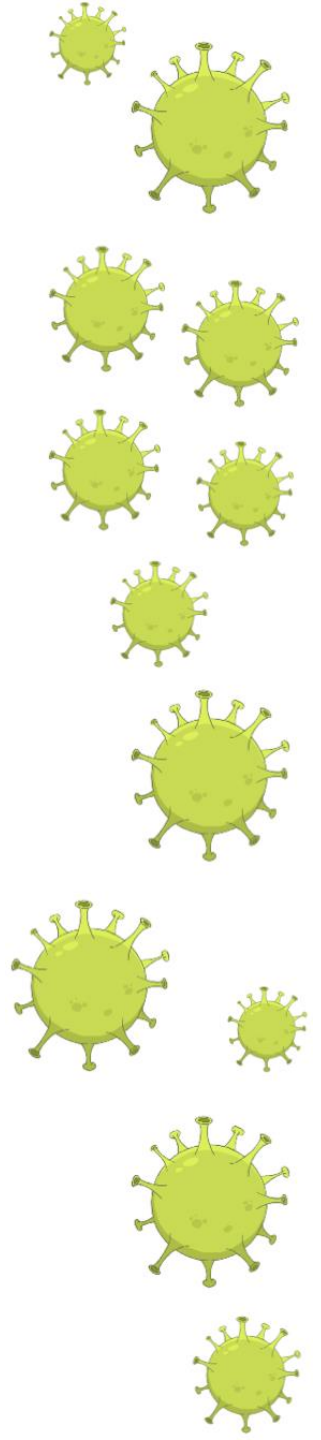


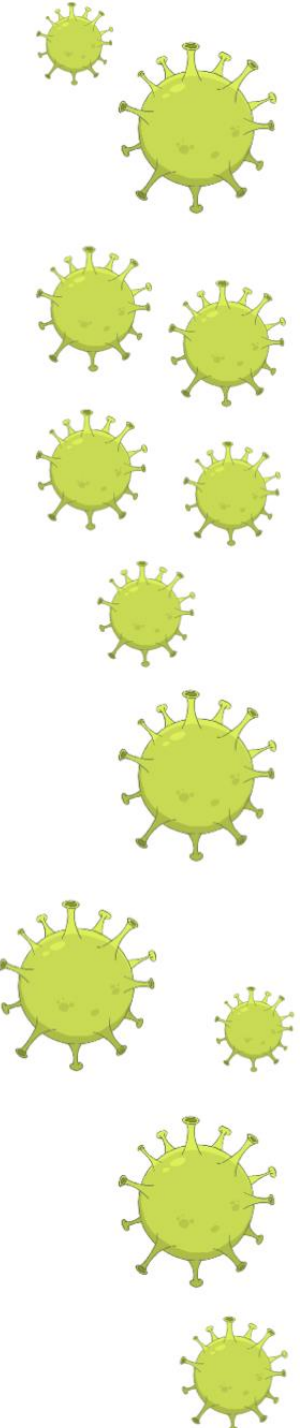
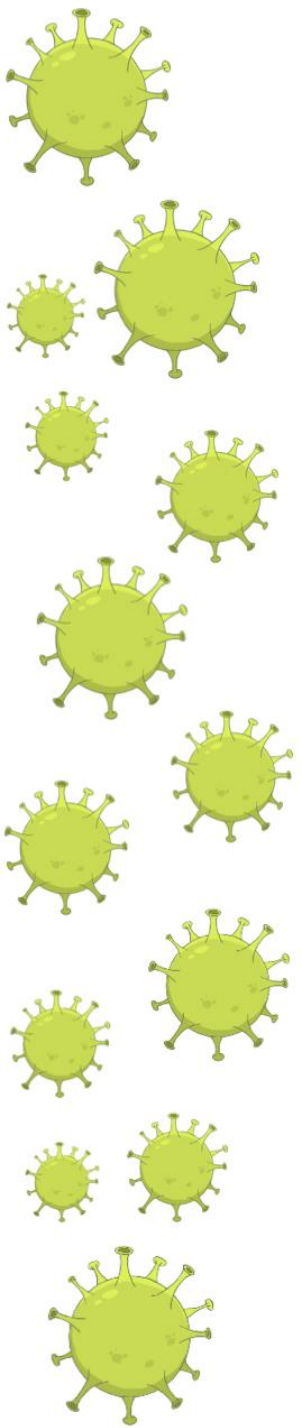
# SPATIAL AGGREGATION

