



DATA BRIEF

SUICIDES IN MASSACHUSETTS BY INDUSTRY & OCCUPATION: 2016-2019

Occupational Health Surveillance Program, Massachusetts Department of Public Health

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Suicides are a highly significant, yet largely preventable public health issue. Compared to national rates, Massachusetts' rate of suicide is low (14.5 deaths/100,000 U.S. residents compared to 9.3 deaths/100,000 MA residents, in 2019¹), but it has been steadily growing. In Massachusetts in 2019, suicide took 642 lives (rate: 9.3 deaths/100,000 residents) with rates increasing 41% since 2003.² There are numerous risk factors for suicide, many of which relate to work. Work is an important social determinant of health, and work-related factors such as work-related access to lethal means and job stress (including low job control and high job insecurity) have been found to be associated with increased suicide risk.³ In recent years in Massachusetts (2018-2019), suicide at work has been a leading cause of workplace fatalities.⁴ The purpose of this data brief is to provide information on the magnitude, trends, and risk factors for suicides in Massachusetts for practitioners, suicide prevention specialists, and employers, and to identify occupations and industries with high rates and numbers of suicides. The rate of suicide is not the same for all occupations and industries, suggesting that work should be considered when planning outreach initiatives and interventions. The workplace also represents an important venue for suicide prevention activities. The Massachusetts Department of Public Health's Suicide Prevention Program works in collaboration with multiple national, state, and local partners to reduce these deaths.

Data Highlights and Prevention Measures

Massachusetts death certificates were used to analyze suicide deaths from 2016 through 2019, by industry and occupation among working-aged residents (16 years or older). Occupation describes the kind of work an individual does to earn a living (i.e., job title), while industry describes the activities the individual's employer is engaged in. Additional factors (such as availability of paid sick leave) that may contribute to the differences in suicide rates among workers within different industries and occupations were examined. Key data highlights and associated prevention measures are:

Key Data Highlights:

- Between 2016 and 2019, there were 2,199 suicides among working-aged Massachusetts residents.
- Among *industry sectors*, the Agriculture, Forestry, Fishing, and Hunting sector had the lowest number of suicides (n=25), however this sector had the highest suicide rate (46.5 deaths/100,000 workers).
- Among *occupation groups*, the Construction and Extraction group had the highest number of suicides (n=316), and the highest suicide rate (49.2 deaths/100,000 workers).
- White, non-Hispanic workers had the highest number of suicides (n=1,923) as well as the highest suicide rate (17.9 deaths/100,000 workers), as compared to other racial/ethnic groups, while Hispanic workers had the lowest suicide rate (7.8 deaths/100,000 workers) followed by Black, non-Hispanic workers (9.8 deaths/100,000 workers).
- 79.0% of people who died by suicide were male, while 21.0% were female.⁵ Among males, the Construction and Extraction occupations had the highest suicide rate (49.3 deaths/100,000 workers) compared to other occupation groups, while the Production occupations had the highest suicide rate among women (9.7 deaths/100,000 workers) compared to other occupation groups.
- As the age groups of workers increased, the suicide rates also increased. For example, the rate among workers aged 16-24 years old was 7.2 deaths/100,000 workers, compared to the rate of 37.6 deaths/100,000 workers among those aged 65+.
- Suicide rates were almost two times higher among workers in occupation groups with low percentages of workers covered by paid sick leave compared to workers in occupation groups with high percentages of workers covered by paid sick leave.

¹ Centers for Disease Control and Prevention, WISQARS – Fatal Injuries Report, Nation, Regional and State, 1981-2019.

² Massachusetts Violent Death Reporting System (MAVDRS), Injury Surveillance Program, Massachusetts Department of Public Health, 2019.

³ Peterson C, Sussell A, Li J, Schumacher PK, Yeoman K, Stone DM. Suicide rates by industry and occupation – national violent death reporting system, 32 states, 2016. MMWR Morb Mortal Wkly Rep 2020; 69:57-62.

⁴ Massachusetts Department of Public Health, Occupational Health Surveillance Program, 2018-2019 Massachusetts Fatal Injuries at Work.

<https://www.mass.gov/doc/massachusetts-fatal-injuries-at-work-2018-2019-0/download>

⁵ Sex is noted on the death certificate as male, female, unknown. There were no "unknown" suicide deaths in the examined time period.

