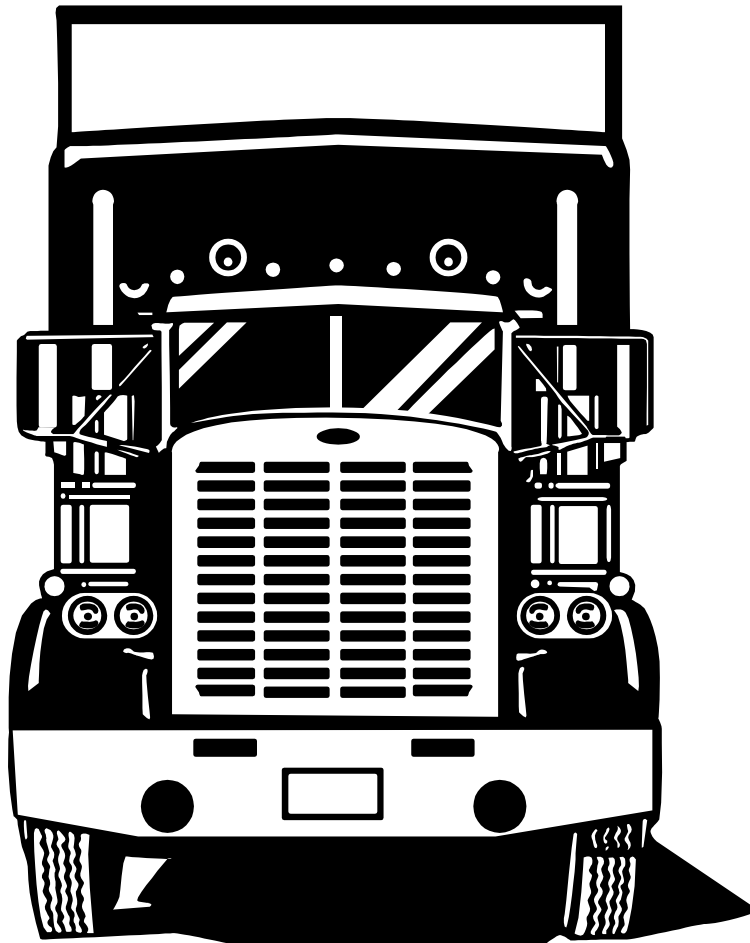


**COLORADO HAZARDOUS SUBSTANCES
EMERGENCY EVENTS SURVEILLANCE (HSEES)
SYSTEM**

**2005 REPORT
TRANSPORTATION INCIDENTS**



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 transportation events reported to Colorado in 2005. 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 99 transportation events were reported. In 90 (90.9%) events, only one substance was released. The most commonly reported categories of substances released were paints & dyes, volatile organic compounds, other, and acids. During this reporting period, 10 events (10.1% of all reported events) resulted in a total of 15 victims, of whom 3 (20.0%) died. The most frequently reported injury was trauma. An evacuation was ordered for 1 (1.0%) event.

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 transportation events during 2005 in Colorado, and summarizes the characteristics of these acute releases of hazardous substances and their associated public health consequences.

METHODS

In 2005, thirteen 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 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.

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 law 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. Events are included for all hazardous substance incidents that are greater than or equal to one gallon or ten pounds and any quantity of an extremely hazardous substance or an HSEES Mandatory Substance. 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 2005, Colorado HSEES captured a total of 99 acute hazardous substances transportation events. The counties with the most frequent number of events were Adams (51 [51.5%]), Denver (6 [6.1%]), Arapahoe (4 [4.0%]) and Larimer (4 [4.0%]) (Table 1).

Of the 99 transportation-related events, 94 (94.9%) occurred during ground transport (e.g., truck, van, or tractor), 4 (4.0%) involved transport by rail and 1 (1.0%) involved a pipeline (Figure 1).

Trucks were involved in 89 (94.7%) of the ground transportation events. Of the 89 truck-related incidents, 80 (89.9%) involved non-tanker trucks and 9 (10.1%) involved tanker trucks. The remainder of the ground transportation incidents occurred during transport in vans, automobiles and other.

Of the 4 rail-related incidents, 2 (50.0%) occurred from a tank car, 1 (25.0%) from a boxcar and 1 (25.0%) other.

The largest proportions of transportation-related events occurred due to releases en route that were later discovered at fixed facilities (39 [39.4%]) and from a moving vehicle or vessel (33 [33.3%]) (Figure 2).

