

Opioid-related
Overdose Deaths
in Louisiana
by Industry and
Occupation, 2014-2019

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Summary and Key Findings

Information from Louisiana death certificates was used to describe opioid-related overdose deaths from 2014 through 2019 by industry and occupation. Total counts (2014-2019) and average annual rates and rate ratios are presented. Key findings are:

- The rate of fatal opioid overdose varied significantly by decedent industry and occupation.
- Opioid-related overdose death rates (per 100,000) were significantly higher than the rates for all workers (13.8) for 25-44-year-olds (17.1), males (20.3), and white workers (17.1).
- Construction and extraction workers had both a high rate (50.4 deaths per 100,000 workers) and a high number of opioid-related overdose deaths (n=431). The opioid-related death rate for those employed in construction and extraction occupations was almost four times the average rate for all Louisiana workers (13.8). Construction and extraction workers accounted for 25% of all opioid-related deaths among the working population (n=1,696).
- Workers in the installation, repair, and maintenance occupational group also had a high rate. While there were fewer deaths in this group (n=110) than in construction, the rate of opioid-related death (23.8) was almost double the average rate for all Louisiana workers (13.1).
- Other occupational groups with a significantly higher than average rate of opioid-related overdose death among Louisiana workers included food preparation and serving related (22.2) as well as transportation and material moving (18.7).
- Occupations with a high rate of fatal opioid-related overdose varied by gender. Among males, workers in construction and extraction occupations (51.4) and food preparation and serving related (31.2) had rates significantly higher than the average rate for all male workers in Louisiana (20.3). Among females, workers in construction and extraction occupations (21.5), food preparation and serving related (16.1), and personal care and services (11.5) had rates significantly higher than the average rate for all Louisiana female workers (7.0).

Introduction

Louisiana is currently experiencing an epidemic of opioid-related overdose deaths. From 2014-2019 the number of deaths increased 171% from 217 to 588, and the age-adjusted rate (per 100,000 residents) more than doubled from 5.4 to 12.5.^{1,2} This report seeks to contribute to the understanding of the populations in Louisiana most affected by the ongoing opioid epidemic. This analysis characterizes opioid-related overdose deaths among Louisiana residents from 2014 to 2019 by demographic characteristics as well as the industry and occupation of the decedents.

Methods

Opioid-related overdose deaths in Louisiana occurring from 2014 and 2019 were identified using information from Louisiana death certificates. The following International Classification of Diseases – 10th edition (ICD-10) codes were selected from the underlying cause of death fields to identify all poisonings/ overdoses: X40-X44, X60-X64, X85, and Y10- Y14. All cause of death fields (primary and secondary) were then used to identify opioid-related overdose deaths: T40.0, T40.1, T40.2, T40.3, and T40.4. All opioid-related overdose deaths regardless of intent were included in the analysis. Information about age, gender, race, ethnicity, and usual industry and occupation of the decedents was also obtained from death certificates. Occupation describes the kind of work a person does to earn a living (i.e., job title), whereas industry describes what a person's employer or business does. Industry and occupation were coded according to the North American Industry Classification System³ and the Standard Occupational Classification System⁴ respectively, using the National Institute for Occupational Safety and Health Industry and Occupation Computerized Coding System (NIOCCS)⁵ followed by manual review.

The data were used to describe the frequency and rates of opioid-related overdose death among Louisiana residents by demographic characteristics as well as industry and occupation, overall and by gender. Six-year average annual opioid-related overdose death rates among workers were calculated as the number of deaths per 100,000 workers. A 95% confidence interval (95% CI) was calculated for all rates presented. Rate ratios were calculated to compare demographic-specific and industry- and occupation-specific rates to those of all workers in the state. Rate ratios were considered statistically significant if the 95% CI did not contain 1.0. Population estimates for all rate calculations were obtained from the American Community Survey (ACS) using 1-year estimates for 2014-2019. Rates among workers calculated in this manner assume that all those who died and had occupation and/or industry reported on their death certificates were employed in that industry and occupation at the time of, or just prior to, death (as the rate denominator is based on employment during the study period). Because death certificates contain information about the decedent's usual, not current, industry and occupation, this assumption may not hold if the decedent's usual industry and occupation

