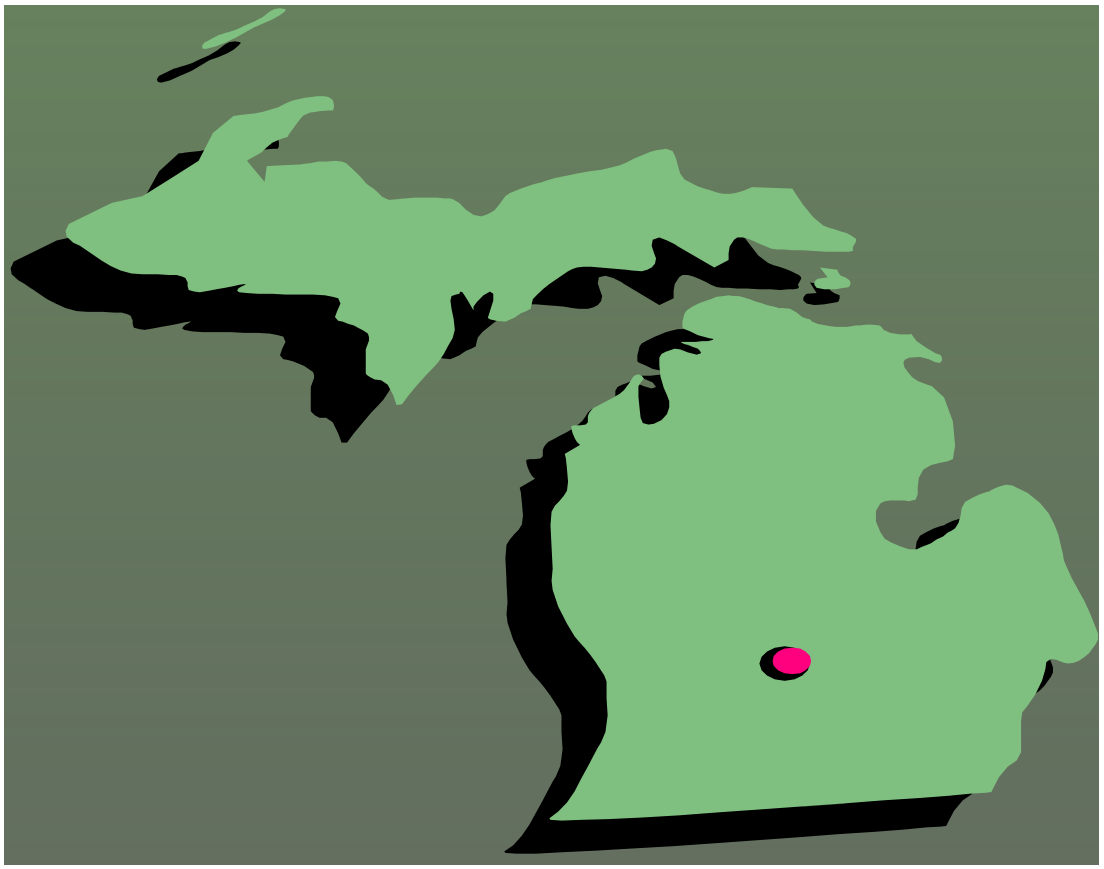
January 4, 2024

2022
ANNUAL REPORT

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



2022 Annual Report

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

January 4, 2024

2022 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 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

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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Lansing, MI 48909
517.284.7777

Barton G. Pickelman
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 & 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

OHC Occupational Health Clinic

OD Report Occupational Disease Report

WDCA Workers' Disability Compensation Agency

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

Background

This is the 31st 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 2022. 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 employees 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 employee 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 employee's workplace to assess current working conditions and determine if other employees are experiencing similar health issues. In some cases where an enforcement inspection will not be initiated, the MIOSHA Consultation Education and Training Division (CET) may offer its non-enforcement consultation services to the employer. Reports are analyzed on a yearly basis and the results are shared with health professionals and other stakeholders.

Figure 1.

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: 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 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 2022, 901 (1.7%) of the 52,090 calls to the Michigan Poison Control Center were related to exposures at work.

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' Disability Compensation Agency** for work-related injuries and illnesses resulting in 7 or more consecutive days away from work, and specific loss including amputations, loss of vision, total loss of hearing, or death
- **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
- **Michigan Emergency Medical Services Information System (MIEMSIS)** ambulance runs to workplaces for respiratory conditions and injuries

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 on-site by the company, an outside medical department contracted by the company (OHC), 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).

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, Dehydration; D50-D89: Diseases of the Blood and Blood-Forming Agents; F01-F99: Mental Disorders except F43, Reaction to Severe Stress; G00-G99: Select Diseases of the Nervous System and Sense Organs; H90-H91: Noise-Induced Hearing Loss, Tinnitus; I00-I99: Select Diseases of the Circulatory System; J40-J47: Select Diseases of the Respiratory System; J60-J70: Pleural Plaques w/no Parenchymal Abnormality; J80-J84: Interstitial Lung Disease; L94.9: Connective Tissue Lung Disease; K00-K95: Diseases of the Digestive System; and N00-N99: Diseases of the Genitourinary System.

ICD-10 codes were used to classify the diagnosis or clinical impression recorded on the OD 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).

RESULTS

In 2022, 4,725 OD Reports were submitted to LEO. Figure 2 and Appendix 1 show the number of reports since 1985.

Reporting Source

Company or contract medical departments submitted 43% of the reports (2,048 cases); non-company-associated health care practitioners submitted 57% of the reports (2,677 cases). Figure 3 and Appendix 1 show the trends by reporting source (company or non-company associated) since 1991.

Company Size

Of the 3,023 OD reports that listed company size, 46% (1,378 reports) were submitted on individuals who worked in companies with > 500 employees (Table 1). For companies with 500 or fewer employees, a greater proportion of reports came from non-company health practitioners compared to company-associated clinicians. About 87% of the 995 reports with known company size that were submitted by non-company practitioners involved companies with ≤ 500 employees, while about 38% of the 2,028 reports with known company size submitted by company-associated practitioners involved companies with ≤ 500 employees.

Non-Company Clinicians

Sixteen non-company-associated clinicians reported 56 incidents of occupational disease. Twenty-four labs were responsible for identifying 1,443 reports of elevated blood lead levels.

