

Minnesota Occupational Health Indicators

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Minnesota Occupational Health Indicators

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Summary of Minnesota Occupational Health and Safety Statistics

- Approximately 2.8 million people were employed in 2014
- 67,300 injuries and illnesses were reported by employers in 2014
- 7,390 of those injuries and illnesses required 10 or more days away from work in 2014
- In 2013 at least 2,322 hospitalizations were covered by workers' compensation due to work-related injury or disease
- 62 work-related deaths occurred in 2014
- 40 amputations related to work were reported by employers in 2014
- 29 individuals were hospitalized for burns related to work tasks in 2013
- In 2014, 7,370 cases of musculoskeletal disorder cases requiring days away from work were reported to employers
- 357 cases of carpal tunnel syndrome requiring days away from work were reported by employers in 2015
- In 2014, 325 inpatient hospitalizations for pneumoconiosis, a known work-related disease, occurred
- Over the past decade the number of newly diagnosed malignant mesothelioma cases has begun to equal the number of work-related fatal injuries
- In 2013, 53 cases of work-related pesticide poisoning were reported to the Minnesota Poison Control Center
- In 2013, 596 Minnesota adults had a blood lead level $\geq 10\mu\text{g/dL}$.
- 5.5% of employed adults worked in industries at high-risk of morbidity in 2014
- 13.0% of employed adults worked in occupations at high-risk of morbidity in 2014
- An estimated 1,483 occupational health and safety professionals (by discipline or certification) were working in 2013.
- 2,912 establishments were inspected by Minnesota OSHA in 2014
- Over 1 billion dollars was paid in workers' compensation benefits in 2013

Introduction

Working age Minnesotans spend on average half or more of their waking hours at work. While employment provides enormous benefits to individuals and to society, many workers remain at risk of injuries, illnesses, and even death. Although implementation of labor laws and occupational health standards have greatly improved the well-being of the workforce, continued efforts are necessary to monitor the health and safety of Minnesota workers. This report focuses on various indicators of occupational safety and health. Ongoing surveillance of workplace injuries, illnesses, and exposures is essential for evaluating occupational health programs and for preventing future injury and illness.

A joint effort between epidemiologists and researchers with the National Institute for Occupational Safety and Health (NIOSH) and the Council of State and Territorial Epidemiologists (CSTE) developed indicators of occupational health and safety. NIOSH, through its State Occupational Safety and Health Surveillance Program, provides funding to states to complete and disseminate these indicators. The Minnesota Department of Health (MDH) Center for Occupational Health and Safety was funded by NIOSH in 2010 to develop the Minnesota Occupational Health and Safety Surveillance Program and the funding was continued in 2015 for another five years. As part of this NIOSH cooperative agreement, these Occupational Health Indicators (OHIs) are calculated each year using available data sources to describe occupational health and safety in Minnesota. The compiled indicators for Minnesota and other participating states are available at: <http://www.cste.org/members/group.aspx?id=106668>.

The occupational health and safety indicators are a set of surveillance tools created to measure and track different aspects of the health and safety of Minnesota's workforce. These indicators can provide useful information and data for policy makers, employers, employees, and occupational health and safety specialists. They can be used for education, developing health and safety priorities, allocation of limited resources, and evaluating the effectiveness of prevention policies and programs. Indicators were calculated for the years 2000 through 2013. For several OHIs, data for 2014 or 2015 were also available and are shown. Trend analysis was completed for applicable indicators, indicating how occupational injury and disease rates may be changing in Minnesota.

Secondary (existing) data sources were used to calculate the indicators. Since the original data was collected by a variety of programs to meet the needs and requirements of those programs, the data can vary in terms of accuracy, completeness, and reliability when used for occupational health surveillance. In addition, these secondary data sources become available at different times for different years, and may lag from one to three years. Limitations of specific OHIs are noted in the narrative for those OHIs. While these limitations can present a challenge in estimating the true prevalence and incidence of work-related injury and disease in Minnesota, they do provide adequate information for setting priorities, examining trends, and identifying at-risk populations.

The data sources for these indicators include:

- Hospital discharge billing data obtained from the Minnesota Hospital Association.

- Blood lead surveillance data collected by the MDH Lead and Healthy Homes Program
- Workers' compensation claims data from the Minnesota Department of Labor and Industry
- Cancer surveillance data from the MDH Minnesota Cancer Surveillance System
- Survey of Occupational Injuries and Illnesses from the U.S. Bureau of Labor Statistics
- Census of Fatal Occupational Injuries from the U.S. Bureau of Labor Statistics
- Current Population Survey from the U.S. Bureau of Labor Statistics
- American Community Survey from the U.S. Census Bureau
- Death certificate data from the MDH Vital Statistics unit
- Poison center call data from the Minnesota Poison Control Center

This report presents data for 21 Occupational Health Indicators grouped into four categories:

Occupational Injury and Illness Indicators

- Non-fatal work-related injuries and illnesses reported by employers
- Work-related amputations with days away from work reported by employers
- State workers' compensation claims for amputations with lost work time
- Work-related musculoskeletal disorders with days away from work reported by employers
- Work-related hospitalizations
- Hospitalizations from work-related burns
- Hospitalizations from or with pneumoconiosis
- Mortality from or with pneumoconiosis
- Acute work-related pesticide-associated illnesses and injury reported to poison control centers
- Incidence of malignant mesothelioma
- State workers' compensation claims for carpal tunnel syndrome with lost work time
- Fatal work-related injuries
- Work-related low back disorders requiring hospitalization

Occupational Exposure and Hazards Indicators

- Elevated blood lead levels among adults
- Percentage of workers employed in industries at high-risk for occupational morbidity
- Percentage of workers employed in occupations at high-risk for occupational morbidity
- Percentage of workers employed in industries and occupations at high-risk for occupational mortality

Occupational Interventions Indicators

- Occupational safety and health professionals
- OSHA enforcement activities

Occupational Socio-Economic Indicators

- Employment demographics
- Workers' compensation awards

Occupational Health Indicators

Employment Demographics for Minnesota, 2000-2014

This demographic indicator is broken into varying levels to describe different aspects of Minnesota’s employed population. The most current information is listed below.

Minnesota’s Employed Population in 2014

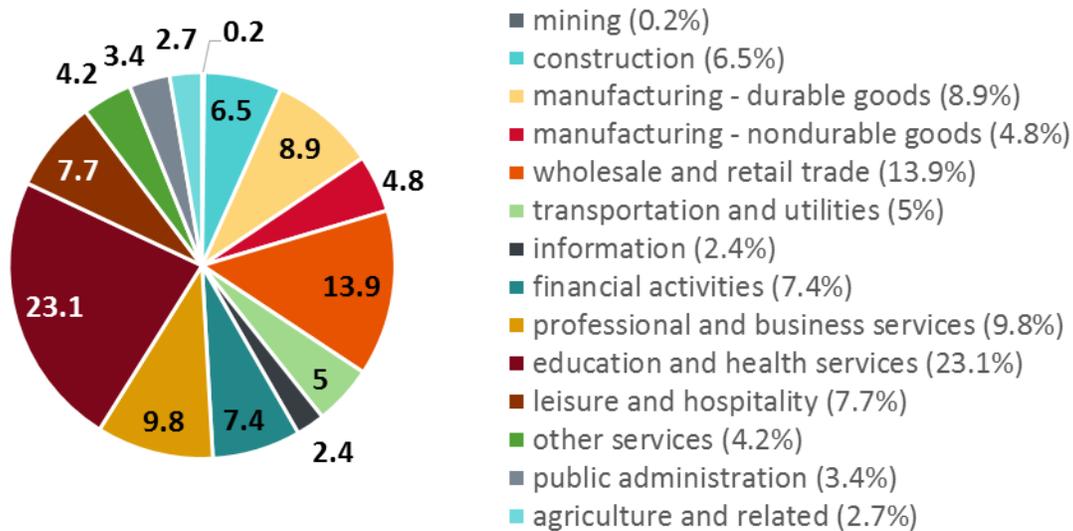
- The unemployment rate was 4%
- 6.1% were self-employed
- 21.3% were part time employees
- 1.49 million (52.3%) were male and 1.36 million (47.7%) were female
- 89% were white, 4.6% were black, and 5.9% were of another race/ethnicity

Minnesota’s Employed Population in 2013

- 1.7% of the employed population were between the ages of 16 and 17
- 93.2% of the employed population were between 18 and 64 years of age
- 5.1% were 65 years of age or older

Data from the U.S. [Bureau of Labor Statistics](#) (BLS) Geographic Profiles of Employment and Unemployment was used to describe Minnesota’s working population, age 16 and older. The geographic profiles are compiled from the [Current Population Survey](#) (CPS). The CPS is a monthly survey of households that is conducted by the BLS in partnership with the U.S. Census Bureau to provide data on the labor force, employment, unemployment, persons not in the labor force, hours of work, earnings, and other demographic and labor force characteristics.

Figure 1: Minnesota Employment Percentages by Industry Category, 2014



The following figures describe the demographic composition of the Minnesota workforce between the years 2000 and 2014. This information can be useful in providing context for the

following occupational health indicators; it can also assist in identifying at-risk employee groups in Minnesota.

Figure 2: Minnesota Unemployment Rate, 2000-2014

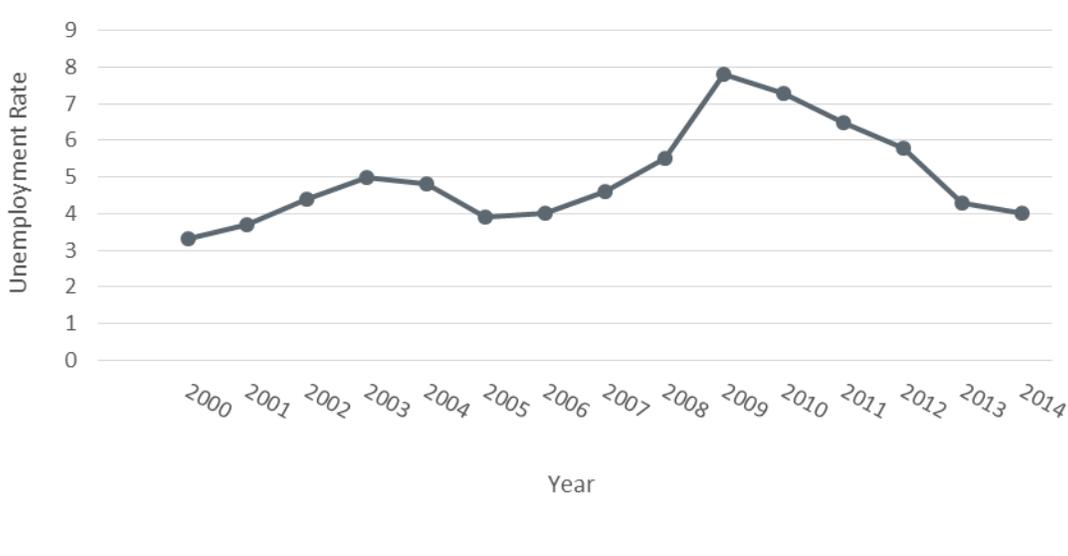


Figure 3: Minnesota Workforce by Number of Hours Worked per Week, 2000-2014

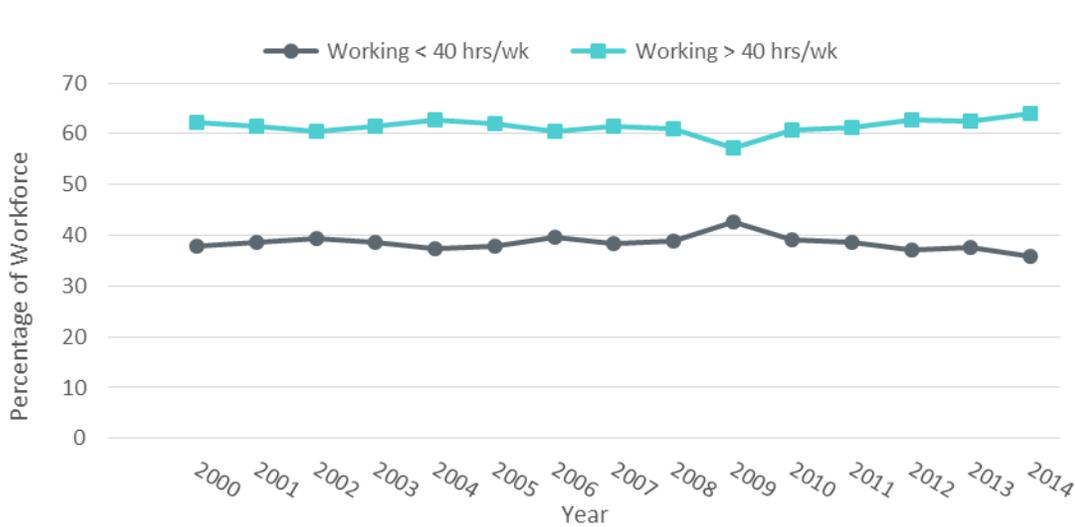


Figure 4: Minnesota Workforce by Gender, 2000-2014

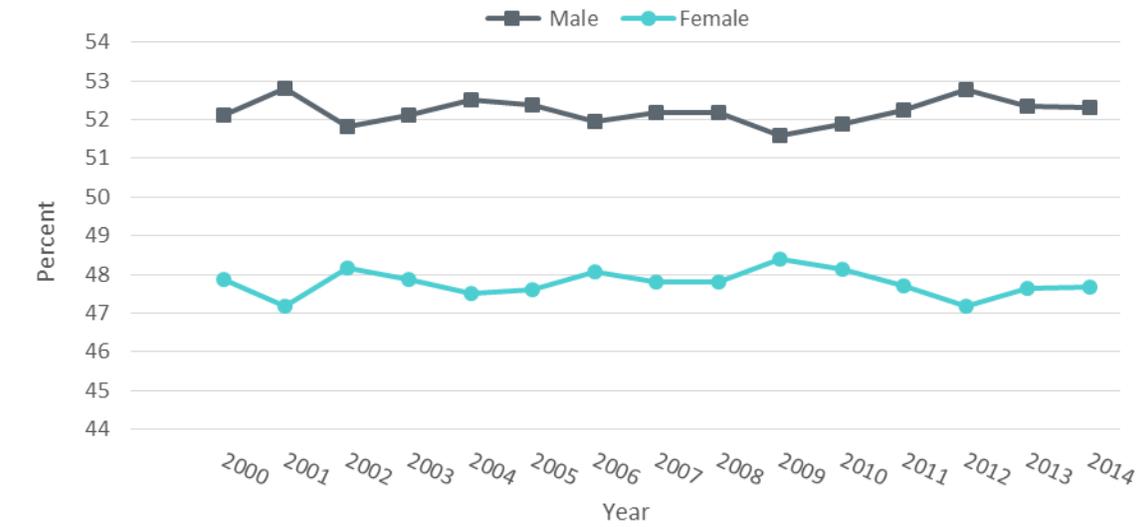


Figure 5: Minnesota Workforce by Age Groups, 2000-2013

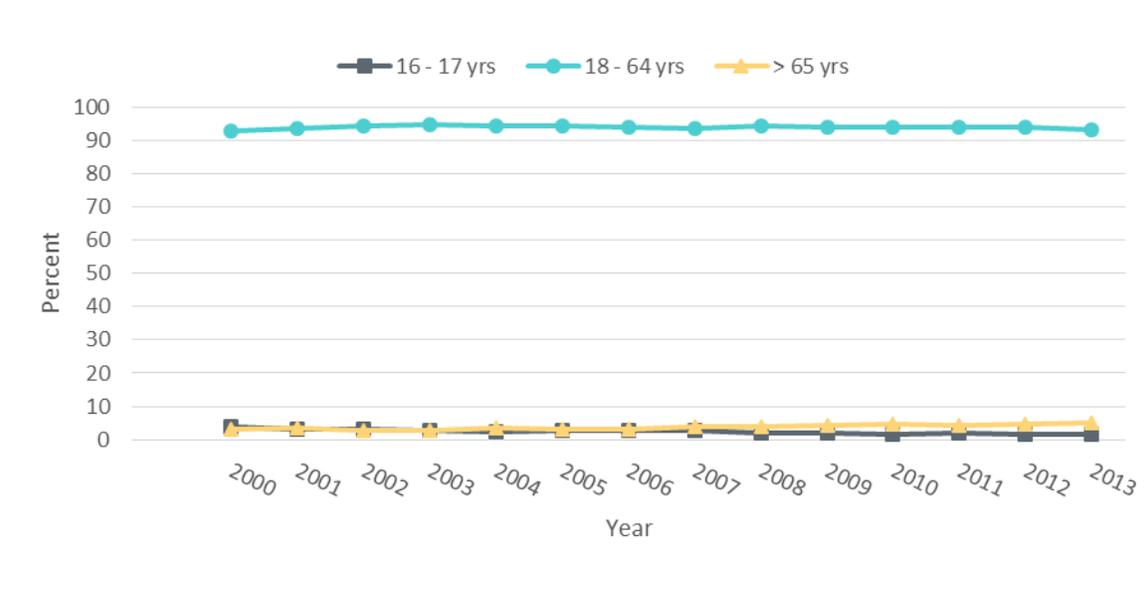


Table 1: Minnesota Employment Demographics for Employed Civilians (16 years of age or greater), 2000- 2014

Year	Number of Individuals Employed	Unemployment Rate	Self-Employed (%)	Employed Part-Time (%)	Working <40 hours/week (%)	Working ≥ 40 hours/week (%)
2000	2,649,000	3.3	8.1	19.3	37.8	62.2
2001	2,710,000	3.7	9.4	21.7	38.6	61.4
2002	2,790,000	4.4	8.8	23.0	39.4	60.7
2003	2,800,000	5.0	8.0	21.7	38.6	61.4
2004	2,815,000	4.8	8.0	21.8	37.3	62.7
2005	2,815,000	3.9	7.4	22.5	38.0	62.0
2006	2,772,000	4.0	7.3	22.5	39.6	60.4
2007	2,772,000	4.6	7.0	22.4	38.4	61.6
2008	2,731,000	5.5	6.6	21.6	38.9	61.0
2009	2,703,000	7.8	6.3	23.2	42.7	57.3
2010	2,721,000	7.3	6.2	23.2	40.2	60.8
2011	2,764,000	6.5	6.4	23.2	38.6	61.4
2012	2,776,000	5.8	6.5	21.9	37.2	62.7
2013	2,815,000	4.3	5.7	22.2	37.6	62.3
2014	2,853,000	4.0	6.1	21.3	35.9	64.0

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Table 2: Minnesota Employment Demographics for Employed Civilians (16 years of age or greater) by Age, Gender, and Race, 2000- 2014,

Year	Age 16-17	Age 18-64	Age 65+	Male	Female	White	Black	Other	Hispanic
2000	3.9	92.8	3.3	52.1	47.9	94.1	2.9	3.0	n/a
2001	3.3	93.4	3.4	52.8	47.2	94.5	2.5	3.0	n/a
2002	3.0	94.2	2.8	51.8	48.2	93.9	2.6	3.5	2.9
2003	2.6	94.7	2.9	52.1	47.9	92.8	3.0	4.2	2.9
2004	2.3	94.2	3.5	52.5	47.5	91.6	2.9	5.4	2.7
2005	2.6	94.2	3.3	52.4	47.6	91.4	2.7	5.9	3.3
2006	2.8	94.1	3.2	51.9	48.1	91.3	3.4	5.3	3.9
2007	2.6	93.6	3.8	52.2	47.8	91.1	3.5	5.4	4.0
2008	2.1	94.1	3.8	52.2	47.8	90.8	3.6	5.6	3.6
2009	1.8	93.8	4.3	51.6	48.4	92.1	3.2	4.7	3.3
2010	1.5	94.0	4.5	51.9	48.1	92.5	3.2	4.3	3.4
2011	1.8	93.9	4.3	52.2	47.7	92.4	3.1	4.5	3.9
2012	1.6	93.9	4.7	52.8	47.2	89.3	3.9	6.7	3.7
2013	1.6	93.2	5.1	52.3	47.6	88.5	4.2	7.1	4.2
2014	n/a	n/a	n/a	52.3	47.6	89.4	4.6	5.9	4.3

Non-Fatal Work-Related Injuries and Illnesses, 2000-2014

This indicator tracks work-related injuries or illnesses that require an employee to take time away from work.

Work-related *injuries* may include:

- Falls
- Burns
- Being struck or crushed
- Electric shocks
- Assaults

Work-related *illnesses* may include:

- Asthma
- Silicosis
- Carpal-tunnel syndrome
- Mesothelioma
- Contact dermatitis

Injuries and illnesses prevent an employee from participating in normal activities and adversely impact the employee, the employee's family, and the employer. Work-related injuries and illnesses are preventable with control of occupational hazards and adherence to safe work practices.

In 2014, the [U.S. Bureau of Labor Statistics](#) (BLS) reported an estimated total of nearly 3.0 million injury and illness cases within the private sector workforce, with an estimated incidence rate of 3.2 cases per 100 full-time equivalent (FTE) workers at the national level. Included in these 3.0 million injuries and illnesses were nearly 1.6 million injury and illness cases requiring days away from work, job transfer or work restrictions (a rate of 1.7 cases per 100 FTEs, continuing the same rate as in 2013). The incidence rate for public sector employees (state and local government) was significantly higher at 5.0 cases per 100 FTEs.

This indicator provides health and safety professionals with information about rates of injuries and illnesses in the state of Minnesota. This indicator utilizes data from the [Survey of Occupational Injuries and Illnesses](#) (SOII) conducted by the BLS in collaboration with the states. The survey collects injury and illness data from a probability sample of employers. The employers are randomly selected and required to provide information on injury or illness cases (recorded on the OSHA log) for a one-year period that result in one or more days of absence or restricted work. The [Minnesota Department of Labor and Industry](#) (DOLI) compiles these cases and reports for Minnesota on an annual basis. These measures are then presented in DOLI's annual [Minnesota Workplace Safety Report](#).

Of the 67,300 injuries and illnesses that occurred in Minnesota in 2014, almost 10% (7,390) of those individuals required 10 or more days away from work.

The figures below depict the number of injuries and illnesses reported by employers for each year between 2000 and 2014. The figures and tables provide information for both the private

and public employment sectors. The public employment sector includes those in state government, police, fire fighters, and other city and local employees. The higher rate of injuries for those in the private and public sector versus only the private sector has remained similar over the past 15 years. The figures also show a significant ($p < .05$) decline in the number of occupational injuries and illnesses that occurred from 2000 to 2014. While the declining trend in injury and illness is encouraging, there continues to be a huge toll of preventable occupational injuries and illnesses.

