

# Louisiana Hazardous Substances Emergency Events Surveillance (HSEES) System

## 2003: A Summary Report

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



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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 releases of hazardous substances in 15 states. This report summarizes the characteristics of events reported to the Louisiana Department of Health and Hospitals in 2003. 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 entered into an ATSDR-provided web-based data entry system.

A total of 674 events were reported, and the majority of events occurred in fixed facilities (87.1%). In 462 (68.5%) events, only one substance was released. The most commonly reported categories of substances were other inorganic substances and volatile organic compounds (VOCs). During this reporting period, 8 events (1.2% of all reported events) resulted in a total of 42 victims, of whom 1 (2.4%) died. Three events of the 8 events with victims in 2003 involved the majority of victims, i.e. 88.1% of the 42 victims were injured during 3 events. Overall, the number of events involving victims in 2003 decreased from 20 events involving victims in both 2001 and 2002 to 8 events involving victims in 2003. The most frequently reported injuries were gastrointestinal problems, respiratory irritation, eye irritation, and burns. Evacuation reportedly was ordered for 5 (0.7%) events.

# **HAZARDOUS SUBSTANCES EMERGENCY EVENTS SURVEILLANCE SYSTEM**

## **2003 SUMMARY**

### **INTRODUCTION**

The Centers for Disease Control and Prevention defines surveillance as

“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 Materials 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 four goals:

- To describe the distribution and characteristics of acute hazardous substances releases;
- To describe morbidity and mortality among employees, responders, and the public that resulted from hazardous substances releases;
- To identify risk factors associated with the morbidity and mortality; and
- To identify 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 also useful to protect public health.

In the last few years, the fourth 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 public with information that can help prevent chemical releases and reduce morbidity and mortality if a release occurs.

This report provides an overview of HSEES for 2003 in Louisiana and summarizes the characteristics of acute releases of hazardous substances and their associated public health consequences.



## **METHODS**

Beginning in 2002, a newly updated data-collection form, approved by the Office of Management and Budget, went into effect. For each event, information was collected about the event, substance(s) released, victims, injuries, and evacuations.

Various data sources were used to obtain information about these events. These sources included, but were not limited to, Louisiana Department of Public Safety and Corrections, Office of State Police, Louisiana Department of Environmental Quality (LDEQ), 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 the events. All data were entered into the surveillance system using a web-based data entry system provided by ATSDR.

HSEES defines hazardous substances emergency events as uncontrolled or illegal releases or threatened releases of hazardous substances. Events involving releases of only petroleum are not included. Events are included if (1) 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 (2) release of a substance was threatened, but the threat led to an action (for example, evacuation) that could have affected the health of employees, emergency responders, or members of the public. HSEES defines victims as people who suffer at least one adverse health effect within 24 hours of the event or who die as a consequence of the event. Victims who receive more than one type of injury are counted once in each applicable injury type. Events are defined as transportation-related if they occur during surface, air, pipeline, or

water transport of hazardous substances, or before being unloaded from a vehicle or vessel. All other events are considered fixed-facility events.

For the data analyses in this report, the substances released were categorized into 16 groups. The category “mixture” comprises substances from different categories that were mixed before the event, and the category “other inorganic substances” comprises all inorganic substances, except acids, bases, ammonia, and chlorine.

## **RESULTS**

For 2003, 674 hazardous substances emergency events were reported to HSEES: 1 (0.1%) of these events was a threatened release. A total of 587 (87.1%) events occurred in fixed facilities. Table 1 presents the number of events by parish and type of event. Of those events for which parish of occurrence was known, 56.6% occurred in the five parishes: Calcasieu, 105 (15.7%), East Baton Rouge, 66 (9.9%), Jefferson, 65 (9.7%), St. Bernard, 80 (12.0%), and St. Charles, 62 (9.3%).

**Table 1. Number of events meeting the surveillance definition, by parish and type of event, Louisiana Hazardous Substances Emergency Events Surveillance, 2003.**

