

# **Mississippi Occupational Health and Safety Surveillance Report 2018**



**MISSISSIPPI STATE DEPARTMENT OF HEALTH**

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## Executive Summary

### Background

In 2014, more than one million people aged 16 years and older made up Mississippi's workforce. It accounted for 38% of the state population. More than 15% of employees were at high-risk occupation of morbidity/mortality, and 61 of every 100,000 workers experienced a work-related injury or illness, including a total number of 75 work-related fatalities.

Occupational health indicators can provide information on workers' health status and the associated risk factors. The current recommended set of indicators for occupational health surveillance is developed by the Council of State and Territorial Epidemiologists (CSTE) and the National Institute for Occupational Safety and Health (NIOSH) Work Group<sup>[1]</sup>. These indicators can be used by programs to prevent workplace injuries and illness in the state.

The most updated list contains 24 indicators. They are:

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

Mississippi State Department of Health (MSDH) currently identifies and tracks 21 of the 24 indicators. The establishment of the Occupational Health Surveillance (OHS) Program enables the MSDH to:

- Identify and track occupational health risks, safety exposures, and health effects;
- Increase the awareness of how the workplace impacts the health and lives of MS workforce;
- Prioritize occupational health needs;
- Design and implement outreach programs and preventive services;
- Collaborate with strategic partners and affect policy change in occupational health.

Indicators not available in Mississippi are:

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

**Highlights of the findings in this report:**

- In 2014, 68.6% of Mississippi employees reported 40 or more working hours per week compared to 40.6% in 2013. This represented a 69.0% increase.
- The top five fastest increasing industries in 2014 were: education and health services (25.6%), leisure and hospitality (8.3%), professional and business services (6.7%), financial activities (4.0%), and information (1.4%). The top five fastest increasing occupations were: professional and related occupations (21.5%), management, business

and financial operations (12.8%), sales and related occupations (9.7%), construction and extraction (6.5%), installation, maintenance, and repair (3.5%).

- The number of respiratory related deaths decreased: 28 workers died from pneumoconiosis in 2014 (32 in 2013), 23 workers died from asbestosis (25 in 2013), and no deaths from silicosis (2 in 2013).
- The morbidity decreased: the incident rate of work-related pesticide poisoning has decreased from 2.0 (2013) to 1.6 (2014) per 1,000,000 workers. Incident rate of carpal tunnel syndrome decreased from 14.2 (2013) to 13.2 (2014) per 1,000,000 workers.
- The percent of employees in high-risk industry/occupation decreased: the percentage of employed persons in high morbidity risk industries dropped from 8.9% in 2013 to 7.7% in 2014, and the percentage of employed persons in high mortality risk industries decreased from 19.4% in 2013 to 18.5% in 2014.
- There were 75 work-related fatalities reported in 2014, an equivalent of 6.8 per 100,000 full-time employees (6.2 per 100,000 full-time employees in 2013) compared to the national average of 3.4 per 100,000 full time employees. The annual incidence of amputation identified in State Workers' Compensation System was 6.1 per 100,000 covered workers in 2014 (5.8 per 100,000 covered workers in 2013).
- In 2014, 20 people in every 1,000,000 workers had elevated blood lead levels ( $\geq 10$  ug/dl), compared to 15 people to every 1,000,000 workers in 2013.
- OSHA inspection coverage expanded: There were 54,073 employees whose work areas were inspected by OSHA in 2014, compared to 30,860 employees in 2013, an increase of 75%.

## Profile of Mississippi Workforce Aged 16 years and Older, 2014

Work-related injuries and illnesses are preventable and control of occupational hazards is the most effective means of prevention. Research has shown relationships between demographic characteristics of workers and the risk of occupational injury or illness <sup>[2]</sup>. Understanding the basic characteristics of a state's workforce will help state health departments assess possible occupational health risks.

In 2014, there were 1.14 million civil, non-institutionalized workers in Mississippi of which 48% were female, 35% were of a racial minority, 3% were of Hispanic origin, and 95% were aged 18-64 years (Bureau of Labor Statistics, 2014a, 2014b). The makeup of the workforce may be important in understanding the occupational health status differences within the state (See Table 1).

**Table 1. Demographic and employment characteristics, aged 16 years and older, Mississippi, 2014**

Civilian employment by hours per week		
<40 hours	357,018	31.4%
40 hours	533,253	46.9%
41+ hours	246,729	21.7%
Civilian employment by sex		
Male	595,000	52.3%
Female	542,000	47.7%
Civilian employment by age group		
16-17 years	9,096	0.8%
18-64 years	1,077,876	94.8%
65+ years	54,576	4.8%
Civilian employment by race/ethnicity		
White	739,000	65.0%
Black	360,000	31.7%
Other*	37,521	3.3%



Hispanic origin**	34,000	3.0%
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#### Civilian employment by industry

Education and health services	291,072	25.6%
Wholesale and retail trade	163,728	14.4%
Manufacturing: durable goods	108,015	9.5%
Leisure and hospitality	94,371	8.3%
Construction	77,316	6.8%
Professional and business services	76,179	6.7%
Transportation and utilities	67,083	5.9%
Manufacturing: nondurable goods	52,302	4.6%
Other services	52,302	4.6%
Public administration	47,754	4.2%
Financial activities	45,480	4.0%
Agriculture	28,425	2.5%
Mining	19,329	1.7%
Information	15,918	1.4%

#### Civilian employment by occupation

Professional and related occupations	244,455	21.5%
Service	184,194	16.2%
Management, business and financial operations	145,536	12.8%
Office and administrative support	129,618	11.4%
Sales and related occupations	110,289	9.7%
Production	108,015	9.5%
Transportation and material moving	90,960	8.0%
Construction and extraction	73,905	6.5%
Installation, maintenance, and repair	39,795	3.5%
Farming, fishing, and forestry	10,233	0.9%

**Source:**

*U.S. Department of Labor, Bureau of Labor Statistics, Geographic Profile of Employment and Unemployment, 2014*

*\* Persons of Hispanic origin may be of any race (white, black, other)*

*\*\* Other includes Asians, American Indians, Alaskan Natives/Pacific Islanders*

## **Indicator 2: Work-Related Hospitalizations, Mississippi, 2014**

Individuals hospitalized with work-related injuries and illnesses have serious and adverse health outcomes. Tracking of these significant adverse health effects should be undertaken to document the burden of occupational injuries and illnesses, to design, target, and evaluate the impact of prevention efforts over time, and to identify previously recognized settings in which workers may continue to be at high-risk.

