

# *IOWA* HSEES

## Hazardous Substances Emergency Events Surveillance

Cumulative Report  
**2002 – 2003**

This reports is supported by funds from the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) trust fund and the Office of Terrorism Preparedness and Emergency Response of the Centers for Disease Control and Prevention (CDC), provided to the Iowa Department of Public Health under a cooperative agreement by the Agency For Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services

Thomas J. Vilsack  
Governor  
Sally J. Pederson  
Lt. Governor

Mary Mincer Hansen  
Director  
Iowa Department of Public Health

## EXECUTIVE SUMMARY

The Hazardous Substances Emergency Events Surveillance (HSEES) system, maintained by the Agency for Toxic Substances and Disease Registry (ATSDR), actively collects information to describe the public health consequences of releases of hazardous substances in 15 states. This report summarizes the characteristics of events reported to the Iowa Department of Public Health (IDPH) in 2002 and 2003. Information about acute events involving hazardous substances was collected, including the substances(s) released, number of victims, number and types of injuries, and number of evacuations. The data were computerized using an ATSDR-provided web-based data entry system.

A total of 642 events were reported. In 585 (91%) events, only one substance was released. The most commonly reported categories of substances were, ammonia, agricultural chemicals, other (for example meth chemicals and solvents not otherwise specified) and other inorganic substances (for example calcium chloride and sulfur dioxide). During this reporting period, 58 events (9% of all reported events) resulted in a total of 119 victims, of whom 3 (2.5%) died. The most frequently reported injuries were burns, respiratory irritation, eye irritation, and trauma not related to chemicals. Evacuation reportedly was order for 77 (12%) events.

The findings regarding the percentages of events with victims and events with evacuations reported have varied from year to year. In reviewing events for the past 11 years, 1997 had the highest number of victims (106) but 1999 had the highest percentage of events with victims (16%). The year 2002 had the highest number of reported evacuations (40).

# **HAZARDOUS SUBSTANCES EMERGENCY EVENTS SURVEILLANCE SYSTEM**

## **2002-2003 SUMMARY**

### **INTRODUCTION**

The Centers for Disease Control and Prevention defines surveillance as

Ongoing, systematic collections, analysis, and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know. The final link of the surveillance chain is the application of these data to prevention and control. A surveillance system includes a functional capacity for data collection, analysis, and dissemination linked to public health programs”[1].

Since 1990, the Agency for Toxic Substances and Disease Registry (ATSDR) has maintained an active, state-based Hazardous Substances Emergency Events Surveillance (HSEES) system to describe the public health consequences of releases of hazardous substances. The decision to initiate a surveillance system of this type was based on a study published in 1989 about the reporting of hazardous substances releases to three national databases: the National Response Center Database, the Hazardous Material Information System (HMIS), and the Acute Hazardous Events Database [2]. A review of these databases indicated limitations. Many events were missed because of specific reporting requirements (for example, the HMIS did not record events involving intrastate carriers or fixed-facility events). Other important information was not recorded, such as demographic characteristics of victims, the types of injuries sustained, and the number of persons evacuated. As a result of this review, ATSDR implemented the HSEES

system to more fully describe the public health consequences of releases of hazardous substances.

HSEES has four goals:

- To describe the distribution and characteristics of acute hazardous substances releases;
- To describe morbidity and mortality among employees, responders, and the general public that resulted from hazardous substances releases;
- To identify risk factors associated with the morbidity and mortality; and
- To identify strategies that might reduce future morbidity and mortality resulting from the release of hazardous substances.

For a surveillance system to be useful, it must not only be a repository for data, but also useful to protect public health.

In the last few years, the fourth goal of the HSEES system has been emphasized; for example, to develop strategies to reduce subsequent morbidity and mortality by having each participating state analyze its data and develop appropriate prevention outreach activities. These activities are intended to provide industry, responders, and the general public with information that can help prevent chemical releases and reduce morbidity and mortality if a release occurs.

This report provides an overview of HSEES for 2002-2003 in Iowa, summarizes the characteristics of acute releases of hazardous substances and their associated public health consequences, and demonstrates how data from the system are translated into prevention activities to protect public health.

## **METHODS**

Beginning in 2002, a newly updated data-collection form, approved by the Office of Management and Budget, went into effect. For each event, information was collected about the event, substance(s) released, victims, injuries, and evacuation.

Various data sources were used to obtain information about these events. These sources included, but were not limited to, the Iowa Department of Natural Resources, the Division of Narcotics Enforcement, the National Response Center, and the media. Census data were used to estimate the number of residents in the vicinity of the events. All data were computerized using a web-based data entry system provided by ATSDR.

HSEES defines hazardous substances emergency events as uncontrolled or illegal releases or threatened releases of hazardous substances. Events involving releases of only petroleum are not included. Events are included if (1) the amount of substance released (or that might have been released) needed (or would have needed) to be removed, cleaned up, or neutralized according to federal, state, or local law; or (2) release of a substance was threatened, but the threat led to an action (for example, evacuation) that could have affected the health of employees, emergency responders, or members of the general public. HSEES defines victims as people who suffer at least one adverse health effect within 24 hours of the event or who die as a consequence of the event. Victims who receive more than one type of injury are counted once in each applicable injury type. Events are defined as transportation-related if they occur during surface, air, pipeline, or water transport of hazardous substances, or before being unloaded from a vehicle or vessel. All other events are considered fixed-facility events.

For the data analyses in this report, the substances released were categorized into 16 groups. The category “mixture” comprises substances from different categories that were mixed before the event, and the category “other inorganic substances” comprises all inorganic substances, except acids, bases, ammonia and chlorine.

## **RESULTS**

For 2002-2003, 642 hazardous substances emergency events were reported to HSEES: three percent of these events were threatened releases. A total of 471 (73%) occurred in fixed facilities.

