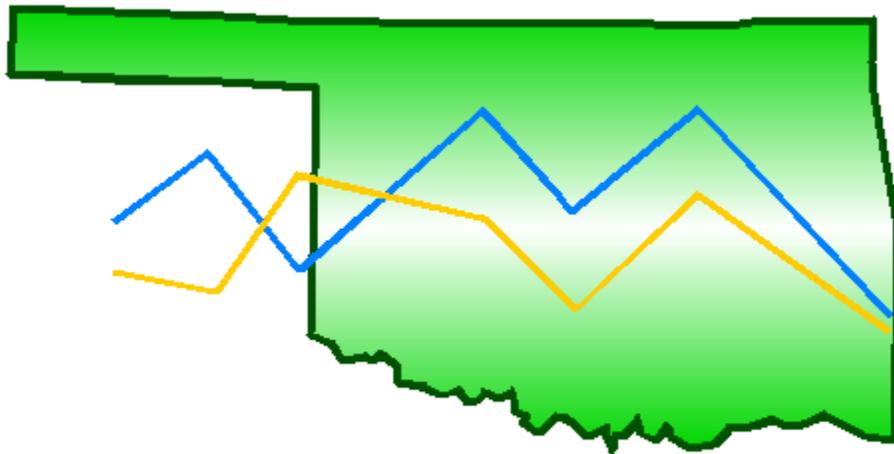
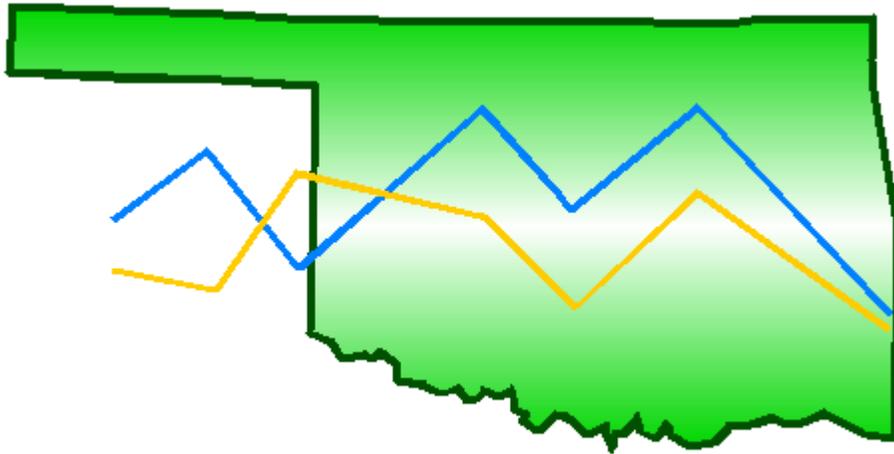


# Oklahoma Occupational Health Indicators, 2003-2005



Injury Prevention Service  
Oklahoma State Department of Health

# Oklahoma Occupational Health Indicators, 2003-2005



Injury Prevention Service  
Oklahoma State Department of Health  
1000 N.E. Tenth Street  
Oklahoma City, OK 73117  
<http://ips.health.ok.gov>

## **Oklahoma Occupational Safety and Health Surveillance Advisory Committee**

Kelly Baker, MPH  
Director  
Center for Health Statistics  
Oklahoma State Department of Health

Raymond L. Huhnke, Ph.D., P.E.  
Professor  
Biosystems and Agricultural Engineering  
Oklahoma State University

Lee McGoodwin, Pharm.D., MS, DABAT  
Managing Director  
Oklahoma Poison Control Center  
Children's Hospital of OU Medical Center

David Bates  
Area Director  
Occupational Safety and Health Administration  
U.S. Department of Labor

Diana Jones  
Director  
Occupational Safety and Health Administration  
Consultation Division  
Oklahoma Department of Labor

Fahad Khan, MPH  
Surveillance Coordinator  
Oklahoma Lead Poisoning Prevention Programs  
Oklahoma State Department of Health

Margaret Phillips, Ph.D., CIH  
Associate Professor  
Department of Occupational and Environmental  
Health  
University of Oklahoma Health Sciences Center

Anne Bliss, MPH  
Epidemiologist  
Oklahoma Cancer Programs  
Oklahoma State Department of Health

Andy Beck  
Fire and Safety Coordinator  
Autry Technology Center

Gerri Mooney  
Counselor  
Oklahoma Workers' Compensation Court

Jim T. Criswell, Ph.D.  
Professor and Extension Pesticide Coordinator  
Department of Entomology & Plant Pathology  
Oklahoma State University

This publication is issued by the Oklahoma State Department of Health, as authorized by James M. Crutcher, M.D., M.P.H., Commissioner of Health and State Health Officer. Fifty (50) copies have been prepared and distributed at a cost of \$200.00. Copies have been deposited with the Publications Clearinghouse of the Oklahoma Department of Libraries.

The Oklahoma State Department of Health is an equal opportunity employer.

## Table of Contents

Executive Summary .....	1
Introduction .....	2
Table 1. Employment Demographic Profile for Oklahoma and the U.S., 2003 .....	3
Indicator 1. Nonfatal Work-Related Injuries and Illnesses Reported by Employers.....	4
Indicator 2. Work-Related Hospitalizations .....	5
Indicator 3. Fatal Work-Related Injuries .....	6
Indicator 4. Work-Related Amputations with Days Away from Work Reported by Employers.....	7
Indicator 5. State Workers' Compensation Claims for Amputations with Lost Work-Time.....	7
Indicator 6. Hospitalizations for Work-Related Burns .....	8
Indicator 7. Work-Related Musculoskeletal Disorders with Days Away from Work Reported by Employers .....	9
Indicator 8. State Workers' Compensation Claims for Carpal Tunnel Syndrome with Lost Work-Time .....	9
Indicator 9. Hospitalizations from or with Pneumoconiosis .....	11
Indicator 10. Mortality from or with Pneumoconiosis .....	11
Indicator 11. Acute Work-Related Pesticide-Associated Illness and Injury Reported to Poison Control Centers.....	13
Indicator 12. Incidence of Malignant Mesothelioma .....	14
Indicator 13. Elevated Blood Lead Levels Among Adults.....	15
Indicator 14. Percentage of Workers Employed in Industries at High Risk for Occupational Morbidity .....	16
Indicator 15. Percentage of Workers Employed in Occupations at High Risk for Occupation Morbidity ....	16
Indicator 16. Percentage of Workers Employed in Industries and Occupations at High Risk for Occupational Mortality.....	16
Indicator 17. Occupational Safety and Health Professionals.....	21
Indicator 18. Occupational Safety and Health Administration Enforcement Activities .....	21
Indicator 19. Workers' Compensation Awards .....	21
Description of Data Sources.....	23
References .....	26



