



Council of State and Territorial Epidemiologists

**In collaboration with
National Institute for Occupational Safety and Health
Centers for Disease Control and Prevention**

Putting Data to Work:
Occupational Health Indicators from
Thirteen Pilot States for 2000

October 2005

The Council of State and Territorial Epidemiologists (CSTE) in collaboration with the National Institute for Occupational Safety and Health (NIOSH) within the Centers for Disease Control and Prevention (CDC) are pleased to present the results of the pilot of CSTE's Occupational Health Indicators. CSTE would like to acknowledge the workgroup members for their numerous contributions to this document, namely for collecting data, offering technical advice and preparing the report. CSTE would also like to thank the Bureau of Labor Statistics and the Occupational Safety and Health Administration in the U.S. Department of Labor for facilitating state access to data for several of the indicators. This report would not be possible without the cooperation of state health departments and their federal occupational health partners.

CSTE produced this report with support from Cooperative Agreement # AU60/CCU007277 between CDC and CSTE.

Suggested Citation: Council of State and Territorial Epidemiologists. Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000. September 2005.

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

Foreword

The Council of State and Territorial Epidemiologists (CSTE) has worked collaboratively with the National Institute for Occupational Safety and Health (NIOSH) to develop a set of occupational health indicators (OHIs). A good indicator anticipates early problem areas for attention. Outcomes of a system that utilizes indicators are ably demonstrated in this document, and serves as an important milestone in the progress towards a national system of occupational health surveillance.

Like other public health problems, those in the workplace are preventable. When the effect of an exposure or hazard can be measured, it is often possible and more feasible to construct useful preventative measures.

The states and federal government need to be able to measure the baseline health of their populations and changes that take place over time. A standard set of indicators allow for assessment and monitoring of the overall health and also provides comparisons which enhance the usefulness of the indicators in policy development, service planning and evaluation. The set of OHIs presented here is part of a larger national process of public health indicator development including injury, environmental, chronic disease and the "Leading Health Indicators" of the Healthy People 2010 project.

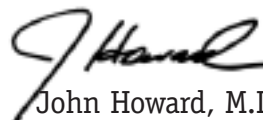
As a comprehensive and recommended set of measures, these OHIs are intended to increase the consistency and availability of occupational disease and injury surveillance data at the state and federal levels. Epidemiologists and other public health professionals can use these materials to enhance surveillance, generate hypotheses and serve as reference material as they develop, implement and evaluate public health prevention activities.

A Workgroup of state CSTE representatives went through a multi-year process of defining 19 OHIs. Thirteen states then agreed to pilot the generation of data from 2000 for these 19 OHIs, and this document presents the results of that pilot. The data provide a baseline from which comparisons and trends over time can be tracked.

CSTE and NIOSH look forward to working together to sustain the existing occupational health indicator project, involving more states, and expanding activity to ensure a comprehensive system for tracking work-related injury and illness.



C. Mack Sewell, DrPH, MS
CSTE President



John Howard, M.D.
Director, NIOSH

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

Contributors

HENRY ANDERSON, *Wisconsin Department of Health and Family Services*

CARRIE BRETON, *Massachusetts Department of Public Health*

DAVID BONAUTO, *Washington Department of Labor and Industries*

GEOFFERY CALVERT, *National Institute for Occupational Safety and Health*

ROBERT CASTELLAN, *National Institute for Occupational Safety and Health*

DAWN CASTILLO, *National Institute for Occupational Safety and Health*

CHRISTY CURWICK, *Washington Department of Labor and Industries*

LETITIA DAVIS, *Massachusetts Department of Public Health*

ALICIA FLETCHER, *New York State Department of Health*

BRETT FOLEY, *Nebraska Department of Health and Human Services*

KITTY GELBERG, *New York State Department of Health*

ROBERT HARRISON, *California Department of Health Services*

KITTY HERRIN, *North Carolina Department of Health and Human Services*

KM MONIRUL ISLAM, *Wisconsin Department of Health and Family Services*

THOMAS LARGO, *Michigan Department of Community Health*

KIM LIM, *Maine Department of Labor*

BARBARA MATERNA, *California Department of Health Services*

ALFRED MAY, *Maine Department of Health and Human Services*

JACKIE MCCLAIN, *Council of State and Territorial Epidemiologists*

JANE MCGINNIS, *Nebraska Department of Health and Human Services*

STEPHANIE MORAGA-MCHALEY, *University of New Mexico School of Medicine*

KAREN MULLOY, *University of New Mexico School of Medicine*

JOHN MYERS, *National Institute for Occupational Safety and Health*

WILLIAM PATE, *North Carolina Department of Health and Human Services*

RUKMANI RAMASPRAD, *New Jersey Department of Health and Senior Services*

FLORENCE REINISCH, *California Department of Health Services*

ROBERT ROSCOE, *National Institute for Occupational Safety and Health*

KENNETH ROSENMAN, *Michigan State University*

LEE SANDERSON, *National Institute for Occupational Safety and Health*

PATRICIA SCHLIEFF, *National Institute for Occupational Safety and Health*

ANDREW SMITH, *Maine Department of Health and Human Services*

MARTHA STANBURY, *Michigan Department of Community Health*

THOMAS ST. LOUIS, *Connecticut Department of Public Health*

JOHN SESTITO, *National Institute for Occupational Safety and Health*

CATHERINE THOMSEN, *Oregon Department of Human Services*

DAVID VALIANTE, *New Jersey Department of Health and Senior Services*

JENNIFER WOLF, *New Jersey Department of Health and Senior Services*

Table of Contents

Introduction	1
Employment Demographics Profile	4
Indicator 1: Non-Fatal Injuries and Illnesses Reported by Employers	7
Indicator 2: Work-Related Hospitalizations	10
Indicator 3: Fatal Work-Related Injuries	12
Indicator 4: Amputations Reported by Employers	14
Indicator 5: Amputations Identified in State Workers' Compensation Systems	16
Indicator 6: Hospitalizations for Work-Related Burns	19
Indicator 7: Musculoskeletal Disorders Reported by Employers	21
Indicator 8: Carpal Tunnel Syndrome Cases Identified in State Workers' Compensation Systems	24
Indicator 9: Pneumoconiosis Hospitalizations	27
Indicator 10: Pneumoconiosis Mortality	30
Indicator 11: Acute Work-Related Pesticide Poisonings Reported to Poison Control Centers	33
Indicator 12: Incidence of Malignant Mesothelioma	35
Indicator 13: Elevated Blood Lead Levels among Adults	37
Indicator 14: Workers Employed in Industries with High Risk for Occupational Morbidity	40
Indicator 15: Workers Employed in Occupations with High Risk for Occupational Morbidity	42
Indicator 16: Workers Employed in Industries and Occupations with High Risk for Occupational Mortality	44
Indicator 17: Occupational Safety and Health Professionals	46
Indicator 18: Occupational Safety and Health Administration (OSHA) Enforcement Activities	49
Indicator 19: Workers' Compensation Awards	53
Data Sources	55
Glossary	67
References	69
Appendix A	74
Appendix B	75
Appendix C	76

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

Introduction

More than 135 million individuals work in the United States. Every year, millions of these workers are injured on the job or become ill as a result of exposure to health hazards at work. These work-related injuries and illnesses result in substantial human and economic costs not only for workers and employers, but also for society at large. Workers' compensation claims alone cost approximately \$46 billion in 2000.¹ It has been estimated that the direct and indirect costs of work-related injuries and illnesses exceed \$170 billion annually.²

Work-related injuries and illnesses can be prevented. Successful approaches to making workplaces safer and healthier begin with having the data necessary to understand the problem. Public health surveillance data are needed to determine the magnitude of work-related injuries and illnesses, identify workers at greatest risk, and establish prevention priorities. Data are also necessary to

measure the effectiveness of prevention activities, and to identify workplace health and safety problems that need further investigation.

Although there is a comprehensive national surveillance system for fatal occupational injuries, the current nationwide system for surveillance of occupational illnesses and non-fatal occupational injuries has substantial gaps. Recognizing the need for more comprehensive occupational health surveillance data, the Council of State and Territorial Epidemiologists (CSTE) convened a workgroup of State and Federal occupational health professionals. In October 2003, CSTE published *Occupational Health Indicators: A Guide for*

Tracking Occupational Health Conditions and Their Determinants, which details a core set of occupational health indicators (OHIs) identified and developed by the workgroup.³ These OHIs are a set of surveillance measures that allow states and territories to uniformly define, collect, and report occupational illness, injury,

What is an Occupational Health Indicator?

An occupational health indicator is a specific measure of a work-related disease or injury, or a factor associated with occupational health, such as workplace exposures, hazards, or interventions, in a specified population. These indicators can be generated by states to track trends in the occupational health status of the working population.

and risk data. They were selected because of their importance to public health and the availability of easily obtainable statewide data in most states.

CSTE's published *Occupational Health Indicators* document³ defines 19 OHIs and one "Employment Demographics" profile. The document defines each OHI by one or more measures of frequency. It also provides a brief discussion of the significance and limitations of the measure(s) and recommendations for additional data analysis. A "how-to" guide outlining a step-by-step process for generating individual state indicator data follows each OHI definition.

This report presents the application of the OHI methodology in 13 states that participated in a pilot project of these indicators for the year 2000. The report begins with demographic profiles of the workforce in the U.S. and participating states. Each OHI measure is presented with 2000 data listed alphabetically by state in each figure and table. A brief narrative about the significance of the OHI precedes each indicator's data. Where available, information for the nation is provided as a basis for comparison. A description of the data sources used to generate the OHIs, including significant data limitations, is provided after the OHI chapters (see page 61).

Occupational Health Indicators

Employment Demographics Profile

- Non-fatal injuries and illnesses reported by employers
- Work-related hospitalizations
- Fatal work-related injuries
- Amputations reported by employers
- Amputations identified in state workers' compensation systems
- Hospitalizations for work-related burns
- Musculoskeletal disorders reported by employers
- Carpal tunnel syndrome cases identified in state workers' compensation systems
- Pneumoconiosis hospitalizations
- Pneumoconiosis mortality
- Acute work-related pesticide poisonings reported to poison control centers
- Incidence of malignant mesothelioma
- Elevated blood lead levels among adults
- Workers employed in industries with high risk for occupational morbidity
- Workers employed in occupations with high risk for occupational morbidity
- Workers in occupations and industries with high risk for occupational mortality
- Occupational health and safety professionals
- OSHA enforcement activities
- Workers' compensation awards

The workgroup acknowledges significant limitations in the design of these OHIs, intrinsic to both the nature of the OHIs and to the data sources upon which they rely. Because of these limitations, caution is advised when interpreting the OHIs. Data limitations that should be considered are noted in the box.

Comparing data across states is not advised for the OHIs that use data from state workers' compensation systems because of the many differences across states in eligibility requirements and other administrative factors that affect the numbers and types of submitted claims.

These OHIs are meant to assist states in building capacity for occupational health surveillance by providing states with tools to generate important information about occupational health status of the state population. The benefits of generating the OHIs extend beyond producing new data. For example, the process of generating the OHIs can help raise awareness, build capacity for using available data, and open dialogue for future collaboration with occupational health partners within the state.

These data will be most useful when multiple years of data are available to highlight trends observed within each state. By producing this

report of one year of data on the 19 OHIs from 13 states, it is hoped that additional states will join in this national initiative and that multiple years of data will be collected and presented. States and the nation as a whole can use these OHIs to target resources and measure progress in preventing work-related diseases and injuries.

Factors affecting quality and comparability of State occupational health indicator data

- Underreporting of occupational injuries and illnesses by employees, physicians, and employers;
- Inadequate health care provider recognition of occupational injuries and illnesses;
- Difficulties in attributing diseases with long latency from time of exposure to disease manifestation (e.g., silicosis) and/or from multi-factorial causes (e.g., lung cancer) to occupational causation;
- Possible exclusion of at-risk populations from surveillance (e.g., self-employed, military)
- Injury, illness, or death coding discrepancies;
- State-specific differences in structure of administrative databases used for surveillance (e.g., workers' compensation, hospital discharge data).

Employment Demographics Profile

As the United States moves into the twenty-first century, its workforce is more diverse than ever. This diversity in age, race, ethnicity, and levels of employment in certain industries and occupations varies from state to state. State-to-state differences are important to consider because these workforce characteristics can impact rates of work-related injury and illness.

Table P1 presents characteristics of the working population in the 13 participating states and the U.S. in 2000. The national unemployment rate was 4.0%. Approximately 7.0% of workers were self-employed (range among the states: 5.0% to 11.8%) and one in six were employed part-time (range: 13.8% to 21.0%). Nearly one-third worked more than 40 hours per week (range: 26.9% to 37.6%).

The gender composition of the workforce was very similar across states, with males comprising about 53%. There were very minor differences among the states in worker age distributions. More substantial differences were in state racial and ethnic compositions: Blacks ranged from 2.4% to 21.9%

of the workforce, while Hispanics ranged from 2.5% to 37.5%.

Table P2 provides the distributions of the workforce in the major industry and occupation classifications by state. Among the industries, services employed the largest proportion of workers nationally (25.2%) and in all 13 states. Nationwide, agriculture employed the least (2.4%). The most notable differences across these states were in the proportion of workers in manufacturing of durable goods (3.5% to 17.8%) and agriculture (0.7% to 8.6%). There were fewer differences in the occupational distributions among the states. The most noteworthy was in farming, forestry, and fishing: the percentage of workers in that occupation group ranged from 0.7% to 8.5% of the workforce.

4 Employment Demographics Profile

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

Table P1. Worker Demographics and Employment Characteristics, Ages 16 and Older, by State and U.S., 2000 Annual Averages

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Number employed (in thousands)	16,246	1,707	3,151	665	5,016	3,814	897	4,030	792	8,533	1,715	2,888	2,831	135,208
% Workforce unemployed	4.9	2.2	2.6	3.5	3.6	3.6	3.0	3.7	4.9	4.6	4.8	5.2	3.5	4.0
% Male	54.6	52.5	52.6	52.3	54.2	53.0	52.2	54.0	52.1	52.8	53.7	52.6	53.3	53.5
% Female	45.4	47.5	47.4	47.7	45.8	47.0	47.7	46.0	48.0	47.2	46.3	47.4	46.7	46.5
% Ages 16-17	1.5	2.3	2.0	2.3	2.9	1.9	3.1	1.7	2.3	1.6	1.8	2.0	2.8	2.7
% Ages 18-64	95.9	93.5	94.0	94.0	94.2	94.9	92.4	95.2	94.6	94.9	95.7	95.7	94.1	94.2
% Ages 65 and older	2.6	4.2	4.0	3.4	2.9	3.3	4.5	3.2	3.1	3.4	2.5	2.3	3.2	3.1
% White	80.6	85.6	90.9	98.5	85.2	74.6	94.3	81.0	87.0	78.7	93.9	89.6	93.4	83.9
% Black	6.2	11.3	5.9	N/A	11.9	21.9	3.2	13.5	2.4	15.0	N/A	3.6	4.3	11.3
% Other	13.2	3.1	3.2	1.5	2.9	3.5	2.5	5.5	10.6	6.4	N/A	6.8	2.2	4.7
% Hispanic ¹	27.4	5.9	5.7	N/A	2.5	3.7	4.2	11.2	37.5	15.8	7.4	4.7	3.4	10.7
% Self-employed	9.3	7.3	6.7	12.2	6.0	7.7	11.0	5.0	9.2	6.2	11.2	7.8	7.9	7.3
% Employed part-time ²	17.4	18.2	18.9	19.7	19.5	13.8	19.4	16.4	18.1	16.8	21.0	20.4	19.2	16.9
% Work < 40 hrs/week ³	31.3	35.3	34.1	33.8	33.9	28.6	35.0	33.1	32.6	35.4	36.5	37.0	36.5	32.4
% Work 40 hrs/week	41.1	32.4	36.0	29.3	34.5	42.1	27.4	39.6	39.3	37.7	33.6	31.8	30.0	37.7
% Work > 40 hrs/week	27.6	32.3	29.9	32.0	31.6	29.3	37.6	27.2	28.2	26.9	29.9	31.2	33.5	29.9

¹"White", "Black", and "Other" are race categories while "Hispanic" refers to ethnicity, which is why "Hispanic" is listed separately from the race categories. For example, someone can be White Hispanic or Black Hispanic.

²"Employed part-time" are individuals who work 1 to 34 hours per week. Employees are considered full-time if they work at least 35 hours per week.

³<40 hrs/week = 1 to 39 hours per week

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

Table P2. Distribution of Workforce by Major Industry and Occupation Groups by State and U.S., 2000 Annual Averages

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Number Employed (in thousands)	16,246	1,707	3,151	665	5,016	3,814	897	4,030	792	8,533	1,715	2,888	2,831	135,208
INDUSTRY														
% Construction	4.9	4.0	4.7	5.4	4.8	7.2	4.2	4.4	4.8	4.8	5.0	6.8	5.0	5.4
% Manufacturing: Durable goods	8.7	11.0	8.9	6.2	17.8	10.4	6.0	5.4	3.5	6.2	10.8	8.0	13.8	8.8
% Manufacturing: Nondurable goods	5.0	5.8	4.8	6.3	4.8	10.1	5.6	7.4	1.8	4.8	4.0	3.2	8.8	5.6
% Transportation, communications, public utilities	5.3	4.6	4.3	4.1	4.0	4.7	5.8	7.6	5.2	5.8	5.7	5.2	4.8	5.7
% Trade	18.3	17.2	18.0	20.9	20.5	18.8	18.3	19.3	21.5	17.6	19.7	20.5	17.8	19.4
% Finance, insurance, real estate	5.3	8.6	7.0	5.1	4.8	4.7	7.5	8.6	4.4	7.7	4.6	5.9	5.4	5.8
% Services	25.4	28.1	31.9	23.9	23.6	20.8	23.4	26.8	22.0	28.3	24.0	24.8	21.9	25.2
% Government	13.8	11.8	12.2	13.8	11.9	13.3	14.0	14.3	22.7	16.5	12.1	15.1	12.4	14.1
% Agriculture	3.3	0.9	1.1	2.4	1.9	2.6	8.6	0.7	2.7	1.3	3.9	2.7	3.0	2.4
OCCUPATION														
% Executive, administrative, managerial	15.6	16.9	17.5	12.2	13.9	13.5	13.0	16.6	14.1	14.3	15.9	15.2	12.5	14.6
% Professional specialty	16.5	19.4	19.5	14.6	15.4	13.9	12.8	16.4	16.0	17.0	16.0	16.8	13.7	15.6
% Technicians and related support	3.3	3.0	3.5	2.9	3.2	2.9	3.8	3.3	3.4	3.1	2.4	3.1	2.6	3.2
% Sales	12.3	12.0	10.7	12.2	11.0	11.5	11.5	13.0	12.2	11.4	11.4	12.4	10.5	12.1
% Administrative support including clerical	13.9	14.6	13.9	14.6	13.1	12.4	15.7	15.7	13.6	15.2	13.3	13.4	14.3	13.8
% Service occupations	13.0	12.1	13.2	12.5	13.3	12.1	11.8	12.8	15.5	17.1	13.0	13.8	13.1	13.5
% Precision production, craft, repair	10.2	9.9	10.0	12.9	11.4	13.1	10.1	9.5	11.7	9.1	10.5	10.6	12.3	11.0
% Machine operators, assemblers, inspectors	4.9	4.5	4.7	5.3	8.8	9.2	4.8	4.4	2.8	3.9	4.9	3.7	8.5	5.4
% Transportation, material moving	3.2	3.5	2.8	5.1	3.8	4.7	4.3	4.0	4.4	3.9	4.0	3.5	4.2	4.1
% Handlers, equipment cleaners, helpers, laborers	3.8	3.2	3.0	3.8	4.1	4.4	3.7	3.5	3.2	3.5	4.4	3.8	5.2	4.0
% Farming, forestry, fishing	3.3	0.8	1.2	4.2	1.9	2.5	8.5	0.7	2.9	1.5	1.7	3.6	3.1	2.5

DATA SOURCES: Bureau of Labor Statistics' Current Population Survey and Geographic Profile of Employment and Unemployment.