The hospital discharge data, collected by the MSDH, were used to estimate the work-related hospitalizations. There were 692 work-related hospitalizations in 2014, which generated the work-related hospitalization rate of 60.9 per 100,000 employed persons.

*Data Source: Mississippi Hospital Discharge Data (number of work-related hospitalizations); Bureau of Labor Statistics Current Population Survey (total number of employed persons). A condition was considered work-related if workers' compensation was listed as primary payer in the hospital discharge data.*

## **Indicator 3: Fatal Work-Related Injuries, Mississippi, 2014**

Work-related fatalities are due to multiple factors and risks: workplace/process design, work organization, worker characteristics, economics and other social factors. Surveillance of work-related fatalities can identify new hazards and case clusters, leading to the development of new interventions and development of new or revised regulations to protect workers. Nationally, 4,821 fatal work injuries were reported to the Census of Fatal Occupational Injuries (CFOI) Program administered by the Bureau of Labor Statistics (BLS) in 2014, which was the highest since 2008. The overall fatal work injury rate for the U.S. in 2014 was 3.4 fatal injuries per 100,000 full-time equivalent workers.

In Mississippi, the annual number of fatal work injuries was 75, with a rate of 6.8 fatal injuries per 100,000 full-time equivalent workers in 2014. This rate was twice as high as the national average (3.4 fatal injuries per 100,000 full-time equivalent workers). The major reason for the fatalities was transportation incidents, followed by falls/slips/trips, and exposure to harmful substances or environments (see Tables 2, 3, and 4). About half of the fatal injuries (37) occurred in the 45-64 years age group. Most cases occurred in white (74%) and male (92%) populations (Figure 1). The leading occupations/industries for fatal work-related injuries were transportation and construction (Table 5).

**Table 2. Total number of fatal work-related injuries by characteristics, Mississippi, 2014**

Characteristics	Number of fatal injuries
Transportation incidents	34
Falls, slips, trips	11
Exposure to harmful substances or environments	9
Contact with objects and equipment	9
Violence and other injuries by persons or animals	8
Fires and explosions	4
Total fatal injuries	75

**Table 3. Total number of fatal work-related injuries by age, Mississippi, 2014**

Age group (years)	Number of fatal injuries
19 and under	1
20 to 24	7
25 to 34	13
35 to 44	11
45 to 54	23
55 to 64	14
65 and over	6

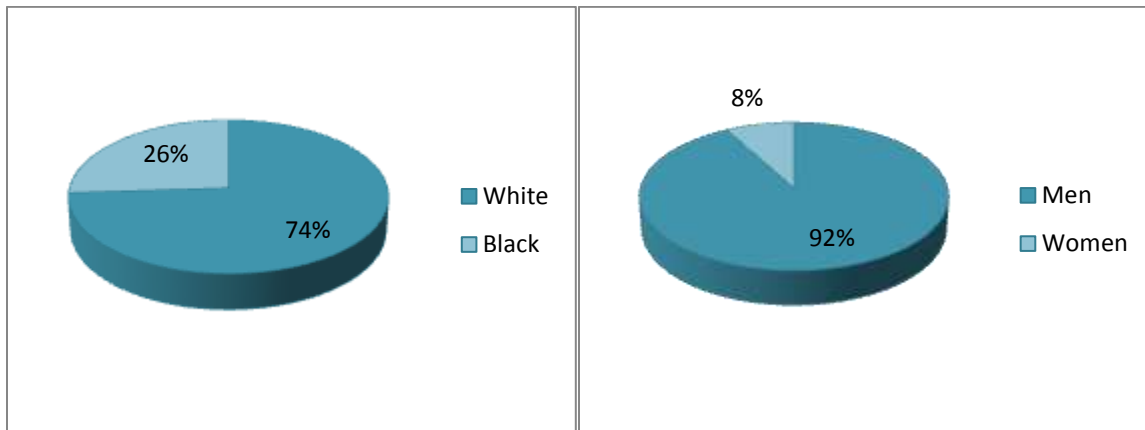
**Table 4. Leading industries with fatal work-related injuries, Mississippi, 2014**

Industry	Number of fatal injuries
Transportation and warehousing	13
Construction	12
Government	10
Administrative and waste services	6
Manufacturing	6

**Table 5. Leading occupations with fatal work-related injuries, Mississippi, 2014**

Occupation	Number of fatal injuries
Transportation and material moving occupations	24
Construction and extraction occupations	15
Service occupations	9
Management, business, science, and arts occupations	9
Sales and office occupations	7

**Figure 1. Fatal work injuries by gender and ethnicity, Mississippi, 2014**



*Data Source: Census of Fatal Occupational Injuries (numbers of fatalities); Bureau of Labor Statistics Current Population Survey Data (employment statistics used to calculate rates).*

### **Indicator 5: State Workers' Compensation claims for amputations with lost work time, Mississippi, 2014**

Work-related amputations are preventable, and control of occupational hazards is the most effective means of prevention. Estimating the burden and tracking these injuries can help target prevention programs and activities.

In 2014, 63 workers from the private sector ( 6.1 per 100,000 covered by State Workers' Compensation System) in Mississippi experienced a nonfatal work-related amputation that required days away from work, which accounted for 0.57% of all the injuries with lost work time filed with State Workers' Compensation. These amputations may greatly affect a worker's job performance and reduce earnings.

*Data Source: Annual Report of Occupational Injuries and Illnesses by Mississippi Workers' Compensation (number of amputation cases with lost work time filed by WC), National Academy of Social Insurance (number of workers covered by State Workers' Compensation).*

### **Indicator 6: Hospitalizations for work-related burns, Mississippi, 2014**

According to data from New England Regional Burn Program, 55 percent of all burns among adults are work-related (Baggs, 2002; Rossignol, 1989). NIOSH has estimated that there are 150,000 work-related burns treated in the emergency rooms each year in the U.S. Burns are painful, disabling, and expensive to treat. In addition, they are the most common cause of work-related hospitalization for young workers.

