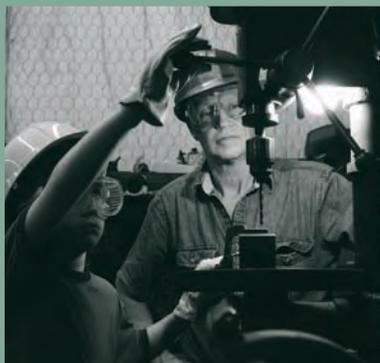
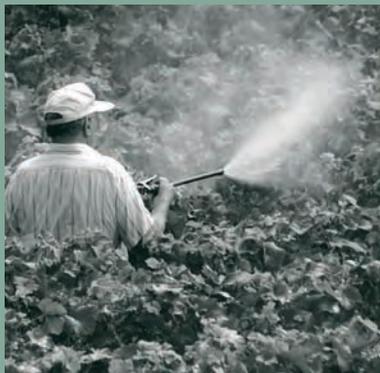


Occupational Health in Oregon

Occupational Public Health Program



Acknowledgements

A special thank you to our reviewers:

National Institute for Occupational Safety and Health: Margaret (Peggy) Filios, Jacek Mazurek

Oregon Department of Consumer and Business Services: Tasha Chapman, Russ Reasoner

Oregon Department of Human Services Public Health Division:

Environmental Health Assessment Program: Julie Early-Alberts, Karen Bishop

Hazardous Substances Emergency Events Surveillance Program: Laura Boswell

Injury Prevention and Epidemiology Program: Matthew Laidler, Heidi Purcell

Lead Poisoning Prevention Program: Barbara Zeal

Oregon Asthma Program: Tracy Carver

Oregon Pesticide Exposure Safety & Tracking Program: Justin Waltz

Oregon State Cancer Registry: Catherine Riddell

Oregon Department of Human Services Public Health Division/Oregon Health & Science University, Oregon

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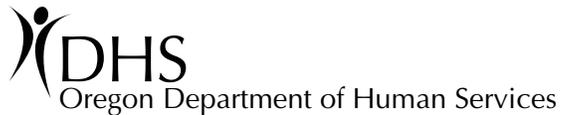
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This work is supported by National Institute for Occupational Safety and Health (NIOSH)

Cooperative Agreement U60 OH008472.

Occupational Health in Oregon

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Department of Human Services
Public Health Division
Office of Environmental Public Health
Occupational Public Health Program

May 2009



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Introduction and executive summary



Introduction and executive summary

Every day, 16 workers in the United States die from injuries that happen at work, and 134 die from work-related diseases. Further, nearly 12,000 private-sector workers have nonfatal work-related injuries or illnesses daily, more than half of which require job transfers, work restrictions or time away from work. Every day, approximately 9,000 workers are treated in emergency departments due to occupational injuries; 200 of these workers are hospitalized. These injuries are expensive. The 2004 workers' compensation (WC) costs were estimated at \$87 billion,¹ an estimate that does not include indirect costs of work-related injuries and illnesses, such as loss of productivity and replacement training.

Work-related injuries, illnesses and deaths are preventable. However, in 2006 more than 60,000 of Oregon's 1.7 million workers were injured on the job or experienced a work-related illness. In 2006, 79 Oregonians died after being hurt at work: an average of more than one work-related death per week.

Successful approaches to healthier and safer workplaces start with using data to understand the scope of the problem. Surveillance data are used to determine the magnitude of work-related injuries and illnesses, as well as to identify workers at greatest risk and establish priorities for prevention.

The Oregon Department of Human Services (DHS) Public Health Division (PHD) has been involved in occupational health surveillance since 1988. The Oregon Occupational Public Health Program (OPHP) was established to improve state-based occupational health surveillance by strengthening and expanding existing tracking and prevention partnerships in the public and private sectors.

OPHP is comprised of four public health surveillance programs:

- **Fundamental:** Using data from governmental and partner sources, OPHP generates and publishes 19 occupational health indicators (OHIs) for each year. The OHIs were chosen to highlight specific work-associated disease, injury or other factors associated with occupational health.
- **Burn:** The OPHP burn surveillance project is working to reduce the number of occupational burns in Oregon by identifying the occupations, industries and populations that have a high risk of burn injury; helping our partners develop targeted intervention strategies to ensure Oregon workers stay healthy; and sharing intervention strategies with other states.
- **Fatality:** The Oregon Occupational Fatality Assessment and Control Evaluation (OR-FACE) program is a collaboration between PHD and the Center for Research on Occupational and Environmental Toxicology (CROET) at Oregon Health & Science University (OHSU). The OR-FACE program is responsible for collecting data on all Oregon traumatic workplace fatalities and collaborates with partners to prevent work-related deaths.
- **Pesticide:** Oregon has a long and active history of pesticide poisoning surveillance. OPHP continues to perform activities related to Oregon workers' pesticide exposures with the help of the Oregon Pesticide Exposure Safety & Tracking (PEST) Program.

Oregon's occupational health promotion projects are carried out by a variety of agencies and organizations, including Oregon DHS PHD, Oregon Occupational Safety and Health Division (OR-OSHA), insurance carriers, university faculty and staff, community-based organizations and others.

Many sources of data are used for tracking work-related illnesses and injuries, including workers' compensation claims, hospital discharge data, the Bureau of Labor Statistics (BLS) Annual Survey of Occupational Injuries and Illnesses (SOII) and the Oregon Behavioral Risk Factor Surveillance System (BRFSS). This Occupational Health in Oregon report presents the state's most recent data to examine trends in work-related illnesses and injuries.

This report begins with a brief summary of the most current work force characteristics for our state (between 2004 and 2006, depending on the data source) followed by a section on each of the following conditions or populations: fatal work-related injuries, nonfatal work-related injuries, musculoskeletal disorders (MSD), occupational burns, occupational exposure to lead, acute work-related pesticide poisoning, work-related asthma (WRA), pneumoconiosis (occupational lung disease), malignant mesothelioma, younger workers, older workers, and women in the work force.

Occupational injuries

Findings

- There were 79 occupational fatalities in Oregon in 2006, 31 percent of which involved motor vehicle transportation. On average, more than one worker died from a work-related injury every week. Oregon's fatal injury rate exceeded the national rate in 2006 (4.4 per 100,000 workers vs. 3.9 for the United States).
- Oregon's fatal occupational injury rate has remained fairly stable since 2003.
- Oregon's nonfatal occupational injury rate has decreased over the past 10 years, from a high of 2,600 injuries per 100,000 workers in 1996 to 1,700 per 100,000 in 2005. Work-related hospitalizations have also decreased over the past five years.

- Rates of carpal tunnel syndrome (CTS) and back injuries decreased between 2000 and 2006 (from 29 to 16 per 100,000 for CTS and 374 to 364 per 100,000 for back injuries); rates of neck and shoulder injury increased from 208 to 380 per 100,000 between 2000 and 2004.
- There were 272 work-related burns and 26 hospitalizations in 2006. The rate of work-related burn hospitalization decreased between 2001 and 2006.

Recommendations

- Many strategies could be implemented to reduce occupational injuries and fatalities due to transportation crashes. For example, employer-provided vehicle maintenance programs, recordkeeping of workers' driving performance, and defensive driving training may be effective. Additional strategies for employers, workers and policy makers are available in the National Institute for Occupational Safety and Health (NIOSH) Publication 2003-119, "Work-related roadway crashes – Challenges and opportunities for prevention."
- Oregon's tracking of musculoskeletal disorders needs to be improved. This is particularly important for industry sectors where these injuries are most common, such as trade, transportation and utilities, and health care.
- An ergonomics standard designed to prevent musculoskeletal disorders could be helpful to reduce the burden of these injuries for Oregon workers. California has implemented this type of standard and has realized both cost savings and health risk reduction.

Toxic exposures

Findings

- Fifty-eight adult Oregonians had elevated blood lead levels (greater than or equal to 25 micrograms per deciliter) in 2005. Rates of adult lead poisoning decreased overall between 2002 and 2005.
- Incidence of acute work-related pesticide poisoning remained relatively stable between 2000 and 2005, with a slight elevation in reported cases in 2002. Fifty-two Oregon workers reported acute pesticide poisoning in 2005.

Recommendations

- The PHD should continue its lead poisoning prevention programs, particularly because occupations with the potential for work-related lead exposure are projected to grow over the next 10 years. Oregon should adopt primacy for administering the U.S. Environmental Protection Agency's (EPA) new Remodeling, Repair and Painting rule, to directly regulate training and enforcement for the activities that represent the greatest risk of lead poisoning.
- Work-related pesticide poisoning surveillance needs to be expanded. The current system may not effectively capture reports of pesticide illnesses by workers who speak languages other than English or who may be concerned about retaliation. Further, workers with disabilities may face additional challenges to know and consistently practice pesticide-safe work practices.

Occupational diseases

Findings

- Asthma prevalence among Oregon adults increased from 7.3 percent in 1999 to 9.9 percent in 2005. More than 50 percent of Oregonians with asthma reported that their asthma was caused or aggravated by chemicals, smoke, fumes or dust on the job.
- Occupational lung disease (pneumoconiosis) contributed to the deaths of 14 Oregonians in 2005. The age-adjusted death rate for pneumoconiosis remained about the same between 2000 and 2004. There were 225 pneumoconiosis hospitalizations in 2005. The hospitalization rate for pneumoconiosis decreased slightly between 2000 and 2005.
- Work-related cancer is relatively rare, but 39 Oregonians were diagnosed with malignant mesothelioma in 2005. There was no clear trend in incidence of malignant mesothelioma between 2000 and 2006.

Recommendations

- Many studies have shown that work-related diseases are underreported. These data would be more complete if health care providers were required to report occupational diseases to the state public health agency. Many states have this kind of requirement, but Oregon currently does not.

Special populations

Findings

- In 2006, 32,000 youths under 18 years of age worked in Oregon and 134 filed accepted disabling workers' compensation claims. One young worker died on the job in 2004; no youths under 18 died from work-related injuries or illnesses in 2006.
- Young workers under 18 are more likely than older workers to experience an occupational cut or burn or to be injured in a fall or when struck by an object.
- In 2006, 432 of 66,000 working Oregonians 65 years or older filed accepted disabling workers' compensation claims. Thirteen older adults died as a result of work-related injuries or illnesses in 2006.
- Older workers are more likely to be injured in a fall and to suffer a fracture than younger workers. The average time away from work after an injury is 40 percent longer for older workers.
- Women are more likely than men to experience work-related sprains, strains and tears, as well as musculoskeletal disorders. Women account for a larger proportion than men of workers' compensation claims for the service industry, and in particular for the health services industry. Women are also more likely than men to be injured at work due to assault or violence.

Recommendations

- OPHP should continue to participate in the Oregon Young Worker Health and Safety Coalition, and should advocate for evidence-based interventions by the Coalition members to address the elevated health risks of cuts, burns or falls.
- Oregon businesses that employ youth should take advantage of local training opportunities for prevention of youth worker injury and illness; for example, the Young Worker Leadership Academies' curriculum developed by the Labor Occupational Health Program at the University of California at Berkeley.
- 2007's House Bill 2022, which requires Oregon health care employers to report incidents of work-related violence against employees, should be extended beyond 2008; data from this surveillance program should be used to create and deliver interventions to reduce workplace violence in health care settings.

Reference

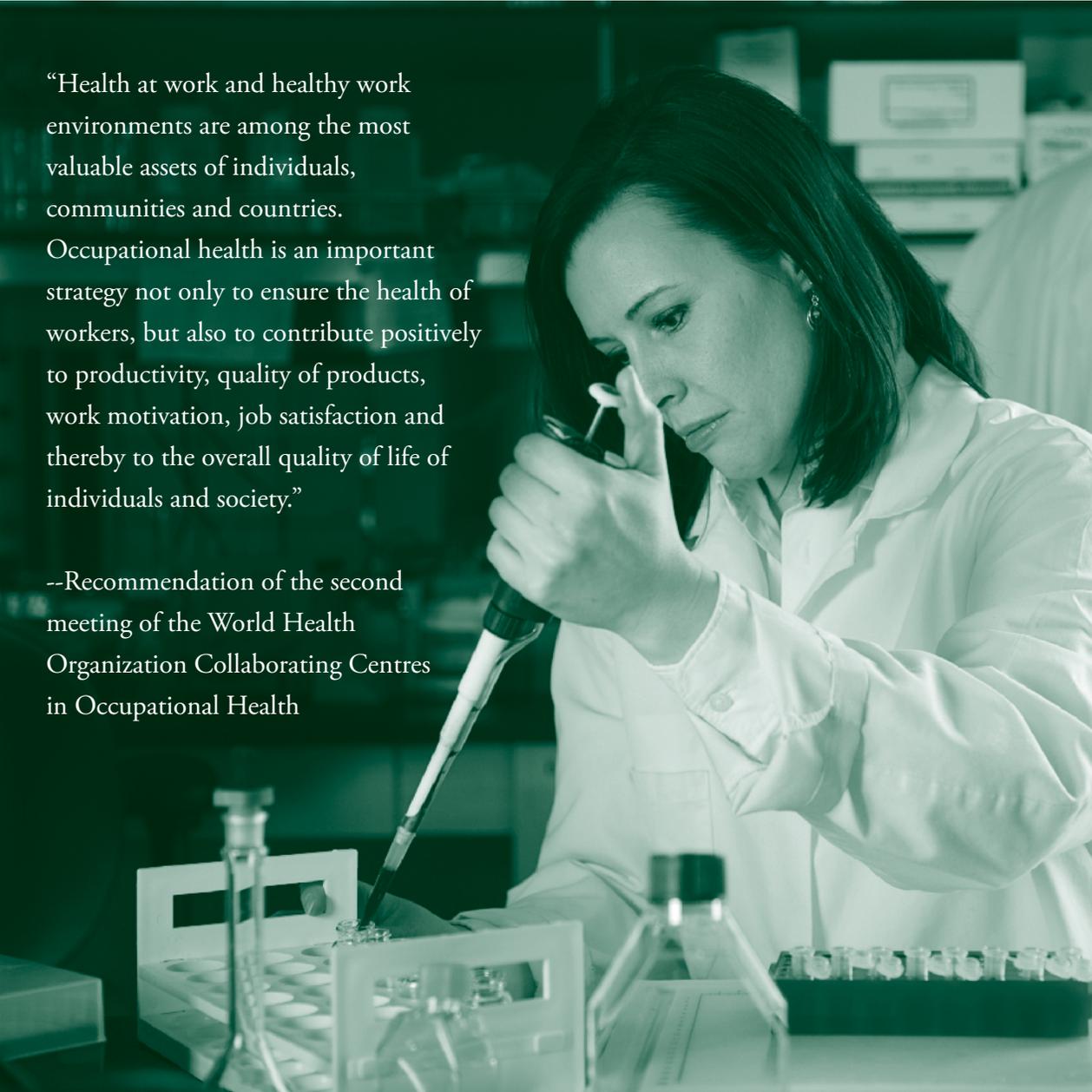
- ¹ National Institute for Occupational Safety and Health (NIOSH). About NIOSH. [Accessed April 2, 2009.] Available at www.cdc.gov/niosh/about.html.