Figure 2
OD Reports to LEO by Year Reported: 1985-2022

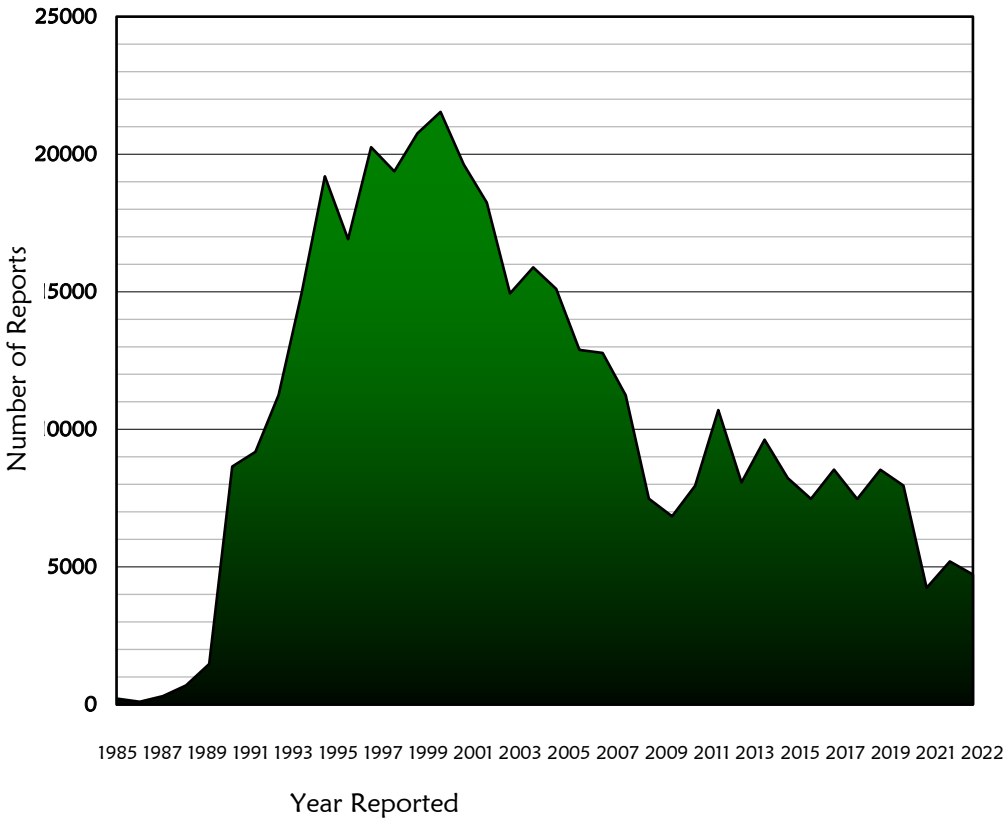
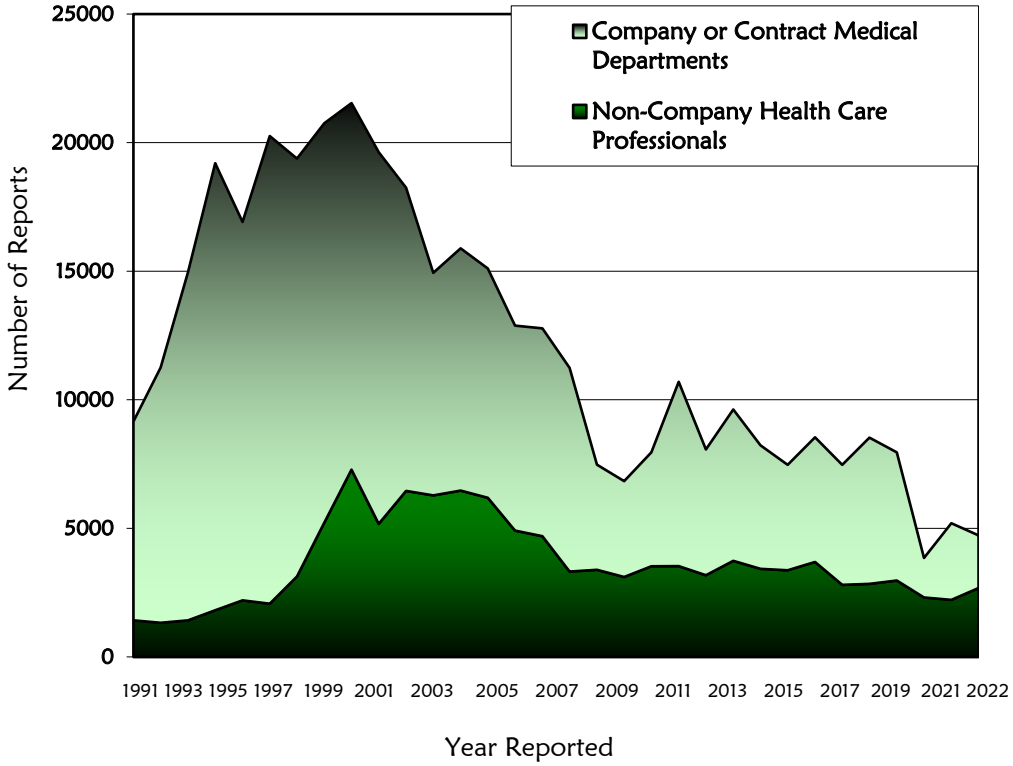


Figure 3
OD Reports by Year and Reporting Source: 1991-2022



RESULTS, continued...

In addition, the Michigan Poison Control Center reported 901 incidents of work-related poisonings, the 3rd Circuit Court of Michigan reported 140 asbestos-related claims, and hospitals submitted 137 reports of patients with work-related illnesses. Twelve (75%) of the clinicians reported only one patient each in calendar year 2022 (Table 2); one clinician reported 23 patients. Another clinician reported 13 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 2022, there were five Michigan physicians who were listed as a "B" reader on the NIOSH "B" reader website:cdc.gov/niosh/topics/chestradiography/breader-list.html.

Table 1
Company Size at Facilities with an OD Report in 2022: Non-Company v Company Clinicians

Number of Employees	REPORTING SOURCE					
	Non-Company Clinicians		Company Clinicians		Total Reports	
	#	%	#	%	#	%
< 25	190	19.1	125	6.2	315	10.4
25-100	332	33.4	359	17.7	691	22.9
100-500	345	34.7	294	14.5	639	21.1
> 500	128	12.9	1,250	61.6	1,378	45.6
Total	995[a]		2,028[b]		3,023	

[a] The number of employees was missing on 1,682 reports.
[b] The number of employees was missing on 20 reports.

Table 2
OD Reports Submitted by Non-Company Clinicians in 2022

Number of reports	Clinicians		Patients
	#	%	#
1	12	75.0	12
2-10	2	12.5	8
≥11	2	12.5	36
Total[a]	16		56

[a] Includes reports only from individual clinicians.

Occupational Health Clinics (OHCs)

There are approximately 175 occupational health clinics (OHCs) in Michigan. Calendar year 2009 had the highest number of OHCs reporting, with 69. Calendar years 2005 and 2021 had the lowest number of OHCs reporting, with 21. In 2022 there were 30 OHCs reporting. Appendix 2 shows the number of OHCs reporting cases and the approximate total number of OHCs from 2005 to 2022; an exact number is not available as there is no comprehensive directory of clinics available. Tracking OD reporting by OHCs began in 2005. Biennial MIOSHA audits of a sample of non-reporting OHCs began in 2009.

