

Oregon Department of Human Services
Public Health Services
Environmental and Occupational Epidemiology
Hazardous Substances Emergency Events Surveillance System (HSEES)

CUMULATIVE REPORT FOR 2004

Contents

	Page
List of Tables.....	3
List of Figures.....	4
Executive Summary.....	5
Introduction.....	7
Methods.....	9
Results.....	11
Industries.....	13
Substances.....	14
Victims.....	14
Nearby populations.....	19
Evacuations.....	19
Decontamination.....	20
Response.....	21
Clandestine Methamphetamine Laboratories: Impact on HSEES findings in Oregon.....	21
Summary of Results, 1993–2004.....	22
References.....	24
Appendix.....	25
Tables and Figures.....	26-40

List of Tables

- Table 1. Number of events meeting the surveillance definition, by county and type of event, Oregon Hazardous Substances Emergency Events Surveillance, 2004
- Table 2. Number of substances involved per event, by type of event, Oregon Hazardous Substances Emergency Events Surveillance, 2004
- Table 3. Industries involved in hazardous substance events, by category, Oregon Hazardous Substances Emergency Events Surveillance, 2004
- Table 4. Number of substances involved, by substance category and type of event, Oregon Hazardous Substances Emergency Events Surveillance, 2004
- Table 5. Number of victims per event, by type of event, Oregon Hazardous Substances Emergency Events Surveillance, 2004
- Table 6. Frequency of substance categories in all events and events with victims, Oregon Hazardous Substances Emergency Events Surveillance, 2004
- Table 7. Frequencies of injuries/symptoms, by type of event, Oregon Hazardous Substances Emergency Events Surveillance, 2004
- Table 8. Distribution of personnel who responded to the event, Oregon Hazardous Substances Emergency Events Surveillance, 2004
- Table 9. Cumulative data by year, Oregon Hazardous Substances Emergency Events Surveillance, 1993–2004
- Table 10. Cumulative data by year and category of victim, Oregon Hazardous Substances Emergency Events Surveillance, 1993-2004

List of Figures

- Figure 1. Areas of fixed facilities involved in events—Oregon Hazardous Substances Emergency Events Surveillance, 2004
- Figure 2. Distribution of transportation-related events, by type of transport—Oregon Hazardous Substances Emergency Events Surveillance, 2004
- Figure 3a. Primary factors reported as contributing to events—Oregon Hazardous Substances Emergency Events Surveillance, 2004
- Figure 3b. Secondary factors reported as contributing to events—Oregon Hazardous Substances Emergency Events Surveillance, 2004
- Figure 4. Number of victims, by population group and type of event—Oregon Hazardous Substances Emergency Events Surveillance, 2004
- Figure 5. Injury disposition—Oregon Hazardous Substances Emergency Events Surveillance, 2003

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 the Oregon Department of Human Services, Public Health Services HSEES program during 2004. 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 230 reported events met the HSEES case definition during 2004. In 190 (81%) events, only one substance was released. The most commonly reported categories of substances were “Other”, “Other inorganic substances”, and “volatile organic compounds” (VOCs). During this reporting period, 25 events (11%) resulted in a total of 77 victims. The most frequently reported injuries/symptoms were respiratory irritation, gastrointestinal system problems, eye irritation, and headache. Evacuations were ordered for 12 (5%) events.

The findings regarding the percentage of events with victims have varied in recent years, that is, there were no consistent trends observed. The distribution of the types of injuries reported has been consistent, however, with respiratory irritation and gastrointestinal system problems reported most frequently.

Prevention outreach efforts for 2004 focused on continuing injury prevention for employees of industries and local responders utilizing county/region specific analyses and work with local community awareness emergency response (CAER) groups and the Oregon Local Emergency Planning Committee (LEPC); and work with statewide committees and the governor's Meth Task Force Subcommittee on Drug Endangered Children to develop protocols for care of children found at clandestine methamphetamine labs and to develop technical recommendations for legislation in response to the methamphetamine epidemic in Oregon. Presentations were given at 3 professional society meetings and 2 trainings for child welfare trainers and caseworkers based on OR HSEES data as well as health and safety information on the hazards of methamphetamine labs.

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 2004 in Oregon, 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 2004, thirteen state health departments participated in HSEES: Colorado, Iowa, Louisiana, 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. For Oregon HSEES, these sources included the Oregon Emergency Response System (OERS), the National Response Center (NRC), the Office of State Fire Marshal, the Department of Environmental Quality (DEQ), the US Department of Transportation HMIS, first responders, fire departments, law enforcement, emergency managers, and media reports. 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. 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 may experience more than one type of injury or symptom, so the total number of victims may be less than the total number of injury types or symptoms. 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 2004, a total of 230 acute hazardous substance events were captured by Oregon HSEES: 16 (7%) of these events were threatened releases. 214 (93%) were events in which substances were released. A total of 161 (70%) events occurred in fixed facilities and the remainder were transportation related events. The counties with the most frequent number of events were Multnomah (66 [28.7%]) and Umatilla (24 [10.4%]) (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 161 fixed-facility events, 134 (83%) reported one type of area and 27 (17%) reported a combination of two area types. Among events with one type of area reported, the main areas were classified as follows: 57 (36%) indoor, non-industrial, residence areas, 28 (18%) outdoor, non-farm, non-industrial areas, 16 (10%) storage areas above ground, and 10 (6%) dump/waste areas (Figure 1). Of the events with two areas, 5 (19%) involved dump/waste areas, and 5 (19%) indoor, non-industrial, residence areas in combinations with other types of areas.

Of the 69 transportation-related events, 59 (86%) occurred during ground transport (e.g., truck, van, or tractor) and 5 (7%) involved transport by rail. Fewer events involved water, air, and pipeline transportation modes (Figure 2). Forty-nine percent of ground transportation events involved trucks. The largest proportions of transportation-related events were releases from a moving vehicle or vessel (31 [46%]) and releases during

loading or unloading of a stationary vehicle (15 [22%]). Of the 69 transportation-related events, 6 (9%) involved a release en route that was later discovered at a fixed facility.

