

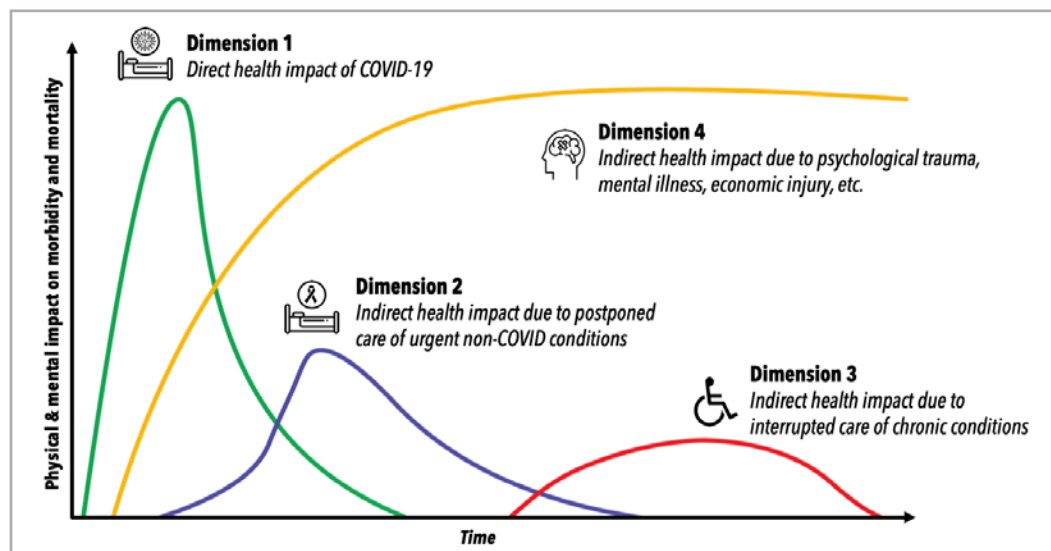
# SOCIAL INEQUALITIES IN COVID-19 RELATED HEALTH OUTCOMES: INSIGHTS FROM THE HELICON PROJECT

BY LAURA VAN DEN BORRE

Symposium on Infectious Diseases  
11 May 2023



# HELICON



A multidimensional impact on population health

## Aims

- Investigate **social patterning of past COVID-19 testing, infection, hospitalizations and mortality**
- Describe the **medium- and long-term direct health impact** of biomedical and social factors after a COVID-19 infection or hospitalization
- Assess **non-COVID morbidity and mortality** and the health economic impact of delayed health care use

Data  
linkages

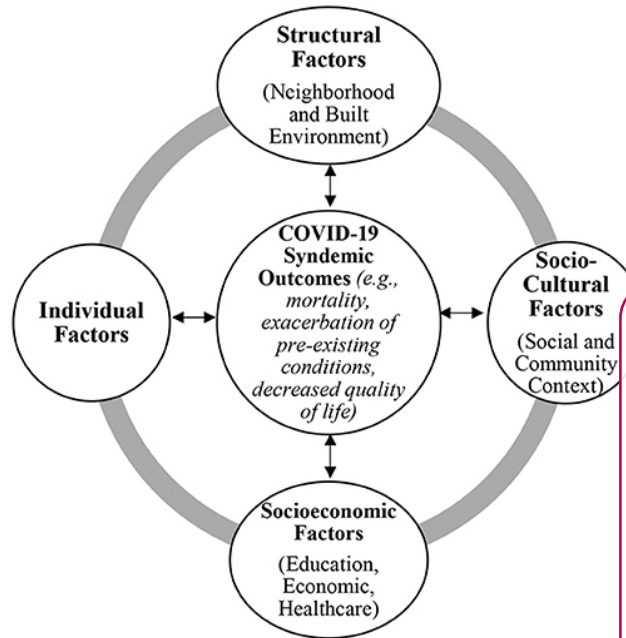
Socio-economic  
and -demographic

Different  
waves

Policy  
transfer

# Social health inequalities are systematic, unfair and avoidable

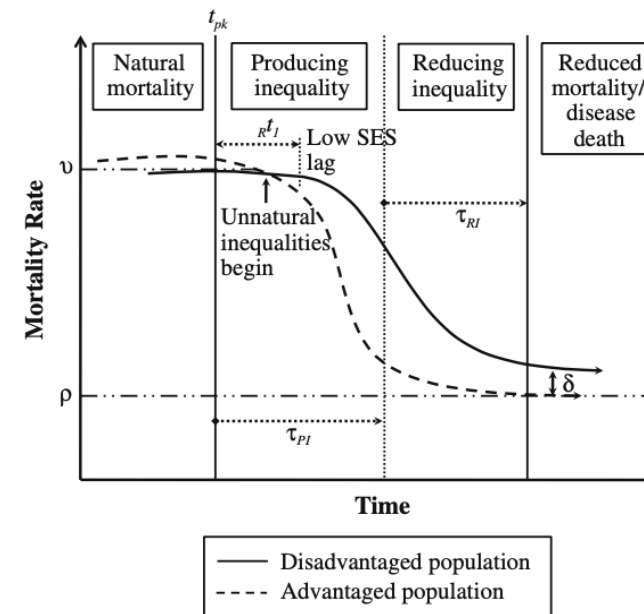
## COVID-19 syndemic



COVID-19 interacts with and is exacerbated by social, economic and health inequalities

