



Council of State and Territorial Epidemiologists

Occupational Health Effect and Biologic Exposure Indicators

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Council of State and Territorial Epidemiologists

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

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This document is intended to provide guidance to states regarding the minimal level of occupational health surveillance activity. The CSTE recommends that every state should have the ability to collect and utilize data from this minimal list of indicators on a regular basis.

In 1998, the Council of State and Territorial Epidemiologists (CSTE), in association with the National Institute for Occupational Safety and Health (NIOSH), convened the NIOSH-States Occupational Health Surveillance Work Group to make recommendations to NIOSH concerning State-based surveillance activities for the coming decade. The Work Group members (see Appendix) agreed that the surveillance planning process should be outcome driven; e.g., begin with the identification of occupational injuries, illnesses and hazards to be placed under surveillance. The Work Group also identified a number of surveillance issues that cut across specific conditions and made several recommendations to NIOSH for the implementation of comprehensive State-based occupational health surveillance systems (CSTE 2001). A draft of the Work Group report contributed to the NIOSH Surveillance Strategic Plan (NIOSH 2001).

The Work Group report described draft “profiles” for priority conditions to be placed under surveillance as part of State-based surveillance systems. Since the publication of the Work Group report, public health surveillance “indicators” have been developed in several areas, including chronic disease, injury control and environmental health (CSTE 1999, STIPDA 1999, CDC 2001, CSTE 2002). These indicators are a construct of public health surveillance that define a specific measure of health or risk status (i.e., the occurrence of a health event or of factors associated with that event) among a specified population. Surveillance indicators allow a state to compare its health or risk status with that of other states and evaluate trends over time within the state, and guide priorities for prevention and intervention efforts. **Occupational health indicators** can provide information about a population’s health status with respect to workplace injuries and illnesses or to factors that can influence health. These indicators can either be measures of health (work-related disease or injury) or factors associated with health, such as workplace exposures, hazards or interventions.

This document describes the recommended set of indicators for occupational health surveillance as defined by the Work Group in 2001 through 2004. The occupational health indicators that have been developed represent the consensus view of state and NIOSH representatives, and are intended as advisory to the states. The indicators represent a core set of data that, if collected at the state level, would assist in the development of programs to prevent workplace injuries and illnesses. The indicators are a subset of the larger number of conditions that were recommended for surveillance in 2001. The indicators are intended to be used in conjunction with other guidelines for the state-based surveillance of occupational injuries and illnesses (NIOSH 1995, CSTE 2001), and to be used as a complement to overall state and national goals to improve the health of the population (CDC 2000).

Background

State health agencies, which are vested with the legal authority to require disease reporting and collect other health data, play a central role in public health surveillance. Whereas public health surveillance was once focused primarily on infectious diseases, it has expanded in recent years to include surveillance of a wide range of health outcomes and their determinants, including

chronic diseases, injuries and health behaviors (Halperin 1998). National statistics on occupational injuries and illnesses have been collected largely outside of the public health infrastructure and rely almost entirely on data reported by employers. State health agencies that have access to a wide variety of public health data systems have an important role in the surveillance of occupational diseases, injuries and hazards. State health agencies are in a unique position to:

- Provide critically needed data on occupational diseases. State health agencies can augment and complement employer-based systems to fill the information gap using a variety of existing health data sources (e.g., death certificates, hospital discharge data, physician reports).
- Generate information necessary to evaluate the conventional occupational injury data sources. Both the annual Survey of Occupational Injuries and Illnesses and the Occupational Safety and Health Administration (OSHA) Data Initiative are based on employer reports of occupational injuries and illnesses. There has been longstanding concern about the accuracy of records maintained by employers (NRC 1987). State surveillance systems – derived from multiple data sources – can be used to supplement the Bureau of Labor Statistics (BLS) data sources to better understand the true economic and human burden of occupational diseases and injury.
- Link surveillance findings with intervention efforts at the State and local levels. State agencies are in a critical position to work with employers, labor unions, health and safety professionals, and community-based organizations to develop and disseminate feasible and effective interventions that can prevent targeted workplace illnesses, injuries and fatalities.
- Integrate occupational health into mainstream public health. Building surveillance programs at the state level that are actively linked to intervention efforts provides an opportunity to integrate occupational health into mainstream public health. Collaborations with partners outside the occupational health infrastructure such as school-based programs or community health clinics may yield benefits in disseminating prevention strategies to reduce the incidence of occupational injuries and illnesses.

In a nationwide surveillance system, all states should have core capacity to conduct a minimum level of surveillance of occupational injuries and illnesses (CSTE 1995). At a minimum, this capacity should include personnel and resources to conduct surveillance of basic occupational indicators using existing data systems, and the ability to develop working relationships with federal, state and local partners in both the public and private sectors. States and their partners may also conduct more in-depth surveillance, follow-up and intervention for specific, targeted diseases, injuries and hazards.

Methods for indicator development

From 2001 through 2003, the Work Group members developed an approach for indicator selection, and then subsequently drafted and finalized the set of occupational health indicators. The following criteria were considered in selecting the indicators:

- *Availability of easily obtainable state-wide data.* The access to existing data that would be available in all states was considered to be a critical element in the development of the indicator set. The Work Group recognized that some states might have access to other sources of data for occupational health surveillance, and that additional indicators may be developed, as these data will allow. However, this document sets out a “core” or minimum set of occupational health indicators that relies on data that should be available to most states.
- *Public health importance of the occupational health effect or exposure to be measured.* This criterion was used in identifying health effect and exposure indicators. Factors considered in determining public health importance included the magnitude or extent of the effect or exposure, severity of the health effect, economic impact, emergent status of the condition, and degree of public concern.
- *Potential for workplace intervention activities.* The indicator should inform program and policy development at the state level to protect worker safety and health.

The Work Group reviewed a number of sources to guide the selection of the final indicator set. This included CSTE recommendations for the surveillance of occupational injuries and illnesses, surveillance case definitions from the published literature, and indicators developed in other public health domains (CSTE 1999, STIPDA 1999, CDC 2001, CSTE 2002).

A total of 19 indicators were selected by Work Group consensus:

- **12 Health effect** indicators (measures of injury or illness that indicate adverse effects from exposure to known or suspected occupational hazards),
- **1 Exposure** indicator (measures of markers in human tissue or fluid that identify the presence of a potentially harmful substance resulting from exposure in the workplace),
- **3 Hazard** indicators (measures of potential for worker exposure to health and safety hazards in the workplace),
- **2 Intervention** indicators (measures of intervention activities or intervention capacity to reduce workplace health and safety hazards), and
- **1 Socioeconomic impact** indicator (measure of the economic impact of work-related injuries and illnesses).

In addition, the Work Group determined that a profile of the employment demographics within a state should be developed.

The Work Group recognizes there may be other occupational health indicators that are important to individual states or local areas depending on state and local needs. In addition, the Work Group acknowledges significant limitations in the design of these indicators, both intrinsic to the nature of the indicators as well as to the data sources upon which they rely. While the indicators should be implemented in all states, some states will not have all of the data resources available to them.

The indicator pilot project and development of "how to" guides

The Work Group recognized the need to pilot the indicators to assess the feasibility of widespread implementation and to develop specific guidance on how to compute the proposed measures. In summer 2002, the five states with NIOSH Cooperative Agreements to conduct "Core Occupational Health Surveillance" (California, Massachusetts, Michigan, New York, and Washington) agreed to both pilot-test the indicators and to create user-friendly "how-to" guides so that other states could calculate the indicators. This pilot project met one of the established goals of the NIOSH Core Surveillance program: "to develop models for other states that can be used to establish a comprehensive, nationwide system of state-based occupational injury and illness surveillance."

An implementation plan was agreed upon, and the states worked on the indicators independently, communicating primarily through conference calls and e-mail. All five pilot states did each indicator; however, individual states took the lead on the various indicators, becoming the primary authors of the "how to" guides for their respective indicators. These guides and the indicator data were shared among the states. Monthly conference calls were held to discuss data issues including, for example, clarification of numerators and denominators, and inconsistencies in the data sources between the states.

Based upon the results of the pilot, the Core States and Work Group worked together to redefine the indicators and finalize the "how to" documents. For example, Indicator 8 ("Carpal Tunnel Syndrome Cases Filed with the State Workers' Compensation System") was modified from the original indicator of "Musculoskeletal Disorders Filed with the State Workers' Compensation System" because of difficulties in defining and obtaining information on all musculoskeletal disorders. Because of differences among states with regards to their data systems, particularly Workers' Compensation data, more general "how-to" guides were developed for indicators 5 and 8 ("Amputations and Carpal Tunnel Syndrome Cases Filed with the State Workers' Compensation System").

Subsequent to the initial pilot testing by the 5 "core" states, 8 additional states (Connecticut, Maine, Nebraska, New Jersey, New Mexico, North Carolina, Oregon and Wisconsin) have pilot tested the "how to guides". Feedback from these 8 additional states were incorporated into the development of the final "how to" guides.

This document is the final "how-to" guides that have been developed by the Core states for all of the 19 indicators and the employment demographics. While these guides may need to be reworked in the future based upon the changes in the content and accessibility of various data sets, they provide easy directions to states wishing to implement these indicators. Additional indicators may also be added in the future. The Core states and the Work Group are also developing a separate data document that will present the indicator data from the pilot states.

These indicators and the "how-to" guides are meant to assist states in building a capacity for occupational health surveillance. Results from the pilot project have shown that the process of generating the indicators is as useful as the data itself. All states will not be able to complete all indicators, nor will the indicators alone provide all of the information necessary for a state occupational health program. However, the process of generating the indicators will help raise awareness and build capacity for using available data, and also open dialogues among occupational health partners within the state. The indicator data itself will be most useful when

multiple years of data have been compiled and potential problems with rate instability can be minimized and trends across multiple years can be observed within each state. Comparing data across states for certain indicators may be difficult due to different limitations inherent in the data system used for that indicator. These limitations are discussed in the individual section for each indicator. The design and implementation of any public health surveillance system should be evaluated according to established criteria (MMWR 2001). Several factors should be considered in the design and evaluation of any occupational health surveillance system:

- Underreporting by employees and health care providers of occupational injuries and illnesses;
- Inadequate health care provider recognition of occupational injuries and illnesses;
- Failure by employers and/or health care providers to report cases according to applicable state laws;
- Difficulties in attributing diseases with long latency from time of exposure to disease manifestation and/or from multifactorial causes (e.g., silicosis, lung cancer);
- Possible exclusion of at-risk populations from surveillance (e.g., self-employed, military);
- Variations in coding the causes of injury, illness or death; and
- Differences in underlying populations at risk (“denominators”).

The Work Group remains committed to ensuring the ongoing viability of this project and assisting all 50 States to address the important public health issue of work-related injury and illness.

Council of State and Territorial Epidemiologists

The Council of State and Territorial Epidemiologists enhances the ability of state and other health agencies to detect, prevent, and control diseases and risks of public health significance. CSTE does this by developing and building effective relationships among state and other health agencies. As a professional organization, CSTE represents public health epidemiologists working in state and territorial health agencies. CSTE has nearly 500 members with surveillance and epidemiologic expertise in a broad range of areas including chronic disease, communicable disease, immunization, environmental health, occupational health, and injuries. The organization frequently provides technical advice and assistance to federal agencies, including the Centers for Disease Control and Prevention (CDC), on matters of state-based epidemiology. CSTE is an affiliate organization of the Association of State and Territorial Health Officials (ASTHO), the professional organization of chief public health executives in each state and territory.

Topic: DEMOGRAPHICS	
PROFILE: EMPLOYMENT DEMOGRAPHICS	
Demographic Group:	Employed persons.
Numerator:	Employed persons 16 years or older by specific demographic characteristics
Denominator:	Employed population 16 years or older for the same calendar year
Measures of Frequency:	<ol style="list-style-type: none"> 1. Percentage of civilian workforce unemployed. 2. Percentage of civilian employment self-employed. 3. Percentage of civilian employment employed part-time. 4. Percentage of civilian employment by number of hours worked (<40, 40, 41+). 5. Percentage of civilian employment by sex. 6. Percentage of civilian employment by age group (16-17, 18-64, 65+ years of age). 7. Percentage of civilian employment by race (White, Black, Other). 8. Percentage of civilian employment by Hispanic origin. 9. Percentage of civilian employment by industry. 10. Percentage of civilian employment by occupation.
Time Period:	Calendar year
Significance and Background:	There are an estimated 133 million civil, non-institutional workers in the United States of which 46% are female, 16% are of a racial minority, and 10% are of Hispanic origin. In addition, 17% of these are part-time workers. The makeup of the workforce differs between States and may be important in understanding the occupational health status between and within a state.
Rationale:	Work-related injuries and illnesses are preventable, and control of occupational hazards is the most effective means of prevention. Research has shown relationships between demographic characteristics of workers and the risk of occupational injury or illness. Understanding the basic characteristics of a State's workforce will help State health departments assess possible occupational health risks for their State.
Limitations of Indicator:	These indicators are not direct measures of occupational risk for a State's workforce or for individual workers.
Data Resources:	<p>BLS Geographic Profiles of Employment and Unemployment (http://www.bls.gov/opub/gp/laugp.htm) (numerator for all measures of frequency, except age).</p> <p>BLS Geographic Profiles of Employment and Unemployment (denominator, except age).</p> <p>Current Population Survey (CPS) micro-data (http://ferret.bls.census.gov/cgi-bin/ferret) for age.</p>
Limitations of Data Resources:	The Geographic Profiles data are based on the Current Population Survey (CPS), which is a monthly probability sample of households across the United States. Geographic Profiles excludes workers less than 16 years of age, active-duty members of the military, and inmates in institutions. These data may underestimate the percentage of certain racial or ethnic worker populations that do not have permanent residences, or are migratory in nature. Additional information is available at http://www.bls.gov/opub/gp/laugp.htm .
HP2010 Objectives:	None
CSTE Positions:	None
Other Available Data:	Data are available to report cross tabulations of many of these demographic indicators, including tabulations by major industry or occupation divisions on the Geographic Profiles website. Information on age distributions by age, educational, unionization, and income are available from the CPS micro-data, which States may be able to utilize (http://ferret.bls.census.gov/cgi-bin/ferret).
Recommendations:	States could report the available cross tabulations of demographic indicators provided within the Geographic Profiles reports.

HOW-TO GUIDE:

PROFILE OF EMPLOYMENT DEMOGRAPHICS

P1. Percentage of civilian workforce unemployed

To obtain the percentage:

- Go to Current Population Statistics: <http://www.bls.gov/opub/gp/laugp.htm>.
- For data prior to 2002, click on the appropriate year of ‘Geographic Profile of Employment and Unemployment’.
- Locate Table 12 – “Employment status of the civilian noninstitutional population by sex, age, race, and Hispanic origin”
- Scroll down to your state.
- Within the Total row, the seventh column of data is the percentage of the civilian labor force that is unemployed.

P2. Percentage of civilian employment self-employed

a) To obtain the number of self-employed workers:

- Go to “Geographic Profile of Employment and Unemployment” as described in P1a.
- Go to Table 18 – “Employed persons by class of worker, annual averages”
- Scroll down to your state.
- Add the fourth column of data (“Agricultural Industries Self-employed”) and the last column of data (“Nonagricultural Industries Self-employed”). Multiply this result by 1,000.

b) To obtain the total employed civilians 16 years or older:

- Go to Table 12 in “Geographic Profile of Employment and Unemployment” and find your state.
- Within the Total row, the fourth column of data is the number of employed in thousands. Multiply the listed number by 1,000.

c) To calculate the percentage:

- Divide the number of self-employed persons (P2a) by the number of employed persons (P2b).
- Multiply the result by 100 to get the **“Percentage of civilian employment self-employed”**.

P3. Percentage of civilian employment in part-time jobs

a) To obtain the number of workers in part-time jobs:

- Go to “Geographic Profile of Employment and Unemployment” as described in P1a.
- Go to Table 13 – “Employed and unemployed persons by full- and part-time status, sex, age, race and Hispanic origin, annual averages”
- Scroll down to your state.
- The sixth data column is the number of part-time workers in thousands. Multiply the listed number by 1,000.

b) To obtain the total employed civilians 16 years or older:

- Use P2b.

c) To calculate the percentage:

- Divide the number of part-time workers (P3a) by the total number employed (P3b).
- Multiply the result by 100 to get the **“Percentage of civilian employment in part-time jobs”**.

P4. Percentage of civilian employment by number of hours worked

a) To obtain the number of employed persons by hours worked:

- Go to “Geographic Profile of Employment and Unemployment” as described in P1a.
- Go to Table 19 – “Persons at work by sex, age, race, and Hispanic origin, annual averages”
- Make sure you are on the first page of Table 19. The heading in the first column (under “Population group and State”) should be “TOTAL”.
- Scroll down to your state.
 - i) 0 to 39 hours worked:
 - 0 hours worked. These are individuals who worked 0 hours during the week of the survey (e.g., due to vacation, sick leave). To obtain the number of employees working 0 hours, multiply the number listed under “Total at work” (first data column) by 1,000, then subtract this from the total employed civilians 16 years or older (P2b).
 - 1-14 hours worked. The second data column is the number of employees working 1-14 hours in thousands. Multiply the listed number by 1,000.
 - 15-29 hours worked. Data are located in the third data column. Multiply the listed number by 1,000.
 - 30-34 hours worked. Data are located in the fourth data column. Multiply the listed number by 1,000.
 - 35-39 hours worked. Data are located in the sixth data column. Multiply the listed number by 1,000.
 - Sum the above together.
 - ii) 40 hours worked:
 - Data are located in the seventh data column. Multiply the listed number by 1,000.
 - iii) 41+ hours worked:
 - 41-48 hours worked. Data are located in the eighth data column. Multiply the listed number by 1,000.
 - 49 hours and over worked. Data are located in the ninth data column. Multiply the listed number by 1,000.
 - Sum the above together.

b) To obtain the total employed civilians 16 years or older:

- Use P2b.

c) To calculate the percentages:

- Divide each of the subcategories by P4b.
- Multiply the result by 100 to get the **“Percentage of civilian employment by number of hours worked”**.

P5. Percentage of civilian employment by sex

- a) To obtain the number of employed males and females:
- Go to “Geographic Profile of Employment and Unemployment” as described in P1a.
 - Using Table 12, find your state.
 - Under ‘Total’, the second row lists data for ‘Men’; the third row lists data for ‘Women’.
 - The fourth column of data is the number of employed. For each sex, multiply the listed number by 1,000.
- b) To obtain the total employed civilians 16 years or older:
- Use P2b.
- c) To calculate the percentages:
- Males. Divide the number of males employed by the total number employed (P5b). Multiply the result by 100.
 - Females. Divide the number of females employed by the total number employed (P5b). Multiply the result by 100.

P6. Percentage of civilian employment by age group (16-17, 18-64, 65+ years of age)

- a) To obtain the number of employed persons by age group:
- Go to <http://ferret.bls.census.gov/cgi-bin/ferret> to download the install file for the latest application version of DataFerrett.
 - Once the download is complete, double click on the file and follow the on screen instructions to install DataFerrett to your machine. (For tutorials and other information for this new version of DataFerrett please go here: <http://dataferrett.census.gov>)
 - Open the Ferrett application from the desktop icon.
 - Register as user by placing your e-mail address into the box and press continue.
 - Select the Microdata tab on the top of the page which will display available dataset; select the “Current Population Survey(CPS)– Basic” – then select one month from the year of interest by double-clicking on the month and year.
 - From the next screen select the following datasets from CPS: “Demographic Variables”, “Labor Force Variables”, “Industry and Occupation Variables”, and “Geography Variables”, and then select GO.
 - On the next screen all of the available variables for the selected tables will be displayed. Using the mouse and control key, please select the following variables and value ranges:
 - “Demographic – age.....{PRTAGE}[11227]” – double click to browse/select variables and values. Check the “SELECT BOX” on next pop-up screen to define value range from 16-90, then click on ‘OK’. Click on ‘OK’ to confirm and to add the variable to your data shopping basket.
 - “Geography-State FIPS Code.....{GESTFIPS}[11511]” – double click to browse/select variables and values. Check the ‘SELECT BOX’ on next pop-up screen, click ‘DESELECT ALL VARIABLES’, then select your State code, then click on ‘OK’. Click on ‘OK’ to confirm and to add the variable to your data shopping basket.

- “Labor Force-employment status.....{PEMLR}[11287]” – double click to browse/select variables and values. Check the ‘SELECT BOX’ on next pop-up screen, click ‘DESELECT ALL VARIABLES’ and then select ‘EMPLOYED AT WORK’ and ‘EMPLOYED ABSENT’. Click on ‘OK’ to confirm and to add the variable to your data shopping basket.
- Click on third tab on home page for ‘STEP 3: DOWNLOAD/MAKE TABLE’.
- Select ‘MAKE A TABLE’ from the table icon – you will see an empty spreadsheet on the left side of your screen and a box on the right with the variables in the shopping basket.
- Using your mouse, pull the variable titled Demographics-Age (PRTAGE) from the right side to the top left corner of the empty spreadsheet and click on ‘GO’ on the toolbar.
- In a few seconds the table will be populated with a total employment number for all of the single years of age between 16 and 90.
- Verify all the selections requested for the query. This is provided in simple SAS code on the bottom left side of your screen. Verify that you have selected your state, age between 16 and 90, and “PEMLR=1” and “PEMLR=2” are selected.
- Use the copy function from the edit menu to copy the spreadsheet and paste (CNTL V) in to Excel.
- Return to the Home Page with the tabs and select Microdata – now select a new month and year.
- From the next screen select the following datasets from CPS: “Demographic Variables”, “Labor Force Variables”, and “Geography Variables”, and then select GO.
- Select the ‘STEP 3: DOWNLOAD/MAKE TABLE’ tab, repeat the process for generating a table, paste the new result in the next column of the Excel spreadsheet.

