

LX Nationale Dagen voor
Arbeidsgeneeskunde – 1 & 2
december 2022
“Update COVID-vaccinatie
en andere vaccins”

- Pierre Van Damme, MD PhD
- Vaccin- en Infectieziekten Instituut (UAntwerpen)
- Centrum voor de Evaluatie van Vaccinaties



COVID-19

Numbers at a glance

632 953 782

Confirmed cases

Last update: 16 November 2022 at 06:45 pm CET

6 593 715

Confirmed deaths

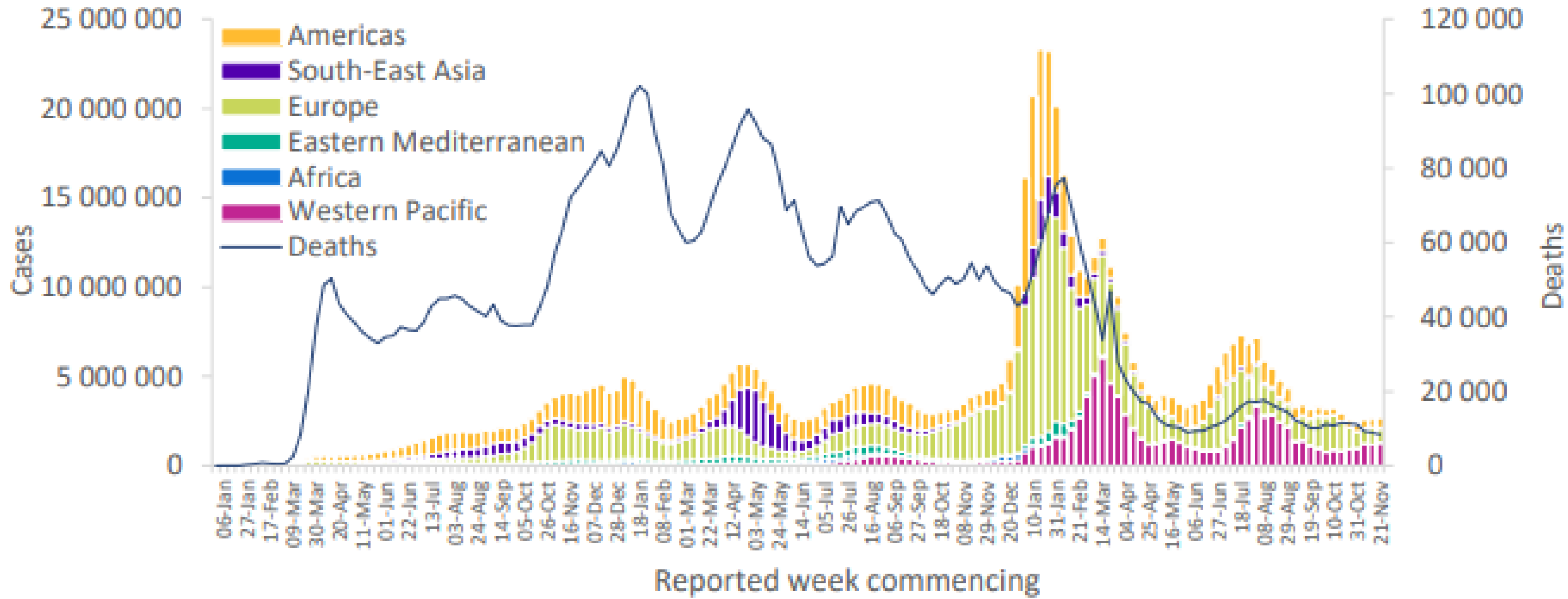
Last update: 16 November 2022 at 06:45 pm CET

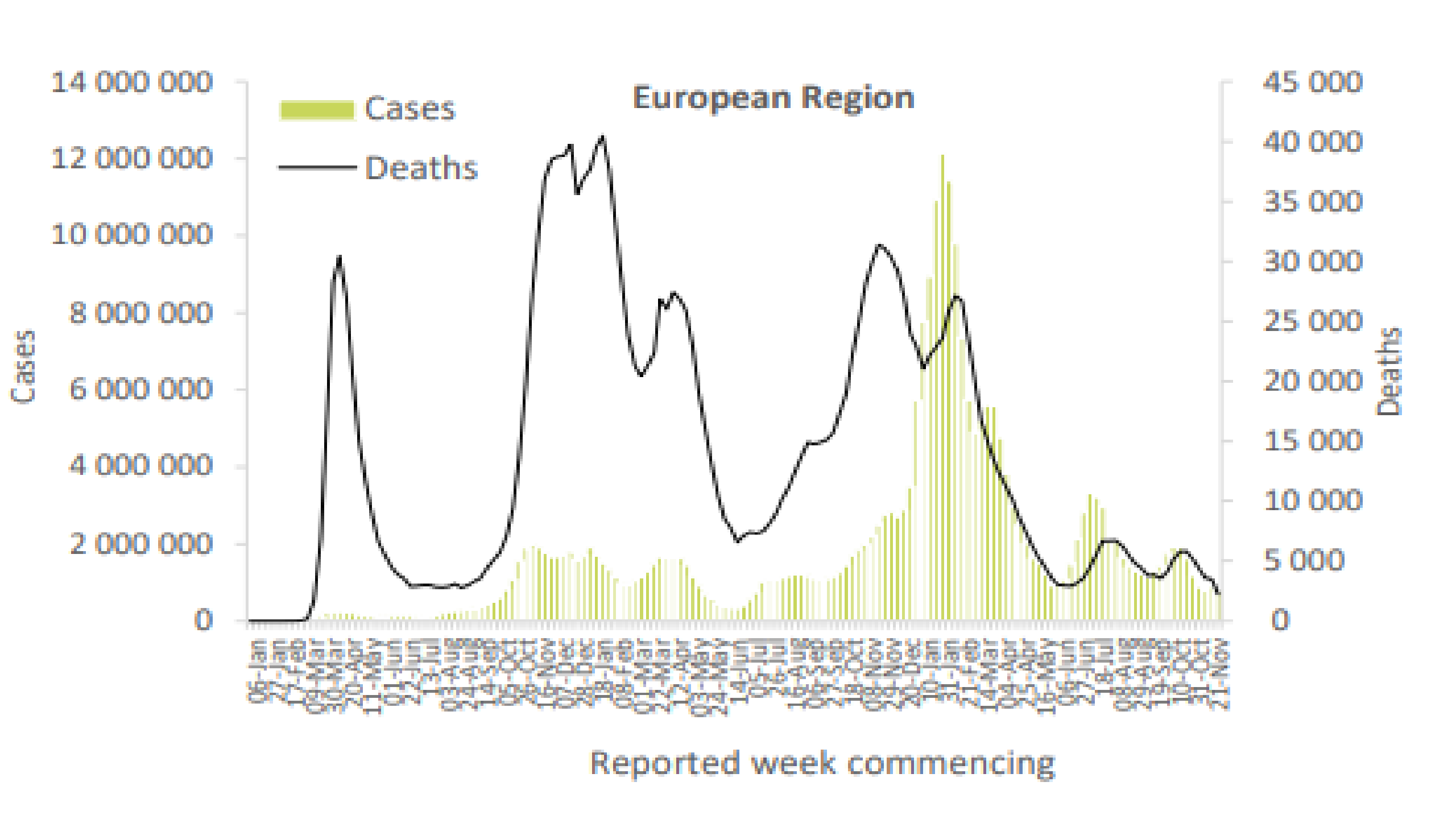
12 885 748 541

Vaccine doses administered

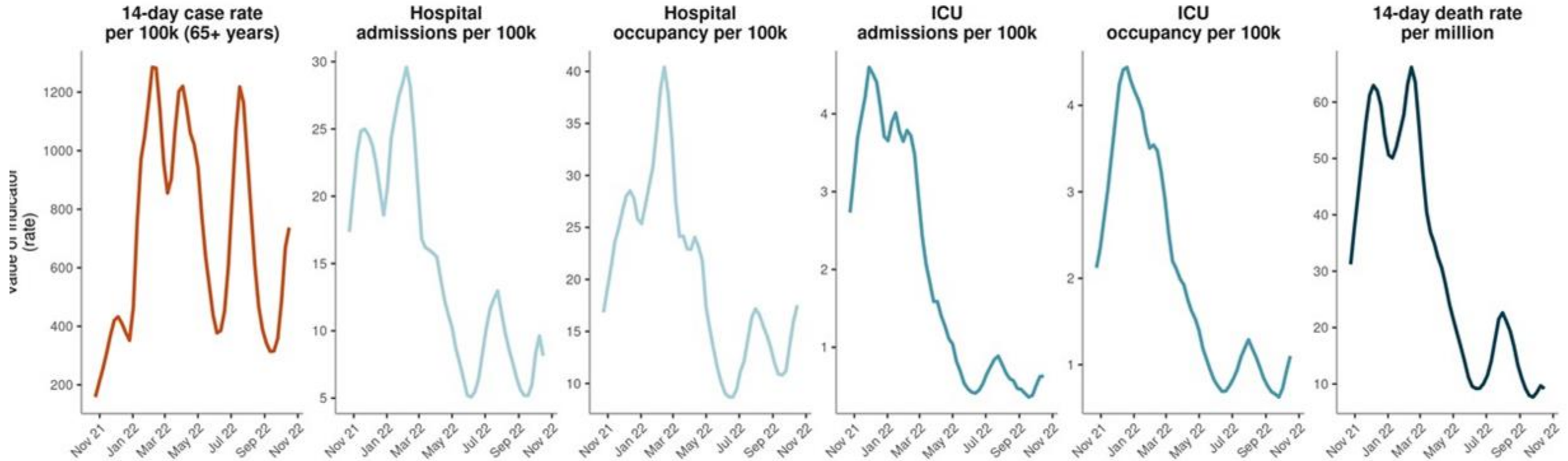
Last update: 9 November 2022

Figure 1. COVID-19 cases reported weekly by WHO Region, and global deaths, as of 27 November 2022**





EU/EEA: COVID-19 epidemiological indicators, last 52 weeks to 16 October 2022



ECDC. Figure produced 20 October 2022
 Epidemic intelligence national data and TESSy COVID-19: 14-day death rate;
 Pooled data from Member States (n = 14 for week 41): ICU admissions;
 Pooled data from Member States (n = 16 for week 41): Hospital occupancy;
 Pooled data from Member States (n = 17 for week 41): Hospital admissions;
 Pooled data from Member States (n = 20 for week 41): ICU occupancy;
 TESSy COVID-19 (n = 29 for week 41): 14-day case rate

