November 11, 2013

2012 Annual Report

Summary of Occupational Disease Reports to the Michigan Department of Licensing and Regulatory Affairs

2012 ANNUAL REPORT SUMMARY OF OCCUPATIONAL DISEASE REPORTS TO THE MICHIGAN DEPARTMENT OF LICENSING and REGULATORY AFFAIRS

Occupational Disease Surveillance Program

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There are many ways to report occupational diseases to the state:

ONLINE:

www.oem.msu.edu

EMAIL:
ODReport@ht.msu.edu

FAX:

517.432.3606

TELEPHONE:

1.800.446.7805

MAIL:

LARA, MIOSHA
Mgt & Tech Svc Div
7150 Harris Dr
PO BOX 30649
Lansing, MI 48909

Michigan State University Department of Medicine

West Fee Hall
909 Fee Road, Room 117
East Lansing, MI 48824
517.353.1846

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Director MIOSHA

There are many resources available to help employers, employees, healthcare professionals and others understand more about work-related diseases. Links to these resources can be found at: **www.oem.msu.edu**.

Acronyms

BLS Bureau of Labor Statistics

LARA MI Department of Licensing and Regulatory Affairs

MDCH Michigan Department of Community Health

MIOSHA Michigan Occupational Safety and Health Administration

MSU OEM Michigan State University Occupational and Environmental Medicine

NAICS North American Industrial Classification System

NIOSH National Institute for Occupational Safety and Health

OD Report Occupational Disease Report

WCA Workers' Compensation Agency

This report was funded by the National Institute for Occupational Safety & Health, under cooperative agreement U60-OH008466.

Background

This is the 21st annual report on occupational diseases in Michigan, and is based upon the reports submitted to the Michigan Department of Licensing and Regulatory Affairs (LARA) in calendar year 2012. Since 1978, physicians, hospitals, clinics, other health professionals and employers have been required by the Michigan Public Health Code (Article 368, Part 56, P.A. 1978, as amended) to report known or suspected cases of occupational diseases. LARA designates Michigan State University's College of Human Medicine, Occupational and Environmental Medicine Division (MSU OEM) as

Part 56 of the Michigan Public Health Code requires reporting of all known or suspected occupational illnesses or work-aggravated health conditions to the Michigan Department of Licensing and Regulatory Affairs *within 10 days of discovery*.

In 2008, the most recent year available, 1,096 (1.3%) of the 84,361 human exposure-related calls to the Michigan Poison Control Center in Detroit were related to occupational exposures.

Background continued...

its bona fide agent to compile and analyze the occupational disease reports.

A standard form is used to report individuals with a known or suspected work-related condition. It requests medical and demographic information on the affected employee as well as information about the facility at which the employee became ill. Figure 1 is a copy of the Known or Suspected Occupational Disease reporting form.

Reports received are reviewed by MSU OEM staff and computerized.

In some cases, additional follow up is conducted. The reported patient may be contacted and interviewed by staff at MSU OEM to obtain more information about their illness. A Michigan Occupational Safety and Health Administration (MIOSHA) enforcement inspection may be initiated at the patient's workplace to assess current working conditions and determine if other employees are experiencing similar health issues.

Reports are analyzed on a yearly basis and the results are shared with health professionals and other stakeholders.

Figure 1. Occupational Disease Reporting Form

Michigan Department of Licensing and Regulatory Affairs — MIOSHA Wage Hour and Technical Services Division

Known or Suspected Occupational Disease Report

(Information will be held confidential as prescribed in Public Act 368 of 1978.)

EMPLOYEE AFFECTED

Name (Last, First, Middle)	Age / Sex M F	Race: White Black Hispanic Other	
Street	City	State	Zip
Home Phone Number	Last Four Digits of Social Security Number (Optional)		

CURRENT EMPLOYER

Current Employer Name	Worksite County		
Worksite Address	City	State	Zip
Business Phone	If Known, Indicate Business Type (products manufactured or work done)		
Number of Employees <25 25-100 100-500 >500			
Employee's Work Unit/Department	Dates of Employment From: Mo Day Year To: Mo Day Year		
Employee's Job Title or Description of Work			

ILLNESS INFORMATION

Nature of Illness or Health Condition (Examples: Headache, Nausea, Difficulty Breathing, Cough, etc.)		Date of Diagnosis Mo Day Year
Suspected Causative Agents (Chemicals, Physical Agents, Conditions)	Did Employee Die? Yes No	If Yes, Date of Death Mo Day Year
If Physician, Indicate Clinical Impression for Suspected Occupational Disease, or Diagnosis of Confirmed Occupational Disease		

ADDITIONAL COMMENTS

REPORT SUBMITTED BY

If Report Submitted by Non-Physician, Did Employee See a Physician? If yes, record information below.	Yes No Don't Know		
Physician's Name	Phone		
Office Address	City	State	Zip
Name of Person Submitting Report	Physician Non-Physician		
Address	City	State	Zip
Signature	Phone		Date

The Michigan Department of Licensing Regulatory Affairs is an equal opportunity, affirmative action employer, service provider and buyer.

Return completed form to:

Michigan Department of Licensing and Regulatory Affairs
Michigan Occupational Safety and Health Administration
MIOSHA Wage Hour and Technical Services Division
7150 Harris Drive, P.O. Box 30649
Lansing, MI 48909-8149

MIOSHA-MTSD-51 (06/13)

Authority: P.A. 368 of 1978
Completion: Required
Penalty: Misdemeanor

METHODS

An OD report is initiated when a clinician knows or suspects that a patient's illness is work related. Reports are submitted by or requested from a variety of sources, listed below. Additional reports are generated through annual review of the Michigan Health and Hospital Association inpatient database.

SOURCES TO IDENTIFY PATIENTS

- **Health Care Providers** Private practice, working for industry, NIOSH-certified "B" readers, audiologists, clinics
- **Employers**
- **Hospitals** for ICD-9 502, 501, 495, 496, 491, 492, and other select work-related conditions
- **Workers' Compensation Agency**
- **Poison Control Center** data for work-related poisonings
- **Reports from Co-Workers or MIOSHA Field Staff** confirmed by a health care provider
- **Death Certificates** for ICD-10 COD or contributing COD J61, J62.8, J63, J64, J65, J67; if Underlying COD J45, J68
- **3rd Judicial Circuit State Court of Michigan** for asbestos-related disease
- **Mine Safety and Health Administration**
- **Michigan Cancer Registry** for mesothelioma
- **Clinical Laboratories** for blood lead analyses, and specific IgE allergy testing

OD reports are computerized to allow for analyses which can be used to direct surveillance, intervention and prevention activities. The computerized information includes: 1) the employee's name, age, sex, race, zip code and optional partial social security number; 2) the employer's name, worksite address, city, zip code, number of persons employed at the facility and an assigned North American Industry Classification System (NAICS) code; 3) details of the illness, including diagnosis date, suspected causative agent(s), whether the employee died, and an assigned diagnosis or clinical impression coded according to the International Classification of Diseases (ICD-9th Revision)[1]; and 4) information about the individual who submitted the report, including whether the reporter is employed by the company, an outside medical department contracted by the company, or a private practice health professional.

