

THE LANCET

Supplementary appendix

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Supplement to: Haas EJ, Angulo FJ, McLaughlin JM, et al. Impact and effectiveness of mRNA BNT162b2 vaccine against SARS-CoV-2 infections and COVID-19 cases, hospitalisations, and deaths following a nationwide vaccination campaign in Israel: an observational study using national surveillance data. *Lancet* 2021; published online May 5. [http://dx.doi.org/10.1016/S0140-6736\(21\)00947-8](http://dx.doi.org/10.1016/S0140-6736(21)00947-8).

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SARS-CoV-2 outcomes by age-groups (in years)	Unvaccinated		2 doses of BNT162b2**		Unadjusted VE (95% CI)	Adjusted for the following variables VE (95% CI)			
	Cases	IR	Cases	IR		Age	Sex	Week	Fully-adjusted***
SARS-CoV-2 infections[‡]									
16–44	84 611	95.1	1801	2.3	95.4 (94.0–96.5)	95.5 (94.2–96.6)	95.4 (94.0–96.5)	96.0 (95.5–96.4)	96.1 (95.7–96.5)
45–64	18 579	86.1	2264	3.4	93.6 (91.4–95.3)	93.6 (91.4–95.2)	93.6 (91.4–95.2)	94.9 (94.2–95.5)	94.9 (94.2–95.5)
≥ 65	5686	67.7	2201	3.8	93.4 (91.3–95.0)	93.5 (91.6–95.0)	93.2 (91.1–94.9)	95.0 (94.0–95.9)	94.8 (93.9–95.5)
All ages	109 876	91.5	6266	3.1	94.2 (93.2–95.1)	94.3 (93.4–95.2)	94.2 (93.2–95.1)	95.3 (94.8–95.7)	95.3 (94.9–95.7)
Asymptomatic SARS-CoV-2 infections									
16–44	40 088	45.1	1174	1.5	92.8 (90.3–94.7)	92.9 (90.3–94.8)	92.8 (90.3–94.7)	93.6 (92.7–94.3)	93.6 (92.8–94.4)
45–64	7414	32.6	1343	2.0	89.1 (84.7–92.3)	89.1 (84.6–92.2)	89.1 (84.7–92.3)	90.9 (89.7–92.0)	90.8 (89.6–91.9)
≥ 65	1636	19.5	1115	1.9	85.9 (80.2–89.9)	86.6 (81.5–90.2)	85.8 (80.1–89.9)	88.4 (85.9–90.4)	88.5 (86.4–90.3)
All ages	49 138	40.9	3632	1.8	90.1 (88.0–91.8)	89.9 (87.8–91.6)	90.1 (88.0–91.8)	91.9 (91.0–92.6)	91.5 (90.7–92.2)
Symptomatic COVID-19 cases									
16–44	28 196	31.7	352	0.5	97.8 (97.0–98.3)	97.9 (97.2–98.5)	97.8 (97.0–98.3)	97.6 (97.2–98.0)	97.6 (97.3–97.8)
45–64	7790	34.3	560	0.8	96.3 (95.0–97.3)	96.3 (95.0–97.3)	96.3 (94.9–97.2)	96.7 (96.2–97.1)	96.7 (96.3–97.0)
≥ 65	3079	36.6	780	1.4	96.1 (94.8–97.1)	96.1 (95.0–96.9)	96.0 (94.7–97.0)	96.9 (96.1–97.6)	96.4 (95.9–97.0)
All ages	39 065	32.5	1692	0.8	96.6 (95.8–97.2)	96.9 (96.3–97.3)	96.6 (95.8–97.2)	97.0 (96.5–97.3)	97.0 (96.7–97.2)
COVID-19 hospitalizations									
16–44	2043	2.3	33	<0.01	98.1 (97.1–98.8)	98.3 (97.4–98.9)	98.1 (97.1–98.7)	98.0 (96.9–98.7)	98.1 (97.3–98.7)
45–64	1687	7.4	112	0.2	97.6 (96.9–98.2)	97.7 (97.0–98.2)	97.7 (96.9–98.2)	97.5 (96.9–98.0)	97.6 (97.1–98.1)
≥ 65	1826	21.7	451	0.8	96.6 (95.3–97.6)	96.6 (95.7–97.4)	96.5 (95.1–97.5)	97.3 (96.4–98.1)	96.8 (96.2–97.3)
All ages	5526	4.6	596	0.3	96.7 (95.5–97.6)	97.3 (96.8–97.7)	96.7 (95.4–97.6)	97.4 (96.5–98.1)	97.2 (96.8–97.5)
Severe and critical COVID-19 hospitalizations									
16–44	644	0.7	7	0.01	98.8 (97.3–99.5)	99.0 (97.8–99.5)	98.8 (97.3–99.5)	98.6 (96.9–99.4)	98.9 (97.6–99.5)
45–64	1132	5.0	62	0.1	98.1 (97.2–98.6)	98.1 (97.4–98.7)	98.1 (97.3–98.7)	97.9 (97.2–98.5)	98.1 (97.5–98.5)
≥ 65	1425	17.0	295	0.5	97.2 (95.9–98.1)	97.2 (96.3–97.9)	97.1 (95.7–98.0)	97.8 (96.9–98.5)	97.3 (96.8–97.8)
All ages	3201	2.7	364	0.2	97.2 (95.9–98.1)	97.7 (97.2–98.1)	97.1 (95.8–98.0)	98.0 (97.0–98.6)	97.5 (97.1–97.8)
COVID-19 deaths									
16–44	36	0	0	0	100	100	100	100	100
45–64	125	0.5	14	<0.01	96.2 (92.6–98.0)	96.5 (93.7–98.1)	96.3 (92.9–98.1)	95.5 (91.4–97.6)	95.8 (92.6–97.6)
≥ 65	554	6.6	124	0.2	96.8 (94.6–98.1)	96.9 (95.6–97.9)	96.7 (94.4–98.0)	97.8 (96.4–98.7)	96.9 (96.0–97.6)
All ages	715	0.6	138	0.1	96.6 (93.9–98.1)	96.9 (95.9–97.7)	96.5 (93.7–98.0)	98.0 (96.3–98.9)	96.7 (96.0–97.3)

