



Michigan COVID-19 Recovery Surveillance Study

Data Report 5: Prevalence of Long COVID by Sociodemographic and Clinical Characteristics

June 2022

Executive Summary

The Michigan COVID-19 Recovery Surveillance Study (MI CReSS) is a joint project between the University of Michigan School of Public Health and the Michigan Department of Health and Human Services (MDHHS) to conduct public health surveillance and record Michigander's experiences with COVID-19 using a representative sample of confirmed cases.

Eight probability samples of a combined 9,000 non-institutionalized adults in Michigan with COVID-19 onset prior to April 15, 2021, who were alive at the time of the study, were eligible to participate. A total of 2,849 respondents completed the survey online or over the phone for a response rate of 32.6%.¹ Responses were weighted to be representative of non-institutionalized adults who were alive at the time of the study in Michigan with COVID-19 onset on or before April 15, 2021, with respect to age, sex, and geographic region. This report includes data on 2,703 respondents with information on recovery time.

This report focuses on prevalence estimates of Long COVID in our sample overall and within subgroups of people according to their sociodemographic and clinical characteristics. Long COVID is defined as prolonged or persistent symptoms lasting at least 90 days following the onset of COVID-19 symptoms among individuals with a probable or confirmed SARS-CoV-2 infection.² Long COVID symptoms typically include fatigue, shortness of breath, and impaired cognitive or physical function.² Long COVID may occur in individuals with asymptomatic, mild, moderate, or severe cases of COVID-19, and may have a sporadic onset or persist from the time of acute COVID-19 illness.² Individuals afflicted with Long COVID typically report fluctuating and sporadic periods of symptoms.²

All adult respondents with a COVID-19 onset date before April 15, 2021, were asked if they had recovered to their usual state of health following their COVID-19 diagnosis. If a respondent reported they had recovered to their usual state of health, they were next asked to estimate about how long it took them to recover from their COVID-19 illness. If a respondent had not recovered to their usual state of health at the time of survey, their recovery time was reported as the duration between their onset of COVID-19 and date of survey completion. For respondents with non-missing data on recovery time, 619 were classified as having Long COVID and 2,084 were classified as not having Long COVID.

[1] American Association for Public Opinion Research, *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*. 2016: <https://www.aapor.org/Standards-Ethics/Standard-Definitions-%281%29.aspx>.

[2] World Health Organization, *Coronavirus Disease (COVID-19): Post-COVID-19 Conditions*. 2021 [https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-\(covid-19\)-post-covid-19-condition](https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-(covid-19)-post-covid-19-condition).

Key Findings

- Among the 2,703 adult respondents, 21.4% had 90-Day Long COVID.
- Long COVID was more prevalent among females than males, respondents ages 75 and older than younger respondents, and Hispanic respondents than respondents from other racial/ethnic populations.
- Long COVID was more prevalent among respondents with less than a high school education and respondents with an annual income under \$50,000 compared to respondents with higher educational attainment or annual income, respectively.
- Long COVID was more prevalent among respondents with BMI greater than 30 compared to those with a BMI less than 30; very severe self-reported COVID-19 symptoms compared to those with no symptoms, mild, moderate, or severe symptoms; and respondents with an overnight hospital stay compared to those who were not hospitalized.
- 27.1% of respondents who had at least one pre-existing condition diagnosed prior to their COVID-19 illness had Long COVID. Long COVID was most prevalent among respondents previously diagnosed with an immunosuppressive condition, COPD or emphysema, cancer, or heart disease.
- The eight most common persistent symptoms that respondents with Long COVID reported experiencing were fatigue; loss of sense of smell or taste; memory loss, brain fog, or disorientation; shortness of breath; general weakness; muscle weakness; joint pain; and hair loss.

Prevalence of Long COVID



Based on the World Health Organization’s (WHO) case definition of Long COVID, we will use a 90-day cutoff point for Long COVID.²

Recovery Time: 37.8%, 26.5%, and 21.4% of respondents had not recovered from COVID-19 by 30, 60, or 90 days, respectively, following onset of their COVID-19 illness (Fig. 1). At the time of survey, 16.6% of respondents reported having not yet recovered to their usual state of health following their COVID-19 diagnosis.

Figure 1: Prevalence of Reporting Not Recovered by Day 30, 60, and 90 among all respondents



Sample N ranges from 2703 to 2720

[2] World Health Organization, Coronavirus Disease (COVID-19): Post-COVID-19 Conditions. 2021
[https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-\(covid-19\)-post-covid-19-condition](https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-(covid-19)-post-covid-19-condition)

Demographics



This section describes the prevalence of Long COVID within subgroups of people according to their sociodemographic characteristics including sex, age, race/ethnicity, educational attainment, and income.

