

THE LANCET

Healthy Longevity

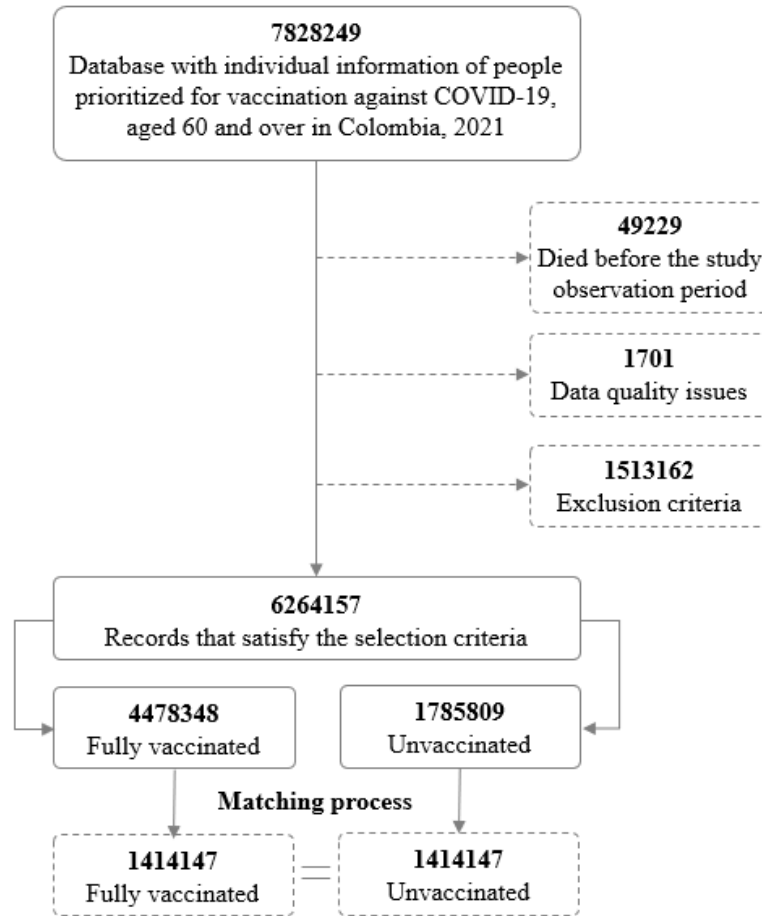
Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

