Universiteit Antwerpen
Faculteit Geneeskunde en Gezondheidswetenschappen

# Anatomie van de COVID-19 pandemie en vaccinatiebeleid – 16 juni 2022

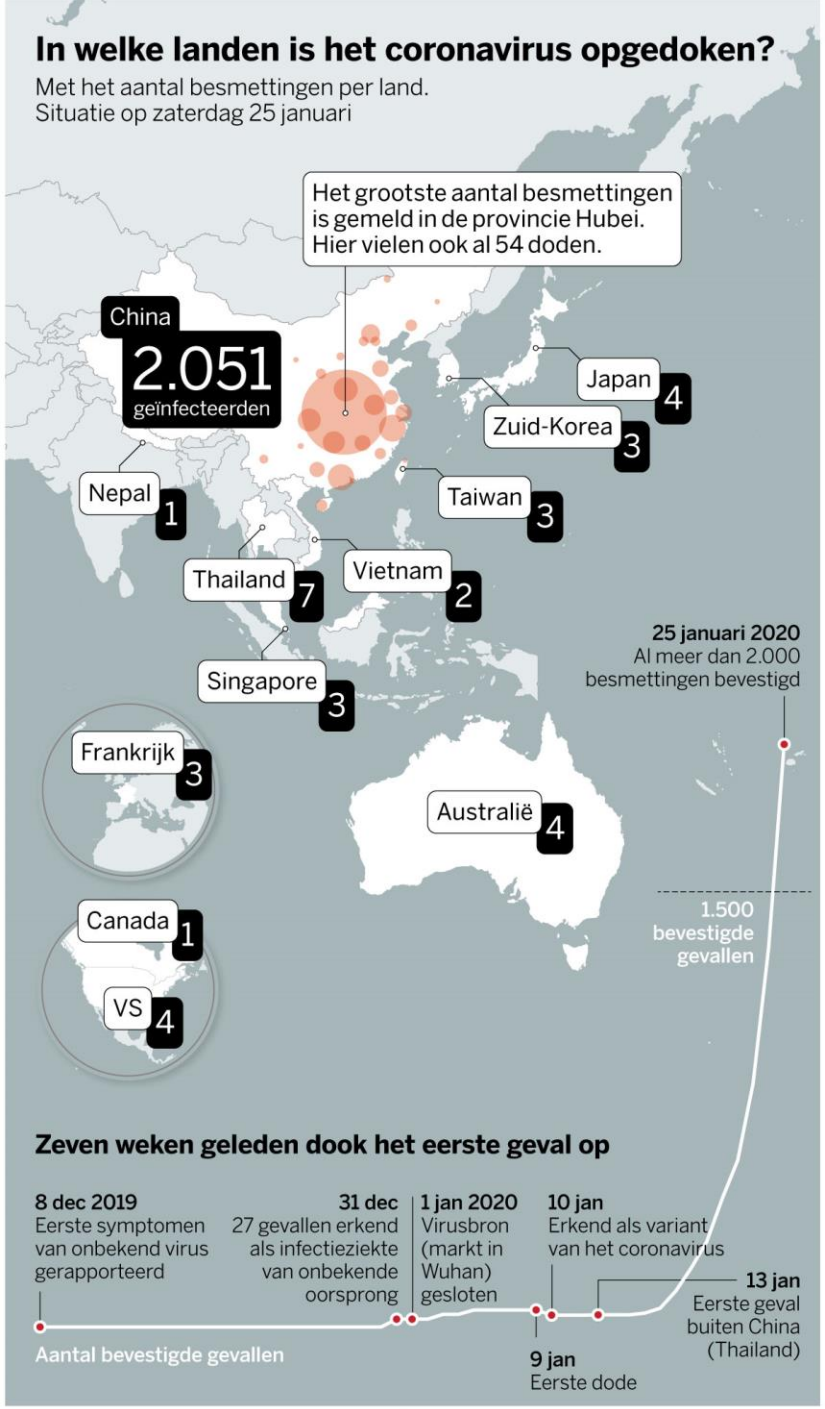

**Pierre Van Damme, MD PhD**

**Vaccin- en Infectieziekten Instituut (UAntwerpen)**

**Centrum voor de Evaluatie van Vaccinaties**

# Januari 2020

**A novel pathology**


DS Infografiek | Bron: Reuters, Somagnews.com, who.int

NG 14 FEBRUARI 2020 - 3,00 € - WEEKBLAD - P309577 - ROULARTA HEALTHCARE - RAKETSTRAAT 50, BUS 14 - 1130 BRUSSEL

# n keer of meer r de gynaecoloog

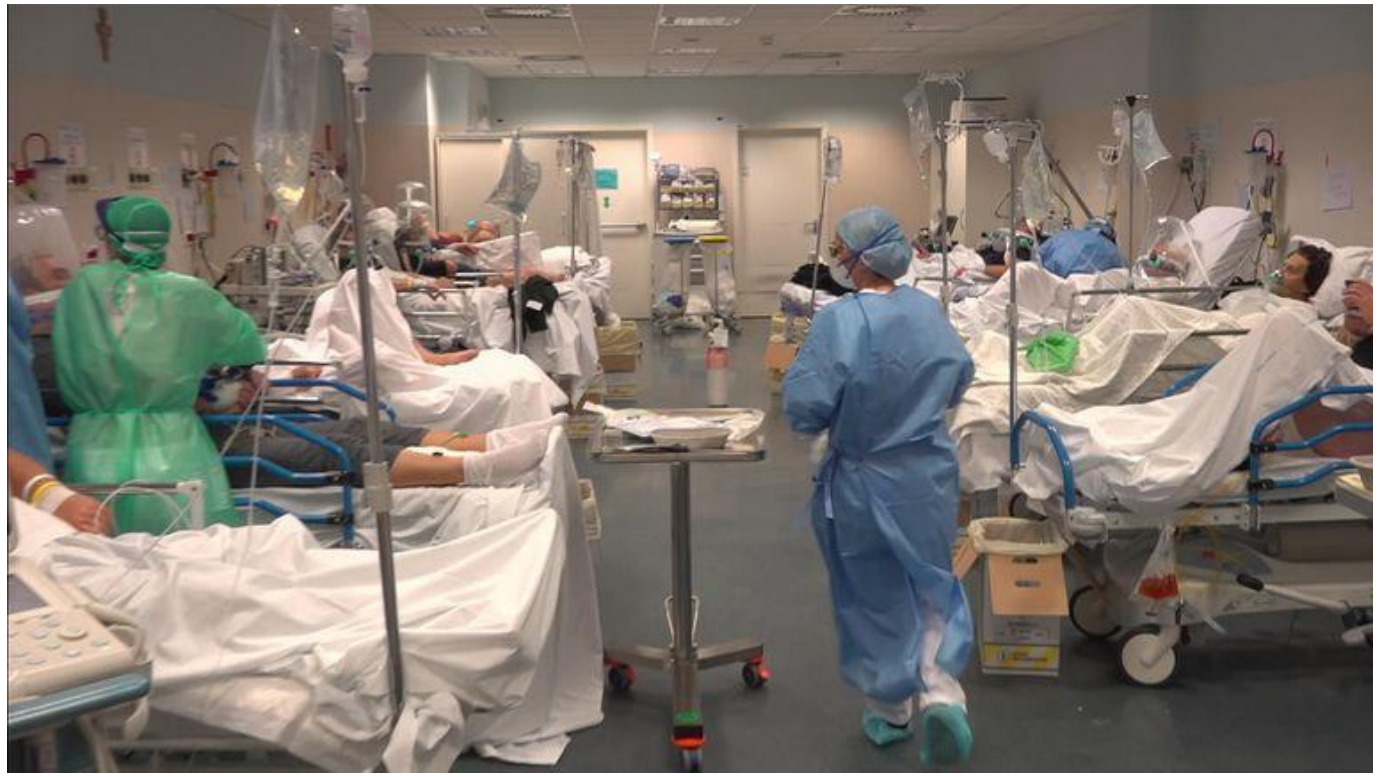
© Gettyimages



## Noodkreet uit Wuhan

Haixia Sun, huisarts in Zottegem, heeft een directe lijn met dokter Zheng Zhi Zhou van het Jiangxia Ziekenhuis in de miljoenenstad Wuhan, waar de toestand stilaan onhoudbaar wordt. "We krijgen geen geld van de overheid", vertelt dokter Zheng. "Voor patiënten die er erg aan toe zijn, zijn er geen beademingstoestellen. Ook aan ander medisch materiaal is er dringend behoefte. Artsen en verplegend personeel zijn totaal uitgeput. Ze doen shifts van 10 tot 12 uur, zonder eten, drinken of plaspauzes – om te vermijden dat ze hun beschermende pakken, brillen en maskers moeten uitdoen."

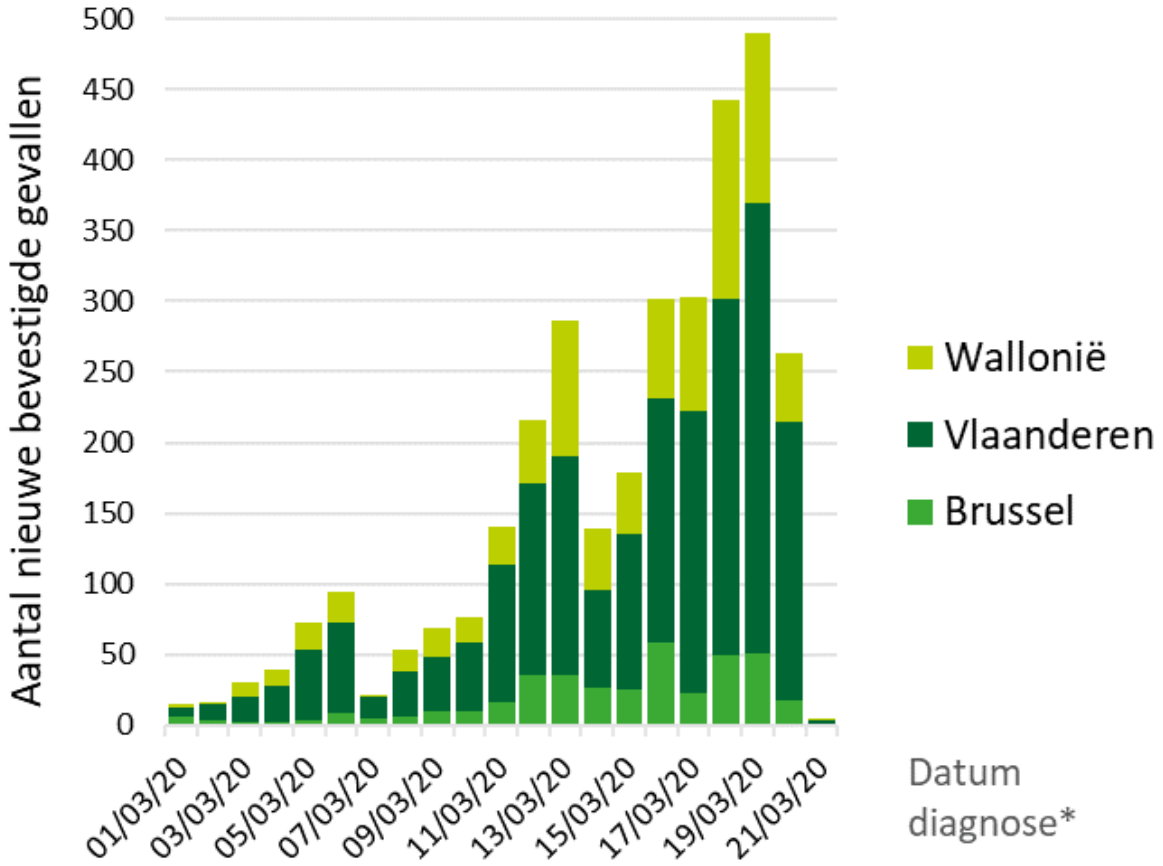
# Italy, eind february 2020




Criminelen op lockdown party


Intussen elke dag op de tram...
Corona inzichten in België!

# Evolution of the first epidemic wave, Belgium




**Part 1 (1-7/3): import from Italy and other ski-resorts (young, healthy, not very ill)**

**Part 2 (7/3-…): frail elderly become ill, no clear epidemiological link**

**Part 3: (10/3 -…) outbreaks in elderly homes and hospitals**

https://epidemio.wiv-isp.be/ID/Documents/Covid19/Meest%20recente%20update.pdf

**3 February 2020**

WHO releases the international community's Strategic Preparedness and Response Pla
states with weaker health systems.

**11-12 February 2020**

WHO convened a Research and Innovation Forum on COVID-19, attended by more than 40
funders from around the world, which included presentations by George Gao, Director General of China CDC, and Zunyou Wu, China CDC's chief epidemiologist.

**16-24 February 2020**

The WHO-China Joint mission, which included experts from Canada, Germany, Japan, Nigeria, Republic of Korea, Russia, Singapore and the US (CDC, NIH) spent time in Beijing and also travelled to Wuhan and two other cities. They spoke with health officials, scientists and health workers in health facilities (maintaining physical distancing). The report of the joint mission can be found here: https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf

**11 March 2020**

Deeply concerned both by the alarming levels of spread and severity, and by the alarming levels of inaction, WHO made the assessment that COVID-19 can be characterized as a pandemic.

**13 March 2020**

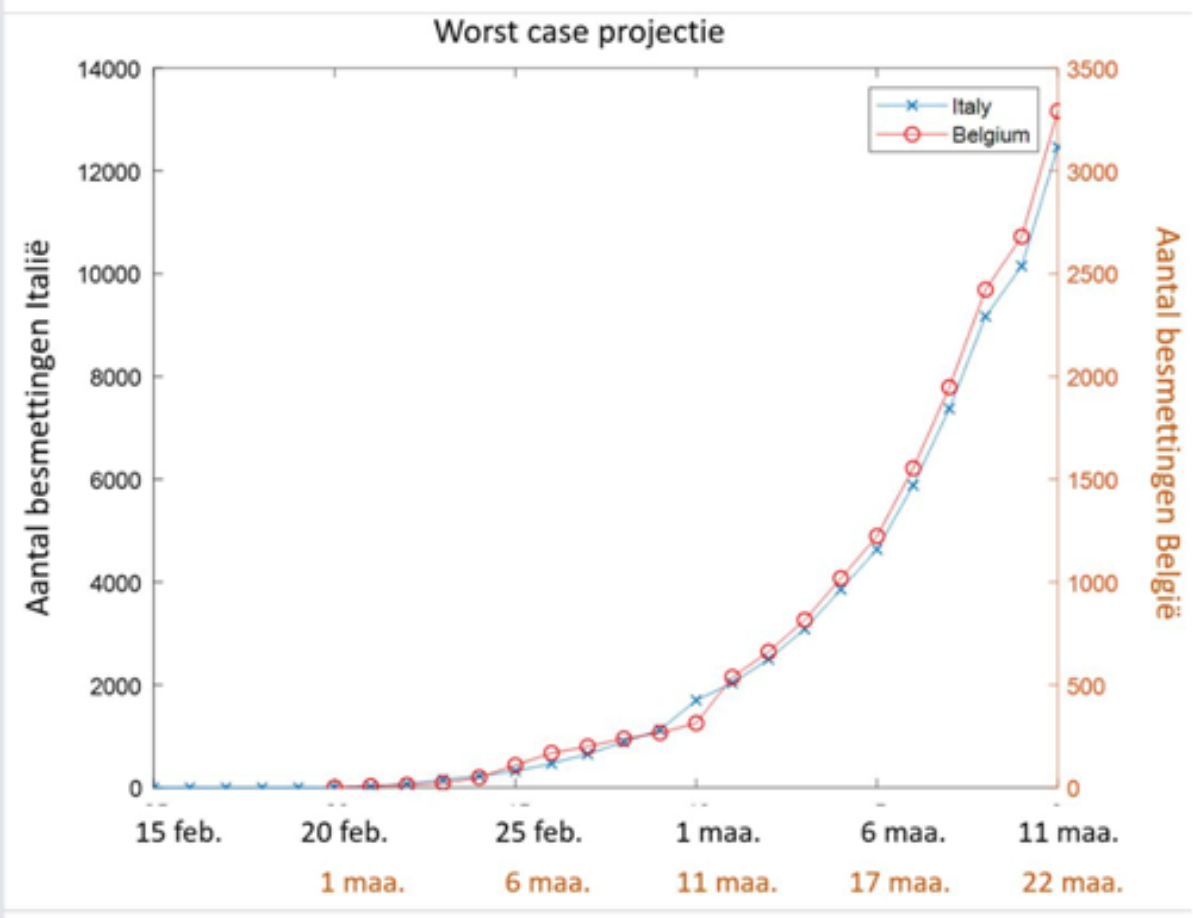
COVID-19 Solidarity Response Fund launched to receive donations from private individuals, corporations and institutions.

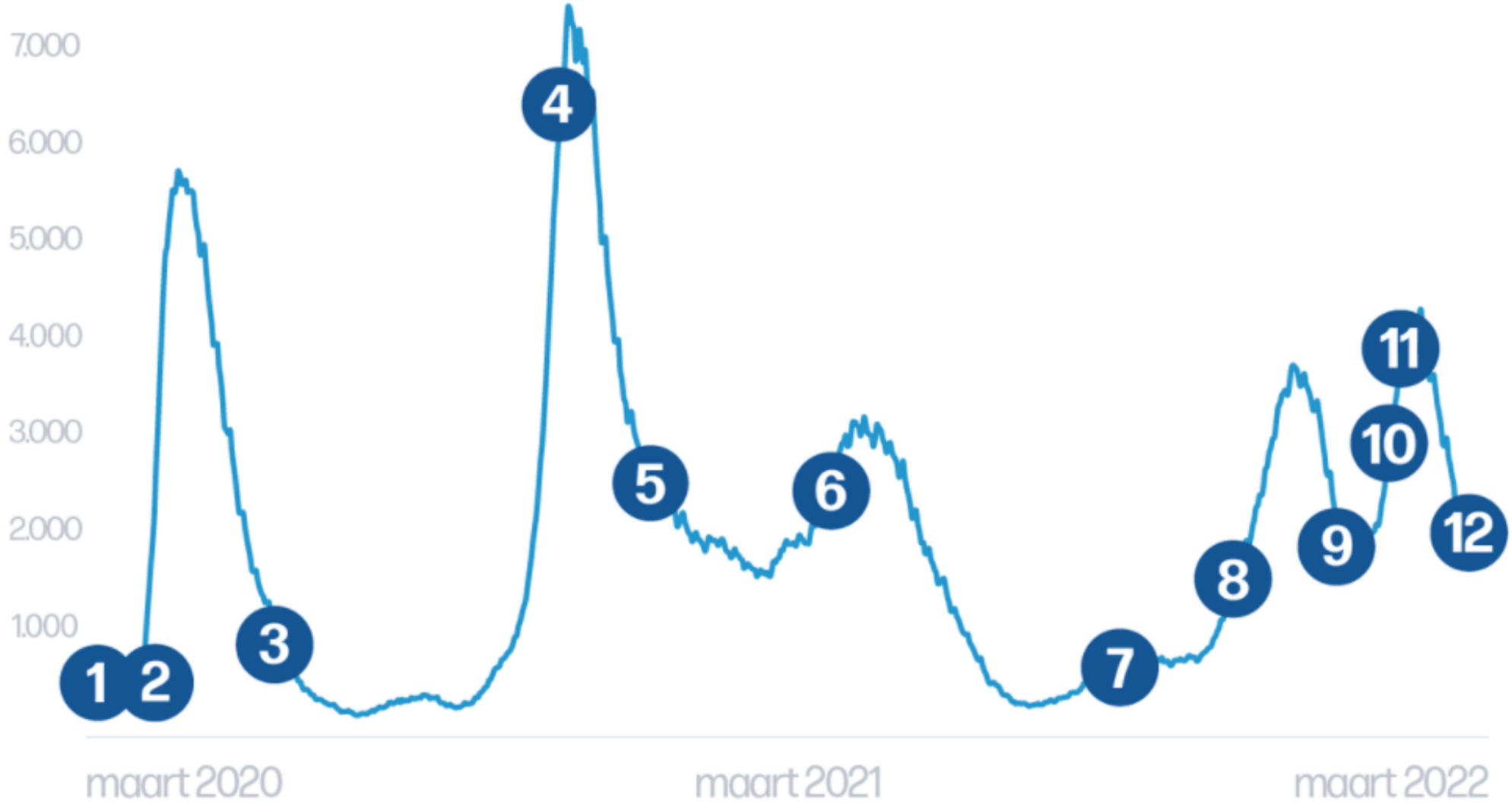
Uitgeroepen tot pandemie door de WHO op 11 maart 2020!


verpleging


3M

# 12/3/2020: vergelijking aantal besmettingen Italië-België






## 1 4 februari 2020

## 1 4 februari 2020

Philip Soubry, die terugkeert uit China, test als eerste Belg positief op het coronavirus.

**Meer lezen ►**

## 2 13 maart 2020

Ons land gaat voor het eerst in lockdown: scholen, horeca en winkels gaan dicht, thuiswerken wordt de norm.

**Meer lezen ►**

## 3 8 juni 2020

De versoepelingen van het “Zomerplan” gaan in: er wordt weer meer mogelijk.

**Meer lezen ►**

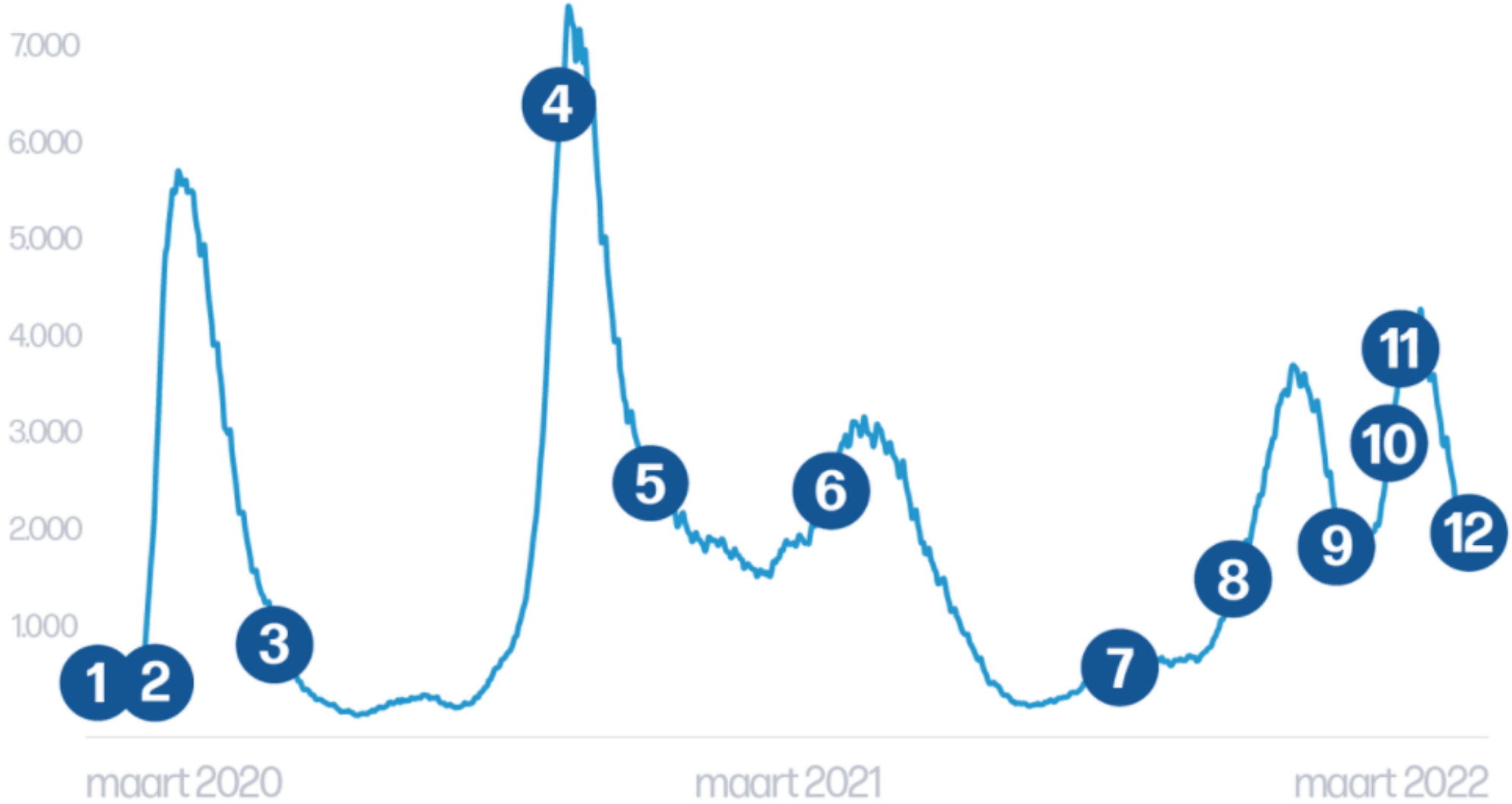
## 4 30 oktober 2020

Overlegcomité kondigt tweede lockdown aan, “knuffelcontact” wordt een begrip.

