Occupational Pesticide Illness and Injury Surveillance in Michigan

2005

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Division of Environmental and Occupational Epidemiology
Michigan Department of Community Health

Occupational Pesticide Illness and Injury Surveillance in Michigan: 2005

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Occupational Pesticide Illness and Injury Surveillance in Michigan: 2005

Summary

This is the third annual report on surveillance of acute, work-related pesticide illnesses and injuries in Michigan. The first report covered data from 2001 – 2003 (MDCH 2005), the second covered 2001 – 2004, and this report summarizes data collected from 2001 – 2005 and presents detailed data on 2005 case reports. From 2001 through 2005, 415 reports were received and 284 (68.4%) were confirmed as cases according to the surveillance case definition. In 2005 there were 103 reported cases; 68 (66.0%) were confirmed. Eighty-nine (86.4%) of the 2005 cases were reported through Michigan's Poison Control Centers (PCC).

In 2005, more than half of all confirmed cases were from exposure to antimicrobial pesticides in contrast to 2004 where a third of the confirmed cases were from exposure to antimicrobials. Antimicrobial cases differed from other pesticide cases in several ways. The workers were more likely to be female, to work in service occupations, and to have an ocular exposure. Two of the three high severity cases in 2005 were due to antimicrobial exposure. The use of splash goggles while using antimicrobials would have prevented the majority of the confirmed cases from antimicrobials.

Ten (15.6%) of the exposed workers in 2005 were employed in hospitals, eight (12.5%) were employed in providing services to dwellings and other buildings, which includes structural pesticide applicators, and six (9.4%) were landscapers. Where activity of the exposed person was known, 27.1% were exposed inadvertently while doing their regular work that did not involve pesticide application.

Four events in 2005 were referred to the Michigan Department of Agriculture (MDA) for investigation of possible pesticide use violations. Two of these events met the criteria for priority reporting to the National Institute for Occupational Safety and Health (NIOSH). The four events are described on pages 15 and 16.

Background

Acting on concerns about acute occupational pesticide-related illness, NIOSH began collecting standardized information about acute occupational pesticide exposure in 1998[1] under the Sentinel Event Notification System for Occupational Risk (SENSOR) program. An analysis of 1998-99 data showed that surveillance could be an important tool to assess acute pesticide-related illness and to identify associated risk factors (Calvert, et al 2004).

In 2001, the Michigan Department of Community Health (MDCH) instituted an occupational pesticide illness and injury surveillance program with financial assistance from NIOSH. The

[1] http://www.cdc.gov/niosh/topics/pesticides/

intent of this surveillance is to identify the occurrence of adverse health effects and then intervene to prevent similar events from occurring in the future. The Michigan surveillance program received an additional five years of funding from NIOSH in July 2005.

MDCH developed this surveillance system because of the recognized need for data on work-related pesticide exposures and adverse health effects in Michigan. Agriculture is the second largest income-producing industry in Michigan, and pesticide use is widespread. The adverse health effects of pesticides are of concern to workers exposed in agricultural settings as well as those exposed in non-agricultural settings such as landscaping, structural applications, disinfectant use in health care or food service situations, or bystander exposure during workplace pesticide applications.

The goals of the pesticide surveillance system are to characterize the occupational pesticide-poisoning problem in Michigan and to prevent others from experiencing adverse health effects from occupational pesticide exposure. The surveillance data are used to:

- Identify groups at risk for pesticide-related illnesses;
- Identify clusters/outbreaks of pesticide-related illnesses;
- Detect trends;
- Identify high-risk active ingredients;
- Identify illnesses that occur even when the pesticide is used correctly;
- Identify and refer cases to regulatory agencies for interventions at worksites;
- Provide information for planning and evaluating intervention programs.

Methods

Occupational pesticide poisoning is reportable under the Public Health Code (Part 56 of Act 368 of 1978, as amended). This law requires health care providers (including Michigan's two Poison Control Centers), health care facilities, and employers to report information about individuals (including names) with suspected or confirmed work-related diseases to the state.

The surveillance system also collects information on individuals with occupational exposure to pesticides who have been reported to the Pesticide and Plant Pest Management Division of MDA. MDA receives complaints about pesticide misuse and health effects and is mandated to conduct investigations to address potential violations of pesticide laws.

Pesticides are a category of chemicals that are used to kill or control insects, weeds, fungi, rodents, and microbes. There are over 600 different approved active ingredients that are sold in about 16,000 products used in the United States (Calvert, 2004).

A new data source was added in 2005 – Michigan's Hazardous Substances Emergency Event Surveillance (HSEES) program, which began data collection in 2005. HSEES receives reports of uncontrolled or illegal acute releases of hazardous substances. When a pesticide is involved, HSEES staff provides the information to the Occupational Pesticide Illness and Injury Surveillance program.

The MDCH work-related pesticide poisoning surveillance system is a case-based system. A reported individual must meet the case definition established by NIOSH and the participating states[2] to be included as a confirmed case. Data are collected according to standardized variable definitions in a database developed for states that are conducting pesticide surveillance.

A suspected case is any person reported to have been exposed at work to a pesticide product. Individuals are interviewed to determine the circumstances of the reported pesticide exposure, the signs and symptoms they experienced, the name of the pesticide, the name of the workplace where exposure occurred, and other details about the incident. When possible, medical records are obtained to confirm and clarify the conditions reported.

Suspected cases are then classified based on criteria related to (1) documentation of exposure, (2) documentation of adverse health effects, and (3) evidence supporting a causal relationship between pesticide exposure and health effects. The possible classifications are: definite, probable, possible, suspicious, unlikely, insufficient information, exposed but asymptomatic, or unrelated.[3] Cases classified as definite, probable, possible, or suspicious are considered confirmed cases.

Confirmed cases are evaluated regarding the severity of the health effect: low, moderate, high and death. The severity index is based on the signs and symptoms experienced, whether medical care was sought, if a hospital stay was involved, and whether work time was lost.[4]

Work sites or work practices where other workers may be at risk are identified. When appropriate, referrals are made to two other state agencies with regulatory responsibility for worker health and pesticide use: the MDA and the Michigan Occupational Safety and Health Administration (MIOSHA) in the Michigan Department of Labor and Economic Growth (DLEG). MDA enforces state and federal legal requirements for the sale and use of pesticides, including training and licensing pesticide applicators. MDA also enforces the federal Environmental Protection Agency's (EPA) Worker Protection Standard, which includes requirements to protect agricultural workers from adverse health effects of pesticides. DLEG enforces MIOSHA standards and performs training in health and safety.

In addition, NIOSH requests prompt reporting of high priority events. The criteria for defining high priority events are:

a. events that result in a hospitalization or death;
b. events that involve four or more ill individuals;
c. events that occur despite use according to the pesticide label; or
d. events that indicate the presence of a recurrent problem at a particular workplace or employer.

With prompt reporting of these events by states involved in pesticide illness and injury surveillance, NIOSH can refer cases to the EPA as needed, identify clusters across states, and

[2] http://www.cdc.gov/niosh/topics/pesticides/pdfs/casedef2003_revAPR2005.pdf page 1
[3] http://www.cdc.gov/niosh/topics/pesticides/pdfs/casedef2003_revAPR2005.pdf pages 2-3
[4] http://www.cdc.gov/niosh/topics/pesticides/pdfs/pest-sevindexv6.pdf

identify the need for national level interventions. Finally, if appropriate, MDCH surveillance staff provide educational consultations to reported individuals and their employers about reducing hazards related to pesticide exposures.

Results

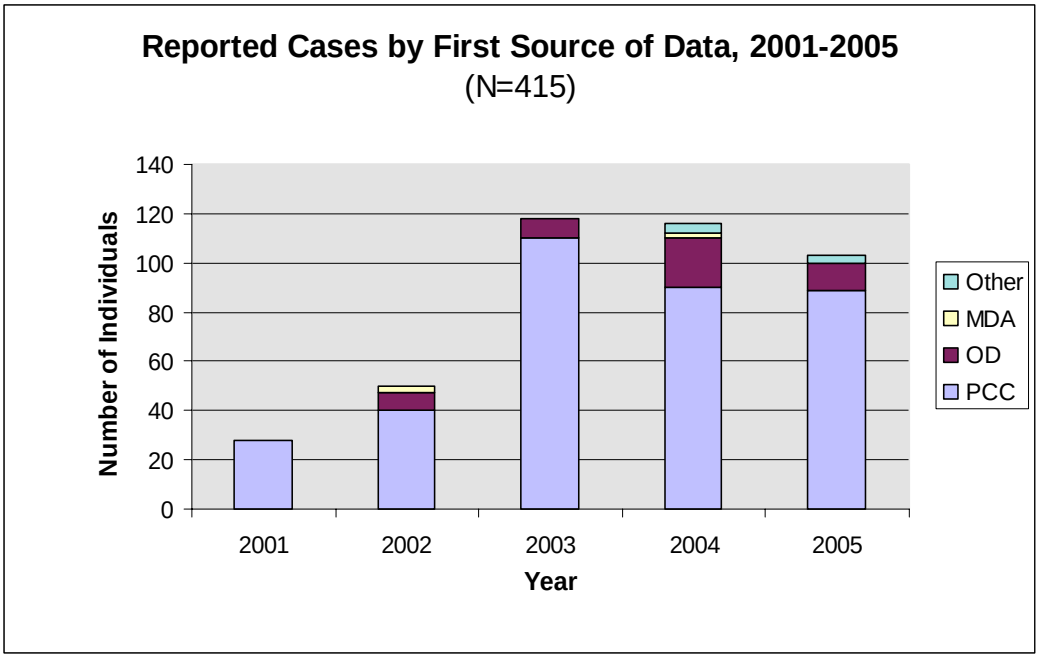
Reports

There were 415 reports of acute occupational pesticide poisonings from 2001 – 2005. These represent 377 separate events, 103 of which were reported in 2005.