## 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 2003-2005 occupational indicators.

- In 2005, Oklahoma's incidence rate of work-related injuries and illnesses was 4,600 per 100,000 FTEs; this was down 18% from 2004 and 8% from 2003.
- The total number of work-related injuries and illnesses that involved more than 10 days away from work reached a three-year high in 2005 with 7,170 cases.
- Although the number of work-related traumatic fatalities declined since 2003, Oklahoma's crude fatality rate among workers 16 years of age and older remained 37-58% higher than the rate for the United States each of the three years.
- The annual rate of work-related burn hospitalizations increased 38% between 2003 and 2005 (2.6 and 3.6 per 100,000 employed persons, respectively).
- The number and incidence rate of musculoskeletal disorders involving days away from work increased since 2003. The increase was mainly driven by increases in disorders of the back, which comprised 45% of all musculoskeletal disorders.
- Despite increases in musculoskeletal disorders overall, the incidence rate of carpal tunnel syndrome cases involving days away from work reached a three-year low in 2005 with 19 cases per 100,000 FTEs (down 24% from 2003 and 42% from 2004). However, the number of carpal tunnel syndrome cases filed with the Oklahoma Workers' Compensation Court rose from 318 in 2003 to 567 in 2005.
- Mortality from or with pneumoconiosis remained consistent over the three-year period. While pneumoconiosis-related hospitalizations also remained fairly stable, there were steady declines in coal workers' pneumoconiosis and silicosis hospitalizations.
- The numbers of cases of acute pesticide-related injuries and illness and malignant mesothelioma remained essentially unchanged during 2003-2005.
- Steady declines appeared among Oklahomans with elevated blood lead levels greater than or equal to 25 µg/dL (a 38% decline in the prevalence rate and a 47% decrease in the incidence rate); however, such declines disappeared when examining only those with levels greater than or equal to 40 µg/dL.

## Introduction

From 2003-2005, Oklahoma averaged a civilian workforce of 1.63 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 ten percent 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 (16%), management, business, and financial operations (15%), office and administrative support (15%), and sales and related occupations (11%).

The annual incidence rate of work-related injury and illness in Oklahoma was the same as the national rate for 2003 and 2005; in 2004, the Oklahoma rate was 17% higher.<sup>1</sup> The work-related fatal injury rate in Oklahoma among persons age 16 years and older was 37-58% higher than the United States (U.S.) rate each of the three years.<sup>2</sup>

The Oklahoma State Department of Health is 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.<sup>3</sup> 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).<sup>3</sup> 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 23. Although work-related incidents are likely underreported, 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., 2003-2005

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

Source: U.S. Department of Labor, Bureau of Labor Statistics, Geographic Profile of Employment and Unemployment, 2003-2005  
\* 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 2005, there was a total of 4.2 million nonfatal injuries and illnesses in private industry; more than 90% of these events (4.0 million) were injuries.<sup>4</sup> Almost one-third (32%) of injuries occurred in goods-producing industries (i.e., agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing), although these industries employed only 21% 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. Just over 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.<sup>5</sup> Direct and indirect costs of work-related illnesses and injuries are estimated to be \$170 billion annually.<sup>6</sup>

## Data Source

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

## Demographic Group

Persons employed in the private sector

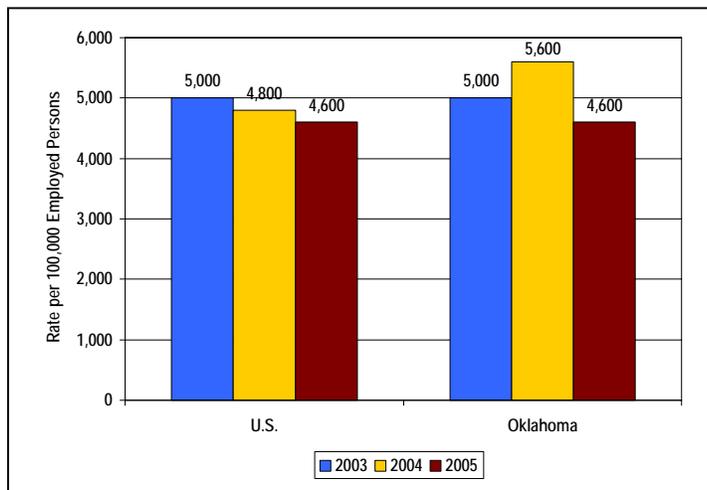
## Inclusion Criteria

Persons with work-related injuries and illnesses reported by employers

## Oklahoma Data

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

Annual incidence rate of nonfatal work-related injuries and illnesses, U.S. and Oklahoma, 2003-2005



## 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.<sup>3</sup> 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.<sup>7</sup>