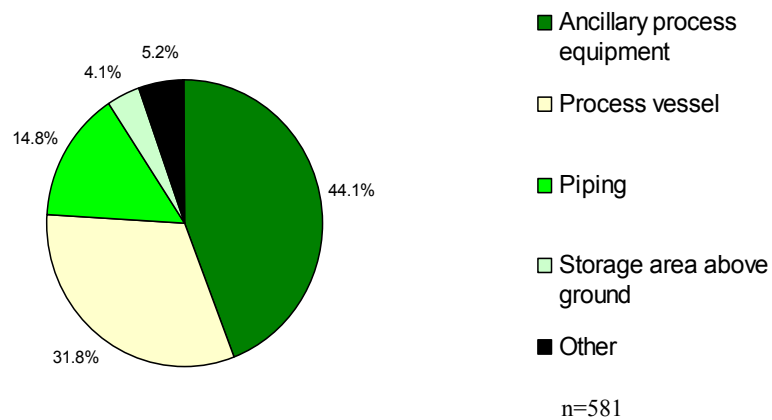
Parish	Fixed Facility		Transportation		All Events	
	No. Events	%	No. Events	%	Total	%
Acadia	1	0.2	2	2.3	3	0.4
Ascension	48	8.2	7	8.0	55	8.2
Assumption	1	0.2	0	0.0	1	0.1
Bossier	0	0.0	3	3.4	3	0.4
Caddo	4	0.7	19	21.8	23	3.4
Calcasieu	102	17.5	3	3.4	105	15.7
De Soto	0	0.0	1	1.1	1	0.1
E. Baton Rouge	63	10.8	3	3.4	66	9.9
Grant	1	0.2	0	0.0	1	0.1
Iberville	52	8.9	3	3.4	55	8.2
Iberia	1	0.2	0	0.0	1	0.1
Jefferson	62	10.7	3	3.4	65	9.7
Lafayette	1	0.2	5	5.7	6	0.9
Lafourche	1	0.2	1	1.1	2	0.3
Lincoln	0	0.0	1	1.1	1	0.1
Livingston	1	0.2	0	0.0	1	0.1
Madison	0	0.0	1	1.1	1	0.1
Morehouse	0	0.0	1	1.1	1	0.1
Orleans	2	0.3	5	5.7	7	1.0
Ouachita	33	5.7	4	4.6	37	5.5
Plaquemines	17	2.9	5	5.7	22	3.3
Rapides	0	0.0	4	4.6	4	0.6
St. Bernard	79	13.6	1	1.1	80	12.0
St. Charles	58	10.0	4	4.6	62	9.3
St. James	23	4.0	4	4.6	27	4.0
St. John the Baptist	4	0.7	1	1.1	5	0.7
St. Landry	5	0.9	0	0.0	5	0.7
St. Martin	0	0.0	1	1.1	1	0.1
St. Mary	3	0.5	0	0.0	3	0.4
St. Tammany	4	0.7	0	0.0	4	0.6
Tangipahoa	0	0.0	2	2.3	2	0.3
Terrebonne	0	0.0	1	1.1	1	0.1
Union	1	0.2	0	0.0	1	0.1
Vermilion	3	0.5	0	0.0	3	0.4
W. Baton Rouge	7	1.2	0	0.0	7	1.0
Webster	4	0.7	2	2.3	6	0.9
Winn	1	0.2	0	0.0	1	0.1
<b>Total<sup>▲</sup></b>	<b>582</b>	<b>100.3</b>	<b>87</b>	<b>99.1</b>	<b>669</b>	<b>99.0</b>

\* Parish was unknown for 5 fixed-facility events.

▲ Total may not equal 100% due to rounding.

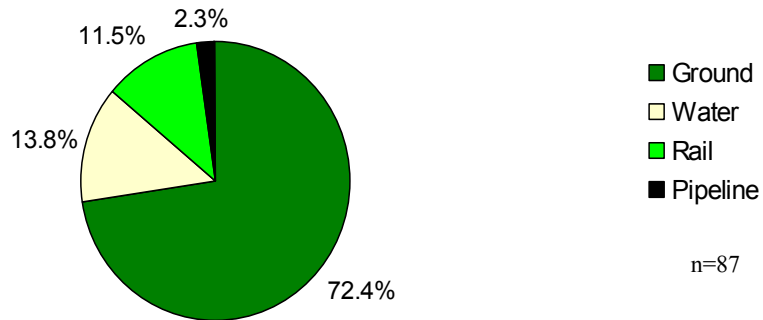
One or two types of area involved in a release can be selected for each fixed-facility event. Of all 587 fixed-facility events, 581 (99.0%) had one type of area and 6 (1.0%), a combination of two area types. Among events with one type of area reported, 256 (44.1%) were classified as ancillary processing equipment, and 185 (31.8%) were classified as process vessel (a reaction chamber in which chemicals are processed) (Figure 1). Of the 6 events with two areas reported, 3 (50.0%) involved ancillary processing equipment in combination with other types of fixed-facility areas.

**Figure 1. Areas of fixed facilities involved in events, Hazardous Substances Emergency Events Surveillance, Louisiana, 2003.**



