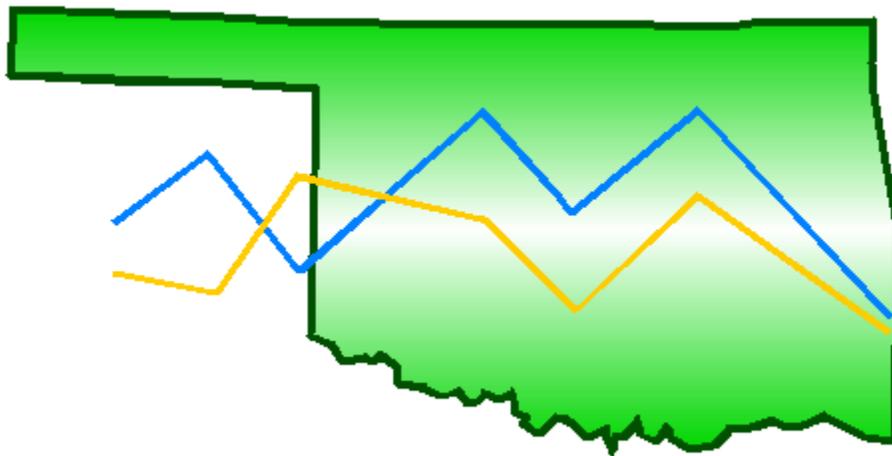
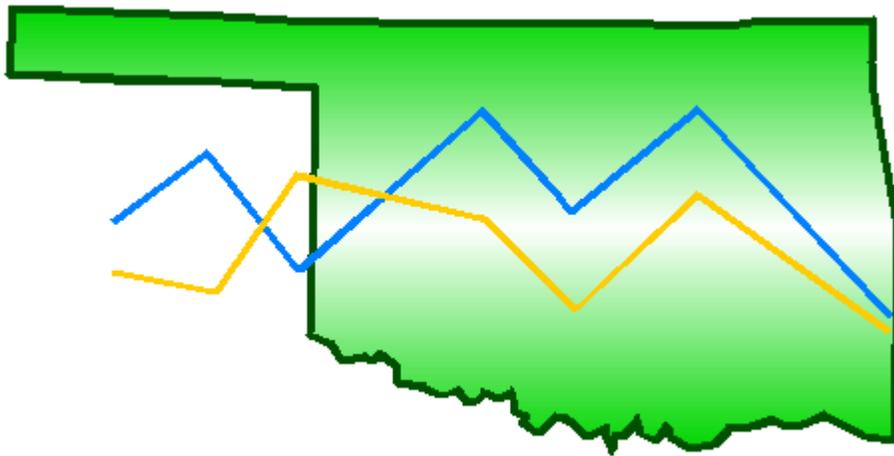


Oklahoma Occupational Health Indicators, 2003-2008



Injury Prevention Service
Oklahoma State Department of Health

Oklahoma Occupational Health Indicators, 2003-2008



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Executive Summary

Work-related injuries, deaths, and illnesses substantially impact Oklahoma's civilian workforce of 1.6 million persons. These incidents involve multiple risk factors, including workplace procedures and design, work organization, worker characteristics, economics, and a variety of social factors. Although many of these incidents are preventable, they continue to occur and affect the physical, mental, and economic status of Oklahoma workers and their businesses. By collecting data on the magnitude and occurrence of work-related incidents, prevention programs can be targeted to reduce exposures. Below are some of the results from Oklahoma's 2003-2008 occupational indicators.

- In 2008, Oklahoma's incidence rate of work-related injuries and illnesses was 4,500 per 100,000 FTEs; this was down 10% from 2003 and was the lowest incidence rate over the six-year period. The highest incidence rate was in 2004 with 5,600 per 100,000 FTEs.
- The total number of work-related injuries and illnesses that involved more than 10 days away from work was highest in 2005 with 7,170 cases and lowest in 2008 with 5,330 cases.
- The number of work-related fatalities declined from 100 in 2003 to 91 in 2006, but increased to 102 in 2008. The work-related crude fatality rate in Oklahoma was 37-65% higher than the U.S. for each of the six years.
- The annual rate of work-related burn hospitalizations increased 54% between 2003 and 2008 (2.6 and 4.0 per 100,000 employed persons, respectively).
- The number and incidence rate of musculoskeletal disorders involving days away from work decreased from a high of 5,190 cases (534 per 100,000 FTEs) in 2004 to 3,540 cases (323 per 100,000 FTEs) in 2008.
- The incidence rate of carpal tunnel syndrome cases involving days away from work reached a four-year low in 2006 with 10 cases per 100,000 FTEs (down 60% from 2003), but more than doubled from 2006-2008 to 21 cases per 100,000 FTEs. The number of carpal tunnel syndrome cases filed with the Oklahoma Workers' Compensation Court rose from 318 in 2003 to 438 in 2008.
- Mortality from or with pneumoconiosis remained consistent over the six-year period. While pneumoconiosis-related hospitalizations also remained fairly stable, there was a steady decline in coal workers' pneumoconiosis (16.4 discharges per million residents in 2003 compared to 5.2 per million residents in 2008). The rate of asbestosis hospital discharges increased 27% from 2003-2008.
- The numbers of cases of acute pesticide-related injuries and illness remained essentially unchanged during 2003 to 2008.
- The number of cases of malignant mesothelioma reached a six-year high of 41 in 2006 before decreasing approximately 25% to 32 in 2008. The annual incidence rate of mesothelioma increased nearly 10% from 2003-2008.
- Steady declines appeared among Oklahomans with elevated blood lead levels greater than or equal to 25 µg/dL (a 57% decline in the prevalence rate and a 40% decrease in the incidence rate); however, such declines disappeared when examining only those with incident blood lead levels greater than or equal to 40 µg/dL.

Introduction

From 2003-2008, Oklahoma averaged a civilian workforce of 1.65 million persons. Just over one-half of workers were male (54%), and 94% were between the ages of 18 and 64 years (Table 1). Two-thirds of employees worked 40 or more hours per week. Approximately 10% of workers were self-employed. The leading industries included education and health services (21%), wholesale and retail trade (15%), manufacturing (10%), professional and business services (8%), leisure and hospitality (8%), and construction (7%). The most common occupations were professional and related occupations (19%), service (17%), management, business, and financial operations (15%), office and administrative support (14%), and sales and related occupations (11%).

The annual incidence rate of work-related injury and illness in Oklahoma was similar to the national rate for 2003 and 2005-2007 (less than 10% higher); in 2004 and 2008, the Oklahoma rate was 17% and 15% higher, respectively.¹ The work-related fatal injury rate in Oklahoma among persons age 16 years and older was 37%-65% higher than the United States (U.S.) rate each of the six years.²

The Oklahoma State Department of Health was funded by the National Institute for Occupational Safety and Health (NIOSH) to collect fundamental data on occupational hazards, diseases, injuries, and deaths in Oklahoma. Data are collected on 19 health conditions specified by guidelines produced by the Council of State and Territorial Epidemiologists (CSTE) and NIOSH.³ The indicators were created and selected based on the availability of existing statewide data sources, the public health importance of the health effect or exposure (e.g., magnitude, severity, economic impact, degree of concern, and emergent status), and the potential for workplace interventions (i.e., future program and policy development).³ The data are collected using standardized methodology from existing data sources, including Oklahoma Vital Statistics, the Oklahoma inpatient hospital discharge database, the

Oklahoma Workers' Compensation Court, the Bureau of Labor Statistics, the American Association of Poison Control Centers/Oklahoma Poison Control Center, the Oklahoma Central Cancer Registry, and the Oklahoma Adult Blood Lead Epidemiology and Surveillance program. Descriptions of these data sources, including limitations, are on page 28. Although work-related incidents are likely under-reported, standardized data are collected in Oklahoma and other states to help fill gaps in knowledge regarding occupational conditions at the state and national levels. Trends within Oklahoma will continue to be compared over time and data will be used to help inform program and policy planning.

Information is collected on the following indicators:

- Nonfatal work-related injuries and illnesses reported by employers
- Work-related hospitalizations
- Fatal work-related injuries
- Work-related amputations with days away from work reported by employers
- State workers' compensation claims for amputations with lost work time
- Hospitalizations for work-related burns
- Work-related musculoskeletal disorders with days away from work reported by employers
- State workers' compensation claims for carpal tunnel syndrome with lost work time
- Hospitalizations from or with pneumoconiosis
- Mortality from or with pneumoconiosis
- Acute work-related pesticide-associated illness and injury reported to poison control centers
- Incidence of malignant mesothelioma
- 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 safety and health professionals
- Occupation Safety and Health Administration enforcement activities
- Workers' compensation awards