Data Source
The distribution of the sources of the case reports is shown in Figure 1. The Poison Control Centers (PCC) remain the major source of reports. In 2005, 89 (86.4%) cases were reported by the PCCs. Eleven (10.7%) cases were from occupational disease (OD) reports from a health care provider and three (2.9%) cases were reported by MDCH's HSEES program.

The average time between the event and the report to the State varied by reporting source. The one event with three cases reported by HSEES was very timely, reported 3 days after the event. PCCs also provided timely reports, with an average time lag of 15 days in 2005. The median time lag for PCCs was three days, with 30 cases being reported the same day the event occurred. The OD reports had the longest time lag, with an average of 361 days between the incident and the date the report was received. This long time lag is secondary to the fact that most OD reports are from hospitals, which report all their cases only once a year.

Figure 1



Classification

Of the 415 cases reported from 2001 through 2005, 284 (68.4%) met the criteria to be considered confirmed cases. In 2005, 68 (66.0%) cases were considered confirmed cases. (Table 1)

Table 1

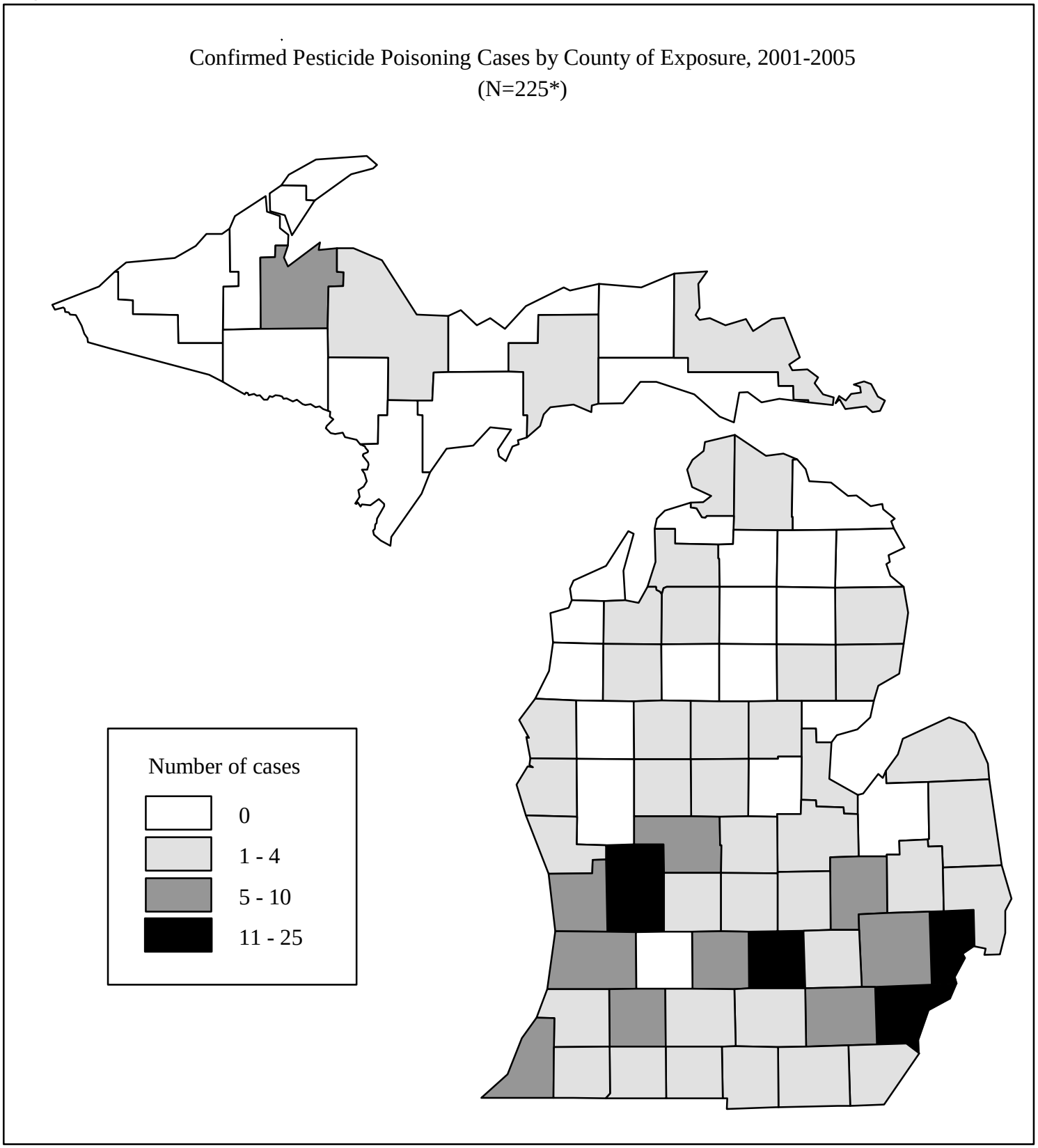
Reported Cases by Classification, 2005 and 2001-2005

	2005		2001-2005	
Classification	**Number**	**Percent**	**Number**	**Percent**
Confirmed cases				
Definite	8	7.8	47	11.3
Probable	15	14.6	56	13.5
Possible	43	41.7	172	41.4
Suspicious	2	1.9	9	2.2
total confirmed	*68*	*66.0*	*284*	*68.4*
Not confirmed				
Unlikely	0	0.0	2	0.5
Insufficient Information	33	32.0	101	24.3
Exposed, Asymptomatic	1	1.0	23	5.5
Unrelated	1	1.0	5	1.2
total not confirmed	*35*	*34.0*	*131*	*31.6*
Total	103	100.0	415	100.0

Location in State

In 2005, there were no confirmed cases in 72.2% of Michigan's counties (60 of 83 counties). Kent, Macomb, Oakland, and Wayne counties each had five reported cases in 2005. Since the numbers per county are low, Figure 2 shows the distribution of all confirmed cases (2001-2005) to preserve anonymity. The county of exposure was unknown for 59 (20.8%) confirmed cases.

Figure 2



* County of exposure was unknown for 59 cases.

The summary information that follows includes data on the 68 confirmed cases reported in 2005. The appendix contains a brief narrative of each confirmed case from 2005. See the previous annual reports for a brief narrative of confirmed cases from previous years.

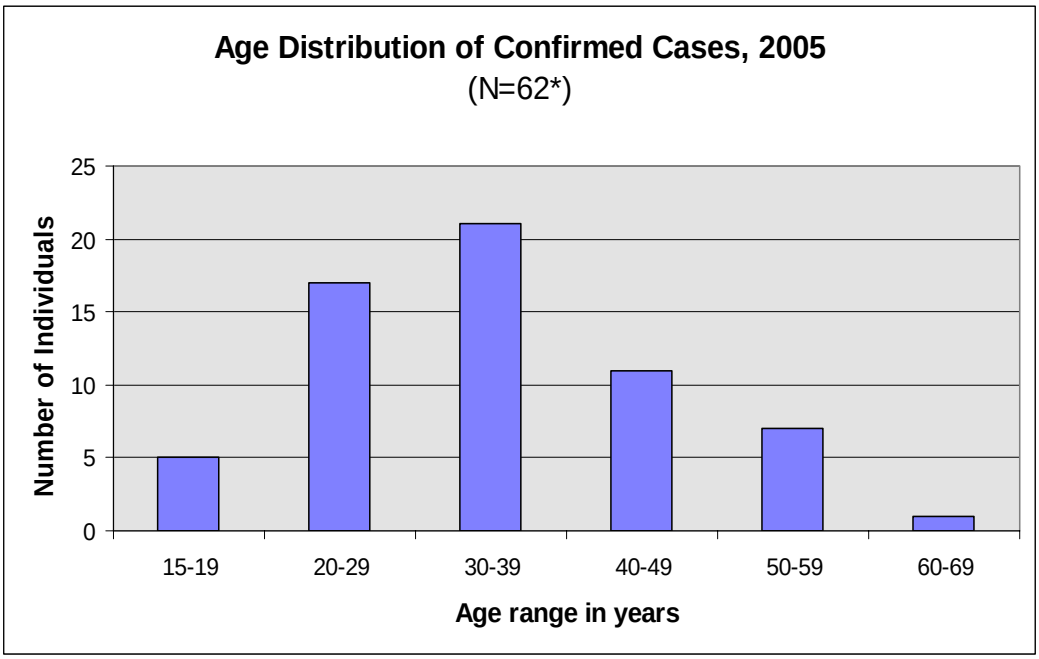
Demographics

Gender
Of the 68 persons with confirmed work-related pesticide illnesses or injuries, 35 (51.5%) were men and 33 (48.5%) were women.

Race and Ethnicity
For 22 (32.4%) individuals, race was unknown. Where race was known, 37 (80.4%) were white. Ethnicity was unknown for 26 (38.2%) cases. Where it was known, 1 (2.4%) was Hispanic.

Age
The age distribution of the individuals where the age was known is shown in Figure 3. The median age was 35, with a range of 17 to 63. Most (61.3%) of the exposed individuals were young adults, 20 – 39 years old.

