Louisiana Hazardous Substances Emergency Events Surveillance (HSEES) System

2007: A Summary Report

Louisiana Department of Health and Hospitals
Office of Public Health
Section of Environmental Epidemiology & Toxicology

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Contents

List of Tables

List of Figures

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. The Louisiana Department of Health and Hospitals, Office of Public Health, Center for Environmental Health Services, Section of Environmental Epidemiology and Toxicology has participated in this surveillance system since 2001. This report summarizes the characteristics of events reported to Louisiana in 2007. 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.

In 2007, 818 events met the HSEES surveillance definition. In 614 (75.1%) events, only one substance was released. The most commonly reported categories of substances were volatile organic compounds, other inorganic substances, and acids. During this reporting period, 30 events (3.7% of all reported events) resulted in a total of 51 victims, of whom 3 (5.9%) died. The most frequently reported injuries were respiratory irritation and eye irritation. Evacuations were ordered for 12 (1.5%) events.

Prevention outreach efforts for 2007 focused on responder injuries related to HSEES events and improving the Louisiana HSEES website.

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.

The Louisiana Department of Health and Hospitals, Office of Public Health, Center for Environmental Health Services, Section of Environmental Epidemiology and Toxicology has participated in this surveillance system since 2001. In 2007, fourteen state health departments participated in HSEES: Colorado, Florida, Iowa, Louisiana, Michigan, Minnesota, New Jersey, New York, North Carolina, Oregon, Texas, Utah, Washington, and Wisconsin.

This report provides an overview of HSEES for 2007 in Louisiana, 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 2005 an updated data-collection form was approved by the Office of Management and Budget. 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, the Louisiana Department of Public Safety and Corrections, Office of State Police, the Louisiana Department of Environmental Quality (LDEQ), the U.S. Coast Guard National Response Center, and the U.S. Department of Transportation, Hazardous Materials Information System (HMIS). 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.

A HSEES event is defined as an uncontrolled or illegal acute release of any hazardous substance (except petroleum when petroleum is the only substance released), in any amount for substances listed on the HSEES Mandatory Chemical Reporting List, or, if not on the list, in an amount greater than or equal to 10 lbs or 1 gallon. Threatened releases of qualifying amounts will be included if the threat led to an action (e.g., evacuation) to protect the public health. Petroleum-only releases are not included because of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). [Note: The Petroleum Exclusion clause of

CERCLA excludes any form of petroleum that has not been refined to the point of becoming single-chemical product]. HSEES defines victims as people who experience at least one documented adverse health effect within 24 hours after the event or who die as a consequence of the event. Victims who receive more than one type of injury or symptom are counted once in each applicable injury type or symptom. Events are defined as transportation related if they occur (a) during surface, air, pipeline, or water transport of hazardous substances, or (b) before being unloaded from a vehicle or vessel. All other events are considered fixed-facility events.

For data analyses, the substances released were categorized into 15 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

In 2007, a total of 818 acute hazardous substances events met the HSEES surveillance definition. A total of 646 (79.0%) events occurred in fixed facilities. The parishes with the most events were East Baton Rouge (123 [15%]) and Calcasieu (112 [13.7%]) (Table 1).

Parish	Type of Event				All Events	
	Fixed Facility		Transportation			
	No. Events	%*	No. Events	%*	No. Events	%
Acadia	1	100	0	0	1	0.12
Allen	1	50	1	50	2	0.24
Ascension	69	77.5	20	22.5	89	10.88
Beauregard	0	0	1	100	1	0.12
Bossier	3	23.1	10	76.9	13	1.59
Caddo	7	28	18	72	25	3.06
Calcasieu	110	98.2	2	1.8	112	13.69
Caldwell	2	100	0	0	2	0.24
Cameron	2	100	0	0	2	0.24
Claiborne	0	0	1	100	1	0.12
De Soto	1	100	0	0	1	0.12
E. Baton Rouge	107	87	16	13	123	15.04
E. Carroll	0	0	1	100	1	0.12
Evangeline	1	50	1	50	2	0.24
Grant	0	0	1	100	1	0.12
Iberville	56	88.9	7	11.1	63	7.7
Jefferson	27	65.9	14	34.1	41	5.01
La Salle	0	0	1	100	1	0.12
Lafayette	2	33.3	4	66.7	6	0.73
Lafourche	2	33.3	4	66.7	6	0.73
Lincoln	0	0	1	100	1	0.12
Livingston	1	33.3	2	66.7	3	0.37
Madison	0	0	1	100	1	0.12
Natchitoches	0	0	1	100	1	0.12
Orleans	7	41.2	10	58.8	17	2.08
Ouachita	8	66.7	4	33.3	12	1.47
Plaquemines	26	83.9	5	16.1	31	3.79
Pointe Coupee	1	8.3	11	91.7	12	1.47
Rapides	0	0	7	100	7	0.86
St. Bernard	71	98.6	1	1.4	72	8.8
St. Charles	74	90.2	8	9.8	82	10.02
St. James	32	97	1	3	33	4.03
St. John the Baptist	17	94.4	1	5.6	18	2.2
St. Landry	1	100	0	0	1	0.12
St. Martin	1	50	1	50	2	0.24
St. Mary	1	50	1	50	2	0.24
St. Tammany	3	75	1	25	4	0.49
Tangipahoa	1	50	1	50	2	0.24
Terrebonne	4	36.4	7	63.6	11	1.34
Vermilion	1	100	0	0	1	0.12
Vernon	0	0	2	100	2	0.24
W. Baton Rouge	5	71.4	2	28.6	7	0.86
Washington	1	50	1	50	2	0.24
Webster	0	0	1	100	1	0.12
Total‡	**646**	**79**	**172**	**21**	**818**	**99.93**