*Eight age groups were used for age adjustment (i.e., 16-24 years, six 10-year increments from 25-84 years, and ≥ 85 years) ** ≥ 7 days after the second dose of BNT162b2. ***The fully-adjusted model includes age-group, sex, and week. [‡]Includes persons with asymptomatic and symptomatic infections as well as persons with a positive SARS-CoV-2 test that did not complete the symptom interview portion of the epidemiological investigation.

Supplement Table 2. Numbers and incidence rate (IR) per 100 000 person-days of laboratory-confirmed SARS-CoV-2 outcomes among unvaccinated and vaccinated with BNT162b2 ≥ 14 days after the second dose, and unadjusted and adjusted estimates of vaccine effectiveness (VE) against laboratory-confirmed SARS-CoV-2 outcomes, by age-group,* Jan 24, 2021–Apr 3, 2021, Israel.

SARS-CoV-2 outcomes by age-groups (in years)	Unvaccinated		2 doses of BNT162b2**		Unadjusted VE (95% CI)	Adjusted for the following variables VE (95% CI)			
	Cases	IR	Cases	IR		Age	Sex	Week	Fully-adjusted***
SARS-CoV-2 infections‡									
16–44	84 611	95.1	1066	1.7	97.2 (96.3–97.8)	97.3 (96.5–98.0)	97.2 (96.3–97.8)	97.0 (96.6–97.3)	97.1 (96.7–97.3)
45–64	19 579	86.1	1292	2.2	96.5 (95.6–97.2)	96.5 (95.6–97.2)	96.5 (95.6–97.2)	96.5 (96.2–96.8)	96.5 (96.3–96.7)
>65	5 686	67.7	1284	2.5	96.1 (95.1–96.9)	96.1 (95.2–96.8)	96.0 (95.0–96.8)	96.2 (95.5–96.8)	95.9 (95.5–96.3)
All ages	109 876	91.5	3642	2.1	96.6 (96.1–97.0)	96.7 (96.2–97.1)	96.6 (96.1–97.0)	96.5 (96.3–96.8)	96.5 (96.3–96.8)
Asymptomatic SARS-CoV-2 infections									
15–44	40 088	45.1	666	1.1	95.8 (94.4–96.9)	95.9 (94.5–97.0)	95.8 (94.4–96.9)	95.2 (94.6–95.8)	95.2 (94.6–95.8)
45–64	7 414	32.6	729	1.3	94.3 (92.4–95.7)	94.3 (92.4–95.7)	94.3 (92.4–95.7)	93.9 (93.3–94.5)	94.0 (93.4–94.4)
>65	1 636	19.5	633	1.2	91.7 (88.8–93.8)	91.9 (89.3–93.9)	91.6 (88.7–93.8)	91.4 (89.9–92.7)	91.5 (90.4–92.5)
All ages	49 138	40.9	2028	1.2	94.4 (93.3–95.3)	94.2 (93.1–95.1)	94.4 (93.3–95.3)	94.1 (93.5–94.7)	93.8 (93.3–94.2)
Symptomatic COVID-19 cases									
16–44	28196	31.7	230	0.4	98.4 (97.7–98.8)	98.5 (97.9–98.9)	98.3 (97.7–98.8)	98.0 (97.6–98.3)	97.8 (97.5–98.1)
