



Universiteit Antwerpen  
| Faculteit Geneeskunde en  
Gezondheidswetenschappen

# COVID-19 anno 2022: clinical insights for patient care

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**Past president GEMS**

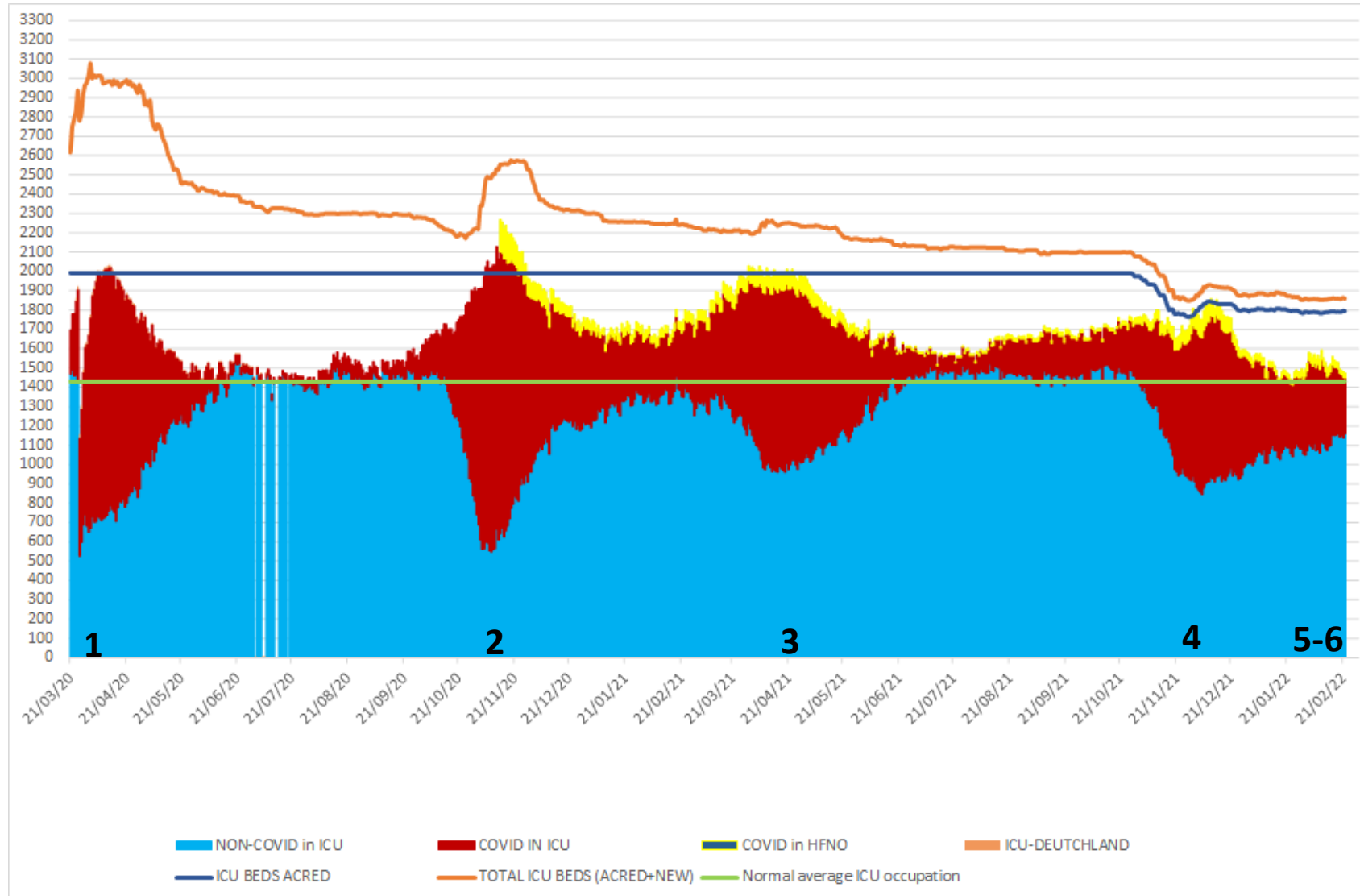
# 6 waves in Belgium (cases)



**Table 1. Common manifestations and potential complications of COVID-19.** N/A, not applicable.

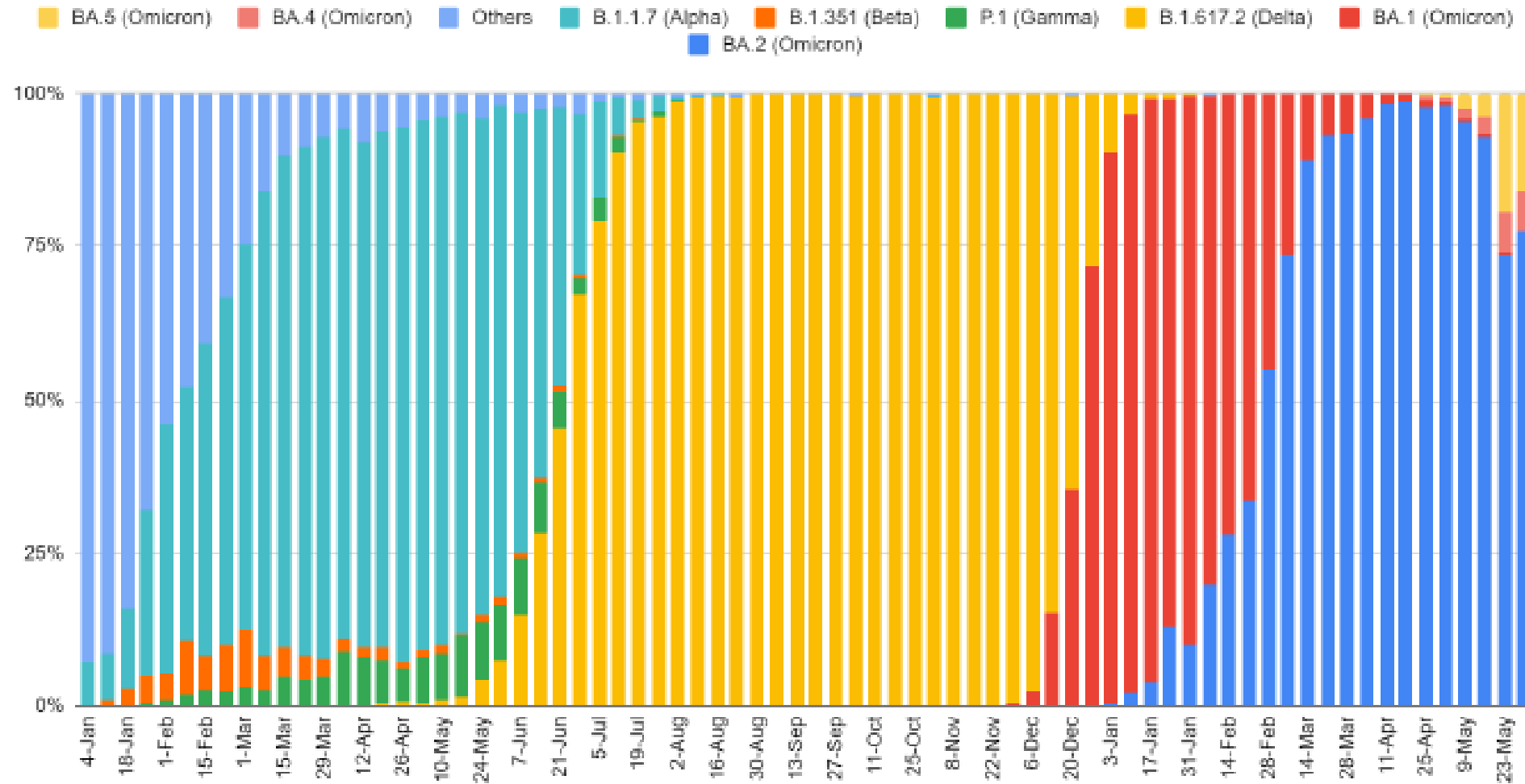
| Organ system     | Acute and severe Covid                                                            |                                                                                                                                          | Long Covid                                                                                                                                                       |
|------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | Common symptoms                                                                   | Potential complications                                                                                                                  | Common symptoms                                                                                                                                                  |
| Respiratory      | Cough<br>Dyspnea, Rhinorrhea<br>(runny nose)                                      | Pneumonia<br>Acute respiratory distress syndrome (ARDS)<br>Respiratory failure                                                           | Dyspnea, cough, interstitial lung disease                                                                                                                        |
| Systemic         | Fever<br>Fatigue                                                                  | Sepsis, kidney injury<br>Liver injury                                                                                                    | Fever, fatigue<br>post-exertional malaise                                                                                                                        |
| Nervous System   | Headache<br>Confusion<br>Anosmia<br>(loss of smell)<br>Ageusia<br>(loss of taste) | Stroke<br>Seizure<br>Guillain-Barre syndrome                                                                                             | Memory deficit, loss of concentration, sleep difficulty, mood disorder, paresthesia, myelopathy, neuropathy, anosmia, ageusia, blurry vision, tinnitus, headache |
| Cardiovascular   | Chest pain<br>Shortness of breath                                                 | Myocardial infarction<br>Myocarditis<br>Cardiogenic shock<br>Stress-induced cardiomyopathy<br>Clotting abnormalities                     | Chest pain, palpitations, hypertension, angina, myocarditis, pericarditis, cardiac arrhythmias, postural orthostatic syndrome                                    |
| Gastrointestinal | Nausea<br>Vomiting<br>Diarrhea<br>Anorexia (loss of appetite)                     | Acute pancreatitis<br>Acute appendicitis<br>Intestinal obstruction<br>Bowel ischemia<br>Hemoperitoneum<br>Abdominal compartment syndrome | Diarrhea, vomiting, nausea, loss of appetite, hepatitis                                                                                                          |
| Skin             | Rash                                                                              | N/A                                                                                                                                      | Hair loss                                                                                                                                                        |
| Musculoskeletal  | Myalgias<br>(muscle aches)                                                        | N/A                                                                                                                                      | Myalgia, arthralgia, weakness                                                                                                                                    |
| Endocrine        | Hyperglycemia                                                                     | Diabetes                                                                                                                                 | Hot/cold sensation, thyroid abnormalities, diabetes, hormonal abnormalities                                                                                      |

# 6 waves: impact on ICU



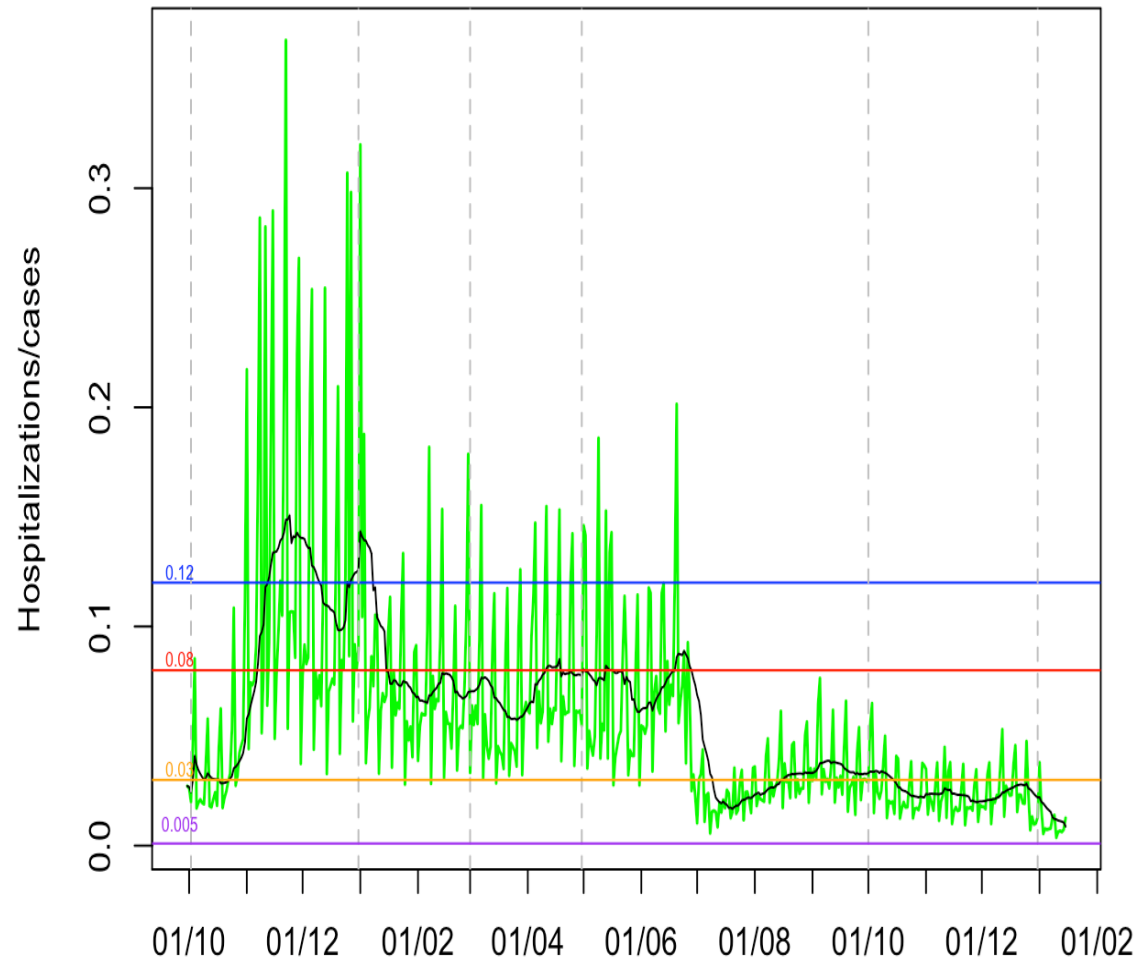
Source Hospital and Transport Surge Committee

# Festival of variants...



# Relationship hospitalizations/confirmed cases

(Christel Faes, hospital surge data)

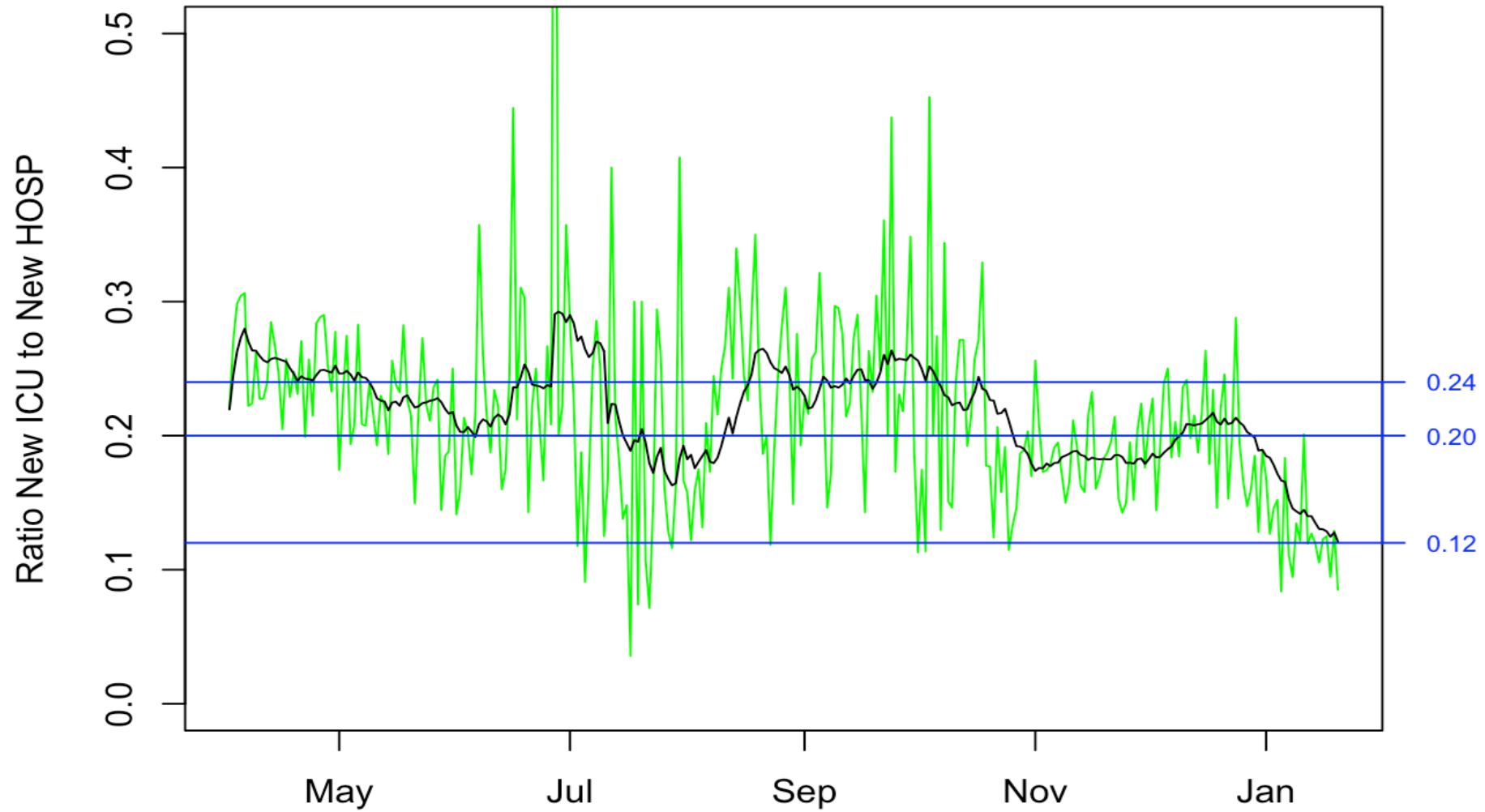


Ratio hosp/cases

- Wave 2: 12/100
- Wave 3: 8/100
- Wave 4: 3/100
- Wave 5: decrease versus 1/100 - 5/1000 ?

