CSTE

OCCUPATIONAL HEALTH INDICATORS:
A Guide for Tracking Occupational Health Conditions and
Their Determinants

Updated July 2021 for analysis of 2018 OHI data

Council of State and Territorial Epidemiologists
In Collaboration with the Centers for Disease Control and Prevention National Institute for
Occupational Safety and Health

Preface

This document provides guidance to states for generating Occupational Health Indicators (OHIs). The guidance document is updated yearly to reflect changes in process, data sources, injury and disease coding and referenced URL links. **This version was written specifically for the analysis of 2018 data.** Changes made for the purpose of analyzing 2018 data may impact the analysis of data from 2003-2017, including web links, injury codes, indicator case definitions, and resulting indicator estimates.

Questions about any specific indicator may be directed to that indicator's lead (Appendix A). Questions about the OHI Work Group, which manages OHI updates and additions for this document, may be directed to the Work Group Co-chairs (Appendix B). Members of the current Work Group are also listed in Appendix B.

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INTRODUCTION

This document describes the current set of occupational health indicators (OHIs) recommended by the Council of State and Territorial Epidemiologists (CSTE), in association with the National Institute for Occupational Safety and Health (NIOSH). These indicators represent a core set of data that can help states develop priorities for workplace injury and illness prevention.

These indicators and this "how-to" guide are meant to assist states in building capacity for occupational health surveillance. The indicators are intended to be used in conjunction with other guidelines for state-based surveillance of occupational injuries and illnesses (NIOSH 1995, CSTE 2001). 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. The indicators can complement other state and national goals to improve population health.

The process of generating 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 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.

Some data sources allow for state-to-state or state-to-national comparisons. Certain data sources, however, do not allow for such comparisons. **Indicators based on Workers' Compensation, Hospital Discharge Data, or Emergency Department Data should <u>NOT</u> be compared from state-to-state or state-to-national. These include:**

- Indicator # 2 Work-related hospitalizations
- Indicator # 5 Amputations identified in state workers' compensation systems
- Indicator # 6 Hospitalizations for work-related burns
- Indicator # 8 Carpal tunnel syndrome cases identified in state workers' compensation systems
- Indicator # 9 Pneumoconiosis hospitalizations
- Indicator # 19 Workers' compensation awards
- Indicator # 20 Hospitalizations for low-back disorders
- Indicator # 22 Work-related severe traumatic injury hospitalizations
- Indicator # 24 Occupational heat-related emergency department visits
- Indicator # 25 Hospitalizations involving occupational eye injuries

Indicators based on the Survey of Occupational Injuries and Illnesses data should <u>NOT</u> be compared from state-to-state or state-to-national. These include:

- Indicator #1: Non-fatal work-related injuries and illnesses reported by employers
- Indicator #4: Work-related amputations with days away from work reported by employers
- Indicator #7: Work-related musculoskeletal disorders with days away from work reported by employers

The OHI Work Group acknowledges that there are significant limitations in the design of the indicators, both intrinsic to the indicators as well as to the data sources upon which they rely. The Work Group remains committed to ensuring the ongoing viability of these indicators and assisting all States as they attempt to understand work-related injuries and illnesses.

This document includes individual sections that provide detailed instructions on obtaining data for and creating the OHIs. OHI data sources and their limitations are described in detail in Appendix C. Due to changes (e.g., website addresses, coding schemes) inherent in the data sources used to generate the indicators, this document is reviewed and updated annually.

Profile of Employment Demographics	
Rationale:	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.
Group:	Employed persons
Data sources:	1. BLS Geographic Profiles of Employment and Unemployment (https://www.bls.gov/gps/home.htm) (numerator for all measures of frequency, except age, sex, race, and Hispanic origin) 2. BLS Geographic Profiles of Employment and Unemployment (denominator, except age). 3. NIOSH Employed Labor Force query system (for percentage of civilian employment by sex, age, race, and Hispanic origin) (https://wwwn.cdc.gov/wisards/cps/)
Numerator:	Employed persons 16 years or older by specific demographic characteristics
Denominator:	Employed population 16 years or older for the same calendar year
Measures:	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+) per week. 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. 11. Percentage of civilian employment by union membership
Time Period:	Calendar year
Limitations:	Because estimates are subject to sampling error, there is potential for over- or under-counts of the number of workers in each of the demographic categories. Furthermore, because the Employed Labor Force query system uses slightly different methods to apply population controls from those used for Geographic Profiles tabular data published by the Bureau of Labor Statistics, demographic estimates may differ slightly between the two data sources.

How-To: Profile of Employment Demographics

P.1) **Percentage of civilian workforce unemployed**
- Use BLS Geographic Profile of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
- Under "States", select Table 14, "Employment status of the civilian noninstitutional population, by gender, age, race, Hispanic or Latino ethnicity, and marital status."
- Locate rows corresponding to your state and find row titled, "Total."
- To obtain **"Percentage of civilian workforce unemployed"**, select value under column titled, "Rate" under "Unemployed."

P.2) **Percentage of civilian employment self-employed**
- Use BLS Geographic Profile of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
- Under "States", select Table 21, "Employed people by class of worker, gender, race, and Hispanic or Latino ethnicity."
- Locate row corresponding to your state and record value in the "Total" column (*P2A*).
- To calculate total number of self-employed workers (in thousands), add values from columns titled "Agricultural industries Self-employed" and "Nonagricultural industries Self-employed" (*P2B*).
- Divide *P2B* by *P2A* (*P2C*).
- To calculate **"Percentage of civilian employment self-employed",** multiply *P2C* by 100.

P.3) **Percentage of civilian employment in part-time jobs**
- To obtain number of workers in part-time jobs:
  - Use BLS Geographic Profile of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
  - Under "States", select Table 16, "Employed and unemployed people by full- and part-time status, gender, age, race, and Hispanic or Latino ethnicity."
  - Locate row corresponding to your state and record the value in the "Total" column under the "Part-time workers" section (*P3A*).
- To obtain total employed civilians 16 years or older:
  - Use BLS Geographic Profile of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
  - Under "States", select Table 14, "Employment status of the civilian noninstitutional population, by gender, age, race, Hispanic or Latino ethnicity, and marital status."
  - Locate rows corresponding to your state and find row titled, "Total."
  - Select the value in the "Total" column under the "Employed" section. This is the total number of employed civilians 16 or older, in thousands (*P3B*).
- To calculate **"Percentage of civilian employment in part-time jobs"**:
  - Divide *P3A* by *P3B* (*P3C*).
  - Multiple *P3C* by 100.

P.4) **Percentage of civilian employment by number of hours worked**
- To obtain the number of employed persons by hours worked:
  - Use BLS Geographic Profile of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
  - Under "States", select Table 22: "People at work by gender, age, race, Hispanic or Latino ethnicity, and hours of work."
  - Locate row corresponding to your state.

- To calculate number persons who worked 0 to 39 hours:
  - 0 hours worked. Locate number under "Total at work" and subtract this value from the total employed civilians 16 years or older. Multiply the result by 1,000 (*P4A*).
  - 1-14 hours worked. Multiply number in column "1 to 14 hours" by 1,000 (*P4B).*
  - 15-29 hours worked. Multiply number in column "15 to 29 hours" by 1,000 (*P4C*).
  - 30-34 hours worked. Multiply number in column "30 to 34 hours" by 1,000 (*P4D*).
  - 35-39 hours worked. Multiply number in column "35 to 39 hours" by 1,000 (*P4E*).
  - To calculate total number working 0 to 39 hours, sum *P4A, P4B, P4C, P4D, and P4E.*
- To calculate number persons who worked 40 hours, multiply number in column "40 hours" by 1,000 (*P4F*).
- To calculate number persons who worked 41+ hours:
  - 41-48 hours worked. Multiply number listed in column "41 to 48 hours" by 1,000 (*P4G*).
  - 49 hours and over worked. Multiply number in column "49 hours and over" by 1,000 (*P4H*).
- To calculate total number working 41 hours or more, sum *P4G and P4H.*

- Use *P3B* for the total employed civilians 16 years or older (*P4I*).
- To calculate **"Percentage of civilian employment by number of hours worked"**:
  - Divide each subcategory by *P4I.*
  - Multiply each result by 100.

P.5)   Percentage of civilian employment by sex
- To obtain totals for employed males and females:
  - Use BLS Geographic Profile of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
  - Under "States", select Table 14: "Employment status of the civilian noninstitutional population, by gender, age, race, Hispanic or Latino ethnicity, and marital status."
  - Find rows corresponding to your state. Under the 'Total' row, the second row includes data for 'Men' and the third row includes data for 'Women.'
    - Record total employment by sex (Men = *P5A,* Women = *P5B*).
- Use *P3B* for the total employed civilians 16 years or older (*P5C*).
- To calculate **"Percentage of civilian employment by sex"**:
  - Men. Divide *P5A* by *P5C*. Multiply the result by 100.
  - Women. Divide *P5B* by *P5C*. Multiply the result by 100.

P.6)   Percentage of civilian employment by age group (16-17, 18-64, 65+ years of age)
- To obtain number of employed persons by age group:
  - Use the NIOSH Employed Labor Force (ELF) (https://wwwn.cdc.gov/wisards/cps/).
  - Click on "ELF Estimates" from left-hand menu.
  - In Step 1, select 'Number of Workers.'
  - In Step 2, under Time Period, select year of interest.
  - In Step 2, under Location, select your state (if necessary, click on Expand Options).
  - In Step 3:
    - For Column Variable, select 'State.'
    - For Row Variable, select 'Age Group (Five Years).'
    - Leave Weight as 'Composite Weight.'
  - In Step 4, click on 'Submit Query.'
  - Once the query results appear, check query parameters to ensure that they correct.
  - Export to an Excel file.
  - Within the Excel file:

- ▪ 16 to 17 years old: The ELF system will automatically generate a value for number of workers age 16-17 years (*P6A*).
        - ▪ 18 to 64 years old: Sum the number of workers in each relevant age category (e.g., age group 18-19 through age group 60-64). This will give you the Total number of workers age 18 to 64 years in your state (*P6B*). (***NOTE:*** *If you highlight the values associated with the 18-64 group, Excel should indicate the sum at the bottom of the screen.*)
        - ▪ 65+ years old: Follow the process in 12b for ages 65 to 75+ (*P6C*). (Again, summation can be done in Excel by highlighting the appropriate values.)
    - To obtain the total employed civilians 16 years or older: The ELF query system will automatically generate a value for the total number of workers age 16 years or older, based on a sum of the individual age categories (*P6D*).
    - To calculate "**Percentage of civilian employment by age group**":
        - – 16 to 17 years old. Divide number of 16 to 17 years old (*P6A*) by total employment (*P6D*). Multiply result by 100.
        - – 18 to 64 years old. Divide number of 18 to 64 years old (*P6B*) by total employment (*P6D*). Multiply result by 100.
        - – 65+ years old. Divide number of 65+ years old (*P6C*) by total employment (*P6D*). Multiply result by 100.

P.7)   Percentage of civilian employment by race
- To obtain number of employed by race:
    - – Use BLS Geographic Profile of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
    - – Under "States", select Table 18: "Percent distribution of employed people by occupation, gender, race, and Hispanic or Latino ethnicity."
        - ▪ White; Under the 'White' row heading, find the row for your state and select the value under the second column, 'Number (thousands)' (*P7A*).
        - ▪ Black; Under the 'Black or African American' row heading, find the row for your state and select the value under the second column, 'Number (thousands)' (*P7B*).
        - ▪ Other; Under the 'Total' row heading, find the row for your state and select the value under the second column, 'Number (thousands)' (*P7C*). Add *P7A* and *P7B* (*P7D*). Subtract *P7D* from *P7C* (*P7E*).
- To obtain total employed civilians 16 years an older, under the 'Total' row heading in Table 18, locate the row for your state and select the value under the second column, 'Number (thousands)' (*P7F*).
- To calculate "**Percentage of civilian employment by race**":
    - – White. Divide *P7A* by *P7F*. Multiply result by 100.
    - – Black. Divide *P7B* by *P7F*. Multiply result by 100.
    - – Other. Divide *P7E* by *P7F*. Multiply result by 100.

P.8)   Percentage of civilian employment by Hispanic origin
- Use BLS Geographic Profile of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
- Under "States", select Table 18: "Percent distribution of employed people by occupation, gender, race, and Hispanic or Latino ethnicity."
    - – Hispanic; Under the 'Hispanic or Latino ethnicity row heading, find the row for your state and select the value under the second column, 'Number (thousands)' (*P8A*).

- To calculate "**Percentage of civilian employment by Hispanic origin"**: divide *P8A* by *P7F*. Multiply result by 100.

P.9) **Percentage of civilian employment by industry**
- Use BLS Geographic Profile of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
- Under "States", select Table 20: "Percent distribution of employed people by industry, gender, race, and Hispanic or Latino ethnicity."
- Under the 'Total' row heading, find the row corresponding to your state.
- Take the value under each of the industry column headings to obtain the "**Percentage of civilian employment by industry."**

P.10) **Percentage of civilian employment by occupation**
- Use BLS Geographic Profile of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
- Under "States", select Table 18 "Percent distribution of employed people by occupation, gender, race, and Hispanic or Latino ethnicity."
- Under the 'Total' row heading, find the row corresponding to your state.
- Take the value under each of the occupation column headings to obtain the "**Percentage of civilian employment by occupation."**

P.11) **Percentage of employed civilian wage and salary workers who are members of a union, or are represented by a union**
- Go to: https://www.bls.gov/cps, "Labor Force Statistics from the Current Population Survey."
- Scroll to "Historical News Release Tables" and select Union Affiliation Tables. Select "Table 5. Union affiliation of employed wage and salary workers by state."
- Locate your state. Check the box for "Members of unions: Percent of employed" and "Represented by unions: Percent of employed."
- Scroll down and click "Retrieve data."

INDICATOR #1 Non-fatal work-related injuries and illnesses reported by employers	
Rationale:	Estimating the burden and tracking occupational injuries and illnesses can direct 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.
Group:	Employed persons in the private sector
Data sources:	Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses (SOII)
Numerator:	1. Estimated cases of work-related injuries and illnesses. 2. Estimated cases of injuries and illnesses involving days away from work. 3. 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:	1. Estimated annual number of work-related injuries and illnesses. 2. Estimated annual incidence rate of work-related injuries and illnesses per 100,000 FTEs. 3. Estimated annual number of cases involving days away from work. 4. Estimated annual incidence rate of cases involving days away from work per 100,000 FTEs. 5. Estimated annual number of cases involving more than 10 days away from work.
Time Period:	Calendar year
Limitations:	SOII data have numerous inherent limitations, including impacts from employer reporting compliance and the accuracy and completeness of the reports. Employers are only required to report the detailed case characteristics (e.g., nature of the disabling condition, body part affected, and event and source producing the condition) when the injury or illness results in at least one day away from work beyond the day of injury or onset of illness. Employers do not always record all relevant events, and they may use restricted or light duty work to eliminate or decrease days away from work for injured workers. Employees may seek care for work-related conditions at personal healthcare providers without reporting the condition to their employer. Moreover, some conditions have long latencies and develop or worsen long after workplace exposures, which can mean they are not recognized or recorded by employers. Finally, industries for which data are available vary by state, primarily due to differences in industry concentration among states. Largely because of this last issue, BLS does not recommend comparing results among states or between individual states and the US as a whole. Additional details about the SOII survey including recordkeeping guidelines, sampling methods, news releases, and breaks in trend can be found here: https://www.bls.gov/iif/soii-overview.htm

How-To: OHI #1 Non-Fatal Work-Related Injuries and Illnesses Reported by Employers

1.1)   Estimated Annual Total Number of Work-Related Injuries and Illnesses
- Use the BLS Injuries, Illnesses, and Fatalities (IIF) data state webpage (http://www.bls.gov/iif/oshstate.htm).
- Select your state from the map.
- Select 'Case counts' under SOII for the target year.
- To locate the number of work-related injuries and illnesses, read across the 'Private Industry' row and down the 'Total Recordable Cases' column from the resulting table.
- To obtain **"Estimated annual total number of work-related injuries and illnesses,"** multiply the 'Total Recordable Cases' by 1,000.

Note: Data from this same table will be used in step 1.3

1.2)   Estimated Annual Total Work-Related Injury and Illness Incidence Rate per 100,000 FTEs
- Use the BLS IIF data state webpage (http://www.bls.gov/iif/oshstate.htm).
- Select your state from the map.
- Select 'Incidence Rates' under SOII for target year.
- Read across the 'Private Industry' row and down the 'Total Recordable Cases' column from the resulting table (the rate will be provided per 100 FTEs).
- To obtain the **"Estimated annual total work-related injury and illness incidence rate per 100,000 FTEs,"** multiply 'Total recordable cases' by 1,000.

Note: Data from this same table will be used in step 1.4

1.3)   Estimated Annual Total Number of Cases Involving Days Away from Work
- Use the BLS IIF data state webpage (http://www.bls.gov/iif/oshstate.htm).
- Select your state from the map.
- Select 'Case counts' under SOII for target year.
- To locate the number of cases with days away from work, read across the 'Private Industry' row and down the sub-column 'Cases with days away from work' from the resulting table.
- To obtain the **"Estimated annual total number of cases involving days away from work,"** multiply 'Cases with days away from work' by 1,000.

1.4)   Estimated Annual Total Incidence Rate for Cases Involving Days Away from Work per 100,000 FTEs
- Use the BLS IIF data state webpage (http://www.bls.gov/iif/oshstate.htm).
- Select your state from the map.
- Select 'Incidence Rates' under SOII for the target year.
- Read across the 'Private Industry' row and down sub-column 'Cases with days away from work' from the resulting table (the rate is provided per 100 FTEs).
- To obtain the **"Estimated annual total incidence rate for cases involving days away from work per 100,000 FTEs,"** multiply 'Cases with days away from work' by 1,000.

1.5)   Estimated Annual Total Number of Cases involving more than 10 Days Away from Work
- Use the BLS IIF homepage (http://www.bls.gov/iif/home.htm).
- Choose IIF DATABASES from the left column.
- Under Workplace Injury and Illness Databases header, locate the row titled 'Nonfatal cases involving days away from work: selected characteristics (2011 forward).' Click on the icon for 'multi-screen

data search.' This will bring you to a page with the header, 'Create Customized Tables.' There should be a sub-header, 'Nonfatal cases involving days away from work: selected characteristics (2011 forward) – Area (Screen 1 of 7).'

- Under 'Choose Area' scroll to locate your state. Select your state and click the 'Next form' button.
- Under 'Choose Ownership,' select '1 Private industry' and then click the 'Next form' button.
- Under 'Choose Data Type,' select '6 Injury and Illness Cases' and then click 'Next form' button.
- Under 'Choose Case Type,' locate and select '3 Selected characteristic by detailed industry.' Click 'Next form' button.
- Under 'Choose category,' hold the shift key (to choose multiple categories) while scrolling down. Select 'DEX DAFW (11-20 days), DFX DAFW (21-30 days), and DGX DAFW (31+ days).' Release shift key. Confirm that all three choices are selected and click 'Next form' button.
- Under 'Choose Industry,' select '00000 All Industry.' Click 'Next form' button.
- You should be at a screen showing 'Nonfatal cases involving days away from work: selected characteristics (2011 forward) – Year (Screen 7 of 7).' The data box on this screen should contain three data series IDs. Click on the 'Retrieve data' button below the data box.
- The results page will be titled **'**Databases, Tables & Calculators by Subject.' The results of the query will show all three data series (11-20 days, 21-30 days, and 31+ days) and the total number in each category. Verify that the state name and data description are correct. You will need the result from all three categories to calculate the "**Estimated Annual Total Number of Cases involving more than 10 Days Away from Work."**

NOTE: *As additional data years (2011 and later) are released, multiple data years may be presented. You can limit the data to one year, if desired, using the 'Change Output Options' function under the page title.*

- To record the data from the results page above, please follow one of the two options described below.
- Option 1: Click on the retrieve data button to display three separate data tables.
  - Write down, print, or download the data found under 'annual' for the target year.
- Option 2: Select the "More Formatting Options" shown on the upper right of the screen. This option allows you to choose the format for displaying and retrieving the data.
  - Table is the default view seen under option 1.
  - Multi-series table combines all three data series into a single table.

NOTE: *If you are not satisfied with how the data is retrieved with your first query, you can click on "More Formatting Options" and make a different choice, then click retrieve data without having to go through the entire data query process.*

- To calculate the "**Estimated Annual Total Number of Cases involving more than 10 Days Away from Work,"** sum the annual result data from all three data sets (11-20 days, 21-30 days, and 31+ days) from Option 1, or from the multi-series table from Option 2, for the target year.

NOTE: *Numbers and rates may not be available from the website if the estimate does not meet the BLS publication criteria. This is particularly true for small states and rare conditions. Regional BLS offices can provide revised/updated counts and rates for any year.*

INDICATOR #2 Work-related Hospitalizations	
Rationale:	Individuals hospitalized with work-related injury and illnesses have some of the more serious and costly work-related adverse health outcomes. Documenting the burden of occupational injuries and illnesses that require hospitalization over time offers the opportunity to identify workers that continue to be at high risk and to target and evaluate the impact of prevention efforts over time.
Group:	Employed persons
Data sources:	1. Inpatient hospital discharge data 2. BLS Geographic Profiles of Employment and Unemployment (https://www.bls.gov/gps/home.htm)
Numerator:	Inpatient hospital discharges with primary payer coded as workers' compensation
Denominator:	Employed population 16 years or older for the same calendar year
Measures:	1. Annual number of inpatient hospitalizations for persons aged 16 years and older 2. Annual crude rate of inpatient hospitalizations per 100,000 employed persons aged 16 years and older
Time Period:	Calendar year
Limitations:	Because inpatient hospital discharge records are not available for all patients and workers' compensation is not filed for all eligible workers, there is potential for an under-count of hospitalized workers. Inpatient 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. Furthermore, most individuals with work-related illnesses and many others with injuries do not file for workers' compensation. Additionally, certain worker groups (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 payer in hospital discharge may also not be accurate. Data between states may not be comparable due to differences in states' workers' compensation programs.

How-To: OHI #2 Work-related Hospitalizations

2.1) **Annual number of inpatient hospitalizations for persons aged 16 years or older**
- Submit a request to your State Health Department or to the appropriate data owner/manager for inpatient hospital discharge data in your state, to obtain the following information from your state's inpatient hospital discharge data:
  - State of residence = *'your state.'*
  - Primary payer = Workers' compensation.
  - Patient age = 16 years or older (preferably age at admission).
  - Exclude:
    - Age = unknown.
    - Residence = out of state or unknown.
    - Inpatient hospitalization = out-of-state.
  - Other criteria:
    - Use unduplicated records.
    - Use discharge data for calendar year only.
    - Use all cases, regardless of length of stay.
  - The number obtained from this request will represent the "**Annual number of inpatient hospitalizations for persons aged 16 years or older**" *(2A).*

2.2) **Annual crude rate of inpatient hospitalizations per 100,000 employed persons aged 16 years or older**
  2.2a) To obtain the denominator for the rate:
  - Use BLS Geographic Profile of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
  - Under "States", select Table 14: "Employment status of the civilian noninstitutional population, by gender, age, race, Hispanic or Latino ethnicity, and marital status."
  - Locate rows corresponding to your state and find row titled, "Total."
  - To obtain **"Number of employed persons aged 16 and older"**, select value under column titled "Total" under "Employed – Civilian labor force" *(2B).*
  - Multiply *2B* by 1,000 *(2C).*

  2.2b) To calculate the rate:
  - Divide *2A* by *2C (2D).*
  - Multiply *2D* by 100,000 to calculate the **"Annual crude rate of inpatient hospitalizations per 100,000 employed persons aged 16 years or older."**

INDICATOR #3 Fatal Work-related Injuries	
Rationale:	Multiple risks contribute to work-related fatalities, including worker characteristics, industry, occupation, and activity at time of incident. Surveillance of work-related fatalities can identify emerging hazards and can lead to the development of new interventions and new or revised regulations to protect workers.
Group:	Employed persons
Data sources:	1. Bureau of Labor Statistics Census of Fatal Occupational Injuries 2. NIOSH Employed Labor Force query system (https://wwwn.cdc.gov/wisards/cps/)
Numerator:	Fatal work-related injuries reported to the Census of Fatal Occupational Injuries (CFOI)
Denominator:	Total hours worked for all employees
Measures:	1. Annual number of fatal work-related injuries (numerator) 2. Annual crude fatality rate per 100,000 full-time equivalent workers (FTEs) aged 16 years and older
Time Period:	Calendar year
Limitations:	Limitations for this indicator are inherent to the data sources themselves. First, fatalities for workers younger than 16 may be included in the numerator but are not included in the denominator. Because the number of deaths among workers less than 16 in any given state are small, these numbers do not meet BLS publication criteria and thus, cannot be obtained from the BLS tables to exclude from the total number of workers. Second, CFOI is reported based on the state in which the fatal incident occurred which does not necessarily match the state of death or the state of residence. The denominator is reported based on state of residence. Thus, rates may under- or overestimate risk. Third, deaths among military personnel and volunteers are included in the numerator but not the denominator. Finally, the BLS uses a different methodology to calculate rates. As a result, rates calculated using the CSTE indicator methodology may differ from the BLS published rates.

NOTE: The denominator that the Bureau of Labor Statistics (BLS) uses to calculate fatality rates has changed over time from the number of workers employed to the total hours worked. The new hours-based rates use the average number of employees at work and the average hours each employee works. To be consistent with the BLS, the denominator for fatal work-related injury rates for this indicator has changed from the number employed, as indicated in the Geographic Profiles, to the number of hours worked which is designated as Full-Time-Equivalent workers or FTEs. States may wish to calculate rates using either method to track trends over time.

How-To: OHI #3 Fatal Work-related Injuries

3.1)   Annual number of fatal work-related injuries
- Use the BLS CFOI data (https://www.bls.gov/iif/oshstate.htm).
- From the map, select your state OR locate your state in the table.
- In the cell titled 'Fatal occupational injuries (CFOI) data,' select 'Fatal injury counts (HTML)' for the target year.
- To obtain **"Annual number of work-related fatal injuries,"** select the value in the cell that is at the intersection of the row titled 'Total' and column titled 'Total fatal injuries.' *(3A).*

3.2)   Annual crude fatality rate per 100,000 full-time-equivalent (FTE) workers aged 16 years or older
3.2a)   To obtain the denominator for the rate:
- Use the NIOSH Employed Labor Force (https://wwwn.cdc.gov/wisards/cps).
- Select "ELF Estimates" from the left-hand menu.
- For Step 1: Select *'type of labor force estimates':* Select *'FTE – primary job'* only.
- For Step 2: Select 'Query Parameters.'
  – For *Time Period:* Select target year.
  – For *Location:* Expand the option to select your state.
- For Total FTE, leave remaining parameters as they are. Skip Step 3 and leave the weighting as 'composite weight.'
- For Step 4: Select *'Submit the Query.'*
- A new screen will populate, and the **Annual Average Number of FTEs** aged 16 years and older will be displayed. *(3B)* This table can be exported to Word, Excel, or Adobe.

