Transmission of severe acute respiratory coronavirus virus 2 (SARS-CoV-2), delta variant, between two fully vaccinated healthcare personnel

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To the Editor—Breakthrough severe acute respiratory coronavirus virus 2 (SARS-CoV-2) infection causing coronavirus disease 2019 (COVID-19) in fully vaccinated individuals occurs, and the frequency is increasing since the SARS-CoV-2 delta variant virus began circulating widely.1 COVID-19 vaccines are highly effective at reducing SARS-CoV-2 shedding and transmission.2 The question of whether fully vaccinated people with breakthrough COVID-19 can transmit the SARS-CoV-2 virus to others is central to the debate around the need for mitigation efforts including masking and physical distancing for fully vaccinated individuals. We report apparent SARS-CoV-2 viral transmission between 2 fully vaccinated healthcare workers (HCW) in the setting of occupational unmasked close contact.

Methods
Healthcare personnel are screened daily and report COVID-19 symptoms to occupational health. Symptomatic HCW are tested for SARS-CoV-2 using a nasopharyngeal swab and the cobas SARS-CoV-2 assay (Roche, Basel, Switzerland). Contact tracing is conducted by interviewing personnel who test positive and their close contacts. Whole-genome sequencing is conducted for all SARS-CoV-2 viral isolates as previously described.3 Consensus sequences are analyzed with Clustal omega (ebi.ac.uk) and visualized with interactive tree of life (itol.embl.de).

Results
In late July, a fully vaccinated HCW (2 doses COVID-19 mRNA vaccine > 6 months earlier) developed new onset headache, cough, fatigue, muscle aches, and sore throat, progressing to fever and loss of taste and smell. At 4 days after symptom onset, a nasopharyngeal swab was positive for SARS-CoV-2 with cycle threshold (Ct) values of 25 and 26 for the E and ORF1ab genes, respectively. Risk factors for COVID-19 included international travel and interacting unmasked with others in the 2 weeks prior to symptom onset. Contact tracing identified 8 exposed HCW contacts; 7 were fully vaccinated and 1 was unvaccinated. No patient exposures occurred. One exposed, fully vaccinated HCW (2 doses COVID-19 mRNA vaccine > 6 months earlier) developed headache, fever, muscle aches, cough, fatigue, and chills 4 days after unmasked, close contact (<2 m or 6 feet) for ~120 minutes while the index case was asymptomatic and ~30 minutes while the index case was symptomatic during the infectious period. Both exposures involved eating together, unmasked, in a shared space. The exposed HCW tested positive for SARS-CoV-2 (Ct values of 17 and 18) 1 day after symptom onset and 4 days after the first exposure to the index HCW. The second HCW had no other known COVID-19 exposures but did interact unmasked with coworkers in the 2 weeks before testing positive. Whole-genome sequencing detected the SARS-CoV-2 delta variant (B.1.617.2). Genome alignment to 41 other delta variants isolated at our institution from April through July 2021 confirmed the relatedness of the 2 HCW viruses and their distinctiveness from other SARS-CoV-2 isolates (Fig. 1).

Discussion
Recent CDC guidance says that fully vaccinated individuals may not need to wear masks indoors or practice physical distancing due to vaccine effectiveness and the low likelihood of a fully vaccinated person transmitting the virus to others.4 The genetic and epidemiological data from our investigation of 2 HCW with breakthrough SARS-CoV-2 infection strongly suggest transmission of the SARS-CoV-2 virus delta variant from one fully vaccinated individual to another in the setting of unmasked close contact. Limitations include the fact that source of the infection for the first HCW is unknown; it remains possible that both HCWs were infected with SARS-CoV-2 from a common source or through separate exposures. SARS-CoV-2 variants, such as the delta variant, can have higher viral loads, potentially increasing transmissibility and requiring enhanced public health measures.5 This apparent transmission of SARS-CoV-2 from one fully vaccinated person to another demonstrates that masking and physical distancing remain vital infection prevention measures for fully vaccinated people while the SARS-CoV-2 virus is still evolving and circulating.
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References


