



COVID-19 vaccine effectiveness against Severe Acute Respiratory Infections (SARI) Test Negative Design

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12–13 November 2023 | Cairo, Egypt



COVID-19 situation in Jordan



COVID-19 Statistical report - Jordan

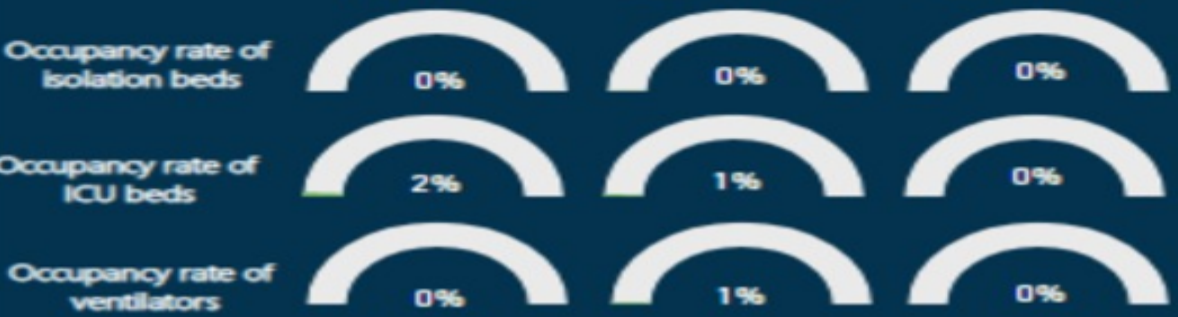
Epi. Week No.23 (04 June - 10 June) 2022



COVID-19 Vaccine

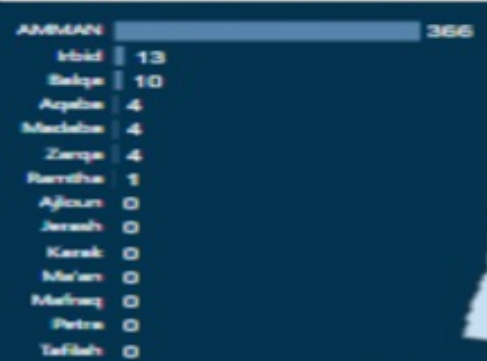
Hospitals Capacity for COVID-19 Cases

North Region Center Region South Region



Communicable Diseases Directorate

Distribution of COVID-19 cases



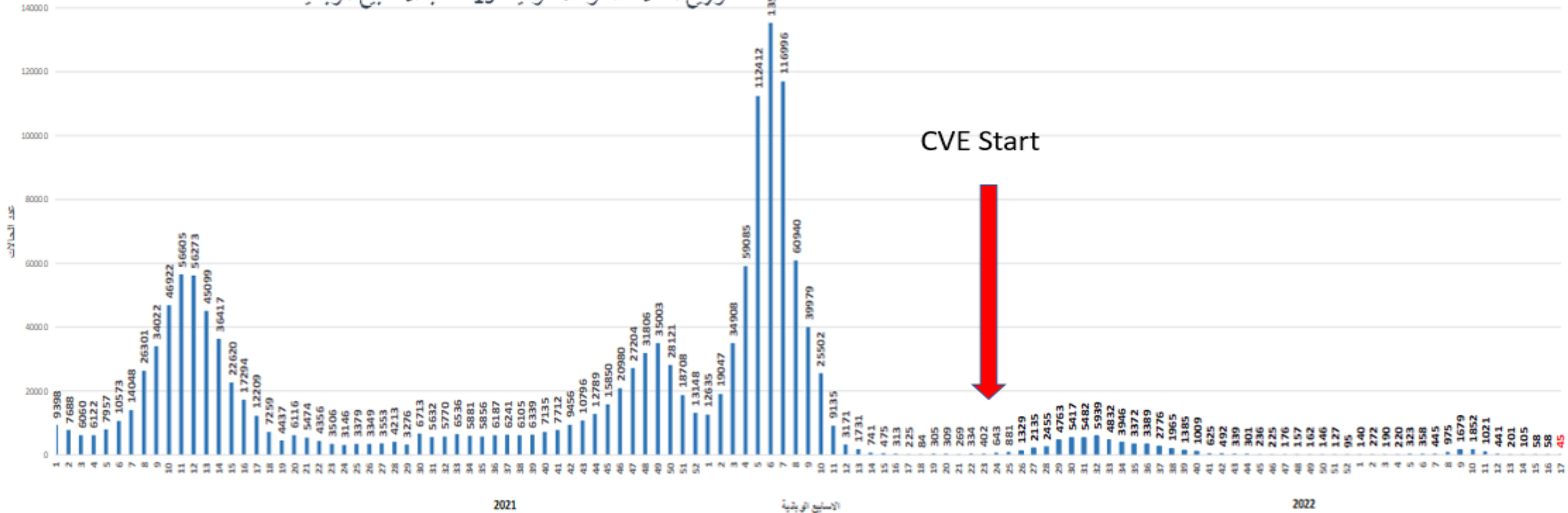
Directorate of Electronic Transformation and Information Technology