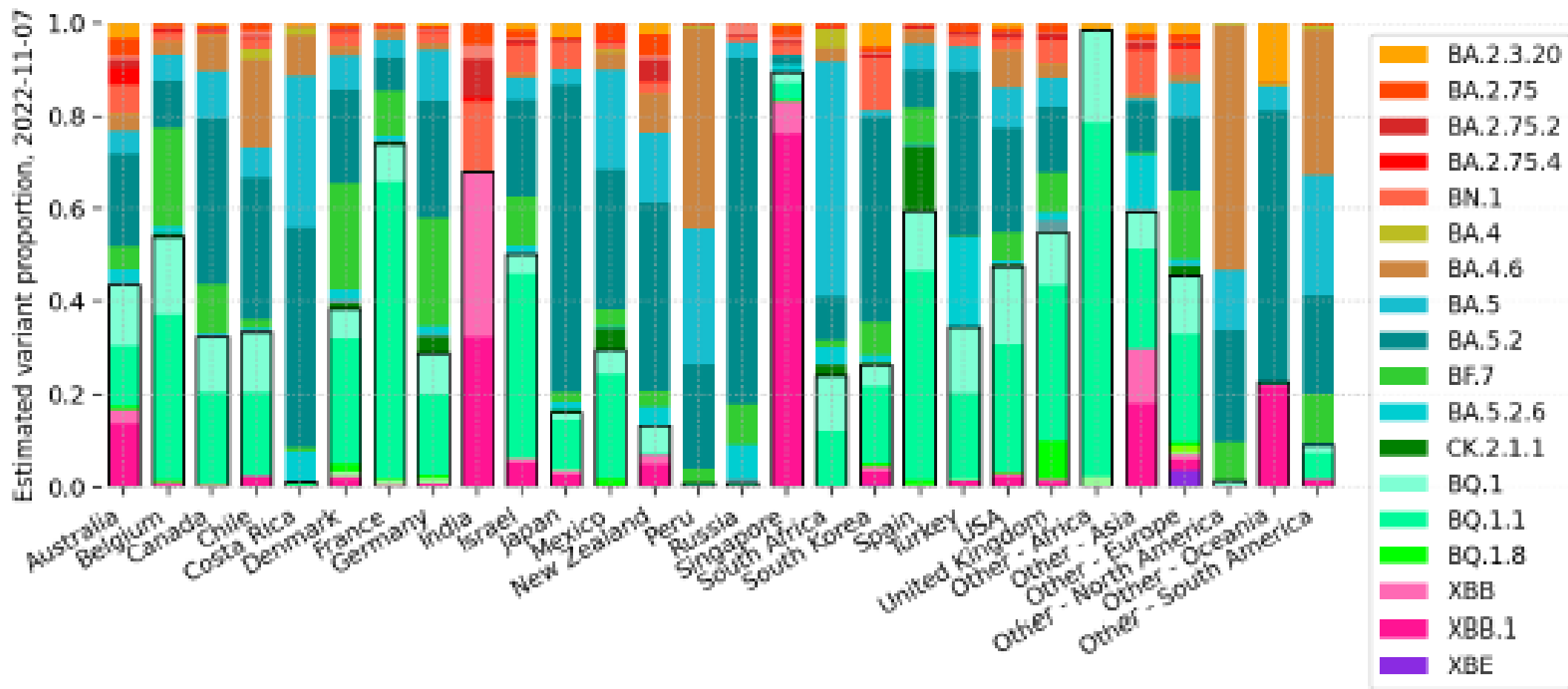
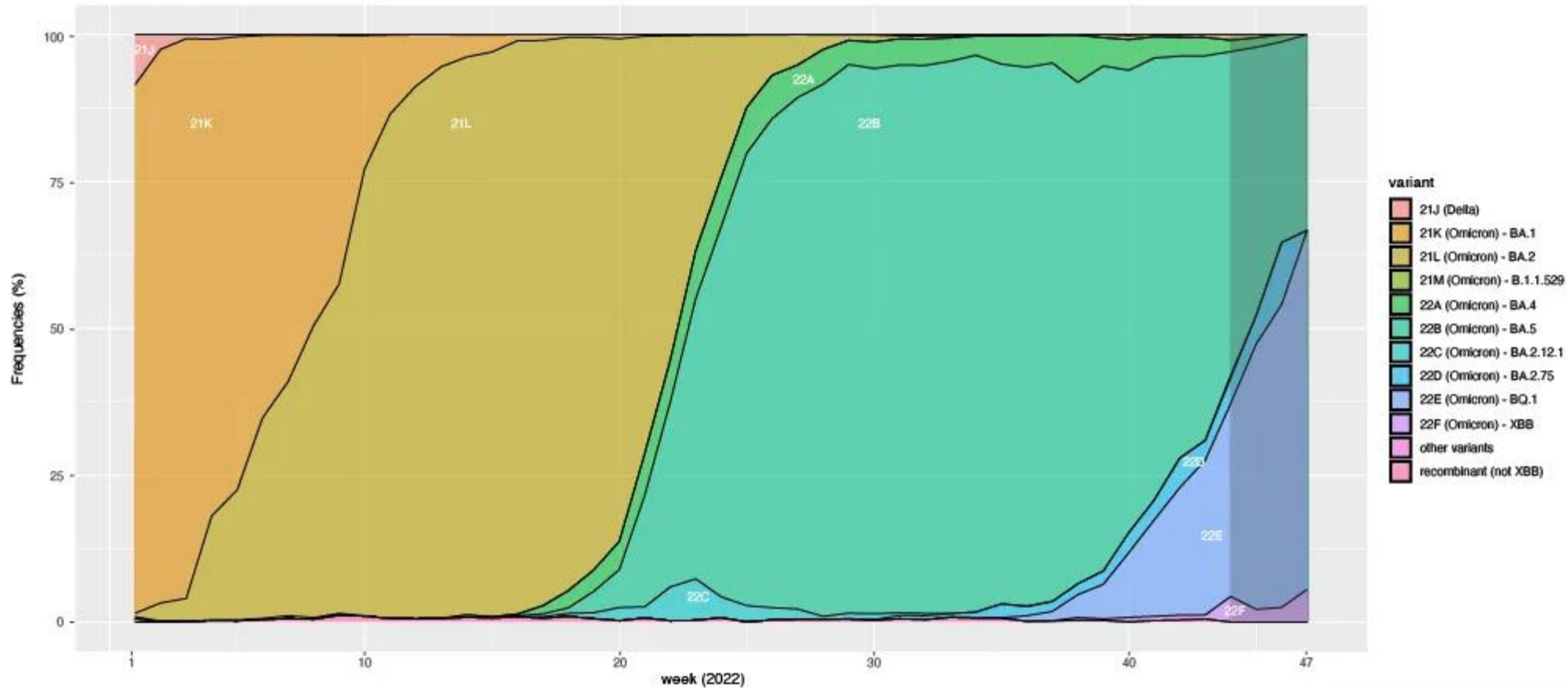


Figure 3: Estimated variant proportions in different countries including Belgium (Source: Moritz Gerstung available at <https://github.com/gerstung-lab/SARS-CoV-2-International>, last update 7/11/2022)

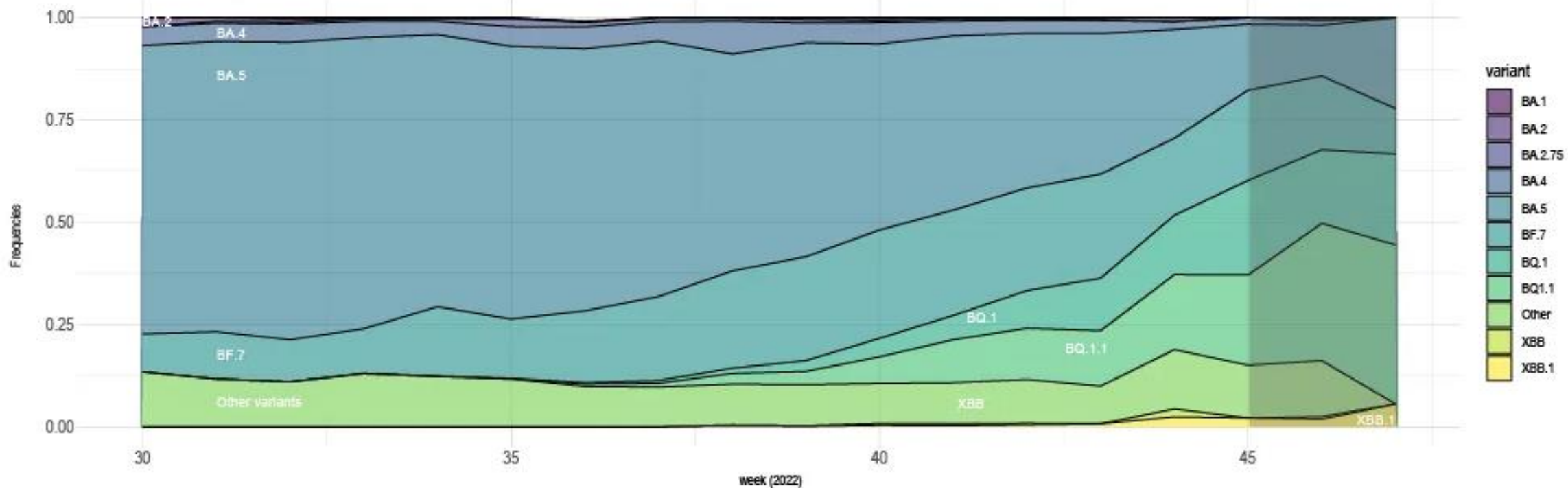
Genomic surveillance of SARS-CoV-2 in Belgium

Belgian SARS-CoV-2 sequencing consortium, coordinated by the national reference laboratory for infectious diseases, Ghent University Hospital

Frequency of SARS-CoV-2 variants in Belgium (1 Januari 2022 to 29 November 2022)
based on 80691 SARS-CoV-2 whole genome sequences



Frequency of SARS-CoV-2 variants in Belgium (25 July 2022 to 29 November 2022)



