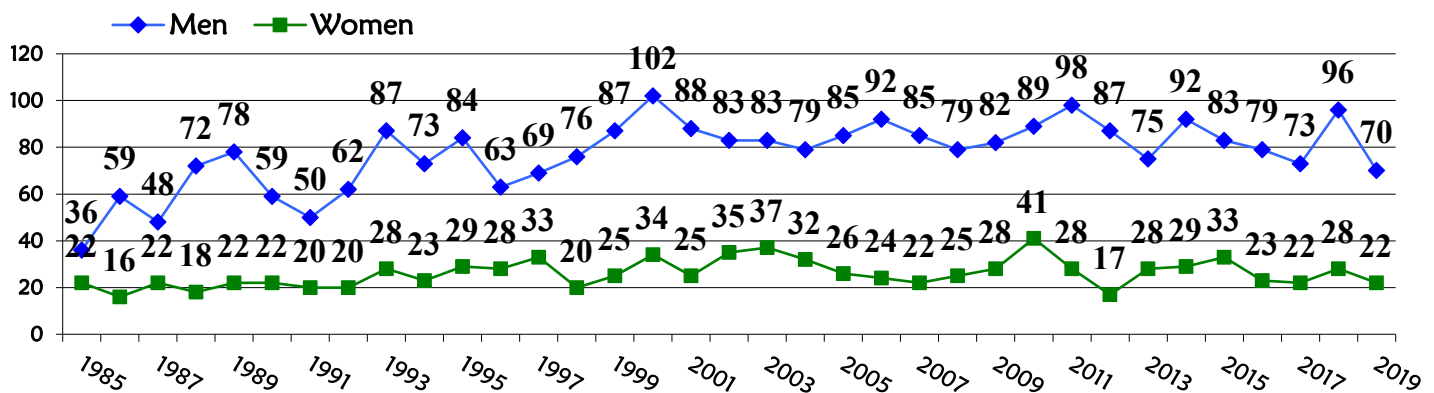


Mesothelioma In Michigan

Mesothelioma is a rare condition, strongly associated with asbestos exposure. The number of patients with mesothelioma by year in Michigan since 1985 is shown in Figure 1. In 2019, the most recent year with data compiled, there were 92 patients (70 men and 22 women). The age range was 24-95 years, average age of 75. The peak year was 136 patients in 2000, with the number of patients ranging from 92-130 in subsequent years.

Figure 1. Number of Men and Women in Michigan Diagnosed with Mesothelioma: 1985-2019



The association between exposure to asbestos and the risk of developing mesothelioma was first reported in the medical literature in 1943 (1). Mesothelioma is almost always caused by exposure to asbestos (2). The percentage of patients with mesothelioma who have a history of occupational asbestos exposure is lower in studies that are based on review of medical records compared to studies based on a complete work history where 90% of mesothelioma has been attributed to asbestos exposure (3). Sometimes the asbestos exposure has occurred indirectly; handling/washing the clothes of someone who works with asbestos or being a bystander at a location where asbestos was applied or disturbed by another worker. In one study of 759 cases of mesothelioma in Australia where no asbestos exposure was identified by history, 81% had elevated levels of asbestos in their lung tissue (4). Among cohorts of asbestos-exposed workers, less than 10% of deaths have been attributed to mesothelioma. Lung cancer is the most common cancer increased among asbestos exposed workers. Unlike lung cancer, there is no additional risk of mesothelioma among current or ex-cigarette smokers.

The use of asbestos in the United States peaked in the 1950's (Figure 2). Given that mesothelioma typically occurs 30 - 40 years after first exposure to asbestos, one would expect the number of cases of mesothelioma in the US to be peaking now, approximately 40 years after the 1980's when asbestos use began to markedly decrease. However, there are large amounts of asbestos still in place from past use as insulation and in products such as asbestos cement, floor tiles, outdoor siding that can cause more recent exposure during renovation and demolition. Mortality from asbestosis shows how the long latency period of adverse health effects from asbestos causes disease long after its use has decreased (Figure 2).