### Demographic Group

Employed residents 16 years and older

### Inclusion Criteria

Hospital discharges with a primary payer of workers' compensation

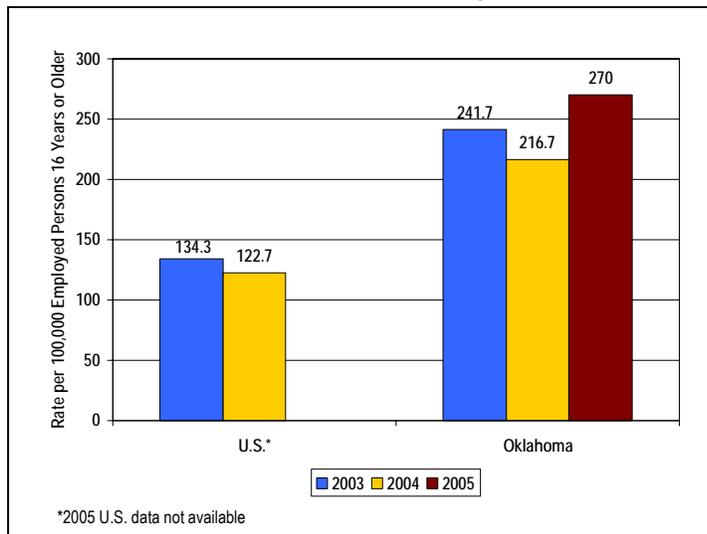
### Oklahoma Data

	2003	2004	2005
Annual number of work-related hospitalizations	3,867	3,532	4,469
Annual crude rate of work-related hospitalizations per 100,000 employed persons	241.7	216.7	270.0

### Data Source

Oklahoma inpatient hospital discharge database

### Annual crude rate of work-related hospitalizations, U.S. and Oklahoma, 2003-2005



## 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.<sup>3</sup> Although women constitute just less than half of the workforce, they account for only about 7% of work-related fatalities.<sup>2</sup> The highest number of fatalities occur among persons 25-54 years of age. From 1994-2005, the number of occupational fatalities in the U.S. dropped from 6,632 to 5,702 deaths. The four most common work-related fatal events in 2005 were highway incidents (25%), falls (13%), struck by object (11%), and homicides (10%). Workplace homicides have declined considerably since 1992 (1,044 in 1992, 564 in 2005); however, the number of falls has increased (600 in 1992, 767 in 2005) as have highway incidents (1,158 in 1992, 1,428 in 2005).<sup>2</sup> 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

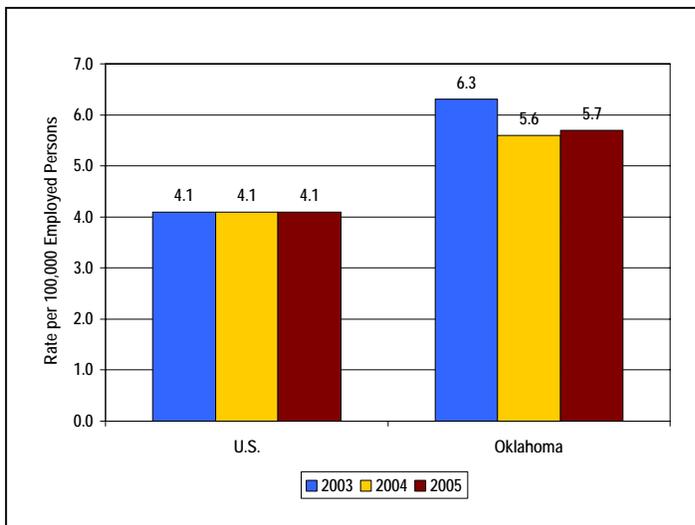
### Inclusion Criteria

Persons who died from a traumatic injury while working

### Oklahoma Data

	2003	2004	2005
Annual number of work-related traumatic fatalities	100	91	95
Annual crude fatality rate per 100,000 employed persons	6.3	5.6	5.7

Annual crude rate of work-related traumatic fatalities, U.S. and Oklahoma, 2003-2005



## 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.<sup>3</sup> Amputation injury claims have been found to be the most expensive worker claim averaging \$18,120.<sup>8</sup> In 2005, there were nearly 8,450 nonfatal amputations involving days away from work; 44% occurred in the manufacturing industry.<sup>9</sup> Over three-quarters of these nonfatal amputations were fingertip amputations, making fingers the most commonly involved body part.<sup>8</sup> Amputations were the second most disabling injuries with a median number of 22 days away from work.<sup>9</sup> Fatal amputations occur far less frequently; there were 171 fatalities from 1992-1999.<sup>8</sup> Two-thirds of these deaths happened in three major industry divisions: transportation/public utilities, agriculture, and manufacturing.<sup>8</sup>

### 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

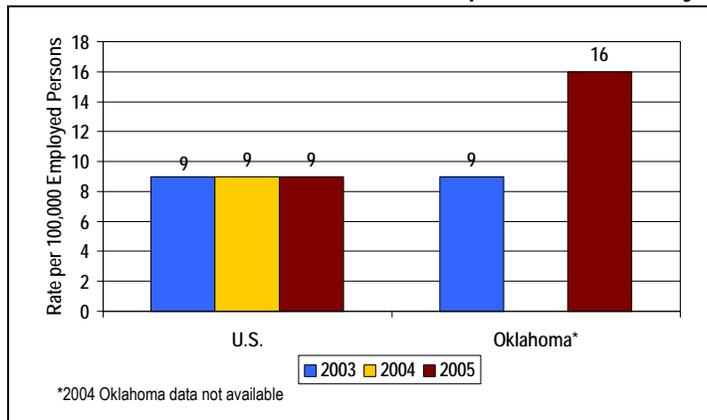
Indicator 4. Persons with an Occupational Injury and Illness Classification (OIIC) nature code of 031 (amputations)

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
Estimated annual number of work-related amputations involving days away from work	90	*	160
Estimated annual incidence rate of amputations involving days away from work per 100,000 FTEs	9.0	*	16.0
Annual number of amputations filed with Oklahoma Workers' Compensation Court	94	197	175
Annual incidence rate of amputations filed with Oklahoma Workers' Compensation Court	6.9	14.3	12.3
*Data are not available due to unreliable estimates.			