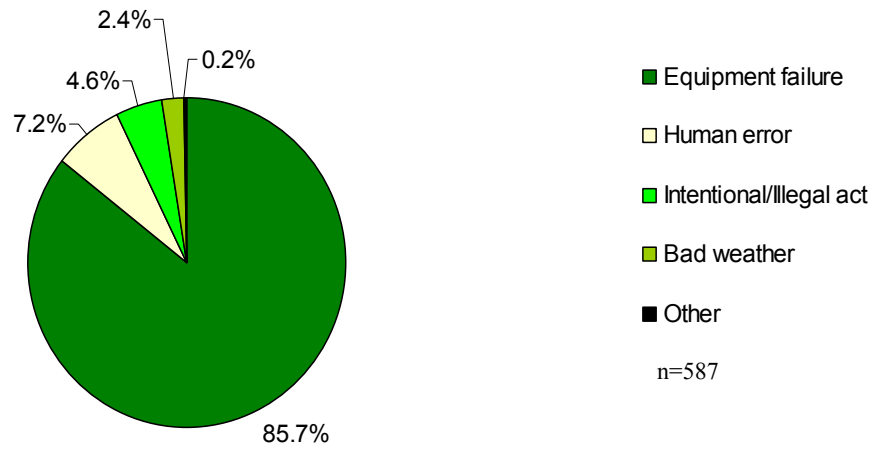
Of the 87 transportation-related events, 63 (72.4%) occurred during ground transport (e.g., truck, van, or tractor), 12 (13.8%) involved water transport, and 10 (11.5%) involved transport by rail (Figure 2). The largest proportion of transportation-related events occurred during unloading of a stationary vehicle or vessel, 43 events (49.4%). Thirty-four events involved releases from a moving vehicle or vessel (39.1%).

**Figure 2. Distribution of transportation-related events, by type of transport, Hazardous Substances Emergency Events Surveillance, Louisiana, 2003.**

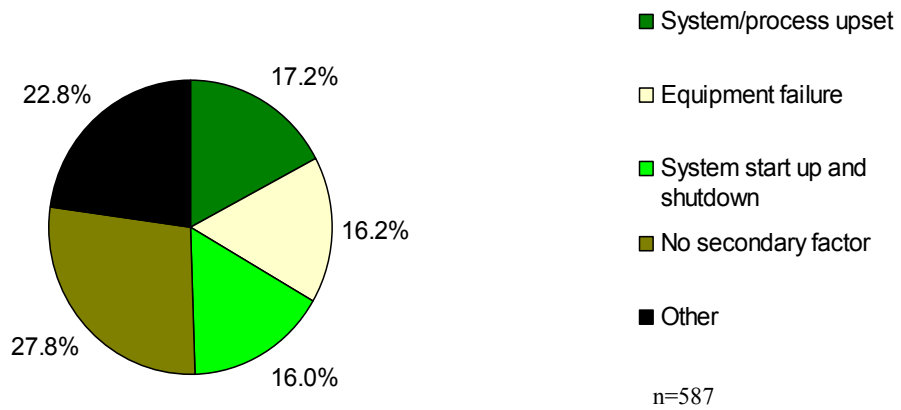


Factors contributing to the events consisted of primary and secondary entries. Of reported primary factors, 503 (85.7%) of fixed-facility events, and 30 (34.5%) of transportation-related events involved equipment failure as the primary factor; 42 (7.2%) of fixed-facility and 57 (65.5%) of transportation-related events involved human error as the primary factor (Figures 3a and 4a). For 163 (27.8%) of fixed-facility and 13 (14.9%) of transportation-related events, there was no secondary contributing factor. The most frequently reported secondary contributing factor in fixed-facility events was system/process upset, 101 (17.2%) events, followed by equipment failure, 95 (16.2%) (Figure 3b). The most frequently reported secondary contributing factor in transportation-related events was improper filling, loading, or packing, 43 events (49.4%), followed by equipment failure, 11 events (12.6%) (Figure 4b).

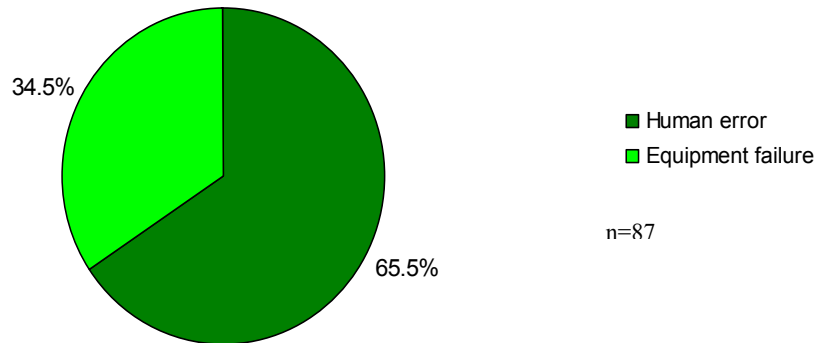
**Figure 3a. Primary factors reported as contributing to the occurrence of fixed-facility events, Hazardous Substances Emergency Events Surveillance, Louisiana, 2003.**