Factors contributing to the events consisted of primary and secondary entries (Figure 3a & 3b). The most common primary factor involved in the releases was human error (68 [68.7%]). Improper filling, loading or packing was the most frequently reported secondary factor (43 [43.4%]).

More than 90.9% of all events involved the release of only one substance. Two substances were released in approximately 8.1% of the events, and one event involved the release of three substances.

The number of events by month ranged from 4 (4.0%) in March to 13 (13.1%) in August. The majority of events (90 [90.9%]) occurred on weekdays and 9 (9.1%) occurred on weekends. Almost 31.3% of the events occurred from 6:00 AM to 11:59 AM, 26.3% from 12:00 PM to 5:59 PM, 22.2% from 6:00 PM to 11:59 PM, and the remainder during the early hours of the day.

Substances

A total of 109 substances were released in all events. The individual substances most frequently released were paint, diesel fuel, sulfuric acid and isopropyl alcohol. Substances were grouped into 16 categories. The substance categories most commonly released were paints and dyes (19 [17.4%]), volatile organic compounds (16 [14.7%]), and other (15 [13.8%]) (Table 2).

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 (99 [90.8%]) and air releases (2 [1.8%]). Of events with two types of releases, the following combinations were reported: spills and fire (5 [4.6%]) and spills and air releases (3 [2.8%]).

Victims

A total of 15 victims were involved in 10 events (10.1% of all events). Of the 10 events with victims, 7 (70.0%) events involved only one victim, 1 (10.0%) involved two victims, and 2 (20.0%) involved 3 victims.

Employees (9 [60.0%]) constituted the largest proportion of the population groups injured, followed by the general public and police officers (3 [20.0%] per group).

Each victim sustained one injury or symptom. The reported injuries were non-chemical related trauma (12 [80.0%]), chemical related trauma (2 [13.3%]), and respiratory system problems (1 [6.7%]).

The median age of the victims was 42 years (range: 8–61 years). Most of the victims (10 [66.7%]) were males.

Of the 15 victims, most (7, 46.7%) were treated at the hospital but not admitted (Figure 4). Of the police officer injuries, the two who sustained chemical related trauma injuries were wearing Level D protection; the one who experienced respiratory irritation was not wearing any form of PPE. The remainder of the employees and general public who sustained non-chemical related trauma injuries were not wearing PPE, however their injuries were a direct result of the impact of crashes.

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 $\frac{1}{4}$ mile of 83 (83.8%) events, schools within $\frac{1}{4}$ mile of 2 (2.0%) events, nursing homes within $\frac{1}{4}$ mile of 4 (4.0%) events, licensed daycares within $\frac{1}{4}$ mile of 12 (12.1%) events, industries or other businesses within $\frac{1}{4}$ mile of 67 (67.7%) events, recreational areas within $\frac{1}{4}$ mile of 3 (3.0%) events and there were no hospitals within $\frac{1}{4}$ mile of any events.

The number of events at which persons were at risk of exposure was determined primarily using GIS. There were 83 (83.8%) events with persons living within ¼ mile of the event; 93 (93.9%) events with persons living within ½ mile; and 96 (97.0%) events with persons living within 1 mile.

Evacuations and Decontaminations

An evacuation was ordered in 1 (1.0%) event. Two people were evacuated for 3 hours from a defined circular area surrounding the event location.

Two (13.3%) victims were decontaminated at the scene. In three events, twelve uninjured people were decontaminated on scene; one was an uninjured member of the general public and eleven were first responders. No uninjured persons were decontaminated at a medical facility.

Response

Information was collected on who responded to the event. Almost 46.5% reported 2 or more categories of personnel who responded, 33.3% reported 3 or more categories, and 27.3% reported 4 or more categories. The response team of the company responsible for the release responded most frequently to events [83 (33.6%)], followed by certified hazardous materials team [40 (16.2%)], third-party cleanup contractors [35 (14.2%)], law enforcement agency [30 (12.1%)] and fire department [26 (10.5%)] (Table 3).

SUMMARY OF RESULTS, TRANSPORTATION INDUSTRIES, 2005

During 2005, the largest proportion of transportation events involved the trucking industry. Most events involved only one substance being released and the most common categories of substances released were paints & dyes, volatile organic compounds, other, and acids. During this reporting period, 10 events resulted in a total of 15 victims, of whom 3 (20.0%) died. The most frequently reported injury was trauma. An evacuation was ordered for 1 (1.0%) event.