THOMAS NEYENS



## SPATIAL ANALYSIS

NATURAL PHENOMENON  $\sim$  EXPLANATORY VARIABLES + SPATIAL NOISE + RANDOM NOISE





CONCEPTUAL EXAMPLE

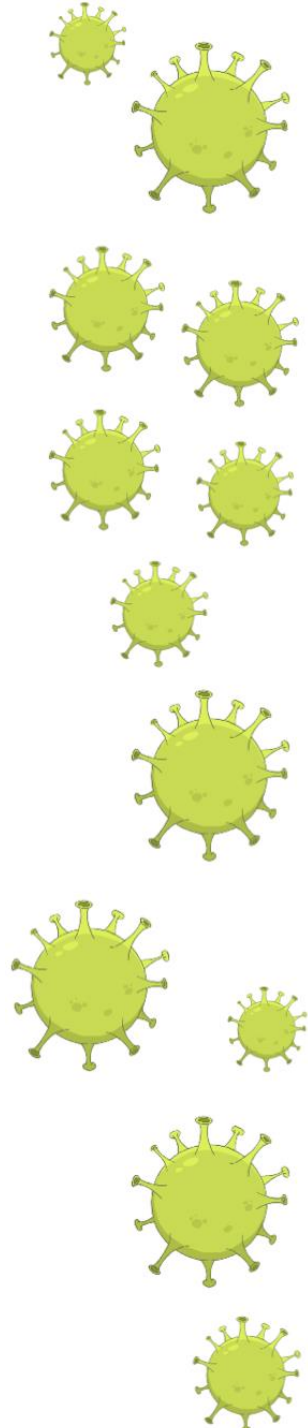
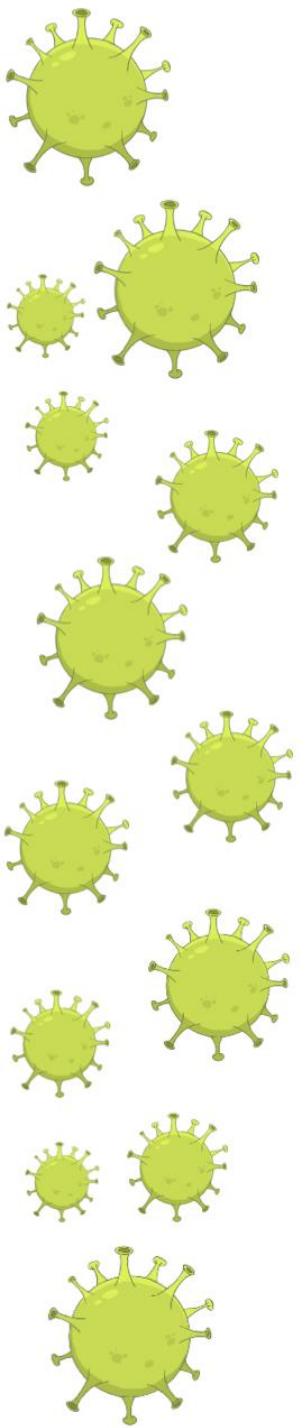
SPATIAL AGGREGATION → INFORMATION LOSS