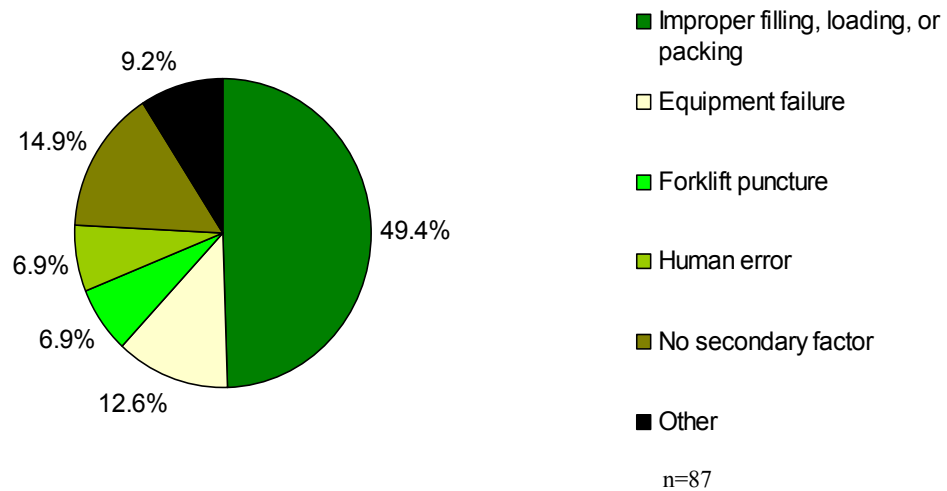
**Figure 3b. Secondary factors reported as contributing to the occurrence of fixed-facility events, Hazardous Substances Emergency Events Surveillance, Louisiana, 2003.**



**Figure 4a. Primary factors reported as contributing to the occurrence of transportation events, Hazardous Substances Emergency Events Surveillance, Louisiana, 2003.**



**Figure 4b. Secondary factors reported as contributing to the occurrence of transportation events, Hazardous Substances Emergency Events Surveillance, Louisiana, 2003.**



More than 68% of all events involved the release of only one substance. Two substances were released in 114 (16.9%) events, and approximately 15% involved the release of more than two substances (Table 2). All of the events in which three or more substances released were fixed-facility events.

**Table 2.—Number of substances involved per event, by type of event, Louisiana Hazardous Substances Emergency Events Surveillance, 2003.**

No. substances	Type of event						All events		
	Fixed facility			Transportation			No. events	%	Total substances
	No. events	%	Total substances	No. events	%	Total substances			
1	380	64.7	380	82	94.3	82	462	68.5	462
2	109	18.6	218	5	5.7	10	114	16.9	228
3	53	9.0	159	0	0.0	0	53	7.9	159
4	22	3.7	88	0	0.0	0	22	3.3	88
≥ 5	23	3.9	176	0	0.0	0	23	3.4	176
<b>Total<sup>▲</sup></b>	<b>587</b>	<b>99.9</b>	<b>1021</b>	<b>87</b>	<b>100.0</b>	<b>92</b>	<b>674</b>	<b>100.0</b>	<b>1113</b>

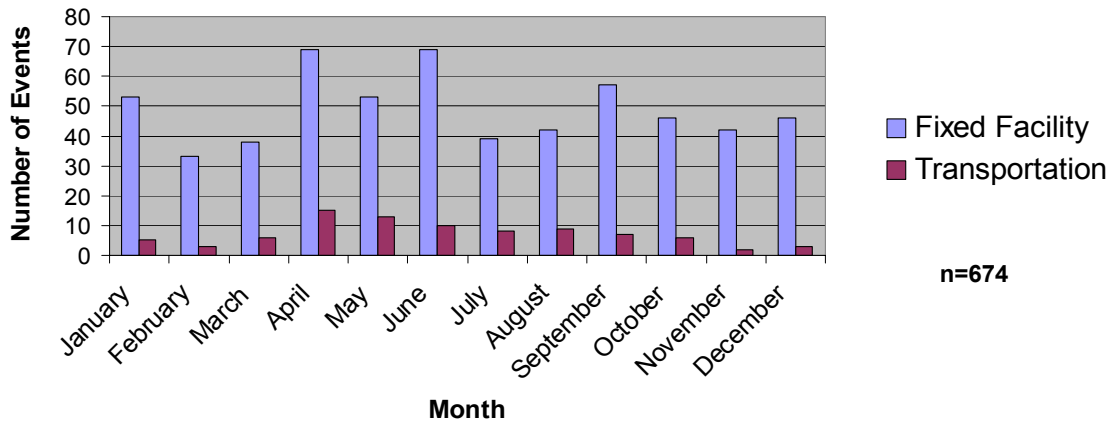
<sup>▲</sup>Total may not equal 100% due to rounding.

A total of 1,113 substances were either released or threatened to be released during these events; 1,112 substances were actually released and 1 substance was threatened to be released. Two types of releases for each chemical (e.g., spill and air) could be reported. Of a total of 1,089 substances having only one type of release reported, 929 releases were air releases (83.5%), 145 were spills (13.0%), 14 were fires (1.3%), and 1 was a threatened event (<1%). No events involved releases that resulted from explosions. Two types of releases were reported for the following combinations: spill and air releases (13, 1.2%), and fires and air releases (10, 0.9%); the remaining release involved a combination of the spill and fire release types.

