Occupational Health Indicators in Colorado
2012 Update

Reported by:

Colorado Department of Public Health and Environment
Occupational Health and Safety Surveillance Program

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SUMMARY

Introduction

Occupational health is an important public health issue in Colorado. Our employment landscape encompasses some of the nation's highest risk occupations, including mining, construction and agriculture. Colorado is also leading the way in developing new technologies and manufacturing methods in the emerging fields of nanotechnology, oil and gas extraction and "green" technology. Impacts to worker health from these new industries are not well understood.

Occupational injuries, illnesses and fatalities are preventable, yet, every year, thousands of people in Colorado are injured on the job or become ill from work-related exposures. The individuals and families affected by occupational injury bear substantial burdens that come with loss of life, income and independence. These injuries, illnesses and fatalities also cost businesses hundreds of millions of dollars each year. The aims of the Colorado Department of Public Health and Environment (CDPHE) Occupational Health and Safety Surveillance Program are to:

- Highlight occupational safety and health trends and determine priorities for prevention and workplace intervention efforts in Colorado;
- Determine data gaps and identify new or additional sources of data to better characterize the occupational health status of Colorado's working population;
- Develop educational activities, identify policies to make Colorado's workplaces healthier and promote newer and safer practices and technologies to prevent injury, illness and fatality.

Occupational Health Indicators

The Council of State and Territorial Epidemiologists (CSTE) and the National Institute for Occupational Safety and Health (NIOSH) recommend a standardized set of Occupational Health Indicators (OHIs) to measure work-related illnesses, injuries and other factors associated with occupational health.[1] These measures are generated using existing population-based data. Currently, the CSTE/NIOSH provide guidance for 20 OHI measures:

1. Non-fatal injuries reported by employers
2. Work-related hospitalizations
3. Fatal work-related injuries
4. Amputations reported by employers
5. Amputations identified in state workers' compensation systems
6. Hospitalizations for work-related burns
7. Musculoskeletal disorders reported by employers
8. Carpal tunnel syndrome cases identified in state workers' compensation systems
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 with high risk of occupational mortality
17. Occupational health and safety professionals
18. OSHA enforcement activities
19. Workers' compensation awards
20. Hospitalizations for low-back disorders

Methods

Data for the OHIs are collected according to the CSTE guidance, *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants*. [1] All measures are collected according to the CSTE/NIOSH framework, with the exception of OHI #1 (Non-fatal injuries and illnesses), which is collected by an alternate method in partnership with the Colorado Department of Labor and Employment, Division of Workers' Compensation. The CDPHE is unable to monitor two OHIs which require data from the Bureau of Labor Statistics (BLS) Survey of Occupational Injuries and Illnesses (SOII).[i] The OHI data are abstracted from multiple existing Colorado and national datasets. Specific methodology is described within each indicator report.

Summary of Findings

Approximately 2.4 million individuals are employed in Colorado each year. The majority of civilian workers in Colorado are White (92.2%) and 16.1% of workers are Hispanic *(Note race and Hispanic ethnicity are not mutually exclusive categories)*. On average, from 2003-2011, a total of 19.8% of workers held jobs in Farming/Fishing/Forestry (0.5%), Maintenance/Repair (3.2%), Production (4.4%), Transportation (5.1%), and Construction/Extraction (6.6%). The percent of workers employed in industries and occupations at high risk for mortality and morbidity was similar in Colorado compared to the United States.

Every year in Colorado, approximately 112 workers are killed on the job. This is the equivalent of one worker fatality every three to four days, resulting in a rate of 4.7 deaths for every 100,000 in the workforce. (United States rate = 3.9/100,000 workers). Both Colorado and Unites States rates have been trending down since 2000, but appeared to stabilize in 2009. The leading cause of fatal work-related injuries in Colorado and the United States continues to be transportation incidents, accounting for over 40% of occupational fatalities, on average. In 2010-2011, Hispanic workers had the highest work-related fatality rate. More information is needed to better understand fatality risk factors and occupational health disparities in Colorado.

On average, the Colorado Department of Labor and Employment receives over 28,000 workers' compensation (WC) claims for non-fatal, lost-time work-related injuries or illnesses per year. Over 50% of these claims result in more than 10 days of temporary disability benefits, indicating that a high proportion of WC injury claims are for injuries severe enough to warrant significant time off work, or that employers might be lacking adequate return-to-work policies or procedures. Since 2007, on average, an additional 91,000 "med-only" claims are filed each year.

From 2001-2011, there were an average of 2,500 hospital admissions per year for which WC insurance was the expected payer. In total, these injuries and illnesses resulted in WC claim pay-outs of over $809 million each year in Colorado. From 2001-2011, enforcement activities of the Occupational Safety and Health Administration were only able to reach less than 1% of eligible establishments and approximately 2% of eligible employees in Colorado.

[i] The SOII collects employer-reported data on non-fatal work-related injuries and illnesses. Colorado is one of only eight states that do not participate in the SOII.

Conclusions

The indicator reports provide baseline data on the status of occupational health and safety in Colorado, which is essential to monitor trends over time, make state-to-state or state-to-national comparisons, inform state activities in work-place injury and illness prevention and prioritize occupational health issues that are specific to Colorado. Collecting and analyzing data on workplace injuries and illnesses can guide the development of new and safer technologies, educational activities and policies to make workplaces safer and healthier.

In general, due to the limitations inherent with data sources used, many of these measures are conservative estimates of work-related injury and illness in Colorado and nationally. It is not clear why some injury and illness rates are declining or are lower in Colorado then the rest of the United States. The systems available for estimating the data may systematically bias the results due to, for example, utilization of other payer sources rather than WC (self-pay or patient's private insurance), underreporting of injuries and illnesses in the workplace and gaps in data sources available for surveillance and monitoring.

Numerous opportunities exist for further exploration and analysis to draw conclusions on risk factors and the status of occupational health and safety in Colorado. These opportunities are highlighted in each indicator section under the heading "Recommendations and Next Steps." The collection and reporting of baseline data contained in this report, along with supplemental projects conducted by the CDPHE Occupational Health and Safety Surveillance Program, improve the CDPHE's ability to characterize the risks associated with preventable occupational injuries and illnesses, to plan and implement prevention strategies and to recognize and respond to hazards and health conditions affecting Colorado's workforce. Select, over-arching activities of the Program are to:

- Utilize these and other occupational health and safety data to develop and implement policy and intervention plans to reduce occupational illnesses and injuries in Colorado. This includes exploring the need for occupational health injuries, illnesses and conditions to be added to the reportable conditions in Colorado. This may be especially important for conditions for which no other source of surveillance data exists to adequately describe the burden among workers, such as conditions largely treated on an out-patient basis (e.g., pneumoconiosis/asbestosis, musculoskeletal injuries, work-related asthma and occupational poisonings from pesticides or other substances).

- In partnership with the CDPHE Office of Health Disparities, consider methods and data sources to investigate the demographic and occupational characteristics of vulnerable and hard to reach populations to better identify occupational health disparities and work towards their elimination.

- Continue to explore opportunities to partner with agencies and health clinics that may collect additional work-related injury and illness data useful for surveillance. These partnerships will assist with developing an accurate picture of occupational injuries and illnesses in Colorado to help characterize the problem and guide intervention and prevention measures and include:
  - The Colorado Workers' Compensation Systems and Colorado Hospital Discharge Data (pesticide poisonings, amputations, burns, musculoskeletal disorders),

- Colorado Department of Agriculture (pesticide poisonings),
- Migrant Health Clinics (pesticide poisonings, migrant worker injuries and illnesses, musculoskeletal injuries),
- Occupational health clinics providing medical surveillance and treatment for work-related injury and illness (e.g., Centura, Denver Health's Center for Occupational Safety and Health, HealthOne, Kaiser Permanente, National Jewish Health),
- The Colorado Violent Death Reporting System (fatalities and workplace violence).

- Continue to build public health capacity in occupational health and safety by:
  - Pursuing additional funding sources to support enhanced occupational health and safety surveillance and investigation (e.g., BLS SOII, SENSOR Pesticides, FACE Program),
  - Integrating occupational health and safety data and messaging into existing public health surveillance and outreach programs. This helps to address the intersection (or convergence) of public health and the health concerns of workers.
  - Working with internal and external partners to include occupation and industry coding in available local, state and national datasets. (e.g., Health records, Environmental Public Health Tracking (EPHT), Behavioral Risk Factor Surveillance Survey (BRFSS))[ii],
  - Hosting student interns from the Colorado School of Public Health and the Mountain and Plains Education and Research Center (MAP ERC) to complete enhanced research and analysis projects.

[ii] The Occupational Health and Safety Surveillance Program was successful in a proposal to add two NIOSH-developed industry and occupation questions on the 2012 BRFSS. Data will be available for analysis in 2013.

ACKNOWLEDGEMENTS

Colorado's OHI data are updated and revised annually by the Colorado Department of Public Health and Environment (CDPHE) Occupational Health and Safety Surveillance Program Staff:

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- Amy Warner, MPH, Program Manager
- Meredith Towle, MPH, Program Coordinator and Epidemiologist
- Michele Heinzman, Census of Fatal Occupational Injuries Coordinator

We thank all members of the Occupational Health and Safety Surveillance Advisory Committee for their review of this report and on-going guidance for enhancing state-based surveillance. A complete list of members is available on our website (http://www.colorado.gov/cs/Satellite/CDPHE-DCEED/CBON/1251607754915).

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Occupational Safety and Health Administration, Denver Regional Office: Megan Meagher, MS, CIH

Rocky Mountain Poison and Drug Center: Alvin Bronstein, MD

REFERENCES

The following documents provide overarching guidelines for state-based occupational health and safety surveillance.

1. Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last Updated May 2011. (http://www.cste.org/dnn/Portals/0/OHIndicatordocument41310.pdf)
2. Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. *Guidelines for Minimum and Comprehensive State-Based Public Health Activities in Occupational Safety and Health.* September 2008. DHHS (NIOSH) Publication No. 2008-148 (http://www.cdc.gov/niosh/docs/2008-148/pdfs/2008-148.pdf)
3. Centers for Disease Control and Prevention. *Indicators for Occupational Health Surveillance.* MMWR 2007; 56(RR01):1-7. (http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5601a1.htm)

SUMMARY OF ACRONYMS

BLS: Bureau of Labor Statistics
BRFSS: Behavioral Risk Factor Surveillance Survey
CDC: Centers for Disease Control and Prevention
CDPHE: Colorado Department of Public Health and Environment
CFOI: Census of Fatal Occupational Injuries
CHA: Colorado Hospital Association
CPS: Census Population Survey
CSTE: Council of State and Territorial Epidemiologist
DOLE: Department of Labor and Employment
EPHT: Environmental Public Health Tracking
FACE: Fatality Assessment and Control Evaluation
FRI: First Report of Injury
GP: Geographic Profile of Employment and Unemployment
LAU: Local Area Unemployment Statistics
NASI: National Academy of Social Insurance
NIOSH: National Institute of Occupational Safety and Health
OSHA: Occupational Safety and Health Administration
OHI: Occupational Health Indicator
MAP ERC: Mountain and Plains Education and Research Center
RMPDC: Rocky Mountain Poison and Drug Center
SENSOR: Sentinel Event Notification System for Occupational Risk
SOII: Survey of Occupational Injuries and Illnesses
QCEW: Quarterly Census of Employment and Wages
WC: Workers' Compensation

Colorado's Employment Demographic Profile

Significance[i]

There are an estimated 139 million civil, non-institutional workers in the United States, of which 47% are female, 18% are of a racial minority and 14% are of Hispanic origin. In addition, 17% of those employed work part-time. The makeup of the workforce differs between states and may be important in understanding the occupational health status between and within a state.

In order to assess and prevent work-related injuries and illnesses in Colorado, it is important to understand the demographic and employment characteristics of Colorado's working population.

Methods

The demographic and employment characteristics for civilian workers in Colorado and the United States were obtained using data from the BLS Geographic Profiles of Employment and Unemployment (GP) and Current Population Survey (CPS). Age, gender, race/ethnicity and employment characteristics are described for both Colorado and the United States.

The GP presents annual averages from the CPS. Whenever possible, data for this report were obtained from the GP tables, as these data are the final statistical summary data of the CPS. In some cases, when GP data were not available, preliminary data from the CPS quarterly averages were used. Final numbers of the GP differ slightly from the CPS, but it is expected that the data for labor force participation rates, employment-population ratios and unemployment rates will be little changed. More information about preliminary estimates in the CPS is available through the BLS website.[ii]

The BLS GP/CPS data capture employment statistics for the ***civilian non-institutional population***, which consists of persons 16 years of age and older residing in the 50 States and the District of Columbia who are not inmates of institutions (for example, penal and mental facilities and homes for the aged). Within this population, the ***civilian labor force*** consists of employed and unemployed persons. ***Employed persons*** are persons who did any work for pay or profit during the survey reference week, persons who did at least 15 hours of unpaid work in a family-operated enterprise and persons who were temporarily absent from their regular jobs because of illness, vacation, bad weather, industrial dispute or various personal reasons. Persons who are neither employed nor unemployed are not in the labor force. This category includes retired persons, students, those taking care of children or other family members and others who are neither working nor seeking work.

The BLS data on civilian workers employed by occupation and industry categories are only reported since 2003. Changes in category definitions in 2003 make it difficult to compare data before this time.

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[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

[ii] http://www.bls.gov/gps/home.htm

Results

Employment Characteristics:

Table 1: Employment status of the civilian, non-institutionalized population aged 16 and older, Colorado, 2000-2011

	Total Civilian Non-institutional Population	Civilian labor force	Percent of population in civilian labor force	Total Civilian Non-institutional Population Employed	% Employment	% Unemployment
2000	3,141,000	2,276,000	72.5	2,213,000	97.2	2.8
2001	3,202,000	2,295,000	71.7	2,210,000	96.3	3.7
2002	3,394,000	2,437,000	71.8	2,298,000	94.3	5.7
2003	3,440,000	2,478,000	72.0	2,328,000	93.9	6.1
2004	3,468,000	2,525,000	72.8	2,389,000	94.6	5.4
2005	3,526,000	2,530,000	71.8	2,406,000	95.1	4.9
2006	3,589,000	2,610,000	72.7	2,527,000	96.8	3.2
2007	3,705,000	2,678,000	72.3	2,589,000	96.7	3.3
2008	3,778,000	2,725,000	72.1	2,594,000	95.2	4.8
2009	3,840,000	2,727,000	71.0	2,526,000	92.6	7.4
2010	3,903,000	2,723,000	69.8	2,482,000	91.1	8.9
2011	3,922,000	2,738,000	69.8	2,507,000	91.6	8.4
Average	**3,575,667**	**2,561,833**	**71.7**	**2,422,417**	**94.6**	**5.4**

Source: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS). The GP/CPS excludes workers <16 yrs of age, active-duty military, and inmates in institutions.

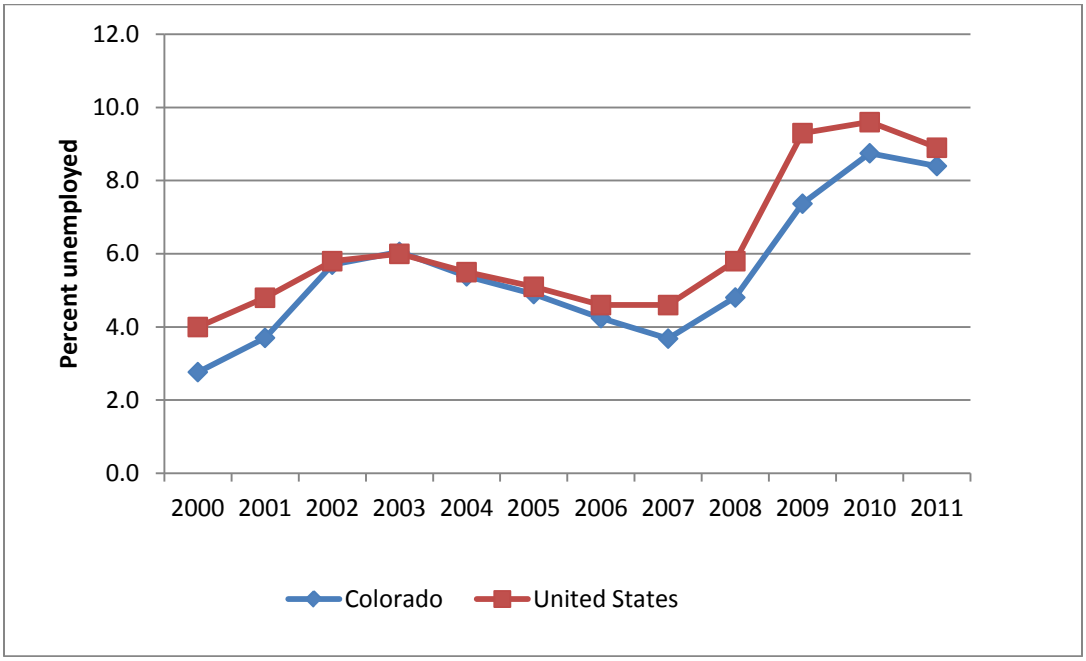
Table 2: Workforce characteristics ages 16 and older, Colorado and the United States, Averages for 2000-2011

	Colorado	United States
Total employed	2,422,417	140,010,833
% Male	54.8	53.3
% Female	45.2	46.7
% 16-17	1.5	1.7
% 18-64	95.5	94.6
% 65 and older	3.0	3.8
% Caucasian	92.2	82.7
% Black	3.4	10.9
% Other	4.5	6.4
% Hispanic	16.1	13.1
% Unemployed	5.5	6.2
% Self employed	8.0	7.2
% Employed part-time	18.0	17.9
% Work <40 hrs/week	33.8	33.8
% Work 40 hrs/week	36.2	39.9

Source: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS). The GP/CPS excludes workers <16 yrs of age, active-duty military, and inmates in institutions.
Note: Race and Hispanic ethnicity are not mutually exclusive categories within the BLS data.

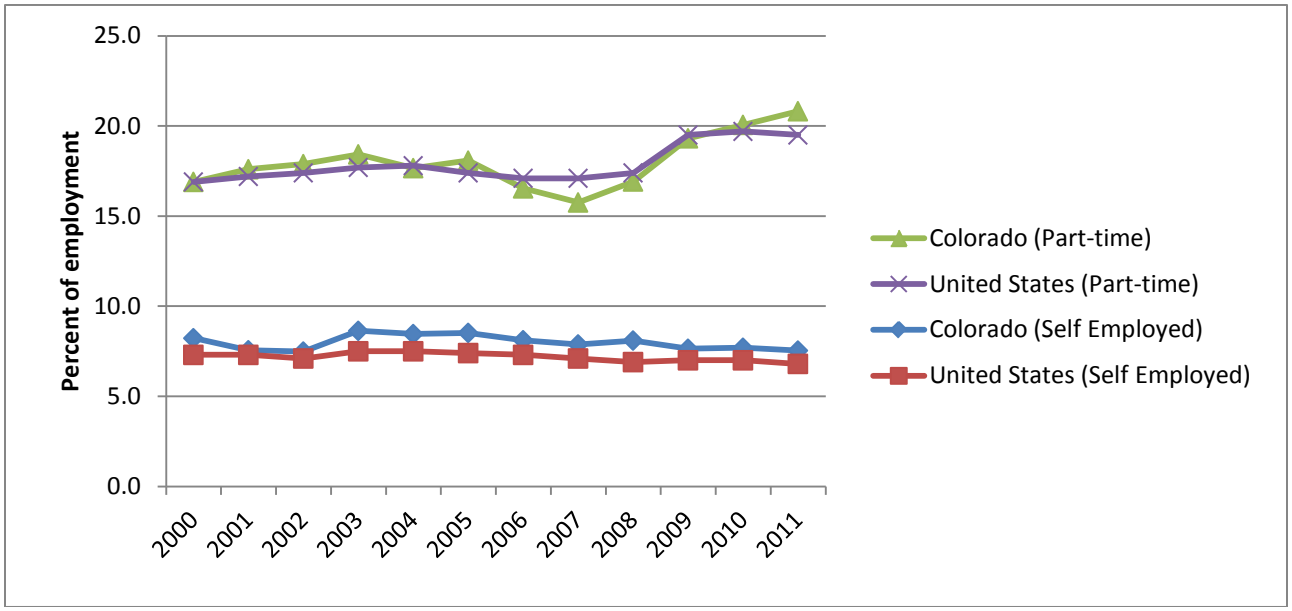
Employment Status:

Figure 1: Percentage of civilian workforce unemployed, Colorado and the United States, 2000-2011



Source: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS). The GP/CPS excludes workers <16 yrs of age, active-duty military, and inmates in institutions.

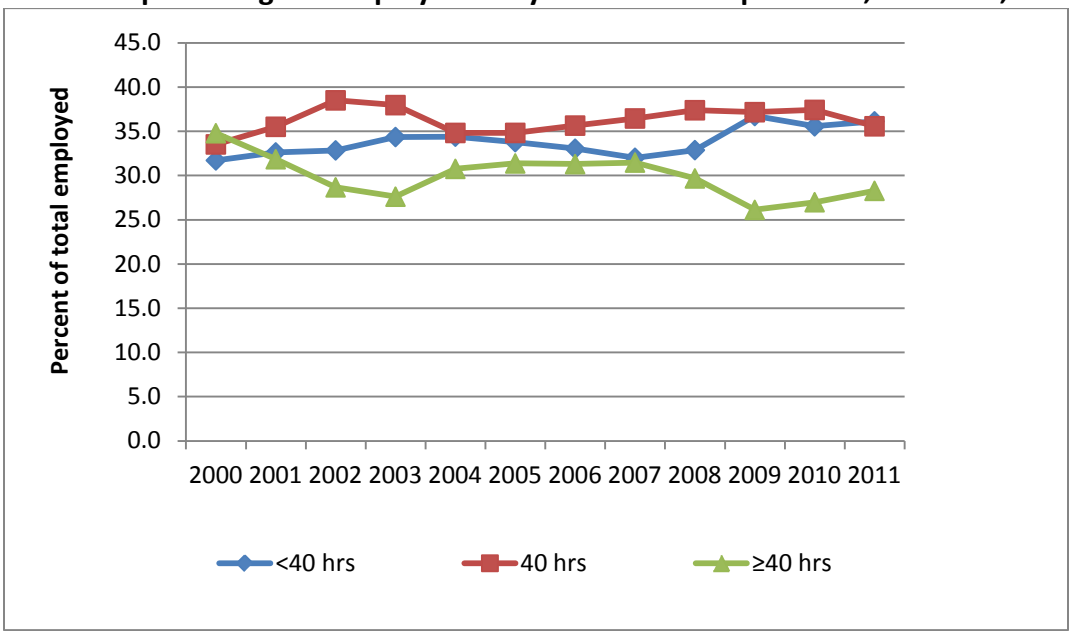
Figure 2: Percentage of civilian workers who are self-employed or employed in part-time jobs*, Colorado and the United States, 2000-2011



Source: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS). The GP/CPS excludes workers <16 yrs of age, active-duty military, and inmates in institutions.
**Self employment and part-time employment status are not mutually exclusive*

Hours Worked:

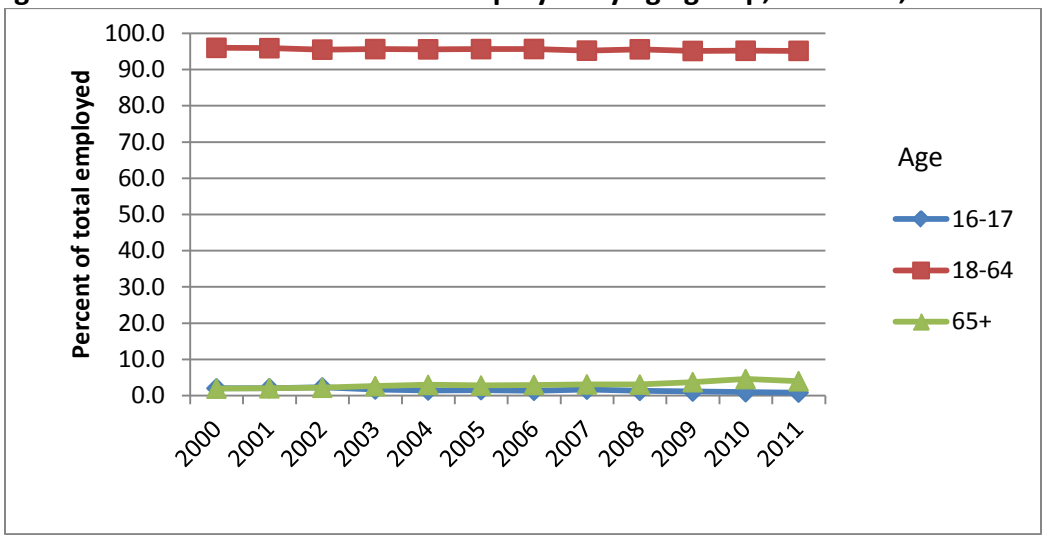
Figure 3: Annual percentage of employment by hours worked per week, Colorado, 2000-2011



Source: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS). The GP/CPS excludes workers <16 yrs of age, active-duty military, and inmates in institutions.

