

# CONNECT-UNIVERSUM 2020

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```

Using computational models  
in response to COVID-19 pandemic



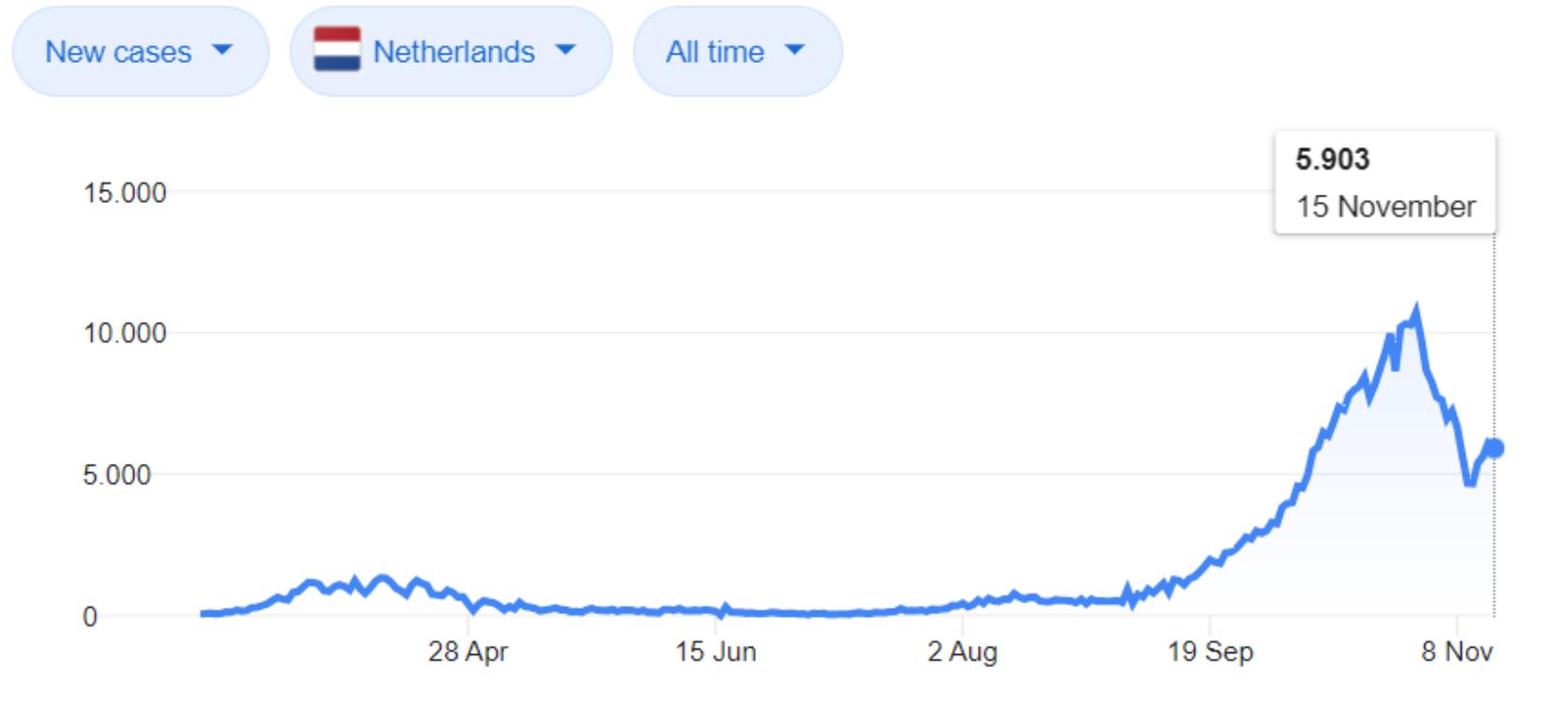
@mikhailsirenko



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# It's almost a year

Daily change



Each day shows new cases reported since the previous day · Updated less than 20 mins ago · Source: [Wikipedia](#)

