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Accessibility
At-home COVID-19 testing and the estimated true incidence of confirmed omicron BA.2 in the United States
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Adoption of at-home COVID-19 rapid antigen tests has rapidly increased in the United States (U.S.)1,2. These tests provide an accessible and less resource-intensive alternative to gold-standard diagnostic tests3. However, at-home tests exist outside established COVID-19 reporting pipelines and public health authorities have limited visibility of their results2. Recently, the SARS-CoV-2 BA.2 Omicron subvariant has caused an uptick in COVID-19 incidence across the U.S and on March 20 it become the dominant circulating variant4. However, these observed increases reflect only official case counts which are subject to significant ascertainment bias as individuals increasingly rely on at-home tests for diagnostics1. Here we aim to use survey data of at-home COVID-19 test users to estimate the true daily incidence of test confirmed COVID-19 during the Omicron BA.2 period.

At-home COVID-19 test use, results, and demographic data were collected via a prospective, cross-sectional online survey (N=97,707) deployed on the SurveyMonkey platform between March 20, 2022 and May 21, 2022. The previously validated1,5,6 survey uses river sampling and weighting to reflect Census targets, approximating a representative sample of U.S. adults. We descriptively analyze the percentage of adults who report positive at-home COVID-19 tests and positive tests in clinical settings. These results are used to calculate a ratio of observed to unobserved positive tests which is utilized as a scaling factor to adjust official U.S. government case counts into estimated true confirmed case counts. Individuals who report a positive PCR following their at-home test are excluded to avoid double counting. The process is repeated across U.S. geographies.

From March 20 to May 21, 2022, official U.S. COVID-19 incidence rose from 32,752 to 110,023 daily cases (Figure 1). During this same period, the estimated proportion of COVID-19 cases diagnosed by home tests rose from 33% to 51%. When using this ratio to adjust official incidence, we find that test confirmed daily COVID-19 cases likely rose from 49,126 [95% CI: 43,206 to 57,955] to 214,569 [95% CI: 188,278 to 249,574]. Over the approximatively 2-month period, we estimate 2,685,303 [95% CI: 1,874.549 to 3,853,341] cases of COVID-19 (an average of over 40,000 a day) were diagnosed by at-home tests and not included in U.S. official case counts. The proportion of missed cases varied dramatically across U.S. regions with New England and West South Central reporting the highest and lowest respective proportion of positive tests diagnosed at home.

Currently, more than half of U.S. confirmed COVID-19 positive individuals are being diagnosed by at-home tests. Adjusting COVID-19 surveillance interpretations to account for the changing patterns in how persons are tested for COVID-19 will better provide a public health response
consistent with available resources and the evolving pandemic. Investment in novel at-home test reporting mechanisms is necessary to continue to have full visibility on COVID-19 cases in the U.S.

References


**Figure 1.** Confirmed versus at-home test adjusted COVID-19 case counts in the United States between January 1, 2022 and May 21, 2022.

Official COVID-19 case counts in the United States (blue, January 1, 2022 and May 21, 2022) from the Department of Health and Human Services compared to estimated confirmed cases (orange, March 20, 2022 and May 21, 2022) accounting for COVID-19 diagnosed at-home tests from a web survey of 97,707 U.S. adults.