

Utah Hazardous Substances Emergency Events Surveillance

Annual Report
2006



Utah Department of Health
Office of Epidemiology
Hazardous Substances Emergency Events Surveillance (HSEES)
www.health.utah.gov/enviroepi
Prepared by Louise Saw



ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

The Utah HSEES program is supported with funds from the CERCLA trust fund, and the Office of Terrorism Planning and Emergency Response of the CDC, and provided by the Agency for Toxic Substances and Disease Registry (ATSDR), Public Health Service, US Department of Health and Human Services under Cooperative Agreement Number U61TS874146

Contents

| | Page |
|------------------------------------------|------|
| List of Tables..... | 2 |
| List of Figures..... | 3 |
| Executive Summary..... | 4 |
| Introduction..... | 5 |
| Methods..... | 7 |
| Results..... | 8 |
| Industries..... | 10 |
| Substances..... | 11 |
| Victims..... | 12 |
| Nearby populations..... | 14 |
| Evacuations..... | 15 |
| Decontamination..... | 15 |
| Response..... | 16 |
| 2006 Prevention Outreach Activities..... | 16 |
| Summary of Results, 2000–2006..... | 17 |
| References..... | 19 |
| Appendix – Tables and Figures..... | 20 |

List of Tables

- Table 1. The ten substances most frequently involved in events—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Table 2. Number of events meeting the surveillance definition, by county and type of event—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Table 3. Number of substances involved per event, by type of event—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Table 4. Industries involved in hazardous substance events, by category—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Table 5. Number of substances involved, by substance category and type of event—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Table 6. Number of victims per event, by type of event—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Table 7. Frequency of substance categories in all events and events with victims—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Table 8. Frequencies of injuries/symptoms, by type of event—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Table 9. Distribution of personnel who responded to the event—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Table 10. Cumulative data by year—Utah Hazardous Substances Emergency Events Surveillance, 2000–2006

List of Figures

- Figure 1. Areas of fixed facilities involved in events—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Figure 2. Distribution of transportation-related events, by type of transport—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Figure 3a. Primary factors reported as contributing to events—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Figure 3b. Secondary factors reported as contributing to events—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Figure 4. Distribution of victims by population group—Utah Hazardous Substances Emergency Events Surveillance, 2006
- Figure 5. Injury disposition—Utah Hazardous Substances Emergency Events Surveillance, 2006

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 acute releases of hazardous substances in participating states. This report summarizes the characteristics of events reported to Utah in 2006. Information about acute events involving hazardous substances was collected, including the substance(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 431 events were reported in 2006. In 133 (30.9 %) events, only one substance was released. The most commonly reported categories of substances were other inorganic substances and volatile organic compounds. During this reporting period, 14 events (3.2 % of all reported events) resulted in a total of 31 victims, none of whom died. The most frequently reported injuries were gastrointestinal problems, respiratory irritation, and headache. Evacuations were ordered for nine (2.1 %) events.

The findings regarding the percentage of events with victims decreased during 2006. The distribution of the types of injuries reported showed a decrease in eye irritation but an increase in gastrointestinal symptoms. Respiratory irritation and headache continued to be among the most frequently occurring types of injuries.

Prevention outreach efforts for 2006 focused on outreach for transportation companies, hospitals and high schools in Utah. These outreach activities shared indicator data, risk factors and prevention strategies for hazardous substances emergency events. Additionally, the efforts involved requests for agencies to report potential events to the Utah HSEES program.

INTRODUCTION

The Centers for Disease Control and Prevention defines surveillance as the

“Ongoing, systematic collection, 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 the 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 several 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 develop 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 the data must also be used to protect public health.

In the last few years, the third goal of the HSEES system has been emphasized; i.e., 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 2006 in Utah, 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

In 2006, fifteen state health departments participated in HSEES: Colorado, Florida, Iowa, Louisiana, Michigan, Minnesota, Missouri, New Jersey, New York, North Carolina, Oregon, Texas, Utah, Washington, and Wisconsin.

Beginning in 2005, a newly updated data-collection form, approved by the Office of Management and Budget, went into effect. Information was collected about each event, including substance(s) released, victims, injuries (adverse health effects and symptoms), and evacuations.

Various data sources were used to obtain information about these events. These sources included, but were not limited to, Utah Division of Environmental Response & Remediation, Utah Highway Patrol, National Response Center, Utah Poison Control Center, Department of Transportation Hazardous Materials Information System, Google Reader (media alert system), media (newspaper, radio, and television), local health agencies and industry. Census data were used to estimate the number of residents in the vicinity of most of the events. All data were computerized using a Web-based data entry system provided by ATSDR.

HSEES defines hazardous substances emergency events as acute uncontrolled or illegal releases or threatened releases of hazardous substances. Events involving releases of only petroleum are excluded. Events are included if (a) 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 laws or (b) the release of a substance was threatened, but the threat lead 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 experience at least one documented adverse health effect within 24 hours after the event or who die as a consequence of the event. Victims who receive more than one type of injury or symptom are counted once in each applicable injury type or symptom. Events are defined as transportation-related if they occur (a) during surface, air, pipeline, or water transport of hazardous substances, or (b) before being unloaded from a vehicle or vessel. All other events are considered fixed-facility events.

For data analyses, the substances released were categorized into 16 groups. The category “mixture” comprises substances from different categories that were mixed or formed from a reaction before the event; the category “other inorganic substances” comprises all inorganic substances except acids, bases, ammonia, and chlorine; and the category “other” comprises substances that could not be grouped into one of the other existing categories.

RESULTS

For 2006, a total of 431 acute hazardous substances events were captured by Utah HSEES: One (0.2%) of these events was a threatened release. There were no events in which substances were both threatened to be released and actually released. A total of 375 (87.0%) events occurred in fixed facilities. The counties with the most frequent number of events were San Juan (279 [64.7%]) and Salt Lake County (72 [16.7%]) (Table 1).

For each fixed-facility event, one or two types of area or equipment involved in the fixed facility where the event occurred could be selected. Of all 375 fixed-facility events, 61 (16.3%) reported

one type of area and zero reported a combination of two area types. Type of area was only reported for mining, utilities, and manufacturing based on the industry code, yielding 314 (83.7%) events with no entry. Among events with one type of area reported, the main areas were classified as follows: 44 (712.1%) ancillary process equipment, six (9.8%) piping, and five (8.2%) process vessel (Figure 1).

