	2,798	2,007	209	476	2,675	47	9	9	62	365	560	423	72	0	0	0	0	0	0	0	0
Permanent wave solution	353	346	174	21	127	317	0	1	1	28	103	39	103	39	0	0	0	0	0	0	0	0
Relaxer: other alkaline	709	691	533	39	100	665	3	0	0	23	305	146	235	85	2	0	0	0	0	0	0	0
Relaxer: other non-alkaline	65	65	53	3	9	65	0	0	0	0	21	18	10	5	0	0	0	0	0	0	0	0
Relaxer: sodium hydroxide	737	723	514	42	127	695	3	2	2	22	311	153	218	87	2	0	0	0	0	0	0	0
Rinse/conditioner/relaxer	2,143	2,004	1,675	125	160	1,939	29	9	9	26	119	401	203	18	0	0	0	0	0	0	0	0
Shampoo	6,533	6,201	4,875	472	705	5,970	160	18	18	42	390	870	982	54	2	0	0	0	0	0	0	0
Spray	2,070	1,885	1,281	208	328	1,664	198	10	10	7	251	373	308	41	3	0	0	0	0	0	0	0
Mouthwash																						
Ethanol	13,304	12,739	3,924	2,866	4,933	11,492	1,097	63	63	50	1,127	2,029	1,563	222	15	0	0	0	0	0	0	0
Fluoride	4,191	4,150	2,981	930	201	4,095	32	1	1	22	76	880	113	7	0	0	0	0	0	0	0	0
Non-ethanol	1,434	1,385	683	339	303	1,298	67	5	5	14	75	258	137	9	0	0	0	0	0	0	0	0
Unknown	208	195	66	40	75	181	13	0	0	1	17	26	27	3	0	0	0	0	0	0	0	0
Nail products																						
Acrylic nail adhesive	1,387	1,366	524	403	345	1,313	25	13	13	12	528	149	402	98	1	0	0	0	0	0	0	0
Acrylic nail primer	248	237	176	17	38	235	0	0	0	1	89	43	67	26	1	0	0	0	0	0	0	0
Acrylic nail remover	65	63	31	4	22	60	1	0	0	2	14	18	9	2	0	0	0	0	0	0	0	0
Other	1,463	1,414	819	62	439	1,384	13	2	2	13	339	256	311	78	0	0	0	0	0	0	0	0
Polish	10,000	9,762	8,882	447	329	9,648	79	20	20	10	526	1,701	1,290	39	0	0	0	0	0	0	0	0
Polish remover: acetone	2,297	2,232	1,698	182	312	2,164	47	9	9	8	223	635	362	14	0	0	0	0	0	0	0	0
Polish remover: other	1,594	1,557	1,206	111	157	1,507	27	5	5	18	132	406	280	20	1	0	0	0	0	0	0	0
Polish remover: unknown	7,032	6,785	4,874	655	1,018	6,571	154	45	45	7	645	1,502	1,032	46	0	0	0	0	0	0	0	0
Category Total:	214,780	208,318	159,085	16,793	26,566	200,239	3,969	793	793	3,106	12,276	35,192	23,768	2,066	54	1	1	1	1	1	1	1
Deodorizers																						
Air fresheners																						
Aerosol	2,584	2,512	1,823	331	278	2,395	70	31	31	11	242	456	547	30	1	0	0	0	0	0	0	0
Liquid	5,945	5,886	5,188	327	285	5,805	38	30	30	11	402	1,365	1,074	44	0	0	0	0	0	0	0	0
Other/unknown	2,100	2,064	1,663	175	173	1,999	38	13	13	12	179	550	370	12	0	0	0	0	0	0	0	0
Solid	4,359	4,324	3,938	134	190	4,299	16	3	3	5	228	947	463	22	0	0	0	0	0	0	0	0
Diaper-pail deodorizer	15	14	8	3	3	13	0	1	1	0	1	2	1	0	0	0	0	0	0	0	0	0
Other	5,092	4,852	3,639	325	722	4,686	86	37	37	37	540	1,075	795	70	3	0	0	0	0	0	0	0
Toilet bowl deodorizer	618	600	499	31	56	580	16	2	2	1	183	40	40	1	0	0	0	0	0	0	0	0
Unknown	59	54	34	5	10	49	1	0	0	1	7	11	7	5	0	0	0	0	0	0	0	0
Category Total:	20,772	20,306	16,792	1,331	1,717	19,826	265	117	117	79	1,678	4,589	3,297	184	4	2	2	2	2	2		



**Table 22A.** Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	Reason										Outcome			
	Age*										Treated in Health Care Facility			
	No. of Case Mentions	No. of Single Exposures	<6	6-19	>19	Unintent	Intent	Other	Adv Rxn	None	Minor	Moderate	Major	Death
Leather	89	87	72	4	9	86	1	0	0	0	4	10	4	0
Other	576	525	258	175	64	490	15	0	0	19	50	89	54	0
Unknown	59	56	32	9	11	52	2	0	0	2	3	14	4	0
Category Total:	2,316	2,194	1,622	331	176	2,114	38	2	39	98	363	125	13	0
Essential oils														
Cinnamon oil	449	422	296	66	46	374	27	2	18	44	32	178	6	0
Clove oil	396	373	245	33	80	346	10	3	13	88	91	100	7	0
Eucalyptus oil	496	453	311	23	102	441	7	2	3	95	130	87	8	0
Other/unknown	5,044	4,839	4,045	216	468	4,753	42	11	30	376	1,156	815	61	0
Pennyroyal oil	26	21	5	3	11	19	2	0	0	7	11	2	1	0
Tea tree oil	966	922	575	76	214	875	13	1	30	271	169	16	2	0
Category Total:	7,377	7,030	5,477	417	921	6,808	101	19	94	757	1,691	1,351	99	4
Fertilizers														
Household plant food	2,368	2,256	1,346	254	547	2,214	21	12	7	75	422	87	3	0
Other	1,885	1,738	1,100	180	373	1,671	27	9	28	132	354	122	13	0
Outdoor fertilizer	3,714	3,546	2,368	344	676	3,465	33	17	28	189	714	199	18	2
Plant hormone	53	41	17	2	19	41	0	0	0	4	10	5	1	0
Unknown	144	128	78	22	21	125	1	0	0	14	19	12	1	0
Category Total:	8,164	7,709	4,909	802	1,636	7,516	82	38	63	414	1,519	425	36	3
Fire extinguishers														
Fire extinguisher	3,764	3,668	303	1,170	1,659	3,312	139	168	31	775	483	986	185	1
Category Total:	3,764	3,668	303	1,170	1,659	3,312	139	168	31	775	483	986	185	1
Food products/food poisoning														
Bacterial food poisoning (documented)														
Botulism	206	196	43	14	114	168	3	10	13	49	45	3	9	1
Other	1,022	998	224	153	490	949	1	18	23	148	124	134	51	6
Unknown	14,543	14,303	2,002	2,235	7,865	13,559	16	134	560	1,524	1,136	2,734	710	12
Capsicum/peppers	5,125	5,032	846	1,052	2,397	4,150	131	67	674	258	56	2,171	125	1
Monosodium glutamate	130	119	8	15	72	39	0	0	79	28	5	25	15	0
Other adverse rxn to food	2,620	2,470	611	474	1,060	997	117	110	1,223	480	116	728	197	12
Question: food/additive	11,615	10,269	6,178	1,381	8,876	412	233	706	706	910	1,295	1,047	160	8
Question: spoiled food	18,226	17,698	5,050	3,101	7,340	16,697	54	357	563	877	1,718	1,079	214	0
Suspected food poisoning	11,503	11,376	1,288	1,623	7,016	11,062	11	93	204	1,240	265	1,894	541	5
Ichthyosarcotoxins														
Ciguatera	158	154	10	15	116	139	0	0	15	75	6	55	38	1
Lupeotoxic	16	15	0	0	10	14	0	0	1	1	3	1	1	0
Other	128	121	7	12	86	84	2	1	34	48	1	29	18	6
Paralytic shellfish	410	400	27	37	302	371	0	0	29	81	13	128	30	2
Scrobroid	273	266	18	19	156	202	2	7	54	64	6	73	36	0
Tetrodotoxin	140	138	32	38	58	129	2	0	7	24	16	30	9	0
Category Total:	66,115	63,555	16,344	10,169	29,064	57,436	751	1,030	4,185	5,807	4,805	10,131	2,154	66
Foreign bodies/toys/miscellaneous														
Ash	419	386	318	17	35	378	3	3	2	20	43	29	3	0
Bubble blowing solution	4,619	4,580	4,246	239	66	4,549	20	6	3	118	563	745	25	1
Charcoal	525	484	381	33	53	464	13	3	4	24	67	26	7	0
Christmas ornament	800	793	660	33	80	787	1	3	2	60	148	47	2	0
Coin	3,934	3,823	3,112	605	78	3,759	43	13	2	1,201	950	353	55	7
Desiccant	43,077	42,878	38,387	2,677	1,198	42,418	320	96	17	1,303	5,523	273	11	0
Feces/urine	6,500	6,500	4,757	353	428	5,564	35	126	13	146	779	114	5	0
Glass	2,451	2,371	819	258	965	2,228	23	103	13	274	364	180	22	1
Glow product	15,966	15,941	10,113	5,344	291	15,705	194	10	22	656	1,696	3,309	72	0
Incense, punk	287	278	245	7	20	272	2	3	1	15	56	18	4	0
Other	21,649	20,621	13,529	3,467	2,670	19,889	369	180	131	2,002	3,374	1,114	140	3
Soil	2,469	2,135	1,823	117	126	2,113	12	1	7	96	255	122	11	0
Toy	10,263	10,201	7,546	2,338	202	10,050	106	14	22	629	1,454	854	32	0
Unknown	669	660	483	79	67	616	7	26	8	76	103	54	7	0
Thermometers														
Mercury	4,408	4,387	1,581	1,262	1,050	4,329	45	4	5	279	841	52	3	0
Other	1,772	1,757	702	469	378	1,726	17	10	4	59	337	76	2	0
Unknown	944	940	326	276	266	937	3	0	0	51	74	3	0	0
Category Total:	120,752	117,983	89,028	17,574	7,973	115,784	1,213	601	256	7,009	16,627	7,369	401	13

Table 22A. Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	Age*					Reason				Outcome					
	No. of Case Mentions	No. of Single Exposures	<6	6-19	>19	Unintentional	Intentional	Other	Adv Rxn	Treated in Health Care Facility			Outcome		
										None	Minor	Moderate	Major	Death	
Fumes/gases/vapors	398	365	32	135	142	328	25	3	6	75	44	62	21	1	0
Carbon dioxide	15,957	14,645	1,829	2,408	7,462	14,307	234	22	39	5,331	3,688	3,545	1,115	149	46
Carbon monoxide	858	827	43	84	598	789	38	0	0	188	103	308	119	1	0
Chloramine	1,155	1,118	53	117	819	1,062	54	0	1	338	86	495	220	1	1
Chlorine: acid mixed with hypochlorite	5,431	5,178	432	939	3,155	4,937	132	6	96	1,529	246	1,983	722	22	1
Chlorine: other	1,401	1,244	118	118	672	1,237	2	1	2	344	146	380	101	10	1
Hydrogen sulfide	6,024	5,737	932	1,306	2,395	5,705	14	3	12	867	2,023	1,152	127	3	0
Methane and natural gas	2,312	2,193	171	820	884	2,105	43	10	28	499	281	340	133	6	1
Other	13	13	3	0	4	13	0	0	0	1	3	1	0	0	0
Polymer fume fever	2,983	2,665	289	570	1,454	2,413	207	18	16	835	335	650	219	20	3
Propane/simple asphyxiant	3,054	2,985	137	693	1,099	2,880	23	56	13	594	538	662	143	1	0
Unknown	39,586	36,970	4,039	7,190	18,684	35,776	772	119	213	10,601	7,493	9,578	2,920	214	53
Category Total:															
Heavy metals	998	907	502	86	225	873	6	14	7	79	118	38	11	0	0
Aluminum	1,017	898	131	73	563	588	21	144	14	471	121	68	67	2	1
Arsenic (excluding pesticide)	26	20	2	8	7	19	0	0	1	5	6	5	0	0	0
Barium	85	62	7	8	39	32	2	12	3	38	13	10	2	0	1
Cadmium	972	812	133	272	330	762	29	6	9	216	109	219	47	2	0
Copper	1	1	1	0	5	16	0	0	1	0	2	3	0	0	0
Fireplace flame colors	17	17	12	0	5	16	0	0	0	0	0	0	0	0	0
Gold	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0
Lead	3,077	2,883	1,399	397	825	2,725	40	40	17	1,081	634	135	76	7	1
Manganese	73	54	6	4	38	49	1	0	1	30	3	9	8	0	0
Mercury: elemental	2,449	2,338	241	657	888	2,015	58	202	30	602	767	66	20	1	0
Mercury: other/unknown	152	139	33	14	73	122	2	5	7	56	34	11	3	0	0
Metal fume fever	727	678	31	72	501	644	14	2	15	214	87	184	87	2	0
Other	2,587	1,827	660	232	722	1,604	84	24	89	391	296	169	67	5	2
Thallium	23	12	1	2	7	2	0	0	0	8	2	0	0	0	0
Unknown	82	72	10	11	42	50	2	12	0	31	5	4	4	0	0
Category Total:	12,286	10,720	3,168	1,836	4,266	9,502	259	467	194	3,222	2,132	922	392	19	5
Hydrocarbons	134	103	12	7	70	96	3	2	0	67	21	24	7	1	0
Carbon tetrachloride	30	28	3	2	19	26	0	0	1	10	8	6	1	0	0
Diesel fuel	1,362	1,298	276	117	719	1,231	53	0	3	269	241	342	69	3	0
Fluorochlorocarbon/propellant	7,252	7,019	505	1,000	3,878	5,907	977	73	27	1,932	1,105	1,546	565	35	6
Gasoline	17,857	17,394	4,069	2,956	8,660	16,135	1,081	71	56	2,834	2,317	6,114	545	18	1
Halogenated hydrocarbon: other	547	484	119	61	251	442	25	3	13	202	71	171	60	4	1
Kerosene	1,354	1,281	656	136	400	1,214	38	20	3	371	261	335	94	4	0
Lamp oil	2,125	2,108	1,668	100	284	2,059	20	17	8	719	570	552	201	16	0
Lighter fluid/naphtha	2,773	2,574	1,312	292	778	2,412	101	37	17	770	523	701	164	8	0
Lubricating oil/motor oil	5,041	4,749	2,925	398	1,138	4,578	89	50	21	785	1,475	736	104	4	0
Mineral seal oil	33	30	12	7	8	26	3	0	1	7	6	0	0	0	0
Mineral spirits/varsol	2,608	2,389	802	312	1,092	2,224	107	28	21	761	421	672	147	13	2
Other	5,642	5,129	2,495	589	1,655	4,877	138	36	58	1,361	1,132	1,153	311	22	1
Toluene/xylene	1,423	1,124	202	128	636	1,015	80	9	15	438	158	364	93	5	0
Turpentine	623	558	162	68	256	483	53	10	9	157	122	127	29	2	0
Unknown	722	653	299	85	208	600	42	6	5	239	157	130	61	4	1
Category Total:	49,526	46,921	15,517	6,758	20,052	43,325	2,810	371	258	10,922	8,589	12,979	2,451	139	12
Industrial cleaners	1,789	1,561	489	110	791	1,493	36	14	15	446	266	363	137	5	0
Acid	3,398	3,128	856	395	1,563	2,946	87	68	15	1,420	412	1,039	438	25	1
Alkali	1,050	929	497	86	291	894	19	6	7	207	169	240	31	0	0
Anionic/nonionic	840	791	190	120	377	714	53	15	7	294	129	308	43	2	0
Cationic	3,009	2,864	276	326	1,850	2,650	148	25	17	911	278	955	272	5	0
Disinfectant	1,774	1,602	428	199	775	1,502	49	28	18	660	237	531	150	12	0
Other/unknown	11,860	10,875	2,736	1,236	5,647	10,213	392	156	81	3,938	1,491	3,436	1,071	49	1
Category Total:															
Information calls	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0
Medical information	2	2	1	0	0	2	0	0	0	0	0	0	0	0	0
Poison information	3	3	2	0	0	3	0	0	0	0	0	0	0	0	0
Category Total:															
Laacrimators	4,616	4,580	709	1,638	1,612	3,150	188	980	68	588	115	2,372	171	3	0
Capsicum defense spray	1,332	1,317	207	387	495	910	67	270	19	229	37	544	74	1	0
Lacrimator: CN	61	61	6	9	29	57	0	3	0	30	1	36	5	0	0
Lacrimator: CS	22	20	5	4	9	19	0	1	0	4	1	8	0	0	0
Other	337	321	47	66	153	252	12	43	3	62	7	106	19	0	0
Unknown	6,368	6,299	974	2,104	2,298	4,388	267	1,297	90	913	161	3,066	269	4	0
Category Total:															

(Continued)

Table 22A. Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	Age*				Reason				Outcome									
	No. of Case Mentions		No. of Single Exposures		Unintentional		Intentional		Treated in Health Care Facility		None		Moderate		Major		Death	
	<6	6-19	>19	>19	Unintentional	Intentional	Other	Adv Rxn	Care Facility	None	Minor	Moderate	Major	Death				
Matches/fireworks/explosives																		
Explosive	288	273	143	65	45	242	20	3	1	66	57	40	3	4	0	0	0	0
Firework	658	649	550	66	22	630	12	2	3	63	195	56	3	4	1	0	0	0
Match	774	769	708	19	30	760	6	1	1	20	183	14	4	0	0	0	0	0
Other	43	43	24	10	5	39	1	2	0	1	12	6	0	0	0	0	0	0
Unknown	6	6	6	0	0	6	0	0	0	1	2	0	0	0	0	0	0	0
Category Total:	1,769	1,740	1,431	160	102	1,677	39	8	5	157	449	116	19	5	0	0	0	0
Mushrooms																		
Coprine	10	9	6	1	1	8	1	0	0	3	5	1	0	0	0	0	0	0
Cycloleptide	63	58	8	12	32	35	18	1	2	43	8	8	13	8	2	2	0	0
Gastrointestinal irritant	164	157	59	29	64	122	29	0	6	75	46	47	26	1	0	0	0	0
Hallucinogenic	806	653	25	349	232	90	550	9	2	470	37	108	255	14	0	0	0	0
Ibotenic acid	47	35	7	11	17	15	18	0	0	32	5	6	17	4	0	0	0	0
Miscellaneous, nontoxic	215	199	79	27	71	155	11	0	31	47	35	46	14	0	0	0	0	0
Monomethylhydrazine	25	25	1	4	20	9	3	2	11	9	6	3	2	0	0	0	0	0
Muscarine	22	22	3	7	10	13	7	0	1	13	6	10	4	0	0	0	0	0
Orellanine	5	3	2	0	1	3	0	0	0	1	2	0	0	0	0	0	0	0
Other potentially toxic	29	22	10	5	5	14	5	0	3	13	8	4	3	0	0	0	0	0
Unknown	7,797	7,638	5,337	1,042	1,042	6,856	640	15	109	2,347	3,289	788	272	26	0	0	0	0
Category Total:	9,183	8,821	5,537	1,471	1,495	7,320	1,282	27	165	3,053	3,447	1,021	606	53	2	0	0	0
Other/unknown nondrug substances																		
Other	19,704	18,627	10,481	2,637	4,115	16,977	468	603	434	2,445	3,320	2,551	482	21	1	0	0	0
Unknown	6,442	6,130	1,582	822	2,726	4,242	172	913	309	1,913	682	891	312	68	15	0	0	0
Category Total:	26,146	24,757	12,063	3,459	6,841	21,219	640	1,516	743	4,358	4,002	3,442	794	89	16	0	0	0
Paints and stripping agents																		
Paints																		
Anti-algae	49	47	1	2	35	41	0	2	4	10	8	13	2	0	0	0	0	0
Anti-corrosion	65	59	8	9	35	58	0	0	1	12	9	11	4	0	0	0	0	0
Oil-base	2,805	2,576	730	530	1,067	2,395	116	23	34	542	335	634	133	6	0	0	0	0
Stains	853	788	331	71	309	752	9	1	24	109	126	150	18	1	0	0	0	0
Water-base	4,996	4,848	3,647	345	725	4,734	42	18	54	323	800	363	44	0	0	0	0	0
Other paint/varnish/lacquer	586	545	222	62	205	524	11	3	7	104	94	101	25	0	0	0	0	0
Unknown paint/varnish/lacquer	7,494	7,092	4,580	518	1,490	6,878	108	19	77	844	1,161	609	108	5	0	0	0	0
Varnish, lacquer	1,506	1,327	344	146	674	1,269	18	4	29	291	187	327	64	3	0	0	0	0
Stripping agents																		
Methylene chloride	755	719	139	74	423	688	17	1	12	237	56	242	72	4	1	0	0	0
Other	571	528	115	30	311	505	12	1	10	198	46	174	62	3	0	0	0	0
Unknown	73	70	9	4	44	64	2	0	3	24	5	21	9	0	0	0	0	0
Category Total:	19,753	18,599	10,126	1,791	5,318	17,908	335	72	255	2,694	2,827	2,645	541	22	2	0	0	0
Pesticides																		
Fumigants																		
Aluminum phosphide	73	70	4	4	46	68	0	1	0	42	11	14	7	3	1	0	0	0
Metam sodium	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Methyl bromide	3	3	0	0	3	3	0	0	0	3	1	1	0	0	0	0	0	0
Other	35	33	6	4	20	32	0	1	4	21	4	10	11	0	0	0	0	0
Sulfuryl fluoride	257	250	34	47	138	238	3	5	4	38	35	30	6	0	0	0	0	0
Unknown	55	54	11	5	26	51	1	2	0	13	5	7	2	0	0	0	0	0
Fungicides (non-medicinal)																		
Carbamate	133	101	31	9	52	94	3	0	3	25	21	17	6	0	0	0	0	0
Copper compound	58	57	6	4	41	56	0	0	1	5	11	17	3	0	0	0	0	0
Non-mercurial	2	2	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0
Other	745	611	128	48	349	585	11	1	13	120	136	132	18	0	0	0	0	0
Other/unknown	4	4	2	0	2	4	0	0	0	2	0	0	1	0	0	0	0	0
Phthalimide	74	52	30	3	15	50	0	2	0	5	13	4	0	0	0	0	0	0
Unknown	42	35	14	3	14	34	0	0	1	9	3	9	2	0	0	0	0	0
Wood preservative	232	220	21	24	130	214	2	0	3	53	22	42	13	0	0	0	0	0
Herbicides (includes algicides, defoliants, dessicants, plant growth regulators)																		
2,4-D or 2,4,5-T	52	47	13	3	23	42	2	1	2	7	13	6	1	1	0	0	0	0
Carbamate	28	25	4	1	16	22	3	0	0	9	7	6	3	0	0	0	0	0
Chlorophenoxy	2,240	1,938	575	188	976	1,866	21	7	42	346	365	365	67	2	0	0	0	0
Diquat	286	259	45	16	176	241	6	1	9	57	56	63	12	0	0	0	0	0
Glyphosate	4,496	4,136	1,133	321	2,251	3,901	51	30	145	680	920	1,111	76	9	4	0	0	0
Other	1,616	1,211	296	77	698	1,166	14	3	26	225	237	255	49	2	1	0	0	0