Annual crude rate of work-related amputations with days away from work, U.S. and Oklahoma, 2003-2005



## Indicator 6. Hospitalizations for Work-Related Burns

### Background

Serious work-related burns are costly, painful, and devastating injuries.<sup>3,10</sup> It was been estimated that 20%-40% of burns are work-related.<sup>3,10-13</sup> 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.<sup>10,14-15</sup> Workers under age 25 years have an incidence rate two to five times higher than that of older age groups, which associates with the level of personal experience and the amount of workplace training.<sup>5,10,16</sup> 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.<sup>10,14-16</sup> In 2005 in the U.S., 17,150 heat burn cases and 6,360 chemical burn cases required days away from work.<sup>9</sup>

### Data Source

Oklahoma inpatient hospital discharge database

### Demographic Group

Employed residents 16 years and older

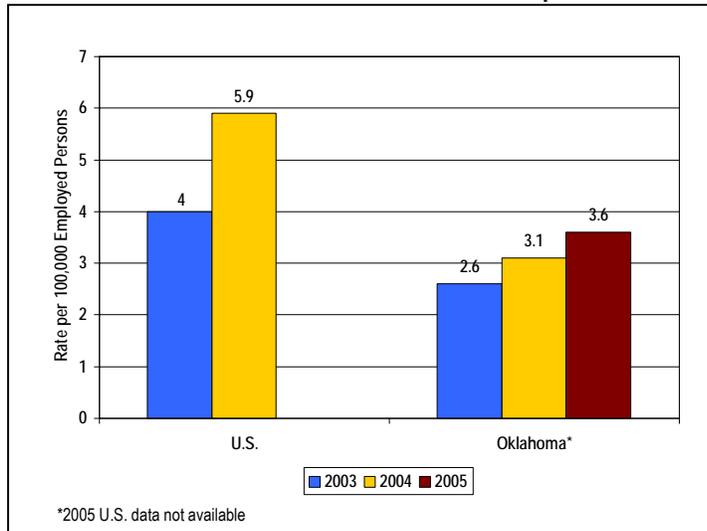
### Inclusion Criteria

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
Annual number of hospitalizations for work-related burns	42	51	60
Annual rate of burn hospitalizations per 100,000 employed persons	2.6	3.1	3.6

Annual crude rate of work-related burn hospitalizations, U.S. and Oklahoma, 2003-2005



## **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 2005, the 375,540 MSDs accounted for 30% of all injuries or illnesses with days away from work (median=9 days).<sup>9</sup> Laborers and material movers had the highest number of MSDs (32,100 cases), followed by nursing aides/orderlies/ attendants (28,920 cases) in 2005. Heavy and tractor-trailer truck drivers had the third highest number of cases (18,330), but the highest median number of days away from work (14 days).<sup>9</sup> Of industry divisions, however, it was the mining industry that had the highest median number of days away from work (20 days).<sup>9</sup> Although the number of other work-related illnesses and injuries have declined in the past decade, MSDs have not, despite extensive efforts to change and redesign working environments to improve ergonomics and daily working conditions.<sup>17</sup> More than 4 out of 10 injuries and illnesses in the U.S. that resulted in days away from work were due to sprains or strains.<sup>9</sup> Included as a MSD is carpal tunnel syndrome, the most disabling injury in terms of days away from work (median=27 days).<sup>9</sup>

### **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
Estimated annual number of all musculoskeletal disorders involving days away from work	4,440	5,190	4,980
Estimated annual incidence rate of all musculoskeletal disorders involving days away from work per 100,000 FTEs	458	534	489
Estimated annual number of musculoskeletal disorders of the neck, shoulder, and upper extremities involving days away from work	1,660	1,710	1,620
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
Estimated annual number of carpal tunnel syndrome cases involving days away from work	240	320	200
Estimated annual incidence rate of carpal tunnel syndrome cases involving days away from work per 100,000 FTEs	25	33	19
Estimated annual number of musculoskeletal disorders of the back involving days away from work	1,750	2,330	2,210
Estimated annual incidence rate of musculoskeletal disorders of the back involving days away from work per 100,000 FTEs	181	240	217
Annual number of carpal tunnel syndrome cases filed with Oklahoma Workers' Compensation Court	318	550	567
Annual incidence rate of carpal tunnel syndrome cases filed with Oklahoma Workers' Compensation Court	23.3	39.8	39.9

**MSD rate\* comparisons between the U.S. and Oklahoma, 2003-2005**

	U.S.			Oklahoma		
	Incidence Rate					
	2003	2004	2005	2003	2004	2005
All musculoskeletal disorders	496	452	413	458	534	489
Disorders of the neck, shoulder, and upper extremities	140	132	**	172	176	160
Carpal tunnel syndrome	25	21	**	25	33	19
Disorders of the back	250	221	**	181	240	217
*Rate per 100,000 FTEs						
**Data not available						

## **Indicator 9. Hospitalizations from or with Pneumoconiosis**

## **Indicator 10. Mortality from or with Pneumoconiosis**

### **Background**

Occupational lung disease, the number one work-related illness, frequently may not be curable, but is always preventable.<sup>18</sup> 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.<sup>3</sup> 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.<sup>3,19</sup> During the 1990s, there were over 30,000 deaths from all pneumoconioses combined (median age=77 years). Ninety-eight percent of deaths were among males and 94% were white. Coal mining and construction were the most frequently recorded industries on the death certificates.<sup>19</sup>

