

# COLORADO HAZARDOUS SUBSTANCES EMERGENCY EVENTS SURVEILLANCE SYSTEM

## 2006 REPORT



Colorado Department  
of Public Health  
and Environment

**ATSDR**  
AGENCY FOR TOXIC SUBSTANCES  
AND DISEASE REGISTRY



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## **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 Colorado 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 204 events were reported. In 196 (96.1%) events, only one substance was released. The most commonly reported categories of substances were paints and dyes, acids, and volatile organic compounds. During this reporting period, 14 events (6.9% of all reported events) resulted in a total of 76 victims, of whom 2 (2.6%) died. The most frequently reported injuries were respiratory system problems, trauma, and headache. Evacuations were ordered for 6 (2.9%) events.

The findings regarding the percentage of events with victims have been consistent in recent years. The distribution of the types of injuries reported has also been consistent. Prevention outreach efforts for 2006 focused on emergency management planning and the education of trucking industries and Colorado Environmental Health Association members.

## 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; and
- 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 last 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 Colorado, 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, fourteen state health departments participated in HSEES: Colorado, Florida, Iowa, Louisiana, Michigan, Minnesota, 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 are not limited to, reports from responsible parties, federal, state and local agencies, media sources and the general public. 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.

An HSEES event is an uncontrolled or illegal acute release of any hazardous substance (except petroleum when petroleum is the only substance released), in any amount for substances listed on the HSEES Mandatory Chemical Reporting List, or, if not on the list, in an amount

greater than or equal to 10 lbs or 1 gallon. Threatened releases of qualifying amounts are included if the threat led to an action (e.g., evacuation) to protect the public health.

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 204 acute hazardous substances events were captured by Colorado HSEES. A total of 58 (28.4%) events occurred in fixed facilities. The counties with the most frequent number of events were Adams (100 [49.0%]), Denver (24 [11.8%]) and El Paso (10 [4.9%]) (Table 1).

Area/equipment involved in fixed-facility events is selected for events with North American Industry Classification System (NAICS) categories “21” Mining, “22” Utilities, “31” Manufacturing, “32” Manufacturing, and “33” Manufacturing. Of the 33 events with these NAICS categories, 11 (33.3%) reported one type of area and 22 (66.7%) reported a combination of two area types. Piping and process vessels were the primary areas for all 33 events (Table 1).

Of the 146 transportation-related events, 140 (95.9%) occurred during ground transport (e.g., truck, van, or tractor), 4 (2.7%) involved transport by rail, and 2 (1.4%) from a pipeline (Figure 2). Most (97.1%) ground transportation events involved trucks. The largest proportions of transportation-related events occurred due to releases en route that were later discovered at fixed facilities (83 [56.8%]) and from a moving vehicle or vessel (31 [21.2%]). Of the 146 transportation-related events, 26 (17.8%) involved a release that occurred during unloading of a stationary vehicle or vessel.

Factors contributing to the events consisted of primary and secondary entries. Primary factors were reported for all 204 events (Figure 3a). Of the reported primary factors, equipment failure and human error were most frequent in fixed facility events, and most (60.3%) transportation-related events involved human error. Secondary factors were reported for 181 (88.7%) events (Figure 3b). Improper filling, loading or packing was the most frequently reported secondary factor for both fixed facility and transportation events.

More than 96% of all events involved the release of only one substance. Two substances were released in approximately 2.5% of the events, and approximately 1.5% involved the release of

three substances (Table 2). Transportation events were more likely than fixed-facility events to have two or more substances released in an event (4.1% vs.3.4%).

The number of events by month ranged from 9 (4.4%) in March to 26 (12.7%) in November.

Approximately 85% of events occurred during weekdays. Almost 31% of the events occurred from 12:00 PM to 5:59 PM, 29.4% from 6:00 AM to 11:59 AM, 22.5% 00:00 AM to 05:59 AM, and the remainder during the evening hours.

### ***Industries***

The largest proportions of HSEES events were associated with the transportation and warehousing (147 [72.1%]) and manufacturing (16 [7.8%]) industries (Table 3). Within transportation, trucking service (135 [91.8%]) accounted for most of the events followed by railroads (5 [3.4%]). The largest number of events with victims also occurred from the transportation industry (8 [57.1%]). The total number of victims was also greatest in the transportation industry (52 [68.4%]).

### ***Substances***

A total of 215 substances were released in all events. The individual substances most frequently released were paint, sulfuric acid, mixtures and sodium hydroxide (Appendix A). Substances were grouped into 16 categories. The substance categories most commonly released in fixed-facility events were other inorganic substances (13 [21.3%]), acids (10 [16.4%]), and other (8 [13.1%]). In transportation-related events, the most common substance categories released were

paints and dyes (38 [24.7%]), acids (26 [16.9%]), and volatile organic compounds (25 [16.2%]) (Table 4).

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: spills (195 [90.7%]), air releases (10 [4.7%]), and radiation (3 [1.4%]). Seven events involved a combination of releases.

### ***Victims***

A total of 76 victims were involved in 14 events (6.9% of all events) (Table 5). Of the 14 events with victims, 5 (35.7%) events involved only one victim, and 1 (7.1%) involved two victims. Of all victims, 26 (34.2%) were injured in fixed-facility events and 50 (65.8%) were injured in transportation 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 one or more substances from the same substance category, substances were counted once in that category. In events that involved two or more substances from different categories, substances were counted once in each category.

