

JUNE 1, 2020

2019 ANNUAL REPORT

**SUMMARY OF OCCUPATIONAL
DISEASE REPORTS TO
THE MICHIGAN DEPARTMENT OF
LABOR & ECONOMIC OPPORTUNITY**



2019 Annual Report

Summary of
Occupational Disease
Reports to the Michigan
Department of Labor &
Economic Opportunity

June 1, 2020

2019 ANNUAL REPORT SUMMARY OF OCCUPATIONAL DISEASE REPORTS TO THE MICHIGAN DEPARTMENT OF LABOR & ECONOMIC OPPORTUNITY

Occupational Disease Surveillance Program

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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 & Regulatory Affairs
LEO MI Department of Labor and Economic Opportunity
MDHHS Michigan Department of Health and Human Services
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



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

ONLINE:

www.oem.msu.edu

EMAIL:

ODReport@msu.edu

FAX:

517.432.3606

TELEPHONE:

1.800.446.7805

MAIL:

MIOSHA Technical
Services Division
530 W Allegan St
PO BOX 30649
Lansing, MI 48909

Background

This is the 28th annual report on occupational diseases in Michigan and is based upon the reports submitted to the Michigan Department of Labor and Economic Opportunity (LEO, formerly the Department of Licensing and Regulatory Affairs, LARA) in calendar year 2019. 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 disease. LEO designates Michigan State University's College of Human Medicine, Occupational and Environmental Medicine Division (MSU OEM) as its bona fide agent to compile and analyze the occupational disease reports.

Background continued...

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 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.

Michigan Department of Labor and Economic Opportunity		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: <input type="radio"/> White <input type="radio"/> Black <input type="radio"/> Hispanic <input type="radio"/> 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 <input type="radio"/> <25 <input type="radio"/> 25-100 <input type="radio"/> 100-500 <input type="radio"/> >500			
Employee's Work Unit/Department	Dates of Employment From: _____ To: _____ Mo Day Year 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 <input type="radio"/> No <input type="radio"/>	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 <input type="radio"/> No <input type="radio"/> Don't Know <input type="radio"/>	
Physician's Name	Phone		
Office Address	City	State	Zip
Name of Person Submitting Report	Physician <input type="radio"/> Non-Physician <input type="radio"/>		
Address	City	State	Zip
Signature	Phone	Date	

The Michigan Department of Labor and Economic Opportunity is an equal opportunity, affirmative action employer, service provider and buyer. Return completed form to:

Michigan Department of Labor and Economic Opportunity (LEO)
Michigan Occupational Safety and Health Administration (MIOSHA)
 Technical Services Division (TSD)
 530 W. Allegan Street, P.O. Box 30649, Lansing, MI 48909-8149
 Overnight Mail Address: 2407 N. Grand River Avenue, Lansing, MI 48906

MIOSHA-TSD-51 (08/19)

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

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 Labor and Economic Opportunity within 10 days of discovery.



In 2019, 807 (1.4%) of the 58,913 human exposure-related calls to the Michigan Poison Control Center were related to occupational exposures.

METHODS

An occupational disease (OD) report should be 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 International Classification of Diseases—10th Revision (ICD-10)¹ beginning October 1, 2015 and includes J45, J62, J63, J64, J65, J66, J67, J68, Z57.2, Z57.3, Z57.5 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 Cause of Death (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 used to direct surveillance, intervention and prevention activities. The computerized OD report information includes: 1) employee name, age, sex, race, zip code and optional partial social security number; 2) employer 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, diagnosis date, suspected causative agent(s), vital status, and assigned ICD-10 code; and 4) information about the report submitter, including whether they are 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 LEO 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).

Beginning in 2012, the 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 ON FIRST REPORT

ICD-10	DESCRIPTION
A15.0	Pulmonary TB
A18.0	TB of Bones & Joints
D86	Sarcoidosis
B90	TB, Late Effects of
C00-D49	Cancer
E20-E35	Diseases of Other Endocrine Glands
E50-E64	Nutritional Deficiencies
E70-E88	Metabolic & Immunity Disorders except E86.0 [276], Dehydration
D50-D89	Diseases of the Blood & Blood Forming Agents
F01-F99	Mental Disorders except F43 [308 (Acute Reaction to Stress) & 309 (Adjustment Reaction)]
G00-G99	Select Diseases of the Nervous System & Sense Organs
H90-H91	Noise-Induced Hearing Loss, Tinnitus
I00-I99	Select Diseases of the Circulatory System
J40-J47, J60-J70	Select Diseases of the Respiratory System, Pleural Plaques w/no Parenchymal Abnormality on ILO form
J80-J84	Interstitial Lung Disease, Pulmonary Fibrosis
L94.9	Connective Tissue Lung Disease
K00-K95	Diseases of the Digestive System
N00-N99	Diseases of the Genitourinary System

RESULTS

A total of 7,953 occupational disease reports were submitted to LEO in calendar year 2019. Figure 2 shows the number of reports received each year since 1985.

Reporting Source

Company or contract medical departments submitted 63% of the reports (4,981 cases); non-company associated health care practitioners submitted 37% of the reports (2,972 cases). Figure 3 shows the trends by reporting source (company or non-company associated) since 1991.

Company Size

Of the 5,684 OD reports that listed company size, 38% (2,166 reports) were submitted on individuals who worked in companies with > 500 employees (Table 1). For companies with 500 or fewer employees, a slightly greater proportion of reports came from non-company health practitioners compared to company clinicians. About 69% of the 730 reports with known company size that were submitted by non-company practitioners involved companies with < 500 employees, while about 61% of the 4,954 reports with known company size submitted by company practitioners involved facilities with < 500 employees.

Non-Company Clinicians

Twenty-five non-company-associated clinicians reported 58 incidents of occupational disease. Twenty-four labs were responsible for identifying 1,867 reports of elevated blood lead level.

