Hazardous Substances Emergency Events Surveillance in Michigan 2008

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Division of Environmental Health
Michigan Department of Community Health
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Michigan Department of Community Health

MDCH

Jennifer M. Granholm, Governor
Janet Olszewski, Director

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Hazardous Substances Emergency Events Surveillance in Michigan: 2008

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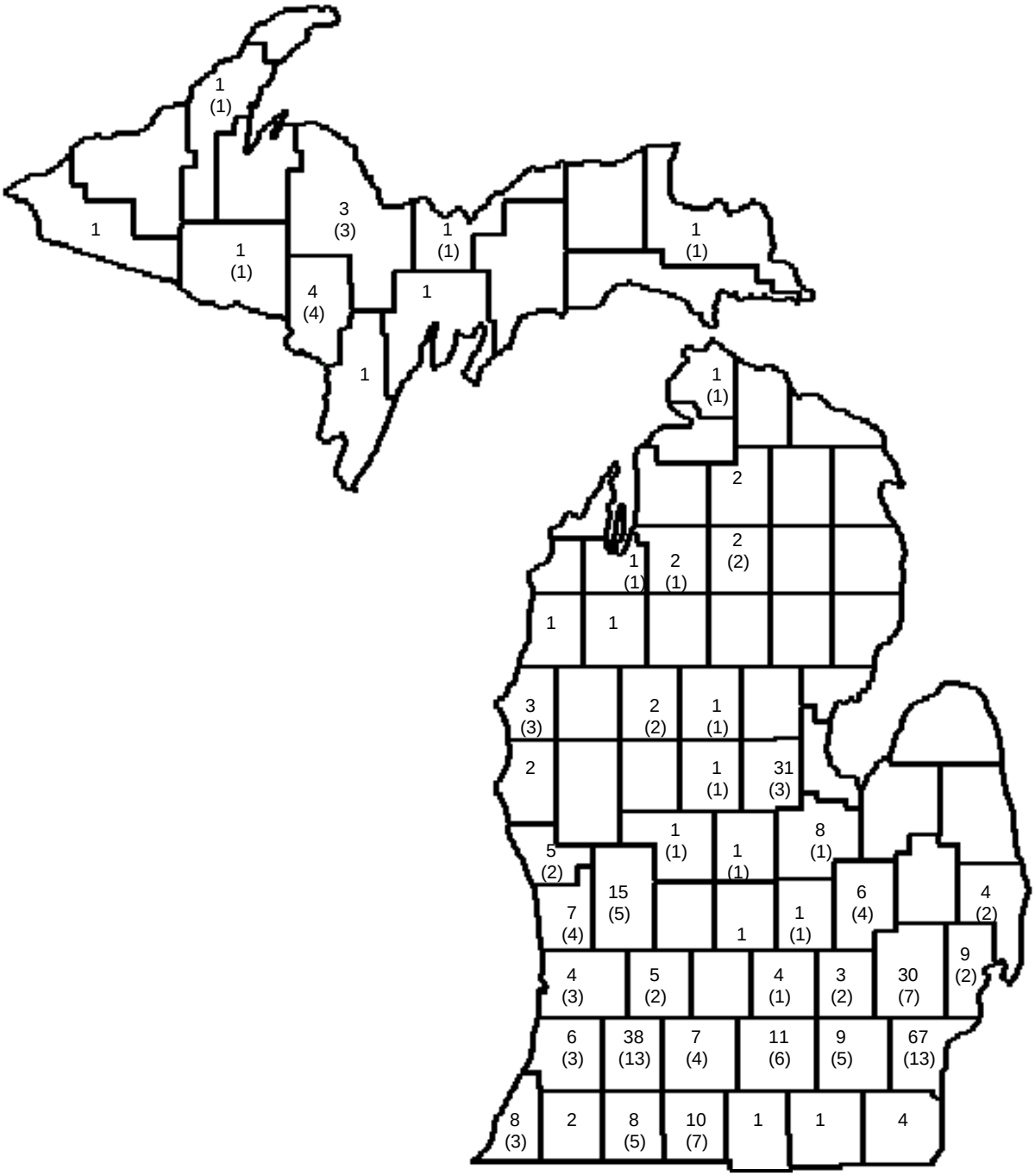
SUMMARY

This report summarizes the characteristics of hazardous substances emergency events reported to the Michigan Department of Community Health (MDCH) for 2008, the fourth year of this surveillance program in Michigan. The Hazardous Substances Emergency Events Surveillance (HSEES) system, supported by the Agency for Toxic Substances and Disease Registry (ATSDR), actively collected and compiled information about acute releases of hazardous substances and their public health consequences in 14 participating states in 2008. Information collected about acute events involving hazardous substances includes the substance(s) released, number of victims, number and types of injuries, and number of evacuations. Reports of releases come from a variety of sources, primarily other state and federal agencies that are mandated to receive reports from industry and the public.

A total of 341 reported events met HSEES criteria for inclusion in 2008 in Michigan. Two hundred fifty-four of the events occurred at fixed facilities and the remainder were associated with transportation. More than one substance was released in 72 (21.1%) of these 341 events. The most commonly reported substances were carbon monoxide and mercury. During this reporting period, 68 events (19.9% of all reported events) resulted in an injury, involving a total of 119 victims, four of whom died. The most frequently reported injuries were headache and gastrointestinal problems. Evacuations were ordered for 57 (16.7%) events. Decontamination occurred in ten (2.9%) events, with a total of 99 people decontaminated. The map on the facing page shows the numbers of events in each county in Michigan and the subset of events in each county that involved an injury, evacuation, sheltering in place, and/or decontamination.

Distribution of all events (N=341)* by county and, in parenthesis, events resulting in injury, evacuation, shelter-in-place, and/or decontamination (N=123) Michigan Hazardous Substances Emergency Events Surveillance, 2008



* County was unknown for 1 event

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INTRODUCTION

Since 1990, the Agency for Toxic Substances and Disease Registry (ATSDR) has supported and maintained a state-based surveillance system through cooperative agreements with state health departments to describe the public health consequences of releases of hazardous substances. The system is titled "Hazardous Substances Emergency Events Surveillance," or HSEES. In October, 2004 the Michigan Department of Community Health (MDCH) was funded to establish HSEES in Michigan, joining 13 other states.[1] This report summarizes data on hazardous substance releases in Michigan during 2008, the fourth year of the surveillance system.

ATSDR implemented the HSEES system to more fully describe the public health consequences of releases of hazardous substances than was possible using existing data. The overall goal of HSEES is to reduce injury and illness from acute hazardous substance releases by linking the data to prevention programs. The objectives of the surveillance system are:

- To describe the distribution of hazardous substances emergencies within the participating states, and nationally.
- To describe the types and causes of morbidity and mortality experienced by employees, responders, and the general public as a result of hazardous substances emergencies.
- To analyze and describe risk factors associated with morbidity and mortality.
- To develop strategies to reduce subsequent morbidity and mortality when comparable events occur in the future. [2]

Surveillance is …"*the on-going, 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.*"
-Centers for Disease Control and Prevention

This report summarizes the characteristics of hazardous substance releases and their associated public health consequences of events that occurred in 2008 in Michigan. The highlights of the 2008 data and associated public health prevention activities are provided in the discussion. The appendices include additional details about the data, and a brief narrative of each of the events that involved an injury, decontamination, evacuation or shelter-in-place.
Annual reports for the first three years of this program can be found here
http://www.michigan.gov/mdch/0,1607,7-132-2945_5105-110654--,00.html

[1] The other participating states are Colorado, Florida, Iowa, Louisiana, Minnesota, New Jersey, New York, North Carolina, Oregon, Texas, Utah, Washington, and Wisconsin.

[2] *Hazardous Substances Emergency Events Surveillance (HSEES) Protocol*. March 2001. Available at www.atsdr.cdc.gov/HS/HSEES/protocol_2004.pdf

METHODS

All participating states follow the ATSDR HSEES protocol for collection and processing of information about releases.[3]

The ATSDR definition of 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 Chemical Reporting List or, if not on the list, in an amount greater than or equal to 10 lbs or one gallon. Threatened releases of qualifying amounts will be included if the threat led to an action (e.g., evacuation) to protect the public health."

In 2007, the HSEES Mandatory Chemical Reporting list was updated to include all chemicals found on the Environmental Protection Agency's Emergency Planning and Community Right-to-Know Act (EPCRA) Section 302 Extremely Hazardous Substances list, all chemicals found on the federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) list with a reporting quantity of more than one pound, and certain substances that ATSDR and HSEES states found important to monitor at any quantity. A copy of the HSEES Mandatory Chemical Reporting List is available at: http://www.michigan.gov/documents/mdch/HSEES_mandatory_Chemical_Reporting_List_247153_7.pdf. Petroleum is excluded because of the Petroleum Exclusion clause in CERCLA, under which the HSEES program has been funded. Starting in 2007, the Michigan HSEES program began data collection of petroleum releases greater than or equal to 25 gallons, even though these data are not included in the natonal HSEES data.

Various sources are used to identify and obtain information about HSEES-eligible events in Michigan. These include reports to the National Response Center (NRC)[4], the Federal Department of Transportation, the Michigan Department of Environmental Quality (DEQ), the Michigan Department of Agriculture, the Michigan State Police, the media, and others. Hospital discharge data are used to identify carbon monoxide releases. Beginning in late 2007, MI-HSEES began receiving and reviewing selected reports from the two state Poison Control Centers to identify spills related to carbon monoxide, disinfectants, mercury, and ammonia.