Factors contributing to the events consisted of primary and secondary entries. Primary factors were reported for 229 (99%) events (Figure 3a). Of the reported primary factors, most (55%) fixed-facility events involved intentional or illegal activity, and the greatest proportion (46%) of transportation-related events involved equipment failure. Secondary factors were reported for 166 (72%) events (Figure 3b). Of the reported secondary factors, the greatest proportion of fixed-facility events (54%) and transportation-related events (33%) involved illicit drug production.

About 81% of all events involved the release of only one substance. Two substances were released in approximately 10% of the events, and approximately 9% involved the release of more than two substances (Table 2). Transportation events were more likely than fixed facility events to have two or more substances released in an event (21.7% vs. 15.6%).

The number of events by month ranged from 30 (13%) in April to 12 (5%) in November, with the largest proportions occurring from January through April. The proportion of events ranged from 16% to 20% during weekdays, and from 3% to 9% during weekend days. Of all 214 events for which time of day or time category was reported, 36% occurred from 6:01 AM to 12:00 PM, 40% from 12:01 PM to 6:00 PM, 13% from 6:01 PM to 12:00 AM, and the remainder (10%) during the early hours of the day.

Industries

The largest proportions of HSEES events were associated with illegal activity related to illicit drugs (specifically methamphetamine laboratories) (79 [34.4%]), transportation (37 [16.1%]), and manufacturing (24 [10.4%]) (Table 3). In the transportation category, the subgroup associated with the largest number of events (26 [70.2%]) was trucking services; in the manufacturing category, the subgroup associated with the largest number of events was sawmills, planing mills, and millwork (6 [25%]) (data not shown).

The largest number of events with victims occurred in the transportation industry category (7 [28%]). The total number of victims was greatest in the manufacturing industry (43 [55.8%]) followed by the number of victims in retail trade, transportation, and construction (8 each [10.4%]). Half of the industry categories had no events with victims (Table 3).

Although the transportation industry resulted in a large proportion of events with victims (28%) and a large number of victims, only 19% of all transportation related events resulted in victims. Conversely, 100% of all events in the agriculture industry resulted in victims, but this industry represents a small proportion (8%) of events with victims (Table 3).

Substances

A total of 305 substances were released in all events, of which 39 (12.8%) substances were reported as threatened releases. The individual substances most frequently released were methamphetamine chemicals, hydraulic oil/fluid, hydrochloric acid, and ammonia (Appendix). Substances were further grouped into 16 categories. The substance categories most commonly released in fixed-facility events were “other” (70 [33.3%]), “other inorganic substances” (29 [13.8%]), and “volatile organic compounds” (22 [10.5%]) (Table 4). In transportation-related events, the most common substance categories released were “other” (32 [34.4%]), “hydrocarbons” (13 [14%]), and “pesticides” and “volatile organic compounds” (8 each [8.6%]).

Two types of releases for each substance (e.g., spill and fire) could be reported. Only one type of release was associated with the following: spills (214 [70.2%]), volatilization/aerosolized (41 [13.4%]), threatened release (39 [12.8%]), fire (9 [3.0%]), and explosion (2 [$<1\%$]). Of events with two types of releases, the following combinations were reported: volatilization/aerosolized and spills (80 [75.6%]), fire and spills (18 [17.0%]), and volatilization/aerosolized and fire (8 [7.6%]). No release types were missing for all substances.

Victims

A total of 77 victims were involved in 25 events (10.9% of all events) (Table 5). Of the 25 events with victims, 16 (64%) events involved only one victim, and 4 (16%) involved two victims. Of all victims, 64 (83.1%) were injured in fixed-facility events. Fixed-

facility events were more likely to have three or more victims per event (38.5%) than were transportation-related events (0%). Additionally, 11 persons in 6 events (3% of all events) were observed at a hospital or medical facility but did not have symptoms resulting from the event and, therefore, were not counted as victims.

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 the multiple substance category. Substances released most often were not necessarily the most likely to result in victims (Table 6). For example, events categorized as “other” constituted 33% of all events; however, only 8.6% of these events resulted in injuries. Conversely, events involving polymers and pesticides accounted for 2.5% and 3.9% of all events respectively, but 43% of the polymer events and 36.4% of pesticide events resulted in injuries.

In fixed-facility events, employees (57 [74%]) constituted the largest proportion of the population groups injured, followed by the general public (5[6%]). For transportation-related events, employees also had the highest proportion of the population types injured (8 [10%]); the second highest proportion was in the responder category (4 [5%]) (Figure 4). In fixed-facility events, 2 emergency response personnel were injured. Of those, 100% were career firefighters. Four responders were injured in transportation-related events.

Of these, 100% were police officers. Police officers were injured more frequently in transportation-related events (4) than in fixed facility-events (0) (data not shown).

Victims were reported to sustain a total of 191 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 irritation (48 [27.4%]), eye irritation, gastrointestinal system problems, and headache (38 each [21.7% each]). In transportation-related events, trauma (4 [25%]), dizziness/central nervous system symptoms (4 [25%]), and gastrointestinal system problems (3 [18.8%]) 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 incident leading to the release of a hazardous substance, and not from exposure to the substance itself.

The median age of the 13 (17%) victims for whom exact age was reported was 53 years (range: 3–70 years). For the 15 (19%) injured persons for whom an age category was reported, 1 (1%) was < 5 years of age, 1 (1%) was 5–14 years of age, 0 (0%) were 15–19 years of age, 4 (27%) were 20–44 years of age, 8 (53%) were 45–64 years of age, and 1 (1%) was ≥65 years of age. Of the 64 injured persons for whom age was not reported, 61 (95%) were presumably adults (because their population group was reported as responders or employees), and 3 (5%) could have been adults or children (because their population group was reported as members of the general public).

Sex was known for 26 (34%) of the victims; of these, 20 (77%) were males. Of all employees and responders for whom sex was reported, 17 (85%) were males.

