



Hazardous Substances Emergency Events Surveillance (HSEES)

Data to Assist NIEHS Training Initiatives

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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

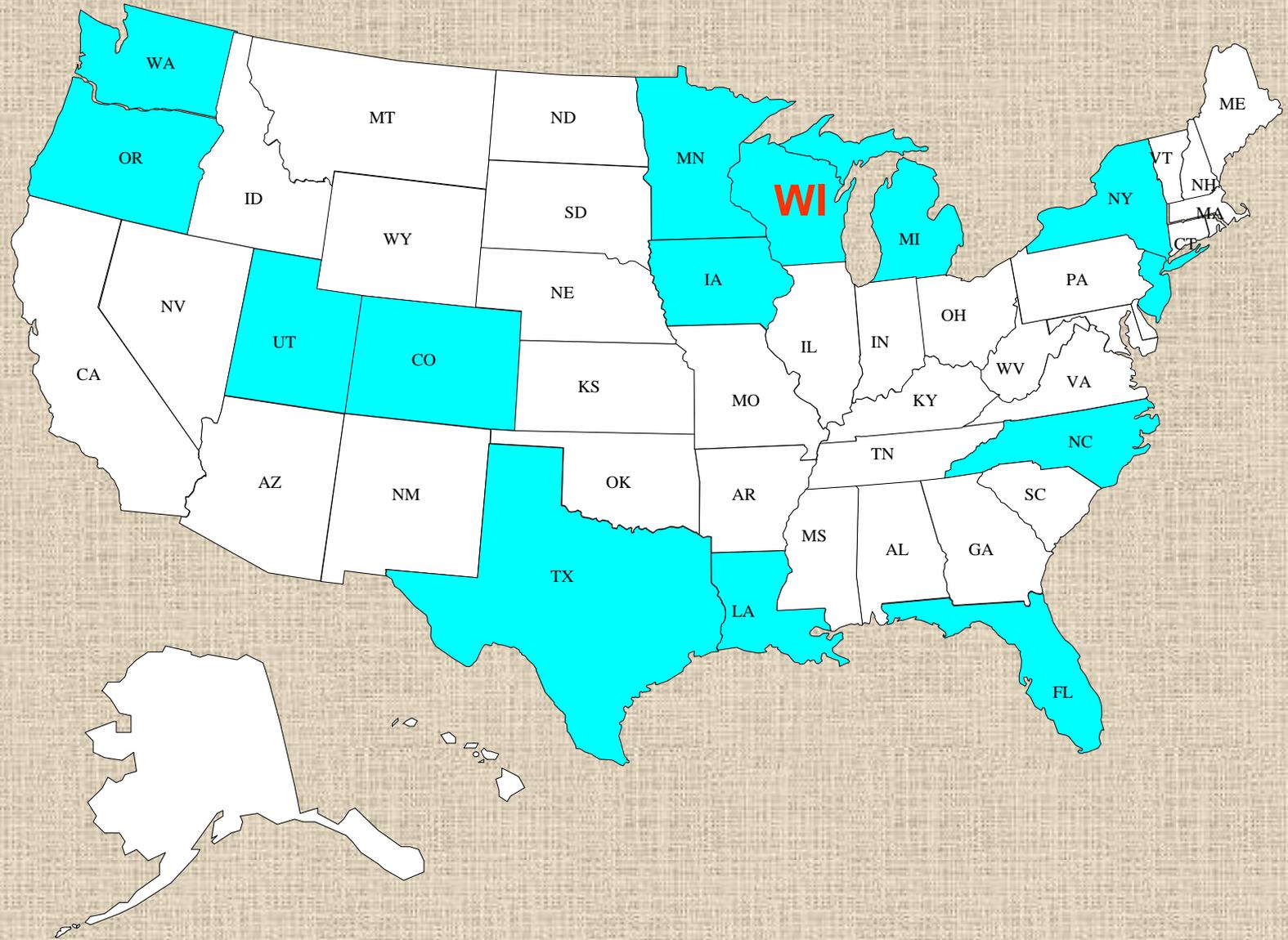
HSEES System Description

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



HSEES - Key Definitions

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

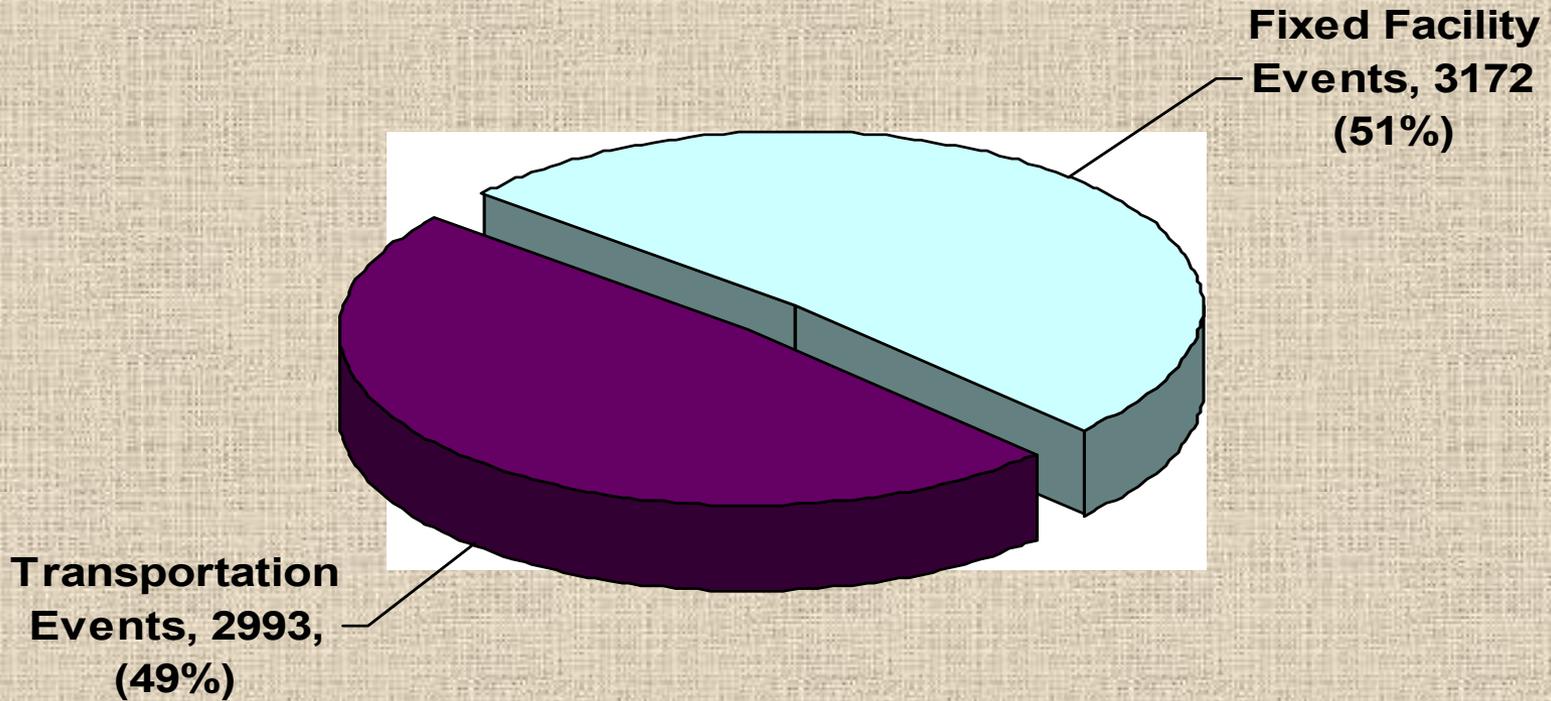
Events, Victims, and Evacuees (1993-2007)