Substances released most often were not necessarily the most likely to result in victims (Table 6). For example, events categorized as paints constituted 20.0% of all events; however, none of these events resulted in injuries. Conversely, events involving hetero-organics and hydrocarbons

accounted for 0.5% and 0.9% of all events respectively, but the 1 hetero-organic event and 50.0% of hydrocarbon events resulted in injuries.

The general public (50 [65.8%]) constituted the largest proportion of the population groups injured, followed by employees (14 [18.4%]) (Figure 4). One police officer was injured in a transportation event when he developed respiratory irritation after discovering a leak in a container at a port of entry.

Victims were reported to sustain a total of 88 injuries or symptoms (Table 7). 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 system problems (22 [57.9%]) and headache (8 [21.1%]). In transportation-related events, respiratory system problems (36 [72.0%]) and trauma (14 [28.0%]) were reported most frequently. All of the trauma injuries in transportation-related events were not substance-related; these injuries resulted from a chain of events, such as a motor vehicle accident leading to the release of a hazardous substance, and not from exposure to the substance itself.

The median age of the victims was 33 years (range: 5-60 years). When victims are grouped into age categories, 4 (5.3%) were 5-14 years of age, 4 (5.3%) were 15-19 years of age, 55 (72.4%) were 20-44 years of age, and 13 (17.1%) were 45-64 years of age.

A small majority of the victims (39 [51.3%]) were females who were either members of the general public or students.

Of the 76 victims, 41 (53.9%) were treated on scene with first aid and 25 (32.9%) were treated at the hospital but not admitted. Two (2.6%) deaths were reported (Figure 5). Both deaths were trauma related.

None of the victims wore any form of PPE, except for the police officer who was wearing level D protection at the time of the incident.

One event involved 35 members of the general public who were injured when a pesticide release was pulled into the ventilation system of a business and the occupants were overcome by the fumes.

### ***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 168 (82.4%) events, schools within ¼ mile of 10 (4.9%) events, hospitals within ¼ mile of 1 (0.5%) event, nursing homes within ¼ mile of 14 (6.9%) events, licensed daycares within ¼ mile of 30 (14.7%) events, industries or other businesses within ¼ mile of 173 (84.8%) events and recreational areas within ¼ mile of 8 (3.9%) events.

The number of events at which persons were at risk of exposure was determined primarily using GIS. There were 158 (77.5%) events with persons living within ¼ mile of the event; 187

(91.7%) events with persons living within ½ mile; and 196 (96.1%) events with persons living within 1 mile.

### ***Evacuations***

Evacuations were ordered in 6 (2.9%) of events. Of these evacuations, 33.3% were of buildings or affected parts of buildings; 33.3% were of a circle/radius, and 33.3% had no defined criteria. The number of people evacuated ranged from 5 to 350 people (median = 100). Evacuations ranged from 1 to 24 hours (median = 3 hours). None of the events had in-place sheltering ordered by an official.

### ***Decontamination***

Seventy two (94.7%) of the victims were not decontaminated and four (5.3%) were decontaminated at the scene.

There were three events where a total of six uninjured persons were decontaminated; all were decontaminated at the scene of the incident. Decontamination at the scene was done for 4 uninjured employees, one uninjured responder, and one uninjured member of the general public.

## ***Response***

Information was collected on who responded to the event. About 30% reported 2 or more categories of personnel who responded, 25.5% reported 3 or more categories, and 24.0% reported 4 or more categories. Private response teams of companies where the release occurred responded most frequently to events 177 (42.4%) followed by certified hazardous materials teams 48 (11.5%) and third party cleanup contractors 41 (9.8%) (Table 8).

## **COLORADO PREVENTION ACTIVITIES**

During 2006 the Colorado HSEES program performed various prevention activities. These activities included:

- In July 2003, in response to the terrorist attacks on the World Trade Center and Pentagon on September 11, 2001, a governor's executive order created 9 All-Hazards Emergency Management Regions (AHEMR) in Colorado. These regions were tasked with determining critical infrastructures in their areas and planning and preparing for terrorist attacks. In order to assist these new regions with counter-terrorism prevention and preparedness planning, in relation to hazardous materials incident potentiality, quarterly reports on 2006 data were developed and distributed to each region.
- A report on 2005 data was prepared for the trucking industries in Colorado. Included with this report was a letter requesting that the trucking industries report their incidents directly to the CDPHE 24-hour spill reporting line in addition to their submittal to DOT.
- Based on feedback from a report on 2004 data submitted to local health departments, and a request from the Colorado Environmental Health Association (CEHA), an article was written for the CEHA's Point Source quarterly newsletter. The article included an analysis of the 2005 data and an accompanying letter requesting that environmental professionals provide information on spills in their area directly to the departments spill reporting line.

## **SUMMARY OF RESULTS, 1993–2006**

During 1993–2006, the largest proportion of events has varied between fixed facilities and transportation, and the total number of events and number of substances has decreased over the years (Table 9). This is mainly attributable to the evolving changes in the inclusion/exclusion criteria of qualifying events.

The percentage of events with victims was highest in 2004 (11.7%) and lowest in 2001 (3.1%). The average percentage of events with victims during 1993–2006 was 6.8%.

Respiratory irritation has consistently been the most frequently reported injury.