Chapter 1: Oregon work force characteristics

“Health at work and healthy work environments are among the most valuable assets of individuals, communities and countries. Occupational health is an important strategy not only to ensure the health of workers, but also to contribute positively to productivity, quality of products, work motivation, job satisfaction and thereby to the overall quality of life of individuals and society.”

--Recommendation of the second meeting of the World Health Organization Collaborating Centres in Occupational Health



Chapter 1: Oregon work force characteristics

Oregon's population in 2006 totaled 3.7 million people with 46 percent (1.7 million) recorded as working in non-farm jobs. Differences in work force characteristics such as age, race, ethnicity and employment levels in specific industries or occupations can affect rates of work-related injuries and illnesses. Table 1-1 presents the characteristics of the working population in Oregon. Table 1-2 presents the distribution of workers by industry and occupation. Finally, Table 1-3 shows the average workers' compensation claim cost at closure for 2004-2005.

Table 1-1. Worker demographics and employment characteristics, ages 16 and older, Oregon, 2000-2006 annual averages

	2000	2001	2002	2003	2004	2005	2006
Number employed (thousands)	1,715	1,680	1,695	1,707	1,710	1,732	1,795
% Work force unemployed	4.8	6.3	7.5	8.2	7.6	6.0	5.4
% Male	53.7	53.6	53.8	53.7	54.4	53.3	54.5
% Female	46.3	46.4	43.8	46.3	45.6	46.7	45.5
% Ages 16-17	1.8	2.2	1.5	1.1	1.3	1.6	1.8
% Ages 18-64	95.7	95.5	96.0	96.2	95.5	94.6	94.6
% Ages 65 and older	2.5	2.3	2.5	2.7	3.2	3.8	3.7
% White	93.9	93.3	91.5	90.8	90.9	90.1	90.9
% Black	NA	1.4	1.7	1.3	1.6	1.6	1.3
% Other	NA	5.2	6.8	7.9	7.5	8.3	9.2
% Hispanic ¹	7.4	6.8	7.4	9.5	9.2	7.0	7.7
% Self-employed	11.2	9.5	9.0	9.0	10.4	NA ²	NA
% Employed part-time	21.0	20.8	19.8	20.3	20.5	NA	NA
% Work < 40 hours/week	36.5	37.7	36.6	36.6	36.3	NA	NA
% Work 40 hours/week	33.6	33.7	34.8	36.8	36.3	NA	NA
% Work > 40 hours/week	29.9	28.6	28.6	26.7	27.4	NA	NA

¹ Because Hispanic refers to ethnicity rather than race, it is listed separately from the race categories above it. Hispanics and Latinos may be of any race.

² Not available after 2004.

Source: U.S. Bureau of Labor Statistics (BLS)

Table 1-2. Distribution of work force by major industry and occupation groups, Oregon, 2003–2004 annual averages

	2003	2004
Number employed	1,707,000	1,710,000
Industry group		
% Education and health services	18.9	19.5
% Wholesale and retail trade	16.5	16.1
% Professional and business services	9.6	9.8
% Durable goods manufacturing	9.4	9.2
% Leisure and hospitality	9.0	8.7
% Financial activities	7.3	6.7
% Construction	6.7	7.7
% Other services	5.3	4.7
% Transportation and utilities	4.6	4.5
% Public administration	4.3	4.0
% Non-durable goods manufacturing	3.7	4.1
% Agriculture and related	2.9	3.4
% Information	1.7	1.8
% Mining	0.1	NA
Occupational category		
% Professional and related occupations	18.6	19.5
% Service	16.8	15.6
% Management, business and financial occupations	13.9	15.6
% Office and administrative support	14.3	13.8
% Sales and related occupations	12.5	11.6
% Production	7.0	6.7
% Transportation and material moving	6.6	6.5
% Construction and extraction	4.9	5.3
% Installation, maintenance and repair	3.3	3.5
% Farming, fishing and forestry occupations	2.1	1.8

Source: BLS

Table 1-3. Average claim cost at closure, Oregon workers' compensation system, 2004–2005

Closure year	# claims closed	Medical costs paid	Time-loss paid	Mean time-loss days paid	Median time-loss days paid	Permanent partial disability paid	Total dollars paid
2004	22,632	\$7,886	\$4,074	62	20	\$2,374	\$14,334
2005	22,018	\$8,068	\$3,926	62	20	\$2,504	\$14,499
Difference	-2.7%	2.3%	-3.6%	0.0%	0.0%	5.5%	1.2%

Source: Oregon Department of Consumer and Business Services (DCBS) Information Management Division (IMD)

Chapter 2: Fatal work-related injuries



Chapter 2: Fatal work-related injuries

The Oregon Occupational Fatality Assessment and Control Evaluation (OR-FACE) program is a collaboration between PHD and the Center for Research on Occupational and Environmental Toxicology (CROET) at Oregon Health & Science University. OR-FACE conducts surveillance, investigation and assessment of traumatic occupational fatalities in Oregon and engages in outreach and education to prevent traumatic occupational fatalities and promote occupational safety. OR-FACE has recorded occupational fatalities since 2003 and now has four years of data from 2003 to 2006.

In that time, OR-FACE recorded 284 occupational fatalities in 255 incidents. The average fatality rate of 4.0 per 100,000 employed workers over the four-year period is consistent with the national occupational fatality rate of 4.0 over the same period (see Table 2-1).

Table 2-1. Occupational fatalities, Oregon, 2003–2006

Year	Incidents	Fatalities*	Oregon fatality rate per 100,000	U.S. fatality rate per 100,000
2003	63	76	4.4	4.0
2004	61	62	3.5	4.1
2005	64	67	3.8	4.0
2006	67	79	4.4	3.9
Total	255	284	Avg. 4.0	Avg. 4.0

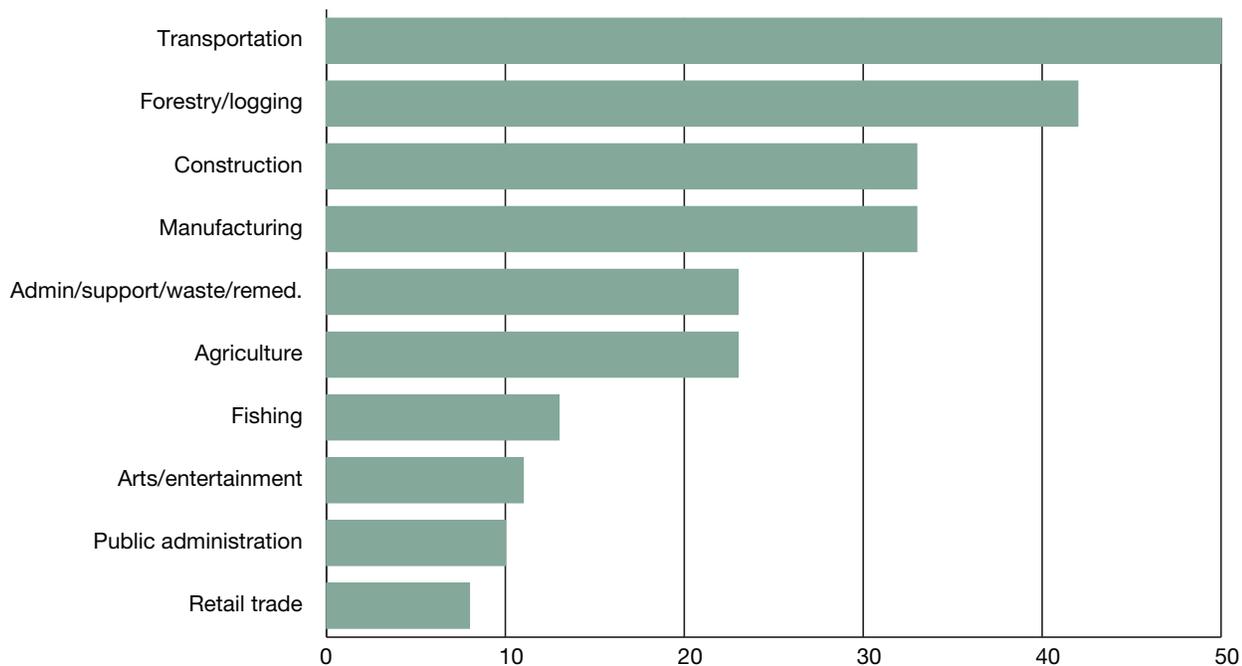
*More than one fatality can occur per incident.

Source: Oregon Occupational Fatality Assessment and Control Evaluation (OR-FACE) program

The OR-FACE data is similar but not identical to the total for the U.S. Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) – differing by one to two incidents each year due to different inclusion criteria, and approximately double the count by the Oregon Workers’ Compensation Division, which includes only covered employees.

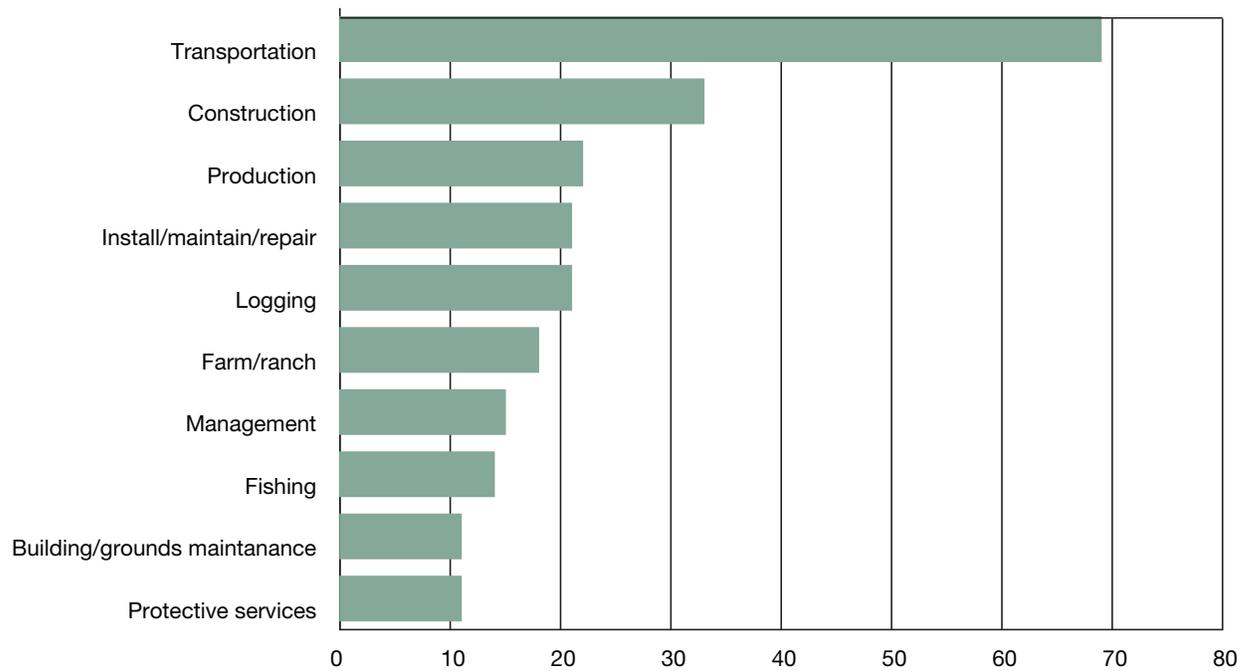
Priority areas of concern in Oregon fatalities relate to motor vehicle transportation, mobile machinery, logging, machinery, fall hazards, persons outside vehicles and water transportation. A few of these priority areas are indicated in the classification of fatalities by standard codes for industry, occupation and event (see Figures 2-1, 2-2 and 2-3).

Figure 2-1. Occupational fatalities by top 10 industries (North American Industries Classification System), Oregon, 2003–2006



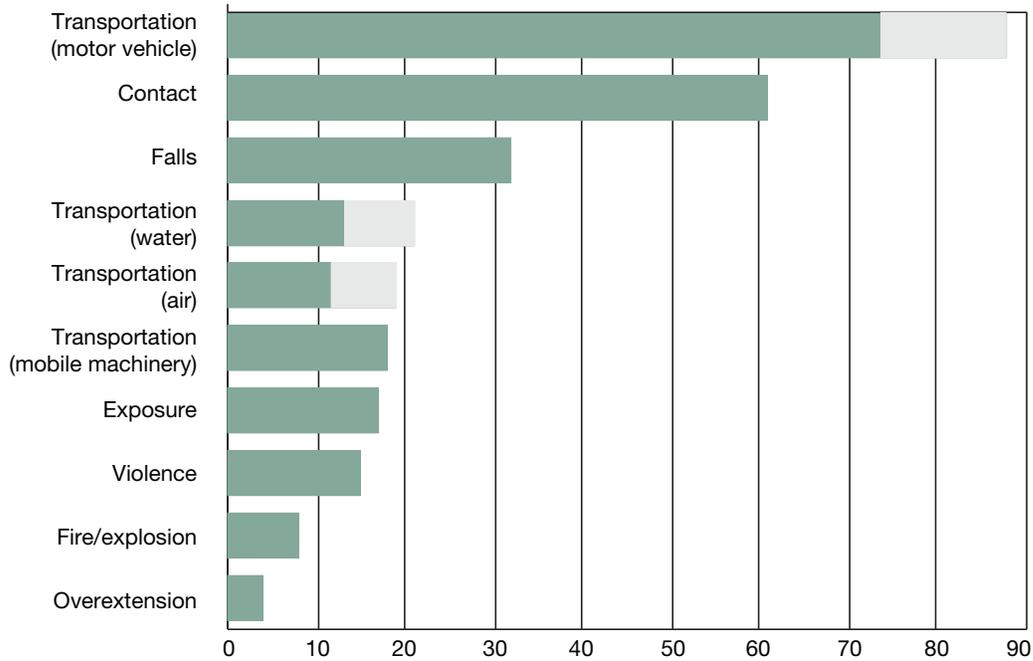
Source: OR-FACE

Figure 2-2. Occupational fatalities by top 10 occupations (Standard Occupational Classification), Oregon, 2003–2006



Source: OR-FACE

Figure 2-3. Occupational fatalities by event (Occupational Injury and Illness Classification System), Oregon, 2003–2006*



*Gray shows multiple fatalities per incident.

Source: OR-FACE

Specific hazards within the standard coded categories were detected by assessment of detailed information in OR-FACE files, which include reports from the medical examiner, police and agency investigators (mostly OR-OSHA), as well as news stories, death certificates and occasional other records from emergency responders, hospitals or independent OR-FACE investigations.