# Policy-making approach: *theory*

**Top-down** – National government decides what to close



**Bottom-up** – Provincial government, since healthcare is their jurisdiction



**Mixed approach** – Certain power given to local authorities, but some of the decisions are made at the country level



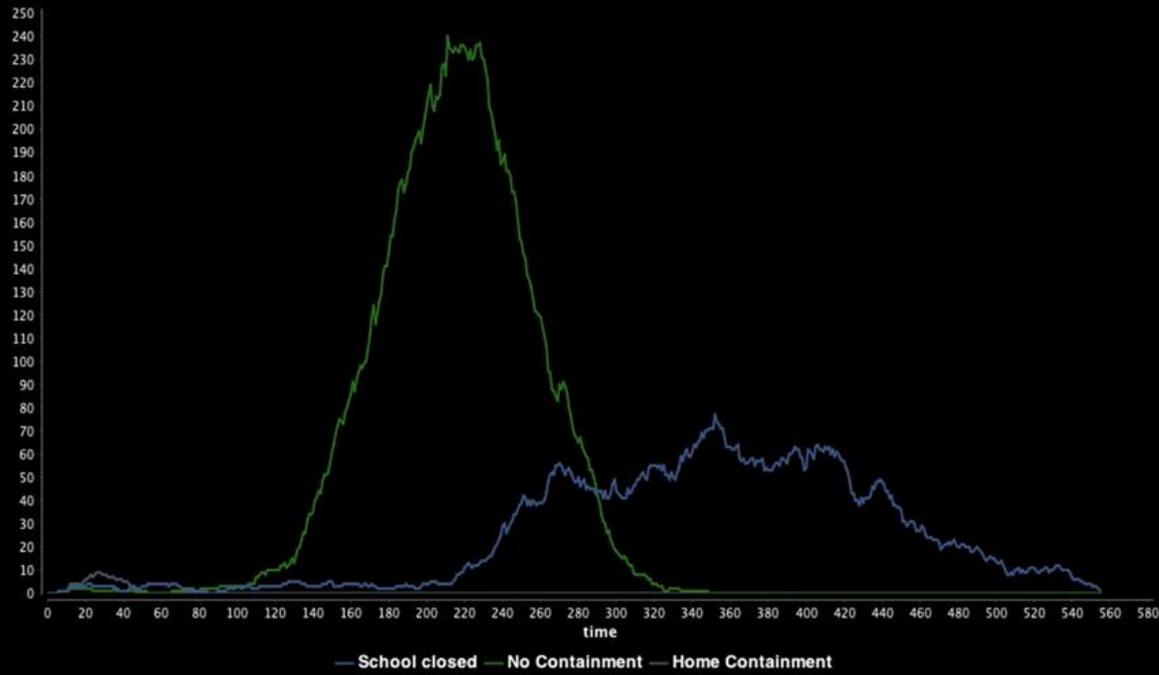
# What is the “base”?