More than one report on a given individual with different work-related diseases may be submitted to LARA within a given year and across multiple years. If several reports are submitted for acute illnesses for a single individual, all of the reports are included in our statistics. In contrast, if more than one report is submitted in a given year for a chronic disease in a single individual, only one of the submissions is included in our statistics. If multiple reports are submitted over several years on that individual's chronic disease, only the earliest report is included in our statistics (see list below for chronic diseases).

The 2011 Annual Report on Silicosis & Other Work-Related Lung Disease contains information on Asbestos-related lung disease that was formerly in the OD Annual Reports. The report can be found at: www.oem.msu.edu

CHRONIC OCCUPATIONAL DISEASES COUNTED ONLY ONCE

ICD-9	DESCRIPTION
011	Pulmonary TB
015	TB of Bones & Joints
135	Sarcoidosis
137	TB, Late Effects of
140-239	Cancer
250-259	Diseases of Other Endocrine Glands
260-269	Nutritional Deficiencies
270-279	Metabolic & Immunity Disorders except 276, Dehydration
280-289	Diseases of the Blood & Blood Forming Agents
290-319	Mental Disorders except 308 (Acute Reaction to Stress) & 309 (Adjustment Reaction)
320-340	Select Diseases of the Nervous System & Sense Organs
388-389	Noise-Induced Hearing Loss, Tinnitus
390-409	Select Diseases of the Circulatory System
491-505	Select Diseases of the Respiratory System
509	Pleural Plaques w/no Parenchymal Abnormality on ILO form
515	Interstitial Lung Disease, Pulmonary Fibrosis
517	Connective Tissue Lung Disease
520-579	Diseases of the Digestive System
580-629	Diseases of the Genitourinary System

RESULTS

A total of 8,069 occupational disease reports were submitted to LARA in calendar year 2012. Figure 2 shows the number of reports received each year since 1985.

Reporting Source

Company or contract medical departments submitted 61% of the reports (4,894 cases); non-company associated health care practitioners submitted 39% of the reports (3,175 cases). Figure 3 shows the trends by reporting source (company or non-company associated) since 1991.

Company Size

Almost two-thirds of reports were submitted on individuals who worked in large companies (Table 1) with 65% of the 5,291 reports that listed company size coming from businesses with > 500 employees.

A greater proportion of reports for companies with 500 or fewer employees come from non-company health practitioners. About 56% of the 793 reports with known company size that were submitted by non-company practitioners involved companies with < 500 employees, while about 31% of the 4,498 reports with known company size submitted by company practitioners involved facilities with < 500 employees.

Non-Company Clinicians

One hundred fifty-nine non-company-associated clinicians reported 364 incidents of occupational disease. Thirty labs were

Figure 2
OD Reports to LARA by Year Reported: 1985-2012

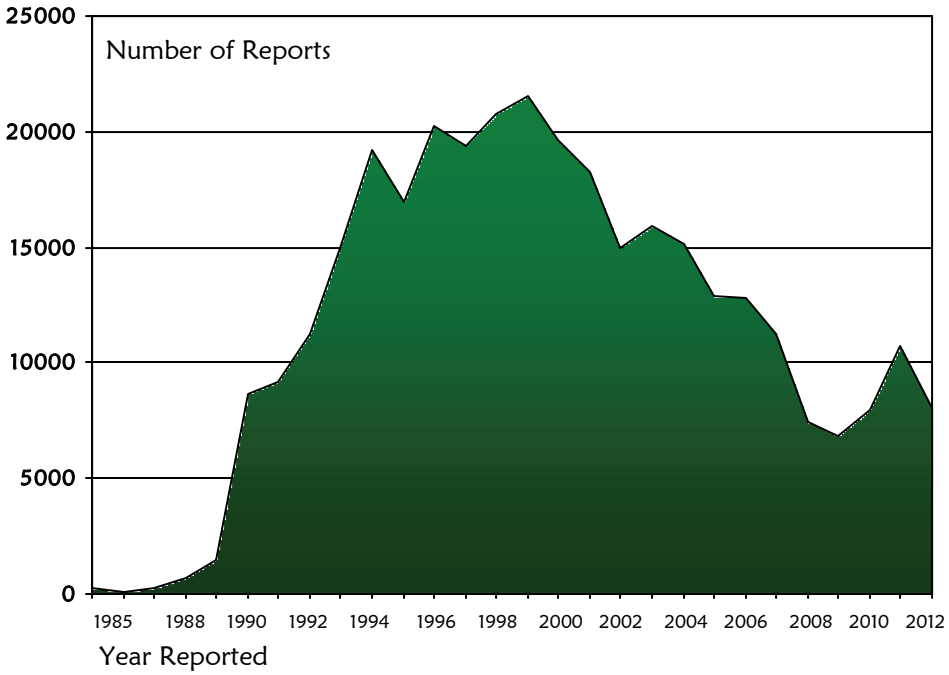
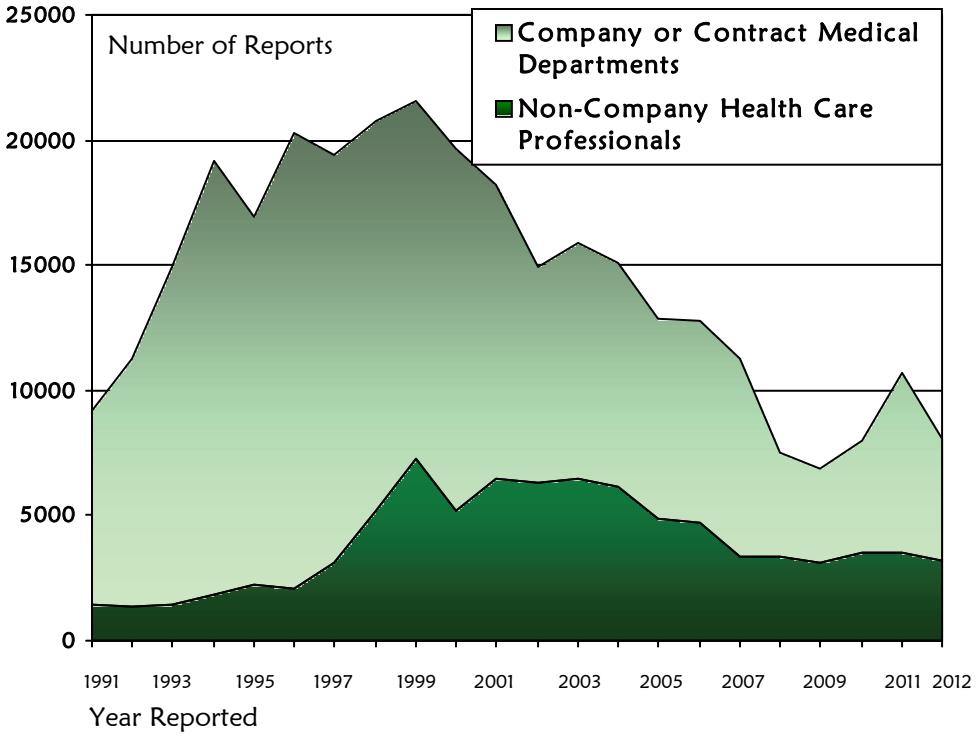