Figure 6: Estimated Total Number of Minnesota Work-Related Injuries and Illnesses, 2000-2014

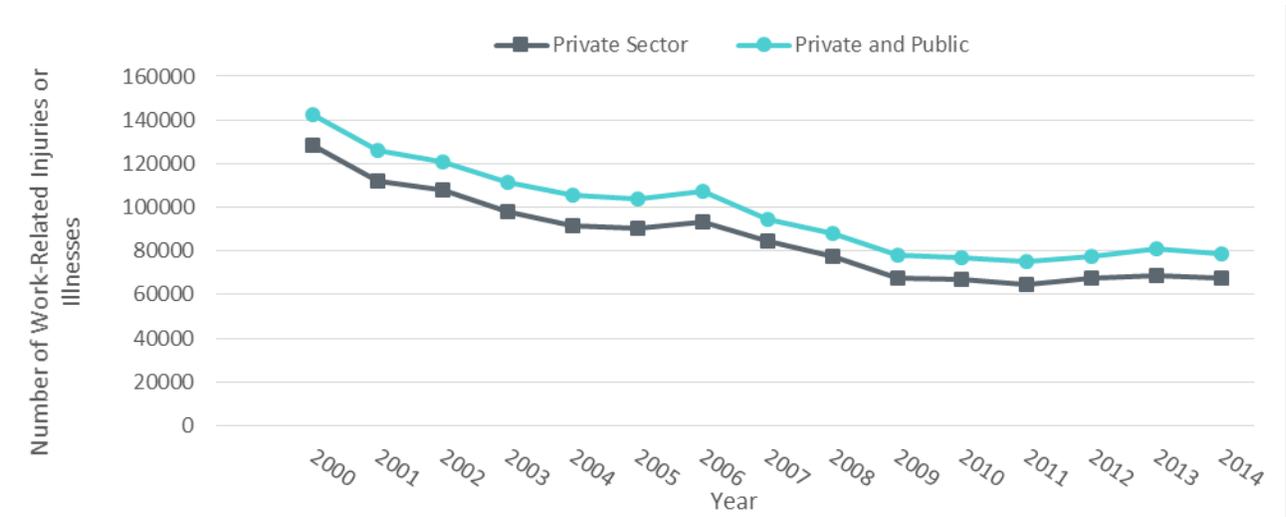


Figure 7: Incidence Rates of Total Work-Related Injuries and Illnesses per 100 Full-time Workers, 2000-2014

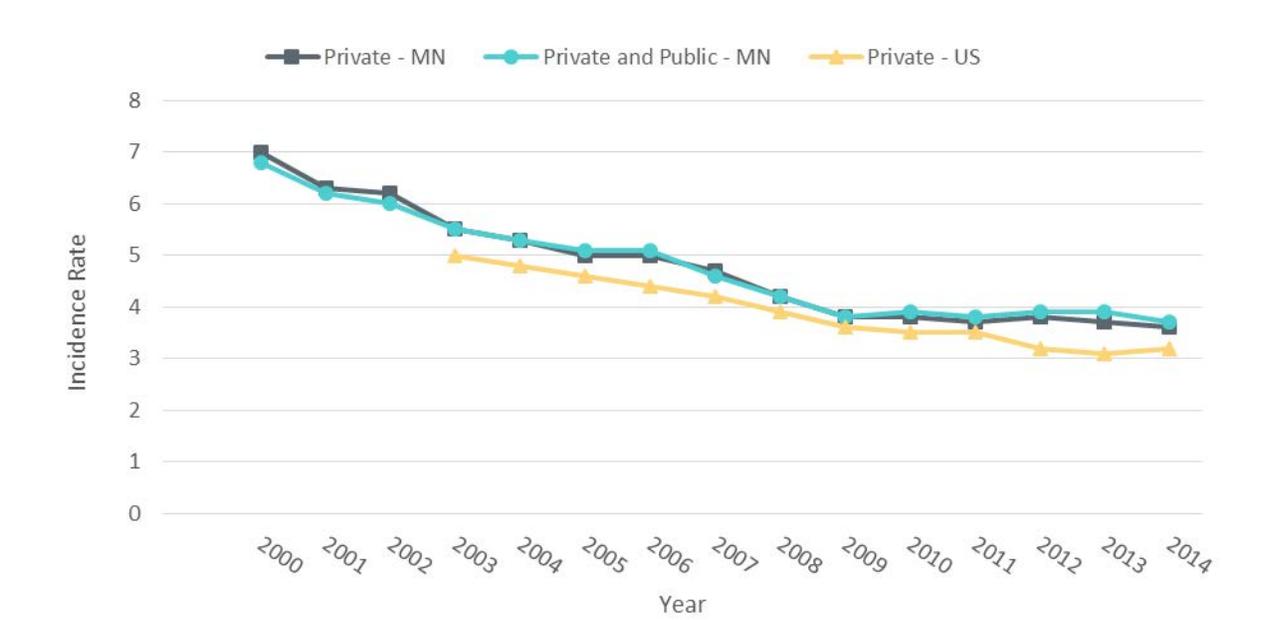


Figure 8: Estimated Total Number of Cases Involving Days Away from Work, 2000-2014

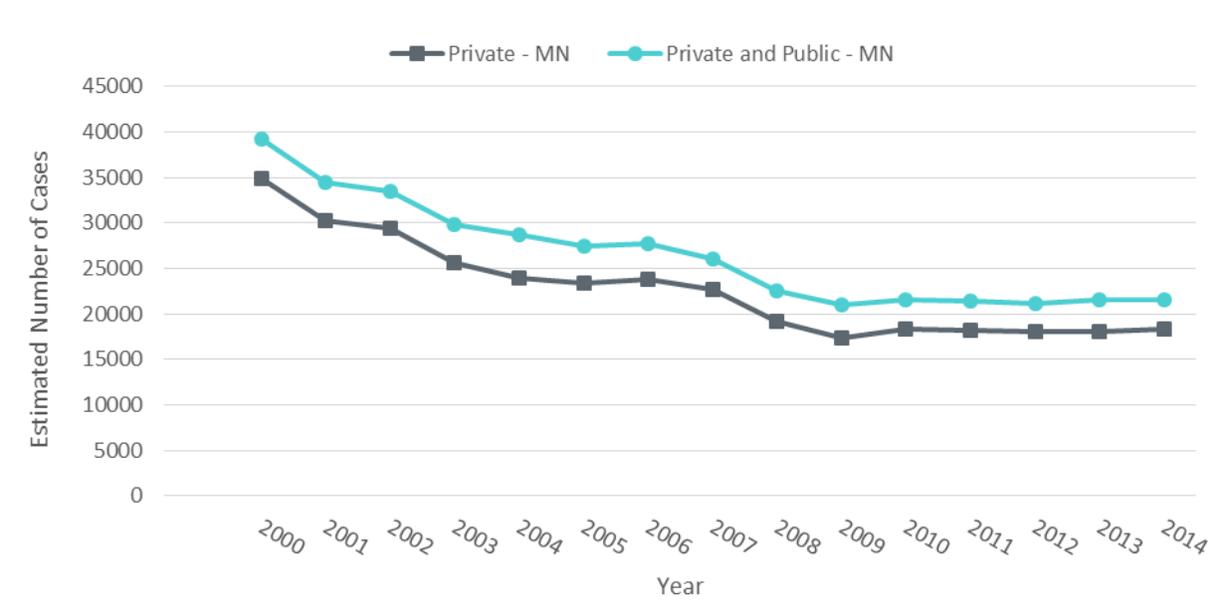


Figure 9: Incidence Rate of Total Number of Cases Involving Days Away from Work, 2000-2014

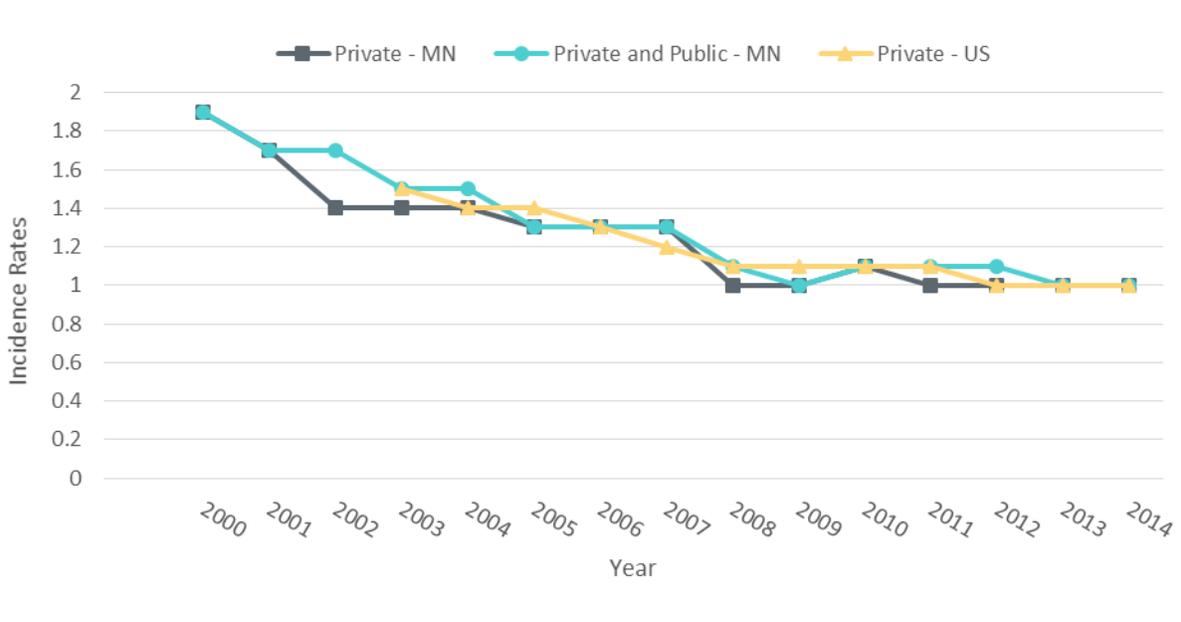
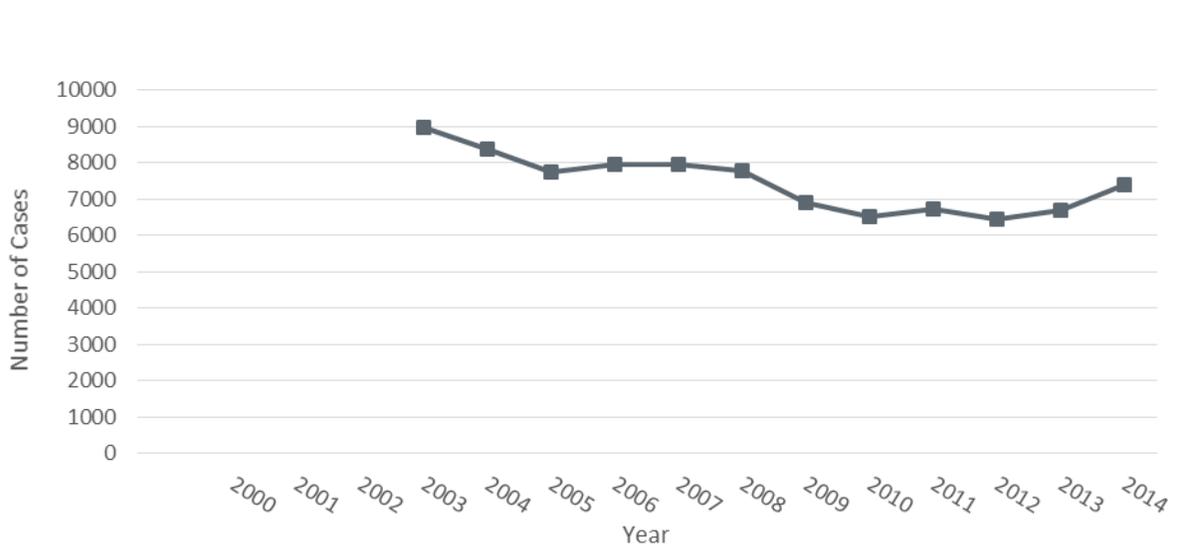


Figure 10: Estimated Total Number of Cases Involving 10 or More Days Away from Work, 2003-2014



Days of work loss due to injury and illness are detrimental for both the employee and employer. Debilitating injury and illness may require that the individual miss work, receive reassignment for a short or extended period, or leave the place of employment permanently. These productivity losses can be costly for an employer as they may require reassignment or having to hire and train new staff. Prevention of injury and illness can often be addressed with engineering controls or addressing unsafe working behaviors or habits by instituting a culture of safety in a workplace.

Table 3: Estimated Counts and Rates of Work-Related Injuries and Illnesses, 2000-2014

Year	Estimated Total of Work-Related Injuries and Illnesses (private sector)	Estimated Total of Work-Related Injuries and Illnesses (private and public sectors)	Incidence Rates of Work-Related Injuries and Illnesses (private sector) (US Private Rate)	Incidence Rates of Work-Related Injuries and Illnesses (private and public sectors)
2000	128,600	142,500	7.0	6.8
2001	120,000	125,800	6.3	6.2
2002	107,800	120,500	6.2	6.0
2003	97,700	111,600	5.5 (5.0)	5.5
2004	91,800	105,500	5.3 (4.8)	5.3
2005	90,600	104,100	5.0 (4.6)	5.1
2006	93,000	107,100	5.0 (4.4)	5.1
2007	84,800	94,200	4.7 (4.2)	4.6
2008	77,300	87,900	4.2 (3.9)	4.2
2009	67,800	78,100	3.8 (3.6)	3.8
2010	66,700	76,700	3.8 (3.5)	3.9
2011	64,700	75,400	3.7 (3.4)	3.8
2012	67,500	77,600	3.8 (3.4)	3.9
2013	68,500	81,200	3.7 (3.3)	3.9
2014	67,300	78,700	3.6 (3.2)	3.7

Table 4: Estimated Counts and Rates of Work-Related Injuries and Illnesses Requiring Days Away From Work (DAFW), 2000-2014

Year	Estimated Total of Work-Related Injuries and Illnesses w/DAFW (private sector)	Estimated Total of Work-Related Injuries and Illnesses w/DAFW(private and public sectors)	Incidence Rates of Work-Related Injuries and Illnesses w/DAFW (private sector) (US Private Rate)	Incidence Rates of Work-Related Injuries and Illnesses w/DAFW (private and public sectors)	Number of Work-Related Illnesses and Injuries with 10 or more DAFW (private sector)
2000	34,900	39,200	1.9	1.9	n/a
2001	30,300	34,500	1.7	1.7	n/a
2002	29,400	33,500	1.4	1.7	n/a
2003	25,600	29,900	1.4 (1.5)	1.5	8,970
2004	24,000	28,700	1.4 (1.4)	1.5	8,370
2005	23,400	27,400	1.3 (1.4)	1.3	7,750
2006	23,800	27,700	1.3 (1.3)	1.3	7,940
2007	22,700	26,100	1.3 (1.2)	1.3	7,950
2008	19,200	22,600	1.0 (1.1)	1.1	7,770
2009	17,400	21,000	1.0 (1.1)	1.0	6,910
2010	18,300	21,500	1.1 (1.1)	1.1	6,530
2011	18,200	21,400	1.0 (1.1)	1.1	6,720
2012	18,000	21,200	1.0 (1.0)	1.1	6,450
2013	18,000	21,500	1.0 (1.0)	1.0	6,680
2014	18,400	21,600	1.0 (1.0)	1.0	7,390

Work-Related Hospitalizations, 2000-2013

This indicator tabulates the number of hospitalizations that occur from work-related injuries or illnesses. The events recorded by this indicator are a subset of the injuries and illnesses reported in the previous indicator, “Non-Fatal Work-Related Injuries and Illnesses Reported by Employers”. These events required an inpatient stay at a hospital with workers’ compensation as the recorded payer. Minnesota hospital discharge billing data is used to create this indicator.

In 2010, an estimated 114,242 work-related hospitalizations occurred nationally.

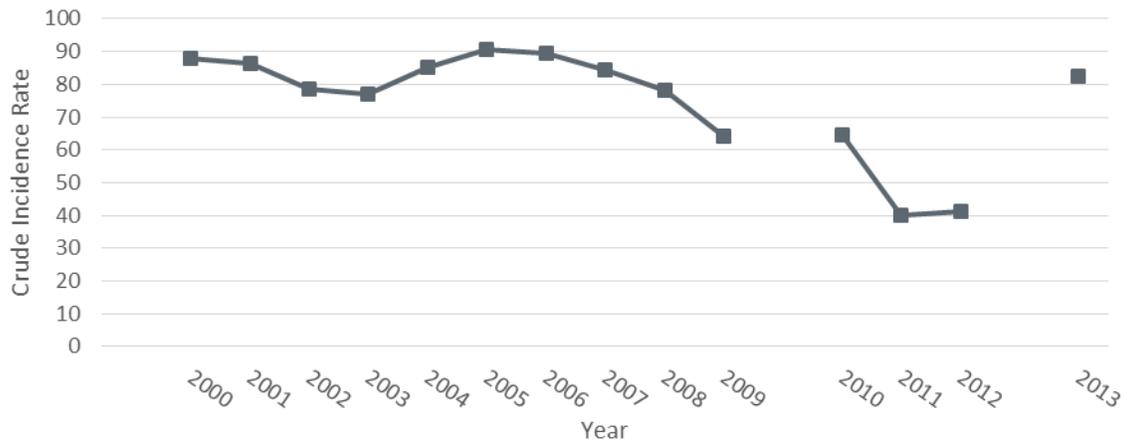
Hospitalizations that occur due to a work-related injury are not only expensive to treat but disruptive to the workplace and production.

In 2014, the average age of an individual hospitalized for a work-related injury was 50 years old with the youngest 16 years of age and the oldest 72 years of age. Of all work-related hospitalizations, 74% were male; this is possibly a function of gender differences among industry employment categories.

Table 5: Annual Number and Rate of Work-Related Hospitalizations, 2000-2013

Year	Number of Work-Related Hospitalizations	Incidence Rate (per 100,000 employed persons \geq 16 years of age)
2000	2,324	87.7
2001	2,345	86.5
2002	2,192	78.6
2003	2,143	77.1
2004	2,382	85.1
2005	2,548	90.5
2006	2,522	89.6
2007	2,335	84.2
2008	2,130	77.9
2009	1,739	64.3
2010	1,756	64.5
2011	1,112	40.2
2012	1,147	41.3
2013	2,322	82.4

Figure 11: Annual Crude Rate of Work-Related Hospitalizations per 100,000 Employed Persons 16 years of Age and Older, 2000-2013



A trend analysis was not completed due to a coding discrepancy over the years 2010 – 2012, leading to an undercount in the number of workers' compensation cases. Several issues need to be considered when interpreting this indicator. Due to the differences in provider recognition and payment mechanisms there will be an undercount in the number of work-related injuries and illnesses identified in the hospitalization billing data. Recognition by the provider or employee of the injury or illness as work-related does not always occur and employees do not always apply for workers' compensation, further decreasing the number of work-related injuries and illnesses reported. Also of concern, individuals employed in farming, independent contractors, longshoremen and maritime workers, and federal employees are not covered by workers compensation which may increase the undercount. While these issues create an undercount, the number of work-related hospitalizations that occur each year due to a work-related injury and illness are numerous with over 2,000 hospitalizations each year.

Fatal Work-Related Injuries, 2000-2014

This indicator tracks fatal work-related injuries. Nationally, each year almost 5,000 deaths are reported through the [Census of Fatal Occupational Injuries](#) (CFOI). Fatalities due to work-related injuries are devastating for the family of the deceased and also for the employer and co-workers. The losses of a contributing workforce member and the economic stability provided by the individual to the family are substantial. This indicator provides information to possibly identify new hazards and at-risk populations. By defining hazards and identifying at-risk populations, new and improved safety standards and protocols can be developed or enforcement of existing standards or better training or establishing priorities for prevention can be created. The data can also be used to evaluate current health and safety practices to prevent fatal injuries in the workplace.

The CFOI is conducted annually by the [Bureau of Labor Statistics](#) (BLS). The CFOI cross-references a number of sources: death certificates, workers' compensation reports, and federal and state agency administrative reports to compile as complete a list as possible of all occupationally related fatal injuries that occur in the United States. The CFOI is a cooperative program between the states and the federal government and has been operational since 1992. Information and statistics regarding job-related injuries, illnesses, and fatalities can also be found in the Minnesota Department of Labor and Industry (DOLI) annual [Minnesota Workplace Safety Report](#).

In 2014, the CFOI collected 4,821 reports of fatal work-related injuries in the United States. This is particularly concerning as work-related injuries often are preventable. At the national level the occupational groups with high rates of fatality in 2014 included construction, transportation and warehousing, and agriculture, forestry, fishing, and hunting. Agriculture, forestry, fishing and hunting has accounted for approximately a 1/3rd of all work-related deaths between the years 2000 and 2014. Just under half (41%) of all occupational fatalities in the United States were involved in a transportation incident.

Of the 62 fatal injuries that occurred in Minnesota in 2014, 60 were male, 24 were transportation incidents, 14 occurred due to contact with objects or equipment, 8 were due to an assault or violent act, 9 were due to falling, and 4 were due to exposure to a harmful substance or environment. Rates of fatal work-related injuries in Minnesota have remained fairly consistent over the past ten years, the greatest number occurred in 2005 with 87 fatalities and the lowest occurred in 2011 with 60 recorded fatalities. In 2014 the rate of injuries per 100,000 full-time employees was 2.3 in Minnesota, below the national rate of 3.4 fatal injuries per 100,000 full-time equivalent workers.

Table 6: Annual Number and Crude Rate of Work-Related Fatalities in Minnesota, 2000-2014

Year	Number of Fatalities	Fatality Crude Rate (per 100,000 employed persons age 16 and older)
2000	68	2.8
2001	76	3.0
2002	81	3.2
2003	72	2.8
2004	80	3.1
2005	87	3.3
2006	78	3.0
2007	72	2.8
2008	65	2.6
2009	61	2.5
2010	70	2.8
2011	60	2.2
2012	70	2.7
2013	69	2.6
2014	62	2.3

Figure 12: Annual Number of Fatal Work-Related Injuries in Minnesota, 2000-2014

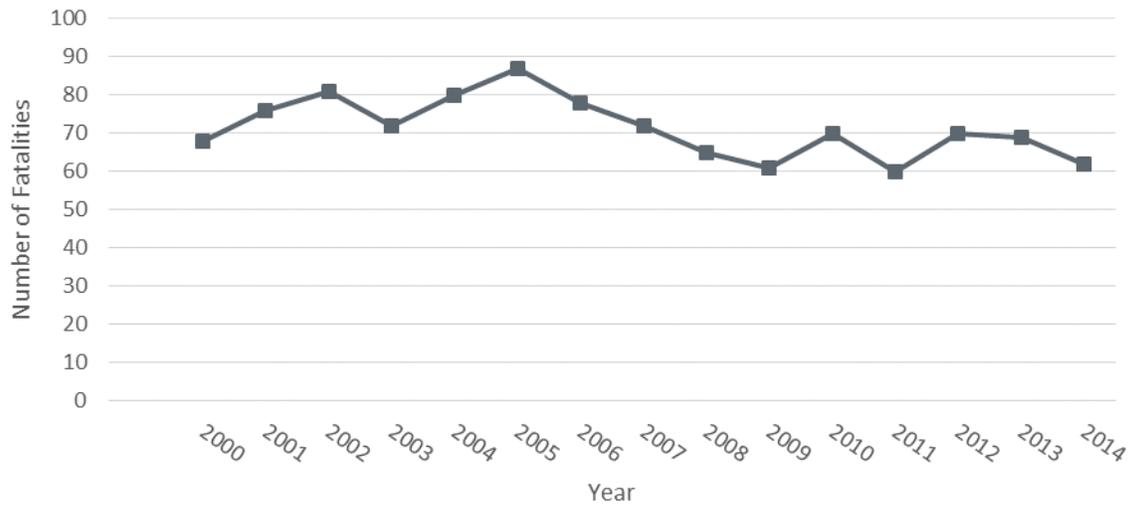
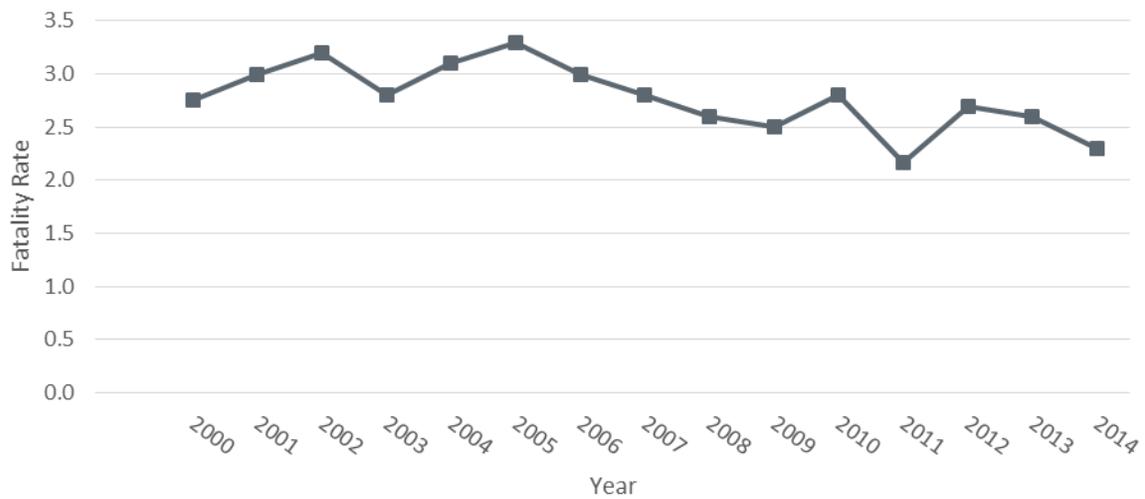


Figure 13: Annual Crude Rate of Fatal Work-Related Injuries per 100,000 Employed Persons, 2000-2014



Trend analysis of the indicator rate from 2000 through 2012 demonstrated a non-significant decline in the number of work-related fatal injuries.

Work-Related Amputations with Days Away From Work (DAFW) (Reported by Employers), 2000-2014

Amputations are preventable and debilitating injuries that lead to losses in productivity and income. Review of these injuries and tracking of these events can provide valuable information in the development and improvement of prevention strategies and regulations to protect workers.

Two indicators are used to describe the number of work-related amputations. For the indicator described here, the annual number of work-related amputations is based on data from the Bureau of Labor Statistics (BLS) Survey of Occupational Injuries and Illnesses (SOII). A second indicator—described later—is based on the annual number of amputations reported through the state workers' compensation program. While these two indicators measure similar outcomes, the data used to compile/create each indicator will produce difference estimates of the number of amputations with lost work time. These differences are due in part to the methods in which data is collected and recorded. To obtain the best picture of the number of amputations with lost work time, both indicators are necessary.

The SOII, which is used to create this indicator, is conducted annually by the BLS. The SOII is a survey of randomly selected employers throughout the United States. Employers selected to participate are required to record all workplace injuries that receive treatment beyond that of first aid. The SOII makes use of these records by requiring the randomly selected employers to submit their injury logs to the BLS.

Although work-related amputations, both fatal and non-fatal, occur less frequently than other work-related injuries, they are often more severe and profoundly impact both the worker and employer.

In 2014, [SOII data](#) estimated that there were 4,900 non-fatal work-related amputations reported by employers in the United States. About 96% of these amputations were to the hand (most likely involving fingers). From 2003 to 2014 non-fatal amputations have declined over time, with the greatest number of injuries in 2005 with 8,450 and the lowest in 2014 with 4,900, an incidence rate of 0.5/10,000 full-time workers. The industries with the largest number of amputations included production, transportations and material moving, service and installation. The median number of days away from work for those with an amputation was 19 days in 2014.

Of the 130 amputations that occurred in Minnesota in the year 2014, all 130 were among males, between the ages of 20 and 44, employed in either production or installation. 110 were white (with 20 not reporting race); the median number of days away from work was 7, with 80 of the cases involving 6-10 days away from work; and finally, all of the amputations involved contact with an object, equipment, and material.

