



- DATA BRIEF -

Characterizing Massachusetts Workers in Select COVID-19 Essential Services: Healthcare

Massachusetts Department of Public Health

FEBRUARY 2021

PURPOSE

Information in this data brief, and in the companion data brief on food stores and urban transit workers, could help policy makers and public health practitioners develop and target efforts to prevent Coronavirus Disease 2019 (COVID-19) among workers and their communities, with the goal of reducing health inequities.

Data on the nature of work (e.g., job duties), job-related benefits (e.g., health insurance), demographics, and the underlying health of Massachusetts workers across industries and occupations may be useful to assess the relationship between work and potential health impacts from the pandemic. Such data for COVID-19 cases will also be crucial but is not yet consistently available. As a first step in identifying potential inequities linked to work, we used existing data sources to examine select characteristics of healthcare personnel in Massachusetts. This is particularly important as healthcare is the largest industry in the state, employing more than 40% of all workers.¹ Given the nature of the work, both with the possibility of close contact to COVID-19 patients and exposure to areas where COVID-19 patients are treated, healthcare personnel are at greater risk of exposure to coronavirus as compared to other occupations. The documented variance in availability of personal protective equipment increases that risk. Nationally, more than 9,000 cases of healthcare personnel with COVID-19 were documented by the CDC between February 12 and April 9, 2020, likely a severe undercount due to missing occupation information in a majority of cases reported, and a number that has likely grown exponentially.²

BACKGROUND

The COVID-19 pandemic is unprecedented in recent times. As of December 12, 2020, there were 285,725 cases among Massachusetts residents.³ The pandemic is exacerbating existing health inequities. Older adults, people with certain underlying medical conditions (e.g., cardiovascular disease, diabetes mellitus, chronic lung disease), and communities of color — populations already considered vulnerable to a number of health threats — are bearing a disproportionate burden of COVID-19.⁴⁻⁷ In an effort to curb the spread of the virus in Massachusetts, on March 10, 2020 Governor Baker ordered non-essential businesses to close or facilitate teleworking, while industries designated “COVID-19 essential services” maintained operations.⁸

While the physical, mental, and emotional health of many adults across the Commonwealth has been impacted by the pandemic, certain groups may be disproportionately affected by virtue of their jobs. In order to keep their jobs, many workers in essential services are required to regularly leave home to go to work, putting them at risk of infection, and at risk of transmitting the virus to their families and communities. Studies have found higher rates of COVID-19 in Massachusetts communicates with greater percentages of workers in essential services.^{7,24} Statewide, although adults aged 70 years and older have a higher rate of hospitalization and death, those aged 20-69 have higher rates of infection and comprise approximately 90% of adult cases.³ Workplaces may play an important role in transmission of coronavirus and in perpetuating inequities, and therefore are a key target for prevention.⁹

METHODS

Healthcare personnel were defined as “all paid and unpaid persons working in healthcare settings, home healthcare services, or healthcare occupations within other industries (e.g., school nurses) who have the potential for exposure to patients and/or to infectious materials, including body substances, contaminated

medical supplies and equipment, contaminated environmental surfaces, or contaminated air. Healthcare personnel might include, but are not limited to, physicians, nurses, nursing assistants, therapists, technicians, emergency medical service personnel, dental personnel, pharmacists, laboratory personnel, autopsy personnel, students and trainees, contractual staff not employed by the health-care facility, and persons (e.g., clerical, dietary, housekeeping, laundry, security, maintenance, administrative, billing, and volunteers) not directly involved in patient care but potentially exposed to infectious agents that can be transmitted to and from healthcare personnel and patients.”¹⁰

We selected three industry groups designated as essential services within the Commonwealth: hospitals, ambulatory care settings, and nursing and residential care facilities. While the definition of healthcare personnel does include industries outside of healthcare, these accounted for only 0.5% of total healthcare personnel and were excluded from analysis. We focused on three occupation groups within each of these industries: health diagnosis and treating practitioners, health technologists and technicians, and healthcare support occupations.