Figure 3
OD Reports by Year and Reporting Source: 1991-2012



RESULTS, continued...

responsible for identifying 1,399 reports of lead poisoning. In addition, the Michigan Poison Control Center reported 900 incidents of work-related poisonings, and the 3rd Circuit Court of Michigan reported 359 asbestos-related claims. One hundred thirty-four (84%) of the clinicians reported only one patient each in calendar year 2012 (Table 2); three clinicians reported 31-91 patients each. One of the clinicians runs an occupational medicine clinic. The other two clinicians are certified to interpret chest x-rays for dust-related lung disease ("B" readers). A "B" reader is a licensed physician who has passed a test on interpreting chest x-rays for pneumoconiosis and maintains certification by passing an additional test every four years. As of May 2013, there were six Michigan physicians who were listed as "B" readers on the NIOSH "B" reader website.

Occupational Health Clinics

There are approximately 187 occupational health clinics in Michigan. From June 2005 to 2009, the number of such clinics reporting occupational disease cases to the State increased from 21 to 56. In 2010, the number of reporting clinics dropped to 44, in 2011 increased to 64, and in 2012 decreased to 61. Annual audits of a sample of non-reporting clinics began in 2009.

Demographics

Table 3 shows the age, gender and race distribution of the workers with occupational diseases reported in the year 2012. The mean age of reported patients was 44 ± 14 years (range, 13 to 94 years) with approximately two-thirds of the patients (67%) between the ages of 25 and 54 years. One hundred fifteen reports were submitted for patients under age 20, and 79 reports were submitted for patients age 80 and older.

Sixty-seven percent of all reports submitted were for male workers. Ninety-one percent of the submitted reports (7,375 cases) did not indicate the worker's race. Of the 694 reports that did indicate race, 81% were Caucasian, 12% were African American and 7% were Hispanic.

Table 1
Company Size at Facilities with an OD Report in 2012: Non-Company v Company Clinicians

Number of Employees	REPORTING SOURCE					
	Non-Company Clinicians		Company Clinicians		Total Reports	
	#	%	#	%	#	%
< 25	32	4.0	225	5.0	257	4.9
25-100	83	10.5	374	8.3	457	8.6
100-500	329	41.5	812	18.1	1,141	21.6
> 500	349	44.0	3,087	68.6	3,436	64.9
Total	793[a]	100.0	4,498[b]	100.0	5,291	100.0

[a] The number of employees was missing on 2,382 reports.
[b] The number of employees was missing on 396 reports.

Table 2
OD Reports Submitted by Non-Company Clinicians in 2012

Number of Reports	Clinicians		Patients
	#	%	#
1	134	84.3	134
2-5	19	11.9	44
6-10	2	1.3	16
11-20	1	0.6	14
21-100	3	1.9	156
Total[a]	159	100.0	364

[a] Includes reports only from individual clinicians.

RESULTS, continued...

Table 3
Demographic Characteristics of Occupational Disease Cases Reported in 2012

Demographic Characteristic		
Age	#	%
< 19	115	1.7
20-24	481	7.1
25-29	619	9.1
30-34	686	10.1
35-39	729	10.7
40-44	843	12.4
45-49	866	12.7
50-54	848	12.4
55-59	738	10.8
60-69	598	8.8
70-79	210	3.1
> 80	79	1.2
Total[a]	6,812	100.1[b]
Gender	#	%
Male	5,373	66.8
Female	2,667	33.2
Total[c]	8,040	100.0
Race	#	%
Caucasian	563	81.1
African American	83	12.0
Hispanic	48	6.9
Total[d]	694	100.0

[a]Age was unknown for 1,257 reports. Mean age 44 ±14 yrs.
[b]Percent does not add to 100 due to rounding.
[c]Gender was unknown for 29 reports.
[d]Race was unknown for 7,375 reports.

Younger Workers

Of the 74 workers age 18 and younger, two were 14, one was 15 years old, four were 16 years old, 22 were 17 years of age, and 45 were 18 years old. Thirty (41%) of the reported patients under age 19 were female and 44 (59%) were male. Place of employment was unknown for 59 of the 74 younger workers. Of the 15 with known employment type, three each worked in manufacturing and the trades industry, two each worked in education, arts and entertainment, and miscellaneous service industries, and one each worked in construction, agriculture and food services.

Eleven of the younger workers were reported by a company-affiliated clinician or clinic. Forty-eight were reported by the Poison Control Center, 11 were for an elevated blood lead level (serum lead levels were between six and 30 micrograms per deciliter), four were for respiratory symptoms, three for skin diseases, one each was for tenosynovitis and hearing loss, and six were for general symptoms. No work-related fatalities under the age of 19 were identified in 2012.

Older Workers

Of the 79 workers age eighty and older, 71 (90%) were between the ages of 80 and 89, and 8 (10%) were between 90 and 94 years of age. Seventy-four were men and five were women. Twenty-two of the older patients worked in or were retired from manufacturing, seven worked in construction, six worked in utilities, and one each worked in transportation, education, and public administration. Industry or former industry was not indicated in 41 reports.

Private practice clinicians not associated with any company reported all 79 patients. Fifty-five of the older workers were reported for dust-related lung disease (including 25 with lung cancer, 22 with asbestosis, and eight with silicosis) and 24 for elevated blood lead levels (serum lead levels were between 5 and 25 micrograms per deciliter).

Illness Information

Table 4 shows the distribution of diagnoses or clinical impressions by reporting source. Diagnoses were grouped by major International Classification of Diseases categories (ICD-9th Revision). Overall, repetitive trauma conditions (sprains and strains) were the most frequently reported conditions, with 2,824 cases representing 35% of all OD reports submitted.

Toxic effects of substances (poisoning) were the second most frequently reported conditions, with 1,442 cases representing 18% of all reports. Symptoms, signs and ill-defined conditions were the third most frequently reported condition, representing 1,039 (13%) of the cases. Musculoskeletal diseases were the fourth most frequently reported condition, with 787 cases representing 10% of all reports submitted. There were 747 (9%) diseases of the respiratory system, 591 (7%) reports of diseases of the nervous system and sense organs, 378 (5%) reports of skin diseases, 126 (2%) reports of cancer and

RESULTS, continued...

