

Results of COVID-19 Vaccine Effectiveness Studies: An Ongoing Systematic Review

Forest Plots: Vaccine Effectiveness against Delta and Omicron Variants of Concern

Updated May 12, 2022

Prepared by:

International Vaccine Access Center,
Johns Hopkins Bloomberg School of Public Health

and

World Health Organization

and

Coalition for Epidemic Preparedness Innovations



For comments or questions, please contact: Melissa Higdon at mhigdon@jhu.edu.

TABLE OF CONTENTS

Methods for Inclusion in Forest Plots	3
Abbreviations	4
Delta.....	5
Forest Plots by Vaccine.....	5
Ad26.COV2.S (Janssen)	5
AZD1222 (AstraZeneca).....	6
BBIBP-CorV2 (Beijing CNBG)	7
BBV152 (Bharat).....	7
CoronaVac (Sinovac)	8
BNT162b2 (Pfizer)	9
mRNA-1273 (Moderna).....	10
Heterologous schedules.....	11
Forest Plots by Population of Special Interest	12
Older Adults	12
Healthcare Workers	12
Children.....	12
Immunocompromised.....	12
Duration of Vaccine Effectiveness against Delta	13
Omicron	14
Forest Plots by Vaccine.....	14
Ad26.COV2.S (Janssen)	14
AZD1222 (AstraZeneca).....	14
CoronaVac (Sinovac)	15
BNT162b2 (Pfizer)	16
mRNA-1273 (Moderna).....	17
Second booster vaccination	18
Forest Plots by Population of Special Interest	19
Older Adults	19
Healthcare Workers	19
Children.....	19
Immunocompromised.....	19
Duration of Vaccine Effectiveness against Omicron	20

METHODS FOR INCLUSION IN FOREST PLOTS

Vaccine Effectiveness (VE) estimates included in these plots are from an ongoing systematic review of COVID-19 vaccine effectiveness studies. Due to the predominance of the Delta variant across the globe, the plots in this document are restricted to studies conducted during a period when the Delta variant was the dominant circulating variant. Previous versions of the plots (prior to November 18, 2021) showed results from all studies, regardless of dominant variant, and the latest version of those plots (November 11, 2021) are available on the VIEW-hub resources page (<https://view-hub.org/resources>). Complete details on the method of the systematic review as well as a summary table of results can also be found on the VIEW-hub Resources Page:

- “COVID-19 Vaccine Effectiveness and Impact Studies Review Methods”
- “COVID-19 Vaccine Effectiveness Results Summary Table”

The VE estimates included in the plots are a subset of the estimates abstracted from the systematic literature review. A single study can include many VE estimates. In an effort to not overrepresent the amount of evidence that exists for each vaccine, the following criteria are used to determine which VE estimates are displayed in the forest plots located on the VIEW-hub resources page (<https://view-hub.org/resources>). There are some instances when more than one estimate from a study will be displayed in the same plot (e.g. a study includes VE estimates from two distinct populations). Reference numbers are included for each VE estimate displayed so users can identify when a study is represented more than once within a plot. More information on each reference can be found in the weekly literature review summary table located on VIEW-HUB (<https://view-hub.org/resources>).

- Complete vaccination is defined as ≥ 7 days post final dose; partial vaccination is defined as ≥ 14 days post first dose of a 2-dose vaccine.
- If a study reports results for the same outcome for both combined and individual vaccines, only individual vaccine VE estimates are displayed. This criterion only applies to studies evaluating VE of BNT162b2 (Pfizer) and mRNA-1273 (Moderna) vaccines.
- If a study reports results from 2 different evaluation designs (e.g. test-negative design and cohort design) on the same population, VE estimates from the primary analysis only are displayed.
- If a study reports VE estimates for the same disease outcome for different populations, the general population VE estimate is displayed when available. If a general population estimate is not available, the VE from each population is displayed (exception is when there are estimates for similar age groups in which case the more stable VE estimate will be displayed).
- If a study reports VE estimates on more than one ‘severe’ disease outcome (e.g. ‘severe disease’, ‘hospitalization’, and ‘ICU admission’), the more inclusive disease outcome including a larger population is displayed. These different types of severe outcomes are labeled as ‘severe disease’ in the plots, however it is important to keep in mind that the definition of severe disease varies and may explain some differences in VE estimates for severe disease outcomes.
- If a study reports VE estimates for different time intervals from the final dose, those from the earlier time intervals are plotted in an effort to remove the effect of possible waning of immunity. Studies that report only VE estimates that include a follow-up time that extends beyond 4 months post final dose are indicated with a ^{††}. Studies that report only VE estimates that are restricted to time intervals beyond 4 months are indicated with a ^{*}.

ABBREVIATIONS

asyp = asymptomatic

HCW = healthcare workers

HHC = household contacts

LTCF = long-term care facility

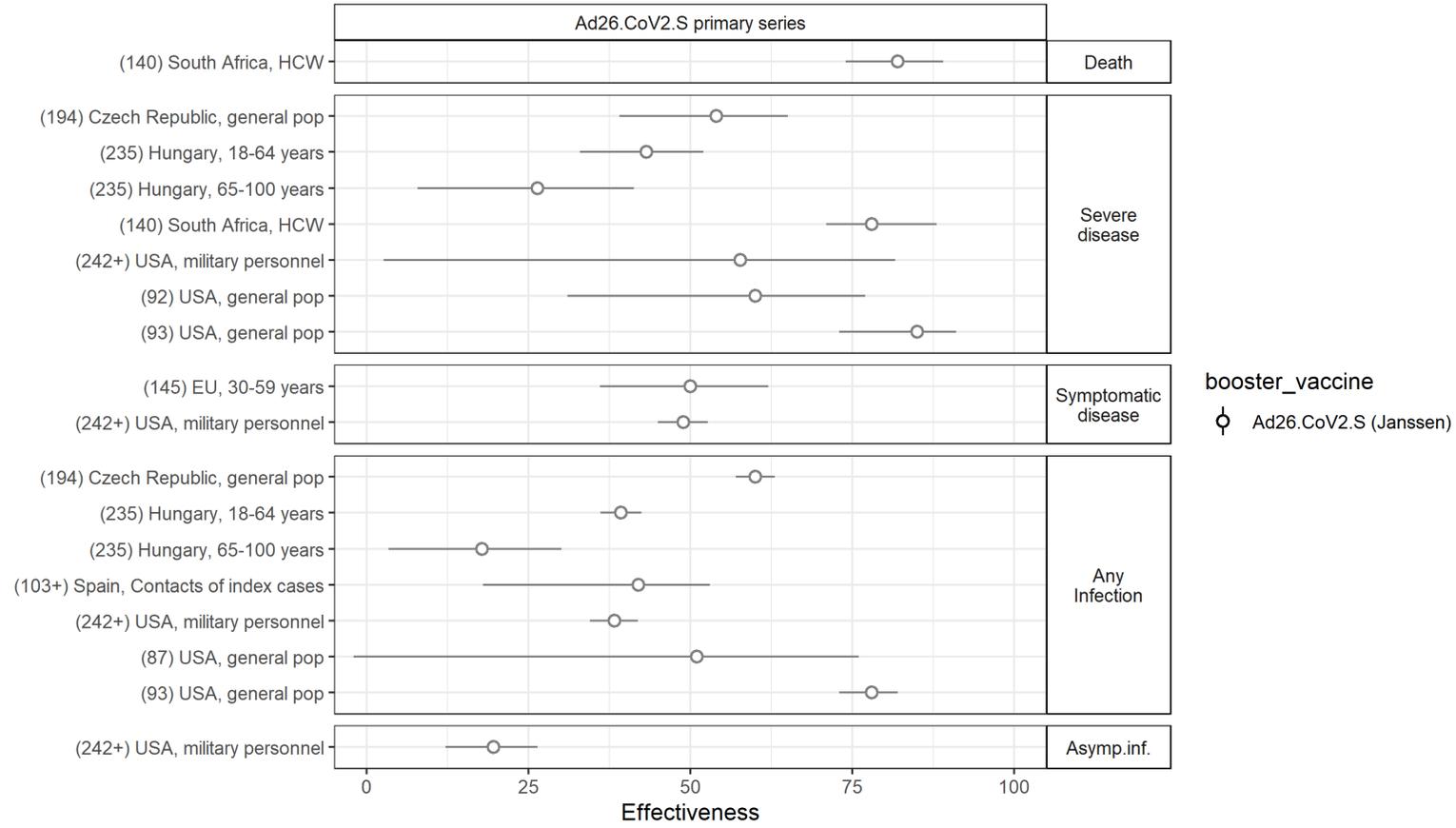
pop = population

SNF= skilled nursing facility

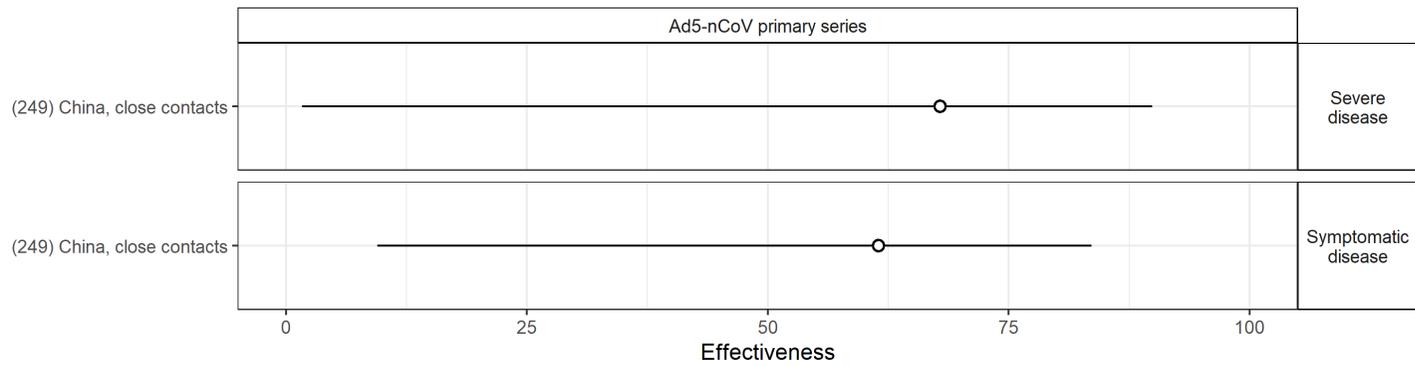
DELTA VARIANT OF CONCERN

BY VACCINE

Ad26.CoV2.S (Janssen) Primary Series Vaccine Effectiveness, Delta Variant
(ref no) country, population

