

Exploratory Analysis of Pennsylvania Occupational Health Indicators (OHIs) Report (2013-2019)

Bureau of
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Executive Summary

The Pennsylvania Department of Health's (DOH) Pennsylvania Occupational Safety and Health Surveillance program (PennOSHS) serves to fill a much-needed gap to collect, analyze, interpret, and disseminate data related to workers and worker health while simultaneously identifying and engaging a diverse group of partners and stakeholders. The goal of the program is to contribute to reducing occupational morbidity and mortality and occupational health disparities in Pennsylvania. This exploratory occupational health report documents occupational health and safety data trends in Pennsylvania and will provide Pennsylvanians with information about current trends in occupational health data not previously available to the public. The Council of State Territorial Epidemiologists (CSTE) and National Institute for Occupational Safety and Health (NIOSH) created the occupational health indicators (OHIs), which are measures of work-related disease, injury, or health factors, including workplace exposures, hazards, and interventions. The OHIs can be used to develop relevant workplace injury and illness prevention strategies. This report explores trends over time, from 2013 to 2019, for 12 of 25 OHIs. Of the 12 indicators evaluated, it was found that six indicators (related to non-fatal injuries and illnesses, work-related hospitalizations, musculoskeletal disorders, pneumoconiosis hospitalizations and mortality, and adult blood lead levels) had significant decreases in rates over the time period. From 2013 to 2019, there were no indicators that showed a significant increase. Large fluctuations in trends over time can be seen for one indicator, asthma. Fluctuations in asthma caused or made worse by work, suggest that PennOSHS should prioritize investment of additional resources to collect more nuanced work-related asthma data and provide educational materials to employers, their employees, and the public. PennOSHS plans to collaborate with PA DOH Environmental Public Health Tracking (EPHT) program to monitor adult asthma in PA through emergency department syndromic surveillance data. PennOSHS will continue to monitor the OHIs presented in the report, calculate the additional 13 OHIs, and search for opportunities to identify new measures of occupational related health concerns and disparities.

Methods

Data used to calculate the OHIs are collected from the datasets listed in Table 1.

Table 1. Occupational Health Indicator Data Sources

Data Sources used in Analyses
Bureau of Labor Statistics' (BLS) Survey of Occupational Injuries and Illness (SOII)
Pennsylvania Health Care Cost Containment Council's (PHC4) inpatient hospital discharge data
BLS Census of Fatal Occupational Injuries (CFOI)
U.S. Census Bureau Current Population Survey (CPS)
BLS Geographic Profile of Employment and Unemployment
Census Bureau's American Community Survey (ACS)
Poison Control Center (PCC) data
Pennsylvania's Adult Blood Lead Epidemiology and Surveillance (ABLES) program
Occupational Safety and Health Administration (OSHA) annual reports
BLS Quarterly Census of Employment and Wages
Centers for Disease Control and Prevention's (CDC) Asthma Call-Back Survey

For this report, specific indicators were chosen based on data availability across years and appropriateness in comparing across states. Each indicator explored includes a brief introduction, a figure and corresponding data table, and a short results section. A Mann-Kendall test was used to statistically confirm linear trends, where a *p-value* ≤ 0.05 is considered statistically significant. Given the change from ICD-9-CM to ICD-10-CM codes on October 1, 2015, a Mann-Kendall test was not conducted on indicators related to burn hospitalizations and pneumoconiosis hospitalizations.

Results

Indicator 1: Non-Fatal Work-Related Injuries and Illnesses Reported by Employers

For this indicator, data are from the Bureau of Labor Statistics' (BLS) Survey of Occupational Injuries and Illnesses (SOII). BLS data encompass people of working age, which is defined as 16 years of age and older. SOII is contingent on complete and accurate employer reporting; therefore, there is potential underestimation with incomplete or partial reporting. Work-related injuries are defined as injuries resulting from single events in occupational settings, such as falls or electric shocks. Work-related illnesses are defined as health conditions caused or aggravated by conditions or exposures in occupational settings (or work environments). A list of situations in which an injury or illness occurs in an occupational setting but is not considered work-related can be found at [osha.gov/laws-regs/](https://www.osha.gov/laws-regs/). In the table and figure below, the incidence rate for both the total number of injuries and illnesses as well as those involving leave from work are displayed. While “Work-Related Injuries and Illnesses” account for all work-related injuries and illnesses, regardless of job transfer, restriction, or days away from work, “Cases Involving Days Away from Work” account for just those work-related injuries and illnesses in which the case involved one or more days with leave from work. Additionally, SOII does not represent all types of Pennsylvania workers (such as workers on a farm with fewer than 11 people and part-time workers). For additional information on SOII, visit: www.bls.gov/iif/soii-overview.htm.

Figure 1: Estimated Non-Fatal Work-Related Injuries and Illnesses Reported by Employers per 100,000 full-time equivalents (FTEs) from 2013 to 2019 in Pennsylvania

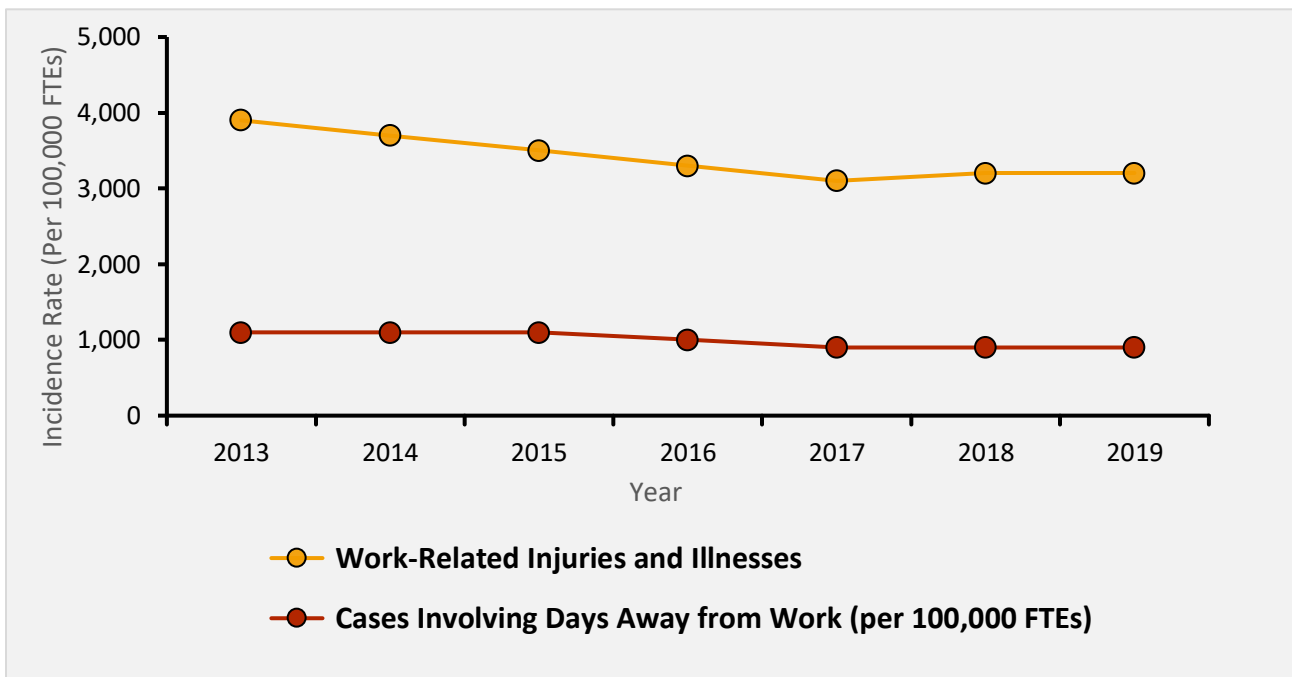


Table 2. Estimated Non-Fatal Work-Related Injuries and Illnesses Reported by Employers per 100,000 full-time equivalents (FTEs) from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Incidence Rate for Work-Related Injuries and Illnesses	3,900	3,700	3,500	3,300	3,100	3,200	3,200
Incidence Rate for Cases Involving Days Away from Work (per 100,000 FTEs)	1,100	1,100	1,100	1,000	900	900	900

There has been a sustained decrease in work-related injuries and illnesses over the last several years. From 2013 to 2019, the incidence rate for work-related injuries and illnesses decreased from 3,900 to 3,200 per 100,000 FTEs (Mann-Kendall coefficient = -0.781, *p-value* = 0.02) and the incidence rate for cases involving days away from work decreased from 1,100 to 900 (Mann-Kendall coefficient = -0.845, *p-value* = 0.02). Over the seven-year period, the average incidence rate for work-related injuries and illnesses was 3,414 cases per 100,000 FTEs and the average incidence rate for cases involving days away from work was 1,000 cases per 100,000 FTEs. Notably, about a third of work-related injuries and illnesses result in days away from work.

Indicator 2: Work-Related Hospitalizations

For this indicator, data are from the Pennsylvania Health Care Cost Containment Council’s (PHC4) inpatient hospital discharge dataset restricted to Pennsylvania residents aged 16 years or older with primary payer coded as workers’ compensation (numerator) and the BLS Geographic Profile of Employment and Unemployment (www.bls.gov/opub/geographic-profile/home.htm) (denominator). BLS data encompass people of working age, which is defined as 16 years of age and older. BLS employment data includes individuals in full-time and part-time positions. In the table and figure below, the number and rate of inpatient work-related hospitalizations are displayed. Data may be underestimated for a number of reasons. For example, due to barriers such as fear of retaliation, accessibility, and general knowledge of the workers’ compensation process, eligible employees may not always use workers’ compensation (Azaroff, 2010). Additionally, workers’ compensation does not cover all types of Pennsylvania workers (such as federal employees, railroad workers, agricultural workers, and domestic workers) and the listed payer in the hospital discharge dataset may be inaccurate. For additional information on PHC4 inpatient hospital discharge data as well as other medical discharge data, visit <https://www.phc4.org/services/datarequests/data.htm>.

Figure 2: Work-Related Hospitalizations from 2013 to 2019 in Pennsylvania

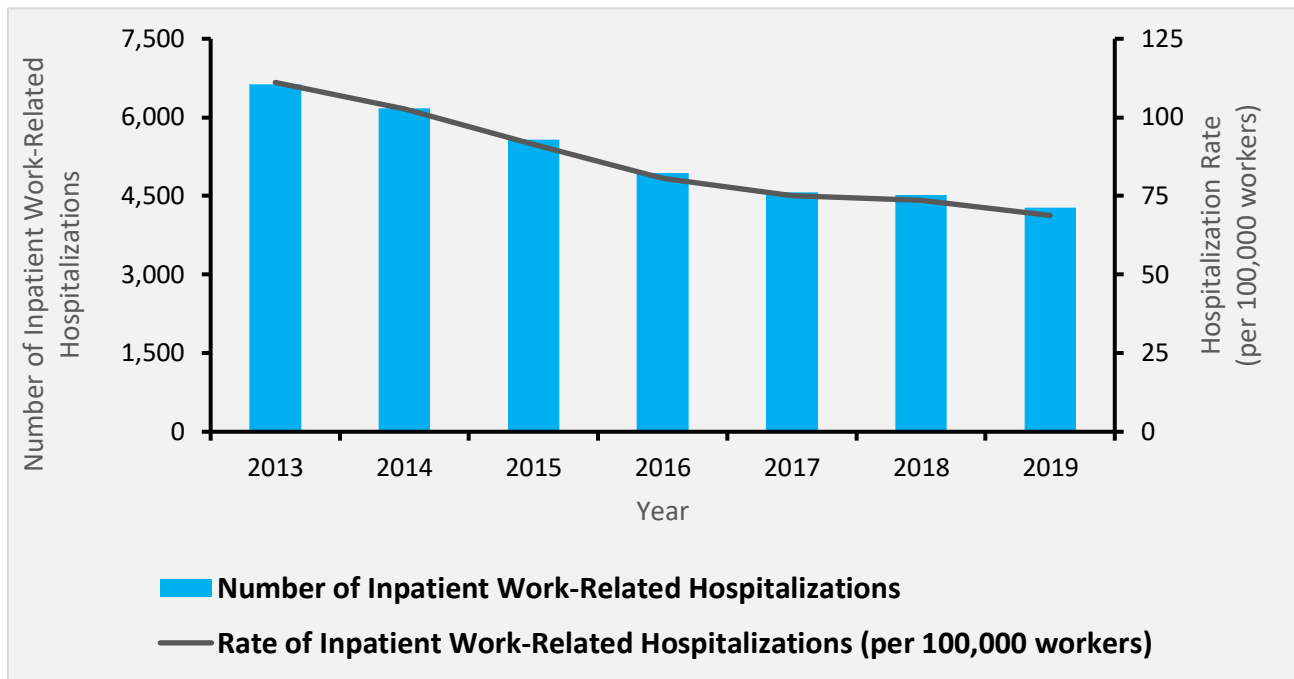


Table 3: Work-Related Hospitalizations from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Inpatient Work-Related Hospitalizations	6,636	6,170	5,575	4,938	4,570	4,523	4,282
Rate of Inpatient Work-Related Hospitalizations (per 100,000 workers)	111.1	102.7	91.5	80.7	75.0	73.5	68.8

The number and rate of inpatient work-related hospitalizations decreased from 2013 to 2019. From 2013 to 2019, the number of inpatient work-related hospitalizations decreased from 6,636 to 4,282 and the rate of inpatient work-related hospitalizations decreased from 111.1 to 68.8 (Mann-Kendall coefficient = -1.00, *p-value* = 0.003). Over the seven-year period, the average number of inpatient work-related hospitalizations was 5,242 cases per year and the average rate of inpatient work-related hospitalizations was 86 cases per 100,000 workers.

Indicator 3: Fatal Work-Related Injuries

For this indicator, data are from the BLS Census of Fatal Occupational Injuries (CFOI) (numerator) and the U.S. Census Bureau Current Population Survey (CPS) accessed through NIOSH’s Employed Labor Force query system (ELF) (denominator). Fatalities are counted if they occurred in Pennsylvania, or if a workplace incident occurred in Pennsylvania that resulted in a death out of state. CFOI age data encompasses people of working age,

which is defined as 16 years of age and older. CFOI data include full-time and part-time workers. Fatalities for workers younger than 16, volunteers, and military personnel may be included in the numerator but are not included in the denominator. Additionally, rates may be over- or under-estimated because the denominator is reported based on the state of person's residence, which may differ from the state in which the fatal work-related injury occurred. In the table and figure below, the number of fatal injuries and fatality rate are displayed. For additional information on CFOI and ELF, visit: <https://www.bls.gov/iif/oshcfoi1.htm> and <https://www.cdc.gov/wisards/cps/>, respectively.