YEAR	1993	1994	1995	1996	1997	1998	1999	2000
EVENTS	350	398	408	331	350	423	507	478
VICTIMS	61	77	71	92	125	174	159	137
EVACUEES	1,640	932	2,109	5,347	5,146	7,552	7,168	3,918
YEAR	2001	2002	2003	2004	2005	2006	2007	1993-2007 Total
EVENTS	508	537	410	428	346	367	324	6,165
VICTIMS	144	154	87	55	39	81	73	1,529
EVACUEES	2,883	3,797	822	1,788	2,143	1,031	6,299	52,575

WI HSEES Event Distribution

All Spills, Fixed and Trans, (1993-2007)

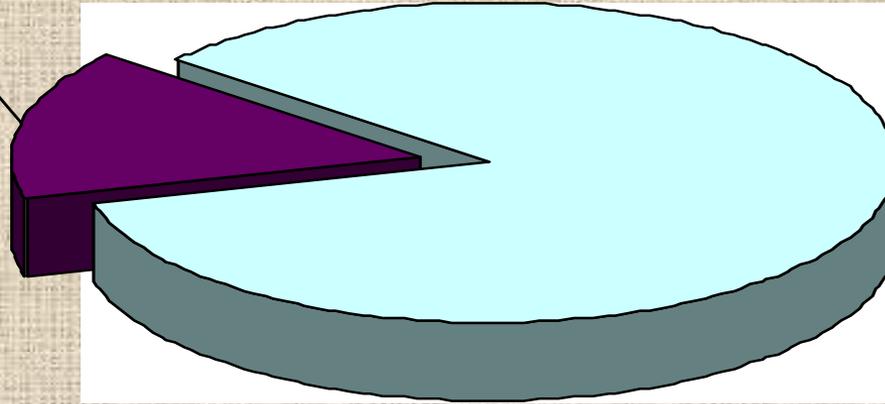
(Total Events: N= 6,165)



WI HSEES Event Distribution, Spills with Victims Fixed and Trans (1993-2007)

(Total Events With Victims: N= 431)

Transportation
Events 73,
(17%)



Fixed Facility
Events , 358,
(83%)

WI HSEES First-Responder Spills Data (1993-2007)

- Sensitive Information
- Sometimes Difficult to Acquire

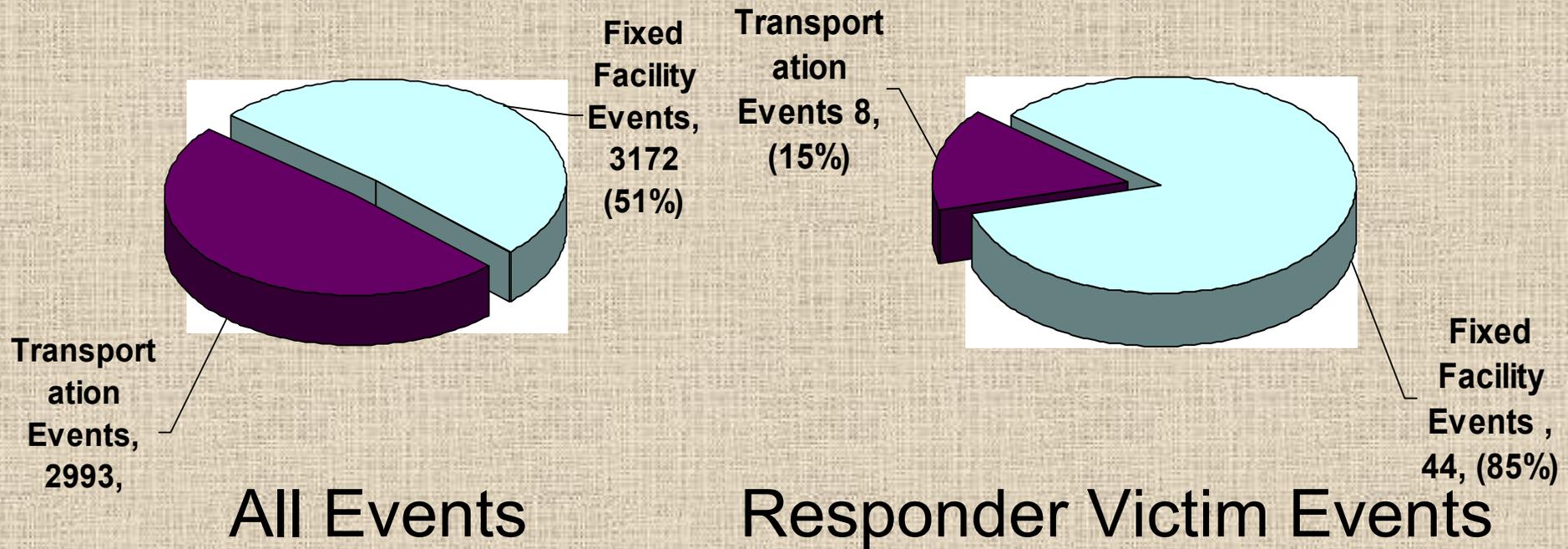
WI HSEES Responder Victim Events (1993-2007)

YEAR	1993	1994	1995	1996	1997	1998	1999	2000
EVENTS	2	3	2	2	2	5	7	6
VICTIMS	11	6	18	8	8	7	13	23
YEAR	2001	2002	2003	2004	2005	2006	2007	1993-2007 Totals
EVENTS	1	4	5	2	5	3	3	52
VICTIMS	2	9	7	7	8	6	11	144

