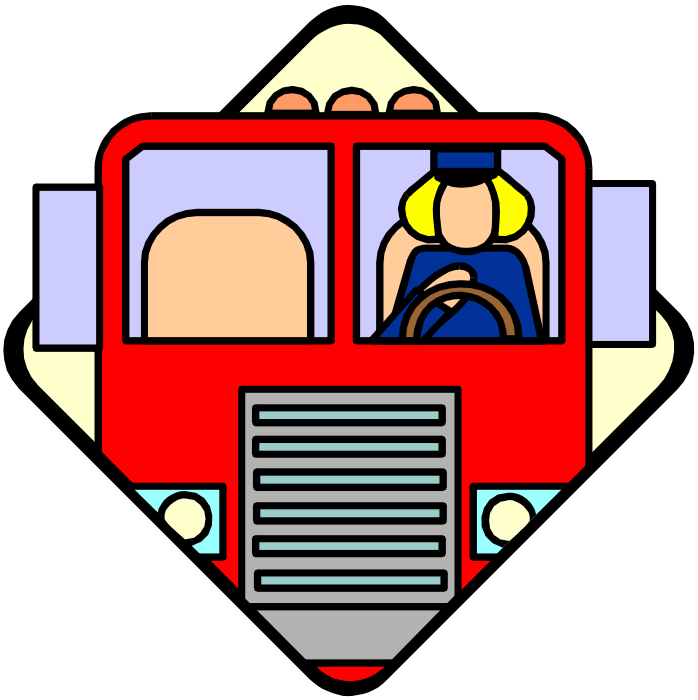
Texas Hazardous Substances Emergency Events Surveillance (HSEES)

1993 - 2000 Report on Trucking Services Events



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TEXAS HAZARDOUS SUBSTANCES EMERGENCY EVENTS SURVEILLANCE (HSEES) REPORT ON TRUCKING SERVICES EVENTS 1993 - 2000

Executive Summary

Since January 1, 1993, the Texas Department of Health has participated in the Hazardous Substances Emergency Events Surveillance (HSEES) System (TxHSEES).[1] This surveillance system is currently funded in 15 states[2] by the Agency for Toxic Substances and Disease Registry (ATSDR) and collects data about emergency releases of non-petroleum hazardous substances. The goal of HSEES is to reduce morbidity (illness) and mortality (death) resulting from hazardous substances emergency events by identifying risk factors and developing risk reduction strategies.

From January 1, 1993, through December 31, 2000, project staff identified 17,854 events meeting case definition. The trucking services industry accounted for 8% (n=1,382) of these events.

Events were investigated using telephone, fax, and written inquiries to appropriate sources including local, county, and state emergency response personnel such as firefighters and HAZMAT staff; county health departments; industrial health and safety personnel; plant managers and employees; and private citizens.

Project staff collected data using a data collection form developed by ATSDR. Within the trucking services industry, 66% of the TxHSEES events (n=908) occurred in transportation events and the remaining 34% (n=474) occurred in fixed-facilities involved in trucking services (i.e., warehouse, dock).

A total of 1,446 chemical substances were released in trucking services events. The chemical substance categories with the most frequently released substances included “other substances” (n=426), volatile organic compounds (n=285), acids (n=207), other inorganic substances (n=137), and bases (n=118). Evacuations were ordered in 71 events, involving 77 substances. The chemical substance categories most frequently associated in events with evacuations included “other substances” (n=27), volatile organic compounds (n=17), and acids (n=17).

A total of 287 people were injured in 91 events; 240 in transportation events and 47 in fixed-facility events. Injured persons included members of the general public (n=149, 52%), employees (n=101, 35%), and responders (n=37, 13%). The most common injuries were respiratory irritation (n=158, 34%), nausea or vomiting (n=70, 15%), trauma (n=69, 15%), eye irritation (n=66, 14%), and headache (n=46, 10%). Most injured persons were treated at a hospital and released (n=199, 69%). First aid was given to 33 (12%) people and 34 (12%) were

admitted to the hospital. Twelve people (4%) died, including 9 employees and 2 members of the general public from trauma injuries in vehicular accidents. One employee died from thermal burns in a transportation event.