Table 1.—Number of events meeting the surveillance definition, by parish and type of event— Louisiana Hazardous Substances Emergency Events Surveillance, 2007

* Percentage = (number of events by type of event per parish ÷ total number of events in that parish) x 100

‡ Percentages do not total 100% because of rounding.

For each fixed-facility event, one or two choices can be selected to describe the type of area where the event occurred or the equipment involved with the event. Only one type of area was reported for 637 (98.6%) and 9 (1.4%) reported a combination of two area types. Among events with one type of area reported, the main areas were classified as follows: 347 (54.5%) ancillary process equipment, 169 (26.5%) piping, and 27 (4.2%) storage area above ground (Figure 1). Of the events with two areas, 4 (44.4%) involved a material handling area in combination with other types of areas.

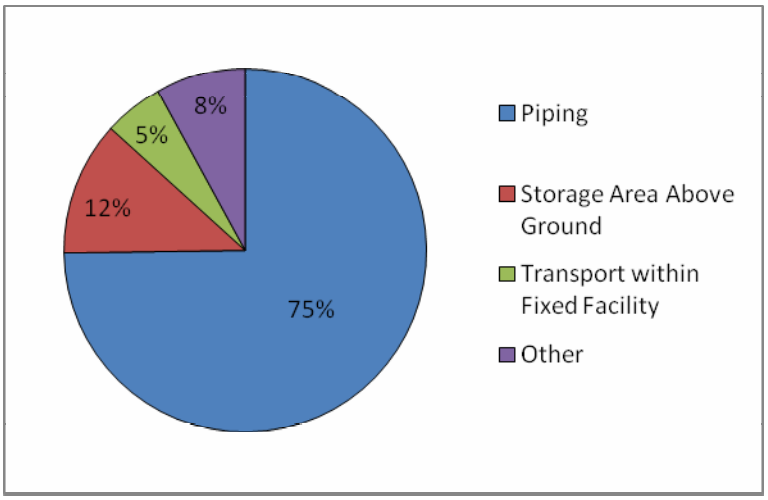

Figure 1.─Primary Area or Equipment of fixed facilities involved in events—Louisiana Hazardous Substances Emergency Events Surveillance, 2007

Of the 172 transportation-related events, 113 (65.7%) occurred during ground transport (e.g., truck, van, or tractor) and 44 (25.6%) involved transport by rail (Figure 2). Fewer events involved other transportation modes. The largest proportions of transportation-related events occurred en route but were not discovered until the vehicle reached a fixed facility destination (63[36.6%]) or from a stationary vehicle or vessel (48 [27.9%]). Of the 172 transportation-related events, 37 (21.5%) involved a release from a moving vehicle or vessel.

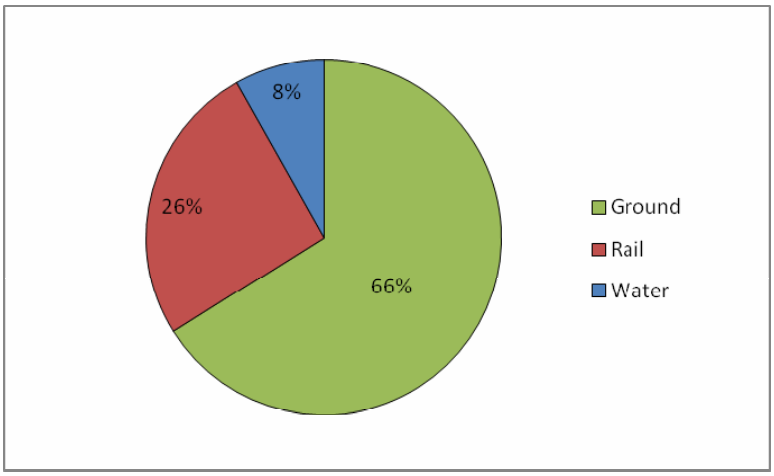

Figure 2.─Distribution of transportation-related events, by type of transport—Louisiana Hazardous Substances Emergency Events Surveillance, 2007

Primary and secondary factors contributing to the events were reported. Primary factors were reported for 815 (99.6%) events (Figure 3a). Most (80.7%) fixed-facility events reported equipment failure as the primary factor, and most (50.6%) transportation-related events also reported equipment failure as the primary factor. Secondary factors were reported for 379 (46.3%) events (Figure 3b). Of the reported secondary factors, most (52.0%) fixed-facility events involved system/process upset and most (59.8%) transportation-related events involved improper filling, loading, or packing.