For each fixed-facility event, one or two types of area involved in the release can be selected. Of all 471 fixed-facility events, 397 (84%) had one type of area and 74 (16%) a combination of two area types. Among events with one type of area reported, the main area was classified as follows: 61 (15%) ancillary processing equipment, 11 (3%) process vessel (a reaction chamber in which chemical are processed), 104 (26%) storage areas above ground (for example, tank, storage shed, and warehouse), and 52 (13%) piping. Of the 74 events with two areas, 42 (57%) involved storage areas above ground in combination with other types of areas (Figure 1). Of the 171 transportation-related events, 151 (88%) occurred during ground transport (for example, truck, van, or tractor), and 12 (7%) involved transport by pipeline (Figure 2). Fewer events involved water, air, and rail transportation modes. The largest proportion of transportation-related events occurred from a moving vehicle (151, 88%) and from pipeline transportation (10, 6%).

Factors contributing to the events consisted of primary and secondary entries and were reported for 642 (100%) events (Figures 3a and 3b). Of reported factors, 247 (52%) of fixed facility events and 54 (32%) of transportation-related events involved equipment failure as the primary factor; 96 (20%) of fixed-facility and 100(58%) of transportation-related events involved human error as the primary factor.

More than 91% of all events involved the release of only one substance. Two substances were released in 41 (6%) events, and 3% involved the release of more than two substances (Table 1). Fixed-facility events were more likely than transportation events to have two or more substances involved in an event (5% versus 4%).

A total of 717 substances were either released or threatened to be released during the events. Two types of releases for each chemical (for example, spill and air) could be reported. Of a total of 692 substances having an actual release reported, only one type of release was associated with the following: air releases (240, 35%), spills (388, 56%), fires (8, 1%) and explosions (5, 1%). Two types of releases were reported for the following combinations: spill and air releases (38, 5%), and spill and fire (6, 1%); the remainder involved other combinations of release types, or unknown release types.

The number of events by month ranged from 119 (18%) in April to 36 (6%) in December, with the largest proportions occurring during April, May, and June (262, 41%). The proportion of events ranged from 18% to 14% during weekdays and from 9% to 7% during weekend days. Of all 632 (98%) events for which time of day or time category was reported, 36% occurred from

6:00 a.m. to 11:59 a.m., 36% from 12:00 p.m. to 5:59 p.m., 17% from 6:00 p.m. to 11:59 p.m., and the remainder during the early hours of the day.

### ***Industries***

The largest proportions of HSEES events were associated with the manufacturing (155, 24.1%) and the agriculture (100, 15.6%) industries (Table 2). However, the largest proportion of events with injuries occurred in the personal services (includes meth labs) industry (39.7%). The number of victims in the manufacturing industry (9, 15.5%) was followed by the number of victims in the agriculture industry (8, 13.8%) and the transportation industry (6, 10.4%).

### ***Substances***

A total of 717 substances were involved in all events, of which 23 (3%) were reported as threatened releases. The substances most frequently released were ammonia, methamphetamine chemicals, nitrogen fertilizer and antifreeze (Appendix A). These substances were grouped into 16 categories. The categories most commonly involved in fixed-facility events were ammonia (149, 29.1%), pesticides/agricultural (105, 20.5%, and other (61, 11.9%). In transportation-related events, the most common releases were pesticides/agricultural (75, 36.6%), ammonia (35, 17.1%), and oxy organics (21, 10.2%) (Table 3).

### ***Victims***

A total of 119 victims were involved in 58 events (9% of all events) (Table 4). Of the events with victims, 45 (77.6%) events involved only one victim and five (8.6%) involved two victims.

Of all victims, 97 (81.5%) were injured in fixed-facility events. Fixed-facility events were more likely to have more than one victim per events (29.3%) than were transportation events (0.3%).

To represent the magnitude of the effects of substances involved in injuries, the number of events in a specific substance category was compared with the number of events in the same category that had victims. Substances released most often were not necessarily the most likely to result in victims (Table 5). For example, events involving the substance category “ammonia” constituted 25.7% of all events. However, only 10.3% of these events resulted in injuries. Conversely, events involving bases and volatile organic compounds exclusively comprised 2.4% and 6.8% of all events respectively, but 17.6% of these 17 events and 12.9% of 49 events resulted in injuries.

The general public (55, 46%) constituted the largest proportion of the population groups injured, followed by employees (45, 38%), responders (10, 8%) and students (9, 8%) (Figure 4). Four emergency response personnel were injured in fixed-facility events. Of those, three (75%) were police officers and one (25%) was a volunteer firefighter (Figure 5a). Six emergency-responder victims were injured in transportation-related events. Of these, five were police officers (83%) and one (17%) was an unspecified responder (Figure 5b). All categories of victims except police officers were found more often in fixed-facility events rather than transportation-related events.

Victims were reported to sustain a total of 142 injuries (Table 6). Some victims had more than one injury. Of all reported injuries, the most common injuries in fixed-facility events were respiratory irritation (44, 36.4%), eye irritation (34, 28.1%), chemical burns (26, 21.5%), skin irritation (5, 4.1%), gastrointestinal problems (5, 4.1%) and trauma (4, 3.3%). In transportation-

related events, trauma (11, 52.4%), respiratory irritation (9, 42.8%), and dizziness or other CNS symptoms (1, 4.8%) were reported most frequently. In a large proportion of the instances, trauma might have resulted from a chain of events, such as a motor vehicle accident, leading to the release of a hazardous substance and not necessarily by the exposure to the substance itself.

Sex was known for 119 (100%) of the victims; of these 92 (77.3%) were males. Males constituted 95.3% of all employees and responders. The median age of the 59 (49.6%) victims for who age was reported was 30 years (range 0- includes victims <1 year old). Of these, two were children <15 years, and seven were children aged 15-19 years. Presumably the 60 (50.4%) injured persons for whom the age was not reported were adults (general public and employees). The largest proportion of victims were treated at the hospital but not admitted (71, 59.7%) or treated at the hospital and admitted (32, 26.9%). Three (2.5%) victims died (Figure 6).

