Occupational Health Indicators in Wyoming:
A Baseline Occupational Health Assessment
2001-2009

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Executive Summary

The Mountain and Plains Education and Research Center (MAP ERC), in collaboration with the National Institute for Occupational Safety and Health (NIOSH) Western States Office, Denver, has prepared this data-driven report to provide the baseline occupational health and safety status of workers in Wyoming (WY). Wyoming officials, employers and workers with data on the state’s workforce are be able to use this report can be used in a number of ways. The report will help leaders in Wyoming (1) examine the benefits of conducting state-wide occupational health surveillance, (2) assess how Wyoming compares to other states, (3) identify potential emerging issues, and (4) determine priorities for prevention of work-related injuries and illnesses. The data and analyses presented herein are descriptive in nature. The report does not offer causal explanations. The report does not call attention to specific hazardous tasks or control measures. Further, the design of the report does not account for changes in state or national economic and demographic conditions.

Highlights of the report are listed below:

- **Compared to the US:**
  - Wyoming had a higher than average rate of fatal work-related injuries
  - Wyoming had a higher than average rate of work-related pesticide poisonings
  - Wyoming had lower proportions of workers employed in industries with a high risk for occupational morbidity.
  - Wyoming had higher proportions of workers employed in occupations with a high risk for occupational morbidity.
  - Wyoming had higher proportions of workers employed in occupations and industries at high risk for occupational mortality.

- The data in this report indicate decreasing trends for the following occupational health indicators:
  - The number and the rate of overall injuries and illnesses (OHI #1)
  - The number and rate of musculoskeletal disorders involving days away from work (OHI #7)

- The data in this report indicate increasing trends for the following occupational health indicators:
  - The number of amputations identified in the State Workers’ Compensation system (OHI #5)
  - The number and rate of carpal tunnel syndrome claims reported to WY workers’ compensation (OHI #8)
  - The total workers’ compensation benefits paid in WY (OHI #19)

For the years 2001 to 2009, rates of work-related fatalities in WY were higher than overall US rates. The percent of workers employed in industries and occupations at high risk for occupational mortality was higher than national rates. Priorities and future directions for prevention should focus on industries and occupations experiencing a disproportional rate of fatal work-related injuries and illnesses.
Introduction and Background

Each year, thousands* of workers in Wyoming (WY) are exposed to workplace conditions that result in occupational illnesses and occupational injuries*. At present, there is no comprehensive, state-wide occupational health surveillance program in WY. Occupational health surveillance programs (which are often administered through state agencies) provide routine data collection and analysis services for state officials, employers and workers. Occupational health surveillance programs also help develop strategies to prevent a variety of work-related health effects. Comprehensive occupational health systems help ensure a state’s workforce is safe, healthy and productive.

Recognizing the need for state-based occupational health surveillance programs, the National Institute for Occupational Safety and Health (NIOSH) and the Council of State and Territorial Epidemiologists (CSTE) developed a list of occupational health indicators (OHI) that summarize important characteristics of workforce health and safety, including influential factors (such as demographics and industry characteristics). Occupational health indicator reports guide state priorities in workplace injury and illness prevention and intervention. Of the 20 OHIs established, 13 report injury and illness resulting from occupational hazards; 3 describe potential workplace health and safety hazards; 2 examine intervention activities; 1 measures harmful exposures in the workplace; and 1 describes the socio-economic impacts of work-related injuries and illnesses.

The purpose of this document is to describe the baseline occupational health status of workers in WY using the OHIs with the target objective of building capacity for occupational health surveillance in WY. Specifically, the goals of this report are to:

- Identify available data sources that are relevant to workforce health and safety
- Collect and compile available data from 2001 to the most recent year for which data are available
- Describe the health and safety characteristics of Wyoming’s workforce
- Determine gaps in the data
- Define the greatest needs for workplace health surveillance
- Determine priorities for prevention and workplace intervention efforts

* Occupational injuries typically result from one-time events that include motor vehicle crashes, falls from heights, direct exposure to electric current, falling objects and exposure to hazardous machinery. In addition to being classified by the “mechanism” of the injury, occupational injuries are also classified by the outcome. Occupational exposures can result in back injuries, amputations, fractures, strains and sprains, traumatic brain injuries and crush injuries. Occupational illnesses are usually the result of a cumulative exposure to hazardous chemicals, high levels of radiation or repetitive motions over time. Examples of occupational illnesses include (but are not limited to) occupational asthma, asbestosis, pneumoconiosis (dust-induced lung disease), mesothelioma and carpal tunnel syndrome.
In 2010, the NIOSH Western States Office (WSO) and the Mountain and Plains Educations and Research Center (MAPERC) completed an Occupational Health Indicator Report for WY that included data on the years 2001-2005. The initial report was presented to the WY Department of Health, WY state legislators, industry representatives and the Governor’s office (represented by Judge Gary Hartman) in February, 2010. The Governor’s Office has used the initial report, along with other occupational health surveillance data, to improve occupational health and safety surveillance in WY.

While it was working on the initial Occupational Health Indicator Report, the NIOSH WSO was also involved with the following activities related to occupational health and safety surveillance in Wyoming:

- The NIOSH WSO was represented on a Workplace Prevention Task Force consisting of legislators, industry representatives, other federal and state employees and academics to examine the high workplace fatality rate in WY.
- The Workplace Prevention Task Force recommended that WY hire an Occupational Epidemiologist, Dr. Tim Ryan, to address occupational safety issues in WY, including data evaluation, injury prevention and public policy options.

This report updates the 2001-2005 report with the most current data available to the authors of the report. It is a product of the Mountain and Plains Education and Research Center (MAP ERC), a center to improve occupational and environmental health and safety through education, research, and community partnership, funded by the Centers for Disease Control and Prevention/NIOSH through grant #5T42OH009229-02. This report represents the views of the authors and should not be considered the official views of the sponsoring agency or any other institution.

We would like to thank and acknowledge the WY Departments of Public Health and Employment for their help in accessing data that contributed to this report. We would also like to thank John Myers, MS, Health Statistician at NIOSH, Morgantown, WV for performing the trend analyses for this report.
Methods

This report was produced in accordance with the document titled “Using the CSTE Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and their Determinants”, which can be found at www.cste.org (April 2011 update). The data, which covers the period 2001-2009, was collected from national, publicly available datasets, as well as data sources particular to Wyoming. Exceptions for years are noted in the methods section for each OHI.

When appropriate, state and national data are compared to understand where Wyoming ranks on occupational health and safety, in relation to other states. Linear and Poisson regression models were used to examine trends (counts and rates) for indicators 1-8,11,13,18, and 19. All data analysis was performed using Excel for Windows software (Microsoft) and SAS Statistical Software, (version 9.2, SAS Institute, Cary, NC). Confidence intervals were calculated at the 95% level using Wald's method for binomial variables.

Detailed methods are described in the CSTE Guidelines. Data for all 20 OHIs were available, as of the date of this report. Each OHI presented in this report is described in terms of its significance, specific methods, results, limitations, and recommendations. Some of the OHIs are based on small numbers. Proportions and rates that are based on small numbers can change dramatically from one year to the next. A list of data sources can be found at the end of this report.
Occupational Health Indicators

Employment and Demographic Profile
1-Non-fatal Injuries and Illnesses
2 -Work-related Hospitalizations
3-Fatal Work-related Injuries
4-Amputations Reported by Employers
5-Amputations Identified in State Workers’ Compensation
6-Hospitalizations for Work-related Burns
7-Musculoskeletal Disorders Reported by Employers
8-Carpal Tunnel Syndrome Cases Identified in State Workers’ Compensation Records
9-Pneumoconiosis Hospitalizations
10-Pneumoconiosis Mortality
11-Acute Work-related Pesticide Poisonings Reported to Poison Control Centers
12-Incidence of Malignant Mesothelioma
13-Elevated Blood Lead Levels Among Adults
14-Workers Employed in Industries with High Risk for Occupational Morbidity
15-Workers Employed in Occupations with High Risk for Occupational Morbidity
16-Workers in Occupations and Industries with High Risk for Occupational Mortality
17-Occupational Health and Safety Professionals
18-OSHA Enforcement Activities
19-Workers’ Compensation Awards
20 -Work-related Low Back Disorder Hospitalizations
Significance

Understanding the diversity of the workforce is essential in assessing occupational health trends, and in preventing work-related injury and illness. Illness and injury trends can vary by demographic characteristics, such as age, sex, race/ethnicity. Identifying worker subgroups who experience higher than expected rates of work-related injuries or illnesses helps leaders develop, implement and evaluate prevention activities that are culturally appropriate and effective.

Methods

The demographic and employment data presented here were obtained from the Bureau of Labor Statistics (BLS) Current Population Survey and BLS Geographic Profiles of Employment and Unemployment. Age, sex, race/ethnicity and employment characteristics are described for the years 2001 to 2009 for both WY and the US. The percent of civilian workers employed by occupational and industry categories is only reported for 2003 to 2009 due to the changes in BLS category definitions that took effect in 2003.

Wyoming’s employment data for black workers and workers classified as “other” was not reliable enough statistically to meet the BLS standards for publication.

Results

Demographics

Age

- In both WY and the US, over 92% of civilian workers employed between 2001 and 2009 were between the ages of 18 and 64 years.
Race/Ethnicity

- The majority of civilian workers in WY and the US from 2001 to 2009 were White.

**Figure P.3 Employed WY and US civilian workers by race and ethnicity, 2001-2009**

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>WY</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>96.2</td>
<td>82.8</td>
</tr>
<tr>
<td>Black</td>
<td>10.8</td>
<td>6.2</td>
</tr>
<tr>
<td>Other</td>
<td>6.2</td>
<td>5.7</td>
</tr>
<tr>
<td>Hispanic</td>
<td>12.8</td>
<td>12.8</td>
</tr>
</tbody>
</table>

Limitations

- Demographic and workforce characteristics are helpful to describe the workforce, but do not directly measure occupational risks or hazards.
- Data from the Current Population Survey, a monthly probability sample of households in the United States, only provide estimates.
- Workers under the age of 16, active-duty military and inmates are not included in the estimates.
- The percentage of non-White workers may be underestimated if they do not have permanent residences or are migratory (such as farmworkers). Thus, in states that experience high rates of seasonal employment, the demographic data are likely to underestimate the size of the population at-risk for work-related injuries and illnesses.

