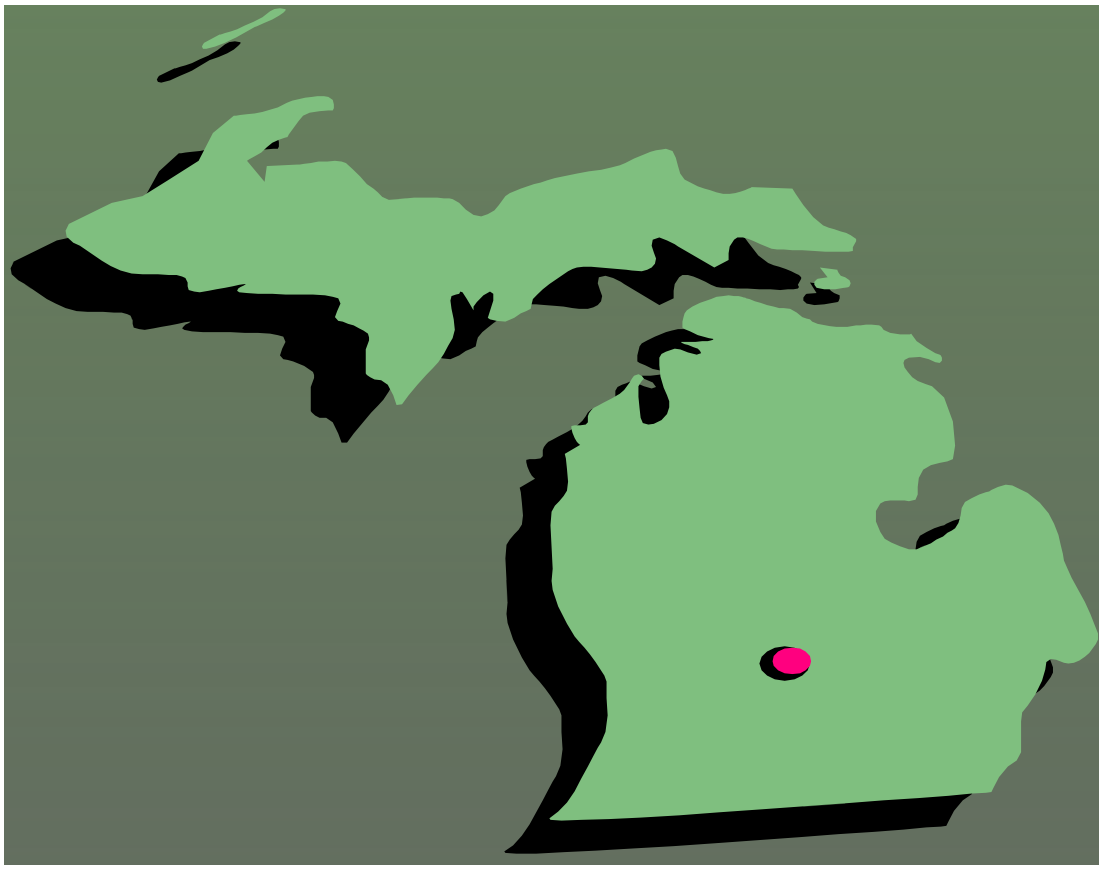
November 24, 2021

2020
ANNUAL REPORT

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



2020 Annual Report

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

November 24, 2021

2020 ANNUAL REPORT SUMMARY OF OCCUPATIONAL DISEASE REPORTS TO THE MICHIGAN DEPARTMENT OF LABOR & ECONOMIC OPPORTUNITY

Occupational Disease Surveillance Program

TABLE OF CONTENTS

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 30643
Lansing, MI 48909

Michigan State University Department of Medicine
West Fee Hall
909 Fee Road, Room 117
East Lansing, MI 48824
517.353.1846

Kenneth D. Rosenman, MD
Mary Jo Reilly, MS

Michigan Department of Labor and Economic Opportunity (LEO)
PO Box 30643
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

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 29th 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 2020. 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: 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 2020, 701 (1.2%) of the 56,963 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)[i] 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**
- **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).

CHRONIC OCCUPATIONAL DISEASES COUNTED ONLY ON FIRST REPORT (ICD-10: DESCRIPTION)

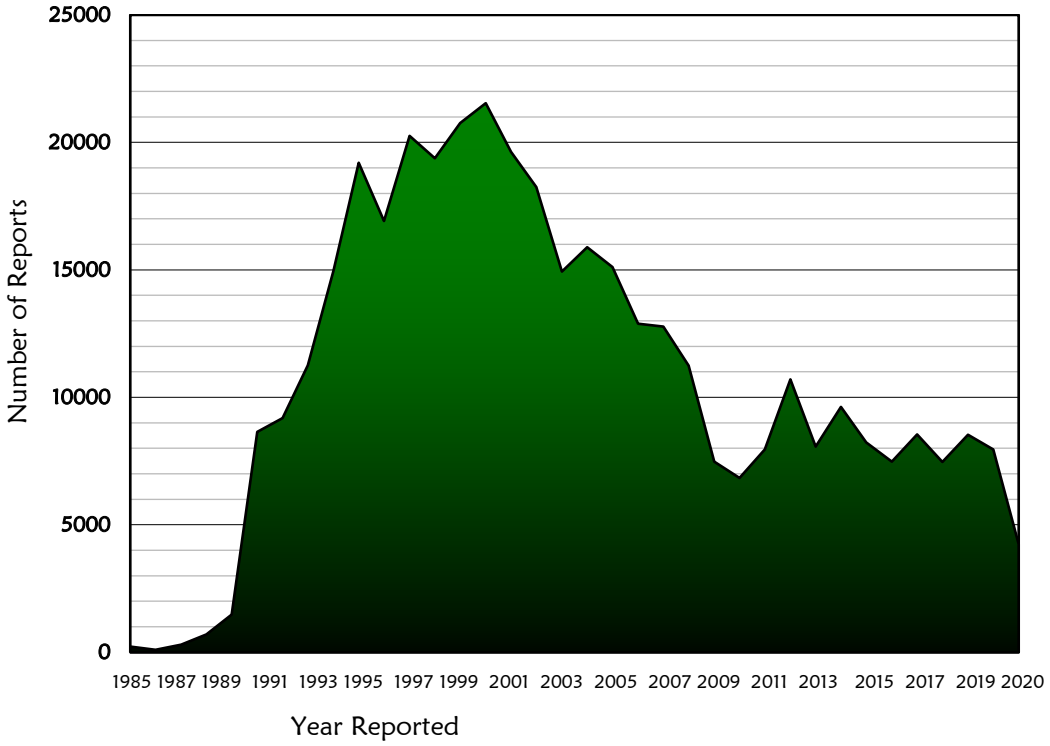
A15.0: Pulmonary TB; A18.0: TB of Bones & Joints; D86: Sarcoidosis; B90: TB, Late Effects of; C00-D49: Cancer; E20-E35: Diseases of Other Endocrine Glands; E50-E64: Nutritional Deficiencies; E70-E88: Metabolic & Immunity Disorders except E86.0, Dehydration; D50-D89: Diseases of the Blood and Blood-Forming 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