Demographics

Table 3 shows the age, gender and race of the employees reported in 2022. The mean age was 44 ± 15 years (range, 13 to 98 years) with approximately 63% of the patients between the ages of 25 and 54 years. One hundred fourteen reports were submitted for patients age 19 or younger, and 66 reports were submitted for patients age 80 and older. Sixty-nine percent of all reports submitted were for male workers. Seventy-nine percent of the submitted reports (3,737 cases) did not indicate the worker's race. Of the 988 reports that did indicate race, 15% were Caucasian, 6% were Black, 78% were listed as "other" and 1% were listed as Hispanic.

Younger Workers

Of the 68 workers *age 18 and younger*, one was 13, two were 14, three were 15, nine were 16, 20 were 17, and 33 were 18 years old. Thirty (44%) of the patients age 18 and younger were female and thirty-eight (56%) were male.

RESULTS, continued...

Table 3
Demographic Characteristics of Occupational Disease Cases Reported in 2022

Demographic Characteristic		
Age	#	%
≤ 19	114	2.5
20-24	353	7.8
25-29	502	11.1
30-34	514	11.4
35-39	466	10.3
40-44	443	9.8
45-49	456	10.1
50-54	476	10.6
55-59	381	8.4
60-69	557	12.4
70-79	181	4.0
≥ 80	66	1.5
Total[a]	4,509	
Gender	#	%
Male	3,258	69.1
Female	1,455	30.9
Total[b]	4,713	
Race	#	%
Caucasian	148	15.0
Black	56	5.7
Hispanic	14	1.4
Other	770	77.9
Total[c]	988	

[a]Age was unknown for 216 reports.
Mean age 44 ±15 yrs.
[b]Gender was unknown for 12 reports.
[c]Race was unknown for 3,737 (79%) reports.

Place of employment was unknown for 53 of the 68 younger workers. Of the 15 with known employment, four worked in administrative and support services, three worked in manufacturing, two each worked in arts and entertainment, and fast-food services, and one each worked in retail trade, health care services, other services, and public administration. Fifty-three of the younger workers were reported by private practice clinicians not associated with any company and 15 were reported by their company medical physician. Thirty-six were reported by the Poison Control Center, 15 were for an elevated blood lead level (serum lead levels were between 5 and 30 micrograms per deciliter), five were for sprains and strains, four for dermatitis, two for conjunctivitis, and one each for bronchitis, dorsalgia, carbon monoxide poisoning, overexertion, exposure to a virus, and illness type was unspecified for one. No work-related *fatal illnesses* for workers aged 18 or younger were identified in the 2022 OD reports submitted to LEO.

Older Workers

Of the 66 workers aged eighty and older, 59 (89%) were between 80 and 89 years and seven (11%) were between 90 and 98 years of age. Sixty-three were men and three were women. Seven had worked in manufacturing and six in construction. Industry or former industry was not indicated in 53 reports.

Private practice clinicians not associated with any company reported all of the 66 patients. Twenty-two of the older workers were reported for an elevated blood lead level (serum lead levels were between 5 and 20 micrograms per deciliter), 37 with asbestos-related diseases, three with a digestive illness, two with bronchitis, one with silicosis and for one older worker the illness type was unknown.

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 2,342 (50%) cases. Musculoskeletal diseases were the second most frequently reported, with 457 (10%), signs and symptoms were the third most commonly reported diseases, with 438 (9%). Respiratory conditions were the fourth most reported, with 433 (9%) cases. There were 401 (9%) reports of noise-induced hearing loss, 314 (7%) skin disease reports, and 202 (4%) reports of eye diseases. Less frequently reported conditions included infectious diseases, neoplasms, nervous system diseases, circulatory system disorders, mental disorders, genitourinary 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 and non-company health care providers (42% and 55%, respectively). The second, third and fourth most frequently reported diagnoses for company providers was musculoskeletal diseases (22%), noise-induced hearing loss (18%), and symptoms, signs and

RESULTS, continued...

Table 4
2022 OD Reports by Disease Type (ICD-10) and Reporting Source

DISEASE TYPE	Non-Company		Company		Total	
	#	%	#	%	#	%
Infectious & Parasitic Diseases (ICD A00 –B99)	0	--	2	0.1	2	<0.1
Neoplasms (ICD C00-D49)	64	2.4	0	--	64	1.4
Blood and Blood Forming Organs (ICD D50-D89)	0	--	0	--	0	--
Endocrine, Nutritional and Metabolic Disorders (ICD E00-E89)	0	--	0	--	0	--
Mental Disorders (ICD F01-F99)	0	--	4	0.2	4	0.1
Nervous System (ICD G00-G99)	1	<0.1	46	2.2	47	1.0
Eye and Adnexa (ICD H00-H59)	192	7.2	10	0.5	202	4.3
Ear and Mastoid Process (ICD H60-H95)	43	1.6	358	17.5	401	8.5
Circulatory System (ICD I00-I99)	0	--	1	<0.1	1	<0.1
Respiratory System (ICD J00-J99)	404	15.1	29	1.4	433	9.2
Digestive System (ICD K00-K95)	0	--	18	0.9	18	0.4
Skin & Subcutaneous Tissue (ICD L00-L99)	215	8.0	99	4.8	314	6.6
Musculoskeletal System & Connective Tissue (ICD M00-M99)	1	<0.1	456	22.3	457	9.7
Genitourinary System (ICD N00-N99)	0	--	2	0.1	2	<0.1
Symptoms, Signs & Ill-Defined Conditions (ICD R00-R99), Other Causes of Morbidity (V00-Y99) and Factors Affecting Health (Z00-Z99)	282	10.5	156	7.6	438	9.3
Lead Poisoning (T56)	1,448	54.1	0	--	1,448	30.6
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)	27	1.0	866	42.3	893	18.9
TOTAL	**2,677**		**2,048**		**4,725**	