3.2b)   To calculate the rate:
- Divide 3*A* by *3B (3C).*
- Multiply *3C* by 100,000 to calculate the **"Annual crude fatality rate per 100,000 FTEs aged 16 years or older.'**

INDICATOR #4 Work-related Amputations with Days Away from Work Reported by Employers	
Rationale:	Work-related amputations are serious injuries. With appropriate occupational hazard controls, many, if not most, amputations could be prevented. Estimating the burden and tracking these injuries can help target prevention efforts. Data on amputations can be used to identify contributing factors and to improve or develop new prevention strategies or regulations to protect workers.
Group:	Employed persons in the private sector
Data sources:	Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses (SOII)
Numerator:	Estimated number of work-related amputations with days away from work (OIICS 2.01 nature code 1311)
Denominator:	Estimated total full-time equivalents (FTEs) worked for the same calendar year
Measures:	1. Estimated annual number of work-related amputations with days away from work 2. Estimated annual incidence rate of work-related amputations with days away from work per 100,000 FTEs
Time Period:	Calendar year
Limitations:	SOII data have numerous inherent limitations, including impacts from employer reporting compliance and the accuracy and completeness of the reports. Employers are only required to report the detailed case characteristics (e.g., nature of the disabling condition, body part affected, and event and source producing the condition) when the injury or illness results in at least one day away from work beyond the day of injury or onset of illness. Employers do not always record all relevant events, and they may use restricted or light duty work to eliminate or decrease days away from work for injured workers. Employees may seek care for work-related conditions at personal healthcare providers without reporting the condition to their employer. Moreover, some conditions have long latencies and develop or worsen long after workplace exposures, which can mean they are not recognized or recorded by employers. Finally, industries for which data are available vary by state, primarily due to differences in industry concentration among states. Largely because of this last issue, BLS does not recommend comparing results among states or between individual states and the US as a whole. Additional details about the SOII survey including recordkeeping guidelines, sampling methods, news releases, and breaks in trend can be found here: https://www.bls.gov/iif/soii-overview.htm Finally, see appendix D for additional notes about changes to OIICS coding that would potentially impact temporal analysis of SOII data pertaining to source, part, and nature of injuries.

How-To: OHI #4 Work-related Amputations with Days away from Work Reported by Employers

4.1)   Estimated annual number of work-related amputations involving days away from work
- Use the BLS IIF data homepage (https://www.bls.gov/iif/data.htm).
- Under Workplace Injury and Illness Databases, locate the row titled 'Occupational Injuries and Illnesses and Fatal Injuries Profiles.' Click on the icon for 'multi-screen data search.' This will bring you to a page called 'Occupational Injuries/Illnesses and Fatal Injuries Profiles.'
- For table type, select 'Case and Demographic Numbers.' Click on 'Continue.'
- Select the target year. Click on 'Continue.'
- Select your state. Leave 'Beginning year:' as 'single year.' Click on 'Continue.'
- Under 'Characteristic Type,' select 'Nature of condition.' Leave 'Name or description' selected under 'Order.' Click on 'Continue.'
- Under 'Subcharacteristic,' select 'Amputations 1311XX.' Leave 'Private industry' selected under 'Ownership.' Click on 'Continue.'
- Review your selections. Select the desired output format – HTML or Excel.
    - To generate an EXCEL table, the table will download as "download.xlsx." Open the downloaded table (opens in protected view). If you wish to edit, print, or save, click on "enable editing."
    - To generate an HTML table, the table will automatically open for viewing.
- To obtain **"Estimated annual number of work-related amputations involving days away from work,"** read across the "Total" row under "Characteristics" and down the 3rd column "Amputations (code 1311XX)" of the table.

NOTE: For some years, the number of amputations is reported in hundreds and is noted by a parenthetical ("(in hundreds)"). If this note is present, multiply the total by 100 to obtain the total number of amputations.

4.2)   Estimated annual incidence rate of amputations involving days away from work per 100,000 FTEs
- Use the BLS IIF data homepage (https://www.bls.gov/iif/data.htm).
- Under Workplace Injury and Illness Databases, locate the row titled 'Occupational Injuries and Illnesses and Fatal Injuries Profiles.' Click on the icon for 'multi-screen data search.' This will bring you to a page called 'Occupational Injuries/Illnesses and Fatal Injuries Profiles.'
- For table type, select 'Case and Demographic Incidence Rates.' Click on 'Continue.'
- Select the target year. Click on 'Continue.'
- Select your state. Leave 'Beginning year:' as 'single year.' Click on 'Continue.'
- Under 'Characteristic Type,' select 'Nature of condition.' Leave 'Name or description' selected under 'Order.' Click on 'Continue.'
- Under 'Subcharacteristic,' select 'Amputations 1311XX.' Leave 'Private industry' selected under 'Ownership.' Click on 'Continue.'
- Review your selections. Select the desired output format – HTML or Excel.
    - To generate an EXCEL table, the table will download "download.xlsx." Open the downloaded table (opens in protected view). If you wish to edit, print, or save, click on "enable editing."
    - To generate an HTML table, the table will automatically open for viewing.
- To locate the number of amputations per 10,000 FTEs, read across the "Total" row under "Characteristics" and down the 3rd column "Amputations (code 1311XX)" of the table.
- To obtain **"Estimated annual incidence rate of work-related amputations involving days way from work per 100,000 FTEs,"** multiply the Total value for 'Amputations (code 1311XX)' by 10.

INDICATOR #5 State Workers' Compensation Claims for Amputations with Lost Work Time	
Rationale:	Work-related amputations are serious injuries. With appropriate occupational hazard controls, many, if not most, amputations could be effectively prevented. Estimating the burden and tracking these injuries can help target prevention efforts. Data on amputations can be used to identify contributing factors and to improve or develop new prevention strategies or regulations to protect workers.
Group:	Workers covered by state workers' compensation
Data sources:	1. Workers' compensation data 2. National Academy of Social Insurance estimate of workers covered by workers' compensation
Numerator:	Amputation cases with lost work-time filed with state workers' compensation
Denominator:	Estimated number of workers covered by state workers' compensation for the same calendar year
Measures:	1. Annual number of amputation cases with lost work-time filed with state workers' compensation 2. Annual incidence rate of amputation cases with lost work-time filed with state workers' compensation per 100,000 workers covered by state workers' compensation
Time Period:	Calendar year
Limitations:	Workers' compensation data have numerous inherent limitations. For example, there are differences among states in the availability of data (i.e., for lost time cases only versus medical benefits cases) and eligibility criteria for filing claims. Furthermore, various types of US workers (e.g., self-employed individuals, railroad workers, and maritime workers, e.g.) are not covered by workers' compensation and the concentration of these workers will vary by state. Therefore, although data for this indicator can be used to estimate burden and evaluate trends within a state, CSTE does not recommended using it to make direct state-to-state comparisons.

How-To: OHI #5 State Workers' Compensation Claims for Amputations with Lost Work-time

5.1)   **Annual number of amputation cases with lost work-time filed with state workers' compensation**
- Submit a request to the data owner/manager for workers' compensation data in your state.
- Because of variability between workers' compensation systems, following are tips for creating the database for this indicator:
  – Identify cases by date of injury:
    ▪ If date of injury is not available, use the date claim was filed.
    ▪ For certain analyses (e.g., trend analyses), the date the claim was filed is more appropriate.
  – Include only filed cases which resulted in lost workdays or time loss.
  – Identify the coding system used in your state's workers' compensation system:
    ▪ American National Standards Institute (ANSI) Z16.2: Nature of Injury = 100 ('Amputation/Enucleation').
    ▪ Occupational Injury and Illness Classification System (OIICS): OIICS v 1.01 – Nature of Injury = 031 ('Amputation'); OIICS v 2.01 – Nature of Injury = 1311 ('Amputations').
    ▪ National Council on Compensation Insurance, Inc. (NCCI)/Workers' Compensation Insurers Organization: Nature of Injury = 02 ('Amputation').
  – Include claimants of all ages and those with unknown age.
  – Include out-of-state residents.
  – Exclude claims involving certain body parts/regions: eye, back, chest, abdomen, and body systems (e.g., respiratory system).
  – This will provide your state's "**Annual number of amputation cases with lost work-time filed with state workers' compensation**" *(5A).*

5.2)   **Estimated annual incidence rate of amputations involving days away from work per 100,000 FTEs**
5.2a)   To obtain the denominator for the rate:
- Use the National Academy of Social Insurance website (http://www.nasi.org/research/workers-compensation).
- Click report titled "REPORT: Workers Compensation: Benefits, Coverage, and Costs" for target year.
- Download the report by clicking "<<Publication Date>> - Benefits, Coverage, and Costs.pdf". You must have Adobe Acrobat installed to download.
- Locate Table 3 titled "Workers' Compensation Covered Jobs, by State, <<YEARS>>."
- Under the heading "Number of jobs (in thousands)," locate your state for the target year. Multiply number by 1,000 *(5B).*

5.2b)   To calculate the rate:
- Divide *5A* by *5B* (*5C*).
- Multiply *5C* by 100,000 to calculate the **"Annual incidence rate of amputation cases with lost work-time filed with state workers' compensation per 100,000 workers covered by state workers' compensation system."**

INDICATOR #6 Hospitalizations for Work-related Burns	
Rationale:	Work-related burns are some of the most devastating injuries affecting workers. Burns are, in fact, the most common cause of work-related hospitalization for young workers. Although burns requiring hospitalization are unusual events, they are painful, disabling, and generally expensive to treat.
Group:	Employed persons
Data sources:	1. Inpatient hospital discharge data 2. BLS Geographic Profiles of Employment and Unemployment (https://www.bls.gov/gps/home.htm)
Numerator:	Inpatient hospital discharges where primary diagnosis is a burn (ICD-10-CM T20-T25, T26-T28, T30-T32) and primary payer is workers' compensation
Denominator:	Employed population 16 years and older for the same calendar year
Measures:	1. Annual number of hospitalizations for work-related burns for victims aged 16 years and older 2. Annual rate of hospitalizations for work-related burns per 100,000 employed persons age 16 years and older
Time Period:	Calendar year
Limitations:	Because inpatient hospital discharge records are not available for all patients and workers' compensation is not filed for all eligible workers, there is potential for an under-count of hospitalized workers. Inpatient 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. Furthermore, most individuals with work-related illnesses and many others with injuries do not file for workers' compensation. Additionally, various types of US workers (e.g., self-employed individuals, railroad workers, and maritime workers, e.g.) are not covered by workers' compensation. Attribution of payer in hospital discharge may not be accurate. Data may not be directly comparable among states due to differences in states' workers' compensation programs.

How-To: OHI #6 Hospitalizations for Work-related Burns

6.1) **Annual number of hospitalizations for work-related burns for victims aged 16 years or older**
- Submit a request to your State Health Department or to the appropriate data owner/manager for inpatient hospital discharge data in your state, to obtain the following information from your state's inpatient hospital discharge data:
  - Principle diagnosis = T20 - T25, T26 - T28, T30 – T32 (based on ICD-10-CM).
  - State of residence = *'your state.'*
  - Primary payer = Workers' compensation.
  - Patient age = 16 years or older (preferably age at admission).
  - Exclude:
    - Age = unknown.
    - Residence = out of state or unknown.
    - Inpatient hospitalization = out-of-state.
    - Sequelae and subsequent encounters (codes ending in 'D' and 'S' based on ICD-10-CM).
  - Other criteria:
    - Use unduplicated records.
    - Use discharge data for calendar year only.
    - Use all cases, regardless of length of stay.
  - The number obtained will represent the "**Annual number of hospitalizations for work-related burns for victims aged 16 years or older**" *(6A).*

6.2) **Annual rate of hospitalizations for work-related burns per 100,000 employed persons aged 16 years or older**
6.2a) To obtain the denominator for the rate:
- Use BLS Geographic Profile of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
- Under "States", select Table 14: "Employment status of the civilian noninstitutional population, by gender, age, race, Hispanic or Latino ethnicity, and marital status."
- Locate rows corresponding to your state and find row titled, "Total."
- To obtain **"Number of employed persons aged 16 and older"**, select value under column titled "Total" under "Employed – Civilian labor force" *(6B).*
- Multiply *6B* by 1,000 *(6C).*

6.2b) To calculate the rate:
- Divide *6A* by *6C (6D).*
- Multiply *6D* by 100,000 to calculate the **"Annual rate of hospitalizations for work-related burns per 100,000 employed persons aged 16 years or older."**

INDICATOR #7 Work-Related Musculoskeletal Disorders with Days Away from Work Reported by Employers	
Rationale:	Work-related musculoskeletal disorders are generally preventable. Control of occupational hazards is the most effective means of preventing these disorders. Estimating the burden and tracking these injuries can help target prevention programs. Information on reported cases can be used to identify contributing factors and develop improved or new prevention strategies or regulations to protect workers.
Group:	Employed persons in the private sector
Data Sources:	Annual Bureau of Labor Statistics (BLS) Survey of Occupational Injuries and Illnesses (SOII)
Numerator:	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:	1. Estimated annual number of incident cases 2. Estimated annual incidence rate per 100,000 full-time-equivalents
Time Period:	Calendar year
Limitations:	SOII data have numerous inherent limitations, including impacts from employer reporting compliance and the accuracy and completeness of the reports. Employers are only required to report the detailed case characteristics (e.g., nature of the disabling condition, body part affected, and event and source producing the condition) when the injury or illness results in at least one day away from work beyond the day of injury or onset of illness. Employers do not always record all relevant events, and they may use restricted or light duty work to eliminate or decrease days away from work for injured workers. Employees may seek care for work-related conditions at personal healthcare providers without reporting the condition to their employer. Moreover, some conditions have long latencies and develop or worsen long after workplace exposures, which can mean they are not recognized or recorded by employers. **Musculoskeletal disorders may develop too late for inclusion in the SOII's data collection or may be reported less frequently to the SOII because of greater difficulty in determining whether they are work-related.** Finally, industries for which data are available vary by state, primarily due to differences in industry concentration among states. Largely because of this last issue, BLS does not recommend comparing results among states or between individual states and the US. Additional details about the SOII survey including recordkeeping guidelines, sampling methods, news releases, and breaks in trend can be found here: https://www.bls.gov/iif/soii-overview.htm

NOTE: Information about changes to SOII over time that impact the definition of Musculoskeletal Disorders (MSDs) are available in Appendix D.

BLS MSD Definition (2011 - forward), based on OIICS v. 2.01	
One of the following Nature codes	
123*	Sprains, strains, tears
2241	Carpal tunnel syndrome
124, 253	Hernia (traumatic and non-traumatic)
27*	Musculoskeletal system and connective tissue diseases and disorders
1972	Soreness, pain, hurt — non-specified injury
1973	Swelling, inflammation, irritation — non-specified injury
1974	Numbness — non-specified injury
1131	Pinched nerve
1211	Herniated disk
1221	Meniscus tear
2244	Tarsal tunnel syndrome
2371	Raynaud's syndrome or phenomenon
AND, one of the following Event codes	
70	Overexertion and bodily reaction, unspecified
71*	Overexertion involving outside sources
72*	Repetitive motion involving microtasks
73*, 78	Other and multiple exertions or bodily reactions
67*	Rubbed, abraded or jarred by vibration

* Denotes all codes that fall in specified 2- or 3-digit series.

NOTE: There are two approaches that can be used to get MSD numbers and incidence rates. One alternative is described in steps 7.1 through 7.8 while a second approach is described in sections 7.9 and 7.10.

7.1)   Estimated annual number of all musculoskeletal disorders involving days away from work
- State level MSD estimates for 2018 and forward will be obtained using the Occupational Injuries/Illness and Fatal Injuries Profiles tool located here: https://data.bls.gov/gqt/InitialPage
- For Table Type, choose 'Case and Demographic Numbers'. Select 'Continue'.
- Select target Year and then select 'Continue'.
- Locate '*your state*' under 'Area'. Leave 'Beginning year' as 'Single Year'. Select 'Continue'.
- Select '*Musculoskeletal Disorder*' under 'Characteristic Type'. Leave 'Order' as 'Name or description'. Select 'Continue'.
- Select '*Musculoskeletal Disorders MSDXXX*' under 'Subcharacteristic' and '*Private industry*' under 'Ownership'. Select 'Continue'.
- Select Output Type as either 'Generate Excel table' or 'Generate HTML table'.
- To obtain **"Annual number of all musculoskeletal disorders involving days away from work,"** locate the row 'Total' in the 1st column, and read across to the 3rd column 'Musculoskeletal disorders (code MSDXXX)'.

7.2)   Estimated annual incidence rate of all musculoskeletal disorders involving days away from work per 100,000 FTE
- State level MSD estimates for 2018 and forward will be obtained using the Occupational Injuries/Illness and Fatal Injuries Profiles tool located here: https://data.bls.gov/gqt/InitialPage

- For Table Type, choose Case and Demographic Incidence Rates. Select 'Continue'
- Select target Year and then 'Continue'
- Locate '*your state*' under 'Area'. Leave 'Beginning year' as 'Single Year'. Select 'Continue'.
- Select '*Musculoskeletal Disorder*' under 'Characteristic Type'. Leave 'Order' as 'Name or description'. Select 'Continue'.
- Select '*Musculoskeletal Disorders MSDXXX*' under 'Subcharacteristic' and '*Private industry*' under 'Ownership'. Select 'Continue'.
- Select Output Type as either 'Generate Excel table' or 'Generate HTML table'.
- Locate the row 'Total' in the 1st column and read across to the 3rd column 'Musculoskeletal disorders (code MSDXXX)'. This is the estimated annual incidence rate of all musculoskeletal disorders involving days away from work per 10,000 FTE or full-time workers (*7A*).
- To calculate the **"Estimated annual incidence rate of all musculoskeletal disorders involving days away from work per 100,000 FTE,"** multiply *7A* by 10.

7.3) Estimated annual number of musculoskeletal disorders of the neck, shoulder, and upper extremities involving days away from work
- From the Table obtained in 7.1 above, locate 'Part of body affected' in the first column. Under this locate 'Neck' and read across to the 3rd column 'Musculoskeletal disorders (code MSDXXX)' (7B). Then locate 'Upper extremities' (1st column) and read across to the 3rd column 'Musculoskeletal disorders (code MSDXXX)' (7C).
- Sum *7B* and *7C* to calculate 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
- From the table obtained in 7.2 above, locate 'Part of body affected' in the first column. Under this locate 'Neck' and read across to the 3rd column 'Musculoskeletal disorders (code MSDXXX)' (7D). Then locate 'Upper extremities' (1st column) and read across to the 3rd column 'Musculoskeletal disorders (code MSDXXX)' (7E).
- Sum *7D* and *7E (7F).*
- To calculate the **"Estimated annual incidence rate of musculoskeletal disorders of the neck, shoulder and upper extremities involving days away from work per 100,000 FTE,"** multiple *7F* by 10.

7.5) Estimated annual number of carpal tunnel syndrome cases involving days away from work
- From the Table obtained in 7.1 above, locate 'Nature of Injury, Illness' in the first column. Under this locate 'Carpal tunnel syndrome' and read across to the 3rd column 'Musculoskeletal disorders (code MSDXXX)' to obtain **"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
- From the table obtained in 7.2 above, locate 'Nature of injury, illness' in the first column. Under this locate 'Carpal Tunnel Syndrome' and read across to the 3rd column 'Musculoskeletal disorders (code MSDXXX)' (3rd column). This is the estimated annual incidence rate of carpal tunnel syndrome cases involving days away from work per 10,000 FTE or full-time workers *(7G).*
- To calculate the **"Estimated annual incidence rate of carpal tunnel syndrome cases involving days away from work per 100,000 FTE,"** multiply (*7G)* by 10.

7.7) **Estimated annual number of musculoskeletal disorders of the back involving days away from work**

- From the Table obtained in 7.1 above, locate 'Part of body affected' in the first column. Under this locate 'Back' and read across to the 3rd column 'Musculoskeletal disorders (code MSDXXX)' to obtain **"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**

- From table obtained in 7.2, locate 'Part of body affected' in the first column. Under this locate 'Back' and read across to the 3rd column 'Musculoskeletal disorders (code MSDXXX)'. This is the estimated annual incidence rate of musculoskeletal disorders of the back involving days away from work per 10,000 FTE or full-time workers *(7H).*
- To calculate the **"Estimated annual incidence rate of musculoskeletal disorders of the back involving days away from work per 100,000 FTE,"** multiply *7H* by 10.

ALTERNATIVE METHODS

7.9) **Estimating annual number of all musculoskeletal disorders involving days away from work at both the U.S. and state level ** FOR 7.1, 7.3, 7.5, & 7.7 ***

- Use the BLS webpage: www.bls.gov/data
- Scroll down and under the heading 'Workplace Injuries'. Select the multi-screen option under row labeled "Non-fatal Cases Involving Days Away from Work: selected characteristics (2011 forward)."
- Select your State and select 'Next Form.'
- Select 'Private Industry' and select 'Next Form.'
- Select 'Injury and Illness Cases' and select 'Next Form.'
- Select 'M Industry Division or Selected Characteristic by Special Combinations' and select 'Next Form.'
- Depressing the CTRL key, select the following: '00X All Industry,' 'P2X Part (Neck),' 'P4X Part (Upper Extremities),' 'N3A Nature (Carpal Tunnel Syndrome),' 'P32 Part (Back).' Select 'Next Form.'
- Select 'MSDXXX Musculoskeletal Disorders.' Select 'Next Form.'
- Select Retrieve Data.
- Review the tables.
    - To obtain the **"Estimated annual number of all musculoskeletal disorders involving days away from work,"** locate the annual number from the *'All Industry'* table.
    - To obtain **"Estimated annual number of musculoskeletal disorders of the neck, shoulder, and upper extremities involving days away from work,"** sum annual numbers from the following tables: *'Part - Neck'* and *'Part - Upper Extremities.'*
    - To obtain **"Estimated annual number of carpal tunnel syndrome cases involving days away from work,"** locate annual number from the *'Nature - Carpal Tunnel Syndrome'* table.
    - To obtain **"Estimated annual number of musculoskeletal disorders of the back involving days away from work,"** location the annual number from the *'Part -Back'* table.

7.10) **Estimating annual incidence rate of all musculoskeletal disorders involving days away from work per 100,000 FTE – at both the U.S. and state level ** FOR 7.2, 7.4, 7.6, & 7.8 ***

- Use the BLS webpage: www.bls.gov/data
- Scroll down and under the heading 'Workplace Injuries', Select the multi-screen option under row labeled "Non-fatal Cases Involving Days Away from Work: selected characteristics (2011 forward)."
- Select your State and select 'Next Form.'
- Select 'Private Industry' and select 'Next Form.'
- Select 'Injury and Illness Rate per 10,000 full-time Workers' and select 'Next Form.'

- Select 'M Industry Division or Selected Characteristic by Special Combinations' and select 'Next Form.'
- Depressing the CTRL key, select the following: '00X All Industry,' 'P2X Part (Neck),' 'P4X Part (Upper Extremities),' 'N3A Nature (Carpal Tunnel Syndrome),' 'P32 Part (Back).'' Select 'Next Form.'
- Select 'MSDXXX Musculoskeletal Disorders.' Select 'Next Form.'
- Select Retrieve Data.
- Review the tables.
  – For the "Estimated annual incidence rate of all musculoskeletal disorders involving days away from work per 100,000 FTE," locate the rate from the 'All Industry' table *(7I)*.
    ▪ To calculate the **"Estimated annual incidence rate of all musculoskeletal disorders involving days away from work per 100,000 FTE,"** multiply *7I* by 10.
  – For the "Estimated annual incidence rate of musculoskeletal disorders of the neck, shoulder, and upper extremities involving days away from work per 100,000 FTE," sum rates from the *'Part – Neck,'* and *'Part – Upper Extremities'* tables *(7J)*.
    ▪ To calculate the **"Estimated annual incidence rate of musculoskeletal disorders of the neck, shoulder, and upper extremities involving days away from work per 100,000 FTE,"** multiply *7J* by 10.
  – For the "Estimated annual incidence rate of carpal tunnel syndrome cases involving days away from work per 100,000 FTE," locate the rate from the *'Nature – Carpal Tunnel Syndrome'* table *(7K)*.
    ▪ To calculate the **"Estimated annual incidence rate of carpal tunnel syndrome cases involving days away from work per 100,000 FTE,"** multiply *7K* by 10.
  – For the "Estimated annual incidence rate of musculoskeletal disorders of the back involving days away from work per 100,000 FTE," locate rate from the *'Part – Back'* table *(7L)*.
    ▪ To calculate the **"Estimated annual incidence rate of musculoskeletal disorders of the back involving days away from work per 100,000 FTE,"** multiply *7L* by 10.

INDICATOR #8 State Workers' Compensation Claims for Carpal Tunnel Syndrome with Lost Work Time	
Rationale:	Carpal tunnel syndrome is generally preventable. Control of occupational hazards is the most effective means of prevention. Estimating the burden and tracking the number and rate of carpal tunnel syndrome can help target prevention programs. Information on reported cases can be used to identify contributing factors and develop improved or new prevention strategies or regulations to protect workers.
Group:	Workers covered by state workers' compensation
Data Sources:	1. Workers' compensation system 2. National Academy of Social Insurance (NASI) estimate of workers covered by workers' compensation
Numerator:	Carpal tunnel syndrome cases with lost work-time filed with state workers' compensation
Denominator:	Estimated number of workers covered by state workers' compensation for the same calendar year
Measures:	1. Annual number of carpal tunnel syndrome cases with lost work-time filed with state workers' compensation 2. Annual incidence rate of carpal tunnel syndrome cases with lost work-time filed with state workers' compensation per 100,000 workers covered by state workers' compensation
Time Period:	Calendar year
Limitations:	Workers' compensation data have numerous inherent limitations. For example, there are differences among states in the availability of data (i.e., for lost time cases only versus medical benefits cases) and eligibility criteria for filing claims. Furthermore, various types of US workers (e.g., self-employed individuals, railroad workers, and maritime workers, e.g.) are not covered by workers' compensation and the concentration of these workers will vary by state. Therefore, although data for this indicator can be used to estimate burden and evaluate trends within a state, CSTE does not recommended using it to make direct state-to-state comparisons.