A total of 4,238 OD Reports, 3,849 non-COVID-19 and 389 COVID-19 were submitted to LEO in calendar year 2020. Figure 2 shows the number of reports since 1985. Data is presented for non-COVID-19 reports on pages 4-13 and Tables 11 and 12, and for the COVID-19 reports on pages 14-16 and Table 8.

Figure 2
OD Reports to LEO by Year Reported: 1985-2020



NON-COVID-19 DATA

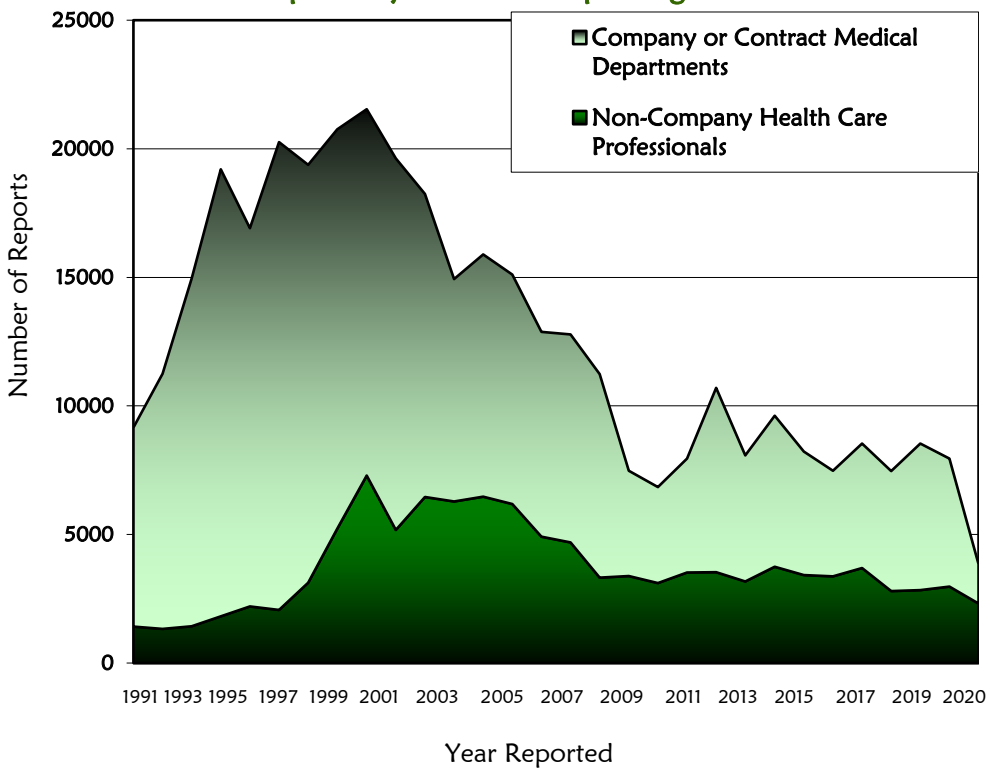
Reporting Source

Company or contract medical departments submitted 40% of the 3,849 non-COVID reports (1,539 cases); non-company-associated health care practitioners submitted 60% of the non-COVID reports (2,310 cases). Figure 3 shows the trends by reporting source (company or non-company associated) since 1991.

Company Size

Of the 1,725 OD reports that listed company size, 48% (834 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 clinicians. About 93% of the 203 reports with known company size that were submitted by non-company practitioners involved companies with < 500 employees, while about 46% of the 1,522 reports with known company size submitted by company practitioners involved companies with < 500 employees.

Figure 3
OD Reports by Year and Reporting Source: 1991-2020



Non-Company Clinicians

Thirty-two non-company-associated clinicians reported 53 incidents of occupational disease. Twenty-four labs were responsible for identifying 1,315

RESULTS, continued...

reports of elevated blood lead level.

In addition, the Michigan Poison Control Center reported 701 incidents of work-related poisonings, the 3rd Circuit Court of Michigan reported 147 asbestos-related claims, and hospitals submitted 94 reports of patients with work-related illnesses. Twenty-seven (84%) of the clinicians reported only one patient each in calendar year 2020 (Table 2); one clinician reported 14 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 2020, 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.

Table 1
Company Size at Facilities with an OD Report in 2020: Non-Company v Company Clinicians

Number of Employees	REPORTING SOURCE					
	Non-Company Clinicians		Company Clinicians		Total Reports	
	#	%	#	%	#	%
< 25	73	36.0	197	12.9	270	15.7
25-100	10	4.9	214	14.1	224	13.0
100-500	112	55.2	285	18.7	397	23.0
> 500	8	3.9	826	54.3	834	48.3
Total	203[a]		1,522[b]		1,725	

[a] The number of employees was missing on 2,107 reports.
[b] The number of employees was missing on 17 reports.

Occupational Health Clinics

There are approximately 190 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, increased in 2019 to 38, and decreased to 34 in 2020. Biennial audits of a sample of non-reporting clinics began in 2009.

Table 2
OD Reports Submitted by Non-Company Clinicians in 2020

Number of reports	Clinicians		Patients
	#	%	#
1	27	84.4	27
2-10	4	12.5	12
>11	1	3.1	14
Total[a]	32		53

[a] Includes reports only from individual clinicians.

Demographics

Table 3 shows the age, gender and race of the workers with reported in 2020. The mean age was 45 ± 16 years (range, 15 to 93 years) with approximately 59% of the patients between the ages of 25 and 54 years. Seventy-four reports were submitted for patients age 19 or younger, and 50 reports were submitted for patients age 80 and older. Seventy-three percent of all reports submitted were for male workers. Eighty-three percent of the submitted reports (3,191 cases) did not indicate the worker's race. Of the 658 reports that did indicate race, 18% were Caucasian, 6% were African American, 76% were listed as "other" and 0.2% were listed as Hispanic.