Workplace Strategies to Prevent Suicide:

The workplace is an important venue for health and safety, which includes concerns related to mental health and suicide prevention. As this data brief demonstrates, certain industry and occupation groups have higher rates of suicide. Employers, unions, worker groups, practitioners, and suicide prevention specialists can all play an important role in suicide prevention:

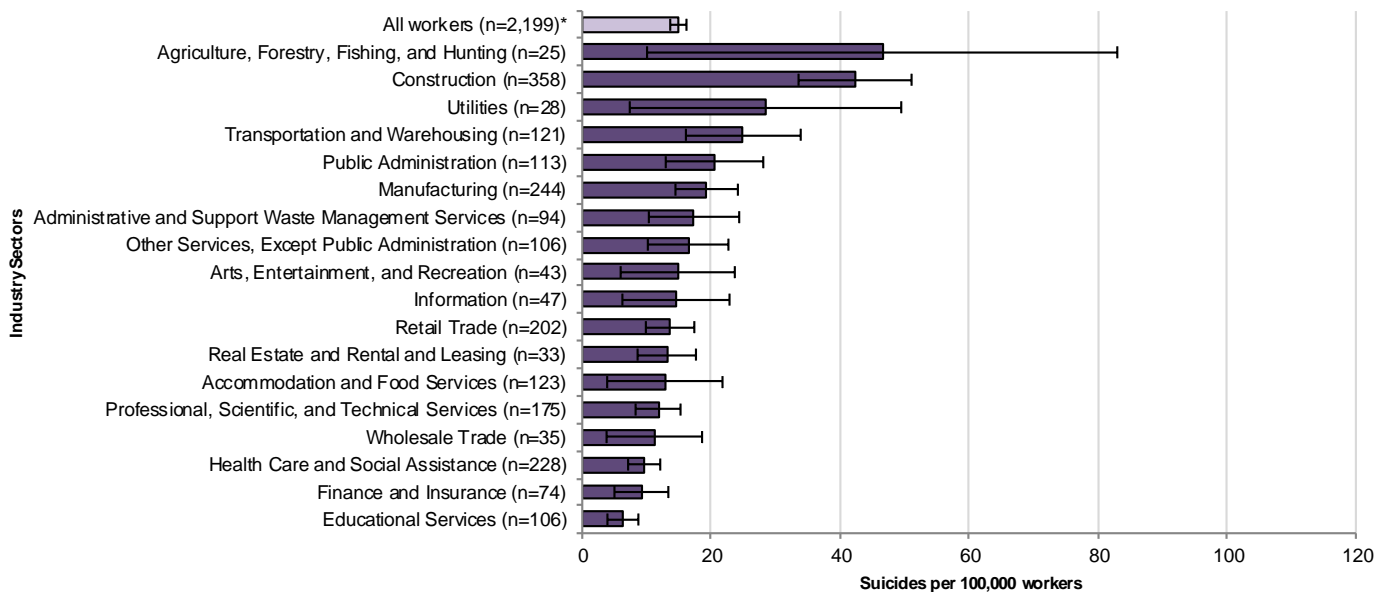
- Create a work environment that fosters communication, cultivates connectedness, and promotes asking for help.
- Increase access and refer employees to mental health and behavioral health services.
- Offer introductory level training in suicide prevention at workplaces for employers and employees to recognize the signs of suicide and instill confidence in talking about suicide.
- Develop suicide prevention campaigns and educational materials for high-risk occupations and industries that raise awareness of the signs of suicide, encourage creating a protective environment at the workplace, and promote help-seeking behaviors.

Massachusetts Suicide Prevention Program (SPP):