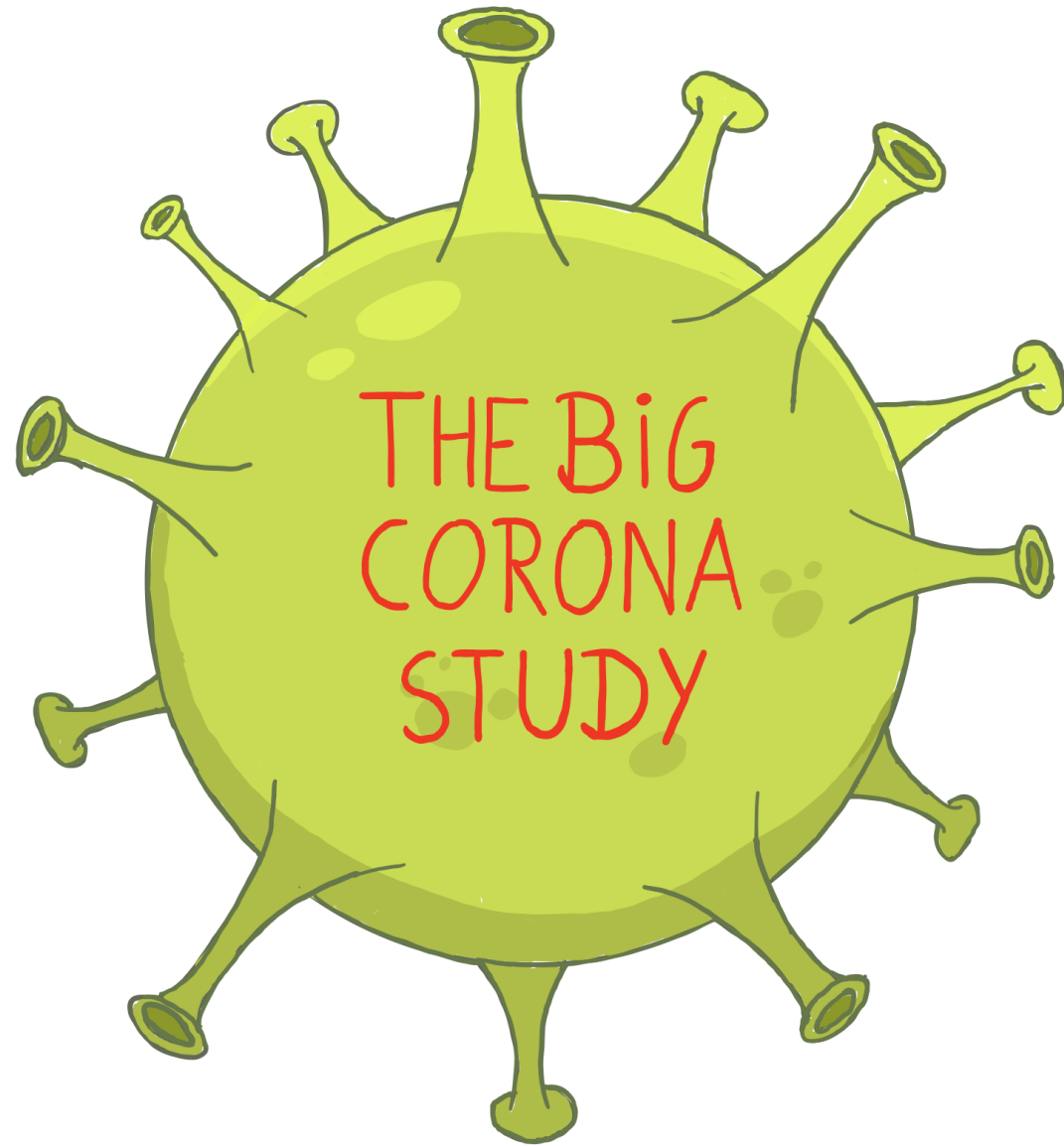
RANDOM

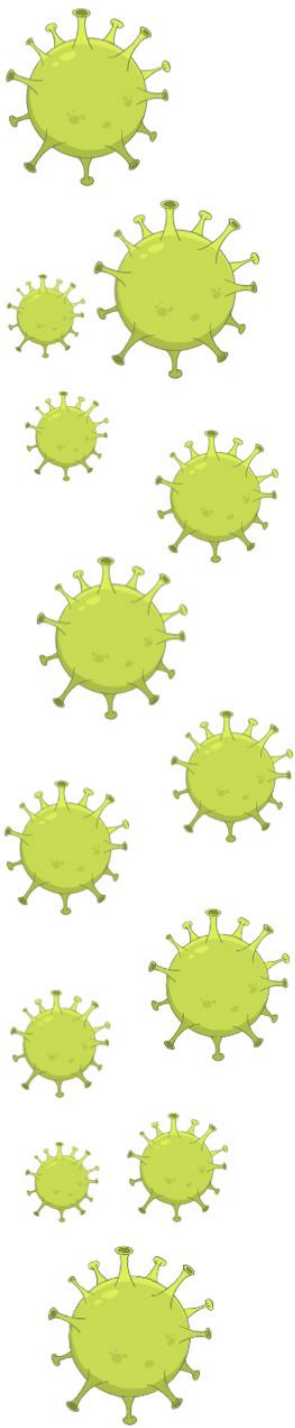
10	

SPATIALLY CORRELATED

10	

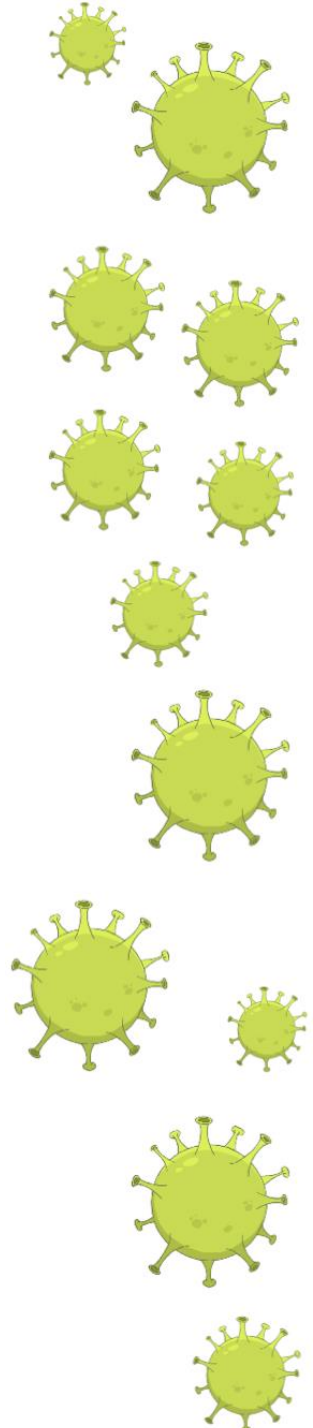






JAN AERTS  
MARC AERTS  
PHILIPPE BEUTELS\*  
JONAS CREVECOEUR  
NIEL HENS\*  
LISA HERMANS  
ANNA IVANOVA  
THOMAS NEYENS\*  
OLUWAFEMI OLUSOJI  
KOEN PEPERMANS  
PIERRE VAN DAMME\*  
MAREN VRANCKX

\*P.I.  
\*C.I.





# THE BIG CORONA STUDY

\* UANTWERP - UHASSELT - KUL