Of the 77 victims, 41 (53%) were treated at the hospital without admission; 16 (21%) were treated on scene (first aid); and 13 (17%) were treated at the hospital with admission. No deaths were reported (Figure 5). Severity was known for all victims.

The status of personal protective equipment (PPE) use was reported for 77 (100%) employee- and responder-victims. Most of the 63 employee-victims (97%) had not worn any form of PPE; half of the 6 responder-victims had not worn any form of PPE.

Employee-victims who did wear PPE most often used gloves (1 [50%]) and hardhat (1 [50%]). Among injured emergency responders who wore PPE, 1 (33%) wore Level “B” protection, 1 (33%) wore Level “D” protection, and 1 (33%) wore firefighter turnout gear with respiratory protection.*

Synopsis of event involving more than 25 injured people.

On Monday, December 13, 2004, the Oregon HSEES system received a report from the Oregon Emergency Response System (OERS) that the Salem Fire Department had responded to a food processing plant in Salem, to assist an ill employee. The employee had reported breathing problems. Media reports provided additional information. While

* Firefighter turnout gear is protective clothing usually worn by firefighters during structural firefighting operations and is similar to level “D” protection. The Occupational Safety and Health Administration defines Level D protection as coveralls, boots/shoes (chemical-resistant leather, steel toe and shank), safety glasses or chemical splash goggles, and hard hats. Level “D” provides limited protection against chemical hazards.

paramedics were treating the worker, more workers became ill. The possible cause was an ammonia release that had occurred earlier that morning. Salem Fire initially responded at about 5:45 that morning when an employee at an adjacent business discovered an ammonia leak in a refrigeration line. Approximately 2 to 3 pounds of ammonia had been released, but the plant's safety team had contained the spill and repaired the equipment, a refrigeration unit.

As more employees became ill a little before 8 am on the 13th, about 150-200 workers were evacuated from the plant. Thirty-six employees were taken to the hospital. Of the 36 workers who were transported to Salem Hospital for treatment, only 5 remained hospitalized after noon the same day. Officials reported that most were evaluated as a precaution and released. Medical staff indicated the patients' symptoms included coughing, nausea, vomiting, runny noses, watery eyes and headaches, consistent with exposure to ammonia.

The regional HazMat team conducted a level D check for ammonia at about 8:30 am but did not detect any remaining ammonia at that time. The on-scene commander from HazMat 13 called OERS to advise that they were clear from the scene at 09:30 hours. People were being allowed back into the plant at that time. OERS passed the information to the Department of Environmental Quality at 09:40 hours. Oregon Emergency Management was advised of the situation as well.

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 194 (84.3%) events, schools within ¼ mile of 36 (15.7%) events, hospitals within ¼ mile of 1 (<1%) event, nursing homes within ¼ mile of 17 (7.4%) events, licensed daycares within ¼ mile of 29 (12.6%) events, industries or other businesses within ¼ mile of 197 (85.7%) events and recreational areas within ¼ mile of 58 (25.2%) events. Information for proximity of the event location in relation to selected populations was missing for 2 events.

The number of events at which persons were at risk of exposure was determined primarily using GIS. There were 208 (90.4%) events with persons living within ¼ mile of the event; 218 (94.8%) events with persons living within ½ mile; and 225 (97.8%) events with persons living within 1 mile. There were no missing values for events at which persons were at risk of exposure.

Evacuations

Evacuations were ordered in 12 (5.2%) of 229 events where evacuation status was reported. Of these evacuations, 91.7% were of buildings or affected parts of buildings; 0% were of defined circular areas surrounding the event locations; 0% were of areas downwind or downstream of the event; and 8.3% were of circular and downwind or downstream areas, of no criteria, or not known. The number of people evacuated was known for 8 (68%) events and ranged from 5 to 260 people, with a median of 38 people.

However, no ordered evacuations were reported as having no evacuees. The median length of evacuation was 2.5 hours (range: 1 to 7 hours). Evacuation length was missing for 3 (25%) events. Of all 12 events, 12 (100%) had access to the area restricted. 1 event had in-place sheltering ordered by an official.

Decontamination

Of the 68 (88%) victims for whom decontamination status was known, 62 (91%) were not decontaminated, 5 (7%) were decontaminated at the scene, and 1 (2%) was decontaminated at a medical facility.

In events where uninjured persons were decontaminated, the median number of uninjured decontaminated individuals was 0 persons per event (range: 0-10 persons). No uninjured persons were reported to have been decontaminated at a medical facility.

Decontamination at the scene was done for 5 uninjured employees, 7 uninjured responders, 10 uninjured members of the general public, and 0 uninjured students (per event). Missing data accounted for 12-13% of the values for all these categories.

Response

Of the 230 (100%) events with information on who responded to the event, 64 (28%) reported 2 or more categories of personnel who responded, 19 (8%) reported 3 or more categories, and 9 (4%) reported 4 or more categories. Law enforcement agencies (29.3%) responded most frequently to events, followed by company response teams (19.4%), fire departments (17.5%), and Certified HazMat teams (15.6%) (Table 8).

Clandestine Methamphetamine Laboratories: Impact on HSEES findings in Oregon

Methamphetamine laboratories and their spin-offs have affected Oregon's HSEES data increasingly over the past 4 years, with 2004 capping the previous years. The presence, recognition, and seizure of clandestine methamphetamine labs has affected the results seen in the factors most frequently involved in spills and releases, the substances most frequently released, the location of spill events, the types of responders to events, and includes both fixed facility and transportation events. Unfortunately, any association of acute health effects of exposure to chemicals released in these labs is difficult to discern from this database. The number and description of persons exposed to a meth lab and follow up of exposures is not possible through HSEES. Thus, our data are most useful in alerting state and local policy makers, officials, responders and affected agency personnel to this growing problem. Our prevention outreach activities continue to address this need.