Transportation events in trucking services (n=908) accounted for slightly less than one-half (49%) of the overall number of transportation events in Texas (n=1,856). The transportation events in trucking services involving victims (n=75) accounted for 47% of the overall number of transportation events involving victims (n=161). The number of victims in transportation events in trucking services (n=240) accounted for 48% of the total number of victims in transportation events (n=504).

From 1993 to 2000, the total number of trucking services industry events (n=1,382) accounted for 8% of TxHSEES' total number of events (n=17,854). The total number of victims in trucking services industry events (n=287) accounted for 8% of the TxHSEES' total number of victims (n=3,447) for the same time period. However, for the number of events involving victims, trucking services industry had 91 events, which is 19% of the total number of events involving victims (n=486).

Of the two trucking companies with the largest number of releases from 1993 to 2000, only one recorded an injury event, and it involved only a single victim. These two facilities routinely handle large volumes of hazardous chemicals. However, they continue to invest considerable resources in safety training emphasizing the need for employees to utilize safe loading/unloading techniques at all times. Smaller trucking companies, which do not have as many resources, do not conduct regular safety training and have a significantly larger number of events involving victims.

[1]This document was supported by funds from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) trust fund provided to the Texas Department of Health under Cooperative Agreement Number U61/ATU698034-10 from the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services.

[2]Other states currently participating in the study are Alabama, Colorado, Iowa, Louisiana, Minnesota, Mississippi, Missouri, New Jersey, New York, North Carolina, Oregon, Utah, Washington, and Wisconsin.

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Introduction

The Hazardous Substances Emergency Events Surveillance (HSEES) System is an on-going, state-based project funded by the Agency for Toxic Substances and Disease Registry (ATSDR) to describe the public health consequences of spills involving hazardous substances. Releases involving only petroleum are excluded. In October 1992, the Texas Department of Health was awarded the cooperative agreement and TxHSEES joined the HSEES system, which currently includes 15 states.

The goal of this project is to reduce morbidity (illness) and mortality (death) resulting from hazardous substances emergency events by identifying trends in the data and offering suggestions to reduce morbidity and mortality such as improved employee training, better equipment maintenance, or a process change. The objectives of the surveillance system are to:

- describe the distribution and characteristics of hazardous substances emergencies,
- describe the morbidity and mortality experienced by employees, responders and the general public that result from hazardous substances emergency events,
- identify risk factors associated with morbidity and mortality from the release of hazardous substances, and
- identify or develop prevention strategies that might reduce future morbidity and mortality associated with hazardous substances releases.

This report summarizes all data collected from the trucking services industries from January 1, 1993, through December 31, 2000.

Methods

Definition of a Reportable Event

For the HSEES system, a reportable event is defined as an uncontrolled, illegal or threatened release of a hazardous substance (excluding petroleum products) that needs to be removed, cleaned up or neutralized according to federal, state or local law. A threatened release which leads to a public health action, such as an evacuation or traffic re-routing, also qualifies for inclusion in the system. If a release includes petroleum products with other hazardous substances which meet event criteria, the release is a reportable event. Due to the large volume of events that occur, the TxHSEES project also adds the criterion that the release quantity must be greater than 10 pounds or 1 gallon (unless the CERCLA reportable quantity is 1 pound).

Definition of Fixed-facility and Transportation Events

Fixed-facility events within the trucking industry were events which occurred inside buildings or outdoors on the premises of a trucking facility or site. Some examples of these events are spills occurring in warehouses or on loading docks. Transportation events within the trucking industry include events involving hazardous materials being transported by ground transportation. The spill may have occurred outside the vehicle on the roadway, or it may have spilled inside the vehicle while it was in transit. When a spill occurs inside the trailer during loading or unloading, but before all of the material has been loaded onto or unloaded from the vehicle, the event is coded as a transportation event.

Data Collection Methods

Data are collected on a data collection form developed and provided by ATSDR. The categories of information collected during an investigation include the following:

- chemical name and quantity released;
- time, date, and location of spill;
- type of release (e.g. spill, explosion, air emission, etc.) and factors contributing to the release (e.g. equipment failure, human error, improper mixing, etc.);
- weather information;
- injury information including victim category (employee, responder, or member of the general public), injury type and treatment sought;
- use of personal protective equipment and number of persons decontaminated (employee, responder, or member of the general public);
- estimated size of the potentially exposed residential and workforce populations near the event;
- evacuation and in-place sheltering activities; and
- control actions and type of emergency response (emergency preparedness plan).