The status of personal protective equipment (PPE) use was reported for 44 (97.8%) employees and for ten (100%) first-responder victims. Most of these employees (40, 88.9%) and (9, 90%) of first responders had not worn any form of PPE. Employees who wore PPE most often used gloves and eye protection (100, 100%). The responder who wore PPE wore fire-fighter turn out gear without respiratory protection.

Three events involved eight or more injured people per event. In 2003 an explosion involving hexane and solvents occurred at a soybean processing plant. Eight employees were taken to the hospital and admitted with burns and respiratory irritation. In 2002, 24 members of the general public were taken to the hospital with respiratory and eye irritation after a motel employee

improperly mixed pool chemicals causing chlorine gas. Four members of the general public were admitted to the hospital and the remaining 20 were treated and released. Also in 2002, nine students and a teacher were burned when molten aluminum exploded during class. All were taken to the hospital, treated and released. The students and teacher were wearing protective eyewear.

### ***Evacuations***

Evacuations were ordered in 77 (12%) events where evacuation status was reported. Of these evacuations 71.4% were of a building or the affected part of a building; 16.8% were of a defined circular area surrounding the event locations; and the remainder were of a downwind or downstream area, a circular and downwind or downstream area, of no criteria, or not known. The number of people evacuated was known for 75 events and ranged from one to 580 people, with a median of 8. However, three evacuations were reported as having no evacuees. The median length of evacuation was 2.5 hours. In 100% of events for which evacuation was ordered, access to the area was restricted.

### ***Response***

States could report up to ten categories of “who responded” to the event. At least one response category was reported for 626 (98%) of events. Of these events, 28% (174) had two or more categories reported, 13% (80) had three or more categories reported, 3% (20) had four or more categories reported, 1% (5) had five or more categories reported, one event had six categories reported, and one event had seven categories reported.

The distributions of the ten response categories are as follows:

Company's response team	98 %
Certified HazMat team	8 %
Fire Department	22 %
Law Enforcement agency	29 %
Environmental agency	0.3%
Emergency Medical Services	2 %
Hospital Personnel	0 %
"Other"	4 %
Health Department	0.1%
EPA Response Team	0 %

Percentages sum to greater than 100% because some events reported multiple categories.

### ***Prevention Activities***

During 2002-2003, the Iowa HSEES program performed various activities. These activities included:

- 1999 and 2000 annual data analysis reports
- Presentations to local emergency planning committees and hazmat teams
- Publication of the *HazMat Quarterly* newsletter
- Presentation at the Midwest Conference on Agricultural Health and Safety
- Comprehensive data analysis report of chemical releases in Polk County
- Established a HSEES website
- Beginning in 2000 a survey was sent to each party responsible for an ammonia release.

The intent of the survey was to determine the exact cause of the release. The survey was continued through 2002 and 2003

- Data analysis report on transportation issued related to hazardous substances emergency events.
- Presentation at the National Environmental Health Conference on the dangers of methamphetamine labs in Iowa.
- Provided data to emergency responders and emergency response planners.

The Iowa HSEES Internet website page is available at

[http://www.idph.state.ia.us/eh/hseess\\_program\\_information.asp](http://www.idph.state.ia.us/eh/hseess_program_information.asp). At this site, annual reports, fact sheets, and other information can be downloaded.

## **METHAMPHETAMINE IN IOWA**

Seizure of methamphetamine (meth) labs in the midwest has increased dramatically over the past several years. The meth epidemic in the central region of the United States stems from two problems: 1) Steadily increasing importation of meth into the region by organized trafficking groups; and 2) Illegal manufacturing of meth by hundreds of users and/or dealers in small “mom and pop” labs.

Meth labs are increasingly becoming a public safety hazard. Police and firefighters must take special safety courses to handle situations because of the likelihood of explosions, invisible poison gases and other dangers.

Meth labs known as “mom and pop” labs can be found everywhere in Iowa. They can be found in rural, city and suburban residences, barns, apartments, motel rooms, vacant buildings, vehicles

and outdoors in sparsely populated areas. Meth manufacturing poses hazards through all levels of production and handling. Many of the chemicals used are caustic or corrosive and are potentially hazardous to people and to the environment. Any amount of solvents, acids, ammonia, ether, and other hazardous chemicals may be found in these labs.

Meth labs are included in the Iowa HSEES if there is a reported injury or evacuation. In 2002 and 2003 the Iowa HSEES captured data on 81 meth related incidents. Sixty of those incidents were actual meth manufacturing labs and 21 were releases that occurred during or after theft of anhydrous ammonia. There were 19 members of the general public (including cooks) and six police officers that were injured during a meth event. Of the members of the general public, eight were transported to the hospital and admitted, six were transported to the hospital, treated and released, three had symptoms reported by an official within 24 hours, one was treated on scene, and one died. Of the police officers that were injured, four were taken to the hospital, treated and released and two sought medical attention from their physicians within 24 hours. Evacuations occurred 47 times in the 81 meth related incidents and a total of 363 people were told to leave their homes.

The following stories are examples of how meth lab injuries can occur:

Two individuals were transporting anhydrous ammonia for the purpose of manufacturing methamphetamine. They were stopped by a trooper who opened the container containing the anhydrous. The trooper and two individuals were overcome by fumes and were transported to the hospital, treated and released.

A complex containing eight apartments and two businesses was destroyed after a fire occurred during the manufacture of meth. Twenty people were evacuated from their apartments and one meth cooker was treated on scene and another meth cooker was taken to the hospital, treated and released.

An active meth lab was discovered in a trailer court. Forty-five people were evacuated from their homes for approximately 7 hours.

Prevention strategies in Iowa include:

Iowa is a member of the Midwest High Intensity Drug Trafficking Area team.

The Iowa Department of Public Health developed meth lab clean up guidelines.

