

Zin en onzin van openbare statistieken in tijden  
van crisis:

Ervaringen tijdens de pandemie

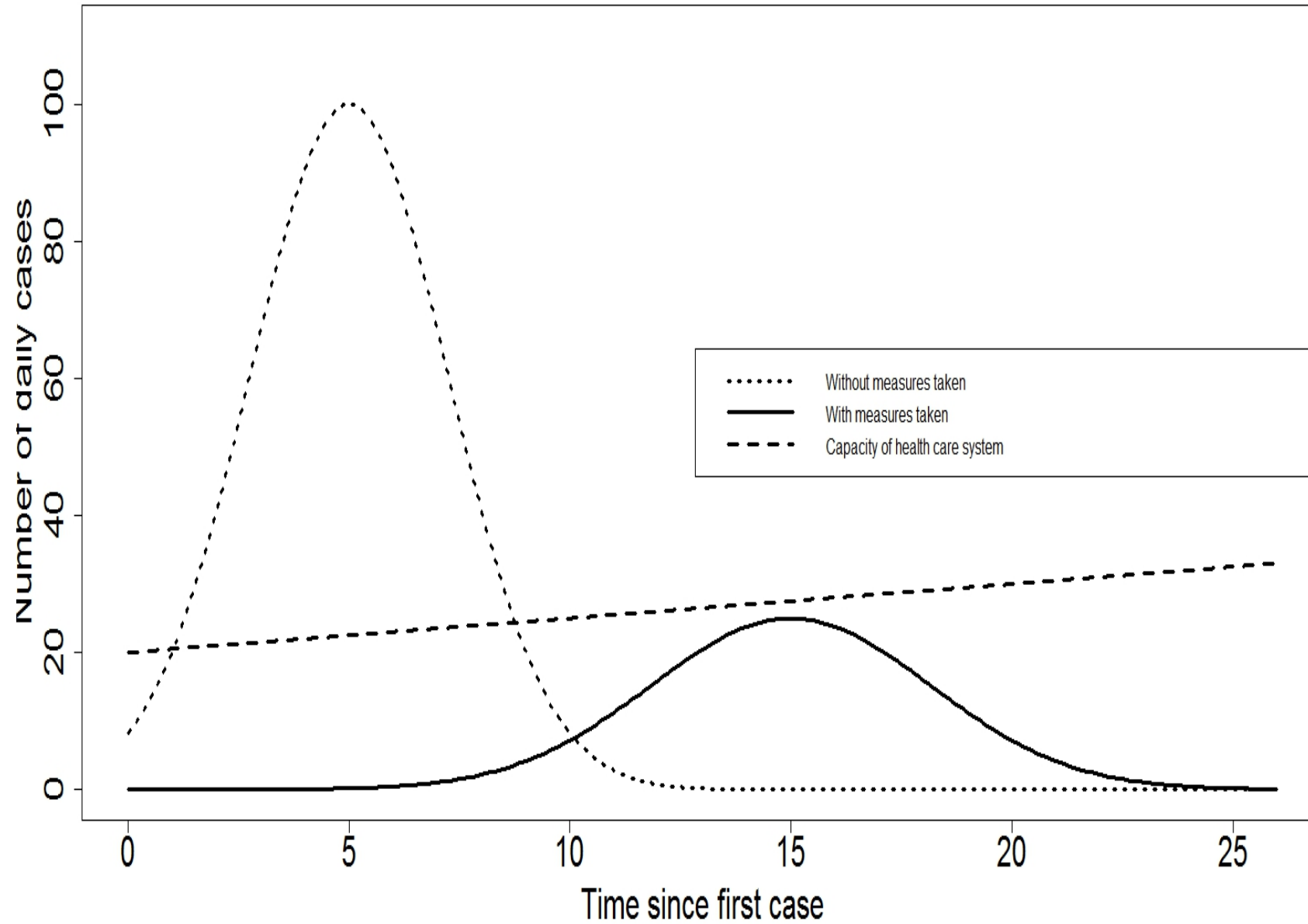
*Geert Molenberghs*

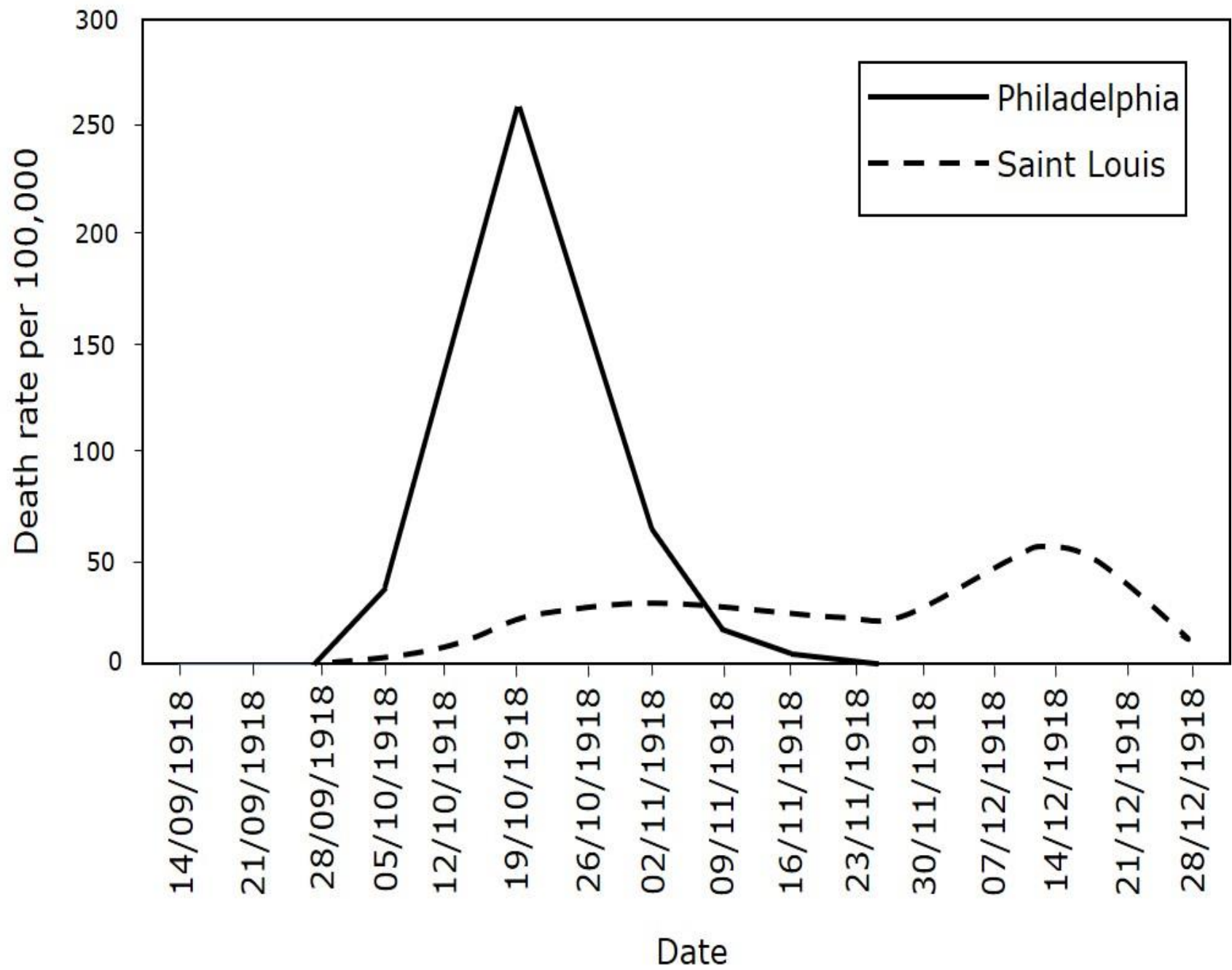
*I-BioStat (KU Leuven, UHasselt)*

Statistiek Vlaanderen

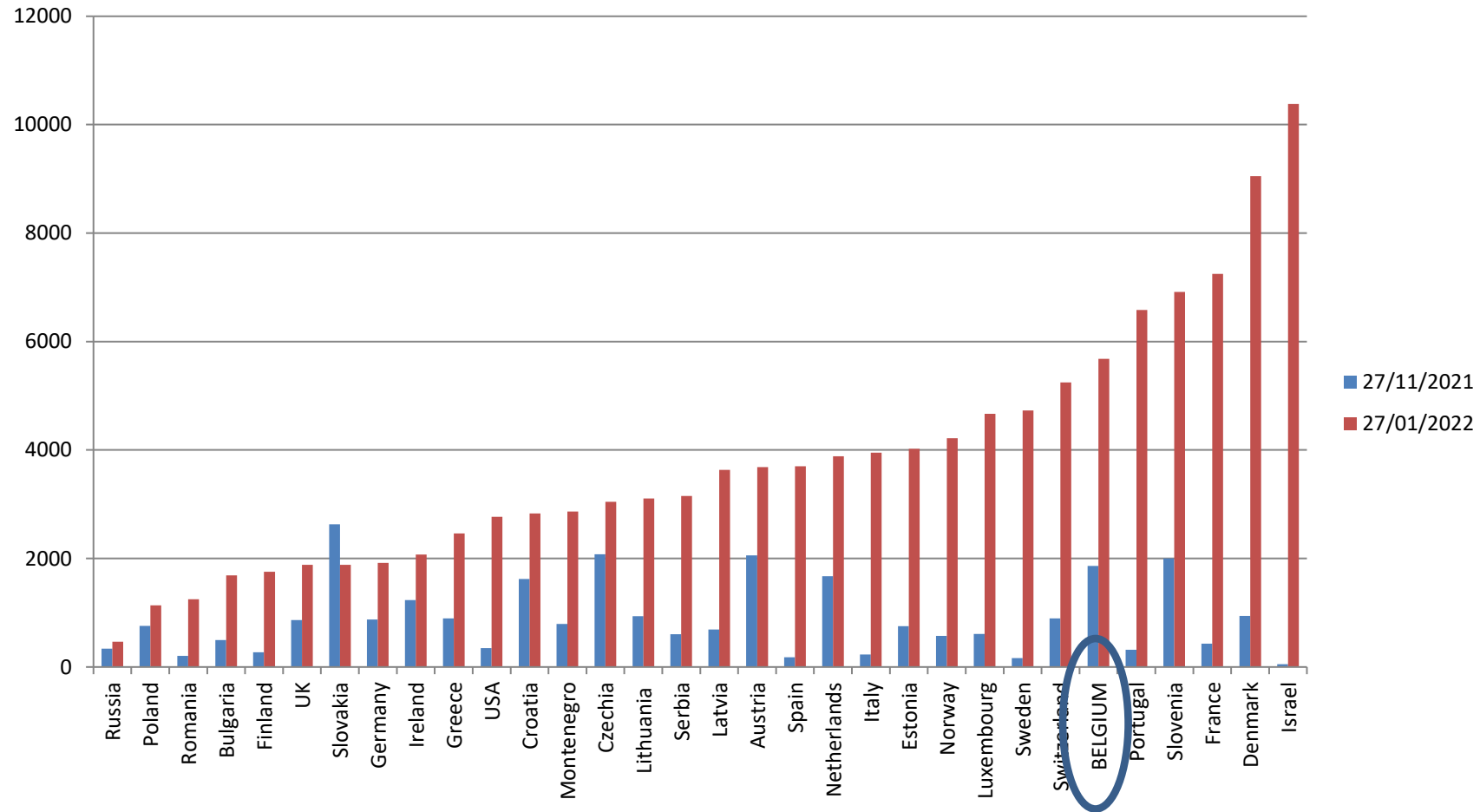
21 maart 2024

The effect of flattening the curve

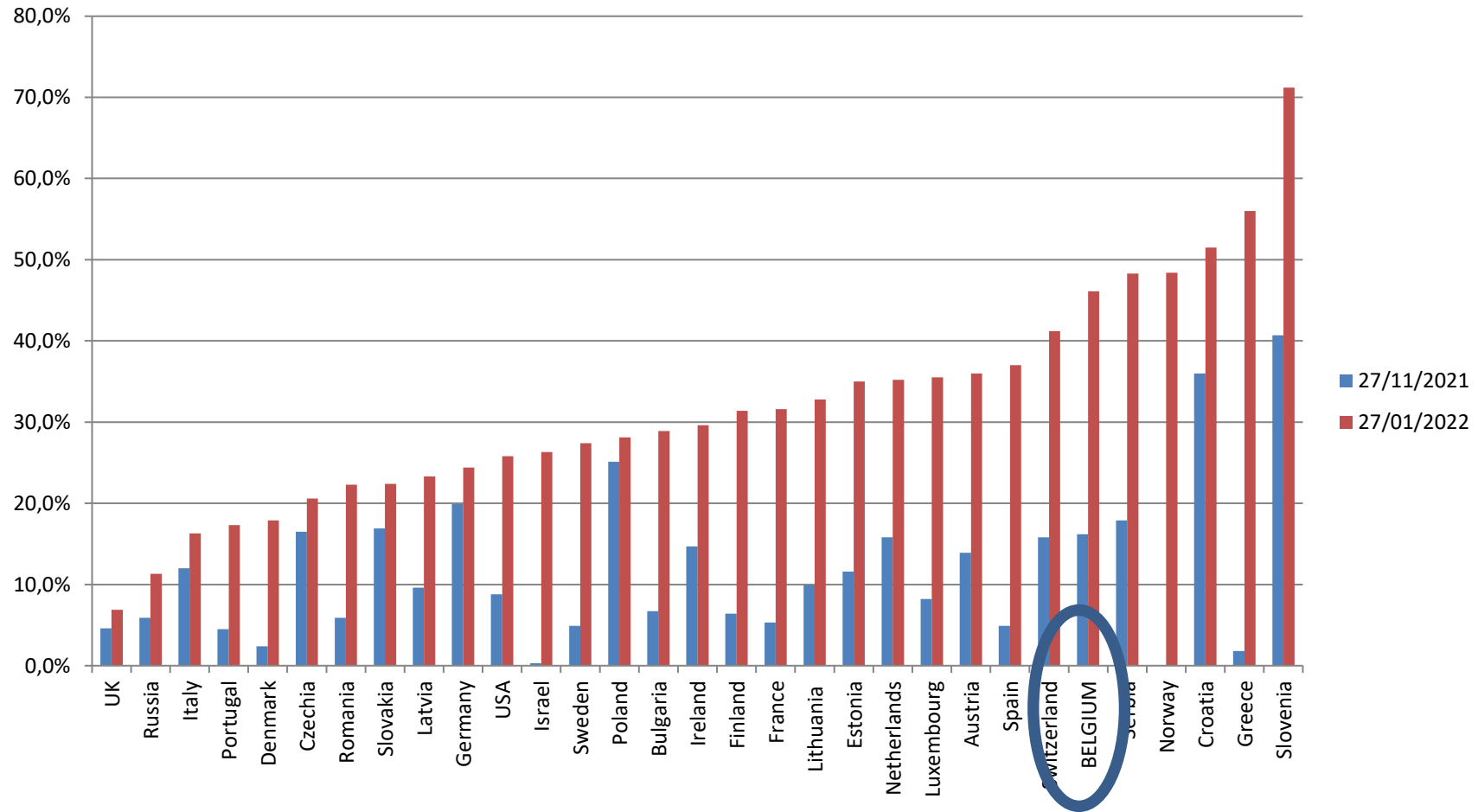




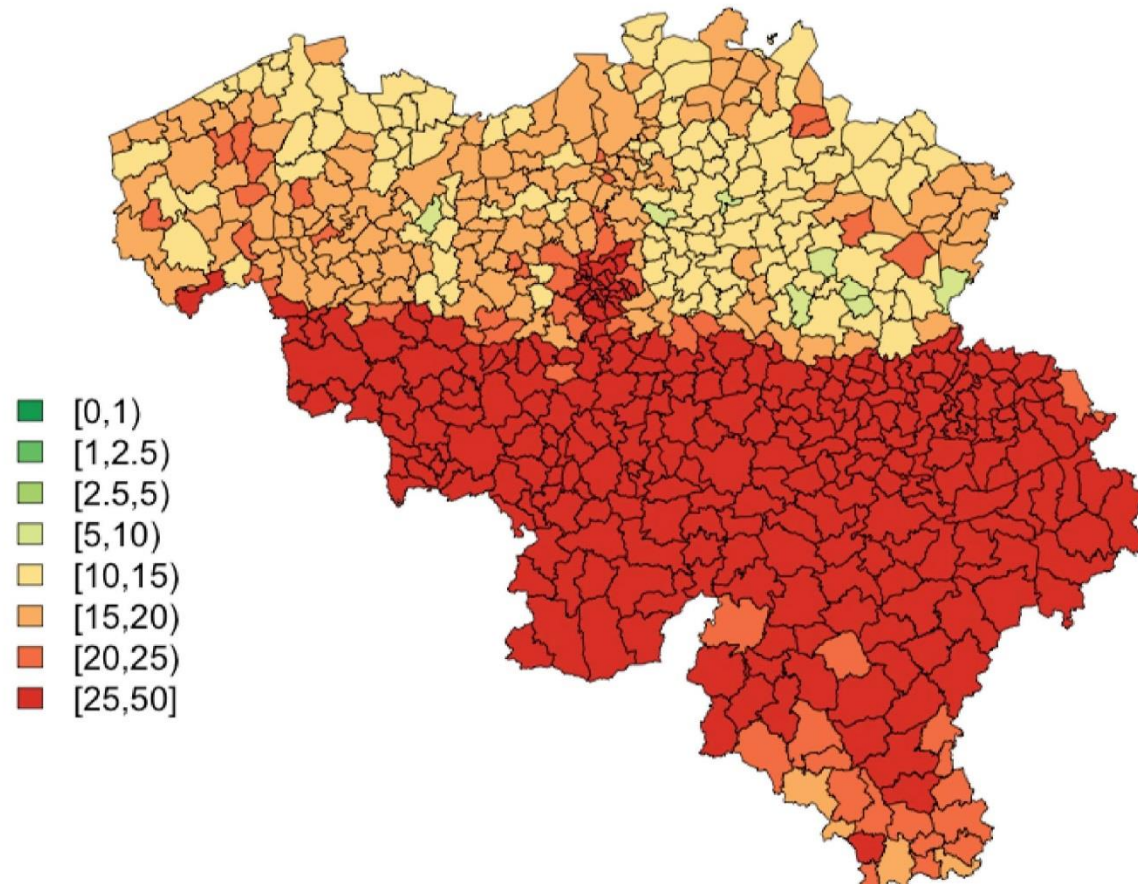
# 14-day incidence (based on OWID data)