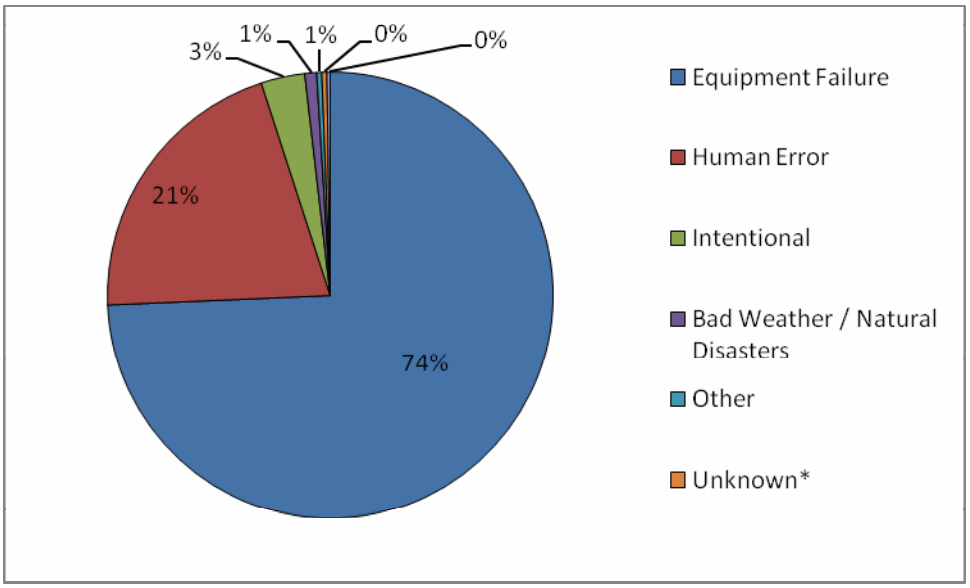

Figure 3a.─Primary factors reported as contributing to events—Louisiana Hazardous Substances Emergency Events Surveillance, 2007
*3 Events did not have primary factors.

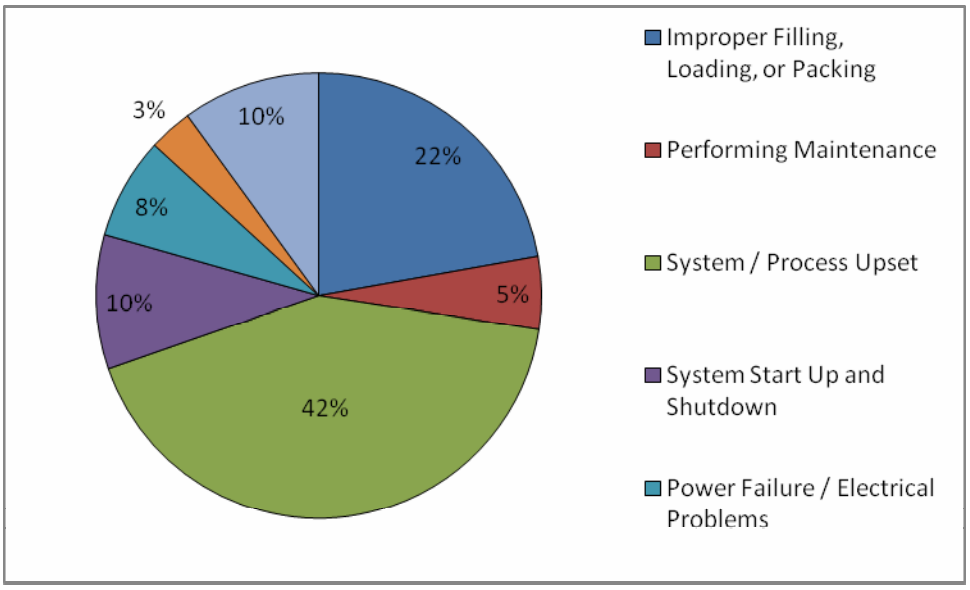

Figure 3b.─Secondary factors reported as contributing to events—Louisiana Hazardous Substances Emergency Events Surveillance, 2007*.
*437 Releases did not have a secondary factor.

More than 74% of all events involved the release of only one substance. Two substances were released in approximately 12% of the events, and approximately 14% involved the release of

more than two substances (Table 2). Fixed-facility events were more likely than transportation events to have two or more substances released in an event (37.2% vs. 2.3%).

No. Substances	Type of Event						All Events		
	Fixed facility			Transportation					
	No. Events	%	Total Substances	No. Events	%	Total Substances	No. Events	%	Total Substances
1	406	62.8	406	168	97.7	168	574	70.2	574
2	99	15.3	198	3	1.7	6	102	12.5	204
3	52	8	156	1	0.6	3	53	6.5	159
4	37	5.7	148	0	0	0	37	4.5	148
≥ 5	52	8	374	0	0	0	52	6.4	374
Total‡	**646**	**99.8**	**1282**	**172**	**100**	**177**	**818**	**100.1**	**1459**

Table 2.—Number of substances involved per event, by type of event—Louisiana Hazardous Substances Emergency Events Surveillance, 2007
‡ Percentages do not total 100% because of rounding.

