Hazardous Substances Emergency Events Surveillance in Michigan: 2011

May 22, 2012

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Funding for Michigan HSEES is provided by cooperative agreement 5U90TP517018 from the Centers for Disease Control and Prevention.

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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 2011. The Hazardous Substances Emergency Events Surveillance system (HSEES) was established in Michigan in 2004 with funding from the Agency for Toxic Substances and Disease Registry (ATSDR). This multi-state program followed standardized protocols and definitions for collection and compilation of hazardous substances release events. In late 2009, ATSDR funded a new surveillance program for hazardous substances releases modeled on HSEES, titled the National Toxic Substance Incidents Program (NTSIP), and funded 7 states, not including Michigan. As an unfunded state, Michigan currently uses the NTSIP database for tracking releases in Michigan, but does not follow all of the NTSIP protocols.

Releases tracked by states in the HSEES/NTSIP system include uncontrolled or illegal acute releases of any hazardous substance (except petroleum when petroleum is the only substance released). Some substances require a threshold minimum amount released in order to be included. Information collected about

these events 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.

Because of resource constraints, beginning in 2010, the Michigan HSEES program limited the types of events included in its system to include for the most part only those that involved an agency response (e.g. hazmat, public health) and an injury, exposure, or evacuation.

A total of 127 reported events met criteria for inclusion in 2011. One hundred fifteen of the events occurred at fixed facilities and the remainder were associated with transportation. More than one substance was released in 7 (5.5%) of these 127 events. The most commonly reported substances were mercury and natural gas. Forty-four of the other events resulted in an injury, involving a total of 68 victims, 10 of whom died; the most frequently reported injuries were burns and trauma.

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 was titled "Hazardous Substances Emergency Events Surveillance" or HSEES until 2009, and then ATSDR funded a new surveillance program for hazardous substances releases modeled on HSEES, titled the National Toxic Substance Incidents Program (NTSIP), which involved collection of national data and data from seven participating states.

In October, 2004 the Michigan Department of Community Health (MDCH) was funded to establish HSEES in Michigan, joining 13 other states. It was not funded for NTSIP. However, as an unfunded state, Michigan currently uses the NTSIP database for tracking releases in Michigan, but does not follow all of the NTSIP protocols. The name of the Michigan system did not change with the change in the national program; it is still MI-HSEES.

The purpose of the national HSEES/NTSIP system has been to describe the public health consequences of releases of hazardous substances, with the goal being to reduce injury and illness from acute hazardous substance releases by linking the data to prevention programs. The objectives of the surveillance systems in Michigan and nationally 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.

This report summarizes the characteristics of hazardous substance releases and their associated public health consequences of events that occurred in 2011 in Michigan. The appendices include additional details about the data, and a brief narrative of each of the events that involved an injury, evacuation, or shelter-in-place.

Annual reports for MI-HSEES for 2005-2008 can be found at http://www.michigan.gov/mdch/0,1607,7-132-2945_5105-110654--,00.html (A report for 2009 was not done because of the mid-year change in funding and event definitions.)

METHODS

The general definition of a HSEES event in Michigan, which is shared with the national NTSIP program is: "An uncontrolled or illegal acute release of a toxic substance."

Beginning in 2010, MI-HSEES altered the specific definition of a release from the definition used in the earlier MI-HSEES system and the current definition used by ATSDR funded states for NTSIP in several ways, because of resource constraints. First, in order to be included as an event in Michigan the released chemical must have resulted in some kind of agency response (e.g. hazmat, fire, public health). In addition, it must have resulted in a human exposure, a human injury, or an evacuation. These events are included regardless of the amount of the chemical released. Second, all carbon monoxide releases/injuries are excluded, regardless of agency response, because they are being tracked in another public health surveillance system[1]. Finally, beginning in 2010 MI-HSEES collects information about natural gas/propane releases/explosions that result in injuries and evacuations.

Various sources are used to identify and obtain information about HSEES-eligible events in Michigan. These include reports to the National Response Center (NRC)[2], the Federal Department of Transportation, the Michigan Department of Environmental Quality (DEQ), the Michigan Department of Agriculture and Rural Development, the Michigan State Police, the Michigan Poison Control Center, the media, and others.

Information collected on Michigan HSEES events includes the following, when available:

- 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 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, and 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 known and a factor in the incident.

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[1] Maile M, Rosenman KD, Krizek A, Reilly MJ, Stanbury M. 2009 Annual Report on Carbon Monoxide Poisoning in Michigan. April 2012. Available at: http://www.oem.msu.edu/userfiles/file/Annual%20Reports/CarbonMonoxide/2009COAnnualReport.pdf

[2] The NRC is the single portal for mandatory reporting of hazardous spills and releases to 16 federal agencies. See: www.nrc.uscg.mil

- Responsible party: If the responsible party for the release is a business, it is classified using the North American Industry Classification System (NAICS).
- 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, public 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.

Because of loss of funding, Michigan HSEES is no longer conducting follow-up interviews to complete data fields where information was missing in the initial report.

All information is entered into a web-based application used by the NTSIP-participating states and maintained by ATSDR.

RESULTS

For 2011, 127 hazardous substance emergency events in Michigan were included in the Michigan MI-HSEES data set. The counties with the most frequent number of events were Wayne with 14(11.0%) events, Oakland with 11 (8.6%) events and Kalamazoo and Kent with 75.5 (8.6%) events. A complete list of counties and event frequencies can be found in Appendix 1.