Mobile meth labs for education

Meth lab fact sheets

Citizens for Community Improvement developed a “hot spot” card.

Provide additional education for farmers and local fertilizer retailers on tips for preventing theft.

Area businesses are encouraged to report the purchase of large quantities of meth ingredients.

### **SUMMARY OF RESULTS, 1993 - 2003**

During 1993-2003, the largest proportion of events occurred in fixed facilities (Table 7).

Although Iowa has two major interstates crossing the state from north to south and east to west, fixed facility events consistently occur more often than transportation related events. The number of events occurring each year varies slightly but there is no consistent increase or decrease in emergency chemical release events.

In events involving victims, respiratory symptoms consistently have been most frequently reported. The number of deaths and injuries associated with events continues to suggest the need to evaluate, not only the danger posed by exposure to hazardous substances, but also the circumstances surrounding the events (for example, a crash resulting from high-speed travel of a truck pulling an ammonia tank). Employees and members of the general public continue to be the most commonly reported victims of emergency events (Figures 7a and 7b).

The findings from the HSEES data analyses regarding the proportions of the number of events with victims and events with evacuations and the distributions of the numbers and types of injuries reported have remained fairly consistent over time.

Appendix A. –The ten most frequent substances involved in events, Iowa Hazardous Substances Emergency Events Surveillance, 2002-2003

Ammonia	183
Methamphetamine Chemicals	51
Nitrogen Fertilizer	24
Antifreeze	23
NPK Fertilizer	19
Hydrochloric Acid	14
Fertilizer NOS	11
PCBs	10
Calcium Oxide	9
Glyphosate Isopropyl ammonia Salt	9

Figure 1 – Areas of fixed-facilities involved in events, Iowa Hazardous Substances Emergency Events Surveillance, 2002-2003

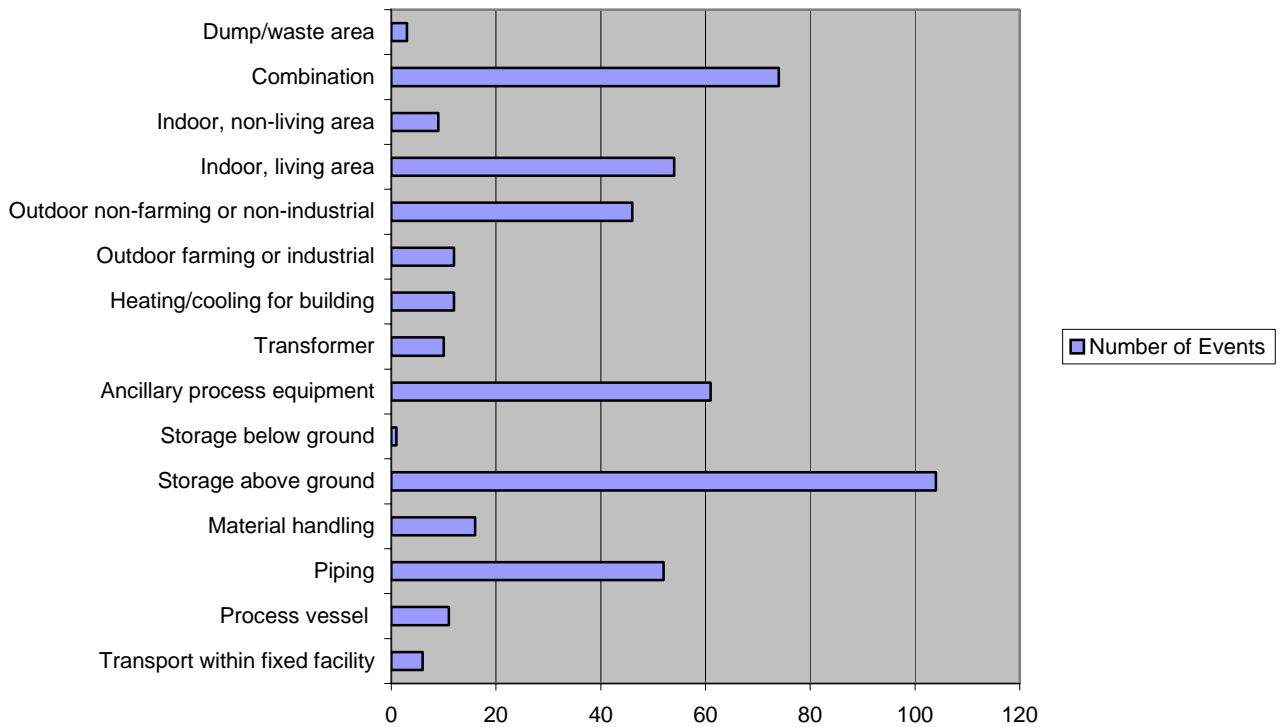


Figure 2 – Distribution of transportation-related events by type of transport, Iowa Hazardous Substances Emergency Events Surveillance, 2002-2003

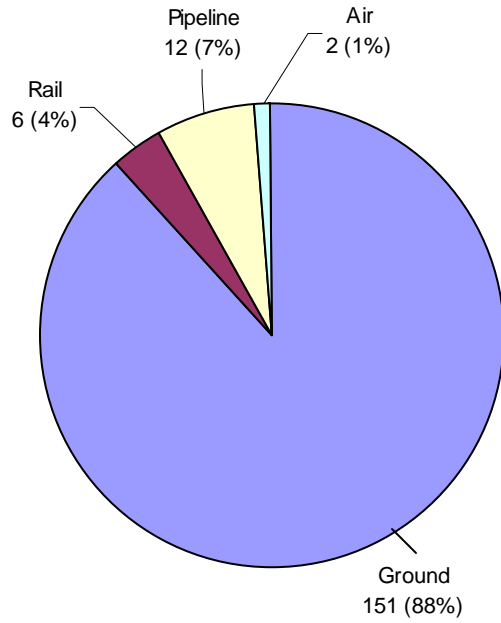


Figure 3a – Primary factors reported as contributing to events, Iowa Hazardous Substances Emergency Events Surveillance, 2002-2003