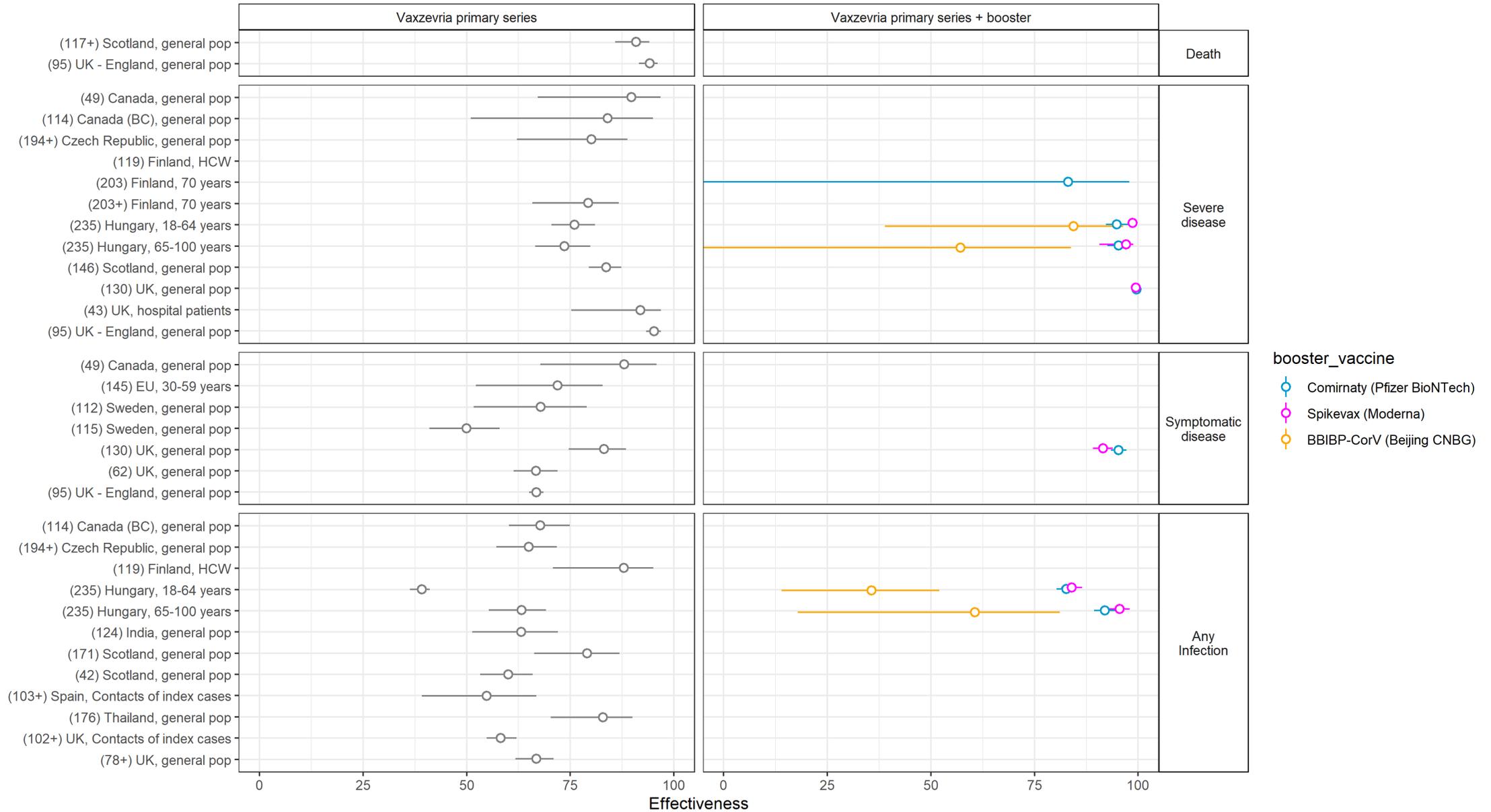


Ad5-nCoV (Cansino) Primary Series Vaccine Effectiveness, Delta Variant
(ref no) country, population



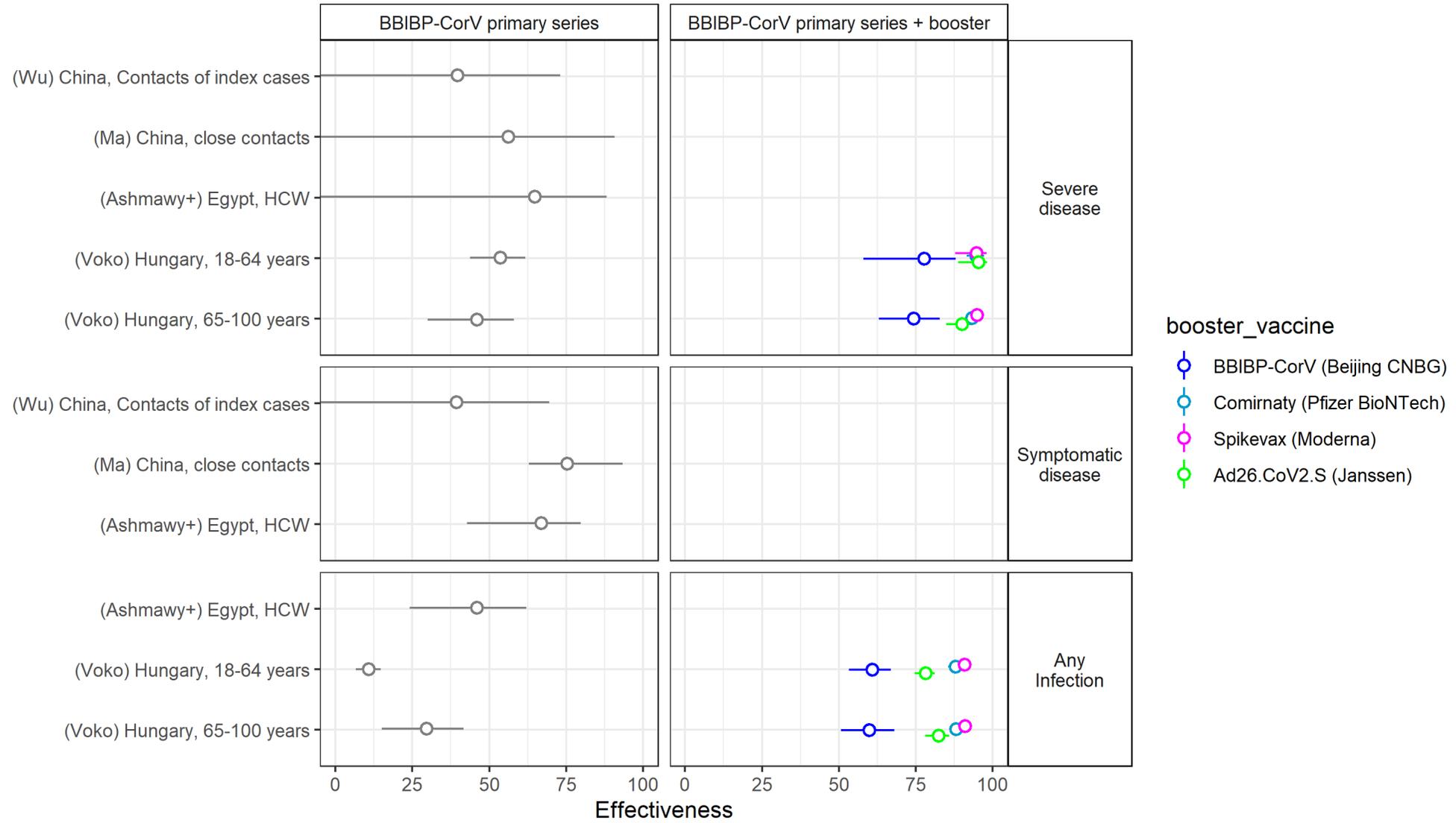
Vaxzevria (AstraZeneca) Primary Series + Booster Dose Vaccine Effectiveness, Delta Variant

(ref no) country, population

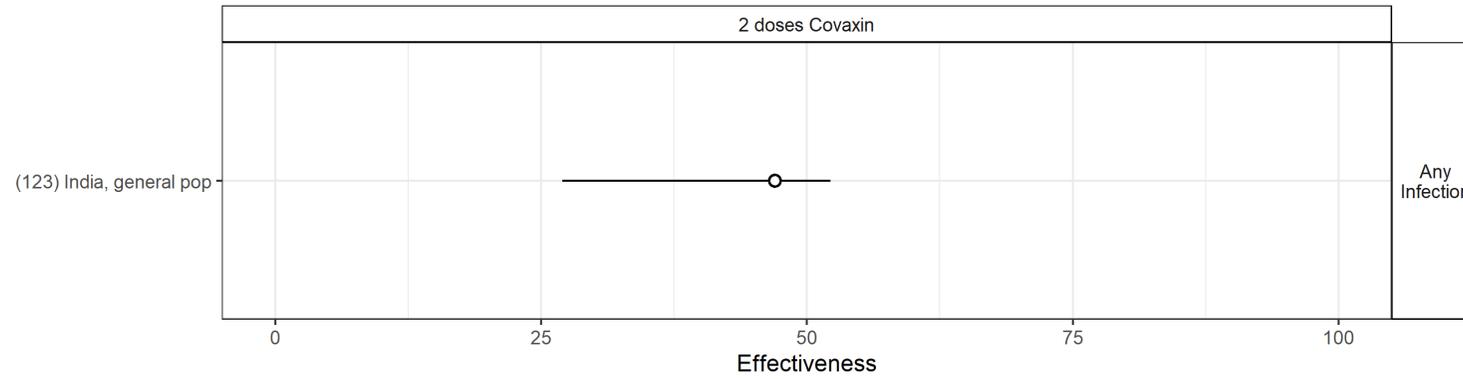


BBIBP-CorV (Beijing CNBG) Primary Series and Booster Dose Vaccine Effectiveness, Delta Variant

