Hazardous Substances Emergency Events Surveillance in North Carolina

2004 - 2005 Report

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February 2007

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The North Carolina Hazardous Substances Emergency Events Surveillance (HSEES) Program is supported by a Cooperative Agreement, U61-ATU486399, from the Agency for Toxic Substances and Disease Registry (ATSDR) in Atlanta, Georgia

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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 North Carolina in 2004 and 2005. Information about acute events involving hazardous substances was collected and compiled, 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 696 events were reported. In 601 (86.4%) events, only one substance was released. The most commonly reported categories of substances were other inorganic compounds, volatile organic compounds, and acids. During this reporting period, 51 events (7.3% of all reported events) resulted in a total of 168 victims, of whom one died. The most frequently reported injuries were respiratory irritation, dizziness or other central nervous system (CNS) symptoms, and headache. Evacuations were ordered for 44 (6.3%) events.

The percentage of events with victims has been declining since 2002. The distribution of the types of injuries reported in 2004-2005 was consistent with previous years.

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."

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 .

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.

This report provides an overview of HSEES for 2004-2005 in North Carolina, and summarizes the characteristics of acute releases of hazardous substances and their associated public health consequences.

METHODS

In 2004-2005, fifteen state health departments participated in HSEES: Colorado, Florida, Iowa, Louisiana, Michigan, Minnesota, Missouri, New Jersey, New York, North Carolina, Oregon, Texas, Utah, Washington, and Wisconsin.

Information was collected about each event, including substance(s) released, victims, injuries (adverse health effects and symptoms), and evacuations.

Various data sources were used to obtain information about these events. These sources included, but were not limited to, North Carolina Division of Emergency Management, National Response Center, State Bureau of Investigation, and news websites. 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. For 2004, events were 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, and 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. In 2005, the definition was revised to include releases of any amount of a substance listed on then HSEES Mandatory Chemical Reporting List; for substances not on the mandatory list, a chemical release was included if the amount was $\geq$ 10 pounds or 1 gallon. Threatened releases of qualifying amounts were included if the threat lead to an action (e.g., evacuation) to protect the public's health. HSEES defines victims as people who experience at least one documented adverse health effect from the event 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 unloading from a vehicle or vessel. All other events are considered fixed-facility events.

For data analyses, the substances released were grouped into 16 categories. 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 grouped into one of the other existing categories.

RESULTS

For 2004-2005, a total of 696 acute hazardous substances events were captured by North Carolina HSEES: 59 (8.5%) of these events were threatened releases. Eighteen (2.6%) were events in which substances were both threatened to be released and actually released. A total of 365 (52.4%) events occurred in fixed facilities. The counties with the most frequent number of events were Mecklenburg (160 [23.0%]), Guilford (43 [6.2%]), and Wake (35 [5.0%]) (Table 1).

One or two types of area or equipment involved in the fixed facility where the event occurred could be selected for some events, depending on the industry classification. Area of fixed facility was not collected for 113 non-industrial events in 2005. Of 252 fixed-facility events, 246 (97.6%) reported one type of area and 6 (2.4%) reported a combination of two area types. Among events with one type of area reported, the main areas were classified as follows: 55 (22.4%) indoor, non-industrial (residential); 38 (15.1%) material handling; and 33 (13.1%) piping (Figure 1). Of the events with two areas, 3 (50.0%) involved storage above ground in combination with other types of areas.

Of the 331 transportation-related events, 305 (92.1%) occurred during ground transport (Figure 2). Most ground transportation events involved trucks (91.2%). The largest proportion of transportation-related events occurred during unloading of a stationary vehicle or vessel (120 [36.3%]). Of the 331 transportation-related events, 119 (36.0%) 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 679 (97.6%) events (Figure 3a). Of the reported primary factors, most (38.9%) fixed-facility events involved human error, and most (75.7%) transportation-related events involved human error. Secondary factors are illustrated in Figure 3b. Of the reported secondary factors, most (32.9%) fixed-facility events

involved illicit drug production, and most (48.6%) transportation-related events involved improper filling.

More than 86% of all events involved the release of only one substance. Two substances were released in approximately 2% of the events, and approximately 12% involved the release of more than two substances (Table 2). Fixed-facility events were more likely than transportation events to involve the release of two or more substances (24.9% vs. 1.2%).

The number of events by month ranged from 33 (4.7%) in December to 77 (11.1%) in April, with the largest proportions occurring from April through July. The proportion of events ranged from 16.2% to 19.4% during weekdays, and from 5.4% to 7.3% during weekend days. Most events (38.4%) occurred from 12:00 PM to 5:59 PM; 31.6% occurred from 6:00 AM to 11:59 AM; 15.4% from 6:00 PM to 11:59 PM; and the remainder during the early hours of the day. The time was missing for one event.

Industries

The largest proportions of HSEES events were associated with transportation and warehousing (359 [51.5%]); the non-industrial category (primarily, illegal drug manufacture) (146 [21.0%];, and manufacturing industries (85 [12.2%]) (Table 3). Within manufacturing, chemical manufacturing (35 [41.2%]) and food manufacturing (18 [21.2%]) accounted for most of the events. The largest number of events with victims occurred from the non-industrial category (primarily, illegal drug manufacture) (12 [23.5%]). The total number of victims was greatest in the manufacturing industry (68 [40.5%]), followed by the number of victims in the retail trade industry (34 [20.2%]) and non-industries (primarily, illegal drug manufacture) (21 [12.5%]).

Substances

A total of 1,153 substances were released in all events, of which 307 (26.6%) substances were reported as threatened to be released. The individual substances most frequently involved were hydrochloric acid, iodine, hydrogen peroxide, ammonia

and sodium hydroxide (Table 4). Substances were grouped into 16 categories. The substance categories most commonly involved in fixed-facility events were other inorganic compounds (182 [22.3%]); volatile organic compounds (179 [21.9%]); and acids (106 [13.0%]) (Table 5). In transportation-related events, the most common substance categories released were volatile organic compounds (61 [18.1%]); acids (50 [14.8%]); and paints (44 [13.1%]).

