

CORRESPONDENCE

Covid-19 Breakthrough Infections in Vaccinated Health Care Workers

TO THE EDITOR: In their article on breakthrough infections among health care workers who had been fully vaccinated against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, Bergwerk and colleagues (published online on July 28)¹ report that among 1497 such workers for whom polymerase-chain-reaction (PCR) data were available, 39 breakthrough infections were documented at their facility. There were no cases of secondary transmission among 31 of the workers with breakthrough cases who had available data regarding household transmission.

Since March 2021, we have identified 4 breakthrough infections among 8678 fully vaccinated health care workers at Asan Medical Center. All 4 of the workers had received two doses of the ChAdOx1 nCoV-19 vaccine (Oxford–AstraZeneca) within a 12-week period. The median interval between the receipt of the second dose of vaccine and diagnosis was 37 days (range, 29 to 42), and the median cycle threshold (Ct) on the STANDARD M nCoV Real-Time Detection Kit (SD Biosensor) was 13.1 (range, 12.3 to 16.0).

On the basis of epidemiologic investigation and contact tracing, we determined that three of the workers had been infected by exposure to unvaccinated household members, and the remaining worker (HCW B) had been infected by another vaccinated health care worker (HCW A), who in turn had contracted a breakthrough infection from her unvaccinated spouse. (HCWs A and B had eaten a meal together and talked without wearing a mask for 20 minutes 1 day before the infection was diagnosed in HCW A; 5 days later, symptoms developed in HCW B.) PCR analysis with the use of the Kaira COVID-19 Variant Detection Kit (Optolane) revealed the presence of either the eta variant or the zeta variant (without sensitivity for further differentiation) in both health care workers. Although in our hospital breakthrough cases have been rare, viral loads among these cases have been moderate. Thus, our findings show that the transmission

of SARS-CoV-2 between vaccinated persons is possible.

Jiwon Jung, M.D.
Heungsung Sung, M.D.
Sung-Han Kim, M.D.

Asan Medical Center
Seoul, South Korea
kimsunghanmd@hotmail.com

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1. Bergwerk M, Gonen T, Lustig Y, et al. Covid-19 breakthrough infections in vaccinated health care workers. *N Engl J Med*. DOI: 10.1056/NEJMoa2109072.

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THE AUTHORS REPLY: Jung et al. describe one case of secondary transmission of SARS-CoV-2 infection among four health care workers who had breakthrough infections at their facility after the receipt of the ChAdOx1 nCoV-19 vaccine. After the publication of our findings on early breakthrough infections (approximately 30 days after the second dose, predominantly with the alpha variant) among health care workers at our facility who had received the BNT162b2 vaccine (Pfizer–BioNTech), we analyzed data for 127 additional health care workers who had late breakthrough infections (approximately 195 days after the second dose) from June through August 2021 during a surge dominated by the delta variant.

For 120 of the workers with breakthrough infections, the indication for testing was known. The majority (85 workers) were tested because of symptoms; 35 were asymptomatic at the time of testing, and none required hospitalization. Among the 61 workers who had an identified suspected source of infection, 37 of such contacts (61%) had been fully vaccinated, including 15 fellow health care workers, 21 household or community contacts, and 1 hospitalized patient. Among the 80 workers with breakthrough infection for whom data were available, the median

value for the lowest N-gene Ct value was 22 (range, 14 to 38), which was considered to indicate a high degree of infectivity.^{1,2} Of the 84 samples that were analyzed by rapid-antigen assays, only 44 tested positive.

In our findings involving health care workers who had received two doses of the BNT162b2 vaccine more than 6 months earlier, many breakthrough infections with the delta variant (both symptomatic and asymptomatic) were associated with a high viral load and the possible transmission of secondary infection. These findings call for further rigorous preventive measures, such as booster vaccinations, in-hospital social distancing, extensive use of personal protective equipment, judicious out-of-hospital behavior, and frequent molecular testing after the occurrence of symptoms or known exposure to infected contacts.

Sharon Amit, M.D., Ph.D.

Tal Gonen, B.A.

Gili Regev-Yochay, M.D.

Sheba Medical Center

Ramat Gan, Israel

gili.regev@sheba.health.gov.il

Since publication of their article, the authors report no further potential conflict of interest.

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1. Jefferson T, Spencer EA, Brassey J, Heneghan C. Viral cultures for COVID-19 infectious potential assessment — a systematic review. *Clin Infect Dis* 2020 December 3 (Epub ahead of print).

2. Singanayagam A, Patel M, Charlett A, et al. Duration of infectiousness and correlation with RT-PCR cycle threshold values in cases of COVID-19, England, January to May 2020. *Euro Surveill* 2020;25:2001483.

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