Consistent with latency from first exposure to asbestos, the number of mesothelioma patients increased with age. There were 4-5 times more men than women with mesothelioma reflecting the likelihood of men and women working in an occupation/industry with asbestos exposure. Table 1 shows the distribution of occupation and industry for men and women for the years 2016-2018.

Table 1. Occupation and Industry of Mesothelioma Patients, Michigan, 2016-2018

Industry (men/women) Occupation	#	%
Agriculture (5/1) Farmer (6)	6	2.1
Mining (2/0) Engineer (1), Miner (1)	2	0.7
Utilities (5/0) Engineer (2), Janitor (2), Utility worker (1)	5	1.7
Construction (56/0) Carpenter (7), Electrician (4), Engineer (2), General laborer (27), Office worker (1), Plumber/pipefitter (7), Supervisor (8)	56	19.3
Manufacturing (98/6) Engineer (11), Factory worker (43), Janitor (2), Professional/office (17), Skilled trades (26), Transportation/driver (5)	104	35.9
Retail Trade (11/2) Professional/office (4), Retail trade worker (9)	13	4.5
Transportation & Warehousing (17/0) Engineer (1), Professional/office (1), Transportation worker (6), Truck driver (7), Water transport worker (2)	17	5.9
Information (4/2) Professional/office (3), Technician (3)	6	2.1
Finance (4/2) Professional/office (6)	6	2.1
Professional, Scientific & Technical Services (1/3) Engineer (1), Professional/office (3)	4	1.4
Administrative & Support & Waste Mgt Services (2/1) Grounds maintenance (2), Office worker (1)	3	1.0
Educational Services (10/5) Administration (1), Janitor (3), Teacher (11)	15	5.2
Health Care & Social Assistance (4/15) Health care worker (8), Janitor (2), Nurse/aid (5), Professional/office (4)	19	6.6
Arts, Entertainment & Recreation (2/2) Artist (3), Coach (1)	4	1.4
Accommodation & Food Services (1/3) Food service worker (3), Professional/office (1)	4	1.4
Other Services (2/0) Mechanic (2)	2	0.7
Public Administration (14/1) Judge (1), Mail carrier (1), Maintenance (2), Professional/office (5), Public safety (6)	15	5.2
Not Employed (1/8)	9	3.1
Total *One additional listed unknown (male)	290*	

Figure 2. US asbestos consumption per capita (1920–2006), actual (1968–2004) and projected (2005–2049) deaths from asbestosis.

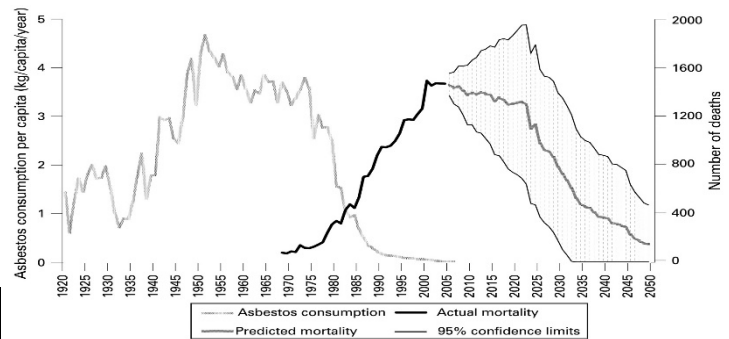
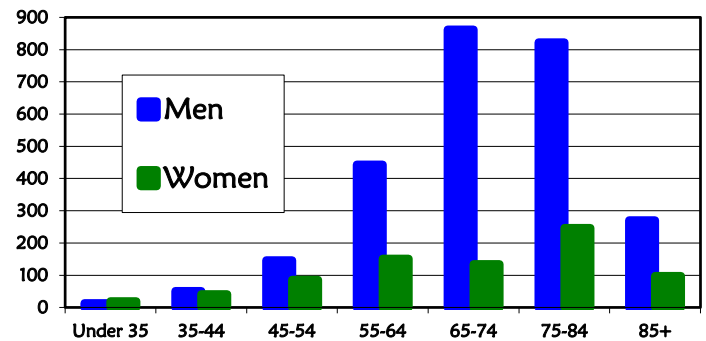