Motor vehicle transportation

Fatalities in motor-vehicle transportation incidents – defined as events that occur during the vehicle’s normal operation– comprised 31 percent of all occupational fatalities. The most prominent types of vehicles involved were semi-trucks with trailers and log trucks. Of the 74 incidents that occurred during 2003–2006, 53 (72 percent) were crashes on paved roads, 13 (17 percent) were crashes on unpaved roads, six (8 percent) involved a person outside the vehicle, and two (3 percent) involved a passenger exiting a moving truck. A majority of the 66 crash incidents occurred in autumn and winter and in the dark or twilight hours. Also, older workers were disproportionately involved in crash events. Workers aged 65 and older comprised 3 percent of the total employed labor force in Oregon, but were involved in 11 percent (nine) of the crash incidents.

Mobile machinery

Incidents involving various types of mobile machinery in diverse events have been a prominent and persistent area of concern. Specific safety recommendations have been developed for the operation of bulldozers, skidders and forklifts, and tractors. A few incidents have also involved cable rigging failure in towing or lifting operations.

Logging

Working as a tree faller is one of the most hazardous occupations in Oregon, with an estimated fatality rate of 258 per 100,000 workers. The fatality rate for log truck drivers is only slightly lower, at 239 per 100,000 workers. Of the 38 incidents in logging operations in 2003–2006, 11 (29 percent) involved log trucks, 10 (26 percent) involved fallers, eight (21 percent) involved yarding operations (both skyline and helicopter logging), three (8 percent) involved road construction, and six were in singular events.

Machinery

A number of incidents each year involved various types of industrial machinery. Most remarkable in these incidents was a common risk factor across different settings where machine maintenance was conducted without first completely shutting down and locking out the machine. Carelessness was occasionally the issue, but in other instances – as with a rock crusher or wood chipper – maintenance was purposely conducted during operation for convenience and speed. In several cases, machines' safety mechanisms were disabled to allow access without shutting down the machine.

Fall hazards

Fall hazards involve a wide variety of workers. Construction workers, who were involved in 11 (33 percent) of the 33 fall incidents, were the most affected group. Falls constituted the largest event category in construction. Ladders were involved in nine (27 percent) of all fall incidents. Most of the remaining incidents involved working at a height: on a roof, trailer, catwalk, treetop, scaffold or other elevated work area; however, three (9 percent) of the incidents involved ground-level falls. Several fall incidents involved delayed death, with complications due to poor health, medication, pulmonary embolism, heart failure or other interacting conditions.

Parked vehicles

Unexpected movement of a motor vehicle or mobile machinery, distinct from transportation events, was a factor in a number of incidents where the operator or another person was outside the vehicle. During 2003–2006, 21 such incidents comprised 34 percent of the 61 contact events and 8 percent of the total 255 incidents. A person outside a vehicle was the most common type of incident in agriculture, comprising six (26 percent) of 23 incidents in agriculture.

Water transportation

Over four years, 21 workers drowned in water transportation events; four additional workers drowned while swimming or working near water. The number of water transportation events varied greatly each year. Multiple victims were often involved. About two-thirds of the incidents and three-fourths of the fatalities occurred in the ocean or at a bar to the ocean. Crab boats were the most common type of boat involved.

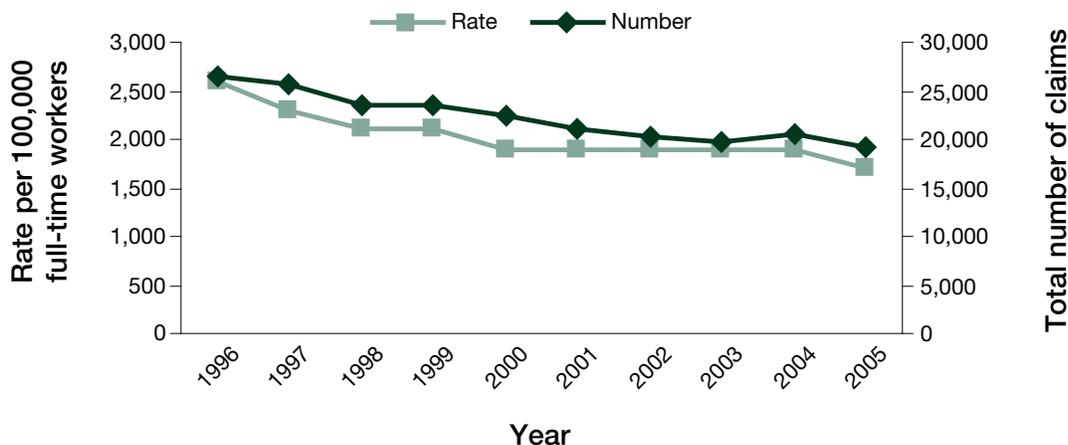
Chapter 3: Occupational injuries



Nonfatal work-related injuries

The U.S. Bureau of Labor Statistics (BLS) reported that in 2005 there were 1.2 million injuries and illnesses that required days away from work resulting in a rate of 1,357 per 100,000 full-time workers. In Oregon, the number of nonfatal cases involving days away from work was 19,100, resulting in a rate of 1,700 per 100,000 full-time workers. Both the number of accepted disabling claims and the claims rate per 100,000 workers have generally been decreasing in Oregon over the past five years (see Figure 3-1).

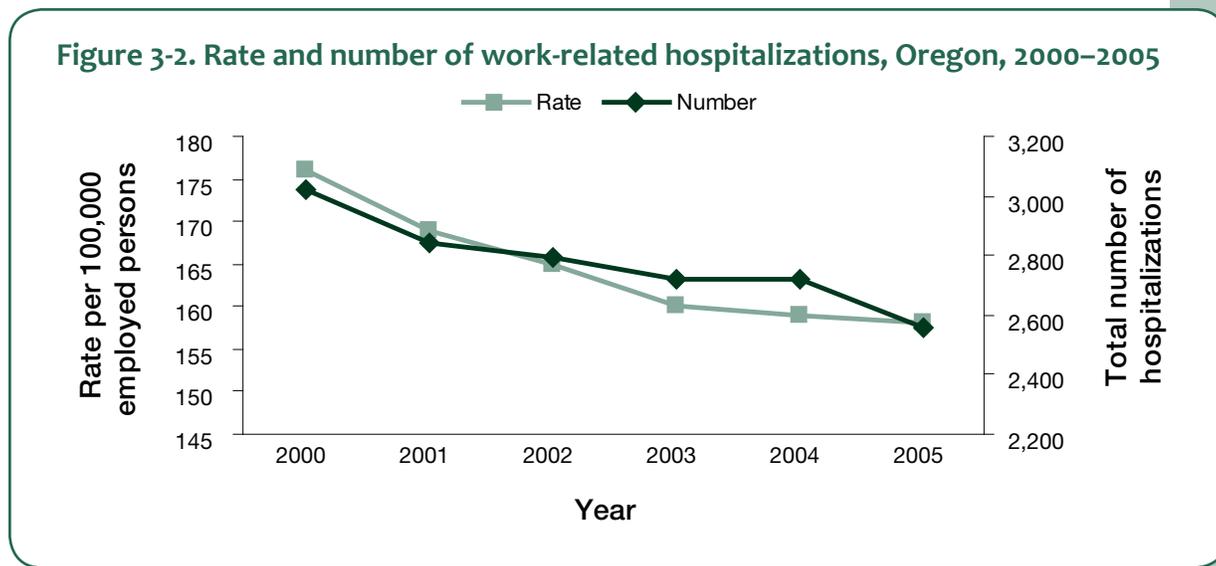
Figure 3-1. Rate and number of nonfatal work-related injury and illness claims, Oregon, 1996–2005



Source: U.S. Bureau of Labor Statistics (BLS) Survey of Occupational Injuries and Illnesses (SOII)

Reviewing only the BLS Survey of Occupational Injuries and Illnesses (SOII) data to estimate Oregon's extent of occupational injuries and illnesses does not present a complete picture. For example, the SOII excludes public sector, self-employed and household workers as well as workers on farms with less than 11 employees. Taken together, these categories comprise up

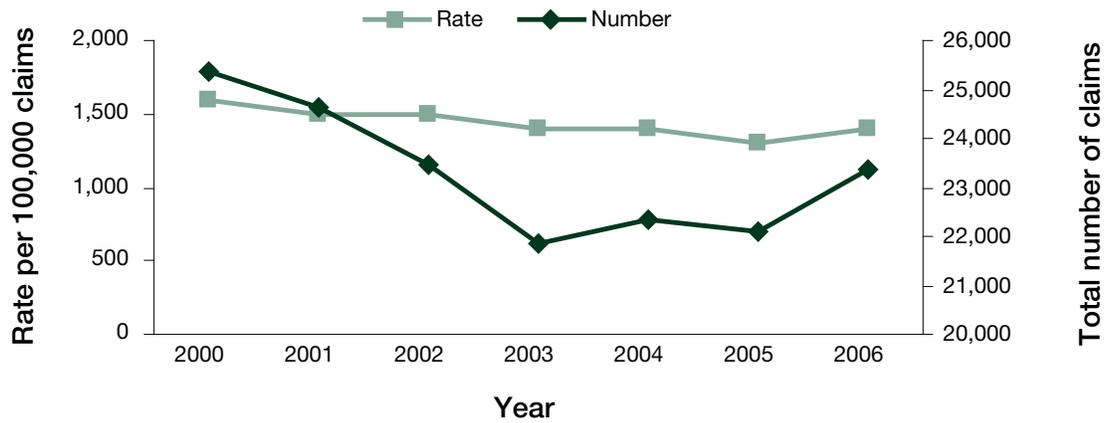
to 21 percent of the U.S. labor force.¹ Thus, supplemental data sources (e.g., hospital discharge records, workers' compensation claims, etc.) are important to get a complete picture of Oregon's state of occupational health. Figure 3-2 presents the number and rate of work-related hospitalizations in Oregon for persons 16 years and older from 2000 to 2005. Both values show a decreasing trend over time.



Source: Oregon Association of Hospitals and Health Systems (OAHHS) hospital discharge index (HDI), BLS Current Population Survey (CPS)

Figure 3-3 presents the total number and rate of disabling (three or more lost workdays, hospitalization or likely permanent disability) claims accepted into the Workers' Compensation Division between 2000 and 2006. The rate of accepted disabling claims has generally been decreasing. Not all Oregon workers are eligible for workers' compensation (e.g., self-employed).

Figure 3-3. Rate and number of accepted disabling claims, Oregon, 2000–2006



Source: Oregon Department of Consumer and Business Services (DCBS) Information Management Division (IMD)
Oregon Workers' Compensation (OWC)

Table 3-1 shows the breakdown of days away from work in Oregon by industry between 2003 and 2005. Utilities, construction and manufacturing were highest in 2005. In 2003 and 2004, transportation and warehousing had the highest incidence rate of days away from work.

Table 3-1. Incidence rate of days away from work for nonfatal occupational illnesses and injuries by industry, Oregon, 2003–2005

Industry	2003	2004	2005
Agriculture, forestry, fishing and hunting	2.8	3.2	1.5
Construction	3.5	2.9	3.0
Manufacturing	1.9	1.9	2.2
Wholesale trade	1.7	1.7	1.9
Retail trade	1.8	1.6	1.7
Transportation and warehousing	4.4	3.9	2.8
Utilities	-	3.2	3.8
Information	-	2.5	0.7
Finance and insurance	0.2	0.4	0.2
Real estate, rental and leasing	1.7	1.5	1.4
Professional, scientific and technical services	0.7	0.4	0.7
Management of companies and enterprises	0.2	0.3	0.6
Administrative and support and waste management and remediation services	2.4	3.1	1.4
Educational services	-	-	1.3
Health care and social assistance	2.0	2.3	1.9
Arts, entertainment and recreation	1.5	1.5	1.7
Accommodation and food services	2.0	1.8	1.5
Other services (except public administration)	1.2	1.0	0.9

Source: BLS, SOII

Reference

- ¹ Leigh JP, Marcin JP, Miller TR. An estimate of the U.S. Government's undercount of nonfatal occupational injuries. *Journal of Occupational and Environmental Medicine* 2004;46(1):10-8.

Musculoskeletal disorders

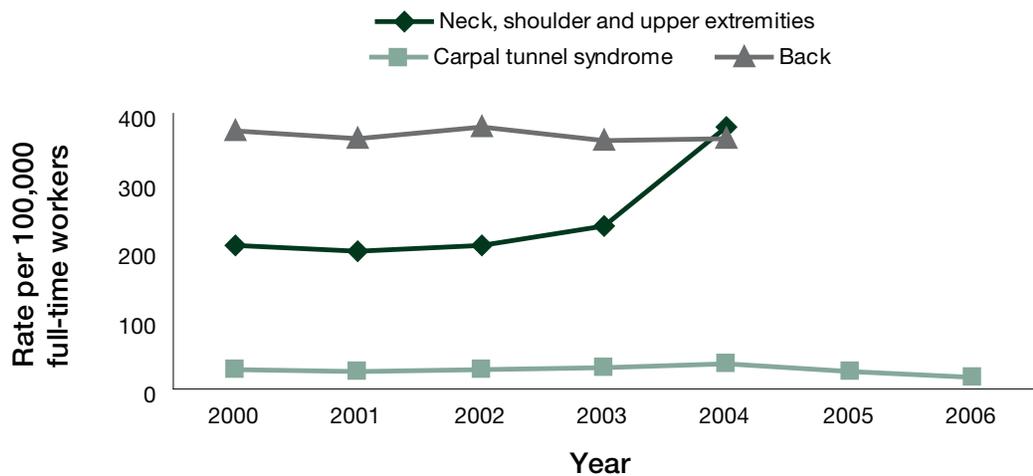
Musculoskeletal disorders (MSDs) consist of injuries or disorders of muscles, nerves, tendons, cartilage, joints and spinal discs. MSDs do not include injuries caused by slips, trips, falls, motor vehicle accidents, etc. The definition of an MSD includes a sprain, strain or tear; back or other pain or soreness; carpal tunnel syndrome (CTS); and hernia. MSDs also include musculoskeletal system and connective tissue diseases and disorders when the event or exposure is from bending, climbing, crawling, reaching, twisting, overexertion or repetitive motion.¹ Workplace risk factors for MSDs include repetitive forceful motions, awkward postures, use of vibrating tools or equipment, and manual handling of heavy or awkward loads. Although MSDs can be caused by a single traumatic event, wear and tear over time can also contribute to these conditions.²

MSDs are more severe than the average nonfatal injury or illness case and cause people to miss more days of work. For example, the median days away from work for an MSD case in 2006 was nine days compared to seven days for all other nonfatal injury and illness cases.³ MSDs can significantly affect the quality of life for workers both on and off the job, and they are among the most costly work-related health problems.

Certain industries and occupations are at higher risk for MSDs. In 2006, the trade, transportation and utilities sector had 34 percent of all MSD cases. The education and health services categories were next with 20 percent, the vast majority of which were health care and social assistance. For occupations, the highest rate of MSDs were found in the nursing aides, orderlies and attendants category (293 per 10,000), followed by laborers and freight handlers (158 per 10,000). Truck drivers had the highest median days away from work (14 days).³

Figure 3-4 illustrates the estimated rate of work-related MSDs in Oregon that result in days away from work, based on BLS data. The rate of CTS has remained fairly steady, with a steeper decline starting in 2005. MSDs of the back were higher than MSDs of the neck and shoulders for all years except 2004. Data for 2005 through 2006 is not available for these parts of the body.