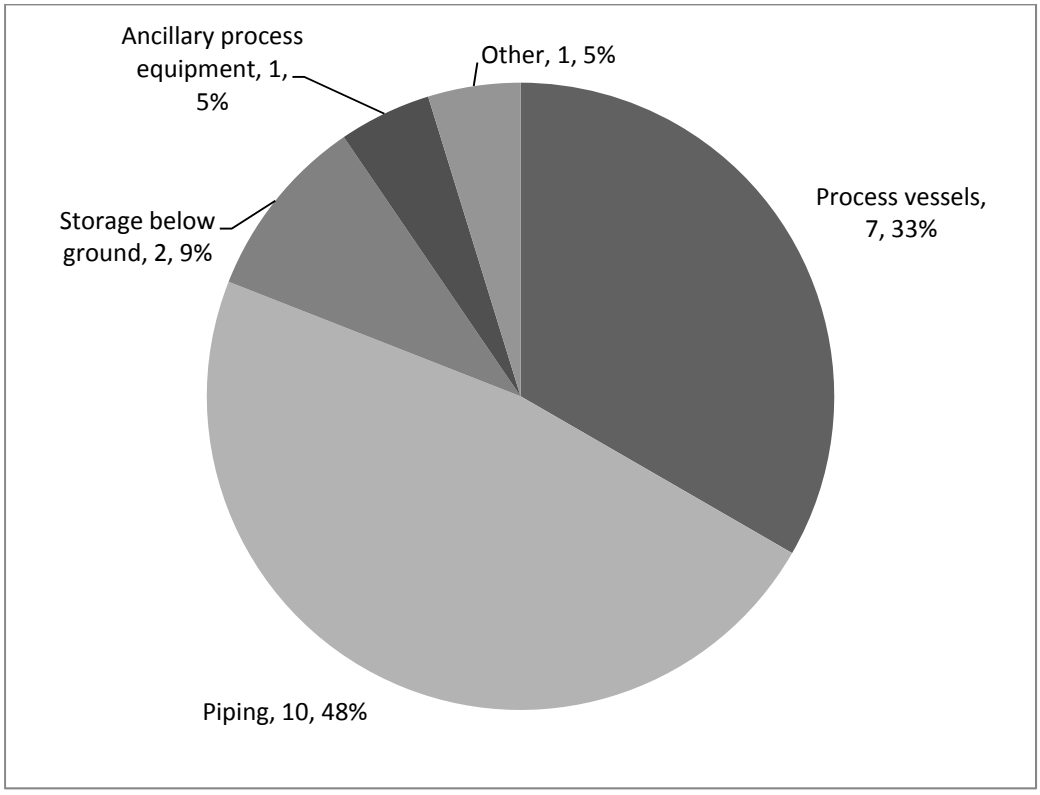
Facility type

A total of 115 (90.6%) events occurred in fixed facilities.

Ninety-four (74.0%) of the 115 fixed facility events did not identify an area in the facility where the release occurred. The locations for the 21 events where an area was identified included process vessels 7 (33%), piping 10 (47.6%), storage below ground 2 (9.5%), ancillary process equipment 1 (4.7%) and other 1 (4.7%). (Figure 1)

Of the 12 transportation events, 8 (66.6%) occurred during ground transport, 1 (8.3%) by pipeline, and 3 (25%) by rail.

Figure 1 – Distribution of fixed facility related events where location was known - Michigan HSEES 2011.



Causes of events

Primary or root cause factors were reported in all 127 events. Of the reported primary factors, human error 40 (31.5%) and equipment failure 64 (50.4%) accounted for most of the factors. At both transportation and fixed facility events the primary cause of events was equipment failure. (Figure 2 and Table 1)

Figure 2 - Primary Causes of Events - Michigan HSEES 2011 (N=127).

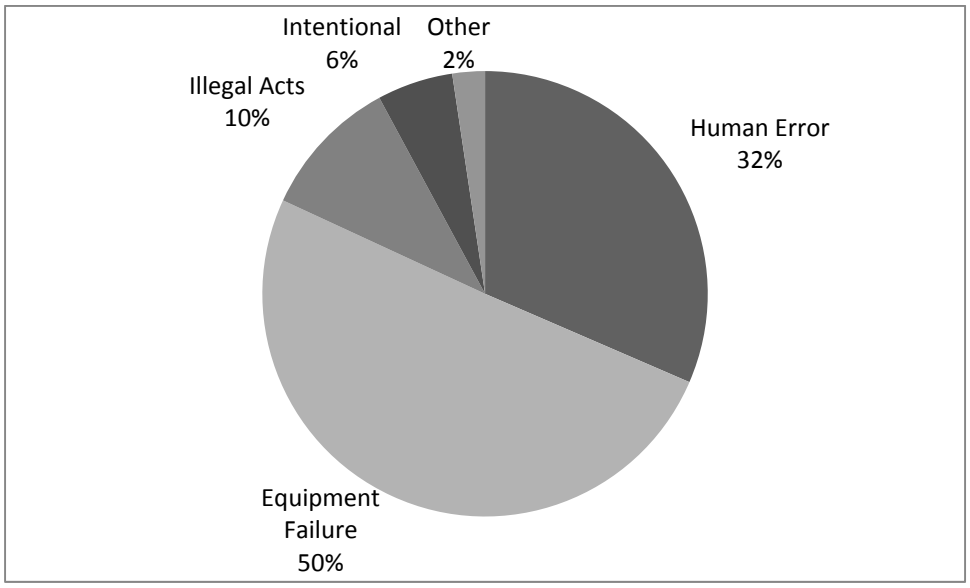


Table 1 – Primary factors associated with events by event type – Michigan HSEES 2011.