Repeat the process for all 12 months.

- The data represent the sum of each of the 12 monthly estimates for each single year of age. Divide the value listed for each age by 12. This will yield the average annual number of employed persons for each age.
 - 16 to 17 year olds
 - Using Excel, sum the average annual number of employed persons corresponding to 16-17 year olds.
 - 18 to 64 year olds
 - Follow the process above (i) for ages 18-64. (Note that if you simply highlight the values associated with the 18-64 group, Excel should illustrate the sum at the bottom of the screen.)
 - 65+ year olds
 - Follow the process above (i) for ages 65 to 90 (equivalent to 65 and older). (Again, summation can be done by Excel by simply highlighting the appropriate values.)
- b) To obtain the total employed civilians 16 years or older:
 - Sum the average annual number of employed for each of the three age groups.

c) To calculate the percentage:

- 16 to 17 year olds. Divide the number of 16 to 17 year olds by the total employment (P6b). Multiply the result by 100.
- 18 to 64 year olds. Divide the number of 18 to 64 year olds by the total employment (P6b). Multiply the result by 100.
- 65+ year olds. Divide the number of 65+ year olds by the total employment (P6b). Multiply the result by 100.

P7. Percentage of civilian employment by race

a) To obtain the number of employed by race:

- Go to “Geographic Profile of Employment and Unemployment” as described in P1a.
- Using Table 12, find your state.
 - i) White.
 - The fifth row indicates data for Whites. The fourth column of data is the number of employed in thousands. Multiply the listed number by 1,000.
 - ii) Black.
 - The ninth row indicates data for Blacks. The fourth column of data is the number of employed in thousands. Multiply the listed number by 1,000.
 - iii) Other.
 - Sum the number of Whites (P7ai) and the number of Blacks (P7aii). Subtract this number from the “Total employed civilians 16 years or older” (P2b).

b) To obtain the total employed civilians 16 years or older:

- Use P2b.

c) To calculate the percentage:

- White. Divide the number of Whites employed (P7ai) by the total number employed (P7b). Multiply the result by 100.
- Black. Divide the number of Blacks employed (P7aii) by the total number employed (P7b). Multiply the result by 100.
- Other. Divide the number of Other races employed (P7aiii) by the total number employed (P7b). Multiply the result by 100.

P8. Percentage of civilian employment by Hispanic origin

a) To obtain the number of Hispanic origin employed:

- Go to “Geographic Profile of Employment and Unemployment” as described in P1a.
- Using Table 12, find your state.
- The twelfth row indicates data for Hispanic origin.
- The fourth column of data is the number of employed in thousands. Multiply the listed number by 1,000.

b) To obtain the total employed civilians 16 years or older:

- Use P2b.

c) To calculate the percentage:

- Divide the number of Hispanic origin (P8a) employed by the total employment (P8b). Multiply the result by 100.

P9. Percentage of civilian employment by industry

- Go to “Geographic Profile of Employment and Unemployment” as described in P1a.
- Go to Table 17 – “Percent distribution of employed persons by sex, race, Hispanic origin, and industry, annual averages”
- Make sure you are on the first page of Table 17. The heading in the first column (under “Population group and State”) should be “TOTAL”.
- Scroll down to your state.
- Find the percent of the total employed in the appropriate columns for each of the following categories: Construction, Manufacturing – Durable goods, Manufacturing – Non-durable goods, Transportation/communications/public utilities, Trade, Finance/insurance/real estate, Services, Government, and Agriculture.

P10. Percentage of civilian employment by occupation

- Go to “Geographic Profile of Employment and Unemployment” as described in P1a.
- Go to Table 15 – “Percent distribution of employed persons by sex, race, Hispanic origin, and occupation, annual averages”
- Make sure you are on the first page of Table 15. The heading in the first column (under “Population group and State”) should be “TOTAL”.
- Scroll down to your state.
- Find the percent of the total employed in the appropriate columns for each of the following categories: Executive/administrative/managerial, Professional specialty, Technicians and related support, Sales, Administrative support including clerical, Service occupations, Precision production/craft/repair, Machine operators/assemblers/inspectors, Transportation/material moving, Handlers/equipment cleaners/helpers/laborers, and Farming/forestry/fishing.

Topic: OCCUPATIONAL INJURIES AND ILLNESSES COMBINED	
INDICATOR #1: NON-FATAL WORK RELATED INJURIES AND ILLNESSES REPORTED BY EMPLOYERS	
Demographic Group:	Employed persons in the private sector
Numerator:	Estimated cases of work-related injuries and illnesses Estimated cases of injuries and illnesses involving days away from work Estimated cases of injuries and illnesses involving more than 10 days away from work
Denominator:	Estimated total full-time equivalents (FTEs) worked for the same calendar year
Measures of Frequency:	Estimated annual total number of work-related injuries and illnesses (numerator) Estimated annual total work-related injury and illness incidence rate per 100,000 FTEs Estimated annual total number of cases involving days away from work (numerator) Estimated annual total incidence rate for cases involving days away from work per 100,000 FTEs Estimated annual total number of cases involving more than 10 days away from work (numerator)
Time Period:	Calendar year
Significance and Background:	In 1999, the U.S. Bureau of Labor Statistics (BLS) reported an estimated total of 5.7 million injury and illness cases within the private sector workforce, an estimated incidence rate of 6.3 cases per 100 full-time-equivalent workers. This included a total of 1.7 million injury and illness cases (1.9 cases per 100 FTE workers) requiring recuperation away from work beyond the day of the incident.
Rationale:	Work-related injuries and illnesses are preventable, and control of occupational hazards is the most effective means of prevention. Estimating the burden and tracking these injuries can help target prevention programs and activities. Information on reported cases can be used to identify contributory factors and to develop improved or new prevention strategies or regulations to protect workers.
Limitations of Indicator:	Employers are required to record events that result in death, loss of consciousness, days away from work, restricted work, or medical treatment beyond first aid. They are only required to report the detailed case characteristics (e.g. nature, body part, event) when the injury or illness results in at least one day away from work. Employers do not always record all relevant events. Also, employers are often unaware of work-related conditions for which employees have obtained medical care from their personal health care providers, and conditions that have long latencies and are diagnosed long after an employee leaves their employment. With respect to injuries/illnesses involving days away from work, employers vary in their use of restricted work activity to reduce lost workdays among their employees with work-related conditions, thereby avoiding cases with days away from work.
Data Resources:	Annual BLS Survey of Occupational Injuries and Illnesses (SOII)
Limitations of Data Resources:	The SOII is a function of BLS using a probability sample and not a census of all employers. It is based on injury and illness data maintained by employers and is subject to sampling error. There is a potential for additional sampling error if an employer has more than 30 cases with days away from work as an employer is only required to report on 30 such cases. Excluded from the survey are the military, self-employed individuals, farms with fewer than 11 employees, and Federal agencies. In some states, the survey does not cover the state and municipal employees. Therefore, the recommended measures of frequency are limited to private sector workforce only. Some states do not participate in the Federal-State survey, and in some participating states, the sample sizes are insufficient to generate State-specific estimates. Numbers and rates may not be published/released by BLS due to the reliability of the estimates. Employers vary with respect to how much they may reduce their potential reporting burden by placing affected workers on restricted work activity, thereby avoiding the reporting of lost workday cases (which require reporting of additional details). In addition, the SOII only collects data for the incident year, and does not capture lost work-time that may carry over to a new calendar year. For example, a debilitating injury that occurs on the last day of the calendar year will have no lost work-time associated with it in the SOII.
HP2010 Objectives:	None
CSTE Positions:	None

Other Available Data:	Industry, occupation, age, gender, race/ethnicity, nature of injury, body part, type of event and source of injury, length of service. Public sector should be looked at, if available.(Details are available only for injuries/illnesses involving days away from work.)
Recommendations:	SOII has many data elements that can be used to better define patterns of work-related injuries and illnesses in the state. These include, for example, industry-specific counts and rates, and, for cases involving days away from work, counts (not rates) of illnesses and injuries by occupation, length of service, age, gender, race/ethnicity and sources of injury.

HOW-TO GUIDE – INDICATOR #1:

NON-FATAL WORK RELATED INJURIES AND ILLNESSES REPORTED BY EMPLOYERS

Two methods to obtain the data are offered - both methods will yield the same numbers. The first method uses the Bureau of Labor Statistics (BLS) website to access the data. The second method uses a CD-ROM, provided by BLS, to access the data. Because the BLS CD-ROM is needed for some of the other indicators, states may elect to use the CD-ROM for this indicator as well. The CD-ROMS can be obtained annually from state SOII programs or BLS regional offices. Contact information is provided at <http://www.bls.gov/iif/home.htm>

1.1 Estimated Annual Total Number of Work-Related Injuries and Illnesses

Method 1:

- Go to the BLS web site: <http://www.bls.gov/iif/home.htm#tables>.
- Scroll down to “Regional Resources” on the right side of the page.
- Select your state and click ‘Go’.
- Select “Case counts” under SOII for the specific year data is needed.
- From resulting table, read across ‘Private Industry’ row and major column ‘Injuries and Illnesses’ and sub-column ‘Total cases’.
- Multiply the value of this cell by 1,000 to get the ‘**Estimated annual total number of work-related injuries and illnesses**’.

Method 2:

- Use OSH Profile CD-ROM (CD-ROM is available from BLS).
- Install the profile onto your computer following the instructions that come with the CD-ROM. Queries for specific states will necessitate the use of Disk 1 or Disk 2 depending upon region.
- Insert the CD-ROM and double-click on your desktop shortcut ‘OSH_Profiles’. Double-click on ‘OSH_Profiles’ again. Click on ‘Enable Macros’. You will see a spreadsheet that says ‘Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses Profiles System’ with a blue background.
- Double-click on ‘Click here!!!’. Click on ‘CDs’ button and select the drive for your CD-ROM. Then click ‘OK’. Click ‘OK’ again.
- Select ‘Annual Survey Summary Tables’ from ‘Publication Type’.
- Select State and Year.
- Click on ‘Create Profiles/Tables’.
- Select Table 7 - ‘Counts of injuries and illnesses’. Click ‘OK’.
- Click ‘Close’, then ‘Yes’, and then ‘OK’.
- From resulting table, read ‘Private Industry’ row and major column ‘Injuries and Illnesses’ and sub-column ‘Total Cases’.
- Multiply the value of this cell by 1,000 to get the ‘**Estimated annual total number of work-related injuries and illnesses**’ for your state.
- Click on the ‘X’ sign on the top of the right hand side of the spreadsheet to close it. Click ‘NO’.

1.2 Estimated Annual Total Work-Related Injury and Illness Incidence Rate per 100,000 FTEs

Method 1:

- Go to the BLS web site: <http://www.bls.gov/iif/home.htm#tables>.
- Scroll down to “Regional Resources” on the right hand side of the page.
- Select your state and click ‘Go’.
- Select ‘Incidence Rates’ under SOII for the specific year data is needed.
- From resulting table, read across ‘Private Industry’ row and major column ‘Injuries and Illnesses’ and sub-column ‘Total Cases’ (rate is provided per 100 FTEs).
- Multiply the value of this cell by 1,000 to get the **‘Estimated annual total work-related injury and illness incidence rate per 100,000 FTEs’**.

Method 2:

- Use OSH Profile CD-ROM (CD-ROM is available from BLS). Insert the CD-ROM and double-click on your desktop shortcut ‘OSH_Profiles’. Double-click on ‘OSH_Profiles’ again. Click on ‘Enable Macros’. You will see a spreadsheet that says ‘Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses Profiles System’ with a blue background.
- Double-click on ‘Click here!!!’. Click on ‘CDs’ button and select the drive for your CD-ROM. Then click ‘OK’. Click ‘OK’ again.
- Select ‘Annual Survey Summary Tables’ from ‘Publication Type’.
- Select State and Year.
- Click on ‘Create Profiles/Tables’.
- Select Table 6 - ‘Incidence rate of injuries and illnesses by industry’. Click ‘OK’.
- Click ‘Close’, then ‘Yes’, and then ‘OK’.
- From resulting table, read ‘Private Industry’ row and major column ‘Injuries and Illnesses’ with sub-column ‘Total cases’.
- Multiply the value of this cell by 1,000 to get the **‘Estimated annual total work-related injury and illness incidence rate per 100,000 FTEs’**.
- Click on the ‘X’ sign on the top of the right hand side of the spreadsheet to close it. Click ‘NO’.

1.3 Estimated Annual Total Number of Cases Involving Days Away from Work

Method 1:

- Go to the BLS web site: <http://www.bls.gov/iif/home.htm#tables>.
- Scroll down to “Regional Resources” on the right hand side of the page.
- Select your state and click ‘Go’.
- Select “Case counts” under SOII for the specific year data is needed.
- From resulting table, read across ‘Private Industry’ row and major column ‘Injuries and Illnesses’ and sub-column ‘Lost workday cases’ with another sub-column ‘With days away from work’.
- Multiply the value of this cell by 1,000 to get the **‘Estimated annual total number of cases involving days away from work’**.

Method 2:

- Use OSH Profile CD-ROM (CD-ROM is available from BLS). Insert the CD-ROM and double-click on your desktop shortcut 'OSH_Profiles'. Double-click on 'OSH_Profiles' again. Click on 'Enable Macros'. You will see a spreadsheet that says 'Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses Profiles System' with a blue background.
- Double-click on 'Click here!!!'. Click on 'CDs' button and select the drive for your CD-ROM. Then click 'OK'. Click 'OK' again.
- Select 'Annual Survey Summary Tables' from 'Publication Type'.
- Select State and Year.
- Click on 'Create Profiles/Tables'.
- Select Table 7 - 'Counts of injuries and illnesses by industry'. Click 'OK'.
- Click 'Close', then 'Yes', and then 'OK'.
- From resulting table, read 'Private Industry' row and major column 'Injuries and Illnesses' with sub-column of 'Lost workday cases' with another sub column 'With days away from work'.
- Multiply the value of this cell by 1,000 to get the **'Estimated annual total number of cases involving days away from work'**.
- Click on the 'X' sign on the top of the right hand side of the spreadsheet to close it. Click 'NO'.

1.4 Estimated Annual Total Incidence Rate for Cases Involving Days Away from Work per 100,000 FTEs

Method 1:

- Go to the BLS web site: <http://www.bls.gov/iif/home.htm#tables>.
- Scroll down to "Regional Resources" on the right hand side of the page
- Select your state and click 'Go'.
- Select 'Incidence Rates' under SOII for the specific year data is needed.
- From resulting table, read across 'Private Industry' row and major column 'Injuries and Illnesses' and sub-column 'Lost work day cases' and another sub-column 'With days away from work'.
- Multiply the value of this cell by 1,000 to get the **'Estimated annual total incidence rate for cases involving days away from work per 100,000 FTEs'**.

Method 2:

- Use OSH Profile CD-ROM (CD-ROM is available from BLS). Insert the CD-ROM and double-click on your desktop shortcut 'OSH_Profiles'. Double-click on 'OSH_Profiles' again. Click on 'Enable Macros'. You will see a spreadsheet that says 'Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses Profiles System' with a blue background.
- Double-click on 'Click here!!!'. Click on 'CDs' button and select the drive for your CD-ROM. Then click 'OK'. Click 'OK' again.
- Select 'Annual Survey Summary Tables' from 'Publication Type'.
- Select State and Year.
- Click on 'Create Profiles/Tables'.

- Select Table 6 - 'Incidence rate of injuries and illnesses by industry'. Click 'OK'
- Click 'Close', then 'Yes', and then 'OK'.
- From resulting table, read 'Private Industry' row and major column 'Injuries and Illnesses' and sub-column 'With days away from work' under sub-column 'Lost workday cases'.
- Multiply the value of this cell by 1,000 to get the '**Estimated annual total incidence rate for cases involving days away from work per 100,000 FTEs**'.
- Click on the 'X' sign on the top of the right hand side of the spreadsheet to close it. Click 'NO'.

1.5 Estimated Annual Total Number of Cases Involving more than 10 Days Away from Work

- Use OSH Profile CD-ROM (CD-ROM is available from BLS). Insert the CD-ROM and double-click on your desktop shortcut 'OSH_Profiles'. Double-click on 'OSH_Profiles' again. Click on 'Enable Macros'. You will see a spreadsheet that says 'Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses Profiles System' with a blue background.
- Double-click on 'Click here!!!'. Click on 'CDs' button and select the drive for your CD-ROM. Then click 'OK'. Click 'OK' again.
- Select 'Case and Demo Bulletin Tables' from 'Publication Type'.
- Select State and Year.
- Click on 'Create Profiles/Tables'.
- Select Table 18 - 'Industry by DAFW'. Click 'OK'
- Click 'Close', then 'Yes', and then 'OK'.
- From resulting table, read 'Total' row and the sub-columns of '11 to 20 days' under column of 'Percent of total cases involving'.
- From resulting table, read 'Total' row and the column of 'Total cases' to get the total number of cases involving days away from work.
- Multiply the percentage of total cases involving '11 to 20 days' by the total number of cases. Divide by 100 to get the total number of cases involving '11 to 20 days away from work'.
- Do the same for the percentage of total cases involving '21 to 30 days' and '31 days or more'.
- Add the total number of cases involving '11 to 20 days', '21 to 30 days' and '31 days or more' to get the '**Estimated annual total number of cases involving more than 10 days away from work**'.
- Click on the 'X' sign on the top of the right hand side of the spreadsheet to close it. Click 'NO'.

Data Tips: Regional BLS offices can provide revised/updated counts and rates for any year. Numbers and rates may not be available from the CD-ROM or web-site if the estimate does not meet the publishable criteria of BLS. This is particularly true for small states and rare conditions.

Topic: OCCUPATIONAL INJURIES AND ILLNESSES COMBINED	
INDICATOR #2: WORK-RELATED HOSPITALIZATION	
Demographic Group:	Employed persons
Numerator:	Hospital discharges with primary payor coded as workers' compensation
Denominator:	Employed persons age 16 years or older for the same calendar year
Measures of Frequency:	Annual number of hospitalizations for persons age 16 years or older (numerator) Annual crude rate of hospitalization per 100,000 employed persons age 16 years or older
Time Period:	Calendar year
Significance and Background:	In 1999, there were 5.7 million work-related injuries and illnesses reported in private industry of which 1.7 million required lost work time beyond the day of the incident. Workers' compensation costs in the United States total more than \$100 billion dollars per year.
Rationale:	Individuals hospitalized with work-related injuries and illnesses have some of the most serious and costly work-related adverse health outcomes. Tracking of these significant adverse health effects should be undertaken to document the burden of occupational injuries and illnesses, to design, target, and evaluate the impact of prevention efforts over time, and to identify previously recognized settings in which workers may continue to be at high risk.
Limitations of Indicator:	Hospital discharge records are only available for non-federal, acute care hospitals. Individuals hospitalized for work-related injuries and illnesses represent less than 10 percent of all workers who receive workers' compensation. The majority of individuals with work-related illnesses and many others with injuries do not file for workers' compensation. Additionally, self-employed individuals such as farmers and independent contractors, federal employees, railroad or longshore and maritime workers are not covered by state workers' compensation systems. Attribution of payor in hospital discharge may not be accurate. Data between states may not be comparable due to differences in states' workers' compensation programs.
Data Resources:	Hospital discharge data (numerator) BLS Current Population Survey Data (denominator)
Limitations of Data Resources:	Practice patterns and payment mechanisms may affect decisions by health care providers to hospitalize patients, to correctly diagnose work-related conditions, and/or to list the condition as a discharge diagnosis. Residents of one state may be hospitalized in another state and not be reflected in his/her state's hospitalization data. All admissions are counted, including multiple admissions for a single individual. Until hospital discharge data is available in all states, aggregation of state data to produce nationwide estimates will be incomplete. Data on race/ethnicity is not collected in some states and is incomplete and/or of questionable validity in others.
HP2010 Objectives:	None
CSTE Positions:	None
Other Available Data:	Age, gender, race/ethnicity, diagnosis, residence zip code
Recommendations:	Age, gender, race/ethnicity, zip code specific counts and rates can be used to better define the pattern of work-related hospitalizations. Proportion of all hospitalizations in the state can be examined.

HOW-TO GUIDE – INDICATOR #2:

WORK-RELATED HOSPITALIZATIONS

2.1 Annual number of hospitalizations for persons age 16 years or older

Obtain from the State Health Department the number of cases meeting the following criteria from the hospital discharge file:

- Primary payor = Workers' Compensation
- Limit age to those 16 years and older
- Select for state of residence= '*your state*'
- Exclude:
 - age unknown
 - out-of-state residents and unknown residence
 - out-of-state hospitalizations
- Use unduplicated data (no exclusions for deaths, readmissions).
- Use discharge during calendar year, not fiscal year.
- This will yield the '**Annual number of hospitalizations for persons age 16 years or older**'.

2.2 Annual crude rate of hospitalization per 100,000 employed persons age 16 years or older

a) To obtain the denominator for the rate:

- Go to Current Population Statistics: <http://www.bls.gov/opub/gp/laugp.htm>.
- For data prior to 2002, click on the appropriate year of 'Geographic Profile of Employment and Unemployment'.
- Locate Table 12 – "Employment status of the civilian noninstitutional population by sex, age, race and Hispanic origin".
- Find your state from the first column.
- Read the 'Total' row for your state and the 4th data column – "Employment Number". This is the '**Number of Employed Persons 16 years of age or older**' (in thousands). Multiply by 1000.

b) To calculate the rate:

- Divide the numerator (2.1) by the denominator (2.2a).
- Multiply this result by 100,000 to get the '**Annual crude rate of hospitalization per 100,000 employed persons age 16 years or older**'.