Figure 2
OD Reports to LEO by Year Reported: 1985-2019

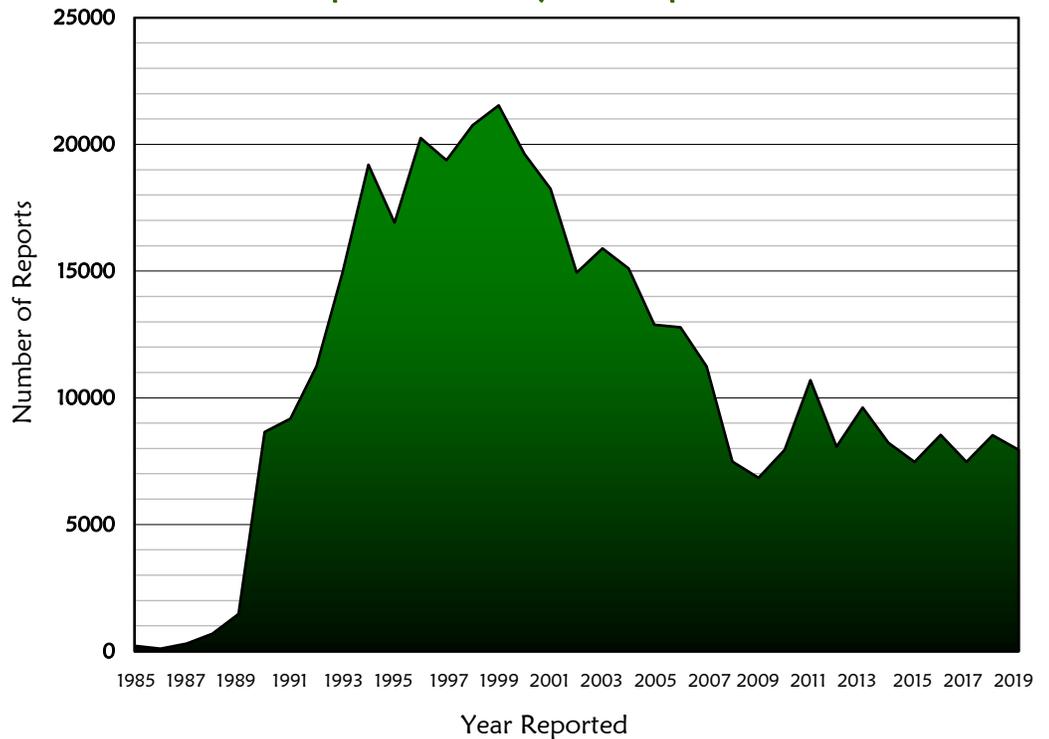
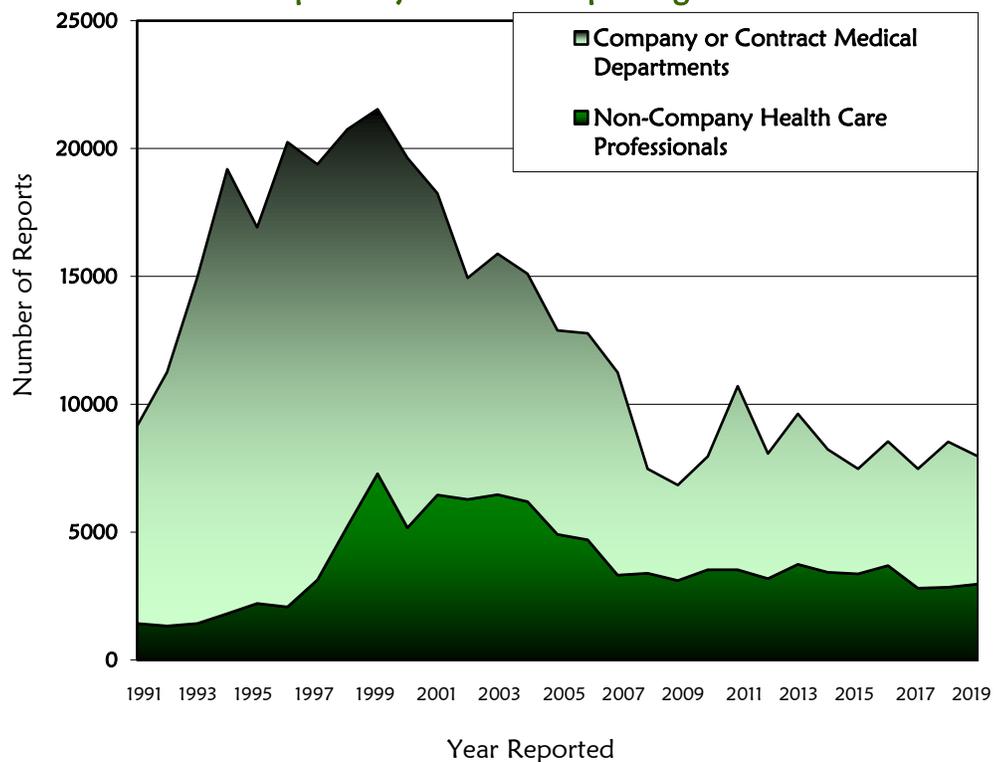


Figure 3
OD Reports by Year and Reporting Source: 1991-2019



RESULTS, continued...

In addition, the Michigan Poison Control Center reported 807 incidents of work-related poisonings, the 3rd Circuit Court of Michigan reported 134 asbestos-related claims and hospitals submitted 95 reports of patients with work-related illnesses, and 11 patients were identified through death certificate review. Nineteen (76%) of the clinicians reported only one patient each in calendar year 2019 (Table 2); one clinician reported 23 patients; this clinician is certified to classify chest x-rays for dust-related lung disease (i.e., “B” reader). 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 five years. In 2019, there were six Michigan physicians who were listed as a “B” reader on the NIOSH “B” reader website: cdc.gov/niosh/topics/chestradiography/breader-list.html.