Table 4
2012 OD Reports by Disease Type and Reporting Source

DISEASE TYPE	Non-Company		Company		Total	
	#	%	#	%	#	%
Infectious & Parasitic Diseases (ICD 001-139)	1	<0.1	12	0.2	13	0.2
Neoplasms (ICD 140-239)	124	3.9	2	<0.1	126	1.6
Metabolic Disorders (ICD 270-279)	0	--	5	0.1	5	0.1
Blood and Blood Forming Organs (ICD 280-289)	0	--	0	--	0	--
Mental Disorders (ICD 290-319)	3	0.1	85	1.7	88	1.1
Nervous System & Sense Organs (ICD 320-389)	63	2.0	528	10.8	591	7.3
Circulatory System (ICD 390-459)	0	--	4	0.1	4	<0.1
Respiratory System (ICD 460-519)	592	18.6	155	3.2	747	9.3
Digestive System (ICD 520-579)	0	--	16	0.3	16	0.2
Genitourinary System (ICD 580-629)	0	--	1	<0.1	1	<0.1
Skin & Subcutaneous Tissue (ICD 680-709)	24	0.8	354	7.2	378	4.7
Musculoskeletal System & Connective Tissue (ICD 710-739)	24	0.8	763	15.6	787	9.8
Symptoms, Signs & Ill-Defined Conditions (ICD 780-799)	719	22.6	320	6.5	1,039	12.9
Repetitive Trauma: Sprains & Strains (ICD 800-999 except ICD 940 & ICD 980-989)	219	6.9	2,605	53.2	2,824	35.0
Burn Confined to Eye (ICD 940)	0	--	8	0.2	8	0.1
Toxic Effects of Substances - Poisonings (ICD 980-989)	1,406	44.3	36	0.7	1,442	17.9
TOTAL	**3,175**	100.0	**4,894**	99.8[a]	**8,069**	100.2[a]

[a]Percent does not add to 100 due to rounding.

88 (1%) mental disorders (stress-related illnesses). Less frequently reported conditions included diseases of the digestive system, infectious and parasitic diseases, and diseases of the circulatory system.

Reporting Source Differences

Company and non-company-affiliated providers differed markedly in the types of occupational diseases reported (Table 4). Fifty-three percent of reports from company health care providers were of repetitive trauma illnesses, while seven percent of reports by non-company providers represented these diagnoses. Conversely, 44% of non-company reports were of toxic effects of substances (poisonings), compared to 1% of company submissions. The second, third and fourth most frequently reported diagnoses for company providers were diseases of the musculoskeletal system and connective tissue (16%), diseases of the nervous system and sense organs (11%), and skin disorders (7%). Symptoms, signs and ill-defined conditions were the second most frequently reported diagnoses by non-company providers (23%). The third and fourth most frequently reported diagnoses for non-company providers were respiratory illness (19%) and repetitive trauma disorders (7%).

Company and non-company practitioners differed by industries represented in their reports (Table 5). Company-affiliated healthcare providers and non-company-affiliated physicians reported high percentages of patients employed in manufacturing (72% and 44%, respectively), primarily automobile production. The second and third most frequently reported industries by company providers were healthcare and social assistance (7%) and educational services (4%). The second and third industry types most frequently reported by non-company providers were construction (28%), and utilities (7%). Industry type was missing on 1,915 non-company and 41 company reports.

Gender Differences

Repetitive trauma was the most frequently reported diagnosis for women and men, with 46% and 30% of submissions, respectively (Table 6). The second, third and fourth most frequent diagnoses for men were poisonings (25%), respiratory diseases (11%), and symptoms, signs and ill-defined conditions (11%). For women, the second, third and fourth most frequently submitted diagnoses were ill-defined symptoms (17%), musculoskeletal diseases (14%) and respiratory diseases (6%). Twenty-nine reports did not indicate gender.

RESULTS, continued...

Table 5
2012 OD Reports by Industry Type and Reporting Source

2007 North American Industry Classification System		Non - Company		Company		Total	
		#	%	#	%	#	%
11	Ag, Forestry Fishing & Hunting	4	0.3	5	0.1	9	0.1
21	Mining	1	0.1	28	0.6	29	0.5
22	Utilities	86	6.8	15	0.3	101	1.7
23	Construction	348	27.6	49	1.0	397	6.5
31-33	Manufacturing	550	43.7	3,481	71.7	4,031	65.9
42	Wholesale Trade	42	3.3	45	0.9	87	1.4
44-45	Retail Trade	18	1.4	136	2.8	154	2.5
48-49	Transportation & Warehousing	26	2.1	36	0.7	62	1.0
51	Information	0	—	21	0.4	21	0.3
52	Finance & Insurance	0	--	33	0.7	33	0.5
53	Real Estate & Rental & Leasing	1	0.1	43	0.9	44	0.7
54	Professional, Scientific & Tech Svcs	15	1.2	51	1.1	66	1.1
56	Administrative & Support & Waste Mgt & Remediation Svcs	14	1.1	145	3.0	159	2.6
61	Educational Services	12	1.0	184	3.8	196	3.2
62	Health Care & Social Assistance	29	2.3	337	6.9	366	6.0
71	Arts, Entertainment & Recreation	28	2.2	11	0.2	39	0.6
72	Accommodation & Food Services	9	0.7	50	1.0	59	1.0
81	Other Services (excl Public Admin)	10	0.8	61	1.3	71	1.2
92	Public Administration	67	5.3	122	2.5	189	3.1
	Total[a]	1,260	100.0	4,853	99.9[b]	6,113	99.9[b]

[a]Industry was unknown for 1,915 non-company reports and 41 company reports.
[b]Percent does not add to 100 due to rounding.

Table 6
2012 OD Reports by Disease Type and Gender

DISEASE TYPE	Males		Females	
	#	%	#	%
Infectious & Parasitic Diseases (ICD 001-139)	7	0.1	6	0.2
Neoplasms (ICD 140-239)	126	2.3	0	—
Metabolic Disorders (ICD 270-279)	5	0.1	0	—
Blood and Blood Forming Organs (ICD 280-289)	0	—	0	—
Mental Disorders (ICD 290-319)	34	0.6	52	1.9
Nervous System & Sense Organs (ICD 320-389)	431	8.0	151	5.7
Circulatory System (ICD 390-459)	3	0.1	1	<0.1
Respiratory System (ICD 460-519)	591	11.0	156	5.8
Digestive System (ICD 520-579)	14	0.3	2	0.1
Genitourinary System (ICD 580-629)	1	<0.1	0	—
Skin & Subcutaneous Tissue (ICD 680-709)	236	4.4	141	5.3
Musculoskeletal System & Conn Tissue (ICD 710-739)	416	7.7	369	13.8
Symptoms, Signs & Ill-Defined Conditions (ICD 780-799)	589	11.0	449	16.8
Repetitive Trauma: Sprains & Strains (ICD 800-999 except ICD 940 & ICD 980-989)	1591	29.6	1219	45.7
Burn Confined to Eye (ICD 940)	6	0.1	2	0.1
Toxic Effects of Substances (ICD 980-989)	1323	24.6	119	4.5
TOTAL[a]	**5,373**	99.9[b]	**2,667**	99.9[b]

[a]Gender was not listed for 29 individuals.
[b]Percent does not add to 100 due to rounding.

