University of Antwerp

The Vaccinators

Cedric De Schepper, Thanh Danh Le,
Wannes Marynen & Stijn Vissers

University of Antwerp

Features

- Daycare and Preschool
- Data Formats
- Demographic Profiling
- Workplace size distributuion

Features

- Daycare and Preschool
- Data Formats
- Demographic Profiling
- Workplace size distributuion

Implementation

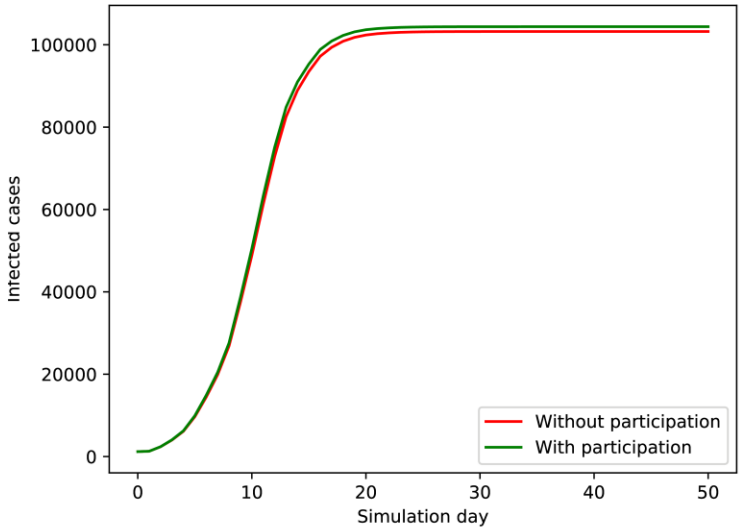
Same algorithm as k12schools

Differences:

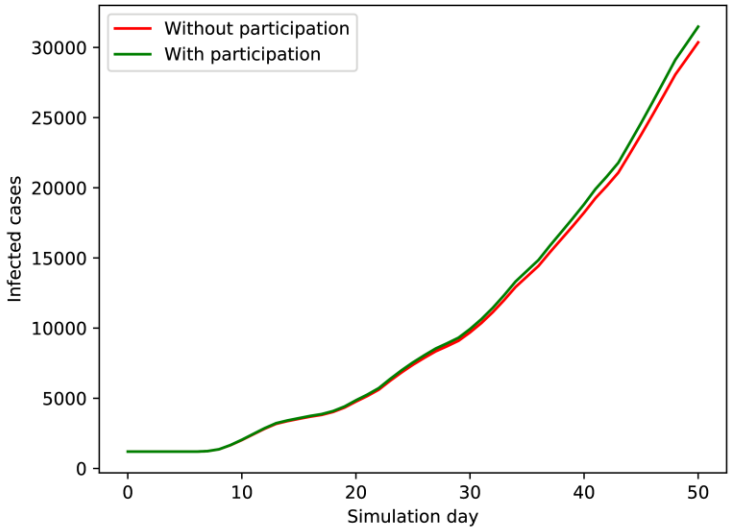
- Size (
  - Daycare: 1 pool of 18
  - Preschool: 6 pools of 20
- Age (0-3 & 3-6)

Impact on simulation

No significant difference with or without participation



measles



influenza

Features

- Daycare and Preschool
- Data Formats
- Demographic Profiling
- Workplace size distributuion

Data formats

Households in JSON

Geogrid in JSON and HDF5

StreamWriter & FileWriter

Data formats
Small demo

Format Comparison

Proto

- Fastest
- Smallest
- Not human readable

JSON/HDF5

- Slower
- Significantly larger
- Human readable
- Usable in other tools

	Default scenario			Double population		
	Gen time	Import time	File size	Gen time	Import time	File size
Proto	1.27s	1.00s	13.8 MB	2.81s	1.91s	27.1 MB
JSON	6.55s	6.97s	117.2 MB	14.23s	12.99s	235.6 MB
HDF5	18.40s	10.48s	147.8 MB	37.31s	22.99s	294.5 MB

Features

- Daycare and Preschool
- Data Formats
- Demographic Profiling
- Workplace size distributuion