Results from Mississippi Hospital Discharge data showed one work-related burn hospitalization in 2014, which yielded an annual rate of work-related burn hospitalization of 0.1 per 100,000 workers in 2014.

*Data Source: Mississippi Hospital Discharge Data (number of work-related hospitalizations); Bureau of Labor Statistics Current Population Survey (total number of employed persons).*

**Indicator 8: State Workers' Compensation claims for carpal tunnel syndrome with lost work-time, Mississippi, 2014**

Carpal tunnel syndrome (CTS) occurs when the median nerve, which runs from the forearm into the palm of the hand, becomes pressed or squeezed at the wrist. The symptoms may be numbness, weakness, or sometimes pain in the hand and wrist, or occasionally in the forearm and arm. A person with carpal tunnel syndrome may wake up feeling the need to "shake out" the hand or wrist. As symptoms worsen, people might feel tingling during the day. Decreased grip strength may make it difficult to form a fist, grasp small objects, or perform other manual tasks. In chronic and/or untreated cases, the muscles at the base of the thumb may waste away. Some people are unable to tell between hot and cold by touch. Carpal tunnel syndrome is especially common in those performing assembly line work-- manufacturing, sewing, finishing, cleaning, and meat, poultry, or fish packing. In fact, carpal tunnel syndrome is three times more common among assemblers than among data-entry personnel <sup>[3]</sup>.

In 2014, 7,970 cases of carpal tunnel syndrome that resulted in days away from work were reported by private sector employers in the United States. In Mississippi, 136 cases of carpal tunnel syndrome resulting in days away from work were reported by private sector employers in 2014. The annual estimated incidence for carpal tunnel syndrome was 13.2 per 100,000 full-time equivalents (FTEs) in the private sector in Mississippi.

Carpal tunnel syndrome is preventable, and control of occupational hazards is the most effective means of prevention. Estimating the burden and tracking carpal tunnel syndrome can help target

prevention programs and activities. Information on reported cases can be used to identify contributory factors and to develop improved or new prevention strategies or regulations to protect workers.

*Data Source: Mississippi Workers' Compensation system (Carpal tunnel syndrome cases with lost work-time filed with state workers' compensation), National Academy of Social Insurance (NASI) estimate of workers covered by workers' compensation (estimated numbers of workers covered by workers' compensation)*

### **Indicator 9: Hospitalizations from or with Pneumoconiosis, Mississippi, 2014**

Nearly all pneumoconioses are caused by occupational exposures, and millions of workers are at risk. Common types include asbestosis, coal workers' pneumoconiosis, and silicosis.

Complications of pneumoconiosis include respiratory infections (including tuberculosis), chronic bronchitis, emphysema, lung cancer, pleuritis, progressive systematic sclerosis, renal disease, and respiratory failure. Control of occupational dust exposure is the single most effective means of preventing pneumoconiosis. Tracking of pneumoconiosis is essential for measuring progress towards elimination of the disease, as well as, for targeting prevention and disease management programs. See Table 6 for details.

**Table 6. Hospitalizations from or with Pneumoconiosis, Mississippi, 2014**

	Coal Workers' Pneumoconiosis	Asbestosis	Silicosis	Other and Unspecified Pneumoconiosis	Total Pneumoconiosis
Number	3	300	24	8	331
Rate*	1.3	125.8	10.1	3.4	138.8
Age-standardized rate*	1.2	113.8	8.4	3.3	125.1

\* Per 1,000,000 residents

*Data Source: Mississippi Hospital Discharge Data (number of work-related hospitalizations); U.S. Census Bureau (population statistics to calculate rates).*

**Indicator 10: Mortality from or with Pneumoconiosis, Mississippi, 2014**

Pneumoconiosis is a term for a class of non-malignant lung diseases caused by the inhalation of mineral dust, nearly always in occupational settings. Most cases of pneumoconiosis develop only after many years of cumulative exposure; thus they are often diagnosed in older individuals, long after the onset of exposure. These diseases, which include silicosis and asbestosis, are incurable and may ultimately result in death. See Table 7 for details.

**Table 7. Mortality from or with Pneumoconiosis, Mississippi, 2014**

	Coal Workers' Pneumoconiosis	Asbestosis	Silicosis	Other and Unspecified Pneumoconiosis	Total Pneumoconiosis
Number	5	23	0	0	28
Death rate*	2.1	9.6	0	0	11.7
Age-standardized death rate*	2.1	8.9	0	0	11.0

\* Per 1,000,000 residents

*Data Source: Mississippi Vital Statistics Records (number of deaths); U.S. Census Bureau (population statistics to calculate rates).*

**Indicator 11: Acute work-related pesticide-associated illness and injury reported to Poison Control Centers, Mississippi, 2014**

Pesticides are among the few chemicals produced that are specifically designed to kill and cause harm. Workers who handle pesticides are at increased risk for exposure. Poison Control Centers (PCCs) are important sources of reports of acute poisonings and chemical exposures. These data can be useful to target prevention. The type of data collected is comparable across states due to the uniformity in case handling by PCCs.



In 2014, 18 work-related pesticide poisoning cases were reported to the Mississippi Poison Control Center. The annual incidence of reported work-related pesticide poisoning cases was 1.6 per 100,000 workers in Mississippi.

*Data Source: American Association of Poison Control Centers (Numbers of work-related pesticide poisoning); Bureau of Labor Statistics Current Population Survey (total number of employed persons).*

**Indicator 12: Incidence of malignant mesothelioma, ages 15 and older, Mississippi, 2014**

Malignant mesothelioma is a rare but fatal cancer. It has been estimated that as much as 90 percent of cases are caused by exposure to asbestos. Tracking of malignant mesothelioma should be undertaken to document the burden of occupational disease; to design, target, and evaluate the impact of prevention efforts over time; and to identify previously unrecognized settings in which workers may continue to be at-risk of asbestos exposure. See Table 8 for details.