**Meer lezen ►**

## 5 22 december 2020

Jos Hermans (96) krijgt als eerste Vlaming een coronavaccin




## 1 4 februari 2020

## 6 24 maart 2021

Om de derde coronagolf tegen te gaan wordt een “paaspauze” ingelast, winkelen moet op afspraak, kappers gaan dicht.

Meer lezen ►

## 7 3 september 2021

De vaccinatiecampagne loopt stilaan ten einde.

Meer lezen ►

## 8 26 oktober 2021

De deltavariant veroorzaakt een vierde coronagolf. Het gebruik van de coronapas (CST) wordt fors uitgebreid.

Meer lezen ►

## 9 25 december 2021

De nieuwe omikronvariant rukt razendsnel op. De besmettingen stijgen fors, maar de variant veroorzaakt minder ziekenhuisopnames. De boostercampagne versnelt

Meer lezen ►

## 10 23 januari 2022

50.000 betogers trekken door Brussel om hun ongenoegen te uiten over de coronamaatregelen, de manifestatie loopt uit op rellen en geweld tegen de politie.

# Start of the vaccination, Dec 2020 – Jan 2021

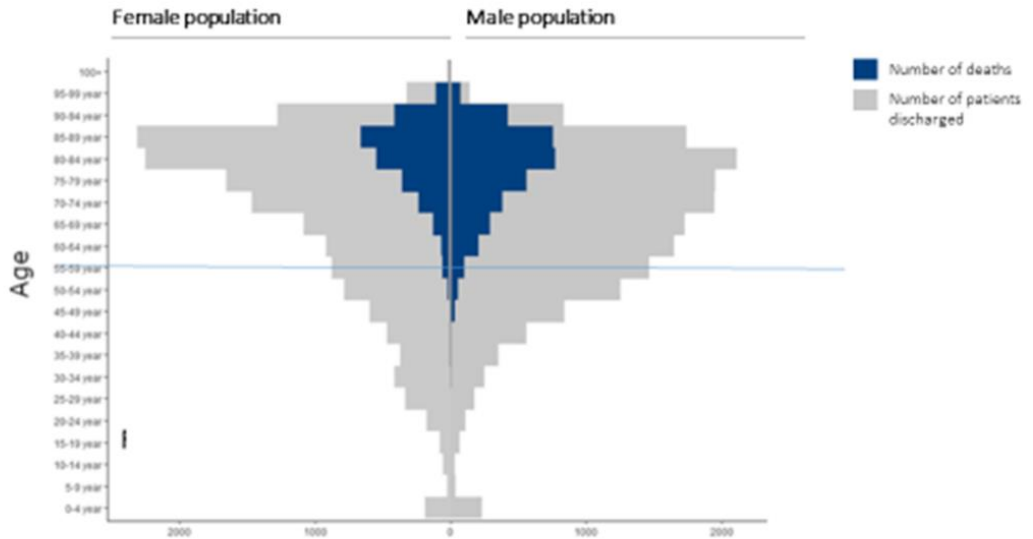
- **Use of the available vaccines, as efficiently as possible**
  - Use of all vaccines (mRNA and adeno-based)
- **Delay in delivering of vaccines**
- **Severity related to age**
- **Limited availability of evidence**

**Vaccination policy driven by:**

- **Shortage of vaccines**
- **Documented efficacy of vaccines**
- **Prioritization**
  - Elderly
  - HCP
  - Pregnant women (4/2021)
  - Risk groups
  - …..

***Mortality and hospitalisation for COVID-19 (source: Sciensano, sample: approx. 60% of the hospitalized)***

Outcome of hospitalized COVID patients based on COVID-19 Clinical Hospital surveillance (source: Sciensano)

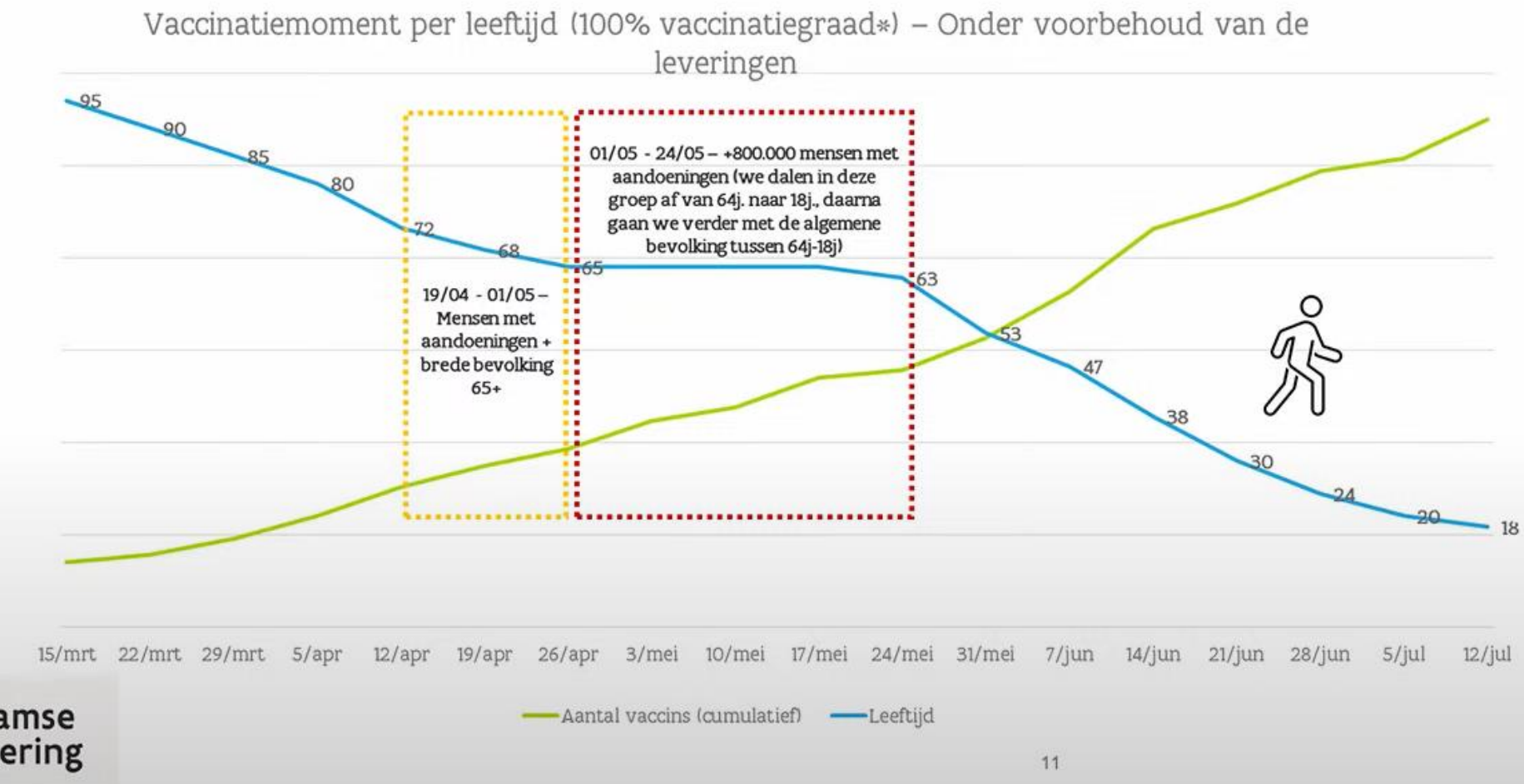



Number of patients, out of 33157 in the sample
This Surveillance does not cover all hospitalised cases in Belgium

# Vaccination policy – Q1-Q2 2021

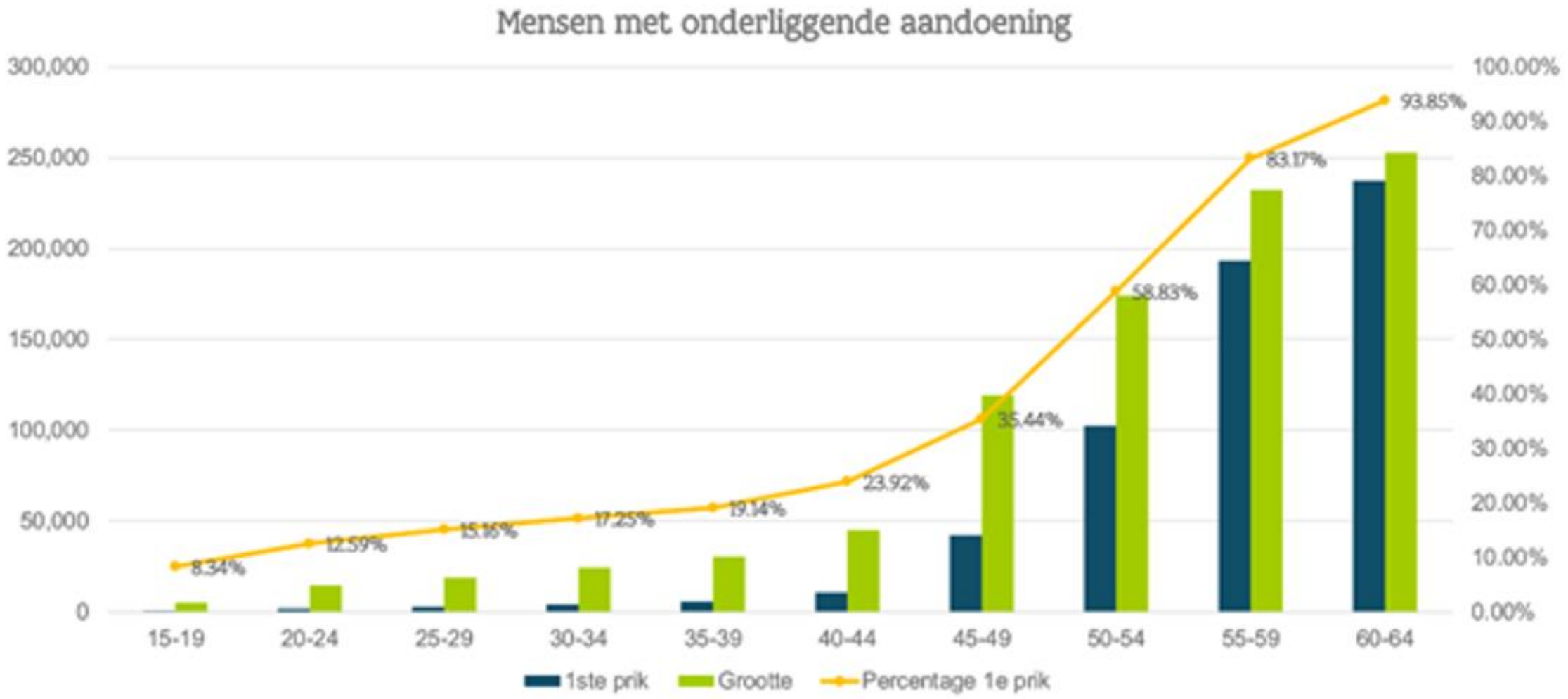
| Fasering uitrol | Fase Ia<br>Gecentraliseerde vaccinatie, hoge prioritering risicogroepen | Fase Ib<br>Gecentraliseerde vaccinatie, uitbreiding prioritaire groepen | Fase II<br>Uitbreiding vaccinatie naar laag-risicogroepen |
|---|---|---|---|
| Eigenschappen vaccin | • Erg beperkte hoeveelheid<br>• 1 of 2 vaccins<br>• Multi-dose vials<br>• Specifieke opslag (-75°C) | • Grotere aantallen<br>• Meer vaccins<br>• Multi-dose vials<br>• Minder complexe opslag (°C) | • Ruime voorraad<br>• Diverse vaccins<br>• Multi-dose & single-dose<br>• Eenvoudige opslag (°C) |
| Doelgroepen (advies HGR) | • Bewoners & personeel WZC → zorginstellingen<br>• Zorgprofessionals (1e lijn, ziekenhuis…) | • 65+ ambulant (leeftijdscateg.)<br>• 45-65 risicopatiënten<br>• Essentiële & kritische functies | • Andere risicopatiënten<br>• Volwassen populatie<br>(Te definiëren ifv nieuwe wetenschappelijke inzichten) |
| Toediening | WZC, ziekenhuis zorginstelling<br>(ism arbeidsgeneeskundige dienst) | Triage- en vaccinatiecentra van 1e lijn en lokaal bestuur<br>Grootschalige vaccinatiecentra | Voortzetting Ia en Ib<br>Andere te ontwikkelen kanalen met 1e lijn, bedrijven, scholen,… |
| Distributie | Centrale opslag FAGG of producent specifieke logistiek (-70°C)<br>Prioriteit hoog volume hub (ZH) | Centrale opslag<br>Specifiek en aangepaste logistiek (uit bvb. lokaal depot of ZH) | Meer decentrale opslag en distributie |
| Communicatie | Informatie aangepast aan fase via diverse kanalen | | |

# The way to July 11, 2021



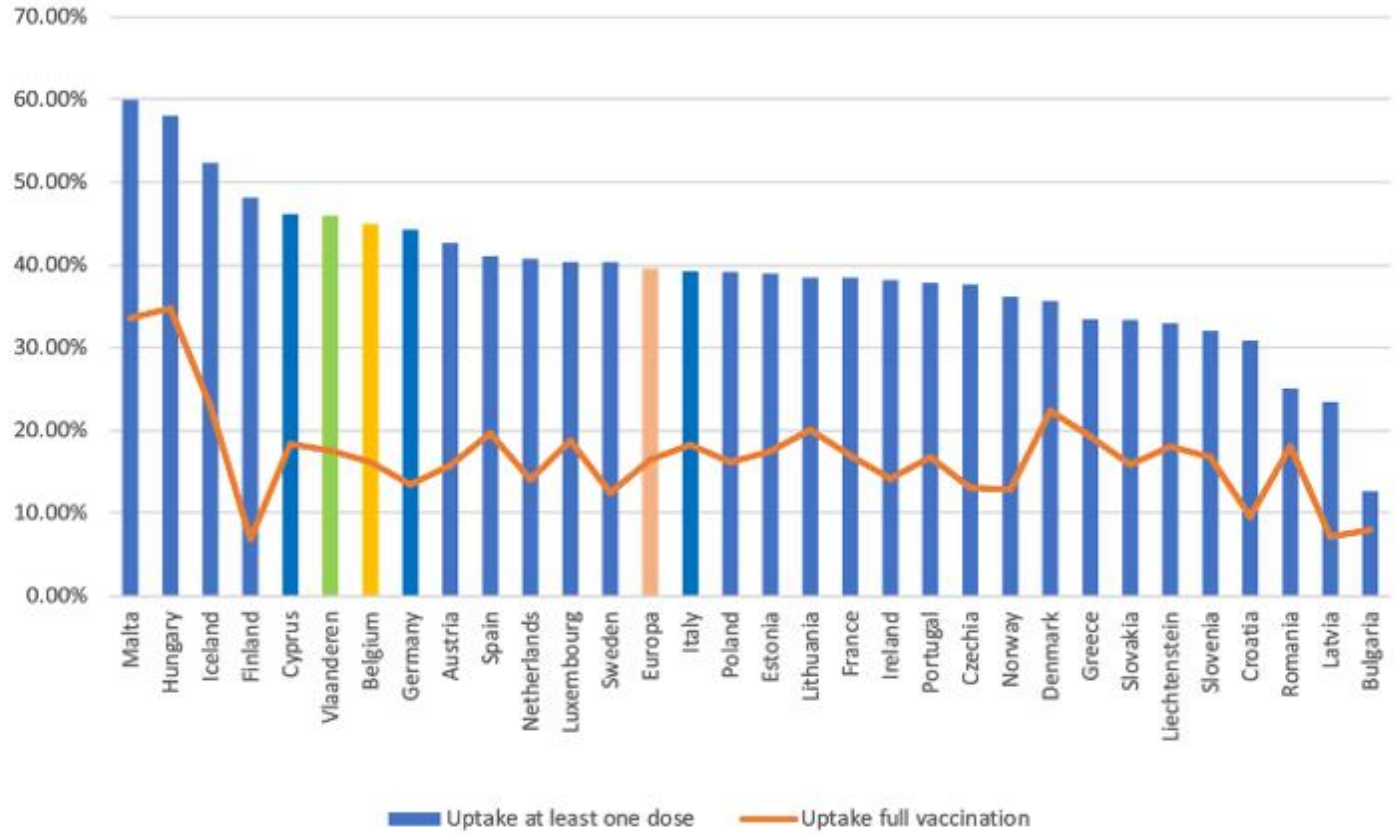

Vlaamse Regering

# Risk groups




Vlaanderen
is zorg

# Immunization coverage – European comparison




| Country | Uptake at least one |
|---|---|
| Malta | 60,00% |
| Hungary | 58,10% |
| Iceland | 52,40% |
| Finland | 48,20% |
| Cyprus | 46,20% |
| Vlaanderen | 46,00% |
| Belgium | 45,00% |
| Germany | 44,30% |
| Austria | 42,70% |
| Spain | 41,10% |
| Netherlands | 40,80% |
| Luxembourg | 40,40% |
| Sweden | 40,40% |
| Europa | 39,60% |
| Italy | 39,30% |
| Poland | 39,20% |
| Estonia | 39,00% |
| Lithuania | 38,50% |
| France | 38,50% |
| Ireland | 38,20% |
| Portugal | 37,90% |
| Czechia | 37,70% |
| Norway | 36,20% |
| Denmark | 35,70% |
| Greece | 33,50% |
| Slovakia | 33,40% |
| Liechtenstei | 33,00% |
| Slovenia | 32,10% |
| Croatia | 30,90% |
| Romania | 25,10% |
| Latvia | 23,50% |
| Bulgaria | 12,70% |

| Country | Uptake full vaccin |
|---|---|
| Hungary | 34,8 |
| Malta | 33,6 |
| Iceland | 23,0 |
| Denmark | 22,4 |
| Lithuania | 20,1 |
| Spain | 19,7 |
| Greece | 19,3 |
| Luxembourg | 18,8 |
| Cyprus | 18,4 |
| Italy | 18,3 |
| Liechtenstei | 18,1 |
| Romania | 18,1 |
| Vlaanderen | 17,6 |
| Estonia | 17,5 |
| France | 17,0 |
| Portugal | 16,8 |
| Slovenia | 16,8 |
| Europa | 16,5 |
| Belgium | 16,2 |
| Poland | 16,2 |
| Slovakia | 15,9 |
| Austria | 15,8 |
| Ireland | 14,2 |
| Netherlands | 14,1 |
| Germany | 13,5 |
| Czechia | 13,1 |
| Norway | 12,9 |
| Sweden | 12,5 |
| Croatia | 9,6 |
| Bulgaria | 8,0 |
| Latvia | 7,2 |
| Finland | 6,9 |

21/05/202

Vlaanderen
is zorg

# Booster-vaccination policy and the delta-variant (Q3 2021)

## watching US, UK and Israel!

# UK Covid cases are high going into the winter, but vaccines have greatly reduced the share of cases that end in hospitalisation or death