6 Employment Demographics Profile

INDICATOR 1:

Non-Fatal Injuries and Illnesses Reported by Employers

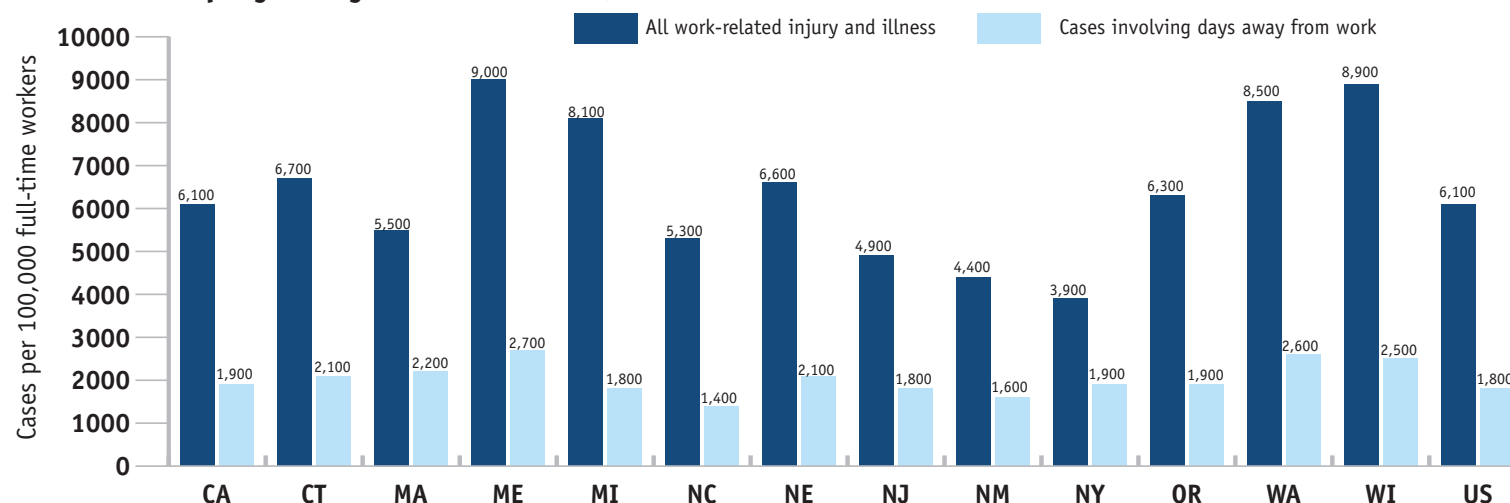
- **Estimated annual number and rate of work-related injuries and illnesses among private sector workers**
- **Estimated annual number and rate of work-related injuries and illnesses involving days away from work**
- **Estimated annual number of injuries and illnesses involving more than 10 days away from work**

Work-related injuries are generally defined as injuries that result from single events such as falls, being struck or crushed by objects, electric shocks, or assaults. Work-related illnesses, such as asthma, silicosis and carpal tunnel syndrome, typically occur as the result of longer-term exposure to hazardous chemicals, physical hazards (e.g., radiation, noise), or repeated stress or strain at work. Infectious diseases also can be caused by workplace exposures. It is more difficult to track work-related illnesses than injuries because many of the conditions also can be caused by non-occupational factors. Also, many work-related illnesses take a long time to develop and may not

appear until many years after the individuals have left employment.

The Bureau of Labor Statistics' (BLS) Annual Survey of Occupational Injuries and Illnesses (Annual Survey) provides yearly estimates of the numbers and incidence rates of work-related injuries and illnesses at national and state levels. Information is collected from a nationwide sample of employers on all work-related injuries and illnesses that result in death, lost work-time, medical treatment other than first aid, loss of consciousness, restriction of work activity, or transfer to another job.

Figure 1: Rates of Non-Fatal Work-Related Injuries and Illnesses Reported by Private Sector Employers by State and U.S., 2000



While the Annual Survey is a valuable source of information about work-related injuries and illnesses, it is well recognized that it has a number of limitations and underestimates the full extent of the problem. Excluded from the national estimates provided by the Annual Survey are public sector workers, the self-employed, household workers, and workers on farms with fewer than 11 employees. Together these sectors comprise approximately 21% of the U.S. workforce.⁴ Occupational diseases are not well documented in the Annual Survey and there is evidence that injuries are underreported^{5,6}. It is also subject to

sampling error. Additional data sources used in generating other occupational health indicators in this report provide important supplementary information that, together with the Annual Survey, provides a more complete picture of occupational health in the states.

According to the Annual Survey, private sector workers nationwide sustained an estimated 5.7 million work-related injuries and illnesses in 2000, resulting in an annual incidence rate of 6,100 per 100,000 full-time workers. Twenty-nine percent (1.7 million) of these injuries and ill-

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

Table 1. Numbers of Non-Fatal Work-Related Injuries and Illnesses Reported by Private Sector Employers by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
All cases of work-related injuries and illnesses	640,900	82,700	132,200	36,000	262,000	146,500	40,800	132,500	21,900	230,200	72,300	145,900	175,500	5,650,100
Cases involving days away from work	201,300	25,600	52,800	10,900	59,500	37,300	12,900	50,200	7,700	112,900	22,300	44,400	49,500	1,664,000
Cases involving more than 10 days away from work	88,752	8,967	18,477	3,721	24,430	12,356	4,603	19,831	2,560	49,846	7,653	14,609	16,465	639,373

nesses resulted in days away from work. Figure 1 illustrates the rates of non-fatal injuries and illnesses for 13 states and the U.S. The rates of all work-related injuries and illnesses varied across these states, from 3,900 to 9,000 per 100,000 full-time workers. Rates involving days away from work ranged from 1,400 to 2,700, with more than half of these states falling above the national average of 1,800 per 100,000 full-time workers.

The corresponding estimated numbers of cases by state are presented in Table 1. Included in this table are the numbers of cases resulting in more than 10 days away from work. Nationwide, 11% of the reported cases resulted in more than 10 lost workdays. This percentage ranged from 8.4% to 21.7% across these states.

DATA SOURCE: Bureau of Labor Statistics' Annual Survey of Occupational Injuries and Illnesses

TECHNICAL NOTES:

- The rates published by BLS are the number of injury and illness cases per 100 FTEs. The rates presented here, which are cases per 100,000 FTEs, were derived by multiplying BLS published rates by 1,000. These converted rates are not as precise as those that would be calculated from the raw Annual Survey data.

INDICATOR 2:

Work-Related Hospitalizations

- Annual number and rate of hospitalizations of persons 16 years or older with workers' compensation reported as the primary payer

Individuals hospitalized for work-related injuries and illnesses have some of the most serious and costly adverse work-related health conditions. It has been estimated that, nationwide, approximately 3% of workplace injuries and illnesses result in hospitalizations, and that hospital charges for work-related conditions exceed \$3 billion annually. Most identified

work-related hospitalizations are for treatment of musculoskeletal disorders and acute injuries.⁷

State hospital discharge data are useful for surveillance of serious health conditions. While these state data sets do not include explicit information about “work-relatedness” of the health conditions for which a patient is hospital-

Figure 2: Rate of Work-Related Hospitalizations by State and U.S., 2000

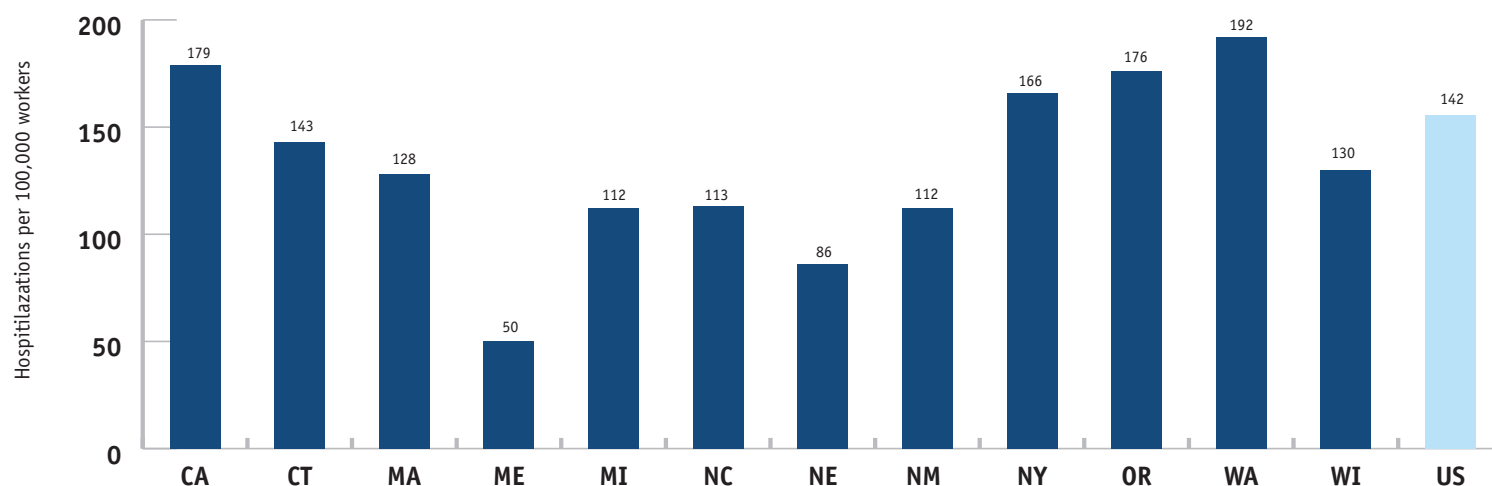


Table 2. Number of Work-Related Hospitalizations by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Work-related hospitalizations of persons age 16 years or older	29,078	2,448	4,059	330	5,618	4,326	770	N/A	883	14,126	3,020	5,532	3,684	192,109

ized, they do include information about the payer for the hospital stay. The designation of workers' compensation as primary payer is a good proxy for the work-relatedness of hospitalized injuries.⁸ It is not a sensitive measure of work-related illness.

Figure 2 illustrates the hospitalization rates of individuals age 16 or older with workers' compensation reported as the primary payer for 11 states in 2000. These rates ranged from 50 to 192 per 100,000 workers. The corresponding numbers of work-related hospitalizations are in Table 2.

There are substantial differences among states in workers' compensation eligibility, reimbursement, and other administrative policies. Therefore, differences among states in work-related hospitalizations as defined in this occupational health indicator (OHI) reflect variations in both workers' compensation systems and the incidence of work-related injuries and illnesses resulting in hospitalization. For this reason, this OHI should be used to monitor trends in work-related hospitalizations within states over time rather than to compare states.

DATA SOURCES: Number of hospitalizations per state: state hospital discharge data. Estimated number of hospitalizations in the U.S.: National Hospital Discharge Survey. Employment statistics used to calculate rates: Bureau of Labor Statistics' Current Population Survey.

TECHNICAL NOTES:

- Hospital discharge records are limited to records for non-federal, acute care hospitals.
- This indicator excludes out-of-state residents hospitalized within the reference state and reference state residents hospitalized out of state. These exclusions will result in some undercount of cases. The degree of undercounting may vary by state.
- Some workers are hospitalized more than once for injuries or illnesses related to a given incident or exposure. Due to data limitations, these secondary hospitalizations cannot be excluded. Thus, this indicator is a measure of hospitalizations, not injuries/illnesses.

INDICATOR 3:

Fatal Work-Related Injuries

- Annual number of fatal work-related injuries
- Annual rate of fatal work-related injuries among persons 16 years or older

A fatal work-related injury is an injury occurring at work that results in death. Since 1992 the Bureau of Labor Statistics (BLS) has conducted the Census of Fatal Occupational Injuries (CFOI), using multiple data sources to provide complete counts of all fatal

work-related injuries in the nation and in every state. CFOI includes fatalities resulting from non-intentional injuries such as falls, electrocutions, and acute poisonings as well as from motor vehicle crashes that occurred during travel for work. Also included are intentional injuries (i.e., homi-

Figure 3: Rate of Fatal Work-Related Injuries by State and U.S., 2000

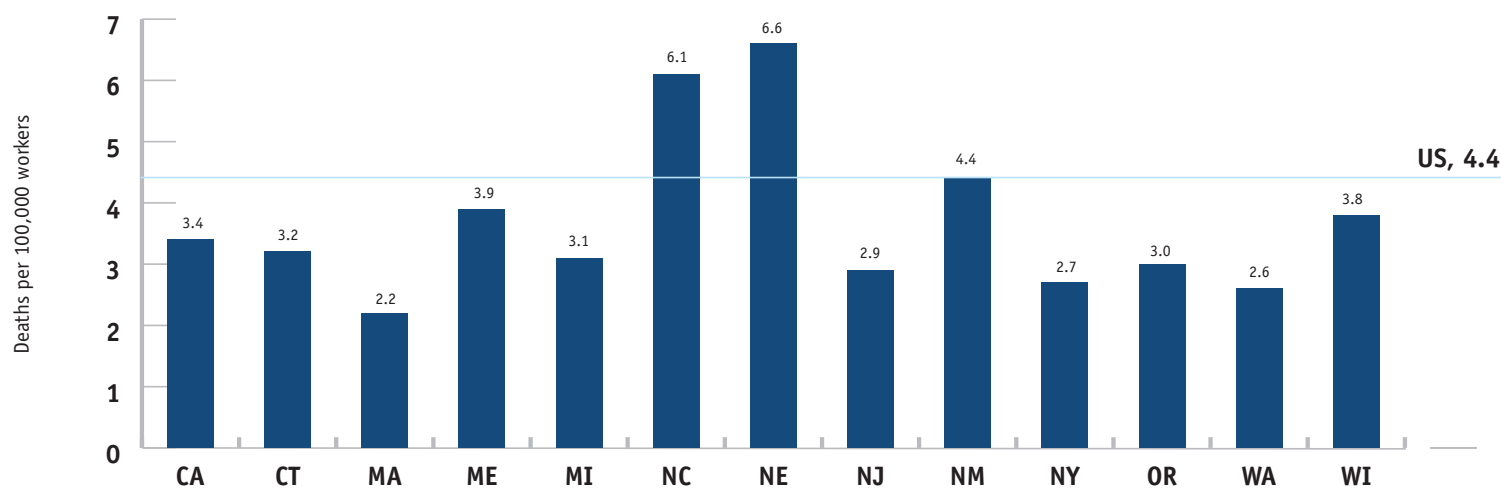


Table 3. Number of Fatal Work-Related Injuries by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Work-related fatalities	553	55	70	26	156	234	59	115	35	233	52	75	107	5,920

cides and suicides) that occurred at work. Fatalities that occur during a person's commute to or from work are not counted.

During the 1990s, on average, more than 6,000 workers died as a result of fatal work-related injuries each year in the U.S. – more than 16 workers per day. Overall, the fatal occupational injury rate declined during the 1990s, from 5.2 deaths per 100,000 workers in 1992 to 4.5 deaths per 100,000 workers in 1999.⁹

Nationwide, 5,920 workers died as a result of work-related injuries in 2000, resulting in a fatal occupational injury rate of 4.4 per 100,000 workers. Figure 3 presents fatal occupational injury rates for 13 states and illustrates a more than three-fold difference in rates across states. More than half of these states had rates below the national average. The numbers of fatal occupational injuries by state and the U.S. are provided in Table 3.

DATA SOURCES: Numbers of fatalities: Census of Fatal Occupational Injuries. Employment statistics used to calculate rates: Bureau of Labor Statistics' Current Population Survey.

TECHNICAL NOTES:

- CFOI reports data on work-related fatalities by the state in which the fatal incident occurred, which is not necessarily the state of death or the state of residence. The denominator data used for calculating rates are based on state of residence, thus rates may be overestimated for a state if the fatal incidents involved victims who were out-of-state residents. Likewise, rates may be underestimated if state residents sustained fatal injuries in incidents that occurred in other states.
- Fatalities of workers younger than the age of 16 and the resident military are included in the numerators of the state and national rates, whereas the employment statistics used to calculate the rates exclude workers under age 16 and the military. This may result in a slight overestimation of rates.
- The rates may differ slightly from those published by BLS for the following reasons: BLS excludes deaths of workers under age 16 and the military in calculating state rates; BLS excludes deaths of workers under the age of 16 and includes the resident military in both the numerator and denominator in calculating national rates.

INDICATOR 4:

Amputations Reported by Employers

- **Estimated annual number and rate of work-related amputations involving days away from work among private sector workers**

An amputation is defined as full or partial loss of a protruding body part – an arm, hand, finger, leg, foot, toe, ear, or nose. An amputation may greatly reduce a worker's job skills and earning potential as well as significantly affect general quality of life.

The Bureau of Labor Statistics' (BLS) Annual Survey of Occupational Injuries and Illnesses (Annual Survey) provides yearly state and national estimates of the numbers and incidence rates of work-related amputations that involve at least one day away from work. According to the Annual Survey, nationally in 2000 there were

Figure 4: Rate of Work-Related Amputations involving Days away from Work Reported by Private Sector Employers by State and U.S., 2000

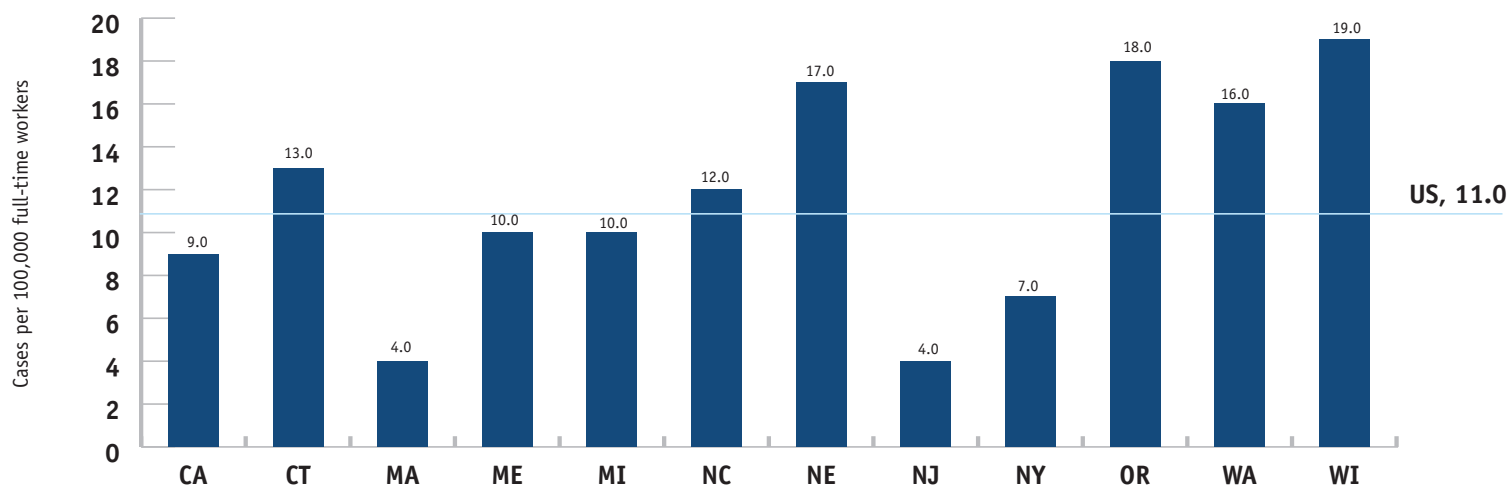


Table 4. Number of Work-Related Amputations Involving Days away from Work Reported by Private Sector Employers by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Amputations involving days away from work	960	163	84	40	312	342	104	117	N/A	420	201	282	375	9,658

9,658 workers in private industry who sustained amputations that resulted in days lost from work. Ninety-one percent (91%) of these amputations involved fingers. The median number of lost workdays was 18 for amputation cases compared to a median of six days for all work-related injuries and illnesses, and 35% of the amputation cases involved loss of 31 or more days of work.