Figure 3: Fatal Work-Related Injuries from 2013 to 2019 in Pennsylvania

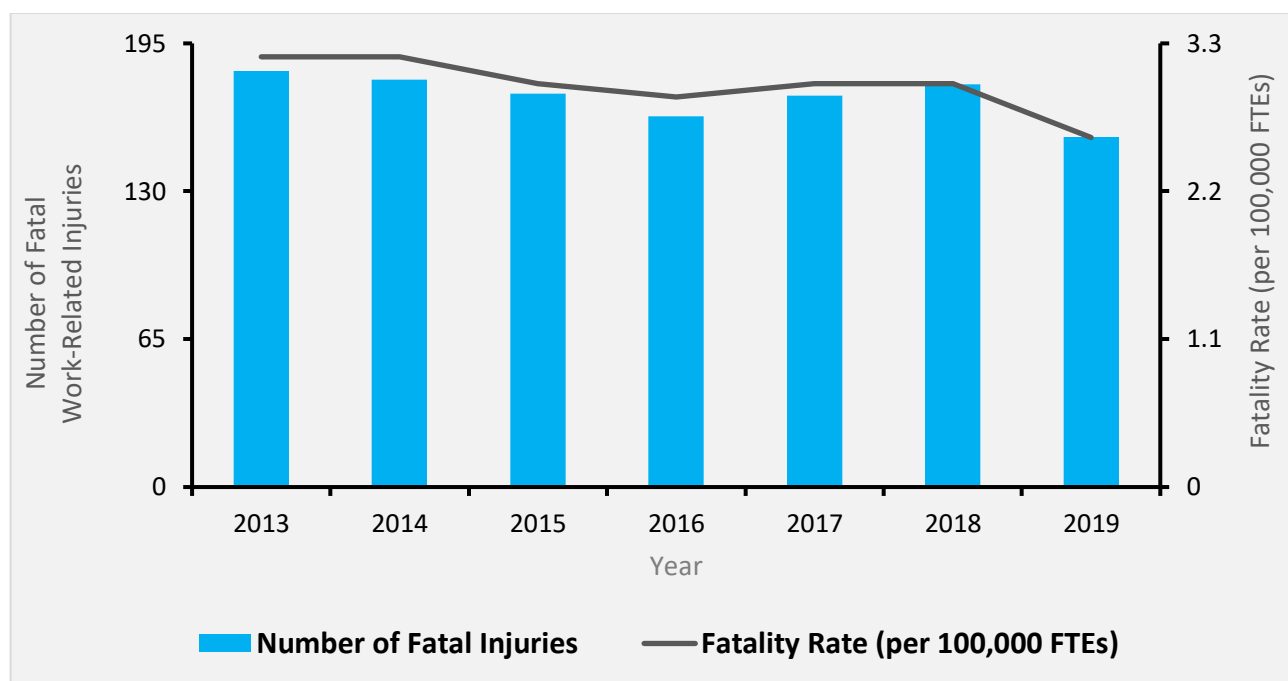


Table 4: Fatal Work-Related Injuries from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Fatal Injuries	183	179	173	163	172	177	154
Fatality Rate (per 100,000 FTEs)	3.2	3.2	3.0	2.9	3.0	3.0	2.6

The number of fatal injuries and fatality rate fluctuated from 2013 to 2019, with a slight decrease overall. From 2013 to 2019, the number of fatal work-related injuries decreased from 183 to 154 (Mann-Kendall coefficient = -0.619, *p-value* = 0.07) and the fatality rate decreased from 3.2 to 2.6 (Mann-Kendall coefficient = -0.688, *p-value* = 0.06). Over the seven-year period, the average number of work-related fatal injuries was 172 cases per year and the average fatality rate was 3 cases per 100,000 FTEs.

Indicator 4: Work-Related Amputations with Days Away from Work Reported by Employers

For this indicator, data are from the BLS Survey of Occupational Injuries and Illnesses (SOII). BLS age data encompass people of working age, which is defined as 16 years of age and older. SOII is contingent on complete and accurate employer reporting; therefore, there is potential for the data to be underrepresented and may include both full or partial amputation. Additionally, SOII does not represent all types of Pennsylvania workers (such as workers on a farm with fewer than 11 people and part-time workers). Work-related injuries are defined as injuries resulting from single events in occupational settings, such as cuts or lacerations. In the table and figure below, the number and rate of work-related amputations with one or more days away from work are displayed. For additional information on SOII, visit: www.bls.gov/iif/soii-overview.htm.

Figure 4: Work-Related Amputations with Days Away from Work Reported by Employers from 2013 to 2019 in Pennsylvania

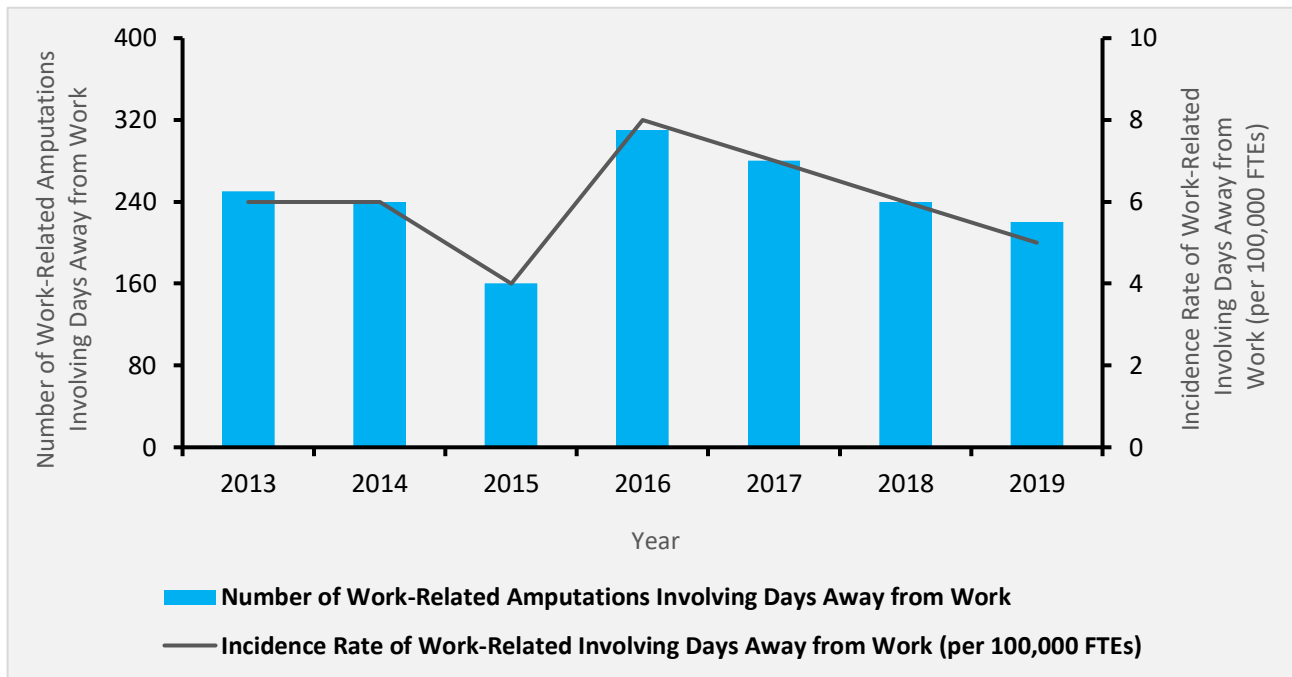


Table 5: Work-Related Amputations with Days Away from Work Reported by Employers from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Work-Related Amputations Involving Days Away from Work	250	240	160	310	280	240	220
Incidence Rate of Work-Related Amputations Involving Days Away from Work (per 100,000 FTEs)	6	6	4	8	7	6	5

Work-related amputations fluctuated from 2013 to 2019, starting and ending in similar case counts. From 2013 to 2019, the number of work-related amputations with days away from work decreased from 250 to 220 (Mann-Kendall coefficient = -0.195, *p-value* = 0.6) and the rate of work-related amputations involving days away from work started at 6 and decreased to 5 (Mann-Kendall coefficient = -0.103, *p-value* = 0.9). Over the seven-year period, the average number of work-related amputations involving days away from work were 243 cases per year and the average rate of work-related amputations involving days away from work was 6 cases per 100,000 FTEs.

Indicator 6: Hospitalizations for Work-Related Burns

For this indicator, data are from PHC4's inpatient hospital discharge data, where primary payer is workers' compensation and primary diagnosis is a burn (numerator) among Pennsylvania residents aged 16 years or older, as well as the BLS Geographic Profile of Employment and Unemployment (denominator). For the period, October 1, 2015, through present, burn cases were defined using the International Classification of Disease 10th edition clinical modification (ICD-10-CM) codes T20–T25, T26–T28, T30–T32. For 2013 through September 31, 2015, the ICD-9-CM (9th edition) codes 940–949 were used. Note the change in classification may not have been one-to-one and comparison before 2015 and after 2015 should be made with caution. BLS age data encompasses people of working age, which is defined as 16 years of age and older. BLS employment data includes individuals in full-time and part-time positions. Work-related burns may be underestimated because workers' compensation, due to barriers such as fear of retaliation, accessibility, and general knowledge of the workers' compensation process, may not always be used (Azarzoff, 2010). Additionally, workers' compensation does not cover all types of Pennsylvania workers (such as federal employees, agricultural workers, railroad workers, and domestic workers), and the listed payer in the hospital discharge dataset may be inaccurate. Underestimation may also occur if burns are secondary to other injuries and may not be captured here. In the table and figure below, the rate and number of inpatient hospitalizations for work-related burns are displayed. For additional information on BLS Geographic Profile of Employment and Unemployment, visit: www.bls.gov/opub/geographic-profile/home.htm.

Figure 5: Hospitalizations for Work-Related Burns from 2013 to 2019 in Pennsylvania

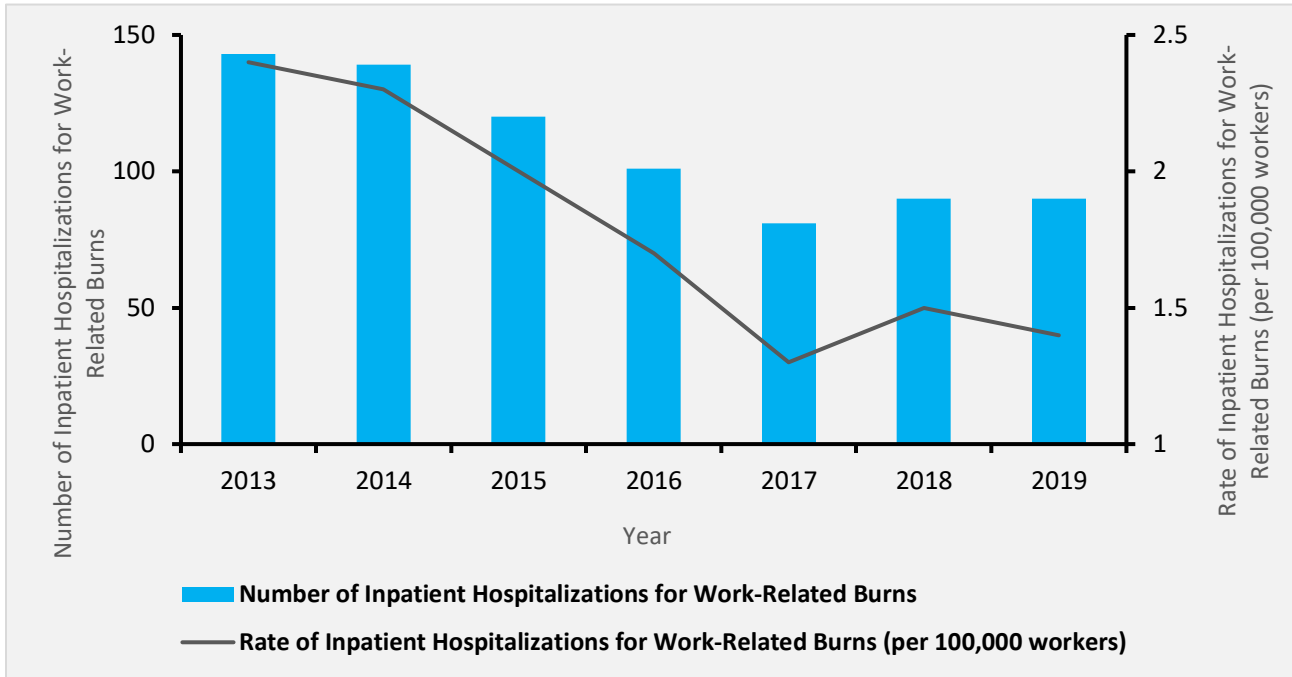


Table 6: Hospitalizations for Work-Related Burns from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Inpatient Hospitalizations for Work-Related Burns	143	139	120	101	81	90	90
Rate of Inpatient Hospitalizations for Work-Related Burns (per 100,000 workers)	2.4	2.3	2.0	1.7	1.3	1.5	1.4

Inpatient hospitalizations for work-related burns experienced an overall decrease from 2013 to 2019. From 2013 to 2015, when ICD-9-CM codes were primarily used, the number of inpatient hospitalizations for work-related burns decreased from 143 to 120 and the rate of inpatient hospitalizations for work-related burns decreased from 2.4 to 2.0. From 2016 to 2019, when ICD-10-CM codes were used, the number of inpatient hospitalizations for work-related burns decreased from 101 to 90 and the rate of inpatient hospitalizations for work-related burns decreased from 1.7 to 1.4. The ICD code change resulted in two separate datasets that were too small to perform the Mann-Kendall test with accuracy. Since 2016 (the first full year ICD-10-CM was implemented), the number of inpatient hospitalizations for work-related burns has declined.

Indicator 7: Work-Related Musculoskeletal Disorders (MSDs) with Days Away from Work Reported by Employers

For this indicator, data are from the BLS Survey of Occupational Injuries and Illnesses (SOII). BLS age data encompass people of working age, which is defined as 16 years of age and older. SOII is contingent on complete and accurate employer reporting. Employers report detailed case characteristics including nature of the disabling condition, body part affected, and event or source producing the condition. BLS identifies a work-related injury as a MSD through case characteristics. MSDs may develop too late to be included in reports and can be difficult to determine if they are work-related resulting in a potential for data to be underrepresented. In the table and figure below, the rate of all MSDs, MSDs of the neck, shoulder and upper extremities, and MSDs of the back involving days away from work (in which at least 1 day away from work is reported) are displayed. Additionally, SOII does not represent all types of Pennsylvania workers (such as workers on a farm with fewer than 11 people and part-time workers). For additional information on SOII, visit: www.bls.gov/iif/soii-overview.htm.