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 (605 [53.0%]); threatened releases (411 [36.0%]); air releases (96 [8.4%]); fire (24 [2.1%]); and explosion (5 [0.4%]). Of events with two types of releases, the following combinations were reported: spill and fire (6 [50.0%]); spill and air (2 [16.7%]); spill and explosion (2 [16.7%]); and fire and explosion (2 [16.7%]).

Victims

A total of 168 victims were involved in 51 events (7.3% of all events) (Table 6). Of the 51 events with victims, 28 (54.9%) events involved only one victim, and 8 (15.7%) involved two victims. Of all victims, 149 (88.7%) were injured in fixed-facility events. Fixed-facility events were more likely to have three or more victims per event (36.1%) than were transportation-related events (13.3%). Additionally, 220 persons in 109 events (15.7% 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.

Employees (109 [64.9%]) constituted the largest proportion of the population groups injured, followed by the general public (64 [20.2%]) (Figure 4). In fixed-facility events, 23 emergency response personnel were injured (Figure 5). Two responders were injured in transportation-related events; one was a police officer and the other a firefighter.

Victims were reported to sustain a total of 217 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 (95 [48.7%]); dizziness or other central nervous system (CNS) symptoms (36 [18.5%]); and headache (20 [10.3%]). In transportation-related events, trauma (11 [50.0%]) and respiratory irritation (4 [18.2%]) were reported most frequently. Most (86.7%) 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.

For the 160 (95.2%) injured persons for whom an age category was reported, 1 (0.6%) was < 5 years of age; 2 (1.2%) were 5–14 years of age; 1 (0.6%) was 15–19 years of age; 110 (68.8%) were 20–44 years of age; and 46 (28.8%) were 45–64 years of age. Of the 8 injured persons for whom age was not reported, all were presumably adults (because their population group was reported as responders or employees).

Sex was known for 161 (95.8%) of the victims; of these, 109 (67.7%) were males. Of all employees and responders for whom sex was reported, 70.9% were males.

Of the 168 victims, 119 (70.8%) were treated at a hospital and released; 35 (20.8%) were treated with first aid; and 12 (7.1%) were admitted to a hospital for treatment. One death was reported (Figure 6).

The status of personal protective equipment (PPE) use was reported for 71(65.1%) employee-victims and for 12 (66.7%) responder-victims. None of the employee-victims and only seven (38.9%) of the responder-victims had worn any form of PPE.

Two events involved 20 or more injured people. The first event occurred at a poultry processing facility, where 10,000 pounds of anhydrous ammonia were released due to a faulty valve. Twenty employees were treated and released for respiratory irritation. A circle radius of the plant was evacuated for 3.5 hours, displacing 250 people. The second event occurred in a textile manufacturing facility, where chemicals were mixed improperly causing the release of hydrogen sulfide. All 22 victims were employees who

were treated and released from a hospital due to respiratory irritation. This incident displaced 750 people for 12 hours due to a circle evacuation order.

The one event in which a death occurred was a trucking accident. The driver was killed due to trauma received during a rollover crash. The interstate was closed for 10 hours. The truck's load of carpet glue compound was not released during the crash. Emergency crews cleared the wreckage without releasing the compound.

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 558 (80.2%) events; schools within ¼ mile of 23 (3.3%) events; hospitals within ¼ mile of 6 (0.9%) events; nursing homes within ¼ mile of 21 (3.0%) events; licensed daycares within ¼ mile of 68 (9.8%) events; industries or other businesses within ¼ mile of 587 (84.3%) events; and recreational areas within ¼ mile of 63 (9.0%) events.

The number of events at which persons were at risk of exposure was determined primarily using GIS. There were 548 (93.6%) events with persons living within ¼ mile of the event; 581 (99.3%) events with persons living within ½ mile; and 581 (99.3%) events with persons living within 1 mile. Information on the number of people living within ¼, ½, and 1 mile of the event was missing for 111 events.

Evacuations

Evacuations were ordered in 44 (6.3%) of 696 events. Of these evacuations, 61.4% were of buildings or affected parts of buildings; 31.8% were of defined circular areas surrounding the event locations; 4.5% were of areas downwind or downstream of the event; and the remainder were of circular and downwind or downstream areas. The number of people evacuated was known for 38 (86.4%) events and ranged from 1 to 750 people, with a median of 59 people. The median length of evacuation was 3.7

hours (range: 30 minutes to 12 hours). Of all 696 events, 157 (22.5%) had access to the area restricted. Three (0.4%) events had in-place sheltering ordered by an official.

Decontamination

Of the 162 (96.4%) victims for whom decontamination status was known, 127 (78.4%) were not decontaminated, 23 (14.2%) were decontaminated at a medical facility, 10 (6.2%) were decontaminated at the scene, and 2 (1.2%) were decontaminated at both the scene and a medical facility.

In events where uninjured persons were decontaminated, the range of uninjured decontaminated individuals was 1-10 persons per event. Decontamination at a medical facility was done for only one uninjured member of the general public. Decontamination at the scene was done for 14 uninjured employees and 6 uninjured members of the general public.

Response

All 696 events had information on who responded to the event: 43.5% reported 2 or more categories of personnel who responded; 32.6% reported 3 or more categories; and 15.5% reported 4 or more categories. There were 4 events where no response was reported. Company response teams (53.7%) responded most frequently to events; followed by fire departments (36.8%); law enforcement (29.6%); and emergency medical technicians (20.2%) (Table 8).

SUMMARY OF RESULTS, 1993 - 2005

During 1993-2005, the largest proportion of events occurred in fixed facilities (Table 9). However, the number of reported transportation-related events increased from 1999-2001. The increase is partially due to the 1999 addition of the U.S. Department of Transportation's Hazardous Materials Information System as a primary notification source for transportation events. In addition, the total number of events continued to

increase until 2005. The increase in the number of events may have been due, at least in part, to the expansion of reporting sources.