Figure 3



* Age was unknown for six of the confirmed cases.

Industry[5]
The type of industry where individuals were employed provides information on where to target interventions. Industry of employment was known for 64 (94.1%) of the 68 confirmed cases and is shown in Table 2.

[5] Categorized based on 1990 US Bureau of Census Industry Codes

Ten (15.6%) individuals worked in a hospital or a health care provider office; they are included in the Professional and Related Services category. All eight (12.5%) in the Business and Repair Services category were in the 'Services to Dwellings and Other Buildings' category, which includes structural pesticide applicators. Six (9.4%) were landscapers and are included in Agriculture, Forestry, and Fisheries.

Table 2

Industry of Confirmed Cases, 2005 (N=64*)		
Type of Industry	**Number**	**Percent**
Professional and Related Services	22	34.4
Agriculture, Forestry, and Fisheries	11	17.2
Retail Trade	9	14.1
Business and Repair Services	8	12.5
Entertainment and Recreation Services	6	9.4
Transportation, Communication, Public Utilities	4	6.3
Miscellaneous	4	6.3
Total	64	100.0

* Industry was unknown for four confirmed cases

Occupation[6]

The occupation of the workers who become ill provides additional information that may help to direct interventions and activities. Occupation was known for 57 (83.8%) of the 68 confirmed cases and is shown in Table 3.

The most common Service Occupations were cleaners/housekeepers (ten or 45.5%), generally exposed to antimicrobials. Six (27.3%) were pesticide applicators. Most (six or 66.7%) of the Farming, Forestry, and Fishing workers were gardeners and groundskeepers.

Table 3

Occupation of 2005 Confirmed Cases (N=57*)		
Occupation	**Number**	**Percent**
Service Occupations	22	38.6
Technical, Sales and Administrative Support Occupations	10	17.5
Farming, Forestry, and Fishing Occupations	9	15.8
Managerial and Professional Specialty Occupations	8	14.0
Precision Production, Craft, and Repair Occupations	4	7.0
Operators, Fabricators, and Laborers	4	7.0
Total	57	100.0

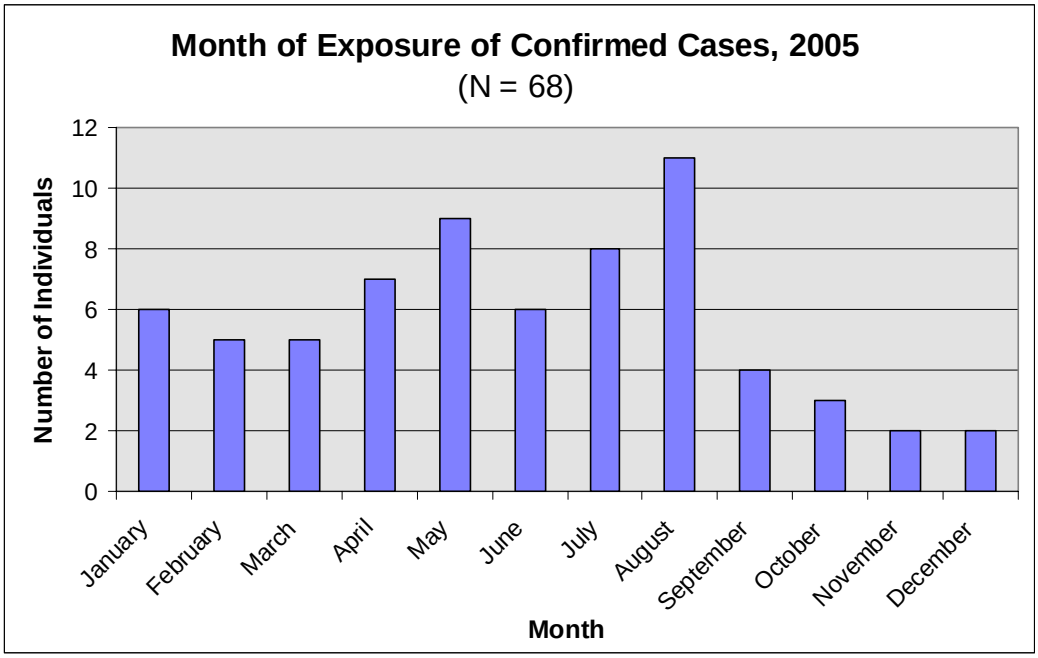
* Occupation was unknown for 11 confirmed cases

[6] Categorized based on 1990 US Bureau of Census Occupation Codes

Exposures

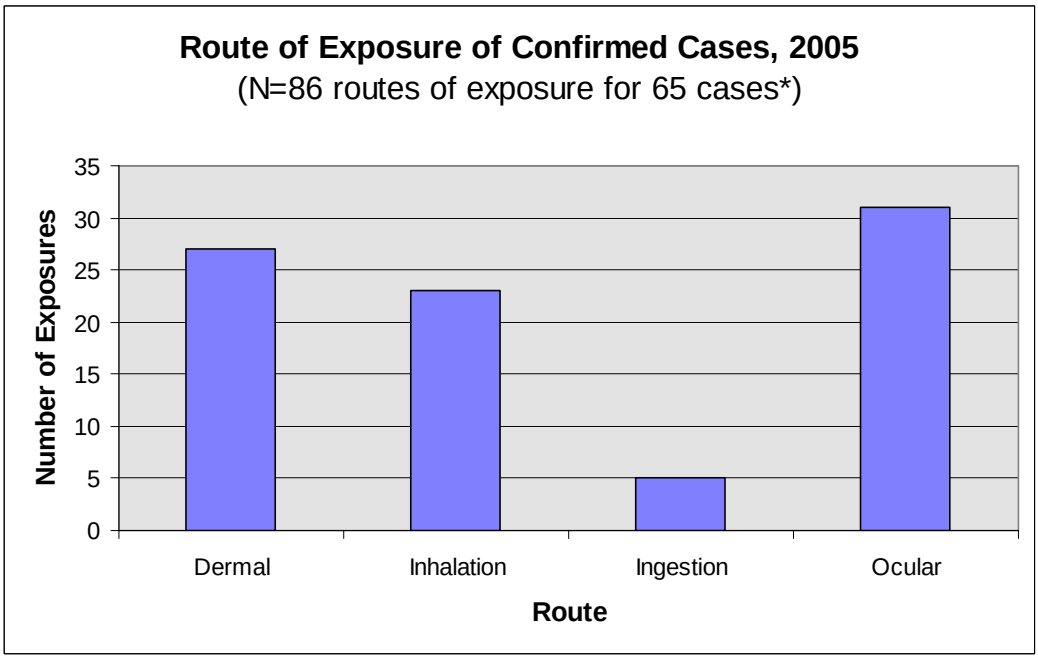
Month of Exposure
Figure 4 shows that confirmed cases were more likely to be exposed in the spring and summer months.

Figure 4



Route of Exposure
Route of exposure indicates how the pesticide entered the body. Figure 5 shows that 65 individuals identified one or more routes of exposure for a total of 86 routes, including 31 (36.0%) ocular exposures, 27 (31.4%) dermal exposures and 23 (26.7%) inhalations. Sixteen individuals were exposed through two different routes. One person had three routes of exposure and one person had four routes.

Figure 5

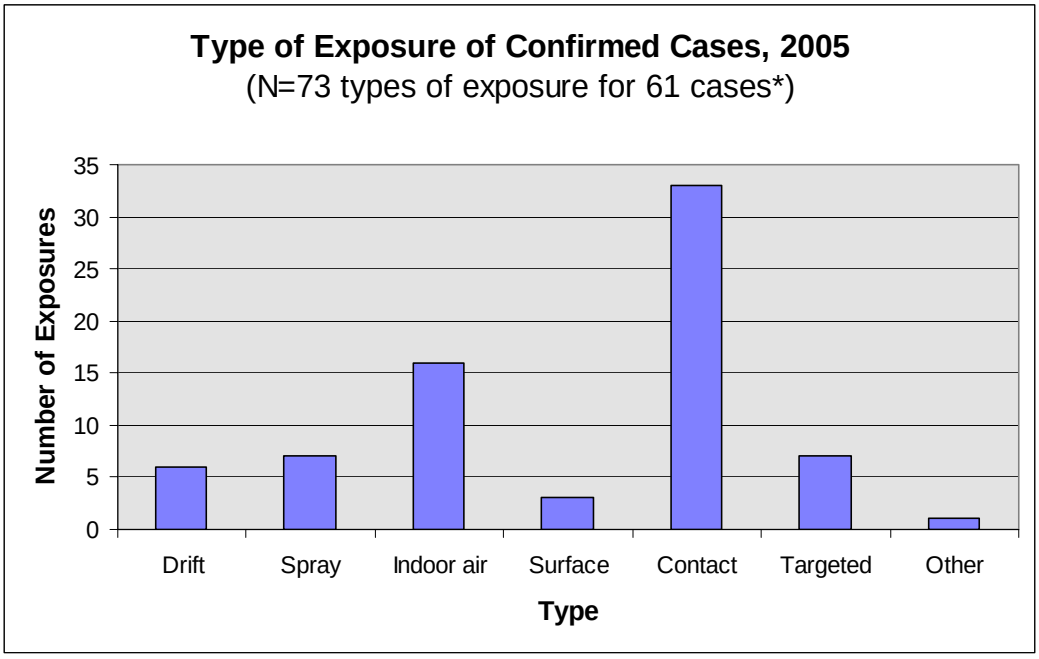


*Route of exposure was unknown for three confirmed cases; 18 had multiple routes of exposure.