- The CDC's five-year [Comprehensive Suicide Prevention Grant](#) was awarded in September 2020. Massachusetts is one of eleven states and universities to receive this five-year funding. The SPP's goal within this grant, as required by the CDC, is to reduce the number of suicidal incidents and deaths among populations within the state whose suicide rate is above the state's overall rate, which was 10/100,000 in 2018. For Massachusetts, this includes working-aged males, Hispanic/Latinx, veterans/military, and specific occupations. To this end, SPP is working closely with DPH's Occupational Health Surveillance Program to create a cross-analysis to identify the occupations and industries with the highest suicide death rates in Massachusetts. Identifying gaps in healthcare and behavioral healthcare systems is also a priority towards the final goal of reducing suicide deaths, suicide attempts, and ideation.
- The SPP offers trainings to help behavioral health professionals better identify someone who is suicidal and help with their suicidality. Trainings have been offered for over 15+ years and are updated as new evidenced-based practices are identified. The SPP provides education and screening trainings for health professionals who want to learn how to identify at-risk individuals in their practices. Additionally, instructional trainings such as Safety Planning Interventions that teach professionals how to create a safety plan with an individual who is in a suicidal crisis are also available. With the onset of COVID-19 and in-person trainings not being possible, SPP has continued to offer all trainings virtually. The SPP keeps a robust training calendar which offers courses throughout the year at a nominal fee to ensure availability to anyone looking to learn more about suicide prevention. For more information on trainings offered, please view the [MDPH Suicide Prevention Training Calendar](#).

Suicide Rates by Industry and Occupation

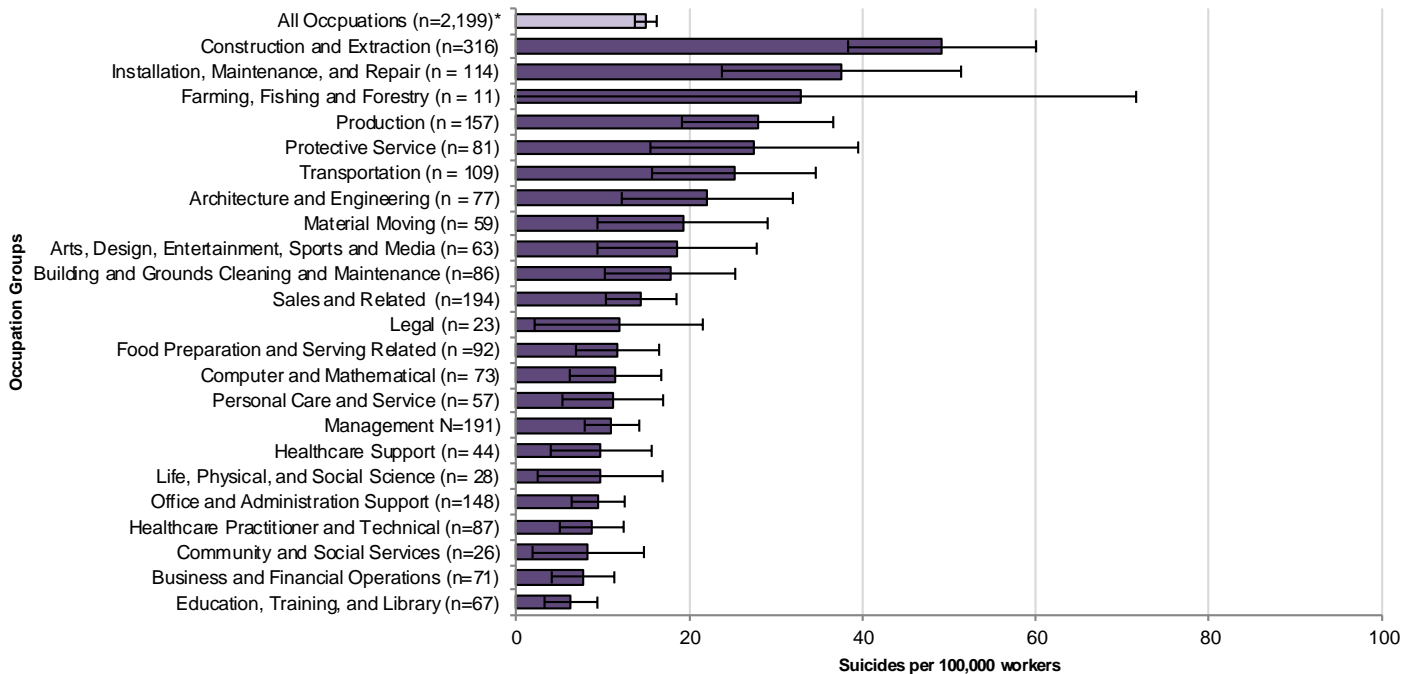
Figure 1. Suicide Rates by Industry Sectors, Massachusetts workers, 2016-2019, n=2,199