Fatalities

Fatalities related to occupational illnesses were reported for 141 workers (Table 7). None of the illness-related fatalities reported were from acute incidents. Non-company clinicians reported all 141 of the fatalities. The workers who died ranged in age from 25 to 91 years. One hundred three died from asbestos-related cancer, 28 from asbestosis, four each from carbon monoxide poisoning and other lung conditions and one each from silicosis and work-related asthma. Sixty-five of the deceased workers had been employed in manufacturing, 10 in construction, eight in utilities, two each in health care services, retail trade and educational services, and one each in public administration, railroads and business services. Former occupation was not specified for 49 workers.

The state has a separate program to track acute traumatic fatalities, called MIFACE (Michigan Fatality Assessment and Control Evaluation). The MIFACE program identified an additional 127 traumatic work-related fatalities from injuries in 2012 that occurred in Michigan (provisional data). A separate report for the most recent work-related fatalities (2011 calendar year) can be found at: www.oem.msu.edu. There were no deaths among youths identified in the MIFACE Program in 2012.

RESULTS, continued...

Table 7
Demographic Characteristics of Reported Occupational Disease Fatalities in 2012

DEMOGRAPHIC CHARACTERISTIC		
Vital Status	**#**	**%**
Fatal	141	1.8
Non-Fatal	7,886	98.2
Total	**8,027**	**100.0**
Unknown	42	
Age	**#**	**%**
20 - 29	1	0.7
30 - 39	1	0.7
40 - 49	1	0.7
50 - 59	18	12.8
60 - 69	33	23.4
70 - 79	58	41.1
> 80	29	20.6
Total	**141[a]**	**100.0**
Disease Type	**#**	**%**
Neoplasm-lung	103	73.0
Asbestos-related	28	19.9
CO poisoning	4	2.8
Other– lung	4	2.8
Silicosis	1	0.7
Work-related asthma	1	0.7
Total	**141**	**99.9[a]**
Industry	**#**	**%**
Manufacturing	65	70.7
Construction	10	10.9
Utilities	8	8.7
Educational Services	2	2.2
Health Services	2	2.2
Retail Trade	2	2.2
Communications	1	1.1
Public Administration	1	1.1
Other Services	1	1.1
Total	**92[c]**	**100.2[a]**

[a]Percentage does not add to 100 due to rounding.
[b]Industry was missing on 49 reports.

Comparison w/Other Data Systems

No one reporting system captures the true burden of occupational disease. The following section looks at other reporting systems and the contribution each makes to the overall characterization of work-related illness in our state.

Published Aggregate Data in MI

Table 8 compares data from the OD reporting system with Workers' Compensation Agency claims and the BLS Annual Survey. These data illustrate the variation of reported disease categories by reporting source and suggest that the magnitude of occupational diseases among Michigan workers is greater than what currently gets reported.

The most quoted data source on occupational injuries and illnesses available in Michigan comes from the BLS Annual Survey of company injury and illness logs. For this data source, the most recent data available at a disease category level is from 2011 with an estimate of 7,500 occupational illnesses and 107,600 occupational injuries in the state.

Data from Michigan's Workers' Compensation Agency (WCA) for 2012 showed 22,446 claims for occupational injuries and illnesses with seven or more consecutive days away from work. Overall in 2012, about $436 million in compensation was paid by insurance companies and self-insured employers on 173,964 claims for both lost work time and medical-only costs. These claims include new claims filed in 2012, as well as previous claims for workers who continue to lose work time or incur medical costs due to their injury or illness. Sixty-eight percent of the total paid claims in 2012 were for medical procedures or care only and 32% for wage loss (http://www.michigan.gov/documents/wca/wca_2012_Annual_Report_416180_7.pdf).

Other Sources-Hospital Discharge Data

The hospital discharge data described in this next section is not part of the 8,069 occupational disease reports described in the 2012 Annual Report. Hospital discharge data does not include identifiers; presumably some of the patients overlap with those in the 8,069 reports. However, especially for long latency, chronic diseases like asbestosis, it would be difficult to identify newly diagnosed patients. Therefore, the hospitalization data in this section should be considered as supplemental to the 8,069 reports submitted to the state in 2012. The most recent data available from the MHA is for calendar year 2011. The following section looks at hospital data where Workers' Compensation is the expected payer.

RESULTS, continued...

Table 8
Comparison of 2011 Bureau of Labor Statistics (BLS) Occupational Illness Survey Data and 2012 LARA Workers' Compensation Agency (WCA) Claims with 2008—2012 LARA Occupational Disease (OD) Reports

	Disease Category														
	Skin		Lung—Dust		Lung—Toxic		Poisoning		Physical Agents		Repeated Trauma		All Other		Total
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
BLS Survey															
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
2011	1,100	14.7	ND	--	400	5.3	100	1.3	ND	--	ND	--	5,900	78.7	7,500
WCA Claims															
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
2012	54	0.3	0	--	103	0.7	13	0.1	27	0.2	11,863	76.7	3,411	22.0	15,471
LARA OD Reports															
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
2008	196	2.9	905	13.2	600	8.7	1,811	26.4	13	0.2	2,305	33.5	1,042	15.2	6,872
2009	258	4.1	321	5.1	372	5.9	1,782	28.1	176	2.8	1,892	29.8	1,544	24.3	6,345
2010	263	3.5	440	5.9	841	11.3	1,750	23.5	190	2.5	2,394	32.1	1,573	21.1	7,451
2011	499	4.9	459	4.5	634	6.3	1,716	17.0	237	2.3	3,974	39.3	2,589	25.6	10,108
2012	378	5.0	328	4.3	419	5.5	1,442	18.9	46	0.6	2,892	38.0	2,106	27.7	7,611

ND = There was no data for this disease category.