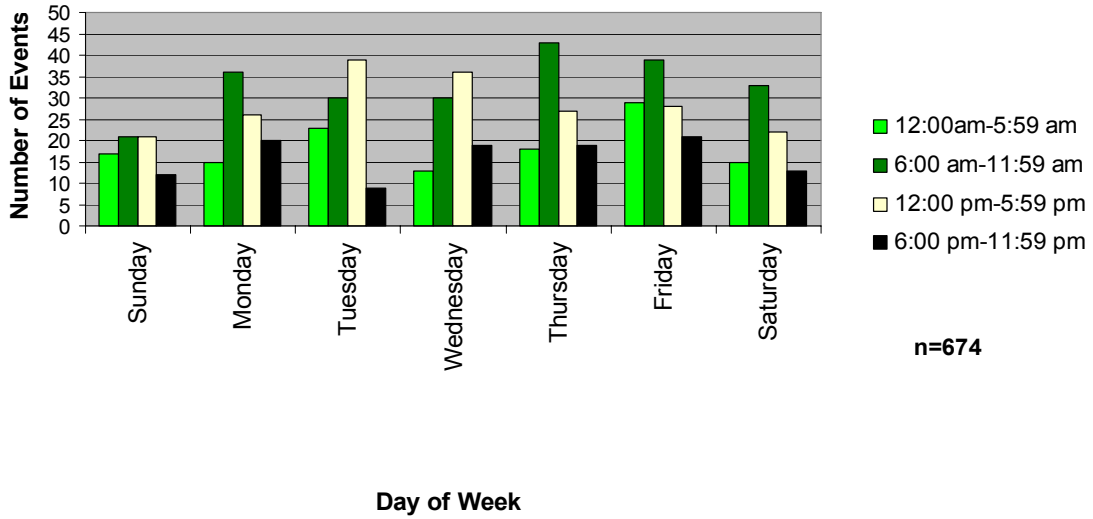
The number of events by month ranged from a low of 36 (5.3%) in February to a high of 84 (12.5%) in April, with the largest number of events occurring from April through June, or the spring season (Figure 5a). During week days, the proportion of events ranged from 14.4% to 17.4%, and from 10.5% to 12.3% of events occurred during weekend days. More than a third of the events (34.4%) occurred from 6:00 a.m. to 11:59 a.m., 29.5% from 12:00 p.m. to 5:59 p.m., 19.3% occurred from 12:00 a.m. to 5:59 a.m., and the remainder from 6:00 p.m. to 11:59 p.m. (Figure 5b).



**Figure 5a. Distribution of events by month and event type, Hazardous Substances Emergency Events Surveillance, Louisiana 2003.**



**Figure 5b. Distribution of events by day and time, Hazardous Substances Emergency Events Surveillance, Louisiana, 2003.**



### ***Industries***

The largest proportions of HSEES events were associated with manufacturing industries, 516 (77.0%), and the transportation industry, 77 (11.5%) (Table 3). The largest proportion of events with injuries occurred in the manufacturing industry (5 of 8 events, 62.5%). Of the victims, 38 of 42 (90.5%) were injured during events in the manufacturing industry, and 2 (4.8%) victims were injured during an event in the utilities industry. The public administration and the transportation industries had one victim each.

**Table 3.—Industries involved in hazardous substances events, by category, Louisiana Hazardous Substances Emergency Events Surveillance, 2003.**

Industry category	Total events		Events with victims		Percentage all events with victims	Total No. victims # (range)*
	No.	%	No.	%		
Business and repair services	1	0.1	0	0.0	0.0	0
Construction	1	0.1	0	0.0	0.0	0
Mining	56	8.4	0	0.0	0.0	0
Manufacturing	516	77.0	5	1.0	62.5	38 (range: 1 to 30)
Professional services	1	0.1	0	0.0	0.0	0
Public administration	1	0.1	1	100.0	12.5	1
Retail trade	2	0.3	0	0.0	0.0	0
Transportation	77	11.5	1	1.3	12.5	1
Utilities	13	1.9	1	7.7	12.5	2
Wholesale trade	2	0.3	0	0.0	0.0	0
<b>Total†<sup>▲</sup></b>	<b>670</b>	<b>99.8</b>	<b>8</b>	<b>1.2</b>	<b>100.0</b>	<b>42</b>

\* Range only provided for manufacturing industry category.

† Total may not equal 100% due to rounding.

▲ Note: Total does not equal 674 events. Industry category was unknown for 2 events. Two additional events were excluded, one of which involved illegal activity in a private residence, and for the other event, no industry category was identified because the hazardous substance was abandoned and the responsible party was not identified.