Table 1. Employment Demographic Profile for Oklahoma and the U.S., 2003-2008

	Oklahoma						U.S.					
	2003	2004	2005	2006	2007	2008	2003	2004	2005	2006	2007	2008
Number employed (in thousands)	1600	1630	1655	1666	1653	1687	137,736	139,252	141,730	144,427	146,047	145,362
Civilian workforce unemployed	6%	5%	5%	4%	4%	4%	6%	6%	5%	5%	5%	6%
Civilian employment self-employed	10%	9%	9%	9%	8%	7%	8%	8%	7%	7%	7%	7%
Civilian employment in part-time jobs	17%	17%	15%	15%	15%	14%	18%	18%	17%	17%	17%	17%
Civilian employment by hours worked												
0-39 hours worked	32%	32%	29%	30%	30%	29%	31%	31%	31%	30%	33%	33%
40 hours worked	41%	41%	41%	41%	43%	44%	41%	41%	42%	42%	41%	41%
41+ hours worked	27%	27%	30%	29%	27%	26%	28%	28%	28%	28%	26%	26%
Civilian employment by sex												
Male	54%	54%	54%	54%	54%	54%	53%	54%	54%	54%	54%	53%
Female	46%	46%	46%	46%	46%	46%	47%	47%	46%	46%	46%	47%
Civilian employment by age group												
16-17 years	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%
18-64 years	94%	94%	94%	94%	93%	94%	95%	95%	95%	95%	95%	95%
65+ years	4%	5%	4%	4%	5%	5%	3%	4%	4%	4%	4%	4%
Civilian employment by race												
White	81%	80%	81%	80%	79%	79%	83%	83%	83%	82%	82%	82%
Black	6%	7%	6%	6%	6%	6%	11%	11%	11%	11%	11%	11%
Other	13%	13%	13%	14%	15%	15%	4%	4%	4%	7%	7%	7%
Civilian employment by Hispanic origin	5%	4%	5%	5%	5%	6%	13%	13%	13%	14%	14%	14%
Civilian employment by industry*												
Mining	2%	2%	2%	3%	3%	3%	<1%	<1%	<1%	<1%	<1%	<1%
Construction	7%	7%	7%	8%	7%	7%	7%	8%	8%	8%	8%	8%
Manufacturing	10%	10%	11%	10%	9%	9%	12%	12%	12%	11%	11%	11%
Wholesale and retail trade	15%	15%	15%	16%	14%	15%	15%	15%	15%	15%	14%	14%
Transportation and utilities	5%	5%	5%	5%	5%	6%	5%	5%	5%	5%	5%	5%
Information	3%	3%	2%	3%	2%	3%	3%	3%	2%	3%	2%	2%
Financial activities	6%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Professional and business services	8%	8%	8%	8%	8%	8%	10%	10%	10%	10%	11%	11%
Education and health services	21%	21%	20%	20%	21%	21%	21%	21%	20%	21%	21%	22%
Leisure and hospitality	8%	9%	8%	8%	9%	9%	8%	9%	8%	8%	9%	9%
Other services	6%	6%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Public administration	6%	6%	7%	6%	7%	7%	5%	5%	5%	5%	5%	5%
Agriculture	3%	3%	3%	3%	3%	3%	2%	2%	2%	2%	1%	1%
Civilian employment by occupation*												
Management, business, and financial operations	15%	15%	16%	14%	15%	15%	15%	15%	14%	15%	15%	15%
Professional and related occupations	19%	18%	19%	18%	19%	20%	20%	20%	20%	20%	21%	21%
Service	15%	18%	16%	17%	17%	16%	16%	16%	16%	17%	17%	17%
Sales and related occupations	11%	11%	10%	12%	11%	10%	12%	12%	12%	12%	11%	11%
Office and administrative support	14%	14%	15%	14%	14%	13%	14%	14%	14%	14%	13%	13%
Farming, fishing, and forestry	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Construction and extraction	7%	6%	6%	7%	7%	7%	6%	6%	7%	7%	7%	6%
Installation, maintenance, and repair	5%	5%	5%	5%	5%	5%	4%	4%	4%	4%	4%	4%
Production	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	6%	6%
Transportation and material moving	6%	6%	6%	6%	7%	7%	6%	6%	6%	6%	6%	6%

Source: U.S. Department of Labor, Bureau of Labor Statistics, Geographic Profile of Employment and Unemployment, 2003-2008

* Numbers include only experienced workers.

NA=data not available

Indicator 1. Nonfatal Work-Related Injuries and Illnesses Reported by Employers

Background

In the U.S. in 2008, there was a total of 3.7 million nonfatal injuries and illnesses in private industry; 95% of these events (3.5 million) were injuries.⁴ More than one-fourth (29%) of injuries occurred in goods-producing industries (i.e., agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing), although these industries employed only 20% of the private industry workforce. The number of work-related illnesses is an underestimate due to the fact that some conditions have long-term latency and induction periods and may be difficult to associate with the workplace. The impact of these occupational events is far-reaching, placing significant burdens on the healthcare system and workplace productivity. Approximately 50% of persons who sustained a nonfatal work-related injury or illness required days away from work, job transfer, or restricted duties at work. In 2004, approximately 3.4 million work-related injuries or illnesses were treated in hospital emergency rooms among workers 15 years of age and older. The majority of these visits involved young male workers. An estimated 29% of emergency department-treated injuries were lacerations, punctures, amputations, and avulsions, while another

24% were sprains and strains.⁵ Direct and indirect costs of work-related illnesses and injuries are estimated to be \$170 billion annually.⁶

Data Source

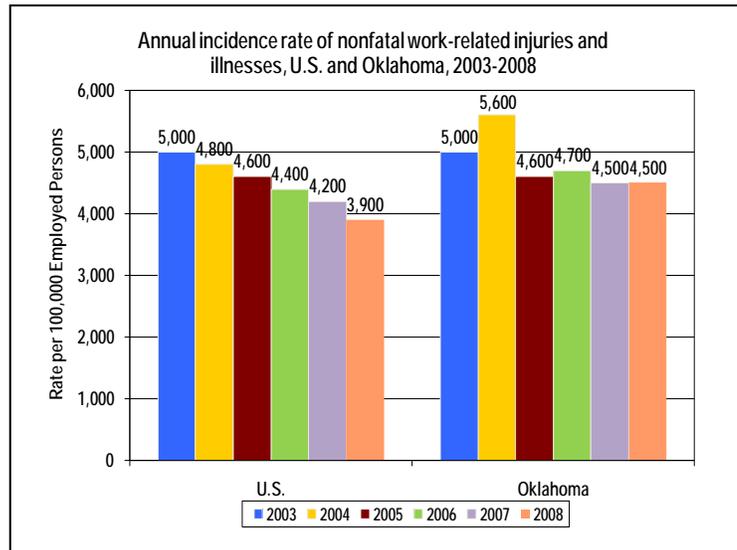
Bureau of Labor Statistics, Annual Survey of Occupational Injuries and Illnesses

Demographic Group

Persons employed in the private sector

Inclusion Criteria

Persons with work-related injuries and illnesses reported by employers



Oklahoma Data

	2003	2004	2005	2006	2007	2008
Estimated annual total number of work-related injuries and illnesses	48,400	54,400	47,300	49,100	48,100	49,400
Estimated annual total work-related injury and illness incidence rate per 100,000 FTEs	5,000	5,600	4,600	4,700	4,500	4,500
Estimated annual total number of cases involving days away from work	13,500	16,100	14,000	14,000	14,400	13,000
Estimated annual total incidence rate for cases involving days away from work per 100,000 FTEs	1,400	1,700	1,400	1,300	1,300	1,200
Estimated annual total number of cases involving more than 10 days away from work	6,990	6,790	7,170	6,350	7,110	5,330

Indicator 2. Work-Related Hospitalizations

Background

Work-related injuries and illnesses that require hospitalization can be costly and may result in long-term disability. In the U.S., workers' compensation costs are more than \$100 billion annually.³ A study of the Nationwide Inpatient Sample data from 1997-1999 showed that hospitalizations paid by workers' compensation involved more procedures, had a slightly longer length of stay, and, in some cases, had higher charges than similar non-workers' compensation cases after adjusting for type of diagnosis and other factors. Furthermore, it has been estimated that work-related hospitalization charges exceed \$3 billion annually.⁷

Data Source

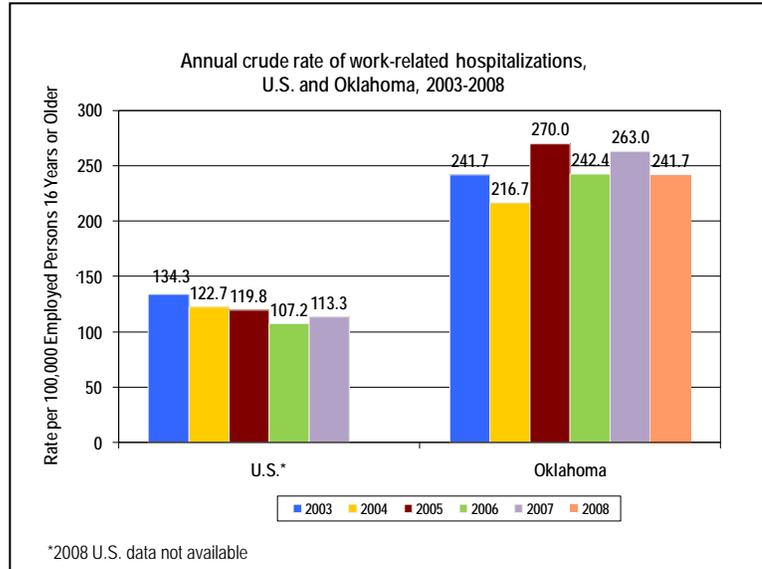
Oklahoma inpatient hospital discharge database

Demographic Group

Employed residents 16 years and older

Inclusion Criteria

Hospital discharges with a primary payer of workers' compensation



Oklahoma Data

	2003	2004	2005	2006	2007	2008
Annual number of work-related hospitalizations	3,867	3,532	4,469	4,039	4,347	4,078
Annual crude rate of work-related hospitalizations per 100,000 employed persons	241.7	216.7	270.0	242.4	263.0	241.7

Indicator 3. Fatal Work-Related Injuries

Background

Workplace fatalities are complex events that involve multiple risk factors, including workplace/procedure design, work organization, worker characteristics, economics, and a variety of social factors.³ Although women constitute just less than half of the workforce, they account for only about 7% of work-related fatalities.² The highest number (61%) of fatalities occur among persons 25-54 years of age, but workers over 65 have an occupational mortality rate at least two to three times higher than every other age group. From 1994-2008, the number of occupational fatalities in the U.S. dropped from 6,632 to 5,214 deaths. The four most common work-related fatal events in 2008 were highway incidents (23%), falls (13%), homicides (10%), and struck by object (10%). Workplace homicides have declined by more than 50% since 1992 (1,044 in 1992, 517 in 2008); the number of homicides decreased 18% from 2007-2008. The number of falls increased from 1992-2007 (600 in 1992, 847 in 2007), but decreased 20% from 2007-2008. The number of highway incidents also increased from 1992-2007 (1,158 in 1992, 1,414 in 2007), but decreased 19% from 2007-2008.² Additional detailed information on work-related fatalities in Oklahoma may be found at <http://ips.health.ok.gov> under *Occupational Injuries*.