Source: Caron & Adegboye (2021:4)

## Stages of Diseases theory



Throughout the crisis, social health inequalities can widen and narrow

Source: Clouston, Rubin, Phelan & Link (2016:1636)

# Social inequalities in...

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COVID-19 vaccination



COVID-19 incidence



All-cause mortality

medRxiv

THE PREPRINT SERVER FOR HEALTH SCIENCES



BMJ Yale

## **Sociodemographic and socioeconomic disparities in COVID-19 vaccine uptake in Belgium – A nationwide record linkage study**

 Lisa Cavillot, Joris A.F van Loenhout, Brecht Devleeschauwer, Chloé Wyndham-Thomas, Herman Van Oyen, Jinane Ghattas, Koen Blot, Laura Van den Borre, Matthieu Billuart, Niko Speybroeck, Robby De Pauw, Veerle Stouten, Lucy Catteau, Pierre Hubin

**doi:** <https://doi.org/10.1101/2023.01.31.23285233>



COVID-19 vaccination

# Social inequalities in COVID-19 vaccination

➡ Are there sociodemographic or socioeconomic disparities in COVID-19 vaccine uptake in Belgium?

LINK-VACC database

First dose of a  
COVID-19  
vaccine

VACCINNET+

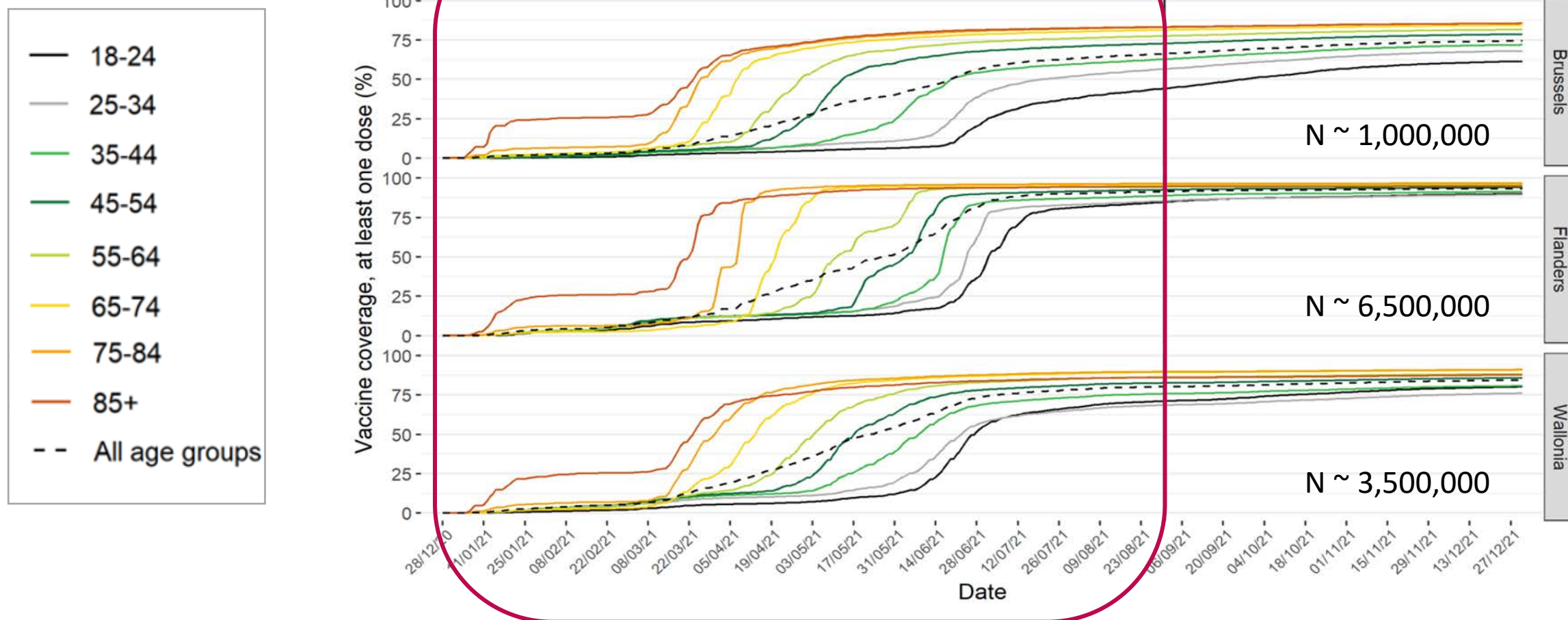
Health Care  
Degree

CoBRHA

Socio-  
demographic  
& -economic  
information

 **STATBEL**   
België in cijfers

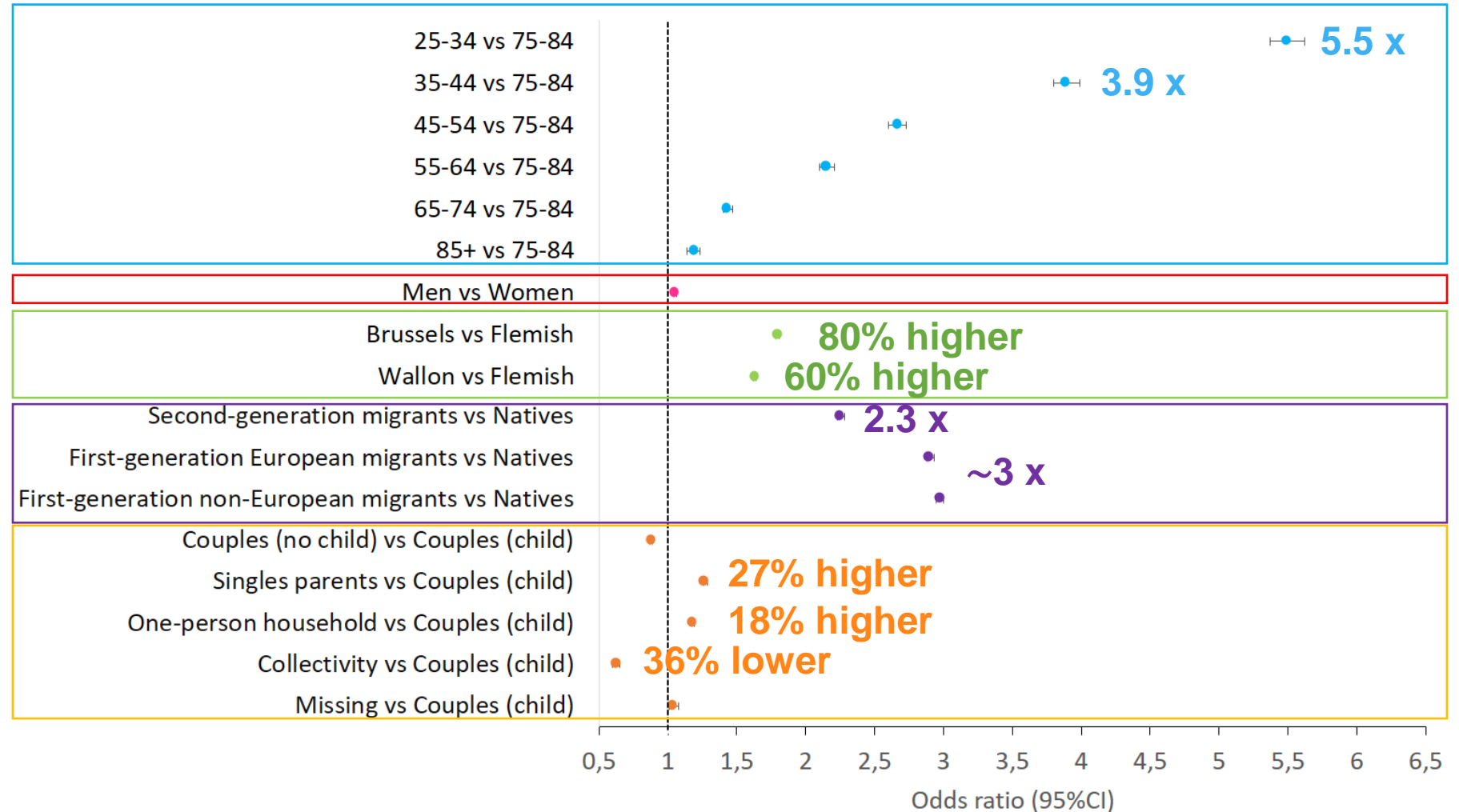
# Overall, high uptake first dose of COVID-19 vaccine



Vaccination coverage of a first dose of COVID-19 vaccine over time by age groups and regions, Belgium, 28/12/2020 – 27/12/2021.



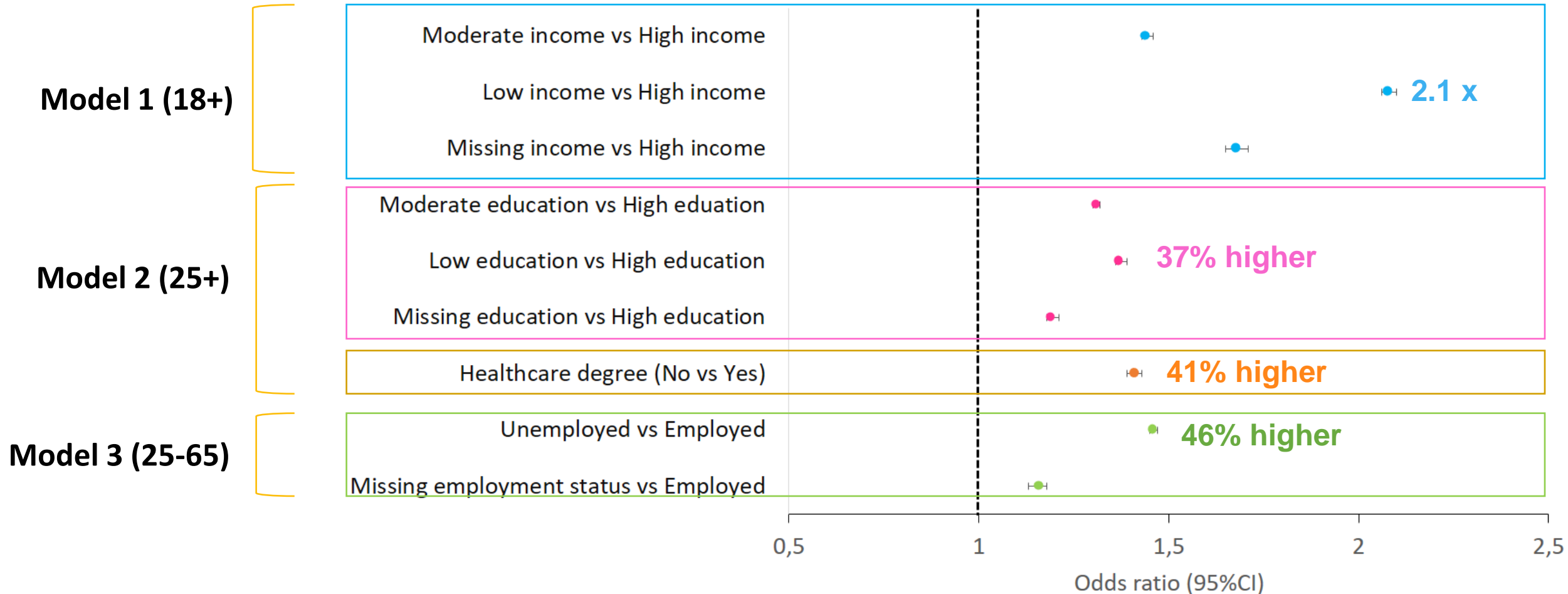
# Large sociodemographic differences in uptake first dose of the COVID-19 vaccine