Recommendations

- Determine how workforce demographics and characteristics impact work-related injuries and illnesses in WY.
- Develop methods for tracking migratory worker populations in order to assess the impact of work-related injuries and illnesses in WY.
Employment Characteristics

- At least 259,000 civilian workers were employed in WY each year from 2001 to 2009. Table P.1 shows the number of civilian workers in WY and the US by year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Wyoming</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>261,000</td>
<td>136,933,000</td>
</tr>
<tr>
<td>2002</td>
<td>259,000</td>
<td>136,485,000</td>
</tr>
<tr>
<td>2003</td>
<td>266,000</td>
<td>137,736,000</td>
</tr>
<tr>
<td>2004</td>
<td>271,000</td>
<td>139,252,000</td>
</tr>
<tr>
<td>2005</td>
<td>273,000</td>
<td>141,730,000</td>
</tr>
<tr>
<td>2006</td>
<td>278,000</td>
<td>144,427,000</td>
</tr>
<tr>
<td>2007</td>
<td>279,000</td>
<td>146,047,000</td>
</tr>
<tr>
<td>2008</td>
<td>284,000</td>
<td>145,882,000</td>
</tr>
<tr>
<td>2009</td>
<td>279,000</td>
<td>140,095,000</td>
</tr>
</tbody>
</table>


- Fewer than 19% of civilian workers in WY and the US were employed part-time during 2001-2009. The percent of workers who were employed part-time in WY was higher than the US. (Figure P.4)

- The majority of civilian workers employed in WY and in the US from 2001 to 2009 were employed full-time, working a standard 40-hour work week, if not greater than 40 hours per week. (Figure P.5)

- In WY, the unemployment rate ranged from 2.9 in 2007 to 6.5 in 2009. Average unemployment rates in WY and the US were similar. Figure P.4. shows the average employment status of WY and US civilian workers for 2001-2009.

- Approximately 10.6% of civilian workers in WY were self-employed during 2001-2009, compared to approximately 7.3% in the US (Figure P.4)
**Industries and Occupations**

- Industries that employed the most civilian workers in WY from 2003 to 2009 were Education and Health Services, Wholesale and Retail Trade, and Mining. Figure P.6 presents the distribution of WY workers in each industry.

**Figure P.6 Employed WY civilian workers by industry**

- Occupational groups that employed the most civilian workers in WY from 2003 to 2009 were Professional and Related Occupations, Management, Business and Financial Operations and Service Occupations. The following graph represents the percentage of WY workers in each occupational group.

**Figure P.7 Employed WY civilian workers by occupational group**
### Indicator 1: Non-fatal Injuries and Illnesses

**Significance**

Occupational injuries and illnesses are common and costly. Often, they are preventable. The vast majority of occupational injuries and illnesses do not result in death or permanent disability. Some do. Many occupational injuries and illnesses result in time lost from work, which is costly for employers, employees and the State of Wyoming. Keeping track of the frequency of occupational injuries and illnesses is the first step in leading comprehensive state-wide prevention efforts.

**Methods**

Occupational Health Indicator 1 is based on data from the BLS Survey of Occupational Injuries and Illnesses (SOII). An incidence rate describes the number of new injuries and illnesses that have occurred over a given time period. In this case, OHI #1 includes incident injuries and illnesses per 100,000 Full-Time Equivalents (FTEs) in Wyoming in each year listed. FTEs measure time on the job, which gives us a more accurate measure of “at-risk experience” than employment status would. Linear and Poisson regression analyses were used to examine work-related injury and illness trends in WY for the years 2003 to 2008. Data prior to 2002 are not available online for WY.

**Results**

- Wyoming injury and illness rates were consistently higher than national rates for the years 2002-2009. Wyoming’s highest rate was 5,800 events per 100,000 FTEs in 2003 and 2005. Wyoming’s lowest rate was 4,000 events per 100,000 FTE’s in 2009. (Table 1.1)
- Wyoming injury and illness rates that resulted in days away from work were higher than national rates from 2002-2009, with a high of 2,500 per 100,000 FTEs in 2003 and a low of 1,400 per 100,000 FTEs in 2009. (Table 1.1)

#### Table 1.1 Estimated Annual Incidence Rate of Work-related Injuries and Illnesses, per 100,000 FTEs, WY and US, 2002-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Estimated Annual Total Work-related Injury and Illness Incidence Rate Per 100,000 FTEs (WY)*</th>
<th>Estimated Annual Total Work-related Injury and Illness Incidence Rate Per 100,000 FTEs (US)*</th>
<th>Estimated Annual Incidence Rate Involving Days Away from Work Per 100,000 FTEs (WY)**</th>
<th>Estimated Annual Incidence Rate Involving Days Away from Work Per 100,000 FTEs (US)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>5,600</td>
<td>5,200</td>
<td>2,200</td>
<td>1,600</td>
</tr>
<tr>
<td>2003</td>
<td>5,800</td>
<td>5,000</td>
<td>2,500</td>
<td>1,500</td>
</tr>
<tr>
<td>2004</td>
<td>5,300</td>
<td>4,800</td>
<td>2,300</td>
<td>1,400</td>
</tr>
<tr>
<td>2005</td>
<td>5,800</td>
<td>4,600</td>
<td>2,300</td>
<td>1,400</td>
</tr>
<tr>
<td>2006</td>
<td>4,800</td>
<td>4,400</td>
<td>1,900</td>
<td>1,300</td>
</tr>
<tr>
<td>2007</td>
<td>4,600</td>
<td>4,200</td>
<td>1,800</td>
<td>1,200</td>
</tr>
<tr>
<td>2008</td>
<td>4,600</td>
<td>3,900</td>
<td>1,600</td>
<td>1,100</td>
</tr>
<tr>
<td>2009</td>
<td>4,000</td>
<td>3,600</td>
<td>1,400</td>
<td>1,100</td>
</tr>
</tbody>
</table>

*Source: Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses*

*Incidence rates for total reportable cases.*

**Incidence rates involving days away from work include those that results in days away from work with or without job transfer or restriction.*
Results (con’t)

- Between 2003 and 2008, there was a significant decrease in the estimated number of work-related injuries and illnesses in Wyoming (Figures 1.1)

- Between 2003 and 2008, there was a significant decrease in the estimated annual total number of cases involving days away from work reported in Wyoming (Figure 1.2.)


**Figure 1.1 Annual number of nonfatal work-related injuries and illnesses reported to SOII, WY, 2003-2008**

Test for trend modeled using a linear regression

**Figure 1.2 Annual incidence rate per 100,000 FTE of nonfatal work-related injuries and illnesses reported to SOII, WY, 2003-2008**

Poisson SOII Rate = 1.046117 - 0.4931*Year; (Pr>|t|: 0.0006)

Test for trend modeled using a Poisson regression

Results (con’t)

- The SOII work-related injury and illness incidence rate per 100,000 FTEs and the annual incidence rate for cases involving DAFW declined at a statistically significant rate as well. Between 2003 and 2008, the overall injury and illness rate per 100,000 FTEs decreased by an estimated 5% per year and the injury and illness rate per 100,000 FTEs involving DAFW decreased by an estimated 7% per year. (Figures 1.3 and 1.4)
Limitations

- This data might not include work-related illnesses with long latency periods (e.g., cancer) because such illnesses can be difficult to attribute to the workplace.
- The source of this data (SOII) relies on information reported by employers. It is reasonable to assume that there may be work-related illness and injuries not reported by employers or workers, which would lead to an under estimate of the true number.
- SOII data are not a complete count of all employers and are subject to sampling error.
- The dataset does not include members of the military, self-employed individuals, farms with fewer than 11 employees and state, local and federal government workers are excluded from these SOII data.

Recommendations

- Determine risk factors that contribute to work-related illness and injuries to guide intervention, education, prevention and regulatory efforts.
**Indicator 2: Work-related Hospitalizations**

**Significance**

Sometimes, work-related injuries and illnesses are serious enough to require hospitalization. Describing and tracking work-related hospitalizations are useful for identifying high-risk occupations and targeting prevention.

**Methods**

The numbers of work-related hospitalizations were obtained from the WY Department of Health, which collects data on all hospital discharges with a primary payer of Workers’ Compensation. The data does not include patients of unknown age, patients under 16 years-of-age, out-of-state residents or unknown residence and out-of-state hospitalizations. Crude rates of hospitalizations per 100,000 employed persons were calculated for each year from 2001-2009 using BLS Current Population Survey estimates as the denominator. Linear and Poisson regression analyses were used to examine trends both for hospitalization counts and hospitalization rates in WY.

**Results**

- Each year, on average, 644 workers were hospitalized in Wyoming for a work-related injury or illness. (Table 2.1)
- The annual crude rate of hospital discharges with primary pay listed as “workers’ compensation” ranged from 164.6 per 100,000 workers in 2007 to 274.3 per 100,000 workers in 2001. (Table 2.1).
- Between 2001 and 2009 in WY, there was not a statistically significant difference in the annual number of work-related hospitalizations or the hospitalization rate per 100,000 workers. (Figures 2.1-2.2)

---

**Table 2.1 Total Workers’ Compensation Hospital Discharges among Residents 16 Years of Age or Older, WY, 2001-2009**

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual number of work-related hospitalizations (WY)</th>
<th>Annual crude rate of hospitalizations per 100,000 employed persons (WY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>716</td>
<td>274.3</td>
</tr>
<tr>
<td>2002</td>
<td>694</td>
<td>268.0</td>
</tr>
<tr>
<td>2003</td>
<td>653</td>
<td>245.5</td>
</tr>
<tr>
<td>2004</td>
<td>674</td>
<td>248.7</td>
</tr>
<tr>
<td>2005</td>
<td>648</td>
<td>237.4</td>
</tr>
<tr>
<td>2006</td>
<td>563</td>
<td>202.5</td>
</tr>
<tr>
<td>2007</td>
<td>461</td>
<td>164.6</td>
</tr>
<tr>
<td>2008</td>
<td>707</td>
<td>248.9</td>
</tr>
<tr>
<td>2009</td>
<td>683</td>
<td>244.8</td>
</tr>
</tbody>
</table>

Limitations

- Employed individuals less than 16 years old experience work-related hospitalizations, but corresponding denominator data are not readily available.
- Practice patterns and payment mechanisms may affect decisions by health care providers to hospitalize patients, to correctly diagnose work-related conditions and/or to list the condition as a discharge diagnosis.
- Residents of one state may be hospitalized in another state and not be reflected in the hospitalization data for the state of residence. Due to the limited number of medical facilities in WY, serious injuries would likely be transferred to a regional trauma center outside of WY and may not be reflected in the hospitalization data for their state of residence or where the injury occurred.
- All admissions are counted, including multiple admissions for a single individual.
- Until hospital discharge data are available in all states, nationwide estimates can not be calculated.
- Data on race/ethnicity are not collected in some states and are incomplete and/or of questionable validity in others.
- Hospital discharge records are only available for non-federal, acute care hospitals.

