

Utah Hazardous Substances Emergency Events Surveillance

Annual Report
2007



Utah Department of Health
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ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

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Contents

	Page
List of Figures	2
List of Tables	3
Executive Summary	4
Introduction.....	5
Methods.....	6
Results.....	8
Industries	10
Substances	10
Victims.....	11
Nearby Populations.....	13
Evacuations.....	14
Decontamination.....	14
Response.....	15
2007 Prevention Outreach Activities	15
Awareness Activities	15
Data-driven Activities.....	16
Summary of Results, 2000-2007.....	17
References.....	18
Appendix A—Figures.....	19
Appendix B—Tables.....	26

List of Figures

- Figure 1. Geographical location of releases, by county
- Figure 2. Areas of fixed-facilities involved in events for mining, utilities or manufacturing (NAICS 21, 22, 31, 32, 33)
- Figure 3. Distribution of transportation-related events, by type of transport
- Figure 4a. Primary factors reported as contributing to events
- Figure 4b. Secondary factors reported as contributing to events
- Figure 5. Distribution of victims by population group
- Figure 6. Injury disposition

List of Tables

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

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 in Utah during 2007. 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 392 events were reported in 2007. Only one substance was released per event in 194 (49.5 %) events. The remaining events had two or more substances released per event. The most commonly reported categories of substances were other inorganic substances and volatile organic compounds. During this reporting period, 20 events (5.1% of all reported events) resulted in a total of 63 victims, one of whom died. The most frequently reported injuries were respiratory irritation, eye irritation, and gastrointestinal system problems. Evacuations were ordered for 15 (3.8%) events.

The findings regarding the percentage of events with victims increased during 2007. Respiratory irritation and gastrointestinal system problems continued to be among the most frequently occurring types of injuries.

Prevention outreach efforts for 2007 focused on outreach for Local Emergency Planning Committees (LEPCs), fire chiefs, and dairies 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 follows:

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 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 respective 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 2007 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 2007, 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 2002, 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 and 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 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 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 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 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 2007, a total of 392 acute hazardous substances events were captured by Utah HSEES. Four (1.0%) of these events were threatened releases. There were no events in which substances were both threatened to be released and actually released. A total of 308 (78.6%) events occurred in fixed facilities (See Table 1 in Appendix A^{*}). The counties with the most frequent number of events were San Juan (186 [47.4%]) and Salt Lake County (41 [10.5%]) (Figure 1 and Table 2).

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 308 fixed-facility events, 76 (19.4%) 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 232 (75.3%) events with no entry. Among events with one type of area reported, the main areas were classified as follows: 41 (53.9%) ancillary process equipment, 14 (18.4%) piping, and ten (13.2%) storage area above ground (See Figure 1 in Appendix B^{**}).

Of the 84 transportation-related events, 76 (90.5%) occurred during ground transport (e.g., truck, van, or tractor) and seven (8.3%) 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 a stationary vehicle or vessel (40 [48.2%]) and during a release enroute that was later discovered at a fixed facility (29 [34.5%]). Of the 84 transportation-related events, 12 (14.3%) involved a moving vehicle or vessel and three (3.6%) involved a stationary vehicle or vessel such as ones staged at a transfer station.

* All tables for the Utah HSEES are presented in Appendix A.

** All figures for the Utah HSEES are presented in Appendix B.

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 all events (Figure 4a). Of the reported primary factors, most (85.7%) fixed-facility events involved equipment failure. For transportation-related events, over half (56.0%) involved equipment failure, and 44.0% involved human error. Secondary factors were reported for all events. Of the reported secondary factors, most (73.0%) fixed-facility events reported no secondary factors involved, and a large portion (41.2%) of transportation-related events involved improper filling, loading or packing (Figure 4b).

Multiple substances could be reported as released or threatened to be released at an event. More than half (189 [61.4%]) of all events involved the release of four substances. For six events (1.9%), two substances were released, and 112 events (36.4%) involved the release of only one substance (Table 3). Among the transportation events, almost all (97.6%) events had only one substance released.

The number of events by month ranged from nine (2.3%) in December to 56 (14.3%) in April, with the largest proportions occurring from January through June. The proportion of events occurring during weekdays ranged from 15.1% to 17.3%, and during weekend days from 9.4% to 9.7%. Of all 392 (100.0%) events for which time of day or time category was reported, 35.2% occurred between 12:00 a.m. to 5:59 a.m., 26.5% occurred from 6:00 a.m. to 11:59 a.m., 24.0% from 12:00 p.m. to 5:59 p.m., and the remainder (14.3%) during the late hours of the day, from 6:00 p.m. to 11:59 p.m..

Industries

The largest proportions of HSEES events were associated with the wholesale trade (190 [48.5%]) and construction (58 [14.8%]) industries (Table 4). The largest number of events with victims occurred from unknown or non-industry (7 [35.0%]), wholesale trade (2 [10.0%]), manufacturing (2 [10.0%]), and health care and social assistance (2 [10.0%]). The total number of victims was greatest in finance and insurance (15 [23.8%]), and health care and social assistance (15 [23.8%]), followed by unknown or non-industry (12 [19.0%]). Although the largest proportions of HSEES events were associated with wholesale trade (190 [48.5%]), only two (1.05%) of these events had victims.

Substances

A total of 970 substances were released or were threatened to be released in all events. Only seven (0.7%) of these substances was reported as threatened to be released. The individual substances most frequently released were carbon monoxide, sulfur dioxide, volatile organic compounds, nitrogen oxide, and paint or coating (Table 1). Substances were grouped into 16 categories. The most commonly released categories of substances were other inorganic substances (419 [43.2%]), volatile organic compounds (214 [22.1%]), and oxy-organics (201 [20.7%]) (Table 5). The substance categories most commonly released in fixed-facility events were other inorganic substances (413 [46.7%]), volatile organic compounds (200 [22.6%]), and oxy-organics (199 [22.5%]) (Table 5). In transportation-related events, the most common substance categories released were paints and dyes (18 [20.9%]), acids (18 [20.7%]), and volatile organic compounds (14 [16.3%]) (Table 5).

For each event, two types of releases for each substance could be reported. For example, one event could involve a substance released into the air and also a solid substance spilled. The release type was reported for all substances. Only one type of release was associated with the

following: air releases (822 [84.7%]), spills (193 [14.3%]), threatened release (7 [0.7%]), fire (1 [0.1%]), explosion (0 [0.0%]), and radiation (0 [0.0%]). There was one event (0.1%) with releases of both air and spill types. No other events had two types of releases.