45–64	7790	34.3	333	0.6	97.9 (97.2–98.4)	97.9 (97.2–98.4)	97.9 (97.2–98.4)	97.7 (97.4–98.0)	97.7 (97.4–97.9)
>65	3079	36.6	437	0.9	97.9 (97.3–98.4)	97.8 (97.3–98.2)	97.9 (97.3–98.3)	97.9 (97.3–98.3)	97.5 (97.2–97.8)
All ages	39 065	32.5	1000	0.6	98.0 (97.6–98.3)	98.1 (97.7–98.3)	98.0 (97.6–98.3)	97.8 (97.5–98.0)	97.7 (97.5–97.9)
COVID-19 hospitalizations									
16–44	2043	2.3	26	0.0	98.1 (97.0–98.8)	98.3 (97.3–98.9)	98.1 (97.0–98.8)	97.9 (96.8–98.7)	98.1 (97.1–98.7)
45–64	1687	7.4	74	0.1	98.3 (97.6–98.7)	98.3 (97.7–98.7)	98.3 (97.7–98.7)	98.1 (97.6–98.6)	98.2 (97.7–98.6)
>65	1826	21.7	259	0.5	98.2 (97.6–98.7)	98.0 (97.5–98.4)	98.2 (97.6–98.7)	98.3 (97.6–98.7)	97.9 (97.6–98.1)
All ages	5556	4.6	359	0.2	98.2 (97.5–98.7)	98.1 (97.8–98.4)	98.2 (97.5–98.6)	98.2 (97.6–98.7)	98.0 (97.7–98.3)
Severe and critical COVID-19 hospitalizations									
16–44	644	0.7	5	0.01	98.9 (97.3–99.6)	99.1 (97.8–99.6)	98.9 (97.3–99.6)	98.7 (96.8–99.5)	99.0 (97.5–99.6)
45–64	1132	5.0	41	0.1	98.6 (97.9–99.0)	98.6 (98.0–99.0)	98.6 (97.9–99.0)	98.4 (97.8–98.9)	98.5 (97.9–98.9)
>65	1425	17.0	160	0.3	98.7 (98.1–99.1)	98.5 (98.0–98.8)	98.7 (98.2–99.1)	98.7 (98.2–99.1)	98.3 (98.0–98.6)
All ages	3201	2.7	206	0.1	98.6 (98.0–99.0)	98.5 (98.2–98.8)	98.6 (98.0–99.0)	98.6 (98.0–99.1)	98.4 (98.1–98.6)
COVID-19 deaths									
16–44	36	0.04	0	0	100	100	100	100	100
45–64	125	0.5	10	<0.01	96.9 (93.5–98.5)	97.1 (94.4–98.6)	97.0 (93.7–98.5)	96.3 (92.2–98.2)	96.5 (93.2–98.2)
>65	554	6.6	61	0.1	98.7 (97.8–99.2)	98.4 (97.7–98.9)	98.7 (97.9–99.2)	98.7 (97.9–99.2)	98.2 (97.7–98.7)
All ages	715	0.6	71	<0.01	98.5 (97.4–99.2)	98.2 (97.6–98.7)	98.6 (97.4–99.2)	98.7 (97.6–99.3)	98.1 (97.6–98.5)

*Eight age groups were used for age adjustment (i.e., 16-24 years, six 10-year increments from 25-84 years, and ≥ 85 years) ** ≥ 14 days after the second dose of BNT162b2. ***The fully-adjusted model includes age-group, sex, and week. †Includes persons with asymptomatic and symptomatic infections as well as persons with a positive SARS-CoV-2 test that did not complete the symptom interview portion of the epidemiological investigation.