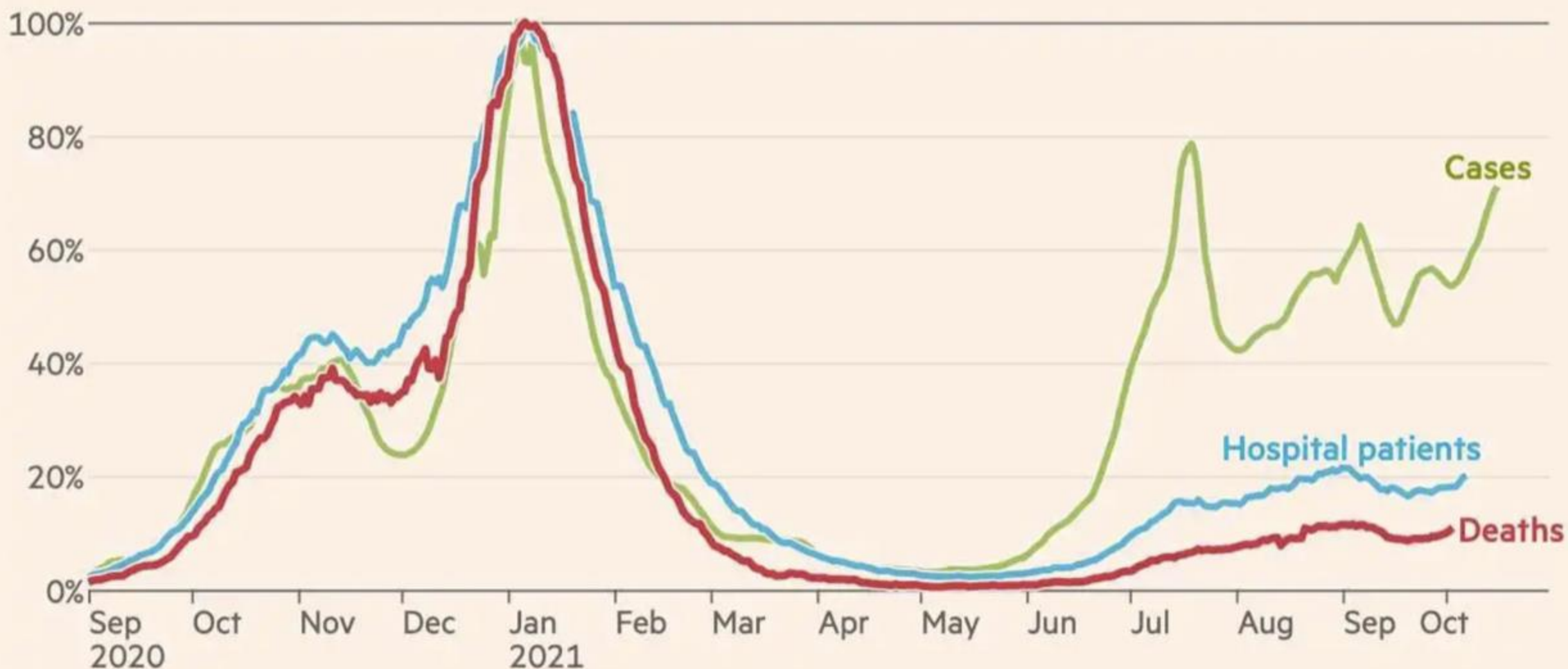


Booster-vaccination policy and changing variants – from wuhan over beta and delta to omicron!

We watch what happens in Israel, UK and the US!

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



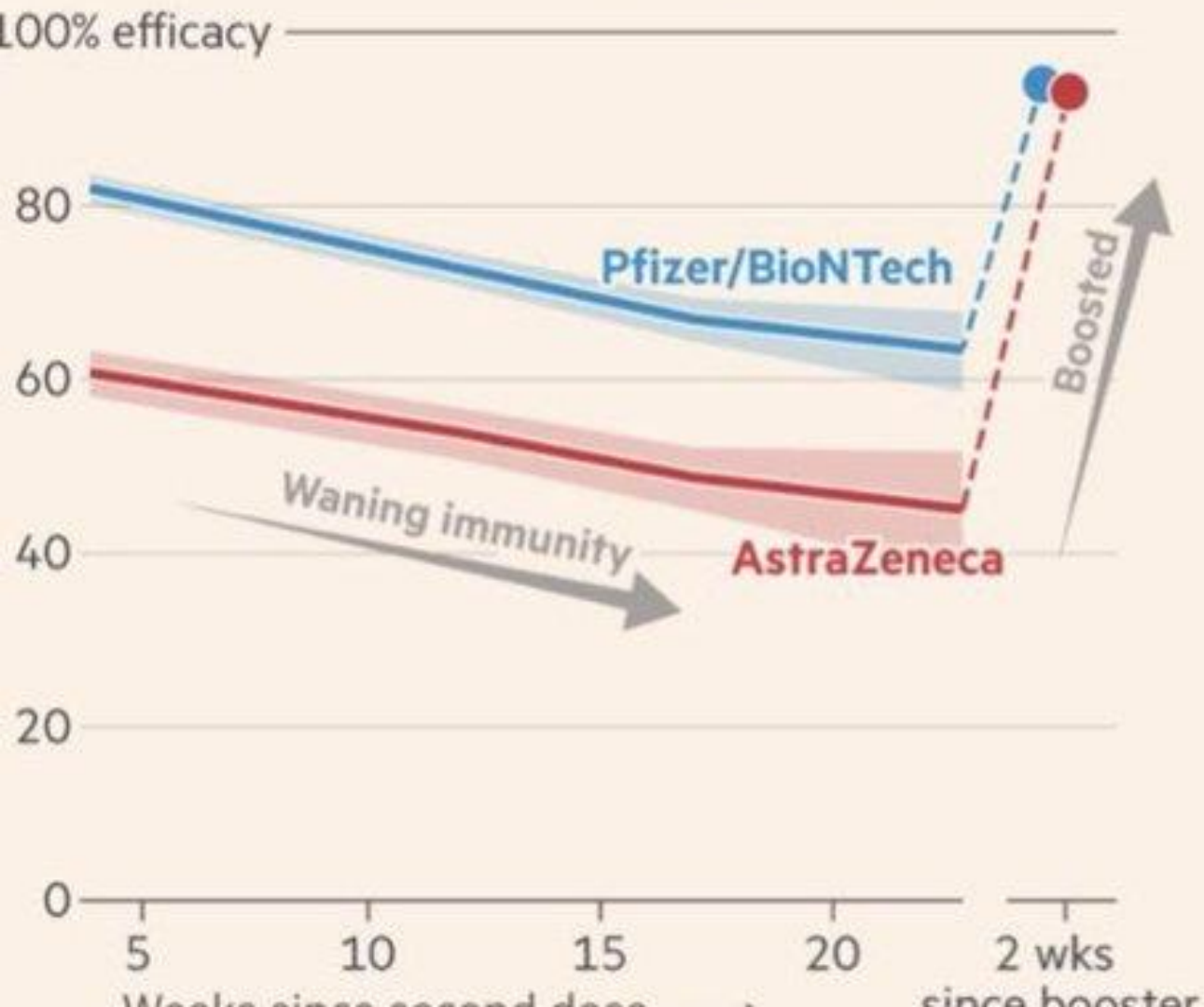


Boosters and variants

- Dissociation because of
 - waning immunity after primary schedule for protection against infection
 - Appearance of new variants
 - More infectious variants

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

Vaccine efficacy against symptomatic infection among people aged 50+*, by initial vaccine**



Relative risk of sympt. infection vs unvaccinated, among people aged 50+*, by initial vaccine**