Victims

A total of 63 victims were involved in 20 events (5.1% of all events) (Table 6). Of the 20 events with victims, six (30.0%) events involved only one victim; eight (40.0%) involved two victims; three (15.0%) involved three victims; one (5.0%) involved four victims; and two (10.0%) involved more than six victims. Of all victims, 59 (93.7%) 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 50.3% of all events; however, only 0.5% of these events resulted in injuries. Conversely, events involving acids and bases accounted for 7.4% and 2.3% of all events respectively, but 10.3% of the acid events and 22.2% of base events resulted in injuries.

The employees (58 [92.1%]) constituted the largest proportion of the population groups injured, followed by general public (5 [7.9%]) (Figure 4). There were no injuries reported among responders, firefighters, police, EMTs, hospital personnel, or students.

Victims were reported to sustain a total of 108 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 respiratory irritation (47 [46.1%]), eye

irritation (21 [20.6%]), and gastrointestinal system problems (7 [6.9%]). In transportation-related events, respiratory irritation (3 [50%]) was reported most frequently, followed by gastrointestinal system problems (1 [16.7%]), and heart problems (1 [16.7%]).

The median age of the 45 (71.4%) victims for whom exact age was reported was 32 years (range: 15-65 years). For the 63 (100.0%) injured persons for whom an age category was reported, zero (0.0%) were < 15 years of age, nine (14.3%) were 15–19 years of age, 42 (66.7%) were 20–44 years of age, 11 (17.5%) were 45–64 years of age, and one (1.6%) was ≥ 65 years of age.

Sex was known for 51 (81.0%) of the victims; of these, 25 (49.0%) were males and 26 (51.0%) were females. Of all employees for whom sex was reported, 50.0% were males.

Of the 63 victims, two (3.2%) were treated on scene (first-aid); 37 (58.7%) were treated at a hospital (not-admitted); nine (14.3%) were treated at a hospital (admitted); 14 were seen by a private physician within 24-hours (22.2%), and one died after arrival at the hospital (1.6%) (Figure 6).

The status of personal protective equipment (PPE) use was reported for 62 (98.4%) employee-victims. Among all of the employee-victims with PPE usage reported, none (0.0%) had worn any form of PPE.

The event that consisted of the largest amount of victims (15 [23.8%]) occurred while a building (on a college campus) was being repaired. The material safety data sheets for the chemicals used did not list them as hazardous. However, when winds directed the fumes into an air intake handler, enough people reported complaints that the building was evacuated. About 30 people went to nearby hospitals for examination. Fifteen experienced symptoms including respiratory symptoms, eye irritation, and gastrointestinal problems. The campus risk management employee turned off the air handlers to stop the fumes from being directed into the

building. The local health department, Hazmat teams, and police inspected the building for hazards before people were allowed back inside.

The event with the next largest number of victims (13 [20.6%]) occurred when three victims of a hydrochloric acid explosion at a spa self presented at a health care facility to receive treatment for symptoms that included respiratory system problems and eye irritation.

Consequently, the attending staff of the clinic developed symptoms (by secondary exposure), and one of the victims required breathing treatment. Hazmat teams responded and decontaminated the area.

Nearby Populations

The proximity ($\frac{1}{4}$, $\frac{1}{2}$, and one mile) of the event location in relation to selected populations was determined using geographic information systems (GIS) or health department records. Residences were within $\frac{1}{4}$ mile of 303 (80.2%) events, schools within $\frac{1}{4}$ mile of 12 (3.2%) events, hospitals within $\frac{1}{4}$ mile of four (1.1%) events, nursing homes within $\frac{1}{4}$ mile of seven (0.7) events, licensed daycares within $\frac{1}{4}$ mile of ten (2.6%) events, industries or other businesses within $\frac{1}{4}$ mile of 308 (81.5%) events and recreational areas within $\frac{1}{4}$ mile of 23 (6.1%) events. Information for proximity of the event location in relation to selected populations was missing for 14 events.

The number of events with persons 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 55.1% of the persons living in proximity of the events were home when the events occurred. There were 304 (80.4%) events with persons living within $\frac{1}{4}$ mile of the event; 331 (87.6%) events with persons living within $\frac{1}{2}$ mile; and 355 (93.9%) events with persons living within one mile. Information on the number of persons living within $\frac{1}{4}$, $\frac{1}{2}$, and one mile of the event was missing for 14

events. There were 302 (79.9%) events with persons at home within ¼ mile of the event; 327 (86.5%) events with persons at home within ½ mile; and 355 (93.9%) events with persons at home within one mile. Information on the number of persons at home when the events occurred was missing for 14 events.

Evacuations

Evacuations were ordered in 15 (3.2%) of 392 events where evacuation status was reported. Of these evacuations, 80.0% (12) were of buildings or affected parts of buildings, and 20.0% (3) were of defined circular areas surrounding the event locations. The number of people evacuated was known for 13 (86.7%) events with a range of 6 to 350 people and a median of 77 people. A category was assigned to the range of people officially evacuated. There were three events with 5 to 20 people evacuated, three with 21 to 50, six with 51 to 100, and three with more than 100. The median length of evacuation was five hours (range: 1 to 24). Evacuation length was missing for 0 (0.0%) events. Of all 392 events, 22 (5.6%) had access to the area restricted. There was one event (0.3%) that had in-place sheltering ordered by an official.

Decontamination

Of the 61 (96.8%) victims for whom decontamination status was known, 23 (37.7%) were not decontaminated, 18 (29.5%) were decontaminated at the scene, 19 (31.1%) were decontaminated at a medical facility, and one (1.6%) was decontaminated at both the scene and a medical facility.

Two events occurred where uninjured persons were decontaminated. In one event, decontamination at the scene was conducted for four uninjured responders. In the other event, decontamination at a medical facility was conducted for 10 uninjured responders. No uninjured employees, students, or members of the general population were decontaminated either at the scene or at medical facilities.

Response

Of the 392 (100%) events with information on who responded to the event, 8.7% (34) reported two or more categories of personnel who responded, 2.8% (11) reported three or more categories, and 1.5% (6) reported four or more categories. The personnel who responded most frequently were the response team of the company where the release occurred (226 [57.7%]), followed by the fire department (17 [4.3%]), health department/health agency (16 [4.1%]), certified Hazmat team (16 [4.1%]), and third party clean-up contractors (16 [4.1%]) (Table 9).