\* ONLINE SURVEY

→ OPEN TO EVERYONE

→ SELF-REPORTING



FWO



MARCH 17 - JUNE 2 : WEEKLY

JUNE 2 - ... : BI-WEEKLY  
(21 WAVES)



2,624,046

# SYMPTOMS





 : MARCH 31 : APRIL 7-9

## SPATIAL ANALYSIS

① MODEL PER MUNICIPALITY

$$P(\text{person}) \sim \text{AGE} + \text{SEX} + \text{SINGLE} + \text{SPATIAL NOISE} + \text{RANDOM NOISE}$$

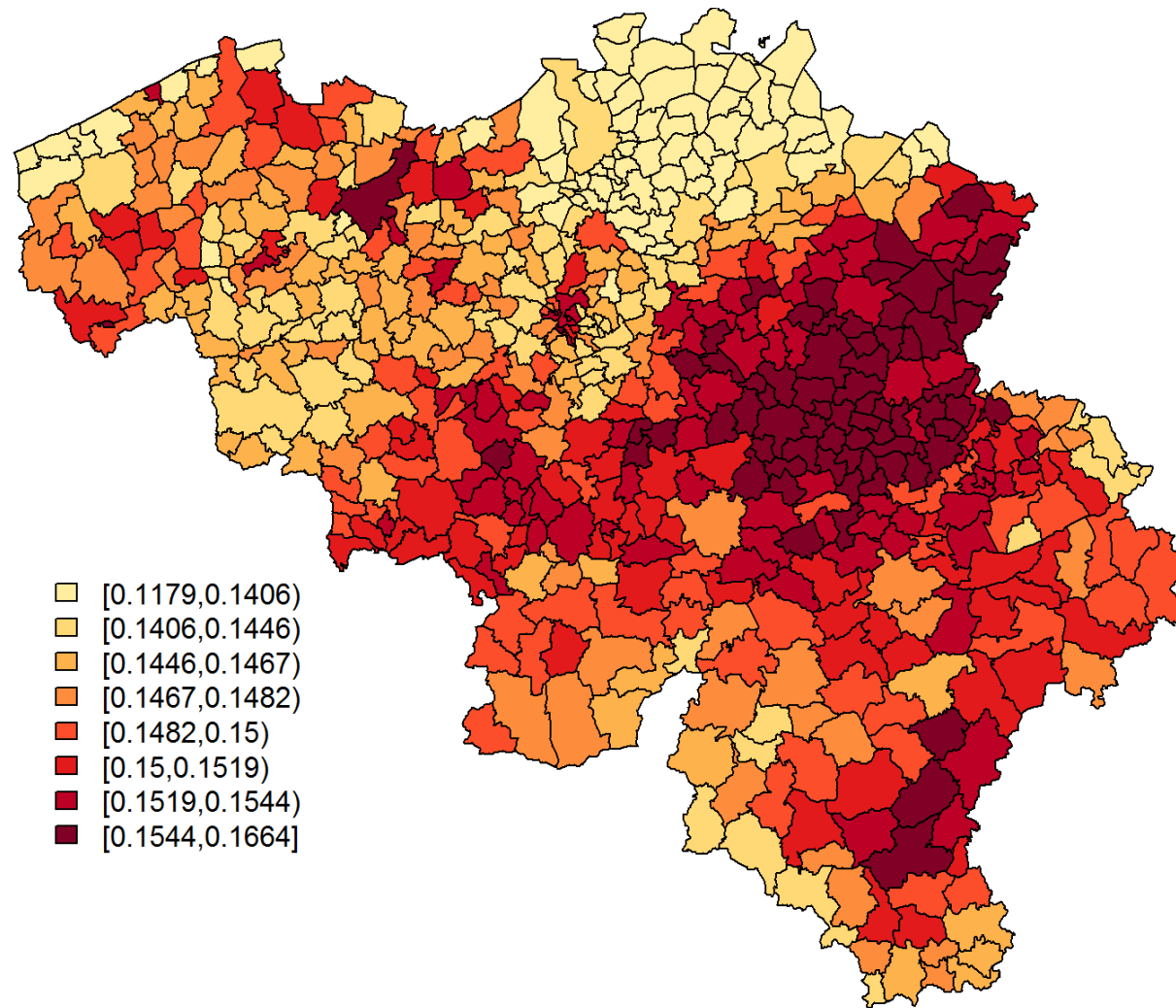
② PREDICT  $P(\hat{\text{person}})$  PER MUNICIPALITY