Age:

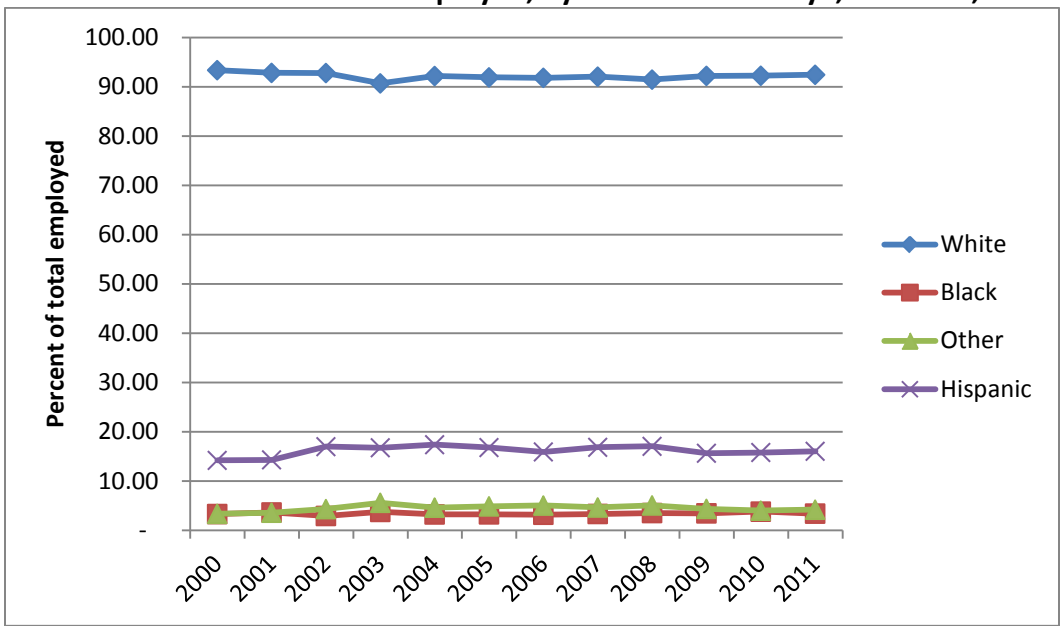
Figure 4: Percent of total workers employed by age group, Colorado, 2000-2011



Source: Bureau of Labor Statistics (BLS) Current Population Survey (CPS) (Accessed by Data Ferret)
The CPS excludes workers <16 yrs of age, active-duty military, and inmates in institutions.

Race/Ethnicity

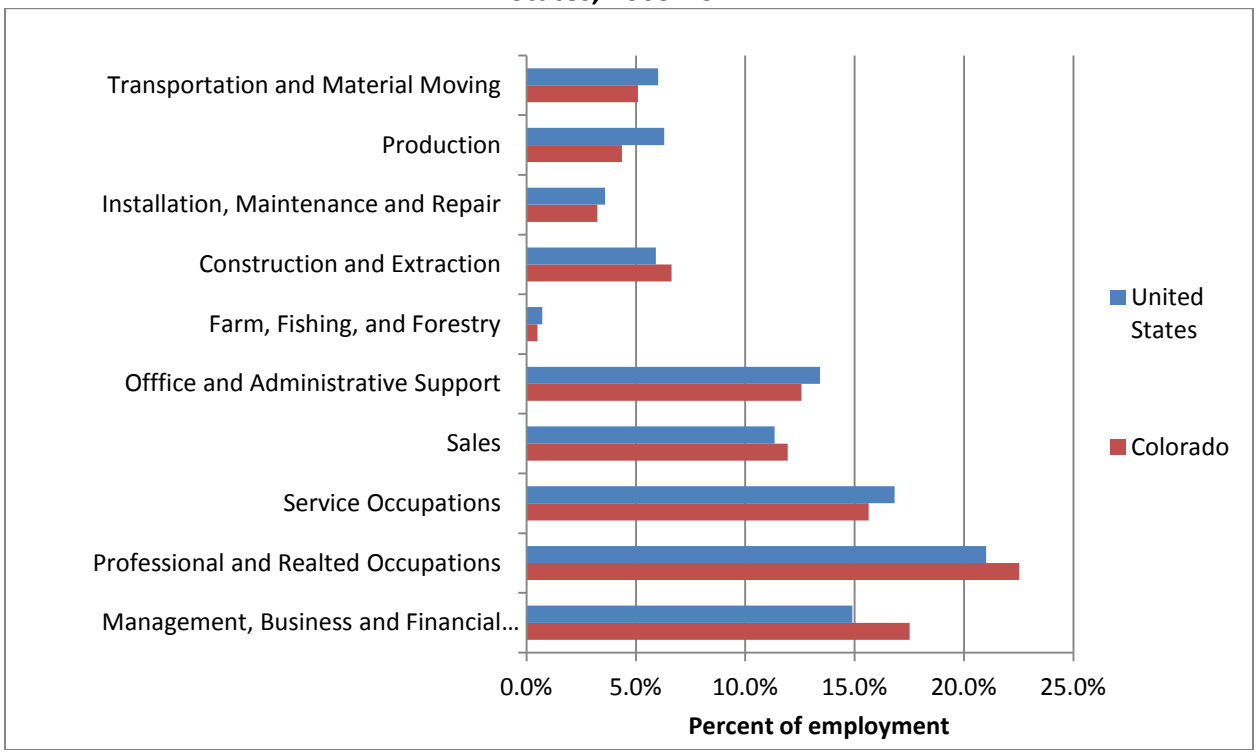
Figure 5: Percent of total workers employed, by race and ethnicity*, Colorado, 2000-2011



Source: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS). The GP/CPS excludes workers <16 yrs of age, active-duty military, and inmates in institutions.
**Hispanic ethnicity is not mutually exclusive of the race categories White, Black and Other.*

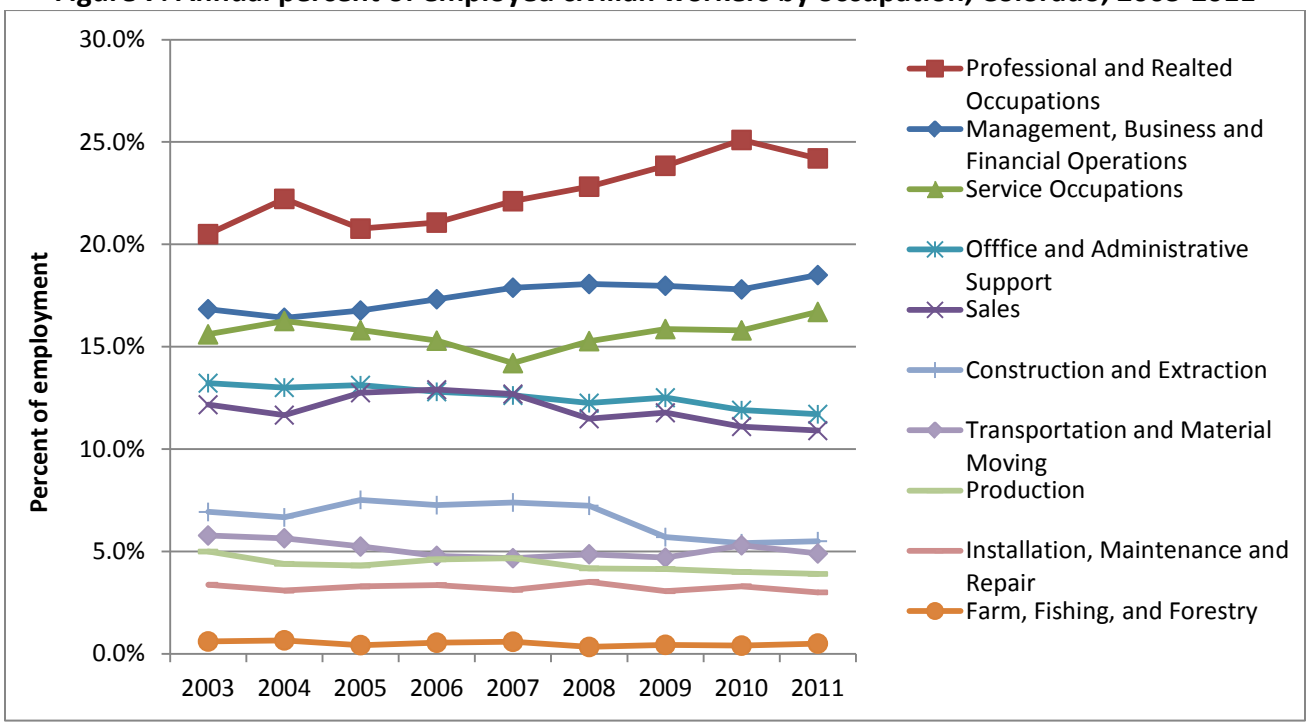
Industry and Occupation:

Figure 6: Average percent of employed civilian workers by occupation, Colorado and the United States, 2003-2011



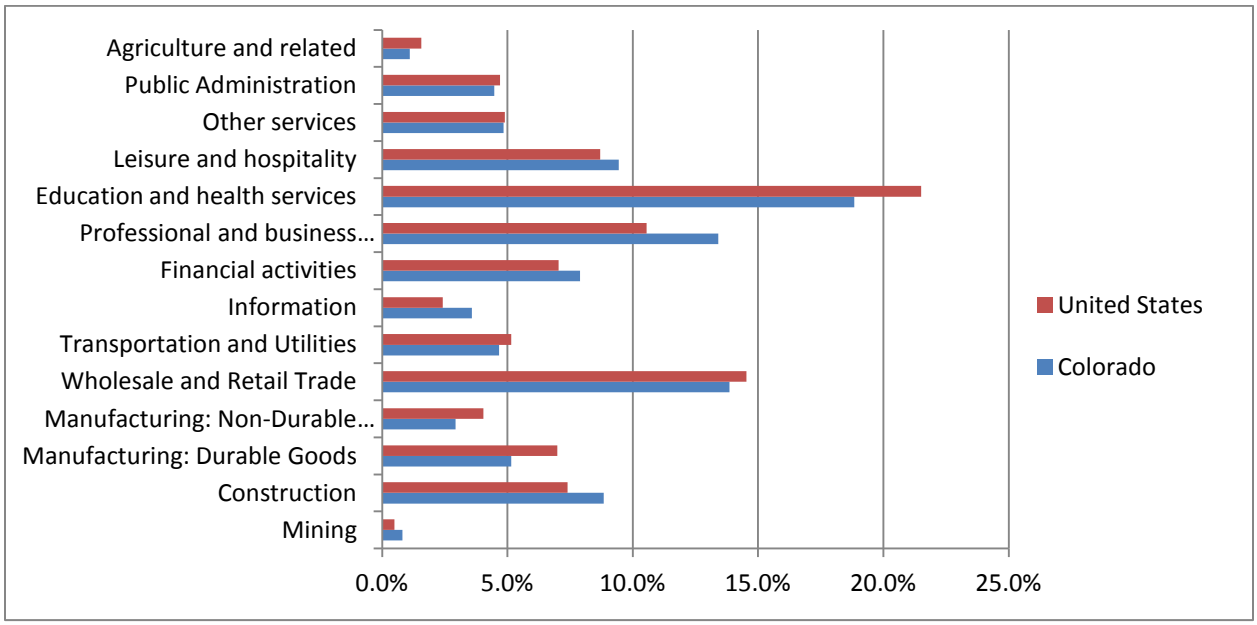
Source: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS). The GP/CPS excludes workers <16 yrs of age, active-duty military, and inmates in institutions.

Figure 7: Annual percent of employed civilian workers by occupation, Colorado, 2003-2011



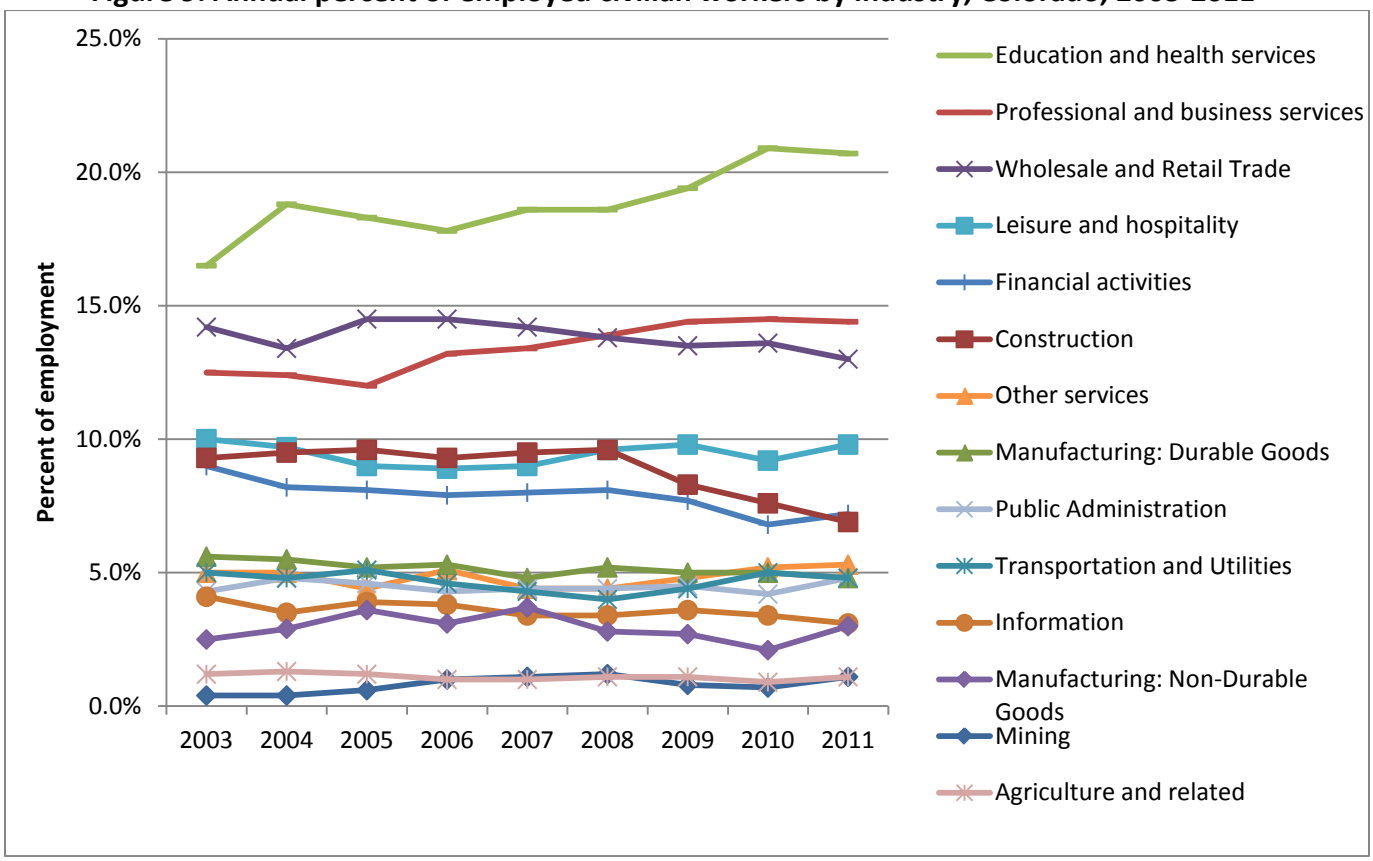
Source: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS). The GP/CPS excludes workers <16 yrs of age, active-duty military, and inmates in institutions.

Figure 8: Average percent of employed civilian workers by industry, Colorado and the United States, 2003-2011



Source: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS). The GP/CPS excludes workers <16 yrs of age, active-duty military, and inmates in institutions.

Figure 9: Annual percent of employed civilian workers by industry, Colorado, 2003-2011



Source: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS). The GP/CPS excludes workers <16 yrs of age, active-duty military, and inmates in institutions.

Limitations

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

Recommendations and Next Steps

- Conduct a more detailed analysis of employment data to describe Colorado's occupation and industry employment by age, gender and race/ethnicity. A comprehensive analysis might include data from the BLS GP/CPS used in this report, as well as other data sources, such as the BLS Local Area Unemployment Statistics (LAU), the BLS Quarterly Census of Employment and Wages (QCEW), the United States Census Bureau and the Colorado Department of Labor and Employment. This

analysis would be useful in unveiling any hidden or underlying disparities in Colorado's employed and unemployed population and in fostering programs to address such issues.

- Determine how workforce demographics and characteristics impact work-related injuries and illnesses in Colorado. A first step toward this objective might be a more detailed review of state workers' compensation (WC) data. The CDPHE has access to First Report of Injury (FRI) data from the Colorado Division of Workers' Compensation. Major limitations of WC data are that they does not contain information on race/ethnicity; data describing the event or exposure are contained in an open-ended text field; and about 15-20% of records have incomplete information on occupation and industry. Opportunities to improve completion of industry and occupation data and to include race/ethnicity on the FRI should be explored in partnership with the Colorado Department of Labor and Employment and WC insurers. An evaluation of WC data might also require coding records by industry based on employer name and address information. The NIOSH Industry and Occupation Computerized Coding System (NIOCCS) software became publically available in the fall of 2012 to assist with this coding.
- Develop methods for tracking Colorado's migratory, seasonal and undocumented working populations. This might be achieved in partnership with community healthcare clinics serving this population, such as the Salud Family Health Centers (www.saludclinic.org).

Indicator 1 (Alternate Method): Non-Fatal Work-Related Injuries and Illnesses

Significance[i]

Work-related **injuries** are typically one-time events and include burns, falls, strains, sprains or fractures, electric shocks, being struck by a falling object, or amputation from getting caught in machinery. Work-related **illnesses** are usually a result of cumulative exposure to hazardous materials or repetitive motions. Examples include occupational asthma, asbestosis, pneumoconiosis, mesothelioma, and carpal tunnel syndrome. The identification of non-fatal work-related injuries and illnesses and associated factors, risks, and exposures is useful for intervention, education, and prevention.

Methods

The CSTE guidance to calculate *Occupational Health Indicator # 1: Non-Fatal Injuries and Illnesses Reported by Employers* is based on data from the BLS Survey of Occupational Injuries and Illnesses (SOII). The SOII is a survey of sampled establishments throughout the United States that is designed to provide an estimate of the number and rate of work-related injuries and illnesses reported by employers. The SOII data come from employer injury logs maintained as part of the Occupational Safety and Health Administration (OSHA) record-keeping requirements.

Colorado is one of eight states that do not participate in administration of the BLS SOII; thus, state-level SOII data are not available to calculate Indicator # 1 based on the CSTE methodology. As an alternate method to evaluate Indicator #1, the CDPHE utilized workers' compensation (WC) claims data from the Colorado Department of Labor and Employment, Division of Workers' Compensation. These claims were filed by employers or workers for a non-fatal injury or illness. Claims were identified based on date of injury within the calendar year. Incidence rates are calculated using the numbers of workers covered by WC provided by the National Academy of Social Insurance (NASI).

Lost-time claims[ii] or claims with permanent medical impairments[iii] are included in these data. The data are reported without regard to whether the claims were admitted or denied. It is estimated that approximately 25% of lost-time claims filed will ultimately be denied.[iv] Colorado employers are required to report individual claim information to the Division of Workers' Compensation for lost-time claims, claims with permanent injury, and fatalities. However, the Division does receive some individual reports on claims that involve only medical benefits or "med-only" claims[v].

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[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

[ii] A lost time claim is one in which the worker misses more than three days or three shifts of work due to the work-related injury or illness.

[iii] Permanent medical impairment claims are claims where the impairment has become static or stabilized and is unlikely to improve despite further medical treatment. Permanent medical impairment claims may not always result in more than three days or three shifts of missed work. An example of this might be a finger amputation.

[iv] Colorado Division of Workers' Compensation, *Work Related Injuries in Colorado*, 2007 Report: www.colorado.gov/cs/Satellite/CDLE-WorkComp/CDLE/1248095316069

[v] A medical-only claim is a claim in which the worker receives medical care but does not lose more than three days or three shifts of work and there is no permanent impairment.

Of note, while lost-time claims are presumed to represent severe injuries, they also may represent occasions when the work-place does not have an adequate or flexible return-to-work policies to accommodate an injured worker. So, rather than return to work with modified job duties, an injured worker cannot return until he/she is able to resume full-duties of his/her position. Also, med-only claims may represent long-term care for chronic injuries and illnesses, as opposed to first-aid or minor injuries.

These data should not be compared to other states' numbers and rates of non-fatal injuries and illnesses. Colorado's non-fatal work-related injury and illness data are based on WC claims filed in the WC system and most other states' Indicator #1 data are based on the SOII data reported by employers. Both systems capture a unique set of non-fatal worker injury and illness data that are difficult to compare due to a variety of reasons and limitations of each dataset. Additionally, administration of WC insurance varies by state, precluding state and national level comparisons.

Results

Table 1.1: Workers' compensation insurance coverage, Colorado, 2001-2010

Year	Civilian Labor Force	Number of workers covered by WC insurance	Percent of civilian workers covered by WC Insurance
2001	2,295,000	2,148,000	93.6%
2002	2,437,000	2,101,000	86.2%
2003	2,478,000	2,064,000	83.3%
2004	2,525,000	2,074,000	82.1%
2005	2,530,000	2,120,000	83.8%
2006	2,610,000	2,173,000	83.3%
2007	2,678,000	2,241,000	83.7%
2008	2,725,000	2,247,000	82.5%
2009	2,727,000	2,137,000	78.4%
2010	2,720,000	2,110,000	77.6%
Average	**2,572,500**	**2,141,500**	**83.2%**

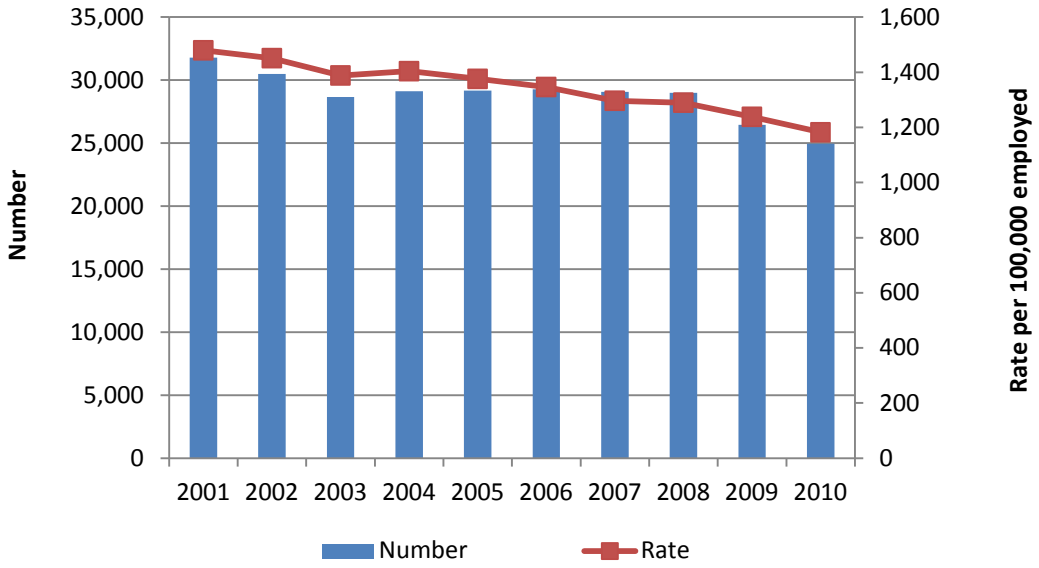
Civilian Labor Force: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP). Included are all persons in the civilian, non-institutional population classified as either employed or unemployed. Included are persons 16 years of age and older residing in the 50 states and the District of Columbia, who are not inmates of institutions (e.g., penal and mental facilities, homes for the aged) and who are not on active duty in the Armed Forces.
Covered Workers: National Academy of Social Insurance (NASI) Workers' Compensation Report. Estimates based on unemployment insurance coverage data.

Table 1.2: Non-fatal work-related injury and illness claims filed with the Colorado Department of Labor, Division of Workers' Compensation, 2001-2010

Year	Number non-fatal work-related injury and illness claims	Rate of non-fatal workers' compensation claims per 100,000 covered workers	Number of claims with >10 days of temporary disability benefits	Percent of claims with > 10 days of temporary disability	Number of med-only claims
2001	31,785	1,480	17,052	53.6%	N/A
2002	30,492	1,451	16,621	54.5%	N/A
2003	28,659	1,389	17,691	61.7%	N/A
2004	29,120	1,404	16,384	56.3%	N/A
2005	29,173	1,376	15,915	54.6%	N/A
2006	29,261	1,347	14,110	48.2%	N/A
2007	29061	1,297	13956	48.0%	103,229
2008	28984	1,290	17921	61.8%	95,938
2009	26465	1,238	14219	53.7%	83,907
2010	24946	1,182	14302	57.3%	81,879
Average	**28,795**	**1,345**	**15,817**	**54.9%**	**91,238**

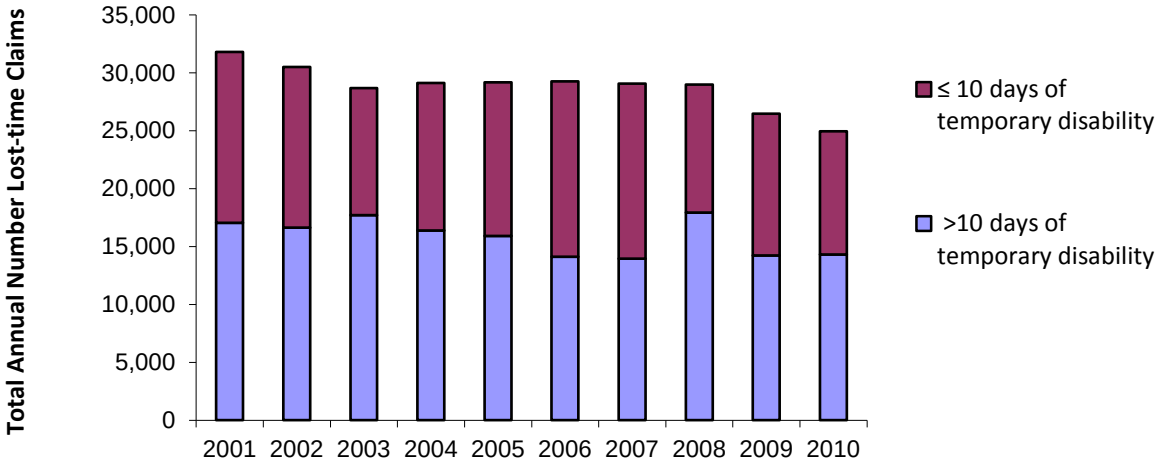
Claims data: Colorado Department of Labor, Division of Workers' Compensation. Includes claims which may be denied.
**Summary data about med-only claims are only available since 2007*
Denominator: Number of covered workers from the National Academy of Social Insurance (NASI)

Figure 1.1 Non-fatal work-related injury and illness claims filed with the Colorado Department of Labor, Division of Workers' Compensation, 2001-2010



Claims data: Colorado Department of Labor, Division of Workers' Compensation. Includes claims which may be denied.
Denominator: Number of covered workers from the National Academy of Social Insurance (NASI)

Figure 1.2: Work-related non-fatal injury and illness lost-time claims and claims with a permanent disability rating filed with the Colorado Department of Labor, Division of Workers' Compensation, 2001-2010



This figure provides estimates of lost time claims and claims with a permanent disability rating filed (including denied claims) with the Colorado Department of Labor and Employment, Division of Workers' Compensation. Medical benefit claims, or "med-only" claims are excluded from these calculations. Med-only claims account for approximately 90,000-105,000 additional claims in Colorado each year.
Source: Colorado Department of Labor, Division of Workers' Compensation.