Occupational Health Clinics

There are approximately 195 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, in 2012 decreased to 61, in 2013 increased to 66, in 2014 decreased to 46, in 2015 decreased to 39, in 2016 decreased to 37, in 2017 increased to 42, in 2018 decreased to 29, and in 2019 increased to 38. Biennial 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 2019. The mean age of reported patients was 45 ± 15 years (range, 15 to 97 years) with approximately 62% of the patients between the ages of 25 and 54 years. Ninety reports were submitted for patients age 19 or younger, and 67 reports were submitted for patients age 80 and older. Sixty-seven percent of all reports submitted were for male workers. Eighty percent of the submitted reports (6,400 cases) did not indicate the worker’s race. Of the 1,553 reports that did indicate race, 84% were Caucasian, 10% were African American, 5.5% were listed as “other” and 0.6% were listed as Hispanic.

Younger Workers

Of the 51 workers *age 18 and younger*, one was 15, five were 16, 20 were 17, and 25 were 18 years old. Fifteen (29%) of the reported patients age 18 and younger were female and 36 (71%) were male.

Table 1
**Company Size at Facilities with an OD Report in 2019:
Non-Company v Company Clinicians**

Number of Employees	REPORTING SOURCE					
	Non-Company Clinicians		Company Clinicians		Total Reports	
	#	%	#	%	#	%
< 25	312	42.7	1,196	24.1	1,508	26.5
25-100	138	18.9	800	16.1	938	16.5
100-500	56	7.7	1,016	20.5	1,072	18.9
> 500	224	30.7	1,942	39.2	2,166	38.1
Total	730 ^a		4,954 ^b		5,684	

^a The number of employees was missing on 2,242 reports.

^b The number of employees was missing on 27 reports.

Table 2
OD Reports Submitted by Non-Company Clinicians in 2019

Number of reports	Clinicians		Patients
	#	%	#
1	19	76.0	19
2-10	5	20.0	16
>11	1	4.0	23
Total ^a	25		58

^a Includes reports only from individual clinicians.

RESULTS, continued...

Table 3
Demographic Characteristics of
Occupational Disease Cases Reported
in 2019

Demographic Characteristic		
Age	#	%
≤ 19	90	2.0
20-24	310	6.8
25-29	434	9.6
30-34	464	10.2
35-39	475	10.5
40-44	465	10.2
45-49	513	11.3
50-54	478	10.5
55-59	435	9.6
60-69	605	13.6
70-79	206	4.5
> 80	67	1.5
Total ^a	4,542	
Gender		
	#	%
Male	5,313	67.1
Female	2,609	32.9
Total ^b	7922	
Race		
	#	%
Caucasian	1,299	83.6
African American	159	10.2
Hispanic	9	0.6
Other	86	5.5
Total ^c	1,553	

^aAge was unknown for 3,411 reports.

Mean age 45 ±15 yrs.

^bGender was unknown for 31 reports.

^cRace was unknown for 6,400 (80%) reports.

5,145 (65%) cases. Signs, symptoms and ill-defined conditions were the 2nd most frequently reported conditions with 747 (9%) cases. Respiratory diseases were the 3rd most reported condition, with 511 cases representing 6% of all reports submitted. Musculoskeletal diseases were the 4th most frequently reported conditions with 506 (6%) cases. Disease of the ear, including noise-induced hearing loss were the 5th most frequently reported, with 455 (6%) cases. There were 312 (4%) skin disease reports, 129 (2%) reports of eye-related diseases, 52 (1%) reports of neoplasms, and 50 (1%) reports of diseases of the nervous system. Less frequently reported conditions included infectious diseases, circulatory system diseases, mental disorders, endocrine disorders and diseases of the digestive system.

Reporting Source Differences

Company and non-company-affiliated providers differed in the types of occupational diseases reported (Table 4). Toxic effects of substances were the most common reported conditions from company health care providers (65%) and non-company providers (64%). The second, third and fourth most frequently reported diagnoses for company providers was musculoskeletal diseases (10%), noise-induced hearing loss (9%), and symptoms, signs and ill-defined conditions (9%).

Place of employment was unknown for 46 of the 51 younger workers. Of the five with known employment, four worked in manufacturing and one worked in retail trade. Forty-seven of the younger workers were reported by private practice clinicians not associated with any company and four were reported by their company medical physician. Thirty-five were reported by the Poison Control Center, 11 were for an elevated blood lead level (serum lead levels were between 5 and 24 micrograms per deciliter), one was for respiratory symptoms, and four were for general symptoms. No work-related *fatal illnesses* for workers age 18 or younger were identified in 2019.

Older Workers

Of the 67 workers age eighty and older, 59 (88%) were between 80 and 89 years, and eight (12%) were between 90 and 97 years old. Fifty-nine were men and eight were women. Seven had worked in construction, six in manufacturing and five of the older patients worked in or were retired from maintenance work. Industry or former industry was not indicated in 49 reports.

Private practice clinicians not associated with any company reported all but one of the 67 patients. Thirty-one of the older workers were reported for an elevated blood lead level (serum lead levels were between 5 and 23 micrograms per deciliter), 34 with asbestosis, and one each with respiratory disease and a nerve disorder.

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-10th Revision).

Poisonings were the most frequently reported condition, with

RESULTS, continued...