**Experience** – China and SARS, H1N1 and South Korea

**Expert opinions** – WHO recommendations, national emergency groups, healthcare experts

**Computational models** – RIVM models in the Netherlands, Imperial College’s model in the UK, COMOKIT model for Vietnam

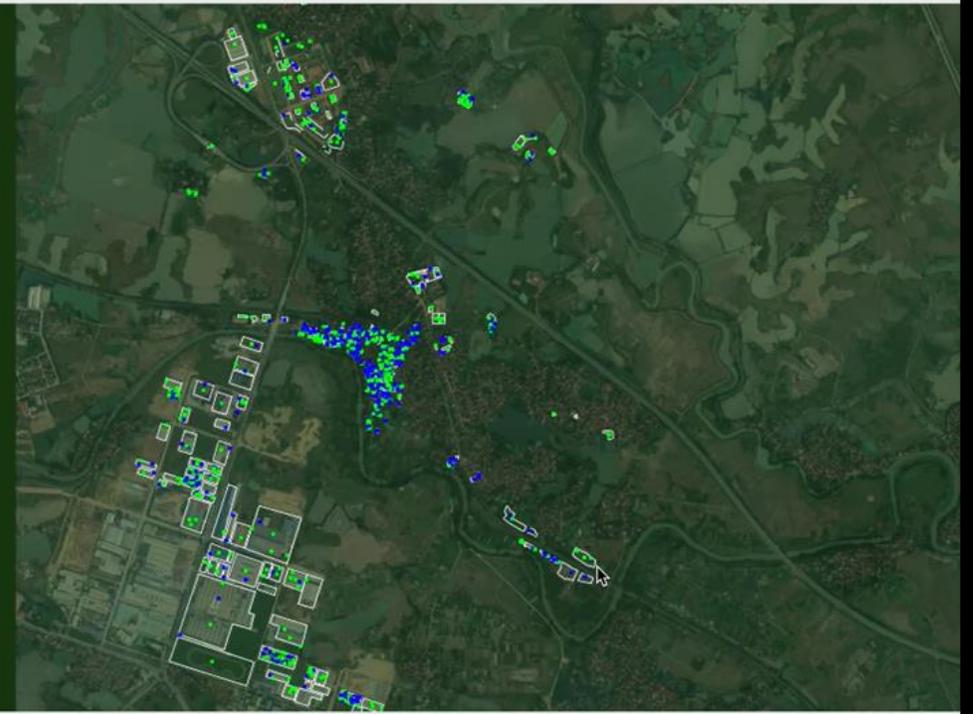
### Infected cases



### No Containment

Day 23

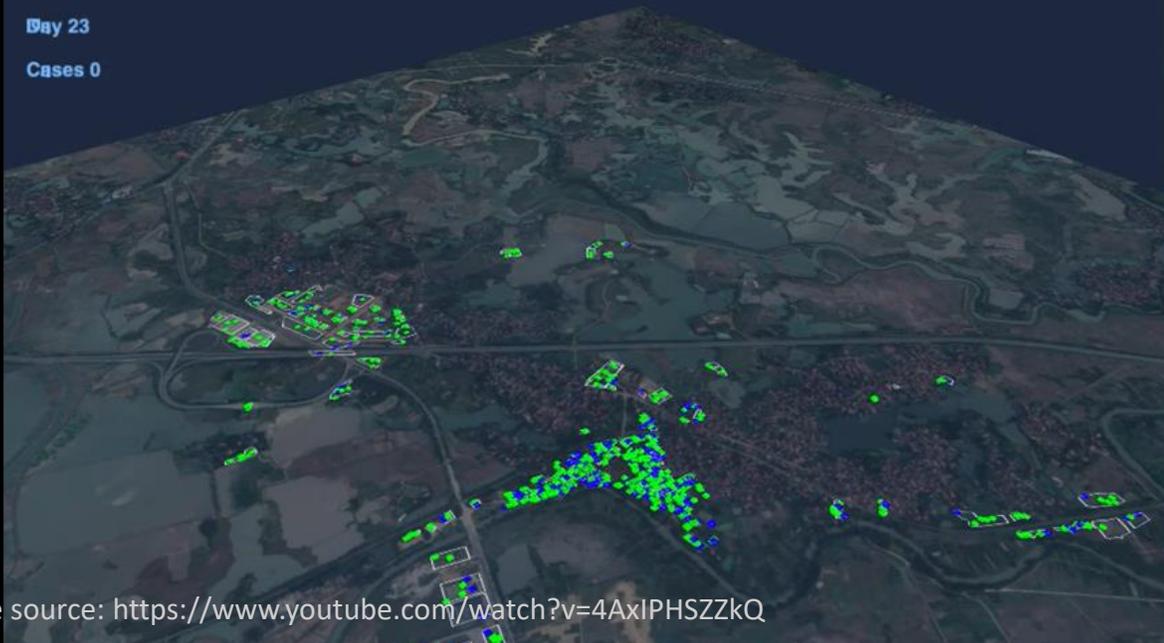
Cases 0



### School closed

Day 23

Cases 0



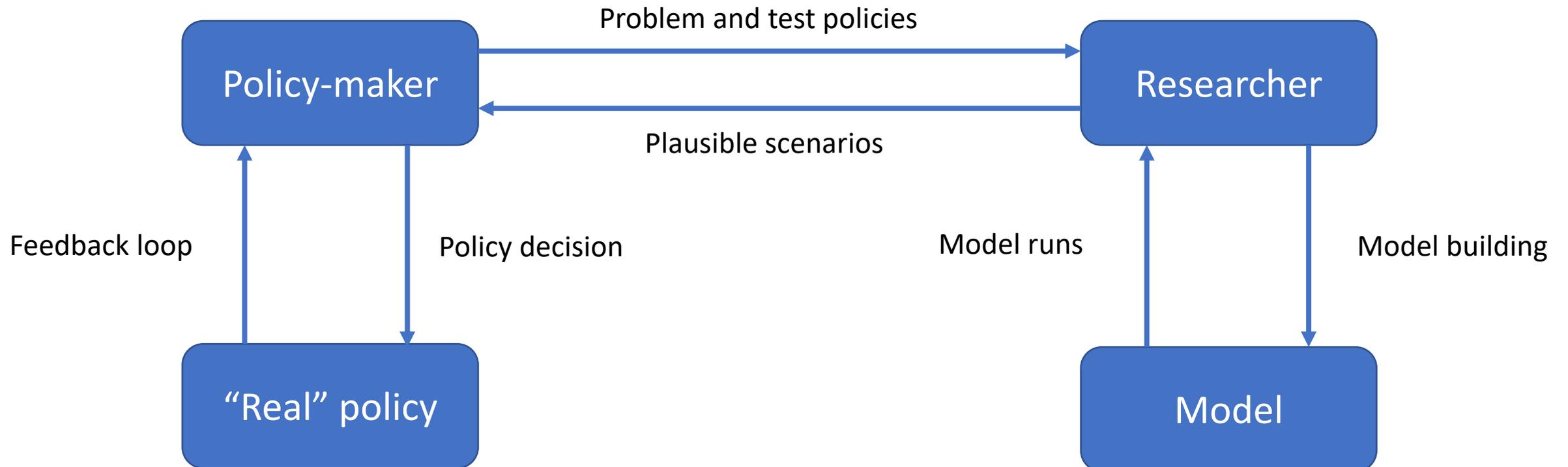
### Home Containment

Day 23

Cases 0



# Oversimplified interaction



The background of the slide is a dark blue color with a complex network of light blue lines and nodes, resembling a digital or biological network. The word "CORPORA" is written in large, light blue, stylized letters across the top, and "VIRUS" is written in similar letters across the bottom. The word "HEROS" is prominently displayed in the center in large, white, bold, sans-serif capital letters.

# HEROS

Health Emergency Response  
in Interconnected Systems

[www.heros-project.eu](http://www.heros-project.eu)