Figure 3-4. Rates of selected work-related musculoskeletal disorders involving days away from work reported by private-sector employers, Oregon, 2000–2006



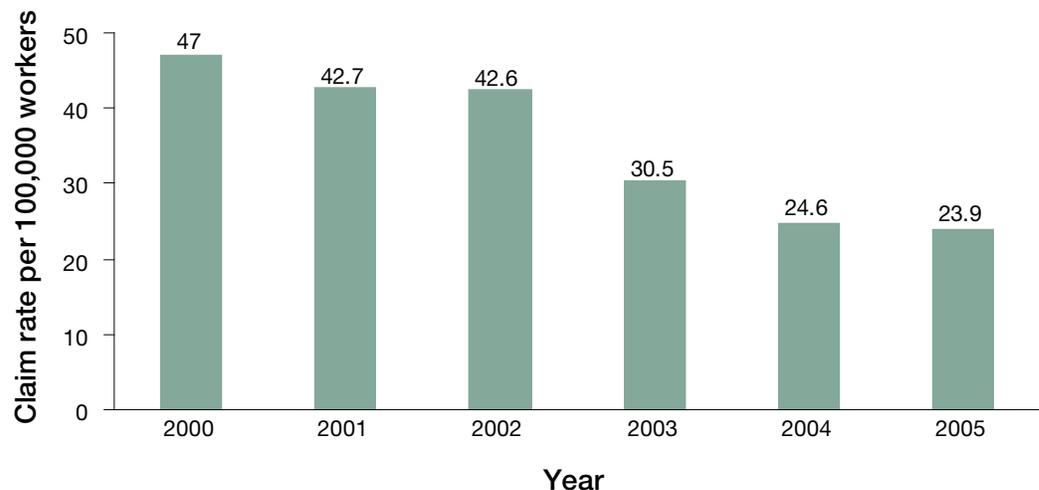
Source: BLS, SOII

Although this annual survey data is a valuable source of information, there are major limitations. For example, it excludes public sector, self-employed and household workers, and workers on farms with fewer than 11 employees. Together these categories may account for 21 percent of the U.S. work force.⁴ Thus, it is imperative to supplement BLS data with other sources, such as workers' compensation claims data.

CTS is named after the eight bones in the wrist, called carpals that form a tunnel-like structure. The tunnel is filled with tendons and nerves that control finger movement and hand sensation. When the wrist is used repeatedly for the same task, the protective coverings that surround the tendons may swell and thicken over time. The swollen tendon coverings put pressure on nerves leading to CTS.¹ One symptom of CTS is painful tingling in the affected hand during the night, often painful enough to disturb sleep; another symptom is a feeling of uselessness in the fingers, sometimes described as feeling swollen when no swelling is apparent.⁴ CTS cases have a higher burden of lost workdays than other types of injury claims. BLS reports 45 percent of CTS cases experience greater than 30 days away from work associated with their injuries.⁵

Figure 3-5 shows the rates of CTS claims from the 2000–2005 Oregon workers’ compensation system data. The claims rate has consistently decreased over the six-year period.

Figure 3-5. Rate of lost work time claims for carpal tunnel syndrome cases identified in Oregon workers’ compensation system, Oregon, 2000–2005



Source: DCBS, IMD, OWC

References

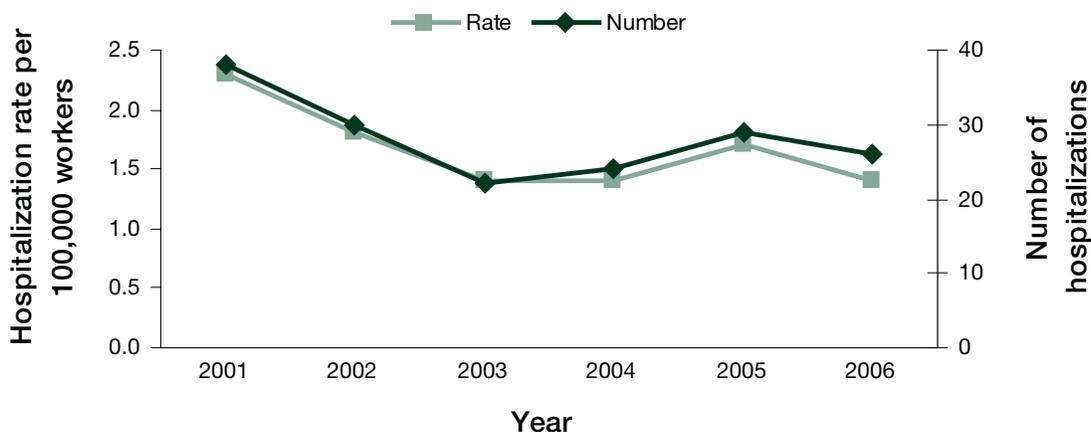
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Occupational burns

Burns are injuries to tissues caused by fire (dry heat), steam (moist heat), radiation, electricity, friction or chemicals. Burns, which have the potential to do serious damage, are the most expensive work-related injuries to treat. Thermal (heat) and chemical burns are the most frequent types associated with work.¹ In 2004, more than 100,000 persons were treated for nonfatal occupational burns in hospital emergency departments.² The Bureau of Labor Statistics reported a median of five missed days from work due to nonfatal occupational heat burns in 2005.³

Hospitalizations for work-related burns (using a primary payer code of workers' compensation on hospital discharge records) are good indicators of work-relatedness. Figure 3-6 presents the number and rate of work-related burn hospitalizations in Oregon between 2001 and 2006. The number and rate have generally decreased over the time period, although there was a slight increase between 2003 and 2005.

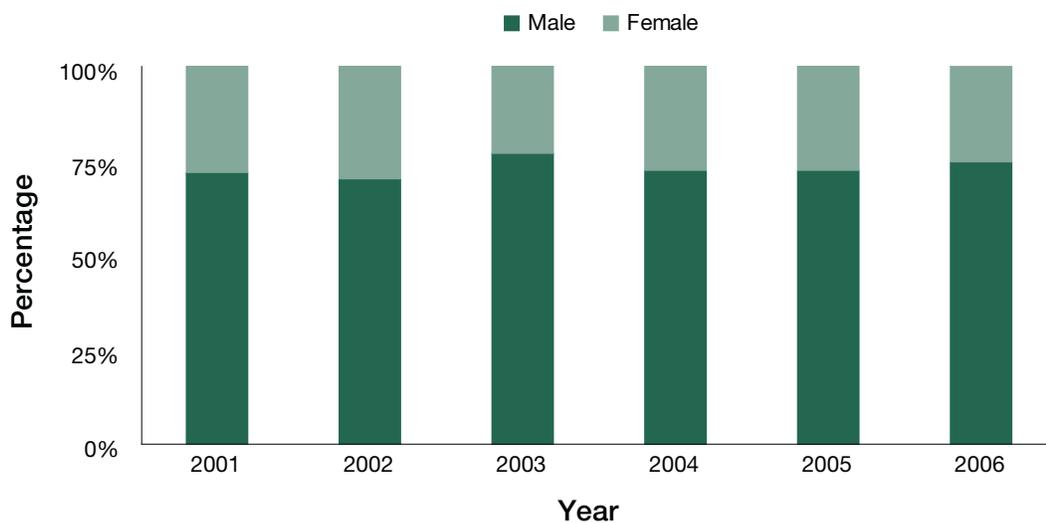
Figure 3-6. Number and rate of hospitalizations for work-related burns, Oregon, 2001–2006



Source: OAHHS, HDI; BLS, CPS

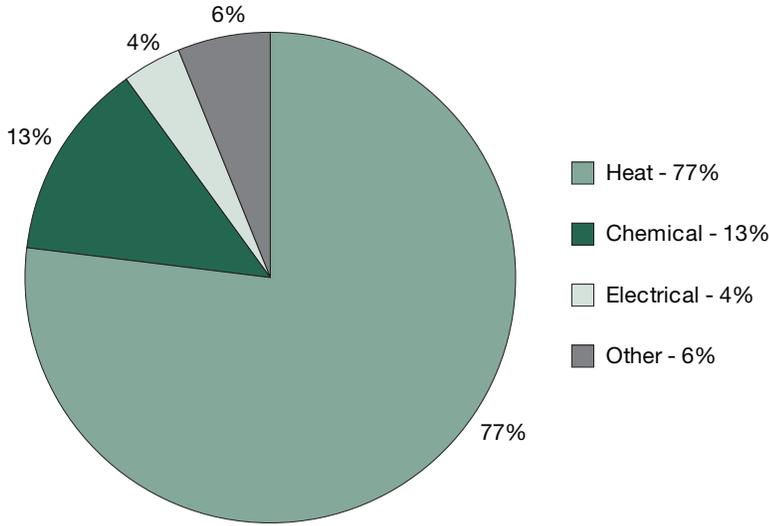
We can also examine workers' compensation claims to describe the epidemiology of occupational burns in Oregon. Between 2001 and 2006, there were 1,570 accepted disabling burn claims in the database. Males filed the majority of burn claims (see Figure 3-7); thermal burns were the most common type (see Figure 3-8). Males predominated in the industries of construction and agriculture; more females were found in health care and educational services (see Figure 3-9). The majority of burns occurred in workers between 25 and 34 years of age (see Figure 3-10).

Figure 3-7. Distribution of occupational burn cases by year and gender, Oregon, 2001–2006



Source: DCBS Information Management Division (IMD) Oregon Workers' Compensation (OWC)

Figure 3-8. Percentage of occupational burns by type, Oregon, 2001–2006



Source: DCBS, IMD, OWC

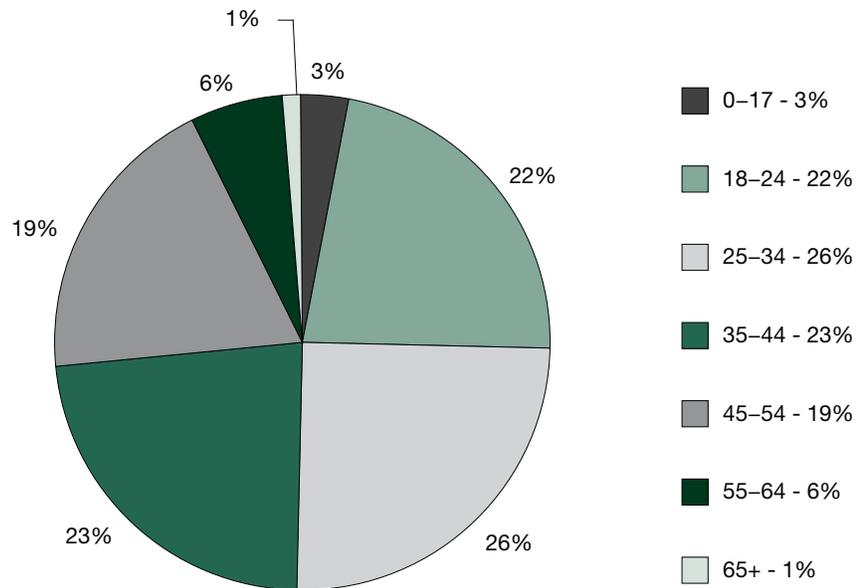
Figure 3-9. Distribution of occupational burns by industry* and gender, Oregon, 2001–2006



*U.S. Department of Commerce, U.S. Census Bureau. North American Industry Classification System, 2002

Source: DCBS, IMD, OWC

Figure 3-10. Percentage of occupational burns by age group, Oregon, 2001–2006



Source: DCBS, IMD, OWC

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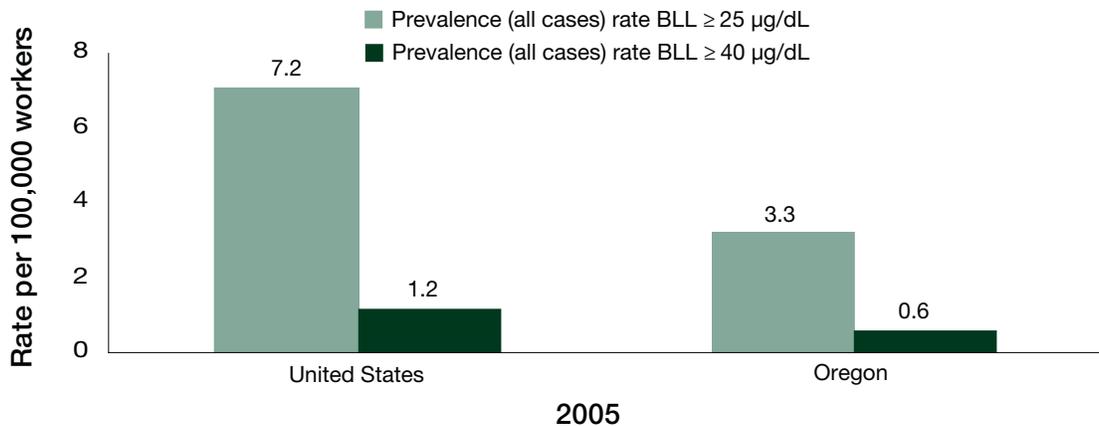
Chapter 4: Toxic exposures



Occupational exposure to lead

Reducing the number of workers with elevated blood lead levels (BLLs) is a Healthy People 2010 objective.¹ Lead affects multiple organ systems and can cause permanent damage. Effects of lead include anemia, nervous system dysfunction (neuropathy), kidney dysfunction (nephropathy) and fertility problems. A BLL is the best biological measure of recent exposure to lead. In 2005, 37 states reported approximately 8,900 adults with BLLs greater than or equal to 25 $\mu\text{g}/\text{dL}$. This corresponds to a national prevalence rate of 7.2 per 100,000 workers. In Oregon in 2005, 58 adult residents had BLLs greater than or equal to 25 $\mu\text{g}/\text{dL}$ (or a prevalence rate of 3.3 per 100,000 workers). Ten adult residents had BLLs greater than or equal to 40 $\mu\text{g}/\text{dL}$ (or a prevalence rate of 0.6 per 100,000 workers) (see Figure 4-1).