Table 4
2019 OD Reports by Disease Type (ICD-10) and Reporting Source

DISEASE TYPE	Non-Company		Company		Total	
	#	%	#	%	#	%
Infectious & Parasitic Diseases (ICD A00 –B99)	0	--	5	0.1	5	0.1
Neoplasms (ICD C00-D49)	51	1.7	1	<0.1	52	0.7
Blood and Blood Forming Organs (ICD D50-D89)	0	--	0	--	0	--
Endocrine, Nutritional and Metabolic Disorders (ICD E00-E89)	0	--	2	<0.1	2	<0.1
Mental Disorders (ICD F01-F99)	0	--	19	0.4	19	0.2
Nervous System (ICD G00-G99)	0	--	50	1.0	50	0.6
Eye and Adnexa (ICD H00-H59)	90	3.0	39	0.8	129	1.6
Ear and Mastoid Process (ICD H60-H95)	0	--	455	9.1	455	5.7
Circulatory System (ICD I00-I99)	0	--	3	0.1	3	<0.1
Respiratory System (ICD J00-J99)	414	13.9	97	1.9	511	6.4
Digestive System (ICD K00-K95)	0	--	17	0.3	17	0.2
Skin & Subcutaneous Tissue (ICD L00-L99)	188	6.2	124	2.5	312	3.9
Musculoskeletal System & Connective Tissue (ICD M00-M99)	1	<0.1	505	10.1	506	6.4
Genitourinary System (ICD N00-N99)	0	--	0	--	0	--
Symptoms, Signs & Ill-Defined Conditions (ICD R00-R99), Other Causes of Morbidity (V00-Y99) and Factors Affecting Health (Z00-Z99)	321	10.8	426	8.6	747	9.4
Lead Poisoning (T56)	1,867	62.8	0	--	1,867	23.5
Other Poisonings (T65)	0	--	1	<0.1	1	<0.1
Toxic Effects of Substances - Injury, Poisoning and Certain Other Consequences of External Causes (ICD S00-T88, except T56 and T65)	40	1.3	3,237	65.0	3,277	49.8
TOTAL	2,972		4,981		7,953	

Table 5
2019 OD Reports by Industry Type and Reporting Source

North American Industry Classification System	Non - Company		Company		Total	
	#	%	#	%	#	%
11 Ag, Forestry Fishing & Hunting	1	0.1	11	0.2	12	0.2
21 Mining	0	--	7	0.1	7	0.1
22 Utilities	121	16.0	10	0.2	131	2.3
23 Construction	223	29.5	247	5.0	470	8.2
31-33 Manufacturing	294	38.9	2,106	42.5	2,400	42.1
42 Wholesale Trade	11	1.5	140	2.8	151	2.6
44-45 Retail Trade	22	2.9	363	7.3	385	6.7
48-49 Transportation & Warehousing	3	0.4	302	6.1	305	5.3
51 Information	0	--	24	0.5	24	0.4
52 Finance & Insurance	1	0.1	25	0.5	26	0.5
53 Real Estate & Rental & Leasing	0	--	75	1.5	75	1.3
54 Professional, Scientific & Tech Svcs	10	1.3	61	1.2	71	1.2
55 Mgt of Companies & Enterprises	0	--	1	<0.1	1	<0.1
56 Administrative & Support & Waste Mgt & Remediation Svcs	7	0.9	379	7.7	386	6.8
61 Educational Services	7	0.9	270	5.5	277	4.9
62 Health Care & Social Assistance	7	0.9	573	11.6	580	10.2
71 Arts, Entertainment & Recreation	12	1.6	41	0.8	53	0.9
72 Accommodation & Food Services	5	0.7	105	2.1	110	1.9
81 Other Services (excl Public Admin)	4	0.5	74	1.5	78	1.4
92 Public Administration	27	3.6	137	2.8	164	2.9
Total ^a	755		4,951		5,706	

^aIndustry was unknown for 2,217 non-company reports and 30 company reports.

Respiratory disorders were the second most frequently reported diagnoses by non-company providers (14%). The third and fourth most frequently reported diagnoses for non-company providers were symptoms and signs (11%) and skin disorders (6%). Company and non-company practitioners differed by industries represented in their reports (Table 5). The most frequently reported industry from company affiliated providers was manufacturing (43%), primarily automobile production. The second and third most frequently reported industries by company providers were health care services (12%) and administrative services (8%). The top industry for non-company providers was manufacturing (39%) and the second was construction (30%). The third most frequent industry type reported by non-company providers was utilities (16%). Industry type was missing on 2,217 non-company and 30 company reports.

RESULTS, continued...

Table 6
2019 OD Reports by Disease Type and Gender

DISEASE TYPE	Males		Females	
	#	%	#	%
Infectious & Parasitic Diseases (ICD A00 –B99)	2	<0.1	3	0.1
Neoplasms (ICD C00-D49)	50	0.9	2	0.1
Blood and Blood Forming Organs (ICD D50-D89)	0	--	0	--
Endocrine, Nutritional & Metabolic Disorders (ICD E00-E89)	0	--	2	0.1
Mental Disorders (ICD F01-F99)	9	0.2	10	0.4
Nervous System (ICD G00-G99)	20	0.4	30	1.1
Eye and Adnexa (ICD H00-H59)	86	1.6	42	1.6
Ear and Mastoid Process (ICD H60-H95)	376	7.1	77	3.0
Circulatory System (ICD I00-I99)	2	<0.1	1	<0.1
Respiratory System (ICD J00-J99)	323	6.1	172	6.6
Digestive System (ICD K00-K95)	15	0.3	2	0.1
Skin & Subcutaneous Tissue (ICD L00-L99)	200	3.8	111	4.3
Musculoskeletal System & Connective Tissue (ICD M00-M99)	253	4.8	253	9.7
Genitourinary System (ICD N00-N99)	0	--	0	--
Symptoms, Signs & Ill-Defined Conditions (ICD R00-R99), Other Causes of Morbidity (V00-Y99) and Factors Affecting Health (Z00-Z99)	370	7.0	371	14.2
Toxic Effects of Substances - Poisonings (ICD S00-T88)	3,607	67.9	1,533	58.8
TOTAL^a	5,313		2,609	

^aGender was not listed for 31 reports.

