2005

Annual Summary of Occupational Disease Reports to the Michigan Department of Labor and Economic Growth

Summary of 2005 Occupational Disease Reports to the Michigan Department of Labor and Economic Growth

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SUMMARY

There were 12,885 occupational disease (OD) reports submitted to the Michigan Department of Labor and Economic Growth (MDLEG), in calendar year 2005 as required under the Michigan Occupational Disease Reporting Law. These reports were submitted by company medical departments or clinics under contract to companies, to provide occupational health services to their employees, as well as health practitioners in private practice who are providing occupational health services. The percentage of reports received from company medical departments has decreased from 84-91% in the early 1990s to approximately 60% in the last four years.

The most frequent types of reports were of repetitive trauma (32%), diseases of the nervous system and sense organs (19%), toxic effects of substances (17%), and respiratory disease (15%). The number of reports submitted in 2005 is much lower than previous years. Since 1999, there has been a downward trend of reporting; 21,538 reports were received in 1999 versus 12,885 reports received in 2005. This could represent an actual reduction in occupational diseases occurring in the state or poorer compliance with the reporting law. To begin to address this issue, two mailings were sent to the 300 occupational health clinics in the state, in June and October of 2005. The mailings were to remind the clinics of the requirements of the Occupational Disease Reporting Law. Initial efforts have increased reporting from clinics from 21 to 50 clinics. Site visits to non-reporting clinics are planned in 2006 as part of this new initiative to enforce the requirement to report.

Companies tend to report different types of illnesses than independent health practitioners. For example, there were 1,810 (37%) reports from independent providers for diseases of the respiratory system while only 92 (1%) such reports were received from employers (Table 4).

The average age of individuals reported was 47 years, ranging from 9 to 96. Sixty-seven percent of individuals reported were between the ages of 25 and 54. Sixty-seven percent of all reports submitted were for male workers.

There were differences in the types of reports received through the OD reporting system compared to illnesses identified through either the Bureau of Labor Statistics' Annual Survey of a sample of employers or the Michigan Workers' Compensation Claims system (Table 8). The OD reporting system had much higher percentages of illnesses in the toxic effects of substances (poisonings), respiratory disease, and dust diseases of the lung categories than the other two reporting systems.

In 2002, Michigan's two Poison Control Centers began to submit work-related reports. There were 1,457 reports received from these Centers in 2005. Given the complementary nature of all the existing programs, we envision that by combining data across systems we will be able to better characterize and understand the extent and distribution of individuals who become sick and injured at work. This is an essential first step in reducing the burden of these preventable injuries and illnesses in our state. A recent publication of ours highlights the incompleteness of

the official statistics on occupational injuries and illnesses. The official statistics are based solely on reporting from employers and we estimate that they undercount the true occurrence of occupational injuries and illnesses by two-thirds.[1] For 2004, the most recent year available, the Bureau of Labor and Statistics (BLS) survey reported 190,200 occupational injuries and illnesses in Michigan. If this represents only one-third of the true number of occurrences, then there would have been over 500,000 occupational injuries and illnesses in Michigan in 2004.

INTRODUCTION

Since 1978, physicians, hospitals, clinics, other health professionals and employers have been required by the Michigan Public Health Code (Article 368, Part 56, P.A. 1978, as amended) to report known or suspected cases of occupational diseases. Until 1996, these reports were submitted to the Michigan Department of Public Health (MDPH). Reports are now submitted to the Michigan Department of Labor and Economic Growth (formerly the Michigan Department of Consumer and Industry Services). During the initial years after the reporting law was enacted, the number of reports received by the MDPH was generally less than one hundred each year. Following the 1988 implementation of the Sentinel Event Notification System for Occupational Risks (Project SENSOR), a statewide initiative for occupational disease surveillance began, with active solicitation of occupational disease reports. MDLEG contracts with Michigan State University's College of Human Medicine, Occupational and Environmental Medicine Division to assist in handling the occupational disease reports.

Figure 1 is a copy of the occupational disease report form submitted to MDLEG by companies and independent health care providers. The form requests medical and demographic information on the affected employee and information about the facility at which the employee became ill. In 1991, computerization of the OD reports began, to allow a more efficient handling of the high volume of reports submitted and facilitating the use of these reports to direct surveillance, intervention and prevention. This is the fourteenth annual report on occupational diseases in Michigan, and is based upon the reports submitted to the MDLEG in calendar year 2005.

On-line occupational disease reporting has been available since 2001 through the Michigan State University Occupational and Environmental Medicine website: www.oem.msu.edu. A secure server is used to maintain the confidentiality of the information submitted on-line. The ability to submit audiogram results was added to on-line reporting in 2003, for cases of occupational noise-induced hearing loss. The health professional electronically submitting occupational disease reports is first given a choice between submitting an occupational disease report for hearing loss or for any other illness. If hearing loss is selected, the user is directed to a screen to report the standard occupational disease report information. Next, the user is asked whether audiogram results will be submitted electronically or via fax or mail. If submitted electronically, a screen to enter audiogram results can be used to report right and left ear hearing thresholds ranging from 250 Hz to 8000 Hz.

In addition to completing the OD report form (Figure 1) on-line, information can be submitted by:

*Email: ODReport@msu.edu
*Fax: (517) 432-3606
*Phone-in: 1-800-446-7805
*Request postage paid envelopes: 1-800-446-7805

*Mail directly to: MDLEG, MIOSHA
Management & Technical Services Division
7150 Harris Drive, PO Box 30649
Lansing, MI 48909-8149

METHODS

The computerized OD records contain: 1) the employee's name, age, sex, race, zip code and social security number; 2) the employer's name, work site address, city, zip code, number of persons employed at the facility and the company's standard industrial classification code (SIC)[2]; 3) details of the illness, including diagnosis date, suspected causative agent(s), whether the employee died, and diagnosis or clinical impression coded according to the International Classification of Diseases (ICD-9th Revision[3]); and 4) information about the individual who submitted the report, including whether the reporter is employed by the company, an outside medical department contracted by the company, or a private practice health professional. An OD report is initiated when a clinician knows or suspects that a patient's illness is work-related. Reports are submitted by physicians, audiologists, employers, hospitals, clinics, laboratories, the 3rd Judicial Court of Michigan (which processes the majority of the asbestos-related claims in Michigan), the two Michigan Poison Control Centers and the Federal Mine Safety and Health Administration. Additional reports are generated through annual review of death certificates and the Michigan Health and Hospital Association inpatient database.

Since October 11, 1997, all clinical laboratories doing business in Michigan have been required to report all blood lead analysis results for both adults and children, to the Michigan Department of Community Health. The blood lead results of 10 μg/dL or greater for adults are incorporated into the Occupational Disease reports submitted each year to the MDLEG. Many of the adults reported through this system have had blood lead testing as part of their company's monitoring program. However, it is the clinical laboratories that actually submit the results to the state, not the employers. In fact, aside from the clinical laboratory reports of blood lead analysis, employers themselves almost never submit an elevated blood lead level report to the MDLEG, even though they would be required to do so under the Michigan Occupational Disease Reporting Law. In light of this, blood lead reports submitted by the clinical laboratories are all considered as non-company reports, even though the company may have initially ordered the blood lead test.

In 2004, we changed the way blood lead reports are counted in the OD report statistics. Prior to 2004, if an individual had multiple blood lead tests performed throughout the year, and they were all reported to the state, each report was counted in the year's statistics. Starting in 2004, we are now counting each individual one time regardless of the number of blood lead tests he or she may have had throughout the year.

Beginning in 2005, regulations requiring laboratories to report arsenic, cadmium, mercury and

cholinesterase testing went into effect. Procedures to handle these reports were developed in 2005. No work-related elevations of the metals or depressed cholinesterase were identified in the first partial year of these new regulations.

Collection of information on work-related illnesses from Michigan's two Poison Control Centers (PCC) began in 2002. On a monthly basis, the work-related reports are incorporated into the occupational disease reporting database. In 1999, for example, 1,406 (1.6%) of the 87,604 human exposure-related PCC calls were related to occupational exposures.

More than one report on a given individual with different work-related diseases may be submitted to the MDLEG within a given year and across multiple years. 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. In contrast, if several reports are submitted for acute illnesses for a single individual, all of the reports are included in our statistics. Appendix A lists the chronic disease categories for which duplicate reports within and across years are removed.

RESULTS

A total of 12,885 occupational disease reports were submitted to the MDLEG in calendar year 2005. Figure 2 shows the number of reports received each year since 1985.

Source of Reports

Company or contract medical departments submitted 62% of the reports (7,974 cases); non-company health practitioners submitted 38% of the reports (4,911 cases) (Figure 3). Most reports were submitted on individuals who worked in large companies (Table 1) with 92% of the 9,127 reports that listed company size coming from businesses with more than 500 employees. A greater proportion of reports involving companies with fewer than 500 employees come from non-company health practitioners. Just over 24% of the 1,478 reports with known company size that were submitted by non-company practitioners involved companies with fewer than 500 employees, while only five percent of the 7,649 reports with known company size submitted by company practitioners involved facilities with fewer than 500 employees.

Five hundred seventy-four private practice clinicians (non-company affiliated) reported 3,246 incidents of occupational disease. In addition, the two Michigan Poison Control Centers reported 1,457 incidents of work-related poisonings. Two hundred seventy-one (78%) of the clinicians reported only one patient each in calendar year 2005 (Table 2), while four clinicians and one occupational medicine practice reported more than 100 patients each. The number of reports submitted by these four clinicians and medical practice in the year 2005 ranged from 160 to 928. Two of the clinicians are certified to interpret chest x-rays for dust-related lung disease ("B" readers), and two are occupational medicine physicians in private practice. A "B" reader is a

licensed physician who has passed a test on interpreting chest x-rays for pneumoconiosis, and maintains certification by passing an additional test every four years. Currently, there are nine Michigan physicians who are "B" readers.

There are approximately 300 occupational health clinics in Michigan. Since June 2005, the number of such clinics reporting occupational disease cases to the State has increased from 21 to 50. The doctors reporting cases from these clinics are included in the statistics in Table 2. With the planned site visits to non-reporting clinics in the latter half of 2006, we expect the number of reporting clinics to increase in the coming years.

Demographics

Table 3 shows the age, gender and race distribution of the workers with occupational diseases reported in the year 2005. The mean age of reported patients was 47 ± 14 years (range, 9 to 96 years) with two-thirds of the patients (67%) between the ages of 25 and 54 years. One hundred fifty-five reports were submitted for patients under age 20, and 175 reports were submitted for patients age 80 and older.

Sixty-seven percent of all reports submitted were for male workers. Seventy-four percent of the submitted reports (9,473 cases) did not indicate the worker's race. Of the 3,412 reports that did indicate race, 52% were Caucasian, 30% were African American, 2% were Hispanic and 16% were listed as "other."

Younger workers. Of the 90 workers age 18 and younger, one was nine years old, three were 10 years old, two were 12 years old, two were 14 years of age, four were 15 years old, 17 were 16 years old, 21 were 17 years of age, and 40 were 18 years old. Thirty-five (39%) of the reported patients under age 19 were female and 55 (61%) were male.

One of the younger workers was employed in the services industry, one worked in public administration, one worked in retail trade, one was employed in manufacturing, and one was employed in construction. Place of employment was unknown for 85 workers.

Three of the younger workers were reported by company-affiliated clinicians or clinics. Sixty-eight workers were reported for unspecified poisonings (from the Poison Control Centers), 10 for an elevated blood lead level, four were for respiratory symptoms, four were for noise-induced hearing loss, one was for a skin disease, one was for a sprain and strain, one was for an allergic reaction, and one was for signs and symptoms. No fatalities were reported for any workers under age 19, although the MI FACE Program identified two fatalities under the age of 19 from acute incidents (not illnesses) in 2005. Of the 10 cases of elevated lead levels, eight had serum lead levels between 10 and 24 micrograms per deciliter, and two had a serum lead level between 25 and 60 micrograms per deciliter.