The number of substances released has also increased. The percentage of events with victims was highest in 1993 (14.7%) and lowest in 1998 (5.8%). The average percentage of events with victims during 1993-2005 was 8.2%.

Respiratory irritation has consistently been the most frequently reported injury; however, dizziness and/or central nervous system symptoms increased due to a single carbon monoxide event in 2005. Employees continue to be the most commonly reported victims of acute chemical releases. However, members of the general public also constitute a large proportion of the victims (Figure 7). The number of injured police officers decreased from 14 in 2002 to 4 in 2005, which likely resulted from increased methamphetamine lab response training for police officers and state laws that became effective in 2005 that have decreased the number of methamphetamine labs in the state.

Table 1. Number of events meeting the surveillance definition, by county and type of event - North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005

County	Type of event				All events	
	Fixed facility		Transportation			
	No. of Events	Percentage	No. of Events	Percentage	Total no. events	Percentage
Alamance	2	33.3%	4	66.7%	6	0.9%
Alexander	1	50.0%	1	50.0%	2	0.3%
Alleghany	0	0.0%	0	0.0%	0	0.0%
Anson	2	100.0%	0	0.0%	2	0.3%
Ashe	6	100.0%	0	0.0%	6	0.9%
Avery	2	100.0%	0	0.0%	2	0.3%
Beaufort	6	100.0%	0	0.0%	6	0.9%
Bertie	0	0.0%	1	100.0%	1	0.1%
Bladen	3	100.0%	0	0.0%	3	0.4%
Brunswick	6	100.0%	0	0.0%	6	0.9%
Buncombe	12	85.7%	2	14.3%	14	2.0%
Burke	8	72.7%	3	27.3%	11	1.6%
Cabarrus	6	37.5%	10	62.5%	16	2.3%
Caldwell	6	100.0%	0	0.0%	6	0.9%
Camden	0	0.0%	0	0.0%	0	0.0%
Carteret	0	0.0%	3	100.0%	3	0.4%
Caswell	0	0.0%	1	100.0%	1	0.1%
Catawba	3	23.1%	10	76.9%	13	1.9%
Chatham	1	0.0%	2	0.0%	3	0.4%
Cherokee	2	100.0%	0	0.0%	2	0.3%
Chowan	0	0.0%	0	0.0%	0	0.0%
Clay	0	0.0%	0	0.0%	0	0.0%
Cleveland	7	87.5%	1	12.5%	8	1.1%
Columbus	2	66.7%	1	33.3%	3	0.4%
Craven	3	100.0%	0	0.0%	3	0.4%
Cumberland	10	76.9%	3	23.1%	13	1.9%
Currituck	0	0.0%	2	100.0%	2	0.3%
Dare	1	0.0%	0	0.0%	1	0.1%
Davidson	6	37.5%	10	62.5%	16	2.3%
Davie	1	50.0%	1	50.0%	2	0.3%
Duplin	3	0.0%	0	0.0%	3	0.4%
Durham	3	60.0%	2	40.0%	5	0.7%
Edgecombe	3	75.0%	1	25.0%	4	0.6%
Forsyth	20	40.8%	29	59.2%	49	7.0%

Table 1. Number of events meeting the surveillance definition, by county and type of event - North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005

County	Type of event				All events	
	Fixed facility		Transportation			
	No. of Events	Percentage	No. of Events	Percentage	Total no. events	Percentage
Franklin	0	0.0%	0	0.0%	0	0.0%
Gaston	5	38.5%	8	61.5%	13	1.9%
Gates	0	0.0%	0	0.0%	0	0.0%
Graham	1	0.0%	0	0.0%	1	0.1%
Granville	0	0.0%	5	100.0%	5	0.7%
Greene	0	0.0%	2	100.0%	2	0.3%
Guilford	14	32.6%	29	67.4%	43	6.2%
Halifax	0	0.0%	0	0.0%	0	0.0%
Harnett	2	100.0%	0	0.0%	2	0.3%
Haywood	3	75.0%	1	25.0%	4	0.6%
Henderson	5	55.6%	4	44.4%	9	1.3%
Hertford	0	0.0%	1	100.0%	1	0.1%
Hoke	0	0.0%	0	0.0%	0	0.0%
Hyde	0	0.0%	0	0.0%	0	0.0%
Iredell	7	77.8%	2	22.2%	9	1.3%
Jackson	1	50.0%	1	50.0%	2	0.3%
Johnston	5	71.4%	2	28.6%	7	1.0%
Jones	0	0.0%	0	0.0%	0	0.0%
Lee	2	66.7%	1	33.3%	3	0.4%
Lenoir	1	20.0%	4	80.0%	5	0.7%
Lincoln	4	57.1%	3	42.9%	7	1.0%
McDowell	18	90.0%	2	10.0%	20	2.9%
Macon	3	0.0%	0	0.0%	3	0.4%
Madison	2	0.0%	0	0.0%	2	0.3%
Martin	0	0.0%	3	100.0%	3	0.4%
Mecklenburg	48	30.0%	112	70.0%	160	23.0%
Mitchell	1	0.0%	2	0.0%	3	0.4%
Montgomery	1	100.0%	0	0.0%	1	0.1%
Moore	1	50.0%	1	50.0%	2	0.3%
Nash	1	14.3%	6	85.7%	7	1.0%
New Hanover	9	81.8%	2	18.2%	11	1.6%
Northampton	1	33.3%	2	66.7%	3	0.4%
Onslow	4	100.0%	0	0.0%	4	0.6%
Orange	4	100.0%	0	0.0%	4	0.6%

Table 1. Number of events meeting the surveillance definition, by county and type of event - North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005