2007 Prevention Outreach Activities

Four prevention activities are completed annually, with one activity completed each quarter. Two awareness activities and two data-driven activities are conducted. The goals of the prevention outreach activities focus on the primary prevention of acute releases of hazardous substances and on the secondary prevention of injuries that occur from releases. The Utah HSEES program continues to use the logic model outlined in the ATSDR HSEES protocol as an aid in developing the prevention plan and outreach activities. This allows the Utah HSEES program to refine the relationship between the proposed prevention activities, stakeholders, and effects.

The four outreach activities that were conducted during the 2007 calendar fall into two categories: awareness activities and data-driven activities. They are described as follows:

Awareness Activities

The first outreach activity for 2007 involved collaboration with LEPCs in the state of Utah. The goal was to increase awareness of and reporting to the Utah HSEES program. The Utah HSEES program registered as a group organization in the Utah Notification and Information System (UNIS). The administrator of the group is the Utah HSEES Coordinator. This system allows members of the group to be notified via phone, e-mail, fax, pager or text

messaging according to the member's preference. These notifications can be emergency alerts or routine updates specific to the organization. The UNIS system allows the administrator to post documents that only group members are permitted to view. The Utah HSEES coordinator presented at LEPC meetings to solicit LEPCs participation in the HSEES organization of the UNIS. A brochure was created and distributed describing the Utah HSEES program, available resources, and examples of how UNIS can aid in notifications of potential HSEES events.

The second awareness activity was to develop protocols for alerting interested individuals and groups when releases occur that pertain to their various geographical interests. Phone and e-mail lists were developed with these contacts. These contacts (e.g. phone numbers, e-mail addresses, etc.) were gained through networking and attendance at the LEPC meetings and the Intermountain Hazardous Material Conference.

Data-driven Activities

The first data-driven activity was mailing the 2005 cumulative report, a fact sheet and a questionnaire to fire chiefs in Utah. The fact sheet that was developed included events by area. The questionnaire requested fire chiefs review the accuracy and completeness of both the report and fact sheet and submit any discrepancies. Consultation with fire chiefs was provided at LEPC meetings.

The second data-driven prevention outreach activity was to inform dairies in Utah of ammonia spill frequencies, provide information regarding the importance of having a safety plan, and to provide data involving employees and hazardous releases. This activity was driven by data that included a Utah event in which a case of ammonia was released from a dairy freezer and injured an employee. A pamphlet describing this and other similar incidents, a brief program description, and information about ammonia spills was developed and provided to dairies in Utah.

Summary of Results, 2000–2007

During 2000–2007, 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 10 pounds being released. The number of total events increased every year from 2000 until 2005. It began to decrease in 2006 and in 2007, the number of total events continued to fall, with a 9.0% decrease. This decrease could be due to fewer events actually occurring or a decrease in the reporting of these events.

The number of substances released has also decreased. The number of events with victims increased from 2002 through 2005, but decreased in 2006 and 2007. The average percentage of events with victims during 2000 to 2006 was 4.7%.

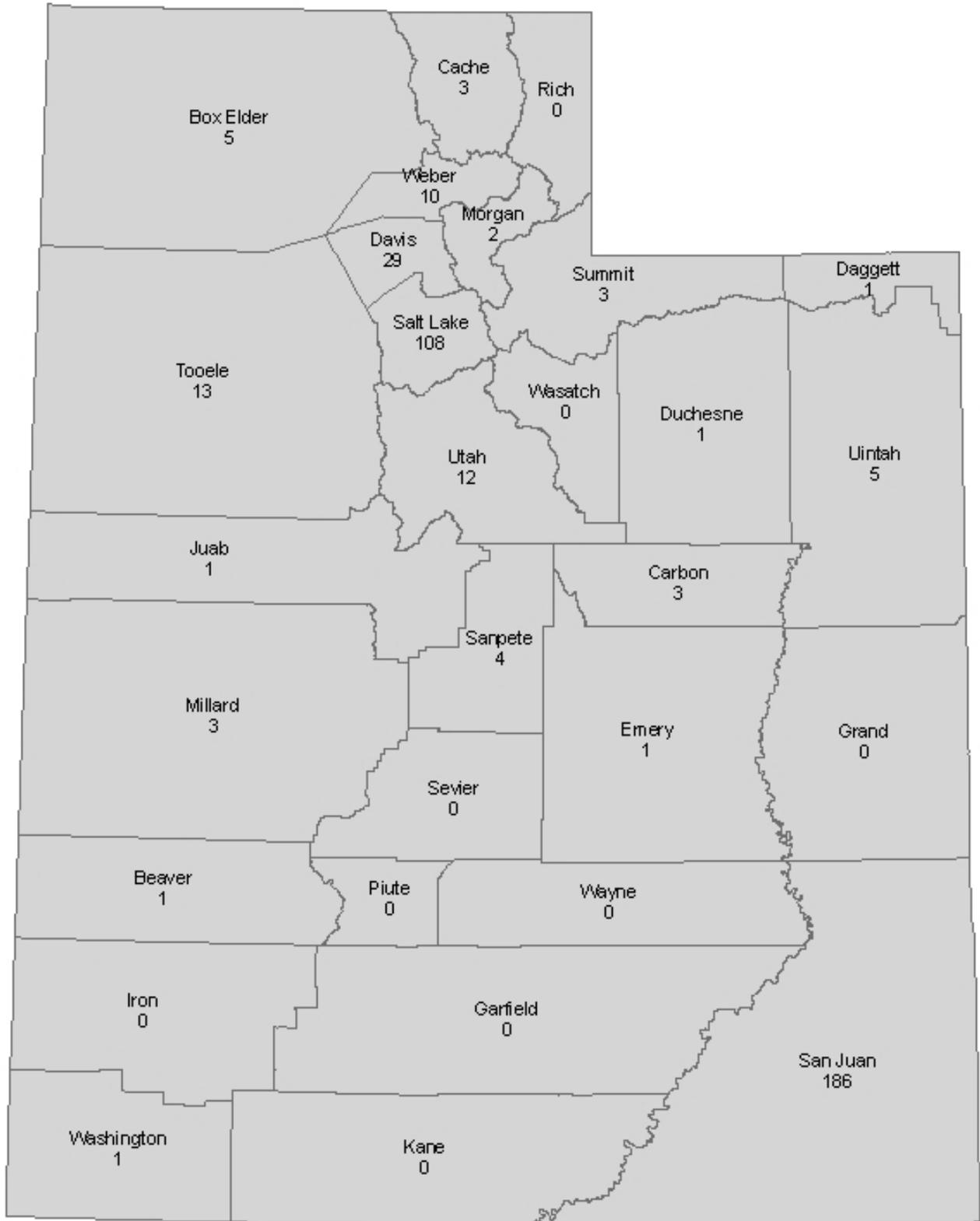
Respiratory irritation has consistently been the most frequently reported injury. Employees remained above the general public as the most commonly reported victims of acute chemical releases (Figure 4). The number of injured responders remained zero.

