Hazardous Substances Emergency Events Surveillance (HSEES)
Data to Assist NIEHS Training Initiatives

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WI HSEES Principal Investigator
WI Department of Health Services
Bureau of Environmental and Occupational Health
The HSEES System...

...tracks the uncontrolled or illegal release of hazardous substances with a special emphasis on the frequencies of associated adverse effects such as victims, symptoms, and evacuees.
Today’s Presentation

● HSEES System Descriptors and Definitions

● WI HSEES All-Spills Data

● WI HSEES First Responder Spills Data

● WI HSEES Ammonia Spills Data

● Looking Forward: HSEES Data and NIEHS Training Goals
HSEES System Description

HSEES is an electronic, web-deployed, secure, data-entry and collection system allowing for real-time data-sharing and analysis with authorized agencies and the general public in support of both prevention and disaster-preparedness initiatives.

Funding

(1) US DHHS, Agency for Toxic Substances and Disease Registry (ATSDR)
(2) CDC, Coordinating Office of Terrorism Prevention and Emergency Response (COTPER)
Current 14 Participating States
A **HSEES Event** is 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 Reporting List, or if not on the list, in an amount greater than or equal to 1 gal or 10 lbs. Threatened releases of qualifying amounts will be included if the threat led to an action, e.g., evacuation, to protect the public’s health.
HSEES - Key Definitions

A **HSEES Victim** is a person who experiences at least one documented, adverse health effect within 24 hours of the hazardous substance event, or who dies as a consequence of the event.

A **HSEES Evacuee** is a person who is ordered (or voluntarily) leaves their workplace, residence, vehicle, or other location as the result of a hazardous substance event.
WI HSEES Information Sources

- WI DNR
- WI DATCP (Agricultural)
- Regional Level-A Response Team Regions
- Local Public Health Agencies
- First Responders (Fire, Police, EMS)
- National Response Center (Washington DC)
- US Department of Transportation
- Media
### WI HSEES All-Spills Data

Events, Victims, and Evacuees (1993-2007)

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WI HSEES Event Distribution
All Spills, Fixed and Trans, (1993-2007)
(Total Events: N= 6,165)

Fixed Facility Events, 3172 (51%)
Transportation Events, 2993, (49%)
WI HSEES Event Distribution, Spills with Victims Fixed and Trans (1993-2007)
(Total Events With Victims: N= 431)

Fixed Facility Events, 358, (83%)
Transportation Events 73, (17%)
WI HSEES First-Responder Spills Data (1993-2007)

- Sensitive Information
- Sometimes Difficult to Acquire
## WI HSEES Responder Victim Events (1993-2007)

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<td>6</td>
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<1% of total events
9% of total victims
WI HSEES Event Distribution
Fixed and Trans (1993-2007)
(Total Events: N= 6,165) (Responder Events With Victims: N= 52)

- Fixed Facility Events, 3172 (51%)
- Transportation Events, 8, (15%)
- Fixed Facility Events, 44, (85%)

All Events
Responder Victim Events
WI HSEES Responder Events
With and Without “other” Victims
(1993-2007)

Events W/ Responder Victs, Only, 29, (56%)

Events W/ Both Responder & Other Victs 23, (44%)
WI HSEES, Distribution of Responder-Victim Types (1993-2007)
Distribution of All Victim Injury Types, WI HSEES (1993-2007)

Respiratory, 35%

SOB, 5%

Dizziness/ CNS, 8%

Skin, 16%

Other, 3%

Burns, 3%

Headache, 9%

GI, 7%

Eye, 14%

Total Injury Types: N= 2622
CNS=central nervous system, SOB=shortness of breath, GI=gastrointestinal
Distribution of Responder Injury Type
WI HSEES (1993-2007)

- SOB, 13%
- Respiratory, 31%
- Heart Probs, 2%
- Dizziness/CNS, 6%
- Skin, 24%
- Other, 1%
- Burns, 1%
- GI, 9%
- Eye, 5%
- Headache, 9%

Total Responder Injury Types: N = 628
CNS = central nervous system, SOB = shortness of breath, GI = gastrointestinal
WI HSEES, All Victim Disposition (1993-2007)

- Treated on scene: 185
- Treated at Hosp & Released: 17
- Admitted To Hospital: 1051
- Trans For Observation: 61
- Private Physician: 37
- Injury Reported by Official: 73
- Other: 105
- Released Admission: 37
- To Hospital: 61
WI HSEES, Primary Causal Factors
Events With Victims (1993-2007)
(Total Events With Victims: N= 431) (Total Responder Events With Victims: N= 52)

Unknown Cause, 106, (25%)
Illegal Activity, 31, (7%)
Human Error, 204, (47%)
Equipment Failure, 90, (21%)
Illegal Activity, 15, (31%)
Equipped Failure, 16, (31%)

Total Events
Responder Victim Events

Human Error, 21, (40%)
Responder Victim Case Study

Chemical Mfg Plant: Unloading Rail Tanker; Phenol, Heated and Under Pressure; Cold Winter Night. Victims: 4 Police, 3 Firefighters, 8 Employees, 1 Employee Fatality