Topic: ACUTE AND CUMULATIVE OCCUPATIONAL INJURIES	
INDICATOR #3: FATAL WORK-RELATED INJURIES	
Demographic Group:	Employed persons
Numerator:	All fatal work-related injuries reported to the Census of Fatal Occupational Injuries (CFOI)
Denominator:	Employed persons age 16 years or older for the same calendar year
Measures of Frequency:	Annual number of fatal work-related injuries (numerator) Annual crude fatality rate per 100,000 employed persons age 16 years or older
Time Period:	Calendar year
Significance and Background:	Each year, nearly 6,000 cases of work-related fatalities are reported to the Census of Fatal Occupational Injuries (CFOI) Program administered by the Bureau of Labor Statistics (BLS). On an average day, 16 workers die as a result of injuries sustained at work.
Rationale:	Multiple factors and risks contribute to work-related fatalities, including workplace/process design, work organization, worker characteristics, economics and other social factors. Surveillance of work-related fatalities can identify new hazards and case clusters, leading to the development of new interventions and development of new or revised regulations to protect workers.
Limitations of Indicator:	Fatalities of people younger than 16 may be included in the numerator but are not included in the denominator, since employment statistics are only available for those 16 years of age and older. Because the numbers of deaths among those less than 16 in any one state are small, these numbers are not broken out in the BLS tables and often do not meet the BLS publication criteria. Also CFOI reports data on work-related fatalities by the state in which the fatal incident occurred, which is not necessarily the state of death or the state of residence. The denominator data used for calculating rates is based on state of residence, thus rates may overestimate risk for a state if the fatal incidents involved victims who were out of state residents. Likewise, rates may be underestimated if fatal incidents occurred in other states. Deaths in the military are included in the counts but not the rates.
Data Resources:	Census of Fatal Occupational Injuries (numerator) BLS Current Population Survey Data (denominator)
Limitations of Data Resources:	CFOI program states are not permitted to release occupation or industry specific data when data are sparse. Such sparse data is categorized under 'others'. The CFOI program, although it has a data element for ICD codes, publishes findings according to the OIIC classification system rather than ICD. Therefore, data from CFOI may not be comparable to causes of death documented on death certificates.
HP2010 Objectives:	20-1 and 20-5
CSTE Positions:	None
Other Available Data	Industry and occupation, age, gender, race/ethnicity, nature, source of injury and event

HOW-TO GUIDE - INDICATOR #3:

WORK-RELATED FATAL INJURIES

Two methods to obtain the data are offered - both methods will yield the same numbers. The first method uses the Bureau of Labor Statistics (BLS) website to access the data, and is recommended. The second alternate method uses a CD-ROM, provided by BLS, to access the data. The CD-ROMS can be obtained annually from state CFOI programs or BLS regional offices. Contact information is provided at <http://www.bls.gov/iif/home.htm>

3.1 Annual number of work-related traumatic fatalities

Method 1:

- Go to the BLS web site: <http://www.bls.gov/iif/home.htm#tables>.
- Scroll down to “Regional Resources” on the right hand side of the page.
- Select your state and click ‘Go’.
- Select ‘pdf’ file under CFOI for entire state.
- From resulting table (table 1), read across ‘Total’ row and ‘Number’ column. This is the ‘**Annual number of work-related fatal injuries**’.

Method 2:

- Use the CFOI Profile CD-ROM (CD-ROM is available from BLS). Install the profile onto your computer following the instructions that come with the CFOI Profiles CD-ROM.
- Insert the CD-ROM and double-click on your desktop shortcut ‘CFOI_Profiles’. Double-click on ‘CFOI_Profiles’ again. Click on ‘Enable Macros’. You will see a spreadsheet that says ‘Bureau of Labor Statistics Census of Fatal Occupational Injuries’ with a blue background.
- Double-click on ‘Click here!!!’. Click on ‘CDs’ button and select the drive for your CD-ROM. Then click ‘OK’. Again click ‘OK’. You will see the profile system with many buttons and pull-down menus and with a title ‘Census of Fatal Occupational Injuries Profiles and Tables’.
- Select ‘CFOI Numbers profile (Table 1)’.
- Select state and Year.
- From ‘Characteristic type’, select ‘Major Industry Division’.
- From ‘Characteristic code’, select ‘T Total’.
- Click on ‘Create Profiles/Tables’.
- Click ‘Close’, then ‘Yes’, and then ‘OK’.
- From resulting table, read the 1st row ‘Total’ and 2nd column ‘All industries’. This is the ‘**Annual number of work-related fatal injuries**’ for your state.
- Click on the ‘X’ sign on the top of the right hand side of the blank spreadsheet. Click ‘NO’.

3.2 Annual crude fatality rate per 100,000 employed persons age 16 years or older

a) To obtain the denominator for the rate:

- Go to Current Population Statistics: <http://www.bls.gov/opub/gp/laugp.htm>.
- For data prior to 2002, click on the appropriate year of ‘Geographic Profile of Employment and Unemployment’.

- Locate Table 12 – “Employment status of the civilian noninstitutional population by sex, age, race and Hispanic origin”.
- Find your state from the first column.
- Read the ‘Total’ row for your state and the 4th data column – “Employment Number”. This is the ‘**Number of Employed Persons 16 years of age or older**’ (in thousands). Multiply by 1000.

b) To calculate the rate:

- Divide the resulting number by the ‘Number of Employed Persons 16 years of age or older’.
- Multiply the result by 100,000 to get the ‘**Annual crude fatality rate per 100,000 employed persons age 16 years and older**’.

NOTE: Because of data limitations, fatalities among persons less than 16 years of age may be included in the numerator (3.1) but are excluded from the denominator.

Data Tips: CFOI publishes preliminary data approximately nine months after the close of the calendar year. A year later, CFOI publishes final, updated counts. The indicator should be based on the final counts. Data for previous years are not available on BLS web site. State CFOI programs and regional BLS offices can provide revised/updated count and fatality rates for any year. Numbers may not be available from the CD-ROM or the web-site if the estimate does not meet the publishable criteria of BLS. This is particularly true for small states.

Topic: ACUTE AND CUMULATIVE OCCUPATIONAL INJURIES	
INDICATOR #4: WORK-RELATED AMPUTATIONS WITH DAYS AWAY FROM WORK REPORTED BY EMPLOYERS	
Demographic Group:	Employed persons in the private sector
Numerator:	Estimated cases of work-related amputation with days away from work (OIIC nature code 031)
Denominator:	Estimated total full-time equivalents (FTEs) worked for the same calendar year
Measures of Frequency:	Estimated annual number of work-related amputation cases with days away from work (numerator) Estimated annual incidence rate of work-related amputation cases with days away from work per 100,000 FTEs
Time Period:	Calendar year
Significance and Background:	Each year, it is estimated that between 16,000 and 21,000 workers will experience a work-related amputation. About 90% of work-related amputations are to the fingers. Results of one study indicated that 22% of all employees who experienced finger amputations had to give up their original employment. These injuries may greatly affect a worker's job skills and reduce earnings.
Rationale:	Work-related amputations are a preventable serious injury, and control of occupational hazards is the most effective means of prevention. Estimating the burden and tracking these injuries can help target prevention programs and activities. Information on reported cases can be used to identify contributory factors and to develop improved or new prevention strategies or regulations to protect workers.
Limitations of Indicator:	Employers are required to record events that result in death, loss of consciousness, days away from work, restricted work, or medical treatment beyond first aid. They are only required to report the detailed nature of injury when the injury results in at least one day away from work. Employers do not always record all relevant events. Employers vary in their use of restricted work activity to reduce lost workdays among their employees with work-related conditions, thereby avoiding cases with days away from work.
Data Resources:	Annual Bureau of Labor Statistics (BLS) Survey of Occupational Injuries and Illnesses (SOII)
Limitations of Data Resources:	The SOII is a function of BLS using a probability sample and not a census of all employers. It is based on injury and illness data maintained by employers and is subject to sampling error. There is a potential for additional sampling error if an employer has more than 30 cases with days away from work as an employer is only required to report on 30 such cases. Excluded from the survey are the military, self-employed individuals, farms with fewer than 11 employees, and Federal agencies. In some states, the survey does not cover the state and municipal employees. Therefore, the recommended measures of frequency are limited to private sector workforce only. Some states do not participate in the Federal-State survey, and in some participating states, the sample sizes are insufficient to generate State-specific estimates. Numbers and rates may not be published/released by BLS due to the reliability of the estimates. Employers vary with respect to how much they may reduce their potential reporting burden by placing affected workers on restricted work activity, thereby avoiding the reporting of lost workday cases (which require reporting of additional details). In addition, the SOII only collects data for the incident year, and does not capture lost work-time that may carry over to a new calendar year. For example, a debilitating injury that occurs on the last day of the calendar year will have no lost work-time associated with it in the SOII.
HP2010 Objectives:	20-2
CSTE Positions:	None
Other Available Data:	Industry, occupation, age, gender, race/ethnicity, body part, type of event and source of injury. (Details are available only for injuries/illnesses involving days away from work.)
Recommendations:	SOII has many data elements that can be used to better define patterns of work-related amputations in the state. These may include, for example, industry-specific counts and rates of injuries, and for cases involving days away from work, counts (not rates) by occupation, length of service, age, gender, race/ethnicity and sources of injury.

HOW-TO GUIDE – INDICATOR #4:

WORK-RELATED AMPUTATIONS WITH DAYS AWAY FROM WORK REPORTED BY EMPLOYERS

Data for this indicator are available on CD-ROMs provided by the Bureau of Labor Statistics (BLS). These CD-ROMs can be obtained annually from state SOII programs or BLS regional offices. Contact information is provided at <http://www.bls.gov/iif/home.htm>

4.1 Estimated Annual Number of Work-Related Amputations Involving Days Away from Work

- Install the OSH Profiles CD-ROM onto your computer following the instructions that come with the CD-ROM. Queries for specific states will necessitate use of Disk 1 or Disk 2 depending upon region.
- Double-click on your desktop shortcut 'OSH_Profiles'. Double-click on 'OSH_Profiles' again. Click on 'Enable Macros'. Now you should find a spreadsheet that says 'Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses Profiles System' with a blue background.
- Double-click on 'Click here!!!'. Click on 'CDs' button and select the drive for your CD-ROM. Then click 'OK'. Again click 'OK'.
- From the 'Profile Type', select 'Case and Demo Numbers (Table 1)'.
- Select State and Year.
- From 'Characteristic Type', select 'Nature'.
- From 'Characteristic Code', select nature code '031 Amputations'.
- Click on 'Create Profiles/Tables'.
- When tables are completed, click on 'Close', then 'Yes', and then 'OK'.
- Read 1st row 'Total' and 3rd column 'Amputations (Code 031)' from resulting table. The value of this cell is the '**Estimated annual number of work-related amputations involving days away from work**'.
- Click on the 'X' sign on the top of the right hand side of the spreadsheet to close it. Click 'NO'.

4.2 Estimated Annual Incidence Rate of Amputations Involving Days Away from Work per 100,000 FTEs

- Use the OSH Profile CD-ROM (CD-ROM is available from BLS). Insert the CD-ROM and double-click on your desktop shortcut 'OSH_Profiles'. Double-click on 'OSH_Profiles' again. Click on 'Enable Macros'. Now you should find a spreadsheet that says 'Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses Profiles System' with a blue background.
- Double-click on 'Click here!!!'. Click on 'CDs' button and select the drive for your CD-ROM. Then click 'OK'. Again click 'OK'.
- From the 'Profile Type', select 'Case and Demo Incidence Rates (Table 2)'.
- Select State and Year.
- From 'Characteristic Type', select 'Nature'.
- From 'Characteristic Code', select nature code '031 Amputations'.
- Click on 'Create Profiles/Tables'.

- When tables are completed, click on 'Close', then 'Yes', and then 'OK'.
- Read 1st row 'Total' and 3rd column 'Amputations (Code 031)' from resulting table. Multiply the value of this cell by 10 to get the '**Estimated annual incidence rate of work-related amputations involving days away from work per 100,000 FTEs**'.
- Click on the 'X' sign on the top of the right hand side of the spreadsheet to close it. Click 'NO'.

Data Tips: Numbers and rates are not available on the CD-ROM when the estimates are not reliable and do not meet BLS publication criteria. BLS does not publish rates less than 0.05. Rates under 0.05 are not considered publishable in the case and demographics system.

Topic: ACUTE AND CUMULATIVE OCCUPATIONAL INJURIES	
Indicator #5: STATE WORKERS COMPENSATION CLAIMS FOR AMPUTATIONS WITH LOST WORK-TIME	
Demographic Group:	Workers covered by State workers' compensation system
Numerator:	Amputation cases filed with State workers' compensation system
Denominator:	Estimated number of workers covered by State workers' compensation system for the same calendar year
Measures of Frequency:	Annual number of amputations filed with State Workers' Compensation (numerator) Annual incidence rate of amputations filed with State Workers' Compensation per 100,000 workers covered by State workers' compensation system
Time Period:	Calendar year
Significance and Background:	It is estimated that between 16,000 and 21,000 workers each year experience a work-related amputation. About 90% of work-related amputations involve the fingers. Results of one study indicated that 22% of all employees who experienced finger amputations had to give up their original employment. These injuries may greatly affect a worker's job skills and reduce earnings.
Rationale:	Work-related amputations are preventable, and control of occupational hazards is the most effective means of prevention. Estimating the burden and tracking these injuries can help target prevention programs and activities. Information on reported cases can be used to identify contributory factors and to develop improved or new prevention strategies or regulations to protect workers.
Limitations of Indicator:	Differences in the availability of data (i.e., for lost time cases only versus all medical benefits cases) and eligibility criteria between states indicate that data for this condition should be used to evaluate trends within a state but not to make state-to-state comparisons.
Data Resources:	Workers' compensation system (numerator) National Academy of Social Insurance (NASI) estimate of workers covered by workers' compensation (denominator)
Limitations of Data Resources:	Workers' compensation data is not complete, as the majority of individuals with work-related illnesses and many with work-related injuries do not file for workers' compensation. Workers' compensation claims may be denied. Additionally, self-employed individuals such as farmers and independent contractors, federal employees, railroad or longshore and maritime workers may not be covered by state workers' compensation systems.
HP2010 Objectives:	20-2
CSTE Positions:	None
Other Available Data:	Age, gender, occupation and industry, type of event and source of injury
Recommendations:	Age, gender, occupation, and industry-specific counts and rates can be used to better define the pattern of occupational injuries/illnesses. Frequency distributions by events and source of injury can highlight important causes.

HOW-TO GUIDE – INDICATOR #5:

STATE WORKERS COMPENSATION CLAIMS FOR AMPUTATIONS WITH LOST WORK-TIME

NOTE: This is administrative data that changes over time. Therefore, this data should be collected at the same time each year.

5.1 Annual number of amputations filed with State Workers' Compensation

Variability in the coding systems used by State workers' compensation (WC) systems precludes a universal method for identifying amputation injuries. Data variables within State workers' compensation data systems may be incomplete and are often not subject to quality control. Collaboration with the workers' compensation database manager is essential for completion. The following are tips for constructing the database for analysis:

- Identify cases by date of injury.
- Include all accepted cases - 'open' and 'closed' claims.
- Include claimants of all ages and those with age unknown.
- Include out of state residents.
- Use only 'lost time' claims.
- Identify coding system used for State workers' compensation amputation cases.
Common coding systems encountered by the pilot states include:
 - American National Standards Institute Z16.2 (ANSI Z16.2) – Nature of Injury Code = 100 'Amputation/Enucleation';
 - Occupational Injury and Illness Classification System (OIICS) – Nature of Injury Code = 031 'Amputation';
 - International Association of Industrial Accident Boards and Commissions Electronic Data Interchange Nature of Injury Code = 237028 'Amputation'.
- Exclude claims that involve the following body parts/regions: eye, back, chest, abdomen, body systems (e.g., respiratory system).
- Recognize state to state variability with regard to workers' compensation laws
 - Number of lost workdays for claim to be considered 'lost time'
 - Statute of limitations for work-related injury claim filing
 - Criteria for acceptance of a work-related injury WC claim
 - Physician choice by employee
 - Industries poorly represented in state's workers' compensation data, e.g. agriculture
 - Inclusion or exclusion of claims originating from self-insured employers
 - Occupations excluded from workers compensation coverage
 - Exclusions by employer size (e.g., compulsory workers' compensation insurance coverage for employers of 4 or more workers)
- This should yield the '**Annual number of amputations filed with State Workers' Compensation**'.

5.2 Annual incidence rate of amputations filed with State Workers' Compensation per 100,000 workers covered by State Workers' Compensation system

a) To obtain the denominator for the rate:

- Go to <http://www.nasi.org>.
- Click on menu 'Publications'.
- Click on 'Reports'.
- Click on report entitled: "Workers' Compensation: Benefits, Coverage, and Costs, 2000, New Estimates."
- Click on 'Download' (must have Adobe Acrobat).
- Go to Table 4 "Number of Workers Covered by Workers' Compensation and Total Covered Wages, by State, 1998 - 2000". Located on page 6-7 of report.
- Identify state and read column for 'Covered Workers (in thousands)' for year 2000. Multiply number by 1,000.

b) To calculate the rate

- Divide the numerator (5.1) by the denominator (5.2a).
- Multiply the result by 100,000 to get the '**Annual incidence rate of amputations filed with State Workers' Compensation per 100,000 workers covered by State Workers' Compensation system**'.

Topic: ACUTE AND CUMULATIVE OCCUPATIONAL INJURIES	
INDICATOR #6: HOSPITALIZATION FOR WORK-RELATED BURNS	
Demographic Group:	Employed persons
Numerator:	Hospital discharges with primary diagnosis of burn injury (ICD-9-CM code 940 – 949) and with primary payor coded as workers' compensation
Denominator:	Employed population 16 years or older for the same calendar year
Measures of Frequency:	Annual number of work-related burn hospitalizations for persons age 16 years and older (numerator) Annual rate of work-related burn hospitalizations per 100,000 employed persons age 16 years or older
Time Period:	Calendar year
Significance and Background:	NIOSH has estimated that there are 150,000 work-related burns treated in emergency rooms each year in the U.S. An estimated 30-40 percent of burns are work-related, with a peak incidence among younger workers, and with males affected more frequently than females. According to data from the New England Regional Burn Program, 55 percent of all burns among adults are work-related.
Rationale:	Work-related burns are some of the most devastating injuries affecting workers. Although hospitalized burns are unusual events, they are painful, disabling, and expensive to treat. Many result in significant disfigurement. In addition, burns are the most common cause of work-related hospitalization for young workers.
Limitations of Indicator:	Individuals hospitalized for work-related injuries and illnesses represent less than 10 percent of all workers who receive workers' compensation. The majority of individuals with work-related illnesses and many others with injuries do not file for workers' compensation. Additionally, self-employed individuals such as farmers and independent contractors, federal employees, railroad or longshore and maritime workers are not covered by state workers' compensation systems. Attribution of payor in hospital discharge may not be accurate. Data between states may not be comparable due to differences in states' workers' compensation programs.
Data Resources:	Hospital discharge data (numerator) Bureau of Labor Statistics (BLS) Current Population Survey Data (denominator)
Limitations of Data Resources:	Work-related burn injuries are experienced by employed individuals less than 16 years old, but corresponding denominator data is not readily available. Practice patterns and payment mechanisms may affect decisions by health care providers to hospitalize patients. Residents of one state may be hospitalized in another state and not be reflected in his/her state's hospitalization data. All admissions are counted, including multiple admissions for a single individual. Until hospital discharge data is available in all states, aggregation of state data to produce nationwide estimates will be incomplete. Data on race/ethnicity is not collected in some states and is incomplete and/or of questionable validity in others. Hospital discharge records are only available for non-federal, acute care hospitals.
HP2010 Objectives:	20-2
CSTE Positions:	None
Other Available Data:	Age, gender, race/ethnicity, and residence zip code
Recommendations:	Age, gender, race/ethnicity, and zip code specific counts and rates can be used to better define the pattern of burns. Can also look at proportion of all burn hospitalizations in the state.

HOW-TO GUIDE – INDICATOR #6:

HOSPITALIZATIONS FOR WORK-RELATED BURNS

6.1 Annual number of hospitalizations for work-related burns for persons age 16 years and over

Obtain from State Health Department the following information from the hospital discharge file:

- Use primary diagnosis between 940 and 949 (ICD-9-CM).
- Use only primary payor = Workers' Compensation.
- Limit age to those 16 years and older.
- Select for state of residence= '*your state*'.
- Exclude:
 - age unknown
 - out-of-state residents and unknown residence
 - out-of-state hospitalizations.
- Use unduplicated data (no exclusions for deaths, readmissions).
- Use discharge during calendar year, not fiscal year.
- This will yield the '**Annual number of hospitalizations for work-related burns**'.