Each spill is given a unique record identification code for tracking purposes. Spills are identified through three main sources: the Environmental Protection Agency=s National Response Center (NRC), the Texas Natural Resource Conservation Commission (TNRCC), and the U.S. Department of Transportation=s Hazardous Materials Information Systems (HMIS). Additional spill notifications are obtained from local fire department=s hazardous materials units, industry, medical providers, and news media.

Each spill is investigated by telephone, fax, or email inquiries to appropriate sources including local, county and state emergency response personnel such as industrial health and safety or environmental personnel; plant managers and employees; firefighters and Hazardous Materials (HAZMAT) teams; county health departments; hospital staff; and private citizens.

Results

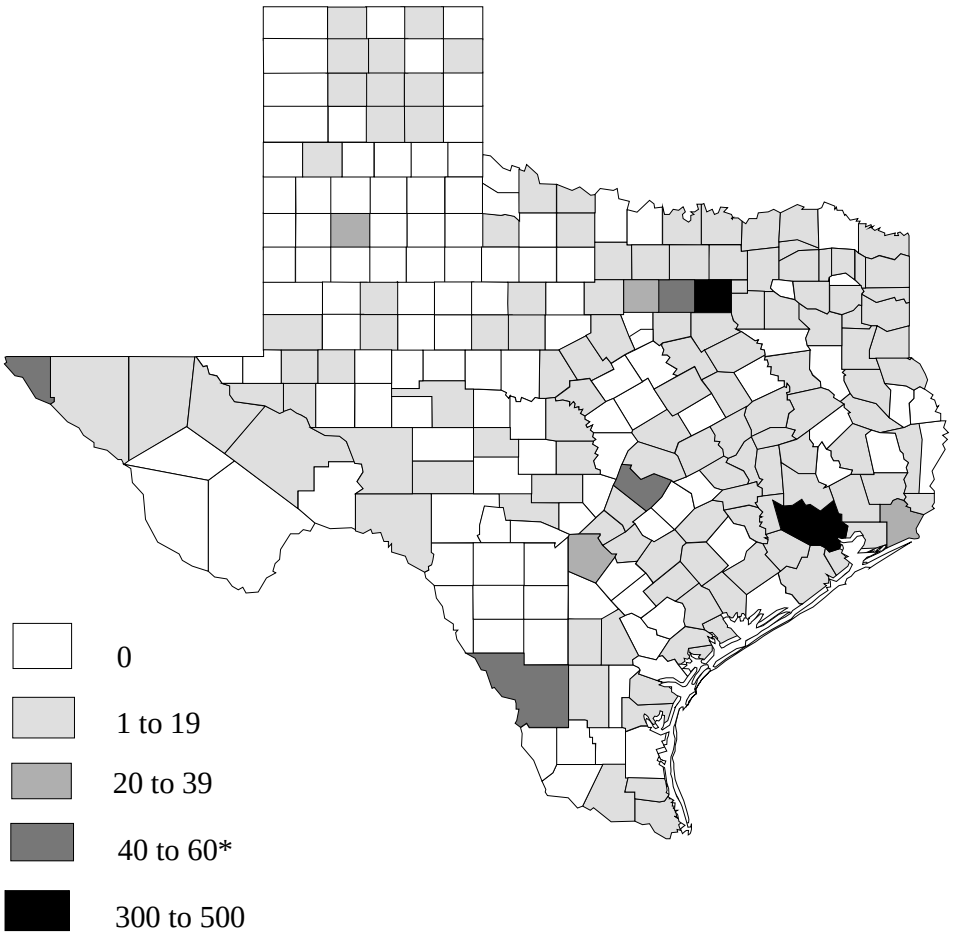
During the eight-year period of 1993-2000, project staff investigated 17,854 reported

actual or threatened releases meeting the case criteria. The trucking services industry accounted for 8% (n=1,382) of these events.

Geographic Distribution

Trucking services industry events from 1993 to 2000 occurred most frequently in Harris (n=426) and Dallas (n=308) counties (Figure 1).

Figure 1. Number of trucking services industry events by county, Texas HSEES, 1993 - 2000



Summary Statistics for Trucking Services Industry Events

Table 1 shows the total number of events, number of events with victims, and number of victims for the trucking services industry compared to Texas as a whole. Table 2 shows the distribution of events in the counties with the most frequent trucking service industry events.