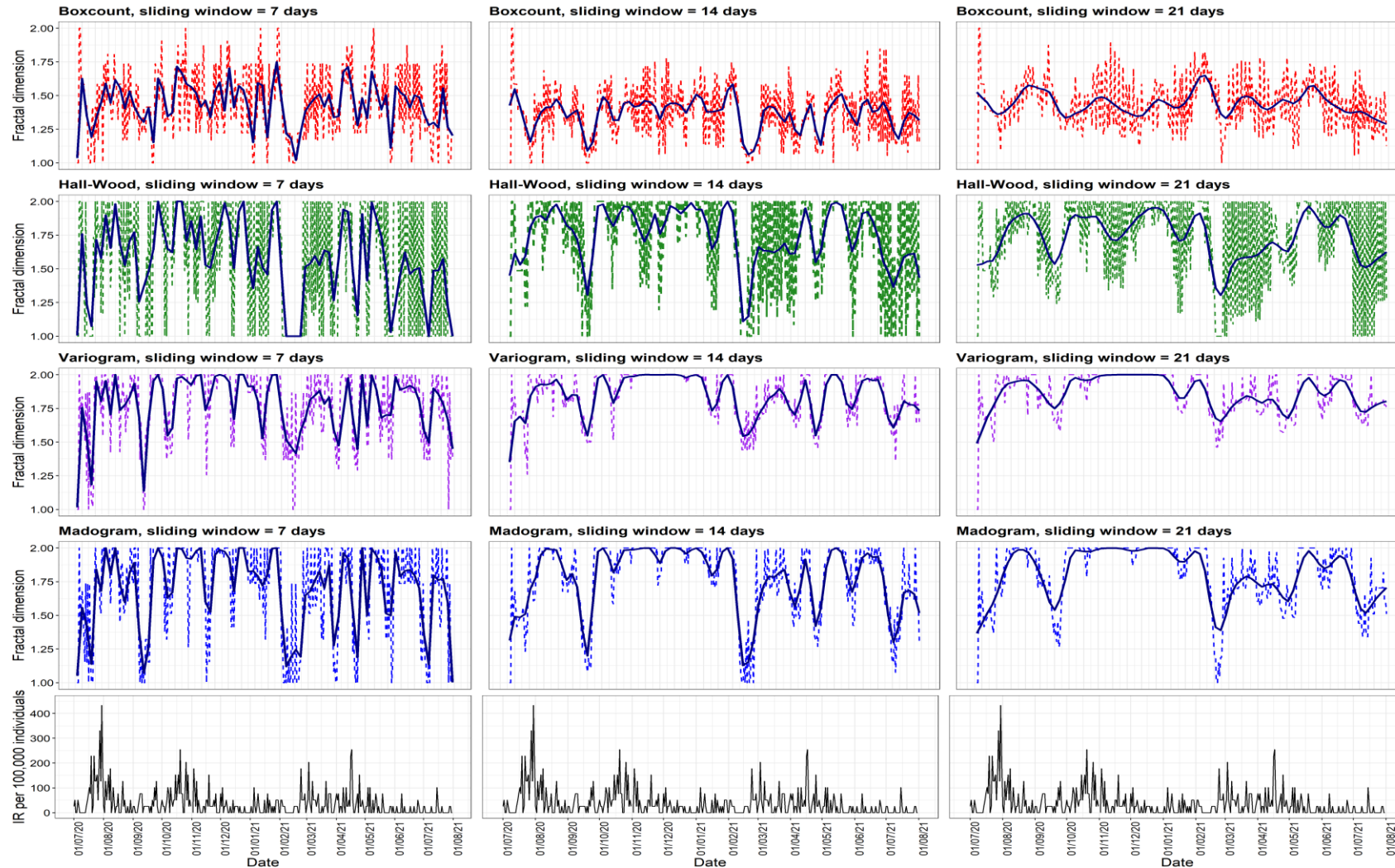
# Positivity



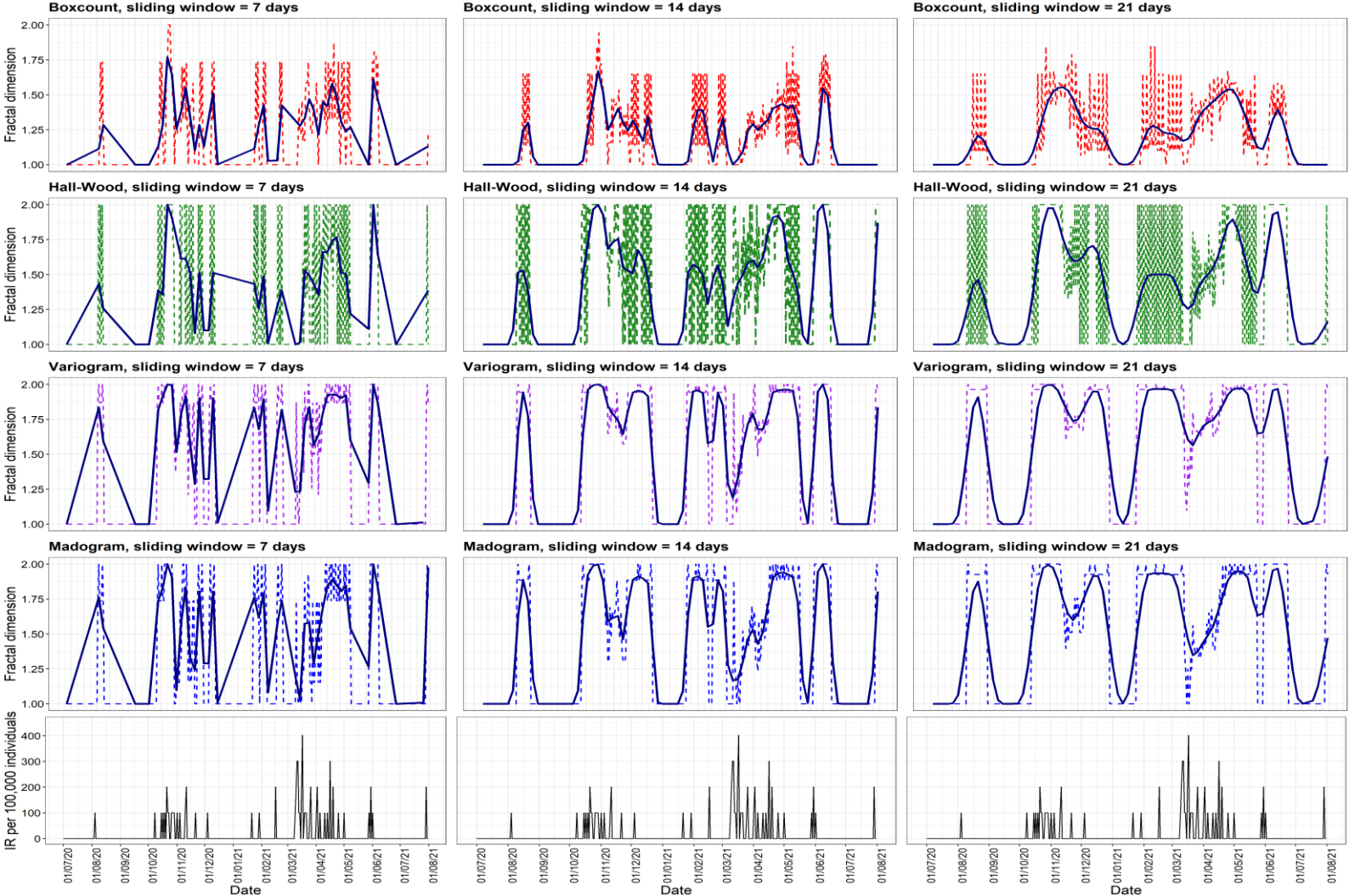
# Understand population dynamics: Positivity Map, 11 November 2020



# Vlaamse Controletoeren: Fractal dimension

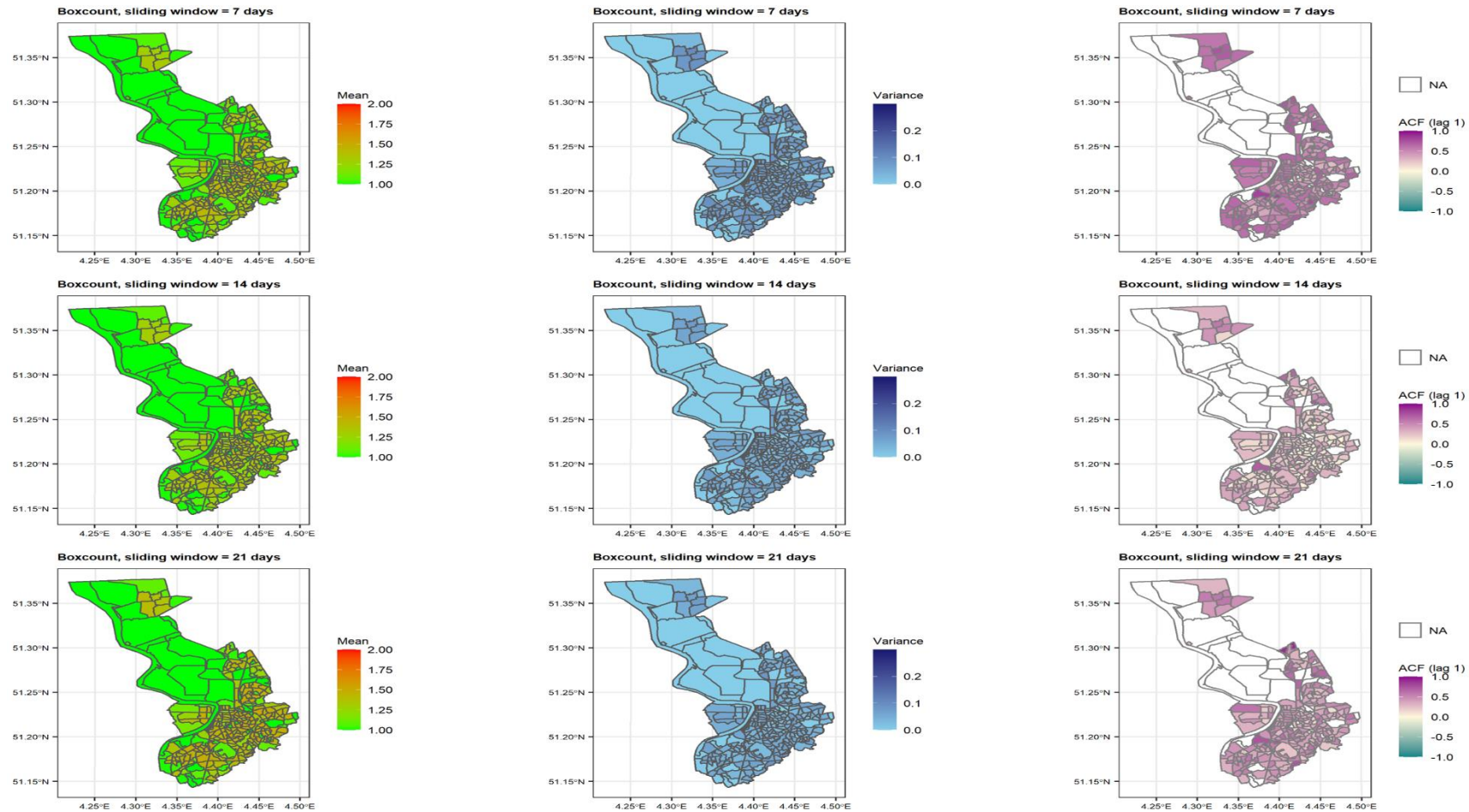


# Fractal dimension



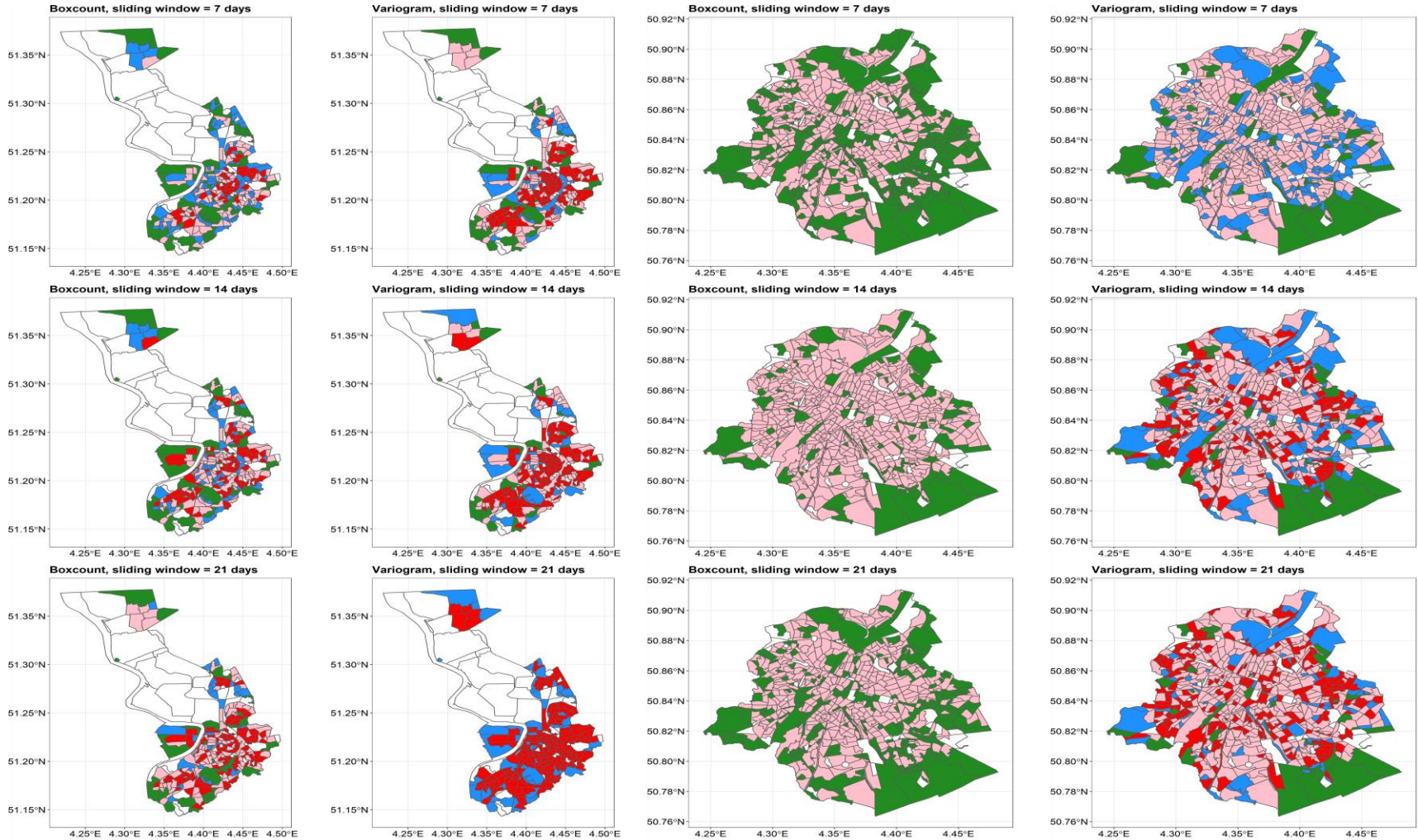


# Fractal dimension

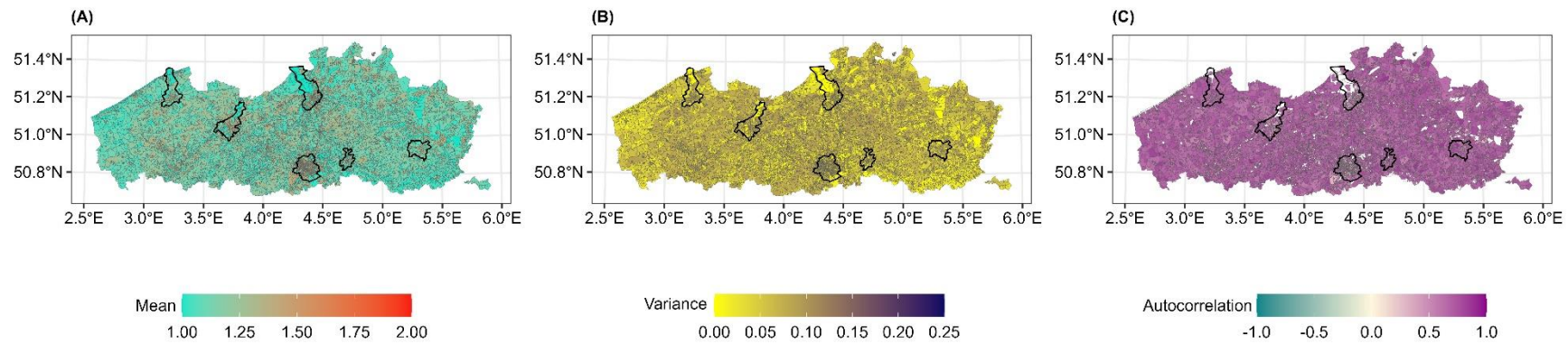


**Figure S11.** Raw values of mean, variance, and autocorrelation value (ACF) of the fractal dimension curve for each statistical sector in Antwerp municipality. The map is adapted from <https://statbel.fgov.be/en/open-data/statistical-sectors-2020> using R 4.2.1 (<https://CRAN.R-project.org/>).