Covid-19 metrics as a percentage of their peak value last winter

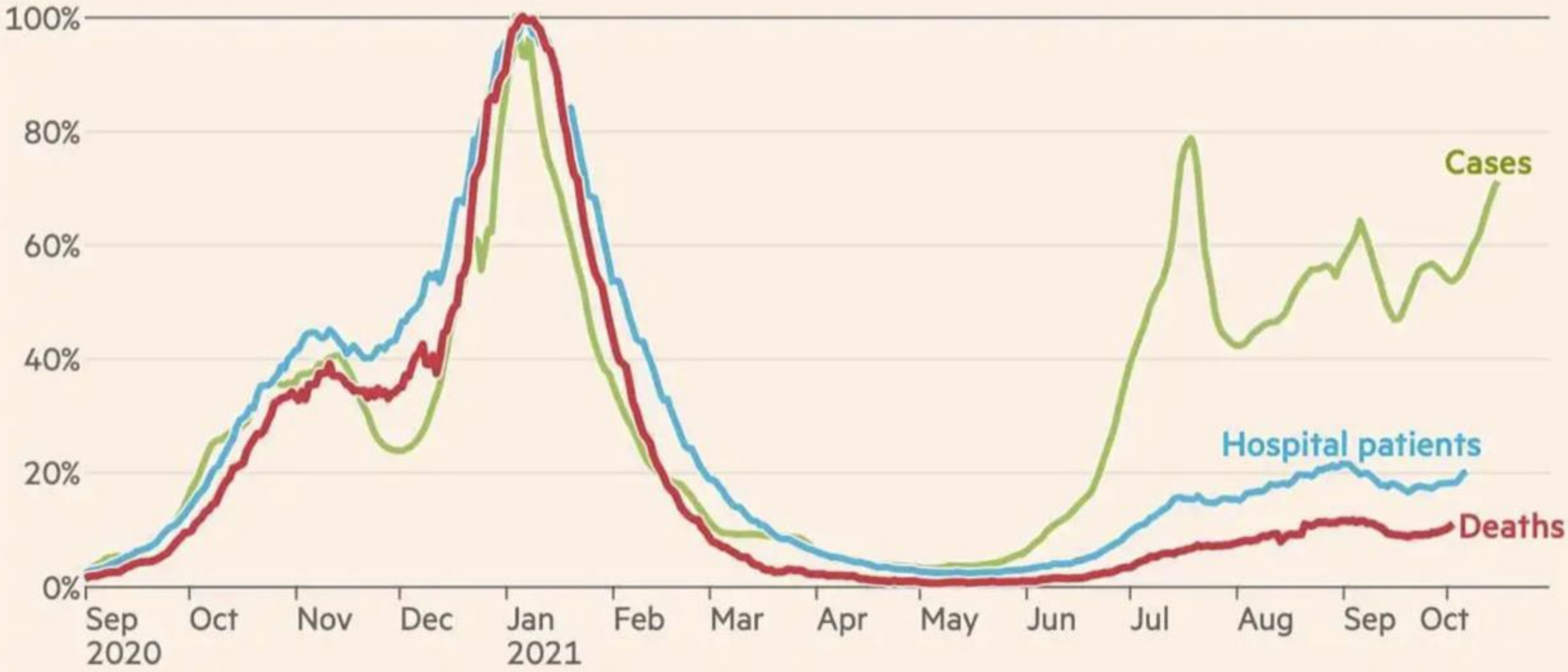
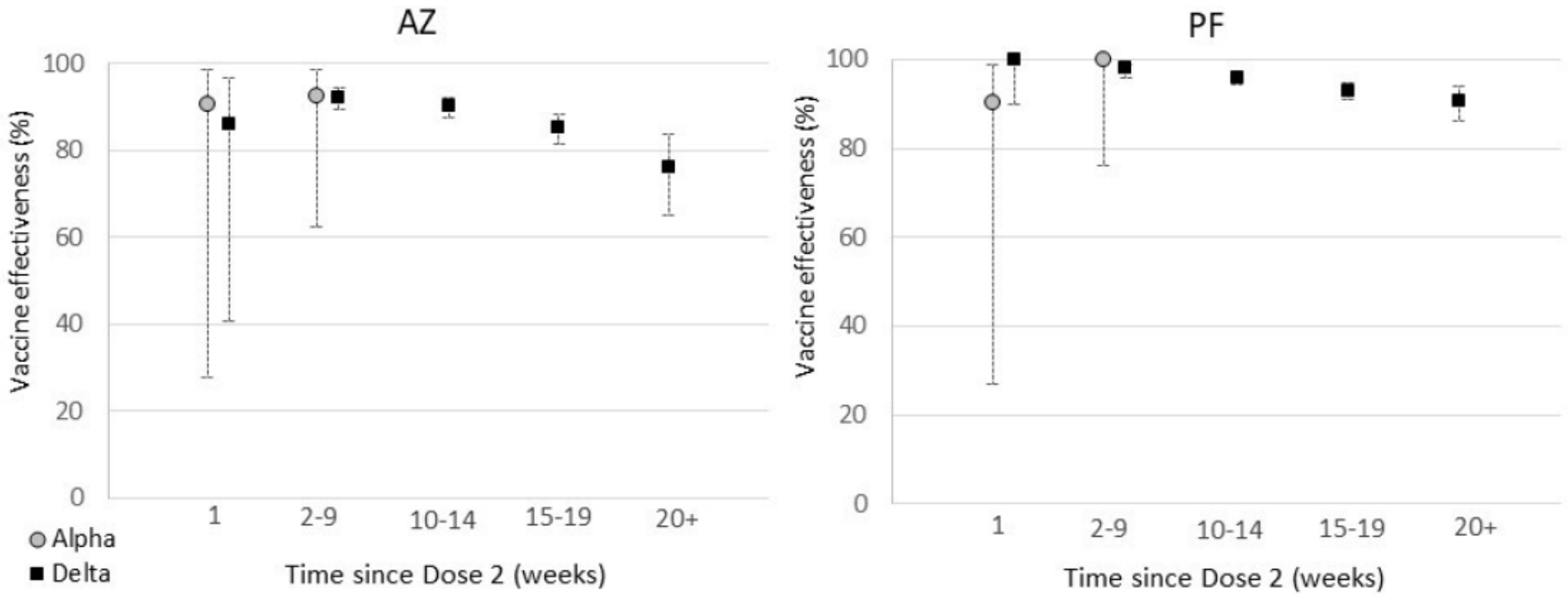
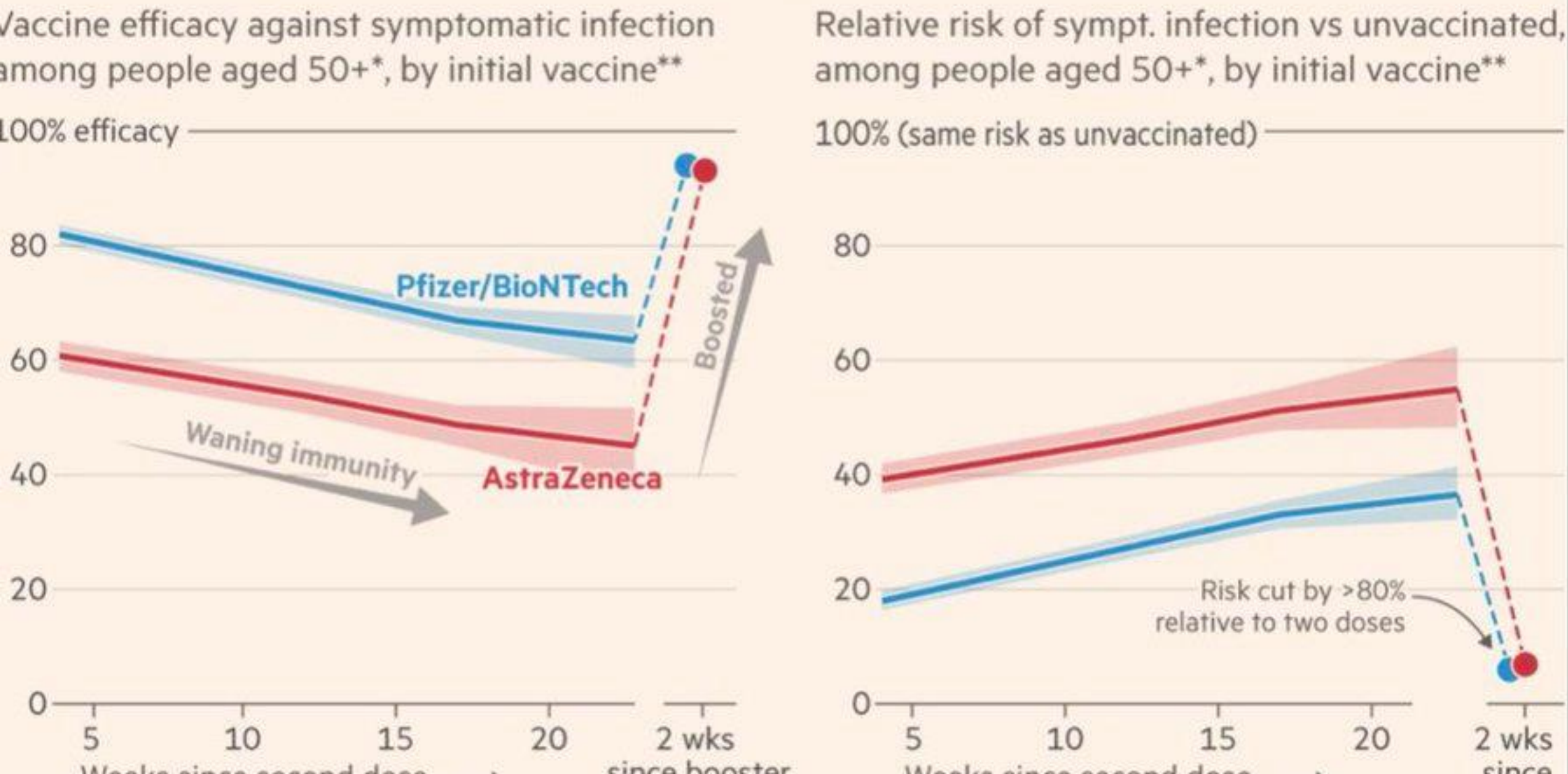


**Figure 2.** Vaccine effectiveness against hospitalisation by age group for Vaxzevria (AZ) and Comirnaty (PF), for a) 65+ years and b) 40 to 64 years.

**a)** 65+



# New data from England show boosters do not merely top up immunity, they elevate protection well above the peak level from two doses



# Extra vaccine dose for immunocompromised (Q3-2021)

- Extra dose for 12 yoa and older who are immunocompromised
  - A third dose for most of them, a second dose for those who received 1 dose of J&J
  - Intended to complete the primary schedule! Not a booster!
  - Can be offered at least 28 days after the previous dose
- Not the same risk groups is at the start of the mass immunization campaign (confusion!)
  - Likelihood to develop complications after contracting COVID19

- Priority is given to those who are more likely to respond less to the primary vaccination!
- Vaccination policy driven by precautionary measure for the immunocompromised!

# ‘booster’ with mRNA-vaccine (Q4-2021)

## For whom?

- 65 yoa and older
- Patients in institutions (nursing homes etc…).
- All 18 yoa and older
- 11-17 yoa (Q1 - 2022)

## When?

- min 2m after J&J (booster is second administration)
- min 4 m after primary schedule with AZ vaccine
- min 4-6m after primary schedule with Pfizer or Moderna

De eerste boostercampagne ging op 10 september 2021 van start volgens dezelfde prioriteitsvolgorde (zie tabel 5). Immuungedeprimeerden werden op deze datum uitgenodigd om een extra dosis vaccin te ontvangen.

**Tabel 5 – Boostervaccinatie van doelgroepen: tijd die nodig is om deze doelgroepen te vaccineren**

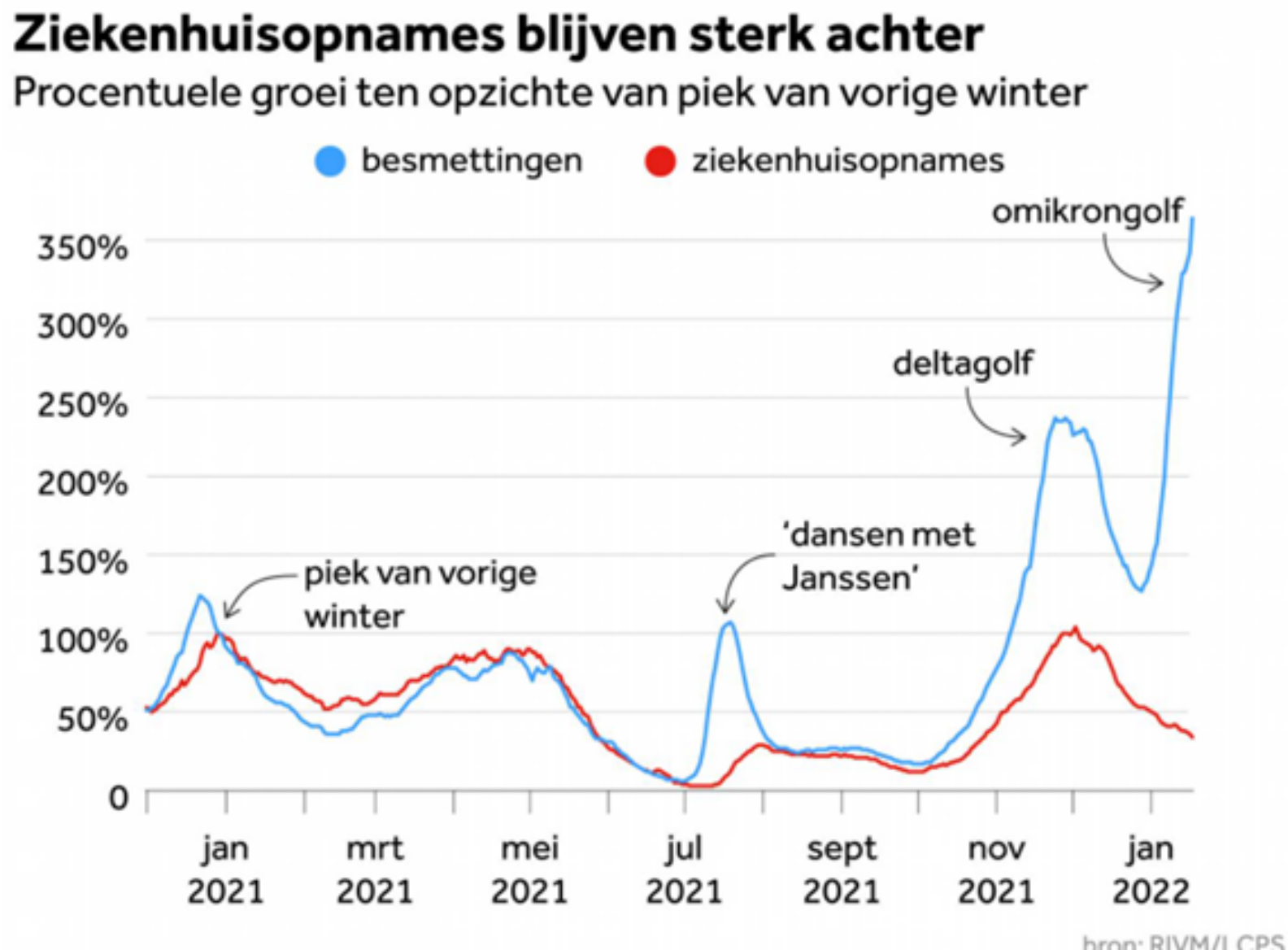
| Doelgroep | 01-30/09/2021 | 01-31/10/2021 | 01-30/11/2021 | 01-31/12/2021 | 01-31/01/2022 | 01-29/02/2022 | 01-31/03/2022 |
|---|---|---|---|---|---|---|---|
| Immuungedeprimeerden | | | | | | | |
| Woonzorgcentra – 85+ | | | | | | | |
| 75-84 jaar | | | | | | | |
| Zorgverleners | | | | | | | |
| 65-74 jaar | | | | | | | |
| Jonger dan 65 jaar | | | | 55 – 64 ans | | | |

*NB. De donkergekleurde vakken geven de periode aan die nodig is om 80% van de doelgroep te vaccineren; de lichtgekleurde vakken geven de periode aan die nodig is om 80-90% van de doelgroep te vaccineren*

Op 07/03/2022 hebben ongeveer 7.050.000 burgers een eerste boosterdosis gekregen (of een extra dosis voor immuungedeprimeerden), d.w.z. 61% van de totale bevolking (inclusief de jongeren en kinderen) of 75% van de volwassen bevolking (18+).

# Boosters en Omikron

# Nederland, 18 jan 2022



| Vaccine Effectiveness (VE) vs Omicron Hospitalization | UKHSA* (95%CI) | Kaiser Southern California (95%CI) | CDC VISION Consortium (95%CI) |
|---|---|---|---|
| 2 doses, waned (>4-6 months) | 44% (30-54) | 68% (56-76) | 57% (39,70) |
| 3 doses (+booster) | 88% (84,91) | 89% (84,92) | 90% (80,94) |
| < 3 months | 88% (84,91) | 89% (83,92) | NA |
| > 3 months | 83% (78,87) | 90% (57,98) | NA |

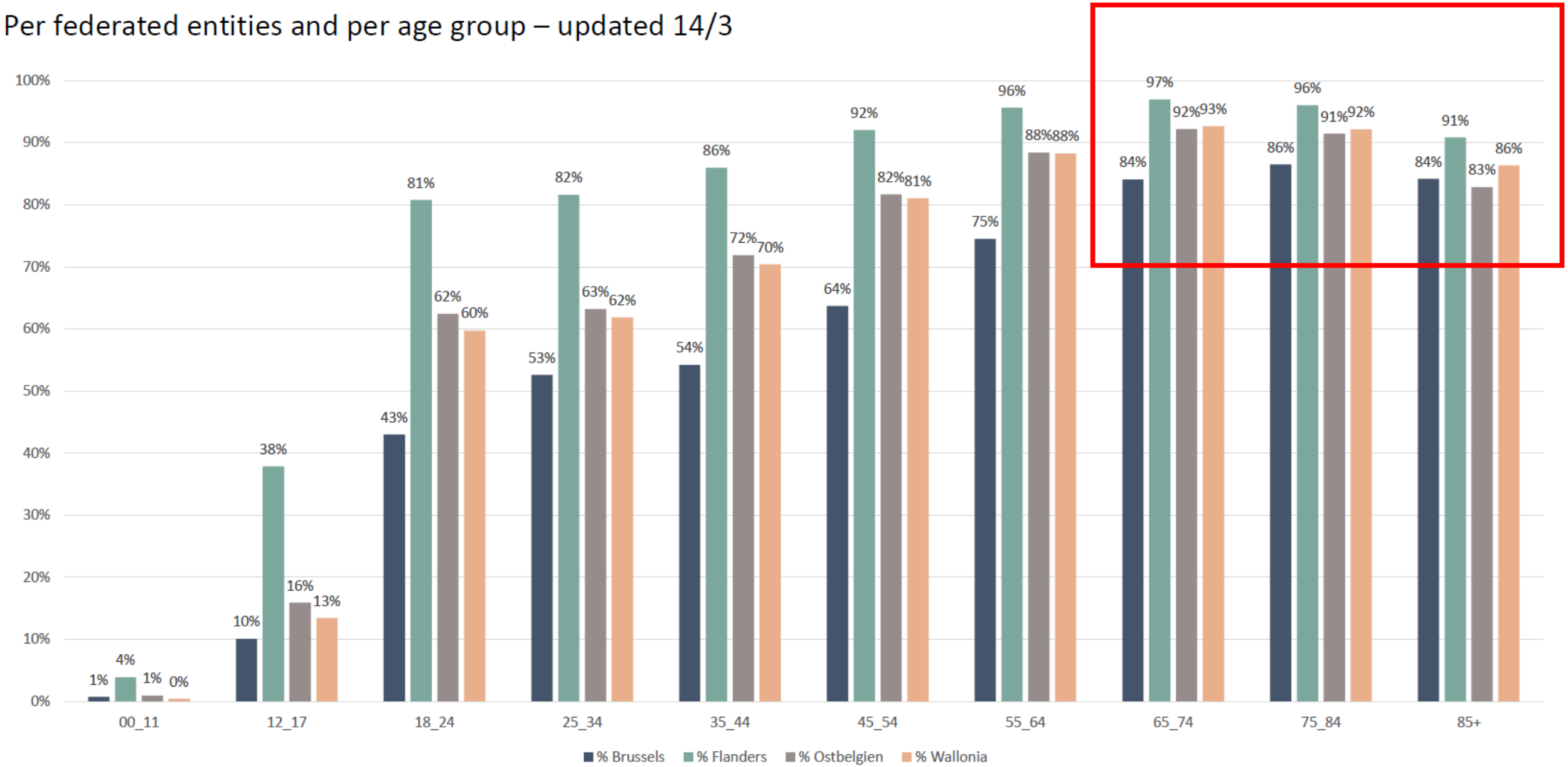
*UK used AZ for 2-doses, and mix of boosters with Pfizer and Moderna, NA –not available

@erictopol

# Selected Belgian data on booster vaccination

# % booster dose amongst fully-vaccinated population

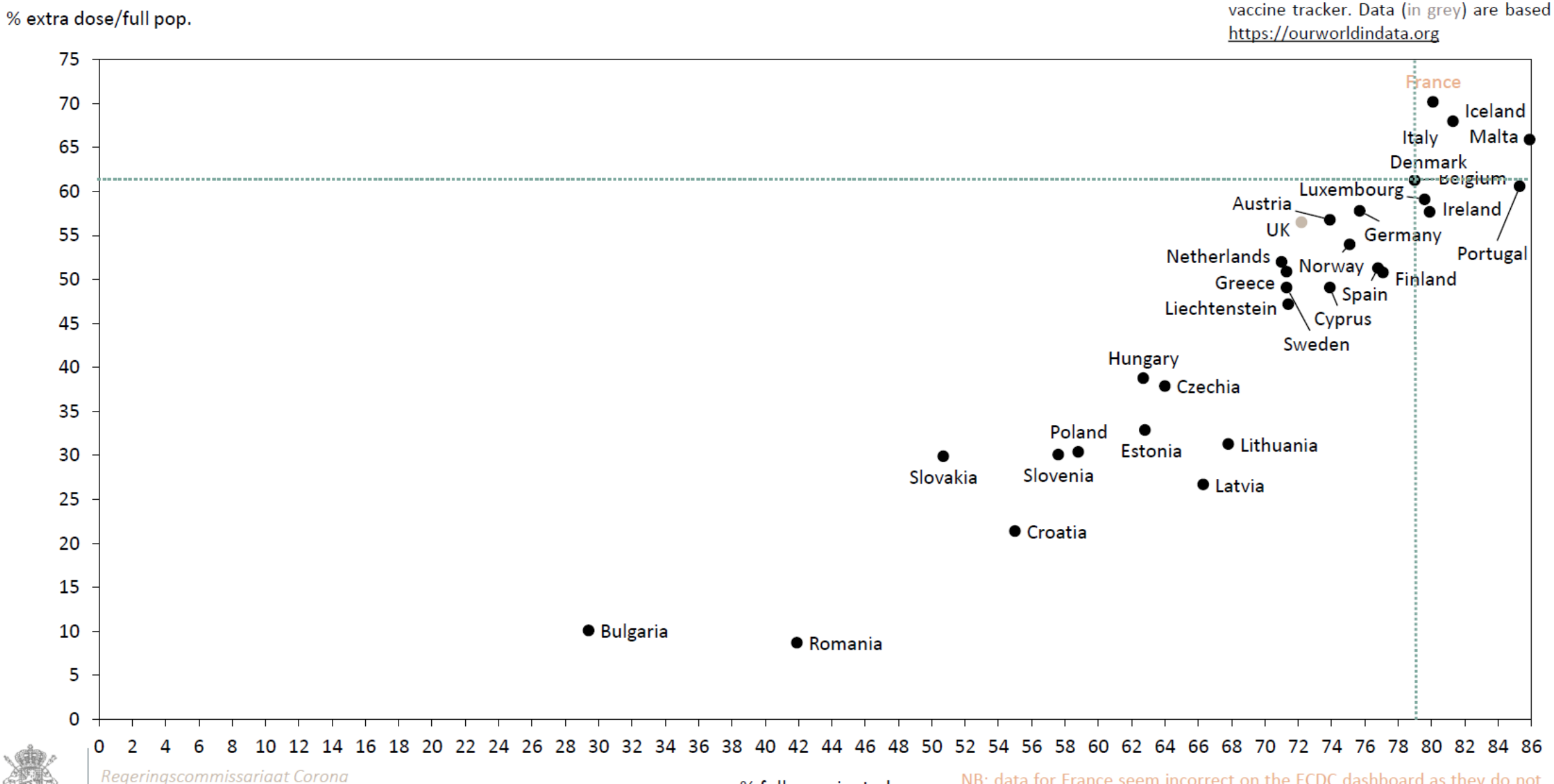
## Per federated entities and per age group – updated 14/3



# International comparison: vaccination coverage fully-vaccinated population and extra doses

COVID-19 | European Centre for Disease Prevention and Control (europa.eu) updated on 16/03 (situation as of 16/03)

Data of UK are not included in the ECD vaccine tracker. Data (in grey) are based o https://ourworldindata.org