Table 22A. Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category

Major Category Generic Substance	No. of Case Mentions		No. of Single Exposures		Age*			Reason				Outcome									
	61	2	48	2	4	0	39	45	3	0	0	34	5	14	6	2	1	Treated in Health Care Facility			Death
																		None	Minor	Moderate	
Paraquat	61	2	48	2	4	0	39	45	3	0	0	34	5	14	6	2	1				
Paraquat/diquat	2	400	2	400	0	0	2	1	1	0	0	1	0	0	0	0	0				
Triazine	481	391	400	324	87	29	236	389	3	1	7	75	69	95	13	0	0				
Unknown	391	86	324	62	75	50	159	303	9	5	5	67	49	69	11	1	1				
Urea	86		62		25	9	24	55	4	0	3	9	16	7	2	0	0				
Insecticides (includes insect growth regulators, molluscicides, nematocides)																					
Arsenic pesticide	344		338		246	10	59	334	2	8	0	31	119	10	0	0	0				
Borate/boric acid	4,216		4,103		3,447	131	411	4,044	31	8	16	253	1,063	136	11	0	0				
Carbamate only	2,749		2,571		970	206	1,055	2,317	85	126	37	483	574	322	91	17	2				
Carbamate with other insecticide	426		400		92	29	211	390	4	3	3	54	69	76	11	0	0				
Chlorinated hydrocarbon only	596		544		224	67	198	472	21	11	37	168	121	94	20	2	0				
Chlorinated hydrocarbon with other insecticide	275		268		94	30	117	260	4	0	3	34	28	62	12	1	0				
Insect growth regulator	119		83		39	8	32	81	2	0	0	8	17	6	2	0	0				
Metaldelhyde	226		216		70	14	114	206	4	1	5	32	42	35	4	0	0				
Nicotine	7		6		0	0	5	5	0	0	0	2	0	0	0	0	0				
Organophosphate	4,377		4,021		1,096	429	1,999	3,761	119	33	97	993	848	892	196	30	3				
Organophosphate/carbamate	111		101		33	12	46	99	1	0	1	22	18	25	7	1	0				
Organophosphate/carbamate/chlorinated hydrocarbon	3		3		0	0	0	2	0	0	1	1	1	0	0	0	0				
Organophosphate/chlorinated hydrocarbon	5		5		2	1	1	4	0	0	1	1	0	2	0	0	0				
Organophosphate/other insecticide	923		874		187	76	509	838	19	3	12	158	133	207	39	3	0				
Other	9,123		8,627		4,231	687	2,924	8,331	71	26	182	799	1,556	1,053	140	4	0				
Piperonyl butoxide only	2		2		0	0	0	0	0	0	0	0	0	0	0	0	0				
Piperonyl butoxide/pyrethrin	311		281		97	45	113	254	7	2	18	62	35	67	15	0	0				
Pyrethrin	5,557		5,095		1,916	596	2,094	4,705	144	24	214	815	848	1,062	171	3	1				
Pyrethrins only	114		112		35	10	54	111	0	0	1	16	15	12	2	0	0				
Pyrethroid	20,526		19,170		5,468	1,801	9,859	17,941	418	142	633	3,047	2,977	4,496	718	19	2				
Rotenone	97		91		20	12	39	88	0	0	2	8	17	18	2	0	0				
Unknown	4,134		3,718		992	386	1,708	3,377	108	89	107	1,016	482	661	167	10	0				
Veterinary insecticide	179		165		49	19	73	156	0	0	8	21	41	25	5	0	0				
Repellents																					
Bird, dog, deer or other mammal repellent	365		352		118	29	160	331	5	2	14	39	52	71	7	2	1				
Insect repellent with DEET	8,163		8,032		5,298	1,427	7,542	7,542	75	67	334	672	1,275	2,490	146	5	0				
Insect repellent without DEET	1,897		1,842		1,408	193	203	1,782	18	9	33	93	327	372	19	0	0				
Insect repellent: unknown	76		71		32	5	27	66	2	1	2	8	11	37	1	0	0				
Naphthalene	1,614		1,578		1,042	106	311	1,519	38	10	8	305	517	111	13	1	0				
Other moth repellent	7		7		7	0	0	7	0	0	0	0	3	1	0	0	0				
Paradichlorobenzene	128		122		79	5	30	112	2	0	8	19	37	9	0	0	0				
Unknown moth repellent	2,273		2,233		1,333	147	522	2,131	64	17	19	404	589	169	29	3	0				
Rodenticides																					
Anticoagulant: long-acting, superwarfarin	13,118		12,813		11,358	348	889	12,323	367	88	12	3,590	3,911	116	63	13	0				
Anticoagulant: warfarin-type	289		281		234	12	30	260	15	6	0	108	95	7	1	0	0				
ANTU	13		10		2	6	1	7	1	1	1	2	5	1	0	0	0				
Bromethalin	566		547		399	25	94	503	27	15	0	158	163	11	8	0	0				
Cholecalciferol	7		7		7	0	0	7	0	0	0	1	0	0	0	0	0				
Cyanide	1		1		1	0	0	1	0	0	0	0	1	0	0	0	0				
Monofluoroacetate	1		1		0	0	0	1	0	0	0	0	0	0	0	0	0				
Other	765		746		515	69	125	714	22	5	3	89	165	45	4	3	0				
Strychnine	104		77		8	1	51	39	13	21	1	40	16	6	3	0	0				
Unknown	1,446		1,349		941	71	241	1,153	103	65	7	584	368	36	18	2	0				
Vacor	2		2		1	0	0	1	0	0	0	1	1	0	0	0	0				
Zinc phosphide	102		96		32	8	43	87	7	0	0	39	35	15	8	1	1				
Category Total:	96,811		90,905		44,669	7,868	30,819	85,826	1,936	838	2,085	16,020	18,578	15,036	2,241	143	18				
Photographic products																					
Developer/fixing/stop bath	340		246		22	109	82	236	4	2	4	77	27	73	15	1	0				
Other	492		453		312	50	73	442	6	2	2	37	65	50	9	0	0				
Photographic coating fluid	1		1		0	0	1	1	0	0	0	1	0	0	0	0	0				
Unknown	12		12		1	4	5	12	0	0	0	7	1	3	3	0	0				
Category Total:	845		712		335	163	161	691	10	4	6	122	93	127	27	1	0				
Plants																					
Amygdalin/cyanogenic glycoside	2,822		2,717		1,758	450	390	2,545	84	1	81	135	568	108	16	1	0				
Anticholinergic	1,047		941		390	363	157	541	374	5	12	465	198	100	267	21	0				
Cardiac glycoside	1,405		1,355		792	234	279	1,270	66	1	16	204	375	81	32	2	0				
Colchicine	19		17		11	3	3	16	1	0	0	2	2	0	0	1	0				
Depressant	324		286		207	33	32	249	28	2	5	28	56	17	4	1	0				
Dermatitis	8,492		7,959		4,144	1,187	2,018	7,368	184	58	334	727	931	872	261	7	0				
Gastrointestinal irritant	10,839		10,392		7,798	1,085	1,239	9,861	289	27	206	726	2,033	856	127	5	0				
Hallucinogenic	412		356		118	130	91	194	149	5	6	129	59	54	57	2	0				

(Continued)

Table 22A. Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	Age*				Reason				Treated in Health Care Facility				Outcome			
	No. of Case Mentions		No. of Single Exposures		<6	6-19	>19	Unintentional	Intentional	Other	Adv Rxn	None	Minor	Moderate	Major	Death
Nicotine	160	138	41	37	44	126	6	2	3	59	24	41	16	0	0	
Non-toxic	10,976	10,259	8,080	1,126	782	9,690	197	18	339	348	1,265	486	50	2	0	
Other toxic	5,451	5,175	3,828	750	457	4,908	145	8	104	403	1,209	329	69	3	1	
Oxalate	8,024	7,835	6,536	756	428	7,556	225	7	42	333	1,771	1,140	73	0	0	
Solamine	1,119	1,081	781	85	166	1,027	19	1	34	99	325	69	8	2	0	
Stimulant	150	139	53	25	51	112	17	2	6	41	32	7	9	0	0	
Toxalbumin	168	156	65	25	52	130	10	12	2	53	56	20	2	1	0	
Unknown toxic or unknown if toxic	12,828	12,206	8,412	1,694	1,172	257	21	187	908	2,388	1,032	1,032	176	4	1	
Category Total:	64,236	61,012	43,014	7,891	7,883	57,317	2,051	170	1,377	4,659	11,297	5,214	1,167	52	2	
Polishes and waxes																
Floor wax/polish/sealer	649	598	344	33	165	581	3	9	5	106	141	105	18	0	0	
Furniture polish	2,075	1,980	1,699	84	147	1,944	25	5	6	212	702	285	15	0	0	
Polish/wax: other	3,661	3,537	2,714	230	490	3,423	61	17	28	435	493	493	56	2	0	
Category Total:	6,385	6,115	4,757	347	802	5,948	89	31	39	753	1,777	883	89	2	0	
Radioisotopes																
Radioisotope (nonmedicinal)	370	345	26	46	158	309	2	15	15	103	54	35	16	1	0	
Category Total:	370	345	26	46	158	309	2	15	15	103	54	35	16	1	0	
Sporting equipment																
Fishing bait	50	48	34	6	7	47	1	0	0	5	8	6	1	0	0	
Fishing product: other	27	27	18	5	4	26	1	0	0	5	5	1	1	0	0	
Golf ball	21	21	1	0	9	2	17	4	0	2	1	0	1	0	0	
Golf product: other	1	1	1	0	0	1	0	0	0	0	1	0	0	0	0	
Gun bluing	39	36	6	1	23	34	2	0	0	21	4	5	4	1	1	
Hunting product: other	395	385	230	65	64	346	21	9	1	115	130	25	4	0	0	
Other	29	29	19	4	5	25	3	1	4	4	5	0	0	0	0	
Unknown	2	2	0	0	0	2	0	0	0	0	0	0	0	0	0	
Category Total:	564	549	310	90	111	498	32	10	1	152	153	51	11	1	1	
Swimming pool/aquarium																
Algalicide	2,052	1,943	603	366	827	1,898	23	6	15	411	210	583	186	3	0	
Aquarium product	2,326	2,176	1,801	122	197	2,140	25	4	5	172	615	132	12	0	0	
Bromine water/shock treatment	125	117	52	14	44	115	0	0	2	24	22	27	6	0	0	
Chlorine water/shock treatment	3,211	3,088	588	728	1,487	2,995	39	8	43	816	204	1,154	415	7	0	
Other	2,835	2,517	673	538	1,094	2,373	41	7	84	517	350	1,077	153	3	0	
Pool/aquarium test kit	326	263	186	28	43	257	2	0	4	31	85	34	8	0	0	
Category Total:	10,875	10,104	3,903	1,796	3,692	9,778	130	25	153	1,971	1,486	3,007	780	13	0	
Tobacco products																
Chewing tobacco	745	735	642	32	49	714	15	3	2	193	214	243	27	1	0	
Cigar	98	95	78	4	11	85	5	0	5	21	37	18	1	0	0	
Cigarette	4,985	4,825	4,444	102	234	4,715	63	18	19	846	1,745	924	57	3	0	
Filter tip	157	155	141	2	10	153	2	0	0	18	64	22	1	0	0	
Other	79	61	40	2	14	56	2	2	1	10	13	16	4	0	0	
Snuff	394	317	317	27	27	362	6	5	4	115	111	124	16	2	0	
Unknown	681	635	462	30	115	559	30	10	32	162	155	130	26	0	0	
Category Total:	7,139	6,883	6,124	199	460	6,644	123	38	63	1,365	2,339	1,477	132	6	0	
Waterproof/sealants																
Waterproofers/sealants: Aerosols	11	10	1	3	6	8	1	0	1	7	3	1	3	0	0	
Waterproofers/sealants: Liquids	2	2	1	0	1	2	0	0	0	1	1	1	0	0	0	
Waterproofers/sealants: Solids	4	4	1	0	3	4	0	0	0	3	0	0	0	0	0	
Waterproofers/sealants: Unknown form	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	
Category Total:	19	17	3	3	10	15	1	0	1	11	4	3	3	0	0	
Weapons of mass destruction																
Anthrax	44	42	2	4	13	24	0	13	2	18	17	1	0	0	0	
Nerve gas	3	3	0	0	1	2	1	0	0	1	0	0	0	0	0	
Other biological weapon	91	86	9	12	48	70	0	5	9	27	19	10	2	0	0	
Other chemical weapon	95	81	6	12	50	73	2	5	0	58	17	24	11	1	0	
Other suspicious powder	56	56	0	0	10	7	34	15	0	4	5	0	0	0	0	
Other suspicious substance	2	2	0	0	1	1	0	1	0	0	0	0	0	0	0	
Suspicious powder in envelope/package	40	40	0	1	22	26	1	13	0	8	13	0	0	0	0	
Category Total:	331	310	17	29	145	203	38	52	11	116	71	40	13	1	0	
Total Nonpharmaceuticals	1,325,308	1,217,693	662,518	150,701	324,115	1,149,512	36,342	11,627	16,567	177,011	199,840	194,634	37,317	2,410	218	
% of single exposures	100.0%	100.0%	54.4%	12.4%	26.6%	94.4%	3.0%	1.0%	1.4%	14.5%	16.4%	16.0%	3.1%	0.2%	0.0%	



Table 22B. Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	Age*				Reason				Outcome										
	No. of Case Mentions		No. of Single Exposures		Unintentional		Intentional		Treated in Health Care Facility		None		Minor		Major		Death		
	<6	6-19	>19	Other	Adx	Other	Other	Other	Other	Other	Other	Other	Other	Other	Other	Other	Other	Other	
Unknown	2	2	0	1	0	0	0	0	0	2	2	0	0	0	0	1	0	0	
Local/topical anesthetics																			
Dibucaine	40	39	27	3	8	38	0	0	0	0	5	14	5	0	1	0	0	0	
Lidocaine	1,724	1,560	696	206	554	1,347	69	6	131	309	386	219	73	8	1	0	0	0	
Other/unknown	5,967	5,676	3,906	504	1,024	5,236	154	20	261	709	1,775	611	96	13	0	0	0	0	
Category Total:	8,273	7,676	4,674	790	1,795	6,889	309	31	432	1,201	2,209	973	221	28	2	0	0	0	
Anticholinergic drugs																			
Anticholinergic drug	9,371	6,858	459	184	5,303	6,296	382	10	143	744	1,042	279	191	9	0	0	0	0	
Category Total:	9,371	6,858	459	184	5,303	6,296	382	10	143	744	1,042	279	191	9	0	0	0	0	
Anticoagulants																			
Glycoprotein IIa/IIIb inhibitor	15	13	2	0	7	7	1	0	5	9	2	2	1	0	1	0	1	0	
Heparin	267	220	27	13	131	156	12	0	51	104	20	27	32	3	5	0	0	0	
Other	38	33	15	1	8	29	2	0	2	16	1	1	0	1	1	0	0	0	
Other antiplatelet	2,271	932	301	24	522	861	28	1	41	123	199	22	8	1	0	0	0	0	
Unknown	61	54	45	6	3	50	2	2	0	20	8	1	2	0	0	0	0	0	
Warfarin (excluding rodenenticide)	3,612	2,245	1,023	73	984	1,965	165	11	93	733	637	50	113	13	0	0	0	0	
Category Total:	6,264	3,497	1,413	117	1,655	3,068	210	14	192	1,005	878	103	156	18	7	0	0	0	
Anticonvulsants																			
Carbamazepine	4,357	2,430	691	429	1,195	1,466	722	2	182	1,497	488	581	408	95	2	0	0	0	
Other	23,341	10,405	2,769	2,218	4,732	6,430	3,122	17	740	4,727	2,703	1,977	799	92	1	0	0	0	
Phenytoin	3,812	2,370	344	131	1,725	1,248	584	2	427	1,634	423	535	490	50	9	0	0	0	
Primidone	238	119	26	8	79	83	21	0	15	48	26	23	10	0	0	0	0	0	
Succinimide	90	67	35	23	8	63	4	0	0	15	26	3	1	1	0	0	0	0	
Unknown	11	4	0	1	3	2	2	0	0	3	2	0	0	0	0	0	0	0	
Valproic acid	8,627	3,379	554	769	1,848	1,745	1,270	6	276	1,915	789	680	348	72	1	0	0	0	
Category Total:	40,476	18,774	4,419	3,579	9,590	11,037	5,725	27	1,640	9,839	4,457	3,799	2,056	310	13	0	0	0	
Antidepressants																			
Lithium	5,674	2,829	181	441	2,020	1,006	970	7	675	2,174	466	573	812	149	7	0	0	0	
MAO inhibitor	268	124	15	3	93	79	17	2	24	65	25	11	21	3	0	0	0	0	
Other	25,210	11,370	2,951	1,938	5,694	6,606	4,087	50	560	6,457	3,429	1,693	1,254	334	8	0	0	0	
SSRI	42,190	19,598	6,234	4,734	7,428	11,260	7,398	64	758	9,409	6,317	2,914	1,047	76	3	0	0	0	
Trazodone	11,490	4,688	458	899	2,968	1,478	3,039	11	102	3,264	990	1,406	528	40	1	0	0	0	
Unknown	83	32	1	11	16	3	28	0	0	23	5	3	5	1	0	0	0	0	
Cyclic antidepressants																			
Amitriptyline	5,830	2,730	480	398	1,671	1,091	1,483	6	84	1,936	473	555	626	203	6	0	0	0	
Amoxapine	19	8	2	2	3	5	2	0	1	4	1	1	1	1	0	0	0	0	
Cyclic antidepressant formulated with a benzodiazepine	35	20	3	1	15	7	13	0	0	15	8	4	2	3	0	0	0	0	
Cyclic antidepressant formulated with a phenothiazine	103	56	7	3	41	16	34	0	3	44	10	13	13	5	1	0	0	0	
Desipramine	118	47	12	3	24	28	16	0	2	30	19	3	8	2	1	0	0	0	
Doxepin	1,004	409	45	53	283	159	224	0	22	293	72	105	78	34	2	0	0	0	
Imipramine	581	292	103	50	118	180	90	1	19	168	98	51	33	8	0	0	0	0	
Maprotiline	15	8	3	2	3	5	3	0	0	5	2	0	0	0	0	0	0	0	
Nortriptyline	916	405	70	51	253	202	171	1	27	238	84	71	56	20	0	0	0	0	
Other cyclic antidepressant	1,744	765	122	117	477	379	313	5	28	486	127	149	140	62	3	0	0	0	
Protriptyline	20	12	4	2	5	5	6	0	1	10	6	2	2	0	0	0	0	0	
Unknown cyclic antidepressant	27	14	1	2	10	4	8	0	0	12	2	3	5	0	0	0	0	0	
Category Total:	95,327	43,407	10,692	8,710	21,122	22,513	17,902	147	2,306	24,633	12,134	7,557	4,631	941	32	0	0	0	
Antihistamines																			
Diphenhydramine	27,807	19,637	10,481	3,312	5,187	13,912	5,215	19	388	6,618	4,240	2,998	1,699	178	12	0	0	0	
Diphenhydramine: OTC	3,990	3,104	2,034	413	583	2,455	583	5	52	809	689	436	155	21	0	0	0	0	
Diphenhydramine: Rx	19	14	8	0	6	8	6	0	0	6	5	1	0	1	0	0	0	0	
H2 receptor antagonist	8,582	6,579	5,333	380	716	6,189	257	2	119	644	1,802	203	26	1	0	0	0	0	
Other	34,672	23,609	14,031	4,716	4,160	20,343	2,591	19	557	4,856	6,447	2,013	723	41	4	0	0	0	
Category Total:	75,070	52,943	31,887	8,821	10,652	42,907	8,652	45	1,116	12,933	13,183	5,651	2,603	242	16	0	0	0	
Antimicrobials																			
Anthelmintics																			
Diethylcarbamazine	61	59	25	8	17	58	1	0	0	4	10	2	0	0	0	0	0	0	
Other	1,695	1,569	965	132	398	1,503	20	3	40	154	394	114	13	0	0	0	0	0	
Piperazine	393	379	304	22	47	364	12	0	3	54	123	20	4	1	0	0	0	0	
Unknown	13	12	9	2	1	11	1	0	0	4	2	1	0	0	0	0	0	0	





Table 22B. Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	No. of Case Mentions	No. of Single Exposures	Age*			Reason				Outcome						
			<6	6-19	>19	Unintent	Intent	Other	Adv Rxn	Treated in Health Care Facility		None	Minor	Moderate	Major	Death
										1,717	456					
Other opioid	3,132	2,638	1,717	456	413	2,396	142	18	2	89	663	828	482	80	4	1
Without opioid	27,095	20,787	14,459	2,937	2,942	19,169	1,075	18	461	3,083	5,499	1,982	424	19	3	
APAP with decongestant/antihistamine, with phenylpropanolamine																
Codene	11	8	4	1	3	7	1	0	0	0	2	2	0	1	1	0
Dextromethorphan	344	257	189	39	25	223	23	0	11	50	69	28	8	2	0	0
Other opioid	2	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0
Without opioid	396	285	136	112	32	174	105	2	3	124	73	41	41	2	0	0
APAP with decongestant/antihistamine, without phenylpropanolamine																
Codene	60	47	31	9	6	42	4	0	1	7	11	1	1	0	0	0
Dextromethorphan	18,260	11,973	7,917	2,044	1,749	9,908	1,644	15	347	2,743	2,835	1,450	347	19	2	
Other opioid	46	28	20	4	4	27	1	0	0	8	4	4	0	0	0	0
Without opioid	6,285	4,371	2,770	963	554	3,369	846	3	133	1,170	982	497	262	10	0	
APAP/ASA with decongestant/antihistamine, with phenylpropanolamine																
Dextromethorphan	120	94	77	8	9	85	4	0	4	12	28	7	1	0	0	0
Other opioid	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Without opioid	24	15	6	5	4	8	7	0	0	7	2	3	3	0	0	0
APAP/ASA with decongestant/antihistamine, without phenylpropanolamine																
Dextromethorphan	149	118	88	18	12	105	9	0	4	19	23	15	0	0	0	0
Other opioid	11	8	4	2	2	6	2	0	0	4	1	2	0	0	0	0
Without opioid	103	72	56	9	7	68	3	0	1	12	24	8	0	0	0	0
ASA with decongestant/antihistamine, with phenylpropanolamine																
Codene	2	1	1	0	0	1	0	0	0	0	1	0	0	0	0	0
Dextromethorphan	22	17	11	3	3	14	1	0	2	3	4	3	0	0	0	0
Without opioid	44	30	10	16	3	14	15	0	0	15	10	4	4	0	0	0
ASA with decongestant/antihistamine, without phenylpropanolamine																
Codene	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Dextromethorphan	31	21	13	5	3	16	3	0	2	3	3	4	1	0	0	0
Other opioid	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Without opioid	85	45	13	21	8	20	25	0	0	25	11	8	7	0	0	0
APAP/dextromethorphan	255	199	150	31	17	187	8	0	3	30	54	11	3	0	0	0
ASA/dextromethorphan	1	1	1	0	0	1	0	0	0	1	1	0	0	0	0	0
Expectorant/antitussive	2,919	2,116	1,164	365	494	1,883	134	1	89	349	455	187	26	8	2	0
Non-ASA salicylate/dextromethorphan	25	20	17	1	2	20	0	0	0	4	5	2	2	0	0	0
Other	4,368	3,505	2,740	360	345	3,291	123	1	85	441	956	336	46	2	0	0
Other dextromethorphan	14,621	11,709	7,384	2,568	1,570	9,979	1,452	4	236	2,150	2,332	1,292	551	23	0	
Other phenylpropanolamine	343	289	157	17	102	286	2	0	1	24	78	15	0	1	0	0
Unknown	1,353	846	404	276	136	501	305	0	29	409	158	149	86	3	0	0
Non-ASA salicylates with antihistamine/decongestant, with ppa																
Dextromethorphan	10	7	6	1	0	7	0	0	0	1	3	1	0	0	0	0
Other opioid	2	2	1	1	0	2	0	0	0	1	0	1	1	0	0	0
Without opioid	8	2	1	1	0	1	1	0	0	1	1	0	0	0	0	0
Non-ASA salicylates with antihistamine/decongestant, without ppa																
Dextromethorphan	14	14	13	1	0	14	0	0	0	3	5	0	0	0	0	0
Other opioid	4	4	3	0	1	4	0	0	0	1	3	0	1	0	0	0
Without opioid	13	7	5	1	1	7	0	0	0	2	3	0	0	0	0	0
Category Total:	114,559	88,631	61,264	15,949	9,942	76,207	10,177	68	1,898	18,074	21,283	10,788	3,671	157	11	
Diagnostic agents																
Clinitest/acetet	4	4	1	1	2	4	0	0	0	1	2	0	0	0	0	0
Other	577	535	108	44	280	453	4	1	74	210	74	108	34	8	0	0
Unknown	13	12	3	2	6	8	0	0	4	2	1	1	0	0	0	0
Category Total:	594	551	112	47	288	465	4	1	78	213	77	109	34	8	0	0
Dietary supplements/herbals/homeopathic																
Amino acids																
Creatine	204	155	58	44	47	98	20	0	32	52	25	21	18	0	0	0
Other amino acid dietary supplement	437	314	177	38	86	250	15	1	48	59	71	27	10	0	1	
Botanical products																
Blue cohosh	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0
Citrus aurantium (single ingredient)	15	11	2	0	8	4	1	0	6	6	1	4	0	0	0	0
Echinacea	338	269	195	45	25	247	12	0	10	10	60	5	2	0	0	0
Ginkgo biloba	129	79	49	9	18	63	5	0	10	14	21	7	2	0	0	0
Ginseng	202	124	50	27	38	87	14	0	22	29	18	15	7	1	0	0