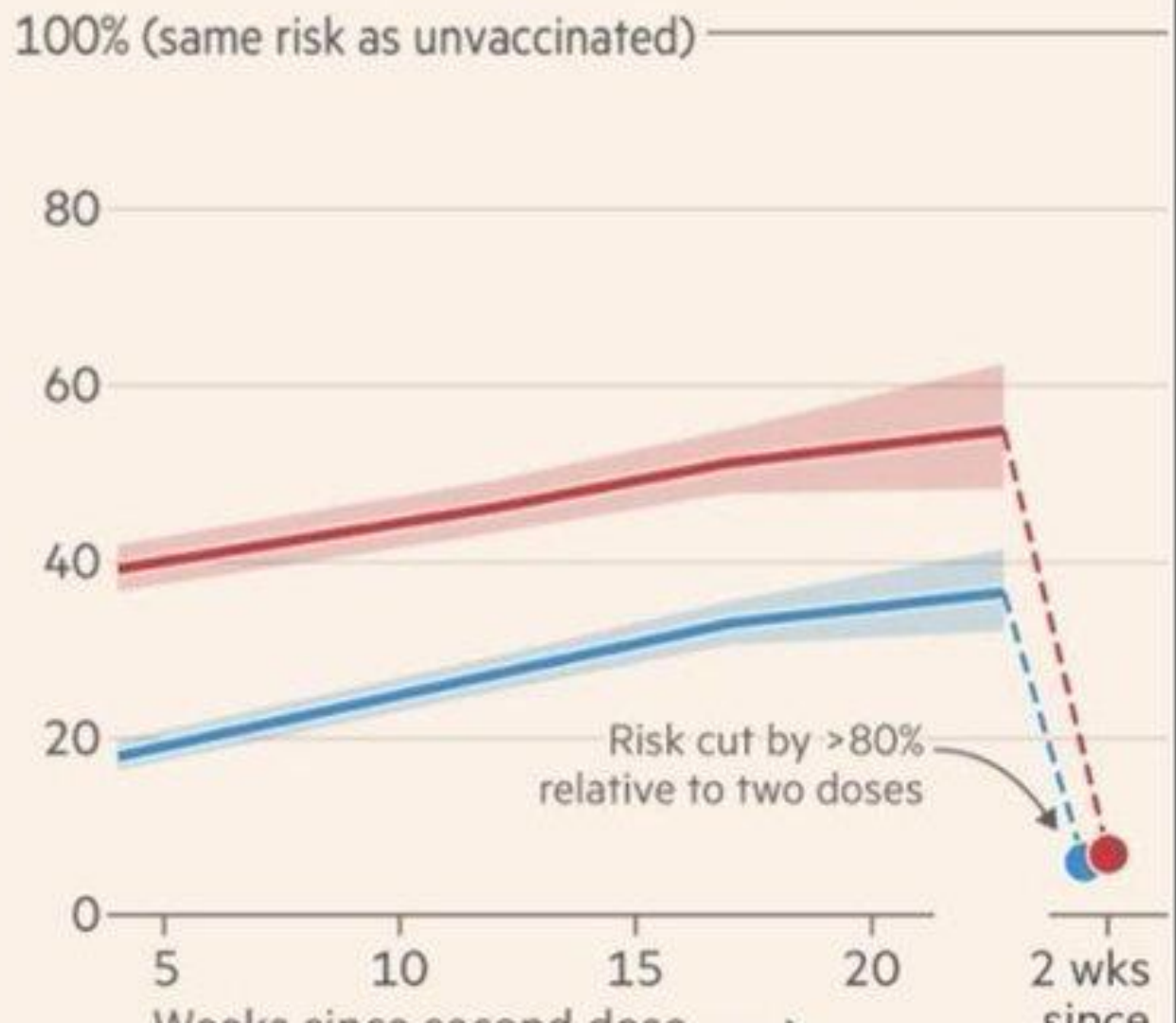
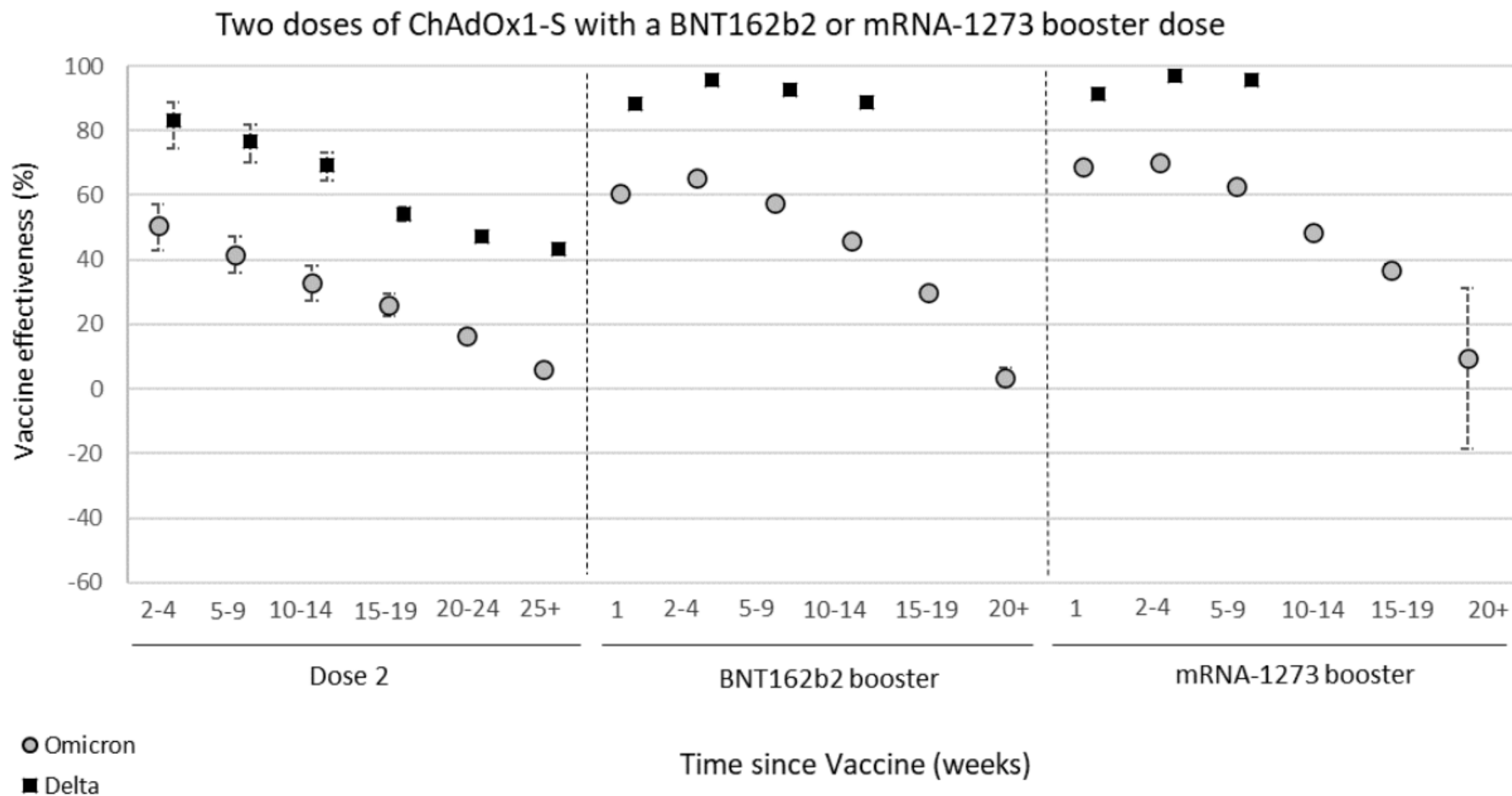


Figure 1 Vaccine effectiveness against symptomatic disease by period after the second and booster doses for Delta (black squares) and Omicron (grey circles) for a) recipients of 2 doses of AstraZeneca (ChAdOx1-S) vaccine as the primary course and Pfizer (BNT162b2) or Moderna (mRNA-1273) as a booster;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



SARS-CoV-2 variants of concern and variants under investigation in England

Technical briefing 34

14 January 2022

This report provides an update on previous [briefings](#) up to 31 December 2021

Table 2. Hazard ratios and vaccine effectiveness against hospitalisation (all vaccine brands combined). OR = odds ratio, HR = hazards ratio, VE = vaccine effectiveness

Dose	Interval after dose (weeks)	OR v symptomatic disease	HR vs hospitalisation	VE vs hospitalisation
1	4+	0.74 (0.72-0.76)	0.57 (0.38-0.85)	58% (37-72)
2	2 to 24	0.81 (0.8-0.82)	0.45 (0.36-0.56)	64% (54-71)
2	25+	0.94 (0.92-0.95)	0.6 (0.49-0.74)	44% (30-54)
3	2 to 4	0.32 (0.31-0.33)	0.26 (0.19-0.35)	92% (89-94)
3	5 to 9	0.42 (0.41-0.43)	0.29 (0.23-0.37)	88% (84-91)
3	10+	0.5 (0.49-0.51)	0.34 (0.26-0.44)	83% (78-87)

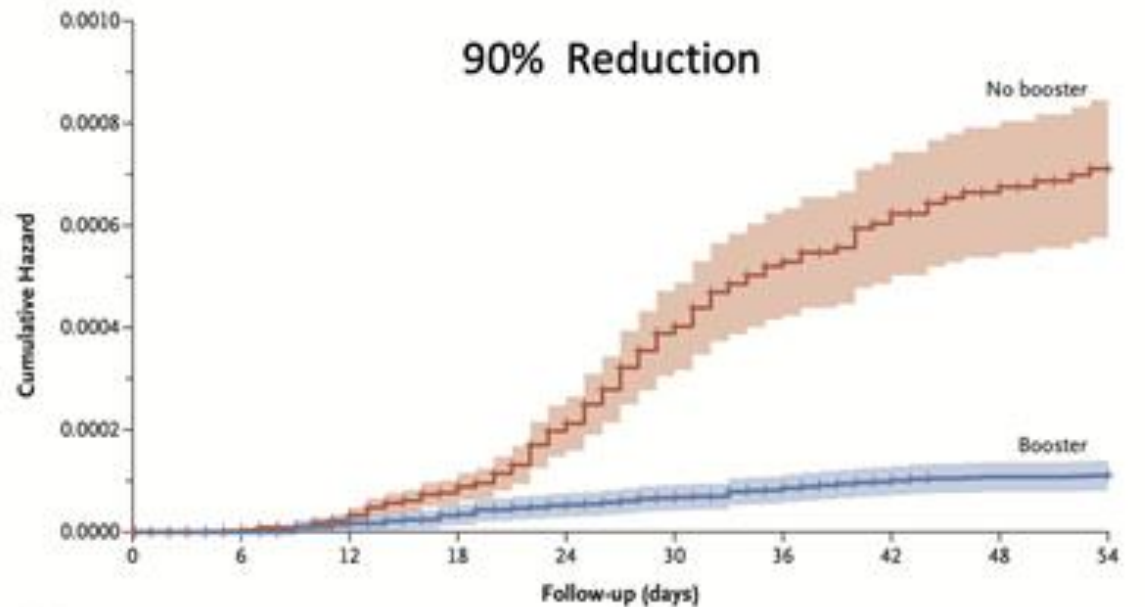


2° booster and the new variants

Mortality Reduction at Calit Health for Initial Booster and Second Booster

3rd shot vs 2 shots, age 50+

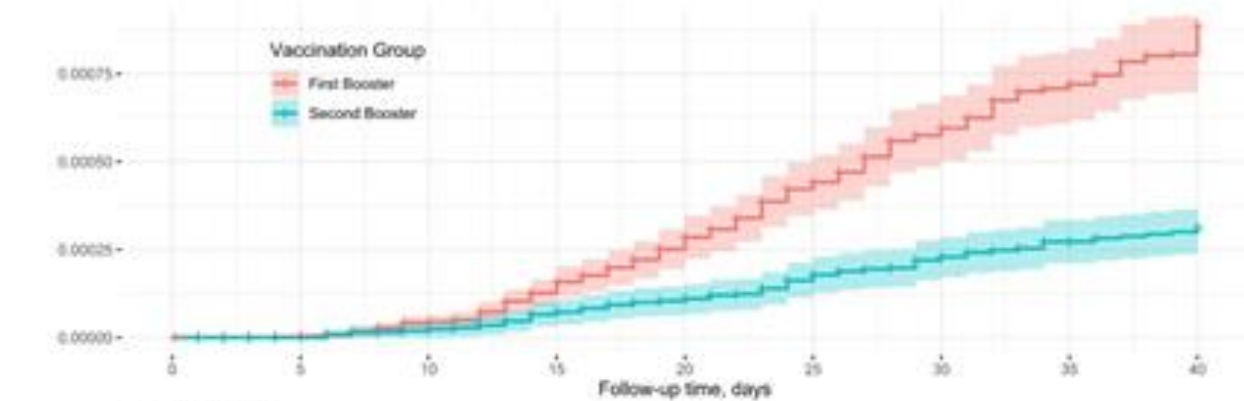
90% Reduction



No. at Risk	0	6	12	18	24	30	36	42	48	54
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+

78% Reduction



Number at risk	0	5	10	15	20	25	30	35	40
First Booster	550648	453524	329688	284252	264512	250861	243292	238311	233847
Second Booster	12817	109774	233373	278549	298038	311424	318775	323619	328022

Place and Age Group	4 th dose vs 3 rd dose	Variant(s)	Citation
Israel, age 60+	74% protection vs Covid death; 68% vs hospitalization	Omicron	Magen O et al, NEJM, April 28, 2022
Israel, age 60+	78% protection from death; 64% vs hospitalization	Omicron	Arbel R et al, Nature Medicine, 25 April 2022
Sweden, Age 80+	60% reduced all-cause mortality	Omicron	Nordstrom P et al, Lancet Reg Health, 13 July 2022
United States, Age 50+	4-fold reduction in mortality	Omicron BA.2 and BA2.12.1	https://covid.cdc.gov/covid-data-tracker/#rates-by-vaccine-status
Israel, median age 80	50% reduction of need for mechanical ventilation or death	Omicron	Brosh-Nissimov T et al, MedRxiv, 27 April 2022

Portugal, Age 80+
May to July 2022

81% protection vs. hosp.
82% protection vs. deaths

Omicron BA5

Kislaya I. et al, Eurosurveillance,
Sept 15, 2022



Original Investigation | Infectious Diseases

Association of Receiving a Fourth Dose of the BNT162b Vaccine With SARS-CoV-2 Infection Among Health Care Workers in Israel

Matan J. Cohen, MD, PhD; Yonatan Oster, MD; Allon E. Moses, MD; Avishay Spitzer, MD; Shmuel Benenson, MD; and the Israeli-Hospitals 4th Vaccine Working Group

OBJECTIVE To evaluate the benefit of a fourth BNT162b2 vaccine dose on the breakthrough infection rate among HCWs.