Limitations

- The number of WC claims filed may underestimate the number of non-fatal injuries and illnesses because not all individuals with work-related injuries and illnesses file for WC benefits.
- The calculations reported in this Indicator refer to claims filed, without regard to whether the claims were admitted or denied.
- Those workers who are self-employed and Federal employees are not covered by Colorado WC insurers and therefore are not included in these estimates. The NASI covered worker data used for rate calculations do include government workers.
- Differences in eligibility criteria and availability of data from WC programs in different states limit these data from being compared with other states or with overall US data.

Recommendations and Next Steps:

- Describe in more detail non-fatal work-related injuries and illnesses in Colorado by industry, age, gender, and injury/illness characteristics, including type of injury/illness, part of the body affected, and source of injury/illness. Some of this can be achieved through a more detailed review of state WC data. (See Employment Demographic Profile Recommendations for more information about analyzing WC First Report of Injury (FRI) data)
- Continue to explore opportunities for Colorado to participate in the BLS Survey of Occupational Injuries and Illnesses (SOII), which requires a state-resource match to federal funds. The SOII collects data on work-related injuries and illnesses reported by employers and is the only comprehensive measure of work-related injuries and illnesses in American workplaces.[vi] These data would be helpful in describing the burden of injuries and illnesses that occur in the workplace by worker characteristics (i.e. gender, age, race/ethnicity) as well as industry and occupation. State-level SOII data would also allow comparison of Colorado statistics to national SOII estimates.

[vi] See BLS SOII overview: http://www.bls.gov/respondents/iif/

Indicator 2: All Work-Related Hospitalizations

Significance[i]

Severe occupational injuries and illnesses may result in hospitalization. This indicator describes and tracks work-related hospitalizations for the purpose of identifying high-risk occupations and targeting prevention.

Methods

The Colorado Hospital Discharge Dataset (HDD) is compiled by the Colorado Hospital Association (CHA) and, through a data sharing agreement, is made available to the CDPHE. The HDD contains records of all hospital discharges from member hospitals. In Colorado, nearly 100% of hospitals are CHA members (excluding Federal facilities). Each record in the HDD represents one hospital discharge resulting from an inpatient hospital admission.

Work-related hospitalizations were identified by selecting records where workers' compensation (WC) insurance was the expected payer. Only Colorado residents age 16 and older were included for analysis. Rates were calculated using employment data from the Bureau of Labor Statistics (BLS).

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

Results

Table 2.1 Annual number and rate of work related hospitalizations, Age 16 years and older, Primary payer workers' compensation, Colorado and the United States, 2001-2011*

Year	Number of hospital discharges (Colorado)	Annual crude rate of hospital discharges per 100,000 employed (Colorado)	Number of hospital discharges (United States)	Annual crude rate of hospital discharges per 100,000 employed (United States)
2001	2,921	132.2	173,724	128.6
2002	3,076	133.9	193,752	141.5
2003	2,865	123.1	184,986	134.3
2004	2,737	114.6	170,796	122.7
2005	2,606	108.3	169,814	119.8
2006	2,605	103.1	154,877	107.2
2007	2,622	101.3	165,441	113.3
2008	2,398	92.4	144,184	99.2
2009	2,205	87.3	Data not available	Data not available
2010	2,184	88.0	Data not available	Data not available
2011	2,104	83.9	Data not available	Data not available
Average	**2,575**	**105.5**	**169,697**	**120.8**

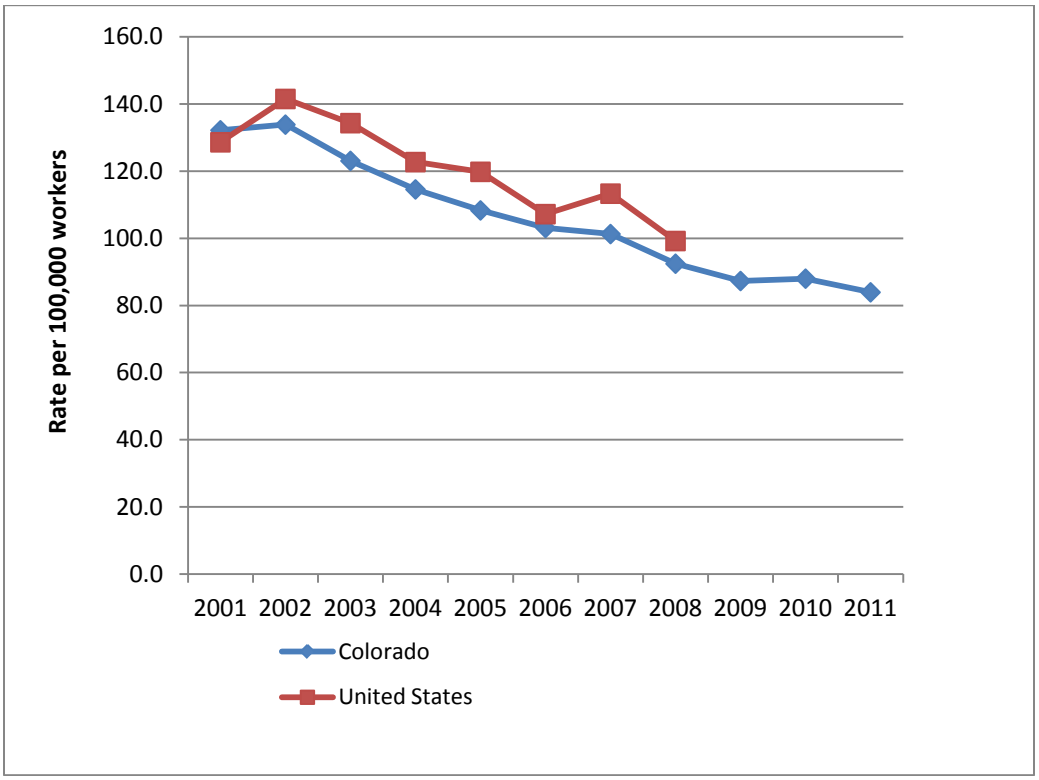
Numerator: Colorado Hospital Association hospital discharge data analyzed by the Health Statistics Section, Colorado Department of Public Health and Environment

Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS)

United States Data: National Hospital Discharge Survey, Provided by the Council of State and Territorial Epidemiologist (CSTE) Occupational Health Indicators Reports

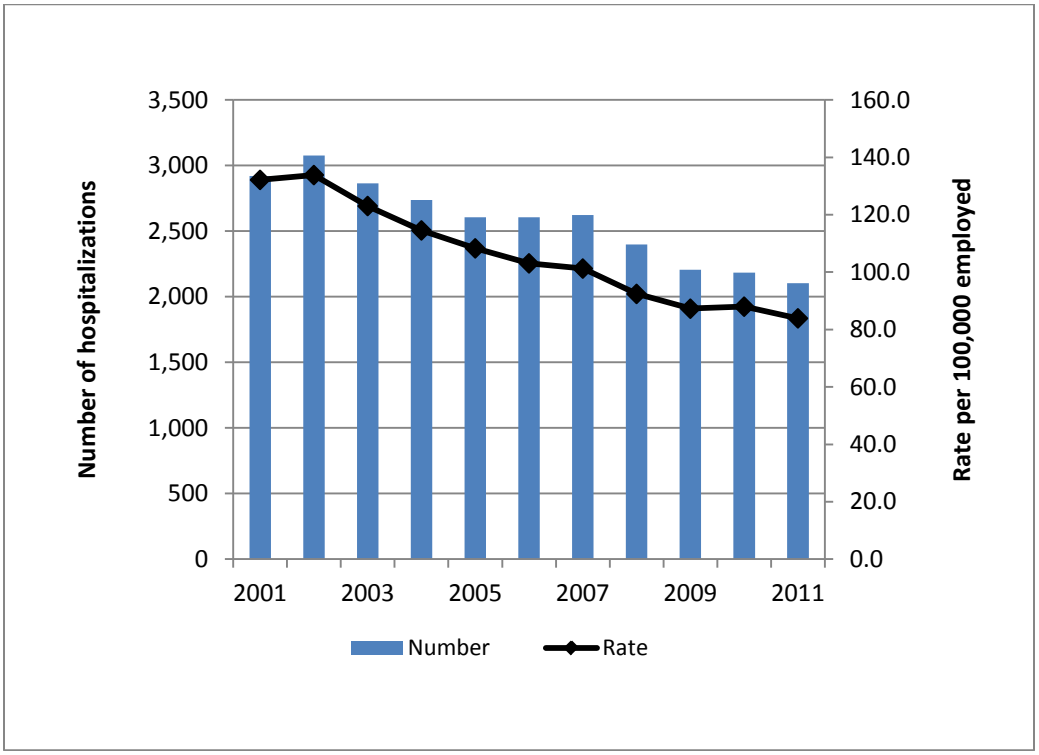
**United States data beyond 2008 not yet available through CSTE, 2011 rate calculations are preliminary*

Figure 2.1: Annual crude rate of work-related hospitalizations per 100,000 employed, Age 16 years and older, Colorado and the United States, 2001-2011*



Numerator: Colorado Hospital Association hospital discharge data analyzed by the Health Statistics Section, Colorado Department of Public Health and Environment
Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS)
United States Data: National Hospital Discharge Survey, Provided by the Council of State and Territorial Epidemiologist (CSTE) Occupational Health Indicators Reports
**United States data beyond 2008 not yet available through CSTE, 2011 rate calculations are preliminary*

Figure 2.2: Annual number and crude rate of work-related hospitalizations per 100,000 employed, Age 16 years and older, Colorado, 2001-2011*



Numerator: Colorado Hospital Association hospital discharge data analyzed by the Health Statistics Section, Colorado Department of Public Health and Environment
Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS)
**2011 rate calculations are preliminary*

Limitations:

- 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.
- The true burden of work-related hospitalizations may be under-represented if workers utilize other payer sources (e.g., self-pay, private insurance).
- Colorado residents hospitalized in another state are not captured in these data. Additionally, self-employed individuals, such as farmers and independent contractors, Federal employees, railroad or long-shore and maritime workers, are not covered by state WC systems and are not captured in these data.
- Hospitalization discharge records are based on admissions, not persons, thus they may include multiple admissions for a single individual or single person-injury event.
- Work-related hospitalization data analyzed using the methods in this report are not directly comparable between states due to differences in states' WC insurance programs.

- Though United States level data are provided in this report, comparing state data to United States data should be done with caution as United States data are based on national probability estimates from state-level data, and WC insurance programs vary from state to state.

Recommendations and Next Steps:

- Evaluate existing hospitalization data available to the CDPHE to describe work-related injuries and illnesses in Colorado by age, gender, race/ethnicity and type of injury/illness.[ii]
- Continue to explore opportunities to link hospitalization data with other health and employment data to obtain information on industries and occupations associated with serious injuries/illnesses. The CDPHE should explore updating its data use agreement with the CHA for permission to link identified hospitalization data with existing state WC data available to CDPHE. In addition, CHA emergency department (ED) data were available to CDPHE starting in 2011. These data should be analyzed to describe work-related emergency visits.
- By conducting more detailed analyses as described, identify the worker characteristics or risk factors that most contribute to work-related hospitalizations to guide intervention, education and prevention efforts.
- Better define other issues that may affect hospitalization data patterns, such as whether there is an overall increase or decrease in non-work-related hospitalizations in Colorado.

[ii] The Occupational Health and Safety Surveillance Program is currently working to publish an expanded analysis of these data.

Indicator 3: Fatal Work-Related Injuries

Significance[i]

Fatal work-related injuries are defined as injuries that occur at work and result in death. Each year, over 4,600 cases of work-related fatalities are reported to the Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI). On average in the United States, 13 workers die each day as a result of injuries sustained at work. The causes of these fatalities include **unintentional** injuries, such as falls, electrocutions, acute poisonings and motor vehicle crashes occurring during work travel, and also the **intentional** injuries of homicides and suicides which occur at work. The identification of risk factors and exposures through surveillance of work-related fatalities is useful for intervention, education and prevention.

Methods

The counts and rates of fatal work-related injuries are reported for the years 2000 to 2009 for both Colorado and the United States. Numerator data were obtained from the CFOI through the BLS or the Colorado Department of Public Health and Environment. Denominator data were obtained from the BLS, Geographic Profile of Employment and Unemployment (GP) or the Current Population Survey (CPS).

The BLS methods for calculating rates have changed from using the number of employed persons as the denominator to using full-time equivalent (FTE) hours worked. To be consistent with the BLS and provide consistent data over time, rates were calculated using both methods. There are negligible differences in rates calculated using employed population compared to FTE hours worked as the denominator. (Table 3.1)

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

Results

Table 3.1: Count and rate of fatal work-related injuries, Colorado and the United States, 2000-2011*

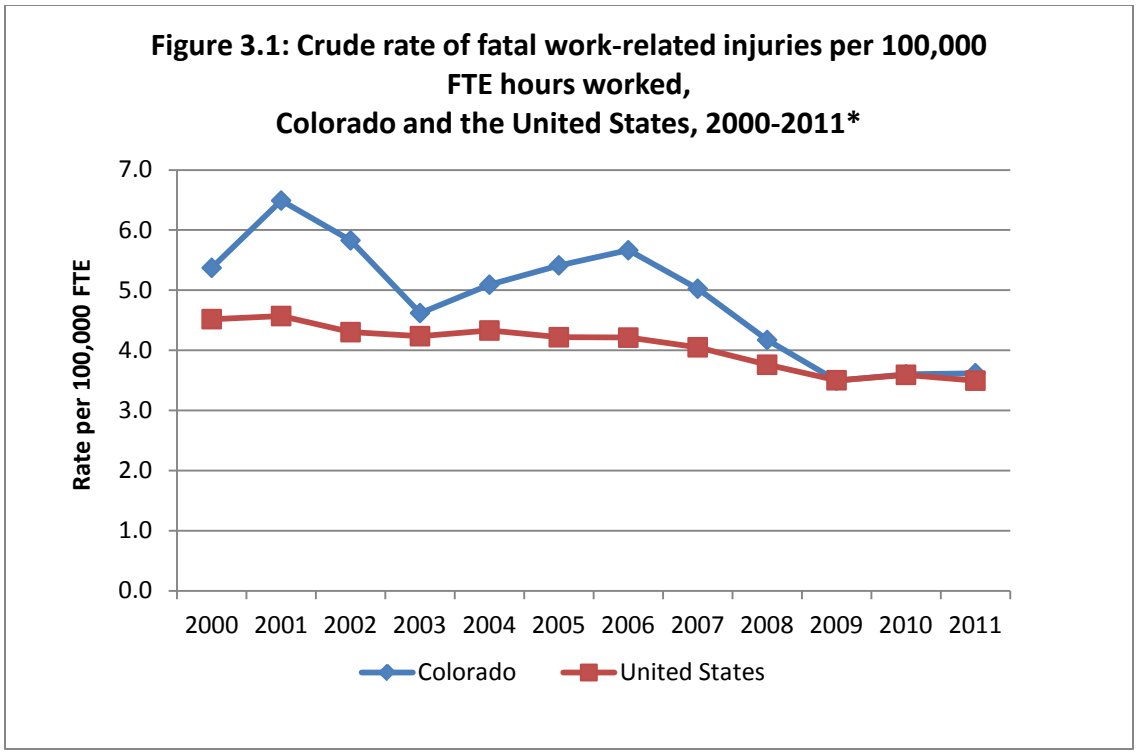
	Colorado			United States		
	Work-related fatalities (all causes)	Fatality rate per 100,000 employed persons, age 16 years and older	Fatality rate per 100,000 FTE hours worked, age 16 years and older	Work-related fatalities (all causes)	Fatality rate per 100,000 employed persons age, 16 years and older	Fatality rate per 100,000 FTE hours worked, age 16 years and older
2000	117	5.3	5.4	5,920	4.4	4.5
2001	139	6.3	6.5	5,915	4.4	4.6
2002	123	5.4	5.8	5,534	4.1	4.3
2003	102	4.4	4.6	5,575	4.0	4.2
2004	117	4.9	5.1	5,764	4.1	4.3
2005	125	5.2	5.4	5,734	4.0	4.2
2006	137	5.4	5.7	5,840	4.0	4.2
2007	126	4.9	5.0	5,675	3.9	4.1
2008	105	4.0	4.2	5,214	3.6	3.8
2009	83	3.3	3.5	4,551	3.3	3.5
2010	85	3.4	3.6	4,690	3.4	3.6
2011	87	3.5	3.6	4,609	3.3	3.5
Average	**112**	**4.7**	**4.9**	**5,418**	**3.9**	**4.1**

Numerator: Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) and Colorado Department of Public Health and Environment CFOI Surveillance Program

Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment & Unemployment (GP) and Current Population Survey (CPS) (secondary source)

**Data for 2011 are preliminary*

***NOTE:** Work-related fatalities of people younger than 16 may be included in the numerator but are not included in the denominator. Deaths in the military are included in the number of fatalities, but not the rates because they are not part of the Bureau of Labor Statistics Current Population*



Numerator: Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) and Colorado Department of Public Health and Environment CFOI Surveillance Program
Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment & Unemployment (GP) and Current Population Survey (CPS) (secondary source)
**Data for 2011 are preliminary*
***NOTE:** Work-related fatalities of people younger than 16 may be included in the numerator but are not included in the denominator. Deaths in the military are included in the number of fatalities, but not the rates because they are not part of the Bureau of Labor Statistics Current Population*

Table 3.2: Annual number and percent of fatal work-related injuries by event or exposure, Colorado, 2000-2011*, N (%)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Transportation incidents	58 (49.6)	56 (40.3)	61 (49.6)	39 (38.2)	60 (51.3)	76 (60.8)	60 (43.8)	63 (50.0)	48 (45.7)	34 (41.0)	30 (35.3)	34 (39.1)
Assaults and violent acts	25 (21.4)	26 (18.7)	27 (22.0)	23 (22.5)	25 (21.4)	8 (6.4)	30 (21.9)	18 (14.3)	14 (13.3)	18 (21.7)	21 (24.7)	16 (18.4)
Contact with objects and equipment	15 (12.8)	26 (18.7)	14 (11.4)	14 (13.7)	16 (13.7)	17 (13.6)	23 (16.8)	21 (16.7)	17 (16.2)	9 (10.8)	15 (17.6)	16 (18.4)
Falls, Slips, Trips	12 (10.3)	20 (14.4)	15 (12.2)	19 (18.6)	9 (7.7)	9 (7.2)	13 (9.5)	11 (8.7)	12 (11.4)	14 (16.9)	12 (14.1)	15 (17.2)
Exposure to harmful substances or environments	7 (6.0)	8 (5.8)	6 (4.9)	4 (3.9)	5 (4.3)	11 (8.8)	7 (5.1)	12 (9.5)	10 (9.5)	6 (7.2)	3 (3.5)	5 (5.7)
Fires and explosions	*	*	*	*	*	*	*	*	4 (3.8)	*	*	*
Other	*	*	*	*	*	*	*	*	*	*	*	*

Source: Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) and the Colorado Department of Public Health and Environment CFOI Surveillance Program

**Annual case numbers are too small for publication due to confidentiality policies of the CDPHE.*

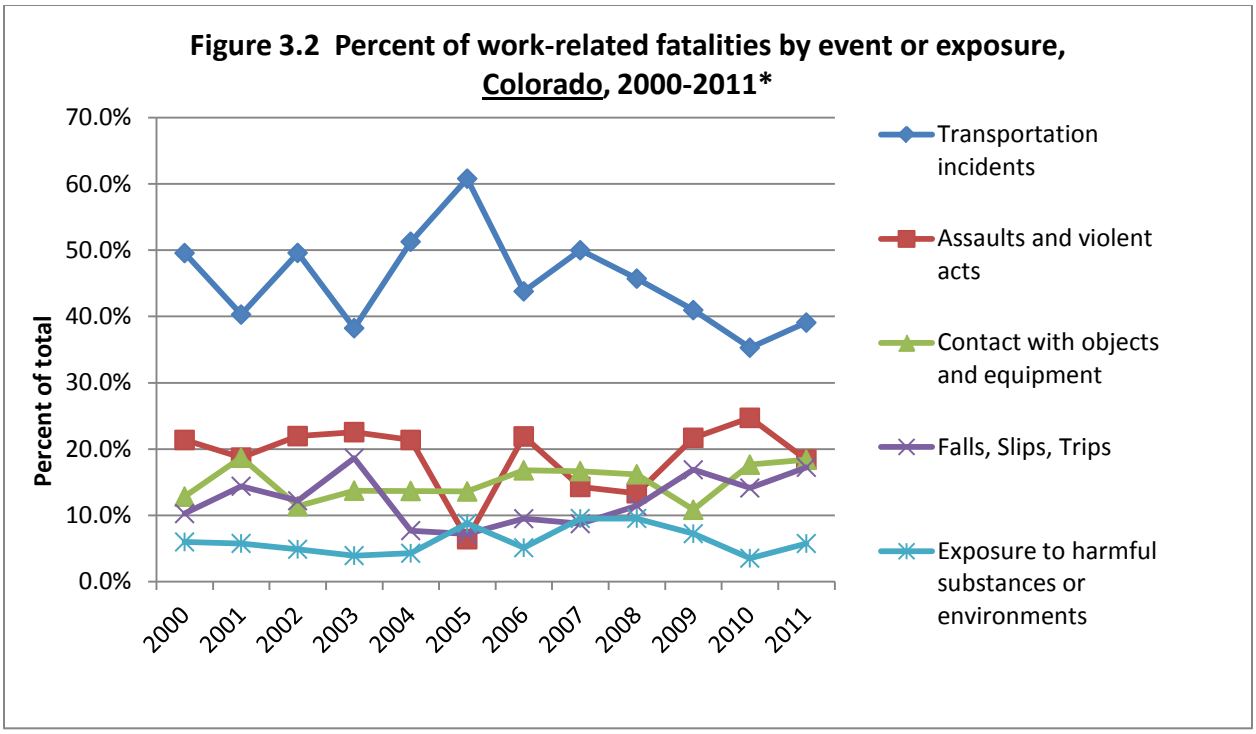
**Data for 2011 are preliminary*

Table 3.3: Annual number and percent of fatal work-related injuries by event or exposure, United States, 2000-2011*, N (%)

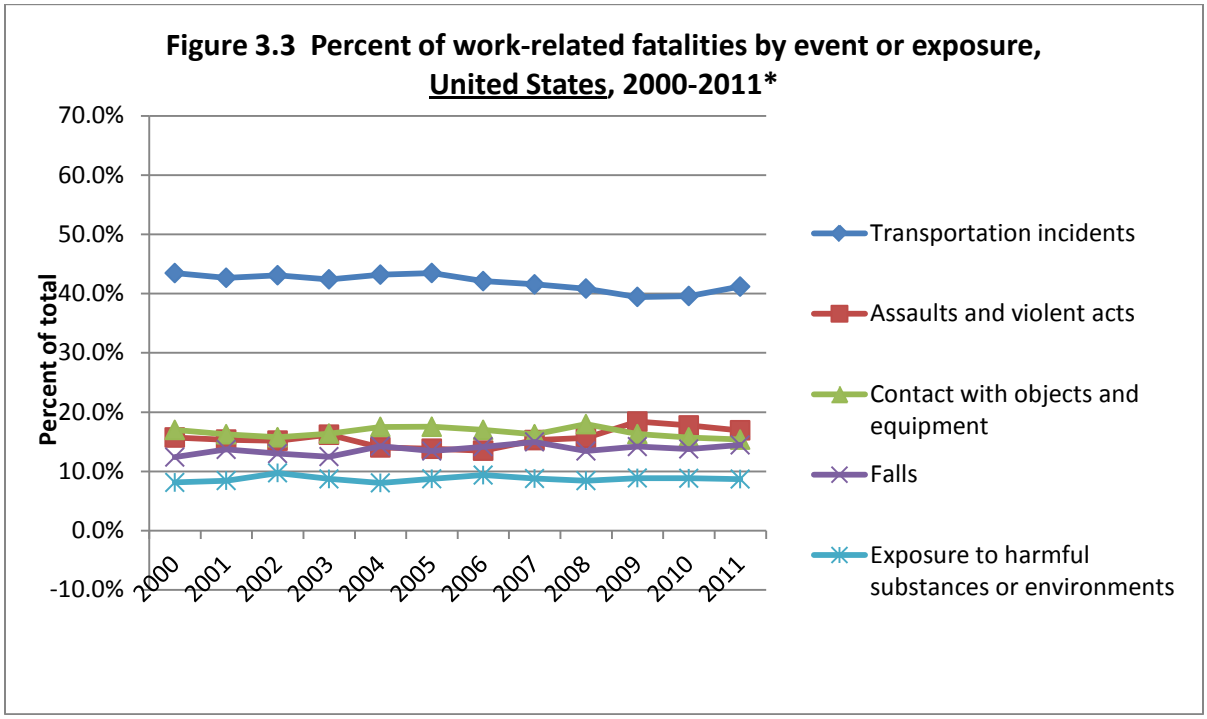
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Transportation incidents	2573 (43.5)	2524 (42.7)	2385 (43.1)	2364 (42.4)	2490 (43.2)	2493 (43.5)	2459 (42.1)	2351 (41.6)	2130 (40.9)	1795 (39.4)	1857 (39.6)	1898 (41.2)
Assaults and violent acts	930 (15.7)	908 (15.4)	840 (15.2)	902 (16.2)	809 (14.0)	792 (13.8)	788 (13.5)	864 (15.3)	816 (15.7)	837 (18.4)	832 (17.7)	780 (16.9)
Contact with objects and equipment	1,006 (17.0)	962 (16.3)	872 (15.8)	913 (16.4)	1009 (17.5)	1005 (17.5)	993 (17.0)	920 (16.3)	937 (18.0)	741 (16.3)	738 (15.7)	708 (15.4)
Falls, Slips, Trips	734 (12.4)	810 (13.7)	719 (13.0)	696 (12.5)	822 (14.3)	770 (13.4)	827 (14.2)	847 (15.0)	700 (13.4)	645 (14.2)	646 (13.8)	666 (14.4)
Exposure to harmful substances or environments	481 (8.1)	499 (8.4)	539 (9.7)	486 (8.7)	464 (8.0)	501 (8.7)	547 (9.4)	497 (8.8)	439 (8.4)	404 (8.9)	414 (8.8)	401 (8.7)
Fires and explosions	177 (3.0)	188 (3.2)	165 (3.0)	198 (3.6)	159 (2.8)	159 (2.8)	202 (3.5)	152 (2.7)	174 (3.3)	113 (2.5)	191 (4.1)	143 (3.1)
Other	19 (0.3)	24 (0.4)	14 (0.3)	16 (0.3)	11 (0.2)	14 (0.2)	24 (0.4)	26 (0.5)	18 (0.3)	16 (0.4)	12 (0.3)	13 (0.3)