Information collected on each HSEES event includes the following:

- Type of event: Events are classified according to whether they occur at fixed facilities or during transportation. Fixed-facility events involve hazardous substances released at industrial sites, schools, farms, or other permanent facilities. Transportation-related events involve hazardous

[3] http://www.atsdr.cdc.gov/HS/HSEES/hsees.html
[4] The NRC is the single portal for mandatory reporting of hazardous spills and releases to 16 federal agencies. See: www.nrc.uscg.mil

materials released during transport by surface, air, or water. The type of area or equipment within fixed facilities involved in the release is also recorded (e.g., piping, storage tank, laboratory).

- Event location: The location of the event is identified by longitude and latitude coordinates where possible, and an ATSDR-maintained Geographic Information System (GIS) uses this information to identify nearby population groups and institutions (e.g. schools). If the exact location is not available, nearby population groups are estimated based on incident information.
- Date and time of the release, and current weather conditions: If weather information is not provided by the reporting agency, weather conditions at the time of the release are determined from historical weather data available on www.weather.com.
- Responsible party: If the responsible party for the release is a business, it is classified using the North American Industry Classification System (NAICS)[5].
- Response: Response actions are categorized including what activities were taken to protect public health (e.g., issuance of health advisories, health investigations, and environmental sampling), and the groups responding to the incident (e.g., fire department, HazMat, health agency).
- Substance(s) released: Released substances are identified by chemical name or chemical category, including "mixture." Chemical constituents of brand name products are ascertained. The quantity released, type of release (e.g., spill, fire, volatilization), and whether the substance was actually released or a threatened release are also recorded.
- Causes: A primary or root cause of the release is assigned (e.g., human error, equipment failure, bad weather) and, when appropriate, a secondary or immediate cause of the release (e.g., improper mixing, vehicle collision, explosion).
- Victim(s): The number of individuals injured in the event is noted and which population group(s) were involved (e.g., the public, emergency responders, school children). Also recorded are the type(s) of injuries, severity of medical outcome, and demographics (age, gender) of injured individuals.
- Evacuation, sheltering-in-place, and decontamination: The numbers of individuals evacuated, sheltered in place, and decontaminated are recorded.

Some of this Information is available from the initial reporting source, and the rest is usually obtained by contacting response agencies such as local fire or police departments or other individuals knowledgeable about the event. Information on petroleum-only events is limited to the information provided in the initial report because no follow-up is conducted.

[5] http://www.census.gov/epcd/www/naics.html

All information is entered into a web-based application used by the HSEES-participating states and maintained by ATSDR. This system ensures uniformity of data classification and standards for quality control.

Michigan data collection for 2008 events was completed in June 2009. A descriptive analysis of the data was conducted using SAS®[6]. Selected data were compared to data from previous years.

[6] Statistical Analysis Software (SAS®) version 9.1

RESULTS

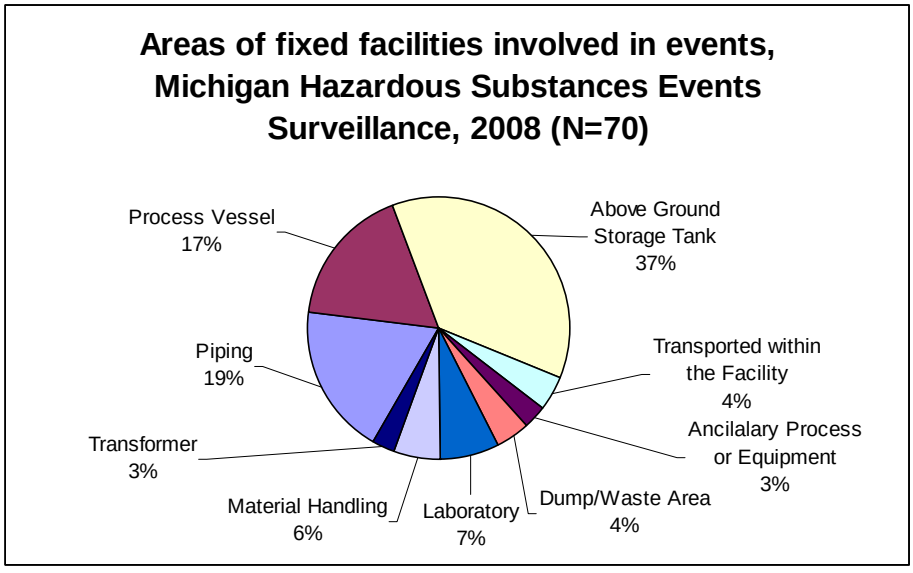
For 2008, 341 hazardous substance emergency events in Michigan were HSEES-eligible events and were included in the Michigan HSEES (MI-HSEES) data set: 337 (98.8%) were actual releases, 4 (1.2%) were threatened releases. The counties with the most frequent number of events were Wayne with 67 (19.6%) events, Midland with 29 (8.5%) events and Kalamazoo with 28 (8.2%) events. A complete list of counties and event frequencies can be found in Appendix 1. An additional 169 events involved petroleum releases. Petroleum release events are discussed separately on page 18.

There were more events reported in 2008 than the 2 previous years (338 events in 2006 compared to 310 events in 2007) and less than the first year, 2005 (383 events). Wayne and Midland counties have continued to report the greatest number of events.

Facility type

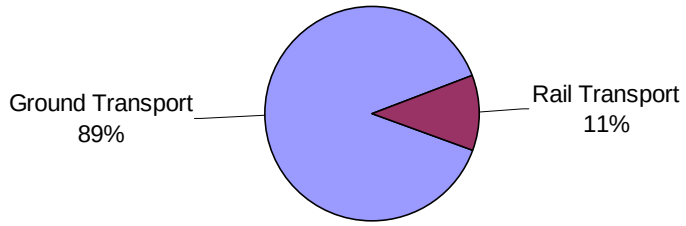
A total of 254 (74.5%) events occurred in fixed facilities. This is similar to previous years, where fixed facility events counted for 67%, 70.7% 72.3% of all events in 2005, 2006 and 2007 respectively.

One hundred and eighty-four (72.4%) of the 254 fixed facility events did not identify an area in the facility where the release occurred. The main locations identified for the 70 events that included an area are as follows: above ground storage area- 26 (37.1%), piping- 13 (18.6%),process vessel- 12 (17.1%), laboratory- 5 (7.1%), and material handling- 4 (5.7%) transported within the facility- 3 (4.3%), dump waste area- 3 (4.3%), ancillary process/equipment- 2 (2.9%), and transformer/capacitor- 2 (2.9%) (Figure 1).



Of the 87 transportation-related events, 77 (88.5%) occurred during ground transport and 10 (11.5%) involved transport by rail (Figure 2). The largest proportion of transportation related events occurred during unloading from a vehicle, which had 30 (34.5%) events. Twenty-nine (33.3%) events occurred while moving and were later discovered at a fixed facility, 13 (14.9%) occurred while moving, and 12 (13.8%) occurred in a stationary vehicle. Status was unknown for 3 (3.4%) of events.

Figure 2.- Distribution of transportation-related events, by type of transport- Michigan Hazardous Substances Emergency Events Surveillance, 2008 (N=87)



Causes of events

Primary or root cause factors were reported in all but 13 (10 fixed facility and 3 transportation) of the 341 events. Secondary or immediate causal factors were identified in 118 (46.1%) of the 244 events where a primary factor was known. Of the reported primary factors in the 220 fixed facility events, human error and intentional (related to drug manufacturing) accounted for most of the factors with 97 (39.8%) and 70 (28.7%) entries, respectively. Illicit drug production was the secondary cause of 65 (26.6%) fixed facility events. These primary and secondary factor distributions for fixed facilities are similar to those in the two previous years.

Out of the 84 transportation-related events with known primary causes, human error and equipment failure each had 42 (50.0%). Improper filling/loading/packing was the leading secondary cause of 20 (23.8%) transportation-related events (Tables 1a and 1b).

Table 1a.- Primary factors associated with events by event type- Michigan Hazardous Substances Emergency Events Surveillance, 2008*

	Event Type					
	Fixed Facility		Transportation		All Events	
Primary Factor	No. of Events	%	No. of Events	%	No. of Events	%
Human Error	97	39.8	42	50.0	139	42.4
Intentional	70	28.7	0	0.0	70	21.3
Equipment Failure	68	27.9	42	50.0	110	33.5
Illegal Act	5	2.0	0	0.0	5	1.6
Bad Weather	3	1.2	0	0.0	3	0.9
Other	1	0.4	0	0.0	1	0.3
Total	244	100.0	84	100.0	328	100

*Primary factor was unknown for 10 fixed facility events and 3 transportation events

Table 1b.- Secondary factors associated with events by event type- Michigan Hazardous Substances Emergency Events Surveillance, 2008

	Event Type					
	Fixed Facility		Transportation		All Events	
Secondary Factor	No. of Events	%	No. of Events	%	No. of Events	%
No Secondary Factor	126	51.6	48	57.1	174	53.0
Illicit Drug Production	65	26.6	0	0.0	65	19.8
Equipment Failure	8	3.3	5	5.9	13	4.0
Improper Fill/Load/Pack	8	3.3	20	23.8	28	8.5
Forklift Puncture	8	3.3	5	6.0	13	4.0
Vehicle/Vessel Collision	0	0.0	2	2.4	2	0.6
Improper Mixing	14	5.7	0	0.0	14	4.3
Human Error	2	0.8	0	0.0	2	0.6
Performing Maintenance	1	0.4	0	0.0	1	0.3
Unauthorized Dumping	6	2.6	0	0.0	6	1.9
Explosion	2	0.8	0	0.0	2	0.6
System/Process Upset	2	0.8	0	0.0	2	0.6
Fire	1	0.4	0	0.0	1	0.3
Overspray/Misapplication	1	0.4	0	0.0	1	0.3
Load shift	0	0.0	4	4.8	4	1.2
Total	244	100.0	84	100	328	100

Substances

A single substance was released in 269 (78.9%) of the 341 events. Two substances were released in 24 (7.0%) events and 48 (14.1%) events involved the release of more than two substances. Table 2 illustrates the number of substances released per event by type of event (fixed or transportation). Almost

all (98.9%) transportation events and 72.0% of events at fixed facilities involved only one substance.

