Supplemental Online Content

Muhsen K, Maimon N, Mizrahi AY, et al. Association of receipt of the fourth BNT162b2 dose with Omicron infection and COVID-19 hospitalizations among residents of long-term care facilities. *JAMA Intern Med*. Published online June 23, 2022. doi:10.1001/jamainternmed.2022.2658

This supplemental material has been provided by the authors to give readers additional information about their work.

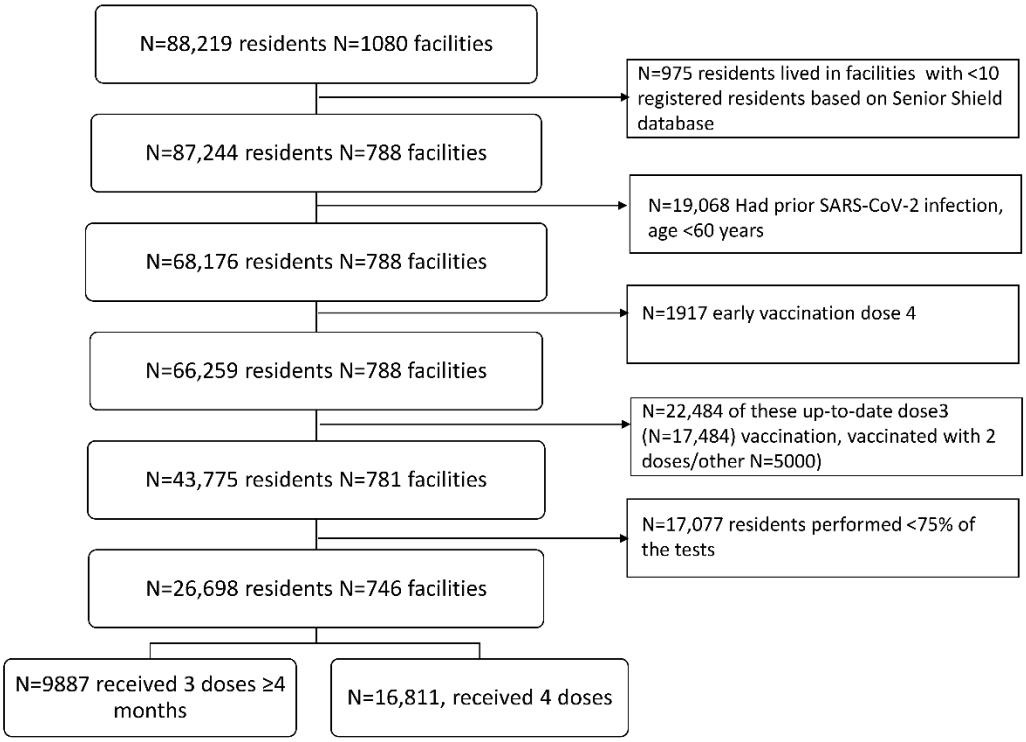
eMethods

Study population

The long-term care facilities (LTCFs) that were included in the Senior Shield program vary in multiple aspects including funding sources and the characteristics of the patient populations such as functional status, disabilities, and needs. For example, the geriatric facilities include chronic geriatric facilities (hospitalization for years) which are funded by the State of Israel, and serve a significantly frail population that needs substantial assistance in performing activities of daily living (ADL). Geriatric facilities include also a few acute care facilities that function as mini-hospitals and provide acute care for the elderly population (e.g., mechanical ventilation, rehabilitation); these services are funded by the sick funds and usually, there is a relatively higher patient turnover compared to the chronic geriatric facilities.

LTCFs that were classified as welfare disabilities included individuals with mental/cognitive and physical disabilities across all age groups who usually need substantial help in performing ADL. The welfare nursing homes serve a population that needs some help and supervision in performing ADL. LTCFs that were classified as welfare statutory accommodation include independent individuals capable of performing ADL who voluntarily choose to spend the rest of their lives with others in these facilities. Typically, this is an affluent population. The elderly day-care facilities serve individuals, who live in their own homes, but they are transported to these facilities 2-3 times a week; they vary in their needs and functional status.

eFigure. Selection of the study groups among those who performed ≥75% of the SARS-CoV-2 RT-PCR assays during the follow-up period



eTable 1. Characteristics of the study groups who performed ≥75% of the SARS-CoV-2 RT-PCR assays during the follow-up period

	3 Doses Only (N=9887)	**4 Doses (N=16,811)**
Sex		
Female	6671 (67.5%)	11,624 (69.1%)
Male	3211 (32.5%)	5167 (30.7%)
Missing	5 (0.1%)	20 (0.1%)
Age (Years), mean (SD)	78.3 (9.7)	83.0 (8.7)
Socioeconomic status rank		
Low	1763 (17.8%)	2630 (15.6%)
Medium	4041 (40.9%)	4813 (28.6%)
High	3093 (31.3%)	8015 (47.7%)
Missing	990 (10.0%)	1353 (8.0%)
Population group		
Arab	376 (3.8%)	352 (2.1%)
General Jewish population	8743 (88.4%)	15,402 (91.6%)
Ultraorthodox Jewish population	486 (4.9%)	619 (3.7%)
Missing	282 (2.9%)	438 (2.6%)
Starting follow-up epidemiological week [a], Median (IQR)	4 (1)	4 (1)
Vaccination with the fourth dose at the facility level [b]		
0%-60%	7291 (73.7%)	8279 (49.2%)
60%-70%	1622 (16.4%)	3922 (23.3%)
70%-80%	783 (7.9%)	3514 (20.9%)
80%-100%	191 (1.9%)	1096 (6.5%)

SD: standard deviation; IQR: interquartile range.