Demographic Profile

Regions by using province id

Different parameters per province

Population

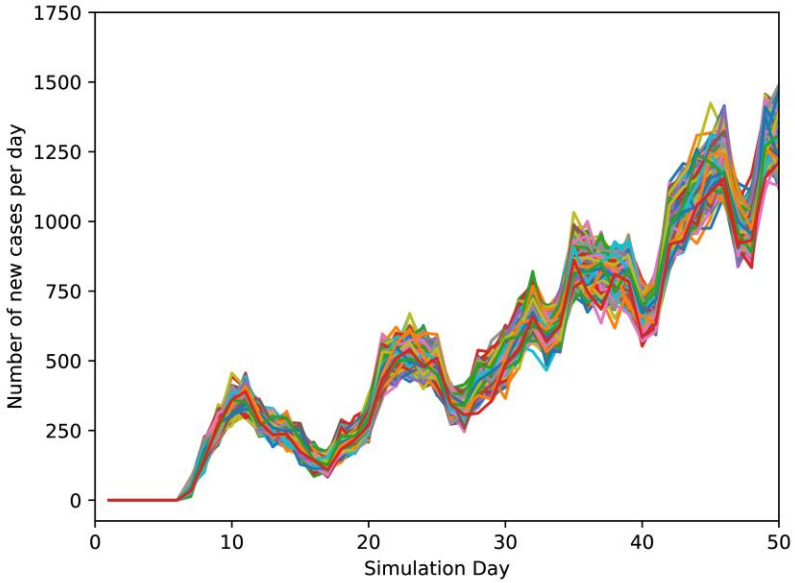
Participation_X

Household profile

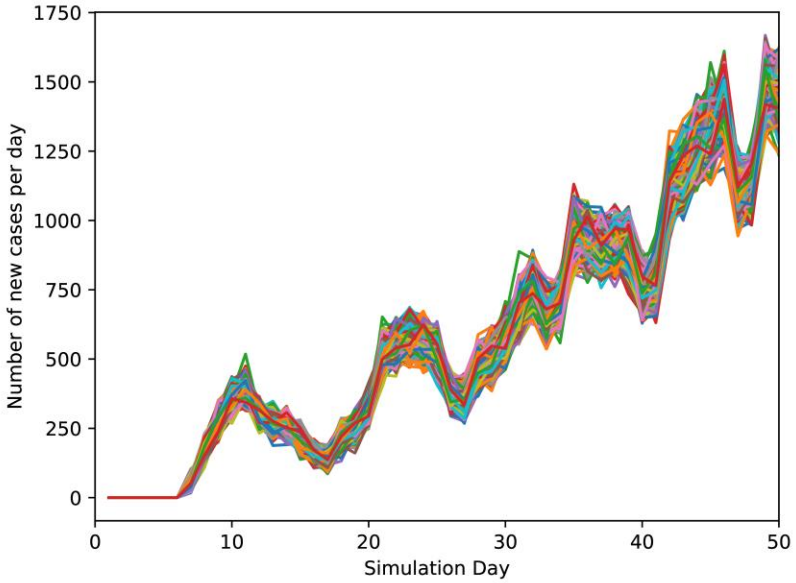
Major cities

Demographic profile Demo

Impact on simulation



4 regions



1 region

New cases per day

Features

- Daycare and Preschool
- Data Formats
- Demographic Profiling
- Workplace size distributuion

Implementation

Generating:

$$\sum_{n=1}^{k} ratio_n * (max_n + min_n)/2$$

Populating (Accurate implementation):

- pool size < minimum size: w = 1 - ratio
- minimum < pool size < maximum: w = (1 - ratio)/10
- pool size ≥ max (with pool not largest workplace type): w = 0.00000000001
- pool size ≥ max (with pool largest workplace type): w = 0.00000000001 / (amount over max size)