Census Industry Codes (CIC) were used to define the three healthcare industry groups: Ambulatory Health Care services (CIC: 7970-8180); Hospitals (CIC: 8190); and Nursing and Residential Care Facilities (CIC: 8270-8290). Census Occupation Codes (COC) were used to define select healthcare occupation groups: Health Diagnosis and Treating Practitioners (COC: 3000-3260); Health Technologists and Technicians (COC: 3300-3540); Healthcare Support Occupations (COC: 3600-3655).

The National Institute for Occupational Safety and Health (NIOSH)’s Employed Labor Force system was used to query demographic data from the 2016-2018 Current Population Survey.¹¹ The three-year average annual percent of workers was analyzed. The number of establishments, and median hourly and annual wage was derived from the Quarterly Census of Employment and Wages from the U.S. Bureau of Labor Statistics and the U.S. Bureau of Labor Statistic Occupational Employment Statistics.^{12,13} Data from the Massachusetts Behavioral Risk Factor Surveillance System (BRFSS), 2012-2018, were used for prevalence estimates of having one or more high risk underlying medical conditions and select healthcare access indicators (e.g., flu vaccination, no health insurance, costs as a barrier to care and has a personal healthcare provider).¹⁴ Two-sample t-tests were used to test for significance at the alpha level of 0.05.

RESULTS

Employment Characteristics

Table 1. Average annual number of establishments and workers, Healthcare, Massachusetts

| Industry/Occupation | Average annual number (percent) of workers ^a | Average annual number of establishments ^b |
|---|---|--|
| Total Massachusetts Workforce | 3,560,000 (100.0%) | 244,938 |
| Ambulatory Healthcare Services | 213,000 (6.0%) | 12,031 |
| Health Diagnosis and Treating Practitioners | 58,000 (1.6%) | ^c |
| Health Technologists and Technicians | 22,000 (0.6%) | ^c |
| Healthcare Support Occupations | 41,000 (1.2%) | ^c |
| Hospitals | 212,000 (6.0%) | 233 |
| Health Diagnosis and Treating Practitioners | 88,000 (2.5%) | ^c |
| Health Technologists and Technicians | 20,000 (0.6%) | ^c |
| Healthcare Support Occupations | 19,000 (0.5%) | ^c |
| Nursing and Residential Care Facilities | 68,000 (1.9%) | 2,302 |
| Health Diagnosis and Treating Practitioners | 8,000 (0.7%) | ^c |
| Health Technologists and Technicians | 5,000 (0.1%) | ^c |
| Healthcare Support Occupations | 22,000 (0.6%) | ^c |
| Healthcare workers in other settings* | 18,000 (0.5%) | 125,896 |

*These workers are excluded from analysis below; ^a Data Source: 2016-2018 Current Population Survey; ^b 2016-2018 Quarterly Census of Employment and Wages. Establishment = a single economic unit (e.g., a store), typically at one physical location, that produces goods or services; ^c Establishments are found at the industry level not at the occupational level.