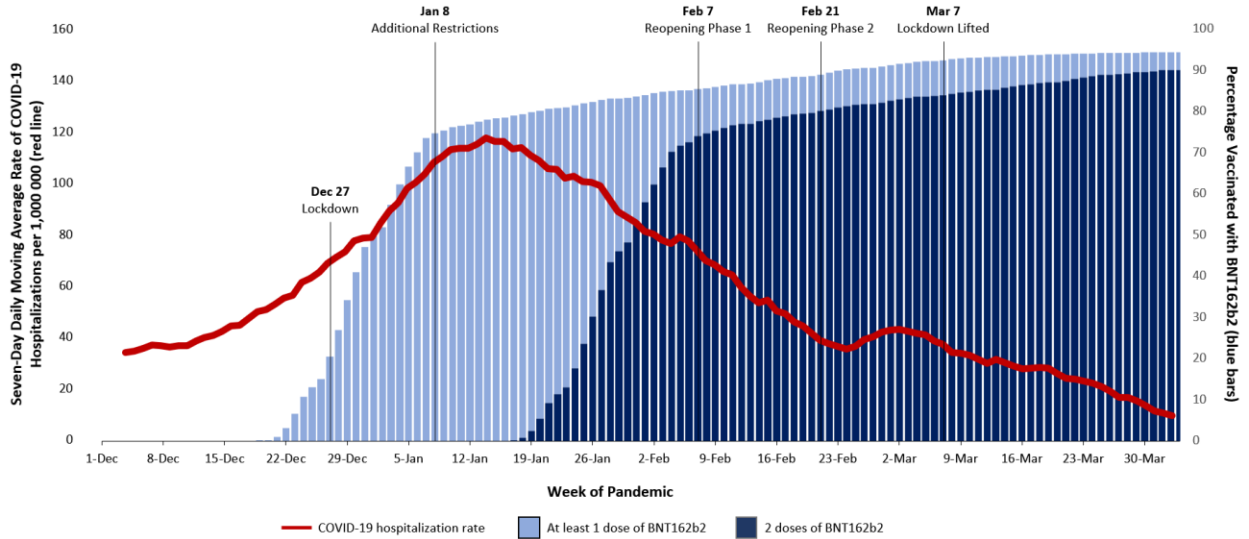
Supplemental Table 3. Numbers and incidence rate (IR) per 100 000 person-days of laboratory-confirmed SARS-CoV-2 outcomes among unvaccinated and partially-vaccinated (one dose of BNT162b2 14 days to 21 days after the first dose), and unadjusted and adjusted estimates of vaccine effectiveness (VE) against laboratory-confirmed SARS-CoV-2 outcomes among individuals ≥ 16 years of age, Jan 24, 2021–Apr 3, 2021, Israel.

SARS-CoV-2 outcomes	Unvaccinated		Partially-vaccinated*		Unadjusted VE (95% CI)	Adjusted VE** (95% CI)
	Cases	IR	Cases	IR		
SARS-CoV-2 infections‡	109 876	91.5	9327	34.1	56.6 (50.9–61.7)	57.7 (54.9–60.3)
Asymptomatic SARS-CoV-2 infections	49 138	40.9	4429	16.2	48.9 (40.4–56.2)	52.0 (48.9–55.0)
Symptomatic COVID-19 cases	39 065	32.5	3099	11.3	63.2 (56.9–68.7)	62.5 (59.3–65.4)
COVID-19 hospitalizations	5556	4.6	397	1.5	76.9 (67.6–83.5)	75.7 (72.0–79.0)
Severe and critical COVID-19 hospitalizations	3201	2.7	236	0.9	80.2 (70.2–86.8)	75.6 (71.9–78.9)
COVID-19 deaths	715	0.6	55	0.2	88.4 (77.3–94.1)	77.0 (69.7–82.6)

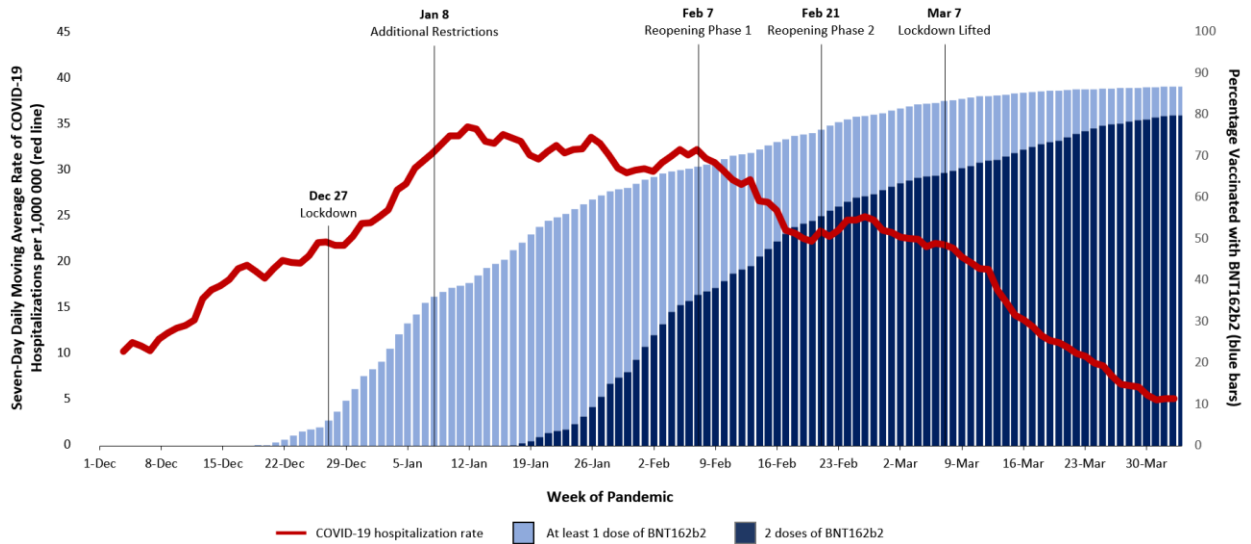
*Partially-vaccinated is 14–21 days after receipt of first dose of BNT162b2 vaccine. **Model is adjusted for age (i.e., 16–24 years, six 10-year increments from 25–84 years, and >85 years), sex, and calendar week. ‡Includes all persons (asymptomatic and symptomatic) with a positive SARS-CoV-2 test.