**Table 8. Incidence of malignant mesothelioma, ages 15 and older, Mississippi, 2014**

Number of malignant mesothelioma cases	24
Incidence *	10.1
Age-standardized incidence *	9.9

\* Per 1,000,000 residents

*Data Source: Mississippi Cancer Registry data (Numbers of mesothelioma cases); U.S. Census Bureau (population statistics to calculate rates).*

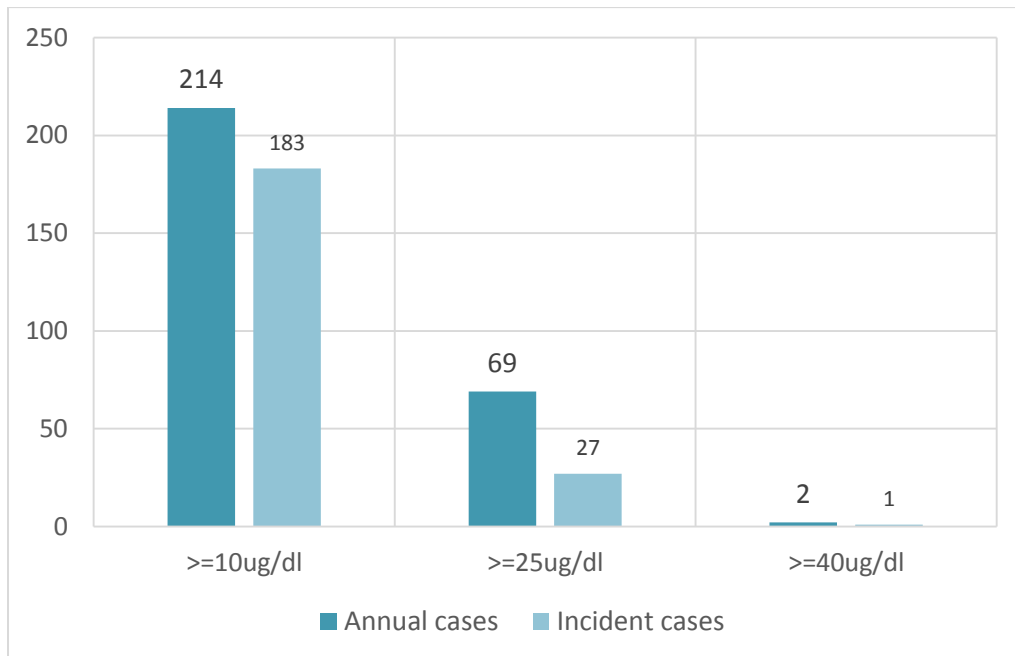
**Indicator 13: Elevated blood lead levels (BLL) among adults, Mississippi, 2014**

In the United States, the majority of cases of elevated blood lead levels (BLL) among adults are related to a workplace. During 2014, 26 states reported the exposure source for 3,615 adults with BLLs  $\geq 25\mu\text{g/dL}$ . Among these 3,615 adults, 94.3% had occupational exposures. Elevated blood lead may cause damage to the nervous, hematologic, reproductive, renal, cardiovascular, or

gastrointestinal systems. Some early symptoms of lead poisoning may include: fatigue, upset stomach or stomach cramps, poor appetite, irritability, nervousness or depression, headache, sleeplessness, metallic taste in the mouth, reproductive problems, high blood pressure, lack of concentration, and muscle and/or joint pain. Industries with the highest risk of exposures to lead include battery manufacturing, secondary smelting refining of nonferrous metals, and painting and paper hanging <sup>[4]</sup>. The current case definition for elevated blood lead levels ( $\geq 5$  ug/dL) came into effect in late 2015. It is important to note that the average BLL for the adult general population is less than 1  $\mu\text{g/dL}$ .

In 2014, the number of annual cases aged 16 years and older with elevated BLLs of  $\geq 5$ ug/dl reported to Mississippi Adult Blood Lead Epidemiology (ABLES) program was 214, and the number of incident cases was 183. See Figure 2 for more details.

**Figure 2. Numbers of annual cases and incidence cases among adults aged 16 years and older, Mississippi, 2014**



*Data Source: Reports of elevated BLLs from laboratories to Mississippi ABLES program (numerator)  
BLS Current Population Survey Data – Geographic Profile of Employment and Unemployment  
(denominator)*

**Indicator 14: Percentage of workers employed in industries at high-risk for occupational morbidity, Mississippi, 2014**

Some industries have been identified as high-risk for occupational morbidities based on having significantly higher injury and illness rates compared to the national average. These high-risk industries are listed in Table 9. Work-related injuries and illnesses are preventable, and control of occupational hazards is the most effective means of prevention. Concentrating on high-risk industries for non-fatal injuries and illnesses helps prioritize limited resources.

In 2014, 70,576 Mississippi workers were in industries that were high-risk for occupational morbidity. The percentage of workers in high morbidity risk industries was 7.7%.

**Table 9. NAICS codes and industry titles for high morbidity risk industries (n=54)**

Industry code	Industry name
311212	Rice milling
311313	Beet sugar manufacturing
311611	Animal (except poultry) slaughtering
311613	Rendering and meat byproduct processing
312111	Soft drink manufacturing
313220	Narrow fabric mills and schiffli machine embroidery
314994	Rope, Cordage, Twine, Tire Cord, and Tire Fabric Mills
321113	Sawmills
321114	Wood preservation
321214	Truss manufacturing
321912	Cut stock, re-sawing lumber, and planing
321918	Other millwork (including flooring)
321920	Wood container and pallet manufacturing

321991	Manufactured home (mobile home) manufacturing
321992	Prefabricated wood building manufacturing
326122	Plastics pipe and pipe fitting manufacturing
327390	Other concrete product manufacturing
331222	Steel wire drawing
331511	Iron foundries
331513	Steel foundries (except investment)
331523	Nonferrous Metal Die-Casting Foundries
331524	Aluminum foundries (except die-casting)
331529	Other Nonferrous Metal Foundries (except Die-Casting)
332313	Plate work manufacturing
332439	Other metal container manufacturing
333111	Farm machinery and equipment manufacturing

*Data Source: U.S. Census Bureau County Business Patterns (CBP) (numerator and denominator)*

**Indicator 15: Percentage of workers employed in occupations at high-risk for occupational morbidity, Mississippi, 2014**

Workers in certain occupations sustain non-fatal injuries and illnesses at much higher rates than the overall workforce, such as police and sheriff patrol officers, roofers, and taxi drivers. High-risk occupations are listed in Table 10 below. In 2014, 142,375 Mississippi workers were employed in occupations at high-risk for occupational morbidities. The percentage of employed persons who worked in high-risk occupations in Mississippi was 17.1%.