### **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)

## Oklahoma Data

	2003	2004	2005
Annual number of total pneumoconiosis hospital discharges	148	181	146
Annual rate of total pneumoconiosis hospital discharges	53.1	64.4	52.0
Annual age-standardized rate of total pneumoconiosis hospitalizations	51.3	64.3	49.6
Annual number of coal workers' pneumoconiosis hospital discharges	47	37	27
Annual rate of coal workers' pneumoconiosis hospital discharges per million residents	16.9	13.2	9.6
Annual age-standardized rate of coal workers' pneumoconiosis hospital discharges per million residents	16.4	13.1	9.1
Annual number of asbestosis hospital discharges	79	122	105
Annual rate of asbestosis hospital discharges per million residents	28.4	43.4	37.4
Annual age-standardized rate of asbestosis hospital discharges per million residents	27.2	43.3	35.6
Annual number of silicosis hospital discharges	21	19	13
Annual rate of silicosis hospital discharges per million residents	7.5	6.8	4.6
Annual age-standardized rate of silicosis hospital discharges per million residents	7.3	6.9	4.5
Annual number of other and unspecified pneumoconiosis hospital discharges	2	3	3
Annual number of total pneumoconiosis deaths	12	13	14
Annual total pneumoconiosis death rate per million residents	4.3	4.6	5.0
Annual age-standardized total pneumoconiosis death rate per million residents	4.2	4.7	4.7
Annual number of coal workers' pneumoconiosis deaths	1	4	3
Annual number of asbestosis deaths	9	8	8
Annual asbestosis death rate per million residents	3.2	2.8	2.9
Annual age-standardized asbestosis death rate per million residents	3.1	2.8	2.7
Annual number of silicosis deaths	1	1	2
Annual number of other and unspecified pneumoconiosis deaths	1	0	1

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

	U.S.			Oklahoma		
	Age-Standardized Rate					
	2003	2004	2005	2003	2004	2005
Total pneumoconiosis hospitalization	90.4	117.7	**	51.3	64.3	49.6
Coal workers' pneumoconiosis hospitalization	30.3	23.5	**	16.4	13.1	9.1
Asbestosis hospitalization	54.6	92.0	**	27.2	43.3	35.6
Silicosis hospitalization	4.1	5.0	**	7.3	6.9	4.5
Total pneumoconiosis mortality	11.5	10.9	**	4.2	4.7	4.7
Asbestosis mortality	6.4	6.3	**	3.1	2.8	2.7
*Rate per million residents						
**Data not available						

# 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 farmworkers 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.<sup>20</sup>

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.<sup>20</sup> In a study using 1998-1999 pesticide surveillance data from the Sentinel Event Notification System for Occupational Risks (SENSOR) program, these poisonings were found to be a particular health problem in agriculture, which had an illness incidence rate of 18.2 per 100,000 FTEs, compared to 0.53 per 100,000 FTEs in non-agricultural industries.<sup>21</sup> Insecticides were responsible for 49% of illnesses and nearly 30% were ranked as moderately severe. Incidence rates peaked among the 20-24 year age group and, in most cases, exposure occurred during routine work activities not involving pesticide application.<sup>21</sup>

## Data Source

American Association of Poison Control Centers/  
Oklahoma Poison Control Center

## Demographic Group

Employed residents 16 years and older

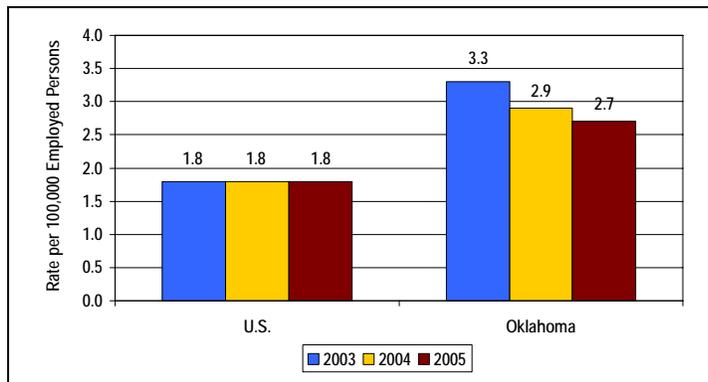
## Inclusion Criteria

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 for an unknown reason.

## Oklahoma Data

	2003	2004	2005
Annual number of reported work-related pesticide poisoning cases	53	47	45
Annual incidence rate of reported work-related pesticide poisoning cases per 100,000 employed persons	3.3	2.9	2.7

Annual incidence rate of reported work-related pesticide poisonings, U.S. and Oklahoma, 2003-2005



## Indicator 12. Incidence of Malignant Mesothelioma

### Background

Mesothelioma, a rare form of cancer, is typically caused by exposure to asbestos and related fibers.<sup>3</sup> Approximately 2,500 deaths occur every year, including 20% among females.<sup>19</sup> 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.<sup>18</sup> 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.<sup>18</sup> In 1999, occupations with elevated mesothelioma mortality included plumbers, pipefitters, steamfitters, mechanical engineers, electricians, and elementary school teachers.<sup>19</sup>

### Data Source:

Oklahoma Central Cancer Registry

### Demographic Group

Residents 15 years of age and older

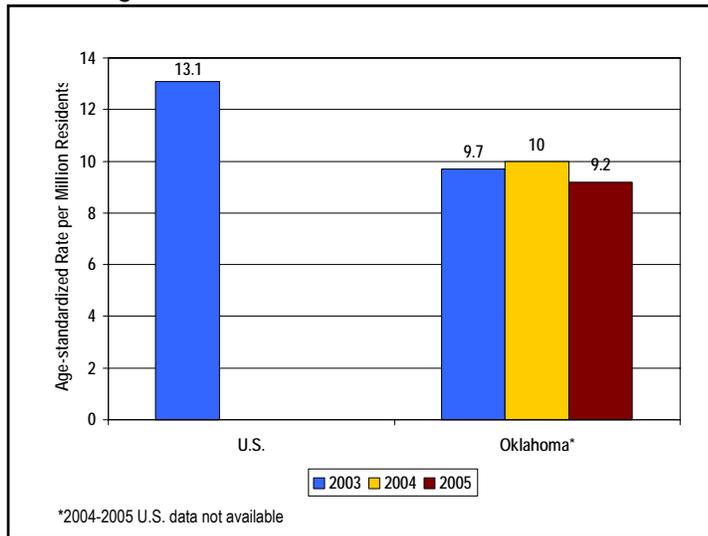
### Inclusion Criteria

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

### Oklahoma Data

	2003	2004	2005
Annual number of incident mesothelioma cases	28	28	28
Annual mesothelioma incidence rate per million residents	10.1	10.0	10.0
Annual age-standardized mesothelioma incidence rate per million residents	9.7	10.0	9.2