6.2 Annual rate of hospitalization per 100,000 employed persons age 16 years or older

a) To obtain the denominator for the rate:

- Go to Current Population Statistics: <http://www.bls.gov/opub/gp/laugp.htm>.
- For data prior to 2002, click on the appropriate year of 'Geographic Profile of Employment and Unemployment'.
- Locate Table 12 – "Employment status of the civilian noninstitutional population by sex, age, race and Hispanic origin".
- Find your state from the first column.
- Read the 'Total' row for your state and the 4th data column – "Employment Number". This is the '**Number of Employed Persons 16 years of age or older**' (in thousands). Multiply by 1000.

b) To calculate the rate:

- Divide the numerator (6.1) by the denominator (6.2a).
- Multiply this result by 100,000 to get the '**Annual crude rate of work-related burn hospitalizations per 100,000 employed persons age 16 years or older**'.

Topic: ACUTE AND CUMULATIVE OCCUPATIONAL INJURIES	
INDICATOR # 7: WORK-RELATED MUSCULOSKELETAL DISORDERS WITH DAYS AWAY FROM WORK REPORTED BY EMPLOYERS	
Demographic Group:	Employed persons
Numerator:	<ol style="list-style-type: none"> 1. Estimated cases of all musculoskeletal disorders (MSDs) involving days away from work 2. Estimated cases of MSDs of the upper extremities, neck, and shoulder involving days away from work 3. Estimated cases of carpal tunnel syndrome involving days away from work 4. Estimated cases of MSDs of the back involving days away from work
Denominator:	Estimated full-time equivalents (FTEs) worked for the same calendar year
Measures of Frequency:	Estimated annual number of incident cases Estimated annual incidence rate per 100,000 full-time-equivalents
Time Period:	Calendar year
Significance and Background:	The 1999 Annual BLS Survey identified 582,340 cases of musculoskeletal disorders that resulted in days away from work. Over half of these cases involved the back. Estimates of the costs of back injuries alone are \$50-100 billion per year. About 4% (27,832) of these injuries were carpal tunnel syndrome, 2% (11,945) involved the neck, 10% (56,834) involved the shoulder, and 15% (87,956) involved the upper extremities.
Rationale:	Work-related musculoskeletal disorders are preventable, and control of occupational hazards is the most effective means of prevention. Estimating the burden and tracking these injuries can help target prevention programs and activities. Information on reported cases can be used to identify contributory factors and to develop improved or new prevention strategies or regulations to protect workers.
Limitations of Indicator:	Employers are required to record events that result in death, loss of consciousness, days away from work, restricted work, or medical treatment beyond first aid. They are only required to report the detailed case characteristics (e.g., nature, body part, event) when the injury or illness results in at least one day away from work. Employers do not always record all relevant events. Also, employers are often unaware of work-related conditions for which employees have obtained medical care from their personal health care providers, and conditions that have long latencies and are diagnosed long after an employee leaves their employment. Regarding injuries/illnesses involving days away from work, employers vary in their use of restricted work activity to reduce lost workdays among their employees with work-related conditions, thereby avoiding cases with days away from work.
Data Resources:	Annual Bureau of Labor Statistics (BLS) Survey of Occupational Injuries and Illnesses (SOII)
Limitations of Data Resources:	The SOII is a function of BLS using a probability sample and not a census of all employers. It is based on injury and illness data maintained by employers and is subject to sampling error. There is a potential for additional sampling error if an employer has more than 30 cases with days away from work as an employer is only required to report on 30 such cases. Excluded from the survey are the military, self-employed individuals, farms with fewer than 11 employees, and Federal agencies. In some states, the survey does not cover the state and municipal employees. Therefore, the recommended measures of frequency are limited to private sector workforce only. Some states do not participate in the Federal-State survey, and in some participating states, the sample sizes are insufficient to generate State-specific estimates. Numbers and rates may not be published/released by BLS due to the reliability of the estimates. Employers vary with respect to how much they may reduce their potential reporting burden by placing affected workers on restricted work activity, thereby avoiding the reporting of lost workday cases (which require reporting of additional details). In addition, the SOII only collects data for the incident year, and does not capture lost work-time that may carry over to a new calendar year. For example, a debilitating injury that occurs on the last day of the calendar year will have no lost work-time associated with it in the SOII.
HP2010 Objectives:	20-3
CSTE Positions:	None

Other Available Data:	Age, gender, race/ethnicity, occupation, industry, type of event, and source of injury (Details are available only for injuries/illnesses involving days away from work.)
Recommendations:	SOII has many data elements that can be used to better define patterns of work-related MSDs in the state. These may include industry specific counts and rates, and counts (not rates) by age, gender, race/ethnicity, and occupation, source of injury/illness.

HOW-TO GUIDE – INDICATOR #7:

WORK-RELATED MUSCULOSKELETAL DISORDERS WITH DAYS AWAY FROM WORK REPORTED BY EMPLOYERS

NOTE: The definition of musculoskeletal disorders involving days away from work used by BLS has changed over time. The earlier definition included all cases of overexertion and repetitive motion (OIIC event codes 220-239). The definition used here, which restricts to certain body parts but adds another event code, is the most recent. Indicator values are developed using the revised OSHA definition of Musculoskeletal Disorders.

7.1 Estimated Annual Number of All Musculoskeletal Disorders Involving Days Away from Work

Definition of musculoskeletal disorders using the revised OSHA definition:

All injuries and illnesses involving days away from work with:

OIIC nature codes:

- 021 (sprains, strains, tears) **or**
- 0972 (back pain, hurt back) **or**
- 0973 (soreness, pain, hurt, except the back) **or**
- 1241 (carpal tunnel syndrome) **or**
- 153 (hernia) **or**
- 17* (musculoskeletal system and connective tissue diseases and disorders)

AND

OIIC event codes:

- 211 (bending, climbing, crawling, reaching, twisting) **or**
- 22 (overexertion) **or**
- 23 (repetitive motion)

*All nature codes that begin with 17

- Go to BLS website: <http://www.bls.gov/iif/home.htm>
- Scroll down to where the map of the United States is. To the left of this, you will see "You can download an electronic version of any article or table from the BLS FTP site."
- Click on "BLS FTP site" which will bring you to <ftp://ftp.bls.gov/pub/special.requests/ocwc/osh/>
- This page contains 3 data sets for each State for each year (2000, 2001, 2002). The dataset naming conventions are:
 - xx2000_nature.pdf
 - xx2000_pob.pdf
 - xx2001_nature.pdf
 - xx2001_pob.pdfwhere "xx" is the State abbreviation. The 'nature table' is by detailed nature for MSDs and the 'part of body table' is by detailed part of body for MSDs.
- Open the 'nature' table for your state and year.
- Read the first row ("Total") under the column 'Number' to obtain the '**Annual number of all musculoskeletal disorders involving days away from work**'.

7.2 Estimated Annual Incidence Rate of All Musculoskeletal Disorders Involving Days Away from Work per 100,000 FTE

- Follow directions for 7.1.
- From the nature table, read the first row – ‘Total’ under the column - ‘Incidence rate’.
- Multiply by 10 to obtain the “**Estimated annual incidence rate of all musculoskeletal disorders involving days away from work per 100,000 FTE**”.

7.3 Estimated Annual Number of Musculoskeletal Disorders of the Neck, Shoulder, and Upper Extremities Involving Days Away from Work

- Follow directions for 7.1.
- Open the ‘part of body’ table for your state and year.
- Sum the three numbers in the rows of ‘1 - Neck, including throat,’ ‘21 – Shoulder, including clavicle, scapula’ and ‘3 – Upper extremities’ under the column - ‘Number’ to obtain the ‘**Estimated annual number of musculoskeletal disorders of the neck, shoulder and upper extremities involving days away from work**’.

7.4 Estimated Annual Incidence Rate of Musculoskeletal Disorders of Neck, Shoulder, and Upper Extremities Involving Days Away from Work per 100,000 FTE

- Follow directions for 7.3.
- Sum the three numbers in the rows of ‘1 - Neck, including throat,’ ‘21 - Shoulder including clavicle, scapula’ and ‘3 - Upper extremities’ under the column - ‘Incidence rate’.
- Multiply the sum by 10 to obtain the ‘**Annual incidence rate of musculoskeletal disorders of the neck, shoulder and upper extremities involving days away from work per 100,000 FTE**’.

7.5 Estimated Annual Number of Carpal Tunnel Syndrome Cases Involving Days Away from Work

- Follow directions for 7.1.
- From the ‘Nature’ table, read the row of ‘1241 - Carpal tunnel syndrome’ under the column - ‘Number’ to obtain the ‘**Estimated annual number of carpal tunnel syndrome cases involving days away from work**’.

7.6 Estimated Annual Incidence Rate of Carpal Tunnel Syndrome Cases Involving Days Away from Work per 100,000 FTE

- Follow directions for 7.5.
- Read the row of ‘1241 - Carpal tunnel syndrome’ under the column - ‘Incidence rate.’
- Multiply the number by 10 to get the ‘**Estimated annual incidence rate of carpal tunnel syndrome cases involving days away from work per 100,000 FTE**’.

7.7 Estimated Annual Number of Musculoskeletal Disorders of the Back Involving Days Away from Work

- Follow directions for 7.3.
- From the 'part of body' table, read the row of '23 Back, including spine, spinal cord' under the column - 'Number' to obtain the '**Estimated annual number of musculoskeletal disorders of the back involving days away from work**'.

7.8 Estimated Annual Incidence Rate of Musculoskeletal Disorders of the Back Involving Days Away from Work per 100,000 FTE

- Follow directions for 7.7.
- From the 'part of body' table, read the rows of '23 Back, including spine, spinal cord' under the column - 'Incidence rate.'
- Multiply the number by 10 to get the '**Estimated annual incidence rate of musculoskeletal disorders of the back involving days away from work per 100,000 FTE**'..

Topic: ACUTE AND CUMULATIVE OCCUPATIONAL INJURIES	
INDICATOR #8: CARPAL TUNNEL SYNDROME CASES FILED WITH THE STATE WORKERS' COMPENSATION SYSTEM	
Demographic Group:	Workers covered by State Workers' Compensation
Numerator:	Carpal tunnel syndrome cases filed with State Workers' Compensation system involving days away from work
Denominator:	Estimated number of workers covered by State workers' compensation system for the same calendar year
Measures of Frequency:	Annual number of carpal tunnel syndrome cases filed with State Workers' Compensation involving days away from work (numerator) Annual incidence rate of carpal tunnel syndrome cases filed with State Workers' Compensation per 100,000 workers covered by State Workers' Compensation system
Time Period:	Calendar year
Significance and Background:	The 2000 Annual BLS Survey identified 27,697 cases of carpal tunnel syndrome that resulted in days away from work. The median number of days away from work was 27. The BLS estimated annual case incidence rate for carpal tunnel syndrome is 3.0 per 10,000 FTE. Estimates from State workers' compensation systems suggest the BLS annual survey underestimates the incidence rate of carpal tunnel syndrome.
Rationale:	Carpal tunnel syndrome is preventable, and control of occupational hazards is the most effective means of prevention. Estimating the burden and tracking carpal tunnel syndrome can help target prevention programs and activities. Information on reported cases can be used to identify contributory factors and to develop improved or new prevention strategies or regulations to protect workers.
Limitations of Indicator:	Differences in the availability of data (i.e., for lost time cases only versus medical benefits cases) and eligibility criteria between states indicate that data for this condition should be used to evaluate trends within a state but not to make state-to-state comparisons.
Data Resources:	Workers' compensation system (numerator) National Academy of Social Insurance (NASI) estimate of workers covered by workers' compensation (denominator)
Limitations of Data Resources:	Workers' compensation data is not complete, as the majority of individuals with work-related illnesses and many with work-related injuries do not file for workers' compensation. Workers' compensation claims may be denied. Additionally, self-employed individuals such as farmers and independent contractors, federal employees, railroad or longshore and maritime workers are not covered by state workers' compensation systems. (The length of days away from work that is required before a case will be recorded in the workers' compensation system will vary by state)
HP2010 Objectives:	20-3
CSTE Positions:	None
Other Available Data:	Age, gender, occupation and industry, type of event and source of injury
Recommendations:	Age, gender, occupation, and industry-specific counts and rates can be used to better define the pattern of occupational injuries/illnesses. Frequency distributions by events and source of injury can highlight important causes.

HOW-TO GUIDE – INDICATOR #8:

CARPAL TUNNEL SYNDROME FILED WITH STATE WORKERS' COMPENSATION SYSTEM

NOTE: This is administrative data that changes over time. Therefore, this data should be collected at the same time each year to allow for valid trend analysis within the State.

8.1 Annual number of carpal tunnel syndrome cases filed with State Workers' Compensation

Variability in the coding systems used by State workers' compensation systems precludes a universal method for identifying Carpal Tunnel Syndrome cases. Data variables within State workers' compensation data systems may be incomplete and are often not subject to quality control. Collaboration with the workers' compensation database manager is essential for completion. The following are tips for constructing the database for analysis:

- Identify cases by date of injury.
- Include all accepted cases - 'open' and 'closed' claims.
- Include claimants of all ages and those with age unknown.
- Include out of state residents.
- Use only 'lost time' claims.
- Coding Systems used for State workers' compensation carpal tunnel syndrome cases:
 - American National Standards Institute Z16.2 (ANSI Z16.2) – Nature of Injury Code = 562 'Nerve Disorder' combined with Type of Injury Code = 12* 'Overexertion' and Body Part Code = 320 'Wrist';
 - Occupational Injury and Illness Classification System (OIICS) – Nature of Injury Code = 1241 'Carpal Tunnel Syndrome';
 - International Classification of Diseases – 9th Revision Clinical Modification – ICD-9-CM Codes = 354.0 'Carpal tunnel syndrome' and/or ICD-9-CPT code = 64721 'Neuroplasty; median nerve at carpal tunnel';
 - International Association of Industrial Accident Boards and Commissions Electronic Data Interchange Nature of Injury Code = 2370762 combined with all upper extremity body part codes (236768-236778) and 'multiple body parts' code (236804)
- Recognize state to state variability with regard to workers' compensation laws
 - Number of lost workdays for claim to be considered 'lost time'
 - Statute of limitations for work-related disease claim filing
 - Criteria for acceptance of a work-related disease WC claim
 - Physician choice by employee
 - Industries poorly represented in state's workers' compensation data e.g. agriculture
 - Inclusion or exclusion of claims originating from self-insured employers
 - Occupations excluded from workers compensation coverage
 - Exclusions by employer size (e.g. compulsory workers' compensation insurance coverage for employers of 4 or more workers)
- This will yield the '**Estimated annual number of carpal tunnel syndrome cases filed with State Workers' Compensation**'.

8.2 Annual incidence rate per 100,000 workers covered by State workers' compensation system

a) To obtain the denominator for the rate:

- Go to National Academy of Social Insurance web site: <http://www.nasi.org>.
- Click on menu 'Publications'.
- Click on 'Reports'.
- Click on report entitled: "Workers' Compensation: Benefits, Coverage, and Costs, 2000, New Estimates".
- Click on 'Download' (must have Adobe Acrobat).
- Go to Table 4 "Number of Workers Covered by Workers' Compensation and Total Covered Wages, by State, 1998 - 2000". Located on page 6-7 of report.
- Identify state and read column for 'Covered Workers (in thousands)' for year 2000. Multiply by 1,000.

b) To calculate the rate:

- Divide the numerator (8.1) by the denominator (8.2a)
- Multiple the result by 100,000 to get the **'Annual incidence rate of carpal tunnel syndrome cases filed with State Workers' Compensation per 100,000 workers covered by State Workers' Compensation system'**.

Topic: OCCUPATIONAL ILLNESSES	
INDICATOR #9: HOSPITALIZATION FROM OR WITH PNEUMOCONIOSIS	
Demographic Group:	Resident persons age 15 years or older
Numerator:	<ol style="list-style-type: none"> 1. Hospital discharges with a primary or contributing diagnosis of total pneumoconiosis 2. Hospital discharges with a primary or contributing diagnosis of coal workers' pneumoconiosis 3. Hospital discharges with a primary or contributing diagnosis of "asbestosis" 4. Hospital discharges with a primary or contributing diagnosis of "silicosis" 5. Hospital discharges with a primary or contributing diagnosis of other and unspecified pneumoconiosis
Denominator:	Midyear resident population age 15 years or older for the same calendar year
Measures of Frequency:	<p>Annual number of hospitalizations for persons age 15 years or older (numerator)</p> <p>Annual rate of hospitalization per million residents</p> <p>Annual, age-standardized, rate of hospitalization (standardized by the direct method to the Year 2000 U.S. standard population)</p>
Time Period:	Calendar year
Significance and Background:	Nearly all pneumoconioses are attributable to occupational exposures, and millions of workers are at risk. Common types include asbestosis, coal workers' pneumoconiosis, and silicosis. Complications of various pneumoconioses and other conditions associated with exposure to the same dusts that cause pneumoconiosis include: respiratory infections (including tuberculosis); chronic bronchitis; emphysema; lung cancer; pleuritis; progressive systemic sclerosis; renal disease; and respiratory failure.
Rationale:	Pneumoconiosis frequency varies geographically being largely determined by local industrial activities and migration of affected individuals. Control of occupational dust exposure is the single most effective means of preventing pneumoconiosis. Tracking of pneumoconiosis is essential for measuring progress towards elimination of the disease, as well as for targeting prevention and disease management programs.
Limitations of Indicator:	Because the pneumoconioses are typically diseases of long latency, current incidence is not necessarily indicative of current exposures, and it may be many years before reductions in occupational exposures affect the number of hospitalizations.
Data Resources:	<p>Hospital discharge data (numerator)</p> <p>State population estimates from the U.S. Bureau of the Census (denominator)</p> <p>Year 2000 U.S. Standard population (for age-standardization)</p>
Limitations of Data Resources:	<p>The number of diagnoses listed on discharge summaries may vary by regional practice patterns and by the persons completing the summaries. Practice patterns and payment mechanisms may affect decisions by health care providers to hospitalize patients, to diagnose pneumoconiosis, and/or to list pneumoconiosis as a discharge diagnosis.</p> <p>Residents of one state may be hospitalized in another state and not be reflected in his/her state's hospitalization data. All admissions are counted, including multiple admissions for a single individual. Until hospital discharge data is available in all states, aggregation of state data to produce nationwide estimates will be incomplete.</p>
HP2010 Objectives:	20-4
CSTE Positions:	1996-Env-02; 1999-Env-04
Other Available Data:	Age, gender, race/ethnicity, residence zip code, payor code
Recommendations:	Age, gender, race/ethnicity, and zip code-specific counts and rates can be used to better define the pattern of hospitalizations. Information on the payor can be used to provide insight on utilization of workers compensation benefits.

HOW-TO GUIDE – INDICATOR #9:

HOSPITALIZATIONS FROM OR WITH PNEUMOCONIOSIS

9.1 Hospital discharges with a primary or contributing diagnosis of ICD-9-CM code 500-505 (“total pneumoconiosis”)

9.1.1 Annual number of hospital discharges

Obtain from the State Health Department the number of cases meeting the following criteria from the hospital discharge file:

- Any diagnosis between 500 and 505 (ICD-9-CM).
- Limit age to those 15 years and older.
- Select for state of residence=*'your state'*.
- Exclude:
 - age unknown
 - out-of-state residents
 - unknown state of residence
 - out-of-state hospitalizations
- Use unduplicated data (no exclusions for deaths, readmissions).
- Use discharge during calendar year, not fiscal year.
- For each of these categories, obtain the number of hospitalizations for each of the following age groups: 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85 and over.
- This will yield the **'Annual number of total pneumoconiosis hospitalizations for persons age 15 years of age and older'**.

NOTE: If less than 5 events, the number may be too small to produce reliable estimates or may violate confidentiality requirements. Rates should not be calculated.

9.1.2 Annual rate of hospitalization per million residents

a) To obtain the denominator for the rate:

- Go to Quickfacts for the U.S. Census: <http://quickfacts.census.gov/>.
- Select your state for recent statistics.
- Select “Browse more datasets for *your state*”.
- Select “General Demographic Characteristics” under Census 2000 population, demographic, and housing information.
- Sum all age groups for ages 15 and above or subtract 0-14 from total.

b) To calculate the crude hospitalization rate:

- Divide the sum of all age groups (numerator 9.1.1.) by the denominator (9.1.2a).
- Multiply this result by 1,000,000 to yield the **'Annual rate of total pneumoconiosis hospitalizations per million residents'**.

9.1.3 Annual, age-standardized, rate of hospitalization per million residents

- Use the US 2000 Standard population (provided in column E in table below) found at: <http://www.cdc.gov/nchs/datawh/nchsdefs/ageadjustment.htm#aarates>.

- Use below table for all pneumoconioses. A spreadsheet works well for these calculations.
- In Column C (2000 State Pop), enter state's 2000 census population (10.1.2), by age groups.
- In Column B (# Hospitalizations), enter number of hospitalizations obtained in 10.1.1, by age groups for all pneumoconioses.
- Column D = Column B / Column C
(Hospitalizations/Pop) = (# Hospitalizations) / (2000 State Pop)
- Column F = Column D * Column E
(# Expected Hospitalizations) = (Hospitalizations/Pop) * (US 2000 Standard Pop)
- The '**Annual age-adjusted total pneumoconiosis hospitalization rate per million residents**'= (F10 / E10) * 1,000,000
(The sum (Σ) of all expected total pneumoconiosis hospitalizations) / (the sum of US 2000 Standard Pop) multiplied by 1,000,000

		Column B	Column C	Column D	Column E	Column F
	Age Group	State Resident Hospitalizations, ages 15 and older, 2000				
		# Hospitalizations	2000 State Pop	Hospitalizations/Pop	US 2000 Std Pop	# Expected Hospitalizations
2	15-24			B2/C2	38,077,000	D2*E2
3	25-34			B3/C3	37,233,000	D3*E3
4	35-44			B4/C4	44,659,000	D4*E4
5	45-54			B5/C5	37,030,000	D5*E5
6	55-64			B6/C6	23,961,000	D6*E6
7	65-74			B7/C7	18,136,000	D7*E7
8	75-84			B8/C8	12,315,000	D8*E8
9	85+			B9/C9	4,259,000	D9*E9
10	Total				215,670,000	$\Sigma(F2:F9)$

9.2 Hospital discharges with a primary or contributing diagnosis of ICD-9 code 500 ("Coal Workers' Pneumoconiosis)

9.2.1 Annual number of coal workers' pneumoconiosis hospital discharges

Follow directions for 9.1.1 using any diagnosis = '500'.