Table 2.- Number of substances involved per event, by event type- Michigan Hazardous Substances Emergency Events Surveillance, 2008

	Type of Event								
	Fixed Facility			Transportation			All Events		
No. of Substances	No. of Events	%	Total Substances	No. of Events	%	Total Substances	No. of Events	%	Total Substances
1	183	72.0	183	86	98.9	86	269	78.9	269
2	23	9.2	46	1	1.1	2	24	7.0	48
3	24	9.4	72	0	0.0	0	24	7.0	72
4	14	5.5	56	0	0.0	0	14	4.2	56
5	10	3.9	50	0	0.0	0	10	2.9	50
Total	254	100	407	87	100	88	341	100	495

A total of 495 substances were associated with the 341 events, of which 4 (0.8%) were threatened rather than actually released. The leading ten substances released and the number of releases of each substance are listed in Table 3.

Table 3.- Ten most frequently released substances involved in Michigan Hazardous Substances Emergency Events Surveillance, 2008

Substance	**# of times released**
Carbon Monoxide	35
Mercury	34
Hydrochloric Acid	33
Sulfuric Acid	26
Sodium Hydroxide	24
Coleman® Fuel	25
Ammonia	21
Caustic Soda	11
Acetone	8
Isopropanol	8

In addition, only groups rather than specific substances could be identified in some events, including paints (20 releases), unspecified solvents (39 releases) and meth chemicals (32 releases).

Carbon monoxide had the greatest number of releases (35) followed by mercury and hydrochloric acid. Hydrochloric (muriatic acid), sodium hydroxide, ammonia, acetone, and Coleman® Fuel were frequently associated with methamphetamine laboratory seizures. A complete list of chemicals and the frequency of their releases are in Appendix 2.

Carbon monoxide has been the most frequently released substance in the 4 years of MI-HSEES data collection.

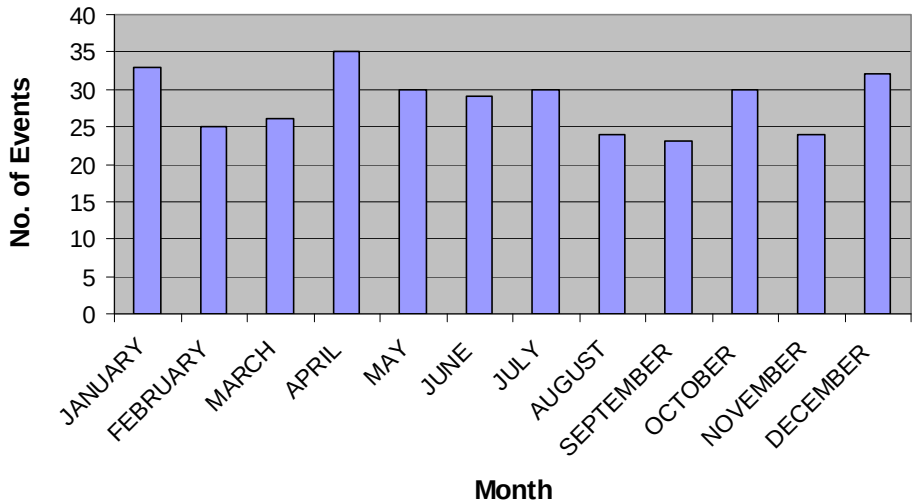
Mercury was the second most frequently released substance in 2008, as it was in 2007.

One or two different types of releases could be reported for each substance. The most frequent release type of the 360 substances where only one type was reported was spills (liquid/solid) with 259 (71.9%), followed by air releases with 93 (25.8%), threatened release with 3 (0.8%), fire with 3 (0.8%) and explosion with 2 (0.5%). There were 135 chemicals with two release types. Of events with two types of releases, the following combinations were reported: spill and air release with 113 (83.7%), spill and fire release- 15 (11.1%), spill and explosion release- 6 (4.4%), and threatened release and fire- 1 (0.7%).

Time of release

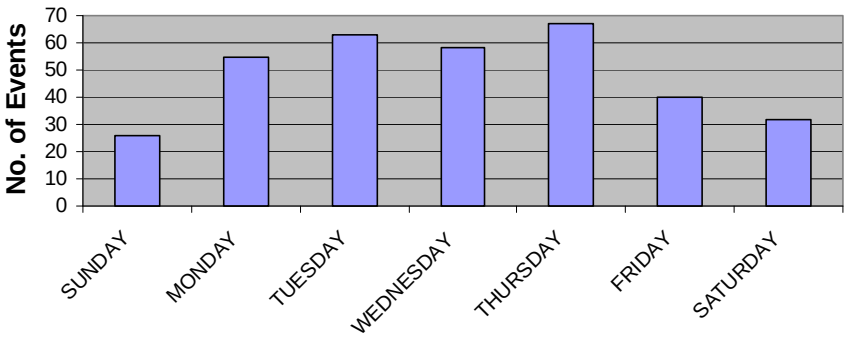
The number of events by month ranged from 23 (6.7%) in September to 35 (10.3%) in April. (Figure 3).

Figure 3.- Month distribution of events- Michigan Hazardous Substances Emergency Events Surveillance, 2008 (N=341)



Events were more likely to occur on weekdays than weekends (Figure 4). Of the 245 (71.8%) events for which a time category was reported, 93 (38.0%) occurred from 6 a.m. to 11:59 a.m., 72 (29.4%) from 12 p.m. to 5:59 p.m., 53 (21.6%), from 6 p.m. to 11:59 pm and the remaining 27 (11.0%) from 12 a.m. to 5:59 a.m. This is similar to previous years.

Figure 4.- Event day of the week distribution- Michigan Hazardous Substances Emergency Events Surveillance, 2008 (N=341)



Business/industry

Two hundred thirty-three (68.3%) of the 341 events were the responsibility of an industry or business and 108 (31.7%) were not. The largest proportion of the business-associated events involved transportation and manufacturers of paper, chemical and petroleum industries with 95 (40.1%) and 49 (21.0%), respectively (Table 4). The distribution by industry is similar to that in 2006 and 2005. Selected industry subcategories with large numbers are also displayed on Table 4, including ground transportation- 85 (36.5%) and manufacturing of chemicals/pharmaceuticals- 44 (18.9%). Twenty-seven (61.4%) of the 44 chemicals/pharmaceuticals manufacturing events occurred at one large chemical manufacturing facility.

Table 4.- Industries involved in events by 2-digit and selected 3-digit NAICS codes- Michigan Hazardous Substances Emergency Events Surveillance, 2008 (N=233*)

NAICS Code	Industry Category	No. Events	%
72	Accommodations/Food Services	4	1.7
56	Administrative Support/Waste Management and Remediation	2	0.9
11	Agriculture	5	2.1
71	Arts/Entertainment/Recreation	5	2.1
23	Construction	7	3.0
61	Education	10	4.3
62	Health Care	7	3.0
31	Manufacturing- Food/Textiles/Apparel	7	3.0
33	Manufacturing- Metal/Transportation	15	6.4
32	Manufacturing- Paper/Petroleum/Chemicals/Plastics (N=49)		
325	*Manufacturing- Chemicals/Pharmaceuticals*	*44*	*18.9*
324	*Manufacturing- Petroleum/Coal*	*1*	*0.4*
322	*Manufacturing- Paper*	*1*	*0.4*
326	*Manufacturing- Plastics/Rubber*	*3*	*1.3*
21	Mining	1	0.4
81	Other Services (N=6)		
811	*Repair and Maintenance*	*6*	*2.6*
92	Public Administration	3	1.3
54	Professional, Scientific, Technical Services	3	1.3
44	Retail Trade- Motor Vehicle/Building Materials/Gas Stations	2	0.9
48	Transportation- Ground/Air/Rail (N=95)		
484	*Transportation- Ground*	*85*	*36.5*
482	*Transportation- Rail*	*9*	*3.9*
486	*Transportation- Pipeline*	*1*	*0.4*
49	Transportation- Storage Warehouse/Messenger	2	0.9
22	Utilities	7	3.0
42	Wholesale Trade	3	1.3
	Total	233	100
*108 events occurred in a non-industry setting.			

Response

Three hundred and thirty-nine (99.4%) events had information on the types of emergency personnel that responded to the event: 185 (54.5%) reported only one category of responders, 154 (45.4%) reported two categories of responders, 52 (15.3%) reported three and 51 (15.0%) reported four or more categories of responders. Company response teams, followed by law enforcement, third party clean-up contractors and fire departments were the most frequent categories of personnel to respond to an event.

Thirty-three events (9.7% of all events) resulted in a public health response. One (3.0%) event involved a health investigation and environmental sampling, 30 (90.9%) event had environmental sampling only.

