

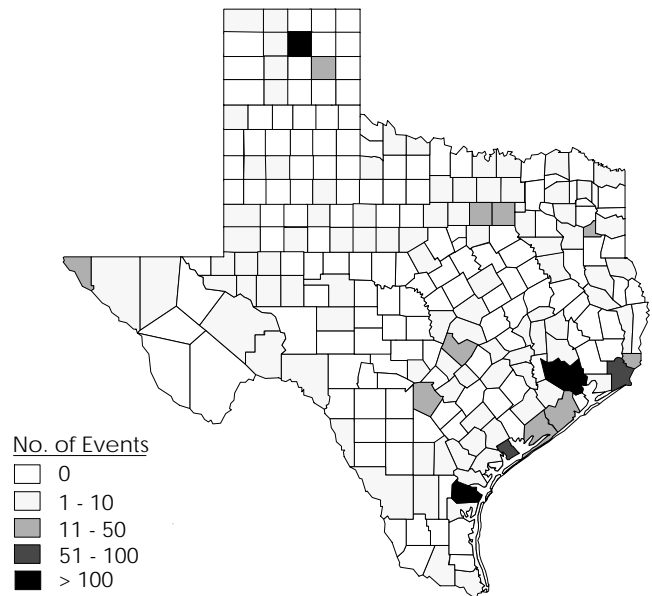
Hazardous Substances Emergency Events Surveillance

In October 1992, the Texas Department of Health (TDH) was awarded a cooperative agreement from the Agency for Toxic Substances and Disease Registry to conduct surveillance of hazardous substances emergency events in Texas. Staff began surveillance and data collection for these events in January 1993. A number of sources are used to collect information about the nature and public health impact of these spills and releases in Texas. These sources include state environmental agencies, local fire department hazardous materials units, hospitals, and federal agencies. Using a standard data collection form, staff collect data on emergency events that meet the case definition of an uncontrolled, illegal, or threatened release of one or more hazardous substances. Spills involving exclusively petroleum products are not included in the database.

There were 1,256 hazardous substances emergency events in 1994 that met the case definition; 1,101 occurred at fixed facilities, and 155 were related to transportation. Figure 1 shows the distribution of these events by county. Four of the five counties with the highest numbers of reported spills are located on the Texas Gulf Coast. Approximately 83% of these events involved the release of one substance (Table 1). Releases from fixed facilities were more likely to involve more than one substance (18.4%) compared with those that were transportation related (10.3%). Of the 1,677 substances released, most involved spills of liquids and emissions of vapors. Table 2 shows the types of chemicals released by type of event. Volatile organic compounds were the most frequently released substances for all events. Sulfur dioxide was the most frequently indicated specific substance in these events.

The majority of spills (77.8%) occurred on weekdays; however, 283 (22.2%) events occurred on the weekend. Of the 1,201 events with information about time of occurrence, over one-half (65.6%) occurred between 6 AM and 6 PM with the fewest number of spills occurring between 12 AM and 6 AM.

Figure 1. Number of Hazardous Substances Emergency Events by County



A total of 1,012 persons experienced injuries from emergency events detected with this surveillance system. Eighty (6.4%) of the 1,256 emergency events involved injuries. Compared with releases from fixed facilities (5.1%),

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transportation-related events (15.5%) were more likely to result in injuries. The greatest number of injuries, however, occurred from releases from fixed facilities. The general public was the group most frequently injured (75.7% of all victims) in both transportation-

Approximately 94% of all injuries occurred in four counties: Galveston (597), Dallas (145), Harris (127), and El Paso (76). An additional 25 counties also had persons injured from these events (1 to 9 victims each).

Table 1. Distribution of the Number of Substances Released by Type of Event

No. of Substances Released	Type of Event								
	Fixed Facility			Transportation			All Events		
	No. of Events	(%)	No. of Substances	No. of Events	(%)	No. of Substances	No. of Events	(%)	No. of Substances
1	898	(81.6)	898	139	(89.7)	139	1,037	(82.6)	1,037
2	121	(11.0)	242	8	(5.2)	16	129	(10.3)	258
3	41	(3.7)	123	3	(1.9)	9	44	(3.5)	132
4	20	(1.8)	80	2	(1.3)	8	22	(1.8)	88
5	10	(0.9)	50	2	(1.3)	10	12	(1.0)	60
>5	11	(1.0)	89	1	(0.6)	13	12	(1.0)	102
Total	1,101		1,482	155		195	1,256		1,677

related (68.1%) and fixed facility (77.3%) events. Employees accounted for 19% of those injured. Responders accounted for approximately 6% of those injured. Of the 978 victims for whom information about gender was available, approximately one-half were males and one-half were females. Ages of the victims ranged from 1 to 85 years of age with over one-half (54.8%) between the ages of 21 and 50 years of age. The median age of victims was 35 years.

