Does the effectiveness of booster COVID-19 vaccines change over time? Results from a Living Evidence Synthesis focused on the Omicron period

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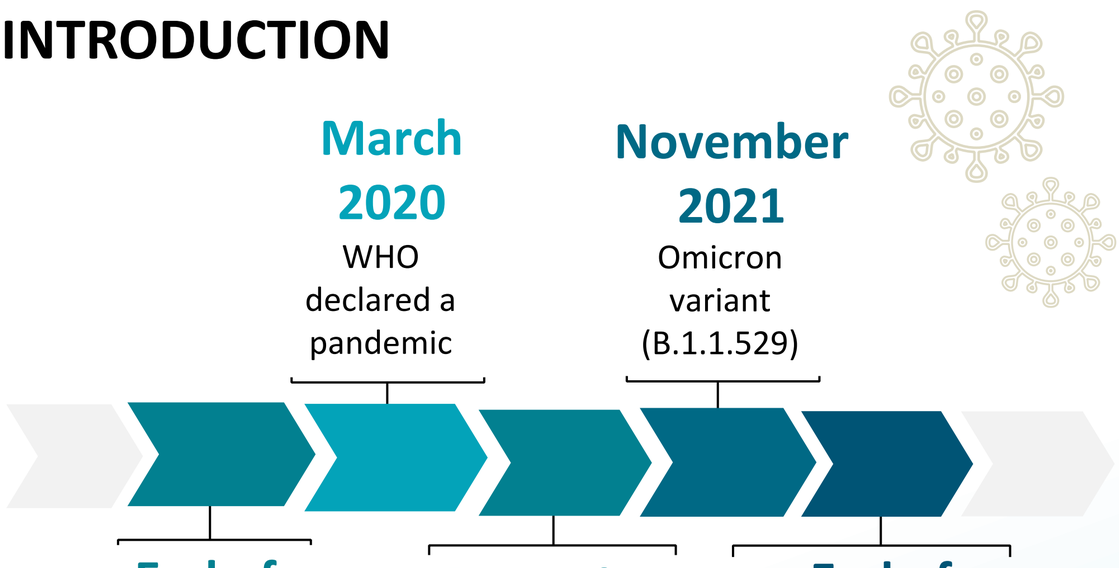
INTRODUCTION



- Vaccine-induced antibodies are reduced at 6 months after a primary COVID-19 vaccination series and vaccine effectiveness against infections and hospitalisations might also be reduced 2–7 months after receiving a primary vaccination series. This reduction in vaccine effectiveness might be further accentuated by the emergence of new variants of concern.

PURPOSE

- To review the long-term vaccine effectiveness (VE) of booster doses against COVID-19 infections, hospitalizations, and deaths.

METHODS

P	I	C	O
Adult general population	**Full primary vaccine series and an additional dose of a Canadian-licensed COVID-19 vaccine** BNT162b2, mRNA-1273, ChAdOx1/AZD1222, Ad26.COV2.S	**Unvaccinated participants**	**Effectiveness of COVID-19 vaccines** against SARS-CoV-2 infections, hospitalisations, and mortality

Step 1
A reviews was developed following the World Health Organizatio n's Practical Guide for Rapid Reviews

Step 2
Search Strategy Databases: US National Institutes of Health's (NIH) iSearch COVID-19 Portfolio7 and EMBASE via OVID

Step 3
Studies Selection

Step 4
Data extraction

A team of trained reviewers selected and extracted studies, verified by a second reviewer. Uncertainties were resolved with a third reviewer.
We extracted vaccine effectiveness data for SARS-CoV-2 infections, hospitalisations, and mortality.
Baseline: 0-28 days after the booster dose.
Follow-up: ≥84 days post booster.