Table 7: Annual Number and Crude Rate of Work-Related Amputations Reported by Employers in Minnesota, 2000-2014

Year	Number of Amputations	Rate (per 100,000 Full-time Workers)
2000	168	9.0
2001	96	5.0
2002	214	12.0
2003	130	7.0
2004	180	11.0
2005	170	9.0
2006	160	9.0
2007	90	5.0
2008	160	9.0
2009	150	8.0
2010	40	2.0
2011	90	5.0
2012	100	6.0
2013	60	3.0
2014	40	2.0

Figure 14: Estimated Annual Number of Work-Related Amputations with Days Away from Work Reported by Employers, 2000-2014

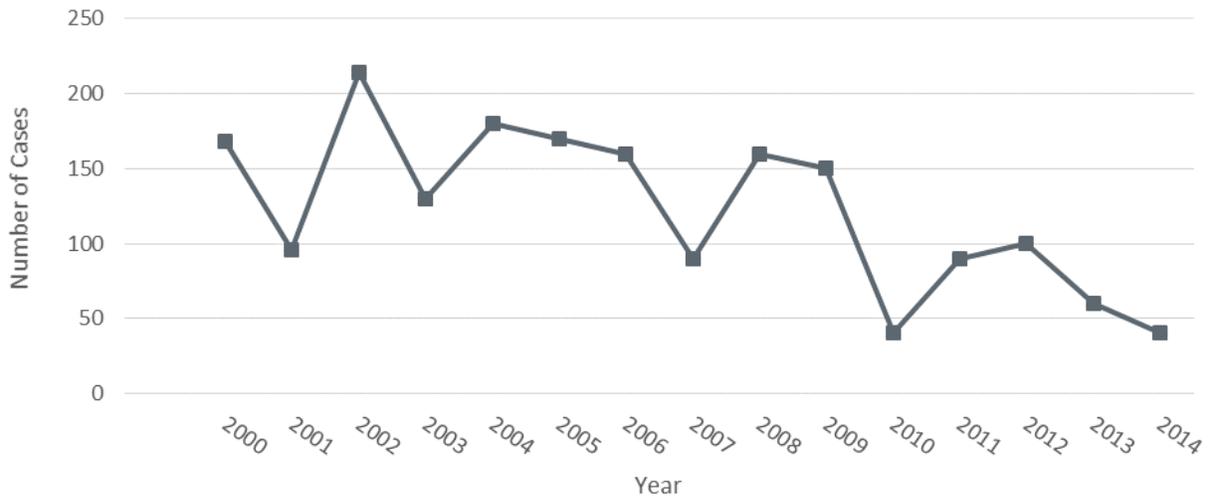
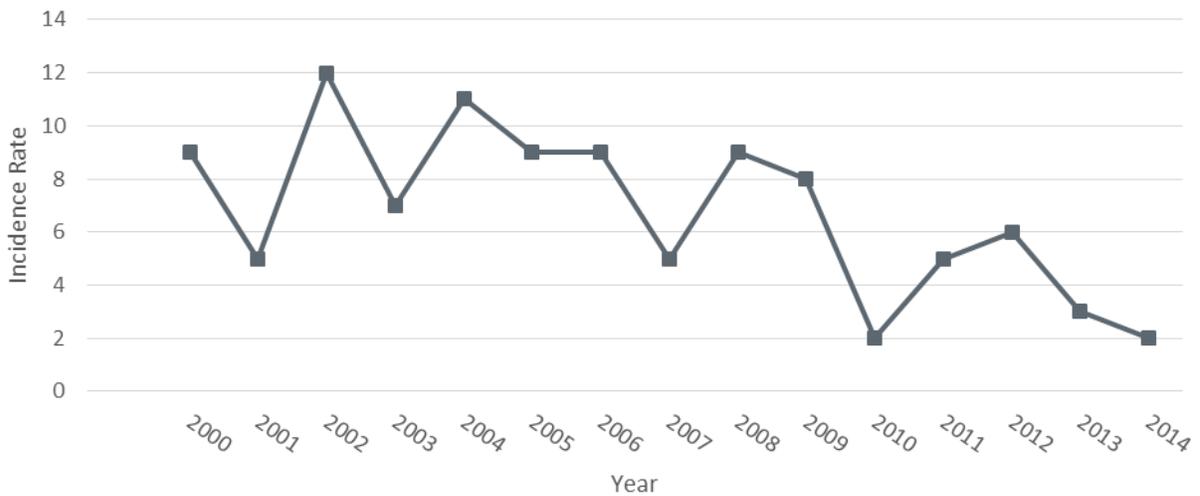


Figure 15: Annual Incidence Crude Rate of Work-Related Amputations with Days Away from Work Reported by Employers per 100,000 Full-Time Workers, 2000-2014



Trend analysis of this indicator found the number of work-related amputations reported by employers to have a significant decreasing trend.

Work-Related Amputations with Lost Work-Time (Reported through Workers' Compensation), 2000-2015

Amputations are preventable and debilitating injuries that lead to losses in productivity and income. Review of these injuries and tracking of these events can provide invaluable information in the development and improvement of prevention strategies and regulations to protect workers.

As previously noted, two indicators in this report estimate the number of amputations that occur due to work-related activities. The first indicator measured the number of work-related amputations that occur in a year based on data from the annual BLS SOII. The second indicator—presented here—documents the number of amputations reported through the state workers' compensation program. While these two indicators measure similar outcomes, the data used to compile/create each indicator produces different estimates of the number of amputations with lost work time. Multiple data sources can provide a more complete picture of the number of amputations with lost work time.

This indicator utilizes Minnesota workers' compensation claims data to characterize the number, rate, and trend of amputation cases filed through workers' compensation.

The Minnesota Department of Labor and Industry (DOLI) collects and maintains the workers' compensation claims dataset. MN DOLI provides data to the MDH Center for Occupational Health and Safety for the completion of this indicator. The DOLI research and statistics unit creates a number of reports and other informational products on workers' compensation claims and the impact they have on Minnesota's worker population; these reports are available on their [website](#).

The difference in the number of amputation cases between the previous OHI, *Work-Related Amputations with Days Away from Work Reported by Employers*, and this indicator is due in large part to the data sources utilized to calculate each one. The *Work-Related Amputations with Days Away from Work Reported by Employers* indicator makes use of the BLS SOII, which is a survey of randomly selected employers. Whereas this indicator makes use of workers' compensation indemnity claims to enumerate the number of amputations annually. The data collected by the SOII is used to estimate the number of cases that occur annually based upon the number of cases reported by the survey sample. The number of cases filed through workers' compensation is subject to the rules and regulations governing workers' compensation in the state of Minnesota. These constraints on data collection will influence the number of cases collected by each system. Despite these differences in collection methodology, the two indicators demonstrate a level of agreement in the number of amputation cases that have occurred in Minnesota on an annual basis.

Table 8: Annual Number and Crude Rate of Amputation Cases with Lost Work-Time filed with State Workers' Compensation in Minnesota, 2000 - 2015

Year	Number of Amputations	Incidence Rate (per 100,000 Workers)
2000	151	5.9
2001	126	4.9
2002	106	4.2
2003	190	7.5
2004	179	6.9
2005	173	6.6
2006	182	6.9
2007	142	5.4
2008	162	6.2
2009	115	4.6
2010	107	4.3
2011	85	3.3
2012	101	3.9
2013	115	4.4
2014	85	3.2
2015	118	4.5

Figure 16: Annual Number of Amputations with Lost Work-Time filed with State Workers' Compensation in Minnesota, 2000-2015

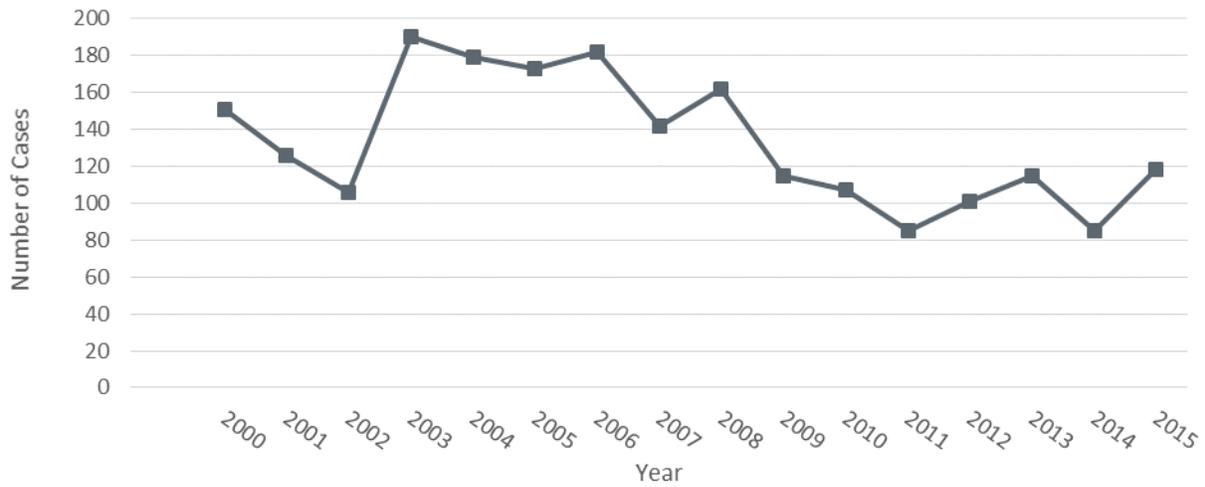
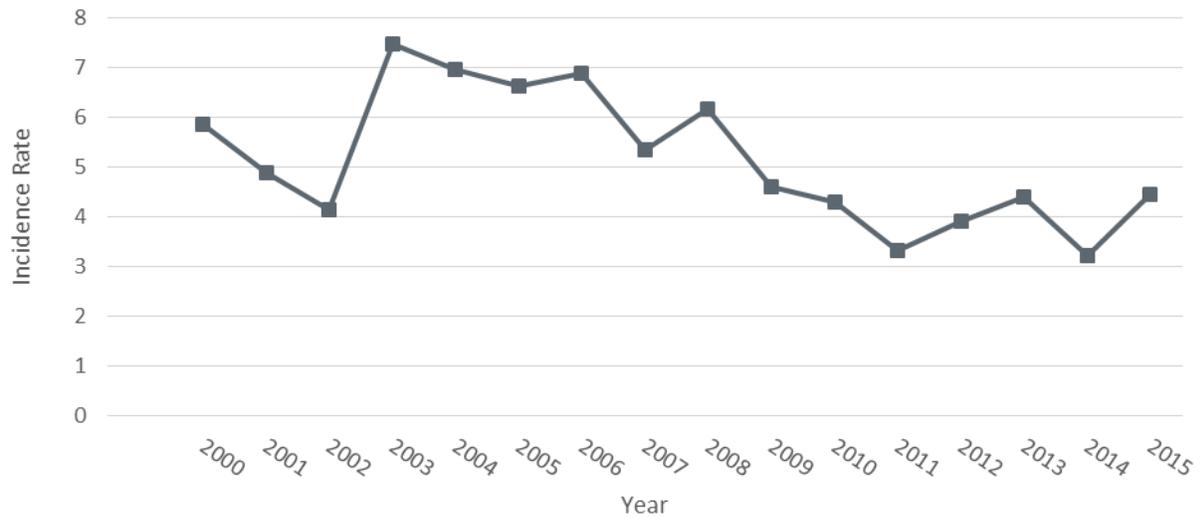


Figure 17: Annual Incidence Crude Rate of Workers' Compensation Claims for Amputations with lost Work-Time per 100,000 Workers in Minnesota, 2000-2015



Trend analysis of both indicators demonstrates a significant decreasing trend between 2000 and 2015.

Hospitalizations for Work-Related Burns, 2000-2013

This indicator uses hospital discharge data to track work-related burns.

Although work-related hospitalized burns are unusual events, they are some of the most devastating, painful, and expensive injuries to treat. Many burns result in disfigurement, often leaving the individuals unable to maintain their current position in the workforce. NIOSH estimated that there are 150,000 work-related burns treated in emergency rooms each year in the United States. An estimated 30 to 40% of these work-related burns are among younger people and males are more frequently affected.

Work-related burns are identified from hospital discharge data based on the payer; the cases with workers' compensation listed as the primary payer are assumed to have a relationship to work. However, not all burns related to work activity will make use of workers' compensation to cover the related healthcare costs. If a provider is unaware, or an employee fails to report that the injury occurred during a work-related activity it will not be recorded as such. In addition, farmers, independent contractors, federal employees, and longshoremen and maritime workers are not eligible for state workers compensation, further decreasing the capture and count of work-related injuries. All of these factors will contribute to an undercount of work-related burns. While this indicator will not capture all work-related burns, it provides useful information in identifying demographic and other characteristics of burn victims as well as whether the number of burns is increasing or decreasing over time.

In 2013 the average age of an individual suffering a work-related burn requiring hospitalization was 41 years of age. Approximately 92% of all work-related burn victims were male, a pattern consistent over the past 14 years.

Table 9: Annual Number and Crude Rate of Work-Related Burns Requiring Hospitalization in Minnesota (16 years of age or greater), 2000-2013

Year	Number of work-related burns	Incidence Rate (per 100,000 employed persons \geq 16 years of age)
2000	67	2.5
2001	65	2.4
2002	75	2.7
2003	61	2.2
2004	61	2.2
2005	61	2.2
2006	51	1.8
2007	35	1.3
2008	38	1.4
2009	22	0.8
2010	24	0.9
2011	18	0.7
2012	32	1.15
2013	29	1.03

Figure 18: Annual Number of Hospitalizations for Work-Related Burns for Persons 16 Years of Age and Older, 2000-2013

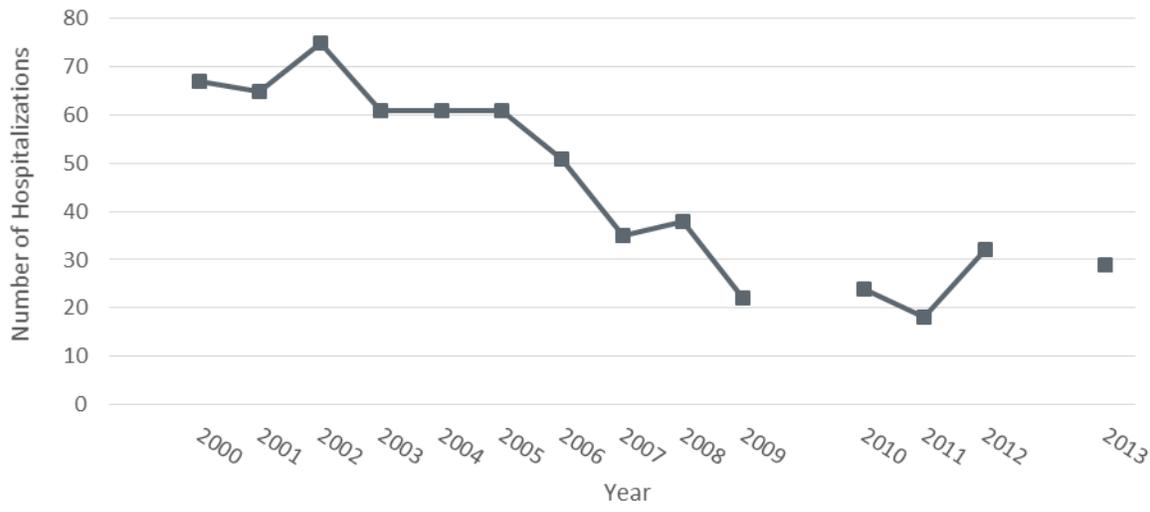
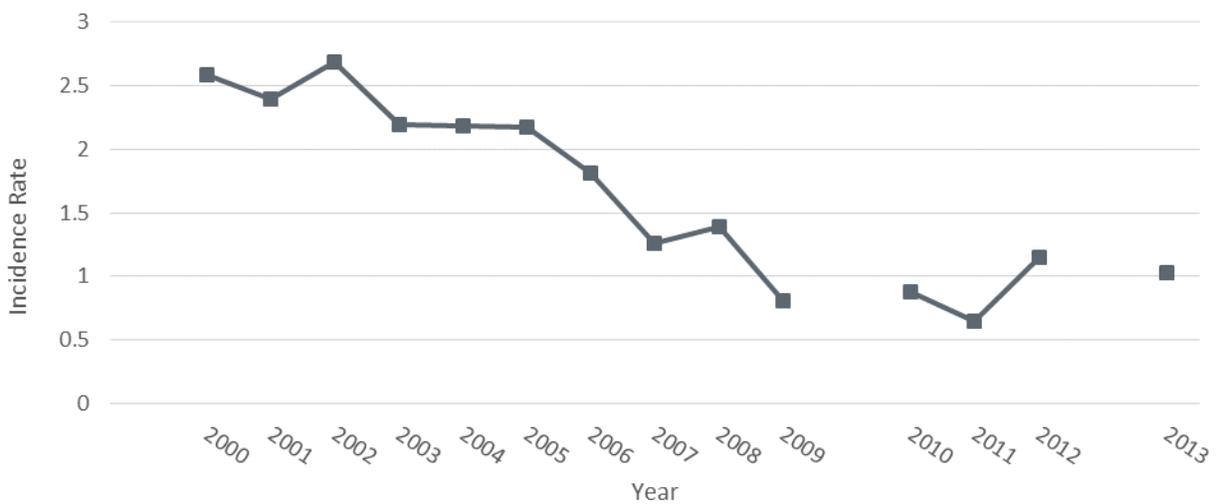


Figure 19: Annual Incidence Crude Rate of Work-Related Hospitalizations for Burns per 100,000 Workers 16 Years of Age and Older, 2000-2013



Trend analysis was deemed inappropriate due to a coding discrepancy over the time period 2010 - 2012. Unfortunately, an individual's occupation is not captured at the time of hospitalization making it difficult to identify at-risk occupational populations from this data source.

Work-Related Musculoskeletal Disorders with Days Away from Work (Reported by Employers), 2000-2014

This indicator measures the number of individuals reported by employers to have missed days of work due to a musculoskeletal disorder. Musculoskeletal disorders include carpal tunnel syndrome, injury to the neck and shoulders, or injury to the back.

Musculoskeletal disorders usually develop due to overuse of muscles, poor posture, or repeated movement. Work-related musculoskeletal disorders are preventable. With appropriate training, correct controls and efficient ergonomic design in place, employees can avoid injuries caused by repetitive stress movements and improper body alignment.

SOII data was used to create this indicator. The SOII is a random sampling of employers to collect information on employee injury and illness in a given calendar year. Each randomly selected employer is required to record any injury requiring any treatment greater than first aid in the company OSHA log. At the conclusion of the year, these logs are provided to the BLS as part of the SOII. These data are then used to estimate national and state rates of injury and illness.

Table 10: Annual Number and Crude Rate of All Musculoskeletal Disorders Involving Days away from Work in Minnesota, 2000-2014.

Year	Number of Cases	Incidence Rate (per 100,000 full-time Workers)
2000	14872	805
2001	11833	667
2002	12025	687
2003	9940	558
2004	9770	563
2005	9000	500
2006	8730	473
2007	9460	467
2008	7410	398
2009	6710	372
2010	7240	416
2011	7200	407
2012	7030	396
2013	6950	381
2014	7370	392

Figure 20: Annual Number of all Musculoskeletal Disorders Involving Days Away from Work in Minnesota, 2000-2014

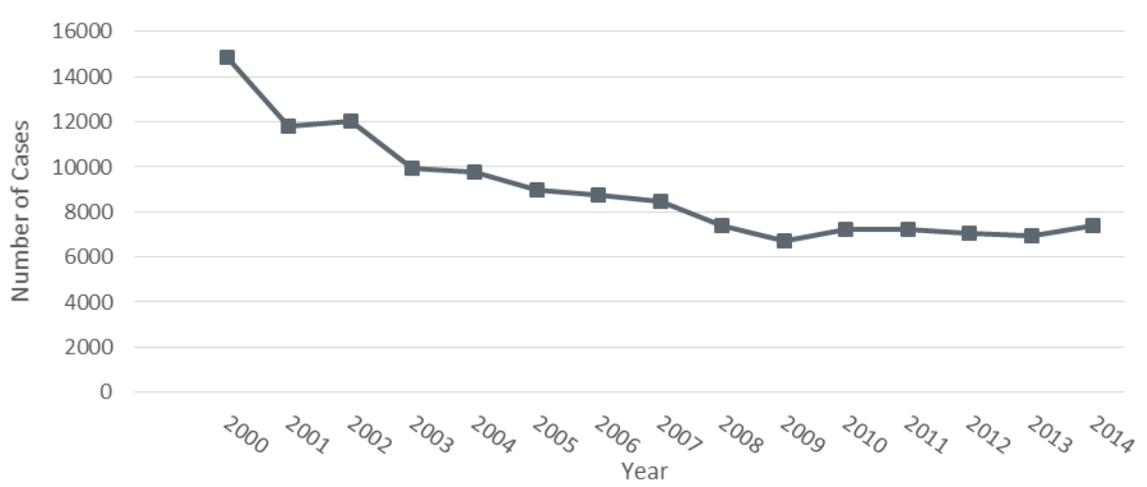


Figure 21: Annual Crude Rate of all Musculoskeletal Disorders Involving Days Away from Work in Minnesota, 2000-2014

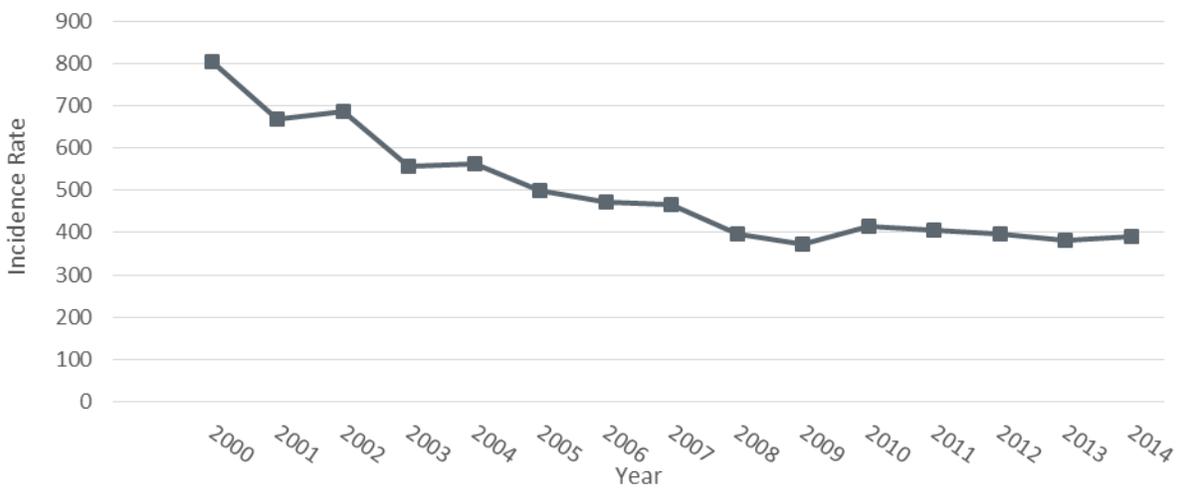


Table 11: Annual Number and Crude Rate of Musculoskeletal Disorders of the Neck, Shoulder, and Upper Extremities Involving Days Away from Work in Minnesota, 2000-2014

Year	Number of Cases	Incidence Rate (per 100,000 full-time workers)
2000	1962	115
2001	3347	189
2002	3335	191
2003	2750	154
2004	3100	178
2005	2390	133
2006	2550	139
2007	2240	123
2008	2110	113
2009	1710	95
2010	1980	114
2011	1820	103
2012	2220	125
2013	2380	130
2014	2110	113

Figure 22: Annual Number of Neck, Shoulder, and Upper Extremity Disorders with Days Away from Work in Minnesota, 2000-2014

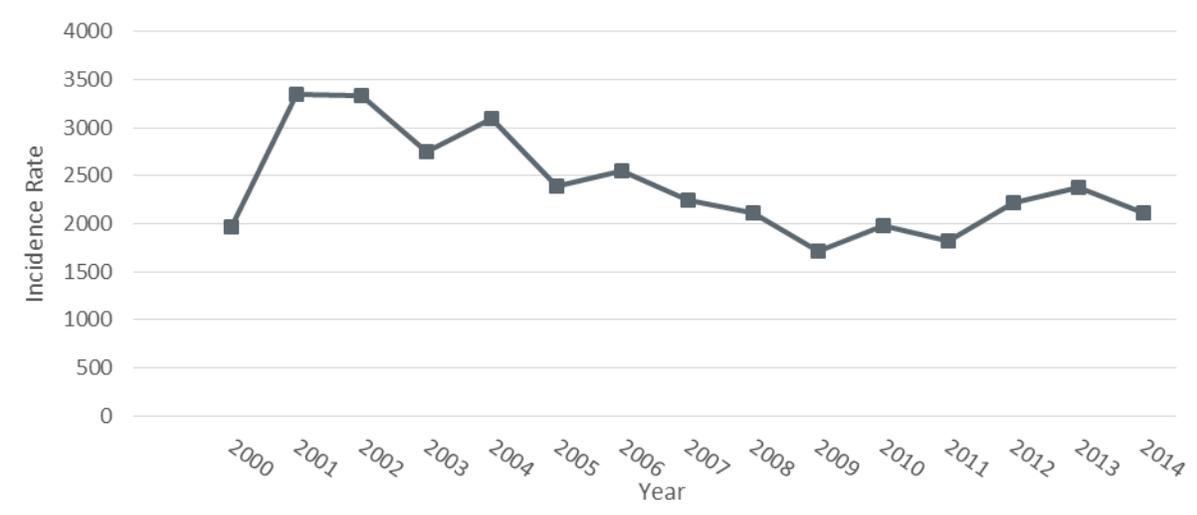


Figure 23: Annual Incidence Crude Rate per 100,000 Full-Time Workers of Neck, Shoulder, and Upper Extremity Disorders with Days Away from Work in Minnesota, 2000-2014

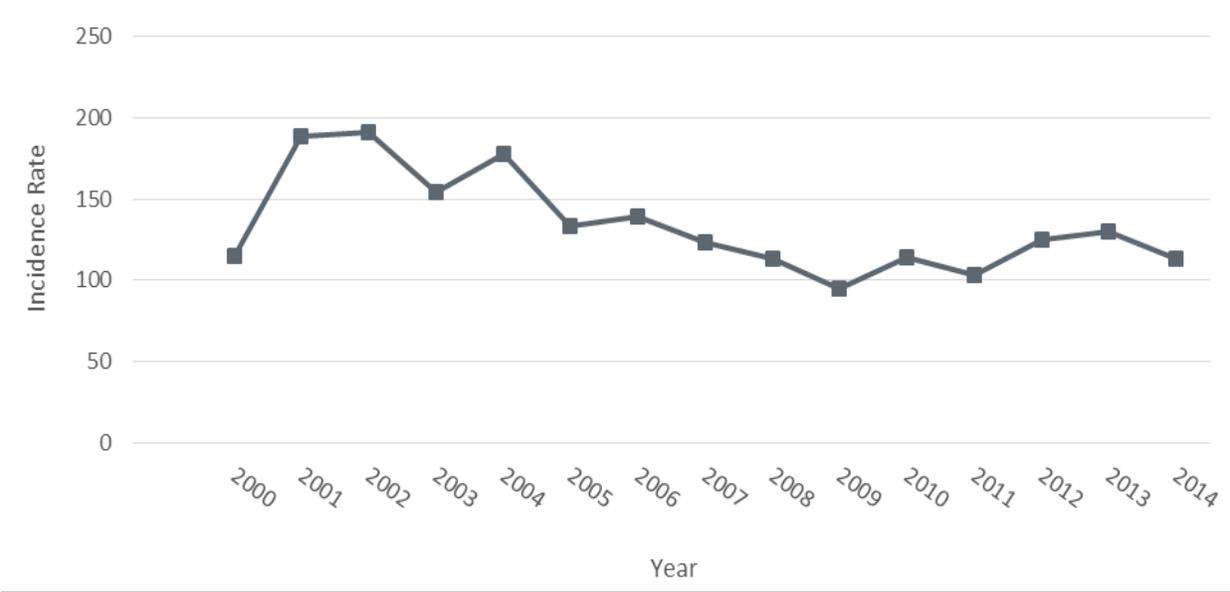


Table 12: Annual Number and Incidence Crude Rate of Carpal Tunnel Syndrome Cases Involving Days Away from Work in Minnesota, 2000-2014