**Table 10. List of high-risk occupations for occupational morbidity (N =49)**

BOC occupation codes	BOC code title
1310	Surveyors, cartographers, and photogrammetrists
2720	Athletes, coaches, umpires, ad related workers
3400	Emergency medical technicians and paramedics
3600	Nursing, psychiatric, and home health aides
3648	Veterinary assistants and laboratory animal caretakers

3850	Police and sheriff's patrol officers/ (3860-Transit & railroad police are included in 3850)
3940	Crossing guards
4030	Food preparation workers
4210	First-line supervisors of landscaping, lawn service, and grounds-keeping workers
4220	Janitors and building cleaners
4230	Maids and housekeeping cleaners
4250	Grounds maintenance workers
4350	Nonfarm animal caretakers
5410	Reservation and transportation ticket agents and travel clerks
5500	Cargo and freight agents
6130	Logging workers
6230	Carpenters
6240	Carpet, floor, and tile installers and finishers
6260	Construction laborers
6515	Roofers
6530	Structural iron and steel workers
6750	Septic tank servicers and sewer pipe cleaners
6765	Miscellaneous construction and related workers
6820	Earth drillers, except oil and gas
6840	Mining machine operators
7020	Radio and telecommunications equipment installers and repairers

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*Data Source: Bureau of Labor Statistics' Current Population Survey (CPS) (numerator and denominator)*

**Indicator 16: Percentage of workers employed in industries and occupations at high-risk for occupational mortality**

Multiple factors and risks contribute to work-related fatalities, including workplace and process design, work organization, worker characteristics, economics and other social factors.

Surveillance of work-related fatalities can identify new hazards and case clusters, leading to the

development of new interventions and development of new or revised regulations to protect workers. Concentrating on high-risk industries and occupations for fatalities helps prioritize limited resources.

Table 11 comprises the high-risk mortality industries based on Bureau of Labor Statistics' Census of Fatal Occupational Injuries (CFOI) for private sector workers 16 years of age and older for the year 2014. These 38 industries had fatality rates more than twice as high (7.3 and higher) as the overall rate of 3.6 per 100,000 full-time equivalent workers. Rates calculated for workers aged 16 years or older in private sector industries.

**Table 11. Bureau of Census industry codes and industry titles for high mortality risk private sector industries (N = 38)**

Industry Codes*	Industry Title**
0170	Crop production
0180	Animal production and aquaculture
0270	Logging
0280	Fishing, hunting and trapping
0290	Support activities for agriculture and forestry
0370	Oil and gas extraction
0380	Coal mining
0390	Metal ore mining
0470	Nonmetallic mineral mining and quarrying
0490	Support activities for mining
0770	Construction
2180	Agricultural chemical manufacturing
2570	Cement, concrete, lime, and gypsum product manufacturing
2890	Coating, engraving, heat treating, and allied activities
3095	Commercial and service industry machinery manufacturing
3770	Sawmills and wood preservation

4070	Motor vehicle and motor vehicle parts and supplies merchant wholesalers
4180	Metals and minerals, except petroleum, merchant wholesalers
4280	Recyclable material merchant wholesalers
4480	Farm product raw material merchant wholesalers
4490	Petroleum and petroleum products merchant wholesalers
4570	Farm supplies merchant wholesalers
4580	Miscellaneous nondurable goods merchant wholesalers
4990	Beer, wine, and liquor stores
5680	Fuel dealers
6090	Water transportation
6170	Truck transportation
6190	Taxi and limousine service
6280	Scenic and sightseeing transportation
6290	Services incidental to transportation
7180	Other consumer goods rental
7190	Commercial, industrial, and other intangible assets rental and leasing
7770	Landscaping services
7790	Waste management and remediation services
7880	Business, technical, and trade schools and training
8390	Vocational rehabilitation services
8670	Recreational vehicle parks and camps, and rooming and boarding houses
8690	Drinking places, alcoholic beverages

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\*2012 Census Industry Codes\*\*Bureau of Census Industry Title

Table 12 shows the high-risk mortality occupations based on Bureau of Labor Statistics' Census of Fatal Occupational Injuries (CFOI) for private sector workers 16 years of age and older for the year 2014. These 63 occupations had fatality rates more than twice as high (7.3 and higher) as the overall rate of 3.6 per 100,000 full-time equivalent workers. Rates calculated for workers aged 16 years or older in private sector industries.

**Table 12. Bureau of Census occupation code and occupation titles for high mortality risk occupations (N = 63)**

Occupation Codes*	Occupation Titles**
0205	Farmers, ranchers, and other agricultural managers
1310	Surveyors, cartographers, and photogrammetrists
2720	Athletes, coaches, umpires, and related workers
2760	Entertainers and performers, sports and related workers, all other
3940	Crossing guards
4210	First-line supervisors of landscaping, lawn service, and grounds keeping workers
4250	Grounds maintenance workers
4340	Animal trainers
4540	Tour and travel guides
6005	First-line supervisors of farming, fishing, and forestry workers
6050	Miscellaneous agricultural workers
6100	Fishers and related fishing workers
6130	Logging workers
6200	First-line supervisors of construction trades and extraction workers
6220	Brick masons, block masons, and stonemasons
6250	Cement masons, concrete finishers, and terrazzo workers
6260	Construction laborers
6300	Paving, surfacing, and tamping equipment operators
6320	Operating engineers and other construction equipment operators
6355	Electricians
6400	Insulation workers
6420	Painters, construction and maintenance
6515	Roofers
6530	Structural iron and steel workers
6600	Helpers, construction trades
6660	Construction and building inspectors
6710	Fence erectors