Victims, evacuations, sheltering in place, and decontaminations:

One hundred twenty-three (36.1%) of the 341 events involved an injury, evacuation, shelter-in-place, and/or decontamination. A brief synopsis of the 123 events that included one or more of these public health impact measures is included in Appendix 3.

Victims

A total of 119 victims were reported in 68 events (19.9% of all events) (Table 5). Of the 68 events with victims, 47 (69.1%) involved only one victim, 10 (14.7%) involved two victims three (4.4%) had three victims, and eight (11.8%) had four or more victims. Of all victims, 111 (93.2%) were injured in fixed facility events (Table 5).The proportion of total events involving a victim was similar to previous years, but the total number of victims was less (167 in 2007, 207 in 2006 and 209 in 2005).

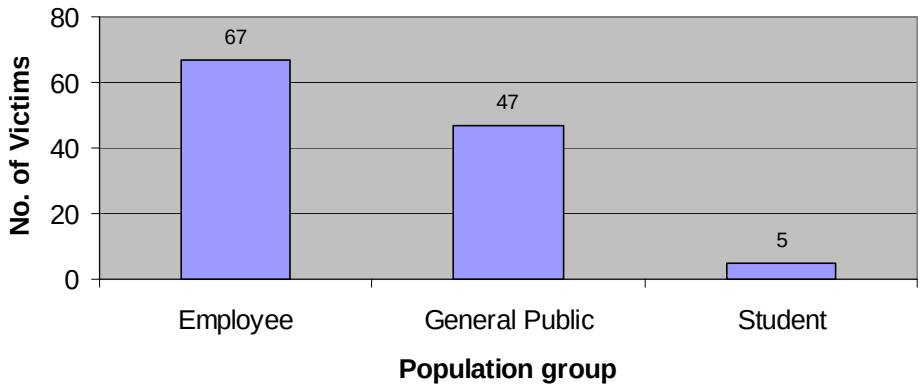
Table 5.- Number of victims per event, by type of event- Michigan Hazardous Substances Emergency Event Surveillance, 2008

	Type of Event								
	Fixed Facility			Transportation			All Events		
No. of Victims	No. of Events	%	Total Victims	No. of Events	%	Total Victims	No. of Events	%	Total Victims
1	43	69.4	43	4	66.7	4	47	39.5	47
2	8	12.9	16	2	33.3	4	10	16.8	20
3	3	4.8	9	0	0.0	0	3	7.6	9
≥4	8	12.9	43	0	0	0	8	43.7	43
Total	62	100	111	6	100	8	68	100	119

Figure 5 shows the distribution of victims by population group. Employees constituted the largest part of the population groups injured with 67 (56.3%) of 119 persons injured, followed by the general public with 47 (39.5%) persons injured. Students accounted for five (4.2%) of the persons injured.

Employees and the general public have been the top two population groups with victims. 2008 marks the first year where there were no responder injuries. In 2007, there was a decrease in responder injuries with only three firefighters. In 2005, there were 29 firefighters and three police officers and in 2006 there were five police officers, three firefighters and two EMS responders injured.

Figure 5.- Distribution of victims by population group- Michigan Hazardous Substances Emergency Surveillance, 2008 (N=119)

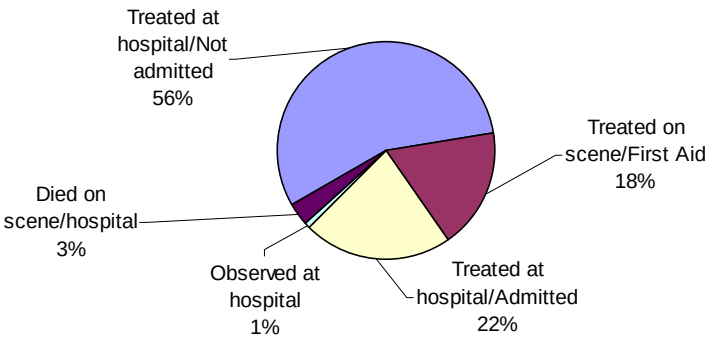


The age group was determined for 29 (24.4%) of the 119 victims: Twelve (13.3%) were four to 14 years old, four (4.4%) were 15-19 years old, 49 (54.4%) were 20-44 years old, 21 (23.3%) were 45-64 years old and four (4.4%) were older than 65 years.

Sex was known for 97(81.5%) of the 119 victims; of these, 77 (79.4%) were male. The proportion of male victims has remained constant over the three years of data collection.

Severity of injuries was known for 118 (99.2%) of victims: 66 (55.9%) were treated and released from the hospital, 21 (17.8%) were treated on scene, 26 (22.0%) were admitted to the hospital, one (0.8%) was only observed at the hospital and four (3.4%) died (Figure 6). All four deaths were due to carbon monoxide.

Figure 6.- Injury outcome- Michigan Hazardous Substances Emergency Events Surveillance, 2008 (N=118)



The 119 victims were reported to have sustained a total of 189 injuries or symptoms (Table 6). Of all reported injuries/symptoms the most common in fixed facility events were dizziness/other CNS symptoms with 50 (28.2%) events, followed by headache and respiratory irritation with 42 (23.7%) and 30 (17.0%) events, respectively. The top four injury types in fixed facilities have been constant over the three years of data collection.

Table 6.- Frequencies of injuries/symptoms, by type of event- Michigan Hazardous Substances Emergency Events Surveillance, 2008

	Type of Event					
	Fixed Facility		Transportation		All Events	
Injury/Symptom	No. of Injuries	%	No. of Injuries	%	No. of Injuries	%
Dizziness/other CNS* symptoms	50	28.2	2	16.7	52	27.5
Headache	42	23.7	2	16.7	44	23.3
Respiratory Irritation	30	17.0	4	33.3	34	18.0
Gastrointestinal Problems	26	14.7	3	25.0	29	15.3
Shortness of Breath	11	6.2	1	8.3	12	6.3
Burns	6	3.4	0	0.0	6	3.2
Eye Irritation	6	3.4	0	0.0	6	3.2
Skin Irritation	4	2.3	0	0.0	4	2.1
Trauma	2	1.1	0	0.0	2	1.1
Total	177	100.0	12	100.0	189	100.0

*Central Nervous System

Evacuations and sheltering in place

Evacuations were ordered in 56 (16.4%) of the 341 events. Of these evacuations, 47 (82.5%) were of buildings or the affected parts of the building, eight (14.0%) were of homes and businesses surrounding or

downstream/downwind of the event, and one (1.8%) were not defined. The number of people evacuated was known for 44 (77.2%) of the 56 events. The number of people evacuated ranged from one to 500 (Table 7). The length of evacuation, which was reported for 21 (36.8%) events, ranged from one hour to 72 hours with a median of five hours. Five (1.5%) events involved sheltering in place orders in the surrounding communities. Two of the five shelter-in-place events also had evacuation orders.

The number of events with evacuations varied over the three years of data collection. There were evacuations in 7.6% and 14.8% of all events in 2005 and 2006, respectively. A majority (52.3%) of the events during this time period involved evacuation of 20 or fewer people.

Table 7.- Ranges of numbers of evacuated people by number of events, Michigan Hazardous Substances Emergency Events Surveillance, 2008*

# of people evacuated	# of events
<5	20
5-20	14
21-50	4
51-100	1
101-500	5
Unknown	12
Total	56

Decontamination

Decontamination took place in ten events (2.9% of all events), including three events in which eight injured people were decontaminated and 31 uninjured were decontaminated and seven events in which there were no injuries and 60 uninjured people were decontaminated. Seven of the eight injured decontaminated individuals were decontaminated on-scene and one at a medical facility.

Petroleum and Petroleum Products Releases

Although the 14 state/ATSDR protocol does not include capture of petroleum-related spills and releases, beginning in 2007, MI-HSEES began collecting basic

information on petroleum and petroleum-related product spills that are greater than or equal to 25 gallons. (Propane releases which were reported in pounds were converted to gallons to determine if they met the 25-gallon inclusion criterion). No follow up was conducted on these cases and they were not reported to ATSDR.

This is the second year of collecting these petroleum-only related events. There were 165 events, down from 206 in 2007. Event location was known for 161 events- 62 (38.5%) of these were in fixed facilities and the other 99 (61.5%) were transportation related. These events occurred in 43 (51.8%) of the 83 counties, with the greatest number of events occurring in Wayne County: 37 (22.4%), Oakland: 16 (9.7%) and Kent: 11 (6.7%).

A primary cause was known for 135 (81.8%) of these events. Of the known primary causes, human error and equipment failure were the most frequent with 69 (51.1%) and 44 (32.6%) respectively. Bad weather accounted for 14 (10.4%) events. A secondary cause was identified in 75 (69.0%) of these events; the most frequent secondary cause was vehicle collision with 57 (76.0%).

A total of 43,548 gallons of petroleum and petroleum-related products were spilled. There were 169 spills in the 165 events. The most spilled petroleum product was diesel fuel with 87 (51.5%) spills. Table 8 lists all of the petroleum and petroleum-related products.