Younger Workers

Of the 42 workers *age 18 and younger*, two were 15, eight were 16, nine were 17, and twenty-three were 18 years old. Seventeen (40%) of the reported patients age 18 and younger were female and twenty-five (60%) were male.

RESULTS, continued...

Table 3
Demographic Characteristics of Occupational Disease Cases Reported in 2020

Demographic Characteristic		
Age	#	%
≤ 19	74	2.4
20-24	264	8.7
25-29	291	9.6
30-34	324	10.7
35-39	320	10.6
40-44	266	8.8
45-49	277	9.2
50-54	319	10.5
55-59	260	8.6
60-69	414	13.7
70-79	165	5.5
≥ 80	50	1.7
Total[a]	3,024	
Gender	#	%
Male	2,773	72.5
Female	1,053	27.5
Total[b]	3,826	
Race	#	%
Caucasian	120	18.2
African American	36	5.5
Hispanic	1	0.2
Other	501	76.1
Total[c]	658	

[a]Age was unknown for 825 reports.
Mean age 45 ±16 yrs.
[b]Gender was unknown for 23 reports.
[c]Race was unknown for 3,191 (83%) reports.

Place of employment was unknown for 39 of the 42 younger workers. Of the three with known employment, one each worked in manufacturing, health care services and for a temporary employment agency. Forty of the younger workers were reported by private practice clinicians not associated with any company and two were reported by their company medical physician. Thirty-three were reported by the Poison Control Center, six were for an elevated blood lead level (serum lead levels were between 5 and 12 micrograms per deciliter), and one each was for respiratory symptoms, a skin disease and a repetitive trauma condition. No work-related *fatal illnesses* for workers age 18 or younger were identified in 2020.

Older Workers

Of the 50 workers aged eighty and older, 44 (88%) were between 80 and 89 years, and six (12%) were between 90 and 93 years old. Forty-eight were men and two were women. Five had worked in construction and three in manufacturing. Industry or former industry was not indicated in 42 reports.

Private practice clinicians not associated with any company reported all but one of the 50 patients. Nineteen of the older workers were reported for an elevated blood lead level (serum lead levels were between 5 and 24 micrograms per deciliter), 28 with asbestosis, two with respiratory disease and one with noise-induced hearing loss.

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 2,199 (57%) cases. Respiratory diseases were the second most frequently reported conditions with 369 (10%) cases. Diseases of the ear, including noise-induced hearing loss were the third most frequently reported, with 334 (9%) cases. Signs, symptoms and ill-defined conditions were the fourth most reported, with 319 (8%) cases. There were 194 (5%) eye disease reports, 192 (5%) musculoskeletal disease reports, 152 (4%) skin disease reports and 62 (2%) reports of neoplasms. Less frequently reported conditions included nervous system diseases, 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, including lead and other poisonings, were the most common reported conditions from company health care providers (53%) and non-company providers (60%). The second, third and fourth most frequently reported diagnoses for company providers was diseases of the ear including noise-induced hearing loss (19%), musculoskeletal diseases (13%), and symptoms, signs and ill-defined conditions (8%).

RESULTS, continued...

Table 4
2020 OD Reports by Disease Type (ICD-10) and Reporting Source

DISEASE TYPE	Non-Company		Company		Total	
	#	%	#	%	#	%
Infectious & Parasitic Diseases (ICD A00 –B99)	0	--	0	--	0	--
Neoplasms (ICD C00-D49)	62	2.7	0	--	62	1.6
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	--	2	0.1	2	0.1
Nervous System (ICD G00-G99)	0	--	13	0.8	13	0.3
Eye and Adnexa (ICD H00-H59)	180	7.8	14	0.9	194	5.0
Ear and Mastoid Process (ICD H60-H95)	43	1.9	291	18.9	334	8.7
Circulatory System (ICD I00-I99)	0	--	0	--	0	--
Respiratory System (ICD J00-J99)	362	15.7	7	0.5	369	9.6
Digestive System (ICD K00-K95)	0	--	10	0.6	10	0.3
Skin & Subcutaneous Tissue (ICD L00-L99)	94	4.1	58	3.8	152	3.9
Musculoskeletal System & Connective Tissue (ICD M00-M99)	0	--	192	12.5	192	5.0
Genitourinary System (ICD N00-N99)	1	<0.1	2	0.1	3	0.1
Symptoms, Signs & Ill-Defined Conditions (ICD R00-R99), Other Causes of Morbidity (V00-Y99) and Factors Affecting Health (Z00-Z99)	189	8.2	130	8.4	319	8.3
Lead Poisoning (T56)	1,315	56.9	0	--	1,315	34.2
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)	64	2.8	819	53.2	883	22.9
TOTAL	**2,310**		**1,539**		**3,849**	

Table 5
2020 OD Reports by Industry Type and Reporting

North American Industry Classification System		Non - Company		Company		Total	
		#	%	#	%	#	%
11	Ag, Forestry Fishing & Hunting	3	1.4	3	0.2	6	0.3
21	Mining	0	--	1	0.1	1	0.1
22	Utilities	0	--	3	0.2	3	0.2
23	Construction	25	11.4	72	4.7	97	5.5
31-33	Manufacturing	174	79.5	858	56.0	1,032	58.9
42	Wholesale Trade	0	--	22	1.4	22	1.3
44-45	Retail Trade	1	0.5	114	7.4	115	6.6
48-49	Transportation & Warehousing	0	--	133	8.7	133	7.6
51	Information	0	--	7	0.5	7	0.4
52	Finance & Insurance	0	--	0	--	0	--
53	Real Estate & Rental & Leasing	1	0.5	22	1.4	23	1.3
54	Professional, Scientific & Tech Svcs	0	--	16	1.0	16	0.9
55	Mgt of Companies & Enterprises	0	--	0	--	0	--
56	Administrative & Support & Waste Mgt & Remediation Svcs	1	0.5	105	6.8	106	6.1
61	Educational Services	1	0.5	24	1.6	25	1.4
62	Health Care & Social Assistance	9	4.1	107	7.0	116	6.6
71	Arts, Entertainment & Recreation	0	--	2	0.1	2	0.1
72	Accommodation & Food Services	0	--	13	0.8	13	0.7
81	Other Services (excl Public Admin)	1	0.5	11	0.7	12	0.7
92	Public Administration	3	1.4	20	1.3	23	1.3
	Total[a]	219		1,533		1,752	

[a]Industry was unknown for 2,091 non-company reports and 6 company reports.

