

SARS-CoV-2

Trends in antibody seroprevalence and reported case prevalence



How do rates of SARS-CoV-2 infection based on antibody seroprevalence compare to rates based on the number of reported cases?



Background

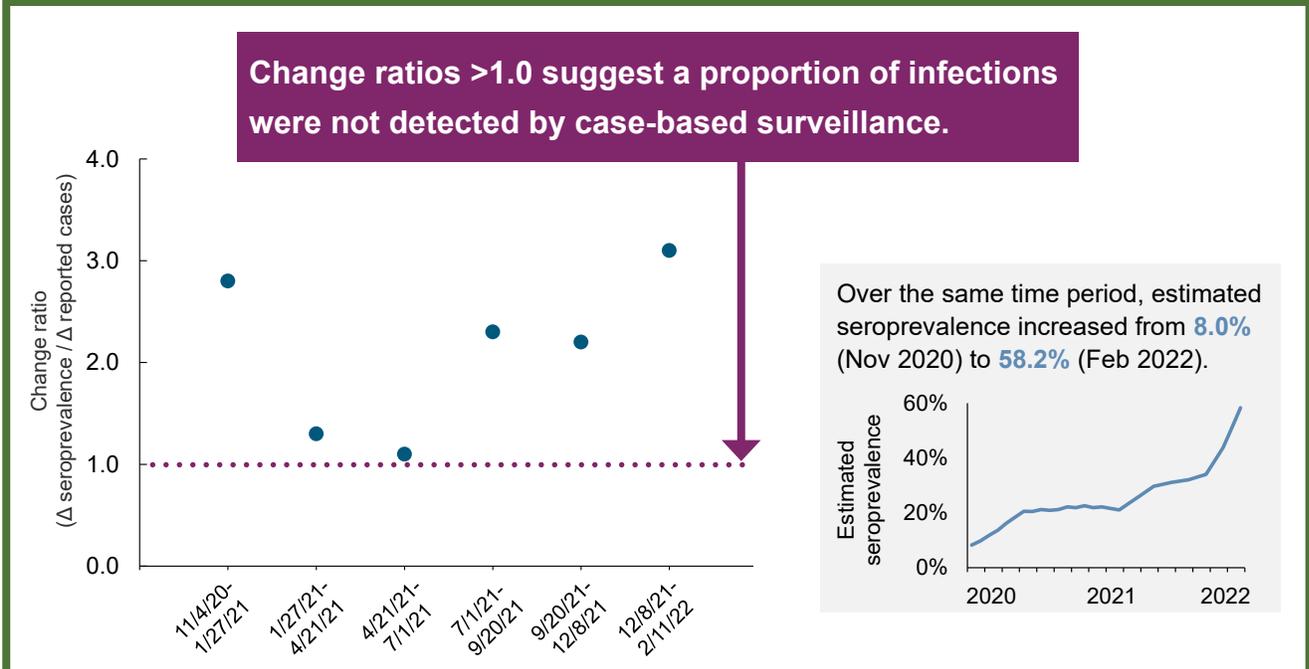
The prevalence of SARS-CoV-2 antibodies in the US population is several times higher than the prevalence of reported COVID-19 cases; thus, antibody seroprevalence is thought to be a more accurate estimate of actual infections. However, previous analyses of seroprevalence have been limited in timespan and geographic scope.



Methods and Results

Remnant samples from 1,469,792 serum specimens collected from patients across the US between October 2020 and February 2022 were tested for the presence of SARS-CoV-2 infection-induced, nucleocapsid-protein antibodies. Changes in antibody seroprevalence were compared to changes in the prevalence of COVID-19 cases reported by the public health system over the same period in the form of a change ratio (change in seroprevalence/change in number of reported cases).

Trends in SARS-CoV-2 seroprevalence and COVID-19 case prevalence



Based on a nationwide study on SARS-CoV-2 infection-induced, nucleocapsid-protein antibody seroprevalence, a proportion of COVID-19 infections were not detected by clinical case-based surveillance, especially during the winter months.