Supplemental Figure 1. Seven-day daily moving average of incidence rates of COVID-19 hospitalizations per 1,000,000 and prevalence of BNT162b2 vaccination among persons aged 16–24, 25–44, 45–64, and ≥65 years Dec 1, 2020 – Apr 3, 2021, Israel. Note: Y-axis scales for COVID-19 hospitalizations vary by age group.

A. ≥65 years

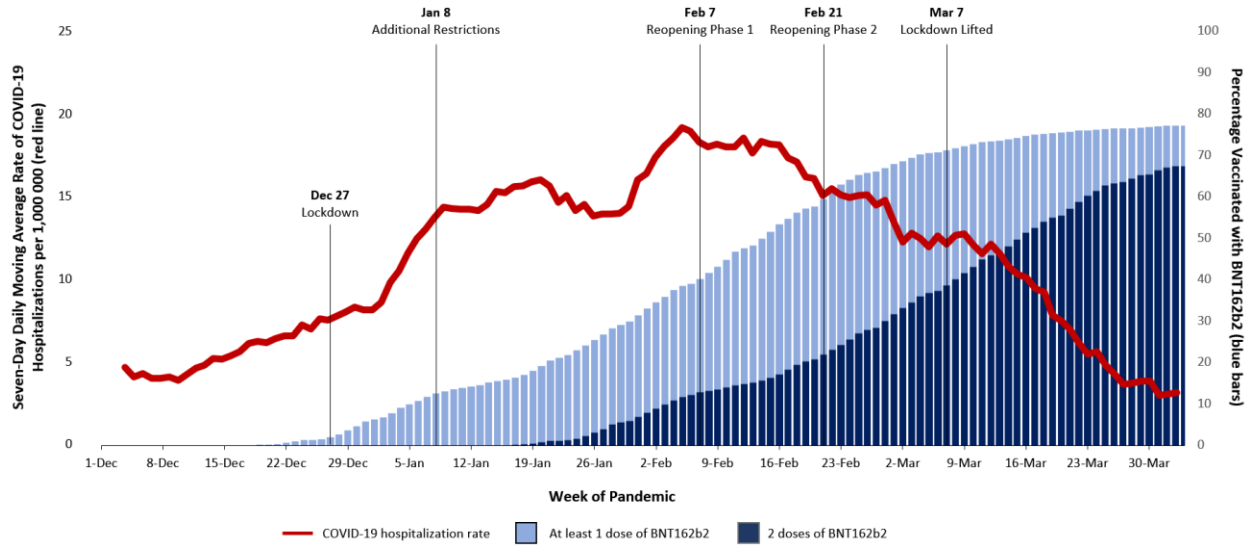


B. 45–64 years

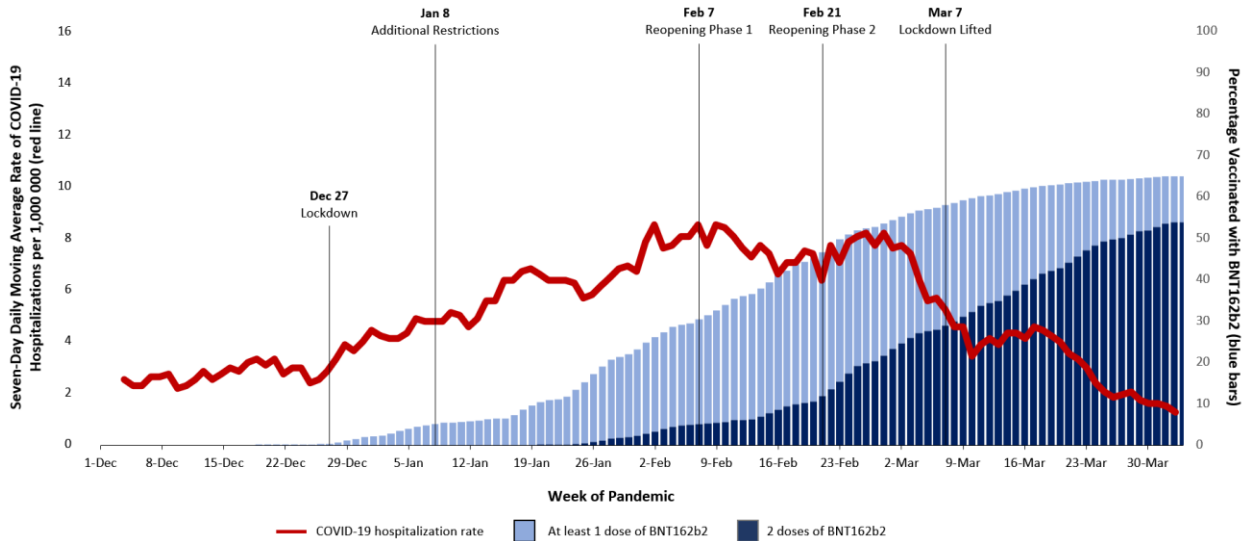


Supplemental Figure 1 (cont). Seven-day daily moving average of incidence rates of COVID-19 hospitalizations per 1,000,000 and prevalence of BNT162b2 vaccination among persons aged 16–24, 25–44, 45–64, and ≥ 65 years Dec 1, 2020 – Apr 3, 2021, Israel. *Note:* Y-axis scales for COVID-19 hospitalizations vary by age group.