Table 22B. Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	No. of Case Mentions	No. of Single Exposures	Age*				Reason				Outcome				
			<6	6-19	>19	Unintent	Intent	Other	Adv Rxn	Treated in Health Care Facility			Outcome		
										None	Minor	Moderate	Major	Death	
Kava kava	72	38	6	7	24	14	12	0	11	17	5	7	7	1	0
Ma huang/ephedra (single ingredient)	980	757	345	109	267	454	166	3	128	357	205	130	102	3	0
Multi-botanical with citrus aurantium	236	195	105	24	60	126	37	0	31	89	71	36	20	0	0
Multi-botanical with ma huang	1,086	818	415	148	222	516	187	1	103	350	228	134	86	6	0
Multi-botanical without ma huang or citrus aurantium	2,221	1,774	912	297	501	1,163	281	8	317	618	420	288	136	10	0
Other single ingredient botanical	2,053	1,512	909	129	383	1,269	85	1	149	234	288	136	44	1	0
St. John's wort	170	107	55	11	78	15	12	1	14	31	27	5	2	0	0
Valerian	214	135	47	21	57	69	39	1	24	55	27	18	7	0	0
Yohimbe	233	180	32	11	128	78	33	1	66	99	28	44	3	0	0
Cultural medicines															
Asian	136	111	54	19	33	91	7	1	11	39	21	24	6	0	1
Ayurvedic	9	5	2	3	0	3	0	0	2	5	0	1	0	0	0
Hispanic	11	9	2	0	7	5	2	0	2	7	0	2	2	0	0
Other	33	25	11	1	8	19	2	0	4	8	6	5	1	0	0
Dietary supplement/homeopathic: unknown	2,959	2,391	1,508	282	508	1,850	255	7	268	578	468	229	131	7	0
Homeopathic	8,434	8,020	7,369	223	356	7,743	107	11	148	414	1,988	196	37	0	0
Hormonal products															
Androgen/precursor (dietary supplement)	121	84	52	7	23	69	4	0	10	16	23	5	3	1	0
Glandular	37	26	17	3	6	21	2	0	2	5	6	3	0	0	0
Melatonin	2,371	1,898	1,235	400	228	1,583	278	0	30	286	458	206	5	1	0
Phytoestrogen	74	50	32	6	11	38	4	0	8	7	12	3	7	0	0
Other dietary supplements															
Blue-green algae	91	76	22	14	35	69	0	1	6	10	7	3	3	0	0
Glucosamine (with or without chondroitin)	741	525	373	23	111	479	10	1	34	28	89	15	5	0	0
Other single ingredient non-botanical	650	455	280	43	106	348	36	0	70	100	39	21	21	1	0
Category Total:	24,258	20,144	14,314	1,944	3,327	16,834	1,629	39	1,564	3,524	4,656	1,605	708	35	2
Diuretics															
Furosemide	2,887	1,108	555	70	420	1,008	61	4	26	258	299	112	30	1	1
Other	1,760	764	337	75	301	672	50	2	35	141	195	52	17	1	1
Thiazide	4,550	1,911	880	181	757	1,690	154	2	60	379	514	99	42	3	0
Unknown	1,037	376	173	31	143	330	28	1	17	79	94	40	8	0	0
Category Total:	10,234	4,159	1,945	357	1,621	3,700	293	9	138	857	1,102	303	97	5	2
Electrolytes and minerals															
Calcium	16,373	14,900	13,772	603	410	14,695	129	11	50	326	2,433	207	35	1	0
Chromium, trivalent	434	366	193	29	113	340	11	0	15	62	62	30	3	1	0
Colloidal silver	72	62	22	7	33	47	4	0	11	16	8	7	0	1	0
Fluoride	3,172	3,004	2,645	77	2,934	27	2	3	142	107	618	189	64	7	0
Iron	3,953	3,041	1,845	303	750	2,643	242	3	37	808	799	292	67	0	0
Magnesium	1,135	923	376	109	381	767	82	6	61	119	133	143	20	1	0
Multi-mineral dietary supplement	257	190	124	11	41	161	7	2	19	30	34	13	2	0	0
Multi-mineral, multi-herbal dietary supplement	315	247	139	28	72	178	33	1	34	80	60	29	15	1	0
Other	55	49	19	3	21	46	0	0	3	12	8	11	0	0	0
Potassium	1,482	653	222	47	344	569	59	1	22	129	164	22	18	1	0
Selenium	122	94	39	8	39	80	5	3	6	21	14	13	1	0	0
Sodium	2,756	2,299	1,255	469	452	1,986	206	45	43	342	433	380	37	1	2
Unknown	8	7	2	1	3	3	2	0	1	3	1	1	1	0	0
Zinc	963	785	470	62	198	709	27	2	44	85	118	81	19	0	1
Category Total:	31,097	26,620	21,123	1,928	2,934	25,158	834	76	488	2,140	4,885	1,418	222	14	3
Eye/ear/nose/throat preparations															
Steroid, topical for eye/nose/throat	2,566	2,014	1,083	367	446	1,850	39	4	120	75	290	210	15	0	0
Nasal preparations															
Other	587	561	382	27	124	540	3	1	17	20	102	42	2	0	0
Other decongestant	2,388	2,226	1,104	223	745	2,044	47	14	121	272	593	273	37	1	0
Tetrahydrozoline	9	23	18	3	2	22	0	0	0	3	7	4	1	0	0
Unknown	9	8	3	1	3	8	0	0	0	2	0	1	1	0	0
Ophthalmic preparations															
Contact lens product	3,290	3,199	1,613	347	1,017	3,120	23	15	38	572	368	658	129	3	0
Glaucoma therapy	295	242	79	11	125	214	2	1	25	45	46	22	8	0	0
Other	1,468	1,382	713	145	420	1,289	24	19	48	110	183	116	39	1	0
Other sympathomimetic	1,121	1,063	487	184	312	803	59	139	53	229	332	113	26	0	0
Tetrahydrozoline	2,108	2,036	1,153	368	403	1,577	140	277	25	430	791	127	37	1	0
Unknown	54	49	11	14	17	27	2	10	9	14	8	7	2	0	0
Otic preparations															
Combination product	2,335	2,294	1,117	301	701	2,270	6	0	18	206	369	671	37	0	0
Other	2,209	2,191	872	209	910	2,159	11	1	20	254	273	659	40	0	0
Unknown	60	56	18	9	21	55	0	0	1	7	6	24	1	0	0
Throat preparations															
Lozenge with local anesthetic	299	266	126	69	59	230	23	3	8	21	75	19	3	0	0

(Continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	Age*										Reason				Outcome							
	No. of Case Mentions		No. of Single Exposures		<6		6-19		>19		Unintent	Intent	Other	Adv Rxn	Treated in Health Care Facility		None	Minor	Moderate	Major	Death	
Lozenge without local anesthetic	1,003	944	777	96	56	893	28	3	20	27	156	36	4	0	0	0	0	0	0	0	0	
Other	498	469	200	96	144	421	30	3	14	67	110	49	6	0	0	0	0	0	0	0	0	
Unknown	5	4	2	1	1	3	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	
Category Total:	20,322	19,027	9,758	2,471	5,506	17,525	437	491	537	2,355	3,709	3,032	388	6	0	0	0	0	0	0	0	
Gastrointestinal preparations																						
Antacids																						
Other	8,519	8,056	7,451	293	250	7,934	80	4	32	125	1,091	93	7	1	0	0	0	0	0	0	0	
Proton pump inhibitor	8,905	5,233	3,092	310	1,527	4,875	156	5	191	400	1,142	163	24	2	1	0	0	0	0	0	0	
Salicylate-containing	2,725	2,455	1,990	195	215	2,254	72	3	120	201	631	78	11	1	0	0	0	0	0	0	0	
Antidiarrheals																						
Diphenoxylate/atropine	469	282	155	24	92	231	32	0	18	178	108	52	23	1	0	0	0	0	0	0	0	
Loperamide	1,242	971	616	59	257	824	78	1	65	221	377	64	19	0	0	0	0	0	0	0	0	
Non-opioid	65	45	23	5	15	42	0	0	3	4	5	4	0	0	0	0	0	0	0	0	0	
Other opioid	2	2	0	1	1	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	
Paregoric	10	8	3	0	4	6	1	0	1	6	1	2	1	0	0	0	0	0	0	0	0	
Antispasmodics																						
Anticholinergic	3,437	2,028	1,103	244	583	1,690	221	2	101	653	613	250	126	4	1	0	0	0	0	0	0	
Other	84	42	20	5	16	30	9	0	3	18	7	6	5	0	0	0	0	0	0	0	0	
Laxative	15,072	13,418	9,592	1,143	2,245	12,336	536	166	370	1,117	1,873	1,422	136	6	0	0	0	0	0	0	0	
Other	10,353	8,788	7,397	329	863	8,329	196	14	239	686	1,618	282	124	5	0	0	0	0	0	0	0	
Unknown	31	14	7	3	3	10	1	1	2	3	3	3	0	0	0	0	0	0	0	0	0	
Category Total:	50,914	41,342	31,449	2,611	6,071	38,563	1,382	196	1,145	3,612	7,471	2,419	476	20	2	0	0	0	0	0	0	
Hormones and hormone antagonists																						
Androgen	409	279	68	34	140	176	63	1	38	88	39	35	18	0	0	0	0	0	0	0	0	
Corticosteroid	9,291	7,615	4,191	795	2,175	6,936	160	9	487	566	1,194	293	69	1	0	0	0	0	0	0	0	
Estrogen	1,893	1,177	801	80	247	1,088	32	5	49	98	218	31	10	1	0	0	0	0	0	0	0	
Insulin	4,280	3,560	148	149	2,859	3,200	269	17	54	1,314	1,294	187	532	39	2	0	0	0	0	0	0	
Oral contraceptive	9,242	7,579	6,024	701	692	6,856	430	11	272	612	1,223	189	16	1	0	0	0	0	0	0	0	
Other hormone	798	623	213	121	246	556	28	0	38	146	160	61	23	1	0	0	0	0	0	0	0	
Other hormone antagonist	565	425	156	31	205	396	14	0	15	54	84	15	7	0	0	0	0	0	0	0	0	
Progesterin	1,453	1,223	750	121	285	1,093	34	3	86	114	210	39	9	0	0	0	0	0	0	0	0	
Selective estrogen receptor modulator	434	248	102	13	112	235	4	0	8	32	71	5	4	0	0	0	0	0	0	0	0	
Thyroid preparation	11,630	8,024	4,532	532	2,524	7,707	189	5	109	895	1,563	104	35	1	0	0	0	0	0	0	0	
Unknown hormone or antagonist	30	20	6	4	8	11	2	1	6	10	2	4	0	0	0	0	0	0	0	0	0	
Oral hypoglycemics																						
Biguanide	5,151	2,516	649	254	1,439	2,159	282	4	63	598	760	159	76	18	9	0	0	0	0	0	0	
Other/unknown	548	295	133	16	132	245	28	2	18	149	126	14	40	4	0	0	0	0	0	0	0	
Sulfonylurea	4,244	1,951	974	99	804	1,647	172	6	99	1,368	780	68	472	52	1	0	0	0	0	0	0	
Thiazolidinedione	1,907	696	360	42	253	639	35	1	20	193	316	22	21	2	0	0	0	0	0	0	0	
Category Total:	51,875	36,231	19,107	2,992	12,121	32,944	1,742	65	1,362	6,237	8,040	1,226	1,332	120	12	0	0	0	0	0	0	
Miscellaneous drugs																						
Allopurinol	550	251	126	15	89	227	7	0	16	37	85	12	3	1	0	0	0	0	0	0	0	
Disulfiram	264	83	10	2	52	38	24	2	16	31	11	7	9	0	0	0	0	0	0	0	0	
Ergot alkaloid	262	190	114	22	45	160	12	0	18	113	84	25	10	1	0	0	0	0	0	0	0	
L-dopa and related drug	1,025	522	193	7	287	465	22	2	28	141	137	64	24	0	0	0	0	0	0	0	0	
Neuromuscular blocking agent	28	14	2	0	9	8	1	0	5	11	2	1	4	1	1	0	0	0	0	0	0	
Nicotinic pharmacological	1,015	924	446	80	344	698	55	0	169	225	259	150	45	1	0	0	0	0	0	0	0	
Other	19,952	13,496	5,392	1,754	5,436	11,504	946	49	933	2,730	3,055	1,581	473	32	4	0	0	0	0	0	0	
Category Total:	23,096	15,480	6,283	1,880	6,262	13,100	1,067	53	1,185	3,288	3,653	1,840	568	36	5	0	0	0	0	0	0	
Muscle relaxants																						
Carisoprodol (formulated alone)	8,007	3,445	291	425	2,470	814	2,467	6	59	2,637	463	1,129	680	103	1	0	0	0	0	0	0	
Cyclobenzaprine	8,040	3,812	1,309	537	1,739	2,167	1,515	4	82	2,176	1,019	842	441	54	0	0	0	0	0	0	0	
Methocarbamol	1,490	770	139	138	430	307	307	1	25	351	163	152	31	5	0	0	0	0	0	0	0	
Other	6,426	3,053	720	436	1,683	1,189	1,189	15	169	1,691	612	599	441	110	2	0	0	0	0	0	0	
Unknown	195	52	12	8	24	17	31	1	3	33	8	7	3	3	0	0	0	0	0	0	0	
Category Total:	24,158	11,132	2,471	1,544	6,346	5,062	5,509	27	338	6,888	2,265	2,729	1,596	275	3	0	0	0	0	0	0	
Narcotic antagonists																						
Narcotic antagonist	313	138	11	11	95	61	39	7	27	78	9	23	26	1	0	0	0	0	0	0	0	
Category Total:	313	138	11	11	95	61	39	7	27	78	9	23	26	1	0	0	0	0	0	0	0	
Radiopharmaceuticals																						
Radiopharmaceutical	34	33	4	2	19	23	0	1	9	13	5	1	0	0	0	0	0	0	0	0	0	
Category Total:	34	33	4	2	19	23	0	1	9	13	5	1	0	0	0	0	0	0	0	0	0	

**Table 22B.** Demographic profile of SINGLE SUBSTANCE Pharmaceutical exposure cases by generic category

Major Category Minor Category Generic Substance	No. of Case Mentions	No. of Single Exposures	Age*				Reason				Outcome							
			<6	6-19	>19	Unintent	Intent	Other	Adv Rxn	Treated in Health Care Facility			None	Minor	Moderate	Major	Death	
										574	81	290						241
Sedative/hypnotics/antipsychotics																		
Barbiturates																		
Long-acting	2,368	1,403	361	106	867	1,007	319	6	38	574	290	241	133	47	2			
Short/intermediate-acting	305	134	10	13	87	75	46	0	8	81	17	30	19	4	0			
Unknown type	70	22	2	3	12	8	9	0	0	15	1	3	3	1	0			
Atypical antipsychotic																		
Aripiprazole	41,053	17,507	2,546	4,196	9,720	6,781	9,576	63	892	12,342	3,339	4,749	3,231	468	11			
Clozapine	69,268	27,420	5,859	3,643	15,551	10,564	15,673	250	529	17,490	5,424	7,961	2,442	300	9			
Risperidone	1,939	676	121	102	379	339	280	0	49	309	165	124	32	1	0			
Chloral hydrate	192	115	27	15	70	46	53	0	10	85	16	36	7	8	1			
Meprobamate	65	35	6	5	22	14	17	0	2	24	4	8	7	1	0			
Methaqualone	11	4	0	0	3	0	2	1	0	1	0	0	0	0	0			
Other																		
Phenothiazine	20,192	9,650	1,345	1,668	5,815	3,845	5,261	20	387	5,899	1,521	3,029	1,027	92	2			
Sleep aid (OTC)	4,514	2,215	539	305	1,202	1,206	721	12	241	1,228	496	388	423	32	1			
Unknown	927	580	101	83	347	190	383	3	2	376	105	133	104	8	1			
Unknown	246	119	5	23	62	91	10	4	4	86	16	20	13	3	0			
Category Total:	141,150	59,880	10,922	10,162	34,137	24,086	32,431	365	2,162	38,510	11,394	16,721	7,453	965	27			
Serums, toxoids, vaccines																		
Serum, toxoid, vaccine	2,538	2,115	436	247	1,093	1,666	10	6	429	615	167	459	80	6	1			
Category Total:	2,538	2,115	436	247	1,093	1,666	10	6	429	615	167	459	80	6	1			
Stimulants and street drugs																		
Diet aids																		
Other: OTC																		
Other: Rx	341	293	144	37	93	193	46	0	51	124	76	57	19	0	0			
Phenylpropanolamine	118	87	44	10	28	70	9	0	7	31	30	11	4	0	1			
Phenylpropanolamine and caffeine	82	56	26	8	21	45	6	0	5	22	15	8	4	0	0			
Unknown	20	19	7	6	5	12	3	0	4	6	2	4	0	0	0			
Amphetamine																		
Amphetamine	126	85	39	13	27	51	15	0	19	49	23	7	14	1	0			
Amphetamine nitrite	12,021	8,016	2,675	2,818	2,090	5,394	2,195	84	248	4,126	1,994	1,308	1,046	116	6			
Caffeine	60	47	4	0	36	22	24	0	1	23	4	5	5	2	0			
Cocaine																		
Cocaine	5,696	4,330	1,247	1,427	1,427	2,138	1,686	18	455	1,799	703	981	654	18	1			
Cocaine	7,746	2,922	116	369	2,089	313	2,467	63	15	2,469	515	364	714	162	25			
Ephedrine	751	551	264	75	181	350	170	1	23	214	138	85	63	4	0			
GHB and analog/precursor	485	297	6	44	220	45	147	75	12	232	12	45	105	40	1			
Hallucinogenic amphetamine																		
Heroin	1,932	1,187	21	503	516	124	959	66	20	883	61	207	306	45	3			
Heroin	1,701	869	21	76	631	88	692	61	15	734	82	115	199	137	17			
LSD	364	230	4	99	100	42	176	10	0	164	8	32	84	10	0			
Marijuana																		
Marijuana	3,699	911	108	409	297	240	586	35	34	552	141	173	128	12	0			
Mescaline/peyote																		
Mescaline/peyote	113	100	23	20	50	73	20	1	6	38	8	29	18	0	0			
Methamphetamine																		
Methamphetamine	1,186	690	45	103	435	171	472	24	9	499	54	96	163	29	2			
Methylphenidate																		
Methylphenidate	8,766	6,062	1,397	3,582	936	4,836	977	11	194	1,996	1,520	851	527	24	0			
Other hallucinogen																		
Other hallucinogen	15	13	0	9	2	1	8	3	0	13	0	3	7	0	0			
Other stimulant																		
Other stimulant	67	47	11	13	19	17	26	0	4	28	10	7	9	1	0			
Other stimulant/street drug																		
Other stimulant/street drug	21	14	8	2	4	10	3	0	1	5	3	1	1	1	0			
Phencyclidine																		
Phencyclidine	733	303	10	38	188	97	173	15	5	208	26	48	79	16	1			
Unknown hallucinogen																		
Unknown hallucinogen	6	3	0	3	0	0	2	1	0	2	0	0	3	0	0			
Unknown stimulant/street drug																		
Unknown stimulant/street drug	190	116	9	37	48	23	60	19	4	77	9	17	31	7	1			
Category Total:	46,239	27,248	6,229	9,701	9,443	14,355	10,922	487	1,132	14,294	5,434	4,454	4,183	625	58			
Topical preparations																		
Acne preparation																		
Boric acid/borate	3,183	3,035	1,884	512	527	2,861	32	9	129	166	555	334	33	1	0			
Calamine	75	74	29	7	33	72	1	0	1	7	12	10	0	0	0			
Camphor																		
Camphor	3,441	3,371	2,594	1,09	579	3,347	15	1	8	154	514	154	4	0	0			
Diaper care/rash product																		
Diaper care/rash product	9,505	9,295	7,398	528	1,170	9,073	132	13	63	990	2,834	1,190	74	7	1			
Hexachlorophene antiseptic																		
Hexachlorophene antiseptic	2,058	2,047	1,792	79	147	2,007	8	1	31	217	664	283	10	0	0			
Hydrogen peroxide																		
Hydrogen peroxide	45,090	44,531	42,801	617	863	44,447	42	15	24	526	5,730	755	23	0	0			
Iodine or iodide antiseptic																		
Iodine or iodide antiseptic	61	60	32	4	20	55	3	0	1	13	13	11	0	0	0			
Mercury antiseptic																		
Mercury antiseptic	12,198	11,968	4,611	969	5,458	11,694	192	34	40	511	1,251	1,450	42	0	0			
Methyl salicylate	1,362	1,222	395	213	499	1,053	103	11	40	249	286	194	34	2	0			
Minoxidil	150	137	94	10	29	125	8	0	3	17	44	5	4	0	0			
Other liniment	9,190	9,112	7,130	583	1,128	8,937	49	27	92	688	1,966	1,620	60	4	0			
Other topical antiseptic	165	155	65	2	70	142	4	0	8	31	41	18	7	0	0			
Podophyllin	2,769	2,706	1,642	169	725	2,439	24	3	238	150	428	504	34	0	0			
Podophyllin	6,494	6,378	4,764	747	703	6,097	160	79	31	364	1,491	597	38	2	0			
Category Total:	51	43	12	6	20	31	3	0	8	13	8	10	5	0	0			

(Continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category

Major Category Minor Category Generic Substance	Age*					Reason					Outcome										
	No. of Case Mentions	No. of Single Exposures	<6			6-19		>19		Unintent	Intent	Other	Adv Rxn	Treated in Health Care Facility			None	Minor	Moderate	Major	Death
			19	6-847	450	1,455	56	77	1,455					1,455	8,944	152					
Silver nitrate	194	174	19	6,847	450	1,455	56	77	1,455	152	5	1	13	43	20	42	12	0	0	0	
Topical steroid	9,317	9,066	6,847	8,088	372	1,367	8,944	28	1	87	173	284	22	3	0	0	0	0	0	0	
Topical steroid with antibiotic	1,442	1,401	808	1,536	311	1,451	1,367	5	3	24	73	240	18	0	0	0	0	0	0	0	
Wart preparation	1,563	1,536	953	1,536	311	1,451	1,367	30	4	49	191	296	41	3	0	0	0	0	0	0	
Category Total:	108,308	106,311	83,870	5,425	14,163	104,294	844	202	890	4,576	17,524	7,964	461	22	1	0	0	0	0	0	
Veterinary drugs	3,128	2,967	1,094	218	1,405	2,875	49	9	28	343	690	476	70	3	2	0	0	0	0	0	
Category Total:	3,128	2,967	1,094	218	1,405	2,875	49	9	28	343	690	476	70	3	2	0	0	0	0	0	
Vitamins	201	142	89	22	24	129	2	1	9	15	11	8	2	0	0	0	0	0	0	0	
Multiple vitamin liquids: adult formulations	4	4	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
No iron, with fluoride	131	94	58	9	21	83	4	0	7	15	21	9	2	0	0	0	0	0	0	0	
With iron, no fluoride	6	4	2	1	1	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
With iron, with fluoride	6	4	2	1	1	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
Multiple vitamin liquids: pediatric formulations	364	350	324	21	4	342	1	0	7	16	65	15	1	0	0	0	0	0	0	0	
No iron, no fluoride	387	363	354	8	0	363	0	0	0	7	56	11	0	0	0	0	0	0	0	0	
No iron, with fluoride	609	565	539	23	3	557	1	1	5	44	131	25	1	0	0	0	0	0	0	0	
With iron, no fluoride	24	23	22	1	0	22	0	0	1	0	4	2	0	0	0	0	0	0	0	0	
With iron, with fluoride	24	23	22	1	0	22	0	0	1	0	4	2	0	0	0	0	0	0	0	0	
Multiple vitamin tablets: adult formulations	3,085	2,194	1,400	243	460	1,912	152	1	122	251	392	109	60	2	0	0	0	0	0	0	
No iron, no fluoride	32	29	21	5	3	29	0	0	0	2	5	0	0	0	0	0	0	0	0	0	
No iron, with fluoride	120	107	79	9	17	102	3	0	2	14	30	1	0	0	0	0	0	0	0	0	
With iron carbonyl (no fluoride)	7,425	6,175	4,636	344	1,012	5,801	273	9	81	592	1,515	189	19	0	0	0	0	0	0	0	
With iron, no fluoride	59	46	37	6	2	42	4	0	0	5	8	2	0	0	0	0	0	0	0	0	
With iron, with fluoride	59	46	37	6	2	42	4	0	0	5	8	2	0	0	0	0	0	0	0	0	
Multiple vitamin tablets: pediatric formulations	18,036	17,451	13,786	3,539	75	16,851	551	11	25	454	3,133	279	6	0	0	0	0	0	0	0	
No iron, no fluoride	1,111	1,009	951	54	3	990	19	0	0	31	201	20	1	0	0	0	0	0	0	0	
No iron, with fluoride	62	53	47	4	2	51	0	0	2	12	13	2	0	0	0	0	0	0	0	0	
With iron carbonyl (no fluoride)	16,464	15,863	14,331	1,414	89	15,592	214	15	35	1,141	3,790	580	16	0	0	0	0	0	0	0	
With iron, no fluoride	108	98	91	5	0	97	0	0	0	9	22	8	0	0	0	0	0	0	0	0	
With iron, with fluoride	108	98	91	5	0	97	0	0	0	9	22	8	0	0	0	0	0	0	0	0	
Multiple vitamins, unspecified adult formulations	76	53	35	8	9	49	2	0	2	1	15	5	0	0	0	0	0	0	0	0	
No iron, no fluoride	4	4	3	0	1	3	0	0	1	0	0	1	0	0	0	0	0	0	0	0	
No iron, with fluoride	1,751	1,351	996	99	208	1,284	51	1	15	120	342	28	4	0	0	0	0	0	0	0	
With iron, no fluoride	5	2	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	
With iron, with fluoride	5	2	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	
Multiple vitamins, unspecified pediatric formulations	273	265	194	65	5	254	9	0	2	9	47	6	0	0	0	0	0	0	0	0	
No iron, no fluoride	45	42	42	0	0	42	0	0	0	3	8	1	0	0	0	0	0	0	0	0	
No iron, with fluoride	199	194	182	12	0	192	2	0	0	23	37	10	1	0	0	0	0	0	0	0	
With iron, no fluoride	17	16	14	2	0	16	0	0	0	3	6	1	0	0	0	0	0	0	0	0	
With iron, with fluoride	17	16	14	2	0	16	0	0	0	3	6	1	0	0	0	0	0	0	0	0	
Other vitamins	2,802	2,421	575	338	1,276	1,197	320	6	887	421	132	775	101	2	0	0	0	0	0	0	
Niacin (B3)	3,423	2,408	1,937	84	315	2,265	71	2	64	134	434	52	6	0	0	0	0	0	0	0	
Other B complex vitamins	341	223	167	12	35	198	13	1	10	23	46	5	2	0	0	0	0	0	0	0	
Pyridoxine (B6)	619	511	378	41	68	472	16	0	20	47	93	35	3	0	0	0	0	0	0	0	
Vitamin A	2,193	1,622	1,251	198	146	1,505	75	7	32	68	265	87	5	2	0	0	0	0	0	0	
Vitamin C	516	390	117	9	220	331	10	0	47	37	48	29	5	0	0	0	0	0	0	0	
Vitamin D	1,120	796	644	39	98	755	17	1	22	65	163	21	0	0	0	0	0	0	0	0	
Vitamin E	865	711	368	79	221	529	62	2	117	153	115	90	20	1	0	0	0	0	0	0	
Other	854	641	476	88	54	582	31	0	22	71	153	35	3	0	1	0	0	0	0	0	
Unknown	63,331	56,220	44,151	6,783	4,372	52,646	1,904	58	1,537	3,787	11,302	2,441	258	7	1	0	0	0	0	0	
Category Total:	17,756	13,381	4,006	2,641	5,172	6,647	3,949	854	843	8,074	2,378	1,620	1,475	475	47	0	0	0	0	0	
Unknown drug	17,756	13,381	4,006	2,641	5,172	6,647	3,949	854	843	8,074	2,378	1,620	1,475	475	47	0	0	0	0	0	
Category Total:	17,756	13,381	4,006	2,641	5,172	6,647	3,949	854	843	8,074	2,378	1,620	1,475	475	47	0	0	0	0	0	
Total Pharmaceuticals	1,425,456	972,073	526,636	135,769	266,149	763,207	163,619	3,972	34,899	255,993	213,173	105,218	46,308	6,809	507	0	0	0	0	0	
% of single exposures	100.0%	100.0%	54.2%	14.0%	27.4%	78.5%	16.8%	0.4%	3.6%	26.3%	21.9%	10.8%	4.8%	0.7%	0.1%	0	0	0	0	0	
Total - Nonpharmaceuticals + Pharmaceuticals	2,750,764	2,189,766	1,189,154	286,470	590,264	1,912,719	199,961	15,599	51,466	433,004	413,013	299,852	83,625	9,219	725	0	0	0	0	0	
% of single exposures	100.0%	100.0%	54.3%	13.1%	27.0%	87.3%	9.1%	0.7%	2.4%	19.8%	18.9%	13.7%	3.8%	0.4%	0.0%	0	0	0	0	0	

### Adolescent fatalities – ages 13–19 years

In the age range 13 to 19 years, there were 62 reported fatalities (Table 8) including 47 pharmaceuticals and 15 nonpharmaceuticals, similar to the numbers reported in this age group reported annually since 1999.