INCIDENTS OF INTEREST

One incident involved an evacuation and injuries when a truck containing calcium carbide rolled over, releasing calcium carbide and diesel fuel to the environment. Two responders were injured due to exposure to the calcium carbide and two residences were evacuated as a precaution.

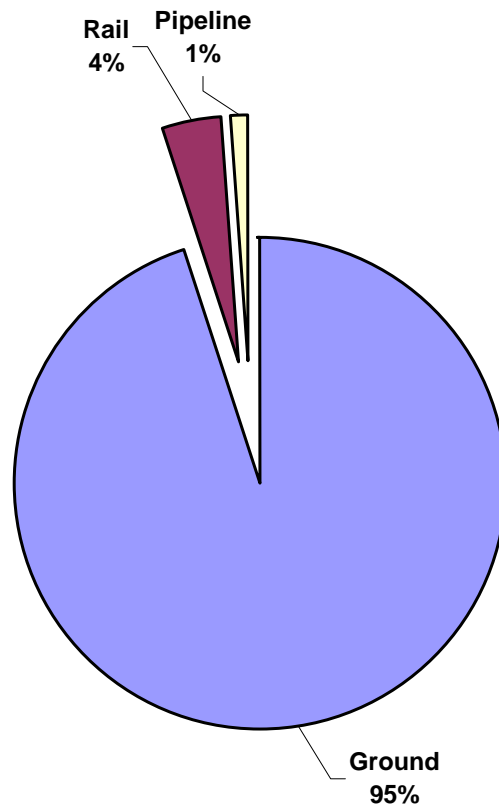
Another event involved an inhalation exposure to a police officer when a box trailer was discovered leaking a gelling agent at a port of entry. The officer was treated and released from the hospital.

Decontamination on persons without injuries occurred in 3 incidents. A citizen was decontaminated after a collision with a mobile methamphetamine lab, 3 responders were decontaminated on the scene of a broken open tote of sodium hypochlorite and 8 responders were decontaminated after responding to a leaking tote of a hypochlorite solution.

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.

**Figure 1.-Distribution of transportation-related events, by type of transport—
Colorado Hazardous Substances Emergency Events Surveillance, 2005**