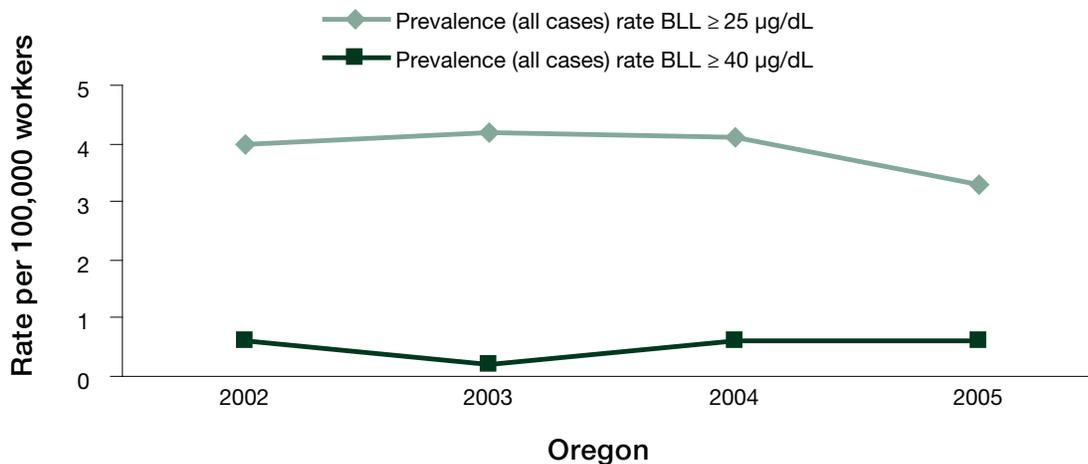
Figure 4-1. Prevalence rate of persons with blood lead levels $\geq 25 \mu\text{g}/\text{dL}$ and $\geq 40 \mu\text{g}/\text{dL}$, age 16 years and older, Oregon and United States, 2005



Source: Oregon Adult Blood Lead Epidemiology and Surveillance (ABLES)

Figure 4-2 shows Oregon's adult lead poisoning prevalence over time. BLLs greater than or equal to 25 µg/dL have declined from 2002 to 2005, although the individual years of 2003 and 2004 were slightly higher. For BLLs greater than or equal to 40 µg/dL the rate has remained fairly steady over the four-year period.

Figure 4-2. Prevalence rate of persons with blood lead levels ≥ 25 µg/dL and ≥ 40 µg/dL, age 16 years and older, Oregon, 2002–2005



Source: ABLES, U.S. Bureau of Labor Statistics (BLS) Current Population Survey (CPS)

Adult lead poisoning is largely an occupational risk. Industries where workers could be exposed to lead include battery manufacturing, nonferrous foundries, radiator repair shops, lead smelters, construction, demolition and firing ranges. In Oregon, construction and extraction professions are projected to grow by more than 17 percent in the next 10 years.² Lead taken home from the workplace also can harm children and other adults living in the home. Lead exposures can occur in hobbies such as making pottery and stained glass, casting ammunition and fishing weights, and renovating and remodeling projects.

References

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Acute work-related pesticide poisoning

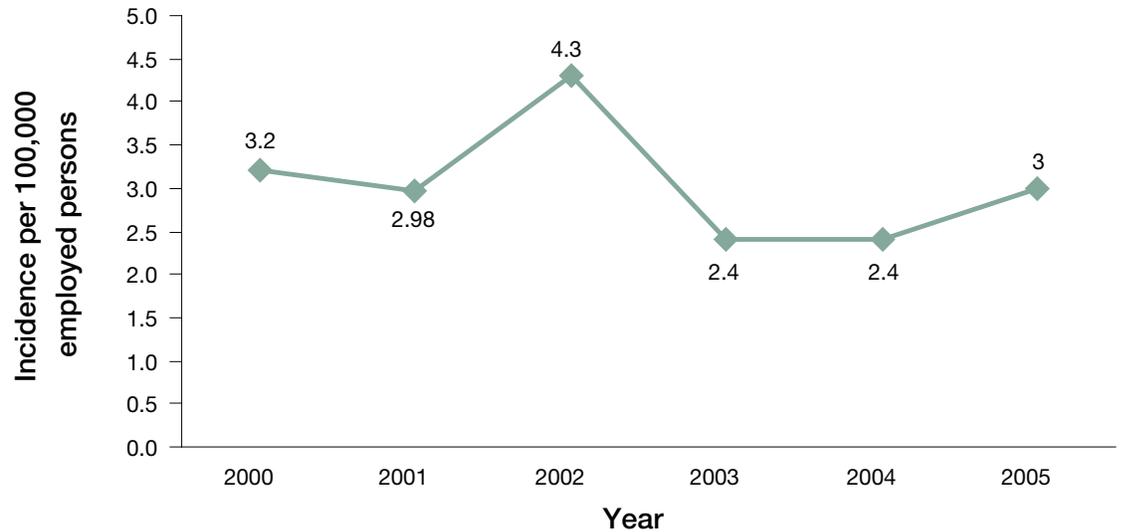
The U.S. Environmental Protection Agency (EPA) defines pesticides as “any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any insects, rodents, nematodes, fungi, weeds or any other forms of life declared to be pests; any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant.”¹

Pesticides come in all forms and are a diverse group of chemicals. In the United States, approximately one billion pounds of pesticide-active ingredients are used annually, and more than 16,000 pesticide products are available.²

The EPA estimates that 10,000 to 20,000 physician-diagnosed pesticide poisonings occur each year among the approximately 3,380,000 U.S. agricultural workers. Agricultural workers, groundskeepers, pet groomers, fumigators and a variety of other workers are at risk for exposure to pesticides including fungicides, herbicides, insecticides, rodenticides and sanitizers. Also at risk are workers who only occasionally use or are around pesticides and who, therefore, may not be trained in pesticide safety.

Surveillance for occupational pesticide-related illness is designed to protect workers by determining the magnitude and underlying causes of overexposure to pesticides in the workplace. Surveillance also serves as an early warning system of any harmful effects not detected by manufacturer pesticide testing.³ Figure 4-3 shows the rate of work-related pesticide poisoning cases in Oregon between 2000 and 2005.

Figure 4-3. Incidence of reported acute work-related pesticide poisoning cases, Oregon, 2000–2005

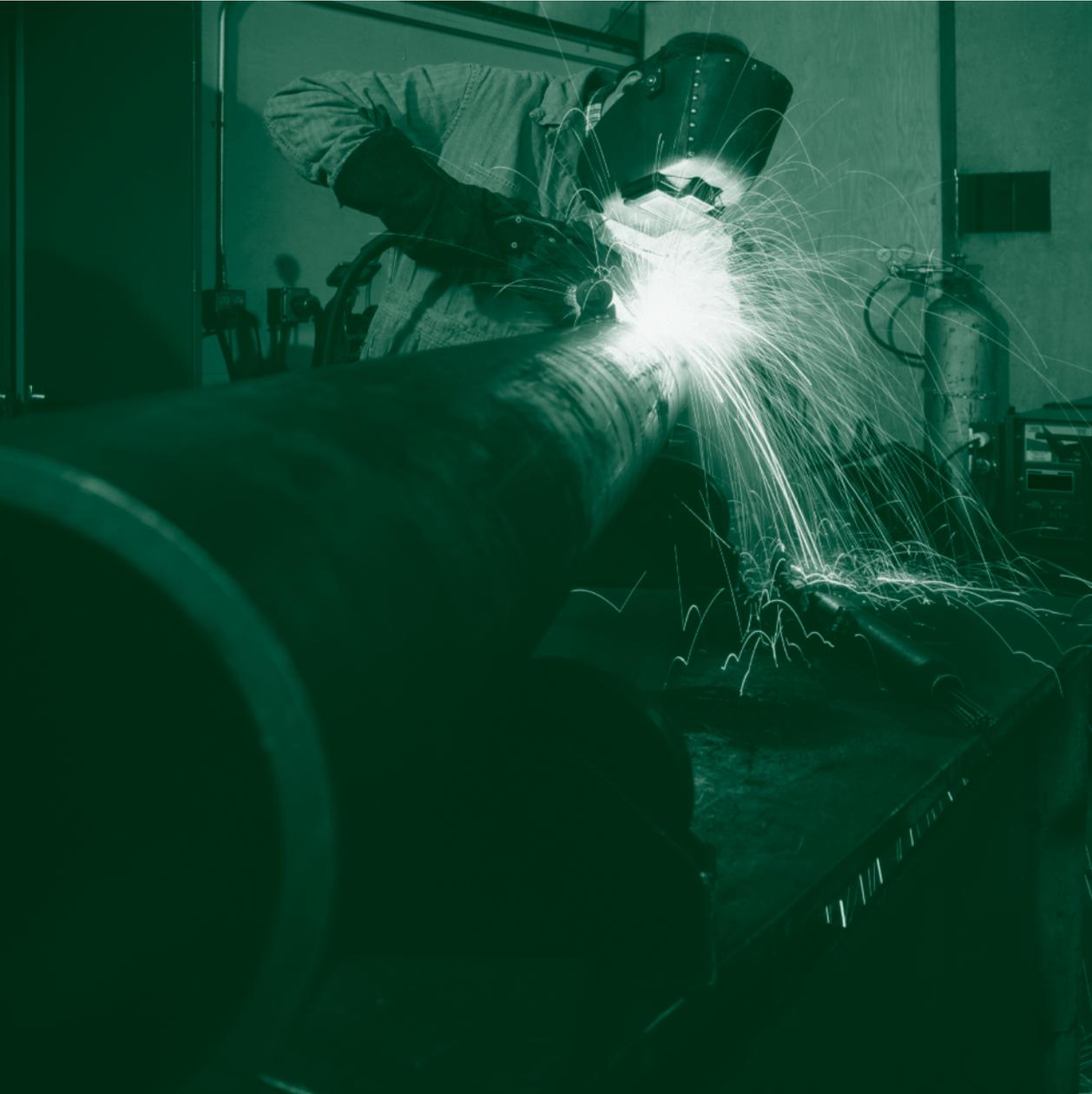


Source: TESS

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Chapter 5: Occupational diseases



Work-related asthma

Work-related asthma (WRA) is the respiratory disease most commonly reported to surveillance systems in many developed countries, including the United States.¹ Asthma is a chronic inflammatory disease of the airways characterized by chest tightness, wheezing, cough and shortness of breath that is generally intermittent; however, in some cases asthma can be fatal. WRA is asthma-caused or exacerbated by workplace exposures. It may be related to airway obstruction associated with workplace exposure.² The U.S. Occupational Safety and Health Administration (OSHA) estimates that at least 11 million workers in a wide range of industries and occupations are exposed to at least one agent known to be associated with WRA.³ Population-based studies estimate that more than one of seven adults with asthma have that condition due to their work.⁴

Four states that conducted surveillance for WRA (California, Massachusetts, Michigan, New Jersey) between 1993 and 1999 reported that the most common types of agents responsible were miscellaneous chemicals not easily classified (e.g., perfumes, odors, glues) at approximately 20 percent. The next most common group was cleaning materials (11.6 percent), followed by mineral and inorganic dust (11.1 percent) and indoor air pollutants (9.9 percent).² There are more than 250 substances known or believed to cause or exacerbate WRA, and the list evolves as knowledge increases.

The following table, adapted from the New York State Department of Health, lists agents responsible for WRA, sorted by which workers might be at risk:

Workers at risk	Agents
Animal handlers	Animal urine, dander
Bakers	Enzymes, flour/grain dust/mites
Carpenters	Acrylate, amines, diisocyanate, epoxy resins, wood dusts
Cleaners/janitors	Cleaning materials, dusts, molds
Daycare providers	Cleaning materials, dusts, latex (natural), molds
Electronic workers	Amines, colophony, metals, soldering flux
Farmers	Animal urine, dander, grain dusts, mites, insects
Hairdressers	Henna, persulfate
Health care workers	Formaldehyde, glutaraldehyde, latex, methyldopa, penicillins, psyllium
Laboratory workers	Animal urine, dander, feathers, enzymes, formaldehyde, glutaraldehyde, insects, latex
Machinists/tool setters	Metal working fluids, oil mists
Office workers	Cleaning materials, dusts, molds
Pharmaceutical workers	Cephalosporins, pancreatin, papain, pepsin, psyllium
Photographers	Complex amines
Plastic/rubber workers	Anhydrides, diisocyanates
Sawmill workers	Wood dusts
Seafood processors	Crabs, prawns
Teachers	Cleaning materials, dusts, molds
Textile workers	Dyes, gums
Welders	Welding fumes

According to data from the Oregon Behavioral Risk Factor Surveillance System (BRFSS), adult asthma prevalence in Oregon increased from 7.3 percent in 1999 to 9.9 percent in 2005.⁵ In a call-back survey of adults with asthma, 52.8 percent of those reporting current asthma said their asthma was caused or aggravated by any job they ever had (95 percent CI 47.5–58.0). Further, 13.5 percent (95 percent CI 10.5–16.6) of those reporting current asthma said they either told or were told by their health care providers that their asthma was related to their work. Table 5-1 shows that among call-back participants who were ever diagnosed with asthma, those with WRA were more likely to have had their usual activities limited in the past 12 months as compared to those with asthma not related to work.

Table 5-1. Prevalence (95 percent CI) of asthma characteristics among those ever diagnosed with asthma, by work-relatedness, Oregon, 2005

	Work-related asthma (n=348)	Non-work-related asthma (n=346)
Had asthma symptoms in past 30 days	73.7 (67.4–80.0)	66.1 (58.8–73.3)
Had nighttime asthma symptoms in past 30 days	31.3 (24.5–38.1)	26.4 (19.3–33.5)
Had ≥ 1 asthma attacks/episodes in past 30 days	61.2 (54.1–68.4)	50.8 (43.3–58.3)
Usual activities limited at least a little due to asthma in past 12 months	77.2 (71.3–83.1)	59.4 (52.2–66.7)
Had ≥ 1 routine checkups for asthma in past 12 months	44.7 (37.5–51.9)	42.9 (35.6–50.1)
Had ≥ 1 emergency department or urgent care visits for asthma in past 12 months	11.0 (7.0–15.1)	9.0 (5.4–12.5)
Used prescription asthma medication in past 3 months	56.6 (38.8–49.0)	62.5 (55.0–70.0)

Source: Oregon Behavioral Risk Factor Surveillance System (BRFSS) asthma call-back survey

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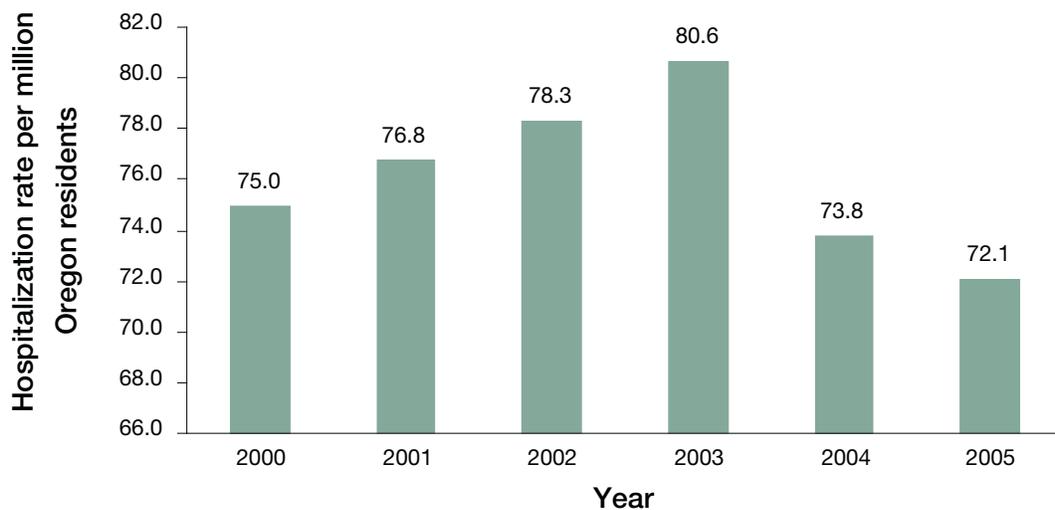
Pneumoconiosis (occupational lung disease)

Pneumoconioses are a class of respiratory diseases that are nearly all attributable to occupational exposure. Common types of these diseases include asbestosis, coal workers' pneumoconiosis (black lung) and silicosis. Pneumoconioses are usually due to long-term inhalation exposure to mineral dust and often have a long latency period between exposure and disease manifestation. Thus they are often diagnosed in older adults (mainly males) long after the period of exposure has occurred.