Older workers. Of the 175 workers age eighty and older, 165 were between the ages of 80 and 89, and 10 were between 90 and 96 years of age. Ninety-nine were men, 24 were women and

gender for 52 individuals was unknown. A company-affiliated clinician or contract medical clinic reported three of these patients.

Ninety-four of the older workers were reported for dust-related lung disease (including 53 with asbestosis, 22 with pleural thickening, and 19 with silicosis), 55 for noise-induced hearing loss, 14 for cancer, seven for elevated blood lead levels, two for respiratory conditions, two for repetitive trauma disorders, and one for an ear disorder.

Seventy-four of the older patients worked in or were retired from manufacturing, eight worked in the services industry, six worked in construction, three worked in the utilities industry, two worked for the railroad, and one worked in public administration. Industry or former industry was not indicated in 81 reports.

Illness Information

Table 4 shows the distribution of diagnoses or clinical impressions by reporting source. Diagnoses are grouped by major International Classification of Diseases categories (ICD-9th Revision). Overall, repetitive trauma illnesses were the most frequently reported conditions, with 4,071 cases representing 32% of all OD reports submitted. The majority of reports were for sprains and strains of the wrist, hand and finger.

Diseases of the nervous system and sense organs were the second most frequently reported condition, representing 2,429 (19%) of the cases. Toxic effects of substances (poisonings) were the third most frequently reported conditions, with 2,164 cases representing 17% of all reports. Diseases of the respiratory system were the fourth most frequently reported condition, with 1,902 cases representing 15% of all reports submitted. There were 1,363 (11%) reports of musculoskeletal and connective tissue disease, 403 (3%) reports of skin and subcutaneous tissue disease, 146 (1%) reports of mental disorders, and 77 (0.6%) reports of cancer. Infrequently reported conditions included infectious and parasitic diseases, diseases of the digestive system, diseases of the genitourinary system, blood disorders, welding flash (burns to the eye), pregnancy complications, and diseases of the circulatory system.

Reporting source differences. Company and non-company affiliated providers differ markedly in the types of occupational diseases reported (Table 4). Fifty-one percent of reports from company health care providers are of repetitive trauma illnesses, while less than one percent of reports by non-company providers represent these diagnoses. Conversely, 44% of non-company reports are of toxic effects of substances (poisonings), compared to less than one percent of company submissions. The second, third and fourth most frequently reported diagnoses for company providers are diseases of the nervous system and sense organs (22%), diseases of the musculoskeletal system and connective tissue (17%), and diseases of the skin and subcutaneous tissue (5%). Respiratory illnesses are the second most frequently reported diagnoses by non-company providers (37%). The third and fourth most frequently reported diagnoses for non-company providers are diseases of the nervous system and sense organs (14%) and cancer (2%).

Company and non-company practitioners also differ in the types of industries represented in their reports (Table 5). Eighty-nine percent of patients reported by company affiliated health care providers are employed in manufacturing, primarily automobile production. In contrast, 73% of patients reported by non-company affiliated providers are employed in manufacturing. The second and third industry types most frequently reported by company providers are service industries (6%) and public administration (3%). The second and third industry types most frequently reported by non-company providers are construction (11%) and services (5%). The type of industry was missing on 2,758 non-company and 56 company reports.

Gender differences. Repetitive trauma illnesses were the most frequently reported diagnoses for both men and women, with 30% of submissions on men and 40% of submissions on women (Table 6). The second, third and fourth most frequently submitted diagnoses for men were diseases of the nervous system and sense organs (23%), toxic effects of substances (18%), and diseases of the respiratory system (13%). For women, the second, third and fourth most frequently submitted diagnoses were toxic effects of substances (17%), diseases of the nervous system and sense organs (15%), and diseases of the musculoskeletal system and connective tissue (14%). Seven hundred eighty-seven reports did not indicate gender.

Fatalities. Fatalities related to occupational illnesses were reported for 111 workers (Table 7). None of the fatalities reported were from acute incidents. The state has a separate program to track acute traumatic fatalities, called MIFACE (Michigan Fatality Assessment and Control Evaluation). The MIFACE program identified an additional 108 acute work-related traumatic fatalities in 2005 that occurred in Michigan. A separate report is being prepared on these 108 deaths, and will be available in late 2006. Past reports can be found at: www.oem.msu.edu. Two deaths among children were identified in the MIFACE Program in 2005.

Non-company clinicians reported all but two of the 111 of the individuals with occupational illnesses who died. The workers who died ranged in age from 46 to 89 years. Seventy-nine died from asbestos-related cancer (including 23 from mesothelioma), 28 from asbestosis, and one each died from asthma, silicosis, smoke inhalation, and in relation to mental stress. Sixty-three of the deceased workers had been employed in manufacturing, 12 in construction, eight in utilities, and three in the services industry. Former occupation was not specified for 25 workers.

Comparison with Other Data Systems

Published Data in Michigan at a Disease Category Level. Table 8 compares data from the OD reporting system with Workers' Compensation Claims and the BLS Annual Survey. These data illustrate the variation of reported disease categories by reporting source and suggest that the magnitude of occupational diseases among Michigan workers is greater than what currently gets reported. No one system completely captures all categories of occupational disease.

The most recent data that is available from the MDLEG Bureau of Workers' Compensation (BWC) at a disease-category level is from 2001. In that year, there were 8,902 claims due to occupational illnesses and 42,550 claims for occupational injuries. Although not available at a

disease-category level, in 2004 (the most recent year for which this information is available) the BWC reported 35,383 claims for both occupational injuries and illnesses (www.michigan.gov/documents/wca_2005_Annual_Report_154833_7.pdf).

The other major data on occupational injuries and illnesses available in Michigan comes from the BLS annual survey of company injury and illness logs. For this data source, the most recent data available at a disease category level is from 2004 with an estimate of 16,700 occupational illnesses in the state. Table 8 compares occupational disease reports received by MDLEG with the BLS survey and the BWC reports.

Hospital Discharge Data – Workers' Compensation. Figure 4 shows the number and percent of patients as well as hospitalizations paid for by Workers' Compensation (WC) for the years 1992 through 2004. The numbers of hospitalizations per year that are paid for by Workers' Compensation from 1998-2004 are decreased as compared to the years 1992-1997. In addition, the percentage of hospitalizations that are paid for by WC has decreased since 1994 (Figure 5). In 2003, 0.39% of the 1,324,372 Michigan hospitalizations were paid for by WC; in 2004, 0.36% of the 1,333,313 Michigan hospitalizations were paid for by Workers' Compensation.

Table 9 shows the primary discharge diagnosis for hospitalizations from 1992 through 2004, where the primary source of payment was WC. WC covers a broad range of conditions, including mental illness, infections, heart disease and cancer. The most common conditions covered by WC are musculoskeletal diseases, accounting for approximately 39-44% of patient WC-related hospitalizations from 1992-2004. The second most frequent conditions covered by WC during this same time period are injuries and poisoning, accounting for 36-43% of all WC-related patient hospitalizations.

Table 10 lists the demographic characteristics of patients with WC hospitalizations. Approximately 75% of the hospitalizations were for men, across all years from 1992 to 2004. Among hospitalizations for which race was known, approximately 85% were white, 10% were African American, 1-2% were Hispanic, <1% were Asian or American Indian, and 1-5% were listed as "other."

The majority of hospitalizations involved workers between the ages of 30 and 50 years. Less than 1% involved workers under the age of 15 or over the age of 80 years. The percentage of hospitalizations of workers under the age of 20 has decreased slightly over time, from 3% in 1992 to 1.7% in 2004.

Hospital Discharge Data – Pneumoconiosis. Figure 6 shows the number of individuals hospitalized in Michigan with asbestosis, coal workers' pneumoconiosis and silicosis from 1990 to 2004. Repeat admissions of the same individual within each calendar year are excluded from these counts. For most of these patients, pneumoconiosis was not the primary discharge diagnosis listed on the discharge record. For the past decade, there has been a steady increase in the number of hospitalizations for asbestosis (Figure 6). From 2002 to 2004, there was a 55% increase in the number of hospitalizations for asbestosis. This increase probably

represents a more widespread recognition of asbestos-related radiographic changes from medical screenings performed in the 1990s, although it could be from a true increase in the incidence of asbestos-related disease. Regulations to control asbestos exposure were not promulgated until the early 1970s and were not widely implemented until the 1980s. Given the 25 year or greater latency period from the time of first exposure to the development of asbestos-related radiographic changes, the cases being identified now represent exposures from these earlier unregulated years. The trend we are seeing in Michigan is consistent with national data published in the NIOSH 2002 Work-Related Lung Disease Surveillance Report on asbestosis (www.cdc.gov/niosh/docs/2003-111/2003-111.html).

As shown in Figure 7, Medicare is the primary payment source for hospitalizations related to these dust diseases of the lung. WC is very rarely the source of payment, which is consistent with findings in both Michigan and New Jersey that the majority of patients with pneumoconiosis never apply for WC [4,5].

Mesothelioma/Asbestosis. The association between exposure to asbestos and the risk of developing mesothelioma was first reported in the medical literature in 1943[6]. The only other exposure associated with the risk of developing mesothelioma has been the therapeutic use of x-rays. 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[7]. Among cohorts of asbestos-exposed workers, up to 10% of deaths have been attributed to mesothelioma.

Asbestos-related lung disease is the most common dust disease reported to the Michigan Department of Labor and Economic Growth. The number of reports of asbestosis in 1999 was 3,384, decreased to 677 reports in the year 2002, and increased in 2005 to 1,061 (Figure 8). The number of reports of pleural thickening decreased from 2001 to 2002, from 2,397 to 1,269 reports. In 2004, the number of reports of asbestos-related pleural thickening increased to 1,976, and decreased to 488 in 2005. The reports for asbestos-related x-ray changes are largely from one of Michigan's B-readers as well as an occupational medicine physician.

We have used data from the Michigan Cancer Registry to describe the demographics of mesothelioma in Michigan. From 1985 through the year 2003 there were 1,713 Michigan residents reported to the Michigan Cancer Registry with invasive mesothelioma. Figure 9 shows the number of men and women diagnosed with mesothelioma by year, from 1985 to 2003. Approximately one quarter (26%) of the reports of mesothelioma occurred in women. Mesothelioma occurred predominantly among Caucasians (93.5%) compared to African Americans (5.6%). Approximately 1% were classified as "other" ancestry.

Figure 10 shows the age at diagnosis separately for men and women. The peak age of occurrence of mesothelioma was for individuals 65 years and older for both men and women.

Figure 11 shows the distribution of the number of cases of mesothelioma among Michigan

residents, by county. The south-central region of Michigan has the highest number of cases of mesothelioma. Figure 12 shows the average annual incidence rates of mesothelioma among Michigan residents, by county. The counties with the highest rates are: Presque Isle (4.6 per 100,000); Bay (4.2 per 100,000); Alger (4.1 per 100,000); Mackinac (3.7 per 100,000); Ontonagon (3.6 per 100,000); and Midland (3.5 per 100,000).

Poison Control Center Data. In 2005, a total of 1,457 calls to one of the two Michigan Poison Control Centers were identified as work-related. Table 11 reports the available demographic characteristics of the individuals reported. There were more reports for males (57%) than females (43%). The individuals ranged in age from 9 to 75 years. Almost 90% of these individuals were less than age 50. More detailed information about the nature of these poisonings is available, but not in a format that is readily analyzable.

DISCUSSION

There were 12,885 Occupational Disease Reports sent to the MDLEG in calendar year 2005. The most frequent types of occupational diseases reported to the MDLEG were repetitive trauma illnesses (32%), diseases of the nervous system and sense organs (19%), toxic effects of substances (17%), and respiratory disease (15%). From 1988 through 1999, the number of reports sent to the State increased substantially. Figure 2 shows the number of occupational disease reports received each year since 1985. Since 1999, the number of reports has decreased. This year, in 2005, there was a large decrease in the number of reports received, with over 2,200 fewer reports received than in 2004. The overall decline in the number of reports reflects fewer reports from company medical departments. The number of reports from private practitioners remained relatively unchanged through 2004; in 2005 there was a large decline in the number of private practitioner reports (Figure 3). The cause for this decrease is unknown, but does parallel the decreases seen in the BLS Annual Survey and Workers' Compensation claims. The actual number of companies reporting in 2005 increased to 374, compared to 305 in 2003.