Recommendations

- Encourage or require hospital medical records to include standardized (and accurate) codes for a patient’s occupation and industry. Collecting industry and occupation information on hospital medical records will help guide state-level efforts on education, prevention, and intervention.
Indicator 3: Fatal Work-related Injuries

Significance
Sometimes, injuries at work result in death. Unintentional work-related injuries include falls, electrocutions, acute poisonings and motor vehicle crashes occurring during work-related travel. Intentional work-related injuries include homicides and suicides that occur at work. Workplace fatalities involve many risk factors, including workplace design, workplace policies and the social climate at work. Surveillance of fatal work-related injuries, their contributing risk factors and the prevalence of risk factors in WY workplaces can help state officials develop intervention, education, prevention and regulatory efforts.

Methods
The rates of fatal work-related injuries are reported for the years 2001 to 2008 for both WY and the US. Numerator data were obtained from the Census of Fatal Occupational Injuries (CFOI) and rates were calculated using the BLS Current Population Survey as the denominator. Linear and Poisson regression analyses were used to examine trends for fatal work-related injuries.

Results
• The average annual rate of fatal work-related injuries in WY was 13.7 per 100,000 workers. (Table 3.1)
• Work-related injury fatality rates in WY were much higher then overall US rates for the time period 2001 to 2009. (Table 3.1 )
• There was not a statistically significant difference in the annual number of fatal work-related injuries or the annual crude occupational fatality rate per 100,000 employed persons between 2001-2009 in WY. (Figures 3.1-3.2). 2009 was the first year that there was a significant decrease in the fatality rate.

<table>
<thead>
<tr>
<th>Year</th>
<th>Wyoming</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>40 (15.3)</td>
<td>5,915 (4.3)</td>
</tr>
<tr>
<td>2002</td>
<td>33 (12.7)</td>
<td>5,534 (4.0)</td>
</tr>
<tr>
<td>2003</td>
<td>37 (13.9)</td>
<td>5,757 (4.0)</td>
</tr>
<tr>
<td>2004</td>
<td>43 (15.9)</td>
<td>5,764 (4.1)</td>
</tr>
<tr>
<td>2005</td>
<td>46 (16.8)</td>
<td>5,734 (4.0)</td>
</tr>
<tr>
<td>2006</td>
<td>36 (12.9)</td>
<td>5,840 (4.0)</td>
</tr>
<tr>
<td>2007</td>
<td>48 (17.1)</td>
<td>5,488 (3.7)</td>
</tr>
<tr>
<td>2008</td>
<td>33 (11.6)</td>
<td>5,214 (3.6)</td>
</tr>
<tr>
<td>2009</td>
<td>19 (6.8)</td>
<td>4,551 (3.5)</td>
</tr>
</tbody>
</table>

Limitations

- Work-related fatalities of people younger than 16 may be included in the numerator but not in the denominator.
- Since work-related fatalities are reported by the state in which the fatality occurred and not the state of the worker’s residence, rates may overestimate risk if the work-related fatalities involved workers who were out-of-state residents. Likewise, rates may be underestimated if fatalities occurred in other states.
- Deaths in the military are included in the number of fatalities but not in the rates.

Recommendations

- Review fatal work-related injury and illness data in WY by industry cause, occupation, age, gender, race/ethnicity and injury/illness characteristics.
- Identify the primary risk factors which contribute to work-related fatalities to guide intervention, education, prevention and regulatory efforts.
Indicator 4: Amputations Reported By Employers

Significance

Most work-related amputations involve full or partial loss of workers’ fingers. Less common amputations involve arms, legs, feet, toes, noses and ears. Work-related amputations can be prevented through the identification and control of occupational hazards. Proper machine guarding, lock-out/tag-out procedures and personal protective equipment are common methods to prevent amputation.

Methods

Data were obtained from the BLS Annual Survey of Occupational Injuries and Illnesses (SOII) which provides yearly state and national estimates on the number and incidence rates of work-related amputations involving at least one day away from work. Data are not available for years prior to 2002 for WY. Linear and Poisson regression analyses were used to examine trends for amputations reported by employers.

Results

• Compared to the national average, workers in Wyoming were more likely to suffer an amputation involving days away from work. (Table 4.1)

• While there were fewer work-related amputations reported in Wyoming in 2008 than in 2002, statistical analyses were unable to detect a trend. The differences observed from year to year may be due to natural variability. (Figures 4.1-4.2)

Table 4.1 Estimated Work-related Amputations Involving Days Away from Work, WY and US, 2002-2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Wyoming</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>35 (24.0)</td>
<td>8,793 (10.0)</td>
</tr>
<tr>
<td>2003</td>
<td>30 (20.0)</td>
<td>8,150 (9.0)</td>
</tr>
<tr>
<td>2004</td>
<td>20 (16.0)</td>
<td>8,160 (9.0)</td>
</tr>
<tr>
<td>2005</td>
<td>20 (14.0)</td>
<td>8,450 (9.0)</td>
</tr>
<tr>
<td>2006</td>
<td>30 (15.0)</td>
<td>7,990 (9.0)</td>
</tr>
<tr>
<td>2007</td>
<td>180 (97.0)*</td>
<td>7,320 (8.0)</td>
</tr>
<tr>
<td>2008</td>
<td>20 (10.0)</td>
<td>6,230 (7.0)</td>
</tr>
</tbody>
</table>


* Note: SOII data are a probability sample, not a complete count of all employers, and are subject to sampling error. Due to WY’s small population and small SOII sample size, a slight increase in the number of amputations reported through SOII can dramatically affect the total number of estimated amputations.
Limitations

- Whether an occupational amputation results in days away from work may depend on the worker and the employer involved. Sometimes, employers assign employees with work-related conditions to restricted work activity, which may result in an underestimation of cases involving days away from work.
- Work-related illness and injuries not reported by employers or workers may lead to underestimated the actual number of reportable cases by the SOII.
- SOII data are a probability sample and not a complete count of all employers and are subject to sampling error.
- Military, self-employed individuals, farms with fewer than 11 employees and state, local and federal government workers are excluded from these SOII data.

Recommendations

- Determine the primary risk factors that contribute to work-related amputations to guide intervention, education, prevention and regulatory efforts.
Indicator 5: Amputations Identified in Workers’ Compensation System

Significance
Most work-related amputations involve full or partial loss of workers’ fingers. Less common amputations involve arms, legs, feet, toes, noses and ears. Work-related amputations can be prevented through the identification and control of occupational hazards. Proper machine guarding, lock-out/tag-out procedures and personal protective equipment are common methods to prevent amputation.

Methods
The WY Department of Employment tracks the number of compensation claims filed for amputations resulting in “time loss.” Annual incidence rates were calculated using the number of workers covered by workers’ compensation provided by the National Academy of Social Insurance (NASI). Linear and Poisson regression analyses were used to examine trends for amputations identified in the WY workers’ compensation system.

Results
- Although there was a significant increase in the estimated annual number of amputation cases filed with the WY workers’ compensation system between 2001-2008, (estimated increase of 1.6 amputations/year), a Poisson regression analysis indicated there was not a statistically significant trend in the annual incidence rate of amputation cases filed with WY state workers’ compensation per 100,000 workers covered by the WY workers’ compensation system during the same time period. (Figure 5.1-5.2)

Table 5.1 State Workers’ Compensation Claims for Amputations with Lost Work-time, WY, 2001-2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of amputation claims filed</th>
<th>Annual incidence rate of amputation claims filed per 100,000 workers covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>23</td>
<td>10.1</td>
</tr>
<tr>
<td>2002</td>
<td>34</td>
<td>14.8</td>
</tr>
<tr>
<td>2003</td>
<td>29</td>
<td>12.5</td>
</tr>
<tr>
<td>2004</td>
<td>37</td>
<td>15.4</td>
</tr>
<tr>
<td>2005</td>
<td>34</td>
<td>13.8</td>
</tr>
<tr>
<td>2006</td>
<td>30</td>
<td>11.5</td>
</tr>
<tr>
<td>2007</td>
<td>36</td>
<td>13.3</td>
</tr>
<tr>
<td>2008</td>
<td>41</td>
<td>14.7</td>
</tr>
</tbody>
</table>

Source: Wyoming Department of Labor, Division of Workers’ Compensation (numerator) National Academy of Social Insurance (NASI) estimate of workers covered by workers’ compensation (denominator)
Limitations

- The number of workers’ compensation claims filed may be underestimated because not all individuals with work-related injuries and illnesses file for workers’ compensation.
- Those workers who are self-employed (farmers, independent contractors), who work in small businesses or who are federal employees may not be covered by state workers’ compensation insurers and therefore are not included in these estimates.
- Differences in eligibility criteria and availability of data of workers’ compensation programs limit these data from being compared with other states or overall US data.

Recommendations

- Review amputation data by industry, occupation, age, gender, race/ethnicity, and other characteristics to identify important risk factors and patterns and to help guide intervention, education, prevention and regulatory efforts.
Indicator 6: Hospitalizations From Work-related Burns

Significance

Hospitalizations from work-related burns include injuries to tissues caused by contact with dry heat (fire), moist heat (steam), chemicals, electricity, friction or radiation. Describing and tracking hospitalizations from work-related burns are useful ways to identify high risk occupations or work processes and targeting prevention.