**Figure 2.-Phase of Transportation—Colorado Hazardous Substances
Emergency Events Surveillance, 2005**

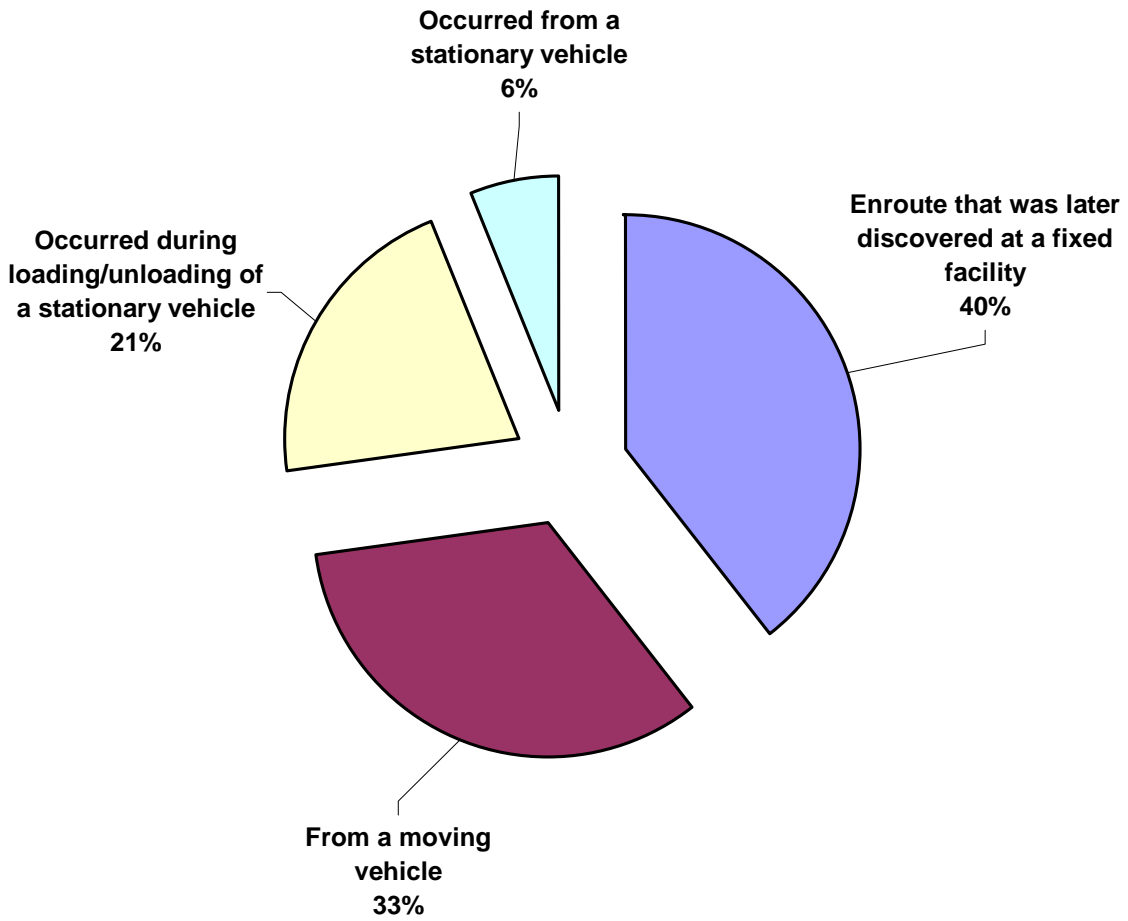


Figure 3a.