References

1. Centers for Disease Control and Prevention (1986). Comprehensive plan for epidemiologic surveillance. Atlanta: US Department of Health and Human Services.
2. Binder S.(1989). Death, injuries, and evacuations from acute hazardous materials releases. *Am J Public Health.* 70:1042–4.

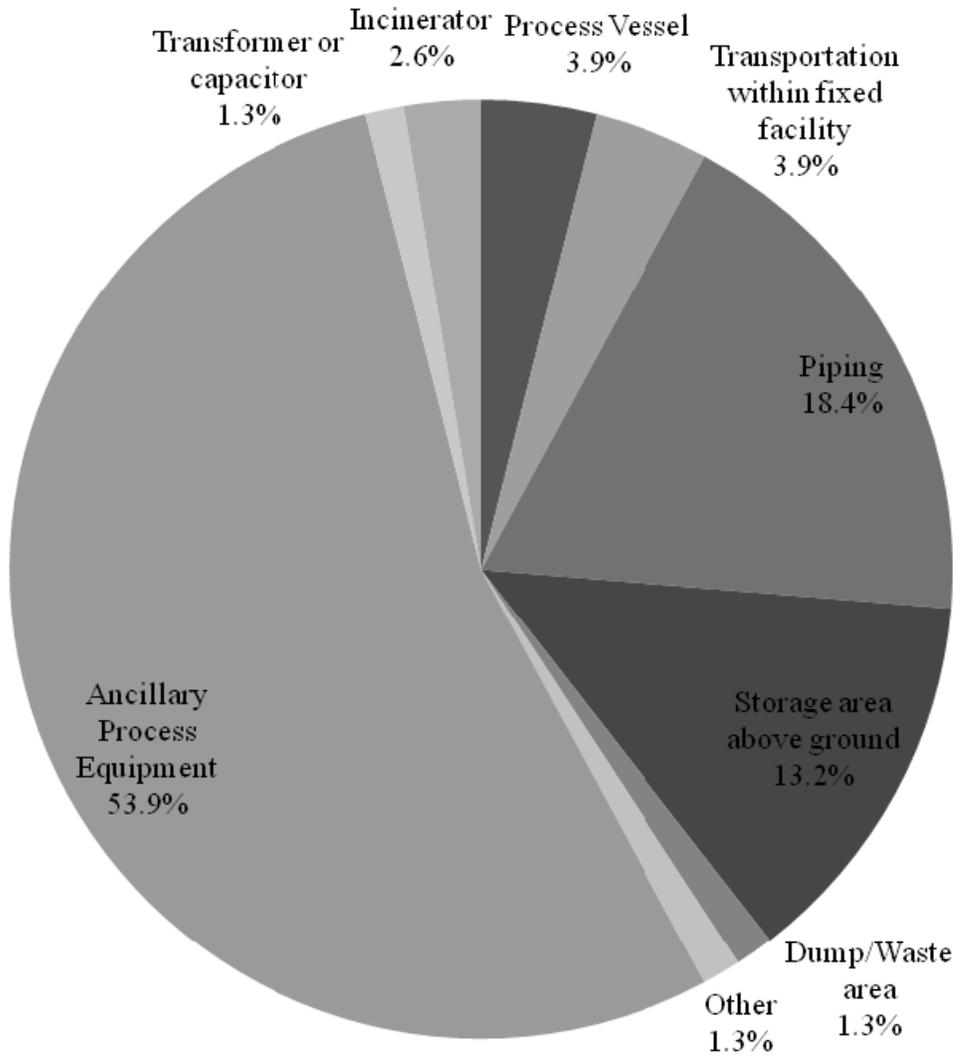
Appendix A
Figures

Figure 1. Geographical Location of Releases by County.



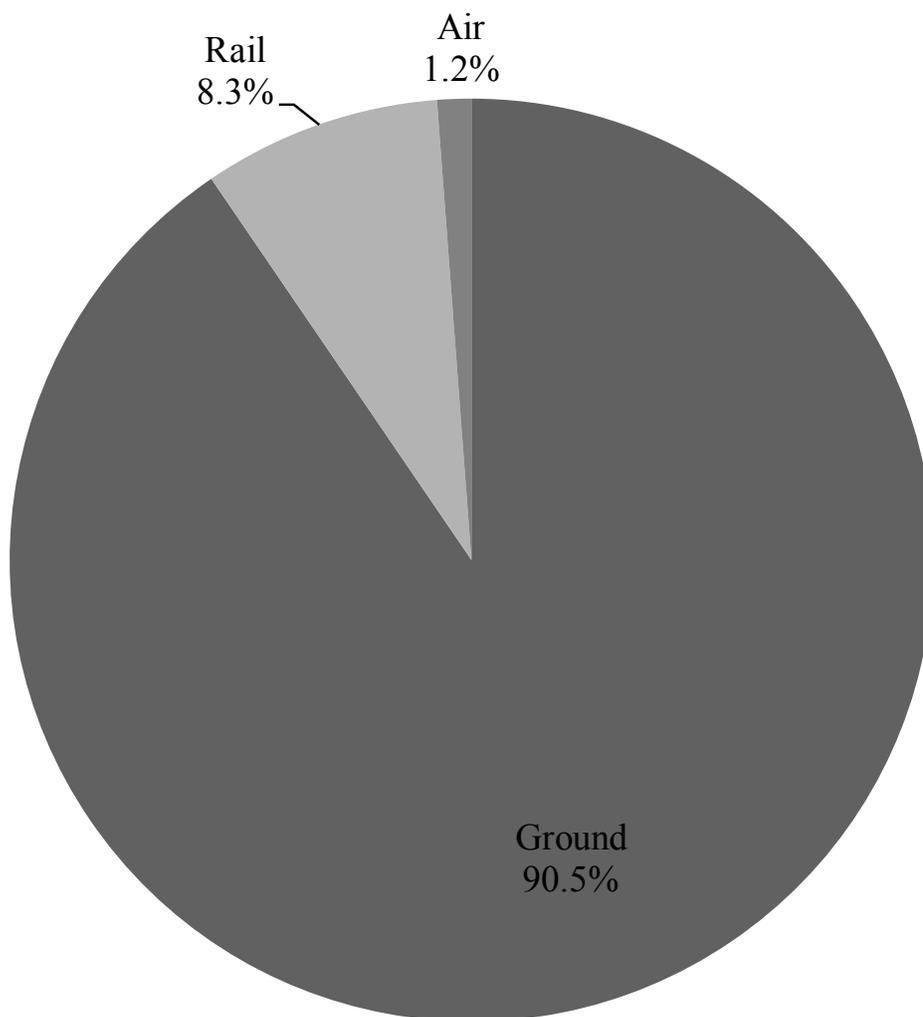
Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

Figure 2. Area of fixed-facilities involved in events for mining, utilities or manufacturing (NAICS 21, 22, 31, 32, 33).