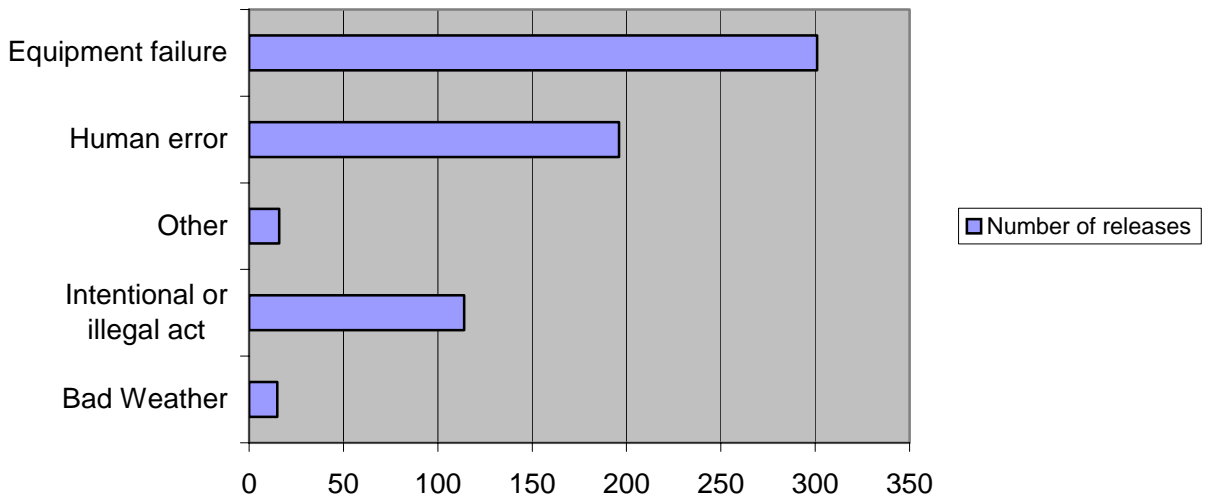
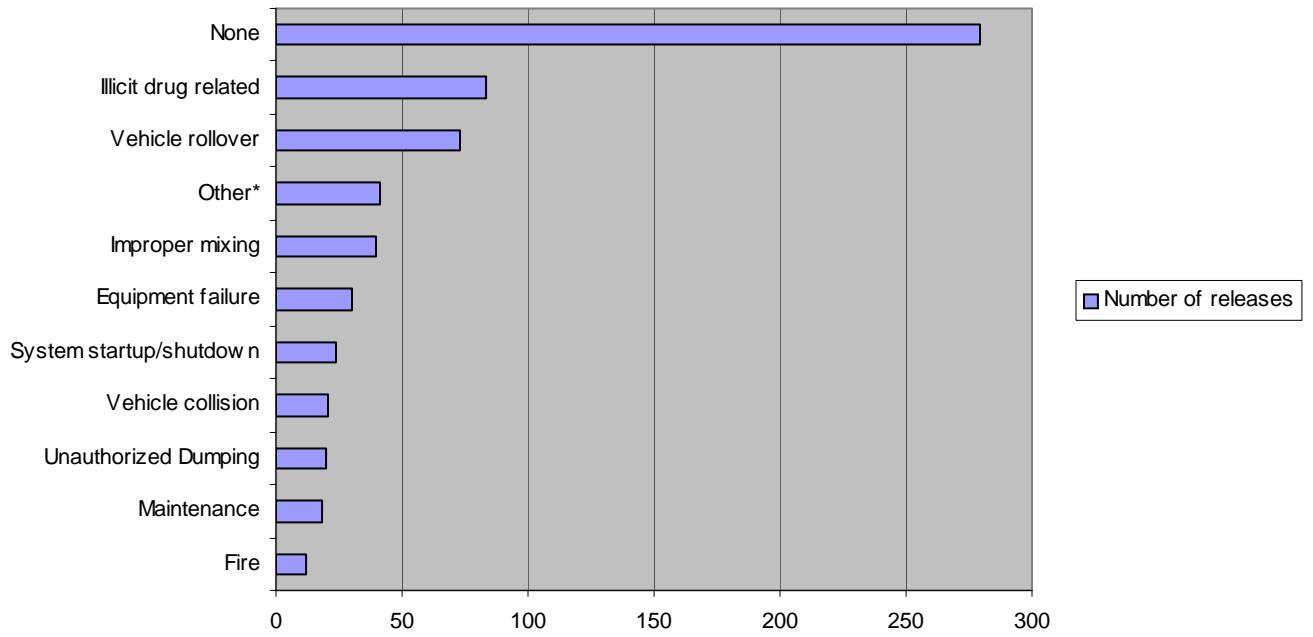


Figure 3b - Secondary factors reported as contributing to events, Iowa Hazardous Substances Emergency Events Surveillance, 2002-2003



\*Includes improper mixing, human error, power failure, explosion, over spray, load shift, and forklift puncture.