Pneumoconiosis deaths have declined in the United States over the years. In 1972 there were more than 5,400 deaths, but by 1999 this number had dropped to 2,475. Coal workers' pneumoconiosis was the most frequent type of death between 1968 and 1999, but was replaced by asbestosis in 1998 and 1999.¹ From 1993 to 2002, the annual U.S. death rate (adjusted for age) for all pneumoconioses was 14.0 per million residents older than 15 years of age. Asbestosis mortality rates, unlike other kinds of pneumoconiosis rates, have actually increased. In 1994, the U.S. age-adjusted death rate for asbestosis was 1.71 per million residents; in 2005, it was 2.28 per million residents.² It is likely that pneumoconioses are undercounted on death certificates because they are not always recognized by health care providers; they have a long latency period that possibly causes individuals with pneumoconiosis to die of other diseases, and they result in nonspecific symptoms.³

We can use various methods to examine the epidemiology of pneumoconioses in Oregon. One way is to review the annual hospitalization rate due to these conditions. The age-adjusted rate of hospitalizations from or with any type of pneumoconiosis has shown some inter-year variation, but has hovered between 72 and 80 hospitalizations per million Oregon residents between 2000 and 2005 (see Figure 5-1).

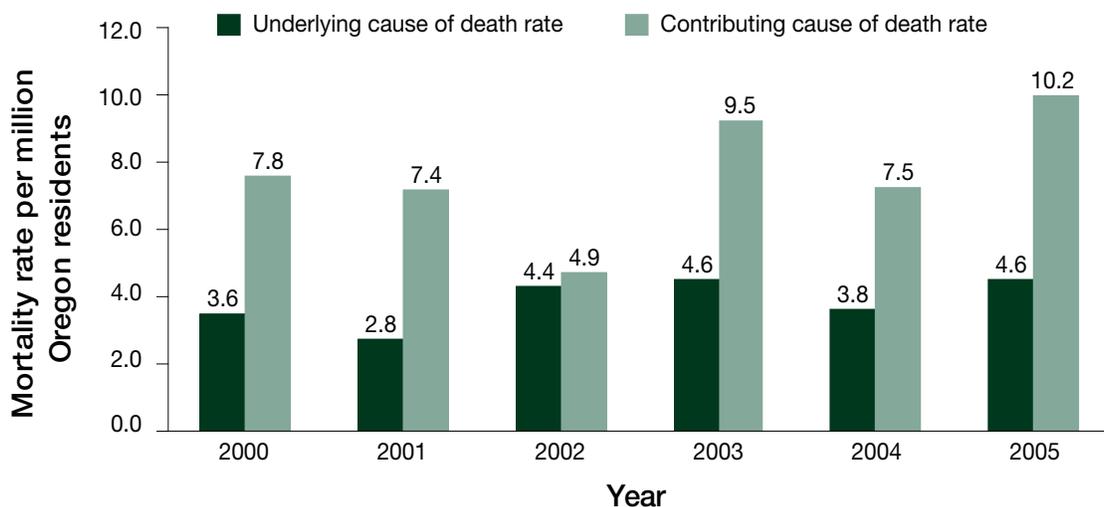
Figure 5-1. Age-adjusted pneumoconiosis hospitalization rate per million residents, Oregon, 2000–2005



Source: Oregon Association of Hospitals and Health Systems (OAHHS) hospital discharge index (HDI); U.S. Bureau of Labor Statistics (BLS) Current Population Survey (CPS)

Figure 5-2 presents the age-adjusted mortality rate (both as an underlying cause of death and a contributing cause of death)* for all pneumoconioses per million Oregon residents between 2000 and 2005. Although the rates vary over time, when any pneumoconiosis diagnosis contributes to a death, the rates can be twice as high.

Figure 5-2. Age-adjusted pneumoconiosis mortality rate per million residents, Oregon, 2000–2005



Source: National Occupational Respiratory Mortality System (NORMS)

*There can be multiple causes of death on any given death certificate; a contributing cause of death is a cause not also listed as the underlying cause of death.

References

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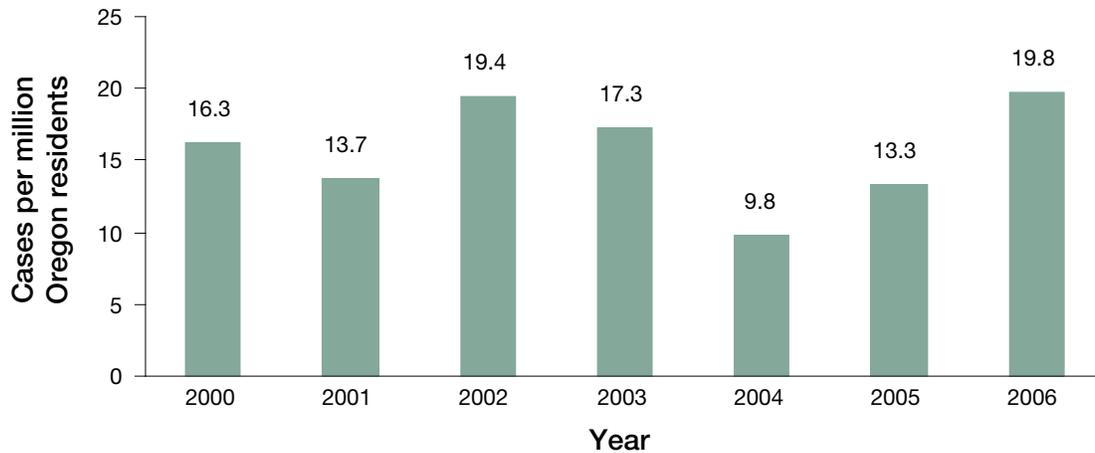
Malignant mesothelioma

Malignant mesothelioma (MM) is a rare cancer of the membranes that line the chest cavity (pleura) or abdominal cavity (peritoneum). Exposure to asbestos is the leading cause of this highly fatal cancer.¹ Prior exposure to asbestos, usually from the workplace, has been reported in 62 to 85 percent of all mesothelioma cases.²

Asbestos is a generic name given to a fibrous variety of minerals that possess flexibility, resistance to degradation, electrical resistance and high tensile strength. These qualities made asbestos useful for a variety of products, such as insulation and fireproofing material, automotive brakes, and cement and wallboard materials. However, asbestos minerals separate into microscopic-size particles that, when inhaled, can cause life-threatening diseases, including MM. Although the use of asbestos-containing products has markedly decreased, these minerals are still found in many residential or commercial settings and can pose health problems to workers and others.³

The Oregon State Cancer Registry collects data on newly diagnosed cancer cases. Figure 5-3 illustrates Oregon's incidence rates of malignant mesothelioma between 2000 and 2006. All rates are age-adjusted for the 2000 U.S. Census standard population; this is an important consideration because MM has a long latency period between exposure and disease onset. Thus, 20 to 40 years can pass between exposure to asbestos and diagnosis of the disease.

Figure 5-3. Age-adjusted incidence rate of malignant mesothelioma, Oregon, 2000–2006



Source: OSCaR

References

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Chapter 6: Special populations

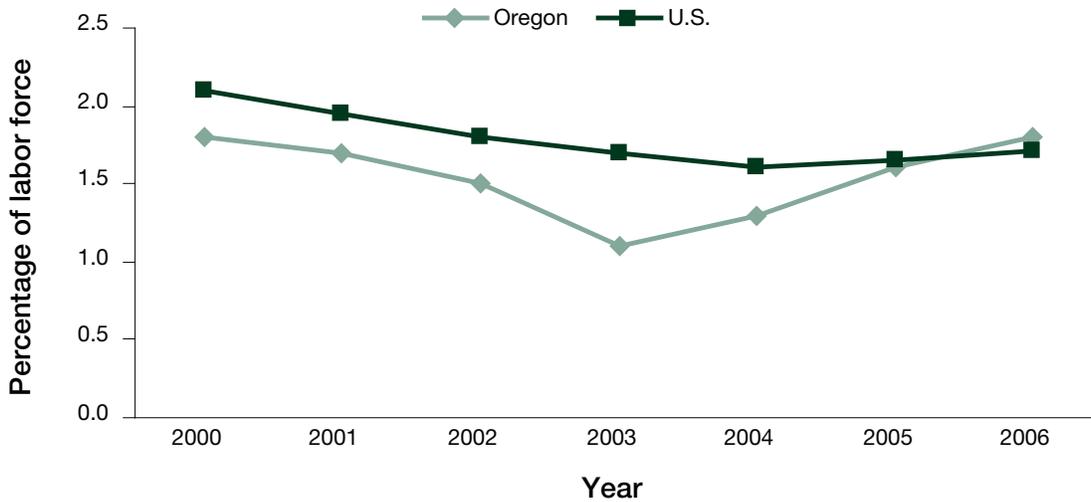


Younger workers

Protecting young workers from illness and injury in the workplace presents a wide variety of challenges. There are many definitions of “young” worker. For this profile Oregon looked at workers 17 years of age and younger. Young workers are at increased risk of illness or injury when they perform tasks outside of their usual training or work assignments. Also, young workers may lack necessary experience, training or supervision and may not be familiar with work requirements, safe work practices and safe operating procedures. Furthermore, rapid growth and development makes them more likely to be harmed by exposure to hazardous substances.¹

The National Institute for Occupational Safety and Health estimates that 2.4 million 16- to 17-year-old youth had jobs in 2006.² In Oregon there were approximately 32,000 workers 16 to 17 years of age for the same year. Both numbers likely underestimate the true number of working youth since some youth work but are not recorded on payroll. Figure 6-1 presents the percent distribution of workers younger than 17 years of age in the United States and Oregon for the time period 2000 to 2006.

Figure 6-1. Percentage of workers 17 years and younger in the labor force, United States and Oregon, 2000–2006



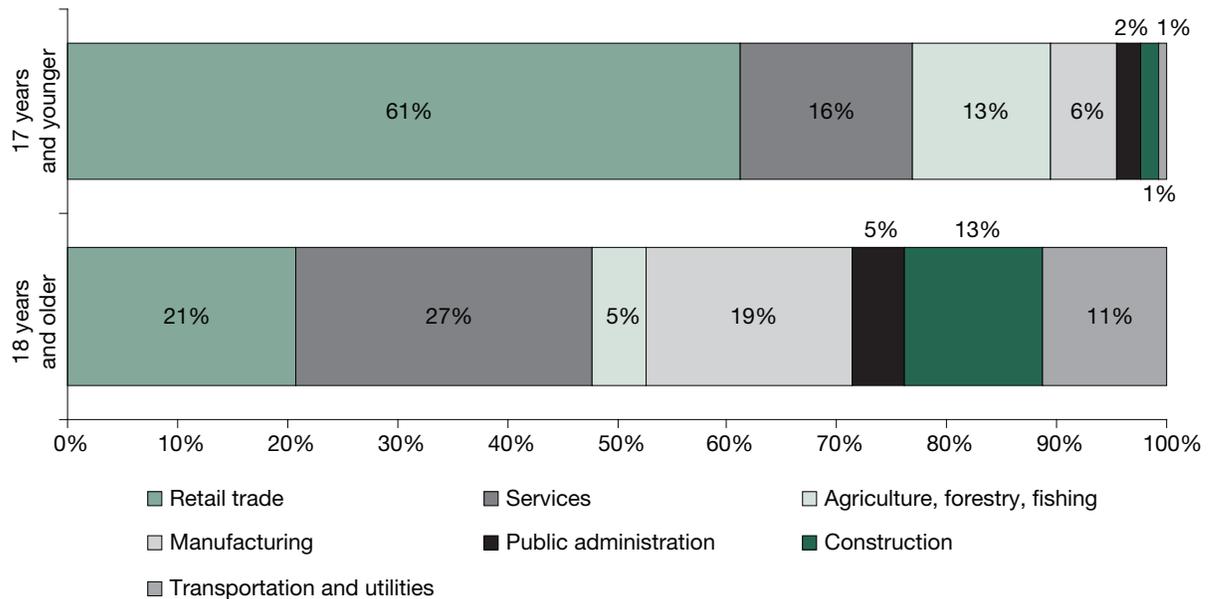
Source: U.S. Bureau of Labor Statistics (BLS) Current Population Survey (CPS)

For 2006, the U.S. Bureau of Labor Statistics (BLS) reported a total of 5,840 fatalities in the United States due to occupational injuries; of these, 21 occurred in workers younger than 17 years of age for a fatality rate of 0.9 deaths per 100,000 workers.² For comparison, 18- to 19-year-olds suffered 106 fatalities in 2006, for a fatality rate of 2.8 deaths per 100,000 workers. In 2006, there were 87 occupational fatalities in Oregon; none were in workers younger than 17 years of age, but four deaths occurred in 18- to 19-year-olds.³

Oregon workers' compensation data on young workers

In 2006, Oregon workers 17 years and younger accounted for only 134, or 0.6 percent, of all accepted disabling workers' compensation claims. Young workers were more likely to be in the retail industries, which include businesses such as restaurants, grocery stores and gas stations, while workers 18 and older predominated in manufacturing and construction (see Figure 6-2).