Year	Number of Cases	Incidence Rate (per 100,000 full-time workers)
2000	875	47
2001	666	38
2002	808	46
2003	630	35
2004	550	32
2005	360	20
2006	590	32
2007	350	19
2008	300	16
2009	310	17
2010	310	18
2011	120	7
2012	140	8
2013	210	11
2014	280	15

Figure 24: Annual Number of Carpal Tunnel Syndrome Cases Involving Days Away from Work Reported by Employers in Minnesota, 2000-2014

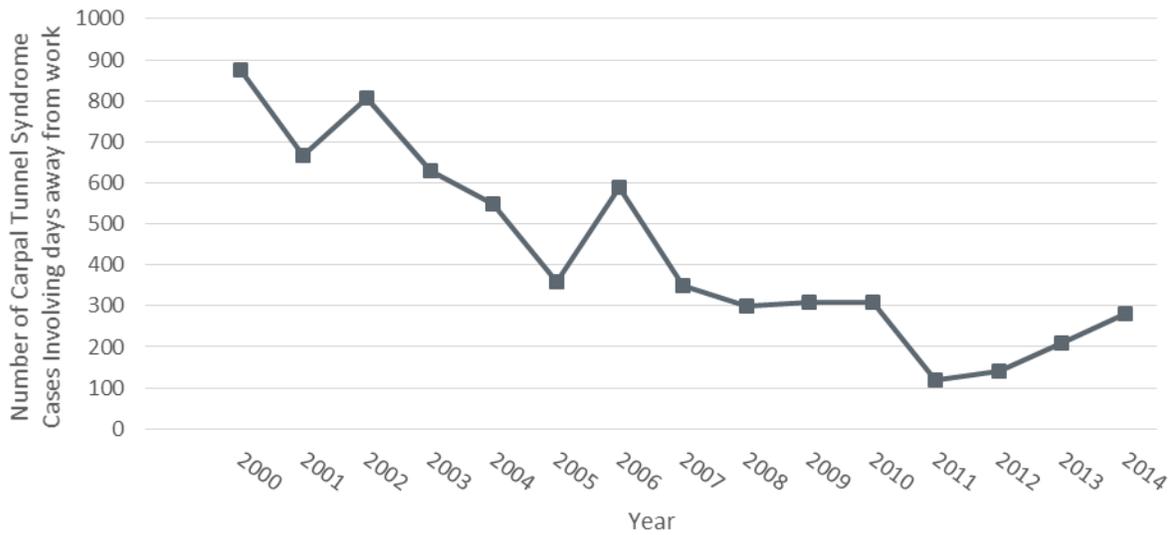


Figure 25: Annual Incidence Crude Rate per 100,000 Full-Time Workers of Carpal Tunnel Syndrome Cases Involving Days away From Work Reported by Employers in Minnesota, 2000-2014

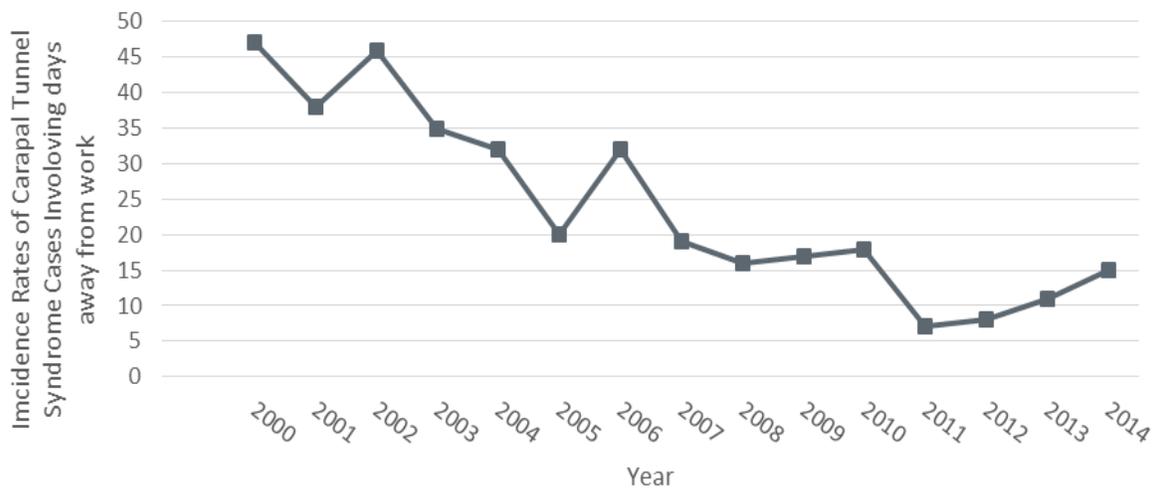


Table 13: Annual Number and Rate of Musculoskeletal Disorders of the Back Involving Days Away from Work in Minnesota, 2000-2014

Year	Number of Cases	Incidence Rate (per 100,000 full-time workers)
2000	4509	263
2001	6425	362
2002	6470	369
2003	5250	294
2004	4820	278
2005	4720	263
2006	4490	243
2007	4250	234
2008	3910	210
2009	3680	204
2010	3950	227
2011	3550	201
2012	3220	181
2013	3160	173
2014	3200	170

Figure 26: Annual Number of Musculoskeletal Disorders of the Back Involving Days Away from Work Reported by Employers, 2000-2014

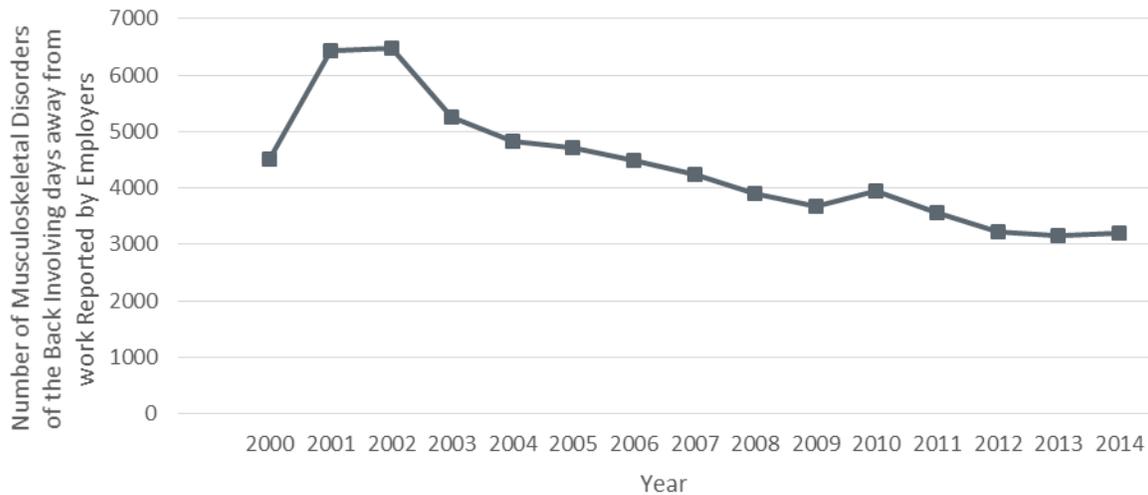
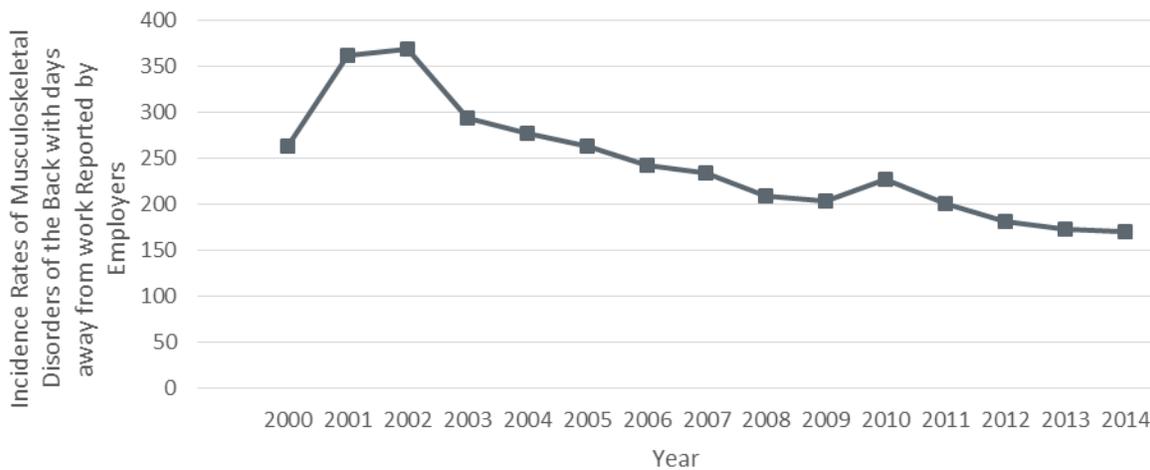


Figure 27: Annual Incidence Crude Rate per 100,000 Full-Time Workers of Musculoskeletal Disorders of the Back with Days Away from Work Reported by Employers, 2000-2014



Trend analysis of this indicator demonstrates a statistically significant decrease in the number of musculoskeletal disorders reported by employers between 2000 and 2014. This decline may be a product of the introduction of ergonomic interventions and education regarding proper body alignment and support when performing job duties.

For resources on ergonomics and how to prevent musculoskeletal disorders, as well as research regarding musculoskeletal disorders please visit the National Institute of Occupational Safety and Health’s website for ergonomics: <http://www.cdc.gov/niosh/topics/ergonomics/>.

State Workers Compensation Claims for Carpal Tunnel Syndrome with Lost Work Time, 2000-2015

This indicator identifies the number of Minnesota employees who have filed a workers compensation claim for at least one day of lost work time due to work-related carpal tunnel syndrome.

Carpal tunnel syndrome occurs when the median nerve, which runs through the forearm into the hand, becomes compressed or squeezed while passing through the wrist. Carpal tunnel may occur from repetitive motion or action, injury or trauma, or overexertion of the wrist in daily operations. With appropriate workplace controls and an ergonomic configuration of a workstation, carpal tunnel syndrome is preventable. As carpal tunnel syndrome may develop gradually or over extended periods of time, workers and employers may be unaware of the work-related nature of the injury/illness and fail to report.

This indicator is based on data from the Minnesota's workers' compensation system. The data is compiled and supplied by the MN DOLI. In Minnesota, report of a work-related injury or illness is required if that injury or illness incapacitates the employee for more than three work days or if it requires medical attention greater than first aid. In addition to these time and severity requirements, specific occupations are excluded from the reporting requirement including: farmers, independent contractors, federal employees, railroad and longshoremen and maritime workers. These reporting restrictions may create an underreporting of carpal tunnel syndrome, leading to an underestimation by this indicator of the number of Minnesota employees affected by carpal tunnel syndrome.

Table 14: Annual Number and Incidence Crude Rate of Carpal Tunnel Syndrome Cases with Lost Work Time Filed with Workers' Compensation in Minnesota, 2000-2015

Year	Number of Cases	Incidence Crude Rate (per 100,000 workers covered by workers' compensation)
2000	658	25.6
2001	755	29.3
2002	519	20.3
2003	774	30.5
2004	776	30.2
2005	705	27.0
2006	619	23.0
2007	570	21.5
2008	545	20.7
2009	460	18.3
2010	445	17.8
2011	362	14.2
2012	392	15.1
2013	376	14.2
2014	485	18.4
2015	357	13.5

Figure 28: Annual Number of Carpal Tunnel Syndrome Cases with Lost Work Time Filed with Workers' Compensation in Minnesota, 2000-2015.

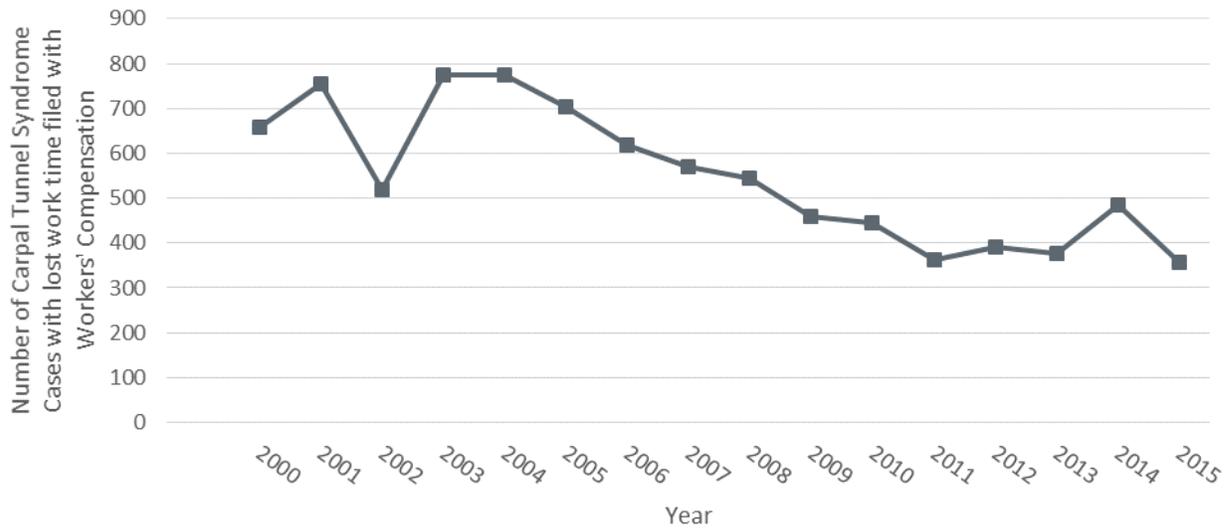
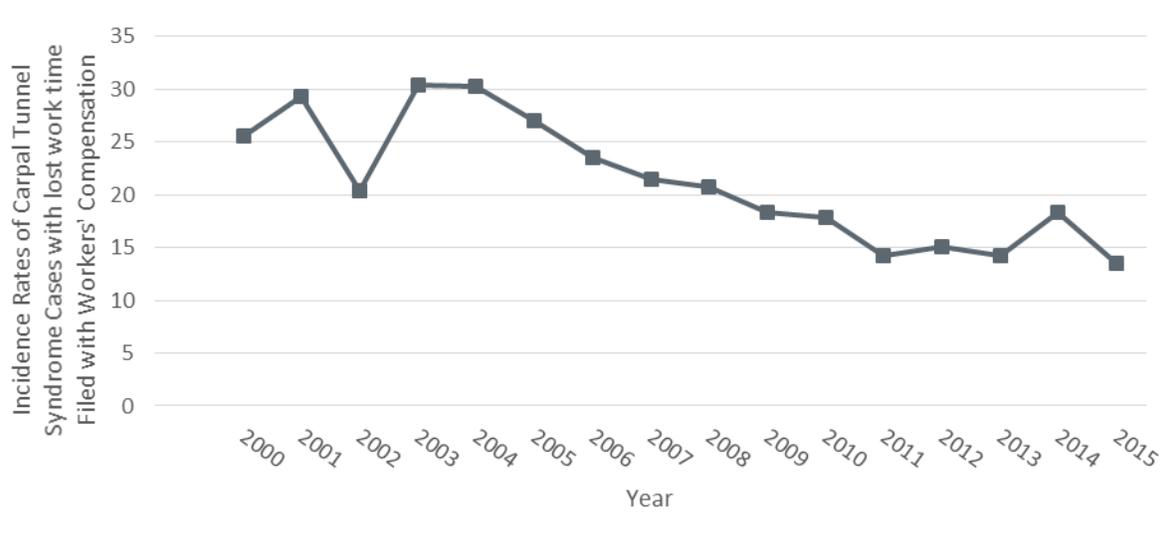


Figure 29: Annual Incidence Rate per 100,000 Full-Time Workers of Carpal Tunnel Syndrome Cases with Lost Work Time Filed with Workers' Compensation in Minnesota, 2000-2015



The number of carpal tunnel cases with lost work time reported to the workers' compensation system have declined slightly over the past five years. This is in agreement with the indicator estimating the number of work-related musculoskeletal disorders as a whole. Trend analysis revealed that there was a statistically significant general decline in the numbers and rates of carpal tunnel cases between 2000 and 2015.

The National Institute for Occupational Safety and Health (NIOSH) has made a significant commitment to the research of [ergonomic and musculoskeletal disorders](#) (including carpal

tunnel) in an effort to reduce and prevent the number of workplace injuries that cause carpal tunnel each year.

Hospitalizations from or with Pneumoconiosis, 2000-2014

De-identified hospital discharge billing data from the Minnesota Hospital Association is used to create this indicator.

All pneumoconioses are believed to be occupationally related in nature. Pneumoconiosis is a general term for a group of dust-related lung diseases, including—but not limited to—silicosis, asbestosis, and coal workers pneumoconiosis. The distinction between each type of pneumoconiosis is dependent upon the type of dust fiber the individual was exposed to. Silica exposure may lead to silicosis, asbestos exposure may lead to asbestosis, and coal dust may lead to coal workers pneumoconiosis. Dust exposure may lead to inflammation, scarring, and irreversible damage to lung tissue eventually decreasing lung function.

Development of pneumoconiosis puts an individual at increased risk of respiratory infections or other conditions, such as chronic bronchitis, COPD, lung cancer, pleuritis, pulmonary hypertension, and tuberculosis. Pneumoconioses tend to have a long latency period, occurring and progressing many years or even decades after the exposure first started or ceased. This can make identification of the exposure of interest difficult to identify by both the employee and provider. Pneumoconioses are debilitating diseases and may result in death.

This indicator tracks the number of hospitalizations that occur each year to treat individuals suffering from a diagnosed pneumoconiosis. Many industries and occupations have the potential for dust exposure that could lead to pneumoconiosis without appropriate respiratory protection.

Crude rates were created to compare the number of pneumoconiosis hospitalizations that occur from year to year in Minnesota. To create these crude rates the number residents in Minnesota were used. Age-standardized rates were also created.

Table 15: Annual Number and Crude Rate of Total Pneumoconiosis Hospitalizations in Minnesota (age 15 and greater), 2000-2014

Year	Number of Cases	Crude Rate (per million residents)
2000	262	70.5
2001	304	80.9
2002	306	79.8
2003	317	81.6
2004	328	83.9
2005	346	87.2
2006	288	71.2
2007	412	101.4
2008	412	98.9
2009	311	73.4
2010	400	91.8
2011	387	97.7
2012	338	78.3
2013	308	70.7
2014	325	74.1

Figure 30: Annual Number of Total Pneumoconiosis Hospitalizations in Minnesota, 2000-2014

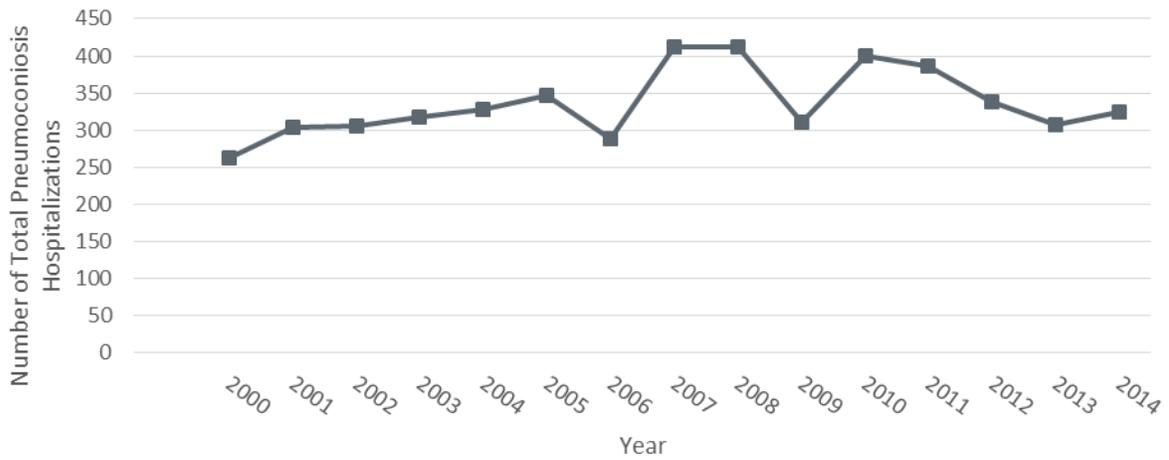


Figure 31: Annual Crude Rate of Total Pneumoconiosis Hospitalizations per Million Residents in Minnesota, 2000-2014

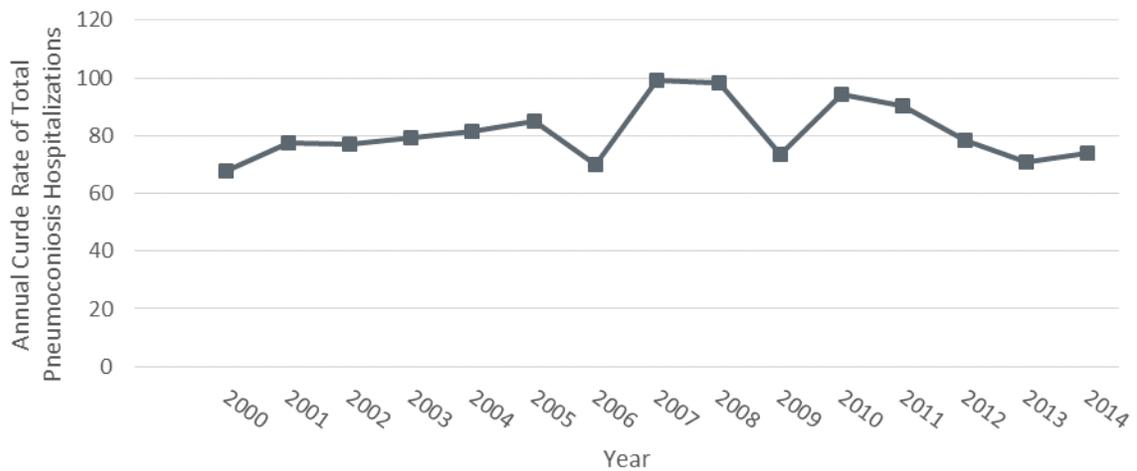


Table 16: Annual Number and Rates of Coal Workers Pneumoconiosis Hospitalizations, 2000-2014

Year	Number of Cases	Crude Rate** (per million residents)	Age-Adjusted Rate** (per million residents)
2000	6	1.6	1.6
2001	14	3.6	3.8
2002	*	*	*
2003	13	3.3	3.3
2004	10	2.5	2.5
2005	7	1.7	1.8
2006	*	*	*
2007	9	2.2	2.2
2008	6	1.4	1.4
2009	7	1.7	1.6
2010	*	*	*
2011	5	1.3	1.2
2012	*	*	*
2013	*	*	*
2014	*	*	*

*Fewer than 5 cases, numbers are suppressed as rates may be unreliable

**Age standardized rates were created with the use of eight, ten-year age categories

Table 17: Annual Number and Annual Rates of Asbestosis Hospitalizations in Minnesota, 2000-2014

Year	Number of Cases	Crude Rate*(per million residents)	Age-Adjusted Rate** (per million residents)
2000	230	67.7	60.8
2001	249	77.5	65.8
2002	272	77.2	69.8
2003	279	79.3	71.3
2004	290	81.3	73.8
2005	314	85.0	79.4
2006	266	70.1	65.3
2007	380	99.3	92.6
2008	380	98.4	90.3
2009	284	73.7	66.5
2010	369	94.2	84.8
2011	344	90.3	77.7
2012	310	78.3	67.3
2013	285	70.7	60.8
2014	300	74.1	63.5

*Fewer than 5 cases, numbers are suppressed for privacy and as rates may be unreliable

**Age standardized rates were created with the use of eight, ten-year age categories

Figure 32: Annual Number of Asbestosis Hospitalizations in Minnesota, 2000-2014

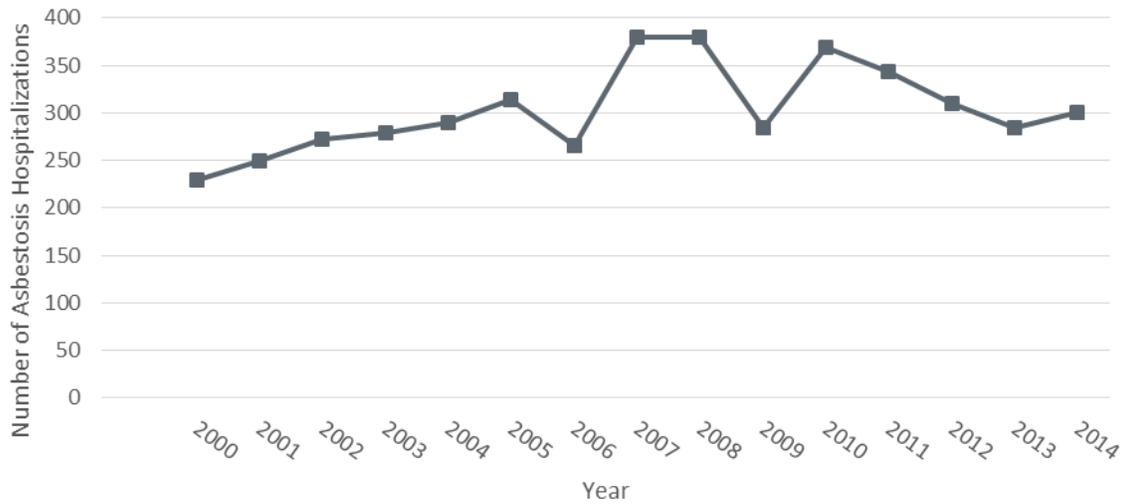


Figure 33: Annual Age-Adjusted Rate for Asbestosis Hospitalizations per Million Minnesota Residents, 2000-2014