Annual age-standardized incidence rate of mesothelioma, U.S. and Oklahoma, 2003-2005



## Indicator 13. Elevated Blood Lead Levels Among Adults

Lead exposure has long been recognized as a health hazard.<sup>22</sup> Mainly an occupational health problem, 90%-95% of adults with elevated blood lead levels are exposed in their working environments.<sup>3,22</sup> The highest number of elevated blood lead levels were among workers involved in manufacture of storage batteries; painting, paperhanging, and decorating; and mining of lead ores.<sup>23</sup> 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 2003, 37 states participating in the Adult Blood Lead Epidemiology and Surveillance Program reported 9,884 resident adults with elevated blood lead levels greater or equal to 25 µg/dL.<sup>23</sup>

### 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
Annual number of residents with elevated blood lead levels greater than or equal to 25 µg/dL	85	74	55
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
Annual number of incident cases of residents with elevated blood lead levels greater than or equal to 25 µg/dL	48	46	26
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
Annual number of residents with blood lead levels greater than or equal to 40 µg/dL	19	24	19
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
Annual number of incident cases of residents with blood lead levels greater than or equal to 40 µg/dL	6	11	14
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

### Blood lead rate\* comparisons between the U.S. and Oklahoma, 2003-2005

	U.S.			Oklahoma		
	2003	2004	2005	2003	2004	2005
Greater than or equal to 25 µg/dL						
Prevalence rate	8.2	7.5	**	5.3	4.5	3.3
Incidence rate	5.1	4.7	**	3.0	2.8	1.6
Greater than or equal to 40 µg/dL						
Prevalence rate	1.4	1.2	**	1.2	1.5	1.2
Incidence rate	0.8	0.7	**	0.4	0.7	0.9
*Rate per 100,000 employed persons						
**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.<sup>3</sup> 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.

### **Industries at high risk for occupational morbidity (North American Industry Classification System (NAICS) Industry Title)**

Framing contractors  
Sugar manufacturing  
Fluid milk manufacturing  
Creamery butter manufacturing  
Animal slaughtering and processing  
Cookie and cracker manufacturing  
Beverage and tobacco product manufacturing  
Rubber and plastic footwear manufacturing  
Wood products manufacturing  
All other converted paper product manufacturing  
Glass container manufacturing  
Concrete block and brick manufacturing  
Other concrete product manufacturing  
Steel product manufacturing from purchased steel  
Foundries  
Cutlery and flatware manufacturing  
Plate work and fabricated structural product manufacturing  
Ornamental and architectural metal work manufacturing  
Spring and wire manufacturing  
Other metal valve and pipe fitting manufacturing  
Enameled iron and metal sanitary ware manufacturing

All other miscellaneous fabricated metal product manufacturing  
Commercial laundry, dry cleaning, and pressing machine manufacturing  
Industrial and commercial fan and blower manufacturing  
Overhead traveling crane, hoist, and monorail system manufacturing  
Motor vehicle manufacturing  
Motor vehicle body and trailer manufacturing  
Motor vehicle transmission and power train parts manufacturing  
Motor vehicle metal stamping  
Ship and boat building  
Beer, wine, and distilled alcoholic beverage merchant wholesalers  
Scheduled air transportation  
Urban transit systems  
Couriers and messengers  
General warehousing and storage  
Nursing and residential care facilities  
Amusement parks and arcades

	Oklahoma			U.S.		
	2003	2004	2005	2003	2004	2005
Number of employed persons in high morbidity risk industries	81,008	84,131	83,037	7,557,604	7,553,389	NA
Percentage of employed persons in high morbidity risk industries	6.8	7.0	6.8	6.7	6.6	NA
NA=data not available						

**Occupations at high risk of occupational morbidity (1990 Bureau of the Census Occupation Title)**

Actors	Helpers, extraction workers
Emergency medical technicians and paramedics	Other extraction workers
Nursing, psychiatric, and home health aides	Electrical and electronics installers/repairers, transportation equipment
First-line supervisors/managers of correctional officers	Electrical and electronics installers/repairers, industrial and utility
Firefighters	Aircraft mechanics and service technicians
Fire inspectors	Heavy vehicle and mobile equipment service technicians and mechanics
Combined food preparation and serving workers, including fast food	Miscellaneous vehicle and mobile equipment mechanics, installers, and repairers
Food servers, non-restaurant	Heating, air conditioning, and refrigeration mechanics and installers
Food preparation and serving related workers, all other	Home appliance repairers
Pest control workers	Maintenance and repair workers, general
Transportation attendants	Maintenance workers, machinery
Reservation and transportation ticket agents and travel clerks	Telecommunications line installers and repairers
Cargo and freight agents	Riggers
Animal breeders	Signal and track switch repairers
Logging workers	Helpers of installation, maintenance, and repair workers
Carpenters	Aircraft structure, surfaces, rigging, and systems assemblers
Construction laborers	Engine and other machine assemblers
Paving, surfacing, and tamping equipment operators	Food/tobacco roasting, baking, and drying machine operators and tenders
Pile driver operators	Food cooking machine operators and tenders
Glaziers	Extruding/drawing machine setters, operators, and tenders, metal and plastic
Insulation workers	Rolling machine setters, operators, and tenders, metal and plastic
Reinforcing iron and rebar workers	Lathe and turning machine tool setters, operators, and tenders, metal and plastic
Sheet metal workers	Milling and planing machine setters, operators, and tenders, metal and plastic
Structural iron and steel workers	Metal furnace and kiln operators and tenders
Helpers, construction trades	Molders and molding machine setters, operators, and tenders, metal and plastic
Septic tank servicers and sewer pipe cleaners	
Miscellaneous construction and related workers	
Derrick, rotary drill, and service unit operators, oil, gas, and mining	
Earth drillers, except oil and gas	
Roof bolters, mining	
Roustabouts, oil and gas	