Source: Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) and the Colorado Department of Public Health and Environment CFOI Surveillance Program

**Data for 2011 are preliminary*

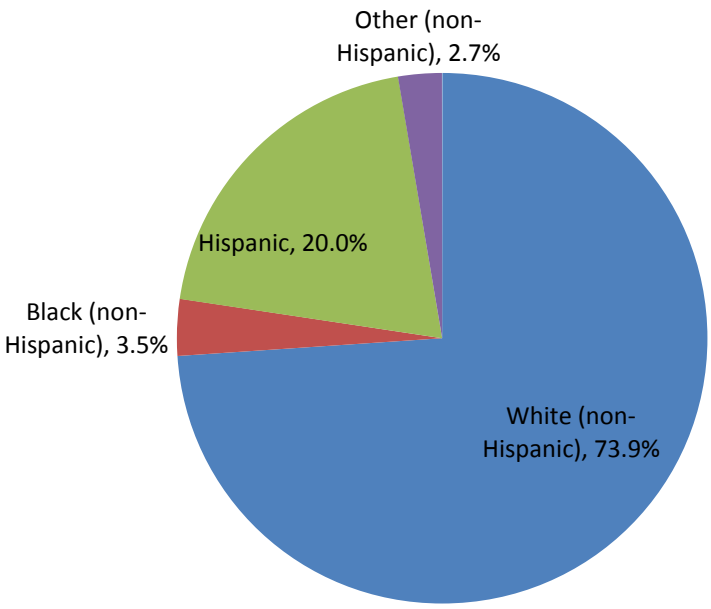


Source: Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) and the Colorado Department of Public Health and Environment CFOI Surveillance Program
**Data for 2011 are preliminary*



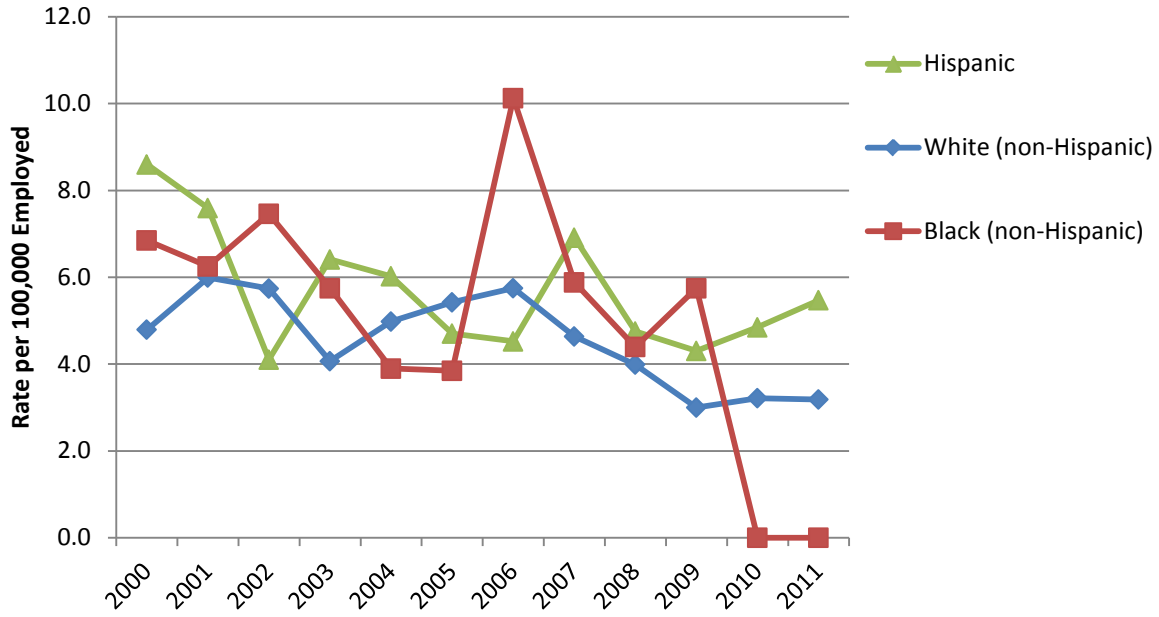
Source: Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI)
**Data for 2011 are preliminary*

Figure 3.4: Average percent of work-related fatalities by race and ethnicity, Colorado, 2000-2011*



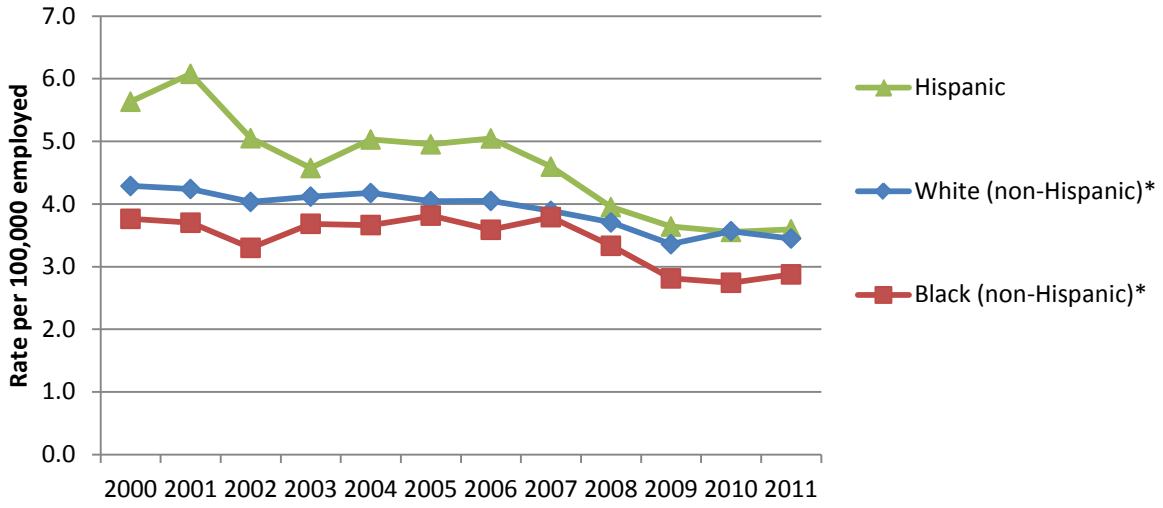
Source: Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) and the Colorado Department of Public Health and Environment CFOI Surveillance Program
**Data for 2011 are preliminary*

Figure 3.5: Work-related fatality rates by race and ethnicity, Colorado, 2000-2011*

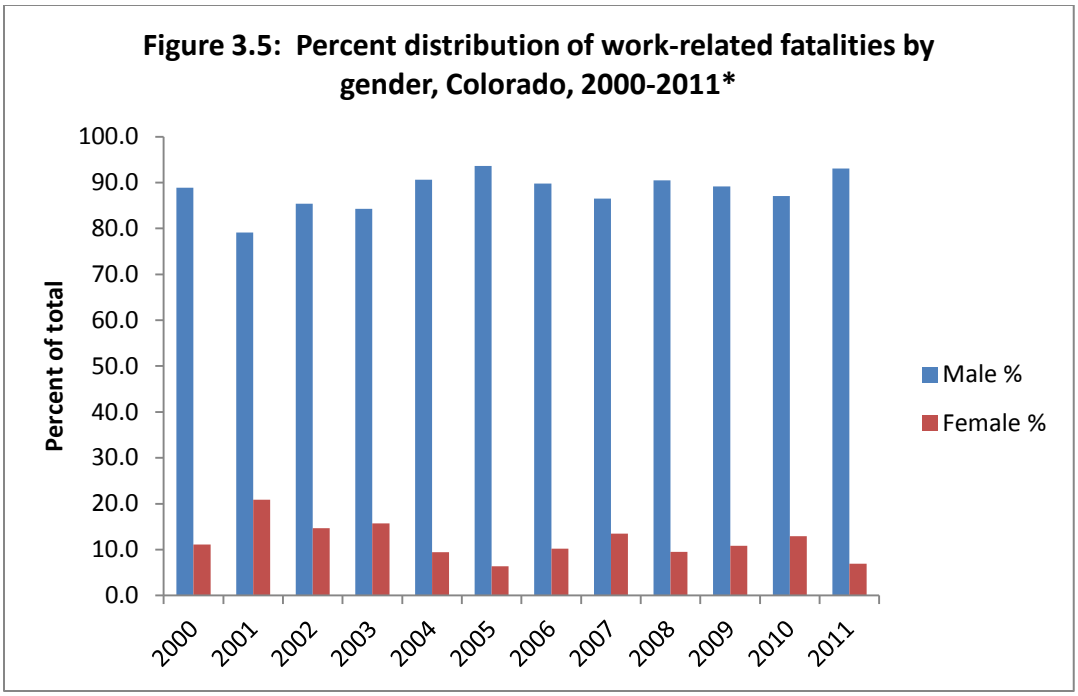


Numerator: Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) and the Colorado Department of Public Health and Environment CFOI Surveillance Program
Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment & Unemployment (GP) and the Current Population Survey (CPS)
**Data for 2011 are preliminary*
***NOTE**: The CFOI race and ethnicity categories include White (non-Hispanic), Black (non-Hispanic), and Hispanic. However, the CPS classifies employment data as White, Black and Other, with Hispanic ethnicity classified as a separate variable. Other surveillance within CDPHE demonstrates that Hispanics in Colorado are often classified as Whites for racial categorization. To calculate the rate of non-Hispanic Whites, the CPS denominator data were adjusted by subtracting the number of Hispanics from the number of Whites employed in Colorado.*

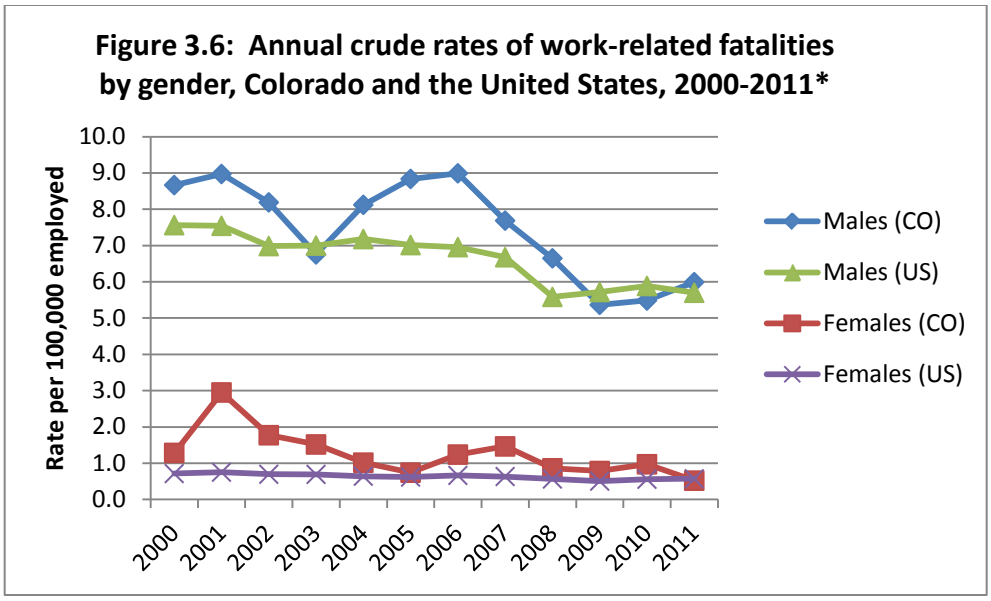
Figure 3.7: Work-related fatality rates by race and ethnicity, United States, 2000-2011*



Numerator: Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI)
Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment & Unemployment (GP) and the Current Population Survey (CPS)
**Data for 2011 are preliminary*
***NOTE**: The CFOI race and ethnicity categories include White (non-Hispanic), Black (non-Hispanic), and Hispanic. However, the CPS classifies employment data as White, Black and Other, with Hispanic ethnicity classified as a separate variable. Other surveillance within CDPHE demonstrates that Hispanics in Colorado are often classified as Whites for racial categorization. To calculate the rate of non-Hispanic Whites, the CPS denominator data were adjusted by subtracting the number of Hispanics from the number of Whites employed in Colorado.*



Source: Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) and the Colorado Department of Public Health and Environment CFOI Surveillance Program
**Data for 2011 are preliminary*



Numerator: Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) and the Colorado Department of Public Health and Environment CFOI Surveillance Program
Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment & Unemployment (GP) and Current Population Survey (CPS)
**Data for 2011 are preliminary*

Limitations

- The CPS data use a sample of households; therefore, CPS employment estimates and the fatality rates based on them contain sampling error.
- Fatalities of people younger than 16 and military personnel are included in the numerator. However, these groups are not included in the denominator data from the BLS GP/CPS.
- Suicides and homicides that take place at the workplace are considered work-related fatalities even though these deaths may not necessarily be caused by work-related factors.
- Since work-related fatalities are reported by CFOI according to 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.

Accomplishments to Date

- In February 2012, the Occupational Health and Safety Surveillance Program took over implementation of the CFOI. Direct oversight of this program is expected to enhance our understanding and use of these data.

Recommendations and Next Steps

- Enhance surveillance of fatal work-related injuries and illnesses to collect and report more detailed information on industry, occupation and injury/illness characteristics.

- Should the NIOSH Fatality Assessment and Control Evaluation (FACE) Program extend funding to new states, Colorado should apply to conduct additional surveillance, targeted investigations and prevention activities at the state level using the FACE model.
- Analyze existing CFOI data by state of residence to estimate how many out-of–state residents are included in Colorado data.

Indicator 4: Amputations Reported By Employers (Unable to Report)

Significance[i]

Most work-related amputations involve full or partial loss of fingers. Less common amputations involve the arm, leg, foot, toe, nose or ear. Work-related amputations can be prevented through the identification and control of occupational hazards and the implementation of safety procedures.

Methods

This indicator is calculated using data from the Bureau of Labor Statistics (BLS) Survey of Occupational Injuries and Illnesses (SOII), an employer based survey of workplace injuries. The SOII is the only comprehensive measure of work-related injuries and illnesses in American workplaces. As such, employers, employees, public policy makers and researchers rely on these data in their efforts to protect and maintain the productivity of the American workforce. Colorado is one of only eight states that does not participate in the BLS SOII; thus, state-level data for this indicator are not available. [ii]

See Indicator #5 (Amputations Identified in the State Workers' Compensation System) for data on this measure collected by an alternate method.

Recommendations and Next Steps

- Continue to explore opportunities for Colorado to participate in the BLS SOII, which requires a state-resource match to federal funds. (See Indicator #1 Recommendations for additional information about SOII participation.)

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

[ii] See BLS SOII overview: http://www.bls.gov/respondents/iif/home.htm

Indicator 5: Amputations with Lost Work-Time Identified in Workers' Compensation System

Significance[i]

It is estimated that, each year, between 16,000 and 21,000 workers in the United States experience a work-related amputation. Most work-related amputations involve full or partial loss of fingers. Less common amputations involve the arm, leg, foot, toe, nose or ear. Work-related amputations can be prevented through the identification and control of occupational hazards and the implementation of safety procedures and regulations.

Methods

The Colorado Department of Labor and Employment, Division of Workers' Compensation, reports the number of compensation claims admitted for amputations that resulted in lost work time. Amputation counts are coded as "02" as per the Workers' Compensation Insurance Organization (WCIO) coding scheme on the First Report of Injury (FRI).

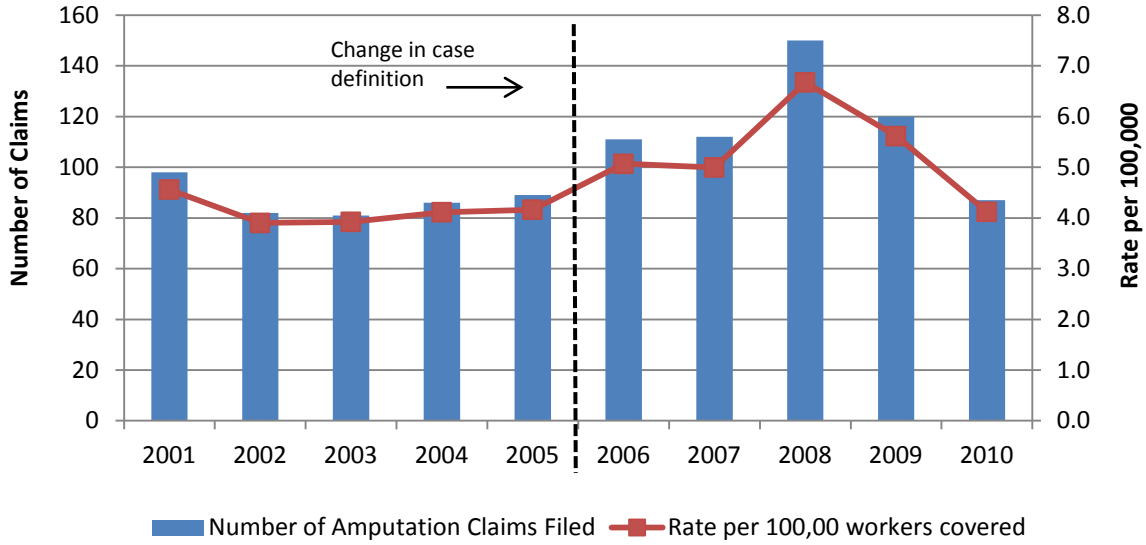
Only amputation claims which were accepted, resulted in more than three days (or three shifts) of lost work-time, and closed in the calendar year were included. Claims were included regardless of employer size, claimant age or claimant state of residence. Claims admitted by employees of self-insured employers were also included. Incidence rates were calculated using the numbers of workers covered by workers' compensation provided by the National Academy of Social Insurance (NASI).

Of note, data for 2001-2005 were collected with lost-time defined as > 10 days away from work.[3] Beginning with 2006 data, lost-time claims were defined as those resulting in > 3 days or shifts away from work. This later definition of lost-time matches the definition used by the CSTE OHI guidance[i] and the Colorado Department of Labor and Employment, Division of Workers' Compensation.

Results

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

Figure 5.1: Annual incidence rate of amputation claims filed with State Workers' Compensation per 100,000 workers covered, Colorado, 2001-2010*



Numerator: Closed claims from the Colorado Department of Labor, Division of Workers' Compensation
Denominator: National Academy of Social Insurance (NASI) estimate of workers covered by workers' compensation
**Beginning with 2006, the case definition was modified to follow the NIOSH/CSTE Occupational Health Indicator guidance*

Table 5.1 State Worker's Compensation Claims for Amputations with Lost Work Time, Colorado, 2001-2010*		
Year	**Number of claims filed**	**Annual incidence rate per 100,000 workers covered**
2001	98	4.6
2002	82	3.9
2003	81	3.9
2004	86	4.1
2005	89	4.2
Average 2001-2005	**87**	**4.1**
2006	111	5.1
2007	112	5.0
2008	150	6.7
2009	120	5.6
2010	87	4.1
Average 2006-2010	**116**	**5.3**

Numerator: Claims from the Colorado Department of Labor, Division of Workers' Compensation
Denominator: National Academy of Social Insurance (NASI) estimate of workers covered by workers' compensation

**Beginning with 2006 data, case definition was modified to follow the NIOSH/CSTE Occupational Health Indicator guidance*

Limitations

- Workers' compensation (WC) data are largely based on FRI reports, which are completed by employers or workers and thus might not capture latent amputations (i.e., a crush injury resulting in an amputation days or weeks later).
- The number of claims filed and admitted in the Colorado WC system might be underestimated because not all individuals with work-related injuries and illnesses file for WC.
- Those workers who are self-employed or Federal employees are not covered by Colorado WC insurers and therefore are not included in these estimates. However, the NASI covered worker data used for rate calculations do include government workers.
- Differences in eligibility criteria and availability of data from different state's WC programs limit these data from being compared with other states or with overall United States data.

Recommendations and Next Steps

- Further analyze existing WC data at CDPHE to report amputations by occupation, industry, age, gender and other available characteristics to determine risk factors, causes and patterns. (See Employment Demographic Profile Recommendations for more information about analyzing WC FRI data.)

Indicator 6: Hospitalizations for Work-Related Burns

Significance[i]

Describing and tracking hospitalizations from work-related burns are useful for identifying high-risk occupations and targeting prevention.

Methods

The Colorado Hospital Discharge Dataset is compiled by the Colorado Hospital Association (CHA) and, through a data sharing agreement, made available to the Colorado Department of Public Health and Environment (CDPHE). The hospital discharge dataset contains records of all hospital discharges from member hospitals. In Colorado, nearly 100% of hospitals are CHA members (excluding Federal facilities). Each record in the dataset represents one hospital discharge resulting from an inpatient hospital admission.

Data were collected from all Colorado discharge data records for cases with an ICD-9-CM principle diagnosis code between 940 and 949. Work-related hospitalizations were identified by selecting records where workers' compensation insurance is the expected payer. Only Colorado residents age 16 and over were included for analysis. Rates were calculated using employment data from the Bureau of Labor Statistics.

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

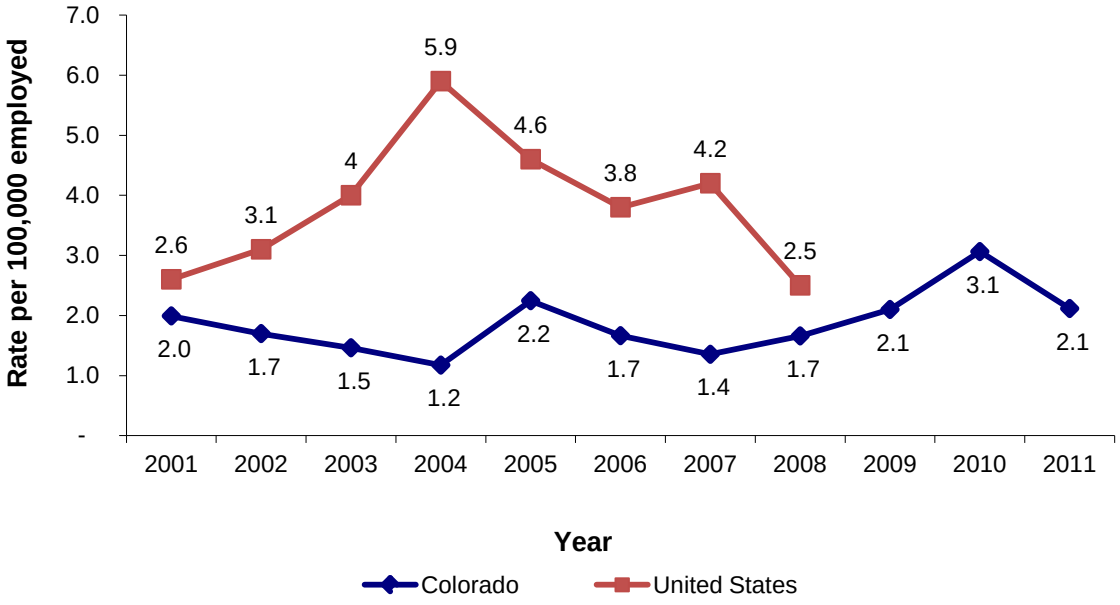
Results

Table 6.1: Number and crude rate of work-related burn hospitalizations per 100,000 employed, Primary payer workers' compensation, Age 16 and older, Colorado, 2001-2011*

Year	Annual number of burn hospitalizations	Crude rate of burn hospitalizations per 100,000 employed
2001	44	2.0
2002	39	1.7
2003	34	1.5
2004	28	1.2
2005	54	2.2
2006	42	1.7
2007	35	1.4
2008	43	1.7
2009	53	2.1
2010	76	3.1
2011	53	2.1
Average	**46**	**1.9**

Numerator: Colorado Hospital Association hospital discharge data analyzed by the Health Statistics Section, Colorado Department of Public Health and Environment
Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS)
**2011 rate calculations are preliminary*

Figure 6.1 Annual crude rate of work-related burn hospitalizations per 100,000 employed persons, Age 16 years and older, Colorado and the United States, 2001-2011*



Numerator: Colorado Hospital Association hospital discharge data analyzed by the Health Statistics Section, Colorado Department of Public Health and Environment
Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS)
United States Data: National Hospital Discharge Survey, Provided by the Council of State and Territorial Epidemiologist (CSTE) Occupational Health Indicators Reports
**United States data beyond 2008 not yet available through CSTE, 2011 rate calculations are preliminary*

Limitations

- Most work-related burn injuries are likely treated in the out-patient setting and, thus, not captured in hospitalization data.
- The true burden of work-related hospitalizations may be under-represented if workers utilize other payer sources (e.g., self-pay, private insurance). Employed individuals less than 16 years old experience work-related burn injuries but, because the GP/CPS excludes workers younger than 16 years of age, corresponding employment denominator data are not readily available.
- Colorado residents hospitalized in another state are not captured in these data. Hospitalization discharge records are based on admissions, not persons; thus, they may include multiple admissions for a single individual or single person-injury event.
- Work-related hospitalization data analyzed using the methods in this report are not directly comparable between states due to differences in states' workers' compensation insurance programs.

- Though United States level data are provided in this report, comparing state data to United States data should be done with caution as United States data are based on national probability estimates from state-level data, and workers' compensation insurance programs vary from state to state.

Recommendations and Next Steps

- Analyze existing hospitalization data available to the CDPHE to describe work-related burn hospitalizations in Colorado by age, gender, race/ethnicity and type of injury.[ii]
- Continue to explore opportunities to link hospitalization data with other health and employment data to obtain information on industries and occupations associated with serious burns. (See Indicator # 2 Recommendations for more information about analyzing hospitalization data.)
- By conducting more detailed analyses described, identify the worker characteristics or risk factors that most contribute to work-related burns to guide intervention, education and prevention efforts.
- Better define other issues that may affect hospitalization data patterns, such as whether there is an overall increase or decrease in non-work-related hospitalizations in Colorado.