How-To: OHI #8 State Workers Compensation Claims for Carpal Tunnel Syndrome with Lost Work-Time

8.1) **Annual number of carpal tunnel syndrome cases with lost work-time filed with state workers' compensation**

- Submit a request to the data owner/manager for workers' compensation data in your state.
- Because of variability between workers' compensation systems, following are tips for constructing the database for this indicator:
    - Identify cases by date of injury:
        - If date of injury is not available, use the date claim was filed.
        - For certain analyses (e.g., trend analyses), the date the claim was filed is more appropriate.
    - Include only filed cases which resulted in lost workdays or time loss.
    - Identify the coding system used in your state's workers' compensation system:
        - American National Standards Institute (ANSI) Z16.2: Nature of Injury = 562 ('Nerve Disorder') combined with Type of Injury = 12* ('Overexertion) and Body Part = 320 ('Wrist').
        - Occupational Injury and Illness Classification System (OIICS): OIICS v 1.01 – Nature of Injury = 1241 ('Carpal Tunnel Syndrome'); OIICS v 2.01 – Nature of Injury = 2241 ('Carpal Tunnel Syndrome').
        - National Council on Compensation Insurance, Inc. (NCCI)/Workers' Compensation Insurers Organization: Nature of Injury = 78 ('Carpal Tunnel Syndrome').
    - Include claimants of all ages and those with unknown age.
    - Include out-of-state residents.
    - This will provide your state's **"Annual number of carpal tunnel syndrome cases with lost work-time filed with state workers' compensation"** *(8A).*

8.2) **Annual incidence rate of carpal tunnel syndrome cases with lost work-time filed with state workers' compensation per 100,000 workers covered by state workers' compensation system**

8.2a) To obtain the denominator for the rate:
- Use the National Academy of Social Insurance website: http://www.nasi.org/research/workers-compensation.
- Click report titled "REPORT: Workers' Compensation: Benefits, Costs, and Coverage" for target year.
- Download the report by clicking "<<Publication date>> - Benefits, Coverage, and Costs.pdf". You must have Adobe Acrobat installed to download.
- Locate Table 3 titled "Workers' Compensation Covered Jobs, by State, <<YEARS>>."
- Under the heading "number of jobs (in thousands)" identify your state for the target year. Multiply number by 1,000 *(8B).*

8.2b) To calculate the rate:
- Divide *8A* by *8B (8C).*
- Multiply *8C* by 100,000 to calculate the **"Annual incidence rate of carpal tunnel syndrome cases with lost work-time filed with state workers' compensation per 100,000 workers covered by state workers' compensation system."**

INDICATOR #9 Hospitalizations from or with Pneumoconiosis	
Rationale:	Because pneumoconiosis is largely determined by local industrial activities and migration of affected individuals, frequency of pneumoconiosis varies geographically. 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.
Group:	State residents age 15 years or older
Data Sources:	1. Inpatient hospital discharge data 2. State population estimates from the Bureau of the Census American Community Survey 3. Year 2000 U.S. Standard population (for age-standardization)
Numerator:	1. Inpatient hospital discharges with a primary or contributing diagnosis of "total pneumoconiosis" (ICD-10-CM = J60 through J66) 2. Inpatient hospital discharges with a primary or contributing diagnosis of "coal workers' pneumoconiosis" (ICD-10-CM = J60) 3. Inpatient hospital discharges with a primary or contributing diagnosis of "asbestosis" (ICD-10-CM = J61) 4. Inpatient hospital discharges with a primary or contributing diagnosis of "silicosis" (ICD-10-CM = J62) 5. Inpatient hospital discharges with a primary or contributing diagnosis of "other or unspecified pneumoconiosis" (ICD-10-CM = J63 through J66)
Denominator:	Midyear resident population age 15 years or older for the same calendar year
Measures:	1. Annual number of inpatient hospitalizations for persons age 15 years or older 2. Annual rate of inpatient hospitalizations per million residents 3. Annual, age-standardized, rate of inpatient hospitalization (standardized by the direct method to the Year 2000 U.S. standard population)
Time Period:	Calendar year
Limitations:	Unlike some of the other occupational health indicators based on hospital discharge data, work-relatedness for pneumoconiosis is not identified based on workers' compensation being the expected payer for hospital services. Instead, this indicator assumes most pneumoconiosis are work-related. For this reason, the indicator does not have the types of limitations inherent with identifying work-related cases based on the expected payer. However, it has other limitations. One important limitation is that it may not accurately reflect recent respiratory exposures in the state of interest. Because pneumoconioses are typically diseases of long latency, it may be many years before exposures lead to a hospitalization. Likewise, it may be years before changes in occupational exposures affect the number of hospitalizations.

How-To: OHI #9 Hospitalizations from or with Pneumoconiosis

9.1) **Inpatient hospital discharges with a primary or contributing diagnosis of ICD-10-CM J60-J66 ("total pneumoconiosis")**

9.1a) Annual number of inpatient hospital discharges.

- Submit a request to your State Health Department or to the appropriate data owner/manager for inpatient hospital discharge data in your state, to obtain the following information from your state's inpatient hospital discharge data:
  - Any diagnosis = J60 through J66 (based on ICD-10-CM).
  - State of residence = *'your state.'*
  - Patient age = 15 years or older (preferably age at admission).
- Exclude:
  - Age = unknown.
  - Residence = out of state or unknown.
  - Inpatient hospitalization = out-of-state.
- Other criteria:
  - Use un-deduplicated records.
  - Use discharge during calendar year, not fiscal year.
- Obtain the number of inpatient 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.
- The numbers obtained will represent the **"Annual number of total pneumoconiosis inpatient hospitalizations for persons age 15 years of age and older"** *(9A).*

 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.*

Note: *Until 2016 (including the 2016 data collection) this indicator used US Census data from the American Fact Finder website for calculating the denominator (population of residents age 15 years and older). As of March 31ˢᵗ 2020, the American Fact Finder website is being taken offline. Data previously reported by that website will now be available at https://data.census.gov/cedsci/. The following instructions have been modified to reflect this change.*

9.1b) Annual rate of inpatient hospitalization per million residents

- To obtain the denominator for the rate:
  - Use the **Explore Census Data** webpage: https://data.census.gov/cedsci/.
  - Under the search box, click the link for 'Advanced search.'
  - Under 'Browse filters,' click on 'Geography.' From the menu that appears, click 'state.' Find your state and check the corresponding box filter by your state.
  - Under 'Browse filters' click on 'Years' and select the year of interest from the menu that appears.
  - After selecting filters by state and year of interest, click the 'Search' button at the bottom right of the screen.
  - The resulting table will be 'ACS Demographic and Housing Estimates.'
  - Read across the row for 'Total Population' and down the row for 'Estimate' to find the Total Population Estimate.
  - Sum the estimates for 'Under 5 years,' '5-9 years,' and '10-14 years,' and subtract this value from the Total Population Estimate to obtain the total population age 15 years and older *(9B).*
  - Use the estimate for total population age 15 years and older to populate an Excel spreadsheet to perform age adjusting.

- To calculate the crude inpatient hospitalization rate:
    - Divide the sum of all pneumoconiosis inpatient hospitalizations *(9A)* by the denominator *(9B) (9C)*.
- To calculate the **"Annual rate of total pneumoconiosis inpatient hospitalizations per million residents,"** multiply *9C* by 1,000,000.

9.1c) Annual, age-standardized, rate of inpatient hospitalization per million residents
- Use the table below to perform the calculations. A spreadsheet such as Excel works well for these calculations.
    - In Column C below, (State Pop), enter the state's census population (using the same table generated in step 9.1b) by age group for the target year (e.g., population estimates for 2017 if generating rates for 2017).
    - In Column B (# Inpatient Hospitalizations), enter number of inpatient hospitalizations obtained in 9.1a, by age group for all pneumoconioses.
    - Column D = Column B / Column C (Inpatient Hospitalizations/Pop) = (# Inpatient Hospitalizations) / (State Pop).
    - Use the US 2000 Standard population (provided in column E in table below). This information can also be found at http://www.cdc.gov/nchs/data/statnt/statnt20.pdf.
    - Column F = Column D * Column E (# Expected Inpatient Hospitalizations) = (Inpatient Hospitalizations/Pop) * (US 2000 Standard Pop).
- To calculate the **"Annual age-adjusted total pneumoconiosis inpatient hospitalization rate per million' residents,"** divide Cell F10 by Cell E10 and multiply by 1,000,000. (The sum (Σ) of all expected total pneumoconiosis inpatient hospitalizations) / (the sum of US 2000 Standard Pop) multiplied by 1,000,000).

		Column B	Column C	Column D	Column E	Column F
		State Resident Inpatient Hospitalizations, age 15 and older, [year]				
	Age Group	# Inpatient Hospitalizations	[year] State Pop	Inpatient Hospitalizations/Pop	US 2000 Std Pop	# Expected Inpatient 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**	**Σ(F2:F9)**

9.2) **Inpatient hospital discharges with a primary or contributing diagnosis of ICD-10-CM code J60 ("Coal Workers' Pneumoconiosis)**

9.2a)   Annual number of coal workers' pneumoconiosis inpatient hospital discharges
- Follow directions for 9.1a using any diagnosis = 'J60' *(9D)*

9.2b)   Annual rate of coal workers' pneumoconiosis inpatient hospitalizations per million residents
- Follow directions for 9.1b to obtain the denominator for the rate *(9E)*.
- To calculate the crude inpatient hospitalization rate:
  – Divide the sum of all coal workers' pneumoconiosis inpatient hospitalizations *(9D)* by the denominator *(9E) (9F)*.
- To calculate the **"Annual rate of coal workers' pneumoconiosis inpatient hospitalizations per million residents,"** multiply *9F* by 1,000,000.

9.2c)   Annual, age-standardized, rate of inpatient hospitalization per million residents
- Follow directions for 9.1c using inpatient hospitalizations from 9.2a.

9.3) **Inpatient hospital discharges with a primary or contributing diagnosis of ICD-10-CM code J61 ("Asbestosis")**

9.3a)   Annual number of asbestosis inpatient hospital discharges
- Follow the directions for 9.1a using any diagnosis = 'J61' *(9G)*.

9.3b)   Annual rate of asbestosis inpatient hospitalizations per million residents
- Follow directions for 9.1b to obtain the denominator for the rate *(9H)*.
- To calculate the crude inpatient hospitalization rate:
  – Divide the sum of all asbestosis inpatient hospitalizations *(9G)* by the denominator *(9H) (9I)*.
- To calculate the **"Annual rate of asbestosis inpatient hospitalizations per million residents,"** multiply *9I* by 1,000,000.

9.3c)   Annual, age-standardized, rate of asbestosis inpatient hospitalizations per million residents
- Follow directions for 9.1c using inpatient hospitalizations from 9.3a.

9.4) **Inpatient hospital discharges with a primary or contributing diagnosis of ICD-10-CM code J62 ("Silicosis")**

9.4a)   Annual number of silicosis inpatient hospital discharges
- Follow the directions for 9.1a using any diagnosis = 'J62' *(9J)*

9.4b)   Annual rate of silicosis inpatient hospitalizations per million residents
- Follow directions for 9.1b to obtain the denominator for the rate *(9K)*.
- To calculate the crude inpatient hospitalization rate:
  – Divide the sum of all silicosis inpatient hospitalizations *(9J)* by the denominator *(9K) (9L)*.
- To calculate the **"Annual rate of silicosis inpatient hospitalizations per million residents,"** multiply *9L* by 1,000,000.

9.3c)   Annual, age-standardized, rate of silicosis inpatient hospitalizations per million residents
- Follow directions for 9.1c using inpatient hospitalizations from 9.4a.

9.5) **Inpatient hospital discharges with a primary or contributing diagnosis of ICD-10-CM code J63, J64, J65, or J66 ("Other and Unspecified Pneumoconiosis")**

    9.5a)   Annual number of other and unspecified pneumoconiosis inpatient hospital discharges
- Follow the directions for 9.1a using any diagnosis = 'J63,' 'J64,' 'J65,' or 'J66' *(9M).*

    9.5b)   Annual rate of other and unspecified pneumoconiosis inpatient hospitalizations per million residents
- Follow directions for 9.1b to obtain the denominator for the rate *(9N)*.
- To calculate the crude inpatient hospitalization rate:
    - Divide the sum of all other and unspecified pneumoconiosis inpatient hospitalizations *(9M)* by the denominator *(9N) (9O).*
- To calculate the **"Annual rate of other and unspecified pneumoconiosis inpatient hospitalizations per million residents,"** multiply *9O* by 1,000,000.

    9.5c)   Annual, age-standardized, rate of silicosis inpatient hospitalizations per million residents
- Follow directions for 9.1c using inpatient hospitalizations from 9.5a.

NOTE: The sum of 9.2a, 9.3a, 9.4a and 9.5a may be more than 9.1a because cases could be hospitalized with more than one type of pneumoconiosis.

INDICATOR #10 Mortality from or with Pneumoconiosis	
Rationale:	Because pneumoconiosis mortality statistics are largely determined by local industrial activities and migration of affected individuals, frequency of pneumoconiosis varies geographically. Control of occupational dust exposure is the single most effective means of preventing pneumoconiosis. Tracking of pneumoconiosis is essential for measuring progress toward elimination of the disease, as well as for targeting prevention and disease management programs.
Group:	State residents age 15 years or older
Data Sources:	1. Death certificate records from vital statistics agency 2. State population estimates from the U.S. Bureau of the Census American Community Survey 3. Year 2000 U.S. Standard Population (for age-standardization)
Numerator:	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 with ICD-10 code in the range J63 – J66 (ICD-9 code range 503 – 505) ("other and unspecified pneumoconiosis")
Denominator:	Midyear resident population age 15 years or older for the same calendar year
Measures:	1. Annual number of deaths 2. Annual death rate (deaths per million residents) 3. Annual age-standardized death rate (standardized by the direct method to the Year 2000 U.S. Standard population) (deaths per million residents)
Time Period:	Calendar year
Limitations:	Because 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. State of residence of the decedent may not have been the state of exposure.

How-To: OHI #10 Mortality from or with Pneumoconiosis

10.1)   Deaths with an ICD-10 code in the range J60-J66 as an underlying or contributing cause of death ("Total Pneumoconiosis")

    10.1a)   Annual number of total pneumoconiosis deaths

- Submit a request to the State Health Department's Office of Vital Records for the following information:
    - Underlying or contributory causes of death = J60 to J66.8 (based on ICD-10-CM). ***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.***
    - State of residence = '*your state.'*
    - Decedent age = 15 years or older.
- Exclude:
    - Age = unknown.
    - Residence = out-of-state or unknown.
    - 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.
- The numbers represent the **"Annual number of total pneumoconiosis deaths"** *(10A).*

NOTE: If less than 5 events, numbers will be too small to produce reliable estimates. Rates should not be calculated.

Note: Until 2016 (including the 2016 data collection) this indicator used US Census data from the American Fact Finder website for calculating the denominator (population of residents age 15 years and older). As of March 31st 2020, the American Fact Finder website is being taken offline. Data previously reported by that website will now be available at https://data.census.gov/cedsci/. The following instructions have been modified to reflect this change.

    10.1b)   Annual total pneumoconiosis death rate (deaths per million residents)

- To obtain the denominator for the rate:
    - Use the **Explore Census Data** webpage: [https://data.census.gov/cedsci/.](https://data.census.gov/cedsci/)
    - Under the search box, click the link for 'Advanced search.'
    - Under 'Browse filters,' click on 'Geography.' From the menu that appears, click 'state.' Find your state and check the corresponding box filter by your state.
    - Under 'Browse filters' click on 'Years' and select the year of interest from the menu that appears.
    - After selecting filters by state and year of interest, click the 'Search' button at the bottom right of the screen.
    - The resulting table (DP05) will be 'ACS Demographic and Housing Estimates.'
    - Read across the row for 'Total Population' and down the row for 'Estimate' to find the Total Population Estimate.
    - Sum the estimates for 'Under 5 years,' '5-9 years,' and '10-14 years,' and subtract this value from the Total Population Estimate to obtain the total population age 15 years and older *(10B).*
    - Use the estimate for total population age 15 years and older to populate an Excel spreadsheet to perform age adjusting.

- To calculate the crude death rate:

- Divide the total number of pneumoconiosis deaths *(10A)* by the denominator *(10B)* *(10C).*
- To calculate the **"Annual total pneumoconiosis death rate per million residents,"** multiply *10C* by 1,000,000.

10.1c) Annual age-standardized total pneumoconiosis death rate (deaths per million residents)
- Use table below to perform calculations. Excel works well for performing these calculations
  - In Column C, below (State Pop), enter the state's census population (using the same table generated in step 10.1b) by age group for target year (e.g., population estimates for 2017 if generating rates for 2017).
  - In Column B (# Deaths), enter number of deaths obtained in 10.1a, by age group for all pneumoconioses.
  - Column D = Column B / Column C (Deaths/Pop) = (# Deaths) / (State Pop)
  - Use the US 2000 Standard population (provided in column E in table below). This information can also be found at http://www.cdc.gov/nchs/data/statnt/statnt20.pdf.
  - Column F = Column D * Column E (# Expected Deaths) = (Deaths/Pop) * (US 2000 Standard Pop).
- To calculate the **"Annual age-adjusted total pneumoconiosis death rate per million' residents,"** divide Cell F10 by Cell E10 and multiply by 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, [year]				
	Age Group	# Deaths	[year] State Population	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 (Ages 15+)				215,670,000	Σ(F2:F9)

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

10.2a) Annual number of coal workers' pneumoconiosis deaths
- Follow directions for 10.1a using any cause of death = 'J60' *(10D).*

10.2b) Annual coal workers' pneumoconiosis death rate (deaths per million residents)
- Follow directions for 10.1b to obtain the denominator for the rate *(10E)*.
- To calculate the crude annual death rate:
  - Divide the sum of all coal workers' pneumoconiosis deaths *(10D)* by the denominator *(10E) (10F).*
- To calculate the **"Annual coal workers' pneumoconiosis death rate (deaths per million residents),"** multiply *10F* by 1,000,000.

10.2c) Annual, age-standardized, coal workers' pneumoconiosis death rate (deaths per million residents)
- Follow directions for 10.1c using deaths from 10.2a.

10.3) Deaths with ICD-10 code J61 as an underlying or contributing cause of death ("Asbestosis")
10.3a) Annual number of asbestosis deaths
- Follow directions for 10.1a using any cause of death = 'J61' *(10G).*

10.3b) Annual asbestosis death rate (deaths per million residents)
- Follow directions for 10.1b to obtain the denominator for the rate *(10H)*.
- To calculate the crude annual death rate:
  - Divide the sum of all asbestosis deaths *(10G)* by the denominator *(10H) (10I).*
- To calculate the **"Annual asbestosis death rate (deaths per million residents),"** multiply *10I* by 1,000,000.

10.3c) Annual, age-standardized, asbestosis death rate (deaths per million residents)
- Follow directions for 10.1c using deaths from 10.3a.

10.4) Deaths with ICD-10 code J62 as an underlying or contributing cause of death ("Silicosis")
10.4a) Annual number of silicosis deaths
- Follow directions for 10.1a using any cause of death = 'J62.0' – 'J62.8' *(10J).*

10.4b) Annual silicosis death rate (deaths per million residents)
- Follow directions for 10.1b to obtain the denominator for the rate *(10K)*.
- To calculate the crude annual death rate:
  - Divide the sum of all asbestosis deaths *(10J)* by the denominator *(10K) (10L).*
- To calculate the **"Annual silicosis death rate (deaths per million residents),"** multiply *10L* by 1,000,000.

10.4c) Annual, age-standardized, silicosis death rate (deaths per million residents)
- Follow directions for 10.1c using deaths from 10.4a.

10.5) Deaths with an ICD-10 code in the range J63, J64, J65, or J66 as an underlying or contributing cause of death ("Other and Unspecified Pneumoconiosis")
10.5a) Annual number of other and unspecified pneumoconiosis deaths
- Follow directions for 10.1a using any cause of death = 'J63.0'- 'J63.8', 'J64', 'J65', 'J66.0'-'J66.8' *(10M).*

10.5b) Annual other and unspecified pneumoconiosis death rate (deaths per million residents)
- Follow directions for 10.1b to obtain the denominator for the rate *(10N)*.
- To calculate the crude annual death rate:
  - Divide the sum of all other and unspecified pneumoconiosis deaths *(10M)* by the denominator *(10N) (10O).*
- To calculate the **"Annual other and unspecified pneumoconiosis death rate (deaths per million residents),"** multiply *10O* by 1,000,000.

10.5c) Annual, age-standardized, all other and unspecified pneumoconiosis death rate (deaths per
        million residents)
        - Follow directions for 10.1c using deaths from 10.5a.

NOTE: *The sum of 10.2a, 10.3a, 10.4a and 10.5a may be greater than 10.1a because cases could have more than one type of pneumoconiosis listed on the death certificate.*

INDICATOR #11 Acute work-related pesticide-associated injuries and illnesses reported to poison control centers	
Rationale:	Workers who handle pesticides are at increased risk for exposure. Data on acute poisonings and chemical exposures are useful to target prevention. These data can be consistently obtained from state Poison Control Centers (PCCs). These data are comparable across states due to the uniformity in case handling by PCCs.
Group:	Employed persons
Data Sources:	1. Poison Control Center data 2. BLS Geographic Profiles of Employment and Unemployment (https://www.bls.gov/gps/home.htm)
Numerator:	Reported cases of work-related pesticide poisoning
Denominator:	Employed persons aged 16 years or older for the same calendar year
Measures:	1. Annual number of reported cases of work-related pesticide poisoning 2. 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
Limitations:	PCCs capture only a small proportion of acute occupational pesticide-related illness cases (~10%). PCCs do not systematically collect information on industry and occupation, however, cases associated with occupational exposures can be identified.

How-To: OHI #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[1]
- NIOSH will distribute state data for this Occupational Health Indicator for the target year via the Consortium of Occupational State Surveillance Listserv (OCC-HLTH-STATE-SURV@LISTSERV.CDC.GOV). Contact Suzanne Marsh at NIOSH at smm2@cdc.gov with questions about this indicator *(11A).*

11.2)   Annual incidence rate of reported work-related pesticide poisoning cases per 100,000 employed persons age 16 years or older
11.2a)   To obtain the denominator for the rate:
- Use the BLS webpage (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
- Under "States", Select Table 14 "Employment status of the civilian noninstitutional population, by gender, age, race, Hispanic or Latino ethnicity, and marital status."
- Find rows corresponding to your state and select the value in the "Total" column under the "Employed" section. This is the total number of employed civilians 16 or older in thousands *(11B).*
- To calculate the total employed, multiply *11B* by 1,000 *(11C).*

11.2b)   To calculate the rate:
- Divide *11A* by *11C (11D).*
- To calculate the **"Annual incidence rate of reported work-related pesticide poisonings per 100,000 employed persons aged 16 years or older,"** multiple *11D* by 100,000.

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[1] These data are derived from data provided by the American Association of Poison Control Centers (AAPCC) using the case definition listed in this guide. There may be a discrepancy between the number of incident cases provided by EPA/NIOSH/AAPCC and the number of cases derived from your local PCC.

States are encouraged to contact their local Poison Control Center (PCC) to share the data obtained through AAPCC and to discuss plans to disseminate it. Contact information can be obtained from AAPCC https://aapcc.org/centers. Some states have more than one PCC.

INDICATOR #12 Incidence of Malignant Mesothelioma	
Rationale:	Malignant mesothelioma, while relatively rare, is a fatal cancer largely attributable to workplace exposure to asbestos. Tracking malignant mesothelioma is critical in documenting the burden of occupational disease. Understanding the burden of this disease offers opportunities 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.
Group:	State residents age 15 years or older
Data Sources:	1. State-wide Cancer Registry data 2. State population estimates from the U.S. Bureau of the Census American Community Survey 3. Year 2000 US Standard population (for age-standardization)
Numerator:	Incident cases with mesothelioma
Denominator:	Midyear resident population age 15 years or older for the same calendar year
Measures:	1. Annual number of incident mesothelioma cases 2. Annual mesothelioma incidence rate (cases per million residents) 3. Annual, age-standardized, mesothelioma incidence rate (standardized by the direct method to the Year 2000 U.S. Standard population) (cases per million residents)
Time Period:	Calendar year
Limitations:	Not all cases of malignant mesothelioma are caused by occupational exposures. Furthermore, because cancer is a disease of long latency, current incidence is not indicative of current exposures and it may be many years before changes in occupational exposures affect incidence. Finally, state of residence of the decedent may not have been the state of exposure.

How-To: OHI #12 Incidence of Malignant Mesothelioma

12.1) **Annual number of incident mesothelioma cases**
- Submit a request to the State Cancer Registry to obtain the number of incident cases meeting the following criteria:
  - State of residence = *'your state.'*
  - ICD-O histology = 9050-9053.
  - Age = 15 years or older.
  - Exclude:
    - Age = unknown.
    - Residence = out-of-state and unknown.
  - 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.
  - The numbers obtained will represent the **"Annual number of incident mesothelioma cases" (12A)**.

NOTE: If less than 5 events, the number will be too small to produce reliable estimates. Rates should not be calculated.

Note: Until 2016 (including the 2016 data collection) this indicator used US Census data from the American Fact Finder website for calculating the denominator (population of residents age 15 years and older). As of March 31st 2020, the American Fact Finder website is being taken offline. Data previously reported by that website will now be available at https://data.census.gov/cedsci/. The following instructions have been modified to reflect this change.

12.2) **Annual mesothelioma incidence rate (cases per million residents)**
- 12.2a) To obtain the denominator for the rate:
  - Use the Explore Census Data webpage: https://data.census.gov/cedsci/.
    - Under the search box, click the link for 'Advanced search.'
    - Under 'Browse filters,' click on 'Geography.' From the menu that appears, click 'state.' Find your state and check the corresponding box filter by your state.
    - Under 'Browse filters' click on 'Years' and select the year of interest from the menu that appears.
    - After selecting filters by state and year of interest, click the 'Search' button at the bottom right of the screen.
    - The resulting table will be 'ACS Demographic and Housing Estimates.'
    - Read across the row for 'Total Population' and down the row for 'Estimate' to find the Total Population Estimate.
    - Sum the estimates for 'Under 5 years,' '5-9 years,' and '10-14 years,' and subtract this value from the Total Population Estimate to obtain the total population age 15 years and older *(12B).*
    - Use the estimate for total population age 15 years and older to populate an Excel spreadsheet to perform age adjusting.

- 12.2b) To calculate the crude annual incidence rate:
  - Divide the number of mesothelioma-related deaths *(12A)* by the denominator *(12B) (12C).*
  - Multiply *12C* by 1,000,000 to obtain the **"Annual mesothelioma incidence rate (cases per million residents).'**

12.3) **Annual, age-standardized mesothelioma incidence rate (cases per million residents)**
- Use table below to perform calculations. Excel works well for performing calculations.
    - In Column C below, (State Pop), enter the state's census population (using the same table used to generate 12.2a) by age group for target year (e.g., population estimates for 2017 if generating rates for 2017).
    - In Column B (# mesothelioma cases), enter number of mesothelioma cases obtained in 12.1, by age group.
    - Column D = Column B / Column C (mesothelioma cases /Pop) = (# mesothelioma cases) / (State Pop).
    - Use the US 2000 Standard population (provided in column E in table below). This information can also be found at http://www.cdc.gov/nchs/data/statnt/statnt20.pdf.
    - Column F = Column D * Column E (# Expected mesothelioma cases) = (mesothelioma cases /Pop) * (US 2000 Standard Pop).
- To calculate the **"Annual, age-standardized mesothelioma incidence rate (cases per million residents),"** divide Cell F10 by Cell E10 and multiply by 1,000,000. (The sum (Σ) of all expected total pneumoconiosis inpatient hospitalizations) / (the sum of US 2000 Standard Pop) multiplied by 1,000,000.

		Column B	Column C	Column D	Column E	Column F
		State Resident Mesothelioma Cases, ages 15 and older, [year]				
	Age Group	**# Mesothelioma Cases**	**[year] State Population**	**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)

INDICATOR #13 Elevated Blood Lead Levels among Adults	
Rationale:	The average blood lead level for the general US adult population is less than 1 µg/dL of venous whole blood. BLLs ≥5 ug/dL are considered elevated and should be reported. As of November 2015, this is the case definition for elevated BLL used by the Council of State and Territorial Epidemiologists (CSTE), the National Institute for Occupational Safety and Health (NIOSH), and the Centers for Disease Control (CDC).
Group:	Employed persons
Data sources:	1. Reports of elevated BLLs from laboratories (numerator). 2. Population estimates from BLS Current Population Survey – Geographic Profile of Employment and Unemployment (denominator)
Numerators:	All reported state residents age 16 years or older, with blood lead level of: 1. ≥5 µg/dL, 2. ≥ 10 µg/dL, 3. ≥25 µg/dL, 4. ≥ 40 µg/dL
Denominator:	Employed population aged 16 years or older for the same calendar year
Measures:	1. Annual number of residents with elevated BLLs 2. Annual number of incident cases of residents with elevated BLLs 3. Annual prevalence rate per 100,000 employed persons age ≥ 16 years 4. Annual incidence rate per 100,000 employed persons age ≥ 16 years
Time Period:	Calendar year
Limitations:	In practice, many state surveillance systems cannot yet collect information on BLLs below 10 ug/dL. Thus, comparisons among states for exposures below this level may not be meaningful or reliable, since the estimates may not even exist in in all states.