*This category excluded 11 suicides among those working in the military or military specific industries due to lack of denominator information and 33 suicides because the death certificates did not contain enough information to code industries.
 Numerator source: MA Violent Death Reporting System, MA Department of Public Health, 2016-2019
 Denominator source: American Community Survey, 2016-2019

- The average suicide rate for all Massachusetts workers across all industry sectors was 14.9 deaths per 100,000 workers.
- The Agriculture, Forestry, Fishing, and Hunting industry sector had the highest rate of suicides (46.5 deaths/100,000 workers) but had the lowest number of suicides (n=25).
- The Construction industry sector had the second highest rate of suicides (42.3 deaths/100,000 workers) and the highest number of suicides (n=358).
- The following industry sector had a suicide rate statistically significantly higher than the average rate for all workers:
 - Construction (42.3 deaths/100,000 workers)

Figure 2. Suicide Rates by Occupation Groups, Massachusetts workers, 2016-2019, n=2,199*

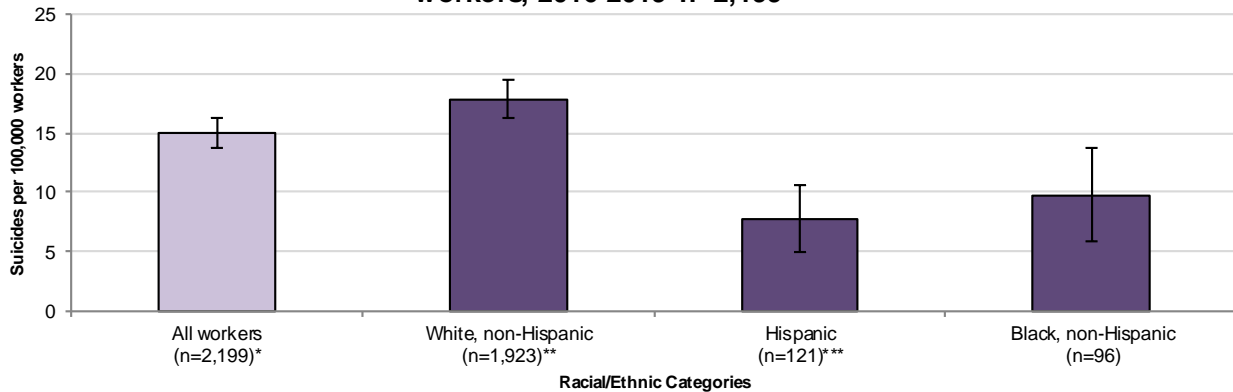


*This category excluded 12 suicides among those working in the military or military specific occupations due to lack of denominator information and 13 suicides because the death certificates did not contain enough information to code occupation.
 Numerator source: MA Violent Death Reporting System, MA Department of Public Health, 2016-2019
 Denominator source: American Community Survey, 2016-2019

- The average suicide rate for all Massachusetts workers across all occupation groups was 15.0 deaths per 100,000 workers.
- The Construction and Extraction occupations had the highest rate of suicides (49.2 deaths/100,000 workers) and the highest number of suicides (n=316).
- The following occupation groups had suicide rates statistically significantly higher than the average rate for all workers:
 - Construction and Extraction (49.2 deaths/100,000 workers)
 - Installation, Maintenance, Repair (37.6)
 - Production (27.9)

Suicides by Race/Ethnicity, Sex, and Age Group

Figure 3. Suicide rates for all workers by race/ethnicity, Massachusetts workers, 2016-2019 n=2,199[†]



*This category excluded 12 suicides among those working in the military or military specific occupations due to lack of denominator information
 **This category excluded 8 suicides among those working in the military or military specific occupations due to lack of denominator information and 11 suicides because the death certificates did not contain enough information to code occupation
 ***This category excluded 3 suicides among those working in the military or military specific occupations due to lack of denominator information
[†]Other racial and ethnic groups are not included here due to a low number of suicides in the examined time period
 Numerator source: MA Violent Death Reporting System, MA Department of Public Health, 2016-2019
 Denominator source: American Community Survey, 2016-2019

- Compared to the average suicide rate for all Massachusetts workers across all occupation groups and all other racial/ethnic groups, White, non-Hispanics had the highest suicide rate (17.9 deaths/100,000 workers) and the highest number of suicides (n=1,923).
- Hispanic workers had the lowest suicide rate compared all other racial/ethnic groups (9.8 deaths/100,000 workers), followed by Black, non-Hispanic (7.8 deaths/100,000 workers) – both of which are lower than the average suicide rate for all Massachusetts workers.
- Due to the low number of suicides in other racial and ethnic groups in the examined time period, it was not possible to generate detailed findings about the rates of suicides in other groups.