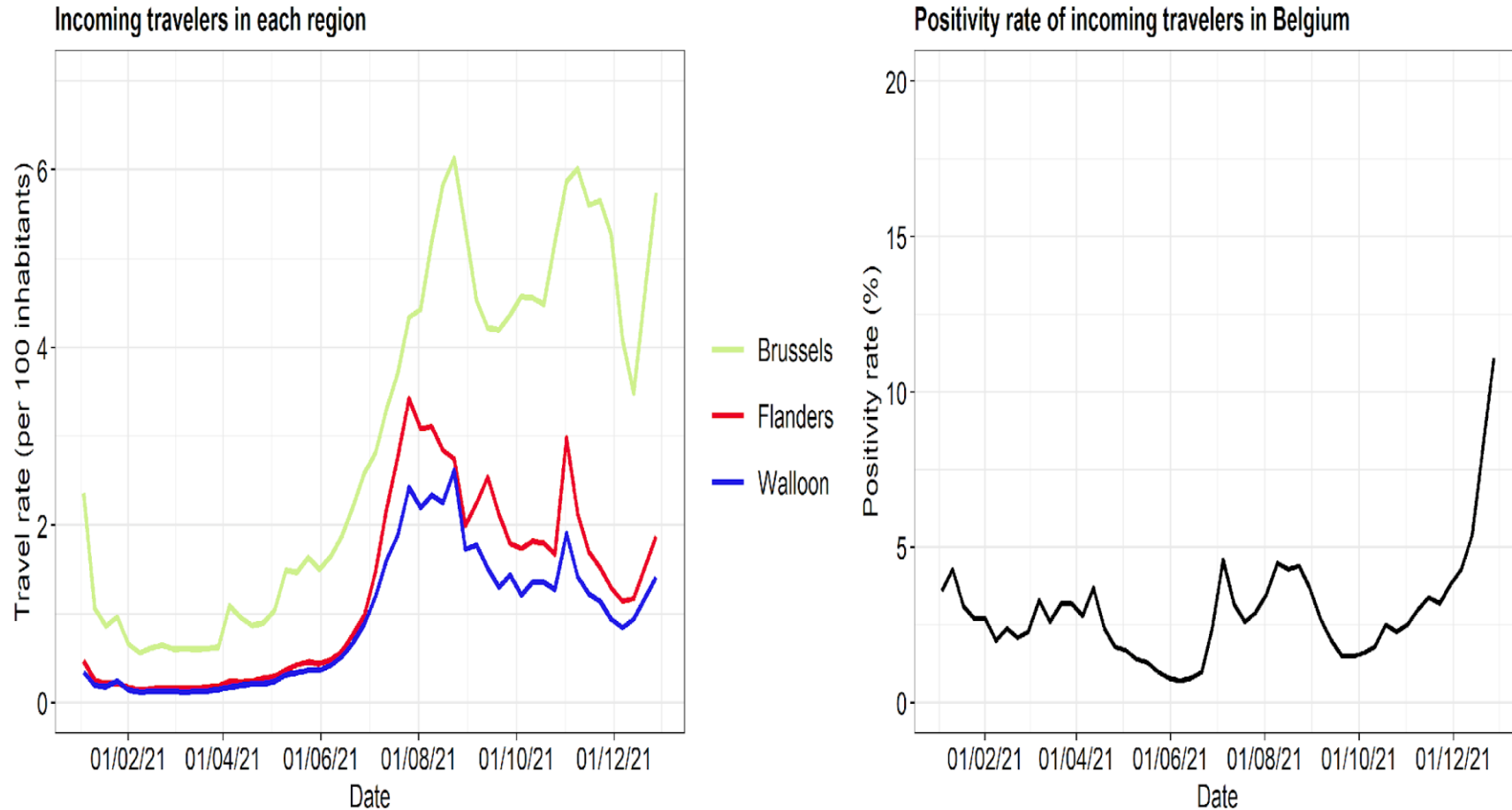
# Fractal dimension



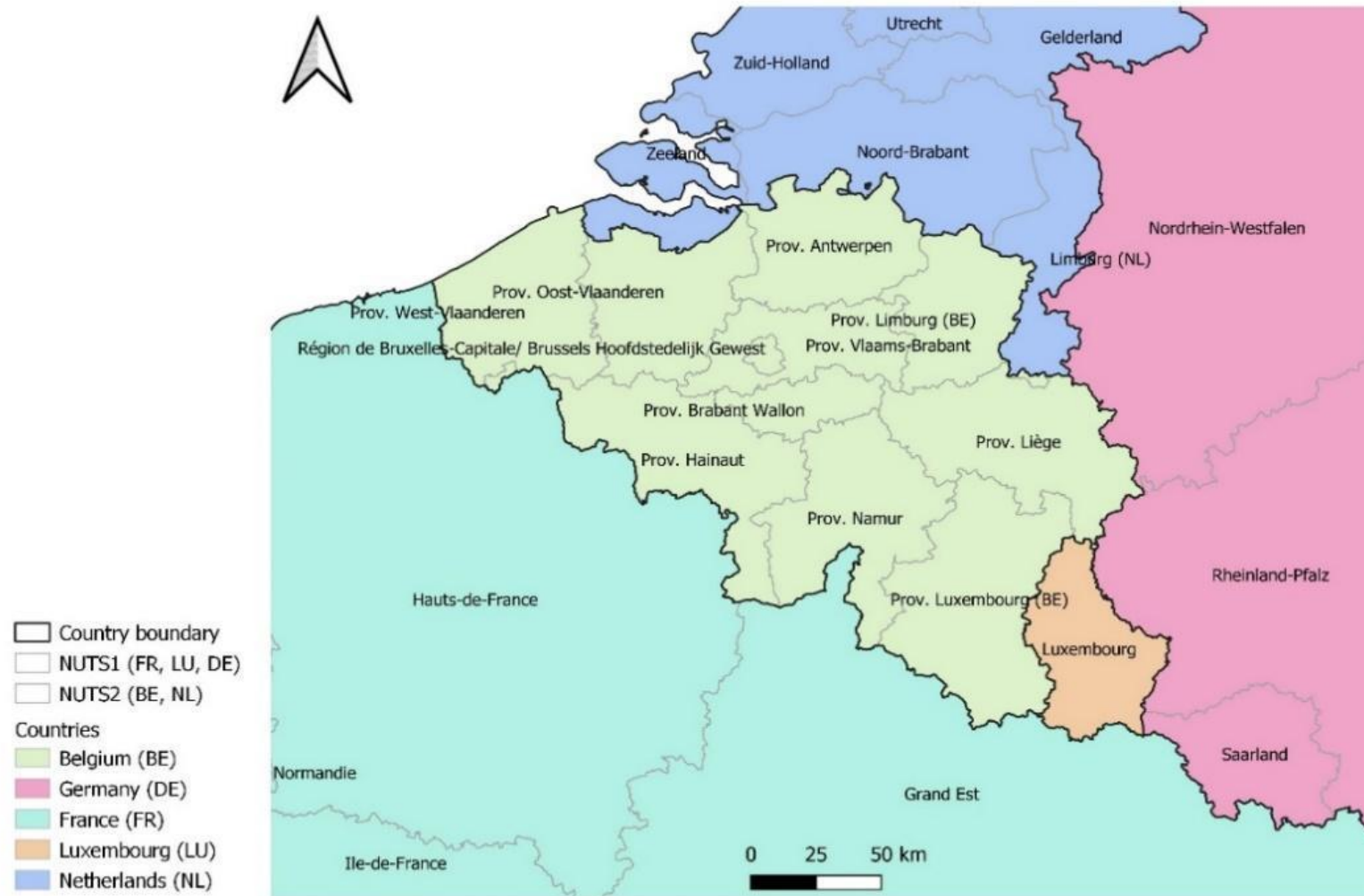
# Fractal dimension - Flanders



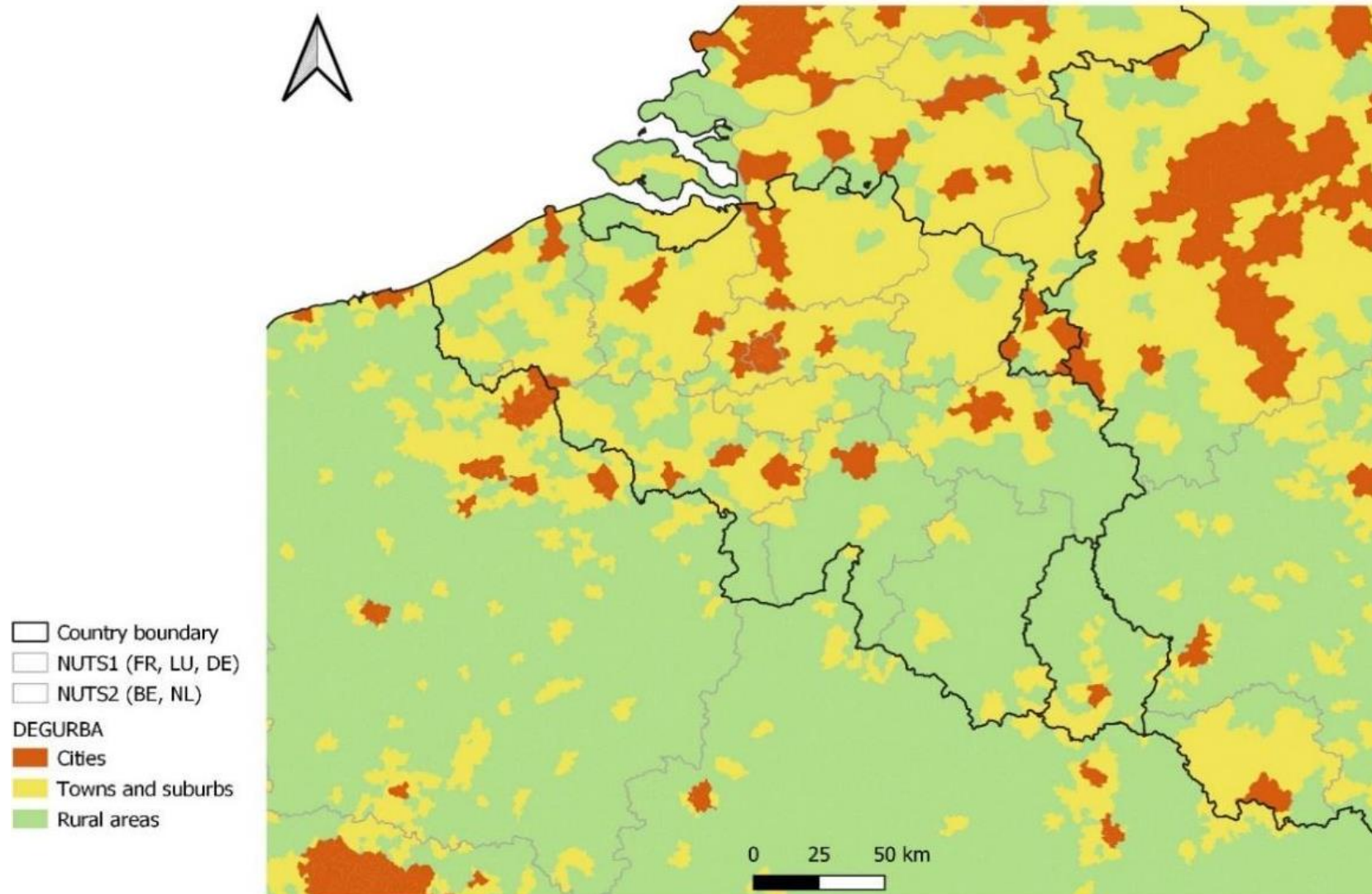
# International perspective: Incoming travelers



# Transnational perspective

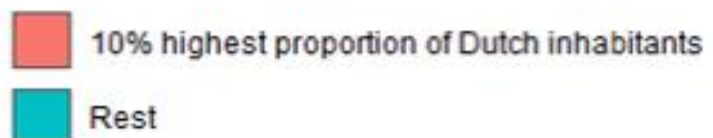
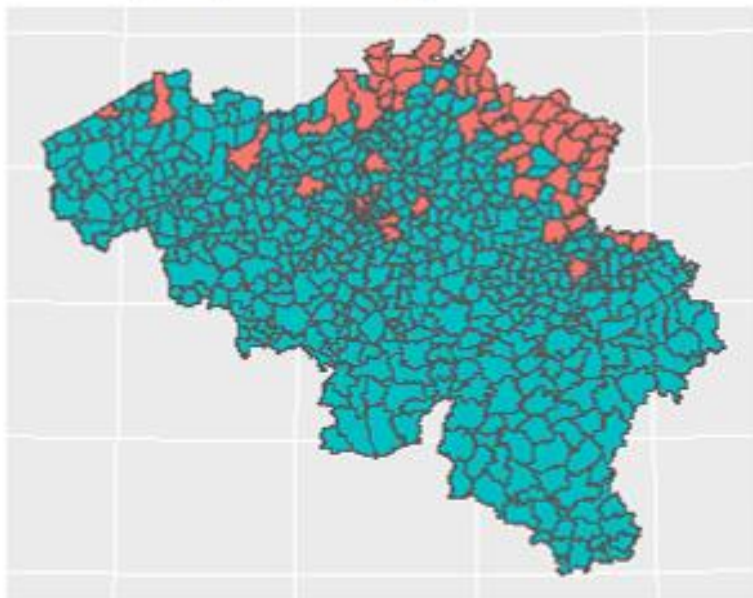


# Degree of urbanization

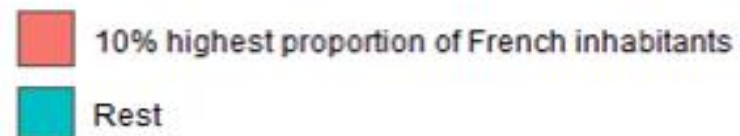
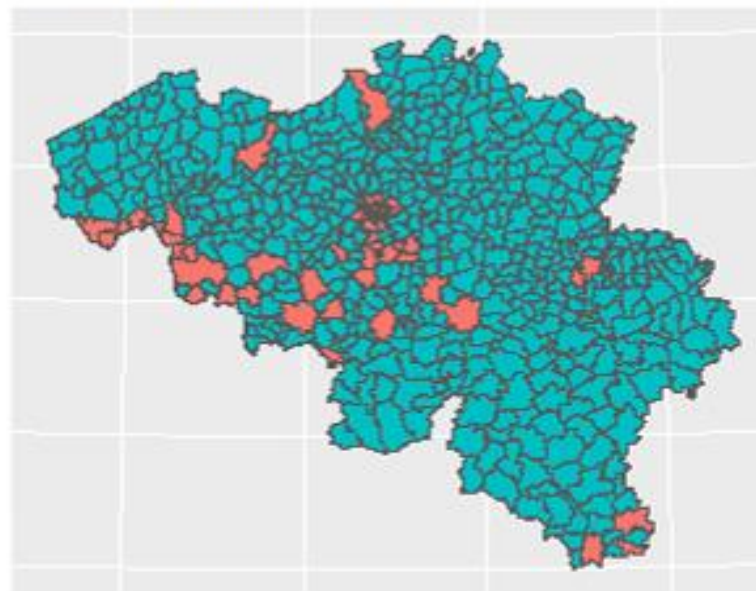