DESIGN, SETTING, AND PARTICIPANTS This multicenter cohort study was performed in January 2022, the first month of the 4-dose vaccination campaign, during a surge of the Omicron variant wave. All health care workers at 11 general hospitals in Israel who had been vaccinated with 3 doses up to September 30, 2021, and had not contracted COVID-19 before the vaccination campaign were included.

EXPOSURES Vaccination with a fourth dose of the BNT162b2 vaccine during January 2022.

MAIN OUTCOMES AND MEASURES Breakthrough COVID-19 infections in 4-dose recipients vs 3-dose recipients measured by a polymerase chain reaction test result positive for SARS-CoV-2. Health care workers were tested based on symptoms or exposure.

RESULTS A total of 29 611 Israeli HCWs (19 381 [65%] female; mean [SD] age, 44 [12] years) had received 3 vaccine doses between August and September 2021; of these, 5331 (18%) received the fourth dose in January 2022 and were not infected by the first week after vaccination. Overall breakthrough infection rates were 368 of 5331 (7%) in the 4-dose group and 4802 of 24280 (20%) in the 3-dose group (relative risk, 0.35; 95% CI, 0.32-0.39). Similar reductions were found in a matched analysis by the exact day of receiving the third vaccine (relative risk, 0.61; 95% CI, 0.54-0.71) and in a time-dependent Cox proportional hazards regression model (adjusted hazard ratio, 0.56; 95% CI, 0.50-0.63). In both groups, no severe disease or death occurred.

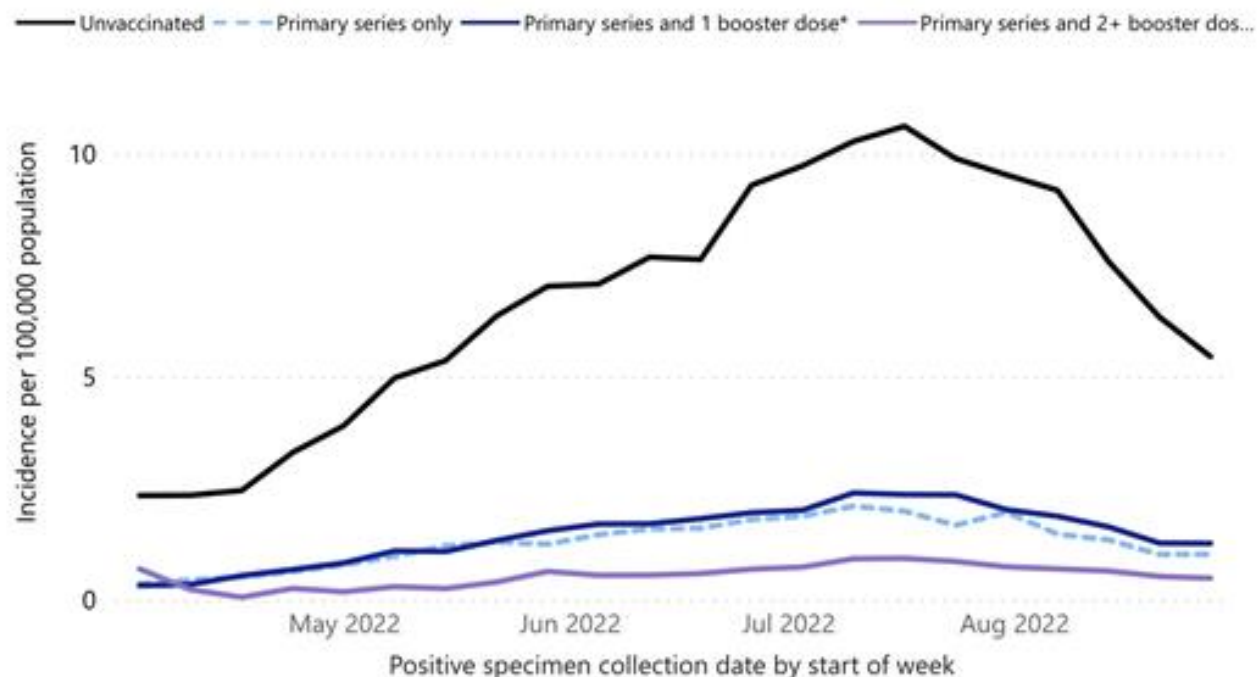
Table 3. Breakthrough Infection Rates Among 4-Dose and 3-Dose Vaccinated Health Care Workers

Characteristic	No. infected/No. at risk (%)		Crude analysis, RR (95% CI)	Time-dependent model, adjusted HR (95% CI)	Matched comparisons, RR (95% CI)
	3-Dose group (n = 24 280)	4-Dose group (n = 5331)			
All	4802/24 280 (20)	368/5331 (7)	0.35 (0.32-0.39)	0.56 (0.50-0.63)	0.61 (0.54-0.71)
Sex					
Male	1415/7804 (18.)	154/2426 (6)	0.35 (0.30-0.41)	0.56 (0.49-0.65)	0.66 (0.56-0.79)
Female	3387/16 476 (21)	214/2905 (7)	0.36 (0.31-0.41)	0.55 (0.46-0.66)	0.57 (0.46-0.70)
Age group, y					
<40	2044/10 429 (20)	81/1112 (7)	0.37 (0.30-0.46)	0.57 (0.45-0.72)	0.62 (0.48-0.81)
40-59	466/2466 (19)	106/1706 (6)	0.33 (0.27-0.40)	0.56 (0.48-0.65)	0.58 (0.48-0.71)
≥60	2292/11 385 (20)	181/2513 (7)	0.36 (0.31-0.41)	0.55 (0.45-0.68)	0.73 (0.54-0.99)

Select Outcome

- Deaths
- Cases

April 03, 2022–September 03, 2022 (26 U.S. jurisdictions)



In August 2022, among people ages 50 years and older, unvaccinated people had:

12X
Risk of Dying from COVID-19

compared to people vaccinated with a primary series and two or more booster doses.*

Among people ages 50 years and older, vaccinated people with a primary series and one booster dose had:

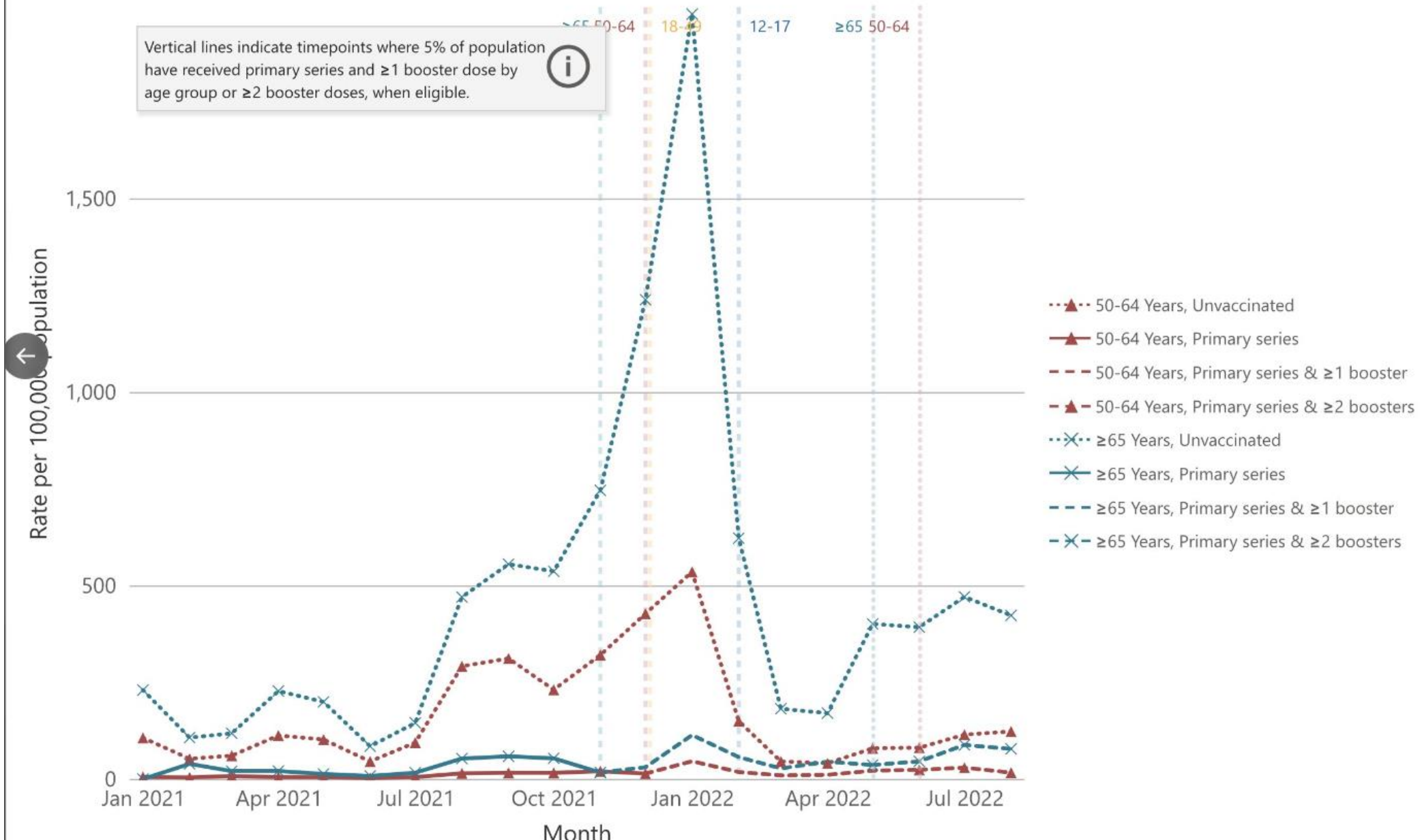
3X
Risk of Dying from COVID-19

compared to people vaccinated with a primary series and two or more booster doses.*