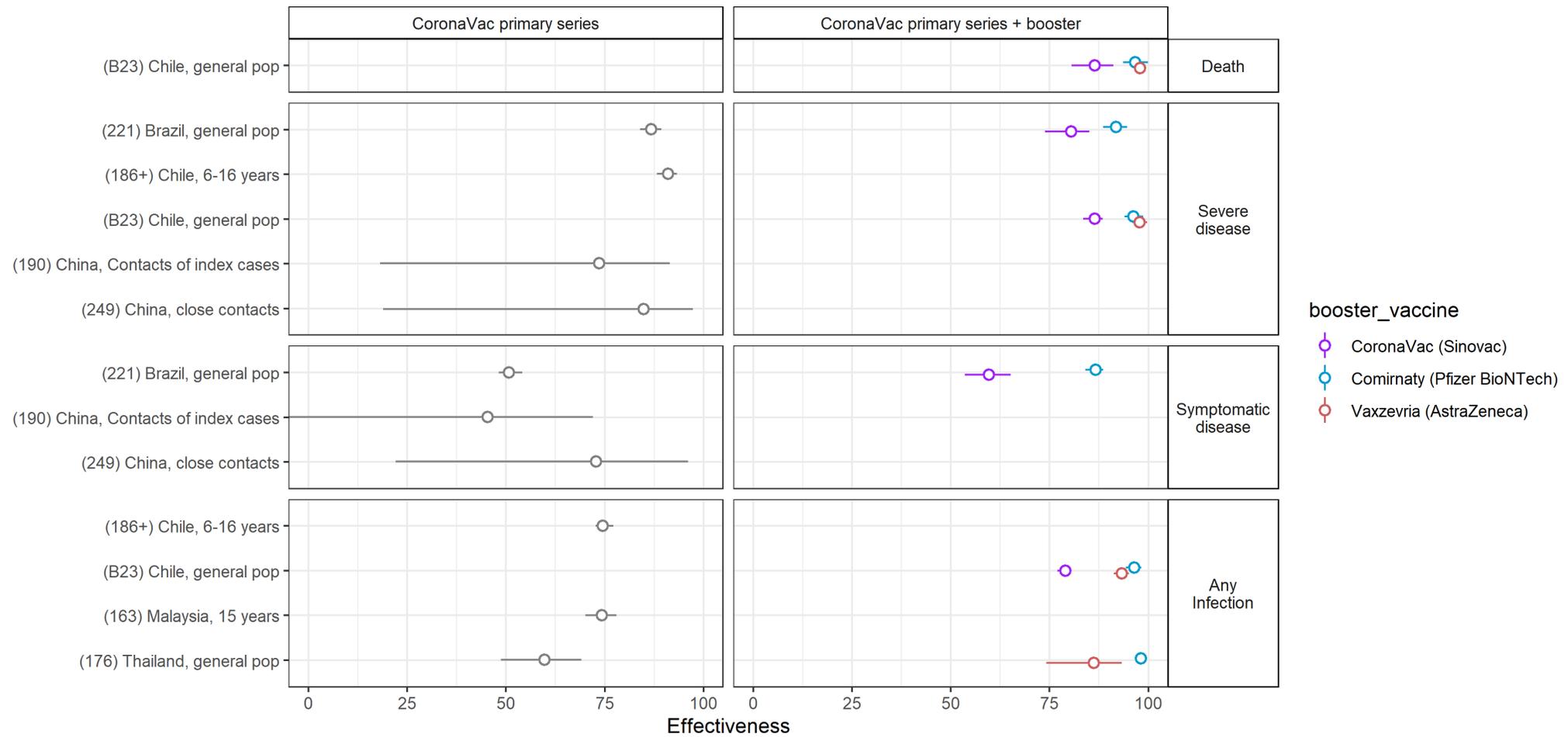
(ref no) country, population



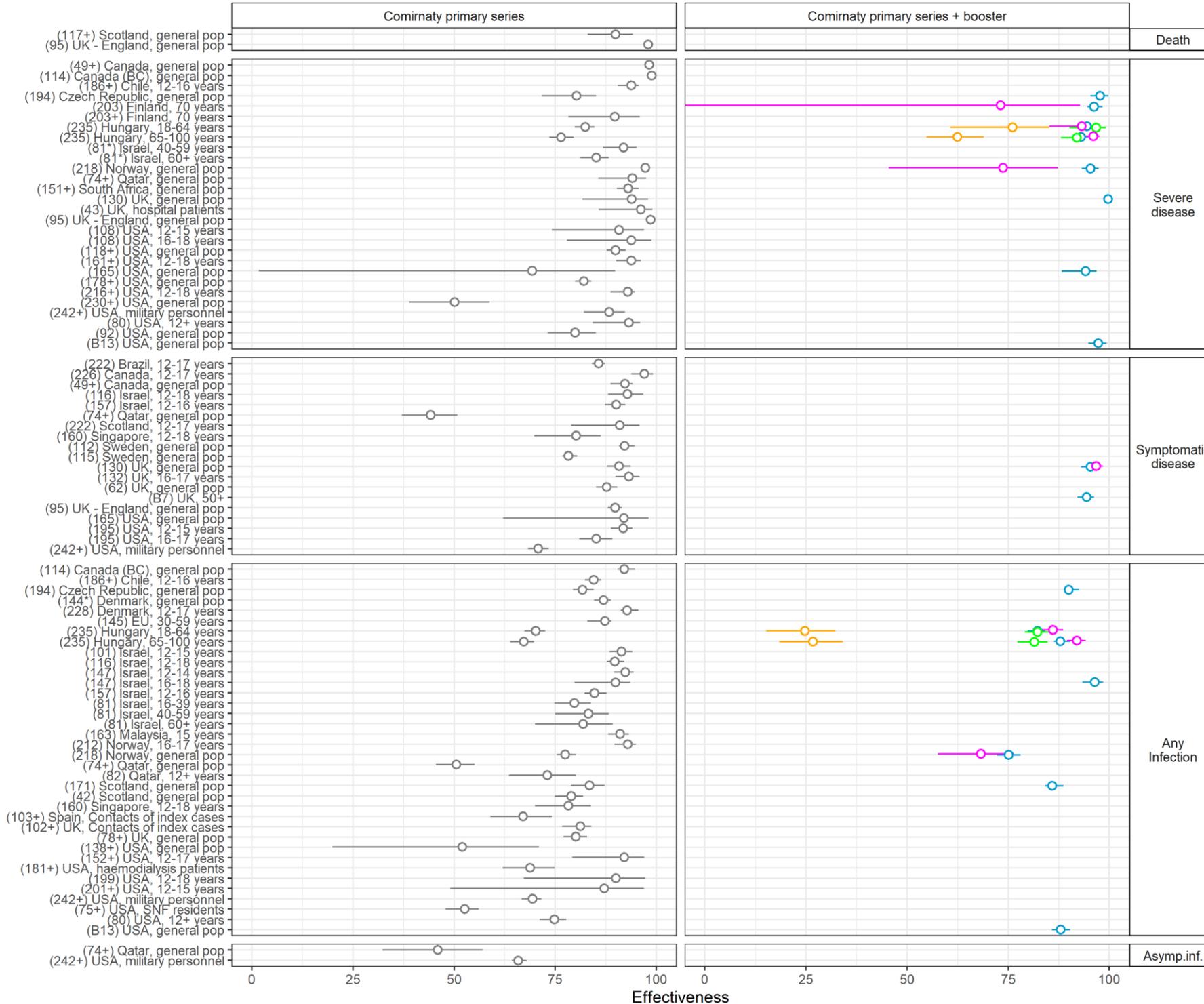
BBV152 (Bharat BioTech) Primary Series Vaccine Effectiveness, Delta Variant
(ref no) country, population



CoronaVac (Sinovac) Primary Series and Booster Dose Vaccine Effectiveness, Delta Variant
(ref no) country, population



Comirnaty (Pfizer BioNTech) Vaccine Effectiveness, Delta Variant
(ref no) country, population

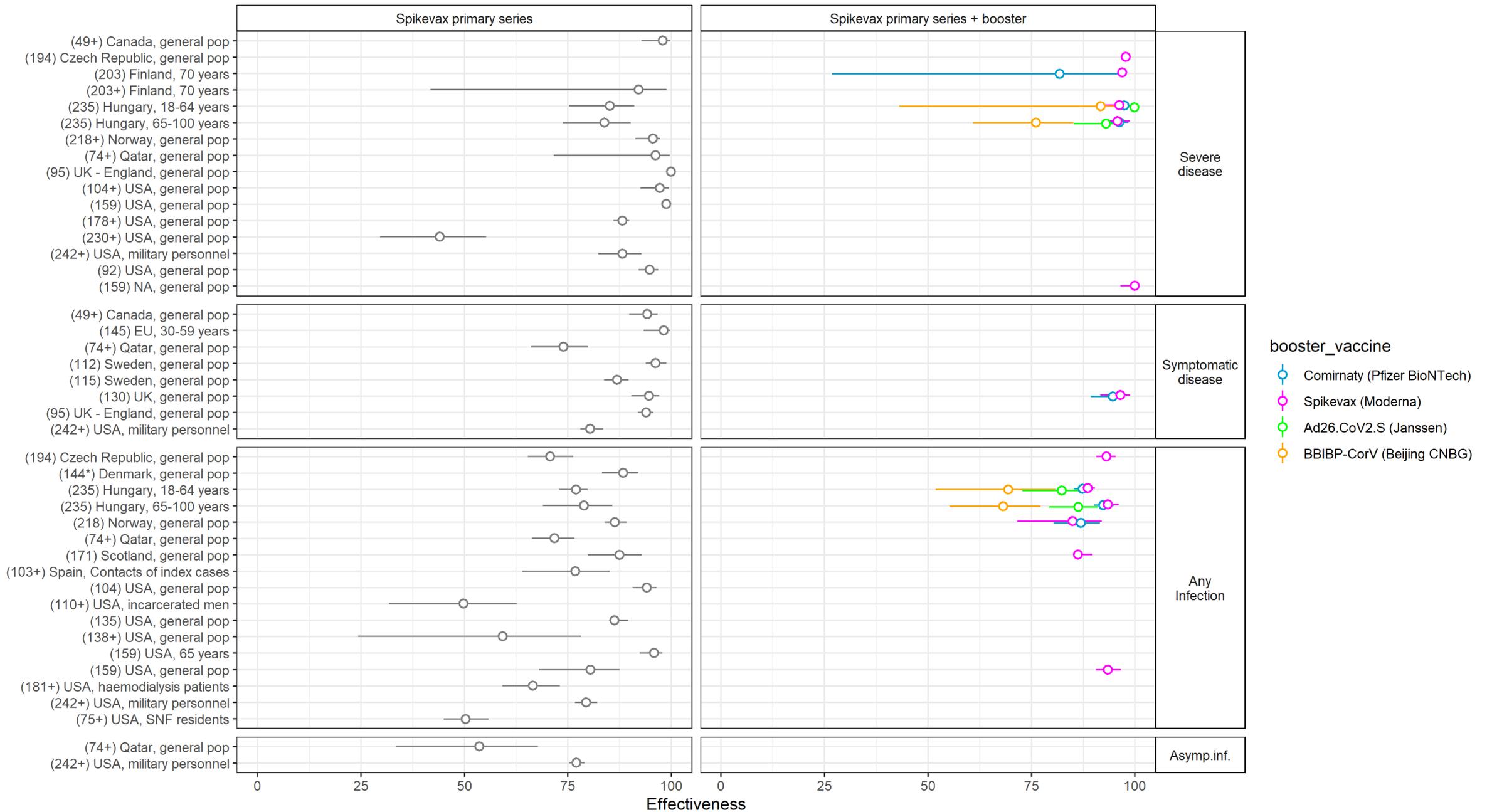


booster_vaccine

- Comirnaty (Pfizer BioNTech)
- Spikevax (Moderna)
- Ad26.CoV2.S (Janssen)
- BBIBP-CorV (Beijing CNBG)

Spikevax (Moderna) Primary Series + Booster Dose Vaccine Effectiveness, Delta Variant

