

Short Communication

PUBLIC HEALTH CONSEQUENCES OF ACUTE CHEMICAL RELEASES, LOUISIANA, 1986

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Summary

A review of national, state, and local sources identified 89 different nonradioactive chemical releases resulting in public health impact in Louisiana in 1986. Five events resulted in deaths, 59 in injuries, and 33 in evacuations. Chlorine and natural gas were the most frequently involved hazardous substances. Little overlapping occurred between the different data sources, and less than 30% of these incidents were identified from the national reporting systems.

Introduction

The United States Superfund Amendments and Reauthorization Act of 1986 contains provisions for emergency planning and the right of communities to know about chemical releases. Despite this law, the annual numbers of deaths, injuries, and evacuations caused by acute chemical releases are unknown. The most complete numbers to date are obtained by a compilation of information from the National Response Center data base, the Department of Transportation Hazardous Material Information System, and the Acute Hazardous Events data base from the Environmental Protection Agency — the three largest national sources of data coding deaths and injuries [1]. This compilation is known as the Public Health Consequences data base (PHC) and contains information about events identified which resulted in deaths, injuries, or evacuations in 1986 [1]. Characteristics of constituent data bases have been previously described [1,2].

To evaluate the completeness of PHC and to better estimate numbers of deaths, injuries, and evacuations from acute chemical releases, we tried to

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identify (from state, local, and news sources) as many incidents as possible that resulted in a public impact in Louisiana in 1986, the year covered by PHC. Louisiana was chosen because of its limited size and large chemical industry.

Methods

An incident resulting in a public health impact was defined as any hazardous material release which resulted in either deaths, injuries, or evacuations. Deaths and injuries were included if they were the result of exposure to chemicals, chemical-related fire, and chemical-related explosion. Individual injuries resulting from the misuse of household chemicals in private residences were excluded. Also specifically excluded from analysis were incidents from carbon monoxide poisoning from faulty heating systems, within-the-home natural gas leaks or oven explosions, and localized releases that were part of attempted murders. In addition to evacuations due to actual releases, those from perceived risk of releases were also included. Our search was restricted to releases of non-radioactive materials. Events were coded as transportation-related if they involved loading, unloading, or transporting (by train, truck, or barge) a toxic chemical.

All events from the PHC data base that occurred in Louisiana were reviewed.

The Nexis Library System, a large on-line, full-text library of news, general, and business information compiled from newspapers, magazines, newsletters, and wire services, was searched for hazardous materials released during 1986 that resulted in a public health impact in Louisiana.

Organizations that represented potential sources of information were contacted. They included governmental agencies at the Federal (Agency for Toxic Substances and Disease Registry, Army Corps of Engineers, Coast Guard, Federal Railroad Administration, Regional Environmental Protection Agency), State (Department of Environmental Quality, Department of Health and Human Resources, Department of Transportation, State Police), and local level (police and fire departments); and non-governmental organizations such as the Baton Rouge Morning Advocate (a local newspaper) and the Regional Poison Control Center. The survey was not exhaustive. For example, fire departments were selected according to the size of the population they served, whether they were located close to a major transportation route or chemical plants, and whether they specialized in hazardous material recovery operations.

Results

Identified were 89 different events that resulted in public health impacts in Louisiana in 1986. The sources from which these events were identified are shown in Table 1. Figure 1 illustrates the limited overlap between the PHC national data bases, news sources (including Nexis and the Baton Rouge

TABLE 1

Sources of identification of incidents resulting in public health consequences, Louisiana, 1986

Source of data	Number of incidents (N = 89)
National (Public Health Consequences data base total)	26
News sources	19
Morning Advocate	13
Nexis	11
State and local	54
State Police	28
Fire Departments	19
Department of Environmental Quality	17

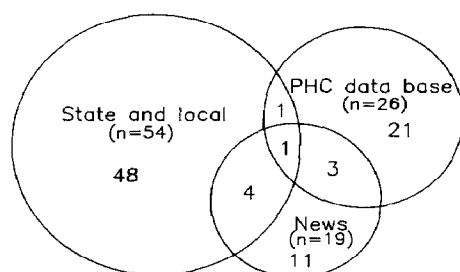


Fig. 1. Hazardous material releases incidents resulting in public health consequences, Louisiana, 1986, sources of identification and overlap between sources.

Morning Advocate), and state and local sources. PHC identified less than 30% of all incidents.

Five incidents resulted in a total of nine deaths. Fifty-nine incidents resulted in a total of 267 injuries (1 – 89 injuries per incident, on average 4.5 injuries per incident). Thirty-three incidents resulted in evacuations and at least 24 of those required that more than one building be evacuated. Incidents that resulted in deaths of at least three injuries were more likely to be reported by PHC (50% – 6/12) than those that resulted in no deaths or less than three injuries (26% – 20/77).

Among all incidents, 26 (29%) were transportation-related. Sixteen were associated with trucks, 5 with trains, and 1 with a barge. We were unable to identify the mode of transportation in four incidents stated to involve transports. Only 18 out of 26 (69%) transportation-related incidents has their cause identified. Leaks (8) and vehicle collisions (6) were the most frequent identified causes of transportation-related incidents. Only 42 out of 63 (67%) incidents at fixed locations had their cause identified. At fixed locations, opera-

tor error (16) and equipment failure (15) were the most frequent causes of release. All stages of the process were involved (steady state, unloading, maintenance, downloading).

The most frequently involved chemicals were chlorine (14 incidents), natural gas (14), propane (6), ammonia (4), hydrochloric acid (3), sulfuric acid (2), phosphoric acid (2), and diesel fuel (2). Information about the quantities, concentration, and media involved was scarce.

Discussion

No one state or national data source had adequate information to characterize deaths, injuries, and evacuations from chemical releases in Louisiana. Given that the national data collection system did not capture the majority of incidents in Louisiana in 1986 shows its inadequacy for routine national surveillance of hazardous material releases resulting in public health impact. To improve estimates of chemical incidents with public health impact in Louisiana, information needs to be collected from many local and state organizations. In addition, organizations that already collect information about chemical releases but not about public health impacts could be used to gather useful information. Standardizing forms used by several agencies to gather information and addition on the forms of items pertaining to injuries and evacuations would be useful as would updating reports after verification and follow-up of information about the health impact of chemical releases.

Acknowledgement

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References

- 1 S. Binder, Deaths, injuries, and evacuation from acute hazardous materials releases. *Am. J. Pub. Health*, 79 (1989) 1042-1044.
- 2 R.A. Walter, R.C. DiGregorio, K.J. Kooyoomjian and T.L. Eby, A statistical analysis of hazardous material releases reported to the national response center, In: J. Ludwigson (Ed.), 1986 Hazardous Material Spills Conference, Government Institutes, Rockville, MD, pp. 163-171.