[ii] The Occupational Health and Safety Surveillance Program is currently working to publish an expanded evaluation of work-related hospitalization data.

Indicator 5: Amputations with Lost Work-Time Identified in Workers' Compensation System

Significance[i]

It is estimated that, each year, between 16,000 and 21,000 workers in the United States experience a work-related amputation. Most work-related amputations involve full or partial loss of fingers. Less common amputations involve the arm, leg, foot, toe, nose or ear. Work-related amputations can be prevented through the identification and control of occupational hazards and the implementation of safety procedures and regulations.

Methods

The Colorado Department of Labor and Employment, Division of Workers' Compensation, reports the number of compensation claims admitted for amputations that resulted in lost work time. Amputation counts are coded as "02" as per the Workers' Compensation Insurance Organization (WCIO) coding scheme on the First Report of Injury (FRI).

Only amputation claims which were accepted, resulted in more than three days (or three shifts) of lost work-time, and closed in the calendar year were included. Claims were included regardless of employer size, claimant age or claimant state of residence. Claims admitted by employees of self-insured employers were also included. Incidence rates were calculated using the numbers of workers covered by workers' compensation provided by the National Academy of Social Insurance (NASI).

Of note, data for 2001-2005 were collected with lost-time defined as > 10 days away from work.[3] Beginning with 2006 data, lost-time claims were defined as those resulting in > 3 days or shifts away from work. This later definition of lost-time matches the definition used by the CSTE OHI guidance[i] and the Colorado Department of Labor and Employment, Division of Workers' Compensation.

Results

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

Indicator 6: Hospitalizations for Work-Related Burns

Significance[i]

Describing and tracking hospitalizations from work-related burns are useful for identifying high-risk occupations and targeting prevention.

Methods

The Colorado Hospital Discharge Dataset is compiled by the Colorado Hospital Association (CHA) and, through a data sharing agreement, made available to the Colorado Department of Public Health and Environment (CDPHE). The hospital discharge dataset contains records of all hospital discharges from member hospitals. In Colorado, nearly 100% of hospitals are CHA members (excluding Federal facilities). Each record in the dataset represents one hospital discharge resulting from an inpatient hospital admission.

Data were collected from all Colorado discharge data records for cases with an ICD-9-CM principle diagnosis code between 940 and 949. Work-related hospitalizations were identified by selecting records where workers' compensation insurance is the expected payer. Only Colorado residents age 16 and over were included for analysis. Rates were calculated using employment data from the Bureau of Labor Statistics.

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

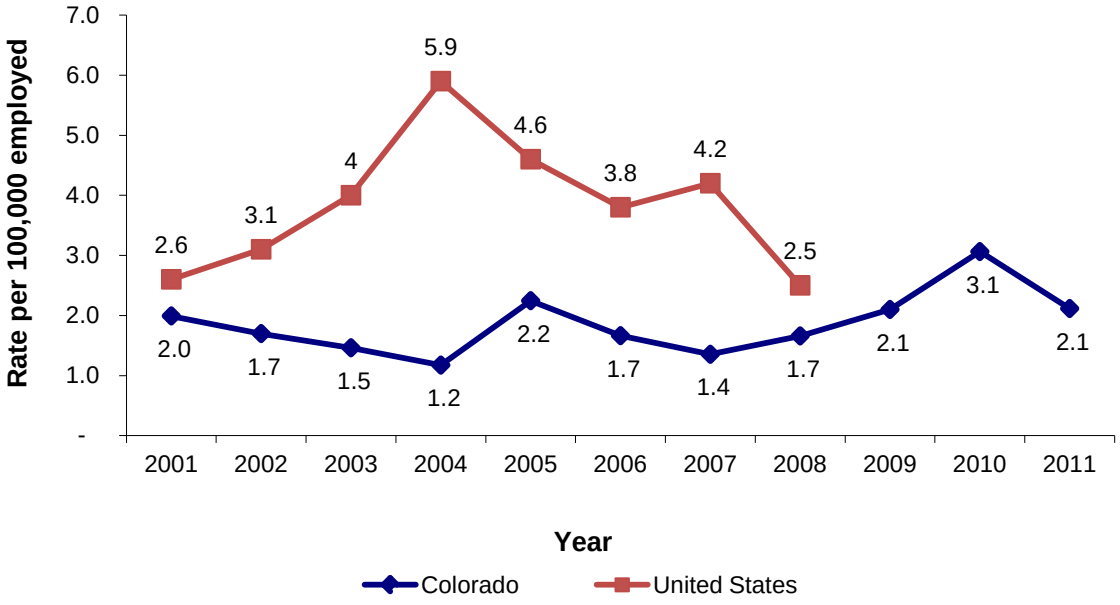
Results

Table 6.1: Number and crude rate of work-related burn hospitalizations per 100,000 employed, Primary payer workers' compensation, Age 16 and older, Colorado, 2001-2011*

Year	Annual number of burn hospitalizations	Crude rate of burn hospitalizations per 100,000 employed
2001	44	2.0
2002	39	1.7
2003	34	1.5
2004	28	1.2
2005	54	2.2
2006	42	1.7
2007	35	1.4
2008	43	1.7
2009	53	2.1
2010	76	3.1
2011	53	2.1
Average	**46**	**1.9**

Numerator: Colorado Hospital Association hospital discharge data analyzed by the Health Statistics Section, Colorado Department of Public Health and Environment
Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS)
**2011 rate calculations are preliminary*

Figure 6.1 Annual crude rate of work-related burn hospitalizations per 100,000 employed persons, Age 16 years and older, Colorado and the United States, 2001-2011*



Numerator: Colorado Hospital Association hospital discharge data analyzed by the Health Statistics Section, Colorado Department of Public Health and Environment
Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS)
United States Data: National Hospital Discharge Survey, Provided by the Council of State and Territorial Epidemiologist (CSTE) Occupational Health Indicators Reports
**United States data beyond 2008 not yet available through CSTE, 2011 rate calculations are preliminary*

Limitations

- Most work-related burn injuries are likely treated in the out-patient setting and, thus, not captured in hospitalization data.
- The true burden of work-related hospitalizations may be under-represented if workers utilize other payer sources (e.g., self-pay, private insurance). Employed individuals less than 16 years old experience work-related burn injuries but, because the GP/CPS excludes workers younger than 16 years of age, corresponding employment denominator data are not readily available.
- Colorado residents hospitalized in another state are not captured in these data. Hospitalization discharge records are based on admissions, not persons; thus, they may include multiple admissions for a single individual or single person-injury event.
- Work-related hospitalization data analyzed using the methods in this report are not directly comparable between states due to differences in states' workers' compensation insurance programs.

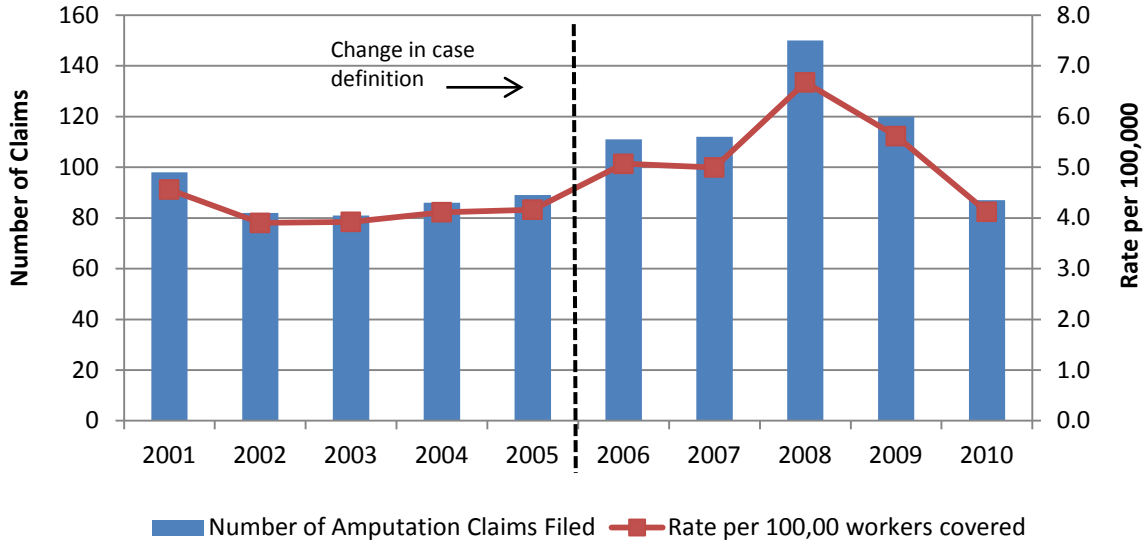
- Though United States level data are provided in this report, comparing state data to United States data should be done with caution as United States data are based on national probability estimates from state-level data, and workers' compensation insurance programs vary from state to state.

Recommendations and Next Steps

- Analyze existing hospitalization data available to the CDPHE to describe work-related burn hospitalizations in Colorado by age, gender, race/ethnicity and type of injury.[ii]
- Continue to explore opportunities to link hospitalization data with other health and employment data to obtain information on industries and occupations associated with serious burns. (See Indicator # 2 Recommendations for more information about analyzing hospitalization data.)
- By conducting more detailed analyses described, identify the worker characteristics or risk factors that most contribute to work-related burns to guide intervention, education and prevention efforts.
- Better define other issues that may affect hospitalization data patterns, such as whether there is an overall increase or decrease in non-work-related hospitalizations in Colorado.

[ii] The Occupational Health and Safety Surveillance Program is currently working to publish an expanded evaluation of work-related hospitalization data.

Figure 5.1: Annual incidence rate of amputation claims filed with State Workers' Compensation per 100,000 workers covered, Colorado, 2001-2010*



Numerator: Closed claims from the Colorado Department of Labor, Division of Workers' Compensation
Denominator: National Academy of Social Insurance (NASI) estimate of workers covered by workers' compensation
**Beginning with 2006, the case definition was modified to follow the NIOSH/CSTE Occupational Health Indicator guidance*

Table 5.1 State Worker's Compensation Claims for Amputations with Lost Work Time, Colorado, 2001-2010*		
Year	**Number of claims filed**	**Annual incidence rate per 100,000 workers covered**
2001	98	4.6
2002	82	3.9
2003	81	3.9
2004	86	4.1
2005	89	4.2
Average 2001-2005	**87**	**4.1**
2006	111	5.1
2007	112	5.0
2008	150	6.7
2009	120	5.6
2010	87	4.1
Average 2006-2010	**116**	**5.3**

Numerator: Claims from the Colorado Department of Labor, Division of Workers' Compensation
Denominator: National Academy of Social Insurance (NASI) estimate of workers covered by workers' compensation

**Beginning with 2006 data, case definition was modified to follow the NIOSH/CSTE Occupational Health Indicator guidance*

Limitations

- Workers' compensation (WC) data are largely based on FRI reports, which are completed by employers or workers and thus might not capture latent amputations (i.e., a crush injury resulting in an amputation days or weeks later).
- The number of claims filed and admitted in the Colorado WC system might be underestimated because not all individuals with work-related injuries and illnesses file for WC.
- Those workers who are self-employed or Federal employees are not covered by Colorado WC insurers and therefore are not included in these estimates. However, the NASI covered worker data used for rate calculations do include government workers.
- Differences in eligibility criteria and availability of data from different state's WC programs limit these data from being compared with other states or with overall United States data.

Recommendations and Next Steps

- Further analyze existing WC data at CDPHE to report amputations by occupation, industry, age, gender and other available characteristics to determine risk factors, causes and patterns. (See Employment Demographic Profile Recommendations for more information about analyzing WC FRI data.)

Indicator 7: Musculoskeletal Disorders Reported by Employers (Unable to Report)

Significance[i]

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

Methods

This indicator is calculated using data from the Bureau of Labor Statistics (BLS) Survey of Occupational Injuries and Illnesses (SOII), an employer based survey of workplace injuries. The SOII is the only comprehensive measure of work-related injuries and illnesses in American workplaces. As such, employers, employees, public policy makers and researchers rely on these data in their efforts to protect and maintain the high level of productivity of the American workforce. Colorado is one of eight states that does not participate in the BLS SOII; thus, state-level data for this indicator are not available. (http://www.bls.gov/respondents/iif/home.htm)

Data for this indicator are characterized using the Occupational Injury and Illness Classification System (OIICS) codes, which are not utilized by the Colorado Department of Labor and Employment (DOLE), Division of Workers' Compensation, to classify injuries. Thus, data on this measure are not currently available through Colorado's workers' compensation (WC) system.

Recommendations and Next Steps

- Continue to explore opportunities for Colorado to participate in the BLS SOII, which requires a state-resource match to federal funds. (See Indicator #1 Recommendations for additional information about SOII participation.)
  - NOTE: The Colorado DOLE reports work-place injuries by body part and nature of injury in the annual *Work-Related Injuries in Colorado* reports. The DOLE also produces an annual report on Workers' Compensation costs by nature of injury.[ii] These reports routinely showcase strain injuries (e.g., MSD) as the largest contributor to both the total number of workplace injuries and aggregate compensation costs. Participating in the SOII would provide the necessary state-level information to comprehensively evaluate MSD injuries by industry, occupation and worker characteristics, thus facilitating targeted prevention strategies.
- Because state WC data are collected by the First Report of Injury (FRI) completed by employers or workers (not physicians) and injuries are only identified by body part or nature of injury (not diagnosis), these data cannot be used to comprehensively evaluate MSD injuries. The CDPHE

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

[ii] DOLE reports are available online: www.colorado.gov/cs/Satellite/CDLE-WorkComp/CDLE/1248095316069

should continue seeking alternate methods to evaluate this measure. A first step might be to evaluate work-related hospitalizations, in which diagnosed MSDs can be classified using ICD-9-CM coding. [iii] However, these data would be limited since outpatient treatment and care are not captured in hospitalization admission data.

[iii] The Occupational Health and Safety Surveillance Program is currently working to publish an expanded evaluation of work-related hospitalization data.

Indicator 8: Carpal Tunnel Syndrome Cases Identified in Workers' Compensation Systems

Significance[i]

Carpal tunnel syndrome (CTS) may be caused by repetitive movements, placing hands or limbs in awkward positions or using equipment that vibrates. Symptoms include burning, tingling and numbness in fingers and 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 Colorado Department of Labor and Employment, Division of Workers' Compensation, reported the number of compensation claims filed and admitted for CTS from 2001 to 2010.

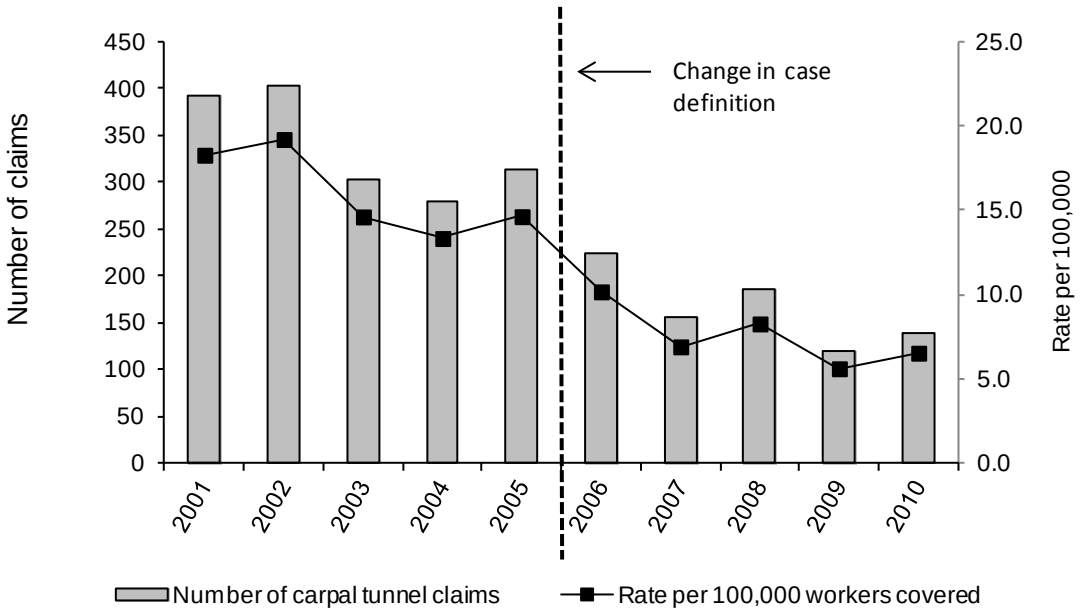
Only CTS claims which were accepted, resulted in more than three days (or three shifts) of lost work-time and closed in the calendar year were included. Claims were included regardless of employer size, claimant age or claimant state of residence. Claims admitted by employees of self-insured employers were also included. Incidence rates were calculated using the numbers of workers covered by workers' compensation (WC) provided by the National Academy of Social Insurance (NASI).

Of note, data for 2001-2005 were collected with lost-time defined as > 10 days away from work.[3] Beginning with 2006 data, lost-time claims were defined as those resulting in > 3 days or shifts away from work. The later definition of lost-time matches the definition used by the CSTE OHI guidance[i] and the Colorado Department of Labor and Employment, Division of Workers' Compensation. Because of this case definition change, averages are calculated separately for the period 2001-2005 and 2006 forward.

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

Results

Figure 8.1: Annual carpal tunnel syndrome cases filed with State Workers' Compensation per 100,000 workers covered, Colorado, 2001-2010*



Numerator: Closed claims from the Colorado Department of Labor, Division of Workers' Compensation
Denominator: National Academy of Social Insurance (NASI) estimate of workers covered by workers' compensation
**Beginning with 2006, the carpal tunnel case definition was modified to follow the NIOSH/CSTE Occupational Health Indicator guidance*

Table 8.1: Carpal Tunnel Syndrome Claims Filed with State Workers' Compensation, Colorado, 2001-2010*		
Year	**Number of claims**	**Annual incidence rate per 100,000 workers covered**
2001	393	18.3
2002	404	19.2
2003	302	14.6
2004	279	13.3
2005	313	14.6
Average 2001-2005	338.2	16.0
2006	223	10.2
2007	155	6.9
2008	186	8.3
2009	120	5.6
2010	138	6.5
Average 2006-2010	164.4	7.5

Numerator: Closed claims from the Colorado Department of Labor, Division of Workers' Compensation

Denominator: National Academy of Social Insurance (NASI) estimate of workers covered by workers' compensation

**Beginning with 2006, the carpal tunnel case definition was modified to follow the NIOSH/CSTE Occupational Health Indicator guidance*

Limitations

- The number of claims filed to and admitted by workers' compensation (WC) may be underestimated because not all individuals with work-related injuries and illnesses file for WC.
- The number of claims filed to and admitted by WC may be underestimated if the treating physician did not recognize the condition as work-related.
- Those workers who are self-employed or Federal employees are not covered by Colorado WC insurers and, therefore, are not included in these estimates. However, the NASI covered worker data used for rate calculations do include government workers.
- Differences in eligibility criteria and availability of data on WC programs in various states limit these data from being compared with other states or with overall United States data.

Recommendations and Next Steps

- Further analyze existing WC data at CDPHE to report the incidence of CTS by occupation, industry, age, gender and other characteristics to determine risk factors, causes and patterns. (See Employment Demographic Profile Recommendations for more information about analyzing WC FRI data.)

- Ensure primary care physicians and workers are educated on the relationship between work-place exposure and other risks for developing CTS, such as obesity, diabetes and other chronic conditions.[ii]

[ii] National Institute of Neurological Disorders and Stroke, CTS Factsheet: http://www.ninds.nih.gov/disorders/carpal_tunnel/detail_carpal_tunnel.htm#177743049

Indicator 9: Pneumoconiosis Hospitalizations

Significance[i]

Pneumoconioses are lung diseases caused by dust exposure and nearly all are attributable to occupational exposures. Common types include silicosis, asbestosis, coal workers' pneumoconiosis and pneumoconiosis due to exposure to a variety of other mineral dusts, including talc, aluminum, bauxite and graphite. Complications of pneumoconiosis that may cause hospitalizations include respiratory infections (including tuberculosis), chronic bronchitis, emphysema, lung cancer, pleuritis, progressive systemic sclerosis, renal disease and respiratory failure. Controlling and monitoring exposure to dust and providing ongoing medical surveillance for exposed workers are important steps to preventing pneumoconiosis.

Note that the estimated incidence of hospitalizations does not necessarily represent current exposures or new diagnoses. Pneumoconiosis occurs 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 presented for 2001 to 2011 may reflect past exposures from the 1960s to present.

Methods

The Colorado Hospital Discharge Dataset is compiled by the Colorado Hospital Association (CHA) and, through a data sharing agreement, made available to the Colorado Department of Public Health and Environment (CDPHE). The hospital discharge dataset contains records of all hospital discharges from member hospitals. In Colorado, nearly 100% of hospitals are CHA members (excluding Federal facilities). Each record in the dataset represents one hospital discharge resulting from an inpatient hospital admission.

Data were collected from all Colorado discharge data records if the ICD-9-CM codes 500-505 were present in any one of 15 diagnosis fields for Colorado residents, age 15 years or older. Rates were calculated using Colorado population estimates from the United States Census Bureau as the denominator.

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

Results

Table 9.1: Number and rates of hospitalizations from or with pneumoconiosis, Colorado and the United States, Residents age 15 and older, 2001-2011*

	Colorado			United States	
	Number of hospitalizations	Crude rate per 1,000,000	Age standardized rate per 1,000,000	Number of hospitalizations	Age standardized rate per 1,000,000
2001	363	103.9	134.7	25,710	116.2
2002	353	99.2	127.3	32,795	151.1
2003	387	107.5	136.5	19,667	90.4
2004	413	113.1	139.0	27,146	125
2005	418	112.6	139.8	26,188	108.9
2006	389	102.7	126.8	20,799	86.1
2007	356	92.0	112.3	19,037	78.5
2008	356	90.6	108.8	19,097	78.9
2009	326	81.6	97.0	data not available	data not available
2010	324	80.6	101.6	data not available	data not available
2011	335	82.0	101.4	data not available	data not available
Average	**365**	**96.9**	**120.5**	**23,805**	**104.4**

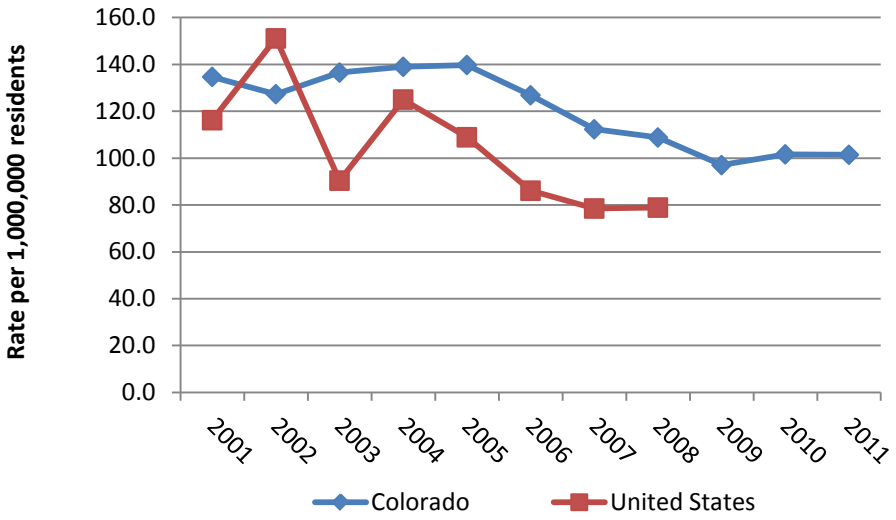
Numerator: Colorado Hospital Association hospital discharge data analyzed by the Health Statistics Section, Colorado Department of Public Health and Environment

Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS)

United States Data: National Hospital Discharge Survey, Provided by the Council of State and Territorial Epidemiologist (CSTE) Occupational Health Indicators Reports

**United States data beyond 2008 not yet available through CSTE*

Figure 9.1: Age-adjusted hospitalization rates from or with pneumoconisis per 1,000,000 residents, Age 15 and over, Colorado and the United States, 2001-2011*



Numerator: Colorado Hospital Association hospital discharge data analyzed by the Health Statistics Section, Colorado Department of Public Health and Environment
Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS)
United States Data: National Hospital Discharge Survey, Provided by the Council of State and Territorial Epidemiologist (CSTE) Occupational Health Indicators Reports
**United States data beyond 2008 not yet available through CSTE*

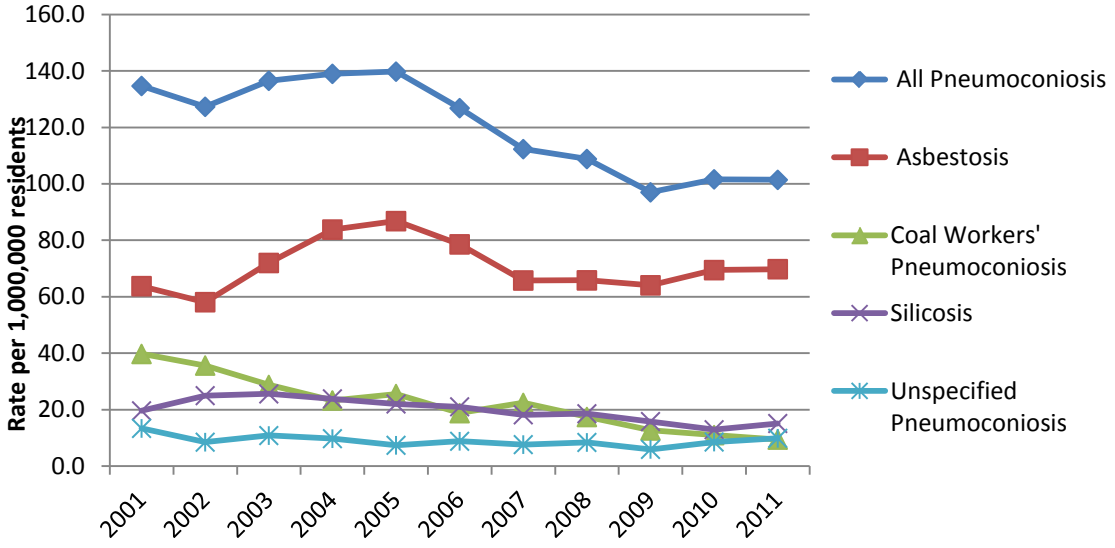
Table 9.2: Number of hospitalizations from or with pneumoconiosis by type of pneumoconiosis, Colorado residents age 15 and older, 2001-2011

	All Pneumoconiosis	Asbestosis	Coal Workers' Pneumoconiosis	Silicosis	Unspecified Pneumoconiosis
2001	363	171	107	52	38
2002	353	161	99	68	25
2003	387	205	81	71	32
2004	413	245	69	71	33
2005	418	256	77	67	24
2006	389	238	59	65	29
2007	356	205	72	61	24
2008	356	211	58	63	29
2009	326	214	42	55	20
2010	324	217	36	42	30
2011	335	222	34	55	33

Colorado Hospital Association hospital discharge data from the Colorado Department of Public Health and Environment Health Statistic Section

Note: *As specific types of pneumoconiosis are not mutually exclusive, and more than one diagnosis may be identified in a single hospitalization, the sum of hospitalizations across the various pneumoconiosis categories may be greater than the total count of hospitalizations with a pneumoconiosis diagnosis.*

Figure 9.2: Annual age-adjusted pneumoconiosis hospitalization rate per 1,000,000 residents, Age 15 and older, Colorado, 2001-2011



Colorado Numerator: Colorado Hospital Association hospital discharge data from the Colorado Department of Public Health and Environment Health Statistic Section

Denominator: Population estimates from the United States Census Bureau; Year 2000 US Standard population (for age-standardization)

Limitations

- Because of the long latency for development of disease, current pneumoconiosis hospitalization incidence is not necessarily indicative of current exposure.
- 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.
- The true burden of work-related hospitalizations may be under-represented if workers utilize other payer sources (e.g., self-pay, private insurance).
- Colorado residents hospitalized in another state are not captured in these data.
- Hospitalization discharge records are based on admissions, not persons; thus, they may include multiple admissions for a single individual.
- Typically, only a small number of the most severe cases of pneumoconiosis are hospitalized; thus, these hospitalization rates most likely underestimate the true burden of pneumoconiosis among workers.
- Work-related hospitalization data analyzed using the methods in this report are not directly comparable between states due to differences in states' workers' compensation insurance programs.
- Though United States level data are provided in this report, comparing state data to United States data should be done with caution as United States data are based on national probability estimates from state-level data, and workers' compensation (WC) insurance programs vary from state to state.

