

Report of Tennessee Occupational Health Indicators

Work-Related Injuries, Deaths, and Compensation

2013 – 2017

Occupational Health and Safety Surveillance Program
Office of Population Health Surveillance
Division of Population Health Assessment



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Introduction

Developed by the Council of State and Territorial Epidemiologists (CSTE), Occupational Health Indicators (OHIs) are twenty-five (25) measures that aid in developing priorities for workplace injury and illness prevention. Since 2015, the Tennessee Occupational Health and Safety Surveillance Program (OHSSP) has annually reported these indicators for data years 2013-2017 to the National Institute for Occupational Safety and Health (NIOSH) at the Centers for Disease Control and Prevention (CDC). In this report, the program has gathered this data to observe trends over time. Where possible, the corresponding US rates were also plotted to provide a national comparison.

The focus of most of these indicators is the worker, who for the purpose of this report, is defined as an employed person at least 16 years of age, unless otherwise noted. Rates in this document are created using either number of workers or Full Time Equivalent (FTEs), defined as the number of full-time workers needed to complete a job (without overtime), as a representation of time spent in the workplace. As an example, one full-time worker (100%) plus two part time workers each working 50% would equal a total 2.0 FTEs.

Tennessee has at least four years of data for 20 of the 25 OHIs developed by CSTE. Of the five OHIs for which insufficient data is available to establish reliable trends - one indicator (OHI #17) has depreciated and is no longer collected, two indicators (#20, #22) are undergoing revisions to address changes in coding, one (#21) is not currently collected in TN, and one indicator (#25) is new. However, the data collected for all 25 indicators is reported in the Appendix.

Summary

From 2013-2017, the rates of work-related injury and illness and work-related hospitalizations in Tennessee have remained constant or have decreased (Indicators #1, #2). This general stable or downward trend in overall outcomes is reflected in several indicators examining specific work-related maladies, such as burns, musculoskeletal disorders, pesticide related poisonings, lead toxicity, and heat related illnesses (Indicators #6, #7, #11, #13, #24). Long term work-related illnesses such as Pneumoconiosis and Mesothelioma have generally remained unchanged (Indicators #9, #10, #12).

While most of the health-related indicators have remained stable or are improving, there are some points of concern. The proportion of Tennesseans working in high-risk positions increased during this time period (Indicators #14-16), and while not statistically significant, the number of work-related fatalities has consistently increased (Indicator #3). The number of amputations increased as well, with the largest increase occurring in 2017 (Indicator #4).

Of the remaining indicators, the percentage of Tennessee Occupational Safety and Health Administration (TOSHA) covered sites and covered workers which received an inspection by the agency has remained consistent (Indicator #18). The number of health care workers who received an influenza vaccine in a year increased, and the average worker compensation per covered workers has decreased (Indicator #19). The remaining indicators (#5, #8, #17) had changes in how the value was reported that prevent drawing analytical conclusions.

Findings from this report will be used by OHSSP and its Advisory Committee to set program priorities for the upcoming 5-year grant cycle (2021-2026).

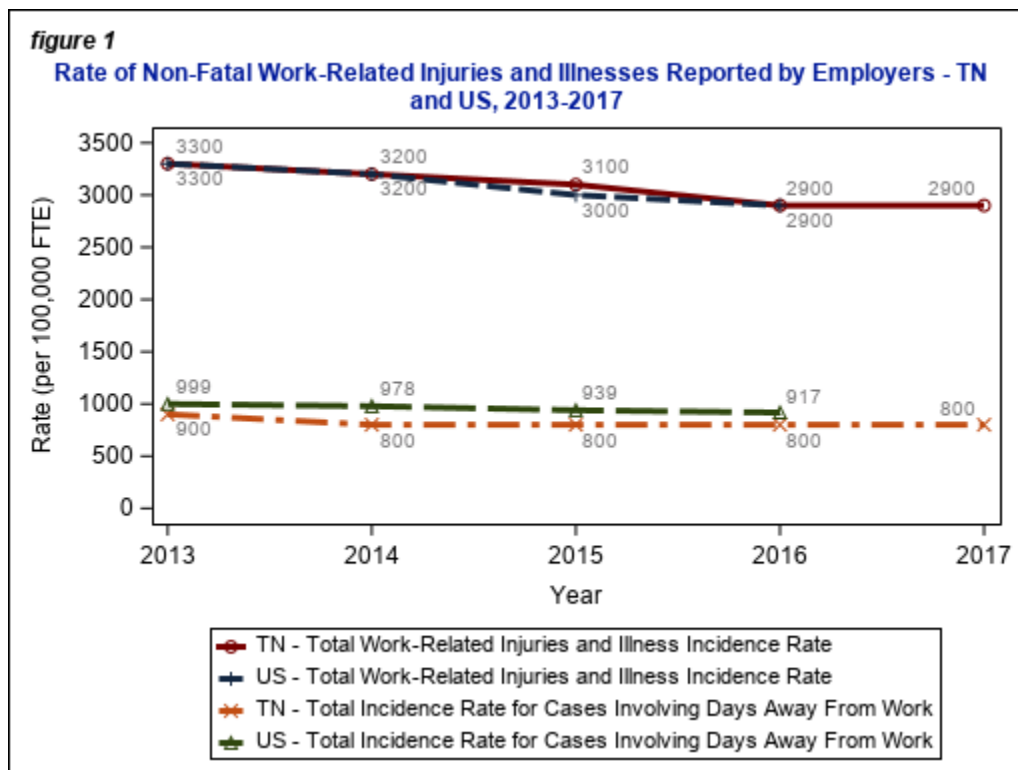
Occupational Health Indicator 1: Non-Fatal Work-Related Injuries and Illnesses Reported by Employers

Non-fatal work-related injuries reported by employers (OHI #1) represents workers in the private sector* (i.e., non-governmental nor self-employed) with work-related injuries and illnesses that involve more than 10 days away from work. Over 60,000 work-related events are estimated to occur each year in Tennessee.

In 2013, Tennessee had 3,300 non-fatal work-related injuries or illnesses per 100,000 FTEs. In 2017, this number was 2,900 non-fatal work-related injuries or illnesses per 100,000 FTEs, which represents a slight decrease of 400 events per 100,000 FTEs over the five-year period.

The number of days away from work in Tennessee remains lower than the US average and decreased from 900 days per 100,000 FTE in 2013 to 800 days per 100,000 FTE in 2014 and subsequent years.

**Refer to the glossary for a description of private sector employers.*



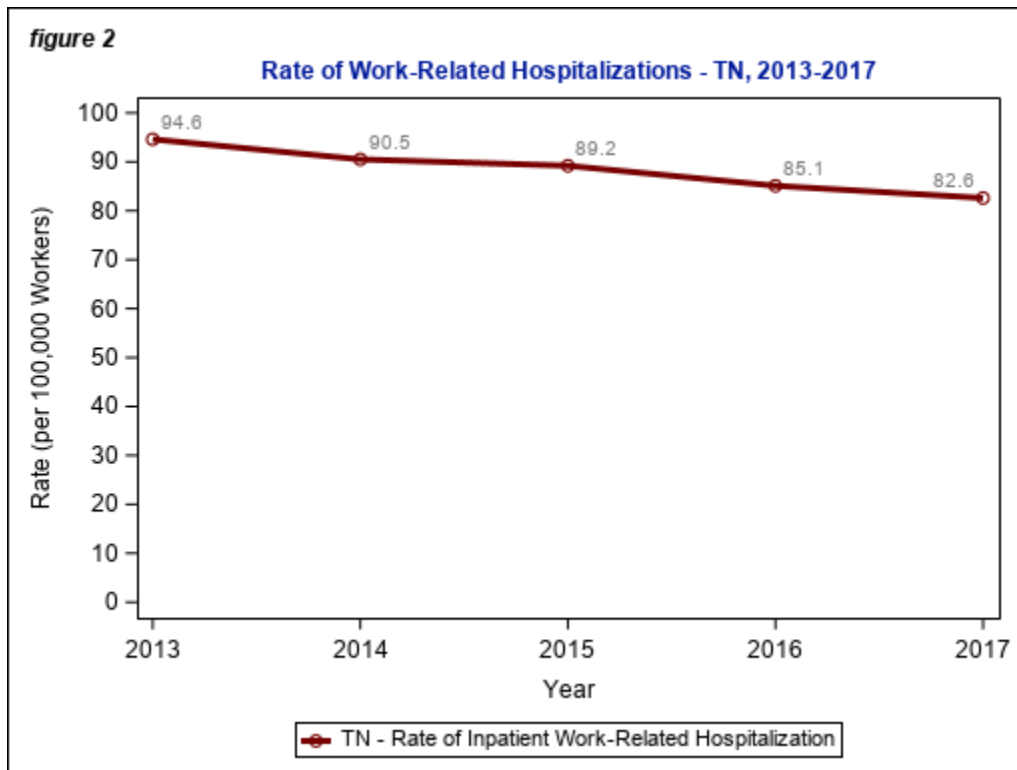
Data Source: Bureau of Labor Statistics' (BLS) Annual Survey of Occupational Injuries and Illnesses (SOII)

Occupational Health Indicator 2: Work-Related Hospitalizations

Indicator 2 represents the rate of hospitalizations of workers covered by workers compensation. This indicator measures the burden of work-related injuries and illnesses through the serious and costly outcome of hospitalizations.

The rate of work-related hospitalizations has decreased slightly over the 5-year period. The data for TN had a maximum rate of 94.60 per 100,000 workers in 2013 and a minimum of 82.59 per 100,000 workers in 2017, for a decrease of 12.7% over the 5-year period.

U.S. data is not available for this indicator because there is not a national data equivalent to the Hospital Discharge Data System.

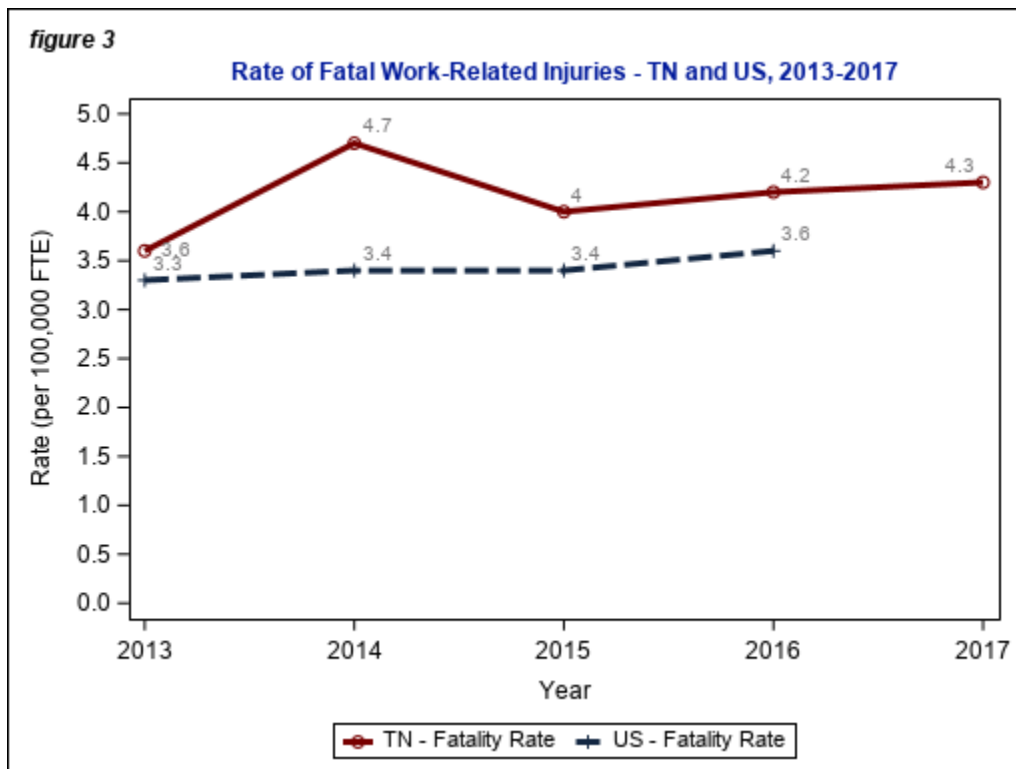


Data Source: Tennessee Department of Health, Population Health Assessment, Hospital Discharge Data System

Occupational Health Indicator 3: Fatal Work-Related Injuries

The source of this indicator is the Census of Fatal Occupational Injuries and provides the number of workers that died from injuries suffered at work.

Fatal work-related injuries in Tennessee increased slightly from 3.6 per 100,000 FTEs in 2013 to 4.3 per 100,000 FTEs in 2017. The fatality rate in Tennessee was consistently higher than in the United States. In 2013, the U.S. fatality rate of work-related injuries was 3.3 per 100,000 FTEs, 0.3 lower than Tennessee. In 2016, the U.S. fatality rate was 3.6, a difference of 0.6 compared to Tennessee in the same year.

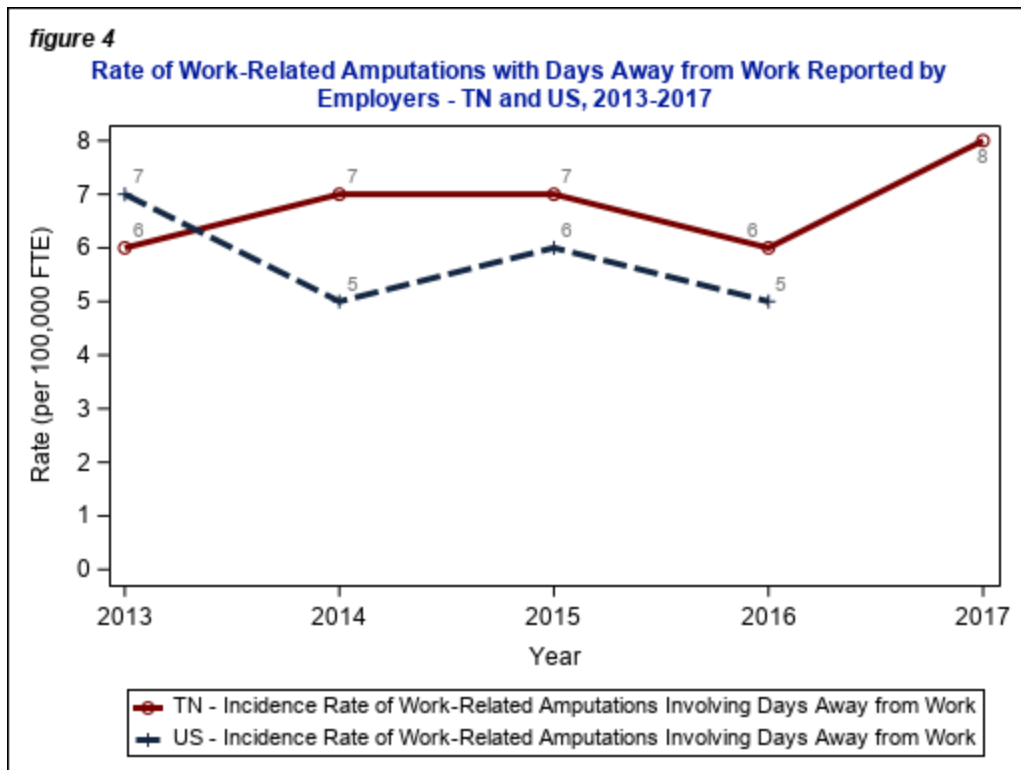


Data Source: Bureau of Labor Statistics' (BLS) Census of Fatal Occupational Injuries (CFOI)

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

This indicator represents workers in the private sector and measures the rate of work-related amputation cases with days away from work. The indicator includes only non-fatal amputations.