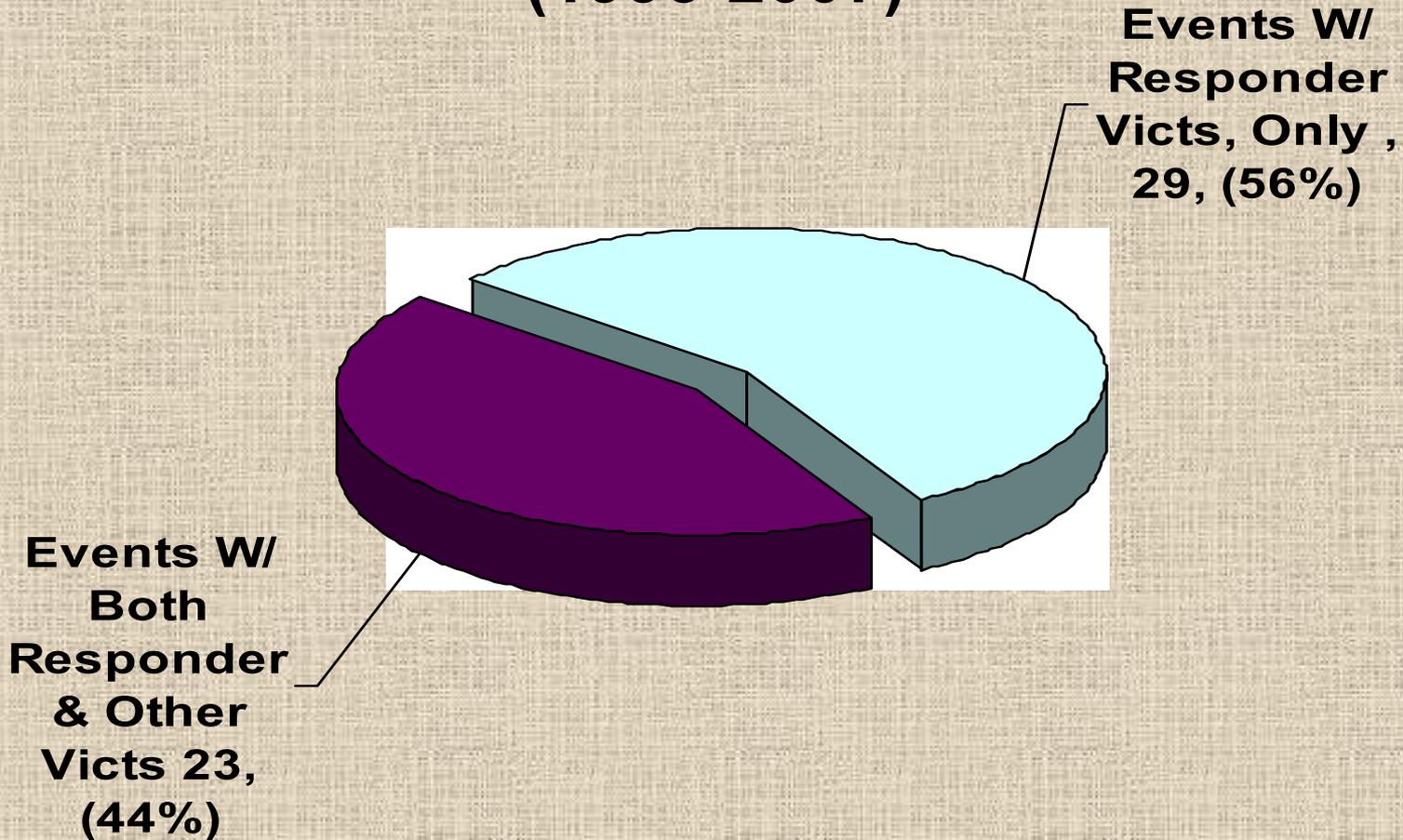
<1% of total events
9% of total victims

WI HSEES Event Distribution Fixed and Trans (1993-2007)

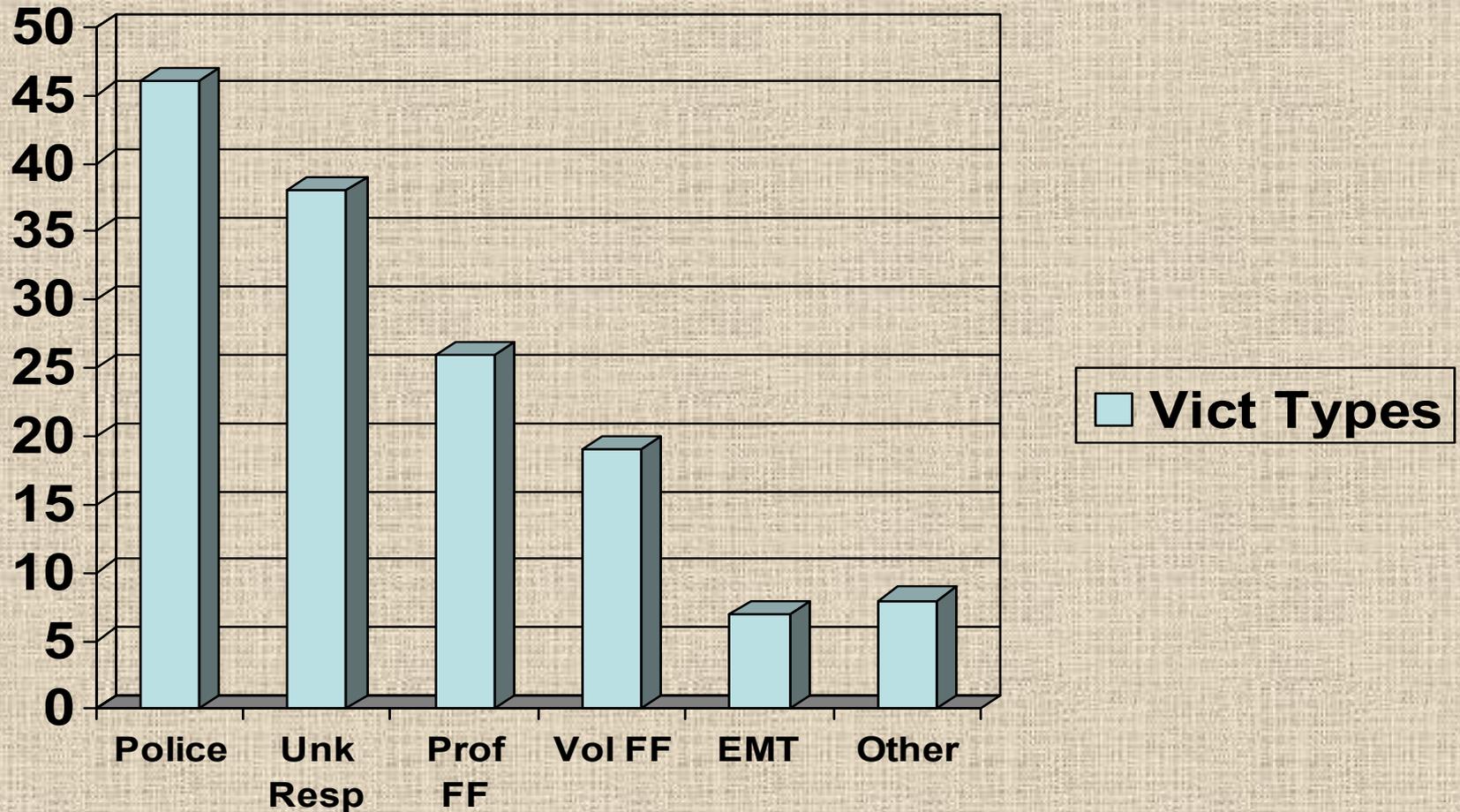
(Total Events: N= 6,165) (Responder Events With Victims: N= 52)