We used the ICD-9 codes to classify the diagnosis or clinical impression recorded on the occupational disease reports submitted to the MDLEG. In the ICD-9 coding system, sprains and strains are classified as injuries. Employers are only required to report *illnesses* on the OD reporting form, not injuries. 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.

Many employers, physicians and other health care 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. We currently receive reports from approximately 374 companies and 348 non-company physicians. There were approximately 257,000 companies in the year 2005 and 26,977 practicing physicians in Michigan in the year 2005. Accordingly, we are receiving reports from 0.1% of companies and 1.3% of physicians. Over the last several years, these

percents have remained largely unchanged. We have continued our efforts to remind employers of the requirement to report by routinely distributing reporting forms during MIOSHA inspections. Also, all new physicians receive information on the requirement to report when they apply for medical licensure in Michigan.

We know that the 12,885 occupational disease reports received this past year under-represent the actual incidence of occupational diseases in Michigan. Based on our recent matching of multiple data bases in Michigan for the years 1999-2001, we estimate that the BLS survey missed 50% of the total number of occupational illnesses in Michigan. In 2004, the BLS annual survey reported 16,700 illnesses. If that figure is doubled then we would have expected in excess of 30,000 occupational illnesses in Michigan in 2005 instead of the approximately 13,000 reported. Even this number is an underestimate because it assumes that all physicians recognize work-related illness in their patients and that all employers are informed when work-related conditions are diagnosed. Given the limited training that health care providers receive in diagnosing work-related conditions, and that many individuals never inform their employer when they are diagnosed with a work-related condition, these assumptions often go unmet.

The type of illness and the type of industry where occupational diseases occur as reported by non-company health practitioners differs from company-based health practitioners (Tables 1, 4 and 5). These differences vary depending on the specialties of the private practice physicians who submit reports. For example, the non-company health practitioners who reported patients in the year 2005 were more likely to report patients with respiratory disease who work in small, non-manufacturing companies. A large percentage of the year 2005 reports from non-company health practitioners were from physicians who are specialists in the radiographic interpretation of mineral and dust-related lung disease. Without these reports the increased diagnosis of asbestos related lung disease would be missed (Figure 8). However, regardless of the mix of non-company specialists reporting, the data illustrate that relying on company-based reports alone would cause occupational illness statistics to markedly under-count certain work-related conditions. For the years 1992-1994, only 9.6% of the workers for whom an Occupational Disease Report was submitted had definitely filed a Workers' Compensation reference claim, although an additional 36% may have filed a claim for a total of 45.6%[8].

Review of Table 8 shows a large difference in the distribution of occupational illnesses identified through the state's OD reporting system, compared to both the Bureau of Labor Statistics' (BLS) Annual Survey of Employers and the state's Workers' Compensation (WC) claims system. For example, respiratory disease represents approximately 17% (2,435) of the OD reports, while that category of diseases only accounts for 4% (1,200 cases) of the BLS survey and only 2% (145 cases) of WC claims. Non-employer sources such as from Poison Control Centers, "B" Readers, and laboratories provide additional occupational diseases not being reported by employers or practitioners.

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

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Figure 1. Occupational Disease Reporting Form

Michigan Department of Labor and Economic Growth — Management and Technical Services Division

Known or Suspected Occupational Disease Report

(Information will be held confidential as prescribed in Act.)

EMPLOYEE AFFECTED

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

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: _____ To: _____ Mo Day Year Mo Day Year		
Employee's Job Title or Description of Work			

ILLNESS INFORMATION

Nature of Illness or Health Condition (Examples: Headache, Nausea, Difficulty Breathing, Cough, etc.)		Date of Diagnosis _____ Mo Day Year
Suspected Causative Agents (Chemicals, Physical Agents, Conditions)	Did Employee Die? Yes ◯ 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? Yes ◯ No ◯ Don't Know ◯
If yes, record information below.

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 Growth is an equal opportunity, affirmative action employer, service provider and buyer.

Return completed form to:

Michigan Department of Labor and Economic Growth
Michigan Occupational Safety and Health Administration
Management and Technical Services Division
7150 Harris Drive, P.O. Box 30649
Lansing, MI 48909-8149

MIOSHA-MTSD-51 (12/03)

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

Figure 2. Occupational Disease Reports to the Michigan Department of Labor and Economic Growth: 1985-2005

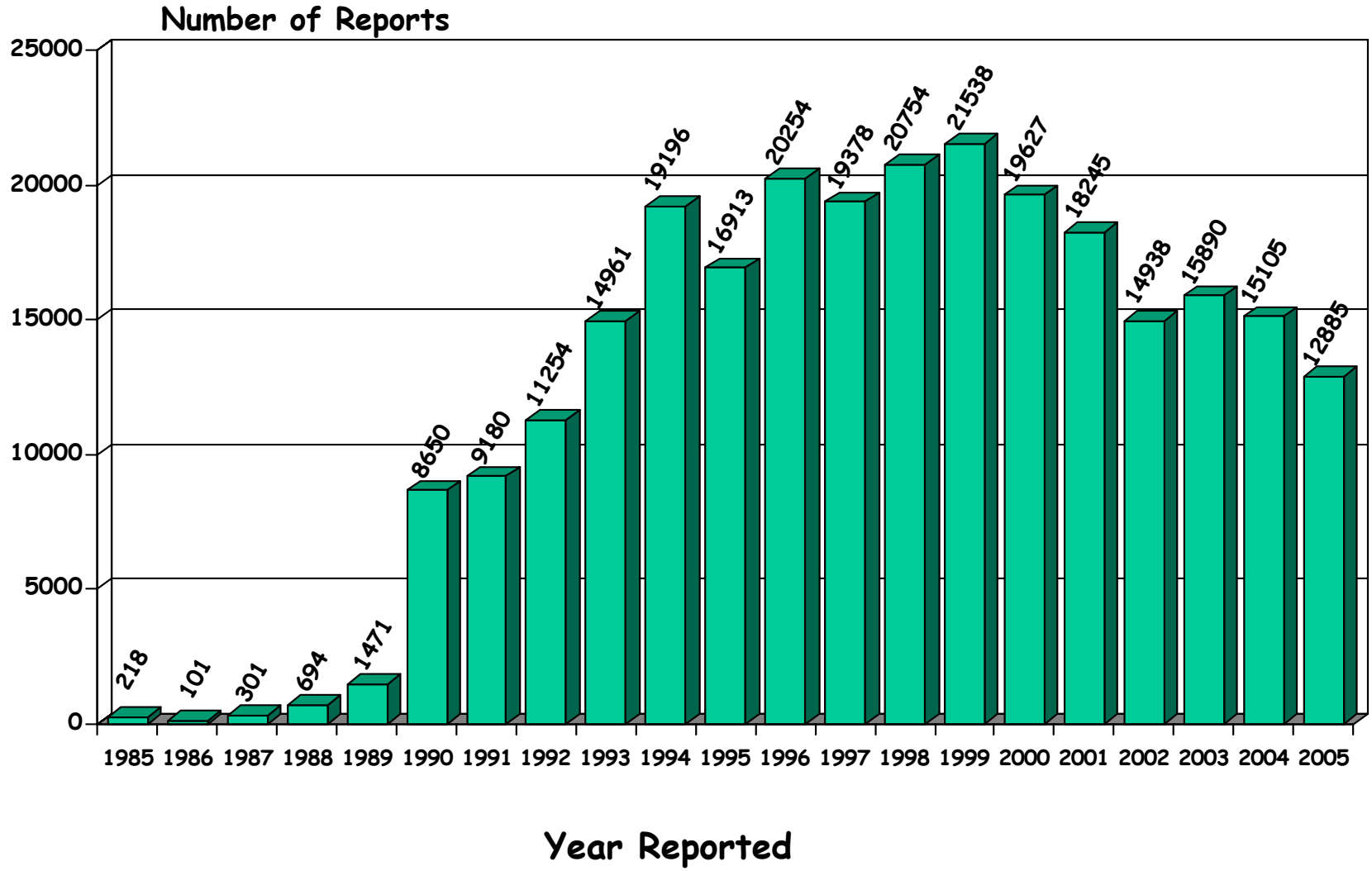
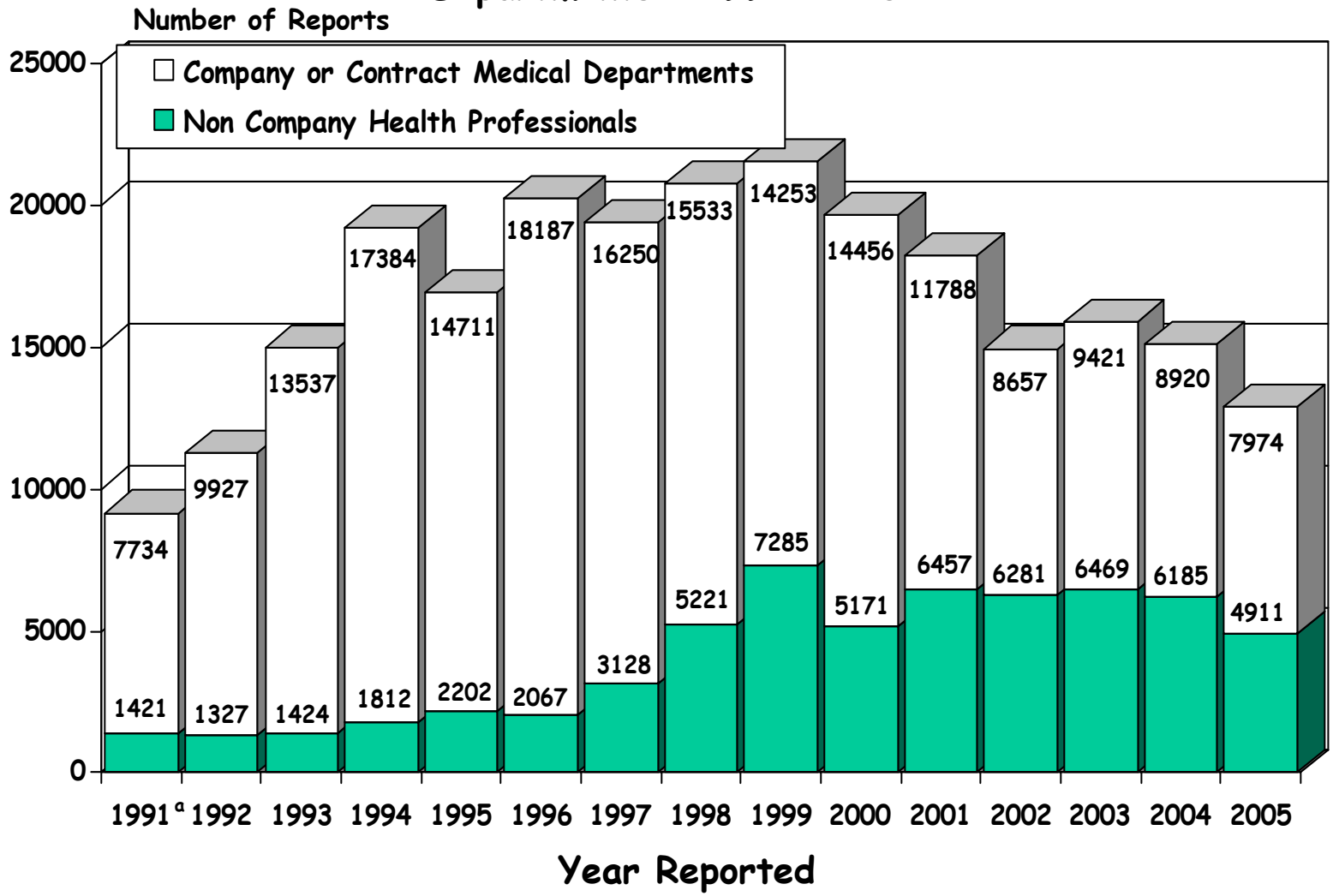


Figure 3. Occupational Disease Reports by Reporting Source, Non-Company Health Professionals and Company or Contract Medical Departments: 1991-2005



[a]Reporting source was unknown for 25 reports.