-Primary factors reported as contributing to events—Colorado Hazardous Substances Emergency Events Surveillance, 2005

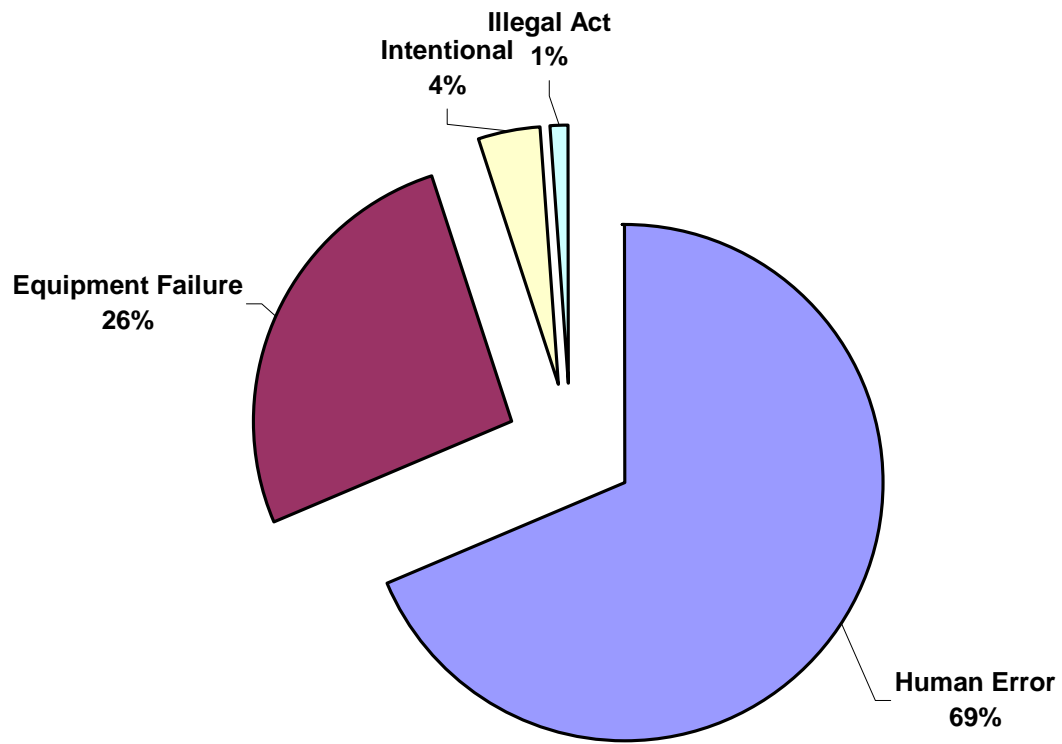
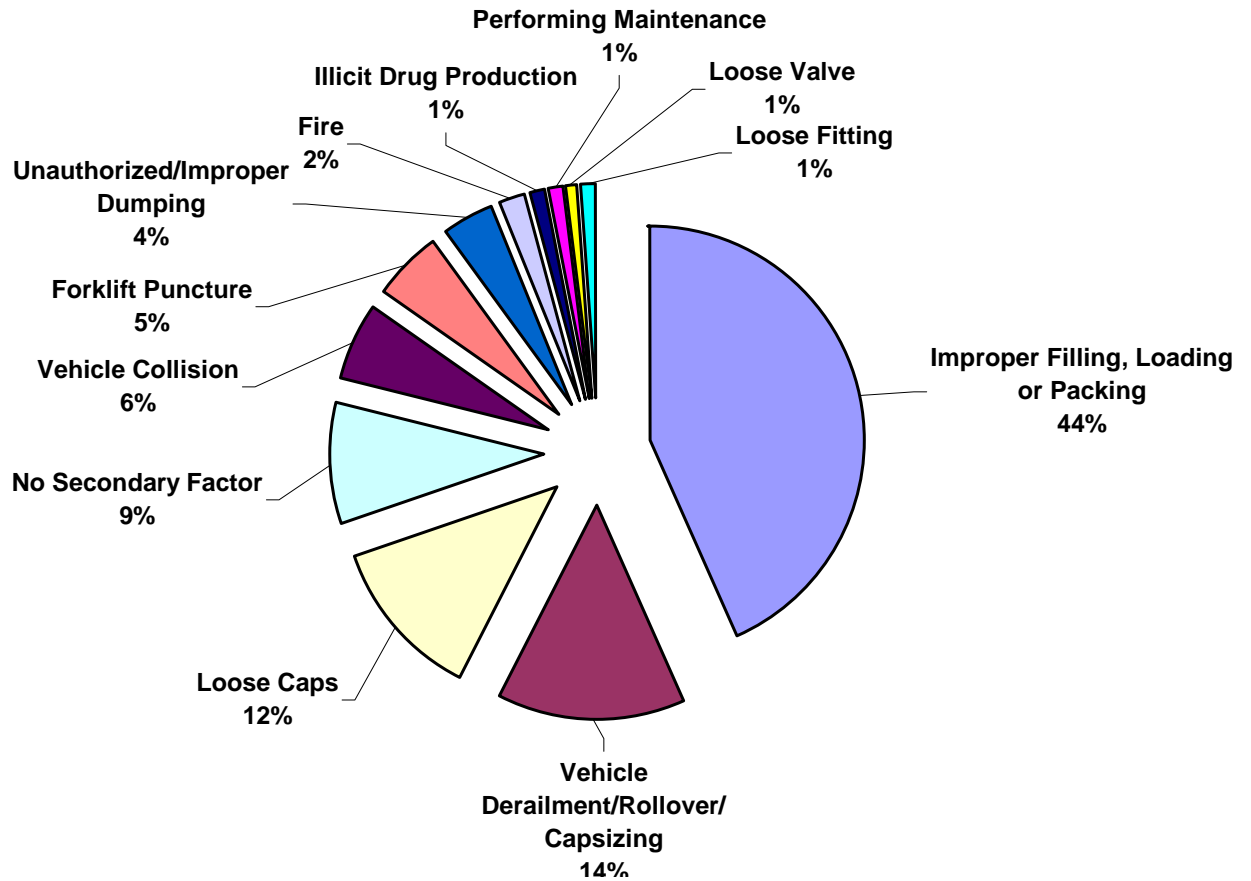


