

**The benefits of vaccines: getting the message across**  
**AFMPS – Pharma.be symposium**  
**“from vaccines to vaccination”**  
**12<sup>th</sup> of May 2022**

Pr. Nicolas Dauby

Service des Maladies Infectieuses – CHU Saint-Pierre  
Institut d’Immunologie Médicale, Université Libre de Bruxelles (ULB)  
Ecole de Santé Publique (CR4), Université Libre de Bruxelles (ULB)



## Conflict of interests

### AdBoard

- Roche (2021)

### Speaker fees

- Boehringer (2021)

### Scientific conference fees:

- Eumedica (2022)
- Pfizer, Janssen, MSD (2018-2019)

### Unpaid consultancy on vaccine pharmacoeconomics

- MSD (2020-2021)

### Consultancy for AFMPS (vaccine evaluation)

### Expert at Conseil supérieur de la santé

# Basic facts about vaccines

Vaccines saves lives

Vaccines prevent life-long sequelae

Vaccines are cost-effective but also have high return on investment thanks to their broad impact

Vaccines are the safest health products

And..

Vaccines only work if administered in human body



## Save the Date : inscrivez-vous au symposium sur les vaccins du 6 décembre 2019

### Après-midi : Vaccine Implementation

13 h 45

**Tuberculosis vaccines: rising opportunities** - Johan Vekemans (Organisation mondiale de la Santé - OMS)

14 h 15

**Implementation of vaccination program in Belgium** - Paloma Carrillo (Office de la Naissance et de l'Enfance - ONE) - Geert Top (Agentschap Zorg en Gezondheid - Vlaanderen)

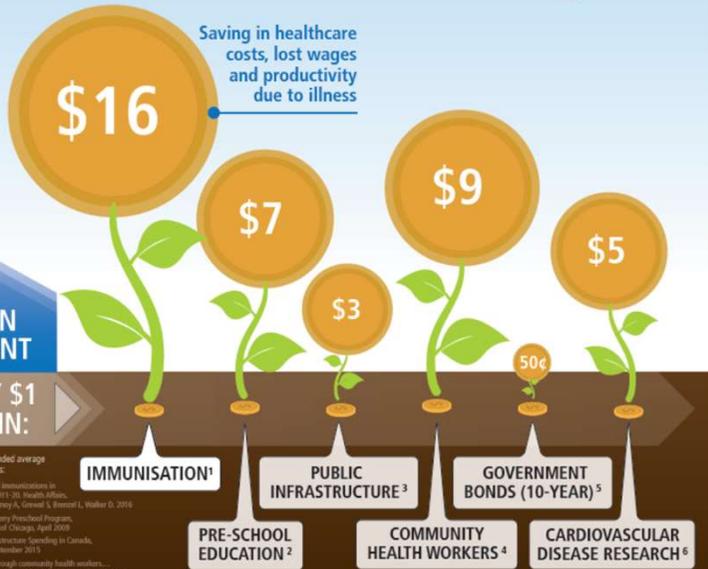
14 h 45

**Societal impact of vaccination: beyond individual protection** - Nicolas Dauby (CHU Saint-Pierre)

A new study, published February 2016 in the journal *Health Affairs*, puts a precise figure on the value of vaccinating children.

# IMMUNISATION

A HEALTHY RETURN ON INVESTMENT



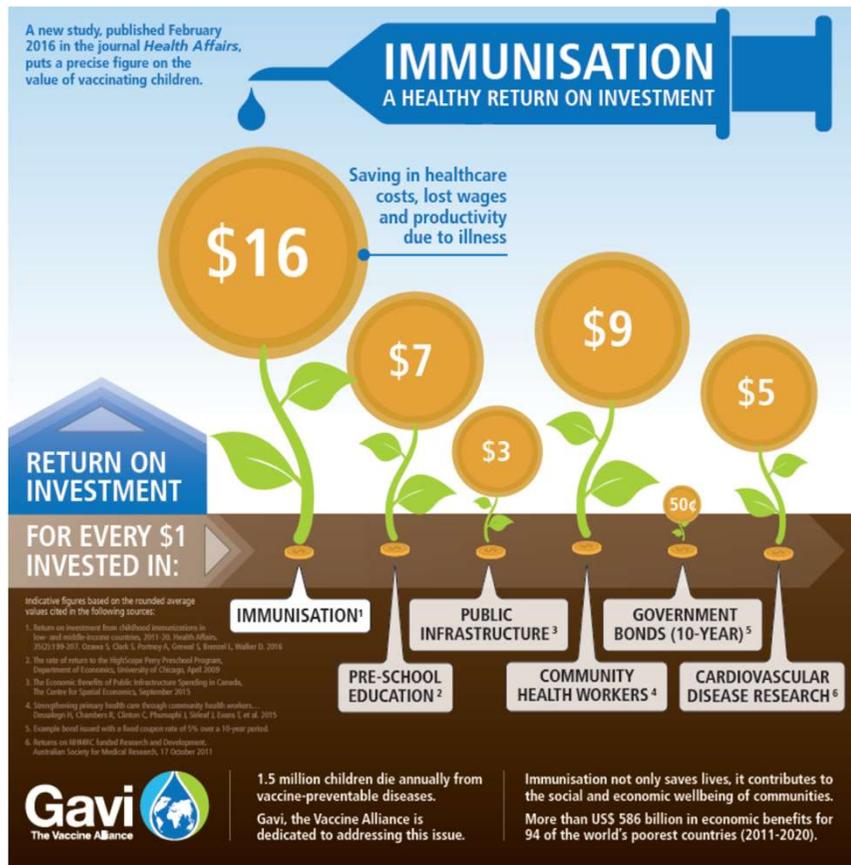
Indicative figures based on the rounded average values cited in the following sources:

- Return on investment from childhood immunizations in low- and middle-income countries, 2011-20. *Health Affairs*, 35(2):199-207. Grais R, Clark S, Parney A, Guralov S, Banzoff L, Walker D. 2016.
- The rate of return to the HighScope Perry Preschool Program. Department of Economics, University of Chicago, April 2002.
- The Economic Benefits of Public Infrastructure Spending in Canada. The Centre for Spatial Economics, September 2013.
- Strengthening primary health care through community health workers. *Health Affairs*, 34(10):1811-1818. Gaitanaki S, Gaitanaki S, Gaitanaki S, Gaitanaki S, Gaitanaki S, et al. 2015.
- Example bond issued with a fixed coupon rate of 5% over a 10-year period.
- Returns on NRMHC funded Research and Development. Australian Society for Medical Research, 17 October 2011.



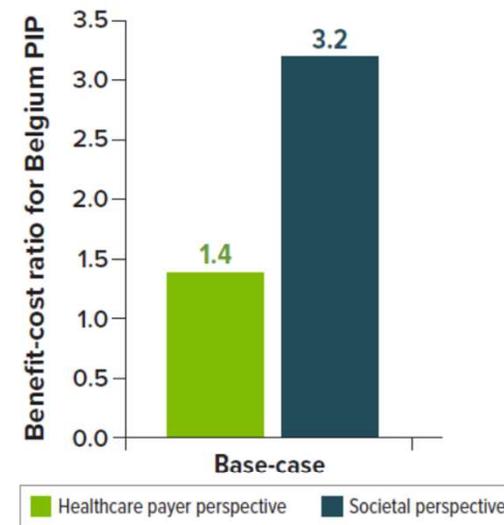
1.5 million children die annually from vaccine-preventable diseases. Gavi, the Vaccine Alliance is dedicated to addressing this issue.

Immunisation not only saves lives, it contributes to the social and economic wellbeing of communities. More than US\$ 586 billion in economic benefits for 94 of the world's poorest countries (2011-2020).



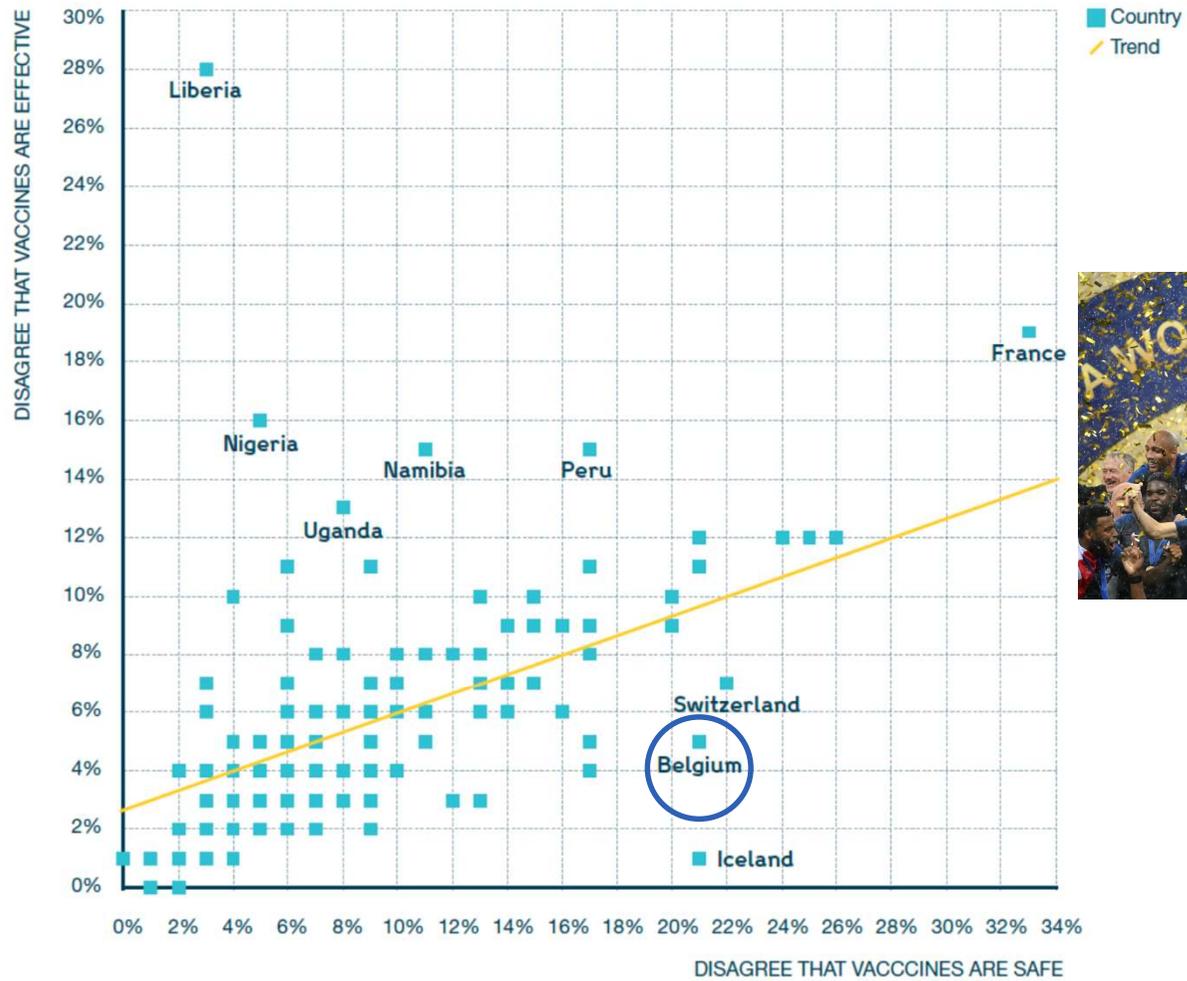
# La vaccination en Belgique rapporte plus qu'on le pense

Pour chaque euro dépensé dans un vaccin pour les enfants, trois euros sont épargnés en évitant une maladie et ses complications.



Note: A benefit-cost ratio greater than 1 indicates that each Euro invested in the PIP results in more than 1 Euro of disease-related cost savings.

Carrico et al ISPOR conference 2021



# A future vaccination campaign against COVID-19 at risk of vaccine hesitancy and politicisation

Published Online  
May 20, 2020  
[https://doi.org/10.1016/S1473-3099\(20\)30426-6](https://doi.org/10.1016/S1473-3099(20)30426-6)

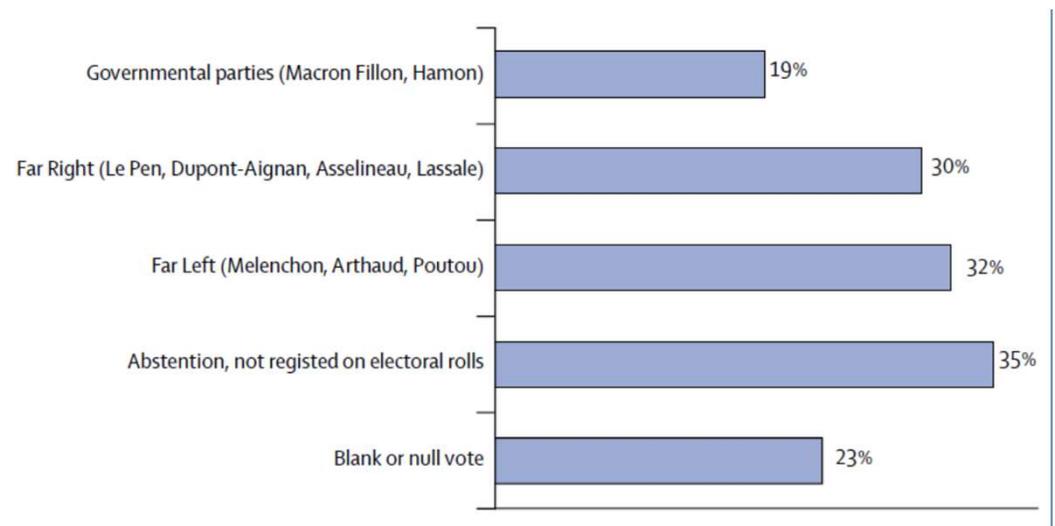
Online survey, 10 days after introduction of national lockdown (27-29 March 2020)

**26%** of participants would not accept a vaccine  
**37%** among low-income participants  
**36%** among young women (18-35)

Impact of political view :  
Far right/left voters more likely to refuse vaccination

The COCONEL Group  
[patrick.peretti-watel@inserm.fr](mailto:patrick.peretti-watel@inserm.fr)

The COCONEL Group includes: Patrick Peretti-Watel (scientific coordinator), Valérie Seror, Sébastien Cortaredona, Odile Launay, Jocelyn Raude, Pierre Verger (research consortium), François Beck, Stéphane Legleye, Olivier L'Haridon, Jeremy Ward (steering committee)





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journal homepage: <http://www.elsevier.com/locate/socscimed>



Short communication

## The French public's attitudes to a future COVID-19 vaccine: The politicization of a public health issue

Jeremy K. Ward <sup>a,b,\*</sup>, Caroline Alleaume <sup>b,c</sup>, Patrick Peretti-Watel <sup>b,c</sup>, theCOCONEL Group

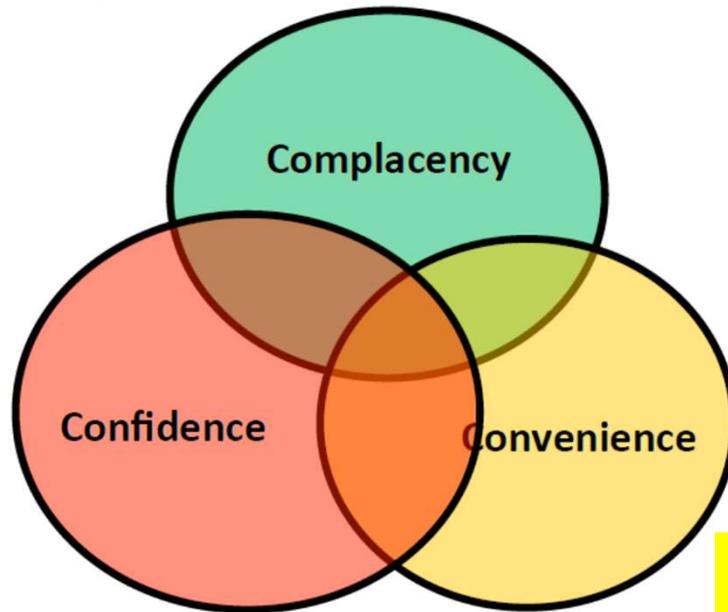


Three main, but not exclusive reasons, were given to refuse the coronavirus vaccine:

1. being against vaccination in general (**27.6%** of refusers)
2. a vaccine produced in a rush is too dangerous (**64.4%**)
3. the vaccine is useless because of the harmless nature of COVID-19 (**9.6%**).