Figure 4. Number of Hospitalizations and Number of Patients Paid for by Workers' Compensation in Michigan: 1992-2004

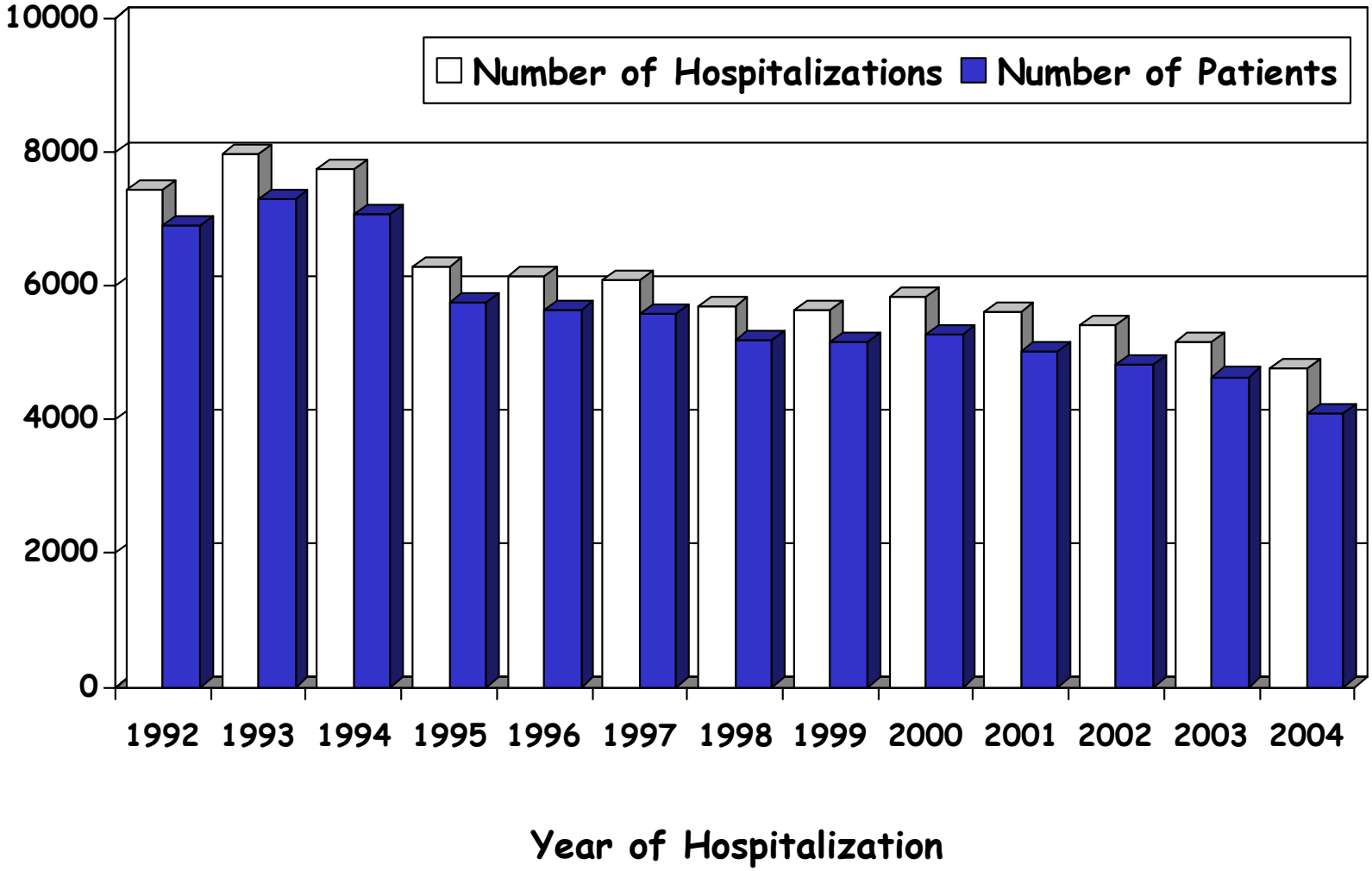


Figure 5. Percent of Total Michigan Hospitalizations Paid for by Workers' Compensation: 1992-2004

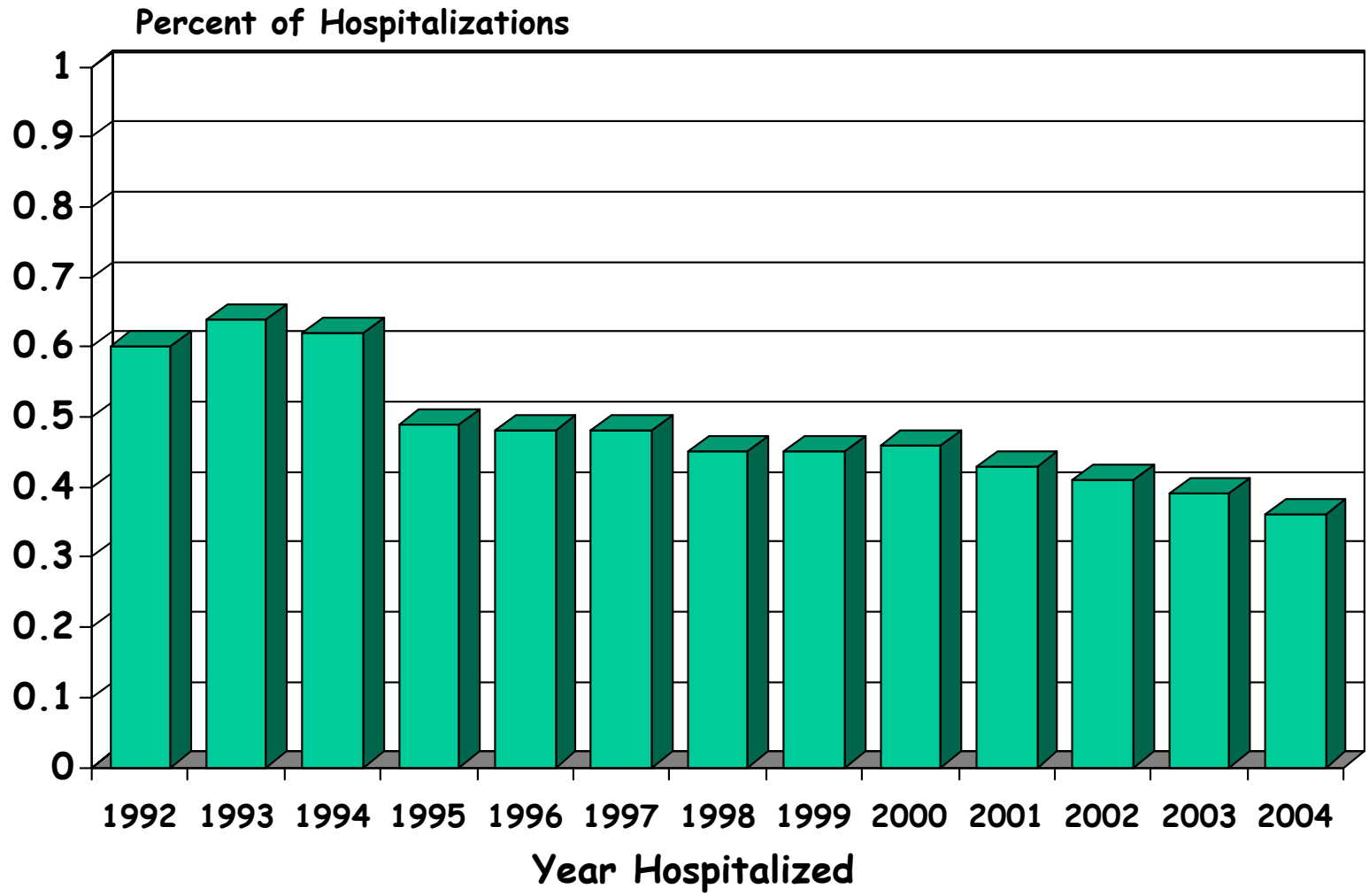


Figure 6. Number of Patients Discharged with Coal Workers' Pneumoconiosis (CWP), Asbestosis and Silicosis in Michigan: 1990-2004