County	Type of event				All events	
	Fixed facility		Transportation			
	No. of Events	Percentage	No. of Events	Percentage	Total no. events	Percentage
Pamlico	0	0.0%	0	0.0%	0	0.0%
Pasquotank	2	0.0%	0	0.0%	2	0.3%
Pender	0	0.0%	0	0.0%	0	0.0%
Perquimans	0	0.0%	1	100.0%	1	0.1%
Person	0	0.0%	1	100.0%	1	0.1%
Pitt	3	37.5%	5	62.5%	8	1.1%
Polk	3	100.0%	0	0.0%	3	0.4%
Randolph	5	71.4%	2	28.6%	7	1.0%
Richmond	1	0.0%	1	0.0%	2	0.3%
Robeson	5	83.3%	1	16.7%	6	0.9%
Rockingham	2	0.0%	1	0.0%	3	0.4%
Rowan	7	77.8%	2	22.2%	9	1.3%
Rutherford	20	100.0%	0	0.0%	20	2.9%
Sampson	4	66.7%	2	33.3%	6	0.9%
Scotland	0	0.0%	1	100.0%	1	0.1%
Stanly	2	66.7%	1	33.3%	3	0.4%
Stokes	2	0.0%	0	0.0%	2	0.3%
Surry	4	50.0%	4	50.0%	8	1.1%
Swain	1	50.0%	1	50.0%	2	0.3%
Transylvania	3	100.0%	0	0.0%	3	0.4%
Tyrrell	0	0.0%	0	0.0%	0	0.0%
Union	3	100.0%	0	0.0%	3	0.4%
Vance	1	100.0%	0	0.0%	1	0.1%
Wake	14	40.0%	21	60.0%	35	5.0%
Warren	0	0.0%	0	0.0%	0	0.0%
Washington	0	0.0%	0	0.0%	0	0.0%
Watauga	10	83.3%	2	16.7%	12	1.7%
Wayne	0	0.0%	2	100.0%	2	0.3%
Wilkes	2	100.0%	0	0.0%	2	0.3%
Wilson	0	0.0%	3	100.0%	3	0.4%
Yadkin	1	0.0%	0	0.0%	1	0.1%
Yancey	2	0.0%	0	0.0%	2	0.3%
Total	365	52.4%	331	47.6%	696	100.0%

Table 2. Number of substances involved per event, by type of event - North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005

No. substances	Type of event						All events		
	Fixed facility			Transportation					
	No. events	%	Total substances	No. events	%	Total substances	No. events	%	Total substances
1	274	75.1	274	327	98.8	327	601	86.4	601
2	10	2.7	20	3	0.9	6	13	1.9	26
3	12	3.3	36	0	0.0	0	12	1.7	36
4	8	2.2	32	1	0.7	4	9	1.3	36
≥ 5	61	16.7	454	0	0.3	0	61	8.8	454
Total[¶]	**365**	**100**	**816**	**331**	**100**	**337**	**696**	**100.1**	**1153**

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

Table 3. Industries involved in hazardous substance events, by category - North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005

Industry category	Total Events		Events with victims		Percentage of events with victims	Total no. of victims
	No.	Percentage	No.	Percentage		
Accommodation and food services	4	0.6	1	2.0	25.0	4
Agriculture, forestry, and fishing	5	0.7	1	2.0	20.0	1
Arts, entertainment, and recreation	6	0.9	2	3.9	33.3	2
Construction	4	0.6	1	2.0	25.0	7
Educational services	4	0.6	1	2.0	25.0	1
Health care and social assistance	7	1.0	0	0.0	0.0	0
Manufacturing	85	12.2	11	21.6	12.9	68
Not an industry or not identified	146	21.0	12	23.5	8.2	21
Other	26	3.7	6	11.8	23.1	11
Public administration	3	0.4	0	0.0	0.0	0
Retail trade	14	2.0	3	5.9	21.4	34
Transportation and warehousing	359	51.2	11	21.6	3.1	17
Utilities	27	3.9	1	2.0	3.7	1
Wholesale trade	6	0.9	1	2.0	16.7	1
Total[¶]	696	99.7	51	100.3	7.3	168

[¶] Percentages do not total 100% because of rounding

Table 4. The 10 substances most frequently involved in events—North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005

Rank	Standardized Substance Name	Frequency
1	Sodium hydroxide	74
2	Hydrochloric acid	71
3	Methamphetamine chemicals, NOS*/ methamphetamine	54
4	Hydrogen peroxide	51
4	Iodine	51
6	Ammonia	43
7	Acetone	40
8	Resin, NOS*	36
9	Pseudoephedrine	35
10	Coleman® fuel	33
Total		488

*NOS = Not otherwise specified

Table 5.—Number of substances involved, by substance category and type of event—North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005

Substance category	Type of event				All events	
	Fixed facility		Transportation			
	No. substances	%	No. substances	%	No. substances	%
Acids	106	13.0	50	14.8	156	13.5
Ammonia	37	4.5	6	1.8	43	3.7
Bases	72	8.8	38	11.3	110	9.5
Chlorine	11	1.3	4	1.2	15	1.3
Formulations	1	0.1	0	0.0	1	0.1
Hetero-organics	3	0.4	5	1.5	8	0.7
Hydrocarbons	3	0.4	2	0.6	5	0.4
Mixture*	35	4.3	12	3.6	47	4.1
Other†	98	12.0	22	6.5	120	10.4
Other inorganic substances‡	182	22.3	18	5.3	200	17.3
Oxy-organics	42	5.1	12	3.6	54	4.7
Paints and dyes	9	1.1	44	13.0	53	4.6
Pesticides	10	1.2	22	6.5	32	2.8
Polychlorinated biphenyls	14	1.7	0	0.0	14	1.2
Polymers	14	1.7	41	12.2	55	4.8
Volatile organic compounds	179	21.9	61	18.1	240	20.8
Total¶	**816**	**99.8**	**337**	**100**	**1153**	**99.9**

* Substances from different categories that were mixed or formed from a reaction before the event.
† Not belonging to one of the existing categories.
‡ All inorganic substances except for acids, bases, ammonia, and chlorine.
¶ Percentages do not total 100% because of rounding.