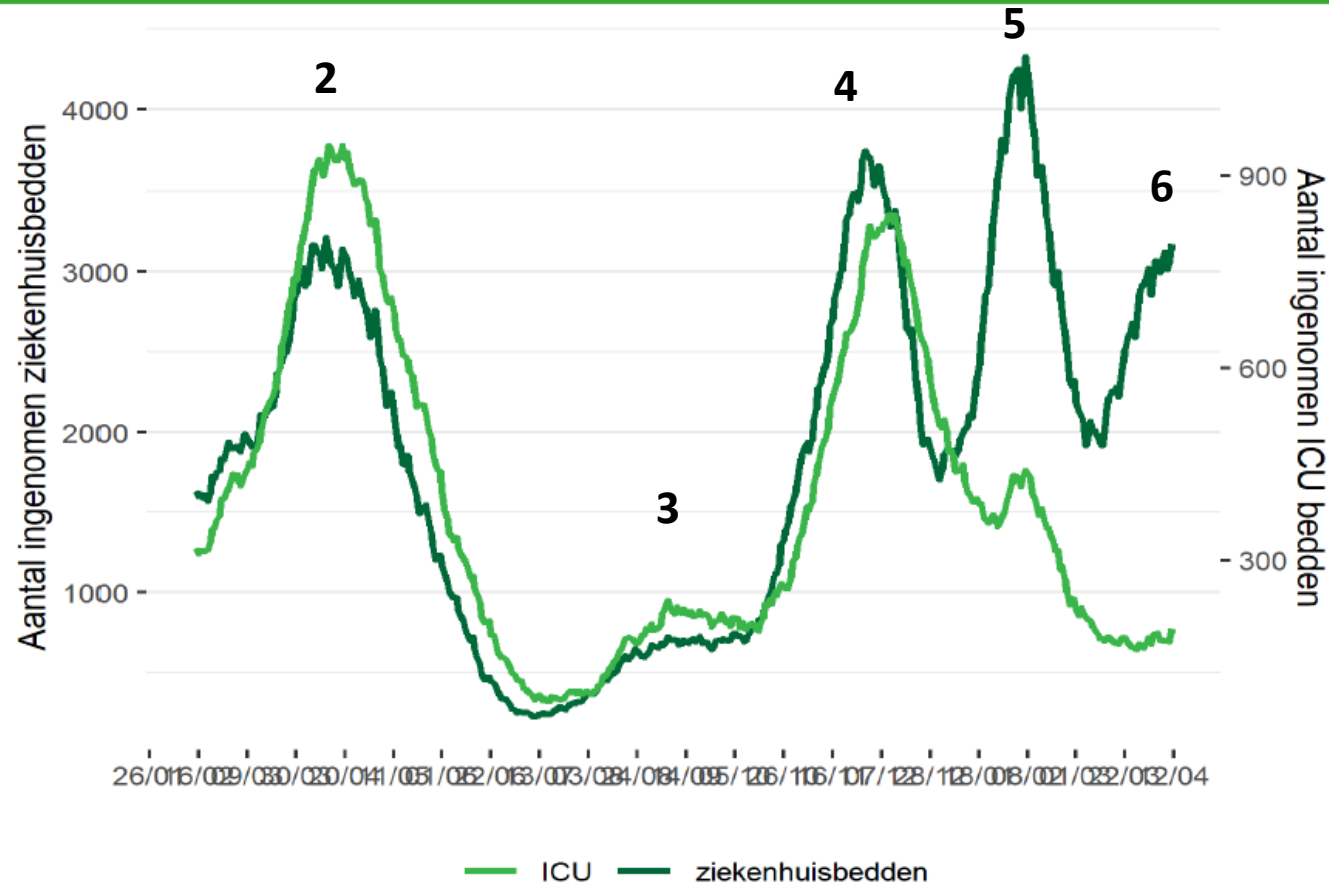
# Relationship admission ICU / hosp

(Christel Faes, hospital surge data)



# Impact on hospital bed/ ICU bed occupation

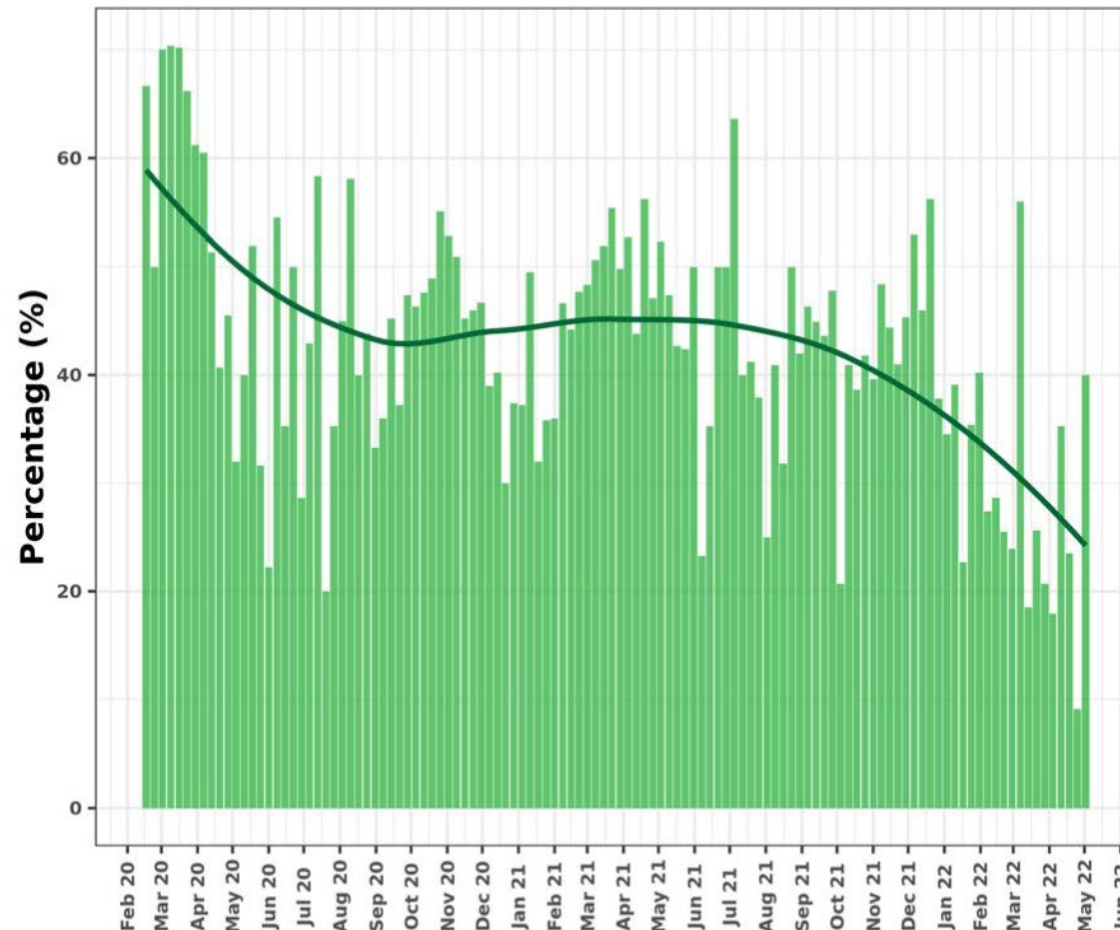
Aantal ingenomen bedden in het ziekenhuis en op ICU, 15/02/21 - 05/04/22





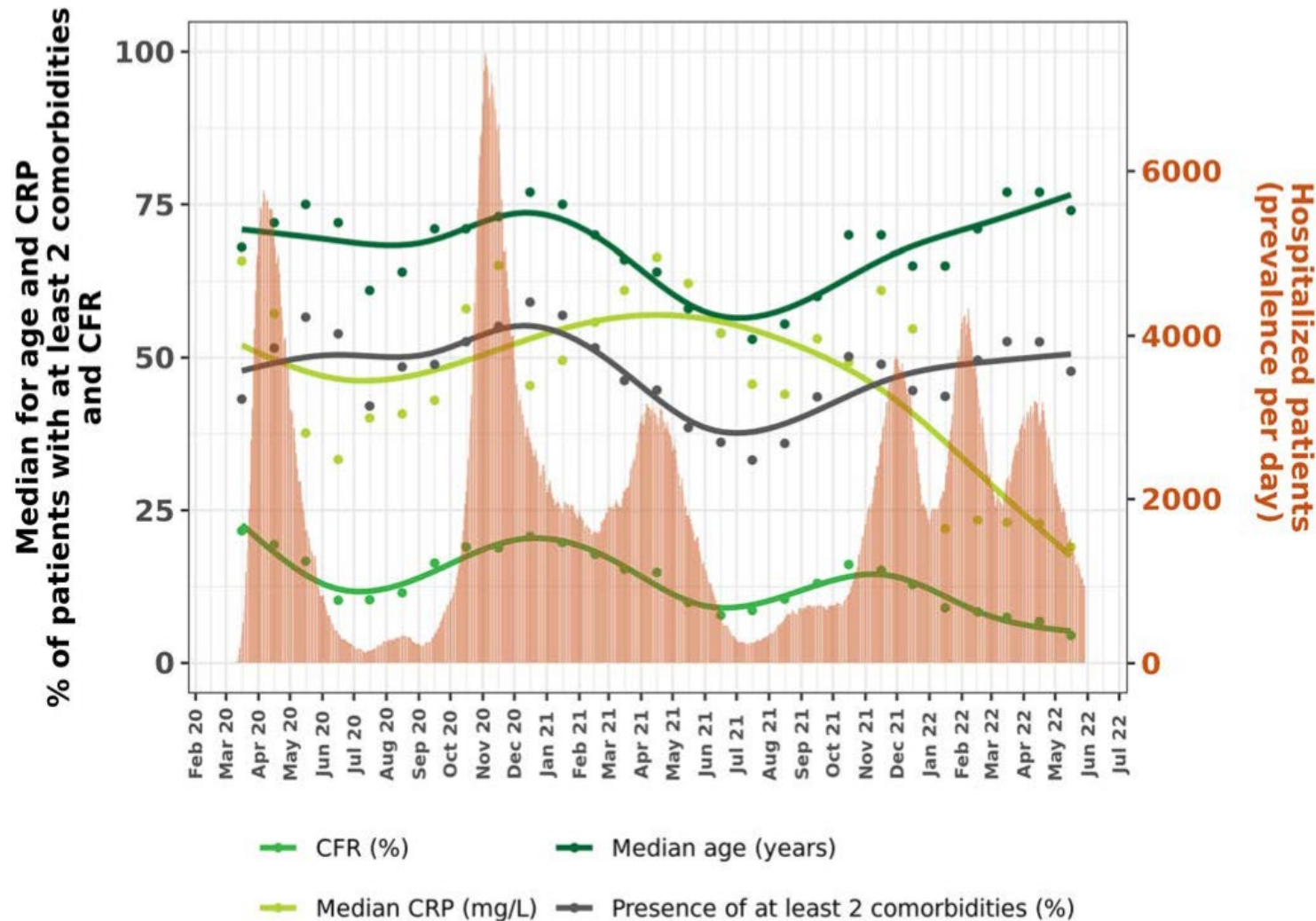
# Evolution need for ventilation among ICU-admissions for covid-19

Figure 29: Invasive ventilation among all ICU patients over time, per week



Data: Sciensano

# Evolution profile of the hospitalised COVID-19-patient



Geriatric

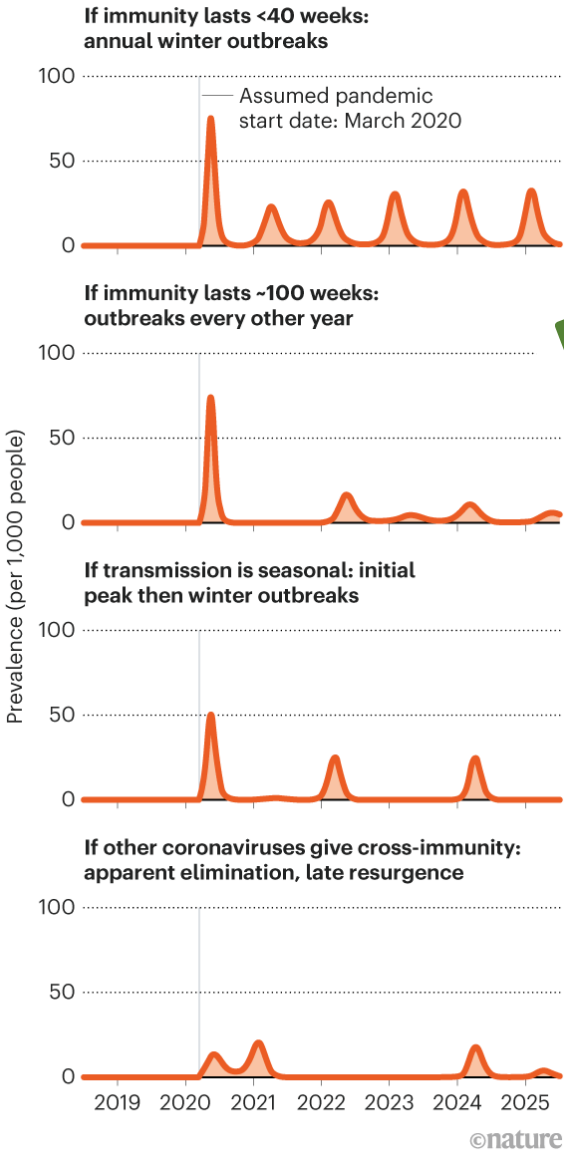
Severely immunopressed  
(hemato-onco,  
transplantation,...)

Data: Sciensano

1. How to prevent infection in the most vulnerable?

# WHAT HAPPENS NEXT?

To predict how COVID-19 might come and go in temperate regions such as North America and Europe, researchers have modelled the influence of factors including how long immunity to the coronavirus might last, the role of seasons and whether other coronavirus infections might give some immunity to it.



Required:  
population immunity (asap)!