# Vaccine hesitancy : from 3Cs to 5Cs

**Complacency** : perception of low risk & disease severity



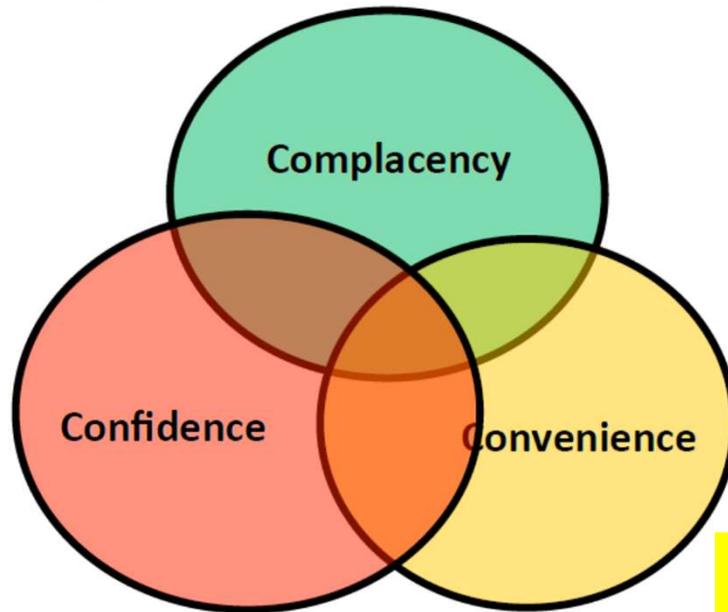
**Convenience**  
Barriers & access



**Confidence** & trust in safety & efficacy of vaccination

# Vaccine hesitancy : from 3Cs to 5Cs

**Complacency** : perception of low risk & disease severity



**Confidence** & trust in safety & efficacy of vaccination



**Convenience**  
Barriers & access



**Communication**  
Source of information



**Context**  
Socio-demographics matters !

## Getting the message across...

1. Online misinformation : impact & how to tackle it
2. Vaccine hesitancy among healthcare providers : how to win with our best allies ?
3. Trusting our authorities : lessons from abroad...and Belgium

# Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA

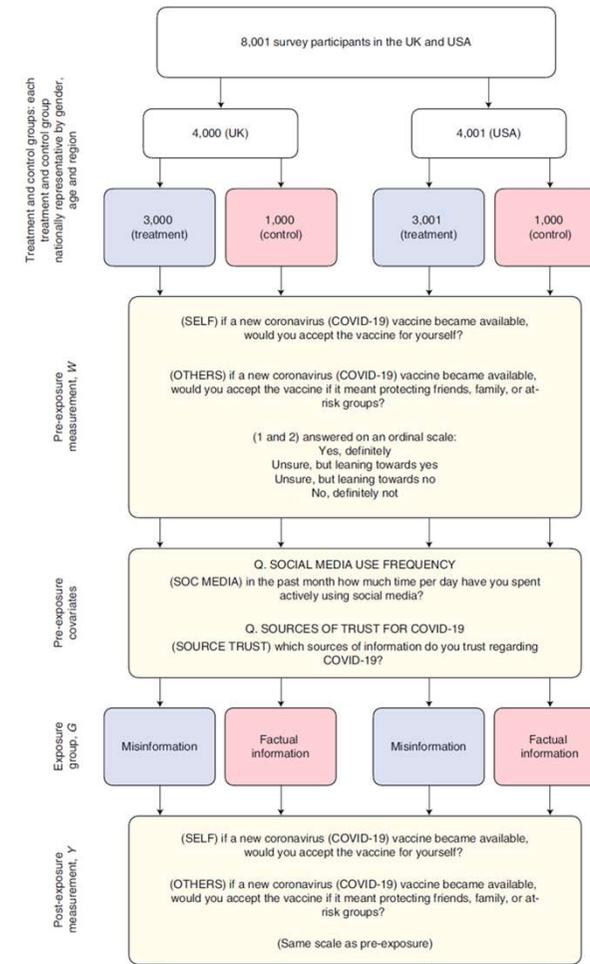
Sahil Loomba<sup>1,5</sup>, Alexandre de Figueiredo<sup>2,5</sup>, Simon J. Piatek<sup>2</sup>, Kristen de Graaf<sup>2</sup> and Heidi J. Larson<sup>2,3,4</sup>

Randomized control trial, September 2020

How online exposure to misinformation affects intent or vaccinate ?

Among those who stated that they would definitely accept a vaccine, recent misinformation induced a decline in intent to vaccinate :

- 6.2 percentage points (95th CI 3.9 to 8.5) UK
- 6.4 percentage points (95th CI 4.0 to 8.8) US



## COVID-19 Vaccines & fertility : online origins of a fake news

- Blog post, december 2020, rapidly withdrawn
  - « ex-Pfizer employee wrote that vaccine antibody may attack the placenta »
- >25% women in UK would decline the vaccine, citing concerns about its effect on fertility !

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## **Social media influencers can be used to deliver positive information about the flu vaccine: findings from a multi-year study**

Erika Bonnevie <sup>1,\*</sup>, Sierra M. Smith<sup>1</sup>, Caitlin Kummeth<sup>2</sup>, Jaclyn Goldberg<sup>3</sup>  
and Joe Smyser<sup>3</sup>

« People consider Instagram celebrities to have a higher level of trustworthiness than traditional celebrities »

Digital campaign using user-generated content from social media « micro » influencers, predominantly followed by African Americans & Hispanics

2018-2019 and 2019-2020 Flu season

### **Exemple of post :**

**« Me and my family are getting our flu shots this year and you should get your flu shot too !  
#stopflu #fightflu**

Year 1 :

- 9 million social media users
- 64612 likes or share & 1512 response

Year 2

- 8 million users
- 155.600 likes or shares & 3122 responses

94% of response were positive

# Team HALO : online scientists influencers during COVID-19 pandemic

The screenshot shows the Team Halo website. At the top left is the Team Halo logo. To the right, it says "#TeamHalo is part of the United Nations Verified initiative." and "ENGLISH". Below this, three circular portraits of team members are displayed: Shannon M. Clark, MD, MMS, FACCQ; Dr. Julien Audry; and Vicki Chan MD. Each portrait includes a small flag icon. Below the portraits is a large green and yellow banner with the text: "Got a question about the COVID-19 virus or vaccine? Get answers from those working to stop the spread and harm of COVID-19 worldwide. Ask them anything." At the bottom of the banner are buttons for "TikTok" and "Twitter".

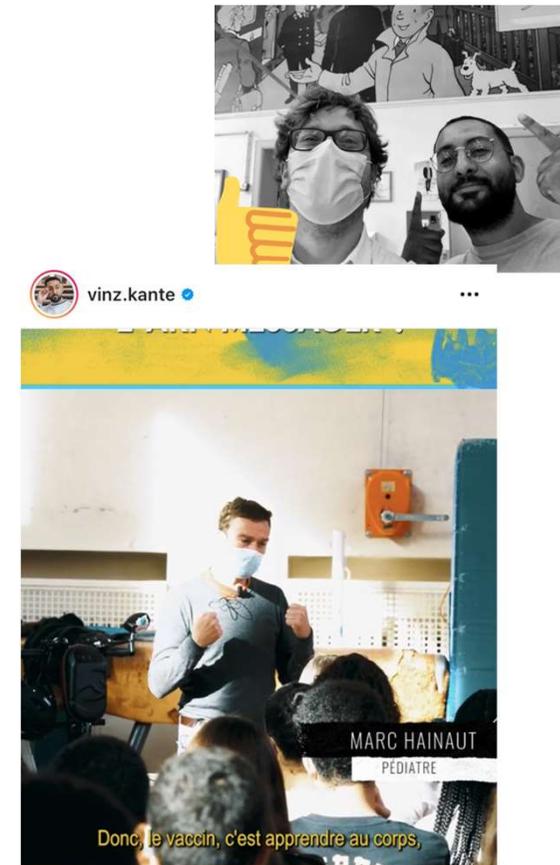
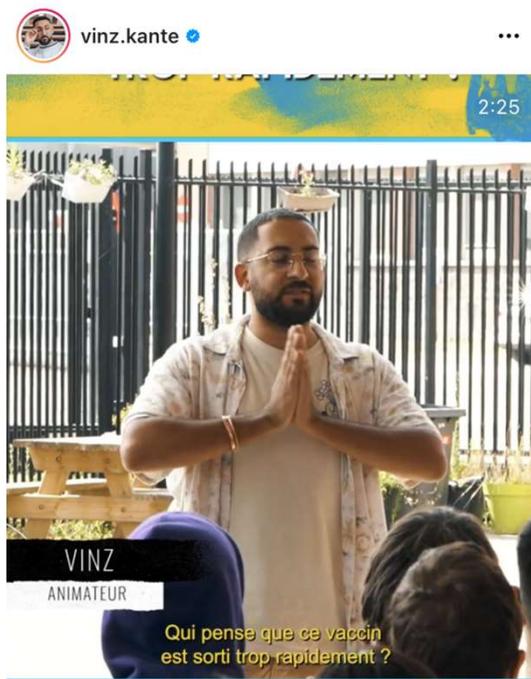
The screenshot shows a TikTok profile for "nataliapasternakscience". The profile name is "Natalia Pasternak" and she has 19 Following, 25.6K Followers, and 164.7K Likes. Her bio identifies her as a Microbiologist, PhD ICB USP, lab de desenvolvimento de vacinas, and #TeamHalo. Her website is www.iqc.org.br. The profile includes a "Follow" button and a "Log in" button. Below the profile information are suggested accounts: stephanevw, israelneves, and isuperio. A "Videos" section shows a grid of video thumbnails.

The screenshot shows a TikTok video by "nataliapasternakscience". The video features a woman speaking in front of a bookshelf. A red text overlay at the bottom of the video reads: "E os mutantes? Vão escapar das vacinas?". The video has a play button in the center and a "Report" button in the top right corner. The TikTok logo and the user's handle are visible at the bottom.

# School' up : campaign about COVID-19 vaccine in Brussels school, autumn 2021 - online dissemination



52.8 K followers vinz.kante



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3. Trusting our authorities : lessons from abroad...and Belgium

Health care providers (HCP) are our best allies :  
critical role in vaccine acceptance but at risk of vaccine hesitancy

Most parents look to their child's HCP for  
information & advice on VPD

Patients have a high level of trust in HCP  
(nurses & doctors)

Effective communication about vaccines  
benefits/risks, the value & need for  
vaccinations & vaccine safety increase  
patients confidence in their decision to get  
vaccinate

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**HCP are not vaccine experts, likely also  
to have uncertainties or doubts about  
vaccines**

**Vaccine-hesitant HCP cannot effectively  
adress the concerns of their vaccine-  
hesitant patients**

RAPID COMMUNICATION

## Attitudes of healthcare workers towards COVID-19 vaccination: a survey in France and French-speaking parts of Belgium and Canada, 2020



Pierre Verger<sup>1</sup>, Dimitri Scronias<sup>1,2</sup>, Nicolas Dauby<sup>3,4,5</sup>, Kodzo Awoenam Adedzi<sup>6</sup>, Cathy Gobert<sup>7</sup>, Maxime Bergeat<sup>8</sup>, Arnaud Gagneur<sup>9,10</sup>, Eve Dubé<sup>6,11</sup>

Survey among 2678 healthcare workers (GPs in France & Belgium, Nurses in Canada) in October & November 2020

Most important factor associated with hesitancy or reluctance to accept a COVID-19 vaccine :

**Concerns about the safety** of vaccines developed in an emergency (independent replication for each country)

Second factor : **distrust in the ministry of health** to ensure vaccine safety

Other factor : **personal history** of influenza vaccination

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# Big Pharma vs. Little Cuba: Why Cubans trust vaccines and how they're helping vaccinate the world

Published: March 16, 2022 2:17pm GMT

Jennifer Ruth Hosek

Anonymous interview with Cubans on reason why they vaccinate

The respondents believe that Cubans **don't pay much attention to fake news** about vaccines that arrives from abroad via social media.

"I am not sure of the effectiveness of this vaccine, nevertheless, **I know that in my country we have been making globally recognized vaccines for many years.**"

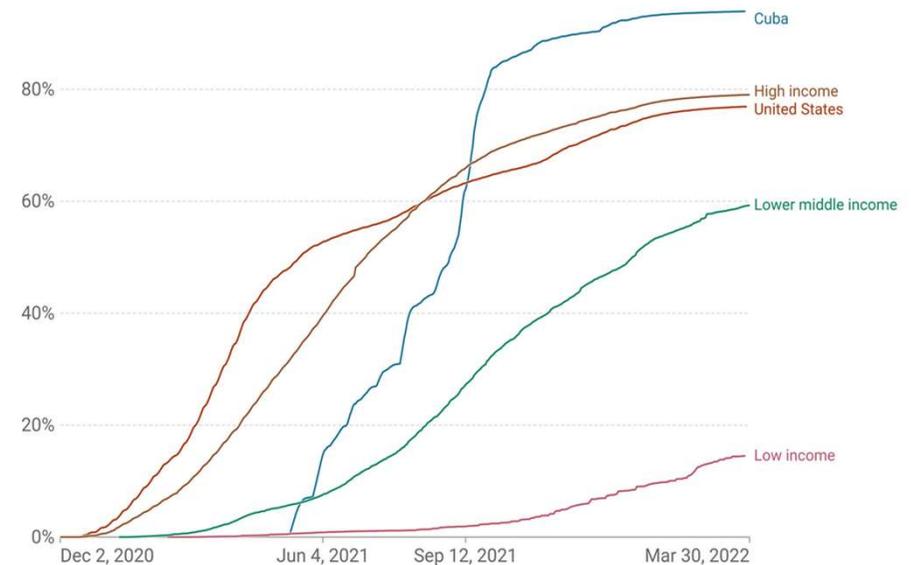
"In the situation in which this pandemic has placed the world, there is no space not to get vaccinated. It is very egotistical." Another added, "**The liberty of every person must not curtail the liberty of others.**"

THE CONVERSATION

Academic rigour, journalistic flair

Share of people who received at least one dose of COVID-19 vaccine  
Total number of people who received at least one vaccine dose, divided by the total population of the country.

Our World in Data



Source: Official data collated by Our World in Data - Last updated 31 March 2022, 09:00 (London time) OurWorldInData.org/coronavirus • CC BY

## Vaccines and Public Trust: Containing COVID-19 in Cuba

Verena Muzio-González PhD DSc

Director of Clinical Research, Genetic Engineering and Biotechnology Center

“both CIGB and IFV, developers of our COVID-19 vaccines, have manufactured vaccines for decades using the same technology platforms.

There is **public trust** in our vaccines and **immunization programs**.

Once a vaccine is approved for use and released to immunize our population, people know they are not being used as guinea pigs, **they trust the vaccines and the science**.

This makes for a smooth vaccine rollout.”



# Communication on COVID-19 vaccines by politics in French-speaking Belgium Complacency, vaccine stigma and more

Bénédicte Linard (Ecolo): «Un tiers de jeunes vaccinés à Bruxelles, ce n'est pas grave!»

✂ MAXIME BIERMÉ ET CHARLOTTE HUTIN | BELGIQUE | 18:19



Health Minister, French Community, October 2021

## Molenbeek : deux élus demandent que le vaccin AstraZeneca ne soit pas administré dans le centre de vaccination qui ouvre lundi

13 mars 2021 à 13:38 - mise à jour 15 mars 2021 à 12:02 · 4 min

Rachid Ben Salah (DéFI). Pour lui, "au vu de la situation européenne et du nombre de pays qui suspendent l'administration du vaccin concerné, je demande le principe de précaution. Il est nécessaire d'avoir une vue claire de la situation au sujet d'un vaccin qui pose problème".

## Nos ministres feront-ils vacciner leurs enfants ?

Belgique (/actu/belgique)

Pinto Ferreira Dos Santos Gauvain

divulgués dans la presse. D'autres ne veulent pas que cette information soit dévoilée, car ils estiment que cela pourrait leur attirer des ennuis. "La question de la vaccination soulève toujours des tensions et des critiques. On préfère éviter cela", nous répond l'un d'entre eux. À

# Conclusions

## From vaccine to vaccination..getting the message **S** accross

Determinants of vaccine acceptance have not really changed with the COVID-19 pandemic

- Concerns about safety
- Complacency

The « online jungle » should be invested by public authorities but also scientists to counter disinformation about vaccines

HCP remain our best allies to get the message accross & get the vaccine in the arms

- Careful listening of their concerns
- Importance of continuous medical education but also training in medical school !