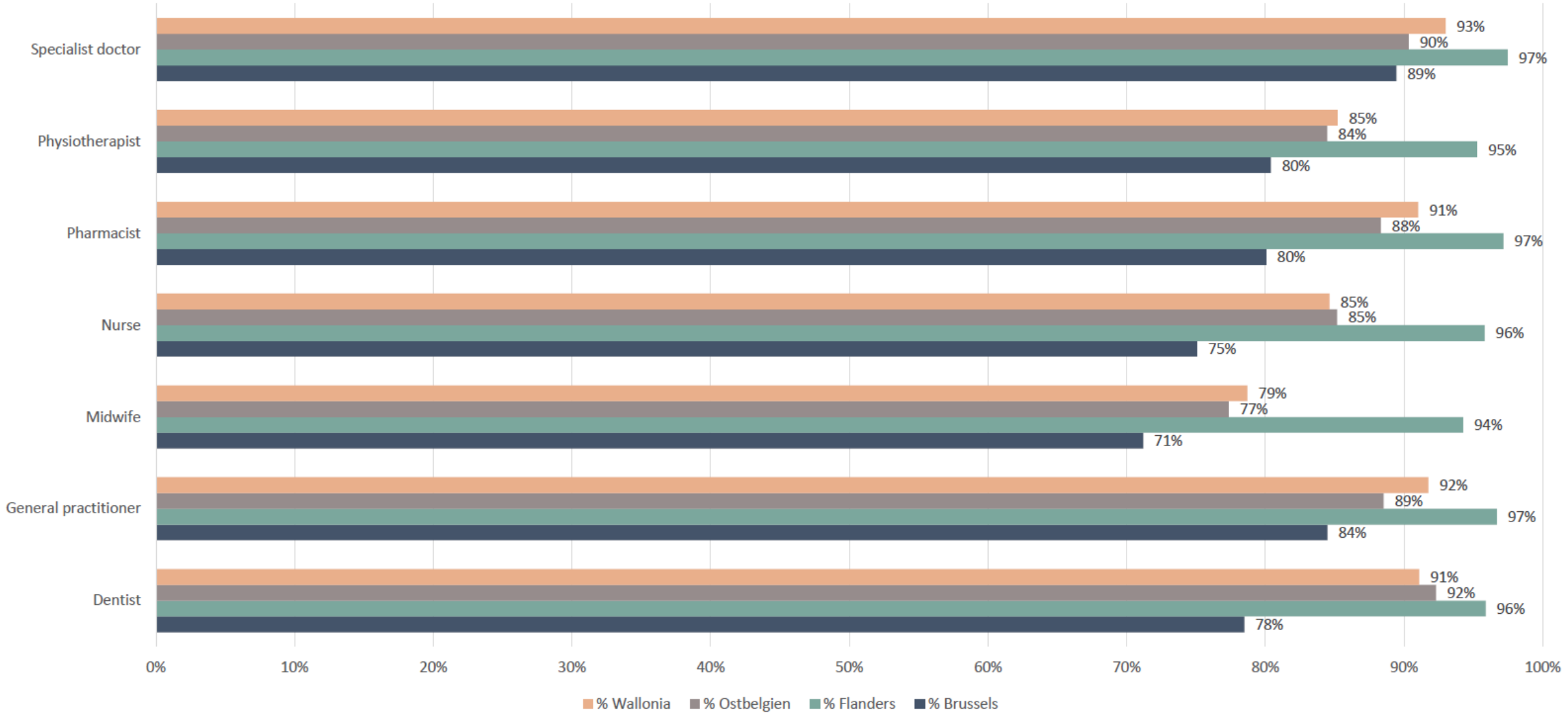





NB: data for France seem incorrect on the ECDC dashboard as they do not

# % booster dose amongst fully-vaccinated population of HCW

## Per federated entities and per main healthcare profession – updated 27/2



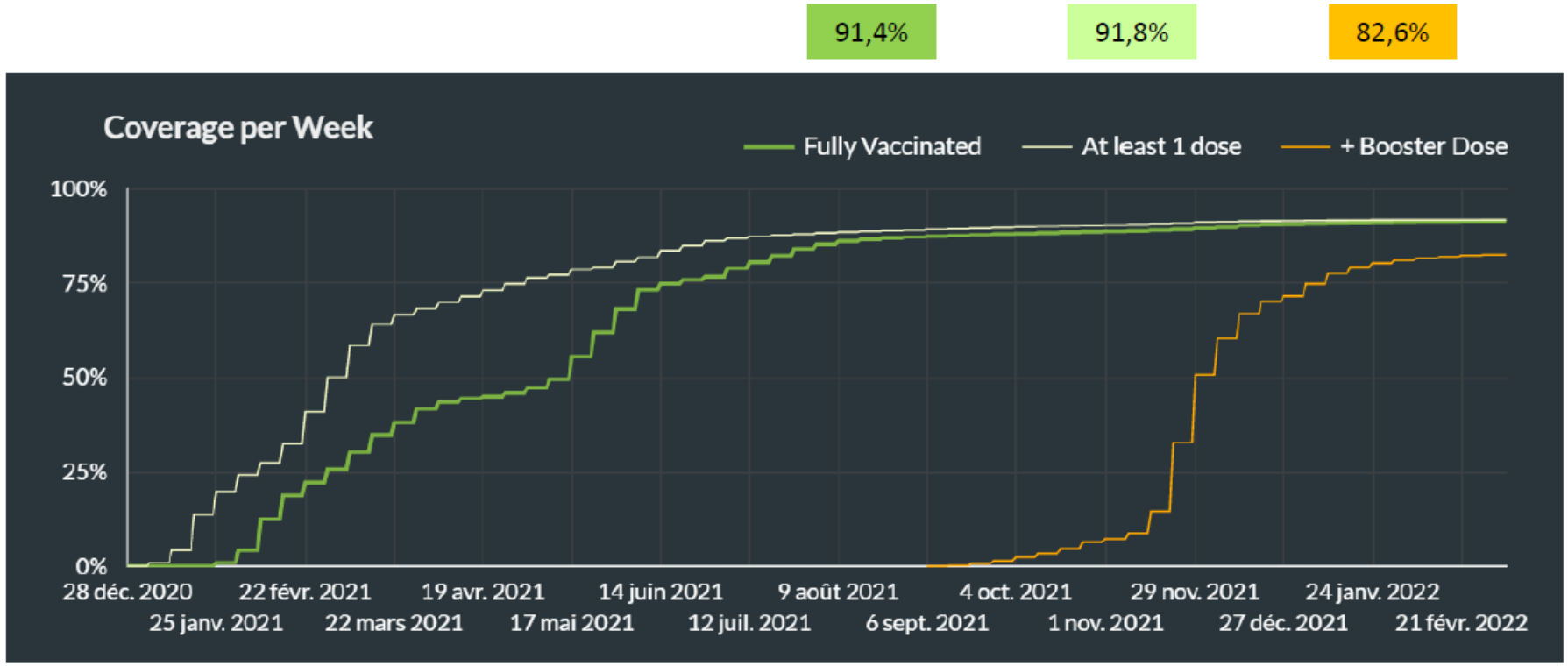



Source: Data Sciensano

# % booster dose amongst the whole population of HCW

Updated 17/3

## Belgium




Denominators = total health care workers

**Belgium : 538.989 HCW**

**Brussels : 39.909 HCW**

**Flanders : 329.178 HCW**

**Ostbelgien : 2.670 HCW**

**Wallonia : 167.232 HCW**

## By federated entities

All HCW combined
**fully-vaccinated**

- Brussels: 77% = 30.563
- Flanders: 96% = 314.721
- Ostbelgien: 82% = 2.198
- Wallonia: 87% = 145.219

**Belgium : 492.701 HCW**

All HCW combined
**F-V with booster**

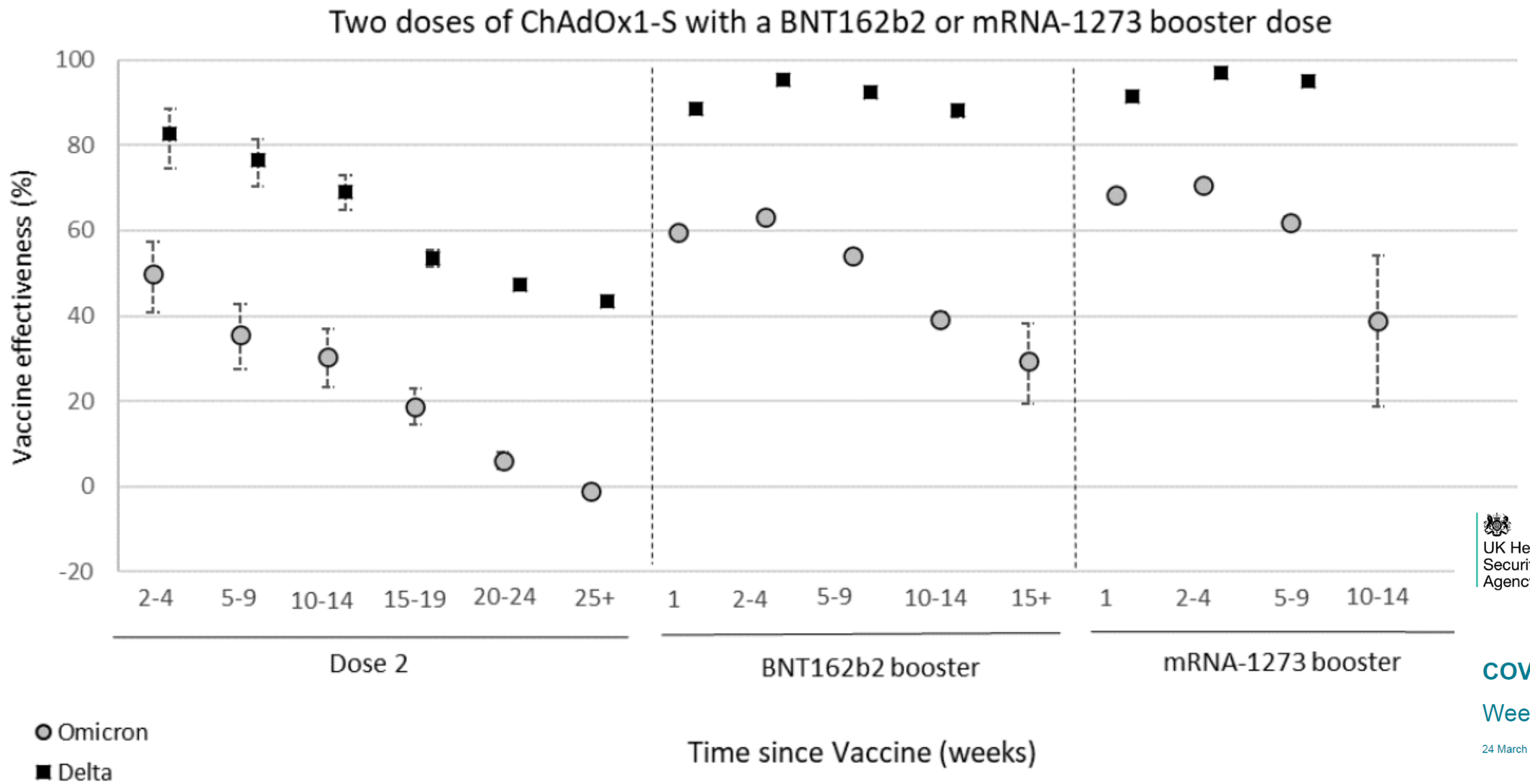
- Brussels: 58% = 23.191
- Flanders: 91% = 298.872
- Ostbelgien: 68% = 1.843
- Wallonia: 73% = 121.462

**Belgium : 445.368 HCW**

# Boosters en Omikron/2

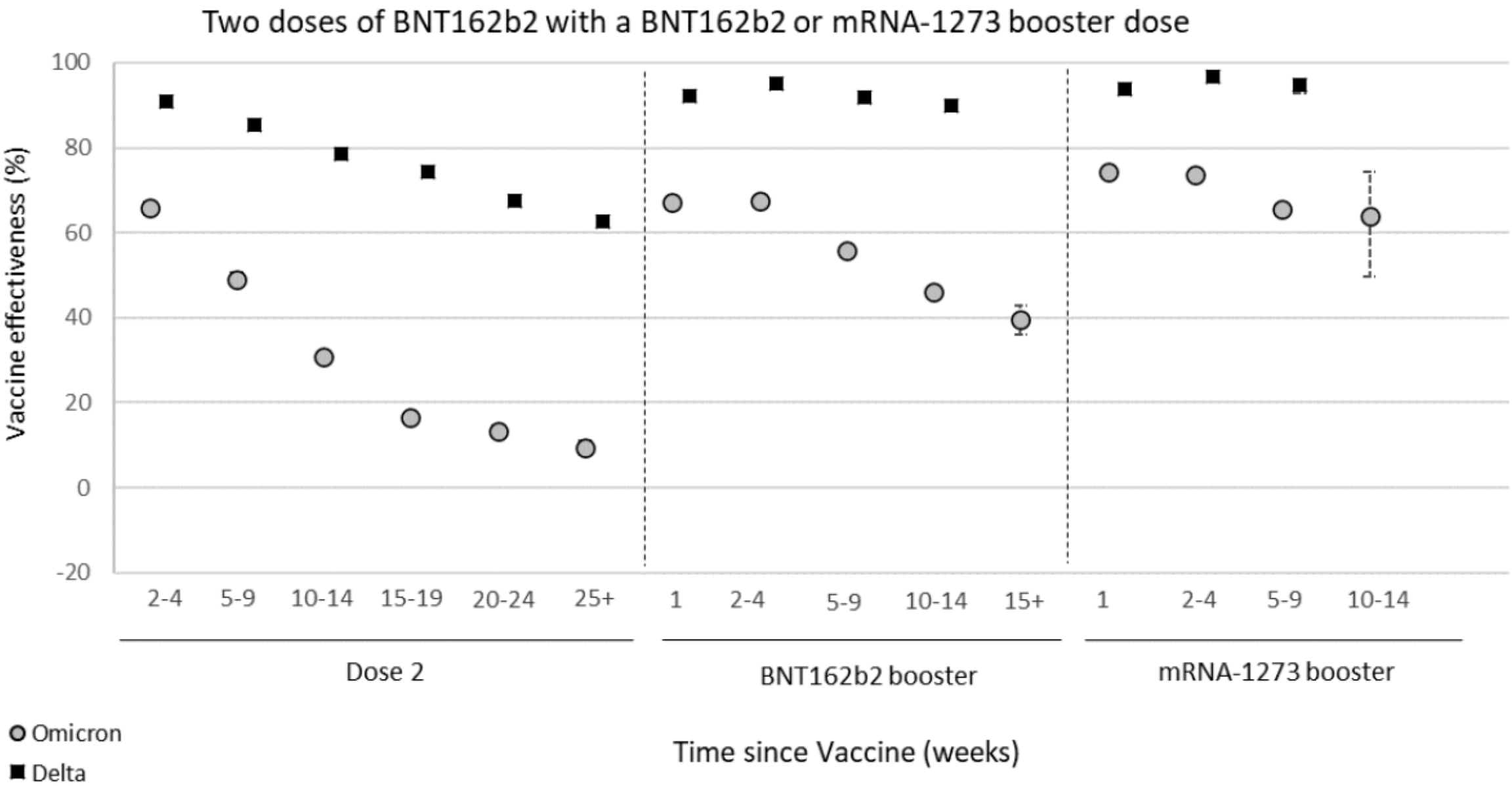
**Figure 1. Vaccine effectiveness against symptomatic disease by period after the second and booster doses for Delta (black squares) and Omicron (grey circles) for a) recipients of 2 doses of Astrazeneca (ChAdOx1-S) vaccine as the primary course and Pfizer (BNT162b2) or Moderna (mRNA-1273) as a booster; b) recipients of 2 doses of Pfizer vaccine as the primary course and Pfizer or Moderna as a booster, and c) 2 doses of Moderna as a primary course and Pfizer or Moderna as a booster**

a)

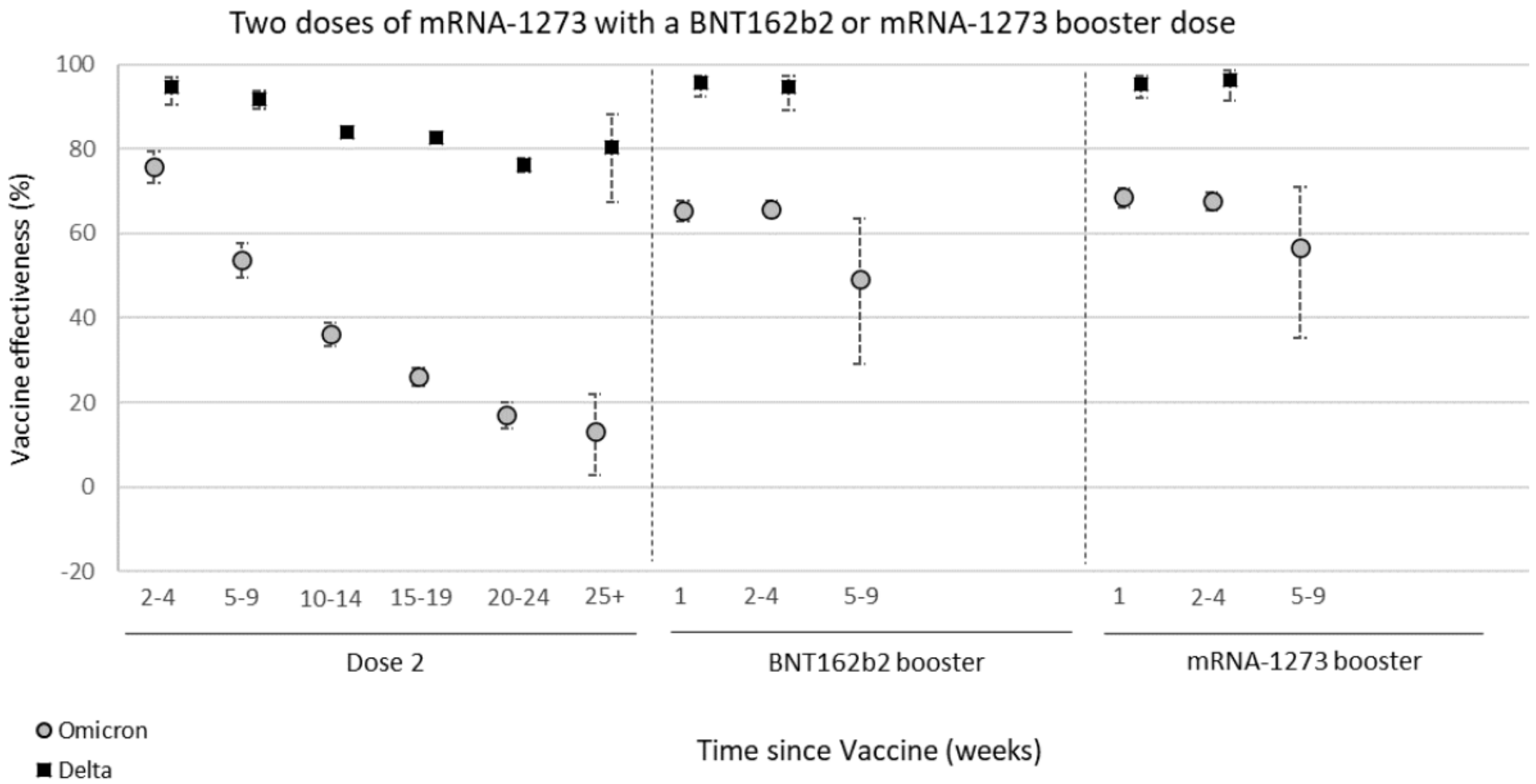



UK Health Security Agency

b)

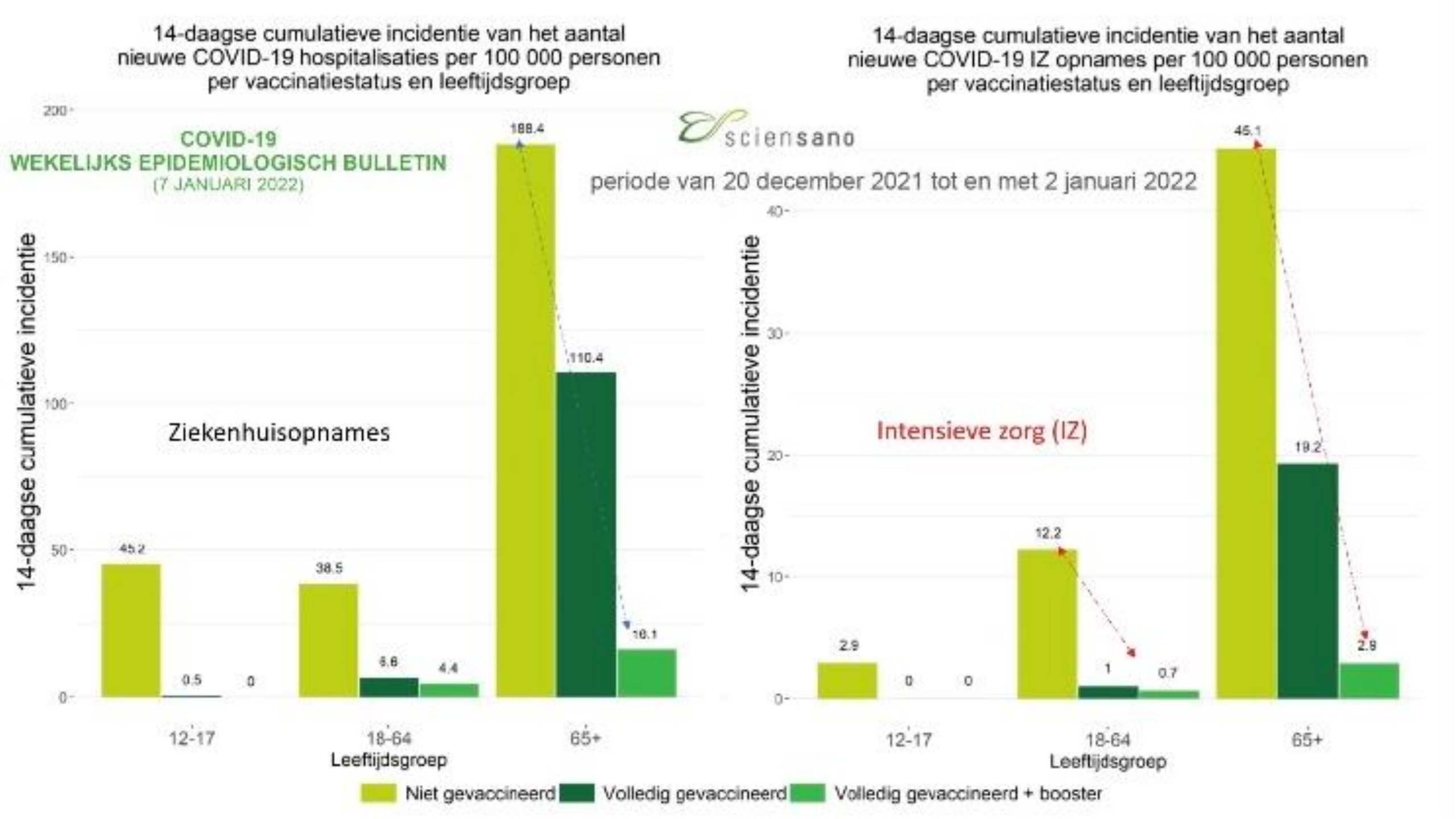

Two doses of BNT162b2 with a BNT162b2 or mRNA-1273 booster dose
Vaccine effectiveness (%)
100
80
60
40
20
0
-20
2-4
5-9
10-14
15-19
20-24
25+
1
2-4
5-9
10-14
15+
1
2-4
5-9
10-14
Dose 2
BNT162b2 booster
mRNA-1273 booster
Omicron
Delta
Time since Vaccine (weeks)

c)


Two doses of mRNA-1273 with a BNT162b2 or mRNA-1273 booster dose
Vaccine effectiveness (%)
100
80
60
40
20
0
-20
2-4
5-9
10-14
15-19
20-24
25+
1
2-4
5-9
1
2-4
5-9
Dose 2
BNT162b2 booster
mRNA-1273 booster
Omicron
Delta
Time since Vaccine (weeks)

| Feature | BA.1 | BA.2 |
|---|---|---|
| Transmission (infectiousness) | Reference | 30% higher |
| Viral Load | Reference | Nearly 2-fold |
| Mutations in Spike | Reference | 8 different, not shared |
| Neutralizing antibodies median titer | Reference | Lower level, ~70% |
| Disease-causing potential (virulence) | Reference | Same, but infects many more people |
| 2-shot effectiveness vs hospitalizations* | | |
| Up to 6 months | 63% (95% CI 47,75) | 69% (95% CI 27,87) |
| Past 6 months | 32% (95% CI 11,49) | 50% (95% CI 7,73) |
| 3-shot effectiveness vs hospitalizations * | | |
| Up to 70-days | 81% (95% CI 75,85) | 83% (95% CI 71,91) |
| Past 70-days | 73% (95% CI 65,79) | 70% (95% CI 50,82) |