Figure 3. Age of Diagnosis of Mesothelioma Patients in Michigan by Gender, 1985-2019



Construction, shipbuilding, and certain industrial facilities where asbestos insulation was used on piping, reaction kettles, furnaces and to make asbestos containing products were the most frequent. Among women, work in health care and in educational facilities, where asbestos was used as acoustic and decorative insulation on walls and ceilings were the most frequent. The information on occupation and industry comes from the Michigan Cancer Registry and death certificates so is the usual occupation/industry and may differ from the person's occupation/industry 30-40 years ago prior to their diagnosis where their asbestos exposure actually occurred.

Coastal states, which had a large shipbuilding/repair industry, generally have the highest incidence of mesothelioma with the incidence in industrial states like Michigan having the next highest rates (5, 6).

FIGURE 4

Distribution of MI Residents Diagnosed with Mesothelioma by County: 1999-2019

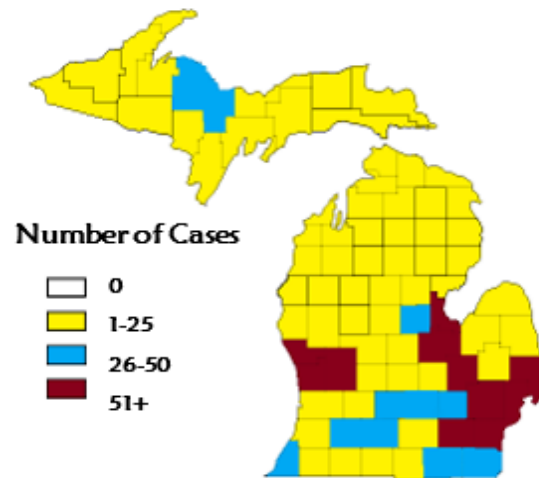


Figure 4 shows the distribution of mesothelioma patients by county of residence. Increased patients with mesothelioma in Marquette County in the Upper Peninsular are thought to be from asbestos exposure on equipment in paper mills, and mines from asbestos being present as a contaminant in the ore being mined and asbestos insulation in the ore processing facilities. Increased mesothelioma patients in Bay and Saginaw Counties are thought to be from asbestos exposure used in the largest shipyard that was in Michigan and foundries in Saginaw County. In Muskegon/Kent and the Detroit Metropolitan area, asbestos exposure occurred in the numerous industrial facilities in these counties.

Mesothelioma has a poor prognosis. Data from the 18 cancer registries in the CDC Surveillance, Epidemiology, and End Results Program (SEER) reported 91.4% mortality with a median of seven months (7). The best treatment results are found for patients receiving multimodality therapy, usually consisting of neoadjuvant chemotherapy, followed by surgery and adjuvant radiotherapy. Combining these modalities, a median survival of 17–38 months for patients in tumor Stage I to 7–24 months in tumor Stage IV has been reported (8). One aspect of mesothelioma management that can be overlooked by physicians is the availability of compensation to cover medical care and funeral costs and support of family dependents. Patients with mesothelioma and their dependents should be encouraged to seek legal advice regarding the potential to receive compensation.