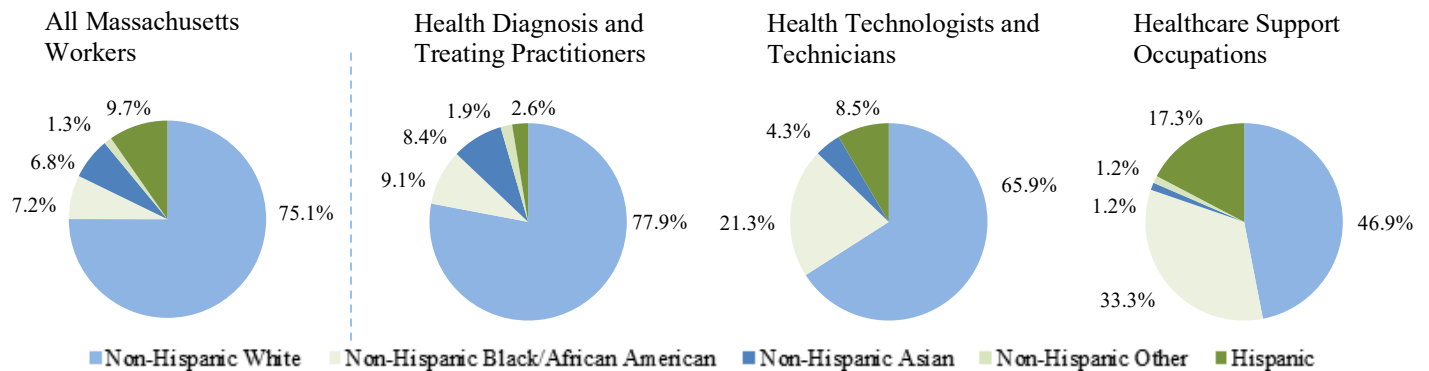
Table 2. Essential Healthcare Occupations within Healthcare Industries and corresponding wage information*, Massachusetts, Essential Service Groups

| Essential Service Group | Occupation - within COC healthcare industry (COC code) ^a | Percent of COC healthcare workforce, % ^b | Median hourly wage, \$ ^c | Median annual wage, \$ ^c |
|--|---|---|-------------------------------------|-------------------------------------|
| Total Massachusetts Workforce | All Occupations | | 23.40 | 48,680 |
| Health Diagnosis and Treating Practitioners (COC: 3000-3260) | Registered Nurses (3255) | 16.02 | 41.76 | 86,860 |
| | Physicians and Surgeons (3060) | 6.76 | ** | ** |
| | Physical Therapists (3160) | 1.62 | 44.26 | 92,060 |
| | Dentists (3010) | 1.15 | 71.40 – 97.35 | 148,520 - 202,490 |
| | Therapists, All Other (3245) | 1.08 | 29.07 | 60,470 |
| Health Technologists and Technicians (COC: 3300-3540) | Licensed Practical and Licensed Vocational Nurses (3500) | 3.04 | 27.62 | 57,450 |
| | Clinical Laboratory Technologists and Technicians (3300) | 1.62 | 28.25 | 58,750 |
| | Diagnostic Related Technologists and Technicians (3320) | 1.35 | 35.35 – 41.28 | 73,520 - 85,860 |
| | Health Practitioner Support Technologists and Technicians (3420) | 0.88 | 15.60 – 30.16 | 32,440 - 62,740 |
| | Dental Hygienists (3310) | 0.74 | 40.33 | 83,880 |
| Healthcare Support Occupations (COC: 3600-3655) | Nursing, Psychiatric, and Home Health Aides (3600) | 10.95 | 14.49 – 15.54 | 30,140 - 32,310 |
| | Medical Assistants (3645) | 2.37 | 18.87 | 39,240 |
| | Dental Assistants (3640) | 1.35 | 22.00 | 45,760 |
| | Healthcare Support Workers, All Other, Including Medical Equipment Preparers (3655) | 0.81 | 19.21 – 20.85 | 39,950 - 43,370 |
| | Phlebotomists (3649) | 0.68 | 18.69 | 38,880 |

^aCOC = Census Occupation Code; Five leading occupations for respective essential service group; ^bData Source: 2016-2018 Current Population Survey; ^cData Source: U.S. Bureau of Labor Statistic Occupational Employment Statistics (OES), Massachusetts May 2018, https://www.bls/oes/2018/may/oes_ma.htm; Note: OES 2018 data on wages are for occupations across industries, not industry-specific; **Median annual wage is unavailable