Data Source

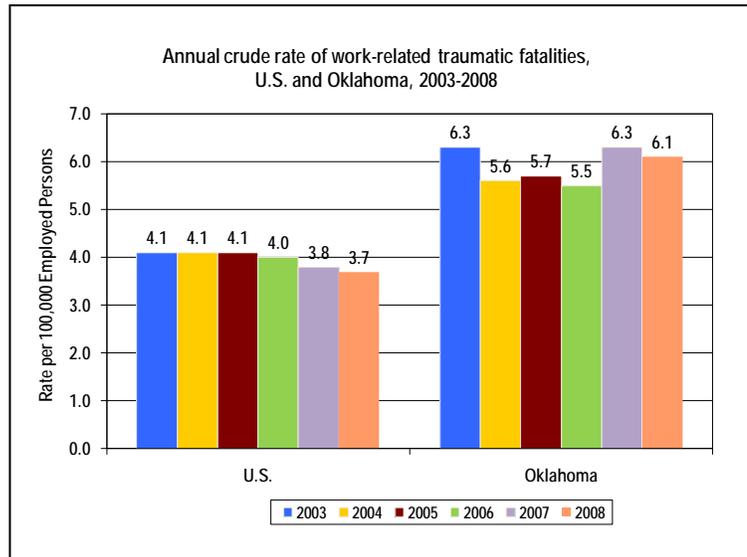
Bureau of Labor Statistics, Census of Fatal Occupational Injuries

Demographic Group

Employed persons 16 years and older

Inclusion Criteria

Persons who died from a traumatic injury while working



Oklahoma Data

	2003	2004	2005	2006	2007	2008
Annual number of work-related traumatic fatalities	100	91	95	91	104	102
Annual crude fatality rate per 100,000 employed persons	6.3	5.6	5.7	5.5	6.3	6.1

Indicator 4. Work-Related Amputations with Days Away from Work Reported by Employers

Indicator 5. State Workers' Compensation Claims for Amputations with Lost Work-Time

Background

Amputations are serious injuries that profoundly impact a worker's productivity and abilities, in addition to being monetarily costly. In 2008, there were nearly 6,230 nonfatal amputations involving days away from work; 44% occurred in the manufacturing industry.⁹ More than two-thirds (70%) of these nonfatal amputations were fingertip amputations, and nearly 95% of all work-related amputations involved the fingers. Amputations were the third most disabling injuries with a median number of 26 days away from work.⁹

Data Source

Indicator 4. Bureau of Labor Statistics, Annual Survey of Occupational Injuries and Illnesses

Indicator 5. Oklahoma Workers' Compensation Court

Demographic Group

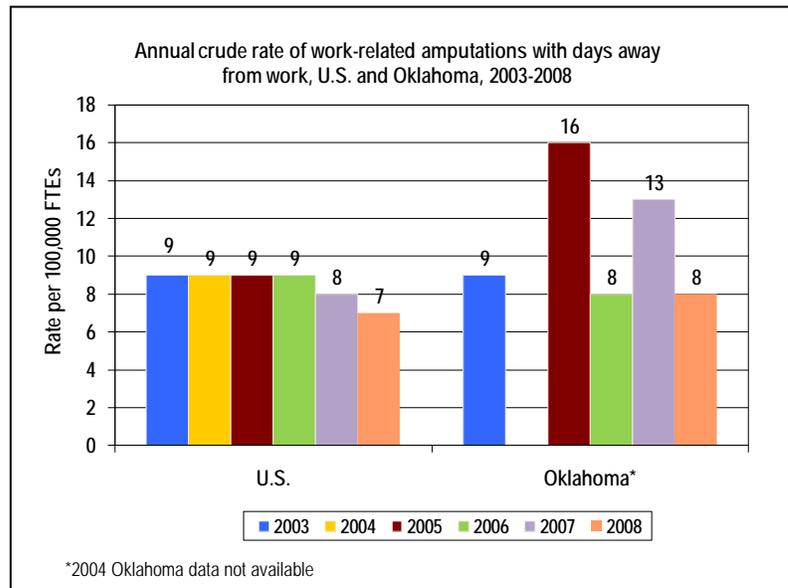
Indicator 4. Persons employed in the private sector

Indicator 5. Persons who are covered by the Oklahoma Workers' Compensation Court system

Inclusion Criteria

Indicator 4. Persons with an Occupational Injury and Illness Classification (OIIC) nature code of 031 (amputations)

Indicator 5. Persons with a National Council on Compensation Insurance (NCCI) code for amputation (02) (unless the claim involves the eye, back, chest, abdomen, or body systems) regardless of open or closed claim status, age, and state of residence; based on the date of injury



Oklahoma Data

	2003	2004	2005	2006	2007	2008
Estimated annual number of work-related amputations involving days away from work	90	*	160	80	140	90
Estimated annual incidence rate of amputations involving days away from work per 100,000 FTEs	9.0	*	16.0	8.0	13.0	8.0
Annual number of amputations filed with Oklahoma Workers' Compensation Court	94	197	175	166	172	183
Annual incidence rate of amputations filed with Oklahoma Workers' Compensation Court	6.9	14.3	12.3	11.4	11.6	12.2

*Data are not available due to unreliable estimates.

Indicator 6. Hospitalizations for Work-Related Burns

Background

Serious work-related burns are costly, painful, and devastating injuries.^{3,10} It has been estimated that 20%-40% of burns are work-related.^{3,10-13} Males have a higher incidence rate than females, and specific occupations have been found to be associated with degree of burn, anatomic site, and exposures.^{10,14-15} Workers under age 25 years have an incidence rate two to five times higher than that of older age groups, which is associated with the level of personal experience and the amount of workplace training.^{5,10,16} Welders, cooks, laborers, food service workers, and mechanics generally have the highest rates of burn injury, with the majority of injuries being to the upper extremities from heat/scald burns, followed by chemical burns.^{10,14-16} In 2008 in the U.S., 15,630 heat burn cases and 5,620 chemical burn cases required days away from work.⁹

Data Source

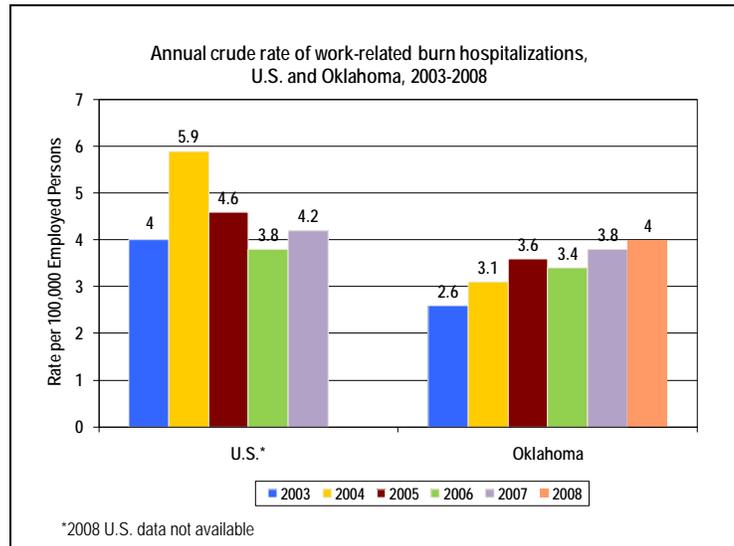
Oklahoma inpatient hospital discharge database

Demographic Group

Employed residents 16 years and older

Inclusion Criteria

Hospital discharges with a primary payer of workers' compensation and a principal ICD-9-CM diagnosis code from 940 through 949



Oklahoma Data

	2003	2004	2005	2006	2007	2008
Annual number of hospitalizations for work-related burns	42	51	60	57	63	67
Annual rate of burn hospitalizations per 100,000 employed persons	2.6	3.1	3.6	3.4	3.8	4.0

Indicator 7. Work-Related Musculoskeletal Disorders with Days Away from Work Reported by Employers

Indicator 8. State Workers' Compensation Claims for Carpal Tunnel Syndrome with Lost Work-Time

Background

Musculoskeletal disorders (MSDs), as defined by the U.S. Department of Labor, are injuries or disorders of the muscles, nerves, tendons, joints, cartilage, and spinal discs that are not caused by slips, trips, falls, motor vehicle crashes, or similar events. In 2008, the 317,440 MSDs accounted for nearly 30% of all injuries or illnesses with days away from work (median=10 days).⁹ Of occupations with over 5,000 cases of MSDs, nursing aides, orderlies, and attendants had the highest rate of MSDs (232 per 10,000 workers); followed by laborers and freight handlers (148 per 10,000 workers); and light or delivery service truck drivers (113 per 10,000 workers). Of occupations reporting at least 500 MSDs, automotive body and related repairers had the highest median days away from work (68), followed by operating engineers and other construction equipment operators (30), and telecommunications equipment installers and repairers (27). The number of MSDs declined 27% from 2003-2008, and the proportion of MSDs compared to all injuries with days away from work declined 11% during the same time period. Almost 4 out of 10 injuries and illnesses in the U.S. that resulted in days away from work were due to sprains or strains.⁹ Included as a MSD is carpal tunnel syndrome, the most disabling injury in terms of days away from work (median=28 days).⁹ Carpal tunnel syndrome ranks second behind back injuries as a leading cause of lost time from work, and has the second

highest total cost of all workers' compensation claims behind lumbar disc displacement.⁸

Data Source

Indicator 7. Bureau of Labor Statistics, Annual Survey of Occupational Injuries and Illnesses

Indicator 8. Oklahoma Workers' Compensation Court

Demographic Group

Indicator 7. Persons employed in the private sector

Indicator 8. Persons who are covered by the Oklahoma Workers' Compensation Court system

Inclusion Criteria

Indicator 7. Persons with one or more of the following Occupational Injury and Illness Classification (OIIC) nature codes: 021 (sprains, strains, tears), 0972 (back pain, hurt back), 0973 (soreness, pain, hurt, except the back), 1241 (carpal tunnel syndrome), 153 (hernia), or any nature code that begins with 17 (musculoskeletal system and connective tissue diseases and disorders) AND one of the following OIIC event codes: 211 (bending, climbing, crawling, reaching, twisting), 22 (overexertion), or 23 (repetitive motion).