Table 8.- List of petroleum and petroleum-related products spilled- Michigan Hazardous Substances Emergency Event Surveillance, 2008

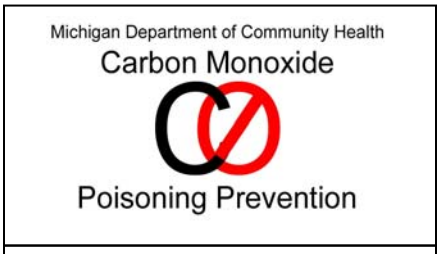
Name	Frequency	Percent
Diesel	87	51.5%
Ethylene Glycol	9	5.3%
Fuel Oil	1	0.6%
Gasoline	15	8.9%
Heating Oil	2	1.2%
Hydraulic Fluid	6	3.6%
Hydraulic Oil	5	3.0%
Jet Fuel	3	1.8%
Liquefied Petroleum Gas	1	0.6%
Lubricant	2	1.2%
Mineral Oil	4	2.4%
MIX: Antifreeze/Diesel Fuel/Hydraulic Oil/Motor Oil	1	0.6%
MIX: Butane/Propane	1	0.6%
MIX: Diesel Fuel/Fuel Oil NOS	1	0.6%
MIX: Diesel Fuel/Gasoline	1	0.6%
MIX: Diesel Fuel/Hydraulic Fluid/Oil	1	0.6%
MIX: Transmission Oil/Waste Oil	1	0.6%
Motor Oil	4	2.4%
Oil	11	6.5%
Petroleum Distillates	2	1.2%
Transformer Oil	9	5.3%
Transmission Fluid	1	0.6%
Waste Oil	1	0.6%
Total	169	100.0%

DISCUSSION

Data on the 341 non-petroleum chemical releases in 2008 in Michigan comprise the fourth full year of MI-HSEES operation. Twenty-one percent of these releases resulted in injury to 167 individuals, and evacuations were ordered in approximately 13% of the events.

Carbon monoxide continued to be the most frequently reported release event this year, although there were fewer CO-related events than previous years (52 in 2005, 75 in 2006 and 39 in 2007). This was mainly due to a data deadline in place. The 2008 hospital discharge data was not fully reported until after the ATSDR deadline for 2008 data closeout. Most of these events were identified from hospital discharge data (hospitals are required to report all CO-related poisoning hospitalizations).

In response to several reports of CO poisoning from running tractors in barns, MI-HSEES, in collaboration with the Occupation and Environmental Medicine Department and Michigan State University, developed a hazard alert about working on tractors in enclosed barns. This was distributed throughout the state to county agriculture agencies and was also posted on our website.



The MDCH web site for information about carbon monoxide poisoning prevention is at: www.michigan.gov/carbonmonoxide

CO release events are included in MI-HSEES if they occur at a place of work, or if they happen in a home, excluding releases from faulty furnaces, and there is an outside response, e.g. EMS or fire department is called to the home. The events included in MI-HSEES represented only a small proportion of the total number of CO releases in the state.

Methamphetamine-related release events also continued to be reported frequently; 2008 had the most reported in a year with 63. This is up from the previous high of 48 in 2005 and 2007. There were fewer reports in 2006 than in 2005 and 2007, which may have been a result of a new law restricting the sale of ephedrine and pseudoephedrine-containing over-the-counter drugs. The increases in 2007 and 2008 could be a result of methamphetamine manufacturers finding ways around the law.

Overall, there were more HSEES-qualifying events in 2008 than 2007. The overall increase can be attributed mostly to the increase in methamphetamine events.

The data from 2008 on petroleum-related releases show that petroleum is the largest category of chemical releases in the state (over 150 in 2008 and over 200 in 2007). These events appear to be less likely than MI-HSEES events to result in human injury, but data collection is very limited because of lack of resources to the program. Additional resources would make it possible to have more complete information collected on these events, including information on injuries, making the data more useful for epidemiologic analysis and for a more complete picture of hazardous substance releases in Michigan.

The MI-HSEES data continue to be useful in characterizing the variety of hazardous substances releases in Michigan and identifying appropriate follow-up public health actions. The MI-HSEES project is part of a larger program in the MDCH that addresses chemical terrorism and chemical emergency events preparedness and response. That program has been supporting local health departments in the development of plans and exercises related to chemical emergency events. MI-HSEES established a set of procedures for immediately alerting local health departments of MI-HSEES events in their communities in early 2006. In 2008, MI-HSEES alerted local public health departments to 14 incidents and provided assistance in 10 others. MI-HSEES will continue alerting and providing data in various formats to promote planning for and responding to chemical emergency events locally and statewide.

Appendix 1.- Events by county- Michigan Hazardous Substances Emergency Surveillance, 2008*						
County	Event Type				Total	
	Fixed Facility		Transportation		All Events	
	No.	%	No.	%	No.	%
Alger	1	0.3	0	0.0	1	0.3
Allegan	4	1.2	0	0.0	4	1.2
Barry	5	1.5	0	0.0	5	1.5
Berrien	6	1.8	2	0.6	8	2.4
Branch	10	2.9	0	0.0	10	2.9
Calhoun	4	1.2	3	0.9	7	2.1
Cass	2	0.6	0	0.0	2	0.6
Chippewa	1	0.3	0	0.0	1	0.3
Clare	1	0.3	0	0.0	1	0.3
Clinton	0	0.0	1	0.3	1	0.3
Crawford	0	0.0	2	0.6	2	0.6
Delta	1	0.3	0	0.0	1	0.3
Dickinson	4	1.2	0	0.0	4	1.2
Emmet	1	0.3	0	0.0	1	0.3
Genesee	5	1.5	1	0.3	6	1.8
Gogebic	1	0.3	0	0.0	1	0.3
Grand Traverse	1	0.3	0	0.0	1	0.3
Gratiot	1	0.3	0	0.0	1	0.3
Hillsdale	1	0.3	0	0.0	1	0.3
Houghton	1	0.3	0	0.0	1	0.3
Ingham	1	0.3	3	0.9	4	1.2
Iron	1	0.3	0	0.0	1	0.3
Isabella	1	0.3	0	0.0	1	0.3
Jackson	7	2.1	4	1.2	11	3.2
Kalamazoo	33	9.7	5	1.5	38	11.1
Kalkaska	2	0.6	0	0.0	2	0.6
Kent	9	2.6	6	1.8	15	4.4
Lenawee	1	0.3	0	0.0	1	0.3
Livingston	3	0.9	0	0.0	3	0.9

Appendix 1.- Events by county- Michigan Hazardous Substances Emergency Surveillance, 2008*						
County	Event Type				Total	
	Fixed Facility		Transportation		All Events	
	No.	%	No.	%	No.	%
Macomb	6	1.8	3	0.9	9	2.7
Manistee	1	0.3	0	0.0	1	0.3
Marquette	3	0.9	0	0.0	3	0.9
Mason	2	0.6	1	0.3	3	0.9
Menominee	1	0.3	0	0.0	1	0.3
Midland	29	8.5	2	0.6	31	9.1
Monroe	3	0.9	1	0.3	4	1.2
Montcalm	1	0.3	0	0.0	1	0.3
Muskegon	4	1.2	1	0.3	5	1.5
Oakland	18	5.3	12	3.5	30	8.8
Oceana	2	0.6	0	0.0	2	0.6
Osceola	2	0.6	0	0.0	2	0.6
Otsego	1	0.3	1	0.3	2	0.6
Ottawa	6	1.8	1	0.3	7	2.1
Saginaw	4	1.2	4	1.2	8	2.4
Shiawassee	1	0.3	0	0.0	1	0.3
St. Clair	2	0.6	2	0.6	4	1.2
St. Joseph	8	2.4	0	0.0	8	2.4
Van Buren	6	1.8	0	0.0	6	1.8
Washtenaw	7	2.1	2	0.6	9	2.7
Wayne	37	10.9	30	8.8	67	19.7
Wexford	1	0.3	0	0.0	1	0.3
Total	253	74.4	87	25.6	340	100.0

*County was unknown for 1 (0.3%) event

Appendix 2.- Complete list of substances released and frequencies- Michigan Hazardous Substances Emergency Events Surveillance, 2008