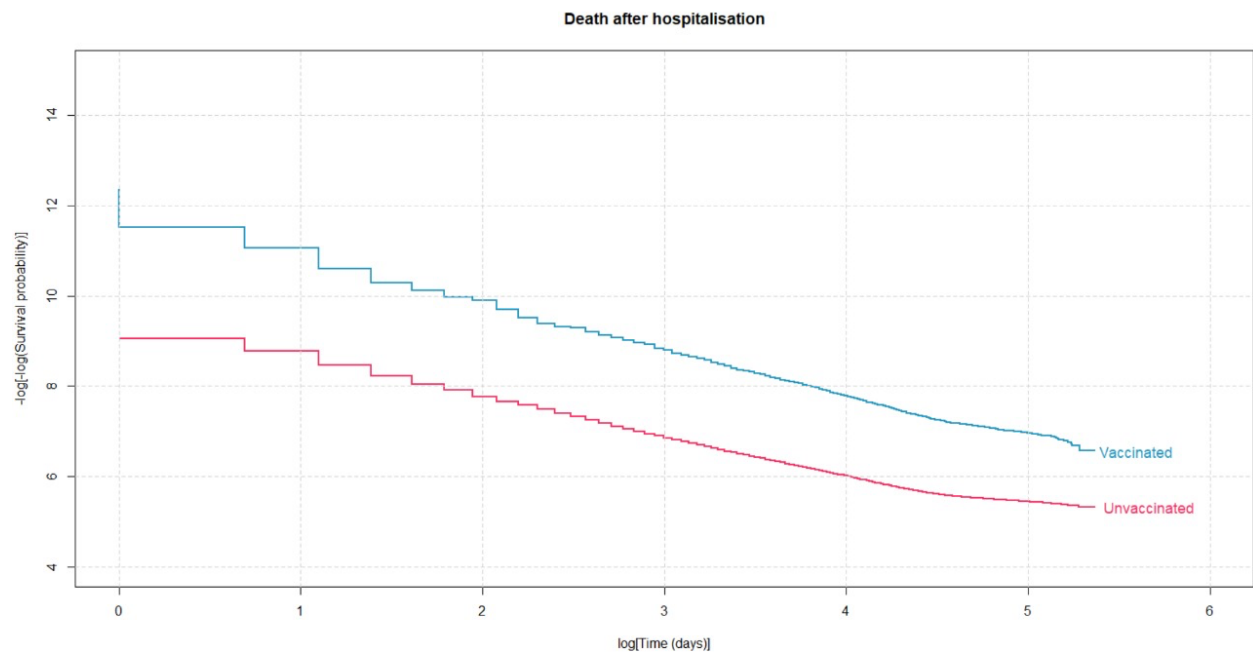
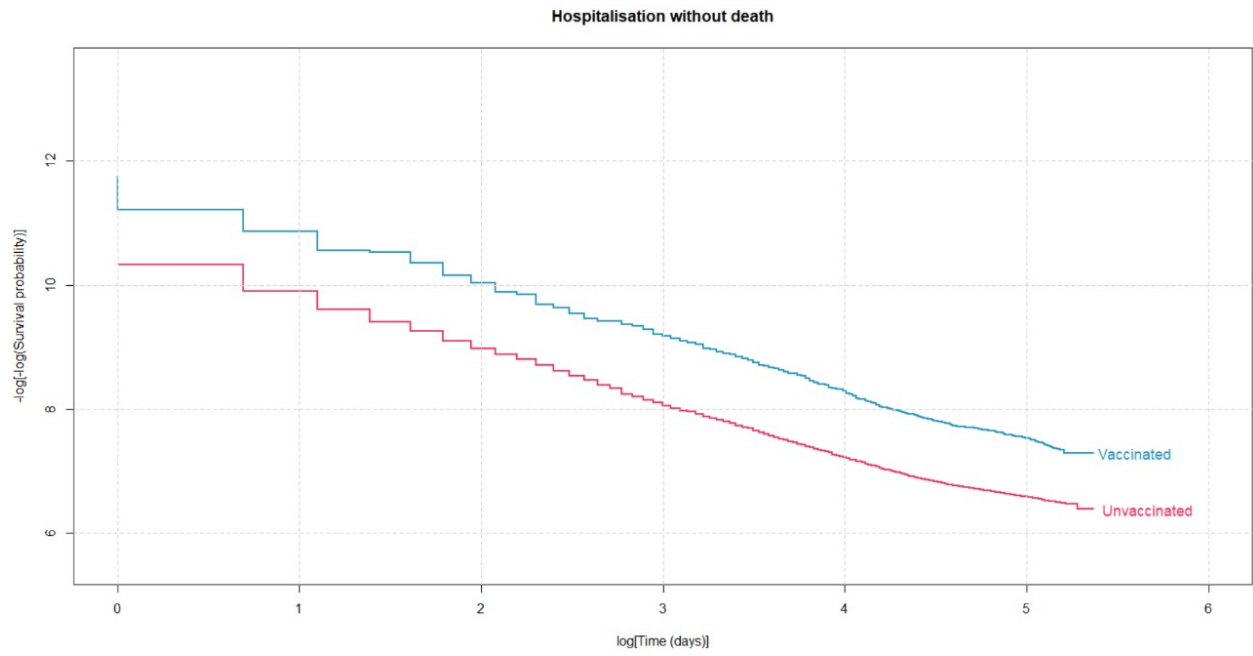
Supplement to: Arregocés-Castillo L, Fernández-Niño J, Rojas-Botero M, et al. Effectiveness of COVID-19 vaccines in older adults in Colombia: a retrospective, population-based study of the ESPERANZA cohort. *Lancet Healthy Longev* 2022; published online March 21. [https://doi.org/10.1016/S2666-7568\(22\)00035-6](https://doi.org/10.1016/S2666-7568(22)00035-6).