Indicator 8. Includes all cases with a National Council on Compensation Insurance (NCCI) code for carpal tunnel syndrome (78) regardless of open or closed claim status, age, and state of residence; based on the date of injury

Oklahoma Data

	2003	2004	2005	2006	2007	2008
Estimated annual number of all musculoskeletal disorders involving days away from work	4,440	5,190	4,980	4,160	4,240	3,540
Estimated annual incidence rate of all musculoskeletal disorders involving days away from work per 100,000 FTEs	458	534	489	401	397	323
Estimated annual number of musculoskeletal disorders of the neck, shoulder, and upper extremities involving days away from work	1,660	1,710	1,620	1,070	1,110	1,130
Estimated annual incidence rate of musculoskeletal disorders of neck, shoulder, and upper extremities involving days away from work per 100,000 FTEs	172	176	160	103	103	103
Estimated annual number of carpal tunnel syndrome cases involving days away from work	240	320	200	110	160	230
Estimated annual incidence rate of carpal tunnel syndrome cases involving days away from work per 100,000 FTEs	25	33	19	10	15	21
Estimated annual number of musculoskeletal disorders of the back involving days away from work	1,750	2,330	2,210	2,210	1,690	1,510
Estimated annual incidence rate of musculoskeletal disorders of the back involving days away from work per 100,000 FTEs	181	240	217	213	158	138
Annual number of carpal tunnel syndrome cases filed with Oklahoma Workers' Compensation Court	318	550	567	436	398	438
Annual incidence rate of carpal tunnel syndrome cases filed with Oklahoma Workers' Compensation Court	23.3	39.8	39.9	29.8	26.7	29.2

MSD incidence rate* comparisons between the U.S. and Oklahoma, 2003-2008

	U.S.						Oklahoma					
	2003	2004	2005	2006	2007	2008	2003	2004	2005	2006	2007	2008
All musculoskeletal disorders	496	452	413	386	354	334	458	534	489	401	397	323
Disorders of the neck, shoulder, and upper extremities	140	132	118	110	103	95	172	176	160	103	103	103
Carpal tunnel syndrome	25	21	18	14	13	11	25	33	19	10	15	21
Disorders of the back	250	221	203	186	170	158	181	240	217	213	158	138
*Rate per 100,000 FTEs												

Indicator 9. Hospitalizations from or with Pneumoconiosis

Indicator 10. Mortality from or with Pneumoconiosis

Background

Occupational lung disease, the number three work-related illness behind skin diseases and hearing loss, frequently may not be curable, but is always preventable.¹⁸ Because most pneumoconioses are attributable to occupational exposure, controlling dust exposure is the single most effective prevention strategy, in addition to good ventilation and protective equipment.³ Types of pneumoconioses include asbestosis (exposure to microscopic asbestos fibers), coal workers' pneumoconiosis ("black lung disease"; inhalation of coal dust), and silicosis (exposure to free crystalline silica), and these conditions may lead to complications such as respiratory infections/failure, renal disease, lung cancer, and emphysema.^{3,18} From 1996-2005, there were over 27,000 deaths from all pneumoconioses combined (median age=79 years). Ninety-seven percent of deaths were among males and 94% were white. Coal mining and construction were the most frequently recorded industries on the death certificates.¹⁸

Data Source

Indicator 9. Oklahoma inpatient hospital discharge database

Indicator 10. Oklahoma Vital Statistics

Demographic Group

Indicator 9. Residents 15 years of age and older

Indicator 10. Residents 15 years of age and older

Inclusion Criteria

Indicator 9. Persons with any ICD-9-CM diagnosis code of 500 (coal workers' pneumoconiosis), 501 (asbestosis), 502 (silicosis), and 503, 504, 505 (other and unspecified pneumoconiosis)

Indicator 10. Persons with an underlying or contributing ICD-10 cause of death code of J60 (coal workers' pneumoconiosis), J61 (asbestosis), J62.0-J62.8 (silicosis), and J63.0-J63.8, J64, J65, J66.0-J66.8 (other and unspecified pneumoconiosis)

Pneumoconiosis age-standardized rate* comparisons between the U.S. and Oklahoma, 2003-2007

	U.S.					Oklahoma				
	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007
Total pneumoconiosis hospitalization	90.4	117.7	108.9	86.1	78.5	51.3	64.3	49.6	46.4	56.2
Coal workers' pneumoconiosis hospitalization	30.3	23.5	39.0	15.4	8.6	16.4	13.1	9.1	7.1	6.6
Asbestosis hospitalization	54.6	92.0	60.2	60.9	61.7	27.2	43.3	35.6	37.9	42.3
Silicosis hospitalization	4.1	5.0	3.1	4.1	2.5	7.3	6.9	4.5	7.0	6.3
Total pneumoconiosis mortality	11.5	10.9	10.2	**	8.9	4.2	4.7	4.7	10.4	4.7
Asbestosis mortality	6.4	6.3	6.0	**	5.7	3.1	2.8	2.7	7.1	3.6

*Rate per million residents
 **Data not available. No U.S. data available for 2008. See table below for 2008 Oklahoma rates.

Oklahoma Data

	2003	2004	2005	2006	2007	2008
Annual number of total pneumoconiosis hospital discharges	148	181	146	138	169	141
Annual rate of total pneumoconiosis hospital discharges	53.1	64.4	52.0	48.7	59.0	48.8
Annual age-standardized rate of total pneumoconiosis hospitalizations	51.3	64.3	49.6	46.4	56.2	46.0
Annual number of coal workers' pneumoconiosis hospital discharges	47	37	27	22	21	15
Annual rate of coal workers' pneumoconiosis hospital discharges per million residents	16.9	13.2	9.6	7.8	7.3	5.19
Annual age-standardized rate of coal workers' pneumoconiosis hospital discharges per million residents	16.4	13.1	9.1	7.1	6.6	5.19
Annual number of asbestosis hospital discharges	79	122	105	113	126	107
Annual rate of asbestosis hospital discharges per million residents	28.4	43.4	37.4	39.9	44.0	37.0
Annual age-standardized rate of asbestosis hospital discharges per million residents	27.2	43.3	35.6	37.9	42.3	34.5
Annual number of silicosis hospital discharges	21	19	13	20	19	16
Annual rate of silicosis hospital discharges per million residents	7.5	6.8	4.6	7.1	6.6	5.5
Annual age-standardized rate of silicosis hospital discharges per million residents	7.3	6.9	4.5	7.0	6.3	5.3
Annual number of total pneumoconiosis deaths	12	13	14	30	14	9
Annual total pneumoconiosis death rate per million residents	4.3	4.6	5.0	10.6	4.9	3.1
Annual age-standardized total pneumoconiosis death rate per million residents	4.2	4.7	4.7	10.4	4.7	3.0
Annual number of asbestosis deaths	9	8	8	21	11	8
Annual asbestosis death rate per million residents	3.2	2.8	2.9	7.4	3.8	2.8
Annual age-standardized asbestosis death rate per million residents	3.1	2.8	2.7	7.1	3.6	2.7

Indicator 11. Acute Work-Related Pesticide-Associated Illness and Injury Reported to Poison Control Centers

Background

In 1995, the Environmental Protection Agency implemented a regulation mandating that farmers, pesticide applicators, and farm workers be educated about the health effects of pesticide exposure and the need for medical treatment for such effects (Agricultural Worker Protection Standard 40 CFR Parts 156 and 170). After one year, meetings were held across the U.S. to evaluate implementation and progress. One resounding conclusion was the need for better recognition, diagnosis, and treatment of pesticide-related poisonings.¹⁹

Pesticides, by design, are made to kill and cause harm to living organisms; as a result, workers in certain occupations may be exposed to pesticides either in preparing them for use, in applying them, or in entering areas post application.¹⁹ In a study using 1998-2005 pesticide surveillance data from the Sentinel Event Notification System for Occupational Risks (SENSOR) program and the California Department of Pesticide Regulation (CDPR), pesticide poisonings were found to be a particular health problem in agriculture, which had an illness incidence rate of 53.6 per 100,000 FTEs, compared to 1.4 per 100,000 FTEs in non-agricultural industries.¹⁹ Insecticides were responsible for 54% of illnesses. Incidence rates peaked among the 18-24 year age group and, in most cases, exposure occurred during routine work activities not involving pesticide application.¹⁹