Type of Exposure

Figure 6 shows how workers who became ill were exposed to pesticides. Exposure from direct contact with the pesticide, such as during application or from an accidental spill, accounted for 33 (45.2%) cases where type of exposure was known. Exposure via indoor air accounted for an additional 16 (21.9%) cases. Eleven workers experienced more than one type of exposure.

Figure 6

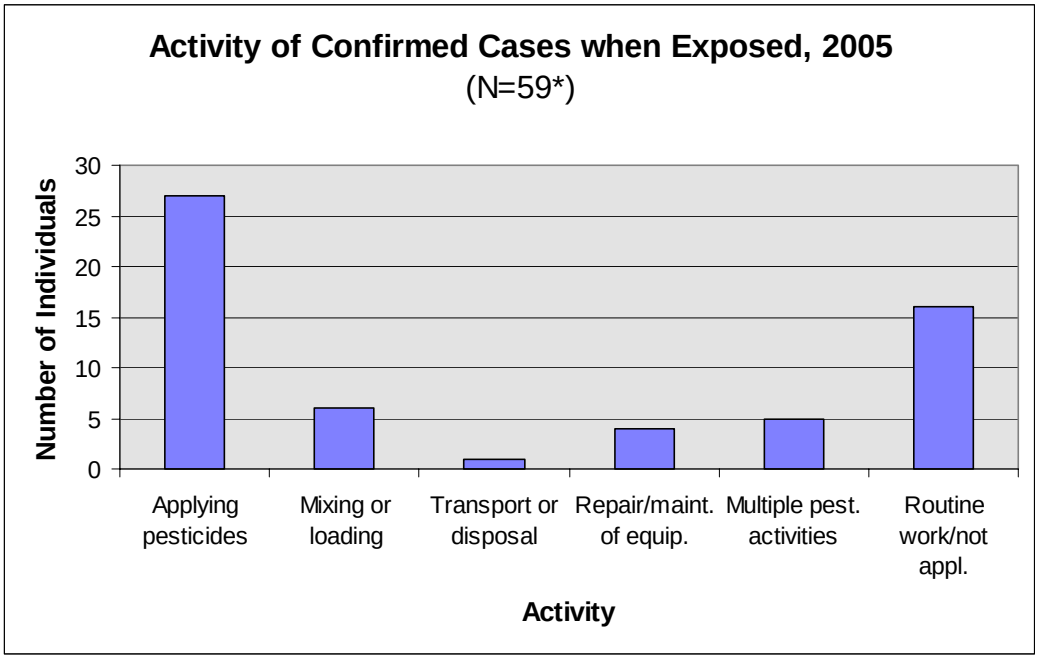


*Type of exposure was unknown for seven confirmed cases; eleven cases had more than one type of exposure.

Activity at Time of Exposure

Activity at time of exposure was determined for 59 (86.8%) of the confirmed cases. Of those, Figure 7 shows that 16 (27.1%) were doing work activities that did not involve pesticide applications and thus had "bystander" exposure. Twenty-seven (45.8%) individuals who became ill were applying pesticides when they were exposed.

Figure 7



* Activity was unknown for 9 cases

Medical Care

Table 4 shows where confirmed cases first sought medical care. Forty-four (44.1%) of the 68 cases first sought medical advice from an emergency department; in some instances medical personnel consulted with Poison Control.

Table 4

First Source of Medical Care of Confirmed Cases, 2005
(N=68)

First Care	Number	Percent
Advice from poison control	34	50.0
Emergency room/urgent care	30	44.1
Ambulance	2	2.9
Occupational health clinic	1	1.5
Physician office visit	1	1.5
Total	68	100.0

Product Used

Among confirmed cases, more than half of all exposures were to antimicrobials (see Table 5). Table 6 shows the severity of the case by the type of product used. For more information on the high severity cases, see MI00367, MI00434, and MI00436 in the appendix.

Table 5

Product Type of Confirmed Cases, 2005 (N=68)		
Product Type	**Number**	**Percent**
Insecticide	17	25.0
Herbicide	13	19.1
Fungicide	1	1.5
Antimicrobial	35	51.5
Mixture	2	2.9
Total	68	100.0

Table 6

Severity by Product Type of Confirmed Cases, 2005 (N=68)						
Product Type	**Low**		**Moderate**		**High**	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Insecticide	16	28.6	1	11.1	0	0.0
Herbicide	11	19.6	2	22.2	0	0.0
Fungicide	1	1.8	0	0.0	0	0.0
Antimicrobial	27	48.2	6	66.7	2	66.7
Mixture	1	1.8	0	0.0	1	33.3
Total	56	100.0	9	100.0	3	100.0

Antimicrobials

Antimicrobials accounted for more than half of the confirmed cases in 2005.

Antimicrobial pesticides are substances or mixtures of substances used to destroy or suppress the growth of microorganisms such as bacteria, viruses, or fungi on inanimate objects and surfaces.[7] Antimicrobials are registered by the EPA, just as other pesticides are. Antimicrobials include:

- Sterilizers, which destroy microbes including fungi, viruses, bacteria, and their spores;
- Disinfectants, which destroy or inactivate fungi and bacteria, but not necessarily their spores; and
- Sanitizers, which reduce microorganisms from inanimate objects to levels considered safe.

Type of Antimicrobial

Where the type of antimicrobial used was known, the most commonly reported type was disinfectant (82.6%). (Table 7)

[7] http://www.epa.gov/oppad001/ad_info.htm "What Are Antimicrobial Pesticides?"

Table 7

Type of Antimicrobial, 2005 Confirmed Cases (N=23*)		
Type	**Number**	**Percent**
Sterilizer	3	13.0
Disinfectant	19	82.6
Sanitizer	1	4.3
Total	23	100.0

* Type of antimicrobial was unknown for 12 cases

Active Ingredient

A wide variety of active ingredients are used in antimicrobial pesticides. Table 8 shows that the most commonly reported one was alkyl dimethyl benzyl ammonium chloride, present in 41.2% of the 34 products for which active ingredient was known. Sodium hypochlorite (bleach) was also common, in 32.4% of the products.

As with other pesticides, there can be more than one active ingredient. In particular, 12 of the alkyl dimethyl benzyl ammonium chloride products had at least one other ingredient, usually other ammonium chloride compounds.

Table 8

Active Ingredient, 2005 Confirmed Antimicrobial Cases (N=56*)		
Ingredient	**Number**	**Percent**
Alkyl dimethyl benzyl ammonium chloride	14	25.0%
Sodium hypochlorite	11	19.6%
Didecyl dimethyl ammonium chloride	6	10.7%
Alkyl dimethyl ethylbenzyl ammonium chloride	5	8.9%
Octyl decyl dimethyl ammonium chloride	3	5.4%
Hydrochloric acid	3	5.4%
Glutaraldehyde	2	3.6%
1,2-Benzenedicarboxaldehyde	2	3.6%
2-Benzyl-4-chlorophenol	2	3.6%
o-Phenylphenol	2	3.6%
3-(Trimethoxysilyl) propyl dimethyl octadecyl ammonium chloride	1	1.8%
Peroxyacetic acid	1	1.8%
Phosphoric acid	1	1.8%
Isopropanol	1	1.8%
Sodium hydroxide	1	1.8%
Pine oil	1	1.8%
Total	56	100.0%

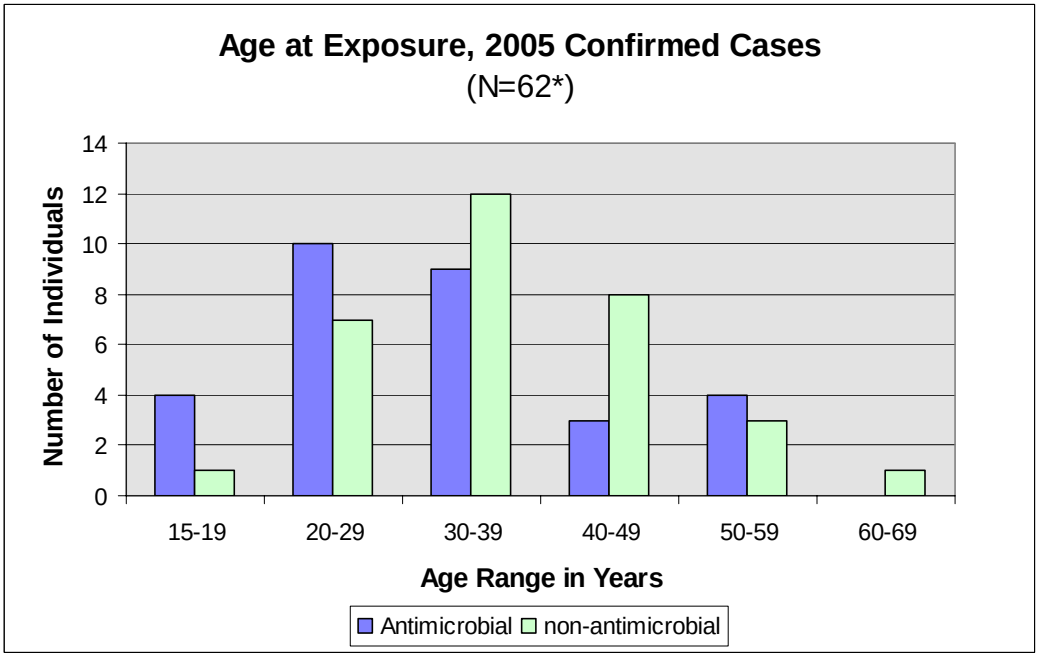
* Active ingredient was unknown for one case; nineteen cases had more than one active ingredient

Confirmed cases from 2005 with antimicrobial pesticide exposures are compared to cases with exposures to other pesticides.