A « vaccine-positive » culture should be promoted actively by the authorities, including politics

Context matters ! Importance to take into account education & language to get the message accross

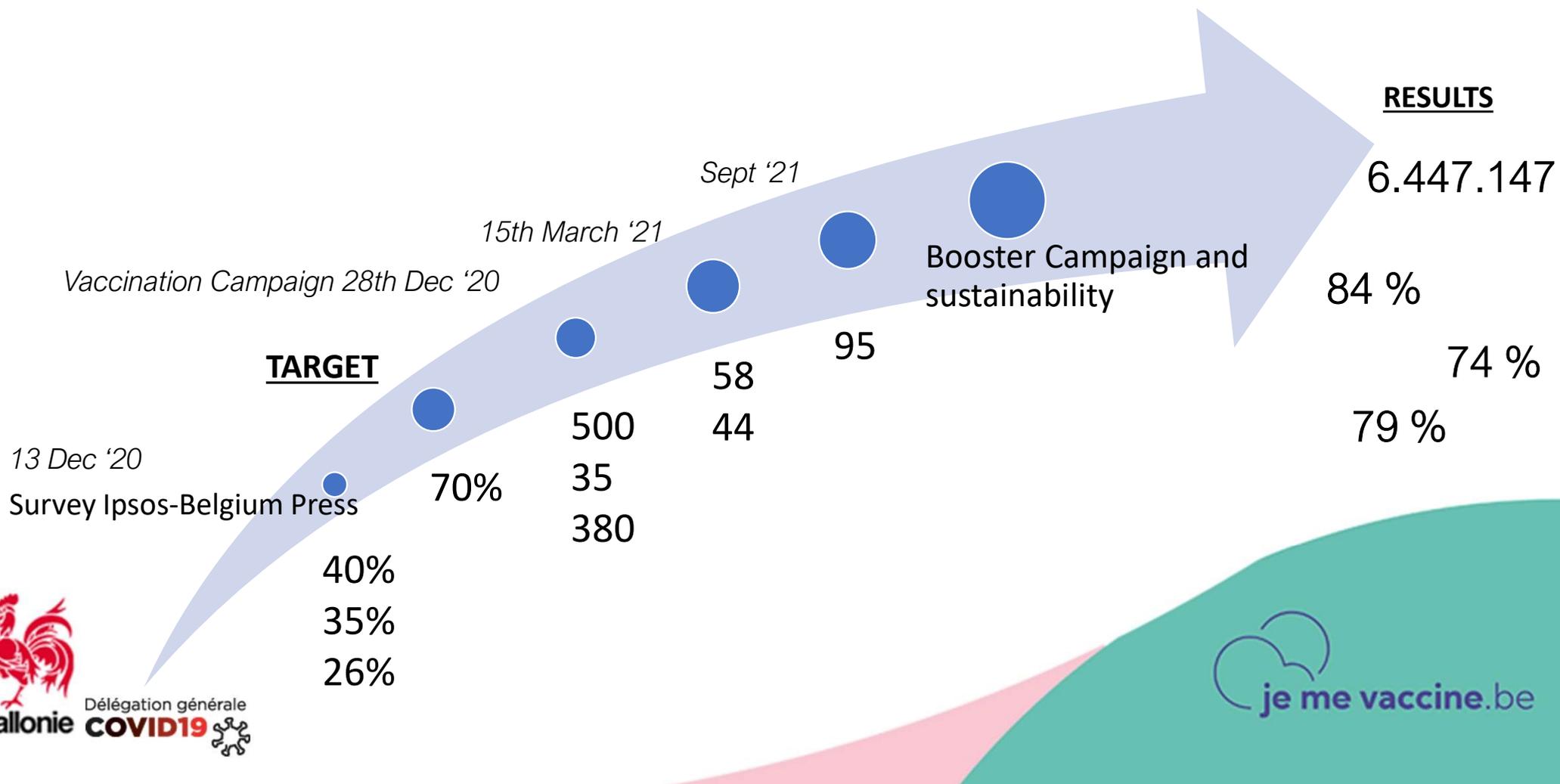
# Vaccination Covid-19 Campaign

*From « We never did it before » to « we did it »...*

Julie Therasse  
*Pharmacist*



# General Overview



# Campaign Operations, *Issues and challenges:*

- ✓ Blank Page
- ✓ Adaptability
- ✓ Anticipation
- ✓ Innovation



**PRESSÉ.E D'ÊTRE VACCINÉ.E ?**

Vous habitez dans la Province du HAINAUT et vous n'avez PAS ENCORE PRIS rendez-vous ?

Le centre de vaccination de SOIGNIES vous invite à son «**MARATHON DE LA VACCINATION**»

Du vendredi 11 juin à partir de 7h au dimanche 13 juin minuit (24h/24h)!

PLUS D'INFOS je me vaccine.be



**DIPLOME du Super PETIT VACCINÉ**

DÉCERNÉ À

Pour avoir aidé à protéger ceux que tu aimes. Merci à toi Super Héros!



Notre vaccibus débute son aventure demain, il est arrivé à bon port. #magicobus



# Vaccination campaign, *Lessons learned:*

- ✓ One team philosophy!
- ✓ Agility
- ✓ Listen to first line feedback and sub-regional specificities
- ✓ Rigidity to reasonable flexibility from authorities

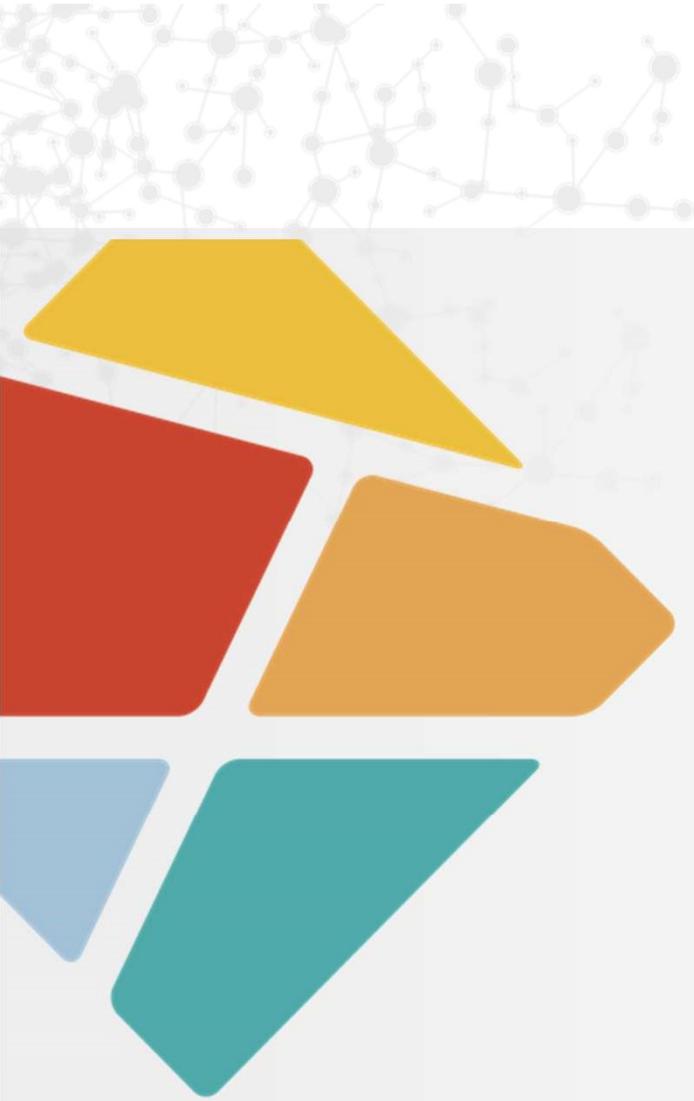
# *Opportunities for the future:*

Move to a sustainable vaccination...

- ✓ The Rush to Single dose Vial and multivariant vaccine.
- ✓ Simplification Vaccines logistics
- ✓ Reinforce vaccination through the first line of care, General Practitioner and Pharmacists.
- ✓ Communication impact to increase vaccination adherence in a future Campaign

Thank you!





# Belgian vaccines landscape analysis

## Recommendations for an effective integrated vaccination policy

**Ingrid Maes**

May 10th, 2022

Who we are

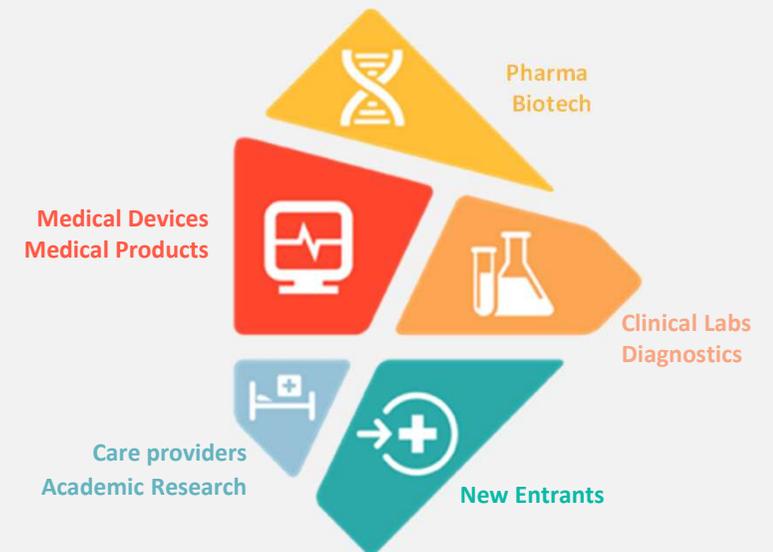
# We are health sector specialists



## We are a health sector strategy and expert advisors



## Working with all health stakeholders



# Our track record of publications and reports on sector innovations and new policy

## Our recent reports and publications



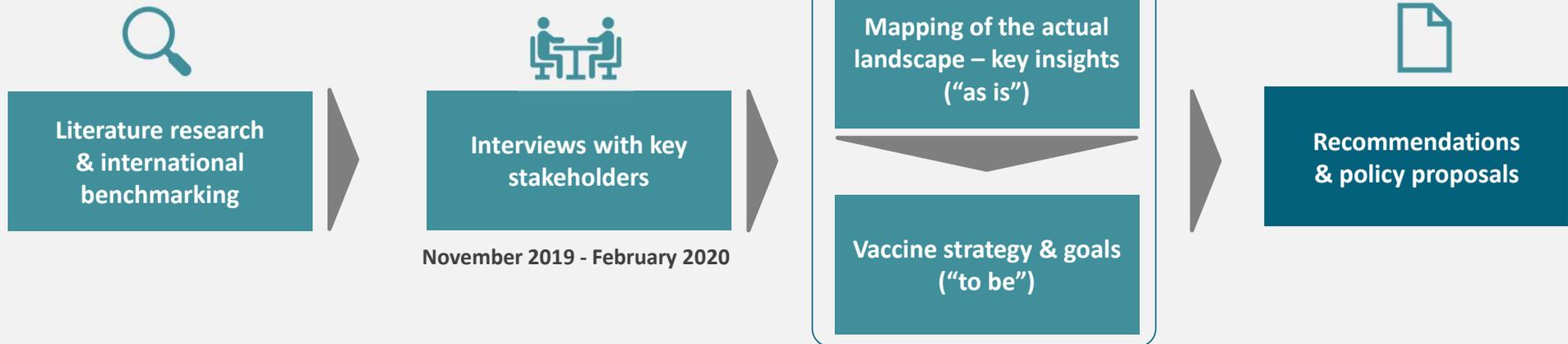
## In progress:



Report can be downloaded  
from the website  
[Ingrid.maes@inovigate.com](mailto:Ingrid.maes@inovigate.com)

# Independent landscape analysis of the Belgian vaccine situation and system

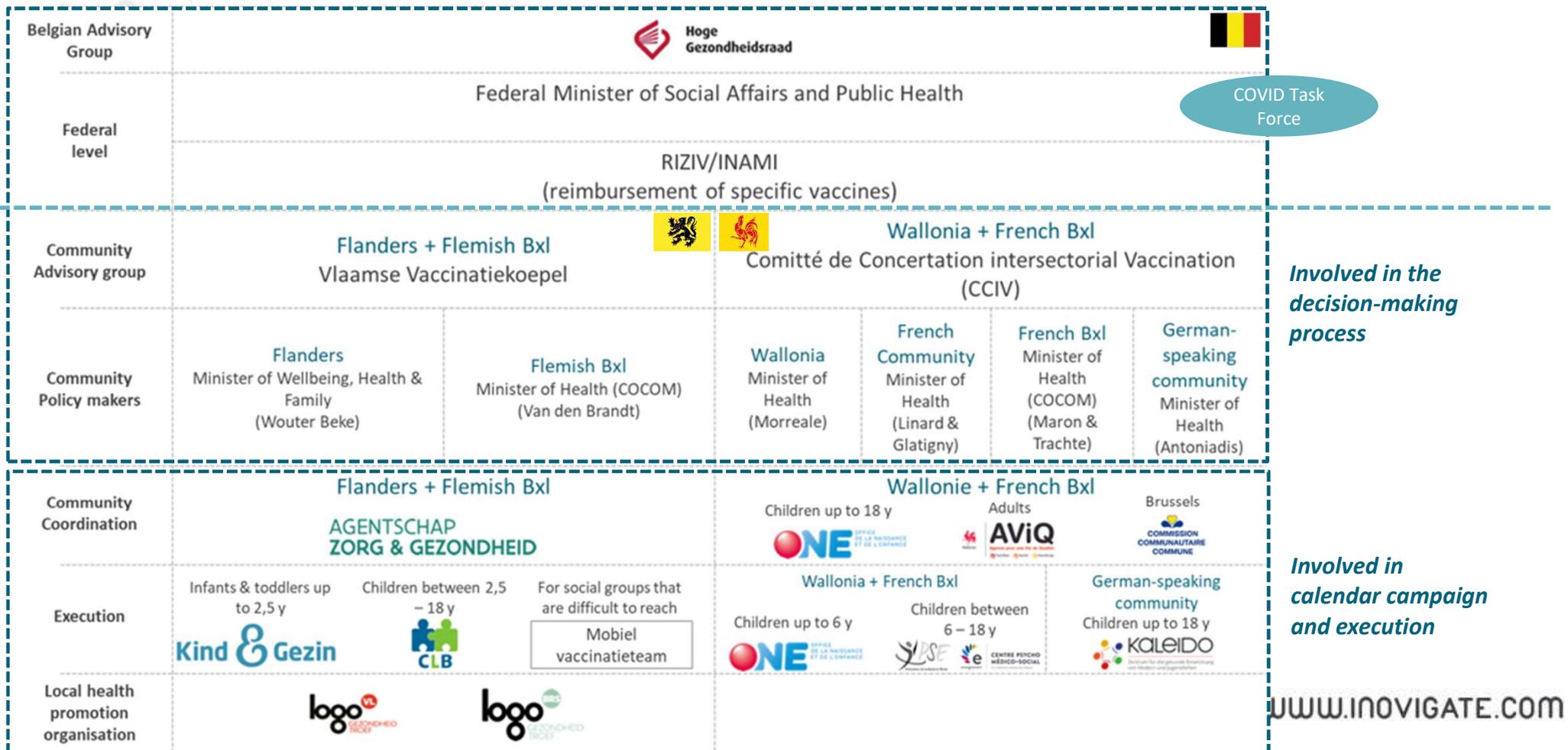
## Approach



Commissioned by MSD Belgium, executed by Inovigate under complete intellectual independence.