Respiratory disorders were the second most frequently reported diagnoses by non-company providers (16%). The third and fourth most frequently reported diagnoses for non-company providers were symptoms and signs (8%) and eye 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 (56%), primarily automobile production. The second and third most frequently reported industries by company providers were transportation and warehousing (9%) and retail trade (7%). The top industry for non-company providers was manufacturing (80%) and the second was construction (11%). The third most frequent industry type reported by non-company providers was health care services (4%). Industry type was missing on 2,091 non-company and six company reports.

RESULTS, continued…

Table 6
2020 OD Reports by Disease Type and Gender

DISEASE TYPE	Males		Females	
	#	%	#	%
Infectious & Parasitic Diseases (ICD A00 –B99)	0	--	0	--
Neoplasms (ICD C00-D49)	62	2.2	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)	1	<0.1	1	0.1
Nervous System (ICD G00-G99)	4	0.1	9	0.9
Eye and Adnexa (ICD H00-H59)	122	4.4	71	6.7
Ear and Mastoid Process (ICD H60-H95)	256	9.2	73	6.9
Circulatory System (ICD I00-I99)	0	--	0	--
Respiratory System (ICD J00-J99)	262	9.4	104	9.9
Digestive System (ICD K00-K95)	10	0.4	0	--
Skin & Subcutaneous Tissue (ICD L00-L99)	93	3.4	58	5.5
Musculoskeletal System & Connective Tissue (ICD M00-M99)	95	3.4	95	9.0
Genitourinary System (ICD N00-N99)	2	0.1	1	0.1
Symptoms, Signs & Ill-Defined Conditions (ICD R00-R99), Other Causes of Morbidity (V00-Y99) and Factors Affecting Health (Z00-Z99)	179	6.5	139	13.2
Toxic Effects of Substances - Poisonings (ICD S00-T88)	1,687	60.8	502	47.7
TOTAL[a]	**2,773**		**1,053**	

[a]Gender was not listed for 31 reports.

Gender Differences

Toxic effect of substances (poisoning) was the most frequently reported diagnosis for men and women, with 61% and 48%, respectively (Table 6). The second, third and fourth most frequent diagnoses for women were signs and symptoms (13%), respiratory diseases (10%), and musculoskeletal diseases (9%). For men, the second, third and fourth most frequently reported diagnoses were respiratory diseases (9%), noise-induced hearing loss (9%), and signs and symptoms (7%). Thirty-one reports did not indicate gender.

Table 7
Demographic Characteristics of Reported Occupational Disease Fatalities in 2020

DEMOGRAPHIC CHARACTERISTIC		
Vital Status	**#**	**%**
Fatal	45	1.2
Non-Fatal	3,804	98.8
Total	**3,849**	
Age	**#**	**%**
20 – 39	0	--
40 – 59	1	2.3
60 - 69	13	29.5
70 - 79	19	43.2
≥ 80	11	25.0
Total	**44**[a]	
Disease Type	**#**	**%**
Lung Cancer from asbestos exposure	34	75.6
Asbestosis	11	24.4
Total	**45**	
Industry	**#**	**%**
Manufacturing	4	36.4
Construction	7	63.6
Total	**11**[b]	

[a]Age was missing on 1 report.
[b]Industry was missing on 34 reports.

Fatalities

Forty-five of the 3,849 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 45 fatalities. The workers who died ranged in age from 58 to 90 years. Thirty-four died from asbestos-related cancer and 11 from asbestosis. Four of the deceased workers had been employed in manufacturing and seven in construction. Former industry was not specified for 34 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 204 (preliminary data) traumatic work-related fatalities from injuries in 2020 that occurred in Michigan. A separate report on the 163 traumatic work-related fatalities for injuries in 2019 can be found at: www.oem.msu.edu. There was one acute work-related injury resulting in death among youths in the MIFACE Program in 2020.

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' 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 and poisonings. 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 comes from the BLS Annual Survey of company injury and illness logs. In 2020, there were a total of 107,400 injuries and illnesses of which 69,800 were severe enough to cause a loss of work days, job transfer or restriction. Of the 107,400 total, 34,700 were occupational illnesses likely including COVID-19 and 72,700 were occupational injuries. Based on past BLS data we estimate that 29,000 of the 29,600 cases listed under the Lung-Toxic column were for COVID-19.

For 2020, WDCA reported 17,452 new paid claims for occupational injuries and illnesses with seven or more consecutive days away from work; 12,417 of those paid claims are for illnesses (Table 8). Five thousand nine hundred and thirty of the 12,417 WDCA claims were for COVID-19.

Table 8
Comparison of 2020 Bureau of Labor Statistics (BLS) Occupational Illness Survey Data and 2020 LEO Workers' Disability Compensation Agency (WDCA) Claims with 2008—2020 LEO Occupational Disease (OD) Reports

	Disease Category														
	Skin		Lung—Dust		Lung—Toxic		Poisoning		Physical Agents		Repeated Trauma		All Other		Total
BLS Survey															
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
2020	700	2.0	ND	--	29,600	85.3	200	0.6	600	1.7	ND	--	3,600	10.4	34,700
WDCA Claims[a]															
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
2020	7	0.1	0	--	5,943	47.9	4	<0.1	11	0.1	5,884	47.4	568	4.6	12,417
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
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

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

[a] Includes 5,930 COVID-19 cases reported to the WDCA in 2020. 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 2020, there were 871 reports that could not be classified for this table. Appendix 1 shows BLS and WDCA counts from 2010-2020.