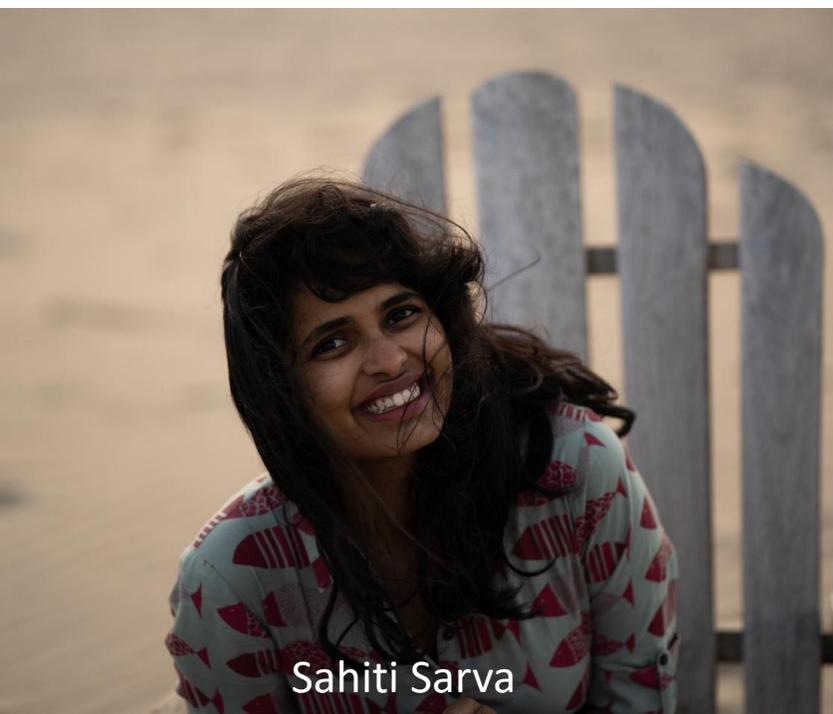
Tina Comes



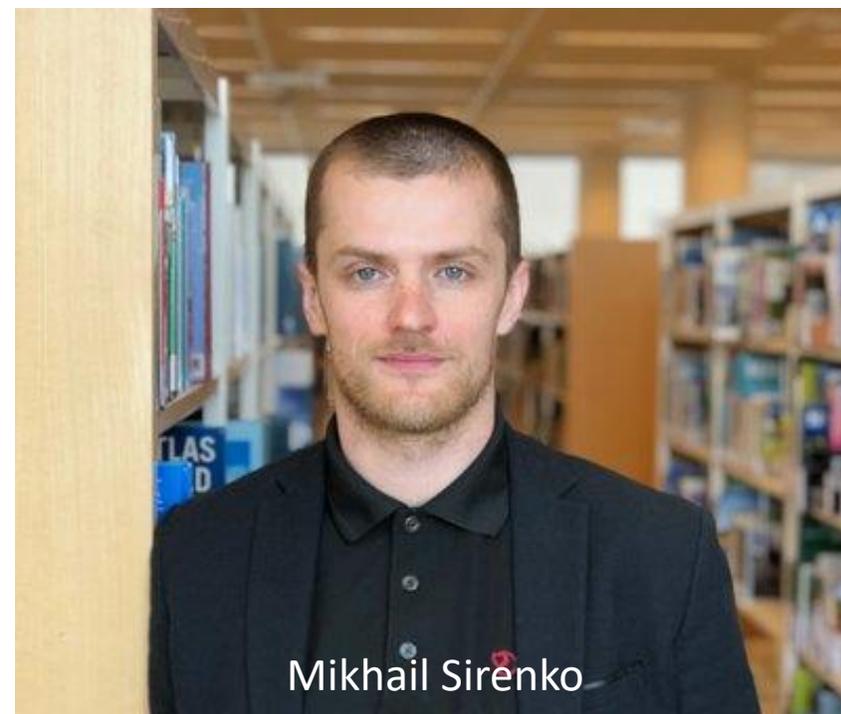
Jin Rui Yap



Alexander Verbraeck



Sahiti Sarva



Mikhail Sirenko



Daan van Bilsen

# What we have built informally



Hi!

Here is what we know about Emma:

Emma is 42.