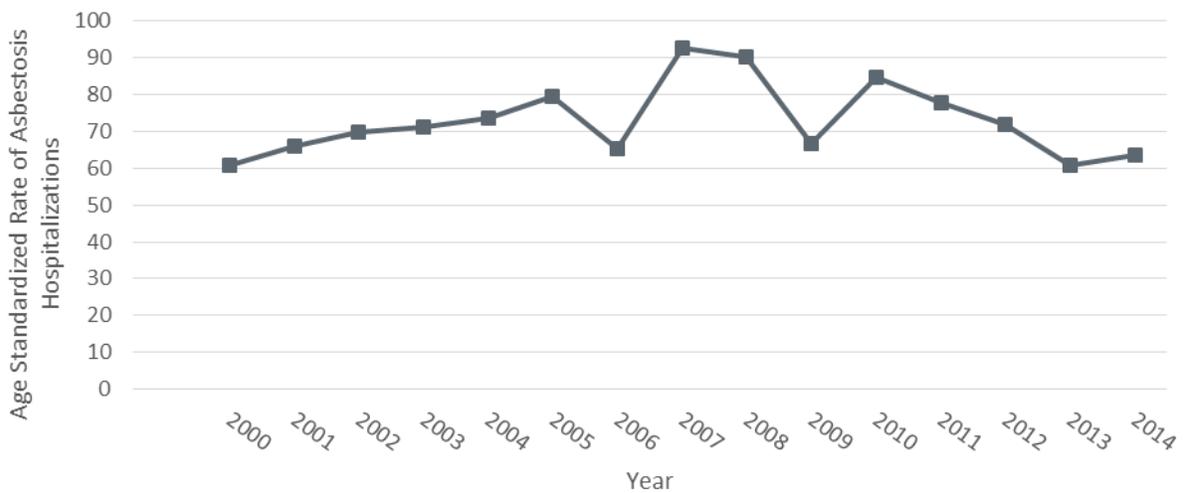


Table 18: Annual Number and Rates of Silicosis Hospitalizations in Minnesota

Year	Number of Cases	Crude Rate (per million residents)	Age-Adjusted Rate* (per million residents)
2000	22	5.7	5.6
2001	36	9.2	7.8
2002	27	6.8	5.3
2003	22	5.5	5.6
2004	23	5.7	5.3
2005	24	5.9	4.7
2006	16	3.9	3.5
2007	16	3.9	3.8
2008	20	4.8	4.5
2009	20	4.7	4.2
2010	28	6.6	6.3
2011	30	7	7.1
2012	18	4.2	4.3
2013	14	3.2	3.3
2014	19	4.3	9

*Age standardized rates were created with the use of eight, ten-year age categories

Figure 34: Annual Number of Silicosis Hospitalizations in Minnesota, 2000-2014

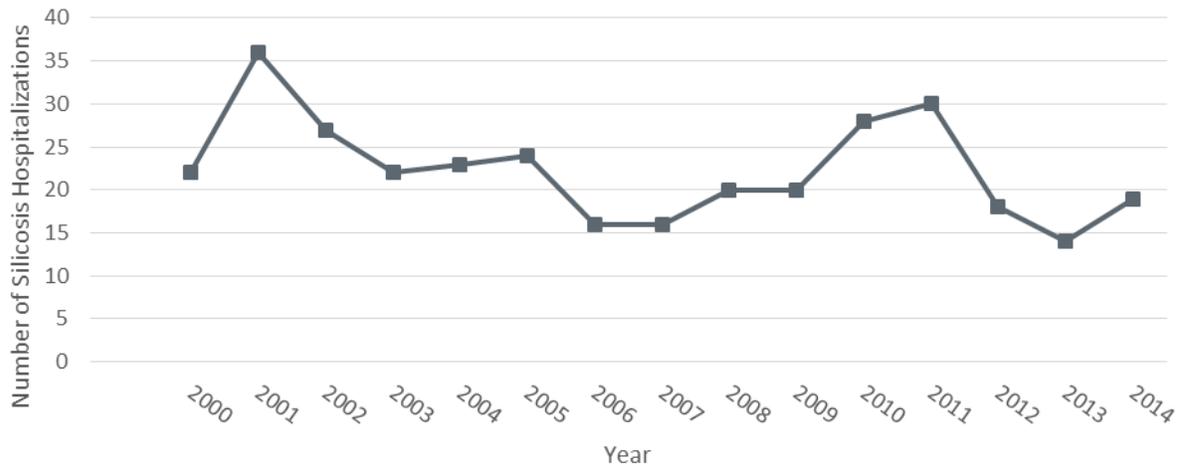


Figure 35: Annual Age-Adjusted Rate for Silicosis Hospitalizations per Million Residents, 2000-2014

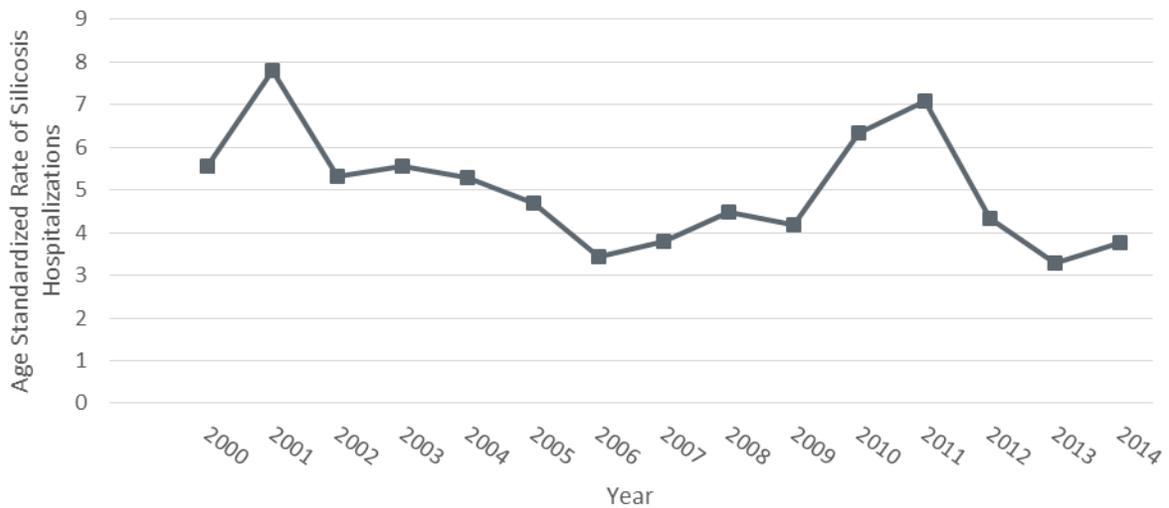


Table 19: Annual Number and Rates of Other and Unspecified Pneumoconiosis Hospitalizations in Minnesota, 2000-2014

Year	Number of Cases	Crude Rate**(per million residents)	Age-Adjusted Rate**(per million residents)
2000	5	1.3	1.2
2001	8	2.0	2.1
2002	5	1.3	1.3
2003	*	*	*
2004	5	1.2	1.3
2005	*	*	*
2006	*	*	*
2007	8	1.9	1.9
2008	6	1.4	1.2
2009	*	*	*
2010	*	*	*
2011	8	1.9	1.8
2012	8	1.9	1.7
2013	6	1.4	1.1
2014	*	*	*

*Fewer than 5 cases, numbers are suppressed as rates may be unreliable.

** Age standardized rates were created with the use of eight, ten-year age categories.

Trend analysis of total pneumoconiosis hospitalizations between 2000 and 2014 reveal a non-significant slight increase. This slight increasing trend is most likely entirely driven by the increase in asbestosis hospitalizations. Asbestosis hospitalizations trend analysis depicts a significant increasing trend for the number of cases between 2000 and 2014 but a non-significant increasing trend for the incidence rate of these cases. However, coal workers pneumoconiosis, and silicosis rates both demonstrate a significant decreasing trend between

2000 and 2014. Finally, unspecified pneumoconiosis hospitalizations displayed an insignificant downward trend between 2000 and 2014. Pneumoconioses have a long latency for development, typically appearing 20 to 30 years after exposure. Over the last several decades there have been a number of policies and laws put into place to reduce and monitor these exposures. The trends that are seen with silicosis, coal workers pneumoconiosis, and other and unspecified pneumoconiosis would appear consistent with reductions in exposure over the past. However, it's unclear whether the slight increase in asbestosis hospitalizations may be due to greater recognition of the disease or an actual increase in the number of asbestosis cases.

This indicator, paired with the following two indicators: *Mortality from or with Pneumoconiosis* and *Incidence of Malignant Mesothelioma* indicate the public health impact that asbestos and other occupational dust exposures continue to have on the working and retired populations of Minnesota.

Mortality from or with Pneumoconiosis, 2000-2014

All pneumoconioses are believed to be occupationally related in nature. Pneumoconiosis is a general term used to describe a group of dust-related lung diseases including—but not limited to—silicosis, asbestosis, and coal workers pneumoconiosis. The distinction between each type of pneumoconiosis is dependent upon the type of mineral dust fiber the individual was exposed to. Silica exposure may lead to silicosis, asbestos exposure may lead to asbestosis, and coal dust may lead to coal workers pneumoconiosis. Dust exposure may lead to inflammation, scarring, and irreversible damage to lung tissue eventually decreasing lung function.

Workers in many industries and occupations remain at increased risk of pneumoconiosis due to past or continuing exposures to silica, asbestos, or coal dusts. Some high risk industries include mining, construction, foundry work, and ship building, while occupations at risk include electricians, plumbers, and many others.

In the United States between 2000 and 2014, a total of 34,050 individuals had pneumoconiosis listed as either a major or contributing cause of death (<http://webappa.cdc.gov/ords/norms-national.html>). Nationally, pneumoconiosis death rates have held steady or declined slightly over the last three decades. This is most likely due in large part to the identification of hazardous exposures and prevention strategies and programs that have been put in place over the last several decades.

This indicator is based on death certificate data maintained by the Vital Records Unit at the Minnesota Department of Health. All deaths with an ICD-10 indicating pneumoconiosis as the underlying or contributing cause of death were identified and compiled annually to complete this indicator.

Table 20: Annual Number and Rates of Total Pneumoconiosis Deaths in Minnesota, 2000-2014

Year	Number	Crude Annual Rate (per million residents)	Age-Adjusted Rate* (per million residents)
2000	19	4.9	5.0
2001	28	7.1	7.1
2002	23	5.8	5.9
2003	23	5.8	5.7
2004	33	8.2	8.2
2005	27	6.6	6.5
2006	26	6.3	6.3
2007	25	6.0	6.0
2008	32	7.6	7.8
2009	23	5.5	5.3
2010	28	6.6	6.4
2011	33	7.7	7.4
2012	31	7.2	6.6
2013	33	7.6	7
2014	35	8	7.2

*The age-adjusted rate is calculated with eight, ten-year age categories.

Table 21: Annual Number of Total Pneumoconiosis Deaths Nationally*, 2000-2014

Year	Number of Deaths
2000	2,864
2001	2,747
2002	2,720
2003	2,639
2004	2,531
2005	2,430
2006	2,312
2007	2,194
2008	2,160
2009	1,998
2010	2,037
2011	1,898
2012	1,860
2013	1,867
2014	1,793
2000-2014	34,050

*Data obtained from the NIOSH National Occupational Respiratory Mortality System (NORMS)
<http://webappa.cdc.gov/ords/norms.html>.

Figure 36: Annual Number of Total Pneumoconiosis Deaths in Minnesota, 2000-2014

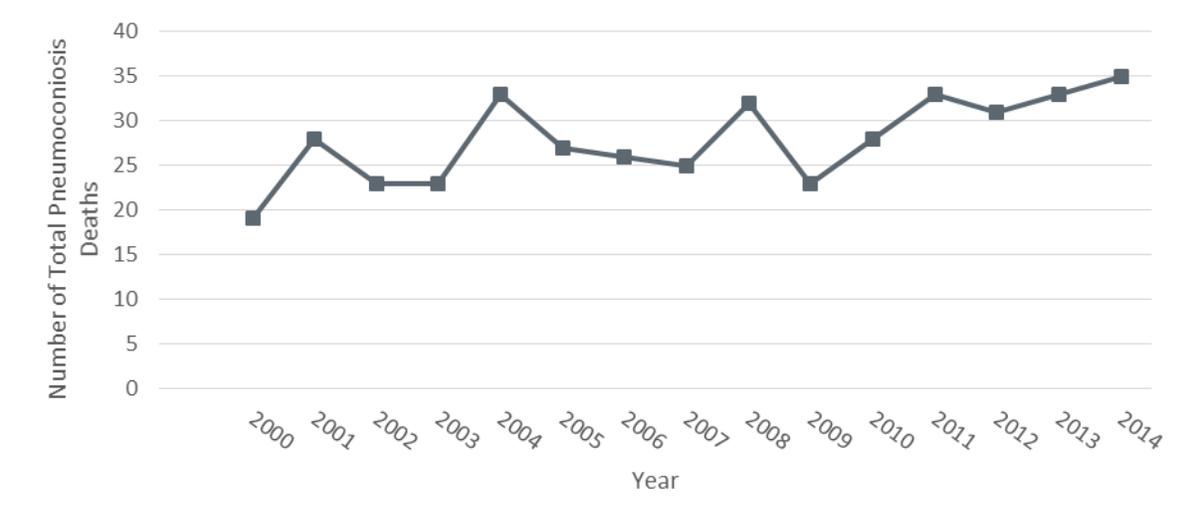


Figure 37: Annual Age-Adjusted Total Pneumoconiosis Death Rate in Minnesota per Million Residents, 2000-2014

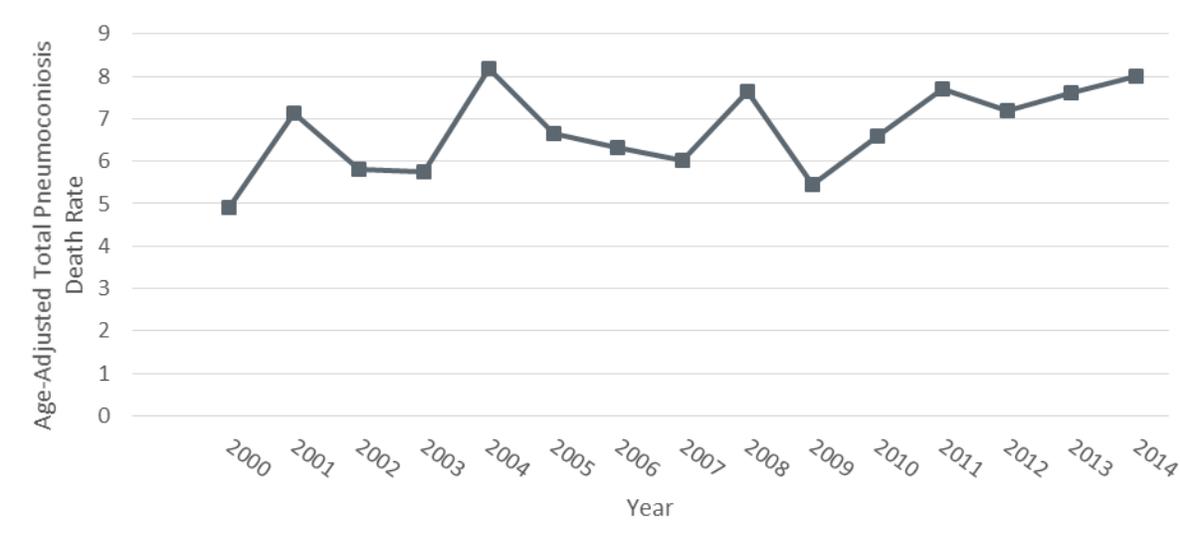


Table 22: Number and Rates of Asbestosis Deaths in Minnesota, 2000-2014

Year	Number	Crude Rate (per million residents)	Age-Adjusted Rate* (per million residents)
2000	15	3.9	4.0
2001	21	5.4	5.4
2002	21	5.3	5.4
2003	18	4.5	4.5
2004	26	6.5	6.6
2005	21	5.2	5.4
2006	21	5.1	5.2
2007	23	5.5	5.5
2008	28	6.7	6.9
2009	18	4.3	4.3
2010	22	5.2	5.2
2011	27	6.3	6.3
2012	28	6.5	5.9
2013	30	6.9	6.2
2014	35	7.9	7.1

* The age-adjusted rate is calculated with eight, ten-year age categories.

Table 23: Annual Number of Asbestosis Deaths Nationally, 2000-2014*

Year	Number
2000	1,493
2001	1,454
2002	1,473
2003	1,471
2004	1,470
2005	1,423
2006	1,344
2007	1,401
2008	1,346
2009	1,262
2010	1,318
2011	1,252
2012	1,219
2013	1,238
2014	1,221
2000-2014	20,385

*The data to populate this table was provided by the NIOSH National Occupational Respiratory Mortality System (NORMS) <http://webappa.cdc.gov/ords/norms.html>.

Figure 38: Annual Number of Asbestosis Deaths in Minnesota, 2000-2014

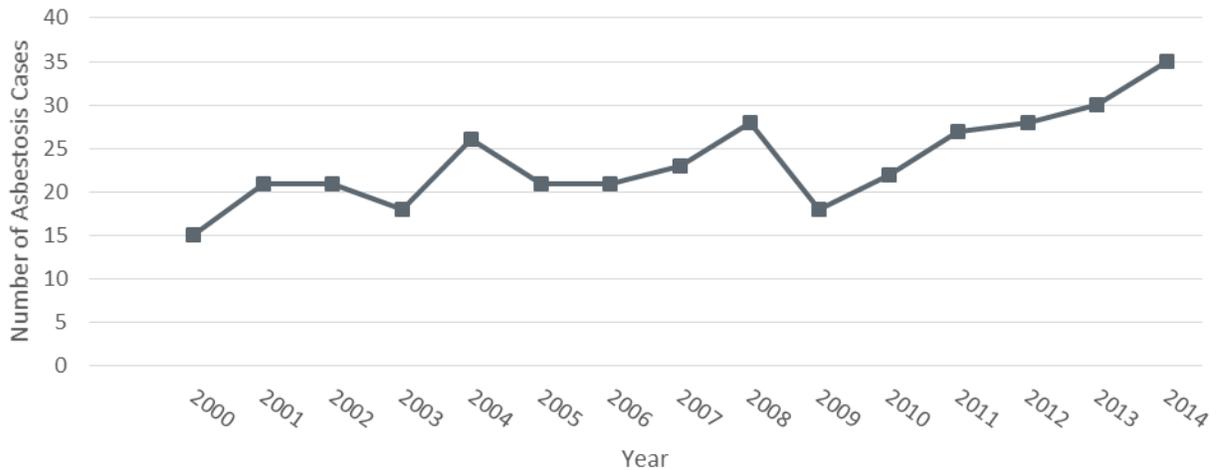
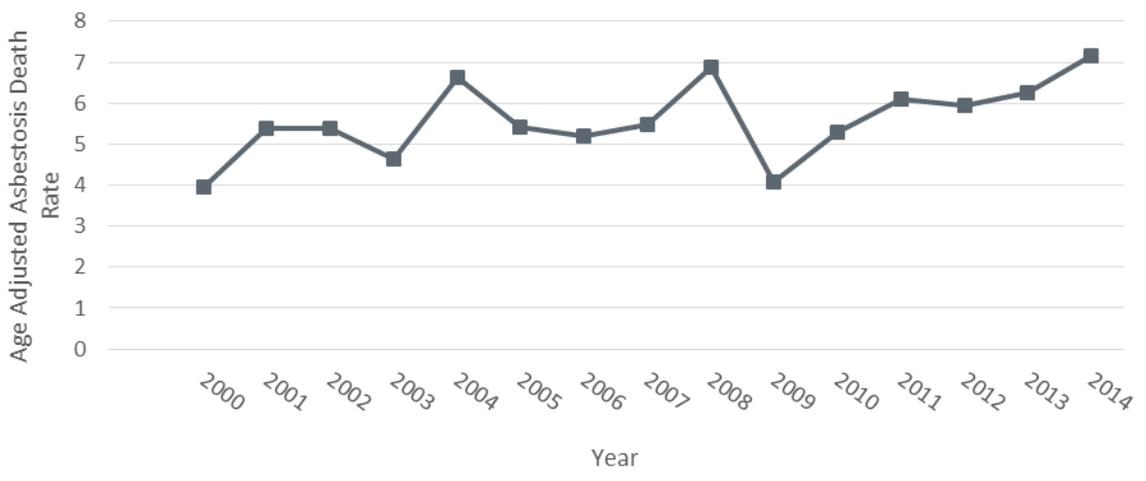


Figure 39: Annual Age-Adjusted Annual Asbestosis Death Rate in Minnesota per Million Residents, 2000-2014



Asbestosis is associated with the exposure to asbestos fibers that are inhaled and cause scarring and inflammation of the lung. On a national level 20,385 people had asbestosis listed as a major or contributing cause of death from 2000 to 2014, and the number of deaths has remained fairly steady with about 1,400 deaths per year until 2009 and about 1,200 deaths per year after that. (<http://webappa.cdc.gov/ords/norms.html>).

The trend analysis revealed that total deaths attributed to any form of pneumoconiosis showed a significant positive trend for the time period 2000 to 2014 and the rate of these deaths showed a non-significant positive trend over the same period in Minnesota. The number of silicosis deaths showed a non-significant decreasing trend over the same time period. However, both the number and the rate of the deaths attributed to asbestosis were found to have significantly increased between 2000 and 2014 in Minnesota. The long latency of asbestosis suggests that these current deaths from asbestos exposure are most likely due to exposure that occurred many years, if not decades earlier. Unfortunately, detailed occupational histories are

not available for these individuals; this prevents the identification of the likely exposure pathway.

Incidence of Malignant Mesothelioma, 2000-2013

Mesothelioma is a rare and almost always fatal cancer of the lining of the chest (pleura) or abdomen (peritoneum). Asbestos exposure is the leading known cause of malignant mesothelioma, most often related to occupational exposures. High-risk occupations include plumbers, pipefitters, steamfitters, construction workers, and electricians. Mesothelioma has a long latency period, usually developing 20 to 40 years or more after asbestos exposure.

Nearly 80% of the cases are among males, reflecting previous occupational histories with increased exposures to asbestos. Family members of these workers were potentially exposed via take-home asbestos exposure. Take-home exposures occur when a family member is exposed to asbestos from worker's contaminated clothing or footwear.

There has been a history of concern about mesothelioma in Minnesota, particularly in the Northeastern region of the state. A two-fold excess of mesothelioma among males was first identified in this region in 1997 for the period 1988-1994. That excess has continued through 2013. Subsequent investigations indicated that the excess mesothelioma was associated with two large industries in the region – the former Conwed Corporation ceiling tile plant and the taconite (iron ore) mining industry.

As mesothelioma has a long latency period for development, the cases are due to exposures that occurred decades earlier, prior to adequate worker protection.

This indicator uses data from the Minnesota Cancer Surveillance System (MCSS) at the Minnesota Department of Health (MDH). The MCSS collects information on all diagnosed cancers in the state of Minnesota. The MCSS however only tracks cancer cases that have occurred among Minnesota residents; therefore, if an individual who was employed in Minnesota and exposed to asbestos has since moved out of the state prior to diagnosis, the system will not have data on that case.

All cases between the years 2000 and 2013 greater than 15 years of age, residing in the state of Minnesota are included for the indicator.