Table 1. Summary statistics for the trucking services industry and Texas statewide, Texas HSEES, 1993 - 2000

	TEXAS EVENTS NUMBER	TRUCKING SERVICES INDUSTRY EVENTS NUMBER (%)
Total number of events	17,854	1,382 (7.7)
Total number of events with victims	486	91 (18.7)
Total number of victims	3,447	287 (8.3)

Table 2. Trucking services industry distribution by type of event in counties with 20 or more events, Texas HSEES, 1993 - 2000

COUNTY	TRANSPORTATION NO. OF EVENTS (%)	FIXED FACILITY NO. OF EVENTS (%)	TOTAL NO. OF EVENTS
Harris	247 (58.0)	179 (42.0)	426 (100.0)
Dallas	212 (68.8)	96 (31.2)	308 (100.0)
Tarrant	27 (50.0)	27 (50.0)	54 (100.0)
El Paso	34 (68.0)	16 (32.0)	50 (100.0)
Travis	24 (58.5)	17 (41.5)	41 (100.0)
Webb	24 (60.0)	16 (40.0)	40 (100.0)
Bexar	18 (60.0)	12 (40.0)	30 (100.0)
Jefferson	12 (46.2)	14 (53.8)	26 (100.0)
Lubbock	8 (40.0)	12 (60.0)	20 (100.0)
Remaining counties	302 (78.0)	85 (22.0)	387 (100.0)
Total	908 (65.7)	474 (34.3)	1,382 (100.0)

Transportation Events in Trucking Services Industry

Table 3 shows the total number of events, number of events with victims, and number of victims for transportation events in the trucking services industry compared to Texas as a whole.

Table 3. Summary statistics for transportation events in trucking services industry and Texas statewide, Texas HSEES, 1993 - 2000

	TRANSPORTATION EVENTS NUMBER	TRUCKING SERVICES INDUSTRY TRANSPORTATION EVENTS NUMBER (%)
Total number of transportation events	1,856	908 (48.9)
Total number of transportation events with victims	161	75 (46.6)
Total number of victims in transportation events	504	240 (47.6)

Fixed-facility Events in Trucking Services Industry

Table 4 shows the total number of events, number of events with victims, and number of victims for fixed-facility events in the trucking services industry compared to Texas as a whole.

Table 4. Summary statistics for fixed-facility events in trucking services industry and Texas statewide, Texas HSEES, 1993 - 2000

	TEXAS FIXED-FACILITY EVENTS NUMBER	TRUCKING SERVICES INDUSTRY FIXED-FACILITY EVENTS NUMBER (%)
Total number of fixed-facility events	15,998	474 (3.0)
Total number of fixed-facility events with victims	325	16 (4.9)
Total number of victims in fixed-facility events	2,943	47 (1.6)

Factors Associated with Events in Trucking Services Industry

Data on factors associated with events were not collected until mid-1995. The most frequently identified factors were human error (n=422, 31%) and equipment failure (n=172, 13%). Human error was identified as a factor in 16 events involving injured people.

Types of Releases in Trucking Services Industry

There were 1,446 chemicals released in the 1,382 events. Most releases were spills (n=1,344). Air emissions (n = 65) were the second most frequent type of release.

Chemical Substance Categories in Trucking Services Industry

HSEES substances are grouped into 11 categories. Table 5 shows the distribution of these substances by substance category and type of event in the trucking services industry. For both transportation and fixed-facility events, the largest chemical substance category released was "other", followed by volatile organic compounds.

Table 5. Distribution of substances released by substance category and type of event in trucking services industry, Texas HSEES, 1993 - 2000*

SUBSTANCE CATEGORY	TYPE OF EVENT				ALL EVENTS	
	TRANSPORTATION		FIXED FACILITY			
	NO. OF SUBSTANCES	(%)	NO. OF SUBSTANCES	(%)	NO. OF SUBSTANCES	(%)
Acids	136	(14.1)	71	(14.9)	207	(14.3)
Ammonia	4	(0.4)	5	(1.0)	9	(0.6)
Bases	83	(8.6)	35	(7.3)	118	(8.2)
Chlorine	0	(0.0)	0	(0.0)	0	(0.0)
Mixtures*	75	(7.8)	32	(6.7)	107	(7.4)
Other inorganic substances	93	(9.6)	44	(9.2)	137	(9.5)
Other substances[H]	290	(30.0)	136	(28.5)	426	(29.5)
Paints and dyes	67	(6.9)	23	(4.8)	90	(6.2)
Pesticides	36	(3.7)	27	(5.7)	63	(4.4)
Polychlorinated biphenyls	3	(0.3)	0	(0.0)	3	(0.2)
Volatile organic compounds	180	(18.6)	105	(22.0)	285	(19.7)
Indeterminate‡	1	(0.1)	0	(0.0)	1	(0.1)
Total§¶	967	(100.1)	478	(100.1)	1,446	(100.1)