BLLs reflect the contributions of acute external exposure to lead as well as the release of internal bone lead stores into the blood. For persons without significant lead body burden, a BLL is a good indicator of recent (preceding 3-5 weeks) external lead exposure.

This indicator likely underestimates the true burden of lead exposure in any given state for several reasons:
    o   Reports from laboratories are frequently incomplete.
    o   Some states do not require laboratories to report all BLLs.
    o   Some states may have no BLL reporting requirements.
    o   Not all employers offer BLL testing to employees, even if employees are exposed to lead.
    o   Some workers may not be tested using appropriate methods.

Additionally, although most elevated blood lead levels are presumed to be occupationally-related, approximately 10-15% of elevated adult BLLs come from non-occupational exposures. It may not be possible to distinguish occupational exposures from non-occupational exposures. |

How-To: OHI #13 Elevated Blood Lead Levels among Adults

*NOTE: The current case definition for elevated blood lead levels (≥5 ug/dL) was adopted in late 2015. **If it is feasible, states are encouraged to calculate and report blood lead levels ≥ 5 ug/dL. If blood lead levels <10 ug/dL are not available, please indicate this in the reporting template***.

13.1)   Annual number of residents with elevated BLLs
   13.1a)   Prevalent Case Criteria
   - Obtain data from your state ABLES Program. Use the following criteria to identify **prevalent** cases (*new plus old cases*) in a given year:
     – Age = 16 years or older at the time of blood draw.
       ▪ If date of blood draw (preferred date) is unavailable, use earliest date from either laboratory sample received or laboratory sample analyzed to calculate age.
     – Include all cases (i.e., occupational, non-occupational, unknown exposure source).
     – Include all state residents and unknown residence.
     – If an adult has more than one BLL test in a year, count the person one time only using their highest BLL.
     – Exclude:
       ▪ Residence = out-of-state.

   13.1b)   Incident Case Criteria
   - Access your State ABLES Program database. Use the following criteria to identify **incident** cases (*new cases*):
     – Two consecutive years of data are needed to determine new cases: i.e., the target year (e.g., 2017) and the year preceding the target year (e.g., 2016).
     – An incident (or *new case*) is an adult whose highest BLL was ≥5 µg/dL in a given year (e.g., 2016) but who did not have a BLL ≥5 µg/dL in the preceding year (e.g., 2015).
     – See table below for example. Contact the NIOSH ABLES program if you have difficulties or if you need to obtain the numbers for your state.

Person	Year 2015 (BLL µg /dL)	Year 2016 (BLL µg /dL)	Year 2017 (BLL µg /dL)	New case for 2017 (Y/N)
A	2	3	7	Y
B	12	4	8	Y
C	Not in registry	Not in registry	9	Y
D	24	28	18	N (prevalent case, not new)
E	11	4	4	Not a case (not a prevalent or new case)
F	12	Not tested	7	Y (considered a new case)

   13.1c)   Worksheet for Calculating Prevalence and Incidence Numerator
   - Access your states ABLES Program data base to determine the number of prevalent and incident adult cases in the five BLL range categories.

NOTE: Numbers in RED are for illustration purposes and need to be replaced with your own numbers. ALSO, the numbering in the tables below match the numbering in the reporting template.

BLL Range	Prevalence range	Annual number of prevalent cases with BLLs ≥	Incidence range	Annual number of incident cases with BLLs ≥
BLL <5 µg/dL	p1	100	i1	
BLL 5 to <10 µg/dL	p2	80	i2	
BLL 10 to < 25 µg/dL	p3	85	i3	
BLL 25 to < 40 µg/dL	p4	30	i4	
BLL ≥ 40 µg/dL	p5	10	i5	

- Plug the numbers you have from the table above into the formulas provided in the tables below to get the final count for the four BLL categories (prevalent and incident cases).

BLL Category	Prevalence numerator	Formula based on prevalence range numerator	Annual number of prevalent cases with BLLs ≥
BLL ≥5 µg/dL	Prev#_BLL ≥5µg/dL	p2 +p3 +p4 +p5	80+85+30+10 =205
BLL ≥10 µg/dL	Prev#_BLL≥10µg/dL	p3 +p4 +p5	85+30+10 =125
BLL ≥25 µg/dL	Prev#_BLL≥25µg/dL	p4 +p5	30+10 =40
BLL ≥ 40 µg/dL	Prev#_BLL≥40µg/dL	p5	10

BLL Category	Incidence numerator	Formula based on incidence range numerator	Annual number of incident cases with BLLs ≥
BLL ≥5 µg/dL	Inc#_BLL≥5µg/dL	i2 +i3 +i4 +i5	
BLL ≥10 µg/dL	Inc#_BLL≥10µg/dL	i3 +i4 +i5	
BLL ≥25 µg/dL	Inc#_BLL≥25µg/dL	i4+i5	
BLL ≥ 40 µg/dL	Inc#_BLL≥40µg/dL	i5	

Note: Number of adults in categories with higher BLLs are included in categories with lower BLLs. For example, the number of adults with BLL ≥40 µg/dL is a subset of the number of adults with BLL ≥10 µg/dL. Hence BLL ≥5 µg/dL will always have the largest annual number, followed by BLL ≥10 µg/dL, BLL≥25 µg/dL, and BLL ≥40 µg/dL.

13.2)   Estimated annual prevalence (or incidence) rate of residents with elevated BLLs

13.2a) To obtain the denominator:
- Use the Geographic Profile of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
- Under "States", Select Table 14 "Employment status of the civilian noninstitutional population, by gender, age, race, Hispanic or Latino ethnicity, and marital status."
- From the row corresponding to your state, select value in the "Total" column under "Employed" section. This is the total number of employed civilians 16 or older in thousands *(13A).*
- To calculate the total employed, multiply *13A* by 1,000 *(13B).*

13.2b) To calculate the prevalence (and incidence) rate:
- Divide the numerator for each specific BLL category obtained above in *13.1c* by 13*B*. The numerator changes by category, but the denominator is the same.
- To calculate the **"Annual prevalence (incidence) rate per 100,000 employed persons aged 16 years or older,"** multiply the results of each category by 100,000.

Annual prevalence rates:

Prevalence rate of BLL ≥5 µg/dL	=	$\dfrac{\text{Annual number of prevalent cases with BLL ≥5 µg/dL}}{\text{Number of employed persons}}$	x 100,000	=
Prevalence rate of BLL ≥10 µg/dL	=	$\dfrac{\text{Annual number of prevalent cases with BLL ≥10 µg/dL}}{\text{Number of employed persons}}$	x 100,000	=
Prevalence rate of BLL ≥25 µg/dL	=	$\dfrac{\text{Annual number of prevalent cases with BLL ≥25 µg/dL}}{\text{Number of employed persons}}$	x 100,000	=
Prevalence rate of BLL ≥ 40 µg/dL	=	$\dfrac{\text{Annual number of prevalent cases with BLL ≥ 40 µg/dL}}{\text{Number of employed persons}}$	x 100,000	=

Annual incidence rates:

Incidence rate of BLL ≥5 µg/dL	=	$\dfrac{\text{Annual number of incident cases with BLL ≥5 µg/dL}}{\text{Number of employed persons}}$	x 100,000	=
Incidence rate of BLL ≥10 µg/dL	=	$\dfrac{\text{Annual number of incident cases with BLL ≥10 µg/dL}}{\text{Number of employed persons}}$	x 100,000	=
Incidence rate of BLL ≥25 µg/dL	=	$\dfrac{\text{Annual number of incident cases with BLL ≥25 µg/dL}}{\text{Number of employed persons}}$	x 100,000	=
Incidence rate of BLL ≥ 40 µg/dL	=	$\dfrac{\text{Annual number of incident cases with BLL ≥ 40 µg/dL}}{\text{Number of employed persons}}$	x 100,000	=

INDICATOR #14 Percentage of Workers Employed in Industries at High Risk for Occupational Morbidity	
Rationale:	Control of occupational hazards is the most effective means of preventing work related injuries and illnesses. Concentrating on high-risk industries for non-fatal injuries and illnesses helps prioritize limited resources.
Group:	Employed persons
Data Sources:	U.S. Census Bureau County Business Patterns (CBP)
Numerator:	Employed workers, 16 years of age and older, in private sector industries at high-risk for occupational morbidity
Denominator:	Employed persons age 16 years or older in all private sector industries for same calendar year
Measures:	1. Number of employed persons in high morbidity risk North American Industry Classification System (NAICS) industries 2. Percentage of employed persons in high morbidity risk (NAICS) industries.
Time Period:	Calendar year
Limitations:	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 could mean that industries considered "high-risk" according to national BLS estimates may be more or less risky in individual states. The list of high-risk industries was constructed using an across-the-board threshold for "high-risk" based on national data. It is possible that certain industries on this list of 54 are more, or less risky in an individual state. Therefore, this indicator is not a direct estimate of how much risk workers in your state experience at work. It only provides an aggregate estimate of how many workers are employed in industries, which at the national level, have been deemed high-risk.

How-To: OHI #14 Percentage of Workers Employed in Industries at High Risk for Occupational Morbidity

The following are industries with high risk of morbidity based on Bureau of Labor Statistics "total reportable cases incidence rates" for private sector workers for the year 2014. These 54 industries had occupational injury and illness rates of more than double the overall national rate, or 6.4 cases per 100 full-time workers or higher. For this indicator, these industries are classified as high-risk industries and they accounted for 6.3 million workers in the United States (5.3% of the private sector non-farm wage and salary employment). **So that states may collect trend data for this indicator, this list was used with 2013 data and is planned for use until advised otherwise.**

Table 1. NAICS codes and Industry Titles for High Morbidity Risk Industries (n=54)

Industry code	Industry name
311212	Rice milling
311313	Beet sugar manufacturing
311611	Animal (except poultry) slaughtering
311613	Rendering and meat byproduct processing
312111	Soft drink manufacturing
313220	Narrow fabric mills and schiffli machine embroidery
314994	Rope, Cordage, Twine, Tire Cord, and Tire Fabric Mills
321113	Sawmills
321114	Wood preservation
321214	Truss manufacturing
321912	Cut stock, resawing lumber, and planning
321918	Other millwork (including flooring)
321920	Wood container and pallet manufacturing
321991	Manufactured home (mobile home) manufacturing
321992	Prefabricated wood building manufacturing
326122	Plastics pipe and pipe fitting manufacturing
327390	Other concrete product manufacturing
331222	Steel wire drawing
331511	Iron foundries
331513	Steel foundries (except investment)
331523	Nonferrous Metal Die-Casting Foundries
331524	Aluminum foundries (except die-casting)
331529	Other Nonferrous Metal Foundries (except Die-Casting)
332313	Plate work manufacturing
332439	Other metal container manufacturing
333111	Farm machinery and equipment manufacturing
336111	Automobile manufacturing
336112	Light truck and utility vehicle manufacturing
336211	Motor vehicle body manufacturing
336212	Truck trailer manufacturing
336214	Travel trailer and camper manufacturing
336370	Motor vehicle metal stamping
336611	Ship building and repairing
336612	Boat building
337215	Showcase, partition, shelving, and locker manufacturing

339995	Burial casket manufacturing
44229	Other home furnishings stores
448320	Luggage and leather goods stores
453910	Pet and pet supplies stores
481111	Scheduled passenger air transportation
4852	Interurban and rural bus transportation
488320	Marine cargo handling
4921	Couriers and express delivery services
541940	Veterinary services
562111	Solid waste collection
562219	Other nonhazardous waste treatment and disposal
562920	Materials recovery facilities
621910	Ambulance services
6222	Psychiatric and Substance Abuse Hospitals
6231	Nursing Care Facilities (Skilled Nursing Facilities)
6233	Continuing Care Retirement Communities and Assisted Living Facilities for the Elderly
6239	Other Residential Care Facilities
713110	Amusement and Theme Parks
713920	Skiing Facilities

Note: Until 2016 (including the 2016 data collection) this indicator used County Business Patterns data from the American Fact Finder website for calculating the percentage of persons in high risk morbidity industries. As of March 31st 2020, the American Fact Finder website was taken offline. Data previously reported by that website is now be available at https://data.census.gov/cedsci/. The following instructions have been modified to reflect this change.

14.1) Number of employed persons in high morbidity risk North American Industry Classification System (NAICS) industries
- To track and calculate the number of employed persons, it is recommended that you copy and paste Table 1 into an excel spreadsheet.
- Use the Explore Census Data webpage: https://data.census.gov/cedsci/.
  - Under the search box, click the link for 'Advanced search.'
  - Under 'Browse filters,' click on 'Geography.' From the menu that appears, click 'state.' Find your state and check the corresponding box filter by your state.
  - Under 'Browse filters' click on 'Years' and select the year of interest from the menu that appears.
  - Under 'Browse filters' click on 'Survey', select 'Economic Surveys' > 'Business Patterns' > 'County Business Patterns'.
  - There are two options for selecting individual NAICS codes:
    - Option 1: Manually enter the NAICS codes from Table 1 in the search bar under "Narrow search with filters." Check the box next to the NAICS codes when it appears, and it will automatically add the result to your search filter. Click the 'X' in the search box to clear the search and then search the next NAICS code in the same way. Repeat until you have added all the NAICS codes.
    - Option 2: Under 'Browse Filters,' click on 'Codes' and select 'Industry Codes (NAICS).' Select the high risk NAICS codes from Table 1. As boxes are checked for the appropriate NAICS codes, the codes will automatically be added to your search filter.

- After selecting filters by state, year of interest, survey, and NAICS, click the 'Search' button at the bottom right of the screen.
- The resulting table will be 'All Sectors: County Business Patterns by Legal Form of Organization and Employment Size Class for U.S., States, and Selected Geographies.' Click on the table title.
- Locate 'Filter|Download' on the left side near the top of the screen. Select 'Download.'
- After selecting 'Download' once, you will need to select which of the downloaded items you wish to view (the file will not actually download to your computer on the first click). Find the selection box on the left side of the screen, check the box next to the table of interest, then click 'Download selected'. A pop-up box will appear giving you the option to select the CSV format (the option for PDF format will not be available).
- Click the box next to the CSV format and select 'Download.' A pop-up box will appear showing the progress of the download. When the progress is complete, click "download now." THIS step will download the file to your computer. Open the downloaded CSV file in MS Excel.
- Once the downloaded table is opened in Excel, choose 'Filter' from the top right menu. From the variable 'LFO_LABEL,' select "All establishments." From the variable 'EMPSZES_LABEL,' select "All establishments."
- The total employed for each NAICS code can be found in the column titled 'EMP' or 'Number of employees.'
- Copy and paste the numbers into the table you created in Excel earlier.
  - If the code was not included the downloaded table, enter '0' for that NAICS code.
  - For some codes, a letter will be entered in place of a number. This letter refers to the range of employees for that particular industry. Refer to the table below for number ranges associated with each letter and use the midpoint of the range.

A	0-19
B	20-99
C	100-249
E	250-499
F	500-999
G	1,000-2,499
H	2,500-4,999
I	5,000-9,999
J	10,000-24,999
K	25,000-49,999
L	50,000-99,999

- Sum the numbers of employees from each industry (using midpoints where necessary). This is the **"Number of workers employed in high-risk industries"** *(14A)*.

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

14.2a) To obtain the denominator for the percentage:
- Use the Explore Census Data webpage: https://data.census.gov/cedsci/.
  - Under the search box, click the link for 'Advanced search.'
  - Under 'Browse filters,' click on 'Geography.' From the menu that appears, click 'state.' Find your state and check the corresponding box filter by your state.

- Under 'Browse filters' click on 'Years' and select the year of interest from the menu that appears.
- Under 'Browse filters' click on ', select 'Economic Surveys' > 'Business Patterns' > 'County Business Patterns'.
- After selecting filters by state, year of interest, and survey, click the 'Search' button at the bottom right of the screen.
- The resulting table will be 'All Sectors: County Business Patterns by Legal Form of Organization and Employment Size Class for U.S., States, and Selected Geographies.' Click on the table title.
- Locate 'Filter|Download' on the left side near the top of the screen. Select 'Download.'
- After selecting 'Download' once, you will need to select which of the downloaded items you wish to view (the file will not actually download to your computer on the first click). Find the selection box on the left side of the screen, check the box next to the table of interest, then click 'Download selected'. A pop-up box will appear giving you the option to select the CSV format (the option for PDF format will not be available).
- Click the box next to the CSV format and select 'Download.' Another pop-up box will appear showing the progress of the download. When the progress is complete, click "download now." THIS step will download the file to your computer. Open the downloaded CSV file in MS Excel.
- Once the downloaded table is opened in Excel, choose 'Filter' from the top right menu. From the variable 'LFO_LABEL,' select "All establishments." From the variable 'EMPSZES_LABEL,' select "All establishments."
- The total employed population can be found in the top row ('Total for all sectors') under the column 'Number of Employees' *(14B).*

14.2b) To calculate the percentage:
- Divide the total number of workers employed in high-risk industries (*14A*) by the number of employed persons (*14B*) *(14C)*.
- To calculate the **"Percentage of employed persons in high morbidity risk industries,"** multiply *14C* by 100.

INDICATOR #15 Percentage of Workers Employed in Occupations at High Risk for Occupational Morbidity	
Rationale:	Control of occupational hazards is the most effective means of preventing work related injuries and illnesses. Concentrating on high-risk occupations for non-fatal injuries and illnesses helps prioritize limited resources.
Group:	Employed persons
Data Sources:	Bureau of Labor Statistics' Current Population Survey (CPS)
Numerator:	Employed persons aged 16 years or older, in private sector occupations at high risk for occupational morbidity
Denominator:	Employed persons aged 16 years or older, in all private sector industries for the same calendar year
Measures:	1. Average number of employed persons in 2014 SOII high-risk occupations 2. Percentage of employed persons in 2014 SOII high-risk occupations
Time Period:	Calendar year
Limitations:	Differences in regional industrial practices could mean that occupations considered "high-risk" according to national BLS estimates may be more or less risky in individual states. The list of high-risk occupations was constructed using an across-the-board threshold for "high-risk" based on national data. It is possible that certain occupations on this list of 49 are more, or less risky in an individual state. Therefore, this indicator is not a direct estimate of how much risk workers in your state experience at work. It only provides an aggregate estimate of how many workers are employed in occupations which, at the national level, have been deemed high-risk.

How-To: OHI #15 Percentage of Workers Employed in Occupations at High Risk for Occupational Morbidity

The following are the high-morbidity occupations based on Bureau of Labor Statistics "days away from work" cases and employment estimates for private sector workers for data year 2014. In 2014, the injury DAFW rate for all private sector workers was 97.8 per 10,000 FTE. Following the standard set in 2008, the 49 high risk occupations are those with rates more than double the rate for all workers (i.e., greater than 195.6 per 10,000 FTE). **So that states may collect trend data for this indicator, this list was used with 2013 data and is planned for use until otherwise advised.**

Table 1. List of high-risk occupations for occupational morbidity (N =49)

BOC occupation codes	BOC code title
1310	Surveyors, cartographers, and photogrammetrists
2720	Athletes, coaches, umpires, ad related workers
3400	Emergency medical technicians and paramedics
3600	Nursing, psychiatric, and home health aides
3648	Veterinary assistants and laboratory animal caretakers
3850	Police and sheriff's patrol officers/ (3860-Transit & railroad police are included in 3850)
3940	Crossing guards
4030	Food preparation workers
4210	First-line supervisors of landscaping, lawn service, and groundskeeping workers
4220	Janitors and building cleaners
4230	Maids and housekeeping cleaners
4250	Grounds maintenance workers
4350	Nonfarm animal caretakers
5410	Reservation and transportation ticket agents and travel clerks
5500	Cargo and freight agents
6130	Logging workers
6230	Carpenters
6240	Carpet, floor, and tile installers and finishers
6260	Construction laborers
6515	Roofers
6530	Structural iron and steel workers
6750	Septic tank servicers and sewer pipe cleaners
6765	Miscellaneous construction and related workers
6820	Earth drillers, except oil and gas
6840	Mining machine operators
7020	Radio and telecommunications equipment installers and repairers
7040	Electric motor, power tool, and related repairers
7120	Electronic home entertainment equipment installers and repairers
7160	Automotive glass installers and repairers
7200	Automotive service technicians and mechanics
7220	Heavy vehicle and mobile equipment service technicians and mechanics
7260	Miscellaneous vehicle and mobile equipment mechanics, installers, and repairers
7300	Control and valve installers and repairers
7315	Heating, air conditioning, and refrigeration mechanics and installers
7340	Maintenance and repair workers, general

7420	Telecommunications line installers and repairers
7610	Helpers--installation, maintenance, and repair workers
8100	Part of Molders and molding machine setters, operators, and tenders, metal and plastic
8510	Furniture finishers
8530	Sawing machine setters, operators, and tenders, wood
8830	Photographic process workers and processing machine operators
8940	Tire builders
9050	Flight attendants
9120	Bus drivers
9130	Driver/sales workers and truck drivers
9140	Taxi drivers and chauffeurs
9240	Railroad conductors and yardmasters
9620	Laborers and freight, stock, and material movers, hand
9720	Refuse and recyclable material collectors

NOTE: *To calculate the number of employed persons, it is recommended that you copy and paste Table 1 into an excel spreadsheet.*

15.1) Number of Employed Persons in High Morbidity Risk 2010 Bureau of Census Occupations
- Use the NIOSH Employed Labor Force (ELF) (https://wwwn.cdc.gov/wisards/cps/).
- Click on "ELF Estimates" from left-hand menu.
- In Step 1, select 'Number of workers.'
- In Step 2:
  - Under "Time Period," select target year.
  - Under "Location," select your state (if necessary, click on "Expand Options").
  - In the "Workforce" section, click on "Expand Options." Scroll to "Class of Worker (Primary Job 1994-2018)." Keep "CPS groups" button selected. Using the Ctrl button, select "Private, For Profit" and "Private, Nonprofit."
  - In the "Industry/Occupation" section, click on "Expand Options."
  - Under "B.O.C. Occupation (Primary Job 2011+)," click on "Select" next to the box labeled "All Occupation Codes." Click on the "+" next to each major occupation category.
  - Click the "+" again next to the occupation subgroups and check the boxes for the occupation codes from Table 1.
  - Click "Hide" (options are still selected, but less screen space is needed). To check the occupation codes that you've selected already, click the "View" button next to "B.O.C. Occupation (Primary Job 2011+)." To add or delete selected codes, double-click on "Selected Codes."
- Step 3: Select report variables (optional).
  - For "Column Variable (1-Major Group)," select "State."
  - For "Row Variable (2-Major Group)," select "Occupation Code (Primary Job 2011+)."
  - Leave Weight as "Composite Weight."
- Step 4, click "Submit Query."
- Once the query results appear, check query parameters to ensure that they are correct.
- Export to an Excel file. All values together make up the **"Estimate of employed persons in high morbidity risk occupations"** *(15A).*

15.2) **Percentage of Employed Persons in High Morbidity Risk 2010 Bureau of Census Occupations**

15.2a) To obtain the annual estimate of employed persons using ELF.
- In Step 1, select 'Number of workers.'
- In Step 2:
  - Under "Time Period," select target year.
  - Under "Location," select your state (if necessary, click on "Expand Options").
  - In the "Workforce" section, click on "Expand Options." Scroll to "Class of Worker (Primary Job 1994-2018)." Keep "CPS groups" button selected. Using the Ctrl button, select "Private, For Profit" and "Private, Nonprofit."
- Step 3: Select report variables (optional).
  - For "Column Variable (1-Major Group)," select "State."
  - For "Row Variable (2-Major Group)," select "Labor force status."
  - Leave Weight as "Composite Weight."
- Step 4, click "Submit Query."
- Once the query results appear, check query parameters to ensure that they are correct.
- Record the total number which includes the "Employed-At Work" and the "Employed-Absent." This total represents the "**Estimate of employed persons**" *(15B).*

15.2b) To calculate the percentage:
- Divide the number of workers employed in high-risk occupations (*15A*) by the number of employed persons (*15B*) *(15C)*.
- To calculate the **"Percentage of workers employed in occupations at high risk for occupational morbidity,"** multiply *15C* by 100.

INDICATOR #16 Percentage of Workers Employed in Industries and Occupations at High Risk for Occupational Mortality	
Rationale:	Multiple risk factors 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 be an initial step in identifying high risk industries and occupations and can lead to the development of new interventions and development of new or revised regulations to protect workers. Concentrating on high-risk industries and occupations for fatalities helps prioritize limited resources.
Group:	Employed persons
Data Sources:	NIOSH Employed Labor Force query system (https://wwwn.cdc.gov/wisards/cps/)
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:	1. Number of employed persons in high mortality risk 2012 Bureau of the Census industries 2. Percentage of employed persons in high mortality risk 2012 Bureau of the Census industries 3. Number of employed persons in high mortality risk 2010 Bureau of the Census occupations 4. Percentage of employed persons in high mortality risk 2010 Bureau of the Census occupations
Time Period:	Calendar year
Limitations:	Differences in regional industrial practices may result in high-risk industries and occupations within a specific state to differ from national data. The lists of high-risk industries and occupations were constructed using across-the-board thresholds for "high-risk" based on national data. It is possible that certain industries and occupations on this list are more, or less risky in an individual state. Therefore, this indicator is not a direct estimate of how much risk workers in your state experience at work. It only provides an aggregate estimate of how many workers are employed in industries and occupations which, at the national level, have been deemed high-risk.

How-To: OHI #16 Percentage of Workers Employed in Industries and Occupations at High Risk for Occupational Mortality

The following are the high-mortality industries based on Bureau of Labor Statistics' Census of Fatal Occupational Injuries (CFOI) for private sector workers 16 years of age and older for the year 2014. These 38 industries had fatality rates more than twice as high (7.3 and higher) as the overall rate of 3.6 per 100,000 full-time equivalent workers.

Table 1. Bureau of Census industry codes and industry titles for high mortality risk private sector industries (N = 38)

2012 Census Industry Codes	Bureau of Census Industry Title
0170	Crop production
0180	Animal production and aquaculture
0270	Logging
0280	Fishing, hunting and trapping
0290	Support activities for agriculture and forestry
0370	Oil and gas extraction
0380	Coal mining
0390	Metal ore mining
0470	Nonmetallic mineral mining and quarrying
0490	Support activities for mining
0770	Construction
2180	Agricultural chemical manufacturing
2570	Cement, concrete, lime, and gypsum product manufacturing
2890	Coating, engraving, heat treating, and allied activities
3095	Commercial and service industry machinery manufacturing
3770	Sawmills and wood preservation
4070	Motor vehicle and motor vehicle parts and supplies merchant wholesalers
4180	Metals and minerals, except petroleum, merchant wholesalers
4280	Recyclable material merchant wholesalers
4480	Farm product raw material merchant wholesalers
4490	Petroleum and petroleum products merchant wholesalers
4570	Farm supplies merchant wholesalers
4580	Miscellaneous nondurable goods merchant wholesalers
4990	Beer, wine, and liquor stores
5680	Fuel dealers
6090	Water transportation
6170	Truck transportation
6190	Taxi and limousine service
6280	Scenic and sightseeing transportation
6290	Services incidental to transportation
7180	Other consumer goods rental
7190	Commercial, industrial, and other intangible assets rental and leasing
7770	Landscaping services
7790	Waste management and remediation services

7880	Business, technical, and trade schools and training
8390	Vocational rehabilitation services
8670	Recreational vehicle parks and camps, and rooming and boarding houses
8690	Drinking places, alcoholic beverages

* The overall rate and the rates for the categories listed in Table 1 were generated by NIOSH with restricted access to the Bureau of Labor Statistics Census of Fatal Occupational Injuries microdata.