Methods

Data were obtained from the WY State Department of Health for the number of hospitalizations for work-related burns. Criteria for inclusion were any hospital discharge records with a primary payer of workers’ compensation, principle ICD-9-CM diagnosis code between 940-949 and patients aged 16 years or older. Rates were calculated using BLS Current Population Survey data for the denominator. Linear and Poisson regression analyses were used to examine trends for hospitalization counts and rates in WY.

Results

- On average, from 2001-2009, 26 workers in WY were hospitalized for work-related burns (Table 6.1)
- The annual crude rate of work-related burn hospitalizations per 100,000 workers ranged from 6.5 to 14.0 for the years 2001 to 2009. (Table 6.1)
- Although there was a significant decrease in the annual number of hospitalizations for work-related burns in WY between 2001-2009, (estimated decrease of 0.7 burns/year), a Poisson regression analysis indicated there was not a statistically significant trend in the incidence rate of hospitalizations for work-related burns per 100,000 employed persons in WY during the same period. (Figure 6.1-6.2)

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of hospitalizations for work-related burns</th>
<th>Annual crude rate of work-related burn hospitalizations per 100,000 workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>26</td>
<td>10.0</td>
</tr>
<tr>
<td>2002</td>
<td>31</td>
<td>12.0</td>
</tr>
<tr>
<td>2003</td>
<td>21</td>
<td>7.9</td>
</tr>
<tr>
<td>2004</td>
<td>38</td>
<td>14.0</td>
</tr>
<tr>
<td>2005</td>
<td>28</td>
<td>10.3</td>
</tr>
<tr>
<td>2006</td>
<td>18</td>
<td>6.5</td>
</tr>
<tr>
<td>2007</td>
<td>25</td>
<td>8.9</td>
</tr>
<tr>
<td>2008</td>
<td>24</td>
<td>8.5</td>
</tr>
<tr>
<td>2009</td>
<td>26</td>
<td>9.3</td>
</tr>
</tbody>
</table>

**Limitations**

- Employed individuals less than 16 years old experience work-related burn injuries, but corresponding denominator data are not readily available.
- Practice patterns and payment mechanisms may affect decisions by health care providers to hospitalize patients, to correctly diagnose work-related conditions and/or to list the condition as a discharge diagnosis.
- Residents of one state may be hospitalized in another state and not be reflected in the hospitalization data for the state of residence. Due to the limited number of medical facilities in WY, serious injuries would likely be transferred to a regional trauma center outside of WY and may not be reflected in the hospitalization data for their state of residence or where the injury occurred.
- All admissions are counted, including multiple admissions for a single individual.
- Until hospital discharge data are available in all states, nationwide estimates will be incomplete.
- Data on race/ethnicity are not collected in some states and are incomplete and/or of questionable validity in others.
- Hospital discharge records are only available for non-federal, acute care hospitals.

**Recommendations**

- Encourage or require hospital medical records to include standardized (and accurate) codes for a patient’s occupation and industry. Collecting industry and occupation information on hospital medical records will help guide state-level efforts on education, prevention, and intervention related to occupational burn injuries.
## Indicator 7: Musculoskeletal Disorders Reported by Employers

### Significance

Work-related musculoskeletal disorders and injuries affect the muscles, tendons, nerves, ligaments, joints and spinal discs and significantly impact the ability of workers to perform their jobs effectively. Contributing work activities include repetitive motion, placing hands or limbs in awkward positions, using equipment that vibrates and handling heavy objects. Work-related musculoskeletal disorders can be prevented through the identification and control of occupational hazards and the implementation of safety procedures and regulations.

### Methods

Data were obtained from the BLS annual Survey of Occupational Injury and Illness (SOII). Data for WY were not available for 2001. The BLS definition of musculoskeletal disorders involving days away from work includes persons with one or more of the following Occupational Injury and Illness Codes (OIC): 021 (sprains, strains, tears), 0972 (back pain, hurt back), 0973 (soreness, pain, hurt, except the back), 1241 (carpal tunnel syndrome), 153 (hernia), any code that begins with 17 (musculoskeletal system and connective tissue diseases and disorders) and one of the following OIC event codes: 211 (bending, climbing, crawling, reaching, twisting), 22 (overexertion) or 23 (repetitive motion). Linear and Poisson regressions were used to examine trends for musculoskeletal disorder counts and rates in WY for the years 2003-2009.

### Results

- Every year between 2002 and 2008, on average, 1,026 workers in Wyoming suffered from a musculoskeletal disorder that involved days away from work. (Table 7.1)
- According to estimated incidence rates, an average Wyoming worker is more likely to suffer a musculoskeletal disorder involving days away from work than a typical US worker. (Table 7.1)

### Table 7.1 Musculoskeletal Disorders Involving Days Away from Work, WY and US, 2002-2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Number and estimated incident rate of work-related musculoskeletal disorders per 100,000 full time employees (WY)</th>
<th>Number and estimated incident rate of work-related musculoskeletal disorders per 100,000 full time employees (US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>913 (658)</td>
<td>487,900 (553)</td>
</tr>
<tr>
<td>2003</td>
<td>1,260 (863)</td>
<td>435,180 (496)</td>
</tr>
<tr>
<td>2004</td>
<td>950 (665)</td>
<td>401,700 (452)</td>
</tr>
<tr>
<td>2005</td>
<td>1,170 (717)</td>
<td>375,540 (413)</td>
</tr>
<tr>
<td>2006</td>
<td>980 (560)</td>
<td>375,160 (413)</td>
</tr>
<tr>
<td>2007</td>
<td>980 (519)</td>
<td>335,390 (386)</td>
</tr>
<tr>
<td>2008</td>
<td>930 (477)</td>
<td>317,440 (354)</td>
</tr>
</tbody>
</table>

Results (con’t)

• Between 2003 and 2009, there was a decrease in the estimated number of work-related musculoskeletal disorders involving days away from work reported by employers in WY. A Poisson regression analysis indicates that the estimated annual incidence rate of all musculoskeletal disorders involving days away from work per 100,000 FTE decreased by an estimated 11.6% per year between 2003-2009 as well. (Figures 7.1-7.2)

Limitations (con’t)

• Musculoskeletal disorders may be under-recorded on the Occupational Safety and Health Administration (OSHA) logs that serve as the basis of the annual SOII survey from which these data are extracted.
• The definition of musculoskeletal disorder involving days away from work used by the BLS has changed over time.
**Indicator 8: Carpal Tunnel Syndrome Cases Identified in Workers’ Compensation Systems**

**Significance**

Work-related carpal tunnel syndrome (CTS) may be caused by trauma or fractures of the hand or wrist or physical hazards, such as high exertional force and high repetition, placing hands or limbs in awkward positions or using equipment that vibrates. Symptoms include burning, tingling and numbness of fingers which can lead to difficulty in gripping and holding objects. Work-related CTS can be prevented through the identification and control of occupational hazards and the implementation of safety procedures and regulations.

**Methods**

The WY Department of Labor, Division of Workers’ Compensation, tracked the number of compensation claims, resulting in time loss, filed for CTS for 2001 to 2008. Annual incidence rates were calculated using the number of workers covered by workers’ compensation provided by the National Academy of Social Insurance (NASI). Linear and Poisson regression analyses were used to examine trends for CTS counts and rates in WY for the years 2001-2008.

**Results**

- Between 2001 and 2008, there was an increase in the estimated annual number of CTS cases with lost work-time filed with the WY workers’ compensation system (p=0.0065). A Poisson regression analysis also indicates that the overall incidence rate of CTS cases per 100,000 FTE increased by an estimated 5.4% per year between 2001-2008 (Pr>ChiSq<0.0001). (Figure 8.1-8.2)

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of carpal tunnel syndrome claims filed</th>
<th>Annual incidence rate of carpal tunnel claims filed per 100,000 workers covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>4</td>
<td>4.4</td>
</tr>
<tr>
<td>2002</td>
<td>10</td>
<td>1.3</td>
</tr>
<tr>
<td>2003</td>
<td>3</td>
<td>5.2</td>
</tr>
<tr>
<td>2004</td>
<td>12</td>
<td>4.2</td>
</tr>
<tr>
<td>2005</td>
<td>10</td>
<td>6.9</td>
</tr>
<tr>
<td>2006</td>
<td>45</td>
<td>17.3</td>
</tr>
<tr>
<td>2007</td>
<td>82</td>
<td>30.4</td>
</tr>
<tr>
<td>2008</td>
<td>131</td>
<td>47.0</td>
</tr>
</tbody>
</table>

Source: Wyoming Department of Labor, Division of Workers’ Compensation

- Annually, an estimated 14.5 per 100,000 WY workers reported work-related CTS for the years 2001 to 2008. (Table 8.1)
- The annual incidence rate of CTS filed with the WY Division of Workers’ Compensation per 100,000 workers covered ranged from 1.3 in 2002 to 47.0 in 2008. (Table 8.1)
- The number of claims filed with workers’ compensation for work-related CTS has risen over the 8-year period, particularly between 2006-2008.
Limitations
- The number of claims filed with workers’ compensation may be underestimated because not all individuals with work-related injuries and illnesses file for workers' compensation.
- The number of claims filed with workers’ compensation may be underestimated due to the fact that the treating physician may or may not recognize the condition as work-related.
- Those workers who are self-employed (farmers, independent contractors), who work in small businesses or who are federal employees may not be covered by state workers’ compensation insurers and therefore are not included in these estimates.
- Differences in eligibility criteria and availability of data of workers’ compensation programs limit these data from being compared with other states or overall US data.

Recommendations
- Partner with WY Department of Labor, Division of Workers’ Compensation to review the WC cases by industry, occupation and demographic variables to better characterize the increasing trend in the number of CTS cases reported to WC.
- Identify primary risk factors that contribute to CTS to target prevention efforts.
- Identify and track other forms of repetitive motion injury.
- Educate primary care physicians and workers on the relationship between work-place exposure and risks and the development of CTS.
Indicator 9: Pneumoconiosis Hospitalizations

Significance
Pneumoconioses are lung diseases caused by dust exposure in the workplace. Pneumoconioses include silicosis, asbestosis, coal workers’ pneumoconiosis and pneumoconiosis due to a variety of other mineral dusts, including talc, aluminum, bauxite, and graphite. Complications of pneumoconiosis that may cause hospitalizations include respiratory infections, tuberculosis, chronic bronchitis, emphysema, lung cancer, pleuritis, progressive systemic sclerosis, renal disease and respiratory failure. Controlling and monitoring exposure to dust and ongoing medical surveillance are important in preventing pneumoconioses.

