

SYNOPSIS

Review of “COVID-19 Symptoms and Duration of Rapid Antigen Test Positivity at a Community Testing and Surveillance Site During Pre-Delta, Delta, and Omicron BA.1 Periods”

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Article citations:

Marquez C, Kerkhoff AD, Schrom J, Rojas S, Black D, Mitchell A, et al. COVID-19 symptoms and duration of rapid antigen test positivity at a community testing and surveillance site during pre-Delta, Delta, and Omicron BA.1 periods. *JAMA Netw Open.* 2022;5(10):e2235844. Available from: <https://doi.org/10.1001/jamanetworkopen.2022.35844>

One-minute Summary

- The authors report on symptoms and rapid antigen test (RAT) positivity duration from a cross-sectional study of 63,277 participants presenting to a walk-up community COVID-19 testing site in San Francisco, California. The study used three periods for its analysis based on variant predominance: January 10 – May 31, 2021 (pre-Delta), June 1 – November 30, 2021 (Delta) and December 1, 2021 - January 30, 2022 (Omicron BA.1).
- Test positivity during the pre-Delta period was 19.2%, 8.5% during Delta, and 41.6% during Omicron BA.1 (pre-Delta, n=1,065; Delta, n=468; Omicron BA.1, n=3,032).
- Prevalence of selected symptoms in RAT-positive participants during each period (plus pairwise significance for Omicron BA.1 vs. pre-Delta, Omicron BA.1 vs. Delta) indicated that during the Omicron BA.1 period, RAT-positive participants were more likely to experience upper respiratory symptoms (e.g. cough and sore throat) and less likely to experience fever or loss of taste or smell:
 - **Cough:** 51.3%, 60.0%, 67.4% (p=0.003, p=0.005)
 - **Sore throat:** 29.6%, 29.1%, 43.4% (p=0.003, p=0.003)
 - **Congestion:** 27.6%, 41.2%, 38.8% (p=0.003, p=0.43)
 - **Headache:** 41.0%, 35.7%, 35.5% (p=0.003, p=0.96)
 - **Fever:** 34.7%, 36.8%, 30.4% (p=0.02, p=0.01)
 - **Smell or taste loss:** 17.2%, 20.5%, 5.3% (p=0.003, p=0.003)

- Test positivity did not differ substantially by vaccination status. Test positivity was higher among symptomatic participants compared to asymptomatic participants:
 - **For symptomatic participants:** 80% (95% CI: 76–84%) remained positive at five days since symptom-onset, 35% (95% CI: 30–40%) remained positive at 10 days since symptom-onset.
 - **For asymptomatic participants:** 49% (95% CI: 43–55%) remained positive at five days since initial RAT, 19% (95% CI: 5–42%) at 10 days since initial RAT.

Additional Information

The median age of participants was 32 years (interquartile range: 21–44) and 52.0% were women. Among 17,007 participants for which ethnic information was available, 69.7% were LatinX/Hispanic, followed by white (12.7%), other (9.4%), Asian (6.1%) and Black (2.1%). Amongst symptomatic participants, the proportion who were unvaccinated decreased through the study period from, 94.0% of participants during the pre-Delta period, 51.1% during Delta and 3.4% during Omicron BA.1.

In total, 18,301/63,277 (28.9%) reported having at least one symptom (pre-Delta = 5,533; Delta = 5,485, and Omicron BA.1 = 7,283) with 24.9% (4,565/18,301) of these participants testing positive by RAT.

During the Omicron BA.1 period and following 5 days after symptom-onset, 31.1% (507/1,613; 95% confidence interval [CI]: 25.3–37.4) of participants reported similar symptoms, 63.0% (1,011/1,613; 95% CI: 56.6–69.2) reported improvement of symptoms and 5.9% (95/1,613; 95% CI: 3.3–9.7) reported worsening symptoms.

