

ESTIMATED NUMBER OF COVID-19 DEATHS AVERTED BY VACCINATION IN BELGIUM

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Objective

- Vaccination campaigns have been rolled out globally in order to limit the impact of COVID-19 on severe health outcomes, including mortality.
- To calculate **Vaccine effectiveness** against COVID-19 mortality and to estimate the number of **averted deaths** by COVID-19 vaccination
 - in the Belgian population aged ≥ 65 years
 - between January 2021 and January 2023.



Method to estimate vaccine effectiveness against COVID-19 mortality

- We defined a proxy for COVID-19 death = a person tested positive in
 - the first week of the month, and died within the same month
 - in the second, third or fourth week of the month and died within the same or the following month
- Using a Cox proportional hazard model
 - Events = proxy for COVID-19 deaths
 - Comparing recently vaccinated persons, classified into time intervals since vaccination (0-2, 2-4, 4-6 months), to those unvaccinated or vaccinated a longer time ago
 - Adjusted for sex, age, previous infection, comorbidities, province and income
 - Stratified per age group and per variant period

Method to estimate number of averted deaths by vaccination

Formula is based on an adapted method developed by Machado et al

$$\text{Averted deaths}_{w, \text{vacc}} = \text{Deaths Reported}_w * \frac{VC_{w, \text{vacc}} * VE_{\text{vacc}}}{1 - \sum_{\text{vacc}=1}^n VC_{w, \text{vacc}} * VE_{\text{vacc}}}$$

Deaths Reported: based on national surveillance of COVID-19 mortality

Vaccine Coverage: based on national surveillance of COVID-19 vaccine coverage

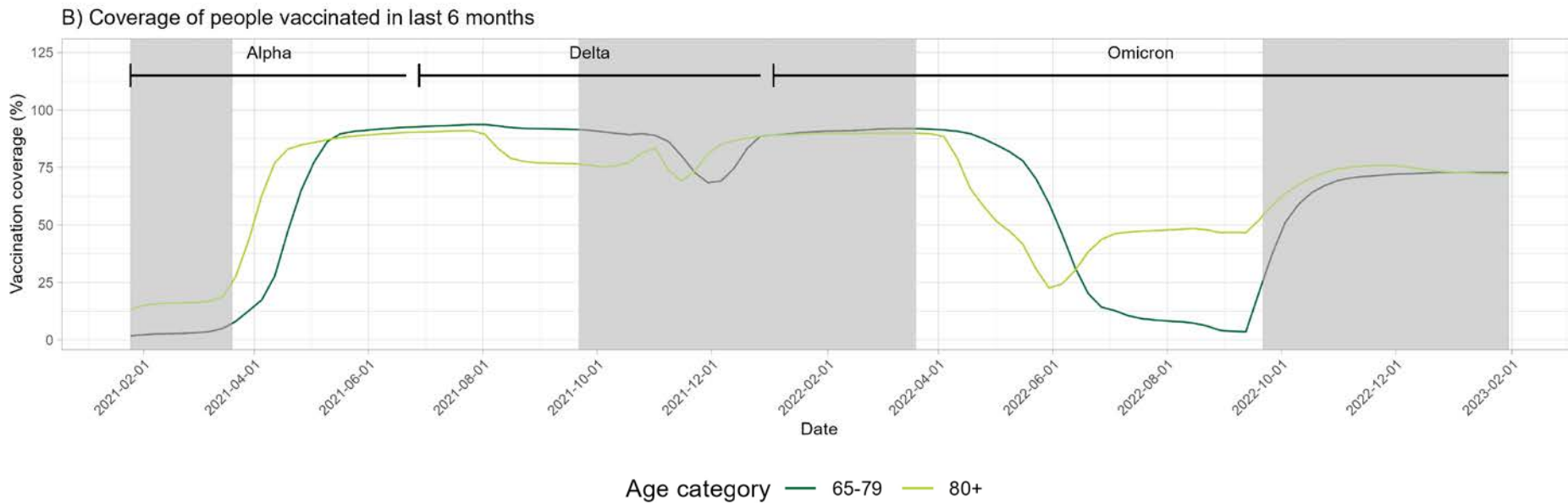
Vaccine effectiveness: against COVID-19 mortality, estimated using Belgian data

$$\text{Total expected deaths}_w = \text{Deaths Reported}_w + \sum_{\text{vacc}=1}^n \text{Averted deaths}_{w, \text{vacc}}$$