* Mixtures of substances are chemical substances from different categories.

H Other substances are substances that do not fit into a category.

‡ One chemical could not be classified.

§Total exceeds total number of events (1,382) because more than one substance was released.

¶ Percentages may not add to 100 due to rounding.

Table 6 shows the number of substances released in all trucking services industry events, the number of events involving victims and the percentage of releases with victims. Trucking services industry releases involving other inorganic substances and "other" substances were more likely to result in people being injured, 15% and 11%, respectively.

Table 6. Number of substances released in all trucking services industry events and events with victims, by substance category, Texas HSEES, 1993 - 2000

SUBSTANCE CATEGORY	NO. OF RELEASES (%)	NO. OF RELEASES WITH VICTIMS (%)	PERCENTAGE OF RELEASES WITH VICTIMS
Acids	207 (14.3)	18 (15.7)	8.7%
Ammonia	9 (0.6)	0 (0.0)	0.0%
Bases	118 (8.2)	6 (5.2)	5.1%
Chlorine	0 (0.0)	0 (0.0)	0.0%
Mixtures	107 (7.4)	5 (4.3)	4.7%
Other inorganic substances	137 (9.5)	21 (18.3)	15.3%
Other substances	426 (29.5)	45 (39.1)	10.6%
Paints and dyes	90 (6.2)	1 (0.9)	1.1%
Pesticides	63 (4.4)	4 (3.5)	6.3%
Polychlorinated biphenyls	3 (0.2)	0 (0.0)	0.0%
Volatile organic compounds	285 (19.7)	15 (13.0)	5.3%
Indeterminate*	1 (0.1)	0 (0.0)	0.0%
Total H	1,446 (100.1) ‡	115 (100.0)	8.0%

* One chemical could not be classified.
H Total exceeds total number of events (1,382) because more than one substance was released.
‡ Percentages may not add to 100 due to rounding.

Chemical Categories Associated with Victims in Trucking Services Industry

Table 7 shows the chemical categories in single chemical events associated with more than 5 victims total for all events combined. The largest number of victims were exposed to pesticides.

Table 7. Distribution of chemical categories associated with the more than 5 victims in trucking services industry events, Texas HSEES, 1993-2000

SUBSTANCE	NO. OF VICTIMS	NO. OF RELEASES
Pesticides	139*	4
Other substances	49	25
Acids	26	15
Other inorganic substances	22	14
Mixtures	20	4
Volatile organic compounds	19	15
Bases	7	6
Total	263	72

*The pesticides category includes one aldicarb release with 136 people reporting injuries.

Victim Information in Trucking Services Industry

A total of 91 events were associated with 275 injured people and 12 fatalities; 75 (82%) events were transportation and 16 (18%) occurred at fixed facilities. Of the 287 victims, 240 (84%) people were injured in transportation events and 47 (16%) people were injured in fixed-facility events. The majority of people injured during transportation events were members of the general public (n=134, 56%). Transportation events also injured 73 (30%) employees and 33 (14%) responders. The majority of the people injured in fixed-facility events were employees (n=28, 60%). Fixed-facility events also injured 15 (32%) members of the general public and 4 (8%) responders.

For transportation events, the largest number of members of the general public and responders were injured in 1994 due to a transportation event when aldicarb was released (Figure 2). A total of 136 people were injured in that event, including 111 members of the general public and 25 responders. Since 1994, less than 20 members of the general public and responders were injured each year. No members of the general public were injured in 2000 and no responders were injured in 1993, 1996, 1997, or 2000. From 1993 – 2000 less than 20 employees were injured each year. The largest number of employees were injured in 1998. Employees were the only group injured in 2000.