The reasons for the adolescent fatalities, 26 were presumed suicides, and 16 were attributed to intentional abuse (Table 8). These numbers are similar to those in most recent years except for 2003 when abuse was the most common reason. As in the past years, only a small number (11 of 62) of adolescent fatalities were coded as being unintentional including 6 cases attributed to carbon monoxide.

### All fatalities – all ages

The age distribution of reported fatalities is similar to that in past years with 91.9% (1,130 of 1,229) of fatal cases occurring in adults (age > 19 years) including 6 patients of unknown age (Table 4).

The most common classes of substances involved across all fatalities were sedative/hypnotics/antipsychotics followed by opioids, cardiovascular drugs, acetaminophen in combination, antidepressants and stimulants/street drugs (Table 18). Of these top 6 classes most frequently involved in fatalities in Table 18 only 4 appear in Table 17A: sedative/hypnotics/antipsychotics ranked 4<sup>th</sup>, antidepressants, 9<sup>th</sup> and cardiovascular drugs 11<sup>th</sup> among exposure frequency. Thus there was little correlation between frequency of exposure and frequency of fatality.

### Demographic summary of exposure data

Tables 22A (Nonpharmaceutics) and 22B (Pharmaceutics) provide summary demographic data on patient age, reason for exposure, medical outcome, and use of a health care facility for all 2,403,539 exposure cases, presented by substance categories. This table differs from the version of previous years. The first column counts all exposures to that substance (as in previous years) but the second column (and the breakdowns by Age, Treatment Site, Reason, and Outcome) report single substance exposures only. Single substance cases reflect most (91.1%) of all exposures (Table 5). This table for 2006 restricts the breakdown columns to single-substance cases to improve precision (avoid misrepresentation). In past years when multi-substance exposures were included, a relatively innocuous substance was mentioned in a death column when, for example, the death was attributed to an antidepressant, opioid, or cyanide. This subtlety was not always appreciated by the casual user of the information. The restriction of the breakdowns to single-substance exposures should increase precision and reduce misrepresentation of the results in this unique by-substance table.

Tables 22A + 22B tabulate 2,750,757 substance-exposures, of which 2,189,760 were single-substance exposures

including 1,217,693 (55.6%) nonpharmaceuticals and 972,067 (44.4%) pharmaceuticals.

In 16.8% of exposures that involved pharmaceutical substances the reason for exposure was intentional, compared to only 3.0% when the exposure involved a nonpharmaceutical substance. Correspondingly, treatment in a health care facility was provided in a higher percentage of exposures that involved pharmaceutical substances (26.3%) compared with nonpharmaceutical substances (14.5%). Exposures to pharmaceuticals also had more severe outcomes. Of single-substance implicated fatal cases, 506 were pharmaceuticals compared with 218 nonpharmaceuticals.

Fatalities associated with single substance exposures tabulated in Table 22B included: 116 opioids (29 methadone, 23 unspecified opioid, 17 heroin, 17 hydrocodone, 17 oxycodone and 1 meperidine), 57 acetaminophen, 46 carbon monoxide, 25 cocaine, 22 cardiac glycoside, 17 cyclic antidepressants (6 amitriptyline, 2 doxepin, 1 combined with a phenothiazine, 1 desipramine and 7 unspecified cyclic antidepressants), 17 ethylene glycol, 14 aspirin, 13 calcium antagonist, 12 diphenhydramine, 11 atypical antipsychotic and 10 beverage ethanol.

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### Disclaimer

The American Association of Poison Control Centers (AAPCC; <http://www.aapcc.org>) maintains the national database of information logged by the country's 61 Poison Centers (PCs) serving all 50 United States, Puerto Rico and the District of Columbia. Case records in this database are from self-reported calls: they reflect only information provided when the public or healthcare professionals report an actual or potential exposure to a substance (e.g., an ingestion, inhalation, or topical exposure, etc.), or request information/educational materials. Exposures do not necessarily represent a poisoning or overdose. The AAPCC is not able to completely verify the accuracy of every report made to member centers. Additional exposures may go unreported to PCs and data referenced from the AAPCC should not be construed to represent the complete incidence of national exposures to any substance(s). Rev. March 2006

### Appendix A - Acknowledgments

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#### *Poison centers*

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The initial review of reported fatalities and development of the abstracts was the responsibility of the staff of the

participating poison centers. These poison centers and individuals are listed at the beginning of this report.

Many individuals at each center participate in the review of their centers fatality cases. The following toxicology professionals summarized and prepared their center's fatality data for NPDS:

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The Lead and Peer review of the 2006 fatalities was carried out by the 27 individuals listed here. The authors and the AAPCC wish to express our appreciation for their volunteerism, dedication, hard work and good will in completing this task in a very limited time.

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\*These 5 reviewers further volunteered to read the top ranked 150 abstracts and judge publish or omit.

## Appendix B - Abstracts of selected cases

Abstracts of the 88 cases selected (see Selection of Abstracts for Publication) from 1,229 human fatalities judged related to a poisoning exposure as reported to U.S. Poison Centers in 2006. A structured format for abstracts was optional in the preparation of the abstracts and was used in the abstracts presented. Abbreviations, units and normal ranges omitted from the abstracts are given at the end of this appendix

### Abstracts

**Case 2.** Acute formic acid ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 48 y/o male ingested about 1 cup of an unknown pesticide obtained where he worked as a beekeeper. At 15 min the patient was awake and alert without nausea, vomiting, diarrhea or sweating, but was "breathing fast". EMS found the patient barely responsive and very hypotensive despite maximal IV fluids, dopamine and norepinephrine. The liquid in the unlabeled bottle tested acidic with pH paper. EMS believed the patient had ingested formic acid. The patient arrived in the ED and was intubated.

**Past Medical History:** Not provided.

**Physical Exam:** BP 161/79, HR 105, R 28, T 39°C. On a vent, PEEP 10, O<sub>2</sub> sat 95% on 100% FI O<sub>2</sub>. O<sub>2</sub> sat decreased

into the 70s when the patient was laying flat. The patient had burns on the face, entire mouth and vocal cords.

**Laboratory Data:** ABG-pH 6.84 / pCO<sub>2</sub> 58 / p O<sub>2</sub> 159 / HCO<sub>3</sub> 10, O<sub>2</sub> sat 97% on 100% FiO<sub>2</sub>.

**Clinical Course:** The patient received 1 ampule sodium bicarbonate IV push and started on an IV infusion. The patient had aspirated the formic acid, had noisy sounding lungs and they suctioned bloody frothy fluid from the lungs. Bronchoscopy showed burns to the upper airway and all the way down which were consistent with acid aspiration. Endoscopy was deferred due to the patient's instability. At 6 h, the patient had a cardiac arrest, and could not be resuscitated.

**Autopsy Findings:** Cause of death: severe metabolic acidosis due to intentional ingestion of formic acid. Other findings: third degree chemical burns around mouth and involving oral, esophageal, gastric mucosa, and proximal small bowel mucosa, second degree chemical burn on left thumb, secondary superficial chemical fixation of heart, left lung, diaphragm, spleen, left kidney, pancreas, liver, colon, aorta, and serosal surfaces of the abdominal, pericardial, and left pleural cavities, cardiac hypertrophy, and mild obesity. Only lidocaine (used in CPR) was detected in a post mortem femoral blood sample.

**Case 31.** Acute ingestion, methanol: *probably responsible.*

**Scenario/Substances:** A 29 y/o male was arrested and taken to local jail where he ingested moonshine containing methanol.

**Past Medical History:** Alcoholism, bipolar disorder.

**Physical Exam:** Obtunded, HR 87, BP 139/83 mm Hg, T 37°C, and RR 22.

**Laboratory Data:**

Na 136	Cl 106	Glu 173
K 4.6	HCO <sub>3</sub> 6	Cr 1.4

pH 7.1, serum osmolarity 430, methanol concentrations of 348, 346, 333 and 38 mg/dL were recorded during CVVHD.

**Clinical Course:** The patient was intubated, given IV fluids with sodium bicarbonate and a dose of IV ethanol prior to transfer to a tertiary care facility. At the facility, the patient was hypothermic (34°C), acidotic (pH 6.9 / pCO<sub>2</sub> 25, HCO<sub>3</sub> 4.8), tachycardic (114 /min), and displayed dilated and unresponsive pupils. Continuous veno-venous hemodialysis was performed for two days and fomepizole was given IV, twice daily for 3 days until the osmolar gap was zero. The patient expired on Day 4, when support was withdrawn per the family's request after the patient remained unresponsive and a brain MRI and EEG showed "extensive damage".

**Autopsy Findings:** Cerebral edema, herniation, and multiple diffuse petechial cerebral hemorrhages.

**Case 36.** Acute methanol ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 44 y/o male presented to the ED with delirium, muscle spasticity and diaphoresis. The ED staff suspected methanol or ethylene glycol ingestion.

**Past Medical History:** Unknown.

**Physical Exam:** Altered mental status

**Laboratory Data:** ABG-pH <6.80 / pCO<sub>2</sub> 36 / pO<sub>2</sub> 213. Anion gap 32 mmol/L. Serum osmolality was measured 451 mOsm/L with a calculated gap of 150 mOsm/L. Methanol serum concentration on admission was 288 mg/dL. After 5 h of dialysis the methanol was 18 mg/dL. Urine was negative for acetone or calcium oxalate crystals. Salicylic acid, acetaminophen and ethanol and ethylene glycol concentrations were negative. ECG showed transient ST segment elevations.

**Clinical Course:** The patient was intubated on arrival, received a loading dose of fomepizole and dialysis was instituted. Initial head CT was normal. Fomepizole therapy was continued during dialysis. The patient was given 50 grams of mannitol prior to a second dialysis. Approximately 12 h after presentation the patient developed a significant left-sided intracranial hemorrhage and expired. No autopsy was performed.

**Case 42.** Acute brake fluid ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 47 y/o man was found down in his room under his dresser. Used brake fluid had been discarded in a 2 liter cola bottle and buried in the trash in the garage. The patient, who was profoundly mentally disabled, liked cola and may have retrieved it from the trash. The patient's mother recalled seeing a styrofoam cup in the kitchen containing an oily substance.

**Past Medical History:** Mental retardation, seizure disorder, hypertension. Medications included hydrochlorothiazide, lithium, quetiapine, phenytoin, thiothixene and haloperidol.

**Physical Exam:** The patient presented to the ED with seizures and coma.

**Laboratory Data:** Day 1

Na 143 K 3.8	Cl 110 HCO <sub>3</sub> 19	BUN 19 Cr 0.7	Glu 149
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lactate 2.8, lithium, 1.5, urine drug screen negative, salicylates-none detected, Day 3 calcium 7.3,

Na 149 K 3.3	Cl 116 HCO <sub>3</sub> 8	BUN 45 Cr 2.8
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propylene glycol 7.0, diethylene glycol 38 mg/dL, other alcohols (ethanol ethylene glycol, acetone, methanol, isopropanol) negative, Day 6 BUN 65, Cr 4.6, Day 8 BUN 73, Cr 5.0, Day 9: BUN 106, Cr 6.3, Day 12 BUN 70, Cr 5.2.

**Clinical Course:** Renal failure progressed and hemodialysis initiated on Day 3 of hospitalization. The patient remained encephalopathic, with no purposeful movements and expired on Day 13. Cause of death was toxic encephalopathy.

**Autopsy Findings:** (external examination) found cause of death was inadvertent drinking of brake fluid and its complications, mental retardation was contributory.

**Case 60.** Acute ethylene glycol ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 53 y/o male was found with altered mental status after reportedly drinking up to 16 ounces of ethylene glycol antifreeze.

**Physical Exam:** On presentation in the ED the patient was unresponsive, HR 88, BP 140/60, RR 32.

**Laboratory Data** included Ca 8.7,

Na 145 K 3.3	Cl 105 HCO <sub>3</sub> 16	BUN 14 Cr 1.1	Glu 106
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ABG-pH 7.26 / pCO<sub>2</sub> 37 / HCO<sub>3</sub> 16, ethanol none detected. Measured osmolality was 502 mOsm/L, osmolar gap 210 mOsm/L (from osmolality based on the electrolytes of 301 mOsm/L). Ethylene glycol concentration on Day 1 was 1,540 mg/dL.

**Clinical Course:** Progressive renal failure ensued despite therapy with fomepizole and 8 hemodialysis runs over the next 6 days. Altered mental status persisted and death occurred on Day 7. No autopsy was performed.

**Case 75.** Acute cyanide ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 27 y/o male left a suicide note at home and presented to the ED for unknown reasons where he went into a bathroom, and shortly after walking out, had a cardiopulmonary arrest.

**Past Medical History:** Testicular cancer.

**Physical Exam:** Vital signs post cardiac arrest were: BP 100/42, HR 140.

**Laboratory Data:** pH, <6.8, lactate, 12, HCO<sub>3</sub> 12, methemoglobin 11.9 %.

**Clinical Course:** He was resuscitated in the ED with atropine, bicarbonate, calcium, epinephrine and a cyanide kit (amyl nitrite, sodium nitrite, sodium thiosulfate). White powder was noted in his underwear. The addition of the reagent testing for heroin (most likely Marquis reagent or sulfuric acid) resulted in the vial exploding, suggesting the presence of hydrogen cyanide generated from sodium cyanide. The patient required intubation and pressors after resuscitation. A single dose of activated charcoal was given. In the ICU additional IV sodium thiosulfate (total of 3 doses given) was given. 3 h after the arrest: pH 7.34, lactate 2. The patient became hypotensive and tachycardic and exhibited evidence of brain death. He expired 48 h after presentation and his organs (liver, kidneys and heart) were harvested for donation.

**Autopsy Findings:** Cerebral edema and herniation. Antemortem toxicology of gastric contents revealed 7.3 µg/ml of cyanide. Antemortem blood thiocyanate was 60 µg/ml, drawn approximately 8 h after the patient. ingested the cyanide.

**Case 76.** Acute cyanide ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 32 y/o male ingested cyanide in a suicide attempt, vomited and collapsed. EMS arrived 15 min after collapse and found the patient to have pulseless electrical activity. Resuscitation efforts were initiated and the patient was transported to the ED; atropine and epinephrine administered en route.

**Past Medical History** included depression with prior suicide attempts.

**Laboratory Data:** Initial ABG-pH 6.87 / PCO<sub>2</sub> 58 / PO<sub>2</sub> 165 / HCO<sub>3</sub> 10, serum cyanide concentration > 500 µg/dL, methemoglobin 7.2% after sodium nitrite.

**Clinical Course:** In the ED, the Glasgow Coma Score was 3, CPR was continued and cyanide antidote (Na Nitrite 300 mg IV and thiosulfate 12.5 g IV) was administered. The patient had return of BP to 150 systolic, after 80 min of CPR with HR 80, T 32.7° C. Pupils dilated and nonreactive to light. The patient was pronounced brain dead 36 h after admission. Death was attributed to brain anoxia due to cardiac arrest from cyanide overdose. No autopsy findings were available.

**Case 77.** Acute cyanide ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 44 y/o male from Southeast Asian obtained a white and gray colored rock from a Hmong herbalist. The patient became obtunded soon after biting into it. EMS intubated and transported him to the ED.

**Clinical Course:** The patient arrived at the hospital nearly apneic with ABG-pH 7.18 / pCO<sub>2</sub> 14.9 and shortly thereafter had a cardiac arrest. Respiratory support was continued for 48 h. An EEG was compatible with brain death, and the patient was taken off the ventilator and expired on Day 3.

**Autopsy Findings:** Analysis of the rock showed inorganic cyanide, and death was ascribed to cyanide toxicity.

**Case 78.** Acute cyanide ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 44 y/o male shot someone, got into a car and drove a short distance, got out and ran a short distance and then collapsed. The patient was found apneic and pulseless.

**Past Medical History:** The patient had previously made threats "to shoot individuals and then take cyanide" in 1993 and was found to possess cyanide at that time.

Laboratory Data included pH 6.9, lactate 25, CK 183, acetaminophen and salicylates none detected, urine toxicology screen negative.

**Clinical Course:** The patient was initially intubated and resuscitated with return of spontaneous circulation. The patient remained hypotensive, unconscious and unresponsive. Cyanide exposure was not initially appreciated and the patient was managed symptomatically and supportively post-resuscitation, including norepinephrine for BP support. When the lactate remained elevated despite adequate oxygenation and perfusion (~4 h post-arrival) the patient was given amyl nitrite, sodium nitrite and sodium thiosulfate, with hemodynamic improvement and was weaned from the pressors. The patient remained unconscious and unresponsive, with dilated and fixed pupils. Support was withdrawn and the patient expired on Day 3.

**Autopsy Findings** included pre-mortem blood cyanide 7.2 mg/L. Death was ruled secondary to cyanide toxicity and anoxic brain injury.

**Case 87.** Acute ethylene glycol ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A male in his 50's was found unresponsive outside on a cold day

**Past Medical History:** None available.

**Physical Exam:** The patient was cool to the touch, HR 76, BP 160/90, T 33.1°C rectal, RR 10, pupils were 5 mm and reactive. The patient was moving his extremities but responded to painful stimuli, Glasgow Coma Scale of 4.

**Laboratory Data:** calcium 9.4,

Na 150	Cl 118	BUN 15	Glu 242
K 7	HCO <sub>3</sub> < 5	Cr 2.1	

ABG-pH 6.8 / pCO<sub>2</sub> 12 / pO<sub>2</sub> 352, Mg 3.1, phosphorus 5.5, lactate 2.3, CK 6,668, WBC 29.3, Hgb 15.7, Hct 52.4%, platelets 320, urinalysis 3 + blood and protein, 10–20 RBC/hpf, and no crystals. PT, PTT and INR were normal. Urine drug screen negative and serum acetaminophen, salicylates, and ethanol were all undetected. ECG showed sinus rhythm at 67, QRS 92 msec, QTc 420 msec T waves tall and peaked, no Osborne waves noted.

**Clinical Course:** The patient was intubated and ventilated, received sodium bicarbonate loading and was put on a bicarbonate infusion in addition to boluses of calcium gluconate, insulin, D50 and ceftriaxone. Head CT was unremarkable. The patient was treated for diabetic ketoacidosis with an insulin infusion until serum Glu normalized. The patient developed generalized tonic-clonic seizures treated with IV lorazepam followed by phenobarbital and he was placed on a propofol infusion. The acidosis worsened and ABG 5 h showed pH 6.73 / pCO<sub>2</sub> 22.4 which improved slightly to pH, 6.86 / pCO<sub>2</sub> 20. A toxic alcohol screen was sent and the patient was started on fomepizole, thiamine, pyridoxine, and folinic acid. Ethylene glycol was 89 mg/dL; hemodialysis was initiated. post-dialysis ethylene glycol was 15 and acidosis resolved. On Day 2 the patient became hypotensive requiring pressor and inotropic support. Ethylene glycol was 7. On Day 3 the patient was unresponsive, calcium 6.1, Cr 6.2, pupils were fixed and dilated and was not assisting the ventilator. The patient expired on Day 3. No autopsy was performed.

**Case 94.** Acute ingestion, ethylene glycol: *probably responsible.*

**Scenario/Substances:** A 75 y/o male admitted the night before the PC inquiry with presumed CVA. He was then noted to be very acidemic with and elevated osmolar gap.

**Past Medical History:** Two prior CVAs, colon cancer, and hypertension. Current medications included warfarin, atenolol, verapamil, and hydrochlorothiazide.

**Physical Exam:** HR 73, BP 139/40, T normal, RR 16. Confused with slurred speech, lungs clear, cardiovascular and abdominal exam normal, skin warm and dry, extremities without rigidity.

**Laboratory Data:** pH 7.2 on admission, later 6.9, HCO<sub>3</sub> 7.9, measured osmolality 361 mOsm/kg, lactate 2.3, BUN 22 and

Cr on admission 2.2, later 3.2, UA with calcium oxalate crystals, ethylene glycol concentration was 448 µg/L.

**Clinical Course:** The patient was intubated 4 h after admission to the hospital for worsening mental status and slurred speech, treated with TPA for suspected CVA, subsequently received a bicarbonate infusion, a loading dose of ethanol, subsequent fomepizole, and finally 2 cycles of hemodialysis. The second round of hemodialysis was halted for hypotension; the patient expired after cardiac arrest.

**Autopsy Findings:** Not available.

**Case 97.** Strychnine ingestion, presumed suicide, : *undoubtedly responsible.*

**Scenario/Substances:** A 64 y/o female found dead at home in bed. There was no history of a disturbance or signs of an agonal death.

**Past Medical History** included a history of alcoholism:

**Autopsy Findings:** post-mortem blood strychnine 1100 ng/mL [ $>500$  potentially fatal], vitreous ethanol 130 mg/dL. No strychnine-containing food, medications or other substances were found in her home.

**Case 99.** Acute mixed ingestion (multiple cleaning agents including sodium hypochlorite and sodium hydroxide): *undoubtedly responsible.*

**Scenario/Substances:** A 49 y/o male was found on the kitchen floor of his home after the apparent ingestion of multiple cleaning products. Ingredients indicated on the empty containers found at the scene included sodium hypochlorite, sodium hydroxide, surfactants, pine oil, isopropyl alcohol, alkyl alcohol ethoxylates and hydrogen peroxide. Patient was found by EMS with agonal respirations. The patient arrested during transport and arrived at the ED with CPR in progress. A moderate amount of fluid that smelled like the carpet cleaner was suctioned from the patient's airway following intubation.

**Past Medical History** included ethanol abuse.

Physical Exam included BP 61/27, HR 93, pupils fixed and dilated. There was blood on the patient's face, in the orogastric tube, and in the stool.

**Laboratory Data** included ABG-pH 6.84 / pCO<sub>2</sub> 45 / pO<sub>2</sub> 257, bicarbonate 7, sodium 160, Cr 2.3, AST 57, ethanol negative.

**Clinical Course:** The patient underwent a prolonged resuscitation including mechanical ventilation, but died 1 h 45 min after arriving at the ED. Clinical course was consistent with massive aspiration.

**Autopsy Findings** included pulmonary edema, severe microvesicular hepatocyte steatosis and mild gastric hemorrhage. Pathological diagnosis was isopropanol intoxication. Postmortem labs included urine drug screen positive for promethazine and dimethoxystrychnine, blood promethazine 45 ng/mL, acetone 36, isopropyl alcohol 4.2, benzoylecgonine not detected.

**Case 102.** Acute cleaning liquid ingestion (pine oil): *contributory.*

**Scenario/Substances:** An 8 y/o male was brought to the ED in cardiopulmonary arrest after reportedly ingesting a pine

oil-containing cleaner. Aggressive CPR was not successful and the patient expired in the ED.

**Past Medical History:** There were previous reports of sexual and physical abuse. According to the coroner's investigative report, the child had vomited in the bedroom and bathroom. A blender was found with some sort of bleach and pine oil-containing cleaner mixture. There were numerous bottles of the cleaner found lying around the home. The mother explained that the child urinated all over the house and that she used the cleaner to clean up the mess and reduce the odor of urine.

**Autopsy Findings:** Multiple contusions and scars consistent with cord or strap injuries. Confluent injuries of the buttocks and hips, and subcutaneous hemorrhage of the left arm. Circumferential scars of wrists and ankles consistent with old ligature marks. Superficial cutaneous ulceration of the penis consistent with chemical injury, a thin subcutaneous fat layer was consistent with starvation. Postmortem laboratory analysis: isopropyl alcohol (4) and acetone (23), stomach contents positive for ethanol (78) judged to be due to postmortem production. Official cause of death reported as "Generalized acute and chronic cutaneous trauma due to battered child syndrome, and ketoacidosis"

**Case 108.** Acute caustic ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 52 y/o male ingested drain cleaner (active ingredient was concentrated sulfuric acid) in an apparent suicide attempt.