If the source of payment changed after the patient was treated and discharged from the hospital, such as might occur in a disputed workers' compensation case, it is likely that this change would not be captured in the MHA data reported in this section. Figure 4 shows the number of patients, as well as hospitalizations, with Workers' Compensation (WC) insurance designated as the primary payment source at discharge for the years 1992 through 2011; the numbers of hospitalizations from 1995-2011 decreased compared to the years 1992-1994. In addition, the percentage of hospitalizations with WC insurance designated as the primary payment source at discharge decreased beginning in 1993 (Figure 5). For both these parameters, there was a plateau in the decrease from 2004 to 2008. However, there was also a decrease in 2009-2011 in both these parameters. In 2009, 0.30% of the 1,305,935 Michigan hospitalizations designated WC insurance as the primary payment source at discharge, and in 2011 0.28% of the 1,278,767 Michigan hospitalizations designated WC insurance as the primary payment source at discharge.

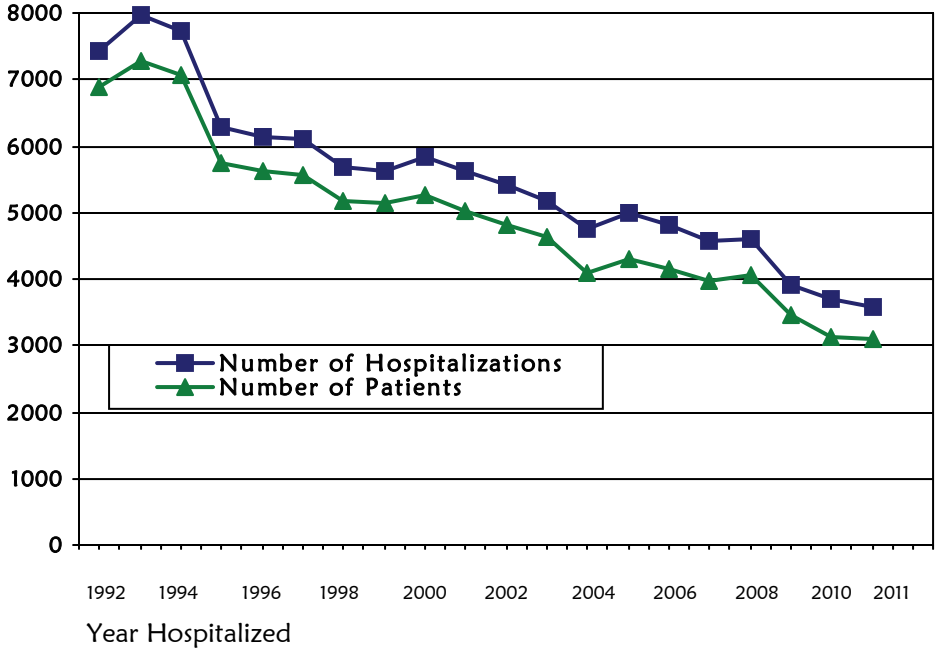
Table 9 shows the primary discharge diagnosis for hospitalizations from 1992 to 2011 where WC insurance was designated as the primary payment source at discharge. WC insurance covers a broad range of conditions, including mental illness, infections, heart disease and cancer. The most common two conditions covered by WC insurance are musculoskeletal diseases, accounting for approximately 29-44% of patient WC-related hospitalizations from 2002-2011 and injuries and poisoning, accounting for 39-44% of all WC-related patient hospitalizations.

Table 10 lists the demographics of patients with WC insurance as the primary payment source at discharge. From 70-76% of the hospitalizations were for men, across all years from 2002 to 2011. Among hospitalizations for which race was known, approximately 85-90% were white, 7-11% were African American, <1% were Asian, and 2-5% were listed as "other."

Most hospitalizations involved workers between the ages of 40 and 59 years. Less than 1% involved workers under the age of 15 or 80 years or older, except since 2005 through 2011 where 3-4% of the workers were 80 years or older. The percentage of hospitalizations of workers under the age of 20 has decreased slightly over time, from 3% in 1992 to 1% in 2011 (1992 data not shown).

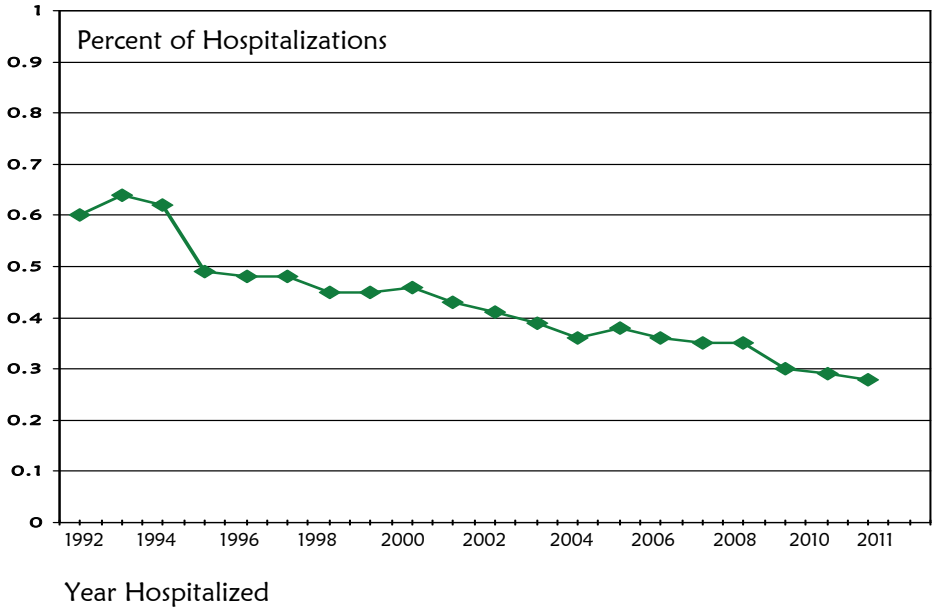
RESULTS, continued...

Figure 4
Hospitalizations and Patients with Workers' Compensation Designated as the Primary Payment Source at Discharge in Michigan: 1992-2011



The number of hospitalizations and patients with Workers' Compensation as the primary source of payment in Michigan has steadily declined over time.

Figure 5
Percent of Total Michigan Hospitalizations with Workers' Compensation Designated as the Primary Payment Source at Discharge in Michigan: 1992-2011



In Calendar year 2011, there were 1,278,767 hospitalizations in Michigan. Of those, only 0.28% were paid for by Workers' Compensation. The percent of hospitalizations paid for by Workers' Compensation in Michigan has steadily declined over time.

RESULTS, continued...