# Our neighbours

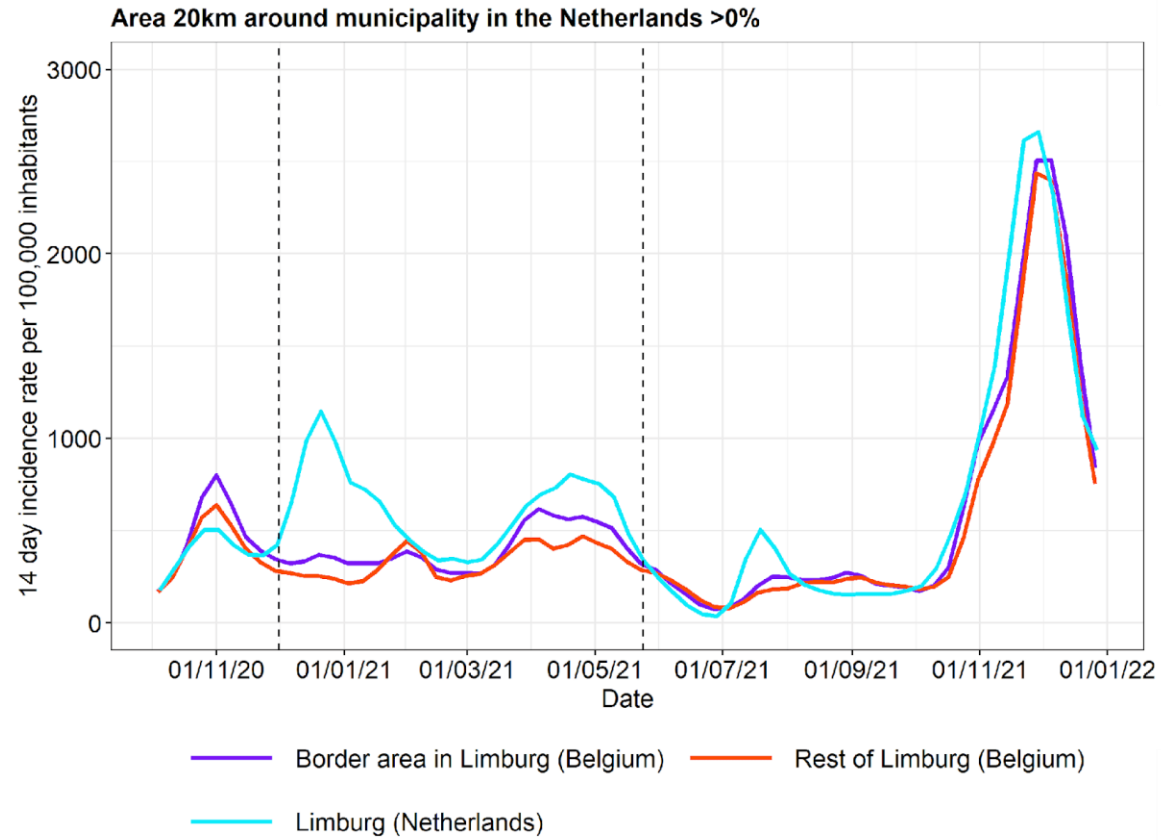
Dutch people in Belgium



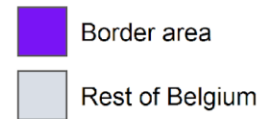
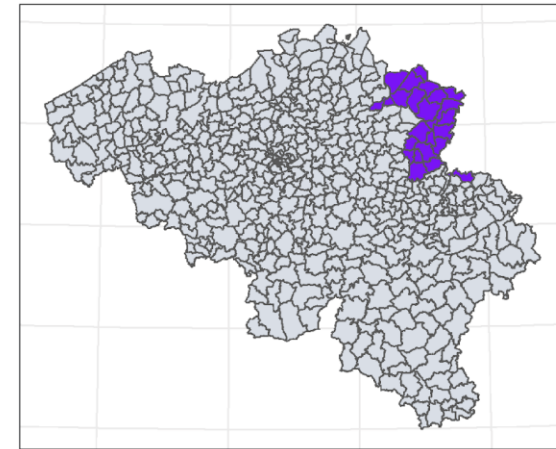
French people in Belgium