¹ Louisiana 2019 Drug Deaths, <https://ldh.la.gov/assets/opioid/final2019DrugDeathFactsheet092220.pdf>

² Louisiana Opioid Data and Surveillance System, <https://lodss.ldh.la.gov/>

³ The 2002 and 2012 North American Industry Classification System (NAICS) manuals area available from <http://www.census.gov/eos/www/naics/>.

⁴ The 2010 Standard Occupational Classification (SOC) manuals are available from <http://www.bls.gov/soc/>

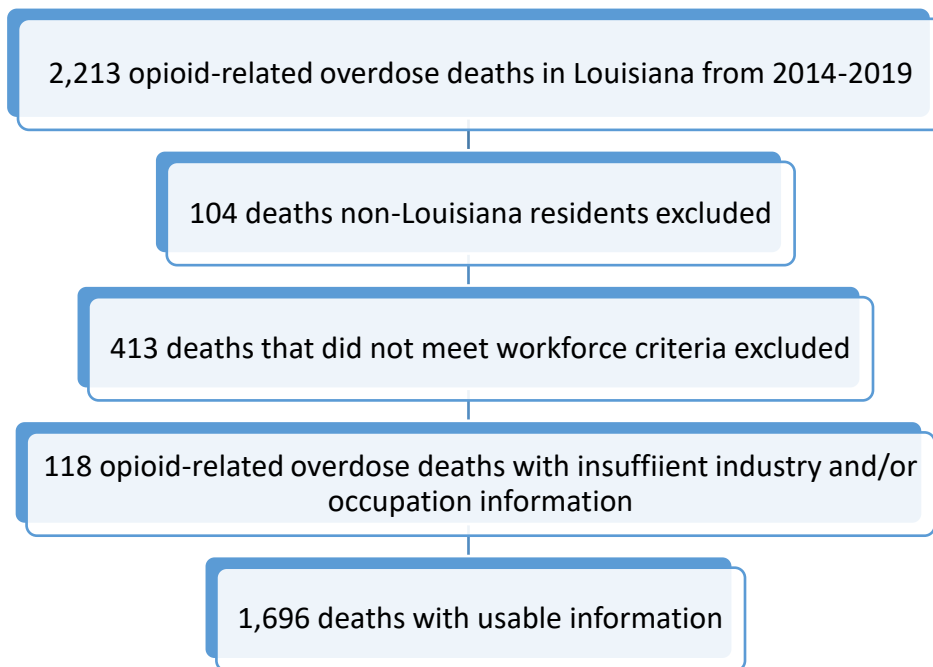
⁵ National Institute for Occupational Safety and Health, NIOSH Industry and Occupation Computerized Coding System. <https://wwwn.cdc.gov/niosh-nioccs/>

differed from the industry and occupation in which they were employed in the period prior to their death or if they had retired.

Findings

Study Group

There were 2,213 opioid-related overdose deaths in Louisiana from 2014 through 2019. Because this report was focused on opioid-related overdose deaths among Louisiana residents, 104 deaths of out-of-state residents or decedents of indeterminate residence were excluded from the analysis. An additional 413 deaths were excluded because the focus of this report is the employed population, and these death certificates were for individuals not in the workforce because they were homemakers (208), retired (1), unemployed/had never been employed (57), unable to work due to disability (88), students (55), children under age 16 (4). An additional 118 individuals were excluded because there was insufficient information to properly code industry and/or occupation. This left 1,696 deaths for inclusion in the analysis.



Deaths by Demographics

As shown in Table 1, the annual average opioid-related overdose death rates per 100,000 workers were significantly higher than the rates for all workers for 25-44-year-olds (17.1), males (20.3), and white workers (17.1). Rates were higher for non-Hispanics compared to Hispanics, but not significantly so. With the exception of ethnicity, the opioid-related overdose death rate for every other demographic subgroup was significantly lower than or the same as the rate for all workers.