COVID-19 situation in Jordan

احصائية الكوفيد-19 في الأردن

الأسبوع الوبائي رقم 17 من عام 2023 من 22- 28 نيسان
توزيع الحالات المؤكدة لكوفيد-19 حسب الاسبوع الوبائية





COVID-19 vaccine policy

- Phased distribution plans
- Expansion to above the age of 12 years (75% of the target population)
- Four different types of vaccines (BioNTech-Pfizer, Sinopharm, Oxford/Astrazenca and Sputnik.V)
- Booster dose
- Inclusion of 5-11 years to the vaccine target population

SARI surveillance system in Jordan

- Established in 2008
- Four sentinel sites
- Goal: minimizing the impact of influenza and rapid implementation of appropriate prevention and control
- Using the 2014 WHO SARI case definition
- Inclusion of SARS-CoV-2 testing, starting in the 36th epidemiological week of 2020



Primary objective

To estimate the overall COVID-19 vaccine effectiveness (CVE) against laboratory-confirmed SARS-CoV-2 in hospitalized SARI patients belonging to the target group(s) for COVID-19 vaccination



Secondary objectives

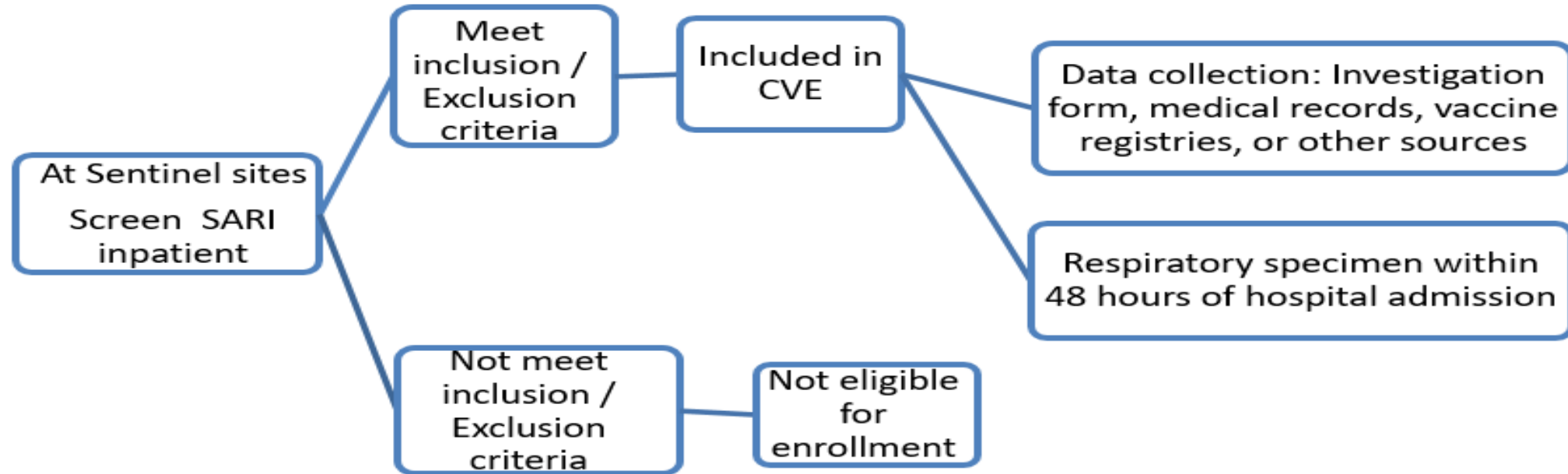
- To estimate CVE against laboratory-confirmed SARS-CoV-2 requiring hospitalization among SARI patients in COVID-19 vaccine target groups by:
 - COVID 19 vaccination status
 - To estimate CVE for more severe outcomes (e.g. ICU admission, or in-hospital mortality)
 - To compare CVE for :
 - Different age groups
 - Kinds of vaccines
 - Time since vaccination