# Border area Limburg

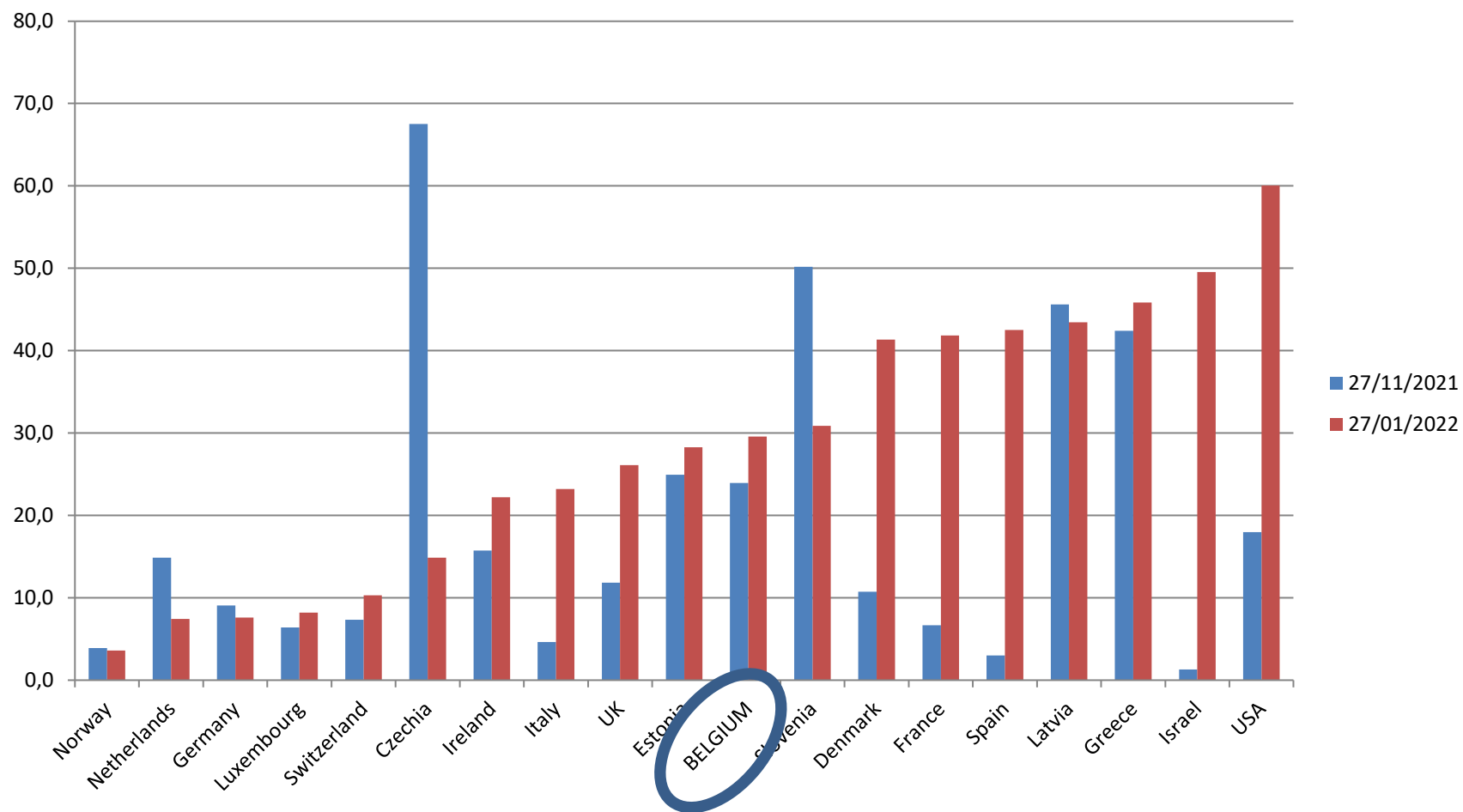


Border area

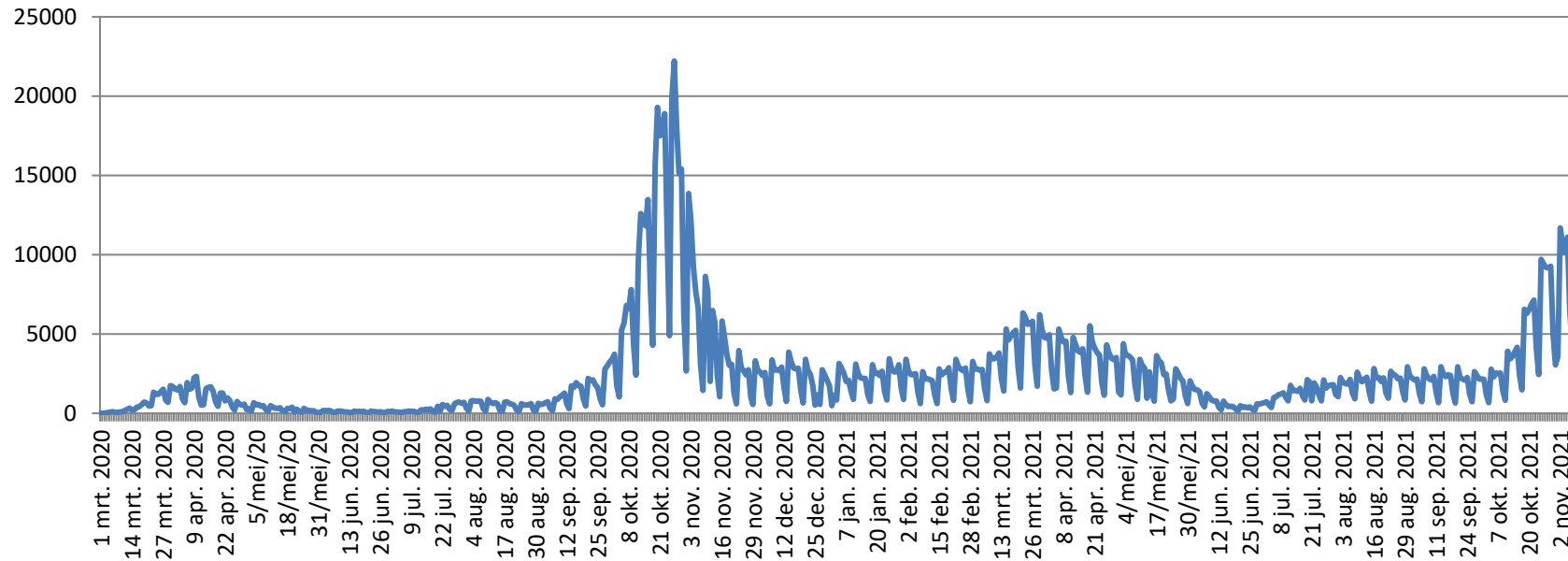




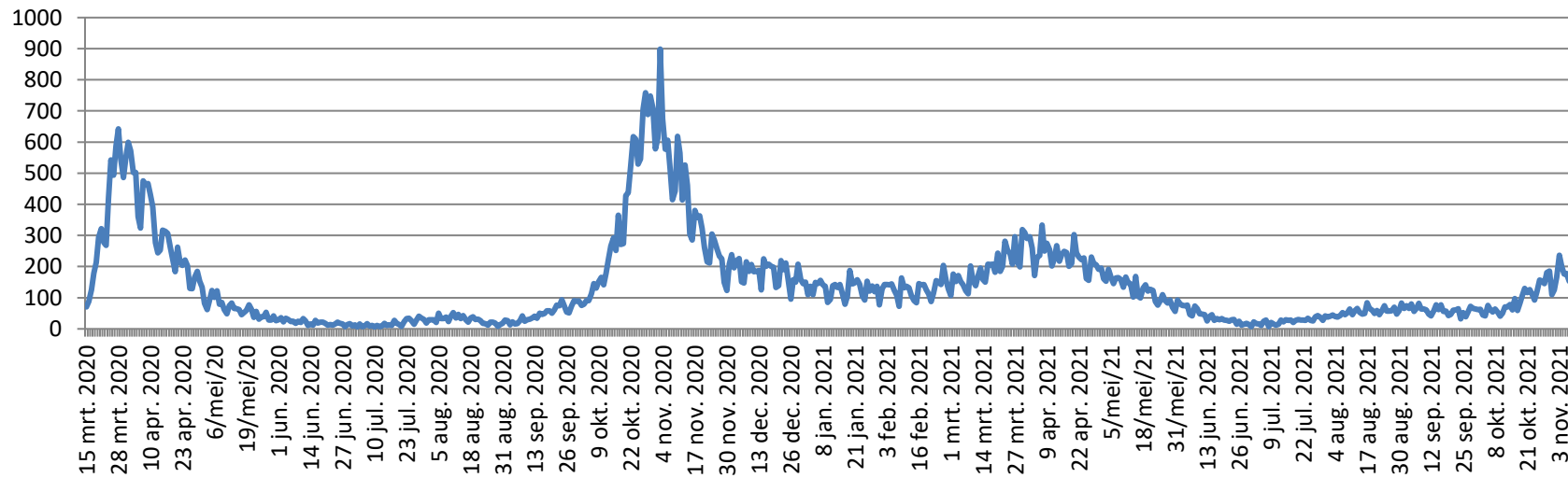
# Hospitalisations per day per million



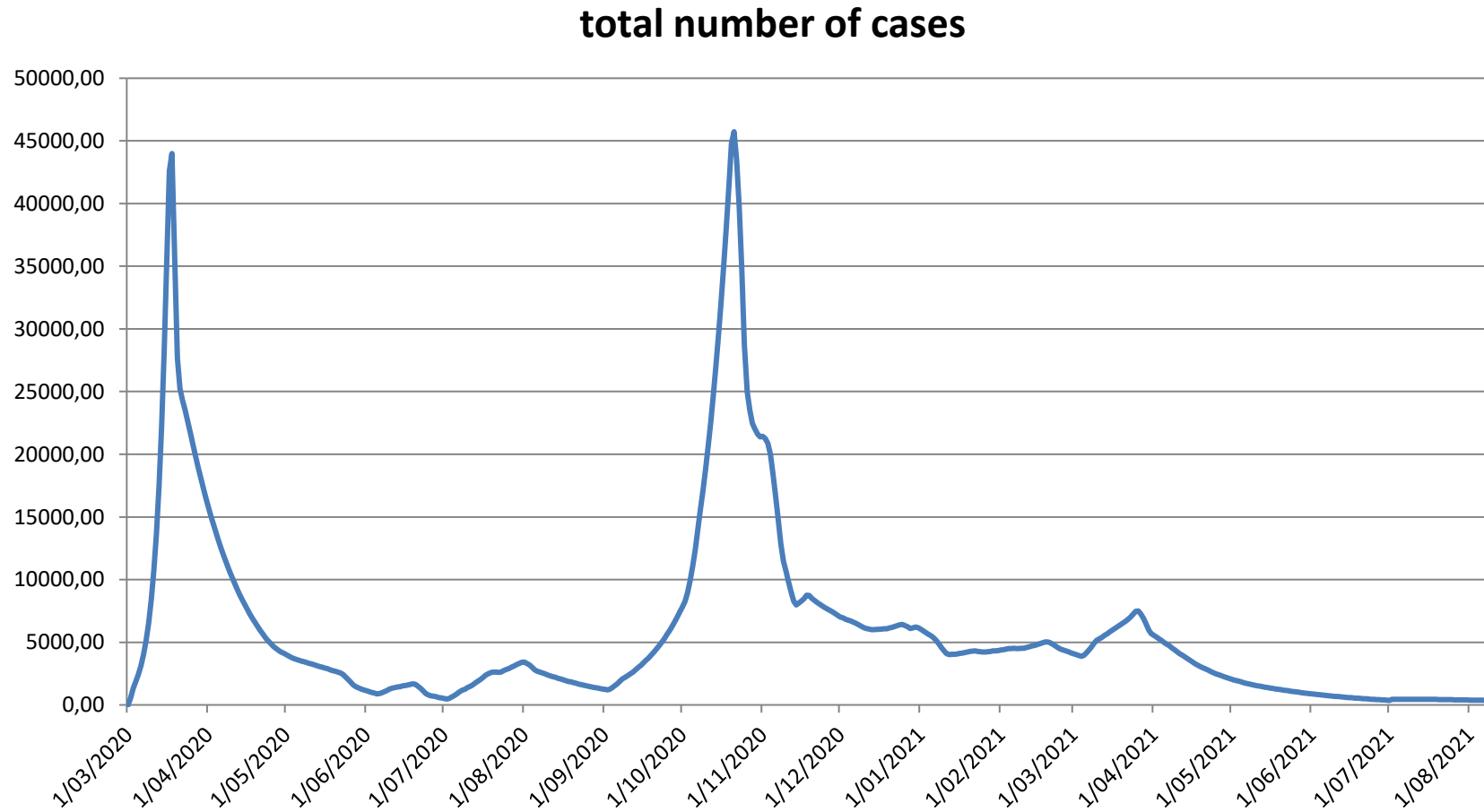
## Confirmed Cases



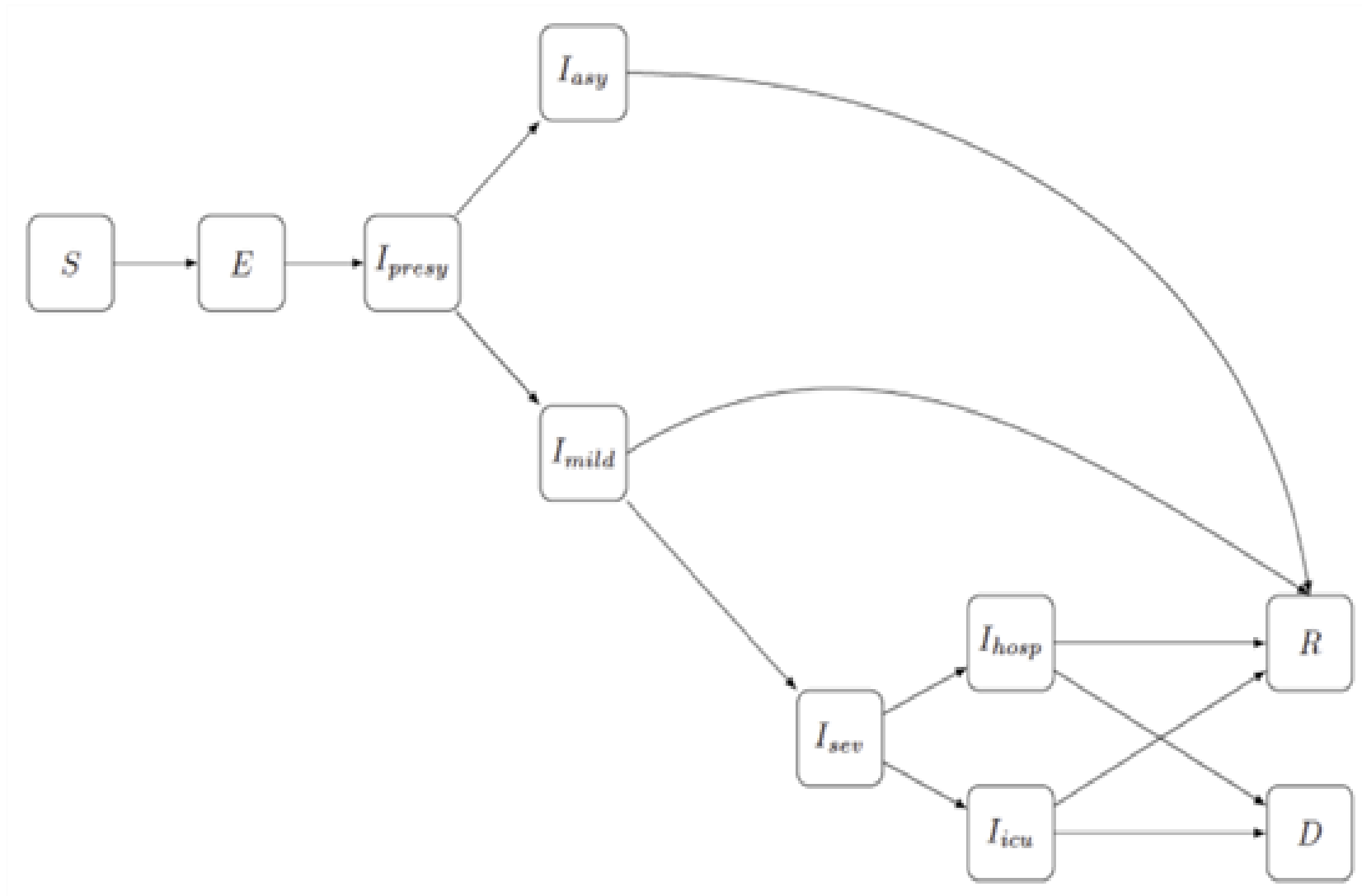
## Hospital Admissions



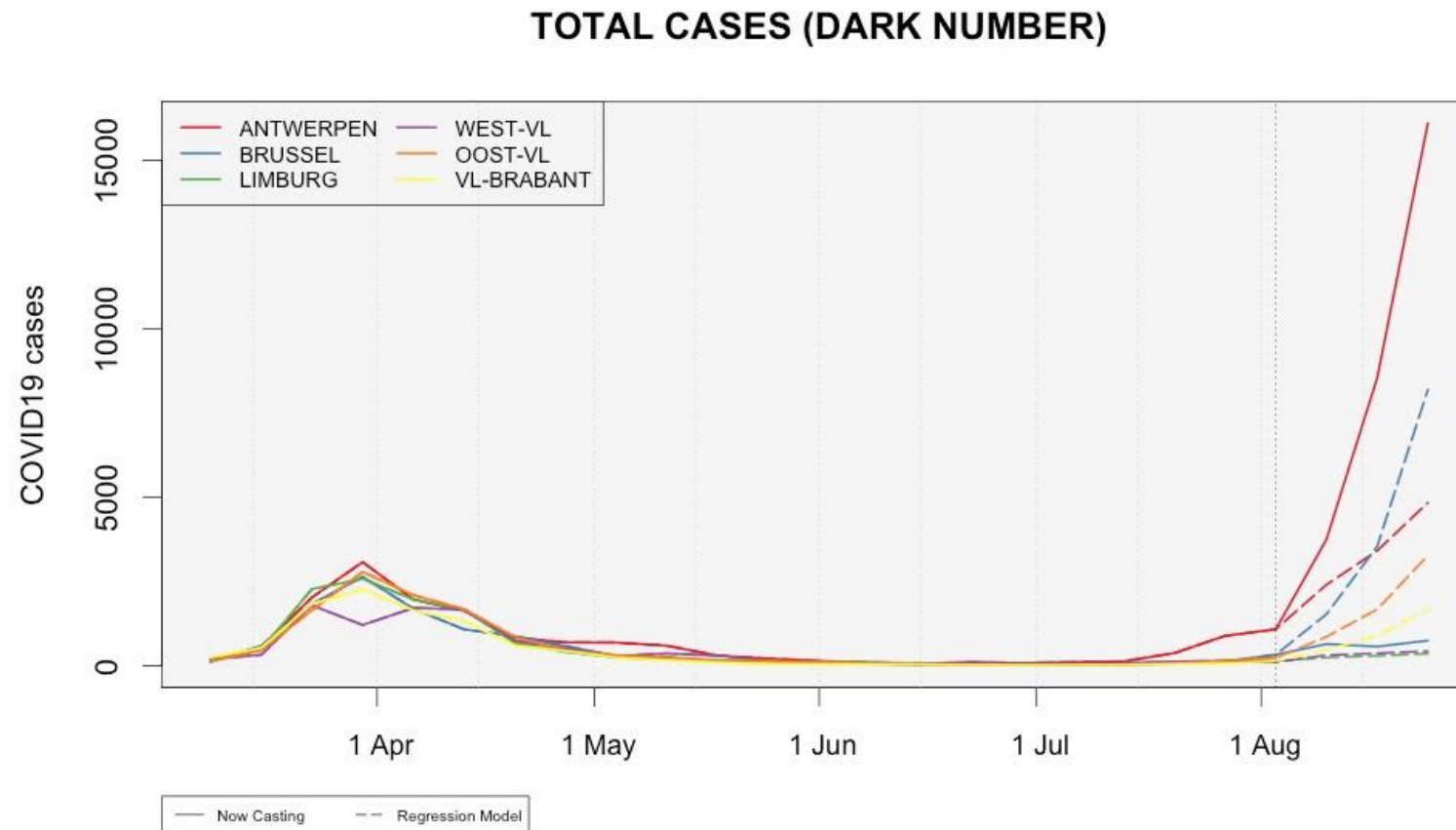
# The dark number...



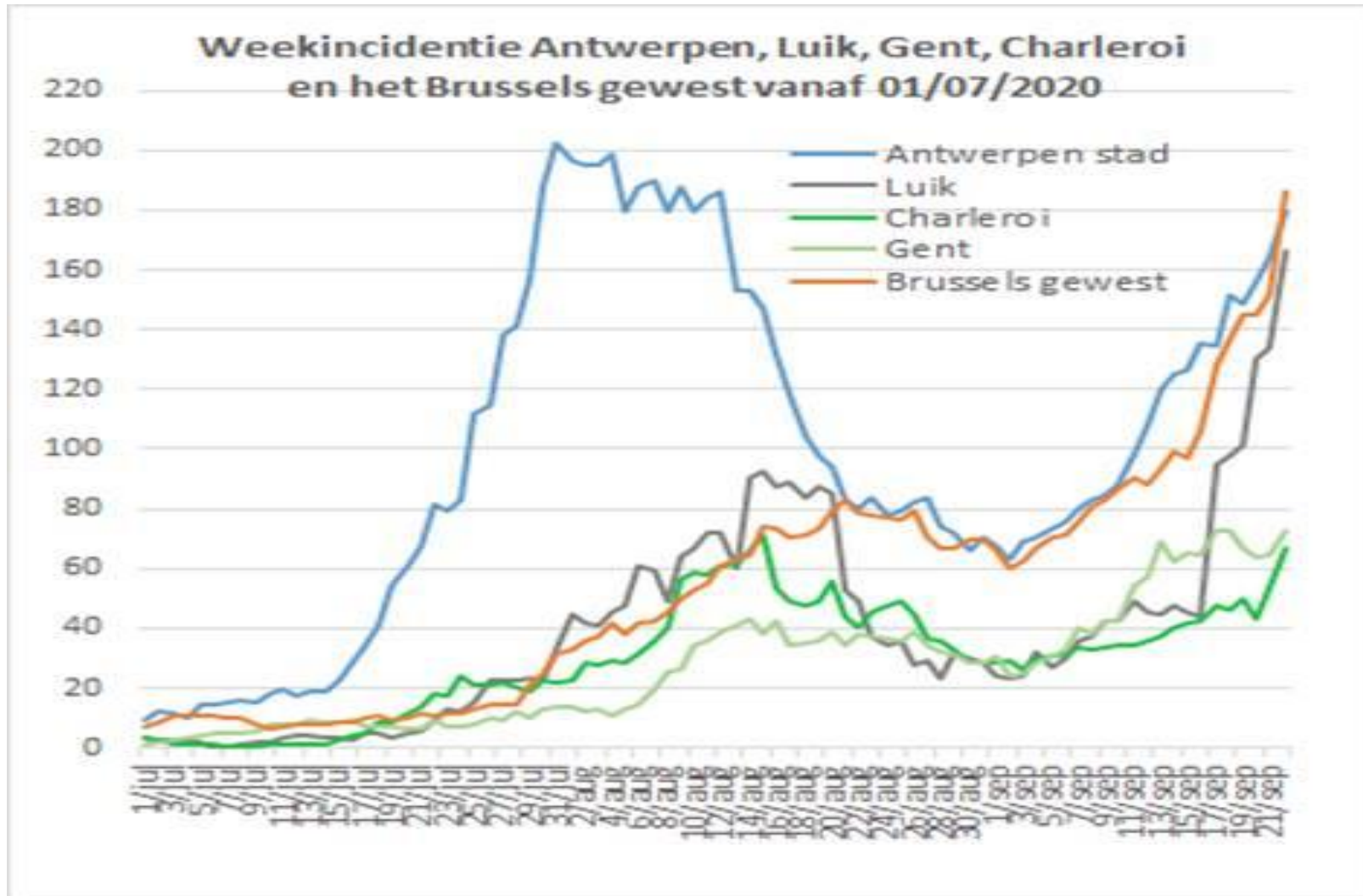
# Stochastic model (Niel Hens)



# The power of scenarios: Summer 2020 in Antwerp



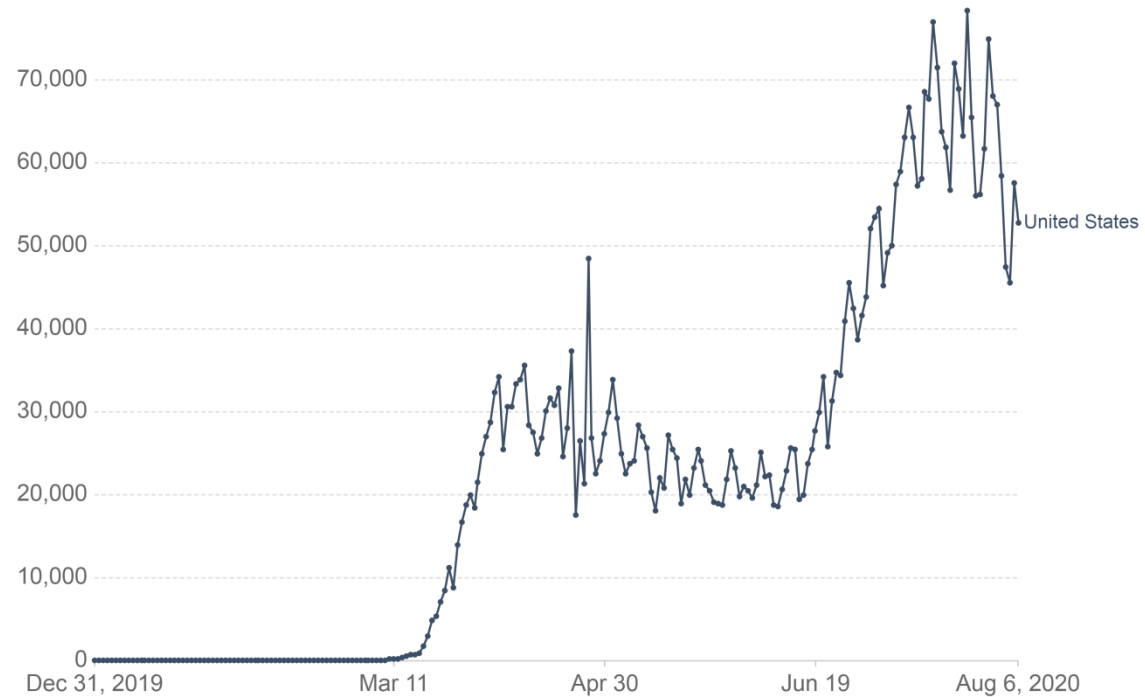
# The Antwerp Curfew



# Confirmed Cases in US

## Daily new confirmed COVID-19 cases

The number of confirmed cases is lower than the number of actual cases; the main reason for that is limited testing.