Gender
Women were more likely to be exposed to antimicrobial pesticides, with 60.0% of antimicrobial exposures, whereas only 36.4% of the non-antimicrobial exposures were women.

Age
Workers exposed to antimicrobials tended to be younger than those exposed to other pesticides, with a median age of 32.6 compared to 36.4. (Figure 8)

Figure 8



* Age was unknown for six of the confirmed cases.

Occupation
In more than half of the antimicrobial cases, the exposed person was working in a Service Occupation. For non-antimicrobial cases, the largest group was in Farming, Forestry, and Fishing Occupations (mostly farming and landscaping). (Figures 9 and 10)

Figure 9

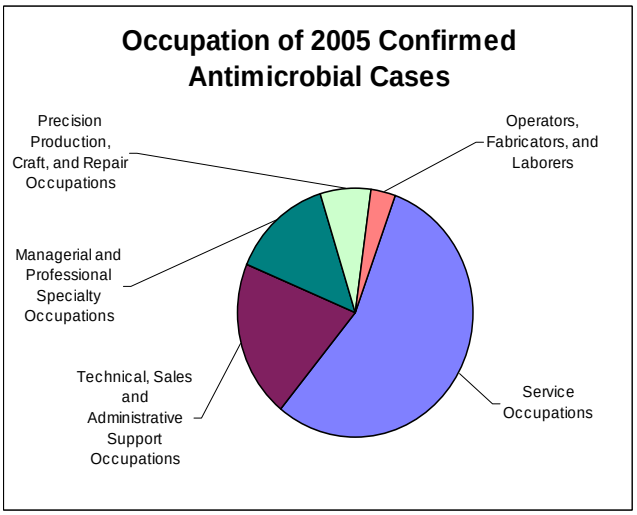
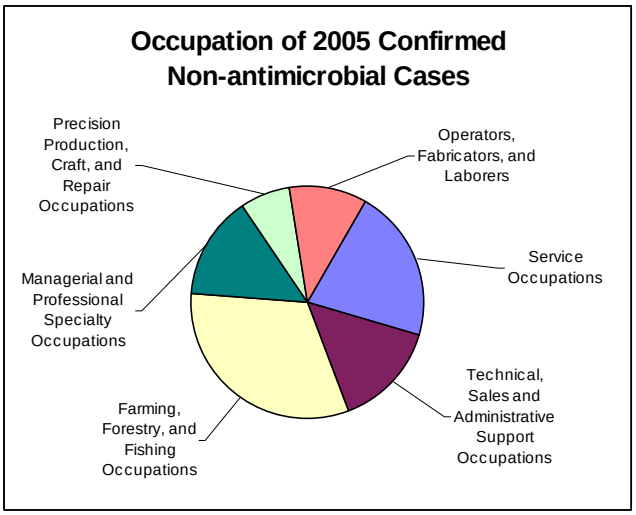
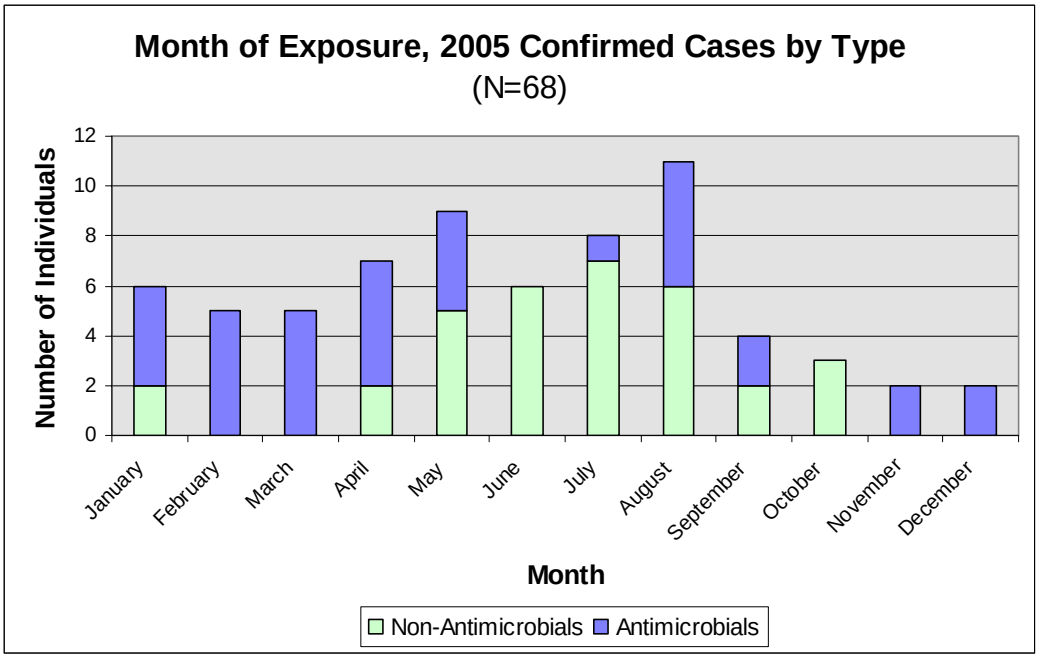


Figure 10



Month of Exposure
Confirmed cases from exposures to non-antimicrobial pesticides were more likely to occur in the warmer months than confirmed cases from exposures to antimicrobials.

Figure 11



Route of Exposure
Table 9 shows that more than half of all antimicrobial exposures were eye injuries. Dermal and inhalation exposures were most common for non-antimicrobial cases.

Table 9

Route of Exposure of Confirmed Cases, 2005
(N=86 routes of exposure for 65 cases*)

	Antimicrobials		Non-antimicrobials	
Route	Number	Percent	Number	Percent
Dermal	9	21.4%	18	40.9
Inhalation	9	21.4%	14	31.8
Ingestion	1	2.4%	4	9.1
Ocular	23	54.8%	8	18.2
Total	42	100.0%	44	100.0

* Three non-antimicrobial cases had unknown routes of exposure

Outreach, Education, and Prevention Activities

Publications and Presentations

A staff member of the surveillance program represented MDCH on the MDA Pesticide Advisory Committee and provided an activity report each quarter. In addition, staff regularly attended the Michigan Primary Care Association's Migrant and Seasonal Farmworkers Workgroup. Information about the program, pesticide safety, and occupational disease reporting requirements was provided to migrant health clinics.

The MDCH surveillance program contributed to a NIOSH article about cases occurring in retail establishments that has been accepted for publication in *Public Health Reports*.

The 2003 Pesticide annual report was finalized, distributed to stakeholders, presented at the interagency Migrant Council, and made available on the Division's website.

The pesticide surveillance program researched and screened links to accurate and useful information about pesticide use and safety. These links were organized and made available to the public on the Division's website.

Information about MDCH's Occupational Pesticide Illness and Injury Surveillance project was presented at the Michigan Association of Local Public Health (MALPH) annual Information Integration conference and the Michigan Grower and Farmworker conference. An update of the project, with results, was presented at the annual meeting with Michigan's Poison Control Centers and to the employees at the Detroit Poison Control Center.

MDA Investigations

MDA conducted regulatory investigations on five events reported in 2005.

One case involved a switchboard operator walking to her car at lunchtime. A groundskeeper was spraying nearby with a mixture of herbicides and the breeze brought some to the switchboard operator's face. She developed a bad cough, red skin, a swollen tongue, chest tightness, and difficulty breathing. She went to an emergency department where she was diagnosed with inhalation exposure. The case was referred to MDA. The investigator spoke to the applicator, who had no record of any complaint on the day in question, over a year before the investigation. No violations were cited.

The second MDA referral involved a school bus driver who sprayed a pyrethrin-containing insecticide for head lice on the bus. All the windows and doors were open. She developed a cough, sore throat, shortness of breath, a headache, and burning, tearing eyes.

The third case referred to MDA involved a shop supervisor at a recycling center. He pulled a garbage can out of a hazardous waste building. Inside were some rusted cans of DDT. The garbage can tipped over and some DDT spilled on his pant leg. This was not a confirmed case

because he did not develop any symptoms, but it was referred to MDA because the DDT was not in the proper type of container and was not properly labeled.

The fourth incident referred to MDA in 2005 took place in a school. They had been having a problem with head lice and several classrooms were sprayed with a pyrethrin-containing miticide. One teaching assistant developed a headache, shortness of breath, and vomited. Another adult developed a headache and a third developed nausea. A child with a history of seizures developed nausea and had a seizure. This was referred to MDA because the school lacked an Integrated Pesticide Management (IPM) plan.

The last 2005 case investigated by MDA involved a mechanic at a golf course who was exposed to pesticides and other chemicals stored and mixed in his work area, as well as during the repair of a sprayer. He vomited, developed a red, itchy rash, headache, tearing eyes, blurred vision, loss of coordination, fainting, hair loss, and frequency of urination. He also developed a number of respiratory signs and symptoms – wheezing, cough, chest tightness, and shortness of breath and was diagnosed with occupational asthma. MIOSHA was involved and reported concerns about the golf course to MDA. The MDA inspection revealed one area of noncompliance with notification and posting requirements and three areas of partial compliance with use of a mixing/loading pad, notification and posting, and record maintenance. A follow-up visit found the golf course in compliance with pesticide regulations.