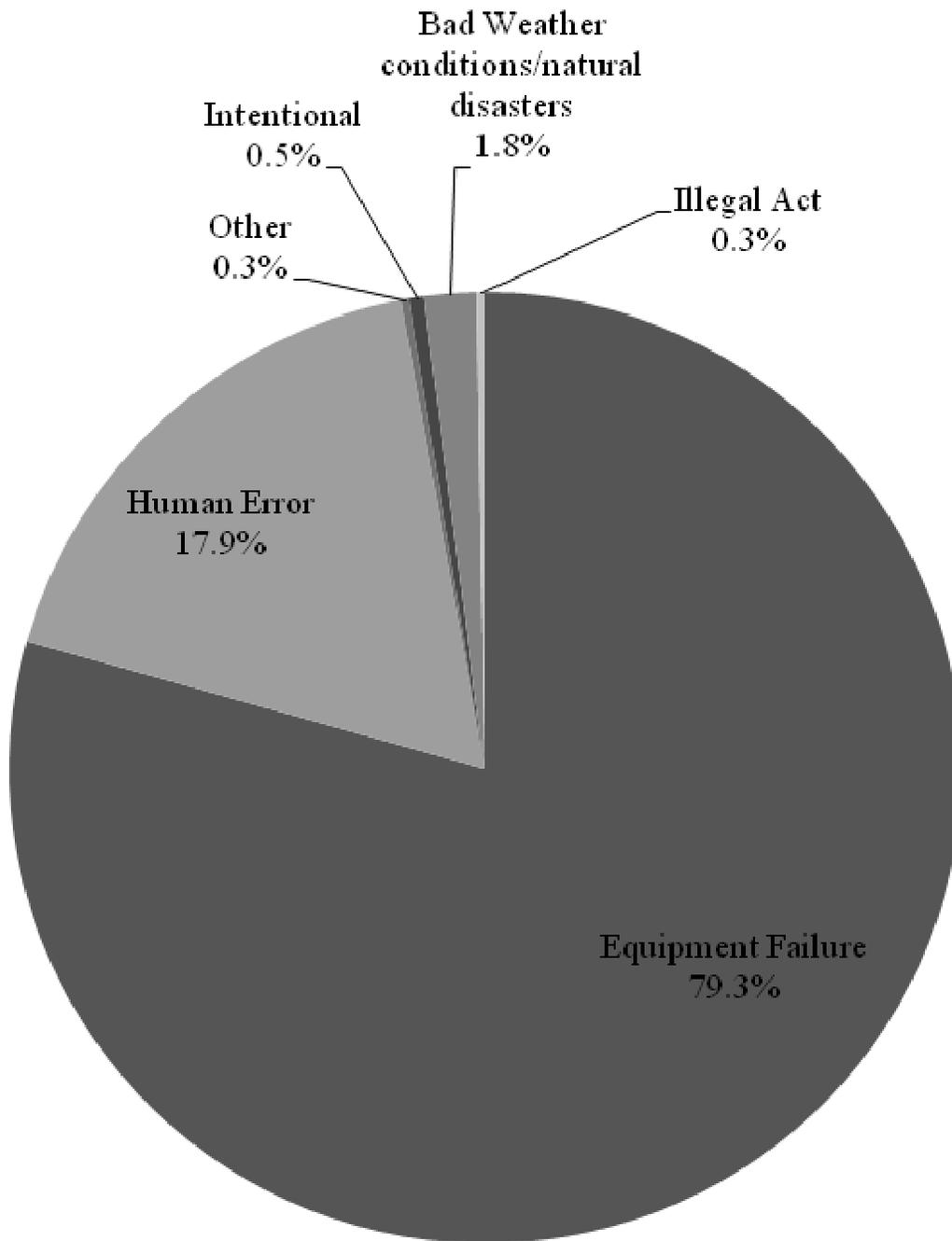
Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.
Note: Percentages do not total 100% due to rounding

Figure 3. Distribution of transportation-related events, by type of transport.



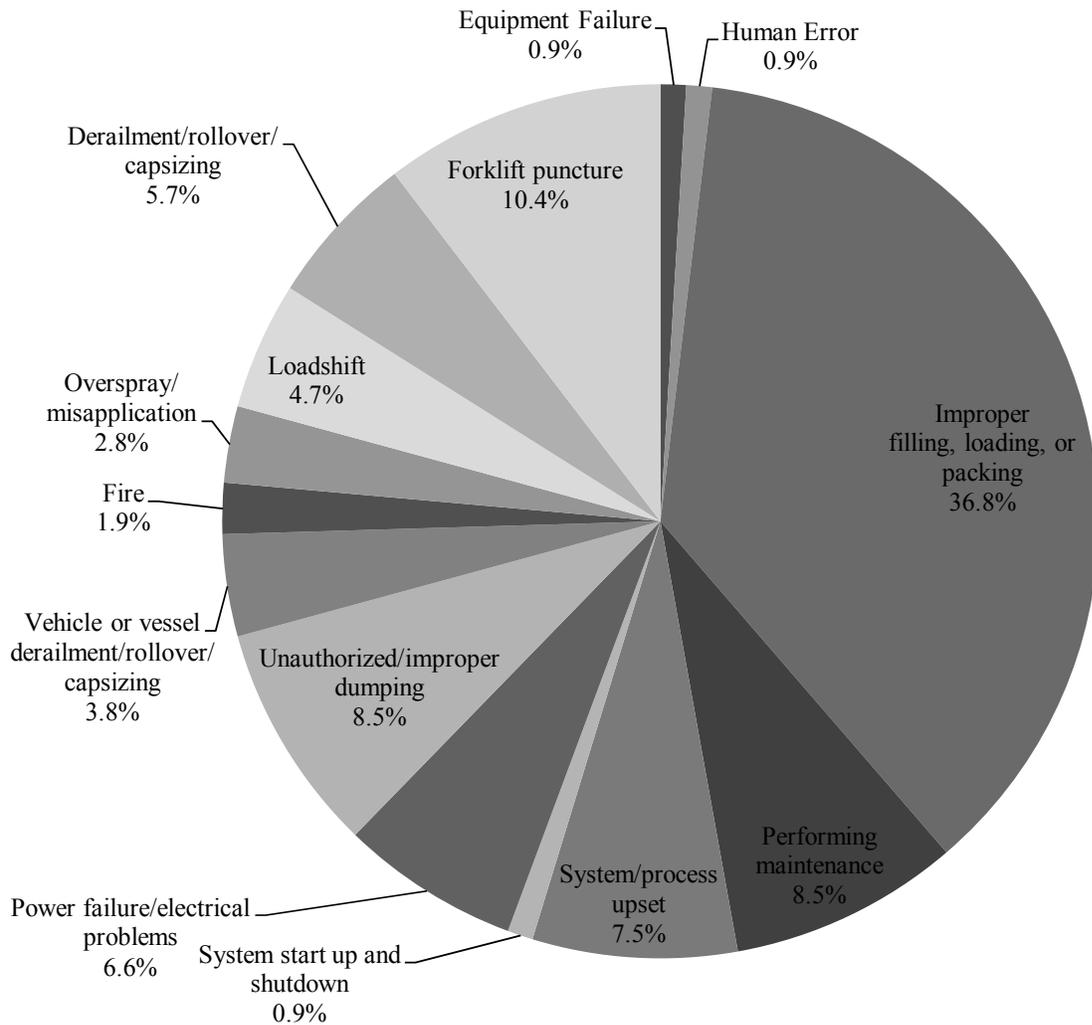
Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