Multiple machine tool setters, operators, and tenders, metal and plastic  
 Layout workers, metal and plastic  
 Bookbinders and bindery workers  
 Extruding and forming machine setters, operators, and tenders, synthetic and glass fibers  
 Sawing machine setters, operators, and tenders, wood  
 Woodworking machine setters, operators, and tenders, except sawing  
 Crushing, grinding, polishing, mixing, and blending workers  
 Cutting workers  
 Extruding, forming, pressing, and compacting machine setters, operators, and tenders  
 Cooling and freezing equipment operators and tenders  
 Molders, shapers, and casters, except metal/plastic

Tire builders  
 Helpers for production workers  
 Production workers, all other  
 Ambulance drivers and attendants, except emergency medical technicians  
 Driver/sales workers and truck drivers  
 Railroad brake, signal, and switch operators  
 Railroad conductors and yardmasters  
 Sailors and marine oilers  
 Ship engineers  
 Other transportation workers  
 Conveyor operators, tenders  
 Laborers and freight, stock, and material movers, hand  
 Machine feeders and offbearers  
 Refuse and recyclable material collectors  
 Shuttle car operators  
 Material moving workers, all other

	Oklahoma			U.S.		
	2003	2004	2005	2003	2004	2005
Number of employed persons in high morbidity risk occupations	193,086	191,547	186,042	12,595,944	12,854,488	NA
Percentage of employed persons in high morbidity risk occupations	12.1	11.7	11.2	12.2	12.4	NA
NA=data not available						

**Industries at high risk for occupational mortality (2000 Bureau of the Census Industry Title)**

Crop production  
 Animal production  
 Logging  
 Fishing, hunting, and trapping  
 Support activities for agriculture and forestry  
 Oil and gas extraction  
 Coal mining  
 Nonmetallic mineral mining and quarrying  
 Support activities for mining  
 Construction  
 Cement, concrete, lime, and gypsum product manufacturing  
 Misc. nonmetallic mineral product manufacturing  
 Foundries  
 Sawmills and wood preservation  
 Veneer, plywood, and engineered wood product manufacturing  
 Recyclable material, merchant wholesalers

Farm product raw materials, merchant wholesalers  
 Petroleum and petroleum product, merchant wholesalers  
 Other motor vehicle dealers  
 Fuel dealers  
 Water transportation  
 Truck transportation  
 Taxi and limousine service  
 Scenic and sightseeing transportation  
 Services incidental to transportation  
 Commercial, industrial, and other intangible assets rental and leasing  
 Landscaping services  
 Waste management and remediation services  
 Recreational vehicle parks and camps, and rooming and boarding houses  
 Drinking places, alcoholic beverages

	Oklahoma			U.S.		
	2003	2004	2005	2003	2004	2005
Number of employed persons in high mortality risk industries	255,988	269,728	291,312	17,922,675	18,724,429	NA
Percentage of employed persons in high mortality risk industries	16.1	16.4	17.5	15.0	15.6	NA
NA=data not available						

**Occupations at high risk for occupational mortality (2000 Bureau of the Census Industry Title)**

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

	Oklahoma			U.S.		
	2003	2004	2005	2003	2004	2005
Number of employed persons in high mortality risk industries	199,371	204,472	214,610	12,763,066	13,170,735	NA
Percentage of employed persons in high mortality risk industries	12.5	12.4	12.9	11.0	11.0	NA
NA=data not available						

**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).<sup>3</sup>

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.<sup>3</sup>

Selected occupational safety and health professionals in Oklahoma, 2003-2005

	2003	2004	2005
Number of board certified occupational medicine physicians	29	29	29
Number of members of the American College of Occupational and Environmental Medicine (ACOEM)	76	67	56
Number of board certified occupational health nurses	43	42	39
Number of member nurses of the American Association of Occupational Health Nurses (AAOHN)	48	66	62
Number of board certified industrial hygienists	47	42	48
Number of industrial hygienist members of the American Industrial Hygiene Association (AIHA)	118	101	96
Number of board certified safety health professionals	115	119	121
Number of safety engineer members of the American Society of Safety Engineers (ASSE)	507	633	803

**Number of selected occupational safety and health professionals per 100,000 employees, Oklahoma and U.S., 2003-2005**

	Oklahoma			U.S.		
	2003	2004	2005	2003	2004	2005
Board certified occupational medicine physicians	1.8	1.8	1.8	1.7	1.8	1.8
ACOEM members	4.8	4.1	3.4	4.0	4.0	3.5
Board certified occupational health nurses	2.7	2.6	2.4	4.6	4.6	4.5
AAOHN members (nurses)	3.0	4.0	3.8	5.9	6.8	6.4
Board certified industrial hygienists	2.9	2.6	2.9	4.9	4.3	4.9
AIHA members (industrial hygienists)	7.4	6.2	5.8	8.0	7.9	7.6
Board certified safety professionals	7.2	7.3	7.3	7.3	7.5	7.5
ASSE members (safety engineers)	31.7	38.8	48.5	21.8	23.6	25.9

**OSHA enforcement activities, Oklahoma and U.S., 2003-2005**

	Oklahoma			U.S.		
	2003	2004	2005	2003	2004	2005
Annual number of establishments inspected by Federal/State OSHA	624	631	642	99,153	96,838	96,238
Total number of establishments under OSHA jurisdiction	91,611	92,465	94,703	7,897,678	8,364,795	8,571,144
Estimated percentage of all establishments under OSHA jurisdiction inspected by OSHA	0.7	0.7	0.7	1.3	1.2	1.1
Annual number of employees whose work areas were inspected by OSHA	23,161	31,743	45,096	3,915,466	3,905,987	3,777,751
Estimated percentage of employees under OSHA jurisdiction whose work areas were inspected	2.0	2.8	3.8	3.1	3.0	2.9

**Workers' compensation awards, Oklahoma and U.S., 2003-2005**

	Oklahoma			U.S.		
	2003	2004	2005	2003	2004	2005
Total amount of workers' compensation benefits paid (\$ in thousands)	561,643	572,001	587,523	54,870,813	55,968,121	55,307,176
Average amount of workers' compensation paid per covered worker (\$)	411.16	413.89	413.75	438.00	444.70	431.60

## 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. On average, death certificates are received in Vital Records within two to four weeks following the death. Death certificates are scanned and all text regarding cause of death is entered into the computer. The file is then sent to the National Center for Health Statistics for ICD-10 coding; data are typically coded within 45-60 days and the files are returned to the Oklahoma State Department of Health. Deaths are coded to multiple causes of death.