RESULTS, continued…

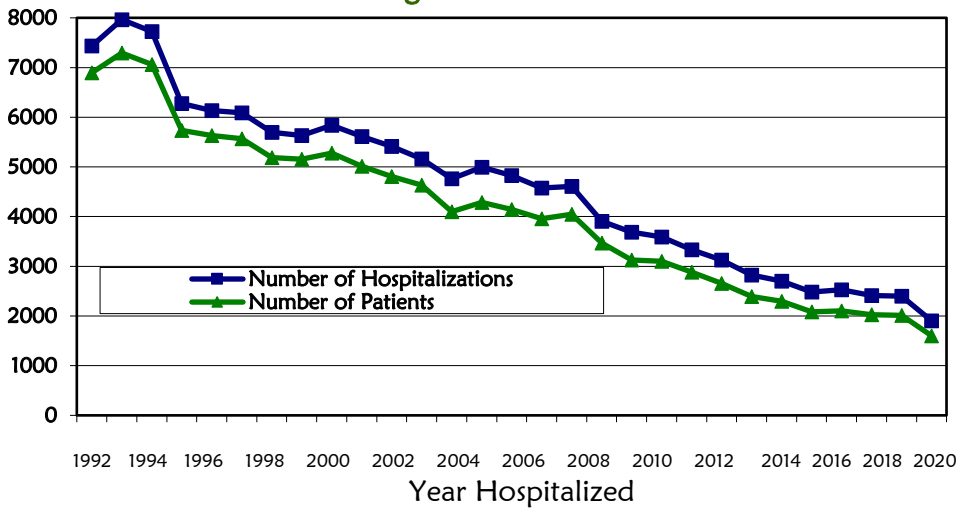
Overall in 2020, about $395 million in compensation was paid by insurance companies and self-insured employers on 145,082 claims for both lost work time and medical-only costs. These 145,082 paid claims include new claims for injuries and illnesses filed in 2020, as well as ongoing payments for claims from previous years for workers who continue to lose work time or incur medical costs due to their injury or illness. Sixty-four percent of the total paid claims in 2020 were for medical procedures or care only and 36% for wage loss (https://www.michigan.gov/documents/leo/2020_WDCA_Annual_Report_720822_7.pdf).

Other Sources-Hospital Discharge Data

The hospital discharge data described in this next section is not part of the 3,849 occupational disease reports described in this 2020 Annual Report of Occupational Diseases. Hospital discharge data does not include identifiers; presumably some of the hospitalized patients overlap with those in the 3,849 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 3,849 OD reports submitted to the State in 2020. 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 2020; the numbers of hospitalizations from 1995-2020 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 2020 0.20% of the 1,067,739 Michigan hospitalizations designated WC insurance as the primary payment source at discharge. Table 9 shows the primary discharge diagnosis for hospitalizations from 2015 to 2020 where WC insurance was designated as the primary payment source at discharge. Data for 2002 through 2014 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 52%, and musculoskeletal diseases, accounting for 14% of all WC-related patient hospitalizations in 2020. In 2020, there were 206 (10.8%) cases of COVID-19.

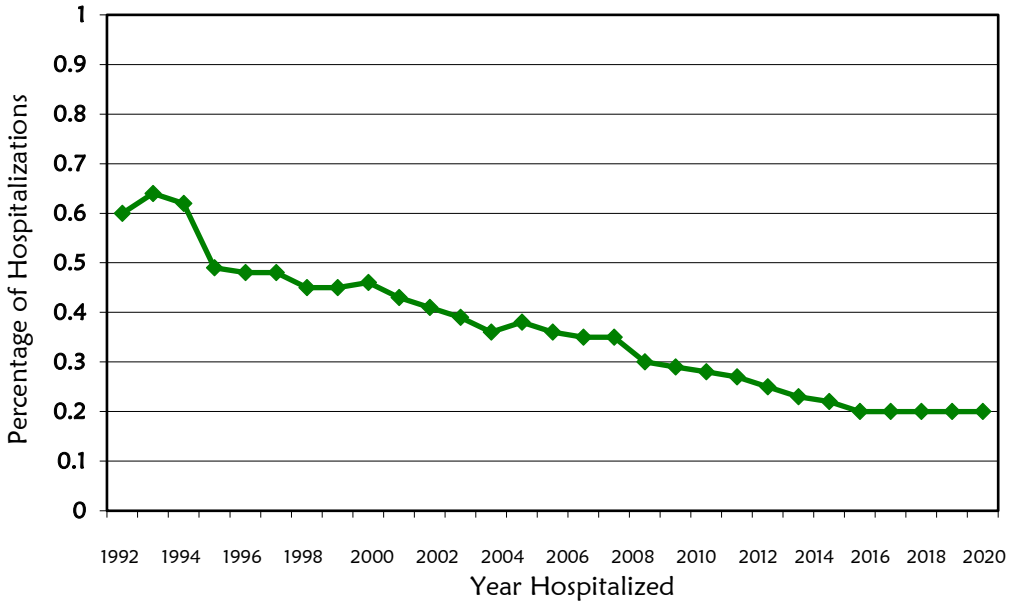
Figure 4
Hospitalizations and Patients with Workers' Compensation Designated as the Primary Payment Source at Discharge in Michigan: 1992-2020



RESULTS, continued…

Figure 5

Percent of Total Michigan Hospitalizations with Workers' Compensation Designated as the Primary Payment Source at Discharge in Michigan: 1992-2020



In 2020, only 0.20% of the 1,067,739 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 2013-2020, with Workers' Compensation Designated as Primary Payment Source at Discharge

	Year of Hospitalization							
	2015 Q123		2015 Q4	2016	2017	2018	2019	2020
1⁰ Discharge Diagnosis ICD-9	%	**1⁰ Discharge Diagnosis ICD-10**	%	%	%	%	%	%
Infectious Diseases (001-139)	2.0	Infectious & Parasitic Diseases (A00 –B99)	4.1	2.5	2.4	3.1	2.5	4.4
Neoplasms (140-239)	0.1	Neoplasms (C00-D49)	0.2	0.3	0.3	0.2	0.3	0.3
Endocrine Diseases (240-279)	0.5	Blood & Blood Forming Organs (D50-D89)	—	0.2	0.1	0.3	<0.1	0.1
Blood Diseases (280-289)	0.1	Endocrine & Metabolic (E00-E89)	0.3	0.5	0.3	0.5	0.8	0.9
Mental Disorders (290-319)	0.6	Mental Disorders (F01-F99)	0.9	0.3	0.3	0.4	0.6	0.8
Nervous System Diseases (320-389)	1.4	Nervous System (G00-G99)	1.7	2.1	2.3	1.3	1.9	2.1
Circulatory Diseases (390-459)	3.5	Eye and Adnexa (H00-H59)	0.2	<0.1	<0.1	0.1	0.1	0.1
Respiratory Diseases (460-519)	2.3	Ear and Mastoid Process (H60-H95)	—	<0.1	0.1	--	--	0.1
Digestive Diseases (520-579)	1.9	Circulatory System (I00-I99)	2.7	3.8	3.4	3.7	4.1	4.3
Genitourinary Diseases (580-629)	0.7	Respiratory System (J00-J99)	2.4	2.5	2.4	2.6	1.9	2.6
Pregnancy Complications (630-676)	0.3	Digestive System (K00-K95)	1.7	2.5	2.1	1.5	1.8	1.3
Skin Diseases (680-709)	4.8	Skin & Subcutaneous Tissue (L00-L99)	5.8	4.5	5.2	4.4	4.6	2.5
Musculoskeletal Diseases (710-739)	24.0	Musculoskeletal (M00-M99)	22.9	20.6	19.2	18.8	16.5	14.3
Congenital Anomalies (740-759)	0.1	Genitourinary System (N00-N99)	0.5	1.2	0.6	1.1	0.8	0.7
Perinatal Complications (760-779)	—	Pregnancy and Perinatal (O00-P96)	0.9	0.3	0.2	0.2	0.2	0.3
Symptoms & Signs (780-799)	1.5	Congenital Anomalies (Q00-Q99)	0.2	0.1	--	--	<0.1	0.1
Injury & Poisoning (800-999)	50.0	Symptoms, Signs (R00-R99)	1.6	1.4	1.9	1.3	1.3	1.5
V Codes	6.4	Toxic Effects - Poisonings (S00-T88)	53.9	56.1	57.8	59.4	61.0	51.8
		COVID-19 (U07.1)	--	--	--	--	--	10.8
		Factors Affecting Health (Z00-Z99)		1.1	1.2	1.1	1.5	1.1
Total	**2053**	**Total**	**634**	**2485**	**2531**	**2412**	**2396**	**1903**