6730 Highway maintenance workers  
6750 Septic tank servicers and sewer pipe cleaners  
6800 Derrick, rotary drill, and service unit operators, oil, gas, and mining  
6840 Mining machine operators  
6920 Roustabouts, oil and gas  
6940 Other extraction workers  
7000 First-line supervisors of mechanics, installers, and repairers  
7020 Radio and telecommunications equipment installers and repairers  
7210 Bus and truck mechanics and diesel engine specialists  
7220 Heavy vehicle and mobile equipment service technicians and mechanics  
7240 Small engine mechanics  
7260 Miscellaneous vehicle and mobile equipment mechanics, installers, and repairers  
7315 Heating, air conditioning, and refrigeration mechanics and installers  
7340 Maintenance and repair workers, general  
7350 Maintenance workers, machinery  
7360 Millwrights  
7410 Electrical power-line installers and repairers  
7420 Telecommunications line installers and repairers  
7610 Helpers--installation, maintenance, and repair workers  
7940 Rolling machine setters, operators, and tenders, metal and plastic  
8530 Sawing machine setters, operators, and tenders, wood  
8630 Miscellaneous plant and system operators  
8650 Crushing, grinding, polishing, mixing, and blending workers  
9000 Supervisors of transportation and material moving workers  
9030 Aircraft pilots and flight engineers  
9130 Driver/sales workers and truck drivers  
9140 Taxi drivers and chauffeurs  
9150 Motor vehicle operators, all other  
9240 Railroad conductors and yardmasters  
9300 Sailors and marine oilers

9310	Ship and boat captains and operators				
9510	Crane and tower operators				
9520	Dredge, excavating, and loading machine operators				
9560	Hoist and winch operators				
9650	Pumping station operators				
9720	Refuse and recyclable material collectors				
	Coal Workers’ Pneumoconiosis	Asbestosis	Silicosis	Other and Unspecified Pneumoconiosis	Total Pneumoconiosis

Census Occupation Codes\*\*BOC Occupation Titles

In 2014, 174,624 workers (18.5%) in Mississippi were employed in industries at high-risk for occupational mortality. Additionally, 147,824 workers (15.6%) worked in occupations at high mortality risk in Mississippi.

*Data Source: Bureau of Labor Statistics’ Current Population Survey (CPS) (numerator and denominator)*

**Indicator 17: Occupational safety and health professionals, Mississippi, 2014**

Work-related injuries and illnesses are preventable. It is important to determine if there are sufficient trained personnel to implement occupational health preventive services. Physicians with training and/or special interest in occupational medicine provide primary, secondary and tertiary occupational health preventive services. In 1989, the American Medical Association recommended that there be one physician per 1,000 employees. Occupational health nurses provide a great deal of the onsite occupational health care. Industrial hygienists and safety professionals are typically the primary individuals responsible for evaluating workplaces and making recommendations to prevent occupational injuries and illnesses. See Table 13 for details.

**Table 13. Occupational safety and health professionals, Mississippi, 2014**

	Number	Rate*
Board-certified occupational medicine physicians	2	0.2
American College of Occupational and Environmental Medicine members	15	1.3
Board-certified occupational health nurses	26	2.3
American Association of Occupational Health Nurse members	N/A**	N/A**
Board-certified industrial hygienists	13	1.1
American Industrial Hygiene Association members	1	0.9
Board-certified safety health professionals	52	4.6
American Society of Safety Engineers members	168	14.8

*\*per 100,000 employees*

*\*\* For 2014, data are not available from the American Association of Occupational Health Nurses (AAOHN).*

*Data Source: Current membership rosters of cited organizations (Numbers of health and safety professionals); Bureau of Labor Statistics Current Population Survey (Employment estimates used to calculate rates).*

### **Indicator 18: Occupational safety and health administration (OSHA) enforcement activities, Mississippi, 2014**

The Occupational Safety and Health Administration (OSHA) was established in 1970 with the mission “assure safe and healthful conditions for working men and women by setting and enforcing standards and providing training, outreach, education and compliance assistance”.

Under the OSHA law, employers are responsible for providing a safe and healthful workplace for their workers. To this end, OSHA conducts inspections on workplaces in high-hazard industries and employers with the highest injury and illness rates. Inspections can also be triggered by a fatality, hospitalization of three or more workers, worker complaint or referral (including outside health/safety agency or media). Beginning in 2015, reporting requirements for employers was updated to include all work-related amputations and losses of an eye as well as all hospitalizations of at least one worker, all of which could trigger an inspection as well.

Comprehensive information about inspections is found on the OSHA website<sup>[5]</sup>. This indicator may provide a measure of health and safety benefits and protections felt by workers from the OSHA inspection activities. See Table 14 for details.

**Table 14. OSHA Enforcement Activities, MS, 2014**

	<b>Totals</b>	<b>Percentage (%)</b>
Number of Establishments Inspected by OSHA	581	
Number of Establishments Eligible for Inspection	69,955	0.8
Number of Employees at Inspected Sites	54,073	
Number of Covered Employees in MS	1,089,802	5.0

*Data Source: OSHA annual reports of total inspections conducted and the number of workers covered by these inspections (numerators), Bureau of Labor Statistics' data on Covered Employers and Wages (commonly referred to as the ES-202/QCEW data <http://www.bls.gov/cew/home.htm>) for the number of workers employed and establishments in the public and private sectors (denominators).*

**Indicator 19: Workers' Compensation awards, Mississippi, 2014**

Workers' compensation is a system created to compensate employees of private and government employers when they are injured at work. In general, whether an employer or an employee was the cause of the employee's injury, the workers' compensation system generally compensates the employee for medical costs, lost wages, and other losses. Workers' compensation awards are reviewed to establish whether the reported medical condition is work-related. Accepted awards represent known work-related injuries and illnesses, and often more severe cases. The total and average amounts of benefits paid estimate the burden of these events, which can help justify prevention programs and activities. This is a gross indicator of the burden of occupational injury and illness. It does not include human, non-economic costs nor all the economic costs associated with occupational injuries and illnesses.