Table 5
2022 OD Reports by Industry Type and Reporting

North American Industry Classification System		Non - Company		Company		Total	
		#	%	#	%	#	%
11	Ag, Forestry Fishing & Hunting	0	--	11	0.5	11	0.4
21	Mining	14	1.3	2	0.1	16	0.5
22	Utilities	90	8.4	23	1.1	113	3.6
23	Construction	249	23.3	55	2.7	304	9.8
31-33	Manufacturing	504	47.2	1,359	66.5	1,863	59.9
42	Wholesale Trade	33	3.1	37	1.8	70	2.2
44-45	Retail Trade	19	1.8	72	3.5	91	2.9
48-49	Transportation & Warehousing	1	0.1	25	1.2	26	0.8
51	Information	0	--	3	0.1	3	0.1
52	Finance & Insurance	0	--	4	0.2	4	0.1
53	Real Estate & Rental & Leasing	3	0.3	13	0.6	16	0.5
54	Professional, Scientific & Tech Svcs	13	1.2	27	1.3	40	1.3
55	Mgt of Companies & Enterprises	1	0.1	1	<0.1	2	0.1
56	Administrative & Support & Waste Mgt & Remediation Svcs	15	1.4	60	2.9	75	2.4
61	Educational Services	8	0.7	86	4.2	94	3.0
62	Health Care & Social Assistance	55	5.1	205	10.0	260	8.4
71	Arts, Entertainment & Recreation	12	1.1	9	0.4	21	0.7
72	Accommodation & Food Services	0	--	22	1.1	22	0.7
81	Other Services (excl Public Admin)	13	1.2	12	0.6	25	0.8
92	Public Administration	38	3.6	18	0.9	56	1.8
	Total[a]	1,068		2,044		3,112	

[a]Industry was unknown for 1,609 non-company reports and 4 company reports.

ill-defined conditions (8%).

Respiratory disorders were the second most frequently reported by non-company providers (15%). The third and fourth most frequently reported for non-company providers were symptoms and signs (11%) and skin disorders (8%). 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 (67%). The second and third most frequently reported industries by company providers were health care and social assistance (10%) and educational services (4%). The top industry for non-company providers was manufacturing (47%) and the second was construction (23%). The third most frequent industry type reported by non-company providers was utilities (8%). Industry type was missing on 1,609 non-company and four company reports.

RESULTS, continued…

Table 6
2022 OD Reports by Disease Type and Gender

DISEASE TYPE	Males		Females	
	#	%	#	%
Infectious & Parasitic Diseases (ICD A00 –B99)	0	--	2	0.1
Neoplasms (ICD C00-D49)	64	2.0	0	--
Blood and Blood Forming Organs (ICD D50-D89)	0	--	0	--
Endocrine, Nutritional & Metabolic Disorders (ICD E00-E89)	0	--	0	--
Mental Disorders (ICD F01-F99)	3	0.1	1	0.1
Nervous System (ICD G00-G99)	18	0.6	29	2.0
Eye and Adnexa (ICD H00-H59)	127	3.9	75	5.2
Ear and Mastoid Process (ICD H60-H95)	347	10.7	52	3.6
Circulatory System (ICD I00-I99)	1	<0.1	0	--
Respiratory System (ICD J00-J99)	293	9.0	139	9.6
Digestive System (ICD K00-K95)	18	0.6	0	--
Skin & Subcutaneous Tissue (ICD L00-L99)	199	6.1	115	7.9
Musculoskeletal System & Connective Tissue (ICD M00-M99)	221	6.9	236	16.2
Genitourinary System (ICD N00-N99)	2	0.1	0	--
Symptoms, Signs & Ill-Defined Conditions (ICD R00-R99), Other Causes of Morbidity (V00-Y99) and Factors Affecting Health (Z00-Z99)	220	6.8	217	14.9
Toxic Effects of Substances - Poisonings (ICD S00-T88)	1,745	53.6	589	40.5
TOTAL[a]	**3,258**		**1,455**	

[a]Gender was not listed for 12 reports.

Gender Differences

Toxic effect of substances (poisoning) was the most frequently reported diagnosis for men and women, with 54% and 41%, respectively (Table 6). The second, third and fourth most frequent diagnoses for women were musculoskeletal disorders (16%), signs and symptoms (14%), and respiratory diseases (10%). For men, the second, third and fourth most frequently reported diagnoses were noise-induced hearing loss (11%), respiratory diseases (9%), and musculoskeletal disorders (7%).

Table 7
Demographic Characteristics of Reported Occupational Disease Fatalities in 2022

DEMOGRAPHIC CHARACTERISTIC		
VITAL STATUS	**#**	**%**
Fatal	70	1.5
Non-Fatal	4,655	98.5
Total	**4,725**	
AGE	**#**	**%**
20 – 39	2	3.0
40 – 59	3	4.5
60 - 69	10	14.9
70 - 79	24	35.8
≥ 80	28	41.8
Total	**67**[a]	
DISEASE TYPE	**#**	**%**
Mesothelioma	27	38.6
Lung Cancer - asbestos exposure	19	27.1
Asbestosis	17	24.3
Respiratory Illness due to Chemicals & Dust	4	5.7
Other Lung Disease - asbestos exposure	3	4.3
Total	**70**	
INDUSTRY	**#**	**%**
Manufacturing	13	59.1
Construction	9	40.9
Total	**22**[b]	

[a]Age missing: 3 rpts. [b]Industry missing 48 rpts.

Fatalities

Seventy of the 4,725 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 70 fatalities. The workers who died ranged in age from 30 to 98 years. Twenty-seven died from mesothelioma, 19 from asbestos-related lung cancer, 17 from asbestosis, four from respiratory disease chemicals or dust, and three from other lung disease related to asbestos exposure. Thirteen of the deceased workers had been employed in manufacturing and nine in construction. Former industry was not specified for 48 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 143 (preliminary data) traumatic work-related fatalities from injuries in 2022 that occurred in Michigan. Separate annual reports on the traumatic work-related fatalities for injuries can be found at: www.oem.msu.edu. There was one acute work-related injury resulting in death among a youth in the MIFACE Program in 2022.

MI Fatality Assessment & Control Evaluation

RESULTS, continued…

Comparison with Other Data Systems

No single 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' Disability Compensation Agency (WDCA) 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, poisonings and physical agents. For the WDCA 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 is extrapolated from the BLS Annual Employer Survey of a sample of Michigan companies. In 2022, there were a total of 104,800 injuries and illnesses of which 60,700 were severe enough to cause a loss of workdays, job transfer or restriction. Of the 104,800, 17,700 were occupational illnesses, including COVID-19, and 87,100 were occupational injuries. Based on past BLS data we estimate that 13,245 of the 13,700 cases listed under the Lung-Toxic column were for COVID-19.