Sex: Long COVID was more prevalent among female compared to male respondents. 25.0% of female respondents had Long COVID, compared to only 17.2% of male respondents (Fig. 2).

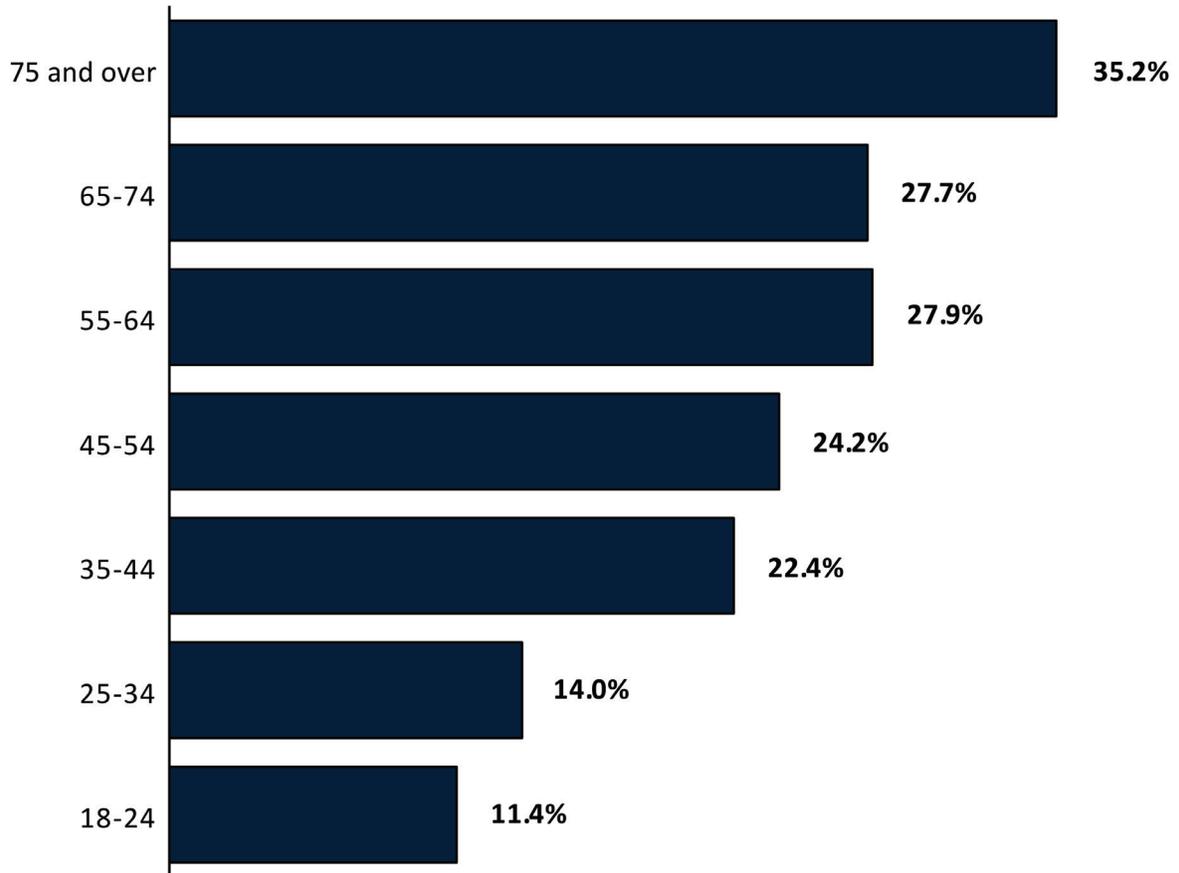
Figure 2: Prevalence of Long COVID among male and female respondents



Sample N ranges from 1098 (males) to 1605 (females).

Age: Long COVID prevalence increased with age and was most prevalent among respondents ages 75 and over (Fig. 3).