Data Source

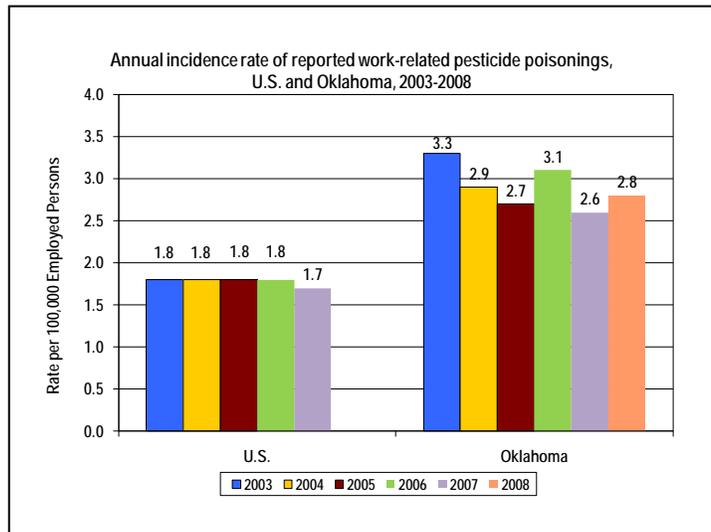
American Association of Poison Control Centers/Oklahoma Poison Control Center

Demographic Group

Employed residents 16 years and older

Inclusion Criteria

Oklahoma Poison Control Center callers who meet the following criteria: 1) the reason for the call is occupational or the exposure site is a workplace; 2) the medical outcome is minor effect, moderate effect, major effect, death, not followed (minimal clinical effects possible), or unable to follow (judged as a potentially toxic exposure); and 3) the exposure is to an agent in one of the generic pesticide categories (disinfectants, non-medicinal fungicides, fumigants, herbicides, insecticides, repellents, and rodenticides). Cases are excluded if they were exposed to more than one product or if the reason for the exposure was suspected suicide, intentional abuse, intentional or malicious action, or an unknown reason.



Oklahoma Data

	2003	2004	2005	2006	2007	2008
Annual number of reported work-related pesticide poisoning cases	53	47	45	51	43	47
Annual incidence rate of reported work-related pesticide poisoning cases per 100,000 employed persons	3.3	2.9	2.7	3.1	2.6	2.8

Indicator 12. Incidence of Malignant Mesothelioma

Background

Mesothelioma, a rare form of cancer, is typically caused by exposure to asbestos and related fibers.³ Approximately 2,500 deaths occur every year, 19% of which are female.¹⁷ With a long latency period, most people diagnosed with malignant mesothelioma are over 50 years of age and are already in an advanced stage of the disease.¹⁸ In most cases, exposure to the carcinogenic material is generally of long duration; however, people (e.g., family members) living with someone who works with asbestos can also be at risk.¹⁸ From 1999-2005, occupations with elevated mesothelioma mortality included plumbers, pipefitters, steamfitters, janitors and cleaners, carpenters, electricians, and elementary school teachers.¹⁸

Data Source:

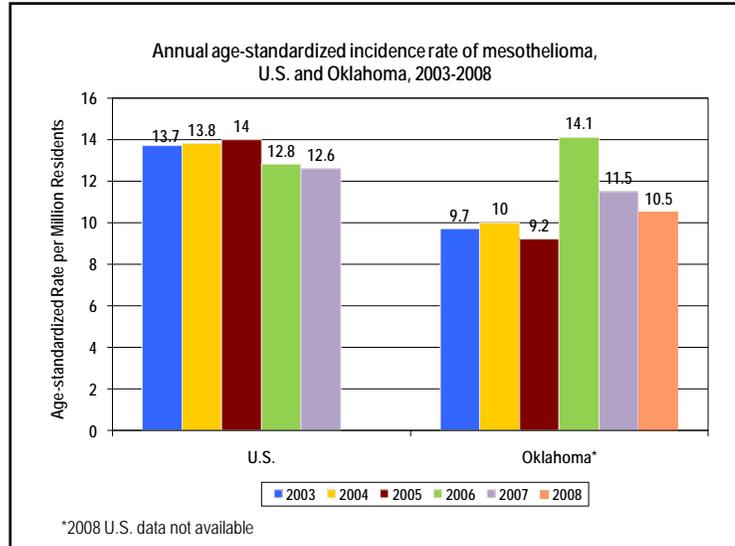
Oklahoma Central Cancer Registry

Demographic Group

Residents 15 years of age and older

Inclusion Criteria

Persons who have an ICD-O-3 histology code of 9050-9053



Oklahoma Data

	2003	2004	2005	2006	2007	2008
Annual number of incident mesothelioma cases	28	28	28	41	35	32
Annual mesothelioma incidence rate per million residents	10.1	10.0	10.0	14.5	12.2	11.1
Annual age-standardized mesothelioma incidence rate per million residents	9.7	10.0	9.2	14.1	11.5	10.5

Indicator 13. Elevated Blood Lead Levels among Adults

Background

Lead exposure has long been recognized as a health hazard, and recent research suggests the symptoms of lead exposure occur at levels lower than previously recommended.^{20,21} Mainly an occupational health problem, 90%-95% of adults with elevated blood lead levels are exposed in their working environments.^{3,21} The highest number of elevated blood lead levels were among workers involved in manufacturing storage batteries; secondary smelting and refining of nonferrous metals; and painting and paperhanging. The industries with the greatest proportion of workers with elevated blood lead levels were: painting and paper hanging; bridge, tunnel, and elevated highway construction; copper foundries; special trade contractors; and heavy construction.²¹ Elevated blood lead levels can produce numerous complications, including anemia, hypertension, kidney problems, decreased fertility, increased miscarriages, and

nervous system dysfunction. Workers can also unknowingly expose their family by bringing home lead from the workplace. In 2008, 40 states participating in the Adult Blood Lead Epidemiology and Surveillance Program reported 9,325 resident adults with elevated blood lead levels greater or equal to 25 µg/dL.²¹

Data Source

Adult Blood Lead Epidemiology and Surveillance Program

Demographic Group

Residents 16 years of age and older

Inclusion Criteria

Blood lead levels greater than or equal to 25 µg/dL and greater than or equal to 40 µg/dL; all cases regardless of occupational exposure status are included.

Oklahoma Data

	2003	2004	2005	2006	2007	2008
Annual number of residents with elevated blood lead levels greater than or equal to 25 µg/dL	85	74	55	65	31	38
Annual prevalence rate of residents with elevated blood lead levels greater than or equal to 25 µg/dL per 100,000 employed persons	5.3	4.5	3.3	3.9	1.9	2.3
Annual number of incident cases of residents with elevated blood lead levels greater than or equal to 25 µg/dL	48	46	26	39	10	31
Annual incidence rate of residents with elevated blood lead levels greater than or equal to 25 µg/dL per 100,000 employed persons	3.0	2.8	1.6	2.3	0.6	1.8
Annual number of residents with blood lead levels greater than or equal to 40 µg/dL	19	24	19	10	3	8
Annual prevalence rate of residents with blood lead levels greater than or equal to 40 µg/dL per 100,000 employed persons	1.2	1.5	1.2	0.6	*	0.5
Annual number of incident cases of residents with blood lead levels greater than or equal to 40 µg/dL	6	11	14	5	1	8
Annual incidence rate of residents with blood lead levels greater than or equal to 40 µg/dL per 100,000 employed persons	0.4	0.7	0.9	0.3	*	0.5
*Rate not calculated due to small number.						

Blood lead rate comparisons between the U.S. and Oklahoma, 2003-2008

	U.S.						Oklahoma					
	2003	2004	2005	2006	2007	2008	2003	2004	2005	2006	2007	2008
Greater than or equal to 25 µg/dL												
Prevalence rate	8.2	7.5	**	**	**	**	5.3	4.5	3.3	3.9	1.9	2.3
Incidence rate	5.1	4.7	4.2	4.4	3.8	**	3.0	2.8	1.6	2.3	0.6	1.8
Greater than or equal to 40 µg/dL												
Prevalence rate	1.4	1.2	**	**	**	**	1.2	1.5	1.2	0.6	*	0.5
Incidence rate	0.8	0.7	0.7	0.7	0.6	**	0.4	0.7	0.9	0.3	*	0.5
Rate per 100,000 employed persons												
*Rate not calculated due to small number of cases.												
**Data not available.												

Indicator 14. Percentage of Workers Employed in Industries at High Risk for Occupational Morbidity

Indicator 15. Percentage of Workers Employed in Occupations at High Risk of Occupational Morbidity

Indicator 16. Percentage of Workers Employed in Industries and Occupations at High Risk for Occupational Mortality

Work-related injuries and illnesses are preventable and occupational hazards can be mediated and avoided; however, limited resources often impose unfortunate restrictions on businesses and industries. In order to help prioritize the allocation of resources, as well as identify the jobs that tend to drive overall occupational morbidity and mortality rates, lists of occupations and industries at highest risk of fatal and nonfatal injuries have been identified.³ The tables below list the identified high-risk industries and occupations, as well as

data for Oklahoma and the U.S. on the numbers of workers involved in them.