NIOSH Reports

There were two priority reports to NIOSH in 2005. These were the incidents where lice spray was used on a school bus and in a school described above. They were reported to NIOSH because the product (the same product in both instances) was used according to the label, but individuals developed symptoms.

Discussion

Surveillance Data

In 2005, the number of pesticide exposure reports from the Poison Control Centers remained about the same as in 2004 (89 vs. 90), but the number of reports from health care providers decreased from 20 to 11. Whether this is due to fewer cases or lack of compliance with reporting requirements is unknown.

More than a quarter of the confirmed cases in 2005 were engaged in activities not related to pesticide application. Better education of users of pesticides on safe pesticide application is needed to prevent inadvertent workplace exposures. Michigan law mandates that all schools, public buildings, and health care facilities have an IPM plan for each building in order to manage pests with the least possible impact on people, property, and the environment. More widespread adoption of IPM in all workplaces would reduce pesticide exposures.

The number of exposures to antimicrobials has grown from 27 (31.0%) cases in 2004 to 35 (51.5%) in 2005. Not all antimicrobial cases were abstracted in 2001-2003.

Workers exposed to antimicrobials were predominantly female and the majority worked in service occupations. Antimicrobial exposure cases had a higher percentage of moderate and high severity cases, although the numbers of these cases were very low. More than half of the exposures were to the eyes, indicating that changing the container label of antimicrobials to recommend the use of splash goggles would decrease antimicrobial injuries to workers. Antimicrobial exposures remain an area of ongoing concern.

Interventions

MDCH has continued to refer cases to MDA for investigation of possible safety violations. MDCH also worked to improve pesticide education for individuals and groups through the activities listed above. Education must remain a priority for both certified and non-certified pesticide applicators, since both groups may be exposed or expose other workers.

Challenges to Surveillance

Pesticide poisoning is a complex condition for surveillance because it encompasses many kinds of illnesses and injuries from skin rash to nerve toxicity. In addition, health care providers receive limited education in the toxic effects of pesticides and pesticide-related illnesses are frequently overlooked. The potential for pesticides to harm people depends in part on the dose (length of exposure and chemical concentration), and the route of entry into the body. It is also related to the specific chemicals in each product. Pesticide products are often mixtures including one or more active ingredients, as well as other ingredients that may also be toxic. Depending on the chemicals involved, pesticides can have short and long-term adverse health effects on different organ systems, including the skin, gastrointestinal, respiratory, nervous, and reproductive systems.

The problem of identifying pesticide-related illness for public health surveillance begins with difficulties in recognition and diagnosis, because the diverse signs and symptoms experienced can resemble an acute upper respiratory illness, acute conjunctivitis, or acute gastrointestinal illness, among other conditions. In these cases, patients may not seek medical care, or may not be correctly diagnosed if an occupational and environmental history that asks about pesticide exposure is not taken (Calvert, 2004). Migrant workers face additional barriers such as language difficulties, lack of access to care, and fear of job loss or deportation. Another problem is that even when diagnosed, pesticide-related illnesses and injuries may not be reported due to the reluctance on the part of workers and their health care providers to involve state agencies because of concerns about job security, lack of knowledge of the public health code reporting requirements, or lack of time to report (Calvert et al, 2001). Additional education to promote recognition of pesticide poisoning and compliance with the reporting requirement is needed.

More outreach is needed to educate health care providers on the importance of recognizing and reporting instances of occupational pesticide illnesses and injuries. While the emergency room was the first source of care for 30 (44.1%) of confirmed cases in 2005, the hospital submitted an

occupational disease report for only 4 (13.3%) of those cases. The remaining cases were brought to the program's attention by PCC, but if the health care providers in the hospital do not call the PCC for advice, the case will not be identified by the surveillance system.
As in many other occupational disease and illness surveillance systems, the Michigan occupational pesticide surveillance data are likely a significant undercount of the true number of work-related pesticide poisoning cases in Michigan. A 2004 study done in the State of Washington found that the primary barrier for migrant farm workers in seeking health care was economic. Workers could not afford to take time off to seek medical care and were afraid that they might lose their jobs if they did so. That study also found that only 20-30 percent of pesticide-related illnesses among farm workers who filed a workers' compensation claim were given a diagnosis code that indicated pesticide poisoning. (Michigan's workers' compensation data identify poisonings as a group but are not specific enough to capture pesticide exposures.)

This surveillance system continues to face some challenges due to the time lag between the occurrence and the reporting of the incident for occupational disease (OD) and MDA reports. This presents difficulties in following up with reported cases because of worker mobility, especially among seasonal farm workers. PCC reports are received promptly, but do not always contain sufficient information to allow contact with the exposed individual. Lack of information from follow-up often results in a case classification of "insufficient information."

Notwithstanding these limitations, the Michigan occupational pesticide surveillance system is receiving and investigating reports of occupational pesticide illness and injury, and has launched follow-up prevention activities. To improve the surveillance system, additional data sources will be added, including laboratory reporting of all acetylcholinesterase and pseudocholinesterase testing in Michigan. Mandatory reporting of cholinesterase by all Michigan laboratories went into effect in October 2005, and the results of this reporting will be included in the next year's annual report. Adverse event reports that pesticide manufacturers are required to submit to the EPA are also being accessed as an additional data source. The surveillance system is being expanded to include non-occupational pesticide injuries and illnesses in 2006. Plans include the development of regulations to require the reporting of all pesticide injuries and illnesses, not just work-related events.

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Additional Resources

MDCH Division of Environmental and Occupational Epidemiology pesticide information: www.michigan.gov/mdch-toxics

NIOSH occupational pesticide poisoning surveillance system: www.cdc.gov/niosh/topics/pesticides/

Pesticide-Related Illness and Injury Surveillance: A How-To Guide for State-Based Programs DHHS (NIOSH) publication number 2006-102. October 2005 http://www.cdc.gov/niosh/docs/2006-102/

Extoxnet Pesticide Information Profiles: http://extoxnet.orst.edu/pips/ghindex.html

EPA Pesticide Product Label System: http://oaspub.epa.gov/pestlabl/ppls.home

Information on pesticide products registered for use in Michigan: http://state.ceris.purdue.edu/

Information on licensing and registration for pesticide application businesses, credentials for certified technicians, and laws and regulations for pesticide application: www.michigan.gov/mda/0,1607,7-125-1569_16988---,00.html

Information on the federal Worker Protection Standard (worker exposure to pesticides in agriculture): www.epa.gov/pesticides/health/worker.htm. In Michigan, call the Pesticide and Plant Pest Management Division, MDA, at (517) 373-1087.

Michigan State University's Pesticide Education Program: www.pested.msu.edu

To report occupational pesticide exposures in Michigan: http://oem.msu.edu/

Appendix

Case Narratives, 2005 Confirmed Cases

Insecticides

MI00355 – A 46-year-old female sales worker was stocking shelves. One plastic bottle containing an organophosphate insecticide was open, and spilled on her. She washed well after the exposure but developed difficulty breathing, chest pain, and a red, itchy rash that spread from her arms to her trunk. She went to an emergency department where she was diagnosed with a severe allergic reaction.

MI00365 – A 39-year-old female hospital nurse was exposed to a pyrethroid insecticide that was brought in and poured into plastic containers; it then eroded through the container. She was also exposed when working with other patients who had been exposed. She developed a headache and nausea and was seen in the emergency department.

MI00366 – A 32-year-old female hospital nurse was at a meeting in a conference room down the hall from where a pyrethroid insecticide (see case 365) ate through a plastic container. She had a history of asthmatic bronchitis and developed wheezing, shortness of breath, and chest tightness. She went to the emergency department.

MI00376 – A 29-year-old male landscaper was exposed to an insecticide he had not previously used. He developed blurred vision, a headache, cough and fatigue. He went to an emergency department four days after the exposure.

MI00391 – A 30-year-old male certified pesticide applicator was spraying for bees with a pyrethroid insecticide. Some drifted back onto him and he also touched his hand to his eye. It began to tear and was itching and burning. He rinsed his eye several times and called poison control.

MI00394 – A 39-year-old woman was sprayed in the eye with a pyrethroid insecticide when she opened the door to leave work. She went back in and flushed her eye and then went to an emergency department. Her eye felt irritated and she was diagnosed with chemical conjunctivitis.

MI00395 – A 54-year-old female school bus driver sprayed a pyrethrin-containing insecticide for head lice on the bus. All the windows and doors were open. She developed a cough, sore throat, shortness of breath, a headache, and burning, tearing eyes. She went to the company doctor. The next day she went back to work, became symptomatic again, and went to an emergency department. She lost two days from work and still had a cough when interviewed over a year later. This case was referred to MDA.

MI00398 – A 39-year-old male laborer working in a department store warehouse was unloading a truck containing mixed freight. A case of pyrethroid insecticide exploded, he thought due to

heat. He inhaled the fumes and some got on his skin. He developed shortness of breath, vomiting, a headache, and a rash on his chest and neck. He called poison control.

MI00400 – A 49-year-old male arborist, who was a certified pesticide handler, injected a chloro-nicotinyl insecticide into soil. He was nauseous that day and the next day had a seizure. He was taken by ambulance to an emergency department and stayed overnight.