NOTE: If less than 5 events, the number may be too small to produce reliable estimates or may violate confidentiality requirements. Rates should not be calculated.

9.2.2 Annual rate of coal workers' pneumoconiosis hospitalizations per million residents

a) To obtain the denominator for the rate:

Follow directions for 9.1.2a.

b) To calculate the crude hospitalization rate:

- Divide the sum of all ages (numerator 9.2.1) by the denominator (9.2.2a).

- Multiply this result by 1,000,000 to yield the ‘**Annual rate of coal workers’ pneumoconiosis hospitalizations per million residents**’.

9.2.3 Annual, age-standardized, rate of hospitalization per million residents

Follow directions for 9.1.3 using hospitalizations from 9.2.1.

9.3 Hospital discharges with a primary or contributing diagnosis of ICD-9 code 501 (“Asbestosis”)

9.3.1 Annual number of asbestosis hospital discharges

Follow directions for 9.1.1 using any diagnosis = ‘501’.

NOTE: If less than 5 events, the number may be too small to produce reliable estimates or may violate confidentiality requirements. Rates should not be calculated.

9.3.2 Annual rate of asbestosis hospitalizations per million residents

a) To obtain the denominator for the rate:

- Follow directions for 9.1.2a.

b) To calculate the crude hospitalization rate:

- Divide the sum of all ages (numerator 9.3.1) by the denominator (9.3.2a).
- Multiply this result by 1,000,000 to yield the ‘**Annual rate of asbestosis hospitalizations per million residents**’.

9.3.3 Annual, age-standardized, rate of asbestosis hospitalizations per million residents

Follow directions for 9.1.3 using hospitalizations from 9.3.1.

9.4 Hospital discharges with a primary or contributing diagnosis of ICD-9 code 502 (“Silicosis”)

9.4.1 Annual number of silicosis hospital discharges

Follow directions for 9.1.1 using any diagnosis = ‘502’.

NOTE: If less than 5 events, the number may be too small to produce reliable estimates or may violate confidentiality requirements. Rates should not be calculated.

9.4.2 Annual rate of silicosis hospitalizations per million residents

a) To obtain the denominator for the rate:

- Follow directions for 9.1.2a.

b) To calculate the crude hospitalization rate:

- Divide the sum of all ages (numerator 9.4.1) by the denominator (9.4.2a).
- Multiply this result by 1,000,000 to yield the ‘**Annual rate of silicosis hospitalizations per million residents**’.

9.4.3 Annual, age-standardized, rate of silicosis hospitalizations per million residents

Follow directions for 9.1.3 using hospitalizations from 9.4.1.

9.5 Hospital discharges with a primary or contributing diagnosis of ICD-9 code 503, 504 or 505 (“Other and Unspecified Pneumoconiosis”)

9.5.1 Annual number of other and unspecified pneumoconiosis hospital discharges

Follow directions for 9.1.1 using any diagnosis = ‘503’, ‘504’ or ‘505’.

9.5.2 Annual rate of other and unspecified pneumoconiosis hospitalizations per million residents

a) To obtain the denominator for the rate:

- Follow directions for 9.1.2a.

b) To calculate the crude hospitalization rate:

- Divide the sum of all ages (numerator 9.5.1) by the denominator (9.5.2a).
- Multiply this result by 1,000,000 to yield the ‘**Annual rate of other and unspecified pneumoconiosis hospitalizations per million residents**’.

9.5.3 Annual, age-standardized, rate of other and unspecified hospitalizations per million residents

Follow directions for 9.1.3 using hospitalizations from 9.5.1.

NOTE: The sum of 9.2.1, 9.3.1, 9.4.1 and 9.5.1 may be more than 9.1.1 because cases could be hospitalized with more than one type of pneumoconiosis.

Topic: OCCUPATIONAL ILLNESSES	
INDICATOR #10: MORTALITY FROM OR WITH PNEUMOCONIOSIS	
Demographic Group:	Resident persons age 15 years or older
Numerator:	<ol style="list-style-type: none"> 1. Deaths with ICD-10 code of J60-J66 (ICD-9 code 500-505) as the underlying or contributing cause of death (“total pneumoconiosis”) 2. Deaths with ICD-10 code of J60 (ICD-9 code 500) as the underlying or contributing cause of death (“coal workers’ pneumoconiosis”) 3. Deaths with ICD-10 code of J61 (ICD-9 code 501) as the underlying or contributing cause of death (“asbestosis”) 4. Deaths with ICD-10 code of J62 (ICD-9 code 502) as the underlying or contributing cause of death (“silicosis”) 5. Deaths included in numerator #1, but not in #2, #3, or #4 with ICD-10 code of J63 (ICD-9 code 503) or J64 (505) or J66 (504) (“other and unspecified pneumoconiosis”)
Denominator:	Midyear resident population age 15 years or older for the same calendar year
Measures of Frequency:	<p>Annual number of deaths (numerator)</p> <p>Annual death rate per million residents</p> <p>Annual age-standardized death rate (standardized by the direct method to the Year 2000 U.S. Standard population)</p>
Time Period:	Calendar year
Significance and Background:	Nearly all pneumoconioses are attributable to occupational exposure, and millions of workers are at risk. Common types include asbestosis, coal workers' pneumoconiosis, and silicosis. Pneumoconiosis is more commonly listed as a contributing cause of death than as the underlying cause of death. Consequently, this indicator monitors all listed causes of death on the death certificate.
Rationale:	Pneumoconiosis frequency varies geographically being largely determined by local industrial activities and migration of affected individuals. Control of occupational dust exposure is the single most effective means of preventing pneumoconiosis. Tracking of pneumoconiosis is essential for tracking progress towards elimination of the disease, as well as for targeting prevention and disease management programs.
Limitations of Indicator:	Because the pneumoconioses are typically chronic diseases with a long latency (pre-clinical period), current incidence is not necessarily indicative of current exposures, and it may be several years before reductions in exposures affect mortality. In addition, people may not die in the state in which they were exposed.
Data Resources:	<p>Death certificate records from vital statistics agency (numerator)</p> <p>State population estimates from the U.S. Bureau of the Census (denominator)</p> <p>Year 2000 U.S. Standard Population (for age-standardization)</p>
Limitations of Data Resources:	Causes of death listed on the death certificate and coding of those causes may be inaccurate. The number of contributing cases of death listed on the death certificate may vary by person completing the death certificate and geographic region. Death certificates identify only a small percentage of the individuals who develop pneumoconiosis. Data on race/ethnicity is not collected in some states and is incomplete and/or of questionable validity in others. The state of death may not be the state of exposure.
HP2010 Objectives:	20-4
CSTE Positions:	1996-Env-02; 1999-Env-04
Other Available Data:	Age, gender, race/ethnicity, county of residence, usual occupation and industry
Recommendations:	Age, gender, race/ethnicity, and county-specific counts and rates can be used to better define the pattern of pneumoconiosis mortality. Because usual occupation and usual industry information is not necessarily indicative of the setting in which the causative exposure occurred, industry- and occupation-specific measures should be interpreted and reported with caution.

HOW-TO GUIDE – INDICATOR #10:

MORTALITY FROM OR WITH PNEUMOCONIOSIS

10.1 Deaths with ICD-10 code of J60-J66 as the underlying or contributing cause of death (“Total Pneumoconiosis”)

10.1.1 Annual number of total pneumoconiosis deaths

Obtain from State Health Department’s Office of Vital Records the following information:

- Number of deaths with ICD-10 code of J60 – J66.8 as the underlying or contributing cause of death. **Make sure that you emphasize that you want these counts based on contributing causes of death in addition to underlying cause. Obtaining counts based on underlying cause only will result in a significant undercount of cases.**
- Limit age to those 15 years and older.
- Select for state of residence=*‘your state’*.
- Exclude:
 - age unknown
 - out-of-state residents or unknown residence
 - out-of-state deaths
- Obtain the number of deaths for each of the following age groups: 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85 and over.
- This will yield the **‘Annual number of total pneumoconiosis deaths’**.

NOTE: If less than 5 events, the number may be too small to produce reliable estimates or may violate confidentiality requirements. Rates should not be calculated.

10.1.2 Annual total pneumoconiosis death rate per million residents

a) To obtain the denominator for the rate:

- Go to Quickfacts for the U.S. Census: <http://quickfacts.census.gov/>.
- Select your state for recent statistics.
- Select “Browse more datasets for *your state*”.
- Select “General Demographic Characteristics” under Census 2000 population, demographic, and housing information.
- Sum all age groups for ages 15 and above or subtract 0-14 from total.

b) To calculate annual death rate per million residents:

- Divide the sum of all ages (numerator 10.1.1) by the denominator (10.1.2a).
- Multiply this result by 1,000,000 to yield the **‘Annual total pneumoconiosis death rate per million residents’**.

10.1.3. Annual age-standardized total pneumoconiosis death rate per million residents

- Use the US 2000 Standard population (provided in column E in table below) found at: <http://www.cdc.gov/nchs/dataawh/nchsdefs/ageadjustment.htm#aarates>.
- Use below table for all pneumoconioses. A spreadsheet works well for these calculations.

- In Column C (2000 State Pop), enter state's 2000 census population (10.1.2), by age groups.
- In Column B (# Deaths), enter number of deaths obtained in 10.1.1, by age groups for all pneumoconioses.
- Column D = Column B / Column C
(Deaths/Pop) = (# Deaths) / (2000 State Pop)
- Column F = Column D * Column E
(# Expected Deaths) = (Deaths/Pop) * (US 2000 Standard Pop)
- **Age-adjusted total pneumoconiosis death rate = (F10 / E10) * 1,000,000**
(The sum (Σ) of all expected deaths) / (the sum of US 2000 Standard Pop) multiplied by 1,000,000

		Column B	Column C	Column D	Column E	Column F
		State Resident Deaths, ages 15 and older, 2000				
	Age Group	# Deaths	2000 State Pop	Deaths/Pop	US 2000 Std Pop	# Expected Deaths
2	15-24			B2/C2	38,077,000	D2*E2
3	25-34			B3/C3	37,233,000	D3*E3
4	35-44			B4/C4	44,659,000	D4*E4
5	45-54			B5/C5	37,030,000	D5*E5
6	55-64			B6/C6	23,961,000	D6*E6
7	65-74			B7/C7	18,136,000	D7*E7
8	75-84			B8/C8	12,315,000	D8*E8
9	85+			B9/C9	4,259,000	D9*E9
10	Total				215,670,000	$\Sigma(F2:F9)$

10.2 Deaths with an underlying or contributing cause of death with ICD-10 code J60 ("Coal Workers' Pneumoconiosis")

10.2.1 Annual number of coal workers' pneumoconiosis deaths

Follow directions for 10.1.1 using any cause of death = 'J60'.

NOTE: If less than 5 events, the number may be too small to produce reliable estimates or may violate confidentiality requirements. Rates should not be calculated.

10.2.2 Annual death rate per million residents

a) To obtain the denominator for the rate:

Follow directions for 10.1.2a.

b) To calculate the crude death rate:

- Divide the sum of all ages (numerator 10.2.1) by the denominator (10.2.2a).
- Multiply this result by 1,000,000 to yield the '**Annual coal workers' pneumoconiosis death rate**'.

10.2.3 Annual, age-standardized, coal workers' pneumoconiosis death rate per million residents

Follow directions for 10.1.3 using deaths from 10.2.1.

10.3 Deaths with an underlying or contributing diagnosis of ICD-10 code J61 (“Asbestosis”)

10.3.1 Annual number of asbestosis deaths

Follow directions for 10.1.1 using any cause of death = ‘J61’.

NOTE: If less than 5 events, the number may be too small to produce reliable estimates or may violate confidentiality requirements. Rates should not be calculated.

10.3.2 Annual asbestosis death rate per million residents

a) To obtain the denominator for the rate:

Follow directions for 10.1.2a.

b) To calculate the crude death rate:

- Divide the sum of all ages (numerator 10.3.1) by the denominator (10.3.2a).
- Multiply this result by 1,000,000 to yield the ‘**Annual asbestosis death rate per million residents**’.

10.3.3 Annual, age-standardized, asbestosis death rate per million residents

Follow directions for 10.1.3 using deaths from 10.3.1.

10.4 Deaths with an underlying or contributing diagnosis of ICD-10 code J62 (“Silicosis”)

10.4.1 Annual number of silicosis deaths

Follow directions for 10.1.1 using any cause of death = ‘J62.0’ – ‘J62.8’.

NOTE: If less than 5 events, the number may be too small to produce reliable estimates or may violate confidentiality requirements. Rates should not be calculated.

10.4.2 Annual silicosis death rate per million residents

a) To obtain the denominator for the rate:

Follow directions for 10.1.2a.

b) To calculate the crude death rate:

- Divide the sum of all ages (numerator 10.4.1) by the denominator (10.4.2a).
- Multiply this result by 1,000,000 to yield the ‘**Annual silicosis death rate per million residents**’.

10.4.3 Annual, age-standardized death rate per million residents

Follow directions for 10.1.3 using deaths from 10.4.1.

10.5 Deaths with an underlying or contributing diagnosis of ICD-10 code J63, J64, J65, J66 (“Other and Unspecified Pneumoconiosis”)

10.5.1 Annual number of other and unspecified pneumoconiosis deaths

Follow directions for 10.1.1 using any cause of death = 'J63.0' - 'J63.8', 'J64', 'J65', 'J66.0' - 'J66.8'.

NOTE: If less than 5 events, the number may be too small to produce reliable estimates or may violate confidentiality requirements. Rates should not be calculated.

10.5.2 Annual other and unspecified pneumoconiosis death rate per million residents

a) To obtain the denominator for the rate:

Follow directions for 10.1.2a.

b) To calculate the crude death rate:

- Divide the sum of all ages (numerator 10.5.1) by the denominator (10.5.2a).
- Multiply this result by 1,000,000 to yield the '**Annual other and unspecified pneumoconiosis death rate per million residents**'.

10.5.3 Annual, age-standardized other and unspecified pneumoconiosis death rate per million residents

Follow directions for 10.1.3 using deaths from 10.5.1.

NOTE: The sum of 10.2.1, 10.3.1, 10.4.1 and 10.5.1 may be greater than 10.1.1 because cases could have more than one type of pneumoconiosis listed on the death certificate.

Topic: OCCUPATIONAL ILLNESSES	
INDICATOR #11: ACUTE WORK-RELATED PESTICIDE-ASSOCIATED ILLNESS AND INJURY REPORTED TO POISON CONTROL CENTERS	
Demographic Group:	Employed persons
Numerator:	Reported cases of work-related pesticide poisoning
Denominator:	Employed persons age 16 years and older for the same calendar year
Measures of Frequency:	Annual number of reported cases of work-related pesticide poisoning (numerator) Annual incidence rate of reported cases of work-related pesticide poisoning per 100,000 employed persons age 16 years or older
Time Period:	Calendar year
Significance and Background:	Pesticides are among the few chemicals produced that are specifically designed to kill and cause harm. In the US, approximately one billion pounds of pesticide active ingredient are used annually, and over 20,000 pesticide products are being marketed. The EPA estimates 20,000 - 40,000 work-related pesticide poisonings per year.
Rationale:	Workers who handle pesticides are at increased risk for exposure. Poison Control Centers (PCCs) are important sources of reports of acute poisonings and chemical exposures. These data can be useful to target prevention. The type of data collected is comparable across states due to the uniformity in case handling by PCCs.
Limitations of Indicator:	PCCs capture only a small proportion of acute occupational pesticide-related illness cases, an estimated 10%. PCCs do not systematically collect information on industry and occupation; however, cases associated with occupational exposures can be identified.
Data Resources:	Poison Control Center data (numerator) BLS Current Population Survey Data (denominator)
Limitations of Data Resources:	Not all states have poison control centers. State health agencies may have to enter into an agreement with their state-based PCC to obtain local data, or may obtain less timely PCC data from the Toxic Exposure Surveillance System, which is administered by the American Association of Poison Control Centers.
HP2010 Objectives:	None
CSTE Positions:	1996-Env-16; 1999-Env-3
Other Available Data:	Age, gender, pesticide active ingredient, signs/symptoms arising from the pesticide exposures, illness severity, and whether hospitalization/ICU treatment was provided.
Recommendations:	Age, gender, pesticide chemical class, and severity-specific counts and rates can be used to better define the pattern of acute occupational pesticide-related illness. Industry and occupation should be analyzed where available.

HOW-TO GUIDE – INDICATOR #11:

ACUTE WORK-RELATED PESTICIDE ASSOCIATED ILLNESS AND INJURY REPORTED TO POISON CONTROL CENTERS

11.1 Annual number of reported work-related pesticide poisoning cases

- Go to information provided on request by CSTE to states.
- Look up the number for your state to obtain the ‘**Annual number of reported work-related pesticide poisoning cases**’.

NOTE: These data are derived from the American Association of Poison Control Centers (AAPCC) using the case definition listed below, and provided to NIOSH (NIOSH provides data to CSTE). There may be a discrepancy between the number of incident cases provided by NIOSH/AAPCC and the number of cases derived from your local PCC using the alternate method below.

- States are encouraged to contact your local Poison Control Center (PCC) to share this data obtained through AAPCC and describe plans to disseminate it. Contact information can be obtained from AAPCC <http://www.aapcc.org/director2.htm>. Some states have more than one PCC.

11.2 Annual incidence rate of reported work-related pesticide poisoning cases per 100,000 employed persons age 16 years or older

a) To obtain the denominator for the rate:

- Go to Current Population Statistics: <http://www.bls.gov/opub/gp/laugp.htm>.
- For data prior to 2001, click on the appropriate year of ‘Geographic Profile of Employment and Unemployment’.
- Locate ‘Table 12. Employment status of the civilian noninstitutional population by sex, age, race and Hispanic origin’.
- Find your state from the first column.
- Read the ‘Total’ row for your state and the 4th data column – ‘Employment Number’. This is the ‘**Number of Employed Persons 16 years of age or older**’ (in thousands). Multiply by 1000.

b) To calculate the rate:

- Divide the numerator (11.1) by the denominator (11.2a).
- Multiply this result by 100,000 to get the ‘**Annual incidence rate of reported work-related pesticide poisonings per 100,000 employed persons age 16 years or older**’

NOTE: If you use the rate provided by CSTE, you must divide by 10 to get the rate per 100,000 employed persons.

The criteria utilized by NIOSH/AAPCC for identify work-related pesticide poisonings are provided below.

Case definition: The criteria utilized by NIOSH/AAPCC to identify work-related pesticide poisonings are provided below.