Data Source

U.S. Census Bureau County Business Patterns
Bureau of Labor Statistics Current Population Survey

Demographic Group

Employed residents 16 years and older

Inclusion Criteria

Employed in industries/occupations at high risk for occupational morbidity/mortality

Industries at high risk for occupational morbidity (North American Industry Classification System, [NAICS] Industry Title), 2003-2007

Framing contractors	Steel product manufacturing from purchased steel	Industrial and commercial fan and blower manufacturing
Sugar manufacturing	Foundries	Overhead traveling crane, hoist, and monorail system manufacturing
Fluid milk manufacturing	Cutlery and flatware manufacturing	Motor vehicle manufacturing
Creamery butter manufacturing	Plate work and fabricated structural product manufacturing	Motor vehicle body and trailer manufacturing
Animal slaughtering and processing	Ornamental and architectural metal work manufacturing	Motor vehicle transmission and power train parts manufacturing
Cookie and cracker manufacturing	Spring and wire manufacturing	Motor vehicle metal stamping
Beverage and tobacco product manufacturing	Other metal valve and pipe fitting manufacturing	Ship and boat building
Rubber and plastic footwear manufacturing	Enameled iron and metal sanitary ware manufacturing	Beer, wine, and distilled alcoholic beverage merchant wholesalers
Wood products manufacturing	All other miscellaneous fabricated metal product manufacturing	Scheduled air transportation
All other converted paper product manufacturing	Commercial laundry, dry cleaning, and pressing machine manufacturing	Urban transit systems
Glass container manufacturing		Couriers and messengers
Concrete block and brick manufacturing		General warehousing and storage
Other concrete product manufacturing		Nursing and residential care facilities
		Amusement parks and arcades

Industries at high risk for occupational morbidity (North American Industry Classification System, [NAICS] Industry Title), 2008

Cotton ginning	Architectural and structural metals manufacturing	Motor vehicle body and trailer manufacturing
Sugarcane milling	Other metal container manufacturing	Motor vehicle seating and interior trim manufacturing
Fluid milk manufacturing	Other fabricated wire product manufacturing	Motor vehicle metal stamping
Animal slaughtering except poultry	Precision turned product manufacturing	Ship and boat building
Rendering and meat byproduct processing	Industrial pattern manufacturing	Metal household furniture manufacturing
Seafood canning	All other miscellaneous fabricated metal product manufacturing	Institutional furniture manufacturing
Soft drink and ice manufacturing	Agricultural implement manufacturing	Beer, wine, and distilled alcoholic beverage wholesalers
Leather and hide tanning and finishing	Sawmill and woodworking machinery manufacturing	Pet and pet supplies stores
Truss manufacturing	Paper industry machinery manufacturing	Air transportation
Wood container and pallet manufacturing	Food product machinery manufacturing	Marine cargo handling
All other wood product manufacturing	Commercial laundry, dry cleaning, and pressing machine manufacturing	Other support activities for transportation
Tire retreading	Industrial and commercial fan and blower manufacturing	Couriers and messengers
Porcelain electrical supply manufacturing	Overhead traveling crane, hoist, and monorail system manufacturing	Refrigerated warehousing and storage
Concrete pipe manufacturing	Light truck and utility vehicle manufacturing	Veterinary services
Other concrete product manufacturing	Heavy duty truck manufacturing	Other ambulatory health care services
Rolling and drawing of purchased steel		Specialty hospitals except psychiatric and substance abuse
Secondary smelting and alloying of aluminum		Nursing and residential care facilities
Foundries		Spectator sports
Forging and stamping		Skiing facilities
Kitchen utensil, pot, and pan manufacturing		Special food services

Occupations at high risk of occupational morbidity (1990 Bureau of the Census Occupation Title), 2003-2007

Actors	Electrical and electronics installers/repairers, industrial and utility	Molders and molding machine setters, operators, and tenders, metal and plastic
Emergency medical technicians and paramedics	Aircraft mechanics and service technicians	Multiple machine tool setters, operators, and tenders, metal and plastic
Nursing, psychiatric, and home health aides	Heavy vehicle and mobile equipment service technicians and mechanics	Layout workers, metal and plastic
First-line supervisors/managers of correctional officers	Miscellaneous vehicle and mobile equipment mechanics, installers, and repairers	Bookbinders and bindery workers
Firefighters	Heating, air conditioning, and refrigeration mechanics and installers	Extruding and forming machine setters, operators, and tenders, synthetic and glass fibers
Fire inspectors	Home appliance repairers	Sawing machine setters, operators, and tenders, wood
Combined food preparation and serving workers, including fast food	Maintenance and repair workers, general	Woodworking machine setters, operators, and tenders, except sawing
Food servers, non-restaurant	Maintenance workers, machinery	Crushing, grinding, polishing, mixing, and blending workers
Food preparation and serving related workers, all other	Telecommunications line installers and repairers	Cutting workers
Pest control workers	Riggers	Extruding, forming, pressing, and compacting machine setters, operators, and tenders
Transportation attendants	Signal and track switch repairers	Cooling and freezing equipment operators and tenders
Reservation and transportation ticket agents and travel clerks	Helpers of installation, maintenance, and repair workers	Molders, shapers, and casters, except metal/plastic
Cargo and freight agents	Aircraft structure, surfaces, rigging, and systems assemblers	Tire builders
Animal breeders	Engine and other machine assemblers	Helpers for production workers
Logging workers	Food/tobacco roasting, baking, and drying machine operators and tenders	Production workers, all other
Carpenters	Food cooking machine operators and tenders	Ambulance drivers and attendants, except emergency medical technicians
Construction laborers	Extruding/drawing machine setters, operators, and tenders, metal and plastic	Driver/sales workers and truck drivers
Paving, surfacing, and tamping equipment operators	Rolling machine setters, operators, and tenders, metal and plastic	Railroad brake, signal, and switch operators
Pile driver operators	Lathe and turning machine tool setters, operators, and tenders, metal and plastic	Railroad conductors and yardmasters
Glaziers	Milling and planing machine setters, operators, and tenders, metal and plastic	Sailors and marine oilers
Insulation workers	Metal furnace and kiln operators and tenders	Ship engineers
Reinforcing iron and rebar workers		Other transportation workers
Sheet metal workers		Conveyor operators, tenders
Structural iron and steel workers		Laborers and freight, stock, and material movers, hand
Helpers, construction trades		Machine feeders and offbearers
Septic tank servicers and sewer pipe cleaners		Refuse and recyclable material collectors
Miscellaneous construction and related workers		Shuttle car operators
Derrick, rotary drill, and service unit operators, oil, gas, and mining		Material moving workers, all other
Earth drillers, except oil and gas		
Roof bolters, mining		
Roustabouts, oil and gas		
Helpers, extraction workers		
Other extraction workers		
Electrical and electronics installers/repairers, transportation equipment		

Occupations at high risk of occupational morbidity (2002 Bureau of the Census Occupation Title), 2008

Athletes, coaches, umpires, and related workers	Reinforcing iron and rebar workers	Stationary engineers and boiler operators
Emergency medical technicians and paramedics	Roofers	Cementing and gluing machine operators and tenders
Nursing, psychiatric, and home health aides	Structural iron and steel workers	Cleaning, washing, and metal pickling equipment operators and tenders
First-line supervisors/managers of correctional officers	Highway maintenance workers	Cooling and freezing equipment operators and tenders
Police and sheriff patrol officers	Miscellaneous construction and related workers	Etchers and engravers
Transit and railroad police	Mining machine operators	Molders, shapers, and casters, except metal and plastic
Animal control workers	Roof bolters, mining	Paper goods machine setters, operators, and tenders
Food servers, non-restaurant	Aircraft mechanics and service technicians	Tire builders
First-line supervisors/managers of landscaping, lawn service, and grounds keeping	Automotive glass installers and repairers	Helpers—production workers
Janitors and building cleaners	Automotive service technicians and mechanics	Production workers, all other
Maids and housekeeping cleaners	Bus and truck mechanics and diesel engine specialists	Bus drivers
Nonfarm animal caretakers	Heating, air conditioning, and refrigeration mechanics and installers	Driver/sales workers and truck drivers
Transportation attendants	Industrial and refractory machinery mechanics	Taxi drivers and chauffeurs
Reservation and transportation ticket agents and travel clerks	Telecommunications line installers and repairers	Railroad conductors and yardmasters
Meter readers, utilities	Coin, vending, and amusement machine servicers and repairers	Subway, streetcar, and other rail transportation workers
Forest and conservation workers	Welding, soldering, and brazing workers	Sailors and marine oilers
Boilermakers	Lay-out workers, metal, and plastic	Hoist and winch operators
Brick masons, block masons, and stone masons	Model makers and patternmakers, wood	Laborers and freight, stock, and material movers, hand
Carpenters	Sawing machine setters, operators, and tenders, wood	Shuttle care operators
Construction laborers		
Pile-driver operators		
Glaziers		
Pipe layers, plumbers, pipefitters, and steamfitters		

Industries at high risk for occupational mortality (2000 Bureau of the Census Industry Title), 2003-2007

Crop production	Foundries	Scenic and sightseeing transportation
Animal production	Sawmills and wood preservation	Services incidental to transportation
Logging	Veneer, plywood, and engineered wood product manufacturing	Commercial, industrial, and other intangible assets rental and leasing
Fishing, hunting, and trapping	Recyclable material, merchant wholesalers	Landscaping services
Support activities for agriculture and forestry	Farm product raw materials, merchant wholesalers	Waste management and remediation services
Oil and gas extraction	Petroleum and petroleum product, merchant wholesalers	Recreational vehicle parks and camps, and rooming and boarding houses
Coal mining	Other motor vehicle dealers	Drinking places, alcoholic beverages
Nonmetallic mineral mining and quarrying	Fuel dealers	
Support activities for mining	Water transportation	
Construction	Truck transportation	
Cement, concrete, lime, and gypsum product manufacturing	Taxi and limousine service	
Misc. nonmetallic mineral product manufacturing		

Industries at high risk for occupational mortality (2007 Bureau of the Census Industry Title), 2008