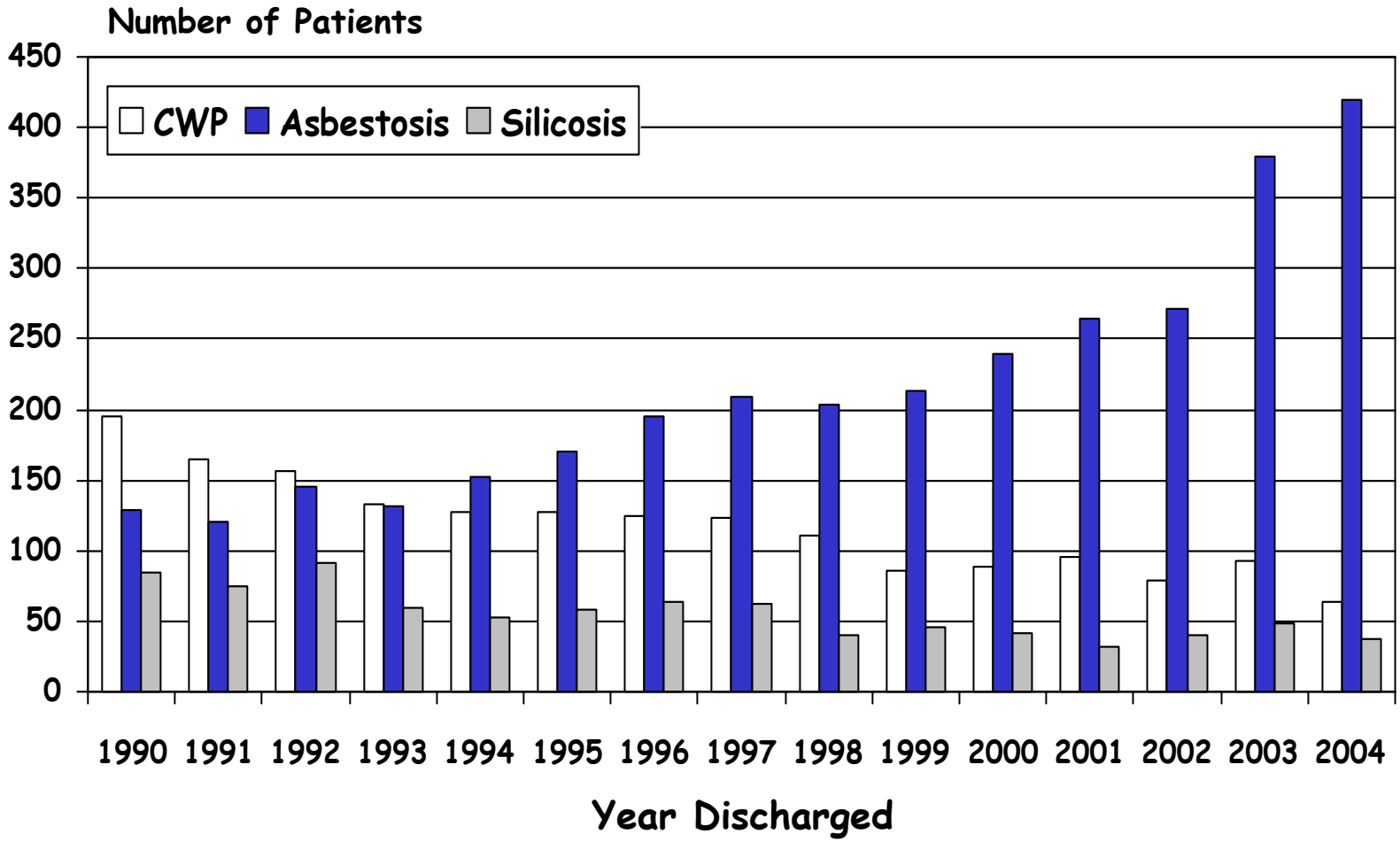
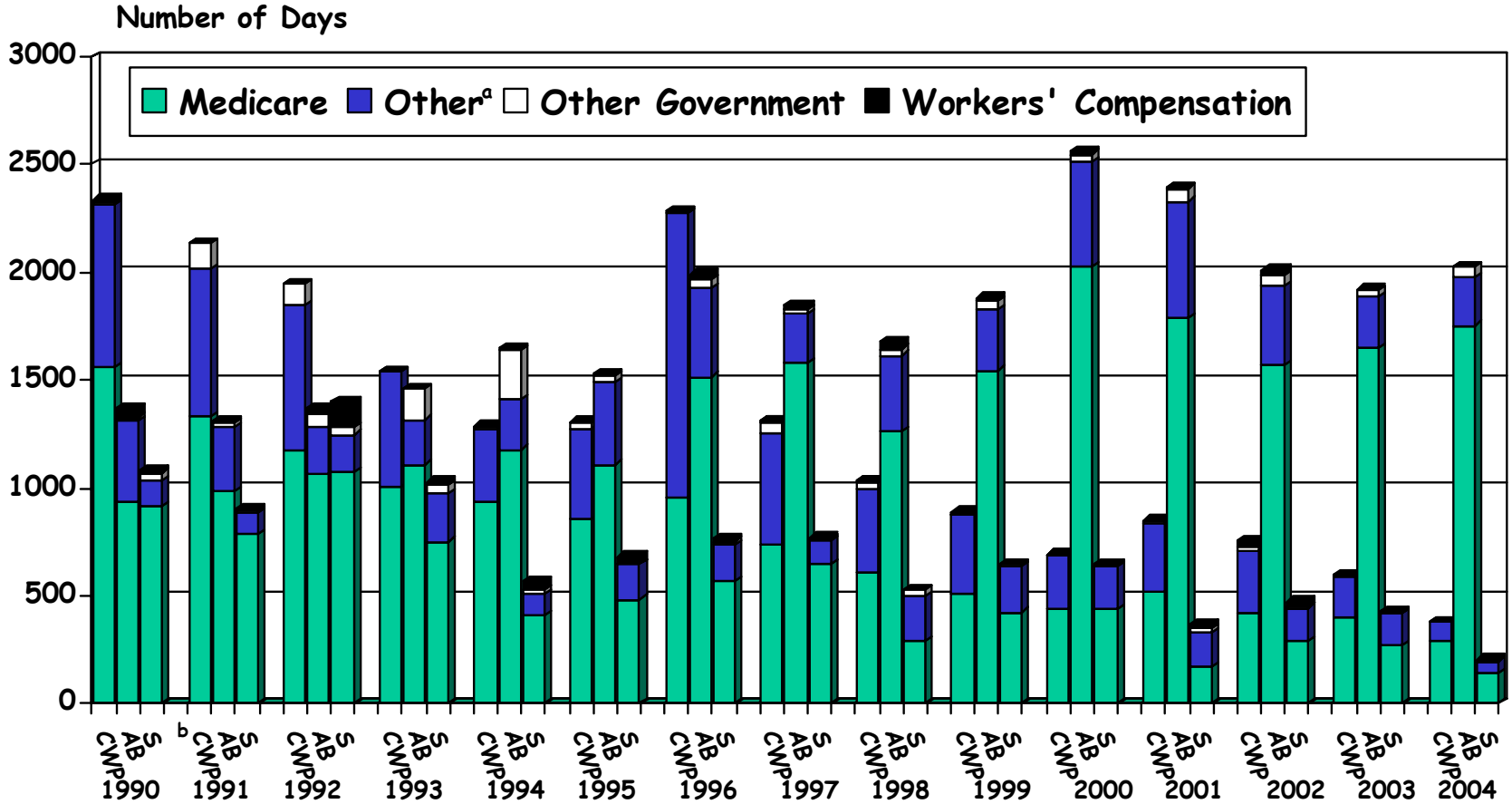


Figure 7. Number of Days Hospitalized by Payment Source for Coal Workers' Pneumoconiosis, Asbestosis and Silicosis in Michigan: 1990-2004



[a]"Other" includes: Medicaid, HMOs, PPOs, Other Insurance, Self-Pay and No-Charge payment sources.
[b]Diagnosis codes: CWP=Coal Workers' Pneumoconiosis; AB=Asbestosis; S=Silicosis.

Figure 8. Asbestos-Related Cases Reported to the Michigan Department of Labor and Economic Growth: 1989-2005

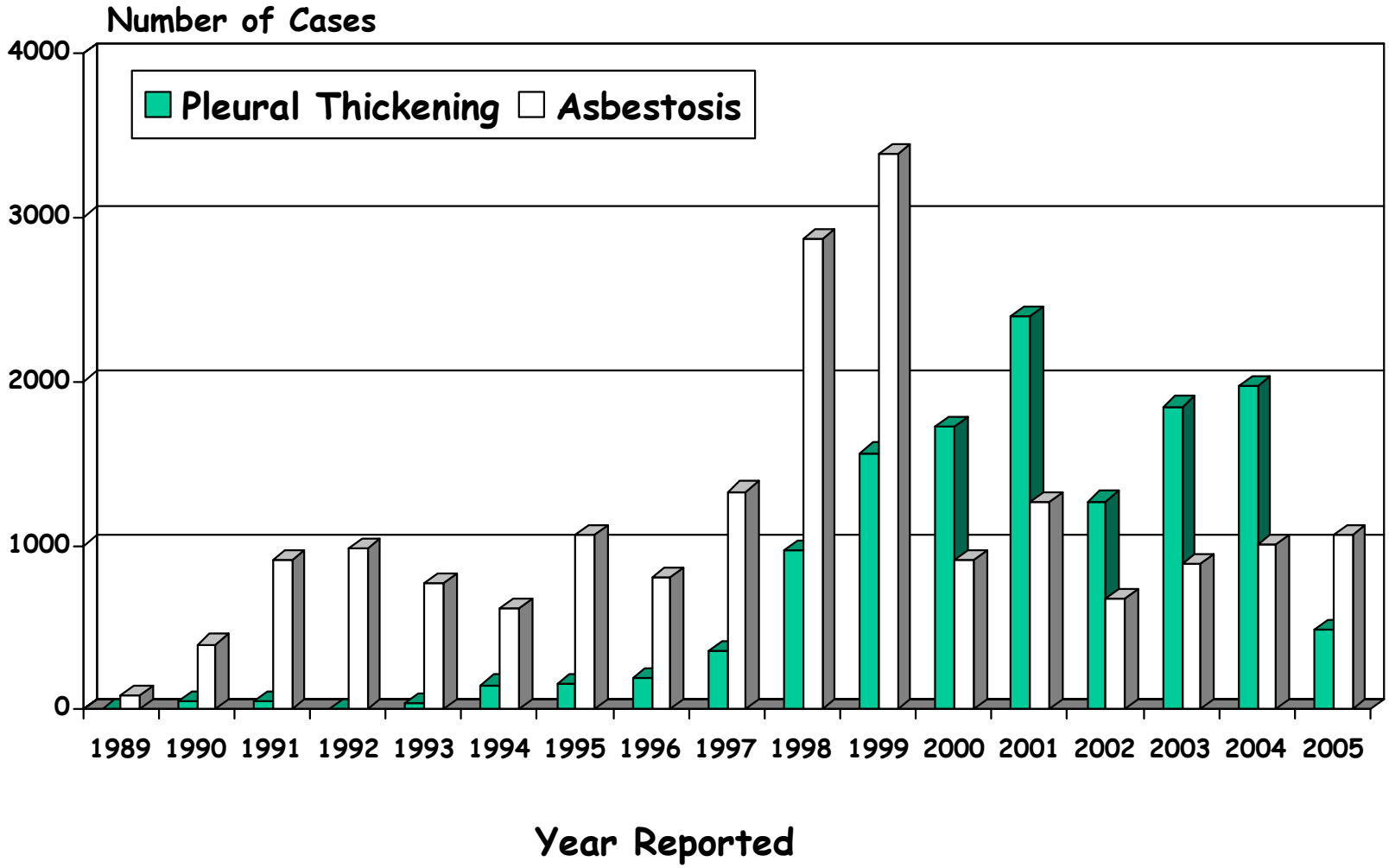


Figure 9. Number of Men and Women in Michigan Diagnosed with Mesothelioma: 1985-2003