1. Reason for the call (**ExpReason**) = **3** (occupational) **OR** Exposure Site (**ExpSite**) = **3** (workplace)
2. Medical outcome (**MedicalOutcome**) =
201=minor effect
202=moderate effect
203=major effect
204=death
206=not followed, minimal clinical effects possible
207=unable to follow, judged as a potentially toxic exposure
3. **Exclude** cases where Exposure Site (**ExpSite**) = **3** (workplace) AND (**ExpReason**) = **9** (suspected suicide), **11** (intentional abuse), **12** (intentional action but specific intention unknown), **14** (malicious), or **18** (unknown reason).
4. Exposure to an agent included in one of the pesticide generic categories (Note: Only include cases exposed to one product, i.e., (**NoOfSubs**) = **1**):

Disinfectants

0201008 disinfectant industrial cleaner
0201055 bromine water/shock treatment
0201056 chlorine water/shock treatment
0042281 hypochlorite disinfectant: hypochlorite, non-bleach product
0040280 phenol disinfectant: phenol (eg, lysol)
0039282 pine oil disinfectant
0077286 other/unknown disinfectant

Fungicides (non-medicinal)

0243566 carbamate fungicide
0201033 copper compound fungicide
0077564 mercurial fungicide
0077565 *non-mercurial (inactive) fungicide*
0253000 phthalimide fungicide
0254371 wood preservative
0077566 *other/unknown (inactive) non-medicinal fungicide*
0201034 other non-medicinal fungicide
0201035 unknown non-medicinal fungicide

Fumigants

0201036 aluminum phosphide fumigant
0201037 metam sodium (fumigant, fungicide, or herbicide)
0201038 methyl bromide (fumigant, fungicide, or herbicide)
0201039 sulfuryl fluoride fumigant
0201040 other fumigant
0201041 unknown fumigant

Herbicides (includes algicides, defoliants, dessicants, plant growth regulators)

0201054 algicide
0254370 anti-algae paint: anti-algae
0243561 carbamate herbicide
0017000 *2,4-d or 2,4,5-t (inactive)*
0201042 chlorophenoxy herbicide
0049562 diquat
0201043 glyphosate
0049000 paraquat
0049561 paraquat/diquat combination
0077121 plant hormone
0213000 triazine herbicide
0215000 urea herbicide
0077561 other herbicide
0077567 unknown herbicide

Insecticides (includes insect growth regulators, molluscicides, nematicides)

0004562 arsenic pesticide
0062562 borate/boric acid pesticide
0070000 carbamate only (alone)
0070560 carbamate with other insecticide
0050000 chlorinated hydrocarbon only (alone)
0050560 chlorinated hydrocarbon with other insecticide
0201044 insect growth regulator
0172000 metaldehyde(molluscicide)
0208562 nicotine(excluding tobacco products)
0038000 organophosphate
0038560 organophosphate/carbamate combined
0038561 *organophosphate/chlorinated hydrocarbon (inactive)*
0038562 organophosphate/other insecticide
0038563 *organophosphate/carbamate/chlorinated hydrocarbon (inactive)*
0176000 *piperonyl butoxide only (inactive)*
0144000 *piperonyl butoxide/pyrethrin (inactive) (without carbamate or o.p.)*
0144001 *pyrethrins only (inactive)*
0201045 pyrethrin
0201046 pyrethroid
0145000 rotenone
0077568 *veterinary insecticide (inactive) (for pets-flea collars, etc.)*

0077562 other insecticide
0077569 unknown insecticide

Repellents

0201047 bird, dog, deer or other mammal repellent
0201048 insect repellent with deet
0201049 insect repellent without deet
0218000 *insect repellent: unknown (inactive)*
0033000 naphthalene moth repellent
0050430 paradichlorobenzene moth repellent
0077431 other mothball or moth repellent
0077430 unknown mothball or moth repellent

Rodenticides

0174000 antu
0048563 anticoagulant: warfarin-type anticoagulant rodenticide
0048564 anticoagulant: long-acting, superwarfarin anticoagulant rodenticide
0244577 barium carbonate barium carbonate containing rodenticides
0201050 bromethalin
0201051 cholecalciferol rodenticide
0012563 cyanide rodenticide (excluding industrial or misc. Chemical)
0162000 monofluoroacetate 1080/monofluoroacetate/smfa
0043000 strychnine rodenticide
0197000 vacor/pnu
0201052 zinc phosphide
0217000 thallium
0077563 other rodenticide
0077577 unknown rodenticide

Topic: OCCUPATIONAL ILLNESSES	
INDICATOR #12: INCIDENCE OF MALIGNANT MESOTHELIOMA	
Demographic Group:	Resident persons age 15 years or older
Numerator:	Incident cases with mesothelioma
Denominator:	Midyear resident population age 15 years or older for the same calendar year
Measures of Frequency:	Annual number of incident mesothelioma cases (numerator) Annual mesothelioma incidence rate per million residents Annual, age-standardized, mesothelioma incidence rate (standardized by the direct method to the Year 2000 U.S. Standard population)
Time Period:	Calendar year
Significance and Background:	Approximately 2,500 deaths with malignant mesothelioma occur each year in the United States. The only well established risk factor for malignant mesothelioma is exposure to asbestos and related fibers. It has been estimated that as much as 90 percent of cases are caused by exposure to asbestos.
Rationale:	Malignant mesothelioma, while relatively rare, is a fatal cancer largely attributable to workplace exposure to asbestos. Tracking of malignant mesothelioma should be undertaken to document the burden of occupational disease, to design, target, and evaluate the impact of prevention efforts over time, and to identify previously unrecognized settings in which workers may continue to be at risk of asbestos exposure.
Limitations of Indicator:	Not all cases of malignant mesothelioma are caused by occupational exposures. Because cancer is a disease of long latency, current incidence is not indicative of current exposures and it may be many years before reductions in occupational exposures affect incidence.
Data Resources:	State-wide Cancer Registry data (numerator) State population estimates from the U.S. Bureau of the Census (denominator) Year 2000 US Standard population (for age-standardization)
Limitations of Data Resources:	Data from some existing statewide central cancer registries do not yet meet standards for data completeness and quality. Until complete cancer registry data is available in all states, aggregation of state data to produce nationwide estimates will be incomplete.
Other Available Data:	Age, gender, race/ethnicity, county, usual industry, and usual occupation
HP2010 Objectives:	None
CSTE Positions:	None
Recommendations:	Age, gender, race/ethnicity-specific, county counts and rates can be used to better define patterns of malignant mesothelioma. Because usual occupation and usual industry information is not necessarily indicative of the setting in which the causative exposure occurred, industry- and occupation-specific measures should be interpreted and reported with caution.

HOW-TO GUIDE – INDICATOR #12:

INCIDENCE OF MALIGNANT MESOTHELIOMA

12.1 Annual number of incident mesothelioma cases

Obtain from the State Cancer Registry the number of incident cases meeting the following criteria:

- ICD-O histology code of 9050-9053.
- Limit age to those 15 years and older.
- Exclude:
 - age unknown
 - out-of-state residents and unknown residence
- Obtain the number of cases for each of the following age groups: 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85 and over.
- This will yield the ‘**Annual number of incident mesothelioma cases**’.

NOTE: If less than 5 events, the number may be too small to produce reliable estimates or may violate confidentiality requirements. Rates should not be calculated.

12.2 Annual mesothelioma incidence rate per million residents

a) To obtain the denominator for the rate:

- Go to Quickfacts for the U.S. Census: <http://quickfacts.census.gov/>.
- Select your state for recent statistics.
- Select “Browse more datasets for *your state*”.
- Select “General Demographic Characteristics” under Census 2000 population, demographic, and housing information.
- Sum all age groups for ages 15 and above, or subtract ages 0-14 from total.

b) To calculate the annual incidence rate:

- Divide the sum of all age groups (numerator 12.1) by the denominator (12.2a).
- Multiply this result by 1,000,000 to obtain the ‘**Annual mesothelioma incidence rate per million residents**’.

12.3 Annual, age-standardized mesothelioma incidence rate per million residents

- Use the US 2000 Standard population (provided in column E in table below) found at: <http://www.cdc.gov/nchs/datawh/nchsdefs/ageadjustment.htm#aarates>.
- Use below table to calculate the age-standardized incidence rate. A spreadsheet works well for these calculations.
- In Column C (2000 State Pop), enter state’s 2000 census population (12.1), by age groups.
- In Column B (# Mesothelioma Cases), enter number of mesothelioma cases obtained in 13.1, by age groups.
- Column D = Column B / Column C
(Mesotheliomas/Pop) = (# Mesotheliomas) / (2000 State Pop)
- Column F = Column D * Column E
(# Expected Mesotheliomas) = (Mesotheliomas/Pop) * (US 2000 Standard Pop)

- **Age-adjusted incidence rate for mesothelioma = (F10 / E10) * 1,000,000**
(The sum (Σ) of all expected mesotheliomas) / (the sum of US 2000 Standard Pop) multiplied by 1,000,000

		Column B	Column C	Column D	Column E	Column F
	Age Group	State Resident Mesothelioma Cases, ages 15 and older, 2000				
		# Mesothelioma Cases	2000 State Pop	Mesothelioma Cases/Pop	US 2000 Std Pop	# Expected Mesothelioma Cases
2	15-24			B2/C2	38,077,000	D2*E2
3	25-34			B3/C3	37,233,000	D3*E3
4	35-44			B4/C4	44,659,000	D4*E4
5	45-54			B5/C5	37,030,000	D5*E5
6	55-64			B6/C6	23,961,000	D6*E6
7	65-74			B7/C7	18,136,000	D7*E7
8	75-84			B8/C8	12,315,000	D8*E8
9	85+			B9/C9	4,259,000	D9*E9
10	Total				215,670,000	Σ(F2:F9)

Topic: OCCUPATIONAL EXPOSURES	
INDICATOR #13: ELEVATED BLOOD LEAD LEVELS AMONG ADULTS	
Demographic Group:	Employed persons
Numerators:	1. All reported state residents age 16 years or older, with a blood lead level of ≥ 25 $\mu\text{g/dL}$ 2. All reported state residents age 16 years or older, with a blood lead level of ≥ 40 $\mu\text{g/dL}$
Denominator:	Employed population age 16 years or older for the same calendar year
Measures of Frequency:	Annual number of residents with elevated blood lead levels (numerator) Annual prevalence rate per 100,000 employed persons age 16 years or older Annual number of incident cases of residents with elevated blood lead levels Annual incidence rate per 100,000 employed persons age 16 years or older
Time Period:	Calendar year
Significance and Background:	In 2001, reporting systems operating in 23 states enumerated nearly 10,000 adults with blood lead levels (BLLs) greater than or equal to 25 $\mu\text{g/dL}$. About 20 percent had levels greater than or equal to 40 $\mu\text{g/dL}$. Lead adversely affects multiple organ systems and can cause permanent damage. Effects include anemia, nervous system dysfunction, kidney problems, hypertension, decreased fertility, and miscarriages. Children are more sensitive than adults to the effects of lead and about 24,000 U.S. children with BLLs of 10 $\mu\text{g/dL}$ or greater are estimated to be exposed from lead unintentionally brought home by a parent from the workplace. Pediatric effects include neurologic damage, learning disabilities, and behavior problems.
Rationale:	Among adults, lead poisoning is a persistent, mainly occupational, health problem that continues to be an important public health problem. The single best diagnostic test for exposure is the BLL. Federal Occupational Safety and Health Administration (OSHA) regulations to protect workers from lead-associated health effects include requirements for monitoring BLLs among employees who meet certain exposure criteria.
Limitations of Indicator:	BLLs are a good indicator of recent exposure over the 3 to 5 weeks preceding the test, but are not a valid indicator of body burden of lead resulting from long-term exposure. Therefore, an elevated body burden of lead may not be detected in an individual if the lead test is done more than several weeks after the most recent lead exposure.
Data Resources:	Reports of elevated BLLs from laboratories (numerator) BLS Current Population Survey Data (denominator)
Limitations of Data Resources:	Some states do not require laboratories to report elevated BLLs. Even with a reporting requirement, data from laboratories are frequently incomplete. Many workers with significant occupational lead exposure are not appropriately tested. An individual's lead exposure and BLL testing may be done in the same or in different states (which may not be the individual's state of residence). Approximately 10-15% of elevated BLLs among adults can be caused by non-occupational exposures. Not all states may be able to distinguish occupationally exposed individuals from non-occupationally exposed individuals. Not all states may be able to determine both state of employment/exposure and state of residence of their reported cases.
HP2010 Objectives:	
CSTE Positions:	1990-Env-9; 1995-Env-14; 1999-Env-02; 2000-Occ-01; 2001-Occ-01
Other Available Data:	Age, gender, industry, occupation, individual BLL, and all lead test reports (i.e., not just those exceeding the specified criteria)
Recommendations:	Many states have data elements that can be used to better define the pattern of elevated blood lead levels. Report numbers and rates for occupational cases only, rather than including both occupationally and non-occupationally exposed persons in the numerator. Include occupationally exposed cases working in your state (e.g., employer is based in your state, or, if able to determine, worksite is in your state), regardless of their state of residence. Age, gender, and race/ethnicity specific counts and rates can be used to better define the pattern of elevated BLLs. Industry and occupation information can be used to provide additional insight. Individual BLLs can help identify particularly egregious exposures. Obtaining reports on all BLLs can provide insight about the overall frequency of BLL testing. Follow-up of selected cases and/or clusters can help identify where/how individuals with high BLLs were exposed.

HOW-TO GUIDE – INDICATOR #13:

ELEVATED BLOOD LEAD LEVELS AMONG ADULTS

13.1 Persons age 16 years or older with a blood lead level of ≥ 25 $\mu\text{g/dL}$

13.1.1 Annual number of residents with elevated blood lead levels (≥ 25 $\mu\text{g/dL}$)

- Contact state Adult Blood Lead Epidemiology Surveillance (ABLES) program: www.cdc.gov/niosh/ables.html
- Request data according to the following criteria for the calendar year:
 - Blood lead level (BLL) ≥ 25 $\mu\text{g/dL}$
 - Age 16 years and older
 - Earliest date of either draw date, date laboratory received sample, or date laboratory analyzed sample
 - If a person is reported more than once during the time period, count that person one time only, at his/her highest BLL
 - Include all cases, both occupationally and non-occupationally exposed
 - Include all residents of state and unknown residence
 - Exclude out-of-state residents
- This will yield the ‘**Annual number of residents with blood lead levels ≥ 25 $\mu\text{g/dL}$** ’.

13.1.2 Annual prevalence rate per 100,000 employed persons

a) To obtain the denominator for the rate:

- Go to Current Population Statistics: <http://www.bls.gov/opub/gp/laugp.htm>.
- For data prior to 2002, click on the appropriate year of ‘Geographic Profile of Employment and Unemployment’.
- Locate Table 12 – “Employment status of the civilian noninstitutional population by sex, age, race and Hispanic origin”.
- Find your state from the first column.
- Read the ‘Total’ row for your state and the 4th data column – “Employment Number”. This is the ‘**Number of Employed Persons 16 years of age or older**’ (in thousands). Multiply by 1000.

b) To calculate the rate:

- Divide the numerator (13.1.1) by the denominator (13.1.2a).
- Multiply this result by 100,000 to get the ‘**Annual prevalence rate per 100,000 employed persons age 16 years or older**’.

13.1.3 Annual number of incident cases

Use the ABLES definition of an incident case: Case with a BLL of ≥ 25 $\mu\text{g/dL}$ reported in the calendar year, but was not reported in the immediately preceding year with a BLL of ≥ 25 $\mu\text{g/dL}$ (may appear in earlier years with a BLL of 25 $\mu\text{g/dL}$ or greater).

13.1.4 Annual incidence rate per 100,000 employed persons

a) To obtain the denominator for the rate:

Follow directions for 13.1.2.

b) To calculate the rate:

- Divide the numerator (13.1.3) by the denominator (13.1.2a)
- Multiply this result by 100,000 to get the ‘**Annual incidence rate per 100,000 employed persons age 16 years or older**’.

13.2 Persons age 16 years or older with a blood lead level of ≥ 40 $\mu\text{g/dL}$

13.2.1 Annual number of residents with blood lead levels ≥ 40 $\mu\text{g/dL}$

Follow data request from 13.1.1 for BLL ≥ 40 $\mu\text{g/dL}$

13.2.2 Annual prevalence rate per 100,000 employed persons

a) To obtain the denominator for the rate:

Follow directions for 13.1.2.

b) To calculate the rate:

- Divide the numerator (13.2.1) by the denominator (13.2.2a)
- Multiply this result by 100,000 to get the ‘**Annual prevalence rate per 100,000 employed persons age 16 years or older**’.

13.2.3 Annual number of incident cases

Use the ABLES definition of an incident case: Case with a BLL of ≥ 40 $\mu\text{g/dL}$ reported in the calendar year, but was not reported in the immediately preceding year with a BLL of ≥ 40 $\mu\text{g/dL}$ (may appear in earlier years with a BLL of 40 $\mu\text{g/dL}$ or greater).

13.2.4 Annual incidence rate per 100,000 employed persons

a) To obtain the denominator for the rate:

Follow directions for 13.1.2.

b) To calculate the rate:

- Divide the numerator (13.2.3) by the denominator (13.1.2a).
- Multiply this result by 100,000 to get the ‘**Annual incidence rate per 100,000 employed persons age 16 years or older**’.

Topic: OCCUPATIONAL HAZARDS	
INDICATOR #14: PERCENTAGE OF WORKERS EMPLOYED IN INDUSTRIES AT HIGH RISK FOR OCCUPATIONAL MORBIDITY	
Demographic Group:	Employed persons
Numerator:	Employed workers, 16 years of age and older, in high-risk industries for occupational morbidity
Denominator:	Employed persons age 16 years or older for same calendar year
Measures of Frequency:	<p>Number of employed persons in high morbidity risk NAICS industries</p> <p>Percentage of employed persons in high morbidity risk North American Industry Classification System (NAICS) industries.</p> <p>*The NAICS industries selected need to be reviewed every 5 years to update possible changes in the high-risk industries.</p>
Time Period:	Calendar year
Significance and Background:	<p>In 1999, the U.S. Bureau of Labor Statistics (BLS) reported an estimated total of 5.7 million injury and illness cases within the private sector workforce, an estimated incidence rate of 6.3 cases per 100 full-time-equivalent workers. There are several industries that have significantly higher injury and illness rates than this national average. Twenty-five industries have occupational injury and illness rates higher than 13 cases per 100 full-time workers. These industries accounted for 6.5 million workers in the U.S. (6% of the private sector non-farm wage and salary employment), but 17% of the OSHA reportable injuries and illnesses in 1999.</p>
Rationale:	Work-related injuries and illnesses are preventable, and control of occupational hazards is the most effective means of prevention. Concentrating on high-risk industries for non-fatal injuries and illnesses helps prioritize limited resources.
Limitations of Indicator:	It is possible that some new employers are not counted in the County Business Patterns mid-March survey. In addition, differences in regional industrial practices may cause the ranking of high-risk industries within a specific State to differ from those identified from national data.
Data Resources:	Bureau of the Census County Business Patterns (CBP) (numerator and denominator)
Limitations of Data Resources:	<p>The SOII is a function of BLS using a probability sample and not a census of all employers. It is based on injury and illness data maintained by employers and is subject to sampling error. There is a potential for additional sampling error if an employer has more than 30 cases with days away from work as an employer is only required to report on 30 such cases. Excluded from the survey are the military, self-employed individuals, farms with fewer than 11 employees, and Federal agencies. In some states, the survey does not cover the state and municipal employees. Therefore, the recommended measures of frequency are limited to private sector workforce only. Some states do not participate in the Federal-State survey, and in some participating states, the sample sizes are insufficient to generate State-specific estimates. Numbers and rates may not be published/released by BLS due to the reliability of the estimates. Employers vary with respect to how much they may reduce their potential reporting burden by placing affected workers on restricted work activity, thereby avoiding the reporting of lost workday cases (which require reporting of additional details). In addition, the SOII only collects data for the incident year, and does not capture lost work-time that may carry over to a new calendar year. For example, a debilitating injury that occurs on the last day of the calendar year will have no lost work-time associated with it in the SOII. The CBP is based on mid-March payrolls of all employers in the United States, but does not cover farms, public administration, or the self-employed. Exact employment counts for a particular NAICS may not be provided within a State because of confidentiality issues.</p>
HP2010 Objectives:	None
CSTE Positions:	None
Other Available Data:	None
Recommendations:	States could additionally identify their own State-specific high-risk industries and associated employment patterns.

HOW-TO GUIDE – INDICATOR #14:

PERCENTAGE OF WORKERS EMPLOYED IN INDUSTRIES AT HIGH RISK FOR OCCUPATIONAL MORBIDITY

14.1 Number of employed persons in high morbidity risk North American Industry Classification System (NAICS) industries

The following are high morbidity risk NAICS industries:

Manufacturing

3116	Meat product manufacturing
321113	Saw mills
321912	Cut stock, resawing lumber and planing
321918	Other millwork including flooring
32192	Wood container and pallet manufacturing
321999	All other miscellaneous wood product manufacturing
327112	Vitreous china, fine earthenware, and other pottery product manufacturing
327113	Porcelain electrical supply manufacturing
3273	Cement and concrete product manufacturing
3274	Lime and gypsum product manufacturing
327999	All other miscellaneous nonmetallic mineral product manufacturing
331312	Primary aluminum production
331314	Secondary smelting and alloying of aluminum
33141	Nonferrous metal (except aluminum) smelting and refining
331423	Secondary smelting, refining, and alloying of copper
331492	Other nonferrous metal secondary smelting, refining, and alloying
33151	Ferrous metal foundries
33152	Nonferrous metal foundries
332111	Iron and steel forging
332112	Nonferrous forging
332114	Custom roll forming
332115	Crown and closure manufacturing
332116	Metal stamping
33221	Cutlery and handtool manufacturing
33231	Plate work and fabricated structural product manufacturing
33232	Ornamental and architectural metal product manufacturing
33241	Power boiler and heat exchanger manufacturing
33242	Metal tank (heavy gauge) manufacturing
332439	Other metal container manufacturing
33251	Hardware manufacturing
332722	Bolt, nut, screw, rivet, and washer manufacturing
332999	All other miscellaneous fabricated metal product manufacturing
33312	Construction machinery manufacturing
33313	Mining and oil and gas field machinery manufacturing
333311	Automatic vending machine manufacturing
333312	Commercial laundry, dry-cleaning, and pressing machine manufacturing

333319	Other commercial and service industry machinery manufacturing
333414	Heating equipment (except warm air furnaces) manufacturing
333415	Air conditioning and warm air heating and commercial refrigeration equipment manufacturing
333913	Measuring and dispensing pump manufacturing
33392	Material handling equipment manufacturing
3361	Motor vehicle manufacturing
3362	Motor vehicle body and trailer manufacturing
336312	Gasoline engine and engine parts manufacturing
336322	Other motor vehicle electrical and electronic equipment manufacturing
33633	Motor vehicle steering and suspension component (except springs) manufacturing
33634	Motor vehicle brake system manufacturing
33635	Motor vehicle transmission and power train parts manufacturing
33637	Motor vehicle metal stamping
336391	Motor vehicle air conditioning manufacturing
336399	All other motor vehicle parts manufacturing
3365	Railroad rolling stock manufacturing
33661	Ship and boat building
33699	Other transportation equipment manufacturing
337127	Institutional furniture manufacturing
337212	Custom architectural woodwork and millwork manufacturing
337215	Showcase, partition, shelving, and locker manufacturing

Wholesale Trade

4215	Metal and mineral (except petroleum) wholesale
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Transportation and warehousing

48111	Scheduled air transportation
48839	Other support activities for water transportation

Health care and social assistance

62311	Nursing care facilities
62321	Residential mental retardation facilities
623311	Continuing care retirement communities

Arts, entertainment and recreation

71213	Zoos and botanical gardens
71219	Nature parks and other similar institutions

- Go to <http://censtats.census.gov/cbpnaic/cbpnaic.shtml>
- Select your state from the drop-down window in the County Business Patterns section and click on 'Go'.
- On the 2001 County Business Patterns (NAICS) page, verify state by clicking on 'submit'.
- To choose a different year, select year from pull-down menu and click on 'Go'.