Work-related amputations with days away from work increased from 6 to 8 per 100,000 FTEs over the five-year period. Nationally, the rate of amputations in the U.S. has moved in the opposite direction, decreasing from 7 to 5 per 100,000 FTEs.

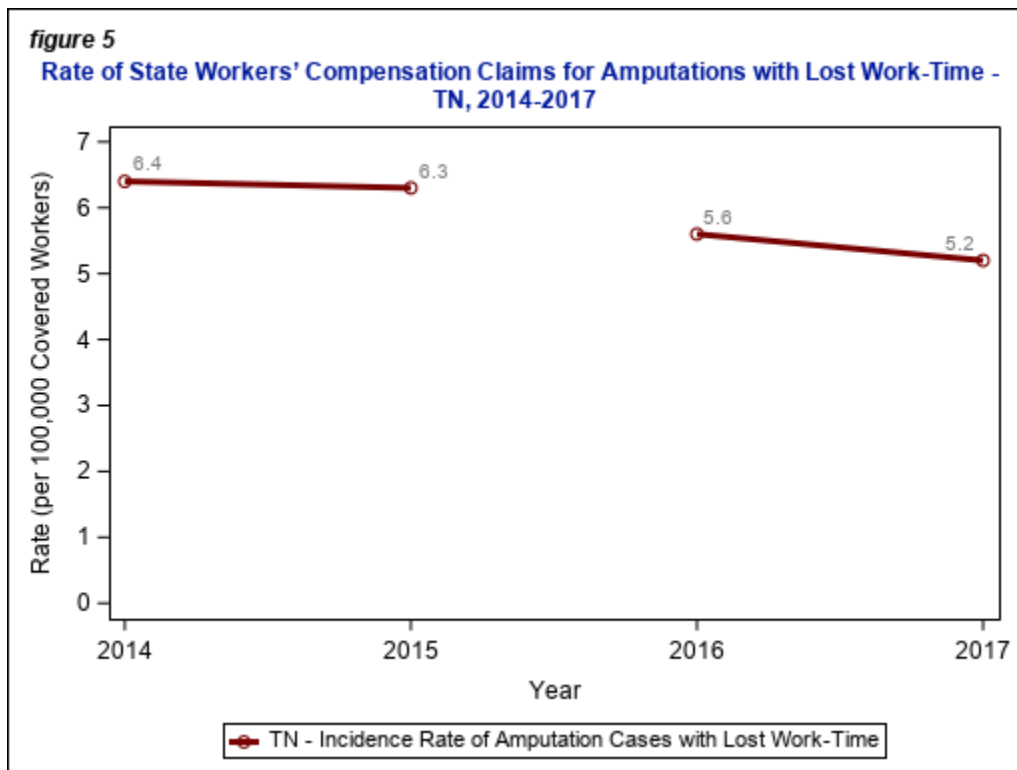


Data Source: Bureau of Labor Statistics' (BLS) Annual Survey of Occupational Injuries and Illnesses (SOII)

Occupational Health Indicator 5: State Workers' Compensation Claims for Amputations with Lost Work Time

This indicator represents the number of claims made for amputations that involved lost work time. Amputations are an important measure, as they often render a permanent reduction in employee productivity and reduced wages for the worker.

The annual incidence rate of compensation claims for amputations with lost work time has progressively decreased in Tennessee from 6.4 per 100,000 covered workers in 2014 to 5.2 per 100,000 covered workers in 2017. It should be noted, however, that this drop in the rate of claims by covered workers is primarily driven by a change in how claims were reported. In 2016 and 2017, the reported number were those with an amputation in which lost work time was confirmed, whereas in 2014 and 2015 it is the number of initial claims without confirmation of lost work time.



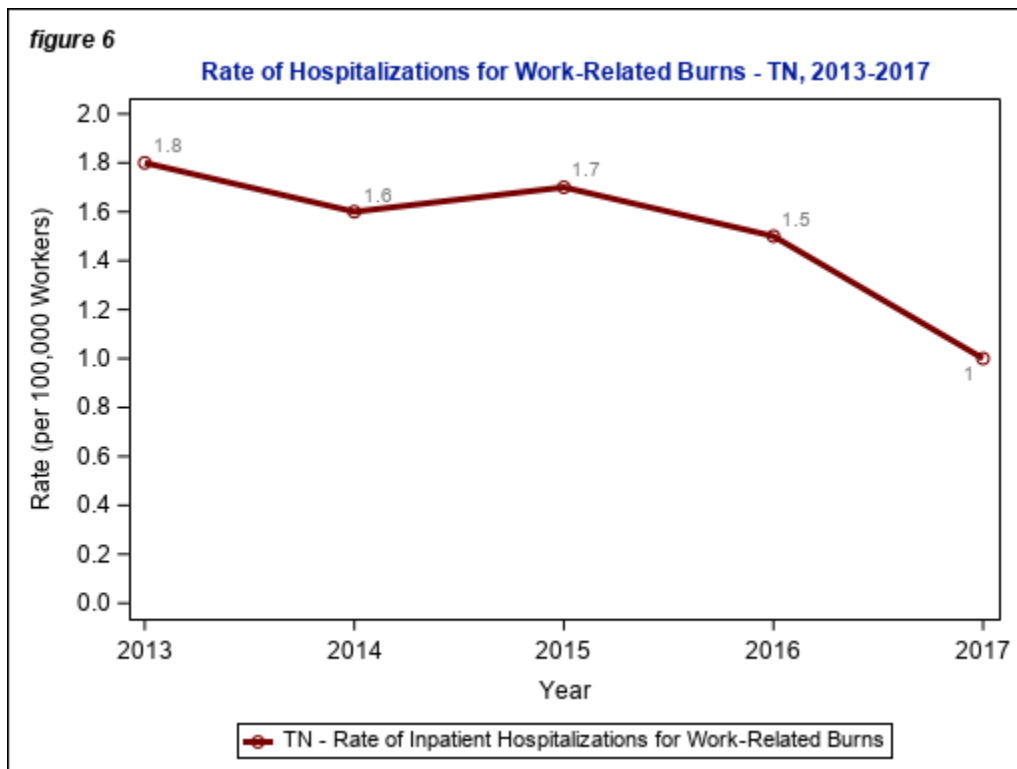
Data Source: Tennessee Department of Labor and Workforce Development, Tennessee Bureau of Workers' Compensation, Workers' Compensation Data System

Occupational Health Indicator 6: Hospitalizations for Work-Related Burns

This indicator are inpatient hospitalizations for burns suffered by workers, which are the most common cause of hospitalizations among young workers.

From 2013 to 2017, the rate of hospitalizations from work related burns in Tennessee decreased from 1.8 per 100,000 workers to 1.0 per 100,000 workers. This represents a decrease of 0.7 hospitalizations per 100,000 workers.

National data is not available.

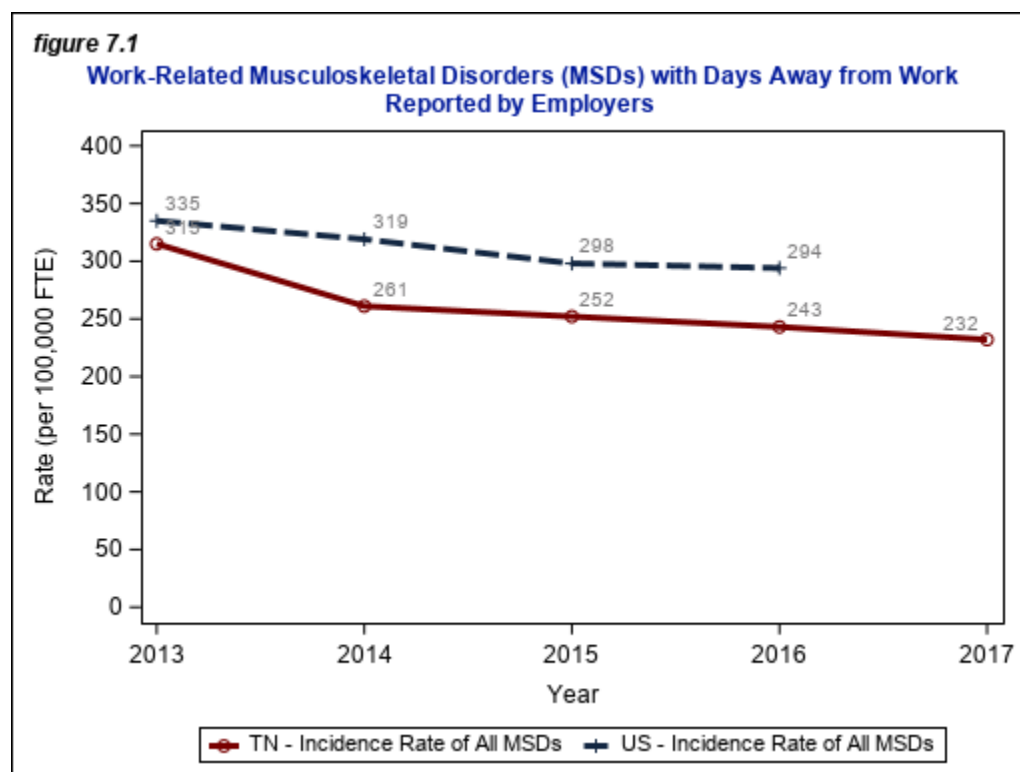


Data Source: Tennessee Department of Health, Population Health Assessment, Hospital Discharge Data System

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

This indicator represents incident rates of musculoskeletal disorders (MSDs), which is divided into three major groups of disorders – (1) MSDs of the shoulders, neck, and upper extremities; (2) MSDs of the back; and (3) carpal tunnel.

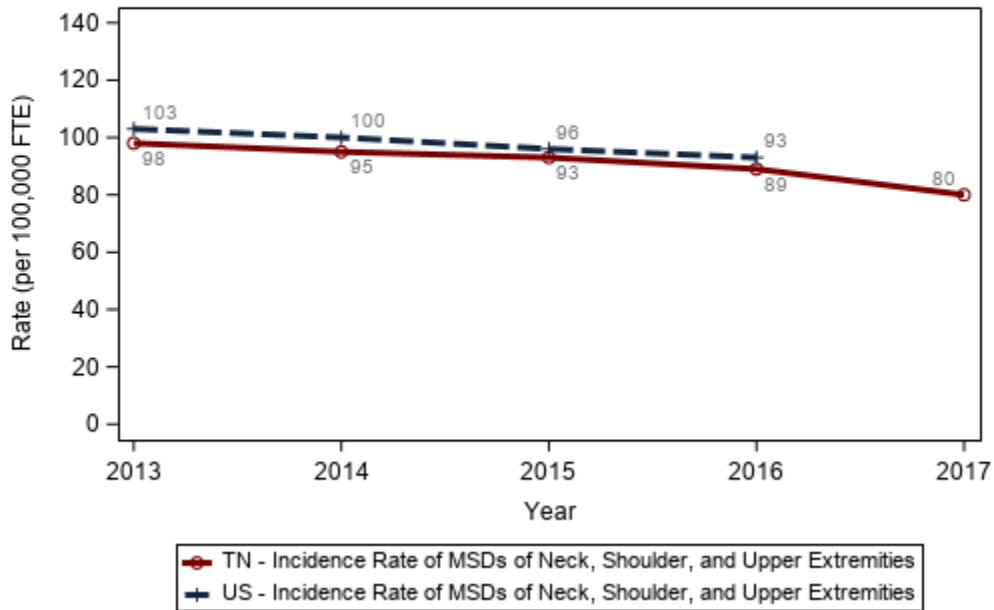
Tennessee rates of MSDs with days away from work are similar to U.S. rates. For all three types of MSDs, the rate decreased by 26%, from 315 to 232 per 100,000 FTEs (Figure 7.1). The overall rate for MSDs of the neck, shoulder, and upper extremities decreased and ranged from 98 per 100,000 FTEs in 2013 to 80 per 100,000 FTEs in 2017 (Figure 7.2). For Carpal Tunnel Syndrome, the rates remain low compared to other MSDs, with the high of 7 and a low of 3 per 100,000 FTEs (Figure 7.3). MSDs of the back decreased, and the rates ranged from 125 per 100,000 FTEs in 2013 to 81 per 100,000 FTEs in 2017 (Figure 7.4).



Data Source: Bureau of Labor Statistics' (BLS) Annual Survey of Occupational Injuries and Illnesses (SOII)

figure 7.2

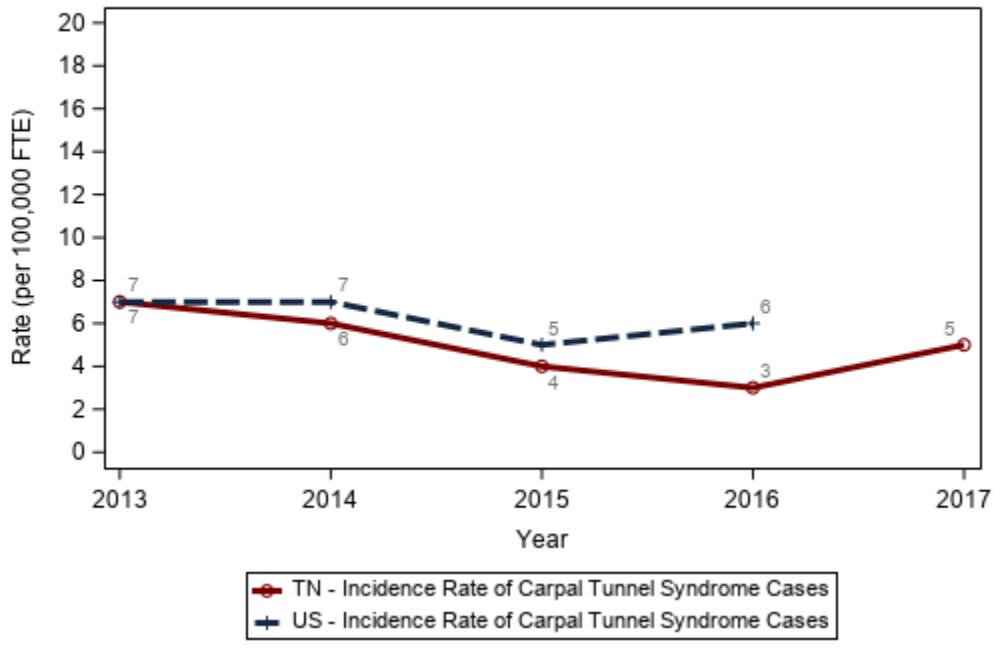
Rate of Work-Related Musculoskeletal Disorders (MSDs) of the Neck, Shoulder, and Upper Extremities with Days Away from Work Reported by Employers - TN and US, 2013-2017