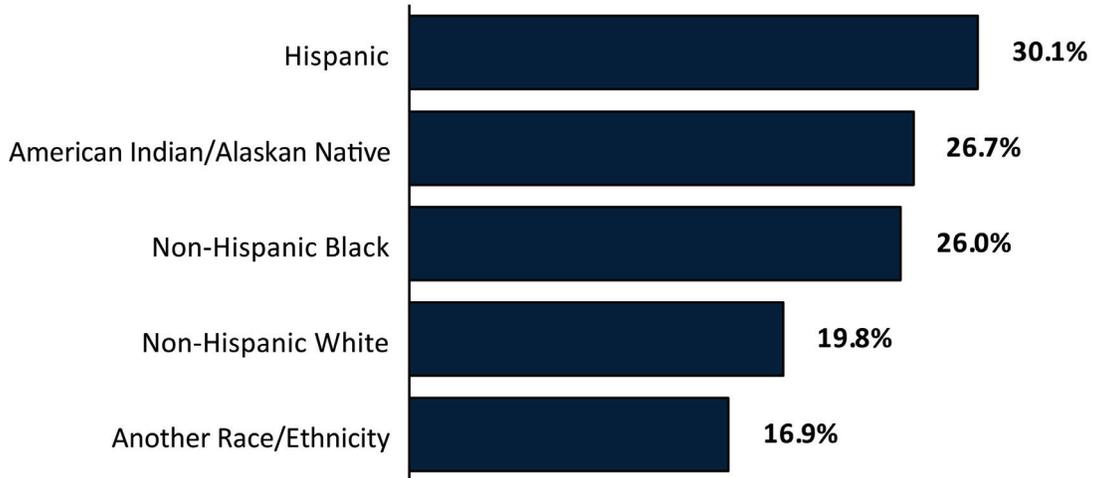
Figure 3: Prevalence of Long COVID among respondents by age.



Sample N ranges from 135 to 519.

Race/Ethnicity: Long COVID was most prevalent among Hispanic respondents (30.1%). Long COVID was least prevalent among respondents who identified as another race/ethnicity (16.9%) (Fig. 4).

Figure 4: Prevalence of Long COVID among respondents by race/ethnicity



Sample N ranges from 73 to 1832. Another Race/Ethnicity includes Middle-Eastern/North African, Non-Hispanic Asian, and Non-Hispanic other.

Income: Long COVID was most prevalent among respondents with a household income during 2019 between \$25,000 and \$49,999 (25.2%) and least prevalent among respondents with a household income of \$75,000 or more (18.1%) (Fig. 5).

Figure 5: Prevalence of Long COVID among respondents by income level



Sample N ranges from 467 to 1060.

Educational Attainment: Long COVID was most prevalent among respondents with less than a high school education (29.4%) and least prevalent among respondents who graduated college (18.3%) (Fig. 6).

Figure 6: Prevalence of Long COVID among respondents by educational attainment.



Sample N ranges from 167 to 1011.

Sexual Orientation and/or Gender Minority Identity: Long COVID prevalence was comparable among respondents who identified as heterosexual and cisgender (21.3%) and respondents who identified as lesbian, gay, or bisexual, or as transgender or non-binary (i.e., sexual orientation or gender minority identity) (20.4%) (Fig. 7).

Figure 7: Prevalence of Long COVID among respondents by sexual orientation and/or gender minority identity



Sample N ranges from 127 to 2485.

Clinical Characteristics



This section explores the prevalence of Long COVID within subgroups of people according to their clinical characteristics, including body mass index (BMI), self-reported COVID-19 symptom severity, hospitalization, and pre-existing conditions.

Body Mass Index (BMI): Long COVID was most prevalent among respondents who were obese (i.e. a BMI >30 kg/m²; 26.7%) and least prevalent among respondents who were underweight or normal weight (i.e. a BMI <25 kg/m²; 15.8%) (Fig. 8).

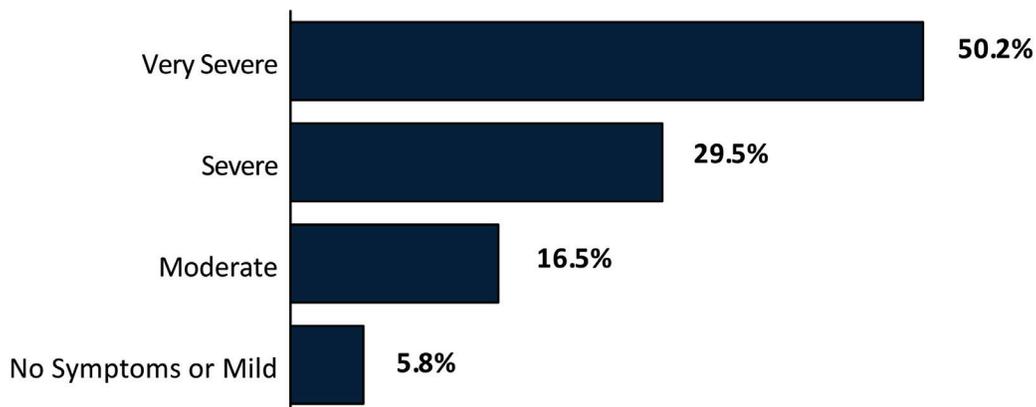
Figure 8: Prevalence of Long COVID among respondents by BMI



Sample N ranges from 681 to 1153, BMI: Body Mass Index.