Employees continue to be the most commonly reported victims of acute chemical releases (except for 2006, when one incident caused a spike in general public exposure). The large number of students injured in 2004 is directly attributable to one incident of improper mixing of chemicals in a high school chemistry lab.

The number of deaths associated with acute hazardous substances events has increased in recent years. Many of these deaths were attributed to non-chemical circumstances surrounding the events (e.g., a crash resulting from high-speed travel of a truck pulling an ammonia tank).

## REFERENCES

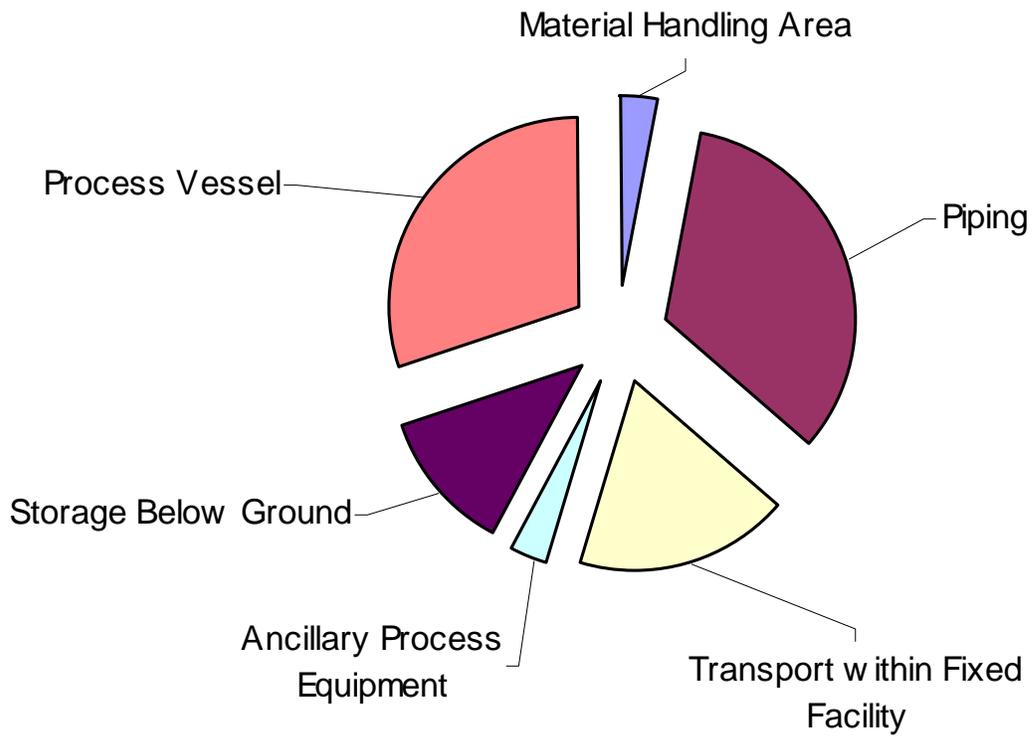
1. Centers for Disease Control and Prevention. Comprehensive plan for epidemiologic surveillance. Atlanta: US Department of Health and Human Services; 1986.
2. Binder S. Death, injuries, and evacuations from acute hazardous materials releases. *Am J Public Health* 1989;70:1042-4.

## Appendix A

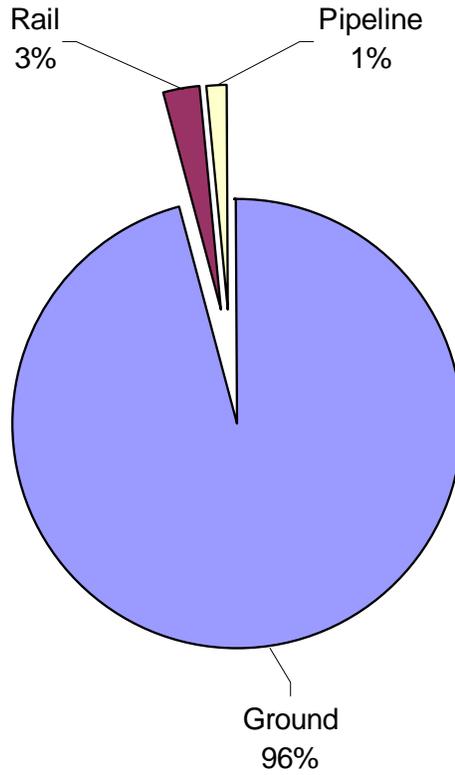
The 10 substances most frequently involved in events—Colorado Hazardous Substances  
Emergency Events Surveillance, 2006

<b>CHEMICAL</b>	<b>NUMBER OF EVENTS</b>
Paint	39
Sulfuric Acid	18
Mixture	12
Sodium Hydroxide	12
Magnesium Chloride	7
Asbestos	5
Ammonia	5
Mercury	4
Methanol	4
Hydrochloric Acid	4