### *Substances*

A total of 1,113 substances were involved in all events. The substances most frequently released were sulfur dioxide, nitric oxide, benzene, and Nitrogen oxides (NOX) (Appendix). The substance categories most commonly involved in fixed-facility events were other inorganic substances (484, 47.5%), volatile organic compounds (302, 29.6%), and oxy-organics (52, 5.1%). In transportation-related events, the most common releases were paints and dyes (27, 29.7%), volatile organic compounds (22, 24.2%), and acids (9, 9.9%) (Table 4).

**Table 4.—Number of substances involved, by substance category and type of event, Louisiana Hazardous Substances Emergency Events Surveillance, 2003.**

Substance category	Type of event				All events	
	Fixed facility		Transportation		No. substances	%
	No. substances	%	No. substances	%		
Acids	30	2.9	9	9.9	39	3.5
Ammonia	26	2.5	0	0.0	26	2.3
Bases	7	0.7	4	4.4	11	1.0
Chlorine	13	1.3	0	0.0	13	1.2
Formulations	0	0.0	0	0.0	0	0.0
Hetero-Organics	2	0.2	1	1.1	3	0.3
Hydrocarbons	20	2.0	1	1.1	21	1.9
Mixture†	8	0.8	4	4.4	12	1.1
Other*	19	1.9	5	5.5	24	2.2
Other inorganic substances‡	484	47.5	8	8.8	492	44.3
Oxy-Organics	52	5.1	4	4.4	56	5.0
Paints & dyes	8	0.8	27	29.7	35	3.2
Pesticides	12	1.2	2	2.2	14	1.3
Polychlorinated biphenyls	1	0.1	0	0.0	1	0.1
Polymers	36	3.5	4	4.4	40	3.6
Volatile organic compounds	302	29.6	22	24.2	324	29.2
<b>Total¶<sup>▲</sup></b>	<b>1020</b>	<b>100.1</b>	<b>91</b>	<b>100.1</b>	<b>1111</b>	<b>100.2</b>

\* Not classified.

† Substances from different categories that were mixed prior to the event.

‡ All inorganic substances except for acids, bases, ammonia and chlorine.

¶ Of a total of 1,113 substances, 2 were excluded because they were not assigned a substance category.

▲ Total may not equal 100% due to rounding.

### ***Victims***

A total of 42 victims were involved in 8 events (1.2% of all events) (Table 5). Of the 8 events with victims, 5 (62.5%) events involved only one victim. Of all victims, 41 (97.6%) were injured in fixed-facility events. Approximately 43% of fixed-facility events with victims had more than one victim per event.

**Table 5.—Frequency of the number of victims by type of event, Louisiana Hazardous Substances Emergency Events Surveillance, 2003.**

No. victims	Type of event						All events		
	Fixed facility			Transportation			No. events	%	Total victims
	No. events	%	Total victims	No. events	%	Total victims			
1	4	57.1	4	1	100.0	1	5	62.5	5
2	1	14.3	2	0	0.0	0	1	12.5	2
3	0	0.0	0	0	0.0	0	0	0.0	0
4	0	0.0	0	0	0.0	0	0	0.0	0
5	1	14.3	5	0	0.0	0	1	12.5	5
≥ 6	1	14.3	30	0	0.0	0	1	12.5	30
<b>Total</b>	<b>7</b>	<b>100.0</b>	<b>41</b>	<b>1</b>	<b>100.0</b>	<b>1</b>	<b>8</b>	<b>100.0</b>	<b>42</b>

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 had victims. Substances in events that involved one or more substances from the same substance category were counted once in that category. Substances in events that involved two or more substances from different categories 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 involving the substance category “other inorganic substances” constituted 39.2% of all events. However, only 12.5% of these events resulted in injuries. Conversely, events involving the chlorine substance category comprised 1.3% of all events, and 12.5% of these events resulted in injuries.

**Table 6.—Frequency of substance categories in all events and events with victims, Louisiana Hazardous Substances Emergency Events Surveillance System, 2003.**

Substance category	All events		Events with victims		
	No.	%	No.	Percentage of all events with victims	Percentage of events with victims in substance category
Acids	23	3.4	1	12.5	4.3
Ammonia	26	3.9	1	12.5	3.8
Bases	11	1.6	0	0.0	0.0
Chlorine	9	1.3	1	12.5	11.1
Formulations	0	0.0	0	0.0	0.0
Hetero organics	2	0.3	0	0.0	0.0
Hydrocarbons	5	0.7	0	0.0	0.0
Mixture‡	12	1.8	0	0.0	0.0
Multiple substance category	131	19.5	2	25.0	1.5
Other†	6	0.9	0	0.0	0.0
Other inorganic substances¶	264	39.2	1	12.5	0.4
Oxy-organics	16	2.4	0	0.0	0.0
Paints & dyes	34	5.1	1	12.5	2.9
Pesticides	11	1.6	0	0.0	0.0
Polychlorinated biphenyls	1	0.1	0	0.0	0.0
Polymers	26	3.9	1	12.5	3.8
Volatile organic compounds	96	14.3	0	0.0	0.0
<b>Total€</b>	<b>673</b>	<b>100.0</b>	<b>8</b>	<b>100.0</b>	

\* 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. Events that involved multiple substances from different substance categories were counted only once in the multiple substance category.