Figure 4 – Distribution of victims by population group, Iowa Hazardous Substances Emergency Events Surveillance, 2002-2003

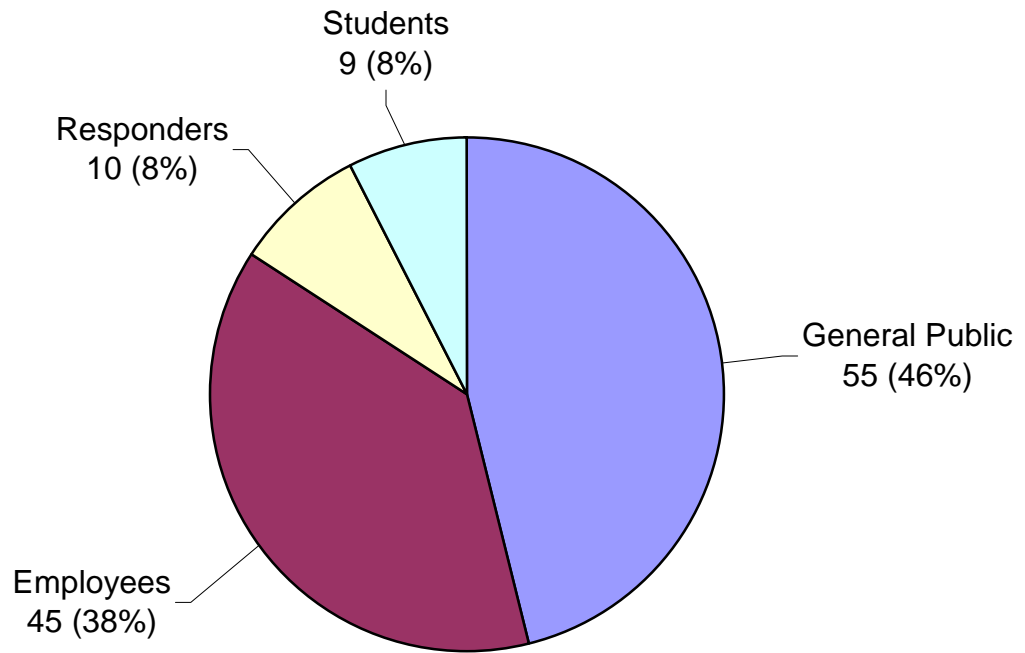


Figure 5a – Distribution of responders injured in fixed facility events by population group, Iowa Hazardous Substances Emergency Events Surveillance, 2002-2003

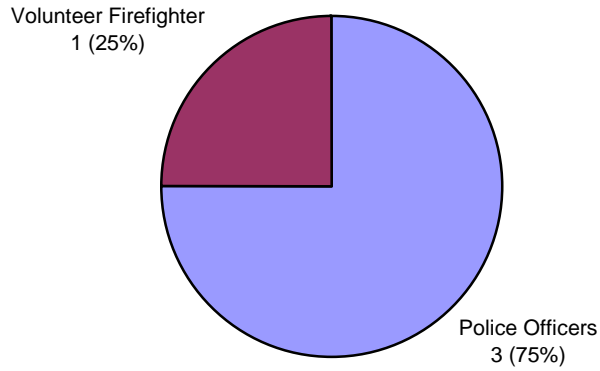


Figure 5b – Distribution of responder victims for transportation-related events by population group, Iowa Hazardous Substances Emergency Events Surveillance, 2002-2003

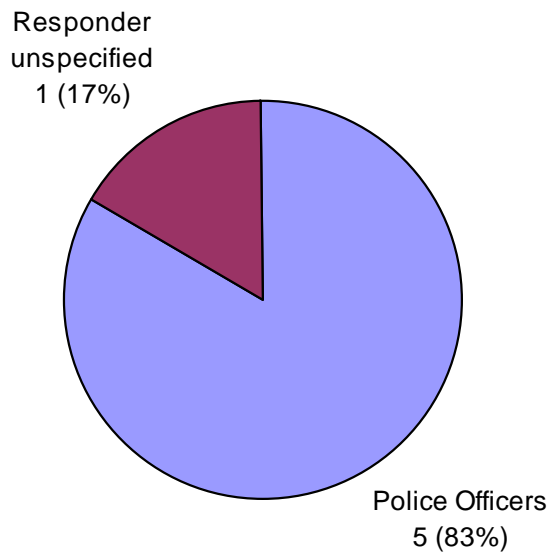


Figure 6 – Injury outcome, Iowa Hazardous Substances Emergency Events Surveillance, 2003-2003