NOTE: *To track and calculate the number of employed persons, it is recommended that you copy and paste Table 1 into an excel spreadsheet.*

16.1)   Number of Employed Persons in High Mortality Risk Industries
- Use the NIOSH Employed Labor Force (ELF) (https://wwwn.cdc.gov/wisards/cps/).
- Click on "ELF Estimates" from left-hand menu.
- In Step 1, select 'Number of workers.'
- In Step 2:
  – Under "Time Period," select target year.
  – Under "Location," select your state (if necessary, click on "Expand Options").
  – In the "Workforce" section, click on "Expand Options." Scroll to "Class of Worker (Primary Job 1994-2018)." Keep "CPS groups" button selected. Using the Ctrl button, select "Private, For Profit" and "Private, Nonprofit, "Self-Employed, Incorporated," and "Self-Employed, Unincorporated."
  – In the "Industry/Occupation" section, click on "Expand Options."
  – Select "B.O.C. Ind. Codes 2012" button next to "Industry By."
  – Click on "Select" next to the box labeled "B.O.C. Industry (Primary Job 2014+)."
  – Click the "+" button next to each major industry code from Table 1.
  – Click "Hide" (options are still selected, but less space is taken up on the screen). To check the industry codes that you've selected already, click the "View" button next to "B.O.C. Industry (Primary Job 2014+)." To add or delete selected codes, double-click on "Selected Codes."
- Step 3: Select report variables (optional).
  – For "Column Variable (1-Major Group)," select "State."
  – For "Row Variable (2-Major Group)," select "Industry Code (Primary Job 2014+)."
  – Leave Weight as "Composite Weight."
- Step 4, click "Submit Query."
- Once the query results appear, check query parameters to ensure that they are correct.
- Export to an Excel file. All of the values together make up the **"Estimate of employed persons in high mortality risk industries"** *(16A).*

16.2)   Percentage of Employed Persons in High Mortality Risk Industries
16.2a)   To obtain the annual estimate of employed persons using ELF:
- In Step 1, select 'Number of workers.'
- In Step 2:
  – Under "Time Period," select target year.
  – Under "Location," select your state (if necessary, click on "Expand Options").
  – Under "Demographics," click on "Expand Options." Under "Age By," select "Individual Year" and highlight "All."
  – In the "Workforce" section, click on "Expand Options." Scroll to "Class of Worker (Primary Job 1994-2018)." Keep "CPS groups" button selected. Using the Ctrl button, select "Private, For Profit" and "Private, Nonprofit," "Self-Employed, Incorporated" and "Self-Employed, Unincorporated."

- Under "Industry/Occupation" section, make sure that all selections are cleared.
- Step 3: Select report variables (optional).
  - For "Column Variable (1-Major Group)," select "State."
  - For "Row Variable (2-Major Group)," select "Labor force status."
  - Leave Weight as "Composite Weight."
- Step 4, click "Submit Query."
- Once the query results appear, check query parameters to ensure that they are correct.
- Record the total number which includes the "Employed-At Work" and the "Employed-Absent." This total represents the "**Estimate of employed persons**" *(16B).*

16.2b) To calculate the percentage:
- Divide the number of workers employed in high-risk industries (*16A*) by the number of employed persons (*16B*) *(16C).*
- To calculate the **"Percentage of workers employed in industries at high risk for occupational mortality,"** multiply *16C* by 100.

High-risk Occupations

Table 2 includes high-mortality occupations based on Bureau of Labor Statistics' Census of Fatal Occupational Injuries for private sector workers 16 years of age and older for 2014. These 63 occupations had fatality rates more than twice as high (7.3 and higher) as the overall rate of 3.6 per 100,000 full-time equivalent workers.

Table 2. Bureau of Census occupation code and occupation titles for high mortality risk occupations (N = 63)

2010 Census Occupation Codes	BOC Occupation Titles
0205	Farmers, ranchers, and other agricultural managers
1310	Surveyors, cartographers, and photogrammetrists
2720	Athletes, coaches, umpires, and related workers
2760	Entertainers and performers, sports and related workers, all other
3940	Crossing guards
4210	First-line supervisors of landscaping, lawn service, and groundskeeping workers
4250	Grounds maintenance workers
4340	Animal trainers
4540	Tour and travel guides
6005	First-line supervisors of farming, fishing, and forestry workers
6050	Miscellaneous agricultural workers
6100	Fishers and related fishing workers
6130	Logging workers
6200	First-line supervisors of construction trades and extraction workers
6220	Brickmasons, blockmasons, and stonemasons
6250	Cement masons, concrete finishers, and terrazzo workers
6260	Construction laborers
6300	Paving, surfacing, and tamping equipment operators
6320	Operating engineers and other construction equipment operators
6355	Electricians
6400	Insulation workers
6420	Painters, construction and maintenance
6515	Roofers
6530	Structural iron and steel workers
6600	Helpers, construction trades
6660	Construction and building inspectors
6710	Fence erectors
6730	Highway maintenance workers
6750	Septic tank servicers and sewer pipe cleaners
6800	Derrick, rotary drill, and service unit operators, oil, gas, and mining
6840	Mining machine operators
6920	Roustabouts, oil and gas
6940	Other extraction workers
7000	First-line supervisors of mechanics, installers, and repairers
7020	Radio and telecommunications equipment installers and repairers
7210	Bus and truck mechanics and diesel engine specialists
7220	Heavy vehicle and mobile equipment service technicians and mechanics
7240	Small engine mechanics

7260	Miscellaneous vehicle and mobile equipment mechanics, installers, and repairers
7315	Heating, air conditioning, and refrigeration mechanics and installers
7340	Maintenance and repair workers, general
7350	Maintenance workers, machinery
7360	Millwrights
7410	Electrical power-line installers and repairers
7420	Telecommunications line installers and repairers
7610	Helpers--installation, maintenance, and repair workers
7940	Rolling machine setters, operators, and tenders, metal and plastic
8530	Sawing machine setters, operators, and tenders, wood
8630	Miscellaneous plant and system operators
8650	Crushing, grinding, polishing, mixing, and blending workers
9000	Supervisors of transportation and material moving workers
9030	Aircraft pilots and flight engineers
9130	Driver/sales workers and truck drivers
9140	Taxi drivers and chauffeurs
9150	Motor vehicle operators, all other
9240	Railroad conductors and yardmasters
9300	Sailors and marine oilers
9310	Ship and boat captains and operators
9510	Crane and tower operators
9520	Dredge, excavating, and loading machine operators
9560	Hoist and winch operators
9650	Pumping station operators
9720	Refuse and recyclable material collectors

* The overall rate and the rates for the categories listed in Table 2 were generated by NIOSH with restricted access to the Bureau of Labor Statistics Census of Fatal Occupational Injuries microdata.

NOTE: *To track and calculate number of employed persons, it is recommended that you copy and paste Table 2 into an excel spreadsheet.*

16.3)   Number of Persons Employed in High Mortality Risk Occupations
- Use the NIOSH Employed Labor Force (ELF) (https://wwwn.cdc.gov/wisards/cps/).
- Click on "ELF Estimates" from left-hand menu.
- In Step 1, select 'Number of workers.'
- In Step 2:
  – Under "Time Period," select target year.
  – Under "Location," select your state (if necessary, click on "Expand Options").
  – Under "Demographics," click on "Expand options." Under "Age By," select "Individual Year" and highlight "All."
  – In the "Workforce" section, click on "Expand Options." Scroll to "Class of Worker (Primary Job 1994-2018)." Keep "CPS groups" button selected. Using the Ctrl button, select "Private, For Profit" and "Private, Nonprofit, "Self-Employed, Incorporated," and "Self-Employed, Unincorporated."
  – In the "Industry/Occupation" section, click on "Expand Options."
  – Select "B.O.C. Occupation (Primary Job 2011+)" button next to "All Occupation Codes."
  – Click on "Select" next to the box labeled "B.O.C. Industry (Primary Job 2014+)."
  – Click the "+" button next to each major occupation code from Table 2.

- Click the "+" button again next to the occupation subgroups and check the boxes for the occupation codes of interest from Table 2.
- Click "Hide" (options are still selected, but less space is taken up on the screen). To check the industry codes that you've selected already, click the "View" button next to "B.O.C. Industry (Primary Job 2014+)." To add or delete selected codes, double-click on "Selected Codes."
- Step 3: Select report variables (optional).
  - For "Column Variable (1-Major Group)," select "State."
  - For "Row Variable (2-Major Group)," select "Occupation Code (Primary Job 2011+)."
  - Leave Weight as "Composite Weight."
- Step 4, click "Submit Query."
- Once the query results appear, check query parameters to ensure that they are correct.
- Export to an Excel file. All of the values together make up the **"Estimate of employed persons in high mortality risk occupations"** *(16D).*

16.4) **Percentage of Employed Persons in High Mortality Risk Occupations**
16.4a) To obtain the average annual number of employed persons using ELF:
- In Step 1, select 'Number of workers.'
- In Step 2:
  - Under "Time Period," select target year.
  - Under "Location," select your state (if necessary, click on "Expand Options").
  - Under "Demographics," click on "Expand Options." Under "Age By," select "Individual Year" and highlight "All."
  - In the "Workforce" section, click on "Expand Options." Scroll to "Class of Worker (Primary Job 1994-2018)." Keep "CPS groups" button selected. Using the Ctrl button, select "Private, For Profit" and "Private, Nonprofit," "Self-Employed, Incorporated" and "Self-Employed, Unincorporated."
  - Under "Industry/Occupation" section, make sure that all selections are cleared.
- Step 3: Select report variables (optional).
  - For "Column Variable (1-Major Group)," select "State."
  - For "Row Variable (2-Major Group)," select "Labor force status."
  - Leave Weight as "Composite Weight."
- Step 4, click "Submit Query."
- Once the query results appear, check query parameters to ensure that they are correct.
- Record the total number which includes the "Employed-At Work" and the "Employed-Absent." This total represents the "**Estimate of employed persons**" *(16E).*

16.4b) To calculate the percentage:
- Divide number of workers employed in high-risk occupations (*16D*) by number of employed persons *(16E) (16F).*
- To calculate the **"Percentage of workers employed in occupations at high risk for occupational mortality,"** multiply *16F* by 100.

INDICATOR #17 Occupational Safety and Health Professionals
NIOSH and CSTE are no longer collecting data for this indicator. Historical instructions for calculating the indicator can be found in previous years' versions of the OHI guidance manual, available upon request from the NIOSH co-chairs.

INDICATOR # 18 OSHA Enforcement Activities	
Rationale:	OSHA enforcement activities may correlate with workplace health and safety benefits, such as a reduction in the number of workplace injuries or illnesses. In some respects, OSHA enforcement activities may serve as a leading indicator of workplace safety, since the potential for a workplace to be inspected by OSHA may provide an incentive for employers to give more attention to workplace health and safety issues.
Group:	Employed persons working under OSHA jurisdiction
Data Sources:	1. OSHA annual reports of total inspections conducted, and the number of workers covered by these inspections 2. Bureau of Labor Statistics' data on Covered Employers and Wages (commonly referred to as the ES-202/QCEW data http://www.bls.gov/cew/home.htm) for the number of workers employed and establishments in the public and private sectors
Numerator:	1. Total number of OSHA inspections 2. Total number of employed persons covered by OSHA inspections
Denominator:	1. Estimated number of establishments under OSHA jurisdiction 2. Estimated number of employees under OSHA jurisdiction for the same calendar year
Measures:	1. Annual number of establishments inspected by OSHA 2. Estimated percentage of all establishments under OSHA jurisdiction inspected by OSHA 3. Annual number of employees whose work areas were inspected by OSHA 4. Estimated percentage of all employees under OSHA jurisdiction whose work areas were inspected
Time Period:	Calendar year
Limitations:	This indicator only measures enforcement activity. Because OSHA may conduct multiple inspections of the same establishment during the calendar year, the percentage 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 are excluded from the denominator in this indicator except for in a few states, therefore, the percentages of establishments and employees covered may be overestimated in states that do inspect smaller farms.

How-To: OHI#18 OSHA Enforcement Activities

18.1) Annual number of establishments inspected by OSHA in all OSHA-covered sectors
- NIOSH will routinely distribute state data for the current Occupational Health Indicator development year prior to the June 30 submission due date by means of the Consortium of Occupational State Surveillance Listserv (OCC-HLTH-STATE-SURV@LISTSERV.CDC.GOV). Contact Suzanne Marsh at NIOSH at smm2@cdc.gov with questions.
- From the data provided, obtain the number for TOTAL INSPECTIONS. This is the **"Annual number of employer establishments inspected by OSHA"**. (18A)

NOTE: NIOSH will collect these data on behalf of the states each year. Thus, if you already have data obtained from NIOSH, skip to 18.2A. However, if you do not have your state's data, please follow the instructions below.

- 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 all sectors (private and/or public) 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.
- 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).
- 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."**
- On page 2 of the INSP-5/INSP-9 report under "Employee information," obtain the number for EMPLOYMENT COVERED. This will yield the "**Annual number of employees whose work areas were 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 used in generating this indicator. The OSHA web site does not include information about number of employees covered.
- In addition to the above website, additional information may be found at: https://www.osha.gov/severeinjury/. Beginning in 2015, employers were required to report all amputations, inpatient hospitalizations, and eye loss cases to OSHA. These reports, which include information about the injury incident, the employer involved, the industry, whether OSHA inspected the worksite, etc., are available at the state and national level for federal OSHA states.

18.2) **Number of OSHA-Covered Establishments that are Eligible for OSHA Inspections**

18.2a) To obtain the number of OSHA-Covered Establishments that are Eligible for OSHA Inspections:

- Use the BLS webpage (http://www.bls.gov/cew/data.htm).
- To access your state's ES-202/QCEW statistics, click the yellow box "Multi-screen Data" next to the "State and County Wages" box. *PLEASE NOTE: Estimates of establishments from the QCEW may not be reported as annualized. If that's the case, average the estimates from the four quarters (Qtr1 – Qtr4).*
- On the first screen, select "Total, all Industries." Select "Next form."
- Select *'your state.'* Select "Next form."
- Select the relevant ownership sector(s) (i.e. federal government and private for federal OSHA states; all options "Total Covered" for state-plan OSHA states). Use the CTRL key to select more than 1 sector. Select "Next form."
- Select "Number of Establishments." Select "Next form."
- Select "All Establishment Sizes." Select "Next form."
- Review the form and select "Retrieve Data."
- If the annual number is not provided, average the quarterly estimates to obtain the annual number of establishments for the target year for each table. NOTE: there may be more than one table retrieved (if both 'federal government' and 'private' were chosen above.) This is the average number of OSHA-covered establishments in your state that are eligible for OSHA inspection.
- To exclude mines and farms and private households, use the instructions in 18.2b.

18.2b) Number of OSHA-Covered Establishments that are Eligible for OSHA Inspections (EXCLUDING MINES AND FARMS AND PRIVATE HOUSEHOLDS)

NOTE: Mines are not covered by OSHA. 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. Beginning with the 2018 data, private households will also be excluded as OSHA does not cover individuals who, in their own residences, employ workers primarily engaged in activities supporting the operation of a household such as cooks, cleaners, gardeners, & property caretakers.

- To adjust the denominator (18.2a) and exclude mines and farms and private households:
  – Follow the first two bullets in 18.2a above. In the first screen, use the CTRL key to select NAICS codes: 111,112,212,213, 814 (Crop Production, Animal Production and Aquaculture, Mining except Oil and Gas, Support Activities for Mining, and Private Households)). Select "next form."
  – Select *'your state.'*
  – Select relevant ownership sector(s).
  – Select, "Number of Establishments."
  – Select, "All Establishment Sizes."
  – Select "Retrieve Data."
  – Sum the annual numbers for the target year from each table. If the annual number is not provided, average the quarterly estimates to obtain the annual number of establishments for the target year for each table (NAICS 111, 112, 212, 213, 814).
  – Subtract this sum from the number of establishments in 18.2a to get the final denominator. This total will represent the **"Number of OSHA-covered establishments that are eligible for OSHA inspection (excluding mines and farms)"** *(18B).*

18.3)   Percentage of OSHA-Covered Establishments Eligible for Inspection that were Inspected by OSHA
- Divide the numerator (*18A*) by the final denominator obtained in *18B* (adjusted for mines and farms and private households) *(18C)*.
- To calculate the "**Percentage of all OSHA-covered establishments eligible for inspection that were inspected by OSHA,"** multiply *18C* by 100.

18.4)   Annual Number of Employees Whose Work Areas were Inspected by OSHA
- NIOSH will routinely distribute state data for the current Occupational Health Indicator development year prior to the June 30 submission due date by means of the Consortium of Occupational State Surveillance Listserv (OCC-HLTH-STATE-SURV@LISTSERV.CDC.GOV). Contact Suzanne Marsh at NIOSH at smm2@cdc.gov or 304.285.5874 with questions.
- From the data provided, obtain the number for EMPLOYMENT COVERED. This is the **"Annual number of employees whose work areas were inspected by OSHA."** (18D)

18.5)   Number of OSHA-Covered Employees in the State that are Eligible for Inspection
18.5a)   To obtain the number of OSHA-Covered Establishments that are Eligible for OSHA Inspections:
- Use the BLS webpage (http://www.bls.gov/cew/data.htm**).**
- To access your state's ES-202/QCEW statistics, Click the yellow box "Multi-screen Data" next to the "State and County Wages" box. *PLEAE NOTE: Estimates of establishments from the QCEW may not be reported as annualized. If that's the case, average the estimates from the four quarters (Qtr1 – Qtr4).*
- On the first screen, select "Total, all Industries." Select "Next form."
- Select *'your state.'* Select "Next form."
- Select the relevant ownership sector(s) (i.e. federal government and private for federal OSHA states; all options "Total Covered" for state-plan OSHA states). Use the CTRL key to select more than 1 sector. Select "Next form."
- Select "All Employees." Select "Next form."
- Select "All Establishment Sizes." Select "Next form."
- Review the form and select "Retrieve Data."
- If the annual number is not provided, average the quarterly estimates to obtain the annual number of employees for the target year for each table. NOTE: there may be more than one table retrieved (if both 'federal government' and 'private' were chosen above.) This is the average number of OSHA-covered employees in your state.
- To exclude mines and farms and private households, use the instructions in 18.5b.

18.5b)   Number of OSHA-Covered Employees in the State that are Eligible for Inspection (EXCLUDING MINERS AND FARMERS AND PRIVATE HOUSEHOLD WORKERS)

NOTE: Mines are not covered by OSHA. 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. Beginning with the 2018 data, private household workers, also not covered under OSHA, will be excluded.

- To adjust the denominator (18.5a) and exclude mines and farms:
  – Follow the first two bullets in 18.2a above. In the first screen, use the CTRL key to select NAICS codes: 111,112,212,213, 814 (Crop Production, Animal Production and Aquaculture, Mining except Oil and Gas, Support Activities for Mining, and Private Households)). Select "next form."

- Select *'your state.'*
- Select relevant ownership sector(s).
- Select, "All Employees."
- Select, "All Establishment Sizes."
- Select "Retrieve Data."
- If the annual number is not provided, average the quarterly estimates to obtain the annual number of employees for the target year for each table (NAICS 111, 112, 212, 213, 814).
- Subtract this sum from the number of employees in 18.5a to get the final denominator. This total will represent the **"Average number of OSHA-covered employees in the state (excluding mines and farms) that are eligible for inspection"** *(18E).*

18.6) **Percentage of OSHA-Covered Employees Eligible for Inspection Whose Work Areas were Inspected by OSHA**

- Divide the numerator (*18D*) by the final denominator obtained in *18E* (adjusted for mines, farms, and private households) *(18F)*.
- To calculate the "**Percentage of all OSHA-covered employees eligible for inspection whose work areas were inspected by OSHA,"** multiply (*18F)* by 100.

INDICATOR #19 Workers' Compensation Awards	
Rationale:	Workers' compensation claims are reviewed to establish whether the reported medical condition is work-related. Accepted claims represent known work-related injuries and illnesses and are often more severe cases. The total and average amounts of benefits paid provide an estimate of the burden of these events, which can help justify prevention programs and activities.
Group:	Workers covered by state workers' compensation
Data Sources:	National Academy of Social Insurance (www.nasi.org).
Numerator:	Total amount of workers' compensation benefits paid
Denominator:	Number of workers with workers' compensation coverage for the same calendar year
Measures:	1. Total amount of workers' compensation benefits paid 2. Average amount of workers' compensation benefits paid per covered worker
Time Period:	Calendar year
Limitations:	This is a gross indicator of the burden of occupational injury and illness. It does not include human, noneconomic costs or economic costs associated with occupational injuries and illnesses. These data are more appropriate for evaluating trends within a state than for making 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.

How-To: OHI #19 Workers' Compensation Awards

19.1) **Total amount of workers' compensation benefits paid**
- Use the National Academy of Social Insurance web site (https://www.nasi.org/research/report-workers-compensation-benefits-costs-and-coverage-2018-data/).
- Click on download entitled: "November-2020-Benefits-Coverage-and-Costs.pdf". You must have Adobe Acrobat installed to download.
- Locate Table 9 titled ''Workers' Compensation Total Benefits Paid and Five-Year Percent Change, by State, <<YEARS>> (in thousands)."
- Locate your state for the target year. Multiply number by 1,000 *(19A)*.

19.2) **Average amount of workers' compensation paid per covered job**
- Use the National Academy of Social Insurance web site (https://www.nasi.org/research/report-workers-compensation-benefits-costs-and-coverage-2018-data/).
- Click on download entitled: "November-2020-Benefits-Coverage-and-Costs.pdf". You must have Adobe Acrobat installed to download.
- Locate Table 3 titled "Workers' Compensation Covered Jobs, by State, <<YEARS>> (in thousands)."
- Locate your state for the target year. Multiply number by 1,000 *(19B)*.
- To calculate the **"Average amount of workers' compensation benefits paid per covered worker,"** divide *19A* by *19B*. This value represents the result in dollars per covered jobs.

INDICATOR #20 Work-Related Low-Back Disorder Hospitalizations
Modifications for this indicator are pending. Thus, 2018 data for OHI 20 are not being collected.

INDICATOR #21 Asthma among Adults Caused or Made Worse by Work	
Rationale:	Work-related asthma is preventable but often undiagnosed. Work-related asthma can have adverse effects on the worker, including increased morbidity, adverse socioeconomic impacts and difficulty getting and sustaining work. Estimating the burden of asthma caused or made worse by work can help target prevention activities.
Group:	Ever-employed adults **with current asthma**
Data Sources:	Asthma Call-Back Survey
Numerator:	Ever-employed adults with current asthma who report that their asthma was caused or made worse by exposures at work
Denominator:	Ever-employed adults (18 years or older) with current asthma
Measures:	1. Weighted estimate of the **number** of ever-employed adults with current asthma who report their asthma was caused or made worse by work 2. Estimated **percent** of ever-employed adults with current asthma who report that their asthma was caused or made worse by work
Time Period:	Calendar year
Limitations:	The data represent a population-based estimate of asthma caused or made worse by work and are subject to measurement, nonresponse, and sampling errors. This indicator does not distinguish between new-onset asthma and work-aggravated asthma. Beginning with the 2011 survey, cellular telephone samples were added to the traditional landline phone samples. The Asthma Call Back Survey also began new weighting methods in 2011 and the wording and order of questions changed in 2012, therefore any trend analysis would need to be restricted to 2012 forward. BRFSS also began releasing landline and cell phone combined files (LLCP) in 2015 instead of separate files.
Recommendations:	If you intend to analyze data by subgroups, stratify by subgroup and analyze each subgroup separately. Doing so will yield incorrect confidence intervals, standard errors, and tests of significance. Instead, you must use the whole dataset and then perform a domain analysis, which will result in reliable confidence intervals, standard errors, and tests of statistical significance.

How-To: OHI #21 Asthma among Adults Caused or Made Worse by Work

This indicator uses data from the Asthma Call Back Survey (ACBS) and there are two ways to obtain data for this indicator:

1. From the CDC BRFSS Asthma Call-back Survey website: http://www.cdc.gov/BRFSS/acbs/index.htm.
   a) From the left-hand column select data for year of interest.
   b) On the next page select the ACBS Adult data file (SAS or SPSS).
   c) Also refer to the adult codebook on the same page for your state FIPS code to use in the provided SAS code.
2. Contact your BRFSS coordinator or your state asthma program to obtain the data or for assistance analyzing this data, if necessary. A list of BRFSS State Coordinators can be found here: http://www.cdc.gov/brfss/state_info/coordinators.htm.

21.1) and 21.2) Weighted frequency and proportion of ever-employed adults with current asthma who report that their asthma was caused or made worse by exposures at work
- To create a dataset variable selecting for ever-employed adults with current asthma: *(Do not create a new dataset based on selected variables because this will negatively alter the weighting and provide inaccurate results).*
  - Select respondents that were ever employed outside the home using the variable EMP_EVER and values "1" and "6". (Survey question: Have you ever been employed outside the home?).

NOTE: This question is only asked of adult respondents who indicated not being currently employed. Therefore, if they were previously employed but not currently employed they will have a value of "1". Those who are currently employed (EMP_STAT values "1" or "2") are auto- filled into this variable with a value of "6" because of skip patterns.

  - Select respondents with current asthma using the variable _CUR_ASTH_C with the value of "1".

NOTE: The variable_CUR_ASTH_C is a calculated variable in the ACBS data file and is not identical to the BRFSS asthma variables ASTHNOW and ASTHMA2. This is because at the time of the call-back interview, the respondent is asked to confirm the responses to the two asthma questions from the BRFSS interview. Not all respondents agree with the responses recorded during the initial interview. The combined call-back variable _CUR_ASTH_C uses the responses at the time of the call-back interview.

> **Sample SAS code:**
> if _cur_asth_c = **1** and EMP_EVER1 in (**1 6**) then curastheveremp = 1;
> else curastheveremp = 9;

- Within the dataset, create a calculated variable called WRA_4Q (asthma caused or made worse by exposures at work). To define WRA_4Q, combine the following questions from the ACBS:
  - WORKENV5: Are your asthma symptoms MADE WORSE by chemicals, smoke, dust, or mold in your CURRENT job?
  - WORKENV6: Was your asthma first CAUSED by things like chemicals, smoke, dust or mold in your CURRENT job?
  - WORKENV7: Were your asthma symptoms MADE WORSE by things like chemicals, smoke, dust, or mold in any PREVIOUS job you ever had?
  - WORKENV8: Was your asthma first CAUSED by things like chemicals, smoke, dust, or mold in any PREVIOUS job you ever had?