- **Cause:** Human error; pole mounted thermometer inserted into the volatile, 20,000 lb phenol load

- **Radio Communication:** Spill initially understood as “Phenyl”, effecting response plan and PPE

- **Exposure Pathways**
  - Victim location atop the tanker car required human contact for repositioning (skin)
  - Removing contaminated work clothes required human contact (skin)
  - CPR (mouth & chest) prior to decontamination, required human contact (skin)
  - Noxious fumes from spill area, work clothes and skin (inhalation)
## WI HSEES, Substances Most Frequently Spilled (1993-2007)

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<tr>
<th>RANK</th>
<th>SUBSTANCE NAME</th>
<th>FREQUENCY</th>
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<tr>
<td>1</td>
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<td>ACID GROUP (5 acids)</td>
<td>587</td>
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<td>3</td>
<td>PAINT OR COATING NOS*</td>
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<td>CORROSIVE NOS*</td>
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<td>ILLICIT METH LAB CHEMICALS NOS*</td>
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<td>ETHYLENE GLYCOL</td>
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* Not Otherwise Specified
WI HSEES Responder Victim Events

Frequencies by Substance Name (1993-2007)
Wisconsin 1993 - 2007

In WI On Any Given Day, More Than 1.5 Million Pounds Of Ammonia Is In Storage.

- Food Processing
- Agri-Coops
- Dairy Coops
- Refrigerated Warehouses
- Petroleum Refineries
- Other Refrigerated Systems
Sites of Ammonia Release

- Agriculture
- Illicit Methamphetamine Labs
- Food Processing/Cold Storage
## All Ammonia Events, Victims, and Evacuees (1993-2007)

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WI HSEES Distribution of Ammonia Responder Events by Activity Category (1993-2007)

Total Ammonia Responder Events: N=19
**Multiple Links Including:**

- WI Department of Commerce Gas Systems Program for plan reviews and Regulatory codes
- OSHA refrigeration e-tool, contact information, summary of incidents
- EPA and other links
- Industrial Refrigeration Consortium
Ammonia Spills in Wisconsin (1993-2005)

Funding Attribution Statement
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Wisconsin Department of Health & Family Services
Division of Public Health
Bureau of Environmental and Occupational Health
One W. Wilson St, Room 150
Madison, WI 53702
Phone: 608 266-2683

http://dhfs.wisconsin.gov/eh/HSEES/

Wisconsin Hazardous Substances Emergency Events Surveillance (HSEES) Program

Publication Number: PPH 45101 (04/07)
Ammonia Characteristics and Effects

Ammonia is a colorless gas with a sharp, suffocating odor.

Ammonia gas can be detected by most people at a concentration of 1 to 8 parts per million (ppm).

Ammonia exposure can cause headache, nausea, and a pronounced burning feeling of the eyes, nose, throat, and skin.

Anhydrous ammonia expands when released and can form large clouds of toxic vapors.

Under certain conditions ammonia can be flammable or explosive.

Ammonia can react with other chemicals to produce lethal vapors.

Liquid ammonia can cause freezing burns and frostbite within seconds. Ammonia burns can cause permanent scarring of the lungs and eyes.

Ammonia Spills in Wisconsin, 1993-2005

Since 1993, Wisconsin has had 667 uncontrolled ammonia releases. This represents ~ 50 ammonia spills per year.

12% of all Wisconsin HSEES events have involved an ammonia release.

393 (59%) of Wisconsin’s ammonia releases involved refrigeration systems.

268 people have sustained injuries as the result of exposure to ammonia during an event. This number represents 19% of all HSEES victims.

121 victims were involved in refrigeration-related ammonia events. This is 45% of all ammonia victims.

7,827 Wisconsin residents were evacuated from their homes or workplaces due to uncontrolled ammonia releases. This is ~ 600 evacuees per year and 17% of all HSEES evacuees.

6,392 people were evacuated due to a refrigeration sector event. This is 82% of all ammonia evacuees.

Ammonia spills have occurred most frequently in the refrigeration sector, the agriculture sector, and associated with illicit production of methamphetamine.
Ammonia Awareness Day, April 25, 2007

http://dhfs.wisconsin.gov/eh/hsees/AmmoniaDay.htm

● An Educational Interaction/Intervention

● Target: Where Ammonia Used As A Refrigerant
  (Also Relevant In General Workplace & Community)

● Interaction Included:
  ▪ New Ammonia Awareness Web Page
  ▪ Ammonia Brochure
  ▪ Multiple Informational Links
  ▪ Evaluative Questionnaire
Looking Forward: HSEES Data and NIEHS Training Goals

• HSEES events could be used for training “scenarios”
• HSEES could collect additional information useful in assessing training impact
• Facilities with HSEES events could be targeted for NIEHS Centers’ training
• HSEES data could be used to identify training needs – example of meth lab response
• Interagency collaboration would benefit both programs.
FOR INFORMATION, CONTACT:

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Joseph.Olson@wi.gov

WI HSEES Web Page  
http://dhfs.wisconsin.gov/eh/hsees/
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