Accuracy vs Speed

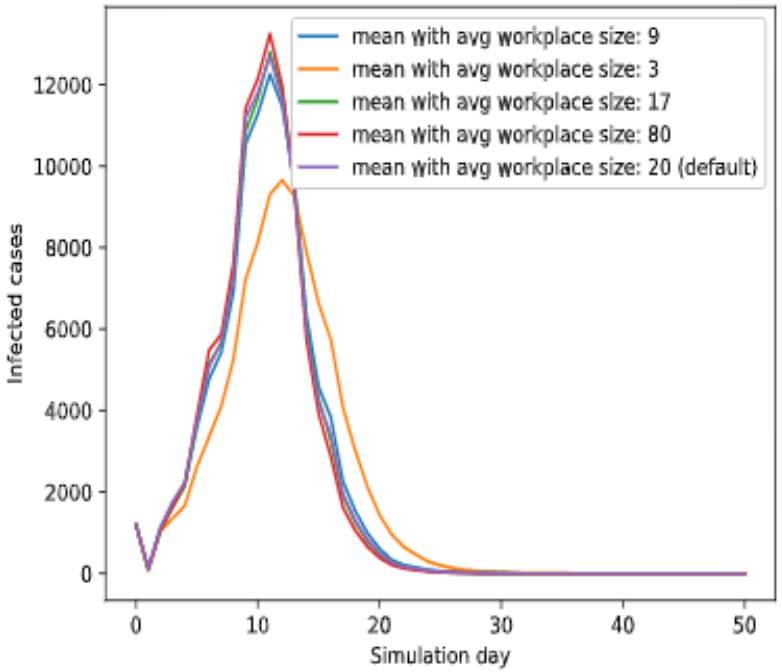
[min, max]	config ratio	actual ratio (mean)	standard deviation	accuracy (mean)
[1, 9]	0.77853284	0.77602516	0.00284574	99.68 %
[10, 49]	0.17190112	0.17426484	0.00275862	98.64 %
[50, 199]	0.04100390	0.04234333	0.00166064	96.84 %
[200, 400]	0.00856214	0.00736667	0.00059997	86.04 %

Accurate implementation after 50 runs.

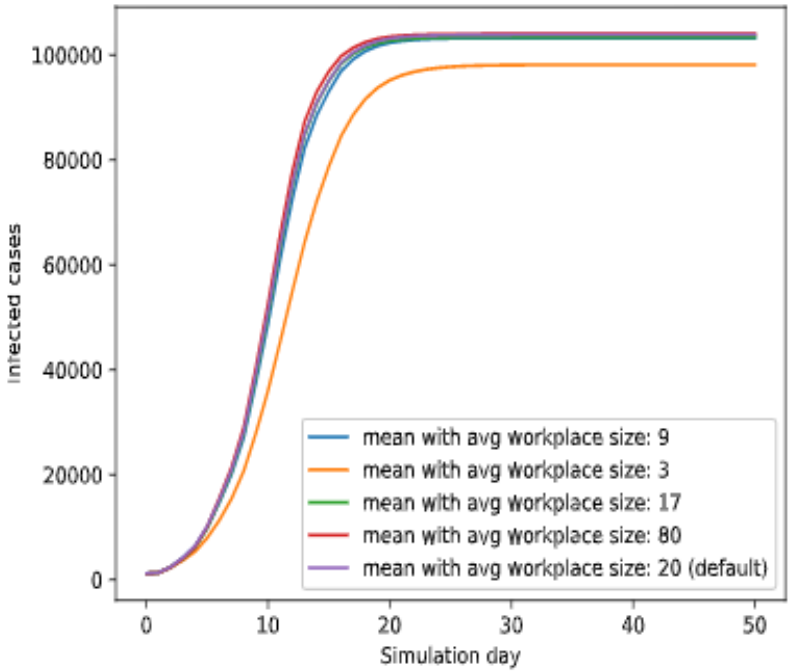
[min, max]	config ratio	actual ratio (mean)	standard deviation	accuracy (mean)
[1, 9]	0.77853284	0.86146304	0.00231454	90.37 %
[10, 49]	0.17190112	0.09855179	0.00282680	57.33 %
[50, 199]	0.04100390	0.03018688	0.00105180	73.62 %
[200, 400]	0.00856214	0.00979836	0.00049904	87.38 %

Fast implementation after 50 runs.