Table 6.—Number of victims per event, by type of event— North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005

No. victims	Type of event						All events		
	Fixed facility			Transportation					
	No. events	%	Total victims	No. events	%	Total victims	No. events	%	Total victims
1	15	41.7	15	13	86.7	13	28	54.9	28
2	8	22.2	16	0	0.0	0	8	15.7	16
3	4	11.1	12	2	13.3	6	6	11.8	18
4	1	2.8	4	0	0.0	0	1	2.0	4
≥5	8	22.2	102	0	0.0	0	8	15.7	102
Total[¶]	**36**	**100**	**149**	**15**	**100**	**19**	**51**	**100.1**	**168**

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

Table 7.—Frequencies of injuries/symptoms, by type of event*— North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005

	Fixed facility		Transportation		All events	
Injury/symptom	**No. injuries**	**%**	**No. injuries**	**%**	**Total no.**	**%**
Burns[†]	8	4.1	1	4.5	9	4.1
Dizziness/central nervous system symptoms	36	18.5	1	4.5	37	17.1
Eye irritation	7	3.6	1	4.5	8	3.7
Gastrointestinal system problems	17	8.7	0	0.0	17	7.8
Headache	20	10.3	4	18.2	24	11.1
Hearing damage/loss	1	0.5	0	0.0	1	0.5
Respiratory irritation	95	48.7	3	13.6	98	45.2
Skin irritation	7	3.6	1	4.5	8	3.7
Trauma[‡]	4	2.1	11	50.0	15	6.9
Total[¶]	**195**	**100.1**	**22**	**99.8**	**217**	**100.1**

*The number of injuries is greater than the number of victims (168) because a victim could have had more than one injury.
[†]Of the 9 burns, 7 were thermal, 1 was chemical, and 1 was both thermal and chemical.
[‡]Of the 15 trauma injuries, 1 was chemical-related, 13 were not chemical-related, 1 was both chemical and non-chemical related.
[¶]Percentages do not total 100% because of rounding.

Table 8.—Distribution of personnel who responded to the event—North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005

Responder category	No.	%[¶]
Certified HazMat team	100	14.4
Department of works/ utilities/ transportation	11	1.6
Emergency medical technicians	141	20.3
Environmental agency	44	6.3
Fire department	256	36.8
Health department/health agency	10	1.4
Law enforcement agency	206	29.6
Other[†]	2	0.3
Response team of company where release occurred	374	53.7
State, county, or local emergency managers/coordinators/planning committees	92	13.2
Third party contractors	88	12.6

[¶]Percentages total greater than 100% because multiple responder categories could be reported per event.
[†]Other = Department of Motor Vehicles and Department of Social Services.

Table 9.– Cumulative data by year— North Carolina Hazardous Substances Emergency Events Surveillance, 1993-2005*

Year	Type of event			No. substances released	No. victims	No. deaths	Events with victims	
	Fixed facility	Transportation	Total				No.	%†
1993	184	77	261	306	151	2	58	14.7
1994	191	54	245	273	111	1	36	9.1
1995	186	58	244	285	107	0	30	7.6
1996	128	45	173	185	126	1	32	8.1
1997	116	42	158	172	80	4	26	6.6
1998	88	69	157	183	63	1	23	5.8
1999	108	210	318	349	17	2	32	8.1
2000	87	214	301	314	67	0	26	6.6
2001	90	221	311	360	117	1	25	6.3
2002	123	188	311	340	210	4	39	9.9
2003	195	179	374	603	183	8	38	9.6
2004	201	181	382	592	103	1	29	7.4
2005	164	150	314	561	65	0	22	7.0
Total	**1861**	**1688**	**3549**	**4523**	**1400**	**25**	**416**	**11.7**

* 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.

Figure 1. - Areas of fixed facilities involved in events—North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005.

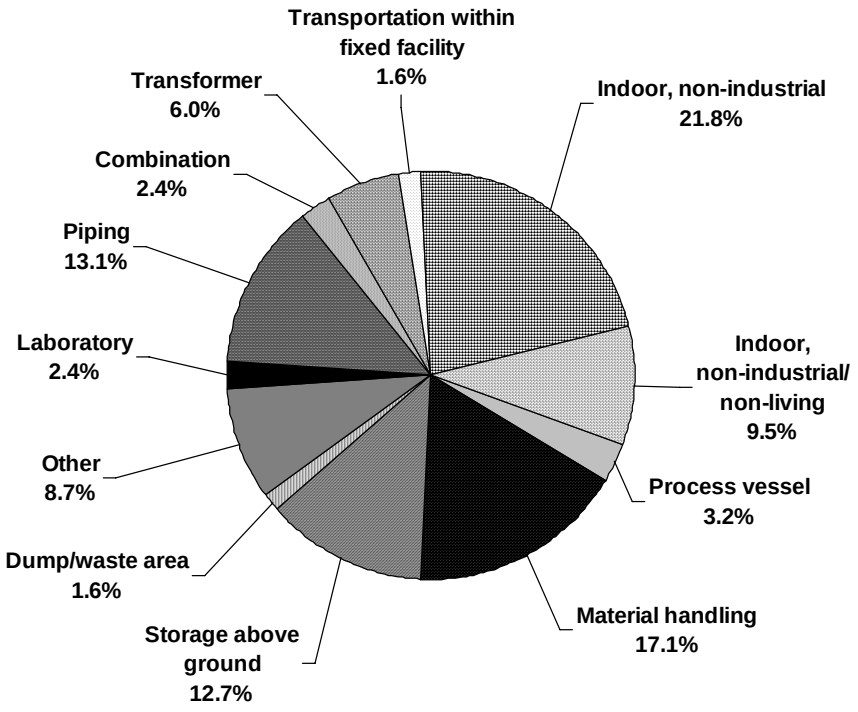
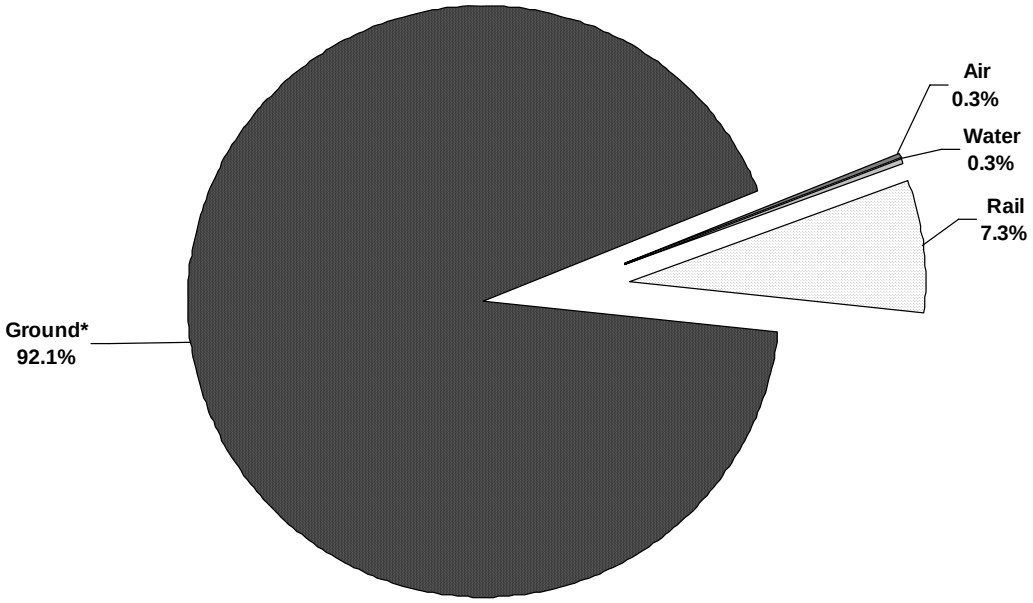


