

**Hazardous Substances Emergency Events Surveillance
(HSEES)**

Report for 1995-2006

Minnesota Department of Health

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List of Tables

- Table 1. Cumulative data by year - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Table 2. Number of events, by county and type of event - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Table 3. Frequencies of injuries by type of event - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Table 4. Industries involved in hazardous substance events, by category - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Table 5. Frequency of substance categories in all events and events with victims - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Table 6. Top two single substances released by year - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Table 7. Events, victims, and victim/event ratio - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Table 8. Victims by category - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006

List of Figures

- Figure 1. Events by year - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Figure 2. Victim events by year - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Figure 3. Events by day of week - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Figure 4. Events by time of day - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Figure 5. Events per 100,000 population, by county - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Figure 6. Number of manufacturing events by county - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Figure 7. Number of agricultural events by county - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Figure 8. Event locations and major roadways - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006
- Figure 9. Event locations and major roadways, Twin Cities Metropolitan Area - Minnesota Hazardous Substances Emergency Events Surveillance, 1995-2006

Sources of preliminary information about events include the Minnesota Duty Officer, the National Response Center, and the U.S. Department of Transportation Hazardous Materials Incident Reporting System. Additional information is collected from company or industry representatives, state and local emergency responders, health and safety personnel and others with knowledge about the release.

Results and Discussion

Overview

From 1995-2006, there were 4,566 HSEES events in Minnesota. Of these, 47 (1.0%) were threatened releases and 36 (0.8%) were part actual and part threatened releases. There were evacuations in 447 events (9.8%) and injuries in 283 events (6.2 %), totaling 877 victims.

Temporal Trends

Overall, the number of HSEES events have been increasing over time ($p < 0.001$) (Table 1, Figure 1) while the number of victim events has been fluctuating, with a slight possible increase over time ($p = 0.083$) (Table 1, Figure 2).

The year with the most HSEES events was 2006 (546), while the fewest were in 1995 (229), the first full year Minnesota participated in the system. Notably, the highest number of victims were reported in 1995 (172 victims, 23 events), when two events resulted in several victims. The fewest victims were reported in 1997 (19 victims, 16 events) (Table 1, Figure 2).

The high number of victims in events at utilities was related to one mass casualty event that resulted in several victims with minor injuries.

Substances released

A total of 5,312 substances were released in the recorded events, with an additional 89 chemicals that were threatened to be released. For all events, the number of substances released ranged from 1 to 197. The majority of events (4,275 [93.6%]) involved release of one substance. The most frequent type of release was spill only, with 3,140 substances (59.1%) released in this way. There were 1,367 substances (25.7%) released by air release only.

By category

Events were assigned a substance category based on the types of substance(s) released. If more than one substance was released and all were of the same category, the event was assigned that substance category. If the substances were of different categories, the event was assigned to a “multiple substances” category.

There were 4,511 events (98.8%) that were assigned a category. The substance categories with the most events include “other inorganic substances” (661 events [14.7%]) and “pesticides and fertilizers” (629 events [13.9%]). The anhydrous ammonia category (which includes ammonium hydroxide) had the highest percentage of events with victims (18.4%) overall, but events assigned the “hetero-organics” category (26.3%) had the highest proportion of victim events within its own category (Table 5).

Evacuations

There were 447 events (9.8%) involving an evacuation ordered by an official. The number of people evacuated ranged from 1 to approximately 1,500, with about 25,200 evacuated for all events. The most common evacuation length (mode) was about 1 hour, while the median evacuation length was 2 hours. Evacuation lengths ranged from 5 minutes to several weeks. Substances released that required evacuations most frequently included anhydrous ammonia (108 events), chlorine gas (33 events) and mercury (28 events).

One hundred twenty-three (27.5%) events with evacuations resulted in victims, totaling 592 victims. The most common industries involved were manufacturing (40 events [32.5%]), and education (13 events [10.6%]). Fourteen events (11.4%) with an evacuation resulted in more than ten victims.

There were 159 events without evacuations that resulted in victims, totaling 284 victims. (The evacuation status was unknown for one victim event.) The most common industries of these events were agriculture (29 events [18.2%]) and wholesale trades (including several farm cooperatives) (28 events, [17.6%]). Three events (1.9%) without an evacuation resulted in more than ten victims. The rural nature of many of these events, with the corresponding lower density of populated areas, might have contributed to the decision not to evacuate and to the lower numbers of victims when compared to events with evacuations.

References

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Appendix

Hazardous Substance and Emergency Event Surveillance

HSEES Chemical-Category Definitions

Acids: Substances that are of concern due to acidity.

Ammonia: Ammonia and closely-related substances that readily produce it.

Bases: Substances that are of concern due to basicity.

Chlorine: Chlorine and closely-related substances that readily produce it.

Formulations: Formulations, brand-name products, waste-stream products, and transportation codes for which the substance(s) of health concern are not known. (If it was known, it would be entered into some other, appropriate category.)

Hetero-Organics: Organic compounds with nitrogen, sulfur, or phosphorous that do not fall into other, more-precise categories.

Hydrocarbons: Alkyl and aromatic hydrocarbons, coal tars, creosote, etc. Note that petroleum products, per se, are not collected into HSEES due to the Petroleum Exclusion clause of CERCLA.

Inorganics: Inorganic substances (substances without carbon, such as metals).

Other: Substances that do not fit into any other category. Also includes radioactive substances and substances whose primary purpose is pharmaceutical or biological.

Oxy-Organics: Organic compounds with oxygen that do not fall into other, more-precise categories.

Paints and Dyes: Paint or dye compounds and formulations.

Pesticides/Agricultural: Pesticides, herbicides, fungicides, etc., as well as agricultural compounds such as fertilizer.

Polychlorinated Biphenyls: Polychlorinated biphenyls.

Polymers: Polymers, plastics, resins and related compounds.

Volatile Organic Compounds: Volatile (rapidly vaporizing) organic (carbon containing) compounds.

Mixtures: A combination of 2 or more chemical substances that have different chemical categories.

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