Supplementary Appendix

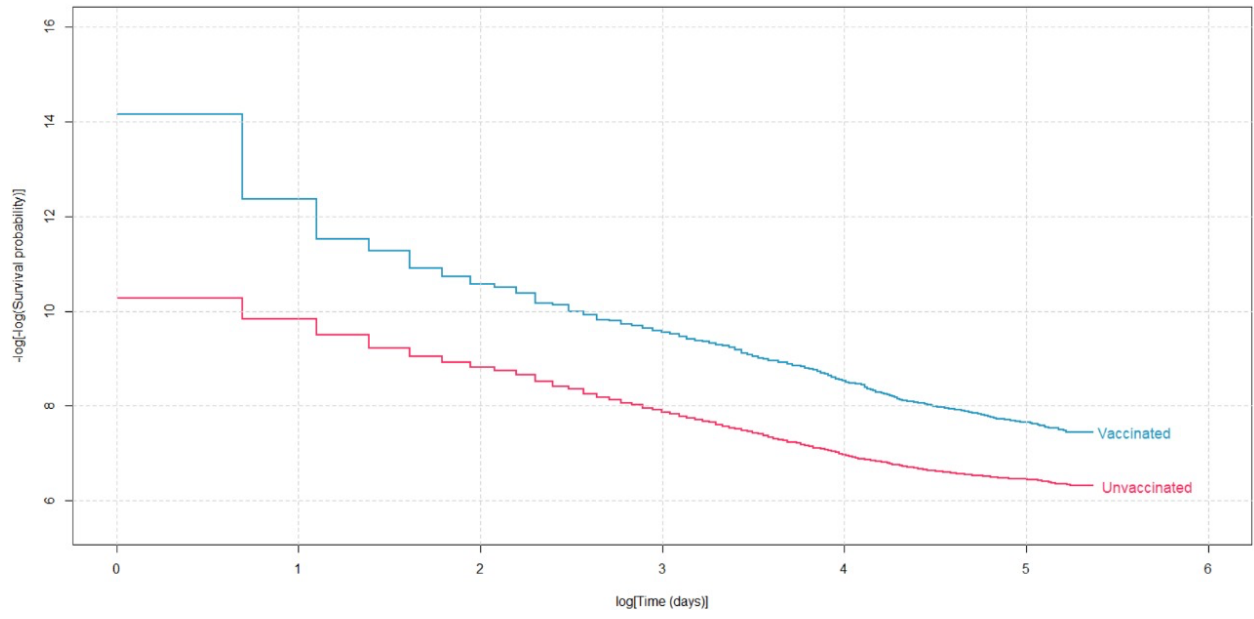
1. Database configuration



2. Verification of proportional hazards assumptions



Death without hospitalisation



3. Sensitivity analysis 1: Misclassification bias

As stated, the vaccination notification process entails a delay in updating the doses applied. At the cut-off date of this study (November 3, 2021), the delay was approximately 24%. This situation has an impact on our study: the risk of differential misclassification since some people identified in the study as unvaccinated (unexposed) are actually fully vaccinated (exposed).

This bias tends to underestimate the true effect of vaccines on the outcomes of interest. To verify this, we carried out a sensitivity analysis in which we randomly changed the classification of 25%, 50%, and 75% of the people in the unexposed cohort as fully vaccinated. Results are in table below.

Table. Effectiveness of vaccines to prevent hospitalisation and death due to COVID-19 in adults 60 years and older, by age group. Sensitivity analysis changing randomly 25%, 50%, and 75% of non-vaccinated as fully vaccinated with any vaccine.

	Hospitalisation without death		Post-hospitalisation death		Death without hospitalisation	
	VE %	IC 95%	VE %	IC 95%	VE %	IC 95%
60 and older						
25%	71.2	68.1 - 74.1	84.3	83.1 - 85.4	78.5	76.1 - 80.7
50%	77.1	74.6 - 79.3	87.5	86.5 - 88.4	82.9	81.0 - 84.6
75%	78.5	76.4 - 80.4	84.3	83.1 - 85.4	78.5	76.1 - 80.7
60-69						
25%	88.8	85.5 - 91.3	94.7	93.3 - 95.8	90.2	86.8 - 92.8
50%	90.9	88.4 - 92.9	96.0	95.0 - 96.8	93.7	91.5 - 95.4
75%	92.0	89.9 - 93.6	96.6	95.8 - 97.3	94.2	92.3 - 95.6
70-79						
25%	72.8	67.6 - 77.1	89.2	87.6 - 90.6	83.9	80.2 - 87.0
50%	78.6	74.6 - 81.9	91.5	90.3 - 92.6	87.2	84.2 - 89.6
75%	78.7	75.1 - 81.7	92.1	91.0 - 93.0	89.8	87.5 - 91.7
>80						
25%	44.7	35.1 - 52.9	71.7	68.9 - 74.3	68.3	63.7 - 72.3
50%	51.2	42.7 - 58.5	74.8	72.3 - 77.1	71.1	66.9 - 74.8
75%	52.9	45.3 - 59.4	75.4	73.1 - 77.5	71.6	67.8 - 75.1