- ‘natural’ immunity after COVID-disease: clinical risks, duration and width unknown
- Passive immunity (antibodies): select indications
- **Immunity through vaccination: lower risks, scaleable, duration and width(?)**

# Covid Vaccinaties België

HOME **BAROMETER** INTERACTIEF ARCHIEF

NL ▾

⌚ LAATSTE UPDATE 09/06 11:22

🔔 MELDINGEN

## 💉 BOOSTER DOSIS



**7.156.145**

personen

**62,1%**

van de bevolking

## 💉 2E BOOSTER DOSIS



**349.936**

personen

**3,0%**

van de bevolking

## 💉 OORSPRONKELIJK VACCINATIEPROTOCOL

**MINSTENS DEELS**

**80,2%**

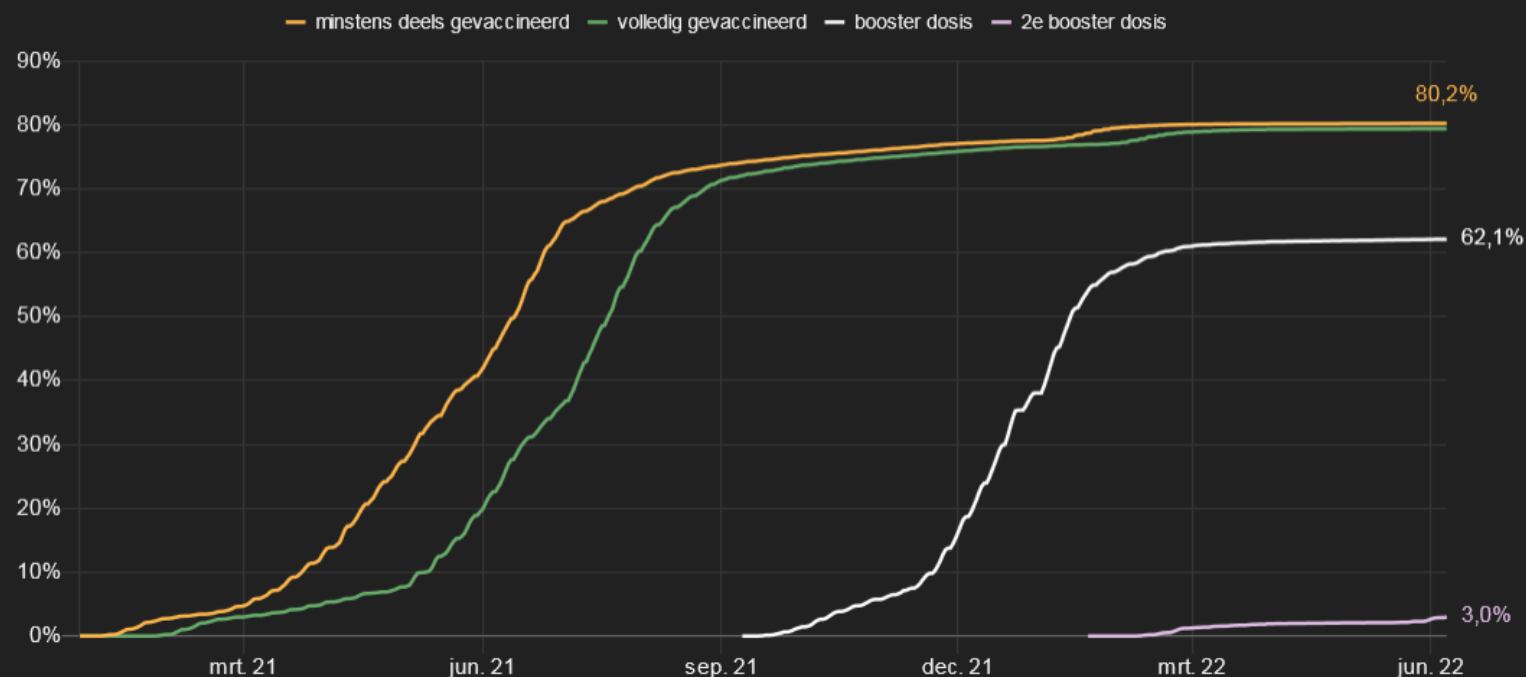
van de bevolking

**VOLLEDIG**

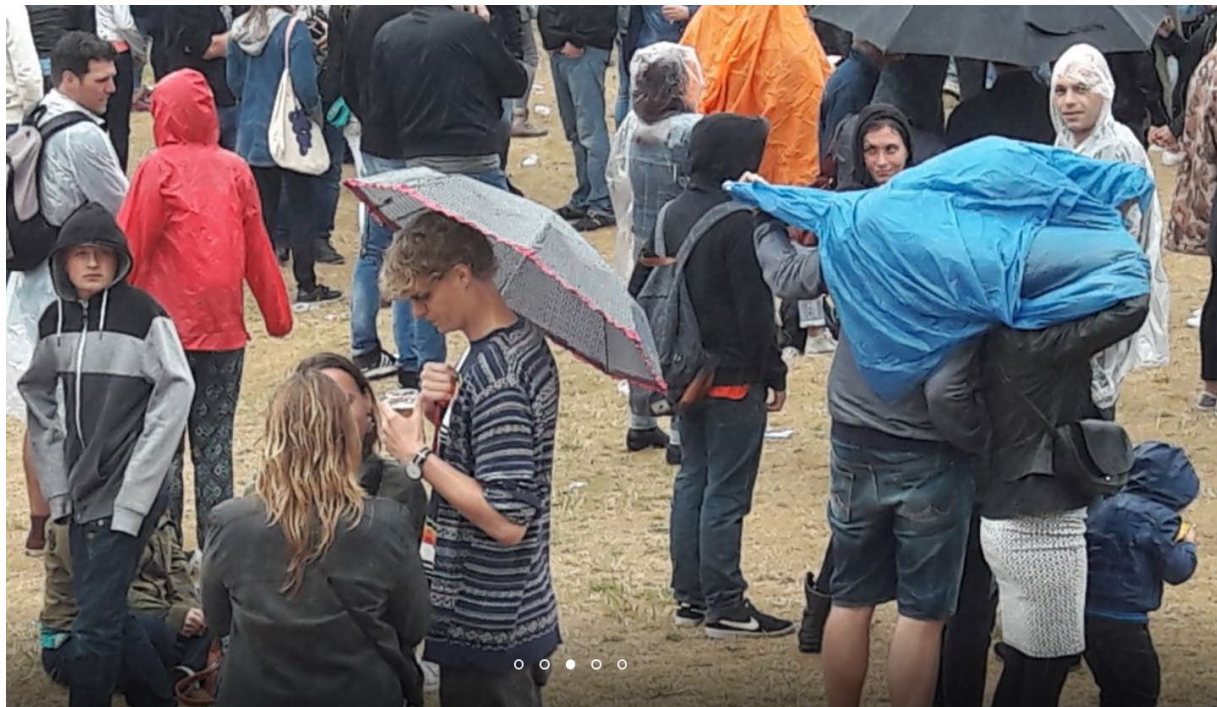
**79,4%**

van de bevolking

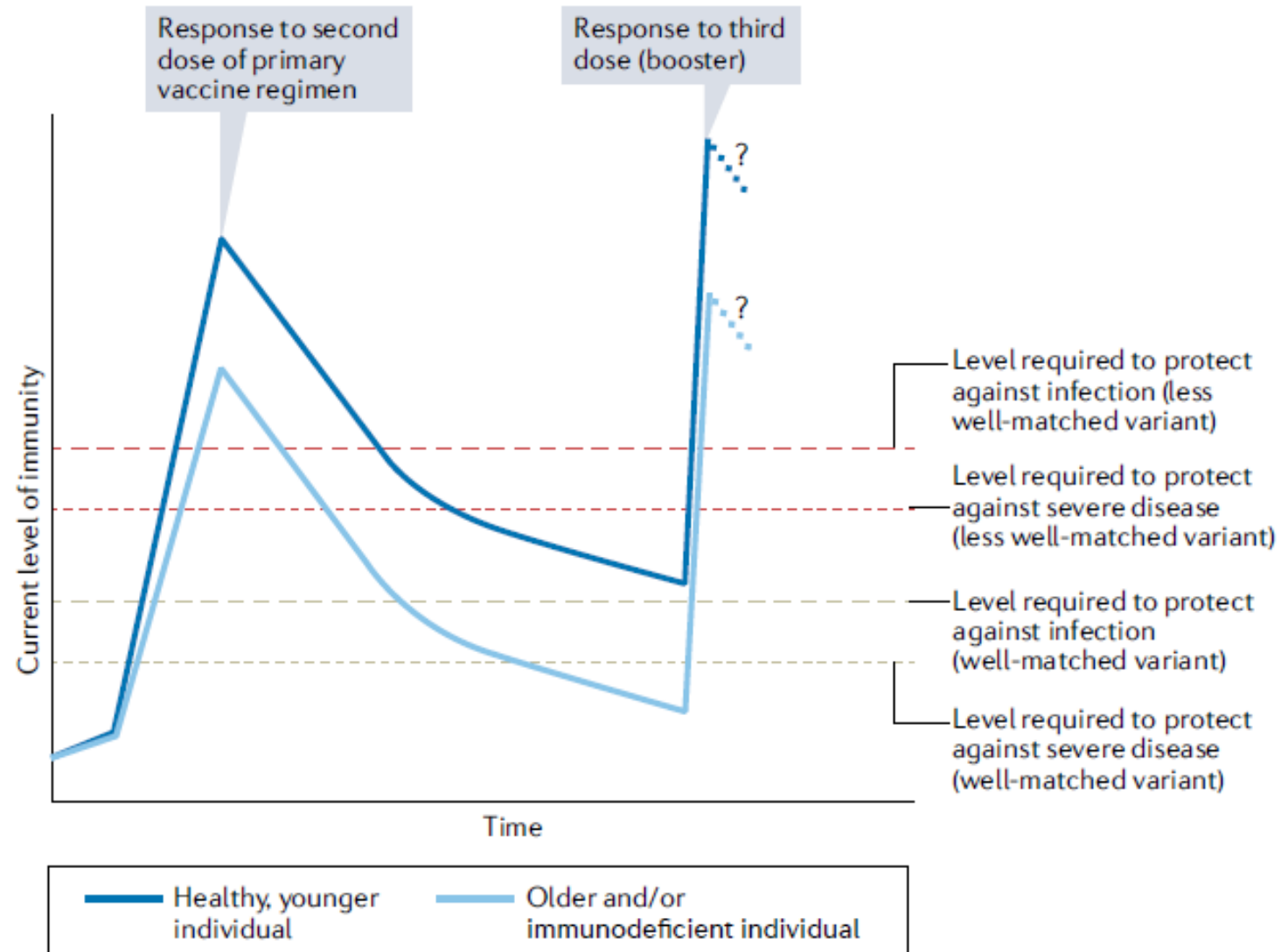
## Gevaccineerd percentage van de bevolking







# Breakthrough infections



~immune status  
~variant

# Efficacy of covid-19 vaccines in immunocompromised patients: systematic review and meta-analysis

Ainsley Ryan Yan Bin Lee,<sup>1</sup> Shi Yin Wong,<sup>1</sup> Louis Yi Ann Chai,<sup>2,3,4,5</sup> Soo Chin Lee,<sup>6,7</sup>  
Matilda Xinwei Lee,<sup>6</sup> Mark Dhinesh Muthiah,<sup>8,9</sup> Sen Hee Tay,<sup>10</sup> Chong Boon Teo,<sup>1</sup>  
Benjamin Kye Jyn Tan,<sup>1</sup> Yiong Huak Chan,<sup>11</sup> Raghav Sundar,<sup>3,6,12,13,14</sup> Yu Yang Soon<sup>3,15</sup>

N = 82 studies

94% used mRNA vaccine

1st  $\leftrightarrow$  2nd  $\leftrightarrow$  3d vaccine dose

After 2nd dose:

only 1/3 of Tx patient seroconverted

hemato < immuno < solid cancer

HIV = immunocompetent

**Importance of 3d (and 4th!) dose!**

After 3 d dose

Tx < solid cancer, hemato



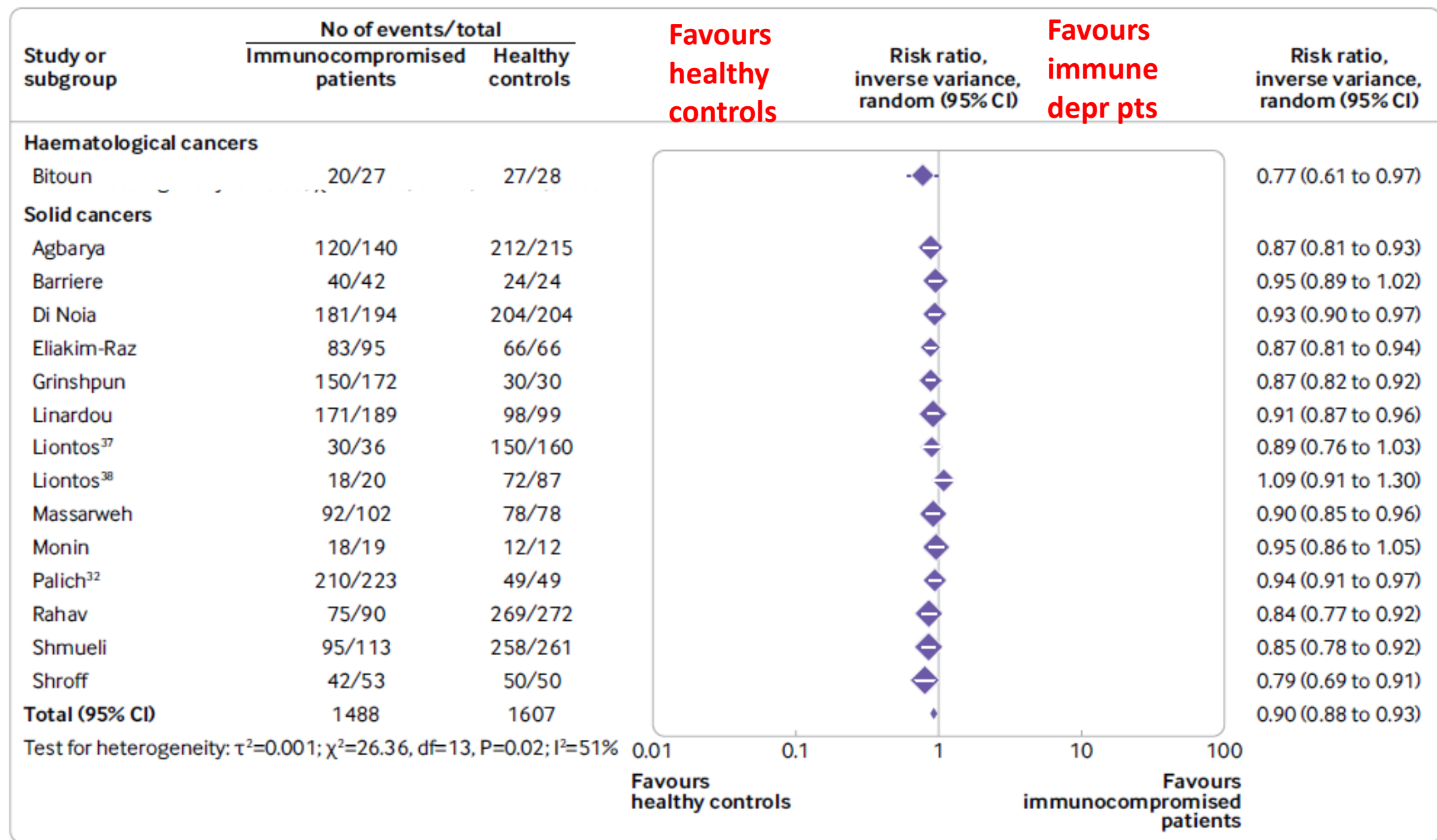
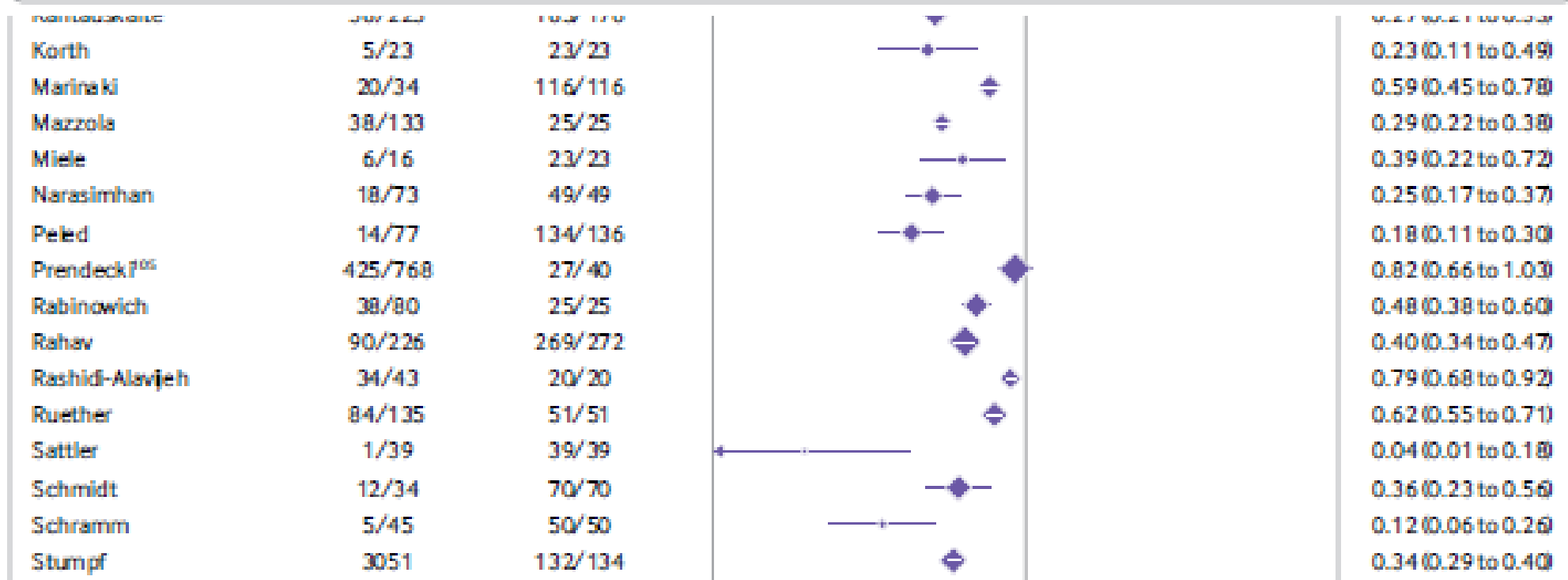
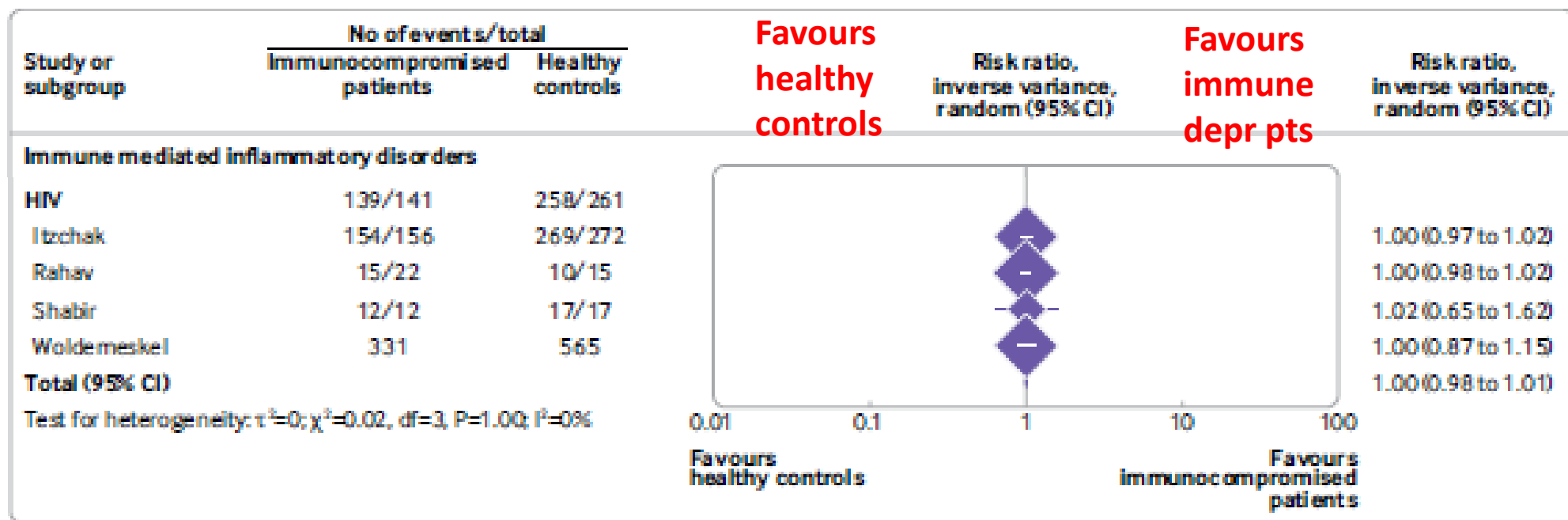