- Use the following criteria when creating this variable:
  - If *any* of the four variables has a yes response (value of "1"), the calculated variable (WRA_4Q) has a "yes" response and should be coded as 1.
  - If *all* of the four variables have a no response, the calculated variable (WRA_4Q) has a "no" response and should be coded as 2. *(For purposes of this indicator, values "2" and "10" should be considered a "no" response for variables WORKENV5 and WORKENV6. Value "2" should be considered a "no" response for variables WORKENV7 and WORKENV8).*
  - All other responses are coded to 9 for the calculated variable (WRA_4Q).

NOTE: Be aware of complex skip patterns that auto fill responses into variables if these data are used other analyses.

> **Sample SAS code:**
> if WORKENV5=**1** or WORKENV6=**1** or WORKENV7=**1** or WORKENV8=**1** then WRA_4Q=**1**;
> else if WORKENV5 in (**2 10**) and WORKENV6 in (**2 10**) and WORKENV7
> in (**2**) and WORKENV8 in (**2**) then WRA_4Q=**2**;
> else WRA_4Q=**9**;

- Calculate the weighted frequency and proportion of ever-employed adults with current asthma who report that their asthma was caused or made worse by exposures at work. Specify the stratum variable (_STSTR), the cluster or primary sampling unit variable (_PSU), and the record weight.

> **Sample SAS code for states using landline telephone and cell phone sample:**
> **proc surveyfreq**;
> strata _ststr;
> cluster _psu;
> weight llcpwt_f;
> table curastheveremp*wra_4Q/row cl; **run**;

Note: The data file from the BRFSS website contains data from all states. Thus, if using this data file, add: `'IF _STATE = [state FIPS code];'`. *Use the codebook on the website to determine your state's FIPS code.*

- To determine the weighted estimate of the number of ever-employed adults with current asthma who report that their asthma was caused or made worse by exposures at work and the estimated proportion of ever-employed adults with current asthma who report that their asthma was caused or made worse by exposures at work, review your output
  - Use the results where curastheveremp=1 and WRA_4Q = 1:
    - 21.1 - The Weighted Frequency is the "**Weighted estimate of the number of ever-employed adults with current asthma who report that their asthma was caused or made worse by exposures at work.**"
    - 21.2 - The Row Percent is the "**Estimated proportion of ever-employed adults with current asthma who report that their asthma was caused or made worse by exposures at work.**"

NOTE: The 95% confidence intervals (CIs) can also be obtained from the generated tables if needed.

INDICATOR #22 Work-Related Severe Traumatic Injury Hospitalizations
Modifications for this indicator are pending. Thus, as of April 2020, the 2017 data for OHI 22 are not being collected.

INDICATOR #23 Influenza Vaccination Coverage among Healthcare Personnel	
Rationale:	Influenza is a significant cause of morbidity and mortality. Healthcare personnel (HCP) can serve as vectors for influenza transmission because they can acquire it from patients and transmit it to other patients and workers (CDC 2009). Furthermore, HCP often come to work ill (Wilde 1999, Mossad 2017). A report from the 2009 H1N1 U.S. influenza pandemic season estimated that 50% of HCP with influenza contracted the virus from patients or coworkers in the healthcare setting (Harriman 2009). Nosocomial influenza outbreaks result in longer stays and greater mortality for patients (Cunney 2000, Bridges 2003, Weinstock 2000), and missed work for HCP (Wilde 1999, Sartor 2002). However, overall poor influenza vaccination coverage among HCP has been demonstrated for years. From 1998-2005, influenza vaccination coverage among HCP peaked at 43% (Lu 2008). During the 2008-2009 influenza season, the National Health Interview Survey measured HCP influenza vaccination at 53% nationally (CDC 2011). Seasonal vaccination coverage among HCP during the 2009-2010 influenza season – a period of intense public attention due to the circulation of a novel, pandemic H1N1 strain – reached only 62% (CDC 2010). The seasonal influenza vaccine is highly effective in healthy, younger adults, which includes many HCP. Thus, vaccination campaigns in this group can be simple, safe, and effective (Pavia 2010). Higher influenza vaccination coverage among HCP is associated with reductions in nosocomial influenza among hospitalized patients (Weinstock 2000, Salgado 2004) and nursing home residents (Hayward 2006, Potter 1997, Lemaitre 2009). Therefore, CDC recommends that all HCP receive the vaccine annually (Fiore 2010). The Infectious Diseases Society of America (IDSR 2013), the Association of Professionals in Infection Control and Epidemiology (APIC 2019), The American College of Physicians (ACP 2013), and the American Academy of Pediatrics (AAP 2018), also strongly recommend vaccination of HCP.
Group:	Healthcare personnel in licensed acute care facilities
Data Sources:	State-specific aggregate National Healthcare Safety Network data published by CDC
Numerator:	HCP at licensed acute care facilities who received influenza vaccination at the healthcare facility or reported receiving influenza vaccination elsewhere.
Denominator:	Number of HCP working in a healthcare facility, regardless of clinical responsibility or patient contact. The metric is a pooled proportion of vaccinated employees created from the following (the proportion for each category is available in the NHSN report): 1. Employees: persons who receive a direct paycheck from the reporting facility. 2. Licensed independent practitioners: includes physicians (MD, DO, MBBS), advanced practice nurses, and physician assistants, who are affiliated with the facility but do not receive a direct paycheck from the facility. 3. Students/trainees and volunteers: all students/trainees and adult volunteers who do not receive a direct paycheck from the facility.
Measures:	Proportion of HCP at licensed acute care facilities who received an influenza vaccination.
Time Period:	October 1 (or when the vaccine becomes available) through March 31 of the next year.
Limitations of Indicator:	The overall proportion of vaccinated HCP in a state does not provide information on disparities in vaccination coverage among different types of facilities, or among different subgroups of HCP.

How-To: OHI #23 Influenza Vaccination Rates Among Health Care Providers

23.1)   **Percentage of Healthcare Personnel (HCP) who have Received an Influenza Vaccination**
- Use the Healthcare Safety Network (NHSN) web page:
  (https://www.cdc.gov/nhsn/datastat/index.html).
- Select the dropdown menu, "Healthcare Personnel Influenza Vaccination Summary Data Tables."
- Locate the section for data by State (Acute Care Hospitals).
- Open the PDF file for the "2017-2018 Tables".
- Find your state in the alphabetical list in the left-hand column.
- The **"Percentage of Healthcare Personnel (HCP) who have received an influenza vaccination"** can be found under "All Healthcare Personnel Vaccination %" in the right-hand column.

INDICATOR #24 Occupational Heat-Related Emergency Department Visits	
Rationale:	Minimal epidemiologic information about occupational heat-related morbidity is available. Tracking occupational heat illness using emergency department data helps establish a baseline for epidemiologists to understand the magnitude of the burden of heat illness among workers and to support prevention measures.
Group:	Employed persons
Data Sources:	1. Emergency department visits data 2. BLS Geographic Profiles of Employment and Unemployment (https://www.bls.gov/gps/home.htm)
Numerator:	Emergency department (ED) visits for persons aged 16 years or older with a primary or contributing diagnosis of heat-related illness, AND with primary payer coded as workers' compensation, OR a work-related E-code
Denominator:	Employed persons age 16 years or older for the same calendar year
Measures:	1. Annual number of ED visits for persons age ≥ 16 years or older 2. Annual crude rate of ED visits per 100,000 employed persons age ≥ 16 years
Time Period:	Calendar year
Limitations:	This indicator likely underestimates the burden of work-related heat illness for several reasons. First, residents of outside states, or cases with unknown residence are not counted, even if their heat illness occurred while working in the state where care was sought. Patients of unknown age are not counted. Additionally, attribution of payer in ED discharge records may not be accurate. Work-related encounters may not be recognized as such if workers' compensation is not listed as the intended payer at the time of the visit. The majority of individuals with work-related illnesses and injuries do not file for workers' compensation, and many types of workers are not eligible for workers' compensation. This indicator uses ICD-10 CM external cause of injury codes as a supplement to workers' compensation, to identify additional work-related cases. However, the effectiveness of external cause codes for identifying work-relatedness is not well established and will vary by code usage within each medical facility.
Recommendations:	The same methodology used in the how-to-guide can be used to examine heat-related hospitalizations.

How-To: OHI #24 Occupational Heat-Related ED Visits

NOTE: *Effective October 1, 2015 health care providers began using the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM). The instructions below have been updated to reflect this change.*

NOTE: *Historically, the CSTE OHI workgroup has excluded hospitalized cases of heat illness from this indicator. The indicator will no longer exclude hospitalized emergency department cases. A portion of heat illness cases seen in emergency departments can be serious enough to warrant hospitalization. From a surveillance perspective it is desirable to capture these cases. However, please indicate in the data reporting template whether your dataset includes ED outpatient visits only, or all ED visits. In either case you can use the directions below to calculate the indicator.*

24.1) **Annual number of ED visits for occupational heat-related illness for persons 16 years and older:**
- Submit a request to the State Health Department to obtain the number of cases meeting the following criteria from the ED visit data file:
    - Principal OR any secondary diagnosis codes = one or more of the codes from Table 1 **AND** the record is work-related (see next bullet).
    - A record may be deemed work-related if the primary payer listed is Workers' Compensation **OR** if the record contains any of the codes for external causes of morbidity listed in Table 2.
    - Age = Patient was 16 years or older.
    - ED visit was during the target calendar year.
    - Use unduplicated data (no exclusions for death, readmissions).
    - Exclude record if:
        - Age is unknown.
        - Patient is a resident of a different state, or state of residence is unknown.
    - This total will represent the **"Annual number of ED visits for occupational heat-related illness for persons 16 years or older"** *(24A).*

Table 1. ICD-10-CM diagnostic codes indicating a heat-related ED visit	
Code	**Definition**
T67.0XXA	Heatstroke and sunstroke, initial encounter
T67.1XXA	Heat syncope, initial encounter
T67.2XXA	Heat cramp, initial encounter
T67.3XXA	Heat exhaustion, anhydrotic, initial encounter
T67.4XXA	Heat exhaustion due to salt depletion, initial encounter
T67.5XXA	Heat exhaustion, unspecified, initial encounter
T67.6XXA	Heat fatigue, transient, initial encounter
T67.7XXA	Heat edema, initial encounter
T67.8XXA	Other effects of heat and light, initial encounter
T67.9XXA	Effect of heat and light, unspecified, initial encounter
X30.XXXA	Exposure to excessive natural heat, initial encounter
W92.XXXA	Exposure to excessive heat of man-made origin, initial encounter

Table 2. ICD-10-CM External causes of morbidity indicating an ED visit was work-related	
Code	Definition
Y99.0	Civilian activity done for pay
Y99.1	Military activity
Y92.61	Building [any] under construction as the place of occurrence
Y92.62	Dock or shipyard as place of occurrence
Y92.63	Factory as place of occurrence
Y92.64	Mine or pit as the place of occurrence
Y92.65	Oil rig as the place of occurrence
Y92.69	Other specified industrial and construction area as the place of occurrence
Y92.71	Barn as the place of occurrence
Y92.72	Chicken coop as the place of occurrence
Y92.73	Farm field as the place of occurrence
Y92.74	Orchard as the place of occurrence
Y92.79	Other farm location as the place of occurrence
Z04.2[1]	Encounter for examination and observation following work accident
Z57.6[1]	Occupational exposure to extreme temperature
Z57.8[1]	Occupational exposure to other risk factors

[1]The Z codes included in this table are not external cause of morbidity (external cause codes) based on ICD-10. These codes fall under the category of 'Factors influencing health status and contact with health services.'

24.2) **Annual rate of ED visits for occupational heat-related illness per 100,000 employed persons age 16 years or older**

24.2a) To obtain the denominator for the rate:
- Use the Geographic Profile of Employment and Unemployment webpage (https://www.bls.gov/opub/geographic-profile/2016/home.htm). Select target year.
- Under "States," select Table 14: "Employment status of the civilian non-institutional population, by gender, age, race, Hispanic or Latino ethnicity, and marital status."
- Locate rows corresponding to your state and find row titled "Total."
- To obtain "Number of employed persons aged 16 years or older," select value under "Employed, Total" *(24B).*
- Multiply *24B* by 1,000 to obtain the number of employed persons in your state for the target year *(24C).*

24.2b) To calculate the rate:
- Divide *24A* by *24C (24D).*
- To calculate the **"Annual crude rate of occupational heat-related ED visits per 100,000 employed persons age 16 years or older,"** multiply *24D* by 100,000.

Note: If you would like to calculate heat-related hospitalizations, repeat steps 1 and 2 using hospitalizations instead of ED visits. Hospitalizations will include those admitted to the hospital regardless of admission source (e.g. admitted through the ED). ***This step is not required or expected by NIOSH or the CSTE OHI workgroup.***

INDICATOR #25 Hospitalizations for or with Occupational Eye Injuries	
Rationale:	Occupational eye injuries are common yet preventable. In severe cases, ocular trauma can lead to lifetime disability. Although protective eyewear can reduce the risk of eye injury, identifying additional risk factors for eye injuries is integral to preventing them [Blackburn, 2012]. Estimating the burden of occupational eye injuries and associated risk factors can help target prevention activities.
Group:	Employed persons
Data Resources:	1. Inpatient hospital discharge data 2. BLS Geographic Profiles of Employment and Unemployment (https://www.bls.gov/gps/home.htm)
Numerator:	Inpatient hospital discharges for eye injuries and eye removal procedures with primary payer coded as workers' compensation.
Denominator:	Employed population 16 years and older for the same calendar year
Measures:	1. Annual number of work-related inpatient hospitalizations for eye injury for persons age 16 years and older 2. Annual crude rate of work-related inpatient hospitalizations for eye injury per 100,000 employed persons age 16 years and older
Time Period:	Calendar year
Limitations:	This indicator likely underestimates the burden of work-related eye injuries. It excludes patients hospitalized outside their state of residence. Additionally, the indicator only counts hospitalizations in which workers' compensation was listed as the primary payer on the discharge record. Many workers with work-related illnesses and injuries do not file for workers' compensation, and many types of workers are not eligible for workers' compensation. Although the indicator likely undercounts work-related eye injuries, some of the cases it captures may be hospitalizations for head injuries (affecting the eyes) that may not have been preventable by standard precautions against eye injuries.

How-To: OHI #25 Hospitalizations for and with Occupational Eye Injuries

25.1) Annual number of inpatient hospitalizations for and with occupational eye injuries for persons age 16 years and older

- Submit a request to the State Health Department to obtain the number of cases meeting the following criteria from the ED visit data file:
    - Principal diagnosis (i.e., first-listed) is an eye injury diagnosis code contained in Table 1. **OR**
    - Principal diagnosis is an injury diagnosis code (S or T code); **and** any of the secondary diagnosis codes is contained in Table 1. **OR**
    - Primary procedure code is contained in Table 2. **OR**
    - Principal diagnosis is an injury diagnosis code (S or T code); **and** any of the secondary procedure codes is contained in Table 2.
    - State of residence = *'your state.'*
    - Primary payer = Workers' Compensation.
    - Age = Patient was 16 years or older (age at admission is preferred).
    - Use discharge during target calendar year, not fiscal year.
    - Use unduplicated data (no exclusions for death, readmissions).
    - Include all cases reported on the discharge file, regardless of length of stay.
    - Exclude record if:
        - Age is unknown.
        - Patient is a resident of a different state, or state of residence is unknown.
        - Inpatient hospitalization = out-of-state.
    - This total will represent the **"Annual number of inpatient hospitalizations for work-related eye injuries"** *(25A).*

25.2) Annual crude rate of inpatient hospitalizations for work-related eye injuries per 100,000 employed persons age 16 years and older

25.2a) To obtain the denominator for the rate:
- Use the Geographic Profile of Employment and Unemployment webpage (https://www.bls.gov/opub/geographic-profile/archive.htm). Select target year.
- Under "States," select Table 14: "Employment status of the civilian non-institutional population, by gender, age, race, Hispanic or Latino ethnicity, and marital status."
- Locate rows corresponding to your state and find row titled "Total."
- To obtain "Number of employed persons aged 16 years or older," select value under "Employed, Total" *(25B).*
- Multiply *24B* by 1,000 to obtain the number of employed persons in your state for the target year *(25C).*

25.2b) To calculate the rate:
- Divide *25A* by *25C (25D).*
- To calculate the **"Annual crude rate of inpatient hospitalizations for work-related eye injuries per 100,000 employed persons age 16 years and older,"** multiply *25D* by 100,000.

TABLE 1. Diagnostic Categories and ICD-10-CM Codes for Identifying Cases with An Eye Injury

S00 Superficial injury of head	S01 Open wound of head	S02 Fracture of skull and facial bones	S04 Injury of cranial nerve	S05 Injury of eye and orbit
S00.10XA	S01.101A	S02.30XA	S04.011A	S05.00XA
S00.11XA	S01.102A	S02.31XA	S04.012A	S05.01XA
S00.12XA	S01.109A	S02.32XA	S04.019A	S05.02XA
S00.201A	S01.111A	S02.30XB	S04.02XA	S05.20XA
S00.202A	S01.112A	S02.31XB	S04.031A	S05.21XA
S00.209A	S01.119A	S02.32XB	S04.032A	S05.22XA
S00.211A	S01.121A	S02.3XXA	S04.039A	S05.30XA
S00.212A	S01.122A	S02.3XXB	S04.041A	S05.31XA
S00.219A	S01.129A		S04.042A	S05.32XA
S00.221A	S01.131A		S04.049A	S05.40XA
S00.222A	S01.132A		S04.10XA	S05.41XA
S00.229A	S01.139A		S04.11XA	S05.42XA
S00.241A	S01.141A		S04.12XA	S05.50XA
S00.242A	S01.142A		S04.20XA	S05.51XA
S00.249A	S01.149A		S04.21XA	S05.52XA
S00.251A	S01.151A		S04.22XA	S05.60XA
S00.252A	S01.152A		S04.40XA	S05.61XA
S00.259A	S01.159A		S04.41XA	S05.62XA
S00.261A			S04.42XA	S05.70XA
S00.262A				S05.71XA
S00.269A				S05.72XA
S00.271A				S05.8X1
S00.272A				S05.8X2
S00.279A				S05.8X9
				S05.90XA
				S05.91XA
				S05.92XA

Table 1, continued

T15 Foreign body on external eye	T26 Burn and corrosion confined to eye and adnexa	H Series
T15.00XA	T26.00XA	H05.33 [.331, .332, .333, .339]
T15.01XA	T26.01XA	H35.6 [.60, .61, .62, .63]
T15.02XA	T26.02XA	H44.81 [.811, .812, .813, .819]
T15.10XA	T26.10XA	
T15.11XA	T26.11XA	
T15.12XA	T26.12XA	
T15.80XA	T26.20XA	
T15.81XA	T26.21XA	
T15.82XA	T26.22XA	
T15.90XA	T26.30XA	
T15.91XA	T26.31XA	
T15.92XA	T26.32XA	
	T26.40XA	

	T26.41XA	
	T26.42XA	
	T26.50XA	
	T26.51XA	
	T26.52XA	
	T26.60XA	
	T26.61XA	
	T26.62XA	
	T26.70XA	
	T26.71XA	
	T26.72XA	
	T26.80XA	
	T26.81XA	
	T26.82XA	
	T26.90XA	
	T26.91XA	
	T26.92XA	

TABLE 2. Procedural Categories and ICD-10-CM Procedure Codes for Identifying Cases Who Undergo an Eye Removal Procedure

Procedural Category	ICD-10-PCS
Replacement of Eye with Synthetic Substitute, Open Approach	08R00JZ (right eye) 08R10JZ (left eye)
Resection of Eye, External Approach	08T0XZZ (right eye) 08T1XZZ (left eye)

Appendix A: Current Occupational Health Indicator and Work Group Leads

INDICATOR	STATE LEADS	NATIONAL LEADS
Demographic profile	Tom Largo (MI) largot@michigan.gov	Audrey Reichard akr5@cdc.gov
1. Non-fatal injury and illness	Kathy Leinenkugel (IA) kathy.leinenkugel@idph.iowa.gov	Suzanne Marsh smm2@cdc.gov
2. All hospitalizations	Alicia Fletcher (NY) alicia.fletcher@health.ny.gov	Suzanne Marsh smm2@cdc.gov
3. Fatalities	Antionette Lavender (GA) antionette.lavender@dph.ga.gov	Suzanne Marsh smm2@cdc.gov
4. BLS amputations	Kathy Leinenkugel (IA) kathy.leinenkugel@idph.iowa.gov	Suzanne Marsh smm2@cdc.gov
5. WC amputations	Sara Wuellner (WA) sara.wuellner@lni.wa.gov	Suzanne Marsh smm2@cdc.gov
6. Burn hospitalizations	Alicia Fletcher (NY) alicia.fletcher@health.ny.gov	Suzanne Marsh smm2@cdc.gov
7. Musculoskeletal disorders	Kathleen Grattan (MA) kathleen.grattan@state.ma.us	Suzanne Marsh smm2@cdc.gov
8. WC Carpal Tunnel Syndrome	Sara Wuellner (WA) sara.wuellner@lni.wa.gov	Suzanne Marsh smm2@cdc.gov
9. Pneumoconiosis hospitalizations	Alicia Fletcher (NY) alicia.fletcher@health.ny.gov	Suzanne Marsh smm2@cdc.gov
10. Pneumoconiosis fatalities	Tom Largo (MI) largot@michigan.gov	Katie Dodd yla8@cdc.gov
11. Pesticide exposures	John Beckman (CA) john.beckman@cdph.ca.gov	Walter Alarcorn Wda7@cdc.gov
12. Mesothelioma	Tom Largo (MI) largot@michigan.gov	
13. Lead exposures	Brandi Loper Brandi.loper@cdph.ca.gov	Rebecca Tsai Vht5@cdc.gov
14. High morbidity industries	Anna Reilly (LA) anna.reilly@la.gov	Audrey Reichard akr5@cdc.gov
15. High morbidity occupations	Anna Reilly (LA) anna.reilly@la.gov	Audrey Reichard akr5@cdc.gov
16. High mortality industries & occupations	Anna Reilly (LA) anna.reilly@la.gov	Suzanne Marsh smm2@cdc.gov
17. OSH professionals	Sara Wuellner (WA) sara.wuellner@lni.wa.gov	Suzanne Marsh smm2@cdc.gov
18. OSHA Inspections	Kathleen Grattan (MA) kathleen.grattan@state.ma.us	Suzanne Marsh smm2@cdc.gov
19. WC awards	Madison Liford (KY) mali223@uky.edu	Suzanne Marsh smm2@cdc.gov
20. Low back hospitalizations	Sara Wuellner (WA) sara.wuellner@lni.wa.gov	Suzanne Marsh smm2@cdc.gov
21. Asthma		Katie Dodd yla8@cdc.gov

INDICATOR	STATE LEADS	NATIONAL LEADS
22. Severe traumatic injury	Alicia Fletcher (NY) alicia.fletcher@health.ny.gov	Suzanne Marsh smm2@cdc.gov
23. Influenza vaccination coverage	Bob Harrison (CA) robert.harrison@ucsf.edu	Tristan Victoroff uwm3@cdc.gov
24. Heat-related ED visits	Anna Reilly (LA) Anna.reilly@la.gov	Tristan Victoroff uwm3@cdc.gov
25. Eye injuries	Marija Borjan (NJ) marija.borjan@doh.nj.gov	Suzanne Marsh smm2@cdc.gov

Appendix B: Current OHI Work Group

For Membership Information and Work Group Operating Guidelines, visit
www.cste.org/webpdfs/OHIWorkgroupOperatingGuidelines.doc

Work Group Leads	Name	E-mail
Co-Chair (State Rep)	Marija Borjan	marija.borjan@doh.nj.gov
Co-Chair (NIOSH Rep)	Tristan Victoroff	uwm3@cdc.gov
Co-Chair (NIOSH Rep)	Suzanne Marsh	smm2@cdc.gov
OHI Staff Lead (CSTE National staff)	Cailyn Lingwall	clingwall@cste.org

State	Name	E-mail
AL	Debra Hodges	debra.hodges@adph.state.al.us
CA	John Beckman	john.beckman@cdph.ca.gov
CO	Dara Buris	dara.burris@state.co.us
CT	Amanda DeLoretto	amanda.deloreto@ct.gov
	Ivan Cherniack	ivan.cherniack@ct.gov
FL	Meredith Hennon	meredith.hennon@flhealth.gov
GA	Antionette Lavender	antionette.lavender@dph.ga.gov
IA	Kathy Leinenkugel	kathy.leinenkugel@idph.iowa.gov
IL	Lee Friedman	lfried1@uic.edu
KS	Farah Ahmed	fahmed@kdheks.gov
KY	Madison Liford	mali223@uky.edu
LA	Anna Reilly	anna.reilly@la.gov
MA	Kathleen Grattan	kathleen.grattan@state.ma.us
MD	Ann Liu	ann.liu@maryland.gov
ME		
MI	Tom Largo	largot@michigan.gov
MN	Erik Zabel	erik.zabel@state.mn.us
MO	Carol Braun	carol.braun@health.mo.gov
MT	Emily Healy	emily.healy@mt.gov
NC	Gialana Dang	gregory.dang@dhhs.nc.gov
ND		
NE	Derry Stover	derry.stover@nebraska.gov
NH	Karla Armenti	karmenti@unh.edu
NJ	Marija Borjan	marija.borjan@doh.nj.gov
NM	Sandy Lam	sandy.lam@state.nm.us
NY	Alicia Fletcher	alicia.fletcher@health.ny.gov
OK	Claire Nguyen	clairen@health.ok.gov
OR	Curtis Cude	curtis.g.cude@state.or.us
	Dave Dreher	david.m.dreher@dhsoha.state.or.us
SC	Fran W. Marshall	marshafw@dhec.sc.gov
SD	Tristan Victoroff	uwm3@cdc.gov
TX	Ketki Patel	ketki.patel@dshs.texas.gov
VA	Dwight Flammia	dwight.flammia@vdh.virginia.gov
WA	Sara Wuellner	sara.wuellner@lni.wa.gov
WI	Barbara Grajewski	barbara.grajewski@wisconsin.gov
WY	Meredith Towle	meredith.towle@wyo.gov

Appendix C: Example SAS Programs for Select OHIs

Note: These are just examples of SAS programs for select OHIs that have been provided by states. These may need to be adjusted according to your state's specific variables. Also, sample SAS programs will be provided for OHI#20 (low back) and OHI#22 (traumatic) once we resume data collection for these OHIs. If you have any questions, please contact the OHI lead.