Figure 2. - Distribution of transportation-related events, by type of transport—North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005.



***Transport in truck, van or trailer.**

Figure 3a. - Primary factors reported as contributing to events—North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005.

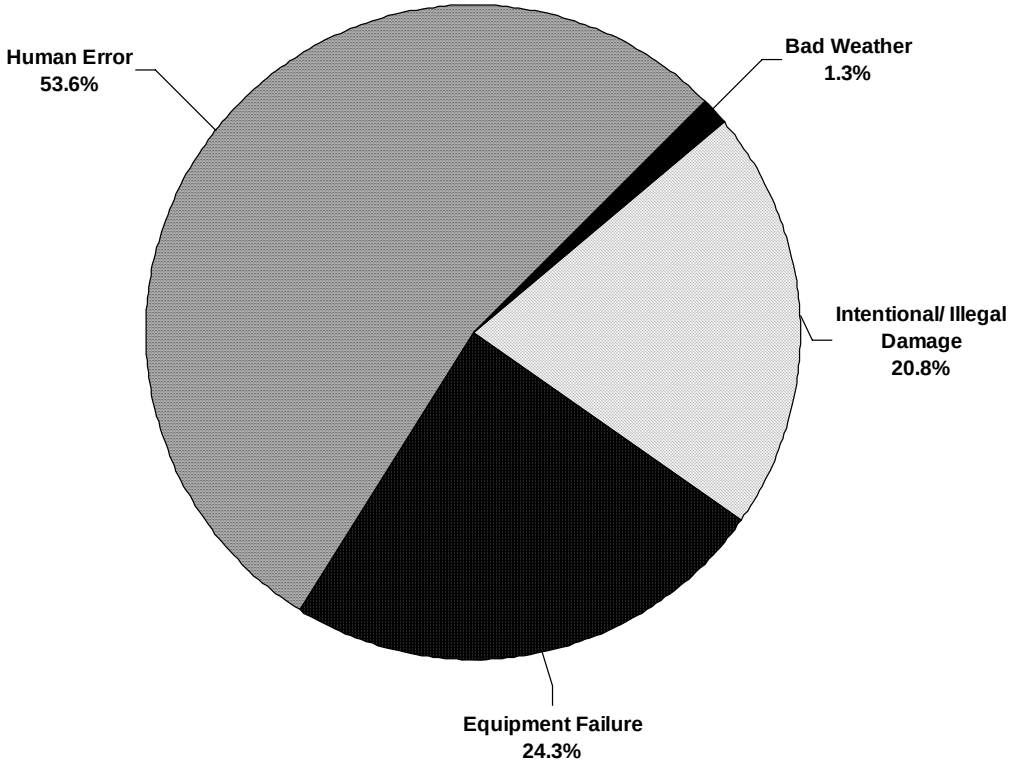
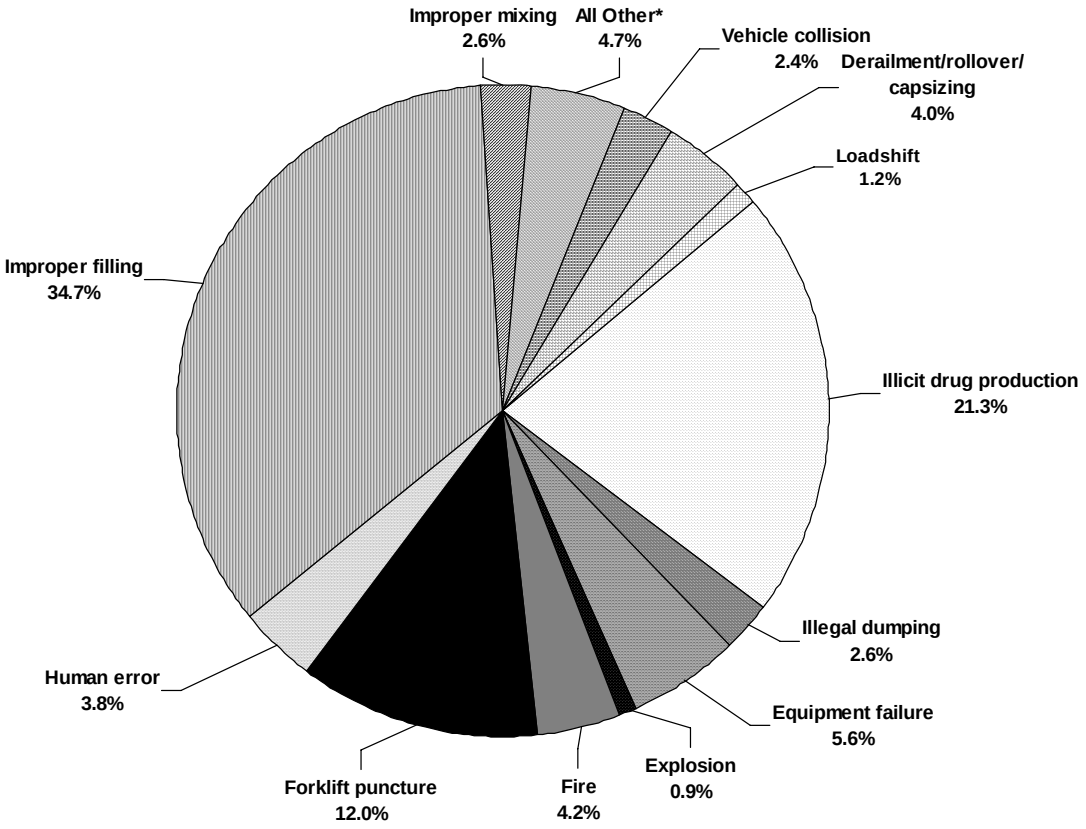