Of the 56 transportation-related events, 46 (82.1%) occurred during ground transport (e.g., truck, van, or tractor) and eight (14.3 %) involved transport by rail (Figure 2). Fewer events involved water, air, and pipeline transportation modes. All ground transportation events involved trucks. The largest proportions of transportation-related events occurred from unloading of a stationary vehicle or vessel (19 [33.9 %]) and during a release en route that was later discovered at a fixed facility (16 [28.6%]). Of the 56 transportation-related events, 12 (21.4 %) involved a moving vehicle or vessel and nine (16.1%) involved a stationary vehicle or vessel such as ones staged at a transfer station.

Primary and secondary factors contributing to the events were collected. Examples of primary factors include equipment failure, human error, intentional, illegal act, bad weather conditions, etc. Examples of secondary factors include power failure, vehicle or vessel collision, load shift, fire, forklift puncture, etc. Primary factors were reported for 430 (99.8 %) events (Figure 3a). Of the reported primary factors, most (90.7%) fixed-facility events involved equipment failure. For transportation-related events, over half (62.5%) involved human error. Secondary factors were reported for 429 (99.5%) events (Figure 3b). Of the reported secondary factors, most (86.9%) fixed-facility events reported no secondary factors involved, and a large portion (41.1%) of transportation-related events involved improper filling, loading or packing.

Multiple substances could be reported as released or threatened to be released at an event. More than half [285 (66.1%)] of all events involved the release of four substances. For 13 events (3.0%), two substances were released, and 30.9 % (133) of all events involved the release of only one substance (Table 3). All of the transportation events had only one substance released.

The number of events by month ranged from 14 (3.2%) in February to 63 (14.6%) in May, with the largest proportions occurring from March through November. The proportion of events occurring during weekdays ranged from 12.3% to 19.0%, and during weekend days from 11.8% to 12.8%. Of all 431 (100.0%) events for which time of day or time category was reported, 38.5% occurred between 12:00 AM to 5:59 AM, 24.3% occurred from 6:00 AM to 11:59 AM, 24.1% from 12:00 PM to 5:59 PM, and the remainder (12.9%) during the late hours of the day, from 6:00 PM to 11:59 PM.

Industries

The largest proportions of HSEES events were associated with the wholesale trade (296 [68.7%]) and manufacturing (43 [10.0%]) industries (Table 3). The largest number of events with victims occurred from construction industries (2 [14.3%]), other services (2 [14.3%]), and unknown or not an industry (2 [14.3%]). The total number of victims was greatest in the construction industries (14 [45.2%]) followed by the number of victims in retail trade (4 [12.9%]). Although the largest proportions of HSEES events were associated with wholesale trade (296 [68.7%]) only one (0.3%) of these events had victims.

Substances

A total of 1,299 substances were released or were threatened to be released in all events. Only one (0.1%) of these substances was reported as threatened to be released. The individual substances most frequently released were sulfur dioxide, volatile organic compounds, carbon monoxide, and nitrogen oxide (NOX) (Appendix). Substances were grouped into 16 categories. The most commonly released categories of substances were other inorganic substances (614 [47.3%]), volatile organic compounds (299 [23.0%]), and oxy-organics (286 [22.0%]) (Table 5). The substance categories most commonly released in fixed-facility events were other inorganic substances (611 [49.1%]), volatile organic compounds (288 [23.2%]), and oxy-organics (284 [22.8%]) (Table 5). In transportation-related events, the most common substance categories released were volatile organic compounds (11 [20.0%]), paint and dye (11 [20.0%]), and acids (11 [14.5%]) (Table 5).

Two types of releases for each substance (e.g., spill and air) could be reported. Only one type of release was associated with the following: air releases (1,205 [92.8%]), spills (93 [7.2%]), threatened release (1 [0.1%]), fire (0 [0.0%]), explosion (0 [0.0%]), and radiation (0 [0.0%]). There were no events with two types of releases. The release type was reported for all substances.

Victims

A total of 31 victims were involved in 14 events (3.2% of all events) (Table 6). Of the 14 events with victims, nine (64.3%) events involved only one victim, and two (14.3%) involved two victims, and two (14.3%) involved four victims. Of all victims, 26 (83.9%) were injured in fixed-facility events.

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 resulted in victims. In events that involved two or more substances, substances were counted once in the multiple substances category. Substances released most often were not necessarily the most likely to result in victims (Table 7). For example, events categorized as multiple substances category constituted 69.1% of all events; however, only 0.7% of these events resulted in injuries. Conversely, events involving acids and bases accounted for 3.2% and 1.9% of all events respectively, but 14.3% of the acid events and 25.0% of base events resulted in injuries.

The employees (27 [87.1%]) constituted the largest proportion of the population groups injured, followed by general public (2 [6.5 %]), and firefighters (2 [6.5%]) (Figure 4). There were no reported responders, police, EMT, hospital personnel, or students injured.

Victims were reported to sustain a total of 54 injuries or symptoms (Table 8). Some victims had more than one injury or symptom. Of all reported injuries/symptoms, the most common injuries/symptoms in fixed-facility events were gastrointestinal system problems (11 [27.5%]), and respiratory irritation (10 [25.0%]). In transportation-related events, headache (4 [28.6%]),

gastrointestinal system problems (4 [28.6%]), and dizziness/central nervous system symptoms (4 [28.6%]) were reported most frequently.

The median age of the 121 (68.8%) victims for whom exact age was reported was 34 years (range: 2-71 years). For the 28 (90.3%) injured persons for whom an age category was reported, zero (0.0%) were < 15 years of age, one (3.6%) was 15–19 years of age, 23 (82.1%) were 20–44 years of age, four (14.3%) were 45–64 years of age, and zero (0.0%) were ≥ 65 years of age. The one injured person for whom age was not reported was likely ≥ 16 years of age because he or she was reported as an employee.

Sex was known for 146 (83.0%) of the victims; of these, 21 (67.7%) were males and seven (22.6%) were females. Of all employees for whom sex was reported, 80.8% were males.

Of the 31 victims, 14 (45.2%) were treated on scene (first-aid) and 12 (38.7%) were treated at a hospital (not-admitted), four (12.9%) were treated at a hospital (admitted) (Figure 6). Severity was unknown for one (3.2%) victim.

The status of personal protective equipment (PPE) use was reported for 26 (96.3%) employee-victims. All these of the employee-victims with PPE usage reported only two (7.7%) had worn any form of PPE. The other 24 (92.3%) had not worn any form of PPE.