C. 25–44 years

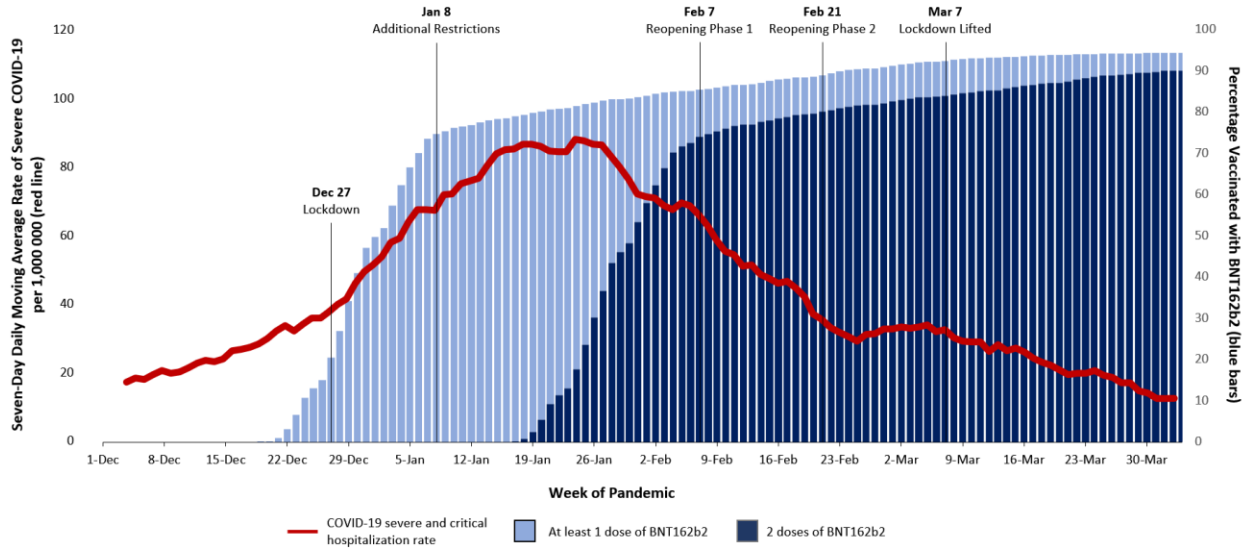


D. 16–24 years

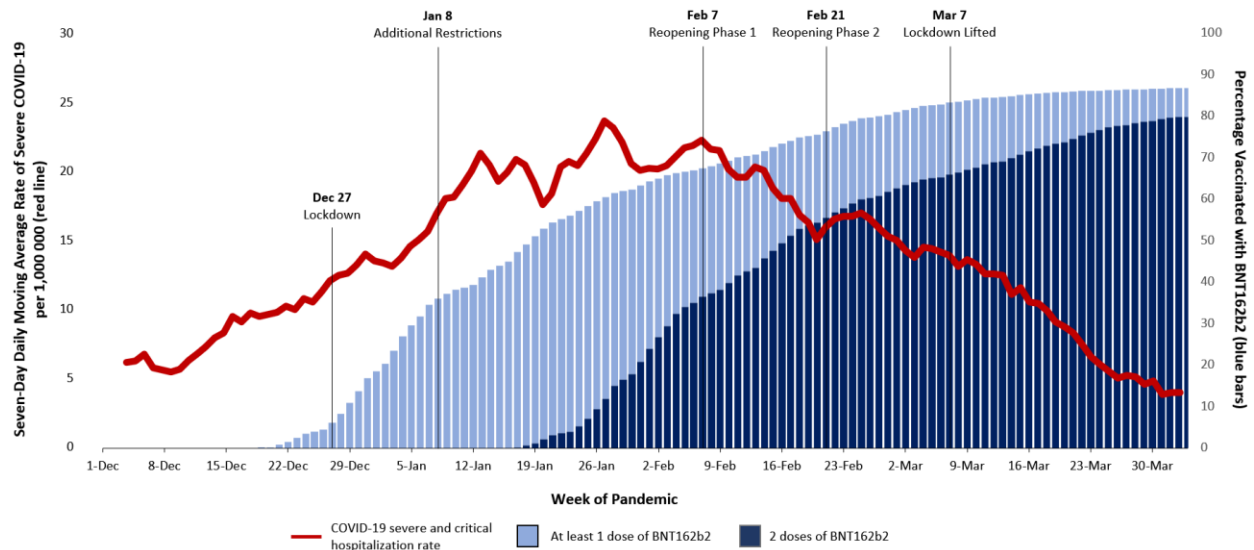


Supplemental Figure 2. Seven-day daily moving average of incidence rates of COVID-19 severe and critical hospitalizations per 1,000,000 and prevalence of BNT162b2 vaccination among persons aged 16–24, 25–44, 45–64, and ≥65 years Dec 1, 2020 – Apr 3, 2021, Israel. Note: Y-axis scales for COVID-19 severe and critical hospitalizations vary by age group.