Impact on simulation

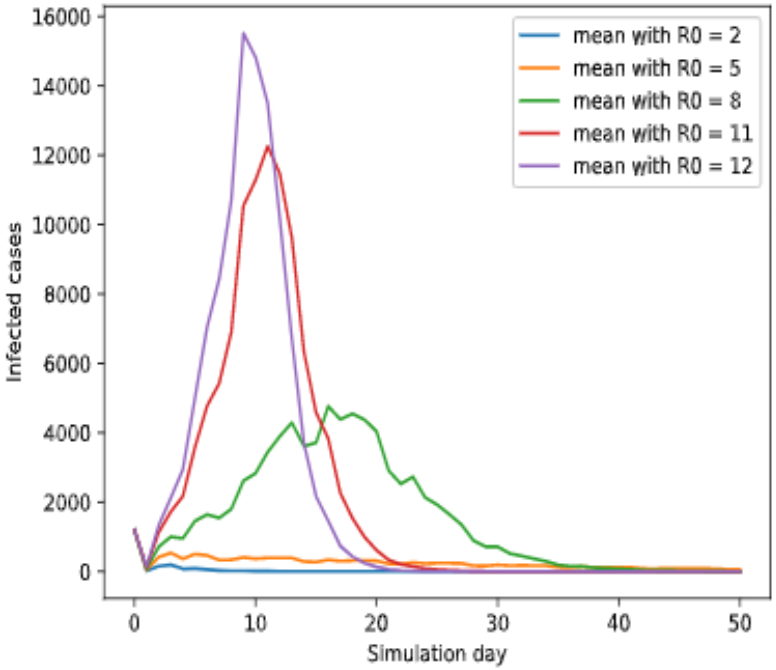


(a) new cases

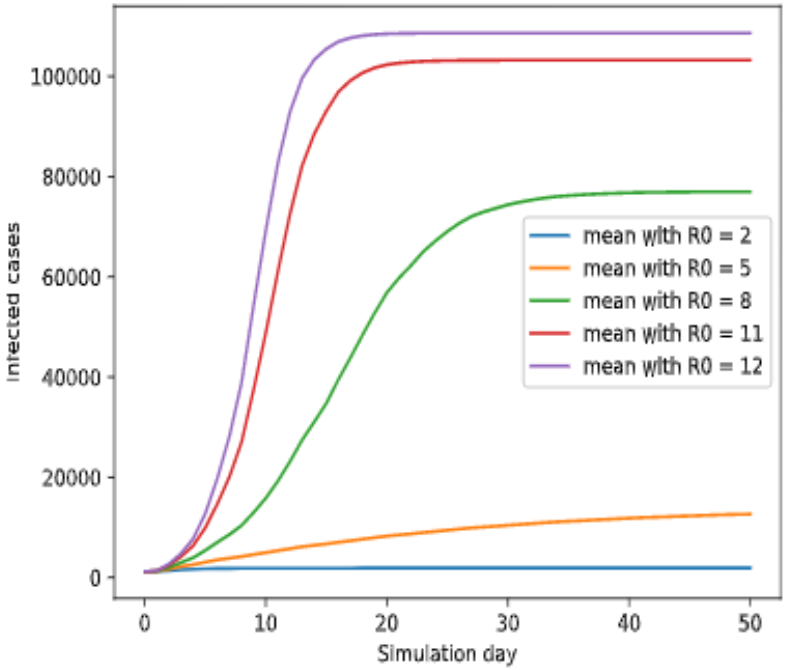


(b) cumulative cases

Impact on simulation



(a) new cases



(b) cumulative cases

Simulation of Belgium

CONFIGURATION OF BELGIUM

CONFIGURATION OF FLANDERS

RESULTS

Configuration of Belgium

configuration per province with corresponding household