Self-Reported COVID-19 Symptom Severity: Long COVID was most prevalent among respondents with self-reported very severe COVID-19 symptoms (50.2%) and least prevalent among respondents who reported no symptoms or mild COVID-19 symptoms (5.8%) (Fig. 9).

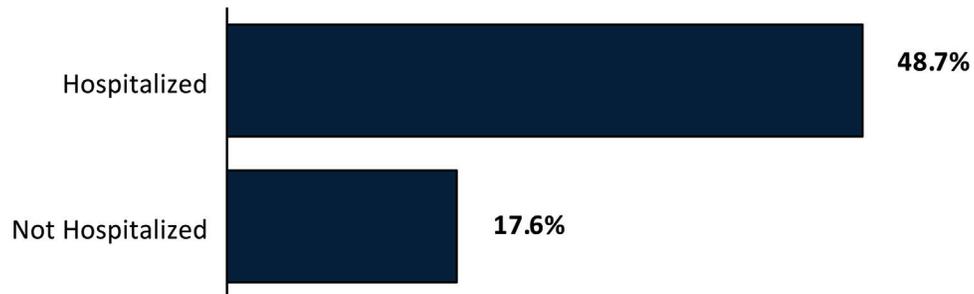
Figure 9: Prevalence of Long COVID among respondents by self-reported COVID-19 symptom severity



Sample N ranges from 382 to 850.

Hospitalization: 48.7% of respondents with an overnight stay in the hospital had Long COVID compared to only 17.6% of respondents who did not have an overnight stay in the hospital (Fig. 10).

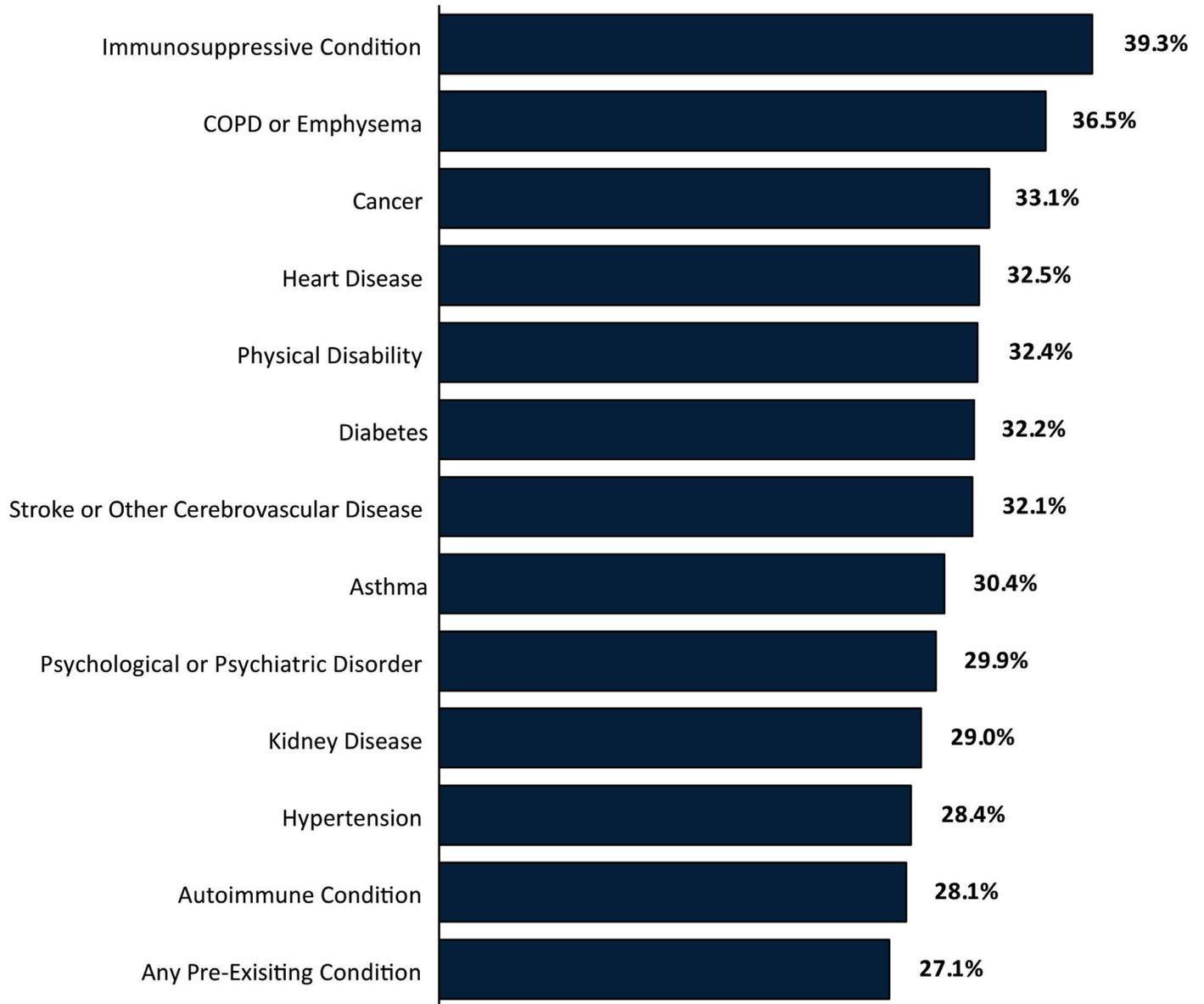
Figure 10: Prevalence of Long COVID among respondents with an overnight stay in the hospital and respondents who did not have an overnight stay in the hospital