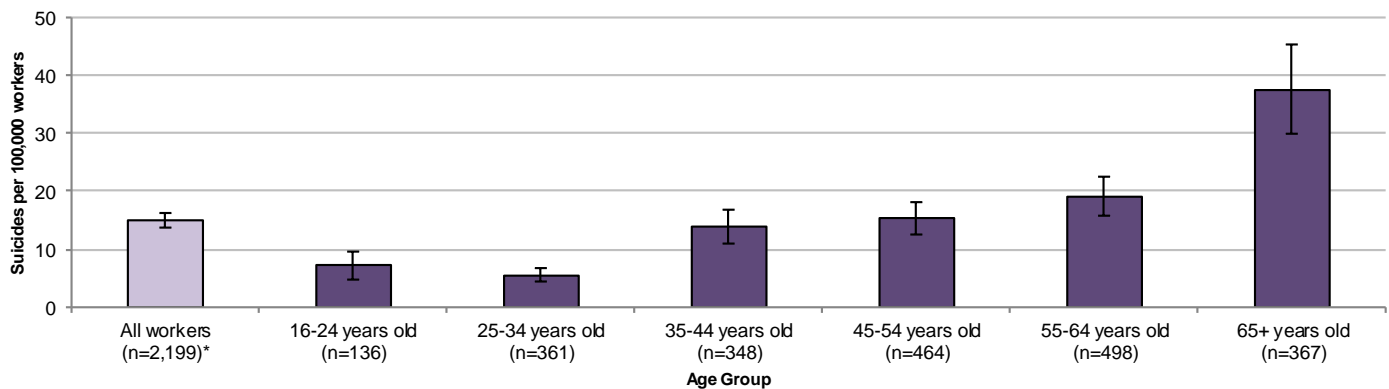
Table 1. Rate, number, and percent of suicides for occupation groups with the five highest rates by sex*, Massachusetts workers, 2016-2019 n=2,199**

| Males | | | | Females | | | |
|--|--|--------------|-------------|--|--|------------|-------------|
| Occupation Group | Rate of suicides/100,000 workers (95% CI) Rate | Suicides | | Occupation Group | Rate of suicides/100,000 workers (95% CI) Rate | Suicides | |
| | | N | % | | | N | % |
| Construction and Extraction | 49.3 (38.3, 60.3) ¹ | 309 | 17.8 | Production | 9.7 (0.5, 19.0) | 17 | 3.7 |
| Installation, Maintenance, Repair | 38.6 (24.4, 52.9) ¹ | 113 | 6.5 | Arts, Design, Entertainment, Sports, and Media | 9.4 (0.5, 18.4) | 17 | 3.7 |
| Production | 36.1 (24.1, 48.1) ¹ | 140 | 8.1 | Healthcare Support | 9.4 (3.3, 15.5) | 36 | 7.7 |
| Protective Service | 32.5 (18.0, 46.9) ¹ | 78 | 4.5 | Food Preparation and Serving Related | 8.6 (2.9, 14.2) | 35 | 7.5 |
| Arts, Design, Entertainment, Sports, and Media | 29.0 (12.3, 45.8) | 46 | 2.7 | Sales and Related | 7.7 (3.5, 12.0) | 50 | 10.8 |
| All Occupations | 23.3 (21.1, 25.5)¹ | 1,722 | 79.0 | All Occupations | 6.5 (5.3, 7.7) | 464 | 21.0 |

* Sex is noted on the death certificate as male, female, unknown. There were no "unknown" suicide deaths in the examined time period.
 **This category excluded 12 suicides among those working in the military or military specific occupations due to lack of denominator information and 13 suicides because the death certificates did not contain enough information to code occupation.
¹Rate significantly higher than rate for all occupation categories
 Numerator source: MA Violent Death Reporting System, MA Department of Public Health, 2016-2019
 Denominator source: American Community Survey, 2016-2019

- Among the 2,199 suicides, 79.0% of were male and 21.0% were female.
- Among males, the Construction and Extraction occupations had the highest rate of suicides (49.3 deaths/100,000 workers), while the Production occupations had the highest rate of suicides among females (9.7 deaths/100,000 workers).
- Among males, the top four occupation groups with the highest rates were all significantly higher than the rate for all occupation categories among all Massachusetts workers (15.0 deaths /100,000 workers).