Recommendations and Next Steps

- Evaluate existing hospitalization data available to the CDPHE to describe hospitalizations from or with pneumoconiosis in Colorado by age, gender, race/ethnicity and type of pneumoconisis.[ii]
- Continue to explore opportunities to link hospitalization data with other health and employment data to obtain information on industries and occupations associated with pneumoconiosis hospitalizations. (See Indicator #2 Recommendations for more information about analyzing hospitalization data.)
- By conducting more detailed analyses, identify the worker characteristics or risk factors that most contribute to pneumoconiosis hospitalizations to guide intervention, education and prevention efforts.
- Because all types of pneumoconioses are chronic diseases, they are largely treated on an outpatient basis and the true burden of the disease is not well described by hospitalization data. The CDPHE, in partnership with its Occupational Health and Safety Surveillance Advisory Committee and other stakeholders, should work to identify data sources that estimate the rate of outpatient (non-hospitalized) cases of pneumoconiosis (incidence and prevalence). The utility of states workers' compensation FRI reports (available to CDPHE) should be evaluated for surveillance of pneumoconiosis incidence. (See Employment Demographic Profile Recommendations for more information about evaluating WC FRI data.)

[ii] The Occupational Health and Safety Surveillance Program is currently working to publish an expanded evaluation of these data.

Indicator 10: Pneumoconiosis Mortality

Significance[i]

Pneumoconioses are lung diseases caused by dust exposure and nearly all are attributable to occupational exposures. Common types include silicosis, asbestosis, coal workers' pneumoconiosis and pneumoconiosis due to exposure to a variety of other mineral dusts, including talc, aluminum, bauxite and graphite. Controlling and monitoring exposure to dust and maintaining ongoing medical surveillance for exposed workers are important steps to preventing pneumoconiosis.

Methods

The number of pneumoconiosis deaths was estimated based on mortality data from the Colorado Department of Public Health and Environment (CDPHE), Colorado Health Information Dataset (COHID) (http://www.cdphe.state.co.us/cohid/index.html). Colorado residents age 15 or older with an underlying cause of death as 'Pneumoconiosis and Chemical Effects' were included in this calculation. Denominator data were obtained from the United States Census Bureau.

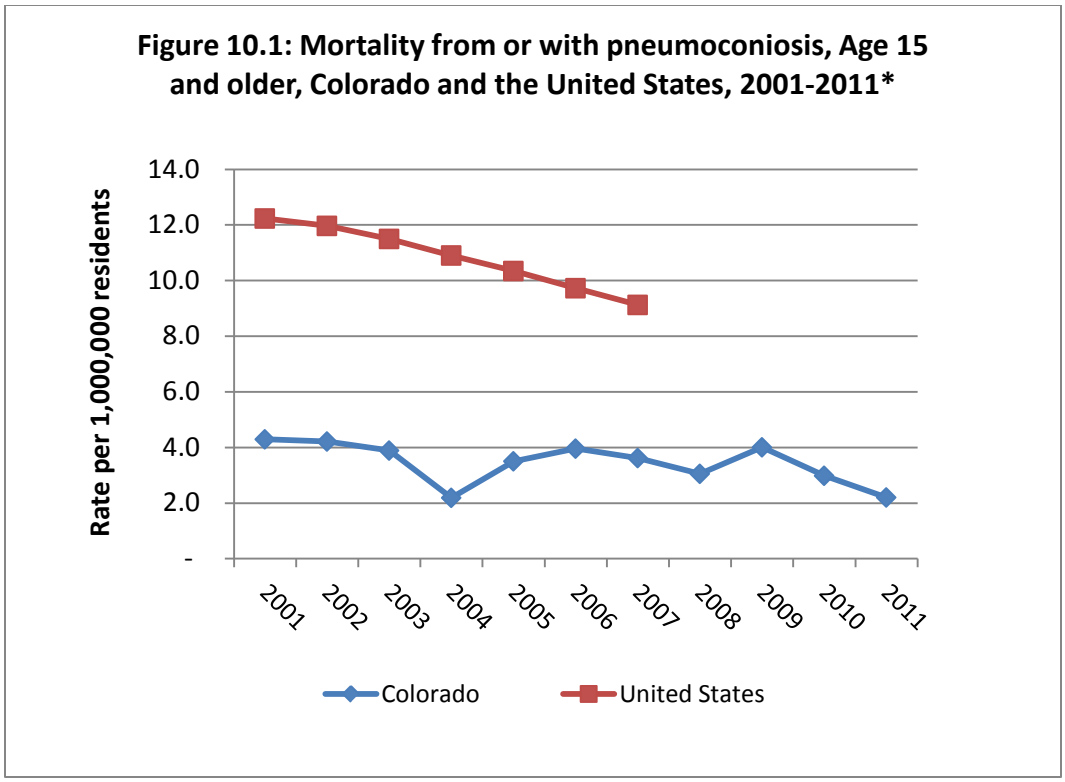
Results

Table 10.1: Mortality from or with pneumoconiosis, Colorado residents age 15 and older, 2001-2011

	Number of deaths	Crude rate per 1,000,000 residents*
2001	15	4.3
2002	15	4.2
2003	14	3.9
2004	8	2.2
2005	13	3.5
2006	15	4.0
2007	14	3.6
2008	12	3.1
2009	16	4.0
2010	12	3.0
2011	9	2.2
Average	**13.0**	**3.4**

Source: Death certificate records from Colorado Department of Public Health and Environment Health Statistics Section (numerator); State population estimates from the US Census Bureau (denominator)

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.



Colorado Numerator: Death certificate records from Colorado Department of Public Health and Environment Health Statistics Section
U.S. Numerator: National Center for Health Statistics multiple cause of death file, provided by the Council of State and Territorial Epidemiologists
Denominator: State and national population estimates from the United States Census Bureau
**U.S. data not available through CSTE beyond 2007*

Limitations

- Except in some specific cases, the estimated incidence of mortality from pneumoconiosis does not represent current exposures due to the long latency between a person's dust exposure and development of disease.
- Age standardized death rates were not calculated because the number of fatalities in specific age groups is too small to produce reliable estimates and data cannot be released due to confidentiality protections.
- Conducting geographic analysis of pneumoconiosis mortality may be problematic if the death and exposure do not occur in the same location.
- The causes of death listed on death certificates and coding of those causes may be inaccurate and may vary depending on who completes the certificate. The chronic nature of pneumoconiosis may lead to incomplete or inaccurate coding of the death certificate in cases where pneumoconiosis is not listed, despite its contribution to the death.
- In Colorado, death certificates are not coded for industry or occupation, so the possible work-related exposures leading to pneumoconiosis cannot be identified.

Recommendations and Next Steps

- Using death certificate data available to the CDPHE, report mortality by type of pneumoconiosis, age, gender and race/ethnicity.
- Identify ways to better characterize current trends in exposure and new diagnosis. (See also Indicator #9 Recommendations for improving surveillance of pneumoconiosis incidence and prevalence.)

Indicator 11: Acute Work-Related Pesticide Poisonings Reported to Poison Control Centers

Significance[i]

Pesticides (including disinfectants) are chemicals used in the workplace purposely designed to harm certain life forms. The active ingredients in pesticides can pose both acute and chronic exposure risks if not carefully applied. An estimated one billion pounds of pesticides applied as fungicides, fumigants, herbicides, insecticides, repellents and rodenticides are used each year in the United States to protect food and control disease. At least an additional 2.6 billion pounds of pesticide active ingredients are used annually as disinfectants.[ii]

The Environmental Protection Agency (EPA) has estimated that 10,000-20,000 physician-diagnosed pesticide illnesses and injuries occur among agricultural workers each year in the United States. If workers from the non-agricultural setting are included, for example grounds keepers and janitorial or cleaning staff, this estimate doubles to 20,000 to 40,000 work-related pesticide poisonings each year. [iii]

Methods

Local poison centers provide guidance and information for cases of work-related pesticide exposure to medical professionals, the public and consumers throughout the United States. The American Association of Poison Control Centers (AAPCC) collects information on all poisonings reported to poison control centers; these data are compiled in the National Poison Data System (NPDS). The Council of State and Territorial Epidemiologists (CSTE) works with the AAPCC to provide NPDS data on aggregate work-related pesticide and disinfectant poisoning exposures to state-based surveillance programs.

Because Colorado's Occupational Health and Safety Surveillance Program has access to both case-level data reported to NPDS by the Rocky Mountain Poison and Drug Center (RMPDC) and aggregate data provided by the CSTE, both sources are currently utilized to monitor work-related pesticide poisoning. However, there are slight differences in applied case definitions, which are further described in Table 11.1 notes.

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[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

[ii] United State Environmental Protection Agency, *Pesticides Industry Sales and Usage Report, 2006-2007*, http://www.epa.gov/opp00001/pestsales/07pestsales/market_estimates2007.pdf (See Tables 3.1 and 3.3)

[iii] Blondell, J. *Epidemiology of Pesticide Poisonings in the United States, With Special Reference to Occupational Cases.* Occ Med 1997; 12:209-220.

Results

Table 11.1 Work-related pesticide poisoning exposures reported to poison centers, Number and rate per 100,000 employed, Colorado and the United States, 2001-2011*

	Colorado Cases from RMPDC reports		Colorado Cases from AAPCC		United States Cases from AAPCC	
	Number	Rate	Number	Rate	Number	Rate
2001	75	3.39	58	2.60	2,492	1.80
2002	58	2.52	46	2.00	2,528	1.90
2003	55	2.36	36	1.60	2,503	1.80
2004	62	2.60	53	2.20	2,476	1.80
2005	59	2.45	51	2.10	2,593	1.80
2006	53	2.10	35	1.40	2,560	1.77
2007	49	1.89	38	1.47	2,458	1.68
2008	65	2.51	41	1.58	2,171	1.50
2009	54	2.14	42	1.66	2,040	1.46
2010	64	2.58	Data not available	Data not available	Data not available	Data not available
2011	57	2.27	Data not available	Data not available	Data not available	Data not available
Average	**59**	**2.44**	**44**	**1.85**	**2,425**	**1.72**

Data Include only closed cases, with single-substance exposure. Any changes to previously reported numbers are likely due to updates in case status recorded in NPDS between data extractions.

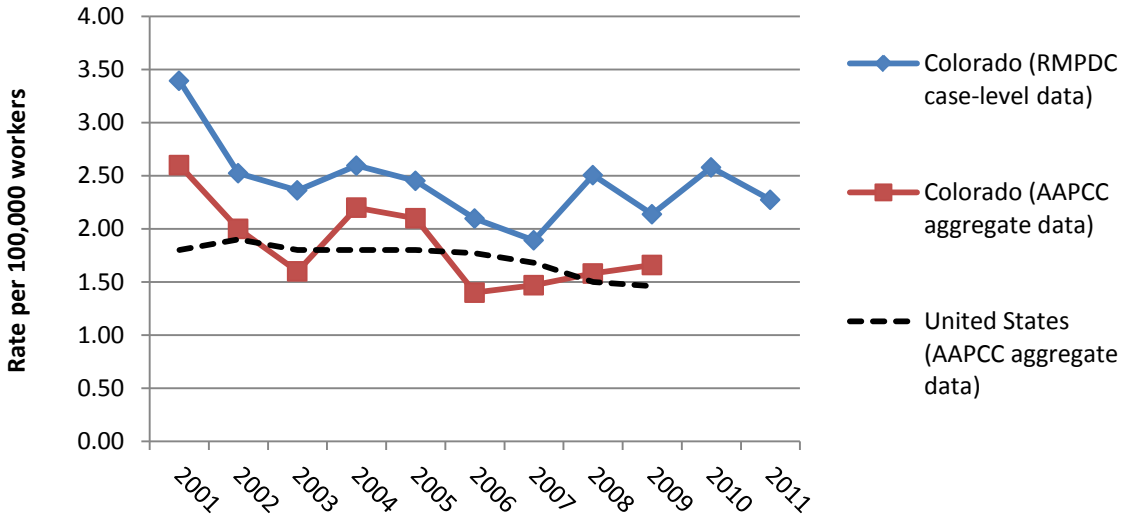
Numerator: RMPDC case-level data from the NPDS. Includes all Pesticides generic codes for fumigants, fungicides, herbicides, insecticides, miscellaneous pesticides, repellents and rodenticides, all Household Cleaner disinfectants, and select disinfectants from the Swimming Pool/Aquarium and Industrial Cleaner categories (as specified in the CSTE OHI guidance).

Numerator: AAPCC aggregate data provided by the CSTE for Colorado and the United States. Includes the same generic codes as the RMPDC case-level data, with the following few codes excluded:

- *0201055 (bromine water/shock treatment) in the Swimming Pool/Aquarium Category*
- *0201056 (chlorine water/shock treatment) in the Swimming Pool/Aquarium Category*
- *0201008 (disinfectant industrial cleaner) in the Industrial Cleaner Category*
- *0077562 (Other Type of Insecticide/Pesticide)*
- *0077569 (Unknown Type of Insecticide/Pesticide)*

Denominators: Employed persons age 16 years or older from the BLS Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS).
***AAPCC aggregate data for Colorado and the United States is not available from the CSTE beyond 2009*

Figure 11.1 Work-related pesticide poisoning exposures reported to poison centers, Number and rate per 100,000 employed, Colorado and the United States, 2001-2011*



Data Include only closed cases, with single-substance exposure. Any changes to previously reported numbers are likely due to updates in case status recorded in NPDS between data extractions.

Numerator: RMPDC case-level data from the NPDS. Includes all Pesticides generic codes for fumigants, fungicides, herbicides, insecticides, miscellaneous pesticides, repellents and rodenticides, all Household Cleaner disinfectants, and select disinfectants from the Swimming Pool/Aquarium and Industrial Cleaner categories (as specified in the CSTE OHI guidance).

Numerator: AAPCC aggregate data provided by the CSTE for Colorado and the United States. Includes the same generic codes as the RMPDC case-level data, with the following few codes excluded:

- *0201055 (bromine water/shock treatment) in the Swimming Pool/Aquarium Category*
- *0201056 (chlorine water/shock treatment) in the Swimming Pool/Aquarium Category*
- *0201008 (disinfectant industrial cleaner) in the Industrial Cleaner Category*
- *0077562 (Other Type of Insecticide/Pesticide)*
- *0077569 (Unknown Type of Insecticide/Pesticide)*

Denominators: Employed persons age 16 years or older from the BLS Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS).
**AAPCC aggregate data for Colorado and the United States is not available from the CSTE beyond 2009*

Limitations

- It is presumed that most work-related pesticide exposures (including disinfectants) reported to poison centers are acute exposures; however, we were not able to quantify the distinction between acute and chronic exposure with the data presently available for this indicator.
- Not all acute work-related pesticide exposures resulting in illness are reported to poison centers; thus, these data likely underestimate the true-burden of acute pesticide poisoning.

- Poison centers capture the types and active ingredients of a pesticide; however, the detailed circumstance, occupation, business and industrial identification associated with a call are generally unknown.
- Poison center staff routinely follow cases to identify a reasonably certain medical outcome and update NPDS records until the case is closed. Thus, any updates to previously reported data are likely reflections of updated case reports captured in the latest analysis.

Accomplishments to Date:

- In 2011, the Occupational Health and Safety Surveillance Program secured direct access to poison center call data for Colorado cases from the RMPDC.
- In 2012, an in-depth analysis of all occupational poisoning exposure data from the RMPDC was completed.[iv]
- The CDPHE is currently conducting additional analysis of RMPDC data to describe occupational and environmental pesticide poisonings by age, gender, race/ ethnicity, severity and illness outcome. As much as possible, this analysis will describe the different risk factors for pesticide poisonings from agricultural use and pesticide poisonings from non-agricultural use (i.e., disinfectants)**.**

Recommendations and Next Steps

- Pursue opportunities to enhance public health surveillance activities in Colorado for occupational pesticide poisoning with the goals of providing more comprehensive data and evaluating and describing risk factors associated with chronic and acute exposure cases.[v] Activities toward these goals may include pursuing physician-diagnosed pesticide poisoning as a reportable condition and applying to participate in the CDC/NIOSH Sentinel Event Notification System for Occupational Risk (SENSOR) Pesticide Surveillance Program during the next grant application cycle.[vi]
- Conduct a quality assessment of the case-level RMPDC data and aggregate AAPCC data to better understand differences in case numbers and possibly improve consistency in national surveillance efforts.

[iv] The complete report is published on our program webpage: http://www.colorado.gov/cs/Satellite/CDPHE-DCEED/CBON/1251610614250

[v] In summer 2012, the Occupational Health and Safety Surveillance Program conducted a survey study of certified pesticide applicators in Colorado. The report of findings is forthcoming.

[vi] See SENSOR Program overview: www.cdc.gov/niosh/topics/pesticides/overview.html

Indicator 12: Incidence of Malignant Mesothelioma

Significance[i]

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 deaths from malignant mesothelioma is still increasing in the United States, which is likely the result of exposures decades ago. [ii] Regulatory actions and a decline in use of asbestos in industrial and consumer products may lead to a decline in mesothelioma incidence in the future, but this may not be evident for several decades. Workers, however, continue to be exposed to asbestos during remediation and demolition of existing asbestos in buildings, highlighting the continued need to monitor and prevent work-related exposure to asbestos.

Methods

The Colorado Central Cancer Registry in the Colorado Department of Public Health and Environment (CDPHE) collects information on the incidence, treatment, survival and deaths due to cancer. Data are collected from physicians, clinics, pathology labs, hospitals and death certificates. Annual age-standardized incidence of mesothelioma was calculated using the registry (ICD-O histology codes 9050, 9051, 9052, 9053). State population estimates were obtained from the United States Census Bureau.

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

[ii] Centers for Disease Control and Prevention. *Malignant Mesothelioma Mortality – United States, 1999-2005.* MMWR 2009; 58(15);393-396

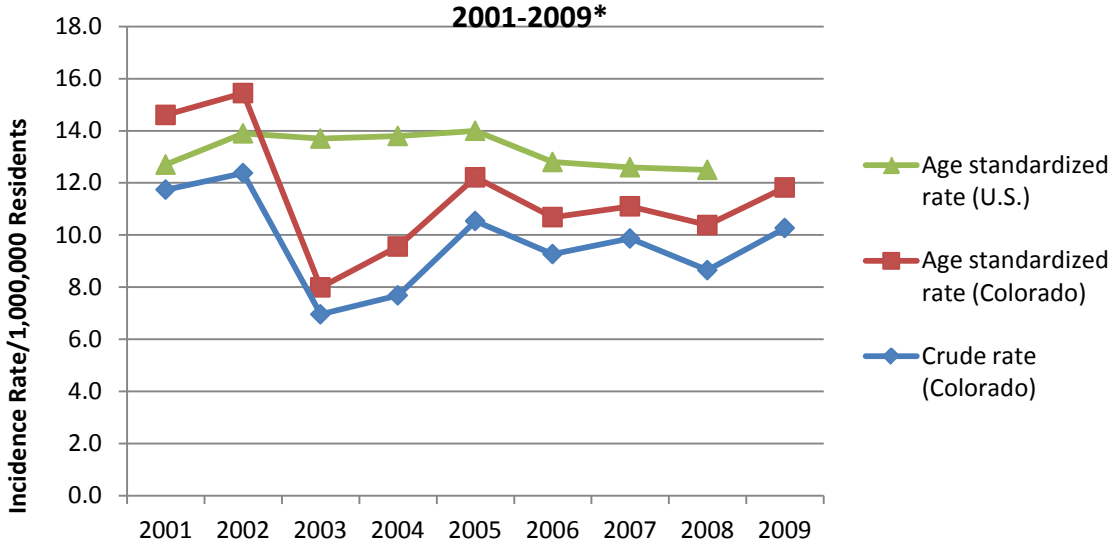
Results

Table 12.1 Incident number and rates of malignant mesothelioma per 1,000,000 residents, Age 15 and older, Colorado, 2001-2009

	Number of Cases	Crude Rate	Age Standardized Rate
2001	41	11.7	14.6
2002	44	12.4	15.4
2003	25	7.0	8.0
2004	28	7.7	9.6
2005	39	10.5	12.2
2006	35	9.3	10.7
2007	38	9.9	11.1
2008	34	8.7	10.4
2009	41	10.3	11.8
Average	**36**	**9.7**	**11.5**

Source: Colorado Department of Public Health and Environment Cancer Registry data (numerator); State population estimates from the United States Census Bureau (denominator); Year 2000 US Standard population (for age standardization)

Figure 12:1 Annual Incidence Rate of Malignant Mesothelioma per 1 Million Residents, Age 15 and older, Colorado and the United States, 2001-2009*



Source: Colorado Department of Public Health and Environment Cancer Registry data (numerator); State population estimates from the United States Census Bureau (denominator); Year 2000 US Standard population (for age standardization)
United States Data: National Cancer Institute (NCI) Surveillance Epidemiology, and End Results, (SEER) program or the North American Association of Central Cancer Registries. Data provided by the Council of State and Territorial Epidemiologist (CSTE) Occupational Health Indicators Reports
**United States data beyond 2008 not yet available through CSTE*

Limitations

- The estimated incidence does not necessarily represent current exposures, primarily because of the long latency associated with the disease. Therefore, current rates reflect exposures that occurred decades ago.

Recommendations and Next Steps

- Analyze and report the incidence of mesothelioma by age, gender, race/ethnicity, occupation/industry and exposure history for prevention efforts. Data on these variables, including industry and occupation, are available in Colorado's' cancer registry. However, the data for industry and occupation would need to be coded for analysis. The NIOSH Industry and Occupation Computerized Coding System (NIOCCS) software became available in the fall of 2012 to assist coding data such as these.

Indicator 13: Elevated Blood Lead Levels Among Adults

Significance[i]

The blood lead level (BLL) is the best biological indicator of recent lead exposure. The average BLL of the general population is less than two micrograms per deciliter (µg/dL). The workplace is the main source of lead exposure for adults. The Occupational Safety and Health Administration (OSHA) requires employers covered under OSHA Lead Standard 29 CFR 1910.1025 and 1926.62 to monitor lead exposure in the workplace. When a worker's BLL is 40 µg/dL or greater, OSHA requires employers to offer an annual medical exam and other medical interventions, depending on the BLL. In addition, biological monitoring and medical surveillance programs are made available to all employees exposed to lead above the action level of 30 µg/m^3 time weighted average (TWA) for more than 30 days each year.

In Colorado, a BLL of 10 µg/dL or greater is a mandatory public health reportable condition for adults over age 18.[ii] Following recommendations of the Council of State and Territorial Epidemiologists (CSTE) in 2009, the CDC/NIOSH Adult Blood Lead Epidemiology and Surveillance (ABLES) program changed their case definition of elevated BLL from greater than 25 µg /dL to greater than10 µg /dL based on evidence linking lower levels of lead in adults with decreased kidney function, cardiovascular disease and cognitive impairment. [iii]

Methods

All laboratories must report elevated adult BLL tests of 10 µg/dL or greater to the Colorado Department of Public Health and Environment (CDPHE). In 2007, CDPHE developed a dedicated electronic lead reporting database to collect and analyze reports of elevated adult and all childhood BLLs. Rates were calculated using employment estimates from the Bureau of Labor Statistics (BLS) Geographic Profile of Employment and Unemployment (GP) Current Population Survey (CPS) as the denominator.

