

Association of long COVID with seeing difficulties among adults in the United States

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Background

- The symptoms and conditions that persist or develop four weeks after the initial COVID-19 or SARS-CoV-2 infection are known as Long COVID¹.
- While initially causing respiratory problems, the virus can affect almost every organ in the body and lead to multi-organ syndrome².
- Furthermore several post-COVID conditions such as headaches, dizziness, fatigue, and myalgia have been linked to visual disturbances and vision loss³. It is not yet clear whether this vision problem is related to long COVID
- Although there have been a few studies on COVID-19 and vision problems, the association between Long COVID on vision problems has not been examined by a study.

Objective

- This study determines the association of long COVID with seeing difficulties.

Methods

- Study Design and Data Source:** Cross-sectional analysis of 51,288 (weighted N=197,765,255) responders' data from the Household Pulse Survey (HPS) administered online across all 50 states and the District of Columbia between November 2-14, 2022.⁴
- Beginning June 1, 2022, the survey included questions on the presence of COVID symptoms that lasted for three months or longer.
- Analytical Sample:** Adults aged 18 or older with complete data on long COVID symptoms and no COVID infection in the past four weeks with no missing data on long COVID symptoms or difficulty seeing were included.

Methods

- Dependent Variable:** Seeing difficulty was measured using the Washington Group short set on functioning and considered present (yes/no) if the respondent reported "some difficulty," "a lot of difficulties," or "unable to do." in response to the question "Do you have difficulty seeing, even when wearing glasses?"
- Key Explanatory Variable:** Long COVID status (Long COVID/ No long COVID but COVID-19/Never COVID-19)
- Other explanatory variables:** Demographic variables (age, sex, race/ethnicity), social determinants of health (income, marital status, education, food sufficiency, health insurance, & region), working remotely, COVID-19 vaccine, depression, and anxiety.
- Statistical Analysis:**
 - Rao-Scott chi-square tests to test the association between categorical explanatory variables and seeing difficulty.
 - Multivariable logistic regression to identify the association between long COVID on seeing difficulty while controlling for other explanatory variables.
 - Considered replicate survey weights provided by the HPS and a jackknife approximation to adjust for variability in the estimation of these weights.
 - Random imputation is used to impute missing data on sex. SAS 9.4 was used for analysis.

Results

Figure 2: Prevalence of Seeing Difficulty among Different Categories of Long COVID Patients: HPS Data Collected during November 2-14, 2022