A. ≥65 years

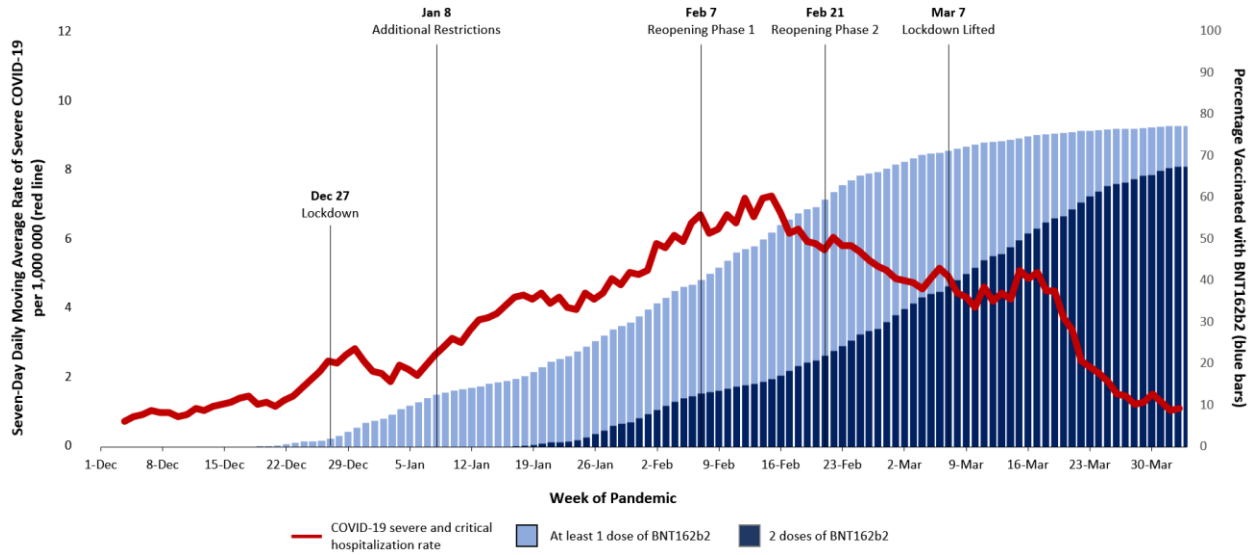


B. 45–64 years

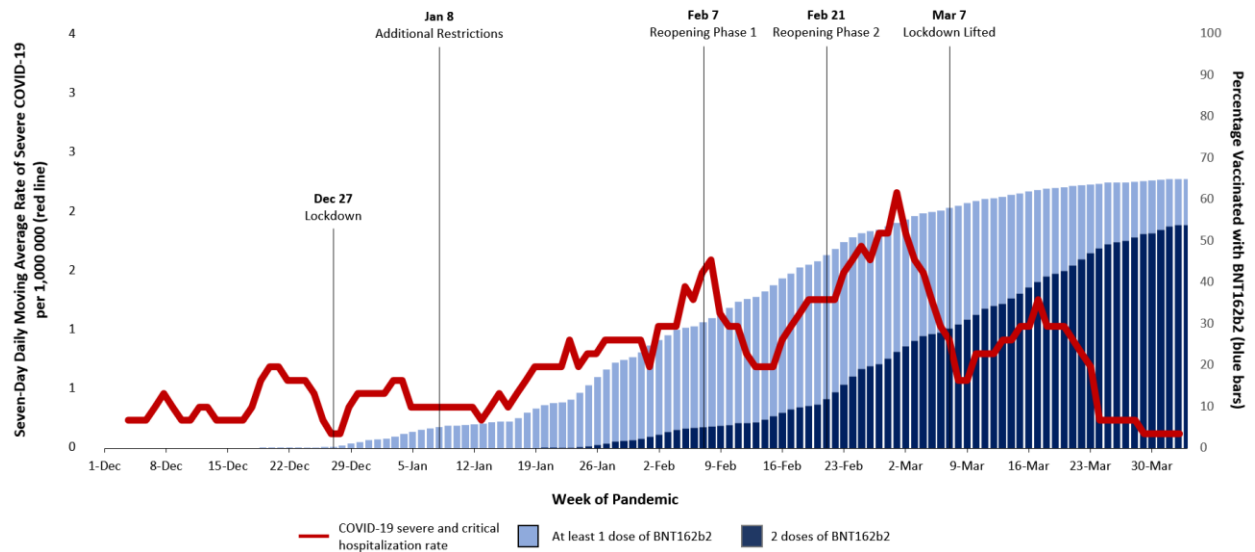


Supplemental Figure 2 (cont). Seven-day daily moving average of incidence rates of COVID-19 severe and critical hospitalizations per 1,000,000 and prevalence of BNT162b2 vaccination among persons aged 16–24, 25–44, 45–64, and ≥65 years Dec 1, 2020–Apr 3, 2021, Israel. Note: Y-axis scales for COVID-19 severe and critical hospitalizations vary by a ge group.