Sample N ranges from 361 (hospitalized) to 2340 (not hospitalized).

Pre-Existing Conditions: Among respondents who had at least one pre-existing condition diagnosed prior to their COVID-19 illness, 27.1% had Long COVID (Fig. 10). Long COVID was most prevalent among respondents with a history of an immunosuppressive condition (39.3%), chronic obstructive pulmonary disease (COPD) or emphysema (36.5%), cancer (33.1%), or heart disease (32.5%) (Fig. 11).

Figure 11: Prevalence of Long COVID among respondents with a pre-existing condition



Sample N ranges from 53 to 1581; COPD: Chronic obstructive pulmonary disease. Any pre-existing condition includes respondents with at least one pre-existing condition.

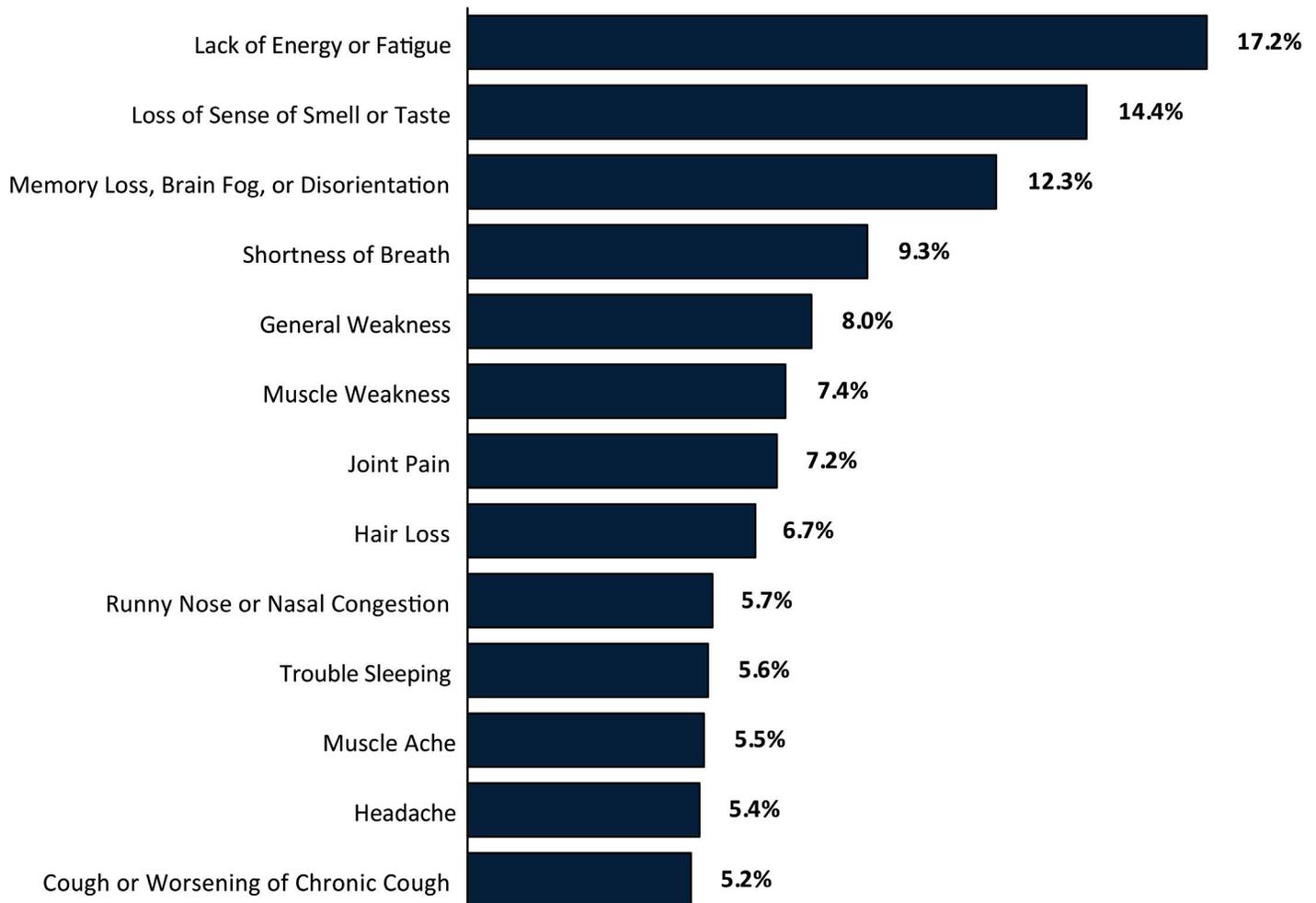
Long COVID Symptoms



Respondents with a COVID-19 onset date between June 1, 2020, and April 15, 2021, were asked if they had ever experienced one of 26 symptoms during their COVID-19 illness. If a respondent indicated they experienced a symptom, they were then asked the duration they experienced the symptom. This section explores the most common symptoms respondents experienced for 90 days or more among symptomatic respondents.

Prevalent Symptoms Lasting for 90 Days: The most common symptoms respondents reported persisting for 90 days or more were lack of energy or fatigue (17.2%); loss of sense of smell or taste (14.4%); memory loss, brain fog, or disorientation (12.3%); and shortness of breath (9.3%) (Fig. 12).

Figure 12: Most common symptoms persisting for 90 days or more



Sample N ranges from 1665 to 1829. Results displayed are among symptomatic respondents only.

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SURVEY METHODS

The first eight MI CReSS samples totaling 9,000 adults with a confirmed diagnosis of COVID-19 in the Michigan Disease Surveillance System (MDSS) were drawn between June 2020 and July 2021. The samples included individuals with COVID-19 onset on or before April 15, 2021, based on self-reported date of illness onset. If the illness onset date was not available, the collection date for the individual's first positive COVID-19 test was used. If the collection date was not available, the date of case referral to MDHHS was used.