Methods: Study characteristics

Study design	Test negative case control design
Study population	SARI patients in a hospital that is part of the SARI surveillance network
Start period	4-6-2022 to 4-6-2023
Sample size (cases vs controls)	909/1818



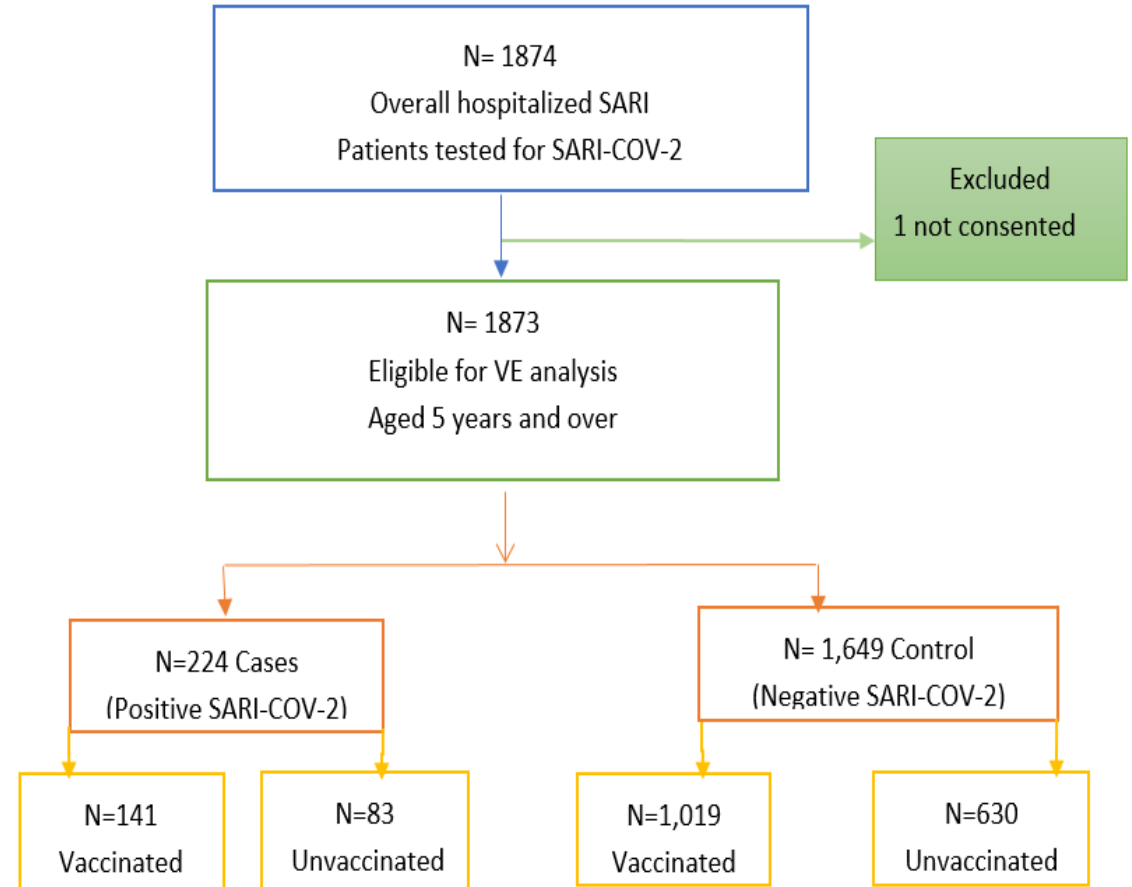
Methods: Enrollment and laboratory testing



- ✓ Nasopharyngeal and/or throat specimen was taken within 48 hours of hospital admission
- ✓ SARS-CoV-2 infection was laboratory-confirmed by RT-PCR documented either within 48 hours of admission to hospital or within 14 days before admission

Methods: Data management

- WHO standardized questionnaire was used
- Electronic data collection from different sources (EMR, patient/physician interviews.....)
- Data validation, cleaning and verification were carried out locally and supported regionally



Methods: Statistical analysis

- Description of cases and controls
- The measure of association was odds ratio (OR)
- The CVE was computed as $(1 - OR) * 100$. 95 % CI
- Univariable and multivariable multilevel logistic regression analysis was carried out
- Stratified analysis was conducted by age group, duration since last dose and types of vaccines