*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.<sup>24</sup>

*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.<sup>3</sup>

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.<sup>4</sup>

### 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 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 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.

## References

1. United States Department of Labor, Bureau of Labor Statistics. *Occupational Injuries and Illnesses: Industry Data*. Available at <http://data.bls.gov/cgi-bin/dsrv?ii>. Accessed July 8, 2008.
2. United States Department of Labor, Bureau of Labor Statistics. *Census of Fatal Occupational Injuries – Current and Revised Data*. Available at <http://www.bls.gov/iif/oshcfoi1.htm#19922002>. Accessed July 8, 2008.
3. Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants*. March 2008.
4. Bureau of Labor Statistics. *Workplace injuries and illnesses in 2005*. Washington, DC: United States Department of Labor, Bureau of Labor Statistics, USDL 06-1816, October 19, 2006.
5. Derk SJ, Marsh SM, Jackson LL. Nonfatal occupational injuries and illnesses – United States, 2004. *MMWR Morb Mortal Wkly Rep*, 2007;56(16):393-397.
6. Thomsen C, McClain J, Rosenman K, Davis L. Indicators for occupational health surveillance. *MMWR Morb Mortal Wkly Rep*, 2007;56(RR01):1-7.
7. Dembe AE, Mastroberti MA, Fox SE, Bigelow C, Banks SM. Inpatient hospital care for work-related injuries and illnesses. *Am J Ind Med*, 2003;44(4):331-342.
8. Brown JD. Amputations: A continuing workplace hazard. *Compensation and Working Conditions Online*. January 2003. Available at <http://stats.bls.gov/opub/cwc/print/sh20030114ar01p1.htm>. Accessed July 15, 2008.
9. Bureau of Labor Statistics. *Nonfatal Occupational Injuries and Illnesses Requiring Days Away from Work, 2005*. Washington, DC: United States Department of Labor, Bureau of Labor Statistics, USDL 06-1982, November 17, 2006.
10. Islam SS, Nambiar AM, Doyle EJ, Velilla AM, Biswas RS, Ducatman AM. Epidemiology of work-related burn injuries: Experience of a state-managed workers' compensation system. *J Trauma*, 2000;49:1045-1051.
11. McCullough J, Henderson A, Kaufman J. Occupational burns in Washington state, 1989-1993. *J Occup Environ Med*, 1998;40:1083-1089.
12. Quinney B, McGwin G, Cross JM, Valent F, Taylor AJ, Rue LW. Thermal burn fatalities in the workplace, United States, 1992-1999. *J Burn Care Rehabil*, 2002;23:305-310.
13. Rossignol AM, Locke JA, Boyle CM, Burke JF. Epidemiology of work-related burn injuries in Massachusetts requiring hospitalization. *J Trauma*, 1986;26:1097-1101.
14. Baggs J, Curwick C, Silverstein B. Work-related burns in Washington state, 1994-1998. *J Occup Environ Med*, 2002;44:692-699.
15. Horwitz IB, McCall BP. Quantification and risk analysis of occupational burns: Oregon workers' compensation claims, 1990 to 1997. *J Burn Care Rehabil*, 2004;25:328-336.
16. Hendricks KJ, Layne LA. Adolescent occupational injuries in fast food restaurants: An examination of the problem from a national perspective. *J Occup Environ Med*, 1999;41(12):1146-1153.
17. Falkiner S, Myers S. When exactly can carpal tunnel syndrome be considered work-related? *J Surgery*, 2002;72(3):204-209.

18. American Lung Association. *Occupational lung disease fact sheet*. January 2005. Available at [http://www.lungusa.org/site/apps/nlnet/content3.aspx?c=dvLUK9O0E&b=2060319&content\\_id={A234CDA5-0941-455E-98DF-A5C2CD9CB950}&notoc=1](http://www.lungusa.org/site/apps/nlnet/content3.aspx?c=dvLUK9O0E&b=2060319&content_id={A234CDA5-0941-455E-98DF-A5C2CD9CB950}&notoc=1). Accessed July 15, 2008.
19. Division of Respiratory Disease Studies, National Institute for Occupational Safety and Health. *Work-Related Lung Disease Surveillance Report, 2002*. Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, 2003-111, May 2003.
20. Office of Pesticide Programs, U.S. Environmental Protection Agency. *Promoting Safety for America's Future. FY 2002 Annual Report*. Available at <http://www.epa.gov/oppead1/annual/2002/2002annualreport.pdf>. Accessed July 8, 2008.
21. Calvert GM, Plate, DK, Das R, Rosales R, Shafey O, Thomsen C, Male D, Beckman J, Arvizu E, Lackovic M. Acute occupational pesticide-related illness in the US, 1998-1999: Surveillance findings from the SENSOR-pesticides program. *Am J Ind Med*, 2004;45:14-23.
22. National Institute for Occupational Safety and Health. *Adult Blood Lead Epidemiology and Surveillance (ABLES)*. Available at <http://www.cdc.gov/niosh/topics/ables/ables.html>. Accessed July 8, 2008.
23. Roscoe RJ, Graydon JR. Adult blood lead epidemiology and surveillance – United States, 2003-2004. *MMWR Morb Mortal Wkly Rep*, 2006;55(32):876-879.
24. Bureau of Labor Statistics. *National census of fatal occupational injuries in 2003*. Washington, DC: United States Department of Labor, Bureau of Labor Statistics, USDL 04-1830, September 22, 2004.