Figure 3b. - Secondary factors reported as contributing to events—North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005.



***All other includes: maintenance, overspray/misapplication, power failure, and system upset.**

Figure 4. - Number of victims, by population group and type of event—North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005.

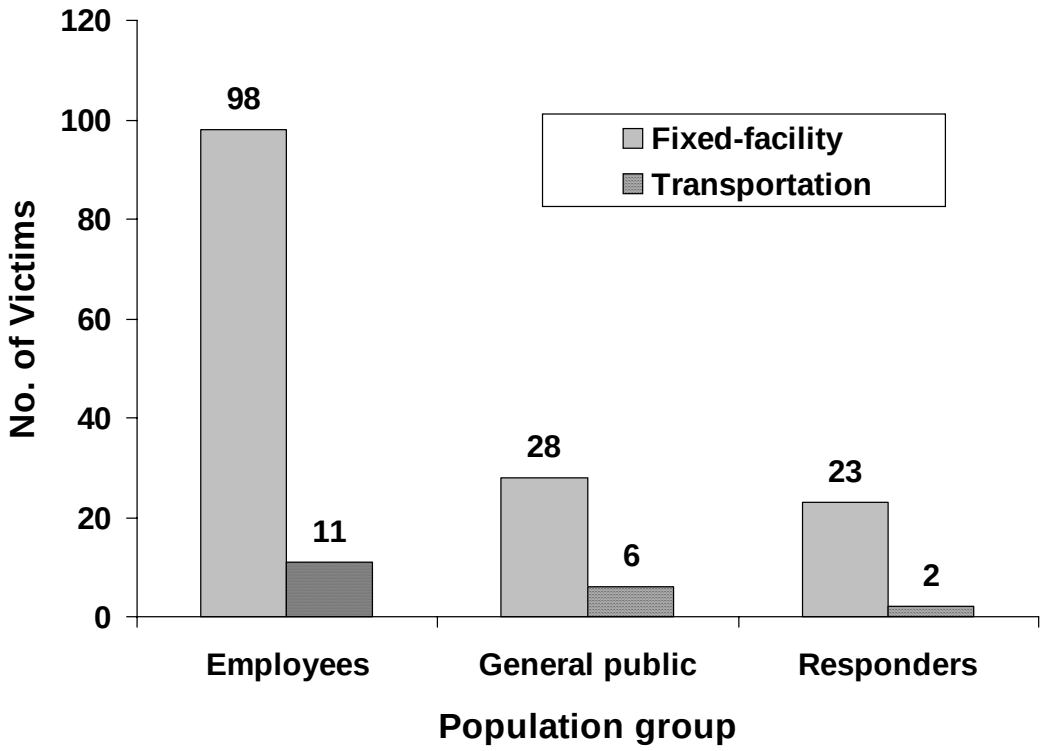
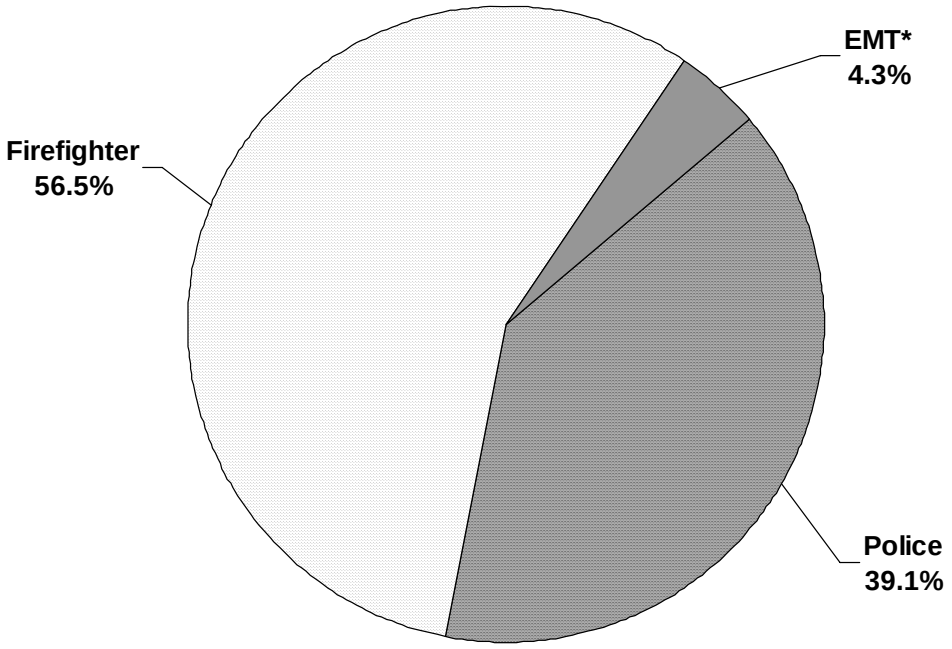


Figure 5. Distribution of responders injured in fixed-facility events, by type of responder—North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005.