Primary Factor	Event Type					
	Fixed Facility*		Transportation		All Events	
	Number of Events	%	Number of Events	%	Number of Events	%
Human Error	35	30.4	5	41.7	40	31.4
Intentional	7	6.1	0	0	7	5.5
Equipment Failure	57	49.6	7	58.3	64	50.4
Illegal Act	13	11.3	0	0	13	10.2
Bad Weather	0	0	0	0	0	0
Other	3	2.6	0	0	3	2.4
Total	115		12		127	

Substances

A single substance was released in 112 (88.2%) of the 127 events. A mixture of methamphetamine chemicals were reported in 7 (5.5%) events.

A total of 46 substances/mixtures were associated with the 127 events. The 12 substances/mixtures that were released in more than one event and the numbers of events for each of these are listed in Table 2. The list of all 46 substances/mixtures released are in Appendix 2.

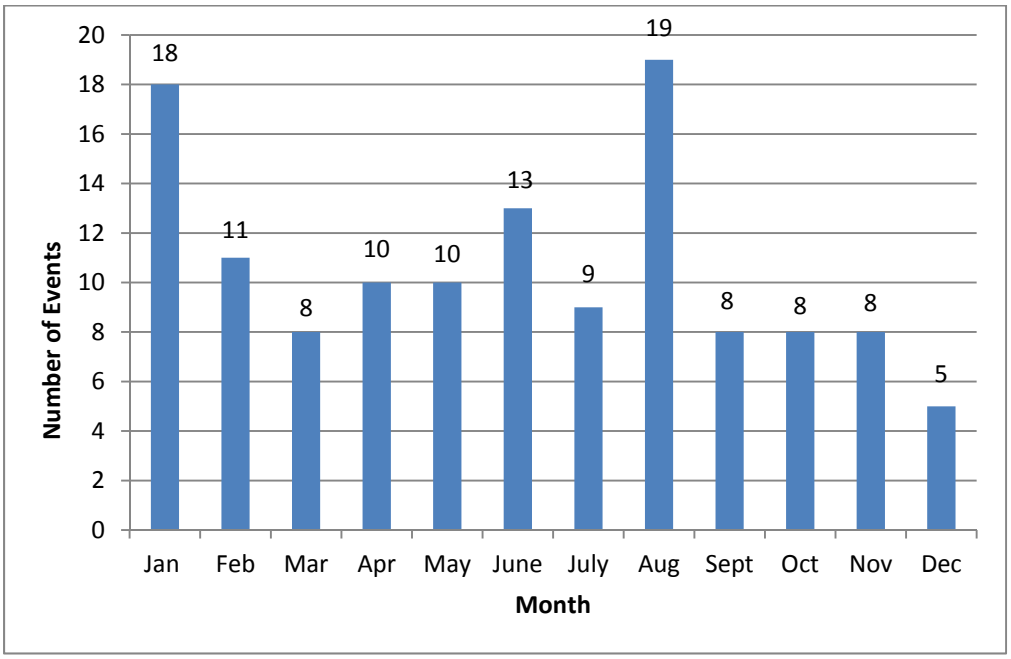
Table 2 - Twelve substances/mixtures involved released in more than one event - Michigan HSEES 2011

Substance	Number of times released
Mercury	27
Natural Gas	23
Ammonia	10
Gasoline	7
Methamphetamine Chemicals NOS	7
Explosives NOS	4
Propane	4
Oxygen	3
Acetone	2
Butane	2
Hydrochloric Acid	2
Hydrogen	2

Time of release

The number of events by month ranged from 19 (14.9%) in August to 5 (3.9%) in December. (Figure 3)

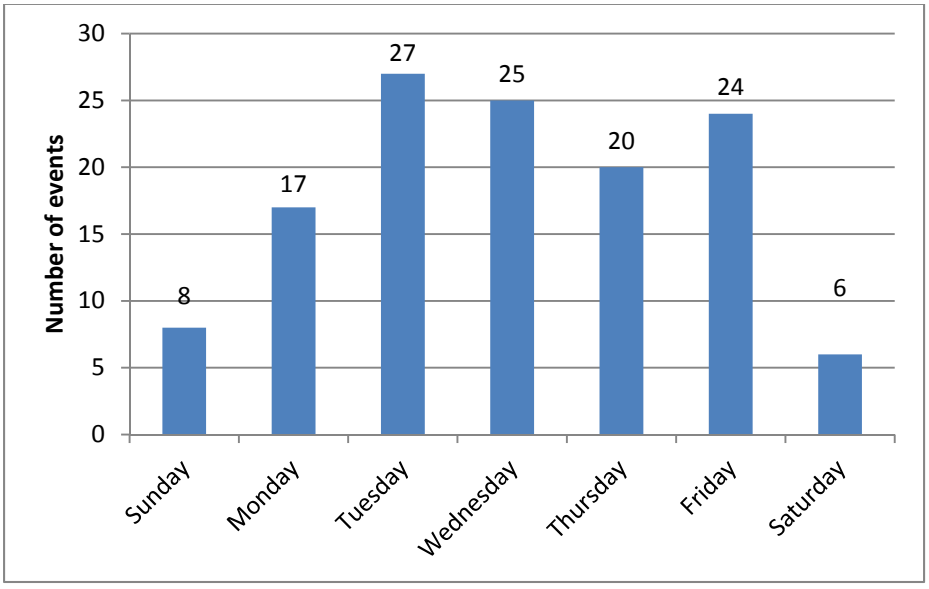
Figure 3 – Month distribution of events - Michigan HSEES 2011.