Figure 4 illustrates the estimated rates of work-related amputations for 12 states in 2000. Rates ranged from 4.0 to 19.0 per 100,000 full-time workers. The estimated numbers of amputations by state are included in Table 4.

The Annual Survey is based on data collected from a nationwide sample of employers. While it

is a valuable source of information about work-related injuries, it has a number of limitations. Excluded from the estimates are public sector workers, the self-employed, household workers, and workers on farms with fewer than 11 employees. Together these sectors comprise approximately 21% of the U.S. workforce.⁴ In addition, there is evidence that injuries are underreported on the Occupational Safety and Health Administration (OSHA) logs.^{5,6} The Annual Survey is also subject to sampling error. State workers' compensation data used in Indicator 5 in this report are another source of information about work-related amputations in the states.

DATA SOURCE: Bureau of Labor Statistics' Annual Survey of Occupational Injuries and Illnesses

TECHNICAL NOTES:

- The rates published by BLS are the number of amputation cases per 10,000 FTEs. The rates presented here, which are amputation cases per 100,000 FTEs, were derived by multiplying BLS published rates by 10. These converted rates are not as precise as those that would be calculated from the raw Annual Survey data.

INDICATOR 5:

Amputations Identified in State Workers' Compensation Systems

- Annual number and rate of amputations identified in state workers' compensation systems

An amputation is defined as full or partial loss of a protruding body part – an arm, hand, finger, leg, foot, toe, nose, or ear. An amputation may greatly reduce a worker's job skills and earning potential as well as significantly affect general quality of life.

The Bureau of Labor Statistics (BLS) estimated that nationally in 2000 there were 9,658 workers in private industry who sustained an amputation that resulted in days away from work. Ninety-one percent (91%) of these amputations involved fingers.

Figure 5: Rate of Lost Work Time Claims for Amputations identified in Workers' Compensation Systems by State, 2000

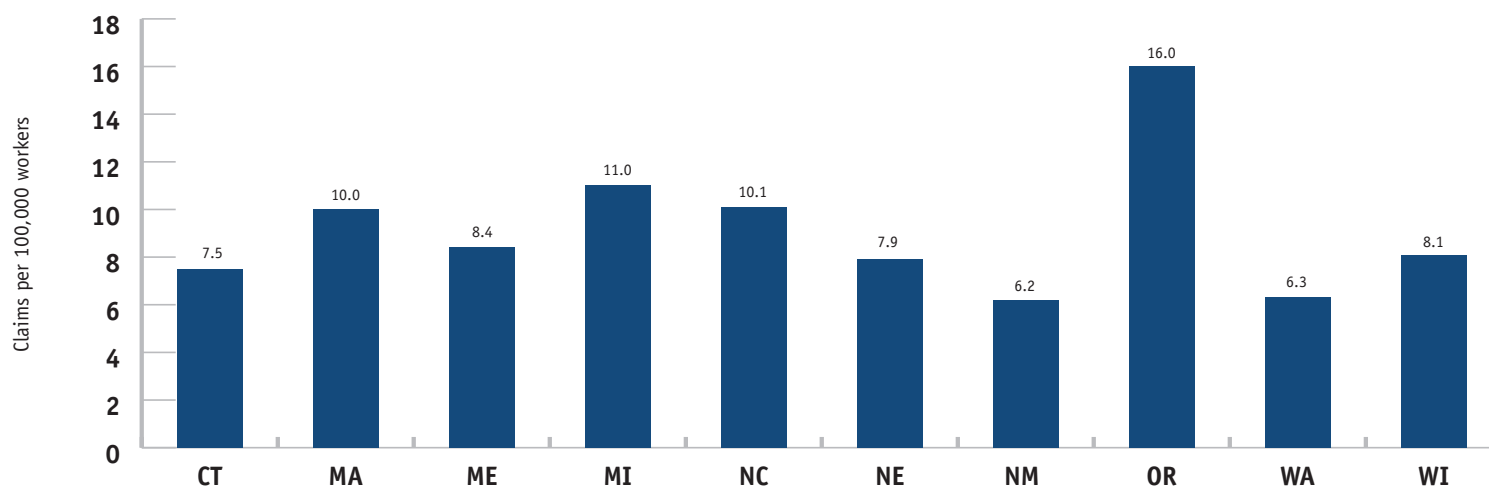


Table 5. Number of Lost Work Time Claims for Amputations Identified in Workers' Compensation Systems by State, 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI
Amputations filed with workers' compensation	N/A	124	319	58	488	369	67	N/A	40	N/A	243	167	215

Claims data from state workers' compensation systems were used as the data source for this occupational health indicator (OHI). There are substantial differences among states in workers' compensation claim coding systems, criteria for claim eligibility, reimbursement, and other administrative regulations. Therefore, differences among states in work-related amputations as defined in this OHI reflect variations in both workers' compensation systems and amputation incidence. For this reason, this OHI should be used to monitor trends in work-related amputa-

tions within states over time rather than to compare states.

Figure 5 illustrates the rates of amputation claims identified in state workers' compensation systems for 10 states in 2000. National data are not available for this OHI. Cases were limited to amputations identified through "lost-time" claims. These are claims for which workers missed sufficient time from work to qualify for time loss benefits. The corresponding number of amputation claims for each state is listed in Table 5.

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

DATA SOURCES: Numbers of amputations: State Workers' Compensation systems. Numbers of workers covered by workers' compensation used to calculate rates: National Academy of Social Insurance.¹

TECHNICAL NOTES:

STATE	Claims Included (Claims Filed ¹ or Claims Accepted)	Waiting Period for Time Loss Compensation	Data Systems Definition for Claim Identification ²
CT	Time Loss Claims Filed	3 Days	OIICS Nature of Injury Code = 031 (Amputation)
MA	Time Loss Claims Filed	5 Days	ANSI Z-16.2 Nature of Injury Code = 100 (Amputation/ Enucleation) excluding Body Part Code = 130 (Eye)
ME	Time Loss Claims Filed	7 Days	OIICS Nature of Injury Code = 031 (Amputation)
MI	Time Loss Claims Filed	7 Days	ANSI Z-16.2 Nature of Injury Code = 100 (Amputation/ Enucleation) excluding Body Part Code = 130 (Eye)
NC	Time Loss Claims Filed	7 Days	IAIABC Nature of Injury Code = 2 (Amputation)
NE	Time Loss Claims Filed	7 Days	IAIABC Nature of Injury Code = 2 (Amputation)
NM	Time Loss Claims Filed	7 Days	BLS Supplemental Data System Nature of Injury Code = 100 (Amputation/Enucleation) excluding Body Part code = 130 (Eye)
OR	Time Loss Claims Accepted	3 Days	OIICS Nature of Injury Code = 031 (Amputation)
WA	Time Loss Claims Accepted	3 Days	ANSI Z-16.2 Nature of Injury Code = 100 (Amputation/ Enucleation) excluding Body Part Code = 130 (Eye)
WI	Time Loss Claims Filed	3 Days	IAIABC Nature of Injury Code = 2 (Amputation)

¹Claim is filed but acceptance or rejection of the claim is not determined.

²International Association of Industrial Accident Boards and Commissions (IAIABC); Occupational Injury and Illness Classification System (OIICS); American National Standards Institute (ANSI).

INDICATOR 6:

Hospitalizations for Work-Related Burns

- The annual number and rate of hospitalized persons 16 years or older with principal diagnosis of burn and primary payer coded as workers' compensation

Burns encompass injuries to tissues caused by contact with dry heat (fire), moist heat (steam), chemicals, electricity, friction, or radiation. Burns are among the most expensive work-related injuries to treat and can result in significant disability. Thermal and chemical burns

are the most frequent types of work-related burn injury. A substantial proportion of burns occur in the service industry, especially in food service, often disproportionately affecting working adolescents.^{10,11}

Figure 6: Rate of Hospitalizations for Work-Related Burns by State and U.S., 2000

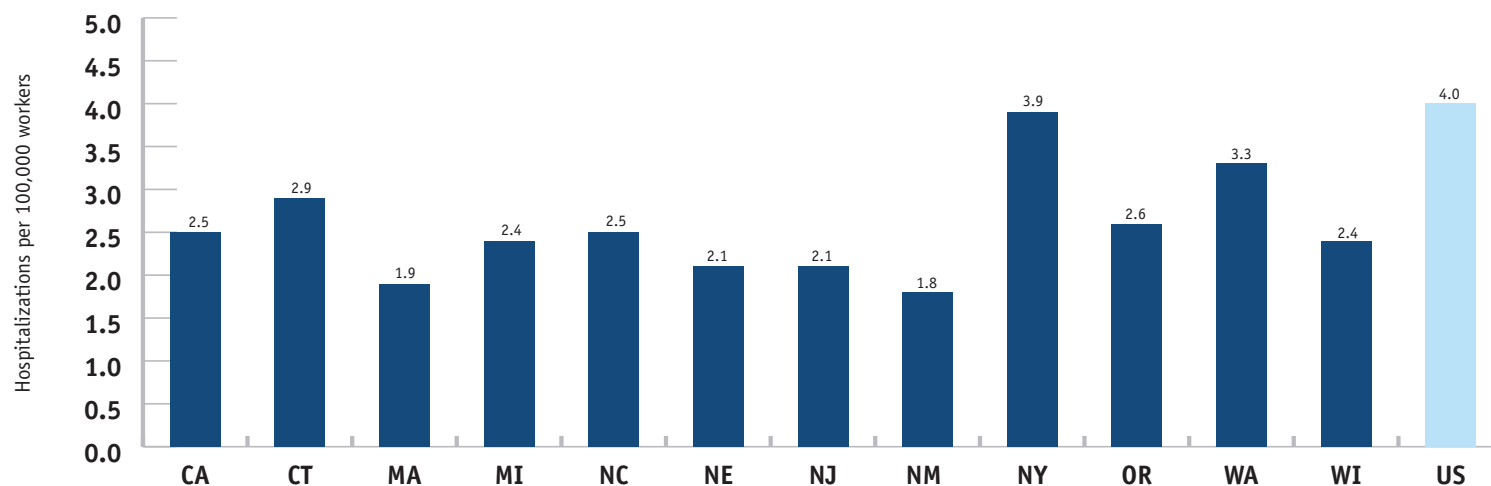


Table 6. Number of Hospitalizations for Work-Related Burns by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Work-related burn hospitalizations	399	50	60	N/A	121	96	19	85	14	332	45	94	67	5,370

In 2000 there were an estimated 35,000 burn injuries resulting in days away from work (private sector), for an incidence rate of 3.9 per 10,000 full-time employees. Nationally, it has been estimated that 150,000 people with work-related burns are treated in emergency rooms annually.¹² Approximately 30% to 40% of hospitalizations for burns among adults have been found to be work-related.¹¹

The designation of workers' compensation payment as primary payer on hospital discharge records is a good proxy for the work-relatedness of hospitalized injuries.¹³ Figure 6 shows the burn hospitalization rates for employed persons age 16 and older, where workers' compensation was the primary payer, for 12 states and the U.S.

Rates ranged from 1.8 to 3.9 per 100,000 workers, compared to the national rate of 4.0. The numbers of hospitalizations for work-related burns are in Table 6.

There are substantial differences among states in workers' compensation eligibility, reimbursement, and other administrative policies. Therefore, differences among states in work-related burns as defined in this occupational health indicator (OHI) reflect variations in both workers' compensation systems and work-related burn incidence. For this reason, this OHI should be used to monitor trends in work-related hospitalized burns within states over time rather than to compare states.

DATA SOURCES: Number of hospitalizations per state: state hospital discharge data. Estimated number of hospitalizations in the U.S.: National Hospital Discharge Survey. Employment statistics used to calculate rates: Bureau of Labor Statistics' Current Population Survey.

TECHNICAL NOTES:

- Hospital discharge records are limited to records for non-federal, acute care hospitals.
- This indicator excludes out-of-state residents hospitalized within the reference state and reference state residents hospitalized out of state. These exclusions will result in some undercount of cases. The degree of undercounting may vary by state.
- Some workers are hospitalized more than once for injuries or illnesses related to a given incident or exposure. Due to data limitations, these secondary hospitalizations cannot be excluded. Thus this indicator is a measure of hospitalizations, not burn injuries.

INDICATOR 7:

Musculoskeletal Disorders Reported by Employers

- **Estimated annual number and rate of musculoskeletal disorders (MSDs) involving days away from work among private sector workers**
- **Estimated annual number and rate of MSDs of the back**
- **Estimated annual number and rate of MSDs of the upper extremities, neck, and shoulder**
- **Estimated annual number and rate of carpal tunnel syndrome cases**

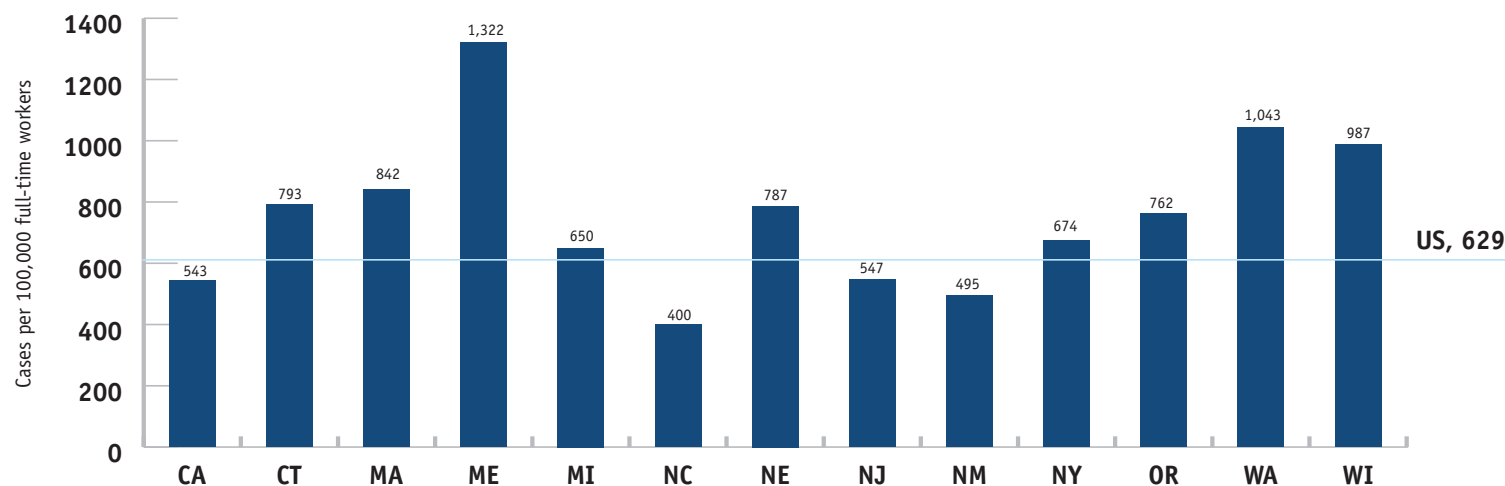
Work-related musculoskeletal disorders (MSDs) are injuries or disorders of muscles, tendons, nerves, ligaments, joints, or spinal discs that are caused or aggravated by work activities. Workplace risk factors for MSDs include repetitive forceful motions, awkward postures, use of vibrating tools or equipment, and manual handling of heavy, awkward loads. These disorders also can be caused by single, traumatic events such as falls. Both single events and wear and tear over time can play a role in these disorders.

This occupational health indicator is based on data collected by the Bureau of Labor Statistics (BLS) in the Annual Survey of Occupational Injuries and Illnesses (Annual Survey). The BLS

definition of MSDs includes sprains, strains, pain, hurt back, carpal tunnel syndrome, and hernia in which the event leading to the condition is reported as overexertion, repetitive motion, or bending, reaching, or twisting. BLS excludes MSDs reportedly caused by single events such as slips and falls, and motor vehicle crashes.

MSDs are some of the most common and costly work-related health problems. These injuries can significantly impact the ability of workers to perform their jobs and affect quality of life both on and off the job. According to the Annual Survey, MSDs have consistently accounted for over one-third of all work-related injuries and illnesses involving days away from work reported by

Figure 7: Rate of All Work-Related Musculoskeletal Disorders Involving Days Away from Work Reported by Private Sector Employers by State and U.S., 2000



employers over the last decade.¹⁴ In 2000, BLS estimated that, nationwide, there were over 577,000 work-related MSDs resulting in days away from work (private sector) for an annual rate of 629 MSDs per 100,000 full-time workers. Direct workers' compensation costs of work-related MSDs have been estimated at \$20 billion annually in the U.S., and total costs of these injuries when including indirect costs, such as lost productivity, range as high as \$54 billion.¹⁵

Figure 7 illustrates the estimated rates of work-related MSDs resulting in days away from work for 13 states and nationally in 2000. These ranged widely, from 400 to 1,322 per 100,000 full-time

workers. Rates for selected types of MSDs and their corresponding numbers of cases by state and nationally are presented in Tables 7a and 7b, respectively. The selected types include neck, shoulder, and upper extremity, carpal tunnel syndrome (CTS), and back. In all states, MSDs of the back accounted for close to half of the MSDs reported.

The Annual Survey is based on data collected from a nationwide sample of employers. While it is a valuable source of information about work-related injuries, it has a number of limitations. Excluded from these estimates based on the Annual Survey are public sector workers, the self-

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

Table 7a. Rates¹ of Selected Work-Related Musculoskeletal Disorders involving Days Away from Work Reported by Private Sector Employers by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Neck, Shoulder and Upper Extremities	151	214	255	403	209	103	236	141	N/A	175	208	284	289	174
Carpal Tunnel Syndrome	30	50	19	79	39	15	50	11	13	15	29	60	56	30
Back	266	423	442	742	312	242	380	285	276	365	374	495	513	319

¹ Cases per 100,000 full-time workers

Table 7b. Numbers of Work-Related Musculoskeletal Disorders involving Days Away from Work Reported by Private Sector Employers by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
All MSDs	56,615	9,840	20,140	5,271	21,017	11,019	4,858	14,898	2,458	40,232	8,719	17,972	19,534	577,814
Neck, Shoulder, and Upper Extremities	15,700	2,659	6,081	1,606	6,760	2,824	1,453	3,815	N/A	10,447	2,387	4,877	5,719	160,156
Carpal Tunnel Syndrome	3,149	615	444	314	1,261	410	308	297	62	886	330	1,033	1,105	27,571
Back	27,731	5,245	10,566	2,959	10,096	6,657	2,341	7,777	1,369	21,798	4,276	8,530	10,158	293,033

employed, household workers and workers on farms with fewer than 11 employees. Together these sectors comprise approximately 21% of the U.S. workforce.⁴ In addition, there is evidence that MSDs are under-recorded on the Occupational Safety and Health Administration

(OSHA) logs that serve as the basis for the Annual Survey.^{5,6} The Annual Survey is also subject to sampling error. Workers' compensation data used in Indicator 8 in this report provide additional information about one type of MSD—CTS—in the states.

DATA SOURCE: Bureau of Labor Statistics' Annual Survey of Occupational Injuries and Illnesses

TECHNICAL NOTES:

- The rates published by BLS are the number of MSD cases per 10,000 FTEs. The rates presented here, which are MSD cases per 100,000 FTEs, were derived by multiplying BLS published rates by 10. These converted rates are not as precise as those that would be calculated from the raw Annual Survey data.