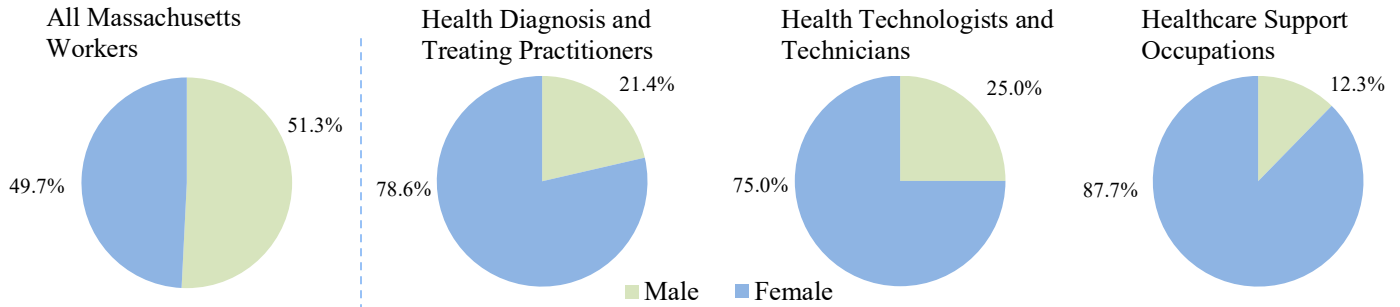
Demographic Characteristics

Figure 1. Three-year average annual percent of workers by healthcare occupations within healthcare industries and race/ethnicity, Massachusetts*



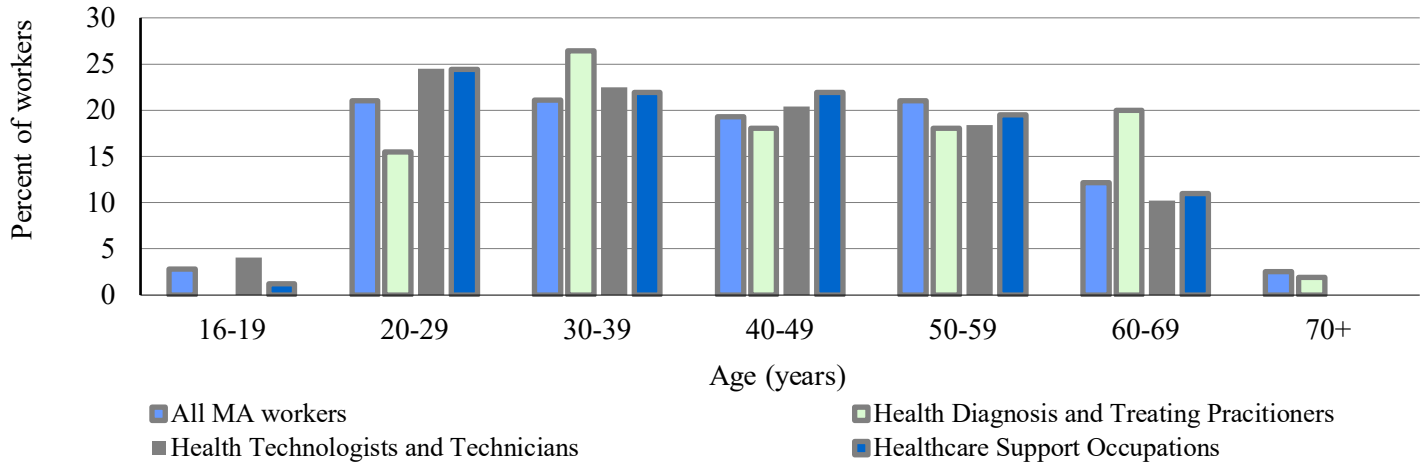
Data Source: 2016-2018 Current Population Survey, NIOSH ELF; Weighted estimates of average annual numbers of workers are: All Massachusetts Workers, N=3,560,000; Health Diagnosis and Treating Practitioners, N=154,000; Health Technologists and Technicians, N=48,000; Healthcare Support Occupations, N=81,000. *Total sample size for all three healthcare occupation groups and Massachusetts workers are weighted estimates of the numbers of workers

Figure 2. Three-year average annual percent of workers by healthcare occupations within healthcare industries and sex, Massachusetts*



Data Source: 2016-2018 Current Population Survey, NIOSH ELF; Weighted estimates of average annual numbers of workers are: All Massachusetts Workers, N=3,560,000; Health Diagnosis and Treating Practitioners, N=154,000; Health Technologists and Technicians, N=48,000; Healthcare Support Occupations, N=81,000. *Total sample size for all three healthcare occupation groups and Massachusetts workers are weighted estimates of the numbers of workers.