The event that consisted of the largest amount of victims (10 [32.3%]) occurred while constructing residential homes. An extensive historic wooden flume was uncovered at a new home construction site. The flume was constructed of large dimension lumber, and was

reportedly approximately three feet wide and at least 100 feet long. It contained an orange sludge. As soon as the flume was uncovered, workmen in the area immediately reported flu like symptoms.

Nearby populations

The proximity of the event location in relation to selected populations was determined using geographic information systems (GIS) or health department records. Residences were within ¼ mile of 375 (87.0%) events, schools within ¼ mile of ten (2.3%) events, hospitals within ¼ mile of three (0.7%) events, nursing homes within ¼ mile of one (0.2%) event, licensed daycares within ¼ mile of five (1.2%) events, industries or other businesses within ¼ mile of 416 (96.5%) events and recreational areas within ¼ mile of 20 (4.6%) events. Information for proximity of the event location in relation to selected populations was missing for 18 events.

The number of events at which persons were at risk of exposure was determined primarily using GIS. Information was collected on the number of persons living in proximity of the event and on the number of persons at home within proximity of the events. Approximately 56% of the persons living in proximity of the events were home when the events occurred. There were 372 (86.3%) events with persons living within ¼ mile of the event; 391 (90.7%) events with persons living within ½ mile; and 400 (92.8%) events with persons living within one mile. Information on the number of persons living within ¼, ½, and one mile of the event was missing for 23 events. There were 365 (84.7 %) events with persons at home within ¼ mile of the event; 386 (89.6%) events with persons at home within ½ mile; and 398 (92.3%) events with persons at

home within one mile. Information on the number of persons at home when the events occurred was missing for 21 events.

Evacuations

Evacuations were ordered in nine (2.1%) of 428 events where evacuation status was reported. Of these evacuations, 55.6% (5) were of buildings or affected parts of buildings, 33.3% (3) had no defined criteria, and 11.1% (1) were of defined circular areas surrounding the event locations. The number of people evacuated was known for six (66.7%) events and ranged from four to 700 people, with a median of 15 people. A category was assigned to the range of people officially evacuated. There were two events with <5 people evacuated, three with 5 to 20, one with 21 to 50, two with 51 to 100, and one with >100. The median length of evacuation was four hours (range: 1 to 48). Evacuation length was missing for 0 (0.0%) events. Of all 431 events, 13 (3.0%) had access to the area restricted. There were no events that had in-place sheltering ordered by an official.

Decontamination

Of the 27 (87.1%) victims for whom decontamination status was known, 23 (85.2%) were not decontaminated, one (3.7%) was decontaminated at the scene, two (7.4%) were decontaminated at a medical facility, and one (3.7%) was decontaminated at both the scene and a medical facility.

One event occurred where uninjured persons were decontaminated. In this event, decontamination at the scene was conducted for 12 uninjured responders, and three uninjured

members of the general public. Decontamination at a medical facility was conducted for zero uninjured employees, responders, members of the general public, and students.

Response

Of the 431 (100%) events with information on who responded to the event, 6.7% (29) reported two or more categories of personnel who responded, 2.1% (9) reported three or more categories, and 0.9% (4) reported four or more categories. The personnel who responded most frequently were the response team of the company where release occurred, 86 (18.1%), followed by 3rd party clean-up contractors, 18 (3.8%) , health department/health agency 16 (3.4%), and fire department 15 (3.2%)(Table 9).

2006 Prevention Outreach Activities

The first outreach activity for 2006 involved collaboration with transportation companies in the State of Utah that report to DOT, to increase awareness by tools such as a brochure describing the HSEES program, what resources are available and how to report directly to our program. Efforts were made to have the companies that currently report to DOT directly report to the HSEES program to increase the percentage of events entered into the system within the 48 hour rule.

The second outreach activity for 2006 involved education of Utah school district superintendents concerning the importance of having an evacuation plan in place. A pamphlet was created and distributed with data involving students and hazardous releases in Utah, a brief program description and information about evacuation plans.

The third activity involved mailing the Utah 2002-2003 cumulative report to Hospital Emergency Planning committees. A fact sheet was included with information on the importance of decontamination of patients before admittance to the hospital and also before transporting them to the hospital. The fact sheet included data involving cases where patients or individuals were brought into care facilities without being decontaminated and people at the facility then became ill.

The fourth activity involved mailing the Utah 2004 report to large Utah industries. The industries were selected based on the Toxics Release Inventory (TRI) status [3]. An evaluation of the report was sent out with a self-addressed postage prepaid envelope. The evaluation served to determine what information was helpful to the industry. Additionally, a letter was sent describing the HSEES program and asking industries to add the Utah HSEES program to the list of those contacted in the event of a release.

SUMMARY OF RESULTS, 2000–2006

During 2000–2006, the largest proportion of events occurred in fixed facilities (Table 10). The number of transportation related-events has decreased in recent years. This could be due to exclusion of events that do not meet the reporting rule of either one gallon or ten pounds being released. The number of total events had been increasing until 2006, when there was a 16.6% decrease. This decrease could be due to fewer events actually occurring or a decrease in reporting of these events.

The number of substances released has also decreased. The number of events with victims increased from 2002-2005, but decreased in 2006. The average percentage of events with victims during 2000–2006 was 4.6 %.

Respiratory irritation has consistently been the most frequently reported injury. Employees rose above members of the general public as the most commonly reported victims of acute chemical releases (Figure 7). The number of injured responders remained zero.

REFERENCES

1. Centers for Disease Control and Prevention. Comprehensive plan for epidemiologic surveillance. Atlanta: US Department of Health and Human Services; 1986.
2. Binder S. Death, injuries, and evacuations from acute hazardous materials releases. *Am J Public Health* 1989; 70:1042–4.
3. Toxics Release Inventory, website: <http://www.epa.gov/tri/>

Appendix

Table 1. The ten substances most frequently involved in events—Utah Hazardous Substances Emergency Events Surveillance, 2006

