Vaccine Effectiveness, Burden and Impact Studies (VEBIS) - Vaccine effectiveness and the impact of COVID-19 vaccines through routinely collected exposure and outcome data using health registries

First published: 04/04/2024

Last updated: 03/04/2025

Study Ongoing

Administrative details

EU PAS number

EUPAS1000000101

Study ID

1000000101

DARWIN EU® study

No

Study countries

- [ ] Belgium
- [ ] Denmark

- [ ] Luxembourg
- [ ] Norway
- [ ] Portugal
- [ ] Spain

Study description

A retrospective cohort was constructed from linked electronic health records (EHR) in each country. Country specific (level) relative VE (rVE) was estimated on a monthly basis, using a study period covering an eight-week follow-up period. Each month the study period was shifted forward to the following month. Country estimates were then pooled together. The study period covered in this report is April 2022 to March 2023. The rVE of first, second and third booster doses was estimated and compared to the VE of complete primary vaccination received at least 24 weeks ago (≥24 weeks).

Study status

Ongoing

Research institutions and networks

Institutions

European Centre for Disease Prevention and Control

EpiConcept

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Institution

Contact details

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Primary lead investigator

Esther Kiessling

Primary lead investigator

Study timelines

Date when funding contract was signed

Actual: 19/10/2021

Study start date

Actual: 28/01/2022

Date of final study report

Planned: 31/10/2025

Sources of funding

- Other

More details on funding

Funded by European Centre for Disease Prevention and Control

Study protocol

Protocol for a COVID-19 VE estimation using health data registries FINAL.pdf
(707.2 KB)

Regulatory

Was the study required by a regulatory body?

No

Is the study required by a Risk Management Plan (RMP)?

Not applicable

Methodological aspects

Study type

Study type list

Study topic:

Human medicinal product

Study type:

Non-interventional study

Scope of the study:

Effectiveness study (incl. comparative)

Data collection methods:

Secondary use of data

Study design:

This is a retrospective cohort study using data collected routinely in EHR databases. A comparison of the risk of the severe outcomes (hospitalisation due to COVID-19 and COVID-19 related death), is done between individuals with different vaccination status.

Main study objective:

To measure VE of booster doses of COVID-19 vaccine, in resident populations living in the community aged ≥50 years in EU/EEA countries, against the following outcomes:

• Hospital admission due to COVID-19

• Death related to COVID-19.

The relative VE (rVE) of first, second or third booster was estimated compared to individuals with COVID-19 primary vaccination administered ≥ 24 weeks ago without a subsequent booster.

Study Design

Non-interventional study design

Cohort

Study drug and medical condition

Medicinal product name

BIMERVAX

COMIRNATY

JCOVDEN

NUVAXOVID

SPIKEVAX

VAXZEVRIA

Study drug International non-proprietary name (INN) or common name

COVID-19 MRNA VACCINE (NUCLEOSIDE-MODIFIED)

COVID-19 VACCINE (RECOMBINANT, ADJUVANTED)

DAVESOMERAN

ELASOMERAN

IMELASOMERAN

RAXTOZINAMERAN

TOZINAMERAN

Anatomical Therapeutic Chemical (ATC) code

(J07BN) Covid-19 vaccines

Covid-19 vaccines

(J07BN01) covid-19, RNA-based vaccine

covid-19, RNA-based vaccine

(J07BN02) covid-19, viral vector, non-replicating

covid-19, viral vector, non-replicating

(J07BN04) covid-19, protein subunit

covid-19, protein subunit

Medical condition to be studied

COVID-19

Population studied

Short description of the study population

The study population included individuals in the national vaccination plan and/or the reference population registries fulfilling the following criteria during each eight–week study period:

• Resident in any of the participating EU/EEA country at the beginning of each study period.
• Aged between 50 and 110 years at the beginning of each study period.
• Not living in nursing homes (if available, and according to last update of data).
• First vaccine dose received at a time when it was recommended for the corresponding age group (i.e., excluding individuals vaccinated before the start of the recommended period was in place for a target age group or, alternatively, for those countries with no clearly defined recommended start date by age, the first 5% of persons vaccinated within each age-group –for each five-year age category- as these first vaccinees may not be representative of their corresponding age group).
• Completed primary COVID-19 vaccination series ≥24 weeks ago.
• Do not have inconsistent or missing data on vaccination (vaccination status unknown, any vaccination date is unknown, any vaccine brand is unknown, number of doses is unknown, interval between first and second dose is shorter than 19 days, interval between complete vaccination and booster dose or between booster doses is shorter than 90 days, number of doses higher than recommended, receive any vaccine brand not approved by EMA, and the combination of vaccine brands is not a recommended schedule by national public health authorities may vary by age group).

Age groups

- Adults (46 to < 65 years)

- Elderly (≥ 65 years)
    - Adults (65 to < 75 years)
    - Adults (75 to < 85 years)
    - Adults (85 years and over)

Estimated number of subjects

14000000

Study design details

Setting

The study was carried out in six EU/EEA countries: Belgium, Denmark, Luxembourg, Spain (Navarre), Norway, Portugal, representing close to 14 million people ≥50 years.

Outcomes

Outcomes of interest are defined as:
Hospital admission due to COVID-19:
- Admission to hospital in which COVID-19 is the main diagnosis in the admission or discharge record (for example, based on International Classification of Diseases (ICD) coding or similar);
OR,
- Admission to hospital in which admission criteria are compatible with SARI (based on similar criteria as in SARI surveillance, ICD coding or similar) AND with a laboratory-confirmed SARS-CoV-2 infection ≤14 days before admission or up to 24 hours after admission.
COVID-19 related death:
- death for which COVID-19 is recorded as the cause of death;
OR, if cause of death not available,

- laboratory-confirmed SARS-CoV-2 infection with death within 30 days after a positive test.

For each outcome, the censoring date of the outcome occurrence (date of the event of interest) was the earliest among the date of hospital admission or death, and the date of the laboratory diagnosis (i.e. the date of the first diagnosis of the infection episode that resulted in hospital admission or death).

Data analysis plan

Vaccination status was a time-changing variable defined at the beginning of the eight-week study period.

Individuals for which vaccination status changed during the follow-up period were censored without an event reported in the vaccination status group they left, and were recorded as a delayed entry into the new vaccination status group, on the date their vaccination status changed.

Individuals were then followed up until the earliest date of:

• Event of interest, with date of outcome as previously defined;

• Death from any cause (on the date of death);

• Discontinuation in the administrative database (i.e. emigration);

• Administrative censoring (eight weeks after the start of the observation period).

Cox regression with calendar time as the underlying time scale was used to estimate hazard ratios (HRs) of defined outcomes among the group with the vaccine status of interest compared to the reference vaccination status group. Vaccine effectiveness was defined as VE = (1-HR) x 100. To estimate the rVE of booster doses compared to primary vaccination we used complete primary vaccination series ≥24 weeks ago without a subsequent booster as the reference group.

Cox regression models were adjusted by age, sex geographical region (if applicable to the study site), previous infection, comorbidities, socioeconomic

variables or others as available and relevant at each study site.

See protocol.

Documents

Interim analysis of COVID-19 vaccine effectiveness against hospitalisation and ...

Data management

ENCePP Seal

The use of the ENCePP Seal has been discontinued since February 2025. The ENCePP Seal fields are retained in the display mode for transparency but are no longer maintained.

Data sources

Data sources (types)

Electronic healthcare records (EHR)

Laboratory tests and analyses

Other

Data sources (types), other

Data will be extracted from different EHR databases:

- Databases including COVID-19 laboratory-confirmed infection;

- Epidemiological surveillance databases (for notifiable diseases);

- Primary healthcare consultation; Hospital admission/discharge;
- Death or mortality registers which record the cause of death.

Use of a Common Data Model (CDM)

CDM mapping

No

Data quality specifications

Check conformance

Unknown

Check completeness

Unknown

Check stability

Unknown

Check logical consistency

Unknown

Data characterisation

Data characterisation conducted

No