Results



Variables	Total N=1,873	cases /total n (%) n=224 (11.96)	controls/total n (%) n=1,649 (88.04)	P-value*
Age, median (IQR)	56 (36-71)	64 (49-76)	55 (34-70)	<0.001
Age groups				<0.001
5-16 years	186 (9.9)	4 (1.8)	182 (11.0)	<0.001
17-49 years	566 (30.2)	58 (25.9)	508 (30.8)	
50-64 years	459 (24.5)	52 (23.2)	407 (24.7)	
≥ 65 years	662 (35.3)	110 (49.1)	552 (33.5)	<0.001
Sex				
Female	926 (49.4)	101 (45.1)	825 (50.0)	
Male	947 (50.6)	123 (54.9)	824 (50.0)	
Presence of any chronic condition				0.035
No	430 (23.0)	39 (17.4)	391 (23.7)	
Yes	1,443 (77.0)	185 (82.6)	1,258 (79.3)	
Hospital				<0.001
KAUH	851 (45.4)	114 (50.9)	737 (44.7)	
Karak	422 (22.5)	38 (17.0)	384 (23.3)	
PHH	322 (17.2)	62 (27.7)	260 (15.8)	
Zarqa	278 (14.8)	10 (4.5)	268 (16.3)	

* Chi-squared test was used to compare categorical variables; rank sum test was used to compare continuous variables (age)