Figure 6: Work-Related Musculoskeletal Disorders (MSDs) with Days Away from Work Reported by Employers per 100,000 FTEs from 2013 to 2019 in Pennsylvania

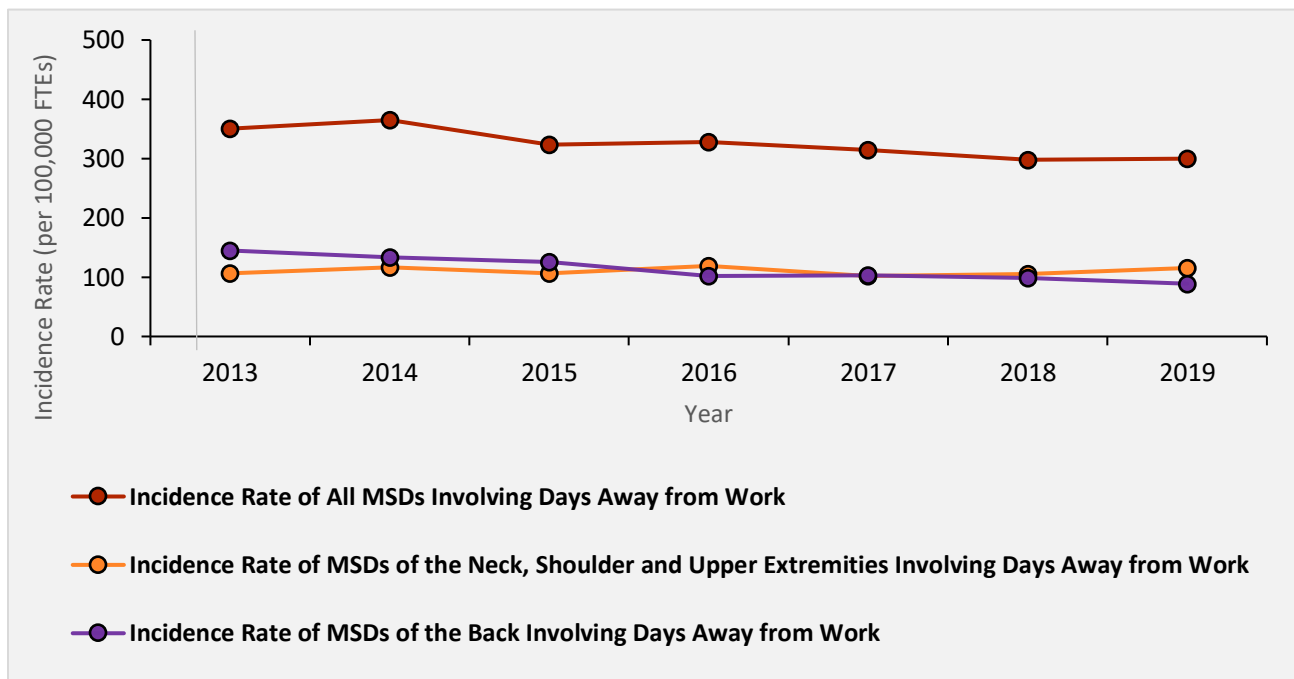


Table 7: Work-Related Musculoskeletal Disorders (MSDs) with Days Away from Work Reported by Employers per 100,000 FTEs from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Incidence Rate of All MSDs Involving Days Away from Work	351	365	323	328	315	298	300
Incidence Rate of MSDs of the Neck, Shoulder and Upper Extremities Involving Days Away from Work	106	117	106	119	102	105	116
Incidence Rate of MSDs of the Back Involving Days Away from Work	145	134	126	102	103	99	89

Overall, from 2013 to 2019, work-related MSDs decreased. From 2013 to 2019, the rate of all MSDs decreased from 351 to 300 (Mann-Kendall coefficient = -0.71, *p-value* = 0.04), the rate of MSDs of the neck, shoulder and upper extremities increased from 106 to 116 (Mann-Kendall coefficient = -0.098, *p-value* = 0.88), and the rate of MSDs of the back decreased from 145 to 89 (Mann-Kendall coefficient = -0.905, *p-value* = 0.007). Over the seven-year period, the average incidence rate of all MSDs involving days away from work was 326 cases per 100,000 FTEs; the average incidence rate of MSDs of neck, shoulder, and upper extremities involving days away from work was 110 cases per 100,000 FTEs; and the average incidence rate of MSDs of the back involving days away from work was 114 cases per 100,000 FTEs.

Indicator 9: Hospitalizations from or with Pneumoconiosis

Pneumoconioses are a group of lung diseases caused by inhalation of certain dusts and may lead to lung impairment, disability, and premature death. The most common types of pneumoconioses are asbestosis (inhaling asbestos fibers), silicosis (inhaling silica dust), and coal workers' pneumoconiosis (inhaling coal mine dust). For this indicator, data are from PHC4's inpatient hospital discharge data restricted to residents aged 15 years of age or older and the Census Bureau's American Community Survey's (ACS) one-year population estimates for Pennsylvania population age 15 years or older and year 2000 U.S. standard population (for age-standardization). This indicator assumes that most pneumoconiosis diagnoses are work-related. Therefore, hospital discharge data includes individuals in full-time positions, part-time positions and retired or no longer working. For October 1, 2015, through present, inpatient hospital discharges of total pneumoconiosis were identified as those with an ICD-10-CM code of J60-J66. For years 2013 to September 31, 2015, ICD-9-CM codes were used (500-505). Specifically, coal workers' pneumoconiosis (J60;500), asbestosis (J61;501), and silicosis (J62;502) were further defined. Note the change in classification may not have been one-to-one and comparison before 2015 and after 2015 should be made with caution. For calculated rates, the denominator is all PA residents ages 15 years or older. An inherent limitation of this data is the long latency of pneumoconiosis.

Hence, it may take many years for an occupational exposure to lead to pneumoconiosis hospitalization. It may also take many years before changes in the frequency and duration of occupational exposures impact pneumoconiosis hospitalizations. In the tables and figures below, the numbers and age-adjusted rates for inpatient hospital discharges for total pneumoconiosis, coal workers' pneumoconiosis, asbestosis, and silicosis are displayed. Age standardized rates are calculated to adjust for differences in the age distribution among those with pneumoconiosis (eliminating differences in observed rates across years that result from age differences). For additional information on ACS, visit: www.census.gov/programs-surveys/acs.

Figure 7: Hospitalizations from or with Pneumoconiosis from 2013 to 2019 in Pennsylvania

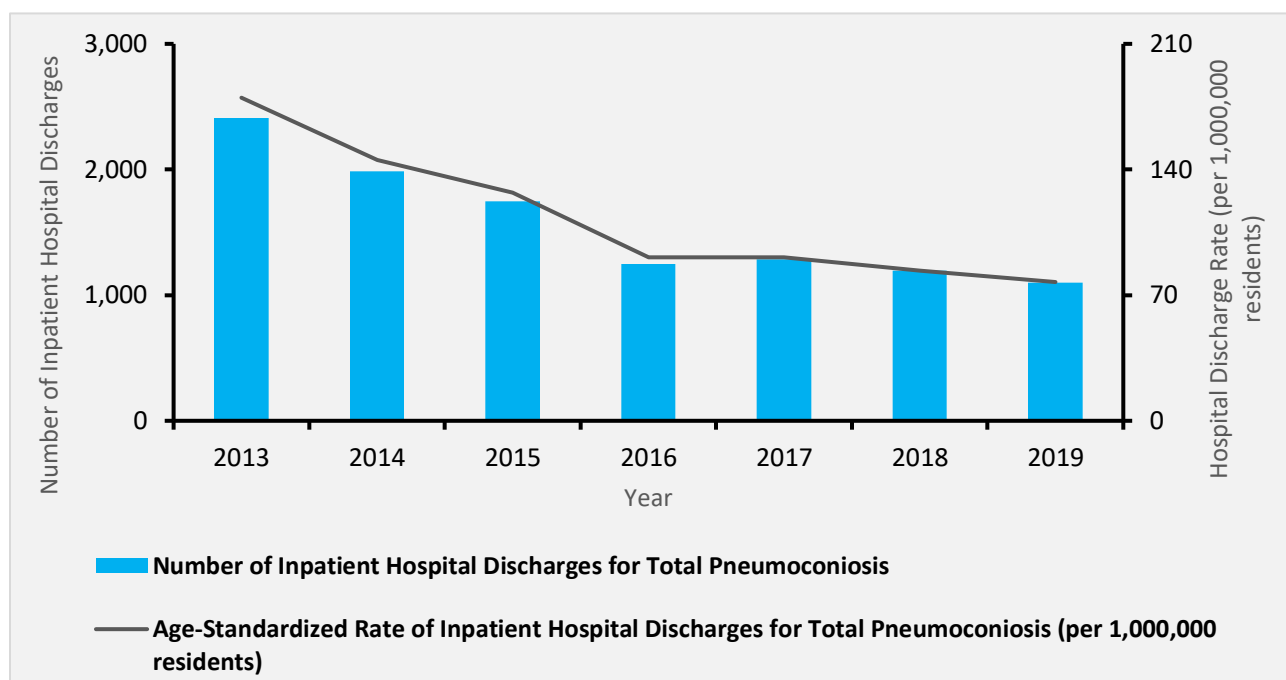


Table 8: Hospitalizations from or with Pneumoconiosis from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Inpatient Hospital Discharges for Total Pneumoconiosis	2,412	1,985	1,746	1,250	1,284	1,195	1,100
Age-Standardized Rate of Inpatient Hospital Discharges for Total Pneumoconiosis (per 1,000,000 residents)	180.0	145.3	127.0	91.0	91.2	83.5	77.3

There has been a sustained decrease in hospitalizations for total pneumoconiosis over the last several years. From 2013 to 2015, when ICD-9-CM codes were primarily used, the number of inpatient hospital discharges for total pneumoconiosis decreased from 2,412 to 1,746 and the age-adjusted rate of inpatient hospital discharges for total pneumoconiosis decreased from 180.0 to 127.0. From 2016 to 2019, when ICD-10-CM codes were used, the number of inpatient hospital discharges for total pneumoconiosis decreased from 1,250 to 1,100 and the age-adjusted rate of inpatient hospital discharges for total pneumoconiosis decreased from 91.0 to 77.3. The ICD code change resulted in two separate datasets that were too small to perform the Mann-Kendall test with accuracy. Since 2016 (the first full year ICD-10-CM was implemented) the number of inpatient hospital discharges for total pneumoconiosis declined and may be attributed to improved treatments available and outpatient management.

Figure 8: Hospitalizations from or with Coal Workers' Pneumoconiosis from 2013 to 2019 in Pennsylvania

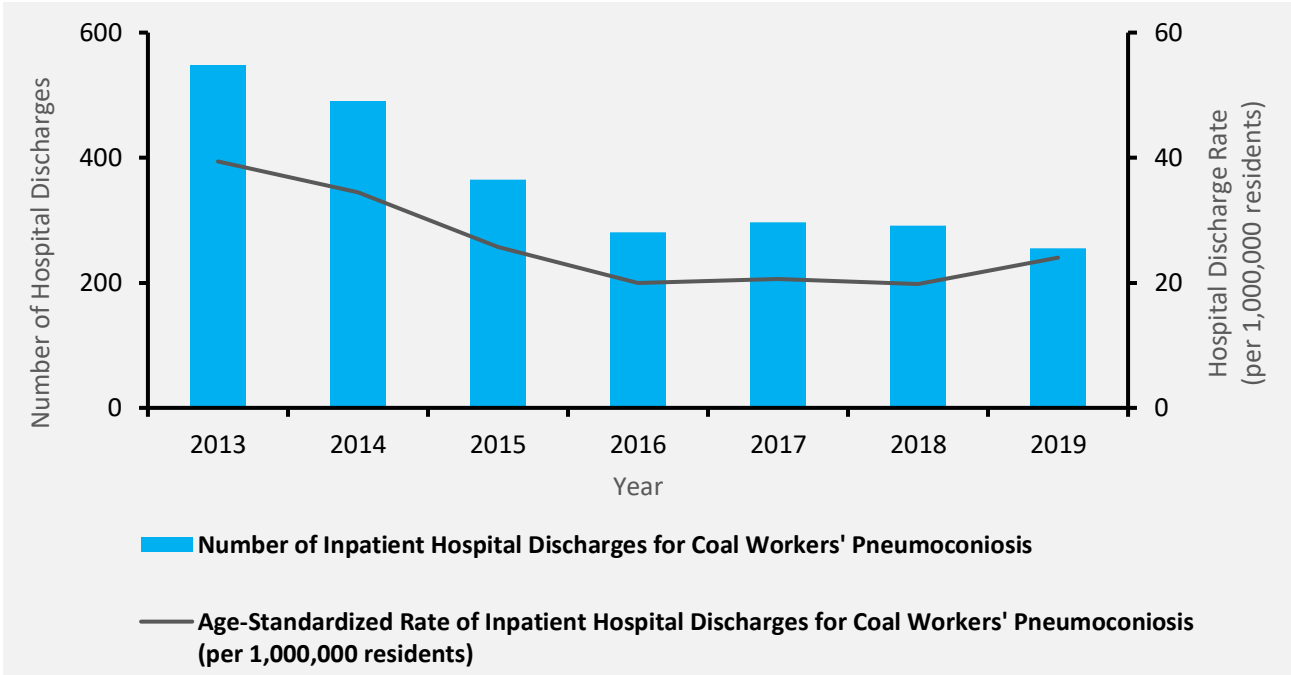


Table 9: Hospitalizations from or with Coal Workers' Pneumoconiosis from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Inpatient Hospital Discharges for Coal Workers' Pneumoconiosis	548	491	365	281	297	291	255
Age-Standardized Rate of Inpatient Hospital Discharges for Coal Workers' Pneumoconiosis (per 1,000,000 residents)	39.4	34.5	25.7	20.0	20.6	19.8	24.0

Coal workers' pneumoconiosis hospitalizations have declined over the last several years. From 2013 to 2019, the number of annual inpatient hospital discharges for coal workers' pneumoconiosis decreased from 548 to 255 (Mann-Kendall coefficient = -0.81, *p-value* = 0.016) and the rate of coal workers' pneumoconiosis decreased from 39.4 in 2013 to 24.0 (Mann-Kendall coefficient = -0.619, *p-value* = 0.07). However, the 2019 rate increased by approximately four compared to the past three years. Over the seven-year period, the average number of inpatient hospital discharges for coal workers' pneumoconiosis was 361 discharges per year and the average hospitalization rate for coal workers' pneumoconiosis was 25 cases per 1,000,000 residents.

Figure 9: Hospitalizations from or with Asbestosis from 2013 to 2019 in Pennsylvania

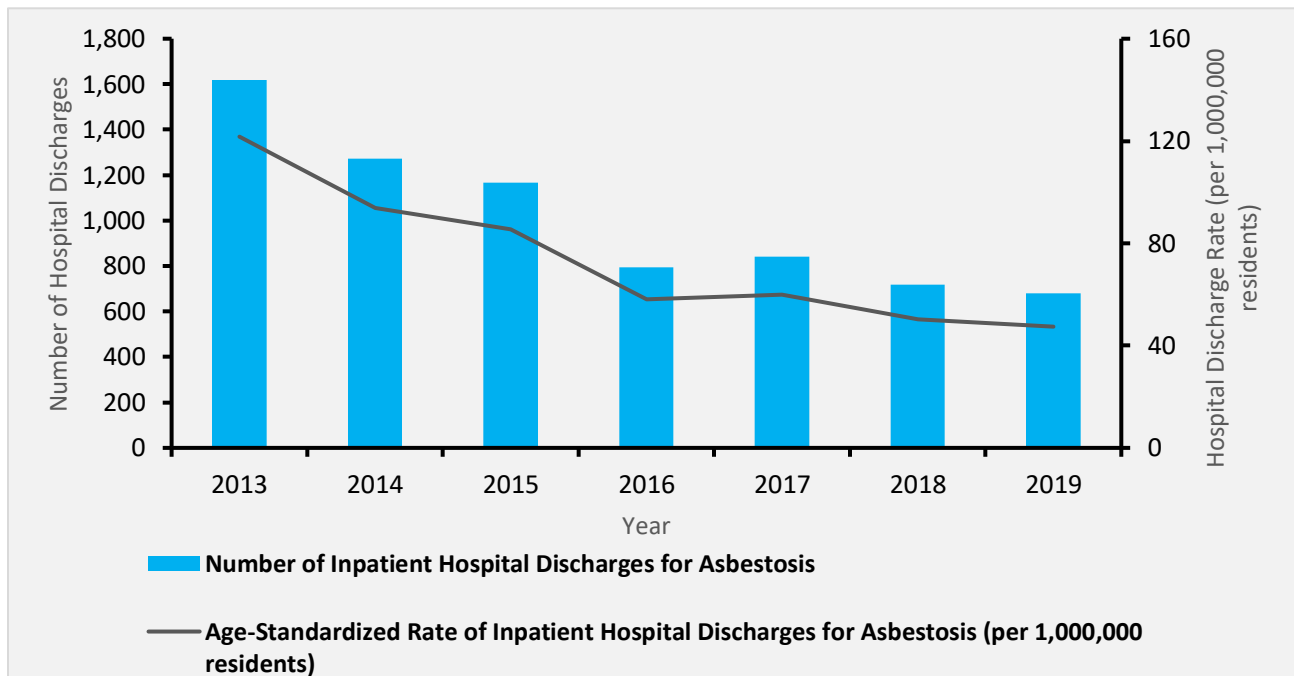


Table 10: Hospitalizations from or with Asbestosis from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Inpatient Hospital Discharges for Asbestosis	1,617	1,272	1,166	795	841	718	679
Age-Standardized Rate of Inpatient Hospital Discharges for Asbestosis (per 1,000,000 residents)	121.7	93.8	85.4	58.0	59.8	50.2	47.4

There has been a sustained decrease in asbestosis hospitalizations over the last several years. From 2013 to 2019, the number inpatient hospital discharges for asbestosis decreased from 1,617 to 679 (Mann-Kendall coefficient = -0.905, *p-value* = 0.007) and the rate of inpatient hospital discharges for asbestosis decreased from 121.7 to 47.4 (Mann-Kendall coefficient = -0.905, *p-value* = 0.007). Asbestosis was the most common type of pneumoconiosis in Pennsylvania that required hospitalization. Over the seven-year period, the average number of inpatient hospital discharges for asbestosis was 1,013 cases per year and the average hospitalization rate for asbestosis was 73 cases per 1,000,000 residents.