Table 24: Malignant Mesothelioma Deaths in the United States, Males and Females, 2000-2014*

Year	Number of Deaths	US Age-Adjusted Rate Per 100,000
2000	2,530	0.9
2001	2,508	0.9
2002	2,575	0.9
2003	2,625	0.9
2004	2,657	0.9
2005	2,701	0.9
2006	2,588	0.8
2007	2,606	0.8
2008	2,709	0.9
2009	2,753	0.8
2010	2,745	0.8
2011	2,832	0.9
2012	2,874	0.8
2013	2,686	0.8
2014	2,786	0.8

* Data from the National Occupational Respiratory Mortality System (<http://webappa.cdc.gov/ords/norms-national.html>)

Table 25: Annual Number of Mesothelioma Incident Cases in Minnesota by Gender, 2000-2013

Year	Number	Males	Females
2000	72	58	14
2001	47	40	7
2002	66	52	14
2003	69	52	17
2004	66	48	18
2005	65	49	16
2006	65	42	23
2007	53	47	11
2008	71	60	13
2009	48	39	12
2010	77	57	20
2011	88	61	27
2012	65	51	14
2013	80	59	21

Figure 40: Number of Malignant Mesothelioma Cases in Minnesota, 2000-2013

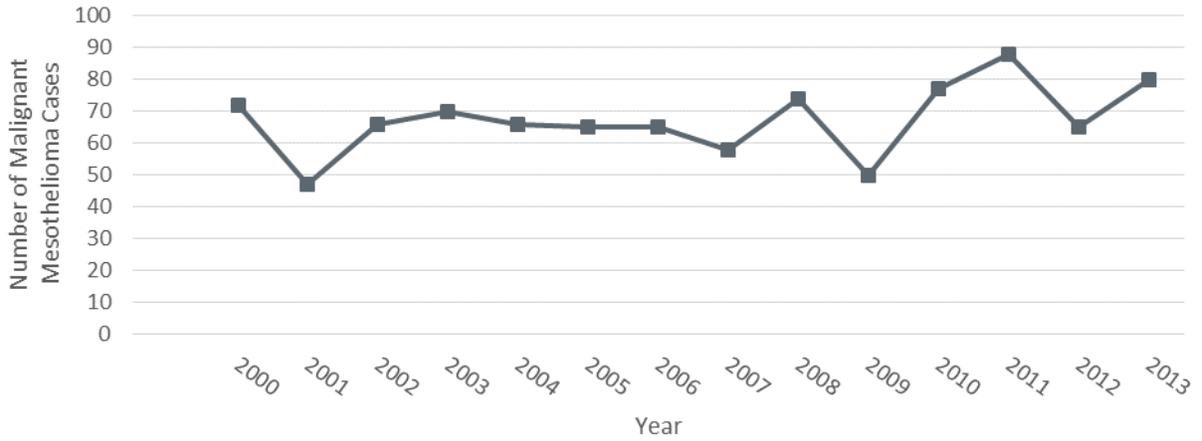


Figure 41: Annual Age-Adjusted Rate of Mesothelioma per 100,000 by Gender for Minnesota and U.S. SEER, 1992-2013

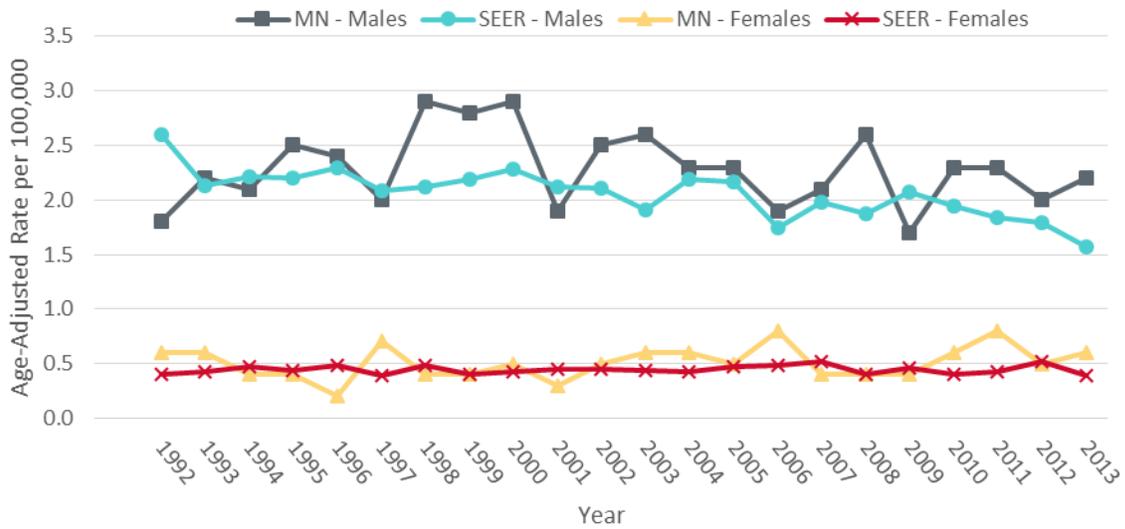


Figure 42: Average Age-Adjusted Rates of Mesothelioma by Time Period and Region, Males, 1988-2013

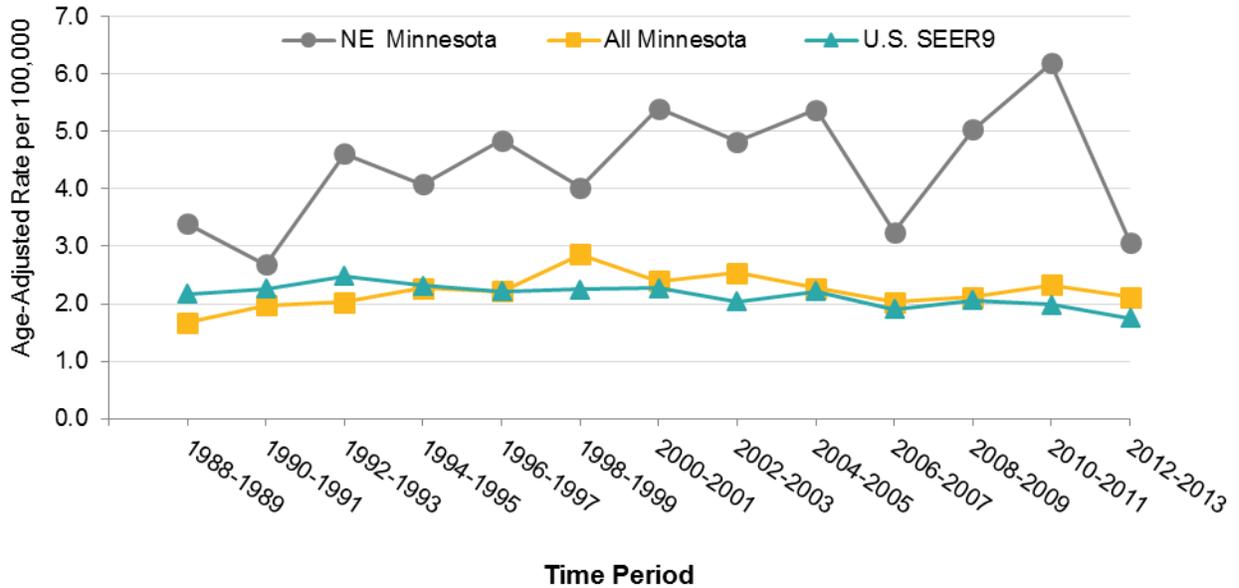
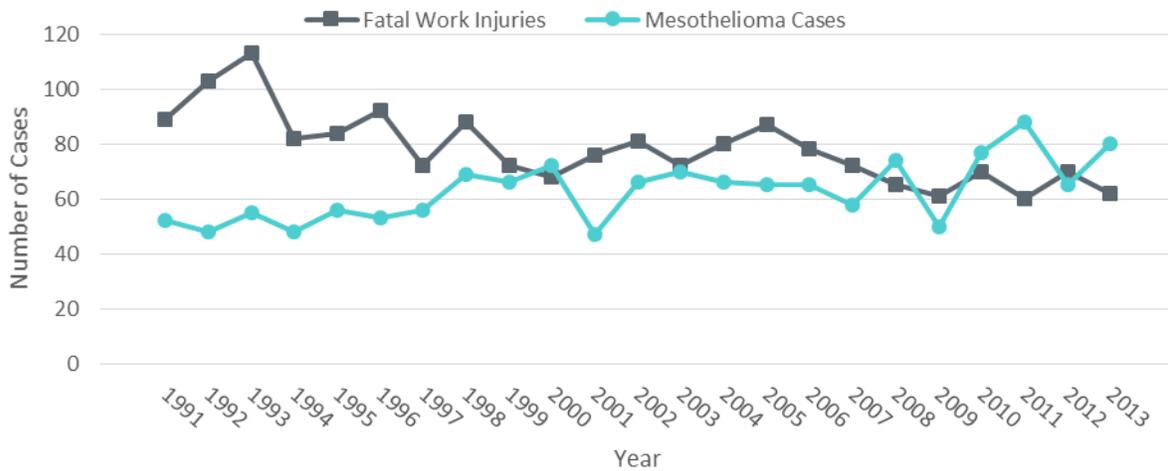


Figure 43: Annual Number of New Mesothelioma Cases and Fatal Work Injuries in Minnesota, 1991-2013



There were no significant trends in the numbers or rates of mesothelioma between 2000 and 2013.

Acute Work-Related Pesticide Associated Illness and Injury (Reported to Poison Control Centers), 2000-2013

Pesticides, when used appropriately, provide a variety of benefits to society: increasing crop production, preserving produce, and controlling insect and exotic species infestations. However, pesticides - including insecticides, herbicides, fungicides, etc. are all designed to kill unwanted pests, and have the potential to do harm to people. While these chemicals provide a necessary function, they are regulated to promote proper usage and application. Even with regulation, however, incidents of exposure through accident, misuse, or inaccurate application still occur. Individuals that are mixing, applying, or working in areas that receive pesticide applications are at the greatest risk of exposure.

The aim of this indicator is to identify the number of work-related poisonings that occur each year due to pesticide exposure. This indicator uses data from the Minnesota Poison Control Center. Cases of pesticide poisonings are difficult to accurately count as not every case is reported to the Poison Control Center. Nor are the symptoms of an acute reaction always recognized as relating to an exposure to pesticide. The cases included in this indicator are those that have been recognized as pesticide-related and a call has been made to the Minnesota Poison Control Center to report the incident.

Table 26: Annual Number and Crude Rate of Reported Work-Related Pesticide Poisoning Cases in Minnesota, 2000-2013

Year	Number of Cases	Crude Rate (per 100,000 employed persons age 16 or older)
2000	72	2.7
2001	40	1.5
2002	44	1.6
2003	49	1.8
2004	37	1.3
2005	37	1.3
2006	90	3.2
2007	132	4.8
2008	93	3.4
2009	63	2.3
2010	68	2.5
2011	68	2.5
2012	68	2.5
2013	53	1.9

As part of its programs, the American Association of Poison Control Centers (AAPCC) collects and aggregates data from all 55 United States poison centers into the National Poison Data System (<http://www.aapcc.org/data-system/>). Each poison center classifies cases of acute occupational poisoning and then enters each case into the National Poison Data System on a real-time rolling basis every eight minutes. Thus, data from all 50 states, Puerto Rico, the Federated States of Micronesia, American Samoa, the U.S. Virgin Islands and Guam are included in the national statistics presented for this indicator. The U.S. Environmental Protection Agency (EPA) estimates that between 10,000 and 20,000 pesticide poisonings occur each year among

the approximately 2 million U.S. agricultural workers
[\(http://www.cdc.gov/niosh/topics/pesticides/\)](http://www.cdc.gov/niosh/topics/pesticides/).

Table 27: Annual Number of Acute Occupational Pesticide-Related Illness Cases in the United States, 2000-2011*

Year	Number of Cases
2000	2,827
2001	2,474
2002	2,528
2003	2,503
2004	2,476
2005	2,593
2006	3,545
2007	2,458
2008	2,171
2009	2,040
2010	2,871
2011	2,833
2000-2011	31,319

**Data courtesy of the American Association of Poison Control Centers*

Figure 44: Annual Number of Work-Related Pesticide Poisonings in Minnesota, 2000-2013

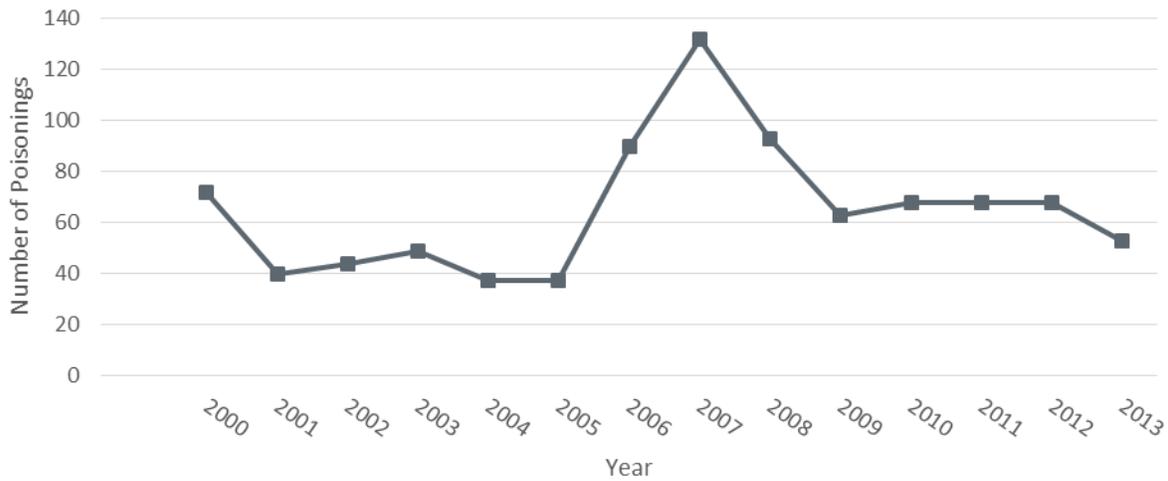
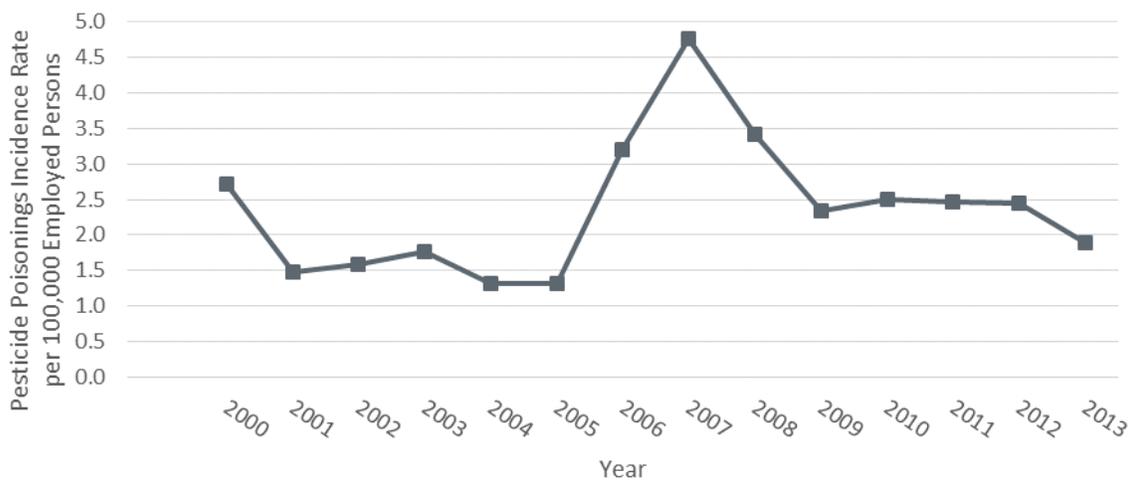


Figure 45: Annual Crude Rate of Work-Related Pesticide Poisonings per 100,000 Employed Persons (age 16 or greater), 2000-2013



A trend analysis of the number and incidence rate of work-related pesticide poisoning cases from 2000 through 2013 reveals that there has been no statistically significant increase or decrease in the numbers of cases or incidence rates of work-related pesticide poisonings over this 14-year period.

Elevated Blood Lead Levels among Adults, 2000-2015

The majority of cases of elevated blood lead levels (BLL) among adults are related to a workplace. Elevated blood lead may cause damage to the nervous, hematologic, reproductive, renal, cardiovascular, or gastrointestinal systems. Some early symptoms of lead poisoning may include: fatigue, upset stomach or stomach cramps, poor appetite, irritability, nervousness or depression, headache, sleeplessness, metallic taste in the mouth, reproductive problems, high blood pressure, lack of concentration, and muscle and/or joint pain. Because of these detrimental health effects, the Federal and Minnesota Occupational Safety and Health Administration (OSHA) lead standards require monitoring of blood lead levels in adults working in at-risk occupations and industries.

From 1987 to 2013, the [National Institute for Occupational Safety and Health \(NIOSH\)](#) provided funding for state-based surveillance of adult blood lead levels through the Adult Blood Lead Epidemiology and Surveillance (ABLES) program. Partial funding for adult blood lead surveillance was restored in 2015 and CDC/NIOSH continues to fund some 28 states – including Minnesota – to collect blood lead level reports from clinical laboratories to promote interventions and prevention of lead exposure. As part of these surveillance activities, industry and occupation information is collected for all adults who have been tested for blood lead levels. This indicator utilizes data collected by the Lead and Healthy Homes Program at the MDH. The Lead Program collects the results of all blood lead tests that are completed in Minnesota under a Minnesota statute (MS 144.9502). The childhood lead program monitors rates and addresses concerns related to elevated blood lead levels in children; the MDH adult lead ABLES program—in cooperation with OSHA, county level health departments, and the Center—monitors rates and addresses concerns for adults that have elevated blood lead levels.

Occupational lead exposure is of concern both for the worker and the worker's family living in the same household. Similar to several other occupational exposures (such as asbestos), lead dust can be carried home on clothes, shoes, skin, and hair which can then be ingested by other members of the family. Lead poisoning in young children or a developing fetus may cause learning, behavior, and health problems and possibly miscarriages, premature births, and stillbirths in pregnant women. Information on how to prevent bringing lead dust into the home can be found at the MDH Environmental Health Division's lead webpage:

<http://www.health.state.mn.us/divs/eh/lead/fs/takehome.html>.

The lead indicator shows the numbers and rates of adults (age ≥ 16) whose blood lead levels (BLLs) exceeds any of three different levels of concern and/or regulatory standards. The blood lead levels that are considered elevated and of public health concern have repeatedly been lowered over time as new research emerged. The levels presented here are those prior to late 2015 when levels of concern were again lowered by CDC. The lowest level of concern shown for this indicator here is $\geq 10\mu\text{g}/\text{dL}$, the level established in 2009 by the ABLES program as an elevated BLL. The U.S. Department of Health and Human Services had previously recommended that adult blood lead levels be less than $25\mu\text{g}/\text{dL}$, which is the second level for this indicator. Adults who exceed this level are referred to MN OSHA, who use the industry and occupation information to prioritize their workplace inspections. The third and highest

threshold level is 40 µg/dL, which represents a return to work level associated with the Minnesota's OSHA standards.

For this indicator, adult blood lead cases are described as either "prevalent" cases or "incident" cases, depending on whether the individual had had an elevated blood lead level reported in the previous calendar year. Prevalent cases are simply all the cases that occur in a year regardless of any previous elevated test results. An incident case is a case who did not have an elevated blood lead in the previous calendar year. The national rate of prevalent cases of elevated blood leads ≥ 25 µg/dL in the year 2009 was 6.1/100,000 employed persons at least 16 years of age. The national rate of prevalent cases of elevated blood leads ≥ 40 µg/dL in the year 2009 was 0.9/100,000 employed persons at least 16 years of age. The rates in Minnesota are lower than the national average; however, the results still present a cause for concern as it demonstrates that a large number of individuals are exposed to lead through daily work activities.

Table 28: Annual Number and Crude Rates of Adult Cases of Blood Lead Levels \geq 10 $\mu\text{g}/\text{dL}$ in Minnesota, 2005-2015

Year	Prevalent Cases	Incident Cases	Prevalent Rate per 100,000 employed persons	Incident Rate per 100,000 employed persons
2005	607	282	21.6	10.0
2006	616	283	21.9	10.1
2007	593	271	21.4	9.8
2008	563	242	20.6	8.9
2009	509	191	18.8	7.1
2010	572	240	21.0	8.8
2011	428	181	15.7	6.5
2012	493	265	17.8	9.6
2013	596	342	21.2	12.1
2014	560	215	19.6	7.5
2015	510	204	17.9	7.2
US 2010*	28,667	16,496	24.8	14.3

*United States levels provided by the CDC/NIOSH ABLES program.

Table 29: Annual Number and Rates of Adult Cases of Blood Lead Levels ≥ 25 $\mu\text{g/dL}$ in Minnesota, 2005-2013

Year	Prevalent Cases	Incident Cases	Prevalent Rate per 100,000 employed persons	Incident Rate per 100,000 employed persons
2005	131	60	4.7	1.5
2006	134	63	4.8	1.4
2007	156	78	5.6	2.0
2008	125	52	4.6	1.9
2009	96	39	3.6	0.8
2010	113	60	4.2	1.5
2011	88	41	3.2	1.5
2012	123	66	4.4	2.4
2013	106	51	3.8	1.8
2014	70	39	2.5	1.4
2015	53	32	1.9	1.1
US 2010*	8,432	5,105	6.7	4.0

*U.S. levels provided by the CDC/NIOSH ABLES program.

Table 30: Annual Number and Rates of Adult Cases of Blood Lead Levels ≥ 40 $\mu\text{g}/\text{dL}$ in Minnesota, 2005-2015

Year	Prevalent Cases	Incident Cases	Prevalent Rate per 100,000 employed persons	Incident Rate per 100,000 employed persons
2005	11	8	0.4	0.2
2006	18	14	0.6	0.3
2007	29	23	1.1	0.6
2008	17	12	0.6	0.4
2009	5	3	0.2	0.1
2010	7	6	0.3	0.2
2011	7	6	0.3	0.2
2012	12	11	0.4	0.4
2013	9	7	0.3	0.2
2014	4	2	0.1	0.1
2015	9	8	0.3	0.3
US 2010*	1,313	n/a	1.0	n/a

*U.S. levels provided by the CDC/NIOSH ABLES program.

Figure 46: Annual Number of Prevalent Cases Among Adults with an Elevated BLL in Minnesota, 2005-2015

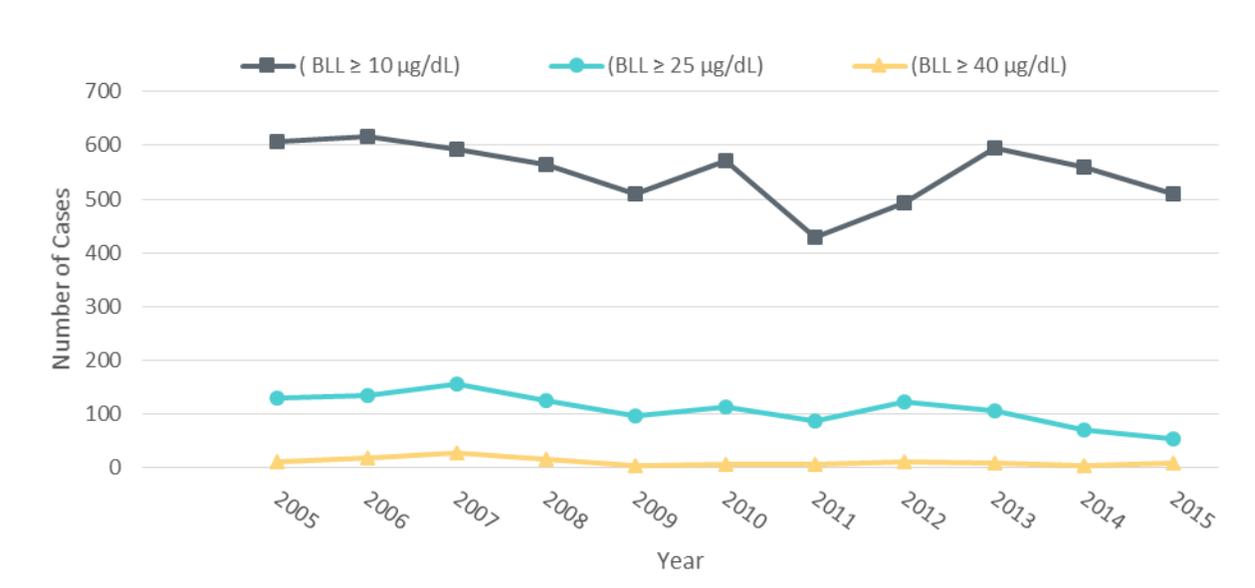


Figure 47: Annual Prevalence Crude Rates per 100,000 Employed Persons Among Adults with an Elevated BLL in Minnesota, 2005-2015.

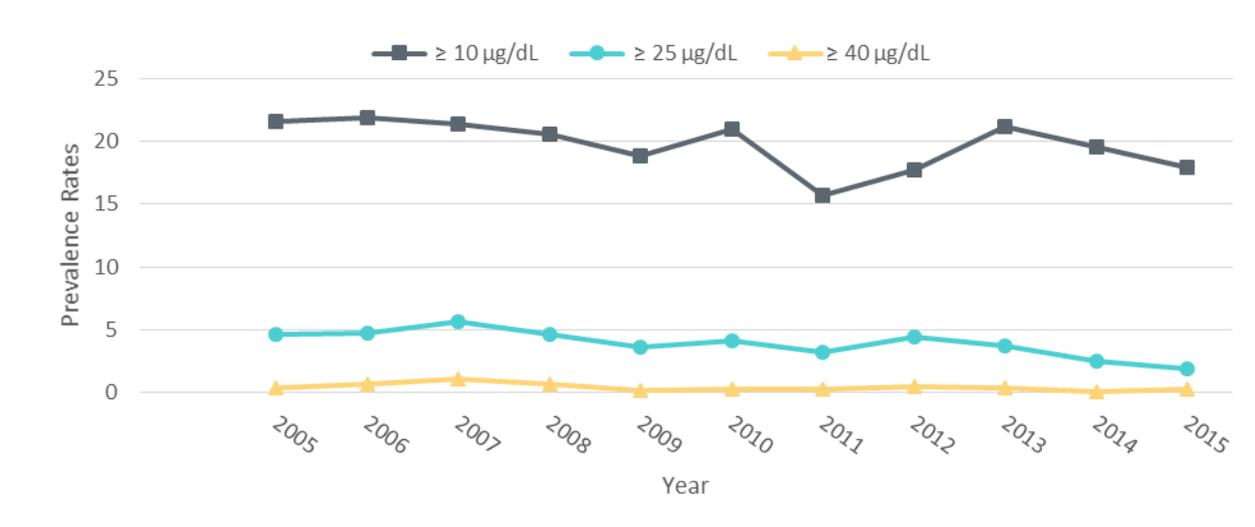
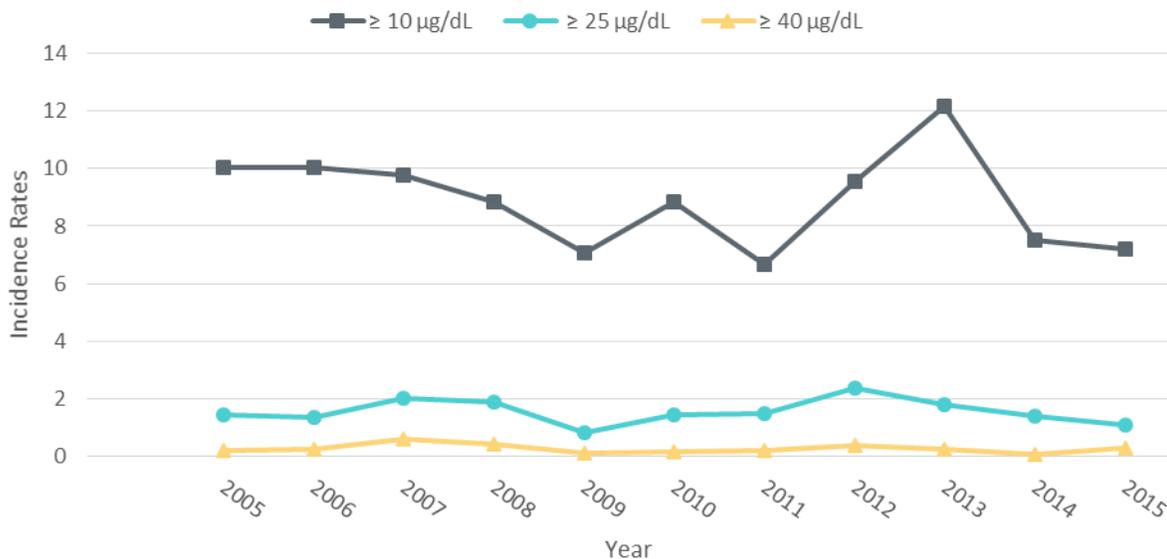


Figure 48: Incidence Crude Rates per 100,000 Employed Persons Among Adults with an Elevated BLL in Minnesota, 2005-2015.