For 2022, WDCA reported 15,309 new paid claims for occupational injuries and illnesses with seven or more consecutive days away from work, and specific loss including amputations, loss of vision, total loss of hearing, or death; 9,105 of those paid claims are for illnesses (Table 8). One thousand five hundred twenty-nine of the 9,105

Table 8

Comparison of 2022 Bureau of Labor Statistics (BLS) Occupational Illness Survey Data and 2022 LEO Workers' Disability Compensation Agency (WDCA) Claims with 2010—2022 LEO Occupational Disease (OD) Reports

	Disease Category														
	Skin		Lung—Dust		Lung—Toxic		Poisoning		Physical Agents		Repeated Trauma		All Other		Total
BLS Survey															
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
2022	500	2.8	ND	--	13,700	77.4	100	0.6	800	4.5	ND	--	2,600	14.7	17,700
WDCA Claims[a]															
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
2022	12	0.1	0	--	1,539	16.9	0	--	226	2.5	6,290	69.1	1,038	11.4	9,105
LEO OD Reports[a]															
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
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
2020	163	4.8	226	6.7	604	17.9	1,330	39.5	72	2.1	204	6.1	768	22.8	3,367
2021	257	6.9	174	4.7	458	12.3	1,424	38.2	100	2.7	401	10.8	909	24.4	3,723
2022	326	8.4	161	4.1	338	8.7	1,496	38.5	6	0.2	877	22.6	679	17.5	3,883

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

[a] Includes 4,018 COVID-19 cases reported to the WDCA in 2021. 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 WDCA. In 2022, there were 6,204 reports that could not be classified for this table. Appendix 3 shows BLS, WDCA and LEO counts from 2010-2022.

RESULTS, continued…

WDCA illness claims were for COVID-19.

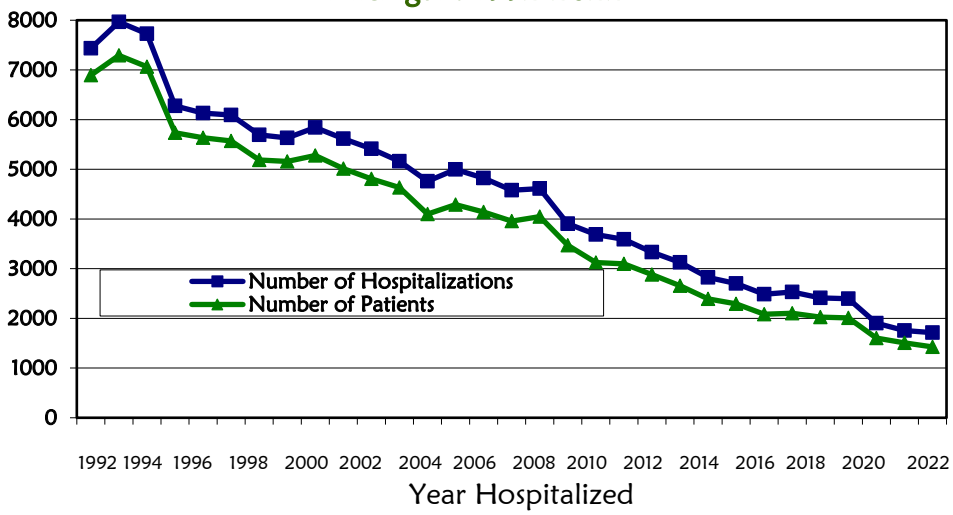
Overall, in 2022, about $415 million in compensation was paid by insurance companies and self-insured employers on 134,061 claims for both the 15,309 lost work time and specific loss injury claims, and 118,752 medical-only claims. These 134,061 paid claims include new claims for injuries and illnesses filed in 2022, 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. Sixty-eight percent of the total paid claims in 2022 were for medical procedures or care only and 32% for wage loss (https://www.michigan.gov/leo/bureaus-agencies/wdca/resources-and-reports).

Other Sources-Hospital Discharge Data

The hospital discharge data described in this next section is not part of the 4,725 occupational disease reports described in this 2022 Annual Report of Occupational Diseases. Hospital discharge data does not include identifiers; presumably some of the hospitalized patients overlap with those in the 4,725 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 4,725 OD reports submitted to the State in 2022. 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 2022; the numbers of hospitalizations from 1995-2022 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 2022 0.16% of the 1,052,334 Michigan hospitalizations designated WC insurance as the primary payment source at discharge. Table 9 shows the primary discharge diagnosis for hospitalizations from 2015 to 2022 where WC insurance was designated as the primary payment source at discharge. Data for 2002 through 2015 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 are 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 65%, and musculoskeletal diseases, accounting for 13% of all WC-related patient hospitalizations in 2022. In 2022, there were 10 (0.6%) cases of COVID-19 where workers' compensation was the payer.

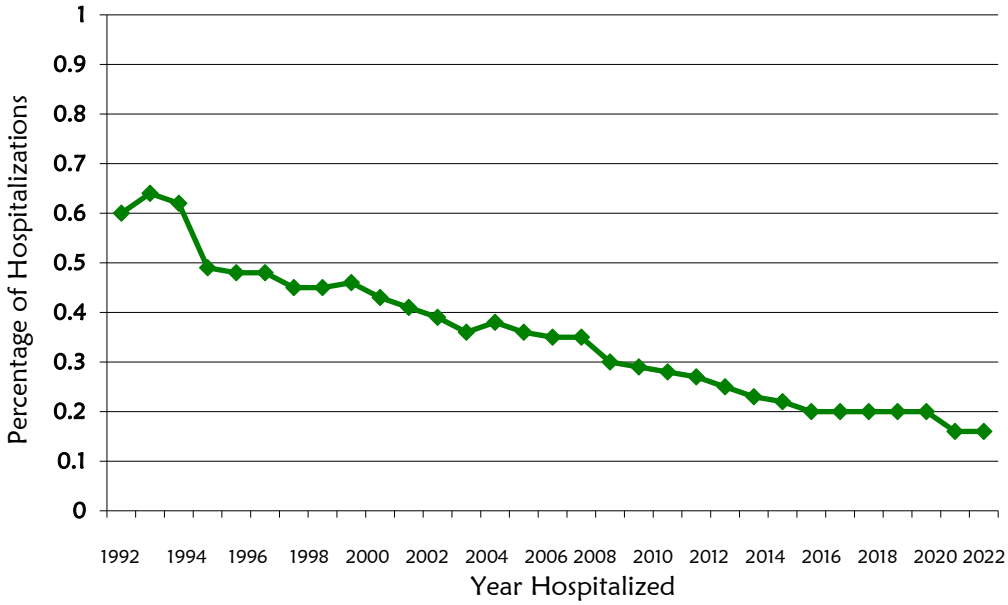
Figure 4
Hospitalizations and Patients with Workers' Compensation Designated as the Primary Payment Source at Discharge in Michigan: 1992-2022



RESULTS, continued…

Figure 5

Percent of Total Michigan Hospitalizations with Workers' Compensation Designated as the Primary Payment Source at Discharge in Michigan: 1992-2022



In 2022, 0.16% of the 1,052,334 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 2015 Q4-2022, with Workers' Compensation Designated as Primary Payment Source at Discharge