Source: CDC COVID-19 Response, Epidemiology Task Force, Surveillance & Analytics Team, Vaccine Breakthrough

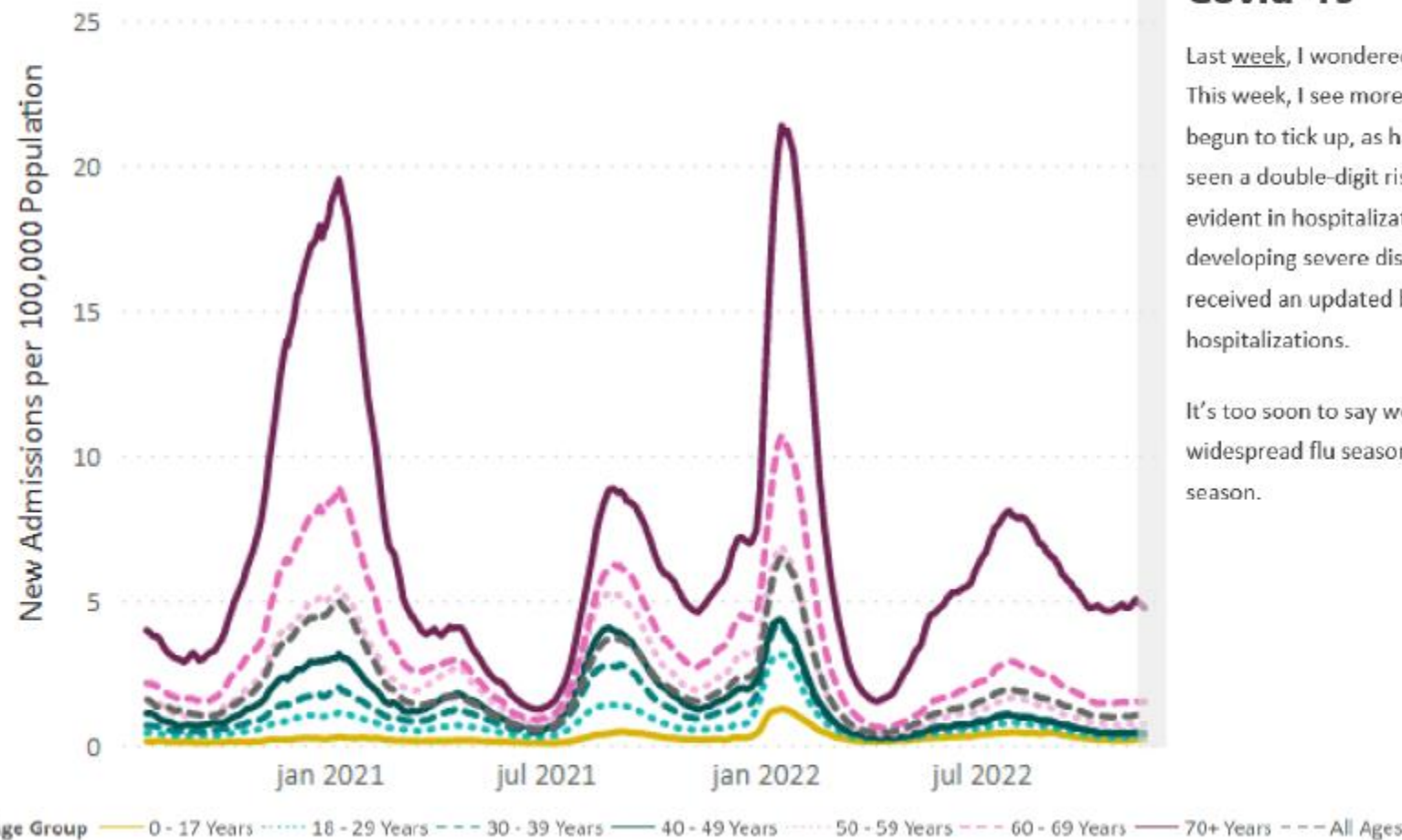
Rates of COVID-19-Associated Hospitalization by Vaccination Status

in all eligible age groups, January 2021 - August 2022



New Admissions of Patients with Confirmed COVID-19, United States

Aug 01, 2020 - Nov 15, 2022



Covid-19

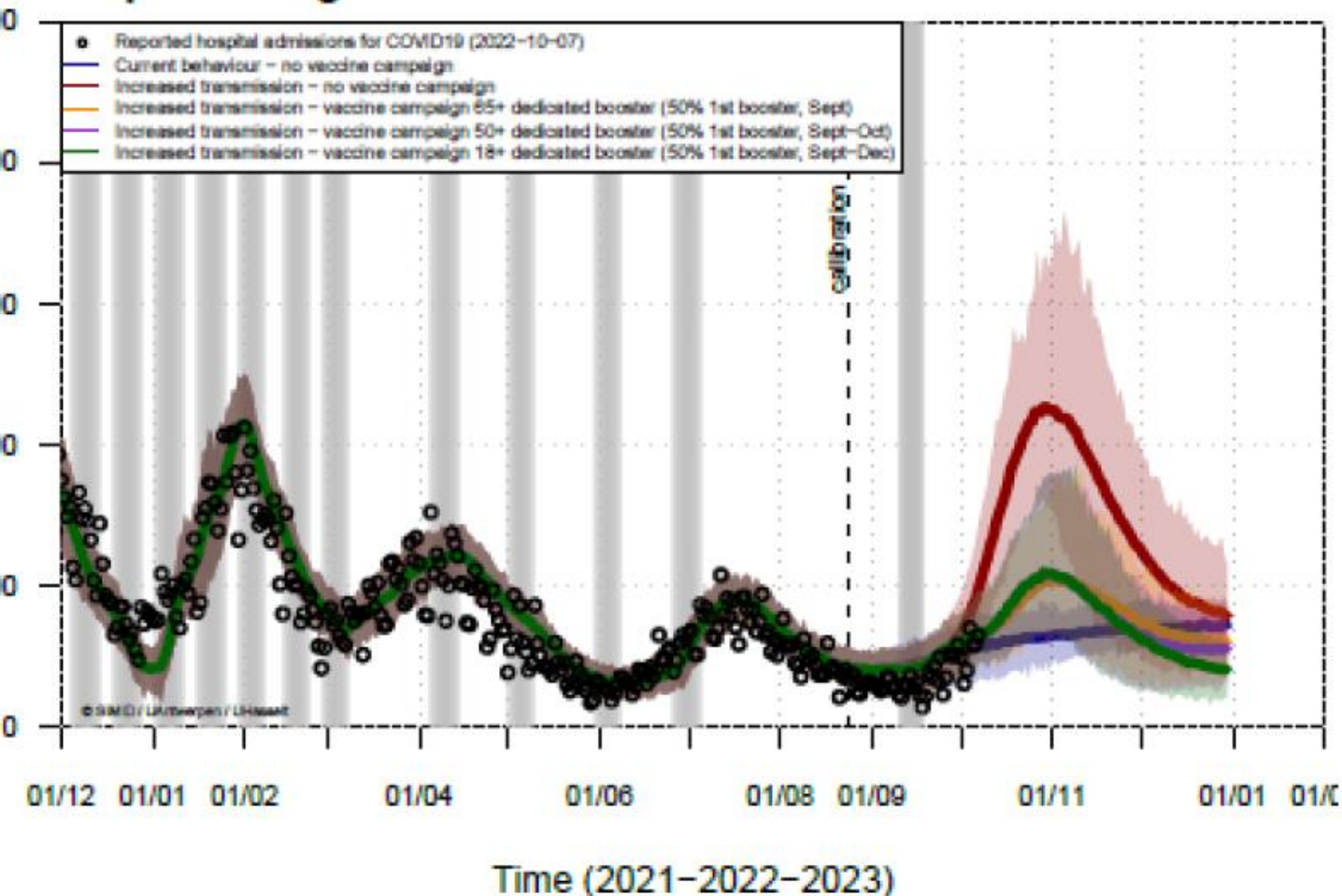
Last week, I wondered whether the U.S. may be headed into another covid-19 wave. This week, I see more evidence for this scenario. Cases and hospitalizations have begun to tick up, as has test positivity. Fourteen states and Washington D.C. have seen a double-digit rise in hospitalizations over the last two weeks. The rise is most evident in hospitalization rates in older adults, the group that is most vulnerable to developing severe disease. Unfortunately, just 27% of adults 65 and older have received an updated bivalent booster, which I worry will contribute to an increase in hospitalizations.

It's too soon to say we'll see another wave for sure, but coupled with the early and widespread flu season, the healthcare system is likely facing another difficult winter season.

Updated figures from Technical Note SIMID dd. 31/8/2022 - 2022-10-07

This figure displays the observed hospitalization data plotted on the scenarios with the assumption of (A) 50% and (B) 100% uptake of a fall 2022 booster, relative to previous booster uptake in 3 age categories (65+, 50+, 18+). Note that these % are modelled relative to the % of the target age group vaccinated with the previous booster, so 50% means here that only half of those having received the previous booster would be receiving a booster in the fall of 2022.