HSEES events were more likely to occur in industrial areas as opposed to commercial, residential or agricultural areas. In addition, HSEES events were more likely to occur in the 6 hours before noon (35.2%) and the 6 hours after and including noon (28.2%), compared with the 6 hours before midnight (18.0%) and the 6 hours after and including midnight (18.6%) (2 events did not have a time specified). Additionally, 14%-18% of events occurred on each weekday as compared with 9%-10% on a weekend day. Most events occurred in the second half of the year, with the highest number occurring in October (110 events, or 13.4%) (Figure 4).

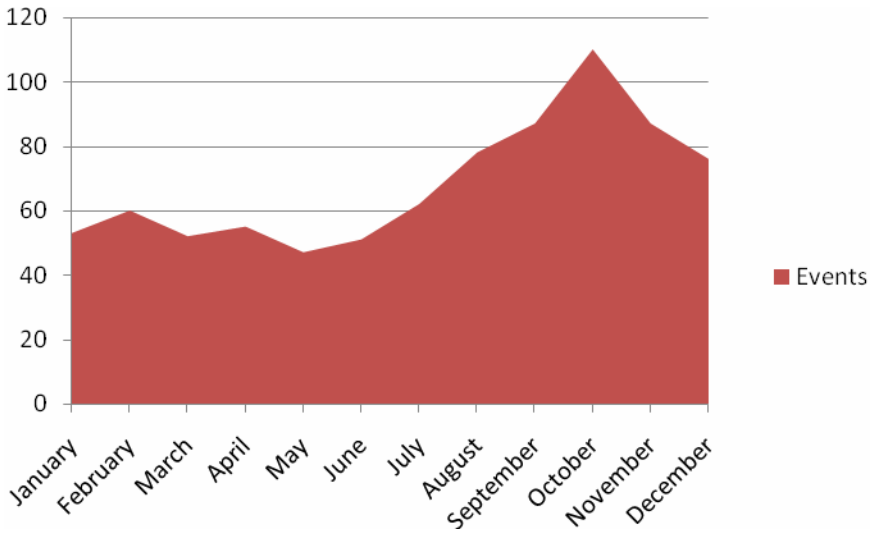

Figure 4.─ Monthly breakdown of HSEES events for calendar year 2007—Louisiana Hazardous Substances Emergency Events Surveillance, 2007

Industries

The largest proportions of HSEES events were associated with the manufacturing (581 [71.0%]) and transportation (174 [21.3%]) industries (Table 3). Within manufacturing, petroleum manufacturing (224 [27.4%]) accounted for most of the events. The largest number of events with victims occurred in the manufacturing industry (16 [53.3%]). The total number of victims was greatest in the manufacturing industry (19 [37.3%]) followed by the number of victims in retail trade (11 [21.6%]) and transportation (9 [17.6%]). The subcategory chemical manufacturing (North American Industry Classification System [NAICS] code 3251 and subcategories) accounted for 78.9% of all victims in the manufacturing industry. Although the manufacturing industry resulted in a large proportion of events with victims and a large number of victims, only 2.8% of all 581 events resulted in victims. Conversely, 100.0% of all events in the Educational Services industry (NAICS code 611310) resulted in victims, but this industry represents a small proportion (3.3%) of events with victims. The incident with the largest

number of injuries was in the retail trade industry (NAICS Code 444110). Eleven people were slightly injured during the unloading of a truck when bleach was spilled onto a pallet of fertilizer causing a chemical reaction.

Industry Category	Total Events		Events with Victims		Percentage of Events with Victims	Total no. Victims # (maximum)*
	No.	%	No.	%		
Accommodation and Food Services	No HSEES Events					
Administrative and Support and Waste Management and Remediation Services	2	0.2	0	0	0	0
Agriculture, Forestry, Fishing and Hunting	1	0.1	0	0	0	0
Arts, Entertainment, and Recreation	1	0.1	0	0	0	0
Construction	3	0.4	1	3.3	33.3	1 (1)
Educational Services	1	0.1	1	3.3	100	1 (1)
Finance and Insurance	No HSEES Events					
Health Care and Social Assistance	No HSEES Events					
Information	No HSEES Events					
Management of Companies and Enterprises	No HSEES Events					
Manufacturing	581	71	16	53.3	2.8	19 (2)
Mining	7	0.9	0	0	0	0
Not an Industry	2	0.2	0	0	0	0
Not Identified	5	0.6	0	0	0	0
Other Services (except Public Administration)	2	0.2	1	3.3	50	3 (3)
Professional, Scientific, and Technical Services	3	0.4	1	3.3	33.3	2 (2)
Public Administration	No HSEES Events					
Real Estate and Rental and Leasing	No HSEES Events					
Retail Trade	5	0.6	1	3.3	20	11 (11)
Transportation and Warehousing	174	21.3	6	20	3.4	9 (4)
Utilities	7	0.9	1	3.3	14.3	2 (2)
Wholesale Trade	24	2.9	2	6.7	8.3	3 (2)
Total‡	**818**	**99.9**	**30**	**99.8**	-	**51 (11)**

Table 3.—Industries involved in hazardous substance events and events with victims, by category— Louisiana Hazardous Substances Emergency Events Surveillance, 2007

*Minimum number of victims per event = 1.