Day of week of releases

Events were more likely to occur during the week than on weekends (Figure 4).

Figure 4 – Event day of the week distribution - Michigan HSEES 2011.



Business/industry

Sixty-five (51.1%) of the 127 events were the responsibility of an industry or business. The largest proportion of the industry/business-associated events involved paper/petroleum/chemicals/plastic manufacturing and ground/air/rail transportation, with 8 (12.3%) events each. (Table 4)

Table 4 – Industries involved in events by 2-digit NAICS codes - Michigan HSEES 2011.

NAICS Code	Industry Category	No. Events	%
11	Agriculture	4	6.2
22	Utilities	7	10.8
23	Construction	2	3.1
31	Manufacturing - Food/Textiles/Apparel	2	3.1
32	Manufacturing - Paper/Petroleum/Chemicals/Plastics (N=21)	8	12.3
33	Manufacturing - Metal/Transportation	5	7.7
42	Wholesale Trade	1	1.5
44	Retail Trade - Motor Vehicle/Building Materials/Gas Stations	3	4.6
48	Transportation - Ground/Air Rail (N=51)	8	12.3
56	Administrative Support/Waste Management and Remediation	3	4.6
61	Education	5	7.7
62	Health Care	5	7.7
72	Accommodations/Food Services	5	7.7
81	Other Services	1	1.5
		65	

Response

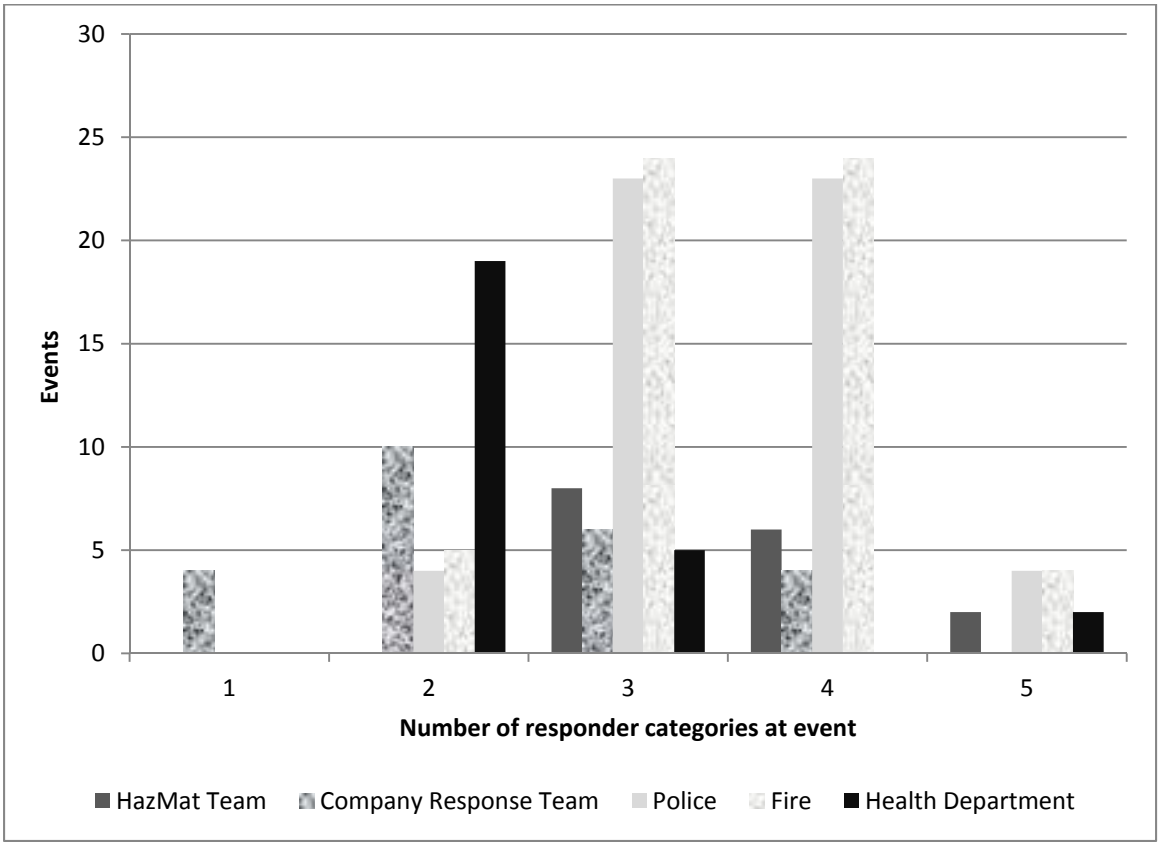
Responders: There were five categories of responders to the 127 events; HazMat, fire, company response team, health department, and police. Table 5 shows the frequency of responses by responder categories.

Table 5 - Frequency of responses by responder category- Michigan HSEES 2011.