Figure 3. Three-year average annual percent of workers by healthcare occupations within healthcare industries and age-group, Massachusetts*

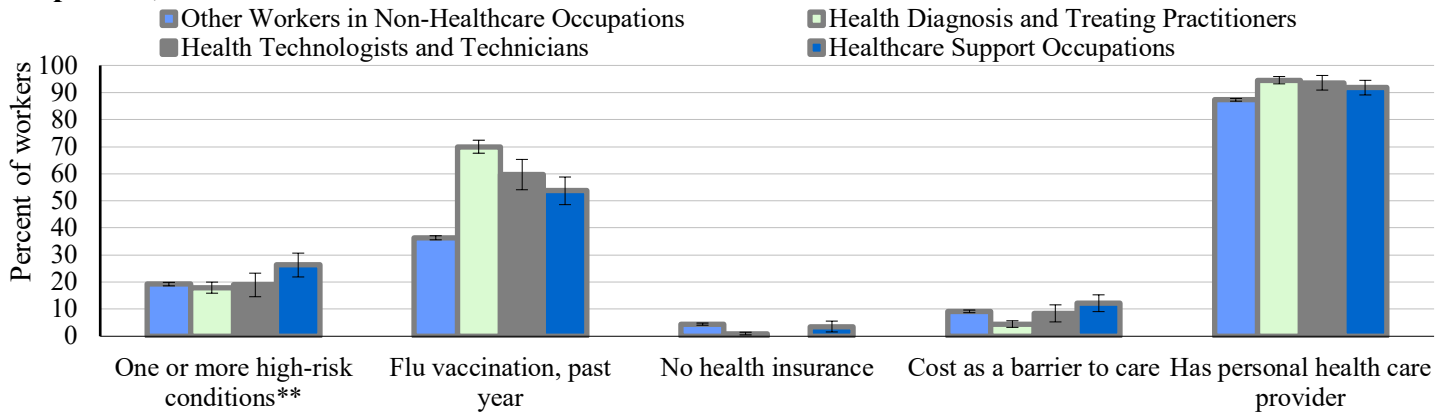


Data Source: 2016-2018 Current Population Survey, NIOSH ELF

*Total sample size for all three healthcare occupations and Massachusetts workers are weighted estimates of the numbers of workers

Indicators Related to Health and Healthcare Access

Figure 4. Percent of workers with one or more underlying medical conditions and select health care access indicators by occupation group within healthcare industries vs. other workers in non-healthcare occupations, Massachusetts**



Data Source: 2012-2018 Massachusetts Behavioral Risk Factor Surveillance System, MDPH *Insufficient Data (Relative Standard Error=30% or Sample N<50) **Includes those with current asthma, and those ever told they had COPD, diabetes, myocardial infarction, coronary heart disease, stroke, or kidney disease.

SUMMARY OF FINDINGS

Healthcare support occupations

On average, each year from 2016-2018, there were an estimated 81,000 people in healthcare support occupations within healthcare industries. Median salaries across all healthcare support occupations ranged from \$30,140 to \$60,450 (data not shown), the lowest range of the three occupation groups examined. The percentage of non-Hispanic Black/African Americans was nearly five times higher in this occupation group as compared with the Massachusetts workforce (33.3% vs. 7.2%, p<0.01). The percentage of Hispanic workers was 1.7 times greater compared with the Massachusetts workforce (17.3% vs. 9.7%, p<0.01).