Belgium commuting

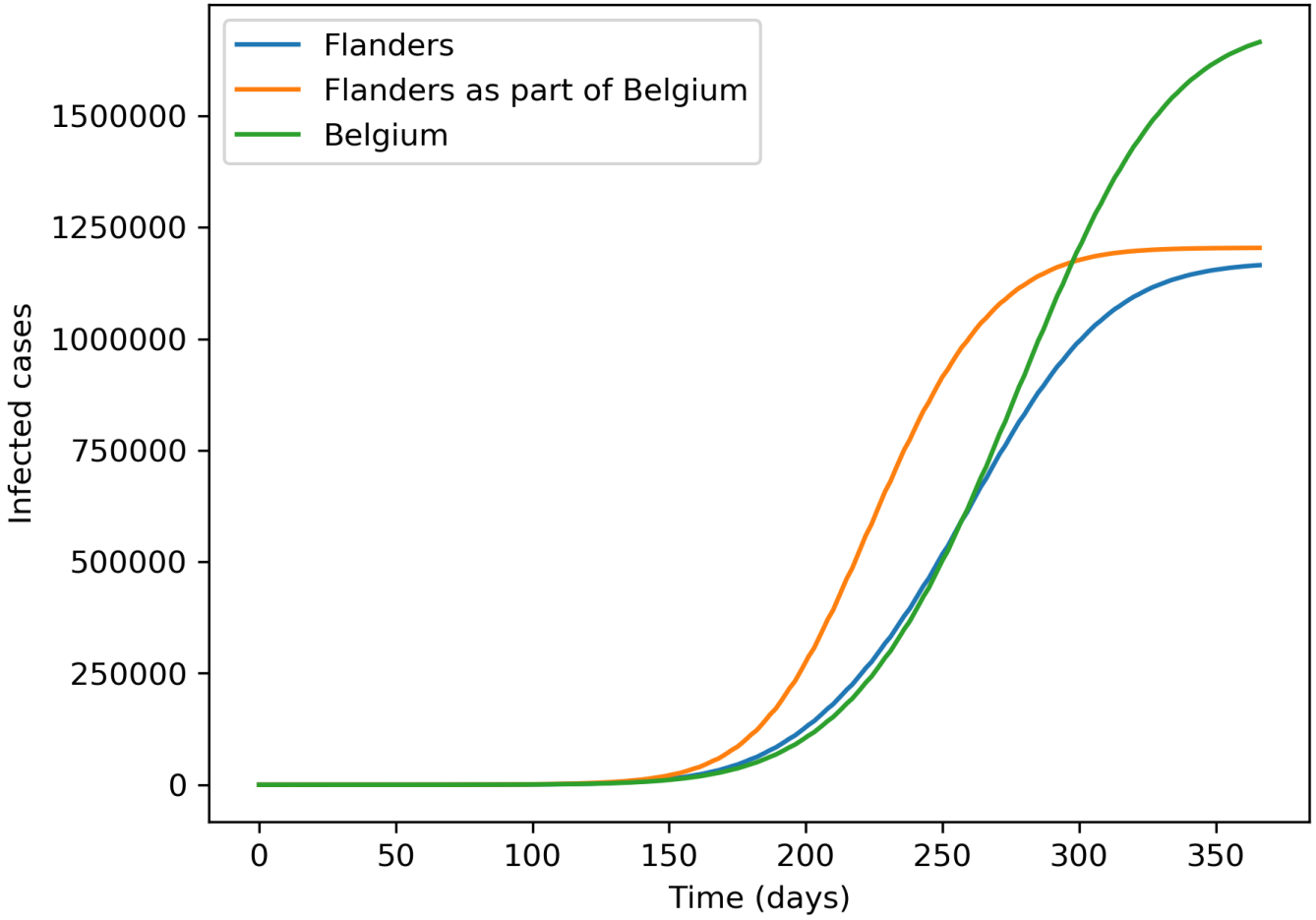
Belgium cities

Belgium workplace size distribution

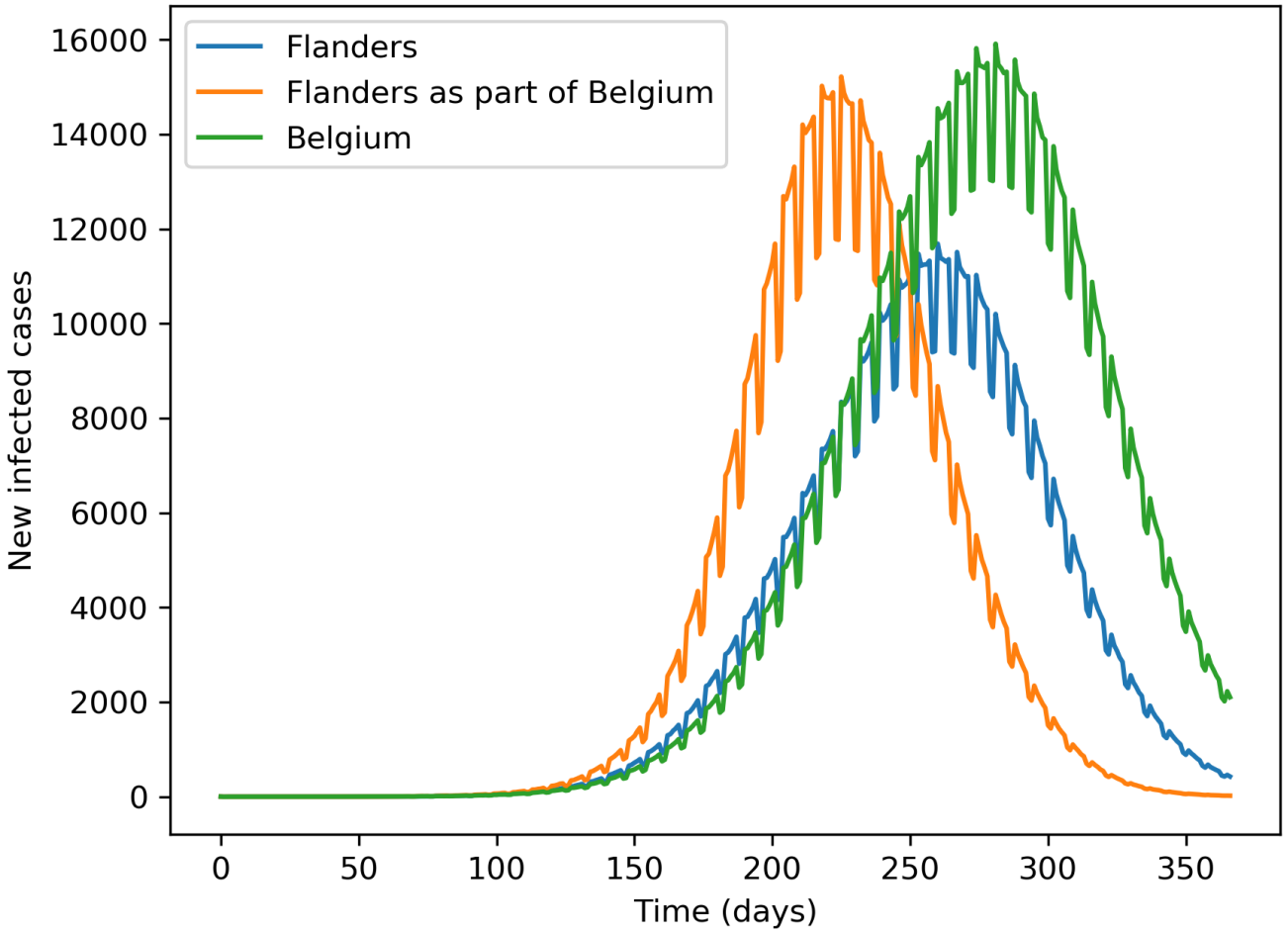
Configuration of Flanders

Flanders as part of Belgium	Flanders as isolated region
• Same as configuration Belgium • Except only provinces of Flanders	• Flanders commuting • Flanders cities • Flanders workplace size distribution

Results


Flanders
Flanders as part of Belgium
Belgium
Infected cases
1500000
1250000
1000000
750000
500000
250000
0
0
50
100
150
200
250
300
350
Time (days)

Results


Flanders
Flanders as part of Belgium
Belgium
New infected cases
16000
14000
12000
10000
8000
6000
4000
2000
0
0
50
100
150
200
250
300
350
Time (days)

Data visualisation

University of Antwerp