[a] More than seven days after vaccination with the fourth dose and a matching index week for the recipients of the three doses only.

[b] Vaccination with the fourth dose at the facility level: this variable was defined as the proportion of residents who were vaccinated with the fourth dose of the BNT162b2 vaccine in a certain facility among all residents registered in the same facility.

eTable 2. Associations of administration of the fourth dose of BNT162b2 vaccine with SARS-CoV-2 infection, COVID-19 hospitalizations, and deaths – subsample of residents who performed≥75% of the RT-PCR tests during the study period

	Number of residents	Number of cases	Cumulative incidence	Unadjusted HR (95% CI)	P-value	Adjusted HR (95% CI)	P-value
>7 days following vaccination with the 4th dose							
Confirmed SASR-CoV-2 infection							
3 doses of the BNT162b2 vaccine	9887	3991	44.2%	1.00	*<.001*	1.00	*<.001*
4 doses of the BNT162b2 vaccine	16,881	3850	23.8%	0.55 (0.52, 0.58)		0.56 (0.52, 0.59)	
Mild/moderate COVID-19 hospitalization							
3 doses of the BNT162b2 vaccine	9805	442	5.0%	1.00	*<.001*	1.00	*<.001*
4 doses of the BNT162b2 vaccine	16,801	203	1.2%	0.32 (0.26, 0.39)		0.31 (0.25, 0.38)	
Severe COVID-19 hospitalization							
3 doses of the BNT162b2 vaccine	9884	234	2.6%	1.00	*<.001*	1.00	*<.001*
4 doses of the BNT162b2 vaccine	16,809	103	0.6%	0.30 (0.23, 0.40)		0.29 (0.22, 0.40)	
COVID-19-related death							
3 doses of the BNT162b2 vaccine	9887	75	0.9%	1.00	*<.001*	1.00	*<.001*
4 doses of the BNT162b2 vaccine	16,881	38	0.2%	0.28 (0.18, 0.45)		0.28 (0.17, 0.47)	
>14 days following vaccination with the 4th dose							
Confirmed SASR-CoV-2 infection							
3 doses of the BNT162b2 vaccine	8133	2680	35.3%	1.00	*<.001*	1.00	*<.001*
4 doses of the BNT162b2 vaccine	15,674	2729	18.4%	0.53 (0.49, 0.56)		0.54 (0.50, 0.58)	
Mild/moderate COVID-19 hospitalization							
3 doses of the BNT162b2 vaccine	8067	291	3.9%	1.00	*<.001*	1.00	*<.001*
4 doses of the BNT162b2 vaccine	15,655	137	0.9%	0.30 (0.23, 0.38)		0.28 (0.22, 0.36)	
Severe COVID-19 hospitalization							
3 doses of the BNT162b2 vaccine	8131	170	2.2%	1.00	*<.001*	1.00	*<.001*
4 doses of the BNT162b2 vaccine	15,672	71	0.5%	0.25 (0.18, 0.34)		0.24 (0.17, 0.34)	
COVID-19-related death							
3 doses of the BNT162b2 vaccine	8133	55	0.7%	1.00	*<.001*	1.00	*<.001*
4 doses of the BNT162b2 vaccine	15,674	25	0.2%	0.22 (0.12, 0.38)		0.23 (0.12, 0.42)	

HR: Hazard ratio: CI: confidence intervals

eAppendix. STROBE statement—checklist of items that should be included in reports of ***cohort studies***

	Item No	Recommendation	Page No
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	3 3-4
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-6
Objectives	3	State specific objectives, including any prespecified hypotheses	6, 9
Methods			
Study design	4	Present key elements of study design early in the paper	7
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	7-8
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	7-10
		(*b*) For matched studies, give matching criteria and number of exposed and unexposed	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	9-10
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	9-10
Bias	9	Describe any efforts to address potential sources of bias	10-11
Study size	10	Explain how the study size was arrived at	Not relevant
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	10-11
		(*b*) Describe any methods used to examine subgroups and interactions	
		(*c*) Explain how missing data were addressed	
		(*d*) If applicable, explain how loss to follow-up was addressed	
		(*e*) Describe any sensitivity analyses	
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	12 Figure 1

			(b) Give reasons for non-participation at each stage	
			(c) Consider use of a flow diagram	
Descriptive data		14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	12, table 1
			(b) Indicate number of participants with missing data for each variable of interest	
			(c) Summarise follow-up time (eg, average and total amount)	
Outcome data		15*	Report numbers of outcome events or summary measures over time	12-13, table 2, figure 2
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included		13 Table 2 Figure 3
		(*b*) Report category boundaries when continuous variables were categorized		
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period		
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses		4
Discussion				
Key results	18	Summarise key results with reference to study objectives		15
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias		16-17
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence		17
Generalisability	21	Discuss the generalisability (external validity) of the study results		17
Other information				
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based		20

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at http://www.strobe-statement.org