Figure 10: Hospitalizations from or with Silicosis from 2013 to 2019 in Pennsylvania

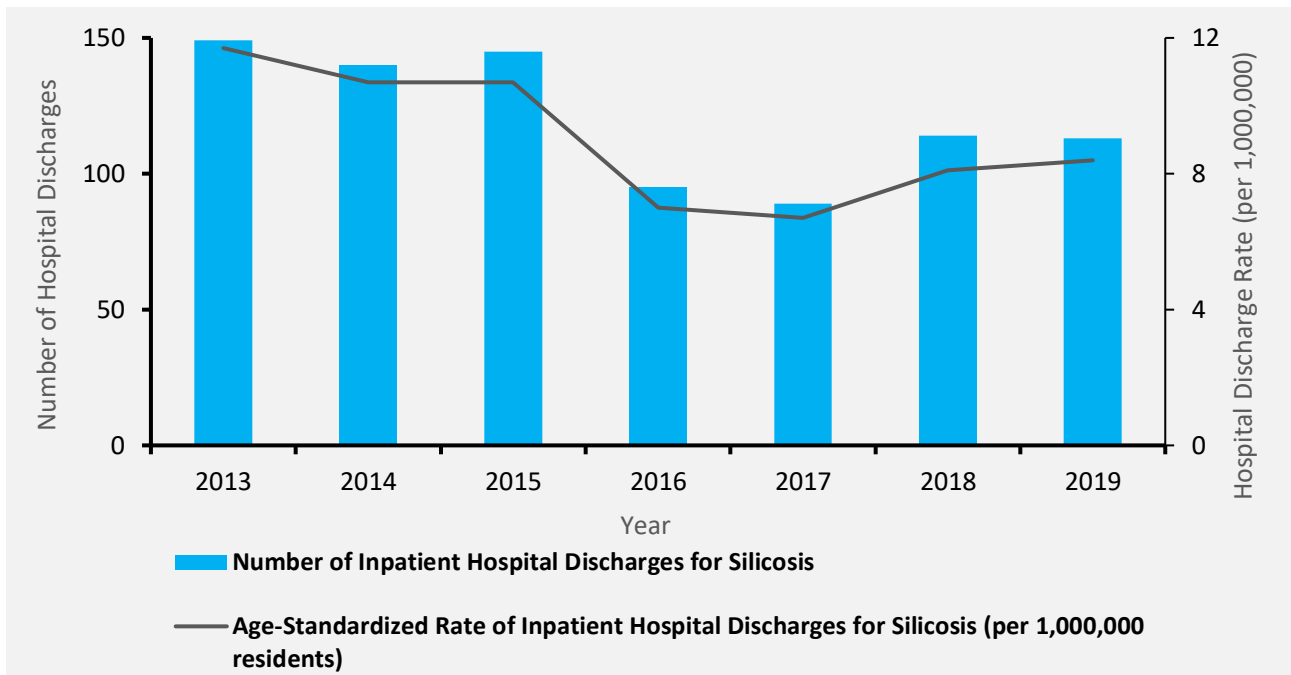


Table 11: Hospitalizations from or with Silicosis from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Inpatient Hospital Discharges for Silicosis	149	140	145	95	89	114	113
Age-Standardized Rate of Inpatient Hospital Discharges for Silicosis (per 1,000,000 residents)	11.7	10.7	10.7	7.0	6.7	8.1	8.4

Silicosis hospitalizations have fluctuated over the last several years. From 2013 to 2019, the number of inpatient hospital discharges decreased from 149 to 113 (Mann-Kendall coefficient = -0.524, *p-value* = 0.13) and the rate of inpatient hospital discharges for silicosis decreased from 11.7 to 8.4 (Mann-Kendall coefficient = -0.488, *p-value* = 0.17). However, since 2016 the rate of inpatient hospital discharges for silicosis has increased from 7.0 to 8.4. Among Pennsylvanians hospitalized with pneumoconiosis, silicosis was the rarest type. Over the seven-year period, the average number of inpatient hospital discharges for silicosis was 121 cases per year and the average hospitalization rate for silicosis was 11 cases per 1,000,000 residents.

Indicator 10: Mortality from or with Pneumoconiosis

For this indicator, data are from Pennsylvania’s Vital Statistics’ death certificate records and the Census Bureau’s ACS one-year population estimates and year 2000 U.S. standard population (for age-standardization). This indicator assumes that most pneumoconiosis deaths result from exposure to dust at work. Vital Statistics’ death records include individuals in full-time positions, part-time positions, retired and/or no longer working. Mortality from or with total pneumoconiosis was identified among decedents age 15 years or older with an ICD-10 code of J60-J66. Specifically, coal workers’ (J60), asbestosis (J61), and silicosis (J62) were further defined. An inherent limitation of this data is the long latency of pneumoconiosis. Hence, it may take many years for an occupational exposure to lead to pneumoconiosis death. Additionally, there may be disparities in state of occupational exposure and state of residence at the time of death. In the tables and figures below, the numbers and rates for mortality from or with total pneumoconiosis, coal workers’ pneumoconiosis, asbestosis, and silicosis are displayed. For additional information on ACS, visit: www.census.gov/programs-surveys/acs.

Figure 11: Mortality from or with Pneumoconiosis from 2013 to 2019 in Pennsylvania

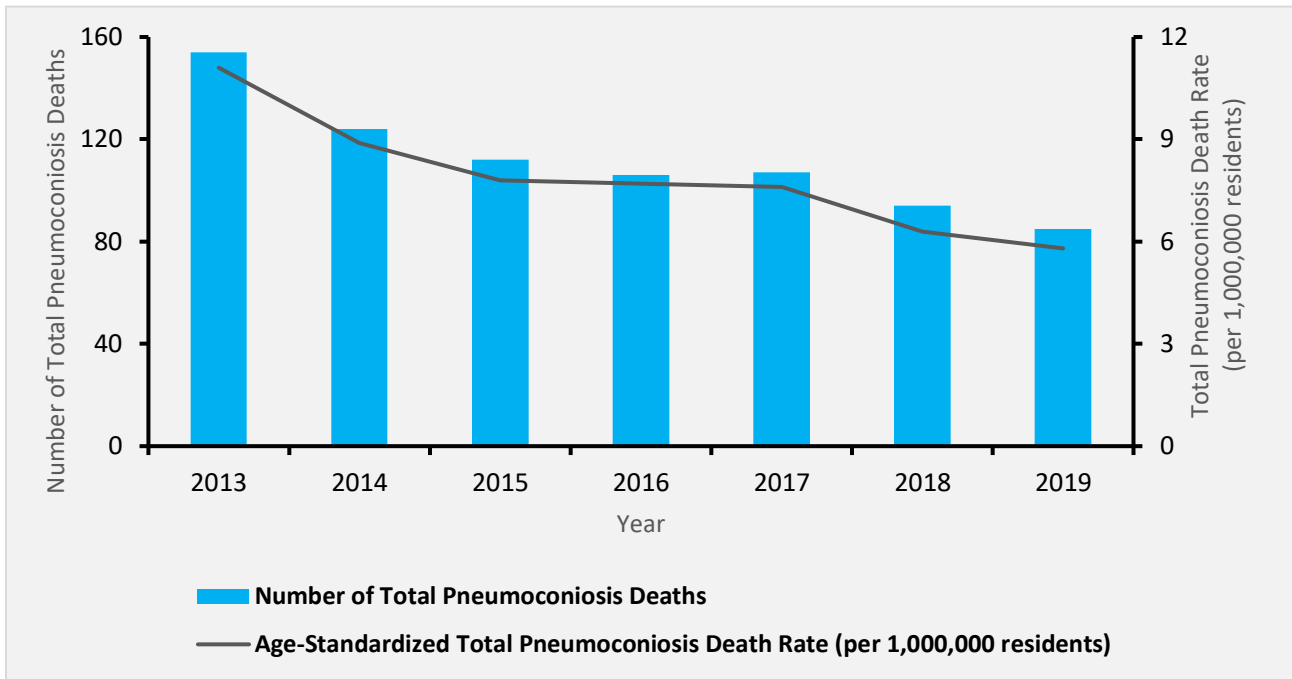


Table 12: Mortality from or with Pneumoconiosis from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Total Pneumoconiosis Deaths	154	124	112	106	107	94	85
Age-Standardized Total Pneumoconiosis Death Rate (per 1,000,000 residents)	11.1	8.9	7.8	7.7	7.6	6.3	5.8

There has been a sustained decrease in total pneumoconiosis deaths over the last several years. From 2013 to 2019, the number of total pneumoconiosis deaths decreased from 154 to 85 (Mann-Kendall coefficient = -0.905, *p-value* = 0.007) and the rate decreased from 11.1 to 5.8 (Mann-Kendall coefficient = -1.00, *p-value* = 0.003). Over the seven-year period, the average number of total pneumoconiosis deaths was 112 deaths per year and the average death rate for pneumoconiosis was 8 deaths per 1,000,000 residents. This decrease may be a result of an increase in workplace safety measures, changes in available treatment, decline of the coal mining industry workforce, and discontinued manufacturing of asbestos containing materials. However, with the fabrication of domestic kitchen benchtops from artificial stone, increases in pneumoconiosis, specifically silicosis, are of recent concern and continued surveillance of this disease is imperative.

Figure 12: Mortality from or with Coal Workers' Pneumoconiosis from 2013 to 2019 in Pennsylvania

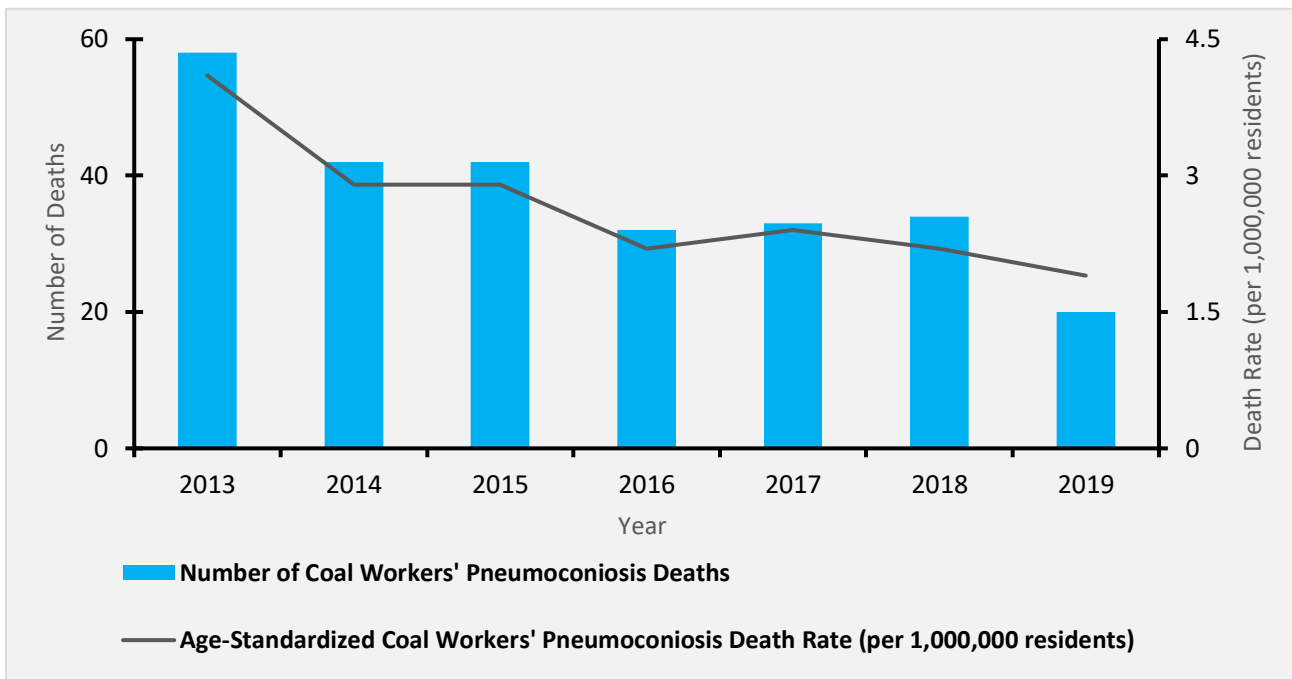


Table 13: Mortality from or with Coal Workers' Pneumoconiosis from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Coal Workers' Pneumoconiosis Deaths	58	42	42	32	33	34	20
Age-Standardized Coal Workers' Pneumoconiosis Death Rate (per 1,000,000 residents)	4.1	2.9	2.9	2.2	2.4	2.2	1.9

Coal workers' pneumoconiosis deaths experienced a sustained decrease over the last several years. From 2013 to 2019, the number of coal workers' pneumoconiosis deaths decreased from 58 to 20 (Mann-Kendall coefficient = -0.683, *p-value* = 0.05) and the rate of coal workers' pneumoconiosis deaths decreased from 4.1 to 1.9 (Mann-Kendall coefficient = -0.851, *p-value* = 0.01). Over the seven-year period, the average number of total pneumoconiosis deaths was 37 deaths per year and the average death rate for coal workers' pneumoconiosis was 3 deaths per 1,000,000 residents.