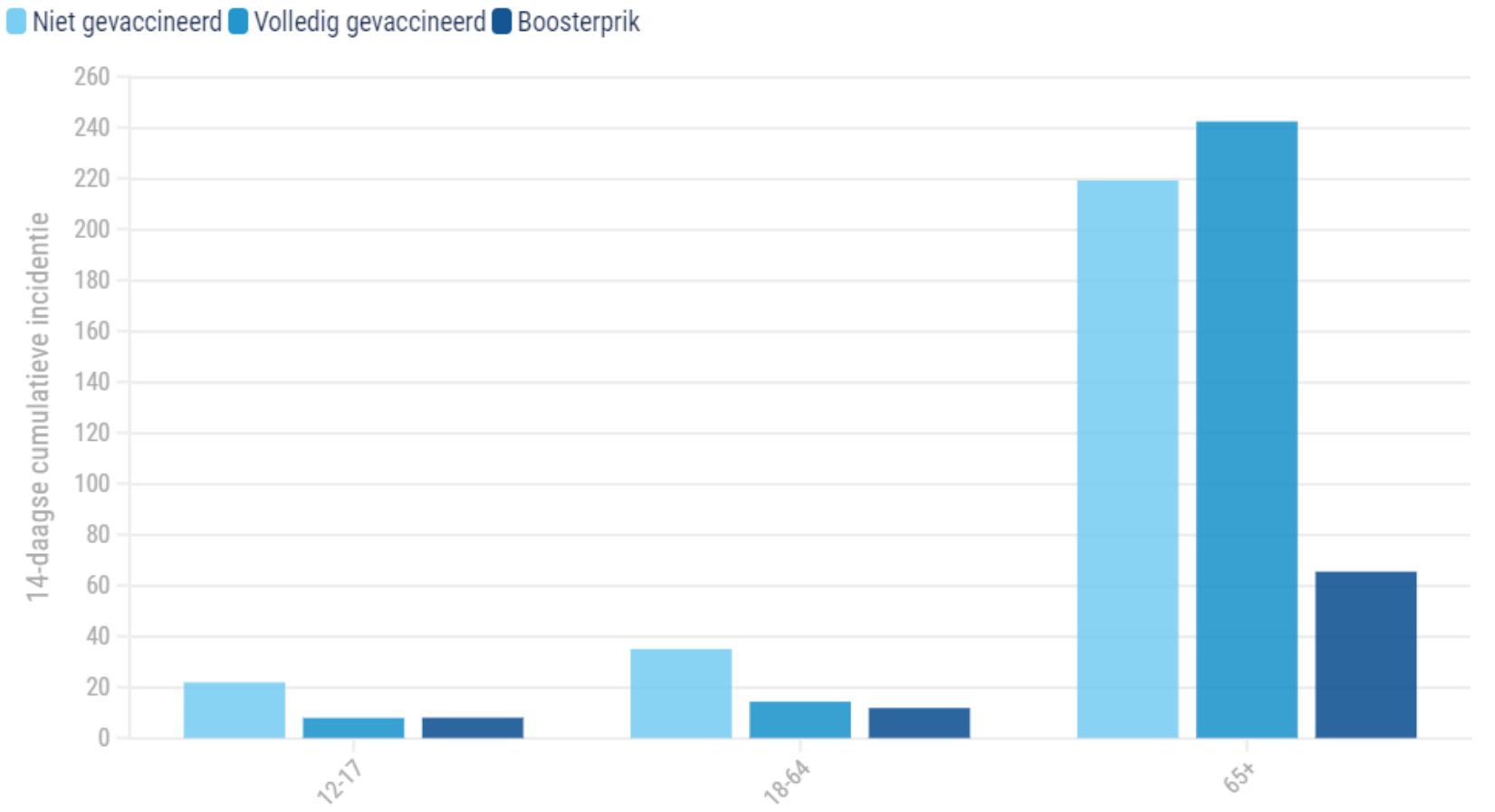
*data from UKHSA March 24 report using Emergence Care dataset, includes "for" and "with" Covid so under-estimates effectiveness


14-daagse cumulatieve incidentie van het aantal nieuwe COVID-19 hospitalisaties per 100 000 personen per vaccinatiestatus en leeftijdsgroep
COVID-19
WEKELIJKS EPIDEMIOLOGISCH BULLETIN
(7 JANUARI 2022)
sciensano
periode van 20 december 2021 tot en met 2 januari 2022
Ziekenhuisopnames
14-daagse cumulatieve incidentie
200
150
100
50
0
45.2
0.5
0
38.5
6.6
4.4
188.4
110.4
16.1
12-17
18-64
65+
Leeftijdsgroep
14-daagse cumulatieve incidentie van het aantal nieuwe COVID-19 IZ opnames per 100 000 personen per vaccinatiestatus en leeftijdsgroep
Intensieve zorg (IZ)
40
30
20
10
0
2.9
0
0
12.2
1
0.7
45.1
19.2
2.9
12-17
18-64
65+
Leeftijdsgroep
Niet gevaccineerd
Volledig gevaccineerd
Volledig gevaccineerd + booster

2 of 4

## Aantal nieuwe ziekenhuisopnames per 100.000 per vaccinatiestatus en leeftijdsgroep

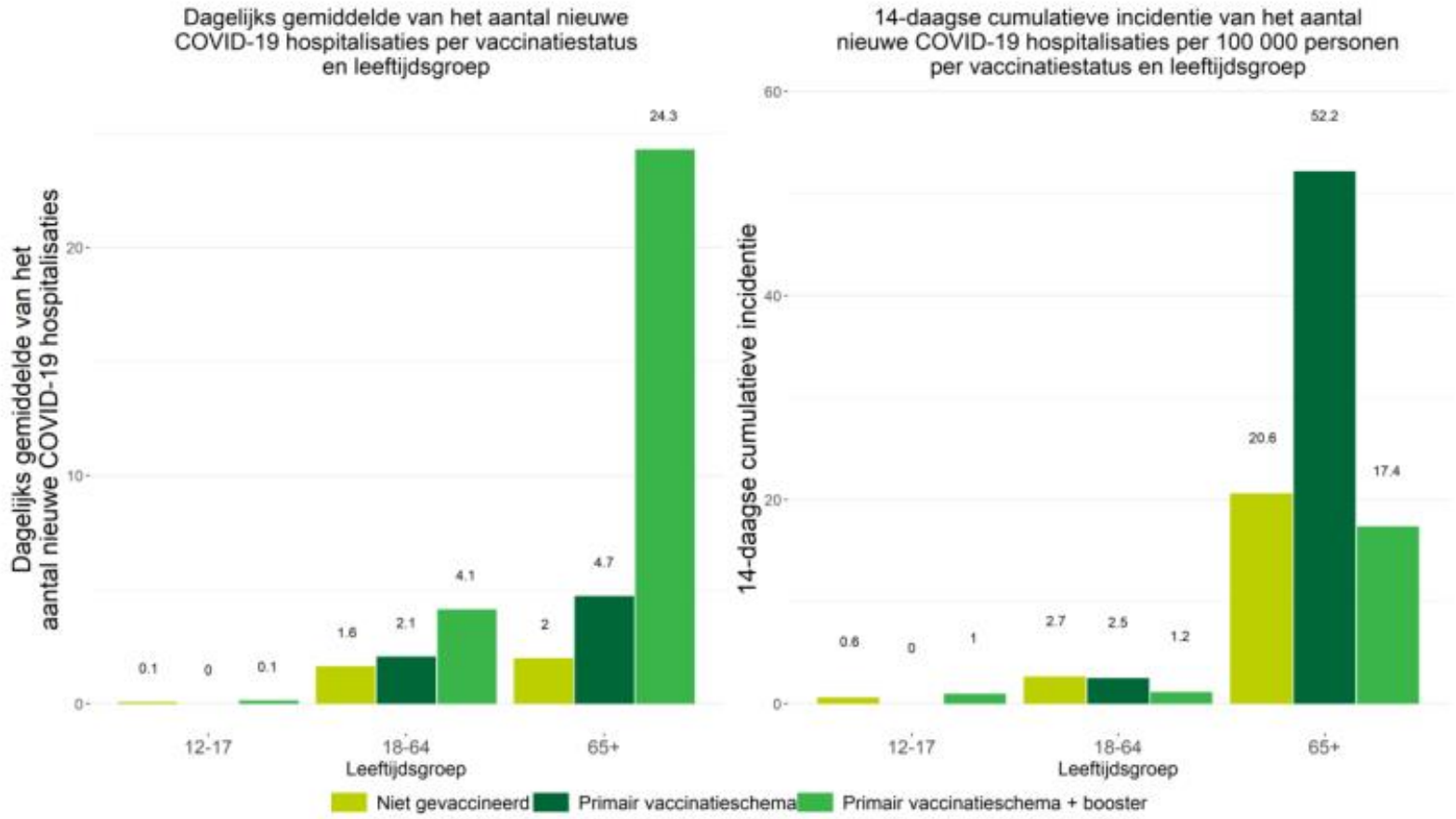
17 januari 2022 t.e.m. 30 januari 2022




Bron: Surge Capacity Survey, Sciensano • Aangezien bij deze monitoring de tijd tussen vaccinatie en ziekenhuisopname niet bekend is, wordt er bij deze berekening geen rekening gehouden met de 14 dagen wachttijd voor bescherming na vaccinatie. Personen die gedeeltelijk zijn gevaccineerd, en zij die minder dan 14 dagen volledig zijn gevaccineerd, zijn niet in deze grafiek opgenomen.

## a) Ziekenhuisopnames

Onderstaande grafieken tonen het gemiddelde aantal ziekenhuisopnames per dag en de cumulatieve incidentie over 14 dagen, per vaccinatiestatus en per leeftijdsgroep, voor de periode van 30 mei tot en met 12 juni 2022.

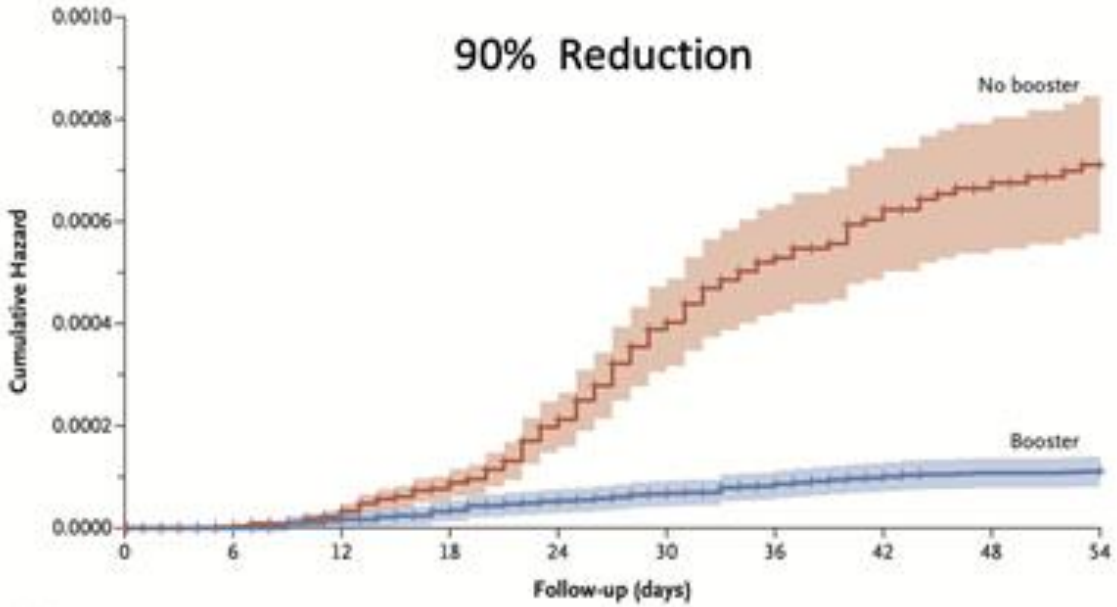



Bron: Surge Capacity Survey. Aangezien bij deze monitoring de tijd tussen vaccinatie en ziekenhuisopname niet bekend is, wordt er bij deze berekening geen rekening gehouden met de 14 dagen wachttijd voor bescherming na vaccinatie. Personen die gedeeltelijk zijn gevaccineerd, en zij wiens vaccinatiestatus onbekend is, zijn niet in deze grafiek opgenomen. De noemers die gebruikt worden voor de berekening van de incidenties komen overeen met het totale aantal personen dat 14 dagen voor de datum van de berekening de vermelde vaccinatiestatus heeft gekregen. Voor meer details over de gebruikte methodologie, gelieve secties 10.7 en 10.8 van het FAQ-document te raadplegen.

# 2° booster and the new variants

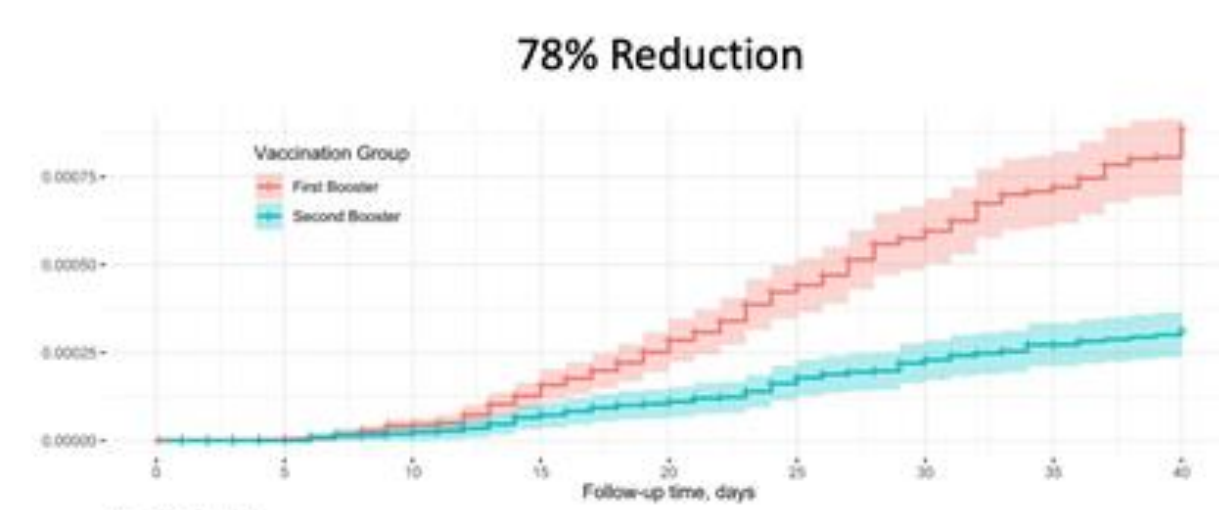
# Mortality Reduction at Calit Health for Initial Booster and Second Booster

## 3rd shot vs 2 shots, age 50+




| No. at Risk | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| No booster | 841,428 | 723,609 | 520,459 | 326,741 | 202,797 | 145,021 | 111,761 | 101,695 | 90,036 | 83,989 |
| Booster | 46,259 | 119,332 | 322,203 | 515,639 | 639,315 | 696,859 | 729,971 | 739,945 | 756,591 | 757,614 |

## 4th shot vs 3-shots, age 60+

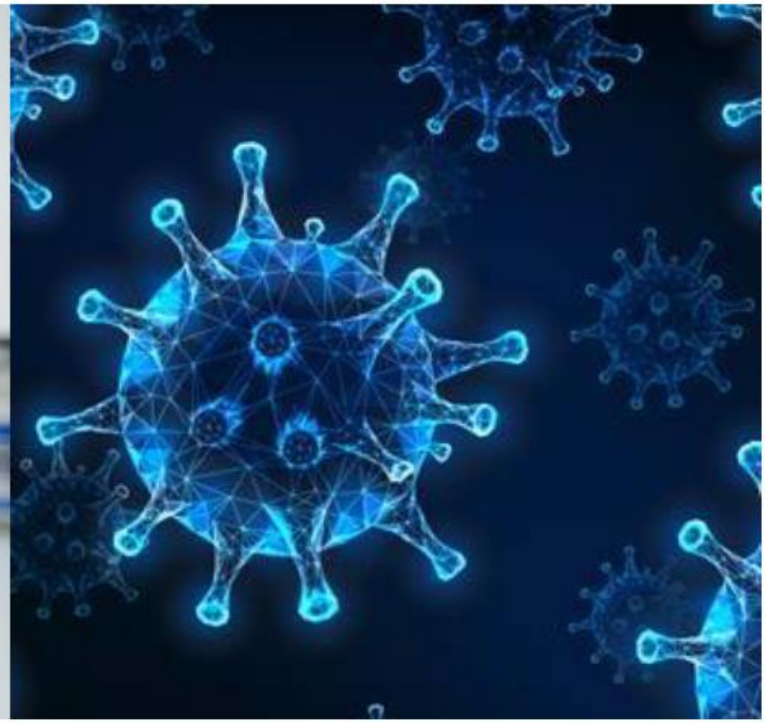



Number at risk

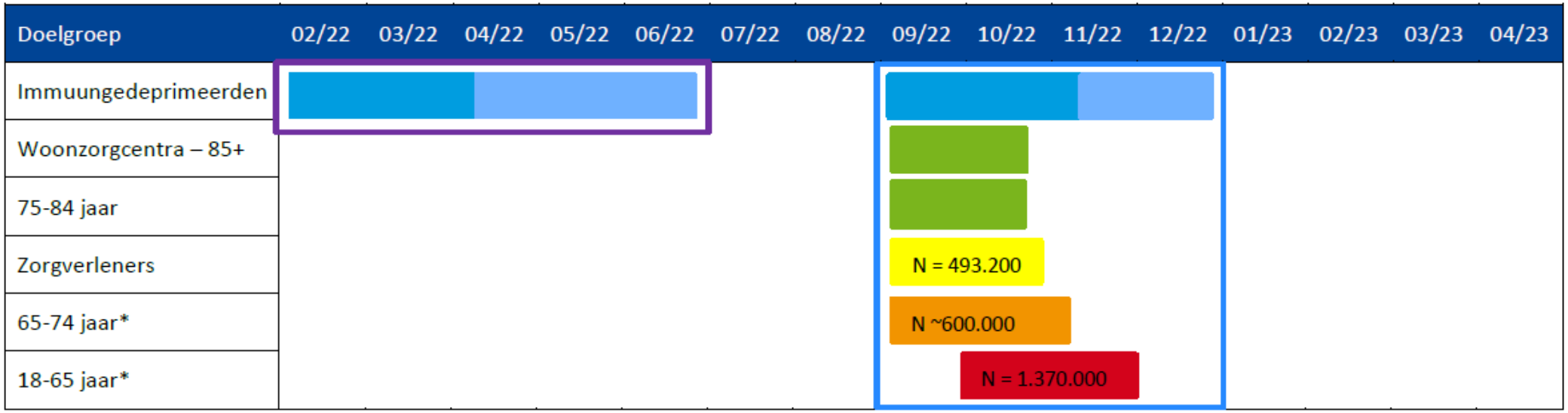
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| First Booster | 550648 | 453524 | 329688 | 284252 | 264512 | 250861 | 243292 | 238311 | 233847 |
| Second Booster | 12817 | 109774 | 233373 | 278549 | 298038 | 311424 | 318775 | 323619 | 328022 |

# ADVIES VAN DE TASK FORCE OVER DE TOEKOMSTIGE VACCINATIESTRATEGIE VOOR 2022

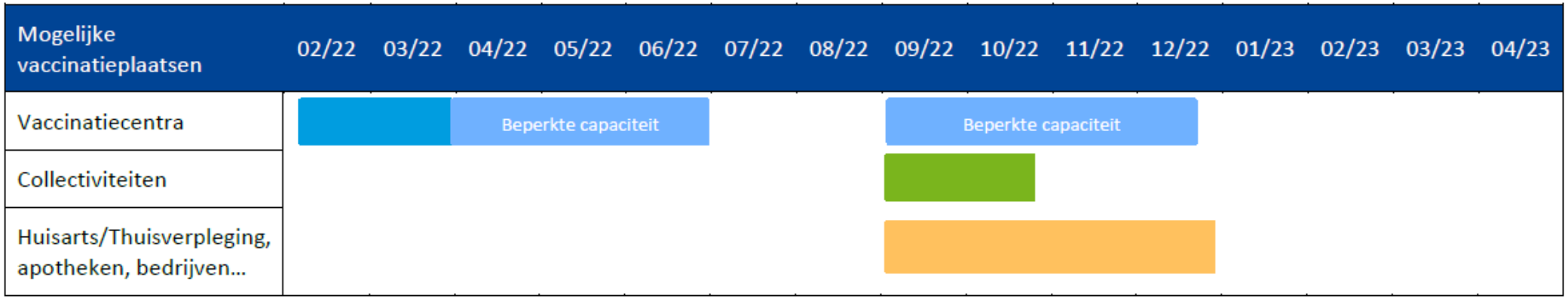
**VERSIE VAN 01 MAART 2022**

## 7.1. Tweede boostercampagne gericht op doelgroepen met risico 1 en 2 (scenario A)

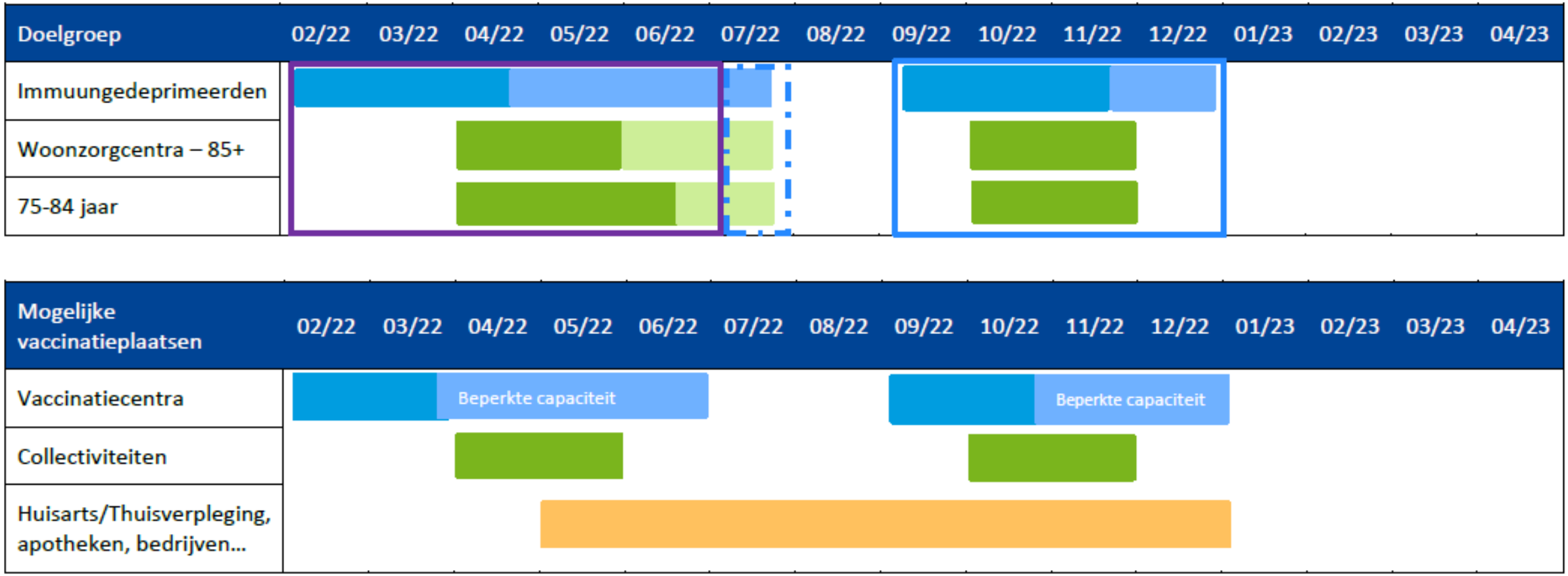



** in deze leeftijdscategorieën zijn enkel de mensen met comorbiditeiten opgenomen*



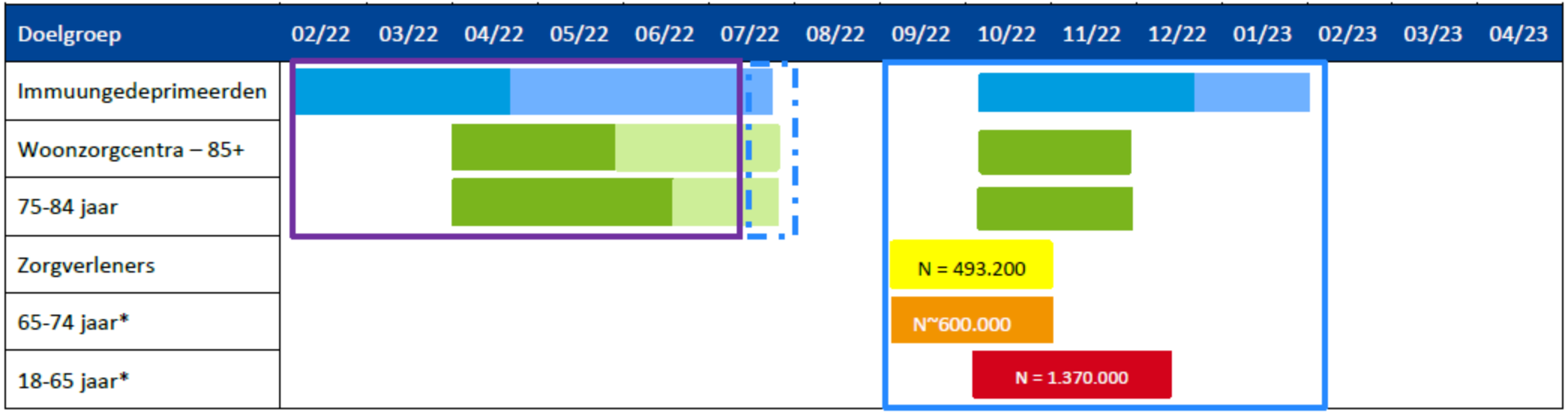

In **scenario A** start de 2de boostercampagne in september 2022 met de meest kwetsbaren, vanwege hun hoge leeftijd of door hun verlaagde immuniteit. De tweede groep, bestaande uit zorgverleners en volwassenen met comorbiditeiten (prioriteit 2) zou dan in oktober 2022 worden uitgenodigd. Naast deze doelgroepen zouden ook personen die na overleg met hun huisarts een boostervaccin wensen te krijgen, aan de doelgroepen kunnen worden toegevoegd.