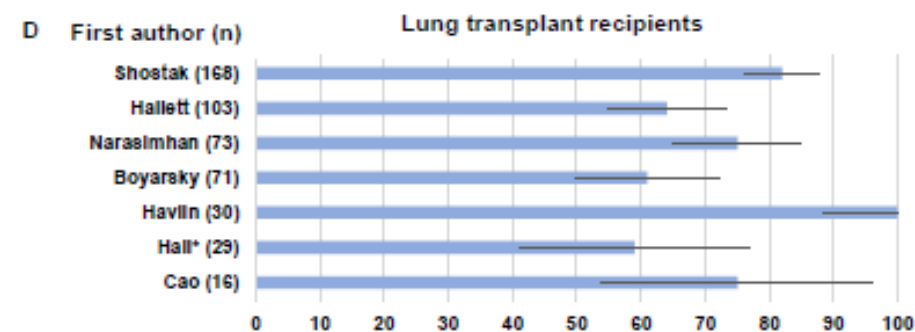
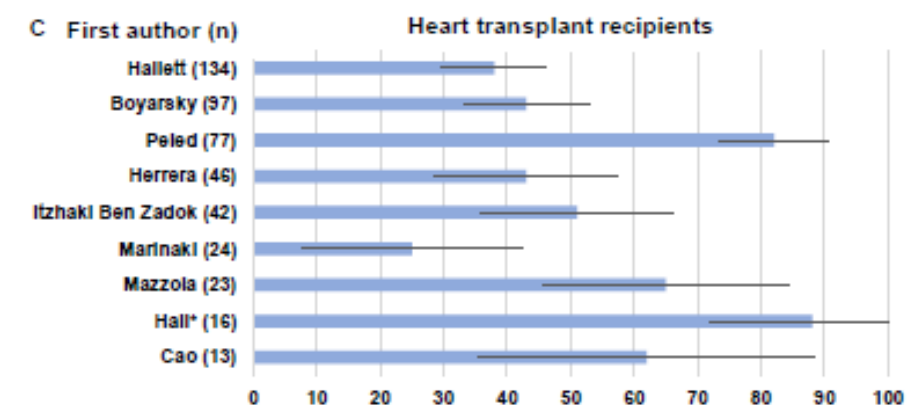
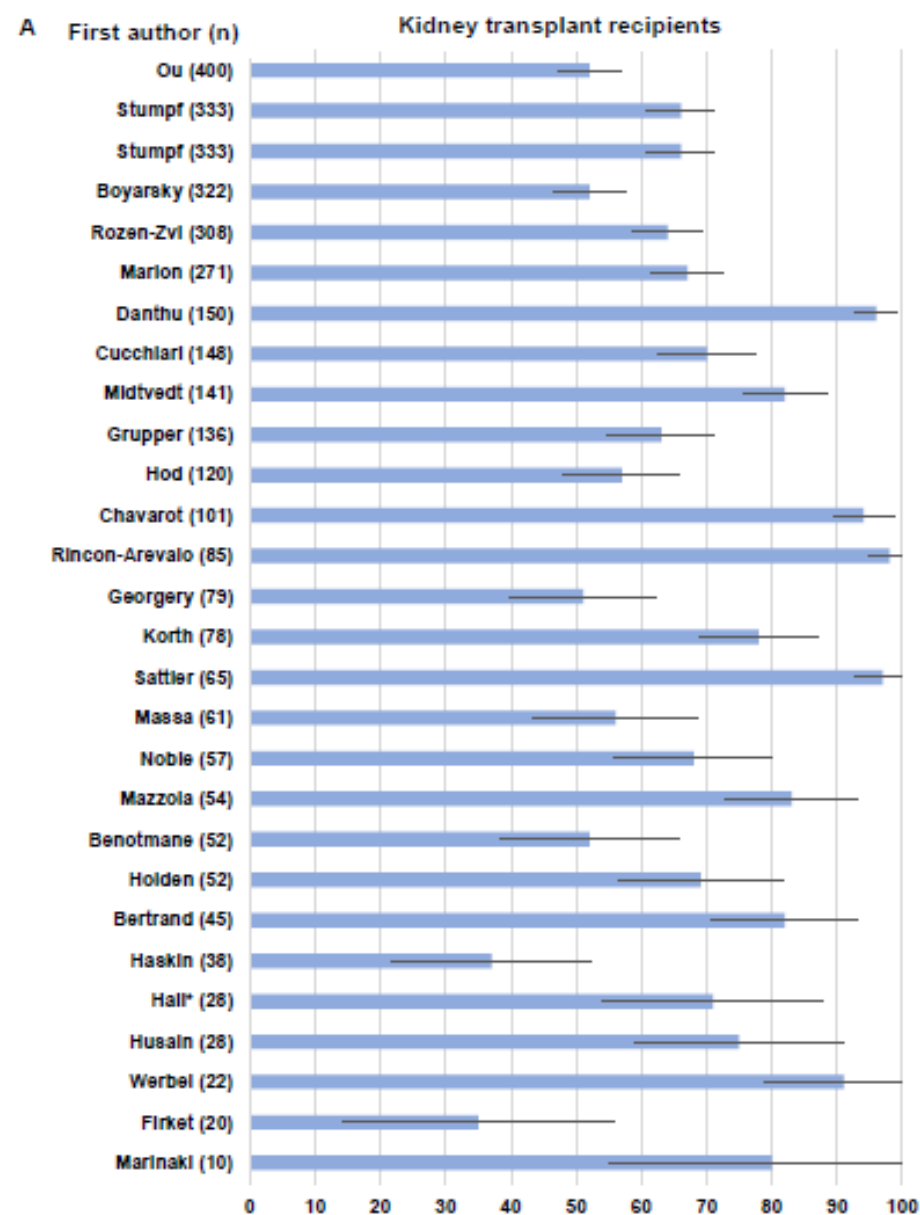
Fig 3 | Risk ratios for seroconversion among immunocompromised patients with haematological cancers and solid cancers compared with immunocompetent controls after a second dose of covid-19 vaccine



## Immunological and clinical efficacy of COVID-19 vaccines in immunocompromised populations: a systematic review

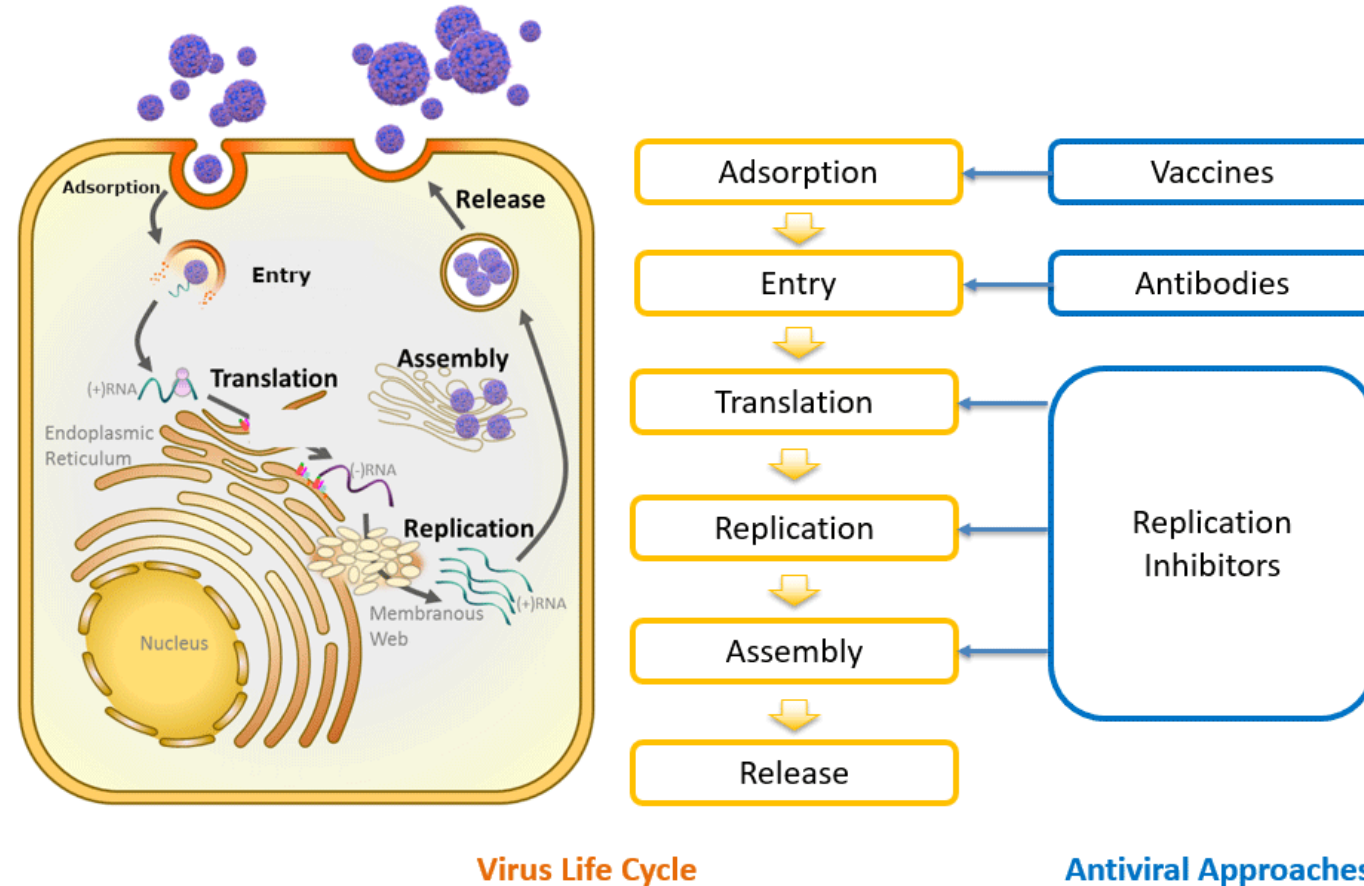
Simon Galmiche<sup>1</sup>, Liem Binh Luong Nguyen<sup>1</sup>, Eric Tartour<sup>2</sup>, Xavier de Lamballerie<sup>3</sup>,  
Linda Wittkop<sup>4</sup>, Paul Loubet<sup>5</sup>, Odile Launay<sup>6,\*</sup> [Clinical Microbiology and Infection 28 \(2022\) 163–177](#)

- N = 162 studies
- % non-response highest for Tx and hemato > cancer, dialysis
- Risk factors for non-response:
  - Older age
  - Use of steroids, immunosuppressives, anti-CD20
- ?? To be studied
  - Effect of 3d, 4th dose
  - Heterologous schedules
  - Cocoon vaccination, Mabs...