Crop production	Cement, concrete, lime, and gypsum product mfg	Taxi and limousine service
Animal production	Iron and steel mills and steel production mfg	Pipeline transportation
Forestry, except logging	Nonferrous metal production and processing (except aluminum)	Scenic and sightseeing transportation
Logging	Foundries	Services incidental to transportation
Fishing, hunting, trapping	Ship and boat building	Sound recording industries
Support activities for agriculture and forestry	Sawmills and wood preservation	Other consumer good rental
Oil and gas extraction	Veneer, plywood, and engineered wood product mfg	Commercial, industrial, and other intangible assets rental and leasing
Coal mining	Recyclable material wholesalers	Landscaping services
Metal ore mining	Farm product raw materials wholesalers	Waste management and remediation services
Nonmetallic mineral mining and quarrying	Farm supplies wholesalers	Drinking places, alcoholic beverages
Support activities for mining	Wholesale electronic markets, agents, and brokers	Commercial and industrial machinery and equipment repair and maintenance
Construction	Rail transportation	
Animal food, grain, and oilseed milling	Water transportation	
Sugar and confectionery products	Truck transportation	
Miscellaneous petroleum and coal products		

Occupations at high risk for occupational mortality (2000 Bureau of the Census Occupation Title), 2003-2007

Farm, ranch, and other agricultural managers	Electricians	Maintenance workers, machinery
Farmers and ranchers	Plasterers and stucco masons	Electronic power-line installers and repairers
Petroleum engineers	Roofers	Telecommunications line installers and repairers
Firefighters	Structural iron and steel workers	Commercial drivers
Security guards and gaming surveillance officers	Helpers, construction trades	Helpers, installation, maintenance, and repair workers
Crossing guards	Hazardous materials removal workers	Water and liquid waste treatment plant and system operators
First-line supervisors/managers of landscaping, lawn service, and groundskeeping workers	Miscellaneous construction and related workers	Aircraft pilots and flight engineers
Grounds maintenance workers	Derrick, rotary drill, and service unit operators, oil, gas, and mining	Driver/sales workers and truck drivers
Animal trainers	Earth drillers, except oil and gas	Taxi drivers and chauffeurs
First-line supervisors/managers of farming, fishing, and forestry workers	Explosives workers, ordnance handling experts, and blasters	Motor vehicle operators, all other
Miscellaneous agricultural workers	Mining machine operators	Railroad brake, signal, and switch operators
Fishers and related fishing workers	Roof bolters, mining	Railroad conductors and yardmasters
Logging workers	Roustabouts, oil and gas	Sailors and marine oilers
First-line supervisors/managers of construction traders and extraction workers	Helpers, extraction workers	Ship and boat captains and operators
Boilermakers	Other extraction workers	Crane and tower operators
Cement masons, concrete finishers, and terrazzo workers	First-line supervisors/managers of mechanics, installers, and repairers	Dredge, excavating, and loading machine operators
Construction laborers	Heavy vehicle and mobile equipment service technicians and mechanics	Pumping station operators
Paving, surfacing, and tamping equipment operators	Miscellaneous vehicle and mobile equipment mechanics, installers, and repairers	Refuse and recyclable material collectors
Operations engineers and other construction equipment operators	Maintenance and repair workers, general	Material moving workers, all other

Occupations at high risk for occupational mortality (2000 Bureau of the Census Occupation Title), 2008

Farmers and ranchers	Operation engineers and other construction equipment operators	Riggers
Athletes, coaches, umpires, and related workers	Electricians	Molders and molding machine setters, operators, and tenders, metal and plastic
Announcers	Glaziers	Welding, soldering, and brazing workers
Fire fighters	Insulation workers	Chemical processing machine setters, operators, and tenders
Security guards and gaming surveillance officers	Painters, construction, and maintenance	Aircraft pilots and flight engineers
Crossing guards	Roofers	Driver/sales workers and truck drivers
First-line supervisors/managers of landscaping, lawn service, and groundskeeping workers	Structural iron and steel workers	Taxi drivers and chauffeurs
Pest control workers	Helpers, construction traders	Motor vehicle operators, all other
Grounds maintenance workers	Highway maintenance workers	Locomotive engineers and operators
Tour and travel guides	Miscellaneous construction and related workers	Railroad brake, signal, and switch operators
First-line supervisors/managers of farming, fishing, and forestry workers	Derrick, rotary drill, and service unit operators, oil, gas, and mining	Railroad conductors and yardmasters
Miscellaneous agricultural workers	Earth drillers, except oil and gas	Sailors and marine oilers
Fishers and related fishing workers	Mining machine operators	Ship and boat captains and operators
Logging workers	Roustabouts, oil and gas	Ship engineers
First-line supervisors/managers of construction traders and extraction workers	Other extraction workers	Service station attendants
Boilermakers	First-line supervisors/managers of mechanics, installers, and repairers	Conveyor operators and tenders
Brick masons, block masons, and stonemasons	Bus and truck mechanics and diesel engine specialists	Crane and tower operators
Cement masons, concrete finishers, and terrazzo workers	Heavy vehicle and mobile equipment service technicians and mechanics	Industrial truck and tractor operators
Construction laborers	Maintenance and repair workers, general	Refuse and recyclable material collectors
Paving, surfacing, and tamping equipment operators	Maintenance workers, machinery	Material moving workers, all other
	Millwrights	
	Electronic power-line installers and repairers	

High morbidity risk employment comparisons between the U.S. and Oklahoma, 2003-2007

	U.S.					Oklahoma				
	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007
Number of employed persons in high morbidity risk industries (in thousands)	7,557.6	7,553.4	7,636.1	7,745.3	7,739.3	81.0	84.1	83.0	83.3	94.6
Percentage of employed persons in high morbidity risk industries	6.7	6.6	6.6	6.5	6.4	6.8	7.0	6.8	6.5	7.2
Number of employed persons in high morbidity risk occupations (in thousands)	12,595.9	12,854.5	15,855.8	16,639.6	16,709.8	193.1	191.5	186.0	207.4	202.1
Percentage of employed persons in high morbidity risk occupations	12.2	12.4	11.2	11.5	11.4	12.1	11.7	11.2	12.4	12.1

High mortality risk employment comparisons between the U.S. and Oklahoma, 2003-2007

	U.S.					Oklahoma				
	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007
Number of employed persons in high mortality risk occupations (in thousands)	12,763.1	13,170.7	14,853.4	15,473.6	15,631.9	199.4	204.5	214.6	225.2	225.3
Percentage of employed persons in high mortality risk occupations	11.0	11.0	10.5	10.7	10.7	12.5	12.4	12.9	13.5	13.5
Number of employed persons in high mortality risk industries (in thousands)	17,922.7	18,724.4	20,091.8	20,851.0	21,046.7	256.0	269.7	291.3	302.8	275.7
Percentage of employed persons in high mortality risk industries	15.0	15.6	14.2	14.4	14.4	16.1	16.4	17.5	18.2	16.5

High morbidity/mortality risk employment comparisons between the U.S. and Oklahoma, 2008

	U.S.	Oklahoma
Number of employed persons in high morbidity risk industries (in thousands)	8,587.3	102.6
Percentage of employed persons in high morbidity risk industries	7.1	7.7
Number of employed persons in high morbidity risk occupations (in thousands)	22,880.8	228.7
Percentage of employed persons in high morbidity risk occupations	15.7	19.0
Number of employed persons in high mortality risk industries (in thousands)	20,591.4	277.6
Percentage of employed persons in high mortality risk industries	16.6	19.9
Number of employed persons in high mortality risk occupations (in thousands)	16,104.5	219.2
Percentage of employed persons in high mortality risk occupations	13.0	15.7

Indicator 17. Occupational Safety and Health Professionals
Indicator 18. Occupational Safety and Health Administration Enforcement Activities
Indicator 19. Workers' Compensation Awards

Prevention education, safety analyses, enforcement of laws and regulations, and prompt medical attention are all important components to reducing the burden of occupational illness and injury. A sufficient number of personnel trained in occupational health preventive services is critical for each state in addressing work-related injuries and illnesses. Occupational safety and health professionals provide primary, secondary, and tertiary prevention services, ranging from workplace evaluations and safety assessments to onsite occupational health care and appropriate, timely treatment of injuries. Identifying a deficiency among certain types of service professionals may indicate a need to increase educational, recruitment, or retention efforts for that profession.

Another part of occupational safety and health prevention efforts are the enforcement activities of the Occupational Safety and Health Administration (OSHA). Charged with the mission to “assure so

far as possible every working man and woman in the nation safe and healthful working conditions,” OSHA’s activities are varied and include standards development, prevention education, compliance assistance, and enforcement (i.e., inspections and investigations).³

Without adequate prevention measures, the socioeconomic impact of occupational illnesses and injuries can be tremendous. Adverse occupational events translate into a wide array of physical, mental, and economic sequelae that affect the employee, employer, and their families, in addition to larger infrastructures, such as the health care and workers’ compensation systems. Although not all workers are covered (e.g., self-employed, other workers exempt from coverage) by workers’ compensation or file a claim for compensation if injured, workers’ compensation awards can be used as a gross measure of the burden of occupational injuries and illnesses.³

Selected occupational safety and health professionals in Oklahoma, 2003-2008

	2003	2004	2005	2006	2007	2008
Number of board certified occupational medicine physicians	29	29	29	29	30	28
Number of members of the American College of Occupational and Environmental Medicine (ACOEM)	76	67	56	57	55	48
Number of board certified occupational health nurses	43	42	39	44	42	40
Number of member nurses of the American Association of Occupational Health Nurses (AAOHN)	48	66	62	59	51	46
Number of board certified industrial hygienists	47	42	48	52	51	54
Number of industrial hygienist members of the American Industrial Hygiene Association (AIHA)	118	101	96	89	77	77
Number of board certified safety health professionals	115	119	121	126	137	152
Number of safety engineer members of the American Society of Safety Engineers (ASSE)	507	633	803	654	625	649