According to data from the BRFSS, a greater percentage of workers in healthcare support occupations reported one or more underlying medical conditions that may increase the risk for severe COVID-19 complications when compared to all other workers in non-healthcare occupations and compared to health diagnosis and treating practitioners (26.3% vs. 19.3% and 18.0%). Compared to all other workers in non-healthcare occupations, a greater percentage of workers in healthcare support occupations reported that cost was a barrier to seeking medical care in the previous year (12.2% vs. 9.2%). Across all three healthcare occupation groups, a greater percentage of workers in healthcare support occupations reported that cost was a barrier to seeking medical care in the previous year (12.2% vs. 8.5% and 4.5%). A smaller percentage of workers in healthcare support occupations reported not having health insurance when compared to all other workers in non-healthcare occupations (3.6% vs. 4.5%). Furthermore, a smaller percentage of workers in this occupation group reported receiving a flu vaccination compared to the other groups.

Health technologists and technicians

Health technologists and technicians accounted for the smallest percentage of workers among the three groups examined, with 48,000 workers. The median income for this group ranged from \$57,450 – \$85,860. The percentage of non-Hispanic Black/African American workers was three times greater (21.3% vs. 7.2%, p<0.01) in the occupation group health technologists and technicians as compared with the total Massachusetts workforce. Consistent with health diagnosing and treating practitioners, there were more females than males (75% vs. 25%), which differed from the overall Massachusetts workforce with 48.7% females and 51.3% males. This occupation group had the largest percentage of younger workers, those under age 29 (24.7%) compared

with all Massachusetts workers and health diagnosing and treating practitioners (21.0% and 15.4% respectively).

Results from the BRFSS show that health technologists and technicians were less likely than health diagnosis and treating practitioners to have a primary care practitioner or to receive flu vaccination. In addition, a greater percentage of health technologists and technicians reported cost as a barrier to care when compared to health diagnosis and treating practitioners, and a greater percentage had a high-risk condition. However, they were more protected than healthcare support occupations on each of these measures. While some of these differences were small, they demonstrate variation across healthcare personnel experiences.

Health diagnosis and treating practitioners

Health diagnosis and treating practitioners was the largest occupation group of the three examined with 154,000 workers. This occupation group had the highest median income range (\$60,470 – \$202,490). There was a greater percentage of White workers in health diagnosis and treating practitioner occupations (75.1% vs. 77.9%, respectively) compared with the overall Massachusetts workforce. This difference was more striking compared to other occupation groups (66.0% in health technologists and technicians vs. 46.9% in healthcare support occupations). As with the other occupation groups examined, there were more females in health diagnosis and treating practitioners compared to all Massachusetts workers (78.6% vs. 48.7%, respectively). Compared to the total Massachusetts workforce, health diagnosis and treating practitioners had a higher percentage of workers aged 60 to 69 years old. An estimated 22% of workers in this occupation group were over 60 years old compared with 15% of all workers.

When looking at data from the BRFSS, compared with all other workers in non-healthcare occupations, a greater percentage of health diagnosing and treating practitioners reported that they have a personal healthcare provider, have health insurance, receive flu vaccination and are less likely to have a high risk condition.

CONCLUSION

Work is an important social determinant of health and risk factor for coronavirus infection, especially for particular groups of workers.^{9,15-17} Nationwide, studies have shown that those in essential services who are required to work outside of the home are at higher risk of developing COVID-19 as a result of their exposures at work.¹⁸ As the pandemic progressed, healthcare settings were recognized as environments where transmission was occurring, putting healthcare workers at risk of contracting the disease. This was true in Massachusetts, as an early cluster of cases was linked to a hospital and many subsequent cases have occurred among workers at long term care facilities.¹⁹ As information about the work experience of those who were diagnosed with COVID-19 became available, it became apparent that it was necessary to take a closer look at the demographic makeup of occupation groups deemed essential.