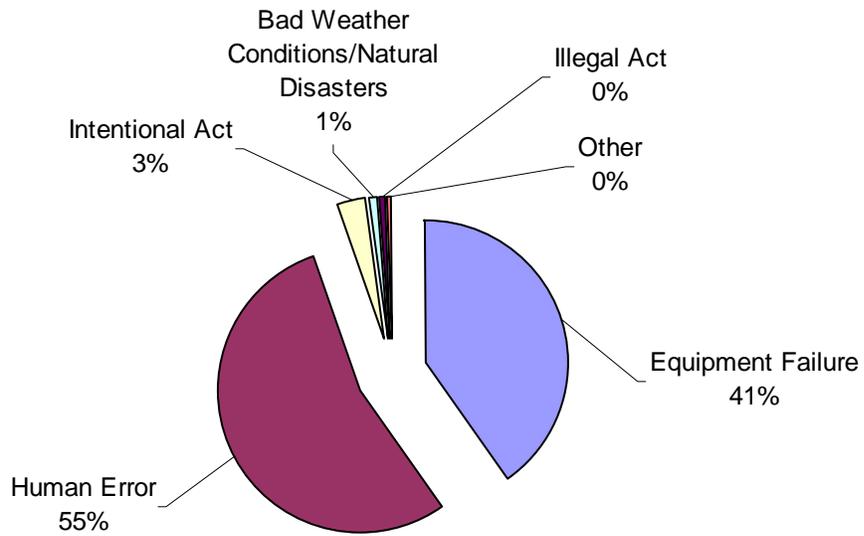
**Figure 1. –Primary areas of fixed facilities involved in events Colorado Hazardous Substances Emergency Events Surveillance, 2006**



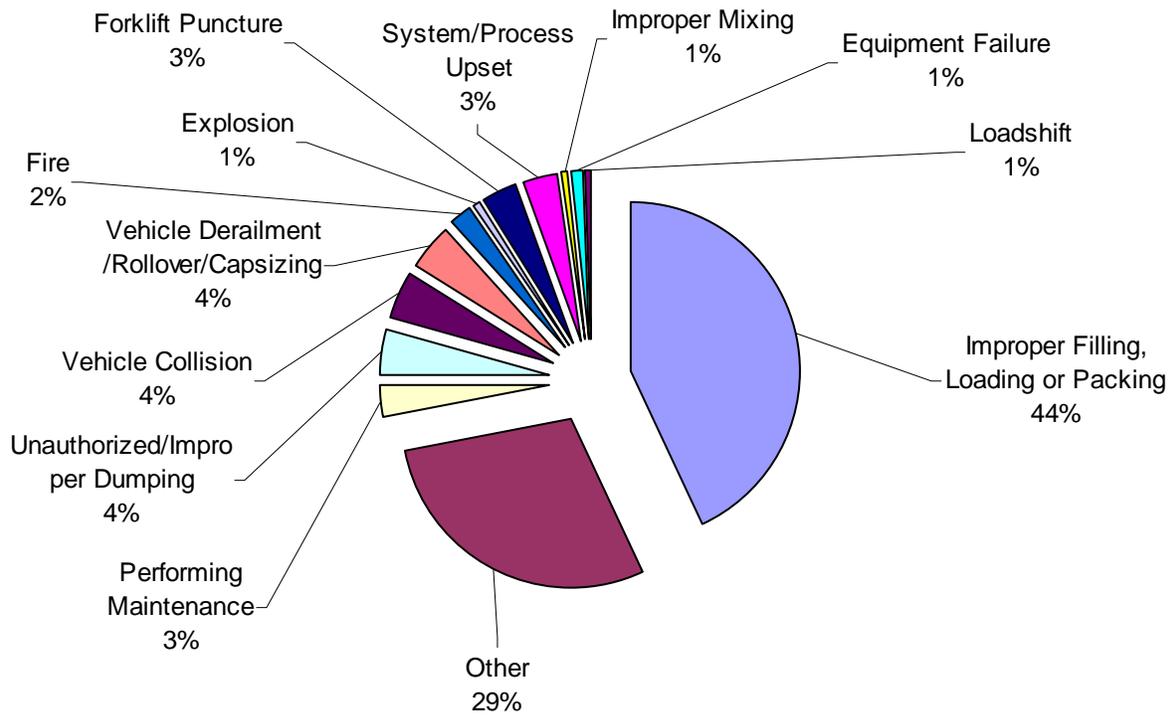
**Figure 2.-Distribution of transportation-related events, by type of transport—  
Colorado Hazardous Substances Emergency Events Surveillance, 2006**