‡ Percentages do not total 100% because of rounding.

Substances

A total of 1459 substances were released in all events, of which 3 (0.2%) substances were reported as threatened to be released. The individual substances most frequently released were sulfur dioxide, hydrogen sulfide, benzene, volatile organic compounds NOS and Nitrogen Oxides (Appendix). Substances were grouped into 16 categories. The substance categories most commonly released in fixed-facility events were volatile organic compounds (527 [41.1%]), other inorganic substances (370 [28.9%]), and acids (89[6.9%]) (Table 4). In transportation-related events, the most common substance categories released were acids (49 [27.7%]), volatile organic compounds (34 [19.2%]), paints (28 [15.8%]), and bases (22 [12.4%]).

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: air releases (1065 [74.6%]), spills (360 [25.2%]), fire (1 [<0.1%]), and explosion (1 [<0.1%]). Of events with two types of releases, the following combinations were reported: spills and air releases (27 [93.1%]), spill and fire (1 [3.5%]),and the remaining 1 (3.5%) involved a fire and explosion.

Substance Category	Type of Event				All Events	
	Fixed facility		Transportation			
	No. Substances	%	No. Substances	%	No. Substances	%
Acids	89	6.9	49	27.7	138	9.5
Ammonia	29	2.3	3	1.7	32	2.2
Bases	12	0.9	22	12.4	34	2.3
Chlorine	28	2.2	4	2.3	32	2.2
Formulations	1	0.1	0	0	1	0.1
Hetero-Organics	4	0.3	4	2.3	8	0.5
Hydrocarbons	44	3.4	3	1.7	47	3.2
Mixture Across Chemical Category	11	0.9	0	0	11	0.8
Other	34	2.7	4	2.3	38	2.6
Other Inorganic Substances	370	28.9	9	5.1	379	26
Oxy-Organics	43	3.4	7	4	50	3.4
Paints and Dyes	10	0.8	28	15.8	38	2.6
PCB's	0	0	1	0.6	1	0.1
Pesticides	42	3.3	6	3.4	48	3.3
Polymers	34	2.7	2	1.1	36	2.5
Unknown	4	0.3	1	0.6	5	0.3
VOC's	527	41.1	34	19.2	561	38.5
Total‡	**1282**	**100.2**	**177**	**100.2**	**1459**	**100.1**

Table 4.—Number of substances involved, by substance category and type of event—Louisiana Hazardous Substances Emergency Events Surveillance, 2007

‡ Percentages do not total 100% because of rounding.

Victims

A total of 51 victims were involved in 30 events (3.7% of all events) (Table 5). Of the 30 events with victims, 21 (70.0%) events involved only one victim, and 6 (20.0%) involved two victims. Of all victims, 37 (72.5%) were injured in fixed-facility events.

No. Victims	Type of Event						All Events		
	Fixed facility			Transportation					
	No. Events	%	Total Victims	No. Events	%	Total Victims	No. Events	%	Total Victims
1	11	57.9	11	10	90.9	10	21	70	21
2	6	31.6	12	0	0	0	6	20	12
3	1	5.3	3	0	0	0	1	3.3	3
4	0	0	0	1	9.1	4	1	3.3	4
5	0	0	0	0	0	0	0	0	0
≥6	1	5.3	11	0	0	0	1	3.3	11
Total‡	**19**	**100.1**	**37**	**11**	**100**	**14**	**30**	**99.9**	**51**

Table 5.─Number of victims per event, by type of event—Louisiana Hazardous Substances Emergency Events Surveillance, 2007

‡ Percentages do not total 100% because of rounding.

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 volatile organic compounds constituted 21% of all events; however, only 1.2% of these events resulted in injuries. Conversely, events involving

chlorine accounted for 3.8% of all events respectively, but 9.7% of the 31 events resulted in injuries.

Substance Category	All Events		Events with Victims		
	No.	%	No.	Percentage of all Releases with Victims	Percentage of Events with Victims in Substance Category
Acids	106	13	11	36.7	10.4
Ammonia	30	3.7	0	0	0
Bases	32	3.9	3	10	9.4
Chlorine	31	3.8	3	10	9.7
Formulations	1	0.1	0	0	0
Hetero-Organics	5	0.6	0	0	0
Hydrocarbons	4	0.5	0	0	0
Mixture Across Chemical Category†	11	1.3	3	10	27.3
Multiple Substance Category*	167	20.4	2	6.7	1.2
Other‡	13	1.6	2	6.7	15.4
Other Inorganic Substances§	139	17	2	6.7	1.4
Oxy-Organics	21	2.6	1	3.3	4.8
Paints and Dyes	36	4.4	0	0	0
PCB's	No HSEES Events				
Pesticides	23	2.8	1	3.3	4.3
Polymers	24	2.9	0	0	0
Unknown	3	0.4	0	0	0
VOC's	172	21	2	6.7	1.2
Total¶	**818**	**100**	**30**	**100.1**	**3.7**

Table 6.—Frequency of substance categories in all events and events with victims—Louisiana Hazardous Substances Emergency Events Surveillance System, 2007

*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 substance categories, they were counted only once in the multiple substance category.