Odds ratios and 95% confidence intervals for NOT having received the first COVID-19 vaccine dose by socio-demographic characteristics, Belgium, 28/12/2020 – 31/8/2021. Results for the 18+ population, adjusted for all displayed characteristics and income.



# Considerable socioeconomic differences in uptake first dose of the COVID-19 vaccine

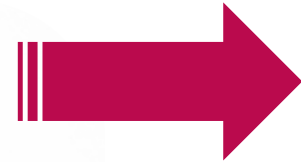


Odds ratios and 95% confidence intervals for NOT having received the first COVID-19 vaccine dose by socio-demographic characteristics, Belgium, 28/12/2020 – 31/8/2021. All models adjusted for all SD characteristics

# ➡ Are there sociodemographic or socioeconomic disparities in COVID-19 vaccine uptake in Belgium?



COVID-19 vaccination



Important social disparities in COVID-19 vaccine uptake identified in Belgium:

- Young people
- Migrants
- Single parents, one-person household
- Socioeconomic disadvantaged groups (low income, low education, unemployed)



Similar patterns were identified within each Belgian region

Meurisse et al. *Archives of Public Health* (2022) 80:109  
<https://doi.org/10.1186/s13690-022-00856-9>

Archives of Public Health

RESEARCH

Open Access



# The association between area deprivation and COVID-19 incidence: a municipality-level spatio-temporal study in Belgium, 2020–2021

Marjan Meurisse<sup>1\*</sup> , Adrien Lajot<sup>1</sup>, Brecht Devleesschauwer<sup>1,2</sup>, Dieter Van Cauteren<sup>1</sup>, Herman Van Oyen<sup>1,3</sup>, Laura Van den Borre<sup>1,4</sup> and Ruben Brondeel<sup>1</sup>

COVID-19 incidence



# Social inequalities in COVID-19 incidence

➡ Is area deprivation linked with higher COVID-19 incidence at the municipal level?

## Area deprivation index

Median number of  
COVID-19 cases  
per week  
(1/3/2020-1/6/2021)



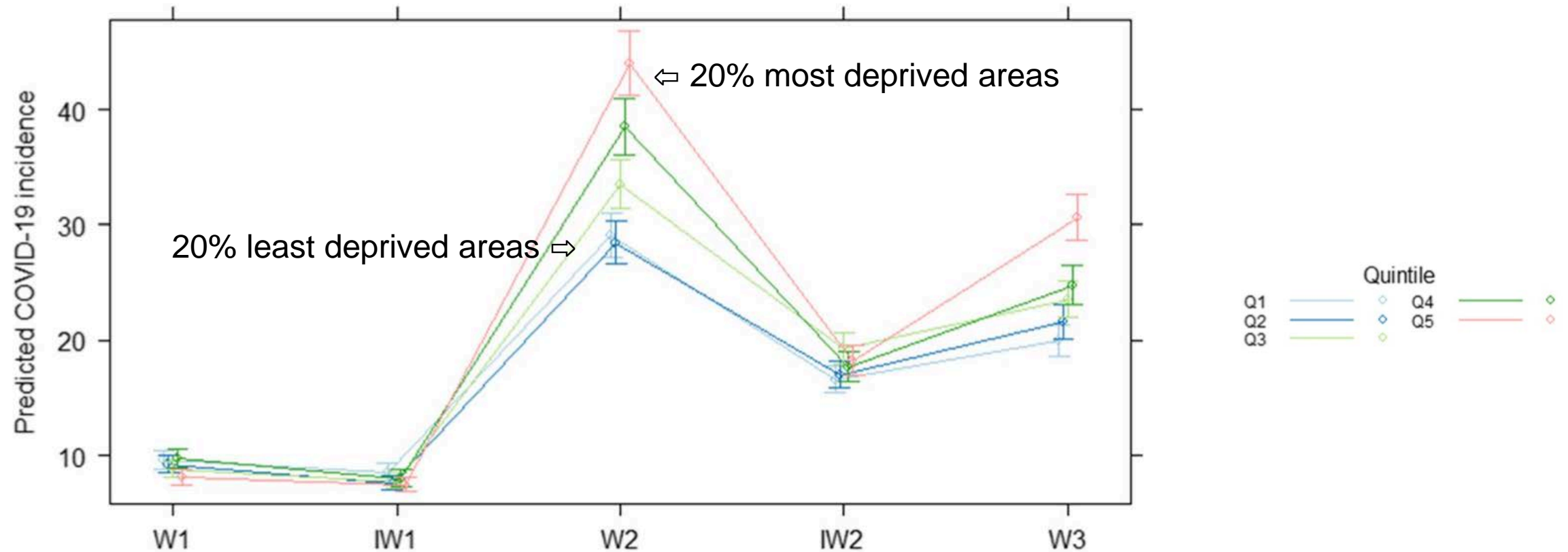
Percentage of  
unemployment in  
the active  
population (2018)