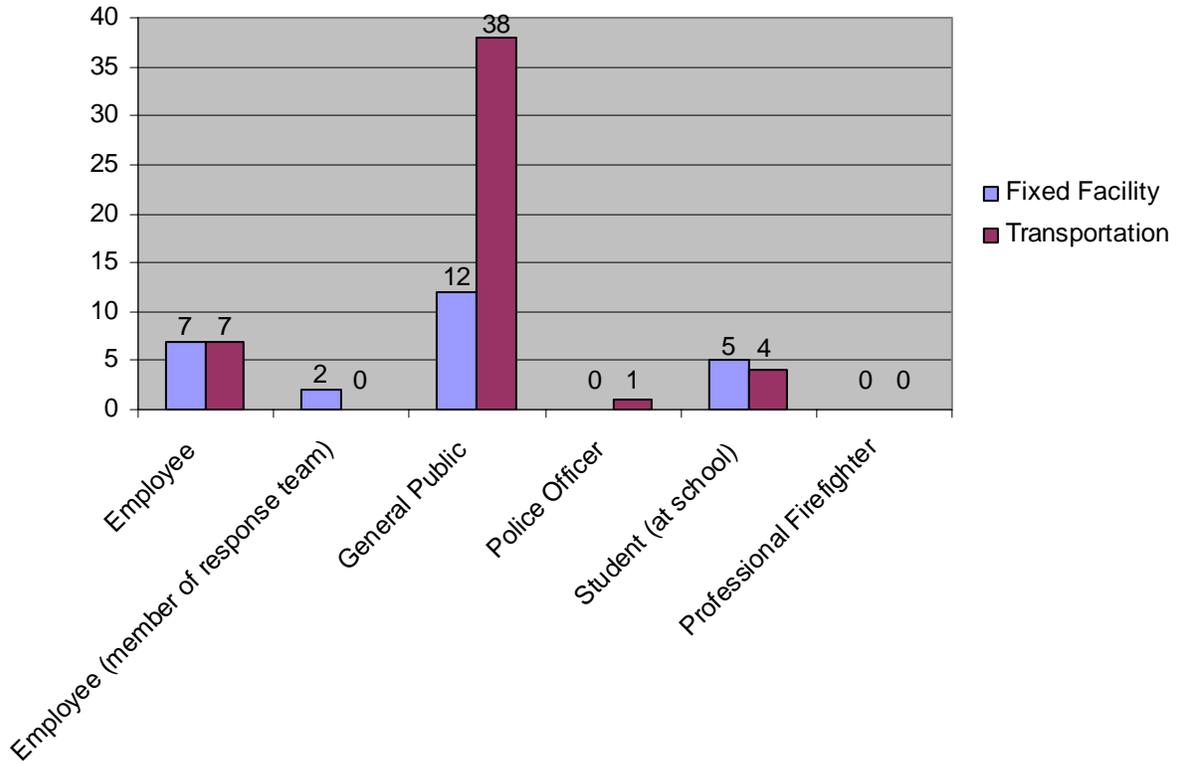
**Figure 3a.-Primary factors reported as contributing to events—Colorado Hazardous Substances Emergency Events Surveillance, 2006**



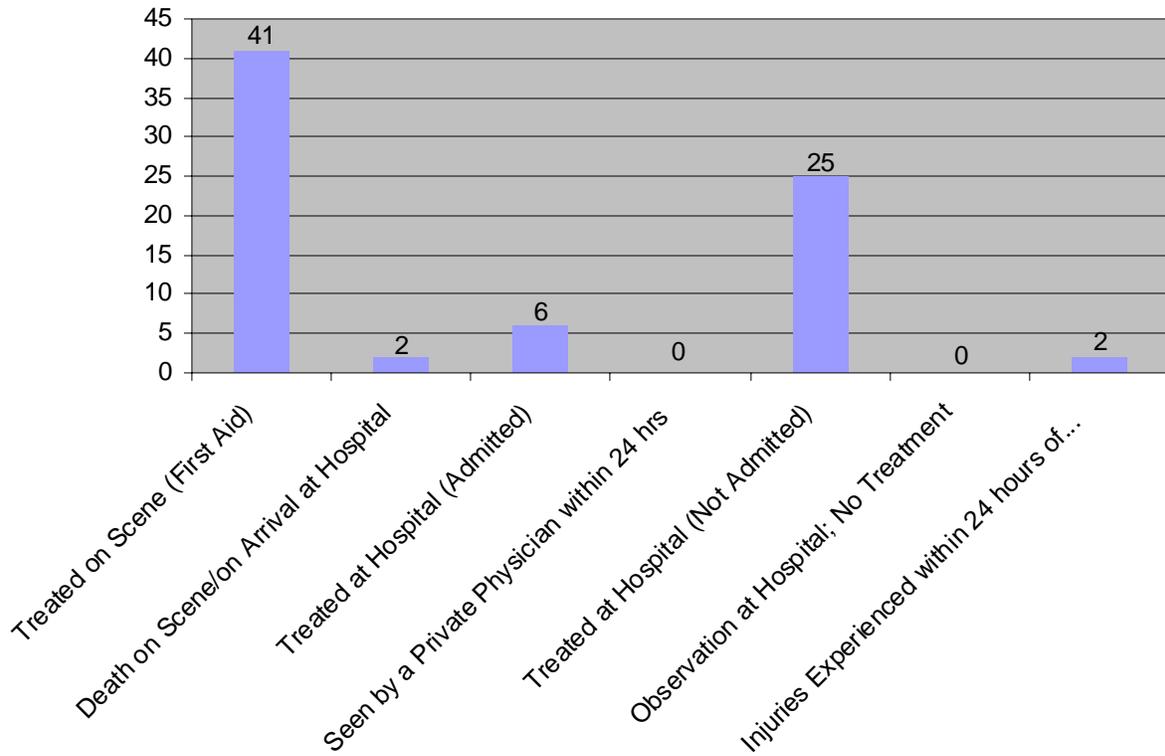
**Figure 3b.-Secondary factors reported as contributing to events—Colorado Hazardous Substances Emergency Events Surveillance, 2006**