Data Source: Bureau of Labor Statistics' (BLS) Annual Survey of Occupational Injuries and Illnesses (SOII)

figure 7.3

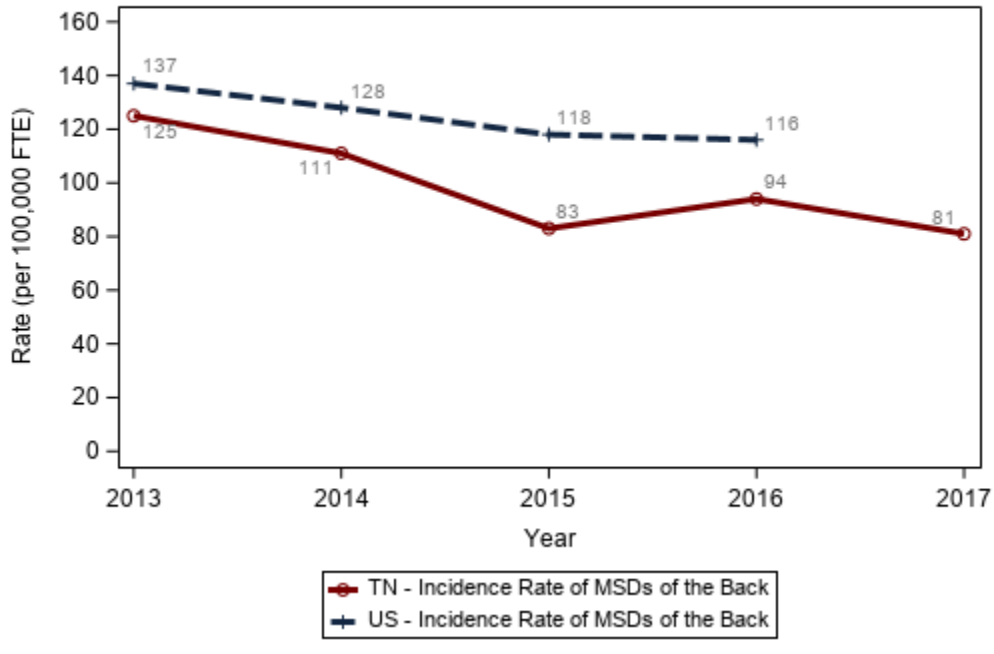
Rate of Work-Related Carpal Tunnel Syndrome with Days Away from Work Reported by Employers - TN and US, 2013-2017



Data Source: Bureau of Labor Statistics' (BLS) Annual Survey of Occupational Injuries and Illnesses (SOII)

figure 7.4

Rate of Work-Related Musculoskeletal Disorders (MSDs) of the Back with Days Away from Work Reported by Employers - TN and US, 2013-2017

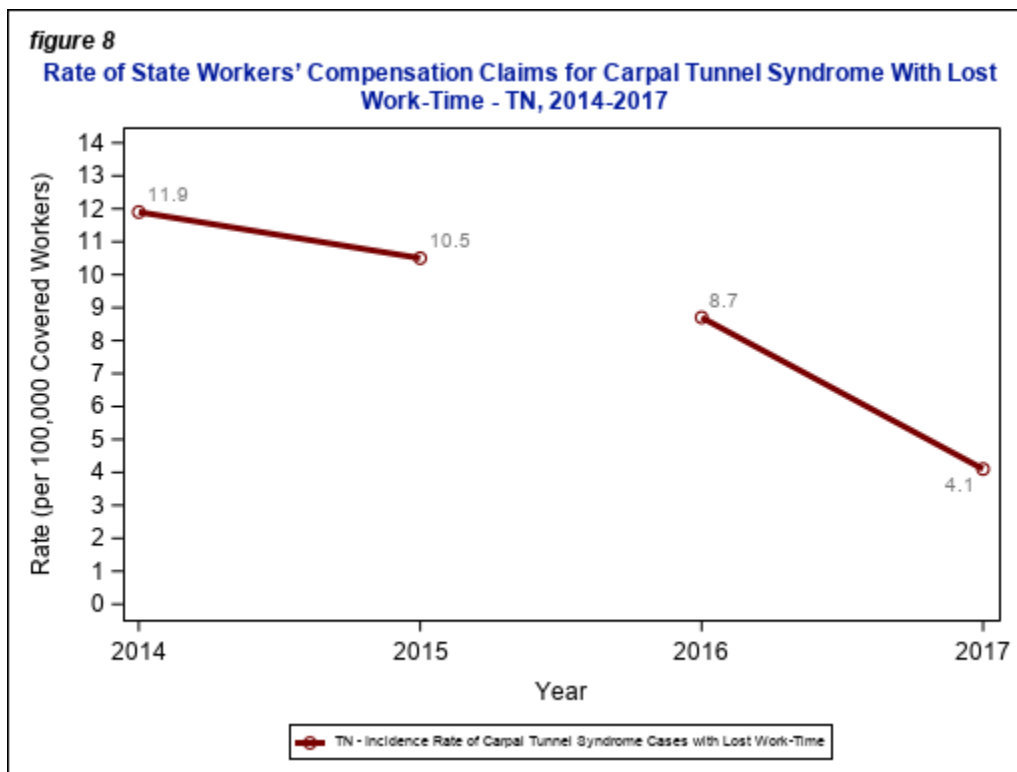


Data Source: Bureau of Labor Statistics' (BLS) Annual Survey of Occupational Injuries and Illnesses (SOII)

Occupational Health Indicator 8: State Workers' Compensation Claims for Carpal Tunnel Syndrome with Lost Work Time

This indicator measures the rate of claims for Carpal Tunnel Syndrome with lost work time filed with the state's workers' compensation program per 100,000 covered workers.

The incidence rate of claims for carpal tunnel syndrome with lost work time has decreased over the four-year period, from a maximum of 11.9 per 100,000 covered workers in 2014 to a minimum of 4.1 per 100,000 covered workers in 2017. However, the method for calculating this indicator was changed in 2016, shifting from initial reports to confirmed cases of lost time due to carpal tunnel. The impact of the change is unknown, so trends for this measure should be interpreted with caution.

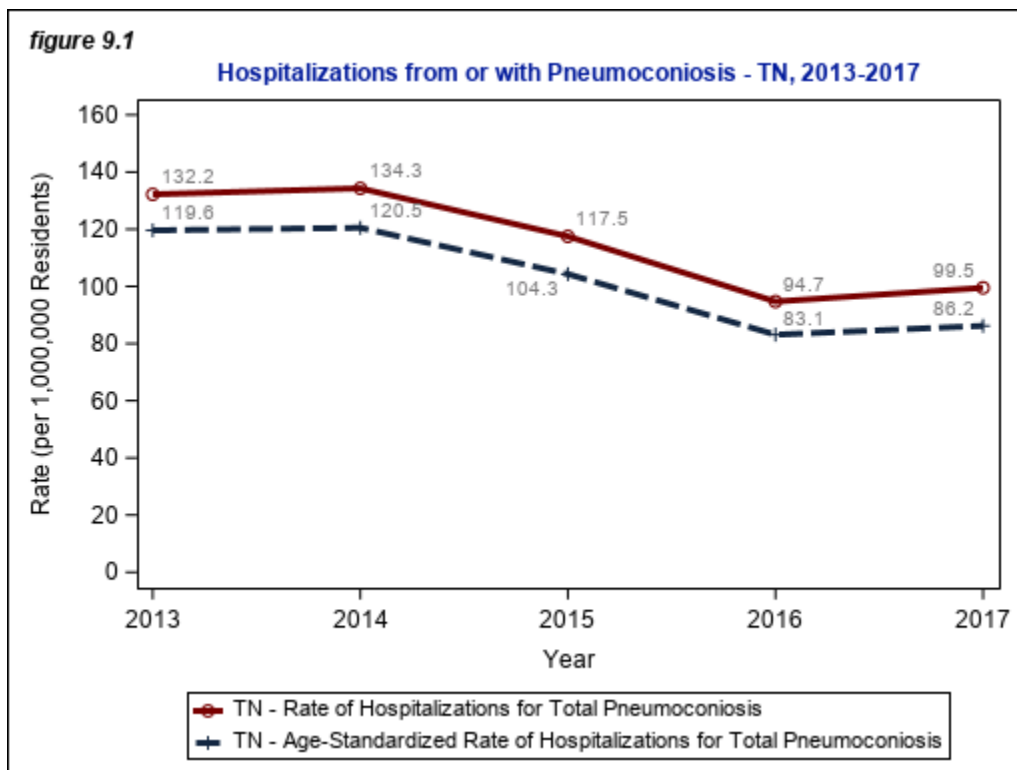


Data Source: Tennessee Department of Labor and Workforce Development, Tennessee Bureau of Workers' Compensation, Workers' Compensation Data System

Occupational Health Indicator 9: Hospitalizations from or with Pneumoconiosis

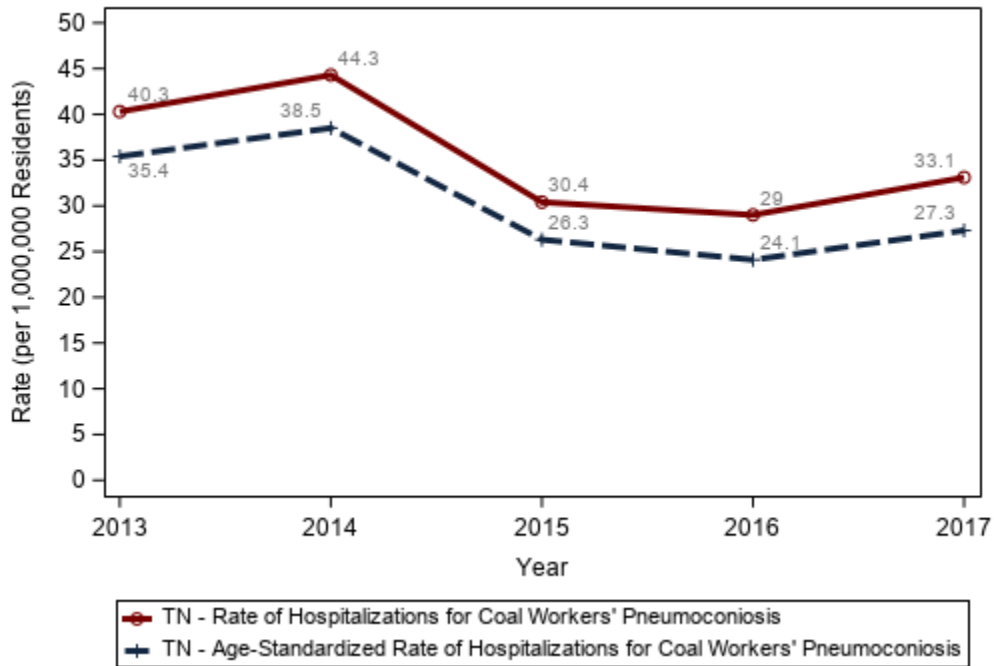
This indicator measures inpatient hospitalizations from or with pneumoconiosis of resident persons who are 15 years or older. Hospitalization is assessed for Total Pneumoconiosis; Asbestosis; Coal Workers' Pneumoconiosis; Silicosis; and Other and Unspecified Pneumoconiosis. Pneumoconiosis is attributable to occupational exposures, as inhalation of these types of dust particles (coal, silica, asbestos) is not common outside of the work setting.

Hospitalizations due to pneumoconiosis decreased from 2013 to 2017. In 2013, there were 132.2 hospitalizations per 100,000 Tennessee residents, and in 2017, this rate dropped to 99.5 per 100,000 residents. This was driven by a continual decrease in asbestosis cases which was 76.5 per 100,000 residents in 2013 and was down to 55.06 per 100,000 residents in 2017. While the other forms of pneumoconiosis had lower rates in 2017 than 2013, they were not significantly lower, individually.



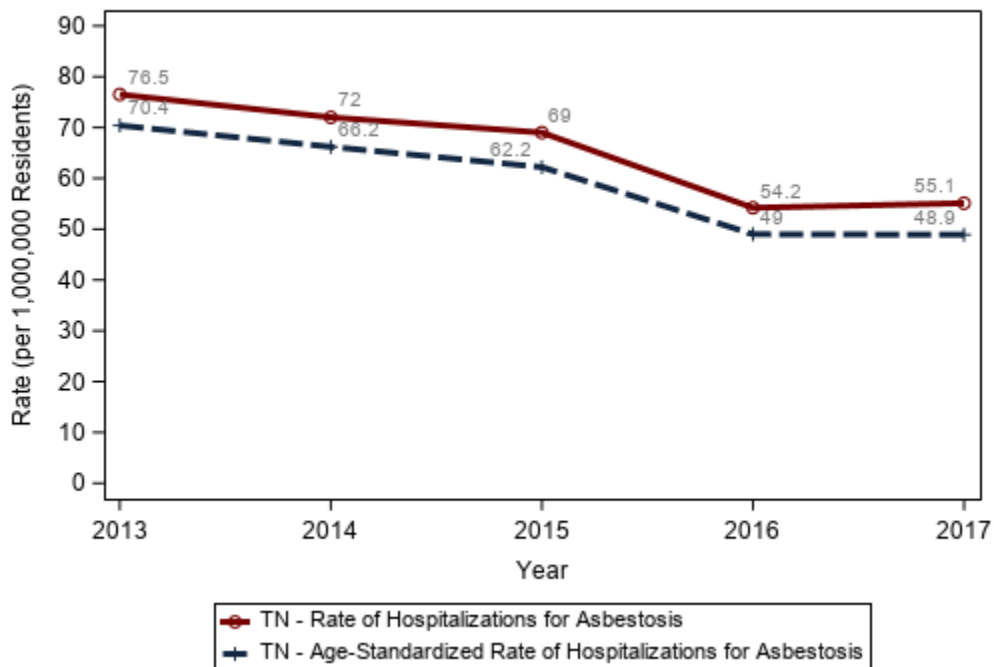
Data Source: Tennessee Department of Health, Population Health Assessment, Hospital Discharge Data System

figure 9.2
Rate of Hospitalizations from or with Coal Workers Pneumoconiosis - TN, 2013-2017