Vlaamse  
Arbeidsrekening

Percentage of  
households with no  
car (2019)  
and of persons with  
low education  
(2017)



# The most deprived areas experienced the highest COVID-19 incidence in wave 2 (and wave 3)



**Predicted COVID-19 incidence per 100,000 inhabitants by area deprivation in quintiles, by wave, Belgian, 1/3/2020 – 1/6/2021. Results adjusted for median age per municipality and urbanization**

Note: Wave 1= 1/3/2020 – 22/6/2020; Interwave 1= 23/6/2020-30/8/2020; Wave 2=31/8/2020-1/12/2020; Interwave 2= 2/12/2020-14/2/2021; Wave 3= 15/2/2021-26/6/2021

# ➤ Is area deprivation linked with higher COVID-19 incidence at the municipal level?



COVID-19 incidence

More deprived areas experienced higher COVID-19 incidence in wave 2 (and in wave 3)

- Clear significant gradient by education levels
- Significant gradient by unemployment levels
- Car ownership was not significantly associated

Significant association with degree of urbanization: more densely populated areas were predicted to experience a lower incidence.



## All-cause mortality

### **Under review with Journal of Public Health**

**Excess mortality across migrant groups in Belgium during the first three COVID-19 waves: the evolving dynamics of social inequalities**

Katrien Vanthomme, Sylvie Gadeyne, Brecht Devleesschauwer & Laura Van den Borre

### **Manuscript in preparation**

**Social patterns and excess mortality during the first three COVID-19 waves in Belgium**

Laura Van den Borre, Sylvie Gadeyne, Brecht Devleesschauwer & Katrien Vanthomme

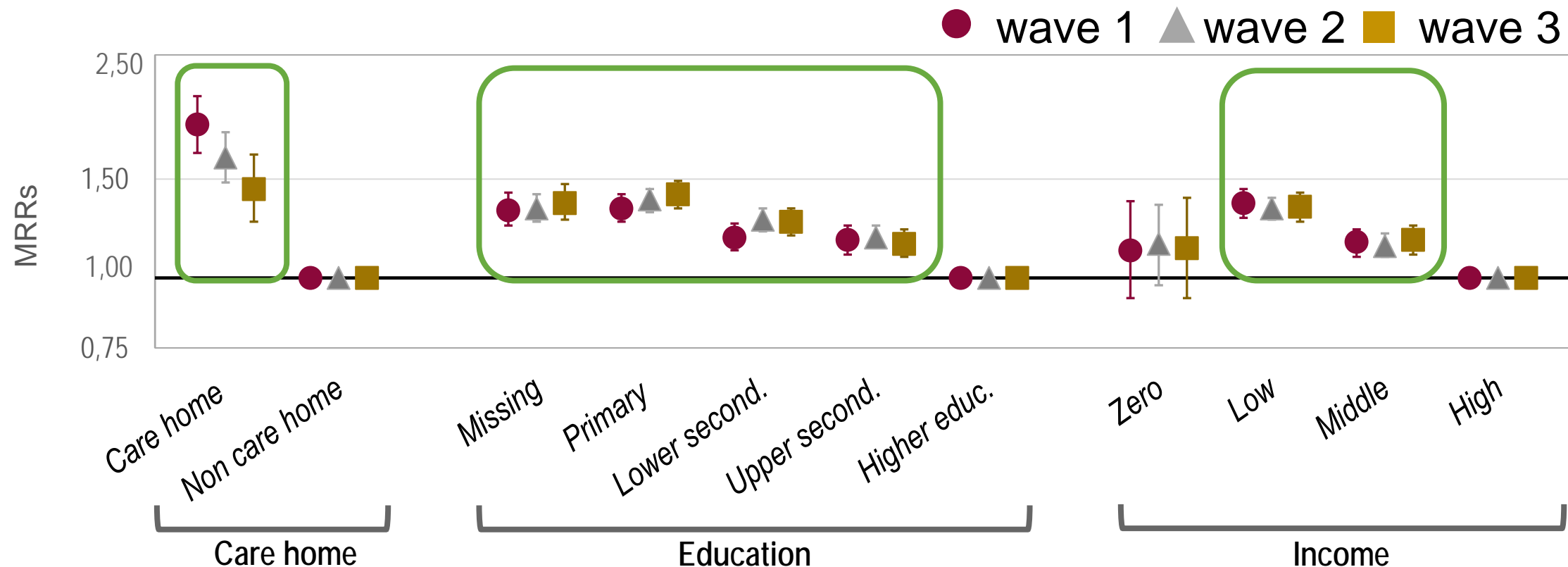


# Social inequalities in all-cause mortality

➡ Which population groups experienced the heaviest mortality burden during the first three COVID-19 waves in Belgium?