Table 7
Demographic Characteristics of Reported Occupational Disease Fatalities in 2019

DEMOGRAPHIC CHARACTERISTIC		
Vital Status	#	%
Fatal	59	0.7
Non-Fatal	7,894	99.3
Total	7,953	
Age	#	%
20 – 39	0	--
40 - 59	4	6.9
60 - 69	15	25.9
70 - 79	24	41.4
≥ 80	15	25.9
Total	58^a	
Disease Type	#	%
Neoplasm-asbestos-Related	33	55.9
Asbestosis	22	37.3
Other– lung	4	6.8
Total	59	
Industry	#	%
Manufacturing	6	35.3
Construction	11	64.7
Total	17^b	

^aAge was missing on 1 report.

^bIndustry was missing on 47 reports.

Gender Differences

Toxic effect of substances (poisoning) was the most frequently reported diagnosis for men and women, with 68% and 59%, respectively (Table 6). The second, third and fourth most frequent diagnoses for women were signs and symptoms (14%), musculoskeletal diseases (10%), and respiratory diseases (7%). For men, the second, third and fourth most frequently reported diagnoses were noise-induced hearing loss (7%), signs and symptoms (7%), and respiratory disorders (6%). Thirty-one reports did not indicate gender.

Fatalities

Fifty-nine of the 7,953 OD reports were for fatal occupational illnesses (Table 7). None of the illness-related fatalities reported were from acute incidents. Non-company clinicians reported all of the 59 fatalities. The workers who died ranged in age from 45 to 89 years. Thirty-three died from asbestos-related cancer, 22 from asbestosis and four from other lung diseases. Six of the deceased workers had been employed in manufacturing and 11 in construction. Former industry was not specified for 42 workers.

Michigan has a separate program to track acute traumatic fatalities, called MIFACE (Michigan Fatality Assessment and Control Evaluation). The MIFACE program identified an additional 169 traumatic work-related fatalities from injuries in 2019 that occurred in Michigan. A separate report for the most recent work-related fatalities (2017 calendar year) can be found at: www.oem.msu.edu. There were two acute work-related injuries resulting in deaths among youths in the MIFACE Program in 2019.



RESULTS, continued...

Comparison with Other Data Systems

No one reporting system captures the true burden of occupational disease. This 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 paid 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 is currently reported by any one system. The "All Other" illness column in Table 8 for BLS data includes everything but skin diseases, respiratory conditions and poisonings. For the WCA and OD reports, the "All Other" illness column includes every illness that cannot be categorized into one of the first six illness categories.

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. In 2018 (most recent year available), there were a total of 104,800 injuries and illnesses of which 54,900 were severe enough to cause loss of work days, job transfer or restriction. Of the 104,800 total, 5,400 were occupational illnesses and 99,400 were occupational injuries.

Data from Michigan's Workers' Compensation Agency (WCA) for 2018 (most recent year available) showed 22,602 paid claims for occupational injuries and illnesses with seven or more consecutive days away from work; 14,052 of those paid claims are for illnesses (Table 8). Overall in 2018, about \$447 million in compensation was paid by insurance companies and self-insured employers on 301,252 claims for both lost work time and medical-only costs.

Table 8
Comparison of 2018 Bureau of Labor Statistics (BLS) Occupational Illness Survey Data and 2018 LEO Workers' Compensation Agency (WCA) Claims with 2008—2019 LEO Occupational Disease (OD) Reports

		Disease Category														
		Skin		Lung—Dust		Lung—Toxic		Poisoning		Physical Agents		Repeated Trauma		All Other		Total
BLS Survey																
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	#
2018	1,000	18.5	ND	--	600	11.1	NS	--	ND	--	ND	--	3,800	70.4	5,400	
WCA Claims																
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	#
2018	39	0.3	9	0.1	49	0.3	3	<0.1	22	0.2	11,450	81.5	2,480	17.6	14,052	
LEO OD Reports^a																
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	
2013	347	4.0	274	3.2	439	5.1	2,192	25.5	45	0.5	3,263	37.9	2,041	23.7	8,601	
2014	338	4.5	371	4.9	458	6.1	1,808	23.9	181	2.4	2,547	33.7	1,863	24.6	7,566	
2015	185	2.8	340	5.1	261	3.9	1,826	27.6	99	1.5	2,307	34.9	1,598	24.2	6,616	
2016	259	3.5	341	4.6	427	5.7	2,325	31.3	202	2.7	2,601	35.0	1,280	17.2	7,435	
2017	157	3.7	170	4.0	205	4.8	2,470	58.4	73	1.7	488	11.5	666	15.7	4,229	
2018	153	4.1	384	10.4	33	0.9	1,925	52.0	65	1.8	577	15.6	565	15.3	3,702	
2019	320	7.1	336	7.5	253	5.6	1,920	42.8	78	1.7	552	12.3	1,028	22.9	4,487	

ND = No data for this disease category. NS = Data too small to be displayed.

^a Totals for LEO OD Reports are less than the total number of submitted reports for each year because some of the reports cannot be assigned to the disease categories used by BLS and the WCA. In 2019, there were 3,466 reports that could not be classified for this table.

RESULTS, continued...

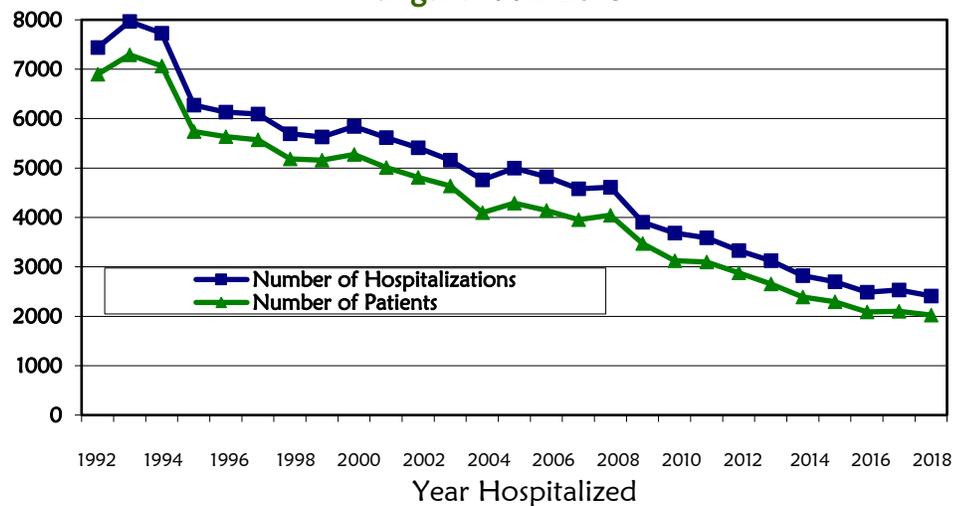
These paid claims include new claims for injuries and illnesses filed in 2018, as well as ongoing payments for claims from previous years for workers who continue to lose work time or incur medical costs due to their injury or illness. Eighty-four percent of the total paid claims in 2018 were for medical procedures or care only and 16% for wage loss (http://www.michigan.gov/documents/wca/wca_2018_Annual_Report_650732_7.pdf).