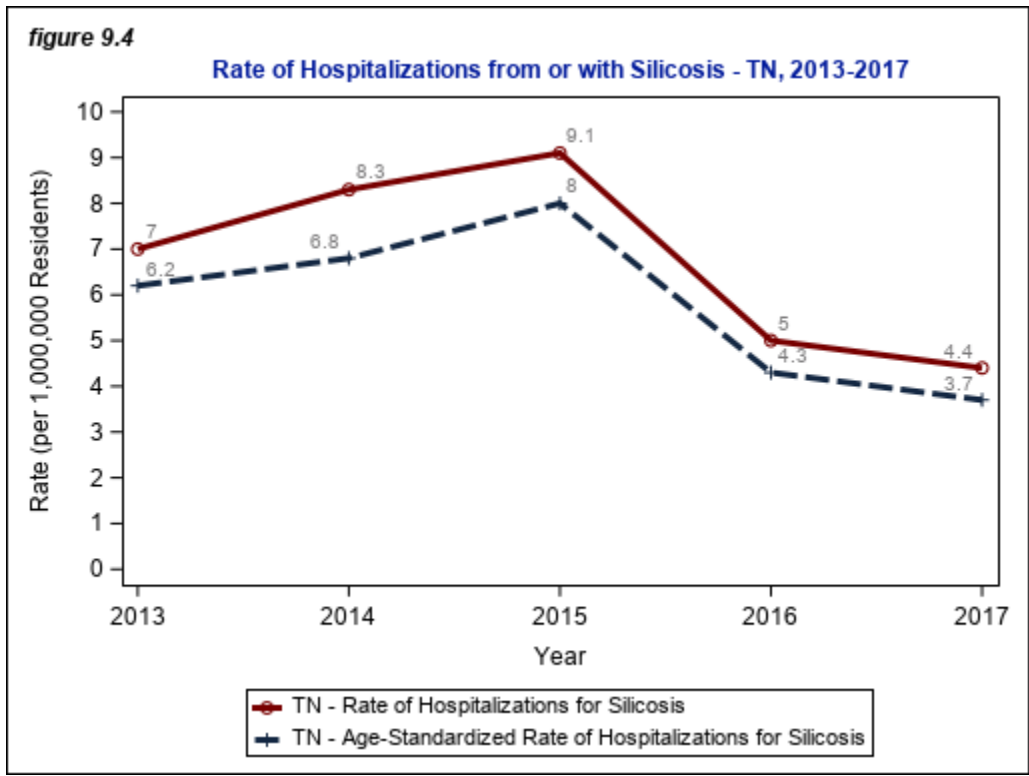


Data Source: Tennessee Department of Health, Population Health Assessment, Hospital Discharge Data System

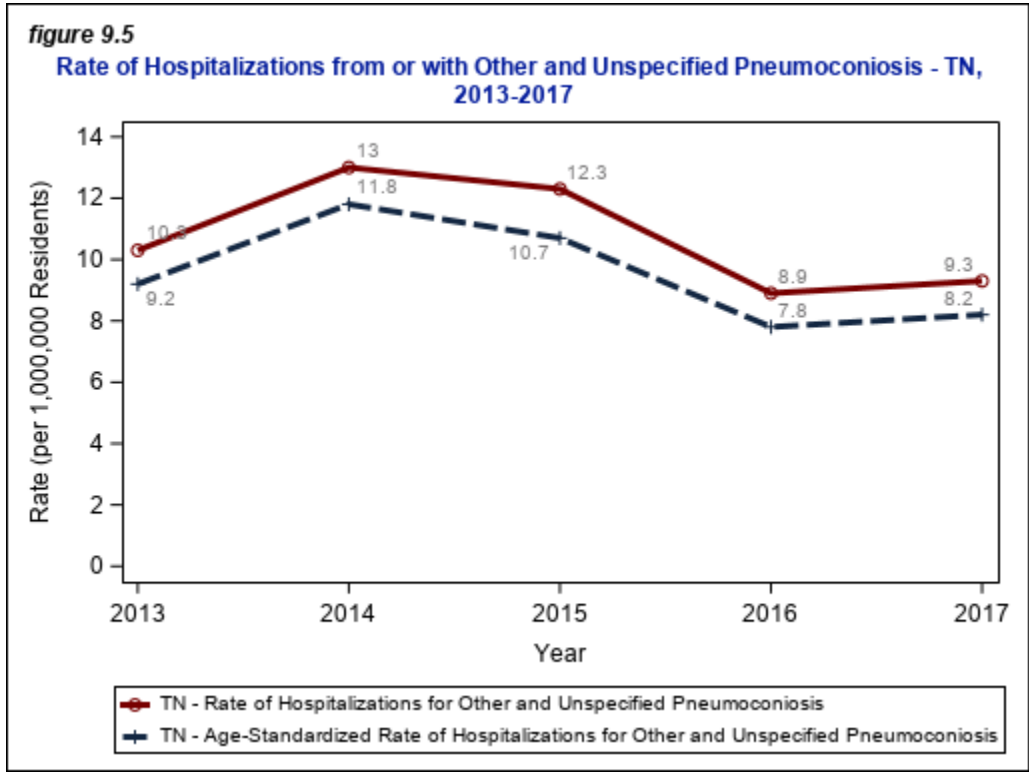
figure 9.3
Rate of Hospitalizations from or with Asbestosis - TN, 2013-2017



Data Source: Tennessee Department of Health, Population Health Assessment, Hospital Discharge Data System



Data Source: Tennessee Department of Health, Population Health Assessment, Hospital Discharge Data System

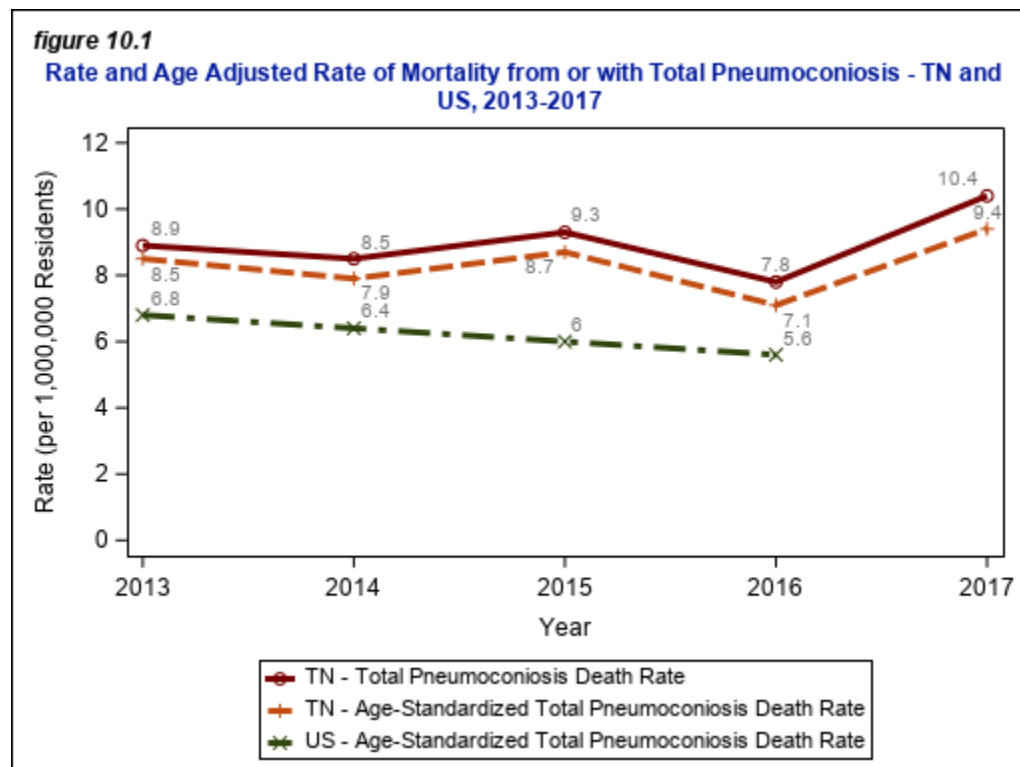


Data Source: Tennessee Department of Health, Population Health Assessment, Hospital Discharge Data System

Occupational Health Indicator 10: Mortality from or with Pneumoconiosis

This indicator represents the death rate due to pneumoconiosis among resident persons that are 15 years or older. Mortality is presented for total pneumoconiosis, asbestosis, and coal workers' pneumoconiosis. Silicosis and 'other unspecified pneumoconiosis' trends are not displayed as both indicators had years with a rate too small to report and reliable trend lines could not be established with the remaining years available.

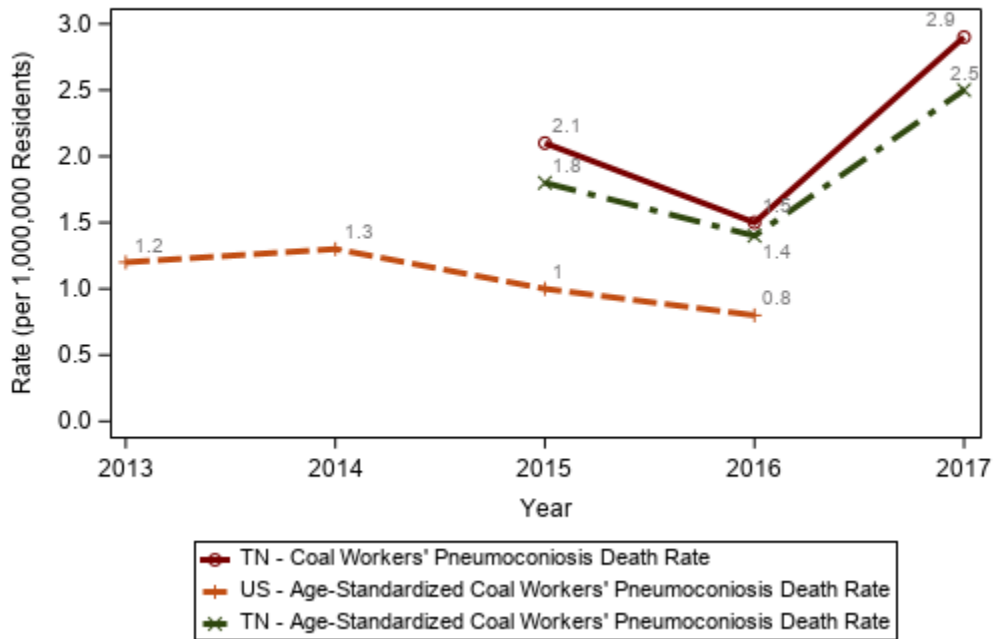
From 2013 to 2017, the mortality rate from total pneumoconiosis remained relatively stable. In 2013, it was 8.9 per 1,000,000 residents and in 2017, it increased to 10.4 per 1,000,000 residents. After standardizing for age, TN pneumoconiosis mortality rates decreased slightly, but remained higher than US rates. While most of the change in overall pneumoconiosis mortality is driven by asbestosis deaths (6.7 in 2013 and 5.9 in 2017), coal worker pneumoconiosis deaths were up to 2.9 per 1,000,000 residents in 2017.



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

figure 10.2

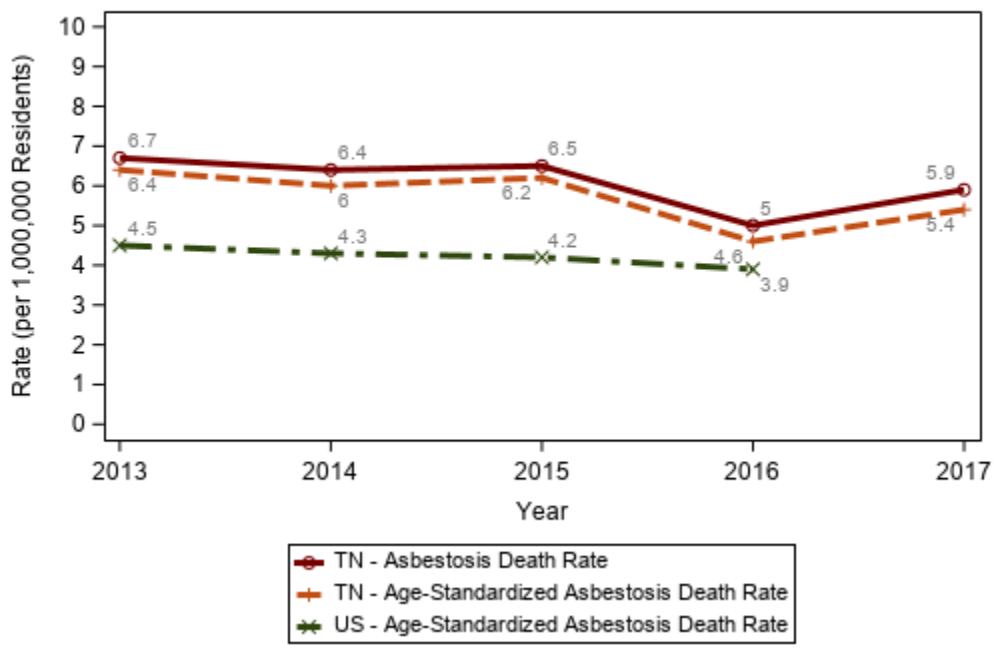
Rate and Age Adjusted Rate of Mortality from or with Coal Workers Pneumoconiosis - TN and US, 2013-2017



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

figure 10.3

Rate and Age Adjusted Rate of Mortality from or with Asbestosis - TN and US, 2013-2017

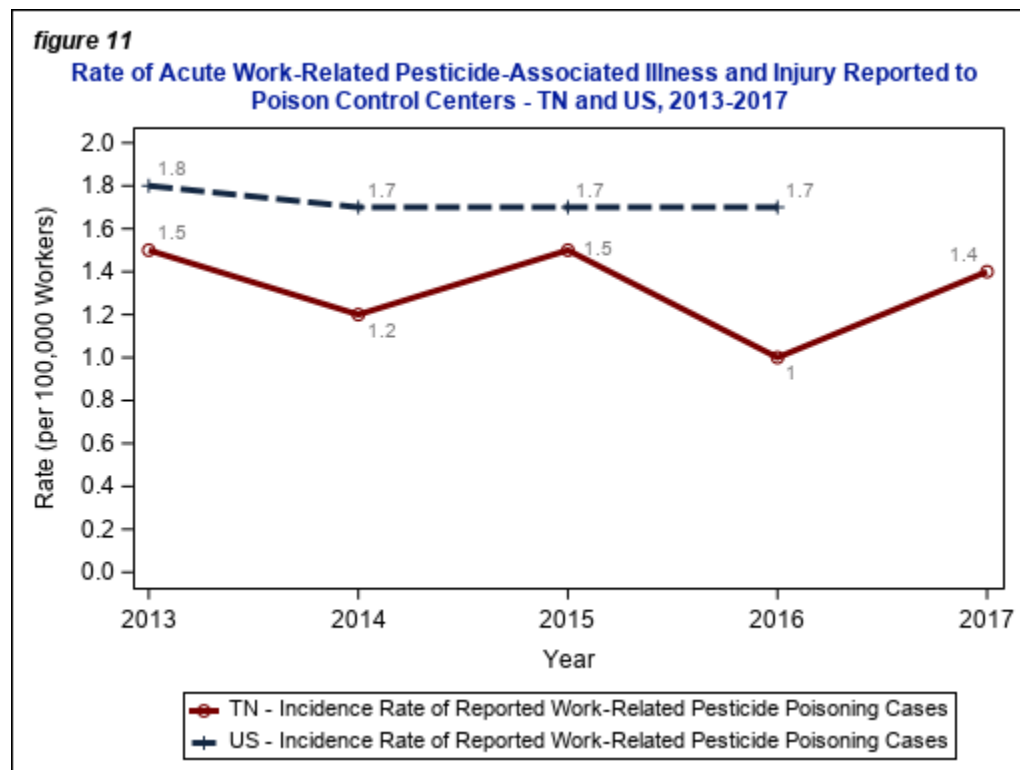


Data Sources: Tennessee Department of Health, Vital Records and Statistics, Death Statistical System; Centers for Disease Control and Prevention, National Center for Health Statistics, Multiple Cause of Death (CDC WONDER Online Database); Census Bureau's Population Estimates

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

This indicator measures the rate of reported cases of acute work-related pesticide poisoning. Acute work-related pesticide poisoning occurs due to short term exposure(s) to large amounts of pesticides in the workplace, with symptoms that occur within hours of exposure. This measure serves as an early warning system for harmful side effects not previously observed in testing by the pesticide manufacturer.