Methods
Pneumoconiosis hospitalization data were obtained from the WY State Health Department. Pneumoconioses cases meeting the following criteria were requested: any diagnosis of ICD-9-CM code 500 through 505 (including asbestosis) and age 15 years and older. Excluded data included patient age unknown, out-of-state residents, unknown state of residence and out-of-state hospitalizations.

Results
• Crude and age-standardized hospitalization rates for 2001 to 2008 were not calculated due to the small number (<5) of cases per year.

Limitations
• Due to the voluntary nature of the WY inpatient hospital database, the number of patients with a pneumoconiosis diagnosis cannot be accurately reflected.
• Discharge summaries may vary, including the number of diagnoses listed and who completed the summary, but may not include pneumoconiosis as the contributing cause of hospitalization.
• Not all cases of pneumoconiosis may be hospitalized for pneumoconiosis-related complications because of insurance coverage and how a physician may diagnose the condition. Typically, only the small number of the most severe cases are hospitalized. Therefore, hospitalization rates likely underestimate the true burden of pneumoconiosis among workers.
• Pneumoconioses occur many years after a worker’s first exposure to hazardous dust. The latency from time of exposure to detection of disease averages 20 to 40 years. Therefore, rates in 2001 to 2008 may reflect past exposures from the 1960s to the 1980s.

Recommendations
• Identify data sources that estimate the rate of outpatient (non-hospitalized) cases of pneumoconiosis.
**Indicator 10: Pneumoconiosis Mortality**

**Significance**

Pneumoconioses are lung diseases caused by dust exposure in the workplace. Pneumoconioses include silicosis, asbestosis, coal workers’ pneumoconiosis and pneumoconiosis due to exposures to a variety of other mineral dusts, including talc, aluminum, bauxite, and graphite. Controlling occupational exposure through monitoring, surveillance and prevention programs can prevent pneumoconioses.

**Methods**

The WY Department of Health’s Vital Records Program provided information on pneumoconiosis mortality for the years 2001 to 2009. Mortality rates and age-standardized rates were not calculated due to the small number of cases reported each year and multiple age groups.

**Results**

- Less than 5 pneumoconiosis deaths occurred per year in WY from 2001 to 2009.

**Limitations**

- The estimated incidence of mortality from pneumoconiosis does not necessarily represent current exposures, primarily because of the long latency between a person’s first dust exposure and development of disease.
**Indicator 11: Acute Work-related Pesticide Poisonings Reported to Poison Control Centers**

**Significance**

An estimated 1 billion pounds of pesticides are used each year in the US to protect food and control disease. Agricultural workers and those applying pesticides have the highest risk of over-exposure to potentially harmful pesticides. The Environmental Protection Agency estimates that 20,000 to 40,000 work-related pesticide poisonings occur each year.

**Methods**

The American Association of Poison Control Centers collects information on reported cases of work-related pesticide poisoning resulting in acute illness. Pesticide poisonings include exposures to disinfectants, fungicides, fumigants, herbicides, insecticides, repellents and rodenticides. The incidence of reported work-related pesticide poisonings per 100,000 employed persons age 16 years and older is calculated for WY and the US for the years 2001 to 2009 using the BLS Current Population Survey data for the denominator. Linear and Poisson regression analyses were used to examine trends for work-related pesticide poisoning cases and rates in WY for the years 2001-2009.

**Results**

- On average, an estimated 4.2 per 100,000 WY workers per year reported work-related pesticide poisoning to a poison control center between 2001 to 2009. (Table 11.1)
- The rate of work-related pesticide poisonings in WY ranged from 2.2 to 6.8 per 100,000 workers per year for the years 2001 to 2009. (Table 11.1)
- Based on reports from poison control centers, between 2001 to 2009, work-related pesticide poisoning rates in WY were higher than the national average. (Table 11.1)
- In WY, there was not a statistically significant difference in the annual number or incidence rate per 100,000 workers of acute work-related pesticide-associated illness and injury reported to poison control centers between 2001-2009. (Figure 11.1-11.2)

### Table 11.1 Work-related Pesticide Poisonings Reported to Poison Control Centers, WY and US, 2001-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Wyoming (rate)</th>
<th>United States (rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>15 (5.8)</td>
<td>2,492 (1.8)</td>
</tr>
<tr>
<td>2002</td>
<td>8 (3.1)</td>
<td>2,528 (1.9)</td>
</tr>
<tr>
<td>2003</td>
<td>12 (4.5)</td>
<td>2,503 (1.8)</td>
</tr>
<tr>
<td>2004</td>
<td>10 (3.8)</td>
<td>2,476 (1.8)</td>
</tr>
<tr>
<td>2005</td>
<td>6 (2.2)</td>
<td>2,593 (1.8)</td>
</tr>
<tr>
<td>2006</td>
<td>19 (6.8)</td>
<td>2,560 (1.8)</td>
</tr>
<tr>
<td>2007</td>
<td>15 (5.4)</td>
<td>2,458 (1.7)</td>
</tr>
<tr>
<td>2008</td>
<td>8 (2.8)</td>
<td>2,171 (1.5)</td>
</tr>
<tr>
<td>2009</td>
<td>10 (3.6)</td>
<td>2,040 (1.5)</td>
</tr>
</tbody>
</table>

Source: American Association of Poison Control Centers (AAPCC) Reported cases of work-related pesticide poisonings (numerator); Employed persons age 16 years or older from the BLS Current Population Survey (denominator).
Limitations

- Not all work-related pesticide exposures resulting in illness are reported to poison control centers.
- Most reported work-related pesticide poisonings are acute exposures to pesticides; chronic long-term exposures are usually not reported to poison control centers.

Recommendations

- Review reported work-related pesticide poisonings by age, gender, race/ethnicity, industry, occupation, severity and illness in order to better target prevention efforts.
Mesothelioma is a rare, fatal cancer of the lining that surrounds the chest and abdominal cavities. Primarily attributable to asbestos exposure, onset of the disease may not occur for 20 to 40 years after exposure. The number of mesothelioma deaths in the US is expected to peak in 2010; However, occupational and environmental exposure to asbestos continues to occur. Mesothelioma can be prevented by controlling occupational exposure through monitoring, surveillance and prevention programs.

Methods
Mesothelioma data by year and age group were provided by the Cancer Surveillance Program at the WY Department of Health for the years 2001 to 2008. Age-standardized rates were not calculated due to the small number of cases for multiple age groups. State population estimates were obtained from the US Census Bureau for the denominator and were used to calculate crude rates. Nationwide estimates are not available because not all states meet current reporting standards. Linear and Poisson regression analyses were used to examine trends for mesothelioma counts and rates in WY for the years 2001-2008.

Results
• Annually, an average of 7 mesothelioma cases were diagnosed in WY between 2001 to 2008. (Table 12.1)
• The crude annual mesothelioma incidence rate per million persons has ranged from 4.9 to 32.3 between 2001 to 2008. (Table 12.1)
• There was not a statistically significant difference in the annual number or incidence rate per 1,000,000 residents of mesothelioma cases in WY between 2001-2008. (Figure 12.1-12.2)

<table>
<thead>
<tr>
<th>Table 12.1 Incidence of Malignant Mesothelioma, WY, 2001-2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>2001</td>
</tr>
<tr>
<td>2002</td>
</tr>
<tr>
<td>2003</td>
</tr>
<tr>
<td>2004</td>
</tr>
<tr>
<td>2005</td>
</tr>
<tr>
<td>2006</td>
</tr>
<tr>
<td>2007</td>
</tr>
<tr>
<td>2008</td>
</tr>
</tbody>
</table>

Source: Wyoming Department of Health Cancer Surveillance Program; State population estimates from the U.S. Census Bureau (denominator)
Limitations

- The estimated incidence rate does not necessarily represent current exposures, primarily because of the long latency associated with the disease.

Recommendations

- Review the incidence of mesothelioma by age, gender, race/ethnicity, occupation, industry and exposure history for prevention efforts.
**Indicator 13: Elevated Blood Lead Levels Among Adults**

**Significance**
Exposure to elevated levels of lead in the workplace can cause anemia, hypertension, nerve and kidney damage and lead to fertility and pregnancy problems. Lead remains a substantial health problem in the US due to occupational and environmental exposures. Occupational exposure may occur in workers engaged in the manufacture of storage batteries, mining of lead and zinc ores, working in firing ranges and painting and paper hanging. The average Blood Lead Level (BLL) of the general population is less then 2 micrograms per deciliter (µg/dL).

**Methods**
Data were obtained from the WY Department of Health for the years 2002 to 2009 for adults with BLLs ≥ 10 µg/dL among persons 16 years or older. BLL data were not available prior to the year 2002. Annual prevalence rates were calculated using the BLS, Current Population Survey estimates for numbers of employed persons aged 16 years and older. Linear and Poisson regression analyses were used to examine trends for BLL counts and rates in WY.