**Past Medical History:** History of prior suicide attempt.

**Physical Exam:** BP 153/116, HR 122, RR 28, T 36.7°C, O<sub>2</sub> sat by pulse oximetry was 99%. The patient reported a pain severity of 10 on a scale of 10.

**Laboratory Data:** ABG-pH  $< 6.8$  / pCO<sub>2</sub> 72 / pO<sub>2</sub> 297.

**Clinical Course:** The patient was intubated and given multiple doses of sodium bicarbonate. An ECG was interpreted as an acute myocardial infarction. A flat plate of his abdomen revealed ileus and chest film revealed "white out." The patient remained acidemic and on a ventilator. Repeat labs were ABG-pH 6.92 / pCO<sub>2</sub> 126 / pO<sub>2</sub> 356. The patient suddenly became bradycardic and resuscitation was commenced with bicarbonate, epinephrine and atropine and the patient became asystolic and expired.

**Autopsy Findings:** Pathological findings found were extensive erosions and perforation of the stomach and bowel. Cause of death was determined to be complications of sulfuric acid poisoning occurring in a suicidal manner.

**Case 115.** Acute carbon monoxide exposure: *undoubtedly responsible.*

**Scenario/Substances:** A 16 y/o male was found in full cardiopulmonary arrest with evidence of vomiting in a small 2-person tent.

**Clinical Course:** EMS was called and the patient was declared dead at the scene.

**Autopsy Findings:** An autopsy and post mortem toxicology analysis was performed. A carboxyhemoglobin concentration

of 54% was reported. No other anatomical cause of death was discovered.

**Case 116.** Acute carbon monoxide exposure: *undoubtedly responsible*.

**Scenario/Substances:** A 16 y/o male was found by a family friend in bed, apneic, but reportedly warm to the touch. The victim's father was found dead downstairs. A gas generator was being used in the basement to heat the home because power had been reportedly turned off due to delinquent bills. Bystander CPR was begun. Paramedics continued CPR but were unable to establish intravenous access or intubate the patient due to rigor.

**Past Medical History:** History of depression.

**Physical Exam:** Rectal T 33.6 °C. The patient was rigid, lungs were clear to auscultation with assisted breaths. There were no detectable vital signs in the ED.

**Laboratory Data:** Carboxyhemoglobin concentration 60%. Per the fire department, just outside the home the carbon monoxide concentration was 250 parts per million.

**Clinical Course:** The patient was asystolic with CPR in progress. The patient was endotracheally intubated and epinephrine and atropine were administered via the ET tube. Epinephrine and atropine were repeated IV without return of spontaneous circulation. The patient was re-warmed but remained asystolic. A bedside ultrasound revealed cardiac standstill. No autopsy was performed.

**Case 160.** Acute inhalation of caustic fumes: *contributory*.

**Scenario/Substances:** A 78 y/o female lost consciousness while using a drain cleaner containing chlorine and bleach to clean her bathroom. The patient was found down and transported to the ED.

**Past Medical History:** included asthma and heart disease.

**Clinical Course:** In the ED the patient was unresponsive, pupils were fixed and dilated. The patient was intubated and started on norepinephrine for hypotension. The patient was resuscitated from a cardiac arrest shortly after arrival but expired a few h later. Death was judged due to an acute asthma attack following inhalation of caustic fumes.

**Autopsy Findings** documented microscopic changes consistent with acute and chronic asthma, and emphysematous changes of the lungs, hypertensive and atherosclerotic cardiovascular disease. Toxicological testing did not detect alcohol or drugs of abuse.

**Case 166.** Acute butane inhalation: *undoubtedly responsible*.

**Scenario/Substances:** An 18 y/o male was huffing butane at a public park with friends when he suddenly collapsed. Friends initiated CPR and called EMS.

**Past Medical History:** substance abuse.

**Physical Exam:** EMS found the patient unresponsive with no pulse, apneic, and cyanotic. There were no visible signs of trauma and continued resuscitative measures.

**Clinical Course:** The patient was intubated, given epinephrine, atropine, and bicarbonate, defibrillation, and CPR

during the 35 min transport to the ED. On arrival to the ED the patient's pupils were fixed and dilated and he was without respiratory effort. Physical exam showed diffuse purpuric discoloration to the head, face and neck, and dependent lividity. ECG showed fine ventricular fibrillation versus asystole. CPR was continued and the patient received additional bicarbonate, naloxone 1.6 mg and additional defibrillations. After 45 min of unsuccessful ACLS measures, the patient was pronounced dead. The death was attributed to cardiopulmonary arrest secondary to suspected substance abuse.

**Autopsy Findings** included blood analyses positive for butane and ruled the manner of death as a probable accident due to acute butane intoxication.

**Case 168.** Acute aluminum phosphide pellet ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 27 y/o male noted by coworkers in the grain elevator to exhibit a decreasing concentration of consciousness vomiting and then collapsed. The patient was confused on awakening, but was able to talk. It was believed that the patient had eaten some aluminum phosphide pellets from his pocket instead of the candy.

**Past Medical History** included severe headaches x 2 weeks, nausea and vomiting x 24 h.

**Physical Exam** on presentation to ED gaze was disconjugate, the patient was disoriented, skin was cold, but became diaphoretic and the patient was noted to be in severe distress. BP 99/68, HR 123, RR 35, T 36.7°C. A small area of ecchymosis noted to lower anterior neck and pain noted with movement of extremities.

**Laboratory Data:** WBC increased from 13 to 18.9, HGB decreased from 13.2 to 9.8, platelets decreased from 230 to 139, prothrombin time 14. Na increased from 141 to 152, K decreased from 3.6 to 3.2, HCO<sub>3</sub> 20, anion gap 20, Glu 112, ionized calcium decreased from 1.03 to 0.87. Myoglobin increased from 77 to 692 ng/ml. Lactate increased from 8.6 to 14.2. ABG-pH decreased from 7.42 to 6.88 / pCO<sub>2</sub> decreased from 47 to 29, base deficit increased from 4.5 to 24.5. Drugs of Abuse Screen negative. Results of head CT and lumbar puncture were unremarkable.

**Clinical Course:** Respiratory function, BP and mental status declined with increasing metabolic acidosis. He was intubated, sedated and vasopressors (dopamine, phenylephrine, norepinephrine, dobutamine) added in an attempt to raise systolic BP above 65. Echocardiogram showed 4 chamber dilatation with an ejection fraction of 15%. The patient developed ventricular tachycardia during the attempt to place a pulmonary artery catheter which degenerated to fine ventricular fibrillation and he could not be resuscitated.

**Autopsy Findings** revealed no indication of intrinsic disease. The clinical presentation was judged consistent with aluminum phosphide exposure. There is no indication of other toxic compounds. Gastric content collected at the scene of collapse had a high aluminum content, so the possibility of ingestion of a pellet or pellets exist, though sample contamination

cannot be ruled out. This death was from exposure to aluminum phosphide/phosphine.

**Case 171.** Ingestion of a lead-containing charm: *undoubtedly responsible*.

**Scenario/Substances:** A 4 y/o male ingested a charm, presented to the ED with abdominal complaints and was discharged with a diagnosis of gastroenteritis. The child returned to the ED 2 days later with listlessness, a sore tummy, poor oral intake and intractable vomiting.

**Past Medical History** included microcephaly and developmental delay.

**Physical Exam** showed lethargy and evidence of dehydration.

**Laboratory Data:** abdominal x-ray showed a foreign body in the stomach.

**Clinical Course:** 10 h after admission the patient became agitated and combative and had a respiratory arrest associated with seizure-like activity. The patient was intubated and a head CT showed diffuse cerebral edema. An abdominal xray showed a foreign body in the stomach and a blood lead concentration blood lead was 180 µg/dL. The child failed to recover, met criteria for brain death, comfort measures were given and he died on Day 4.

**Autopsy Findings:** A heart-shaped charm found in the stomach contained 99.1 % lead.

**Case 172.** Acute magnesium exposure: *undoubtedly responsible*.

**Scenario/Substances:** An 18 y/o female presented for a routine prenatal visit and reported 3 days of contractions. The patient was diagnosed with preterm labor and administered magnesium sulfate IV. 4 grams were ordered, but 400 mL of a 40 g/L infusion were administered, for an actual dosage of 16 grams.

**Past Medical History:** 27.5 week pregnancy.

**Physical Exam:** Patient was alert, but weak with respiratory difficulty, diaphoretic, with absent deep tendon reflexes, able to breath spontaneously, with assistance opening her airway, BP 110/50,

**Laboratory Data:** Serum magnesium concentration 18.9 meq/L, her initial oxygen sat was 100%.

**Clinical Course:** CaCl<sub>2</sub> was administered and hemodialysis planned. The patient began coughing and complaining of shortness of breath. The heart rate declined from the 70's to the low 30s. Atropine 1 mg was administered twice. The patient developed sinus tachycardia, which deteriorated into ventricular tachycardia, and then ventricular fibrillation, and finally fine ventricular fibrillation and asystole. The patient was intubated and cardiopulmonary resuscitation was attempted but was unsuccessful. Resuscitation efforts were continued until an emergency cesarean section was performed to deliver the baby. After delivery, the resuscitation effort was discontinued. The patient died of cardiopulmonary arrest within 1 h of the administration of magnesium. No autopsy results were available.

**Case 177.** Acute herbicide ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 62 y/o woman reportedly drank half a bottle of glyphosate concentrate approximately 30 min prior to arrival in the ED.

**Past Medical History:** Depression, on escitalopram and mirtazapine.

**Physical Exam:** Patient awake and alert and "panting", had vomited. BP 83/58, HR 101, RR 16 on ventilator.

**Laboratory Data:** pH 7.44, HCO<sub>3</sub> 17, BUN 8, creatinine 0.8, anion gap, 27, Ca 10.6, PT 11.3, PTT 32, INR, 0.8, ALT 28, WBC 11, platelets 320. Late Day 2 ALT 231, AST 263, Alk Phos 73, WBC 22.2, Hct 35%. Urine drug screen was negative and acetaminophen was not detected.

**Clinical Course:** The patient was given activated charcoal in the field. The patient was admitted to ICU, IV fluids with bicarbonate given for metabolic acidosis, hemodialysis started, tachycardia, hypotension noted later in the course. It was reported that the product contained diquat. The patient receiving N-acetylcysteine 7 grams. Developed T 102° F, antibiotics were started. The patient's urine output declined and became anuric. Pressors were started for hypotension. The family discontinued life support and patient expired. No autopsy was performed.

**Case 178.** Acute arsenic ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 70 y/o female drank ~8 ounces of a crab grass killer containing 13.2% methane arsenate (14 grams of arsenic). The patient had a large initial emesis and continued to vomit. EMS arrived ~1 h after the ingestion.

**Past Medical History** included mental illness and diabetes mellitus managed with oral hypoglycemics.

**Physical Exam:** The patient was initially confused but awake. BP 160 systolic, HR 20.

**Laboratory Data:** Initial labs

Na 140	Cl 106	BUN 17
K 3.4	HCO <sub>3</sub> 19.2	Cr 1.3

AST 20, ALT 32, Alk Phos 113, HGB/Hct 11/34.9, Platelets 108, QTc 537 msec, ethanol neg. acetaminophen and salicylates not detected, abdominal X-ray showed a density in the stomach. Initial blood arsenic 6,943 µg/L (value returned on day 5).

**Clinical Course:** The patient was intubated on arrival in the ED, sedated with propofol, lavaged, activated charcoal was given and whole bowel irrigation was initiated. BAL 3 mg/kg mg was administered every 4 h. The dose was decreased to every 6 h on Day 3, then twice daily thereafter. Hemodialysis was begun immediately and continued. Hypotension was treated with norepinephrine. Bilateral pulmonary infiltrates presumed to result from aspiration were treated with levofloxacin. On Day 4 Cr was 1.8, AST 96, ALT 87. The patient was transfused for Hgb 8.3. EEG on Day 5 showed alpha coma and brain stem dysfunction. Sedation was stopped but the patient remained unresponsive. Hemodialysis and BAL were continued, but the patient's condition did not improve.

On Day 10, comfort measures were instituted and the patient died. Death was judged secondary to arsenic toxicity. Autopsy was not performed.

**Case 184.** Acute fluorochlorocarbon inhalation: *probably responsible*.

**Scenario/Substances:** A 19 y/o female was inhaling a product which contained fluorinated hydrocarbons while sitting in a hot tub. EMS was called regarding a “near-drowning” apparently after the patient became unconscious. The patient was given CPR on scene and described as “down” in the hot tub for approximately 20 min prior to being discovered. In the ED, after resuscitation the physician noted evidence of emesis and possible aspiration.

**Past Medical History:** History of drug abuse, specifically “huffing” (inhalant abuse).

**Physical Exam:** Unresponsive, BP 115/43, HR 117, T 36.4°C, ventilated. Chest film bilateral fluffy infiltrates at the lung bases.

**Laboratory Data:** ABG-pH 6.88 / pCO<sub>2</sub> 63 / pO<sub>2</sub> 87, WBC 8.5, HGB 11.3 g/dL, platelet count, 256, Na 130, K 4.1, HCO<sub>3</sub> 22, Cr 1.1, ALT 349. A urine drug of abuse screen was negative, ethanol 5 mg/dL.

**Clinical Course:** After initial resuscitation the BP dropped into the 70’s systolic, A nasogastric tube was placed (with return of bright red blood). IV fluids and pressors were given. On hospital Day 2 formal neurological assessment indicated absence of brain activity and a nuclear perfusion scan showed absence of cerebral perfusion. The patient was pronounced dead on Day 2. No autopsy was performed.

**Case 187.** Acute inhalation of fluorochlorocarbon propellant: *undoubtedly responsible*.

**Scenario/Substances:** A 39 y/o male had a witnessed arrest after inhaling office gas duster with difluoroethane propellant. The patient collapsed and was down for 15–30 min prior to EMS arrival. CPR was initiated in the interim.

**Past Medical History** included anxiety, depression, hepatitis C virus positive antibody and a history of “huffing” products containing fluorinated hydrocarbons.

**Laboratory Data:** Initial data included ABG-pH 7.06 / pCO<sub>2</sub> 58 / pO<sub>2</sub> of 72 / HCO<sub>3</sub> 16, Glu 275, Cr 1.5, BUN 9, AST 149, ALT 196, WBC 12.8, HGB 15.2 g/dL. Urine was positive for cannabinoids.

**Clinical Course:** On arrival at the ED the patient was unresponsive, skin was mottled, pupils were fixed and dilated and ECG showed tachyarrhythmia. The patient was intubated and beta blockers were initiated. The patient remained unresponsive with fixed and dilated pupils. Chest film showed a left-lower lobe infiltrate and the patient was treated with antibiotics. Shortly after admission the patient developed refractory hyperthermia despite treatment with a cooling protocol. A head CT on hospital Day 2 showed subarachnoid blood, diffuse edema and changes consistent with anoxic injury to the basal ganglia. The patient had absent brainstem reflexes, fixed and dilated pupils and no spontaneous respiratory effort. Brain death was declared on Day 2, comfort measures

were instituted and the patient expired. Death was attributed to anoxic brain injury and multiorgan system failure due to cardiac arrest and prolonged asystole from abuse of a product containing difluoroethane.

**Autopsy Findings included:** History of “huffing” with collapse (clinical), facial abrasions, history of anoxic brain injury (clinical) with moderate to severe cerebral edema and history of diffuse subarachnoid hemorrhage on admission CT (clinical) with no subarachnoid hemorrhage noted on autopsy. Analytical results were negative for amphetamines, barbiturates, benzodiazepines, cocaine, difluoroethane (from Day 3), methadone, opiates, phencyclidine, propoxyphene and tricyclics.

**Case 199.** Acute diazinon ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 31 y/o female presented to the ED after drinking about 6 ounces of 25% diazinon.

Past Medical History included a suicide attempt the week prior by drinking pyrethrins.

**Clinical Course:** The patient was asymptomatic on presentation and was admitted to the ICU for observation and support. 17.5 h after the ingestion, the patient developed respiratory distress and coughing which progressed to cyanosis. The patient was intubated and CPR was initiated but could not be resuscitated.

**Autopsy Findings:** Cause of death was the toxic effects of diazinon based on: a strong odor of the body and viscera, a history of ingesting the contents of a bottle labeled “diazinon”, diazinon recovered from the stomach contents (850 cc), hepatic steatosis, renal cortical petechiae, petechiae of the gastric mucosa and serosal surfaces of the large and small intestines, undetectable serum/plasma cholinesterase concentrations and multifocal neuronal necrosis of the brain.

**Case 202.** Acute pesticide inhalation: *probably responsible*.

**Scenario/Substances:** The roommate of a 28 y/o male set off 2 roach foggers containing tetramethrin and permethrins in their apartment. They left the house for several h after the fogging. When they returned, they opened all the windows and left again for another h. Upon returning, the patient had some respiratory distress, but symptoms resolved on their own. The next day they both went to work. Upon returning from work, the patient began to “feel bad”. At midnight, the patient’s condition deteriorated and he agreed to be taken to the ED.

**Past Medical History:** The patient was reluctant to seek help, probably because he was not a US citizen. The patient had run out of “heart medicines” and hadn’t taken any for 2 months.

**Laboratory Data:** Urine and blood toxicology screening were negative.

**Clinical Course:** The patient arrived at the ED with dyspnea and flash pulmonary edema. The patient had a seizure, pulmonary and then cardiopulmonary arrest and could not be resuscitated.



**Autopsy Findings:** Cause of death was acute respiratory failure (h) due to aerosol inhalation in an enclosed space (h). Anatomic findings included marked cardiomegaly with left ventricular hypertrophy and subsequent changes of long term heart failure including pleural effusions and congestion of the liver and spleen. The medications with the patient consisted of two BP control agents, 1 a calcium channel blocker. Based on the kidney changes observed, hypertension was likely driven by primary renal disease. Had such natural disease not been present, the aerosol exposure would likely have resulted in no illness. This individual however was at risk due to his disease.

**Case 204.** Anaphylaxis to honey bee envenomation: *undoubtedly responsible.*

**Scenario/Substances:** A 29 y/o male farm worker collapsed in a field shortly after being stung by a bee. The patient was driven by co-workers to a clinic where resuscitation was attempted with epinephrine, lidocaine, intubation and cardioversion. The patient was stabilized and transported to the ED.

**Clinical Course:** In the ED, prolonged resuscitation restored BP. Pupils were fixed and dilated following resuscitation, and pressors were required to maintain blood. Ventilatory and BP support were continued for about 32 h when the patient expired.

**Autopsy Findings:** Post mortem toxicology testing showed honeybee venom IgE detected in serum at a concentration of 0.77 kU/L, consistent with a “moderate concentration”. Cause of death was “anoxic encephalopathy, anaphylactic shock and allergy to bee venom.”

**Case 205.** Acute laundry detergent ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 89 y/o female aspirated while drinking a glassful of liquid laundry detergent.

**Past Medical History:** Alzheimer’s dementia, CHF.

**Physical Exam:** Coarse breath sounds with rhonchi.

**Clinical Course:** The patient was admitted for symptomatic and supportive care, required suctioning due to lack of effort to cough. The patient received furosemide, albuterol nebulizer treatments, and oxygen, appeared to be recovering but declined and died on Day 5 with a do not resuscitate order in place.

**Autopsy Findings:** The pulmonary parenchyma was fluid filled in the upper lobes and consolidated in the lower lobes with green mucous in the small airway, exuding slight to moderate amounts of bloody fluid. The cause of death was aspiration pneumonia; dementia was a contributing factor. Manner of death was accident.

**Case 209.** Mushrooms (cyclopeptides) ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 74 y/o female hand-picked, cooked and ingested mushrooms along with shrimp. Eight h after ingestion, the patient developed nausea, vomiting, and watery diarrhea and presented to the ED 2 h later. A mycologist identified the ingested mushrooms as *Amanita virosa*.

Laboratory Data initially was significant for: AST 113, ALT 104, Glu 221. One day later: AST 1303, ALT 981, PT 14.5, INR 1.5, Early on Day 3: AST 4206, ALT 3712, PT 43.3, INR 4.6, Tot Bili: 3.7, Cr 0.8, Late on day 3: AST 7812, ALT 5614, PT 68.6, PTT 64.3, INR 8.0, Tot Bili: 3.5, Cr 1.1, CO<sub>2</sub> 7, HGB 8.6, Hct 26.5, Platelets 36, Lactate 16.4, pH 6.86 / pCO<sub>2</sub> 22.9 / pO<sub>2</sub> 95.7.

**Clinical Course:** Patient was admitted and received both intravenous hydration and N-acetylcysteine. On Day 3, the patient developed altered mental status with progressive clinical deterioration. The patient was intubated, ventilated, received fresh frozen plasma, vitamin K, and pharmacologic blood presser support. The patient died of multi-organ system failure on Day 3. No autopsy was performed.

**Case 215.** Acute isopropanol ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 52 y/o male was brought to the ED after ingesting isopropyl alcohol and ethanol.

**Past Medical History:** included alcoholism.

**Clinical Course:** The patient arrived at the ED in cardiopulmonary arrest. A head CT scan suggested a subarachnoid hemorrhage. Initial resuscitative efforts achieved a BP of 95/50 without return of spontaneous ventilation. Brain death was confirmed and the patient was removed from the ventilator at the family’s request 28 h after presentation.

**Autopsy Findings** included femoral blood isopropanol 14 and acetone 250, vitreous isopropanol 18 and acetone 338. No subarachnoid hemorrhage was found, but cerebral edema was present. Cause of death was acute isopropanol intoxication.

**Case 228.** Acute phosphoric acid inhalation: *undoubtedly responsible.*

**Scenario/Substances:** A 71 y/o female developed respiratory distress while using a tub and tile cleaner containing phosphoric acid. The patient’s husband stated she was not breathing for 15 min. EMS intubated and transported the patient to the ED.

**Past Medical History:** included asthma and seizure disorder.

**Physical Exam** in the ED included “tight” lungs.

**Laboratory Data:** ABG-pH 7.12 / pCO<sub>2</sub> 43 / pO<sub>2</sub> 593 on 100% FiO<sub>2</sub>.

**Clinical Course:** The patient received humidified oxygen and steroids. Within a few h of arrival, the patient developed status epilepticus, received a loading dose of phenytoin and a lorazepam infusion. The patient’s T rose to 40.4° C. On Day 4 the remained unresponsive despite being off sedation for over 24 h and the decision was made to provide comfort care only. The patient was extubated on Day 7 and expired.

**Autopsy Findings** included microscopic evidence of hypoxic brain injury, emphysema, pulmonary edema and hemorrhage and right ventricular hypertrophy with congestion of the liver consistent with changes secondary to chronic obstructive pulmonary disease.

**Case 237.** Acute acetaminophen ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 14 y/o female told her mother she ingested an unknown number of acetaminophen tablets at an unspecified time. En route to the ED, the patient was noted by EMS to be hypoglycemic and was treated with 1 ampule of D50.

**Past Medical History:** includes a previous salicylate overdose.

**Physical Exam:** HR 105, BP 70/40, T 32.2°C (rectal), RR > 30. The patient was drowsy, sclera were icteric, bowel sounds were hypoactive and mucous membranes were dry.

**Laboratory Data** included acetaminophen 50 µg/mL, lactate 15, ethanol 126 mg/dL, lipase 201, AST 29,059, ALT 4677, ABG-pH 7.0 / pCO<sub>2</sub> 21, INR 9.9, PT 111, PTT 54.3,

Na 134 K 4.4	Cl 77 HCO <sub>3</sub> 7.0	BUN 184 Cr 4.9	Glu 112
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**Day 2:** INR 3.5, PT 42.2, PTT 41.8, AST 15,466, ALT 2341, total bilirubin 4.6, potassium 6.7, CO<sub>2</sub> 15, BUN 53, Cr 2.8, troponin 5.74 ng/mL. **Day 3:** ALT 2113, AST 15,152, BUN 43, Cr 1.3, HGB 8.8, Hct 24.3. **Day 5:** ALT 1059, AST 8976, total bilirubin 10.2, WBC 23. **Day 7:** AST 286, ALT 4147, -pH 7.2 / pCO<sub>2</sub> 23 / pO<sub>2</sub> 3, HCO<sub>3</sub> 24.

**Clinical Course:** The patient was intubated shortly after arrival in the ED for respiratory arrest and increasing CNS depression. IV N-acetylcysteine was begun and continued throughout the course. Head CT showed mild cerebral edema. Hypotension was treated initially with fluids and later with pressors. The patient received fresh frozen plasma for coagulopathy and was placed on the liver transplant list. Cardiac arrest occurred en route to the OR at which time the family recommended comfort measures. CVVH was done and antibiotics were given to treat infectious causes. Day 7 chest xray showed worsening acute lung injury, abdominal CT showed ischemic colitis, and the patient died of multiorgan failure. No autopsy results are available.

**Case 249.** Acute acetaminophen ingestion: *contributory.*

**Scenario/Substances:** A 50 y/o male was found unresponsive after taking an unknown amount of acetaminophen/diphenhydramine combination product. The patient was taken to the ED and was intubated.

**Past Medical History:** Ethanol abuse, hepatitis C and prior overdose with acetaminophen/ diphenhydramine.

**Physical Exam:** BP 175/101, HR 110–114, RR 22, oxygen sat 94% on FIO<sub>2</sub> of 60%.

**Laboratory Data:** Admission: AST 40, ALT 56, PT 13.2 sec, INR 1.2, total bilirubin, 0.9, direct bilirubin, 0.1, acetaminophen 386 µg/mL, ethanol 150, urine drug screen negative. On Day 2 (36 h) acetaminophen, 602 µg/mL. On Day 4 AST, 2228, ALT, 2204, PT, 28.8 sec, INR, 4.9, total bilirubin, 5.8, direct bilirubin, 5.8, acetaminophen 296 µg/mL, Cr, 1.3, BUN 20.