③ MODEL PER MUNICIPALITY

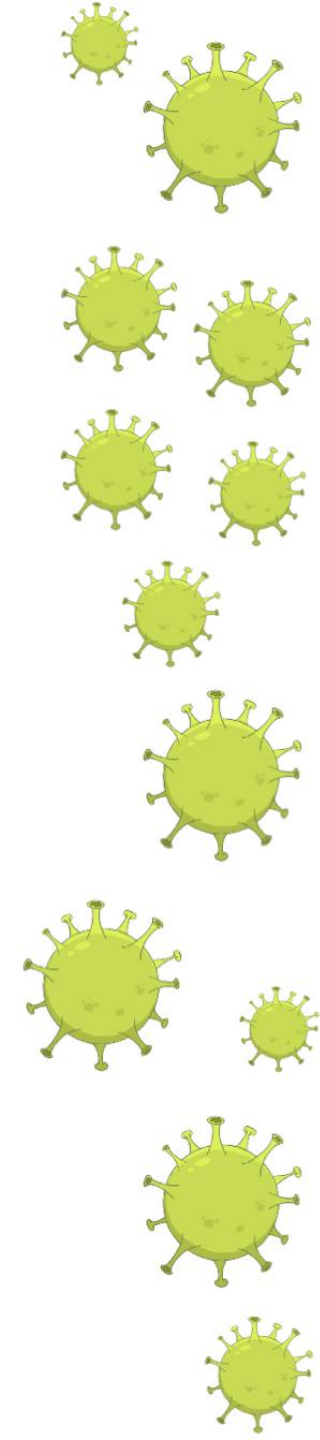
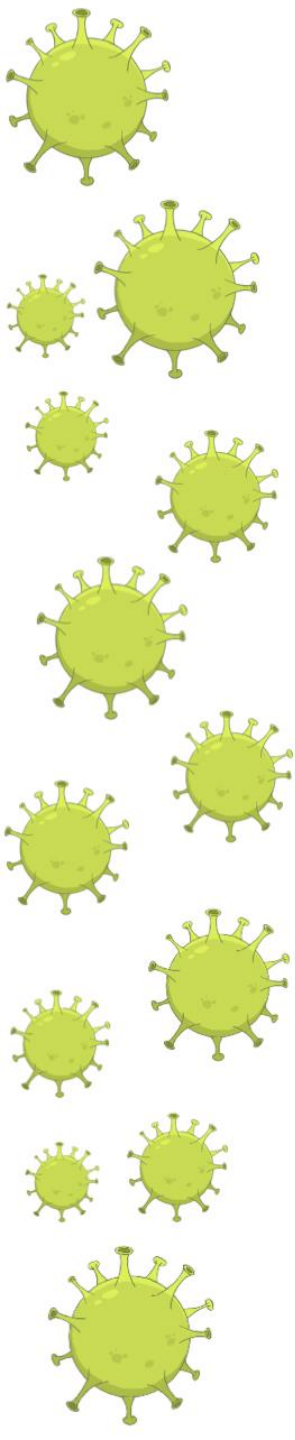
$$\# \text{virus} \sim \text{AGE} + \text{SEX} + P(\hat{\text{person}}) + \text{SPATIAL NOISE} + \text{RANDOM NOISE}$$