The rate of acute work-related pesticide-associated illness and injuries reported has remained relatively stable in Tennessee for the past 5 years. Though Tennessee has a robust agricultural industry, Tennessee had a maximum rate of 1.5 cases of pesticide associated cases of illness and injury per 100,000 workers in 2015 and a minimum of 0.97 per 100,000 workers in 2016. These rates remained below U.S. rates for all years measured.

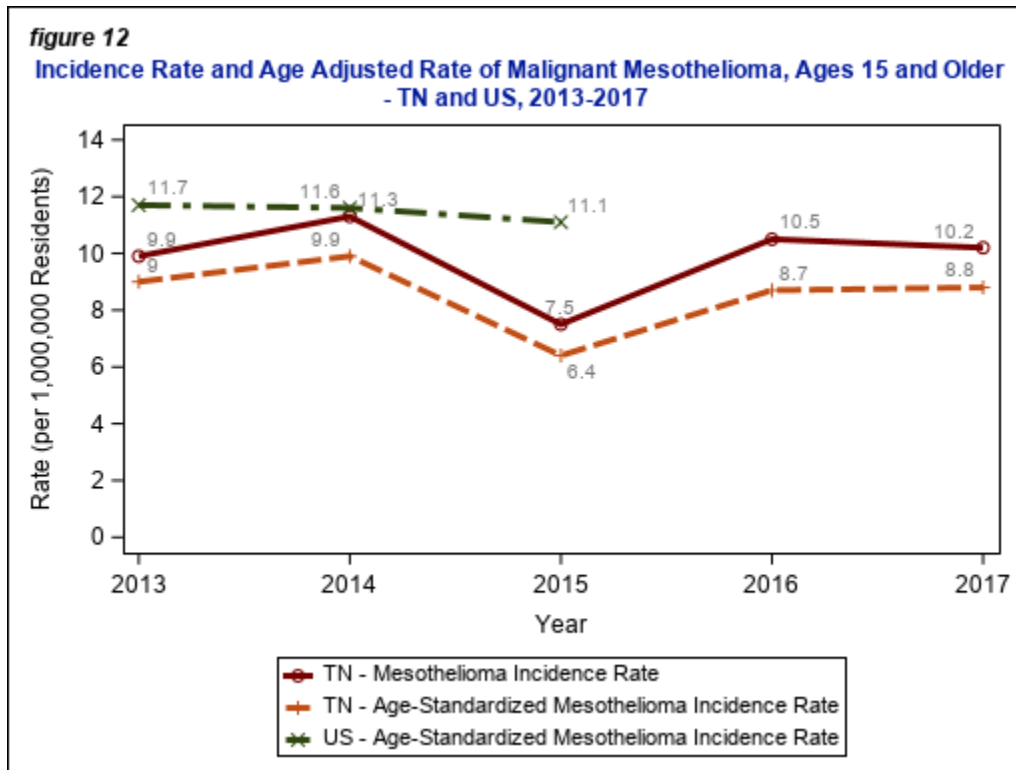


Data Source: American Association of Poison Control Centers

Occupational Health Indicator 12: Incidence of Malignant Mesothelioma, Ages 15 and Older

This indicator represents the incident rate of mesothelioma cases in resident persons age 15 years or older. Mesothelioma is a fatal but rare cancer that is mostly attributed to exposure to asbestos in the workplace.

While there is some variation in mesothelioma rates over time (figure 12), the rate per 1,000,000 Tennessee residents has remained stable, and has not significantly changed year over the years studied. The maximum rate during this period was in 2014 (11.3 cases per 1,000,000 residents) and after adjusting for age, Tennessee has had a consistently lower rate of mesothelioma than the United States.



Data Sources: State Cancer Registries and North American Association of Central Cancer Registries (NAACCR) Incidence - Cancer in North America (CiNA) Production File, 1995-2015.

Occupational Health Indicator 13: Elevated Blood Lead Levels (BLL) Among Adults

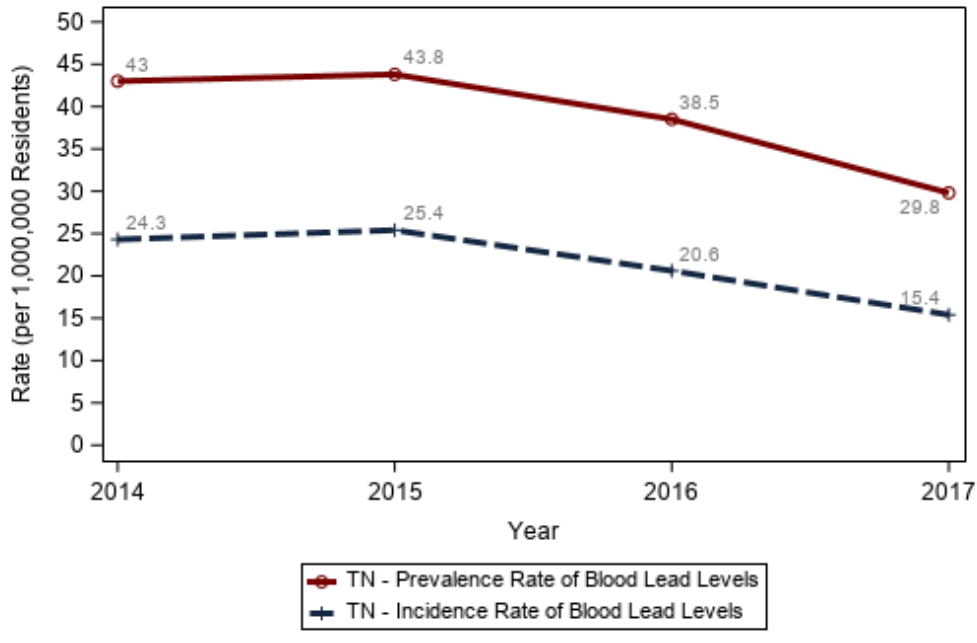
This indicator represents rates of elevated blood lead levels among workers and includes both incident (new) and prevalent (new plus existing) cases. Increased blood lead levels affect multiple organs and leads to toxicity. The typical blood lead level for U.S. adults is 0.92 $\mu\text{g}/\text{dL}$, and a blood lead level of $\geq 5 \mu\text{g}/\text{dL}$ is the threshold for meeting the NIOSH Adult Blood Lead Epidemiology and Surveillance case definition for an elevated blood level. For surveillance purposes, elevated blood lead level categories are $\geq 5 \mu\text{g}/\text{dL}$, $\geq 10 \mu\text{g}/\text{dL}$, $\geq 25 \mu\text{g}/\text{dL}$, and $\geq 40 \mu\text{g}/\text{dL}$. With increasing blood levels, increased testing frequency is recommended, and at levels over 25 $\mu\text{g}/\text{dL}$, removal from the workplace is recommended, depending on the industry.

At the lower end of lead toxicity (i.e., $\geq 5 \mu\text{g}/\text{dL}$; $\geq 10 \mu\text{g}/\text{dL}$), both the prevalence and incidence rates of elevated blood lead levels decreased in Tennessee. For instance, the prevalence rate of Tennesseans with elevated blood lead level at the $\geq 10 \mu\text{g}/\text{dL}$ decreased from 31.66 per 1,000,000 residents in 2013 down to 15.76 in 2017, cutting the prevalence rate almost in half.

However, at toxicity level $\geq 40 \mu\text{g}/\text{dL}$, the prevalence rate has remained about the same with 0.70 at its maximum and 0.36 at its lowest.

figure 13.1

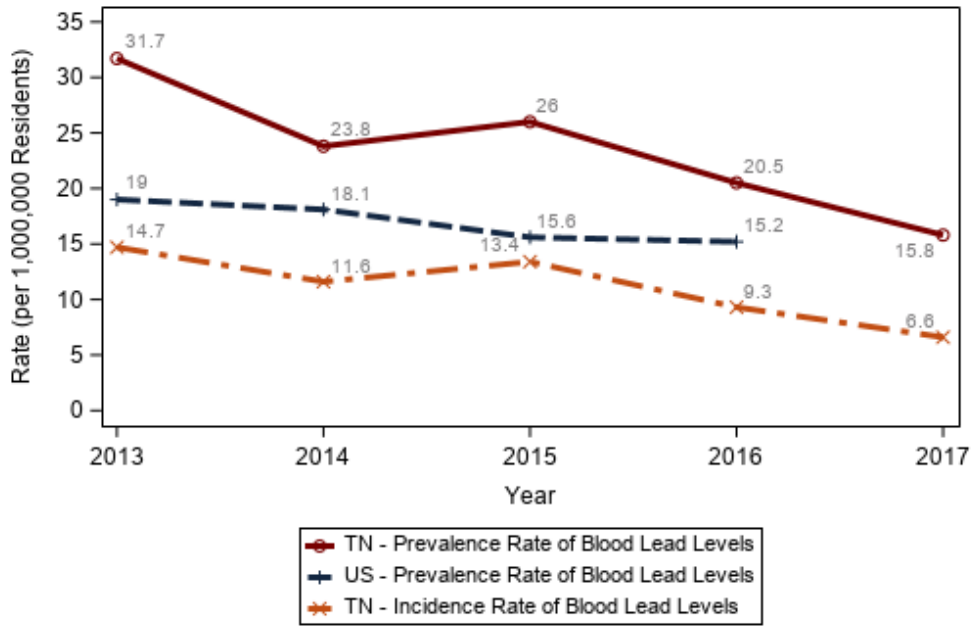
**Prevalence and Incidence Rate of Elevated Blood Lead Levels (BLL) Among Adults
"≥ 5 µg/dL" - TN, 2013-2017**



Data Sources: State Adult Blood Lead Epidemiology and Surveillance (ABLES) Program, Bureau of Labor Statistics' *Geographic Profile of Employment and Unemployment*, Current Population Survey (CPS) and Local Area Unemployment Statistics (LAUS) Program

figure 13.2

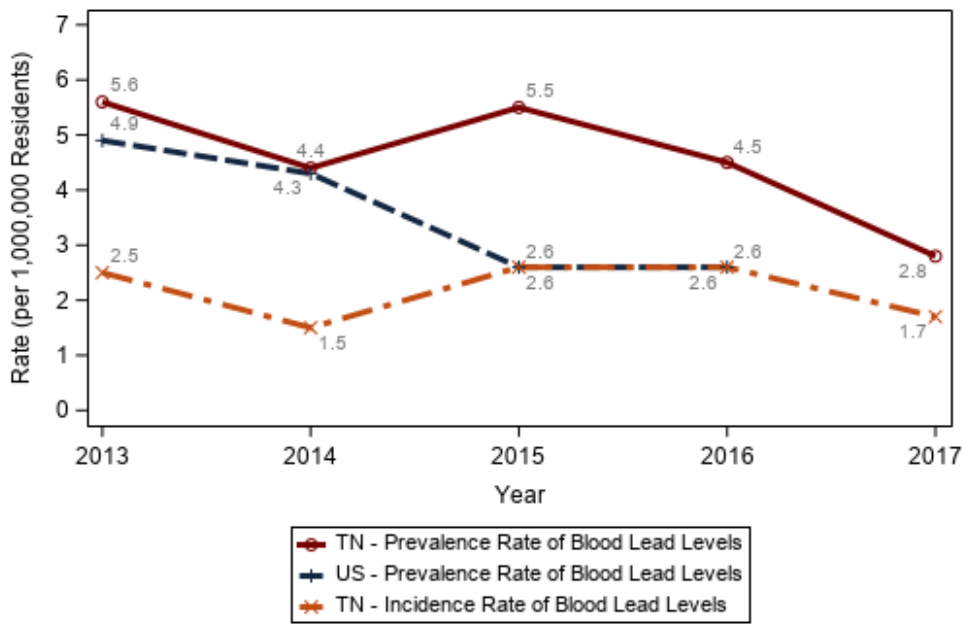
Prevalence and Incidence Rate of Elevated Blood Lead Levels (BLL) Among Adults
 "≥ 10 µg/dL" - TN and US, 2013-2017



Data Sources: State Adult Blood Lead Epidemiology and Surveillance (ABLES) Program, Bureau of Labor Statistics' *Geographic Profile of Employment and Unemployment*, Current Population Survey (CPS) and Local Area Unemployment Statistics (LAUS) Program

figure 13.3

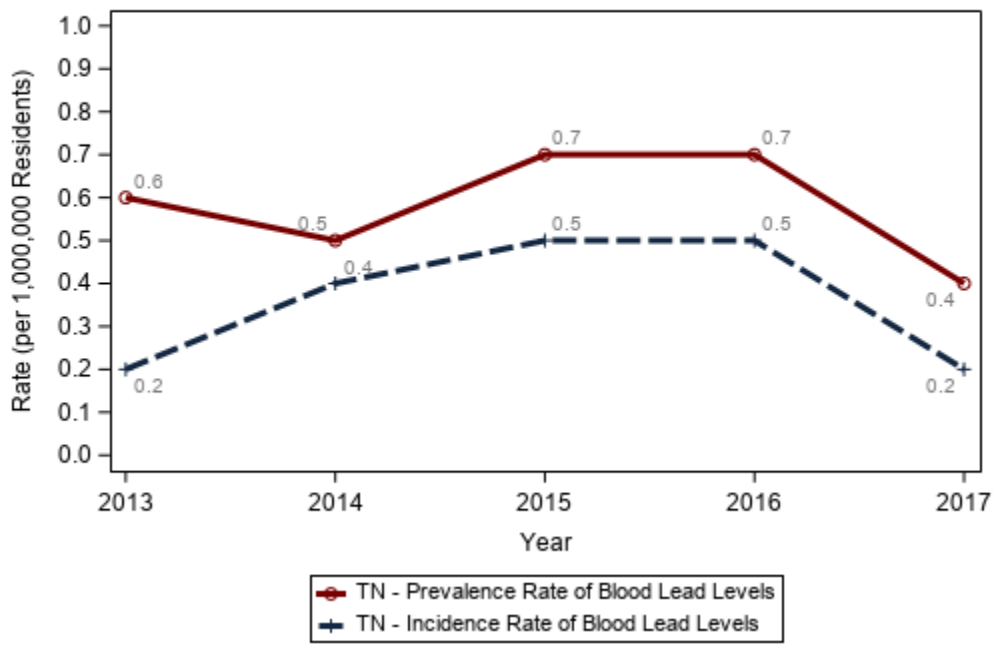
Prevalence and Incidence Rate of Elevated Blood Lead Levels (BLL) Among Adults
 "≥ 25 µg/dL" - TN and US, 2013-2017



Data Sources: State Adult Blood Lead Epidemiology and Surveillance (ABLES) Program, Bureau of Labor Statistics' *Geographic Profile of Employment and Unemployment*, Current Population Survey (CPS) and Local Area Unemployment Statistics (LAUS) Program

figure 13.4

Prevalence and Incidence Rate of Elevated Blood Lead Levels (BLL) Among Adults
" $\geq 40 \mu\text{g/dL}$ " - TN, 2013-2017