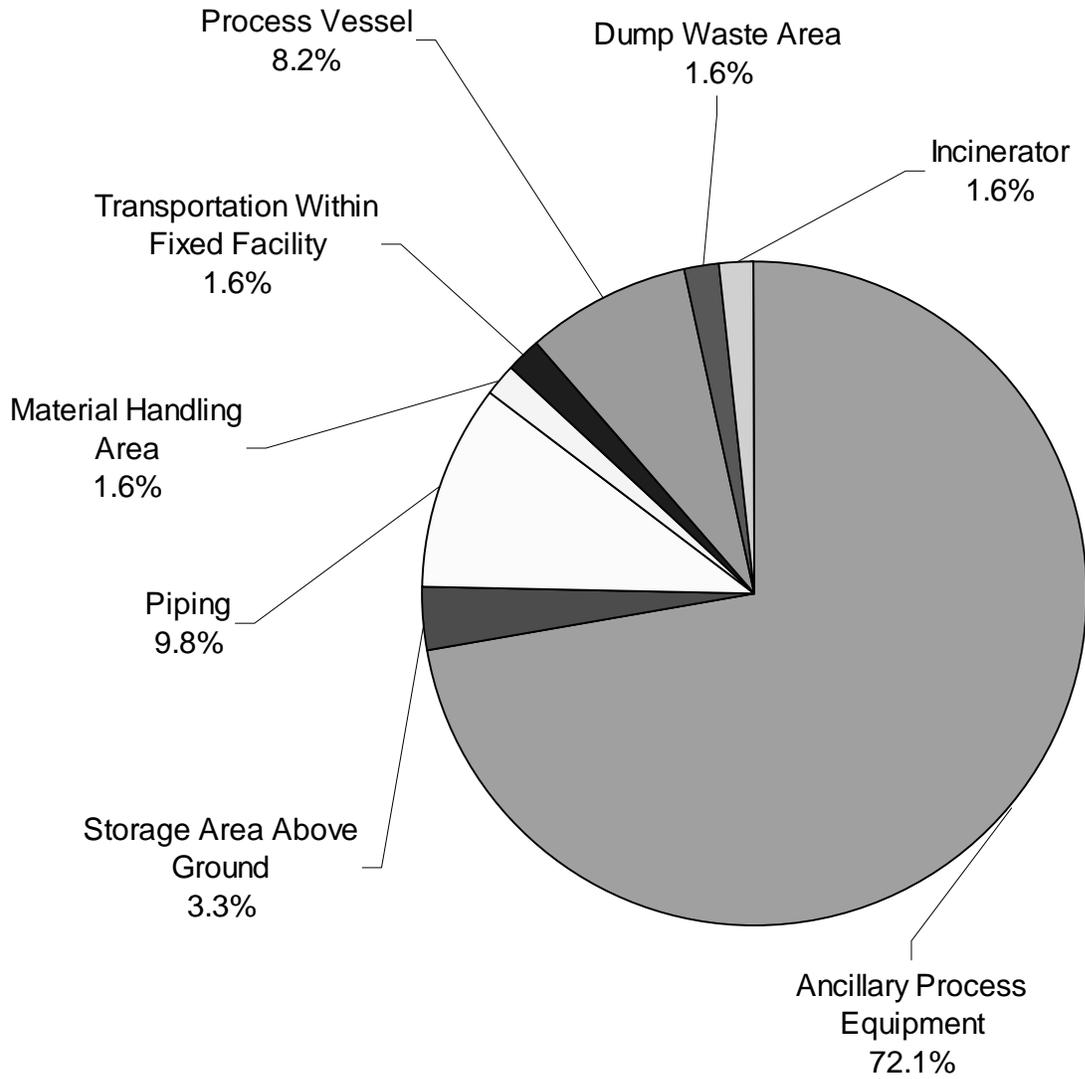
| Number | Standardized Substance Name | Frequency |
|--------|-----------------------------------|-----------|
| 1 | Sulfur Dioxide (SO ₂) | 308 |
| 2 | Volatile Organic Compounds (VOCs) | 283 |
| 3 | Carbon Monoxide (CO) | 279 |
| 4 | Nitrogen Oxide (NO _x) | 236 |
| 5 | Nitrogen Dioxide | 51 |
| 6 | Paint NOS | 11 |
| 7 | Chlorine | 9 |
| 8 | Mercury | 7 |
| 9 | Hydrochloric Acid | 6 |
| 10 | Process waste water | 6 |
| Total | | 1,196 |

Table 2. Number of events meeting the surveillance definition, by county and type of event—
Utah Hazardous Substances Emergency Events Surveillance, 2006

| | Type of event | | | | All events |
|------------|----------------|------|----------------|------|----------------------|
| | Fixed facility | | Transportation | | |
| County | No. events | %* | No. events | %* | Total no. events (%) |
| Beaver | 1 | 100 | 0 | 0 | 1 (0.2) |
| Box Elder | 2 | 66.7 | 1 | 33.3 | 3 (0.7) |
| Cache | 4 | 100 | 0 | 0 | 4 (0.9) |
| Carbon | 1 | 100 | 0 | 0 | 1 (0.2) |
| Daggett | 0 | 0 | 0 | 0 | 0 (0.0) |
| Davis | 30 | 85.6 | 5 | 14.3 | 35 (8.1) |
| Duchesne | 3 | 100 | 0 | 0 | 3 (0.7) |
| Emery | 0 | 0 | 0 | 0 | 0 (0.0) |
| Garfield | 0 | 0 | 0 | 0 | 0 (0.0) |
| Grand | 0 | 0 | 1 | 100 | 1 (0.2) |
| Iron | 0 | 0 | 1 | 100 | 1 (0.2) |
| Juab | 1 | 100 | 0 | 0 | 1 (0.2) |
| Kane | 0 | 0 | 0 | 0 | 0 (0.0) |
| Millard | 1 | 100 | 0 | 11.1 | 1 (0.2) |
| Morgan | 0 | 0 | 0 | 0 | 0 (0.0) |
| Piute | 0 | 0 | 0 | 0 | 0 (0.0) |
| Rich | 0 | 0 | 0 | 0 | 0 (0.0) |
| Salt Lake | 33 | 45.8 | 39 | 54.2 | 72 (16.7) |
| San Juan | 279 | 100 | 0 | 0 | 279 (64.7) |
| Sanpete | 0 | 0 | 0 | 0 | 0 (0.0) |
| Sevier | 0 | 0 | 0 | 0 | 0 (0.0) |
| Summit | 1 | 50 | 1 | 50 | 2 (0.5) |
| Tooele | 10 | 90.9 | 1 | 9.1 | 11 (2.6) |
| Uintah | 2 | 50 | 2 | 50 | 4 (0.9) |
| Utah | 5 | 55.6 | 4 | 44.4 | 9 (2.1) |
| Wasatch | 0 | 0 | 0 | 0 | 0 (0.0) |
| Washington | 0 | 0 | 1 | 100 | 1 (0.2) |
| Wayne | 0 | 0 | 0 | 0 | 0 (0.0) |
| Weber | 2 | 100 | 0 | 0 | 2 (0.5) |
| | 375 | 87.0 | 56 | 13 | 431 (100.0) |

* Percentage = (number of events by type of event per county ÷ total number of events in that county) x 100

Figure 1. Area of fixed facilities involved in events for Mining, Utilities or Manufacturing (NAICS 21, 22, 31, 32, 33)—Utah Hazardous Substances Emergency Events Surveillance, 2006.