## 7.2. Tweede boostercampagne gericht op risicogroepen 1 (scenario B)

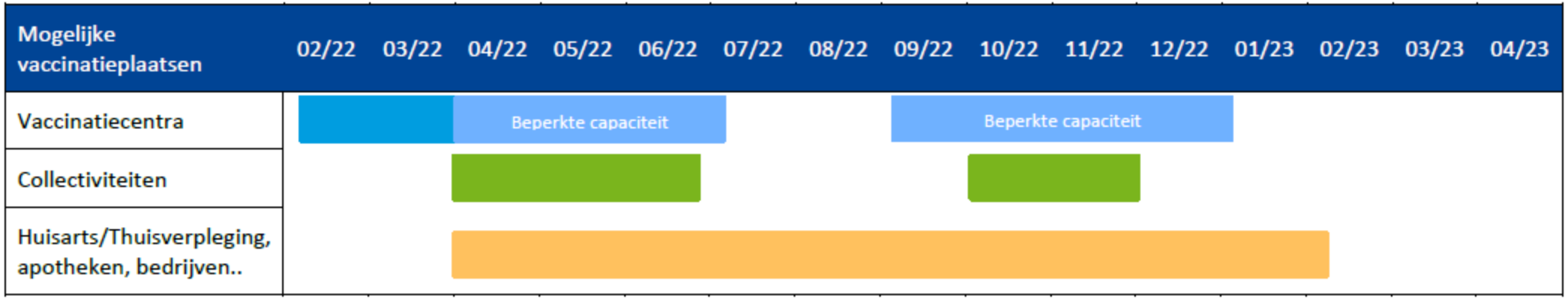



**Scenario B** is gericht op de meest kwetsbare mensen (prioriteit 1). In de periode in het paarse kader zouden als boostervaccins de originele vaccins (Wuhan-stam) worden gebruikt. Vanaf juli 2022 zijn er misschien aangepaste vaccins beschikbaar (blauw kader - stippellijn), maar het blijft tot dusver onduidelijk welke vaccins daadwerkelijk op de markt zullen worden gebracht (monovalente vaccins tegen omikron of multivalente vaccins).

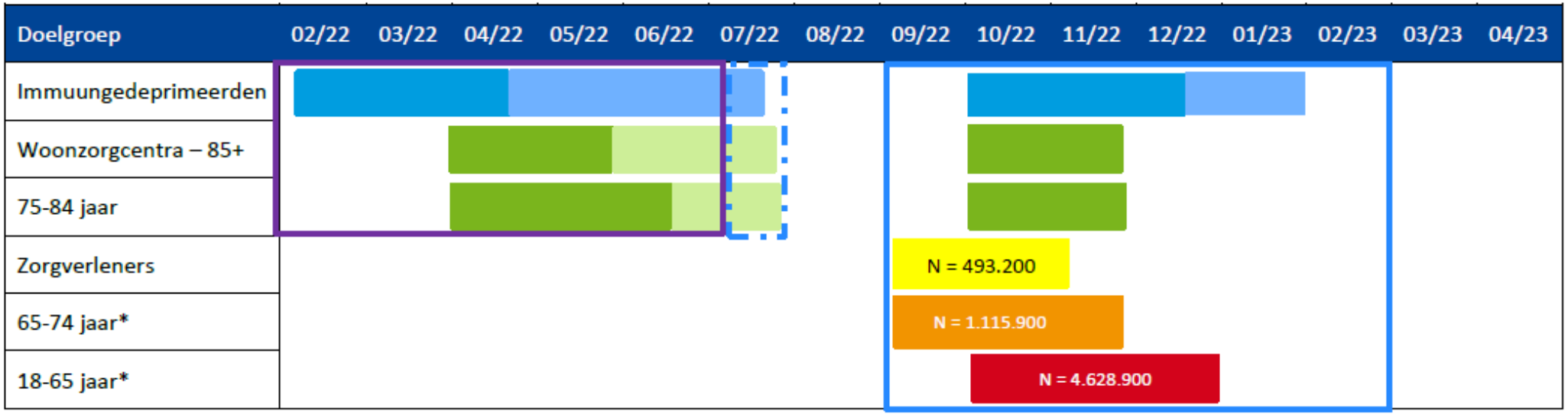
## 7.3. Tweede boostercampagne gericht op de doelgroepen met risico 1 en 2 (scenario C)



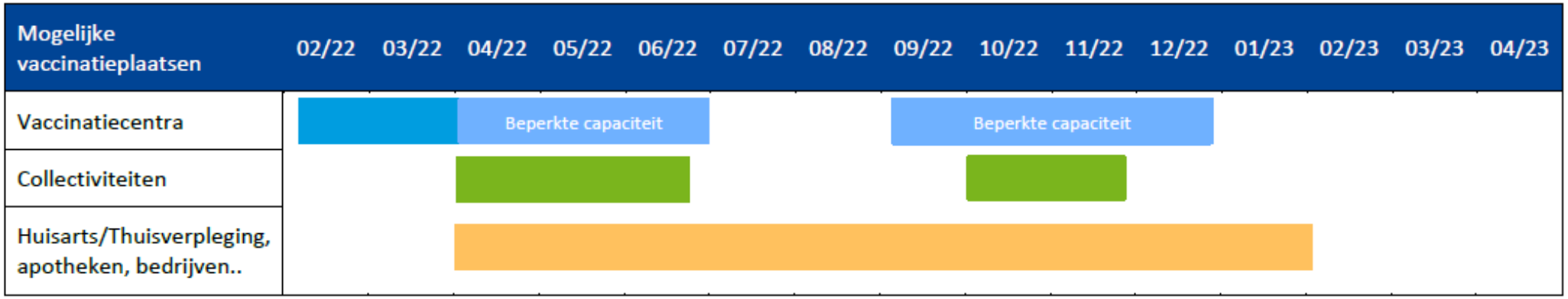

** in deze leeftijdscategorieën zijn enkel personen met comorbiditeiten opgenomen*



## 7.4. Tweede boostercampagne naar gelang van het risiconiveau van de doelgroepen 1 tot 3 (scenario D)




** in deze leeftijdscategorieën zijn mensen met of zonder comorbiditeiten opgenomen*

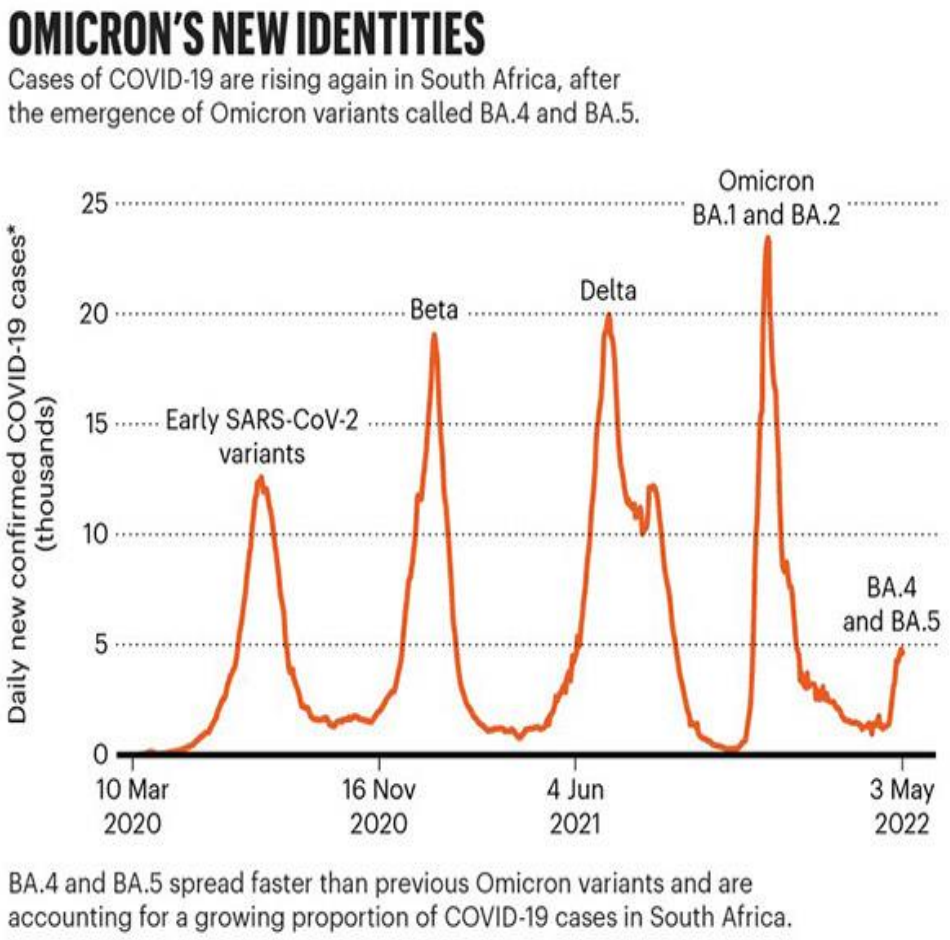



Scenario D is het meest ruime scenario, dat begint bij de meest kwetsbaren, om dan in het 2de semester van 2022 uit te breiden naar de volledige volwassen bevolking. Naast deze doelgroepen zouden ook burgers die na overleg met hun huisarts een boostervaccin wensen te krijgen, aan de doelgroepen kunnen worden toegevoegd. Het gaat dan vooral over jongeren  personen die omwille van hun leeftijd (<18 jaar) nog geen deel uitmaakten van de doelgroep.

# Second booster policy

- **Belgium (Q2 - 2022)**
  - 80 and older
  - Nursing homes
  - ….
- **Other countries:**
  - Risk groups
  - Co-morbidity
  - 50 and older
  - 65 and older
  - 18 and older

# Nature, 10 May 2022




## A more predictable future for SARS-CoV-2?

The rise of new offshoots of the Omicron coronavirus variant could mean that waves of infection are beginning to settle into predictable patterns, with new variants periodically emerging from circulating strains. Variants BA.4 and BA.5 seem to be slightly more transmissible than earlier forms of Omicron and are likely to trigger waves of infections. Scientists note that variants now seem to emerge roughly every six months — but say we shouldn't rule out more surprises from SARS-CoV-2.

# Who should get the boosters?

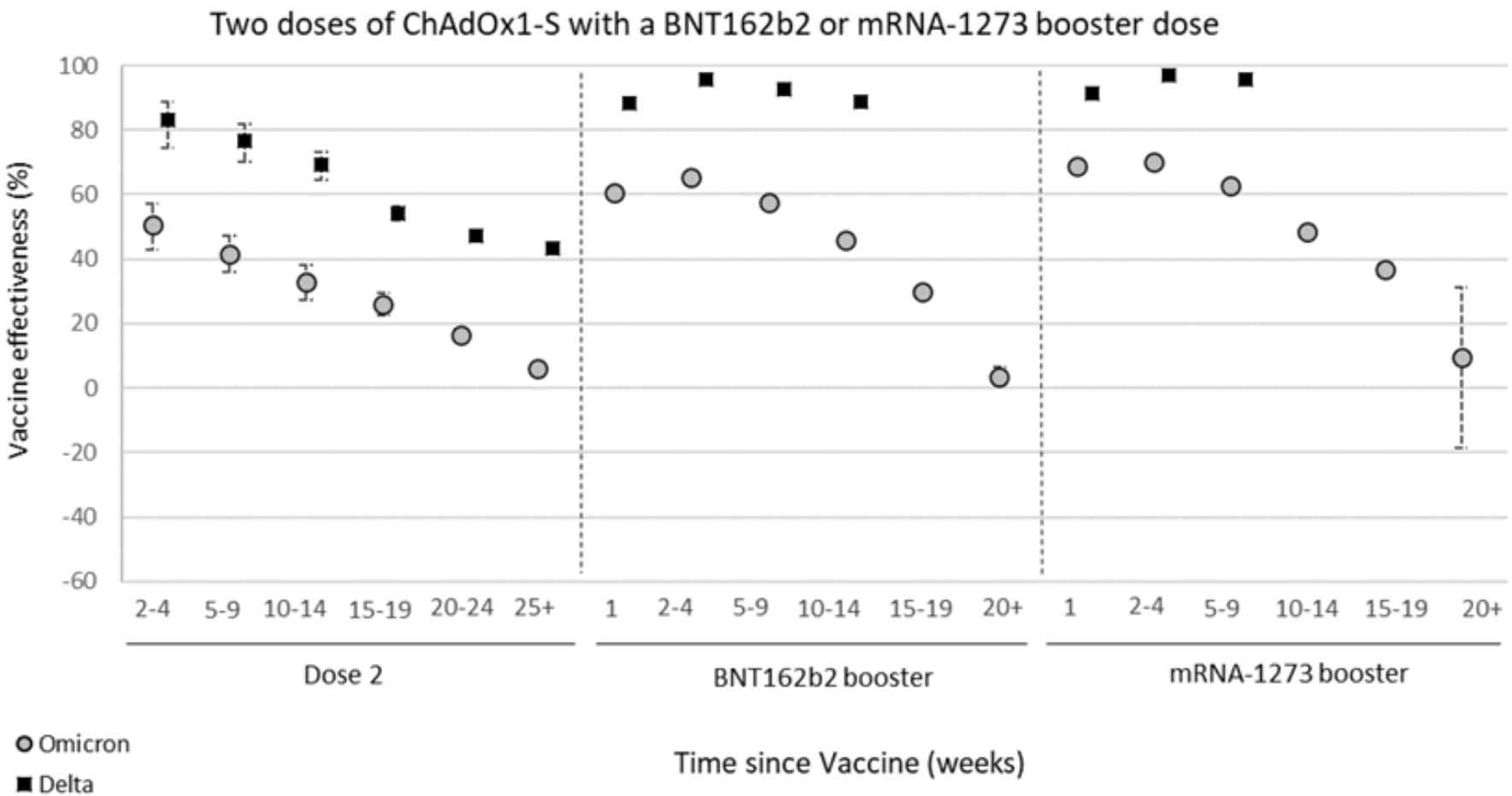
Boost vulnerable groups and hold in reserve a surge capacity in case of a serious event.

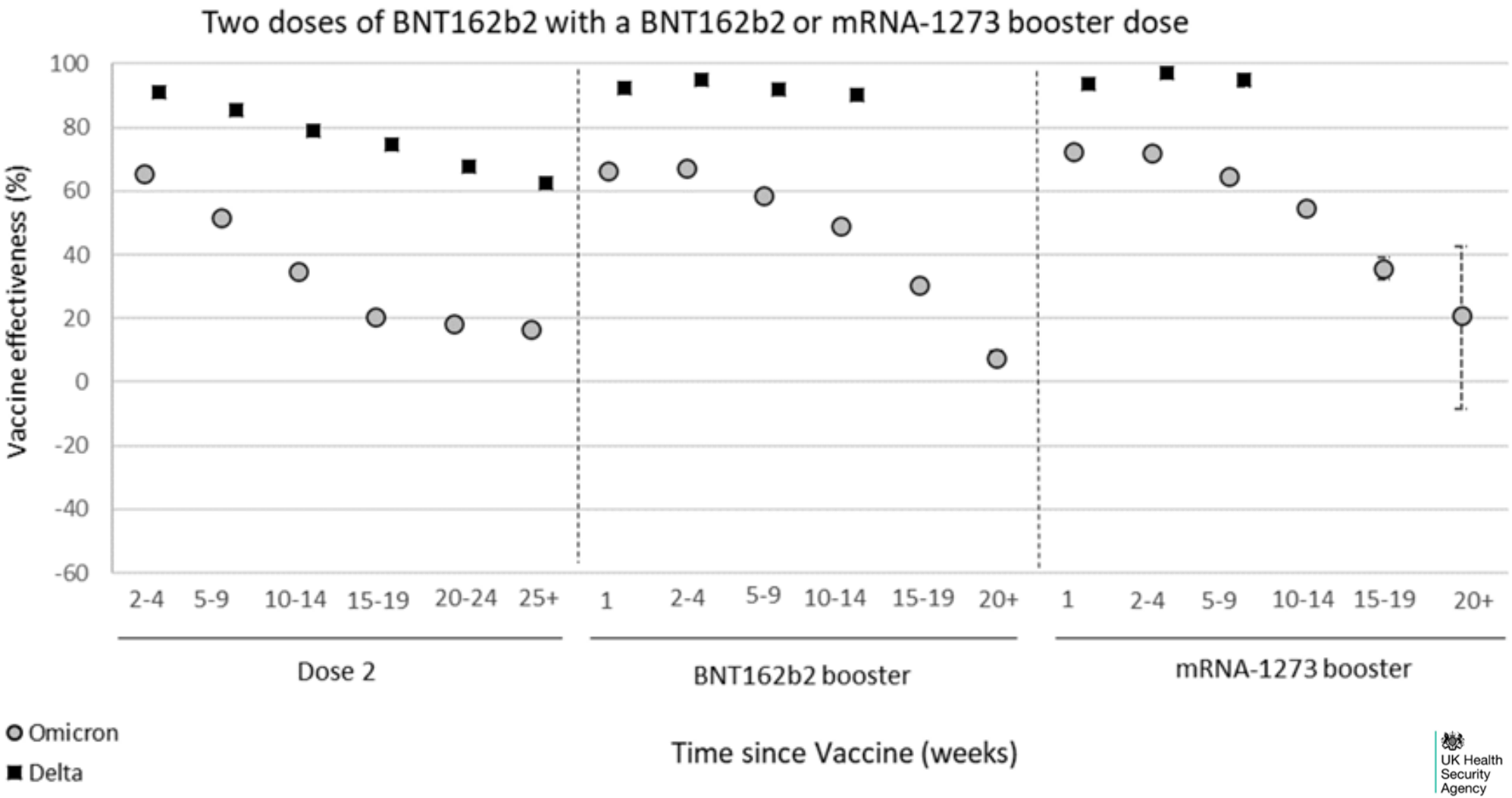
In the UK JCVI have issued interim advice

- Residents in a care home for older adults and staff
- Frontline health and social care workers
- All aged 65 year and over
- Adults 16-64 in a clinical risk group

**Figure 1. Vaccine effectiveness against symptomatic disease by period after the second and booster doses for Delta (black squares) and Omicron (grey circles) for a) recipients of 2 doses of AstraZeneca (ChAdOx1-S) vaccine as the primary course and Pfizer (BNT162b2) or Moderna (mRNA-1273) as a booster; b) recipients of 2 doses of Pfizer vaccine as the primary course and Pfizer or Moderna as a booster, and c) 2 doses of Moderna as a primary course and Pfizer or Moderna as a booster**

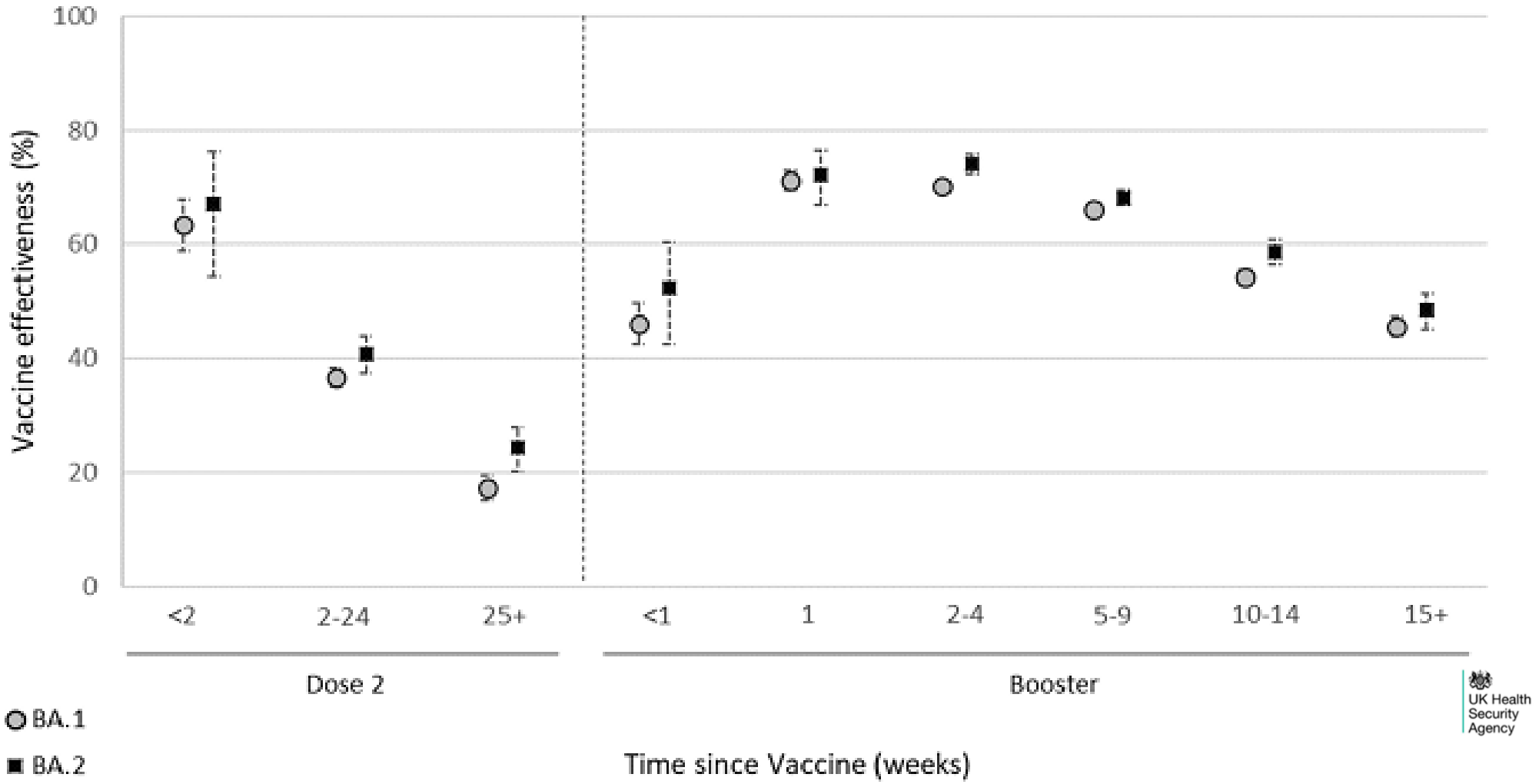
a)