†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.

Employees (44 [86.3%]) constituted the largest proportion of the population groups injured, followed by general public (7 [13.7%]) (Figure 5).

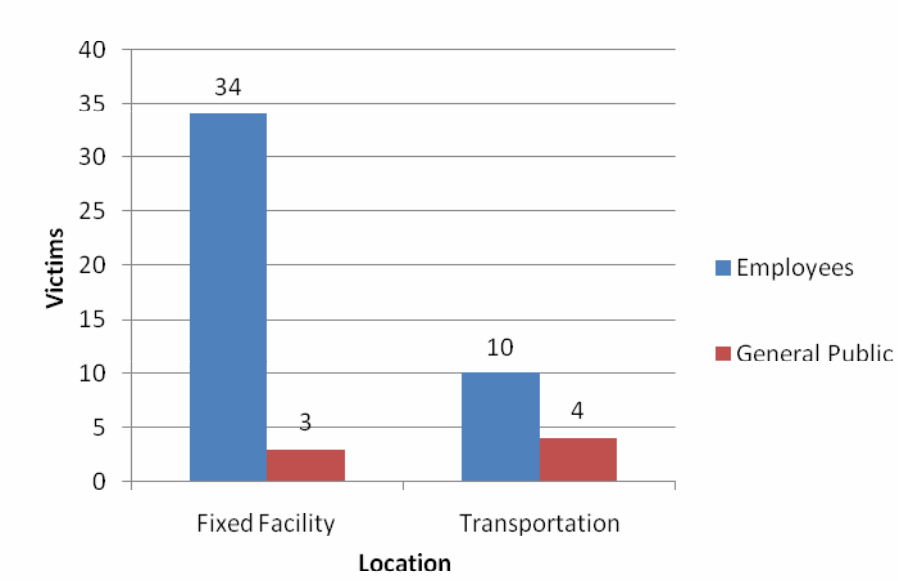

Figure 5.─Number of victims, by population group and type of event—Louisiana Hazardous Substances Emergency Events Surveillance, 2007.

Victims were reported to sustain a total of 66 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 eye irritation (15 [30%]) and respiratory irritation (14 [28%]). In transportation-related events, respiratory irritation (5 [31.3%]) and trauma (5 [31.3%]) 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 accident leading to the release of a hazardous substance, and not from exposure to the substance itself.

Injury/Symptom	Fixed Facility		Transportation		All events	
	No. injuries	%	No. injuries	%	Total no.	%
Burns	10	20	3	18.8	13	19.7
Dizziness / Central Nervous System Symptoms	No HSEES Events					
EyeIrritation	15	30	1	6.3	16	24.2
Gastrointestinal System Problems	3	6	0	0	3	4.5
Headache	1	2	0	0	1	1.5
Heart Problems	No HSEES Events					
Heat Stress	No HSEES Events					
Other	No HSEES Events					
Respiratory Irritation	14	28	5	31.3	19	28.8
Shortness of Breath	2	4	0	0	2	3
Skin Irritation	1	2	2	12.5	3	4.5
Trauma†	4	8	5	31.3	9	13.6
Total‡	**50**	**100**	**16**	**100.2**	**66**	**99.8**

Table 7.─Frequencies of injuries/symptoms, by type of event*—Louisiana Hazardous Substances Emergency Events Surveillance, 2007

*The number of injuries is greater than the number of victims (51) because a victim could have had more than one injury.

† All trauma injuries were not chemical-related.

‡ Percentages do not total 100% because of rounding.

The median age of the 17 (33.3%) victims for whom exact age was reported was 43 years (range: 18─61 years). For the 22 (43.1%) injured persons for whom an age category was reported, 1 (4.5%) was 15–19 years of age, 12 (54.5%) were 20–44 years of age, and 9 (40.9%) were 45–64 years of age. Of the 29 injured persons for whom age was not reported, 25 (86.2%) were presumably adults (because their population group was reported as responders or employees), and 4 (13.8%) could have been adults or children (because their population group was reported as members of the general public).

Sex was known for 36 (70.6%) of the victims; of these, 32 (88.9%) were males. Of all employees and responders for whom sex was reported, 96.6% were males.

Of the 51 victims, 34 (41.2%) were treated on scene and 13 (25.5) were treated at hospital and not admitted. Three (5.9%) deaths were reported (Figure 6). Two of the three deaths resulted from exposure to the released substance(s); the remaining one death resulted from physical trauma received during a motor vehicle accident.