**Results**
- The annual prevalence rate per 100,000 employed persons in WY with a BLL ≥ 10µg/dL ranged from a low of 8.6 in 2009 to a high of 24.5 in 2005. (Table 13.1)
- There was not a statistically significant trend in the annual number or prevalence rate of WY residents with elevated blood lead levels (≥ 10 µg/dL) between 2002-2009. (Figure 13.1-13.2)

<table>
<thead>
<tr>
<th>Year</th>
<th>Persons age 16 year and older with Blood Lead Levels &gt; 10µg/dL (annual prevalence rate per 100,000 employed persons 16 years and older)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>33 (12.7)</td>
</tr>
<tr>
<td>2003</td>
<td>39 (14.7)</td>
</tr>
<tr>
<td>2004</td>
<td>41 (15.1)</td>
</tr>
<tr>
<td>2005</td>
<td>67 (24.5)</td>
</tr>
<tr>
<td>2006</td>
<td>56 (20.1)</td>
</tr>
<tr>
<td>2007</td>
<td>30 (10.7)</td>
</tr>
<tr>
<td>2008</td>
<td>36 (13.6)</td>
</tr>
<tr>
<td>2009</td>
<td>24 (8.6)</td>
</tr>
</tbody>
</table>

*Source: Reports of elevated BLLs from Wyoming Department of Health (numerator); BLS, Current Populations Survey (denominator)*
Limitations

- Not all employers provide BLL testing to all lead-exposed workers, which may result in underreporting.
- Many workers with significant occupational lead exposure are not appropriately tested.
- It is estimated that approximately 10-15% of elevated BLLs among adults may be caused by non-occupational exposures.
- Not all states may be able to distinguish occupationally exposed individuals from non-occupationally exposed individuals.
- Not all states may be able to determine both state of employment/exposure and state of residence of their reported cases.

Recommendations

- Increase testing in WY to accurately track rates of occupational lead exposure.
- Include age, gender and race/ethnicity in specific counts and rates to better define the pattern of elevated BLLs.
- Follow-up selected cases and/or clusters to help identify where and how individuals were exposed to lead. If the exposure is determined to be occupational related, work with the case(s) to develop and implement a lead exposure prevention plan.
- Work with identified cases industries to institute lead exposure prevention plans.
Indicator 14: Workers Employed in Industries with High Risk for Occupational Morbidity

Significance

In 2008, the U.S. Bureau of Labor Statistics (BLS) reported an estimated total of 3.7 million injury and illness cases within the private sector workforce. This equates to an estimated incidence rate of 3.9 cases per 100 full-time-equivalent workers. Workers in certain industries sustain a higher percentage of injuries and illnesses resulting in “days away from work” (DAFW). Industry categories that are at highest risk for occupational morbidity are determined every five years based on those industries with injury and illness rates more than double the national injury and illness annual rate average. The last five-year period for this calculation was 2003 to 2007 and the most recent period is 2008 to 2012. Work-related injuries and illnesses are preventable and control of occupational hazards is the most effective means of prevention. Concentrating on specific industries that may be at high-risk for non-fatal injuries and illnesses will help prioritize limited resources.

Methods

The US Census Bureau County Business Patterns reports the percentage of workers employed in industries at high risk for occupational morbidity. High morbidity risk industries are identified based on annual injury and illness incidence rates for private sector workers. The percent of workers in WY and US employed in industries with high risk for occupational morbidity is described for the years 2001 to 2008 and are divided into two intervals, 2003-2007 and 2008, due to the recalculation of high risk industries explained in the Significance section, above.

Results

- From 2003 to 2007, approximately 4.6% of the workforce in WY and 7.9% of the workforce in the U.S. were employed in industries with a disproportionately high risk for non-fatal injuries and illnesses. (Table 14.1)

- For the years 2003 -2007, the highest morbidity industries in WY included:
  - Nursing and Residential Care Facilities
  - Wood Products Manufacturing
  - General Warehousing and Storage
  - Scheduled Air Transportation and Sugar Manufacturing
  - Sugar Manufacturing

- Some of these industries, including Woods Products and Scheduled Air Transportation, have very small work forces.

- 2008 data are based on a newly calculated table of high-risk morbidity industries. For 2008, the highest morbidity industries in WY included:
  - Nursing and Residential Care Facilities
  - Skiing facilities
  - Couriers and messengers
  - Veterinary services
  - Other ambulatory health care services
### Limitations
- Since the County Business Patterns estimates are calculated in March of each year, new employees for that year may not be counted.
- The ranking of high-risk industries may differ by region.
- Estimates are based on a probability sample of private sector employers and does not include all employers.
- Estimates are based on injury and illness data maintained by employers and are subject to sampling error.
- Estimates do not include the military, small farms and federal agencies.

### Recommendations
- Work-related injuries and illnesses are preventable and control of occupational hazards is the most effective means of prevention. Concentrating on specific industries that may be at high-risk for non-fatal injuries and illnesses will help prioritize limited resources.

### Table 14.1 Percentage of Workers Employed in Industries with High Risk for Occupational Morbidity, WY and US 2003-2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Wyoming</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>4.5</td>
<td>6.7</td>
</tr>
<tr>
<td>2004</td>
<td>4.8</td>
<td>6.6</td>
</tr>
<tr>
<td>2005</td>
<td>4.8</td>
<td>6.6</td>
</tr>
<tr>
<td>2006</td>
<td>5.0</td>
<td>6.5</td>
</tr>
<tr>
<td>2007</td>
<td>4.1</td>
<td>6.4</td>
</tr>
<tr>
<td>Average 2003-2007</td>
<td>4.6</td>
<td>6.5</td>
</tr>
<tr>
<td>2008</td>
<td>5.9</td>
<td>6.6</td>
</tr>
<tr>
<td>Average of all years</td>
<td>4.8</td>
<td>6.5</td>
</tr>
</tbody>
</table>

Those industry categories considered high risk for occupational morbidity are determined at five year intervals. The first interval was between 2003-2007. The second interval is between 2008 and 2012.

Source: BLS Current Population Survey
Indicator 15: Workers Employed in Occupations with High Risk for Occupational Morbidity

Significance

In 2008, the BLS reported an estimated 1.1 million injuries and illnesses that resulted in “days away from work” (DAFW). This equates to a rate of 113 DAFW cases per 100,000 FTEs. The risk of these injuries and illnesses is significantly higher in certain occupations. Occupational categories that are at highest risk for occupational morbidity are determined based on those occupations with injury and illness rates more than double the national DAFW injury and illness rate annual average. The last five-year period for this calculate was 2003 to 2007 and the most recent period is 2008 to 2012. Work-related injuries and illnesses are preventable and control of occupational hazards is the most effective means of prevention. Concentrating on occupations at high-risk for non-fatal injuries and illnesses will help prioritize limited resources.

Methods

The percent of workers employed in high-risk occupations are reported from 2003 to 2009 based on 2000 census codes for employed persons age 15 or older in WY and the US. The available data are divided into two interval, 2003-2007 and 2008-2009, due to the recalculation of high-risk occupations explained in the Significance section, above. These data were collected from the BLS Current Population Survey.

Results

- For the years 2003-2007, the highest morbidity occupations in WY included:
  - Driver/Sales Workers and Truck Drivers
  - Laborers and Freight, Stock, and Material Movers
  - Construction Laborers
  - Carpenters
  - Nursing/Psychiatric, and Home Health Aides

- For the years 2008-2009, the highest morbidity occupations in WY included:
  - Driver/Sales Workers and Truck Drivers
  - Operating Engineers and other Construction Equipment Operators
  - Laborers and Freight, Stock, and Material Movers
  - Construction Laborers
  - Janitors and Building Cleaners

- Between 2003 and 2007, approximately 13.8% of the workforce in the US were employed in occupations with a high risk for occupational morbidity. Between 2008 and 2009, approximately 25% of the US workforce was employed in high risk occupations. (Table 15.1)
- Between 2003 and 2009, approximately 21.4% of the workforce in WY and 16.6% of the workforce in the US were employed in occupations with a high-risk for occupational morbidity.
- A larger percentage of WY’s population was employed in occupational categories considered high risk for occupational morbidity than the US between 2003-2007 and 2008-2009.
Table 15.1 Percentage of Workers Employed in Occupations with High Risk for Occupational Morbidity, WY and US 2003-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Wyoming</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>16.9</td>
<td>14.1</td>
</tr>
<tr>
<td>2004</td>
<td>17.5</td>
<td>13.0</td>
</tr>
<tr>
<td>2005</td>
<td>17.4</td>
<td>13.2</td>
</tr>
<tr>
<td>2006</td>
<td>18.8</td>
<td>14.5</td>
</tr>
<tr>
<td>2007</td>
<td>19.5</td>
<td>14.1</td>
</tr>
<tr>
<td><strong>Average Between 2003-2007</strong></td>
<td><strong>18.0</strong></td>
<td><strong>13.8</strong></td>
</tr>
<tr>
<td>2008</td>
<td>21.7</td>
<td>16.1</td>
</tr>
<tr>
<td>2009</td>
<td>21.1</td>
<td>15.6</td>
</tr>
<tr>
<td><strong>Average Between 2008-2009</strong></td>
<td><strong>21.4</strong></td>
<td><strong>15.9</strong></td>
</tr>
<tr>
<td><strong>Average of all years</strong></td>
<td><strong>16.6</strong></td>
<td><strong>14.4</strong></td>
</tr>
</tbody>
</table>

Those occupational categories considered high-risk for occupational morbidity are determined at five year intervals. The first interval was between 2003-2007. The second interval is between 2008 and 2012.

Source: BLS Current Population Survey

Limitations
- The ranking of high-risk occupations may differ by state and/or industry.
- Estimates do not include the military, small farms and federal agencies.
- Due to changes in the classification of high risk occupations, it is not possible to compare trends in percentages for greater than the five year interval.

Recommendations
- Work-related injuries and illnesses are preventable and control of occupational hazards is the most effective means of prevention. Concentrating on occupations at high-risk for non-fatal injuries and illnesses will help prioritize limited resources.
Indicator 16: Workers Employed in Occupations and Industries with High Risk for Occupational Mortality

Significance

Each year, over 4,600 cases of work-related fatalities are reported to the Census of Fatal Occupational Injuries (CFOI) Program administered by the Bureau of Labor Statistics (BLS). On an average day, 13 workers die in the US as a result of injuries sustained at work. The risks for these occupational fatalities are significantly higher in certain industries and occupations. Occupation and industry categories that are at highest risk for occupational mortality are determined every five years based on those occupations and industries with fatality rates more than double the national annual average fatality rate. The last five-year period for this calculation was 2003 to 2007 and the most recent period is 2008 to 2012. Prevention efforts should target these highest risk occupations and industries.

Methods

The BLS collects information on the percentage of workers employed in industries and occupations at high risk for occupational mortality. The percent of workers in WY and US employed in industries and occupations with high risk for occupational mortality is reported for the years 2003 to 2009. The available data are divided into two intervals, 2003-2007 and 2008-2009, due to the recalculation of high risk occupations and industries explained in the Significance section, above. These data were collected from the BLS Current Population Survey.