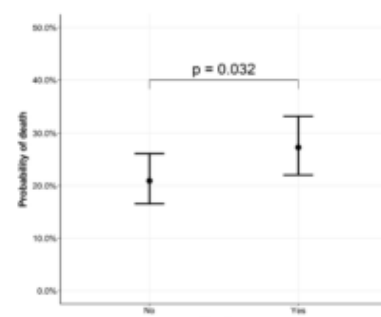
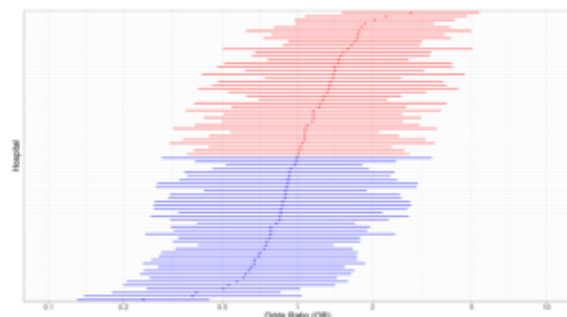


2. How to prevent progression to severe illness in the most vulnerable?

# Antiviral strategies



## Overflow in ICU contributes to in-hospital mortality

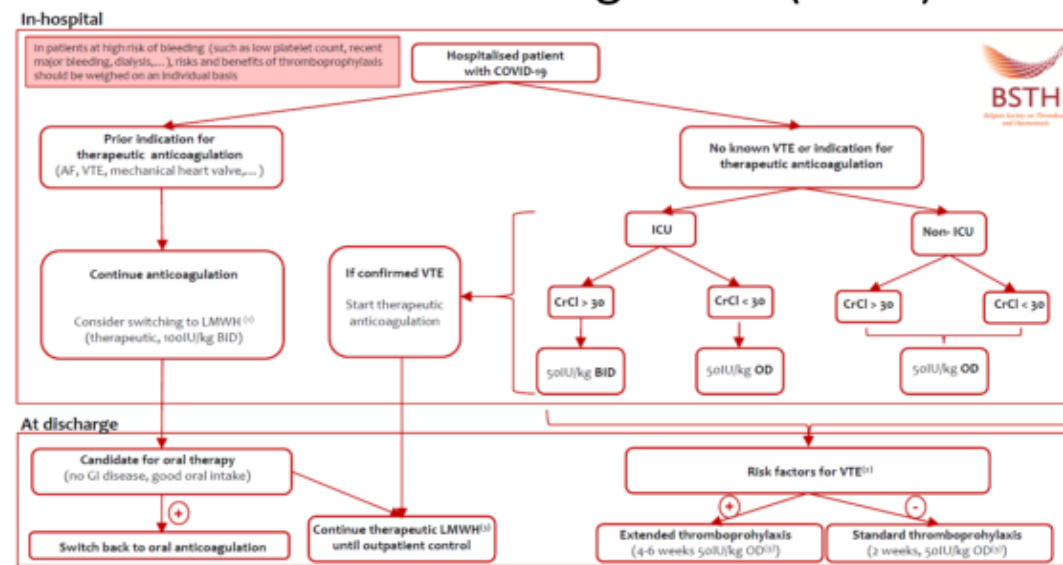


Mortaliteit in hospitaal 10-20%  
Mortaliteit in ICU 30-40%

Taccone et al, Lancet Regional Health 2020,

In this national dataset with an hospital mortality of 36.1% for COVID-19 patients requiring ICU admission, mortality varied significantly across different centres and was associated with organizational characteristics, in particular ICU overflow and the proportion of additionally created ICU beds. Management of crisis surges during the following waves of COVID-19 and possible other pandemics should take into account these factors to readress patients into ICUs with the adequate quality of care and available materials and trained personnel.

## Guidelines on anticoagulation (BSTH)



[https://covid-19.sciensano.be/sites/default/files/Covid19/COVID-19\\_Anticoagulation\\_Management.pdf](https://covid-19.sciensano.be/sites/default/files/Covid19/COVID-19_Anticoagulation_Management.pdf)

## The NEW ENGLAND JOURNAL of MEDICINE

RECOVERED OF 2021 FEBRUARY 25, 2021 VOL. 384 NO. 8

### Dexamethasone in Hospitalized Patients with Covid-19

The RECOVERY Collaborative Group<sup>a</sup>

Standard of care  
versus  
dexamethasone 6 mg 1 x/d x 10 d

|                        | dexa  | soc   | RR (95%CI)       |
|------------------------|-------|-------|------------------|
| Overall                | 22,9% | 25,7% |                  |
| Ventilated             | 25,3% | 41,4% | 0,64 (0,51-0,81) |
| No respiratory support | 17,8% | 14,0% | 1,19 (0,92-1,55) |

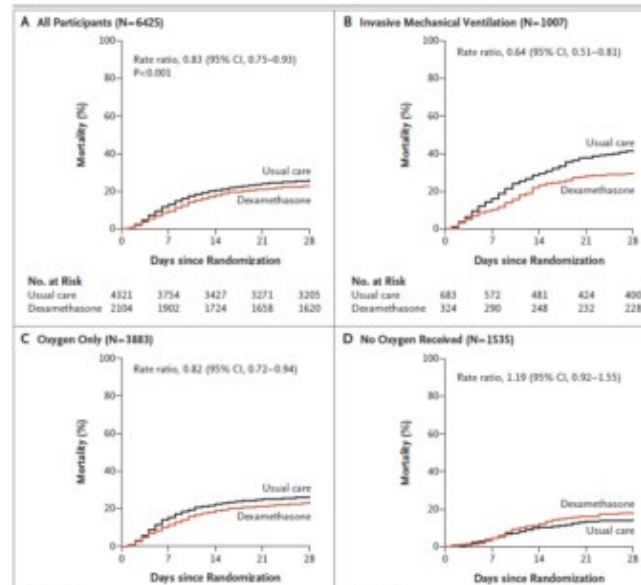


Figure 2. Mortality at 28 Days in All Patients and According to Respiratory Support at Randomization.

Horby, NEJM Feb 2021

## The NEW ENGLAND JOURNAL of MEDICINE

RECOVERED OF 2021 FEBRUARY 11, 2021 VOL. 384 NO. 8  
Repurposed Antiviral Drugs for Covid-19 — Interim WHO Solidarity Trial Results  
WHO Solidarity Trial Consortium<sup>a</sup>

405 hospitals in 30 countries

Standard of care (4088)

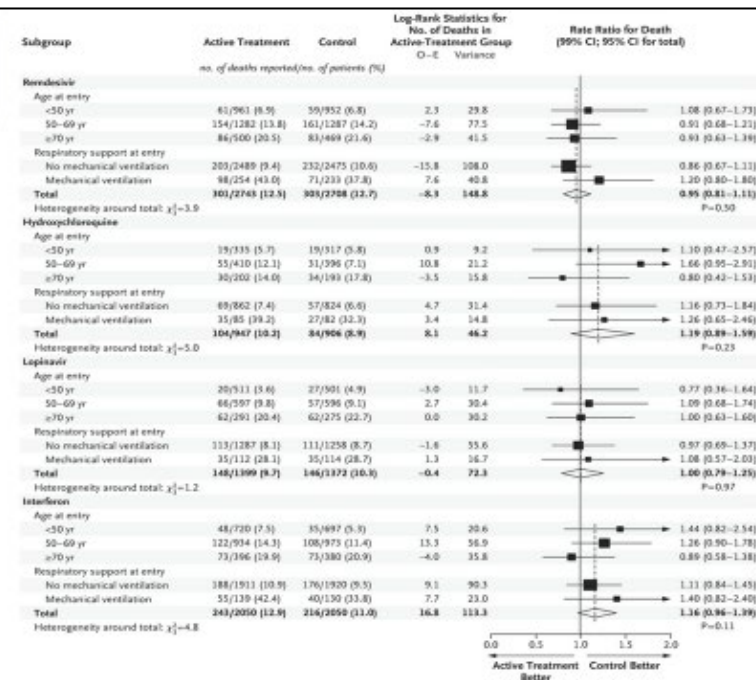
vs.

Standard of care +

- remdesivir (2750)
- hydroxychloroquine (954)
- lopinavir/r (1411)
- interferon (2063)

No significant therapeutic effect on:

- Mortality
- Duration of ventilation
- Length of stay



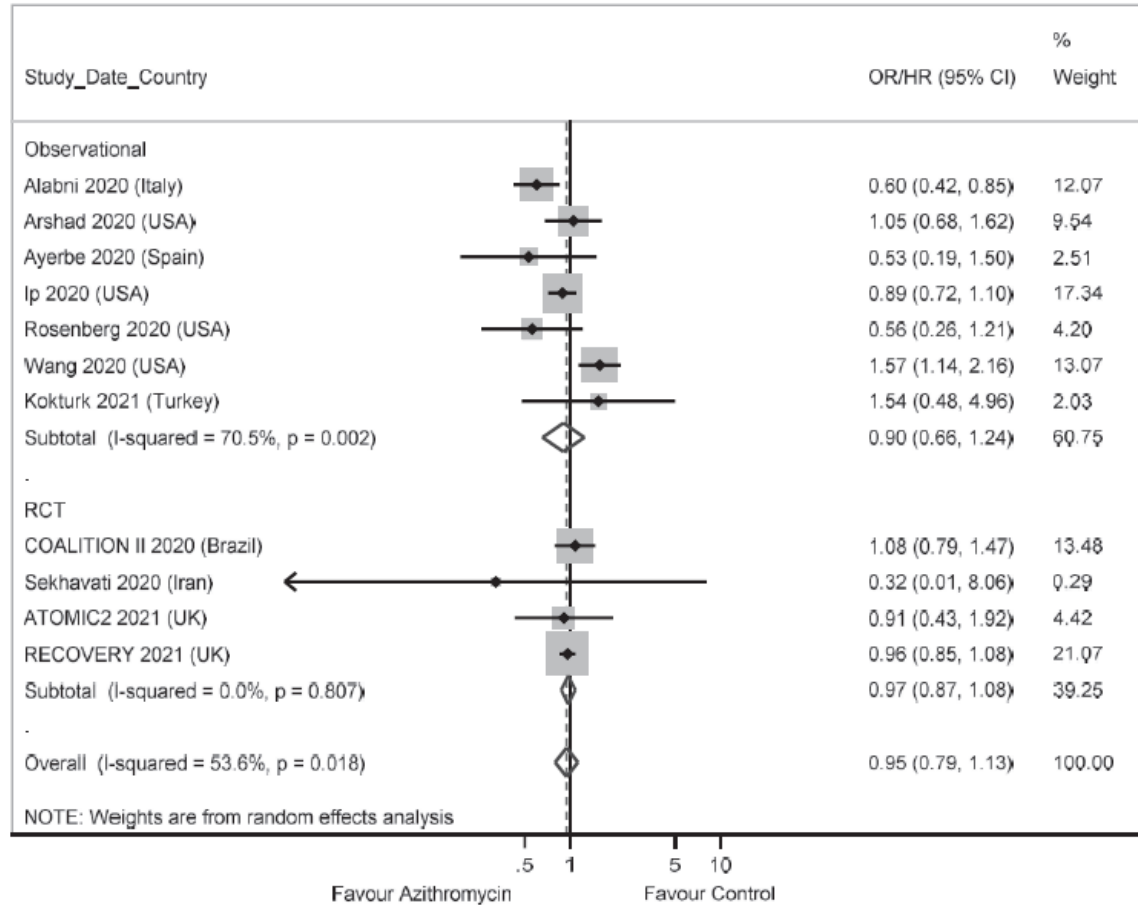


# Key summary of German national treatment guidance for hospitalized COVID-19 patients

**Table 1** Summarizing table of key pharmacologic recommendations

| Drug treatment                             | Recommendation <sup>a</sup> | WHO scale <sup>b</sup> | Evidence (sample size <sup>c</sup> ) | Quality of evidence |
|--------------------------------------------|-----------------------------|------------------------|--------------------------------------|---------------------|
| <b>1. Immunomodulators</b>                 |                             |                        |                                      |                     |
| 1.1 Corticosteroids                        | ↑↑                          | 5–9                    | 6 RCT ( <i>N</i> = 7595)             | Moderate            |
| 1.2 Tocilizumab (anti-IL6)                 | ⇔                           | (5-)6*                 | 9 RCT ( <i>N</i> = 6481)             | Low to moderate     |
| <b>2. Antivirals</b>                       |                             |                        |                                      |                     |
| 2.1 Remdesivir                             | None                        | N/A                    | 4 RCT ( <i>N</i> = 7142)             | Low to moderate     |
| 2.2 Convalescent plasma                    | ↓↓↓                         | 4–9                    | 4 RCT ( <i>N</i> = 931)              | Low to moderate     |
| 2.3.1 Bamlanivimab (nMAB)                  | ↓                           | 4–9                    | 1 RCT ( <i>N</i> = 314)              | Low                 |
| 2.3.2 nMABs for early nosocomial infection | ⇔                           | (1–2) <sup>#</sup>     | <i>Expert opinion</i>                | N/A                 |
| <b>3. Anticoagulation</b>                  |                             |                        |                                      |                     |
| 3.1 Pharmacological thromboprophylaxis     | ↑↑                          | 4–9                    | <i>Expert opinion</i>                | N/A                 |
| 3.2 Intensified anticoagulation            | ⇔                           | 4–9                    | <i>Expert opinion</i>                | N/A                 |
| <b>4. Miscellaneous</b>                    |                             |                        |                                      |                     |
| 4.1 Azithromycin                           | ↓↓↓                         | 4–9                    | 4 RCT ( <i>N</i> = 8759)             | Moderate to high    |
| 4.2 Ivermectin                             | ↓↓↓                         | 4–9                    | 1 RCT ( <i>N</i> = 72)               | Very low            |
| 4.3 Vitamin D <sub>3</sub>                 | ↓↓↓                         | 4–9                    | 1 RCT ( <i>N</i> = 76)               | Very low            |

## Azithromycin in patients with COVID-19: a systematic review and meta-analysis



The results presented in this systematic review do not support the use of azithromycin in the management of COVID-19. They also show no evidence of any harm caused to patients who received it, which would be consistent with the well-established safety profile reported before for azithromycin.<sup>4</sup> Future research on repurposed or innovative treatment for patients with COVID-19 may need to consider alternative drugs.

# <https://www.bvikm.org/covid-19-sars-cov-2>

## COVID-19/SARS-COV-2

- **Richtlijnen.**

- **"Interim clinical guidance for adults with suspected or confirmed COVID-19 in Belgium"** (deze richtlijnen kunnen onderhevig zijn aan wijzigingen, de link leidt steeds naar de meest recente versie ervan).
- Samenstelling van de werkgroep die de Belgische richtlijnen heeft opgesteld (klik op de namen om eventuele "conflicts of interest" te bekijken):



**Koen BLOT:** Department of Epidemiology and Public Health, Sciensano (Brussels).

**Emmanuel BOTTIEAU:** Department of Clinical Sciences, Instituut voor Tropische Geneeskunde [ITG (Antwerp)].

**Nicolas DAUBY:** Department of Internal Medicine and Infectious Diseases, CHU-Saint-Pierre (Brussels).

**Julien DE GREEF:** Department of Internal Medicine and Infectious Diseases, Cliniques Universitaires Saint-Luc-UCLouvain (sint-Lambrechts-Woluwe).

**Pieter DEPUYDT:** Department of Intensive Care Medicine, UZ Gent (Ghent).

**Paul DE MUNTER:** Department of Internal Medicine, UZ Leuven (Leuven).

**Maya HITES:** Department of Infectious Diseases, Cliniques Universitaires de Bruxelles [CUB-Erasme (Anderlecht)].

**Patrick LACOR:** Department of Internal Medicine, UZ Brussel (Jette).

**Natalie LORENT:** Department of Pneumology, UZ Leuven (Leuven).

**Jiska MALOTAUX:** Department of Internal Medicine, UZ Gent (Ghent).



**Fabio TACCONE:** Department of Intensive Care Medicine, Cliniques Universitaires de Bruxelles [CUB-Erasme (Anderlecht)].