Ironically, the overwhelming effect of the methamphetamine epidemic, at least in the form of methamphetamine labs, is on a system that only includes events where a lab has been actively manufacturing within the past 72 hours of seizure by law enforcement. Our data do not include the many dump sites, boxed labs and inactive labs that are discovered, as they are not considered acute events, and there is no way to estimate the numbers of clandestine methamphetamine laboratories that exist and go unrecognized. Even though Oregon HSEES captures a small portion of the meth related events, it can show the changed character of events and opportunities for exposure of the public to hazardous materials.

The economic, social, environmental and health impacts on Oregon go far beyond the data discernable here, due to the corollary impacts of a serious drug epidemic on human health, the ambient environment, crime, family breakdown, joblessness, incarceration, and much needed treatment. One spin off that is difficult to document precisely is the purported increase in the numbers of children being referred for foster care, the numbers of children in poverty or homeless.

SUMMARY OF RESULTS, 1993–2004

During 1993–2004, the largest proportion of events occurred in fixed facilities (Table 9). In addition, the total number of events increased through 2002 and has decreased slightly since then. We believe these variations are due to changes in reporting by partner agencies and in surveillance system staff over time. There has been an observable increase in the number of substances involved in Oregon HSEES events since 2000. This coincides with a change in personnel as well as the introduction of the on-line data entry system, but neither of these factors would appear to have an impact on the number of substances released. It seems more plausible that changes in reporting to the major reporting partner agencies may have occurred, or, simply that more substances have been released.

The percentage of events with victims was highest during 1993 (22.6%) and lowest during 2004 (10.9%). The average percentage of events with victims during 1993–2004 was 15.3%.

Respiratory irritation has consistently been the most frequently reported injury.

Employees continue to be the most commonly reported victims of acute chemical releases (58%). However, members of the general public constitute a large proportion of the victims as well with 33%. (Table 10).

The number of deaths associated with acute hazardous substances events has increased in recent years. Even though the percentage of events with deaths has remained relatively stable over the years, varying between 0 and 2%, this indicates a need for increased prevention activities.

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

The 10 substances most frequently involved in events—Hazardous Substances Emergency Events Surveillance, Oregon, 2004

Number	Substance Name	Frequency (%)
1.	Methamphetamine Drug Lab Chemicals ¹	70 (23%)
2.	Hydraulic Oil/Fluid ²	19 (6%)
3.	Hydrochloric Acid	13 (4%)
4.	Ammonia	11 (4%)
5.	Iodine	8 (3%)
6.	Acetone	7 (2%)
7.	Diesel Fuel	7 (2%)
8.	Chlorine	6 (2%)
9.	Phosphorus	6 (2%)
10.	Latex Paint	5 (2%)
Total		152 (50%)

¹ Includes “Methamphetamine” and “Methamphetamine Chemicals NOS” to be consistent with other states collecting HSEES data.

² Combines hydraulic oil and hydraulic fluid as these are used interchangeably by reporting parties.

Table 1: Number of events meeting the surveillance definition, by county and type of event, Oregon Hazardous Substances Emergency Events Surveillance, 2004

<i>County</i>	Type of event				All events
	Fixed facility		Transportation		
	No. events	%*	No. events	%*	Total no. events (%)
Baker	2	100	0	0	2 (0.9)
Benton	3	100	0	0	3 (1.3)
Clackamas	8	61.5	5	38.5	13 (5.7)
Columbia	0	0	4	100	4 (1.7)
Coos	5	83.3	1	16.7	6 (2.6)
Crook	1	100	0	0	1 (0.4)
Curry	1	50.0	1	50.0	2 (0.9)
Deschutes	2	100	0	0	2 (0.9)
Douglas	6	100	0	0	6 (2.6)
Hood River	1	50.0	1	50.0	2 (0.9)
Jackson	4	57.1	3	42.9	7 (3.0)
Jefferson	1	50.0	1	50.0	2 (0.9)
Josephine	4	66.7	2	33.3	6 (2.6)
Klamath	2	40.0	3	60.0	5 (2.2)
Lane	11	50.0	11	50.0	22 (9.6)
Lincoln	3	75.0	1	25.0	4 (1.7)
Linn	9	75.0	3	25.0	12 (5.2)
Malheur	1	50.0	1	50.0	2 (0.9)
Marion	7	77.8	2	22.2	9 (3.9)
Morrow	1	100	0	0	1 (0.4)
Multnomah	49	74.2	17	25.76	66 (28.7)
Polk	1	50.0	1	50.0	2 (0.9)
Umatilla	20	83.3	4	16.7	24 (10.4)
Union	2	40.0	3	60.0	5 (2.2)
Wallowa	1	100	0	0	1 (0.4)
Wasco	2	100	0	0	2 (0.9)
Washington	9	75.0	3	25.0	12 (5.2)
Yamhill	5	71.4	2	28.6	7 (3.0)
Total	161	70	69	30	230 (100)

* 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, Oregon Hazardous Substances Emergency Events Surveillance, 2004

No. substances	Type of event						All events		
	Fixed facility			Transportation					
	No. events	%	Total substances	No. events	%	Total substances	No. events	%	Total substances
1	136	84.5	136	54	78.3	54	190	81.4	190
2	13	8.1	26	8	11.6	16	21	9.8	42
3	4	2.5	12	4	5.8	12	8	4.1	24
4	4	2.5	16	2	2.9	8	6	2.7	24
≥ 5	4	2.5	20	1	1.4	5	5	2.0	25
Total	161	100.1	210	69	100	95	230	100	305

Table 3: Industries involved in hazardous substance events, by category, Oregon Hazardous Substances Emergency Events Surveillance, 2004