- Yearly stock files of the total Belgian population (2015-2020)
- All-cause mortality (2015-2021)
- Administrative census 2011
- Tax register (2014-2017)

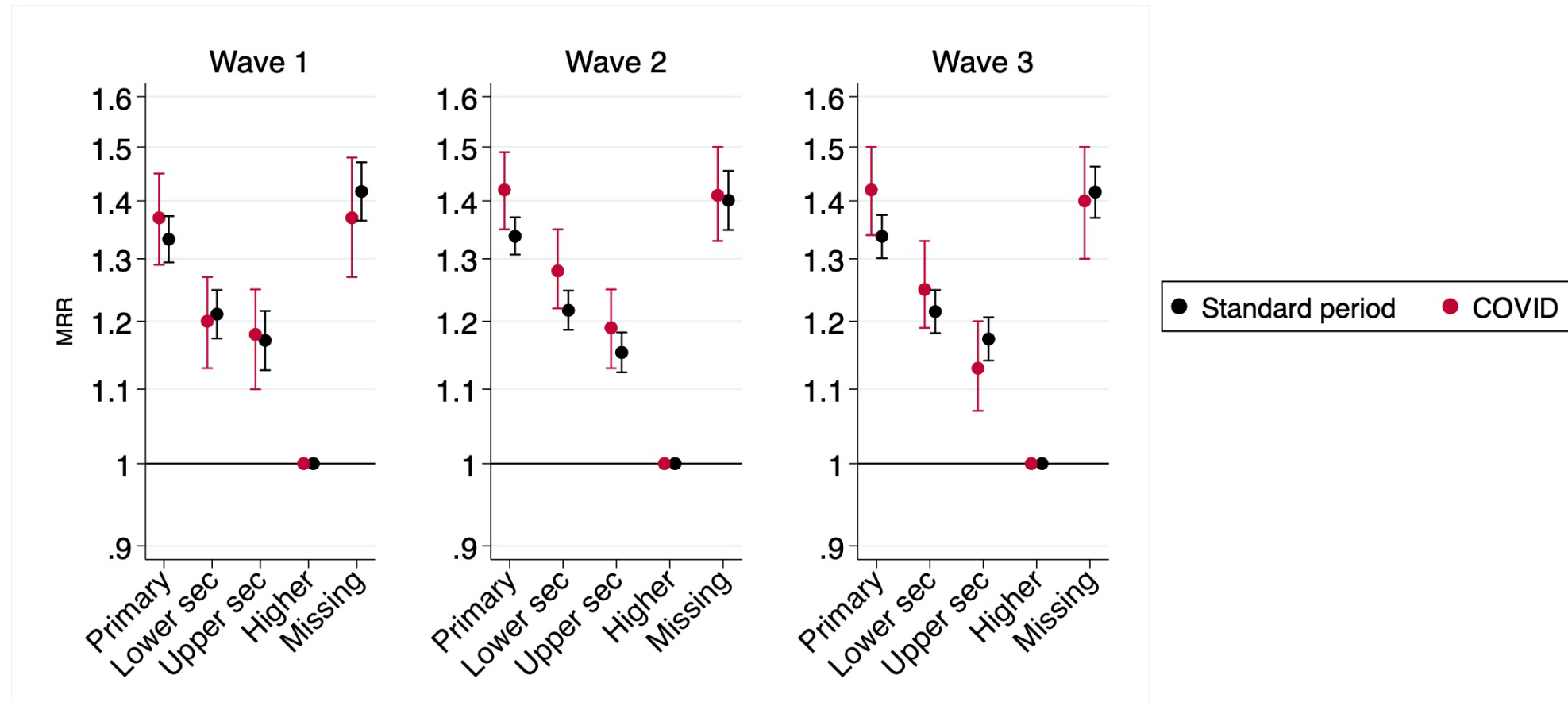
# Important mortality differences by care home residency, education and income during all three waves



**Mortality Rate Ratios and 95% confidence intervals for the male 65+ population by COVID-19 wave, adjusted for age, migrant background, household type, region of residence, care home residency, educational attainment and income level.**

Note: Wave 1= 1/3/2020 – 21/6/2020; Wave 2=31/8/2020-14/2/2021; Wave 3= 15/2/2021-26/6/2021