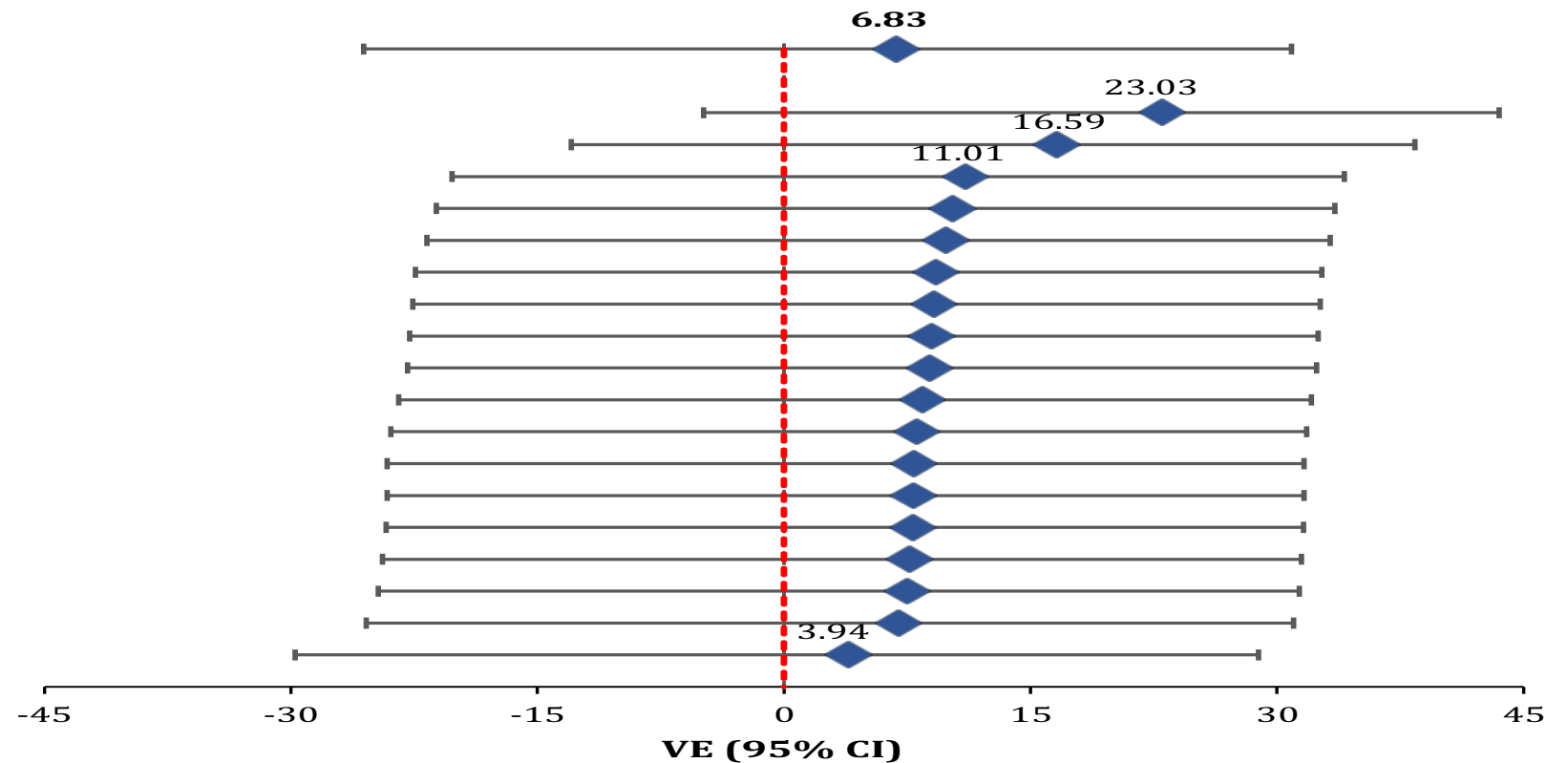
Results

Variables	Total N=1,873	cases /total n (%) n=224 (11.96)	controls /total n (%) n=1,649 (88.04)	P-value
COVID-19 vaccination				
Unvaccinated	713 (38.1)	83 (37.1)	630 (38.2)	0.054
Partially	61 (3.3)	7 (3.1)	54 (3.3)	
Fully	1,099 (58.7)	134 (59.8)	965 (58.5)	
Booster	141 (7.5)	24 (10.7)	117 (7.1)	
Type of vaccine (as 2st dose) (fully vaccinated)				
Pfizer	552 (50.2)	61 (45.5)	491 (50.9)	
AstraZeneca	109 (9.9)	16 (11.9)	93 (9.6)	
Sinopharm	433 (39.4)	57 (42.5)	376 (39.0)	
Sputnik	5 (0.5)	0	5 (0.5)	
Duration since the last vaccination dose				
<6 months	39 (3.4)	7 (5.0)	32 (3.1)	
6-12 months	295 (25.4)	39 (27.5)	256 (25.1)	
12-18 months	517 (44.7)	58 (41.1)	459 (45.0)	
>18 months	309 (26.6)	37 (26.2)	272 (26.7)	
ICU admission				
No	1,529 (81.6)	177 (79.0)	1,352 (82.0)	0.001
Yes	344 (18.4)	47 (21.0)	297 (18.0)	
Hospital based mortality				
No	1,720 (91.8)	193 (86.2)	1,527 (92.6)	0.001
Yes	153 (8.2)	31 (13.8)	122 (7.4)	

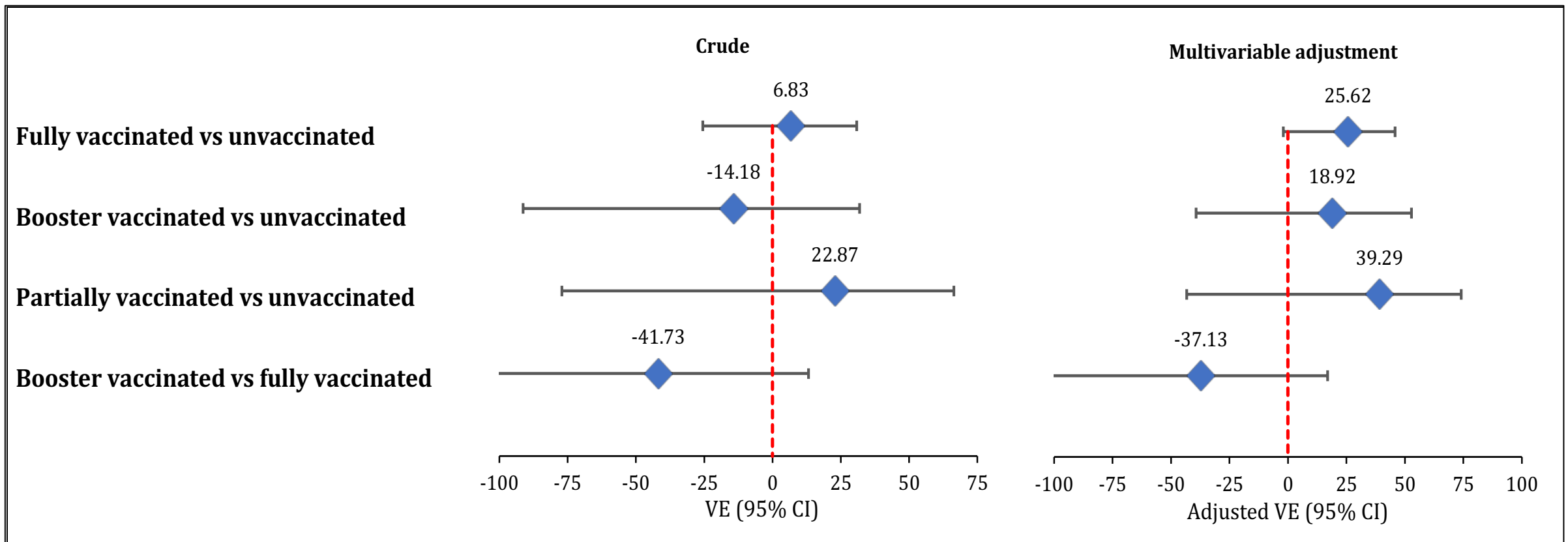
Results: Crude and univariable analysis for the effectiveness of fully vaccinated compared to unvaccinated