**Caroline THEUNISSEN:** Department of Clinical Sciences, [ITG (Antwerp)].

**Eva VAN BRAECKEL:** Department of Respiratory Medicine, UZ Gent (Ghent).



**Sabrina VAN IERSSEL:** Department of Internal Medicine, UZ Antwerpen (Edegem).

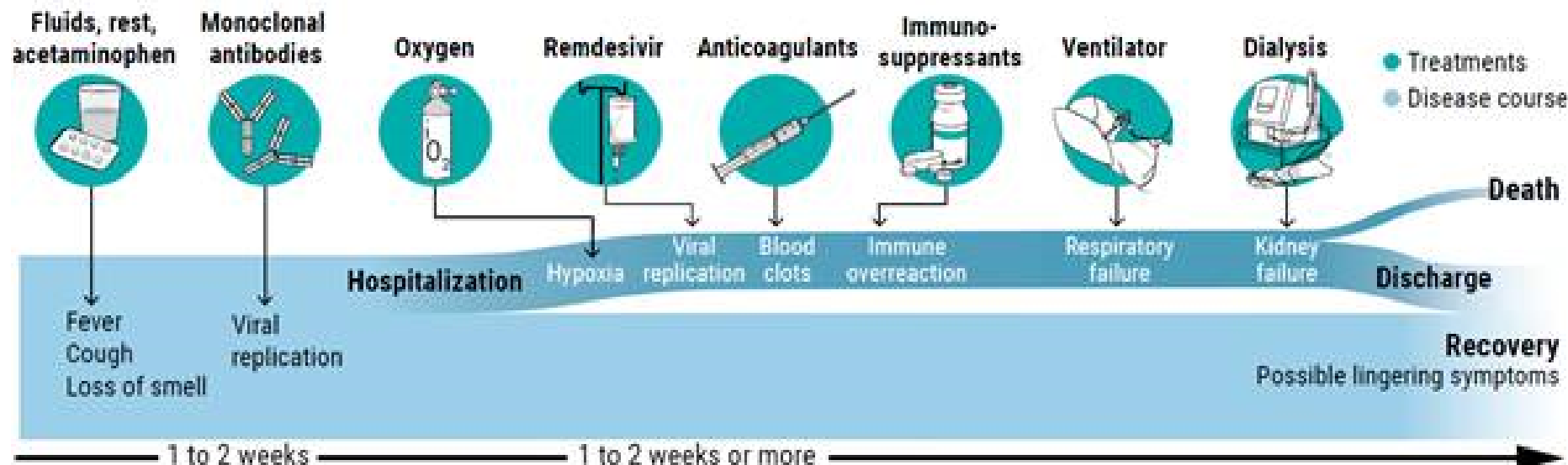
**Roel VAN LOOCK:** DG PRE – Department of Assessors: FAGG - AFMPS (Brussels).

**Sandrine MILAS:** Department of Infectious Diseases CHU Charleroi (Charleroi).

- **"Richtlijnen voor de behandeling van kinderen met COVID-19"** (richtlijnen van het UZ Leuven, onafhankelijk gereviseerd door de Belgian COVID-19 Paediatric Task Force).

# Treatment options during the disease course

## Antivirals (Paxlovid)



**Monoclonal antibodies** appear to reduce risk of hospitalization in outpatients at high risk of severe disease—provided patients can access them.

**Oxygen**, delivered through nasal prongs, a mask, or an invasive breathing tube, is crucial to COVID-19 care. But how it's administered varies among hospitals.

**The antiviral remdesivir** is widely used in hospitalized patients, but evidence is mixed on its ability to shorten hospital stays; it hasn't been shown to improve survival.

**Anticoagulants** can prevent blood clots that are common in COVID-19 patients, but physicians must weigh the risk of bleeding when deciding the right dose.

**The immunosuppressant drugs** dexamethasone and tocilizumab have both reduced mortality in large clinical trials of hospitalized patients, showing that it's possible to tame the potentially deadly inflammation that characterizes severe disease.

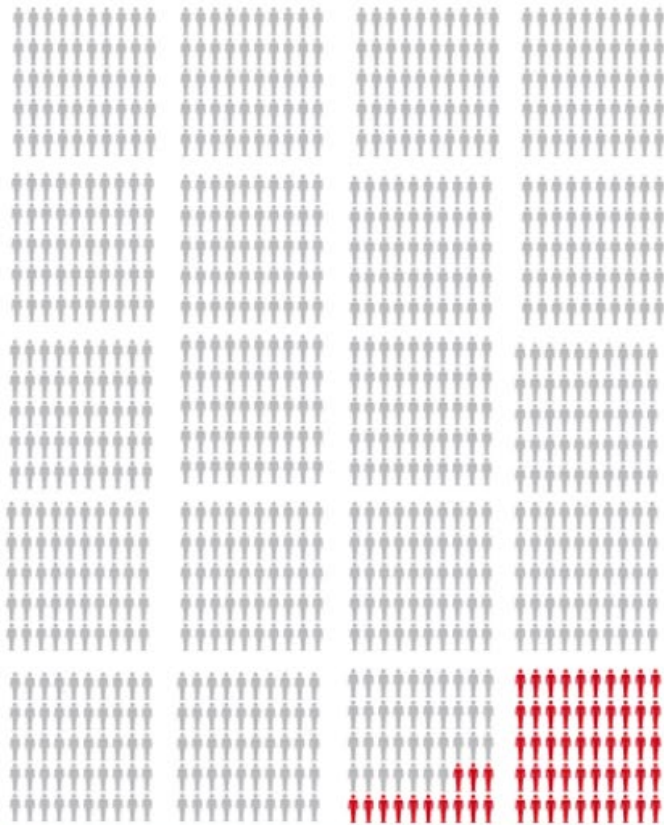
## Availability of antivirals for COVID-19 in Belgium

| Name                                              | Availability in Belgium                                                                                                                                                |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Molnupiravir (Lagevrio <sup>®</sup> )             | Currently available via the federal stocks only for utilization in the nursing home setting in the case of a COVID-19 outbreak, or in the context of a clinical trial. |
| Nirmatrelvir + ritonavir (Paxlovid <sup>®</sup> ) | Expected in a near future via the federal stocks.                                                                                                                      |
| Remdesivir (Veklury <sup>®</sup> )                | Available via hospital pharmacies, via the federal stocks.                                                                                                             |



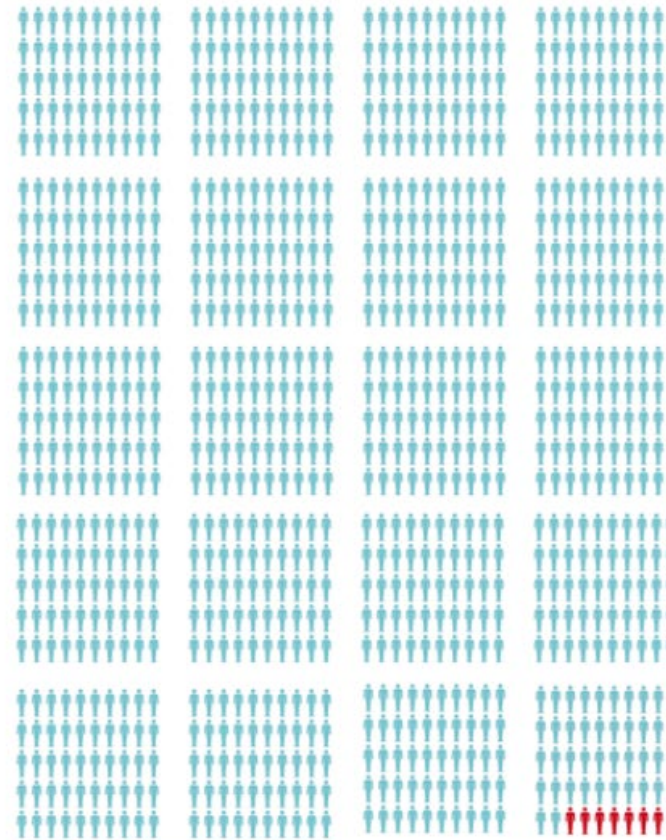
# Paxlovid (nirmatrelvir+ritonavir)(Pfizer)

Voor 1000 risicopatiënten zonder  
behandeling (placebo)



63 opnames of overlijdens = 6,3%

Voor 1000 risicopatiënten behandeld met  
Paxlovid

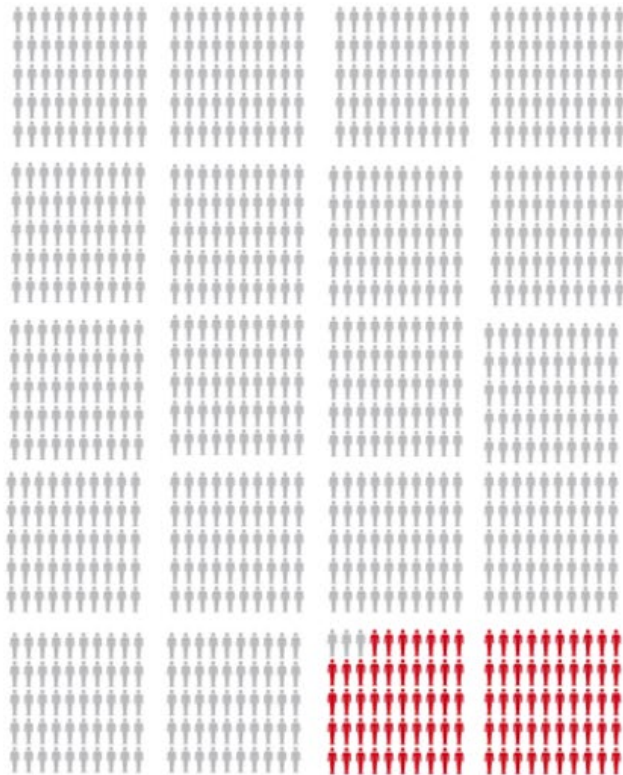


8 opnames of overlijdens = 0,8%

- Voor de behandeling van volwassenen met COVID-19
- met een verhoogd risico op ernstige ziekte, maar die geen extra zuurstof nodig hebben (= THUIS)
- zo snel mogelijk (binnen 5 dagen na het begin van de symptomen) worden toegediend.
- Concreet gebruik...?

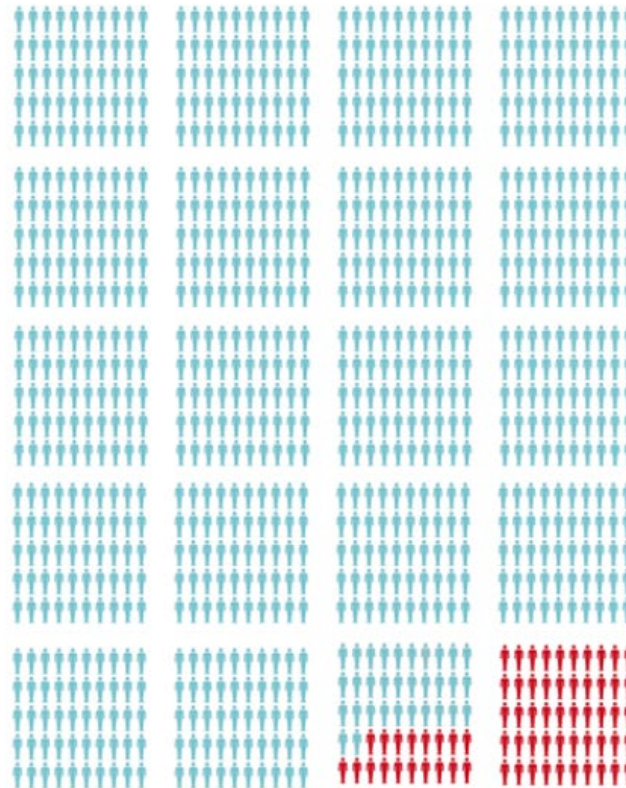
# Lagevrio (molnupiravir)

Voor 1000 risicopatiënten zonder  
behandeling (placebo)



97 opnames of overlijdens = 9,7%

Voor 1000 risicopatiënten behandeld met  
molnupiravir



68 opnames of overlijdens = 6,8%

- Voor de behandeling van volwassenen met COVID-19
- met een verhoogd risico op ernstige ziekte, maar die geen extra zuurstof nodig hebben (THUIS)
- Gebruik bij uitbraken in WZC
- Studie bij huisartsen



**Table 2: Neutralisation activity of monoclonal antibodies (mAbs) available in Belgium against the main SARS-CoV-2 Variants of Concern (VOC) (3,4).**

Information on the VOC currently circulating in Belgium can be accessed via “Genomic Surveillance of SARS-CoV-2 in Belgium” ([link](#) ).

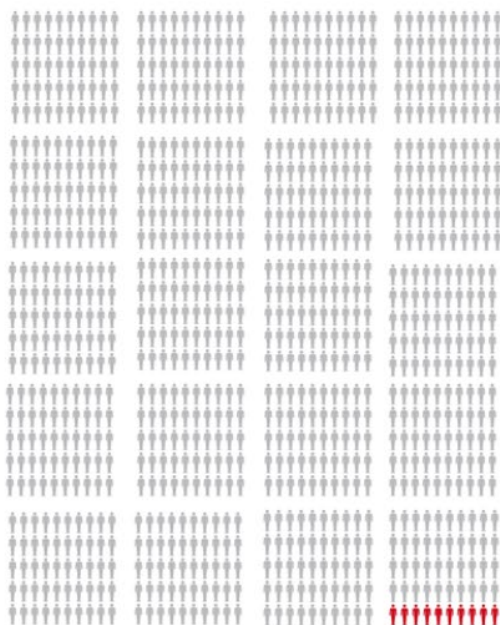
|                                                              | <b>Delta<br/>B.1.617.2</b> | <b>Omicron BA.1<br/>B.1.1.529</b> | <b>Omicron BA.2<br/>BA. Lineage</b>                                         | <b>Availability in<br/>Belgium</b>                         |
|--------------------------------------------------------------|----------------------------|-----------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------|
| <b>Casirivimab<br/>(REGN10933)</b>                           | Maintained activity        | Highly reduced activity           | Highly reduced activity                                                     | /-/                                                        |
| <b>Imdevimab<br/>(REGN10987)</b>                             | Maintained activity        | Highly reduced activity           | Reduced (to highly reduced) activity                                        | /-/                                                        |
| <b>Ronapreve®<br/>(casirivimab+imdevimab)</b>                | Maintained activity        | Highly reduced activity           | reduced activity (to highly reduced) activity                               | Out of federal stock in November 2021                      |
| <b>Sotrovimab<br/>(S309), Xevudy®</b>                        | Maintained activity        | Maintained activity               | Highly reduced activity                                                     | Available via federal stock                                |
| <b>Tixagevimab<br/>(AZD8895)</b>                             | Maintained activity        | Highly reduced activity           | Highly reduced activity                                                     | /-/                                                        |
| <b>Cilgavimab<br/>(AZD1061)</b>                              | Maintained activity        | Highly reduced activity           | Maintained activity                                                         | /-/                                                        |
| <b>Evusheld®<br/>AZD7442<br/>Tixagevimab+<br/>cilgavimab</b> | Maintained activity        | Highly reduced activity           | (Slightly) reduced activity. Activity essentially maintained by Cilgavimab. | Expected soon via federal stock, for prophylactic use only |

Other data concerning neutralizing activity of different mAbs against different variants can be found [here](#).