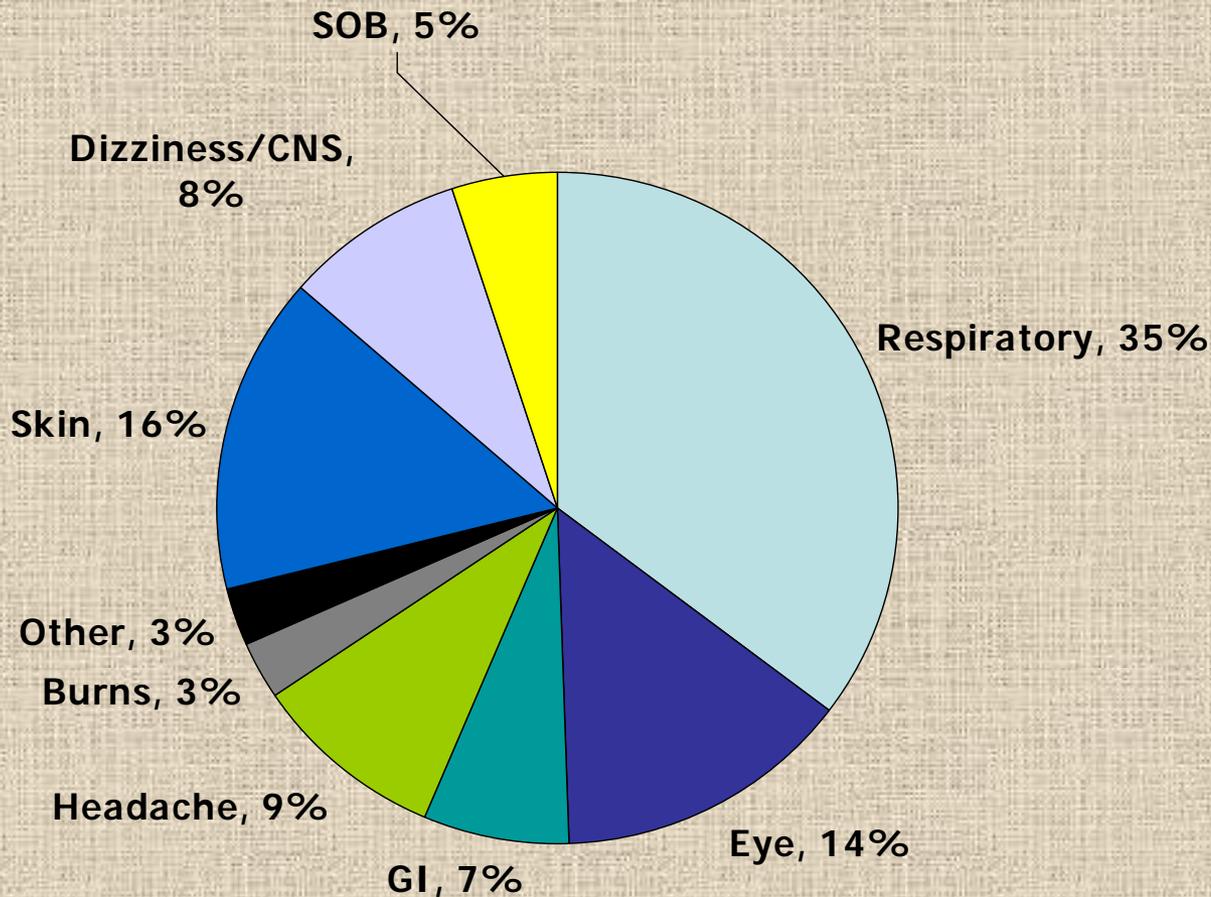
WI HSEES Responder Events With and Without “other” Victims (1993-2007)



WI HSEES, Distribution of Responder-Victim Types (1993-2007)



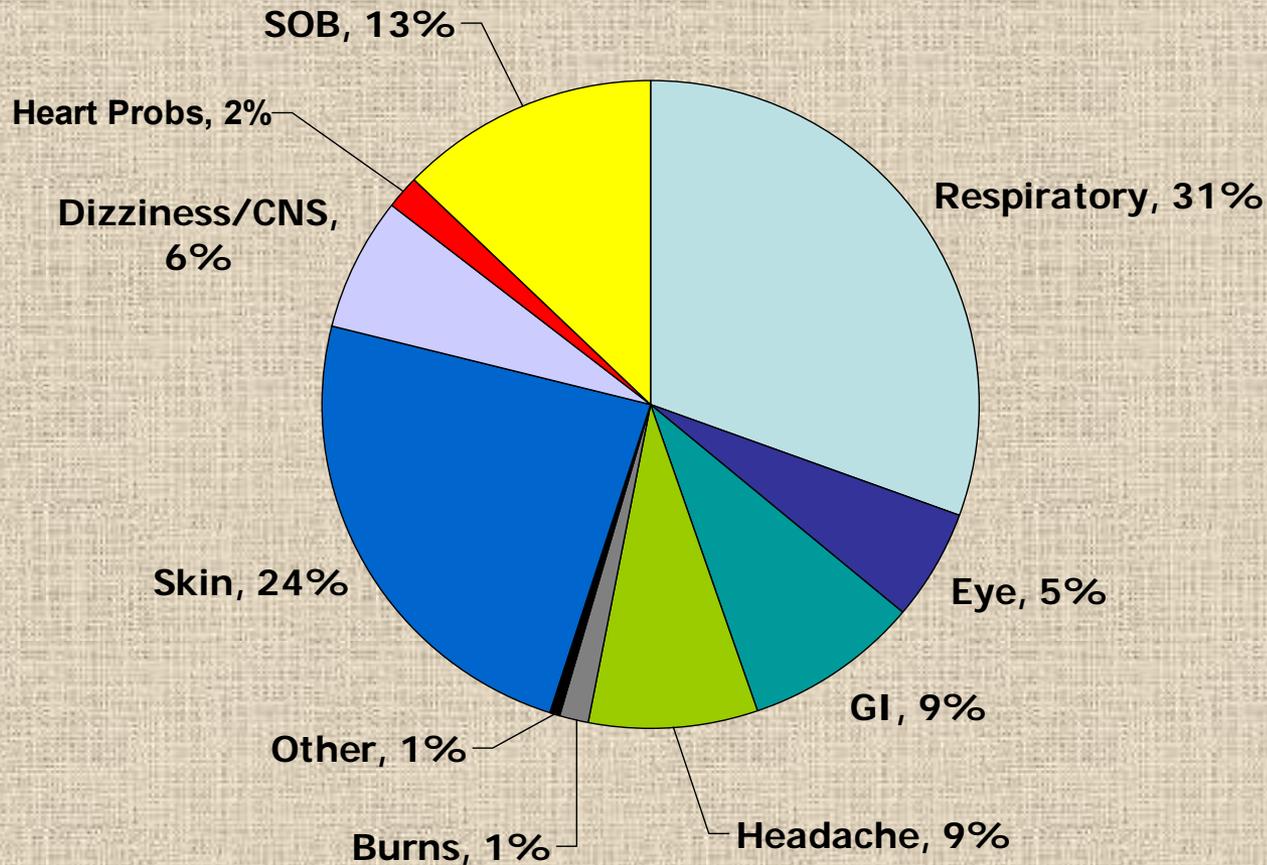
Distribution of All Victim Injury Types, WI HSEES (1993-2007)