Figure 13: Mortality from or with Asbestosis from 2013 to 2019 in Pennsylvania

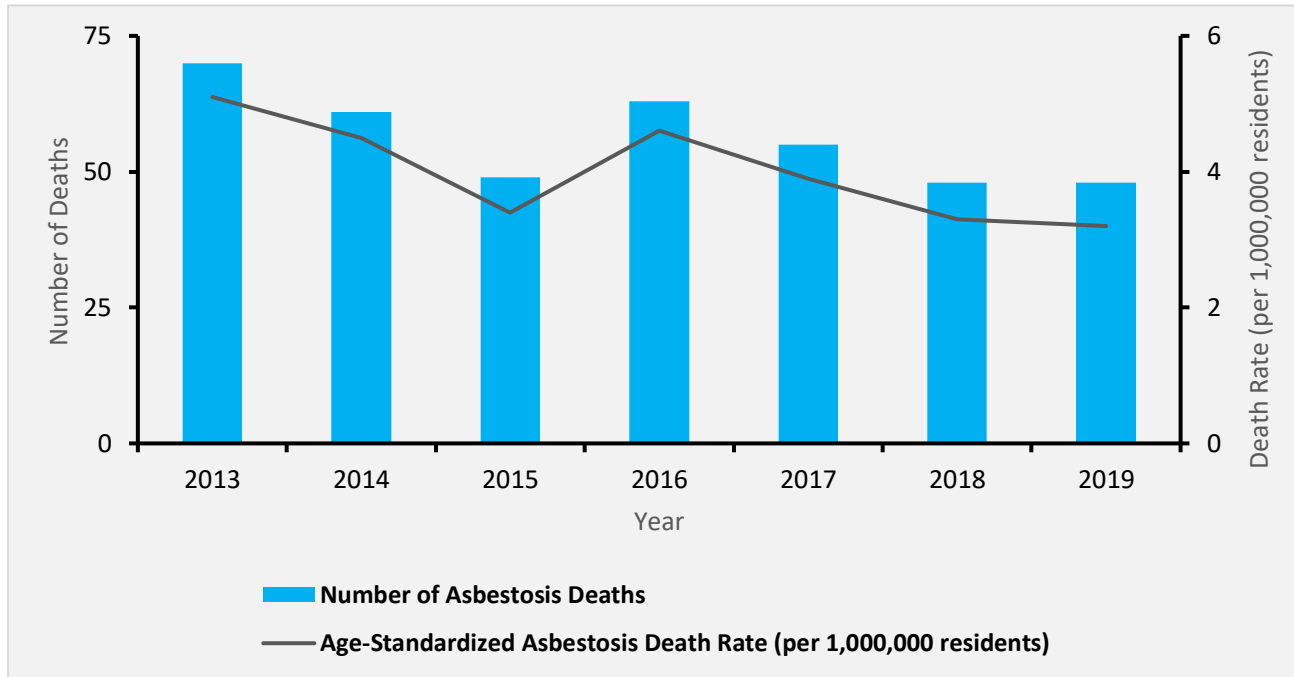


Table 14: Mortality from or with Asbestosis from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Asbestosis Deaths	70	61	49	63	55	48	48
Age-Standardized Asbestosis Death Rate (per 1,000,000 residents)	5.1	4.5	3.4	4.6	3.9	3.3	3.2

Asbestosis deaths have fluctuated over the last several years. From 2013 to 2019, the number of asbestosis deaths decreased from 70 to 48 (Mann-Kendall coefficient = -0.683, *p-value* = 0.05) and the rate of coal workers' pneumoconiosis deaths decreased from 5.1 to 3.2 (Mann-Kendall coefficient = -0.714, *p-value* = 0.04). Over the seven-year period, the average number of asbestosis deaths was 56 deaths per year and the average death rate for asbestosis was 4 deaths per 1,000,000 residents.

Figure 14: Mortality from or with Silicosis from 2013 to 2019 in Pennsylvania

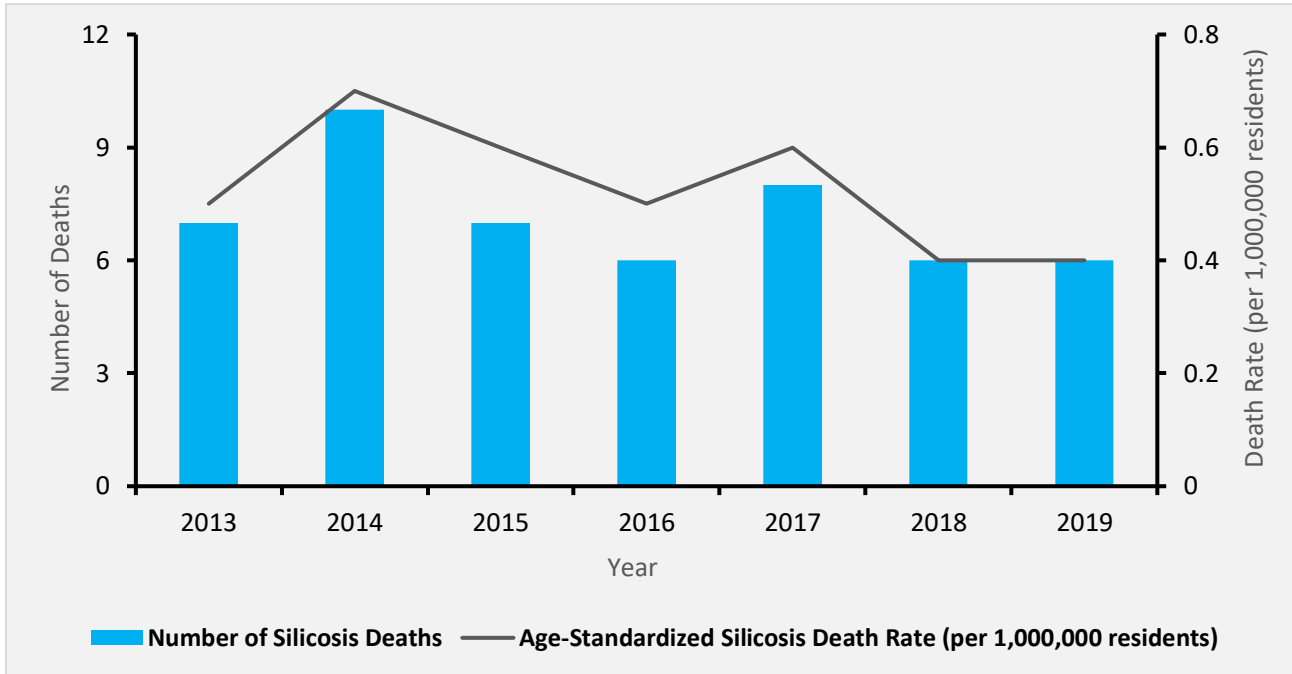


Table 15: Mortality from or with Silicosis from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Silicosis Deaths	7	10	7	6	8	6	6
Age-Standardized Silicosis Death Rate (per 1,000,000 residents)	0.5	0.7	0.6	0.5	0.6	0.4	0.4

Silicosis deaths decreased slightly over the past several years. From 2013 to 2019, the number of silicosis deaths decreased from 7 to 6 (Mann-Kendall coefficient = -0.476, *p-value* = 0.20) and the rate of silicosis deaths decreased from 0.5 to 0.4 (Mann-Kendall coefficient = -0.514, *p-value* = 0.16). The number and rate of silicosis deaths for 2019 did not change from 2018. Over the seven-year period, the average number of silicosis deaths was 7 deaths per year and the average death rate for silicosis was 0.5 deaths per 1,000,000 residents.

Indicator 11: Acute Work-Related Pesticide-Associated Illness and Injury Reported to Poison Control Centers

For this indicator, data are from National Poison Control Center (PCC) data (2013-2017) restricted to work-related cases and BLS Geographic Profiles of Employment and Unemployment. BLS age data encompasses people of working age, which is defined as 16 years of age and older. BLS employment data includes individuals in full-time and part-time positions. Those who handle and encounter pesticides in work settings are at an increased risk for experiencing adverse health effects associated with exposure. Pesticides are defined

as chemicals used to destroy or control pests, including weeds (herbicides), insects (insecticides), rodents (rodenticides), and fungi (fungicides). PCCs capture a small proportion of acute occupational pesticide-related illness cases, only around 10% (Calvert et al., 2003); therefore, data may be substantially underestimated. However, PCC data is currently the main source of work-related pesticide poisoning data for most states. In the table and figure below, the numbers and rates of work-related pesticide poisoning cases are displayed. PCC data is based on call data aggregated nationally and distributed to PennOSHS through NIOSH. Call data is reliant upon individuals, including medical providers, to report potential pesticide exposure or poisoning. For additional information on BLS Geographic Profiles of Employment and Unemployment and national PCC data visit: www.bls.gov/gps/home.htm and <https://aapcc.org/centers>, respectively.

Figure 15: Acute Work-Related Pesticide-Associated Illness and Injury Reported to Poison Control Centers from 2013 to 2017 in Pennsylvania

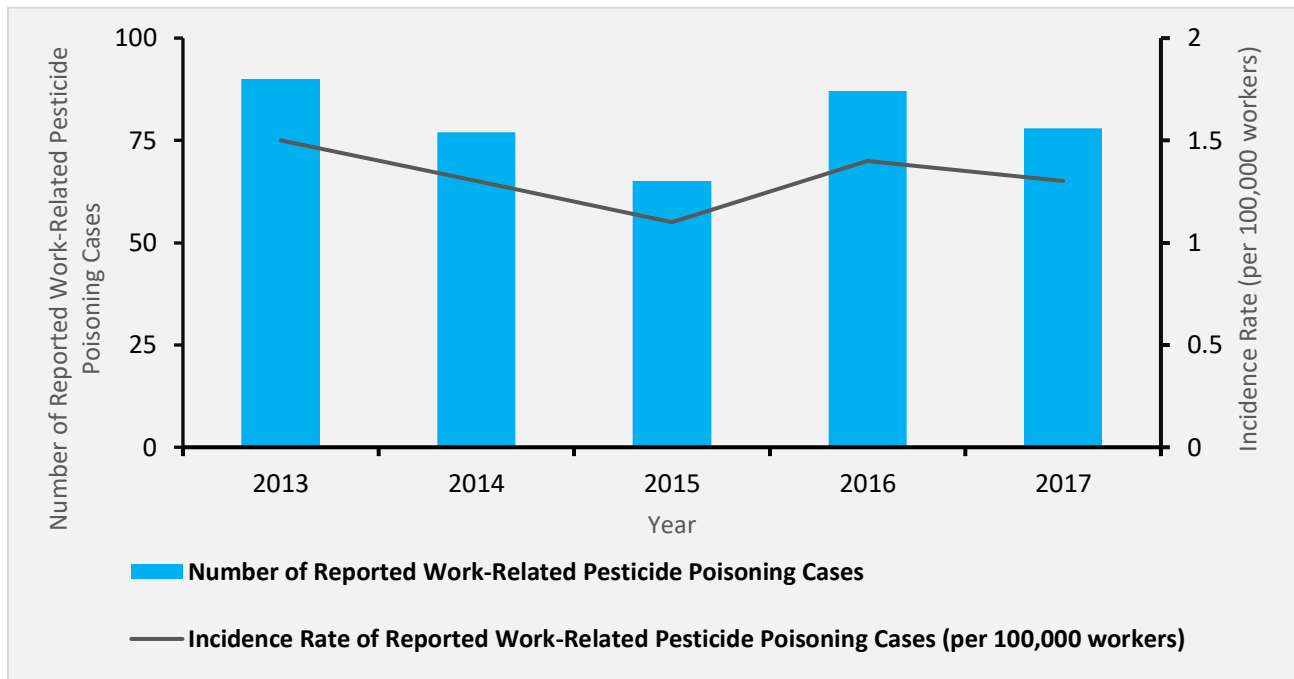


Table 16: Acute Work-Related Pesticide-Associated Illness and Injury Reported to Poison Control Centers from 2013 to 2017 in Pennsylvania

	2013	2014	2015	2016	2017
Number of Reported Work-Related Pesticide Poisoning Cases	90	77	65	87	78
Incidence Rate of Reported Work-Related Pesticide Poisoning Cases (per 100,000 workers)	1.5	1.3	1.1	1.4	1.3

Acute work-related pesticide-associated illnesses and injuries have fluctuated from 2013 – 2017. During this time, the number of reported work-related pesticide poisoning cases decreased from 90 to 78 and the rate of reported work-related pesticide poisoning cases decreased from 1.5 to 1.3 (Mann-Kendall coefficient = -0.32, *p-value* = 0.60). Over the five-year period, the average number of reported work-related pesticide poisoning cases was 79 cases per year and the average rate of reported work-related pesticide poisoning cases was 1.3 cases per 100,000 workers.

Indicator 13: Elevated Blood Lead Levels Among Adults

For this indicator, data are from the Pennsylvania Adult Blood Lead Epidemiology Surveillance (ABLES) program, as well as the BLS Geographic Profile of Employment and Unemployment. BLS age data encompasses people of working age, which is defined as 16 years of age and older. The ABLES data is restricted to PA residents aged 16 years or older at the time of testing. For each year and cutoff point, a case is considered new if an adult had an elevated blood lead level (BLL) for the target year but not the year before. A case is considered old if the case had an elevated BLL in the prior year. Prevalence includes both new and old cases for a given year and incidence includes only new cases for a given year. Data may be underestimated due to incomplete reporting from laboratories and individuals exposed to lead not being tested. In the tables and figures below, the prevalence, prevalence rate, incidence, and incidence rate of adults with BLLs ≥ 25 and ≥ 40 micrograms/deciliter ($\mu\text{g}/\text{dL}$) are displayed. Levels for Indicator 13 were chosen based upon the following: A BLL of 25 micrograms/deciliter is considered elevated, additionally Healthy People 2010 had a goal of eliminating BLLs above this level. A BLL of 40 micrograms/deciliter requires an employer to offer an employee an annual medical exam and other medical interventions according to OSHA regulations. Importantly, adverse health effects have been associated with BLLs below 25 and 40 micrograms/deciliter (CSTE OHIs). For more information about the ABLES program, visit: <https://www.health.pa.gov/topics/envirohealth/Pages/Lead.aspx>.

Figure 17: Elevated Blood Lead Levels (BLL) $\geq 25 \mu\text{g/dL}$ Among Adults from 2013 to 2019 in Pennsylvania

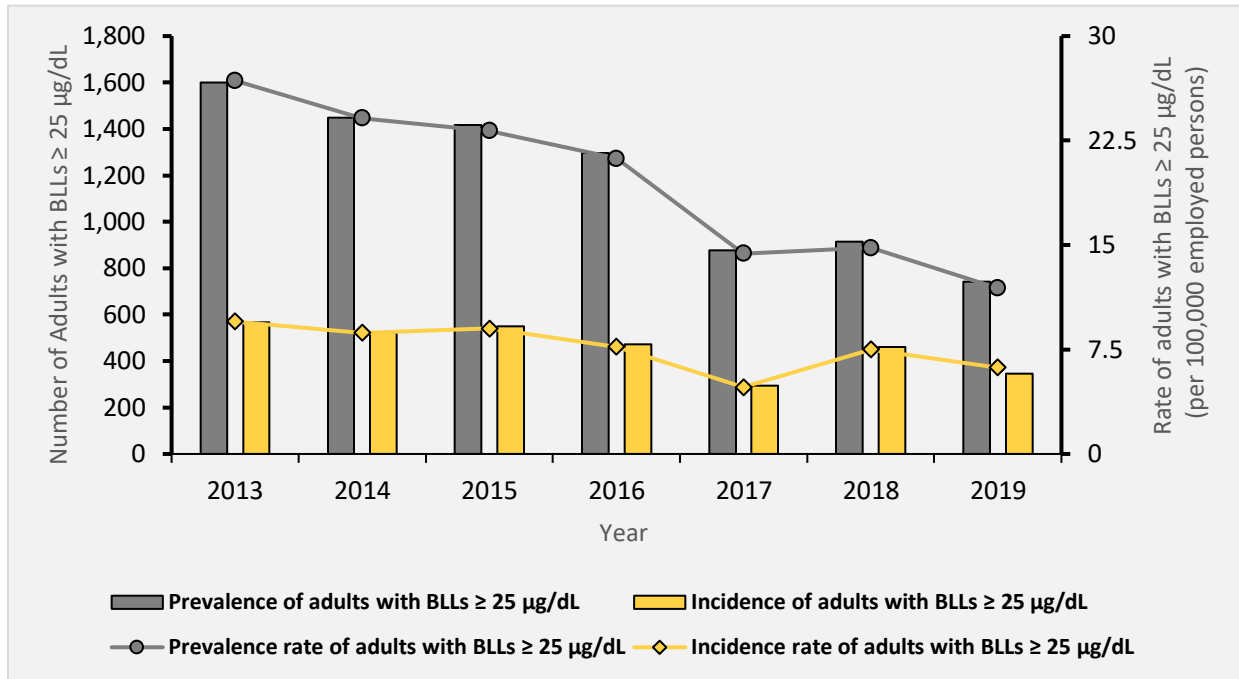


Table 16: Elevated Blood Lead Levels (BLL) $\geq 25 \mu\text{g/dL}$ Among Adults from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Prevalence of adults with BLLs $\geq 25 \mu\text{g/dL}$	1,600	1,448	1,416	1,297	876	914	741
Prevalence rate of adults with BLLs $\geq 25 \mu\text{g/dL}$	26.8	24.1	23.2	21.2	14.4	14.8	11.9
Incidence of adults with BLLs $\geq 25 \mu\text{g/dL}$	567	524	550	471	295	460	347
Incidence rate of adults with BLLs $\geq 25 \mu\text{g/dL}$	9.5	8.7	9.0	7.7	4.8	7.5	6.2

Prevalence and incidence of adults with BLLs $\geq 25 \mu\text{g/dL}$ has sustained an overall decrease. From 2013 to 2019, the prevalence of adults with BLLs $\geq 25 \mu\text{g/dL}$ decreased from 1,600 to 741 and the prevalence rate decreased from 26.8 to 11.9 per 100,000 employed persons (Mann-Kendall coefficient = -0.905, *p-value* = 0.007). Similarly, from 2013 to 2019, the incidence of adults with BLLs $\geq 25 \mu\text{g/dL}$ decreased from 567 to 347 and the incidence rate decreased from 9.5 to 6.2 (Mann-Kendall coefficient = -0.714, *p-value* = 0.04). The proportion

of incidence cases among prevalence cases are 35% (2013), 36% (2014), 39% (2015), 36% (2016), 34% (2017), 50% (2018) and 47% (2019).