④ PREDICT  $\text{RISK}(\hat{\text{virus}})$  PER MUNICIPALITY

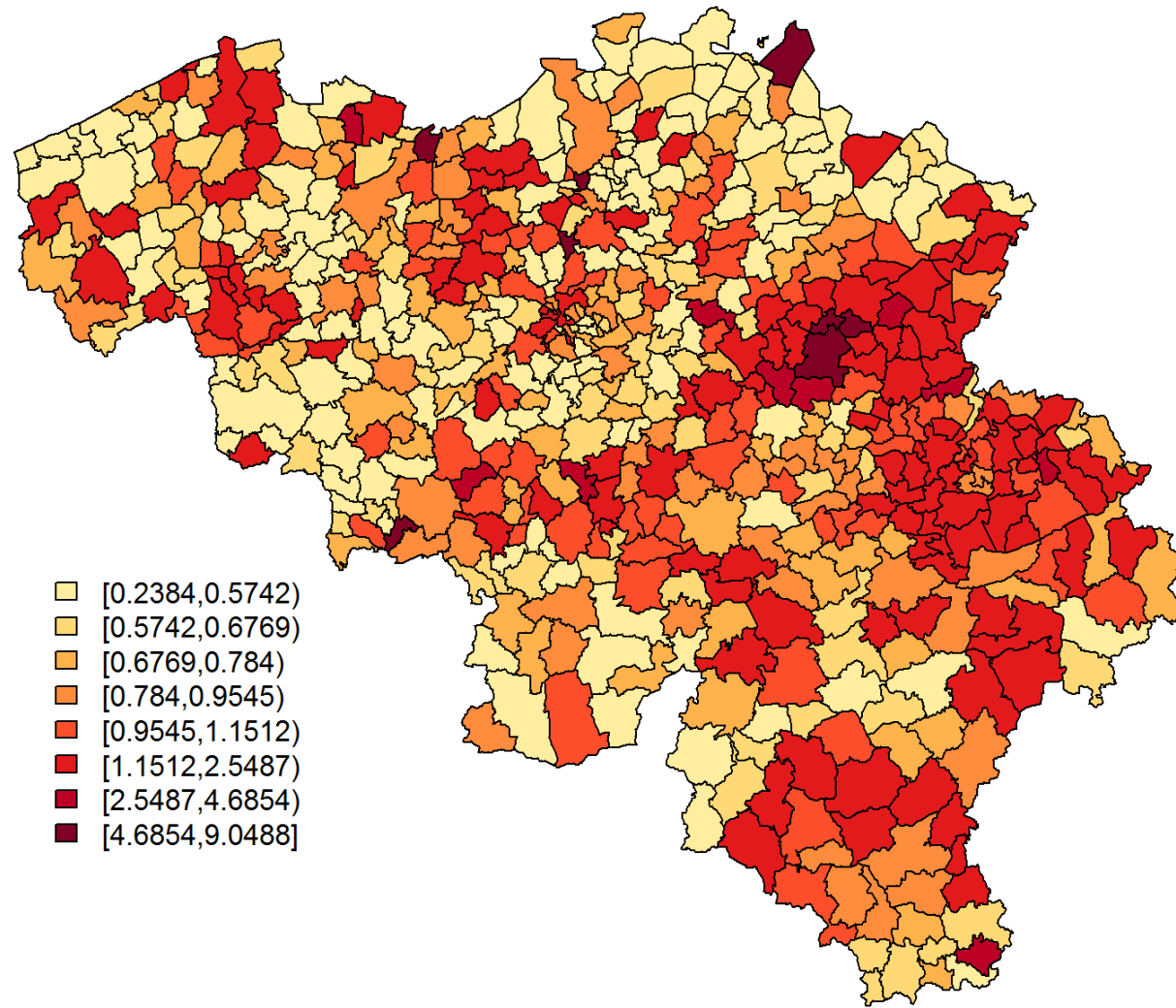
 :MARCH 31











-  [0.1179,0.1406)
-  [0.1406,0.1446)
-  [0.1446,0.1467)
-  [0.1467,0.1482)
-  [0.1482,0.15)
-  [0.15,0.1519)
-  [0.1519,0.1544)
-  [0.1544,0.1664]