Updated figure from Technical Note SIMID v2022-08-31



advies TF en beslissing IMC:

- Vaccinatie sterk aanbevolen voor 50 en ouder, risicogroepen, zwangeren, gezondheidswerkers
- Aanbod voor 18-49 jarigen













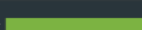
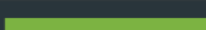

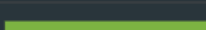




Belgium COVID-19 Epidemiological Situation





















Numbers of 28 November

Age Groups (based on the age on 1 Jan 2022)

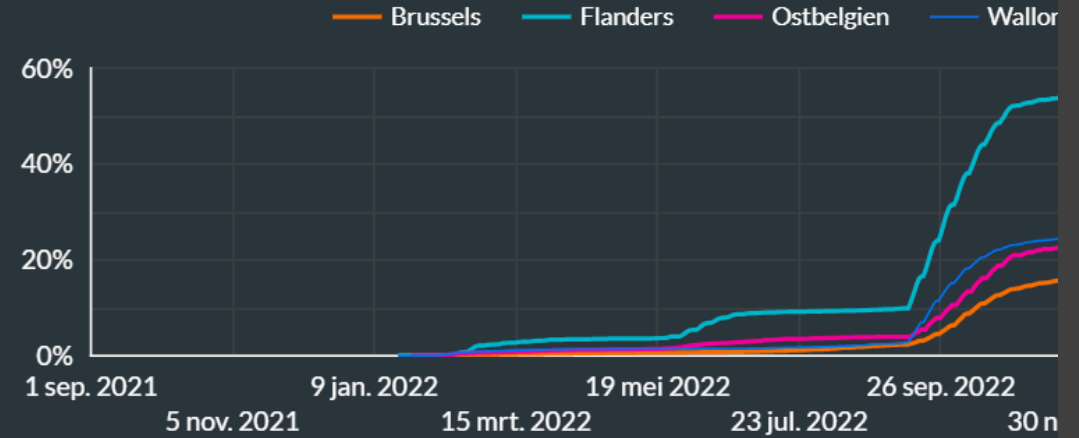
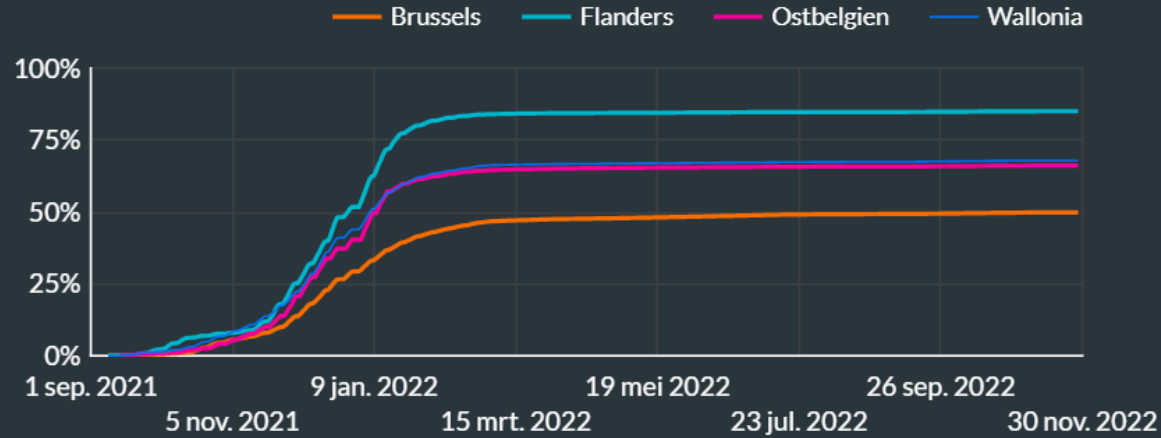
1st Booster

2nd Booster

	People Vaccinated	Coverage
85+	312,9K 	92% 
75-84	675,5K 	93% 
65-74	1,1 mln. 	91% 
55-64	1,3 mln. 	86% 
45-54	1,2 mln. 	78% 
35-44	1 mln. 	67% 
25-34	907,1K 	61% 
18-24	553,9K 	60% 
12-17	157,1K 	20% 
05-11	329 	+0%
00-04	2 	+0%

	People Vaccinated	Coverage
85+	240,3K 	71% 
75-84	544,6K 	75% 
65-74	838,9K 	70% 
55-64	854,7K 	55% 
45-54	562,4K 	37% 
35-44	351,9K 	23% 
25-34	266,5K 	18% 
18-24	131,1K 	14% 
12-17	11K 	1% 
05-11	7 	+0%
00-04	0 	0%

18+ Coverage by Region (of residence)



Coverage by Region and Age Group

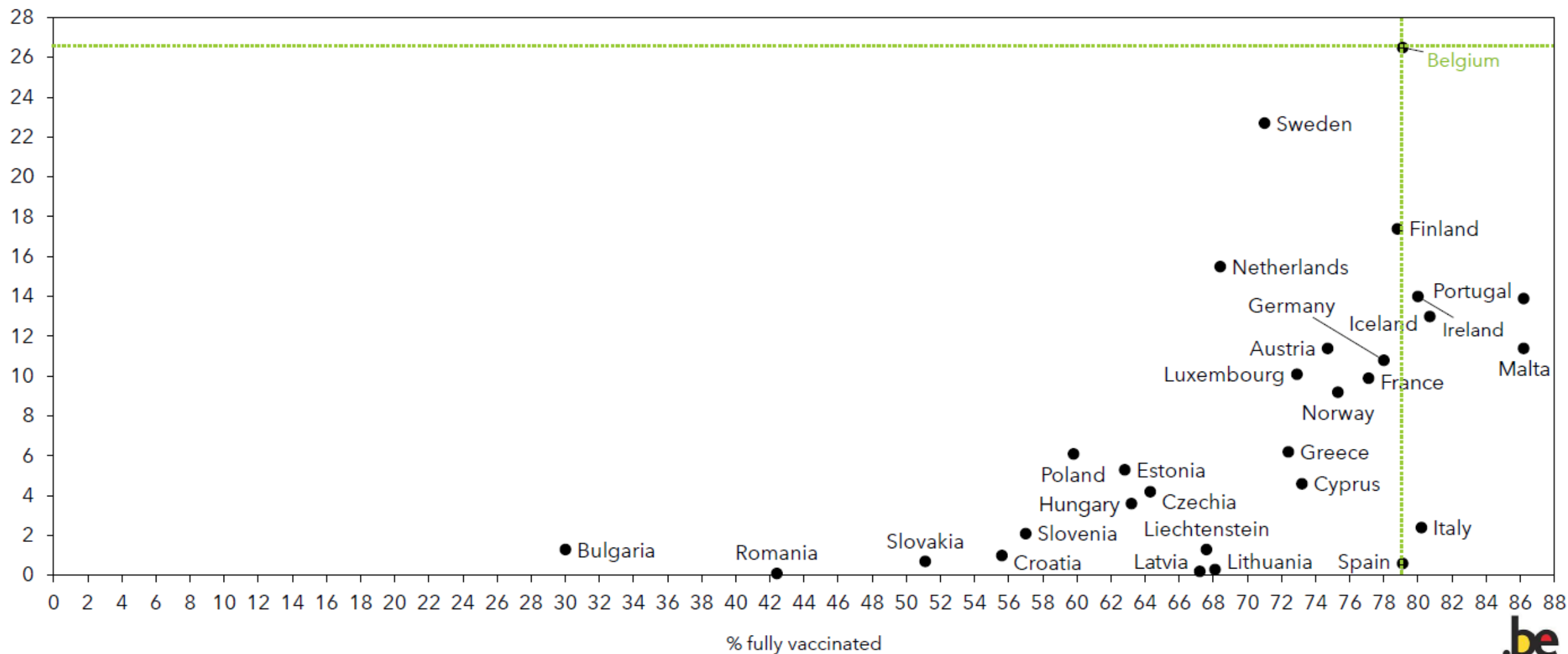
	Brussels	Flanders	Ostbelgien	Wallonia
85+	82%	96%	83%	87%
75-84	79%	96%	87%	88%
65-74	74%	95%	84%	86%
55-64	64%	92%	72%	79%
45-54	52%	86%	67%	70%
35-44	42%	78%	56%	57%
25-34	38%	73%	47%	48%
18-24	26%	73%	50%	50%
12-17	5%	30%	8%	5%

	Brussels	Flanders	Ostbelgien	Wallonia
85+	53%	80%	44%	55%
75-84	51%	85%	49%	59%
65-74	41%	81%	43%	54%
55-64	26%	68%	27%	38%
45-54	14%	51%	18%	19%
35-44	7%	37%	11%	5%
25-34	5%	29%	8%	3%
18-24	2%	24%	6%	2%
12-17	+0%	2%	+0%	+0%

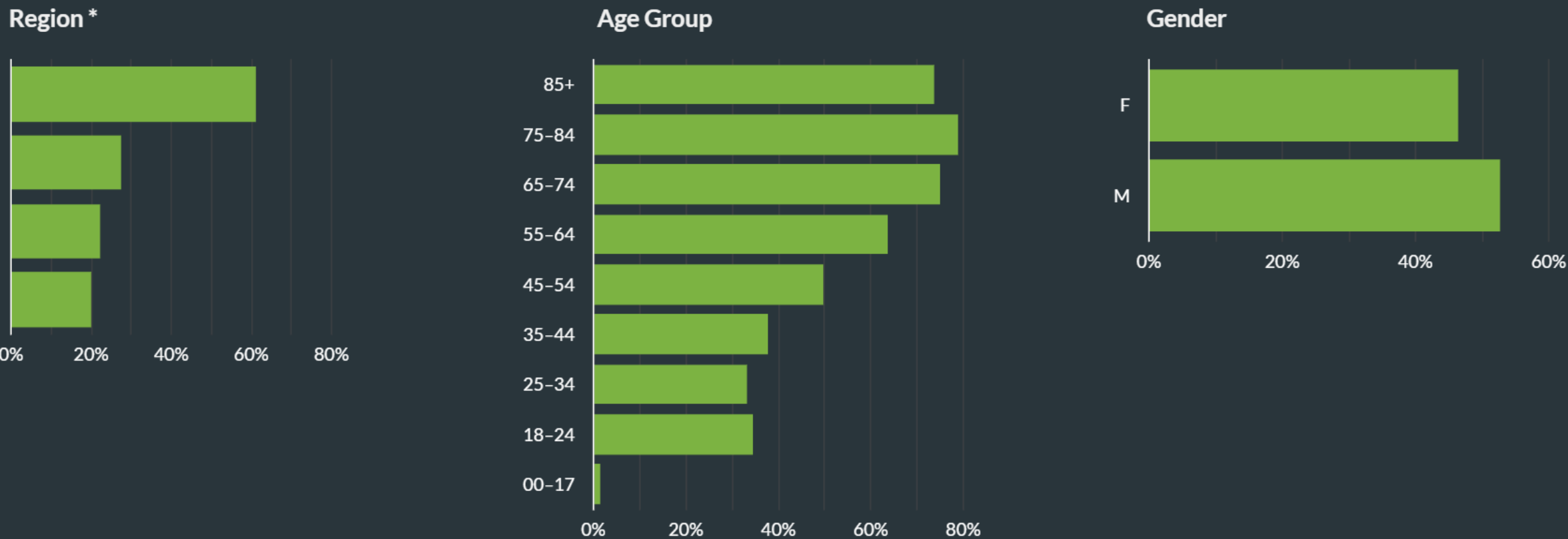
Vaccination coverage: international comparison

Vaccination coverage fully-vaccinated population and second booster in EU/EEA countries

second booster/full pop.