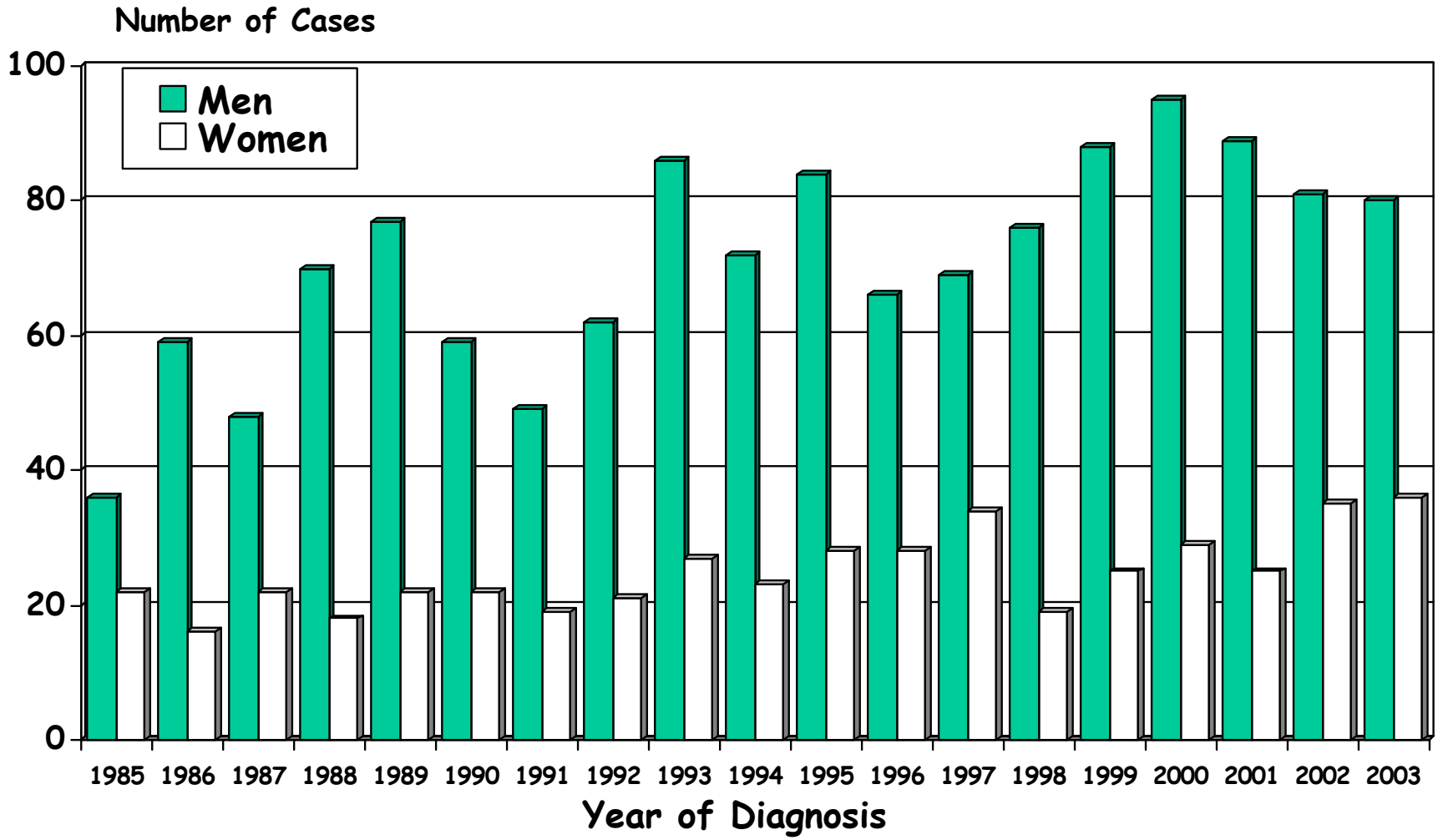
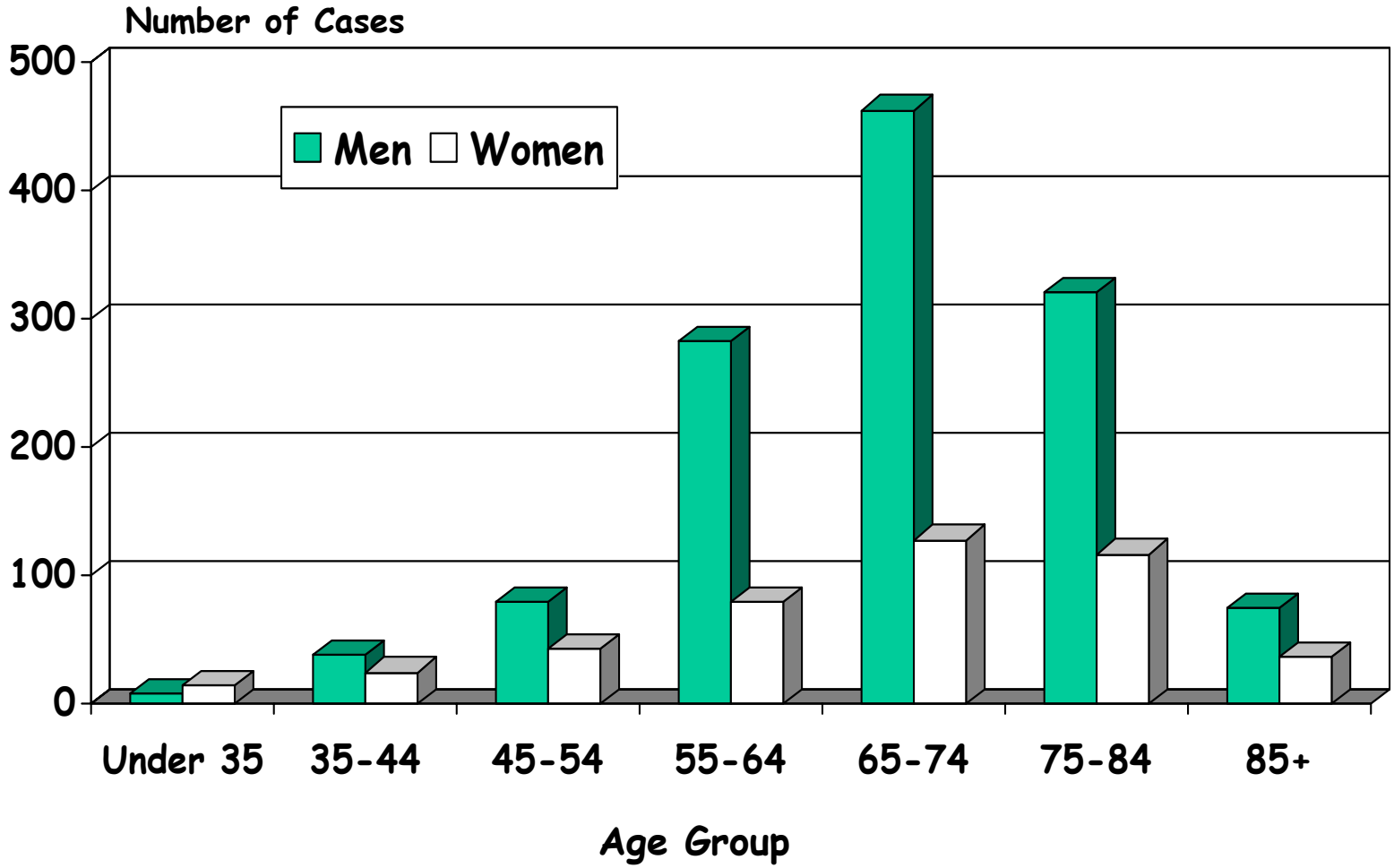
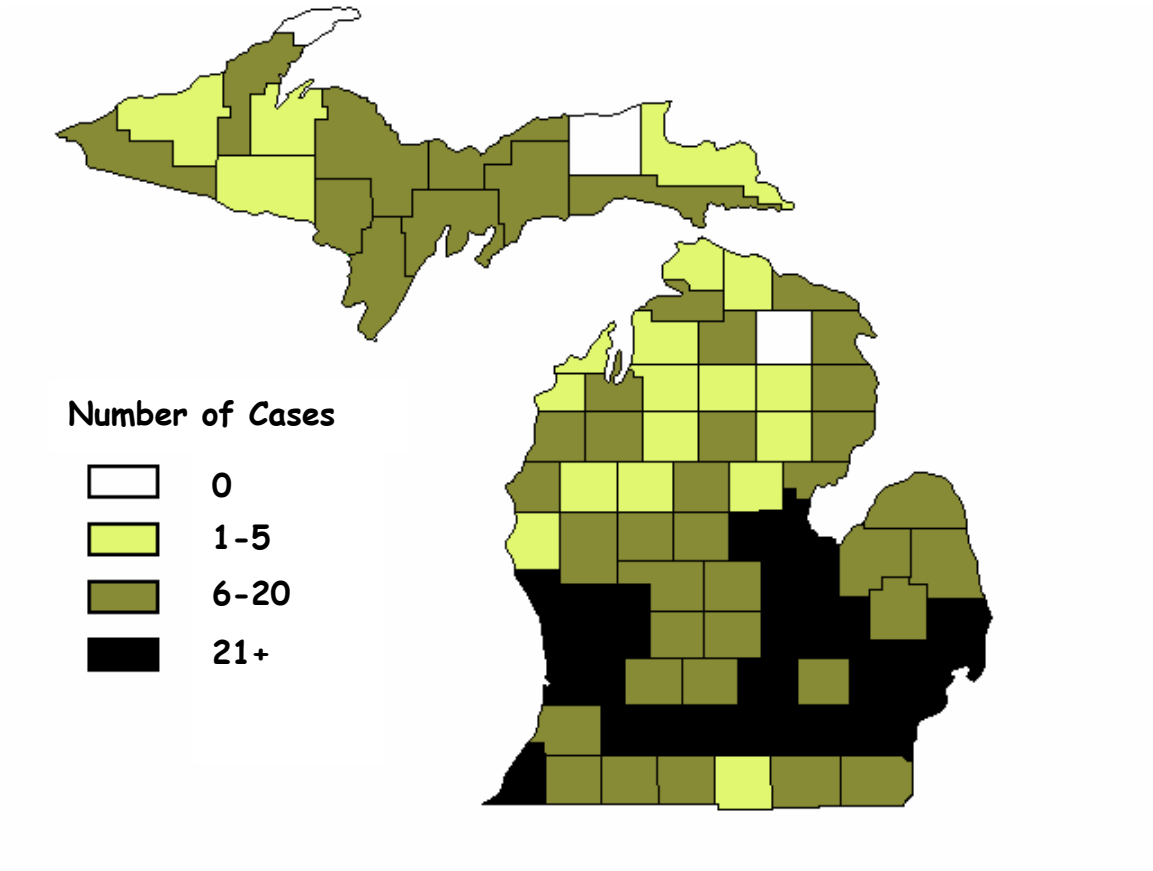


Figure 10. Cases of Mesothelioma in Michigan by Gender and Age at Diagnosis[a]: 1985-2003



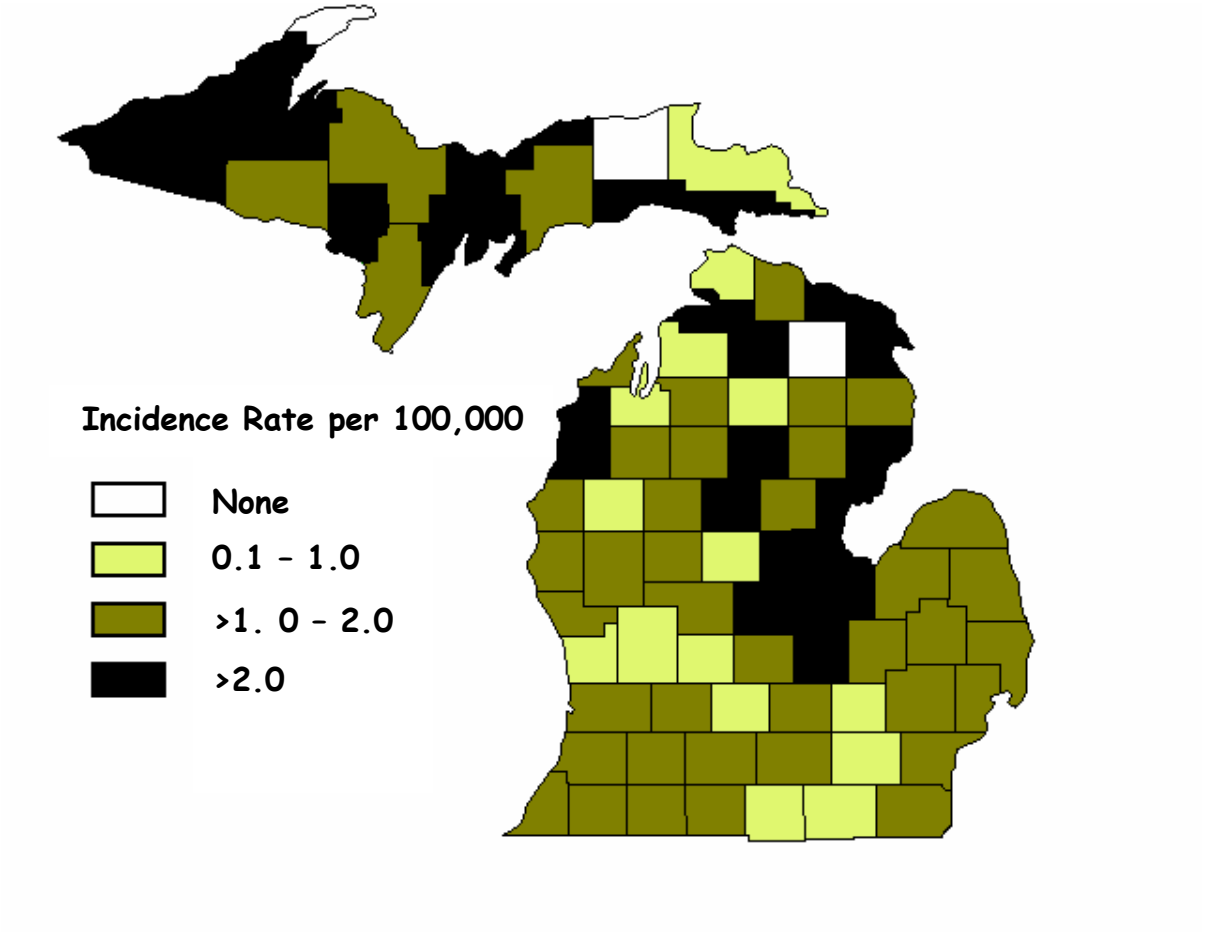
[a]For one female, age at diagnosis was unknown.

Figure 11. Distribution of Michigan Residents Diagnosed with Mesothelioma by County: 1985-2003



Total number of cases: 1,713.

Figure 12. Average Annual Incidence Rates of Mesothelioma Among Michigan Residents, by County[a]



[a]Numerator is the average number of Michigan residents by county, diagnosed with mesothelioma from 1985-2000 (most recent data available).
Denominator is the estimated number of Michigan residents age 16+ by county, from the United States Census Bureau for July 1, 1993.