Figure 4a. Primary factors reported as contributing to events.



Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

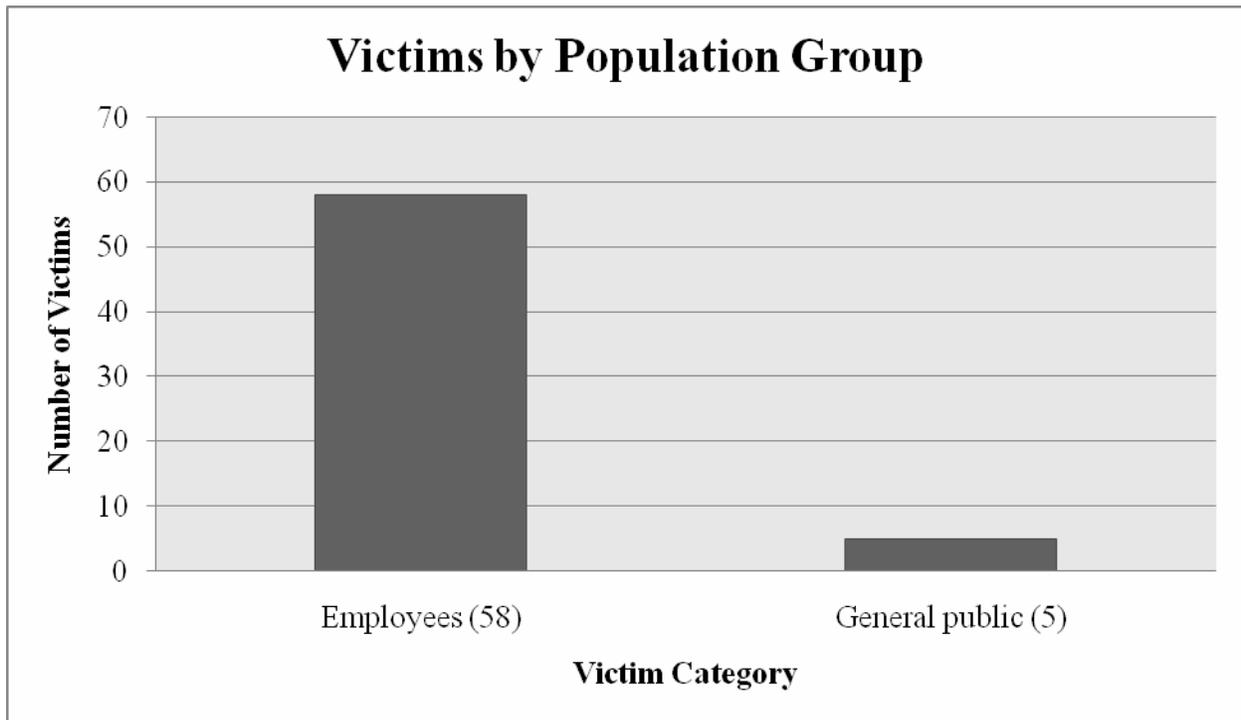
Figure 4b. Secondary factors reported* as contributing to events.



Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

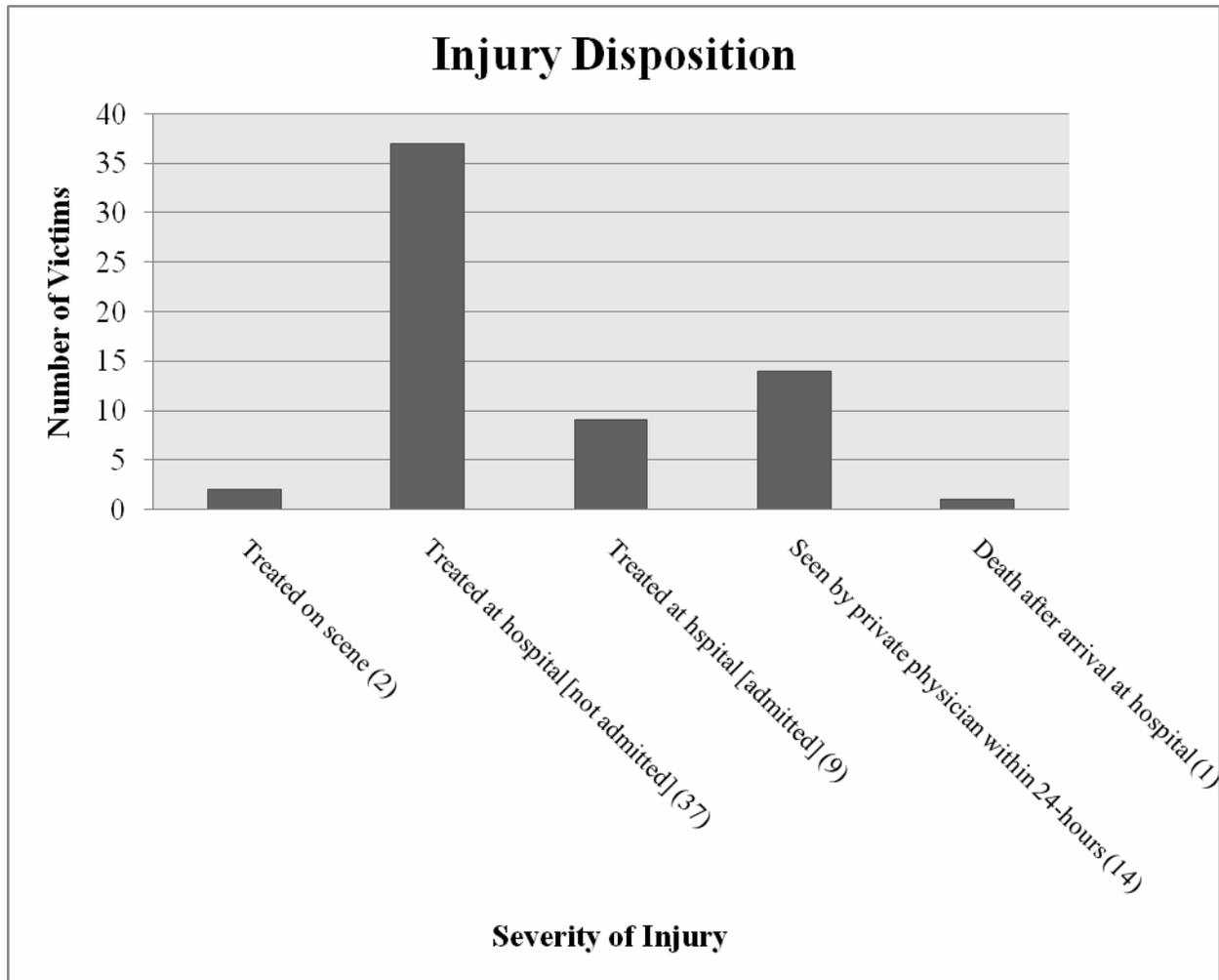
*Secondary factors were reported in only 106 of 392 cases. This chart represents only those 106 events in which secondary factors were reported.

Figure 5. Distribution of victims by population group.



Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

Figure 6. Injury disposition.



Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

Appendix B
Tables

Table 1. The 10 substances most frequently involved in events.

Number	Standardized Substance Name	Frequency
1	Carbon Monoxide (CO)	193
2	Sulfur Dioxide (SO ₂)	191
3	Volatile Organic Compounds (VOCs)	184
4	Nitrogen Oxide (NO _x)	184
5	Paint or Coating (NOS)	18
6	Chlorine	13
7	Ammonia	13
8	Sulfuric Acid	10
9	Hydrochloric Acid	9
10	Mixture	8
Total		823

Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

Table 2. Number of events meeting the surveillance definition, by county and type of event.

County	Type of event				All events	
	fixed facility		transportation			
	No. events	%*	No. events	%*	Total no. events (%)	% of total events
Beaver	1	100.0	0.0	0.0	1.0	0.3
Box Elder	5	100.0	0.0	0.0	5.0	1.3
Cache	2	66.7	1.0	33.3	3.0	0.8
Carbon	1	33.3	2.0	66.7	3.0	0.8
Daggett	0	0.0	1.0	0.0	1.0	0.3
Davis	25	86.2	4.0	13.8	29.0	7.4
Duchesne	1	100.0	0.0	0.0	1.0	0.3
Emery	1	100.0	0.0	0.0	1.0	0.3
Garfield	0	0.0	0.0	0.0	0.0	0.0
Grand	0	0.0	0.0	0.0	0.0	0.0
Iron	0	0.0	0.0	0.0	0.0	0.0
Juab	1	100.0	0.0	0.0	1.0	0.3
Kane	0	0.0	0.0	0.0	0.0	0.0
Millard	3	100.0	0.0	0.0	3.0	0.8
Morgan	1	50.0	1.0	50.0	2.0	0.5
Piute	0	0.0	0.0	0.0	0.0	0.0
Rich	0	0.0	0.0	0.0	0.0	0.0
Salt Lake	41	38.0	67.0	62.0	108.0	27.6
San Juan	186	100.0	0.0	0.0	186.0	47.4
Sanpete	4	100.0	0.0	0.0	4.0	1.0
Sevier	0	0.0	0.0	0.0	0.0	0.0
Summit	2	66.7	1.0	33.3	3.0	0.8
Tooele	13	100.0	0.0	0.0	13.0	3.3
Uintah	3	60.0	2.0	40.0	5.0	1.3
Utah	9	75.0	3.0	25.0	12.0	3.1
Wasatch	0	0.0	0.0	0.0	0.0	0.0
Washington	1	100.0	0.0	0.0	1.0	0.3
Wayne	0	0.0	0.0	0.0	0.0	0.0
Weber	8	80.0	2.0	20.0	10.0	2.6
	308	78.6	84.0	21.4	392.0	100.0

Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

* Percentage = (number of events by type of event per county ÷ total number of events in that county) x100

Table 3. Number of substances involved per event, by type of event.

No. substances	Type of event						All events		
	Fixed facility			Transportation					
	No. events	%	Total substances	No. events	%	Total substances	No. events	%	Total substances
1	112	36.4	112	82	97.6	82	194	49.5	194
2	6	1.9	12	2	2.4	4	8	2.0	16
3	1	0.3	3	0	0.0	0	1	0.3	3
4	189	61.4	756	0	0.0	0	189	48.2	756
≥5	0	0.0	0	0	0.0	0	0	0.0	0
Total	308	100	883	84	100	86	392	100	969

Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

Table 4. Industries involved in hazardous substance events, by category.