Example SAS programs are being offered for the following OHIs:

OHI#2: Work-Related Hospitalizations
OHI#6: Hospitalizations for Work-Related Burns
OHI#9: Hospitalizations from or with Pneumoconiosis
OHI#13: Elevated Blood Lead Levels among Adults
OHI#21: Asthma among Adults Caused or Made Worse by Work
OHI#24: Occupational Heat-Related Emergency Department Visits
OHI#25: Hospitalizations for or with Occupational Eye Injuries

OHI#2: Work-Related Hospitalizations

➢ *Example 1*

```
data test.CT16BI ;
Set Test.final2016;
where AcctType = "I" and state = "CT" and PayorSource = "B" and age_calc ge
16;
run;
quit;

proc freq data=test.CT16BI ;
tables PayorSource;
run;
quit;
```

➢ *Example 2*

```
DATA STEP1;
      SET OHI;

WORKCOMP=0;
IF PRIME=205 THEN WORKCOMP=1;
ELSE IF PRIME=211 THEN WORKCOMP=1;
ELSE IF PRIME=215 THEN WORKCOMP=1;
ELSE IF PRIME=221 THEN WORKCOMP=1;
ELSE IF PRIME=225 THEN WORKCOMP=1;
ELSE IF PRIME=231 THEN WORKCOMP=1;
ELSE IF PRIME=299 THEN WORKCOMP=1;

IF WORKCOMP=1;

IF AGE GE 16;
IF STATE= 'your state';
IF PAT_TYPE=0;
IF YEAR='16';

RUN;
```

> *Example 1*

```
data Final2016_copy;
set test.CT16BI;
format ad yyq.;
run;

proc freq data = Final2016_copy;
where AcctType = "I" and payorsource = "B" and

( (dx1 ge "T20" and dx1 le "T32999")
or (dx2 ge "T20" and dx2 le "T32999")
or (dx3 ge "T20" and dx3 le "T32999")
or (dx4 ge "T20" and dx4 le "T32999")
or (dx5 ge "T20" and dx5 le "T32999")
or (dx6 ge "T20" and dx6 le "T32999")
or (dx7 ge "T20" and dx7 le "T32999")
or (dx8 ge "T20" and dx8 le "T32999")
or (dx9 ge "T20" and dx9 le "T32999")
or (dx10 ge "T20" and dx10 le "T32999"));

tables payorsource*ad;
run;
```

> *Example 2*

```
DATA STEP1;
      SET UB;

IF PAT_TYPE='0';
IF YEAR='16';

WORKCOMP=0;
IF PRIME=205 THEN WORKCOMP=1;
ELSE IF PRIME=211 THEN WORKCOMP=1;
ELSE IF PRIME=215 THEN WORKCOMP=1;
ELSE IF PRIME=221 THEN WORKCOMP=1;
ELSE IF PRIME=225 THEN WORKCOMP=1;
ELSE IF PRIME=231 THEN WORKCOMP=1;
ELSE IF PRIME=299 THEN WORKCOMP=1;

IF WORKCOMP=1;

*SEVEN CHARACTERS;
DX5CODE=SUBSTR(DX1,1,7);
DX5CODE2=SUBSTR(DX2,1,7);
DX5CODE3=SUBSTR(DX3,1,7);
DX5CODE4=SUBSTR(DX4,1,7);
DX5CODE5=SUBSTR(DX5,1,7);
DX5CODE6=SUBSTR(DX6,1,7);
DX5CODE7=SUBSTR(DX7,1,7);
```

```
DX5CODE8=SUBSTR(DX8,1,7);
DX5CODE9=SUBSTR(DX9,1,7);
DX5CODE10=SUBSTR(DX10,1,7);
DX5CODE11=SUBSTR(DX11,1,7);
DX5CODE12=SUBSTR(DX12,1,7);
DX5CODE13=SUBSTR(DX13,1,7);

DXCODE=SUBSTR(DX1,1,3);
DXCODEV=SUBSTR(DX1,1,1);

if dxcode = 'T20'
or dxcode = 'T21'
or dxcode = 'T22'
or dxcode = 'T23'
or dxcode = 'T24'
or dxcode = 'T25'
or dxcode = 'T26'
or dxcode = 'T27'
or dxcode = 'T28'
or dxcode = 'T30'
or dxcode = 'T31'
or dxcode = 'T32'

then output;

run;
```

➢ *Example 1*

```
data test.acct_I2016;
set test.Final2016_copy;
where accttype = "I" and state = "CT" ;
run;
quit;


data Final2016_copy;
set test.acct_I2016;
age_calc= year(ad) - year(bd);
if month(ad) < month(bd) or (month(ad) = month(bd) and day(ad) < day(bd))
      then age_calc=age_calc-1;
admityear = year(ad);
format dd yyq.;
run;
quit;


proc format;
value agef
15-24 = "15-24"
25-34 = "25-34"
35-44 = "35-44"
45-54 = "45-54"
55-64 = "55-64"
65-74 = "65-74"
75-85 = "75-84"
85-HIGH = "85+";
run;

data pneumo;
set Final2016_copy;


coal = 0;
asbest = 0;
sili = 0;
oth = 0;

array diag (10)

dx1 dx2 dx3 dx4 dx5 dx6 dx7 dx8 dx9 dx10;

do i = 1 to 10;

if diag(i) ge ('J60') and diag (i) le ('J6099999') then coal = 1;
else if diag(i) ge ('J61') and diag (i) le ('J6199999')then asbest= 1;
```

```
else if diag (i) ge ('J62') and diag (i) le ('J6299999')then sili = 1;
else if diag (i) ge ('J63') and diag (i) le ('J6699999') then oth = 1;

end;

run;

title 'coal';
proc freq data = pneumo;

where coal = 1 and year(dd) = 2016;
tables age_calc*dd;
format age_calc agef.;
run;

title 'asbest';
proc freq data = pneumo;

where asbest = 1 and year(dd) = 2016;
tables age_calc*dd;
format age_calc agef.;
run;
title 'sili';
proc freq data = pneumo;

where sili = 1 and year(dd) = 2016;
tables age_calc*dd;
format age_calc agef.;
run;
title 'oth';
proc freq data = pneumo;

where oth = 1 and year(dd) = 2016;
tables age_calc*dd;
format age_calc agef.;
```

> *Example 2*

```
data pneumoc; set e.Inp_Sparcs2016; /*Include all hospitalizations not just WC
cases*/

if age ge 15 and age le 24 then agegroup = '15-24';
if age ge 25 and age le 34 then agegroup = '25-34';
if age ge 35 and age le 44 then agegroup = '35-44';
if age ge 45 and age le 54 then agegroup = '45-54';
if age ge 55 and age le 64 then agegroup = '55-64';
if age ge 65 and age le 74 then agegroup = '65-74';
if age ge 75 and age le 84 then agegroup = '75-84';
if age ge 85 then agegroup = '85+';

/*icd10 dx*/
array lung[25] prindx dx1-dx24 ;
do i=1 to 25;
if substr(lung[i],1,3) in ('J60', 'J61', 'J62', 'J63', 'J66', 'J64', 'J65', 'J66')
then pneumo = 1;
if substr (lung[i],1,3) = 'J60' then coal =1;
```

```
if substr(lung[i],1,3) = 'J61' then asb = 1;
if substr (lung[i],1,3) = 'J62' then silica =1;
if substr (lung[i],1,3) in ('J64', 'J65') then unsp_pneumo=1;
end;

if pat_addr_st = 'NY';

proc format;
value agegroup
      1='15-24'
    2='25-34'
      3='35-44'
      4='45-54'
      5='55-64'
      6='65-74'
      7='75-84'
      8='85+';

data final; set pneumoc;
if age ge 15;

RUN;

title 'pneumo';
proc freq data=final;
where asb = 1;
*tables quarter/ nopercent  out=pneumo;
tables pat_addr_cnty_cd/ nopercent  out=pneumo;
run;

title 'asbestosis';
proc freq data=final;
where asb = 1;
tables agegroup/ nopercent  out=asb;
run;

title 'coal';
proc freq data=final;
where coal = 1;
tables agegroup/ nopercent  out=coal;
run;

title 'silica';
proc freq data=final;
where silica = 1;
tables agegroup/ nopercent  out=silica;
run;

title 'unspecified pneumo';
proc freq data=final;
where unsp_pneumo = 1;
tables agegroup/ nopercent  out=unsp_pneumo;
run;
```

➢ *Example 1*

```
* P R E V A L E N C E
**************************************************************************;
%let yrl = 2015;
%let yrs = 15;

* PREVALENT CASES: age 16 and older, exclude out of state residents, deduplicate
(once for patient ID, lead value, and new collect date and again for highest BLL);
Proc Freq data=steph.ables_&yrl;
     tables st;
run;
Proc Contents data=steph.ables_&yrl;
     run;
Data work.ind13_prelim;
     set steph.ables_&yrl;
     if age ge 16 & st in ("PA" "  ");

     if lead_value lt 5 then leadcat2 = 1;
     if lead_value ge 5 and lead_value lt 10 then leadcat2 = 2;
     if lead_value ge 10 and lead_value lt 25 then leadcat2 = 3;
     if lead_value ge 25 and lead_value lt 40 then leadcat2 = 4;
     if lead_value ge 40 then leadcat2 = 5;
run;

Proc Sort data=work.ind13_prelim nodupkey out=work.ind13_dedup1;
     by patid lead_value new_collect_date;
run;
Proc Sort data=work.ind13_dedup1;
     by patid descending lead_value;
run;
Data work.ind13_dedup2;
     set work.ind13_dedup1;
     by patid;
     if first.patid;
run;
Proc Freq data=work.ind13_dedup2;
     tables leadcat2;
run;

* I N C I D E N C E
**************************************************************************;
%let yrones = 14;
%let yrtwos = 15;
%let yronel = 2014;
%let yrtwol = 2015;

* INCIDENT CASES: age 16 and older, exclude out of state residents, deduplicate
(once for patient ID, lead value, and new collect date and again for highest BLL);
* first year data;
Data work.ind13_inc1a;
     set work.ables_&yronel;
     if age ge 16 & st in ("PA" "  ");
```

```sas
        if lead_value lt 5 then leadcat2 = 1;
        if lead_value ge 5 and lead_value lt 10 then leadcat2 = 2;
        if lead_value ge 10 and lead_value lt 25 then leadcat2 = 3;
        if lead_value ge 25 and lead_value lt 40 then leadcat2 = 4;
        if lead_value ge 40 then leadcat2 = 5;

        year = &yrone1;
run;
Proc Sort data=work.ind13_inc1a nodupkey out=work.ind13_inc1b;
        by patid lead_value new_collect_date;
run;
Proc Sort data=work.ind13_inc1b;
        by patid descending lead_value;
run;
Data work.ind13_inc1c;
        set work.ind13_inc1b;
        by patid;
        if first.patid;
run;

* second year data;
Data work.ind13_inc2a;
        set steph.ables_&yrtwo1;
        if age ge 16 & st in ("PA" "  ");

        if lead_value lt 5 then leadcat2 = 1;
        if lead_value ge 5 and lead_value lt 10 then leadcat2 = 2;
        if lead_value ge 10 and lead_value lt 25 then leadcat2 = 3;
        if lead_value ge 25 and lead_value lt 40 then leadcat2 = 4;
        if lead_value ge 40 then leadcat2 = 5;

        year = &yrtwo1;
run;
Proc Sort data=work.ind13_inc2a nodupkey out=work.ind13_inc2b;
        by patid lead_value new_collect_date;
run;
Proc Sort data=work.ind13_inc2b;
        by patid descending lead_value;
run;
Data work.ind13_inc2c;
        set work.ind13_inc2b;
        by patid;
        if first.patid;
run;

* merge first and second years together;
Proc Sort data=work.ind13_inc1c;
        by patid year;
run;
Proc Sort data=work.ind13_inc2c;
        by patid year;
run;
Proc Contents data=work.ind13_inc1c; run;
Proc Contents data=work.ind13_inc2c; run;
Data work.ind13_incident;
        set work.ind13_inc1c work.ind13_inc2c;
        by patid year;
run;
```

```sas
* use code sent by Rebecca Tsai CDC;
Data work.status_&yrtwol;
      set work.ind13_incident;
      by patid year lead_value;

year_prev = lag1(year);
bll_prev = lag1 (lead_value);
id_prev = lag1 (patid);

    if (patid eq id_prev) and ((year - 1) eq year_prev) then do;

            if lead_value >= 5 and bll_prev < 5 then StatusGE5 = '1';
        if lead_value >= 5 and bll_prev = .   then StatusGE5 = '1';
        if lead_value >= 5 and bll_prev >= 5 then StatusGE5 = '2';
        if lead_value <  5 and bll_prev = .   then StatusGE5 = '4';
        if lead_value <  5 and bll_prev ne .  then StatusGE5 = '5';

            if lead_value >= 10 and bll_prev < 10  then StatusGE10 = '1';
        if lead_value >= 10 and bll_prev = .   then StatusGE10 = '1';
        if lead_value >= 10 and bll_prev >= 10 then StatusGE10 = '2';
        if lead_value <  10 and bll_prev = .   then StatusGE10 = '4';
        if lead_value <  10 and bll_prev ne .  then StatusGE10 = '5';

        if lead_value >= 25 and bll_prev < 25  then StatusGE25 = '1';
        if lead_value >= 25 and bll_prev = .   then StatusGE25 = '1';
        if lead_value >= 25 and bll_prev >= 25 then StatusGE25 = '2';
        if lead_value <  25 and bll_prev = .   then StatusGE25 = '4';
        if lead_value <  25 and bll_prev ne .  then StatusGE25 = '5';

            if lead_value >= 40 and bll_prev < 40  then StatusGE40 = '1';
        if lead_value >= 40 and bll_prev = .   then StatusGE40 = '1';
        if lead_value >= 40 and bll_prev >= 40 then StatusGE40 = '2';
        if lead_value <  40 and bll_prev = .   then StatusGE40 = '4';
        if lead_value <  40 and bll_prev ne .  then StatusGE40 = '5';
    end;
run;
Data work.status_z_&yrtwol;
      set work.status_&yrtwol;
      where year=&yrtwol;

      if statusge5 = " " and lead_value ge 5 then statusge5="1";
      else if statusge5 = " " and lead_value < 5 then statusge5="4";
      if statusge10= " " and lead_value ge 10 then statusge10="1";
      else if statusge5 = " " and lead_value < 10 then statusge10="4";
      if statusge25= " " and lead_value ge 25 then statusge25="1";
      else if statusge5 = " " and lead_value < 25 then statusge25="4";
      if statusge40= " " and lead_value ge 40 then statusge40="1";
      else if statusge5 = " " and lead_value < 40 then statusge40="4";
run;
Proc Freq data=work.status_z_&yrtwol;
      tables statusge5 statusge10 statusge25 statusge40;
run;
```

> ## *Example 1*

```
DATA ASTHMA.WRA16;
      SET ASTHMA.ACBS_2016;
FORMAT _ALL_;

IF _STATE = [FIPS code];

* [Note: add this line only if using data file from BRFSS Website which contains
data from all states, also use the codebook on the website to determine your
state's FIPS code]

IF _CUR_ASTH_C = 1 AND EMP_EVER1 IN (1 6) THEN CURASTHEVEREMP = 1;
ELSE CURASTHEVEREMP = 9;

IF WORKENV5 = 1 OR WORKENV6 = 1 OR WORKENV7 = 1 OR WORKENV8 = 1 THEN WRA_4Q = 1;
ELSE IF WORKENV5 IN (2 10) AND WORKENV6 IN (2 10) AND WORKENV7 IN (2) AND WORKENV8
IN (2 10) THEN WRA_4Q = 2;
ELSE WRA_4Q = 9;

RUN;

PROC SURVEYFREQ;
      STRATA _STSTR;
      CLUSTER _PSU;
      WEIGHT LLCPWT_F;
      TABLE CURASTHEVEREMP*WRA_4Q/ROW CL;
RUN;
```

Note: The Z codes included in Table 2 of the How-to-Guide are not external cause of morbidity (external cause codes) based on ICD-10. These codes fall under the category of 'Factors influencing health status and contact with health services.

➢ *Example 1*

```
data test.CT16E;
Set Test.final2016;
where AcctType = "E" and state = "CT"  and age_calc ge 16;

run;
quit;

data test.CT16E;
Set Test.final2016;
where AcctType = "E" and state = "CT"  and age_calc ge 16;

run;
quit;

data Heat ;
Set CT16E;
array diag (10)
dx1 dx2 dx3 dx4 dx5 dx6 dx7 dx8 dx9 dx10;
do i = 1 to 10;

if payorsource = "B"
then B=1;

if diag(i) in: ('Y990', 'Y991', 'Y926', 'Y927', 'Z042', 'Z576', 'Z578')
then workcodes=1;

If
diag(i) in ('T670XXA', 'T671XXA','T672XXA', 'T673XXA', 'T674XXA',
 'T675XXA','T676XXA', 'T677XXA', 'T678XXA', 'T679XXA', 'X30.XXXA', 'W92.XXXA')
then heatrelatedEDvisit=1;

if B=1 or workcodes=1 then EDworkrelated=1;

if EDworkrelated=1 and heatrelatedEDvisit=1 then heatindicator=1;

End;
run;

Proc freq;
tables EDworkrelated B heatrelatedEDvisit heatindicator;
run;
```

Example 2

```
data Heat16; set  X.er_sparcs2016;
Array P1 [*] Source1-Source6; Do i=1 to Dim(P1);
      If P1[i] = "B" then OC1=1; End;
Array P2 [*] PayType1-PayType6; Do i=1 to Dim(P2);
      If P2[i] = "WC" then OC2=1; End;
Array P3 [*] Typology1-Typology6; Do i=1 to Dim(P3);
      If P3[i] in ("95", "951", "953", "954","959")  then OC3=1; End;
If WC_IND="WC" then OC4=1; run;

data External; set heat16;
if (oc1=1 or oc2=1 or oc3=1 or oc4=1) or ecode1 in ('Y990' 'Y991' 'Z042' 'Z576'
'Z578') or ecode2 in ('Y9261' 'Y9262' 'Y9263' 'Y9264' 'Y9265' 'Y9269' 'Y9271'
'Y9272') then wr=1 ;
if age ge 16;
if pat_addr_st = 'NY'; run;

data final; set external;
array heatdx[25] prindx dx1-dx24;
do i=1 to 25;
if heatdx[i] in ('T670XXA' 'T671XXA' 'T673XXA' 'T674XXA' 'T675XXA' 'T676XXA'
'T677XXA' 'T678XXA' 'T679XXA' 'X30XXXA' 'W92XXXA') then heat=1;
end;  run;

data wrfinal; set final; if wr=1 and heat=1; run;
```

> *Example 1*

```
data test.eye1 ;
Set test.CT16BI;
array diag (10)
dx1 dx2 dx3 dx4 dx5 dx6 dx7 dx8 dx9 dx10;

array surg (10)
op1 op2 op3 op4 op5 op6 op7 op8 op9 op10;

do i = 1 to 10;

if dx1 in ('S0010XA', 'S0011XA',   'S0012XA', 'S00201A', 'S00202A',
'S00209A',     'S00211A', 'S00212A',
    'S00229A', 'S00241A', 'S00242A', 'S00249A', 'S00251A', 'S00252A',
'S00259A',     'S00261A', 'S00262A',
'S00269A', 'S00271A', 'S00272A', 'S00279A'  /*S00 Superficial injury of
head*/

'S01101A', 'S01102A', 'S01109A', 'S01111A', 'S01112A', 'S01119A', 'S01121A',
'S01122A', 'S01129A', 'S01131A',
'S01132A', 'S01139A', 'S01141A', 'S01142A', 'S01149A', 'S01151A', 'S01152A',
'S01159A',       /*S01 Open wound of head*/

'S0230XA', 'S0231XA', 'S0232XA', 'S0230XB', 'S0231XB', 'S0232XB', 'S023XXA',
'S023XXB',       /*S02 Fracture of skull and facial bones*/

'S04011A', 'S04012A', 'S04019A', 'S0402XA', 'S04031A', 'S04032A', 'S04039A',
'S04041A', 'S04042A', 'S04049A',
'S0410XA', 'S0411XA', 'S0412XA', 'S0420XA', 'S0421XA', 'S0422XA', 'S0440XA',
'S0441XA', 'S0442XA', /*S04 Injury of cranial nerve*/

'S0500XA',       'S0501XA', 'S0502XA', 'S0520XA', 'S0521XA', 'S0522XA',
'S0530XA',       'S0531XA', 'S0532XA', 'S0540XA',
'S0541XA', 'S0542XA', 'S0550XA', 'S0551XA', 'S0552XA', 'S0560XA', 'S0561XA',
'S0562XA', 'S0570XA', 'S0571XA',
'S0572XA', 'S058X1', 'S058X2', 'S058X9',  'S0590XA', 'S0591XA', 'S0592XA')
/*S05 Injury of eye and orbit*/
then option1=1;

if dx1 in: ("S","T")
and diag(i) in ( 'S0010XA', 'S0011XA',    'S0012XA', 'S00201A', 'S00202A',
'S00209A', 'S00211A', 'S00212A',
'S00229A', 'S00241A', 'S00242A', 'S00249A', 'S00251A', 'S00252A', 'S00259A',
'S00261A', 'S00262A',
'S00269A', 'S00271A', 'S00272A', 'S00279A'  /*S00 Superficial injury of
head*/
```

```
'S01101A', 'S01102A', 'S01109A', 'S01111A', 'S01112A', 'S01119A', 'S01121A',
'S01122A', 'S01129A', 'S01131A',
'S01132A', 'S01139A', 'S01141A', 'S01142A', 'S01149A', 'S01151A', 'S01152A',
'S01159A',       /*S01 Open wound of head*/

'S0230XA', 'S0231XA', 'S0232XA', 'S0230XB', 'S0231XB', 'S0232XB', 'S023XXA',
'S023XXB',       /*S02 Fracture of skull and facial bones*/

'S04011A', 'S04012A', 'S04019A', 'S0402XA', 'S04031A', 'S04032A', 'S04039A',
'S04041A', 'S04042A', 'S04049A',
'S0410XA', 'S0411XA', 'S0412XA', 'S0420XA', 'S0421XA', 'S0422XA', 'S0440XA',
'S0441XA', 'S0442XA', /*S04 Injury of cranial nerve*/

'S0500XA',       'S0501XA', 'S0502XA', 'S0520XA', 'S0521XA', 'S0522XA',
'S0530XA',       'S0531XA', 'S0532XA', 'S0540XA',
'S0541XA', 'S0542XA', 'S0550XA', 'S0551XA', 'S0552XA', 'S0560XA', 'S0561XA',
'S0562XA', 'S0570XA', 'S0571XA',
'S0572XA', 'S058X1', 'S058X2', 'S058X9',  'S0590XA', 'S0591XA', 'S0592XA')
/*S05 Injury of eye and orbit*/
then option2=1;

If (OP1 = "08R00JZ" or "08R10JZ" or "08T0XZZ") then option3=1;

if dx1 in: ("S","T") and surg(i) in
('H0533', 'H356', 'H4481',       /*H Series*/

'T1500XA', 'T1501XA', 'T1502XA', 'T1510XA', 'T1511XA', 'T1512XA', 'T1580XA',
'T1581XA', 'T1582XA', 'T1590XA', 'T1591XA', 'T1592XA',
/*T15 Foreign body on external eye*/

'T2600XA', 'T2601XA', 'T2602XA', 'T2610XA', 'T2611XA', 'T2612XA', 'T2620XA',
'T2621XA', 'T2622XA', 'T2630XA', 'T2631XA', 'T2632XA',
'T2640XA', 'T2641XA', 'T2642XA', 'T2650XA', 'T2651XA', 'T2652XA', 'T2660XA',
'T2661XA', 'T2662XA', 'T2670XA', 'T2671XA', 'T2672XA',
'T2680XA', 'T2681XA', 'T2682XA', 'T2690XA', 'T2691XA', 'T2692XA') /*T26 Burn
and corrosion confined to eye and adnexa*/
then option4=1;

End;
run;
quit;
Proc freq;
tables option1 option2 option3 option4;
run;
/*grouped for QC - sum for the answer*/
```

➢ *Example 2*

```
/* To identify work relatedness since we have no primary payer variable

data vivian; set e.Inp_Sparcs2016_proc;
Array P1 [*] Source1-Source6; Do i=1 to Dim(P1);
     If P1[i] = "B" then OC1=1; End;
```

```sas
Array P2 [*] PayType1-PayType6; Do i=1 to Dim(P2);
      If P2[i] = "WC" then OC2=1; End;
Array P3 [*] Typology1-Typology6; Do i=1 to Dim(P3);
      If P3[i] in ("95", "951", "953", "954","959")then OC3=1; End;
If WC_IND="WC" then OC4=1;
Array P4 [*] Condition_1-Condition_8; Do i=1 to Dim(P4);
      If P4[i] in ("02") then OC5=1; End;
data final16; set vivian; if oc1=1 or oc2=1 or oc3=1 or oc4=1 or oc5=1; run; */

data Eyes; set final16;

If Prindx in ('S0010XA' 'S0011XA' 'S0012XA' 'S00201A' 'S00202A' 'S00209A' 'S00211A'
'S00212A' 'S00219A' 'S00221A' 'S00222A' 'S00229A'
'S00241A' 'S00242A' 'S00249A' 'S00251A' 'S00252A' 'S00259A' 'S00261A' 'S00262A'
'S00269A' 'S00271A' 'S00272A' 'S00279A'
'S01101A' 'S01102A' 'S01109A''S01111A' 'S01112A' 'S01119A' 'S01121A'
'S01122A' 'S01129A' 'S01131A' 'S01132A' 'S01139A' 'S01141A' 'S01142A' 'S01149A'
'S01151A' 'S01152A' 'S01159A'
'S0230XA' 'S0231XA' 'S0232XA' 'S0230XB' 'S0231XB' 'S0232XB' 'S023XXA' 'S023XXB'

'S04011A' 'S04012A' 'S04019A' 'S0402XA' 'S04031A' 'S04032A' 'S04039A' 'S04041A'
'S04042A'
'S04049A' 'S0410XA' 'S0411XA' 'S0412XA' 'S0420XA' 'S0421XA' 'S0422XA' 'S0440XA'
'S0441XA' 'S0442XA'
'S0500XA' 'S0501XA' 'S0502XA' 'S0520XA' 'S0521XA'
'S0522XA' 'S0530XA' 'S0531XA' 'S0532XA' 'S0540XA' 'S0541XA''S05.42XA'
'S0550XA' 'S0551XA' 'S0552XA' 'S0560XA'
'S0561XA' 'S0562XA' 'S0570XA' 'S0571XA' 'S0572XA' 'S058X1' 'S058X2' 'S058X9'
'S0590XA' 'S0591XA' 'S0592XA' 'T1500XA'
'T1501XA' 'T1502XA' 'T1510XA'
'T1511XA' 'T1512XA' 'T1580XA' 'T1581XA' 'T1582XA' 'T1590XA' 'T1591XA' 'T1592XA'
'T2600XA' 'T2601XA' 'T2602XA' 'T2610XA' 'T2611XA' 'T2612XA' 'T2620XA' 'T2621XA'
'T2622XA'
'T2630XA' 'T2631XA' 'T2632XA' 'T2640XA' 'T2641XA' 'T2642XA' 'T2650XA' 'T2651XA'
'T2652XA' 'T2660XA' 'T2661XA' 'T2662XA' 'T2670XA' 'T2671XA' 'T2672XA' 'T2680XA'
'T2681XA'
'T2682XA' 'T2690XA' 'T2691XA' 'T2692XA'
'H05331' 'H05332' 'H05333' 'H05339' 'H3560' 'H3561' 'H3562' 'H3563' 'H44811'
'H44812' 'H44813' 'H44819') then Eye1=1;

Array D {24} dx1-dx24; do i= 1 to 24;
if (substr (prindx,1,1) in ('S' 'T') and D {i} in ('S0010XA' 'S0011XA' 'S0012XA'
'S00201A' 'S00202A' 'S00209A' 'S00211A' 'S00212A' 'S00219A' 'S00221A' 'S00222A'
'S00229A'
'S00241A' 'S00242A' 'S00249A' 'S00251A' 'S00252A' 'S00259A' 'S00261A' 'S00262A'
'S00269A' 'S00271A' 'S00272A' 'S00279A'
'S01101A' 'S01102A' 'S01109A''S01111A' 'S01112A' 'S01119A' 'S01121A'
'S01122A' 'S01129A' 'S01131A' 'S01132A' 'S01139A' 'S01141A' 'S01142A' 'S01149A'
'S01151A' 'S01152A' 'S01159A'
'S0230XA' 'S0231XA' 'S0232XA' 'S0230XB' 'S0231XB' 'S0232XB' 'S023XXA' 'S023XXB'

'S04011A' 'S04012A' 'S04019A' 'S0402XA' 'S04031A' 'S04032A' 'S04039A' 'S04041A'
'S04042A'
'S04049A' 'S0410XA' 'S0411XA' 'S0412XA' 'S0420XA' 'S0421XA' 'S0422XA' 'S0440XA'
'S0441XA' 'S0442XA'
'S0500XA' 'S0501XA' 'S0502XA' 'S0520XA' 'S0521XA'
'S0522XA' 'S0530XA' 'S0531XA' 'S0532XA' 'S0540XA' 'S0541XA''S05.42XA'
'S0550XA' 'S0551XA' 'S0552XA' 'S0560XA'
```

```
'S0561XA' 'S0562XA' 'S0570XA' 'S0571XA' 'S0572XA' 'S058X1' 'S058X2' 'S058X9'
'S0590XA' 'S0591XA' 'S0592XA' 'T1500XA'
'T1501XA' 'T1502XA' 'T1510XA'
'T1511XA' 'T1512XA' 'T1580XA' 'T1581XA' 'T1582XA' 'T1590XA' 'T1591XA' 'T1592XA'
'T2600XA' 'T2601XA' 'T2602XA' 'T2610XA' 'T2611XA' 'T2612XA' 'T2620XA' 'T2621XA'
'T2622XA'
'T2630XA' 'T2631XA' 'T2632XA' 'T2640XA' 'T2641XA' 'T2642XA' 'T2650XA' 'T2651XA'
'T2652XA' 'T2660XA' 'T2661XA' 'T2662XA' 'T2670XA' 'T2671XA' 'T2672XA' 'T2680XA'
'T2681XA'
'T2682XA' 'T2690XA' 'T2691XA' 'T2692XA'
'H05331' 'H05332' 'H05333' 'H05339' 'H3560' 'H3561' 'H3562' 'H3563' 'H44811'
'H44812' 'H44813' 'H44819')) then Eye2=1; end;

If proc_1 in ('08R00JZ' '08R10JZ' '08T0XZZ' '08T1XZZ') then Eye3=1;

Array pcode {24} proc_2-proc_25; do i=1 to 24;
If (substr (prindx,1,1) in ('S' 'T') AND pcode {i} in ('08R00JZ' '08R10JZ'
'08T0XZZ' '08T1XZZ')) then Eye4=1; end; run;

data Eyehosp; set Eyes;
if (Eye1=1 or Eye2=1 or Eye3=1 or Eye4=1) then Eyeinjury=1;

proc freq; tables Eyeinjury; run;
```