Note: Percentages do not total 100% due to rounding

Figure 2. Distribution of transportation-related events, by type of transport—Utah Hazardous Substances Emergency Events Surveillance, 2006.

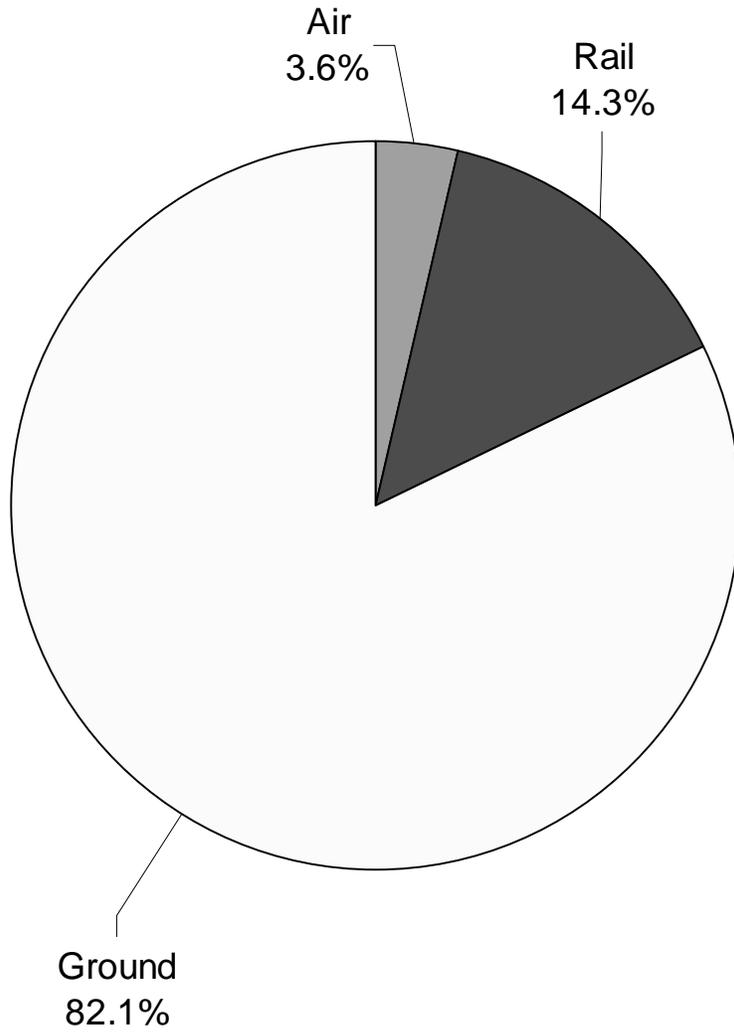


Figure 3a. Primary factors reported as contributing to events— Utah Hazardous Substances Emergency Events Surveillance, 2006

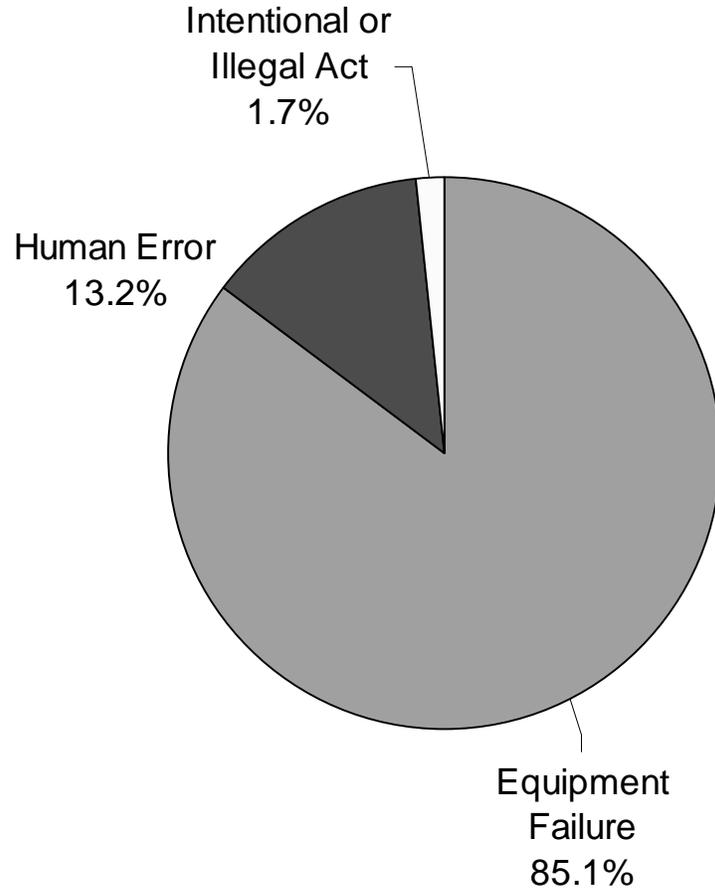


Figure 3b. Secondary factors reported as contributing to events—Utah Hazardous Substances Emergency Events Surveillance, 2006.