Results

From 2003 to 2007, approximately 35% of workers in WY and 16% in the US were employed in industries at high-risk for mortality. In 2008 and 2009, approximately 38% of workers in WY and 16% in the US were employed in industries at high risk for mortality. (Table 16.1)

- For the years 2003-2007, the highest mortality industries in WY included:
  - Construction
  - Animal Production
  - Support Activities for Mining
  - Truck Transportation
  - Coal Mining

- For the years 2008-2009, the highest mortality industries in WY included:
  - Construction
  - Support Activities for Mining
  - Animal Production
  - Coal Mining
  - Truck Transportation
From 2003 to 2009, approximately 36% of the workforce in WY and 16% of the workforce in the US were employed in industries with a high risk for occupational mortality.

A larger percentage of WY’s population was employed in industries considered high risk for occupational mortality than the US from 2003 to 2009.

From 2003-2007, approximately 26% of workers in WY and 11% in the US were employed in occupations at high-risk for mortality.

In 2008-2009, approximately 27% of workers in WY and 13% in the US were employed in occupations at high-risk for mortality. (Table 16.1)

For the years 2003-2007, the highest mortality occupations in WY included:

- Drivers/Sales Workers and Truck Drivers
- Farmers and Ranchers
- First-line Supervisors/Managers of Construction Trades and Extraction Workers
- Operating Engineers and Other Construction Equipment Operators
- Construction Laborers

For the years 2008-2009, the highest mortality occupations in WY included:

- Drivers/Sales Workers and Truck Drivers
- Farmers and Ranchers
- First-line Supervisors/Managers of Construction Trades and Extraction Workers
- Operating Engineers and Other Construction Equipment Operators
- Construction Laborers

From 2003 and 2009, approximately 26% of the workforce in the WY and 12% of the workforce in the US were employed in occupations with a high risk for occupational mortality.

A larger percentage of WY's population was employed in occupations considered at high-risk for occupational morbidity than the US from 2003 to 2009.

### Table 16.1 Workers Employed in Industries and Occupations at High-Risk for Occupational Mortality, WY and US, 2003-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>% of workers employed in high risk industries</th>
<th>% of workers employed in high risk occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WY</td>
<td>US</td>
</tr>
<tr>
<td>2003</td>
<td>31.2</td>
<td>15.1</td>
</tr>
<tr>
<td>2004</td>
<td>33.5</td>
<td>15.6</td>
</tr>
<tr>
<td>2005</td>
<td>36.6</td>
<td>16.0</td>
</tr>
<tr>
<td>2006</td>
<td>37.4</td>
<td>16.3</td>
</tr>
<tr>
<td>2007</td>
<td>36.7</td>
<td>16.3</td>
</tr>
<tr>
<td>Average 2003-2007</td>
<td>35.1</td>
<td>15.9</td>
</tr>
<tr>
<td>2008</td>
<td>38.9</td>
<td>16.6</td>
</tr>
<tr>
<td>2009</td>
<td>37.6</td>
<td>15.8</td>
</tr>
<tr>
<td>Average 2008-2009</td>
<td>38.3</td>
<td>16.2</td>
</tr>
<tr>
<td>Average of all years</td>
<td>35.9</td>
<td>16.0</td>
</tr>
</tbody>
</table>

Source: BLS Current Population Survey
Limitations

- The ranking of high-risk occupations and industries may differ by state and/or industry.
- Determination of high risk industries and occupations based on Current Population Survey estimates may be unstable from year to year.
- Suicides that take place in the workplace are considered work-related fatalities even though these deaths may not necessarily be caused by work-related factors.
- Deaths reported are for the private sector only and exclude military deaths.
- Due to changes in the classification of high risk occupations and industries, it is not possible to compare trends in percentages for greater than the five-year interval.

Recommendations

- Identify the primary risk factors that contribute to fatalities in high risk industries and occupations to develop targeted prevention activities.
Indicator 17: Occupational Health and Safety Professionals

Significance
The goals of occupational safety and health professionals are to identify hazardous conditions, materials and practices in the workplace and assist employers and workers in eliminating or reducing the attendant risks. An adequate number of these professionals in the fields of occupational medicine, occupational health nursing, industrial hygiene and safety are needed to ensure safe workplaces.

Methods
The number of professionals and rate per 100,000 employees in WY for 2003 to 2008 are reported using data from the American College of Occupational and Environmental Medicine (ACOEM), American Association of Occupational Health Nurses (AAOHN), American Industrial Hygiene Association (AIHA), American Society of Safety Engineers (ASSE) and the BLS Current Population Survey.

Results
- For every 100,000 employees in WY for the years 2003 to 2008, on average, there were approximately three occupational medicine physicians and two occupational health nurses. For the same time period, on average, there were approximately six industrial hygienists and 18 safety professionals. (Table 17.1)

Limitations
- Other occupational safety and health fields are not included, such as health physics, ergonomics, or occupational health psychology.
- Member lists include retired and part-time professionals and therefore may overestimate the number of active occupational and safety professionals.

Recommendations
- Recruit and retain critical occupational health and safety professionals to work in WY.
- Increase the number of students in the occupational safety health professional curricula and training programs.
<table>
<thead>
<tr>
<th>Table 17.1 Number of Occupational Safety and Health Professionals and Rate per 100,000 Employees, WY, 2003-2008</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Occupational medicine physicians, # (rate)</strong></td>
</tr>
<tr>
<td>2003</td>
</tr>
<tr>
<td>3 (1.1)</td>
</tr>
<tr>
<td><strong>ACOEM members, # (rate)</strong></td>
</tr>
<tr>
<td>2003</td>
</tr>
<tr>
<td>6 (2.3)</td>
</tr>
<tr>
<td><strong>Occupational health nurses, # (rate)</strong></td>
</tr>
<tr>
<td>2003</td>
</tr>
<tr>
<td>2 (0.8)</td>
</tr>
<tr>
<td><strong>AAOHN members, # (rate)</strong></td>
</tr>
<tr>
<td>2003</td>
</tr>
<tr>
<td>4 (1.5)</td>
</tr>
<tr>
<td><strong>Industrial hygienists, # (rate)</strong></td>
</tr>
<tr>
<td>2003</td>
</tr>
<tr>
<td>6 (2.3)</td>
</tr>
<tr>
<td><strong>AIHA members, # (rate)</strong></td>
</tr>
<tr>
<td>2003</td>
</tr>
<tr>
<td>11 (4.1)</td>
</tr>
<tr>
<td><strong>Safety professionals, # (rate)</strong></td>
</tr>
<tr>
<td>2003</td>
</tr>
<tr>
<td>16 (6.0)</td>
</tr>
<tr>
<td><strong>ASSE members, # (rate)</strong></td>
</tr>
<tr>
<td>2003</td>
</tr>
<tr>
<td>97 (36.5)</td>
</tr>
</tbody>
</table>

**Key**

ACOEM—American College of Occupational and Environmental Medicine
AAOHN—American Association of Occupational Health Nurses
AIHA—American Industrial Hygiene Association
ASSE—American Society of Safety Engineers
Indicator 18: OSHA Enforcement Activities

Significance

The WY Department of Workforce Services Workers’ Safety Occupational Safety and Health Administration (OSHA) Plan conducts investigations and inspections at worksites to ensure compliance with employee safety and health standards and regulations. Investigations and inspections typically occur at worksites in the event of work-related fatal and non-fatal injuries, hospitalizations, employee complaints and outside referrals. Random inspections are also conducted at high-risk worksites. OSHA jurisdiction in WY includes private and federal employers and employees.

Methods

Enforcement activities within establishments under OSHA jurisdiction in WY (excluding mines and farms) for the years 2001 through 2008 are reported. Data sources included OSHA annual reports on inspections and the number of workers covered by these inspections and the BLS on Covered Employers and Wages (ES-202/CEW).

Results

- Approximately 2% of worksites in WY were inspected by OSHA each year between 2001 and 2008. (Table 18.1)
- The percent of OSHA-covered employees whose work areas were inspected ranged from 2.2 to 3.2. (Table 18.1)
- There was not a statistically significant trend in the annual number or percentage of employees whose work area was inspected by OSHA in WY between 2001-2008. (Figure 18.2)

### Table 18.1 Percent of Establishments Under OSHA Jurisdiction Inspected and Employees Whose Work Areas Were Inspected by OSHA, WY, 2001-2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Establishments under jurisdiction</th>
<th>Establishments inspected, # (%)</th>
<th>Covered employees eligible for inspection</th>
<th>Covered employees inspected, # (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>21,209</td>
<td>407 (1.9)</td>
<td>220,432</td>
<td>4,976 (2.3)</td>
</tr>
<tr>
<td>2002</td>
<td>21,459</td>
<td>439 (2.0)</td>
<td>222,986</td>
<td>7,048 (3.2)</td>
</tr>
<tr>
<td>2003</td>
<td>21,763</td>
<td>584 (2.7)</td>
<td>229,602</td>
<td>5,033 (2.2)</td>
</tr>
<tr>
<td>2004</td>
<td>22,340</td>
<td>521 (2.3)</td>
<td>229,265</td>
<td>5,624 (2.5)</td>
</tr>
<tr>
<td>2005</td>
<td>22,955</td>
<td>491 (2.1)</td>
<td>233,504</td>
<td>7,485 (3.2)</td>
</tr>
<tr>
<td>2006</td>
<td>23,795</td>
<td>411 (1.7)</td>
<td>242,427</td>
<td>4,512 (1.9)</td>
</tr>
<tr>
<td>2007</td>
<td>24,378</td>
<td>394 (1.6)</td>
<td>252,609</td>
<td>6,714 (2.7)</td>
</tr>
<tr>
<td>2008</td>
<td>24,934</td>
<td>458 (1.8)</td>
<td>261,740</td>
<td>5,083 (1.9)</td>
</tr>
</tbody>
</table>

Source: OSHA annual reports of total inspections conducted by OSHA; BLS, CEW (denominator)
Limitations
- The percent of worksites inspected may be overestimated since multiple inspections may occur at the same worksite in the same year.
- Only enforcement activities are measured.