Figure 4. Suicide rate for all workers by age group, Massachusetts workers, 2016-2019, n=2,199*

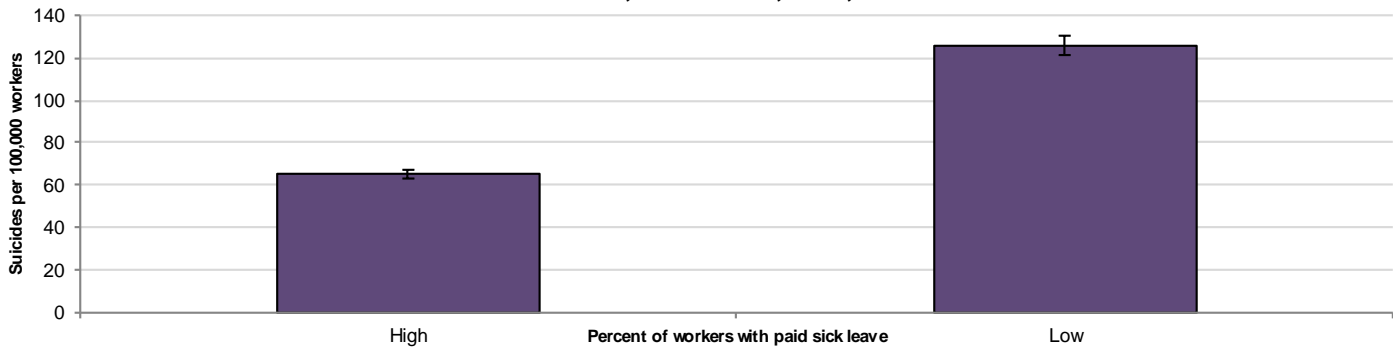


*This category excluded 12 suicides among those working in the military or military specific occupations due to lack of denominator information and 13 suicides because the death certificates did not contain enough information to code occupation.
 Numerator source: MA Violent Death Reporting System, MA Department of Public Health, 2016-2019
 Denominator source: American Community Survey, 2016-2019

- As the age of workers increased, the rate of suicides also increased.
- The age group 65+ years old had a suicide rate statistically higher than the average rate for all Massachusetts workers (37.6 deaths/100,000 workers).

Suicides by Socioeconomic Factor

Figure 5. Rate of suicides for all workers by availability of paid sick leave, Massachusetts, 2016-2019, n=2,199*



*This category excluded 12 suicides among those working in the military or military specific occupations due to lack of denominator information and 13 suicides because the death certificates did not contain enough information to code occupation. An additional 376 suicides were excluded due to having unknown paid sick leave data.

†Using national data from the U.S. Bureau of Labor Statistics (BLS) Employee Benefits Survey from 2019, occupational groups were categorized according to the availability level (high or low) of paid sick leave. An occupation was considered to have high availability of paid sick leave if 70% or more survey respondents within that occupation reported having access to paid sick leave. An occupation was considered to have low availability of paid sick leave if less than 70% of survey respondents within that occupation reported having access to paid sick leave.

Numerator source: MA Violent Death Reporting System, MA Department of Public Health, 2016-2019
Denominator source: American Community Survey, 2016-2019

- The rate of suicide was almost two times higher among workers in occupation groups with low percentages of workers covered by paid sick leave (95.2 deaths/100,000 workers) than among workers in occupation groups with high percentages of workers covered by paid sick leave (48.4 deaths/100,000 workers).
- The paid sick leave data used in Figure 5 represents the United States as a whole, and is not specific to Massachusetts. To note, the Massachusetts Earned Sick Time Law went into effect in July 2015 and was implemented in 2016. This law covers most, but not all workers in the Commonwealth. Paid sick leave offers workers an opportunity to receive paid time off from work to recover from physical as well as mental illness or injury, and to seek related medical diagnosis, treatment, or preventative care.