UK Health Security Agency

## Figure 2. Vaccine effectiveness against symptomatic disease after 2 doses or a booster dose




UK Health Security Agency

**Table 1. vaccine effectiveness against hospitalisation using different definitions of hospitalisations in a) 18 to 64 year olds and b) 65 year olds and over**

| | | ECDS symptomatic with onset date | SUS at least 2 days with ARI code in primary field | SUS at least 2 days and either oxygen, ventilation or ICU with ARI code in primary field |
|---|---|---|---|---|
| **18 to 64** | | | | |
| | **Interval** | **VE** | **VE** | **VE** |
| Dose 1 | 0 to 27 | 48.5 (12.3 to 69.7) | 36.2 (-33.9 to 69.6) | |
| | 28+ | 48.7 (32.8 to 60.8) | 44.1 (25.6 to 58) | 75 (42.4 to 89.1) |
| Dose 2 | 0 to 13 | 39.6 (-31.5 to 72.2) | 88.9 (58.4 to 97) | |
| | 14 to 174 | 54.7 (45.3 to 62.4) | 69 (58.1 to 77) | 86.7 (63.6 to 95.1) |
| | 175+ | 34.6 (21.7 to 45.4) | 56.1 (46.4 to 64) | 82.3 (67.7 to 90.3) |
| Booster | 0 to 6 | 63.9 (52.2 to 72.8) | 74.3 (55.9 to 85) | 90.7 (56 to 98.1) |
| | 7 to 13 | 80.1 (73.5 to 85.1) | 90.9 (83.2 to 95.1) | |
| | 14 to 34 | 82.4 (78.6 to 85.6) | 88.6 (84.9 to 91.5) | 97.1 (92.2 to 98.9) |
| | 35 to 69 | 72.7 (67.2 to 77.2) | 85.8 (82.4 to 88.5) | 94.3 (88.9 to 97.1) |
| | 70 to 104 | 66.9 (59.1 to 73.3) | 80.2 (74.9 to 84.4) | 89.9 (78.3 to 95.3) |
| | 105+ | 53.6 (36.9 to 65.9) | 67.4 (53.1 to 77.4) | 75.9 (15.8 to 93.1) |
| **65+** | | | | |
| | **Interval** | **VE** | **VE** | **VE** |
| Dose 1 | 0 to 27 | | 43.9 (-41 to 77.7) | |
| | 28+ | | 53.4 (36.3 to 65.9) | 78.3 (43.7 to 91.7) |
| Dose 2 | 0 to 13 | | | |
| | 14 to 174 | 77.8 (45 to 91) | 82.3 (74.3 to 87.8) | 90.9 (72.6 to 97) |
| | 175+ | 66.7 (43.4 to 80.4) | 57.7 (49.6 to 64.4) | 73.4 (55.1 to 84.3) |
| Booster | 0 to 6 | 85.8 (61.5 to 94.7) | 77.9 (65.3 to 85.9) | 89.2 (63.1 to 96.8) |
| | 7 to 13 | 92.3 (76.3 to 97.5) | 84.7 (76 to 90.2) | 94.7 (71.6 to 99) |
| | 14 to 34 | 92.4 (86 to 95.8) | 91.3 (89.1 to 93.1) | 95.8 (91.3 to 97.9) |
| | 35 to 69 | 87 (79.2 to 91.8) | 89.3 (87.3 to 90.9) | 92.8 (88.4 to 95.6) |
| | 70 to 104 | 84 (74.6 to 89.9) | 88.1 (86.1 to 89.9) | 92.5 (88.1 to 95.2) |
| | 105+ | 76.9 (60.6 to 86.4) | 85.3 (82.4 to 87.6) | 86.8 (77.1 to 92.3) |

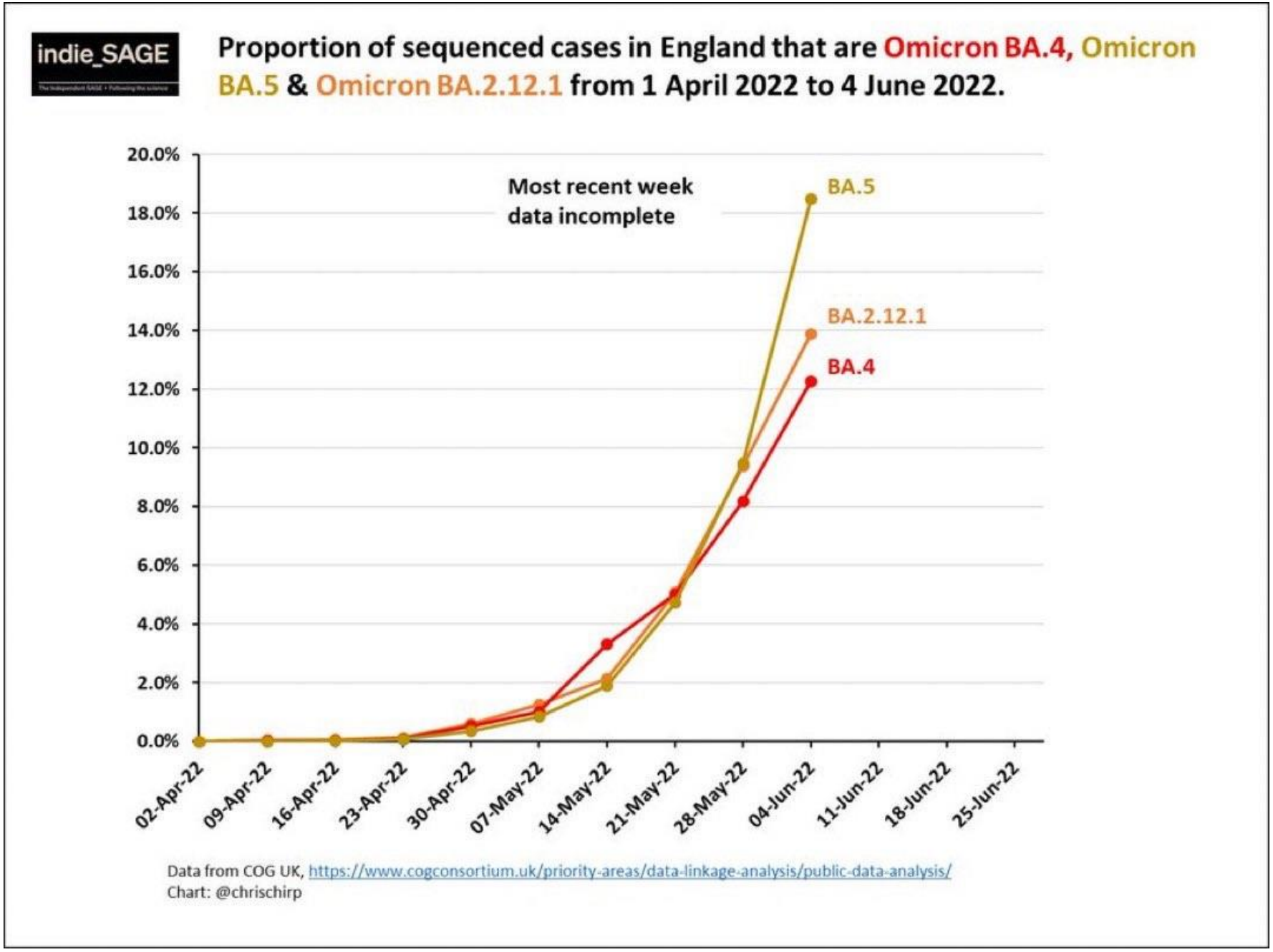
ECDS = Emergency Care Dataset (this analysis includes all admissions with a positive COVID-19 test via emergency care except for those coded as injuries). SUS = Secondary Users Service (this analysis includes all admissions to secondary care for >=2 days with a respiratory code in the first diagnostic field) (11).

UK Health Security Agency

**COVID-19 vaccine surveillance report**

Week 19

12 May 2022


indie_SAGE
Proportion of sequenced cases in England that are Omicron BA.4, Omicron BA.5 & Omicron BA.2.12.1 from 1 April 2022 to 4 June 2022.
Most recent week data incomplete
BA.5
BA.2.12.1
BA.4
20.0%
18.0%
16.0%
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
02-Apr-22
09-Apr-22
16-Apr-22
23-Apr-22
30-Apr-22
07-May-22
14-May-22
21-May-22
28-May-22
04-Jun-22
11-Jun-22
18-Jun-22
25-Jun-22
Data from COG UK, https://www.cogconsortium.uk/priority-areas/data-linkage-analysis/public-data-analysis/
Chart: @chrischirp

During the last two weeks of baseline surveillance - 30/05/2022 to 12/06/2022 - (546 sequences collected at this stage), one BA.1 strain was reported, while BA.2 represented 62.5% (significantly decreasing over the two weeks considered) of the circulating strains (Figure 3). Overall, 198 BA.4 and 387 BA.5 genomes have so far been detected in our country, respectively representing 6.4% (=) and 30.8% (↗) of the genomes for the last two weeks. Based on the latter, it seems that BA.5 has an advantage over BA.4 and will most likely become the dominant lineage in the upcoming weeks in Belgium.

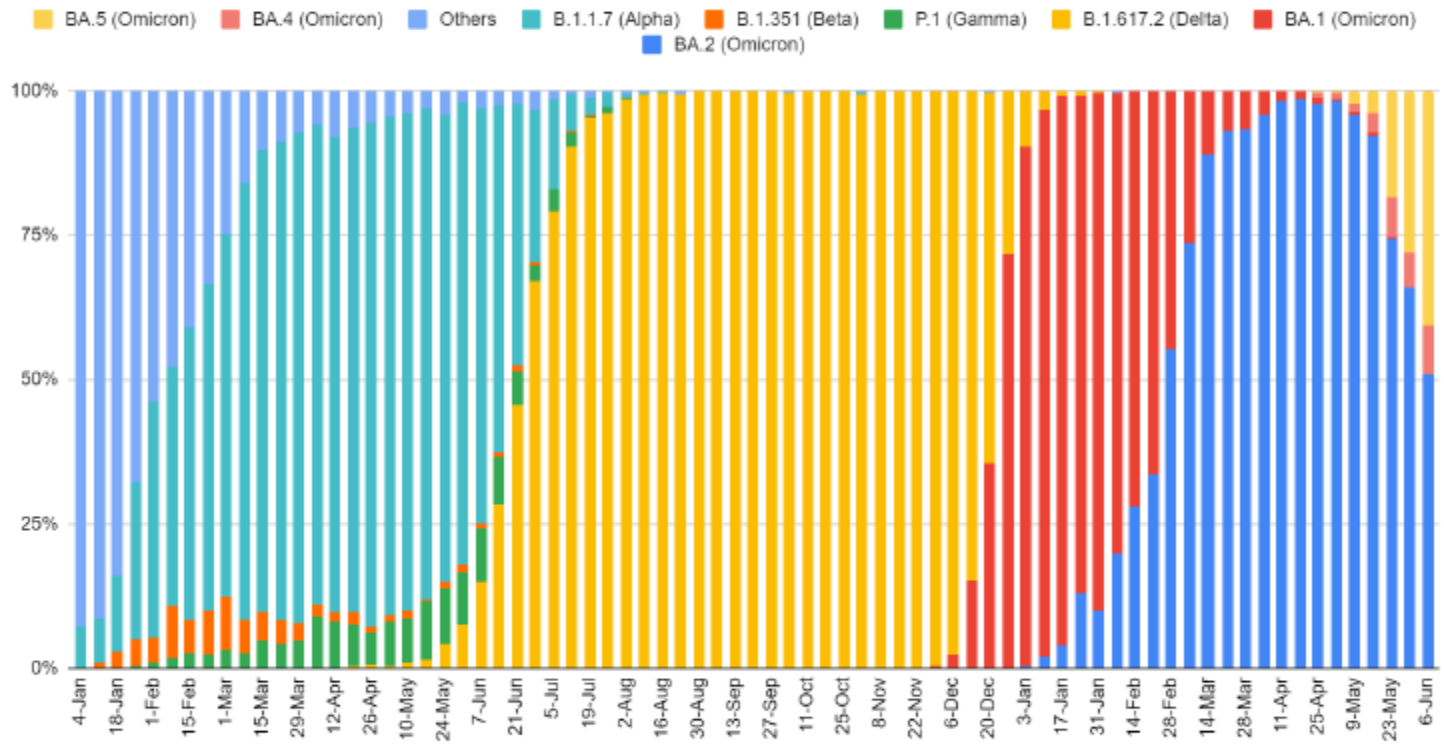
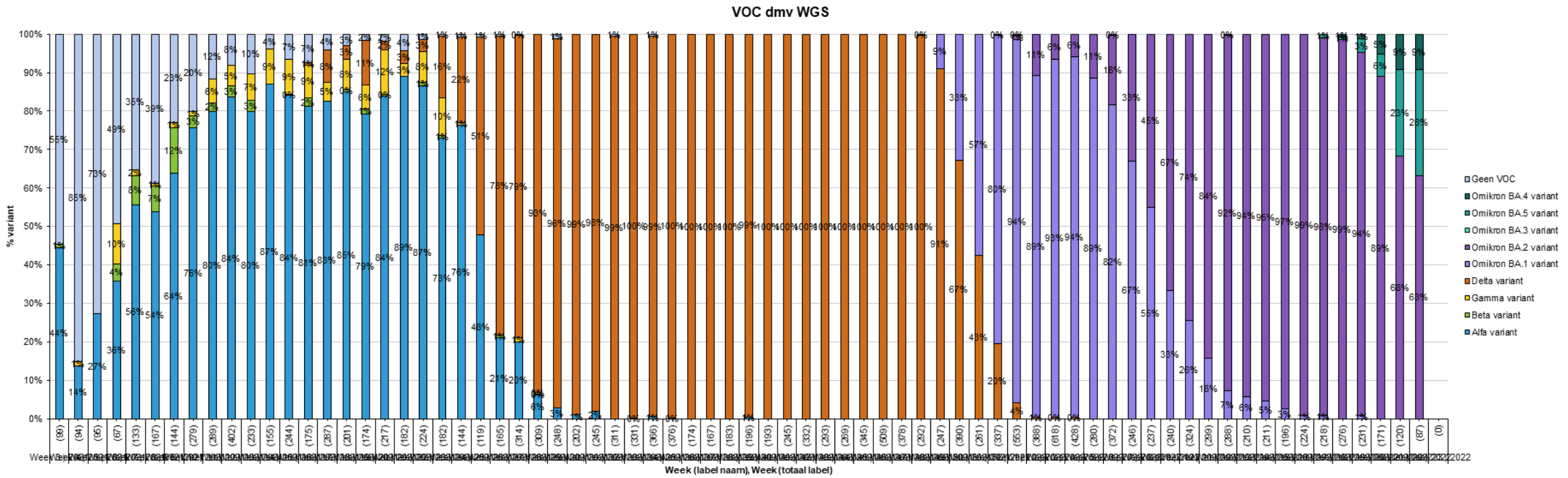
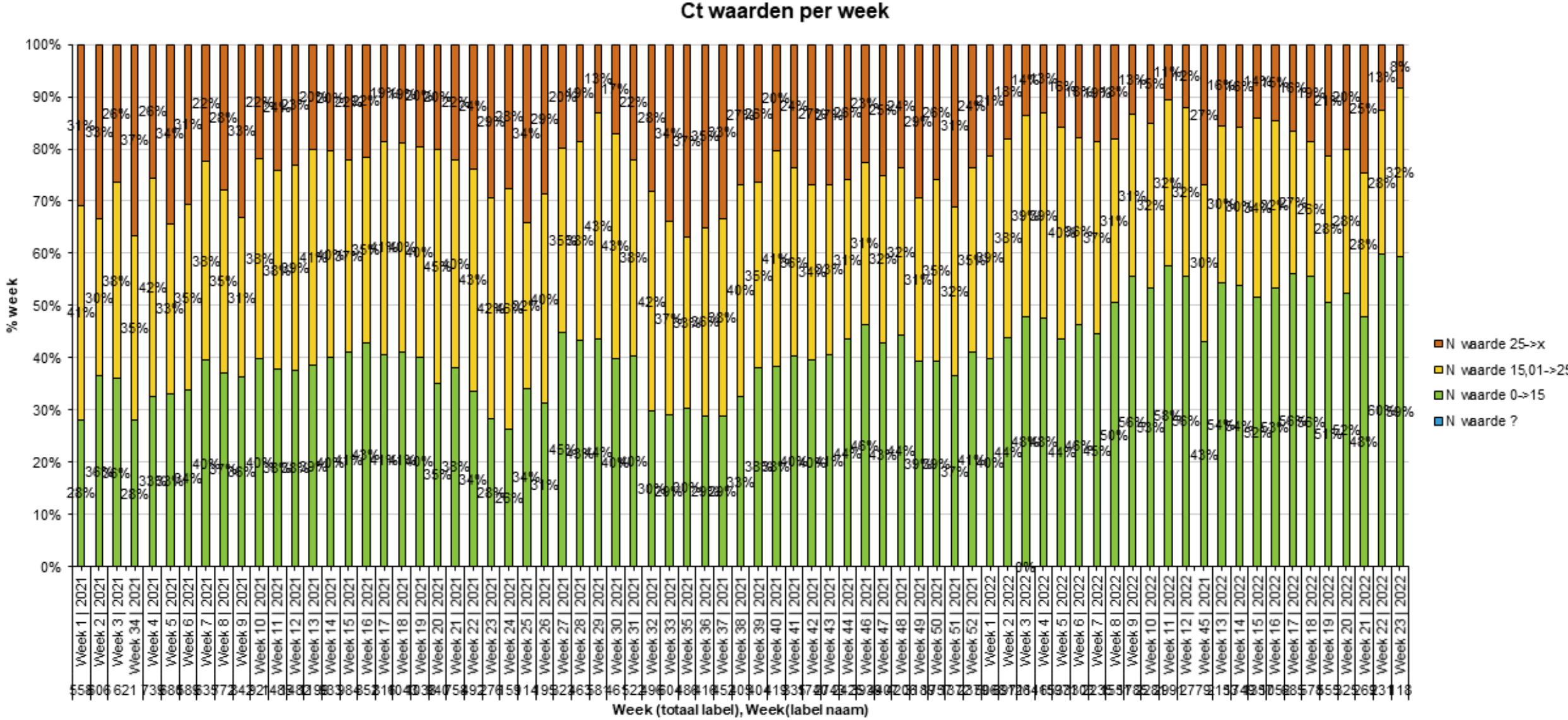
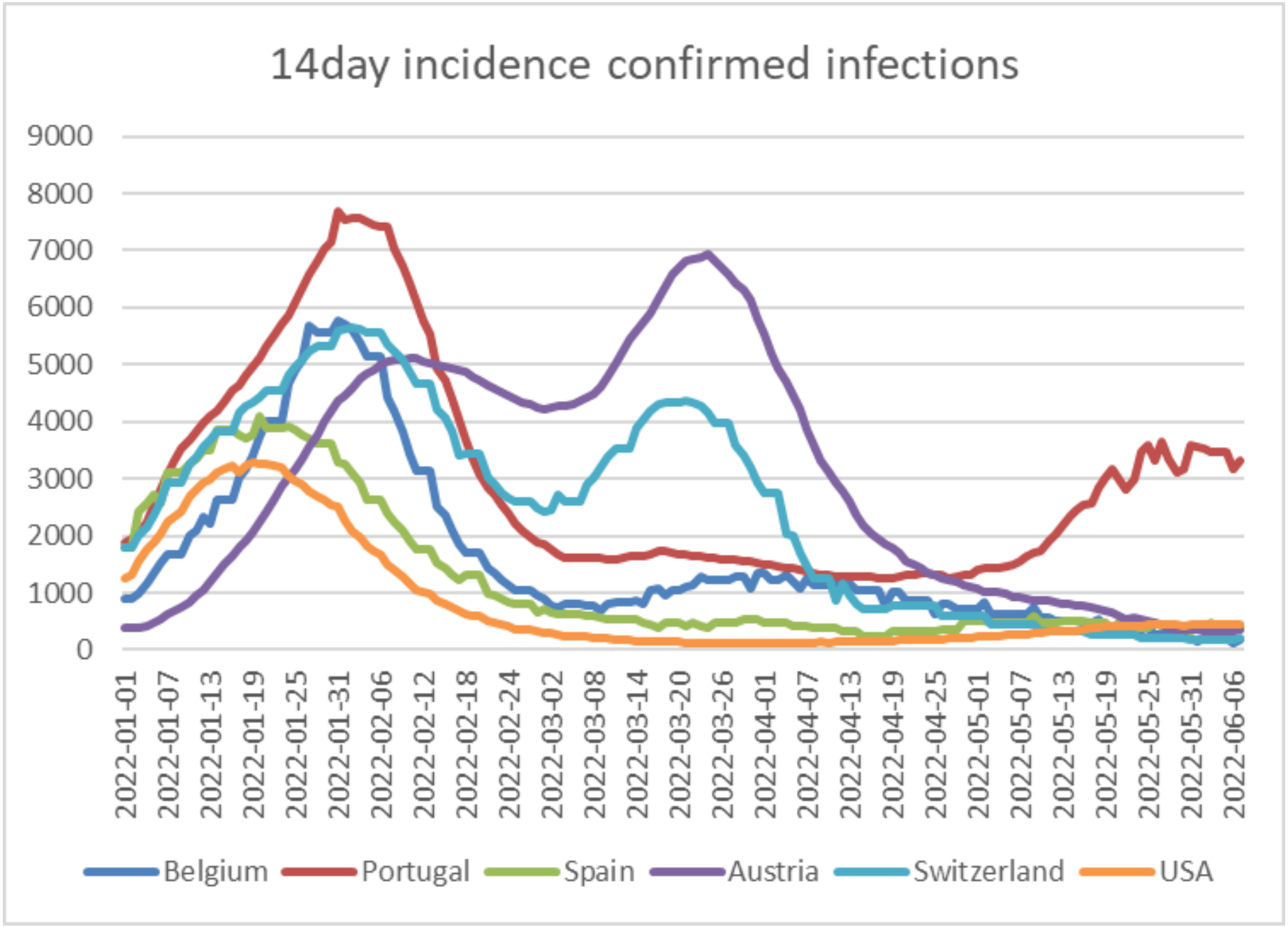