Total Injury Types: N= 2622

CNS=central nervous system, SOB=shortness of breath, GI=gastrointestinal

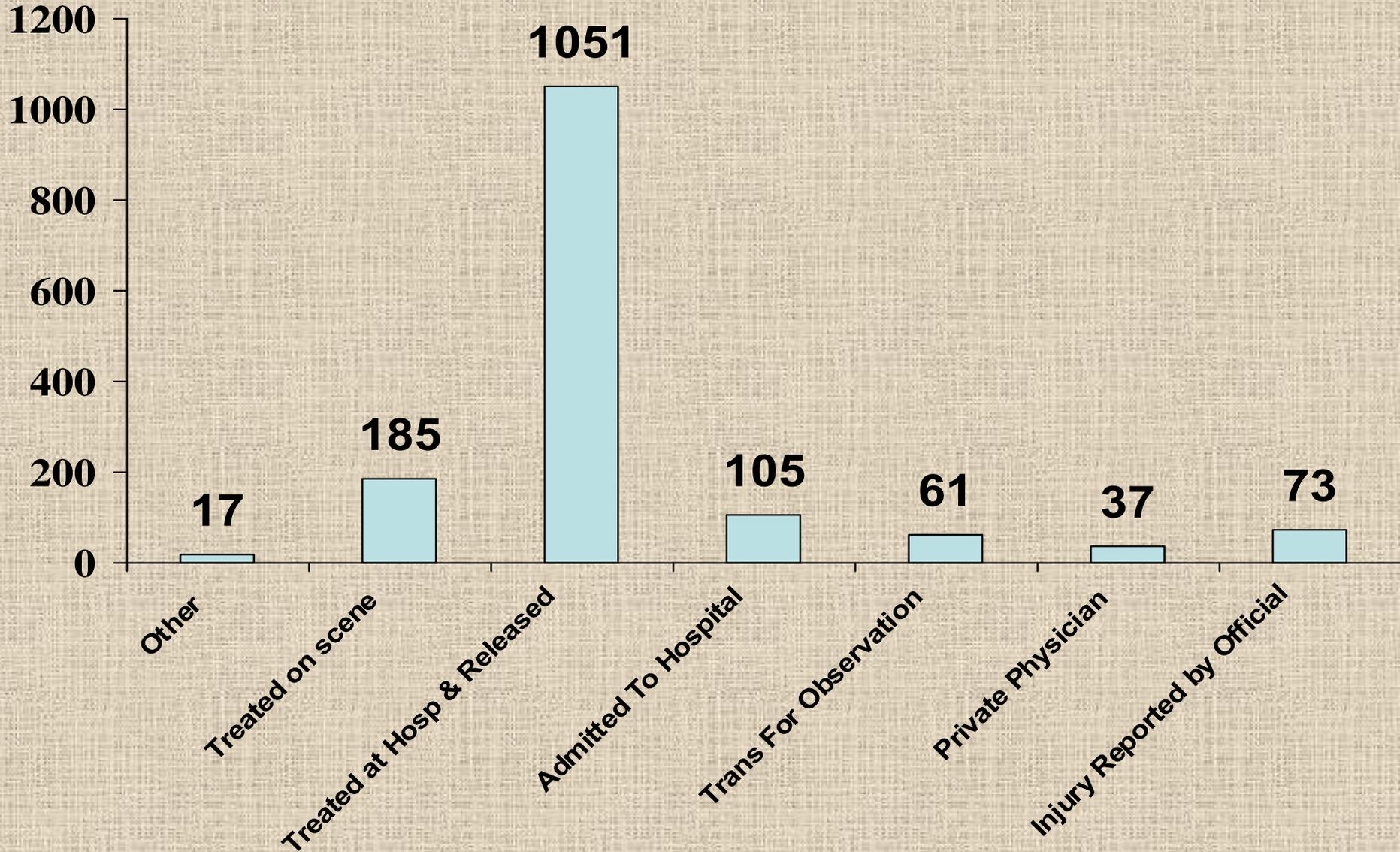
Distribution of Responder Injury Type WI HSEES (1993-2007)



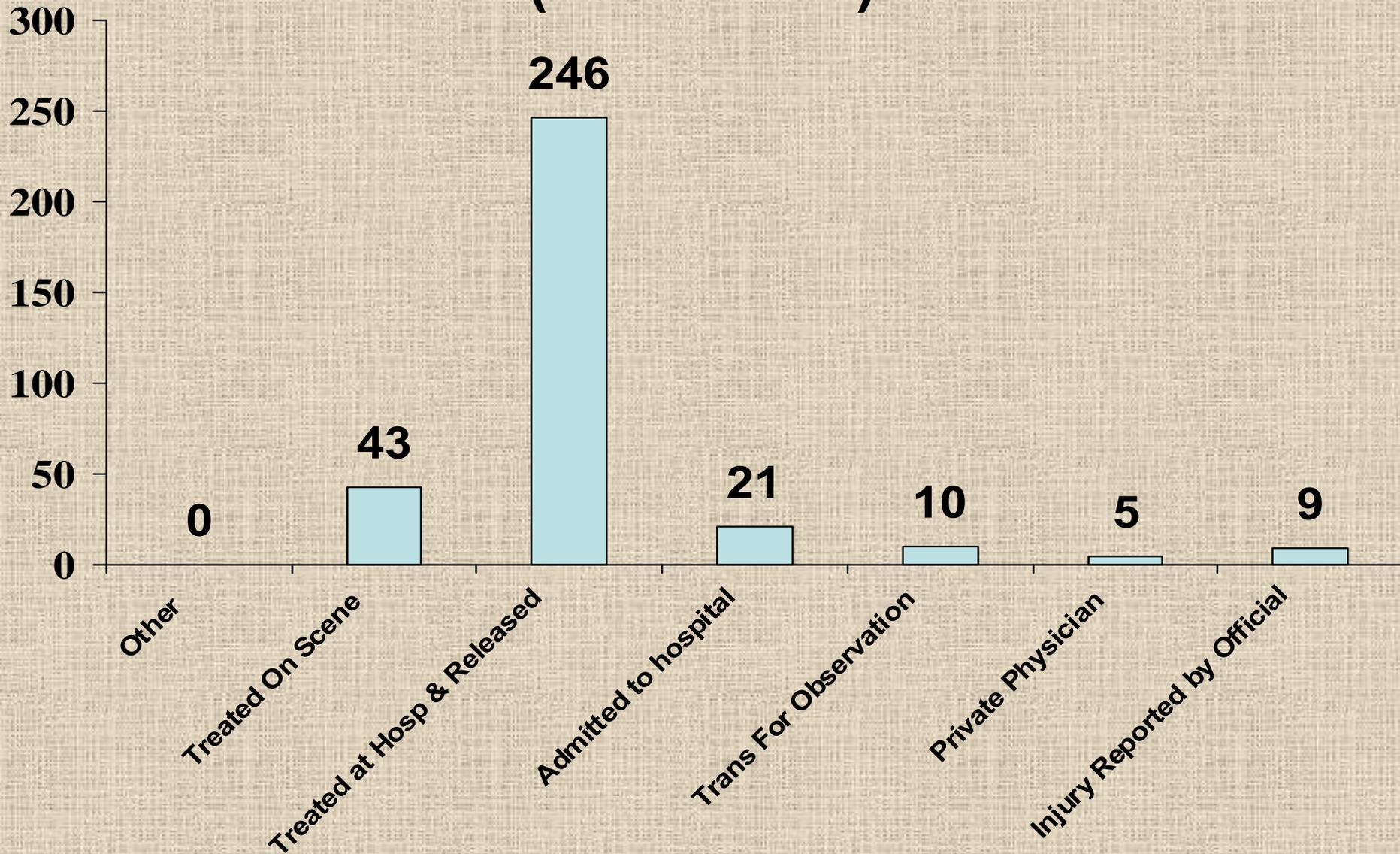
Total Responder Injury Types: N= 628

CNS=central nervous system, SOB=shortness of breath, GI=gastrointestinal

WI HSEES, All Victim Disposition (1993-2007)