	Year of Hospitalization							
	2015 Q4	2016	2017	2018	2019	2020	2021	2022
1⁰ Discharge Diagnosis ICD-10	%	%	%	%	%	%	%	%
Infectious & Parasitic Diseases (A00 –B99)	4.1	2.5	2.4	3.1	2.5	4.4	3.2	2.3
Neoplasms (C00-D49)	0.2	0.3	0.3	0.2	0.3	0.3	0.4	0.1
Blood & Blood Forming Organs (D50-D89)	—	0.2	0.1	0.3	<0.1	0.1	0.1	0.4
Endocrine & Metabolic (E00-E89)	0.3	0.5	0.3	0.5	0.8	0.9	0.7	0.6
Mental Disorders (F01-F99)	0.9	0.3	0.3	0.4	0.6	0.8	0.6	1.0
Nervous System (G00-G99)	1.7	2.1	2.3	1.3	1.9	2.1	1.5	1.5
Eye and Adnexa (H00-H59)	0.2	<0.1	<0.1	0.1	0.1	0.1	0.1	0.1
Ear and Mastoid Process (H60-H95)	—	<0.1	0.1	--	--	0.1	--	0.1
Circulatory System (I00-I99)	2.7	3.8	3.4	3.7	4.1	4.3	3.8	4.1
Respiratory System (J00-J99)	2.4	2.5	2.4	2.6	1.9	2.6	2.1	2.5
Digestive System (K00-K95)	1.7	2.5	2.1	1.5	1.8	1.3	2.3	1.8
Skin & Subcutaneous Tissue (L00-L99)	5.8	4.5	5.2	4.4	4.6	2.5	3.1	3.3
Musculoskeletal (M00-M99)	22.9	20.6	19.2	18.8	16.5	14.3	14.0	12.5
Genitourinary System (N00-N99)	0.5	1.2	0.6	1.1	0.8	0.7	0.8	1.1
Pregnancy and Perinatal (O00-P96)	0.9	0.3	0.2	0.2	0.2	0.3	0.5	0.2
Congenital Anomalies (Q00-Q99)	0.2	0.1	--	--	<0.1	0.1	0.2	0.2
Symptoms, Signs (R00-R99)	1.6	1.4	1.9	1.3	1.3	1.5	1.2	1.3
Toxic Effects - Poisonings (S00-T88)	53.9	56.1	57.8	59.4	61.0	51.8	60.4	65.0
COVID-19 (U07.1)	--	--	--	--	--	10.8	4.0	0.6
Factors Affecting Health (Z00-Z99)		1.1	1.2	1.1	1.5	1.1	1.1	1.3
Total	**634**	**2485**	**2531**	**2412**	**2396**	**1903**	**1756**	**1713**

RESULTS, continued…

Table 10 lists the demographics of patients with WC insurance as the primary payment source at discharge: 70-77% of the hospitalizations were for men, across all years from 2011 to 2022. Data for 2002 through 2010 can be found in prior reports. Among hospitalizations for which race was known, approximately 76-89% were white, 8-12% were Black, <1%-2% were Asian, and 3-11% were listed as "other."

Most hospitalizations involved workers between 40-59 years. There were no hospitalized 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, decreased to 1% in 2018 and 2019, to <1% in 2020, increased to 2% in 2021, and decreased to 1% in 2022 (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, 2011-2022, with Workers' Compensation Designated as Primary Payment Source at Discharge

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Gender	**%**	%	%	%	%	%	%	%	%	%	%	%
Male	74	75	75	76	77	77	77	77	75	70	75	76
Female	26	25	25	24	23	23	23	23	25	30	25	24
Total[a]	**3589**	**3333**	**3127**	**2823**	**2701**	**2485**	**2531**	**2412**	**2396**	**1903**	**1756**	**1711**
Race	**%**	%	%	%	%	%	%	%	%	%	%	%
White	89	87	88	87	86	87	81	80	80	76	81	80
Black	8	9	9	8	9	10	11	12	12	12	8	10
Asian	<1	<1	<1	1	<1	<1	<1	1	<1	2	1	<1
Other	3	4	3	4	5	3	8	7	7	11	10	10
Total[a]	**2659**	**2557**	**2532**	**2286**	**2402**	**2323**	**2494**	**2412**	**2396**	**1903**	**1756**	**1713**
Age	**%**	%	%	%	%	%	%	%	%	%	%	%
< 15	<1	<1	<1	<1	<1	<1	<1	--	--	--	<1	0
15-19	1	1	1	1	1	2	2	1	1	1	2	1
20-39	27	25	25	27	26	28	25	27	24	23	25	26
40-59	53	55	54	54	53	49	50	47	47	48	46	41
60-79	15	17	18	17	19	20	23	24	27	26	27	29
≥ 80	4	1	1	1	1	1	1	1	1	<1	1	2
Total[a]	**3589**	**3333**	**3127**	**2823**	**2701**	**2485**	**2531**	**2412**	**2394**	**1903**	**1756**	**1712**
Avg Age ± SD	48±15	48±13	48±14	47±14	48±14	48±15	49±14	49±15	50±15	50±14	49±15	50±16

[a]Totals vary due to missing information.

Poison Control Center Data

In 2022, 901 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 13 to 87 years. Eighty-three percent of these individuals with known age were less than age 50. Of the 901 calls to the PCC in 2022, the top calls included exposures to: cleaning agents (270, 30%), medications (93, 10%) and fuels/gases/oil (87, 10%).

Adult Blood Lead Epidemiology and Surveillance (ABLES)

Table 12 describes the demographic characteristics of the 1,443 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. Comprehensive reports on elevated blood lead levels in Michigan can be found at: www.oem.msu.edu.

Table 11
Demographic Characteristics of 901 Individuals Reported by the Michigan Poison Control Center in 2022

Demographic Characteristics		
Age	#	%
13-19	54	6.6
20-29	314	38.4
30-39	177	21.6
40-49	134	16.4
50-59	89	10.9
60-69	44	5.4
≥ 70	6	0.7
Total	**818**[a]	
Gender	#	%
Male	564	62.7
Female	335	37.3
Total	**899**[b]	
Top Exposures at Work	#	%
Cleaning Agents	270	30.0
Medication	93	10.3
Fuel/Gases/Oil	87	9.7
Caustics	43	4.8
Acids	37	4.1
Building/Construction	36	4.0
Insecticides/Pesticides	36	4.0
Carbon Monoxide	26	2.9
Freon	18	2.0
Metal Fume	16	1.8
Food	13	1.4
Plants	13	1.4
All Other Exposures	213	23.6
Total	901	

[a]Age was unknown for 83 reports.
[b]Gender was missing on 2 reports.