Industry category	Total events		Events with victims		Percentage of events with victims	Total no. victims Number (maximum) [*]
	No.	%	No.	%		
Abandoned [†]	7	3.0	0	0	0	0
Agriculture	2	0.9	2	8.0	100.0	2 (1)
Business and repair services	5	2.2	1	4.0	20.0	2 (2)
Communications	1	0.4	0	0	0	0
Construction	13	5.7	2	8.0	15.4	8 (7)
Entertainment	2	0.9	0	0	0	0
Finance and Real estate	2	0.9	0	0	0	0
Illegal activity (illicit drug related)	79	34.4	1	4.0	1.3	1 (1)
Illegal activity (non-illicit-drug related)	2	0.9	0	0	0	0
Manufacturing	24	10.4	5	20.0	20.8	43 (36)
Mining	1	0.4	0	0	0	0
Personal services	5	2.2	0	0	0	0
Private vehicle or property	3	1.3	1	4.0	33.3	1 (1)
Professional services	3	1.3	0	0	0	0
Public administration	13	5.7	2	8.0	15.4	3 (2)
Retail trade	5	2.2	3	12.0	60.0	8 (3)
Transportation	37	16.1	7	28.0	18.9	8 (2)
Utilities	17	7.4	1	4.0	5.9	1 (1)
Wholesale trade	3	1.3	0	0	0	0
Unspecified and unknown	6	2.6	0	0	0	0
Total[‡]	230	100	25	100	10.9	77

*Minimum number of victims per event = 1.

[†]Includes chemical dumped on highway or other property and currently nonoperating former businesses.

Table 4: Number of substances involved, by substance category and type of event, Oregon Hazardous Substance Emergency Events Surveillance, 2004

Substance category	Type of event				All events	
	Fixed facility		Transportation			
	No. substances	%	No. substances	%	No. substances	%
Acids	14	6.7	6	6.5	20	6.6
Ammonia	11	5.2	1	1.1	12	4.0
Bases	4	1.9	5	5.4	9	3.0
Chlorine	9	4.3	1	1.1	10	3.3
Formulations	0	0	0	0	0	0
Hetero-organics	2	1.0	0	0	2	0.7
Hydrocarbons	11	5.2	13	14.0	24	7.9
Mixture*	5	2.4	1	1.1	6	2.0
Other [†]	70	33.3	32	34.4	102	33.7
Other inorganic substances [‡]	29	13.8	7	7.5	36	11.9
Oxy-organics	8	3.8	5	5.4	13	4.3
Paints and dyes	12	5.7	4	4.3	16	5.3
Pesticides	5	2.4	8	8.6	13	4.3
Polychlorinated biphenyls	3	1.4	0	0	3	1.0
Polymers	5	2.4	2	2.2	7	2.3
Volatile organic compounds	22	10.5	8	8.6	30	9.9
Total[¶]	210	100	93	100.2	303	100.2

* 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 305 substances, 2 were excluded because they were not assigned a substance category; both substances were released during transportation. Percentages do not total 100% because of rounding.

Table 5: Number of victims per event, by type of event, Oregon Hazardous Substances Emergency Events Surveillance System, 2004

No. victims	Type of event						All events		
	Fixed facility			Transportation					
	No. events	%	Total victims	No. events	%	Total victims	No. events	%	Total victims
1	5	38.5	5	11	91.7	11	16	64	16
2	3	23.1	6	1	8.3	2	4	16	8
3	2	15.4	6	0	0	0	2	8	6
4	1	7.7	4	0	0	0	1	4	4
5	0	0	0	0	0	0	0	0	0
≥6	2	15.4	43	0	0	0	2	8	43
Total	13	100.1	64	12	100	13	25	100	77

Table 6: Frequency of substance categories in all events and events with victims, Oregon Hazardous Substances Emergency Events Surveillance, 2004

Substance category	All events		Events with victims		
	No.	%	No.	Percentage of all releases with victims	Percentage of events with victims in substance category
Acids	20	7.1	1	3.0	5.0
Ammonia	12	4.2	4	12.1	33.3
Bases	9	3.2	2	6.1	22.2
Chlorine	10	3.5	0	0	0
Formulations	0	0	0	0	0
Hetero-organics	2	0.7	0	0	0
Hydrocarbons	24	8.5	2	6.1	8.3
Mixture [†]	6	2.1	1	3.0	16.7
Multiple substance category	0	0	0	0	0
Other [‡]	93	32.9	8	24.2	8.6
Other inorganic substances [§]	30	10.6	3	9.1	10.0
Oxy-organics	13	4.6	3	9.1	23.1
Paints and dyes	16	5.7	1	3.0	6.3
Pesticides	11	3.9	4	12.1	36.4
Polychlorinated biphenyls	3	1.1	0	0	0
Polymers	7	2.5	3	9.1	42.9
Volatile organic compounds	27	9.5	1	3.0	3.7
Total[¶]	283	100.1	33	99.9	11.7

*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 categories, they were counted only once in the multiple substance category (no events fit this description for 2004).

[†]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.

[¶]Percentages do not total 100% because of rounding. Of a total of 230 events, 2 were excluded because the substance released was not assigned a substance category. The 2 events involved one substance each. None of the excluded events had victims.

Table 7: Frequency of injuries/symptoms, by type of event, Oregon Hazardous Substances Emergency Events Surveillance System, 2004

Injury/symptom	Fixed facility		Transportation		All events	
	No. injuries	%	No. injuries	%	Total no.	%
Chemical burns	1	0.5	1	6.3	2	1.1
Dizziness/central nervous system symptoms	3	1.7	4	25.0	7	3.7
Eye irritation	38	21.7	1	6.3	39	20.4
Gastrointestinal system problems	38	21.7	3	18.8	41	21.5
Headache	38	21.7	1	6.3	39	20.4
Heart problems	0	0	0	0	0	0
Heat stress	0	0	0	0	0	0
Other	0	0	0	0	0	0
Respiratory irritation	48	27.4	1	6.3	49	25.7
Shortness of breath	0	0	0	0	0	0
Skin irritation	3	1.7	0	0	3	1.6
Thermal burns	4	2.3	1	6.3	5	2.6
Trauma [†]	2	1.1	4	25.0	6	3.1
Total[‡]	175	99.8	16	100.3	191	100.1

*The number of injuries is greater than the number of victims (77) because a victim could have had more than one injury.

[†] Of the 6 trauma injuries, 1 was chemical-related, 5 were not chemical-related.