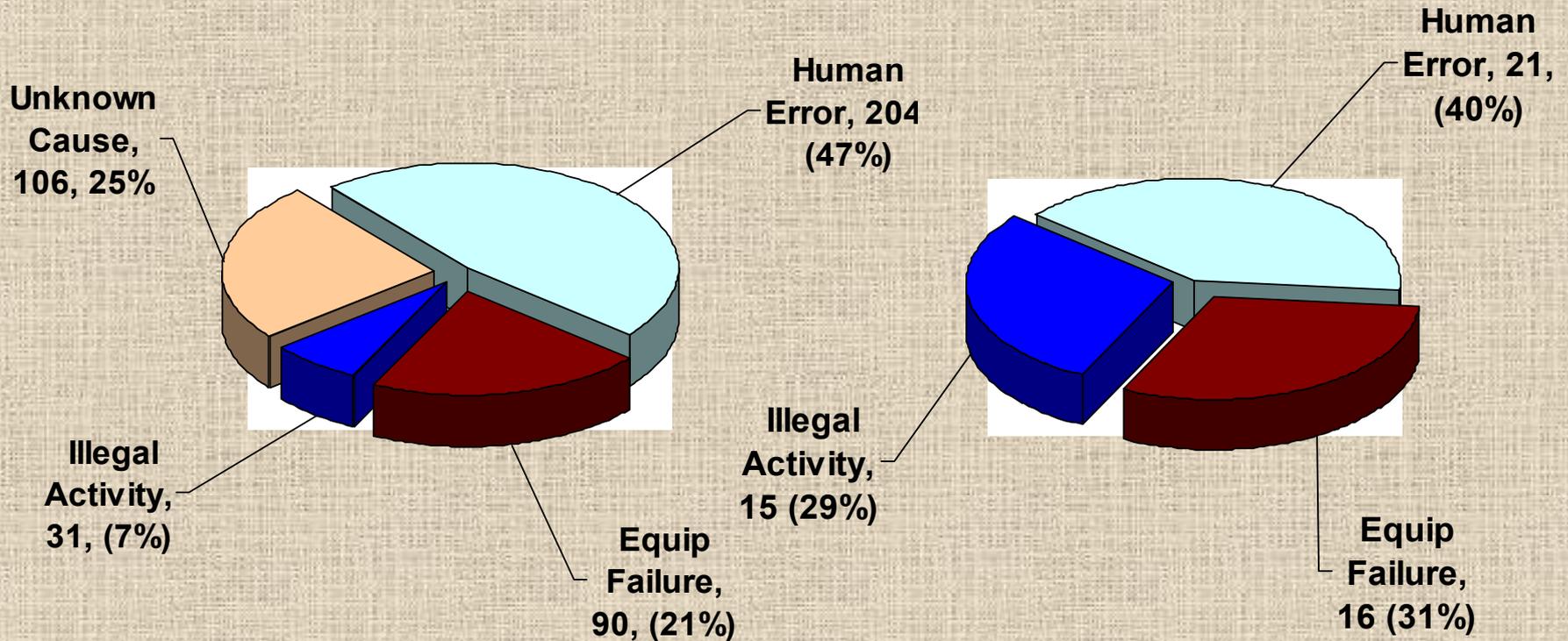


WI HSEES, Responder Victim Disposition (1993-2007)



WI HSEES, Primary Causal Factors Events With Victims (1993-2007)

(Total Events With Victims: N= 431) (Total Responder Events With Victims: N= 52)



Total Events

Responder Victim Events



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

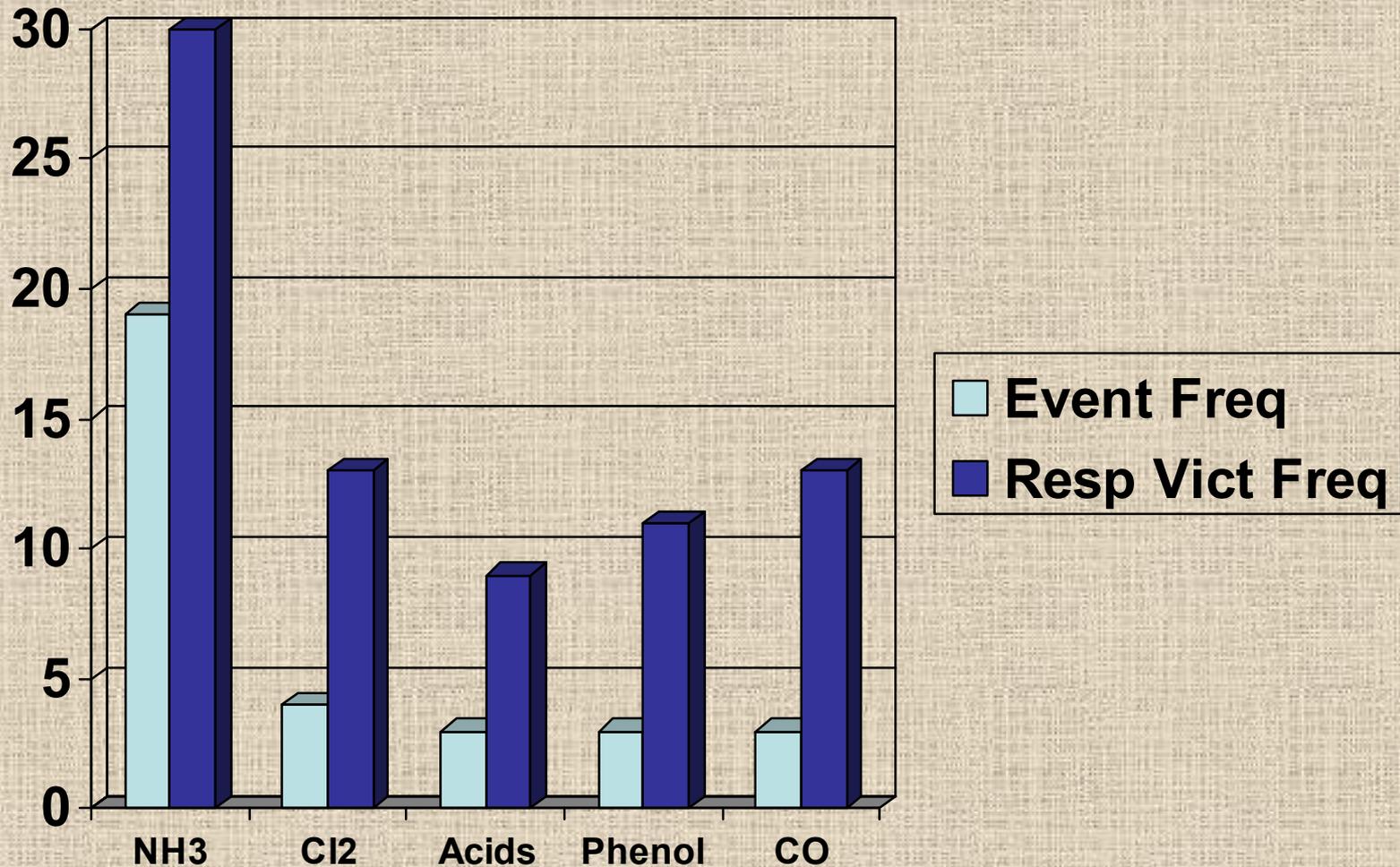
- Cause: Human error; pole mounted thermometer inserted into the volatile, 20,000 lb phenol load
- Radio Communication: Spill initially understood as “Phenyl”, effecting response plan and PPE
- Exposure Pathways
 - Victim location atop the tanker car required human contact for repositioning (skin)
 - 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)