MI00401 – A 63-year-old male structural pesticide applicator was working with a pyrethroid termiticide/insecticide. He cleaned up a small spill with his handkerchief. For the next few days he used this handkerchief to wipe off sweat. On the second day of doing this his back and lower groin area began to hurt. On the third day, he was on the expressway driving home when he began to lose his vision. He pulled over and could not see well enough to call anyone on his cell phone. He waited and his eyesight gradually came back and he drove home. Then after sleeping 28 hours he was nauseous, had shooting pains in his head, and poor balance. He called poison control; they referred him to an emergency department where he was diagnosed with pyrethroid exposure.

MI00411 – A 21-year-old woman got some pyrethroid insecticide in her eyes and on her skin at work. She had a burning sensation to her skin and her eyes were irritated. She went to an emergency department.

MI00412 – A 45-year-old male farmworker applied a carbamate insecticide for several days. He wore PPE while mixing, but not in the tractor while applying the carbamate. He became nauseous, dizzy, weak, and had a headache. He went to an emergency department.

MI00428 – A 25-year-old male landscaper was spraying a pyrethroid insecticide using a backpack sprayer. The o-ring on top was loose, and as he moved some spilled on his back. His back became red, itchy, and very painful to pressure. His mother called poison control.

MI00429 – A 47-year-old male structural pesticide applicator was spraying for fleas with an insect growth regulator. His pants were a little short and some mist got on his leg around his ankles. His skin became red and irritated, and was itchy. He called poison control.

MI00440 – A 30-year-old man was applying a pyrethroid insecticide and had the nozzle pointed the wrong way. He got some on his skin and inhaled some. He became dizzy and had abdominal pain. He called poison control.

MI00441 – A 31-year-old male electrician applied a pyrethroid insecticide to a light pole to kill wasps. Some residue got on his hand, which he then used to wipe sweat off his face. The residue got in his eyes and mouth. His tongue felt swollen and his mouth and eyes burned. He called poison control. He did not see a doctor and his symptoms were gone by the end of the next day.

MI00447 – A 51-year-old teaching assistant was present when a teacher sprayed a classroom after school with a pyrethroid lice killer. The doors and windows were open for ventilation, but the woman had a history of asthma and allergies. Later that night she developed a headache and shortness of breath. The next day she went back in the classroom and that night vomited. Several

other people developed symptoms after being in one of the two classrooms that were sprayed. A school district employee called poison control for information about the product. We sent educational materials to the school district including the MDCH/MDE (Michigan Department of Education) “Head Lice Manual”, the MDA Integrated Pest Management brochure, and our “What You Need to Know about Pesticides and your Health” booklet. This case was referred to the MDA.

MI00450 – A 50-year-old female day care worker entered a closed room that had been treated with a pyrethroid insecticide for roaches and spiders. She developed shortness of breath and chest tightness. The employer called poison control, which recommended a clinic visit. She had a breathing treatment at the clinic, and felt better but not normal several days later.

Herbicides

MI00372 – A 46-year-old female telephone switchboard operator was walking to lunch and passed a groundskeeper who was spraying glyphosate and 2,4-D herbicides outside the building. A breeze brought the spray to the switchboard operator’s face and eyes and into her mouth. She developed a headache, cough, and trouble breathing. Her tongue was swollen, her eyes were tearing, and her face was red and itchy. She went to an emergency room. The case was referred to the MDA to determine if there were any violations of pesticide application requirements; no violations were found.

MI00381 – A 28-year-old male pesticide applicator for a landscaping company put his backpack sprayer in his truck. The handle hit something and depressed, spraying a mixture of herbicides in his face. He developed nausea, vomiting, headache, dizziness, and “felt weird”. He washed with water from the truck and went to an emergency department. He lost a day and a half of work.

MI00389 – An 18-year-old female groundskeeper at a summer camp sprayed weeds with a glyphosate herbicide. Later that evening she vomited. She called poison control and her physician.

MI00390 – a 25-year-old male worker was spraying with a glyphosate herbicide. The end of the hose came off and some sprayed in his mouth. He may have swallowed a few drops. He became nauseous and vomited and called poison control.

MI00397 – A 35-year-old male certified pesticide applicator was spraying an herbicide in a lake. He touched his eye and it began to burn. He rinsed it with water from a hose, but it did not get better so he went to an emergency department. He was diagnosed with corneal abrasion.

MI00404 – A 40-year-old male farmer who was a registered applicator, was pouring ammonium sulfate into a sprayer. He poured too fast and the filter became plugged. After he added all the ingredients, (a glyphosate containing herbicide, liquid nitrogen, and the ammonium sulfate) the tank began to heat up. He took off his PPE after mixing and was walking by the tank to the tractor and he heard a noise being emitted from the tank. He touched the tank. It was very hot so he jerked his hand away and accidentally hit the hose. The hose broke and the mixture sprayed on his arms and face. He had second and third degree burns, his eyes were red and irritated, and

he had cloudy vision for a few days. He went to an emergency department and later followed-up with an eye specialist and his primary care physician.

MI00410 – A 20-year-old male stock handler in a warehouse store was stocking shelves when a bag of glyphosate-containing herbicide broke. Some got on his arms and they became red and irritated. He went home at lunch to shower and change clothes. His workplace called poison control.

MI00414 – An adult male was exposed to a glyphosate-containing herbicide at work. He developed an itchy rash with blisters on his chest and arms and called poison control.

MI00416 – A 34-year-old male Christmas tree farmer sprayed a glyphosate-containing herbicide. While on a break he became dizzy and then fainted and had a seizure. EMS came and took him to an emergency department. He had a history of seizure, with his last seizure three years before.

MI00419 – A 37-year-old male nightclub manager was spraying a diquat dibromide-containing herbicide at a construction site of a nightclub. He was using a pump sprayer and the pump wasn't working. He tried to get the pump off to use a spare. The herbicide spilled on his hands and arms. He drove home about 10 minutes to wash off. His skin blistered and sloughed off. He called poison control.

MI00425 – A 27-year-old female insurance agent was exposed to two herbicides from landscaping work that had been done outside her office. By the time she walked to her car, she had trouble breathing and a scratchy throat. Her tongue and lips were swollen, her chest felt heavy, and her eyes were itching and burning. She drove straight to an urgent care center.

MI00445 – A 40-year-old female gardener at a university was spraying a 2,4-D containing herbicide. Because she was hurrying to finish, she sprayed even though it was "breezier than it should have been". She became disoriented, was nauseous, vomited, had eye and throat irritation and a headache. The next day she still had a headache and was listless. She did not see a doctor because she felt it was her fault and did not want a fine or to risk losing her pesticide-applicator certification.

Fungicides

MI00420 – A 36-year-old male farm worker was mixing a fungicide in a water truck. He must have rested his arm on a small spill and it became red, irritated, and very itchy. He showered three times and then called poison control.

Antimicrobials

MI00352 – A 32-year-old female surgical technician was removing a cartridge from a sterilizing machine. They ran diagnostic tests on the machine every day and it appeared to be functioning properly. The sterilant should all have been broken down by the end of the cycle but some was left and she inhaled it. She went to the emergency department with a sore throat, headache, and burning feeling in her chest. Her eyes were tearing and she was having some difficulty breathing. Her symptoms were gone by that evening.

MI00353 – A 30-year-old male custodian cleaned bathrooms with a quaternary ammonium chloride-based disinfectant for 1½ hours. He felt nauseous, vomited, and had diarrhea. He called poison control.

MI00354 – A 34-year-old male air traffic controller was exposed to a gluteraldehyde-based disinfectant used to clean mold at work. He developed a headache, dizziness, and a sore throat. He went to an urgent care center.

MI00359 – A 20-year-old male fast food restaurant maintenance worker was cleaning a toilet with a sodium hypochlorite-based disinfectant. Some splashed off the brush over his face mask into his eyes. His eyes were burning, itching, and tearing. He went to an emergency department where he was diagnosed with chemical conjunctivitis. He lost three days from work.

MI00360 – A 21-year-old female cashier at a pet store was trying to hook up a box of quaternary ammonium chloride-based disinfectant. The spout came off and some got on her arm and legs. The next day the tube connecting the box to the water for dilution came off and some sprayed on her hands and arms. Her skin became red, itchy, and tender to touch. She called poison control. She thought the box label could be improved and that routine replacement of the hose before it became brittle would help.

MI00362 – A 37-year-old male pizzeria owner was checking a glass washer for sediment. He pulled off a hose and the pressure caused a sodium hypochlorite-based disinfectant to spray in his eye. His eye was itchy, tearing and burned. He called poison control and went to an emergency department where he was diagnosed with chemical conjunctivitis. He couldn’t see for a while; it took about two weeks for his vision to completely clear up and he was off work for a week.

MI00364 – A 35-year-old male property maintenance employee was scrubbing mold. Some sodium hypochlorite-based disinfectant got under his goggles. He had itchy, painful, red eyes, photophobia, and blurred vision. He called poison control and went to an emergency department where he was diagnosed with chemical conjunctivitis. He lost almost seven days of work and at interview three months later was still having trouble driving at night. He works in property maintenance and construction in the winter and as a truck driver the rest of the year.

MI00367 – A 54-year-old male water laboratory technician at a power plant was doing a routine test of a sodium hypochlorite solution used to treat discharge water. He filled a calibration column, which split due to a faulty valve. The disinfectant sprayed into his eyes, nose, throat, and on his upper body. He had been told that the sodium hypochlorite used to treat the discharge water was like pool chlorine, so he didn't worry at first, but it began to burn and he couldn’t see and fell. He went to an emergency shower and showered for 15 minutes. He went back to make sure the system was shut down. As he was reaching for his glasses on the floor, he suddenly went blind. He went to an emergency department where he was treated and then transferred to another hospital for evaluation and management of his burns. He had 3-4 days of temporary blindness, first- and second-degree burns over 7-10% of his body, pain, nasal discharge, tearing, and corneal ulcers. He was off work for seven weeks.