Source: European CDC – Situation Update Worldwide – Last updated 6 August, 10:04 (London time)

CC BY

# August – September 2020: Climate change

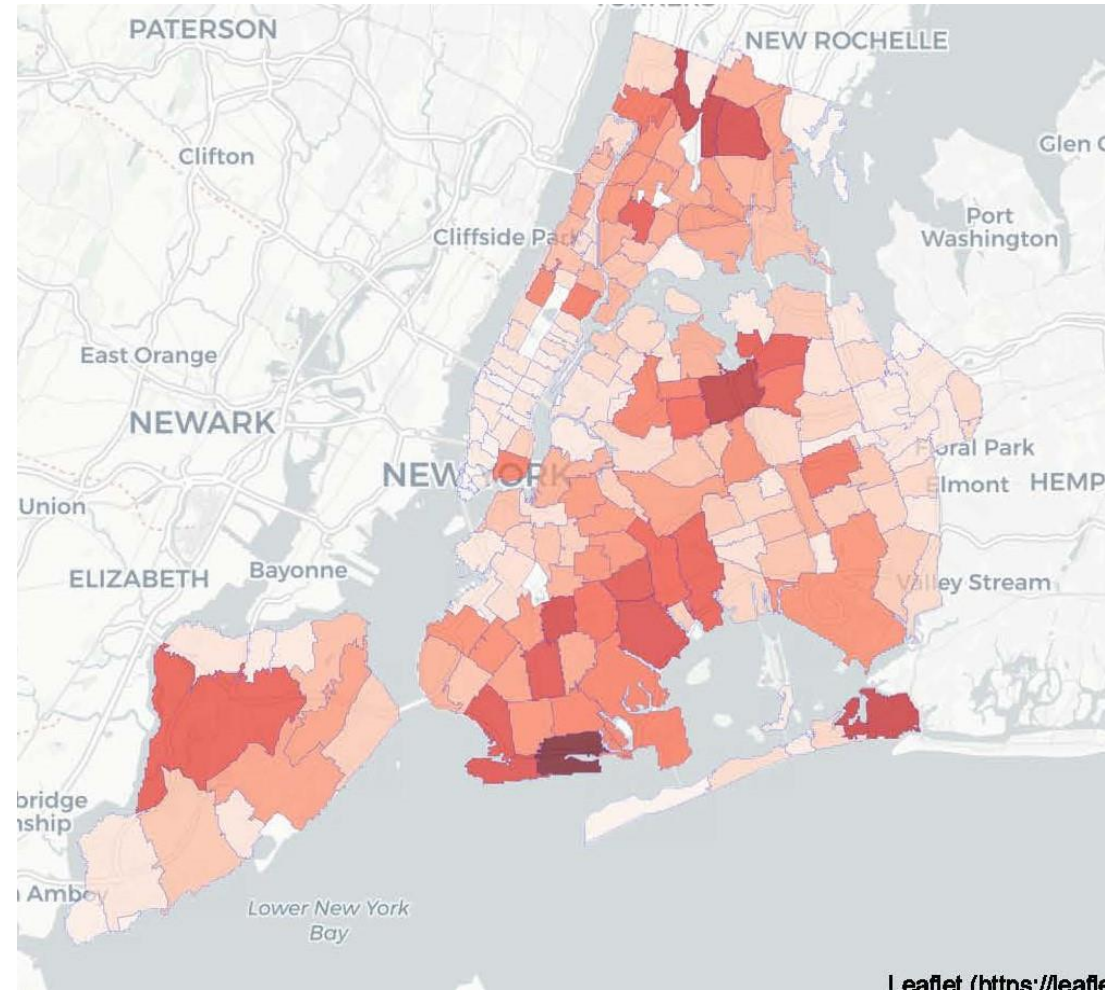
- Prevention paradox
- Media:
  - Paradigm shift: metaphor → scoop
- “Living with the virus”
- Advisory structure called into question
- Fall 2020 wave
- Remarkably under-exposed:
  - Role of Spanish variant...



# Deaths per million, July 31, 2020

Country	DPM	Country	DPM
New York City	2471	Luxembourg	182
New York State	1653	Germany	109
Spain	608 → 1013	Denmark	106
Italy	581 → 867	Argentina	73
United Kingdom	678 → 848	Finland	59
Belgium	849 → 772	Norway	47
Sweden	568 → 693	Greece	19
Netherlands	359 → 579	Uruguay	10
France	463 → 477	Cuba	8
United States	459	Australia	7
Brazil	429	New Zealand	5
Ireland	357	Madagascar	4

# Mortality distribution NYC

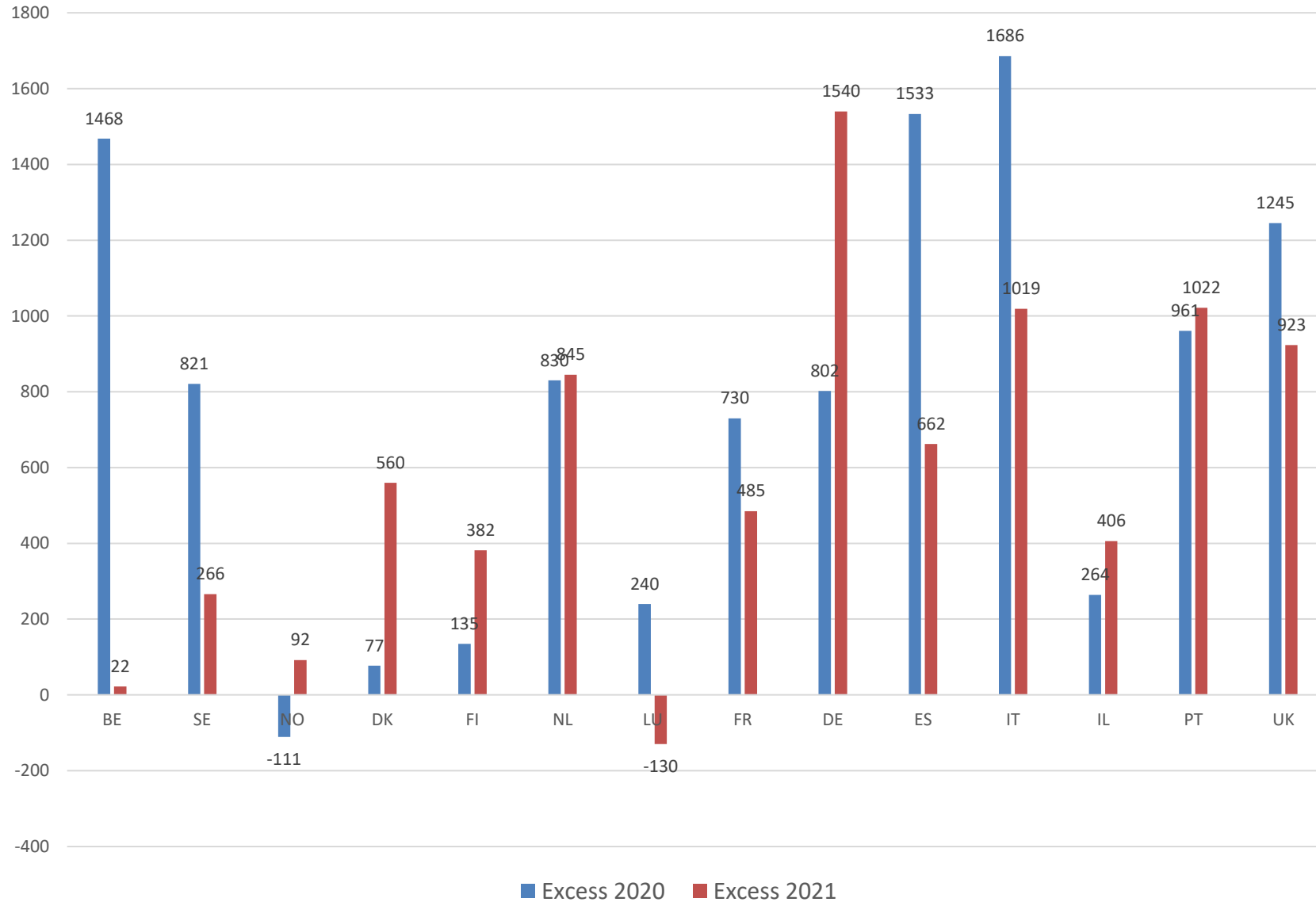


# Mortality in 2020 - 2022

Year	Registered COVID deaths	Excess mortality (relative to 2017 – 2019)
2020	19,837	17,177
2021	8564	2616
2022	4981	6811

- Life expectancy decreases by 10 mts in 2020
- Excess mortality in 2020: older age groups
- Excess mortality in 2021: 65 – 74 years
- Excess mortality in 2022: 85+ years

## Excess mortality (deaths per million)



# Mortality risk higher for men

Age	Number of deaths			Percentage women versus men in DPM		
	First half 2020	Second half 2020	2020	First half 2020	Second half 2020	2020
0-24	1	7	8	(#DIV/0!)	(626)	(731)
25-44	42	47	89	83	68	75
45-64	537	611	1148	50	50	50
65-74	1119	1312	2431	51	48	50
75-84	2853	2894	5747	66	58	62
85+	5146	5200	10346	80	67	73
<b>TOTAL</b>	9698	10071	19769	<b>109</b>	<b>93</b>	<b>101</b>

# Another counterintuitive result

- Assume that 90% of population is vaccinated
- Assume that risk of ICU admission is 10 times higher for an unvaccinated person
- Assume that, overall, 0.8% of infections is admitted to ICU
- Then...

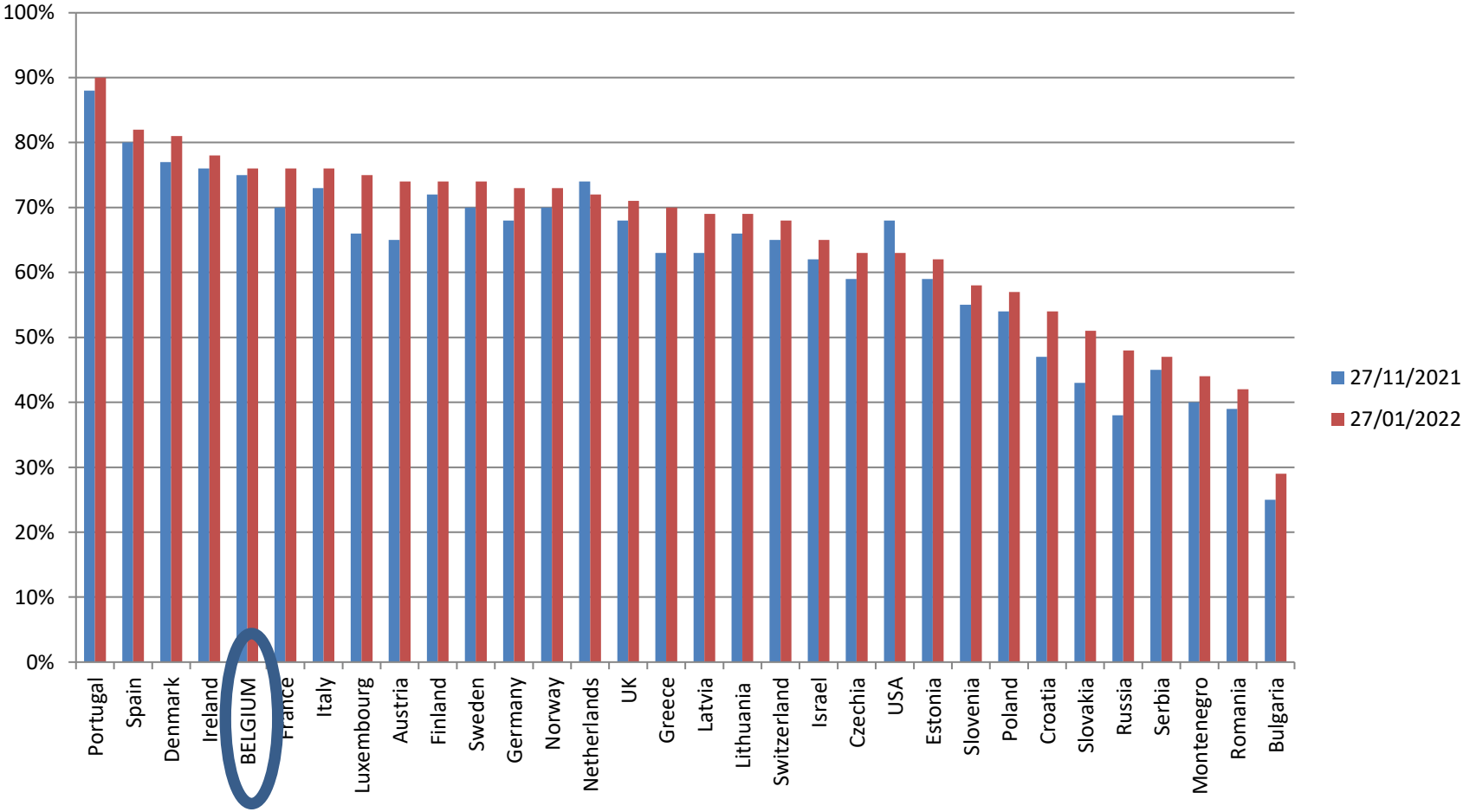
*57% of ICU patients is vaccinated*

# Explaining the strength of 'the enemy'

## The power of delta and omicron

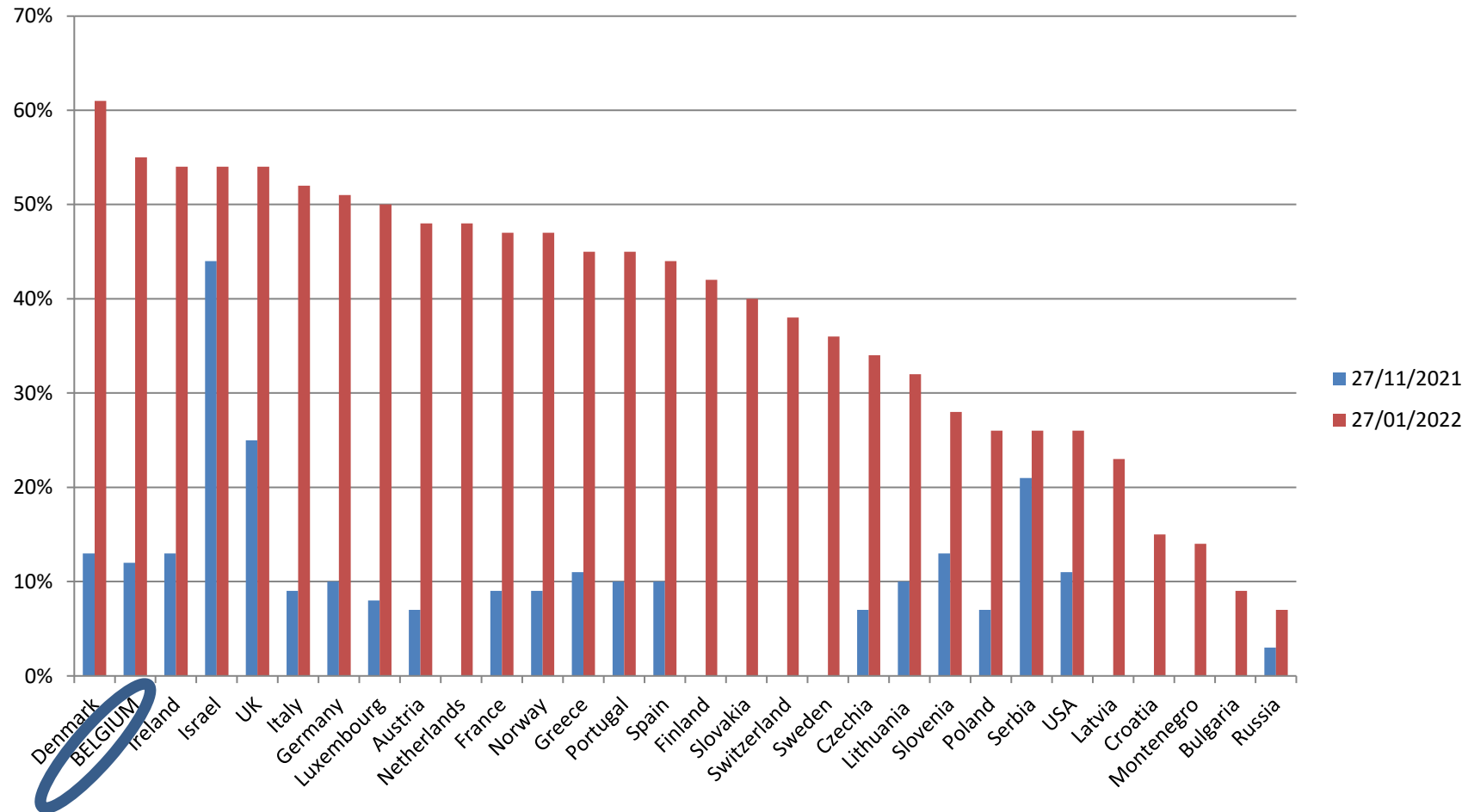
Infection (start with 4 infected people)	R0	After 10 generations
Seasonal influenza	1.5	684
SARS-CoV-2 (Wuhan)	3.0	354.292
SARS-CoV-2 (Alpha)	5.0	48.828.124 (~50 million)
SARS-CoV-2 (Delta)	8.0	4.908.534.052 (~5 billion)
SARS-CoV-2 (Omicron)	2.0 (1/3 interval)	8.589.934.588 (~ 8.5 billion)

# Full basic vaccination





# Booster vaccination



# Do vaccines work?

- *“They work or they do not work!”*
- A number of endpoints:
  - Transmission
  - Infection (including asymptomatic)
  - Symptomatic COVID
  - Severe COVID
  - Hospitalisation
  - ICU / mechanical ventilation
  - Mortality

# Vaccines

- *Efficacy – effectiveness*
  - Surrogate / *Correlates-of-Protection*:
  - Humoral immunity
  - Cellular immunity
  - ...
- A moving target ...