RANK	SUBSTANCE NAME	FREQUENCY
1	AMMONIA	720
2	ACID GROUP (5 acids)	587
3	PAINT OR COATING NOS*	261
4	CORROSIVE NOS*	188
5	SODIUM HYDROXIDE	180
6	POLYCHLORINATED BIPHENYLS	158
7	MERCURY	124
8	CHLORINE	117
9	FLAMMABLE LIQUID NOS*	111
10	UREA AMMONIUM NITRATE	97
11	NITROGEN FERTILIZER	93
12	ILLICIT METH LAB CHEMICALS NOS*	92
13	ETHYLENE GLYCOL	91
	* 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

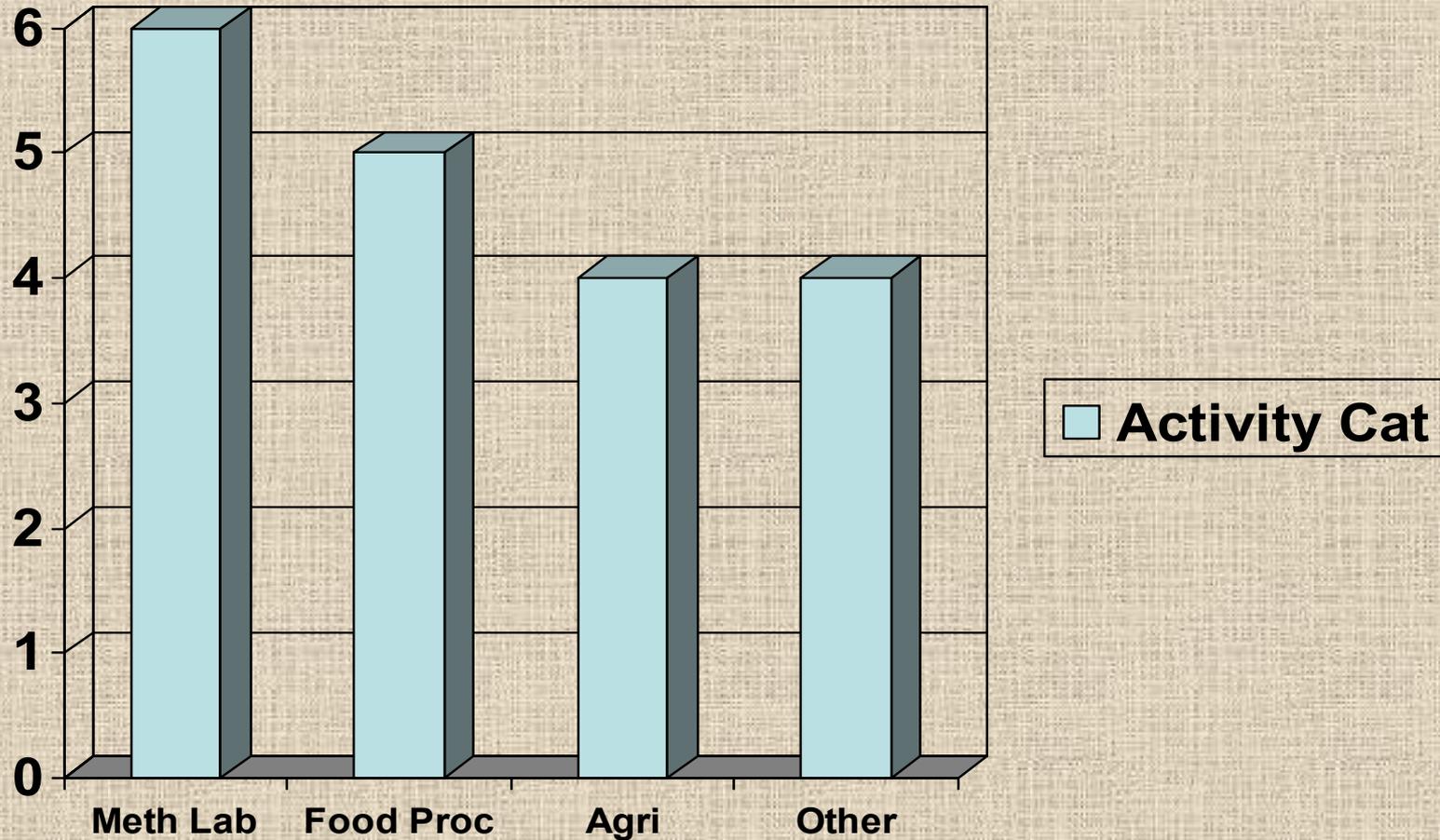
Sites of Ammonia Release

- Agriculture
- Illicit Methamphetamine Labs
- Food Processing/Cold Storage

All Ammonia Events, Victims, and Evacuees (1993-2007)

YEAR	1993	1994	1995	1996	1997	1998	1999	2000
EVENTS	54	46	61	53	46	41	38	30
VICTIMS	3	10	7	40	18	12	27	5
EVACUEES	420	294	565	1,039	641	442	1,238	1,060
YEAR	2001	2002	2003	2004	2005	2006	2007	1993-2007 Totals
EVENTS	39	74	68	62	55	29	23	719
VICTIMS	13	78	22	11	22	17	2	287
EVACUEES	427	346	173	823	359	332	784	8,943