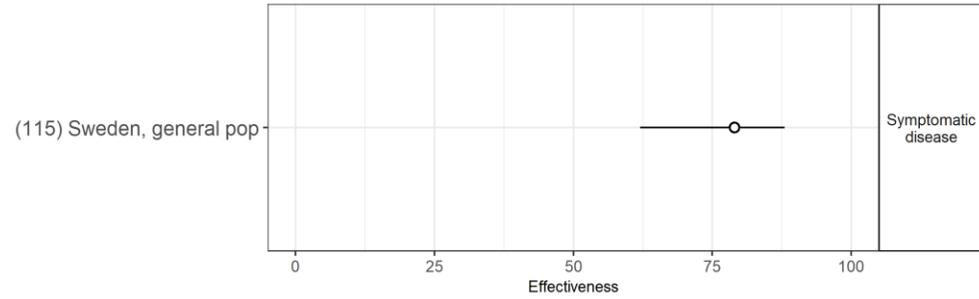
(ref no) country, population



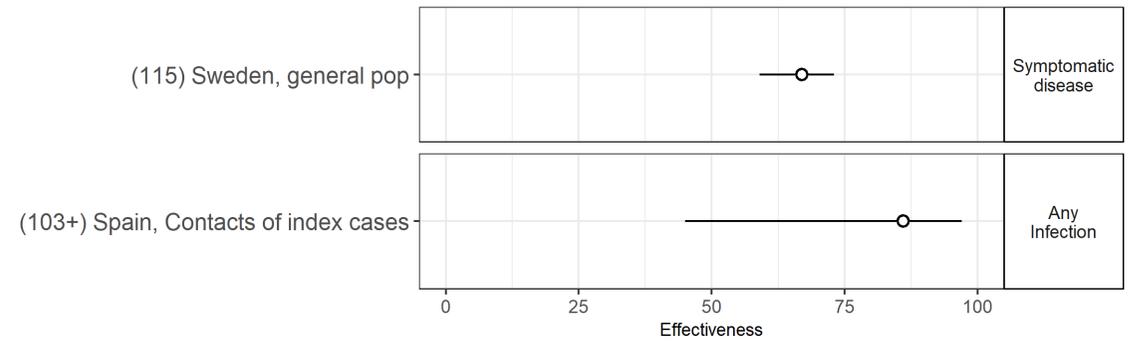
+ Indicates estimates that include a follow-up time extending beyond 4 months post final dose.

=

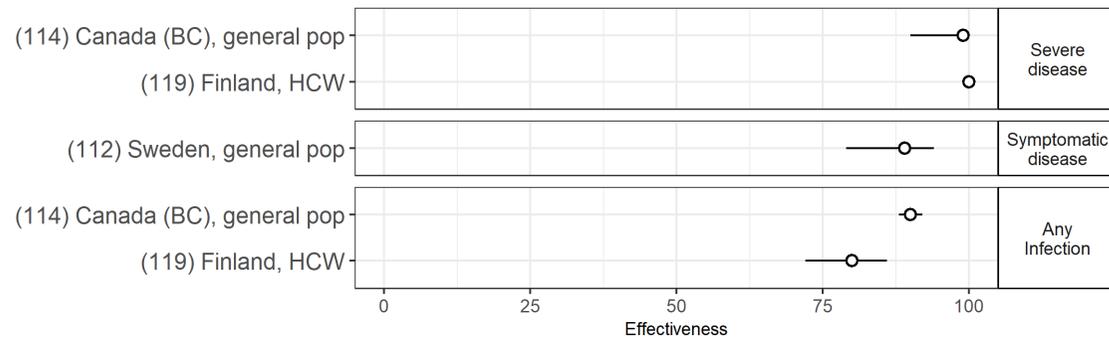
Heterologous AZD1222 (AstraZeneca) 1st dose plus mRNA-1273 (Moderna) 2nd dose Vaccine Effectiveness
(ref no) country, population



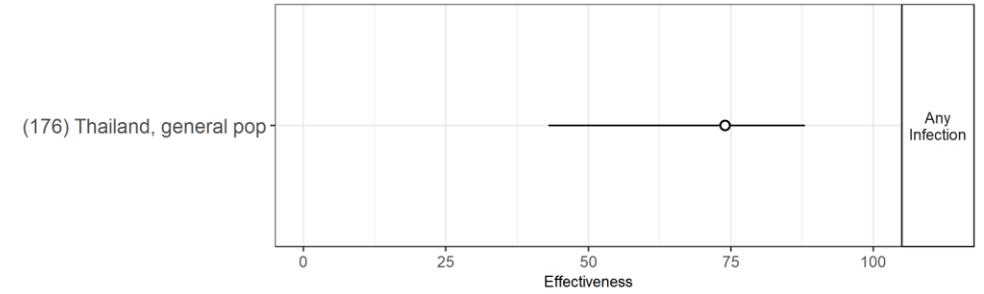
Heterologous AZD1222 (AstraZeneca) 1st dose plus BNT162b2 (Pfizer) 2nd dose Vaccine Effectiveness
(ref no) country, population



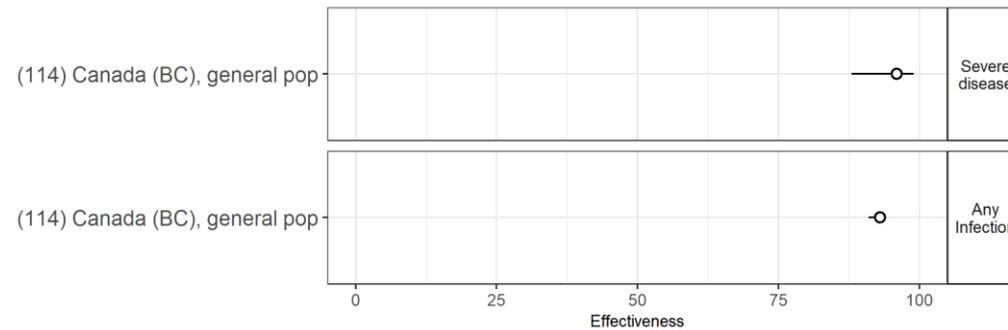
Heterologous AZD1222 (AstraZeneca) 1st dose plus BNT162b2 (Pfizer) or mRNA-1273 (Moderna) 2nd dose Vaccine Effectiveness
(ref no) country, population



Heterologous CoronaVac (Sinovac) 1st dose plus AZD1222 (AstraZeneca) 2nd dose Vaccine Effectiveness
(ref no) country, population



Heterologous mRNA Vaccine Effectiveness
(ref no) country, population

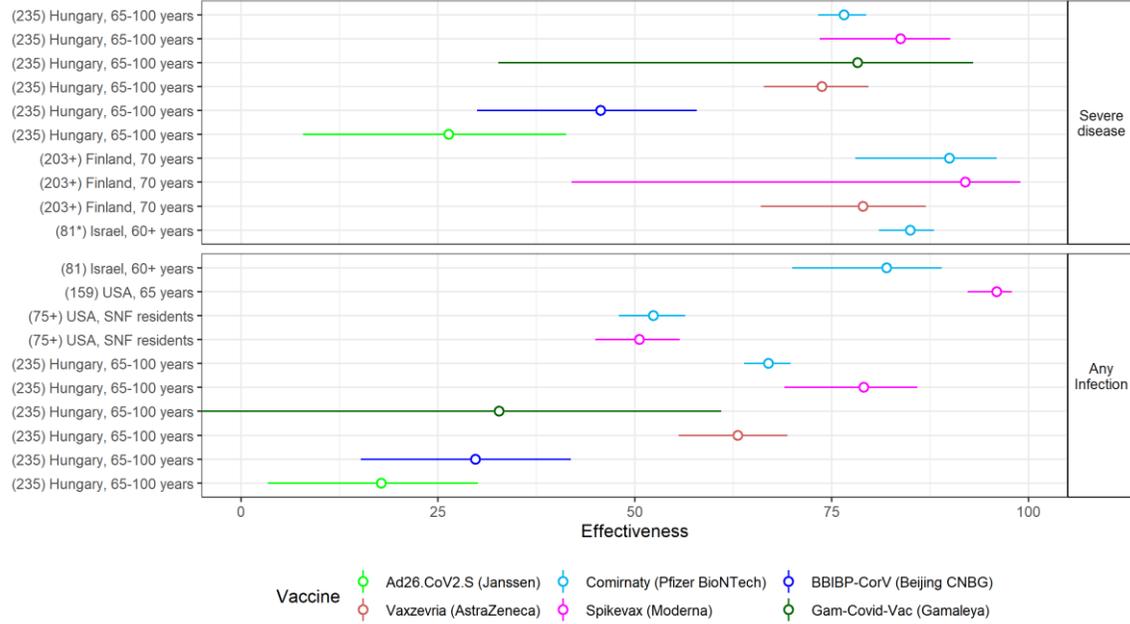


+ |

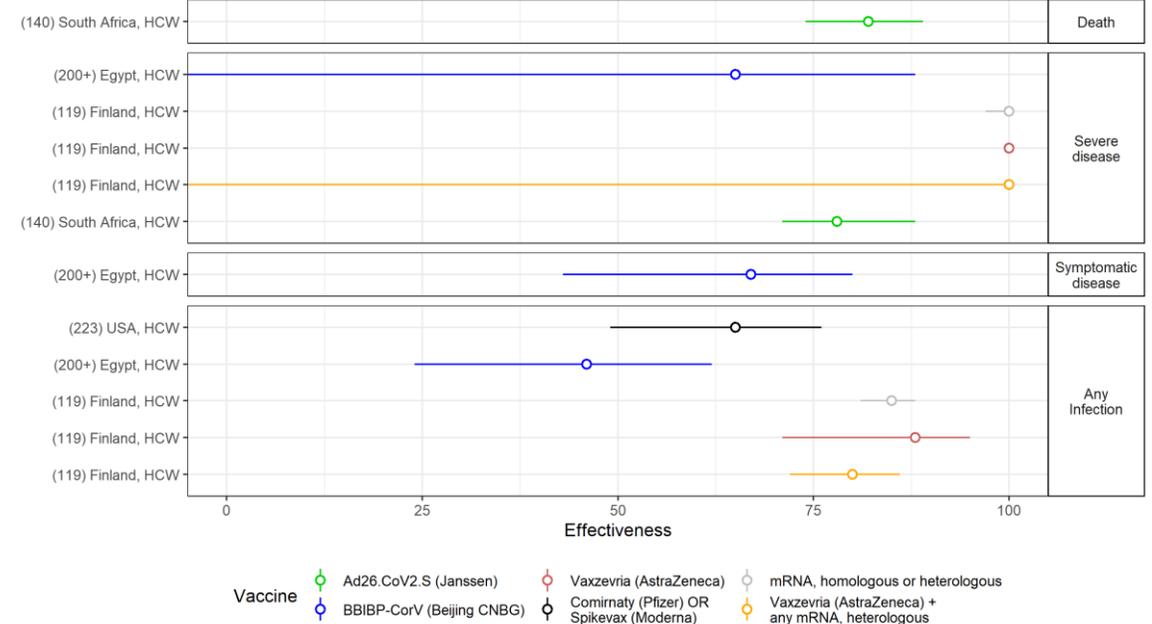
e.