Other Sources-Hospital Discharge Data

The hospital discharge data described in this next section is not part of the 7,953 occupational disease reports described in this 2019 Annual Report of Occupational Diseases. Hospital discharge data does not include identifiers; presumably some of the hospitalized patients overlap with those in the 7,953 OD reports. Especially for long latency, chronic diseases like asbestosis, it would be difficult to identify newly diagnosed patients in the hospitalized data set. Therefore, the hospitalization data in this section should be considered as supplemental to the 7,953 OD reports submitted to the State in 2019. The following section looks at hospital data where Workers' Compensation is the expected payer.

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 2018 (most recent year available); the numbers of hospitalizations from 1995-2018 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 after 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 2009-2016 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; in 2018 0.20% of the 1,212,995 Michigan hospitalizations designated WC insurance as the primary payment source at discharge. Table 9 shows the primary discharge diagnosis for hospitalizations from 2013 to 2018 where WC insurance was designated as the primary payment source at discharge. Data for 2002 through 2012 can be found in prior reports. In the 4th quarter of 2015, hospitals converted to the ICD-10 coding system; therefore, reports from the 4th quarter of 2015 forward will be coded to ICD-10 disease categories. WC insurance covers a broad range of conditions, including mental illness, infections, heart disease and cancer. The most common hospitalized conditions covered by WC insurance were injuries and poisoning accounting for 59%, and musculoskeletal diseases, accounting for 19% of all WC-related patient hospitalizations in 2018.

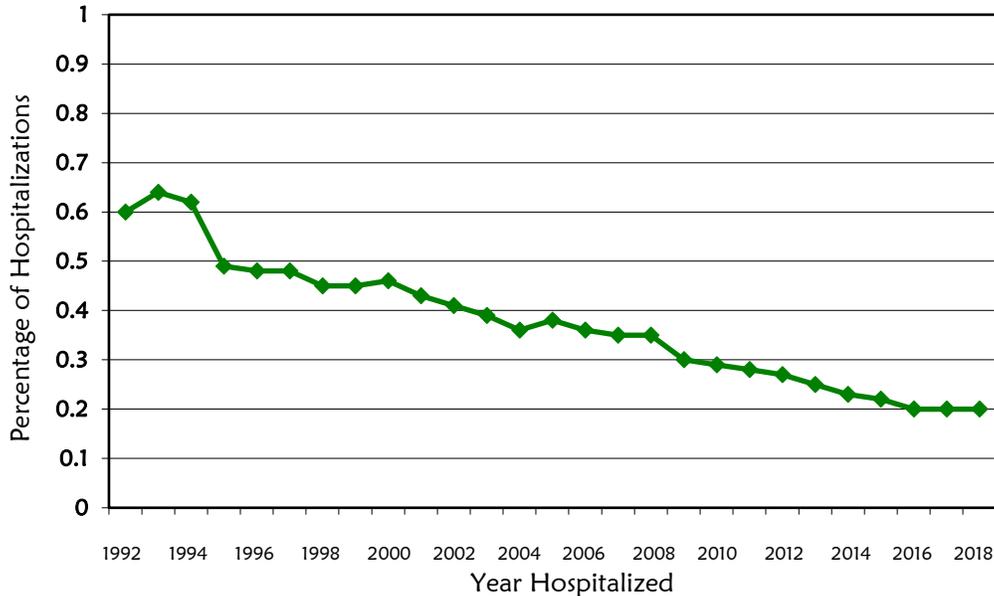
Figure 4
Hospitalizations and Patients with Workers' Compensation Designated as the Primary Payment Source at Discharge in Michigan: 1992-2018



RESULTS, continued...

Figure 5

Percent of Total Michigan Hospitalizations with Workers' Compensation Designated as the Primary Payment Source at Discharge in Michigan: 1992-2018



In 2018, only 0.20% of the 1,212,995 hospitalizations in Michigan were paid for by Workers' Compensation. The percent of hospitalizations paid for by Workers' Compensation in Michigan has declined from the 1990's and has plateaued since 2016.

Table 9

Primary Diagnosis of Hospitalizations in Michigan from 2013-2018, with Workers' Compensation Designated as Primary Payment Source at Discharge