INDICATOR 8:

Carpal Tunnel Syndrome Cases Identified in State Workers' Compensation Systems

- Annual number and rate of carpal tunnel syndrome cases identified in state workers' compensation systems

Carpal tunnel syndrome (CTS) occurs when the median nerve is compressed at the wrist. Symptoms range from a burning, tingling, or numbness in the fingers to difficulty gripping or holding objects. Workplace factors that may cause or aggravate CTS include direct

trauma, repetitive forceful motions or awkward postures of the hands, and use of vibrating tools or equipment.¹⁶

CTS has the longest average disability duration among the top 10 workers' compensation condi-

Figure 8: Rate of Lost Work Time Claims for Carpal Tunnel Syndrome Cases identified in State Workers' Compensation Systems by State, 2000

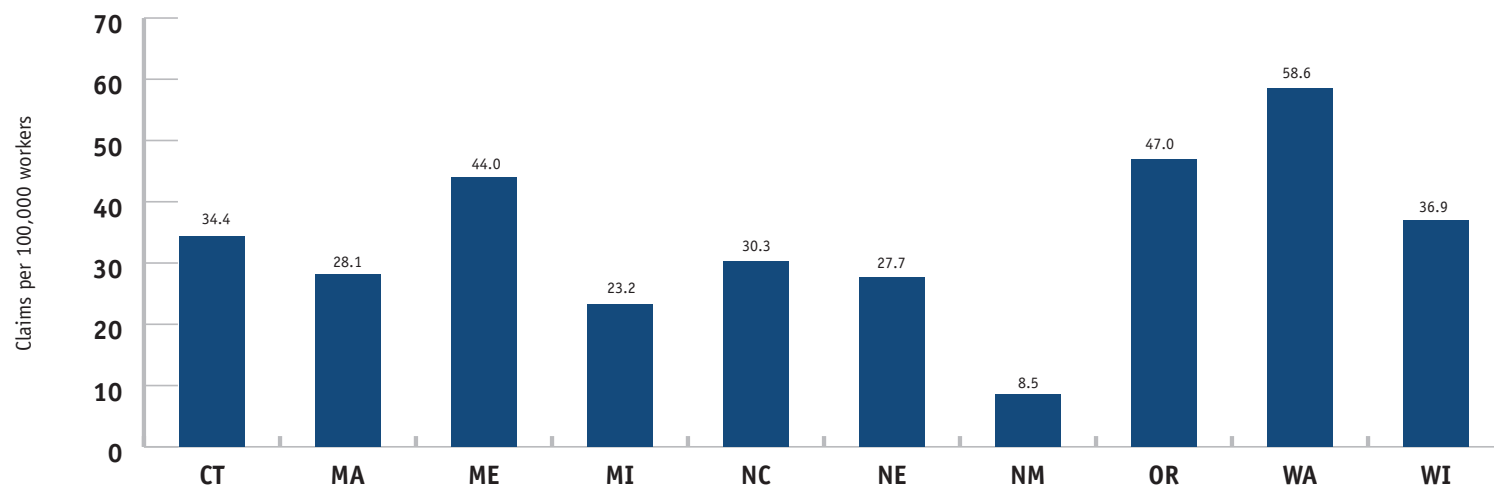


Table 8. Number of Lost Work Time Claims for Carpal Tunnel Syndrome Cases identified in Workers' Compensation Systems by State, 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI
Cases of carpal tunnel syndrome (CTS)	N/A	568	895	301	1,024	1,104	236	N/A	55	N/A	730	1,544	976

tions in the United States.¹⁷ Based on the 2000 Bureau of Labor Statistics' Annual Survey of Occupational Injuries and Illnesses, there were an estimated 27,697 lost workday cases of CTS in the private sector nationwide. The corresponding incidence rate was 3.0 per 10,000 full-time workers. The average number of days away from work due to CTS was 27.

Claims data from state workers' compensation systems were used as the data source for this occupational health indicator (OHI). There are substantial differences among states in workers' compensation claim coding systems, criteria for claim eligibility, reimbursement, and other administrative regulations. Therefore, differences among states in work-related carpal tunnel syn-

drome as defined in this OHI reflect variations in both workers' compensation systems and CTS incidence. For this reason, this OHI should be used to monitor trends in work-related carpal tunnel syndrome within states over time rather than to compare states.

Figure 8 illustrates the rates of carpal tunnel syndrome claims identified in state workers' compensation systems for 10 states in 2000. National data are not available for this OHI. Cases were limited to those identified through "lost-time" claims. These are claims for which workers missed sufficient time from work to qualify for time loss benefits. The corresponding number of CTS claims for each state is listed in Table 8.

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

DATA SOURCES: Numbers of CTS cases: State workers' compensation systems. Numbers of workers covered by workers' compensation used to calculate rates: National Academy of Social Insurance.

TECHNICAL NOTES:

STATE	Claims Included (Claims Filed ¹ or Claims Accepted)	Waiting Period for Time Loss Compensation	Data Systems Definition for Claim Identification ²
CT	Time Loss Claims Filed	3 Days	OIICS Nature of Injury Code = 1241 (Carpal Tunnel Syndrome)
MA	Time Loss Claims Filed	5 Days	Unique Massachusetts Nature of Injury Code (N=265) for Carpal Tunnel Syndrome (added to the ANSI Z-16.2 structure)
ME	Time Loss Claims Filed	7 Days	OIICS Nature of Injury Code = 1241 (Carpal Tunnel Syndrome)
MI	Time Loss Claims Filed	7 Days	ANSI Z-16.2 Nature of Injury Code = 562 (Carpal Tunnel Syndrome) and Body Part Code = 320 (Wrist)
NC	Time Loss Claims Filed	7 Days	IAIABC Nature of Injury Code = 78 (Carpal Tunnel Syndrome)
NE	Time Loss Claims Filed	7 Days	IAIABC Nature of Injury Code = 78 (Carpal Tunnel Syndrome)
NM	Time Loss Claims Filed	7 Days	BLS Supplemental Data System Nature of Injury Code = 265 (Carpal Tunnel Syndrome) and Type of Injury Code = 12* (Overexertion) and Body Part Code = 320 (Wrist)
OR	Time Loss Claims Accepted	3 Days	OIICS Nature Code = 1241 (Carpal Tunnel Syndrome) and Event or Exposure Code = 12* (Overexertion) and Body Part Code = 32 (Wrist)
WA	Time Loss Claims Accepted	3 Days	ANSI Z-16.2 Nature of Injury Code = 562 (Carpal Tunnel Syndrome) and Type of Injury Code = 12* (Overexertion) and Body Part Code = 320 (Wrist)
WI	Time Loss Claims Filed	3 Days	IAIABC Nature of Injury Code = 78 (Carpal Tunnel Syndrome)

¹ Claim is filed but acceptance or rejection of the claim is not determined.

² International Association of Industrial Accident Boards and Commissions (IAIABC); Occupational Injury and Illness Classification System (OIICS); American National Standards Institute (ANSI).

INDICATOR 9:

Pneumoconiosis Hospitalizations

- The annual number and rate of hospitalizations with pneumoconiosis as a principal or secondary discharge diagnosis

Pneumoconiosis is a term for a class of non-malignant lung diseases caused by the inhalation of mineral dust, nearly always in occupational settings. Most cases of pneumoconiosis develop only after many years of cumulative exposure; thus they are usually diagnosed in older individuals, often long after the

onset of exposure. These diseases are incurable and may ultimately result in death.¹⁸

Pneumoconiosis includes: silicosis, asbestosis, coal workers' pneumoconiosis (CWP), and, less commonly, pneumoconiosis due to a variety of other mineral dusts, including talc, aluminum,

Figure 9: Age-Standardized Rates of Hospitalizations from or with Total Pneumoconiosis and Asbestosis by State and U.S., 2000

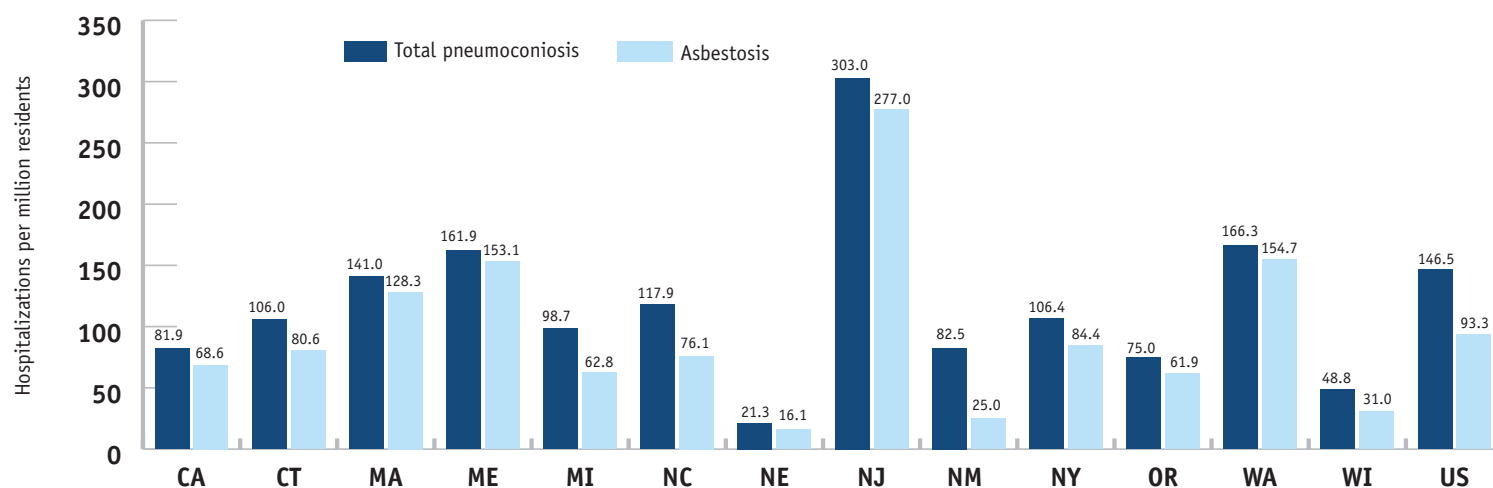


Table 9a. Age-Standardized Rates¹ of Hospitalizations from or with Selected Pneumoconiosis by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Coal workers' pneumoconiosis	8.1	16.8	4.7	— ²	20.2	20.6	—	17.6	42.0	11.3	6.6	5.7	5.4	44.9
Silicosis	3.0	7.4	4.6	5.3	13.9	10.5	—	6.8	11.4	7.7	6.5	4.5	13.0	5.2
Other and unspecified pneumoconiosis	2.3	1.7	3.4	—	2.2	10.7	—	3.2	4.0	3.0	—	1.4	—	4.4

¹ Hospitalizations per one million residents

² Rates were not calculated for states with fewer than five cases in a category.

Table 9b. Numbers¹ of Hospitalizations from or with Pneumoconiosis by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Total pneumoconiosis	1,841	309	759	183	752	712	30	2,101	104	1,614	207	698	212	31,755
Coal workers' pneumoconiosis	185	48	25	<5	153	125	<5	121	52	172	18	25	23	9,715
Asbestosis	1,541	235	691	173	479	460	23	1,919	32	1,281	171	648	135	20,223
Silicosis	67	21	25	6	106	64	<5	47	15	117	18	19	54	1,128
Other and unspecified pneumoconiosis	53	5	18	<5	17	63	<5	22	<10	45	<5	6	<5	952

¹ The sum of particular types of pneumoconioses may be greater than the total because cases could be hospitalized with more than one type of pneumoconiosis.

bauxite, and graphite. Byssinosis and several other dust-related lung diseases are sometimes grouped with “pneumoconiosis,” even though they are caused by occupational exposure to organic (e.g., cotton) dust. Individuals with certain kinds of pneumoconiosis are at increased risk of other diseases, including cancer, tuberculosis, autoimmune conditions, and chronic renal failure.

State-based hospital discharge data are a useful population-based surveillance data source for quantifying pneumoconiosis even though only a small number of individuals with pneumoconiosis are hospitalized for that condition.

It is widely recognized that pneumoconiosis and other long latency diseases are very poorly docu-

mented in the Bureau of Labor Statistics' Annual Survey (Annual Survey). Thus, hospital discharge data are an important source for quantifying the burden of pneumoconiosis, even though they capture only hospitalized cases.

Figure 9 displays age-standardized hospitalization rates in 2000 for all pneumoconioses and for asbestosis, where these were principal or secondary diagnoses, for 13 states and the U.S. Rates varied widely across the states, most likely reflecting differences in the manufacturing and use of asbestos. Over 75% of pneumoconiosis hos-

pitalizations were specifically for asbestosis in all states, except for New Mexico, where pneumoconioses associated with mining (CWP and silicosis) predominated. Table 9a provides the age-standardized rates for other types of pneumoconioses. Table 9b provides the numbers for each of the specific types of pneumoconiosis. It should be noted that the Annual Survey estimated 1,700 dust-related illnesses nationwide in 2000, while there were 9,552 and 31,755 pneumoconiosis hospital discharges in the 13 states and nationwide, respectively.

DATA SOURCES: Number of hospitalizations per state: State hospital discharge data. Estimated number of hospitalizations in the U.S.: National Hospital Discharge Survey. Population statistics used to calculate rates: U.S. Census Bureau.

TECHNICAL NOTES:

- Hospital discharge records are limited to records for non-federal, acute care hospitals.
- This indicator excludes out-of-state residents hospitalized within the reference state and reference state residents hospitalized out of state. These exclusions will result in some undercount of cases. The degree of undercounting may vary by state.
- Some workers are hospitalized more than once for pneumoconiosis. Due to data limitations, these secondary hospitalizations cannot be excluded. Thus, this indicator is a measure of hospitalizations for pneumoconiosis, not of pneumoconiosis.

INDICATOR 10:

Pneumoconiosis Mortality

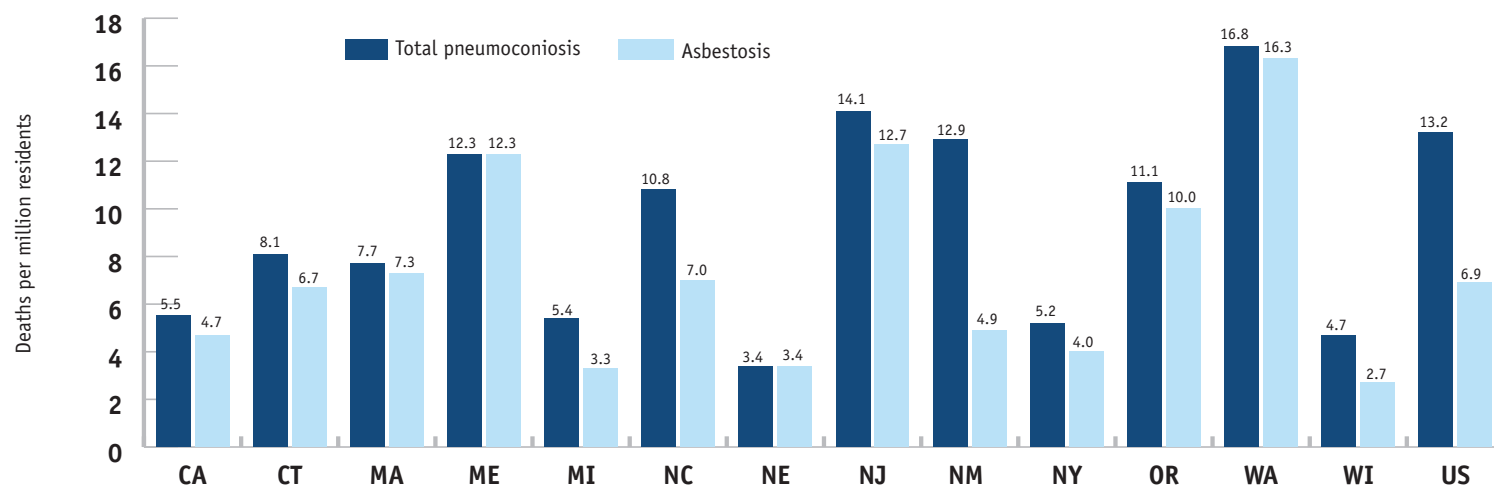
- Annual number and rate of deaths with pneumoconiosis as the underlying or contributing cause of death

Pneumoconiosis is a term for a class of non-malignant lung diseases caused by the inhalation of mineral dust, nearly always in occupational settings. Most cases of pneumoconiosis develop only after many years of cumulative exposure; thus they are often diagnosed in older individuals, long after the onset of

exposure. These diseases are incurable and may ultimately result in death.¹⁸

Pneumoconiosis includes: silicosis, asbestosis, coal workers' pneumoconiosis (CWP), and, less commonly, pneumoconiosis due to a variety of other mineral dusts, including talc, aluminum,

Figure 10: Age-Standardized Rates of Hospitalizations from or with Total Pneumoconiosis and Asbestosis by State and U.S., 2000



Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

Table 10a. Age-Standardized Mortality Rates¹ from or with Selected Pneumoconiosis by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Coal workers' pneumoconiosis	0.3	— ²	—	—	1.2	1.6	—	—	4.8	—	—	—	—	4.4
Silicosis	0.3	—	—	—	1.1	1.0	—	—	—	0.6	—	—	1.4	0.7
Other and unspecified pneumoconiosis	0.2	—	—	—	—	1.4	—	0.9	—	0.3	—	—	—	1.4

¹ Deaths per one million residents

² Rates were not calculated for states with fewer than five deaths in a category.

Table 10b. Numbers of Deaths¹ from or with Pneumoconiosis by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
All pneumoconiosis	143	24	42	14	41	63	5	98	16	79	31	70	21	2,864
Coal workers' pneumoconiosis	8	<5	0	<5	9	9	0	<5	6	<5	<5	<5	<5	950
Asbestosis	122	20	40	14	25	41	5	88	6	61	28	68	12	1,493
Silicosis	8	<5	<5	<5	8	6	0	<5	<5	9	<5	<5	6	152
Other and unspecified pneumoconiosis	5	<5	<5	<5	0	8	0	6	<5	5	<5	<5	<5	307

¹ The sum of these numbers may be greater than the total because deaths could occur with more than one type of pneumoconiosis diagnosis.

bauxite, and graphite. Byssinosis is sometimes grouped with “pneumoconiosis,” even though byssinosis is caused by occupational exposure to organic (e.g., cotton) dust. Individuals with certain kinds of pneumoconiosis are at increased risk of other diseases, including cancer, tuberculosis, autoimmune conditions, and chronic renal failure.

All states collect cause-of-death information on death certificates, including both the underlying and contributing causes of death. From 1990 through 1999, pneumoconiosis was an underlying or contributing cause of more than 30,000 deaths in the United States, for an overall age-adjusted annual mortality rate of 15.8 per million popula-

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

tion among those age 15 and older. Pneumoconiosis was the underlying cause of death in approximately one-third of these deaths.¹⁹ Mortality from most kinds of pneumoconiosis has gradually declined over the past three decades with the exception of asbestosis, which has increased more than tenfold.

Deaths due to pneumoconiosis are undercounted on death certificates.^{20,21} Pneumoconiosis is likely to be under-recorded on the death certificate as a cause of death because it is under-recognized by clinicians for a number of reasons, including the long latency between exposure and onset of symptoms, and the non-specificity of symptoms.

Figure 10 illustrates the age-adjusted rates for all pneumoconiosis deaths and for asbestosis deaths for 13 states and the U.S. for 2000. Rates ranged from 3.4 to 16.8 deaths per million state residents for all pneumoconioses and from 2.7 to 16.3 for asbestosis. The death rate for the U.S. was 13.2 per million persons for all pneumoconioses and 6.9 for asbestosis. Rates of deaths for other types of pneumoconiosis are presented in Table 10a. The numbers for all pneumoconioses combined and for each specific disease are in Table 10b. Asbestosis comprised 78% of all the pneumoconiosis-related deaths in 2000 in the 13 states, compared to 52% in the U.S.

DATA SOURCES: Numbers of deaths: State Vital Records. Numbers of deaths in the U.S.: National Center for Health Statistics multiple cause of death file. Population statistics used to calculate rates: U.S. Census Bureau.