# Assessment & international benchmarking

# Many stakeholders are involved in the Belgian vaccination landscape, with different decision-making levels

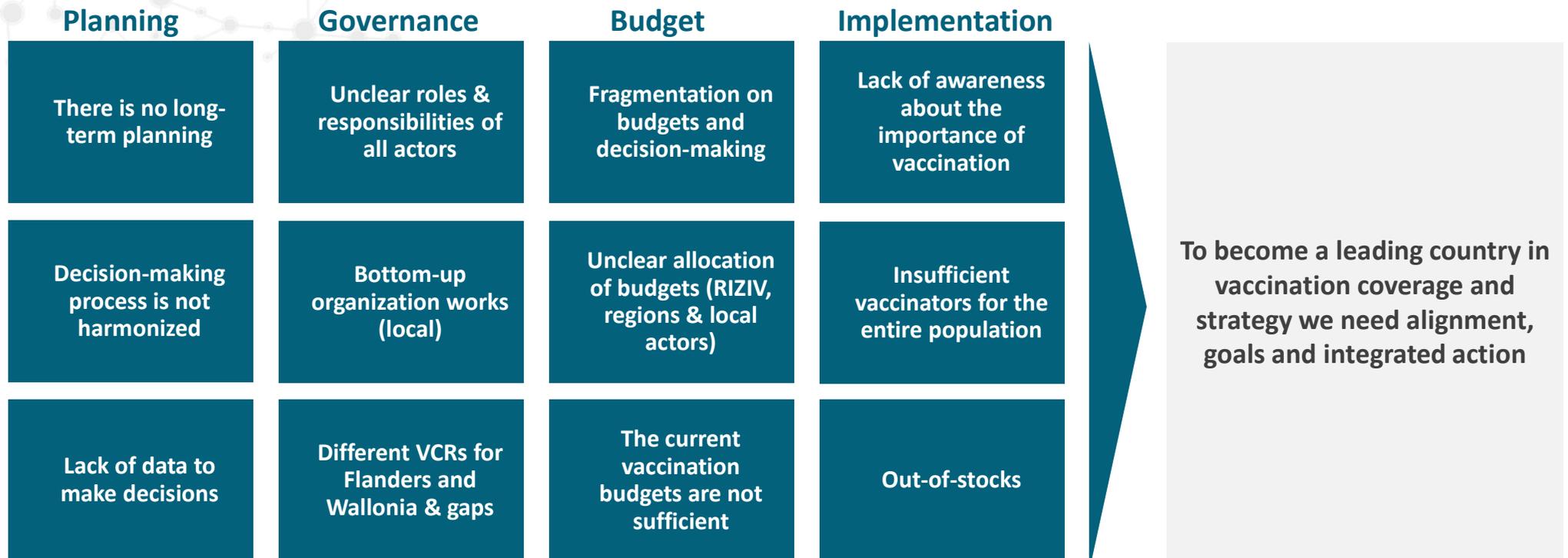


COVID Task Force

*Involvement in the decision-making process*

*Involvement in calendar campaign and execution*

# In Belgium, there are shortcomings in the current vaccine system on planning, governance, budget and implementation level



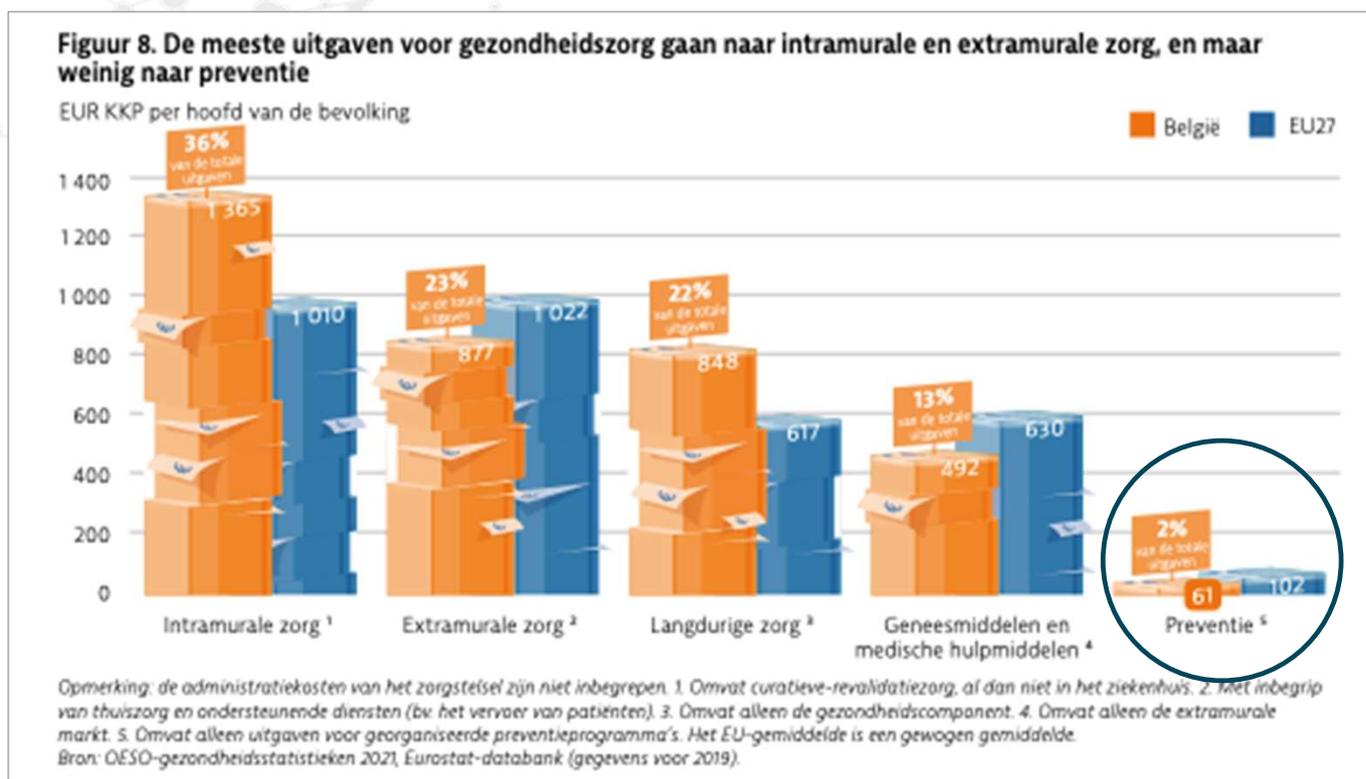
# International benchmarking of vaccination systems:

## Countries with top performing vaccination systems, use standard core outcome sets for prevention, and assess ROI for prevention beyond financial



Long-term strategy & planning	Sufficient budget for prevention & vaccination	Continuously updated immunization programme	Increase public and HCP awareness	Updated data system and continuous surveillance	Increased accessibility and vaccinator capacity	Sufficient supply
<ul style="list-style-type: none"> <li>• Strategic priorities and SMART objectives</li> <li>• Resources aligned to priorities</li> <li>• Clear governance with involvement of multiple stakeholders</li> <li>• Horizon scanning to support long-term planning</li> </ul>	<ul style="list-style-type: none"> <li>• I: 4,2% of total health expenditure for prevention</li> <li>• NL: highest expenditure: €157,9/capita</li> </ul>	<ul style="list-style-type: none"> <li>• Life course immunization programme</li> <li>• For specific populations</li> <li>• Catch-up programs</li> <li>• Continuously evolving programs</li> </ul>	<ul style="list-style-type: none"> <li>• Publicly communicated policy, strategy and programmes</li> <li>• Major public awareness program</li> <li>• Access to high-quality information</li> </ul>	<ul style="list-style-type: none"> <li>• Life immunisation register</li> <li>• Surveillance through rigorous case investigation of suspected cases</li> <li>• National surveillance network with an active monitoring system</li> <li>• Evaluation framework and cycle to assess program delivery effectiveness</li> </ul>	<ul style="list-style-type: none"> <li>• Adequately trained immunisation workforce</li> <li>• Vaccination in diverse settings</li> <li>• Prepared for outbreak</li> </ul>	<ul style="list-style-type: none"> <li>• Efficient &amp; effective procurement through centralised procurement</li> <li>• Dedicated vaccines manufacturing Innovation centre for clinical trials and for emergency preparedness</li> </ul>

## In 2021, in Belgium only 1,6 % of healthcare expenditures for prevention, compared to 2,9% EU average



Source: OECD rapport België, Landenprofiel 2021



# The UK has an immunization schedule that covers the whole life course

Schedule for the UK's routine immunisation programme (excluding catch-up campaigns) – updated August 2019

Age Due	Vaccine Given
<b>8 weeks old</b>	Diphtheria, tetanus, pertussis, polio, Hib and hepatitis B (DTaP/IPV/Hib/HepB) Pneumococcal conjugate vaccine (PCV) Meningococcal B (MenB) Rotavirus
<b>12 weeks old</b>	Diphtheria, tetanus, pertussis, polio, Hib and hepatitis B (DTaP/IPV/Hib/HepB) Rotavirus
<b>16 weeks old</b>	Diphtheria, tetanus, pertussis, polio, Hib and hepatitis B (DTaP/IPV/Hib/HepB) Meningococcal B (MenB) Pneumococcal conjugate vaccine (PCV)
<b>One year old (on or after the child's first birthday)</b>	Hib/MenC booster Pneumococcal conjugate vaccine (PCV) booster Meningococcal B (MenB) booster Measles, mumps and rubella (MMR)
<b>Eligible paediatric age groups annually</b>	Live attenuated influenza vaccine (LAIV)

Age Due	Vaccine Given
<b>Three years four months old or soon after</b>	Diphtheria, tetanus, pertussis and polio (DTaP/IPV or dTaP/IPV) Measles, mumps and rubella (MMR)
<b>Twelve to thirteen years old</b>	Human papillomavirus (HPV)
<b>Fourteen years old (school year 9)</b>	Tetanus, diphtheria and polio (Td/IPV) Meningococcal ACWY conjugate (MenACWY)
<b>65 years old</b>	Pneumococcal polysaccharide vaccine (PPV)
<b>65 years of age and older</b>	Inactivated influenza vaccine
<b>70 years old</b>	Shingles (herpes zoster)

Source: Public Health England: The Green Book (the latest information on vaccines and vaccination procedures, for vaccine preventable infectious diseases in the UK)



# Australia's national immunization program schedule covers children, adolescents, and adults

Vaccine Brand Name	Childhood						Adolescent		Adult				
	Birth <small>(within 7 days)</small>	2 mths <small>(from 6 weeks)</small>	4 mths	6 mths	12 mths	18 mths	4 yrs	12-13 yrs <small>(school program)</small>	14-16 yrs <small>(school program)</small>	Pregnant Indigenous* women >15 yrs	Indigenous* >50 yrs	>65 yrs	70 yrs
H-B-Vax® II Paediatric or Engerix® B – Paediatric (Hep B)	✓												
Infanrix® hexa (DTPa, Hep B, Polio, Hib)		✓	✓	✓									
Prevenar 13® (Pneumococcal)		✓	✓	Medically at risk and Indigenous* (QLD, NT, WA, SA)	✓								
Rotarix® (Rotavirus)		✓	✓										
Nimenrix® (MenACWY)					✓			✓					
ActHIB® (Hib)						✓							
MMRII® or Priorix® (MMR)					✓								
Priorix-Tetra® or ProQuad® (MMRV)						✓							
Infanrix® or Tripacel® (DTPa)						✓							
Infanrix® IPV or Quadracel® (DTPa, Polio)							✓						
Vaqa® Paediatric (HepA)					Indigenous* (QLD, NT, WA, SA)	Indigenous* (QLD, NT, WA, SA)							
Gardasil®9 (HPV)							2 doses (6 months apart)						
Boostrix® (dTpa)								✓					
Boostrix® or Adacel® (dTpa)									✓				
Pneumovax23® (Pneumococcal)							Medically at risk			Medically at risk	✓	✓	✓
Zostavax® (Herpes zoster)													✓

- Annual influenza vaccination is also advised for: babies, +65y, pregnant woman, Aboriginal and Torres Strait Islander people 6 months and over
- Additional guidance for special risk groups, including
  - Aboriginal and Torres Strait Islander people
  - International travellers
  - Migrants, refugees, and people seeking asylum
  - People who are immunocompromised
  - Women who are planning pregnancy, pregnant, or breastfeeding
  - Pre-term infants
  - People at occupational risk

## A dedicated UK Vaccines Manufacturing Innovation Centre for clinical trials and at moderate scale for emergency preparedness

- **Vaccines Manufacturing Innovation Centre (VMIC)** addresses the UK's structural gap in late-stage vaccine manufacturing process development, by 2022
- Led by academia: University of Oxford's Jenner Institute, and 3 academic institutions joined forces the University of Oxford, Imperial College and the London School of Hygiene & Tropical Medicine.
- **Funded by UK Research and Innovation of £66 million + £10 million from commercial partners (Janssen, MSD).**
- **Technology innovation** incl., manufacture of personalised cancer vaccines and vectors for gene therapy.



**“The lack of commercial incentive to develop these has now led to this exceptional partnership of major academic and industrial players in the vaccine field,**  
Professor Adrian Hill  
Jenner Institute Director

# Policy recommendations and proposals for Belgium

# WHO strategic priorities for 2030 should also be the Belgian objectives

WHO Immunization 2030: Strategic Priorities

**Immunization for primary HC and universal health coverage**

- To build effective, efficient and resilient immunization programmes to achieve universal health coverage

**Equity and Access**

- To ensure that everyone has equitable access to vaccines

**Ownership and Accountability**

- To ensure that everyone, everywhere values immunization, as a human right, building community ownership, and strengthening accountability at all levels

**Outbreaks and Emergencies**

- To maintain and strengthen capacity to prepare for, prevent and respond to vaccine-preventable disease outbreaks

**Life course and Integration**

- To establish and strengthen people-centred platforms to deliver vaccines along the life course, by collaborating with other health programmes and sectors, and provide catch-up vaccination

**Research and Innovation**

- To encourage and intensify the development and adoption of new vaccines and vaccine administration technologies, novel vaccine manufacturing platforms, taking account of ever-changing epidemiology and emerging threats

**Availability and Sustainability**

- To ensure a reliable global supply of affordable vaccines of assured quality, taking account global vaccine shortages

**Economic Advantages\***

- Immunization can deliver economic benefits: maintain a healthy and productive workforce; reduce poverty, through avoidance of healthcare costs, lost wages, and lost productivity to illness\*

\*Highlighted in the WHO report as one of the benefits of immunization  
Source: WHO Immunization Agenda 2030: A Global Strategy To Leave No One Behind, August 2019



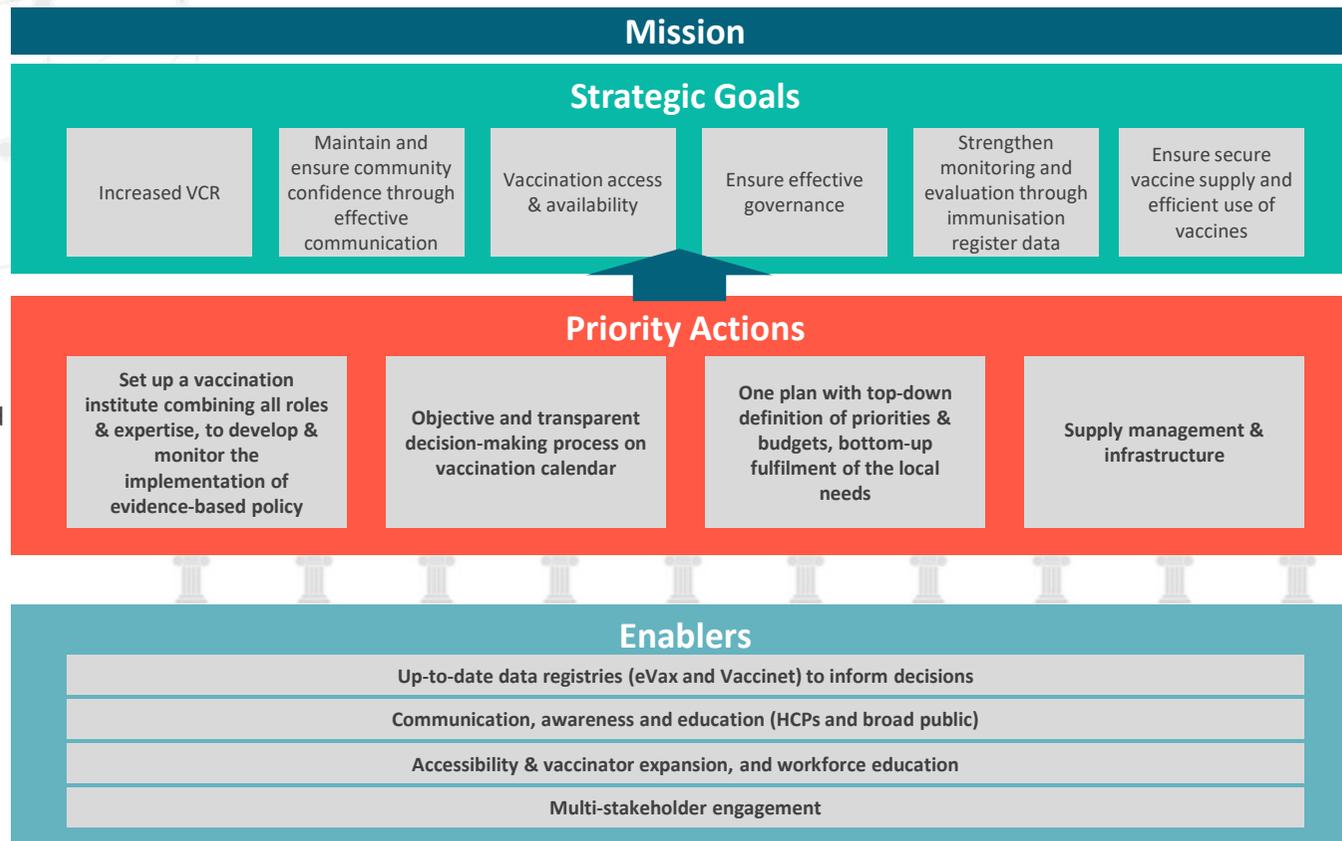
# For a performing vaccination system we must develop a plan for Belgium to achieve the WHO Immunization 2030 goals