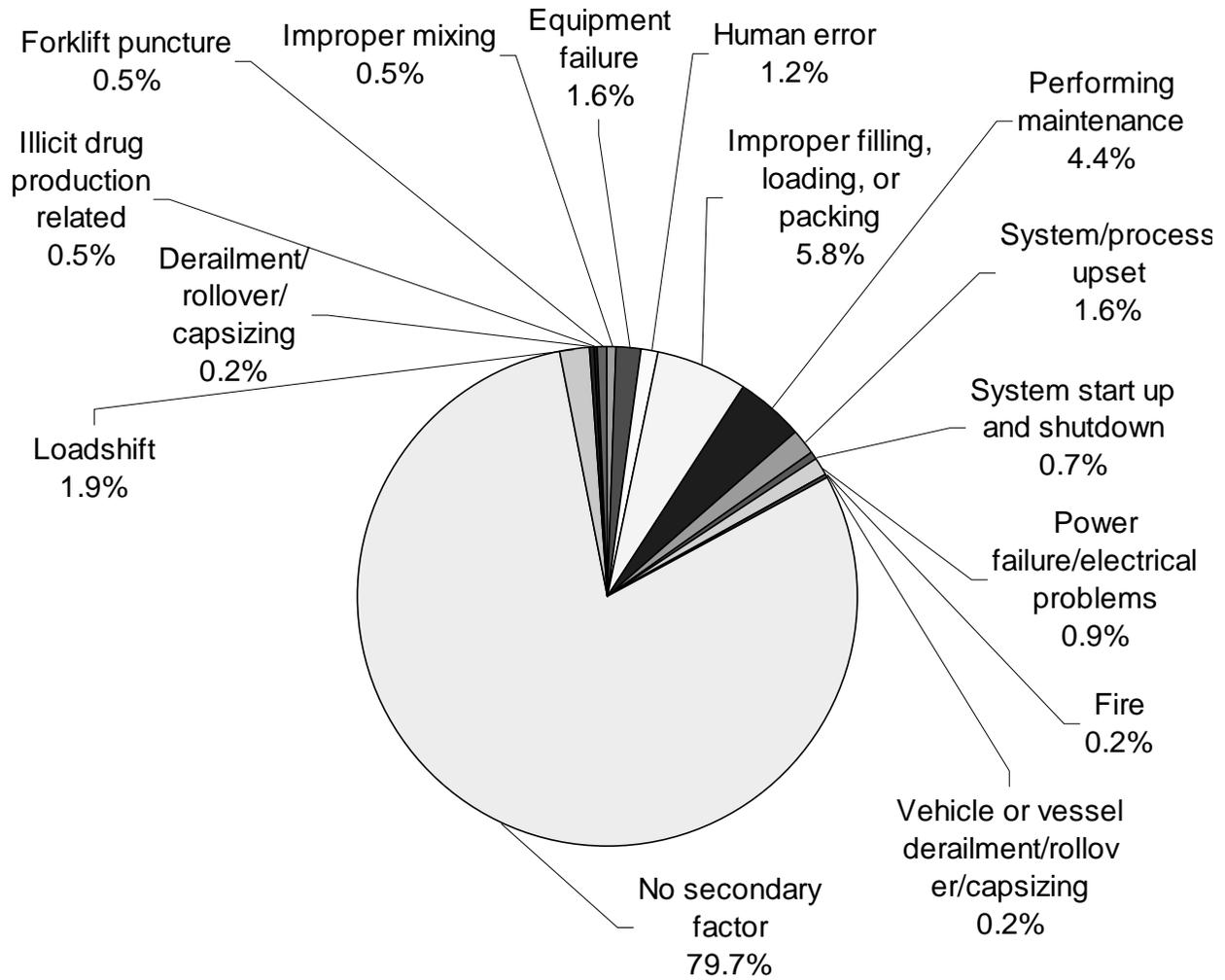


Table 3. Number of substances involved per event, by type of event —Utah Hazardous Substances Emergency Events Surveillance, 2006

| No. substances | Type of event | | | | | | All events | | |
|----------------|----------------|--------------|------------------|----------------|--------------|------------------|------------|--------------|------------------|
| | Fixed facility | | | Transportation | | | | | |
| | No. events | % | Total substances | No. events | % | Total substances | No. events | % | Total substances |
| 1 | 77 | 20.5 | 77 | 56 | 100.0 | 56 | 133 | 30.9 | 133 |
| 2 | 13 | 3.5 | 26 | 0 | 0.0 | 0 | 13 | 3.0 | 26 |
| 3 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0 | 0.0 | 0 |
| 4 | 285 | 76.0 | 1140 | 0 | 0.0 | 0 | 285 | 66.1 | 1140 |
| ≥ 5 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0 | 0.0 | 0 |
| Total | 375 | 100 % | 1243 | 56 | 100 % | 56 | 431 | 100 % | 1299 |

Table 4. Industries involved in hazardous substance events, by category—Utah Hazardous Substances Emergency Events Surveillance, 2006

| Industry category | Total events | | Events with victims | | Percentage of events with victims | Total no. victims (min no.-max no.)* |
|--------------------------------------------------------------------------|--------------|------|---------------------|------|-----------------------------------|--------------------------------------|
| | No. | % | No. | % | | |
| Wholesale Trade | 296 | 68.7 | 1 | 7.1 | 0.3 | 2 (2-2) |
| Manufacturing | 43 | 10.0 | 1 | 7.1 | 2.3 | 1 (1-1) |
| Warehousing | 0 | 0.0 | 0 | 0.0 | 0.0 | 0 |
| Transportation | 27 | 6.3 | 1 | 7.1 | 3.7 | 1 (1-1) |
| Unknown or not an Industry | 4 | 0.9 | 2 | 14.3 | 50.0 | 3 (1-2) |
| Other Services | 9 | 2.1 | 2 | 14.3 | 22.2 | 2 (1-1) |
| Utilities | 2 | 0.5 | 0 | 0.0 | 0.0 | 0 |
| Health Care and Social Assistance | 2 | 0.5 | 1 | 7.1 | 50.0 | 1 (1-1) |
| Public Administration | 3 | 0.7 | 1 | 7.1 | 33.3 | 1 (1-1) |
| Educational Services | 2 | 0.5 | 0 | 0.0 | 0.0 | 0 |
| Retail Trade | 4 | 0.9 | 1 | 7.1 | 25.0 | 4 (4-4) |
| Accommodation and Food Services | 1 | 0.2 | 1 | 7.1 | 100.0 | 1 (1-1) |
| Administrative and Support and Waste Management and Remediation Services | 2 | 0.5 | 0 | 0.0 | 0.0 | 0 |
| Agriculture, Forestry, Fishing and Hunting | 0 | 0 | 0 | 0.0 | 0.0 | 0 |
| Arts, Entertainment, and Recreation | 0 | 0 | 0 | 0.0 | 0.0 | 0 |
| Finance and Insurance | 0 | 0 | 0 | 0.0 | 0.0 | 0 |
| Mining | 6 | 1.4 | 0 | 0.0 | 0.0 | 0 |
| Construction | 5 | 1.2 | 2 | 14.3 | 40.0 | 14 (4-10) |
| Professional, Scientific, and Technical Services | 2 | 0.5 | 1 | 7.1 | 50.0 | 1 (1-1) |
| Information | 23 | 5.3 | 0 | 0.0 | 0.0 | 0 |
| Total[‡] | 431 | | 14 | | 3.2 | 31 |

Note: Percentages do not total 100% due to rounding.