Crude
Adjusted to

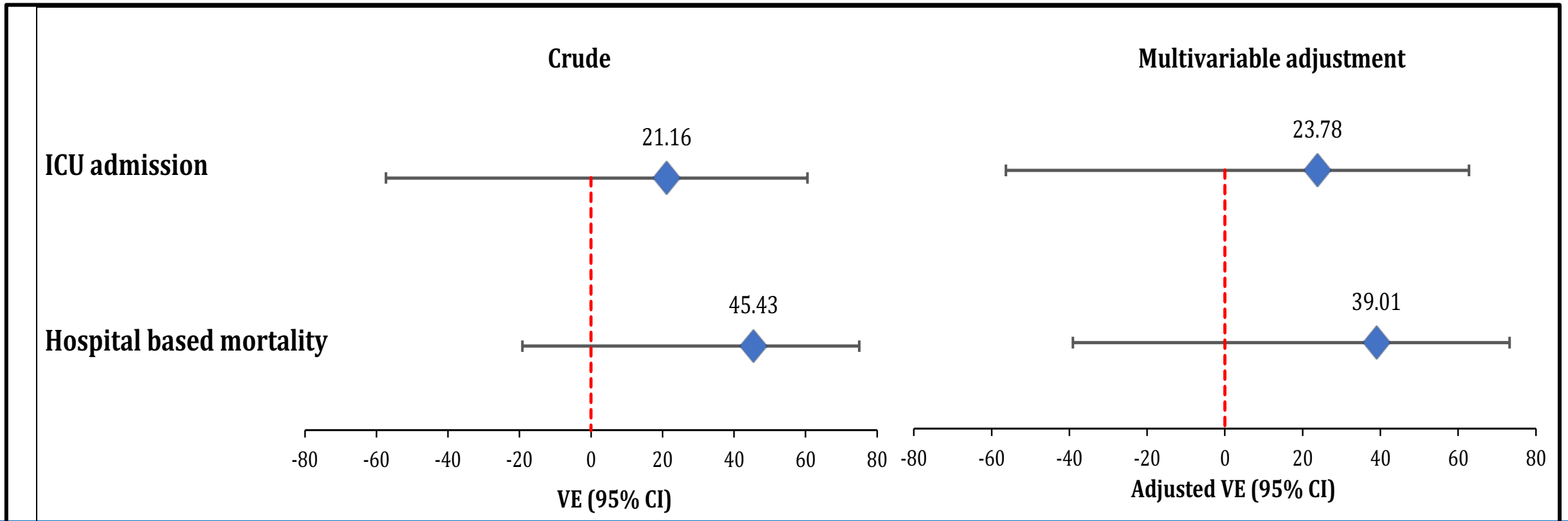
- Age groups
- Onset week
- Hypertension
- Heart diseases
- sex
- Asthma
- Diabetes
- Lung diseases and asthma
- Obese
- Any chronic condition
- Cancer
- Anaemia
- Renal diseases
- Lung diseases
- Rheumatological diseases
- Immunodeficiency
- Liver diseases
- Neuro disease