**Clinical Course:** The patient received PO activated charcoal that was repeated once during the hospitalization. The initial

ECG revealed ST segment depression and QT prolongation which later resolved. IV N-acetylcysteine was started and continued every 4 h. Lorazepam was given for the history of ethanol abuse. The patient was given sodium bicarbonate for acidemia and developed K 2.8 on Day 2. The acetaminophen concentration remained elevated between 231 µg/mL and 387 µg/dL over the first 30 h, the transaminases ranged from 39–82, for AST and 45–78, for ALT. 36 h after presentation, the acetaminophen peaked at 602 µg/mL with AST 145, ALT 141, and INR of 2.6. Patient then received hemodialysis for ~5 h. Post dialysis the acetaminophen concentration was 296 µg/ml, transaminases in the 2000, range, Cr 1.3, and the INR was 4.9. By the 3<sup>rd</sup> Day, charcoal stools were noted and the patient was producing less urine. On Day 5 the T rose to 38.6°C, and WBC decreased to 0.9. The patient's condition continued to decline and the INR remained elevated, plasma acetaminophen remained measurable, and urine output decreased. The family requested withdrawal of support and the patient expired on Day 5.

**Autopsy Findings:** (external exam only), cause of death was complications of acetaminophen toxicity.

**Case 358.** Acute acetaminophen and hydrocodone ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 28 y/o female was noticed by family members to be "swelling up" while preparing for the funeral of her baby. The patient's behavior became erratic. The patient became disoriented and that evening, was found unresponsive on the floor with a mostly empty acetaminophen bottle (27 tablets missing). The patient was brought to the ED unresponsive.

**Past Medical History:** History of multiple spontaneous abortions, dilatation and curettage and a Caesarean-section. The patient had given birth to a stillborn 5 days earlier and was despondent. The patient had a history of depression, drug and alcohol abuse including multiple ED visits for alcohol intoxication. The patient was receiving pain medications for a back injury and had developed a dependence on the medications and increased alcohol intake.

**Physical Exam:** Initial HR was 110, BP 110/70, oxygen sat was 98% on a ventilator.

**Laboratory Data** included Glu 45, K 6.7, BUN 7, Cr 2.8, SGOT 1560, SGPT 1480, Alk phos 190, INR 20, PTT 41.5, Hbg 5, Hct 15. Acetaminophen was 147 µg/ml (at least 12 h post ingestion).

**Clinical Course:** The patient was started on N-acetylcysteine and considered for a liver transplant. The patient had a cardiac arrest and was resuscitated requiring 2 pressors to maintain BP. Treatment was changed to comfort care and the patient died early the next morning.

**Autopsy Findings:** Cause of death: massive liver necrosis and acute acetaminophen and hydrocodone toxicity. Other significant conditions included: acute ethanol ingestion, probable sepsis, post partum (spontaneous abortion). Pathological diagnoses included: chronic back pain syndrome and depression, acute renotubular necrosis (bilateral) acute

ethanol ingestion, bleeding diathesis, DIC, acute splenitis, chronic cigarette smoking, right and left ventricular hypertrophy, bilateral pulmonary congestion and edema, status post gastric bypass, status post laproscopic cholecystectomy, exogenous obesity, status post cardiopulmonary arrest and attempted resuscitation. Toxicology from hospital blood included: acetone 1.0, opiates positive, hydrocodone 600 ng/ml, dihydrocodone 66 ng/ml, hydromorphone 22 ng/ml, acetaminophen 170 µg/ml, ibuprofen trace positive.

**Case 454.** Acute exposure, heparin: *undoubtedly responsible.*

**Scenario/Substances:** A 5 d/o female was given 10,000 U/mL heparin instead of 10 U/mL heparin flush solution in a neonatal intensive care unit as the result of a hospital error. Two 0.5 mL doses were given 5 h apart by the nursing staff.

**Past Medical History:** Premature birth (26 weeks gestation) Physical Exam: not available

**Clinical Course:** Protamine 50 mg IV was given twice after the accidental exposure. The infant expired due to internal bleeding later on the same day as the heparin exposure. No autopsy results were available.

**Case 463.** Acute-on-chronic mixed ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 31 y/o woman was found comatose by family members who reported that she likely took an overdose of paroxetine and quetiapine.

**Past Medical History:** Depression and bipolar disorder, taking paroxetine, quetiapine, lamotrigine, and folic acid therapeutically.

**Physical Exam:** Arrived with respiratory depression and status epilepticus, transferred to a second HCF, intubated there with continued seizures. BP 190/50, HR 50 -131

**Laboratory Data:** ABG-pH 7.14/ pCO<sub>2</sub> 73/ pO<sub>2</sub> 211, Na 150, K 6.6, HCO<sub>3</sub> 24, CK 1400, HGB 7.7 platelets 122,000.

**Clinical Course:** The patient received repeated doses of benzodiazepines for seizures, and was given charcoal and a cathartic. The patient was transferred to a tertiary care hospital, where propofol was added to the treatment regimen and benzodiazepines were continued. Shortly after transfer, the patient's cardiac rhythm changed to atrial fibrillation then ventricular tachycardia. The patient could not be resuscitated from cardiac arrest and died 5 h after being found unresponsive.

**Autopsy Findings:** Acute pulmonary edema, brain swelling with acute uncal and cerebellar tonsillar herniation. Post mortem blood concentrations: ethanol 0.05 gm%, acetaminophen 51 µg/ml, cotinine detected, caffeine detected, phenytoin 8.3 µg/ml, lamotrigine 92 µg/ml, dextromethorphan 0.08 µg/ml, pseudoephedrine 0.47 µg/ml, doxylamine 0.08 µg/ml diphenhydramine 1.9 µg/ml, paroxetine 0.88 µg/ml, pentobarbital 0.72 µg/ml, atropine detected. Gastric contents included paroxetine, nicotine, cotinine, caffeine, pseudoephedrine, doxylamine, diphenhydramine, and lamotrigine.

**Case 475.** Acute valproic acid ingestion: *undoubtedly responsible.*

**Scenario/Substances:** 27 y/o male was found unresponsive at home by friends after a presumed drug overdose.

**Past Medical History** included bipolar disorder (on lithium), obsessive compulsive disorder, chronic back pain, methamphetamine abuse and multiple past suicide attempts.

**Physical Exam findings** included pinpoint pupils, hypothermia: BP 130/50, HR 68, possible mild hypoxia.

**Laboratory Data:** CK and liver enzymes were unremarkable, anion gap 22, ionized calcium 0.88, valproic acid 1,200 µg/ml (>24 h after ingestion), 587 µg/ml later, ammonia 232 mmol/L. Urine toxicology screening was positive for methamphetamine.

**Clinical Course:** On arrival to the ED the patient was minimally responsive to stimuli, hypothermic, and had pinpoint pupils. Naloxone was given with no response. The initial UA was concentrated, but the patient soon became oliguric. On Day 2 with no improvement, valproic acid and ammonia concentrations were found to be elevated and the patient was started on lactulose and intravenous levocarnitine. Over the next several days the patient's serum ammonia and valproic acid concentrations gradually came down, but consciousness was never regained. An EEG revealed minimal brain activity. On Day 7 life support was withdrawn and the patient expired.

**Autopsy Findings:** Blood assay results included valproic acid > 500 mg/L, resuscitative medications, cannabinoids, nicotine/ cotinine and caffeine. Death was attributed to valproic acid intoxication and the manner of death classified as suicide.

**Case 477.** Acute valproic acid ingestion: *probably responsible.*

**Scenario/Substances:** A 43 y/o man was noted by his wife to be slurring his words and behaving strangely. Empty prescription bottles of valproic acid and chlorpromazine (recently filled) were found.

**Past Medical History** included seizure disorder, bipolar disorder, tobacco and alcohol use.

**Physical Exam:** The patient was comatose, hypotensive and had respiratory depression.

**Laboratory Data** included hypernatremia and hypocalcemia. Day 2: valproic acid 980 mg/L. Day 3: valproic acid 950 mg/L, ammonia 300 µg/dL.

**Clinical Course:** In the ED, the patient was intubated and ventilated, fluids and sodium bicarbonate were administered and the patient was subsequently transferred to the referral medical center. Medications included dopamine and norepinephrine. Multiple dose activated charcoal was attempted, but discontinued due to absence of bowel sounds. The patient died of multiple organ failure on Day 3 while being prepared to receive dialysis.

**Autopsy Findings:** Probable cause of death was valproic acid toxicity, manner of death suicide. Postmortem valproic acid 376 µg/mL (cardiac blood).

**Case 480.** Acute on chronic bupropion ingestion: *undoubtedly responsible*.

**Scenario/Substances:** An 18 y/o female reported to her mother that she had taken 4 of her bupropion earlier in the day and was not feeling well. The patient was taken to the ED.

**Past Medical History** included bipolar disorder.

Laboratory Data ~12 h post-ingestion bupropion 382 ng/mL [therapeutic range 50 – 100], hydroxybupropion 4196 ng/mL [600 -2000]. At ~24 h bupropion 165 ng/mL, hydroxybupropion 4416 ng/mL.

**Clinical Course:** The patient was somnolent on arrival in the ED (~12 h post-ingestion) with normal vital signs. The patient had several seizures and suffered a respiratory arrest treated with intubation and resuscitation. The patient apparently suffered anoxic brain injury, met the criteria for brain death and support was withdrawn on Day 6.

**Autopsy Findings** included brain findings of acute anoxic encephalopathy.

**Case 486.** Acute mixed ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 21 y/o male intentionally ingested a box of cough and cold product containing chlorpheniramine 4 mg and dextromethorphan 30 mg along with an unknown quantity of bupropion extended release 300 mg 2 h prior to EMS arrival. The patient was seizing when EMS arrived.

**Past Medical History:** Unspecified psychiatric history.

**Physical Exam:** Patient arrived in full cardiac arrest.

**Clinical Course:** The patient was in cardiac arrest upon arrival to ED, ACLS protocols were followed; the patient expired in the ED.

**Autopsy Findings:** Cause of death was mixed drug ingestion. The manner of death was undetermined. Heart blood concentrations: bupropion 2.0 mg/L (therapeutic 100–300 µg/L), chlorpheniramine 0.7 mg/L, dextromethorphan 2.6 mg/L.

**Case 495.** Acute on chronic ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 36 y/o male was witnessed to have taken bupropion, metoprolol, ibuprofen and lamotrigine.

**Clinical Course:** The patient was taken to the ED, given activated charcoal and admitted to the hospital. The patient was noted to have agitation and muscle jerks, but not seizures. The next morning, the patient was noted to be much less responsive and became apneic, resuscitation was unsuccessful. Activated charcoal was noted in mouth during resuscitation.

**Autopsy Findings:** Activated charcoal was noted in mouth and upper airways. Undigested and partially-digested 300mg bupropion extended release tablets (N=18) were recovered from the GI tract. Blood concentrations were: bupropion 1984, 2655 and 3127 ng/ml, valproic acid 43.4 µg/ml, diphenhydramine 290 ng/ml, lamotrigine 3.6 µg/ml, antemortem metoprolol 167 ng/ml.

**Case 506.** Bupropion ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 61 y/o female ingested 100 bupropion extended release 300 mg tablets in an apparent suicide attempt and presented to the ED within 1 h of ingestion.

**Past Medical History:** Includes depression, diabetes mellitus, hypertension, and hypercholesterolemia.

**Physical Exam:** Agitated, BP 105/53, HR 105, T 36.4°C, RR 16, oxygen sat, 94% on room air. Abdomen normal, alert and oriented x 3.

**Laboratory Data:** On admission the electrolytes were normal except K 3.4 and Glu 260. ABG-pH 7.10 / pCO<sub>2</sub> 64 / pO<sub>2</sub> 317. Acetaminophen, salicylate, ethanol, urine drug screen, sulfonyleurea concentration, none detected. Plasma bupropion concentration on admission, 925 ng/mL [50–100 ng/mL] and hydroxybupropion concentration on admission, 3985 ng/mL [600–2000 ng/mL].

**Clinical Course:** The patient received activated charcoal PO (15 gm by EMS and 50 gm in the ED) and lorazepam 1 mg IV push. The patient remained agitated and tachycardic. Approximately 4 h post ingestion, the patient began having recurrent, generalized tonic-clonic seizures that were initially well controlled with IV lorazepam boluses. Finger stick blood Glu concentrations ranged from 139–148 during the seizures. The patient became hypotensive, unresponsive to IV boluses and minimal improvement with dopamine IV. The patient developed marked bradycardia, then cardiac arrest due to pulseless electrical activity from which she was resuscitated with ACLS protocols. Intermittent seizure activity continued and phenobarbital, then phenytoin were given. CT of the head was unremarkable. Seizure activity abated over the next day, but the patient remained unresponsive. On Day 1, the patient developed ventricular tachycardia which was effectively treated and biventricular systolic dysfunction. On Day 3 the patient exhibited renal failure and shock liver, then developed ventricular fibrillation and could not be resuscitated.

**Autopsy Findings:** Cause of death: hypoxic encephalopathy with short-term survival in coma, status post cardiac arrest and resuscitation, acute bupropion toxicity with seizures, and suicide.

**Case 539.** Acute diphenhydramine ingestion: *undoubtedly responsible*.

**Scenario/Substances:** An 11 month old female ingested an unknown amount of diphenhydramine (50 mg gelcaps) on the floor after mother spilled them.

**Physical Exam:** Systolic BP 50, HR 220, T 41.1°C, on ventilator.

**Laboratory Data:** K 5.3, HCO<sub>3</sub> 13, lactate 13.2, PT >100, INR 13.1, PTT >140, K 5.3, CO<sub>2</sub> 13, ALT 71, AST 218, pH 6.9, diphenhydramine concentration 1400 ng/ml, ECG sinus tachycardia, QRS 130 msec.

**Clinical Course:** The patient presented with status epilepticus, was intubated upon arrival and became progressively bradycardic and hypotensive after intubation. The patient was treated with benzodiazepines, phenobarbital, sodium

bicarbonate, epinephrine, atropine, intravenous fluids, vasopressin, and pyridoxine. An EEG demonstrated continuous seizure activity and subsequent head CT revealed diffuse cerebral edema. The patient was declared brain dead and removed from life support. No autopsy was performed.

**Case 540.** Acute diphenhydramine ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 12 month old male arrived in emergency room 1 h after ingesting an estimated 32 diphenhydramine-containing over-the-counter -containing sleep medications. The patient was ventilated by EMS during transport.

**Clinical Course:** On arrival in the ED 1 h after the ingestion, the patient was in status epilepticus, HR 180 without QRS prolongation. The patient vomited tablet fragments. The patient was intubated and received lorazepam, phenobarbital and was started on IV fluids and sodium bicarbonate. Within 1 h the patient developed bradycardia and hypotension followed by asystole. Despite CPR, atropine, epinephrine, dopamine, and external pacing, the patient could not be resuscitated and died 2 h after ingestion.

**Autopsy Findings:** Death was ruled as an accidental overdose due to diphenhydramine ingestion. Postmortem diphenhydramine was 17.8 mg/L.

**Case 544.** Acute diphenhydramine ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 35 y/o male was found unresponsive after ingesting unknown amounts of two over-the-counter sleep aids containing diphenhydramine. While in route to the hospital patient had a seizure.

**Past Medical History:**

**Laboratory Data:** In the ED: acetaminophen and ethanol were not detected, salicylate 2.8 mg/dL.

**Clinical Course:** Patient continued to seize in the ED, went into cardiopulmonary arrest with pulseless electrical activity. The patient was intubated and received epinephrine, atropine, and IV fluids with sodium bicarbonate. The patient expired within 1 h of arriving at the ED.

**Autopsy Findings:** Based on external exam, cause of death was suicide related to diphenhydramine ingestion. Post mortem diphenhydramine concentration was 16,603 ng/mL.

**Case 564.** Chronic salicylate ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 71 y/o female was admitted to a psychiatric unit for depression and was noted to be developing tachypnea. The patient admitted to taking 2 grams of salicylate every day for the last 2 weeks.

**Past Medical History** included a history of depression. Medications include furosemide and lisinopril.

**Physical Exam:** RR 32, O<sub>2</sub> sat was 93% on 2 liters of oxygen. The patient was awake and alert, mental status was normal, hearing was decreased.

**Laboratory Data:** Initial labs: ABG-pH 7.47 / pCO<sub>2</sub> 12 / pO<sub>2</sub> 149, HCO<sub>3</sub> 9, BUN 51 Cr 2.1, salicylate 52, falling to 42.7 and 34.6 mg/dL 8 and 16 h later.

**Clinical Course:** The patient was transferred to a medical ward, started on IV fluids and furosemide was stopped. The patient developed mental status changes and became agitated and was given lorazepam. The patient died 2 days after admission.

**Autopsy Findings:** Cause of death was an accidental acute salicylate overdose. Post mortem salicylate concentration was 30.2 mg/dL.

**Case 575.** Acute aspirin ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 31-year-old man reported taking 100 salicylate tablets 5 h prior to arrival.

**Past Medical History:** History of psychiatric problems but specific diagnoses were not known.

**Physical Exam:** Awake and alert, denied tinnitus but had nausea and vomiting. Vital signs included HR 70, BP normotensive, T hyperthermic, RR tachypneic.

**Laboratory Data:** ABG-pH 7.5/ pCO<sub>2</sub> 24, salicylate 80 mg/dL, and urine drug screen (unknown method) negative. Salicylate concentration nine h after ingestion was 97, and thirteen h after ingestion was 109 mg/dL. At that time his creatinine was 1.43 and K 4.2.

**Clinical Course:** The patient received IV fluids, repeated doses of oral activated charcoal which were vomited, and a single ampule of sodium bicarbonate, followed by a sodium bicarbonate infusion which was discontinued. The patient subsequently became increasingly agitated, hyperthermic, and diaphoretic, and was treated unsuccessfully with haloperidol after which his HR and BP further elevated. The patient was intubated and had seizures. Asystole occurred during his seizure, resuscitation was unsuccessful. The patient died twelve h after presentation to hospital.

**Autopsy Findings:** Lead bullet encapsulated by fibrous tissue found in left thorax, post mortem blood salicylate 106.6 mg/dL.

**Case 582.** Acute aspirin ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 45 y/o was brought to the ED after ingesting "two handfuls" of 325 mg salicylate tablets along with vodka approximately 3 h earlier.

**Past Medical History:** Depression, prior suicide attempts, gallbladder disease, peptic ulcer disease, asthma. Other medications include alprazolam, diazepam, mirtazapine, oxycodone, ziprasidone, hydrocodone, iron, albuterol, benzotropine, and esomeprazole.

**Physical Exam:** Alert, intermittently cooperative, then became increasingly agitated. BP 150/85, HR 94–100, RR 38, T 36.1°C.

**Laboratory Data:**

Na 148	Cl 105	BUN --	Glu 350
K 6.7	HCO <sub>3</sub> 20	Cr 1.1	

salicylate 129.8 mg/dL.

**Clinical Course:** The patient was treated with intravenous fluids and bicarbonate but rapidly deteriorated over the next 2 h becoming hypotensive (78 systolic) and hyperthermic (rectal T 103.3° F) and expired in the ED 7 h post ingestion.

**Autopsy Findings:** The pulmonary parenchyma was dark red-purple and cut surfaces exuded large amounts of blood and frothy fluid. Peripheral postmortem blood analysis revealed a salicylate concentration of 820 µg/mL, and therapeutic concentrations of alprazolam and mirtazapine. The cause of death was recorded as acute salicylate intoxication.

**Case 586.** Acute aspirin ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 50 y/o male ingested approximately 300 acetylsalicylic acid tablets of unknown strength and drank mouthwash 3–4 h prior to coming to the ED.

**Past Medical History:** The patient had been prescribed amitriptyline for unknown diagnosis.

**Physical Exam:** Progressive agitation requiring endotracheal intubation.

**Laboratory Data:** Initial salicylate concentration 61.9, 4 h later 97 mg/dL. Urine drugs of abuse screen was positive for benzodiazepines and negative for tricyclic antidepressants.

**Clinical Course:** When the second salicylate concentration was available, the patient received 10 ampules of sodium bicarbonate intravenous push. Prior to hemodialysis the patient developed dysrhythmias and had torsade de pointes that led to cardiac arrest. No autopsy results were available.

**Case 588.** Acute aspirin ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 57 y/o female took an overdose of an unknown amount of salicylate and acetaminophen.

**Physical Exam:** The patient was described as being obtunded.

**Laboratory Data:** ABG-pH 7.39 / pCO<sub>2</sub> 16 / pO<sub>2</sub> 120 FiO<sub>2</sub> unknown. Plasma concentrations: salicylate 127 mg/dL and acetaminophen 21.7 µg/mL,

**Clinical Course:** The patient was intubated due to mental status. Urine alkalization was initiated. N-acetylcysteine was given due to the unknown time of ingestion. The patient was transferred to the ICU and was waiting to be hemodialyzed. The patient had a cardiac arrest and could not be resuscitated.

**Autopsy Findings:** The cause of death was listed as salicylate toxicity. Perimortem levels were: salicylate 106.5 mg/L, acetaminophen 17.5 mg/L, and diphenhydramine 0.24 mg/L. The stomach contents measurements included: salicylate 4.1 mg, acetaminophen 0.02 mg, diphenhydramine 0.04 mg.

**Case 629.** Unknown ingestion: *probably responsible.*

**Scenario/Substances:** A 44 y/o male, responsive when paramedics arrived on scene, reported having ingested at least 30 nifedipine 30 mg tablets 6 h earlier.

**Past Medical:** History: Not available.

**Physical Exam:** HR 32, BP 86/40, RR 14.

**Laboratory Data:** Not reported.

**Clinical Course:** Glucagon was administered in the field. On transfer from the EMS stretcher to the ED bed, the patient went into asystole and was not able to be resuscitated.

**Autopsy Findings:** Peripheral blood concentrations: metoprolol 8.10 mg/L, caffeine 0.06 mg/L, nordiazepam 1.00 mg/L. Benzodiazepine metabolites were detected in heart blood. Ocular fluid concentrations: ethanol 0.01g/dL.

**Case 644.** Chronic digoxin ingestion: *probably responsible.*

**Scenario/Substances:** A 66 y/o male presented to the ED with “symptomatic bradycardia”. The patient was taking digoxin chronically.

**Past Medical History:** Cardiac disease, diabetes mellitus.

**Physical Exam:** BP not reported, HR 20–30, mental status normal.

**Laboratory Data:** Serum creatinine, 8.3, potassium 8.3, digoxin 4.3 ng/mL.

**Clinical Course:** The patient received a sodium bicarbonate infusion, calcium infusion, furosemide, insulin, atropine and sodium polystyrene sulfonate in the ED (doses unknown). HR increased to 60, and the patient’s condition improved. The patient had emergent hemodialysis for renal failure and hyperkalemia. Post dialysis HR 50, BP 120/39 on dopamine infusion at 3 µg. ECG “no heart block”. After dialysis: potassium 4.5, serum creatinine 4.7. The serum digoxin concentration 24 h after admission was 2.2 ng/mL. Approximately 36 h after admission the patient developed heart block, had a cardiac arrest and was unable to be resuscitated. It is unknown whether the patient received any digoxin specific Fab antibody before or during the cardiac arrest. No autopsy was performed.

**Case 673.** Acute diltiazem ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 42 y/o man was found by family members down on the bathroom floor with empty medication bottles including propranolol and diltiazem. EMS found the patient to be in cardiac arrest and transported him to the ED.

**Past Medical History:** included previous suicide attempts

**Clinical Course:** In the ED the patient was obtunded, hypotensive, and bradycardic which progressed to arrest (pulseless electrical activity). The patient was intubated, given 4 mg epinephrine, 3 mg glucagon, atropine, and 2 ampules bicarbonate. The patient was started on dopamine and norepinephrine for hypotension with minimal response. A transvenous pacemaker was inserted with some response in the pulse. The patient was lavaged, medication fragments were returned and activated charcoal was given. Despite calcium gluconate and intra-arterial balloon pump support the patient could not be resuscitated.

**Autopsy Findings** included no injuries, diseases, or evidence of trauma. High blood concentrations of propranolol, diltiazem, and promethazine were found. Cause of death was diltiazem overdose. Manner of death was suicide.

**Case 674.** Acute on chronic mixed ingestion (diltiazem, zolpidem): *undoubtedly responsible*.

**Scenario/Substances:** A 45 y/o female was found asystolic in the field after a reported ingestion of zolpidem and diltiazem.

**Physical Exam:** Severe hypotension.

**Clinical Course:** Calcium, insulin and Glu, pressors, and pacing (external or internal), were recommended. An intra-aortic balloon pump placed and the patient was dependent on pressors to maintain BP. The patient was diagnosed with anoxic encephalopathy and died after a 3 day hospitalization.

**Autopsy Findings:** No autopsy was performed. The medical examiner amended the death certificate to a diltiazem overdose, with suicide as the manner of death. Postmortem diltiazem concentration was 760,000 ng/ml; timing and site from which the sample was not known).

**Case 713.** Acute-on-chronic mixed ingestion, verapamil, alprazolam: *undoubtedly responsible*.

**Scenario/Substances:** A 51 y/o female arrived in ED unresponsive after having ingested an unknown number of 120 mg sustained release verapamil tablets (estimated to be 3 bottles), and an unknown number of alprazolam tablets.