RESULTS, continued…

Table 10 lists the demographics of patients with WC insurance as the primary payment source at discharge: 74-77% of the hospitalizations were for men, across all years from 2011 to 2020. 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 African American, <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, and to <1% in 2020 (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, 2011-2020, with Workers' Compensation Designated as Primary Payment Source at Discharge

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

[a]Totals vary due to missing information.

RESULTS, continued…

Poison Control Center Data

In 2020, 701 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 (64%). The individuals ranged in age from 15 to 77 years. Eighty-three percent of these individuals with known age were less than age 50. Of the 701 calls to the PCC in 2020, the top calls included exposures to: cleaning agents (235, 34%), acids (51, 7%), medications (47, 7%) and carbon monoxide (27, 4%).

Adult Blood Lead Epidemiology and Surveillance (ABLES)

Table 12 describes the demographic characteristics of the 1,315 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 701 Individuals Reported by the Michigan Poison Control Center in 2020

Demographic Characteristics		
Age	#	%
14-19	48	7.1
20-29	248	36.8
30-39	170	25.3
40-49	93	13.8
50-59	83	12.3
60-69	26	3.9
≥ 70	5	0.7
Total	**673[a]**	
Gender	#	%
Male	442	63.5
Female	254	36.5
Total	**696[b]**	
Top Exposures at Work	#	%
Cleaning Agents	235	33.5
Acids	51	7.1
Medication	47	6.7
Carbon Monoxide	27	3.9
Building/Construction	25	3.6
Solvents	25	3.6
Fuel/Gases	24	3.4
Insecticides/Pesticides	23	3.3
Metal Fume	20	2.9
All Other Exposures	224	32.0
Total	**701**	

[a]Age was unknown for 28 reports.
[b]Gender was missing on 5 reports.

Table 12
Demographic Characteristics of 1,315 Individuals Reported by Laboratories with Elevated Blood Lead in Michigan, 2020

	Blood Lead Level			
	>=5 & <10 ug/dL		>=10 ug/dL	
Age	#	%	#	%
16-19	8	1.1	13	2.2
20-29	109	15.2	83	13.9
30-39	169	23.6	117	19.6
40-49	130	18.2	115	19.2
50-59	131	18.3	133	22.2
60-69	108	15.1	91	15.2
≥ 70	60	8.4	46	7.7
Total	**715** [a]		**598**	
Gender	#	%	#	%
Male	635	88.6	544	91.0
Female	82	11.4	54	9.0
Total	**717**		**598**	
Industry	#	%	#	%
Construction	2	3.8	1	1.0
Manufacturing	51	96.2	97	99.0
Utilities	0	--	0	--
Trade	0	--	0	--
Public Admin	0	--	0	--
Arts & Entertainment	0	--	0	--
Admin & Support	0	--	0	--
Transportation	0	--	0	--
Other Services	0	--	0	--
Prof & Scientific	0	--	0	--
Educational Services	0	--	0	--
Health Care	0	--	0	--
Accomod & Food Svc	0	--	0	--
Mining	0	--	0	--
Total	**53**[b]		**98**[b]	

[a] Age was missing on two reports.
[b] Industry was missing on 664 reports of blood lead levels <10 ug/dL and on 500 reports of blood leads >=10ug/dL.

Work-Related COVID-19

As of 8/3/21, there have been 906,538 confirmed and 107,549 probable COVID-19 cases, including 19,947 confirmed and 1,297 probable deaths of COVID-19 in Michigan (https://www.michigan.gov/coronavirus/0,9753,7-406- 98163_98173---,00.html). Skilled Nursing, Home for the Aged and Adult Foster Care facilities have reported 25,055 cases and 5,681 deaths among residents and 23,475 cases and 77 deaths among staff (https://www.michigan.gov/coronavirus/0,9753,7-406-98163_98173-526911--,00.html). As of May 2021, there were 331 reported outbreaks in schools, with 8,139 of the outbreaks involving both students and staff cases, 2,767 involving student cases only and 25 involving staff cases only. In 2020 through 8/3/21, there were 19,947 deaths attributed to COVID-19, 11.3% of all 177,237 Michigan deaths from any cause during this time period (https://vitalstats.michigan.gov/osr/Provisional/CvdTable2.asp).

Of the 19,947 deaths, 4,004 (20.1%) died from COVID-19 between the ages of 25-64. Although people begin working at an earlier age and may continue working to an older age, and certainly not all COVID-19 deaths within the 25- 64 age group were work-related, this number and percent provide a potential of COVID -19 deaths that might have been work-related. The above numbers provide a framework of possible work-related COVID-19 cases in Michigan: 23,475 cases and 77 deaths among long term care facility staff; 8,139 school outbreaks involving both students and staff cases; and 4,004 deaths among those aged 25-64. To determine what gets counted as a work-related COVID-19 case, we compiled the Michigan data on work-related COVID-19 cases from: 1) workers' compensation paid claims for COVID-19 where seven or more consecutive days in a row of work were missed; 2) direct reports by employers of COVID-19 cases and deaths submitted to Michigan OSHA; and 3) reports of Occupational Disease submitted to MIOSHA by hospitals.