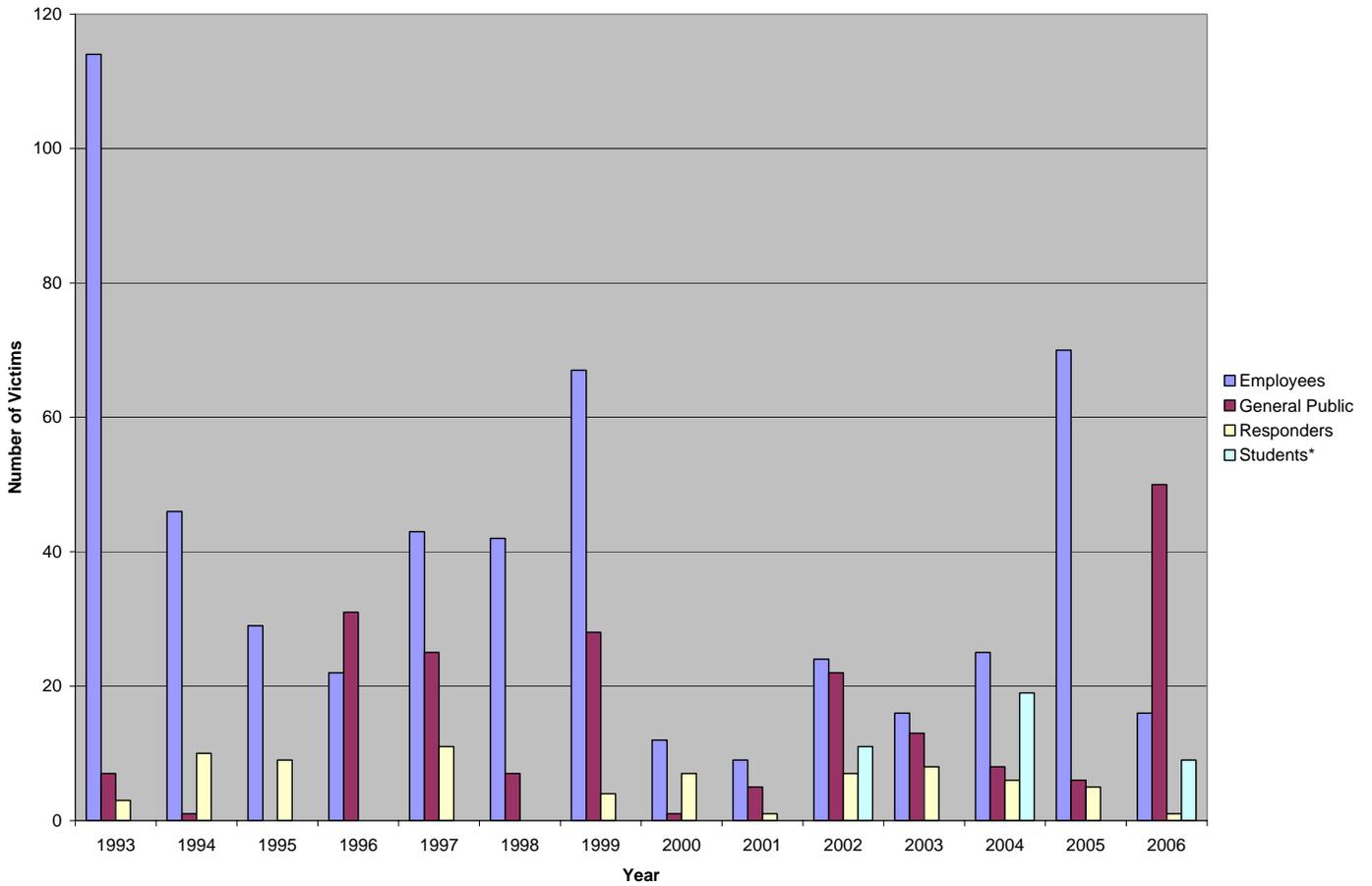
**Figure 4.-Number of victims, by population group and type of event—  
Colorado Hazardous Substances Emergency Events Surveillance, 2006**



**Figure 5.-Injury disposition—Colorado Hazardous Substances  
Emergency Events Surveillance, 2006**



**Figure 6.-Number of victims, by category and year—Colorado Hazardous Substances Emergency Events Surveillance, 1993–2006**



\*Student category was separated out of the general public category in 2001

**Table 1.—Number of events meeting the surveillance definition, by county and type of event— Colorado Hazardous Substances Emergency Events Surveillance, 2006**

County	Type of event				All events
	Fixed facility		Transportation		
	No. events	%*	No. events	%*	Total no. events (%)
Adams	13	13.0	87	87.0	100 (49.0)
Arapahoe	2	66.7	1	33.3	3 (1.5)
Baca	0	0.0	1	100.0	1 (0.5)
Boulder	3	75.0	1	25.0	4 (2.0)
Broomfield	2	100.0	0	0.0	2 (1.0)
Chaffee	0	0.0	1	100.0	1 (0.5)
Cheyenne	0	0.0	1	100.0	1 (0.5)
Clear Creek	0	0.0	1	100.0	1 (0.5)
Denver	9	37.5	15	62.5	24 (11.8)
Douglas	3	75.0	1	25.0	4 (2.0)
Eagle	1	100.0	0	0.0	1 (0.5)
El Paso	6	60.0	4	40.0	10 (4.9)
Elbert	1	100.0	0	0.0	1 (0.5)
Fremont	0	0.0	3	100.0	3 (1.5)
Garfield	1	33.3	2	66.7	3 (1.5)
Gunnison	1	100.0	0	0.0	1 (0.5)
Jefferson	4	80.0	1	20.0	5 (2.5)
Kiowa	0	0.0	1	100.0	1 (0.5)
Larimer	0	0.0	4	100.0	4 (2.0)
Lincoln	0	0.0	3	100.0	3 (1.5)
Logan	0	0.0	2	100.0	2 (1.0)
Mesa	2	33.3	4	66.7	6 (2.9)
Moffat	0	0.0	1	100.0	1 (0.5)
Montrose	1	33.3	2	66.7	3 (1.5)
Morgan	0	0.0	1	100.0	1 (0.5)
Otero	2	100.0	0	0.0	2 (1.0)
Phillips	1	50.0	1	50.0	2 (1.0)