Chemical Name	Frequency	Percent
2,4-D	1	0.2
353- EC Herbicide	1	0.2
Acetone	8	1.6
Acid NOS	1	0.2
Acrylonitrile	3	0.6
Acrylonitrile styrene acrylate	1	0.2
Adhesive NOS	2	0.4
Alcohol NOS	1	0.2
Ammonia	21	4.2
Ammonium Hydroxide	1	0.2
Ammonium Nitrate	6	1.2
Ammonium Sulfate	2	0.4
Antifreeze	1	0.2
Biphenyl	1	0.2
Bleach	2	0.4
Butadiene	2	0.4
Cabot Cleaner	1	0.2
Calcium Chloride	1	0.2
Carbon Monoxide	35	7.1
Caustic Soda	11	2.2
Chlorine	6	1.2
Chloroform	1	0.2
Chloromethyl methyl ether	1	0.2
Chromic Acid	1	0.2
Cleaning Agent NOS	2	0.4
Coleman® Fuel	25	5.1
Cyanide	1	0.2
Decalin	1	0.2
DIETHYLENE GLYCOL MONOHEXYL ETHER	1	0.2
Dowtherm J	1	0.2
Drain Cleaner NOS	7	1.4
Ethanol NOS	3	0.6
Ethanolamine NOS	1	0.2
Ether NOS	3	0.6
Ethyl Chloride	2	0.4
Ethyl Ether	4	0.8
Ethylbenzene	1	0.2
Ethylene	1	0.2
Ethylene Glycol	2	0.4
Ethylene Oxide	1	0.2
Ethylenediamine	1	0.2
Ferric Chloride	1	0.2
Fertilizer NOS	1	0.2
Formaldehyde	2	0.4
Freon	1	0.2
Glyphosate Isopropylammonium salt	1	0.2
Heptane	1	0.2
Hydrochloric Acid	33	6.7
Hydrofluoric Acid	1	0.2
Ink	3	0.6
Iodine	4	0.8
Isocyanate NOS	1	0.2
Isoflurane	1	0.2
Isopropanol NOS	8	1.6
Lexar	1	0.2
Lighter Fluid NOS	1	0.2
Lithium	1	0.2
Mercury	34	6.9
METH OIL	1	0.2
Methamphetamine Chemicals NOS	32	6.5
Methanol NOS	2	0.4
Methyl Chloride	1	0.2
MIX: 2,4-D/Benzene/Toluene	1	0.2
MIX: Acetic Acid/Caustic Soda/Hydrogen Peroxide/Nitric Acid/peroxyacetic acid/Sodium Hypochlorite/Sulfuric Acid	1	0.2
MIX: Alkaline cleaner/oxonia active/Sodium Hypochlorite	1	0.2
MIX: Alkylbenzenenesulfonic Acids/Sodium Glucoante	1	0.2
MIX: Aluminum NOS/Hydrogen/Sulfuric Acid	1	0.2
MIX: Ammonia/Fuel Gas NOS/Lithium/Sodium Hydroxide/Sulfuric Acid	1	0.2
MIX: Ammonia/Fuel Gas NOS/Lithium/Sulfuric Acid	1	0.2
MIX: Ammonia/Sulfuric Acid	1	0.2
MIX: Benzene/COKE OVEN GAS	2	0.4
MIX: Benzene/Ethylbenzene/Toluene/Xylene	1	0.2
MIX: Bleach/Carbon Dioxide	1	0.2
MIX: Caustic Soda/DISODIUM TRIOXOSILICATE	1	0.2
MIX: Chlorine/Cleaning Agent NOS	1	0.2
MIX: Cyclohexylamine/Morpholine	1	0.2
MIX: Drain Cleaner NOS/Salt NOS/Sodium Hydroxide	1	0.2
MIX: Ethyl Ether/methyl lithium	1	0.2
MIX: Ferric Chloride/PRAESTOL 189K/Rinse Agent NOS/spectro n x 108	1	0.2
MIX: Hexane/Isopropanol NOS	1	0.2
MIX: Hexane/Methanol NOS/Sodium Hydroxide	1	0.2
MIX: Methanol NOS/Methylene Chloride/methylene potassium	1	0.2
MIX: Paint NOS/Solvent NOS	1	0.2
MIX: Potassium Hydroxide/Sodium Hydroxide	1	0.2
MIX: Potassium Hydroxide/Sodium Silicate	2	0.4
MIX: Trimethylbenzenes/Xylene	1	0.2

Appendix 2.- Complete list of substances released and frequencies- Michigan Hazardous Substances Emergency Events Surveillance, 2008

Chemical Name	Frequency	Percent
Monoethanolamine	2	0.4
N-Butyl Acetate	1	0.2
Nitric Acid	3	0.6
Nitrogen NOS	1	0.2
o-Dichlorobenzene	1	0.2
Paint NOS	20	4.0
Phenol	1	0.2
Phenyl Ether	1	0.2
Phosgene	1	0.2
Phosphoric Acid	2	0.4
Phosphorus	1	0.2
Picric Acid	1	0.2
Polyol NOS	1	0.2
Potassium Hydroxide	3	0.6
Propane	1	0.2
Resin NOS	2	0.4
RX: Ammonia/Bleach/Chloramine	5	1.0
RX: Bleach/Chloramine/Drain Cleaner NOS	1	0.2
RX: Bleach/Chloramine/Toilet Cleaner NOS	1	0.2
RX: Bleach/Chlorine/Comet	1	0.2
RX: Bleach/Chlorine/Lime- Away	1	0.2
RX: Bleach/Chlorine/Sno-Bol Cleaner	1	0.2
RX: Chloramine/Chlorine/Hydrochloric Acid	1	0.2
Silicone	1	0.2
Sodium Hydroxide	24	4.8
Sodium Hypochlorite	3	0.6
Sodium Nitrite	1	0.2
Sodium o-Phenylphenate	1	0.2
Solvent NOS	39	7.9
Stannous Chloride	1	0.2
Styrene	3	0.6
Sulfuric Acid	26	5.3
Toluene	4	0.8
Triclopyr	1	0.2
Triethanolamine	1	0.2
Uniwash	1	0.2
Vinyl Chloride	6	1.2
Vinylidene Chloride	2	0.4
Waste Solvents NOS	1	0.2
Xylene	2	0.4
Total	495	100.0

Appendix 3.- Events resulting in an evacuation, injury or decontamination- Michigan Hazardous Substances Emergency Events Surveillance, 2008

MI20080002- An employee was using acetone to clean out a paint nozzle. The static electricity from the chemicals ignited and started a small fire. The fire was out before firefighters arrived. The building was evacuated but there were no injuries.

MI20080004- A school employee improperly mixed bleach and ammonia creating chloramine.

MI20080005-An employee improperly mixed chemicals and was exposed to chloramine.

MI20080017- There was a carbon monoxide leak a welding shop. One employee went to the emergency department.

MI20080018-Two employees at a biofuel plant mixed ammonia and sulfuric acid together. They were sent to the emergency department and treated for eye and skin irritation.

MI20080019- There was a hydrochloric acid spill from the cold mill tank at a steel manufacturing company. One employee, wearing only safety goggles, was injured while he was attempting to transfer the material. Acid splashed into his eyes and onto his back, arm and leg. He was admitted to hospital overnight.

MI20080020- Fire at a plastics facility. Acrylonitrile styrene acrylate, propane and plastics burned. Local residents told to shelter-in-place while the fire was extinguished. About 30 area homes lost power for 8 hours. Contractors came to clean up.

MI20080038-A plumber mixed chemicals while trying to clear a drain. A chemical reaction occurred and he had to go to the emergency department for treatment for coughing and respiratory troubles.

MI20080040- An environmental engineer was blasting a wall with dry ice and bleach, his respirator malfunctioned and he got splashed in the face. The poison control center was consulted while he was en route to the emergency department for treatment for coughing, shortness of breath and respiratory distress.

MI20080044- An employee cleaning at a restaurant improperly mixed bleach and ammonia together. He went to emergency department for treatment for respiratory irritation.

MI20080045-A woman at home was cleaning her bathroom. She mixed Sno-Bol® cleaner and bleach together and was over come by fumes. She called EMS and was taken to emergency department for treatment for shortness of breath and coughing.

Appendix 3.- Events resulting in an evacuation, injury or decontamination- Michigan Hazardous Substances Emergency Events Surveillance, 2008

MI20080046- Mercury leaked from a blood pressure cuff when it was dropped onto the floor at a YMCA. It was confined to a non-public area. The YMCA was evacuated for 48 hours, until contractors and the health department could make sure the area was safe to occupy. Two employees were in the room at the time of the spill, but they were uninjured.

MI20080079- Police seized an active methamphetamine lab containing sodium hydroxide, hydrochloric acid, Coleman® fuel as well as other chemicals used in manufacturing methamphetamine. Four people were evacuated while police and contractors could clean up the house.

MI20080082-Police seized an active methamphetamine lab containing solvents, sodium hydroxide and hydrochloric acid. Three people were evacuated until proper clean up was completed.

MI20080088- Police seized a recently active methamphetamine lab containing sodium hydroxide, solvents and Coleman® fuel. Two people were evacuated while clean up was completed.

MI20080092- An employee was cleaning out a tank at a food manufacturing company when a flow meter failed and mixed chemicals. He was admitted to the hospital overnight for treatment for respiratory problems, shortness of breath, headache and nausea. The meter was fixed and upgraded later that day.

MI20080093- There was a spill of ammonium hydroxide in a school science lab. Three classrooms were evacuated. The spill was cleaned up according to material safely data sheet (MSDS) by the school janitor. Three students experienced headache and dizziness and were treated at the school by the school nurse.

MI20080095- An employee at a fruit processing plant was accidentally exposed to a mixture of cleaners. He experienced sore throat, cough and shortness of breath. He lost about 1 week of work.

MI20080098- A mercury spill from a blood pressure cuff in a clinic caused employees to be evacuated for the day. Contractors arrived to ventilate and clean up the spill.

MI20080099- The welding on the piping into the main building of a refuse facility failed causing a line to break & release chlorine. Only the chlorine left in the pipe was released, the system was not on at the time. All eleven workers were evacuated until the area was ventilated and cleaned.

Appendix 3.- Events resulting in an evacuation, injury or decontamination- Michigan Hazardous Substances Emergency Events Surveillance, 2008

MI20080101- Police seized an active methamphetamine lab containing acetone, iodine, ammonia, Coleman® fuel and sulfuric acid. Four people were evacuated until proper clean up was completed.

MI20080102- Police seized an active methamphetamine lab containing sodium hydroxide, sulfuric acid, ammonia nitrate, solvents and ether. One person was evacuated while clean up was completed.

MI20080104- An active methamphetamine lab exploded at a home. Two people were inside at the time. One went to the hospital where he was treated for burns.

MI20080112- A man renovating his home improperly mixed bleach and ammonia creating chloramine. The fire department responded, observed and treated his cough, shortness of breath and eye irritation.

MI20080118- Police seized an active methamphetamine lab containing ether, sodium hydroxide and other chemicals used in manufacturing methamphetamine. Four people were evacuated until proper clean up was completed.

MI20080119- Police seized an active methamphetamine lab containing iodine, solvents and other chemicals involved in manufacturing the drug. Two people were evacuated until clean-up was completed.