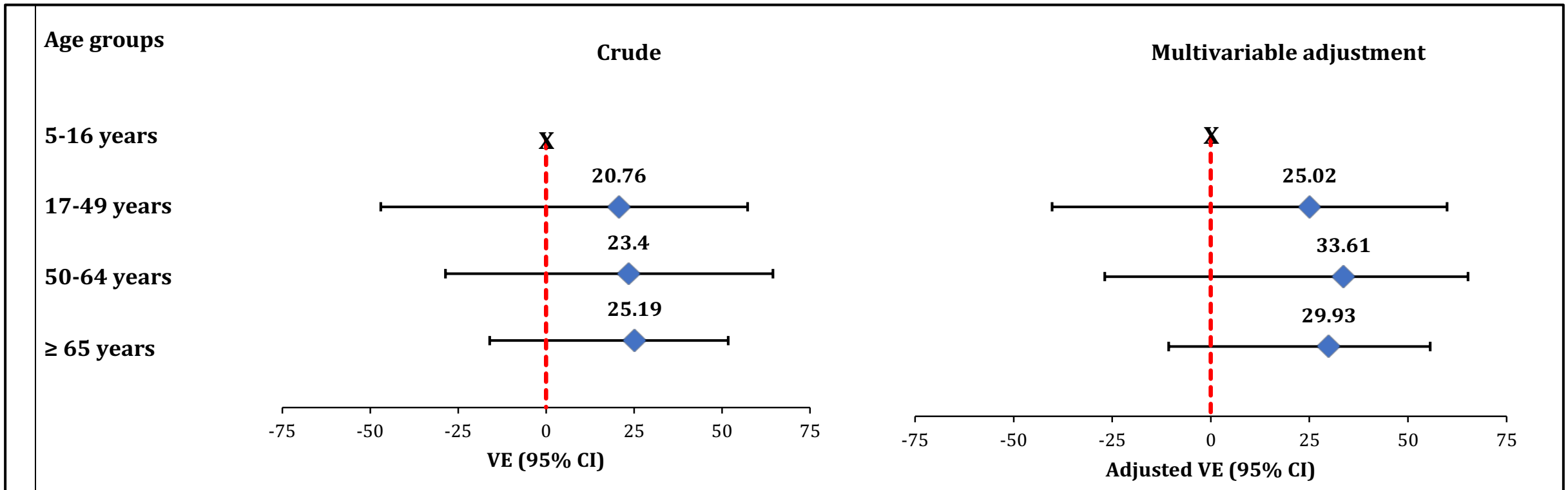
Crude and adjusted VE by Vaccination Status



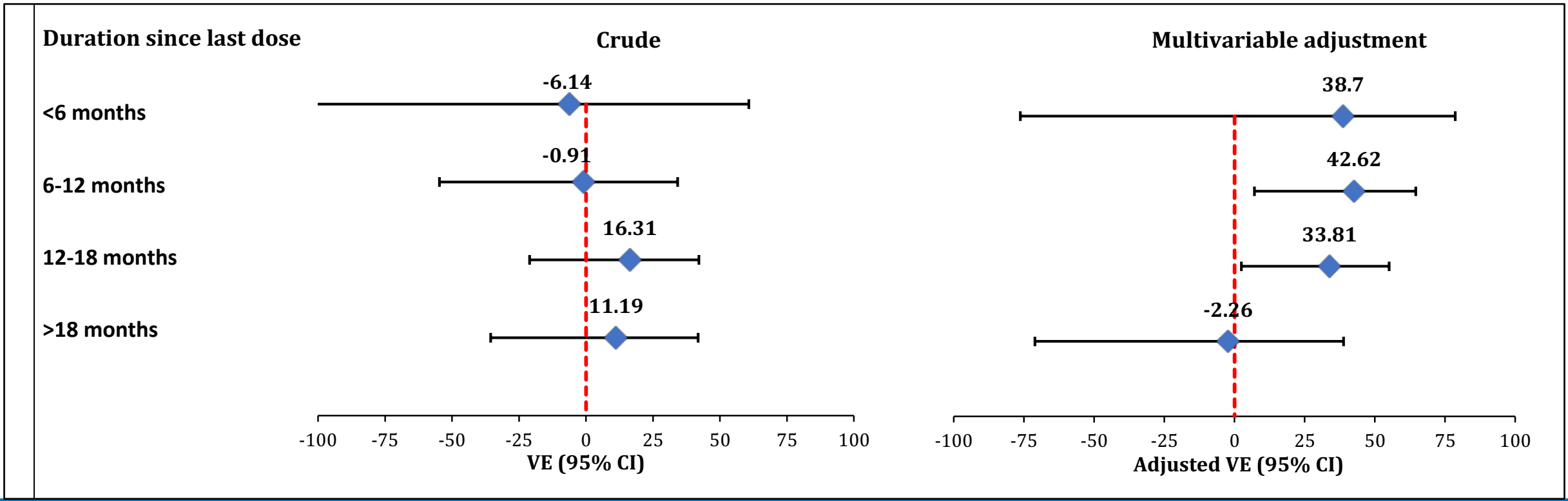
Vaccine effectiveness of fully vaccinated compared to unvaccinated on ICU admission and death among the cases