Figure 2. Distribution of victims in trucking services industry in transportation events by category and year, Texas HSEES 1993 - 2000

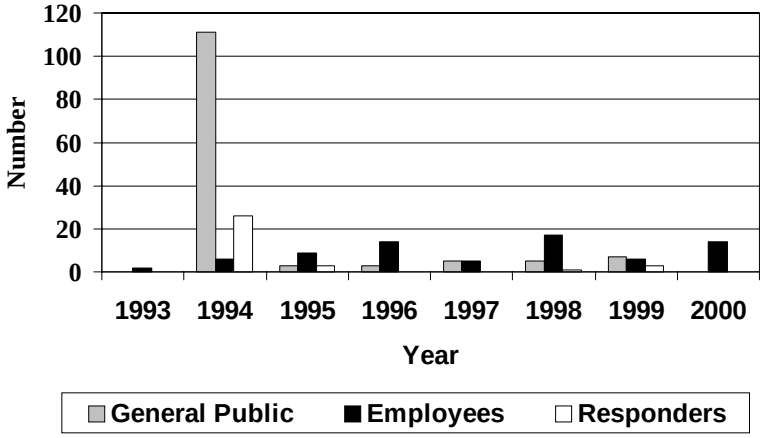
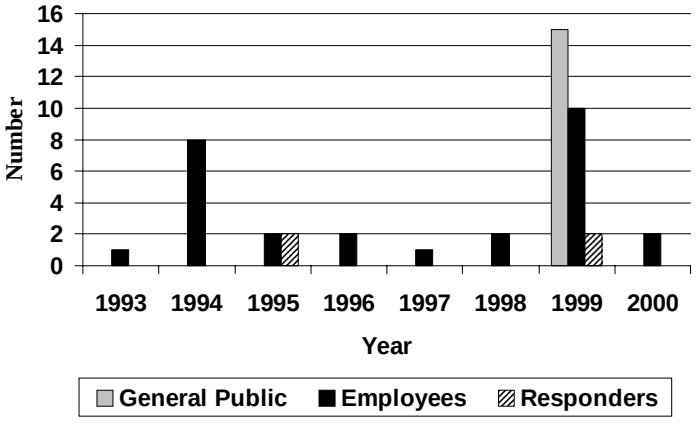


Figure 3 shows that the majority of the victims in fixed-facility events were employees. For fixed-facility events, the largest number of members of the general public (n=15) were injured in one event in 1999 due to a release of a mixture of barium, lead, sodium hydroxide, and oil. Two EMT personnel were also injured in this same event.

Figure 3. Distribution of victims in trucking services industry in fixed-facility events by category and year, Texas HSEES 1993 - 2000



The majority of persons injured reported respiratory irritation (n=158, 34%), followed by nausea or vomiting (n=70, 15%), trauma (n=69, 15%), eye irritation (n=66, 14%), and headache (n=46, 10%). All trauma injuries occurred in transportation events and were related to the vehicular accident and not to the release of hazardous substances. Most injured persons (n=199, 69%) were treated at the hospital and released; 34 (12%) were admitted to the hospital; 33 (11%) received first aid; and 12 (4%) died, including 9 employees and 2 members of the general public from trauma injuries in vehicular accidents, and 1 employee who died from thermal burns in a transportation event.

Evacuations in Trucking Services Industry

Of the 1,382 events from 1993 through 2000, an official evacuation order was given in 71 (5%) events; 50 (70%) were transportation events and 21 (30%) were fixed-facility events. Forty percent of the evacuations were of a building or affected part of a building, 37% were of a circular radius from the release, and 14% were downwind or downstream from a release. The remaining 9% were of a circular radius and downwind from the release or used no criteria. In-place sheltering was ordered in 4 events, and instructions regarding precautions to take during in-place sheltering were provided in 2 events.

Chemicals Associated with Evacuations in Trucking Services Industry

The substances most frequently associated with the 71 ordered evacuations were "other substances" (n=27, 35%), acids (n=17, 22%), and volatile organic compounds (n=17, 22%).

Figure 4 shows the cumulative data for the distribution of total numbers of events, victims, events with victims, and substances for each year from 1993 to 2000 for the trucking services industry.