All Michigan adults 18 years and older in the MDSS with a date of birth, phone number, and geographic information (county and/or zip code) were eligible for the survey sample. Deceased cases and institutionalized individuals (for example, people in prisons or psychiatric hospitals) were excluded from the sampling frame. The sampling frame was then divided into geographic strata, including Public Health Preparedness Regions 1, 3, 5, 6, 7, and 8, the counties of Macomb, Oakland, Saint Clair, Monroe, Washtenaw, and Wayne (excluding Detroit), and the city of Detroit. A base number of cases was sampled from each geographic stratum to support reporting of stratum-level results, and the remainder of the sample was drawn proportionally.

All individuals in the sample were sent an introductory recruitment letter and consent document. Participants were given a website and unique code to take the survey online if they chose. Attempts to reach the entire sample included at least two mailings and five call attempts by telephone. Upon contact with potential participants, the sample was further limited to respondents who spoke English, Spanish, or Arabic, or who had a proxy available to translate from another language into English, Spanish, or Arabic.

Reported results incorporated survey weights that were calibrated to represent the total population within the sampling frame, as well as the population size within geographic stratum (overall and by sex and age).

If you are interested in learning more about Long COVID, the National Institutes of Health (NIH) has begun an initiative known as RECOVER to better understand the long-term effects of COVID-19. You can learn more the RECOVER study and Long COVID by visiting recovercovid.org/long-covid.

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