† Not classified.

‡ Substances from different categories that were mixed prior to the event.

¶ All inorganic substances except for acids, bases, ammonia, and chlorine.

€ Of a total of 674 events, 1 event was not included. Of the 674 events, 462 involved one substance each, of which 1 had its substance category missing. The one event excluded did not include a victim. One-hundred fourteen events involved two substances.

Members of the general public (35, 83.3%) constituted the largest proportion of the population groups injured, followed by employees (7, 16.7%). The one victim injured during a transportation-related event was an employee. All other victims were injured during fixed-facility events. No emergency response personnel were injured as a result of HSEES events.

Victims were reported to sustain a total of 45 injuries (Table 7) as some victims had more than one injury. Of all reported injuries, the most common injuries in fixed-facility events were gastrointestinal system problems (32, 72.7%), followed by respiratory system problems (7, 15.9%), and eye irritation (2, 4.5%). The one victim injured during a transportation-related event experienced a thermal burn. None of the employee victims were wearing any form of PPE.

**Table 7.—Frequencies of injuries/symptoms, by type of event, Louisiana Hazardous Substances Emergency Events Surveillance, 2003.**

Injury/symptom	Fixed Facility		Transportation		All Events	
	No. injuries	%	No. injuries	%	Total No.	%
Burns	1	2.3	1	100.0	2	4.4
Dizziness or other central nervous system	1	2.3	0	0.0	1	2.2
Eye irritation	2	4.5	0	0.0	2	4.4
Gastrointestinal problems	32	72.7	0	0.0	32	71.1
Respiratory system problems	7	15.9	0	0.0	7	15.6
Skin irritation	1	2.3	0	0.0	1	2.2
<b>Total*</b>	<b>44</b>	<b>100.0</b>	<b>1</b>	<b>100.0</b>	<b>45</b>	<b>99.9</b>

\*The number of injuries is greater than the number of victims (42) because a victim can have more than one injury.

Sex was known for 12 (28.6%) of the 42 victims; of these, 9 (75.0%) were males. Sex was known for all 7 employees. Males constituted 71.4% of all employees. The median age of the 9 (21.4%) victims for whom an exact age was reported was 41 years (range: 24–67). Of those



victims for whom an exact age was known, there were no reports of victims below 19 years of age. All 31 injured persons for whom age was not reported were members of the general public. The largest proportion of victims were treated at the hospital but not admitted, 32 (76.2%). Nine (21.4%) victims were treated at the hospital and admitted, and 1 (2.4%) died after arrival at the hospital. One employee victim of a fixed-facility event in which antimony pentachloride was released experienced chemical burns and died after arrival at a hospital. The primary factor contributing to this event was human error, and the secondary contributing factor was improper filling, loading, or packing.

Three events involved more than one injured person per event. These events resulted in two victims, five victims, and thirty victims respectively, and all occurred at fixed facilities. In the event involving two victims, ammonia was released at approximately 5:20 am on a Monday morning in an industrial area, and an order to shelter-in-place was given. The primary factor in this event was an intentional or illegal act, occurring during an alleged attempt of ammonia theft. Both victims were male, between the ages of 20 and 44 years of age, and members of the general public. Both victims were driving past the event location when the injuries occurred and experienced gastrointestinal problems and eye irritation. This event led to a road closure. In the event resulting in five victims, chlorine along with two refrigerants were released on a Sunday morning at approximately 3:20 am, and an order to shelter-in-place was issued. Four of the five victims were employees, and the fifth victim was a member of the general public. All five victims experienced respiratory symptoms and were admitted to the hospital for treatment. The primary contributing factor in this event was equipment failure. In the event involving thirty victims, hydrogen sulfide and sulfur dioxide were released into an industrial area at 5:10 pm on a Wednesday. All thirty victims experienced gastrointestinal problems, were members of the

general public, and were treated at the hospital but not admitted. Neither an order to shelter-in-place nor to evacuate was given. The primary contributing factor was equipment failure. All three of these events occurred under clear weather conditions and were located in industrial areas which have residential areas located within a quarter mile of the location where the event occurred.

### **EVACUATION AND SHELTER-IN-PLACE**

Evacuations were ordered in 5 of 674 events (0.7%). Of these evacuations, all were of a defined circular area surrounding the event locations. The number of people evacuated was known for 3 events and ranged from 1 to 100 people, with a median of 40. The median length of evacuation was 1 hour. In 4 of the events for which evacuation was ordered, access to the area was restricted. Seven events (1.0%) had in-place sheltering ordered by an official. One event had an order to both evacuate and shelter-in-place.