	Year of Hospitalization							
	2013	2014	2015 Q123	2015 Q4				
1^o Discharge Diagnosis ICD-9	%	%	%	1^o Discharge Diagnosis ICD-10	%	%	%	%
Infectious Diseases (001-139)	2.2	2.6	2.0	Infectious & Parasitic Diseases (A00 –B99)	4.1	2.5	2.4	3.1
Neoplasms (140-239)	0.1	0.1	0.1	Neoplasms (C00-D49)	0.2	0.3	0.3	0.2
Endocrine Diseases (240-279)	0.7	0.6	0.5	Blood & Blood Forming Organs (D50-D89)	—	0.2	0.1	0.3
Blood Diseases (280-289)	0.1	0.2	0.1	Endocrine & Metabolic (E00-E89)	0.3	0.5	0.3	0.5
Mental Disorders (290-319)	1.0	0.9	0.6	Mental Disorders (F01-F99)	0.9	0.3	0.3	0.4
Nervous System Diseases (320-389)	2.1	1.9	1.4	Nervous System (G00-G99)	1.7	2.1	2.3	1.3
Circulatory Diseases (390-459)	3.1	4.0	3.5	Eye and Adnexa (H00-H59)	0.2	<0.1	<0.1	0.1
Respiratory Diseases (460-519)	1.8	2.1	2.3	Ear and Mastoid Process (H60-H95)	—	<0.1	0.1	--
Digestive Diseases (520-579)	1.8	1.9	1.9	Circulatory System (I00-I99)	2.7	3.8	3.4	3.7
Genitourinary Diseases (580-629)	0.8	1.0	0.7	Respiratory System (J00-J99)	2.4	2.5	2.4	2.6
Pregnancy Complications (630-676)	0.3	0.4	0.3	Digestive System (K00-K95)	1.7	2.5	2.1	1.5
Skin Diseases (680-709)	5.0	5.0	4.8	Skin & Subcutaneous Tissue (L00-L99)	5.8	4.5	5.2	4.4
Musculoskeletal Diseases (710-739)	24.7	23.6	24.0	Musculoskeletal (M00-M99)	22.9	20.6	19.2	18.8
Congenital Anomalies (740-759)	0.2	0.1	0.1	Genitourinary System (N00-N99)	0.5	1.2	0.6	1.1
Perinatal Complications (760-779)	--	—	—	Pregnancy and Perinatal (O00-P96)	0.9	0.3	0.2	0.2
Symptoms & Signs (780-799)	1.3	1.4	1.5	Congenital Anomalies (Q00-Q99)	0.2	0.1	--	--
Injury & Poisoning (800-999)	48.9	48.5	50.0	Symptoms, Signs (R00-R99)	1.6	1.4	1.9	1.3
V Codes	5.9	5.8	6.4	Toxic Effects - Poisonings (S00-T88)	53.9	56.1	57.8	59.4
				Factors Affecting Health (Z00-Z99)		1.1	1.2	1.1
Total^a	3127	2823	2053	Total	634	2485	2531	2412

^aTotals vary due to missing information.

RESULTS, continued...

Table 10 lists the demographics of patients with WC insurance as the primary payment source at discharge. From 74-77% of the hospitalizations were for men, across all years from 2011 to 2018. Data for 2002 through 2010 can be found in prior reports. Among hospitalizations for which race was known, approximately 80-89% were white, 8-12% were African American, <1%-1% were Asian, and 3-8% were listed as “other.”

Most hospitalizations involved workers between 40-59 years. Less than 1% involved workers under the age of 15. The percentage of workers 80 years or older has ranged over time from <1-4%. The percentage of hospitalizations of workers under the age of 20 has decreased slightly over time, from 3% in 1992 to 1% in 2015, increased to 2% in 2016 and 2017, and decreased to 1% in 2018 (1992 data not shown).

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

Table 10
Demographics of Hospitalizations in Michigan, 2011-2018, with Workers' Compensation Designated as Primary Payment Source at Discharge

	2011	2012	2013	2014	2015	2016	2017	2018
Gender	%	%	%	%	%	%	%	%
Male	74	75	75	76	77	77	77	77
Female	26	25	25	24	23	23	23	23
Total^a	3589	3333	3127	2823	2701	2485	2531	2412
Race	%	%	%	%	%	%	%	%
White	89	87	88	87	86	87	81	80
African Am	8	9	9	8	9	10	11	12
Asian	<1	<1	<1	1	<1	<1	<1	1
Other	3	4	3	4	5	3	8	7
Total^a	2659	2557	2532	2286	2402	2323	2494	2412
Age	%	%	%	%	%	%	%	%
< 15	<1	<1	<1	<1	<1	<1	<1	--
15-19	1	1	1	1	1	2	2	1
20-39	27	25	25	27	26	28	25	27
40-59	53	55	54	54	53	49	50	47
60-79	15	17	18	17	19	20	23	24
≥ 80	4	1	1	1	1	1	1	1
Total^a	3589	3333	3127	2823	2701	2485	2531	2412
Avg Age ± standard deviation	48 ±15	48 ±13	48±14	47±14	48 ±14	48 ±15	49±14	49±15

^aTotals vary due to missing information.

RESULTS, continued...

Poison Control Center Data

In 2019, 807 calls to the Michigan Poison Control Center (PCC) were identified for individuals with work-related symptoms. Table 11 describes available demographic characteristics and exposures of the individuals reported. There were more reports for males (63%). The individuals ranged in age from 15 to 79 years. Eighty-one percent of these individuals with known age were less than age 50. Of the 807 calls to the PCC in 2019, the top calls included exposures to: cleaning agents (173, 21%), medications (52, 6%), acids (47, 6%), fuels/gases (41, 5%) and

insecticides/pesticides (34, 4%).

Adult Blood Lead Epidemiology and Surveillance (ABLES)

Table 12 describes the demographic characteristics of the 1,867 individuals reported with a blood lead level of ≥ 5 ug/dL. 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.

Table 11
Demographic Characteristics of 807
Individuals Reported by the Michigan
Poison Control Center in 2019

Demographic Characteristics		
Age	#	%
14-19	52	7.4
20-29	236	33.5
30-39	171	24.3
40-49	110	15.6
50-59	107	15.2
60-69	23	3.3
≥ 70	5	0.7
Total	704^a	
Gender	#	%
Male	491	62.7
Female	292	37.3
Total	783^b	
Top Exposures at Work	#	%
Cleaning Agents	173	21.4
Fuel/Gases	41	5.1
Medication	52	6.4
Acids	47	5.8
Oils/Lubricants	20	2.5
Metal Fume	20	2.5
Insecticides/Pesticides	34	4.2
Carbon Monoxide	33	4.1
Building/Construction	29	3.6
All Other Exposures	358	44.4
Total	807	

^aAge was unknown for 103 reports.