# Evusheld (tixagevimab/cilgavimab)

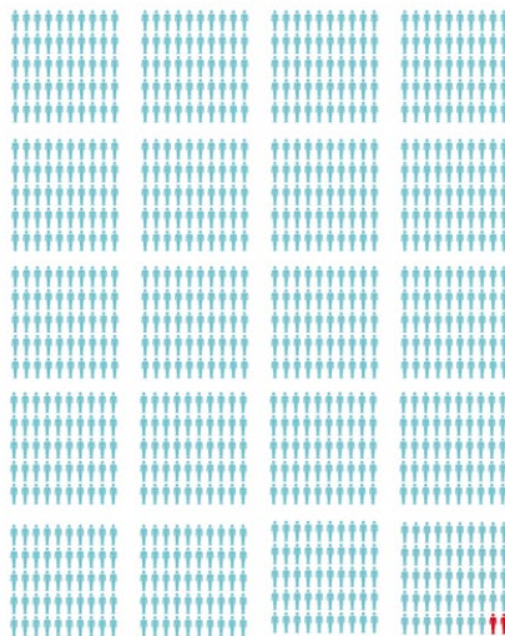
Gegevens over doeltreffendheid (vermindering van symptomatische infecties)

Voor 1000 risicopatiënten zonder  
behandeling (placebo)



9,8 symptomatische infecties = 0,98%

Voor 1000 risicopatiënten behandeld met  
Evusheld



2,3 symptomatische infecties = 0,23%

IM injection

Only for prophylactic use

NNT 133

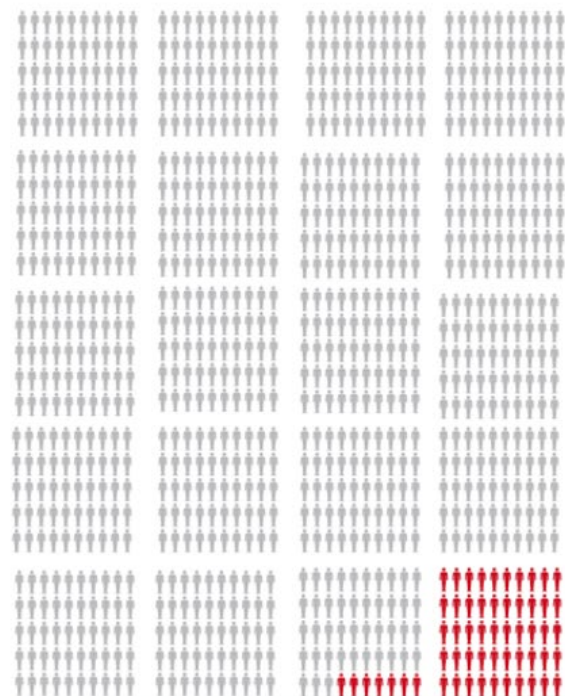
Negative PCR required

Severely immunedepressed with no  
response after 2nd booster

Cave: cardio-vascular and thrombo-  
embolic events

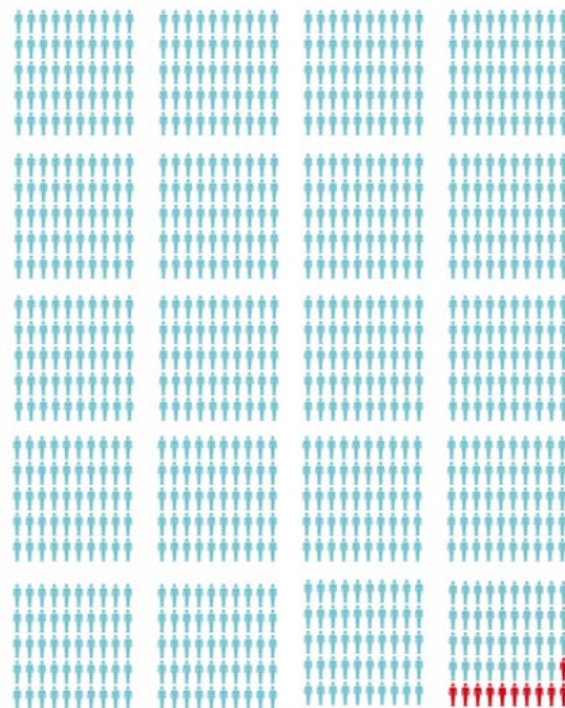
# Xevudy (sotrovimab) (GSK)

Voor 1000 risicopatiënten *zonder* behandeling  
(placebo)



57 opnames of overlijdens = 5,7%

Voor 1000 risicopatiënten behandeld met  
sotrovimab



11 opnames of overlijdens = 1,1%

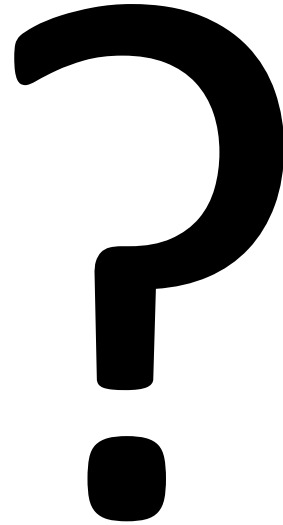
- Sinds november 2021 gebruikt voor de behandeling van patiënten die in het ziekenhuis werden opgenomen met COVID-19.
- IV injectie (eenmalig)
- patiënten met een zwakker afweersysteem (bijvoorbeeld patiënten die een transplantatie hebben ondergaan, patiënten die immuunonderdrukkende geneesmiddelen nemen (zoals rituximab) of patiënten met een kwaadaardige aandoening van het bloed (hematologische maligniteiten)), maar die geen aanvullende zuurstoftoediening nodig hebben.
- **Niet voor Omicron-BA2 variant**

Table 3

Summary of historical efficacy of different therapeutics against SARS-CoV-2 VOCs. White = drug not available at that time; red : not effective; green = effective; orange = partially effective. Restriction reported refer to initial restrictions by FDA. rRR : relative risk reduction in hospitalization n registration RCTs allocated according to leading VOC.

|                                                             | approximate cost per patient (€) | efficacy against VOC Alpha | efficacy against VOC Delta | efficacy against VOC BA.1 | efficacy against VOC BA.2 and VOI XE |
|-------------------------------------------------------------|----------------------------------|----------------------------|----------------------------|---------------------------|--------------------------------------|
| <b>bamlanivimab+etesesevimab (Eli Lilly)</b>                | 2000                             |                            | restricted 04/2021         |                           |                                      |
| <b>casirivimab+imdevimab - Ronapreve® (Regeneron/Roche)</b> | 2000                             |                            |                            | restricted 01/2022        |                                      |
| <b>sotrovimab - Xevudy® (GSK)</b>                           | 1000                             |                            |                            |                           | restricted 03/2022                   |
| <b>tixagevimab+cilgavimab - Evusheld® (AstraZeneca)</b>     | 1000                             |                            |                            |                           | approved for prophylaxis only        |
| <b>regdanvimab – Regkirona® (Celltrion)</b>                 | 300                              | rRR 71%                    |                            |                           |                                      |
| <b>nirmatrelvir - Paxlovid® (Pfizer)</b>                    | 635 (5 days)                     |                            | rRR 87%                    |                           |                                      |
| <b>molnupiravir - Lagevrio® (Merck)</b>                     | 635 (5 days))                    |                            | rRR 30%                    |                           |                                      |
| <b>remdesivir - Veklury® (Gilead)</b>                       | 1600 (3 days)                    |                            | rRR 86%                    |                           |                                      |
| <b>CCP</b>                                                  | 200 (600-ml)                     |                            | rRR 80%                    |                           |                                      |
| <b>Vax-CCP</b>                                              | 200 (600-ml)                     |                            |                            |                           |                                      |

3. How to help to clear infection/shedding in the most vulnerable?





## 4. How to diagnose and manage long/post covid?



# A clinical case definition of post-COVID-19 condition by a Delphi consensus

Joan B Soriano, Srinivas Murthy, John C Marshall, Pryanka Relan, Janet V Diaz, on behalf of the WHO Clinical Case Definition Working Group on Post-COVID-19 Condition

## Panel: A definition of the post-COVID-19 condition

Post-COVID-19 condition occurs in individuals with a history of probable or confirmed SARS-CoV-2 infection, usually 3 months from the onset of COVID-19 with symptoms that last for at least 2 months and cannot be explained by an alternative diagnosis. Common symptoms include fatigue, shortness of breath, and cognitive dysfunction (other symptoms are listed in the appendix [p 4] and published literature<sup>14</sup>), and generally have an impact on everyday functioning. Symptoms might be new onset after initial recovery from an acute COVID-19 episode or persist from the initial illness. Symptoms might also fluctuate or relapse over time.

A separate definition might be applicable for children.

### Notes

There is no minimum number of symptoms required for the diagnosis; symptoms involving different organs systems and clusters have been described.

Probable or confirmed

Start < 3 m after covid

Duration ≥ 2 m

No alternative Dx

*Soriano, Lancet Infect Dis 2022*

| Domain number | Domain name                                                                                                                                                   |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1             | History of SARS-CoV-2 infection                                                                                                                               |
| 2             | SARS-CoV-2 laboratory confirmation                                                                                                                            |
| 3             | Minimum time period from onset of symptoms (or from date of positive test for asymptomatic) 3 months (consensus achieved after Delphi panel group discussion) |
| 4             | Minimum duration of symptoms at least 2 months                                                                                                                |
| 5             | Symptoms or impairments, or both, include cognitive dysfunction, fatigue, and shortness of breath, and others                                                 |
| 6             | Minimum number of symptoms                                                                                                                                    |
| 7             | Clustering of symptoms                                                                                                                                        |
| 8             | Time course nature of symptoms (fluctuating, increasing, new onset, relapsing, persistent)                                                                    |
| 9             | Sequelae of well described complications of COVID-19 (eg, stroke and heart attack)                                                                            |
| 10            | Symptoms cannot be explained by an alternative diagnosis                                                                                                      |
| 11            | Application of definition to different populations, include separate definition for children and other populations or subgroups (eg, older or pregnant)       |
| 12            | Impact on everyday functioning                                                                                                                                |

■ Consensus achieved in round 1 ■ Consensus achieved in round 2  
■ Consensus achieved after Delphi panel group discussion

**Table 2**

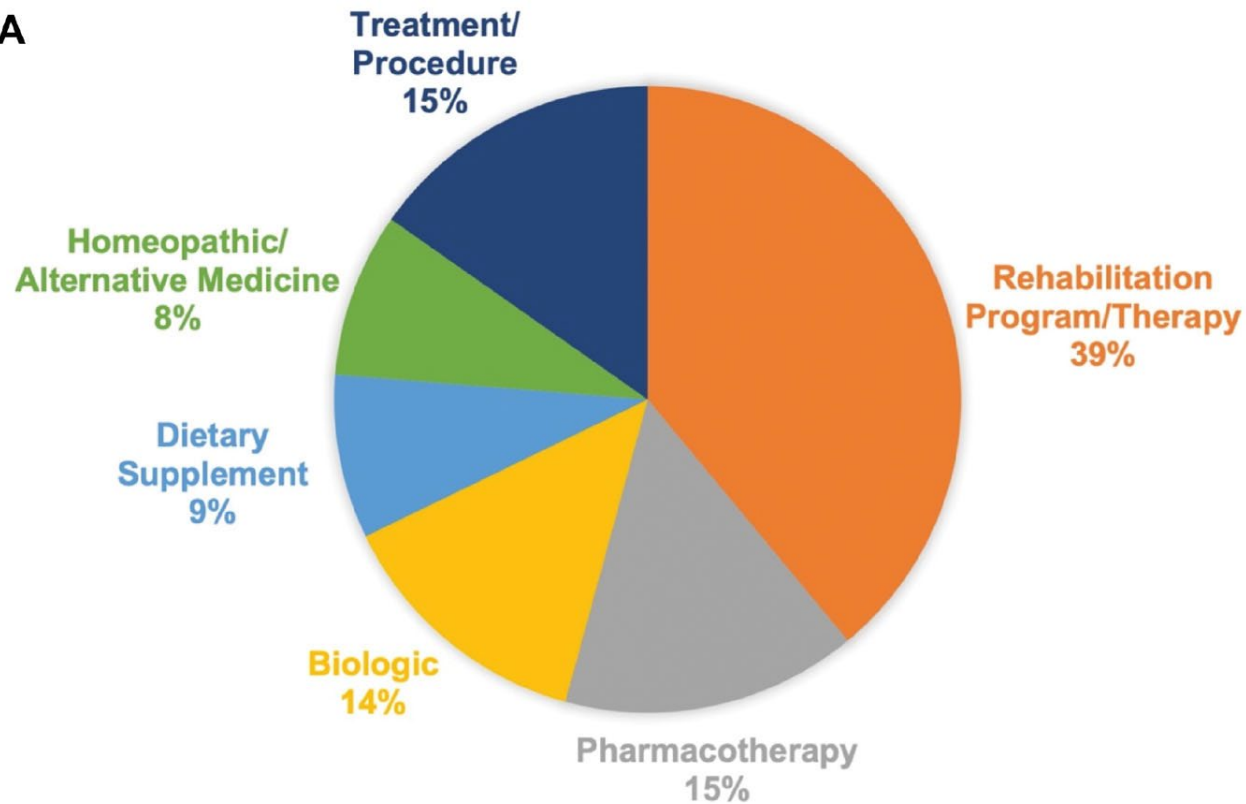
The most common symptoms of Post-COVID19 syndrome, Fibromyalgia, and Chronic Fatigue Syndrome / Myalgic encephalomyelitis [29,54–58].

| Post-COVID19 syndrome   | Fibromyalgia            | Chronic Fatigue Syndrome /Myalgic encephalomyelitis |
|-------------------------|-------------------------|-----------------------------------------------------|
| Fatigue                 | Fatigue                 | Fatigue                                             |
| Headache and Joint pain | Chronic widespread pain | Chronic widespread pain                             |
| Hair loss               | Unrefreshing sleep      | Unrefreshing sleep                                  |
| Cognitive impairment    | Fogginess (“fibrofog”)  | Impaired memory                                     |
| Dyspnea-related         | Physical exhaustion     | Impaired concentration                              |
| Mood related disorders  | Cognitive impairment    | Post-exertional malaise                             |
| Ageusia and anosmia     |                         |                                                     |
| Sweat                   |                         |                                                     |

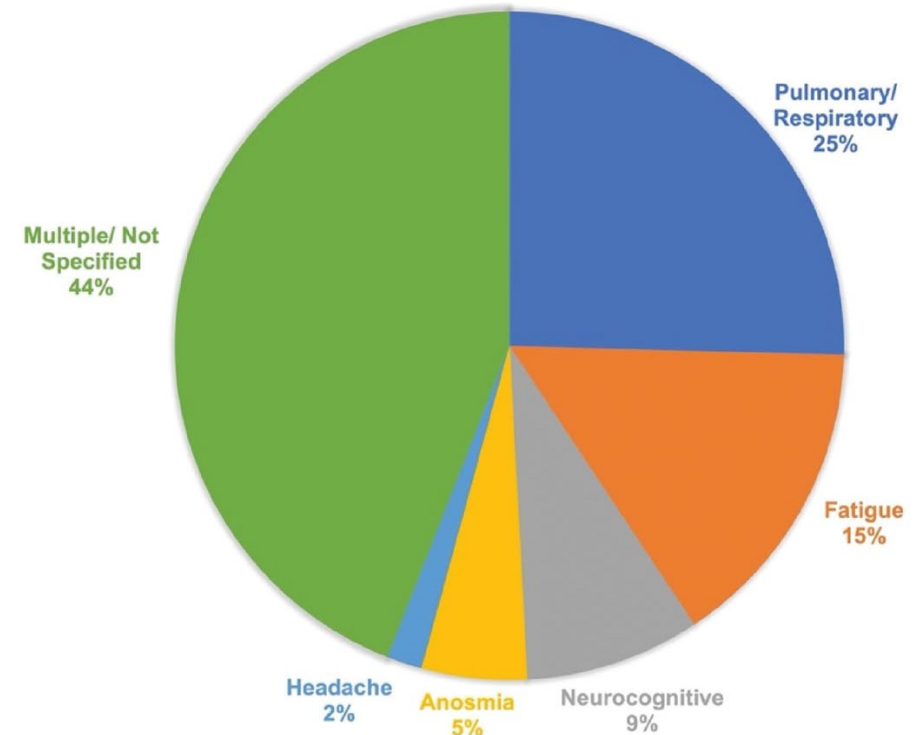
# Which research for long/post covid is in the pipeline?