MI20080122- A family had picric acid in the home. Police and the bomb squad responded. Twenty homes were evacuated while the bomb squad detonated the acid in the back yard of the home.

MI20080124- Police seized an active methamphetamine lab containing ammonia, solvents and hydrochloric acid. Six people were evacuated while clean-up was completed.

MI20080133- Police seized a recently active methamphetamine lab containing solvents as well as other chemicals used in manufacturing. Six people were evacuated while clean-up was completed.

MI20080134- Police seized a methamphetamine lab containing iodine, solvents, drain cleaner and other chemicals used in manufacturing the drug. One person, the cook, was injured when the lab exploded. He was admitted to the hospital for treatment of burns.

MI20080151- Police seized an active dimethyltryptamine (DMT) lab containing hydrochloric acid, acetone, solvents and naphtha at an apartment building. Twenty people were evacuated for four hours while police, hazmat teams and contractors cleaned the area.

Appendix 3.- Events resulting in an evacuation, injury or decontamination- Michigan Hazardous Substances Emergency Events Surveillance, 2008

MI20080154- Hundreds of people were evacuated from their homes after a tanker filled with anhydrous ammonia overturned on an exit ramp from the highway. The interstate and local roads were closed until the tanker was removed. There was only a small leak of product.

MI20080155- An equipment failure occurred while a process was being set up in a new plant. Hydrochloric acid vapors were released into the air inside the plant and the ventilation system pulled the vapors to the outdoors. Eighteen employees were evacuated from the area, six of whom were treated for minor respiratory irritation and decontaminated on scene. The other 12 employees were decontaminated- per protocol.

MI20080157- Police seized an active methamphetamine lab containing ammonia and ether. Six people, including two children, were evacuated while clean-up was completed.

MI20080159- A small amount of ammonia leaked in a compressor room at a food store when an employee was changing a filter. The valve was turned off and repaired. The building (50 people) was evacuated while a contractor cleaned up.

MI20080173- There was a release of anhydrous ammonia from piping on a roof at a meat processing plant. The employees were evacuated while the fire department and hazmat crews cleaned up the area.

MI20080182- A farmer lost control of an ammonia tanker and flipped it. Anhydrous ammonia released to the air. A shelter-in-place was issued for two hours until spill was contained.

MI20080192- There was a mercury spill onto the floor in a home from a vial. The residents tried to clean the spill by themselves with rags and a vacuum cleaner. Then they called 911. The house was highly contaminated and was condemned for 3 days until clean up could be complete. All six people were decontaminated and evacuated from the home. One person went to the emergency department for observation.

MI20080193- Police seized a recently active methamphetamine lab containing drain cleaner, Coleman® fuel and other chemicals used in manufacturing the drug. Four people were evacuated while contractors cleaned the house.

MI20080206- A student had a bottle of sulfuric acid in his locker. The bottle fell out and spilled, splashing the legs of two students with the acid. Both students washed their legs at the school and the poison control center was consulted.

MI20080207- There was a spill of triethylbenze xylene, a diesel fuel additive, from a truck at a truck stop due to a loose cap. Potentially 320 gallons could have

leaked, but only five gallons came out. The parking lot was restricted and local homes were evacuated for about seven hours while the leak was contained.

MI20080210- Severe storms caused a power outage. A couple used a generator in their basement and died as a result of the CO build up in the home. A family member came to check on them and passed out in the dining room and was taken to the ED for treatment for CO poisoning.

MI20080219- A chemist was running an experiment in a fume hood at a chemical manufacturing facility. An overpressure of the device caused the tubing to come off and release a small cloud that could have contained ethylene oxide. He evacuated the area and pulled the evacuation alarm on the building as a precaution. About 150 employees were evacuated, up wind, from the facility. The company response team came to check and clear the area.

MI20080233- Police seized an active methamphetamine lab containing sulfuric acid, sodium hydroxide and other chemicals used in manufacturing methamphetamine. Three people were evacuated while proper clean up was complete.

MI20080235- Police seized an active methamphetamine lab containing acetone, solvents and other chemicals used in manufacturing methamphetamine. One person was evacuated until clean-up was completed.

MI20080240- Equipment failure at a laboratory at an auto manufacturing company caused the release of 600 gallons of coolant. The area was evacuated for four hours while clean-up took place.

MI20080246- A truck carrying a mixture of methyl lithium and ethyl ether, which is highly reactive to air and water, caught on fire while on the interstate. The interstate was closed for hours while the truck was left to burn off. Local homes evacuated until the area was safe. MDCH consulted.

MI20080247- A pump exploded during the transfer of chemicals at a chemical manufacturing facility. Extreme precautions were taken; the building was evacuated while hazmat and company response team cleaned up. One employee experienced a bruise from the exploding pump. He was decontaminated. Another, uninjured employee was also decontaminated on scene.

MI20080248- Equipment failure caused a plastics fire at a metal processing plant. The plant contained tanks of sulfuric acid. Local homes were evacuated as a precaution until the fire was under control and to make sure that no chemicals were leaking.

Appendix 3.- Events resulting in an evacuation, injury or decontamination- Michigan Hazardous Substances Emergency Events Surveillance, 2008

MI20080276- There was a factory fire in a facility where polyurethane foam is made. Sawdust ignited and caused a mixture of chemicals to be released into the air. Three hundred people were evacuated for three hours while the fire department controlled the fire. Twenty uninjured responders were decontaminated at the scene.

MI20080279- Police seized an active methamphetamine lab containing solvents and a mixture of salt, sodium hydroxide and drain cleaner. Two people were evacuated while clean-up was completed.

MI20080280- Police seized a recently active methamphetamine lab containing solvents and other chemicals used in manufacturing. Five people were evacuated until clean-up was completed.

MI20080291- There was a carbon monoxide release at meat packing facility. Eight employees went to the hospital after experiencing headache and nausea and received treatment for carbon monoxide poisoning. The case was referred to MIOSHA. MIOSHA found several violations and proposed $2500 in fines.

MI20080292- A pool employee was working in enclosed when a pool tab ruptured releasing chlorine. He experienced respiratory irritation and was admitted to the hospital and treated for symptoms.

MI20080299- Weed killer was applied around the perimeter of a hospital. The fumes went into the air vents. One hospital employee experienced headache, vomiting and light-headedness. The poison control center was consulted.

MI20080302- A 16 year old male was cleaning floors at a resort. He improperly mixed an acid cleaner with bleach in a bucket and was briefly exposed to the chlorine gas that was generated. He developed a cough, some difficulty breathing and a burning sensation in his lungs, throat and eyes. He went to the emergency department for treatment. The poison control center was consulted.

MI20080308- Police seized an active methamphetamine lab. Five adults and two children were evacuated while clean-up was completed.

MI20080309- There was a methamphetamine lab explosion at a home. Three people were evacuated from the home after the explosion. Two of them went to the hospital for treatment for chemical burns; one was admitted and the other treated and released.

MI20080312- A man was seriously injured when fertilizer, containing sulfuric acid, blew up in his face. He was taken to a local emergency department for treatment. Officials were unaware of what chemicals were involved when he arrived at the emergency department. As a result, the emergency department was shut down and 26 people were evacuated and decontaminated.

Appendix 3.- Events resulting in an evacuation, injury or decontamination- Michigan Hazardous Substances Emergency Events Surveillance, 2008

MI20080313- Employees at a theater company were taking apart an old refrigerator when the freon gas escaped from the hose. Three employees in the parking lot complained of a foul odor and burning sensation; two of them were treated on the scene. This incident closed two lanes on a main road as well as local roads and sidewalks.

MI20080317- An equipment failure caused the release of a very small amount of nitric acid at a community college. The building was evacuated as a precaution and night classes were moved to another facility. Hazmat responded to the scene.

MI20080324- Police seized an active methamphetamine lab containing solvents, ether as well as other chemicals used in manufacturing methamphetamine. Four people, including two children were evacuated while clean-up was completed.

MI20080327- There was a fire, potentially containing cyanide, at an empty building. Areas down wind were evacuated until the exposures could be determined. Two people, one reporter and a member of the general public, were decontaminated at the local hospital. There were no injuries.

MI20080339- An 85 year old man improperly mixed cleaning materials in his home. EMS responded and took him to the emergency department where he was treated for shortness of breath and a cough.

MI20080344- Children found about 30 pounds of mercury in the crawl space of a duplex. They played with it spilling some on the floor. Then they kicked it around. Mercury was tracked to the kitchen and living room areas. Both families (six people) were evacuated for a week until clean up could be completed.

MI20080346- A hotel employee improperly mixed pool chemicals. He experienced shortness of breath and respiratory irritability and was treated at the hospital.

MI20080352- Police seized a recently active methamphetamine lab containing iodine, solvents and other chemicals used in the manufacturing process. Four people were evacuated while clean-up was completed.

MI20080374- A barometer spilled onto the floor of a classroom, and spilled mercury. The classroom was closed off for remainder of the day. School was closed the next day so clean-up could be completed. The local health department was on the scene and MDCH was consulted. The school had previously reported that all mercury had been removed from the school.

MI20080375- There was a mercury release at a correctional facility from an unknown source in the bathroom at the food service facility. The facility was

evacuated and closed. MDCH was consulted and a third party contractor cleaned it up.

MI20080376- An active methamphetamine lab caused a house fire in the basement of a home. Two adults and three children were evacuated until it was extinguished.

MI20080379- There was a nitrogen leak from an outdoor above ground tank at a chemical manufacturing plant. The huge chemical cloud floated away from the building. Local buildings, including a 200 people at a bingo hall, were evacuated as a precaution.