[‡] Percentages do not total 100% because of rounding.

Table 8: Distribution of personnel who responded to the event, Oregon Hazardous Substances Emergency Events Surveillance, 2004

Responder category	No.	%*
Certified HazMat team	49	15.6
Department of works/ utilities/ transportation	0	0
Emergency medical technicians	8	2.6
Environmental agency	20	6.4
EPA [†] response team	1	0.3
Fire department	55	17.5
Health department/health agency	3	1.0
Hospital personnel	0	0
Law enforcement agency	92	29.3
Other	25	8.0
Response team of company where release occurred	61	19.4
Specialized multi-agency team	0	0
Emergency managers/coordinators/planning cmts	0	0
Total	314	100.1

* A total of 314 responses were made to 230 events because more than one agency may have responded to an event. Percentages total greater than 100% due to rounding.

[†]Environmental Protection Agency.

Table 9.— Cumulative data by year—Oregon Hazardous Substances Emergency Events Surveillance, 1993-2004*

Year	Type of event			No. substances involved	No. victims	No. deaths	Events with victims	
	Fixed facility	Transportation	Total				No.	% [†]
1993	120	35	155	165	178	0	35	22.6
1994	167	45	212	255	100	0	42	19.8
1995	148	41	189	230	128	0	29	15.3
1996	135	76	211	237	71	0	32	15.2
1997	103	61	164	234	84	2	35	21.3
1998	100	47	147	180	60	3	26	17.7
1999	80	25	105	158	46	1	18	17.1
2000	178	92	270	322	96	2	34	12.6
2001	213	62	275	361	132	1	36	13.1
2002	173	109	282	319	139	5	31	11.0
2003	189	67	256	318	166	5	39	15.2
2004	161	69	230	305	77	0	25	10.9
Total	1767	729	2496	3084	1277	19	382	15.3

* 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.

Table 10. Number of victims*, by category and year, Oregon Hazardous Substances Emergency Events Surveillance, 2004

Year	Category of victim			Total
	Employees (%)	Responders (%)	General Public (%)	
1993	109 (61)	3 (2)	66 (37)	178
1994	41 (41)	24 (24)	35 (35)	100
1995	90 (76)	4 (2)	27 (23)	121
1996	31 (47)	14 (21)	21 (32)	66
1997	43 (66)	6 (9)	16 (25)	65
1998	28 (47)	8 (14)	23 (39)	59
1999	19 (42)	5 (11)	21 (47)	45
2000	37 (39)	8 (8)	53 (56)	95
2001	102 (77)	10 (8)	21 (16)	132
2002	36 (26)	18(14)	83 (60)	139
2003	120 (72)	4 (2)	37 (22)	166
2004	65 (84)	6 (8)	6 (8)	77
Total	721 (58)	110 (9)	409 (33)	1243

* Numbers of victims for each year differ from Table 9 due to victims where no information was available on victim category.

Figure 1: Areas of fixed facilities involved in events, Oregon Hazardous Substances Emergency Events Surveillance, 2004

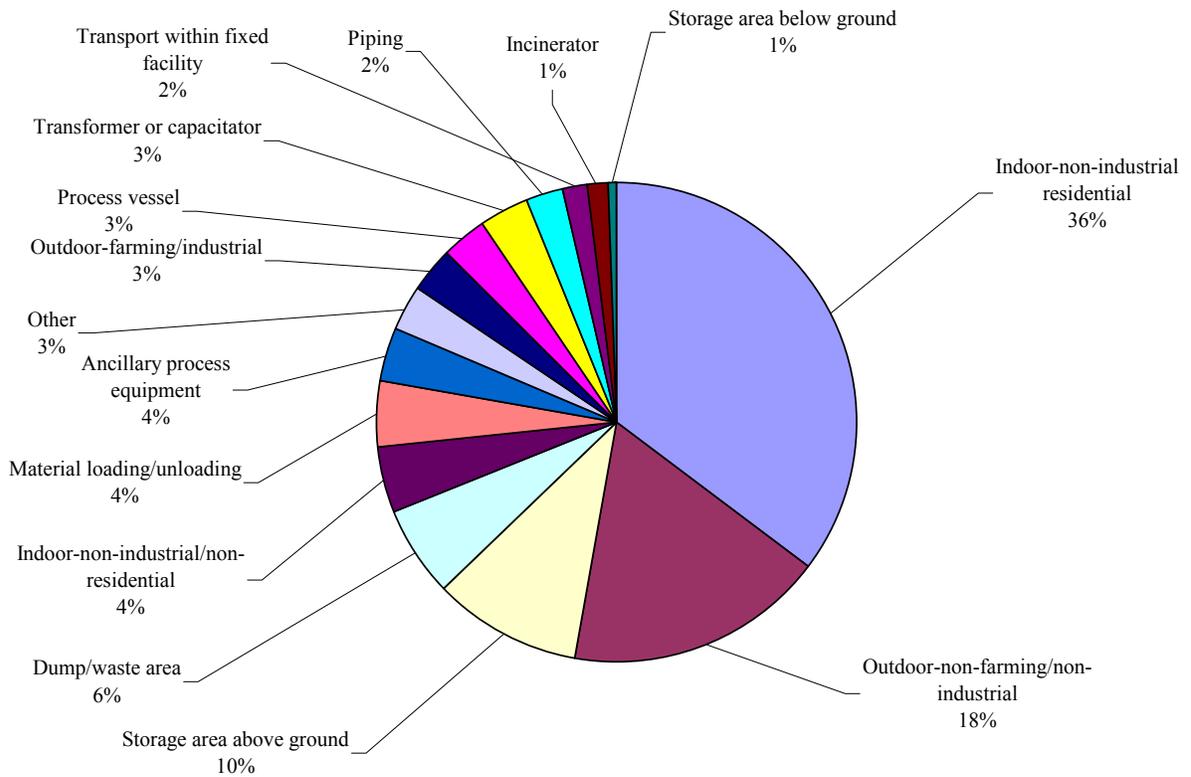


Figure 2: Distribution of transportation-related events, by type of transport, Oregon Hazardous Substances Emergency Events Surveillance, 2004