C. 25–44 years

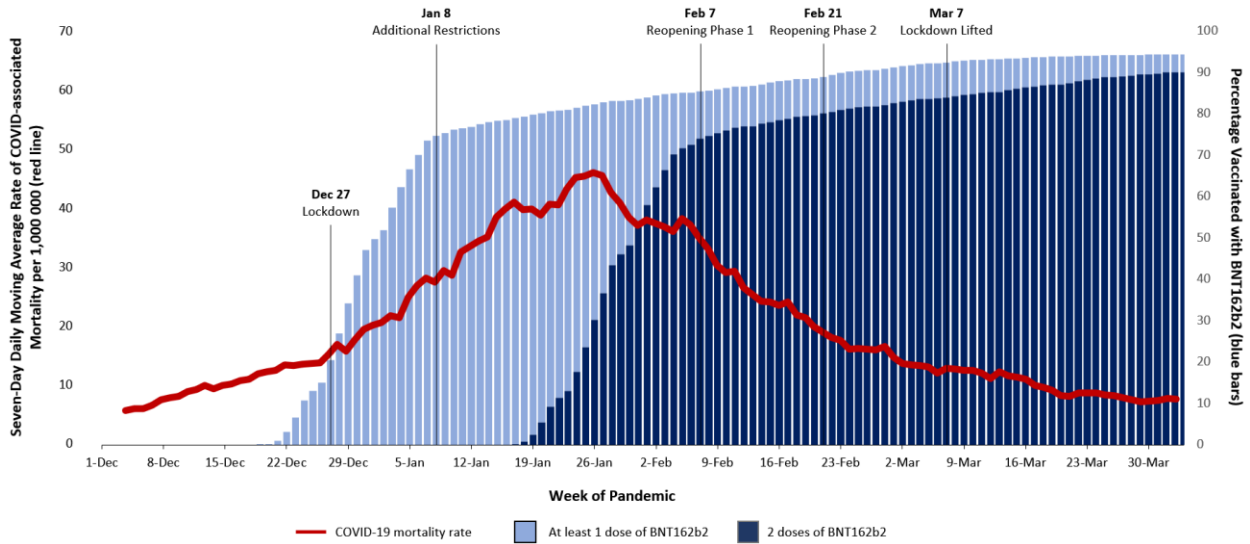


D. 16–24 years



Supplemental Figure 3. Seven-day daily moving average of incidence rates of COVID-19 deaths per 1,000,000 and prevalence of BNT162b2 vaccination among persons aged 45–64 and ≥65 years Dec 1, 2020 – Apr 3, 2021, Israel. *Note:* Y-axis scales for COVID-19 deaths vary by a ge group. Deaths for individuals <45 years of a ge were not presented due to small sample size.

A. ≥65 years



B. 45–64 years