Participants (or guardians for children) completed a survey querying demographic information, vaccination status, symptoms during illness and symptom-onset. After administration of the survey, laboratory personnel performed bilateral anterior nasal swabs for SARS-CoV-2 detection using a RAT (BinaxNOW COVID-19 Ag Card) and a bilateral nasal swab for sequencing.

Symptoms among those testing positive with a RAT by vaccination status during the Omicron BA.1 period:

- Those vaccinated with a primary series and boosted (n=432) had a lower proportion reporting fever, compared to **those unvaccinated** (n=116) (22.5% vs. 36.2%, p=0.01), and higher for congestion (47.9% vs. 34.5%, p=0.04).
- Those vaccinated with a primary series and boosted had a lower proportion reporting fever, compared to **those vaccinated with a primary series but no booster** (22.5% vs. 32.8%, all p=0.01); similarly for cough (62.0% vs. 69.9%) and myalgia (26.6% vs. 34.0%), and higher for congestion (47.9% vs. 39.2%).

Symptoms among those testing positive with a RAT by age during the Omicron BA.1 period:

- Adults (≥ 18 years, $n=2,419$), compared to those < 12 years ($n=302$), more commonly reported shortness of breath (8.6% vs. 3.3%), fatigue (22.2% vs. 7.6%), myalgia (32.2% vs. 8.6%), headache (37.1% vs. 17.6%), taste or smell loss (5.8% vs. 0.3%), sore throat (45.4% vs. 25.5%) and congestion (39.7% vs. 30.1%)(all $p=0.002$).
- Adults (≥ 18 years, $n=2,419$), compared to those 12–17 years ($n=311$), more commonly reported fatigue (22.2% vs. 10.6%, $p=0.002$) and myalgia (32.2% vs. 20.3%, $p=0.002$).

Study limitations reported by authors:

- Symptom type, duration and onset were self-reported by participants; thus, there may be an introduction of bias. However, as RATs were performed after survey completion it is anticipated that there would be no differential bias between those who tested positive vs. negative.
- Did not include information on severity of COVID-19 symptoms including those requiring hospitalization which may underestimate the length of infectivity in these patients as they may have been more unlikely or unable to follow-up for their repeat RAT.
- The authors did not consider previous SARS-CoV-2 infection in participants; therefore, the impact of previous infection and immunity on RAT-positivity duration, symptoms reported, and symptom duration are unknown in this study.
- RATs may not detect infection early in the course of infection, potentially leading to misclassification of disease status (i.e. those with COVID testing negative early in their disease course when their viral load was lower). Symptomatic participants with a negative RAT were advised to repeat testing in 24 – 48 hours.
- The authors noted demographic differences in those retested and not retested; however, the authors addressed this in part by stratifying RAT duration results by vaccination status and symptoms. In addition, there was no evidence to suggest ethnicity impacted RAT-positivity duration.

PHO Reviewer's Comments

Symptom status and duration are correlated with RAT positivity. The proportion of individuals who remain RAT positive decreases as time increases since symptom-onset or first positive test, with test positivity being higher among symptomatic individuals compared to asymptomatic individuals. In this study, a substantial proportion of symptomatic participants infected with Omicron BA.1 remained RAT positive at five days since symptom-onset (80.2%) and 35% remained positive at 10 days, regardless of their vaccine status. The study authors discuss scientific evidence noting a correlation between rapid antigen positivity and viable virus (suggesting infectivity potential); however, the correlation lowers further from infection-onset with infectiousness beyond 10 days being possible but less common.

The results from this study support the use multiple layers of protection by those with a positive RAT to mitigate the risk of SARS-CoV-2 transmission to others including: wearing a well-fitted high quality mask in indoor spaces, crowded places, and close contact settings (e.g., public transit); avoiding contact with those who are immunocompromised or at higher risk of illness (e.g. elderly); avoiding non-essential visits to highest risk settings (e.g. hospitals, long-term care); practicing hand hygiene; optimizing indoor air quality; and using outdoor spaces when weather permits. Individuals with a positive RAT are recommended to follow these measures for at least 10 days following their symptom-onset or first positive RAT if asymptomatic.

Citation

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