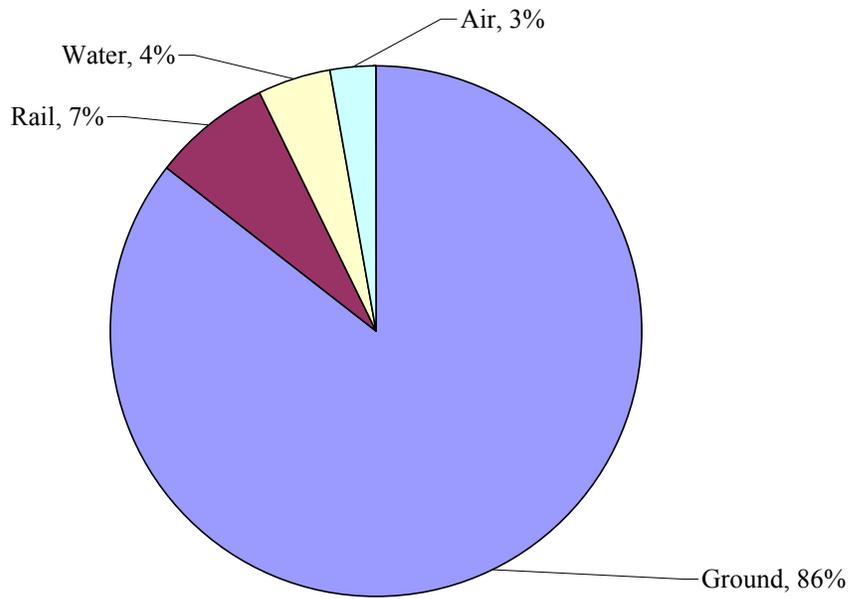


Figure 3a: Primary factors reported as contributing to events, Oregon Hazardous Substances Emergency Events Surveillance, 2004

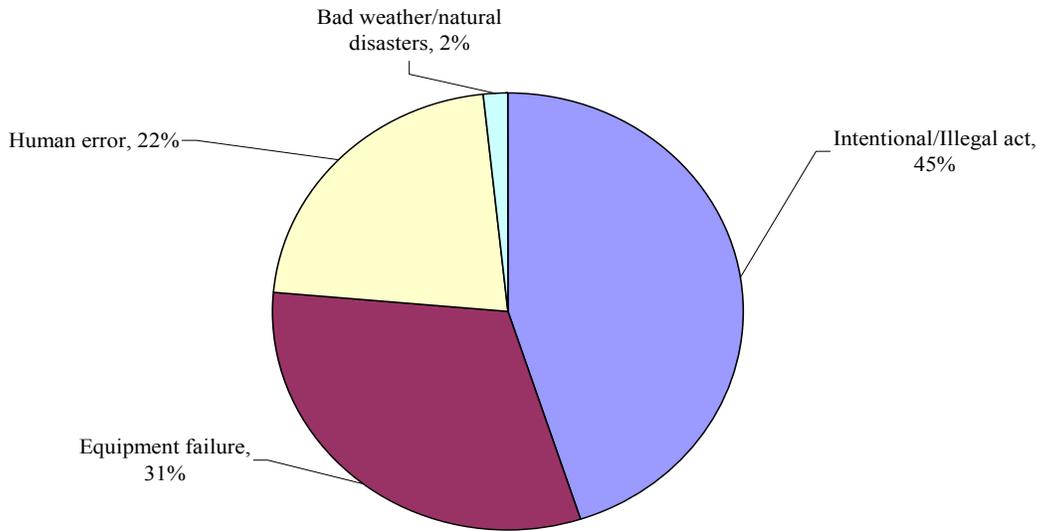


Figure 3b: Secondary factors reported as contributing to events, Oregon Hazardous Substances Emergency Events Surveillance, 2004

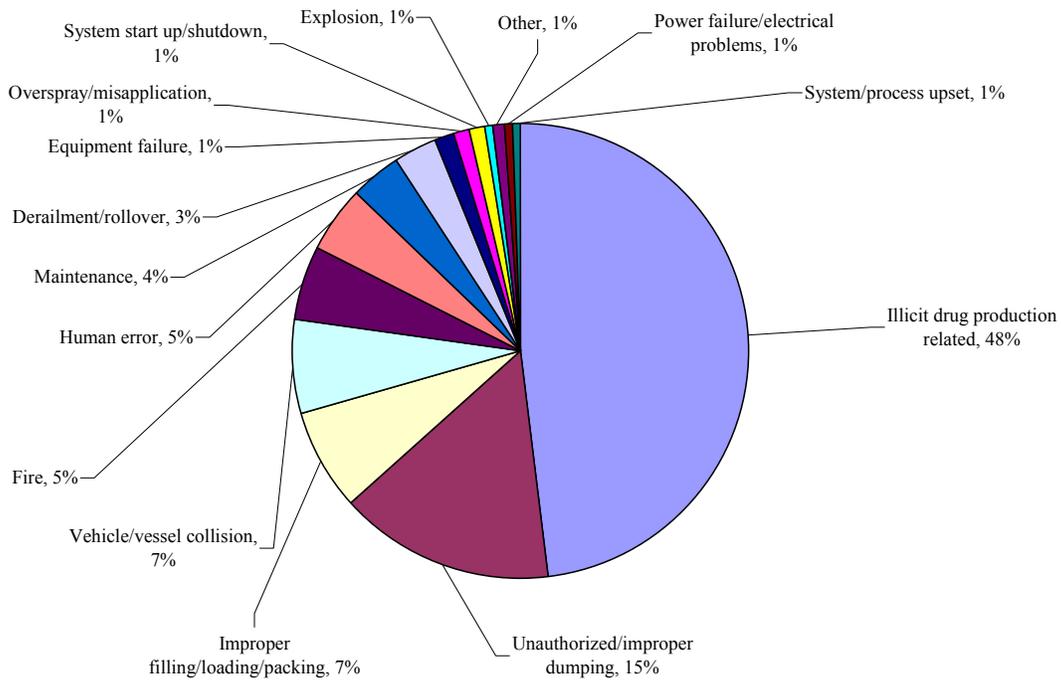


Figure 4: Number of victims, by population group and type of event, Oregon Hazardous Substances Emergency Events Surveillance, 2004