BY STUDY POPULATION OF SPECIAL INTEREST

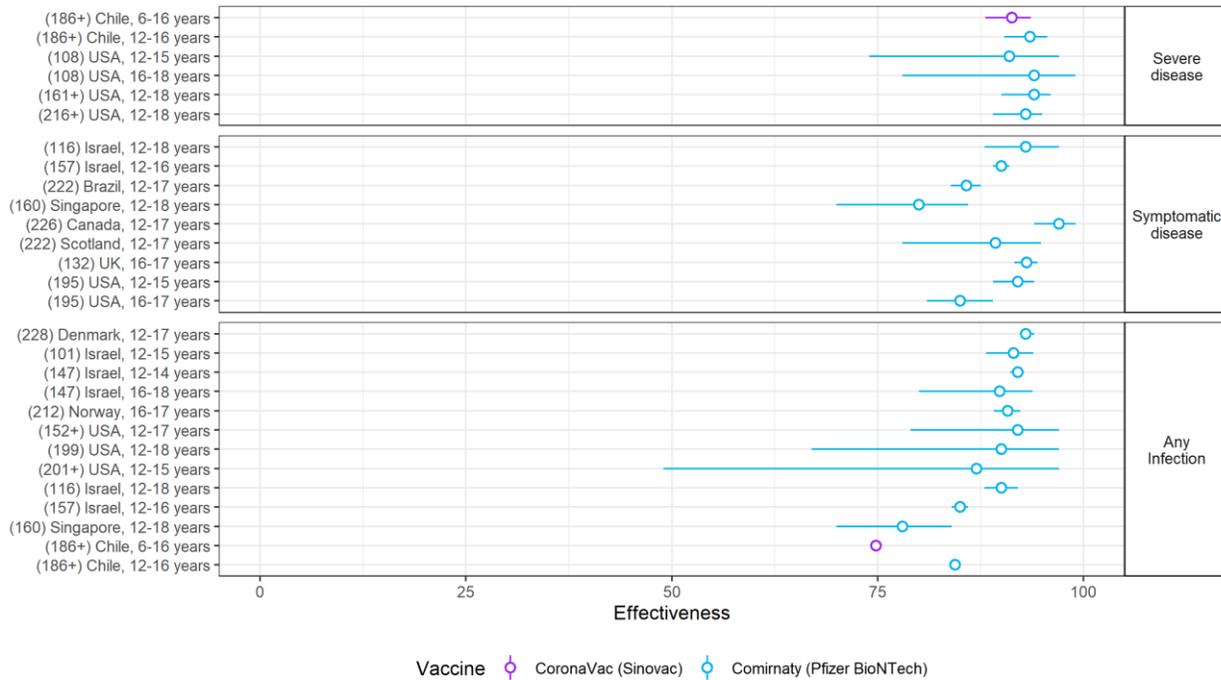
Primary Series Vaccine Effectiveness Among Older Adults/Skilled Nursing Facility Residents, Delta
(ref no) country, population



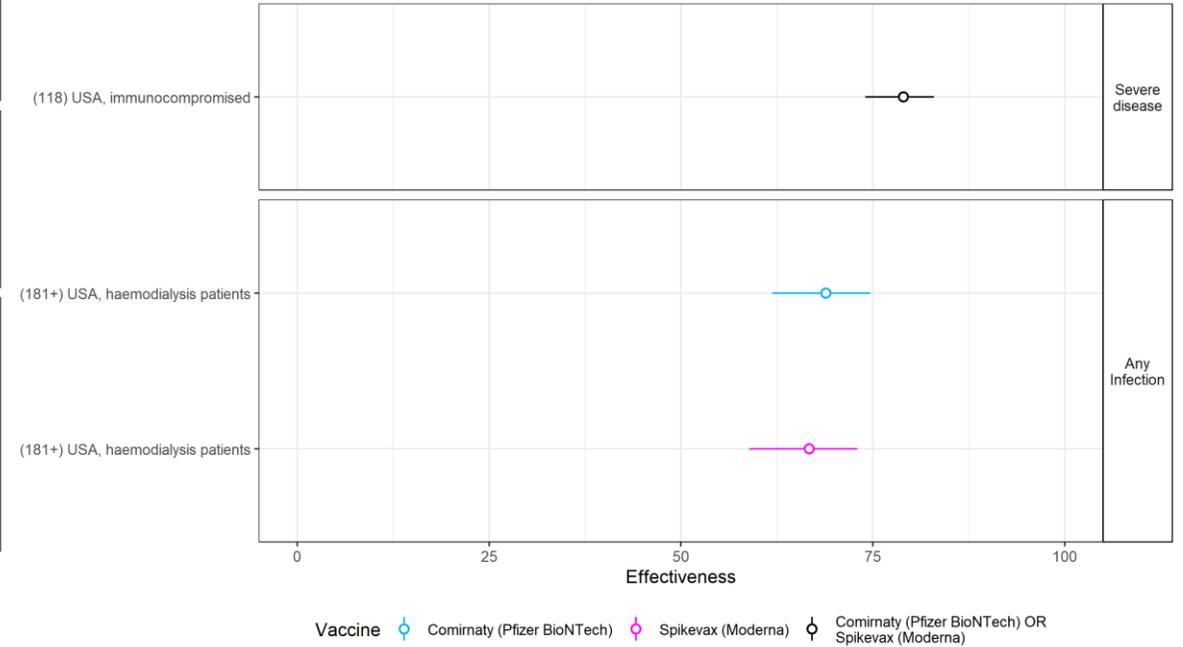
Primary Series Vaccine Effectiveness Among Healthcare Workers, Delta
(ref no) country, population



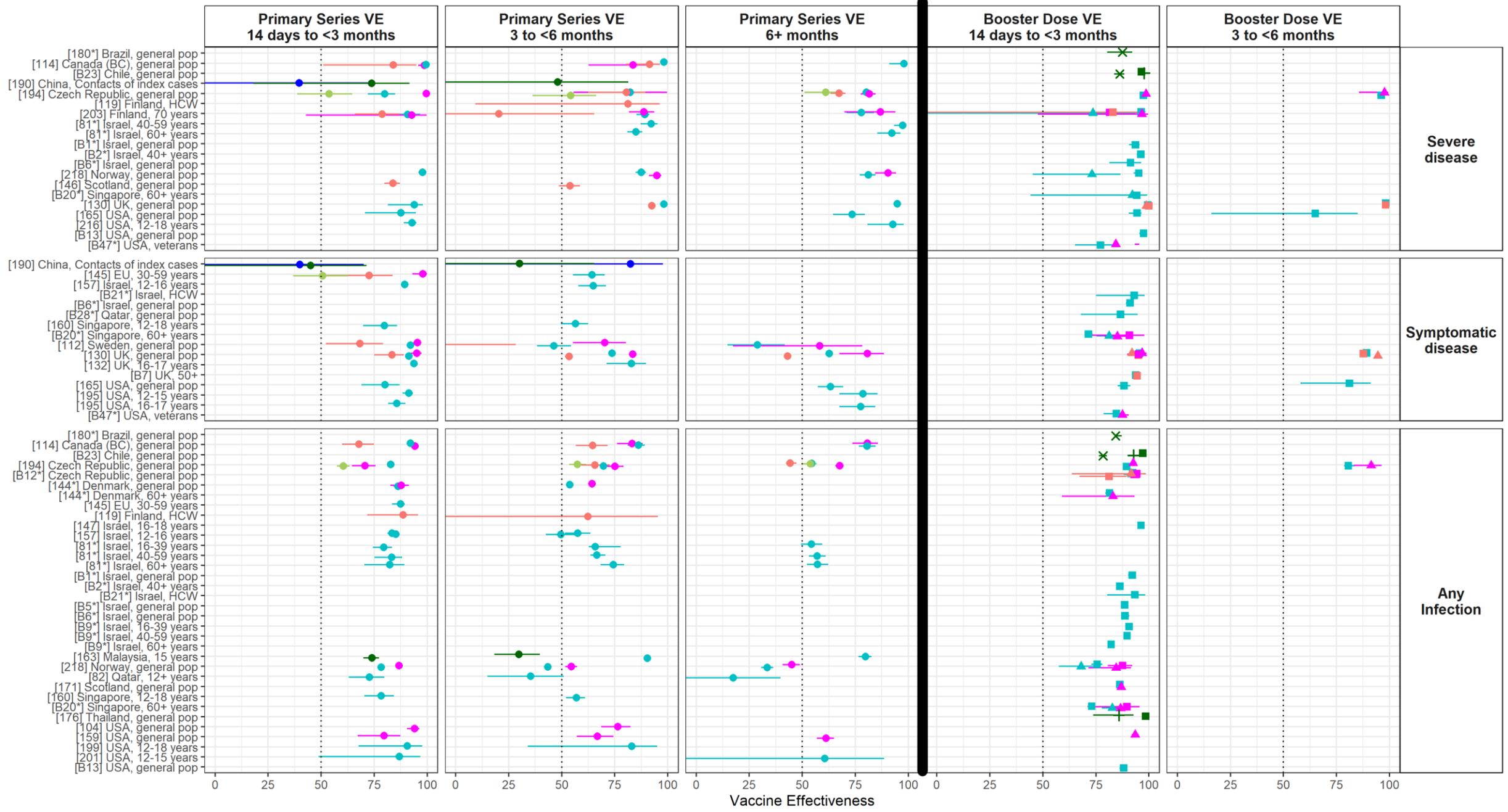
Primary Series Vaccine Effectiveness Among Children, Delta
(ref no) country, population



Primary Series Vaccine Effectiveness Among Immunocompromised Persons, Delta
(ref no) country, population



DURATION OF VACCINE EFFECTIVENESS AGAINST DELTA



Primary Series Vaccine

- AstraZeneca-Vaxzevria
- Moderna-Spikevax
- Sinovac-CoronaVac
- Janssen-Ad26.COVS.2.S
- Pfizer BioNTech-Comirnaty
- Beijing CNBG-BBIBP-CorV

Booster Vaccine

- No booster (Primary Series only)
- AstraZeneca-Vaxzevria
- Moderna-Spikevax
- Pfizer BioNTech-Comirnaty
- Sinovac-CoronaVac

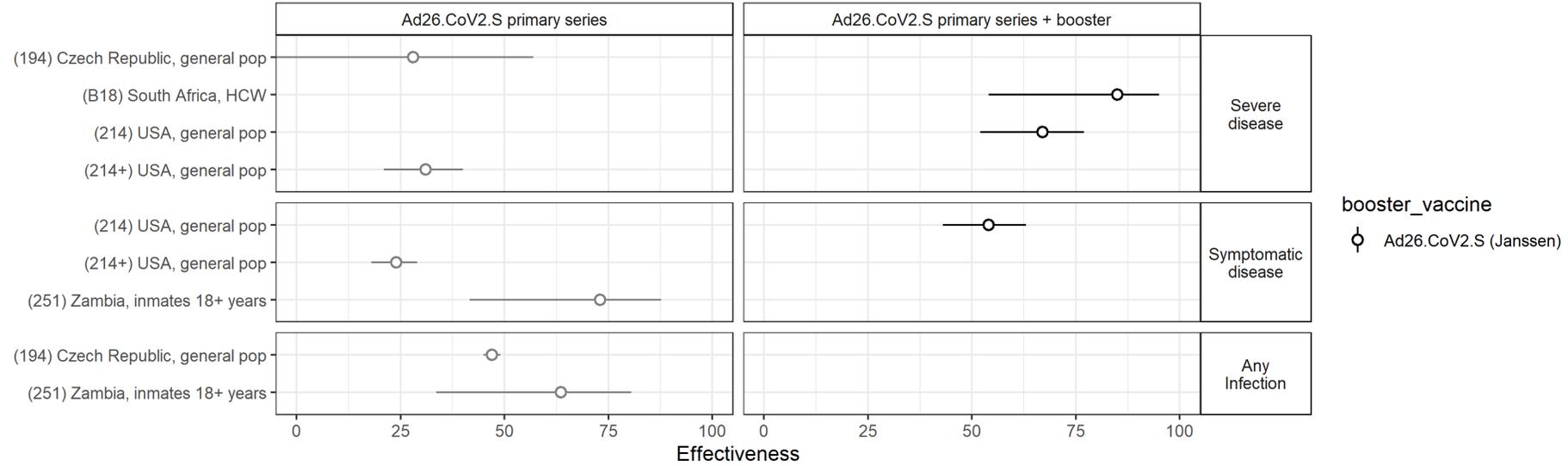
*Reference group is fully vaccinated with two doses.