Table 9 Primary Diagnosis of Patients Hospitalized in Michigan from 2002-2011, with Workers' Compensation Designated as Primary Payment Source at Discharge

	Year of Hospitalization									
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
1º Discharge Diagnosis[a]	%	%	%	%	%	%	%	%	%	%
Infectious Diseases (001-139)	0.1	0.4	0.4	0.7	1.3	0.8	1.3	1.6	1.2	1.5
Neoplasms (140-239)	0.2	0.2	0.2	0.4	0.3	0.1	0.3	0.3	0.1	0.4
Endocrine Diseases (240-279)	0.4	0.3	0.4	0.2	0.5	0.7	0.7	0.7	0.7	0.7
Blood Diseases (280-289)	<0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	<0.1	0.1
Mental Disorders (290-319)	0.9	0.7	0.8	0.6	0.9	1.0	0.9	0.9	0.8	1.0
Nervous System Diseases (320-389)	1.1	1.1	1.2	1.0	1.1	1.4	1.7	1.6	2.0	1.8
Circulatory Diseases (390-459)	2.1	2.6	2.9	4.0	3.8	4.6	4.1	4.7	4.8	4.7
Respiratory Diseases (460-519)	1.4	1.7	2.0	2.2	2.1	2.2	2.6	2.5	2.8	1.9
Digestive Diseases (520-579)	1.7	1.8	2.0	2.5	1.9	1.8	2.3	2.5	2.6	1.9
Genitourinary Diseases (580-629)	0.5	0.6	0.6	0.8	0.8	1.1	1.3	1.2	1.1	1.3
Pregnancy Complications (630-676)	0.5	0.4	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.3
Skin Diseases (680-709)	3.2	3.5	3.3	3.6	4.7	4.7	3.8	4.0	4.3	5.2
Musculoskeletal Diseases (710-739)	43.9	39.3	38.5	34.2	36.9	33.1	32.2	31.8	29.8	28.7
Congenital Anomalies (740-759)	0.2	0.2	0.3	0.1	0.4	0.3	0.2	0.3	0.3	0.3
Perinatal Complications (760-779)	--	--	--	--	--	<0.1	--	--	--	--
Symptoms & Signs (780-799)	1.2	1.7	1.5	1.8	2.3	1.7	1.9	1.4	1.8	1.6
Injury & Poisoning (800-999)	40.1	40.6	41.1	42.4	38.8	42.3	41.8	42.4	43.1	44.2
V Codes	2.2	4.7	4.6	5.5	4.1	3.9	4.6	3.8	4.3	4.6
Total[b]	**4809**	**5160**	**4760**	**4996**	**4825**	**4578**	**4611**	**3906**	**3688**	**3589**

[a] International Classification of Diseases-9th Revision
[b]Totals vary due to missing information.

Table 10 Demographics of Patients Hospitalized in Michigan from 2002-2011, with Workers' Compensation Designated as Primary Payment Source at Discharge

	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Gender	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Male	76	74	76	75	73	73	70	71	73	74
Female	24	26	24	25	27	27	30	29	27	26
Total #	**4809**	**4635**	**4760**	**4996**	**4825**	**4578**	**4611**	**3906**	**3688**	**3589**
Race	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
White	86	85	86	87	87	87	90	89	90	89
African Am	9	11	10	9	9	9	8	9	7	8
Asian	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Other	5	4	3	3	4	4	2	2	2	3
Total #	**3123**	**3046**	**3172**	**3465**	**3261**	**3233**	**3255**	**2761**	**2671**	**2659**
Age	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
< 15	<1	<1	<1	<1	<1	<1	--	--	<1	<1
15-19	1	1	2	1	1	1	1	1	1	1
20-29	11	12	11	11	11	11	10	9	9	10
30-39	25	24	22	20	19	18	17	17	18	17
40-59	54	53	55	53	52	54	54	55	53	53
60-79	8	10	10	11	12	12	14	14	16	15
≥ 80	<1	<1	1	4	3	3	4	4	3	4
Total #	**4792**	**4635**	**4760**	**4986**	**4825**	**4578**	**4602**	**3902**	**3688**	**3589**
Avg Age	43	44	44	46	47	47	48	49	48	48
SD-Age	±12	±13	±12	±15	±15	±15	±15	±15	±14	±15

[a]Totals vary due to missing information.

RESULTS, continued...

Poison Control Center Data

In 2012, 900 calls to the Michigan Poison Control Center (PCC) were identified for individuals with work-related symptoms or exposures. Table 11 describes available demographic characteristics and disease categories of the individuals reported. There were more reports for males (65%). The individuals ranged in age from 13 to 77 years. Eighty-four percent of these individuals were less than age 50. Of the 900 calls to the PCC in 2012, the top calls included: 184 (20%) for allergic reactions, 179 (20%) for nausea-vomiting, 167 (19%) for skin-related symptoms, and 156 (17%) for symptoms involving the head and neck.

Adult Blood Lead Epidemiology and Surveillance (ABLES)

In 2012, more than 13,000 adult Michigan residents were reported by labs as having their blood tested for lead. Table 12 describes the demographic characteristics of the 1,399 individuals reported with a blood lead level of 5 ug/dL and above. Most individuals were males between the ages of 30 and 59. Construction and manufacturing were the most frequently reported industries of lead exposure. A comprehensive report on all blood lead levels in Michigan can be found at: www.oem.msu.edu, the 2011 Annual Report on Blood Lead Levels on Adults in Michigan.

Table 11
Demographic Characteristics of 900 Individuals Reported by the Michigan Poison Control Center in 2012

Demographic Characteristics		
Age	*#*	*%*
13-19	61	7.6
20-29	297	36.8
30-39	172	21.3
40-49	151	18.7
50-59	101	12.5
60-69	24	3.0
≥ 70	1	0.1
Total	**807**[a]	100.0
Gender	#	%
Male	583	64.8
Female	317	35.2
Total	**900**[a]	100.0
Disease Type	#	%
Allergic Reaction	184	20.4
Nausea & Vomiting	179	19.9
Skin Rash and Burns	167	18.6
Head and Neck Symptoms	156	17.3
Respiratory Symptoms	130	14.4
Nervous System & Sense Organs	63	7.0
Cardiovascular Symptoms	21	2.3
Total	**900**	99.9[b]

[a]Age was missing on 93 reports.
[b]Percent does not add to 100 due to rounding.

Table 12
Demographic Characteristics of 1,399 Individuals Reported by Laboratories Screening for Blood Lead in Michigan, 2012

	Blood Lead Level			
	>=5 & <10 *u*g/dL		>=10 *u*g/dL	
Age	**#**	**%**	**#**	**%**
13-19	11	1.4	8	1.4
20-29	102	12.6	80	13.6
30-39	160	19.8	134	22.7
40-49	199	24.7	132	22.4
50-59	181	22.4	152	25.8
60-69	99	12.3	59	10.0
≥ 70	55	6.8	25	4.2
Total	**807**	100.0	**590**[a]	100.1[c]
Gender	#	%	#	%
Male	740	91.7	554	93.6
Female	67	8.3	38	6.4
Total	**807**	100.0	**592**	100.0
Industry	**#**	**%**	**#**	**%**
Construction	149	42.5	170	42.9
Manufacturing	78	22.2	129	32.6
Utilities	40	11.4	21	5.3
Public Admin	33	9.4	11	2.8
Trade	22	6.3	23	5.8
Arts & Entertainment	7	2.0	18	4.5
Transportation	8	2.3	8	2.0
Prof & Scientific	6	1.7	4	1.0
Admin & Support	6	1.7	0	--
Health Care	0	--	3	0.8
Real Estate	0	--	1	0.3
Other Services	2	0.6	8	2.0
Total	**351**[b]	100.1[c]	**396**[b]	100.0

[a] Age was unknown for 2 individuals with a blood lead level >=10ug/dL.
[b]Industry was missing on 456 reports of blood lead levels <10 ug/dL and on 196 reports of blood leads >=10ug/dL.
[c]Percent does not add to 100 due to rounding.