Table 1. Frequency, rate, and rate comparison of opioid-related overdose deaths by demographic characteristics, Louisiana workers, 2014-2019, n= 1,696				
Demographic	Count (Total)	Rate /100,000 Workers (annual avg.)	95% CI	Rate Ratio
Age Group				
16-24	86	5.4	4.3, 6.7	0.4
25-44	937	17.1	16.0, 18.1	1.2 ¹
45-64	616	13.8	12.7, 15.0	1.0
65+	57	8.1	6.1, 10.4	0.6
Sex				
Male	1,278	20.3	19.2, 21.4	1.5 ¹
Female	418	7.0	6.4, 7.7	0.5
Race				
Black	279	7.9	7.0, 8.9	0.6
White	1,382	17.1	16.2, 18.1	1.2 ¹
Asian	12	5.0	2.6, 8.7	0.4
Other/Unknown	23	--- ²	---	---
Ethnicity				
Hispanic	74	11.6	9.5, 14.5	0.8
Non-Hispanic	1,622	14.0	13.3, 14.7	1.0
All Workers	1,696	13.8	13.2, 14.5	---
¹ Rate significantly higher than rate for all workers. ² Rate not calculated due to lack of a denominator.				

Deaths by Industry (Table 2)

The majority, 25.3%, of opioid-related overdose deaths occurred among those employed in the Construction industry (n=429), followed by the Accommodation and Food Services industry at 12.2% (n=207). Three industry sectors each accounted for an additional 6% of the total number of opioid-related overdose deaths, Manufacturing (n=102), Retail Trade (n=102), and Health Care and Social Assistance (n=103). The remaining industries accounted for 0.8% - 5.7% of opioid-related overdose deaths.

Workers in five industry sectors had annual average opioid-related overdose death rates (per 100,000 workers) that were significantly higher than the average rate for all workers (13.8):

- Construction (43.6)
- Mining (21.9)
- Accommodation and food services (20.5)
- Other Services (Except Public Administration) (21.2)⁶
- Transportation and Warehousing (17.9)

While not statistically higher than the average rate for all workers, the fatal opioid-related overdose death rate among those employed in the Agriculture, Forestry, Fishing, and Hunting industry was the 5th highest of all industry sectors with 18.2 deaths per 100,000 workers. There were relatively few deaths in this sector, but it is the third smallest industry sector, making up about 1% of Louisiana's workforce. For this report, data was suppressed for industries in which the number of opioid-related overdose deaths below five.

⁶ This industry sector includes landscaping services; services to buildings and dwellings (except cleaning during construction and immediately after construction); business support services; investigation and security services; waste management and remediation services; employment services, which include temporary staffing agencies; and travel arrangements and reservation services.

Table 2. Frequency, rate, and rate comparison of opioid-related overdose deaths by industry sector, Louisiana workers, 2014-2019, n=1,696

Industry	Count (Total)	Rate /100,000 Workers (annual avg.)	95% CI	Rate Ratio
Construction	429	43.6	39.6, 48.0	3.2 ¹
Mining	77	21.9	17.3, 27.4	1.6 ¹
Accommodation and Food Services	207	20.5	17.8, 23.5	1.5 ¹
Other Services (Except Public Administration)	131	21.2	17.7, 25.1	1.5 ¹
Agriculture, Forestry, Fishing, and Hunting	23	18.2	11.6, 27.4	1.3
Transportation and Warehousing	96	17.9	14.5, 21.9	1.3 ¹
Administrative and Support and Waste Management and Remediation Services	75	17.2	13.5, 21.5	1.2
Arts, Entertainment, and Recreation	39	13.2	9.4, 18.0	1.0
Utilities	14	11.5	6.3, 19.3	0.8
Manufacturing	102	11.0	9.0, 13.3	0.8
Information	19	10.1	6.1, 15.8	0.7
Real Estate and Rental and Leasing	16	7.5	4.3, 12.3	0.5
Retail Trade	102	7.2	5.9, 8.7	0.5
Professional, Scientific, and Technical Services	45	6.8	4.9, 9.1	0.5
Wholesale Trade	20	6.5	4.0, 10.0	0.5
Health Care and Social Assistance	103	5.8	4.8, 7.1	0.4
Finance and Insurance	20	4.9	3.0, 7.6	0.4
Public Administration	28	4.3	2.9, 6.2	0.3
Educational Services	22	1.9	1.2, 3.0	0.1
Management of Companies and Enterprises	*	-	-	-
Active Military ²	*	-	-	-
Insufficient Information	118	-. ²	-	-
All Industries (Workers)	1,696	13.8	(13.2, 14.5)	-