Table 5. Number of substances involved, by substance category and type of event —Utah Hazardous Substances Emergency Events Surveillance, 2006

| Substance category | Type of event | | | | All events | |
|-----------------------------------------|----------------|--------------|----------------|--------------|----------------|--------------|
| | Fixed facility | | Transportation | | | |
| | No. substances | % | No. substances | % | No. substances | % |
| Acids | 11 | 0.9 | 8 | 14.5 | 19 | 1.5 |
| Ammonia | 5 | 0.4 | 0 | 0.0 | 5 | 0.4 |
| Bases | 1 | 0.1 | 7 | 12.7 | 8 | 0.6 |
| Chlorine | 12 | 1.0 | 2 | 3.6 | 14 | 1.1 |
| Formulations | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Hetero-organics | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Hydrocarbons | 4 | 0.3 | 0 | 0.0 | 4 | 0.3 |
| Mixture* | 8 | 0.6 | 2 | 3.6 | 10 | 0.8 |
| Other [†] | 18 | 1.4 | 8 | 14.5 | 26 | 2.0 |
| Other inorganic substances [‡] | 611 | 49.1 | 3 | 5.5 | 614 | 47.3 |
| Oxy-organics | 284 | 22.8 | 2 | 3.6 | 286 | 22.0 |
| Paints and dyes | 0 | 0.0 | 11 | 20.0 | 11 | 0.8 |
| Pesticides | 1 | 0.1 | 1 | 1.8 | 2 | 0.2 |
| Polychlorinated biphenyls | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Polymers | 1 | 0.1 | 0 | 0.0 | 1 | 0.1 |
| Volatile organic compounds | 288 | 23.2 | 11 | 20.0 | 299 | 23.0 |
| Total[¶] | 1244 | 100.0 | 55 | 100.0 | 1299 | 100.0 |

* Substances from different categories that were mixed or formed from a reaction before the event.

† Not belonging to one of the existing categories.

‡ All inorganic substances except for acids, bases, ammonia, and chlorine.

¶ Percentages do not total 100% due to rounding.

Table 6. Number of victims per event, by type of event —Utah Hazardous Substances Emergency Events Surveillance, 2006

| No. victims | Type of event | | | | | | All events | | |
|--------------|----------------|------------|---------------|----------------|------------|---------------|------------|------------|---------------|
| | Fixed facility | | | Transportation | | | | | |
| | No. events | % | Total victims | No. events | % | Total victims | No. events | % | Total victims |
| 1 | 8 | 66.7 | 8 | 1 | 50.0 | 1 | 9 | 64.3 | 9 |
| 2 | 2 | 16.7 | 4 | 0 | 0.0 | 0 | 2 | 14.3 | 4 |
| 3 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0 | 0.0 | 0 |
| 4 | 1 | 8.3 | 4 | 1 | 50.0 | 4 | 2 | 14.3 | 8 |
| 5 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0 | 0.0 | 0 |
| ≥6 | 1 | 8.3 | 10 | 0 | 0.0 | 0 | 1 | 7.1 | 10 |
| Total | 12 | 100 | 26 | 2 | 100 | 5 | 14 | 100 | 31 |

Figure 4. Distribution of victims by population group —Utah Hazardous Substances Emergency Events Surveillance, 2006.



Table 7. Frequency of substance categories in all events and events with victims —Utah Hazardous Substances Emergency Events Surveillance System, 2006*

| Substance category | All events | | Events with victims | | |
|-----------------------------------------|------------|----------------|---------------------|-----------------------------------------|---------------------------------------------------------|
| | No. | % | No. | Percentage of all releases with victims | Percentage of events with victims in substance category |
| Acids | 14 | 3.2 | 2 | 14.3 | 14.3 |
| Ammonia | 3 | 0.7 | 1 | 7.1 | 33.3 |
| Bases | 8 | 1.9 | 2 | 14.3 | 25.0 |
| Chlorine | 11 | 2.6 | 1 | 7.1 | 9.1 |
| Formulations | 0 | 0.0 | 0 | 0.0 | 0.0 |
| Hetero-organics | 0 | 0.0 | 0 | 0.0 | 0.0 |
| Hydrocarbons | 1 | 0.2 | 0 | 0.0 | 0.0 |
| Mixture [†] | 9 | 2.1 | 1 | 7.1 | 11.1 |
| Multiple substances category | 298 | 69.1 | 2 | 14.3 | 0.7 |
| Other [‡] | 16 | 3.7 | 1 | 7.1 | 6.3 |
| Other inorganic substances [§] | 35 | 8.1 | 2 | 14.3 | 5.7 |
| Oxy-organics | 6 | 1.4 | 1 | 7.1 | 16.7 |
| Paints and dyes | 11 | 2.6 | 0 | 0.0 | 0.0 |
| Pesticides | 2 | 0.5 | 0 | 0.0 | 0.0 |
| Polychlorinated biphenyls | 0 | 0.0 | 0 | 0.0 | 0.0 |
| Polymers | 1 | 0.2 | 0 | 0.0 | 0.0 |
| Volatile organic compounds | 16 | 3.7 | 1 | 7.1 | 6.3 |
| Total | 431 | (100.0) | 14 | (100.0) | 3.2 |

*Substances in events that involved multiple substances were counted only once in a substance category when all the substances were associated with the same category. If events involved multiple substances from different substance categories, they were counted only once in the multiple substance category.

[†]Substances from different categories that were mixed or formed from a reaction before the event.

[‡]Not classified.

[§]All inorganic substances except for acids, bases, ammonia, and chlorine.

Table 8. Frequency of injuries/symptoms, by type of event*—Utah Hazardous Substances Emergency Events Surveillance System, 2006

| Injury/symptom | Fixed facility | | Transportation | | All events | |
|-------------------------------------------|----------------|------------|----------------|------------|------------|------------|
| | No. injuries | % | No. injuries | % | Total no. | % |
| Chemical burns | 1 | 2.5 | 1 | 7.1 | 2 | 3.7 |
| Dizziness/central nervous system symptoms | 2 | 5.0 | 4 | 28.6 | 6 | 11.1 |
| Eye irritation | 2 | 5.0 | 0 | 0.0 | 2 | 3.7 |
| Gastrointestinal system problems | 11 | 27.5 | 4 | 28.6 | 15 | 27.8 |
| Headache | 5 | 12.5 | 4 | 28.6 | 9 | 16.7 |
| Heart problems | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Heat stress | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Other | 2 | 5.0 | 0 | 0.0 | 2 | 3.7 |
| Respiratory irritation | 10 | 25.0 | 0 | 0.0 | 10 | 18.5 |
| Shortness of breath | 5 | 12.5 | 0 | 0.0 | 5 | 9.3 |
| Skin irritation | 2 | 5.0 | 1 | 7.1 | 3 | 5.6 |
| Thermal burns | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Trauma | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Total[‡] | 40 | 100 | 14 | 100 | 54 | 100 |

*The number of injuries is greater than the number of victims (31) because a victim could have had more than one injury.