In 2014, the estimated amount of workers' compensation awards in Mississippi was \$336,689,000. This represented an average of \$327.84 for every worker in Mississippi who was eligible for workers' compensation.

*Data Source: National Academy of Social Insurance ([www.nasi.org](http://www.nasi.org)).*

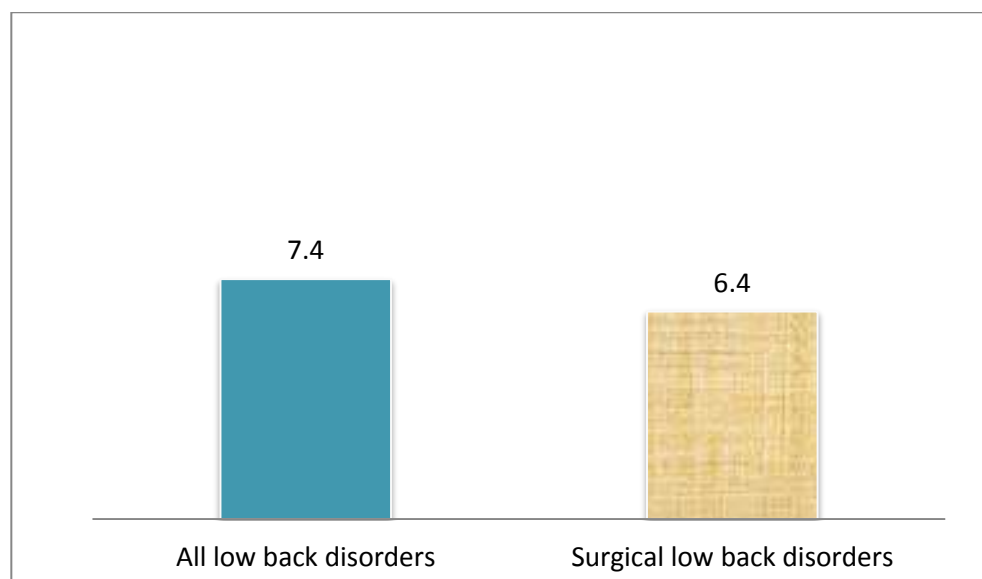
### **Indicator 20: Work-related low back disorder hospitalizations, Mississippi, 2014**

Low back disorders are defined as chronic or acute pain of the lumbosacral, buttock or upper leg region with pain radiating from the back region down one or both legs <sup>[6]</sup>. Low back disorders are one of the leading occupationally related conditions and are the most frequent reason for filing a workers' compensation claim <sup>[7]</sup>. The cost of back pain is also disproportionate, as it represents about 20% of workers' compensation claims, but nearly 40% of the costs.

Hospitalizations for work-related back disorders have serious and costly effects including: high direct medical costs, significant functional impairment and disability, high absenteeism, reduced work performance, and lost productivity. Well-recognized prevention efforts can be implemented for high-risk job activities and reduce the burden of work-related low back disorders.

Hospital discharge data from Mississippi State Department of Health were used to estimate rates of low back disorder hospitalizations among residents 16 years and older. In 2014, there were 84 low back disorder hospitalizations in Mississippi for which workers' compensation was the primary payer. The rate of hospitalizations per 100,000 workers was 7.4. Among the 84 hospitalizations, 73 required surgery. The rate of surgical low back disorder hospitalizations was 6.4 per 100,000 workers in Mississippi (Figure 3).

**Figure 3. Work-related low back disorder hospitalizations rate, per 100,000 workers, Mississippi, 2014**



*Data Source: Mississippi inpatient hospital discharge data (numerator), BLS Current Population Survey Data (denominator)*

### **Indicator 21: Asthma among adults caused or made worse by work, Mississippi, 2014**

Asthma is a chronic inflammatory disease of the airways that is life threatening and can be managed but not cured. Adult asthma can be caused by or made worse by workplace exposures. It has been estimated that approximately 36% to 58% of adult asthma is caused or made worse by workplace exposures, which translates to approximately 9.7 million adults in the United States <sup>[8]</sup>. If diagnosed early, work-related asthma may be partially or completely reversible if exposures can be identified and properly stopped or controlled <sup>[9]</sup>. Work-related asthma is preventable but often goes undiagnosed by physicians. Research has shown that work-related asthma can have adverse effects on the worker, including increased morbidity, adverse socioeconomic impacts and difficulty getting and sustaining work. Estimating the burden of asthma caused or made worse by work can help target prevention programs and activities.

The Asthma Call-Back Survey (ACBS) contains multiple questions related to the work-relatedness of a respondent's asthma and these questions are administered to adults 18 years or older. Data from the 2014 Mississippi Behavioral Risk Factor Surveillance System (BRFSS) ACBS were used to estimate the percent of ever-employed adults in Mississippi who have been told by a health professional that their asthma was work-related. The proportion of adults reported to have work-related asthma is likely to be underestimated because the disease is underdiagnosed in the U.S. In 2014, 108,143 ever-employed adults with current asthma reported that their asthma was caused or made worse by exposures at work in Mississippi. The proportion of work-related asthma among adults with asthma who were ever employed was 66.5%, compared to 49.3% for the U. S.

*Data Sources: Asthma Call-Back Survey (ACBS)*

#### **Indicator 22: Work-related severe traumatic injury hospitalizations, Mississippi, 2014**

Acute work-related trauma is a leading cause of death and disability for U.S. workers. In 2010, more than 4,500 U.S. workers died from occupational injuries. Severe traumatic injury can lead to long-term pain and disability and is very costly for workers' compensation systems and society as a whole. Many severe traumatic injuries can be prevented through proper workplace safety practices. Accurately characterizing the burden of traumatic occupational injuries will help identify priority areas and inform occupational injury prevention efforts <sup>[10]</sup>.

Mississippi inpatient hospital discharge data were used to estimate the annual number and the annual rate of severe traumatic injury hospitalizations in 2014. Hospitalizations were considered work-related severe traumatic injuries if the primary payer was workers' compensation and the primary diagnosis had an ICD-9 code in the range of 800-959.9. Injury diagnostic codes in this

range have been estimated to have an Abbreviated Injury Scale (AIS) severity of 3 or above, which means they have a high probability of hospital admission. In 2014, there were 116 hospitalizations due to severe traumatic injury related to work, and the rate of work-related severe traumatic injury hospitalizations was 10.2 per 100,000 workers in Mississippi.