Figure 17: Elevated Blood Lead Levels (BLL) $\geq 40 \mu\text{g/dL}$ Among Adults from 2013 to 2019 in Pennsylvania

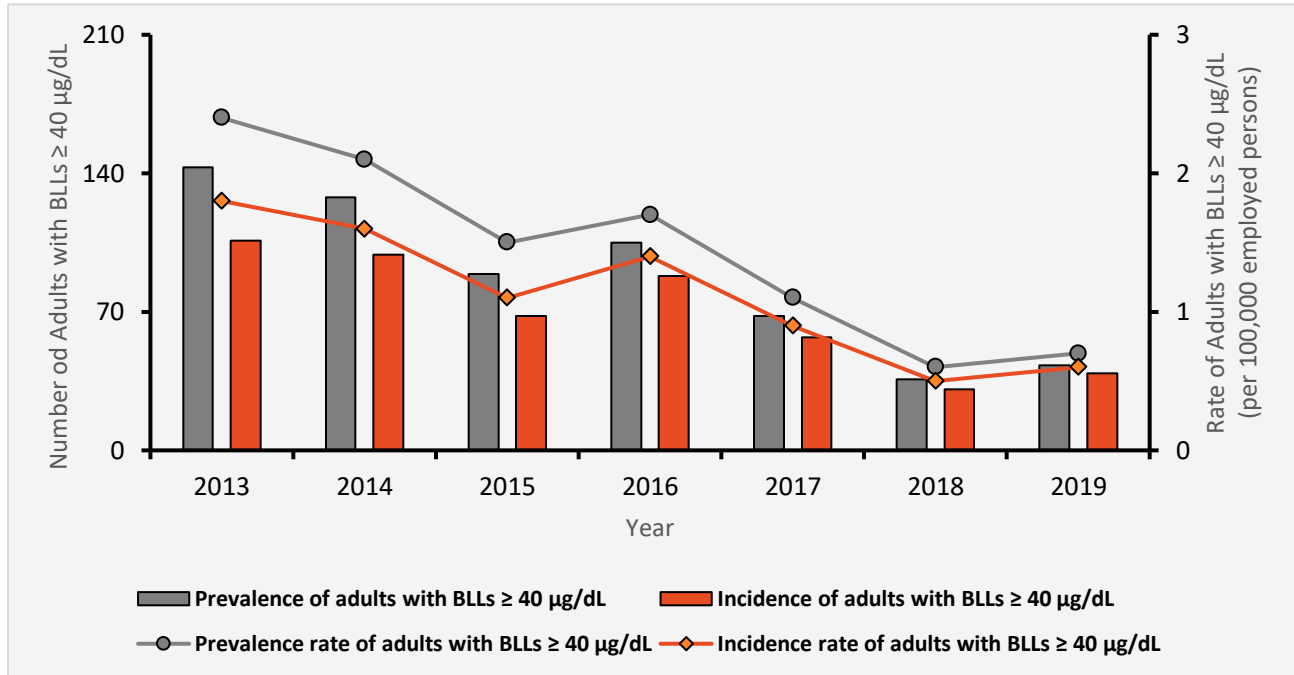


Table 18: Elevated Blood Lead Levels (BLL) $\geq 40 \mu\text{g/dL}$ Among Adults from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Prevalence of adults with BLLs $\geq 40 \mu\text{g/dL}$	143	128	89	105	68	36	43
Prevalence rate of adults with BLLs $\geq 40 \mu\text{g/dL}$	2.4	2.1	1.5	1.7	1.1	0.6	0.7
Incidence of adults with BLLs $\geq 40 \mu\text{g/dL}$	106	99	68	88	57	31	39
Incidence rate of adults with BLLs $\geq 40 \mu\text{g/dL}$	1.8	1.6	1.1	1.4	0.9	0.5	0.6

Prevalence and incidence of adults with BLLs $\geq 40 \mu\text{g/dL}$ has sustained an overall decrease the past few years. From 2013 to 2019, the prevalence of adults with BLLs $\geq 40 \mu\text{g/dL}$ decreased from 143 to 36 and the prevalence rate decreased from 2.4 to 0.7 (Mann-Kendall coefficient = -0.81, *p-value* = 0.02). An extended study that explored PA BLL data from 2007-2017, by industry, also showed a similar decline in prevalence rates (Tsai et al., 2022).

Similarly, the incidence of adults with BLLs ≥ 40 $\mu\text{g/dL}$ decreased from 106 to 39 and the incidence rate decreased from 1.8 to 0.6 (Mann-Kendall coefficient = -0.81, *p-value* = 0.02). The proportion of incidence cases among prevalence cases are 74% (2013), 77% (2014), 76% (2015), 84% (2016), 84% (2017), 86% (2018) and 91% (2019). This calculation is important in understanding how many new individuals are impacted by lead exposure each year.

Indicator 18: OSHA Enforcement Activities

For this indicator, data are from OSHA annual reports of total inspections conducted and the number of workers covered by these inspections, as well as the BLS Quarterly Census of Employment and Wages (QCEW; www.bls.gov/cew/home.htm) for the number of workers employed and establishments in the private sector. BLS age data encompasses people of working age, which is defined as 16 years of age and older. BLS employment data includes individuals in full-time and part-time positions. Pennsylvania is a federal OSHA state, meaning that Pennsylvania did not elect to have its own state OSHA program. Therefore, within the Commonwealth of Pennsylvania federal OSHA has jurisdiction over private sector employees. OSHA may conduct multiple inspections of the same worksite during the calendar year. Therefore, the percentage of establishments inspected, and number of workers covered by OSHA inspections may be overestimated. An OSHA inspection may be triggered by the following: existence of an imminent danger in the workplace that may result in serious physical harm or death, reported severe injuries and illnesses, worker complaints, referrals (by local government agencies or other organizations), targeted inspections in high hazard industries, follow-up inspections when a violation has occurred to ensure compliance. Importantly, OSHA inspections are enforcement inspections, and can be performed by OSHA only. An employer can contract out safety and health services, such as industrial hygienists to determine compliance with an OSHA regulated limit, but an enforcement inspection must be conducted by OSHA federal Compliance Safety and Health Officers. In the table and figure below, the number and percentage of OSHA-covered establishments eligible for OSHA inspection and the number and percentage of employees whose work areas were inspected by OSHA are displayed. Given that not all establishments are eligible for OSHA inspection (farms that have 10 or fewer employees and no temporary labor camp activity within the past 12 months), the numerator only counts those establishments and workers that are eligible for OSHA inspection. Understanding both the number of establishments and employees inspected by OSHA is important in understanding the scope of impact an OSHA inspection may have. For additional information on BLS QCEW, visit: www.bls.gov/cew/home.htm and OSHA covered establishments, visit OSHA.gov.

Figure 18: Employer Establishments Inspected by OSHA from 2013 to 2019 in Pennsylvania

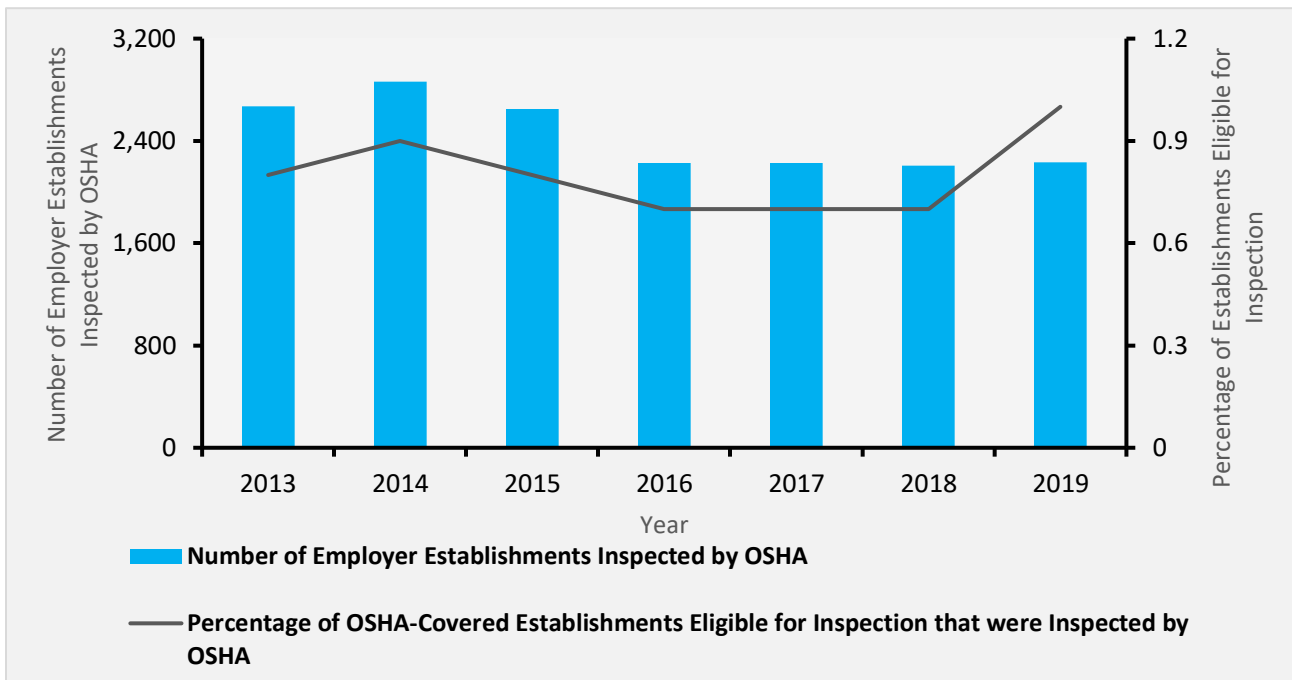


Table 19: Employer Establishments Inspected by OSHA from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Employer Establishments Inspected by OSHA	2,669	2,864	2,652	2,226	2,226	2,204	2,233
Percentage of Establishments Eligible for Inspection that were Inspected by OSHA	0.8	0.9	0.8	0.7	0.7	0.7	1.0

Overall, employer establishments inspected by OSHA have declined. From 2013 to 2019, the number of employer establishments inspected by OSHA decreased from 2,669 to 2,233 (Mann-Kendall coefficient = -0.586, *p-value* = 0.1) and the percentage of OSHA-covered establishments eligible for inspection that were inspected by OSHA increased slightly from 0.8 to 1.0 (Mann-Kendall coefficient = -0.159, *p-value* = 0.8). Over the seven-year period, the average number of employer establishments inspected by OSHA was 2,439 establishments per year.

Figure 19: Employees' Work Areas Inspected by OSHA from 2013 to 2019 in Pennsylvania

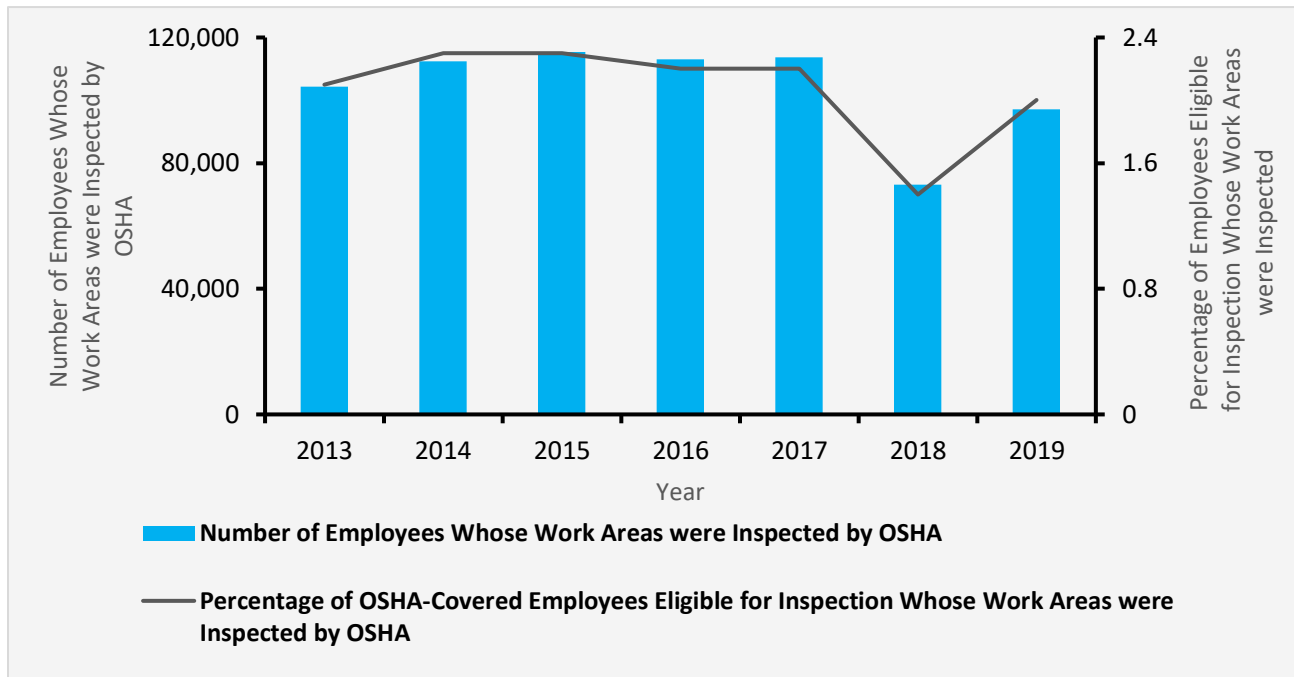


Table 20: Employees' Work Areas Inspected by OSHA from 2013 to 2019 in Pennsylvania