INDICATOR 11:

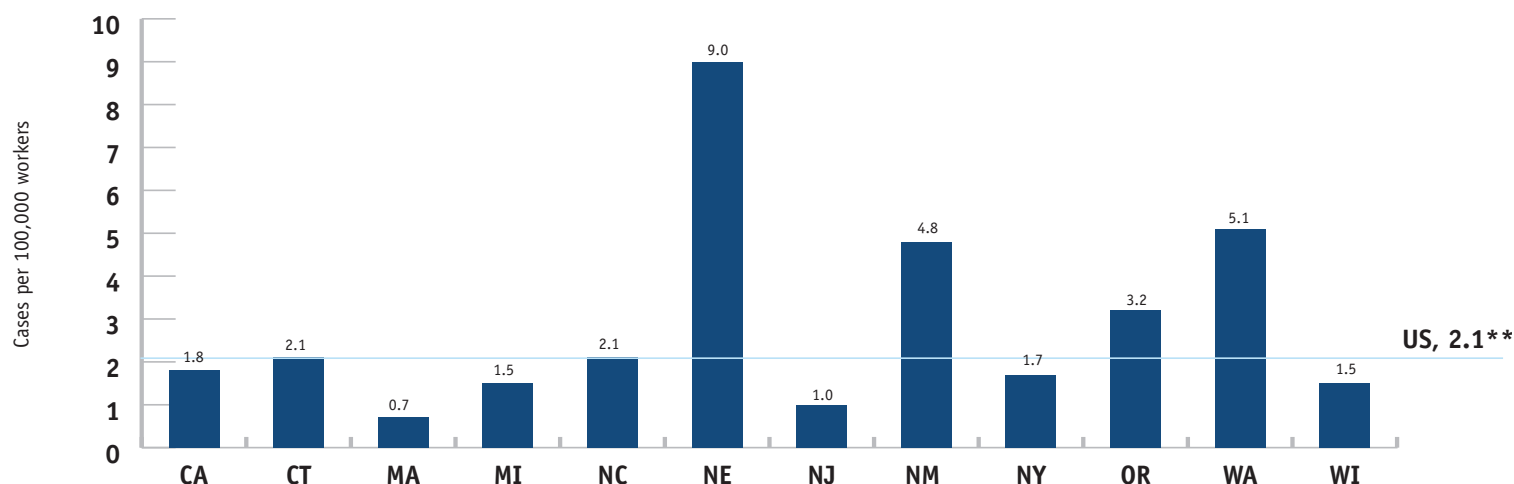
Acute Work-Related Pesticide Poisonings Reported to Poison Control Centers

- Annual number and rate of work-related pesticide poisonings reported to state Poison Control Centers

A pesticide is a substance or mixture of substances used to prevent or control undesired insects, plants, animals, or fungi. In the U.S., approximately one billion pounds of pesticides are used annually, contained

in more than 16,000 pesticide products.²² Although the value of pesticides in protecting the food supply and controlling disease vectors is well recognized, it is also recognized that pesticides can cause harm to people and the environment.

Figure 11: Rate of Work-Related Pesticide-Associated Poisonings by State* and U.S., 2000



* Rates were not calculated for states with fewer than five cases

**Does not include Mississippi and North Dakota

Table 11. Number of Work-Related Pesticide-Associated Poisonings Reported to Poison Control Centers by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US ¹
Cases of pesticide-associated poisonings	284	35	23	<5	74	79	81	39	38	141	54	147	41	2,827

¹ Does not include Mississippi and North Dakota

Adverse health effects from exposure vary depending on the amount and route of exposure and the type of chemical used. Agricultural workers and pesticide applicators are at greatest risk for the more severe pesticide poisonings.

The U.S. Environmental Protection Agency (EPA) estimates that there are 20,000 to 40,000 work-related pesticide poisonings per year.²³ National estimates of pesticide poisoning are not available from the Bureau of Labor Statistics. Poison Control Center (PCC) data are useful for monitoring pesticide poisonings nationally because PCCs service almost the entire U.S. population, even though calls to state and regional PCCs are estimated to capture only approximately 10% of acute occupational pesticide-related illness cases.²⁴ A small

number of states have active programs for occupational pesticide surveillance; seven of these states documented 1,009 individuals with acute occupational pesticide-related illness (including three deaths) in a two-year period, for an incidence rate of 1.2 per 100,000 full-time workers.²³

Data from 13 states were compiled from state PCC data. Incidence rates of pesticide poisonings per 100,000 employed persons in 2000 for these states and the U.S. are presented in Figure 11, and the numbers are in Table 11. The incidence rates for the states ranged from 0.7 to 9.0 per 100,000 employed persons. Nationally, the number of pesticide-associated illnesses and injuries reported by PCCs in 2000 was 2,827, resulting in an incidence rate of 2.1 per 100,000 employed persons.

DATA SOURCES: Numbers of pesticide-associated illness and injury: American Association of Poison Control Centers. Employment statistics used to calculate rates: Bureau of Labor Statistics' Current Population Survey.

TECHNICAL NOTES:

- Cases are counted in the Toxic Exposure Surveillance System (TESS) data system used by these states and nationally by the American Association of Poison Control Centers according to the following TESS variable definitions:
 - Exposure to an agent included in one of the pesticide generic categories: fungicides, fumigants, herbicides, insecticides, repellents, disinfectants, or rodenticides; AND
 - Reason=occupational OR Exposure site=workplace; AND
 - Medical Outcome is one of the following: minor effect; moderate effect; major effect; death; not followed, minimal clinical effects possible; or, unable to follow, judged as potentially toxic exposure

INDICATOR 12:

Incidence of Malignant Mesothelioma

- Annual number and rate of persons 15 years and older newly diagnosed with malignant mesothelioma

Malignant mesothelioma is a rare but highly fatal cancer of the thin membranes surrounding the chest cavity (pleura) or abdominal cavity (peritoneum). Much less frequently, this tumor affects other anatomical sites (e.g., pericardium). The only well-established risk factor for mesothelioma is

exposure to asbestos fibers. Prior asbestos exposure, primarily from exposure in the workplace, has been reported in 62 to 85 percent of all mesothelioma cases.²⁵

Mesothelioma is a disease of long latency, typically with 20-40 years between exposure and

Figure 12: Age-Standardized Incidence Rate of Malignant Mesothelioma by State and U.S., 2000

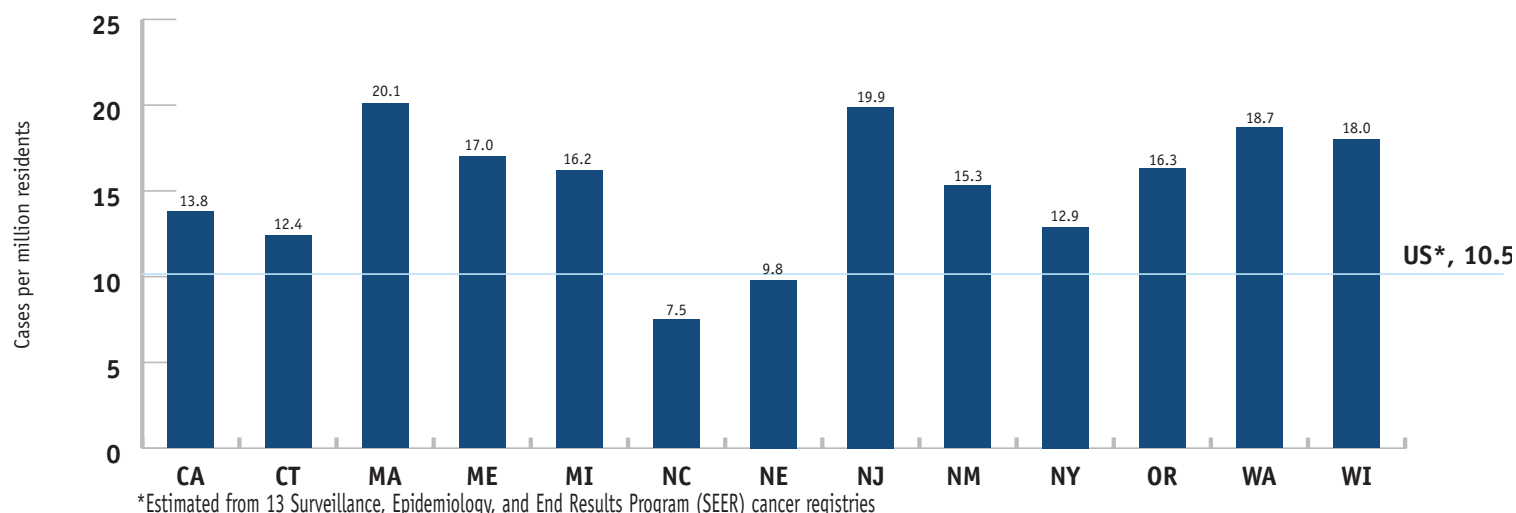


Table 12. Number of Cases of Malignant Mesothelioma by State, 2000¹

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI
Mesothelioma cases	315	36	107	19	124	46	14	138	20	196	45	79	76

¹ National number is not available.

onset of disease. The incidence of mesothelioma in the United States has risen steadily since the 1960s, reflecting high levels of asbestos use and occupational exposure to asbestos during World War II through the 1970s. In the 1970s, new Occupational Safety and Health Administration regulations limited workplace exposures and the Environmental Protection Agency began regulating asbestos uses. The mesothelioma incidence rate in the U.S. is projected to begin declining in 2004.²⁶

Approximately 1.3 million workers continue to be exposed directly or indirectly to asbestos in many industries and activities.²⁷ Environmental exposure to asbestos is also a continuing concern. Asbestos-containing materials are found in hun-

dreds of thousands of schools and public buildings throughout the country, and asbestos continues to be used in many manufactured products.

State Cancer Registries collect data on newly diagnosed cancer cases. Figure 12 illustrates the age-standardized incidence rates of malignant mesothelioma in 13 states and the estimated U.S. rate for 2000 based on 13 state cancer registries in the Surveillance, Epidemiology, and End Results (SEER) Program. The states' rates varied widely, ranging from 7.5 to 20.1 cases per million residents, most likely reflecting historical state-to-state differences in the use and manufacturing of asbestos-containing products. The corresponding numbers of cases for each state are listed in Table 12. National numbers are not available.

DATA SOURCES: Numbers of mesothelioma cases: State cancer registries. Population statistics used to calculate rates: U.S. Census Bureau.

INDICATOR 13:

Elevated Blood Lead Levels among Adults

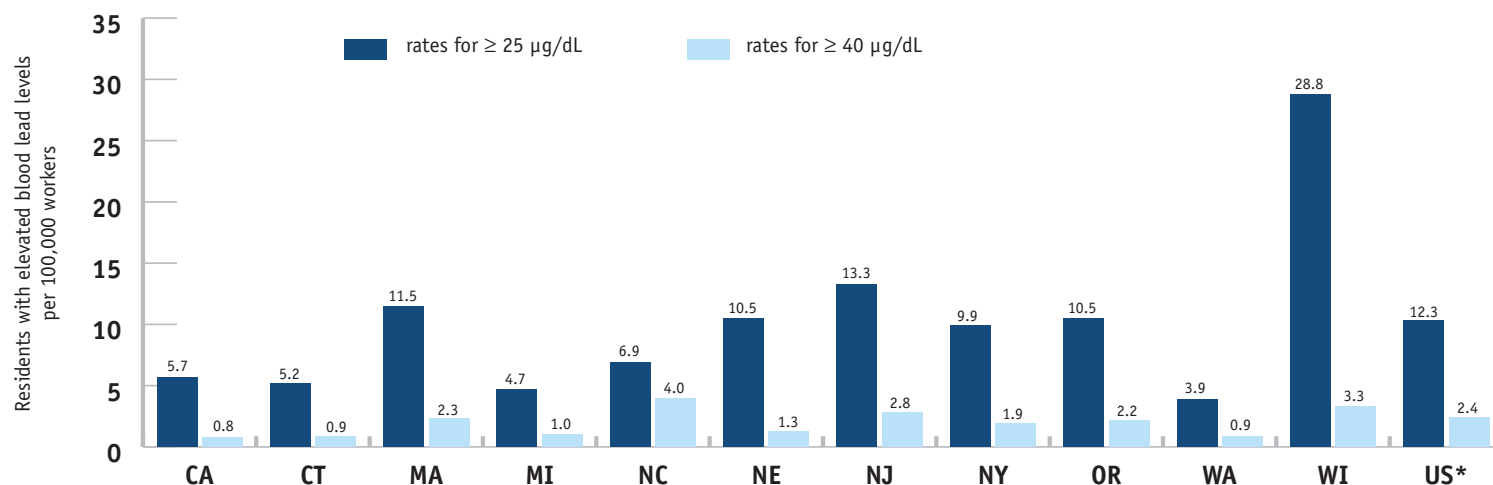
- Annual numbers and rates (prevalence and incidence) of persons age 16 or older with blood lead levels greater than or equal to 25 micrograms per deciliter ($\mu\text{g}/\text{dL}$) and greater than or equal to 40 $\mu\text{g}/\text{dL}$

Lead poisoning among adults is primarily due to occupational exposure. Lead adversely affects multiple organ systems and can cause permanent damage. Exposure to lead in adults can cause anemia, nervous system dysfunction, kidney damage, hypertension,

decreased fertility, and miscarriage. Workers bringing lead dust home on their clothing can expose their children to lead.

The blood lead level (BLL) is the best biological indicator of recent lead exposure. A BLL of 25

Figure 13: Prevalence Rate of Persons with Blood Lead Levels $\geq 25 \mu\text{g}/\text{dL}$ and $\geq 40 \mu\text{g}/\text{dL}$ of Persons Age 16 Years or Older by State and U.S., 2000



* Estimated from 25 states that participated in the Adult Blood Lead and Epidemiology Program (ABLES) in 2000.

Table 13a. Rate¹ of Incident Cases of Persons Age 16 Years or Older with Elevated Blood Lead Levels by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US ³
Rate of blood lead level ≥ 25 $\mu\text{g}/\text{dL}$	3.2	4.1	8.4	N/A	3.5	4.1	3.0	7.5	N/A	6.0	5.7	2.6	8.3	5.5
Rate of blood lead level ≥ 40 $\mu\text{g}/\text{dL}$	0.6	0.9	2.0	N/A	0.8	2.5	— ²	1.3	N/A	1.5	1.2	0.7	1.5	1.0

¹ Residents with elevated BLL per 100,000 workers

² Rates were not calculated for states with fewer than five cases

³ U.S. incidence rate estimated from 24 ABLES states (see technical note)

micrograms per deciliter ($\mu\text{g}/\text{dL}$) or greater for adults is considered “elevated,” and the Healthy People 2010 goal is to eliminate BLLs above this level.²⁸ The federal Occupational Safety and Health Administration (OSHA) requires that employers regularly monitor the BLLs of workers where airborne lead in the workplace exceeds certain levels. When a worker’s BLL is 40 $\mu\text{g}/\text{dL}$ or greater, the employer is required to offer an annual medical exam and other medical interventions depending on the BLL. However, adverse health effects have been found with cumulative exposure at BLLs lower than 40 $\mu\text{g}/\text{dL}$ ²⁹ and 25 $\mu\text{g}/\text{dL}$.³⁰ The average BLL for the general population is less than 2 $\mu\text{g}/\text{dL}$.³¹

Many states, accounting for more than half of the U.S. population, participate in compiling data on

laboratory reports of BLLs in adults for the national Adult Blood Lead Epidemiology and Surveillance (ABLES) program.³² Reporting by clinical laboratories is mandatory in these states. ABLES programs are not always able to determine whether reported cases were exposed to lead at work or exposed in a non-occupational setting; several states have determined that occupational exposures account for approximately 90% of all reported individuals.

Figure 13 presents prevalence rates per 100,000 employed persons of BLLs > 25 $\mu\text{g}/\text{dL}$ and > 40 $\mu\text{g}/\text{dL}$ among persons 16 years or older for 11 states. Of note is the wide range in both rates across states. On the national level, 25 states reported 2000 data to the ABLES program, with a prevalence rate of 12.3 per 100,000 workers for

Table 13b. Number¹ of Prevalent and Incident Cases of Persons Age 16 Years or Older with Elevated Blood Lead Levels by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Prevalent cases with blood lead level ≥ 25 $\mu\text{g/dL}$	924	88	362	N/A	235	264	94	535	N/A	844	180	112	816	11,272
Incident cases with blood lead level ≥ 25 $\mu\text{g/dL}$	512	70	263	N/A	175	155	27	304	N/A	509	97	75	236	4,921
Prevalent cases with blood lead level ≥ 40 $\mu\text{g/dL}$	125	16	72	N/A	48	154	12	111	N/A	160	38	26	92	2,252
Incident cases with blood lead level ≥ 40 $\mu\text{g/dL}$	100	15	64	N/A	40	97	<5	54	N/A	126	20	19	41	844

¹ Prevalence numbers reported from 25 ABLES states. Incidence numbers reported from 24 ABLES states

BLLs > 25 $\mu\text{g/dL}$, and 2.4 for BLLs > 40 $\mu\text{g/dL}$. Table 13a presents rates of incident (new) cases per 100,000 employed persons.

Table 13b includes numbers of prevalent and incident cases for persons with BLLs > 25 $\mu\text{g/dL}$ and with BLLs > 40 $\mu\text{g/dL}$. There is wide variation

across states in the proportion of all cases that are new cases. Individuals with ongoing elevated BLLs are at greater risk for adverse health effects and are an indication that long-term airborne lead exposure continues to be a problem in lead industries.

DATA SOURCES: Numbers of cases with elevated blood lead levels: Adult Blood Lead Epidemiology Surveillance (ABLES) program. Employment estimates used to calculate rates: Bureau of Labor Statistics' Current Population Survey.

TECHNICAL NOTES:

- Rates include all cases of adult elevated BLL reports in the numerator, but the denominators are limited to employed persons. This will result in an overestimate of rates per 100,000 employed persons.
- A prevalent case is a person reported at least once in the calendar year with a BLL greater than or equal to 25 $\mu\text{g/dL}$ (or 40 $\mu\text{g/dL}$).
- An incident case is a person with a BLL greater than or equal to 25 $\mu\text{g/dL}$ (or 40 $\mu\text{g/dL}$) who was reported in the calendar year, but not reported in the immediately preceding calendar year with a BLL greater than or equal to 25 $\mu\text{g/dL}$ (or 40 $\mu\text{g/dL}$).
- Data published by the ABLES Program may differ from Indicator 13 data because: 1) Indicator 13 includes only resident adults, while ABLES data include all adults reported by each state (residents and nonresidents); 2) Lead registries continually correct detected errors, thus published numbers may change over time; and 3) ABLES reports "the Average State Rate" for the U.S. derived by averaging state prevalence rates, while the U.S. prevalence rates shown here reflect the total cases reported divided by the total employment of reporting states.

INDICATOR 14:

Workers Employed in Industries with High Risk for Occupational Morbidity

- The number and percent of workers employed in industries with high risk for occupational morbidity

Workers in certain industries sustain non-fatal injuries and illnesses at much higher rates than the overall workforce. The proportion of the workforce that is employed in these high-risk industries varies by state. This

variation can help explain differences in injury and illness rates among states.