Total expected deaths: in case of no vaccination against COVID-19

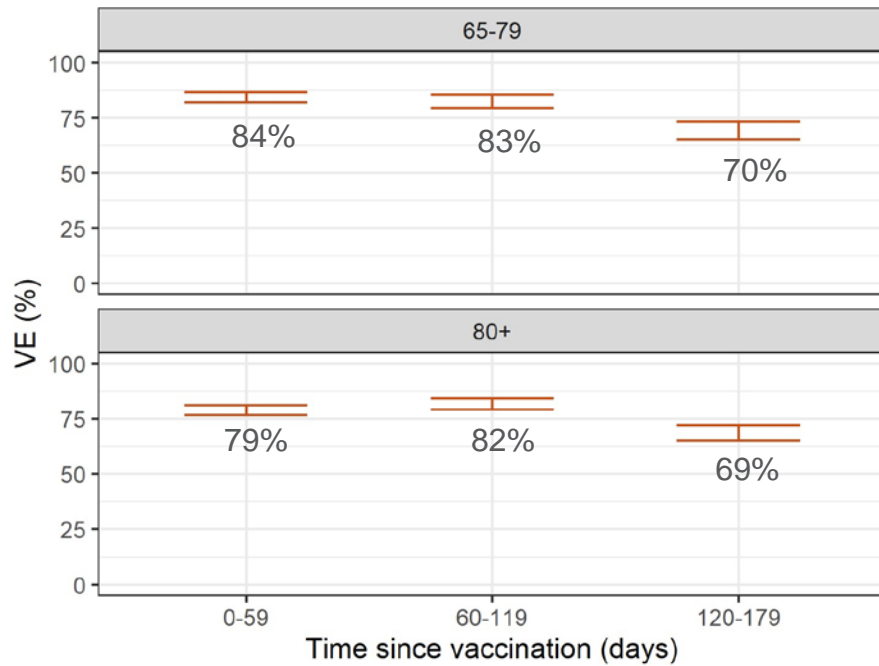
Vaccine coverage

- Coverage of recently vaccinated persons (in last 6 months) over time
- After the roll-out of each vaccination campaign, the coverage rose to above 70%, for both 65-79 year-olds and ≥ 80 year-olds and remained high during the autumn and winter periods