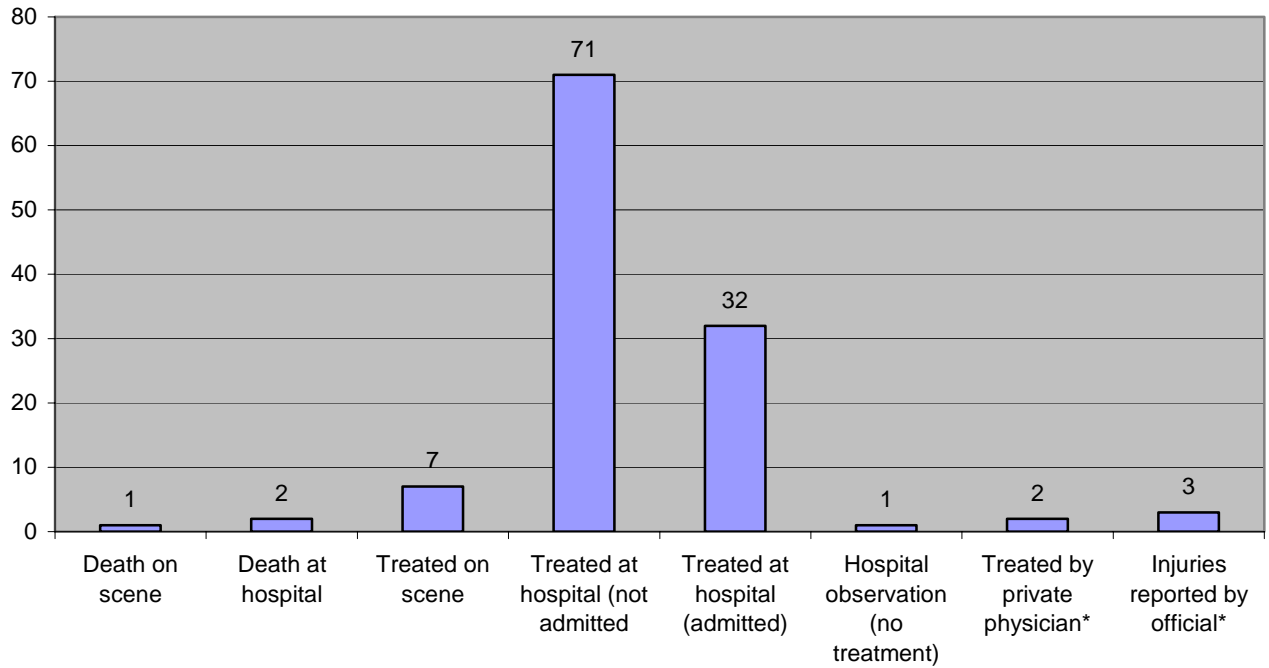
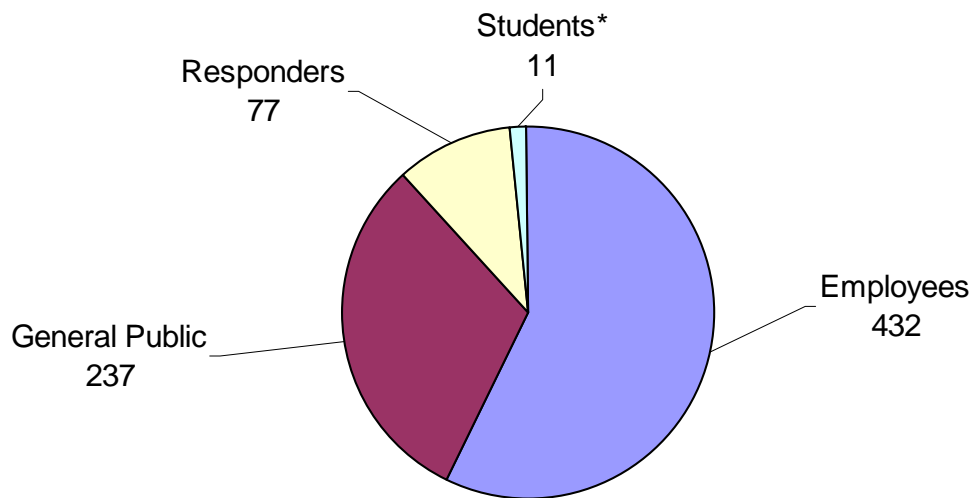


Figure 7a – Breakdown of victims by victim category, Iowa Hazardous Substances Emergency Events Surveillance, 1993-2003



\*Students were added as a separate category in 1998.

Figure 7b – Annual breakdown of victims by victim category, Iowa Hazardous Substances Emergency Events Surveillance, 1993-2003

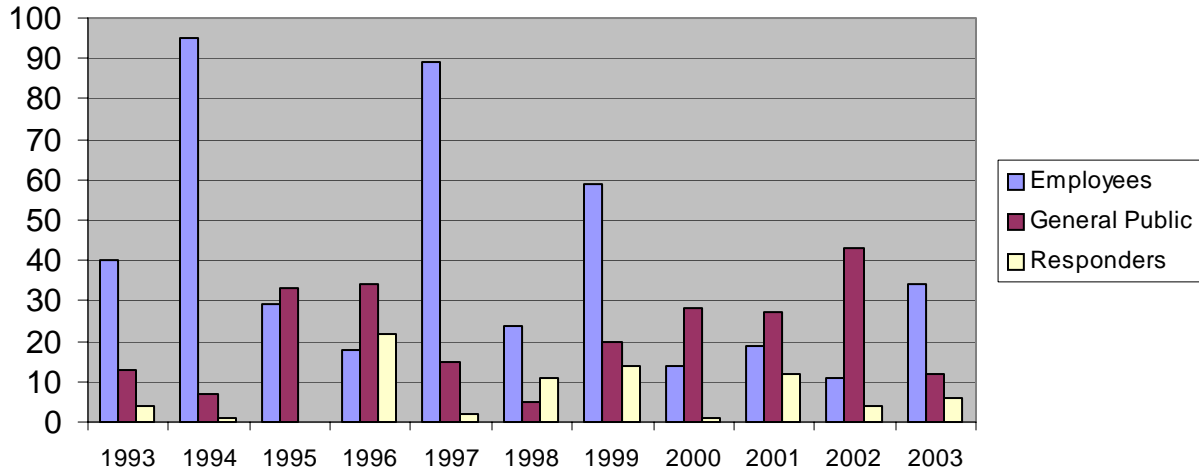


Table 1 – Number of substances involved per event, by type of event, Iowa Hazardous Substances Emergency Events Surveillance, 2002-2003

No. substances	Type of event						All events		
	Fixed facility			Transportation					
	No. events	%	Total substances	No. events	%	Total substances	No. events	%	Total substances
1	442	93.8	442	145	84.8	145	587	91.4	587
2	20	4.3	40	21	12.3	42	41	6.4	82
3	7	1.5	21	3	1.7	9	10	1.6	30
4	1	0.2	4	1	0.6	4	2	0.3	8
≥5	1	0.2	5	1	0.6	5	2	0.3	10
Total	471	100	512	171	100	205	642	100	717

Table 2 – Industries involved in hazardous substances events by category, Iowa Hazardous Substances Emergency Events Surveillance, 2002-2003

Industry category	Total events		Events with victims		Percentages of all events with victims	Total no. victims # (range)*
	No.	%	No.	%		
Agriculture	100	15.6	8	13.8	8	9 (1-2)
Mining	0	0	0	0	0	0
Construction	8	1.2	0	0	0	0
Manufacturing	155	24.1	9	15.5	5.8	19 (1-8)
Transportation	89	13.9	6	10.4	6.7	11 (1-6)
Communications	0	0	0	0	0	0
Utilities	38	5.9	1	1.7	2.6	1 (1)
Wholesale trade	91	14.2	5	8.6	5.5	10 (1-5)
Retail trade	63	9.8	5	8.6	7.9	19 (1-5)
Finance	1	0.2	0	0	0	0
Business and repair services	2	0.3	0	0	0	0
Personal services**	67	10.4	23	39.7	34.3	40 (1-24)
Entertainment	1	0.2	0	0	0	0
Professional services	8	1.2	1	1.7	12.5	10 (10)
Public administration	3	0.5	0	0	0	0
Unspecified and unknown	16	2.5	0	0	0	0
Total	642	100	58	100		119

\*Range of number of victims per event with victims.