In 1999, the Bureau of Labor Statistics (BLS) estimated that nationally there were 5.7 million

Figure 14: Percentage of Workers in Industries with High Risk for Occupational Morbidity by State and U.S., 2000

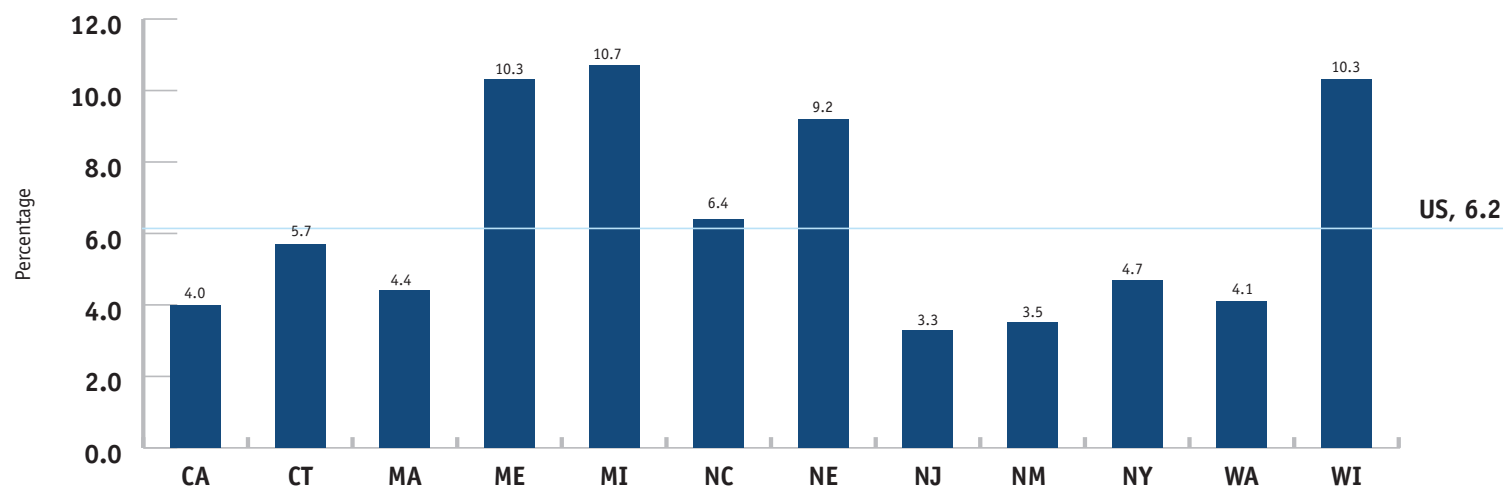


Table 14. Number of Workers Employed in Industries with High Risk for Occupational Morbidity by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Workers in high-risk industries	516,292	87,876	135,890	50,576	437,398	215,578	68,766	132,690	19,225	344,477	N/A	119,401	291,649	7,043,202

injury and illness cases within the private sector, which was equivalent to 6.3 cases per 100 full-time workers. Twenty-five industries had occupational injury and illness rates more than double the national rate.³³ Workers in these industries made up 6% of the national private sector workforce, but 17% of the Occupational Safety and Health Administration (OSHA)-reportable injuries and illnesses. These 25 industries comprised the “high-risk” industries for this occupational health indicator (Appendix

A). The list of high risk industries was developed based on 1999 BLS data from the Survey of Occupational Injuries and Illness.

In 2000, the percentage of workers employed in 25 high-risk industries ranged from 3.3% to 10.7% of the total employed for 12 states (Figure 14). The numbers of workers in each state and nationwide employed in these industries are shown in Table 14.

DATA SOURCE: Census Bureau County Business Patterns

TECHNICAL NOTES:

- The list of high-risk industries will be updated every five years since over time there will be some changes to the list as occupational morbidity rates for individual industries fluctuate. It is not anticipated that year-to-year changes will have significant effect on comparative or trend analyses, but these changes will be evaluated.

INDICATOR 15:

Workers Employed in Occupations with High Risk for Occupational Morbidity

- The number and percent of workers employed in occupations with high risk for occupational morbidity

Workers in certain occupations sustain non-fatal injuries and illnesses at much higher rates than the overall workforce. The proportion of the workforce that is employed in these high-risk occupations varies by state.

This variation can help explain differences in injury and illness rates among states.

In 1999, the Bureau of Labor Statistics (BLS) estimated that nationally there were 1.7 million injury and illness cases within the private sector

Figure 14: Percentage of Workers in Industries with High Risk for Occupational Morbidity by State and U.S., 2000

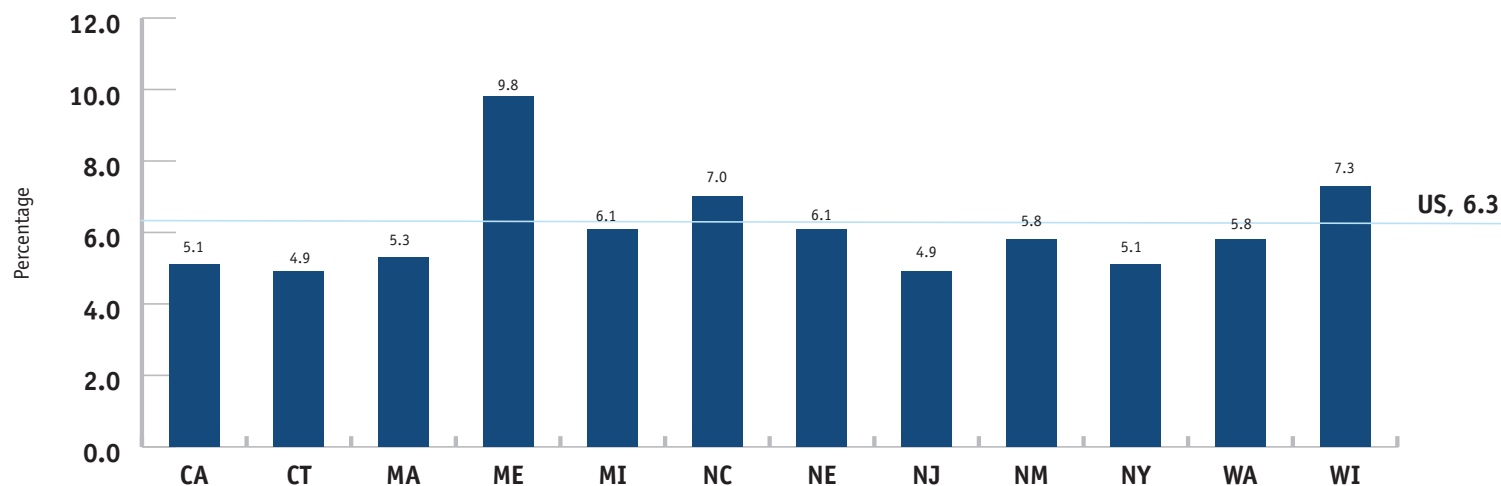


Table 15. Number of Workers Employed in Occupations with High Risk for Occupational Morbidity by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Workers in high-risk occupations	823,344	81,070	168,952	48,357	303,658	266,035	54,349	197,938	46,559	438,564	N/A	167,147	205,222	8,165,899

that resulted in days away from work. This was equivalent to 1.9 cases per 100 full-time workers. Twenty-three occupations had injury and illness rates of more than 5 per 100 full-time workers — more than two-and-a-half times the overall rate. While workers in these occupations made up only 6% of the national private sector workforce, they accounted for 27% of cases with one or more days away from work. These 23 occupations comprised

the “high-risk” occupations for this occupational health indicator (Appendix B). The list of high risk occupations was developed based on 1999 BLS data from the Survey of Occupational Injuries and Illness. In 2000, workers in high-risk occupations ranged from 4.9% to 9.8% of the total employed for 12 states (Figure 15). The numbers of workers in each state and nationwide employed in these occupations are shown in Table 15.

DATA SOURCE: Bureau of Labor Statistics’ Current Population Survey

TECHNICAL NOTES:

- The list of high-risk occupations will be updated every five years since over time there will be some changes to the list as occupational morbidity rates for individual occupations fluctuate. It is not anticipated that year-to-year changes will have significant effect on comparative or trend analyses, but these changes will be evaluated.

INDICATOR 16:

Workers Employed in Industries and Occupations with High Risk for Occupational Mortality

- The number and percent of workers employed in industries and occupations with high risk for occupational mortality due to injuries

Workers in certain industries and occupations sustain fatal injuries at much higher rates than the overall workforce. The proportion of the workforce that is employed in these high-risk industries and occupations

varies by state. This variation can help explain differences in injury mortality rates among states.

In 1998, there were 6,055 work-related injury deaths in the United States, according to the

Figure 16: Percentage of Workers Employed in Occupations and Industries with High Risk for Occupational Mortality by State and U.S., 2000

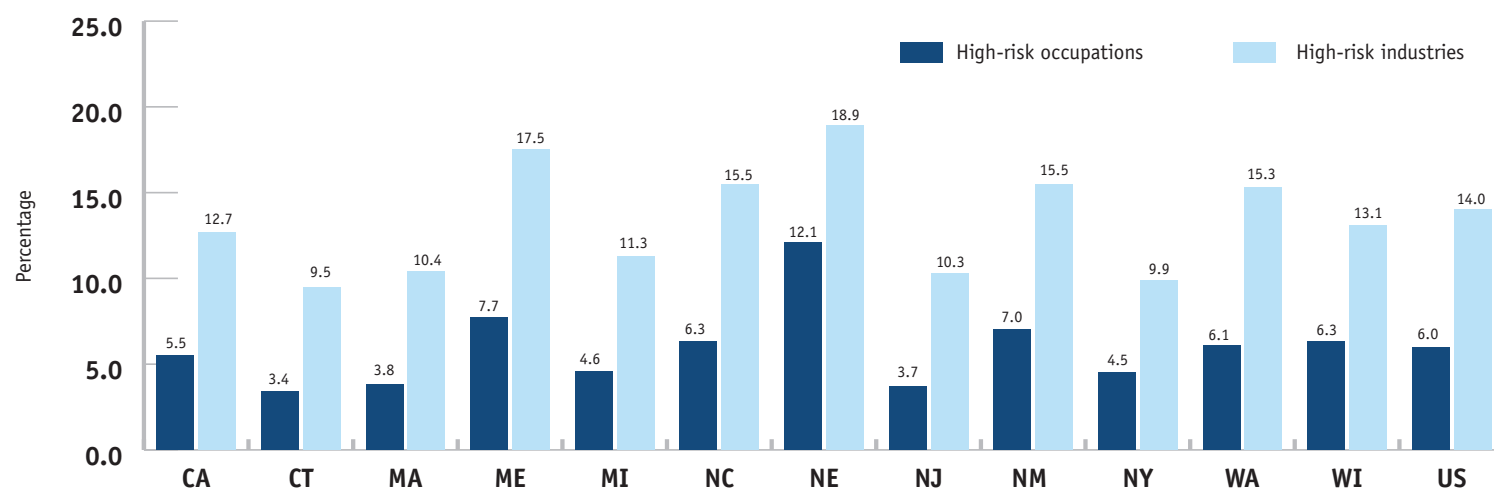


Table 16. Number of Workers Employed in Occupations and Industries with High Risk for Occupational Mortality by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Workers in high-risk occupations	900,723	57,487	122,124	50,985	229,095	242,142	107,761	149,603	56,081	385,518	N/A	176,948	177,067	7,729,698
Workers in high-risk industries	2,059,762	158,799	330,864	116,171	564,231	592,293	168,235	416,753	122,986	852,171	N/A	441,669	370,917	18,117,819

Census of Fatal Occupational Injuries (CFOI), which is administered by the Bureau of Labor Statistics (BLS). This was equivalent to 4.5 deaths per 100,000 workers. Twenty-seven industries had injury fatality rates greater than 10 deaths per 100,000 workers in 1998. Workers in these industries comprised 14% of the private sector workforce, but sustained 58% of the fatal work-related injuries that year. Twenty-four occupations had fatality rates greater than 20 per 100,000. Workers in these occupations made up 6% of the private sector workforce, but sustained 45% of the fatalities. These 27 industries and 24 occupations comprised the “high-risk” groups for this occupational health indicator (Appendix C). The list of high risk industries and occupations

was developed based on 1999 BLS data from the Survey of Occupational Injuries and Illness.

In 2000, workers in high-risk industries for injury death ranged from 9.5% to 23.6% of the total employed in 12 states (Figure 16). The corresponding range for occupations was 3.4% to 12.1% for 11 states. The numbers of workers employed in these industries and occupations are shown for each state and nationwide in Table 16.

DATA SOURCE: Bureau of Labor Statistics’ Current Population Survey

TECHNICAL NOTES:

- The list of high-risk industries and occupations will be updated every five years since over time there will be some changes to the list as occupational mortality rates for individual occupations and industries fluctuate. It is not anticipated that year-to-year changes will have significant effect on comparative or trend analyses, but these changes will be evaluated.

INDICATOR 17:

Occupational Safety and Health Professionals

- **Estimated number and rate of occupational safety and health professionals**

Occupational safety and health (OSH) professionals share the common goal of identifying hazardous conditions or practices in the workplace and helping employers and

workers reduce the risks imposed by such conditions. It is important to assess the availability of such personnel to implement occupational health preventive services in the states. In a 2000 report,

Table 17a. Rates¹ of Occupational Safety and Health Professionals by State and U.S.

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Board-certified occupational medicine physicians	1.9	2.8	2.5	3.0	1.9	1.4	1.0	1.9	2.3	1.1	1.9	2.5	1.9	1.7
ACOEM members	2.9	6.8	4.4	6.6	5.2	3.3	1.6	5.3	5.4	3.4	3.6	5.1	4.5	4.1
Board-certified occupational health nurses	2.9	6.4	7.9	9.1	4.9	8.9	4.9	5.2	5.1	3.6	3.5	3.4	7.3	4.7
Member nurses of AAOHN	3.7	7.6	7.9	12.2	8.5	11.1	10.9	6.5	6.2	5.1	4.1	2.6	10.4	6.1
Board-certified industrial hygienists	5.1	6.6	6.8	3.2	5.1	4.9	2.1	7.0	13.0	3.7	4.3	8.7	3.1	5.0
IH members of AIHA	7.5	10.9	11.0	8.1	8.9	8.0	3.3	11.7	14.4	6.4	6.0	9.8	4.9	8.1
Board-certified safety professionals	6.1	9.8	8.2	6.4	5.5	7.1	4.1	8.8	16.4	5.5	5.4	8.6	6.5	7.4
Safety engineers who are members of ASSE	17.0	23.5	19.3	25.4	17.4	22.4	19.2	21.4	49.4	16.5	32.8	24.0	18.5	22.2

¹ Professionals per 100,000 employees

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

the Institute of Medicine estimated that approximately 75,000 to 125,000 Americans are active or eligible members of professional societies representing core OSH disciplines of occupational safety, industrial hygiene, occupational medicine, and occupational health nursing.³⁴ The report concluded that “the continuing burden of largely preventable occupational diseases and injuries and lack of adequate OSH services in most small and many large workplaces indicate a clear need for more OSH professionals at all levels.” Previously, in 1989, the American Medical

Association recommended a ratio of one OSH physician per 1,000 employees.

This occupational health indicator provides information about occupational safety and health professionals who are board-certified occupational medicine physicians, members of the American College of Occupational and Environmental Medicine (ACOEM), board-certified occupational health nurses, members of the American Association of Occupational Health Nurses (AAOHN), board-certified industrial

Table 17b. Numbers of Occupational Safety and Health Professionals by State and U.S.

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Board-certified occupational medicine physicians	303	47	79	21	94	53	9	78	18	97	33	73	53	2,341
ACOEM members	463	116	138	43	261	126	14	213	43	290	62	147	127	5,532
Board-certified occupational health nurses	466	110	250	63	240	339	44	208	40	306	60	97	206	6,637
Member nurses of AAOHN	594	129	250	84	425	424	98	263	49	436	71	74	293	8,182
Board-certified industrial hygienists	824	113	214	22	257	188	19	284	103	316	74	251	87	6,688
IH members of AIHA	1,212	186	346	56	447	306	30	471	114	543	103	282	139	10,983
Board-certified safety professionals	995	168	257	44	278	269	37	354	130	466	92	249	185	9,992
Safety engineers who are members of ASSE	2,757	401	609	175	873	854	172	864	391	1,406	563	694	524	29,980

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

hygienists, members of the American Industrial Hygiene Association (AIHA), board-certified safety professionals, and members of the American Society of Safety Engineers (ASSE).

Rates of OSH professionals are shown in Table 17a by state and the U.S. Corresponding numbers are shown in Table 17b.

.....
DATA SOURCES: Numbers of health and safety professionals: Current membership rosters of cited organizations. Employment estimates used to calculate rates: Bureau of Labor Statistics' Current Population Survey.

TECHNICAL NOTES:

- Records of past membership totals do not exist for most organizations. For this reason, membership counts for 2003 were used in the numerator of this Indicator, while the number employed in 2000 was used in the denominator.
- Counts of safety and health professionals may include retired individuals and individuals who devote the majority of their time to research and have limited or no time for provision of actual preventive services. An individual may practice part-time or even full-time in the field of occupational health and not be board-certified or a member of the organization representing occupational health professionals.
- The completeness and frequency of updating addresses varies by each organization. Members are often listed in a database by a preferred address, which may not be the address where they practice.
- Other important occupational health specialties such as fire prevention, health physicists, occupational health psychologists, employee-assistance professionals, ergonomists, and health educators are not included.

INDICATOR 18:

Occupational Safety and Health Administration (OSHA) Enforcement Activities

- **Total number of establishments in the state under Federal/state OSHA jurisdiction**
- **Annual number of establishments inspected by Federal/state OSHA**
- **Annual number of employees whose work areas were inspected by Federal/state OSHA**
- **Percent of establishments under Federal/state OSHA jurisdiction inspected by Federal/state OSHA**
- **Percent of employees in establishments under Federal/state OSHA jurisdiction whose work areas were inspected**

The Occupational Safety and Health Act of 1970 was passed by Congress to assure safe and healthy working conditions for every working man and woman in the nation. Under the Act, the United States Department of Labor's Occupational Safety and Health Administration (OSHA) is authorized to conduct worksite inspections to determine whether employers are complying with health and safety standards

issued by the agency. OSHA may issue citations and impose fines on employers if violations are found.

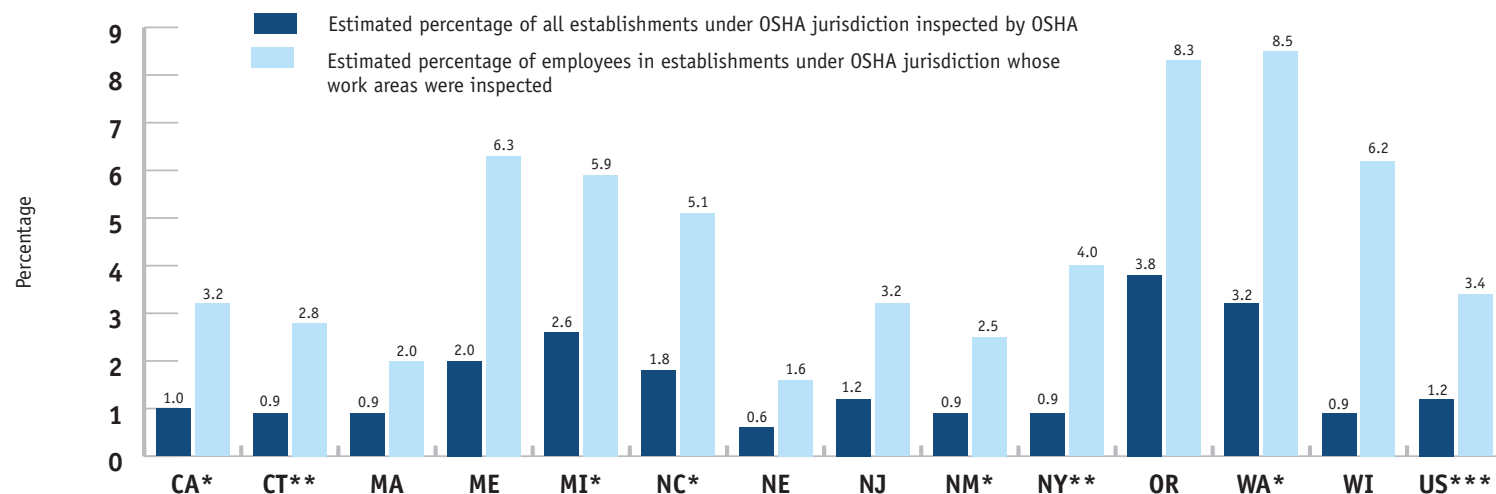
OSHA inspects worksites in response to reports of fatal injuries or incidents resulting in multiple hospitalizations, worker complaints, and referrals from other agencies. OSHA also conducts programmed inspections aimed at specific high-risk

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

industries, occupations or worksites with high injury rates. Federal OSHA jurisdiction includes Federal employment but does not extend to state and municipal government workplaces. However, under the OSHA Act, states may elect to administer their own safety and health programs that are at least as effective as federal OSHA programs. In these “state plan” states, public and private sec-

tor worksites are subject to occupational safety and health inspections conducted by state OSHA programs. In 2000, there were 25 states and territories in which OSHA protections extended to public sector workers. Farms with ten or fewer paid employees, while technically under federal OSHA jurisdiction, are exempt from federal OSHA inspections, unless they have a temporary labor

Figure 18: Percentage[†] of Establishments under OSHA Jurisdiction Inspected by OSHA and of Workers in Establishments under OSHA Jurisdiction Whose Work Areas Were Inspected by OSHA, by State and U.S., 2000



[†] State-specific denominators exclude mining for all states, exclude agriculture for all states except CA and NC, and exclude public sector workers in MA, NE and WI. Data includes both federal OSHA coverage (including federal agencies) and OSHA-approved state plan coverage (including state and local government)

* These states are “state plan” states, which cover both the private and public sectors.