County	Type of event				All events
	Fixed facility		Transportation		
	No. events	%*	No. events	%*	Total no. events (%)
Prowers	1	100.0	0	0.0	1 (0.5)
Pueblo	4	100.0	0	0.0	4 (2.0)
Routt	1	50.0	1	50.0	2 (1.0)
Saguache	0	0.0	2	100.0	2 (1.0)
San Juan	0	0.0	1	100.0	1 (0.5)
Summit	0	0.0	2	100.0	2 (1.0)
Weld	0	0.0	2	100.0	2 (1.0)
<b>Total</b>	58		146		204

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

**Table 2.—Number of substances involved per event, by type of event—Colorado 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	56	96.6	56	140	95.9	140	196	96.1	196
2	1	1.7	2	4	2.7	8	5	2.5	10
3	1	1.7	3	2	1.4	6	3	1.5	9
<b>Total</b>	<b>58</b>	<b>100.0</b>	<b>61</b>	<b>146</b>	<b>100.0</b>	<b>154</b>	<b>204</b>	<b>100.0</b>	<b>215</b>

**Table 3.—Industries involved in hazardous substance events, by category—  
Colorado Hazardous Substances Emergency Events Surveillance, 2006**

Industry category	Total events		Events with victims		Percentage of events with victims	Total no. victims Number (maximum)*
	No.	%	No.	%		
Accommodation & Food Services	1	0.5	0	0.0	0.0	0
Administrative & Support and Waste Management & Remediation Services	2	1.0	0	0.0	0.0	0
Agriculture , Forestry, Fishing and Hunting	0	0.0	0	0.0	0.0	0
Arts, Entertainment & Recreation	0	0.0	0	0.0	0.0	0
Construction	1	0.5	0	0.0	0.0	0
Educational Services	3	1.5	1	7.1	33.3	2
Finance and Insurance	0	0.0	0	0.0	0.0	0
Health Care and Social Assistance	0	0.0	0	0.0	0.0	0
Information	0	0.0	0	0.0	0.0	0
Management of Companies & Enterprises	0	0.0	0	0.0	0.0	0
Manufacturing	16	7.8	1	7.1	6.3	8
Mining	4	2.0	0	0.0	0.0	0
Other Services (except Public Administration)	1	0.5	1	7.1	100.0	4
Professional, Scientific & Technical Services	1	0.5	0	0.0	0.0	0
Public administration	5	2.5	2	14.3	40.0	6 (5)
Real Estate & Rental & Leasing	1	0.5	0	0.0	0.0	0
Retail trade	3	1.5	0	0.0	0.0	0
Utilities	15	7.4	1	7.1	6.7	4
Transportation & Warehousing	147	72.1	8	57.1	4.1	52 (35)
Wholesale trade	2	1.0	0	0.0	0.0	0
Unspecified, unknown or not an industry	2	1.0	0	0.0	0.0	0
<b>Total<sup>‡</sup></b>	<b>204</b>	<b>100.0</b>	<b>14</b>	<b>100.0</b>	<b>6.9</b>	<b>76 (35)</b>

\*Minimum number of victims per event = 1.

**Table 4.—Number of substances involved, by substance category and type of event—Colorado Hazardous Substances Emergency Events Surveillance, 2006**

Substance category	Type of event				All events	
	Fixed facility		Transportation		No. substances	%
	No. substances	%	No. substances	%		
Acids	10	16.4	26	16.9	36	16.7
Agricultural Chemicals & Pesticides	2	3.3	8	5.2	10	4.7
Ammonia	5	8.2	0	0.0	5	2.3
Bases	1	1.6	18	11.7	19	8.8
Chlorine	4	6.6	0	0.0	4	1.9
Formulations	0	0.0	0	0.0	0	0.0
Hetero-organics	0	0.0	1	0.6	1	0.5
Hydrocarbons	1	1.6	1	0.6	2	0.9
Mixture*	5	8.2	7	4.5	12	5.6
Other <sup>†</sup>	8	13.1	12	7.8	20	9.3
Other inorganic substances <sup>‡</sup>	13	21.3	11	7.1	24	11.2
Oxy-organics	2	3.3	4	2.6	6	2.8
Paints and dyes	5	8.2	38	24.7	43	20.0
Polychlorinated biphenyls	1	1.6	1	0.6	2	0.9
Polymers	2	3.3	2	1.3	4	1.9
Volatile organic compounds	2	3.3	25	16.2	27	12.6
<b>Total</b>	<b>61</b>	<b>100.0</b>	<b>154</b>	<b>100.0</b>	<b>215</b>	<b>100.0</b>

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

<sup>†</sup> Not belonging to one of the existing categories.

<sup>‡</sup> All inorganic substances except for acids, bases, ammonia, and chlorine.