**W.T.** → **α** → β → γ → **δ** → **o (BA.1 / 2 / 4&5)** → ...

# Vaccination in the USA (NYT)

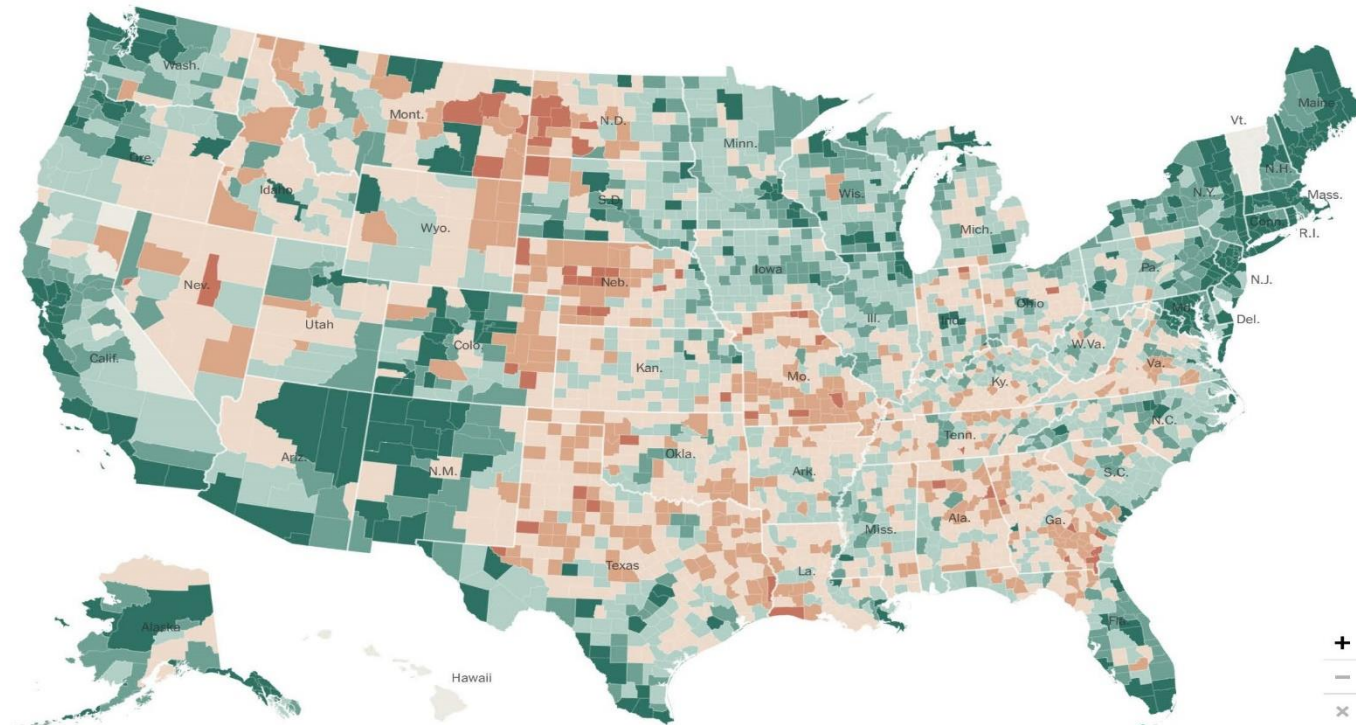
## See How Vaccinations Are Going in Your County and State

Updated Oct. 20, 2022

Fully vaccinated Fully vaccinated, 65+ Boosted

Pct. of residents who are fully vaccinated

30 40 50 60 70% No data

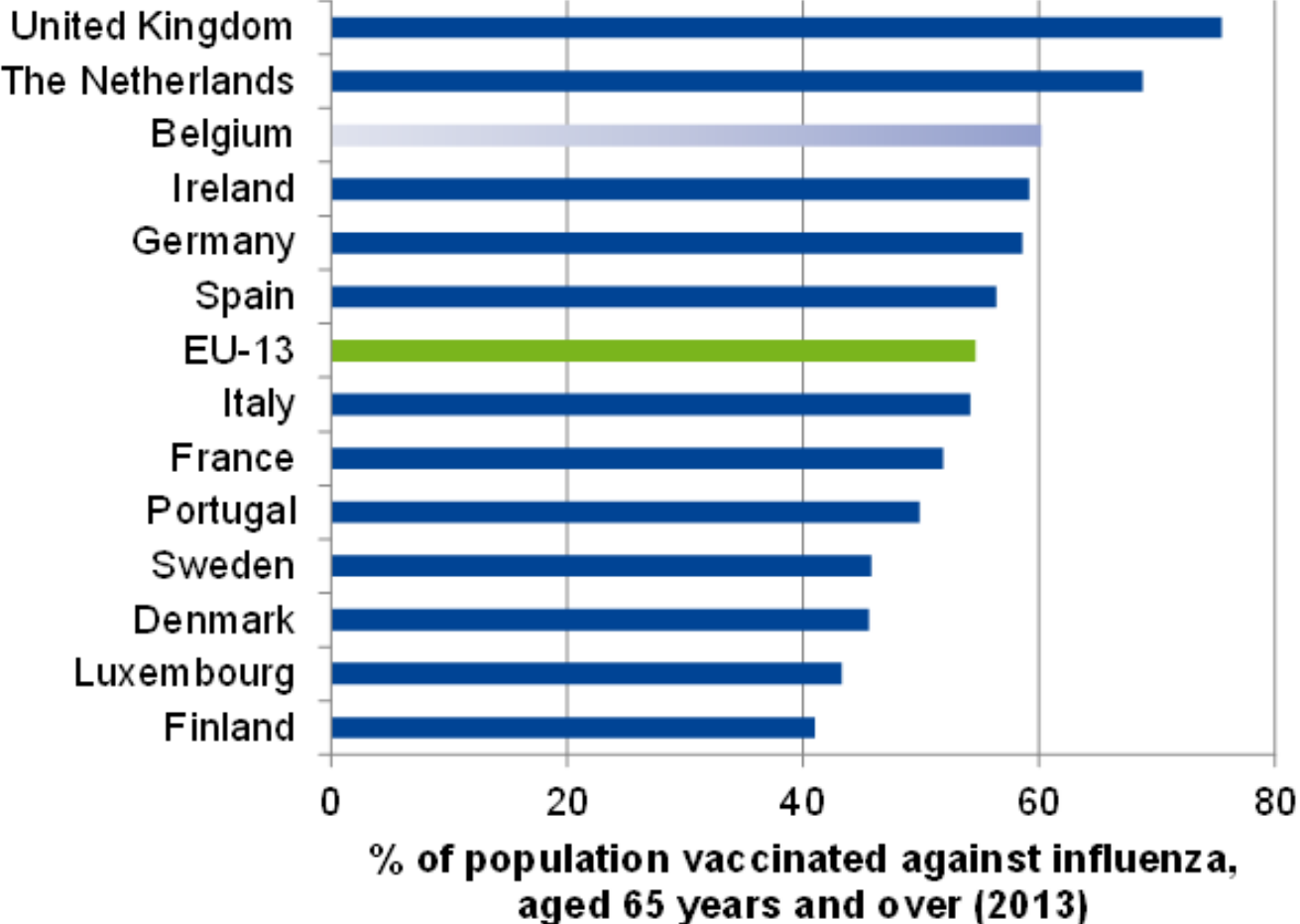


Sources: Centers for Disease Control and Prevention; Massachusetts Department of Public Health; U.S. Census Bureau | Note: No C.D.C. data available for some counties. Vermont was excluded because more than a quarter of data is missing. On Dec. 9, 2021, the C.D.C. capped its vaccination rate figures at 95 percent.

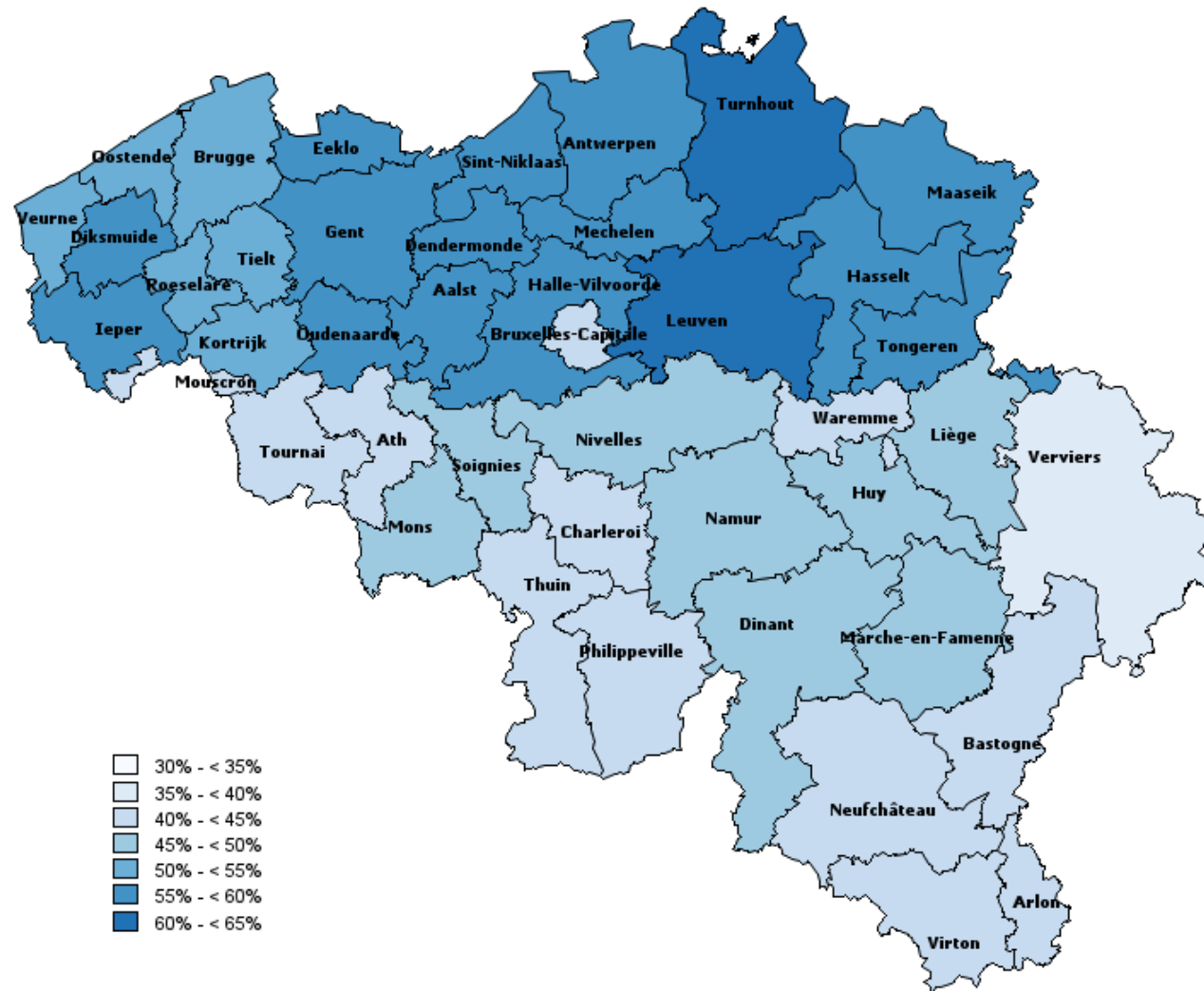
# Heterogeneous Vaccine Coverage in Belgium

Category	Belgium	Flanders	Wallonia	Brussels
Full; entire population	74%	80%	70%	56%
Partial; entire population	75%	81%	71%	58%
Full; 65+	92%	95%	89%	82%
Partial; 12 - 17	75%	86%	67%	44%

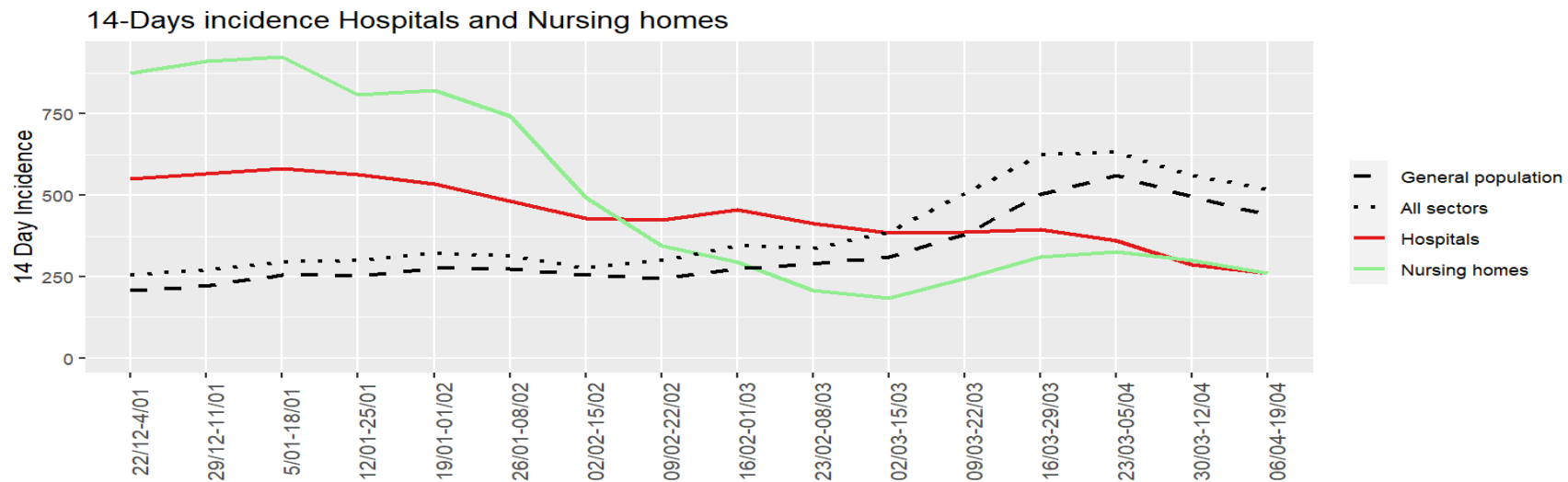
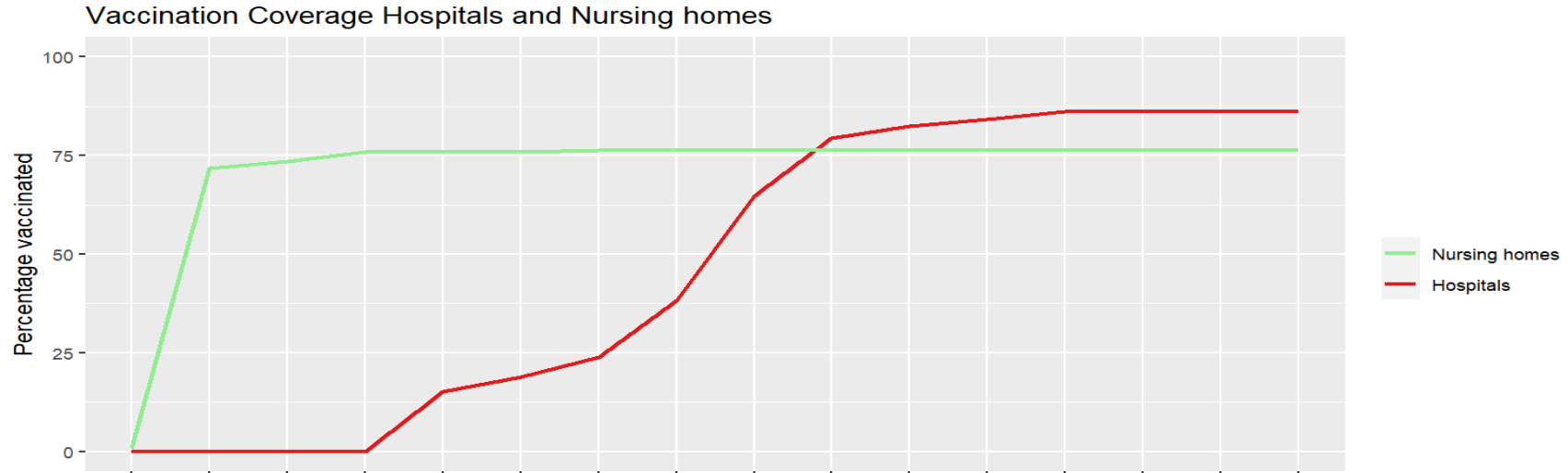
# Regional differences, not just for COVID-19...