Table 1. Number of Employees at Facilities Where an Occupational Illness Occurred By Reporting Source: Company vs. Non-Company Clinician

NUMBER OF EMPLOYEES	Reports from Non-Company Practitioners		Reports from Companies		Total Reports	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*
<25	81	5.5	23	0.3	104	1.1
25-100	109	7.4	99	1.3	208	2.3
100-500	169	11.4	255	3.3	424	4.6
>500	1,119	75.7	7,272	95.1	8,391	91.9
Total	**1,478**[a]	100.0	**7,649**[b]	100.0	**9,127**	99.9[c]

[a] The number of employees was missing on 3,433 reports.
[b] The number of employees was missing on 325 reports.
[c] Percentages do not add to 100 due to rounding.

Table 2. Number of Occupational Disease Reports Submitted by Non-Company Health Practitioners

Number of Reports	Health Practitioners		Number of Patients Represented
	Number	Percent	
1	271	77.7	271
2-5	51	14.6	140
6-10	11	3.2	84
11-20	5	1.4	77
21-100	6	1.7	217
101+	5	1.4	1,771
Total[a]	**349**	100.0	**2,560**

[a] 686 reports were submitted by labs for lead poisoning, representing 225 clinicians. These are not included in the above statistics. 1,457 reports were submitted by Michigan's two Poison Control Centers, and are not included in the above statistics. In addition, 208 reports did not list physician name and are not included in the above statistics.

Table 3. Demographic Characteristics of Reported Occupational Disease Cases

	Number	*Percent*
AGE		
<19	155	1.4
20-24	404	3.5
25-29	611	5.3
30-34	1,115	9.7
35-39	1,161	10.1
40-44	1,135	9.9
45-49	1,785	15.6
50-54	1,841	16.1
55-59	1,287	11.3
60-69	1,227	10.7
70-79	543	4.7
80+	175	1.5
Total	**11,439[a]**	
GENDER		
Male	8,053	66.6
Female	4,045	33.4
Total	**12,098[b]**	
RACE		
Caucasian	1,783	52.3
African American	1,030	30.2
Hispanic	52	1.5
Other	547	16.0
Total	**3,412[c]**	

[a]Age was missing on 1,446 reports. Mean age = 47± 14 years.
[b]Gender was missing on 787 reports.
[c]Race was missing on 9,473 reports.

Table 4. Number of Occupational Disease Reports by Disease Type and Reporting Source

DISEASE TYPE	Non-Company		Company		Total	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Infectious & Parasitic Diseases (ICD 001-139)	2	<0.1	16	0.2	18	0.1
Neoplasms (ICD 140-239)	77	1.6	0	--	77	0.6
Diseases of the Blood & Blood Forming Organs (ICD 280-289)	1	<0.1	0	--	1	<0.1
Mental Disorders (ICD 290-319)	0	--	146	1.8	146	1.1
Diseases of the Nervous System & Sense Organs (ICD 320-389)	706	14.4	1,723	21.6	2,429	18.9
Diseases of the Circulatory System (ICD 390-459)	2	<0.1	3	<0.1	5	<0.1
Diseases of the Respiratory System (ICD 460-519)	1,810	36.9	92	1.2	1,902	14.8
Diseases of the Digestive System (ICD 520-579)	1	<0.1	20	0.3	21	0.2
Diseases of the Genitourinary System (ICD 580-629)	1	<0.1	0	--	1	<0.1
Complications Mainly Related to Pregnancy (ICD 640-648)	0	--	1	<0.1	1	<0.1
Diseases of the Skin & Subcutaneous Tissue (ICD 680-709)	37	0.8	366	4.6	403	3.1
Diseases of the Musculoskeletal System & Connective Tissue (ICD 710-739)	38	0.8	1,325	16.6	1,363	10.6
Symptoms, Signs & Ill-Defined Conditions (ICD 780-799)	64	1.3	201	2.5	265	2.1
Repetitive Trauma: Sprains & Strains (ICD 800-999 except ICD 940 & ICD 980-989)	28	0.6	4,043	50.7	4,071	31.6
Burn Confined to Eye (ICD 940)	0	--	18	0.2	18	0.1
Toxic Effects of Substances (ICD 980-989)	2,144	43.7	20	0.3	2,164	16.8
Total	**4,911**	100.1[a]	**7,974**	100.0	**12,885**	100.0

[a] Percentage does not total to 100 due to rounding.

Table 5. Number of Reports by Industry Type and Reporting Source

INDUSTRY TYPE	Non-Company		Company		Total	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Agricultural & Forestry Services (SIC 01,02,07,08)	1	<0.1	4	0.1	5	<0.1
Mining (SIC 10-14)	0	--	18	0.2	18	0.2
Construction (SIC 15-17)	227	10.5	28	0.4	255	2.5
Manufacturing (SIC 20-39)						
Food & Kindred Products (SIC 20)	1	<0.1	11	0.1	12	0.1
Printing & Publishing (SIC 27)	4	0.2	14	0.2	18	0.2
Chemicals & Allied Products (SIC 28)	18	0.8	52	0.7	70	0.7
Rubber & Misc. Plastics Products (SIC 30)	10	0.5	46	0.6	56	0.6
Stone, Clay, Glass & Concrete Products (SIC 32)	11	0.5	3	<0.1	14	0.1
Primary Metal Industries (SIC 33)	501	23.3	157	2.0	658	6.5
Fabricated Metal Products (SIC 34)	70	3.3	669	8.4	739	7.3
Industrial & Commercial Machinery & Computer Equipment (SIC 35)	44	2.0	195	2.5	239	2.4
Electronic Equipment & Components (SIC 36)	5	0.2	145	1.8	150	1.5
Transportation Equipment (SIC 37)	821	38.1	5,702	72.0	6,523	64.8
Miscellaneous Manufacturing (SIC 22,23,24,25,26,38,39)	83	3.9	42	0.5	125	1.2
Transportation, Communications, Electric, Gas & Sanitary Services (SIC 40-49)	148	6.9	24	0.3	172	1.7
Wholesale & Retail Trade (SIC 50-59)	47	2.2	73	0.9	120	1.2
Insurance & Real Estate (SIC 60-67)	8	0.4	10	0.1	18	0.2
Services						
Hospitals (SIC 80)	28	1.3	102	1.3	130	1.3
Schools (SIC 82)	38	1.8	79	1.0	117	1.2
Misc. (SIC 70,72,73,75,76,79,81,83,86,87,88)	40	1.9	284	3.6	324	3.2
Public Administration (SIC 90-97)	48	2.2	260	3.3	308	3.1
Total	**2,153**	100.0	**7,918**	100.0	**10,071**[a]	100.0

[a]Type of industry was unknown in 2,758 non-company reports and 56 company reports.

Table 6. Number of Occupational Disease Reports by Disease Type and Gender[a]

DISEASE	MALES		FEMALES	
	Number	*Percent*	*Number*	*Percent*
Infectious & Parasitic Diseases (ICD 001-139)	9	0.1	9	0.2
Neoplasms (ICD 140-239)	11	0.1	0	--
Diseases of the Blood & Blood Forming Organs (ICD 280-289)	1	<0.1	0	--
Mental Disorders (ICD 290-319)	63	0.8	79	2.0
Diseases of the Nervous System & Sense Organs (ICD 320-389)	1,822	22.6	588	14.5
Diseases of the Circulatory System (ICD 390-459)	3	<0.1	1	<0.1
Diseases of the Respiratory System (ICD 460-519)	1,026	12.7	220	5.4
Diseases of the Digestive System (ICD 520-579)	21	0.3	0	--
Diseases of the Genitourinary System (ICD 580-629)	1	<0.1	0	--
Complications Mainly Related to Pregnancy (ICD 640-648)	0	--	1	<0.1
Diseases of the Skin & Subcutaneous Tissue (ICD 680-709)	254	3.2	147	3.6
Diseases of the Musculoskeletal System & Connective Tissue (ICD 710-739)	779	9.7	583	14.4
Symptoms, Signs & Ill-Defined Conditions (ICD 780-799)	143	1.8	106	2.6
Repetitive Trauma Injuries (ICD 800-999 except ICD 940 & ICD 980-989)	2,423	30.1	1,626	40.2
Burn Confined to Eye (ICD 940)	16	0.2	2	<0.1
Toxic Effects of Substances Chiefly Non-Medicinal (ICD 980-989)	1,481	18.4	683	16.9
Total[a]	**8,053**	100.0	**4,045**	99.8[b]

[a] Gender was missing on 787 reports.

[b] Percentage does not add to 100 due to rounding.

Table 7. Demographic Characteristics of Reported Occupational Disease Fatalities

	Number	*Percent*
Fatal	111	0.9
Non-Fatal	12,774	99.1
Total	**12,885**	
AGE		
45-49	1	0.9
50-59	7	6.4
60-69	29	26.6
70-79	48	44.0
80+	24	22.0
Total [a]	**109**	
DIAGNOSIS		
Neoplasms	56	50.5
Asbestosis	28	25.2
Mesothelioma	23	20.7
Mental Illness-related	1	0.9
Asthma	1	0.9
Silicosis	1	0.9
Smoke inhalation	1	0.9
Total	**111**	
INDUSTRY		
Manufacturing	63	73.3
Construction	12	14.0
Utilities	8	9.3
Services	3	3.5
Total [b]	**86**	

[a] Age was missing on two reports.

[b] Industry was missing on 25 reports.

Table 8. Comparison of 2004 BLS Occupational Illness Survey Data and 2001 MDLEG Workers' Compensation (WC) Claims with 1992-2005 Occupational Disease Reports

	DISEASE CATEGORY														
	Occupational Skin Disease		Dust Diseases of the Lung		Respiratory Conditions Due to Toxic Agents		Poisoning		Disorders Due to Physical Agents		Disorders Due to Repeated Trauma		All Other Occupational Illnesses		Reports per Year[f]
MDLEG BLS Survey & Workers' Compensation Claims	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
2004 BLS Survey[b]	2,200	13.2	Not available		900	5.4	100	0.6	750	4.5	1,930	11.6	10,820	64.8	16,700
2001 WC Claims[b]	319	3.6	1	<0.1	145	1.6	54	0.6	37	0.4	2,941	33.0	5,405	60.7	8,902
MDLEG Occupational Disease Reports	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#
1992-1993[a,c]	776	6.1	914	7.2	290	2.3	207	1.6	469	3.7	7,151	56.0	2,972	23.3	12,779[d]
1994-1995[a,c]	1,034	5.9	966	5.5	570	3.2	315	1.8	419	2.4	10,601	60.3	3,680	20.9	17,585
1996-1997[a,c]	1,405	7.3	1,159	6.0	799	4.1	631	3.3	414	2.1	11,293	58.3	3,668	18.9	19,369
1998-1999[a]	1,307	6.3	3,225	15.6	1,481	7.2	1,120	5.4	328	1.6	9,644	46.7	3,541	17.2	20,646
2000-2001[a]	953	5.1	1,165	6.3	2,334	12.5	1,246	6.7	231	1.2	9,068	48.7	3,639	19.5	18,636
2002-2003[a]	426	2.9	861	5.9	1,800	12.3	2,858	19.6	105	0.7	5,942	40.8	2,587	17.7	14,579
2004-2005[a]	377	2.8	1,105	8.2	1,602	11.9	2,267	16.9	46	0.3	5,094	37.9	2,938	21.9	13,429

[a]Number of reports per year (averaged over the 2 years). [b]Most recent year available. [c]Counts published in previous years' OD reports for 1992-1997 have been corrected here. [d]Type of occupational disease was missing for 97 reports. [e]This number is estimated since the BLS Annual Survey does not provide numbers for conditions with individual rates <0.05 per 100,000 full time workers. [f]Totals do not match those in Figure 2 due to the classification method for disease categories in this table.