Number of selected occupational safety and health professionals per 100,000 employees, U.S. and Oklahoma, 2003-2008

	U.S.						Oklahoma					
	2003	2004	2005	2006	2007	2008	2003	2004	2005	2006	2007	2008
Board certified occupational medicine physicians	1.7	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.7	1.8	1.7
ACOEM members	4.0	4.0	3.5	3.3	3.1	3.0	4.8	4.1	3.4	3.4	3.3	2.9
Board certified occupational health nurses	4.6	4.6	4.5	4.8	4.1	4.0	2.7	2.6	2.4	2.6	2.5	2.4
AAOHN members (nurses)	5.9	6.8	6.4	6.1	5.8	5.4	3.0	4.0	3.8	3.5	3.1	2.7
Board certified industrial hygienists	4.9	4.3	4.9	4.8	4.7	4.8	2.9	2.6	2.9	3.1	3.1	3.2
AIHA members (industrial hygienists)	8.0	7.9	7.6	7.2	6.2	6.1	7.4	6.2	5.8	5.3	4.7	4.6
Board certified safety professionals	7.3	7.5	7.5	7.5	7.6	7.9	7.2	7.3	7.3	7.6	8.3	9.0
ASSE members (safety engineers)	21.8	23.6	25.9	22.0	21.5	21.9	31.7	38.8	48.5	39.3	37.8	38.5

OSHA enforcement activities, U.S. and Oklahoma, 2003-2008

	U.S.*					Oklahoma					
	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007	2008
Annual number of establishments inspected by Federal/State OSHA	99,153	96,838	96,238	107,610	104,010	624	631	642	792	697	891
Estimated percentage of all establishments under OSHA jurisdiction inspected by OSHA	1.3	1.2	1.1	1.2	1.2	0.7	0.7	0.7	0.8	0.7	0.9
Annual number of employees whose work areas were inspected by OSHA (in thousands)	3,915.5	3,905.9	3,777.7	3,756.1	3,769.9	23.2	31.7	45.1	19.9	15.9	16.9
Estimated percentage of employees under OSHA jurisdiction whose work areas were inspected	3.1	3.0	2.9	2.8	2.8	2.0	2.8	3.8	1.1	1.1	1.4
*U.S. data not available for 2008.											

Workers' compensation awards, U.S. and Oklahoma, 2003-2008

	U.S.						Oklahoma					
	2003	2004	2005	2006	2007	2008	2003	2004	2005	2006	2007	2008
Total amount of workers' compensation benefits paid (\$ in millions)	54,872	55,968	55,307	54,686	55,427	57,633	561.6	572.0	587.5	628.4	656.4	782.1
Average amount of workers' compensation paid per covered worker (\$)	438.0	444.7	431.6	419.6	420.7	441.2	411.2	413.9	413.7	430.1	440.8	521.7

Description of Data Sources

Oklahoma Vital Statistics

The Oklahoma State Department of Health Vital Records Division maintains death certificates on all deaths that occur in the state. In 2010, the electronic death registration system, ROVER, was launched; implementation of this data entry system is ongoing across the state. Prior to this time, death certificates were received in Vital Records within two to four weeks following the death. Death certificates were scanned and all text regarding cause of death was entered into the computer. All deaths are coded to multiple causes of death. ICD-10 cause of death codes are assigned by the Vital Records Division in collaboration with the National Center for Health Statistics (NCHS). ICD-10 death codes are assigned through an automated system using the Mortality Medical Data System. NCHS manually codes the records that the system cannot process.

Limitations. Causes of death and coding of death certificates may not be accurate for all cases. For example, the injury at work variable may not be correctly coded, particularly for persons working in secondary occupations at the time of death. The decedent's usual occupation (type of work done during most of working life) may not reflect the source of an occupational exposure. Persons who die from a work-related illness or injury may not have been exposed in the state where the death occurred.

Bureau of Labor Statistics

The U.S. Department of Labor, Bureau of Labor Statistics, provides a variety of information on labor economics and statistics, including data on employment, unemployment, wages, and safety and health. The Survey of Occupational Injuries and Illnesses uses employer logs to measure non-fatal injuries and illnesses. The Census of Fatal Occupational Injuries collects information on work-related fatalities from a variety of sources, including death certificates, workers' compensation records, and reports to federal and state agencies.²⁴

Limitations. Data may not be collected for military personnel, self-employed persons, small farm operations, youth workers, and federal and state employees. Data reported by employers to the Bureau of Labor Statistics may not be accurate. Some data are based on a probability sample and not a census of all employees; sampling error may be present.³

In 2003, the system to code the industry category changed to the North American Industry Classification System (NAICS). Prior to 2003, the Standard Industrial Classification (SIC) system was used. This change represents a break in series, and industry categories in 2003 cannot be directly compared with results from previous years.⁴

Oklahoma Poison Control Center/American Association of Poison Control Centers

The Oklahoma Poison Control Center provides emergency poisoning treatment advice free of charge from specially trained licensed pharmacists and nurses 24 hours a day, 365 days a year. Callers to the nationwide toll free poison control telephone number that have an Oklahoma area code are routed to the Oklahoma Poison Control Center. The Oklahoma Poison Control Center receives approximately 180 calls each day and obtains detailed information on the exposure, including whether or not the exposure was occupationally-related and if the exposure site was the workplace. All data are entered into an electronic database and are immediately available for analysis. Follow-up information is obtained on all hospitalized cases and home interventions. The Oklahoma Poison Control Center and all other state poison control centers report statewide data to the American Association of Poison Control Centers. Poison control data for this report were obtained from the American Association of Poison Control Centers to maintain consistency for between-state comparisons.

Limitations. Poison control data include only persons who call the center. Although the Oklahoma Poison Control Center encourages reporting of all poisonings (not just those for which help is needed), the vast majority of callers are seeking advice. Data on the specific industry or occupation related to the exposure are not systematically collected.

Oklahoma Hospital Discharge Database

Data for the hospital discharge database (HDD) are collected and maintained by the Health Care Information Division of the Oklahoma State Department of Health. Reporting is mandatory for all licensed acute care facilities in Oklahoma, and data are collected on all inpatients. The HDD includes demographic information, length of stay, discharge diagnosis codes, and hospital charges.

Limitations. The HDD generally does not obtain data from federal hospitals (military and Native American). Data are not collected on Oklahoma residents who are hospitalized in another state. Identification of cases relies on accurate diagnosis of the condition and proper coding, including payer codes. Persons injured at work who are self-employed, work as independent contractors, work in agriculture, and others may not have the primary payer listed as workers' compensation.

Oklahoma Workers' Compensation Court

The Oklahoma Workers' Compensation Court provides procedures to resolve disputes and identify issues related to occupational injuries. The Court is composed of 10 judges who are appointed by the Governor for six-year terms. Reports to Oklahoma Workers' Compensation Court include claims for persons who cannot resolve disputes with their employer or insurance company as well as persons who suffer an injury that requires off-site medical attention or results in more than one shift of time missed.

Limitations. Workers' compensation data are not complete since some persons with work-related injuries or illnesses do not file workers' compensation claims. Certain workers, including sole proprietors, agriculture workers, and federal government employees are not eligible to use the

Oklahoma workers' compensation system. Claims for amputations must be filed within two years of the injury or death or within two years of the last payment of any compensation or authorized medical treatment. For carpal tunnel syndrome, the claim must be filed within two years of the date of last trauma or hazardous exposure. Because workers' compensation systems are not uniform across states, national and state comparisons cannot be made.

Oklahoma Central Cancer Registry

The Oklahoma State Department of Health, Chronic Disease Division maintains the Oklahoma Central Cancer Registry. Data collection for the statewide population-based surveillance system began in 1997. The registry includes information on all newly diagnosed and treated cancers among Oklahoma residents. Basal and squamous cell carcinoma of the skin and carcinoma in situ of the cervix are excluded. Case information is obtained from all hospitals, health care facilities, physicians, pathology laboratories, and other medical providers who diagnose or treat cancer patients. Data on Oklahoma residents are also obtained from other cancer registries, including the Cherokee Nation Cancer Registry and registries maintained in other states, the hospital discharge database, and death certificates. Data are also collected on Oklahomans hospitalized in other states through data sharing agreements. It is estimated that the registry is at least 95% complete.

Limitations. Federal facilities are not required to report cases to the registry; however, their participation is encouraged and a few do report cases to the Oklahoma registry. Many patients treated by federal facilities are included in the registry because they are served by other hospitals under health contracts and are reported by other health care providers.

Adult Blood Lead Epidemiology and Surveillance Program

The Oklahoma Adult Blood Lead Epidemiology and Surveillance (ABLES) program collects and analyzes data to identify the prevalence of elevated blood lead levels in the adult population. In addition, the program strives to identify high risk

industries and occupations for primary prevention strategies to eliminate adult and childhood lead poisoning. The Oklahoma ABLES program has been collecting data statewide on adult (16 years of age and older) blood lead levels since 1995. Oklahoma state law requires that all blood lead test results be reported to the Oklahoma State Department of Health. Reports are received on positive and negative results. For persons with blood lead levels greater than or equal to 25 µg/dL, detailed information including occupation and possible lead exposure sources, is obtained by telephone or mail from the individuals or from their physicians.

Limitations. Many adults who are exposed to lead do not routinely have blood lead level testing. Reporting by laboratories may not be complete, especially by laboratories that are in another state. Oklahomans with elevated blood lead levels may work or have been exposed in another state. The occupation and source of exposure are not known for all persons in the ABLES database.

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