Table 12
Demographic Characteristics of 1,443 Individuals Reported by Laboratories with Elevated Blood Lead in Michigan, 2022

	Blood Lead Level			
	>=5 & <10 *ug*/dL		>=10 *ug*/dL	
Age	#	%	#	%
16-19	12	1.5	12	1.8
20-29	97	12.3	71	10.8
30-39	213	27.1	158	24.0
40-49	145	18.4	134	20.4
50-59	152	19.3	143	21.8
60-69	90	11.5	104	15.8
≥ 70	77	9.8	35	5.3
Total	**786**		**657**	
Gender	#	%	#	%
Male	693	88.2	616	93.8
Female	93	11.8	41	6.2
Total	**786**		**657**	
Industry	#	%	#	%
Construction	125	25.3	105	22.4
Manufacturing	211	42.7	257	54.8
Utilities	61	12.3	29	6.2
Trade	25	5.1	25	5.3
Public Admin	25	5.1	7	1.5
Arts & Entertainment	6	1.2	6	1.3
Admin & Support	7	1.4	6	1.3
Transportation	0	--	0	--
Other Services	10	2.0	3	0.6
Prof & Scientific	9	1.8	4	0.9
Educational Services	3	0.6	2	0.4
Health Care	10	2.0	23	4.9
Accomod & Food Svc	0	--	0	--
Mining	1	0.2	0	--
Real Estate	1	0.2	2	0.4
Total	**494**[a]		**469**[a]	

[a] Industry was missing on 292 reports of blood lead levels <10 ug/dL and on 188 reports of blood leads >=10ug/dL.

DISCUSSION

There were 4,725 Occupational Disease Reports sent to LEO in calendar year 2022. These reports do not include occupational injuries. The most frequent types of occupational diseases reported to LEO were toxic effects of substances (50%), musculoskeletal conditions (10%), signs and symptoms (9%) and respiratory conditions (9%). 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 7,477 in 2008. From 2008 to 2019, the number of reports plateaued with variations of approximately 600 to 4,000 each year. With the onset of the COVID-19 pandemic in 2020 and many workplaces having to shut down and lay off workers, the number of OD reports in 2020 was less than

half the number of reports submitted during 2019. In 2021, the number of OD reports increased to 5,197, and in 2022 the number of OD reports decreased to 4,725. Appendix 1 shows the number and percent of OD reports by Non-Company and Company health care providers from 1985 to 2022.

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 and Appendix 1). In 2020 and 2022, the primary source of OD reports, which typically has been from company-affiliated physicians, reversed so that non-company-affiliated physicians submitted a greater number of OD reports than company-affiliated physicians (Appendix 1).

The WDCA reported that there were 10,127 paid lost work time workers' compensation claims for seven or more days for COVID-19 in 2020 including 25 deaths, 4,046 paid claims in 2021 including 10 deaths, and in 2022 there were 1,529 paid claims for COVID and no deaths. COVID-19 paid workers' compensation claims were 41.5% of all paid lost work time claims for seven or more days in 2020, 20.7% of all paid claims in 2021, and 10.3% of all paid claims in 2022.

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. There were 45 unique work locations/facilities associated with on-site company doctors that reported 1,068 work-related cases, and 30 company-hired occupational health clinics (OHCs) reporting 980 work-related cases from 548 unique work locations; the total number of clients (i.e. work locations/facilities) for these OHCs is unknown. In 2022, there were 295,510 unique work locations throughout Michigan. In addition, there were 16 non-company-affiliated physicians reporting patients to the state. There were 295,510 companies in the year 2022 and 45,404 licensed physicians practicing in Michigan in the year 2022. Accordingly, reports are received from 0.2% 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 4,725 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 2022, the BLS annual survey reported 17,700 illnesses; by extension one would expect 35,400 illnesses in 2022 instead of the approximately 4,700 reported in 2022. Underreporting is probably even greater than that seen in comparing different data systems because these comparisons assume 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 2022 the non-company-affiliated health care practitioners were more likely to report patients with respiratory disease who work in small, non-manufacturing companies.

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 (15,309 in 2022) or illnesses with seven or more days away from work or specific loss including amputations, loss of vision, total loss of hearing or death, are computerized. Therefore, all the injuries and illnesses with less lost work time or not one of the specific loss or death injuries or those who received medical care only (87,110 in 2022) 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 (2019 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 WDCA claims system. For example, poisoning represents approximately 39% (1,496) of the OD reports, while that category of diseases accounts for 0.6% (100) cases in the BLS survey and no cases in the WDCA paid claims file. 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 conditions[4]. 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. An October 2023 report by the Council of State and Territorial Epidemiologists (CSTE) outlined an approach to develop a more comprehensive national report on occupational illness[5]. Michigan will explore if the CSTE recommendations can be applied 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).

Compliance by employers with reporting requirements has repeatedly shown to be incomplete. In 2015 a new regulation was implemented for employers to report acute work-related hospitalizations and amputations directly to MIOSHA (https://www.michigan.gov/-/media/Project/Websites/leo/Documents/MIOSHA5/CIS_WSH_part11ad.pdf?rev=2739003a2f1f4c0b92d247127c0518f8). Despite comprehensive outreach by MIOSHA to inform employers about the reporting law, only 43.6% of acute work-related hospitalizations and only 42.1% of amputations were reported by the employer from 2016 to 2018[6,7]. Companies with 250 or more employees were significantly more likely to comply with reporting hospitalizations and amputations (68.4% and 67.9%, respectively) and small companies with 10 or fewer employees were significantly less likely to comply (32.9% and 18.2%, respectively). For hospitalizations, employers in manufacturing (64.7%), wholesale trade (57.5%) and public administration (66.2%) were significantly more likely to comply with the reporting requirement than employers in agriculture, forestry, fishing and hunting (8.2%); construction (38.2%); finance and insurance (21.4%); real estate and rental and leasing (27.3%); administrative and support and waste management and remediation services (33.9%); arts, entertainment and recreation (10.8%); accommodation and food services (20.8%); and other services except public administration (20.3%). For amputations, employers in manufacturing (59.8%) were significantly more likely to comply with the reporting requirement than employers in agriculture, forestry, fishing and hunting (14.6%), construction (27.4%), retail trade (20.7%), arts, entertainment and recreation (7.7%), accommodation and food services (13.0%) and other services except public administration (27.0%).

Disproportionate reporting of hospitalizations in manufacturing, wholesale trade and public administration and of amputations in manufacturing as well as companies with a large number of employees suggests lack of awareness of the requirement among employers less familiar with workplace safety and health issues, and/or who do not have a dedicated health and safety specialist. Better reporting lays the groundwork to fully characterize the industries where injuries including amputations and acute illnesses result in a hospitalization, which can then be used to target and evaluate preventive interventions in the workplace. Given the usefulness of these reports to identify workplace hazards, it would be beneficial if employer compliance with the reporting requirement improved.

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.

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Appendix 1.