References:

1. Greenberg M. History of Mesothelioma. *European Respiratory Journal* 1997; 10:2690-2691.
2. Lemen RA. Mesothelioma from asbestos exposures: Epidemiologic patterns and impact in the United States. *J Tox Environ Health, Part B* 2016;19:250–265.
3. Spirtas R, Heineman E, Bernstein L, Beebe GW, Keehn RJ, Stark A, Harlow BL, Benichou J. Malignant Mesothelioma: Attributable Risk of Asbestos Exposure. *Occup Environ Med* 1994;51:804-811.
4. Leigh J, Davidson P, Hendrie L, Berry D. Malignant mesothelioma in Australia 1945-2000. *Ann Occ Hyg* 2002;46:160–165.
5. Mazurek JM, Syamlal G, Wood JM, Hendricks SA, Weston A. Malignant Mesothelioma Mortality - United States, 1999-2015. *MMWR* 2017;66:214-218.
6. Mazurek JM, Blackley DJ, Weissman DN. Malignant Mesothelioma Mortality in Women - United States, 1999-2020. *MMWR* 2022;71:645-649. Choi AY, Singh A, Wang D, Pittala K, Hoang CD. Current State of Pleural-Directed Adjuncts Against Malignant Pleural Mesothelioma. *Front Oncol* 2022;12:886430. doi:10.3389/fonc.2022.886430.
7. Liu B, Niu L, Boscoe F, Lee FF. Predictors of Survival among Male and Female Patients with Malignant Pleural Mesothelioma: A Random Survival Forest Analysis of Data from the 2000-2017 Surveillance, Epidemiology, and End Results Program. *J Registry Manag* 2021;48:118-125.
8. Choi AY, Singh A, Wang D, Pittala K, Hoang CD. Current State of Pleural-Directed Adjuncts Against Malignant Pleural Mesothelioma. *Front Oncol* 2022;12:886430. doi: 10.3389/fonc.2022.886430.

*Project

S E.N.S.O.R.

News

Michigan State University
College of Human Medicine
West Fee Hall
909 Wilson Road, Room 117
East Lansing, MI 48824-1316
Phone (517) 353-1846

In this issue: V33n3: Mesothelioma In Michigan

*PS Remember to report all cases of occupational disease!

Printed on recycled paper.

<p>The project SENSOR News is published quarterly by Michigan State University-College of Human Medicine with funding from the National Institute for Occupational Safety and Health and is available at no cost. Suggestions and comments are welcome.</p> <p>(517) 353-1846 MSU-CHM West Fee Hall 909 Wilson Road, Room 117 East Lansing, MI 48824-1316</p> <p>Advisory Board Amir Wolfe, M.D., President, Michigan Occupational & Environmental Medical Association Larry Hennessy, M.D., Michigan Allergy and Asthma Society Darryl Lesoski, M.D., M.P.H. Munson Medical Center Traverse City, MI Thomas G. Robins, M.D., M.P.H. University of Michigan School of Public Health Division of Occupational Medicine Samyr Nasr, MB, BCH President, Michigan Thoracic Society Eric J. Rose, D.O. Marquette General Health System Marquette, MI</p>	<p>Project SENSOR staff</p> <p><i>At the Michigan Occupational Safety & Health Administration (MIOSHA)</i></p> <p>Barton G. Pickleman Director MIOSHA</p> <p><i>At Michigan State University- College of Human Medicine</i></p> <p>Kenneth D. Rosenman, M.D. Professor of Medicine Project SENSOR, Director Mary Jo Reilly, M.S. Project SENSOR Coordinator</p> <p>Project SENSOR Office Staff: Tracy Carey</p>	<p>Michigan Law Requires the Reporting of Known or Suspected Occupational Diseases</p> <p>Reporting can be done by:</p> <p>WEB oem.msu.edu E-Mail ODREPORT@msu.edu FAX (517) 432-3606 Telephone 1-800-446-7805 Mail Michigan Occupational Safety & Health Administration (MIOSHA) Management and Technical Services Division PO Box 30649 Lansing, MI 48909-8149</p> <p>Reporting forms can be obtained by calling 1-800-446-7805</p>
--	--	---