*Counts < 5 are suppressed; rate not calculated. ¹Rate significantly higher than rate for all workers. ²Unable to calculate due to lack of denominator.

Deaths by Occupation (Table 3)

The majority, 25.4%, of opioid-related overdose deaths occurred among residents employed in the Construction and Extraction occupational group (n=431). Those employed in Food Preparation and Serving Related jobs were the next most affected group at 10.4% (n=177). The Sales and Related (n=111); Installation, Repair, and Maintenance (n=110); and Production (n=103) occupational groups each made up between 6.0%-6.5% of opioid-related overdose deaths that occurred from 2014-2019.

Workers in four occupation groups had opioid-related overdose death rates (per 100,000 workers) that were significantly higher than the average rate for all workers (13.8):

- Construction and extraction occupations (50.4)
- Installation, maintenance, and repair occupations (23.8)
- Food preparation and serving related occupations (22.2)
- Transportation and material moving occupations (18.7)

Similar to the industry sectors, although not statistically higher than the average rate for all workers, the fatal opioid-related overdose death rate for those employed in Farming, Forestry, and Fishing occupations was the 4th highest of all occupational groups with 19.5 deaths per 100,000 workers. There were a relatively small number of deaths in this occupational group, but this is the smallest occupational group in the state; < 1% of Louisianans are employed in these jobs.

Table 3. Frequency, rate, and rate comparison of opioid-related overdose deaths by occupational group, Louisiana workers, 2014-2019, n=1,696

Occupational Group	Count (Total)	Rate /100,000 Workers (annual avg.)	95% CI	Rate Ratio
Construction and Extraction	431	50.4	45.8, 55.4	3.6 ¹
Installation, Repair, and Maintenance	110	23.8	19.5, 28.6	1.7 ¹
Food Preparation and Serving Related	177	22.2	19.1, 25.7	1.6 ¹
Farming, Forestry, and Fishing	14	19.5	10.6, 32.7	1.4
Transportation and Material Moving	157	18.7	15.8, 21.8	1.3 ¹
Arts, Design, Entertainment, Sports, and Media	34	17.8	12.3, 24.8	1.3
Production	103	15.3	12.5, 18.6	1.1
Building and Grounds Cleaning and Maintenance	71	14.7	11.5, 18.6	1.1
Personal Care and Services	59	14.1	10.7, 18.1	1.0
Life, Physical, and Social Services	9	9.4	4.3, 17.8	0.7
Sales and Related	111	8.5	7.0, 10.3	0.6
Legal	12	7.8	4.0, 13.7	0.6
Healthcare Support	24	7.0	4.5, 10.3	0.5
Healthcare Practitioners and Technical	55	6.7	5.1, 8.7	0.5
Management	73	6.7	5.2, 8.4	0.5
Architecture and Engineering	14	6.5	3.6, 10.9	0.5
Office and Administrative Support	84	5.7	4.5, 7.0	0.4
Protective Services	17	5.2	3.1, 8.4	0.4
Business and Financial Operations	24	5.0	3.2, 7.4	0.4
Community and Social Services	9	4.4	2.0, 8.3	0.3
Computer and Mathematical	*	-	-	-
Education, Training, and Library	13	1.8	0.9, 3.0	0.1
Military	8	⁻²	-	-
Insufficient Information	83	⁻²	-	-
All Occupations (Workers)	1,696	13.8	(13.2, 14.5)	-

Italicized data indicate unstable rate due to relative standard error > 30%. *Counts < 5 suppressed; rate not calculated. ¹Rate significantly higher than rate for all workers. ²Unable to calculate due to lack of denominator.