OMICRON VARIANT OF CONCERN

BY VACCINE

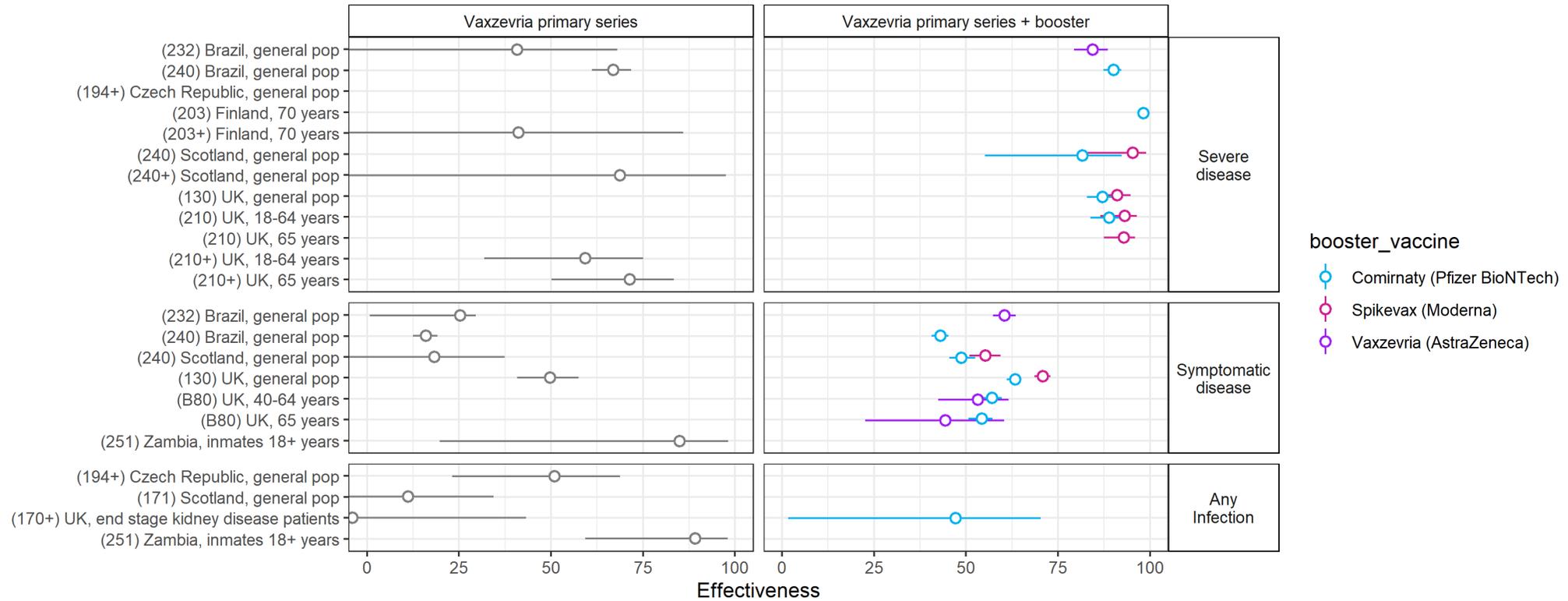
Ad26.CoV2.S (Janssen) Primary Series + Booster Vaccine Effectiveness, Omicron Variant

(ref no) country, population

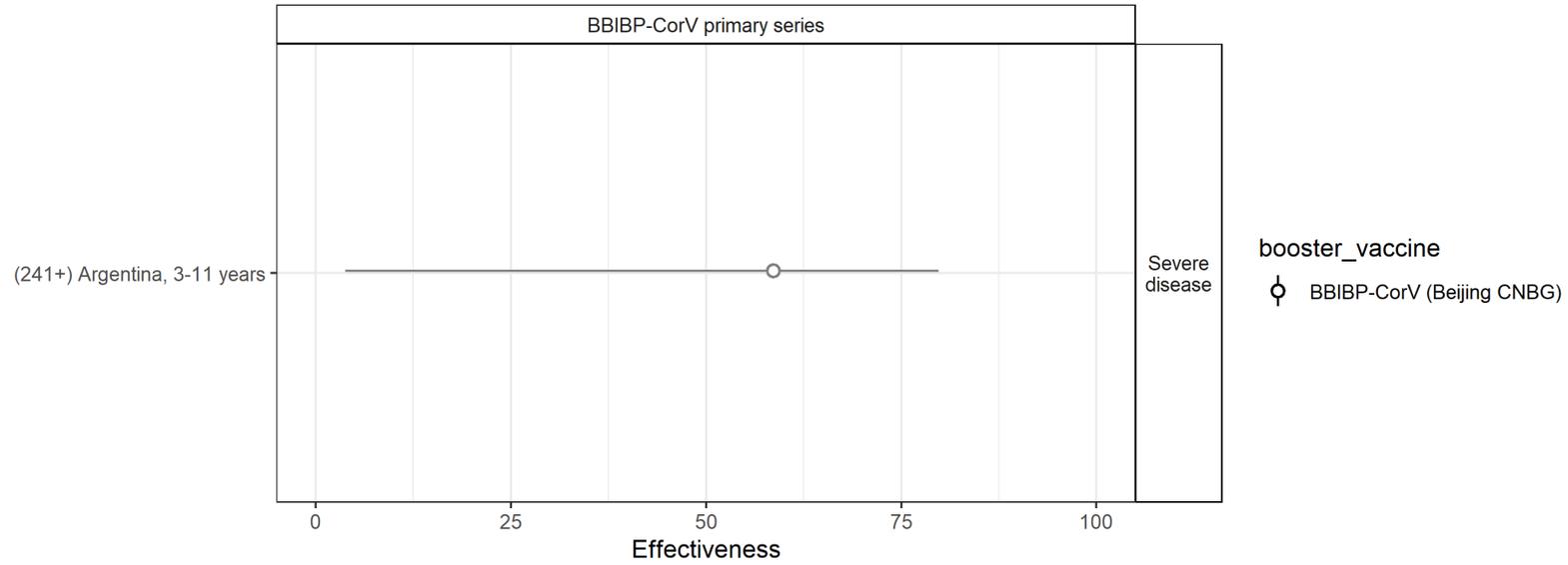


Vaxzevria (AstraZeneca) Primary Series + Booster Dose Vaccine Effectiveness, Omicron Variant

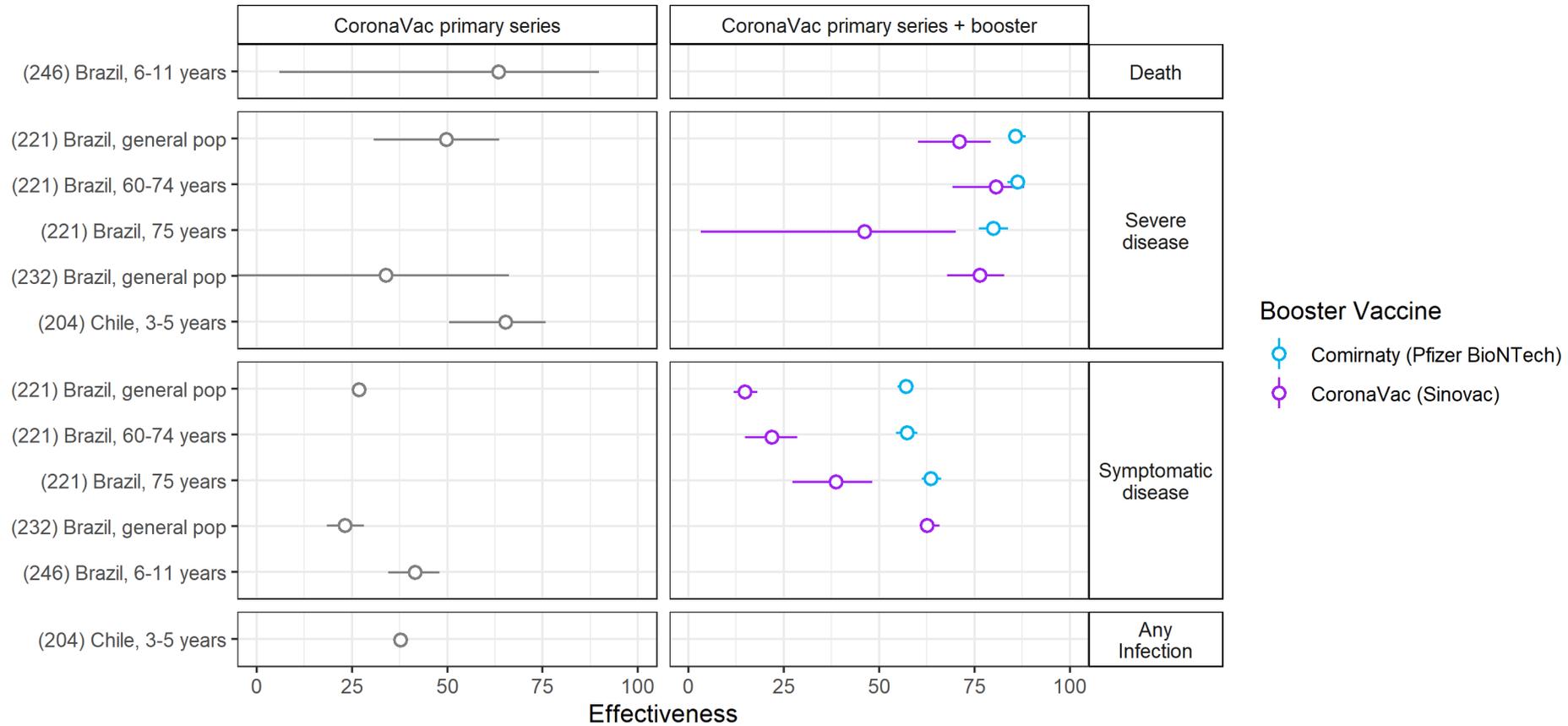
(ref no) country, population



BBIBP-CorV (Beijing CNBG) Primary Series Vaccine Effectiveness, Omicron Variant
(ref no) country, population