Responder category	Number of events responded	%
Hazmat	38	29.9
Fire	84	66.1
Company Response Teams	31	24.4
Public Health	34	26.8
Police	81	63.8

Four events (3.1%) reported only one category of responders, 44 (29.1%) reported two categories of responders, 32 (25.2%) reported three and 57(38.6%) reported four or five categories of responders. The frequencies of events by types of categories of responders are in Figure 5. Note that public health was more frequently involved in events with only one or two responders (i.e., smaller events), and HazMat and Fire were more likely to be involved in events with multiple responders.

Figure 5- Number of responder categories at event - Michigan HSEES 2011.



Public health actions

Forty-five (35.4%) of the 127 events resulted in one or more public health responses. The largest percentage of public health action was for environmental sampling with 39 (30.7%) events, followed by health investigation 5 (3.9%), health advisories 3 (2.4%) , well survey 3 (2.4%), providing alternative water supplies 1(0.8%), 1 (0.8%) where the building was inspected and 1 (0.8%) event where the building was condemned..

Victims, evacuations, and sheltering-in-place

Seventy-five (59%) of the 127 events involved an injury or evacuation. A brief synopsis of each of the 75 events that included one or more of these public health impacts is included in Appendix 3.

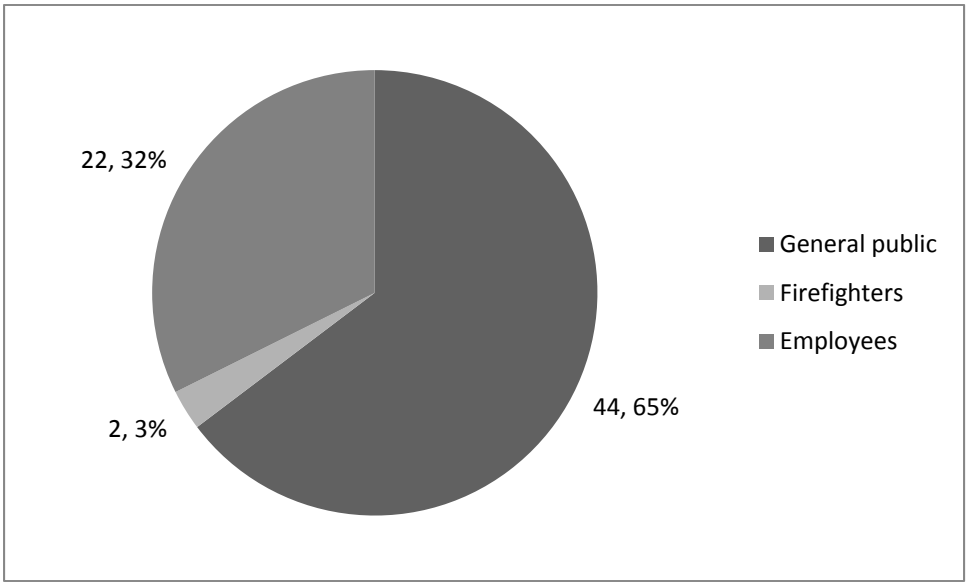
Victims

Sixty-eight victims were reported in 44 events (34.6% of the 127 events) (Table 7). Of the 44 events with victims, 31 (70.5%) involved only one victim, 8 (18.1%) involved two victims, 2 (4.5%) had three victims, and 3 (6.8%) had four or more victims. Of all victims, 62 (91.2%) were injured in fixed facility events (Table 7).

Table 7 - Number of victims per event, by type of events - Michigan HSEES 2011.

Number of Victims	Type of event								
	Fixed Facility			Transportation			All Events		
	No. of Events	%	Total Victims	No. of Events	%	Total Victims	No. of Events	%	Total Victims
1	29	65.9	29	2	4.5	2	31	70.4	31
2	6	13.6	12	2	4.5	4	8	18.2	16
3	2	4.5	6	0	0	0	2	4.5	6
≥4	3	6.8	15	0	0	0	3	6.8	15
Total	40		62	4		6	44		68

Figure 7 – Victims by population group - Michigan HSEES 2011. (N=68)

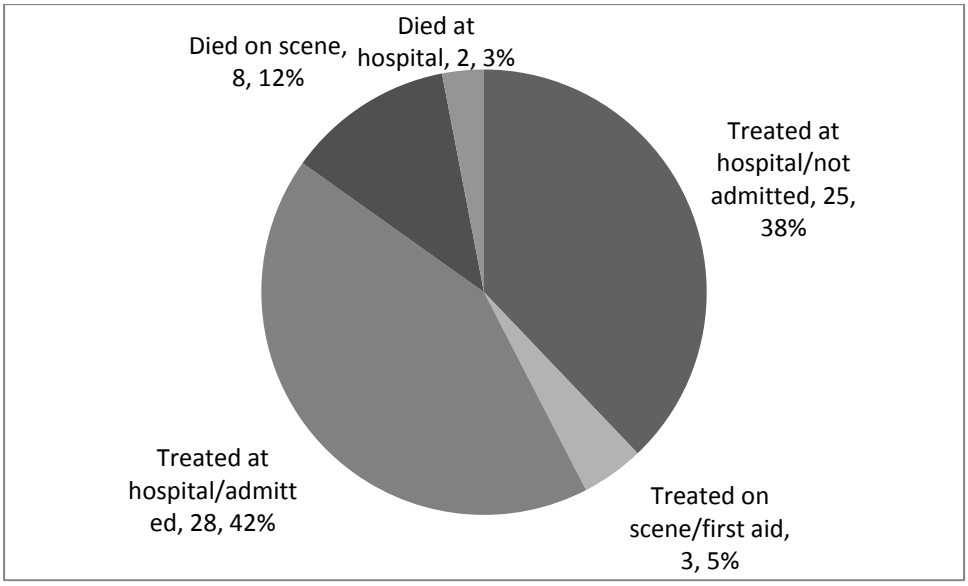


The age group was determined for 39 (57.4%) of the 68 victims: Two (2.9%) were five to 14 years old, 2 (2.9%) were 15 - 20 years old, 19 (27.9%) were 20 – 44 years old, 14 (20.6%) were 45 – 64 years old and 2 (4.2%) were older than 65 years.