**Past Medical History:** History of bipolar disorder.

**Physical Exam:** Mental status, unresponsive. BP not given, HR 40.

**Laboratory Data:**

Na 141	Cl 100	BUN 23	Glu 216
K 3.5	HCO <sub>3</sub> 22	Cr 1.8	

Blood alcohol, acetaminophen, and salicylates negative, urine drug screen negative, ECG junctional rhythm.

**Clinical Course:** Glucagon was administered. The patient was intubated and put on a ventilator. Charcoal was administered, whole bowel irrigation was started and stopped after 700 mL were administered due to lack of bowel sounds. The patient received a Ca IV infusion, dopamine and epinephrine were administered at maximum doses, an insulin/dextrose IV was administered. The patient continued to have intermittent episodes of junctional rhythm. On the second Day, the patient had bradycardia and cardiac arrest. She was resuscitated and paced externally. The patient died of cardiopulmonary arrest on the third Day.

**Autopsy Findings:** Verapamil 2.10 mg/L, norverapamil 1.30 mg/L, temazepam 0.15mg/L, and alprazolam were detected in antemortem blood. Verapamil was 4.80 mg/L in stomach contents.

**Case 719.** Acute ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 56 y/o female left a suicide note and ingested 60 verapamil hydrochloride extended release 240mg capsules. At about 8 h after ingestion, the patient was transported to the ED.

**Laboratory Data:** Initial K 2.4 pH 7.11. Day 1 salicylates and acetaminophen not detectable, Ca 17, Mg 1.6.

Na 136	Cl 106	BUN 17	Glu 655
K 3.3	HCO <sub>3</sub>	Cr 1.5	

**Clinical Course:** In the ED BP 80/50, the patient had several episodes of asystole and pulseless electrical activity, was intubated, received activated charcoal and was lavaged. The patient remained hypotensive on epinephrine, glucagon and calcium infusions. Pacemaker was in place, potassium repletion was attempted, and norepinephrine started. Whole bowel irrigation was attempted, but polyethylene glycol was coming up around the ET tube, suggesting an ileus or bowel ischemia. Insulin bolus given and then insulin infusion started at 20 units/h, increased to 60 units/h, then 100 units/h with BP to 100 systolic. Approximately 16 h after admission the patient had a cardiac arrest and could not be resuscitated. No autopsy findings were available.

**Case 724.** Acute verapamil ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 89 y/o female intentionally ingested an unknown quantity of verpamil SR 240 mg and potassium chloride 10 mEq in an apparent suicide gesture.

**Past Medical History:** Not provided.

**Physical Exam:** Awake, alert, HR 30, BP 55/32 mm Hg.

**Laboratory Data:** K: 5.7, BUN 40, Cr 2.0.

**Clinical Course:** The patient received glucagon 5 mg and 3 ampules of calcium chloride 10%, 2 L IV fluids and norepinephrine. The patient was given atropine and a glucagon infusion at 5 mg/h. Insulin/dextrose infusions were also administered. The patient expired 19 h later.

**Autopsy Findings:** The cause of death was verapamil intoxication. Heart blood verapamil concentration 6.7 mg/L.

**Case 730.** Acute mixed ingestion, amitriptyline cyclobenzaprine: *undoubtedly responsible*.

**Scenario/Substances:** A 2 y/o female was found by her mother when she awoke from a nap whimpering and non-responsive after apparently eating tablets containing amitriptyline purchased over the internet.

**Physical Exam:** Seizing, unresponsive, BP 78/57, HR 200.

**Laboratory Data:** ECG: QRS 160 msec. Amitriptyline concentration 1367 ng/ml.

**Clinical Course:** A nasogastric tube was placed and pink frothy material was aspirated. Activated charcoal was given 2 h post ingestion after intubation. Episodes of ventricular tachycardia were treated with lidocaine. Bradycardia developed, CPR was begun with epinephrine, calcium and bicarbonate given with sinus tachycardia resulting with heart rate of 110 per minute. A phenobarbital infusion was given for continued seizures. The QRS decreased to 114 msec after a bicarbonate infusion was started. Ventricular tachycardia progressing to ventricular fibrillation occurred with continued hypotension, seizures and ultimately ventricular fibrillation. Cardiac pacing was attempted without success. The patient expired 12 h after ingestion.

**Autopsy Findings:** The cause of death was due to accidental acute tricyclic drug intoxication which included 3 different tricyclic compounds, amitriptyline, nortriptyline, and cyclobenzoprine. A complete autopsy found no evidence of

traumatic injury or medical disease process; toxicologic analyses of antemortem blood confirmed the child died of a tricyclic drug overdose. Although the medications the child swallowed were said to be Elavil®, they appear instead to have been a mixture of at least two different tricyclic compounds. Ante-mortem blood concentrations: amitriptyline, 1.3 mg/L, nortriptyline, 0.92 mg/L, and cyclobenzaprine, positive (<0.66 mg/L). Liver concentrations: amitriptyline, 28 mg/kg, nortriptyline, 22 mg/kg, and cyclobenzaprine, 5.2 mg/kg. The manner of death is accidental.

**Case 738.** Mixed, Acute-on-chronic ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 43 y/o woman was found unresponsive by family members with empty bottles of amitriptyline, quetiapine, and alprazolam at the scene after speaking of suicidal ideation. The patient was resuscitated by paramedics and brought to the ED.

**Past Medical History:** Longstanding history of drug abuse, thirty prior suicide attempts, self-injurious behaviors (cutting), major depression with multiple psychiatric hospitalizations.

**Physical Exam:** BP 50/20 mm Hg, HR 86. Pupils were widely dilated and unresponsive at the hospital, comatose and non-responsive to painful stimuli.

**Laboratory Data:** Post-resuscitation ECG showed sinus tachycardia, QRS 142 msec, ABG-pH 7.51 / pCO<sub>2</sub> 45 / pO<sub>2</sub> 589 / FiO<sub>2</sub> 100%.

**Clinical Course:** Vasopressors were given to stabilize the patient's BP. Naloxone did not improve mental status. Sodium bicarbonate was given to narrow the QRS complex and improve BP. The patient was admitted to an intensive care unit where another cardiac arrest occurred, from which she could not be resuscitated. The patient expired nine h after admission.

**Autopsy Findings:** Post-mortem toxicology concentrations were: 4978 ng/mL amitriptyline, 2957 ng/mL nortriptyline, cotinine positive and benzodiazepines positive.

**Case 789.** Chronic drug hypersensitivity: *undoubtedly responsible*.

**Scenario/Substances:** A 54 y/o male developed primary gout and started allopurinol, probenecid, and colchicine about 4 weeks prior to presentation. Within 3 days of beginning these medications, the patient reported a puffy face and a skin rash. The patient continued taking the new medications and the symptoms worsened until hospitalization was necessary due to a fever developing. Other medications included benazepril and glimepiride, which the patient has been taking for years without sequelae.

**Past Medical History** included prior exanthematous drug reaction 10 years earlier, diabetes mellitus (type 2), hypertension, poliomyelitis with right facial droop.

**Physical Exam:** HR 120, BP 184/130 (later fell to 83/47), T 38.9° C, The patient was alert and oriented without changes in vision, anuria, dyspnea, or organomegaly. The patient

presented with a diffuse, erythematous rash with confluent, blanching maculopapular patches without abrasions that spared no part of the body. The patient also presented with rigors, cheilitis, oropharyngeal ulceration, periorbital edema, and itching.

#### Laboratory Data

Na 126 K 6.2	Cl 91 HCO <sub>3</sub> 22	BUN 36 Cr 2.0	Glu 540
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platelets 148k, WBC 12.8, eosinophils 1900 then rose to 2600, AST 112, ALT 285, INR 1.2.

**Clinical Course:** Dermatologic diagnosis was Drug Rash with Eosinophilia and Systemic Symptoms (DRESS) also known as Drug Hypersensitivity Syndrome. The patient was initially treated with intravenous fluids and corticosteroids, but the rash worsened and mucous membranes in the oropharynx began sloughing. The patient became hypotensive requiring multiple vasopressor and developed respiratory failure requiring intubation. The patient was given broad spectrum antibiotics, but expired. No autopsy findings available.

**Case 835.** Acute fentanyl transdermal patch mastication: *undoubtedly responsible*.

**Scenario/Substances:** A 26 y/o male chewed at least 1 and possibly 3 fentanyl transdermal patches in a suicide attempt. The patient left his house and was found dead the next day with a patch in his mouth.

**Autopsy Findings** included fentanyl toxicity, pulmonary edema, and cardiomegaly. Postmortem toxicology included blood fentanyl 4.2 ng/mL, norfentanyl 5.4 ng/mL. No other drugs were identified.

**Case 837.** Mixed ingestion: *probably responsible*.

**Scenario/Substances:** A 47 y/o female placed 5 fentanyl patches on her body at once and ingested unknown amounts of acetaminophen and amphetamines

**Past Medical History:** HIV, liver failure, renal failure, encephalopathy and previous suicide attempts.

**Physical Exam:** HR 110, BP 110/70, oxygen sat 97% on nasal oxygen, comatose, with respiratory depression.

**Laboratory Data:** Electrolytes:

Na 130 K 5.9	Cl 94 HCO <sub>3</sub> 19	BUN 81 Cr 4.5	Glu 62
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PT 51.7, PTT 43.4, INR 5.8, bilirubin 3.5, AST 8412, ALT 8069, Ca 7.9, acetaminophen 186 µg/ml (time post ingestion unknown), salicylate 0.2. Urine screen was positive for opioids and amphetamines, negative for benzodiazepines, cocaine, tricyclic antidepressant, cannabis and other drugs of abuse.

**Clinical Course:** Initial improvement in respirations was noted after the patient was given IV naloxone without change in mental status. The patient received IV N-acetylcysteine, and 1 ampule of 50% dextrose. Later during Day 1, the patient desaturated to 49% and became hypotensive. She was intubated and ventilated, but expired shortly thereafter.



**Autopsy Findings:** No autopsy results were available. Post mortem blood concentrations were: acetaminophen concentration 100 mg/L, fentanyl blood 15 µg/L, tissue concentrations: fentanyl: brain 25 µg/kg, liver 66 µg/kg.

**Case 851.** Acute mixed exposure, meperidine, ketamine: *undoubtedly responsible.*

**Scenario/Substances:** A 53 y/o male had a cardiac arrest during sedation with meperidine and ketamine at a dental office. The patient developed asystole.

**Past Medical History:** Unknown

**Physical Exam:** The patient was unresponsive and intubated, initially hypotensive, then hypertensive, T 42.2°C.

**Clinical Course:** The patient remained unresponsive and ventilator dependent. Muscle rigidity and hyperthermia were noted and dantrolene was given through Day 2. EEG showed no electrical activity. The patient expired on Day 3.

**Autopsy Findings:** The cause of death was listed as hypoxic encephalopathy due to laryngeal and pulmonary edema, due to drug anaphylaxis. The manner of death was undetermined. The toxicology report noted on the comprehensive drug screen with respect to the bile specimen, positive for diphenhydramine, nor-ketamine, and meperidine. From the ante-mortem plasma specimen, the tryptase enzyme concentration was 5.6 µg/L (reported usual range 0.4–10.9 µg/L).

**Case 874.** Acute ingestion of methadone and alprazolam: *undoubtedly responsible.*

**Scenario/Substances:** A 24 y/o male presented to the ED following an overdose of methadone (70 mg) and alprazolam (15 mg). The patient was treated with naloxone and discharged home. The next morning the patient was found unresponsive, but still breathing. In the ED, HR 110, EKG showed a QT 566 msec, and received naloxone 4 mg with no response. The patient suffered a cardiac arrest, recovered a rhythm with CPR, was intubated and placed on a ventilator.

**Laboratory Data:** No salicylates or acetaminophen detected, urine toxicology screen positive for opiates, methamphetamine and benzodiazepines.

**Clinical Course:** When admitted to the ICU, the patient was breathing spontaneously, exhibited no purposeful movement and was without reflexes. The diagnosis was global anoxia from the brain injury. No improvement was shown and the family recommended comfort measures. The patient was extubated and died on Day 4.

**Autopsy Findings:** Cause of death was anoxic ischemic encephalopathy after resuscitated cardiopulmonary arrest due to opiate and benzodiazepine intoxication. Other significant conditions included cardiac hypertrophy. Postmortem blood sample contained methadone 130 ng/ml, other substances (nordiazepam, amphetamine, methamphetamine EDDP) were not detected.

**Case 931.** Acute-on-chronic mixed ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 46 y/o female was transported by EMS after found down at home. An unknown amount of

alprazolam and 55 tablets of 60 mg morphine sulfate were missing, the patient suffered cardiopulmonary arrest in transport and was intubated and resuscitated.

**Physical Exam:** BP 77/34, HR 95,

**Laboratory Data:** Na 144, K 6.3, Ca 8.2, BUN 40 creatinine 3.8, acetaminophen not detected, salicylates 3.4, urine drug screen positive for opioids and benzodiazepines.

**Clinical Course:** Naloxone and atropine were given with no response, pressors were given to maximum doses, without improvement. The patient expired of cardiopulmonary failure on Day 2.

**Autopsy Findings:** Pulmonary congestion and edema, with bilateral pleural effusions. Opiates were found in pre-mortem blood sample at 6,260 ng/ml, free morphine at 354 ng/mL and benzodiazepines at 183 ng/ml. Drug screen pre-mortem was positive for diphenhydramine and metabolites, alprazolam, bupivacaine, promethazine and metabolites, sertraline, and desmethylsertraline.

**Case 953.** Acute opiate ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 41 y/o man arrived in the US on an international flight from Santo Domingo and was reported by his family that he complained of dizziness and was noted to be ataxic later that day prior to becoming unresponsive.

**Physical Exam:** Unresponsive, BP 147/102, HR 125, RR 12, T 38.9°C, 67% oxygen sat on room air, miosis, nystagmus, and decreased bowel sounds.

**Laboratory Data:** ECG: sinus tachycardia with normal intervals, CT scan revealed packets throughout the GI tract. Urine toxicology laboratories came back positive for opiates and benzodiazepines but negative for cocaine.

**Clinical Course:** The patient woke up after 1 mg of naloxone briefly, became depressed again was 2 mg of naloxone, had emesis, tachycardia (HR 150), ECG QTc 586 msec with U waves which was treated with 2 grams of magnesium sulfate. Chest film revealed non-cardiogenic pulmonary edema. The patient was intubated prior to laparotomy which found a small bowel obstruction and 64 packets (each 4 cm x 1.5 cm in diameter) were removed from his GI tract. The packets were tightly packed (in a latex-waxy coating), but about 3–4 packets were soft indicating a leak in the packing material. Post operatively the patient developed Adult Respiratory Distress Syndrome. Blood cultures were positive for gram negative rods and *Klebsiella* grew from sputum cultures. The patient went into septic shock, became hypotensive and expired on Day 8. No autopsy available.

**Case 974.** Acute oxycodone injection: *undoubtedly responsible.*

**Scenario/Substances:** A 43 y/o male was found unresponsive, EMS administered naloxone at the scene and the patient became agitated. The patient reported he had crushed, boiled and injected ~40 oxycodone tablets the previous night. The patient complained of abdominal pain and was transported to the ED.

**Past Medical History** included a seizure disorder associated with a brain injury, drug abuse, hepatitis C, possible preexisting kidney and liver disease.

**Laboratory Data:** Day 1: Glu 102 WBC 24.6, PT 16.4, INR 1.94, BUN 59, Cr 7.9, alkaline phosphatase 259, AST 1765, ALT 5016, amylase 287 U/dL, ammonia 80 umol/L, urine drug screen positive for cannabinoids cocaine opiates, serum acetaminophen none detected, salicylate 4. Day 2: PT 17.1, INR 2.11, fibrinogen 142, AST 4549, ALT 1654, amylase 199 U/dL, ammonia 74 umol/L. Day 3: PT 17.4, INR 2.19, PTT 39.6, BUN 88, Cr 6.8, AST 2349, ALT 1522, ammonia 47 umol/L.

**Clinical Course:** Upon arrival to the ED the patient was awake, confused, mildly combative and agitated. Additional doses of naloxone were administered. Pupils were miotic, HR 76, RR 40, BP 62/54, T 32.1°C, Glasgow coma scale 11. In the ICU, hypotension occurred, followed by respiratory arrest. The patient was intubated and started on dopamine. The patient suffered a cardiac arrest en route to the OR to evaluate an acute abdomen. CPR was performed in the OR, a thoracotomy was performed for open cardiac massage, and spontaneous circulation was restored. The exploratory laparotomy revealed no remarkable abdominal findings. The patient received fresh frozen plasma, intravenous fluid, dopamine, sodium bicarbonate, magnesium, and calcium gluconate, but the patient's condition continued to decline and he expired on Day 3. No autopsy results were available.

**Case 991.** Acute mixed ingestion: *undoubtedly responsible.*

**Scenario/Substances:** An 83 y/o female was found unresponsive by her family with a suicide note after reportedly ingesting an unknown benzodiazepine and acetaminophen.

**Past Medical History:** Vascular disease, cardiomyopathy, renal artery stenosis, chronic obstructive pulmonary disease and coronary artery disease.

**Laboratory Data:** The initial acetaminophen concentration was 155 µg/mL, AST was 273, ALT 83. BUN was 50 and Cr was 2.5 umol/L. Metabolic acidosis was reported but confirmatory laboratory data are not available.

**Clinical Course:** Naloxone caused an improvement in the patient's mental status. The patient was started on N-acetylcysteine. The patient developed hypertension with a systolic BP of 240 mm Hg, and was started on a nitroprusside infusion. The patient also developed an unstable cardiac rhythm requiring multiple doses of atropine. Subsequently, the patient developed hypotension with a systolic BP of 60 treated with IV bolus and dopamine. The patient had two sequential asystolic cardiac arrests, was given atropine and recovered. After the second asystole, the patient developed ventricular tachycardia and asystole and could not be resuscitated.

**Autopsy Findings:** Postmortem toxicological findings included blood concentrations of: hydrocodone 0.193 mg/L, norpropoxyphene 13.0 mg/L, propoxyphene 0.68 mg/L, acetaminophen 45.37 mg/L and a chlordiazepoxide 0.056 mg/L. The cause of death was listed as drug overdose.

**Case 1003.** Metformin acute ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 53 y/o male transferred from jail after taking 150 metformin tablets.

**Past Medical History:** History of hypertension and diabetes  
**Physical Exam:** The patient was combative and hostile and subsequently intubated due to excessive agitation. Systolic BP ranged from 60–72, T 34.2°C. He was in atrial fibrillation.

**Laboratory Data:** HCO<sub>3</sub> 11, Cr, 1.8, Glu, 54. Lactate concentration > 25. ABG-pH, 6.93/ pCO<sub>2</sub> 39/ pO<sub>2</sub> 316. After therapeutic interventions of sodium bicarbonate, vasopressors, and aggressive hydration ABG-pH, 6.94 / pCO<sub>2</sub>, 44.

**Clinical Course:** Over the next several h, the patient became hypotensive and oliguric. The patient was transferred to a tertiary care facility for high flow continuous veno-venous hemodiafiltration. Acidosis and hypotension continued over the next twenty-four h. The patient remained hypothermic. The patient received sodium bicarbonate, vasopressors, and aggressive hydration with little improvement in the acidosis. Care was withdrawn and the patient died on the second Day.

**Autopsy Findings:** A postmortem metformin concentration (iliac vein) was 30 mg/L.

**Case 1010.** Chronic metformin ingestion: *probably responsible.*

**Scenario/Substances:** A 69 y/o female was brought to ED for evaluation of vomiting.

**Past Medical History** included dementia, status post CVA with persistent left-sided weakness, hyperlipidemia, diabetes mellitus and chronic renal insufficiency. Medications included sertraline, nifedipine, glipizide, metformin, glyburide, meclizine, baclofen, clonidine, metoprolol, enalapril and pravastatin.

**Physical Exam:** Frail, confused, deeply sedated after emergency intubation. Initial BP 160/74, HR 101, RR 18. Pupils 3 mm, left-sided weakness.

**Laboratory Data:** included

Na 134	Cl 104	BUN 49	Glu 24
K 7.4	HCO <sub>3</sub> 8	Cr 6.6	

ABG-pH 6.98 / pCO<sub>2</sub> 29 / pO<sub>2</sub> 117, lactate 13.9.

**Clinical Course:** In the ED the patient was intubated, found to have severe lactic acidosis and renal failure. The patient was treated with sodium polystyrene sulfonate, dextrose, bicarbonate and hemodialysis. The patient developed hypotension requiring multiple vasopressors, was evaluated for sepsis and given broad-spectrum antibiotics. Despite bicarbonate infusion and repeat hemodialysis, the patient remained acidotic with lactate concentration rising to 17. The patient became unresponsive off sedation and had non-reactive pupils. A CT of the head showed multiple infarcts and edema, and death occurred on Day 3. The death was attributed to severe acidosis related to chronic intoxication with metformin, although the contribution of other drugs (e.g., nifedipine causing hypotension) cannot be ruled out. The

presenting hypoglycemia was probably caused by accumulation of sulfonylureas due to renal insufficiency and lack of oral intake. No autopsy findings available.

**Case 1043.** Acute ingestion of chloral hydrate liquid: *undoubtedly responsible.*

**Scenario/Substances:** A 26 y/o male was found by his mother to have stopped breathing. EMS initiated resuscitative efforts, naloxone was given without response and the patient was transported to the ED. Materials found in the home suggested ingestion of chloral hydrate liquid (amount unknown), carisoprodol (bottle found empty), hydrocodone (bottle found empty) and marijuana.

**Past Medical History** Alcohol abuse, pancreatitis, and a seizure disorder associated with a head injury sustained as a teenager.

**Laboratory Data:** Urine drug screen positive for cocaine, cannabinoids, carisoprodol, zolpidem, escitalopram, carbamazepine, and hydrocodone. Salicylate 5.7, acetaminophen undetected. Antemortem blood trichloroethanol (total 7.6 µg/ml, free 7.1 µg/ml) and carbamazepine (5.3 µg/ml).

**Clinical Course:** Patient arrived at the ED in cardiac arrest with ventricular tachycardia. Lidocaine was given and cardioversion was attempted 14 times without success. Metoprolol given with immediate return to normal sinus rhythm (HR 90) without ectopy. Amiodarone bolus was given and infusion begun and dopamine was given for hypotension. ECG showed sinus rhythm, elevated ST segments, and shortened PR interval. The patient was unresponsive, flaccid with muscle fasciculations, pupils dilated to 5 mm and sluggish to respond. The patient began to have multiple PVC's. Labetolol was given with good response. At 12 h post ingestion BP was 150/90, HR 100 per minute, pupils fixed and dilated. On Day 2 of hospitalization he was unresponsive, gag reflex was present, the patient was opening his eyes in a repetitive manner, pupils were 7 mm, non-symmetrical and fixed. Temperature rose to 40°C. The patient remained hypertensive with systolic BP at 150. Dopamine and amiodarone were discontinued. HR rose to 130 /min and he began to breath over the ventilator. Minimal urine output with brown sludge noted. BUN was 20, Cr 1.1, lactate 4.4, blood sugar elevated and the patient was started on sliding scale insulin. On Day 3 the patient exhibited involuntary movement of his shoulder and doll's eyes". On Day 4, EEG and CT scan revealed cerebral edema and no cerebral activity. On Day 6 the patient was extubated and placed on comfort measures. The patient expired on Day 7.

**Autopsy Findings** revealed anoxic encephalopathy consistent with prolonged resuscitative efforts, acute pneumonia was in left lower lung lobe, mild lymphocytic meningitis in the brain. The post mortem femoral blood showed carbamazepine (4.3 µg/ml), diazepam (0.033 µg/ml), nordiazepam (0.25 µg/ml) and morphine (total 2.1 µg/ml and free 0.68 µg/ml). Manner of death was suicide.

**Case 1075.** Acute-on-chronic quetiapine ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 38 y/o female informed neighbors that she had ingested quetiapine (200 mg tablets x 60). The patient was comatose when EMS arrived.

**Physical Exam** included, BP 130/80, HR 130, afebrile, RR 20. The patient was comatose, pupils 5mm and reactive, bowel sounds present, skin warm and dry.

**Laboratory Data:** ABG-pH 7.45 / pCO<sub>2</sub> 29 / p O<sub>2</sub> 312 / HCO<sub>3</sub> 22, AST 46, ALT 66, CBC unremarkable, K 2.9, Glu 155, beta HCG negative, urine tox screen negative, ethanol, salicylates and acetaminophen not detectable.

**Clinical Course:** The patient arrived at the ED and was intubated ~1 h after the ingestion. The patient had 2 generalized tonic clonic seizures which responded to lorazepam and fosphenytoin. The BP decreased to 50 systolic and was treated with fluid boluses phenylephrine and norepinephrine. EKG showed QRS 102 msec and QTc 574 msec. The patient had a cardiac arrest ~5 h after ingestion treated with CPR, 3 ampules of sodium bicarbonate and IV fluid, but could not be resuscitated. Death was judged due to cardiovascular collapse. No autopsy findings available.

**Case 1079.** Acute mixed ingestion, quetiapine, venlafaxine: *undoubtedly responsible.*

**Scenario/Substances:** A 41 y/o male was found on the doorstep of a psychiatric facility with altered mental status. He had been discharged the previous evening with prescriptions for venlafaxine extended release and quetiapine.

**Past Medical History:** Substance abuse and depression

**Physical Exam:** Lethargic, responding to painful stimuli only. BP 96/50, HR 104, RR 20, T normal, oxygen sat was 95% on room air.

**Laboratory Data:** QT 475 msec, acetaminophen and salicylates not detected, K 3.3, ethanol 185, urine drug screen, negative.