Immunization mission for Belgium in line with WHO Immunization 2030 goals

Strategic goals are set to achieve the immunization mission

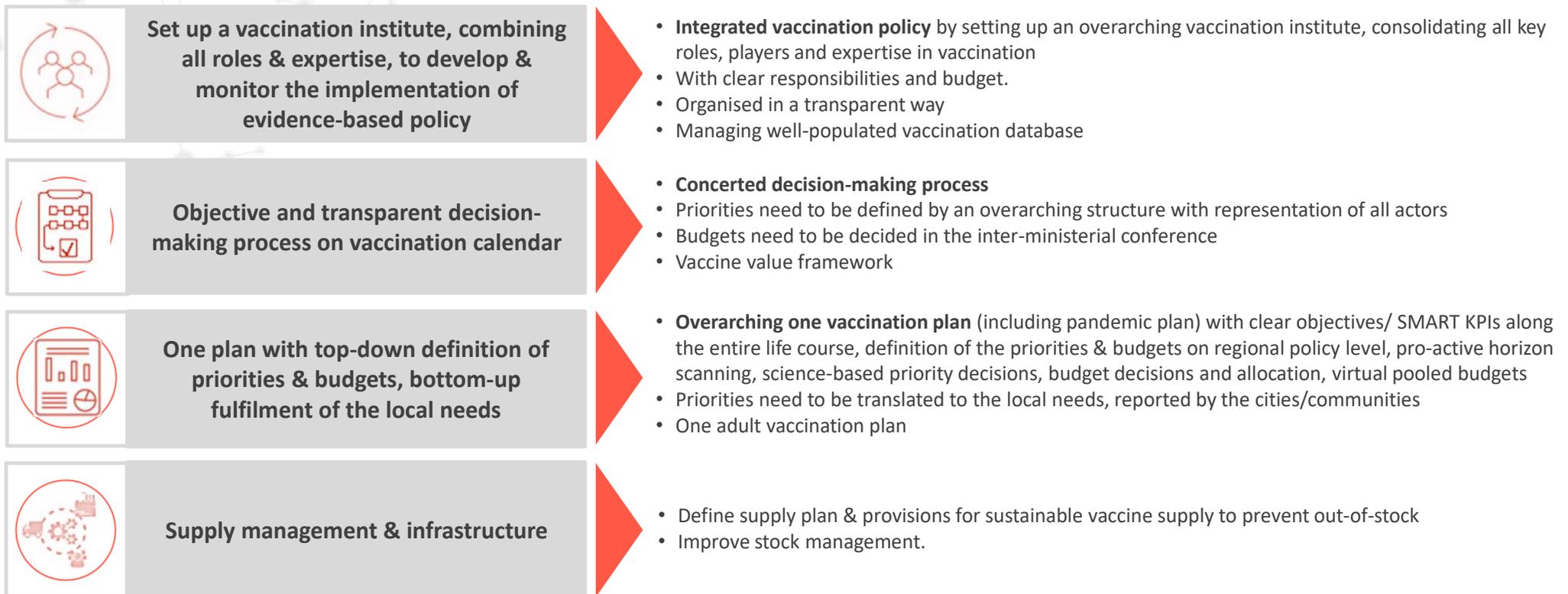
Priority actions are defined to drive and deliver each goal

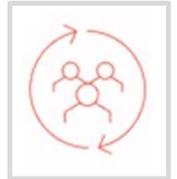
Enablers are additional skills, capabilities, and activities to support and successfully deliver the priority actions



# Four main priority actions need specific alignment

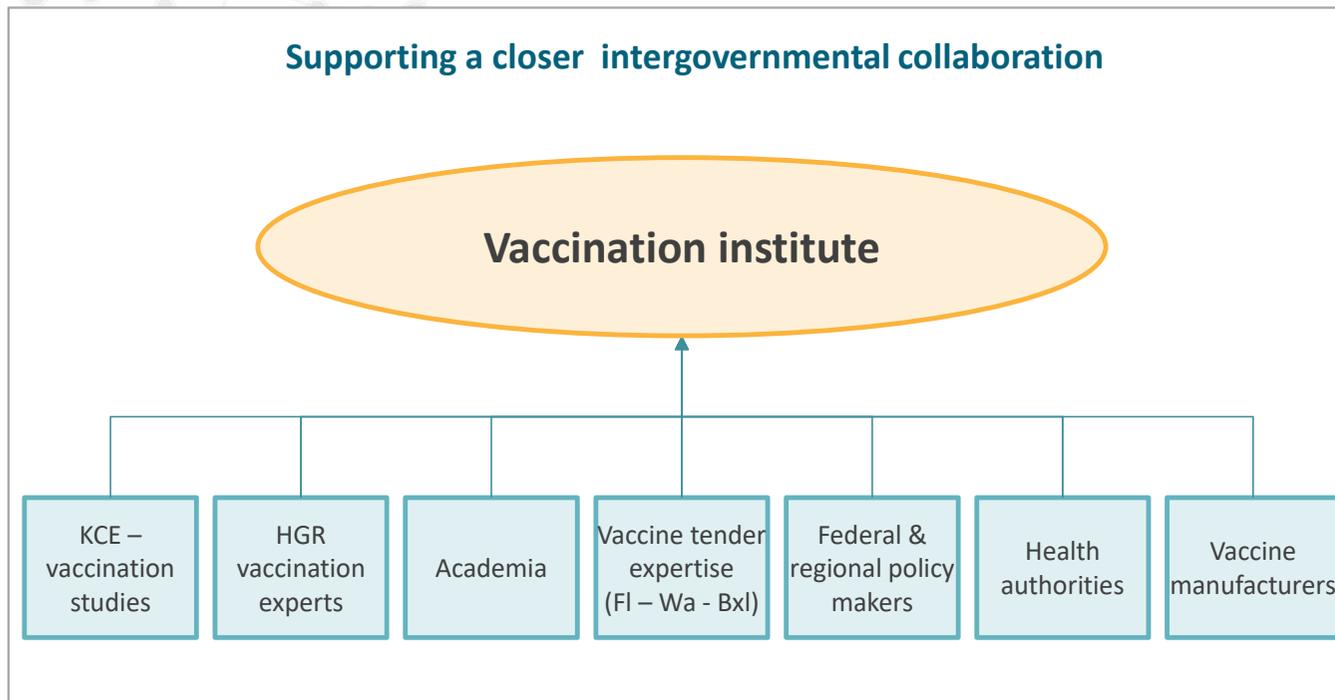
## Priority actions:





## Policy proposal 1:

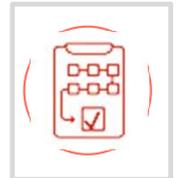
Set up a vaccination institute pooling all roles and expertise, to develop & monitor the implementation of evidence-based vision and policy



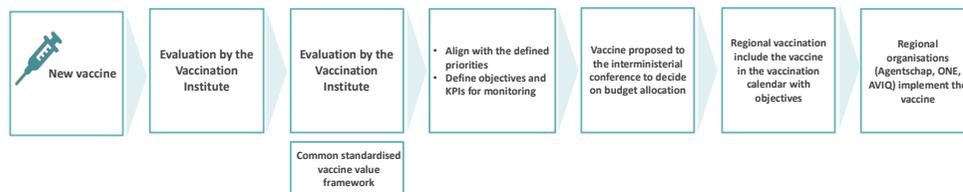
- **Setting up an overarching vaccination institute**, consolidating all expertise and key roles, players and expertise in vaccination
- **Development of an integrated vaccination policy**
  - Define priorities & timelines
  - Define vaccination calendar
  - Proactive horizon scanning
- With clear responsibilities and budget
- Organised in a transparent way
- Managing well-populated vaccination database

## Policy proposal 2:

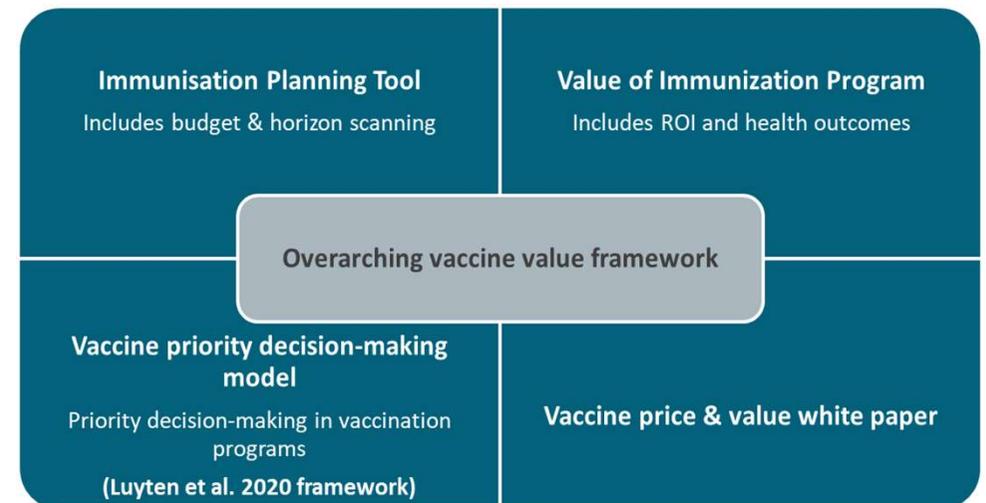
# Objective and transparent decision-making process on vaccination calendar



### Concerted decision-making process for new vaccines



### Common standardized vaccine value framework





## Policy proposal 3:

# One plan with top-down definition of priorities & budgets, bottom-up fulfilment of the local needs

### Overarching one-vaccination-plan for Belgium

#### One-vaccination-plan for Belgium - Strategy Framework for 2023-2027

##### Immunization goals for Belgium in line with WHO Immunization 2030 goals

##### Strategic Goals



##### Core functions

The Strategy is organised around six **core functions** that describe the foundations required to achieve our mission.~

Collectively, these functions represent the core enduring offer through which our ten strategic priorities will be delivered.



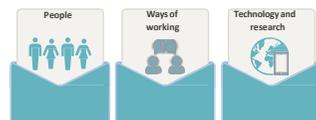
##### Our strategic priorities

The ten **strategic priorities** will focus effort across our system and represent specific programmes that link with and contribute to work within our core functions. They have been selected based on advice from experts within and external to our organisation using the best available evidence of where we can deliver the biggest gains for our population.



##### Our enablers

**Enablers** are the skills, capabilities and activities required to ensure the successful delivery of the core functions and strategic priorities.



### One-adult-vaccination-plan for life-course vaccination

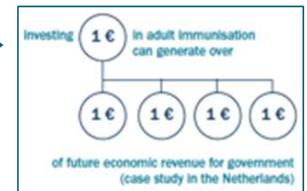


Continuously updated immunization programme

Additional recommendations for specific populations

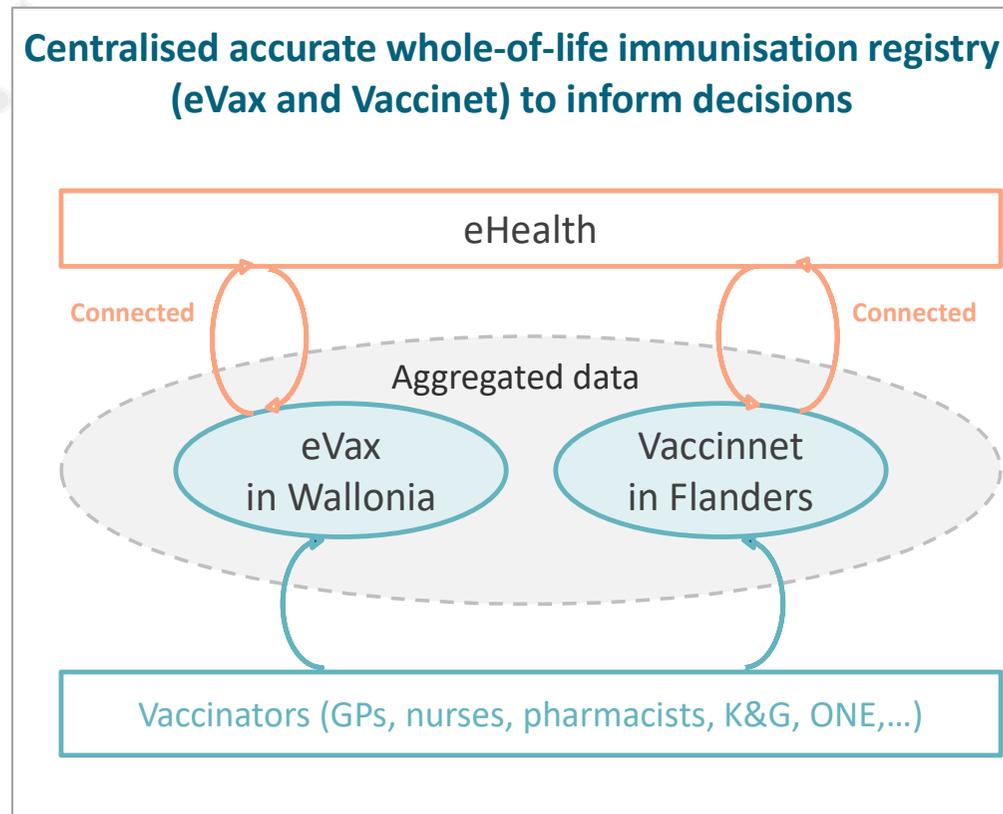
Organization of catch-up programs

Continuously evolving programs incorporating new, more effective, cost-effective vaccines

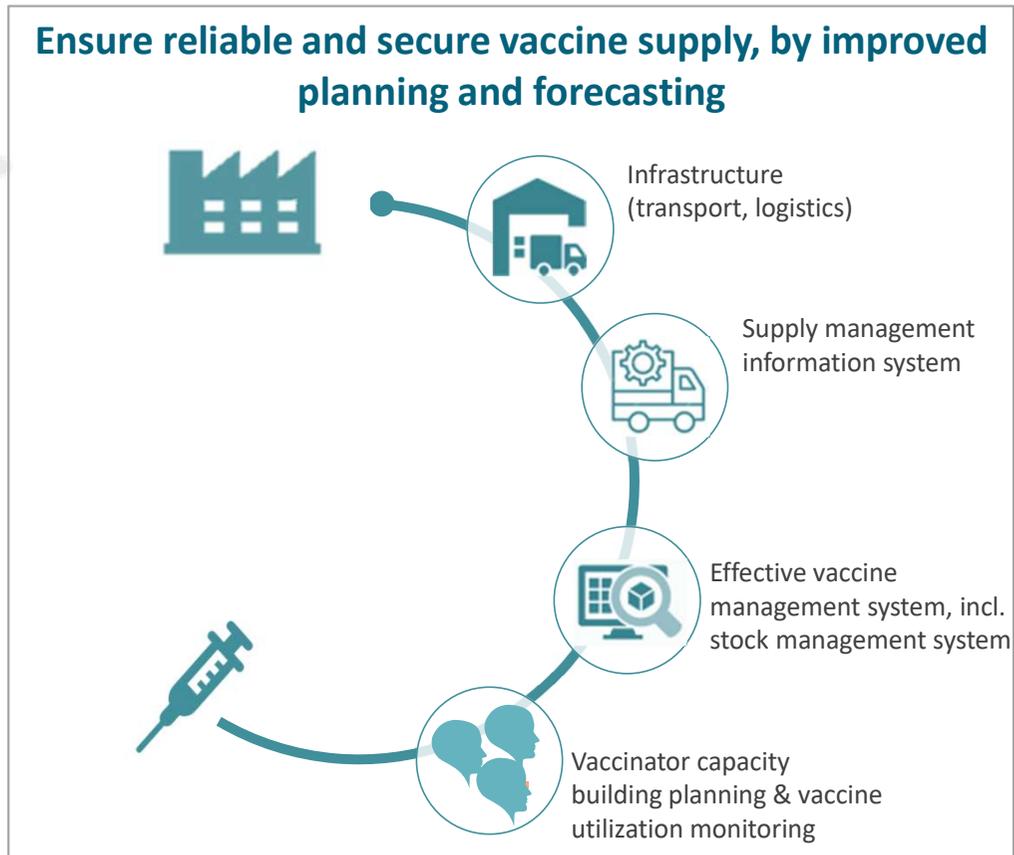


## Policy proposal 3:

One plan with top-down definition of priorities & budgets, bottom-up fulfilment of the local needs