The effectiveness tends to increase when the percentage of misclassified among the unexposed increases. This reinforces that our results are conservative and the greater probability of an underestimation of the real effectiveness of the vaccines.

4. Sensitivity analysis 2: Records with exclusively application of second doses

Approximately 206607 people had records of only the second dose of vaccine (but not the first), so these records were excluded from the analysis presented in the article. We conducted a sensitivity analysis including all these records, assuming they were fully vaccinated. Results are presented in the table below.

Table. Effectiveness of vaccines to prevent hospitalisation and death due to COVID-19 in adults 60 years and older, by vaccine manufacturer and age group. Sensitivity analysis including 206607 records with incomplete data as fully vaccinated.

	Hospitalisation without death		Post-hospitalisation death		Death without hospitalisation	
	(1-HR) %	IC 95%	(1-HR) %	IC 95%	(1-HR) %	IC 95%
Any vaccine	61·9	58·2 - 65·2	80·0	78·6 - 81·2	73·5	70·8 - 76·0
60-69	77·7	73·0 - 81·7	90·8	88·8 - 92·4	83·5	78·6 - 87·2
70-79	63·6	57·5 - 68·8	84·6	82·7 - 86·4	78·4	73·9 - 82·1
80 and older	40·7	31·8 - 48·4	69·3	66·6 - 71·8	64·9	60·4 - 68·9
Ad26.COV2.S	49·2	21·6 - 67·0	82·7	73·1 - 88·9	83·0	64·3 - 91·9
60-69	38·7	0·0 - 63·4	80·4	63·3 - 89·5	83·4	48·4 - 94·7
70-79	51·9	0·0 - 78·5	88·4	72·0 - 95·2	78·6	33·3 - 93·1
80 and older	76·7	43·8 - 90·3	89·3	23·8 - 98·5
BNT162b2	81·9	77·2 - 85·6	93·5	91·8 - 94·9	87·0	82·5 - 90·3
60-69	83·5	77·4 - 88·0	93·8	91·2 - 95·6	85·5	78·1 - 90·4
70-79	78·6	69·0 - 85·2	93·2	90·2 - 95·2	88·5	80·8 - 93·1
80 and older	81·0	54·1 - 92·2	93·0	85·9 - 96·5	86·1	70·6 - 93·4
ChAdOx1 nCoV-19	88·1	82·1 - 92·0	97·8	96·3 - 98·7	91·6	86·2 - 94·9
60-69	86·2	76·5 - 91·9	98·4	95·7 - 99·4	87·2	76·0 - 93·2
70-79	88·6	78·7 - 93·9	97·6	94·9 - 98·9	96·5	89·1 - 98·9
80 and older	96·2	84·6 - 99·0	87·0	59·5 - 95·8
CoronaVac	48·6	43·3 - 53·5	72·8	70·9 - 74·6	66·7	63·2 - 69·9
60-69	70·4	60·8 - 77·7	83·4	78·8 - 87·1	79·1	69·6 - 85·6
70-79	51·8	42·9 - 59·3	78·5	75·5 - 81·0	70·9	64·4 - 76·3
80 and older	36·6	27·0 - 45·0	67·3	64·4 - 70·0	62·9	58·1 - 67·3

.. It is not possible to estimate the effectiveness due to the absence of events in the observation time.

The results for any vaccine were obtained from a cause-specific Cox regression model, where each vaccinated-unvaccinated pair represents a stratum within the model, according to the study design.

The results for each vaccine were obtained from multivariate cause-specific Cox regression models, adjusted by age, sex, affiliation regime to the Colombian health system, cancer, diabetes, hypertension, kidney disease, and HIV, with a random effect for municipality of residence. The reference group corresponds to people who have not received any dose of the COVID-19 vaccine.

The results did not vary significantly, leading to the conclusion about the robustness of the study.