MI20080380- A contractor was using a sawzall to cut through plumbing fixtures in a conference room and cut through two thermometers releasing mercury onto floor and onto himself. He was decontaminated on the scene. His clothes and shoes were bagged and checked for mercury. MDCH, local health department and contractors were involved in the clean-up.

MI20080381- Police seized an active methamphetamine lab containing hydrochloric acid, solvents, and sodium hydroxide. There was a fire and two adults and two children were evacuated until it was extinguished. The children were later taken to Child Protective Services.

MI20080390- Police seized an active methamphetamine lab containing acetone, isopropanol, sulfuric acid, solvents and other chemicals used in the manufacturing process. One person was evacuated while clean up was completed.

MI20080391- Police seized an active methamphetamine lab containing solvents, ether and sodium hydroxide. One person was evacuated until clean up was completed.

MI20080416- Two college students were found dead in their car due to carbon monoxide poisoning. They were using a charcoal grill in the enclosed car.

MI20080419- Police seized an active methamphetamine lab containing sulfuric acid and Coleman® fuel. Four adults and two children were evacuated until clean up was completed.

MI20080420- Police seized an active methamphetamine lab containing hydrochloric acid, Coleman® fuel and lighter fluid. One person was evacuated until clean up was completed.

MI20080425- Police raided a home that contained two active methamphetamine labs- one in a bedroom and one in a closet. Two adults and one child were home

and evacuated at the time of the seizure. The child was taken to the emergency department and decontaminated as a precaution.

MI20080426- Police seized an active methamphetamine lab containing ammonium nitrate, solvents and sodium hydroxide. Five adults were evacuated while clean-up was completed.

MI20080430- A restaurant employee improperly mixed many chemicals and caused a chemical cloud. The restaurant was evacuated. She was seen at the ED and treated for respiratory problems.

MI20080433- An employee at a country club improperly mixed chemicals and formed irritating fumes. One female employee experienced shortness of breath and cough and a male employee experienced headache and cough. The female employee went to the emergency department. She missed two days of work.

MI20080437- Fire at a pork processing plant threatened the release of ammonia from refrigerators. Shelter-in-place orders were issued while the fire department controlled the fire. The area of the plant that houses the refrigeration equipment was unharmed and no ammonia was released.

MI20080438- A family was using a generator in the basement; the exhaust hose was improperly routed outside of the home. Firefighters found five people unconscious; they were transported to the hospital where they were treated for carbon monoxide poisoning.

MI20080440- A student burned himself after he set a mixture of paints and solvents on fire to try and dispose of them. They were from his father's business.

MI20080473- An employee at a cleaning company was accidentally doused with bleach. Her eyes became irritated. She was seen at the emergency department.

MI20080476- Police seized a recently active methamphetamine lab containing hydrochloric acid and drain cleaner. Five people were evacuated while the home was cleaned up.

MI20080478- Three children were riding dirt bikes at a sports dome during an afternoon. All felt ill and went to the hospital for treatment for carbon monoxide poisoning. The facility was evacuated and then closed for three days while testing was done to make sure that ventilation standards were improved.

MI20080485- Police seized an active methamphetamine lab. Most of the spilling occurred in the basement where the cook had placed large garbage bags of meth waste. One person was evacuated while clean-up was completed.

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MI20080486-Police seized a recently active methamphetamine lab containing hydrochloric acid and drain cleaner. Five people were evacuated while the home was cleaned up.

MI20080487- Police seized a recently active methamphetamine lab containing Coleman® fuel, sodium hydroxide and other chemicals involved in manufacturing. Five people evacuated until clean up was complete.

MI20080489 – A generator was operated in home overnight releasing carbon monoxide. Two people passed out as a result and were taken to the hospital.

MI20080490 – A worker in an assisted living facility mixed bleach and comet when cleaning a toilet producing chlorine gas. She experienced vomiting and respiratory irritation.

MI20080491- A power outage caused a family to use a generator and a wood burning stove in their home for 12 hours. The family passed out. They were taken to the emergency department and treated for carbon monoxide poisoning.

MI20080518- An employee was plowing snow in a truck with an exhaust leak. He experienced headache and nausea. EMS was called. He was taken to the emergency department and treated for carbon monoxide poisoning.

MI20080519- An employee was plowing snow and the truck had an exhaust leak. The driver experienced shortness of breath and nausea. EMS was called. He was taken to the emergency department and treated for carbon monoxide poisoning.

MI20080520- Contractors were working on dry-walling with a heater running in an enclosed area. EMS was called. Four employees experienced headache and nausea and were treated at the emergency department for carbon monoxide poisoning.

MI20080521- An employee working on a forklift in a warehouse at a car accessory plant experienced headaches. It was discovered that there was improper ventilation and that he was exposed to carbon monoxide. MIOSHA inspected and fined the company $1500.

MI20080523- Hydrochloric acid vapors were released from a tank car staged at transfer. Two employees experienced respiratory irritation and went to the emergency department for treatment. The tank car was isolated until the missing bolt was replaced.

MI20080524- A man was in the cab of his tractor for approximately one hour. The tractor had an exhaust leak. He passed out. His wife discovered him and called EMS. He was taken to the hospital and treated for carbon monoxide poisoning.

MI20080525- A man was using a modified propane tank to heat his home. He was found passed out and was taken by EMS to the hospital where he was admitted and treated for carbon monoxide poisoning.

MI20080526- There was a carbon monoxide build up from a ruptured pipe on a boiler. This happened in the office building of a plumbing company. Six employees experienced symptoms and were seen at the emergency department for carbon monoxide poisoning.

MI20080527- An employee was working in a pole barn with a lift truck running. She experienced dizziness and headache and was treated for carbon monoxide poisoning at the emergency department.

MI20080528- A defective space heater in an office caused a buildup of carbon monoxide. One employee experienced headache and nausea. She went to the emergency department and was treated for carbon monoxide poisoning.

MI20080529- Construction workers at an industrial complex were using hi/los and generators in poorly ventilated spaces. Four employees experienced headaches and dizziness. EMS was called and they were taken to the emergency department and were treated for carbon monoxide poisoning.

MI20080530- An employee was cleaning a chemical vat with chemical strippers containing 82% methylene chloride, 10% methanol and 8% methylene potassium. He was not wearing a respirator. He was overcome and passed out. This stripper is metabolized as carbon monoxide; he was treated at the hospital for carbon monoxide poisoning.

MI20080531- A small machine shop had a hi/lo running with poor ventilation. One employee experienced dizziness and headache. He was treated for carbon monoxide poisoning at the emergency department.

MI20080532- A gasoline generator was used in the basement of a home as the main power source. Four people were in the home watching television; one passed out and the others felt light-headed and dizzy. All were taken to the hospital by EMS and treated for carbon monoxide poisoning.

MI20080533- A generator was being used inside an auto-body repair shop. An employee felt dizzy and was taken by EMS to emergency department and treated for carbon monoxide poisoning.

MI20080534- A man was washing a freezer out with a power washer in an enclosed space. He became dizzy and passed out. His brother discovered him, called EMS and he was taken to the hospital where he was treated for carbon monoxide poisoning.

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MI20080535- A man was running a generator in his home. He was found passed out. EMS transported him to emergency department for treatment for carbon monoxide poisoning.

MI20080536- A man was power washing walls in his basement with a gas-powered power washer. He was found passed out. His brother found him, called EMS. He was transported to hospital where he was treated for carbon monoxide poisoning.

MI20080537- A man was working on his lawn mower in a closed garage. He was found passed out. EMS transported him to emergency department where he was treated for carbon monoxide poisoning.

MI20080538- A butane heater was used in a living room as the home heat source. The home resident slept with it on for about 9-10 hours. When she woke up she had headache, nausea and dizziness. EMS came and transported her to the emergency department where she was treated for carbon monoxide poisoning

MI20080539- Two people were pressure washing the basement with ammonia and bleach. Both passed out and were taken, by EMS, to the hospital. They were treated for carbon monoxide poisoning; they did not show symptoms from improper mixing of chemicals.

MI20080540- A man was doing drywall inside with a kerosene heater and generator. He felt drowsy and passed out. EMS took him to the emergency department where he was treated for carbon monoxide poisoning.

MI20080541- A man was power-washing his hog barn with the doors closed for 4 hours. He went outside when he was done and passed out. Family members found him and called EMS. He was taken to the hospital and treated for CO poisoning.

MI20080542- A fireman was exposed to exhaust from a fire truck due to an exhaust leak. He was treated on scene for carbon monoxide poisoning

MI20080543- A man was working on a snow mobile in his garage which was heated with a propane heater. He was found passed out. His family called EMS and he was taken to the emergency department and treated for carbon monoxide poisoning.

MI20080544- An iron worker in a mine experienced shortness of breath and chest pain. Carbon monoxide exposure was the cause. He was taken to emergency department for treatment.

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MI20080545- A man was working in an enclosed area with a forklift. He experienced dizziness, headache and nausea. The company sent him to emergency department for treatment for carbon monoxide poisoning.

MI20080546- A man was cutting wood in his deer blind. He was using a propane heater to heat the inside. He felt ill and slept a lot. He passed out and his wife called EMS. He was taken to emergency department and treated for carbon monoxide poisoning.

MI20080547- A faulty forklift had an exhaust leak in a warehouse. One employee experienced headache and nausea. He was sent to the emergency department. The energy company confirmed high levels of carbon monoxide.