Table 3 shows type of injury by type of event. About one-third of injuries involved respiratory irritation (32.8) followed by eye irritation (19.9%), headache (11.8%), and nausea (11.3%). These injuries were the most common for events related to both fixed facilities and transportation. Over one-half of victims were injured by exposure to ammonia. Events involving the release of chlorine, however, were the most likely to result in injuries.

Table 2. Classification of Chemicals Released by Type of Event

Chemical Category	Type of Event					
	Fixed Facility		Transportation		All Events	
	No. of Substances	(%)	No. of Substances	(%)	No. of Substances	(%)
Acids	129	(8.7)	19	(9.7)	148	(8.8)
Ammonia	52	(3.5)	4	(2.1)	56	(3.3)
Bases	69	(4.7)	8	(4.1)	77	(4.6)
Chlorine	25	(1.7)	2	(1.0)	27	(1.6)
Other inorganic substances	270	(18.2)	29	(14.9)	299	(17.8)
Paints and dyes	5	(0.3)	6	(3.1)	11	(0.7)
Pesticides	33	(2.2)	24	(12.3)	57	(3.4)
Polychlorinated biphenyls	40	(2.7)	6	(3.1)	46	(2.7)
Volatile organic compounds	493	(33.3)	21	(10.8)	514	(30.7)
Other	366	(24.7)	76	(39.0)	442	(26.4)
Total	1,482		195		1,677	

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Persons evacuated their homes or work places as a result of 82 (6.5%) emergency events. This action was more likely following transportation-related events than following events associated with fixed facilities. For ordered evacuations,

enough to require hospitalization. Of the employees who were admitted to the hospital or died, over one-half (59.1%) were not wearing any form of personal protective equipment at the time of the incident.

Table 3. Distribution of the Type of Injury by Type of Event

Type of Injury	Type of Event					
	Fixed Facility		Transportation		All Events	
	No. of Injuries	(%)	No. of Injuries	(%)	No. of Injuries	(%)
Chemical burns	11	(0.7)	5	(1.5)	16	(0.9)
Dizziness or other CNS*	68	(4.5)	14	(4.1)	82	(4.4)
Eye irritation	311	(20.5)	58	(17.1)	369	(19.9)
Headache	177	(11.7)	42	(12.4)	219	(11.8)
Nausea	165	(10.9)	44	(13.0)	209	(11.3)
Respiratory irritation	481	(31.7)	128	(37.8)	609	(32.8)
Skin irritation	103	(6.8)	18	(5.3)	121	(6.5)
Thermal burns	1	(0.1)	0	(0.0)	1	(0.1)
Trauma	4	(0.3)	13	(3.8)	17	(0.9)
Vomiting	81	(5.3)	10	(2.9)	91	(4.9)
Other	116	(7.6)	7	(2.1)	123	(6.6)
Total	1,518		339		1,857	

The number of injuries is greater than the number of victims, since a victim can have more than 1 injury.

*Central nervous system symptoms or signs

approximately one half (53.6%) were from buildings; 29% involved a circle or radius around the event; 16% involved evacuations downwind of the event; and 2% had no known criteria. Estimated numbers of persons who left their homes, schools, or places of business ranged from 2 to 5,200 with a median number of 20 persons per evacuation event.

Seven deaths occurred as the result of seven separate events. Six of the seven victims suffered from trauma. Six of the seven victims who died were males. Five of the seven deaths were associated with transportation-related events. Six of the seven persons who died were employees.

Another 25 persons were admitted to the hospital, and the majority (64.0%) of these victims were employees with the remainder (36.0%) from the general public. None of the responders who were injured sustained injuries serious

In summary, the Hazardous Substances Emergency Events Surveillance system provides information on the public health impact of hazardous substances emergency events in Texas. This information can help identify risk factors for injuries related to these events. In 1994 these events were more likely to occur along the Texas Gulf Coast and to be associated with fixed facilities. Events related to transportation, however, were more likely to result in injuries. The general public sustained the highest number of injuries; but, among the injured, employees were more likely to experience serious injuries that required hospitalization or resulted in death.



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