1. Wiegand RE, Deng Y, Deng X, et al. *Lancet Reg Health Am*. Published online December 3, 2022. doi: 10.1016/j.lana.2022.100403

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Trends in antibody seroprevalence and reported case prevalence

Article title: Estimated SARS-CoV-2 antibody seroprevalence trends and relationship to reported case prevalence from a repeated, cross-sectional study in the 50 states and the District of Columbia, United States—October 25, 2020–February 26, 2022

Ryan E Wiegand,^a Yangyang Deng,^b Xiaoyi Deng,^b Adam Lee,^b William A Meyer, III,^c Stanley Letovsky,^d Myrna D Charles,^a Adi V Gundlapalli,^a Adam MacNeil,^a Aron J Hall,^a Natalie J Thornburg,^a Jefferson Jones,^a Ronaldo Iachan,^b Kristie EN Clarke^a

^aCOVID-19 Response, Centers for Disease Control and Prevention, Atlanta, GA; ^bICF Inc., Fairfax, VA; ^cQuest Diagnostics, Secaucus, NJ; ^dLaboratory Corporation of America, Burlington, NC

Citation: Wiegand RE, Deng Y, Deng X, et al. *Lancet Reg Health Am*. Published online December 3, 2022. doi:10.1016/j.lana.2022.100403

Background

- SARS-CoV-2 infection rates in the United States, as reported through laboratory-confirmed cases, are underestimated because people may not have access to healthcare and/or people who are asymptomatic may not get tested.
- One study indicated the number of infections is 6 to 24 times higher than the number of reported cases,¹ and another reported seroprevalence (ie, % of people who have antibodies to SARS-CoV-2) in about 20% of the US population in 2021.²
- These findings suggest that surveillance of only reported cases provides a limited view of the true disease burden; however, these analyses of seroprevalence have been limited in timespan and geographic scope.
- **Objective:** To assess the true disease burden of COVID-19 in the United States, the investigators of this study compared rates of infection, as indicated by SARS-CoV-2 seroprevalence, to rates based on reported cases.

Methods

- A cross-sectional study was conducted using remnant patient sera from clinical laboratories (Quest Diagnostics, Laboratory Corporation of America, BioReference Laboratories) across all 50 US states and the District of Columbia.
- Test results for SARS-CoV-2 infection-induced, nucleocapsid-protein antibodies were evaluated to assess seroprevalence from November 2020 to February 2022.
 - Remnant sera were assayed biweekly from October 25, 2020 to July 11, 2021, and monthly from September 6, 2021 to February 26, 2022.
- Test results were adjusted for demographic variables and assay type, and used in the analysis of trends (eg, seasonal, regional) in change ratios (ie, ratio of the change in seroprevalence to the change in reported case prevalence).

Results

- A total of 1,469,792 remnant serum specimens were analyzed over the study period.
- During the overall study period, seroprevalence increased from 8.0% (95% CI, 7.9%-8.1%) in November 2020 to 58.2% (57.4%-58.9%) in February 2022.
- Change ratios above 1 indicate missed surveillance, and all periods were above 1.
 - November 4, 2020 to January 27, 2021: 2.8 (2.8–2.9)
 - April 21 to July 1, 2021: 1.1 (0.6-1.7)
 - July 1 to September 20, 2021: 2.3 (2.0-2.5)
 - September 20 to December 8, 2021: 2.2 (2.0-2.5)
 - December 8, 2021 to February 26, 2022: 3.1 (3.0-3.3)
- Higher ratios corresponded with time periods of omicron variant dominance, wider availability of at-home testing, and seasons.

Conclusions

- The ratio of the change in SARS-CoV-2 infection-induced, nucleocapsid-protein seroprevalence to the change in reported clinical cases captured by public health networks suggests that the actual burden of SARS-CoV-2 infection is underestimated using a case-based system.

References

1. Havers FP, Reed C, Lim T, et al. *JAMA Intern Med*. 2020;180:1576-1586. doi:10.1001/jamainternmed.2020.4130
2. Jones JM, Stone M, Sulaeman H, et al. *JAMA*. 2021;326:1400-1409. doi:10.1001/jama.2021.15161

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