** These states have “public sector only” state plans where federal OSHA has jurisdiction over the private sector and state agencies have jurisdiction over the public sector.

***The U.S. percentage is for private sector only and excludes mining and agriculture.

Table 18. Number of Establishments Inspected by OSHA and Numbers of Workers Covered by Inspections, by State and U.S., 2000¹

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Total number of establishments under Federal/State OSHA jurisdiction	1,026,355	107,787	187,391	44,865	260,885	222,234	48,127	270,384	44,956	529,104	107,268	221,150	145,872	7,870,222
Annual number of establishments inspected by Federal/State OSHA	10,022	997	1,590	784	6,810	3,859	291	3,332	409	4,741	4,071	7,021	1,264	91,563
Annual number of employees whose work areas were inspected by Federal/State OSHA	473,543	46,817	56,343	30,758	270,338	193,857	11,666	123,661	17,640	289,549	131,307	229,100	151,287	4,423,312

¹ Data includes both federal OSHA coverage (including federal agencies) and OSHA-approved state plan coverage (including state and local government)

camp. They are also exempt from inspections in most state plan states. The mining industry is covered by a separate federal agency – the Mine Safety and Health Administration.

Nationwide, almost eight million workplaces are covered by the OSHA Act. Federal OSHA and “state-plan” states have approximately 1,100 and 1,350 inspectors, respectively. Clearly only a small percentage of worksites can be inspected on an annual basis. The possibility of inspection and of subsequent penalties if violations are found is intended as a general deterrent to dis-

suade employers from violating health and safety standards.³⁵

This occupational health indicator (OHI) provides a measure of the numbers and proportions of workers and worksites potentially benefiting directly from Federal/State OSHA inspection activity. Nationwide in 2000, Federal and State OSHA programs conducted approximately 91,563 workplace inspections. Approximately 4,423,300 individuals, or 3.4% of the workforce under Federal or State OSHA jurisdiction, were employed in work areas covered by these inspections. The

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

percentage of all establishments under OSHA jurisdiction that were actually inspected by OSHA in 2000 ranged from 0.6% to 3.8%. The highest percentages were observed in several “state plan” states. The percentage of workers in establishments under OSHA jurisdiction whose work areas were inspected ranged from 1.6% to 8.5% (Figure 18). The corresponding numbers of establishments under Federal or State OSHA jurisdiction, inspections, and workers covered in each state are included in Table 18.

Federal OSHA and State plans also conduct a range of activities in addition to enforcement. They provide assistance in complying with legally

binding standards and voluntary guidelines promulgated by Federal and State OSHA and support educational outreach and programs for employers and employees. In addition, OSHA funds a consultation program delivered by the states. This OHI does not measure these activities. Nor does this OHI measure the quality of OSHA inspections, such as the extent to which the worksite targeting activity has successfully identified workplaces where there are violations of worksite health and safety standards.

DATA SOURCES: Numbers of OSHA inspections and workers covered by OSHA inspections: OSHA Office of Statistics. Number of establishments and workforce estimates: Bureau of Labor Statistics’ Covered Employers and Wages (ES 202).

TECHNICAL NOTES:

- Because OSHA may conduct multiple inspections of the same establishment during the calendar year, the percent of establishments inspected may be slightly overestimated. Likewise, if OSHA conducts multiple inspections of the same worksite during the year, the number of workers covered by OSHA inspections may be over-counted. Given that relatively few repeat inspections of the same establishments are conducted by OSHA each year, the impact on the Indicator values should be negligible.
- Although all farms technically are under jurisdiction, farms with fewer than 11 employees are not subject to federal OSHA inspection because of a congressional budgetary rider. Farming establishments were excluded from the denominator (i.e., the number of establishments under OSHA jurisdiction) in all states except CA and NC for the following reasons: 1) it was not possible to differentiate between large and small farms (with 10 or fewer employees); 2) data from the 2002 Census of Agriculture indicated that most farms had 10 or fewer employees and were therefore not covered by OSHA; 3) evaluation of OSHA inspections in several states indicated few inspections of large farms were conducted. All farms are covered in CA and NC “state-plan” states, so these states did not exclude agriculture in their calculations.

INDICATOR 19:

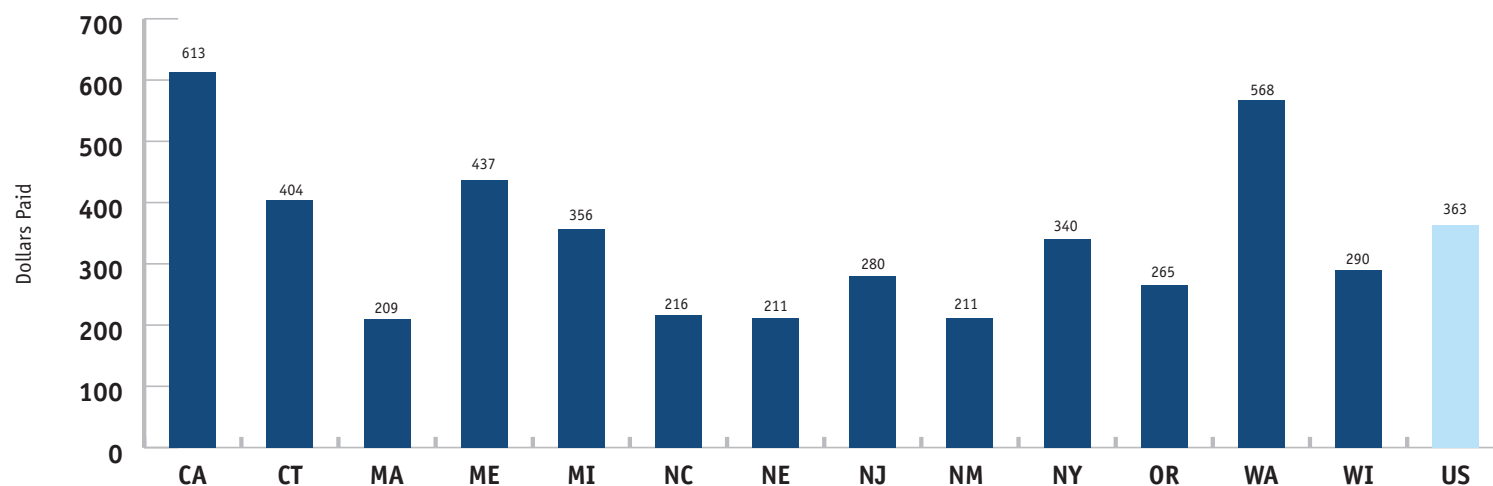
Workers' Compensation Awards

- Annual workers' compensation benefits paid and average amount paid per covered worker

Workers' compensation was first implemented in the United States in 1911 in nine states and in subsequent years by all states. This state-based social insurance program was developed to provide guaranteed compensation for workers with work-related

injuries or illnesses while limiting the liability exposure of employers. Workers' compensation provides benefits to partially replace lost wages and pay for medical expenses associated with a work-related injury or illness. In case of a

Figure 19: Average Workers' Compensation Benefit Paid per Covered Worker* by State and U.S., 2000



*All workers in the state who are eligible for compensation should they sustain work-related injuries or illnesses are considered "covered" workers

Table 19. Workers' Compensation Awards by State and U.S., 2000

	CA	CT	MA	ME	MI	NC	NE	NJ	NM	NY	OR	WA	WI	US
Total benefits paid (in thousands \$)	8,949,070	667,056	666,455	252,283	1,574,467	788,369	179,988	1,066,542	136,830	2,828,018	412,710	1,449,070	768,282	45,909,689

death, the worker's dependents are eligible for survivor benefits.

While the amount of benefits paid is an indicator of the direct financial cost of work-related injuries and illnesses, it does not reflect their true burden. Indirect costs to the employer and worker are not taken into account. In addition, some workers who are eligible for benefits do not file. Finally, several types of workers may not be covered by state workers' compensation systems, including the self-employed, corporate executives, domestic and agricultural workers, federal employees, and railroad, long shore, and maritime workers.

There are substantial differences between states in wages and medical costs, in workers' compen-

sation eligibility, reimbursement, and other administrative regulations governing workers' compensation. Therefore, differences among states in benefits paid could be due to a variety of factors other than injury and illness incidence. For this reason, this occupational health indicator should be used to monitor trends within states over time rather than to compare states.

Figure 19 illustrates workers' compensation benefits paid per covered worker for 13 states and the U.S. in 2000. All workers in the state who are eligible for compensation should they sustain a work-related injury or illness are considered "covered" workers. The corresponding total annual benefits paid are listed in Table 19. Benefits paid ranged from \$136.8 million to \$8.9 billion.

DATA SOURCE: Total amount and average benefits paid: National Academy of Social Insurance.

Data Sources

The following sources were used to obtain data for the 19 occupational health indicators (OHIs) and the employment demographics for the 13 states. The last five sources were used to quantify the appropriate population at risk (i.e., denominators) for the calculation of rates.

Death Certificates

Funeral directors, attending physicians, and medical examiners or coroners are usually responsible for the personal and medical information recorded on death certificates. Local registrars assure that all deaths in their jurisdictions are registered and that required information is documented before sending certificates to the state registrar. State registrars number and file the death certificates and forward certificates of nonresidents to the appropriate state. All states send death certificate data to the National Vital Statistics System, managed by the CDC's National Center for Health Statistics.

The cause-of-death section on the certificate, which is similar in all states, contains the immediate, contributing and underlying causes of death. Since 1999, these causes have been coded according to the International Classification of Diseases, tenth revision (ICD-10)³⁶ format. For injury deaths, all state death certificates include a query about whether the incident occurred at work.

Cancer Registries

Data on cancer incidence are centralized in registries in all but five states in the United States. The sources of these data include hospitals, physician offices, surgery centers, laboratories, and death certificates. Legislation usually requires the reporting of all in situ or malignant neoplasms, but there is some slight variation in reportable cases by state. Standards for the operation of registries (e.g., data definitions, data transmission methodologies, and quality assurance) have been developed by the North American Association of Central Cancer Registries (NAACCR) (some state cancer registries do not yet meet all NAACR

standards for data competencies and quality). Diagnoses are coded according to the International Classification of Diseases for Oncology (ICD-O).³⁷

State Hospital Discharge Data

Patient demographics, diagnoses, and billing information are contained within hospital medical records. Upon patient discharge from a hospital, these data are computerized using standard formats. Diagnoses are coded according to the International Classification of Diseases system, currently ICD-9-CM.³⁸ Pneumoconioses are considered, by definition, work-related diseases. Most acute-care hospitals participate in mandatory or voluntary systems for compiling discharge data at the state level.

While there is no specific query as to the work-relatedness of any other illnesses or injuries, a useful proxy for work-related injury is workers' compensation insurance as the payer.

Hospital discharge data have several limitations for providing information on occupational health. Personal identifiers are not available in most states' data sets, thus repeat hospitalizations of the same individual cannot readily be identified. The ICD classification system by itself can be used to identify only one class of work-related illnesses, pneumoconiosis. Workers' compensation as the payer source is more sensitive in identifying injuries than illnesses. Illnesses are much harder to associate with a work condition due to the non-specificity of many occupational diseases or the long latency between exposure and onset of overt disease. Hospital discharge data generally do not include hospitalizations of their residents who have been hospitalized in another state. Federal hospitals (military and veterans hospitals) are not included in most state hospital discharge data sets.

State Workers' Compensation Systems

Workers' compensation is a no-fault insurance system designed to provide compensation to workers who sustain work-related injuries or illnesses while limiting the legal liability of employers. All states and the District of Columbia have workers' compensation systems, and all employers, except those in Texas, are required to have this form of insurance for their

employees. Several federal workers' compensation systems exist for the protection of select groups of workers, such as federal workers, and longshore, and harbor workers, and are outside of state governance.

State workers' compensation systems are the result of individual state legislation and regulation.³⁹ States may allow employers to self-insure, group self-insure, insure through private carriers, or insure through a state fund. Coverage exemptions differ between states; common exemptions include employment in the public and private sector, specified occupations, and the size of the employer. Marked state-to-state differences exist in the statute of limitations for filing a work-related injury or illness claim, the procedures for filing a claim, and the requirements governing claim adjudication. State laws governing benefits for disability, waiting periods for wage replacement, wage replacement amounts, medical payments, and vocational rehabilitation make comparisons of benefits across states difficult. In addition, there may be considerable variability in the types of data collected, the data coding systems used, and the availability of data for research purposes. The variability in workers' compensation laws across states represents a significant limitation of using these data to make state-to-state comparisons.

Occupational Safety and Health Professionals

Members of occupational safety and health professional associations, including the American College of Occupational and Environmental Medicine (ACOEM), the American Association of Occupational Health Nurses (AAOHN), the American Industrial Hygiene Association (AIHA), and the American Society of Safety Engineers (ASSE), serve as resources to promote primary, secondary, and tertiary prevention of occupational injury and illness. Certain educational and/or work experiences are required for membership and typically a fee is charged.

Certification in an occupational health specialty demonstrates satisfactory completion of accepted criteria developed by a specialty board (e.g., American Board of Occupational Health Nursing). To be board-certified, the occupational safety and health professional must pass a

certification exam, have practiced in his or her specialty area for a certain period of time, and have completed certain educational requirements.

Using professional association data to assess the availability of occupational health professionals has a number of limitations. Members often provide a preferred address that does not necessarily represent their work location. Membership rolls may include retired occupational health professionals. Organizations generally do not archive their membership information that would allow them to provide data on their membership rolls for previous years. The information obtained from organizations reflects current membership status. Some occupational health professionals may not be members of these organizations.

Survey of Occupational Injuries and Illnesses

The Survey of Occupational Injuries and Illnesses (Annual Survey), conducted by the Bureau of Labor Statistics (BLS) in the U.S. Department of Labor, provides annual estimates of the numbers and incidence rates of work-related injuries and illnesses among private sector workers nationwide. Information is collected through an Annual Survey mailed to a stratified random sample of establishments. Employers are asked to provide information on all work-related injuries and illnesses recorded as required under the Occupational Safety and Health Administration (OSHA) record-keeping standard 29 CFR 1904. Recordable injuries and illnesses include those that result in loss of consciousness, one or more days away from work to recuperate, restricted work activity, transfer to another job, or medical treatment beyond simple first aid. More detailed information on worker demographics and the nature and circumstances of the injuries and illnesses is collected for cases resulting in days away from work. The Annual Survey also collects data on the average number of workers employed and the total hours worked at each establishment, information that allows BLS to calculate rates. Since 1996, the Survey sample has included approximately 180,000 private sector establishments nationwide.

Many states choose to participate in the federal-state survey program, which involves allocation of state resources. For these states, the survey data are used to generate state as well

as national estimates. An independent sample is selected for each state. Annual Survey estimates are not produced for states not electing to participate (eight as of June, 2004). In 26 states and U.S. territories – including all those where the public sector is covered by a state OSHA plan – the Annual Survey includes public sector workers. Because the Annual Survey is based on a sample – and not a census – of all establishments, the Survey findings are estimates with corresponding sampling errors. In some participating states, the sample sizes are insufficient to generate statistically reliable state-specific results for all the detailed categories BLS publishes for the nation. BLS adheres to strict publication guidelines based on the reliability of the estimates; numbers and rates are not published or released by BLS if the estimates do not meet these guidelines.

The self-employed, farms with fewer than 11 employees, private households, federal agencies, and the military are not covered in the Survey. In states that do not participate or choose not to collect public sector data, the Survey also does not cover state and municipal employees. In addition, it is well recognized that the Survey undercounts work-related illnesses, especially long-latency illnesses that may not appear until years after individuals have left their place of employment. There is also some evidence that work-related injuries are under-reported.^{5,6}

Census of Fatal Occupational Injuries

The Census of Fatal Occupational Injuries (CFOI), conducted by the Bureau of Labor Statistics (BLS) in the U.S. Department of Labor, is a federal-state cooperative program that compiles an annual census of fatal occupational injuries at both the state and national levels. For a death to be counted, the decedent must have been working for pay, compensation or profit at the time of the event, engaged in a legal work activity, or present at the site of the incident as a requirement of his or her job. The census includes unintentional injuries (e.g., falls, electrocutions, motor vehicle crashes) and intentional injuries (homicide and suicide). Deaths due to occupational illnesses are excluded.

CFOI uses multiple data sources to identify and document work-related injury deaths. These sources include, among others, death certificates, workers' compensation records, reports to regulatory agencies, and medical examiner and police reports, as well as reports in the news media. Multiple sources are used because studies have found that no single source captures all deaths. In addition, two or more sources are required to ensure an accurate count by independently substantiating that incidents were work-related. Due to this methodology, CFOI counts are considered a complete or nearly complete ascertainment of work-related injury deaths.

Poison Control Centers

Poison control centers (PCCs) are available nationwide to provide assistance 24 hours a day to callers with concerns about actual or potential exposure to substances. Most PCCs track calls and manage case information electronically using ToxiCall®. Centers submit data on a real-time basis to the American Association of Poison Control Centers (AAPCC) for inclusion in their Toxic Exposure Surveillance System (TESS). In 2002, 64 PCCs representing 99.8% of the nation's population submitted data to the AAPCC.⁴⁰

PCCs categorize inquiries as human or animal exposures, or non-exposures and information-only. For nearly half of human exposure calls, PCCs follow up to provide further guidance, confirm compliance with recommendations, and gather outcome data.⁴⁰ The types of information gathered by PCCs include demographics, type of substance(s) involved, symptoms, intentionality of exposure, whether the exposure was work-related, location of exposure (e.g., workplace), and medical outcome. PCCs do not systematically collect information on industry and occupation. Centers that use ToxiCall® can generate nearly 100 standard reports or create ad hoc reports to meet more specific needs.

A significant limitation of PCC data for occupational surveillance is that it is a passive system; that is, it relies on cases to be reported. To report a case, the poisoned individual or a health care worker has to know about the existence of a PCC, consider it a source of assistance for addressing a work-related illness, and know how to contact the PCC. Because of the

passive surveillance system design, it is likely that PCC data underestimate the true extent of work-related chemical exposures. Furthermore, health care workers with more experience in managing work-related poisoning may be less likely to use PCCs. Thus, under-reporting may vary by state to some degree according to the experience and expertise of health care workers.

Adult Blood Lead Epidemiology and Surveillance

The Adult Blood Lead Epidemiology and Surveillance (ABLES) system, a state-based program funded by CDC's National Institute for Occupational Safety and Health (NIOSH), commenced in 1987 in four states. By 2004, 37 states were participating in the system. Surveillance of elevated blood lead levels (BLLs) provides a method for identifying industries and occupations where workers are at high risk for exposure to lead.

States participating in ABLES require that clinical laboratories report BLL results to a state agency. The lowest BLL to be reported varies from state to state. Laboratory reports include basic demographic information. States use unique identifiers to differentiate between new and existing cases and to account for multiple reports for the same person. In some ABLES states, physicians also are required to report adults with elevated BLLs. Most states follow up reports of elevated BLLs to determine the sources of lead exposure, including the name of the employer, and additional information about the exposed individual.

The Occupational Safety and Health Administration (OSHA) requires that lead be measured clinically in workers exposed to airborne lead exceeding a certain level. Because of this requirement and because laboratories generally comply with the reporting requirement, ABLES programs are believed to identify a substantial portion of lead-exposed workers. However, they do not capture lead-exposed individuals whose employers are not in compliance with the biological monitoring requirements, or individuals tested by laboratories that are not compliant with the reporting requirement.