Figure 4. Cumulative data for trucking services industry in Texas from 1993 - 2000

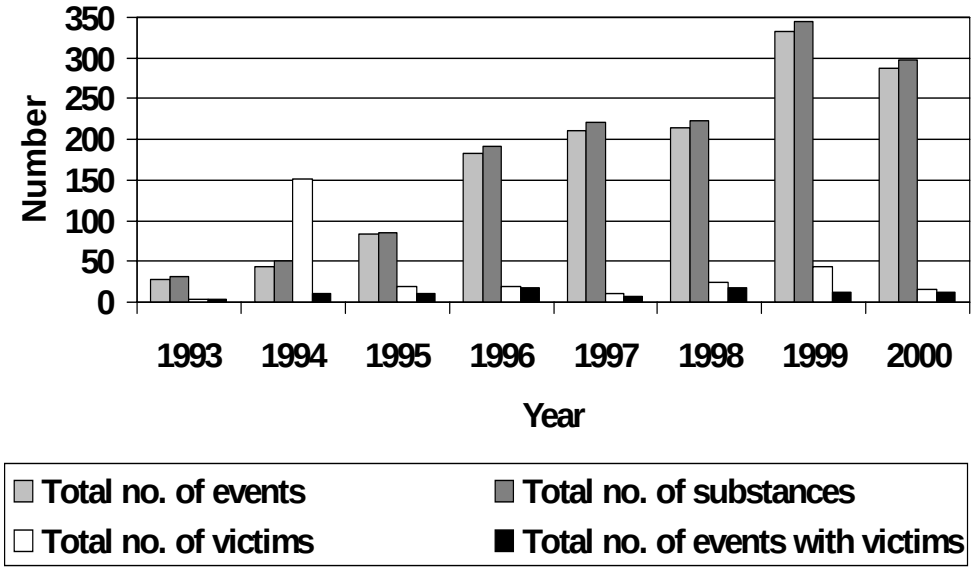


Table 8 shows the cumulative data for transportation events in trucking services by type of event, number of substances released, number of fatalities, number of victims, number of events with victims and percentage by year.

Table 8. Cumulative data for the trucking services industry from 1993 - 2000.

Year	Type of event			No. of substances released	No. of deaths	No. of victims	Events with victims	
	Fixed facility	Transport	Total				No.	%
1993	13	14	27	32	0	3	3	11.1
1994	11	32	43	51	2	151	11	2.3
1995	25	59	84	86	0	19	10	11.9
1996	66	116	182	191	0	19	17	9.3
1997	86	125	211	222	3	11	7	3.3
1998	97	118	215	223	2	25	18	8.4
1999	105	227	332	344	1	43	12	3.6
2000	71	217	288	297	4	16	13	4.5
Total	474	908	1,382	1,446	12	287	91	6.6

Comparison of Data for Trucking Services Industries

Thirteen trucking companies accounted for 727 (53%) of the trucking services industry events. Human error was associated with 297 (41%) events and 82 (11%) were associated with equipment failure. The company with the largest number of events (n=212) had only 1 event involving 1 victim. Although a company has a large number of events (due to the large volume of shipped material), the company may not necessarily have a large number of victims. Of the two trucking companies with the largest number of releases from 1993 to 2000, only one recorded an injury event, and it involved only a single victim. These two facilities routinely handle large volumes of hazardous chemicals. However, they continue to invest considerable resources in safety training emphasizing the need for employees to utilize safe loading/unloading techniques at all times. Smaller trucking companies, which do not have as many resources, do not conduct regular safety training and have a significantly larger number of events involving victims.

Conclusions

Transportation events in trucking services (n=908) accounted for slightly less than one-half (49%) of the overall number of transportation events (n=1,856). The transportation events in trucking services involving victims (n=75) accounted for 47% of the overall number of transportation events involving victims (n=161). The number of victims in transportation events in trucking services (n=240) accounted for 48% of the total number of victims in transportation events (n=504).

From 1993 to 2000, the total number of trucking services industry events (n=1,382) accounted for 8% of TxHSEES' total number of events (n=17,854). The total number of victims

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Each year, the trucking services industry transports a tremendous volume of hazardous chemicals throughout the state. Maintaining effective training and safe work practices will minimize the number of events involving chemical releases and associated injuries.

Contact Information

To obtain additional copies of this report or other materials, please contact the TxHSEES program, Environmental Epidemiology Division (T-702), Bureau of Epidemiology, Texas Department of Health, 1100 West 49th Street, Austin, Texas 78756-3199, (512) 458-7269.