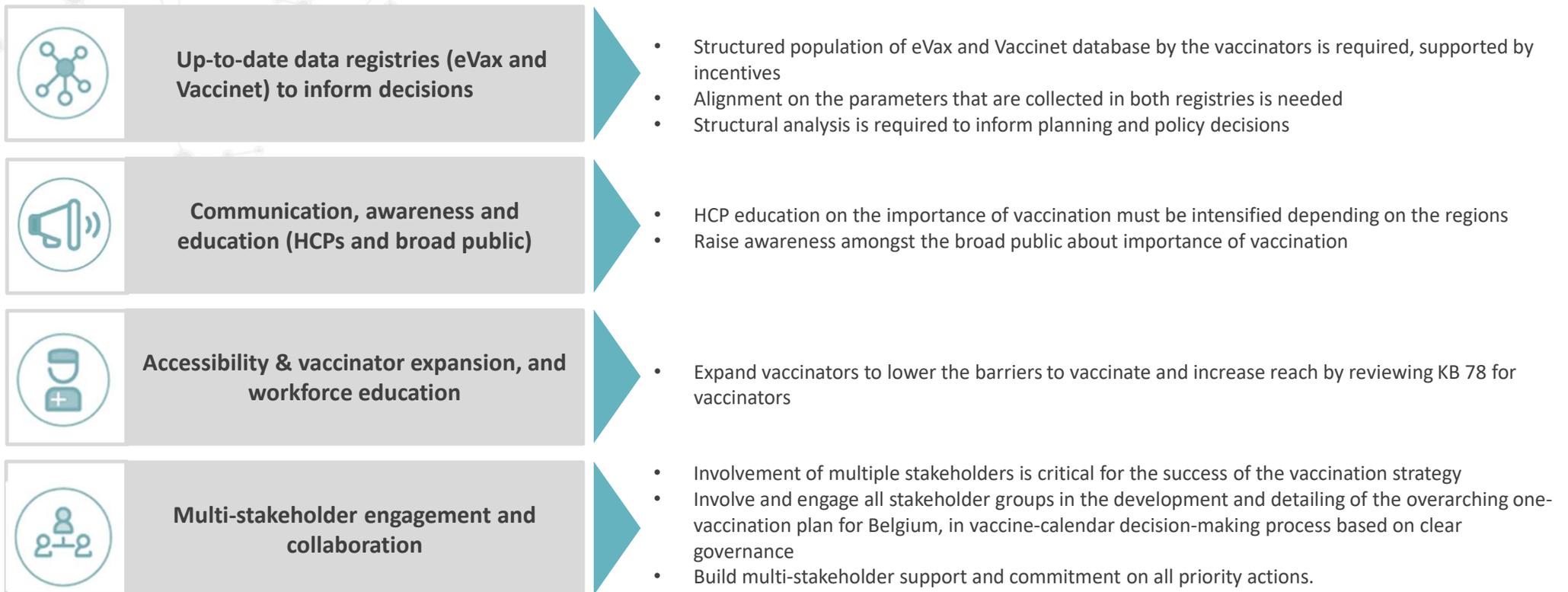


# Policy proposal 4: Supply management and infrastructure



## Four enablers for the priority actions need specific attention

### Enablers:



# Policy proposals and recommendations for Belgium for the minimum “must haves”



## Conclusions and recommendations: the minimum “must haves” for Belgium

1

### Implement an overarching decision-making governance structure that includes all stakeholders

- Closer intergovernmental collaboration
- Set up a vaccination institute pooling all expertise, to develop & monitor the implementation of evidence-based vision and policy

2

### Objective and transparent decision-making process on vaccination calendar

- Decided in a concerted decision-making process for new vaccines
- Based on a common standardized vaccine value framework & horizon scanning

3

### One plan with top-down definition of priorities & budgets, bottom-up fulfilment of the local needs

- overarching one vaccination plan (including pandemic plan)
- and centralised accurate whole-of-life immunisation registry (e-vaccination records)

4

### Supply management & infrastructure

- Ensure reliable and secure vaccine supply through improved planning and forecasting
- “one vaccines supply plan” where collaboration between involved actors is key
- Vaccines manufacturing innovation centre for clinical trials and emergency preparedness

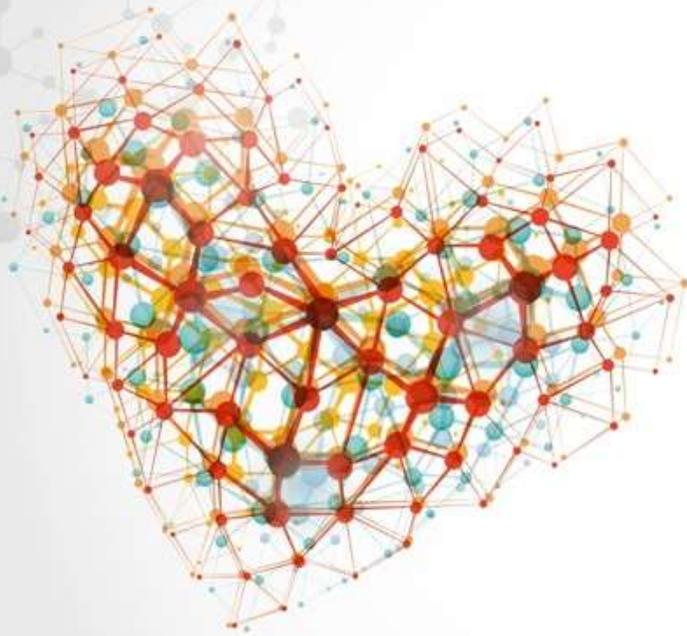
# Our track record in new policy development

## Our recent reports and publications



## In progress:

Report can be downloaded from the website  
Ingrid.maes@inovigate.com



# Connecting for better health

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# COVID-19 VACCINE SURVEILLANCE IN BELGIUM: THE LINK-VACC PROJECT

Vaccine Symposium  
12 May 2022

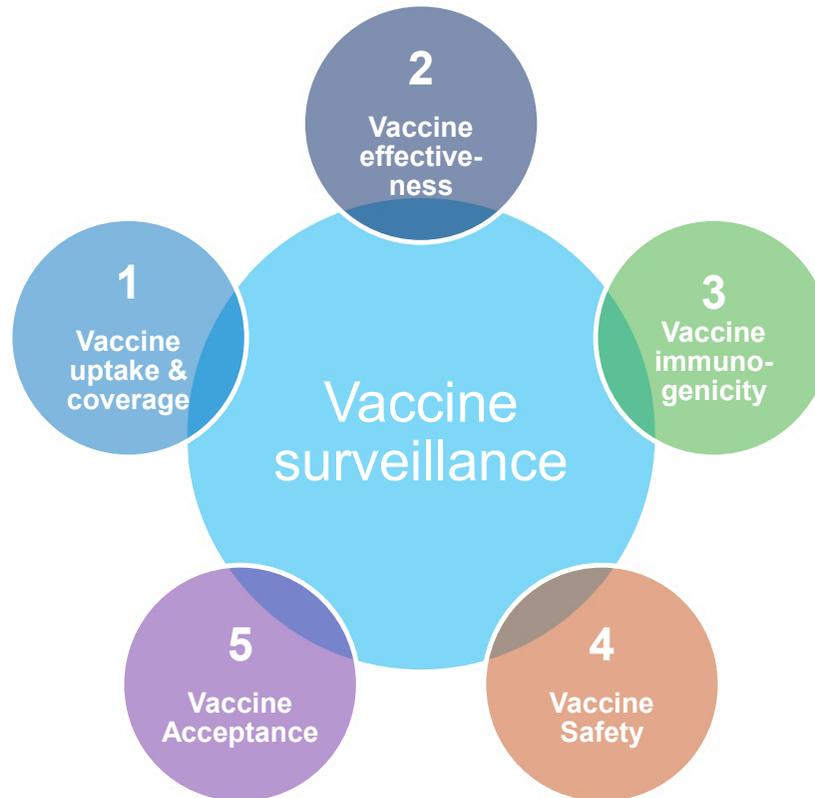
Joris van Loenhout

# Introduction

- Sciensano
  - National institute of public health, animal health and food safety
  - > 700 employees
- Role Sciensano in COVID-19 crisis
  - Leading scientific institution in the epidemiology of infectious diseases
  - Describe the evolution of the epidemic and assess its consequences on the health of the Belgian population
  - Coordinate the drafting of the procedures for general practitioners, hospitals, patients and labs
  - Coordinate the Risk Assessment Group (RAG), which assesses the risk and the effect of the measures

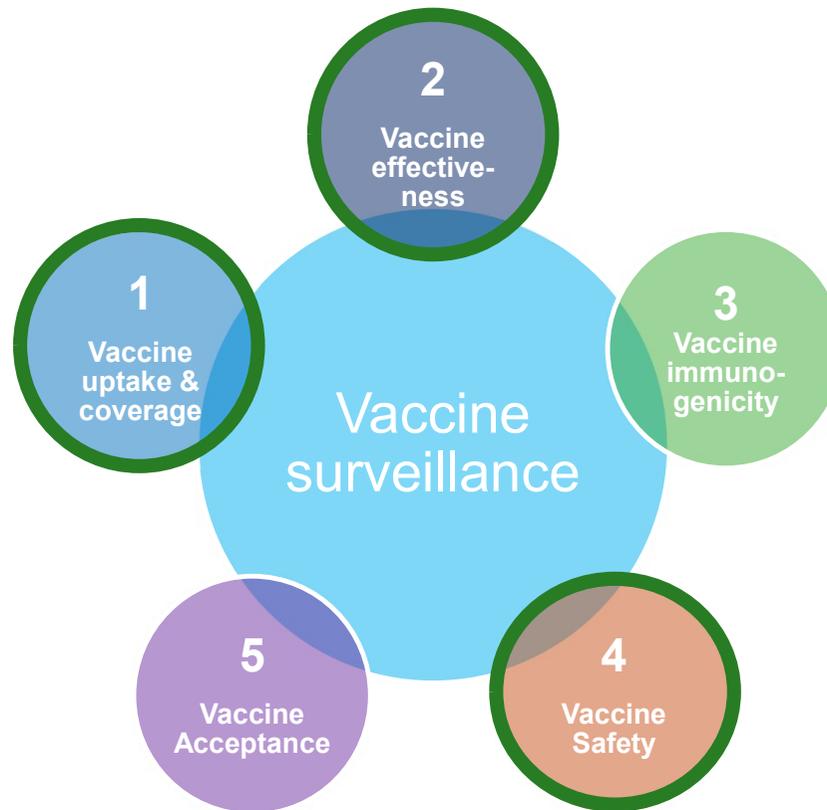
# Background

- All COVID-19 vaccines approved for use in Belgium have been evaluated in clinical trials for safety, immunogenicity, and vaccine efficacy
- Nevertheless, in the post-marketing phase that follows vaccine registration, 5 pillars of surveillance remain indispensable



# Background

- Sciensano set up the **LINK-VACC** project:  
“**Linking of registries for COVID-19 vaccine surveillance**”



# LINK-VACC Project

**Context:** HealthCare sector overloaded since the beginning of the pandemic

**Aim:** Avoid a new prospective data collection

**Proposal:** Link existing databases, to create a prospective cohort of COVID-19 vaccinated persons and allow the monitoring of the pillars of surveillance

**Added value:** Access to systematically collected, well-defined data in existing national health registries

# LINK-VACC scopes

1

Vaccine uptake & coverage

- By age, gender, geographical region, vaccine brand
- By target group (HCW, nursing homes, pseudopathologies)
- By socio-economic and socio-demographic indicators

2

Breakthrough infections

- Breakthrough cases = COVID-19 confirmed cases occurring in vaccinated individuals
- Calculating incidence rates
- Identifying characteristics associated with breakthrough infections

3

Vaccine effectiveness

- Measuring vaccine effectiveness (VE) against laboratory-confirmed SARS-CoV-2 infection / hospitalization
- VE by target group, age, gender, risk-group, vaccine brand
- Correcting for relevant confounders (e.g. co-morbidities)

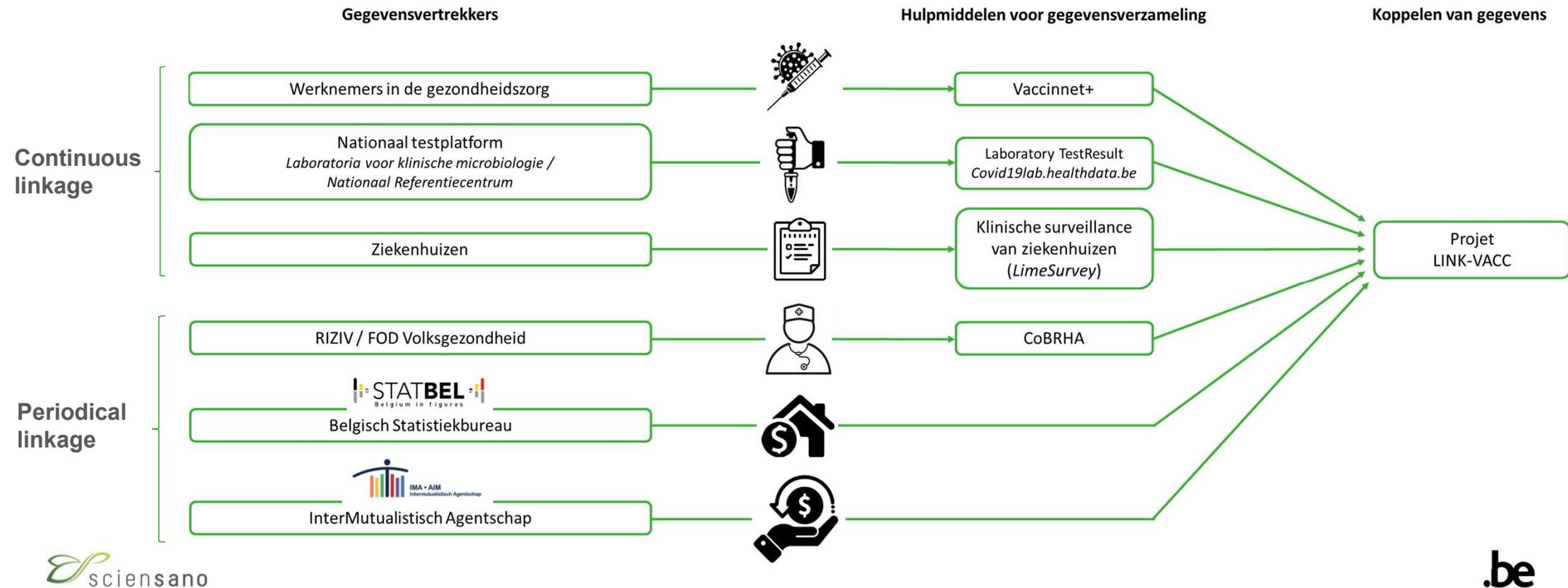
4

Vaccine Safety

- In support of AFMPS/FAGG
- Identification of clustering of breakthrough cases, as possible safety signal
- *Detection of probably cases of Vaccine-Associated Enhanced Disease (VAED)*

# LINK-VACC data sources

## LINKED DATABASES

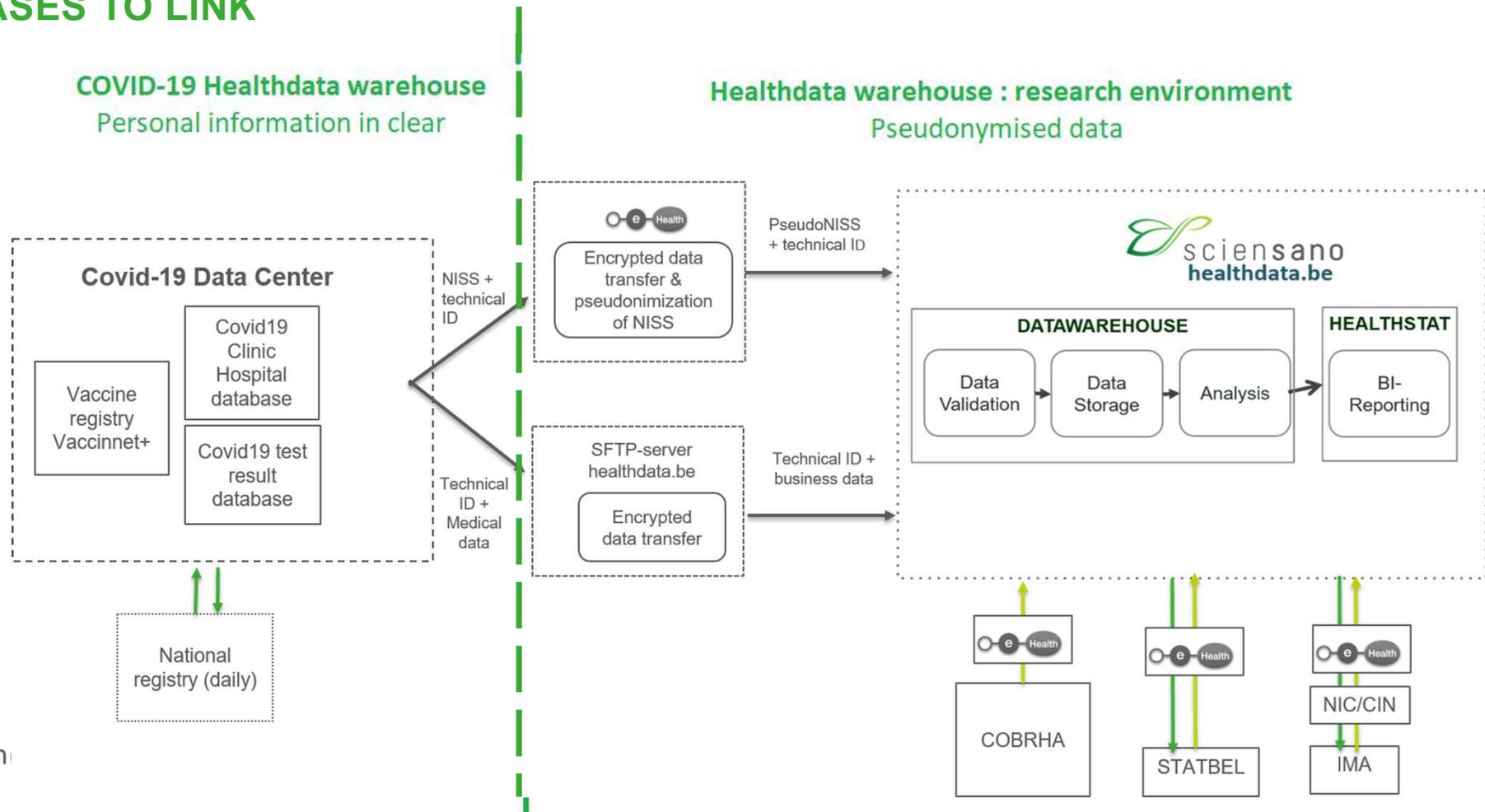


# Dataflow organization & GDPR

## DATABASES TO LINK

**COVID-19 Healthdata warehouse**  
Personal information in clear

**Healthdata warehouse : research environment**  
Pseudonymised data





# VACCINNET+ : National vaccine registry

- Existing tool developed by *Kind & Gezin*, an organization of the Flemish Government
- Vaccine ordering and registration system
- Extension of this application to whole Belgium in the context of COVID-19
- Registration of all **COVID-19 vaccine administrations**