Blood lead levels have remained fairly consistent over the past eight years. Since the 1970's there have been a number of policies implemented to decrease blood lead levels in the United States population, primarily the removal of lead from paint and gasoline. Trend analysis of the indicator shows no statistically significant difference in the number of blood lead measures at 10, 25, and 40 µg/dL over the past 11 years.

Adult exposure to lead primarily occurs in the workplace. Industries with continued risk for employee lead exposure include battery manufacturing and recycling operations, smelting operations, and other manufacturing that utilizes lead based components. As industries have begun to remove lead from the manufacturing process, re-engineered the manufacturing process to reduce exposure, and provided employees with personal protective equipment, levels have come down over time. However, as is depicted by the current blood lead levels, there is still opportunity to further prevent and reduce exposure through continued vigilance in utilizing personal protective devices and creating workplaces either free of or with contained lead.

Further information on the national ABLES program and blood lead levels from other states is available at the NIOSH ABLES web page <http://www.cdc.gov/niosh/topics/ABLES/ables.html>.

The Percentage of Workers Employed in Industries at High-Risk for Occupational Morbidity, 2000-2014

The probability of incurring a serious injury or illness varies by industry; some industries have employee populations that are at higher risk than other populations. Industries with high morbidity rates include manufacturing, construction, farming, nursing home caregivers, and veterinary services. An industry is defined here as “high-risk” if it has a morbidity rate that is twice the national injury and illness rate for all industries over a specified time period.

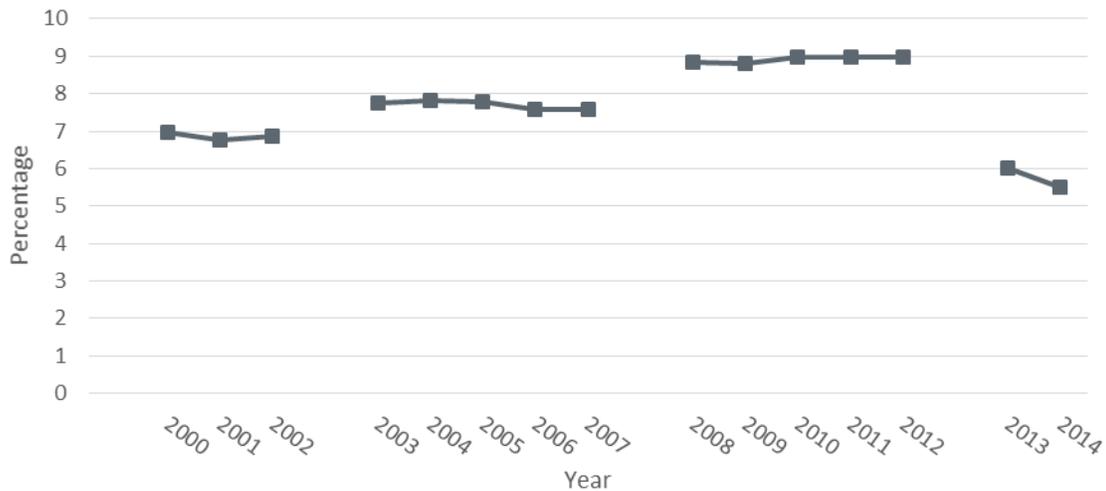
In 2014, the Bureau of Labor Statistics (BLS) estimated a total of almost 3 million injury and illness cases occurred in the United States. Over half of the injury and illness cases reported in 2014 were of a more serious nature that involved days away from work, job transfer, or restriction (DART cases). These cases occurred at a rate of 1.7 cases per 100 full-time equivalent workers.

This indicator utilizes two sources of data: one for the number of injuries by industry and one for the number of workers employed by industry. Payroll data from a random sample of businesses as part of the US Census Bureau’s Business Patterns Survey is used to estimate the number of individuals employed in a specific industry or occupation. High-risk industries and occupations are identified using information from BLS Survey of Occupational Injuries and Illnesses (SOII). Every few years the identification of specific industries and occupations as high-risk is re-evaluated. As the industry-wide rate of DART cases has declined over time, a new high-risk threshold is established every three to five years. For example, in the year 2000, the high-risk industry threshold was 13.0 DART cases per 100 FTEs (representing twice the industry-wide average rate). This threshold was used for each of the years 2000-2002. In 2003, the threshold rate was redefined as 10.0 DART cases per 100 FTEs, reflecting the decline in the industry-wide average. This revised threshold was then used for each of the years 2003-2007. Similarly, new high-risk industry thresholds were established in 2008 (7.8) and 2013 (3.4), and applied to subsequent years as shown in Table 31.

Table 31: Percentage of Minnesota Workers in Industries with High-Risk of Morbidity, 2000-2014

Year	Percentage	Threshold Level (DART cases/100 FTE)
2000	6.9	13.0
2001	6.8	13.0
2002	6.9	13.0
2003	7.8	10.0
2004	7.8	10.0
2005	7.8	10.0
2006	7.6	10.0
2007	7.6	10.0
2008	8.9	7.8
2009	8.7	7.8
2010	8.9	7.8
2011	8.9	7.8
2012	8.9	7.8
2013	6.0	3.4
2014	5.5	3.4

Figure 49: Percentage of Workers Employed in Industries with High-Risk* for Morbidity in Minnesota, 2000-2014



Since the definition of a high-risk industry changed for each of the four time periods, 2000-2002, 2003-2007, 2008-2012 and 2013-2014, it is inappropriate to conduct a trend analysis across all 15 years of data.

2013-2014 Industries at High-Risk for Morbidity

- Rice milling
- Beet sugar manufacturing
- Animal (except poultry) slaughtering
- Rendering and meat byproduct processing
- Soft drink manufacturing
- Narrow fabric mills and schiffli machine embroidery
- Rope, Cordage, Twine, Tire Cord, and Tire Fabric Mills
- Sawmills
- Wood preservation
- Truss manufacturing
- Cut stock, re-sawing lumber, and planning
- Other millwork (including flooring)
- Wood container and pallet manufacturing
- Manufactured home (mobile home) manufacturing
- Prefabricated wood building manufacturing
- Plastics pipe and pipe fitting manufacturing
- Other concrete product manufacturing
- Steel wire drawing
- Iron foundries
- Steel foundries (except investment)
- Nonferrous Metal Die-Casting Foundries
- Aluminum foundries (except die-casting)

MINNESOTA OCCUPATIONAL HEALTH INDICATORS

- Other Nonferrous Metal Foundries (except Die-Casting)
- Plate work manufacturing
- Other metal container manufacturing
- Farm machinery and equipment manufacturing
- Automobile manufacturing
- Light truck and utility vehicle manufacturing
- Motor vehicle body manufacturing
- Truck trailer manufacturing
- Travel trailer and camper manufacturing
- Motor vehicle metal stamping
- Ship building and repairing
- Boat building
- Showcase, partition, shelving, and locker manufacturing
- Burial casket manufacturing
- Other home furnishings stores
- Luggage and leather goods stores
- Pet and pet supplies stores
- Scheduled passenger air transportation
- Interurban and rural bus transportation
- Marine cargo handling
- Couriers and express delivery services
- Veterinary services
- Solid waste collection
- Other nonhazardous waste treatment and disposal
- Materials recovery facilities
- Ambulance services
- Psychiatric and Substance Abuse Hospitals
- Nursing Care Facilities (Skilled Nursing Facilities)
- Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly
- Other Residential Care Facilities
- Amusement and Theme Parks
- Skiing Facilities

The Percentage of Workers Employed in Occupations at High-Risk for Occupational Morbidity, 2000-2014

This indicator is used to identify occupations at high-risk for injury or illness (morbidity). To identify these occupations, morbidity rates for occupational categories are calculated and those greater than the national average incidence rate for Days Away from Work (DART) cases are defined as high-risk. Two data sources are used to create this indicator: the Current Population Survey (CPS) conducted by the Census Bureau and the Survey of Occupational Injury and Illnesses (SOII) conducted by the Bureau of Labor Statistics (BLS). Due to downward trends in national injury rates, this indicator is re-defined approximately every five years with a revised baseline rate and new threshold rate for inclusion as a high-risk occupation.

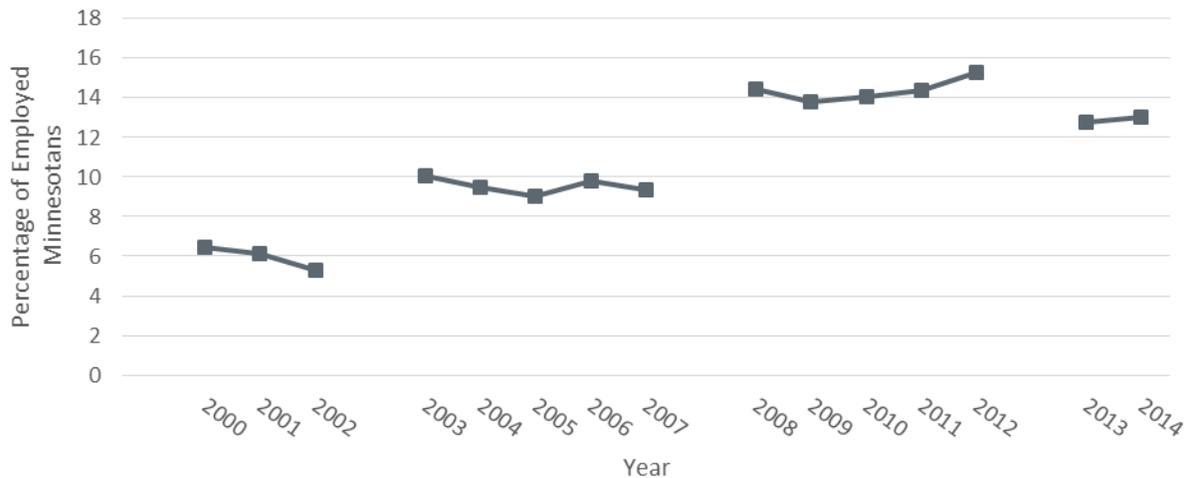
In the year 2000 an occupation was identified as high-risk if the occupation had an injury and illness rate greater than 5 DART cases per 100 full-time equivalent employees. The threshold established in 2000 was used for years 2000, 2001, and 2002. A new high-risk threshold was established based on 2003 data, and that threshold was applied for each of the years 2003-2007. Similarly, a new threshold was identified in 2008 and applied to the years 2008 through 2012. The current threshold was identified in the year 2013. In 2003 the national rate decreased from 5 cases to 2.6 DART cases per 100 full-time equivalent employees. In 2008 the national rate decreased further to 1.13 DART cases per 100 full-time equivalent employees. Finally, in 2013 the national rate rose slightly to 1.7 DART cases per 100 full-time equivalent employees. A total of 49 occupational categories were identified with a rate higher than 1.7 DART cases per 100 full-time equivalent employees.

Changes in the codes used to categorize occupation were instituted in 2003, 2008 and 2013. Due to these changes and the changing thresholds for defining high-risk occupation, a trend analysis was not appropriate.

Table 32: Percentage of Minnesotans Employed in Occupations with High-Risk for Morbidity, 2000-2014

Year	Percentage	Threshold Level (DART cases per 100,000 FTE)
2000	6.5	5.0
2001	6.1	5.0
2002	5.3	5.0
2003	10.1	2.6
2004	9.5	2.6
2005	9.0	2.6
2006	9.8	2.6
2007	9.4	2.6
2008	14.5	1.13
2009	13.8	1.13
2010	14.1	1.13
2011	14.4	1.13
2012	15.3	1.13
2013	12.8	1.7
2014	13.0	1.7

Figure 50: Percentage of Employed Minnesotans in Occupations at High-Risk for Morbidity, 2000-2014.



2013-2014 Occupations at High-risk for Morbidity

- Surveyors, cartographers, and photogrammetrists
- Athletes, coaches, umpires, ad related workers
- Emergency medical technicians and paramedics
- Nursing, psychiatric, and home health aides
- Veterinary assistants and laboratory animal caretakers
- Police and sheriff's patrol officers
- Crossing guards
- Food preparation workers
- First-line supervisors of landscaping, lawn service, and grounds keeping workers
- Janitors and building cleaners
- Maids and housekeeping cleaners
- Grounds maintenance workers
- Nonfarm animal caretakers
- Reservation and transportation ticket agents and travel clerks
- Cargo and freight agents
- Logging workers
- Carpenters
- Carpet, floor, and tile installers and finishers
- Construction laborers
- Roofers
- Structural iron and steel workers
- Septic tank servicers and sewer pipe cleaners
- Miscellaneous construction and related workers
- Earth drillers, except oil and gas
- Mining machine operators

MINNESOTA OCCUPATIONAL HEALTH INDICATORS

- Radio and telecommunications equipment installers and repairers
- Electric motor, power tool, and related repairers
- Electronic home entertainment equipment installers and repairers
- Automotive glass installers and repairers
- Automotive service technicians and mechanics
- Heavy vehicle and mobile equipment service technicians and mechanics
- Miscellaneous vehicle and mobile equipment mechanics, installers, and repairers
- Control and valve installers and repairers
- Heating, air conditioning, and refrigeration mechanics and installers
- Maintenance and repair workers, general
- Telecommunications line installers and repairers
- Helpers--installation, maintenance, and repair workers
- Part of Molders and molding machine setters, operators, and tenders, metal and plastic
- Furniture finishers
- Sawing machine setters, operators, and tenders, wood
- Photographic process workers and processing machine operators
- Tire builders
- Flight attendants
- Bus drivers
- Driver/sales workers and truck drivers
- Taxi drivers and chauffeurs
- Railroad conductors and yardmasters
- Laborers and freight, stock, and material movers, hand
- Refuse and recyclable material collectors

Percentage of Workers Employed in Industries and Occupations at High-Risk for Mortality, 2000-2013

In the United States in 2013 4,585 individuals lost their lives because of an occupationally related injury. The national rate for fatal occupational injuries and illnesses was 3.3 fatal injuries per 100,000 full-time equivalent workers in 2013. The Census of Fatal and Occupational Injuries (CFOI), conducted by the U.S. Bureau of Labor Statistics (BLS) in collaboration with individual states, collect information about these fatalities. Using information from CFOI as well as the Census Bureau's Current Population Survey (CPS), this indicator identifies industries and occupations with an occupational mortality rate double that for all industries combined. By identifying high-risk industries and occupations, priorities for education and prevention programs can be established.

In 2013, 65 occupations were deemed as high-risk. In comparison a total of 40 industries, comprising 15% of the employed United States private sector, were defined as high-risk in 2013.

As the fatal occupational injury rates vary over time, the definition for high-risk industries and occupations has also varied over time. As with the two previous indicators, every three to five years, a new high-risk threshold was identified (representing twice the overall industry-wide mortality rate) and that threshold is applied to subsequent years within each time-period (see Table 33). Due to these changes and potential changes in safety practices in specific industries or occupations, the percentages of high-risk industries and occupations will also vary over time. Consequently, percentages should not be compared between time periods with different baseline mortality rates and a trend analysis is not provided.

Table 33: Percentage of Minnesotans Employed in Industries and Occupations at High-Risk* for Mortality, 2000-2013

Year	Percentage in Industries at High-risk for Mortality	Percentage in Occupations at High-risk for Mortality	Threshold Level
2000	14.3	7.8	9.5
2001	14.1	7.4	9.5
2002	14.1	6.6	9.5
2003	13.6	9.3	9.5
2004	12.8	8.8	9.5
2005	12.2	8.0	9.5
2006	12.8	8.6	9.5
2007	12.5	8.8	9.5
2008	14.2	10.5	7.5
2009	12.6	10.5	7.5
2010	14.6	10.3	7.5
2011	12.1	10.5	7.5
2012	15.2	11.6	3.3
2013	14.1	10.8	3.3

*As the definition of an occupation or industry with a high-risk for mortality has changed over time, comparisons across time periods should be avoided.

Figure 51: Percentage of Minnesotans Employed in Industries at High-Risk for Mortality, 2000-2013

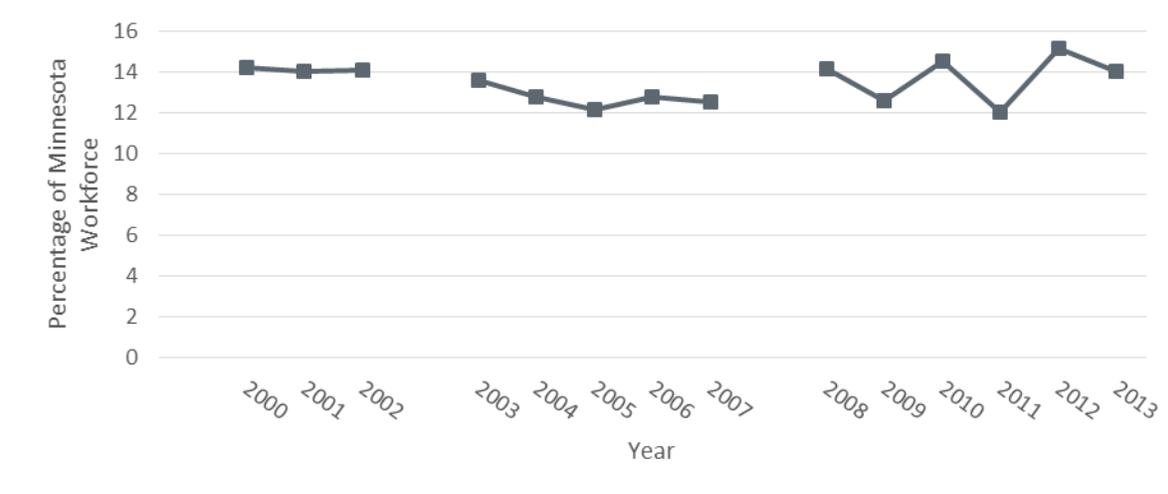
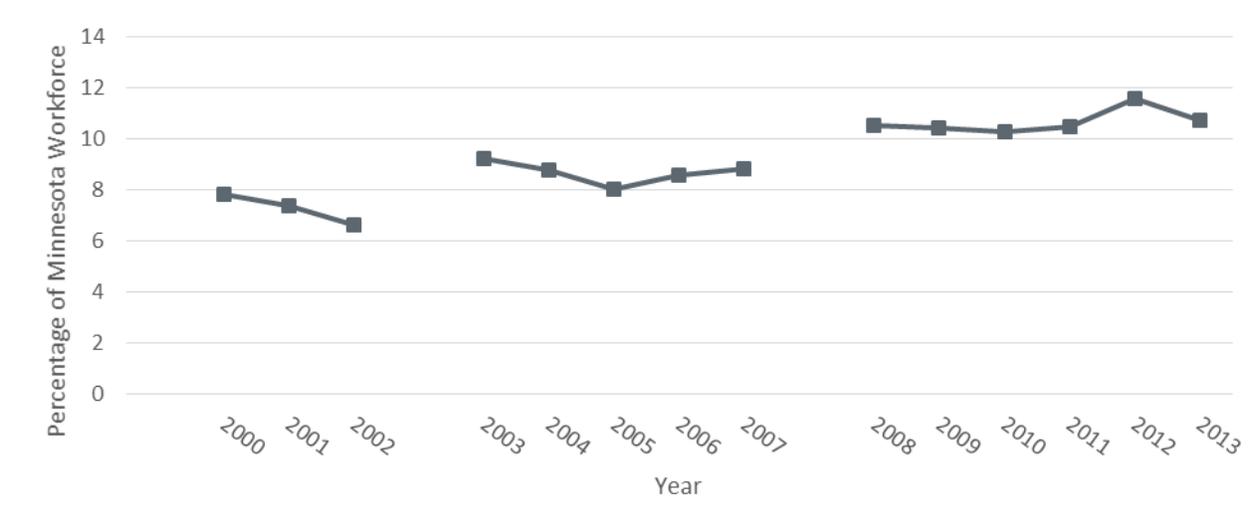


Figure 52: Percentage of Minnesotans Employed in Occupations at High-Risk for Mortality, 2000-2013



2008-2013 Industries at High-Risk for Mortality

- Crop production
- Animal production
- Forestry, except logging
- Logging
- Fishing, hunting, trapping
- Support activities for agriculture and forestry
- Oil and gas extraction
- Coal mining
- Metal ore mining
- Nonmetallic mineral mining and quarrying

- Support activities for mining
- Construction
- Animal food, grain, and oilseed milling
- Sugar and confectionery products
- Miscellaneous petroleum and coal products
- Iron and steel mills and steel product manufacturing
- Nonferrous metal production and processing (except aluminum)
- Foundries
- Ship and boat building
- Sawmills and wood preservation
- Veneer, plywood, and engineered wood product manufacturing
- Recyclable material wholesalers
- Farm product raw materials wholesalers
- Farm supplies wholesalers
- Wholesale electronic markets, agents, and brokers
- Rail transportation
- Water transportation
- Truck transportation
- Taxi and limousine service
- Pipeline transportation
- Scenic and sightseeing transportation
- Services incidental to transportation
- Sound recording industries
- Other consumer good rental
- Commercial, industrial, and other intangible assets rental and leasing
- Landscaping services
- Waste management and remediation services
- Drinking places, alcoholic beverages
- Commercial and industrial machinery and equipment repair and maintenance

2008-2013 Occupations at High-Risk for Mortality

- Farm, ranch and other agricultural managers
- Athletes, coaches, umpires, and related workers
- Announcers
- Fire fighters
- Security guards and gaming surveillance officers
- Crossing guards
- First-line supervisors/managers of housekeeping and janitorial workers
- Pest control workers
- Grounds maintenance workers
- Tour and travel guides
- First-line supervisors/managers of farming, fishing, and forestry workers
- Miscellaneous agricultural workers

MINNESOTA OCCUPATIONAL HEALTH INDICATORS

- Fishers and related fishing workers
- Logging workers
- First-line supervisors/managers of construction trades and extraction workers
- Boilermakers
- Brick masons, block masons, and stonemasons
- Cement masons, concrete finishers, and terrazzo workers
- Construction laborers
- Paving, surfacing, and tamping equipment operators
- Operation engineers and other construction equipment operators
- Electricians
- Glaziers
- Insulation workers
- Painters, construction, and maintenance
- Roofers
- Structural iron and steel workers
- Helpers, construction trades
- Highway maintenance workers
- Miscellaneous construction and related workers
- Derrick, rotary drill, and service unit operators, oil, gas, and mining
- Earth drillers, except oil and gas
- Mining machine operators
- Roustabouts, oil and gas
- Other extraction workers
- First-line supervisors/managers of mechanics, installers and repairers
- Bus and truck mechanics and diesel engine specialists
- Heavy vehicle and mobile equipment service technicians and mechanics
- Maintenance and repair workers, general
- Maintenance workers, machinery
- Millwrights
- Electronic power-line installers and repairers
- Riggers
- Molders and molding machine setters, operators, and tenders, metal and plastic
- Welding, soldering, and brazing workers
- Chemical processing machine setters, operators, and tenders
- Aircraft pilots and flight engineers
- Driver/sales workers and truck drivers
- Taxi drivers and chauffeurs
- Motor vehicle operators, all other
- Locomotive engineers and operators
- Railroad brake, signal, and switch operators
- Railroad conductors and yardmasters
- Sailors and marine oilers
- Ship and boat captains and operators

MINNESOTA OCCUPATIONAL HEALTH INDICATORS

- Ship engineers
- Service station attendants
- Conveyor operators and tenders
- Crane and tower operators
- Industrial truck and tractor operators
- Refuse and recyclable material collectors
- Material moving workers, all other

Occupational Health and Safety Professionals, 2000-2013

A number of different specialties, with unique training experiences, work together to create safe workplaces for Minnesota's workforce; this indicator describes the number people employed in those specialties in Minnesota. Each discipline addresses a specific need or aspect of occupational health and safety. These disciplines include physicians, nurses, industrial hygienists, and safety engineers. Occupational health and safety professionals work in clinics, hospitals, on job sites, at universities, and in government. Having an adequate number of trained and educated professionals to address the diverse and sometimes unique occupational environments and issues is imperative to improving occupational health and safety in Minnesota.

This indicator is based on membership data from the American College of Occupational and Environmental Medicine (ACOEM), the American Association of Occupational Health Nurses (AAOHN), the American Industrial Hygiene Association (AIHA), and the American Society of Safety Engineers (ASSE). These organizations represent different disciplines and responsibilities for specific occupational health and safety concerns; however, it's through their co-operation and interaction that occupational injury and illness rates continue to decline and health and safety are promoted.

Table 34: Number of Health and Safety Professionals by Discipline or Certification in Minnesota, 2003-2013

Year Organization Membership Numbers	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Certified Occupational Medicine Physicians	71	70	73	76	79	81	87	84	n/a	90	n/a
American College of Occ. and Env. Medicine (ACOEM)	106	93	97	99	102	94	90	90	n/a	88	84
Certified Occupational Health Nurses	148	144	141	150	120	117	114	109	n/a	n/a	95
American Association of Occ. Health Nurses (AAOHN)	162	176	184	150	138	142	116	n/a	n/a	77	n/a
Certified Industrial Hygienists	160	163	171	173	173	175	178	177	n/a	124	150
American Industrial Hygiene Association (AIHA)	232	230	236	231	220	294	227	129	n/a	220	180
Certified Safety and Health Professionals	232	245	264	271	277	299	304	310	n/a	331	336
American Society of Safety Engineers (ASSE)	605	645	700	600	611	610	586	309	n/a	625	638
Total	1716	1766	1866	1750	1720	1812	1702	1208	n/a	1555	1483

Data for the year 2011 was unavailable and some data points were inconsistently available starting in 2010; thus, a more extensive comparative trend analysis including the years 2010-2013 was not completed.

Minnesota OSHA Enforcement Activities, 2000-2013

The Minnesota Occupational Safety and Health Administration (MN OSHA) has the authority to inspect workplaces to ensure that employers are complying with all standards and regulations to provide a safe and healthy workplace. The authority to conduct these inspections is granted under the Minnesota Occupational Safety and Health Act of 1973. MN OSHA uses workers' compensation data and other special emphasis programs to identify specific industries and workplaces for inspection. OSHA inspections may be initiated through a variety of events or concerns, including: employee concerns, public concerns, if a fatality occurs at a worksite, if three or more employees are hospitalized in a workplace catastrophe, and follow-up inspections are completed to ensure previously identified violations have been corrected.