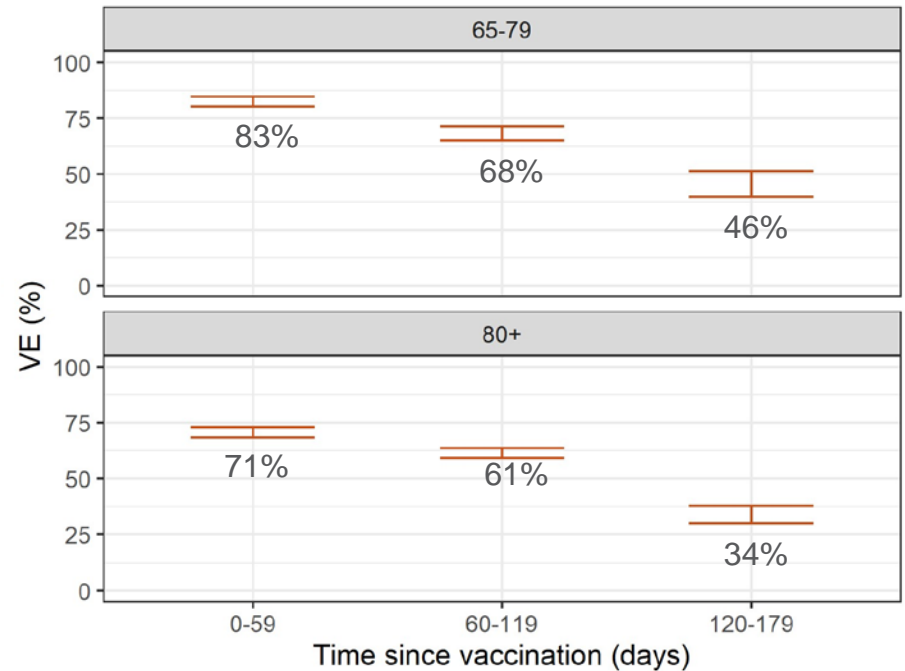


Vaccine Effectiveness against COVID-19 mortality

Delta period



Omicron period

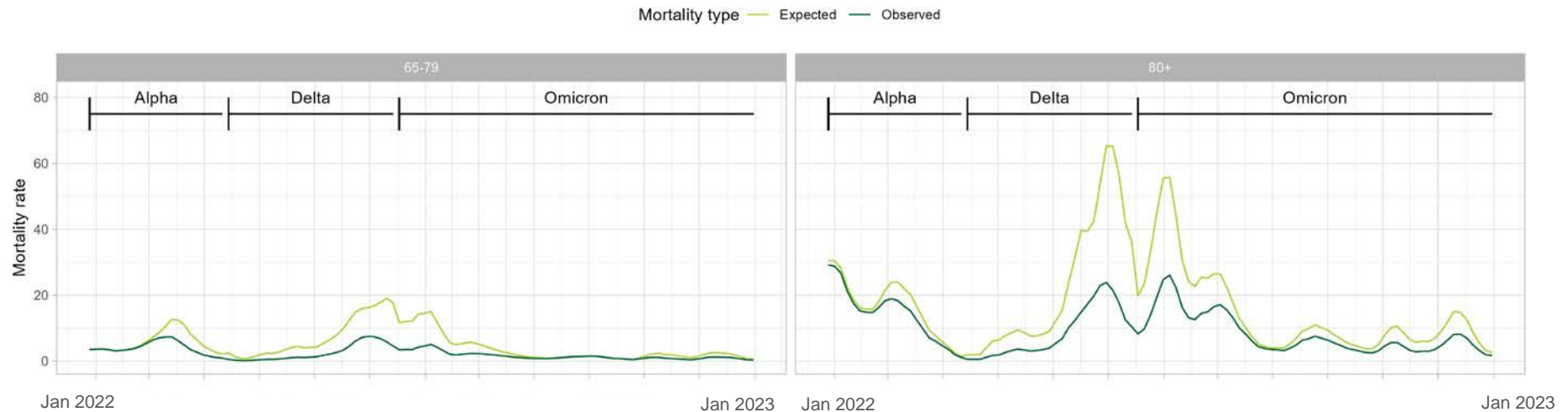


In general, VE among the elderly ≥ 80 years was estimated to be slightly lower compared to 65-79 year-olds

Expected versus reported deaths

- 11,033 COVID-19 deaths were reported in the population of 65 years and older in Belgium by national surveillance of COVID-19 mortality
- Expected mortality rates per 100,000 persons without vaccinating against COVID-19

A) Expected and Observed mortality rate per 100000 people



Estimated number of averted deaths

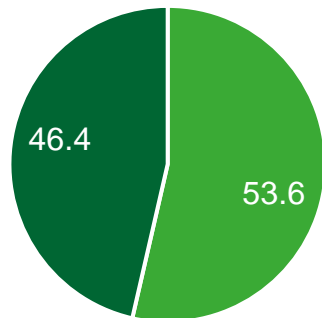
We estimated **10,042 deaths averted** (range: 8,917-11,188) among the Belgian population aged ≥ 65 years

→ representing a 48% reduction (range 45%-50%) in the expected COVID-19 deaths.

Out of these averted deaths:

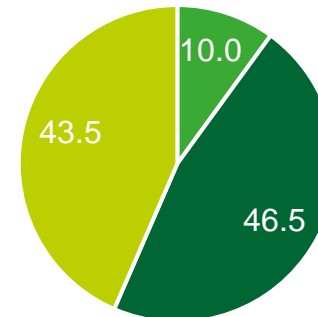
- slightly more persons ≥ 80 year than between 65-79 years
- majority was averted during Delta or Omicron dominance compared to during Alpha dominance

Averted deaths by age group (%)



■ ≥ 80 ■ 65-79

Averted deaths by variant period (%)



■ Alpha ■ Delta ■ Omicron

Conclusions

The multiple COVID-19 vaccination campaigns in Belgium led to an important reduction in COVID-19-related mortality among the Belgian population ≥ 65 years, in particular during Delta and Omicron dominance

→ Underscores the effectiveness of vaccinating to prevent COVID-19 deaths

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