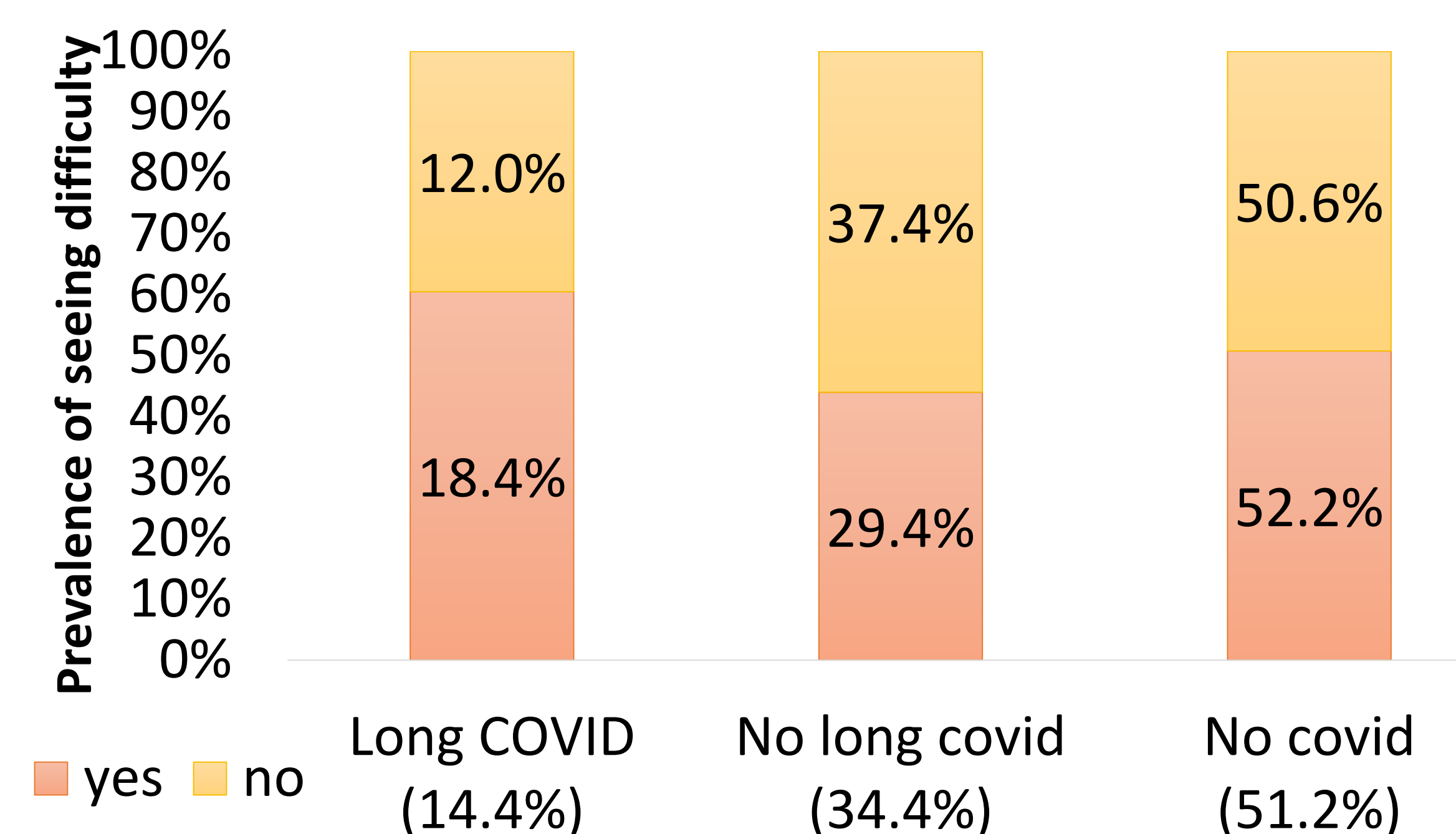
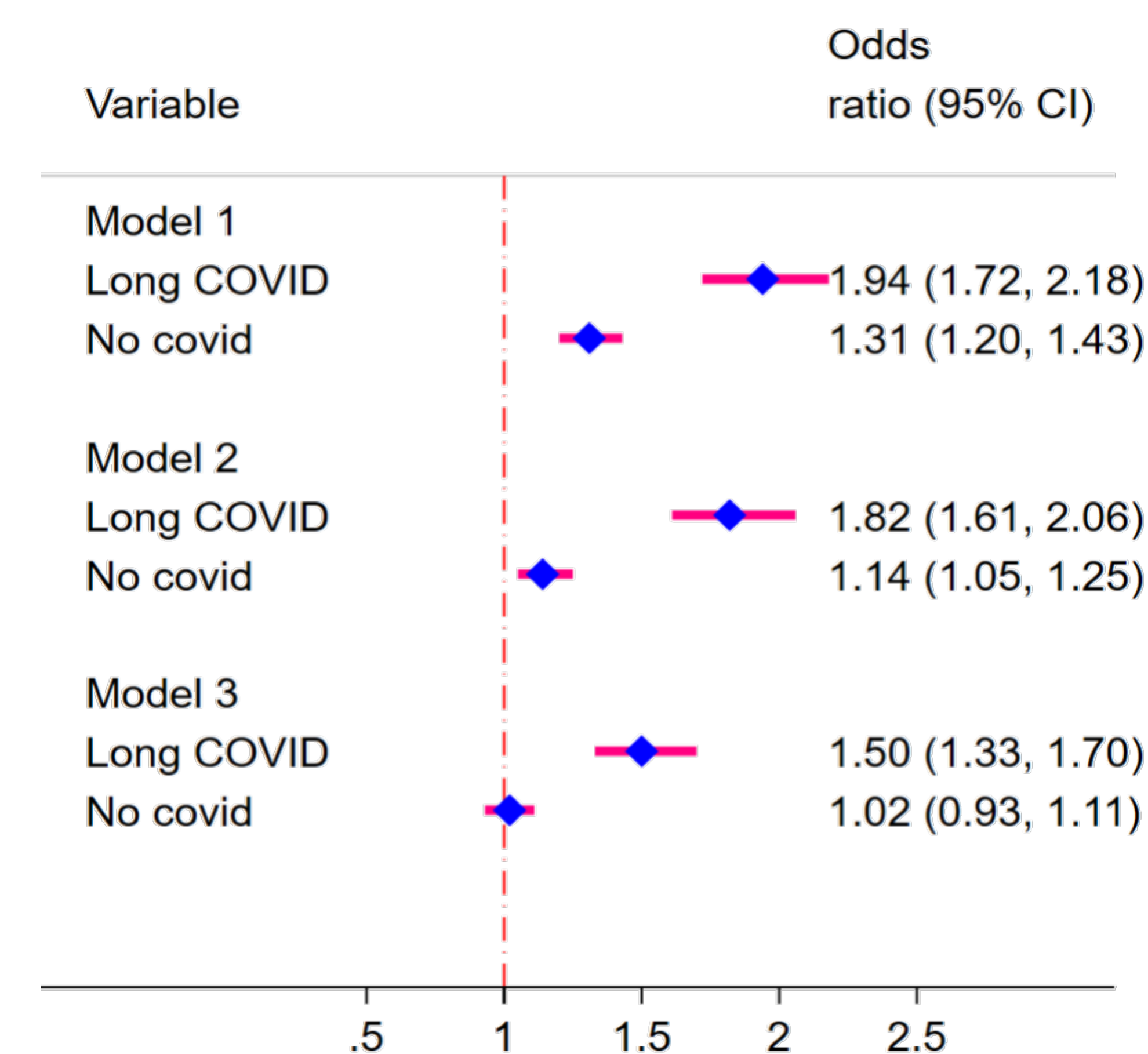