# Educational mortality differences during first three COVID-19 waves were similar to prepandemic situation

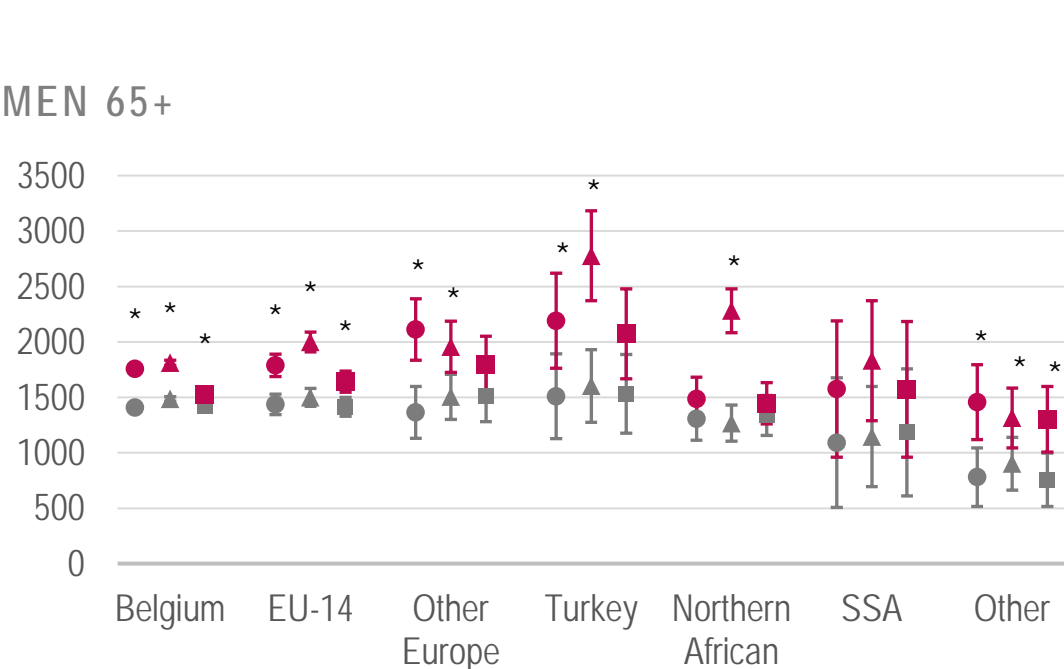


**Mortality Rate Ratios for the male 65+ population not living in a care home by educational level, stratified by COVID-19 wave and standard period (2015-2019), adjusted for age, migrant background, household type, region, and income level.**

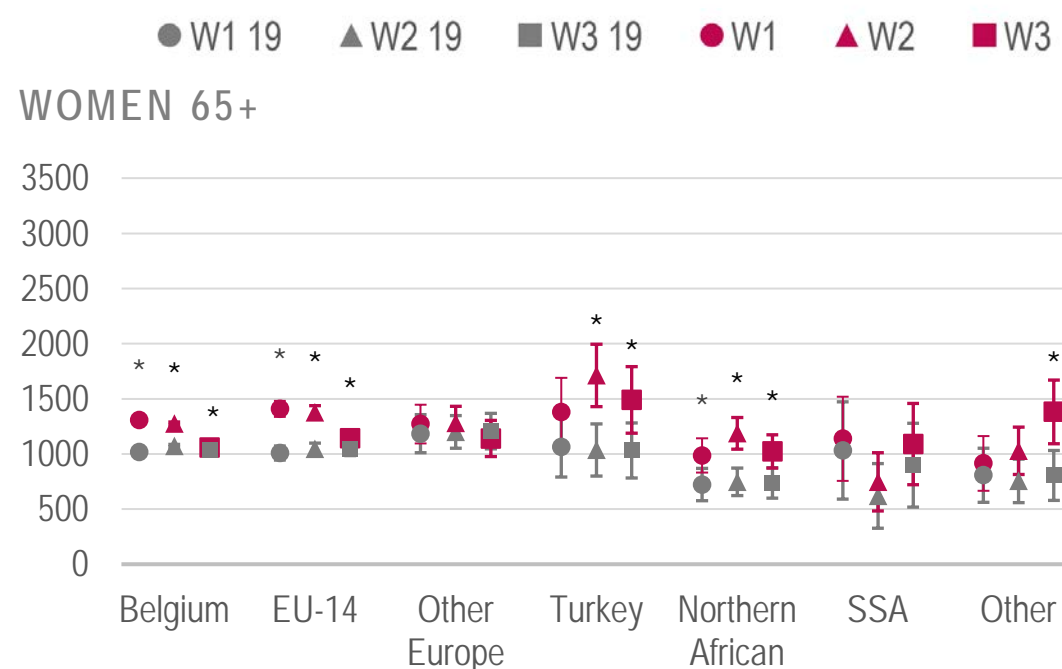
Note: Wave 1= 1/3/2020 – 21/6/2020; Wave 2=31/8/2020-14/2/2021; Wave 3= 15/2/2021-26/6/2021

# Increased mortality for specific migrant groups

MEN 65+



WOMEN 65+



**Directly standardized mortality rates (per 100,000) and 95% confidence intervals for the elderly population during the pandemic and the corresponding standard periods in 2019, by migrant group and wave.**

Note: Wave 1= 1/3/2020 – 21/6/2020; Wave 2=31/8/2020-14/2/2021; Wave 3= 15/2/2021-26/6/2021

# ↪ Which population groups experienced the heaviest mortality burden during the first three COVID-19 waves in Belgium?



Excess mortality

A heavy mortality burden among:

- Elderly men
- Care home residents
- Elderly men of Turkish descent (and North African in W2)

Clear mortality differences by educational attainment and income level

Educational and income mortality inequalities during COVID-19 follow pre-COVID patterns

- Except: significant excess among low-educated middle-aged men and women in wave 3

# Conclusions

- Evidence of social inequalities in
  - COVID-19 vaccination
  - COVID-19 incidence
  - All-cause mortality
- More information is needed to understand the mechanisms underlying these findings
- Policy actions should target :
  - Elderly (care home residents)
  - Persons with a migrant background
  - Persons with a low socio-economic background





**Questions, remarks or suggestions? Send an email!**

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# References

## International

- Caron RM, Adegboye ARA. COVID-19: A Syndemic Requiring an Integrated Approach for Marginalized Populations. *Front Public Health* [Internet]. 2021 [cited 2021 Oct 19];9:675280. Available from: <https://www.frontiersin.org/articles/10.3389/fpubh.2021.675280/full>
- Clouston SAP, Rubin MS, Phelan JC, Link BG. A Social History of Disease: Contextualizing the Rise and Fall of Social Inequalities in Cause-Specific Mortality. *Demography* [Internet]. 2016 [cited 2021 Oct 19];53:1631–56.