***Figure 3:*** *Share of variants of concern per week in Belgium*

# Sequencing van de infecties die in ziekenhuis worden opgenomen (niet INZO – INZO n=0)




Ct waarden per week
% week
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
N waarde 25->x
N waarde 15,01->25
N waarde 0->15
N waarde ?
Week (totaal label), Week(label naam)


14day incidence confirmed infections
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
2022-01-01
2022-01-07
2022-01-13
2022-01-19
2022-01-25
2022-01-31
2022-02-06
2022-02-12
2022-02-18
2022-02-24
2022-03-02
2022-03-08
2022-03-14
2022-03-20
2022-03-26
2022-04-01
2022-04-07
2022-04-13
2022-04-19
2022-04-25
2022-05-01
2022-05-07
2022-05-13
2022-05-19
2022-05-25
2022-05-31
2022-06-06
Belgium
Portugal
Spain
Austria
Switzerland
USA

# FT, 17 juni 2022

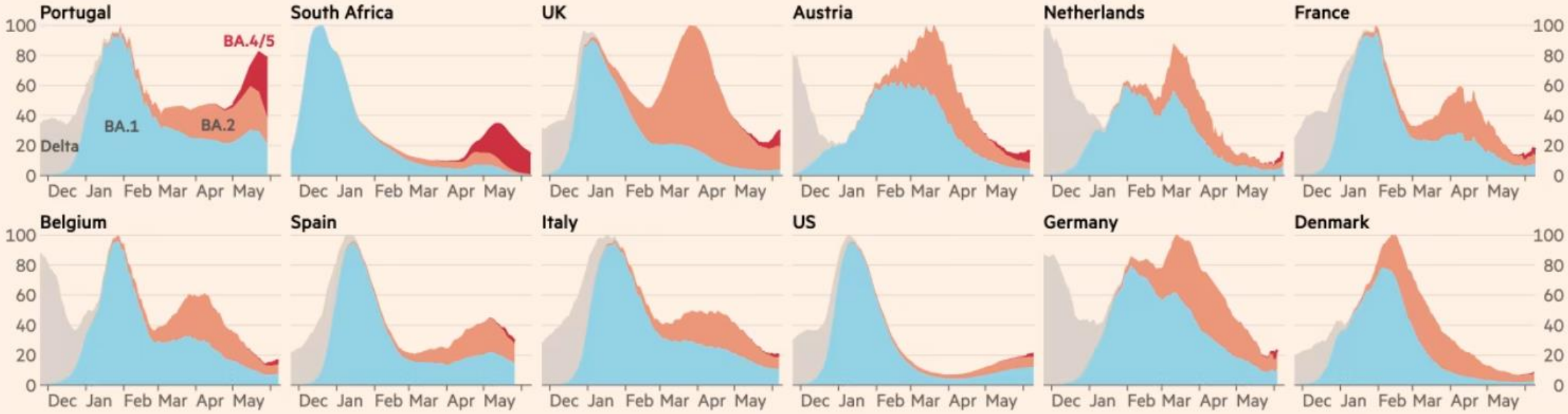
Coronavirus pandemic ✓ Added

## Covid hospital admissions rise in Europe as sub-variants fuel new wave

Omicron offshoots BA.4 and BA.5 drive increase in infections in Portugal, UK, France and Germany

The BA.4/5 Omicron sub-variants triggered waves of Covid hospitalisations in Portugal and South Africa, and are now sending numbers rising elsewhere

Covid hospitalisations as a % of most recent peak, broken down by variant*




*Each variant's share of hospitalisations estimated using method from Tom Wenseleers / @TWenseleers, then applied to total hospitalisations
Source: FT analysis of data from Johns Hopkins CSSE, World Health Organization, Gisaid and COG-UK
FT graphic: John Burn-Murdoch / @jburnmurdoch

# What should we do?

- **Extend 2° booster to a larger part of the population?**
- **When?**
  - August-September: with a monovalent Wuhan strain-based vaccine
    - Might ensure immunity if a novel variant arrives (now or early winter)
    - Could be offered in co-administration with influenza vaccine
  - End of the year: with monovalent Omicron-tailored or bi-valent (Wuhan-Omicron) vaccine
    - Might confer broader immunity to novel variant, but increasing vulnerability in the meantime
- **Protection is waning**
- **No immediate safety issues with current 2nd booster**
- **Interval since last vaccination increases**
- **COVID-19 continues to circulate**
- **Better use documented vaccines now, than waiting for new ones? Non-inferiority?**
- **Precautionary measure?**

# What do we need to make a recommendation?

- Evidence on safety, immunogenicity, non-inferiority for newer vaccines
- Efficacy? Towards which strain?
- Do we need in a pandemic the same kind of evidence as in non-pandemic situation?

- Common sense!
- Risk-benefit assessment!
- International consensus!

# Future vaccines

# The future beyond next winter?

- **Decisions for updating vaccine strains : manufacturers versus WHO!**

- **Co-administration with influenza vaccines**
- **Intradermal vaccines (dose-saring)**
- **Intra-nasal vaccines (mucosal immunity)**
- **Multivalent vaccines**
- **Pan-corona vaccines**

# Implications of the emergence and spread of the SARS-CoV-2 variants of concern BA.4 and BA.5 for the EU/EEA

14 June 2022

## Key messages

Most European Union/European Economic Area (EU/EEA) countries have detected low proportions of the SARS-CoV-2 variants BA.4 and BA.5, however many have seen an increase in recent weeks. In Portugal, BA.5 has become the dominant SARS-CoV-2 variant and the increasing proportions of BA.5 have been accompanied by a surge in COVID-19 cases. The growth advantage reported for BA.4 and BA.5 suggest that these variants will become dominant throughout the EU/EEA, probably resulting in an increase in COVID-19 cases in coming weeks.

The extent of the increase in COVID-19 cases will depend on various factors, including immune protection against infection influenced by the timing and coverage of COVID-19 vaccination regimes, and the extent, timing and variant landscape of previous SARS-CoV-2 pandemic waves. Based on limited data, there is no evidence of BA.4 and BA.5 being associated with increased infection severity compared to the circulating variants BA.1 and BA.2. However, as in previous waves, an increase in COVID-19 cases overall can result in an increase in hospitalisations, ICU admissions and deaths.

Countries should remain vigilant for signals of BA.4 and BA.5 emergence and spread; maintain sensitive and representative testing and genomic surveillance with timely sequence reporting, and strengthen sentinel surveillance systems (primary care ILI/ARI and SARI). Countries should continue to monitor COVID-19 case rates - especially in people aged 65 and older - and severity indicators such as hospitalisations, ICU admissions, ICU occupancy and death.

Improving COVID-19 vaccine uptake of the primary course and first booster dose in populations who are yet to receive them remains a priority. It is expected that additional booster doses will be needed for those groups most at risk of severe disease, in anticipation of future waves.

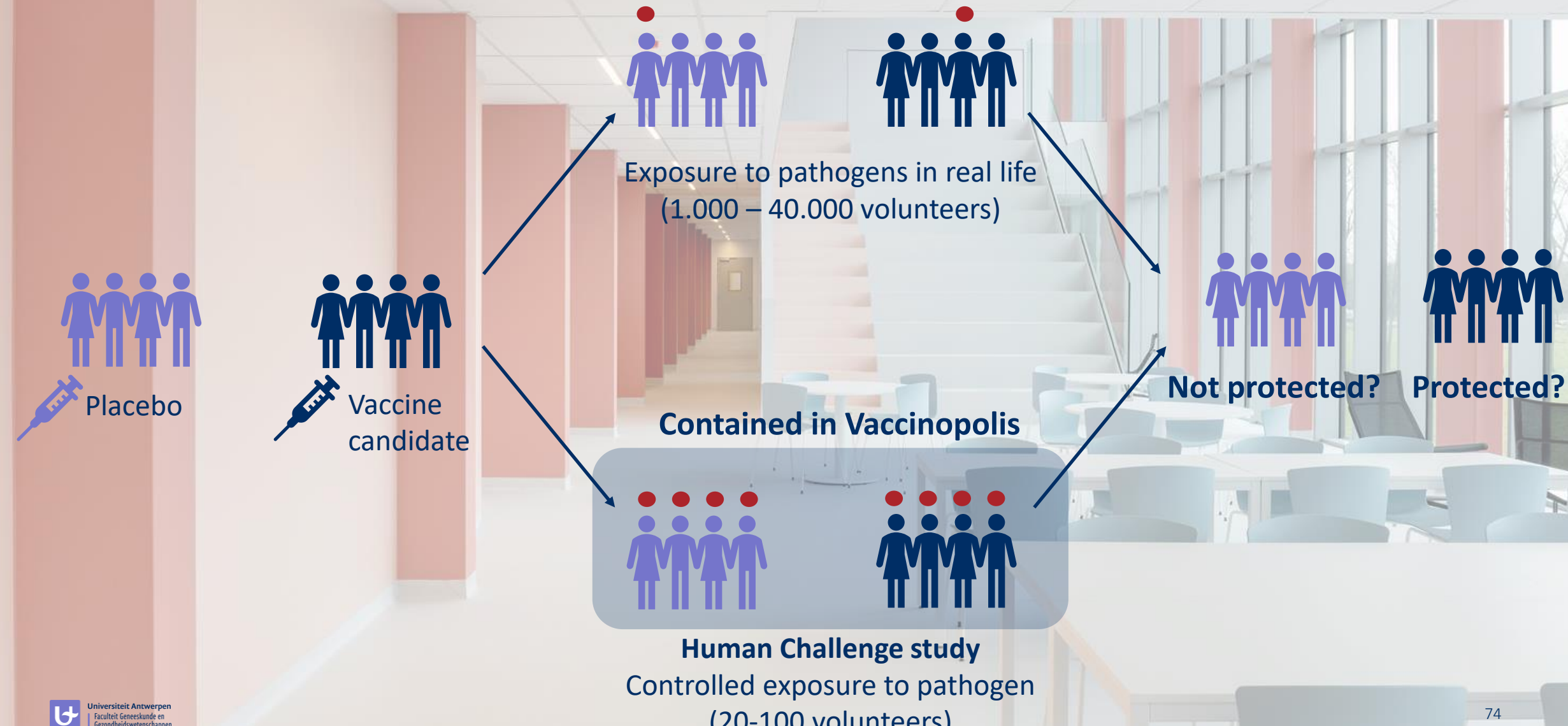
# Vaccinopolis

Powered by UAntwerp

# A unique centre of excellence for vaccination studies

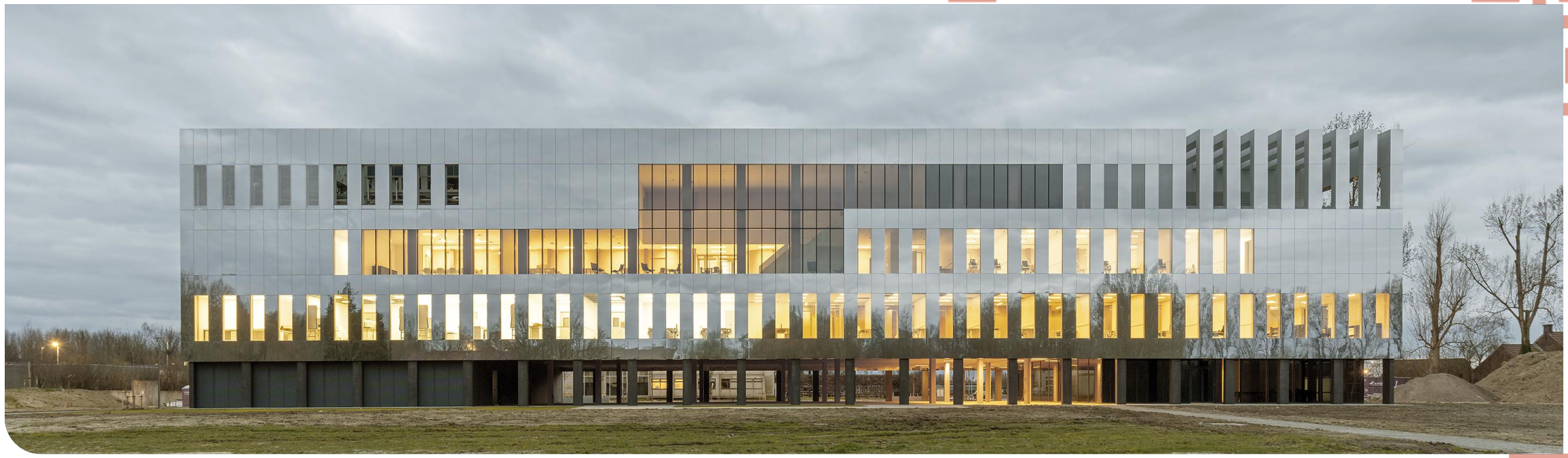
Universiteit Antwerpen
Faculteit Geneeskunde en Gezondheidswetenschappen

# Human Challenge studies

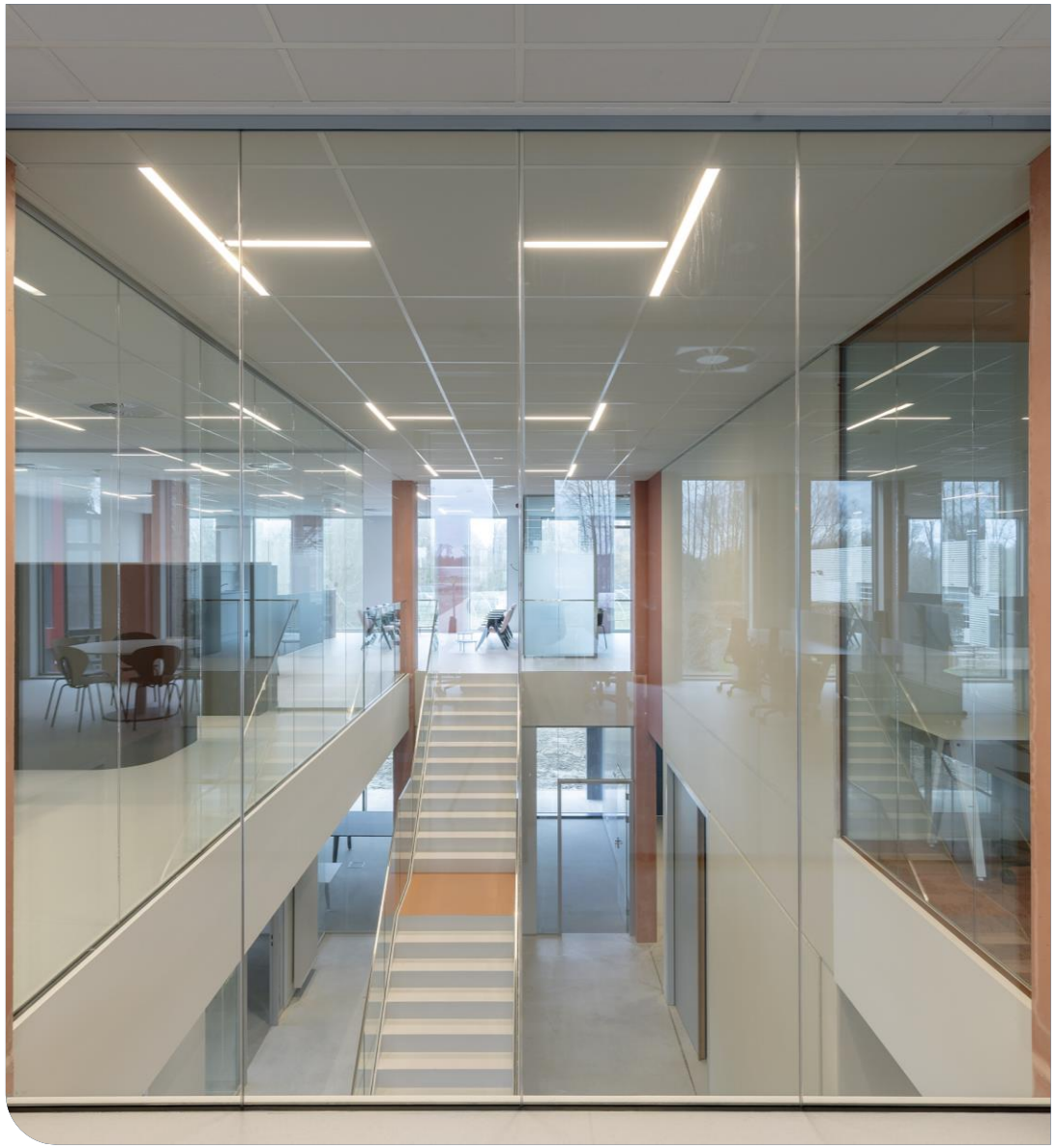


# Facts & Figures

- ✓ Unique 6000m² clinical facility
- ✓ 30 bed quarantine unit (BSL-3 level)
- ✓ Ambulatory vaccine trial unit
- ✓ Fully equipped BSL-2 and BSL-3 labs
- ✓ < 500m from university hospital
- ✓ Located at University of Antwerp
- ✓ Strategic location in Belgium with easy connection to Antwerp and Brussels



# Planning, construction and qualification in just 14 months



Vaccinopolis provides a unique and much needed infrastructure and system to efficiently evaluate novel therapeutics and vaccines. Because of its scale it should also considerably accelerate their development.

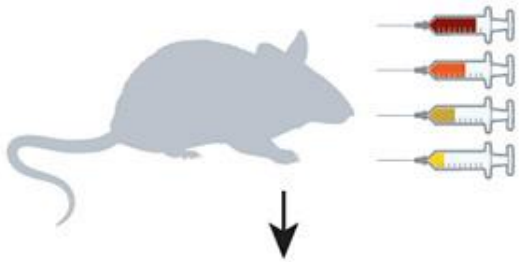
**Peter Piot**

# IMMUNE MODELLING

Scientists have been developing mathematical models to optimize vaccine doses before they are given to humans.

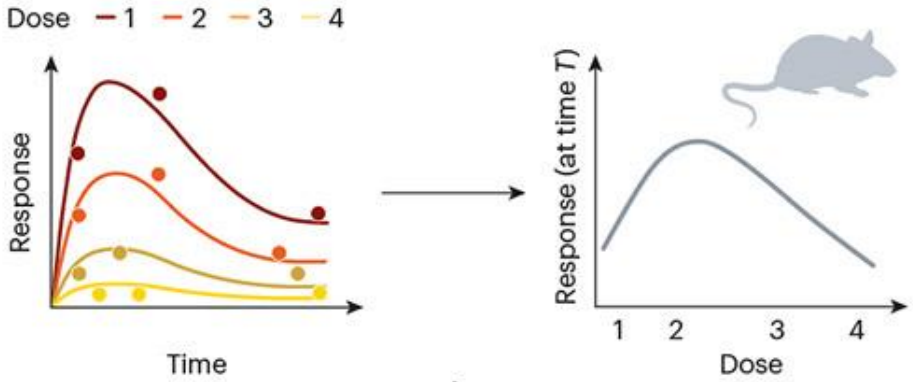
**1. Animal testing**

Scientists administer a wide range of doses in small animal models.



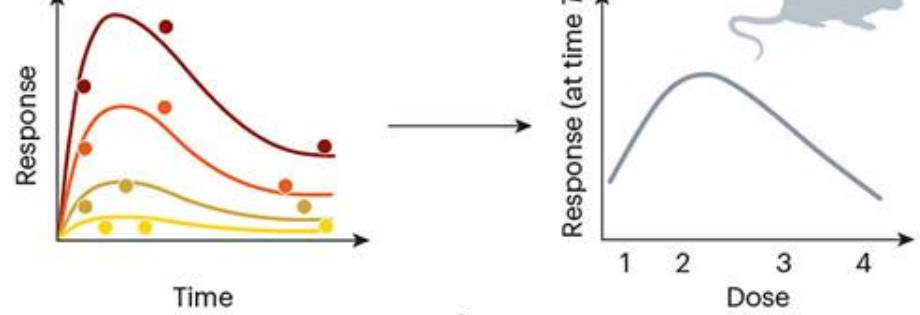
**2. Initial modelling**

Researchers identify doses correlating to the largest and smallest immune responses in animals. They use modelling to estimate the relationship between dose and response.



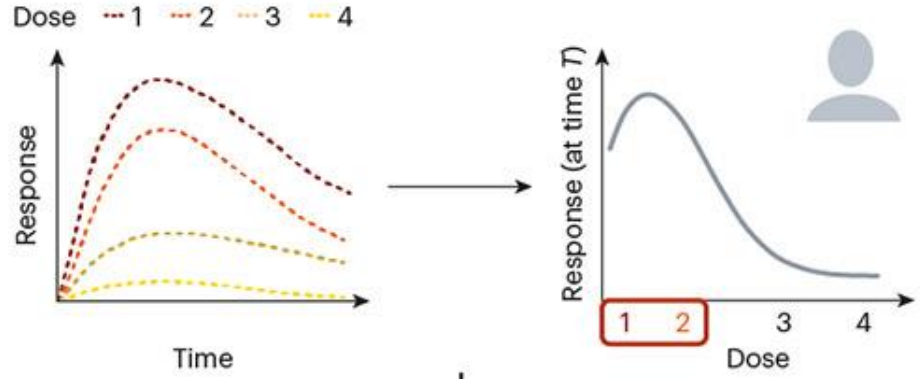

**3. Translation to humans**

Data from the animal model are scaled up to predict a theoretical dose–response relationship for humans, which helps scientists to choose initial doses for testing.

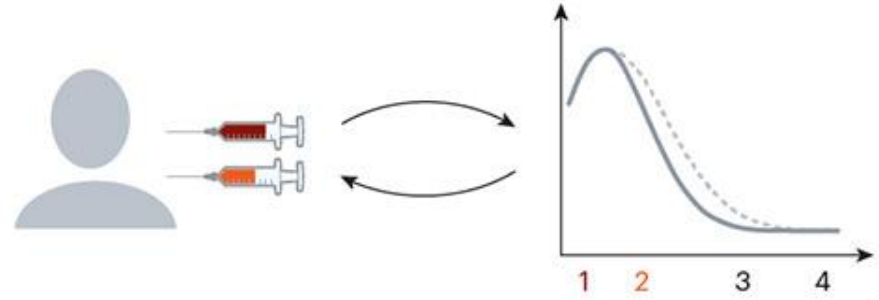

**3. Translation to humans**

Data from the animal model are scaled up to predict a theoretical dose–response relationship for humans, which helps scientists to choose initial doses for testing.




**4. First-in-human**

Scientists feed data from early human testing into the human-response model to further refine dose decisions.



# DOSING DECISIONS

Companies chose different dosing regimens for their vaccines, often for different reasons.

| Vaccine type | Company | Dose* |
|---|---|---|
| **mRNA**  | Pfizer–BioNTech | 30 µg |
| | Moderna | 100 µg |
| **Adenovirus vectored**  | AstraZeneca–Oxford | 50 billion viral particles |
| | Johnson & Johnson | 50 billion viral particles |
| | Gamaleya (Sputnik V) | 100 billion viral particles |
| **Inactivated virus**  | Sinopharm | 4 µg |
| | Sinovac Biotech | 3 µg |
| | Bharat Biotech | 6 µg |
| **Protein****  | Novavax | 5 µg |
| | Biological E | 25 µg |

*Approved adult dose for each shot
**Antigen dose, not including adjuvant