Deaths by Gender and Occupation (Table 4)

Total counts and annual average rates for all occupational groups by gender are presented in Table 4, as well as, where possible, rate ratios comparing occupational group by gender to the overall worker rate by gender. Also displayed is the ratio of males to females in each occupational group for the Louisiana's workforce. The higher a male: female ratio is over 1.0, the occupational group is more heavily dominated by males; ratios less than 1.0 indicate an occupational group contains more female employees. The male: female ratio for the entire Louisiana workforce from 2014-2019 was 1.1.

The occupational groups most heavily populated with male workers were:

- Construction and Extraction (29.6)
- Installation, Repair, and Maintenance (25.8)
- Architecture and Engineering; Farming, Forestry, and Fishing; Transportation and Material Moving; Production (4.8- 5.9)
- Protective Services (2.7)

More female dominated occupational groups (male: female ratio < 0.5) included:

- Personal Care and Services; Healthcare Practitioners and Technical; Office and Administrative Support; Educational, Training and Library (0.3)
- Healthcare Support (0.1)

The majority of opioid-related overdose deaths among Louisiana residents across all occupational groups occurred among males (n=1,278), compared with females (n=418). Not only was the number higher, but the death rate for males was nearly three times higher (20.3) than the female rate (7.1), which was statistically significant (rate ratio=2.9, 95% CI: 2.6, 3.2). Opioid-related overdose deaths among occupational groups tended to follow the distribution of the sexes within the state's workforce, such that male dominated groups tended to have more male deaths than female deaths and vice-versa. Regardless, the rate of opioid-related overdose death was higher among males than females for most occupational groups when comparing categories that did not have cell size restrictions.

For the most part, the occupational groups with the highest percentage of male fatal opioid-related overdose deaths were those with a high male: female workforce ratio. These included:

- Farming, Forestry, and Fishing (100%)
- Construction and Extraction (98.6%)
- Transportation and Material Moving (93.6%)
- Production (91.3%)

Similar to males, the occupational groups with the highest percentage of female fatal opioid-related overdose deaths were also those more heavily populated with female workers, including:

- Healthcare Practitioners and Technical (76.4%)
- Office and Administrative Support (66.7%)
- Personal Care and Services (64.4%)
- Education, Training, and Library (61.5%)

For both male and female workers, there were two occupational groups, had opioid-related overdose death rates that were statistically significantly higher than the rate for all male (20.3) or all female (7.0) workers, respectively, Construction and Extraction (males: 51.4; females: 21.5) and Food Preparation and Serving

Related (males: 31.2; females: 16.1). These occupational groups were two of the four groups with significantly higher opioid-related overdose death rate among all workers (See Table 3). In addition, the opioid-related overdose death rate for female workers in the Personal Care and Services occupational group (11.5) was significantly higher than the rate for all female workers in the state.