[‡] Percentages do not total 100% due to rounding.

Figure 5. Injury disposition —Utah Hazardous Substances Emergency Events Surveillance, 2006.

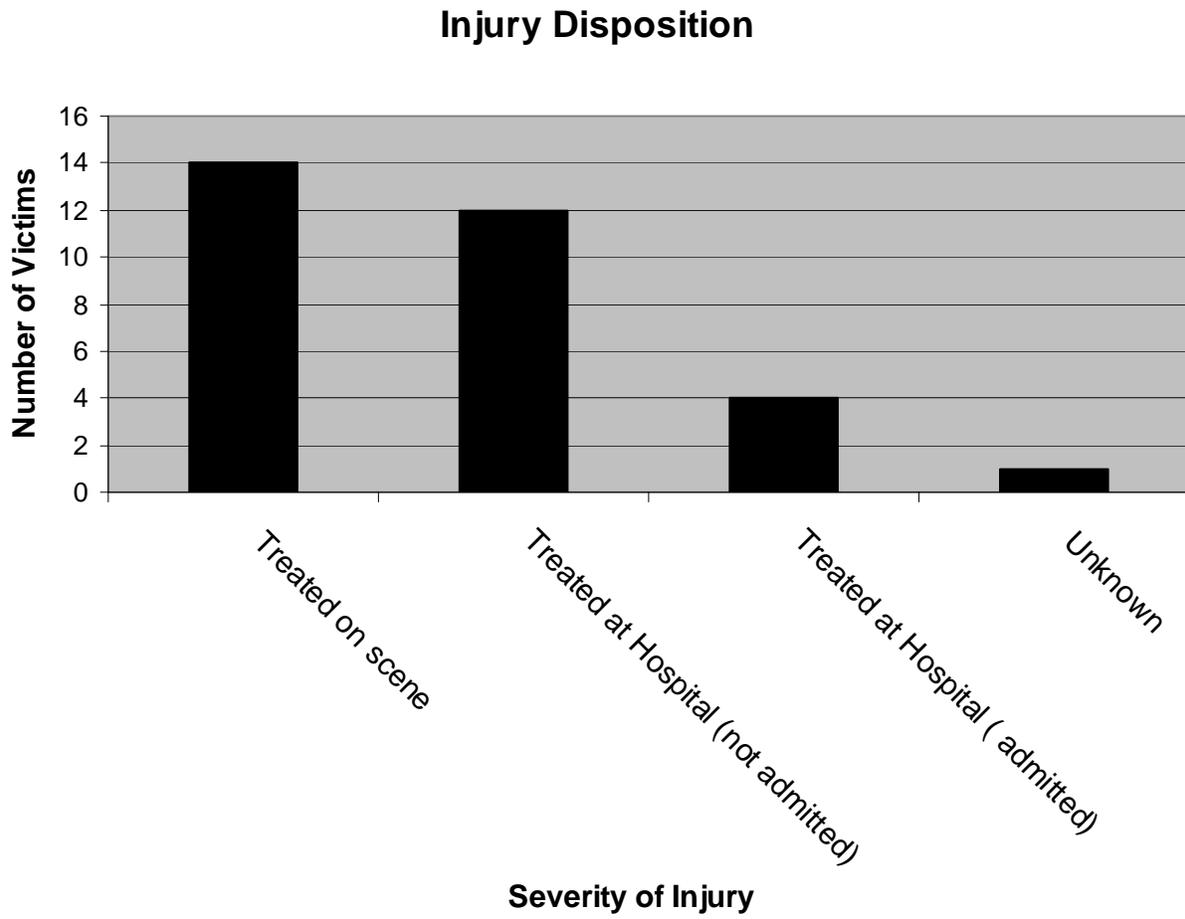


Table 9. Distribution of personnel who responded to the event—Utah Hazardous Substances Emergency Events Surveillance System, 2006

| Responder category | No. | %* |
|------------------------------------------------------------------|------------|-----------|
| 3 rd Party Clean-up Contractor | 18 | 3.8 |
| Certified HazMat team | 10 | 2.1 |
| Department of works/ utilities/ transportation | 1 | 0.2 |
| Emergency medical technicians | 3 | 0.6 |
| Environmental agency/ EPA † response team | 6 | 1.3 |
| Fire department | 15 | 3.2 |
| Health department/health agency | 16 | 3.4 |
| Hospital personnel | 12 | 2.5 |
| Law enforcement agency | 12 | 2.5 |
| No Response | 296 | 62.3 |
| Other | 0 | 0.0 |
| Response team of company where release occurred | 86 | 18.1 |
| Specialized multi-agency team | 0 | 0.0 |
| State, county, or local emergency managers/coordinators/planning | 0 | 0.0 |

*Percentages total greater than 100% because multiple responder categories could be reported per event.

†Environmental Protection Agency.

Table 10. Cumulative data by year—Utah Hazardous Substances Emergency Events Surveillance, 2000-2006

| Year | Type of event | | | No. substances released | No. victims | No. deaths | Events with victims | |
|--------------|----------------|----------------|-------|-------------------------|-------------|------------|---------------------|----------------|
| | Fixed facility | Transportation | Total | | | | No. | % [†] |
| 2000 | 140 | 163 | 303 | 375 | 46 | 0 | 11 | 3.6 |
| 2001 | 408 | 126 | 534 | 1104 | 94 | 0 | 13 | 2.4 |
| 2002 | 329 | 117 | 446 | 939 | 76 | 0 | 8 | 1.8 |
| 2003 | 364 | 110 | 474 | 1000 | 32 | 0 | 8 | 1.8 |
| 2004 | 397 | 107 | 504 | 1138 | 93 | 0 | 38 | 7.5 |
| 2005 | 442 | 75 | 517 | 1347 | 176 | 1 | 55 | 10.6 |
| 2006 | 375 | 56 | 431 | 1299 | 31 | 0 | 15 | 3.4 |
| Total | 2455 | 754 | 3209 | 7202 | 548 | 1 | 148 | 4.6 |

† Percentage of events with victims.