She is single

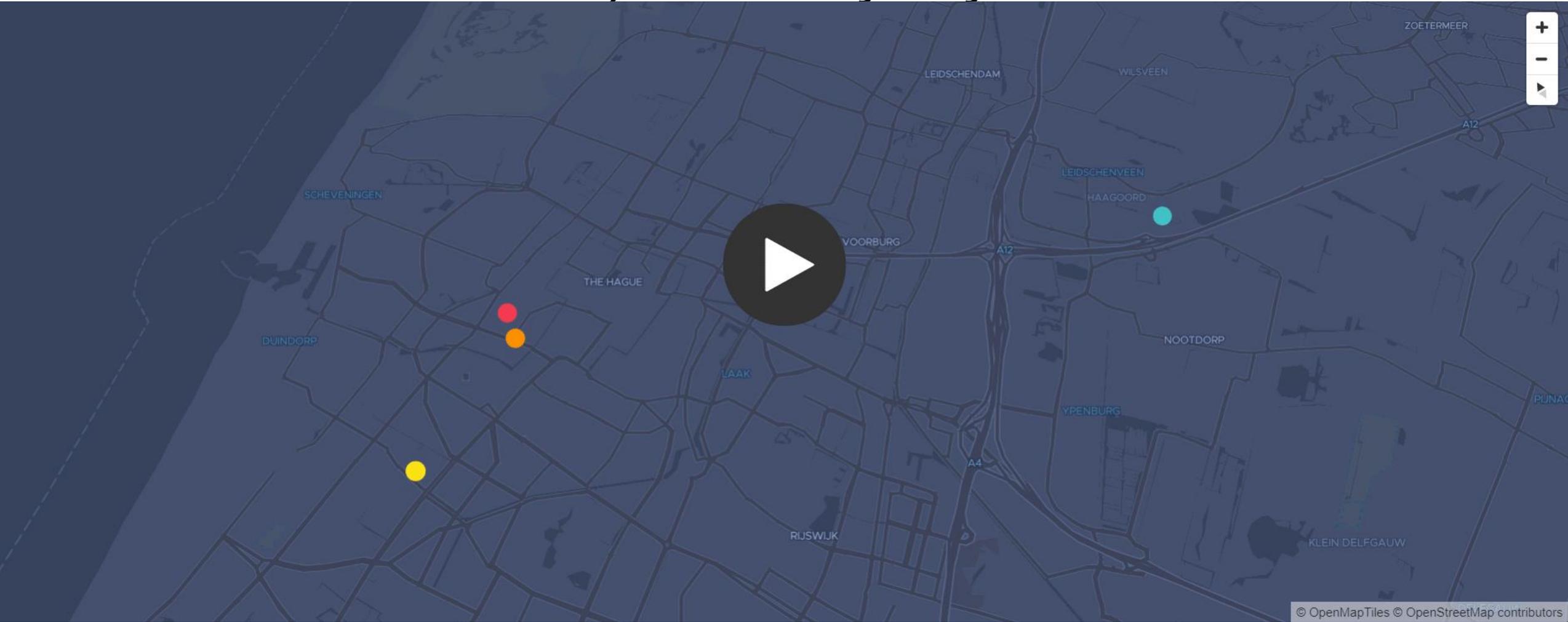
and lives in Rietbuurt.

Works in an auto repair shop and  
has an average income.

She owns a car

and uses it to get to work.

# *A day in the life of Emma*



# How did Meredith get infected?



People do activities at locations where they meet other people and get infected.