Health care workers, first responders and correction officers who were diagnosed with COVID-19 between March 30, 2020 and March 20, 2021 were presumed to have developed their COVID-19 from a work exposure unless proven otherwise. This presumption ended on March 20, 2021, and now all workers are required to provide the same proof of work exposure to receive workers' compensation for COVID-19.

From 2/28/2020 through 12/31/2020 there were 6,298 paid workers' compensation claims for COVID-19, including 19 fatalities. Figure 6 shows the number of paid workers' compensation claims per month. The median age was 41 (range 16-63), 71% were women, 72% worked in health care (39% hospitals, 22% long term care facility, 9% outpatient, 3% other), 18% worked in government (police, fire and correctional officers) and 10% in administrative, employment and building services. Fifty percent of the paid claims were in the spring of 2020 during the first surge of COVID-19 (February through May 2020).

For 2020, there were 431 reports, including 74 fatalities made by employers to Michigan OSHA. The median age was 51 (range 19-82), 63% were women, 81% worked in health care (62% hospitals, 14% long term care facility, 4% outpatient, 1% other), 11% worked in government and 3% in manufacturing. Fifty-eight percent of the employer reports were in the spring of 2020 during the first surge of COVID-19.

For 2020, hospitals reported 87 work-related COVID-19 cases including six fatalities. The median age was 50 (range 25-74), 66% were women, 83% worked in health care (54% hospitals, 15% long term care facility, 11% outpatient, 2% other) and 13% worked in government. Thirty-six percent of the hospital and emergency medical responders' reports were in the spring of 2020 during the first surge of COVID-19. Figure 7 shows a Venn diagram of the overlap of cases from the three sources. The total unique number after accounting for reports from more than one source was 6,385 cases, including 85 fatalities. This number is presumed to be a marked undercount as these 6,385 cases, which included first responders, all health workers and correction officers is smaller than just the 23,475 COVID-19 cases on the MDHHS website. That the 6,385 is an undercount is confirmed by the BLS employer survey which reported 29,600 toxic lung cases in 2020. In years prior to the Pandemic, there were typically 400-700

Work-Related COVID-19, continued

cases under this category; therefore approximately 29,000 COVID-19 cases were identified through the BLS employer survey in Michigan.

Figure 6
Month of Injury for Individuals Who Received WC for COVID-19 for Seven or More Days Away from Work in Michigan: 2/2020-12/2020

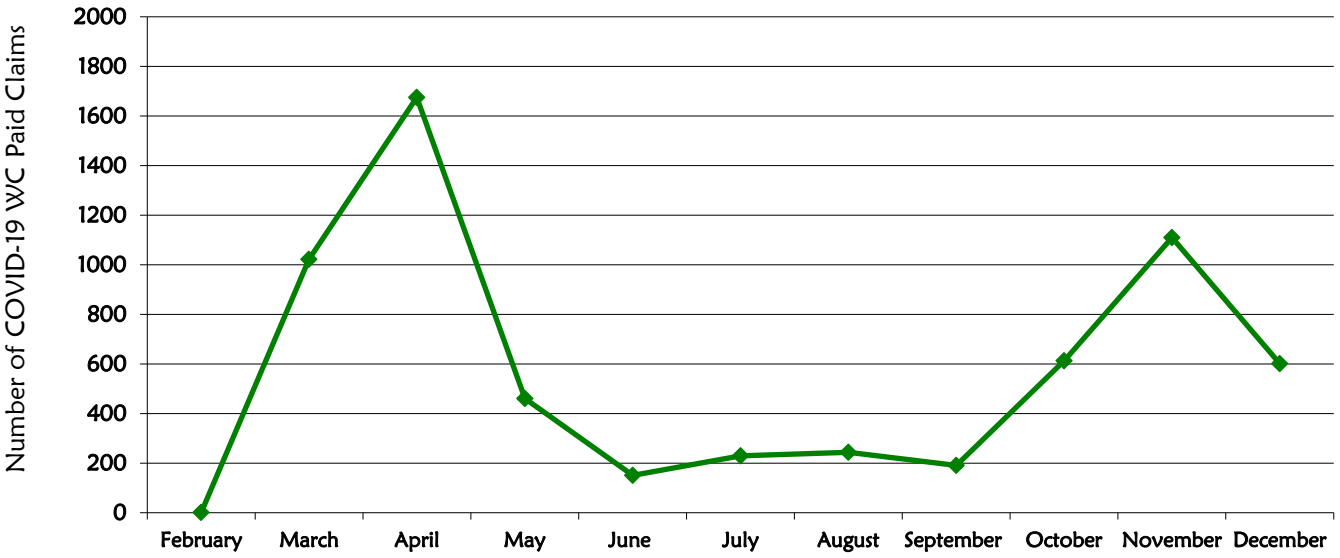
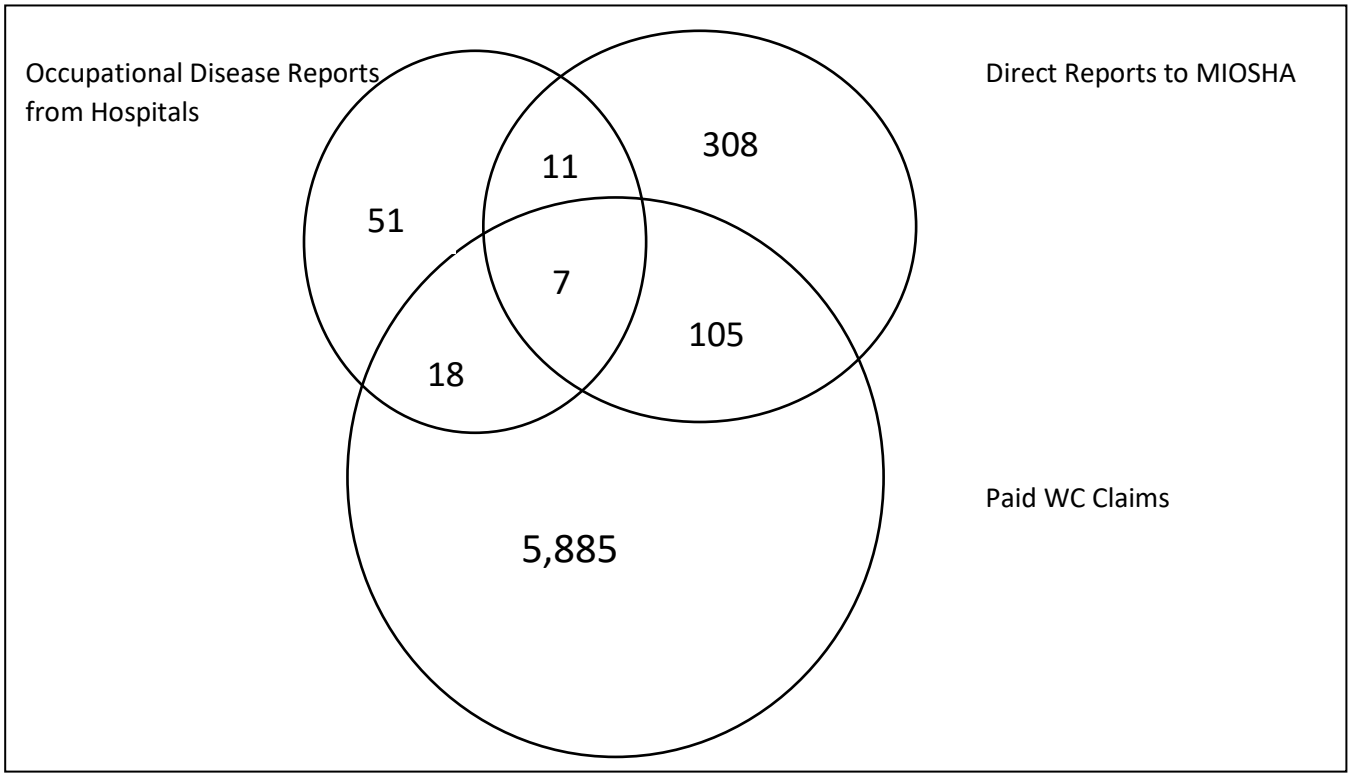