Health care providers – booster 2 (28 nov 2022)



COVID-19 and pregnancy

COVID-19 and pregnancy

Pregnant women are at increased risk for severe illness and complications from COVID-19

- Higher risk for admission to ICU, intubation, death
- Higher risk for preterm delivery (25-44%)
- Higher risk of pre-eclampsia
- Higher risk of IUGR, NICU admission and LWB infants

Risk of severe disease is higher in the late-second and third trimester of pregnancy

Effectiveness

18,391 vaccinated versus 18,391 unvaccinated pregnant women

	VE against documented infections	VE against symptomatic infections	VE against hospitalization
Day 14-20 after dose 1	67% (40-84%)	66% (32-86%)	NA
Day 21-27 after dose 1	71% (33-94%)	76% (30-100%)	NA
Day 7-56 after dose 2	96% (89-100%)	97% (91-100%)	89% (43-100%)

Nieuwe vaccins

Wuhan stam
gebaseerde vaccins

Bivalente vaccins op
basis van BA1 en
wuhan stammen

Bivalente vaccins op
basis van BA4/5 en
wuhan stammen

Recombinant-eiwit
Beta-stam gebaseerd
vaccin

In ontwikkeling (eerst
via fase 1, fase 2, evt
human challenge
studies, fase 3, ...)

Mucosale/nasale
vaccins

Combinatie griep en
COVID-19 vaccins

Pan-corona vaccins

Pneumokokkenvaccins

- Two new PCVs were authorized by EMA in 2021-2022:
 - PCV15-(Vaxneuvance, Merck Sharp & Dohme B.V). = PCV13+ **ST 22F and 33F**.
 - PCV20-(Apexxnar, Pfizer) = PCV15 + **ST 8, 10A, 11A, 12F and 15B**.
- **Both PCV15 and PCV20 are authorized by EMA for active immunisation to prevent invasive disease and pneumoniae caused by *S. pneumoniae* in adults \geq 18 years old**
- PCV15 : EMA (10 2022) expanded indication immunisation to prevent ID, pneumoniae *and AOM* caused by SP in persons from 6 weeks to 18 years old.
- PCV20: EMA authorization in children expected mid 2023

<https://www.health.belgium.be/nl/advies-9674-vaccinatie-tegen-pneumokokken-volwassenen>

Monkeypox



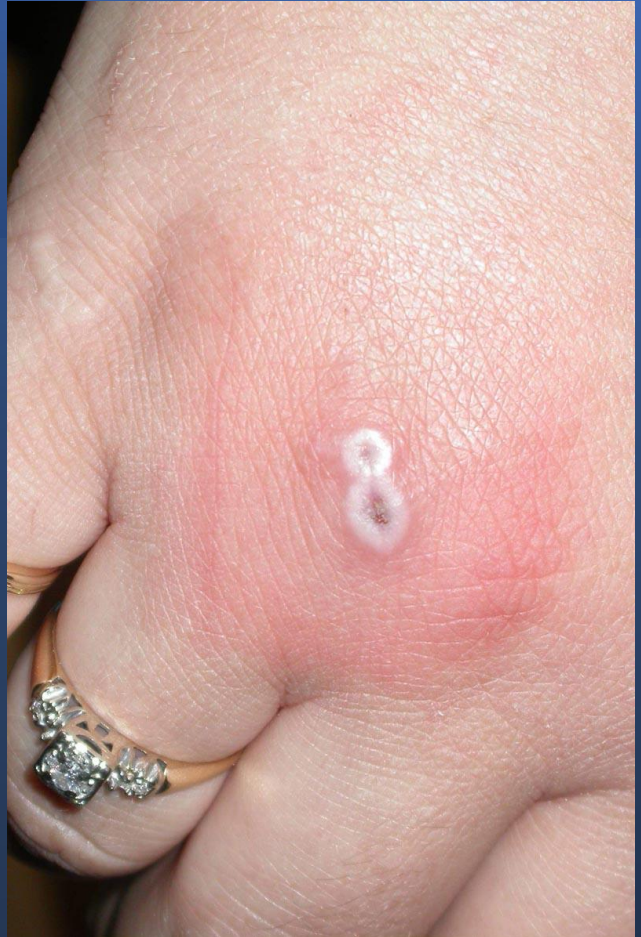






Figure 2. Evolution of lesions 4 days after the first consultation. (a) Two penile lesions with central scabbing and elevated borders. (b) Nipple with some flat erythema and local itching. (c) and (d) Two pustular and erythematous lesions on the neck and thigh.

Most likely mode of transmission, cases of monkeypox, EUR Region, 2022

HEALTH
EMERGENCIES
programme



Mode of transmission	Count (%)
Sexual transmission	5454 (93%)
Person-to-person (excluding: mother-to-child, healthcare-associated or sexual transmission)	367(6%)
Contact with contaminated material (e.g. bedding, clothing, objects)	10 (0.1%)
Other transmission	32 (0.2%)
TOTAL	5862*

* Mode of transmission for 1 case was reported as both sexual transmission and person-to-person

Information on likely mode of transmission is recorded as unknown for 12,774 cases and is missing for 7 cases. Percentages in this table were calculated based on available data (excluding unknown and missing) only.

Orthopoxvirussen

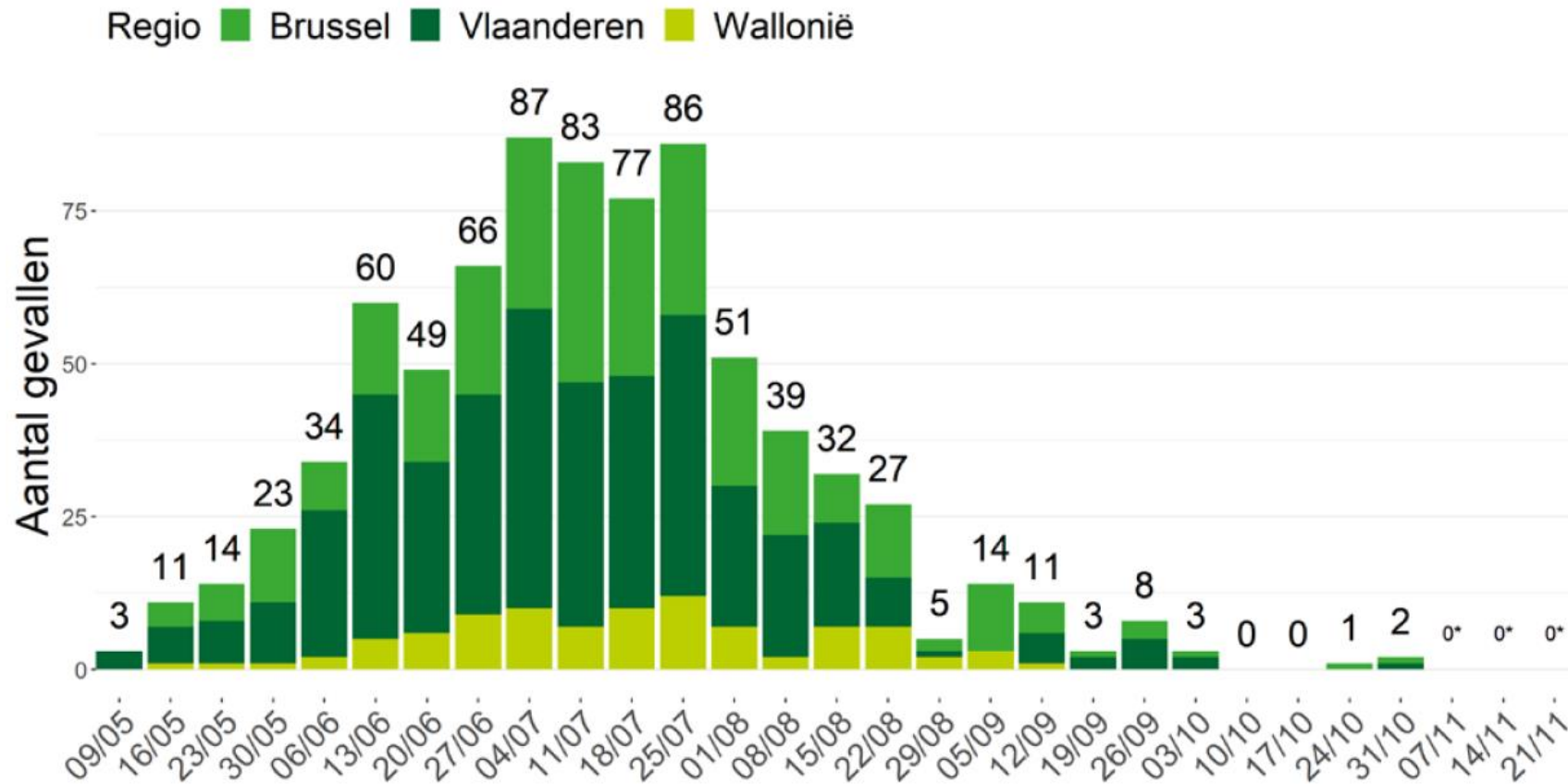
- Pokken (smallpox): variola virus
- Monkeypox : monkeypox virus (2 clades)
- Cowpox
- Horsepox
- Vaccinia virus (origin unknown), closely related to horsepox
 - Repeatedly cultivated and passaged in research laboratories for many decades
 - Composition of the live-attenuated smallpox vaccine (1st and 2nd generation)
 - ACAM2000 (2nd generation): myo/pericarditis 5.7/1000 primary vaccinees
 - MVA: Modified Vaccinia Ankara strain, basis of 3rd generation smallpox vaccine
- Imvanex is a 3rd generation vaccine against smallpox. It contains MVA, an attenuated (weakened), non-replicative form of the vaccinia virus.
 - PEP: 85% efficacy (based on data with 2nd generation vaccine)
 - Preventive: limited data – efficacy based on animal challenge studies



Op 28 november 2022 waren er in ons land in totaal 789 bevestigde gevallen van apenpokken gemeld. Het gaat om 411 gevallen in Vlaanderen (52%), 285 gevallen in Brussel (36%) en 93 gevallen in Wallonië (12%).

Bij de gevallen waarvoor het geslacht gekend is, zijn er 778 mannen, 5 vrouwen, en 3 personen die zich anders identificeren. De leeftijd voor de grote meerderheid situeert zich tussen de 16 en 71 jaar oud. Er zijn 2 gevallen gemeld bij min 16-jarigen; een kind jonger dan drie jaar en een kind ouder dan 12 jaar.

Figuur 3: Aantal gevallen per regio per week sinds 10 mei 2022, België (data laatste 3 weken nog niet volledig)



conclusies

Huidige uitbraak is onder controle

- Meerdere factoren hebben een rol gespeeld
 - gedragsaanpassing, herd immunity (binnen de high risk group), vaccins,
 - minder grote evenementen...

Opflakkingen mogelijk door blijvende laag niveau van circulatie

Introductie uit buitenland mogelijk

Belang van vroegtijdige diagnose, surveillance, isolatie,

tracing van contacten, gerichte vaccinatie

Dank u voor uw aandacht!
Merci pour votre attention!

Questions?