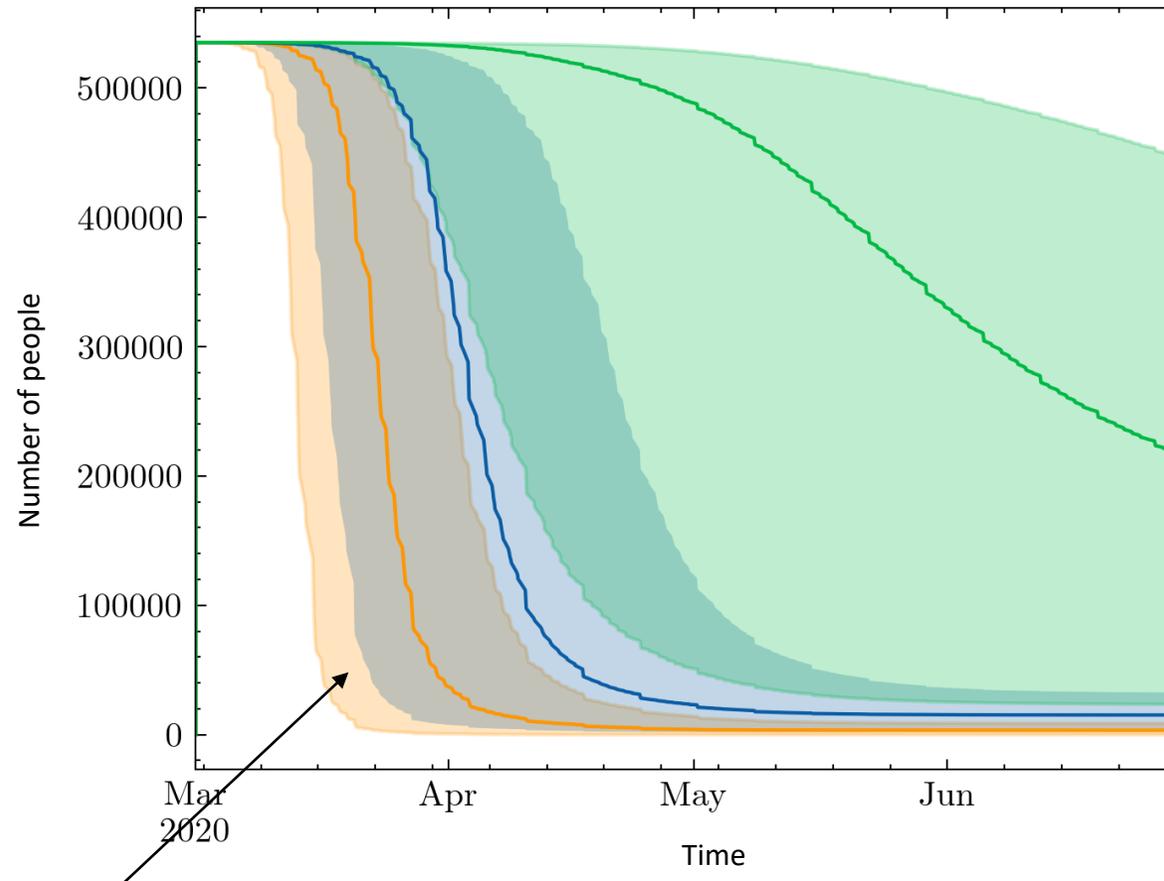


She worked with Josh for 8 hours. Josh, in his turn, got infected from his son who is a student.

They both (Josh and his son) are *asymptomatic*.

# What is more effective?

Non-infected people left in The Hague



**Soft measures may not work.**  
The number of spatial contacts happening at the places that (especially supermarkets and pharmacies) are still open is high enough to fuel the pandemic.