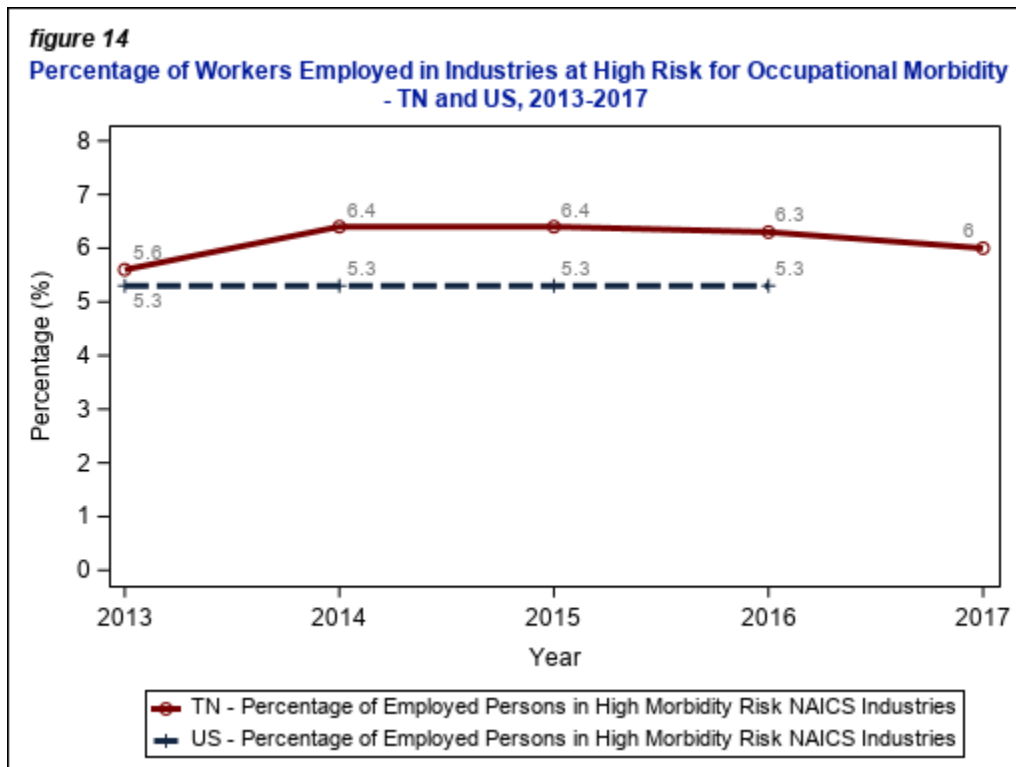
Data Sources: State Adult Blood Lead Epidemiology and Surveillance (ABLES) Program, Bureau of Labor Statistics' *Geographic Profile of Employment and Unemployment*, Current Population Survey (CPS) and Local Area Unemployment Statistics (LAUS) Program

Occupational Health Indicator 14: Percentage of Workers Employed in Industries at High Risk for Occupational Morbidity

Indicator 14 is the percentage of workers who are employed in high-risk or dangerous industries. Industry* is the main type of activity at a person's place of work (e.g., manufacturing), and a "dangerous industry" is one in which the national rate of occupational injury or illness is more than twice the national average, or greater than 6.4 per 100 FTE in 2014, the data year for which the list of industries was compiled. To allow states to study trends, this list has been held constant since 2014. This indicator quantifies the burden for non-fatal injuries and helps to prioritize resources. Industries are coded according to the North American Industry Classification System (NAICS).

The percentage of workers employed in high risk industries in Tennessee was stable over the 5-year period, with a slight increase between 2013 and 2014 that was sustained through 2017. Overall, the percentage of workers in high risk industries remains higher for Tennessee, when compared to the United States, which has remained constant over the observed time period.

**Refer to the glossary for more on industry versus occupation.*



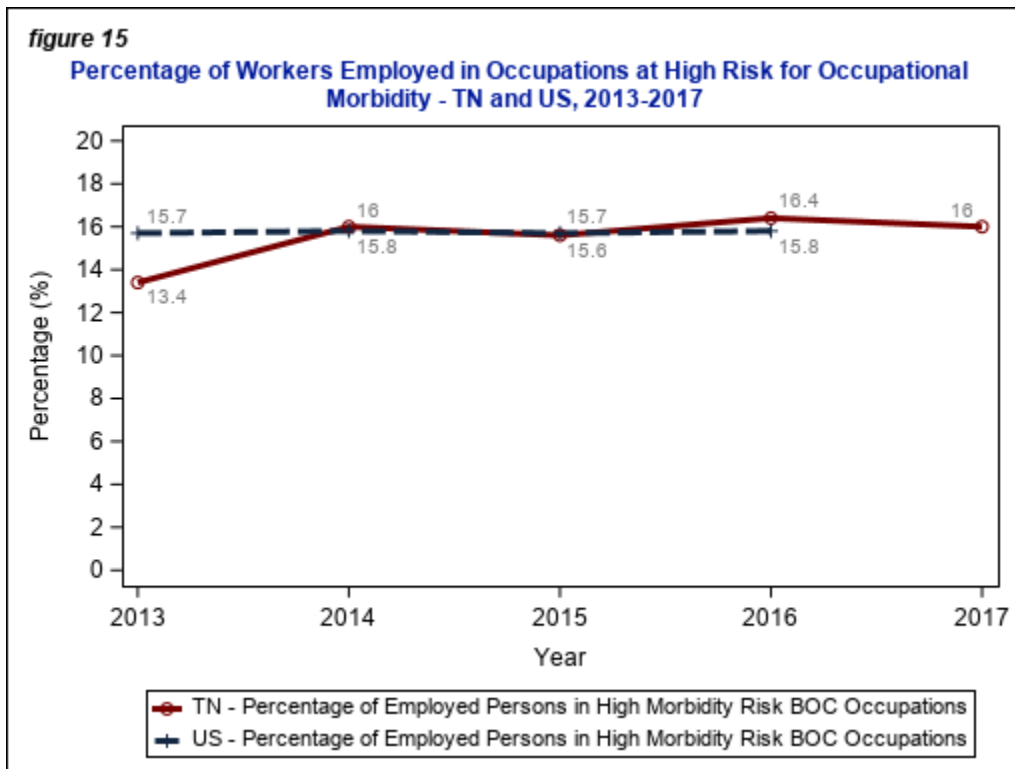
Data Source: Census Bureau's County Business Patterns

Occupational Health Indicator 15: Percentage of Workers Employed in Occupations at High Risk for Occupational Morbidity

Where indicator #14 focused on workers in high risk *industries*, this indicator focuses on the percentage of workers in high risk *occupations*. Occupation* refers to what an individual worker does (e.g., fabricator). A high-risk occupation is one in which its occupational illness and injury rate is more than twice the national average, or greater than 195.6 per 10,000 FTE. This indicator quantifies the burden for non-fatal injuries and helps to prioritize resources.

The percentage of workers employed in occupations at high-risk for occupational morbidity in Tennessee increased from 13.4% to 16.0 in 2013 to 2017, which is very similar to the national average.

**Refer to the glossary for more on industry versus occupation.*

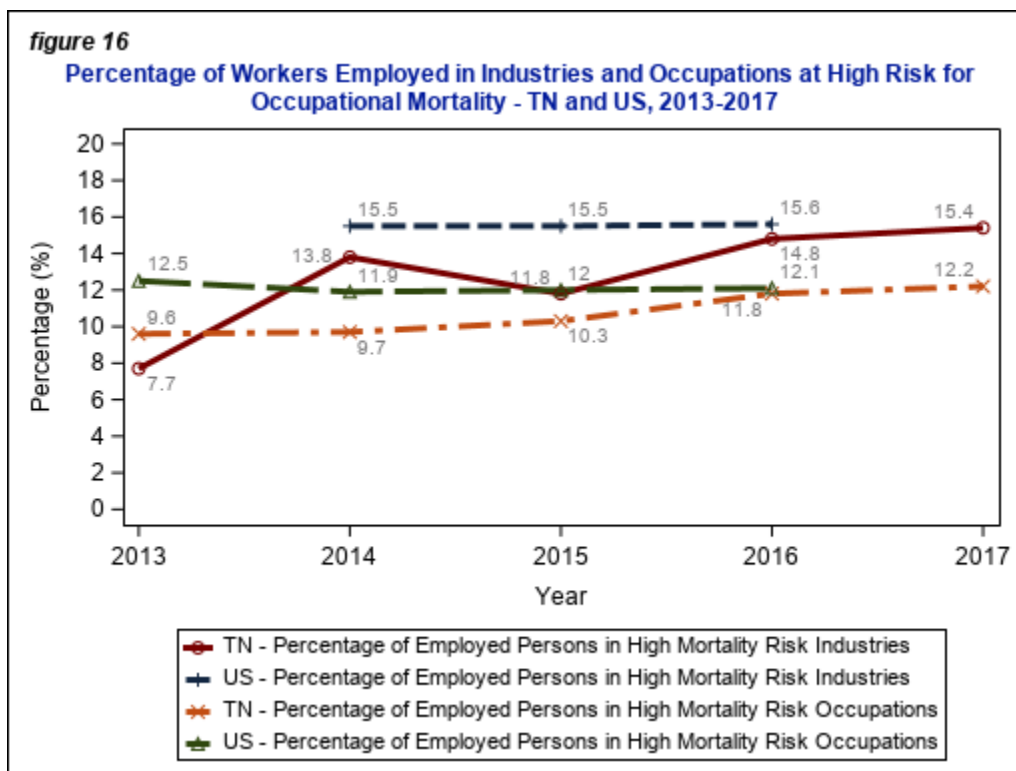


Data Source: Bureau of Labor Statistics' (BLS) Current Population Survey (CPS)

Occupational Health Indicator 16: Percentage of Workers Employed in Industries and Occupations at High Risk for Occupational Mortality

This indicator is similar to Indicators #14 and #15 and reports the percentage of all workers employed in industries and occupations with a higher risk of death. In this indicator, a high-risk industry or occupation reflects industries and occupations with a fatality rate more than double the average rate in the Bureau of Labor Statistics' Census of Fatal Occupation Injuries.

The percentage of workers employed in high mortality risk industries in Tennessee increased from 7.66% in 2013 to 14.75% in 2016. For high mortality risk occupations in Tennessee, the percentage increased from 9.57% in 2013 to 11.8% in 2016. In 2013, Tennessee generally had a smaller percentage of its workers in high mortality industries and occupations than there were nationally, but by 2017, it was similar to the national percentage.

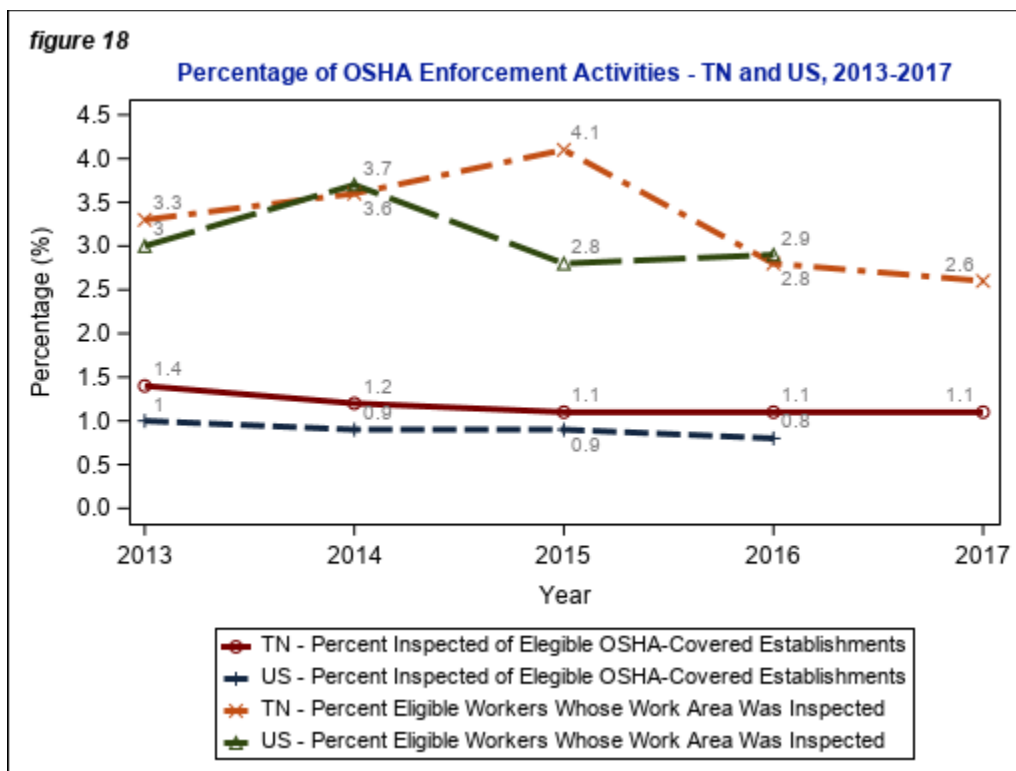


Data Source: Bureau of Labor Statistics' (BLS) Current Population Survey (CPS)

Occupational Health Indicator 18: OSHA Enforcement Activities

This indicator measures the proportion of workplaces inspected by the Occupational Safety and Health Administration (OSHA). Included in this measure is the percentage of eligible work sites inspected, as well as the percentage of OSHA-covered workers receiving an inspection. It is not OSHA's intent to inspect every workplace, and inspection activities are focused on those workplaces at highest risk or those where complaints have been filed or inspections requested due to unsafe conditions. Therefore, this measure can be seen as a measure of workplaces with unsafe conditions.

The percentage of OSHA enforcement activities in Tennessee has remained consistently low over the years 2013-2017 but is higher than the US value. These workplaces receiving inspections represent approximately 3-4% of workers employed at OSHA covered workplaces.

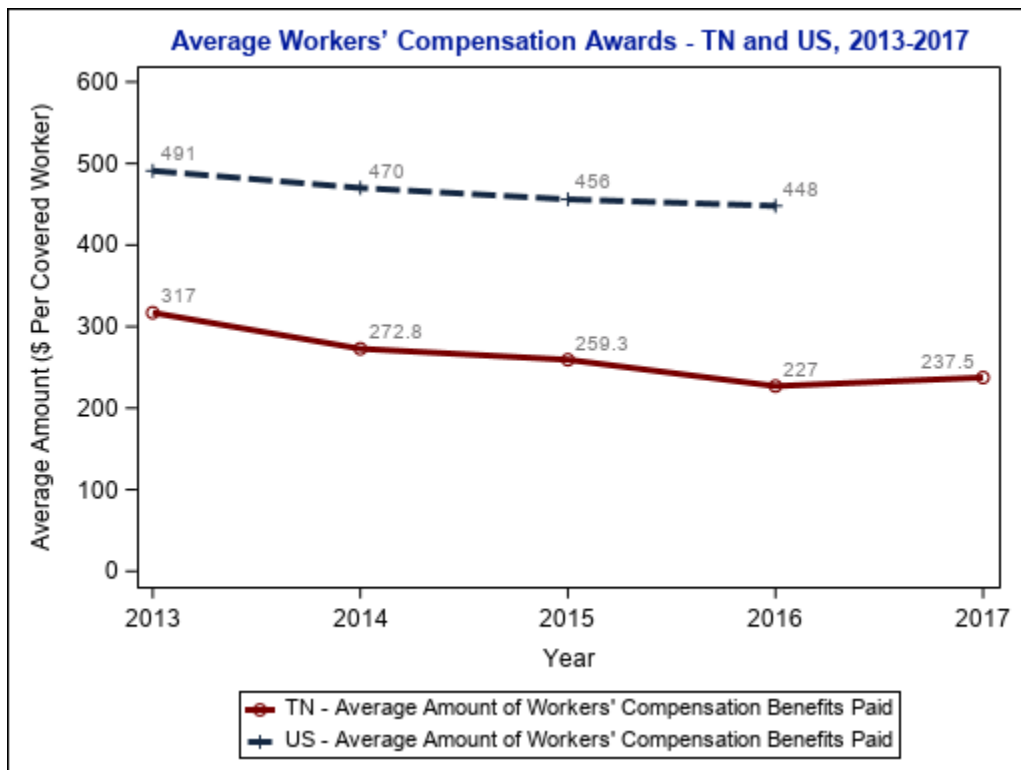


Data Sources: Occupational Safety and Health Administration (OSHA) Annual Inspection Reports and Bureau of Labor Statistics' Covered Employers and Wages (ES-202/QCEW)

Occupational Health Indicator 19: Workers' Compensation Awards

This indicator measures the average benefit received from workers' compensation per covered worker. This calculation involves dividing the total workers compensation award by the total number of workers (not the number of workers who received compensation). This provides a measure of the overall burden of work-related injuries and illnesses in the state.