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[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

[ii] Complete list of Colorado's Reportable Conditions online: http://www.colorado.gov/cs/Satellite/CDPHE-DCEED/CBON/1251607755364

[iii] Adult Blood Lead Epidemiology and Surveillance (ABLES) interactive database: http://wwwn.cdc.gov/niosh-survapps/ables/default.aspx

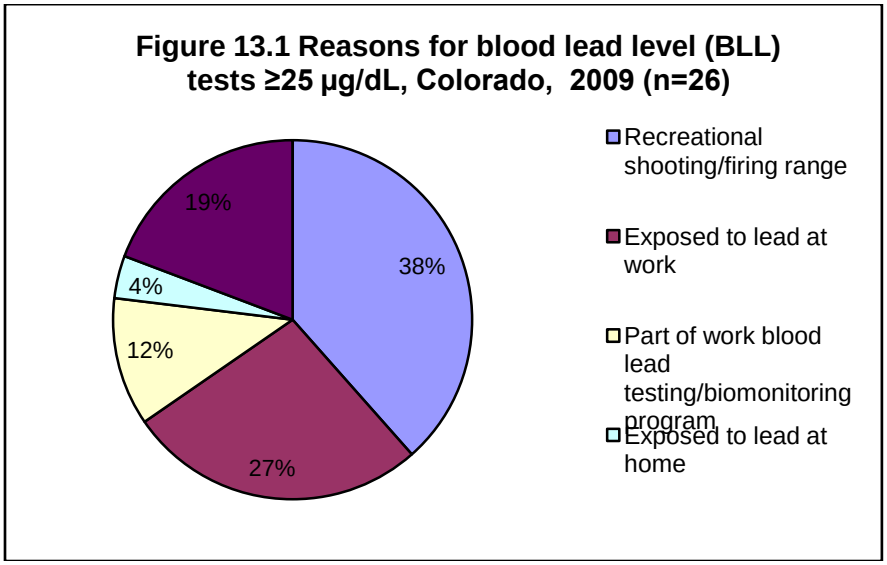
Results

Table 13.1: Elevated blood lead incidence and prevalence cases and rates per 100,000 employed, Ages 16 and over, Colorado, 2008-2011
N (Rate per 100,000 employed)

>=10	2008	2009	2010	2011	Average
Total Cases (Prevalence Rate)	65 (2.5)	78 (3.1)	69 (2.8)	81 (3.2)	73 (2.9)
Incident Cases (Incidence Rate)	62 (2.4)	67 (2.7)	60 (2.4)	53 (2.1)	61 (2.4)
>=25					
Total Cases (Prevalence Rate)	27 (1.0)	23 (0.9)	19 (0.8)	33 (1.3)	26 (1.0)
Incident Cases (Incidence Rate)	23 (0.9)	18 (0.7)	13 (0.5)	19 (0.8)	18 (0.7)
>=40					
Total Cases (Prevalence Rate)	5 (0.2)	9 (0.4)	7 (0.3)	11 (0.4)	8 (0.3)
Incident Cases (Incidence Rate)	4 (0.2)	6 (0.2)	4 (0.2)	6 (0.2)	5 (0.2)

Numerator Cases: Reports of elevated BLLs from Colorado Department of Public Health and Environment (Includes all tests reported for ages ≥16)
Denominator: Bureau of Labor Statistics (BLS) Geographic Profile of Employment and Unemployment (GP) or Current Population Survey (CPS)

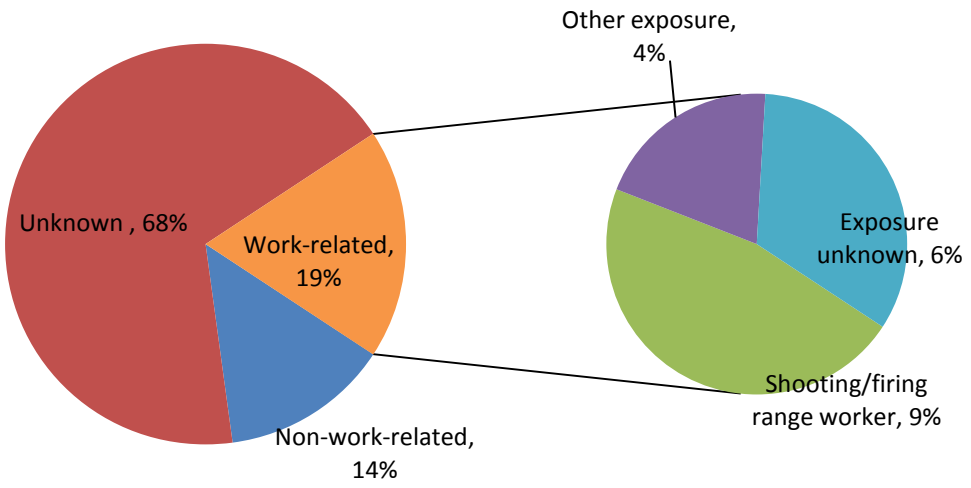
In 2009, CDPHE followed-back with treating physicians of BLL tests ≥25 µg/dL to determine the reason for the test and/or the source of exposure. The following figure demonstrates results from this effort:



Source: Reports of elevated BLLs from Colorado Department of Public Health and Environment
Note: Includes duplicate individuals who may have had more than one BLL test in the time period

A follow-back effort was also conducted in 2011 using exposure definitions of the NIOSH Adult Blood Lead Epidemiology and Surveillance (ABLES) Program. The following figure depicts these results for BLL tests ≥10 µg/dL:

Figure 13.2: Work-relatedness of lead exposure for adult blood lead level (BLL) tests ≥10 µg/dL, Colorado, 2011 (N=81)



Source: Reports of elevated BLLs from Colorado Department of Public Health and Environment
Note: Includes duplicate individuals who may have had more than one BLL test in the time period

Limitations

- There is great variation among states in the resources dedicated to adult lead surveillance, including varying state reporting requirements, outreach and education efforts, surveillance activities and lead testing by public health authorities. For this reason, it is difficult to draw conclusions in state-to-state and state-to-national comparisons. Higher rates of adult elevated BLLs in one state might be an artifact of that state having more resources for case-finding and monitoring.
- It is suspected that many workers exposed to lead do not have routine medical monitoring on the job, particularly in businesses and industries that are not covered by the OSHA lead testing standards.[iv]
- Currently, CDPHE does not have a reporting requirement for all adult blood lead testing data; only cases ≥ 10 µg/dL are reportable by the Colorado Board of Health regulation.
- Even with a reporting requirement, outreach and education are needed to ensure laboratories appropriately report adult elevated BLLs and active follow-back surveillance is required to collect essential demographic and occupational data for identified cases. These activities are time-intensive and are not currently supported with designated funds at the state level.
- An individual's lead exposure and BLL testing might be done in their state of residence or in a different state. Colorado attempts to determine state of residence for follow-up and reporting purposes.

[iv] See OSHA's lead standards for General Industry (29 CFR 1910.1025) and Construction (29 CFR 1926.62)

Accomplishments to Date

- In February, 2012, the Colorado Board of Health approved a proposal to modify the state's Reportable Conditions List. Prior to this change, laboratories were only required to report BLL tests ≥ 25 µg/dL for persons ≥ 18 years old. The approved change now requires laboratory reporting of BLL tests ≥ 10 µg/dL for this age group.
- The CDPHE Occupational Health and Safety Surveillance Program began reporting state surveillance data to the CDC/NIOSH ABLES program in March 2012. By doing so, the CDPHE is held to national standards for follow-back investigation and reporting.

Recommendations and Next Steps

- Using the CDC's Framework for Program Evaluation, evaluate the lead surveillance program to ascertain effectiveness in identifying and describing elevated adult BLLs.
- Identify businesses and industries using lead products or materials and conduct outreach to ensure workers are being tested appropriately. CDPHE's Air Pollution Control Division, which maintains the Colorado Lead Services Directory, and the OSHA Regional and Area Offices in Denver would be good partners in this work.

Indicator 14: Workers Employed in Industries with High Risk for Occupational Morbidity

Significance[i]

In 2008, the United States Bureau of Labor Statistics (BLS) reported an estimated total of 3.7 million occupational injury and illness cases within the private sector workforce. This converts to an estimated incidence rate of 3.9 occupational injury and illness cases per 100 full-time-equivalent workers. Several industries have significantly higher injury and illness rates than this national average. In 2008, 55 industries had occupational injury and illness rates at least double the national average, or ≥7.8 cases per 100 full-time workers. For tracking Occupational Health Indicators, these industries have been designated as high-risk for occupational morbidity. Examples include select types of manufacturing, commercial laundry and dry cleaning operations, nursing and residential care facilities, skiing facilities and certain courier and transportation industries. [ii]

Methods

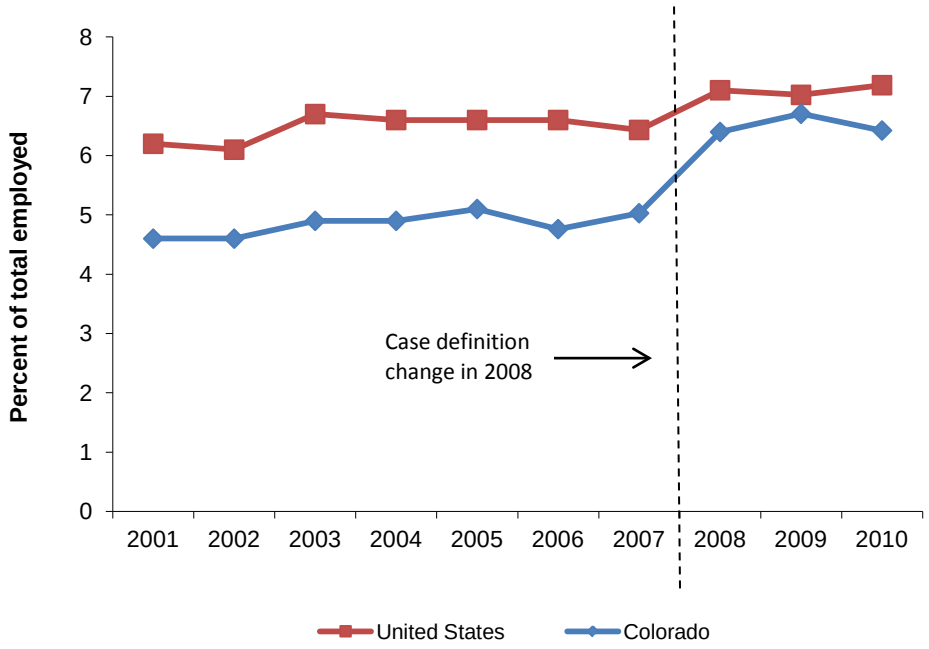
The United States Census Bureau reports the percentage of workers employed by industry in the County Business Patterns report. High-risk industries are identified based on annual injury and illness incidence rates for private sector workers. The list is updated by the Council of State and Territorial Epidemiologists (CSTE) every five years. It was most recently updated for collection of 2008-2012 data.

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

[ii] The complete list is available in the CSTE's *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.*

Results

Figure 14.1 Percent of workers employed in industries with high risk for occupational morbidity, Colorado and the United States 2001-2010*



Source: US Census Bureau County Business Patterns (CBP) (numerator and denominator)
**2008-2010 data collected according to an updated list of high-risk industries and are not comparable to prior years*

Table 14.1 Percentage of Workers Employed in Industries with High Risk for Occupational Morbidity, Colorado and the United States, 2001-2010*

Year	Colorado	United States
2001	4.6	6.2
2002	4.6	6.1
2003	4.9	6.7
2004	4.9	6.6
2005	5.1	6.6
2006	4.8	6.6
2007	5.0	6.4
Average 2001-2007	**4.8**	**6.5**
2008	6.4	7.1
2009	6.7	7.0
2010	6.4	7.2
Average 2008-2010	**6.5**	**7.1**

Source: US Census Bureau County Business Patterns (CBP) (numerator and denominator)
**2008-2010 data collected according to an updated list of high-risk industries and are not comparable to prior years*

Limitations

- Since the County Business Patterns estimates are calculated in March of each year, new employees for that year might not be included in the calculation.
- The ranking of high-risk industries might differ by region.
- Estimates are based on a probability sample of private sector employers and do 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 and Next Steps

- Using available data from the BLS, describe employment by high-risk industry regionally in Colorado to identify potential opportunities for outreach, education and prevention activities.
- Investigate methods to identify Colorado-specific high-risk industries, which may be different from high-risk industries defined with national injury/illness statistics.

Indicator 15: Workers Employed in Occupations with High Risk for Occupational Morbidity

Significance[i]

In 2008, the Bureau of Labor Statistics (BLS) reported an estimated 1.1 million injuries and illnesses that resulted in days away from work, a rate of 113.1 "days away from work" cases per 10,000 full-time-equivalent workers. The risks of these injuries and illnesses are higher in certain occupations. In 2008, 61 occupations had injury and illness rates that were at least double the national average at 226.2 cases per 10,000 full-time-equivalent workers. For tracking the Occupational Health Indicators, these industries have been designated as high-risk for occupational morbidity. Examples include police and correctional officers, nurses and other healthcare workers, housekeeping and janitorial staff, carpenters and other construction workers, bus and taxi drivers and certain types of manufacturing employees. [ii]

Methods

These data were collected from the Bureau of Labor Statistics (BLS) Current Population Survey (CPS) using the DataFerrett application, software that allows data queries for specific industry and occupation codes. (http://dataferrertt.census.gov)

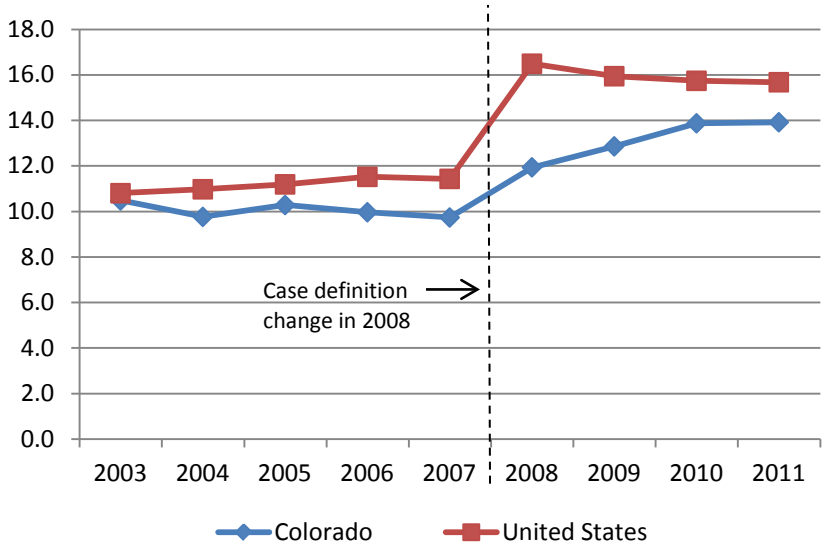
The list of high-risk occupations is updated by the Council of State and Territorial Epidemiologists (CSTE) every five years and specifies census occupation codes for employed persons age 16 or older in Colorado and the United States. This list was most recently updated for collection of 2008-2012 data.

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

[ii] The complete list is available in the CSTE's May 2011 Update to the *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.*

Results

Figure 15.1 Annual percentage of workers employed in occupations with high risk for morbidity, Colorado and the United States, 2003-2011*



Source: Bureau of Labor Statistics Current Population Survey (CPS) (numerator and denominator)
**2008-2011 data collected according to an updated list of high-risk industries and are not comparable to prior years*

Table 15.1 Percentage of Workers Employed in Occupations with High Risk for Occupational Morbidity, Colorado and US, 2003-2011*

Year	Colorado	United States
2003	10.5	10.8
2004	9.8	11.0
2005	10.3	11.2
2006	10.0	11.5
2007	9.7	11.4
Average 2001-2007	**10.0**	**11.2**
2008	11.9	16.5
2009	12.9	15.9
2010	13.9	15.7
2011	13.9	15.7
Average 2008-2011	**13.1**	**16.0**

Source: Bureau of Labor Statistics Current Population Survey (CPS) (numerator and denominator)
**2008-2011 data collected according to an updated list of high-risk industries and are not comparable to prior years*

Limitations

- The ranking of high-risk occupations may differ by region, state and/or industry.
- Estimates are based on a probability sample of private sector employers and do 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 and Next Steps

- Using available data from the BLS, describe employment by high-risk industry regionally in Colorado to identify potential opportunities for outreach, education and prevention activities.
- Investigate methods to identify Colorado-specific high-risk occupations, which may be different from high-risk occupations defined with national injury/illness statistics. This will help target occupational morbidity prevention efforts.

Indicator 16: Workers Employed in Occupations and Industries with High Risk for Occupational Mortality

Significance[i]

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 average, 14 workers die per day as a result of injuries sustained at work throughout the United States. Certain industries and occupations have an increased risk for occupational mortality. Forty industries and sixty-two occupations have fatality rates that are at least double the national average of 7.5 deaths per 100,000 workers. For tracking the Occupational Health Indicators, these industries and occupations have been designated as high-risk for occupational mortality. Example industries with higher risk for mortality include mining and extraction operations, crop and animal production, various transportation services and select manufacturing industries. Example occupations with higher risk for mortality include farmers and ranchers, fire fighters, roofers, highway maintenance workers, construction and manufacturing equipment operators, motor vehicle operators and railroad workers. [ii]

Methods

The BLS collects information on the percentage of workers employed in industries and occupations throughout the United States. The BLS Current Population Survey was used to calculate the number and percent of workers employed in high-risk industries and occupations in Colorado and the United States. The percent of workers employed in high-risk occupations are reported from 2003 to 2008 based on census occupational and industry codes for employed persons age 16 or older in Colorado and the United States. These data were collected from the BLS Current Population Survey (CPS) using the DataFerrett application, which allows data queries for specific industry and occupation codes. (http://dataferrertt.census.gov)

The list of high-risk occupations and industries is updated by the Council of State and Territorial Epidemiologists (CSTE) every five years. It was most recently updated for collection of 2008-2012 data, so earlier years of data are not directly comparable.

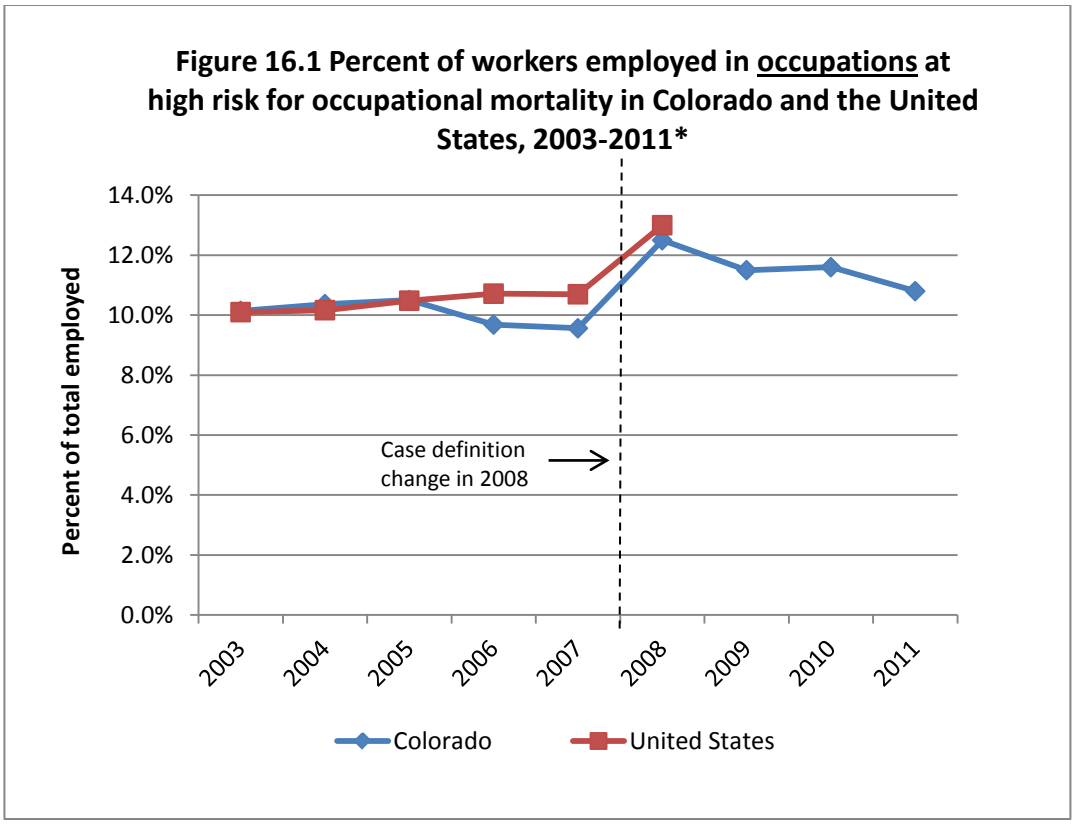
[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

[ii] The complete list is available in the CSTE publication, *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.*

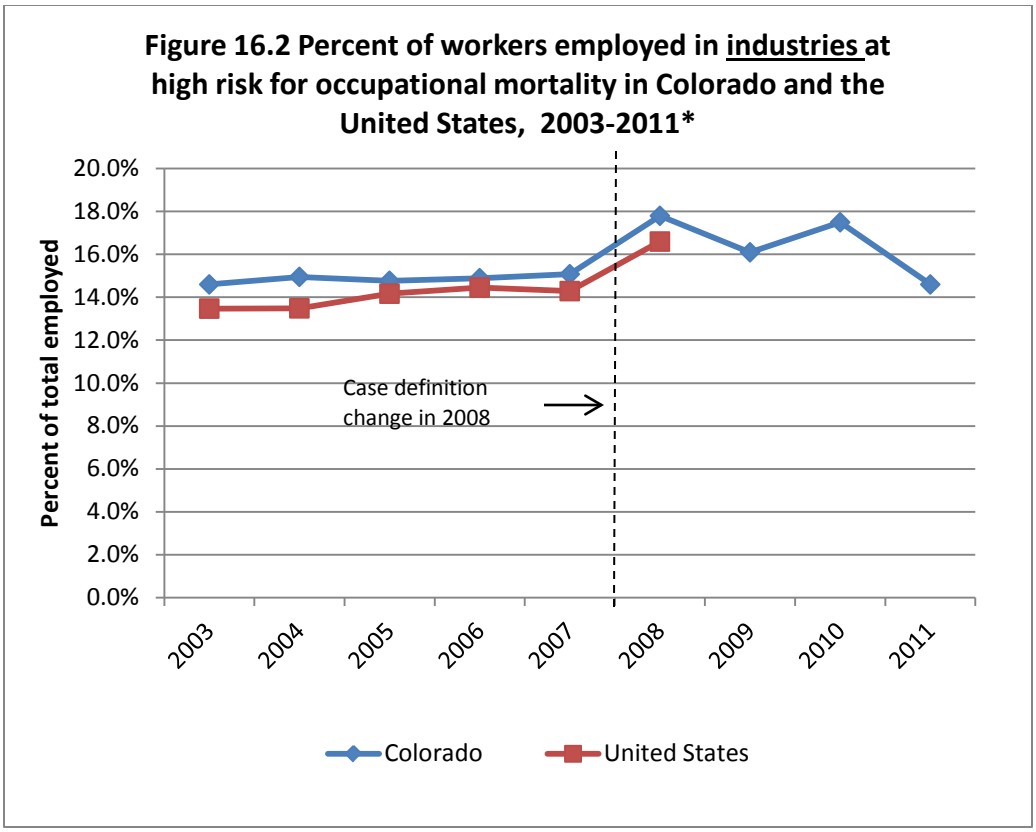
Results

Table 16.1 Workers employed in occupations and industries at high risk for occupational mortality, Colorado and United States, 2003-2011*				
Year	**% of workers employed in high risk occupations**		**% of workers employed in high risk industries**	
	Colorado	United States	Colorado	United States
2003	10.1%	10.1%	14.6%	13.5%
2004	10.4%	10.2%	15.0%	13.5%
2005	10.5%	10.5%	14.8%	14.2%
2006	9.7%	10.7%	14.9%	14.5%
2007	9.6%	10.7%	15.1%	14.3%
	Case definition change		*Case definition change*	
2008	12.5%	13.0%	17.8%	16.6%
2009	11.5%	Not Calculated	16.1%	Not Calculated
2010	11.6%	Not Calculated	17.5%	Not Calculated
2011	10.8%	Not Calculated	14.6%	Not Calculated

Source: Bureau of Labor Statistics Current Population Survey (CPS) (numerator and denominator)
**2008-2011 data collected according to an updated list of high-risk industries and are not comparable to prior years. 2011 data is preliminary.*



Source: Bureau of Labor Statistics Current Population Survey (CPS) (numerator and denominator)
**2008-2011 data collected according to an updated list of high-risk industries and are not comparable to prior years. 2011 data is preliminary.*



Source: Bureau of Labor Statistics Current Population Survey (CPS) (numerator and denominator)
**2008-2011 data collected according to an updated list of high-risk industries and are not comparable to prior years. 2011 data is preliminary.*

Limitations

- BLS CFOI data are used to identify national trends for industries and occupations at high risk for mortality. See Indicator # 3 (Work-related Fatalities) for more information about CFOI data limitations. The true ranking of high-risk occupations and industries may differ by state.

Recommendations and Next Steps

- Investigate methods to identify Colorado-specific high-risk occupations and industries, which may be different from high-risk industries and occupations defined with national injury/illness statistics. This information will help target occupational mortality prevention efforts.

Indicator 17: Occupational Health and Safety Professionals

Significance[i]

Physicians with training and/or special interest in occupational medicine provide primary, secondary and tertiary occupational health preventive services. In 1989, the American Medical Association recommended that there be one occupational health physician for every 1,000 employees. Occupational health nurses provide a great deal of onsite occupational health care. Industrial hygienists and safety professionals are typically the primary individuals responsible for evaluating workplaces and making recommendations to prevent occupational injuries and illnesses.

Occupational safety and health professionals prevent workplace injuries and illnesses through exposure/hazard identification and prevention. An adequate number of 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 Colorado 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 Bureau of Labor Statistics (BLS) Current Population Survey (CPS). The BLS CPS data on employment numbers are used to calculate rates.