This indicator uses records kept by MN OSHA detailing their enforcement activities. However, because MN OSHA may conduct follow-up inspections of a single facility, this may lead to an over estimation by the indicator of the number of establishments or employees covered by the inspections.

Table 35: Number and Percentage of Establishments inspected by MN OSHA, 2000-2013

Year	Number of Establishments	Percentage of Establishments
2000	1,966	1.3
2001	1,928	1.3
2002	1,969	1.3
2003	2,608	1.7
2004	2,647	1.7
2005	2,530	1.6
2006	2,885	1.7
2007	2,537	1.5
2008	2,569	1.5
2009	2,863	1.8
2010	2,592	1.6
2011	2,388	1.5
2012	2,698	1.6
2013	2,912	1.8

Figure 53: Number of Establishments Inspected by Minnesota OSHA, 2000-2013

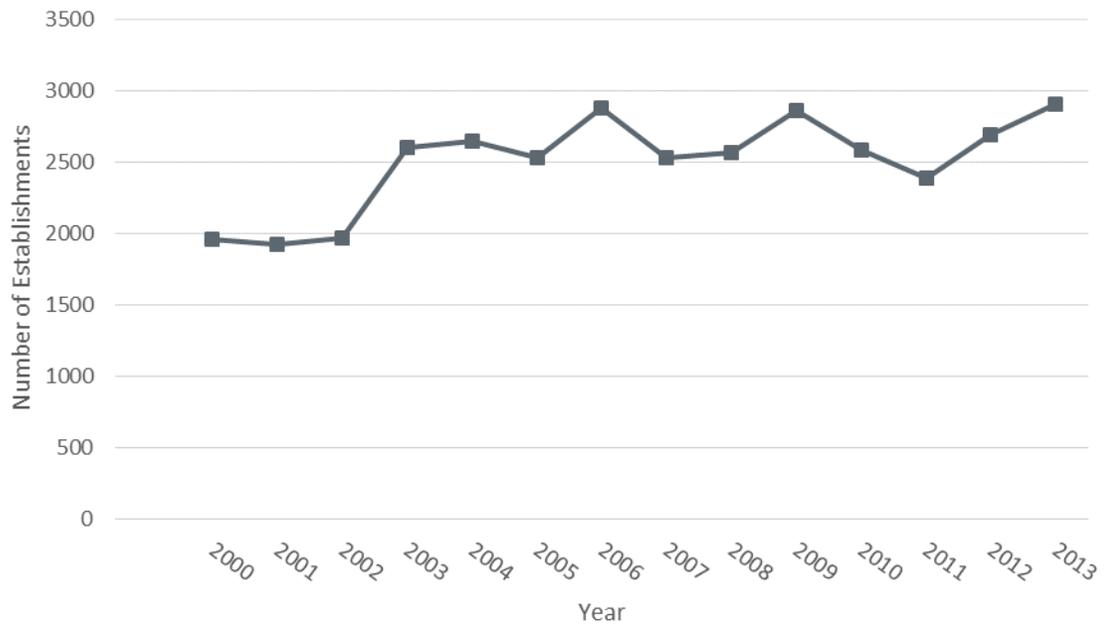
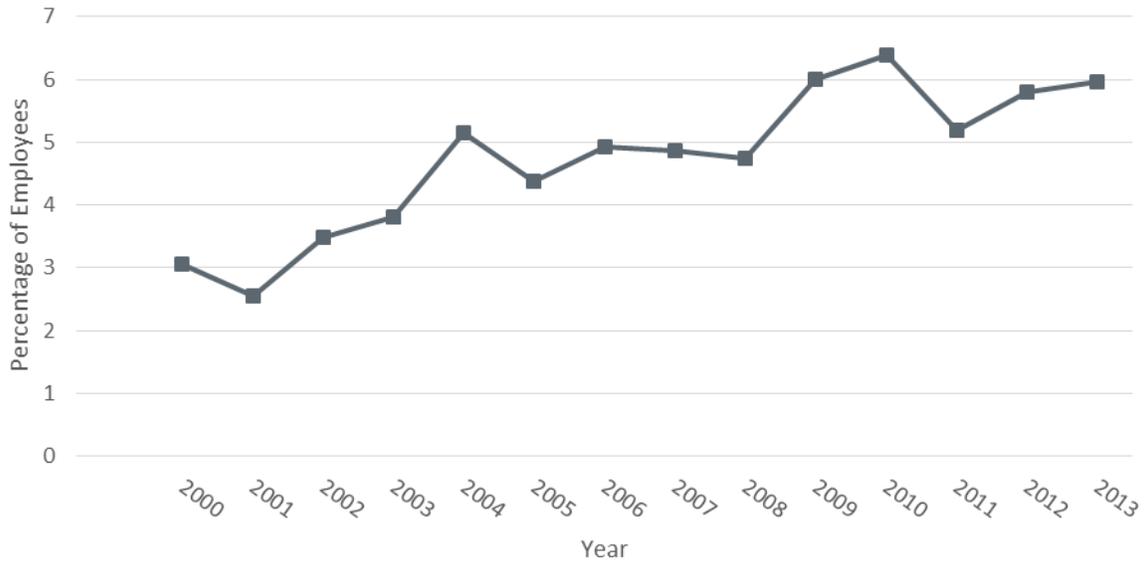


Table 36: Number and Percentage of Employees Employed in Workplaces Inspected by MN OSHA, 2000-2013

Year	Number of Employees	Percentage of Employees
2000	79,298	3.1
2001	66,362	2.6
2002	89,367	3.5
2003	97,582	3.8
2004	133,185	5.2
2005	114,741	4.4
2006	130,295	4.9
2007	129,723	4.9
2008	125,978	4.7
2009	153,034	6.0
2010	162,117	6.4
2011	133,257	5.2
2012	152,752	5.8
2013	159,540	6.0

Figure 54: Percentage of Employees Employed by Establishments Eligible for Inspection that were Inspected by Minnesota OSHA, 2000-2013



A trend analysis comparing the number of covered establishments and employees that were inspected by MN OSHA from 2000 through 2013 demonstrates a statistically significant increase.

To learn more about the MN OSHA inspection program and other programs they are actively involved in please visit: <http://www.dli.mn.gov/mnosha.asp>.

Workers Compensation Awards, 2000-2013

When an occupational injury, illness, or fatality occurs, workers' compensation awards are designed to cover costs for medical care and partial wage replacement for either the employee or surviving dependents. Current national data suggests that the number of individuals covered by workers' compensation has increased and the number of claims has decreased, but the amount dispersed for each claim has increased over time. This could be due in part to increases in medical costs and wage-replacement benefits.

This indicator utilizes data from the National Academy of Social Insurance. The data are incomplete as not every occupationally related injury or illness will be reported. Furthermore, specific industry and occupational classifications are exempt from coverage including: self-employed individuals, corporate executives, domestic and agricultural workers, federal employees, railroad, longshore, and maritime workers. Not every claim is awarded compensation; each state has specific laws and regulations in place regarding the application for and dissemination of workers' compensation awards. These external factors can have a significant influence on the amount of workers' compensation awarded in a state and comparisons should only be made within the state from year to year. These factors also create an underestimate of the true cost of occupational injury and illness within a state.

The following table depicts the total number of dollars paid out in workers compensation claims and the average number of dollars paid out in workers compensation per individual covered by workers compensation.

Table 37: Total and Average Workers' Compensation Benefits Paid in Minnesota Annually, 2000-2013

Year	Workers' Compensation Benefits	Average Award (per covered worker)
2000	\$798,100,000	\$310.30
2001	\$908,000,000	\$352.52
2002	\$921,000,000	\$360.89
2003	\$883,619,000	\$347.61
2004	\$933,975,000	\$363.84
2005	\$945,888,000	\$362.82
2006	\$921,232,000	\$349.35
2007	\$936,085,000	\$352.57
2008	\$1,007,193,000	\$382.82
2009	\$1,082,620,000	\$429.44
2010	\$1,038,272,000	\$414.32
2011	\$1,011,017,000	\$396.01
2012	\$1,043,694,000	\$401.88
2013	\$1,064,684,000	\$402.83

Figure 55: Total Workers' Compensation Benefits Paid Annually in Minnesota, 2000-2013

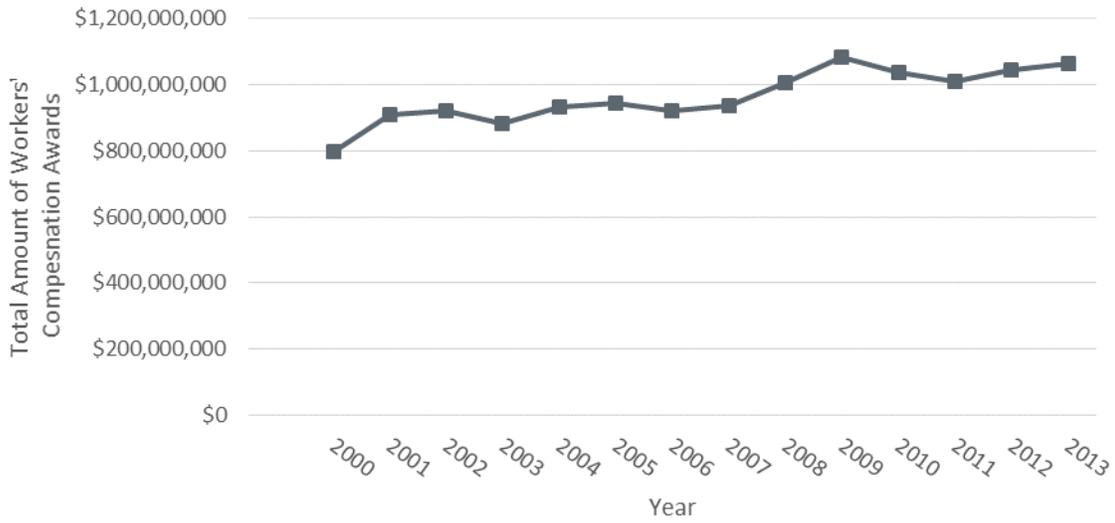
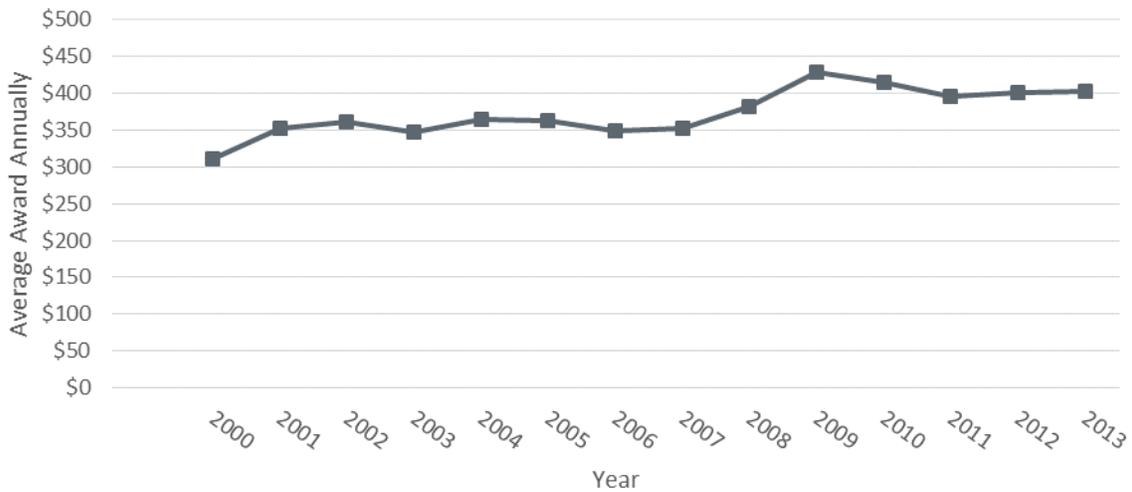


Figure 56: Average Amount of Workers' Compensation Benefits Paid per Covered Worker Annually in Minnesota, 2000-2013



Trend analysis of the amount of workers' compensation benefits paid from 2000 to 2013 demonstrates a statistically significant increase over the years. This is similar to national trends and could in part be related to rising health care costs.

Hospitalizations for Work-Related Low Back Disorders, 2000-2013

It has been estimated from [National Health Interview Survey](#) data that almost two-thirds of all back pain in the United States may be attributable to work-related activities. In the year 2003, 3.2% of the U.S. workforce experienced lost work time due to back pain. An estimated 15-20% of Americans report some form of back pain, resulting in over 100 million days of lost work time and more than 10 million doctors' visits. These disorders are costly: an estimated \$19.8 billion of lost work time for the nation in the year 2003 was due to low back disorders. Strong epidemiological evidence exists for the connection between workplace risk and low back disorders. NIOSH has summarized this research on the NIOSH topic page, Ergonomics and Musculoskeletal Disorders (<http://www.cdc.gov/niosh/topics/ergonomics/>).

This indicator is based on Minnesota hospital discharge billing data. The Minnesota hospital discharge billing data captures injury and illness events in Minnesota that require inpatient hospitalization. These cases of injury and illness are coded for billing purposes to describe the reason for hospitalization, diagnosis, care provided, and procedures. This indicator uses specific diagnostic and procedural codes to identify hospitalizations due to low back disorders. Work-related cases are defined as those in which workers' compensation is the payer. The cases are then divided into those that required surgery and those that did not. This indicator does not capture every case of work-related low back pain as not every case will require inpatient hospitalization. This indicator will also miss cases seen in an outpatient setting or receiving care not covered by workers' compensation.

Table 38: Numbers and Rates of Work-Related Low Back Disorders Requiring Hospitalizations Annually (Age 16 and Older), 2000-2013

Year	Work-Related Low Back Disorders Requiring Surgery	Rate of Low Back Disorders Requiring Surgery (per 100,000 persons)	Work-Related Low Back Disorders Without Surgery	Rate of Low Back Disorders Without Surgery (per 100,000 persons)
2000	530	20.0	646	24.4
2001	517	19.0	637	23.5
2002	432	15.5	547	19.6
2003	404	14.5	519	18.7
2004	506	18.1	633	22.6
2005	479	17.0	639	22.7
2006	476	16.9	626	22.2
2007	423	15.3	553	19.9
2008	360	13.2	483	17.7
2009	329	12.2	426	15.8
2010	320	11.8	424	15.6
2011	157	5.7	208	7.5
2012	139	5.0	196	7.1
2013	383	13.6	457	16.2

Figure 57: Annual Number of Work-Related Low Back Disorder Hospitalizations Requiring Surgery (Age 16 years or Older) in Minnesota, 2000-2013

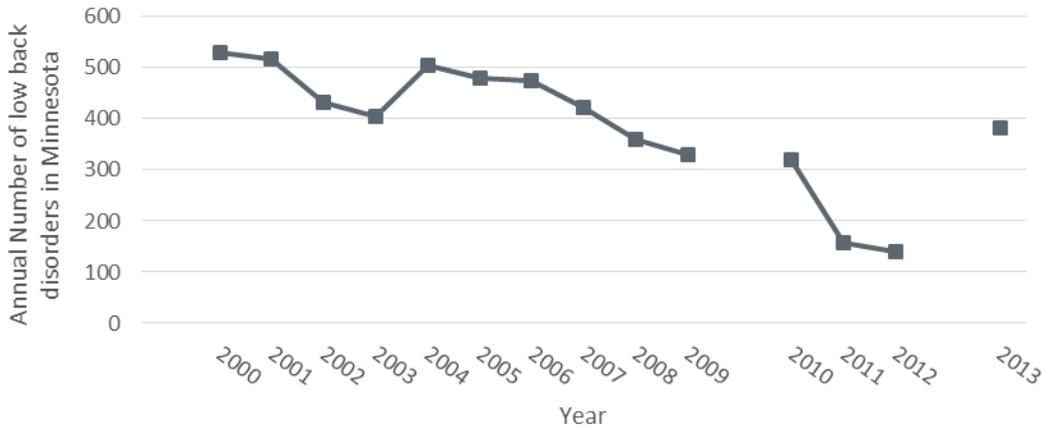


Figure 58: Annual Number of Work-Related Non-Surgical Hospitalizations for Low Back Pain Disorder (Age 16 years or Older) in Minnesota, 2000-2013

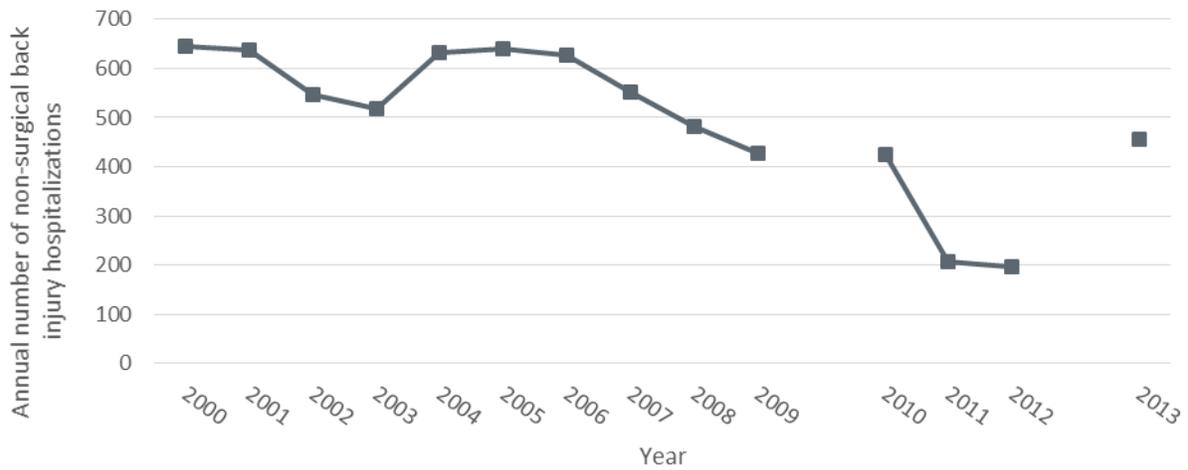


Figure 59: Annual Crude Rate of Work-Related Hospitalizations for Low Back Pain Disorders Requiring Surgery per 100,000 Employed Persons (Age 16 or Older), 2000-2013.

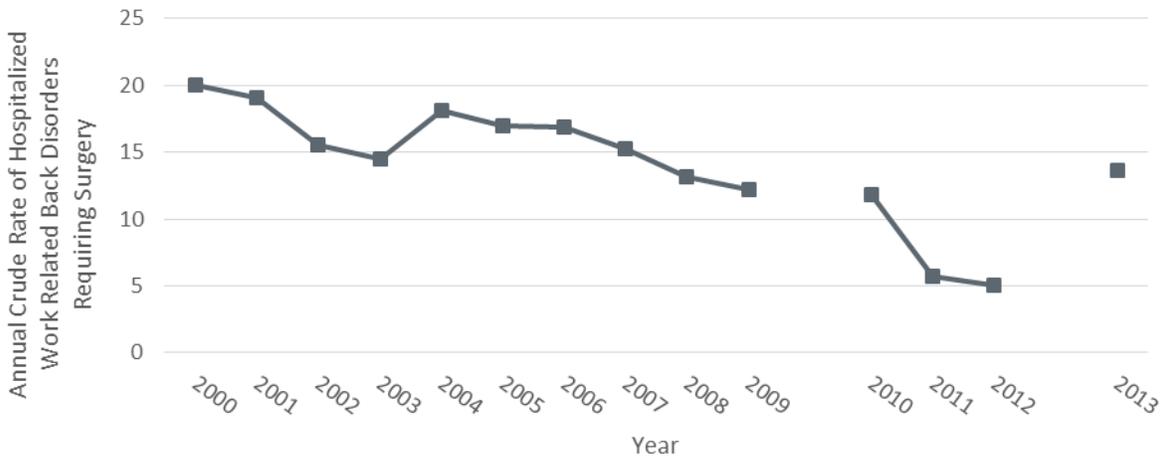
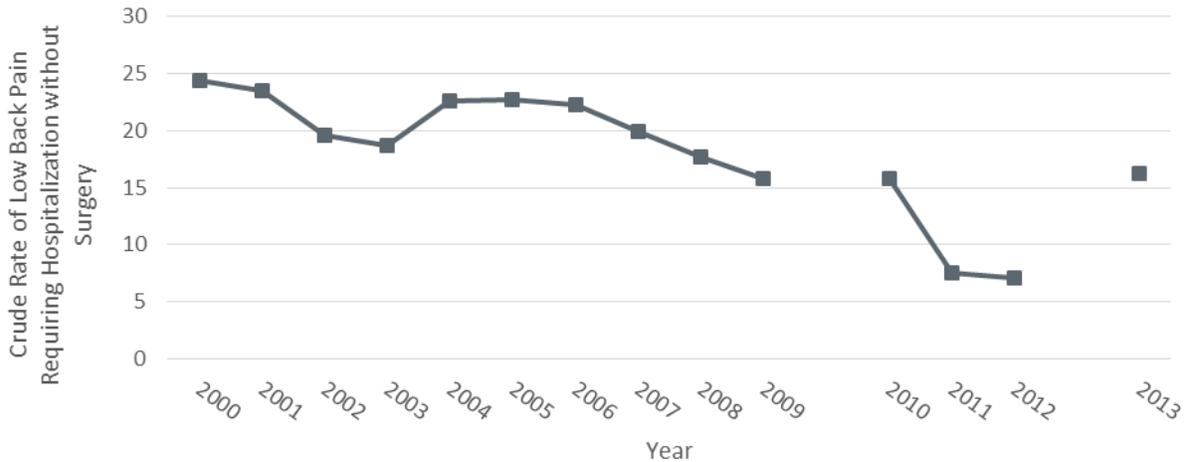


Figure 60: Annual Crude Rate of Work-Related Hospitalizations for Non-Surgical Low Back Pain Disorders per 100,000 Employed Persons in Minnesota (Age 16 or Older), 2000-2013.



A trend analysis was not completed due to a coding discrepancy over the time period 2010 – 2012 in which some workers’ comp cases may not have been properly coded. One should be cautious when interpreting this indicator, as the Minnesota hospital discharge dataset is not a census of all work-related injury and changes in billing and coding practices as well as treatment practices could influence the number of identified cases.

Glossary

AAOHN: American Association of Occupational Health Nurses. The primary association for the largest group of health care professionals serving the workplace.

ABLES: Adult Blood Lead Epidemiology and Surveillance Program, funded through CDC.

ACOEM: American College of Occupational and Environmental Medicine.

AIHA: American Industrial Hygiene Association. One of the largest international associations serving the needs of occupational and environmental health and safety professionals practicing industrial hygiene in industry, government, labor, academic institutions, and independent organizations.

Asbestosis: A type of pneumoconiosis caused by either a high intensity or chronic exposure to asbestos.

ASSE: American Society of Safety Engineers. The oldest professional safety society and is committed to protecting people, property, and the environment.

BLS: Bureau of Labor Statistics. The principal fact-finding agency for the Federal Government in the broad field of labor economics and statistics.

BLL: Blood Lead Level. A measure of lead in the blood. It is often measured in micrograms of lead per deciliter of blood ($\mu\text{g}/\text{dL}$).

Carpal Tunnel Syndrome: Occurs when the nerve running through the wrist is compressed causing pain, numbness, and other symptoms. Carpal Tunnel syndrome is usually due to repeated motion and overuse of the lower forearm.

County Business Patterns Survey: is an annual series conducted by the Census Bureau that provides subnational economic data by industry. This series includes the number of establishments, employment during the week of March 12th, first quarter payroll, and annual payroll.

CFOI: Census of Fatal Occupational Injuries. A Federal-State cooperative program that has been implemented in all 50 states and the District of Columbia since 1992. To compile counts that are as complete as possible, the census uses multiple sources (death certificates, workers' compensation reports, and federal and state agency reports) to identify, verify, and profile fatal worker injuries.

COHS: Center for Occupational Health and Safety, located at the Minnesota Department of Health in the Health Promotion and Chronic Disease Division.

CPS: Current Population Survey. A joint effort between the U.S. Census Bureau and the U.S. Bureau of Labor Statistics, the CPS provides numerous high-profile economic statistics, including the national unemployment rate, and provides data on a wide range of issues relating to employment and earnings.

DLI or DOLI: Minnesota Department of Labor and Industry

FTE: Full-time Equivalent. A term of measurement used to describe the working population by the number of hours worked.

Indicator: A method to measure change in health and safety.

MCSS: Minnesota Cancer Surveillance System.

Mesothelioma: A rare form of cancer originating in the protective lining of the internal organs of the chest or abdomen. Asbestos exposure is the primary known cause of mesothelioma.

Morbidity Rate: The rate of non-fatal disease or injury.

Mortality Rate: Death rate.

Musculoskeletal Disorder: An injury to the muscles, joints, tendons, ligaments, or nerves, usually due to repeated motions and overuse. Most develop over time and can be debilitating.

National Academy of Social Insurance: A nonprofit, nonpartisan organization made up of the nation's leading experts on social insurance. Its mission is to advance solutions to challenges facing the nation by increasing public understanding of how social insurance contributes to economic security.

NIOSH: National Institute for Occupational Safety and Health. The federal agency responsible for conducting research and making recommendations for the prevention of work-related injury and illness.

OSHA: Occupational Safety and Health Administration. OSHA is part of the United States Department of Labor and was created to assure safe and healthy work conditions for working men and women by setting and enforcing standards and providing training, outreach, education, and assistance. In Minnesota, enforcement of state and federal OSHA standards is the responsibility of the MN OSHA program at the Minnesota Department of Labor and Industry.

Pneumoconiosis: An occupational and restrictive lung disease cause by the inhalation of dust.

SENSOR: Sentinel Event Notification System for Occupational Risk. The mission of this program is to build and maintain occupational illness and injury surveillance capacity within state health departments.

Silicosis: A type of pneumoconiosis caused by either a high intensity or chronic exposure to silica.

SOII: Survey of Occupational Injuries and Illnesses. This survey is conducted by the Bureau of Labor Statistics and is designed to provide an estimate of the number of work related injuries and illnesses and a measure of the frequency (rate) at which they occur.

Workers Compensation: A form of insurance providing wage replacement and medical benefits should an employee become injured or ill due to employment exposures or environment.