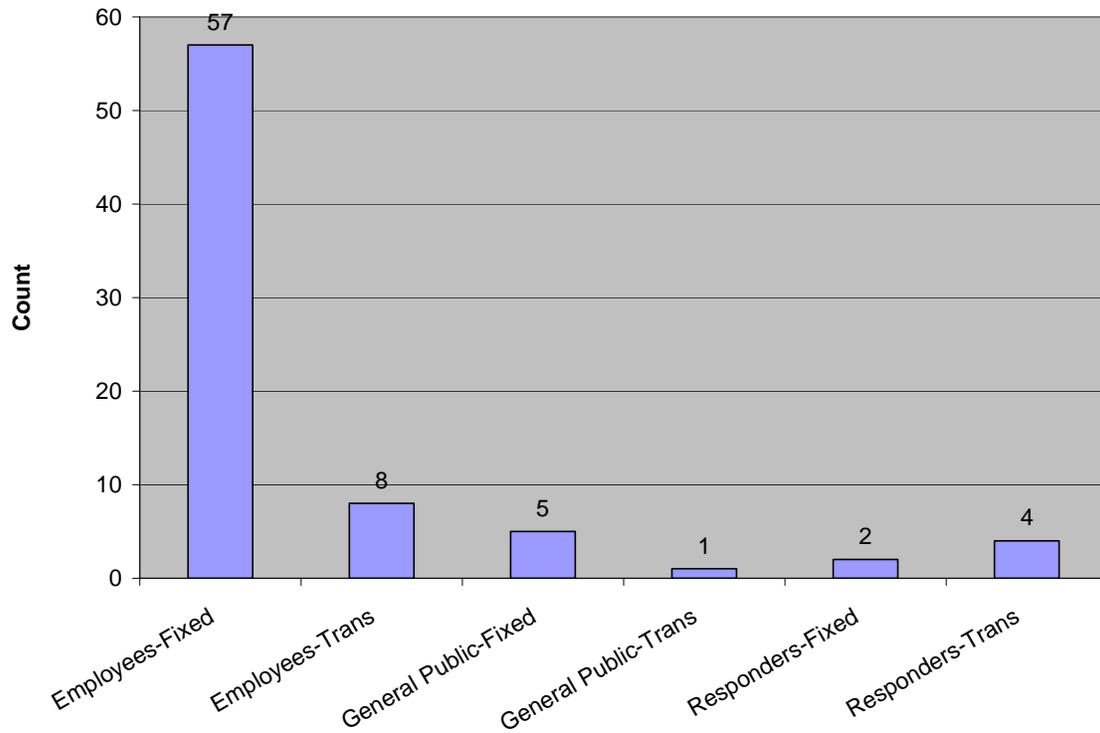
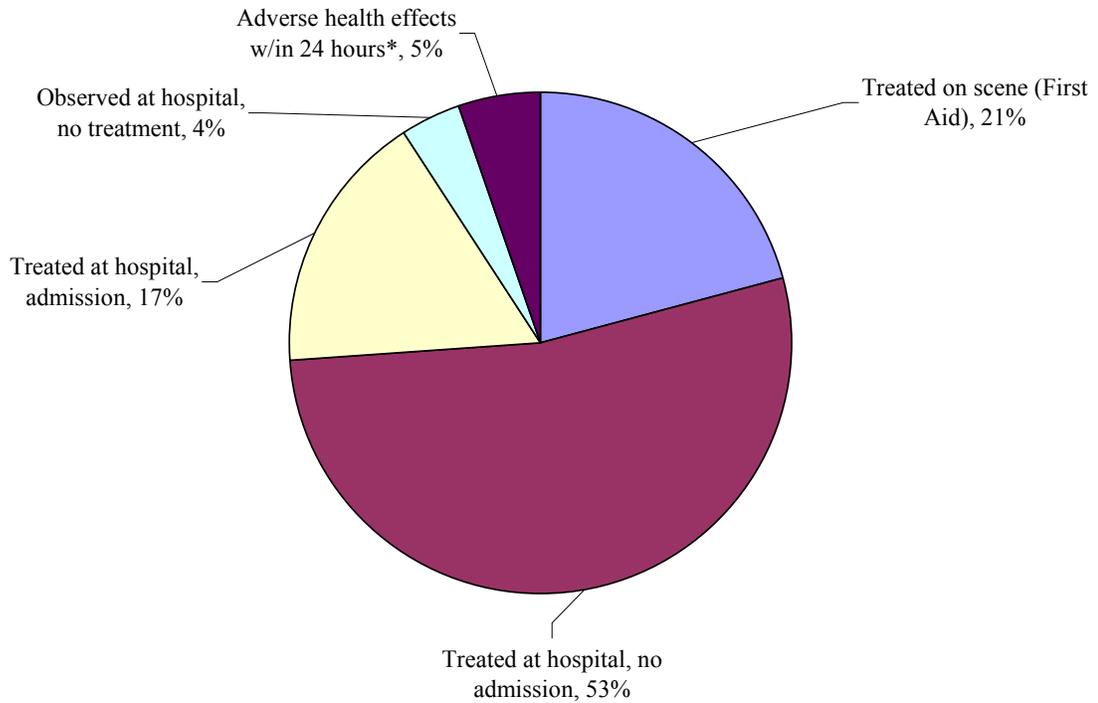


Figure 5: Injury disposition, Oregon Hazardous Substances Emergency Events Surveillance, 2004



*Refers to adverse health effects experienced within 24 hours of event and reported by an official (e.g. fire department, EMT, police, poison control center)