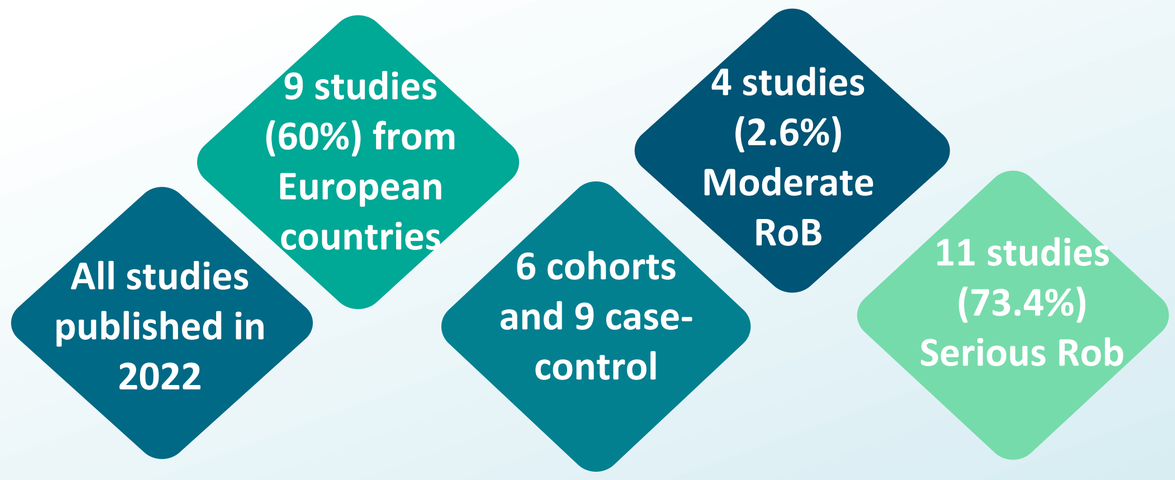
Step 5
Quality assessment

It was done by a single reviewer and verified by a second reviewer.

Step 6
Data Analysis Three-level meta-analytic models via the rma.mv function of the metafor (version 3.0.2)13 package in R (version 4.1.2)

RESULTS

- 16.696 records were screened by title + abstract. 832 records screened full-text and 68 studies included in the overall review and 15 studies for this objective.



- VE did not meet WHO guidelines (≤70% for symptomatic infections with a lower 95% CI of ≤50%, and ≤90% for hospitalisations or mortality with a lower 95% CI of ≤70%) at baseline, reaching 67%. And all follow-up periods had inadequate protection with a statistical reduction in VE.
- For hospitalisations, however, VE met WHO guidelines for adequate protection at baseline, reaching 89% and it kept the protection overtime in adequate level, although it statistically reduces by 74% and 71%.

	Baseline days (7–28)	Follow-up days (84–111)	Follow-up days (112–139)	I^2	σ
Documented infections	67% (95% CI 53 to 77; 95% PI –16 to 91)	51%* (95% CI 30 to 66; 95% PI –44 to 87)	40%* (95% CI 11 to 59; 95% PI –55 to 84)	32, 68	0.35, 0.51
k	11 (24)	9 (19)	7 (14)	-	-
Hospitalisations	89% (95% CI 82 to 93; 95% PI 59 to 97)	74%* (95% CI 60 to 83; 95% PI 8 to 93)	71%* (95% CI 51 to 83; 95% PI –6 to 92)	30, 68	0.32, 0.48
k	7 (11)	8 (13)	4 (5)	-	-
Mortality	86% (95% CI 72 to 93; 95% PI 56 to 96)	86% (95% CI 73 to 92; 95% PI 55 to 95)	83% (95% CI 63 to 92; 95% PI 42 to 95)	33, 60	0.22, 0.29
k	2 (2)	3 (4)	1 (1)		

I^2 is Higgin's and Thompson's I^2 presented at the within-study and between-study levels. Σ is the estimate of τ, the SD of effect sizes in the population, presented at the within-study and between-study levels. κ=number of studies pooled (number of cohorts or observations pooled). PI=prediction interval. *VE at this follow-up timepoint is statistically different from the VE observed at baseline.

CONCLUSION

- COVID-19 booster protection against Omicron infection is modest at first and declines substantially.
- For hospitalizations and deaths, however, protection begins at a higher level and appears to be largely maintained over time.

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