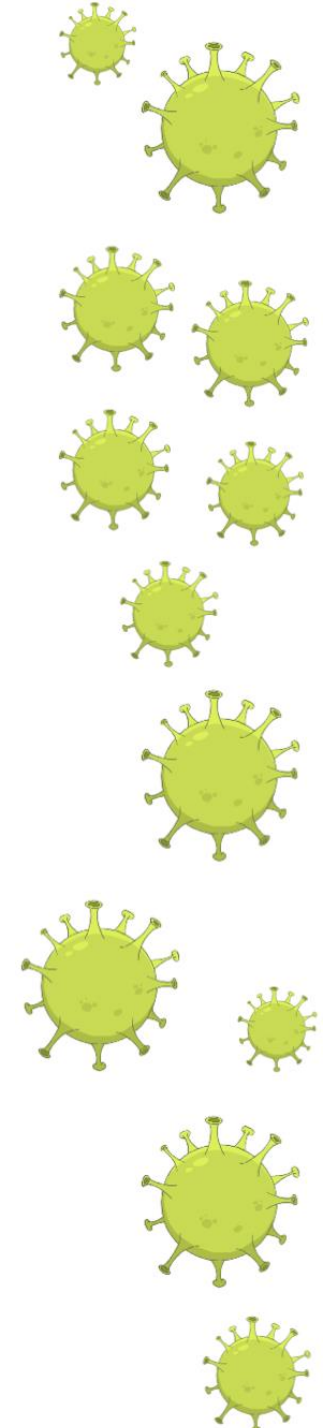
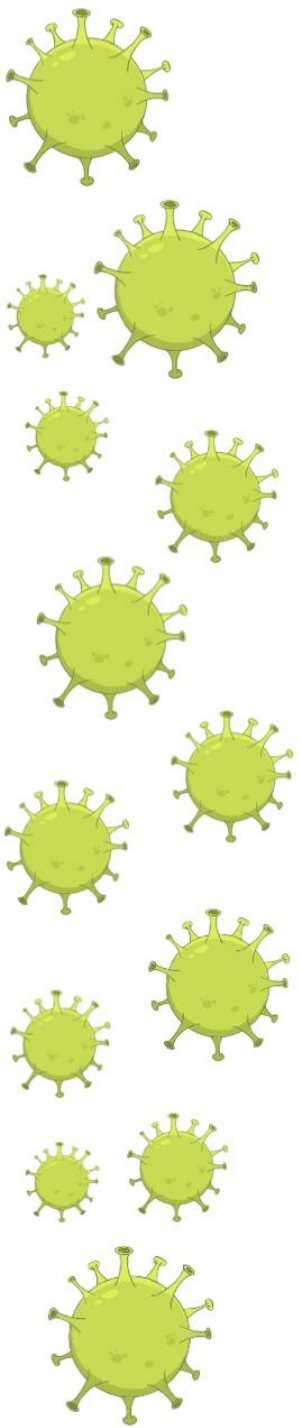
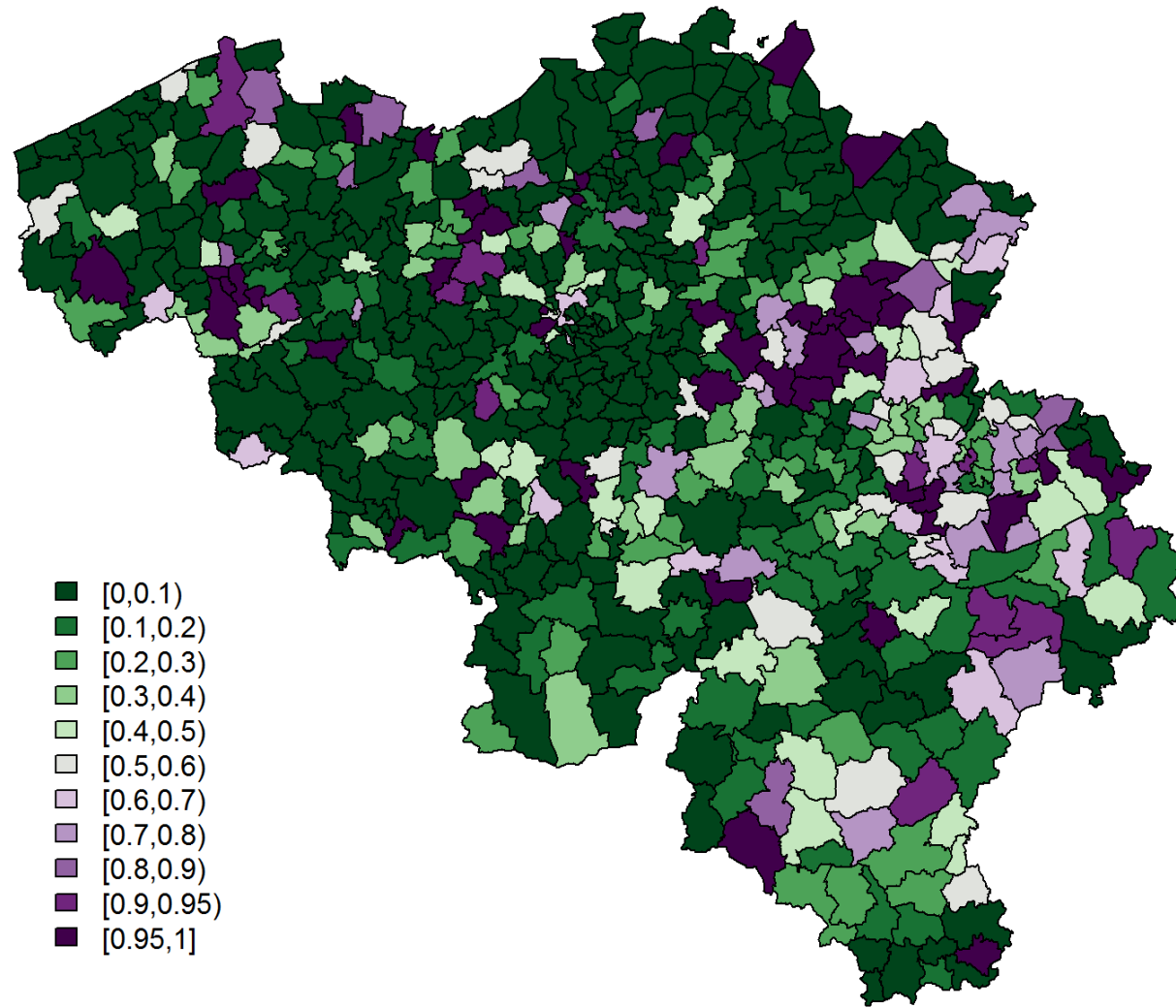
 : APRIL 7-9