Figure 3: Adjusted odds ratio (95% Confidence Interval) of long COVID among respondents of Census household Pulse survey (November 2-14, 2022) using Multivariable binary logistic regression analysis for seeing difficulty



Note: The reference category was 'No long COVID' comprised of individuals who experienced COVID-19 but not long COVID.
Model 1: Unadjusted; **Model 2:** Adjusted for age, Sex, Race, and Marital Status; **Model 3:** Additionally adjusted for age, Sex, Race, Marital Status, education, Income, Health insurance, Region, Depression, Anxiety, and Remote work. Missing categories of marital status, income, health insurance, work remotely, depression, and anxiety were also included in the models.

Results

- Prevalence of long COVID was higher among females, lower income, no health insurance, food insecurity and individuals with no booster vaccine.
- Depression and anxiety were also associated with long COVID.
- Prevalence of seeing difficulty was higher among females, older age groups, low education, low income, living in the south region, having depression or anxiety; and, lower among adults with food security, food sufficiency, and private health insurance.
- Long COVID was strongly associated with seeing difficulties.

Discussion

- Implication:** Follow-up vision screening is recommended for post-COVID patients to identify and prevent any potential effects on the eyes and vision.
- Strengths:** Use of a large, nationally representative sample and the inclusion of information on potential confounding factors.
- Limitations:** Use of self-reported measures of visual difficulties and the cross-sectional design. Using more objective measures of visual difficulties in future studies, such as visual acuity tests or retinal imaging, is recommended to reduce the potential for recall bias or misclassification.

References

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Results

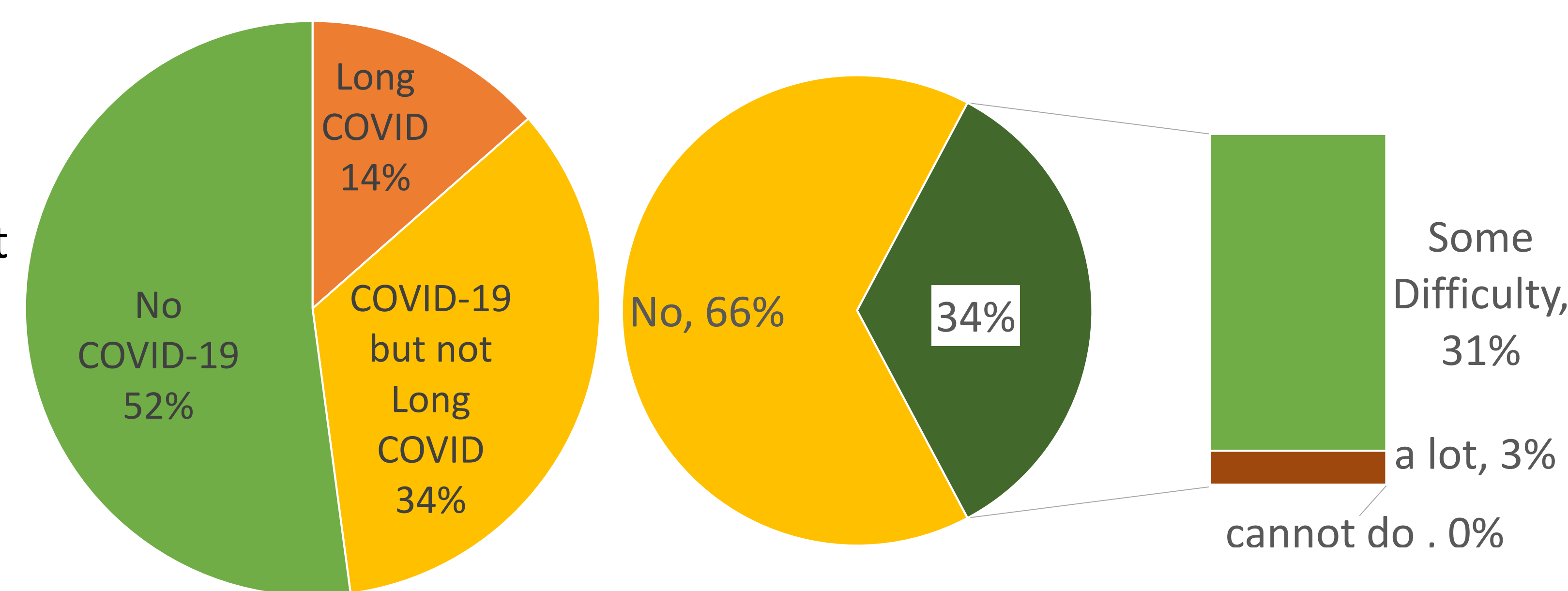


Figure 1: Prevalence of long COVID among respondents of Census household Pulse survey

Figure 2: Prevalence of seeing difficulty among respondents of Census household Pulse