Table 4. Frequency, rate and rate comparison of opioid-related overdose deaths by occupational group and gender, Louisiana workers, 2014-2019, n=1,696

Occupational Group	Ratio in State Workforce	Count (Total)		Rate/100,000 Workers (Annual avg.) (95 % CI)		Rate Ratio	
	Male : Female	Males	Females	Males	Females	Males	Females
Construction and Extraction	29.6	425	6	51.4 (46.7, 56.6)	21.5 (7.9, 46.8)	2.5 ¹	3.1 ¹
Installation, Repair, and Maintenance	25.8	*	*	24.5 (20.1, 29.5)	-	1.2	-
Food Preparation and Serving Related	0.7	101	76	31.2 (25.4, 37.9)	16.1 (12.7, 20.1)	1.5 ¹	2.3 ¹
Farming, Forestry, and Fishing	5.8	14	0	22.8 (12.5, 38.3)	-	1.1	-
Transportation and Material Moving	5.2	147	10	20.8 (17.6, 24.5)	7.4 (3.6, 13.6)	1.0	1.1
Arts, Design, Entertainment, Sports, and Media Production	1.2	29	5	28.2 (18.9, 40.4)	5.7 (1.8, 13.2)	1.4	0.8
Production	4.8	94	9	16.9 (13.7, 20.7)	7.7 (3.5, 14.7)	0.8	1.1
Building and Grounds Cleaning and Maintenance	1.3	60	11	22.2 (17.0, 28.6)	5.2 (2.6, 9.3)	1.1	0.7
Personal Care and Services	0.3	21	38	23.4 (14.5, 35.8)	11.5 (8.2, 15.8)	1.2	1.6 ¹
Life, Physical, and Social Services	1.4	*	*	9.0 (2.9, 21.1)	-	0.4	-
Sales and Related	0.8	56	55	9.8 (7.4, 12.7)	7.5 (5.7, 9.8)	0.5	1.1
Legal	0.8	5	7	7.1 (2.3, 16.6)	8.4 (3.4, 17.4)	0.3	1.2
Healthcare Support	0.1	*	*	-	7.4 (4.7, 11.2)	-	1.1
Healthcare Practitioners and Technical Management	0.3	13	42	6.8 (3.6, 11.7)	6.7 (4.8, 9.0)	0.3	1.0
Management	1.4	57	16	8.9 (6.7, 11.5)	3.5 (2.0, 5.7)	0.4	0.5
Architecture and Engineering	5.9	*	*	7.1 (3.8, 12.1)	-	0.3	-
Office and Administrative Support	0.3	28	56	8.1 (5.4, 11.7)	4.9 (3.7, 6.4)	0.4	0.7
Protective Services	2.7	12	5	5.1 (2.6, 8.9)	5.7 (1.9, 13.3)	0.3	0.8
Business and Financial Operations	0.8	11	13	5.0 (2.5, 9.0)	4.9 (2.6, 8.4)	0.2	0.7
Community and Social Services	0.5	*	*	8.5 (3.1, 18.6)	-	0.4	-
Computer and Mathematical	2.3	*	*	*	*	-	-
Education, Training, and Library	0.3	5	8	3.0 (1.0, 7.1)	1.4 (0.6, 2.8)	0.1	0.2
Military Specific	-. ²	8	0	-. ²	-. ²	-. ²	-
Insufficient Information	-	54	29	-. ²	-. ²	-. ²	-. ²
All Occupations (Workers)	1.1	1,278	418	20.3	7.0	-	-

Italicized data indicate unstable rate due to relative standard error > 30%; *Indicates suppression (count < 5 or calculation would undo of suppression of a cell with a count < 5); rate not calculated. ¹Rate significantly higher than rate for workers. ²Unable to calculate rate due to lack of denominator in American Community Survey data.

Discussion

By using data gathered from the Louisiana Vital Records Database, we have compiled a report on opioid-related overdose deaths, which shows significant differences in the rates among workers by industry and occupation. Similar to all Louisiana residents, the rate of opioid-related overdose death among workers was highest in white, non-Hispanic males and those aged 25-44 years.⁷