Structural racism plays a role in people of color being disproportionately employed in low-paying, hazardous jobs and further supports the observed disparities with COVID-19.²⁰⁻²¹ The healthcare support occupations, with the largest proportion of women, and non-Hispanic Black/African American and Hispanic workers, earn the lowest wages, and face barriers in seeking their own medical care despite being significantly more likely to have underlying medical conditions that put them at risk for COVID-19. This is in addition to working in an industry where there is direct and indirect contact with COVID-19 patients. Further, workers in healthcare support occupations include environmental service staff who may have increased exposure to chemicals that cause work-related lung disease, thus, putting these workers at a greater susceptibility for disease. It has been found that Black workers are more than twice as likely to be respiratory therapists, a healthcare occupation that has shown to be particularly high risk for COVID-19, compared to White workers.²⁰ In Massachusetts, rates for positive coronavirus cases among non-Hispanic Black/African American and Hispanic residents were more than three times higher than the rate for non-Hispanic white residents.²² Rates of hospitalizations in Massachusetts among non-Hispanic Black/African American and Hispanic residents

compared to white residents was 2.4 and 1.6 times higher, respectively.²² While information about work for COVID-19 cases is not consistently available, communities like Chelsea and Boston, with high proportions of essential workers and people of color among their residents have been most impacted.⁷ In addition to work, structural and community-level factors like poverty, unequal and discriminatory treatment in the medical system, and living conditions, such as living in densely populated areas or in multi-generational households, may impact infection risk and further contribute to these disparities.²³

In conclusion, the risk of COVID-19 is not borne equally across all people in the Commonwealth. Occupational factors may exacerbate these health inequities. Thus, it is critical to implement public health surveillance systems that collect information on industry and occupation, as well as race/ethnicity and other demographic variables. Understanding the risk and burden of disease among various occupational groups can help policy makers and public health practitioners, as well as employers, develop and implement targeted workplace interventions to prevent infection of workers and secondary spread to workers' homes and communities.

REFERENCES (all links accessed January 2021):