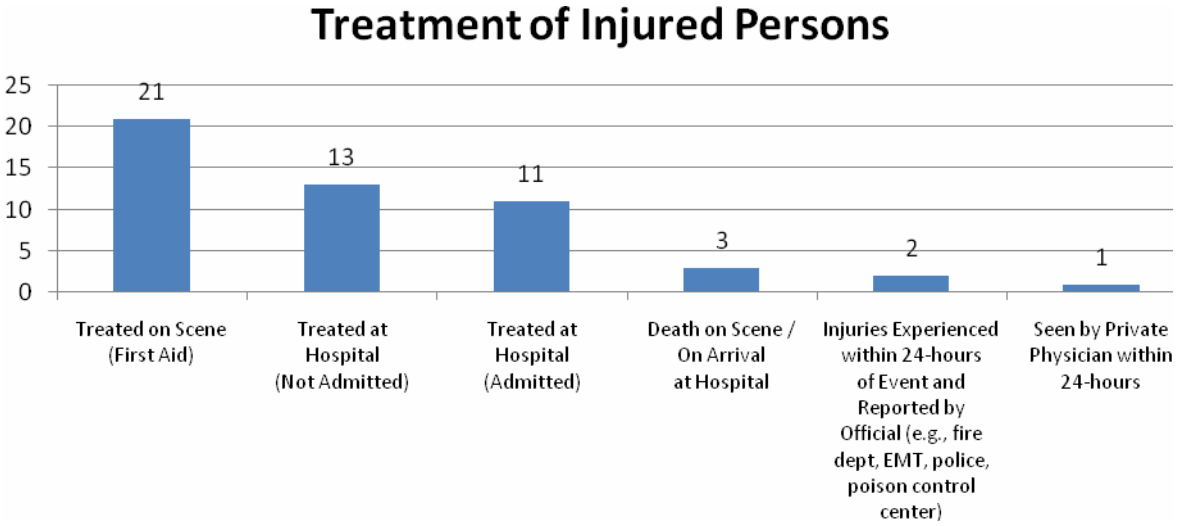

Figure 6.—Injury disposition—Louisiana Hazardous Substances Emergency Events Surveillance, 2007.

The status of personal protective equipment (PPE) use was reported for 40 (78.4%) victims. Most of the victims whose PPE status was known (85.0%) had not worn any form of PPE. One victim reported wearing Level B PPE, while another victim reported wearing Level C PPE. Three victims reported wearing Level D PPE.

One event resulted in 11 victims. In this event, a chemical reaction occurred when bleach was spilled onto fertilizer during the unloading of materials at a home improvement store. The release occurred at approximately 9:00 PM and the building was evacuated for nearly 1 hour. All eleven employee-victims reported eye irritation, while one victim also had gastrointestinal

problems. No victims were reported as wearing any PPE. The primary contributing factor in this event was human error.

Nearby Populations

The proximity of the event location in relation to selected populations was determined using geographic information systems (GIS), a computer mapping program, or state health department records. Residences were within ¼ mile of 653 (79.8%) events, schools were within ¼ mile of 98 (12.0%) events, events, nursing homes were within ¼ mile of 3 (0.4%) events, licensed daycares were within ¼ mile of 106 (13.0%) events, industries or other businesses were within ¼ mile of 755 (92.3%) events and recreational areas were within ¼ mile of 31 (3.8%) events. There were 0 hospitals within ¼ mile of any events.

The number of events at which persons were at risk of exposure was determined primarily using GIS. There were 675 (82.7%) events with persons living within ¼ mile of the event; 759 (93.0%) events with persons living within ½ mile; and 807 (98.9%) events with persons living within 1 mile. There were 2 events where the GIS function could not determine the number of persons living within ¼, ½and 1 mile.

Evacuations

Evacuations were ordered in 12 (1.5%) events. Of these evacuations, 66.7% were of buildings or affected parts of buildings; 8.3% were of defined circular areas surrounding the event locations; 8.3% were of downwind / downstream and 16.7% were of no criteria. The number of people evacuated was known for 2 (16.7%) events and ranged from 5 to 450 people. The median length

of evacuation was 1 hour (range: less than one hour to 70 hours). Of all 12 events, 7 (58.3%) had access to the area restricted. Seventeen (2.1%) events had in-place sheltering ordered by an official.

Decontamination

Of the 43 (84.3%) victims for whom decontamination status was known, 34 (79.0%) were not decontaminated and 9 (21.0%) were decontaminated at the scene.

In five events, uninjured persons were decontaminated. Eighteen uninjured responders were decontaminated in four events. The fifth event had an uninjured employee decontaminated at the scene.

Response

Seven hundred ninety-four (97.0%) events had information on who responded to the event; 10.3% reported 2 or more categories of personnel who responded, 6.3% reported 3 or more categories, and 2.8% reported 4 or more categories. Company response teams (90.3%) responded most frequently to events, followed by third party clean-up contractors (9.1%), law enforcement agencies (7.3%), and fire departments (5.5%) (Table 8). No one responded in 24 (2.9%) events.

Responder Category	No.	%*
Certified HazMat Team	25	2.6
Department of Works / Utilities / Transportation	7	0.7
Emergency Medical Technicians	9	0.9
Environmental Agency	32	3.3
Fire Department	44	4.5
Health Department/ Health Agency	2	0.2
Law Enforcement Agency	58	6
Response Team of Company Where Release Occurred	717	73.9
State, County, or Local Emergency Managers / Coordinators / Planning Committees	4	0.4
Third Party Clean-up Contractor	72	7.4
Total‡	**970**	**99.9**

Table 8.─Distribution of personnel who responded to the event—Louisiana Hazardous Substances Emergency Events Surveillance, 2007

‡The number of responders is greater than the number of events (818) because an event could have had more than one category of responder.