Number and Percent of Non-Company and Company Occupational Disease Reports to LEO by Year, Michigan 1985-2022

Year	Non-Company			Company		Total
	#	%		#	%	
1985[a]						218
1986 [a]						101
1987 [a]						301
1988 [a]						694
1989 [a]						1,471
1990 [a]						8,650
1991	1,421	16		7,734	84	9,155
1992	1,327	12		9,927	88	11,254
1993	1,424	10		13,537	90	14,961
1994	1,812	9		17,384	91	19,196
1995	2,202	13		14,711	87	16,913
1996	2,067	10		18,187	90	20,254
1997	3,128	16		16,250	84	19,378
1998	5,221	25		15,533	75	20,754
1999	7,285	34		14,253	66	21,538
2000	5,171	26		14,456	74	19,627
2001	6,457	35		11,788	65	18,245
2002	6,281	42		8,657	58	14,938
2003	6,469	41		9,421	59	15,890
2004	6,185	41		8,920	59	15,105
2005	4,911	38		7,974	62	12,885
2006	4,696	37		8,082	63	12,778
2007	3,318	30		7,922	70	11,240
2008	3,386	45		4,091	55	7,477
2009	3,106	45		3,731	55	6,837
2010	3,525	44		4,429	56	7,954
2011	3,530	33		7,171	67	10,701
2012	3,175	39		4,894	61	8,069
2013	3,738	39		5,885	61	9,623
2014	3,426	42		4,802	58	8,228
2015	3,368	45		4,104	55	7,472
2016	3,690	43		4,849	57	8,539
2017	2,803	38		4,664	62	7,467
2018	2,838	33		5,692	67	8,530
2019	2,972	37		4,981	63	7,953
2020	2,310	60		1,539	40	3,849
2021	2,217	43		2,980	57	5,197
2022	2,677	57		2,048	43	4,725

[a]Reporting source (non-company vs company) was not available for calendar years 1985-1990.

Appendix 2.

Number of Occupational Health Clinics Reporting Occupational Diseases to LEO and Total Number of Occupational Health Clinics in Michigan, 2005-2022

	# Occupational Health Clinics Reporting	Total # Occupational Health Clinics[a]
Year	**#**	**#**
2005	21	300
2006	50	300
2007	50	300
2008	56	270
2009	69	260
2010	44	224
2011	64	169
2012	61	187
2013	66	187
2014	46	187
2015	39	187
2016	37	195
2017	42	195
2018	29	195
2019	38	195
2020	34	190
2021	21	190
2022	30	175

[a]Total Number of Occupational Health Clinics is an approximate number, since there is no comprehensive directory of clinics available. Tracking OD reporting by occupational health clinics began in 2005.

Appendix 3.

Bureau of Labor Statistics (BLS) Occupational Illness Survey Data, LEO Workers' Disability Compensation Agency (WDCA) Claims, and LEO Occupational Disease (OD) Reports, Michigan 2010-2022

	Disease Category														
	Skin		Lung—Dust		Lung—Toxic		Poisoning		Physical Agents		Repeated Trauma		All Other		Total
BLS Survey															
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
2010	1,200	14.0	ND	--	700	8.1	100	1.2	ND	--	ND	--	6,600	76.7	8,600
2011	1,100	14.7	ND	--	400	5.3	100	1.3	ND	--	ND	--	5,900	78.7	7,500
2012[a]															
2013	1,100	13.4	ND	--	600	7.3	200	2.4	ND	--	ND	--	6,300	76.8	8,200
2014	900	15.0	ND	--	700	11.7	NS	--	ND	--	ND	--	4,400	73.3	6,000
2015	1,400	21.5	ND	--	700	10.8	100	1.5	ND	--	ND	--	4,300	66.2	6,500
2016	900	14.4	ND	--	400	7.8	0	--	ND	--	ND	--	5,100	79.7	6,400
2017	900	14.8	ND	--	300	4.9	200	3.3	1,000	16.4	ND	--	3,700	60.7	6,100
2018	1,000	18.5	ND	--	600	11.1	NS	--	ND	--	ND	--	3,800	70.4	5,400
2019	800	15.1	ND	--	400	7.5	100	1.9	800	15.1	ND	--	3,200	60.4	5,300
2020	700	2.0	ND	--	29,600[b]	85.3	200	0.6	600	1.7	ND	--	3,600	10.4	34,700
2021	500	2.3	ND	--	18,100[b]	82.6	ND	--	700	3.2	ND	--	2,600	11.9	21,900
2022	500	2.8	ND	--	13,700	77.4	100	0.6	800	4.5	ND	--	2,600	14.7	17,700
WDCA Claims[c]															
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
2010	55	0.3	0	--	60	0.3	8	<0.1	28	0.2	14,571	81.9	3,075	17.3	17,797
2011	45	0.3	0	--	107	0.7	9	0.1	34	0.2	12,427	80.2	2,867	18.5	15,489
2012	54	0.3	0	--	103	0.7	13	0.1	27	0.2	11,863	76.7	3,411	22.0	15,471
2013	57	0.4	0	--	110	0.7	4	<0.1	28	0.2	12,062	80.3	2,766	18.4	15,027
2014	30	0.2	0	--	89	0.6	4	<0.1	39	0.3	12,006	80.6	2,734	18.3	14,902
2015	38	0.3	1	<0.1	53	0.4	5	<0.1	36	0.3	10,749	80.2	2,515	18.8	13,397
2016	38	0.3	1	<0.1	93	0.8	3	<0.1	25	0.2	9,976	81.0	2,178	17.7	12,314
2017	25	0.2	1	<0.1	54	0.4	3	<0.1	28	0.2	9,998	80.9	2,246	18.2	12,355
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
2019	9	0.1	ND	--	22	0.2	ND	--	23	0.2	8,476	85.8	1,353	13.7	9,883
2020[d]	8	<0.1	0	--	10,062[b]	55.0	2	<0.1	12	0.1	7,195	39.3	1,012	5.5	18,291
2021	16	0.1	0	--	4,037[b]	32.0	1	<0.1	7	0.1	7,772	61.7	772	6.1	12,605
2022	12	0.1	0	--	1,539	16.9	0	--	226	2.5	6,290	69.1	1,038	11.4	9,105
LEO OD Reports[c]															
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
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
2020	163	4.8	226	6.7	604	17.9	1,330	39.5	72	2.1	204	6.1	768	22.8	3,367
2021	257	6.9	174	4.7	458	12.3	1,424	38.2	100	2.7	401	10.8	909	24.4	3,723
2022	326	8.4	161	4.1	338	8.7	1,496	38.5	6	0.2	877	22.6	679	17.5	3,883

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

[a]Data not available.

[b]Includes COVID-19 cases.

[c] Includes 4,018 COVID-19 cases reported to the WDCA in 2021. 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 WDCA. In 2021, there were 1,474 reports that could not be classified for this table.

[d]2020 WDCA numbers have been updated since the 2020 Annual Report, after a data entry backlog was resolved.