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



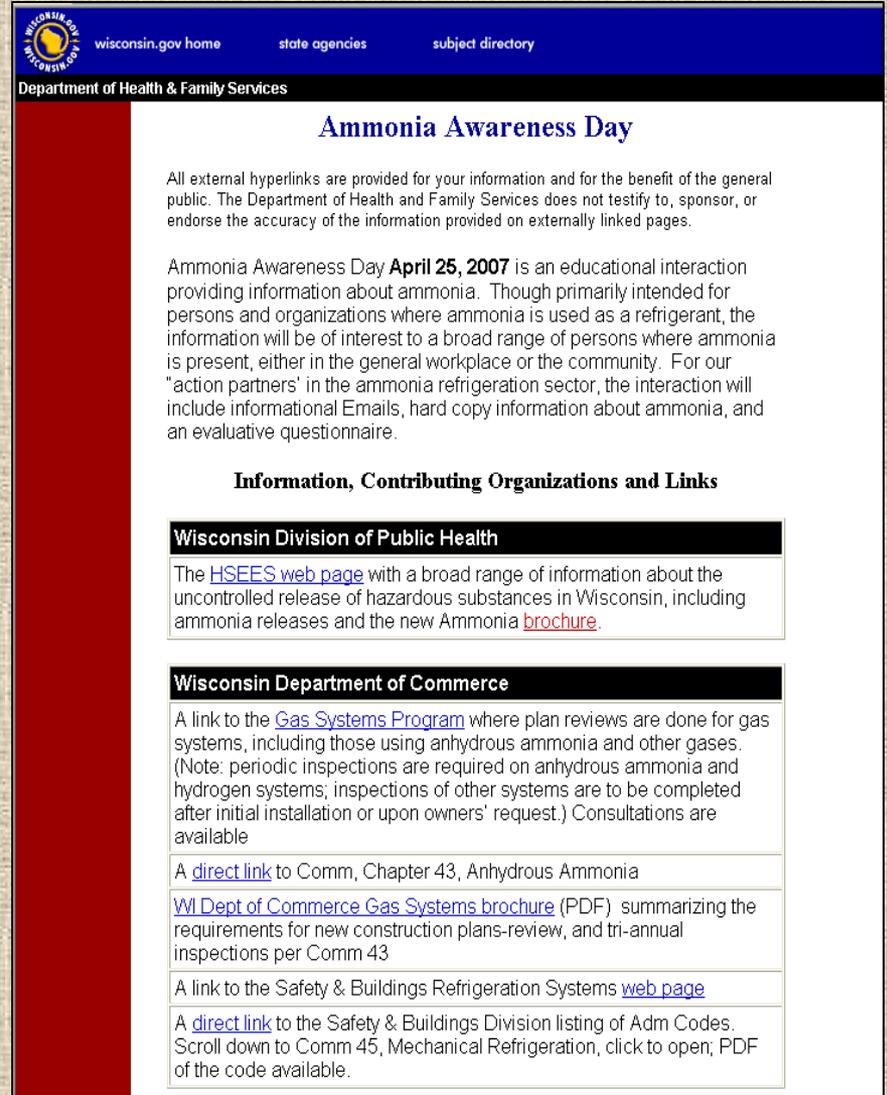
Total Ammonia Responder Events: N=19

WI HSEES Ammonia Webpage

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

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



The screenshot shows the top navigation bar of the Wisconsin Department of Health & Family Services website. It includes the state logo, the text "wisconsin.gov home", "state agencies", and "subject directory". Below this is the text "Department of Health & Family Services". The main heading is "Ammonia Awareness Day". A disclaimer states: "All external hyperlinks are provided for your information and for the benefit of the general public. The Department of Health and Family Services does not testify to, sponsor, or endorse the accuracy of the information provided on externally linked pages." The main text describes Ammonia Awareness Day on April 25, 2007, as an educational interaction. A section titled "Information, Contributing Organizations and Links" contains three sub-sections: "Wisconsin Division of Public Health" with a link to the HSEES web page and a brochure; "Wisconsin Department of Commerce" with a link to the Gas Systems Program and a brochure; and a link to the Safety & Buildings Refrigeration Systems web page, with a direct link to the Adm Codes listing.

wisconsin.gov home state agencies subject directory

Department of Health & Family Services

Ammonia Awareness Day

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Ammonia Awareness Day **April 25, 2007** is an educational interaction providing information about ammonia. Though primarily intended for persons and organizations where ammonia is used as a refrigerant, the information will be of interest to a broad range of persons where ammonia is present, either in the general workplace or the community. For our "action partners" in the ammonia refrigeration sector, the interaction will include informational Emails, hard copy information about ammonia, and an evaluative questionnaire.

Information, Contributing Organizations and Links

Wisconsin Division of Public Health

The [HSEES web page](#) with a broad range of information about the uncontrolled release of hazardous substances in Wisconsin, including ammonia releases and the new Ammonia [brochure](#).

Wisconsin Department of Commerce

A link to the [Gas Systems Program](#) where plan reviews are done for gas systems, including those using anhydrous ammonia and other gases. (Note: periodic inspections are required on anhydrous ammonia and hydrogen systems; inspections of other systems are to be completed after initial installation or upon owners' request.) Consultations are available

A [direct link](#) to Comm, Chapter 43, Anhydrous Ammonia

[WI Dept of Commerce Gas Systems brochure](#) (PDF) summarizing the requirements for new construction plans-review, and tri-annual inspections per Comm 43

A link to the Safety & Buildings Refrigeration Systems [web page](#)

A [direct link](#) to the Safety & Buildings Division listing of Adm Codes. Scroll down to Comm 45, Mechanical Refrigeration, click to open; PDF of the code available.

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.

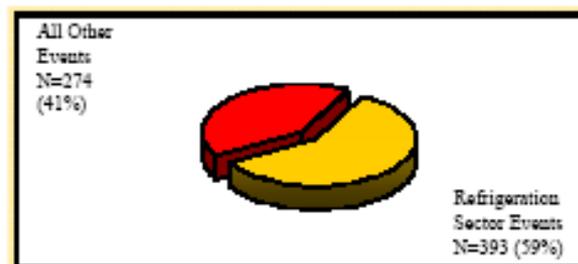
Ammonia can react with other chemicals to produce lethal vapors.

Liquid ammonia can cause freezing burns and frostbite within seconds.

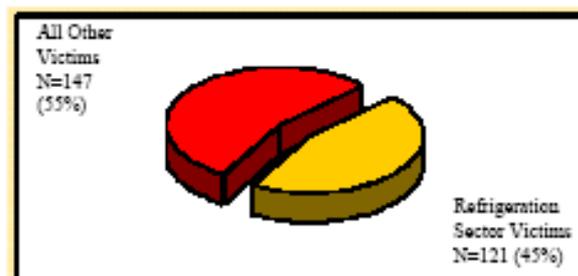
Ammonia burns can cause permanent scarring of the lungs and eyes.

Ammonia Events, Victims, and Evacuees in the Wisconsin Refrigeration Sector, 1993-2005

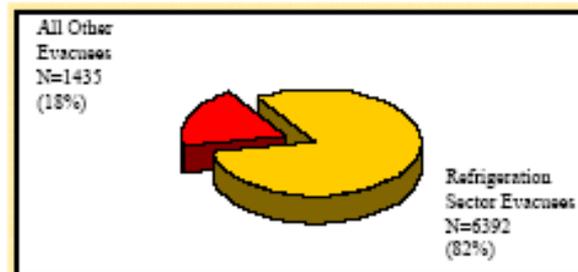
Total Ammonia Events, N=667



Total Ammonia Victims, N=268



Total Ammonia Evacuees, N=7,827



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.

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

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QUESTIONS??