The average worker compensation award in Tennessee declined from \$317 per covered worker in 2013 to \$237 in 2017. The national average also declined over this period, and the Tennessee average is consistently smaller than the national average.

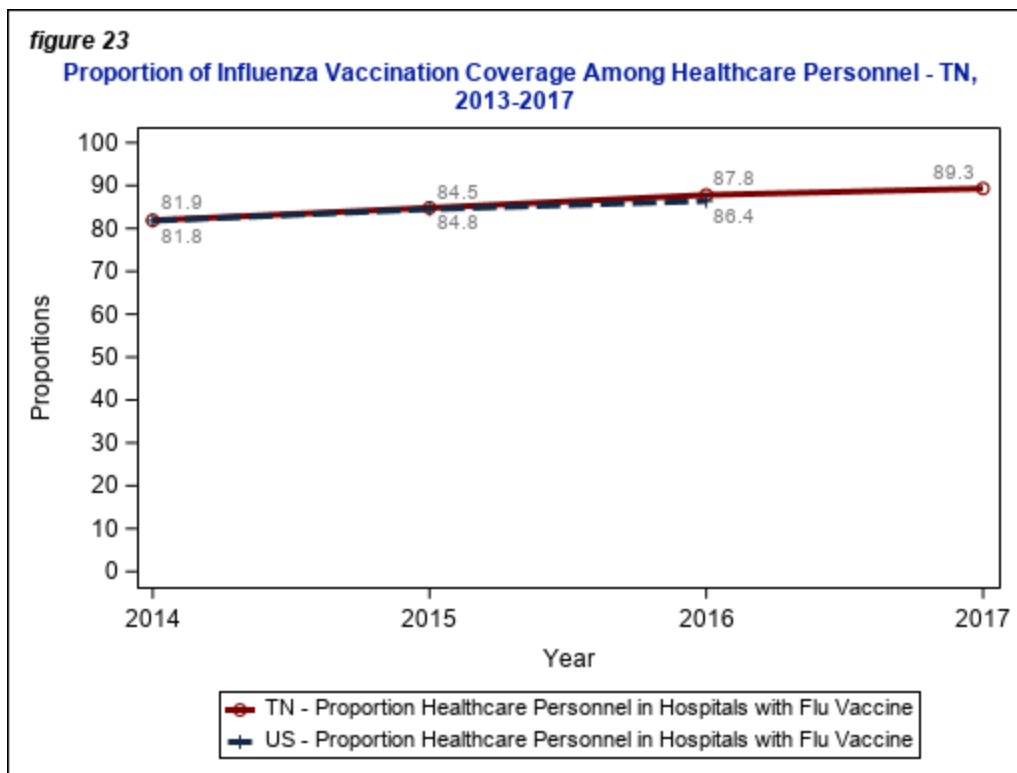


Data Source: National Academy of Social Insurance

Occupational Health Indicator 23: Influenza Vaccination Coverage Among Healthcare Personnel

Indicator #23 represents the percentage of healthcare personnel (HCP) working in licensed acute care facilities receiving their annual influenza vaccine.

Influenza vaccine coverage among HCP in Tennessee increased progressively from 81.9% in 2014 to 89.3% in 2017 and was similar to U.S. influenza vaccine coverage among HCP.



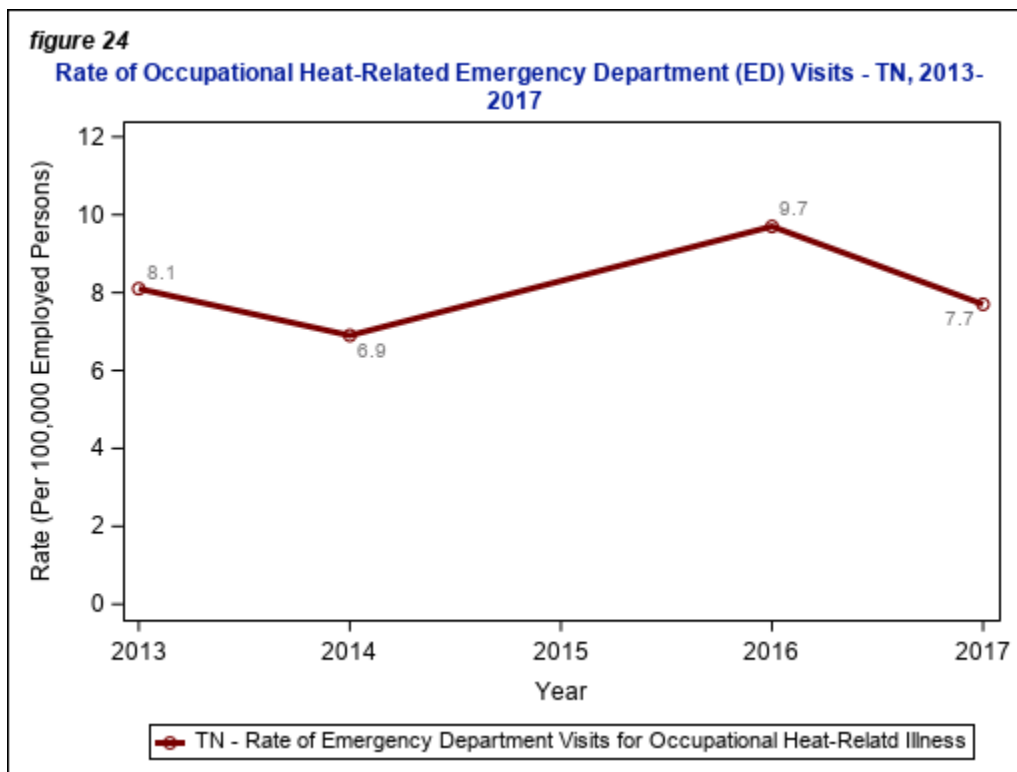
Data Source: Centers for Disease Control and Prevention, Healthcare Safety Network

Occupational Health Indicator 24: Occupational Heat-Related Emergency Department (ED) Visits

This indicator measures workers who visited the emergency department (ED) for heat-related conditions.

The rate of heat-related emergency department visits remained relatively stable over time and ranged from 6.90 visits in 2014 per 100,000 employed persons to 9.68 visits per 100,000 employed persons in 2016.

National comparison data is not available.



Data Source: Tennessee Department of Health, Population Health Assessment, Hospital Discharge Data System

APPENDIX A: Glossary

Incidence: A measure of the frequency with which an event, such as a new case of illness, occurs in a population over a specified period of time.

Industry: A group of establishments that produce similar products or provide similar services. For example, all establishments that manufacture automobiles are in the same industry. A given industry, or even a particular establishment in that industry, might have employees in dozens of occupations.

Occupation: A set of activities or tasks that employees are paid to perform. Employees that perform essentially the same tasks are in the same occupation, whether or not they work in the same industry. Some occupations are concentrated in a few particular industries; other occupations are found in many industries.

Prevalence: The proportion of persons in a population who have a particular disease or attribute at a specified point in time or over a specified period of time.

Private Sector The employer is a non-governmental agency. Additionally, the individual is not self-employed or employed by a small (10 employees or less) agricultural establishment.

Public Sector: The employer is a government agency – local, state, federal, or of another nation.

APPENDIX B: Occupational Health Injury Indicators or Rates in TN & US, 2013-2017

Indicators Subparts-Defined	2013		2014		2015		2016		2017	
	TN	US	TN	US	TN	US	TN	US	TN	US
1.1 Estimated Annual Total Number of Work-Related Injuries and Illnesses	62,900	3,007,300	62,000	2,953,500	61,200	2,905,900	60,200	2,857,400	60,100	
1.2 Estimated Annual Total Work-Related Injuries and Illness Incidence Rate (per 100,000 FTEs)	3,300	3,300	3,200	3,200	3,100	3,000	2,900	2,900	2,900	
1.3 Estimated Annual Total Number of Cases Involving Days Away From Work	16,800	917,090	16,000	916,440	30,600	902,160	15,900	892,270	17,000	
1.4 Estimated Annual Total Incidence Rate for Cases Involving Days Away From Work (per 100,000 FTEs)	900	999	800	978	800	939	800	917	800	
1.5 Estimated Annual Total Number of Cases Involving More Than 10 Days Away From Work	7,920	420,410	7,170	426,430	8,140	412,720	7,420	407,310	8,340	
2.1 Annual Number of Inpatient Work-Related Hospitalizations	2,665		2,558		2,597		2,550		2,542	
2.2 Annual Rate of Inpatient Work-Related Hospitalization (per 100,000 workers)	94.60		90.50		89.21		85.09		82.59	
3.1 Annual Number of Fatal Work-Related Injuries	95	4,585	127	4,821	112	4,836	122	5,190	128	
3.2 Annual Fatality Rate (per 100,000 FTEs)	3.59	3.3	4.70	3.4	4.00	3.4	4.21	3.6	4.28	
4.1 Estimated Annual Number of Work-Related Amputations Involving Days Away from Work	110	6,160	120	4,250	150	5,360	130	5,060	180	
4.2 Estimated Annual Incidence Rate of Work-Related Amputations Involving Days Away from Work (per 100,000 FTEs)	6	7	7	5	7	6	6	5	8	
5.1 Annual Number of Amputation Cases with Lost Work-Time Filed with State Workers' Compensation System			166		167		153		146	
5.2 Annual Incidence Rate of Amputation Cases with Lost Work-Time Filed with State Workers' Compensation System (per 100,000 covered workers)			6.38		6.30		5.58		5.24	
6.1 Annual Number of Inpatient Hospitalizations for Work-Related Burns	50		44		50		46		32	

Indicators Subparts-Defined	2013		2014		2015		2016		2017	
	TN	US	TN	US	TN	US	TN	US	TN	US
6.2 Annual Rate of Inpatient Hospitalizations for Work-Related Burns (per 100,000 workers)	1.77		1.60		1.72		1.53		1.04	
7.1 Estimated Annual Number of All MSDs Involving Days Away from Work	5,950	307,640	5,040	298,460	5,030	286,350	5,040	285,950	4,870	
7.2 Estimated Annual Incidence Rate of All MSDs Involving Days Away from Work (per 100,000 FTEs)	315	335	261	319	252	298	243	294	232	
7.3 Estimated Annual Number of MSDs of the Neck, Shoulder & Upper Extremities Involving Days Away from Work	1,840	94,620	1,840	93,410	1,850	92,380	1,850	90,910	1,690	
7.4 Estimated Annual Incidence Rate of MSDs of Neck, Shoulder, and Upper Extremities Involving Days Away from Work (per 100,000 FTEs)	98	103	95	100	93	96	89	93	80	
7.5 Estimated Annual Number of Carpal Tunnel Syndrome Cases Involving Days Away from Work	130	6,440	120	6,800	90	4,920	60	5390	100	
7.6 Estimated Annual Incidence Rate of Carpal Tunnel Syndrome Cases Involving Days Away from Work (per 100,000 FTEs)	7	7	6	7	4	5	3	6	5	
7.7 Estimated Annual Number of MSDs of the Back Involving Days Away from Work	2,360	126,070	2,130	119,780	1,670	113,450	1,940	113,320	1,690	
7.8 Estimated Annual Incidence Rate of MSDs of the Back Involving Days Away from Work (per 100,000 FTEs)	125	137	111	128	83	118	94	116	81	
8.1 Annual Number of Carpal Tunnel Syndrome Cases with Lost Work-Time Filed with State Workers' Compensation System			309		279		125		115	
8.2 Annual Incidence Rate of Carpal Tunnel Syndrome Cases with Lost Work-Time Filed with State Workers' Compensation System (per 100,000 covered workers)			11.87		10.52		8.70		4.13	
9.1.1 Annual Number of Inpatient Hospital Discharges for Total Pneumoconiosis	695		713		630		512		544	
9.1.2 Annual Rate of Inpatient Hospital Discharges for Total Pneumoconiosis (per 1,000,000 residents)	132.20		134.30		117.53		94.67		99.51	
9.1.3 Annual Age-Standardized Rate of Inpatient Hospital Discharges for Total Pneumoconiosis (per 1,000,000 residents)	119.59		120.50		104.30		83.12		86.19	
9.2.1 Annual Number of Inpatient Hospital Discharges for Coal Workers' Pneumoconiosis	212		235		163		157		181	

Indicators Subparts-Defined	2013		2014		2015		2016		2017	
	TN	US	TN	US	TN	US	TN	US	TN	US
9.2.2 Annual Rate of Inpatient Hospital Discharges for Coal Workers' Pneumoconiosis (per 1,000,000 residents)	40.30		44.30		30.41		29.03		33.11	
9.2.3 Annual Age-Standardized Rate of Inpatient Hospital Discharges for Coal Workers' Pneumoconiosis (per 1,000,000 residents)	35.40		38.50		26.33		24.07		27.31	
9.3.1 Annual Number of Inpatient Hospital Discharges for Asbestosis	402		382		370		293		301	
9.3.2 Annual Rate of Inpatient Hospital Discharges for Asbestosis (per 1,000,000 residents)	76.50		72.00		69.03		54.18		55.06	
9.3.3 Annual Age-Standardized Rate of Inpatient Hospital Discharges for Asbestosis (per 1,000,000 residents)	70.40		66.20		62.24		49.01		48.94	
9.4.1 Annual Number of Inpatient Hospital Discharges for Silicosis	37		44		49		27		24	
9.4.2 Annual Rate of Inpatient Hospital Discharges for Silicosis (per 1,000,000 residents)	7.04		8.30		9.14		4.99		4.39	
9.4.3 Annual Age-Standardized Rate of Inpatient Hospital Discharges for Silicosis (per 1,000,000 residents)	6.20		6.80		8.03		4.28		3.70	
9.5.1 Annual Number of Inpatient Hospital Discharges for Other and Unspecified Pneumoconiosis	54		69		66		48		51	
9.5.2 Annual Rate of Inpatient Hospital Discharges for Other and Unspecified Pneumoconiosis (per 1,000,000 residents)	10.27		13.00		12.31		8.88		9.33	
9.5.3 Annual Age-Standardized Rate of Inpatient Hospital Discharges for Other and Unspecified Pneumoconiosis (per 1,000,000 residents)	9.20		11.80		10.70		7.81		8.19	
10.1.1 Annual Number of Total Pneumoconiosis Deaths	47	1,859	45	1,790	50	1,735	42	1,662	57	
10.1.2 Annual Total Pneumoconiosis Death Rate (per 1,000,000 residents)	8.94		8.50		9.33		7.77		10.43	
10.1.3 Annual Age-Standardized Total Pneumoconiosis Death Rate (per 1,000,000 residents)	8.52	6.8	7.90	6.4	8.73	6.0	7.14	5.6	9.45	
10.2.1 Annual Number of Coal Workers' Pneumoconiosis Deaths	<5	361	<5	363	11	323	8	300	16	