	2013	2014	2015	2016	2017	2018	2019
Number of Employees Whose Work Areas were inspected by OSHA	104,241	112,469	115,350	113,043	113,601	73,179	97,216
Percentage of Employees Eligible for Inspection Whose Work Areas were Inspected	2.1	2.3	2.3	2.2	2.2	1.4	2.0

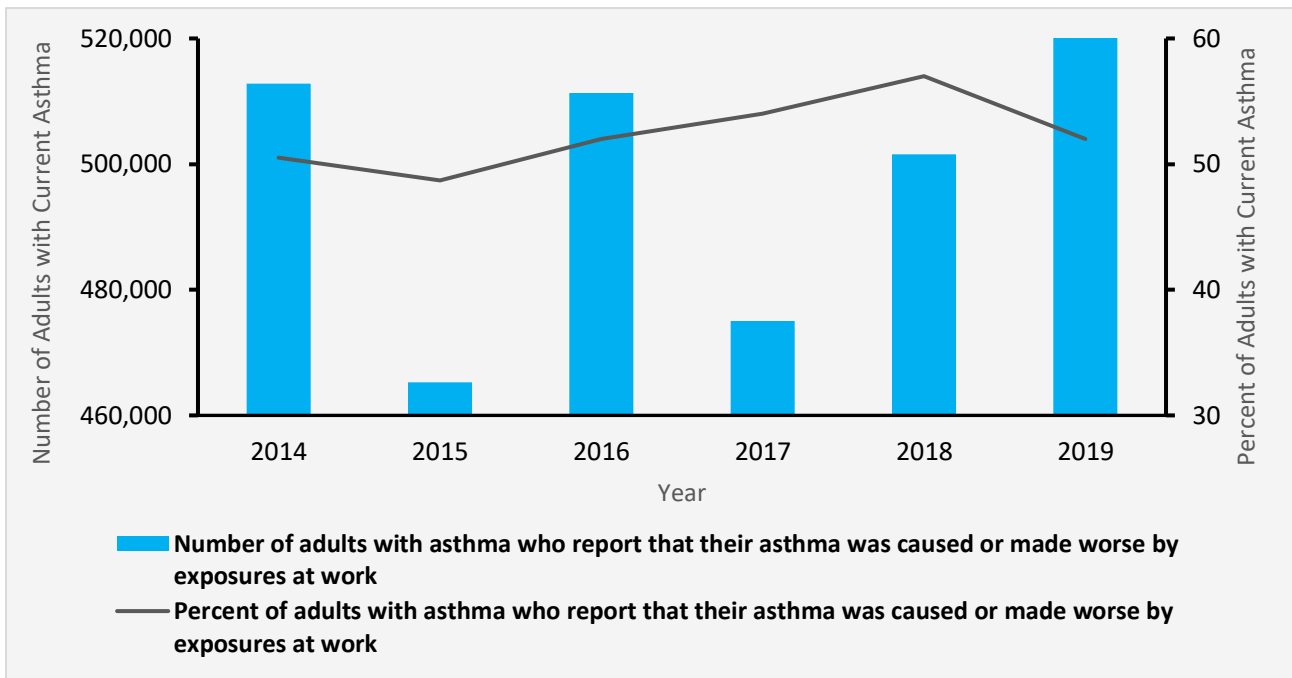
Overall, employees' work areas inspected by OSHA declined over the past few years. From 2013 to 2019, the number of employees whose work areas were inspected by OSHA decreased from 104,241 to 97,216 (Mann-Kendall coefficient = -0.143, *p-value* = 0.8) and the percentage of OSHA-covered employees eligible for inspection whose work areas were inspected by OSHA decreased slightly from 2.1 to 2.0 (Mann-Kendall coefficient = -0.451, *p-value* = 0.2). Over the seven-year period, the average number of employees whose work areas were inspected by OSHA was 104,157 employees per year. A decline in OSHA inspections may be due to a decline in employer reporting of severe injuries and illnesses and/or worker complaints. Improved safety procedures in the workplace, as well as underreporting, could contribute to a decline in employer reporting of injury and illnesses.

Additionally, closure of establishments in high-risk industries may also result in a decline in OSHA inspections.

Indicator 21: Asthma Among Adults Caused or Made Worse by Work

For this indicator, data are from the Center for Disease Control and Prevention’s Asthma Call-Back Survey (based on landline and cell phone estimates). The Asthma Call-Back Survey is conducted approximately two weeks after the Behavioral Risk Factor Surveillance Survey (BRFSS) and is a follow up with individuals who report ever being diagnosed with asthma and collects additional information on the health and experience of those individuals. In the table and figure below, the number and percent of adults aged 18 years or older with current asthma who report that their asthma was caused or made worse by exposures at work are displayed. Asthma Call-Back Survey employment data includes individuals in full-time and part-time positions. A limitation of this data is that it does not differentiate between new-onset asthma and work-aggravated asthma. For more information on the survey, visit: www.cdc.gov/brfss/acbs/index.htm.

Figure 20: Asthma Among Ever-Employed Adults Caused or Made Worse by Work from 2014 to 2019 in Pennsylvania*



Note: Y-axis does not start at zero.

Table 21: Asthma Among Ever-Employed Adults Caused or Made Worse by Work from 2014 to 2019 in Pennsylvania

	2014	2015	2016	2017	2018	2019
Number of adults with asthma... caused or made worse by exposures at work	512,766	465,259	511,294	474,997	501,569	546,611
Percent of adults with asthma... caused or made worse by exposures at work	50.5	48.7	52.0	54.0	57.0	52.0

Over the past few years, the number of adults with asthma who report that their asthma was caused or made worse by exposures at work has and the percent has fluctuated. From 2014 to 2019, the weighted number of ever-employed adults with current asthma who report that their asthma was caused or made worse by exposures at work increased from 512,766 to 546,611 (Mann-Kendall test coefficient = 0.2, *p-value* = 0.7) and the percent of ever-employed adults with current asthma who report that their asthma was caused or made worse by exposures at work increased from 50.5 in 2014 to 52.0 in 2019 (Mann-Kendall test coefficient = 0.552, *p-value* = 0.18).

Over the six-year period, the average number of ever-employed adults with current asthma who report that their asthma was caused or made worse by exposures at work was 502,083 adults per year.

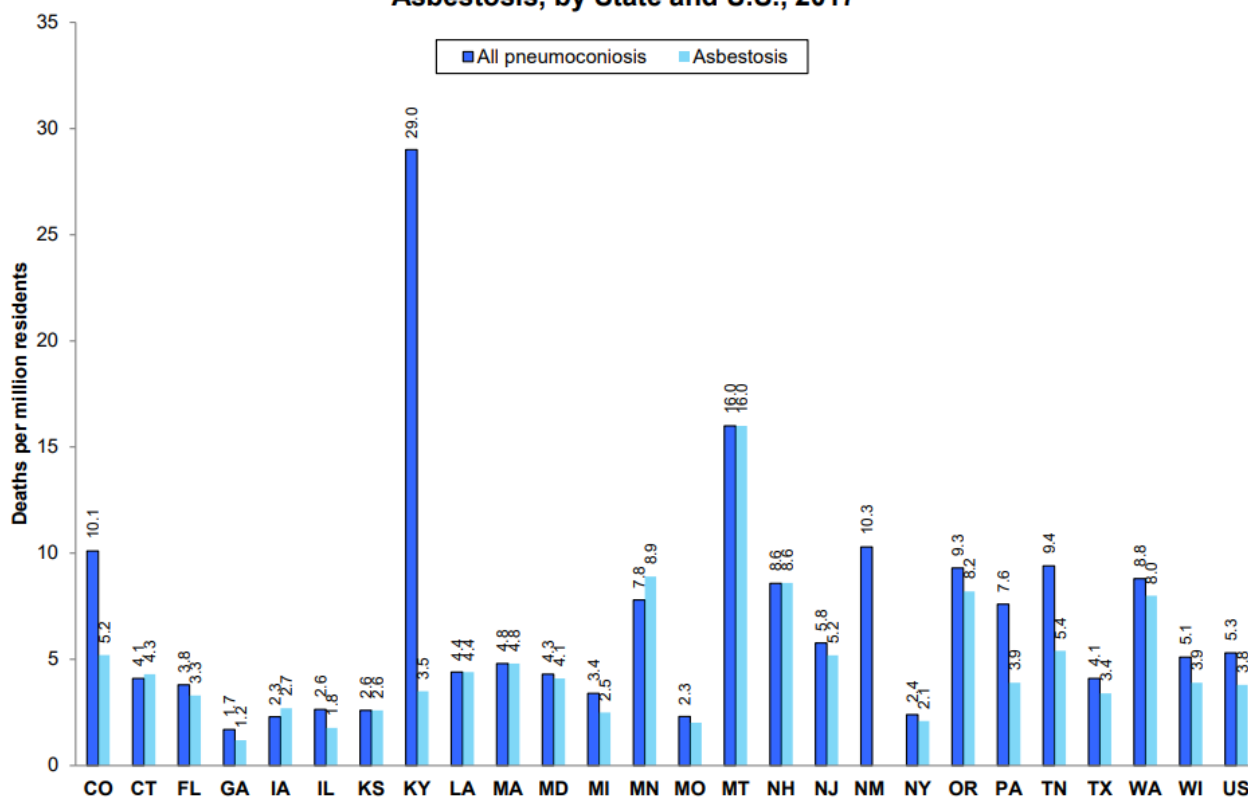
State Comparison

We present multiple 2017 Pennsylvania rates compared to other states to visualize where Pennsylvania stands in comparison to other states. The year 2017 was selected because it was the latest year with published data on CSTE's OHI webpage. For this year, data were available from 17 to 27 states dependent upon the OHI. Indicators selected for state-by-state comparison were based on CSTE's recommendations:

<https://www.cste.org/general/custom.asp?page=OHIndicators>.

Pennsylvania's pneumoconiosis mortality rate was higher than 16 out of 25 states. At 3.9 asbestosis deaths per 100,000 FTEs, PA was tied with WI as the 12th lowest asbestosis mortality rate.

Figure 10. Age-Standardized Mortality Rate from or with Pneumoconiosis and Asbestosis, by State and U.S., 2017

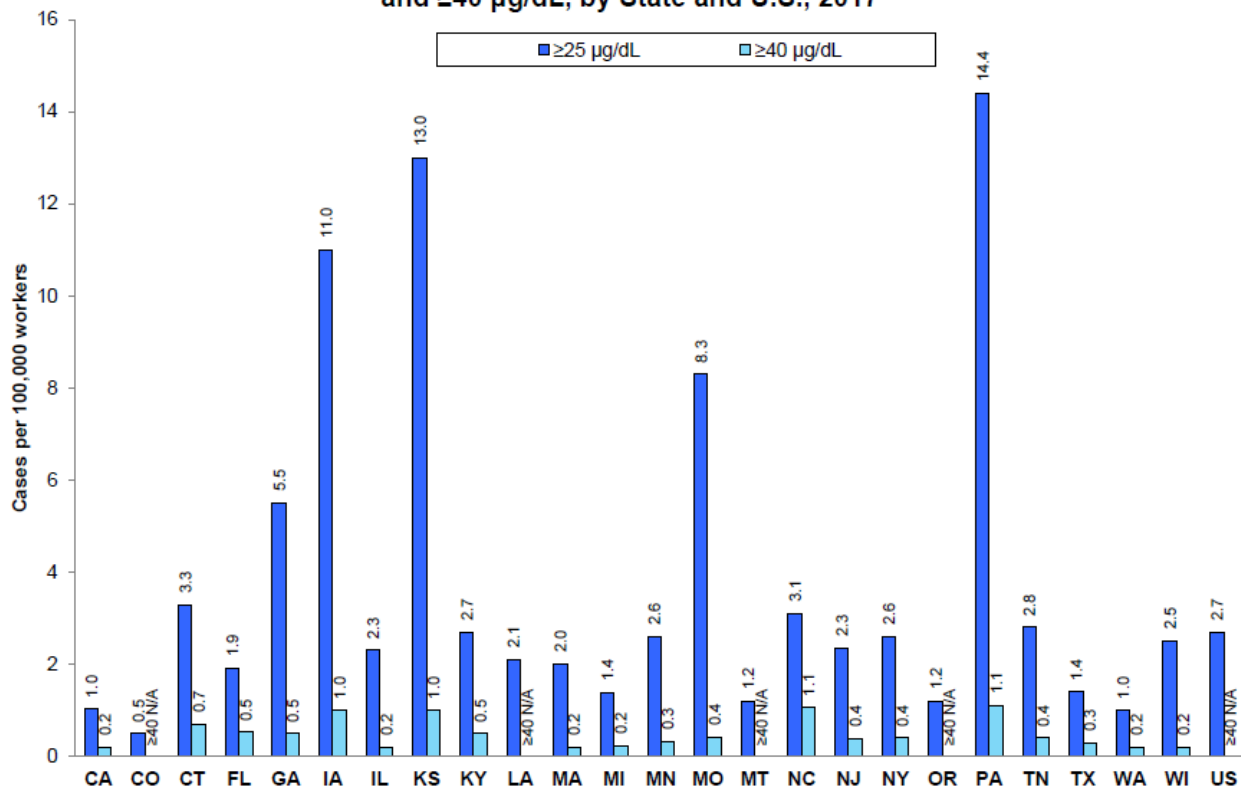


See Technical Notes for more information.
Data were not available for California, Mississippi, Nebraska, and North Carolina.

Data Sources: State Vital Records; Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death (CDC WONDER Online Database); and Census Bureau's Population Estimates

Pennsylvania had the highest prevalence rate of persons with BLLs ≥ 25 $\mu\text{g}/\text{dL}$ out of 25 states. Tied with NC, PA also had the highest prevalence rate of persons with BLLs ≥ 40 $\mu\text{g}/\text{dL}$. PA is home to some of the largest battery manufacturing facilities, where lead exposure is high.

Figure 13b. Prevalence Rate of Persons with Blood Lead Levels ≥ 25 and ≥ 40 $\mu\text{g}/\text{dL}$, by State and U.S., 2017



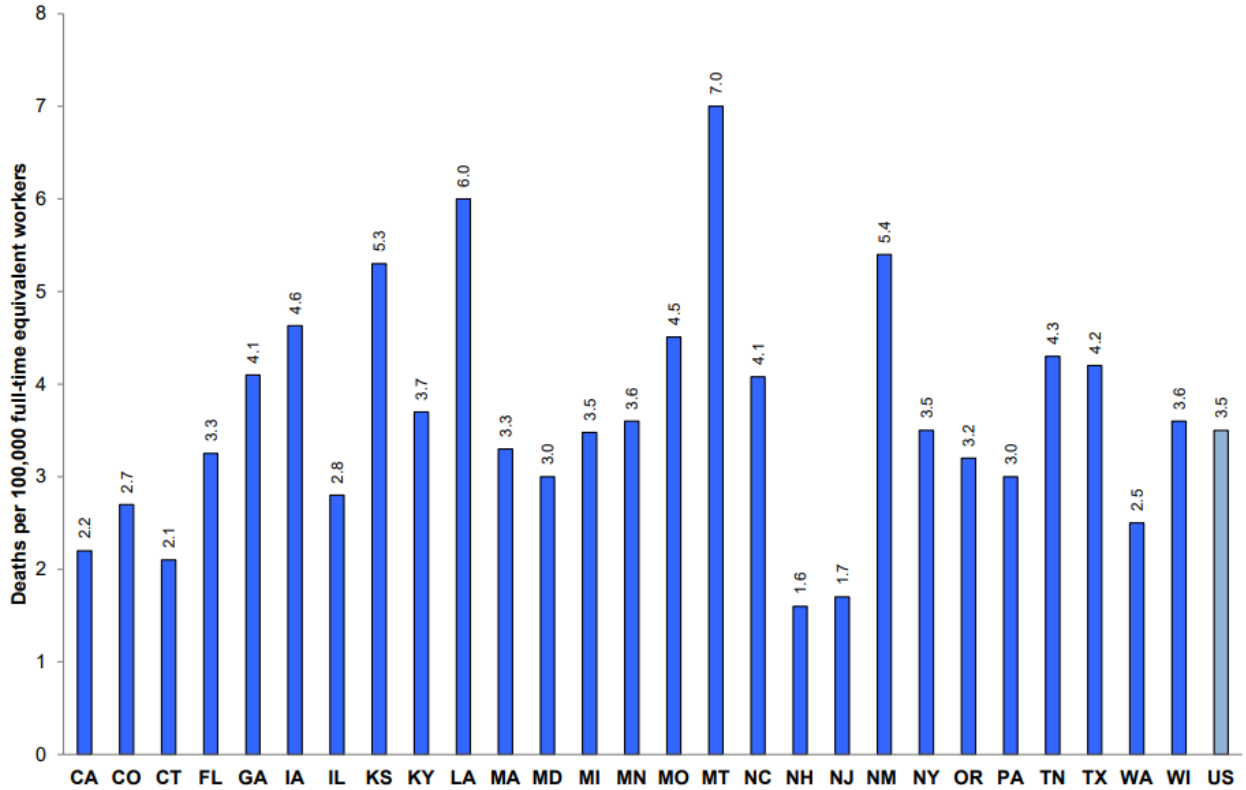
See Technical Notes for more information.