## OUTPUTS

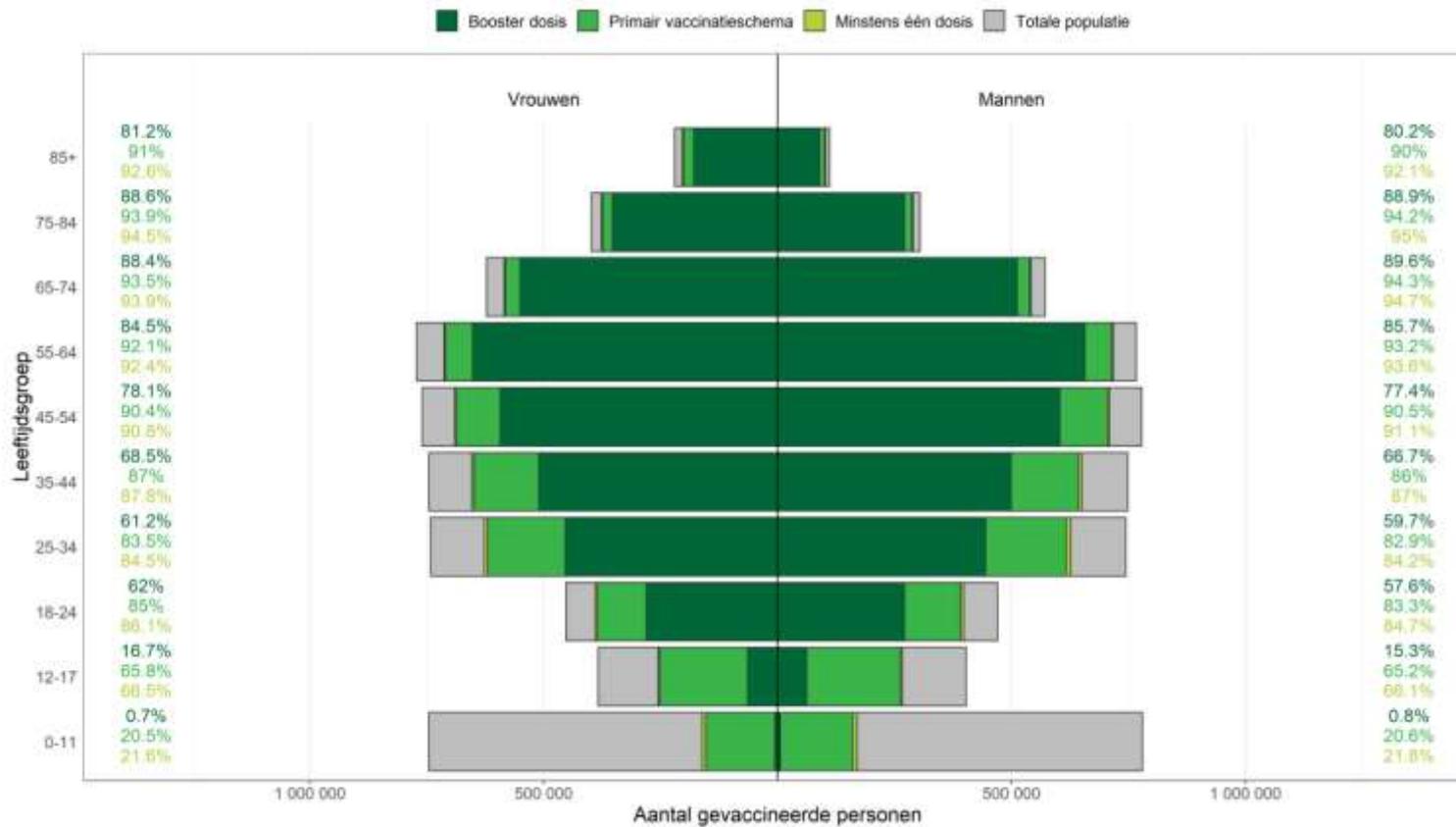
- Identification of patients vaccinated against COVID-19 (age, sex, postal code)
- Information about the received vaccine (brand, lot number, date of vaccination, ...)
  - Surveillance of vaccine coverage

## CHALLENGES

- Need for flexibility (existing system, not designed for COVID-19 (and changes during campaign))
- No data on risk group identification (e.g. nursing home residents, healthcare workers)
- No data on vaccination place (e.g. vaccination centre, hospital, nursing home)

# Example output: Vaccination coverage per gender and age groups in Belgium

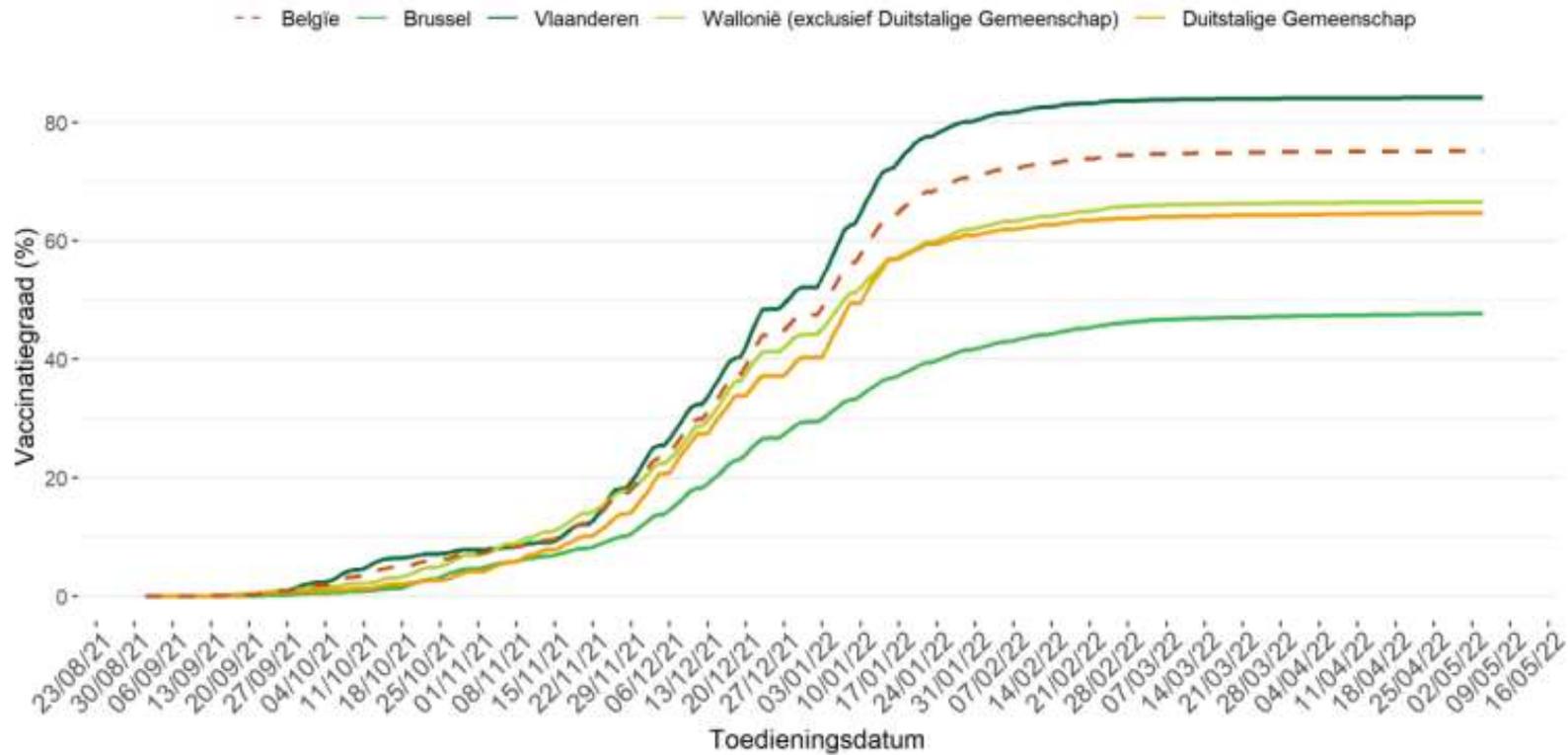
Data of 3 May 2022  
Source Vaccinnet +



# Example output: Booster coverage by region / community

Data of 3 May 2022

Source Vaccinnet +



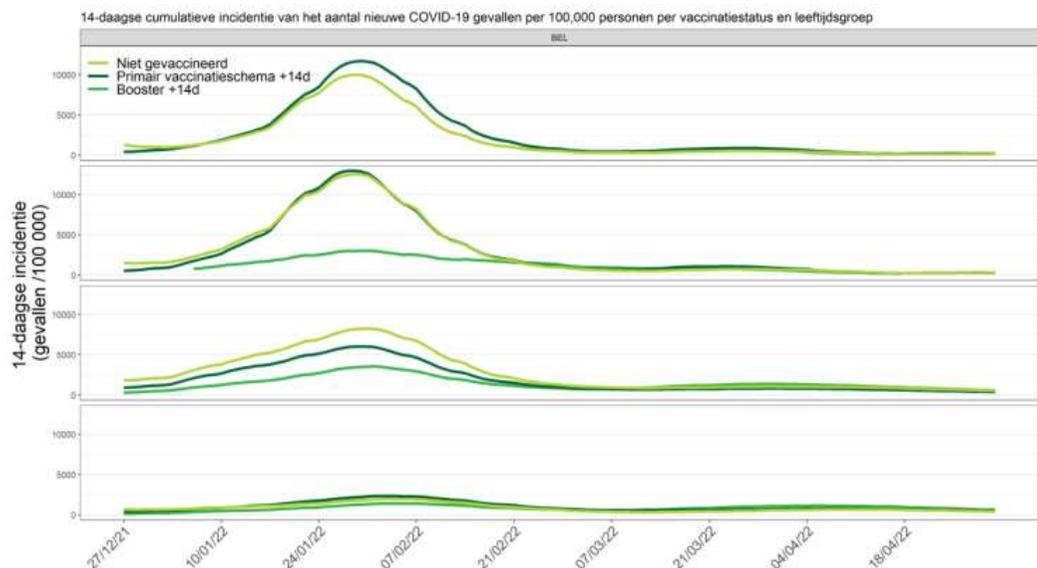


# Laboratory test results: COVID-19 health database

- Data on **patients tested for COVID-19**
- Information on test prescriptions, test results (including rapid tests), symptoms, variant, suspected false negatives and false positives.

## OUTPUTS

- Identification of breakthrough cases, calculation of cumulative incidence by vaccination status
- Test-negative case control study for vaccine effectiveness





# Hospitalisations: two monitoring systems

- **Surge Capacity Surveillance (SCS)**

- Mandatory questionnaire filled out daily by all Belgian hospitals regarding the number of COVID-19 hospitalisations

## OUTPUTS

- Assess the impact of vaccination on the severity of the infection → hospitalisation / ICU admission

## CHALLENGES

- Aggregated data without national number of patients so cannot be linked to Vaccinnet+, instead vaccination status / age group is asked for

- **Clinical Hospital Surveillance (CHS)**

- Questionnaire on clinical data of hospitalized patients with a confirmed COVID-19 diagnostic

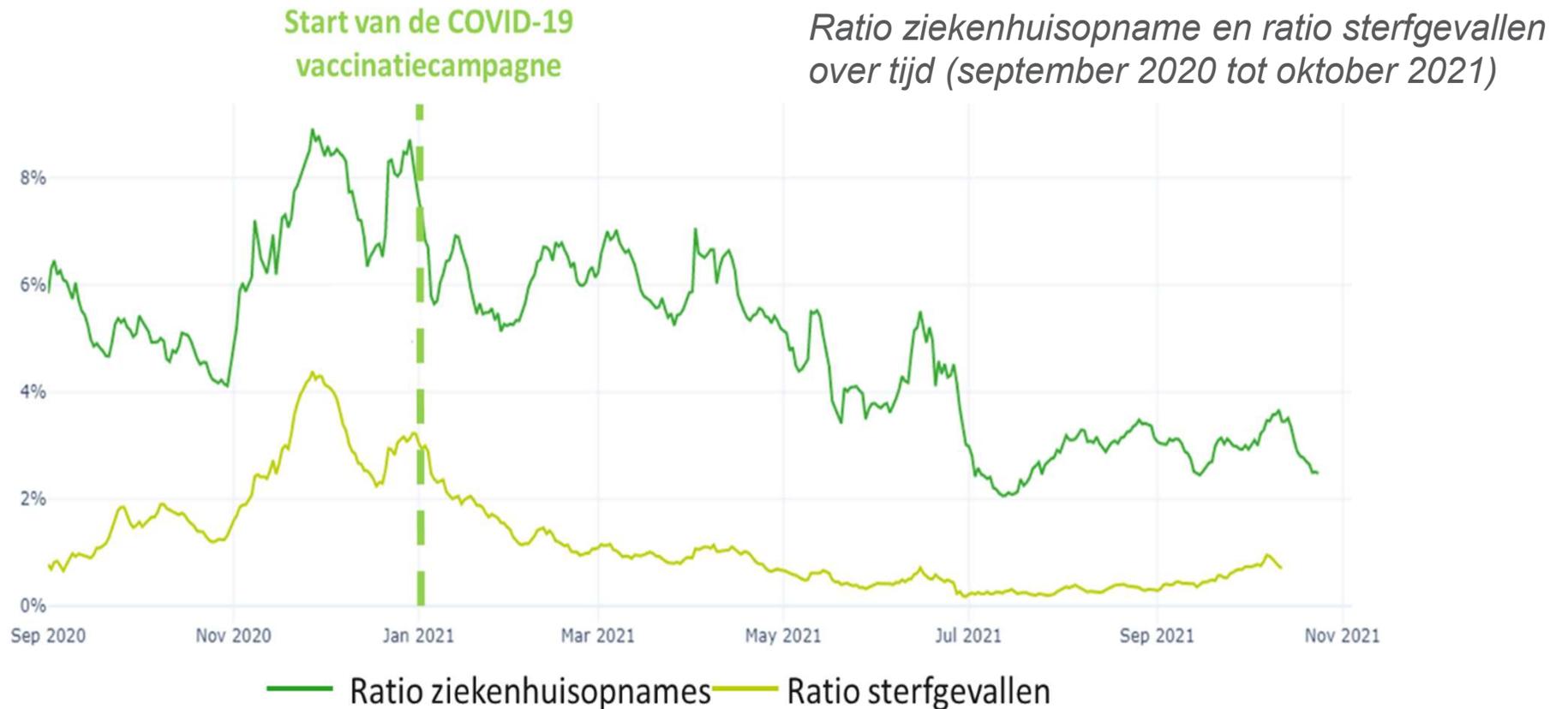
## OUTPUTS

- Identification and characterization of hospitalized breakthrough cases, vaccine effectiveness