- To get data on the industry code of interest, click on ‘Detail’ and read the 3rd column “Number of Employees for week including March 12”. If the number given is a range, use the midpoint of the range.
- Add the numbers of employees from each industry (using midpoints where necessary). This is the ‘Number of workers employed in high-risk industries’.

NOTE: If you cannot find a NAICS code in the County Business Patterns, you can assume the estimated number of employed persons is zero.

14.2 Percentage of employed persons in high morbidity risk North American Industry Classification System (NAICS) industries

a) To obtain the denominator for the percentage:

- Go to <http://censtats.census.gov/cbpnaic/cbpnaic.shtml>
- Select your state from the drop-down window in the County Business Patterns section and click on ‘Go’.
- On the 2001 County Business Patterns (NAICS) page, verify state by clicking on ‘submit’.
- To choose a different year, select year from pull-down menu and click on ‘Go’.
- To get data on the total employed population, read the top row and the 3rd column “Number of Employees for week including March 12”.

b) To calculate the percentage:

- Divide the number of workers employed in high-risk industries (14.1) by the number of employed persons (14.2a).
- Multiply this result by 100 to get the ‘**Percentage of employed persons in high morbidity risk industries**’.

Topic: OCCUPATIONAL HAZARDS	
INDICATOR #15: PERCENTAGE OF WORKERS EMPLOYED IN OCCUPATIONS AT HIGH RISK FOR OCCUPATIONAL MORBIDITY	
Demographic Group:	Employed persons
Numerator:	Employed persons age 16 years or older, in high risk private sector occupations at high risk for occupational morbidity
Denominator:	Employed persons age 16 years or older, in all private sector industries for the same calendar year
Measures of Frequency:	<p>Average number of employed persons in high morbidity risk 1990 Bureau of the Census Occupations</p> <p>Percentage of employed persons in high morbidity risk 1990 Bureau of the Census Occupations</p> <p>*The selected occupational codes need to be reviewed every 5 years to update possible changes in the high risk occupations.</p>
Time Period:	Calendar year
Significance and Background:	In 1999, the Bureau of Labor Statistics (BLS) reported an estimated 1.7 million injuries and illnesses that resulted in “days away from work”, and a rate of 1.9 “days away from work” cases per 100 workers. The risk of these injuries and illnesses are significantly higher in certain occupations. Twenty-three occupations have “days away from work” injury and illness rates higher than 5 cases per 100 workers. These occupations account for approximately 7.2 million workers in the U.S. (6% of the private sector employment), but 27% of OSHA “days away from work” cases in 1999.
Rationale:	Work-related injuries and illnesses are preventable, and control of occupational hazards is the most effective means of prevention. Concentrating on high-risk occupations for non-fatal injuries and illnesses helps prioritize limited resources.
Limitations of Indicator:	Differences in regional industrial practices may cause the ranking of high-risk occupations within a specific State or industry to differ from those identified from national data.
Data Resources:	Bureau of Labor Statistics Current Population Survey (CPS) (numerator and denominator)
Limitations of Data Resources:	<p>The BLS annual Survey of Occupational Injuries and Illnesses (SOII) is based on injury and illness data maintained by employers and is subject to sampling error, a function of BLS using a probability sample and not a census of all employers.</p> <p>Excluded from the survey are the military, self-employed individuals, farms with fewer than 11 employees, and Federal agencies. The CPS can be used to estimate the private sector employment in the United States, excluding the self-employed, but may not match perfectly those workers covered in the SOII.</p>
HP2010 Objectives:	None
CSTE Positions:	None
Other Available Data:	The BLS SOII and the CPS provide occupation data for some States.
Recommendations:	States could additionally identify their own State-specific high-risk occupations and assess associated employment patterns.

HOW-TO GUIDE – INDICATOR #15:

PERCENTAGE OF WORKERS EMPLOYED IN OCCUPATIONS AT HIGH RISK FOR OCCUPATIONAL MORBIDITY

15.1 Number of Employed Persons in High Morbidity Risk 1990 Bureau of Census Occupations

The following are high morbidity risk 1990 Bureau of the Census Occupations:

235	Technicians, n.e.c.
444	Miscellaneous food preparation occupations
463	Public transportation attendants
496	Timber cutting and logging occupations
527	Telephone line installers and repairers
576	Electrician apprentices
596	Sheetmetal duct installers
597	Structural metal workers
706	Punching and stamping press machine operators
709	Grinding, abrading, buffing and polishing machine operators
727	Sawing machine operators
755	Extruding and forming machine operators
766	Furnace, kiln, and oven operators, exc. food
768	Crushing and grinding machine operators
804	Truck drivers
806	Driver-sales workers
853	Excavating and loading machine operators
859	Misc. material moving equipment operators
866	Helpers, construction trades
869	Construction laborers
874	Production helpers
883	Freight, stock, and material handlers, nec
889	Laborers, except construction

- Go to <http://ferret.bls.census.gov/cgi-bin/ferret> to download the install file for the latest application version of DataFerrett.
- Once the download is complete, double click on the file and follow the on screen instructions to install DataFerrett to your machine. (For tutorials and other information for this new version of DataFerrett please go here: <http://dataferrett.census.gov>)
- Open the Ferrett application from the desktop icon.
- Register as user by placing your e-mail address into the box and press continue.
- Select the Microdata tab on the top of the page which will display available dataset; select the “Current Population Survey(CPS)– Basic” – then select one month from the year of interest by double-clicking on the month and year.

- From the next screen select the following datasets from CPS: “Demographic Variables”, “Labor Force Variables”, “Industry and Occupation Variables”, and “Geography Variables”, and then select GO.
- On the next screen all of the available variables for the selected tables will be displayed. Using the mouse and control key, please select the following variables and value ranges:
- “Demographic – age.....{PRTAGE}[11227]” – double click to browse/select variables and values. Check the “SELECT BOX” on next pop-up screen to define value range from 16-90, then click on ‘OK’. Click on ‘OK’ to confirm and to add the variable to your data shopping basket.
- “Geography-State FIPS Code.....{GESTFIPS}[11511]” – double click to browse/select variables and values. Check the ‘SELECT BOX’ on next pop-up screen, click ‘DESELECT ALL VARIABLES’, then select your State code, then click on ‘OK’. Click on ‘OK’ to confirm and to add the variable to your data shopping basket.
- “Indus.&Occ.-(main job) occupation code.....{PTIO1OCD}[11422]” – double click to browse/select variables and values. Check the ‘SELECT BOX’ on the next pop-up screen, click ‘DESELECT ALL VARIABLES’ and then select the occupation codes of interest. Click on ‘OK’ to confirm and to add the variable to your data shopping basket.
- “Labor Force-employment status.....{PEMLR}[11287]” – double click to browse/select variables and values. Check the ‘SELECT BOX’ on next pop-up screen, click ‘DESELECT ALL VARIABLES’ and then select ‘EMPLOYED AT WORK’ and ‘EMPLOYED ABSENT’. Click on ‘OK’ to confirm and to add the variable to your data shopping basket.
- Click on third tab on home page for ‘STEP 3: DOWNLOAD/MAKE TABLE’.
- Select ‘MAKE A TABLE’ from the table icon – you will see an empty spreadsheet on the left side of your screen and a box on the right with the variables in the shopping basket.
- Using your mouse, pull the variable titled Indus & Occ (PT100CD) from the right side to the top left corner of the empty spreadsheet and click on ‘GO’ on the toolbar.
- In a few seconds the table will be populated with a total employment number for all of the occupation groups and employment counts for each occupation category.
- Verify all the selections requested for the query. This is provided in simple SAS code on the bottom left side of your screen. Verify that you have selected your state, all the proper occupation codes, and “PEMLR=1” and “PEMLR=2” are selected.
- Use the copy function from the edit menu to copy the spreadsheet and paste (CNTL V) in to Excel.
- Return to the Home Page with the tabs and select Microdata – now select a new month and year.
- From the next screen select the following datasets from CPS: “Demographic Variables”, “Labor Force Variables”, “Industry and Occupation Variables”, and “Geography Variables”, and then select GO.
- Select the ‘STEP 3: DOWNLOAD/MAKE TABLE’ tab, repeat the process for generating a table, paste the new result in the next column of the Excel spreadsheet.
- Repeat the process for all 12 months.

- After all 12 months are obtained and in the Excel spreadsheet, sum the 12 months and divide by 12. This will yield the ‘**Average number of employed persons in high morbidity risk occupations**’.

15.2 Percentage Of Employed Persons In High Morbidity Risk 1990 Bureau Of Census Occupations

a) To obtain the number of employed persons by age group:

NOTE: This data is the same as average of the total identified in P6.

- Follow the directions in 15.1, except only choose “Demographic Variables”, “Labor Force Variables”, and “Geography Variables” after choosing the month and year of interest.
- Select the ‘STEP 3: DOWNLOAD/MAKE TABLE’ tab. Using your mouse, pull the variable titled Labor Force Variables (PEMLR) from the right side to the top left corner of the empty spreadsheet and click on ‘GO’ on the toolbar. Paste the data into an excel spreadsheet.
- Repeat the process for all 12 months.
- After all 12 months are obtained and in the Excel spreadsheet, sum the 12 months and divide by 12. This will yield the ‘**Average annual number of employed persons**’.

b) To calculate the percentage:

- Divide the number of workers employed in high-risk occupations (15.1) by the number of employed persons (15.2a).

Multiply this result by 100 to get the ‘**Percentage of workers employed in occupations at high risk for occupational morbidity.**’

Topic: OCCUPATIONAL HAZARDS	
INDICATOR #16: PERCENTAGE OF WORKERS EMPLOYED IN INDUSTRIES AND OCCUPATIONS AT HIGH RISK FOR OCCUPATIONAL MORTALITY	
Demographic Group:	Employed persons
Numerator:	Employed persons age 16 years or older, in private sector industries and occupations at high risk for occupational mortality
Denominator:	Employed persons age 16 years or older, in all private industries for the same calendar year
Measures of Frequency:	<p>Average number of employed persons in high mortality risk 1990 Bureau of the Census Industries</p> <p>Percentage of employed persons in high mortality risk 1990 Bureau of the Census Industries</p> <p>Average number of employed persons in high mortality risk 1990 Bureau of the Census Occupations</p> <p>Percentage of employed persons in high mortality risk 1990 Bureau of the Census Occupations</p> <p>*The selected industrial and occupational codes need to be reviewed every 5 years to update possible changes in the high risk industries.</p>
Time Period:	Calendar year
Significance and Background:	<p>Each year, over 6,000 cases of work-related fatalities are reported to the Census of Fatal Occupational injuries (CFOI) Program administered by the Bureau of Labor Statistics (BLS). On an average day, 16 workers die as a result of injuries sustained at work. The risks for these occupational fatalities are significantly higher in certain industries and occupations. Twenty-seven industries have fatality rates higher than 10 deaths per 100,000 workers, and employed approximately 17.2 million workers (14% of the private sector employment), but 58% of the occupational fatalities in 1998. There are also 24 occupations that have fatality rates higher than 20 deaths per 100,000 workers. These occupations account for approximately 7.6 million workers in the U.S. (6% of the private sector employment), but 45% of the occupational fatalities in 1998.</p>
Rationale:	<p>Multiple factors and risks contribute to work-related fatalities, including workplace and process design, work organization, worker characteristics, economics and other social factors. Surveillance of work-related fatalities can identify new hazards and case clusters, leading to the development of new interventions and development of new or revised regulations to protect workers. Concentrating on high-risk occupations and industries for fatalities helps prioritize limited resources.</p>
Limitations of Indicator:	Differences in regional industrial practices may cause the ranking of high-risk occupations and industries within a specific State to differ from those identified from national data.
Data Resources:	BLS Current Population Survey (CPS) (numerator and denominator)
Limitations of Data Resources:	<p>The CFOI program counts suicides at work as work-related fatalities, even when the cause of death may not be due to factors at work. CFOI does not count military deaths. To be consistent with Indicators #14 and #15, this indicator has been limited to private sector workers. Although, unlike Indicators #14 and #15, the self-employed are included.</p>
HP2010 Objectives:	None
CSTE Positions:	None
Other Available Data:	The BLS CFOI and the CPS provide industry and occupation data for most States.
Recommendations:	States could report their own specific high-risk industries and occupations and associated employment patterns.

HOW-TO GUIDE – INDICATOR #16:

PERCENTAGE OF WORKERS EMPLOYED IN INDUSTRIES AND OCCUPATIONS AT HIGH RISK FOR OCCUPATIONAL MORTALITY

16.1 Average Number of Employed Persons in High Mortality Risk Industries

The following are high mortality risk Bureau of the Census Industries:

010	Agricultural crop production
011	Agricultural livestock production
020	Landscape and horticultural services
030	Agricultural services, nec
031	Forestry
032	Fishing, hunting and trapping
040	Metal mining
041	Coal mining
042	Oil and gas extraction
050	Nonmetallic mining and quarrying, except fuel
060	Construction
201	Miscellaneous petroleum and coal products
230	Logging
251	Cement, concrete, gypsum and plaster products
360	Ship and boat building and repair
402	Taxicab service
410	Trucking service
420	Water transportation
471	Sanitary services
500	Wholesale motor vehicles and equipment
531	Wholesale scrap and waste materials
551	Wholesale farm product raw materials
552	Wholesale petroleum products
590	Mobile home dealers
622	Miscellaneous vehicle dealers
650	Liquor stores
752	Electrical repair shops

- Go to <http://ferret.bls.census.gov/cgi-bin/ferret> to download the install file for the latest application version of DataFerrett.
- Once the download is complete, double click on the file and follow the on screen instructions to install DataFerrett to your machine. (For tutorials and other information for this new version of DataFerrett please go here: <http://dataferrett.census.gov>)
- Open the Ferrett application from the desktop icon.
- Register as user by placing your e-mail address into the box and press continue.

- Select the Microdata tab on the top of the page which will display available dataset; select the “Current Population Survey(CPS)– Basic” – then select one month from the year of interest by double-clicking on the month and year.
- From the next screen select the following datasets from CPS: “Demographic Variables”, “Labor Force Variables”, “Industry and Occupation Variables”, and “Geography Variables”, and then select GO.
- On the next screen all of the available variables for the selected tables will be displayed. Using the mouse and control key, please select the following variables and value ranges:
- “Demographic – age.....{PRTAGE}[11227]” – double click to browse/select variables and values. Check the “SELECT BOX” on next pop-up screen to define value range from 16-90, then click on ‘OK’. Click on ‘OK’ to confirm and to add the variable to your data shopping basket.
- “Geography-State FIPS Code.....{GESTFIPS}[11511]” – double click to browse/select variables and values. Check the ‘SELECT BOX’ on next pop-up screen, click ‘DESELECT ALL VARIABLES’, then select your State code, then click on ‘OK’. Click on ‘OK’ to confirm and to add the variable to your data shopping basket.
- “Indus.&Occ.-(main job) industry code.....{PTIO1OCD}[11422]” – double click to browse/select variables and values. Check the ‘SELECT BOX’ on the next pop-up screen, click ‘DESELECT ALL VARIABLES’ and then select the industry codes of interest. Click on ‘OK’ to confirm and to add the variable to your data shopping basket.
- “Labor Force-employment status.....{PEMLR}[11287]” – double click to browse/select variables and values. Check the ‘SELECT BOX’ on next pop-up screen, click ‘DESELECT ALL VARIABLES’ and then select ‘EMPLOYED AT WORK’ and ‘EMPLOYED ABSENT’. Click on ‘OK’ to confirm and to add the variable to your data shopping basket.
- Click on third tab on home page for ‘STEP 3: DOWNLOAD/MAKE TABLE’.
- Select ‘MAKE A TABLE’ from the table icon – you will see an empty spreadsheet on the left side of your screen and a box on the right with the variables in the shopping basket.
- Using your mouse, pull the variable titled Indus & Occ (PT100CD) from the right side to the top left corner of the empty spreadsheet and click on ‘GO’ on the toolbar.
- In a few seconds the table will be populated with a total employment number for all of the industry groups and employment counts for each industry category.
- Verify all the selections requested for the query. This is provided in simple SAS code on the bottom left side of your screen. Verify that you have selected your state, all the proper occupation codes, and “PEMLR=1” and “PEMLR=2” are selected.
- Use the copy function from the edit menu to copy the spreadsheet and paste (CNTL V) in to Excel.
- Return to the Home Page with the tabs and select Microdata – now select a new month and year.
- From the next screen select the following datasets from CPS: “Demographic Variables”, “Labor Force Variables”, “Industry and Occupation Variables”, and “Geography Variables”, and then select GO.
- Select the ‘STEP 3: DOWNLOAD/MAKE TABLE’ tab, repeat the process for generating a table, paste the new result in the next column of the Excel spreadsheet.

- Repeat the process for all 12 months.
- After all 12 months are obtained and in the Excel spreadsheet, sum the 12 months and divide by 12. This will yield the **‘Average number of employed persons in high mortality risk industries’**.

16.2 Percentage of Employed Persons in High Mortality Risk Industries

a) To obtain the number of employed persons by age group:

NOTE: This data is the same as average of the total identified in P6.

- Follow the directions in 15.1, except only choose “Demographic Variables”, “Labor Force Variables”, and “Geography Variables” after choosing the month and year of interest.
- Select the ‘STEP 3: DOWNLOAD/MAKE TABLE’ tab. Using your mouse, pull the variable titled Labor Force Variables (PEMLR) from the right side to the top left corner of the empty spreadsheet and click on ‘GO’ on the toolbar. Paste the data into an excel spreadsheet.
- Repeat the process for all 12 months.
- After all 12 months are obtained and in the Excel spreadsheet, sum the 12 months and divide by 12. This will yield the **‘Average annual number of employed persons’**.

b) To calculate the percentage:

- Divide the number of workers employed in high-risk occupations (16.1) by the number of employed persons (16.2a).

Multiply this result by 100 to get the **‘Percentage of workers employed in industries at high risk for occupational mortality.’**

16.3 Number of Employed Persons in High Mortality Risk Occupations

The following are high mortality risk occupations:

226	Airplane pilots and navigators
461	Guides
473	Farmers, except horticultural
475	Managers, farms, except horticultural
477	Supervisors, farm workers
479	Farm workers
496	Timber cutting and logging occupations
498	Fishers
576	Electrician apprentices
577	Electrical power installers and repairers
595	Roofers
597	Structural metal workers
599	Constructions trades, nec
613	Supervisors, extractive occupations
616	Mining machine operators
804	Truck drivers

806	Driver-sales workers
809	Taxicab drivers and chauffeurs
829	Sailors and deckhands
853	Excavating and loading machine operators
855	Grader, dozer, and scraper operators
859	Miscellaneous material moving equipment operators
869	Construction laborers
875	Garbage collectors

- To obtain the total employment in high-risk occupations, follow directions for 16.1a using occupation codes (i.e., “Indus&Occ. – (mainjob) occupation code{PT101OCD}[11422]) as identified above.

16.4 Percentage of Employed Persons in High Mortality Risk Occupations

a) To obtain the denominator for the percentage:

- Follow directions for 16.2a.

b) To calculate the percentage:

- Divide the number of workers employed in high-risk occupations (16.3) by the number of employed persons (16.2a).
- Multiply this result by 100 to get the **‘Percentage of employed persons in occupations at high risk for occupational mortality’**.

Topic: INTERVENTION RESOURCES FOR OCCUPATIONAL HEALTH	
INDICATOR #17: OCCUPATIONAL SAFETY AND HEALTH PROFESSIONALS	
Demographic Group:	Employed persons.
Numerator:	<ol style="list-style-type: none"> 1. Number of board-certified occupational medicine physicians 2. Number of members of the American College of Occupational and Environmental Medicine (ACOEM) 3. Number of board-certified occupational health nurses 4. Number of members of the American Association of Occupational Health Nurses (AAOHN) 5. Number of board-certified industrial hygienists 6. Number of members of the American Industrial Hygiene Association (AIHA) 7. Number of board certified safety health professionals (BCSP) 8. Number of members of the American Society of Safety Engineers (ASSE)
Denominator:	Employed persons age 16 years or older for the same calendar year
Measures of Frequency:	<ol style="list-style-type: none"> 1. Number of board-certified occupational medicine physicians. 2. Rate of board-certified occupational medicine physicians per 100,000 employees. 3. Number of members of ACOEM. 4. Rate of ACOEM membership per 100,000 employees. 5. Number of board-certified occupational health nurses. 6. Rate of board-certified occupational health nurses per 100,000 employees. 7. Number of members of AAOHN. 8. Rate of AAOHN membership per 100,000 employees. 9. Number of board-certified industrial hygienists. 10. Rate of board-certified industrial hygienists per 100,000 employees. 11. Number of members of AIHA. 12. Rate of AIHA membership per 100,000 employees. 13. Number of BCSP. 14. Rate of board certified safety health professionals per 100,000 employees. 15. Number of members of ASSE. 16. Rate of ASSE membership per 100,000 employees.
Time Period:	Calendar year.
Significance and Background:	Physicians with training and/or special interest in occupational medicine provide both primary, secondary and tertiary occupational health preventive services. In 1989, the American Medical Association recommended that there be one physician per 1,000 employees. Occupational health nurses provide a great deal of the 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.
Rationale:	Work-related injuries and illnesses are preventable. It is important to determine if there are sufficient trained personnel to implement occupational health preventive services.
Limitations of Indicator:	Other important occupational health specialties such as fire prevention, health physicists, ergonomists are not included.
Data Resources:	<p>American Board of Preventive Medicine (ABPM) diplomates database (www.abprevmed.org). (#1,2)</p> <p>Annual roster of members of the ACOEM (www.acoem.org). (#3,4)</p> <p>American Board of Occupational Health Nurses Directory (www.abohn.org). (#5,6)</p> <p>Annual roster of members of the AAOHN member directory (www.aaohn.org). (#7,8)</p> <p>American Board of Industrial Hygiene (www.abih.org). (#9,10)</p> <p>AIHA member directory (www.aiha.org). (#11,12)</p> <p>BCSP member directory (www.bcspp.org). (#13,14)</p> <p>ASSE member directory (www.asse.org). (#15,16)</p> <p>Bureau of Labor Statistics Current Population Survey Data. (denominator)</p>
Limitations of Data Resources:	The numerator data resources include retired individuals and individuals who may devote the majority of their time to research and limited or no time to provision of actual preventive services. An individual may practice part-time or even full-time in the field of occupational health and not be

	board certified or a member of the organization representing occupational health professionals. The completeness and frequency of updating addresses varies by each organization. Members are often listed in a database by a preferred address, which may not be the address where they practice.
HP2010 Objectives:	None
CSTE Positions:	None
Other Available Data:	None
Recommendations:	States could contact the occupational health specialists in the State to confirm address and assess status and nature of activity.