\*\*Includes meth labs.

Table 3 – Number of substances involved, by substance category and type of event, Iowa Hazardous Substances Emergency Events Surveillance, 2002-2003

Substance Category	Type of Event				All events	
	Fixed Facility		Transportation		No. substances	%
	No. substances	%	No. substances	%		
Acids	22	4.3	6	2.9	28	3.9
Other*	61	11.9	19	9.2	80	11.1
Mixture**	14	2.7	6	2.9	20	2.8
Ammonia	149	29.1	35	17.1	184	25.7
Bases	8	1.6	9	4.4	17	2.4
Chlorine	11	2.1	1	0.5	12	1.7
Other inorganic substances***	59	11.5	10	4.9	69	9.6
Paints & dyes	7	1.4	4	2.0	11	1.5
Pesticides	105	20.5	75	36.6	180	25.1
Polychlorinated biphenyls	10	2.0	0	0	10	1.4
Volatile organic compounds	43	8.4	6	2.9	49	6.8
Formulations	0	0	1	0.5	1	0.1
Hetero-organics	1	0.2	1	0.5	2	0.3
Hydrocarbons	2	0.4	10	4.9	12	1.7
Oxy-organics	17	3.3	21	10.2	38	5.3
Polymers	3	0.6	1	0.5	4	0.6
Total	512	100	205	100	717	100

\* Not classified

\*\* Substances that were mixed prior to the event

\*\*\* All inorganic substances except for acids, bases, ammonia, and chlorine

Table 4 – Frequency of the number of victims by type of event, Iowa Hazardous Substances Emergency Events Surveillance, 2002-2003

No. Victims	Type of Event						All events		
	Fixed Facility			Transportation			No. events	%	Total victims
	No. of events	%	Total victims	No. events	%	Total victims			
1	29	70.7	29	16	94.1	16	45	77.6	45
2	5	12.2	10	0	0	0	5	8.6	10
3	2	4.9	6	0	0	0	2	3.4	6
4	0	0	0	0	0	0	0	0	0
6	2	4.9	10	0	0	0	2	3.4	10
≥6	3	7.3	42	1	5.9	6	4	7.0	48
Total	41	100	97	17	100	22	58	100	119

Table 5 – Frequency of substance categories in all events and events with victims, Iowa Hazardous Substances Emergency Events Surveillance System, 2002-2003

Substance Category	All events		Events with victims		
	No.	%	No.	Percentage of all releases with victims	Percentage of events with victims in substance category
Acids	28	3.9	3	4.3	10.7
Other*	80	11.1	22	31.4	27.5
Mixture**	20	2.8	4	5.7	20.0
Ammonia	184	25.7	19	27.1	10.3
Bases	17	2.4	3	4.3	17.6
Chlorine	12	1.7	1	1.4	8.3
Other inorganic substances	69	9.6	0	0	0
Paints & dyes	11	1.5	0	0	0
Pesticides	180	25.1	6	8.6	3.3
Polychlorinated biphenyls	10	1.4	0	0	0
Volatile organic compounds	49	6.8	9	12.9	18.4
Formulations	1	0.1	0	0	0
Hetero organics	2	0.3	0	0	0
Hydrocarbons	12	1.7	1	1.4	8.3
Oxy-organics	38	5.3	2	2.9	5.3
Polymers	4	0.6	0	0	0
Total	717	100	70	100	

\* Not classified

\*\* Substances that were mixed prior to the event.

Table 6 – Frequencies of injuries/symptoms, by type of event\*, Iowa Hazardous Substances Emergency Events Surveillance, 2002-2003

Injury/symptom	Fixed Facility		Transportation		All events	
	No. injuries	%	No. injuries	%	Total no.	%
Trauma	4	3.3	11	52.4	15	10.6
Respiratory	44	36.4	9	42.8	53	37.3
Eye	34	28.1	0	0	34	24.0
Gastrointestinal system	5	4.1	0	0	5	3.5
Heat stress	0	0	0	0	0	0
Chemical burns	26	21.5	0	0	26	18.3
Other	1	0.8	0	0	1	0.7
Skin	5	4.1	0	0	5	3.5
Dizziness or other central nervous system	2	1.7	1	4.8	3	2.1
Headache	0	0	0	0	0	0
Heart problems	0	0	0	0	0	0
Shortness of breath	0	0	0	0	0	0
Total	121	100	21	100	142	100

\* The number of injuries is greater than the number of victims (119) because a victim could have had more than one injury.

Table 7 – Cumulative data by year, Iowa Hazardous Substances Emergency Events Surveillance, 1993-2003\*

Year	Type of event			No. Substances Involved	No. Victims	No. Deaths	Events with Victims	
	Fixed Facility	Transportation	Total				No.	%**
1993	218	88	306	344	57	1	36	11.8
1994	208	79	287	311	103	6	25	8.7
1995	194	128	322	363	62	0	27	8.4
1996	202	95	297	322	74	1	18	6.1
1997	194	121	305	323	106	1	13	4.3
1998	190	94	284	320	41	0	25	8.8
1999	196	92	288	318	93	5	47	16.3
2000	205	86	291	376	44	4	22	7.6
2001	265	75	340	389	58	1	34	10.0
2002	231	84	315	353	61	1	27	8.6
2003	240	87	327	364	52	2	31	9.5
Total	2,333	1,029	3,362	3,783	751	22	305	9.1

\* Numbers in the table may differ from those reported in previous years because of adjustments in HSEES qualification requirements for events.

\*\*Percentage of events with victims