Table 9. Primary Diagnosis of Patients Hospitalized in Michigan from 1992-2004, Paid for by Workers' Compensation

Primary Discharge Diagnosis (ICD-9[a])	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)
Infectious Diseases (001-139)	16 (0.2)	19 (0.3)	23 (0.3)	22 (0.4)	16 (0.3)	13 (0.2)	16 (0.3)	10 (0.2)	9 (0.2)	12 (0.2)	6 (0.1)	22 (0.4)	17 (0.4)
Neoplasms (140-239)	18 (0.3)	37 (0.5)	11 (0.2)	17 (0.3)	17 (0.3)	15 (0.3)	18 (0.3)	18 (0.3)	12 (0.2)	13 (0.3)	10 (0.2)	10 (0.2)	9 (0.2)
Endocrine Diseases (240-279)	24 (0.3)	26 (0.4)	22 (0.3)	19 (0.3)	15 (0.3)	10 (0.2)	20 (0.4)	17 (0.3)	18 (0.3)	13 (0.3)	19 (0.4)	15 (0.3)	19 (0.4)
Blood Diseases (280-289)	6 (0.1)	3 (<0.1)	5 (0.1)	2 (<0.1)	5 (0.1)	7 (0.1)	9 (0.2)	7 (0.1)	1 (<0.1)	1 (<0.1)	2 (<0.1)	3 (0.1)	5 (0.1)
Mental Disorders (290-319)	100 (1.5)	104 (1.4)	102 (1.4)	63 (1.1)	52 (0.9)	54 (1.0)	43 (0.8)	63 (1.2)	56 (1.1)	43 (0.9)	43 (0.9)	34 (0.7)	37 (0.8)
Nervous System Diseases (320-389)	192 (2.8)	167 (2.3)	168 (2.4)	130 (2.3)	91 (1.6)	103 (1.9)	77 (1.5)	55 (1.1)	57 (1.1)	51 (1.0)	52 (1.1)	59 (1.1)	58 (1.2)
Circulatory Diseases (390-459)	187 (2.7)	190 (2.6)	161 (2.3)	144 (2.5)	159 (2.8)	130 (2.3)	121 (2.3)	120 (2.3)	116 (2.2)	129 (2.6)	103 (2.1)	135 (2.6)	140 (2.9)
Respiratory Diseases (460-519)	68 (1.0)	104 (1.4)	73 (1.0)	76 (1.3)	76 (1.3)	70 (1.3)	61 (1.2)	71 (1.4)	57 (1.1)	62 (1.2)	68 (1.4)	86 (1.7)	96 (2.0)
Digestive Diseases (520-579)	135 (2.0)	159 (2.2)	133 (1.9)	113 (2.0)	98 (1.7)	108 (1.9)	94 (1.8)	104 (2.0)	81 (1.5)	83 (1.7)	84 (1.7)	93 (1.8)	96 (2.0)
Genitourinary Diseases (580-629)	53 (0.8)	71 (1.0)	35 (0.5)	42 (0.7)	43 (0.8)	31 (0.6)	25 (0.5)	23 (0.4)	24 (0.5)	23 (0.5)	26 (0.5)	31 (0.6)	28 (0.6)
Pregnancy Complications (630-676)	98 (1.4)	120 (1.6)	23 (0.3)	26 (0.5)	30 (0.5)	51 (0.9)	59 (1.1)	51 (1.0)	36 (0.7)	21 (0.4)	23 (0.5)	23 (0.4)	7 (0.1)
Skin Diseases (680-709)	183 (2.7)	190 (2.6)	244 (3.5)	211 (3.7)	195 (3.5)	193 (3.5)	176 (3.4)	189 (3.7)	196 (3.7)	158 (3.2)	155 (3.2)	179 (3.5)	157 (3.3)
Musculoskeletal Diseases (710-739)	2932 (42.5)	3127 (42.9)	2989 (42.3)	2386 (41.7)	2402 (42.7)	2313 (41.5)	2178 (42.0)	2096 (40.7)	2125 (40.3)	2172 (43.3)	2113 (43.9)	2030 (39.3)	1832 (38.5)
Congenital Anomalies (740-759)	34 (0.5)	36 (0.5)	27 (0.4)	22 (0.4)	13 (0.2)	18 (0.3)	9 (0.2)	20 (0.4)	13 (0.2)	11 (0.2)	11 (0.2)	12 (0.2)	14 (0.3)
Perinatal Complications (760-779)	1 (<0.1)	1 (<0.1)	0 --	1 (<0.1)	0 --	1 (<0.1)	0 --	0 --	0 --	1 (<0.1)	0 --	0 --	0 --
Symptoms & Signs (780-799)	86 (1.2)	93 (1.3)	95 (1.3)	94 (1.6)	93 (1.7)	85 (1.5)	69 (1.3)	80 (1.6)	84 (1.6)	62 (1.2)	59 (1.2)	90 (1.7)	70 (1.5)
Injury & Poisoning (800-999)	2522 (36.6)	2585 (35.5)	2758 (39.1)	2292 (40.0)	2251 (40.0)	2273 (40.8)	2071 (40.0)	2094 (40.6)	2286 (43.3)	2056 (41.0)	1927 (40.1)	2093 (40.6)	1956 (41.1)
V Codes	236 (3.4)	250 (3.4)	189 (2.7)	66 (1.2)	75 (1.3)	92 (1.7)	137 (2.6)	135 (2.6)	107 (2.0)	102 (2.0)	108 (2.2)	245 (4.7)	219 (4.6)
Total[b]	**6891**	**7282**	**7058**	**5726**	**5631**	**5567**	**5183**	**5153**	**5278**	**5013**	**4809**	**5160**	**4760**

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

Table 10. Demographic Characteristics of Patients Hospitalized in Michigan from 1992-2004, Paid for by Workers' Compensation

	1992[a]	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)	# (%)	(%)	# (%)	# (%)	# (%)	# (%)	# %
GENDER													
Male	5103 (74)	5388 (74)	5388 (76)	4387 (76)	4381 (78)	4205 (75)	3919 (76)	3907 (76)	4042 (77)	3797 (76)	3635 (76)	3427 (74)	3634 (76)
Female	1792 (26)	1903 (26)	1675 (24)	1349 (24)	1253 (22)	1365 (25)	1267 (24)	1249 (24)	1235 (23)	1217 (24)	1174 (24)	1208 (26)	1126 (24)
Total	6895	7291	7063	5736	5634	5570	5186	5156	5277	5014	4809	4635	4760
RACE													
White	5173 (85)	5346 (86)	5179 (87)	3708 (85)	3355 (84)	3274 (85)	3016 (85)	2899(85)	3036 (85)	2833 (85)	2697 (86)	2598 (85)	2737 (86)
African American	519 (9)	515 (8)	544 (9)	417 (10)	425 (11)	378 (10)	387 (11)	323 (9)	366 (10)	335 (10)	276 (9)	324 (11)	319 (10)
Asian	11 (<1)	9 (<1)	10 (<1)	12 (<1)	7 (<1)	5 (<1)	14 (<1)	9 (<1)	16 (<1)	3 (<1)	9 (<1)	6 (<1)	11 (<1)
AmericanIndian	0 --	1 (<1)	2 (<1)	1 (<1)	2 (<1)	13 (<1)	13 (<1)	5 (<1)	7 (<1)	12 (<1)	8 (<1)	3 (<1)	7 (<1)
Hispanic	32 (1)	37 (1)	41 (1)	49 (1)	37 (1)	26 (1)	41 (1)	51 (1)	40 (1)	51 (2)	63 (2)	66 (2)	65 (2)
Other	321 (5)	337 (5)	190 (3)	183 (4)	165 (4)	149 (4)	90 (3)	118 (3)	92 (3)	109 (3)	70 (2)	49 (2)	33 (1)
Total	**6056**	**6245**	**5966**	**4370**	**3991**	**3845**	**3561**	**3405**	**3557**	**3343**	**3123**	**3046**	**3172**
AGE													
<15	57 (1)	45 (1)	41 (1)	7 (<1)	9 (<1)	10 (<1)	2 (<1)	6 (<1)	4 (<1)	8 (<1)	8 (<1)	16 (<1)	6 (<1)
15-19	147 (2)	140 (2)	159 (2)	121 (2)	87 (2)	87 (2)	113 (2)	107 (2)	109 (2)	75 (2)	69 (1)	51 (1)	74 (2)
20-29	1248 (18)	1176 (16)	1104 (16)	903 (16)	810 (14)	801 (14)	722 (14)	725 (15)	666 (13)	629 (13)	540 (11)	537 (12)	513 (11)
30-39	2115 (31)	2157(30)	2097 (30)	1684 (29)	1636 (29)	1597 (29)	1421 (28)	1358 (27)	1362(26)	1224 (24)	1188 (25)	1102 (24)	1057 (22)
40-49	1642 (24)	1820(25)	1810 (26)	1531 (27)	1583 (28)	1618 (29)	1548 (30)	1513 (30)	1656(32)	1556 (31)	1541 (32)	1446 (31)	1519 (32)
50-59	1053 (15)	1205 (17)	1248 (18)	1034 (18)	1062 (19)	1017 (18)	934 (18)	884 (18)	1026 20)	1084 (22)	1029 (21)	1005 (22)	1093 (23)
60-69	417 (6)	466 (7)	440 (6)	360 (6)	351 (6)	329 (6)	306 (6)	309 (6)	343 (7)	331 (7)	314 (7)	361 (8)	373 (8)
70-79	92 (1)	113 (2)	104 (1)	68 (1)	74 (1)	73 (1)	78 (2)	85 (2)	75 (1)	77 (2)	85 (2)	97 (2)	101 (2)
80+	23 (<1)	40 (1)	37 (1)	10 (<1)	9 (<1)	12 (<1)	8 (<1)	12 (<1)	11 (<1)	15 (<1)	18 (<1)	20 (<1)	24 (1)
Total	**6794**	**7162**	**7040**	**5718**	**5621**	**5544**	**5132**	**4999**	**5252**	**4999**	**4792**	**4635**	**4760**
Avg. age, std. dev.	40 ±13	41 ±13	41 ±12	41 ±12	42 ±12	42 ±12	42 ±12	42 ±12	43 ±12	43 ±12	43 ±12	44 ±13	44±1

[a]Totals vary due to missing information.

Table 11. Demographic Characteristics of 1,457 Individuals Reported by the Two Michigan Poison Control Centers in 2005

	Number	*Percent*
AGE		
<15	8	0.7
15-19	107	9.4
20-29	368	32.2
30-39	287	25.1
40-49	230	20.1
50-59	114	10.0
60-69	25	2.2
70-79	5	0.4
Total	**1,144[a]**	
GENDER		
Male	827	56.8
Female	630	43.2
Total	**1,457**	

[a]Age was missing on 313 reports.

APPENDIX A

Chronic Occupational Diseases

Multiple reports for an individual patient with one of the following diseases may be submitted within and across years, but only one of these submissions is counted in our statistics.

ICD-9 Code	Description
011	Pulmonary Tuberculosis
015	Tuberculosis of the bones and joints
135	Sarcoidosis
137	Tuberculosis , Late Effects of
140-239	Neoplasms (Cancers)
250-259	Diseases of Other Endocrine Glands
260-269	Nutritional Deficiencies
270-279	Metabolic and Immunity Disorders Except 276, Dehydration
280-289	Disease of the Blood and Blood Forming Organs
290-319	Mental Disorders Except 308:Acute Reaction to Stress, and 309: Adjustment Reaction
320-340	Selected Diseases of the Nervous System and Sense Organs
388-389	Disorders of the Ear: Noise Induce Hearing Loss, Tinnitus
390-409	Selected Diseases of the Circulatory System
491-505	Selected Diseases of the Respiratory System
509	Pleural Plaques with no parenchymal abnormality marked on the ILO Form
515	Interstitial Lung Disease, Pulmonary Fibrosis
517	Connective Tissue Lung Disease
520-579	Diseases of the Digestive System
580-629	Diseases of the Genitourinary System