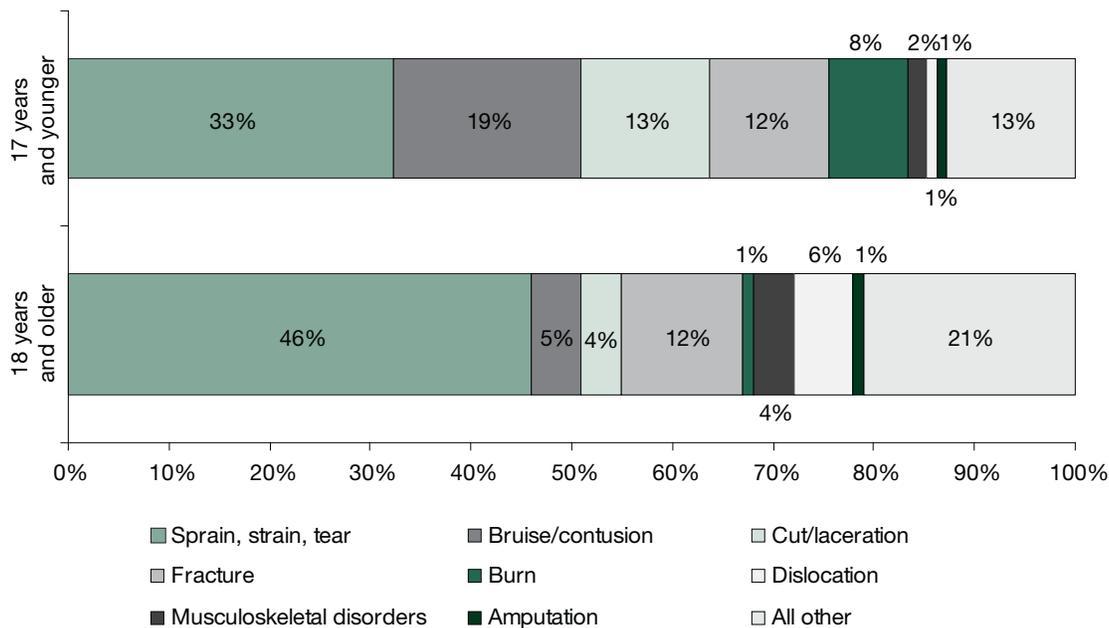
Figure 6-2. Comparison of industry groups by age groups, accepted disabling workers' compensation claims, Oregon, 2006



Source: Department of Consumer and Business Services (DCBS) Information Management Division (IMD) Oregon Workers' Compensation (OWC)

Younger workers were more likely to suffer a cut or laceration than older workers (13 percent versus 4 percent), as well as a heat burn (8 percent versus 1 percent), while workers 18 and older were more likely to suffer a sprain, strain or tear (46 percent versus 33 percent) (see Figure 6-3). Younger workers also were more likely to suffer a fall or be struck by or against an object while older workers were more likely to overexert themselves.

Figure 6-3. Comparison of type of injury by age group, accepted disabling workers' compensation claims, Oregon, 2006



Source: DCBS, IMD, OWC

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Older workers

As the baby boomer generation (those born between 1946 and 1964) ages, the overall percentage of older Americans is expected to continue increasing until 2030. The U.S. population aged 65 and older will represent 20 percent of the population by 2030, or twice their 2000 percentage.¹ As the U.S. population ages, so will its work force. The U.S. Bureau of Labor Statistics (BLS) projects that there will be 1.2 million more workers 65 years and older in the work force in 2010 compared to 2001.²

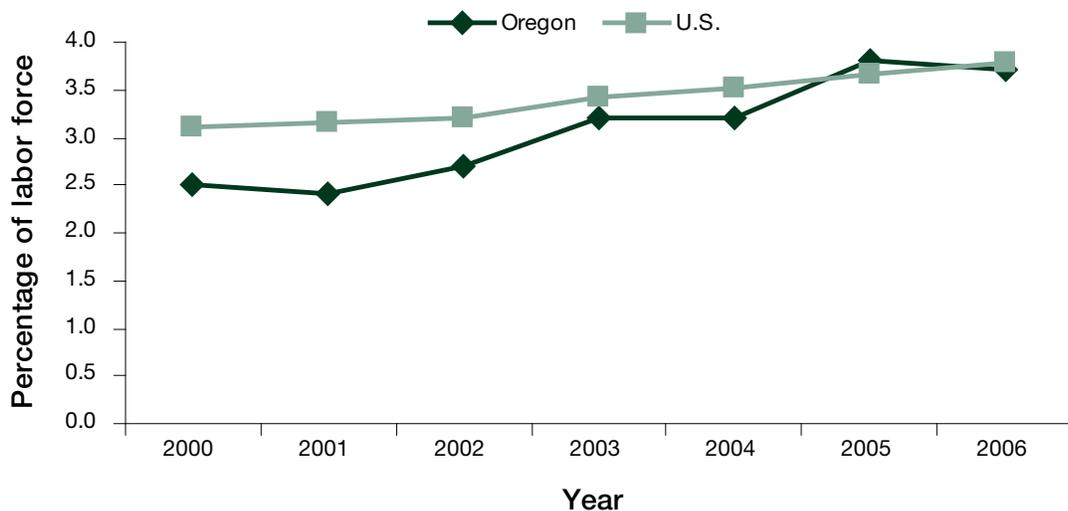
Oregon is a part of this trend toward an aging work force (Figure 6-4). BLS estimates that Oregon will experience a 16 to 25 percent increase in the number of older workers from 2000 to 2010.²

With life expectancy of those born in the 21st century averaging 83 years, there are 18 years of life after the standard retirement age of 65. These almost two decades of life lead to many reasons why older adults remain in the work force. Some reasons may include changes to Social Security benefits and eligibility, a desire to stay active or a need to pay for living and medical expenses.

The profile of injury and illness among older workers is unique. Data show that older workers experience more severe illnesses and injuries while on the job than do their younger counterparts (measured in days away from work) even if the nature and event of the incidents are the same.³ In 2003, workers 65 and older needed a median of 18 days away from work after a workplace illness or injury compared to eight days for all workers combined.³ Older workers also have a higher incidence of death than their younger counterparts. In 2006, the fatality rate for workers 65 and older was more than three times the rate of those 64 and younger with 11.2 deaths per 100,000 U.S. workers.⁴ In 2004, fatality rates were elevated for

workers aged 55 to 64 and were even higher for workers aged 65 and older in Oregon. Senior workers comprised approximately 3.7 percent of the labor force in Oregon in 2006 (see Figure 6-4), but comprised 20 percent of all occupational fatalities in 2004 (12 of 61).⁵

Figure 6-4. Percentage of workers 65 years and older in the labor force, United States and Oregon, 2000–2006

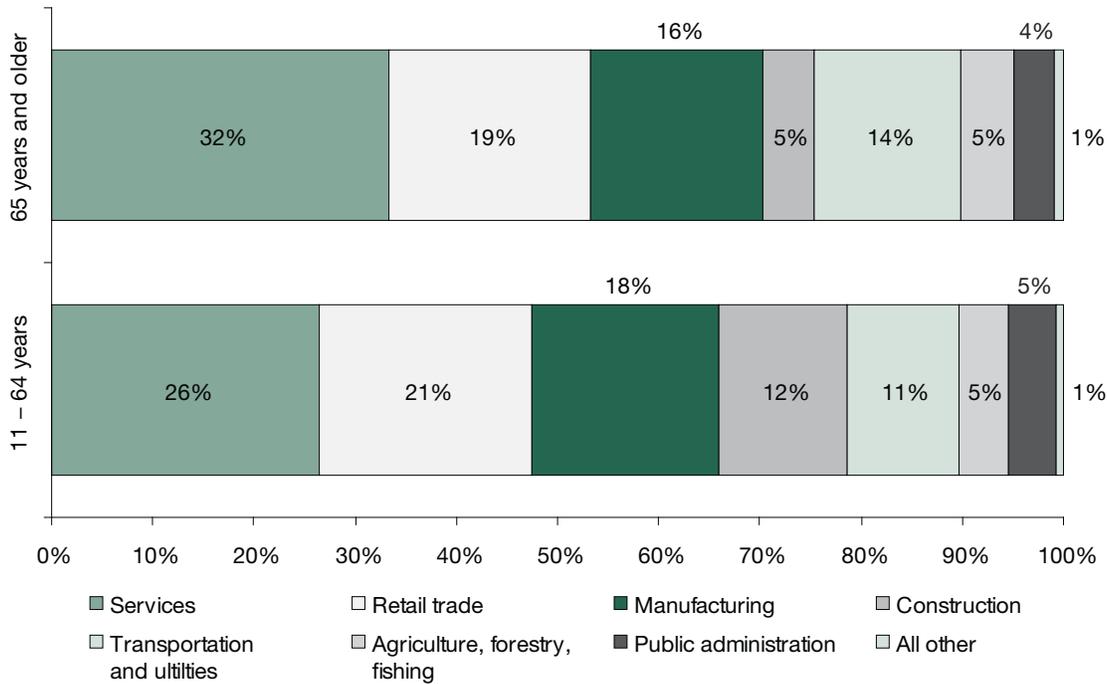


Source: BLS, CPS

Oregon workers' compensation data on older workers

In 2006, Oregon workers 65 years of age and older accounted for only 432, or 2 percent, of all accepted disabling workers' compensation claims. Older workers were more likely to be in the service industries, which include businesses such as hotels and motels as well as personal, business, health and legal services (see Figure 6-5). Workers 11 to 64 years of age predominated in the construction industry while the two age groups were relatively proportioned across the remaining industries (Standard Industrial Classification, 1987).

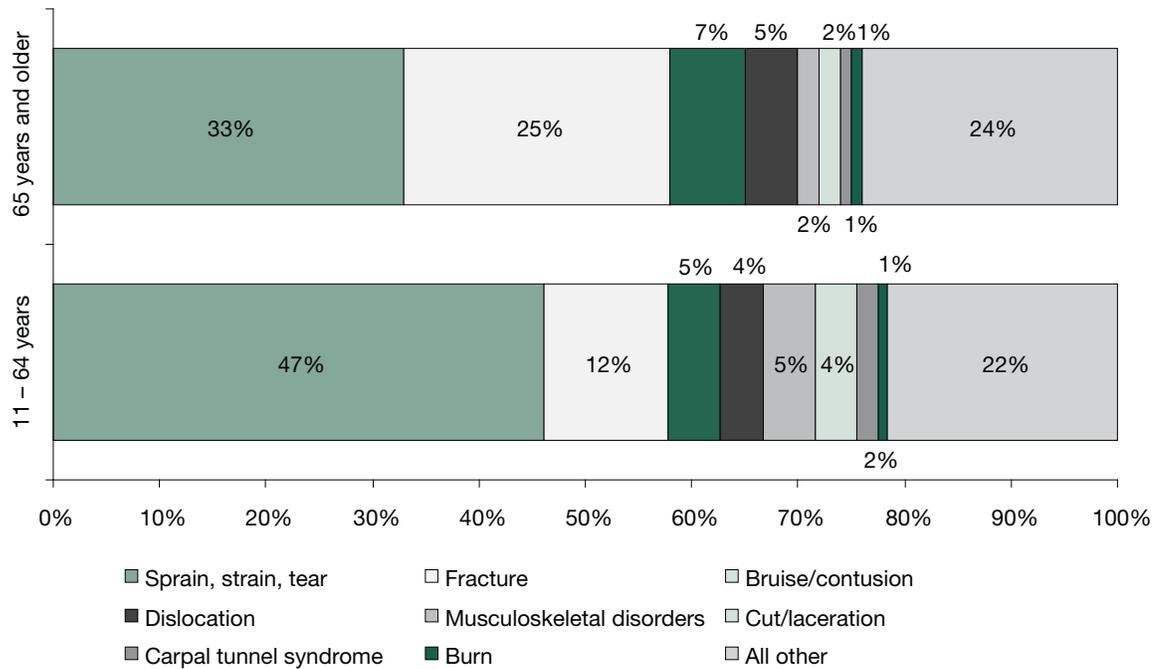
Figure 6-5. Comparison of industry groups by age group, accepted disabling workers' compensation claims, Oregon, 2006



Source: DCBS, IMD, OWC

Older workers were more likely to suffer fractures than workers younger than 65 (25 percent versus 12 percent) while workers younger than 65 were more likely to suffer sprains, strains and tears (47 percent versus 33 percent) (see Figure 6-6).

Figure 6-6. Comparison of types of injuries by age groups, accepted disabling workers' compensation claims, Oregon, 2006



Source: DCBS, IMD, OWC

Older workers were significantly more likely to suffer falls than workers under 65 years of age (38 percent versus 18 percent). Overexertion due to sprains, strains and tears predominated in the 11 to 64 age group, representing 47 percent of illness and injury claims.

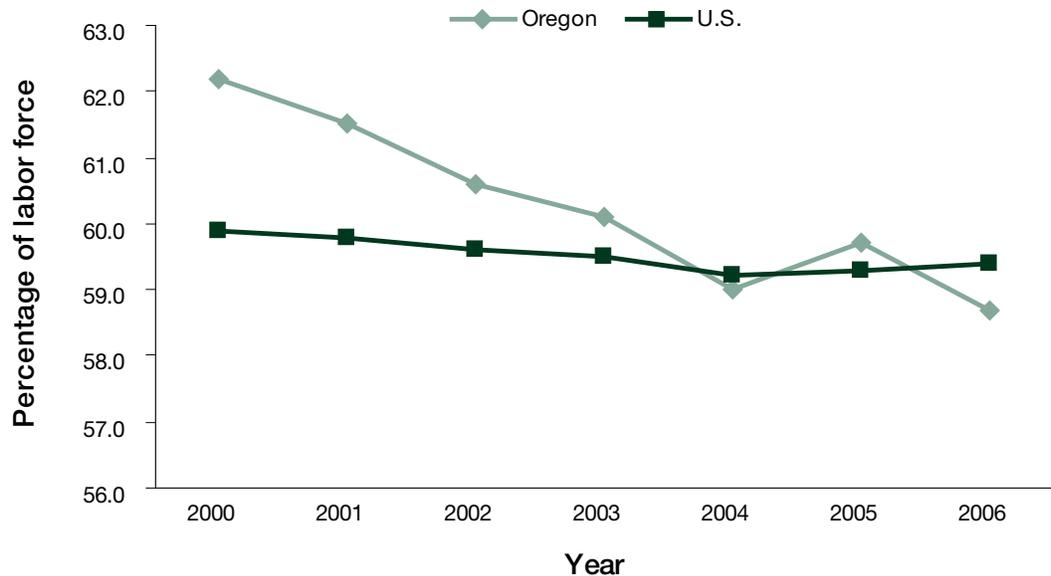
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- ⁵ Oregon Occupational Fatality Assessment and Control Evaluation (OR-FACE). Oregon fatality assessment & control evaluation annual report, 2004. Portland, OR: Oregon Health & Science University, Center for Research on Occupational and Environmental Toxicology, Oregon Fatality Assessment and Control Evaluation. [Accessed March 6, 2009.] Available at www.ohsu.edu/croet/face/reports/2004_Annual_Report.pdf.

Women in the work force

In Oregon, women constitute approximately 46 percent of the civilian non-institutional* working population, which mirrors the United States (46.6 percent in 2001).¹ Women's participation in the work force has slightly receded since the mid-1990s; in the United States in 2006 the female labor force participation rate was 59.4 percent. In Oregon, the 2006 female labor force participation rate was approximately 58.7 percent (see Figure 6-7).