* Percentages do not total 100% because of rounding.

PREVENTION ACTIVITIES

During 2007, the Louisiana HSEES Program performed (or is in the process of performing) various prevention activities. These activities included:

- Email Notification System
- HSEES Parish Profiles
- Report on responder related injuries associated with HSEES events
- Annual Report

SUMMARY OF RESULTS, 2001–2007

During 2001–2007, the largest proportion of events occurred in fixed facilities (Table 9). The total number of events increased from 2006 to 2007.

Year	Type of Event			No. Substances Released	No. Victims	No. Deaths	Events with Victims	
	Fixed Facility	Transportation	Total				No.	%†
2001	684	131	815	1163	63	2	20	2.5
2002	630	122	752	1205	30	1	20	2.7
2003	587	87	674	1113	42	1	8	1.2
2004	474	90	564	1053	176	0	25	4.4
2005	704	163	867	1514	95	3	48	5.5
2006	515	145	660	1086	63	4	31	4.7
2007	646	172	818	1459	51	3	30	3.7
Total	**4240**	**910**	**5150**	**8593**	**520**	**14**	**182**	**3.5**

Table 9.─ Cumulative data by year—Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2007*
* 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.

The percentage of victims decreased from 2006 to 2007. The percentage of events with victims was highest in 2005 (5.5%) and lowest in 2003 (1.2%). The average percentage of events with victims during 2001–2007 was 3.5%.

Respiratory irritation has consistently been one of the most frequently reported injuries. This was again the case in 2007 as respiratory irritation accounted for 28.8% of the reported injuries. In 2007 employees were the most commonly reported victim type, however, members of the general public also constituted a large proportion of the victims in 2007 as well as in previous years (Figure 7). As with previous years, most employee-victims and responder-victims had not worn any form of PPE.

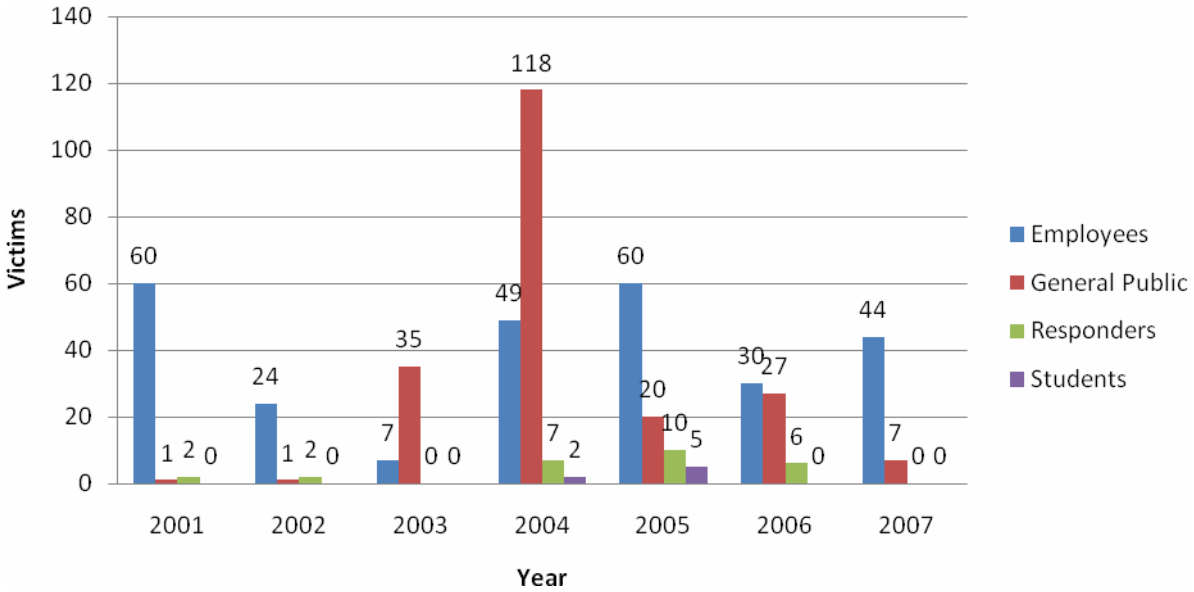

Figure 7.─Number of victims, by category and year—Louisiana Hazardous Substances Emergency Events Surveillance, 2001–2007

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—Louisiana Hazardous Substances Emergency Events Surveillance, 2007

	Chemical Substance	Number of Releases
1	Sulfur Dioxide	131
2	Hydrogen Sulfide	97
3	Benzene	95
4	VOC's	89
5	NOx	64
6	Hydrochloric Acid	53
7	Ethylene	36
8	Paint NOS	35
9	Sulfuric Acid	33
10	Ammonia	32

Note: NOx includes Nitrogen Oxide, Nitrogen Oxides, Nitrogen Oxide NOx, and Nitrogen Oxides NOx