## HELICON

- Meurisse M, Lajot A, Devleesschauwer B, Van Cauteren D, Van Oyen H, Van den Borre L, et al. The association between area deprivation and COVID-19 incidence: a municipality-level spatio-temporal study in Belgium, 2020–2021. *Archives of Public Health*. Springer; 2022;80:1–10. <https://doi.org/10.1186/s13690-022-00856-9>
- Cavillot L, van Loenhout JAF, Devleesschauwer B, Wyndham-Thomas C, Van Oyen H, Ghattas J, et al. Sociodemographic and socioeconomic disparities in COVID-19 vaccine uptake in Belgium – A nationwide record linkage study. *medRxiv* [Internet]. Cold Spring Harbor Laboratory Press; 2023; Available from: <https://www.medrxiv.org/content/early/2023/02/01/2023.01.31.23285233>

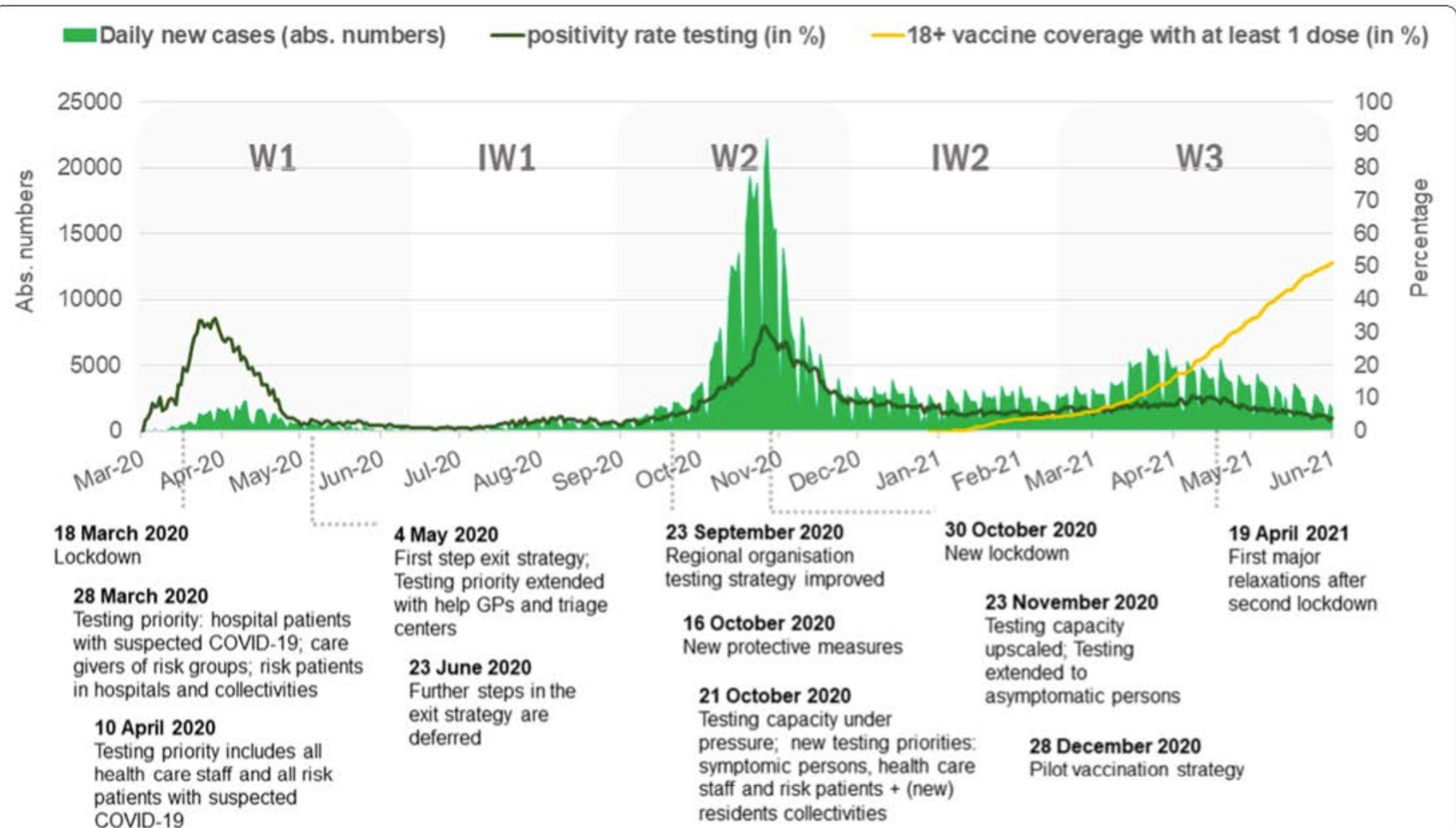
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Photo mortality Photo by Freepik

Photo social inequality Photo by Ryoji Iwata on Unsplash



**Fig. 1** The evolution of the daily number of COVID-19 cases (left y-axis), test positivity rate (right y-axis) and vaccine coverage in the general 18-plus population with at least one dose in percentage (right y-axis), March 2020—June 2021, Belgium