-  [0.2384,0.5742)
-  [0.5742,0.6769)
-  [0.6769,0.784)
-  [0.784,0.9545)
-  [0.9545,1.1512)
-  [1.1512,2.5487)
-  [2.5487,4.6854)
-  [4.6854,9.0488]



 : APRIL 7-9



# CONCLUSIONS SPATIAL ANALYSIS

\* SPATIAL VS. RANDOM NOISE

↓ ↓  
DEPENDS ON SPATIAL RESOLUTION

↓  
ESSENTIAL WHEN TRANSMISSION OCCURS VERY LOCALISED



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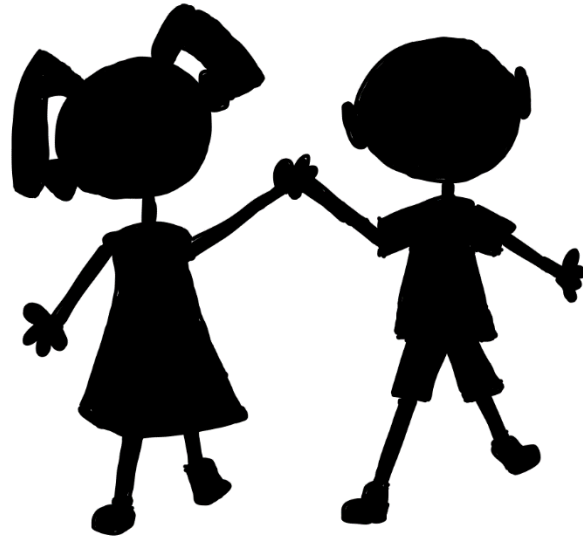


Can COVID-19 symptoms as reported in a large-scale online survey be used to optimise spatial predictions of COVID-19 incidence risk in Belgium?

Thomas Neyens<sup>a,b,\*</sup>, Christel Faes<sup>a</sup>, Maren Vranckx<sup>a</sup>, Koen Pepermans<sup>c</sup>, Niel Hens<sup>a,d</sup>, Pierre Van Damme<sup>d</sup>, Geert Molenberghs<sup>a,b</sup>, Jan Aerts<sup>a</sup>, Philippe Beutels<sup>d</sup>



"Alles komt goed." \*



\* AS ANSWERED IN THE KIDS' VERSION DURING LOCKDOWN TO THE QUESTION:

"DO YOU HAVE A MESSAGE FOR YOUR BEST FRIEND?"