DISCUSSION

There were 8,069 Occupational Disease Reports sent to LARA in calendar year 2012. This report does not include occupational injuries. The most frequent types of occupational diseases reported to LARA were repetitive trauma illnesses (35%), toxic effects of substances (18%), signs and symptoms (13%), musculoskeletal diseases (10%), and respiratory disease (9%). From 1988 through 1999, the number of reports sent to the State increased substantially. Figure 2 shows the number of occupational disease reports received each year since 1985. Since 1999, the number of reports had been decreasing, except for the increase in 2010 and 2011. In 2012, the number of reports decreased. There was a large decrease in the number of reports received in 2005, with over 2,200 fewer reports received than in 2004; in 2009 the total number of reports decreased by over 640 from 2008. In 2010, the number of reports increased to 7,952, an increase of over 1,000 reports since 2009, and in 2011 to 10,701, an increase of almost 4,000 reports, and a decrease of 2,548 reports in 2012. The initial overall decline in the number of reports reflected fewer reports from company medical departments. The number of reports from non-company-affiliated practitioners remained relatively unchanged through 2004; however, from 2004 to 2009, there was a large decline of approximately 3,000 reports in the number of non-company-affiliated practitioner reports as compared to 2004 (Figure 3). The number of company-affiliated physicians or medical departments reporting in 2012 was 179, compared to 188 in 2011, 185 in 2010, 194 in 2009, 449 in 2008, 426 in 2007, 396 in 2006, 374 in 2005, 373 in 2004 and 305 in 2003.

ICD-9 codes were used to classify the diagnosis or clinical impression recorded on the occupational disease reports submitted to LARA. Sprains and strains, except those involving the back, are considered by the federal and Michigan OSHA programs as illnesses secondary to cumulative trauma, and are therefore required to be reported even though in the ICD-9 coding system, sprains and strains are classified as injuries.

Many employers, physicians and other healthcare providers do not report patients with occupational diseases either because they are unaware of the reporting law or choose not to report for a different reason. Currently, reports are received from approximately 179 company-affiliated physicians reporting employees from 1,002 different companies; there were 159 non-company-affiliated physicians reporting patients to the state. There were 234,854 companies in the year 2012 and 29,174 licensed physicians in Michigan in the year 2012. Accordingly, reports are received from 0.4% of companies and 0.5% of physicians. Over the last several years, these percentages have remained largely unchanged. Efforts continue to remind employers of the requirement to report by routinely distributing reporting forms during MIOSHA inspections. In addition, all new physicians receive information on the requirement to report when they apply for medical licensure in Michigan.

The 8,069 occupational disease reports received this past year under-represent the actual incidence of occupational diseases in Michigan. Based on an MSU study matching multiple data bases in Michigan for the years 1999-2001, one could estimate that the BLS survey missed 50% of the total number of occupational illnesses in Michigan[2]. For 2011, the most recent year available, the BLS annual survey reported 7,500 illnesses; by extension one would expect 15,000 illnesses in 2011 instead of the approximately 11,000 reported in that year. Even these types of estimates are an underestimate because it assumes that all physicians recognize work-related illness in their patients and that all employers are informed when work-related conditions are diagnosed. These assumptions often go unmet, given the limited training that healthcare providers receive in diagnosing work-related conditions, and that many individuals never inform their employer when they are diagnosed with a work-related condition.

The type of illness and industry where occupational diseases occur as reported by non-company-affiliated healthcare practitioners differs from company-based healthcare practitioners (Tables 1, 4 and 5). The differences vary depending on the specialties of the non-company-affiliated physicians who submit reports. For example, in 2012 the non-company-affiliated health care practitioners were more likely to report patients with respiratory disease who work in small, non-manufacturing companies. A large percentage of the year 2012 reports from non-company-affiliated health care practitioners were from physicians who are specialists in the radiographic interpretation of mineral

DISCUSSION

and dust-related lung disease. However, regardless of the mix of non-company-affiliated specialists reporting, the data illustrates that relying on company-affiliated reports alone would cause occupational illness statistics to markedly undercount certain work related conditions. Similarly, one cannot rely on Workers' Compensation data for a reliable count of work-related conditions. In a study covering the years 1992-1994, only 9.6% of the workers for whom an Occupational Disease Report was submitted had definitely filed a WC claim, although an additional 36% may have filed a claim for a total of 45.6%[3]. In that study, limits of the data did not allow for a more precise estimate of the claims filed, but the range underscores the point that a large number of workers do not file WC claims even though they are seen by a physician for their illness. This is an ongoing issue, as review of hospital discharge data for individuals with pneumoconioses shows only <1% - 8% paid by WC (2011 Annual Report: Tracking Silicosis and Other Work-Related Lung Diseases in Michigan, available at: www.oem.msu.edu).

Review of Table 8 shows a large difference in the distribution of occupational illnesses identified through the state's OD reporting system, compared to both the BLS Annual Survey of Employers and the state's WCA claims system. For example, poisoning represents approximately 19% (1,442) of the OD reports, while that category of diseases only accounts for approximately 1% (100 cases) of the BLS survey and <1% (13 cases) of WCA claims. Non-employer sources such as from Poison Control Centers, "B" Readers, and laboratories, provide additional occupational diseases not being reported by employers or practitioners.

In addition to tracking the overall incidence of occupational disease, a more comprehensive system allows us to identify areas of concern in our state, monitor trends, develop interventions designed to prevent additional occupational disease, and then evaluate the effectiveness of these efforts.

REFERENCES

1. Public Health Services and Health Care Financing Administration. *International Classification of Diseases, 9th Revision, Clinical Modification.* Washington: Public Health Service, 1980.

2. Rosenman KD, Kalush A, Reilly MJ, Gardiner JC, Reeves M, Luo Z. *How Much Work-Related Injury and Illness is Missed by the Current National Surveillance System?* J Occup Environ Med 2006; 48:357-365.

3. Biddle J, Roberts K, Rosenman KD, Welch EM. *What Percentage of Workers With Work-Related Illnesses Receive Workers' Compensation Benefits?* J Occup Environ Med 1998; 40:325-331.