*Data sources: Inpatient hospital discharge data (numerator), BLS Current Population Survey Data (denominator)*

### **Indicator 23: Influenza vaccination coverage among healthcare personnel, Mississippi, 2014**

Healthcare personnel (HCP) can serve as vectors for influenza transmission because they are at risk for both acquiring influenza from patients and transmitting it to patients and HCP often come to work when ill <sup>[11]</sup>. Higher influenza vaccination coverage among HCP is associated with reductions in nosocomial influenza among hospitalized patients and nursing home residents <sup>[12]</sup>. Influenza vaccination of HCP is also associated with decreased all-cause mortality among nursing home residents <sup>[13]</sup>.

CDC currently supports more than 3000 hospitals that are using National Health Care Safety Network (NHSN) and 22 states require hospitals to report Hospital Acquired Infections using this system. One of the components of NHSN is Healthcare Personnel Safety (HPS), which is comprised of two modules: the Blood/ Body Fluid Exposure Module and the Influenza Vaccination/Management/Exposure Module. This reporting system can provide useful and valid data to track progress towards the 2020 Healthy People goal of 90% vaccination percentage. In 2014, the proportion of hospitalization of hospital care personnel influenza vaccination coverage in acute care hospitals was 74% in Mississippi, which is lower than the 2020 Healthy People goal of 90%.



*Data sources: State-specific aggregate NHSN data provided by CDC:  
<https://www.cdc.gov/nhsn/datastat/index.html>.*

#### **Indicator 24: Occupational heat-related Emergency Department visits, Mississippi, 2014**

There is little epidemiological information about occupational heat-related morbidity. Tracking occupational heat-related illness using emergency department data will establish a baseline for occupational epidemiologist to understand the magnitude of the disease burden in the population and support implementation and evaluation of prevention measures.

In 2014, 117 heat-related emergency department visits among workers were recorded in Mississippi hospital discharge data, which reflected a rate of heat-related emergency department visits of 10.3 per 100,000 workers.

*Data sources: Emergency department visits data (numerator), BLS Current Population Survey Data (denominator). A condition was considered work-related if workers' compensation was listed as primary payer in the hospital discharge data.*

## References

1. Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants. *Council of State and Territorial Epidemiologists in collaboration with the National Institute for Occupational Safety and Health/Centers for Disease Control and Prevention. Updated April 2017*
2. Lay, A. Morgan, et al. Individual, occupational, and workplace correlates of occupational health and safety vulnerability in a sample of Canadian workers. *American journal of industrial medicine* 59.2 (2016): 119-128.
3. Carpal Tunnel Syndrome Fact Sheet <https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Fact-Sheets/Carpal-Tunnel-Syndrome-Fact-Sheet>
4. Adult Blood Lead Epidemiology and Surveillance—United States *Centers for Disease Control and Prevention.*, 2008-2009. *MMWR* 2011; 26 (25), 841-845.
5. OSHA Field Operations Manual CPL 02-00-159, [http://www.osha.gov/OshDoc/Directive\\_pdf/CPL\\_02-00-159.pdf](http://www.osha.gov/OshDoc/Directive_pdf/CPL_02-00-159.pdf)
6. Beeck R. Work Related Low Back Disorders. *National Institute of Occupational Safety and Health* 2000.
7. Johanning E. Evaluation and Management of Occupational Low Back Disorders. *American Journal of Industrial Medicine* 2000; 37, 94-11
8. Knoeller GE, Mazurek JM, Moorman JE. Work-Related Asthma among Adults with Current Asthma in 33 States and DC: Evidence from the Asthma Call-Back Survey, 2006–2007. *Public Health Rep* 126; 603-611, 2011.
9. Tarlo SM, Balmes J, Balkissoon R, et al. Diagnosis and Management of Work-Related Asthma: *ACCP Consensus Statement. Chest*; 134: 1S-41S, 2008.

10. Traumatic Occupational Injury Research Needs and Priorities: A Report by the NORA Traumatic Injury Team. *National Institute for Occupational Safety and Health*. Retrieved July 14, 2015, from <http://www.cdc.gov/niosh/docs/98-134/pdfs/98-134.pdf>.
11. Wilde JA, McMillan JA, Serwint J, et al. Effectiveness of influenza vaccine in healthcare professionals: a randomized trial. *JAMA* 1999; 281: 908–913.
12. Weinstock DM, Eagan J, Malak SA, et al. Control of influenza A on a bone marrow transplant unit. *Infect Control HospEpidemiol*. 2000; 21:730-732.
13. Carman WF, Elder AG, Wallace LA, et al. Effects of influenza vaccination of health-care workers on mortality of elderly people in long-term care: a randomized controlled trial. *Lancet* 2000; 355:93–97.

## Limitations

Indicators which are **NOT** conducive to state-to-state or state-national comparisons using Workers' Compensation or Hospital Discharge Data:

- Indicator # 2 Work-related hospitalizations
- Indicator # 5 Amputations identified in state workers' compensation systems
- Indicator # 6 Hospitalizations for work-related burns
- Indicator # 8 Carpal tunnel syndrome cases identified in state workers' compensation systems
- Indicator # 9 Pneumoconiosis hospitalizations
- Indicator # 19 Workers' compensation awards
- Indicator # 20 Hospitalizations for low-back disorders
- Indicator # 22 Work-related severe traumatic injury hospitalizations

Indicators which are **NOT** conducive to state-to-state or state-national comparisons using Survey of Occupational Injuries and Illnesses data:

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

Indicator 3: Note that this number includes fatalities from transportation incidents and other sectors potentially not work-related. The number of fatal work injuries in Mississippi that OSHA

deemed work-related was much lower. The total number of workers that died while at work may still be useful, but there should be some separation between deaths at work and deaths attributed to work.

Indicator 6: This numbers seems low, but it probably reflects the actuality that many of the burns were treated as outpatient.

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