Figure 6-7. Participation of women in the labor force, United States and Oregon, 2000–2006

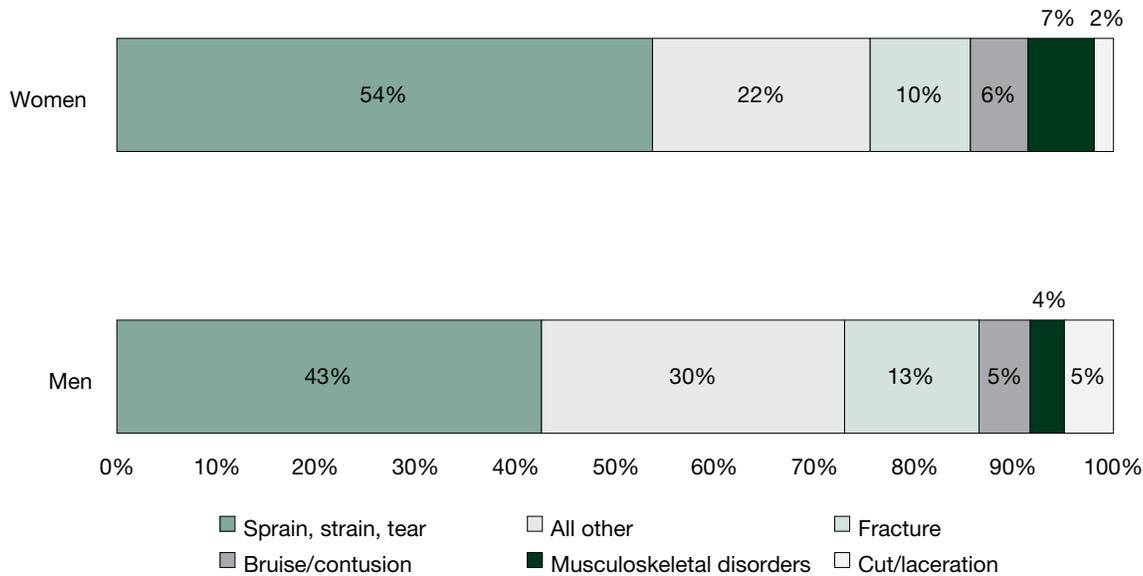


Source: BLS, CPS

In 1976, Oregon women accounted for only 20 percent of all workers' compensation claims; by 1996, this number had risen to 32 percent. In 2006, women had approximately 33 percent of accepted disabling claims.**

Women suffered disproportionately from sprains, strains and tears than did men (54 percent versus 43 percent). They also had a significantly higher percentage of accepted disabling claims for musculoskeletal disorders than men (7 percent versus 4 percent). Men were more likely to suffer amputations, fractures, cuts/lacerations and burns (see Figure 6-8).

Figure 6-8. Comparison of nature of injuries by gender, accepted disabling workers' compensation claims, Oregon, 2006



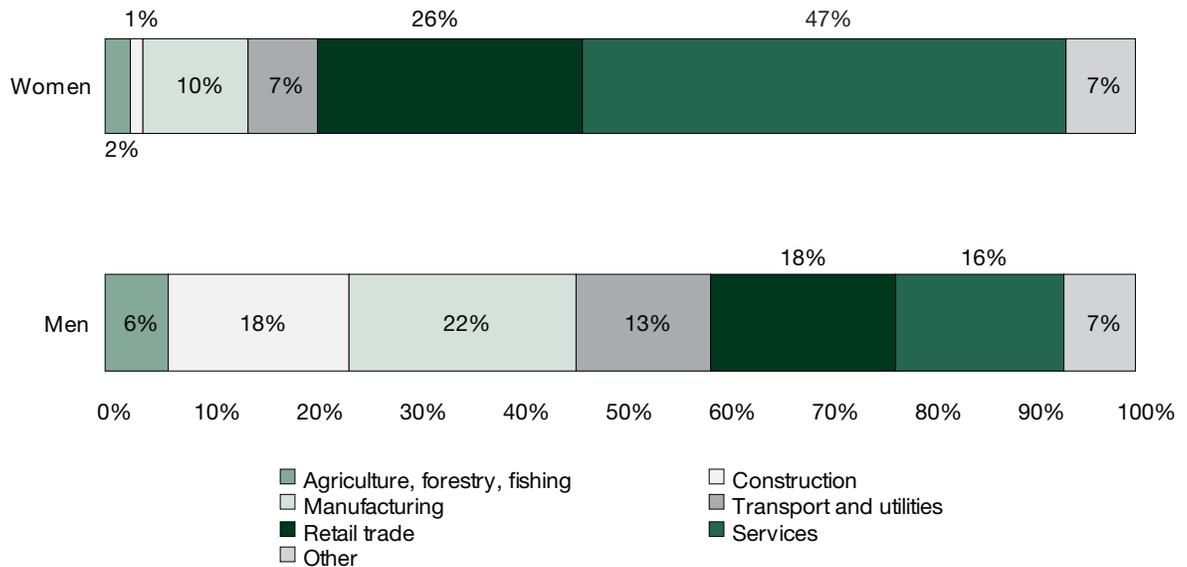
Source: DCBS, IMD, OWC

Women were more likely than men to injure their upper extremities (17 percent versus 13 percent). Men were more likely to be hospitalized (6 percent versus 2 percent).

Women with accepted claims were significantly more likely to report working in a service industry than men; this difference is even greater in the health services industry (19 percent versus 2 percent). Accepted disabling claims

among men predominated in construction, agriculture and transportation industries (Standard Industrial Classification, 1987) (see Figure 6-9).

Figure 6-9. Comparison of industry groups by gender, accepted disabling workers' compensation claims, Oregon, 2006

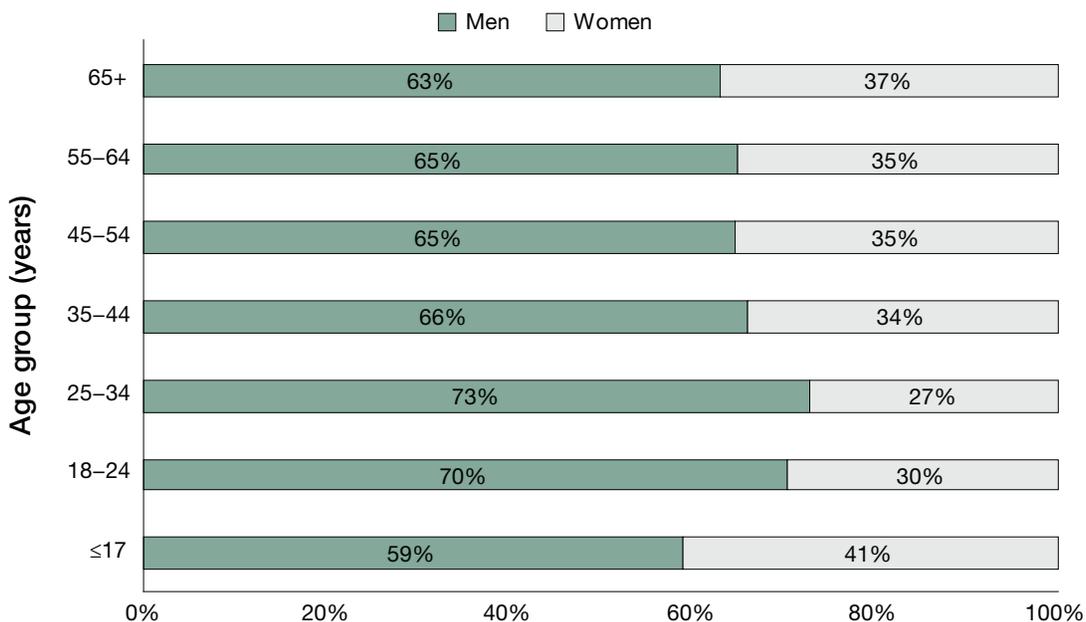


Source: DCBS, IMD, OWC

Women were more likely than men to report assault or violence (3 percent versus 1 percent) as the event causing the injury. Women were also more likely to suffer from repetitive motion injuries (14 percent versus 8 percent), not including carpal tunnel syndrome.

The mean ages of men and women in this analysis were similar (39.8 years for men, 41.4 for women). The distribution of ages by groups is shown in Figure 6-10.

Figure 6-10. Age distribution by gender, accepted disabling workers' compensation claims, Oregon, 2006



Source: DCBS, IMD, OWC

*Civilian non-institutional population includes persons aged 16 years or older who are not inmates of institutions (penal, mental or homes for the elderly) and who are not on active duty in the U.S. armed forces.

**Disabling means that three or more workdays were missed as a result of the injury or illness.

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List of acronyms



List of acronyms

AAPCC	American Association of Poison Control Centers
ABLES	Oregon Adult Blood Lead Epidemiology and Surveillance Program
BLL	Blood lead level
BLS	U.S. Bureau of Labor Statistics
BRFSS	Behavioral Risk Factor Surveillance System
CBP	County Business Patterns series
CDC	Centers for Disease Control and Prevention
CFOI	Census of Fatal Occupational Injuries
CPS	Current Population Survey
CPSC	U.S. Consumer Product Safety Commission
CROET	Center for Research on Occupational and Environmental Toxicology
CSTE	Council of State and Territorial Epidemiologists
CTS	Carpal tunnel syndrome
CWP	Coal workers' pneumoconiosis
DCBS	Oregon Department of Consumer and Business Services
DHHS	U.S. Department of Health and Human Services
DHS	Oregon Department of Human Services
DOL	U.S. Department of Labor
EPA	U.S. Environmental Protection Agency
HCP	Health care provider
HDI	Hospital discharge index
ICD	International Classification of Diseases

IMD	Information Management Division
IRS	Internal Revenue Service
MM	Malignant mesothelioma
MO	Medical only (same as non-disabling)
MSD	Musculoskeletal disorder
NAACCR	North American Association of Central Cancer Registries
NAICS	North American Industry Classification System
NIOSH	National Institute for Occupational Safety and Health
NORA	National Occupational Research Agenda
NORMS	National Occupational Respiratory Mortality System
OAHHHS	Oregon Association of Hospitals and Health Systems
ODA	Oregon Department of Agriculture
OHI	Occupational health indicator
OHSU	Oregon Health & Science University
OIICS	Occupational Injury and Illness Classification System
OPC	Oregon Poison Center
OPHP	Oregon Occupational Public Health Program
OR-FACE	Oregon Occupational Fatality Assessment and Control Evaluation program
OR-OSHA	Oregon Occupational Safety and Health Division
OSCaR	Oregon State Cancer Registry
OSHA	Occupational Safety and Health Administration
OWC	Oregon Workers' Compensation
PARC	Pesticide Analytical Response Center
PCC	Poison control center
PEST	Oregon Pesticide Exposure Safety & Tracking program

PHD	Public Health Division
QCEW	Quarterly Census of Employment and Wages
SIC	Standard Industrial Classification
SOC	Standard Occupational Classification
SOII	Survey of Occupational Injuries and Illnesses
TESS	Toxic Exposure Surveillance System
WC	Workers' compensation
WHO	World Health Organization
WRA	Work-related asthma



Technical notes

Adult Blood Lead Epidemiology and Surveillance

The Adult Blood Lead Epidemiology and Surveillance (ABLES) system, a state-based program funded by the Centers for Disease Control and Prevention's National Institute for Occupational Safety and Health (NIOSH), began in 1987 in four states. By 2004, 37 states were participating in the system. Surveillance of elevated blood lead levels (BLLs) provides a method to identify 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 names of employers and additional information about the exposed individuals.

The U.S. Occupational Safety and Health Administration (OSHA) requires that lead be measured clinically in workers exposed to airborne lead exceeding a certain level. In addition, 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.

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. The North American Association of Central Cancer Registries (NAACCR) has developed standards for the operation of registries (e.g., data definitions, data transmission methodologies and quality assurance); some state cancer registries do not yet meet all NAACCR standards for data competencies and quality. Diagnoses are coded according to the International Classification of Diseases for Oncology (ICD-O).

Census of Fatal Occupational Injuries

The Census of Fatal Occupational Injuries (CFOI) is part of the Bureau of Labor Statistics' occupational safety and health statistics program and provides the most complete count of fatal work injuries. CFOI is a federal program that compiles counts of all fatal work injuries occurring in the United States each calendar year.

For a fatality to be included in the census, the decedent must have been employed 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. CFOI tracks all fatal occupational injuries that occur within each state's boundaries, regardless of the worker's state of employment. CFOI also includes data for all fatal work injuries whether the decedent was working in a job covered by the Occupational Safety and Health Administration (OSHA) or other federal or state agency, or was outside the scope of regulatory coverage.

In addition, CFOI counts include workers not subject to OWC, thus any reported numbers among the different agencies that track occupational fatalities will vary. Oregon's CFOI data are comparable to the federal data found on the BLS Web site: www.bls.gov/iif/oshcfoi1.htm. Due to the difficulty in verifying such deaths, fatalities resulting from occupational illnesses are generally not included in the CFOI statistics.

County Business Patterns

The U.S. Census Bureau annually produces a County Business Patterns (CBP) series, which provides national economic data by industry. CBP data represents 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 is 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 U.S. 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. Since 1998, data have been 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 determines demographics, employment status, weekly hours worked, and industry and occupation of each household member 15 years of age 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 through the Geographic Profile of Employment and Unemployment annual report 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.

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 nonresidents' certificates 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 format. For injury deaths, all state death certificates include a query about whether the incident occurred at work.

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 regarding the work-relatedness of any other illnesses or injuries, a useful indicator 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 be readily 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 to identifying injuries than illnesses. Due to the non-specificity of many occupational diseases or the long latency between exposure and onset of overt disease, illnesses are much harder to associate with a work condition. Discharge data generally do not include hospitalizations of residents previously hospitalized in another state.

Federal military and veterans hospitals are not included in most state hospital discharge data sets.

Oregon's workers' compensation system

Oregon law mandates that employers within the state have workers' compensation (WC) for their employees (Oregon Revised Statutes, Chapter 656). Employers can choose one of three options for workers' compensation insurance: self-insurance, insurance through a private company, or insurance through the state fund (now known as SAIF Corporation). Not all Oregon employees are required to have WC coverage (e.g., sole proprietors, private residence workers), nor are all workers captured in the WC system (e.g., federal workers and maritime workers are excluded). Non-disabling claims (also known as medical only) are not required to be reported to the Workers' Compensation Division. WC definitions are:

- Disabling - Resulting in three or more days lost and/or a change in work duties, hospitalization or likely hospitalization;
- Non-disabling - Workers' compensation claims not associated with three or more days of lost time or with change in work duties (same as medical only).

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 percent of the nation's population submitted data to the AAPCC. 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. 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 such as the Oregon Poison Center (OPC) 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; i.e., 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.

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 as well as domestic, unpaid family and railroad workers. QCEW data provide figures that represent where individuals work, not where they live. 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 six-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.

Survey of Occupational Injuries and Illnesses

The national Survey of Occupational Injuries and Illnesses, 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. 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, which allows BLS to calculate rates.

Since 1996, the survey sample has included approximately 180,000 private sector establishments nationwide. 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 places of employment. There is also some evidence that work-related injuries are underreported.

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