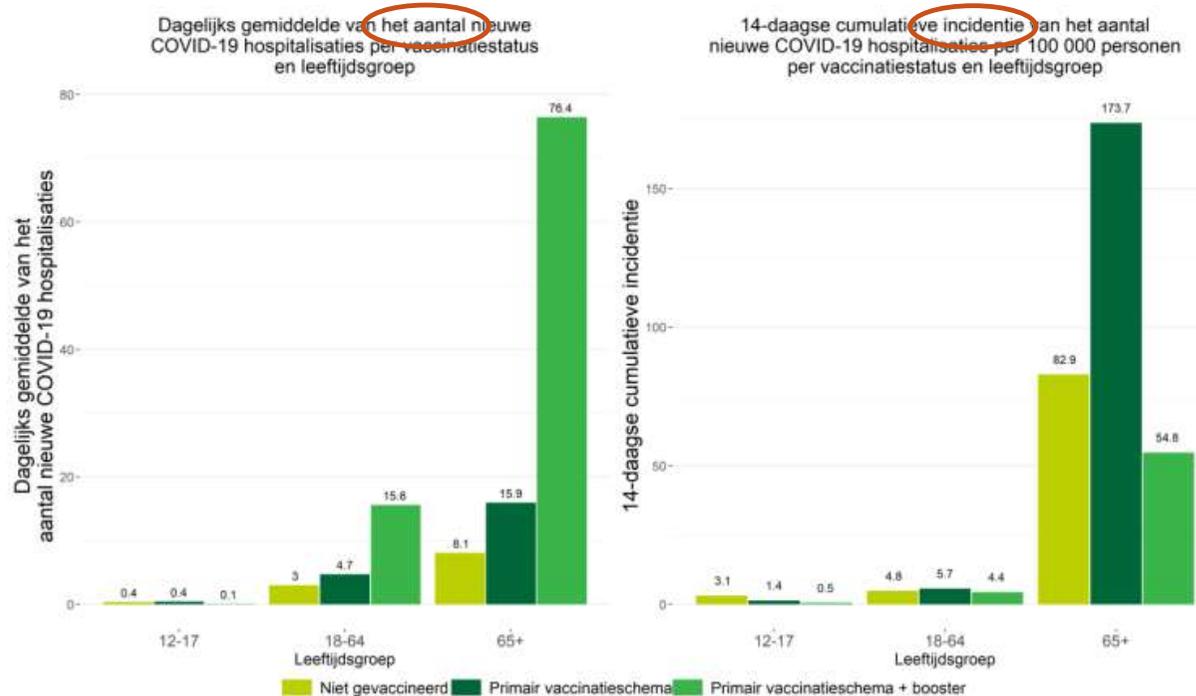
## CHALLENGES

- Non-exhaustive : participation rate varying (not mandatory)
- Data received with delay (3-4 weeks)

# Example output: impact of vaccination on the severity of infections



# Example output: Number of hospitalisations in vaccinated versus unvaccinated persons



**Absolute numbers versus incidence!**

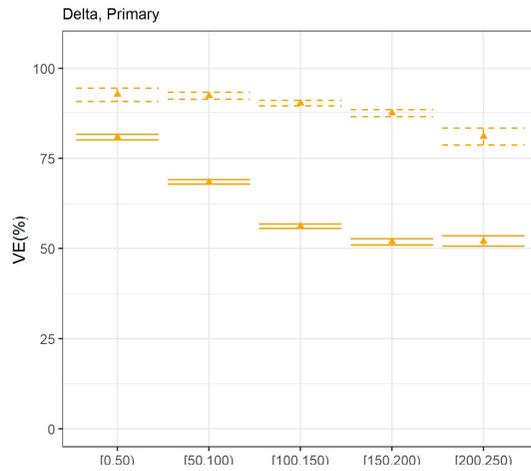
Data from 18 April to 1 May 2022. Source = SCS & Vaccinnet+

Leeftijdscategorie	Relatieve reductie van het risico op hospitalisatie (niet-gecorrigeerd)		
	Primair vaccinatieschema t.o.v. ongevacineerd	Boosterdosist o.v. ongevacineerd	Boosterdosist o.v. primair vaccinatieschema
12-17	55 %	Niet aantoonbaar	Niet aantoonbaar
18-64	Niet aantoonbaar	9 %	22 %
65+	Niet aantoonbaar	34 %	68 %

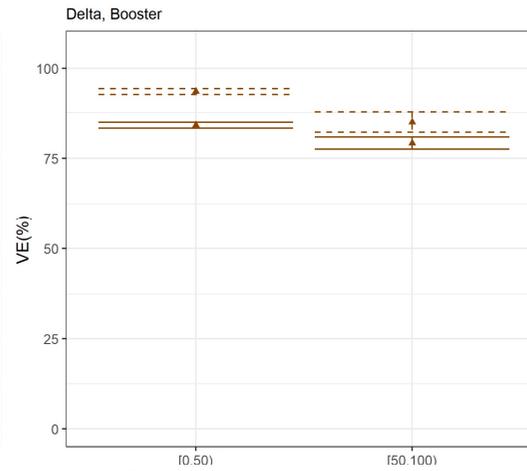
# Example output: Vaccine Effectiveness during Delta & Omicron

**Delta VOC**  
15/07/21 – 06/12/21

## Primary vaccination



## Booster vaccination



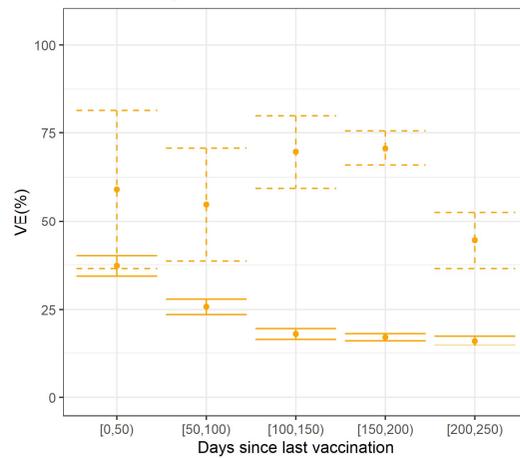
--- VE Hospitalization  
— VE Symptomatic infection

Source = Vaccinnet+, LTR & CHS

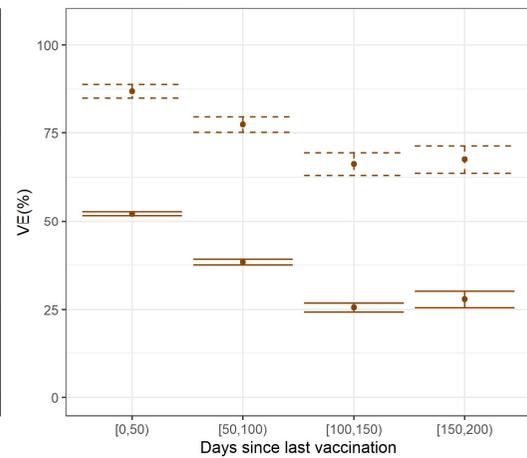
T. Braeye et al. Submitted in  
Eurosurveillance, available as preprint

**Omicron VOC**  
03/01/22 – 14/04/22

## Primary vaccination



## Booster vaccination





# CoBRHA = Common Base Registry for Healthcare Actors

Data allowing identification of **healthcare workers**

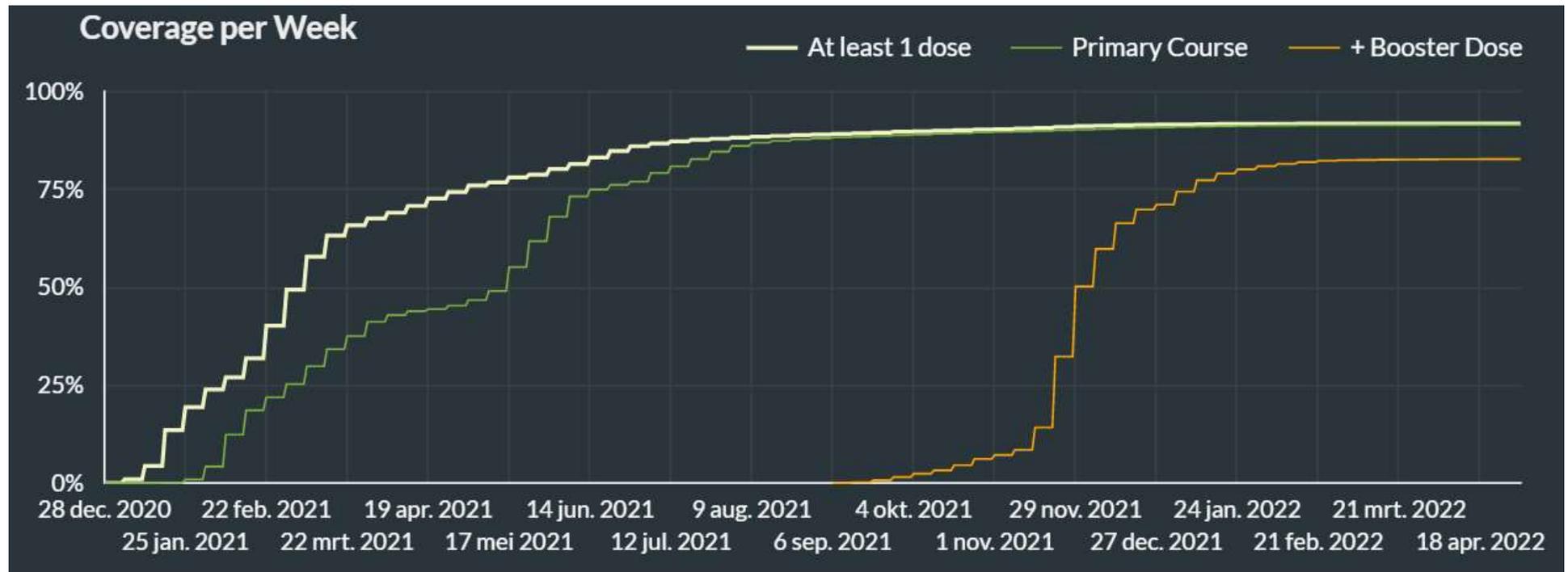
## OUTPUTS

- Determination of vaccination coverage among healthcare workers

## CHALLENGES

- The CoBRHA database lists healthcare workers with a Belgian "license to practice". Healthcare workers who shifted careers to another sector are **not** excluded.
- The active/inactive status used as an inclusion criteria was determined on the basis of RIZIV/INAMI numbers and data from the FPS Public Health. Retired professionals are **not** excluded from the database.
- Administrative staff or students working in a healthcare facility are **not** identifiable in the CoBRHA database.
- Cross-border healthcare workers vaccinated at their workplace in a neighbouring country are not necessarily taken into account as encoding of Belgian residents vaccinated abroad in Vaccinnet+ was only made possible from June 23<sup>rd</sup> 2021 onwards on a voluntary basis.

## Example output: coverage among HCW



# Example output: Factors associated with breakthrough infection

**Table 2:** Factors associated with breakthrough infection (multivariable Cox proportional hazards regression)

Factor	Hazard ratio (95%)	p-value
Age (per 10 years increase)	0.88 (0.88-0.88)	<0.001
Male sex	0.99 (0.98-0.99)	<0.001
Brand primary vaccine (ref: BNT162b2)		
mRNA-1273	0.68 (0.67-0.69)	<0.001
ChAdOx1	1.68 (1.66-1.69)	<0.001
Ad26.COVS	1.54 (1.52-1.56)	<0.001
Healthcare worker	0.60 (0.60-0.61)	<0.001
Prior COVID-19 infection	0.23 (0.23-0.24)	<0.001
Received booster	0.44 (0.43-0.45)	<0.001
Background positivity rate	1.33 (1.32-1.33)	<0.001
High frequent testing profile	3.87 (3.82-3.92)	<0.001

Source = Vaccinnet+, LTR & CoBRHA



# Demographic / clinical characteristics data sources

- **InterMutualist Agency (IMA) database**

Data on reimbursed care and medicines of citizens insured in our country:

- Pseudopathologies (as comorbidities)
- Nursing home resident status
- Medications (eg immunosuppressive)

- **STATBEL : the Belgian Statistical Office**

Socio-economic information (family composition, nationality/origin, employment status, income, ...)

## OUTPUTS

- Differences in vaccine uptake by pseudopathology (IMA) socio-economic and -demographic groups (STATBEL)
- Effect modifiers/bias correction for vaccine effectiveness study

## CHALLENGES

- External databases (timing)

# Conclusion: main challenges LINK-VACC project

- Linkage at individual level: need for a **unique identifier**
  - Limitation to databases containing national registry number of the patient
- **Various databases owners** (internal versus external databases)
  - Dataflow organisation (time consuming)
- Some data received with a **delay**
  - Varies: 3-4 weeks for clinical hospital surveillance to 1-2 years for IMA data
  - Real-time data needed to provide scientific advice to guide public health policy
- Use of **personal information**
  - Respect GDPR rules
  - Data pseudonymisation: separation of secured environment and research environment

# LINK-VACC output until now

TR = Thematic Report / A = Article

1

Vaccine uptake & coverage

**Published:**

- Vaccination in nursing homes (TR)
- Vaccination among healthcare workers (TR)
- Vaccination coverage & impact primary schedule (TR)

**In progress:**

- Coverage by type of pseudopathology (TR) / coverage among children (TR)
- Socio-economic and -demographic determinants of vaccination status (A)

2

Breakthrough infections

**Published:**

- Characteristics of breakthrough infections (A)

**In progress:**

- Averted deaths due to vaccination campaign using WHO model (A)

3

Vaccine effectiveness

**Published:**

- Vaccine effectiveness against infection and onward transmission by vaccine brand and by variant of concern (A x 2)

**Submitted:**

- Vaccine effectiveness against infection / hospitalisation, during delta/omicron (A)

4

Vaccine Safety

- Ongoing collaboration with FAGG/AFMPS on monitoring of safety signals by identifying breakthrough cases/clusters

# Thematic reports and papers in peer-reviewed journals



## THEMATISCH VERSLAG :

VACCINATIEGRAAD EN  
EPIDEMIOLOGISCHE IMPACT VAN DE  
COVID-19-VACCINATIECAMPAGNE  
IN BELGIË



## THEMATISCH RAPPORT :

SURVEILLANCE VAN COVID-19  
VACCINATIE BIJ ZORGVERLENERS IN  
BELGIË



## THEMATISCH RAPPORT :

SURVEILLANCE VAN DE COVID-19  
VACCINATIE IN BELGISCHE  
WOONZORGCENTRA



Vaccine effectiveness against onward transmission of SARS-CoV2-infection by variant of concern and time since vaccination, Belgian contact tracing, 2021



Toon Braeys<sup>a,\*</sup>, Lucy Catteau<sup>a</sup>, Ruben Brondeel<sup>a</sup>, Joris A.F. van Loenhout<sup>a</sup>, Kristiaan Proesmans<sup>a</sup>, Laura Cornelissen<sup>a</sup>, Herman Van Oyen<sup>a,c</sup>, Veerle Stouten<sup>a</sup>, Pierre Hubin<sup>a</sup>, Matthieu Billuart<sup>a</sup>, Achille Djiena<sup>b</sup>, Romain Mahieu<sup>c</sup>, Naima Hammami<sup>d</sup>, Dieter Van Cauwenbergh<sup>a</sup>, Chloé Wyndham-Thomas<sup>a</sup>



Article

## Incidence and Risk Factors of COVID-19 Vaccine Breakthrough Infections: A Prospective Cohort Study in Belgium

Veerle Stouten<sup>1,\*</sup>, Pierre Hubin<sup>1</sup>, Freek Haarhuis<sup>1</sup>, Joris A. F. van Loenhout<sup>1</sup>, Matthieu Billuart<sup>1</sup>, Ruben Brondeel<sup>1</sup>, Toon Braeys<sup>1</sup>, Herman Van Oyen<sup>1,2</sup>, Chloé Wyndham-Thomas<sup>1</sup> and Lucy Catteau<sup>1</sup>



Short communication

Vaccine effectiveness against infection and onwards transmission of COVID-19: Analysis of Belgian contact tracing data, January-June 2021



Toon Braeys<sup>a,\*</sup>, Laura Cornelissen<sup>a</sup>, Lucy Catteau<sup>a</sup>, Freek Haarhuis<sup>a</sup>, Kristiaan Proesmans<sup>a</sup>, Karin De Ridder<sup>a</sup>, Achille Djiena<sup>b</sup>, Romain Mahieu<sup>c</sup>, Frances De Leeuw<sup>c</sup>, Alex Dreuw<sup>d</sup>, Naima Hammami<sup>e</sup>, Sophie Quoilin<sup>a</sup>, Herman Van Oyen<sup>a</sup>, Chloé Wyndham-Thomas<sup>a</sup>, Dieter Van Cauwenbergh<sup>a</sup>

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  - Léonore Nasiadka
  - Elias Vermeiren
  - Izaak Van Evercooren
  
- Other collaborators in Sciensano

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