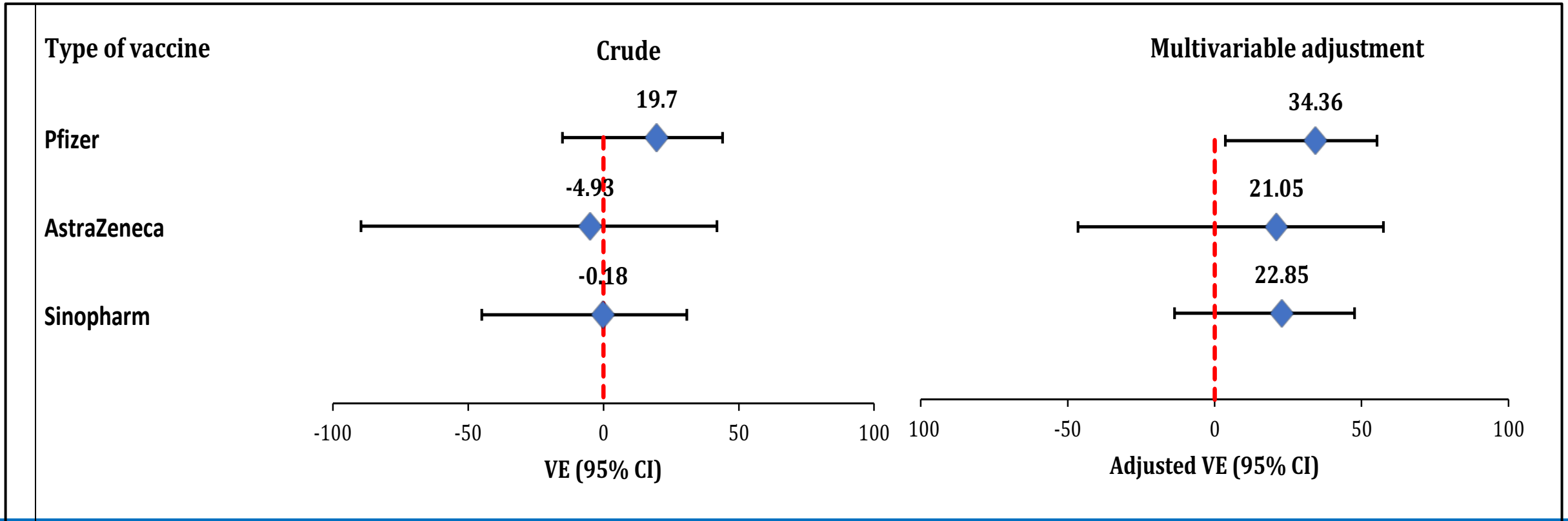
Stratified analysis: Effectiveness of a fully vaccinated compared to unvaccinated by age groups



Stratified analysis: Effectiveness of a fully vaccinated compared to unvaccinated by duration since last dose



Stratified analysis: Effectiveness of a fully vaccinated compared to unvaccinated by type of vaccine product received



Interpretation and limitations of VE estimates

- Receipt of COVID 19 vaccine provided protection against SARI associated with SARS-CoV-2.
- Low VE than other studies, vaccinated participants tended to have longer time delays between their most recent vaccine dose and symptom onset.
- Waning protection for vaccine against SARI with COVID 19, with a decline in protection of more than 6-12 months after the last vaccine dose.
- Vaccinated SARI patients with covid-19 experienced less severe outcomes than unvaccinated SARI patients with covid-19.
- Lower effectiveness for an inactivated vaccine (Sinopharm) compared with an mRNA vaccine (Pfizer)

Limitations

- COVID 19 epidemiological situation and low transmission of COVID 19 resulted in small sample size of cases and some subgroups that limited precision
- Omicron variant circulation during the study period lead to low admission rates
- More than 70% of the population had a period of 12 months and above since last vaccine dose
- Previous SARS-CoV-2 infection, which is associated with a degree of protection against reinfection, may have led to the lower vaccine effectiveness



Conclusion and recommendations

- Observed waning protection for vaccine against SARI with COVID 19 confirms the need of booster doses
- Additionally, mRNA vaccine (Pfizer) were more effective than inactivated vaccine (Sinopharm)
- Further studies with larger sample size are needed
- Use of this data as a comparison group against other population with lower time since last vaccine intake



The Hashemite Kingdom of Jordan
Ministry of Health

Thank you