# Intra-Belgium differences (influenza)

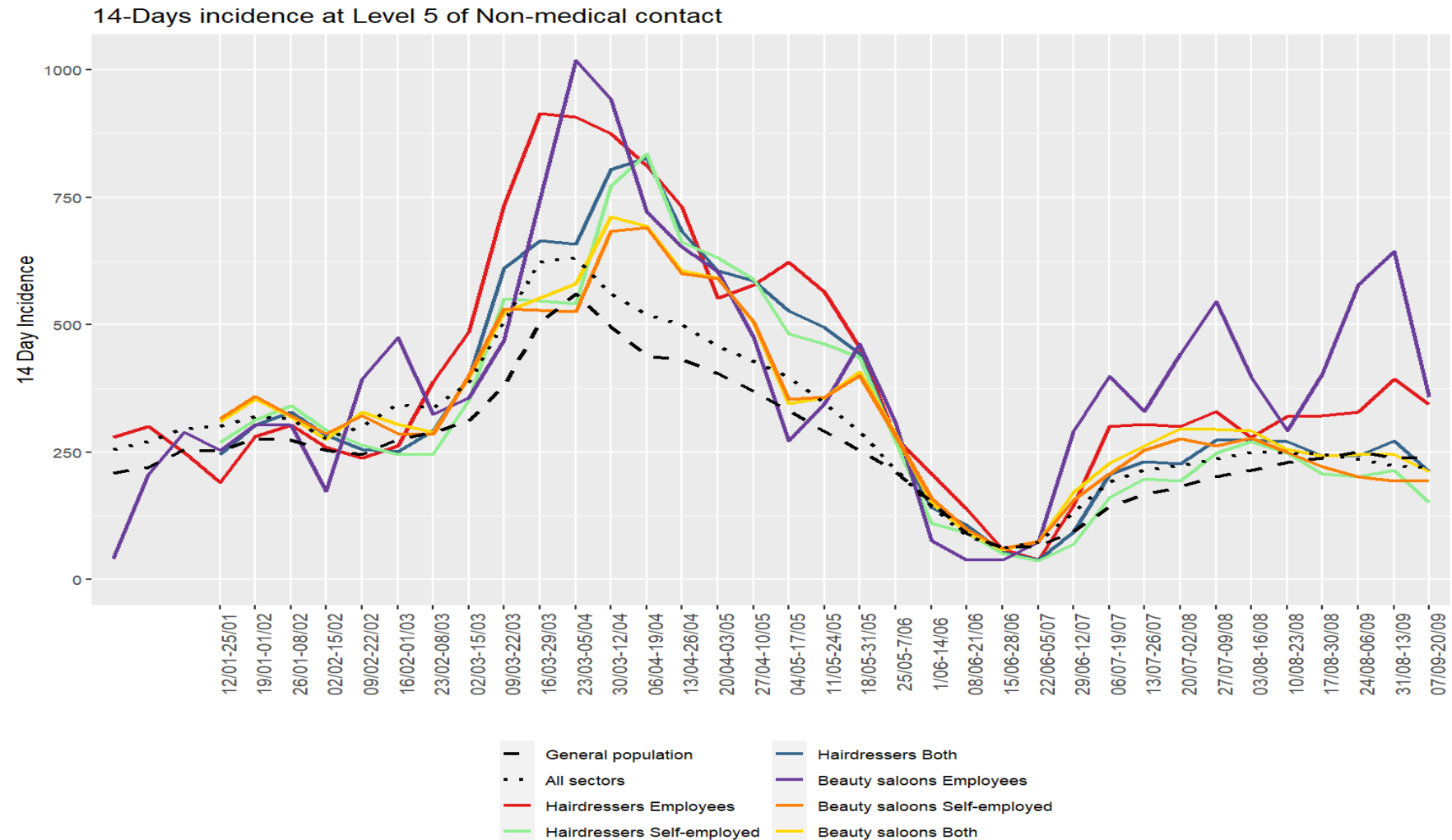


# Health care workers early 2021



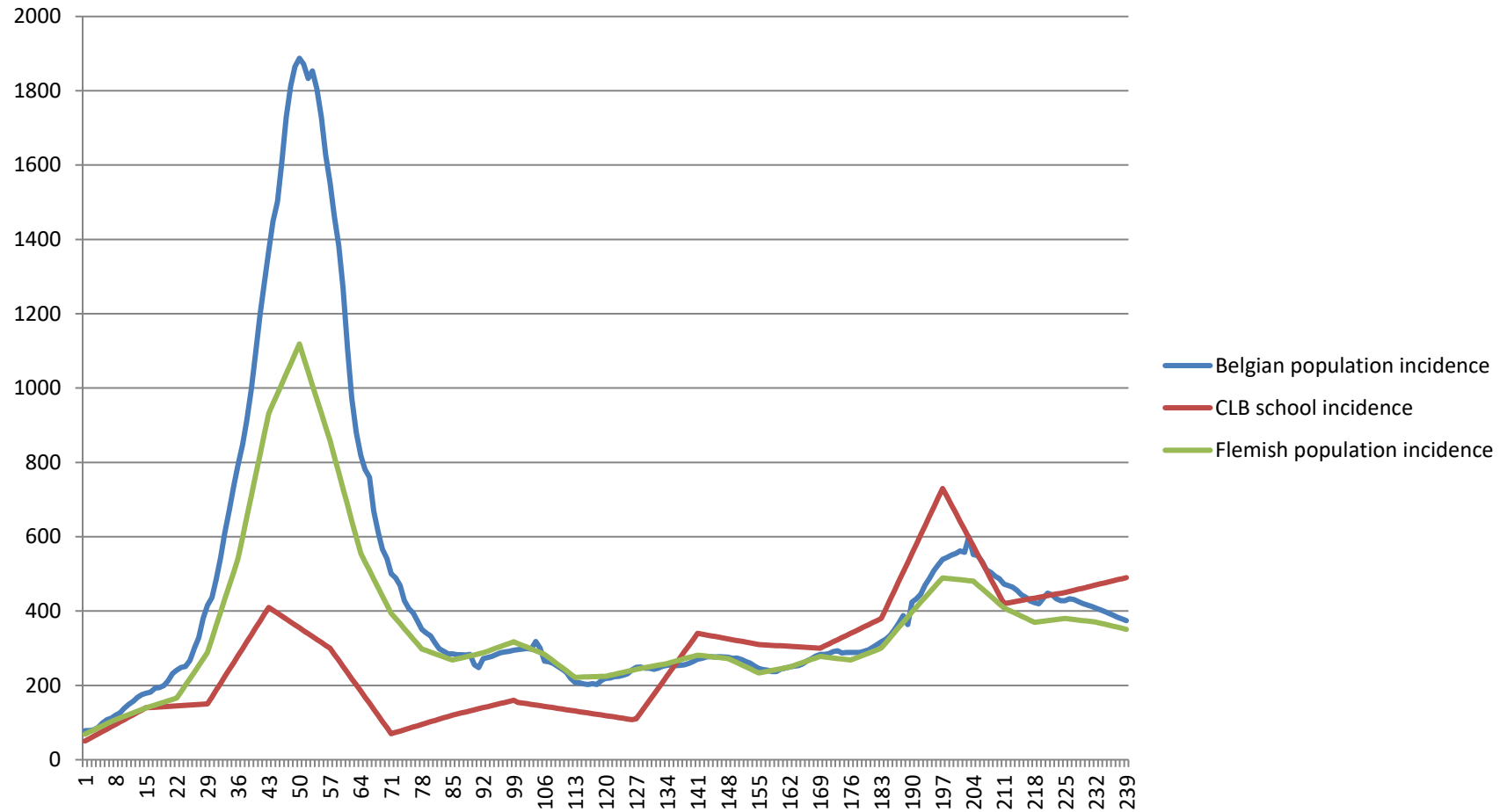


# Non-medical contact professions



# Incidence Flemish school system (2020-2021)

(Source: CLB)

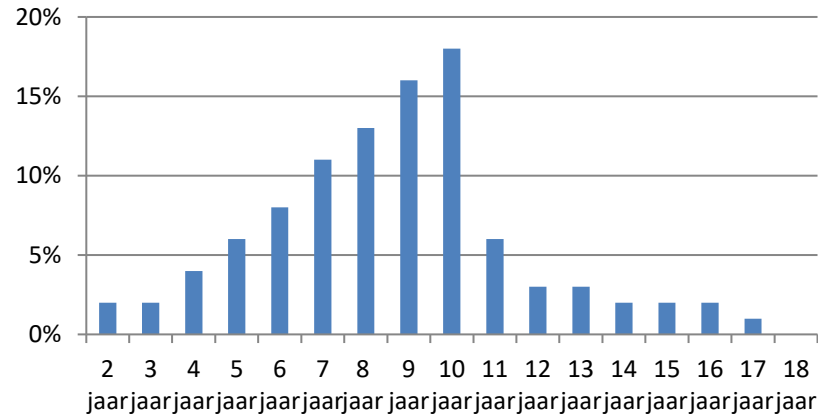


# Heated debate: Role of schools

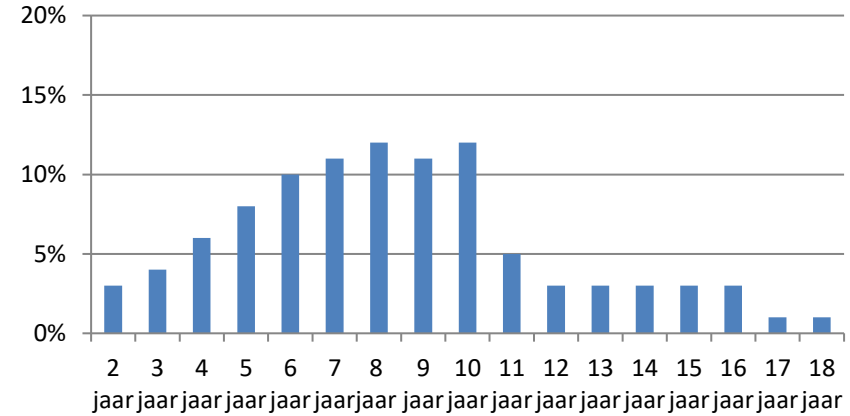
- Situation Spring 2020
- Fall 2020: Children are **not** the engine
- February 2021: Alpha is on the rise
- Measures needed:
  - Schools
  - Extra-scholarly activities
- The complexity of a federal country
- BUT: The role of **higher** education... in French speaking Belgium

# Fractions infections Flemish schools

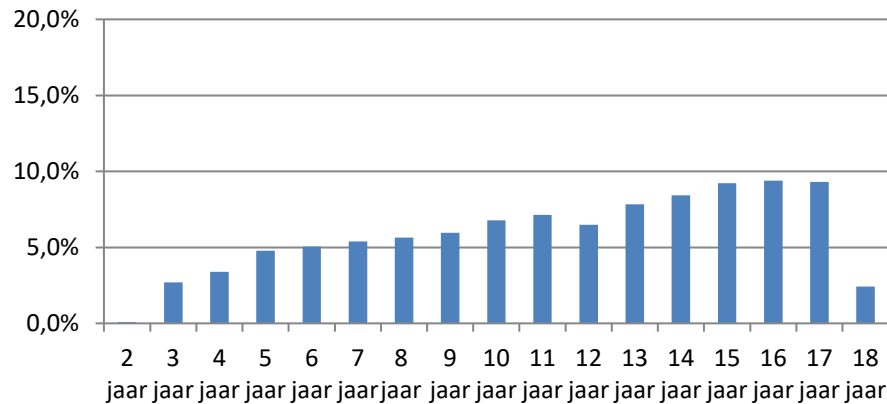
**25/10 - 07/11**



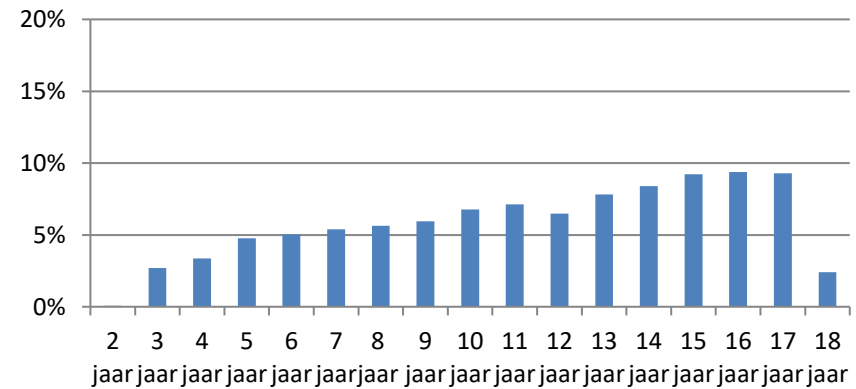
**22/11 - 28/11**



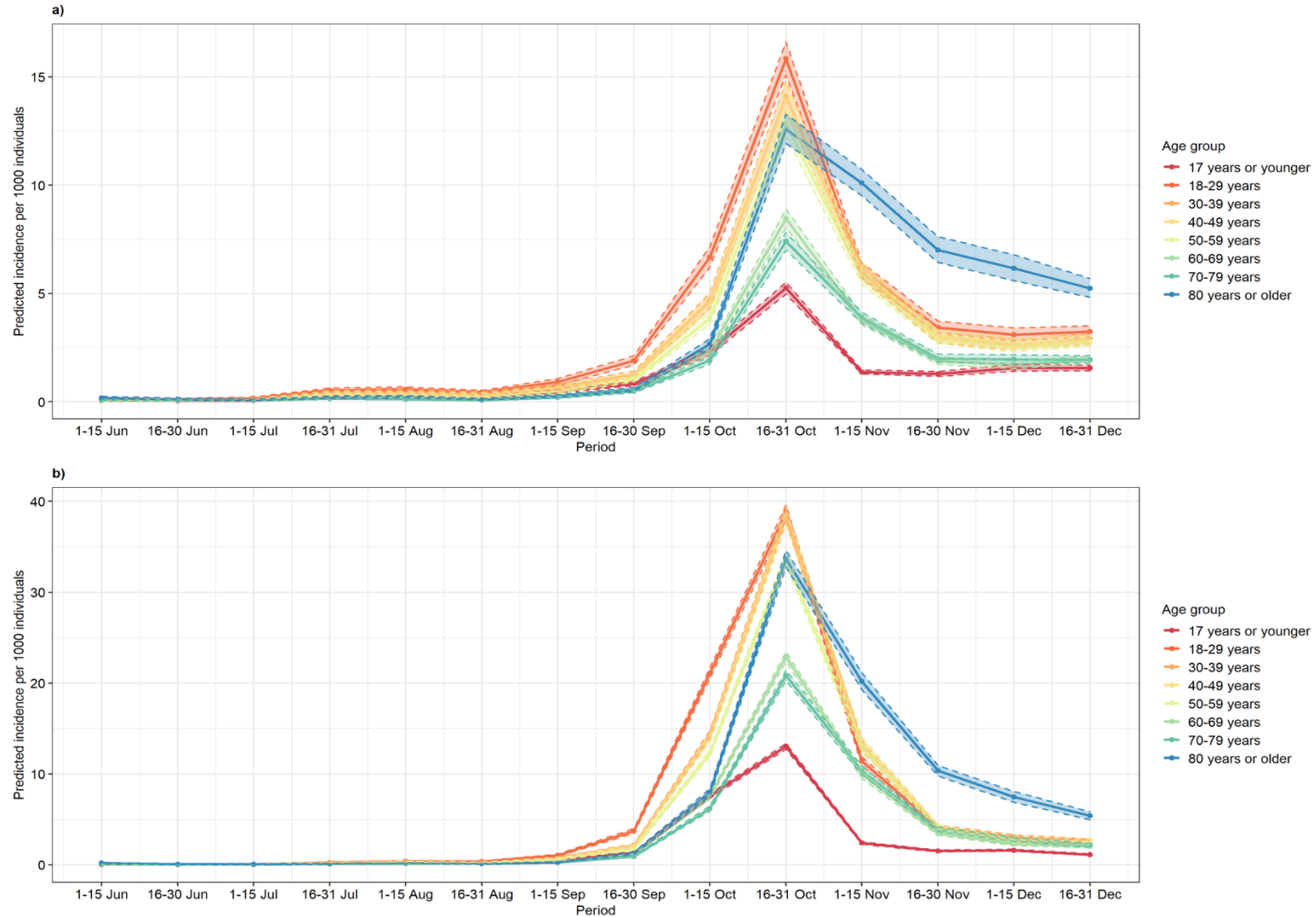
**13/12-19/12**



**17/01-23/01**



# Higher Education



# Conclusion

- Pandemic preparedness
- Education
  - General public
  - Broad array of professionals
- Communication
  - Media
  - Policy makers
  - Scientists
  - General public

# Coronavirus (*De Morgen*, 23 juli 2020)

## Epidemiologist Van Damme: 'It is 5 past 12. I had expected robust measures'

**'Het is vijf na twaalf. Ik had kordate maatregelen verwacht.'  
Dat heeft epidemioloog Pierre Van Damme (UAntwerpen)  
gezegd in *VTM Nieuws*, na afloop van de Nationale  
Veiligheidsraad. Ook viroloog Marc Van Ranst sprak bij de  
VRT van een gemiste kans.**



Four experts receive police protection: “A bizarre fact”  
(GVA, 20 September 2020)