Figure 7
Venn Diagram of Work-Related COVID-19 Cases, Michigan: Calendar Year 2020, 6,533 Cases Representing 6,385 Unique Individuals



Work-Related COVID-19, continued

Another measure of the connection of COVID-19 to work is the number of complaints and referrals received by Michigan OSHA about COVID-19. Since March 2020, Michigan OSHA processed a total of 16,871 complaints and referrals for COVID-19. In 2021, an estimated 85% of this year's complaints/referrals were COVID-related. MIOSHA mailed 4,387 recommendation letters, conducted 3,131 letter investigations, and conducted 1,876 COVID-19 onsite inspections, issuing 370 citations. In comparison, for the five preceding years 2015-2019, the agency processed 15,415 total complaints and referrals, which amounts to approximately 3,100 complaints and referrals per year.

DISCUSSION

There were 4,238 Occupational Disease Reports, with 3,849 non-COVID-19 and 389 COVID-19 sent to LEO in calendar year 2020. These reports do not include occupational injuries. The most frequent types of occupational diseases reported to LEO were toxic effects of substances (57%), respiratory conditions (10%), ear-related conditions (9%) and signs and ill-defined conditions (8%). 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 (which had 7,953 total reports). 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.

The initial overall decline in the number of reports reflected fewer reports from company medical departments consistent with facilities temporarily shutting down. 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 to 62 in 2019, compared to 68 in 2018, 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. In 2020, 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.

Partially offsetting the decrease seen in non-COVID-19 diseases were the 389 COVID-19 reports. The largest increase in work-related COVID-19 cases was seen in the workers' compensation system where there were 6,298 paid lost work time workers' compensation claims for seven or more days for COVID-19, including 19 fatalities. COVID-19 paid workers' compensation cases were 36% of all paid lost work time claims for seven or more days in 2020. The impact of COVID-19 was also reflected in Michigan OSHA activity where 85% of the complaints and referrals were COVID-19 related.

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 51 company-affiliated physicians reporting employees from 525 different companies; there were 32 non-company-affiliated physicians reporting patients to the state. There were 265,886 companies in the year 2020 and 44,744 licensed physicians practicing in Michigan in the year 2020. 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 4,238 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 2020, the BLS annual survey reported 34,700 illnesses; by extension one would expect 69,400 illnesses in 2020 instead of the approximately 3,800 reported in 2020. The difference in COVID-19 reports received by LEO, with 389 COVID-19 reports, with 6,298 paid WC claims for COVID-19, and with 29,000 COVID-19 cases in the BLS employer survey shows that this underreporting was even greater for COVID-19. 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 2020 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 (17,452) 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 (145,082) 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 WCA claims system. For example, poisoning represents approximately 45% (1,330) of the OD reports, while that category of diseases accounts for no cases in the BLS survey and <1% (4 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 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.

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). We have not seen a decrease in acute work-related hospitalizations since the requirement initiated on 9-1-2015 for employers to report acute work-related hospitalizations directly to MIOSHA, although MIOSHA has been able to inspect many of the workplaces where these injuries occur which has presumably resulted in safer conditions at these workplaces (http://www.michigan.gov/lara/0,4601,7-154-10573_11472-370952—,00.html). Despite comprehensive outreach by MIOSHA to let employers know about the reporting law, not all employers have complied in reporting work-related hospitalizations. Preliminary analysis shows that employers are only reporting 27% of hospitalizations when employer

reports are compared to direct reports from hospitals. 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 2021, 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 refining the algorithm to select ambulance transport data for work-related conditions among the approximately one million annual ambulance runs each year.

REFERENCES

1. www.icd10data.com/ICD10CM/codes
2. Rosenman, KD, Kalush A, Reilly MJ, Gardiner JC, Reeves M, Luo Z. *How Much Work-Related Injury and Illness is Missed by the Current National Surveillance System?* J Occup Environ Med 2006; 48:357-365.
3. Biddle J, Roberts K, Rosenman KD, Welch EM. *What Percentage of Workers With Work-Related Illness Receive Workers' Compensation Benefits?* J Occup Environ Med 1998; 40:325-331.
4. National Academies of Sciences: https://www.nap.edu/catalog/24835/a-smarter-national-surveillance-system-for-occupational-safety-and-health-in-the-21st-century

	Bureau of Labor Statistics (BLS) Occupational Illness Survey Data and LEO Workers' Disability Compensation Agency (WDCA) Claims, Michigan 2010-2020														
	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	--	600	47.9	200	0.6	600	1.7	ND	--	3,600	10.4	5,700
WDCA Claims[a]															
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	7	0.1	0	--	13	0.2	4	0.1	11	0.2	5,884	90.7	568	8.8	6,487

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

[a]Data not available.