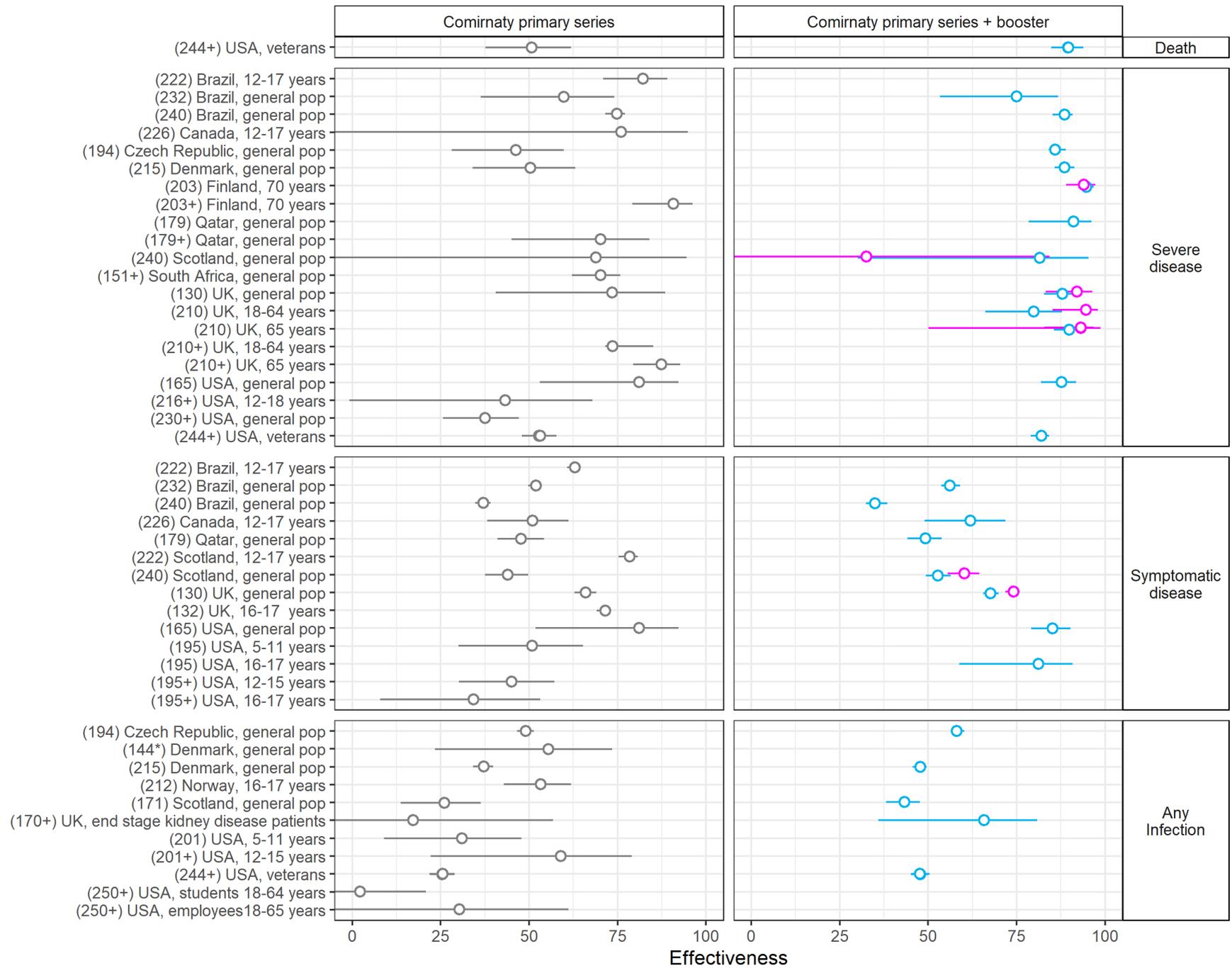


CoronaVac (Sinovac) Primary Series and Booster Dose Vaccine Effectiveness, Omicron
(ref no) country, population



Comirnaty (Pfizer BioNTech) Primary Series + Booster Dose Vaccine Effectiveness, Omicron Variant

(ref no) country, population

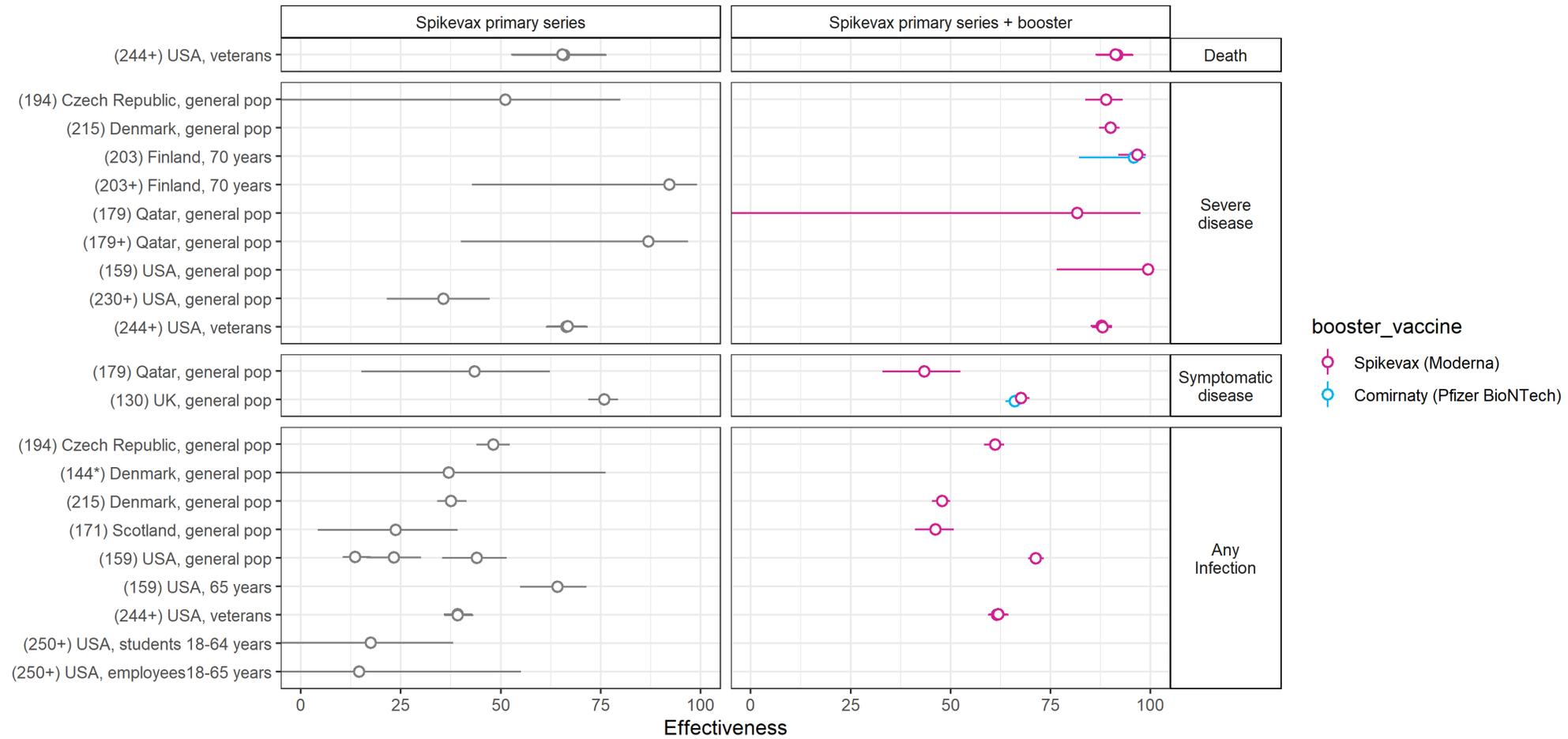


booster_vaccine
 ○ Comirnaty (Pfizer BioNTech)
 ○ Spikevax (Moderna)

+ Indicates estimates that include a follow-up time extending beyond 4 months post final dose.

Spikevax (Moderna) Primary Series + Booster Dose Vaccine Effectiveness, Omicron Variant

(ref no) country, population

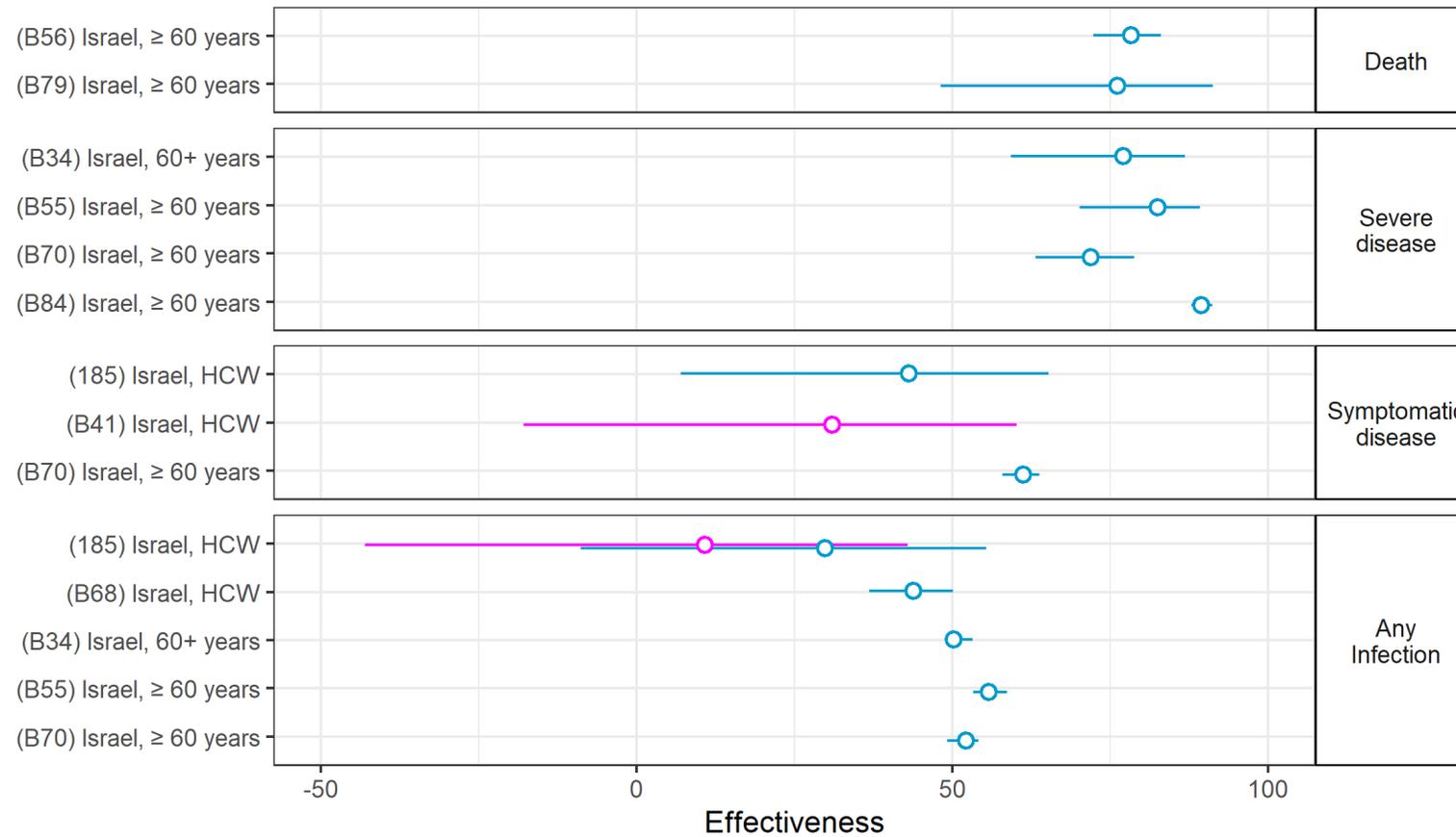


+ Indicates estimates that that include a follow-up time extending beyond 4 months post final dose.