## Interventions planned in trials

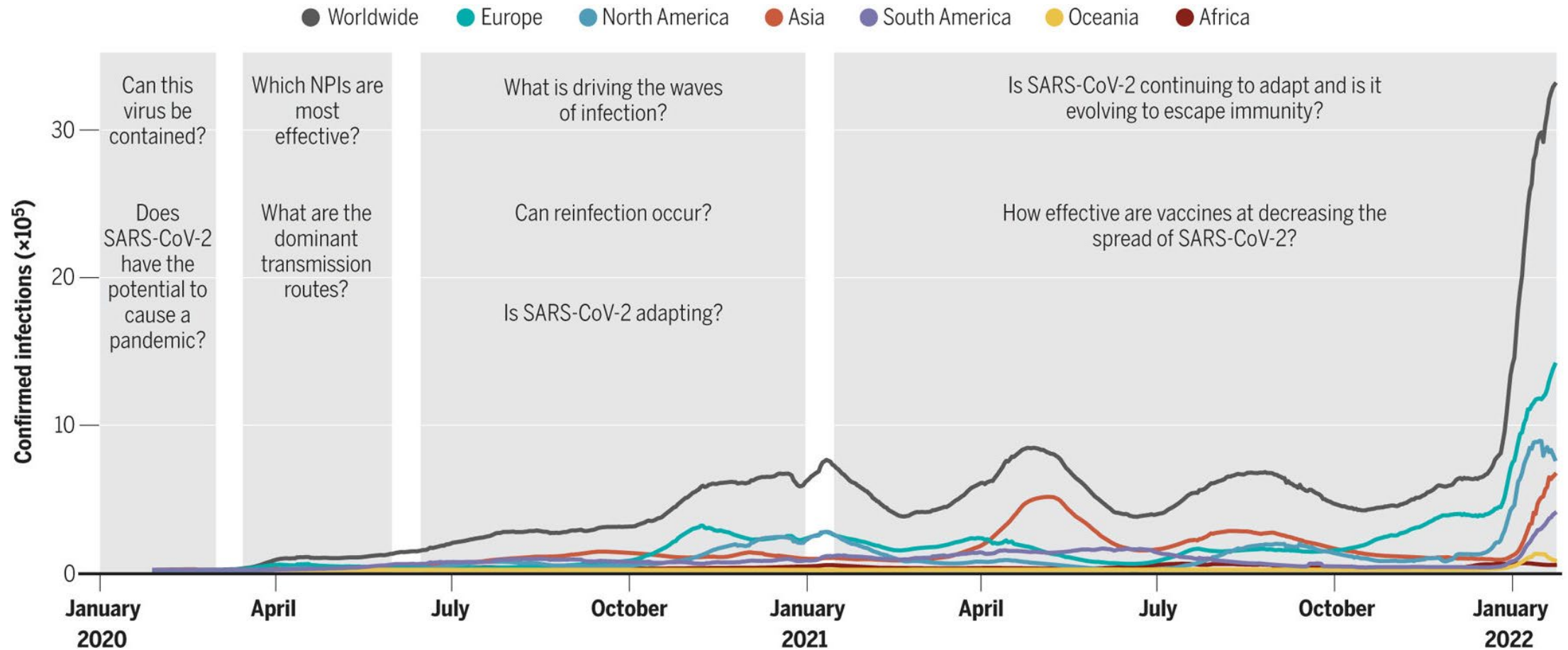
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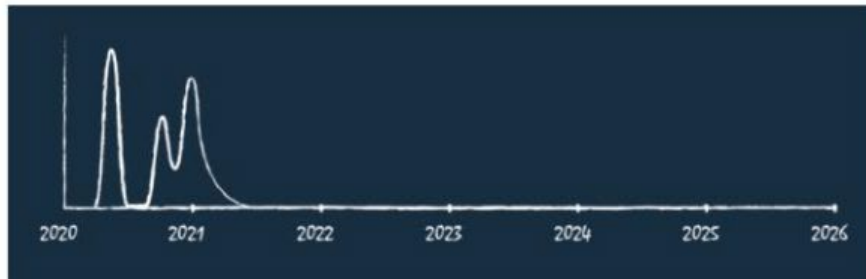
## Symptoms under investigation



# 5. What is ahead of us...?

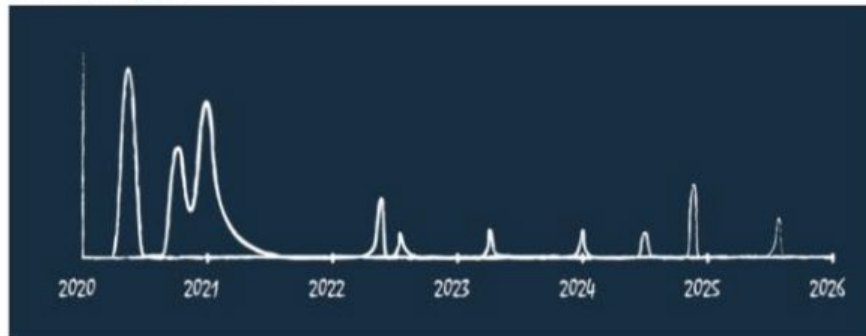


## Back to normal



Wereldwijd zijn voldoende mensen immuun door (herhaalde) vaccinatie of doormaken van de infectie; geen immune escape. **Focus on entrenching learnings for future pandemics and targeted revax**

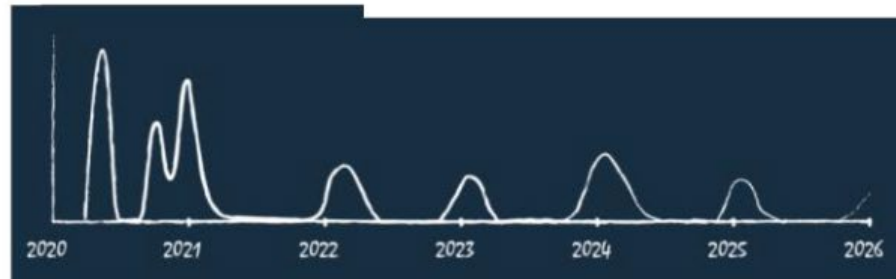
## Externally-driven risk



In België / EU onder controle maar in veel andere landen niet, met permanent risico op herintroductie. **Focus on strong EU approach on travel flows; good outbreak management measures to bend the curve. Ongoing high vaccination coverage.**

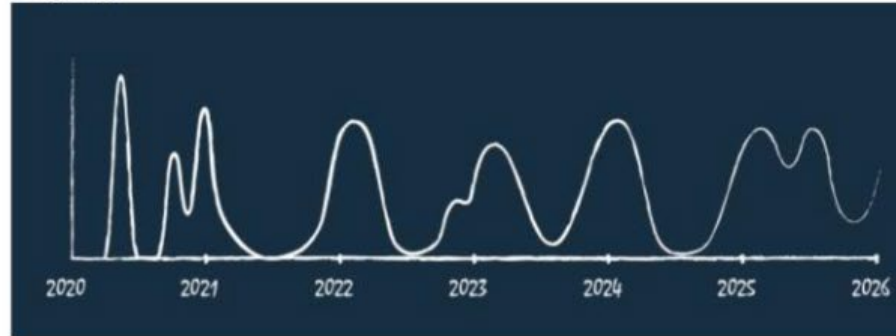
## Influenza-type dynamics

and take 'no-regret' actions that hold in any case



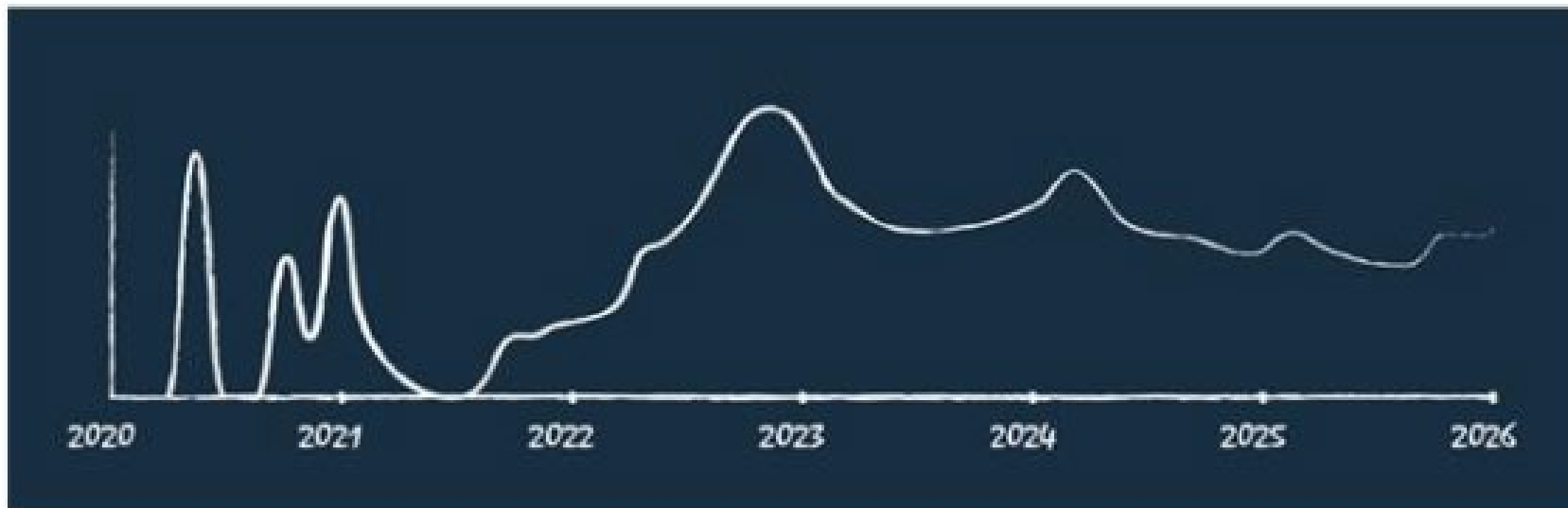
COVID-19 wordt endemisch met jaarlijkse golven in de winter. Iedereen >18 is gevaccineerd. Het virus blijft muteren, maar niet op een manier die veel verandert aan ernst. Enkel kwetsbare groepen hebben hoger risico om ernstig ziek te worden. **Focus on effort on (re)vaccinations and protection of vulnerable**

## Ongoing



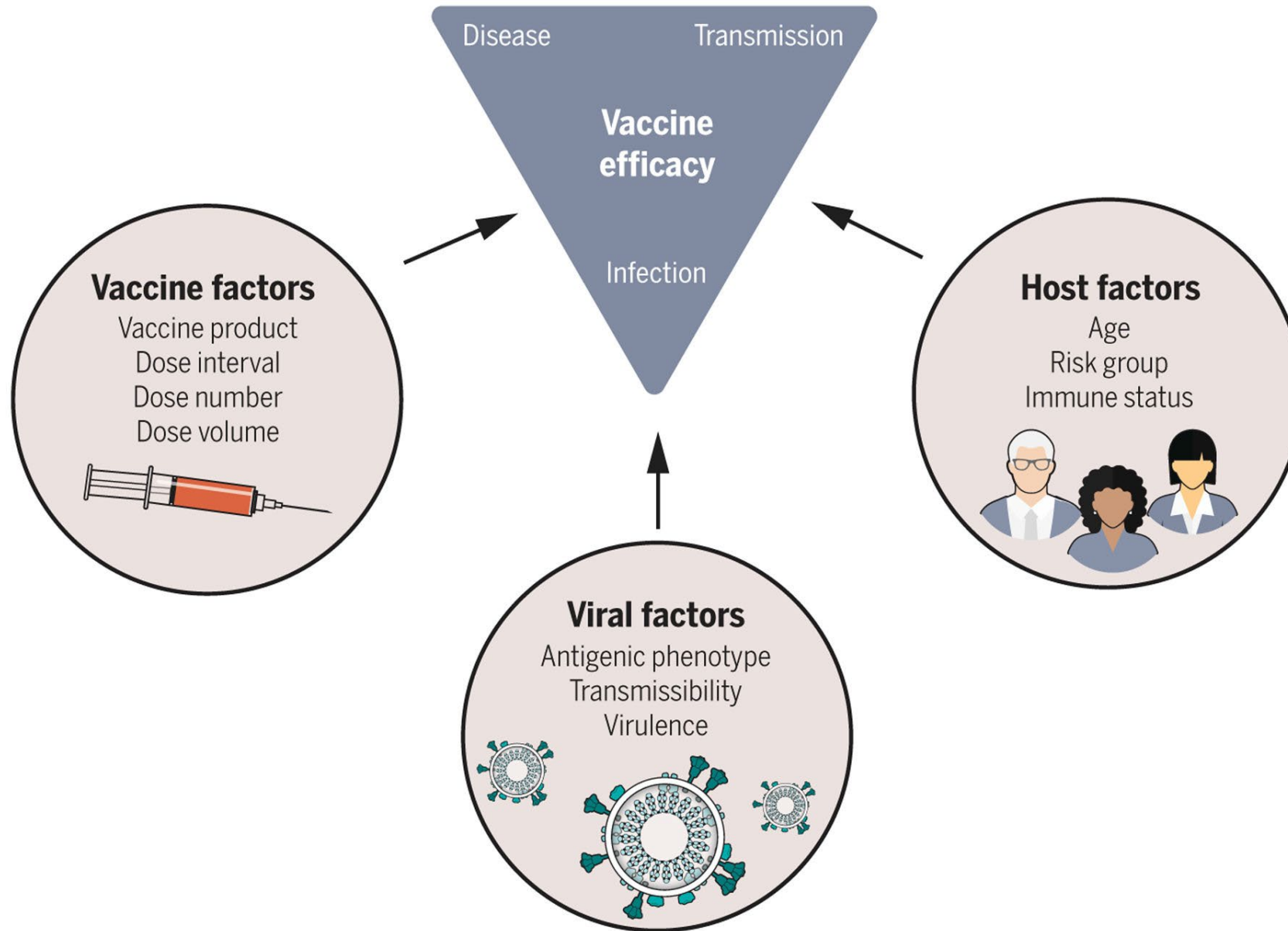
COVID-19 blijft een serieuze bedreiging. Vaccins werken niet voldoende (lang) en er komen steeds nieuwe varianten bij. **Focus on readiness to prepare a bold and short response, with strong signal detection and dynamic understanding of evolution towards constraints.**

## Worst case



COVID-19 eist jaarlijks meer slachtoffers en blijft wereldwijd circuleren; beperkte immuniteit en effectiviteit vaccins. Het is onzeker wanneer de pandemie zal uitdoven, tot die tijd blijven hevige uitbraken plaatsvinden.

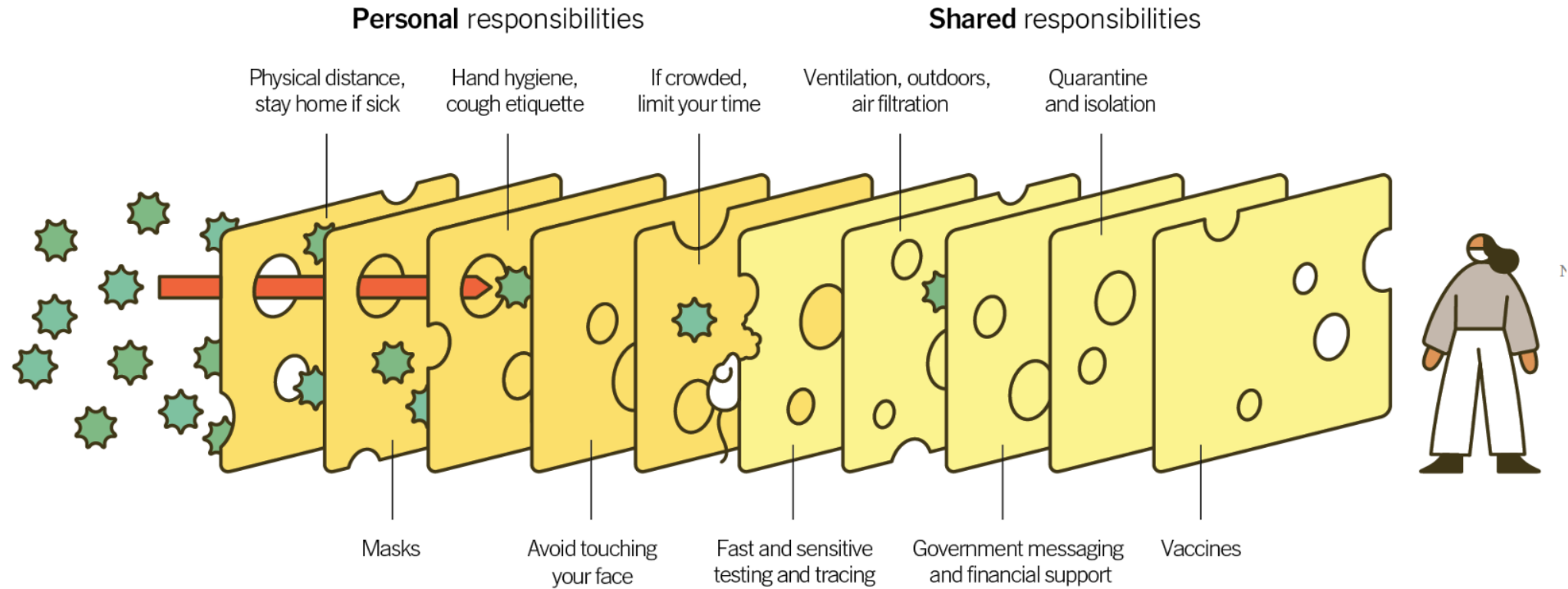




# Pandemic control requires a lot of Swiss cheese...

## Multiple Layers Improve Success

The Swiss Cheese Respiratory Pandemic Defense recognizes that no single intervention is perfect at preventing the spread of the coronavirus. Each intervention (layer) has holes.



Source: Adapted from Ian M. Mackay ([virologydownunder.com](http://virologydownunder.com)) and James T. Reason. Illustration by Rose Wong

# Thank you for your attention!

## Questions...?



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