Recommendations
- Obtain details of enforcement activities.
- Increase the number of inspections for better enforcement to help prevent future work-related injuries and illnesses.
Indicator 19: Workers’ Compensation Benefits

Significance
Workers’ compensation is a state-based social insurance program that covers work-related injuries and illnesses. Benefits include lost wages, related medical expenses, disability payments and survivor benefits. Amounts of paid benefits represent the direct financial burden of work-related injuries and illnesses. A ‘covered worker’ is defined as a worker who is eligible for workers’ compensation benefits in the event of a work-related injury or illness. Workers who may not be covered by state workers’ compensation include those who are self-employed, corporate executives, federal employees, small business owners, farmers and agricultural workers.

Methods
The National Academy of Social Insurance (NASI) collects and reports estimated annual benefits, coverage and costs associated with workers’ compensation programs. The average benefit paid per covered worker in WY and the US is reported for 2001 to 2008.

Results
• Between 2001 and 2008, the total amount of workers’ compensation benefits paid in WY increased at an estimated average amount of $4.6 million each year. However, there was not a statistically significant trend in the average amount of workers’ compensation paid per covered worker in WY during the same time period. (Figures 19.1 and 19.2)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total benefits paid, $</th>
<th>Benefit paid per covered worker, $</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WY (millions)</td>
<td>US (billions)</td>
</tr>
<tr>
<td>2001</td>
<td>100.1</td>
<td>47.8</td>
</tr>
<tr>
<td>2002</td>
<td>107.5</td>
<td>49.3</td>
</tr>
<tr>
<td>2003</td>
<td>114.3</td>
<td>51.9</td>
</tr>
<tr>
<td>2004</td>
<td>120.1</td>
<td>52.8</td>
</tr>
<tr>
<td>2005</td>
<td>116.5</td>
<td>52.1</td>
</tr>
<tr>
<td>2006</td>
<td>117.3</td>
<td>51.1</td>
</tr>
<tr>
<td>2007</td>
<td>127.0</td>
<td>50.4</td>
</tr>
<tr>
<td>2008</td>
<td>137.1</td>
<td>57.6</td>
</tr>
</tbody>
</table>

Source: National Academy of Social Insurance (www.nasi.org) (numerator and denominator)
Limitations

- Not all individuals with work-related injuries and illnesses file a workers’ compensation claim.
- Since payments are made over time, annual awards may not reflect the full cost of injuries and illnesses for that year.
- Data do not describe the indirect burden of work-related injuries or illnesses (e.g., retraining and replacement worker costs, lost wages, administrative costs, etc.).

Recommendations

- Ascertains details of awards including industry, occupation, and cost to employer to target prevention efforts and further describe the economic costs of occupational injuries.
Indicator 20: Work-Related Low Back Disorder Hospitalizations

Significance

Each year 15-20% of Americans report back pain, resulting in over 100 million workdays lost and more than 10 million physician visits. National Health Interview Survey data estimate that two-thirds of all low back pain cases are attributable to occupational activities. The cost of back pain is also disproportionate, as it represents about 20% of workers’ compensation claims, but nearly 40% of the costs. Well-recognized prevention efforts can be implemented for high-risk job activities and reduce the burden of work-related low back disorders.

Methods

All low back disorder hospitalizations and surgical low back disorder hospitalizations for WY residents age 16 years or older were identified from WY hospital discharge records. Low back disorder hospitalizations were identified using a primary payer of workers’ compensation with a relevant diagnostic code (ICD-9-CM diagnostic code categories: herniated disc, probable degenerative changes, spinal stenosis, possible instability, and miscellaneous). Surgical low back disorder hospitalizations were identified using a primary payer of workers’ compensation with the same ICD-9-CM diagnostic codes in combination with a relevant surgical procedure code (procedural code categories: laminectomy, discetomy, fusion, other). Excluded data included patient age unknown, out-of-state residents, unknown state of residence and out-of-state hospitalizations.

Results

- Data for all low back pain hospitalizations were only available for the years 2007-2009 for WY.
- The number of low back pain hospitalizations and low back pain surgeries in WY increased over the three years reported. (Table 20.1)

<table>
<thead>
<tr>
<th>Year</th>
<th>Low Back Pain Hospitalizations</th>
<th>Low Back Surgery Hospitalizations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>Crude Rate per 100,000</td>
</tr>
<tr>
<td>2007</td>
<td>2</td>
<td>0.72</td>
</tr>
<tr>
<td>2008</td>
<td>6</td>
<td>2.11</td>
</tr>
<tr>
<td>2009</td>
<td>12</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Limitations:

- Employed individuals less than 16 years old experience work-related injuries, but corresponding denominator data are not readily available.
- Practice patterns and payment mechanisms may affect decisions by health care providers to hospitalize patients, to correctly diagnose work-related conditions and/or to list the condition as a discharge diagnosis.
- Residents of one state may be hospitalized in another state and not be reflected in the hospitalization data for the state of residence. There may be over counts for patients who have been transferred from one medical facility to another within WY.
- All admissions are counted, including multiple admissions for a single individual.
- Until hospital discharge data are available in all states, aggregation of state data to produce nationwide estimates will be incomplete.
- Data on race/ethnicity are not collected in some states and are incomplete and/or of questionable validity in others.
- Hospital discharge records are only available for non-federal, acute care hospitals.

Recommendations

- Encourage or require hospital medical records to include standardized (and accurate) codes for a patient’s occupation and industry. Collecting industry and occupation information on hospital medical records will help guide state-level efforts on education, prevention, and intervention.
Conclusions

Occupational injuries and illness remain a significant problem in the US. The Bureau of Labor Statistics reported that 4,551 workers in private industry died as a result of work-related injuries in 2009, a rate of 3.5 per 100,000 full-time equivalent workers. In 2009, there were 1.2 million cases of on-the-job injuries and illnesses reported to the BLS that required days away from work. The National Safety Council estimated that on-the-job injuries (both fatal and non-fatal) cost society $182.2 billion in lost wages, productivity, administrative expenses, health care and other costs in 2008.

Occupational health surveillance is the systematic monitoring of health events and exposures among working populations. The purpose of occupational health surveillance is to collect, analyze and disseminate data on work-related cases and exposures, and to partner and plan interventions, prevention programs and campaigns to reduce the burden of work related injuries and illnesses.

Based on surveillance data in WY, the rates of work-related fatalities were higher than overall US rates (WY 13.6 vs. US 3.9). Although, the percent of workers employed in industries and occupations at high risk for occupational mortality was higher for WY than the US, this may not completely explain why the WY fatality rate remains high when the national rate has decreased over time. Additionally, the rate of work-related pesticide poisonings reported to poison control centers in WY was higher compared to overall US rates (WY 4.2 vs. US 1.7). These results warrant the need for more in-depth surveillance to help characterize the problem accurately and guide intervention and prevention measures. Additional helpful information would include industry, occupation, age, gender, race/ethnicity and type of injury/illness, to more adequately characterize each of the OHIs.

Although the rate of occupational injuries and illnesses has decreased over the last five years, there are a number of indicators that suggest a trend in the opposite direction; particularly in burns, carpal tunnel syndrome and amputations. Despite a sharp decrease in the number of people employed in WY in 2008, there was a sharp increase in the number of hospitalizations and the same number of injuries as in 2007. Workers’ compensation benefits have also continued to increase approximately $4.6 million each year between 2001 and 2008, despite the overall decrease in injuries.
Recommendations

The authors of this report would like to recognize the significant progress that has been made towards developing a comprehensive occupational health surveillance program in WY. The following recommendations are offered to help further facilitate this process. They can be accomplished with minimal resources and within a short time frame. WY has recently taken steps to reduce the burden of occupational fatalities.

- Commit to establishing minimum state-based activities in occupational safety and health as recommended by the Centers for Disease Control and Prevention (CDC) and NIOSH (see Guidelines for Minimum and Comprehensive State-Based Public Health Activities in Occupational Safety and Health, NIOSH Publication No. 2008-148. Available at [http://www.cdc.gov/niosh/docs/2008-148/](http://www.cdc.gov/niosh/docs/2008-148/))
- Examine key indicators presented in this report in greater depth to target future state-specific surveillance and intervention efforts in occupations and industries of greatest concern.
- Expand mandatory disease reporting in WY to include occupational and environmental disease and injury.
- Actively seek funding (state, federal and foundation) to support state-based occupational safety and health activities.
- Participate in meetings and other activities with NIOSH and other states collection occupational health and safety data.

Please see individual indicators of this report for additional specific recommendations.
Data Sources

American Association of Occupational Health Nurses (AAOHN) http://www.aaohn.org/

American Association of Poison Control Centers http://www.aapcc.org/DNN/

American College of Occupational and Environmental Medicine (ACOEM) http://www.acoem.org/

American Industrial Hygiene Association (AIHA) http://www.aiha.org/

American Society of Safety Engineers (ASSE) http://www.asse.org/

Annual Survey of Occupational Injuries and Illnesses (SOII) http://www.bls.gov/iif/oshstate.htm

Census Bureau County Business Patterns http://www.census.gov/econ/cbp/index.html

Census of Fatal Occupational Injuries (CFOI) http://www.bls.gov/iif/oshcfoi1.htm


Geographic Profiles of Employment and Unemployment http://www.bls.gov/gps/

Healthcare Cost and Utilization Project (H-CUP) http://www.ahrq.gov/data/hcup/

National Academy of Social Insurance (NASI) http://www.nasi.org/

Adult Blood Lead Epidemiology and Surveillance (ABLES) http://www.cdc.gov/niosh/topics/ABLES/ables.html

Occupational Safety and Health Administration http://www.osha.gov/

Wyoming Department of Employment http://wydoe.state.wy.us/

Wyoming Department of Health http://www.health.wyo.gov/
## References

[http://www.bls.gov/news.release/osh.nr0.htm](http://www.bls.gov/news.release/osh.nr0.htm)

[http://www.bls.gov/news.release/osh2.nr0.htm](http://www.bls.gov/news.release/osh2.nr0.htm)

[http://www.bls.gov/news.release/cfoi.nr0.htm](http://www.bls.gov/news.release/cfoi.nr0.htm)