In general, rates of opioid-related overdose deaths were significantly higher among those employed in industries and occupations that have high rates of work-related injuries. Workers in the construction industry had the highest rate and number of opioid-related overdose deaths. Construction work is physically demanding and those in this field may be in a vulnerable position of being injured on the job and requiring opioid use to work through the pain. Construction workers are usually paid an hourly wage with overtime and this may reflect on questionable stability regarding job security. In Louisiana, in 2019, 7 out of every 1,000 construction full-time equivalent (FTE) workers were injured while at work, and about half of those injuries resulted in lost time from work.⁸ When comparing rates of opioid-related overdose deaths in construction by gender, the rate males in construction occupations was 2.5 times higher than the rate of all male Louisiana workers (20.3), the rate of female construction workers was 3.1 times higher than the rate of all female Louisiana workers (7.0). Although construction is a male dominated field, the rate ratio was higher for female workers than male workers; however, the female rate is unstable due to a small count and relative standard error greater than 30%. Because of this, this finding is unreliable, but it does not diminish the underlying job circumstances that can be associated with construction and extraction jobs that results in opioid use and misuse. Workers in the mining industry had the second highest rate and number of opioid-related overdose deaths. This is reflective of oil and gas extraction, an important industry sector in Louisiana. The injuries rates within these physically demanding jobs for the mining, quarrying, and oil and gas extraction industry had the same injury rates as the construction industry in Louisiana for 2019 as above.⁸ Per an April 2010 report from Bureau of Labor Statistics, Louisiana ranked third for states with the most oil and gas extraction industry fatal work injuries.⁹

The third industry most affected by opioid-related overdose deaths is accommodation and food services. More study is needed to evaluate why this industry is vulnerable to opioid usage. Although it may not be as labor intensive as the construction and mining industry, opioid usage can probably be linked to chronic repetitive fine motions related to musculoskeletal disorders of the hand, back, and knees.

The findings of specific industries and occupations with high rates of opioid-related overdose deaths provide additional information that is useful for implementing Louisiana's Opioid Response Plan¹⁰. This plan is built upon five pillars - surveillance, prevention, intervention, treatment, and recovery - allowing the Louisiana Department of Health to address not only health, but also the social and economic consequences associated with opioid misuse and addiction. In addition to focusing on the high-rate of opioid-related overdose deaths in statistically significant occupation and industries, workers in the lower rate categories should not be excluded from inclusion in targeted interventions.

⁷ CDC Wonder, for all Louisiana resident data

⁸ Bureau of Labor Statistics Survey of Occupational Illnesses and Injuries, 2019, Louisiana. <https://www.bls.gov/iif/oshstate.htm#LA>

⁹ <https://www.bls.gov/iif/oshwc/osh/os/osar0013.htm>

¹⁰ https://ldh.la.gov/assets/oph/Center-PHI/Opioid_Files/LaOpioidResponsePlan2019.pdf

The Louisiana Opioid Data and Surveillance System¹¹ tracks fatal overdoses, makes information available to the public to identify the opioid epidemic occurring statewide, and emphasizes policies needed to reduce opioid abuse. As the rates of opioid-involved deaths are on the rise in Louisiana, it also becomes much more difficult to address during the COVID-19 pandemic. Currently, Louisiana is the top state within the nation for increase in drug overdose deaths in 2020 during the pandemic.¹² Individuals have become cut off from services and disconnected from support systems, which have made it difficult for them to seek help.

These findings highlight the need for comprehensive new employee physical exams to identify existing pain processes and safety sensitive medication usage. In addition, there should be workplace education and ubiquitous signage on safety and proper and appropriate lifting or maneuvering techniques as related to industry and occupation to avoid musculoskeletal and traumatic injury. Furthermore, conservative measures such as physical therapy focus on increasing range of motion and muscle strengthening. Providers should emphasize opioid use for short-term therapy, and employ overdose prevention for those on prescribed opioids for chronic pain through their managing provider. Findings from this report can be used to further support and emphasize the need to implement Louisiana's Opioid Response Plan of 2019 to target interventions within the industries and occupations that are impacted and effect policy change within the workforce and community.

¹¹ <https://lodss.ldh.la.gov/>

¹² <https://www.wvlv.com/article/news/local/americas-top-state-for-overdose-death-increase-during-covid/289-d2b509b5-b0df-447b-8ff9-06e368852516>