Industry category	Total events		Events with victims		Percentage of events with victims	Total no. victims (min no. - max no.)*
	No.	%	No.	%		
Wholesale Trade	190	48.5	2	10.0	0.0	3(2-1)
Manufacturing	1	0.3	2	10.0	2.0	4(2-2)
Warehousing	3	0.8	0	0.0	0.0	0
Transportation	76	19.4	1	5.0	0.0	2(2-0)
Unknown or not an Industry	16	4.1	7	35.0	0.4	12(3-1)
Other Services	5	1.3	1	5.0	0.2	3(3-0)
Utilities	13	3.3	0	0.0	0.0	0
Health Care and Social Assistance	3	0.8	2	10.0	0.7	15(13-2)
Public Administration	4	1.0	1	5.0	0.3	3(3-0)
Educational Services	2	0.5	0	0.0	0.0	0
Retail Trade	1	0.3	0	0.0	0.0	0
Accommodation and Food Services	1	0.3	0	0.0	0.0	0
Administrative and Support and Waste Management and Remediation Services	5	1.3	1	5.0	0.2	1
Agriculture, Forestry, Fishing and Hunting	1	0.3	1	5.0	1.0	1(1-0)
Arts, Entertainment, and Recreation	1	0.3	0	0.0	0.0	0
Finance and Insurance	1	0.3	1	5.0	1.0	15(15-0)
Mining	8	2.0		0.0	0.0	0
Construction	58	14.8		0.0	0.0	0
Professional, Scientific, and Technical Services	0	0.0	0	0.0	0.0	0
Information	1	0.3	1	5.0	1.0	4(4-0)
Real Estate and Rental and Leasing	2	0.5	0	0.0	0.0	0
Total‡	392	100.0	20	100.0	6.8	63

Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

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

Table 5. Number of substances involved, by substance category and type of event.

Substance Category	Type of Event				All Events	
	Fixed facility		Transportation			
	No. Substances	%	No. Substances	%	No. Substances	%
Acids	12	1.4	18	20.9	30	3.1
Ammonia	12	1.4	0	0.0	12	1.2
Bases	2	0.2	8	9.3	10	1.0
Chlorine	15	1.7	0	0.0	15	1.5
Formulations	0	0.0	0	0.0	0	0.0
Hetero-organics	0	0.0	0	0.0	0	0.0
Hydrocarbons	2	0.2	2	2.3	4	0.4
Mixture*	11	1.2	1	1.2	12	1.2
Other †	12	1.4	6	7.0	18	1.9
Other inorganic substances ‡	413	46.7	6	7.0	419	43.2
Oxy-organics	199	22.5	2	2.3	201	20.7
Paints and dyes	0	0.0	18	20.9	18	1.9
Pesticides	5	0.6	4	4.7	9	0.9
Polychlorinated biphenyls	0	0.0	0	0.0	0	0.0
Polymers	1	0.1	7	8.1	8	0.8
Volatile organic compounds	200	22.6	14	16.3	214	22.1
Total[¶]	884	100	86	100	970	100

Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

* 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.

¶ Of a total of 970 substances, three were excluded because they were not assigned a substance category: 0 occurred in fixed facilities and 0 during transportation. Percentages do not total 100% due to rounding.

Table 6. Number of victims per event, by type of event.

No. victims	Type of event						All events		
	Fixed facility			Transportation					
	No. events	%	Total Victims	No. events	%	Total victims	No events.	%	Total victims
1	6	33.3	6	0	0.0	0	6	30.0	6
2	6	33.3	12	2	100.0	4	8	40.0	16
3	3	16.7	9	0	0.0	0	3	15.0	9
4	1	5.6	4	0	0.0	0	1	5.0	4
5	0	0.0	0	0	0.0	0	0	0.0	0
≥6	2	11.1	28	0	0.0	0	2	10.0	28
Total	18	100	59	2	100	4	20	100	63

Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

Table 7. Frequency of substance categories in all events and events with victims. *

Substance Category	All events		Events with victims		
	No.	%	No	Percentage of all releases with victims	Percentage of events with victims in substance category
Acids	29	7.4	3	15.0	10.3
Ammonia	12	3.1	3	15.0	25.0
Bases	9	2.3	2	10.0	22.2
Chlorine	15	3.8	1	5.0	6.7
Formulations	0	0.0	0	0	0.0
Hetero-organics	0	0.0	0	0	0.0
Hydrocarbons	2	0.5	0	0	0.0
Mixture [†]	9	2.3	0	0	0.0
Multiple substances category	197	50.3	1	5.0	0.5
Other [‡]	15	3.8	3	15.0	20.0
Other inorganic substances [§]	35	8.9	2	10.0	5.7
Oxy-organics	14	3.6	1	5.0	7.1
Paints and dyes	18	4.6	0	0	0.0
Pesticides	7	1.8	3	15.0	42.9
Polychlorinated biphenyls	0	0.0	0	0	0.0
Polymers	8	2.0	0	0	0.0
Volatile organic compounds	22	5.6	1	5.0	4.5
Total	392	100	20	100	5.1

Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

*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*.

Injury/symptom	Fixed facility		Transportation		All events	
	No. injuries	%	No. injuries	%	Total no. injuries	%
Chemical burns	2	2.0	0	0.0	2	1.9
Dizziness/central nervous symptoms	6	5.9	0	0.0	6	5.6
Eye irritation	21	20.6	0	0.0	21	19.4
Gastrointestinal system problems	7	6.9	1	16.7	8	7.4
Headache	5	4.9	0	0.0	5	4.6
Heart problems	0	0.0	1	16.7	1	0.9
Heat stress	0	0.0	0	0.0	0	0.0
Other	4	2.9	1	16.7	4	3.7
Respiratory irritation	47	46.1	3	50.0	50	46.3
Shortness of breath	3	2.9	0	0.0	3	2.8
Skin irritation	4	3.9	0	0.0	4	3.7
Thermal burns	0	0.0	0	0.0	0	0.0
Trauma	4	3.9	0	0.0	4	3.7
Total	102	100	6	100.†	108	100

Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

*The number of injuries is greater than the number of victims (63) because a victim could have had more than one injury.

† Percentages do not total 100% due to rounding.

Table 9. Distribution of personnel who responded to the event.

Responder category	No.	%*
3rd party clean-up contractor	16	4.1
Certified Hazmat team	16	4.1
Department of works/utilities/transportation	0	0.0
Emergency medical technicians	12	3.1
Environmental agency/EPA [†] response team	5	1.3
Fire department	17	4.3
Health department/health agency	16	4.1
Hospital personnel	14	3.6
Law enforcement agency	11	2.8
No response	112	28.6
Other	0	0.0
Response team of company where release occurred	226	57.7
Specialized multi-agency team	1	0.3
State, county, or local emergency managers/coordinators/planning committees	0	0.0

Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

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

[†]Environmental Protection Agency.

Table 10. Cumulative data by year.

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	1.7
2004	397	107	504	1138	93	0	38	7.5
2005	442	75	517	1347	176	1	55	10.6
2006	375	56	431	1243	31	0	15	3.5
2007	308	84	392	970	63	1	20	5.1
Total	2763	838	3601	8116	611	2	168	4.7

Source: Utah Hazardous Substances Emergency Events Surveillance, Utah Department of Health, 2007.

† Percentage of events with victims.