**Table 5.—Number of victims per event, by type of event—Colorado 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	0	0.0	0	5	62.5	5	5	35.7	5
2	1	16.7	2	0	0.0	0	1	7.1	2
3	1	16.7	3	0	0.0	0	1	7.1	3
4	2	33.3	8	1	12.5	4	3	21.4	12
5	1	16.7	5	0	0.0	0	1	7.1	5
≥6	1	16.7	8	2	25.0	41	3	21.4	49
<b>Total</b>	<b>6</b>	<b>100.0</b>	<b>26</b>	<b>8</b>	<b>100.0</b>	<b>50</b>	<b>14</b>	<b>100.0</b>	<b>76</b>

**Table 6.—Frequency of substance categories in all events and events with victims—Colorado Hazardous Substances Emergency Events Surveillance System, 2006**

Substance category	All events		Events with victims		
	No.	%	No.	Percentage	Percentage of events with victims in substance category
				of all releases with victims	
Acids	36	16.7	4	21.1	11.1
Agricultural Chemicals & Pesticides	10	4.7	2	10.5	20.0
Ammonia	5	2.3	0	0.0	0.0
Bases	19	8.8	0	0.0	0.0
Chlorine	4	1.9	1	5.3	25.0
Formulations	0	0.0	0	0.0	0.0
Hetero-organics	1	0.5	1	5.3	100.0
Hydrocarbons	2	0.9	1	5.3	50.0
Mixture*	12	5.6	5	26.3	41.7
Other <sup>†</sup>	20	9.3	4	21.1	20.0
Other inorganic substances <sup>‡</sup>	24	11.2	0	0.0	0.0
Oxy-organics	6	2.8	0	0.0	0.0
Paints and dyes	43	20.0	0	0.0	0.0
Polychlorinated biphenyls	2	0.9	0	0.0	0.0
Polymers	4	1.9	1	5.3	25.0
Volatile organic compounds	27	12.6	0	0.0	0.0
<b>Total</b>	<b>215*</b>	<b>100.0</b>	<b>19</b>	<b>100.0</b>	

<sup>†</sup>Substances from different categories that were mixed or formed from a reaction before the event.

<sup>‡</sup>Not classified.

<sup>§</sup>All inorganic substances except for acids, bases, ammonia, and chlorine.

\*Some events may have had more than one type of substance released

**Table 7.—Frequencies of injuries/symptoms, by type of event\*  
Colorado Hazardous Substances Emergency Events Surveillance,  
2006**

Injury/symptom	Fixed facility		Transportation		All events	
	No. injuries	%	No. injuries	%	Total no.	%
Chemical/Thermal burns	0	0.0	0	0.0	0	0.0
Dizziness/central nervous system symptoms	0	0.0	0	0.0	0	0.0
Eye irritation	4	10.5	0	0.0	4	4.5
Gastrointestinal problems	0	0.0	0	0.0	0	0.0
Headache	8	21.1	0	0.0	8	9.1
Heart problems	0	0.0	0	0.0	0	0.0
Heat stress	0	0.0	0	0.0	0	0.0
Other	0	0.0	0	0.0	0	0.0
Respiratory system problems	22	57.9	36	72.0	58	65.9
Shortness of breath	0	0.0	0	0.0	0	0.0
Skin irritation	4	10.5	0	0.0	4	4.5
Trauma <sup>†</sup>	0	0.0	14	28.0	14	15.9
<b>Total*</b>	<b>38</b>	<b>100.0</b>	<b>50</b>	<b>100.0</b>	<b>88</b>	<b>100.0</b>

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

<sup>†</sup> None of the trauma injuries were chemical-related

**Table 8.—Distribution of personnel who responded to the event—Colorado Hazardous Substances Emergency Events Surveillance, 2006**

<b>Responder category</b>	<b>No.</b>	<b>%</b>
Certified HazMat team	48	11.5
Dept of works/utilities/transportation	22	5.3
Emergency medical technicians	15	3.6
Environmental agency/EPA <sup>†</sup> response team	5	1.2
Fire department	39	9.4
Health department/health agency	7	1.7
Law enforcement agency	39	9.4
Other	2	0.5
Response team of company where release occurred	177	42.4
Specialized multiagency teams	5	1.2
State, County or Local emergency managers/coordinators/planning committees	17	4.1
Third party clean up contractors	41	9.8
<b>Total</b>	<b>417</b>	<b>100.0</b>

<sup>†</sup>Environmental Protection Agency.

**Table 9.— Cumulative data by year—Colorado Hazardous Substances Emergency Events Surveillance, 1993-2006\***

Year	Type of event			No. substances released	No. victims	No. deaths	Events with victims	
	Fixed facility	Transportation	Total				No.	% <sup>†</sup>
1993	337	90	427	451	124	0	26	6.1
1994	530	70	600	690	57	1	25	4.2
1995	220	62	282	294	38	2	23	8.2
1996	101	223	324	339	53	2	21	6.5
1997	147	150	297	375	79	3	21	7.1
1998	142	113	255	267	49	1	13	5.1
1999	148	102	250	259	99	0	11	4.4
2000	99	111	210	218	20	0	11	5.2
2001	94	131	225	236	15	0	7	3.1
2002	90	106	196	220	64	4	20	10.2
2003	55	133	188	190	37	1	9	4.8
2004	54	125	179	196	58	3	21	11.7
2005	62	99	161	177	81	3	18	11.2
2006	58	146	204	215	76	2	14	6.9
<b>Total</b>	<b>2075</b>	<b>1562</b>	<b>3637</b>	<b>3950</b>	<b>769</b>	<b>19</b>	<b>222</b>	

\* 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.