***EMT = emergency medical technician**

Figure 6. - Injury disposition—North Carolina Hazardous Substances Emergency Events Surveillance, 2004-2005.

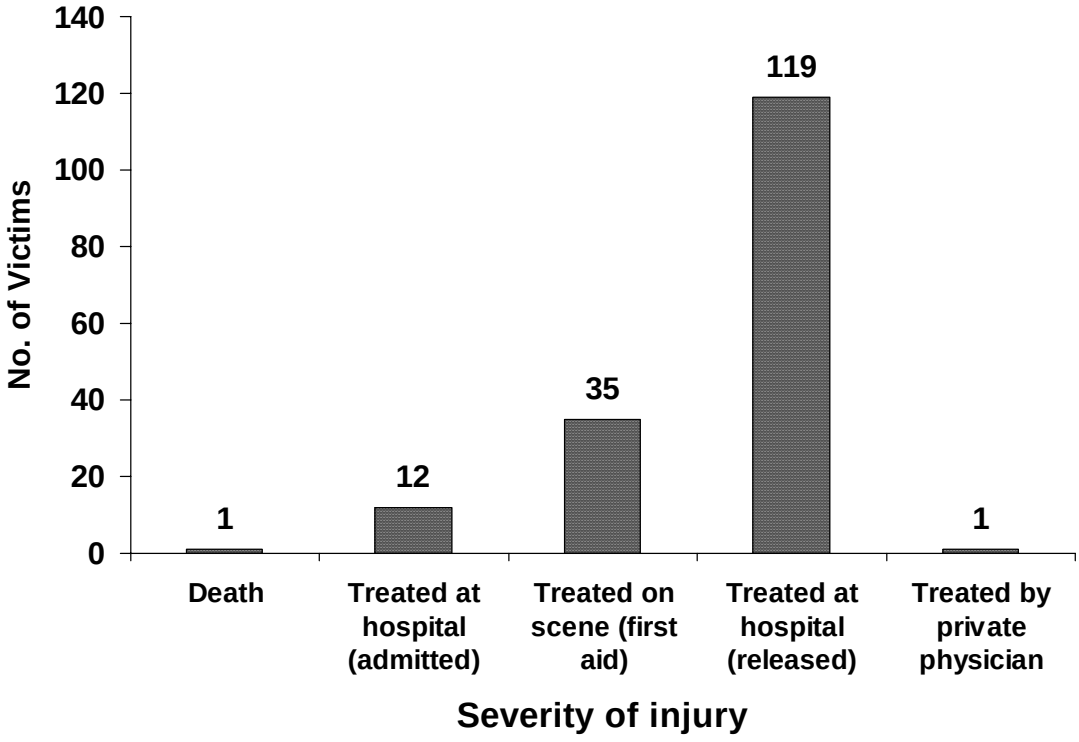
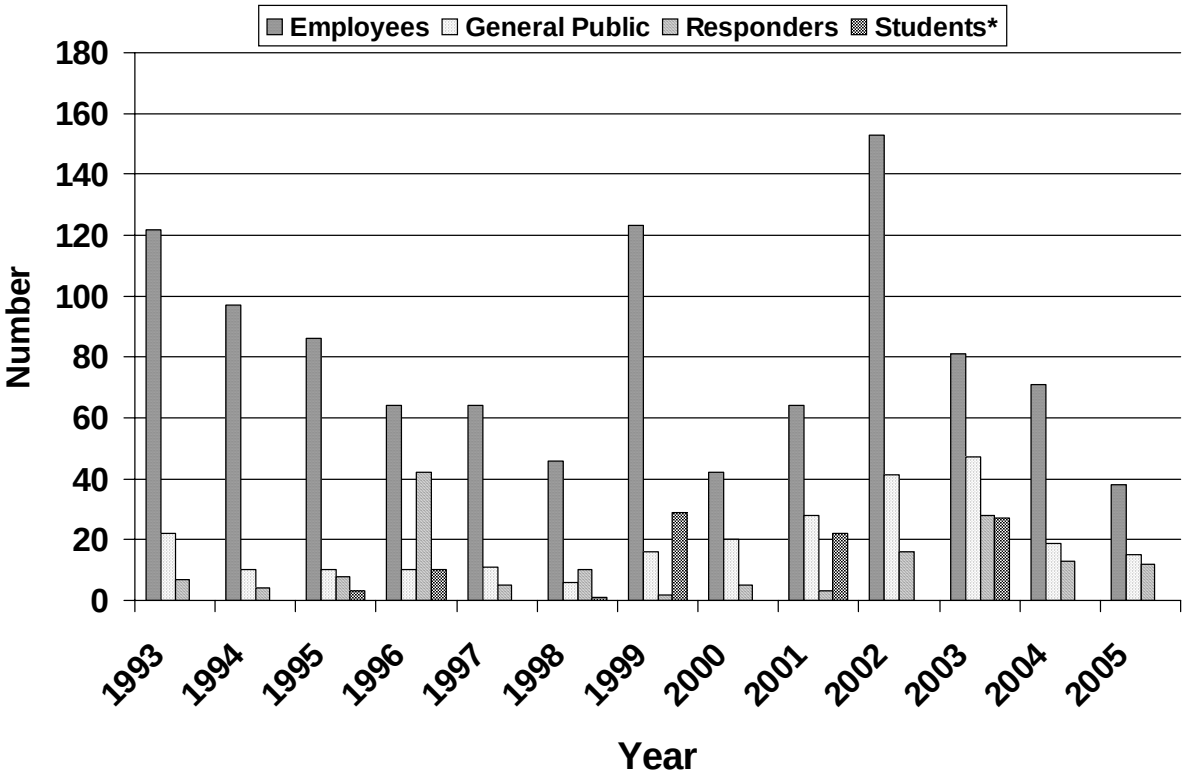


Figure 7. – Number of victims, by category and year—North Carolina Hazardous Substances Emergency Events Surveillance, 1993-2005.



***Students at school**