

## CORRESPONDENCE

## BNT162b2 mRNA Covid-19 Vaccine Effectiveness among Health Care Workers

**TO THE EDITOR:** The surge of coronavirus disease 2019 (Covid-19) around the world and the need for urgent and intensive medical care have weighed heavily on health care systems and hospitals. Health care workers are at high risk of exposure to Covid-19, both in the community and in the workplace when providing care to patients.<sup>1</sup> Covid-19–associated isolation and quarantine of health care workers place additional

burdens on health care services. Since the introduction of vaccines, prioritizing vaccination of health care workers has been advocated, and data on vaccine effectiveness among health care workers in real-world settings is beginning to emerge.

We examined vaccine effectiveness among health care workers at the Hadassah Hebrew University Medical Center (HHUMC), a two-campus medical center in Jerusalem that employs 6680

**Table 1. Incidence of Covid-19 among Vaccinated HCWs at HHUMC.\***

Week since First Dose	Vaccinated HCWs at HHUMC		Vaccinated HCWs Newly Positive for SARS-CoV-2		Incidence of Covid-19 among Vaccinated HCWs	
	Received a First Dose of Vaccine†	Tested for SARS-CoV-2 at HHUMC‡	Positive on Testing at HHUMC	Positive on Testing at HHUMC or Community Clinics	HCWs Tested at HHUMC	HCWs Tested at HHUMC or Community Clinics§
	<i>no. of workers</i>		<i>no. of workers</i>		<i>no./1000 workers</i>	
Week 1	5297	1152	37	50	32.1	9.4
Week 2	5247	1215	40	47	32.9	9.0
Week 3	5200	1126	22	29	19.5	5.6
Week 4	5164	685	11	11	16.1	2.1
Received second dose	4864	607	7	7	11.5	1.4
Did not receive second dose	300	78	4	4	51.3	13.3
Week 5	5050	451	2	3	4.4	0.6
Received second dose	4934	434	2	3	4.6	0.6
Did not receive second dose	116	17	0	0	0	0
Week 6	4947	309	0	2	0	0.4
Received second dose	4793	295	0	2	0	0.4
Did not receive second dose	154	14	0	0	0	0
Week 7	4079	157	3	5	19.1	1.2
Received second dose	4069	151	3	4	19.9	1.0
Did not receive second dose	10	6	0	1	0	100.0

\* Health care workers (HCWs) were tested at the Hadassah Hebrew University Medical Center (HHUMC), community clinics, or both locations. Positive results on testing at community clinics were reported by the local office of the Israeli Ministry of Health to the Hadassah Infection Prevention and Control Unit.

† At each week since the first dose, the number of HCWs represents the number at risk (i.e., those who were not infected during the previous week).

‡ HCWs who were tested more than once per week were counted only once.

§ The denominator used to calculate incidence among the vaccinated HCWs tested at HHUMC or community clinics was the number of HCWs who received a first dose of vaccine. Systematic testing of all vaccinated HCWs was not performed; therefore, some positive cases may have been missed.

people. Jerusalem has one of the highest incidence rates of Covid-19 in Israel.<sup>2</sup> In addition to its regular activities, HHUMC is currently treating patients with Covid-19 in eight dedicated wards. To create a safe hospital environment, HHUMC established a proactive, periodic screening program for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) for all personnel.<sup>3</sup> From the beginning of the epidemic through January 31, 2021, of the 6680 health care workers, 689 (10.3%) were infected, mostly due to exposure to Covid-19 in the community; the trends in incidence among health care workers were similar to that in the Jerusalem population (Fig. S1 in the Supplementary Appendix, available with the full text of this letter at NEJM.org). Vaccination with two doses of the Pfizer–BioNtech vaccine, given 21 days apart,<sup>4</sup> began on December 20, 2020. Within 8 weeks, 5297 of 6252 (84.7%) health care workers who had not been previously infected by December 20 were vaccinated. Most of the health care workers (98.9%) who had received the first dose of vaccine and were not infected by day 21 received the second dose. We collected data regarding the vaccine status of health care workers and the infections that occurred among them. Among the vaccinated workers, the weekly incidence of Covid-19 since the first dose declined notably after the second week; the incidence of infection continued to decrease dramatically and then remained low after the fourth week (Table 1 and Fig. S2). Since September 2020, the probability of being free from Covid-19 had steadily decreased until the commencement of the two-dose vaccinations, after which infections among vaccinated health care workers occurred far less often (Fig. S3). Of note, the numerator used to calculate the incidence of Covid-19 was the number of patients with infection that was detected on either mandatory or voluntary testing; systematic testing of all vaccinated health care workers was not per-

formed. Therefore, we may have missed some positive cases.

In our study that was conducted in an active hospital setting in a community with a high incidence of Covid-19, vaccination of health care workers with the BNT162b2 vaccine resulted in a major reduction of new cases of Covid-19 among those who received two doses of the vaccine, even when a surge of the B.1.1.7 variant was noted in up to 80% of cases.<sup>5</sup> These findings suggest that widespread and effective vaccination among health care workers provides a safe environment, even in the presence of a high rate of SARS-CoV-2 infection in the community.

Shmuel Benenson, M.D.

Yonatan Oster, M.D.

Hadassah Hebrew University Medical Center  
Jerusalem, Israel

Matan J. Cohen, M.D., Ph.D.

Clalit Health Services  
Jerusalem, Israel

Ran Nir-Paz, M.D.

Hadassah Hebrew University Medical Center  
Jerusalem, Israel  
ran.nir-paz@mail.huji.ac.il

Disclosure forms provided by the authors are available with the full text of this letter at NEJM.org.

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1. Bandyopadhyay S, Baticulon RE, Kadhum M, et al. Infection and mortality of healthcare workers worldwide from COVID-19: a systematic review. *BMJ Glob Health* 2020;5(12):e003097.
2. Ministry of Health of Israel. Official COVID-19 data site (<https://data.gov.il/dataset/covid-19>). (In Hebrew.)
3. Oster Y, Wolf DG, Olshtain-Pops K, Rotstein Z, Schwartz C, Benenson S. Proactive screening approach for SARS-CoV-2 among healthcare workers. *Clin Microbiol Infect* 2021;27:155-6.
4. Polack FP, Thomas SJ, Kitchin N, et al. Safety and efficacy of the BNT162b2 mRNA Covid-19 vaccine. *N Engl J Med* 2020;383:2603-15.
5. Ministry of Health of Israel. COVID-19 research reports. 2021 ([https://www.gov.il/BlobFolder/reports/research-report-n219-post-lockdown-guidelines/he/research-report\\_research-report-n219-post-lockdown-guidelines.pdf](https://www.gov.il/BlobFolder/reports/research-report-n219-post-lockdown-guidelines/he/research-report_research-report-n219-post-lockdown-guidelines.pdf)). (In Hebrew.)

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