Blood lead data not available for Maryland, Mississippi, Nebraska, and New Hampshire for any levels. Blood lead levels for ≥ 25 $\mu\text{g}/\text{dL}$ not available for Connecticut, Illinois, New Jersey, New York, Pennsylvania, Washington, and the US. For blood lead levels ≥ 25 $\mu\text{g}/\text{dL}$, insufficient numbers or no cases occurred to provide a statistically valid estimate for New Mexico. For blood lead levels ≥ 40 $\mu\text{g}/\text{dL}$, insufficient number or no cases occurred to provide a statistically valid estimate for Colorado, Louisiana, Montana, New Mexico, Oregon, and the US.

Data Sources: State Adult Blood Lead Epidemiology and Surveillance (ABLES) Program, Bureau of Labor Statistics' Geographic Profile of Employment and Unemployment,

Pennsylvania's rate of fatal work-related injuries was lower than 18 out of 25 states. However, any work-related deaths are devastating and largely preventable.

Figure 3. Rate of Fatal Work-Related Injuries, by State and U.S., 2017

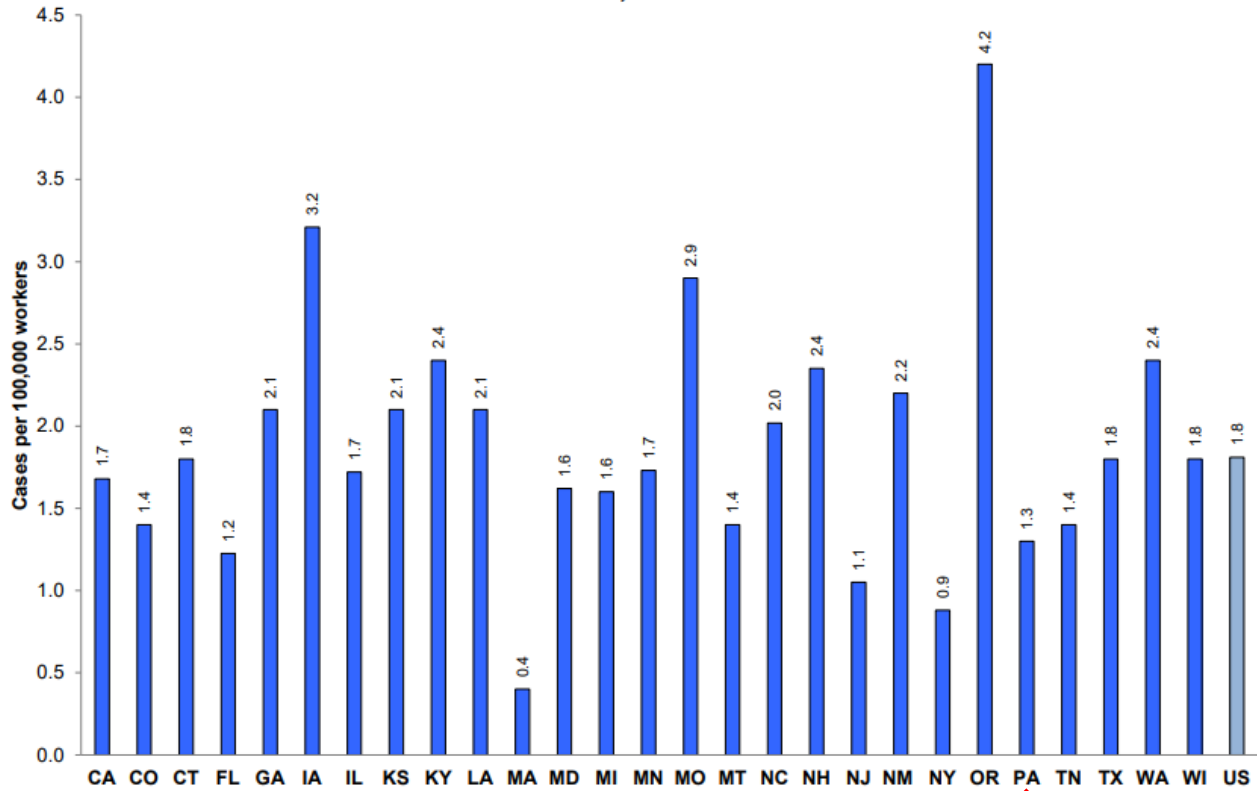


See Technical Notes for more information.
Work-related fatality data not provided by Mississippi and Nebraska

Data Sources: Bureau of Labor Statistics' Census of Fatal Occupational Injuries (CFOI) and Current Population Survey (CPS)

Pennsylvania's rate of work-related pesticide-associated poisonings (PAP) was the 5th lowest out of 27 states (many of which are major farming states, such as Iowa). The proportion of agriculture workers in each state impact state-to-state differences in PAP. Pesticide exposure and poisoning may be underreported.

Figure 11. Rate of Work-Related Pesticide-Associated Poisonings, by State and U.S., 2017

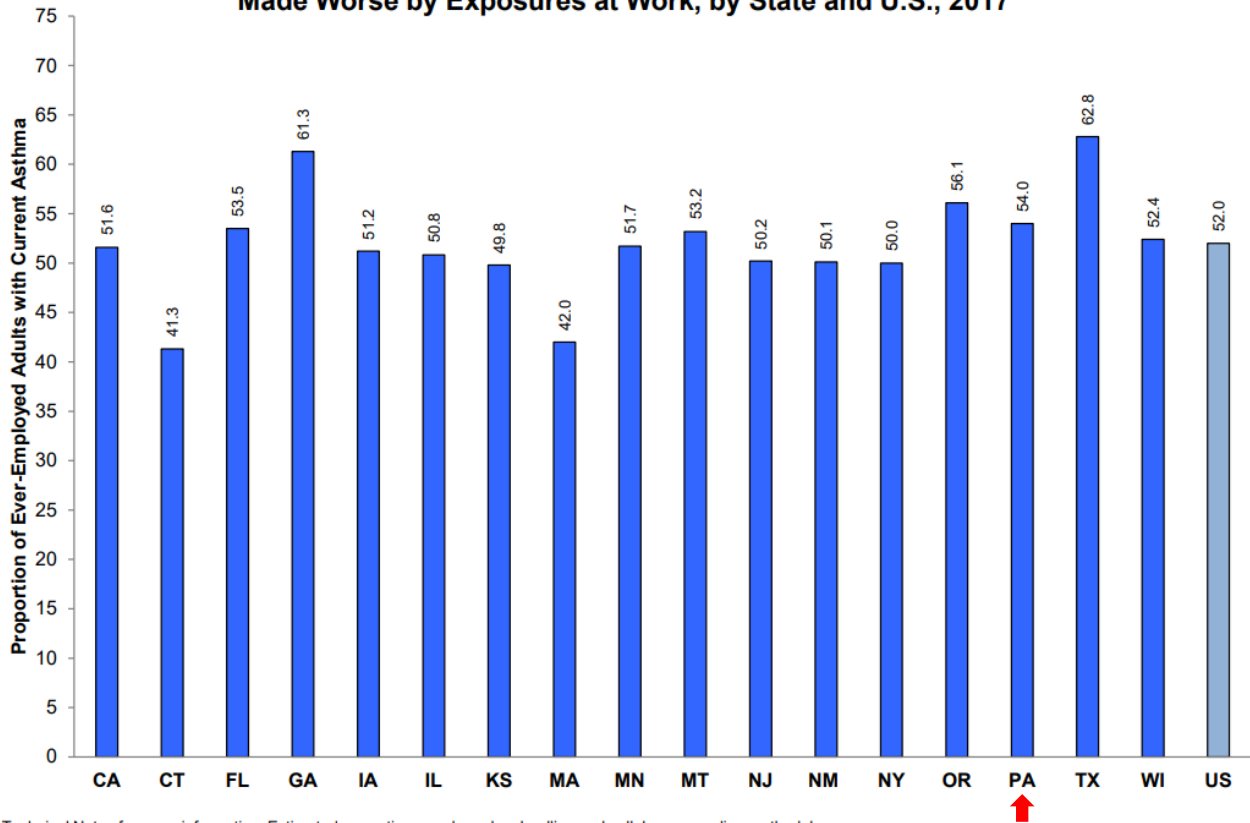


See Technical Notes for more information.
Data were not available for Mississippi and Nebraska.

Data Sources: American Association of Poison Control Centers and Bureau of Labor Statistics' Geographic Profile of Employment and Unemployment, which is based on the Current

Pennsylvania's proportion of ever-employed adults with asthma caused or made worse by work was the 4th highest out of 17 states.

Figure 21. Proportion of Ever-Employed Adults with Current Asthma Caused or Made Worse by Exposures at Work, by State and U.S., 2017

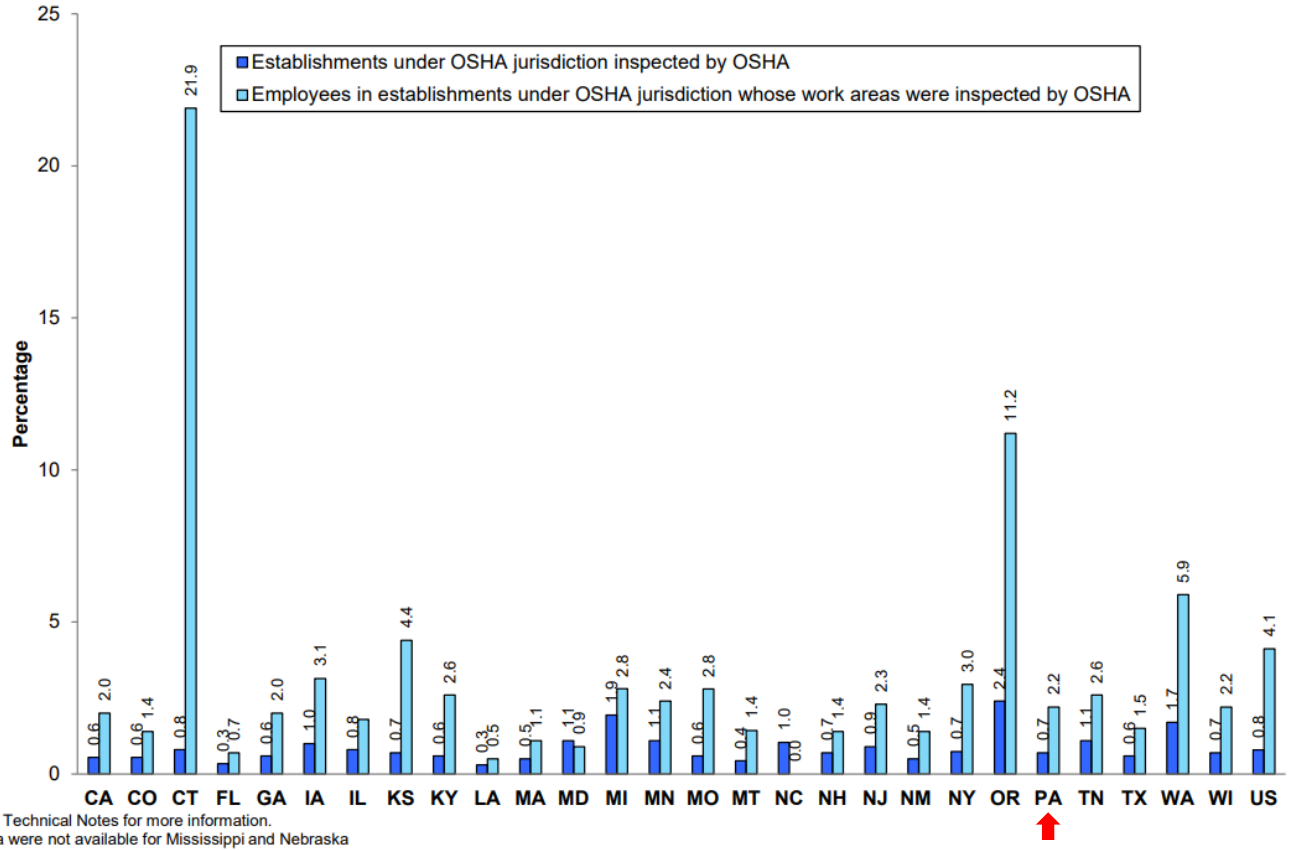


See Technical Notes for more information. Estimated proportions are based on landline and cellphone sampling methodology. Data not available for Colorado, Kentucky, Louisiana, Maryland, Michigan, Missouri, Mississippi, Nebraska, New Hampshire, North Carolina, Tennessee, and Washington..

Data Source: Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, Asthma Call-back Survey (ACBS)

The percentage of work areas inspected by OSHA in Pennsylvania was higher than 13 out of 27 states.

Figure 18. Percentage of Establishments and of Workers in Establishments under OSHA Jurisdiction Inspected by OSHA, by State and U.S., 2017



Conclusion

Exploration of OHIs from 2013 to 2019 shows that many indicators have either gradually declined or remained at a similar level over the seven-year period. The OHIs that have plateaued in recent years provide a unique opportunity for further research to investigate why incidences are still occurring at the same rate as previous years, as well as target agendas for outreach to remediate the issue. These results also show the steep decline in adults with blood lead levels exceeding 25 or 40 µg/dL. Although these results are encouraging, no level of lead is safe, and actions should be taken to continuously decrease incidence rates. Compared to other states, as of 2017 Pennsylvania was among the highest for the prevalence rate of elevated blood lead levels among adults and the proportion of ever-employed adults whose asthma was caused or made worse by work. Currently, Pennsylvania is identifying sources of occupational and non-occupational lead exposure among adults with elevated BLLs and is working to reduce exposure through development of educational materials, participation in lead-related workgroups, and co-hosting lead safety webinars and workshops. Additionally, Pennsylvania plans to increase surveillance among adults with asthma-related illness using syndromic data and identify workplace and non-workplace factors that may contribute to the increasing number of adults with asthma caused or made worse by work. Altogether, this report provides insight into Pennsylvania occupational health trends from 2013 to 2019 and will be updated in subsequent years as data become available.

Citations

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