1. Labor Force Statistics from the Current Population Survey. (2020, April 21) Retrieved from <https://www.bls.gov/cps/home.htm>.
2. Burrer, S. L., Perio, M. A., Hughes, M. M., Kuhar, D. T., Luckhaupt, S. E., McDaniel, C. J., . . . Walters, M. (2020). Characteristics of Health Care Personnel with COVID-19 — United States, February 12–April 9, 2020. *MMWR. Morbidity and Mortality Weekly Report*, 69(15), 477-481. doi:10.15585/mmwr.mm6915e6
3. Massachusetts Department of Public Health (2020, July 15). COVID-19 Dashboard – Dashboard of Public Health Indicators. Retrieved from <https://www.mass.gov/doc/weekly-covid-19-public-health-report-december-17-2020/download>
4. Stokes, E. K., Zambrano, L. D., Anderson, K. N., Marder, E. P., Raz, K. M., Felix, S. E., . . . Fullerton, K. E. (2020). Coronavirus Disease 2019 Case Surveillance — United States, January 22–May 30, 2020. *MMWR. Morbidity and Mortality Weekly Report*, 69(24), 759-765. doi:10.15585/mmwr.mm6924e2
5. Garg, S., Kim, L., Whitaker, M., O'Halloran, A., Cummings, C., Holstein, R., . . . Fry, A. (2020). Hospitalization Rates and Characteristics of Patients Hospitalized with Laboratory-Confirmed Coronavirus Disease 2019 — COVID-NET, 14 States, March 1–30, 2020. *MMWR. Morbidity and Mortality Weekly Report*, 69(15), 458-464. doi:10.15585/mmwr.mm6915e3
6. Killerby, M. E., Link-Gelles, R., Haight, S. C., Schrodt, C. A., England, L., Gomes, D. J., . . . Wong, K. K. (2020). Characteristics Associated with Hospitalization Among Patients with COVID-19 — Metropolitan Atlanta, Georgia, March–April 2020. *MMWR. Morbidity and Mortality Weekly Report*, 69(25), 790-794. doi:10.15585/mmwr.mm6925e1
7. Chambers, L. (2020, April 08). Data show COVID-19 is hitting essential workers and people of color hardest. Retrieved from, <https://www.aclum.org/en/publications/data-show-covid-19-hitting-essential-workers-and-people-color-hardest>.
8. COVID-19: Essential Services. (2020). Retrieved from <https://www.mass.gov/info-details/covid-19-essential-services>
9. Lan, F., Wei, C., Hsu, Y., Christiani, D. C., & Kales, S. N. (2020). Work-related COVID-19 transmission in six Asian countries/areas: A follow-up study. *Plos One*, 15(5). doi:10.1371/journal.pone.0233588
10. Council of State and Territorial Epidemiologists Occupational Health Surveillance Subcommittee. (2020). Personal communication.
11. Employed Labor Force (ELF) query system. (2019, September 23). Retrieved from <https://wwwn.cdc.gov/wisards/cps/>
12. Quarterly Census of Employment and Wages. (2020). Retrieved from <http://www.bls.gov/cew/>
13. U.S. Bureau of Labor Statistics 2018 Occupational Employment Statistics. (2020). Retrieved from www.bls.gov/oes/2018/may/oes_ma.htm
14. Behavioral Risk Factor Surveillance. (2020). Retrieved from <http://www.mass.gov/behavioral-risk-factor-surveillance>
15. Landsbergis, P. A., Choi, B., Dobson, M., Sembajwe, G., Slatin, C., Delp, L., . . . Baron, S. (2018). The Key Role of Work in Population Health Inequities. *American Journal of Public Health*, 108(3), 296-297. doi:10.2105/ajph.2017.304288
16. Dyal, J. W., Grant, M. P., Broadwater, K., Bjork, A., Waltenburg, M., Gibbins, J., . . . Honein, M. (2020, May 07). COVID-19 Among Workers in Meat and Poultry Processing Facilities — 19 States, April 2020. Retrieved from <https://www.cdc.gov/mmwr/volumes/69/wr/mm6918e3.htm>.
17. Mosites, E., Parker, E. M., Clarke, K. E., Gaeta, J. M., Baggett, T. P., Imbert, E., . . . Stoltey, J. (2020). Assessment of SARS-CoV-2 Infection Prevalence in Homeless Shelters — Four U.S. Cities, March 27–April 15, 2020. *MMWR. Morbidity and Mortality Weekly Report*, 69(17), 521-522. doi:10.15585/mmwr.mm6917e1
18. Baker, M. G., Peckham, T. K., & Seixas, N. S. (2020). Estimating the burden of United States workers exposed to infection or disease: A key factor in containing risk of COVID-19 infection. *Plos One*, 15(4). doi:10.1371/journal.pone.0232452
19. COVID-19 Nursing Home Dataset (Rep.). (2020). Retrieved from <https://data.cms.gov/Special-Programs-Initiatives-COVID-19-Nursing-Home/COVID-19-Nursing-Home-Dataset/s2uc-8wxp/data>
20. Hawkins, D. (2020). Differential occupational risk for COVID-19 and other infection exposure according to race and ethnicity. *American Journal of Industrial Medicine*. doi:10.1002/ajim.23145

21. Krieger, N. (2010). Workers are people too: Societal aspects of occupational health disparities-an ecosocial perspective. *American Journal of Industrial Medicine*, 53(2), 104-115. doi:10.1002/ajim.20759
22. COVID-19 Health Equity Advisory Group. (2020). Retrieved from <http://www.mass.gov/orgs/covid-19-health-equity-advisory-group>
23. Hoang U and Jones NR. Is there an association between exposure to air pollution and severity of COVID-19 infection? April 29, 2020. Retrieved from: www.cebm.net/covid-19/is-there-an-association-between-exposure-to-air-pollution-and-severity-of-covid-19-infection/
24. Hawkins D. Social Determinants of COVID-19 in Massachusetts, United States: An Ecological Study. *J Prev Med Public Health* 2020; 53(4): 220-227. Published online: June 24, 2020