HOW-TO GUIDE – INDICATOR #17:

OCCUPATIONAL SAFETY AND HEALTH PROFESSIONALS

To obtain the number of occupational safety and health professionals in each category:

Data for membership in board certified occupational health specialties and professional associations for your state can be acquired by calling Jackie McClain at CSTE at (770) 458-3811 ext. 2003 or by e-mail at jmcclain@cste.org.

NOTE: This is administrative data that changes over time. Therefore, this data is collected at the same time each year.

To obtain the denominator for the rate:

- Go to Current Population Statistics: <http://www.bls.gov/opub/gp/laugp.htm>.
- For data prior to 2002, click on the appropriate year of ‘Geographic Profile of Employment and Unemployment’.
- Locate Table 12 – “Employment status of the civilian noninstitutional population by sex, age, race and Hispanic origin”.
- Find your state from the first column.
- Read the ‘Total’ row for your state and the 4th data column – “Employment Number”. This is the **‘Number of Employed Persons 16 years of age or older’** (in thousands). Multiply by 1000.

To calculate the rate:

- Divide the number of occupational safety and health professionals by the denominator.
- Multiply this result by 100,000 to get the **‘Rate of occupational health and safety professionals per 100,000 employed persons age 16 years or older’**

Topic: INTERVENTION RESOURCES FOR OCCUPATIONAL HEALTH	
INDICATOR #18: OSHA ENFORCEMENT ACTIVITIES	
Demographic Group:	Employed persons.
Numerator:	Total number of OSHA inspections Total number of employed persons covered by OSHA inspections
Denominator:	Estimated number of establishments under OSHA jurisdiction Estimated number of employees under OSHA jurisdiction for the same calendar year
Measures of Frequency:	Annual number of establishments inspected by OSHA Estimated percentage of all establishments under OSHA jurisdiction inspected by OSHA Annual number of employees whose work areas were inspected by OSHA Estimated percentage of all employees under OSHA jurisdiction whose work areas were inspected Estimated percentage of state establishments that are under OSHA jurisdiction
Time Period:	Calendar year
Significance and Background:	In 1970, Congress established the Occupational Safety and Health Administration (OSHA). The OSHA mission is to "assure so far as possible every working man and woman in the nation safe and healthful working conditions". This mandate involves the application of a set of tools by OSHA (e.g., standards development, enforcement, compliance assistance). OSHA conducts both referral and non referral inspections on work-sites. Work-sites are selected into an emphasis program for non referred inspections, randomly and on the basis of industry incidence rates of injuries. Investigations are inspections that are triggered by three events: fatality, catastrophe, or referral (including outside health/safety agency or media). All of the above on-site activities are called inspections for the statistical databases. Comprehensive information about inspections is found in the OSHA Field Inspection Reference Manual CPL 2.103, available on the OSHA web-site (http://www.osha.gov/Firm_osh_toc/Firm_toc_by_sect.html).
Rationale:	The measures of frequency for this indicator provide indications of the number and proportions of workers and worksites potentially benefiting directly from OSHA inspection activity.
Limitations of Indicator:	This indicator only measures enforcement activity and not other measures of OSHA activity such as education and compliance assistance. The number of inspections conducted by OSHA is used to approximate the number of establishments inspected by OSHA in this indicator. Because OSHA may conduct multiple inspections of the same establishment during the calendar year, the % of establishments inspected may be slightly overestimated. In addition, if OSHA conducts multiple inspections of the same worksite during the year, the number of workers covered by OSHA inspections may be over counted. In federal OSHA states and some OSHA state plan states, OSHA does not inspect farms with 10 or fewer employees. Agricultural establishments were excluded from the denominator in this indicator; in states that do inspect smaller farms, the indicators may be overestimated.
Data Resources:	OSHA annual reports of total inspections conducted and the number of workers covered by these inspections (numerators). Bureau of Labor Statistics on Covered Employers and Wages (commonly referred to as the ES-202/CEW data http://www.bls.gov/cew/home.htm) for the number of workers employed and establishments in the public and private sectors (denominators).
Limitations of Data Resources:	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 CEW data individuals holding more than one job are counted multiple times.
HP2010 Objectives:	None
CSTE Positions:	None
Other Available Data:	Other indicators can be generated from the VPP and SHARPS program, the local emphasis programs and the participants of the 21D consultation program. Other data that can be generated

	from the inspections include type of violations and penalties, the number of all workers at the work-site inspected, union affiliation, inspection type, local or national emphasis initiatives, inspection and investigation reports by industrial classification and employer's name.
Recommendations:	Collaborate with State or regional OSHA Office to obtain more detailed information on the above.

HOW-TO GUIDE – INDICATOR #18

OSHA ENFORCEMENT ACTIVITIES IN THE PRIVATE SECTOR

18.1 Annual number of establishments inspected by OSHA in all OSHA-covered sectors

- a) Contact your federal or regional OSHA office to obtain OSHA Inspection reports with criteria #5 and 9 (also called INSP-5 and INSP-9 (state-plan states only)), which contain summary data on OSHA inspections and number of employees covered by these inspections for the calendar year. **Specify that you want the report for the all sectors over which OSHA has jurisdiction.** Regional office contact information can be found on the OSHA web site at www.osha.gov by scrolling to the bottom of the page and clicking on “OSHA Offices,” then “Regional, Area Offices” and then selecting your region.
- b) In your request, specify that you would like the following:
 - The total number of OSHA inspections of establishments conducted within your state for the calendar year.
 - The total number of employees covered by inspections in all covered sectors (i.e., private and federal only for federal states and all sectors for state-plan states).
- c) On page 1 of the INSP-5 report, obtain the number for TOTAL INSPECTIONS. If your state has an INSP-9 report as well, add the total inspections from each report for a grand total. This will yield the **“Annual number of establishments inspected by OSHA”**.

NOTE: OSHA sometimes conducts inspections that are limited to reviewing OSHA logs at the worksites. These are called "Records Inspections" and are included in the number of Total Inspections. Typically the number of records inspections will be small relative to total inspections, so including these as part of the total should not have any substantial effect on the estimates.

Useful state data on OSHA inspections is also available at <http://www.osha.gov/oshstats/index.html>. However the numbers of inspections for states may differ slightly from those included in the INSP-5 and INSP-9 reports, which are to be used in generating this indicator. The OSHA web site does not include information about number of employees covered.

18.2 Estimated percentage of all establishments under OSHA jurisdiction inspected by OSHA

- a) To obtain the denominator for the percentage:
 - Go to the BLS web site <http://www.bls.gov/cew/home.htm>.
 - Access your state’s ES-202/CEW statistics by clicking on “1997-2000 (SIC based)” found under the “Create Customized tables” (one screen or multiple screens) under the heading “Get detailed statistics.” (For years greater than 2000, click on “2001 forward (NAICS basis)”.)
 - On the pop-up screen select your state for #1 and “statewide” for #2.
 - Select All Industries for #3 and all relevant sectors for ownership under #4 (i.e., federal and private for federal states; all options for state-plan states). Use the CTRL key to select more than one.

- For #5 select “All” and for #6 select “number of establishments.”
- Then select “Get Data.”
- From the resulting table, obtain the number of establishments (A) for the year of interest

Adjust for exclusion of mines in the numerator:

- Go back to the window of the pop-up screen, and repeat the same except entering SIC codes 10**, 12**, and 14** instead of All Industries for #3. (For years greater than or equal to 2001, use NAICS codes 212, 213)
- Then select “Get Data.”
- From the resulting table obtain the number of establishments (B) for the year of interest
- Subtract B from A to adjust your denominator.

Adjust for exclusion of farms in the numerator:

- Go back to the window of the pop-up screen, and repeat the same except entering SIC 01** (Agricultural production crops) and SIC 02** (Agricultural Production livestock) instead of All Industries for #3. (For years greater than or equal to 2001, use NAICS codes 111, 112)
- Then select “Get Data.”
- From resulting table obtain the number (C) of establishments for the year of interest.
- Subtract C from (A-B) to get your final denominator, the **“Number of OSHA establishments under OSHA jurisdiction”**.

NOTE: For states that know their OSHA inspects all farms including farms with less than 10 employees, don’t exclude agriculture from the denominator. Include this in a footnote when you submit your data.

b) To calculate the percentage:

- Divide the numerator (18.1) by the denominator (A-B-C) (18.2a)
- Multiply by 100 to obtain the **“Percentage of all OSHA-covered establishments that were inspected by OSHA”**.

18.3 Annual number of employees whose work areas were inspected by OSHA

- On page 2 of the INSP-5/INSP-9 report under "Employee information," obtain the number for employees COVERED BY INSPECTION. This is the **“annual number of employees whose work areas were inspected by OSHA”**.

NOTE: OSHA also reports the total number of workers ‘Employed in Establishment’. This number can be larger than the number of workers ‘Covered by Inspection’ because OSHA often only inspects part but not all of the workplace. The indicator is based on the number of workers covered, NOT the number employed in establishment.

18.4 Estimated percentage of all employees under OSHA jurisdiction whose work areas were inspected

a) To obtain the denominator for the percentage:

- Go to the BLS web site <http://www.bls.gov/cew/home.htm>.

Access your state's ES-202/CEW statistics by clicking on "1997-2000 (SIC based)" found under the "Create Customized tables" (one screen or multiple screens) under the heading "Get detailed statistics." (For years greater than 2000, click on "2001 forward (NAICS basis)".)

- On the pop-up screen select your state for #1 and "statewide for" #2.
- Select All Industries for #3 and all relevant sectors for ownership under #4.
- For #5 select "All" and for #6 select "all employees"
- Then select "Get Data."
- From resulting table obtain the number (A) of employees for the year of interest.

Adjust for exclusion of miners in the numerator:

- Go back to the window of the pop-up screen, and repeat the same except entering SIC codes 10**, 12**, and 14** instead of All Industries for #3. (For years greater than or equal to 2001, use NAICS codes 212, 213)
- Then select "Get Data."
- From the resulting table obtain the number of employees (B) for the year of interest.
- Subtract B from A to adjust your denominator.

Adjust for exclusion of farmers in the numerator:

- Go back to the window of the pop-up screen, and repeat the same except entering SIC 01** (Agricultural production crops) and SIC 02** (Agricultural Production livestock) instead of All Industries for #3. (For years greater than or equal to 2001, use NAICS codes 111, 112)
- Then select "Get Data."
- From resulting table obtain the number (C) of employees for the year of interest.
- Subtract C from (A-B) to get your final denominator.

NOTE: For states that know their OSHA inspects all farms including farms with less than 10 employees, don't exclude agriculture from the denominator. Include this in a footnote when you submit your data.

b) To calculate the percentage:

- Divide the numerator (18.3) by the denominator (18.4a)
- Multiply by 100 to obtain the **"Percentage of all OSHA covered employees whose work areas were inspected by OSHA"**.

18.5 Estimated percentage of state establishments that are under OSHA jurisdiction

NOTE: For state-plan states this should be 100% by definition

a) To calculate the numerator:

- Take the value from 18.2a (without adjusting for agriculture).

b) To calculate the denominator:

- Repeat steps in 18.2 except when you select type of ownership you should select all possibilities (private, state, municipal, and federal)

- Retain the same exclusion for mines but not agriculture.

c) To calculate the percentage:

- Divide the numerator (18.5a) by the denominator (18.5b).

Multiply by 100 to obtain the '**Estimated percentage of State establishments that are under OSHA jurisdiction**'.

Topic: SOCIOECONOMIC IMPACT OF OCCUPATIONAL INJURIES AND ILLNESSES	
INDICATOR #19: WORKERS' COMPENSATION AWARDS	
Demographic Group:	Employed persons
Numerator:	Total amount of workers' compensation benefits paid
Denominator:	Number of workers with workers' compensation coverage for the same calendar year Total employed civilians 16 years and older
Measures of Frequency:	Total amount of workers' compensation benefits paid Average amount of workers' compensation benefits paid per covered worker Percentage of civilian employment covered by workers' compensation
Time Period:	Calendar year
Significance and Background:	In 2000, \$45.9 billion in workers' compensation benefits were paid to workers with occupational injuries or illnesses. The benefits include payments for medical care and wage-replacement to workers or their surviving dependents. The number of workers covered by workers' compensation insurance has increased and while the frequency of claims has declined, the medical and wage-replacement costs per worker have increased, assuring continued economic impact of work-related injuries and illnesses on workers and employers.
Rationale:	Workers' compensation awards are reviewed to establish whether the reported medical condition is work-related. Accepted awards represent known work-related injuries and illnesses, and often more severe cases. The total and average amounts of benefits paid estimate the burden of these events, which can help justify prevention programs and activities.
Limitations of Indicator:	This is a gross indicator of the burden of occupational injury and illness. It does not include human, noneconomic costs nor all the economic costs associated with occupational injuries and illnesses. These data are more appropriate for evaluating trends within a State rather than comparisons between States because of differences in wages and medical costs, the compensation determination, industry types and risks, and policies on permanent disability payments. Even within a State, changes in policies, wages and medical care expenses must be considered.
Data Resources:	National Academy of Social Insurance (www.nasi.org).
Limitations of Data Resources:	Workers' compensation data is not complete, as many individuals with work-related illnesses do not file for workers' compensation. Self-employed individuals (e.g. farmers, independent contractors and small business owners), corporate executives, domestic and agricultural workers may be exempt from coverage. Additionally, federal employees, railroad, long shore and maritime workers are not covered by State workers' compensation systems. Compensation award payments are frequently made over time, thus annual awards may not reflect the full cost of, injuries and illnesses for a given year.
HP2010 Objectives:	20-2
CSTE Positions:	None
Other Available Data:	NASI tables with State-specific data have included: Number of Workers Covered by Workers' Compensation and Total Covered Wages Workers' Compensation Benefits by Type of Insurer and Medical Benefits
Recommendations:	NASI also provides the employers' costs for workers' compensation. State workers' compensation system and state employment data may provide additional information about incidence and costs that would increase the usefulness of these data for prevention efforts. States may supply industry- and occupation-specific counts, costs and rates of accepted workers' compensation claims. Age and gender can also be used to better define the burden of occupational injuries/illnesses. Many States report data collected for the subset of accepted time-loss claims—those involving days away from work—which are likely to have the highest costs to and affects upon workers and employers.

HOW-TO GUIDE – INDICATOR #19:

WORKERS' COMPENSATION AWARDS

19.1 Total amount of workers' compensation benefits paid

- Go to <http://www.nasi.org/>.
- Click on menu 'Publications'.
- Click on 'Reports'.
- Click on report entitled: "Workers' Compensation: Benefits, Coverage, and Costs. 2000, New Estimates."
- Click on 'Download' (must have Adobe Acrobat).
- Go to Table 10 "Workers' Compensation Benefits by State, 1997-2000 (in thousands)". Located on page 18-19 of report.
- Identify state and read column for '2000'. Multiply number by 1,000.

19.2 Average amount of workers' compensation paid per covered worker

a) To obtain the denominator

- Go to <http://www.nasi.org/>.
- Click on menu 'Publications'.
- Click on 'Reports'.
- Click on report entitled: "Workers' Compensation: Benefits, Coverage, and Costs. 2000, New Estimates."
- Click on 'Download' (must have Adobe Acrobat).
- Go to Table 4 "Number of Workers Covered by Workers' Compensation and Total Covered Wages, By State, 1998-2000". Located on page 6-7 of report.
- To determine the number of workers covered by workers' compensation, identify state and read column 'Covered Workers (in thousands)' for 2000. Multiply by 1,000.

b) To calculate the average amount of workers compensation benefits paid per covered worker:

- Divide numerator (19.1) by the denominator (19.2a) - expresses result in dollars per covered worker.

19.3 Percentage of civilian employment covered by workers' compensation

a) To obtain the number of workers covered by workers' compensation:

- Use 19.2a

b) To obtain the total employed civilians 16 years or older:

- Go to Current Population Statistics: <http://www.bls.gov/opub/gp/laugp.htm>.
- For data prior to 2002, click on the appropriate year of 'Geographic Profile of Employment and Unemployment'.
- Locate Table 12 – "Employment status of the civilian noninstitutional population by sex, age, race and Hispanic origin".
- Find your state from the first column.

- Read the 'Total' row for your state and the 4th data column – "Employment Number". This is the '**Number of Employed Persons 16 years of age or older**' (in thousands). Multiply by 1000.
- c) To calculate the percentage:
- Divide the number of workers covered by workers' compensation (19.3a) by the total number employed (19.3b). Multiply by 100.

APPENDIX A: WORK GROUP MEMBERS

NIOSH-CSTE OCCUPATIONAL HEALTH SURVEILLANCE WORK GROUP

OCCUPATIONAL HEALTH SURVEILLANCE INDICATORS

For Tracking Work-Related Health Effects

And Their Determinants

WAYNE BALL, Utah Department of Health
GEOFFREY CALVERT, National Institute for Occupational Safety and Health
ROBERT CASTELLAN, National Institute for Occupational Safety and Health
LETITIA DAVIS, Massachusetts Department of Health
ROBERT HARRISON, California Department of Health Services
MICHAEL HEUMANN, Oregon Department of Health Services
KIM LIM, Maine Department of Labor
JOHN MYERS, National Institute for Occupational Safety and Health
MATT LONDON, New York State Department of Health
LATOYA OSMANI, Council of State and Territorial Epidemiologists
DAVID PARKER, Minnesota Department of Health
KENNETH ROSENMAN, Michigan State University
ROBERT ROSCOE, National Institute for Occupational Safety and Health
DIANA SALZMAN, Texas Department of Health
JOHN SESTITO, National Institute for Occupational Safety and Health
CATHERINE THOMSEN, Oregon Department of Human Services
DAVID VALIANTE, New Jersey Department of Health and Senior Services

APPENDIX B: CORE STATE MEMBERS

CORE OCCUPATIONAL HEALTH SURVEILLANCE PILOT PROJECT

California Department of Health Services

BARBARA MATERNA

FLORENCE REINISCH

Massachusetts Department of Public Health

TSEGAYE BEKLE

LETITIA DAVIS

ROKHO KIM

Michigan Department of Community Health

THOMAS LARGO

MARTHA STANBURY

New York State Department of Health

ALICIA FLETCHER

KITTY GELBERG

Washington State Department of Labor and Industries

DAVE BONAUTO

CHRISTY CURWICK

APPENDIX C: LOCATIONS OF INDICATOR DATA

Location	Indicator
OSH_Profile CD-ROM	
Table 1	4.1
Table 2	4.2
Table 6	1.2, 1.4
Table 7	1.1, 1.3
OSH_CFOI CD-ROM	3.1
www.bls.gov/iif/home.htm#tables	
SOII numbers	1.1, 1.3
SOII rates	1.2, 1.4
CFOI	3.1
ftp://ftp.bls.gov/pub/special.requests/ocwc/osh	7.x
Current Population Statistics	http://www.bls.gov/opub/gp/laugp.htm
Table 12	P1, P2, P3, P4, P5, P7, P8, 2.2, 3.2, 6.2, 11.2, 13.x.2, 13.x.4, 14.2, 19.3
Table 13	P3
Table 18	P2
Table 19	P4
quickfacts.census.gov	9.x.2, 10.x.2, 12.2
www.nasi.org	
Table 4	5.2, 8.2, 19.2
Table 10	19.1
County Business Patterns	14.1
http://censtats.census.gov/cbpnaic/cbpnaic.shtml	
FERRET	P6, 15.x, 16.x
http://ferret.bls.census.gov/cgi-bin/ferret	
www.cste.org	11.1
ABLES	13.x.1, 13.x.3
Cancer Registry	12.1
Hospital Discharge Data	2.1, 6.1, 9.x.1
Vital Records	10.x.1
Workers' Compensation	5.1, 8.1
CSTE	17
OSHA INSP-5 and INSP-9 Reports	18.1, 18.2, 18.3, 18.4
www.bls.gov/cew/home.htm	18.2, 18.4, 18.5

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