Aggregated scenarios generated via sampling virus parameters

# Unexpected role of supermarkets

Infections happened in supermarkets

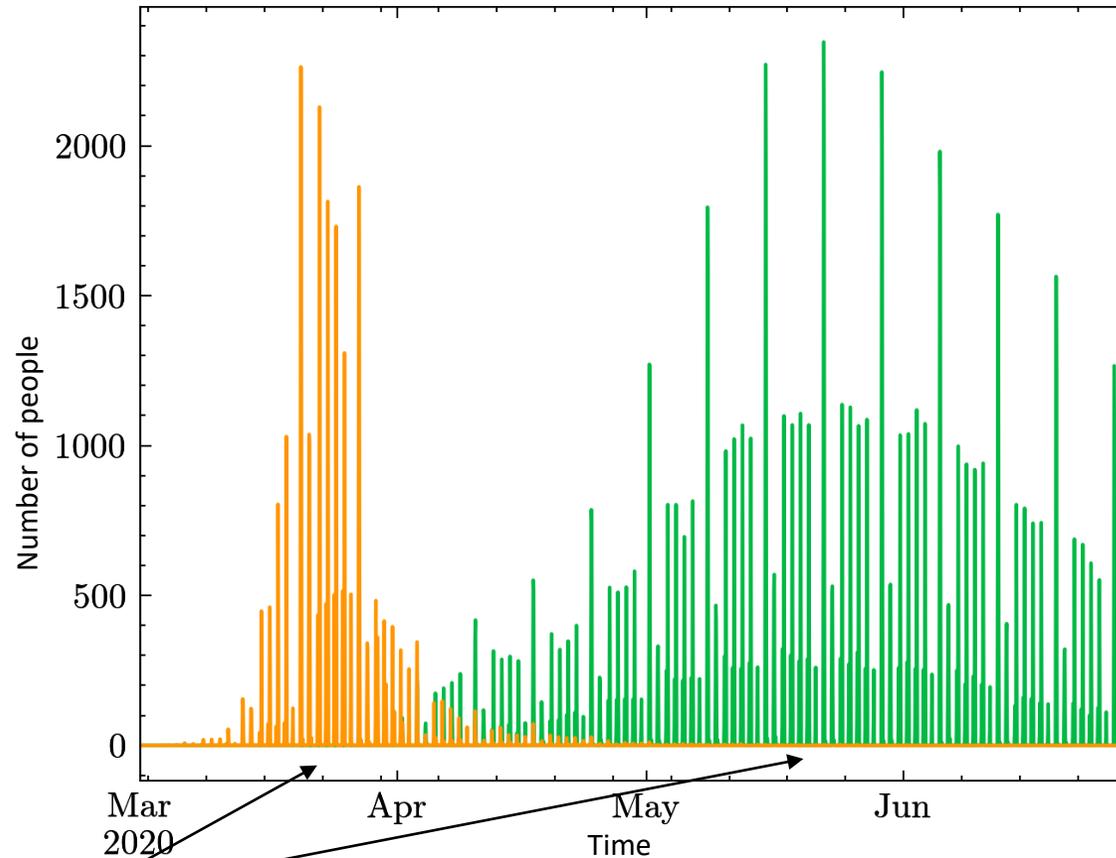
Legend

2 policies

Hard lockdown

Close edu,  
bars,  
Entertainment

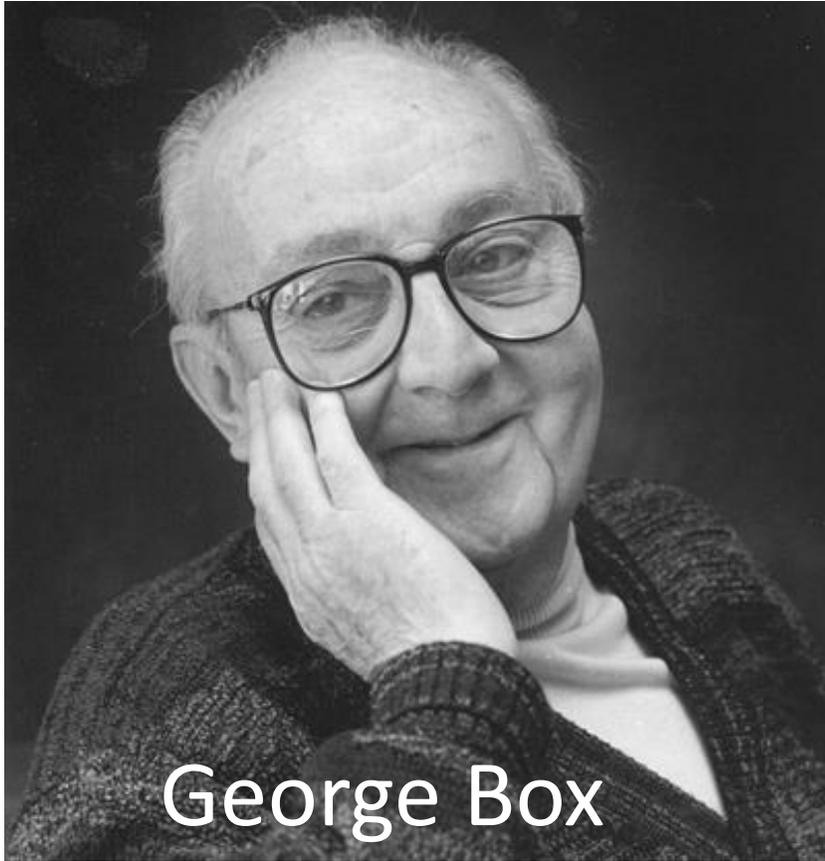
Do nothing



**Prevent crowding,  
especially at supermarkets  
under full lockdown.**

Supermarkets remain only  
places where people meet.  
Therefore they can become  
“urban airports” and boost  
the spread of the virus  
within the city. **Thus, need  
to plan opening hours,  
allowed capacity, etc.**

People got redirected from  
other shops to supermarkets



All models are wrong but  
some of them are useful.

# Key takeaways

- 1 Models are **useful instruments** in response to complex problems
- 2 However, the decisions made by **politicians** are **political**, models **only support them**
- 3 We have to remember that **we are not predicting** but **exploring** plausible **futures**

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Thank you!



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