MI00369 – A 55-year-old female hospital technician splashed some disinfectant in her eye when tearing the seal off a bottle. Her eye was red and irritated. She went to the emergency department and had a follow-up checkup the next day.

MI00370 – A 19-year-old female janitor was mixing a quaternary ammonium chloride-based disinfectant with water when she was startled and accidentally splashed some on her arms. Her arms were red and painful and she had two small first-degree burns with some blistering. She went to an urgent care center and then to an emergency department the next day. She lost 2 days from work.

MI00375 – A 53-year-old male contractor applied a quaternary ammonium chloride-based disinfectant to the basement of a house to remove mold and mildew. He was wearing a respirator (not required by the label), but later went back for about ten minutes without a mask to pick up his equipment. He had flu-like symptoms and was chilled. He called poison control.

MI00377 – A 24-year-old female hospital housekeeper was emptying a bucket of a phenolic disinfectant solution when some splashed in her face and eye. The bucket was over-full and the solution may have been too concentrated. Her eye became red, teary, itchy and painful. She went to the emergency department and was diagnosed with chemical conjunctivitis.

MI00378 – A 25-year-old male cook splashed sodium hypochlorite in his eye. His eye was red and irritated. A coworker called poison control.

MI00379 – A 35-year-old music teacher at a children’s play center got a pine oil cleaner in her eyes. They were red and irritated. She called poison control.

MI00380 – A 43-year-old male municipal water filtration plant operator tried to change a filter on the sodium hypochlorite disinfectant line coming into the plant. The line broke causing a high-pressure spray to his face and eye. He used the emergency eyewash while waiting over an hour for a replacement to come in. He had blurred vision, burning, tearing, and a red eye. He couldn't keep his eye open. He went to an emergency department, and was referred to an ophthalmologist for follow-up. He had injected conjunctivae and a corneal burn. It took about two weeks for the symptoms to clear up completely.

MI00382 – A 50-year-old female maintenance worker at a high school was mixing a new batch of a quaternary ammonium chloride-based disinfectant in a spray bottle. She added concentrate and then water from a hose attached to the sink faucet. She meant to turn the water off because the bottle was full, but turned the wrong way, increasing the water pressure. The diluted disinfectant in the bottle sprayed all over her and got in her eyes. She developed burning, tearing eyes and had blurry vision. She went to an emergency department where she was diagnosed with corneal burns and referred to an ophthalmologist.

MI00384 – A 17-year-old female maintenance worker got some quaternary ammonium chloride-based sanitizer in her eye. Her eye was red and irritated. She went to an emergency department where her eye was irrigated.

MI00385 – A 24-year-old male employee in a group home had some bathroom cleaner sprayed in his eyes. They became red and irritated. He flushed his eyes and called poison control.

MI00388 – A 22-year-old male deck washer was power washing four decks in an apartment complex using a sodium hypochlorite-based cleaner. It soaked through his work boots and his feet became red, swollen, and tender, with some blistering. He also got some on his face and it felt like a mild sunburn. The skin on his face and feet peeled. He went to an emergency department where he was diagnosed with chemical burns to both feet. He lost one and a half weeks from work.

MI00417 – A 57-year-old female deli worker in a supermarket was present when a coworker sprayed the air with a quaternary ammonium chloride-based sanitizer to kill flies. She inhaled the fumes and felt weak, lightheaded, short of breath, and her eyes, face, and the inside of her mouth burned. Her eyes and tongue became swollen. A week later she developed occasional chest pains and a runny nose, which she still had when interviewed a month later. She never returned to work. She called poison control.

MI00418 – A 23-year-old female waitress at a golf course sprayed some quaternary ammonium chloride-based disinfectant bathroom cleaner in her eyes. They became red and irritated. She called poison control.

MI00423 – A 22-year-old woman was cleaning in a nursing home. She spilled some quaternary ammonium chloride-based cleaner on her chest. She developed a red rash and called poison control.

MI00426 – A 25-year-old female resident advocate in a group home sprayed a quaternary ammonium chloride-based disinfectant on a counter where a fan was blowing. Her eye was irritated and itchy. She called poison control.

MI00430 – An adult woman got some phenol-containing germicide in her eye. It was red and irritated. She went to an emergency department.

MI00435 – A 28-year-old cleaner for a cleaning company was cleaning a bathtub with a sponge. She splashed some acid disinfectant in her eye. She rinsed her eye repeatedly and called poison control. She was referred to an urgent care clinic where she was diagnosed with conjunctival injection.

MI00436 – A 38-year-old female hospital employee was cleaning operating instruments with enzymes in an area with poor ventilation. She was unaware that there was a spill of a disinfectant in a cupboard. After several hours, she developed a headache, cough, trouble breathing, sore throat, and she fainted. The next day she went to the emergency department and then followed up with a workers compensation physician. She was off work for nine days. When interviewed two months after the exposure she still had headaches and respiratory problems.

MI00442 – A 41-year-old female employee in an animal blood laboratory splashed some quaternary ammonium chloride-based disinfectant in her eye while cleaning. She irrigated her

eye for about 15 minutes but it was hazy and burning. She went to an emergency room, where the pH of her eye was found to be 8.0. They irrigated and the pH returned to 7.0. She had some conjunctival injection and mild scleral edema. She was told to stay off work and return the next day, when she was found to be asymptomatic.

MI00451 – A 19-year-old male nutritional service worker in a hospital was washing dishes. Some dishwater with some residual quaternary ammonium chloride-based sanitizer drained onto the lid of his pop can nearby. He removed the visible water, but when he took a sip he felt woozy and nauseous. He thinks some of the water got into the drink. He called poison control. He was still nauseous when he went to bed and a little sick the next day.

MI00452 – An adult male health club employee was present when he or someone else was mixing pool-cleaning supplies. There was an accidental spill that resulted in a mixture of muriatic acid and sodium hypochlorite, creating a toxic gas that was released to ventilation system. Three employees and 2 members of the public were taken to the hospital. The building and the next-door building were evacuated for about 6 hours.

MI00453 – An adult female health club employee, coworker of case MI00452, was also exposed when there was an accidental spill that resulted in a mixture of muriatic acid and sodium hypochlorite, creating a toxic gas that was released to ventilation system.

MI00454 – An adult male health club employee, the third employee associated with case number MI00452 above, was also in the building when there was an accidental spill that resulted in a mixture of muriatic acid and sodium hypochlorite, creating a toxic gas that was released to ventilation system.

MI00455 – An adult female cashier in a gas station got some quaternary ammonium chloride-based sanitizer in her eye. It was red and irritated and she called poison control.

MI00457 – A 38-year-old lab technician in an orthodontist's office tossed a mouth guard into a gluterahdehyde solution and some splashed in her eye. She lost her sight for a few seconds, and then had blurry vision. She also had photophobia, tearing, and burning eyes. She went to an urgent care, where she was diagnosed with chemical conjunctivitis and sent to an ophthalmologist. She lost five days of work initially and then three more due to an infection about a month later. At interview she was still experiencing photophobia, and needed drops because she was not producing tears due to damage to her tear ducts. Someone in the office called MIOSHA in for a consult; now all staff are required to wear eye protection with this product.

MI00459 – A 26-year-old male nurse's aid trainee was standing near his trainer who was wiping down an IV pole with a diluted quaternary ammonium chloride-based disinfectant. Some disinfectant from her rag splashed in his eye. He had some initial eye pain and went to the emergency department where he was diagnosed with chemical conjunctivitis.

MI00460 – An 18-year-old female lifeguard at a sports club splashed some sodium hypochlorite in her eye while adding it to the pool. Her eye was red, tearing, burning and she couldn't see well

at first. She took out her contact lens and irrigated her eye for five minutes. Then she called poison control and was referred to an emergency department where she was diagnosed with chemical conjunctivitis.

Mixtures

MI00434 – A 32-year-old male mechanic at a golf course was exposed to pesticides and other chemicals stored and mixed in his work area. In addition to the exposure to the stored chemicals, he was repairing a broken sprayer and chiseled off hardened layers of dried-on pesticides. After this incident he vomited, developed a red, itchy rash, headache, tearing eyes, blurred vision, loss of coordination, fainting, hair loss, and frequency of urination. He also developed a number of respiratory signs and symptoms – wheezing, cough, chest tightness, and shortness of breath. The rash and respiratory symptoms continued, but he waited several months until he had health insurance to see a doctor. He has since seen a number of doctors and quit his job on advice of his physicians. He has been diagnosed with occupational asthma. MIOSHA reported concerns about the golf course to MDA. The MDA inspection revealed one area of noncompliance with notification and posting requirements and three areas of partial compliance with use of a mixing/loading pad, notification and posting, and record maintenance. A follow-up visit found the golf course in compliance with pesticide regulations.

MI00443 – A 27-year-old male landscaper was sawing old railroad ties that had been treated with chromated copper arsenate (CCA). He was wearing short sleeves and after a few minutes noticed some irritation on his arms but continued sawing for about an hour. His arms were burning and he went to an urgent care and was treated with silvadene. He later developed a headache, nausea, and loss of appetite and went to an emergency department.

Jennifer M. Granholm, Governor
Janet Olszewski, Director

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