Sex was known for 54 (79.4%) of the victims; of these, 38 (55.9%) were male.

Severity of injuries was known for 66 (97%) of the victims: 25 (36.8%) were treated and released from the hospital, 3 (4.4%) were treated on scene, 28 (41.1%) were admitted to the hospital, and 10 (14.7%) died (Figure 8).

Figure 8 - Injury outcomes - Michigan HSEES 2011.



Of the 68 victims, 60 were reported to have sustained a total of 60 injuries or symptoms (Table 8). (The remaining eight were known to have been injured, but the types of injuries were unknown.) Of all the reported injuries/symptoms the most common were burns with 26 (43.3%), followed by trauma with 15 (25%).

Table 8 – Number of Injuries/Symptoms - Michigan HSEES 2011.

Injury/Symptom	No. of injuries	%
Burns	26	43.3
Trauma	15	25.0
Respiratory Irritation	13	21.7
Other	4	6.7
Dizziness/other CNS* symptoms	2	3.3
Total	60	100

*Central Nervous System

Fatalities

Among the 68 victims there were 10 (14.7%) fatalities. Of the fatalities 3 (30.0%) were from natural gas/propane explosions, 4 (40.0%) were from fires resulting in the use of cigarettes while on oxygen, 1 (10%) was from hydrogen sulfide in a confined space, 1(10%) was from gasoline, and 1 (10%) was from a fire when filling a butane lighter.

Evacuations and sheltering-in-place

Evacuations were ordered in 50 (39.4%) of the 127 events. Of these evacuations 33 (66%) were of buildings or the affected parts of the building, 3(6%) were within a circle or radius of the event, 1 (2%) had no defined criteria, 2 (4%) were downwind of the event, 3(6%) were within a circle and downwind of the event, and for 9 (18%) the area of evacuation was unknown.

The number of people evacuated was known for 7 (14%) of the 50 events. Four of the seven events involved less than 20 people each. The three others each involved more than 30 people: a freight train derailment, a cooking oil fire in an apartment and a natural gas leak at an elementary school.

Five (10%) of the events with evacuation orders had shelter-in-place orders along with the evacuation orders.

Appendix 1 – Events by county – Michigan HSEES, 2011
(One event occurred in Sarnia, Port Lambton, Ontario, Canada)

County	Event Type				Total	
	Fixed Facility		Transportation		All Events	
	Number	%	Number	%	Number	%
Alger	1	0.8	0	0	1	0.8
Allegan	3	2.4	1	0.8	4	3.2
Antrim	1	0.8	0	0	1	0.8
Arenac	1	0.8	0	0	1	0.8
Bay	3	2.4	0	0	3	2.4
Berrien	0	0	1	0.8	2	1.6
Calhoun	0	0	1	0.8	2	1.6
Charlevoix	1	0.8	0	0	1	0.8
Cheboygan	1	0.8	0	0	1	0.8
Delta	1	0.8	0	0	1	0.8
Dickinson	1	0.8	0	0	1	0.8
Eaton	2	1.6	0	0	2	1.6
Genesee	5	4.0	1	0.8	7	5.6
Gladwin	1	0.8	0	0	1	0.8
Gogebic	1	0.8	0	0	1	0.8
Huron	1	0.8	0	0	1	0.8
Ingham	7	5.6	1	0.8	8	6.3
Ionia	1	0.8	0	0	1	0.8
Iron	1	0.8	0	0	1	0.8
Jackson	1	0.8	1	0.8	2	1.6
Kalamazoo	6	4.8	1	0.8	7	5.6
Kent	7	5.6	0	0	7	5.6
Lenawee	4	3.2	0	0	4	3.2
Livingston	3	2.4	1	0.8	5	4.0
Macomb	6	4.8	0	0	6	4.8
Marquette	1	0.8	0	0	1	0.8
Mason	1	0.8	0	0	1	0.8
Mecosta	1	0.8	0	0	1	0.8
Midland	1	0.8	0	0	1	0.8
Monroe	1	0.8	0	0	1	0.8
Montcalm	2	1.6	0	0	2	1.6
Muskegon	4	3.2	0	0	4	3.2
Oakland	11	8.7	0	0	11	8.7
Oceana	1	0.8	0	0	1	0.8
Ottawa	2	1.6	0	0	2	1.6
Presque Isle	1	0.8	0	0	1	0.8
Saginaw	4	3.2	1	0.8	5	4.0
Shiawassee	0	0	1	0.8	1	0.8
St. Clair	4	3.2	0	0	4	3.2
St. Joseph	1	0.8	0	0	1	0.8
Tuscola	1	0.8	0	0	1	0.8
Van Buren	2	1.6	0	0	2	1.6
Washtenaw	4	3.2	1	0.8	5	4.0
Wayne	13	10.3	1	0.8	14	11.1
Total	**114**	**90.5**	**12**	**9.5**	**126**	**100**