Figure 3b.-Secondary factors reported as contributing to events—Colorado Hazardous Substances Emergency Events Surveillance, 2005



**Figure 4.-Injury disposition—Colorado Hazardous Substances
Emergency Events Surveillance, 2005**

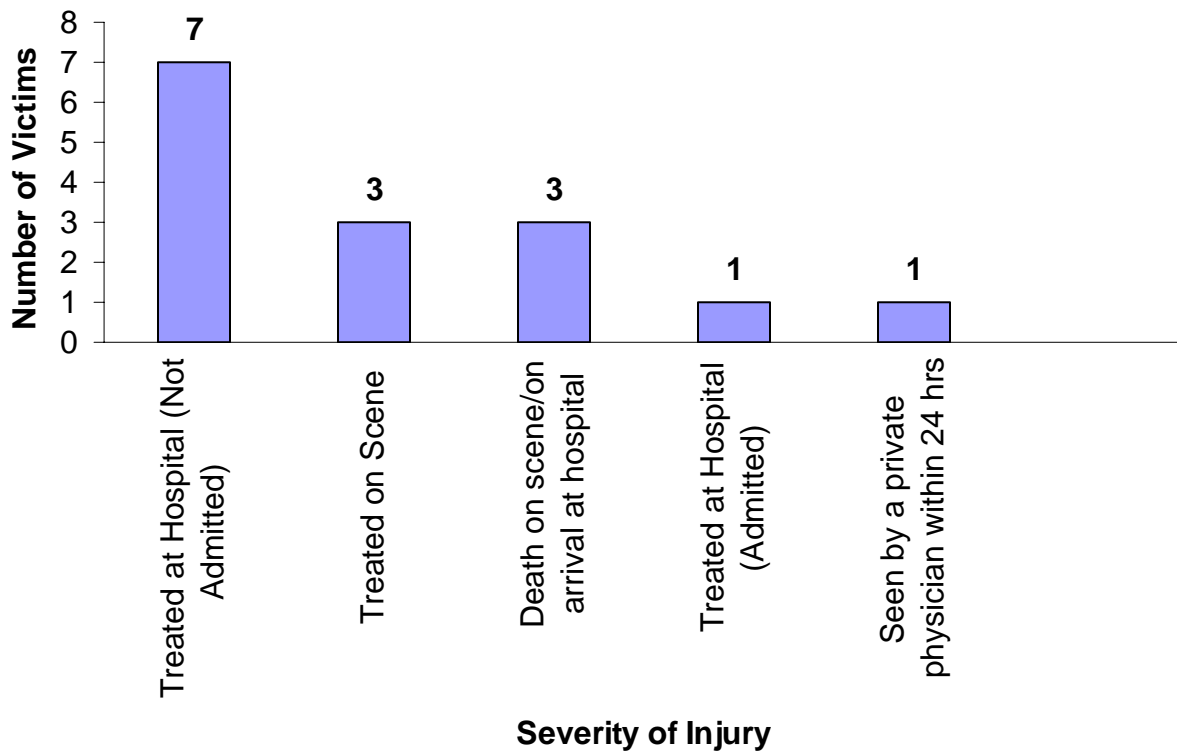


Table 1.—Number of transportation events meeting the surveillance definition, by county— Colorado Hazardous Substances Emergency Events Surveillance, 2005

COUNTY	TOTAL NUMBER OF EVENTS
ADAMS	51 (51.5%)
ARAPAHOE	4 (4.0%)
BACA	1 (1.0%)
BOULDER	2 (2.0%)
CHAFFEE	1 (1.0%)
DENVER	6 (6.1%)
DOUGLAS	2 (2.0%)
EAGLE	1 (1.0%)
EL PASO	3 (3.0%)
ELBERT	1 (1.0%)
GARFIELD	2 (2.0%)
GRAND	2 (2.0%)
GUNNISON	1 (1.0%)
HUERFANO	1 (1.0%)
JEFFERSON	1 (1.0%)
LA PLATA	2 (2.0%)
LARIMER	4 (4.0%)
LAS ANIMAS	1 (1.0%)
LINCOLN	2 (2.0%)
MESA	2 (2.0%)
MONTEZUMA	1 (1.0%)
MORGAN	1 (1.0%)
OURAY	1 (1.0%)
PARK	1 (1.0%)
PUEBLO	3 (3.0%)
SUMMIT	1 (1.0%)
WELD	1 (1.0%)
Total	99 (100.0%)

**Table 2.—Number of substances involved, by substance category—
Colorado Hazardous Substances Emergency Events Surveillance, 2005**

Substance category	No. substances	%
Acids	15	13.8
Ammonia	0	0.0
Bases	8	7.3
Chlorine	4	3.7
Formulations	0	0.0
Hetero-organics	1	0.9
Hydrocarbons	1	0.9
Mixture*	3	2.8
Other [†]	15	13.8
Other inorganic substances [‡]	9	8.3
Oxy-organics	7	6.4
Paints and dyes	19	17.4
Pesticides	8	7.3
Polychlorinated biphenyls	1	0.9
Polymers	2	1.8
Volatile organic compounds	16	14.7
Total	109	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.

Table 3.—Distribution of personnel who responded to the event—Colorado Hazardous Substances Emergency Events Surveillance, 2004

Responder category	No.	%
Certified HazMat team	40	16.2
Emergency medical technicians	11	4.5
Environmental agency/EPA [†] response team	1	0.4
Fire department	26	10.5
Health department/health agency	5	2.0
Hospital personnel	0	0.0
Law enforcement agency	30	12.1
Other	0	0.0
Company's response team	83	33.6
Specialized multi-agency teams	1	0.4
Dept. of works/utilities/transportation	14	5.7
State, County or local emergency managers/coordinators/planning committees	1	0.4
Third party cleanup contractors	35	14.2
Total	247	100.0

[†]Environmental Protection Agency.