**Clinical Course:** The patient seized twice over 6 h, became obtunded, and was given lorazepam for the seizures. BP 137/50, HR 137, oxygen sat was 97% on 4 liters oxygen. The patient was intubated and transferred to a tertiary care facility. During transport, the patient seized again and developed pulseless electrical activity. Attempts at resuscitation were unsuccessful.

**Autopsy Findings** Blunt head trauma consistent with a fall, specifically occipital subgaleal hemorrhage overlying a linear skull fracture and countercoup cerebral cortical contusions. Toxicology results showed venlafaxine 3.3 mg/L (vena cava), 8.4 mg/kg (liver), o-desmethylvenlafaxine 1.3 mg/L (aorta), 1.1 mg/L (vena cava). Quetiapine concentrations were 2.6 mg/L (aorta), 7.3 mg/L (vena cava), 16 mg/kg (liver). Fluoxetine concentration was 0.1 mg/L (aorta) and the norfluoxetine concentration was 1.0 mg/L (aorta). Cause of death was determined to be quetiapine intoxication and blunt head trauma.

**Case 1086.** Acute ingestion of ethanol, propoxyphene and quetiapine: *undoubtedly responsible*.

**Clinical Course:** A 55 y/o male was brought into an ED in cardiac arrest and CPR was initiated. A sustained pulse and rhythm returned after 1.5 h of CPR. His QRS was 138 msec QTc was 611 msec and decreased to 543 msec. The patient was then transferred to an ED at a referral medical center where Glasgow Coma Scale was 3 and reflexes were absent. The patient was hypotensive, bradycardic, and exhibited a dysrhythmia. The patient received 1 ampule of sodium bicarbonate and a bicarbonate infusion, atropine, dopamine but was changed to neosynepherine and norepinephrine. Patient died seven h after transfer.

**Autopsy Findings:** Cause of death was mixed drug intoxication with ethanol, propoxyphene, and quetiapine. Other findings included a left hemothorax—a complication of resuscitation. Post mortem toxicology concentrations include: quetiapine 2400 ng/ml, ethanol 211 mg/dL, propoxyphene 302 µg/L, positive for cannabinoids.

**Case 1102.** Mixed, Acute ingestion, gamma-hydroxybutyric acid, ethanol: *undoubtedly responsible*.

**Scenario/Substances:** A 56 y/o female ingested an unknown amount of gamma-butyrolactone, which she had obtained over the internet. The bottle had been marked as an automotive product. The patient had ingested the substance around midnight that evening, and started to vomit and became unresponsive within 2 h.

**Physical Exam:** The patient presented in cardiac arrest, pupils were fixed and dilated.

**Laboratory Data:** 3 h post ingestion:

Na 145	Cl 103	BUN 7	Glu 203
K 5.1	HCO <sub>3</sub> 18	Cr 1.1	

ABG-pH 7.04 / pCO<sub>2</sub> 34 / pO<sub>2</sub> 264, FiO<sub>2</sub> 100%, salicylate 4.9, ethanol 237, gamma-hydroxybutyric acid 1,135 mg/L, 7.5 h post ingestion gamma-hydroxybutyric acid was 577 mg/L.

**Clinical Course:** After ingestion, the patient had spontaneous emesis and became unresponsive within 2 h. After resuscitation the patient's T was 31°C, Chest x-ray was consistent with aspiration pneumonitis, acidosis worsened requiring a bicarbonate infusion. The patient expired the following day, 53 h after ingestion, after determination of brain death.

**Autopsy Findings:** The autopsy report indicated that the cause of death was pneumonia and anoxic ischemic encephalopathy secondary to alcohol and gamma-hydroxybutyric acid intoxication. The postmortem gamma-hydroxybutyric acid blood concentration was 4.71 mg/L, the vitreous gamma-hydroxybutyric acid was 6.91 mg/L.

**Case 1107.** Acute methamphetamine exposure: *undoubtedly responsible*.

**Scenario/Substances:** A 21 y/o male out with friends during the prior evening and early morning then found unresponsive at home in chair with vomitus on body, dilated pupils and agonal respirations.

**Past Medical History:** revealed no significant medical problems.

**Laboratory Data:** ABG-pH 7.39 / pCO<sub>2</sub> 38, pO<sub>2</sub> 44, bicarbonate 28, salicylate concentration 1.6, acetaminophen and ethanol undetected. Cr 0.9 and peaked at 1.4 on Day 2, CK 8645 initially and declined over the next 2 days, troponin peaked at 1.33 ng/mL. Urinalysis was positive for blood but no red blood cells seen. Urine drug screen was positive for amphetamine.

**Clinical Course:** On presentation to ED, BP 220/136, HR 171, agonal respirations, O<sub>2</sub> sat 98%, T 36.2°C, and pupils dilated. The patient was intubated and given midazolam for hypertension. Head CT showed large, left-sided intraparenchymal bleed with uncal herniation and 7.5mm of midline shift. CT angiogram of the brain did not demonstrate a source for the intracranial hemorrhage. Bronchoscopy showed no evidence of aspiration or pulmonary edema. On Day 3, apnea and cerebral perfusion tests confirmed brain death. The patient was extubated after surgery for organ donation and suffered cardiopulmonary arrest.

**Autopsy Findings:** Cause of death massive intracerebral hemorrhage likely related to methamphetamine use. Confirmatory urine drug screen positive for methamphetamine but serum drug screen was negative.

**Case 1109.** Acute mixed ingestion: *undoubtedly responsible*.

**Scenario/Substances:** A 34 y/o male was discovered unresponsive with empty bottles of methylphenidate, bupropion, clonazepam, propoxyphene/acetaminophen and ethanol with a suicide note.

**Past Medical History:** Long history of depression with multiple previous suicidal attempts.

**Physical Exam:** Arousable. BP 130/80, HR 104, RR 18.

**Laboratory Data:** ECG: NSR 104, QRS 112 msec, QTc 0.468 sec. acetaminophen 56 µg/mL, unknown time of ingestion. Urine toxicology screen, positive benzodiazepines.

**Clinical Course:** Patient received naloxone 2 mg IV without response. The patient received activated charcoal via NGT and 30 min later was found unresponsive and asystolic. Resuscitation was unsuccessful.

**Autopsy Findings:** The medical examiner determined the cause of death to be mixed drug ingestion (bupropion and methylphenidate) and manner of death as suicide. The lungs showed no aspiration and charcoal was noted in stomach. Heart blood concentrations: Methylphenidate 1.1 mg/L, bupropion 4.1 mg/L, propoxyphene 0.6 mg/L, ethanol 0.02% (w/v).

**Case 1121.** Acute ingestion, cocaine: *undoubtedly responsible*.

**Scenario/Substances:** A 17 y/o female had a seizure then cardiac arrest while in car with a friend.

**Physical Exam:** Cardiac arrest for 30 min, T 36.9°C.

**Laboratory Data:** pH 6.8, urine drug screen positive for cocaine and cannabinoids. Antemortem blood testing: ELISA positive for cocaine and fluoxetine, negative for

cannabinoids, ecgonine 3.40 mg/L, ecgonine methyl ester 7.20 mg/L, benzoylecgonine 2.20 mg/L, cocaine 1.10 mg/L. **Clinical Course:** The patient was given pressor support after resuscitation, had several additional cardiac arrests. BP on pressors was 100/64 mm/Hg, pupils were fixed and dilated. The patient expired of cardiopulmonary arrest on the first day.

**Autopsy Findings:** Ischemic changes in the right thalamus and bilateral caudate nuclei, ischemic changes of the myocardium, and bowel, congestion of the lung, liver and uterus. Postmortem peripheral blood testing: ecgonine 5.7, ecgonine methyl ester 6.40 mg/L, benzoylecgonine 7.10 mg/L, cocaine 1.40 mg/L. Tissue concentrations: brain: ecgonine 5.80 mg/L, ecgonine methyl ester 2.90 mg/L, benzoylecognine 2.90 mg/l, cocaine 0.64 mg/L, liver: ecgonine 7.50 mg/L, ecgonine methyl ester 3.60 mg/, benzoylecognine 6.70mg/L, cocaine 0.18 mg/L, muscle: ecgonine 12 mg/L, ecgonine methyl ester 2.80mg/L, benzoylecognine 6.90 mg/L, cocaine 0.33 mg/L; ocular fluid: ecgonine 3.10 mg/L, ecgonine methyl ester 6.70 mg/, benzoylecognine 3.60 mg/l, cocaine 1.10 mg/L.

**Case 1142.** Cocaine, acute ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 28 y/o male inmate at a detention center was witnessed to have ingested an unknown quantity of crack cocaine rocks. Soon after the ingestion the patient became tachycardic and subsequently had a ardiac arrest.

**Physical Exam:** HR 30.

**Clinical Course:** Patient was intubated, given activated charcoal, IV fluids, 4 ampules of atropine, vasopressors, and lidocaine. After transfer to the ICU his initial oxygen sat of 80% declined to 40–50% within an h. Repeat chest x-ray revealed pulmonary edema/Adult Respiratory Distress Syndrome, markedly worse than the previous chest x-ray. The patient developed worsening Adult Respiratory Distress Syndrome and died on Day 2.

**Autopsy Findings:** The manner of death was undetermined. Heart blood concentrations: cocaine 3.4 mg/L, benzoylecgonine 8.8 mg/L.

**Case 1148.** Acute ingestion, cocaine: *probably responsible.*

**Scenario/Substances:** A 35 y/o male was found seizing by the family approximately 15 min after being seen in a normal state of being. EMS was activated, found the patient unresponsive and transported him to a hospital.

**Past Medical History:** None provided.

**Physical Exam:** BP 74/30, T 42.0°C, with seizures, RR 24, HR 132. Pupils unequal, neither reactive to light, diffuse rhonchi, absent bowel sounds, blood noted in oropharynx and via NG tube, melena present

**Laboratory Data:** WBC 21.8, HGB 13.1/Hct 38.8%, K 4.5, HCO<sub>3</sub> 14.6, ALT, 74, AST, 434, ABG-pH 7.23 / pCO<sub>2</sub> 31 / pO<sub>2</sub> 142, INR 2.4, salicylate and acetaminophen negative, ECG showed sinus tachycardia with a QRS 104 msec and QTc 436 msec, R-wave in aVR, S-waves in limb leads.

**Clinical Course:** Intubated, ventilated, hypotension requiring pressors, hyperkalemic, acute renal insufficiency, received dialysis, coagulopathy, expired 24 h after admission with asystole. No autopsy was performed. Cause of death was multisystem organ failure secondary to cocaine intoxication.

**Case 1151.** Acute cocaine ingestion: *undoubtedly responsible.*

**Scenario/Substances:** A 37 y/o man was stopped by police because of erratic driving. He was severely combative, requiring a prolonged physical struggle for restraint and transport.

**Past Medical History:** Cocaine abuse (hospitalized as a "body stuffer" two weeks before this event), hypertension, cocaine-associated chest pain, recent small ischemic stroke, right carotid artery occlusion, femur fracture, depression.

**Physical Exam:** Severely agitated, delirium and profound diaphoresis noted. BP 160/130, T 42.8°C, HR 140. No rigidity. Crack pipe found in gluteal folds.

**Laboratory Data:** pH 7.35, HCO<sub>3</sub> 13, lactate 6.8, Cr 2.7, AST 100, CK 2,369. ECG: QRS duration 80 msec, QTc 514 msec.

**Clinical Course:** Lorazepam 30 mg and haloperidol 10 mg IV were required to control the patient, the patient was then sedated with etomidate and intubated. BP was supported with IV fluids, dopamine and norepinephrine; the patient was sedated with propofol. Active cooling was performed with cool mist and fans, cooling blanket, room T IV fluids, and cool/humidified ventilator circuit air. Within two h, the patient's T was 39.4°C. The patient developed rhabdomyolysis (creatinine kinase 50,832), disseminated intravascular coagulopathy (INR > 10, PTT > 150, fibrinogen <50, platelets 59,000), lower gastrointestinal bleeding, renal failure (Cr 4.9), and possibly liver injury (AST 1,836, ALT 949). Hemodialysis was initiated. The patient developed pulseless electrical activity cardiac arrest and died approximately 25 h after hospital arrival.

**Autopsy Findings:** Cerebral edema and diffuse mucosal hemorrhage through the small intestine. No GI foreign bodies were found. Urine toxicological screening revealed only cocaine, cocaine metabolites and lidocaine, small sample volume precluded quantitative measurement. Autopsy revealed cerebral edema and diffuse mucosal hemorrhage through the small intestine. Other stimulants known to cause hyperpyrexia (e.g. PMA, PMMA) were not detected.

**Case 1154.** Acute cocaine exposure: *probably responsible.*

**Scenario/Substances:** Police apprehended a delirious, combative 41y/o male running down the street. He was handcuffed and subsequently witnessed to have an episode of unresponsiveness by EMS while in transport to the ED.

**Past Medical History** included alcoholism, remission with relapse of unknown course, chronic pain, treated with oxycodone 160 mg and acetaminophen/hydrocodone 10 mg Q 8 h.

**Laboratory Data:** ABG- pH 6.8 / pCO<sub>2</sub> 80 / p O<sub>2</sub> 250

Na 147  
K 2.3

Cl 121  
HCO<sub>3</sub> 12

BUN 7  
Cr 0.71

Glu 371

Lactate > 15, serial troponins negative, urine toxicology screen positive for cocaine and ethanol not detected.

**Clinical Course:** On arrival at the ED the patient was ventilated by bag mask had agonal breathing, and was jerking/twitching, BP 99/57, HR 73, RR 24, T 39.8° C, pulse oximetry 97% on 40% FiO<sub>2</sub>. He received 2 ampules of atropine, 3 ampules of epinephrine and, subsequently, 4 ampules of sodium bicarbonate. Pupils were 10mm bilaterally and fixed. The patient was intubated, transferred to the Critical Care Unit, and maintained a heart rate of 130 and systolic BP of 80–100 on 2 µg dopamine. The patient was spontaneously opening his eyes, and had reactive pupils. The patient exhibited upper body tremors, but no purposeful movements. The next morning the patient had asystole. Resuscitation was unsuccessful and the patient expired.

**Autopsy Findings:** Signs of diffuse minor trauma consistent with resisting arrest and struggling in handcuffs. Non-hemorrhagic transverse fracture of the sternum consistent with CPR. Final pathologic cause of death: excited delirium syndrome due to acute cocaine abuse. Additional pathologic findings included cardiomegaly (490 grams), atherosclerotic coronary artery disease with 75% right stenosis (25% left main stenosis, 75% left anterior descending stenosis and 25% left circumflex stenosis), moderate thickening of mitral valve leaflets, hepatomegaly (2280 grams), history of ethanol abuse, status post CPR, incipient anasarca, history of excited delirium while in police custody, history of cocaine abuse, toxicology laboratories, on admission, tested positive for cocaine, post-mortem toxicology positive for benzoylecgonine and negative for cocaethylene.

**Case 1194.** Mixed ingestion, Methylphenidate, bupropion, cyclobenzaprine: *undoubtedly responsible.*

**Scenario/Substances:** A 63 y/o female ingested 90 bupropion 300 mg extended release tablets and 20 cyclobenzaprine 10 mg tablets in an apparent suicide attempt. No report of methylphenidate ingestion was known.

**Past Medical History:** Chronic pain due to lumbar disc disease, colostomy, depression with prior suicide attempt.

**Physical Exam:** BP 180/90, HR 112–124 (sinus tachycardia)

**Clinical Course:** Upon arrival the patient received activated charcoal and had whole bowel irrigation via NG tube. Two brief seizures occurred 2 h and 45 min after arrival which resolved spontaneously. Subsequently bradycardia, (HR 20), wide-complex QRS and hypotension ensued. The patient developed pulseless electrical activity and then asystole and expired approximately 6 h after admission.

**Autopsy Findings:** Medical Examiner results are based on 3 ER admit blood samples. Premortem toxicology: bupropion: 0.057 mg/L (purple top), 0.012 mg/L (blue top). Cyclobenzaprine: 22 ng/ml (purple top), 14 ng/ml (blue top). Methylphenidate: 0.04 mg/L (purple top), 0.019 mg/L (blue top). Ritalinic acid: 3.3 mg/L (purple top), 4.0 mg/L (blue top), 5.3 mg/L (unspecified tube type).

**Case 1203.** Parenteral administration of enteral nutrition product: *undoubtedly responsible.*

**Scenario/Substances:** A 24 y/o woman, 32 weeks pregnant, who had been receiving gastric feedings inadvertently

received 1400 mL of her enteral nutrition product through her peripherally inserted central catheter. The enteral nutrition product contained maltodextrin, hydrolyzed casein, medium-chain triglycerides, and < 2% other ingredients (oils, vitamins and minerals).

**Past Medical History:** Hyperemesis gravidarum. The patient was receiving parenteral alimentation at home, but continued to have problems and was admitted for inpatient gastrointestinal nutrition.

**Clinical Course:** Vital signs and physical exam were initially unremarkable. Over the next 2 h, the patient developed pitting edema and florid pulmonary edema. The patient was intubated, but could not be adequately oxygenated and expired. The baby expired as well.

**Autopsy Findings:** Patient had bilateral hydrothorax, atelectatic lungs, diffuse edema of tissues, liquid spleen, gravid uterus, and birefringent deposits in alveolar vessels. The decedent expired as a consequence of intravenous introduction of an enteral feeding.

**Case 1227.** Acute calcium polysulfide ingestion: *probably responsible.*

**Scenario/Substances:** A 51 y/o female presented to the emergency department after accidentally ingesting a pet dip product containing calcium polysulfide.

**Past Medical History:** Back surgery 1 week prior to ingestion.

**Physical Exam:** Altered mental status, moaning, BP 211/96, HR 125, RR 20, T 36.4°C axillary. No oral burns on exam.

**Laboratory Data:** ABG-pH, 7.32/ pCO<sub>2</sub> 22/ pO<sub>2</sub> 219,

Na 141	Cl 103	BUN 7	Glu 334
K 3.8	HCO <sub>3</sub> 15	Cr 1.2	

Ca 13.4, AST, 95, alk phos 202, CK, 182, acetaminophen, not detectable, salicylate, 3, lithium, 0.9, WBC, 37.9, platelets, 786. Chest xray: lung mass. Sulfhemoglobin concentration read “too high”. Methemoglobin concentration was 1%.

**Clinical Course:** One h after arrival, the patient was stable, and reported taking only took a sip of the product. No further seizures or vomiting occurred. The patient had a large stool that smelled of rotten eggs. The patient developed altered mental status, cyanosis of the extremities, face and fingertips, the skin appeared mottled. Oxygen sat dropped to 84% despite supplemental oxygen. The patient was intubated. 15 h after ingestion, ABG was pH 7.2/ pCO<sub>2</sub> 23/ pO<sub>2</sub> 455 with an oxygen sat of 84%. ECG: consistent with an inferior wall myocardial infarction, hypotension required pressors. Skin tone was noted to be greenish-blue. The patient died on the 1st Day of multi-system organ failure. No autopsy results were available.

**Case 1519.** Acute ingestion of baking soda: *undoubtedly responsible.*

**Scenario/Substances:** An extremely thin (7.7 kg) 2 year, 11 month old girl in foster care was brought to the ED because of a seizure. Nurses noted a white powdery substance around

her mouth and later it was discovered that she had eaten an unknown amount of baking soda.

**Past Medical History:** In foster care, chronic low weight.

**Physical Exam:** Unresponsive, seizing, BP 79/39, HR 146, RR 25 with hand bagging, T 36.6°C.

**Laboratory Data** included O<sub>2</sub> sat 100%,

Na 180 K 2.7	Cl 123 HCO <sub>3</sub> 48	BUN 16 Cr 0.7	Glu 182
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**Clinical Course:** The child was seizing on arrival in the ED. The patient was intubated and treated with fluids (normal saline), midazolam, lorazepam, and phenobarbital. On transfer to the referral medical center laboratory findings were ABG-pH 7.9 / pCO<sub>2</sub> 27 / pO<sub>2</sub> 89, HCO<sub>3</sub> 53, urine tox screen negative for PCP, amphetamine, cocaine, benzodiazepine, cannabinoids, opiates, barbiturates. A CT scan showed increased intracranial pressure, markedly inhomogenous brain parenchymal attenuation compatible with evolving infarcts, and a suspected thrombus in the superior sagittal sinus and right transverse sinus. After 3 days the patient was declared clinically brain dead. Autopsy findings not available.

#### Abbreviations & normal ranges for abstracts

Disclaimer – all laboratories are different, units and normal ranges are provided for general guidance only. These values were taken from Goldfrank (10), Dart (11) or Harrison (12).

Serum electrolyte summary table

Sodium [133–145]	Chloride [98–106]	BUN [7–18] mg/dL	Glucose [60–110] mg/dL
Potassium [3.5–5]	Bicarbonate [18–24]	Creatinine [0.6–1.2] mg/dL	

serum electrolytes have units of mEq/L = mmol/L

μ/L	= micrograms per Liter
μg/dL	= micrograms per deciLiter
μg/min	= micrograms per minute
μg/mL	= micrograms per milliLiter
μmol/L	= micromoles per milliLiter
ABG	= arterial blood gases
ABG-pCO <sub>2</sub>	= partial pressure of carbon dioxide [35–45] mmHgmm Hg
ABG-pH	= hydrogen ion concentration [7.35–7.45] mm Hg
ABG-pO <sub>2</sub>	= partial pressure of oxygen [90–100] mm Hg
ACLS	= advanced cardiac life support, protocol for the provision of cardiac resuscitation
Alk phos	= alkaline phosphatase [30–120] U/L
ALT	= Alanine transaminase [8–40] U/L=(SGPT-serum glutamic pyruvic transaminase)
AMA	= against medical advice
Ammonia	= [10–80] μg/dL= [6–47] μmol/L
AST	= Aspartate transaminase [40–130] U/L=(SGOT-serum glutamic oxaloacetic transaminase)
Bicarbonate	= [18–24] mEq/L
Bilirubin	= bilirubin concentration [0.1–1] mg/dL

BP	= Blood Pressure, systolic [<130]/diastolic [<85], mm Hg (Torr)
BUN	= Blood urea nitrogen [7–25]
C	= degrees Centigrade
CK	= creatinine kinase (CPK, creatine phosphokinase) [0–130] U/L
Cl	= chloride [98–106] mEq/L
CPR	= cardio pulmonary resuscitation
Cr	= creatinine (serum) [0.6–1.2] mg/dL
CT	= computed tomography
CVA	= cerebrovascular accident
CVVHD	= continuous venovenous hemodialysis
Day	= hospital day, i.e., days since admission
ECG	= electrocardiogram, leads=I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6
ED	= emergency department, in these abstracts refers to the initial health care facility
EEG	= electroencephalogram
ELISA	= enzyme-linked immunosorbent assay
EMS	= emergency medical services, the first responders
FiO <sub>2</sub>	= fraction of inspired oxygen
g/dL	= grams per deciLiter
Glu	= glucose
h	= hours
HCF	= health care facility
HCG	= human chorionic gonadotropin test for pregnancy
HCO <sub>3</sub>	= bicarbonate
HCP	= health care provider
Hct	= hematocrit [39–49] % (male), [33–43] % (female)
Hgb	= hemoglobin [14–18] g/dL (male), [11.5–15.5] g/dL (female)
HIV	= human immunodeficiency virus
HR	= heart rate [60–100] beats per min
hr	= hours
ICU	= intensive care unit
IgE	= immunoglobulin E
INR-PT	= international normalized ratio [0.8–1–2]
IU/L	= international units per Liter
IV	= intravenous
K	= potassium
k/μL	= thousands per microliter
L	= Liter
Lactate	= lactic acid [<18] mg/dL= [<2] mmol/L
mEq	= milliequivalents
mEq/L	= milliequivalents per Liter
mg	= milligrams
mg/dL	= milligrams per deciLiter
mg/kg	= milligrams per kilogram
mg/L	= milligrams per Liter
min	= minutes
mLMI	= milliLiter
mmol/L	= millimoles per Liter
mosm/kg	= milliosmoles per kilogram
mosm/L	= milliosmoles per Liter

MRI	= Magnetic Resonance Imaging	QTc	= QT interval corrected for heart rate, usually $QTcB = QT / RR^{1/2}$ (Bazett correction) 1–15 y-o [ $<440$ ] msec, adult male [ $<430$ ] msec, adult female [ $<450$ ] msec
msec	= milliseconds	RBC	= – red blood cells per high power field
NG	= nasogastric	RR	= respiratory rate [12–16] breaths per minute
ng/mL	= nanograms per milliliter	sec	= seconds
O <sub>2</sub>	= oxygen	SR	= sustained release
OR	= operating room	T	= Temperature (oral) [36.4, 37.2]°C
Osm	= osmole	Troponin	= calcium-regulated protein in muscle tissue occurring in 3 subunits with tropomyosin. normal range [ $<0.04$ µg/L]
PC	= poison center	U/dL	= units per deciliter
PEA	= pulseless electrical activity	U/L	= units per liter
PEEP	= positive end expiratory pressure	U/mL	= units per milliliter
Platelets	= platelet count [150–400] $\times 10^9/L$	UA	= urinalysis
PO	= per os, Latin for by mouth	WBC	= white blood count [3.2, 9.8] $\times 1000/mm^3$
Potassium	= [3.5–5] mEq/L	y/o	= years old [older than me]
PR	= P-R interval [120–200] msec on the ECG		
PT	= prothrombin time [11–15] sec		
PTT	= partial thromboplastin time [23–35] sec		
QRS	= ECG QRS complex duration [60–100] msec		
QT	= Q to T interval on the ECG waveform, varies with heart rate		