For more information, contact these programs at The Massachusetts Department of Public Health, 250 Washington Street, Boston, MA 02108

INJURY SURVEILLANCE PROGRAM (ISP)

Bureau of Community Health and Prevention (BCHAP)
(617) 624-5664 (MAVDRS)
(617) 624-5648 (General injury information)
<http://mass.gov/injury-surveillance-program>

SUICIDE PREVENTION PROGRAM (SPP)

Bureau of Community Health and Prevention (BCHAP)
(617) 624-5460
<http://mass.gov/suicide-prevention-program>

BUREAU OF SUBSTANCE ADDICTION SERVICES (BSAS)

(800) 327-5050
TTY: (888) 448-8321
<http://mass.gov/orgs/bureau-of-substance-addiction-services>

OCCUPATIONAL HEALTH SURVEILLANCE PROGRAM (OHSP)

Bureau of Community Health and Prevention (BCHAP)
(617) 624-5632
<https://www.mass.gov/orgs/occupational-health-surveillance-program>

MA COALITION FOR SUICIDE PREVENTION

(617) 297-8774
info@masspreventsuicide.org

Where to go for *help*
24 hour help line

NATIONAL LIFELINE

<https://suicidepreventionlifeline.org/>

(800) 273-TALK (8255)

Over 150 languages offered

Press 1 for Veterans

TTY: (800) 799-4TTY (4889)

Methods

All data were ascertained using guidelines⁶ recommended by the Centers for Disease Control and Prevention (CDC) and are based upon the International Classification of Disease codes (ICD-10) for mortality. Suicide refers to those who die by ending their own life. Occupation describes the kind of work an individual does to earn a living (i.e., job title), while industry describes the activities the individual's employer is engaged in. Using the National Institute for Occupational Safety and Health Industry and Occupation Computerized Coding System (NIOCCS), industry and occupation were assigned Census Industry Classification (CIC) codes and Census Occupation Classification (COC) codes, respectively, and were further classified by manual review.

The distribution and rate of suicides among Massachusetts residents was presented by industry and occupation and within sex, age, and racial/ethnic groups. Analyses focused on deaths occurring in 2016 through 2019, thus, the four-year average annual suicide rates among workers were calculated as the number of deaths per 100,000 workers. 95% confidence intervals were calculated for all rates. For brevity, all average annual rates are referred to as just rates. Data on the average annual number of workers employed in Massachusetts between 2016 and 2019 were obtained from the American Community Survey 2016-2019 and served as the denominator for rates. Using national data from the U.S. Bureau of Labor Statistics (BLS) Employee Benefits Survey from 2019, occupation groups were categorized according to the availability level (high or low) of paid sick leave. An occupation was considered to have high availability of paid sick leave if 70% or more survey respondents within that occupation reported having access to paid sick leave. An occupation was considered to have low availability of paid sick leave if less than 70% of survey respondents within that occupation reported having access to paid sick leave.

Data Sources:

- *Death Data:* MA Violent Death Reporting System (MAVDRS), MA Department of Public Health (DPH). The MAVDRS is part of the National Violent Death Reporting System (NVDRS), which is a CDC-funded system in all 50 states, the District of Columbia, and Puerto Rico that links data from death certificates, medical examiner files, and police reports to provide a more complete picture of the circumstances surrounding violent deaths. MAVDRS operates within the Injury Surveillance Program (ISP) at DPH. MAVDRS captures all violent deaths (homicides, suicides, deaths of undetermined intent, and all firearm deaths) occurring in MA, regardless of residency, and has been collecting data since 2003. Data reported were analyzed by ICD-10 code
- *Denominators for rates:* *American Community Survey (ACS):* United States Census Bureau, U.S. Department of Commerce.
- *Paid sick leave estimates:* *National Compensation Survey: Employee Benefits in the United States, March 2019:* U.S. Bureau of Labor, U.S. Bureau of Labor Statistics

Statistical Significance: The 95% confidence interval (95% CI) is a range of values determined by the degree of variability of the data within which the true value is likely to lie. The confidence interval indicates the precision of a calculation; the wider the interval, the less precision in the estimate. The 95% confidence intervals used in this report for crude rates are the indicators of reliability (or stability) of the estimate. Smaller population subgroups or smaller numbers of respondents yield less precise estimates

⁶ U.S. Department of Health & Human Services. (2021, September 28). *NVDRS Resources: violence prevention*. Centers for Disease Control and Prevention. Retrieved December 10, 2021, from <https://www.cdc.gov/violenceprevention/datasources/nvdrs/resources.html>