^bGender was missing on 24 reports.

Table 12
Demographic Characteristics of
1,867 Individuals Reported by Laboratories with
Elevated Blood Lead in Michigan, 2019

	Blood Lead Level			
	$>=5$ & <10 ug/dL		$>=10$ ug/dL	
Age	#	%	#	%
16-19	14	1.4	12	1.4
20-29	162	15.8	114	13.6
30-39	242	23.5	199	23.7
40-49	192	18.7	165	19.7
50-59	193	18.8	148	17.6
60-69	144	14.0	131	15.6
≥ 70	81	7.9	70	8.3
Total	1,028		839	
Gender	#	%	#	%
Male	915	89.0	774	92.3
Female	113	11.0	65	7.7
Total	1,028		839	
Industry	#	%	#	%
Construction	113	32.0	90	28.0
Manufacturing	119	33.7	141	43.8
Utilities	79	22.4	41	12.7
Trade	11	3.1	20	6.2
Public Admin	14	4.0	9	2.7
Arts & Entertainment	1	0.3	11	3.4
Admin & Support	2	0.6	2	0.6
Transportation	0	—	0	—
Other Services	1	0.3	1	0.3
Prof & Scientific	7	2.0	3	0.9
Educational Services	1	0.3	0	--
Health Care	5	1.4	0	--
Accomod & Food Svc	0	—	4	1.2
Mining	0	--	0	--
Total	353^a		322^a	

^a Industry was missing on 675 reports of blood lead levels <10 ug/dL and on 517 reports of blood leads ≥ 10 ug/dL.

DISCUSSION

There were 7,953 Occupational Disease Reports sent to LEO in calendar year 2019. These reports do not include occupational injuries. The most frequent types of occupational diseases reported to LEO were toxic effects of substances (65%), signs and ill-defined conditions (9%), respiratory conditions (6%) and musculoskeletal disorders (6%). Figure 2 shows the number of occupational disease reports received each year since 1985. From 1988 through 1999, the number of reports sent to the State increased substantially to 21,538 and then decreased to 6,837 in 2009. Since 2009, the number of reports has plateaued with variations of approximately 600 to 4,000 each year. 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, a decrease of 2,548 reports in 2012, an increase of 1,554 reports in 2013, a decrease of 1,395 reports in 2014, a decrease of 756 reports in 2015, an increase of 1,067 reports in 2016, a decrease of 1,072 reports in 2017, an increase of 1,063 reports in 2018, and a decrease of 577 reports in 2019.

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 decreased in 2018 to 68, compared to 70 in 2017, 88 in 2016, 100 in 2015, 190 in 2014, 210 in 2013, 179 in 2012, 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-10 codes were used to classify the diagnosis or clinical impression recorded on the occupational disease reports submitted to LEO. 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-10 coding system, sprains and strains are listed under the Injury section of codes (ICD-10 S00-T88 Injury, poisoning and certain other consequences of external causes).

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 62 company-affiliated physicians reporting employees from 1,283 different companies; there were 25 non-company-affiliated physicians reporting patients to the state. There were 261,864 companies in the year 2019 and approximately 33,200 licensed physicians practicing in Michigan in the year 2019. Accordingly, reports are received from 0.5% of companies and 0.1% of physicians. Over the last several years, these very low 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 7,953 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 Michigan². For 2018, the most recent year available, the BLS annual survey reported 5,400 illnesses; by extension one would expect 10,800 illnesses in 2019 instead of the approximately 7,900 reported in 2019. 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 2019 the non-company-affiliated health care practitioners were more likely to report patients with respiratory disease who work in small, non-manufacturing companies.

DISCUSSION, continued...

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 alone for a reliable count of work-related conditions. First, in Michigan, only injuries (22,602) or illnesses with seven or more days away from work are computerized. Therefore, all the injuries and illnesses with less lost work time or those who received medical care only (301,252) cannot be analyzed as to type of injury. Second, 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 a pneumoconiosis shows only <1% - 8% paid by WC (2017 Annual Report: Tracking Silicosis and Other Work-Related Lung Diseases in Michigan, available at: www.oem.msu.edu).

Review of Table 8 shows differences 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 43% (1,920) of the OD reports, while that category of diseases accounts for 9 (<1%) cases in the BLS survey and <1% (3 cases) of WCA claims. Non-employer sources such as from the Poison Control Center, "B" Readers and laboratories provide additional occupational diseases not being reported by employers or practitioners.

In 2018, the National Academies of Science issued a comprehensive report on the status of occupational injury and illness surveillance in the United States. The report found that the US surveillance system markedly undercounted work-related injuries and illnesses and accordingly missed many opportunities to prevent these conditions⁴. Implementation of the recommendations in this report would markedly improve the tracking of occupational injuries and illnesses nationwide. The report discusses the role of states and makes numerous recommendations for activities at the state level.

Although it has been reassuring to see the drop in hospitalizations related to work (Figures 4 and 5), our 2015 Annual Report showed that the drop is due to a decrease in minor but not severe injuries (2015 Annual Report—Summary of Occupational Diseases Reported to the MI Department of Licensing and Regulatory Affairs). Increased effort to reduce these severe injuries may be assisted by the new requirements that were implemented in Michigan on 9-1-2015 for employers to report acute work-related hospitalizations (http://www.michigan.gov/lara/0,4601,7-154-10573_11472-370952--,00.html). 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 subsequently evaluate the effectiveness of these efforts. In 2020, we will be adding data from a new source, the Michigan Emergency Medical Services System (MI EMS). This new source will provide data from the approximately 800 ambulance companies in the state on their emergency transports and will provide additional information on occupational diseases. We are currently developing the algorithm to select ambulance transport data for work-related conditions among the approximately one million annual ambulance runs each year.

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