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

Data from ABLES states are submitted to NIOSH, where they are aggregated. Analyses based on the aggregate data are published in CDC's Morbidity and Mortality Weekly Report (MMWR). The aggregated data from ABLES are not necessarily representative of the nation as there is less than 100% participation; states that participate were not selected based on representativeness.

OSHA Integrated Management Information System

The mission of the Occupational Safety and Health Administration (OSHA) is to prevent work-related injuries, illnesses, and deaths. To address this mission, OSHA develops standards, enforces compliance with these standards, and provides compliance assistance. OSHA conducts both referral and non-referral inspections to address compliance issues. Enforcement inspections are performed in the following conditions: the worksite was selected randomly; the worksite belongs to an industry with an excessive injury rate; there was an injury fatality or other catastrophe; a worker filed a complaint; or an outside source made a referral to OSHA.

Information on enforcement inspections is maintained in the Integrated Management Information System (IMIS). IMIS is utilized by OSHA as an electronic management tool and information resource to help direct its resources. It is used also by state agencies that carry out federally-approved OSHA programs. A wide variety of data are contained within IMIS, including the type of inspection conducted, reason for inspection, inspection date, state in which the worksite is located, worksite type, and number of employees at each inspected worksite. The source of information in IMIS is the local, state, or federal office in the geographical area where the activity occurred. Information is entered in an ongoing manner in the course of agency activities.

It is difficult to quantify the number of unique establishments inspected (and thus unique workers impacted) because IMIS has entries listed by inspections rather than establishment. Because IMIS is an administrative database, the data are not static, but can change over time.

Census

The U.S. Census Bureau takes the census of the entire nation in years ending in zero. The first census of the U.S. was taken in 1790 as mandated by the Constitution for the purpose of apportionment of representatives for the seats in the House of Representatives. Census data also are used to distribute government funding, draw state legislative districts, identify populations in need of services, determine business locations, and for many other purposes.

In Census 2000, a short form was sent to every household, and a long form with more detailed questions was sent to a sample of about one in six households. The short form ascertained basic demographics, while the long form sought information on social, economic, and financial characteristics of individuals, and physical characteristics of housing. The economic characteristics included labor force status, place of work, occupation, industry, work status, and income. Following Census 2000, there was debate about undercounting the population. Subsequently, the Census Bureau performed a coverage measurement survey. Based on survey results, the Bureau decided that no adjustments would be made.

County Business Patterns

The U.S. Census Bureau annually produces County Business Patterns (CBP), which provides national economic data by industry. CBP data represent the number of employees working in the primary industry of an establishment, regardless of the individuals' occupations within that establishment. CBP data include the total number of establishments, mid-March employment, first quarter and annual payroll, and number of establishments by nine employment-size classes for all counties in the United States and the District of Columbia.

CBP data are extracted from the Business Register, the U.S. Census Bureau's file of all known single and multi-establishment companies. The Annual Company Organization Survey and Economic Censuses, which are conducted every five years, provide individual establishment data for multi-location firms. Data for single-location firms are obtained from various programs conducted by the Census Bureau, such as the Economic Censuses, the Annual Survey of Manufacturers, and Current Business Surveys, as well as from administrative records of the

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

Internal Revenue Service (IRS), the Social Security Administration (SSA), and the Bureau of Labor Statistics (BLS).

Data are obtained for all employees excluding self-employed individuals, employees of private households, railroad employees, agricultural production employees, and most government employees. CBP quantifies full- and part-time employees who are on the payroll in the pay period including March 12. Beginning in 1998, data are tabulated by industry as defined in the North American Industry Classification System: United States, 1997 (NAICS). Data for 1997 and earlier years are based on the Standard Industrial Classification (SIC) System.

Current Population Survey

The Current Population Survey (CPS) is a monthly survey of about 60,000 households representing the civilian non-institutionalized population of the United States. It is conducted by the U.S. Census Bureau for the Bureau of Labor Statistics. The CPS ascertains demographics, employment status, weekly hours worked, and industry and occupation of each household member aged 15 years and older. The inquiry relates to activity or status during the calendar week that includes the 12th day of the month. Among the ways BLS makes the survey data available are an annual report titled "Geographic Profile of Employment and Unemployment" and a data analysis program, "DataFerrett," that users can download from the Internet.

The occupational and industrial classifications of CPS data for 1992 through 2002 were based on the coding systems used in the 1990 Census. Since then, the CPS has changed its coding systems for occupation and industry. More information can be found at www.census.gov.

The CPS undercounts certain racial/ethnic workers who have no permanent address or are migratory in nature. Because CPS estimates are based on a survey rather than a complete census of the population, they are subject to sampling error.

National Academy of Social Insurance

The National Academy of Social Insurance (NASI) is a non-profit, non-partisan organization dedicated to the study of social insurance programs such as workers' compensation, Medicare, and unemployment insurance. NASI produces an annual research report estimating the annual benefits, coverage, and costs associated with workers' compensation systems at the state level.

NASI estimates the number of workers covered by workers' compensation insurance by utilizing state unemployment insurance data. These data are then adjusted for differences in workers' compensation coverage laws with unemployment insurance coverage laws within a state. NASI estimates the cost of workers' compensation benefits by soliciting information from federal and state agencies, and by utilizing data from private organizations such as A.M. Best and the National Council on Compensation Insurance.

Workers' compensation award payments are frequently made over time, thus the annual awards measured by NASI may not reflect the full cost of injuries and illnesses for a given year. There is significant variation in workers' compensation systems from state to state. Therefore, comparisons across states for measures such as level of coverage and benefits paid per covered worker are problematic.

Quarterly Census of Employment and Wages

The Quarterly Census of Employment and Wages (QCEW) — previously known as the Covered Employment and Wages or the ES-202 program — is a near-census of monthly employment and quarterly wage information. Employment data represent the number of workers covered by state unemployment insurance laws who worked during, or received pay for, the pay period including the 12th of the month. Excluded from the QCEW are those in the military, the self-employed, proprietors, domestic workers, unpaid family workers, and railroad workers. QCEW data provide figures that represent where individuals work, not where they live.

Putting Data to Work: Occupational Health Indicators from Thirteen Pilot States for 2000

At the national level, QCEW publishes employment and wage data for nearly every North American Industry Classification System (NAICS) industry. At the state, county, and metropolitan levels, it publishes these data down to the 6-digit NAICS industry level, assuming that confidentiality can be maintained. QCEW publishes a subset of its quarterly data through an online data query system and full quarterly industry detail data in ASCII format at all geographic levels.

Glossary

Establishments

The physical location of a certain economic activity — for example, a factory, mine, store, or office.

Incidence rate

A measure of the frequency with which a new case of illness occurs in a population over a period of time. The denominator is the population at risk; the numerator is the number of new cases occurring during a given time period.

Indicator

A construct of public health surveillance that defines a measure of health (i.e., the occurrence of a disease or other health-related event) or a factor associated with health (i.e., health status or other risk factor) among a specified population.

Industry

A group of establishments that produce similar products or provide similar services.

Lost-time claim

A workers' compensation term referring to a claim for benefits to partially reimburse an employee for lost wages due to a work-related injury or illness.

Medical-only claim

A workers' compensation term referring to a claim for benefits to reimburse an employee for medical expenses but not lost wages due to a work-related injury or illness.

N/A

Abbreviation for "not available"

Occupation

An occupation relates to the activity performed by a worker.

Prevalence rate

The proportion of persons in a population who have a particular disease or attribute at a specified point in time or over a specified period of time.

Standardization

An analytic procedure to reduce the biasing effect of confounding variables (e.g., age) when comparing two or more populations, sometimes called adjustment.

Surveillance

The ongoing, systematic collection, analysis, and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know.

Work-related illness

An illness arising out of employment due to exposure to a health hazard. Because of the latency of some illnesses (i.e., a lengthy period between first exposure and development of disease), some work-related illnesses occur when the individual is no longer employed in the job where exposure occurred.

Work-related injury

An injury arising out of or during the course of employment.

References

- ¹ National Academy of Social Insurance. *Workers' Compensation: Benefits, Coverage, and Costs, 2000 New estimates*. June 2002. Available: http://www.nasi.org/usr_doc/nasi_wkrs_comp_6_26_02.pdf
- ² Leigh JP, Markowitz SB, Fahs M, Shin C, Landrigan PJ. Occupational Injury and Illnesses in the United States Estimates of Costs, Morbidity and Mortality. *Arch of Intern Med* 1997;157:1557-1568.
- ³ Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Conditions*. Nov. 2004. Available: http://www.cste.org/pdffiles/Revised%20Indicators_12.14.04.pdf
- ⁴ Leigh JP et al. An estimate of the US governments's undercount of nonfatal occupational injuries. *J Occup and Environ. Med.* 2004; 46 (No. 1)
- ⁵ Conway H, Svenson J. Occupational injury and illness rates,1992-1996: why they fell. *Mon Labor Rev.* 1998; 121(11)36-58.
- ⁶ Azaroff LS, Levenstein C, Wegman DH. Occupational Injury and Illness Surveillance: Conceptual Filters Explain Underreporting. *AJPH.* 2002; 92(9):1421-1429.
- 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; 44:331-342.
- ⁸ Sorock GS, Smith E, Hall N. An evaluation of New Jersey's hospital discharge database for surveillance of severe occupational injuries. *Am J Ind Med* 1993; 23:427-437.

- ⁹ National Institute for Occupational Safety and Health. *Worker Health Chartbook, 2004*. Cincinnati, OH: U.S. Department of Health and Human Services, Center for Disease Control and Prevention, DHHS (NIOSH) Publication No. 2004-146. 2004. Available: <http://www.cdc.gov/niosh/docs/chartbook/pdfs/2004-146.pdf>
- ¹⁰ Centers for Disease Control and Prevention. Occupational burns among restaurant workers – Colorado and Minnesota. *MMWR*. 1993; 42:713-716.
- ¹¹ Baggs J, Curwick C, Silverstein B. Work-related burns in Washington State, 1994-1998. *J Occup Environ Med*. 2002; 44:692-9.
- ¹² Rossignol AM, Locke JA, Burke JF. Employment status and the frequency and causes of burn injuries in New England. *J Occup Med*. 1989; 31:751-757.
- ¹³ Sorock GS, Smith E, Hall N. An evaluation of New Jersey's hospital discharge database for surveillance of severe occupational injuries. *Am J Ind Med*. 1993; 23:427-437.
- ¹⁴ National Institute for Occupational Safety and Health. *Worker Health Chartbook, 2004*. Cincinnati OH: U.S. Department of Health and Human Services, Center for Disease Control and Prevention, DHHS (NIOSH) Publication No. 2004-146. 2004. Available: <http://www.cdc.gov/niosh/docs/chartbook/pdfs/2004-146.pdf>
- ¹⁵ Institute of Medicine and National Research Council, *Musculoskeletal Disorders and the Workplace; Low back and Upper Extremities*. National Academy Press, Washington, D.C. 2001, page 58.
- ¹⁶ National Institute for Occupational Safety and Health. *Musculoskeletal disorders and workplace factors: a critical review of epidemiologic evidence for work-related musculoskeletal disorders of the neck, upper extremity, and low back*. Cincinnati, OH: U.S. Department of Health and

Human Services, Centers for Disease Control and Prevention. DHHS (NIOSH) Publication No. 97-141. 1997.

¹⁷ Tanaka S, Wild DL, Seligman PJ, Halperin WE, Behrens VJ, Putz-Anderson V. Prevalence and work-relatedness of self-reported carpal tunnel syndrome among U.S. workers: analysis of the occupational health supplement data of the 1988 national health interview survey. *Am J Ind Med.* 1995; 27:451-470.

¹⁸ Christiani DC, Wegman DH. Respiratory disorders, In: *Occupational Health: Recognizing and Preventing Work-Related Disease* (3rd ed.) Levy BS, Wegman DH (eds.) Little, Brown, 1995:427-454.

¹⁹ National Institute for Occupational Safety and Health. *Work-related lung disease surveillance report 2002.* Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. DHHS (NIOSH) Number 2003-111. 2003.

²⁰ Rosenman KD, Reilly MJ, Henneberger PK. Estimating the total number of newly recognized silicosis cases in the United States. *Am J Ind Med.* 2003; 44:141-147.

²¹ Goodwin S., Stanbury M, Wang, M-L, Silbergeld, E, Parker, JE. Previously undetected silicosis in New Jersey decedents. *Am J Ind Med.* 2003; 44:304-311.

²² Calvert GM, Plate DK, Das R, Rosales R, Shafey O, Thomsen C, Males 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; 45:114-23.

²³ Blondell J. Epidemiology of pesticide poisonings in the United States, with special reference to occupational cases. *J Occup Med.* 1997;12:209-220.

- ²⁴ Calvert GM, Mehler LN, Rosales R, Baum L, Thomsen C, Male D, Shafey O, Das R, Lackovic M, Arvizu E. Acute pesticide-related illnesses among working youths, 1988-1999. *Am J Public Health*. 2003; 93:605-610.
- ²⁵ Albin, M, Magnani, C, Krstev, S, Rapiti, E, and Shefer, I. Asbestos and cancer: An overview of current trends in Europe. *Environ Health Perspect*. 1999; 107(2): 289-298.
- ²⁶ Price, B and Ware, A. Mesothelioma trends in the United States: an update based on Surveillance, Epidemiology, and End Results Program data for 1973 through 2003. *Am J Epidemiol*. 2004;159(2): 107-112.
- ²⁷ U.S. Department of Labor. *Program Highlights; Fact Sheet No. OSHA 92-06, 2004* Available at: www.pp.okstate.edu/ehs/training/oshasbes.htm
- ²⁸ U.S. Department of Health and Human Services. *Healthy People 2010*. 2nd edition. Washington DC. US Government Printing Office. November 2000. Objective 20-7.
- ²⁹ Rosenman KD, Sims A, Luo Z, Gardiner J. Occurrence of lead-related symptoms below the current Occupational Safety and Health Act allowable blood lead levels. *J Occup Environ Med*. 2003; 45:546-555
- ³⁰ Schwartz J. Lead, blood pressure and cardiovascular disease in men. *Arch Environ Health*. 1995; 50:31-37.
- ³¹ Centers for Disease Control and Prevention. *Second National Report on Human Exposure to Environmental Chemicals*. Atlanta, Ga: U.S Department of Health and Human Services. NCEH Pub. No. 03-0022, Lead CAS No. 7439-92-1. 2003. Available at: <http://www.cdc.gov/exposurereport>
- ³² Roscoe RJ, Ball W, Curran JJ, et al. Adult blood lead epidemiology and surveillance — United States, 1998 - 2001. *MMWR* December 13, 2002; 51(No. SS11);1-10.

- ³³ United States Department of Labor, BLS Bulletin 2551. *Occupational Injuries and Illnesses: Counts, Rates, and Characteristics, 1999*. September 2002
- ³⁴ Institute of Medicine. *Safe Work in the 21st Century: Education and Training Needs for the Next Decade's Occupational Safety and Health Personnel*. 2000
- ³⁵ McQuiston TH, Zakocs RC, Loomis DL . The case for stronger OSHA enforcement – Evidence from evaluation research. *Am J Public Health*. 1998; 88:7.
- ³⁶ World Health Organization, *International Statistical Classification of Diseases and Related Health Problems*, Tenth Revision. Geneva, Switzerland. 1992. Updated and Corrected by the National Center of Health Statistics, October 1998.
- ³⁷ World Health Organization. *International Classification of Diseases for Oncology*. Geneva Switzerland. Last updated 2000
- ³⁸ World Health Organization. *International Classification of Diseases, Ninth Revision, Clinical Modification*. Last Updated 2003.
- ³⁹ U.S. Chamber of Commerce. *2003 Analysis of Workers' Compensation Laws*. U.S. Chamber of Commerce; Statistics and Research Center, Washington, D.C. 2003.
- ⁴⁰ Watson WA, Litovitz TL, Rodgers GC, et. al. 2002 Annual report of the American Association of Poison Control Centers Toxic Exposure Surveillance System." *Am J Emerg Med*. September 2003; 21:5.

APPENDIX A:

Industries with High Risk for Occupational Morbidity

This list represents 25 high risk industries based on the Standard Industrial Classification (SIC) system, the traditional governmental industrial coding system. The SIC system is being replaced by the North American Industrial Classification System (NAICS). In order to utilize the currently available data, the SIC codes were converted to NAICS codes. More than 25 NAICS codes were needed to match the original SIC industry list. The NAICS codes are listed in the “how-to” guide for this Indicator.

SIC 201: Meat Products	SIC 346: Metal Forgings and Stampings
SIC 242: Sawmills and Planing Mills	SIC 353: Construction, Mining, and Materials Handling Machinery and Equipment
SIC 244: Wood Containers	SIC 358: Refrigeration and Service Industry Machinery
SIC 253: Public Building and Related Furniture	SIC 371: Motor Vehicles and Motor Vehicle Equipment
SIC 254: Partitions and Fixtures	SIC 373: Ship and Boat Building and Repairing
SIC 321: Flat Glass	SIC 375: Motorcycles, Bicycles, and Parts
SIC 326: Pottery and Related Products	SIC 375: Miscellaneous Transportation Equipment
SIC 327: Concrete, Gypsum, and Plaster Products	SIC 451: Scheduled Air Transportation and Air Courier Services
SIC 332: Iron and Steel Foundries	SIC 505: Wholesale of Metals and Minerals, Except Petroleum
SIC 333: Primary Smelting and Refining of Nonferrous Metals	SIC 805: Nursing and Personal Care Facilities
SIC 334: Secondary Smelting and Refining of Nonferrous Metals	SIC 842: Botanical and Zoological Gardens
SIC 336: Nonferrous Foundries (Castings)	
SIC 342: Cutlery, Handtools, and General Hardware	
SIC 344: Fabricated Structural Metal Products	

APPENDIX B:

Occupations with High Risk for Occupational Morbidity

- Technicians, n.e.c.
- Miscellaneous food preparation occupations
- Public transportation attendants
- Timber cutting and logging occupations
- Telephone line installers and repairers
- Electrician apprentices
- Sheetmetal duct installers
- Structural metal workers
- Punching and stamping press machine operators
- Grinding, abrading, buffing and polishing machine operators
- Sawing machine operators
- Extruding and forming machine operators
- Furnace, kiln, and oven operators, exc. food
- Crushing and grinding machine operators
- Truck drivers
- Driver-sales workers
- Excavating and loading machine operators
- Misc. material moving equipment operators
- Helpers, construction trades
- Construction laborers
- Production helpers
- Freight, stock, and material handlers, nec
- Laborers, except construction

APPENDIX C:

Industries and Occupations with High Risk for Occupational Mortality

Industries

Agricultural crop production
Agricultural livestock production
Landscape and horticultural services
Agricultural services
Forestry
Fishing, hunting and trapping
Metal mining
Coal mining
Oil and gas extraction
Nonmetallic mining and quarrying, except fuel
Construction
Miscellaneous petroleum and coal products
Logging
Cement, concrete, gypsum and plaster products
Ship and boat building and repair
Taxicab service
Trucking service
Water transportation
Sanitary services
Wholesale motor vehicles and equipment
Wholesale scrap and waste materials
Wholesale farm product raw materials
Wholesale petroleum products
Mobile home dealers
Miscellaneous vehicle dealers
Liquor stores
Electrical repair shops

Occupations

Airplane pilots and navigators
Guides
Farmers, except horticultural
Managers, farms, except horticultural
Supervisors, farm workers
Timber cutting and logging occupations
Fishers
Electrician apprentices
Electrical power installers and repairers
Roofers
Structural metal workers
Constructions trades, nec
Supervisors, extractive occupations
Mining machine operators
Truck drivers
Driver-sales workers
Taxicab drivers and chauffeurs
Sailors and deckhands
Excavating and loading machine operators
Grader, dozer, and scraper operators
Miscellaneous material moving equipment operators
Construction laborers