Data Sources

State and United States data provided by the Council of State and Territorial Epidemiologists (CSTE), calculated using the following:

- American Board of Preventive Medicine (ABPM) diplomats database (www.abprevmed.org) (numerator)
- Annual roster of members of the American College of Occupational and Environmental Medicine (ACOEM) (www.acoem.org) (numerator)
- American Board of Occupational Health Nurses (ABOHN) Directory (www.abohn.org) (numerator)
- Annual roster of members of the American Association of Occupational Health Nurses (AAOHN) member directory (www.aaohn.org) (numerator)
- American Board of Industrial Hygiene (ABIH) (www.abih.org) (numerator)
- American Industrial Hygiene Association (AIHA) member directory (www.aiha.org) (numerator)
- Board Certified Safety Professionals (BCSP) member directory (www.bcsp.org) (numerator)
- American Association of Safety Engineers (ASSE) member directory (www.asse.org) (numerator)
- Bureau of Labor Statistics (BLS) Current Population Survey Data (CPS) (denominator)

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[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

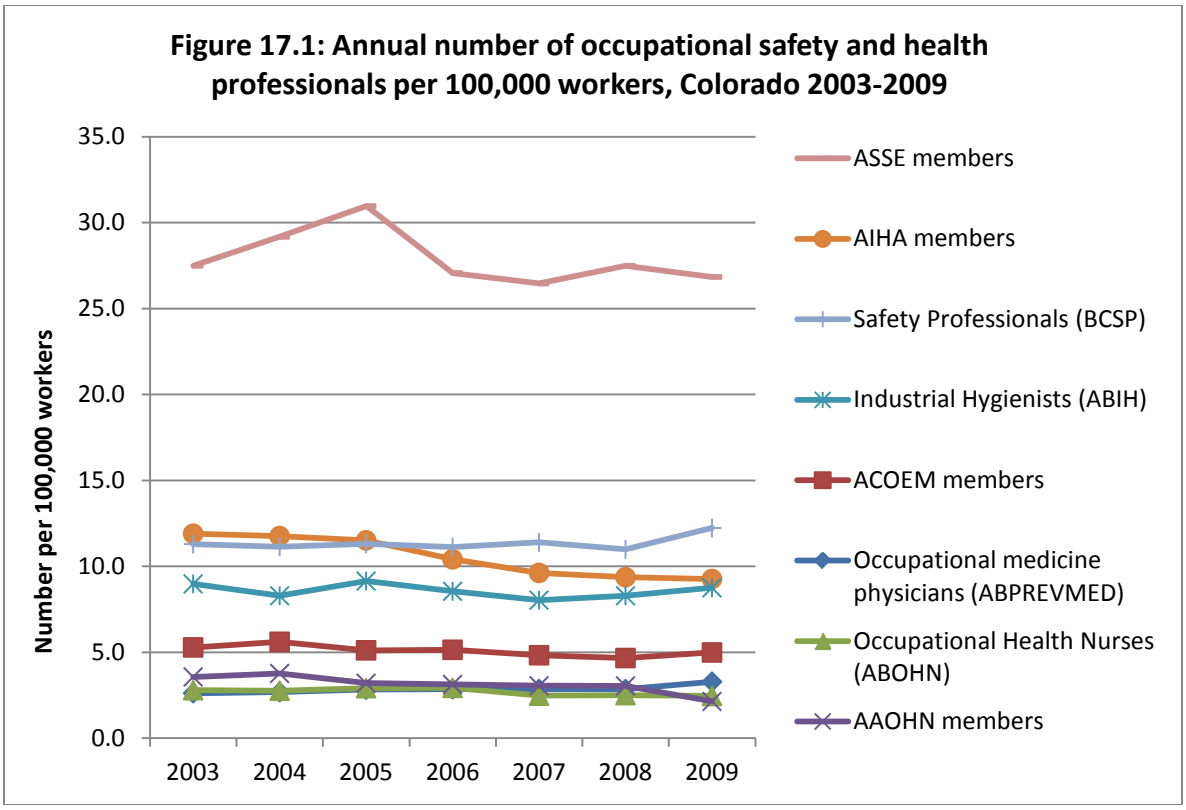
Results

Table 17.1: Occupational safety and health professionals, Colorado, 2003-2009

	Number (Rate per 100,000 employed)							
	2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**Average**
Occupational Medicine Physicians from the American Board of Preventive Medicine (ABPM)	61 (2.6)	64 (2.7)	68 (2.8)	72 (2.9)	74 (2.9)	74 (2.9)	83 (3.3)	71 (2.9)
American College of Occupational and Environmental Medicine (ACOEM) Members	123 (5.3)	134 (5.6)	123 (5.1)	130 (5.2)	125 (4.8)	121 (4.7)	126 (5.0)	126 (5.1)
Certified Occupational Health Nurses from the American Association of Occupational Health Nurses (AAOHN)	65 (2.8)	66 (2.8)	70 (2.9)	74 (3.0)	64 (2.5)	65 (2.5)	62 (2.5)	67 (2.7)
American Association of Occupational Health Nurses (AAOHN) Members	83 (3.6)	90 (3.8)	77 (3.2)	79 (3.2)	79 (3.1)	79 (3.1)	54 (2.1)	77 (3.1)
Certified Industrial Hygienists from the American Board of Industrial Hygienists (ABIH)	209 (9.0)	198 (8.3)	220 (9.2)	216 (8.6)	215 (8.1)	215 (8.3)	221 (8.7)	212 (8.6)
American Industrial Hygiene Association (AIHA) Members	277 (11.9)	281 (11.8)	277 (11.5)	263 (10.5)	243 (9.7)	243 (9.4)	234 (9.3)	261 (10.5)
Board Certified Safety Professionals from the Board of Certified Safety Professionals (BCSP)	263 (11.3)	266 (11.1)	272 (11.3)	281 (11.2)	287 (11.4)	285 (11.0)	309 (12.2)	282 (11.4)
American Association of Safety Engineers (ASSE) Members	640 (27.5)	697 (29.2)	745 (31.0)	684 (27.4)	685 (26.55)	713 (27.5)	678 (26.8)	692 (27.9)

Numerators: American Board of Preventive Medicine (ABPM), American College of Occupational and Environmental Medicine (ACOEM), American Board of Occupational Health Nurses (ABOHN), American Association of Occupational Health Nurses (AAOHN), American Board of Industrial Hygiene (ABIH), American Industrial Hygiene Association (AIHA), American Society of Safety Engineers (ASSE), Board Certified Safety Professionals (BCSP)

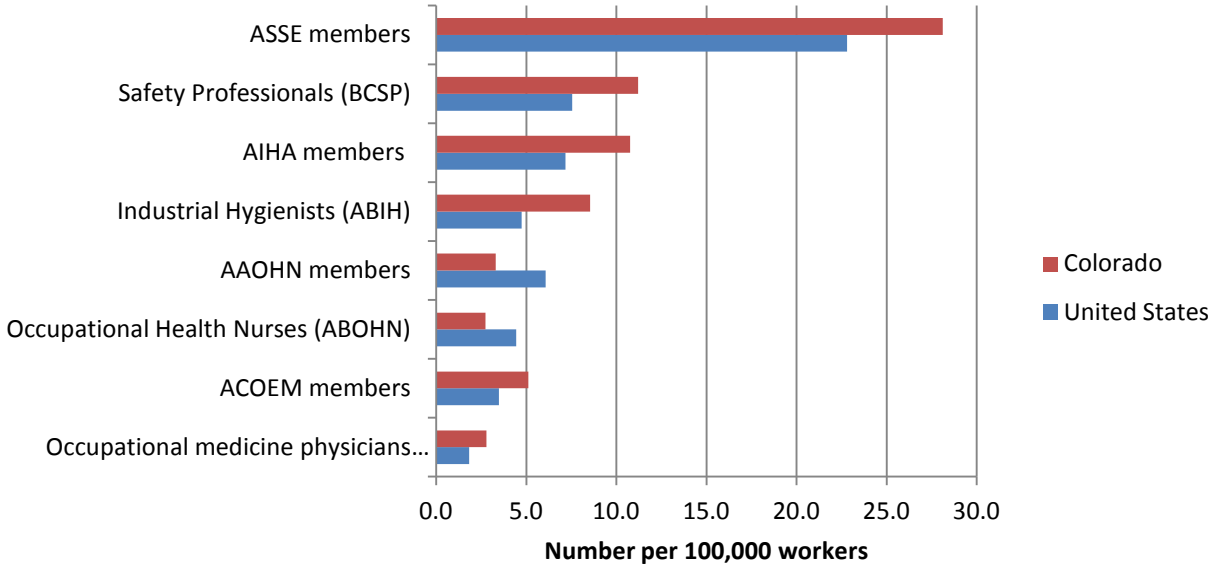
Denominator: Bureau of Labor Statistics Geographic Profile of Employment/Unemployment(GP) or Current Population Survey (CPS)



Numerators: American Board of Preventive Medicine (ABPM), American College of Occupational and Environmental Medicine (ACOEM), American Board of Occupational Health Nurses (ABOHN), American Association of Occupational Health Nurses (AAOHN), American Board of Industrial Hygiene (ABIH), American Industrial Hygiene Association (AIHA), American Society of Safety Engineers (ASSE), Board Certified Safety Professionals (BCSP)

Denominator: Bureau of Labor Statistics Geographic Profile of Employment/Unemployment(GP) or Current Population Survey (CPS)

Figure 17.2: Average annual number of occupational safety and health professionals, Colorado and United States*, 2003-2008



Numerators: American Board of Preventive Medicine (ABPM), American College of Occupational and Environmental Medicine (ACOEM), American Board of Occupational Health Nurses (ABOHN), American Association of Occupational Health Nurses (AAOHN), American Board of Industrial Hygiene (ABIH), American Industrial Hygiene Association (AIHA), American Society of Safety Engineers (ASSE), Board Certified Safety Professionals (BCSP)

Denominator: Bureau of Labor Statistics Geographic Profile of Employment/Unemployment(GP) or Current Population Survey (CPS)

**Currently, U.S. level data only available through 2008*

Limitations

- Other occupational safety and health fields are not included, such as health physics, ergonomics and occupational health psychology.
- Member lists include retired and part-time professionals and may not be mutually exclusive (i.e., members of the AIHA may also be members of ASSE). These factors may result in an overestimate of the number of active occupational health and safety professionals.

Recommendations and Next Steps

- Increase the number of students in the occupational safety and health field who are trained and employed in Colorado. The Mountain and Plains Education and Research Center (MAP ERC) at the University of Colorado, School of Public Health, is an important partner in this effort. Colorado has far less than the recommended number of occupational health physicians per employed workers.
- Explore methods to summarize the financial benefits of investing in occupational health and safety professionals to ensure a stable and healthy workforce at every level.

Indicator 18: OSHA Enforcement Activities

Significance[i]

The United States Department of Labor, Occupational Safety and Health Administration (OSHA), conducts investigations and inspections at worksites to ensure employee safety and health compliance. 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.

Colorado does not have a State-run OSHA; thus, Federal OSHA jurisdiction applies. Federal OSHA covers private sector and Federal employers and employees. It excludes self-employed, family farms or farms with 10 or fewer employees, state and local government workers and workplace hazards regulated by another Federal agency (e.g., the Mine Safety and Health Administration (MSHA)).

Methods

The Federal OSHA Denver Area Office provides Colorado OSHA inspection data based on annual reports. Included are enforcement activities in OSHA-covered establishments under OSHA jurisdiction in Colorado. Denominator data were obtained from the Bureau of Labor Statistics (BLS) Quarterly Census of Employment & Wages (QCEW), also known as Covered Employment and Wages (CEW) or the ES-202 program. Data exclude mines, farms and local and state government establishments and employees.

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

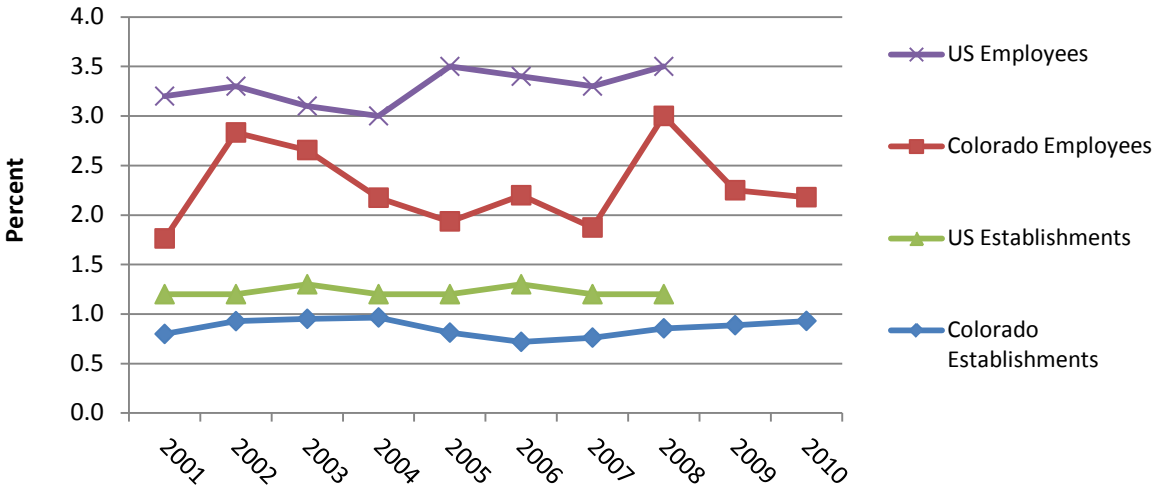
Results

Table 18.1 Establishments and employees inspected by OSHA, Colorado 2001-2011

Year	Establishments under jurisdiction	Establishments inspected	Percent of establishments inspected	Covered employees eligible for inspection	Employees inspected	Percent of employees inspected
2001	150,319	1,200	0.8	1,904,182	33,561	1.8
2002	153,099	1,420	0.9	1,846,285	52,301	2.8
2003	156,264	1,486	1.0	1,809,416	48,046	2.7
2004	159,346	1,537	1.0	1,831,325	39,811	2.2
2005	165,706	1,345	0.8	1,871,536	36,215	1.9
2006	170,744	1,227	0.7	1,915,522	42,118	2.2
2007	174,663	1,330	0.8	1,956,618	36,647	1.9
2008	174,531	1,492	0.9	1,963,490	58,904	3.0
2009	170,868	1,515	0.9	1,855,128	41,729	2.2
2010	167,356	1,556	0.9	1,830,951	39,901	2.2
2011	165,700	1,518	0.9	1,864,233	40,276	2.2
Average	164,418	1,421	0.9	1,877,153	42,683	2.3

Source: OSHA data on total inspections conducted and the number of workers covered by these inspections (numerators); BLS data on Covered Employers and Wages (denominators)

Figure 18.1 Percent of establishments and employees whose work areas were inspected by OSHA, Colorado and the United States, 2001-2010



Colorado data source: OSHA data on total inspections conducted and the number of workers covered by these inspections (numerator); Bureau of Labor Statistics (BLS) Quarterly Census of Employment & Wages (QCEW) (denominator). Includes only employees and establishments under OSHA jurisdiction in Colorado.
US data source: Council of State and Territorial Epidemiologists, Occupational Health Indicators. Currently, US data is only available through 2008.

Limitations

- Because OSHA may conduct multiple inspections of the same establishment during the calendar year, the percent of establishments inspected may be slightly overestimated. Additionally, if OSHA conducts multiple inspections of the same worksite during the year, the number of workers covered by OSHA inspections may be over counted.
- Only enforcement activities are measured. These data do not include information about education and compliance assistance activities.
- Employers participating in an OSHA Voluntary Protection Program (VPP) or the Safety and Health Achievement and Recognition Program (SHARP) are exempted from routine inspections. Excluding workers from these programs will reduce the numerator, resulting in an underestimate of the protective function.
- In the BLS QCEW data, individuals holding more than one job are counted multiple times.

Recommendations and Next Steps:

- Collaborate with OSHA's Denver Area Office to obtain data to report and track details of enforcement activities by type of establishment or event inspected or enforced.
- Identify methods to demonstrate whether increasing inspection and enforcement activities is effective at preventing work-related injuries and illnesses.

Indicator 19: Workers' Compensation Benefits

Significance[i]

Workers' compensation is an insurance program that covers work-related injuries and illnesses. Management and structure of the workers' compensation system varies by state. Benefits include lost wages, related medical expenses 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 or agricultural workers. Additionally, railroad workers, real estate agents paid on commission and certain types of truckers are also exempted. There may be other workers exempted as well.

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 in total and per covered worker in Colorado and the United States is reported.

Results

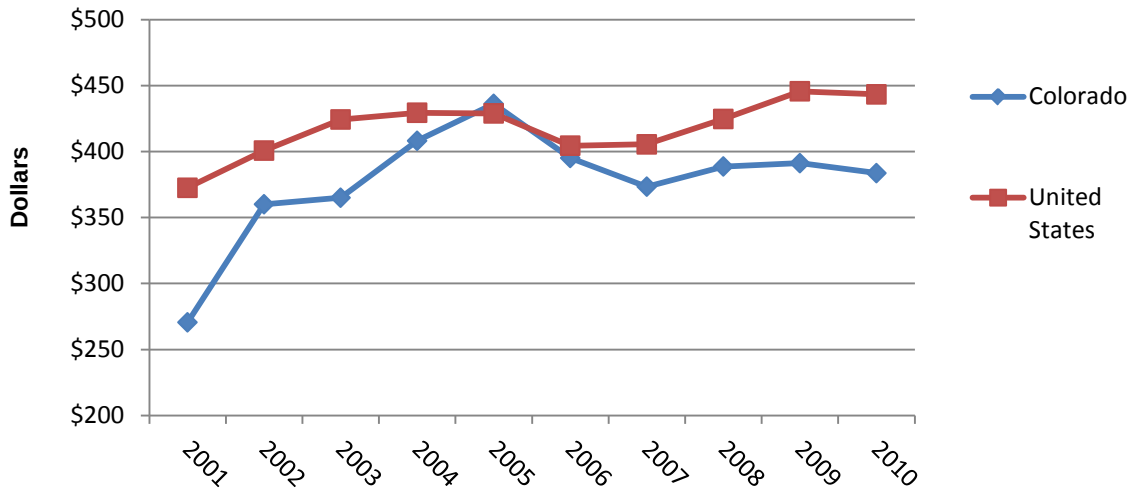
Table 19.1 Average annual workers' compensation benefits paid, Colorado and the United States, 2001-2010

Year	Total annual benefits paid		Benefit paid per covered worker	
	CO	US	CO	US
2001	$581,266,000	$46,285,207,000	$271	$373
2002	$756,658,000	$49,143,768,000	$360	$401
2003	$753,566,000	$51,745,997,000	$365	$424
2004	$853,273,000	$52,892,469,000	$408	$430
2005	$932,350,000	$53,810,800,000	$436	$429
2006	$865,585,000	$51,626,040,000	$395	$405
2007	$837,004,000	$52,319,690,000	$373	$406
2008	$873,643,000	$54,324,252,000	$389	$425
2009	$836,238,000	$54,403,728,000	$391	$446
2010	$809,707,000	$53,869,581,000	$384	$443
Average	$809,929,000	$52,042,153,200	$377	$418

Source: National Academy of Social Insurance (www.nasi.org) Workers Compensation: Benefits, Coverage and Costs (Annual Report) (numerator and denominator)

[i] [i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

Figure 19.1: Average workers compensation benefit paid per covered worker, Colorado and the Unites States, 2001-2010



Source: National Academy of Social Insurance (www.nasi.org), Annual Workers' Compensation Report

Limitations

- The number of claims filed to and admitted by workers' compensation may be underestimated because not all individuals with work-related injuries and illnesses file for workers' compensation.
- There may be a lag time in reporting claims. In Colorado, an average of 80% of claims are filed in the year the injury or illness occurs.
- 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, such as retraining and replacement worker costs, lost wages, administrative costs, etc.

Recommendations and Next Steps

- Report details of awards, including industry, occupation and cost, to employers to target prevention efforts and further describe the economic burden of occupational injuries and illnesses. The Colorado Department of Labor, Division of Workers' Compensation, recently published the first annual reports on *Workers' Compensation Costs in Colorado*.[ii]
- Describe the average and median cost-per-claim of Colorado and United States workers' compensation claims using data from the National Council on Compensation Insurance (NCCI)

[ii] Reports are available online: www.colorado.gov/cs/Satellite/CDLE-WorkComp/CDLE/1248095316069.

Indicator 20: Hospitalizations for Low Back Disorders

Significance[i]

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. In 2003, 3.2% of the total United States workforce experienced a loss in productive time due to back pain. The total cost of this productive time lost to back pain is estimated to be in excess of $19.8 billion.

Methods

The Colorado Hospital Discharge Dataset is compiled by the Colorado Hospital Association (CHA) and, through a data sharing agreement, made available to the Colorado Department of Public Health and Environment (CDPHE). The hospital discharge dataset contains records of all hospital discharges from member hospitals. In Colorado, nearly 100% of hospitals are CHA members (excluding Federal facilities). Each record in the dataset represents one hospital discharge resulting from an inpatient hospital admission.

Data were collected from all Colorado discharge data records. Work-related hospitalizations were identified by selecting records where workers' compensation insurance is the expected payer. Surgical low-back disorder hospitalizations were identified with a relevant ICD-9-CM diagnostic code in any of the first seven principle diagnosis fields in combination with a relevant ICD-9-CM surgical procedure code in any of the first four procedure fields, with certain case exclusions. Non-surgical low-back disorder hospitalizations were identified with a relevant ICD-9-CM diagnostic code in any of the first seven diagnosis fields, with certain case exclusions. See the Council of State and Territorial Epidemiologists (CSTE) Occupational Health Indicator (OHI) Guidance[1] for the complete list of ICD-9-CM codes and exclusion criteria. Only Colorado residents age 16 and older are included for analysis. Rates are calculated using employment data from the Bureau of Labor Statistics.

Note, with the exception of data for the year 2008, the CSTE has not yet provided state-based surveillance programs with low-back disorder hospitalization national probability estimates from the National Hospital Discharge Survey (NHDS); thus, national comparison data are not presented in this report.

[i] Council of State and Territorial Epidemiologists. *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.* Last updated April 2012.

Results

Table 20.1 Work related low-back disorder hospitalizations, Annual number and crude rate per 100,000 employed, Primary payer workers' compensation, Age 16 and older, Colorado 2001-2011*

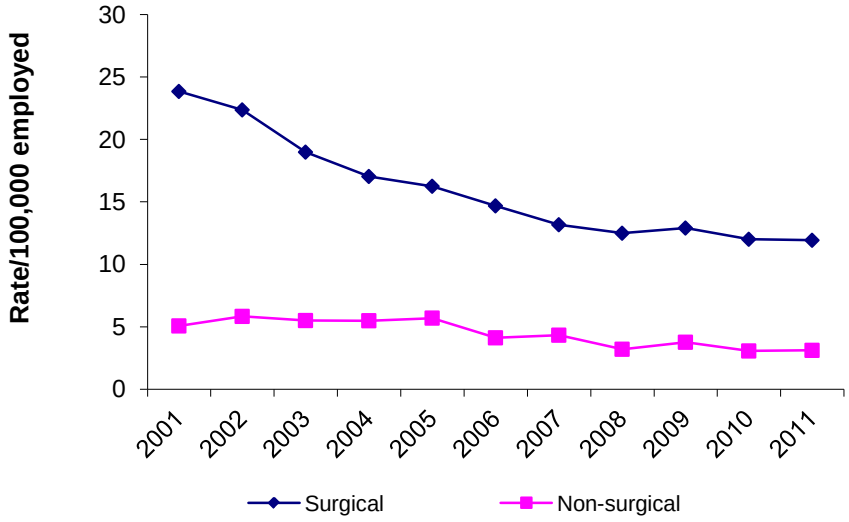
Year	Number of surgical hospitalizations	Crude rate of surgical hospitalizations	Number of non-surgical hospitalizations	Crude rate of non-surgical hospitalizations	Number of total hospitalizations	Crude rate of total hospitalizations
2001	527	23.8	112	5.1	639	28.9
2002	514	22.4	134	5.8	648	28.2
2003	442	19.0	128	5.5	570	24.5
2004	407	17.0	131	5.5	538	22.5
2005	391	16.3	137	5.7	528	21.9
2006	371	14.7	104	4.1	475	18.8
2007	341	13.2	112	4.3	453	17.5
2008	324	12.5	83	3.2	407	15.7
2009	326	12.9	95	3.8	421	16.7
2010	298	12.0	76	3.1	374	15.1
2011	299	11.9	78	3.1	377	15.0
Average	**400**	**16.5**	**110**	**4.5**	**510**	**21.3**

Numerator: Colorado Hospital Association hospital discharge data from the Colorado Department of Public Health and Environment Health Statistic Section

Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS).

**2011 rate calculations are preliminary*

Figure 20.1: Annual crude rates of work-related surgical and non-surgical low back disorder hospitalizations per 100,000 employed persons, Colorado 2001-2011



Numerator: Colorado Hospital Association hospital discharge data from the Colorado Department of Public Health and Environment Health Statistic Section
Denominator: Bureau of Labor Statistics (BLS), Geographic Profile of Employment and Unemployment (GP) and Current Population Survey (CPS)
**2011 rate calculations are preliminary*

Limitations

- The indicator utilizes only the first seven diagnosis and four procedure code fields to include and exclude cases. Many states, including Colorado, have more diagnosis and procedure code fields that could be used to include and exclude cases.
- Practice patterns and payment mechanisms might 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.
- The true burden of work-related low-back disorder hospitalizations may be under-represented if workers utilize of other payer sources (e.g., self-pay, private insurance).
- Colorado residents hospitalized in another state are not captured in these data. Additionally, self-employed individuals, such as farmers and independent contractors, Federal employees, railroad or long-shore and maritime workers, are not covered by state workers' compensation systems and are not captured in these data.
- Hospitalization discharge records are based on admissions, not persons; thus, they may include multiple admissions for a single individual or single person-injury event.
- Work-related hospitalization data analyzed using the methods in this report are not directly comparable between states due to differences in states' workers' compensation insurance programs.

Recommendations and Next Steps

- Evaluate existing hospitalization data available to the CDPHE to describe work-related low-back disorder hospitalizations in Colorado by age, gender, race/ethnicity and type of injury.[ii]
- Continue to explore opportunities to link hospitalization data with other health and employment data to obtain information on industries and occupations associated with serious injuries/illnesses. (See Indicator #2 Recommendations for more information about analyzing hospitalization data.)
- Better define other issues that may affect hospitalization patterns, such as whether there is a decrease in non-work-related low-back disorder surgeries.
- Identify data sources that estimate the rate of outpatient (non-hospitalized) cases of work-related low-back pain and disorder. A first step might be conducting an evaluation of low-back injuries documented in the workers' compensation data available to the CDPHE.

[ii] The Occupational Health and Safety Surveillance Program is currently working to publish an expanded analysis of these data.