➢ *Example 3*

```
DATA STEP1;
      SET OHI;

*RESTRICT TO WORKER'S COMPENSATION AS PAYER;

WORKCOMP=0;
IF PRIME=205 THEN WORKCOMP=1;
ELSE IF PRIME=211 THEN WORKCOMP=1;
ELSE IF PRIME=215 THEN WORKCOMP=1;
ELSE IF PRIME=221 THEN WORKCOMP=1;
ELSE IF PRIME=225 THEN WORKCOMP=1;
ELSE IF PRIME=231 THEN WORKCOMP=1;
ELSE IF PRIME=299 THEN WORKCOMP=1;

IF WORKCOMP=1;

IF AGE GE 16;

IF STATE='your state';

IF PAT_TYPE=0;

IF YEAR='16';

RUN;

data step2;
Set work.step1;

array diag (10)
dx1 dx2 dx3 dx4 dx5 dx6 dx7 dx8 dx9 dx10;

array surg (10)
```

```
proc1 proc2 proc3 proc4 proc5 proc6 proc7 proc8 proc9 proc10;

do i = 1 to 10;

if dx1 in ( 'S0010XA', 'S0011XA',    'S0012XA', 'S00201A', 'S00202A', 'S00209A',
'S00211A', 'S00212A',
     'S00229A', 'S00241A', 'S00242A', 'S00249A', 'S00251A', 'S00252A', 'S00259A',
'S00261A', 'S00262A',
'S00269A', 'S00271A', 'S00272A', 'S00279A'  /*S00 Superficial injury of head*/

'S01101A', 'S01102A', 'S01109A', 'S01111A', 'S01112A', 'S01119A', 'S01121A',
'S01122A', 'S01129A', 'S01131A',
'S01132A', 'S01139A', 'S01141A', 'S01142A', 'S01149A', 'S01151A', 'S01152A',
'S01159A',       /*S01 Open wound of head*/

'S0230XA', 'S0231XA', 'S0232XA', 'S0230XB', 'S0231XB', 'S0232XB', 'S023XXA',
'S023XXB',       /*S02 Fracture of skull and facial bones*/

'S04011A', 'S04012A', 'S04019A', 'S0402XA', 'S04031A', 'S04032A', 'S04039A',
'S04041A', 'S04042A', 'S04049A',
'S0410XA', 'S0411XA', 'S0412XA', 'S0420XA', 'S0421XA', 'S0422XA', 'S0440XA',
'S0441XA', 'S0442XA', /*S04 Injury of cranial nerve*/

'S0500XA',       'S0501XA', 'S0502XA', 'S0520XA', 'S0521XA', 'S0522XA', 'S0530XA',
'S0531XA', 'S0532XA', 'S0540XA',
'S0541XA', 'S0542XA', 'S0550XA', 'S0551XA', 'S0552XA', 'S0560XA', 'S0561XA',
'S0562XA', 'S0570XA', 'S0571XA',
'S0572XA', 'S058X1', 'S058X2', 'S058X9',  'S0590XA', 'S0591XA', 'S0592XA')
/*S05 Injury of eye and orbit*/
then option1=1;

if dx1 in: ("S","T")
and diag(i) in ( 'S0010XA', 'S0011XA',      'S0012XA', 'S00201A', 'S00202A',
'S00209A', 'S00211A', 'S00212A',
'S00229A', 'S00241A', 'S00242A', 'S00249A', 'S00251A', 'S00252A', 'S00259A',
'S00261A', 'S00262A',
'S00269A', 'S00271A', 'S00272A', 'S00279A'  /*S00 Superficial injury of head*/

'S01101A', 'S01102A', 'S01109A', 'S01111A', 'S01112A', 'S01119A', 'S01121A',
'S01122A', 'S01129A', 'S01131A',
'S01132A', 'S01139A', 'S01141A', 'S01142A', 'S01149A', 'S01151A', 'S01152A',
'S01159A',       /*S01 Open wound of head*/

'S0230XA', 'S0231XA', 'S0232XA', 'S0230XB', 'S0231XB', 'S0232XB', 'S023XXA',
'S023XXB',       /*S02 Fracture of skull and facial bones*/

'S04011A', 'S04012A', 'S04019A', 'S0402XA', 'S04031A', 'S04032A', 'S04039A',
'S04041A', 'S04042A', 'S04049A',
'S0410XA', 'S0411XA', 'S0412XA', 'S0420XA', 'S0421XA', 'S0422XA', 'S0440XA',
'S0441XA', 'S0442XA', /*S04 Injury of cranial nerve*/

'S0500XA',       'S0501XA', 'S0502XA', 'S0520XA', 'S0521XA', 'S0522XA', 'S0530XA',
'S0531XA', 'S0532XA', 'S0540XA',
'S0541XA', 'S0542XA', 'S0550XA', 'S0551XA', 'S0552XA', 'S0560XA', 'S0561XA',
'S0562XA', 'S0570XA', 'S0571XA',
'S0572XA', 'S058X1', 'S058X2', 'S058X9',  'S0590XA', 'S0591XA', 'S0592XA')
/*S05 Injury of eye and orbit*/
then option2=1;
```

```
If (proc1 = "08R00JZ" or "08R10JZ" or "08T0XZZ" or "08T1XZZ") then option3=1;

if dx1 in: ("S","T") and surg(i) in
('H0533', 'H356', 'H4481',      /*H Series*/

'T1500XA', 'T1501XA', 'T1502XA', 'T1510XA', 'T1511XA', 'T1512XA', 'T1580XA',
'T1581XA', 'T1582XA', 'T1590XA', 'T1591XA', 'T1592XA',
/*T15 Foreign body on external eye*/

'T2600XA', 'T2601XA', 'T2602XA', 'T2610XA', 'T2611XA', 'T2612XA', 'T2620XA',
'T2621XA', 'T2622XA', 'T2630XA', 'T2631XA', 'T2632XA',
'T2640XA', 'T2641XA', 'T2642XA', 'T2650XA', 'T2651XA', 'T2652XA', 'T2660XA',
'T2661XA', 'T2662XA', 'T2670XA', 'T2671XA', 'T2672XA',
'T2680XA', 'T2681XA', 'T2682XA', 'T2690XA', 'T2691XA', 'T2692XA') /*T26 Burn and
corrosion confined to eye and adnexa*/
then option4=1;

End;
run;
quit;

proc freq;
tables option1 option2 option3 option4;
run;

/*grouped for QC - sum for the answer*/
```

Appendix D: Data Sources

Data Source	Indicators	Notes
Federal Level Data Sources		
Geographic Profiles of Employment and Unemployment https://www.bls.gov/opub/geographic-profile/home.htm	Employment (page 7) OHI#2: Hospitalizations (page 15) OHI#6: Burns (page 23) OHI#11: Pesticides (page 42) OHI#13: Blood Lead (page 47) OHI#20: Low-Back Hospitalizations (page 75) OHI#22: Traumatic Injury Hospitalizations (page 79) OHI#24: Heat-Related ED visits (page 82) OHI#25: Eye Injuries (page 85)	• Based on the Current Population Survey, a monthly probability sample of U.S. households. • Excludes workers <16 years of age, active-duty military, people living in institutions (e.g., prisoners, nursing home residents). • May underestimate certain racial/ethnic worker populations that do not have permanent residences or are migratory in nature.
Survey of Occupational Injuries and Illnesses (SOII) https://www.bls.gov/iif/oshstate.htm	OHI#1: Non-Fatal Injuries and Illnesses (page 12) OHI#4: Amputations (page 19) OHI#7: Musculoskeletal Disorders (page 25)	• Based on employer reports of injuries and illnesses. • Probability sample of employer establishments. • Maintenance of OSHA recordable injuries and illnesses logs by these agencies is voluntary. • Limited to private sector workforce only. Excludes ~14% of workforce (military, self-employed, private household workers, workers on farms with ≤10 employees, Federal agencies) that fall outside the scope of the Occupational Health and Safety Act of 1970. • Until 2008, state and municipal workers were excluded. • Incident year data only collected; does not capture lost work-time that may carry over to new calendar year. • Some states do not participate. For participating states, the sample sizes are sometimes too small to generate reliable state-specific estimates. • Subject to both willful and unintentional underreporting of cases or case details. • Employers may place affected workers on restricted work activity, thereby avoiding reporting of cases as lost workday cases.
BLS SOII data has changed over time		

• Before 2000, the definition of musculoskeletal disorders (MSDs) included cases of overexertion and repetitive motion (OIICS event codes 220-239). The definition for 2000 – 2010 added nature codes as well as an additional event code. In 2011, BLS modified the MSD definition again

after adopting a new version of the Occupational Injury and Illness Classification System (OIICS v. 2.01) which affected the numbering and hierarchical ordering of codes (see table below). Information about the original OIICS coding structure as well as the new OIICS 2.01 coding structure is available here: http://www.bls.gov/iif/oshoiics.htm. Information about changes to the Nature codes involving amputations, avulsions, and enucleations can be found here: http://www.bls.gov/iif/oiics_changes_2010.pdf.

Impact on trend analysis:
- In general, BLS cautions users against directly comparing Event, Source, Secondary Source, Part, and Nature case characteristic codes from 1992-2010 to data from 2011 onward (i.e., BLS designated a 'break in series' starting with 2011 data). However, some data users feel the definitions of particular codes across the different periods are similar enough for their needs.

- For OHI 4, 'Amputations code 031XXX' was used for 2010 and previous calculations. 'Amputations code 1311XX' is used for data from 2011 and forward. You can examine the amputation definition in the original OIICS coding structure and the OIICS 2.01 coding structure before conducting a trend analysis over time **(BLS cautions against this and doesn't do it in-house as a matter of policy).**
  - See pages 4 and 5 of the **original coding structure** (http://www.bls.gov/iif/oiics_manual_2007.pdf) compared to -
  - Pages 17-18 of the **OIICS 2.01 coding structure** (http://www.bls.gov/iif/oiics_manual_2010.pdf).

- **For OHI 7, t**he definition of musculoskeletal disorders (MSDs) involving days away from work used by BLS has changed so substantially since 2000 that SOII estimates for MSD counts and rates from 2011 forward should not be compared with prior years.

Census of Fatal Occupational Injuries (CFOI) https://www.bls.gov/iif/oshstate.htm	OHI#3: Fatalities (page 17)	- Based on a Federal-State cooperative program, counts are compiled based on multiple sources such as death certificates, workers' compensation reports, and Federal and State administrative reports. - CFOI program states not permitted to release occupation or industry specific data when data are sparse. Such data are categorized under 'others.' - Findings published according to the Occupational Injury and Illness Classification (OIIC)system rather than ICD-CM. Therefore, data may not be comparable to causes of death documented on death certificates.
Employed Labor Force (ELF) query system https://wwwn.cdc.gov/wisards/cps/	Employment (page 7) OHI#3: Fatalities (page 17) OHI#15: Occupations at High Risk for Occupational Morbidity (page 56) OHI#16: Industries and Occupations at High Risk for Occupational Mortality (page 60)	- Based on subset of Current Population Survey (CPS) data. - Query system uses slightly different methods to apply population controls compared to those used by BLS in the Geographic Profile (GPS) reports.

		• Demographic estimates will differ slightly from estimates provided in GPS reports, even though both sources derived from CPS data.
Covered Employers and Wages (ES-202/QCEW) http://www.bls.gov/cew/data.htm	OHI#18: OSHA Enforcement (page 68)	• Based on the state's unemployment insurance accounting system as well as two surveys sent to private sector businesses with more than three employees. • Individuals holding more than one job are counted multiple times.
Healthcare Safety Network (NHSN) https://www.cdc.gov/nhsn/datastat/index.html	OHI#23: Influenza Vaccination Coverage (page 80)	• Based on data collected from U.S. healthcare facilities that volunteer to submit data. • Acute care hospitals are more likely than other types of facilities to not be able to report denominator data for credentialed non-employees and other non-employees, as are larger healthcare institutions (as measured by number of employees). • Measure specifications were modified by the CDC to include a more limited number of non-employee healthcare personnel.
County Business Patterns (CBP) https://www.census.gov/programs-surveys/cbp.html	OHI#14: Industries at High Risk for Occupational Morbidity (page 51)	• CBP data are extracted from the Business Register, the Census Bureau's file of all known single and multi-establishment companies. Data comes from a variety of sources, including the Economic Census, the Annual Survey of Manufactures, and Current Business Surveys, as well as from administrative records of the Internal Revenue Service (IRS), the Social Security Administration (SSA), and the Bureau of Labor Statistics (BLS). • While CBP publishes annually, the data is meant to be more of a snap shot in time. Further, CBP does not revise data for prior years. CBP relies on administrative data that is subject to non-sampling error.
data.census.gov **(formerly American FactFinder)**	OHI#9: Pneumoconiosis Hospitalizations (page 32) OHI#10: Pneumoconiosis Mortality (page 37)	• Provides access to data about the United States, Puerto Rico, and the Island Areas. The data in AFF come from several censuses and surveys including the

https://data.census.gov/cedsci/	OHI#12: Incidence Mesothelioma (page 44) OHI#14: Industries at High Risk for Occupational Morbidity (page 51)	county business patterns, decennial census, the American Community Survey, the American Housing Survey, and the Economic Census. • The Census Bureau stopped releasing new data in American FactFinder (AFF) at the end of June 2019 and transitioned to data.census.gov for data releases formerly on AFF.
Year 2000 U.S. Standard population http://www.cdc.gov/nchs/data/statnt/statnt20.pdf	OHI#9: Pneumoconiosis Hospitalizations (page 32) OHI#10: Pneumoconiosis Mortality (page 37) OHI#12: Incidence Mesothelioma (page 44)	
Data Provided by NIOSH		
Poison Control Center	OHI#11: Pesticides (page 42)	• Not all states have poison control centers (PCC). • 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.
OSHA Annual Reports Or contact regional OSHA office: https://www.osha.gov/contactus/bystate	OHI#18: OSHA Enforcement (page 68)	• 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.
State Level Data Sources (Note: **programs using state-level data (even from their own agency) may have to enter into a data sharing agreement or other arrangement with the data owner/manager to gain access to the data.)**		
Inpatient Hospital Discharge Data	OHI#2: Hospitalizations (page 15) OHI#6: Burns (page 23) OHI#9: Pneumoconiosis Hospitalizations (page 32) OHI#20: Low-Back Hospitalizations (page 75) OHI#22: Traumatic Injury Hospitalizations (page 79) OHI#25: Eye Injuries (page 85)	• Data obtained from State Health Departments from hospital discharge files (or other data owner). • Hospital discharge records only available for non-federal, acute care hospitals. • All admissions are counted, including multiple admissions for a single individual. • Practice patterns and payment mechanisms may impact decisions by health care providers to hospitalize patients, correctly diagnose work-related

		• conditions, and/or list conditions as a discharge diagnosis. • Number of diagnoses listed on discharge summaries may vary by regional practice patterns and by person completing discharge summaries. • Residents of one state may be hospitalized in another state. • Until hospital discharge data are available in all states, state data should not be aggregating to produce nationwide estimates. • Data on race/ethnicity is sometimes not complete or unavailable.
Emergency Department Discharge Data	OHI#24: Heat-Related ED visits (page 82)	• Data obtained from State Health Departments from hospital discharge files. • ED visits may involve workers <16 years of age, but denominator data for workers <16 are not readily available. • Practice patterns and payment mechanisms may affect decisions by health care providers to correctly diagnose occupational HRI and/or list the condition as a discharge diagnosis. • All visits are counted, including multiple admissions for a single individual. • Number of diagnoses listed on discharge summaries may vary by regional practice patterns and by person completing discharge summaries. • Until ED data are available in all states, state data should not be aggregating to produce nationwide estimates. • Data on race/ethnicity is sometimes not complete or unavailable. Additionally, industry and occupation are not collected in the ED making it difficult to identify those industries/occupations at high risk of HRI.
Asthma Call Back Survey (ACBS)	OHI#21: Asthma (page 76)	• Data obtained from 1) State Behavioral Risk Factor Surveillance System (BRFSS) coordinator OR your State Asthma Program Data.

		• Not all states participate in the ACBS. • Individuals must have a telephone to participate. • Only conducted in certain languages which can vary by State; therefore, it does not include individuals who speak all languages. • Data are subject to bias of self-reported data. • Additional limitations in estimation methods (i.e., measurement, nonresponse, and sampling errors) are described in the "BRFSS Operational and User's Guide."
Blood Lead Laboratory Reports https://www.cdc.gov/niosh/topics/ables/state.html	OHI#13: Blood Lead (page 47)	• Obtain data from your State ABLES program database. • Some states do not require laboratories to report all BLLs or have no BLL reporting requirement in place. • Laboratory reports are frequently incomplete. • Not all employers in lead-using industries offer BLL testing to their employees, so number of persons reported to states may underestimate the number of workers exposed to lead. • Appropriate testing methods may not always be used. • Individuals may be exposed to lead outside their state of residence. • Not all states are able to determine both state of employment/exposure and state of residence of their reported cases. • Not all states may be able to distinguish occupationally exposed individuals from non-occupationally exposed individuals.
Cancer Registry	OHI#12: Incidence Mesothelioma (page 44)	• Obtain data from your State Cancer Registry. • Data from some existing statewide registries do not yet meet standards for data completeness and quality. • Until complete cancer registry data are available in all states, state data should not be aggregating to produce nationwide estimates. • Because the guidance offered in this document differs from the methodology used by State Cancer Registries, state specific incidence rates calculated using this

		How-To Guide may differ from those published by State Cancer Registries.
Death Certificates (DC)	OHI#10: Pneumoconiosis Mortality (page 37)	• Obtain data from your State Health Department's Office of Vital Statistics. • DC causes of death and coding of causes may be inaccurate. • Number of contributing causes of death on DC may vary by person completing the DC and geographic region. • DCs identify only a small percentage of individuals who develop pneumoconiosis. • Data on race/ethnicity is sometimes not complete or unavailable. • State of residence at death may differ from state of exposure.
Workers' Compensation (WC)	OHI#5: Claims for Amputations (page 21) OHI#8: Claims for Carpal Tunnel Syndrome (page 30)	• Obtain data from your State Workers' Compensation System. • Data are not complete, as many individuals with WR illnesses and injuries do not file for WC. • Claims may be denied. • Number of days away from work required before a case is recorded in the WC system varies by state. • Self-employed individuals like farmers, independent contractors, federal employees, railroad or longshore and maritime workers may not be covered by state WC systems.
Other Data Sources		
National Academy of Social Insurance (NASI) https://www.nasi.org/research/workers-compensation	OHI#5: Claims for Amputations (page 21) OHI#8: Claims for Carpal Tunnel Syndrome (page 30) OHI#19: Workers' Compensations Awards (page 73)	• Data are not complete, as many individuals with WR illnesses and injuries do not file for WC. • Claims may be denied. • Number of days away from work required before a case is recorded in the WC system varies by state. • Self-employed individuals like farmers, independent contractors, federal employees, railroad or longshore and maritime workers may not be covered by state WC systems.

Appendix E: References

American Academy of Pediatrics (AAP). Influenza Implementation Guidance—Healthcare Worker Vaccination. AAP, 2018. Available at https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/immunizations/Influenza-Implementation-Guidance/Pages/Healthcare-Worker-Vaccination.aspx

American College of Physicians. American College of Physicians calls for immunizations for all healthcare providers. ACP Newsroom, January 2013. See https://www.acponline.org/acp-newsroom/american-college-of-physicians-calls-for-immunizations-for-all-health-care-providers

Association for Professionals in Infection Control and Epidemiology (APIC). The APIC Advocacy Agenda: Mandatory healthcare personnel influenza vaccination. APIC, 2019. Available at https://apic.org/wp-content/uploads/2019/07/APIC-Advocacy-Agenda-Mandatory-HCP-Vaccinations_FINAL_2019.pdf

Bridges CB, Kuehnert MJ, and Hall CB. Transmission of Influenza: Implications for Control in Health Care Settings. *Clin Infect Dis*, 2003; 37: 1094–1101.

Centers for Disease Control and Prevention. Novel influenza A (H1N1) virus infections among health-care personnel – United States, April-May 2009. MMWR 2009;58:641-5.

Centers for Disease Control and Prevention. Interim results: influenza A (H1N1) 2009 monovalent and seasonal influenza vaccination coverage among health-care personnel – United States, August 2009-January 2010. MMWR Morb Mortal Wkly Rep. 2010; 59(12):357-362.

Council of State and Territorial Epidemiologists (CSTE). The Role of the States in a Nationwide, Comprehensive Surveillance System for Work-Related Diseases, Injuries and Hazards. A Report from NIOSH-CSTE Surveillance Planning Group. 2001.

Cunney RJ, Bialachowski A, Thornley D, Smaill FM, and Pennie RA. An Outbreak of Influenza A in a Neonatal Intensive Care Unit. *Infect Control Hosp Epidemiol*, 2000; 21:449-454.

Cryer C and Langley J. Developing Indicators of Injury Incidence that can be Used to Monitor Global, Regional and Local Trends. 2008. Available at: http://ipru3.otago.ac.nz/ipru/ReportsPDFs/OR070.pdf

DHHS (NIOSH) Publication 95-107. Minimum and Comprehensive State-Based Activities in Occupational Safety and Health. June 1995.

Fiore AE, Shay DK, Broder K, Iskander JK, Uyeki TM, Mootrey G, Bresee JS, and Cox, NJ. Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2009. *MMWR Recomm Rep*, 2010; 58 (RR08): 1-52.

Harriman K, Rosenberg J, Robinson S, et al. Novel Influenza A (H1N1) Virus Infections Among Health-Care Personnel – United States, April-May 2009. *MMWR Morb Mortal Wkly Rep*, 2009; 58(23): 641-645.

Hayward AC, Harling R, Wetten S, et al. Effectiveness of an Influenza Vaccine Programme for Care Home Staff to Prevent Death, Morbidity, and Health Service Use Among Residents: Cluster Randomised Controlled Trial. *BMJ*, 2006; 333: 1241-1246.

Infectious Diseases Society of America (IDSA), IDSA policy on mandatory immunization of health care personnel against influenza and other infectious diseases. Infectious Diseases Society of America (IDSA), December 2013. https://www.idsociety.org/policy--advocacy/immunization-and-vaccine-policy/Health_Care_Worker_Immunization/

Lemaitre M, Meret T, Rothan-Tondeur M, et al. Effect of Influenza Vaccination of Nursing Home staff on Mortality of Residents: A Cluster-Randomized Trial. *J Am Geriatr Soc,* 2009. 57:1580-1586.

Lu P, Bridges CB, Euler GL, and Singleton JA. Influenza Vaccination of Recommended Adult Populations, U.S., 1998-2005. *Vaccine,* 2008. 26: 1786-1793.

Mossad S, Deshpande A, Schramm S, Liu X, and Rothberg MB. Working Despite Having Influenza-Like Illness: Results of an Anonymous Survey of Healthcare Providers Who Care for Transplant Recipients. *Infection Control and Hospital Epidemiology*, 2017. 38(8): 966-969.

National Center for Health Statistics (NCHS) Expert Group on Injury Severity Measurement. Discussion document on injury severity measurement in administrative datasets. 2004. Available at: http://www.cdc.gov/nchs/data/injury/DicussionDocu.pdf.

Pavia AT. Mandate to protect patients from health care-associated influenza. *CID*, 2010. 50: 465-67.

Potter J, Stott DJ, Roberts MA, et al. Influenza Vaccination of Healthcare Workers in Long-Term-Care Hospitals Reduces the Mortality of Elderly Patients. *J Infect Dis*, 1997. 175:1-6.

Salgado CD, Giannetta ET, Hayden FG, and Farr BM. Preventing Nosocomial Influenza by Improving the Vaccine Acceptance Rate of Clinicians. *Infect Control Hosp Epidemiol*, 2004. 25:923–928.

Sartor C, Zandotti C, Romain F, et al. Disruption of Services in an Internal Medicine Unit Due to a Nosocomial Influenza Outbreak. *Infect Control Hosp Epidemiol*, 2002. 23:615–619.

Sears JM, Bowman SM, and Hogg-Johnson S. Using Injury Severity to Improve Occupational Injury Trend Estimates. *American Journal of Industrial Medicine*, 2014. 57(8):878-885.

Weinstock DM, Eagan J, Malak SA, et al. Control of Influenza A on a Bone Marrow Transplant Unit. *Infect Control Hosp Epidemiol*, 2000. 21:730-732.

Wilde JA, McMillan JA, Serwint J, et al. Effectiveness of Influenza Vaccine in Healthcare Professionals: A Randomized Trial. *JAMA*, 1999. 281: 908–913.