Indicators Subparts-Defined	2013		2014		2015		2016		2017	
	TN	US	TN	US	TN	US	TN	US	TN	US
10.2.2 Annual Coal Workers' Pneumoconiosis Death Rate (per 1,000,000 residents)	*		*		2.05		1.48		2.93	
10.2.3 Annual Age-Standardized Coal Workers' Pneumoconiosis Death Rate (per 1,000,000 residents)	*	1.2	*	1.3	1.8	1.0	1.38	0.8	2.52	
10.3.1 Annual Number of Asbestosis Deaths	35	1,229	34	1,218	35	1,188	27	1,142	32	
10.3.2 Annual Asbestosis Death Rate (per 1,000,000 residents)	6.66		6.40		6.53		4.99		5.85	
10.3.3 Annual Age-Standardized Asbestosis Death Rate (per 1,000,000 residents)	6.43	4.5	6	4.3	6.18	4.2	4.62	3.9	5.39	
10.4.1 Annual Number of Silicosis Deaths	<5	111	<5	84	<5	105	<5	73	<5	
10.4.2 Annual Silicosis Death Rate (per 1,000,000 residents)	*		*		*		*		*	
10.4.3 Annual Age-Standardized Silicosis Death Rate (per 1,000,000 residents)	*	0.3	*	0.3	*	0.3	*	0.2	*	
10.5.1 Annual Number of Other and Unspecified Pneumoconiosis Deaths	8	170	6	134	<5	136	6	161	8	
10.5.2 Annual Other and Unspecified Pneumoconiosis Death Rate (per 1,000,000 residents)	1.50		1.10		*		1.11		1.46	
10.5.3 Annual Age-Standardized Other and Unspecified Pneumoconiosis Death Rate (per 1,000,000 residents)	1.40	0.5	1.00	0.4	*	0.4	0.96	0.5	1.36	
11.1 Annual Number of Reported Work-Related Pesticide Poisoning Cases	41	2,631	34	2,494	44	2,490	29	2,490	43	
11.2 Annual Incidence Rate of Reported Work-Related Pesticide Poisoning Cases (per 100,000 workers)	1.5	1.8	1.20	1.7	1.51	1.7	0.97	1.7	1.40	
12.1 Annual Number of Incident Mesothelioma Cases	52	3,114	60	3,127	40	3,098	57		56	
12.2 Annual Mesothelioma Incidence Rate (per 1,000,000 residents)	9.89		11.30		7.46		10.54		10.24	
12.3 Annual Age-Standardized Mesothelioma Incidence Rate (per 1,000,000 residents)	9	11.7	9.90	11.6	6.37	11.1	8.74		8.77	
13.1.1 Annual Number of Residents with Elevated Blood Lead Levels (≥ 5 $\mu\text{g/dL}$)			1,214		1,265		1,153		916	
13.1.2 Annual Prevalence Rate of Blood Lead Levels (≥ 5 $\mu\text{g/dL}$) (per 100,000 workers)			42.96		43.80		38.47		29.76	
13.1.3 Annual Number of Incident Cases with Elevated Blood Lead Levels (≥ 5 $\mu\text{g/dL}$)			688		734		616		916	

Indicators Subparts-Defined	2013		2014		2015		2016		2017	
	TN	US	TN	US	TN	US	TN	US	TN	US
13.1.4 Annual Incidence Rate of Blood Lead Levels (≥ 5 $\mu\text{g/dL}$) (per 100,000 workers)			24.35		25.40		20.55		29.76	
13.2.1 Annual Number of Residents with Elevated Blood Lead Levels (≥ 10 $\mu\text{g/dL}$)	892		674	17,468	749	17,474	614	14,791	485	
13.2.2 Annual Prevalence Rate of Blood Lead Levels (≥ 10 $\mu\text{g/dL}$) (per 100,000 workers)	31.66	19	23.85	18.1	26	15.6	20.49	15.2	15.76	
13.2.3 Annual Number of Incident Cases with Elevated Blood Lead Levels (≥ 10 $\mu\text{g/dL}$)	414		329		386		280		204	
13.2.4 Annual Incidence Rate of Blood Lead Levels (≥ 10 $\mu\text{g/dL}$) (per 100,000 workers)	14.70		11.64		13.40		9.34		6.63	
13.3.1 Annual Number of Residents with Elevated Blood Lead Levels (≥ 25 $\mu\text{g/dL}$)	158		124	4,260	159	2,907	136	2,563	85	
13.3.2 Annual Prevalence Rate of Blood Lead Levels (≥ 25 $\mu\text{g/dL}$) (per 100,000 workers)	5.61	4.9	4.39	4.3	5.50	2.6	4.54	2.6	2.76	
13.3.3 Annual Number of Incident Cases with Elevated Blood Lead Levels (≥ 25 $\mu\text{g/dL}$)	71		41		74		79		52	
13.3.4 Annual Incidence Rate of Blood Lead Levels (≥ 25 $\mu\text{g/dL}$) (per 100,000 workers)	2.52		1.45		2.60		2.64		1.69	
13.4.1 Annual Number of Residents with Elevated Blood Lead Levels (≥ 40 $\mu\text{g/dL}$)	16		13		19		20		11	
13.4.2 Annual Prevalence Rate of Blood Lead Levels (≥ 40 $\mu\text{g/dL}$) (per 100,000 workers)	0.57		0.46		0.70		0.67		0.36	
13.4.3 Annual Number of Incident Cases with Elevated Blood Lead Levels (≥ 40 $\mu\text{g/dL}$)	7		10		14		15		7	
13.4.4 Annual Incidence Rate of Blood Lead Levels (≥ 40 $\mu\text{g/dL}$) (per 100,000 workers)	0.25		0.35		0.48		0.50		0.23	
14.1 Number of Employed Persons in High Morbidity Risk North American Industry Classification System (NAICS) Industries	157,592	6,308,407	157,395	6,409,798	159,547	6,584,237	163,481	6,682,275	159,897	
14.2 Percentage of Employed Persons in High Morbidity Risk NAICS Industries	5.59%	5.30%	6.42%	5.30%	6.36%	5.30%	6.30%	5.3%	6.02	
15.1 Number of Employed Persons in High Morbidity Risk Bureau of the Census (BOC) Occupations	377,117	17,053,040	345,565	17,605,210	357,944	17,778,497	384,946	18,256,349	380,964	
15.2 Percentage of Employed Persons in High Morbidity Risk BOC Occupations	13.39%	15.70%	16%	15.80%	15.56%	15.70%	16.39%	15.8%	15.96%	
16.1 Number of Employed Persons in High Mortality Risk Bureau of Census (BOC) Industries	215,846	19,070,007	338,318	19,579,754	272,258	19,880,868	386,071	20,367,099	414,489	
16.2 Percentage of Employed Persons in High Mortality Risk BOC Industries	7.66%	15.40%	13.80%	15.50%	11.84%	15.50%	14.75%	15.6%	15.42%	

Indicators Subparts-Defined	2013		2014		2015		2016		2017	
	TN	US	TN	US	TN	US	TN	US	TN	US
16.3 Number of Employed Persons in High Mortality Risk BOC Occupations	269,666	15,442,987	237,304	15,023,126	236,307	15,398,847	308,908	15,769,868	327,357	
16.4 Percentage of Employed Persons in High Mortality Risk BOC Occupations	9.57%	12.50%	9.70%	11.90%	10.27%	12%	11.80%	12.1%	12.18%	
17.1.1 Number of Board-Certified Occupational Medicine Physicians			56	3,064	57	3,082	Measure 17 discontinued			
17.1.2 Rate of Board-Certified Occupational Medicine Physicians (per 100,000 employees)			1.98	2.1	1.96	2.1				
17.2.1 Number of American College of Occupational and Environmental Medicine (ACOEM) Members	89	3,710	74	3,179	69	3,167				
17.2.2 Rate of American College of Occupational and Environmental Medicine (ACOEM) Members (per 100,000 employees)	3.2	2.6	2.62	2.2	2.37	2.1				
17.3.1 Number of Board-Certified Occupational Health Nurses	114	4,529	144	4,502	97	4,214				
17.3.2 Rate of Board-Certified Occupational Health Nurses (per 100,000 employees)	4	3.1	5.10	3.1	3.33	2.8				
17.4.1 Number of American Association of Occupational Health Nurse (AAOHN) Members										
17.4.2 Rate of American Association of Occupational Health Nurse (AAOHN) Members (per 100,000 employees)										
17.5.1 Number of Board-Certified Industrial Hygienists	132	5,785	124	5,701	45	2,186				
17.5.2 Rate of Board-Certified Industrial Hygienists (per 100,000 employees)	4.7	4	4.39	3.9	1.55	1.5				
17.6.1 Number of American Industrial Hygiene Association (AIHA) Members	107	6,224	20	1,286	118	7,203				
17.6.2 Rate of American Industrial Hygiene Association (AIHA) Members (per 100,000 employees)	3.8	4.3	0.71	0.9	4.05	4.8				
17.7.1 Number of Board-Certified Safety Health Professionals (BCSP)	380	13,687	382	14,132	339	14,915				
17.7.2 Rate of Board-Certified Safety Health Professionals (BCSP) (per 100,000 employees)	13.5	9.5	13.52	9.7	11.65	10				
17.8.1 Number of American Society of Safety Engineers (ASSE) Members	712	32,907	702	32,092	680	32,643				

Indicators Subparts-Defined	2013		2014		2015		2016		2017	
	TN	US	TN	US	TN	US	TN	US	TN	US
17.8.2 Rate of American Society of Safety Engineers (ASSE) Members (per 100,000 employees)	25.3	22.9	24.84	21.9	23.36	21.9	Measure 17 discontinued			
18.1 Annual Number of Employer Establishments Inspected by OSHA	1,827	88,239	1,698	83,701	1,574	79,281	1,692	74,350	1,774	
18.2 Number of OSHA-Covered Establishments that are Eligible for OSHA Inspection (EXCLUDING MINES & FARMS)	130,819	8,818,558	145,729	8,970,995	149,556	9,126,538	152,424	9,320,150	156,169	
18.3 Percentage of OSHA-Covered Establishments Eligible for Inspection that were Inspected by OSHA	1.40%	1.00%	1.17%	0.90%	1.05%	0.90%	1.11%	0.8%	1.14%	
18.4 Annual Number of Employees Whose Work Areas were Inspected by OSHA	79,435	3,301,630	84,279	4,235,194	113,873	3,262,194	79,179	3,409,034	74,805	
18.5 Number of OSHA-Covered Employees (EXCLUDING MINERS & FARMERS)	2,394,068	111,552,868	2,333,185	114,121,159	2,811,090	116,932,999	2,878,972	119,247,257	2,922,243	
18.6 Percentage of OSHA-Covered Employees Eligible for Inspection Whose Work Areas were Inspected by OSHA	3.32%	3.00%	3.61%	3.70%	4.05%	2.80%	2.75%	2.9%	2.56%	
19.1 Total Amount of Workers' Compensation Benefits Paid (\$)	808,055	63,574,440	710,062	62,306,736	687,595	61,856,542	622,459	61,918,340	661,846	
19.2 Average Amount of Workers' Compensation Benefits Paid (\$ per covered worker)	317	491	272.79	470.00	259.27	456.00	227.01	448.00	237.48	
20.1 Annual Number of Work-Related Surgical Low Back Disorder Hospitalizations	263		197		154					
20.2 Annual Rate of Work-Related Surgical Low Back Disorder Hospitalization (per 100,000 workers)	9.34		7.00							
20.3 Annual Number of Work-Related Low Back Disorder Hospitalizations	313		242		182					
20.4 Annual Rate of Work-Related Low Back Disorder Hospitalizations (per 100,000 workers)	11.11		8.60							
21.1a 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 (LANDLINE ONLY ESTIMATES)		10,438,354		1,643,907						
21.2a Estimated proportion of ever-employed adults with current asthma who report that their asthma was caused or made worse by exposures at work (LANDLINE ONLY ESTIMATES)		55.1		8						

Indicators Subparts-Defined	2013		2014		2015		2016		2017	
	TN	US	TN	US	TN	US	TN	US	TN	US
21.1b 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 (LANDLINE & CELLPHONE ESTIMATES)		7,884,871		6,703,447		6,460,686		8,054,104		
21.2b Estimated proportion of ever-employed adults with current asthma who report that their asthma was caused or made worse by exposures at work (LANDLINE & CELLPHONE ESTIMATES)		53.2		49.3		52.1		52.0		
22.1 Annual Number of Work-Related Inpatient Hospitalizations for Severe Traumatic Injury	338		340		327					
22.2 Annual Rate of Work-Related Inpatient Hospitalizations for Severe Traumatic Injury (per 100,000 workers)	12.00		12							
23.1 Pooled Proportion of Healthcare Personnel Influenza Vaccination Coverage in Acute Care Hospitals (2015–2016 influenza season)			81.90	81.8	84.8	84.5	87.8	86.4	89.3	
24.1 Annual Number of Emergency Department Visits for Occupational Heat-Related Illness	227		195		345		290		225	
24.2 Annual Rate of Emergency Department Visits for Occupational Heat-Related Illness (per 100,000 employed persons)	8.06		6.90				9.68		7.3	
25.1 Annual Number of Inpatient Hospitalizations for or with Occupational Eye Injuries							20		28	
25.2 Annual Rate of Inpatient Hospitalizations for Occupational Eye Injuries (per 100,000 employed persons)							0.67		0.91	

<5 indicates the value is less than 5.

* indicates the value is based on a count less than 5 and so is suppressed.

An empty cell indicates the data was not gathered. US data for 2017 was unavailable.

A Note on Missing data:

Data stems from several different data sources and so there are several reasons for missing data. Some indicators were discontinued, are new, or not collected in Tennessee.

National Data is not available for indicators using hospital discharge data (indicators #2, #6, #9, #20, #22, #24, #25) or workers compensation data (#5, #8), as there is not a comparable national data set.

References

1. Data Source for United States Indicators (2013 - 2017): Council of State and Territorial Epidemiologists (CSTE). Retrieved from: <https://www.cste.org/page/OHIndicators>
2. Council of State and Territorial Epidemiologists (CSTE). (2016-2020) *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants*. Retrieved from: <https://www.cste.org/page/OHPublications>

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