SECOND BOOSTER DOSE VACCINE EFFECTIVENESS AGAINST OMICRON

Relative* Vaccine Effectiveness of a Second Booster dose, Omicron

(ref no) country, population



*All studies evaluated VE of a 2nd booster relative to 3 doses of Comirnaty (Pfizer BioNTech)

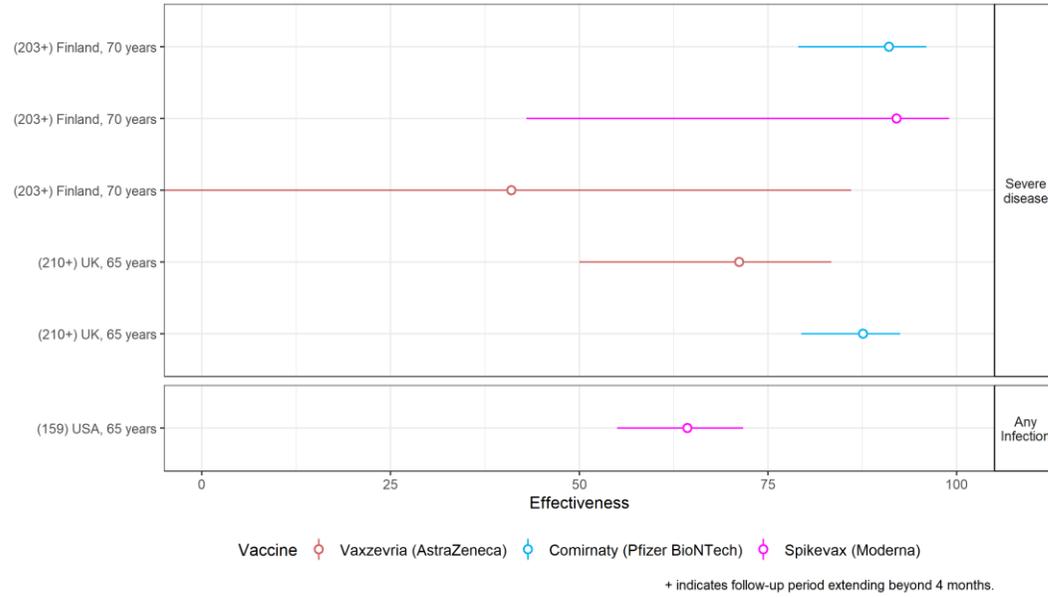
2nd Booster Vaccine

- Comirnaty (Pfizer BioNTech)
- Spikevax (Moderna)

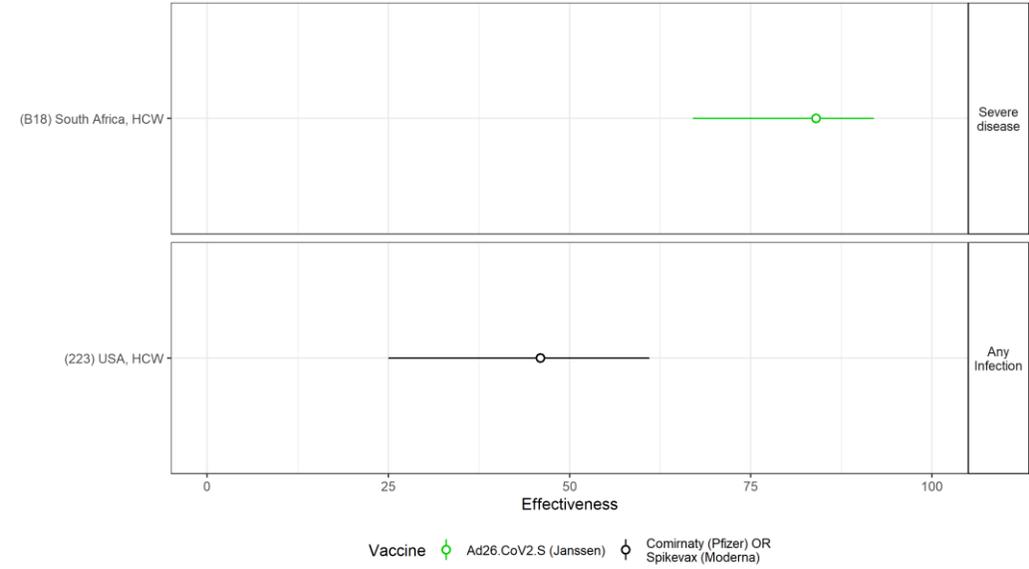
+ Indicates estimates that include a follow-up time extending beyond 4 months post final dose.

BY STUDY POPULATION OF SPECIAL INTEREST

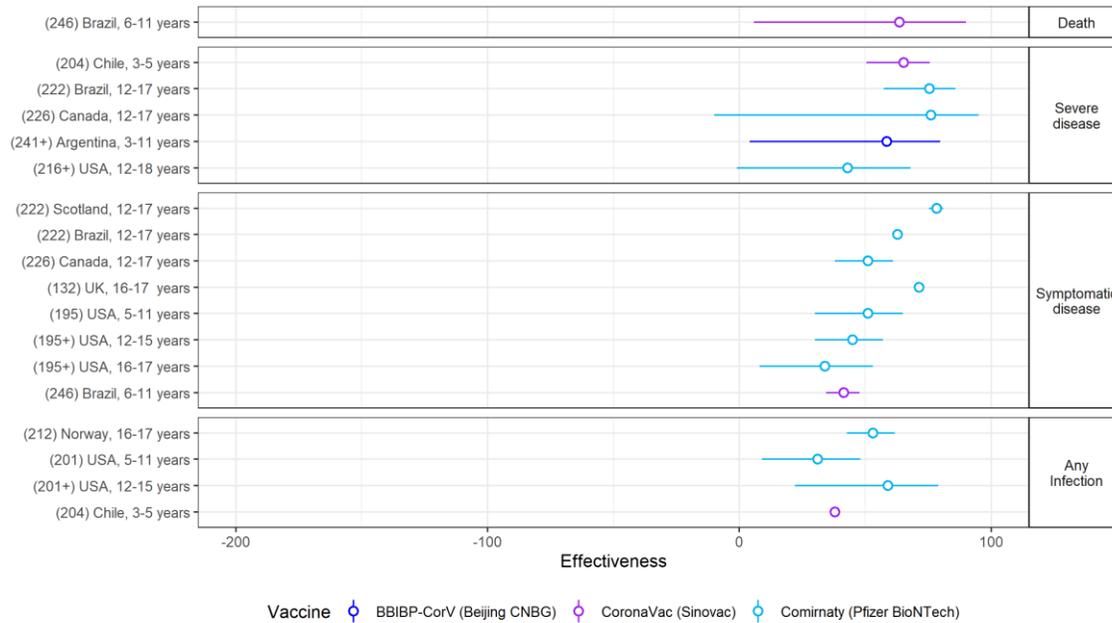
Primary Series Vaccine Effectiveness Among Older Adults/Skilled Nursing Facility Residents, Omicron
(ref no) country, population



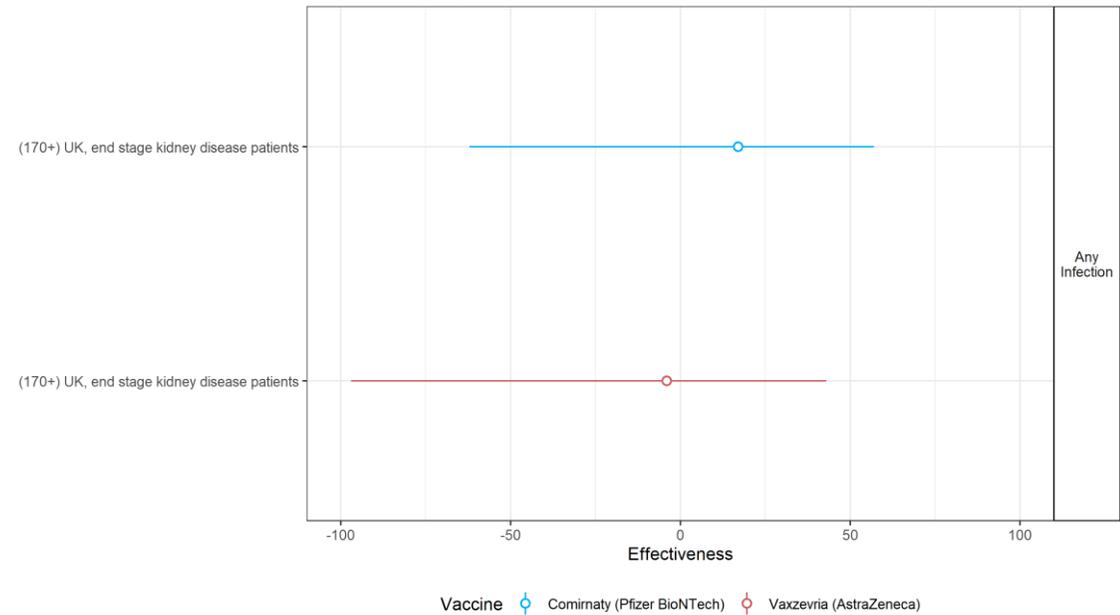
Primary Series Vaccine Effectiveness Among Healthcare Workers, Omicron
(ref no) country, population



Primary Series Vaccine Effectiveness Among Children, Omicron
(ref no) country, population



Primary Series Vaccine Effectiveness Among Immunocompromised Persons, Omicron
(ref no) country, population



DURATION OF VACCINE EFFECTIVENESS AGAINST OMICRON