### **RESPONSE**

For each event, up to 10 categories could be reported to indicate “who responded” to an event (Table 8). A responder was reported for 492 (73.0%) of the 674 events. Of these 492 events for which a responder was reported, 5.5% had 2 or more categories reported, 2.2% had 3 or more categories reported, 1.0% had four or more categories reported, and 0.4% had 5 or more categories reported.

**Table 8.—Reported responder to events, Louisiana Hazardous Substances Emergency Events Surveillance, 2003.**

Responder	%
Company's response team	95.3
Law enforcement agency	4.1
Environmental agency	4.1
Certified HazMat team	2.4
Fire Department	2.2
EMT	0.8
'Other'	0.2

\* Percentages may sum to greater than 100% because multiple responder categories can be reported for an event.

## PREVENTION ACTIVITIES

During 2003, the Louisiana HSEES Program performed various prevention activities. These activities included:

- Louisiana HSEES Presentations to several audiences
- “Hazardous Substances Emergency Events Surveillance (HSEES) related injuries in the State of Louisiana, 2001”, an article published in the *Louisiana Morbidity Report*, July-August 2003 issue (volume 14, number 4)
- Development of the Louisiana HSEES Website  
<http://www.oph.dhh.louisiana.gov/environmentalepidemiology/hseess/index.html>

Annual reports and other information can be downloaded from the Louisiana HSEES website.

## **CHLORINE**

In 2003, there were a total of 13 releases from the chlorine substance category, all of which occurred at fixed facilities. Of the releases from the chlorine substance category, 69.2% involved the release of only one substance. The amount of chlorine released ranged from approximately 7 pounds to 14,400 pounds.

Of the 13 releases from the substance category chlorine, 2 releases (15.4%) involved 6 victims. Approximately 14% of all 42 victims were injured during events involving a release from the chlorine substance category. All 6 victims who were injured in events involving the chlorine substance category experienced respiratory system problems, and all 6 victims were treated at the hospital and admitted. In addition to reported respiratory system problems, one victim also experienced dizziness or central nervous system (CNS) symptoms. No deaths were associated with chlorine releases. Four of the victims (66.7%) were employees, and 2 (33.3%) victims were members of the general public. No evacuations were ordered during an event involving the chlorine substance category, and in one event, an order to shelter-in-place was given.

## **SUMMARY OF RESULTS, 2003**

In 2003, substances were most frequently released in Calcasieu Parish, 15.7%. The chlorine substance category had the highest percentage of victims when compared to the quantity of releases involved. The release of only one substance during an event was more likely to occur during a transportation-related event, 94.3%, than during a fixed-facility event, 64.7%. Paints and dyes were the substances most likely to be released during transportation-related events, 29.7%, and other inorganic substances were the substances most likely to be released during fixed-facility events, 47.5%. Three events in 2003 involved the majority of victims, i.e. 88.1% of the 42 victims were injured during 3 of the 8 events involving victims.

During 2003, the largest proportion of events occurred in fixed facilities (87.1%) (Table 9). This finding is consistent with data from 2001 and 2002. Though the reporting sources used over time have increased, the total number of events has decreased since Louisiana began collection of HSEES data in 2001. Once more years of data have been collected, further analysis will be completed to determine if this decrease is a trend. The number of events involving victims in 2003 decreased from 20 events involving victims in both 2001 and 2002 to 8 events involving victims in 2003. More extensive investigation may be completed in the future to determine if this decrease in the number of events involving victims has actually decreased or if this decrease is related to underreporting of the victims of acute hazardous substances emergency events.

**Table 9.— Cumulative data by year, Louisiana Hazardous Substances Emergency Events Surveillance, 2001-2003.**

Year	Type of event			No. substances involved	No. victims	No. deaths	Events with victims	
	Fixed facility	Transportation	Total				No.	% <sup>▲</sup>
2001	684 (36.0%)	131 (38.5%)	815	1163	63	2	20	41.7
2002	630 (33.1%)	122 (35.9%)	752	1205	30	1	20	41.7
2003	587 (30.9%)	87 (25.6%)	674	1113	42	1	8	16.7
Total	1901	340	2241	3481	135	4	48	100.1

▲ Percentage of events with victims.

## **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 most frequent substances involved in events, Louisiana Hazardous Substances Emergency Events Surveillance, 2003<sup>▲</sup>**

	Chemical Substance	No. of Releases
1.	Sulfur Dioxide	160
2.	Nitric Oxide	98
3.	Benzene	61
4.	NOX	95
5.	Nitrogen Dioxide	49
6.	Nitrous Oxide	40
7.	Hydrogen Sulfide	39
8.	Carbon Monoxide	34
9.	Vinyl Chloride	34
10.	Paint	31

<sup>▲</sup> Note chemical substance may include related chemical substances such as substances not otherwise specified (NOS).