Appendix 2 – Complete list of substances released and frequencies – Michigan HSEES, 2011

Chemical Name	Number of Events	Percent
Mercury	27	21.3
Natural Gas	23	18.1
Ammonia	10	7.9
Gasoline	7	5.5
Methamphetamine Chemicals NOS	7	5.5
Explosives NOS	4	3.1
Propane	4	3.1
Oxygen	3	2.4
Acetone	2	1.6
Butane	2	1.6
Hydrochloric Acid	2	1.6
Hydrogen	2	1.6
Acetylene	1	0.8
Ammonium Chloride	1	0.8
Black Powder	1	0.8
Bromine	1	0.8
Chlorine	1	0.8
Chlorosilane	1	0.8
Chromium	1	0.8
Corrosive NOS*	1	0.8
Diesel Fuel	1	0.8
Ethyl Alchol	1	0.8
Ethyl Mercaptan	1	0.8
Ethylene Oxide	1	0.8
Ferric Chloride	1	0.8
Fire Fighting Powder NOS	1	0.8
Grease NOS	1	0.8
Isocyanates NOS	1	0.8
Metal NOS	1	0.8
Methyltrichlorosilane	1	0.8
MIX: 1,1-Dichloro-1-fluoroethane/Liquified Petroleum Gas/Roofing Emulsion NOS/Spray Paint NOS	1	0.8
MIX: Diesel Fuel/Plastic Fumes	1	0.8
MIX: Fertilizer NOS/Pesticide NOS/Solvent NOS	1	0.8
MIX: Fuel NOS/Lubricant NOS/Plastic Fumes/Roofing Emulsion	1	0.8
MIX: Hydrogen Sulfide/Methane	1	0.8
Nitric Acid	1	0.8
Oil NOS	1	0.8
Pepper Spray NOS	1	0.8
Petroleum Distillates	1	0.8
Phosphine	1	0.8
Plastic Fumes	1	0.8
Reaction: Aluminum/Hydrochloric Acid	1	0.8
Reaction: Chlorine/Fluoride	1	0.8
Reaction: Corrosive NOS/Methyl Ethyl Ketone	1	0.8
Silane	1	0.8
Sulfuric Acid	1	0.8

*NOS – Not Otherwise Specified

Appendix 3- Events resulting in an evacuation, injury or exposure- Michigan HSEES, 2011

MI20110001 - Employees were transferring silane between two tanks, fitting failed causing fire, employees evacuated, no report of injuries.

MI20110002 - A natural gas explosion resulted from a problem with a newly installed hot water heater. The explosion destroyed four apartments, killing a 53 year old man and severely burning a 50 year old woman.

MI20110003 – 58 year old man was killed in a fire from smoking while on oxygen.

MI20110006 - Freight train derailed leaking 2700 gallons of hydrochloric acid, air monitoring was done and drinking water wells were sampled, 35 people were evacuated.

MI20110007 - A sling psychrometer was used by a window company in a home. The instrument was broken and mercury was flung throughout the home resulting in a lengthy cleanup.

MI20110008 - Ammonia was released from refrigeration, 3 employees reported nausea, headache.

MI20110013 - Natural gas dehydration unit failed at a storage facility causing a fire, an employee suffered minor burns while closing safety valves.

MI20110014 - Natural gas leak, resulting in the evacuation of 3 homes.

MI20110015 - Natural gas leak, three businesses evacuated, 15 people. Took at least 3 days to dissipate due to frozen ground.

MI20110017 - A tractor clearing snow hit a 500 pound propane tank causing an explosion resulting in the fatality of the operator due to burns.

MI20110018 - Bromine leak at manufacturing facility, 4 injuries, shelter in place orders and schools were delayed in opening.

MI20110019 - Methamphetamine lab caught house on fire, burning operator.

MI20110021 - A 12 year old boy was injured from heating a bullet with a lighter causing the gunpowder to explode.

MI20110022 - Man was working on an automobile fuel pump when it exploded, killing him.

MI20110024 - Automotive manufacturing plant caught foam in machine on fire, extensive fire, quite a bit of smoke produced. Plant evacuated, shelter in place orders for surrounding residents.

MI20110025 - Two 55 gallon drums filled with gasoline were stored in the basement of a home and were ignited by a space heater, home was destroyed in the resulting explosion and fire.

MI20110026 - Copper thieves broke gas line when stealing water pipes, house exploded destroying house and damaging house next door.

MI20110027 - Man was working on his gas stove, fell asleep, woke up, lit cigarette and house exploded.

MI20110028 - Natural gas explosion destroyed a travel agency, injured one man living in apartment above.

MI20110036 - Ammonia line broke while applying to farm field, applicator had burns to his face arms and chest.

MI20110037 - Methamphetamine lab caught on fire in apartment building, building evacuated.

MI20110039 - Individual smoking while using oxygen caused fire resulting in fatality.

MI20110042 – Ammonia leak on a tank car, one employee was treated and released from hospital.

MI20110045 - Individual smoking while using oxygen caused fire resulting in two fatalities, four injuries.

MI20110046 - Contractor delivering chemicals to water treatment plant delivered to the wrong tank causing release of fluorine and chlorine gas, two people hospitalized.

MI20110049 - Mercury was intentionally spilled in a home due to a dispute among residents.

MI20110050 - Gas company responded to a residence where the gas level was at 68%, one person hospitalized.

MI20110051 - Two individuals lit a mortar in their truck and dropped it on the floor. The mortar shot to the roof and exploded injuring the men.

MI20110052 - Truck driver hit a truck parked on the freeway. One of the trucks was carrying a large load of whiskey, driver received severe burns, freeway closed.

MI20110055 - Bus garage caught on fire, smoke from burning diesel and plastics blew into adjoining neighborhood. One firefighter was injured.

MI20110058 - House exploded due to a natural gas leak, hospitalizing owner with burns.

MI20110059 - House exploded due to a propane leak, one person hospitalized.

MI20110060 - House exploded after piping and wiring were stolen from property. All windows were blown out of the house, house knocked off foundation.

MI20110061 - Worker died from falling into a 25 foot deep manhole after being overcome by sewer gases.

MI20110062 - Train derailment of chemical tank cars, no leaks but residents evacuated as a precaution.

MI20110063 - Bar chain oil was thrown on a campfire, burned 5, 3 hospitalized.

MI20110067 - Worker was exposed to chlorine vapor at work, hospitalized for observation.

MI20110068 - A worker was repairing a leak in a natural gas pipeline when the line broke, worker was found unconscious and later died.

MI20110069 - One person was severely burned when a methamphetamine lab exploded.

MI20110070 - A semi-truck hauling 65,000 pounds of beer hit a guard rail causing one of the saddle tanks to catch fire, freeway closed for 5 hours

MI20110071 - A fatality occurred when a butane lighter was being filled and it caught on fire.

MI20110072 - A fire at a plant resulted in the release of chemicals which were suppressed with water fog producing a cloud of ammonium chloride. Residents were asked to shelter in place and one local road was closed for one hour.

MI20110075 - An explosion occurred from an acetylene tank while welding, building caught on fire employees were evacuated.

MI20110076 - Propane leaked into the crawl space of a home and was ignited by a water heater resulting in one fatality.

MI20110077 - Ammonia leak at a steel treating facility, resulting in the evacuation of the business and closing of local streets.

MI20110078 - A methamphetamine lab exploded in a house resulting in severe burns to the operator, house was condemned.

MI20110079 - A woman was using nail polish remover and lit a lighter catching the nail polish remover on fire and ignited her clothing.

MI20110081 - A contract custodial firm found mercury spilled on a table from a clock.

MI20110085 - Propane explosion demolished home, one person was injured.

MI20110086 - Cooking oil caught on fire destroying apartment and displacing 42 residents.

MI20110087 - A firecracker was thrown at a woman who received severe burns to her legs and arms.

MI20110094 - Contractors broke a natural gas line, road closed, houses evacuated.

MI20110095 - Inventor was injured when an experiment exploded.

MI20110096 - Car hit a gas meter on the side of the house causing a fire that destroyed the car and the house.

MI20110097 - Contractor broke a 6 inch gas main, roads closed, buildings evacuated, gas service cut to business in area.

MI20110098 - A worker was repairing a gas leak when he passed out, was resuscitated on site.

MI20110099 - A construction crew broke a natural gas line, a local elementary school was evacuated.

MI20110101 - Employees at a restaurant drive-through were sprayed by a dry chemical fire extinguisher.

MI20110102 - A man was severely burned when his methamphetamine lab exploded. The explosion and fire destroyed the apartment building where the lab was located resulting in evacuation of other residents.

MI20110103 - A house exploded and was destroyed by fire from natural gas.

MI20110104 - A paving contractor broke a natural gas pipeline which caught on fire. An apartment building was evacuated.

MI20110107 - Home owner's relative was replacing a gas line without turning off the gas, 7000 cubic feet of gas leaked into the house exploded and caught fire. Relative was treated and released from hospital.

MI20110108 - Methamphetamine lab exploded in home knocking it off foundation and severely burning operator.

MI20110109 - Two individuals filled a plastic container with gasoline in their car and lit a cigarette causing an explosion. They jumped out of the car with it still moving and it rolled into the fire department parking lot where it burned and caught a fence on fire. The two individuals were admitted to the hospital for burns.

MI20110110 - House exploded from a natural gas leak. No injuries were reported.

MI20110112 - A tank truck hauling hazardous waste exploded at a truck stop. A beach was closed due to runoff from the tanker. Truck stop was evacuated before explosion, one firefighter had minor injuries.

MI20110115 - Medical center evacuated due to sulfur odor from battery acid.

MI20110116 – Hospital patient swallowed rat poison and was releasing phosphine. Hazmat teams were called in to monitor air quality.

MI20110118 - Two pounds of mercury was spilled in a home.

MI20110119 - A tank truck hauling hydrochloric acid leaked 100 gallons at a rest stop. Rest stop was closed and evacuated while hazmat teams cleaned the area.

MI20110121 - A high school was evacuated due to a gasoline smell. The gasoline entered the building through the ventilation system from a car leaking gas in the parking lot.

MI20110122 - A natural gas explosion occurred at a laundry. The Bureau of Alcohol, Tobacco, Firearms and Explosives determined that it was arson. Two people were injured when their car windows were blown out as they were driving by, 48 structures were damaged, 10 were condemned.

MI20110123 - Natural gas service was shut off to a house and 4 months later the house exploded from an illegal connection to the gas service.

MI20110124 - A man was severely burned when using gasoline to burn brush.

MI20110125 - A house exploded due to a natural gas leak and caught on fire, one house next to it was also destroyed by fire, another was damaged.