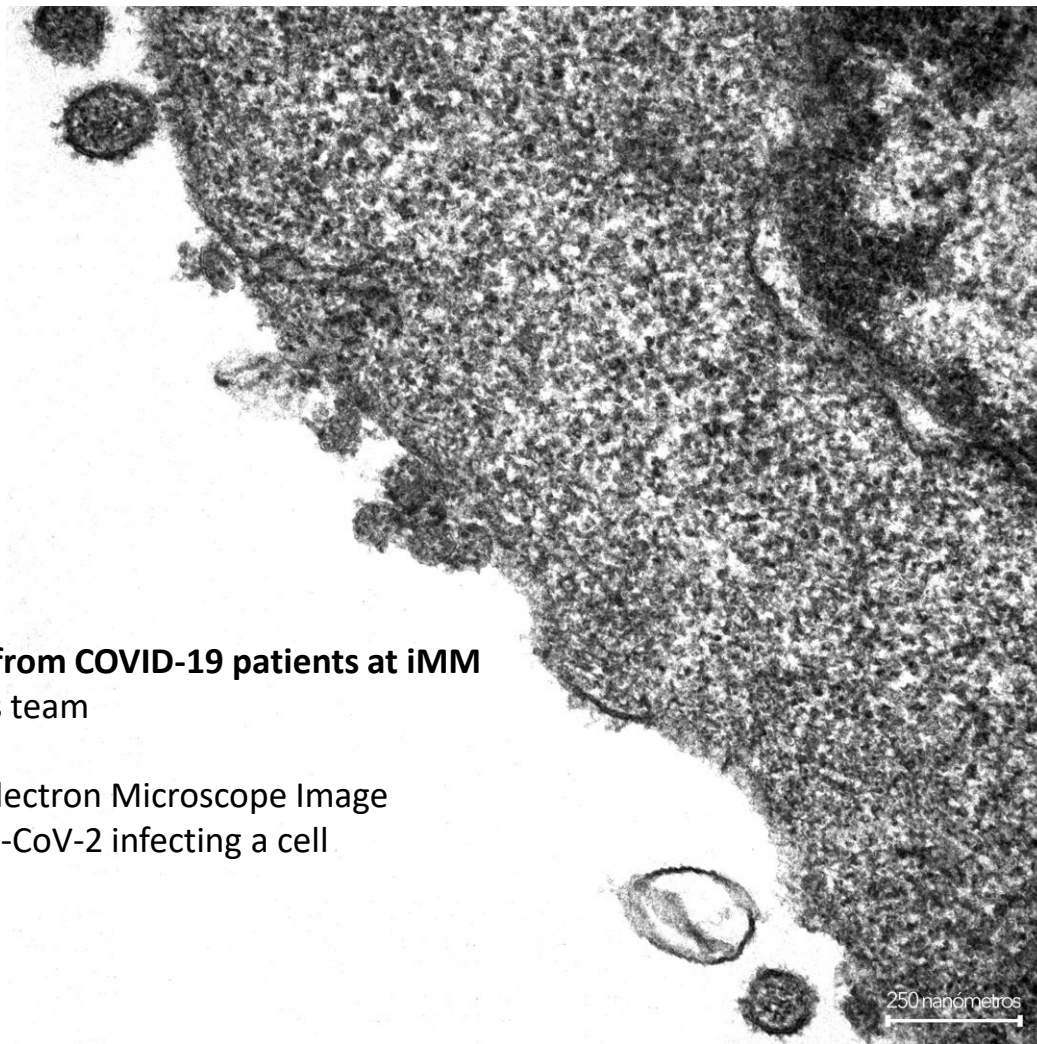


## COMEMORAÇÕES DO 25º ANIVERSÁRIO DO SIED

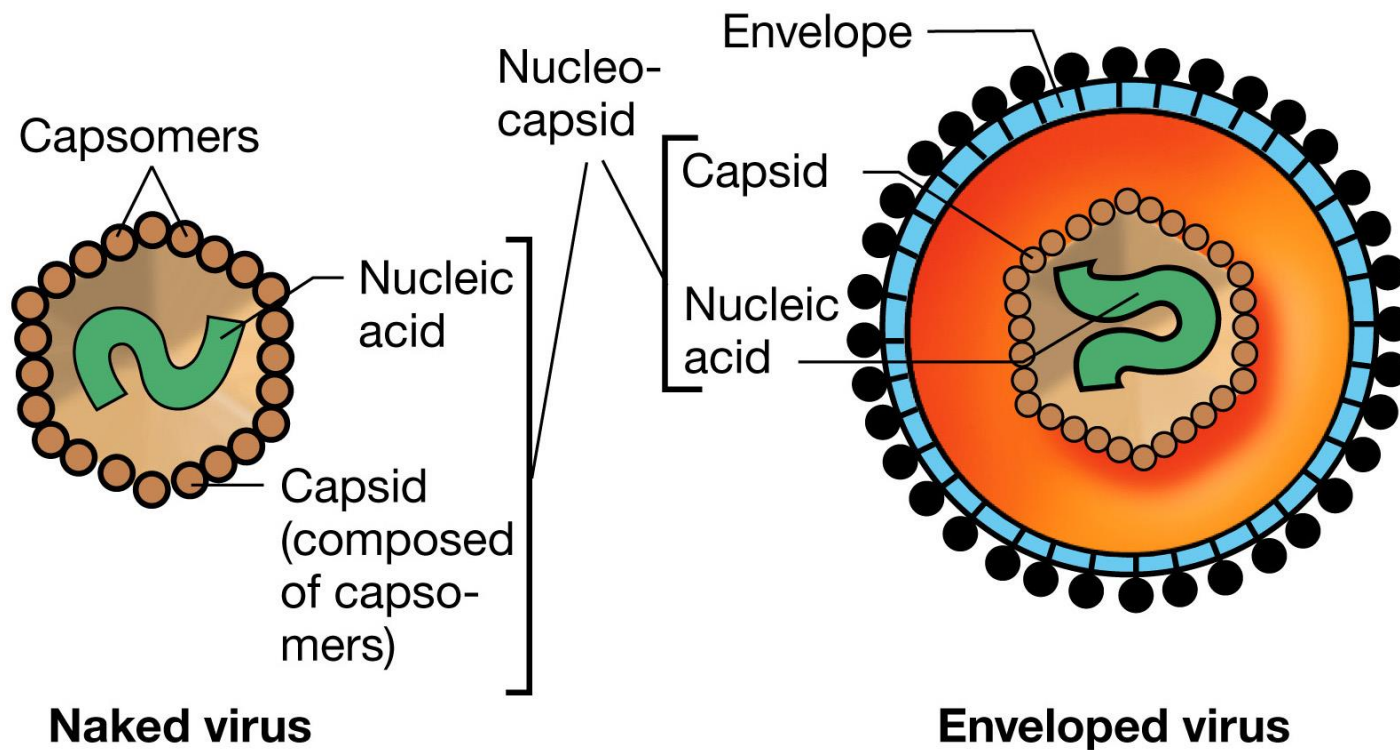
Pedro Simas



**Virus isolated from COVID-19 patients at IMM**  
by Pedro Simas team

Transmission Electron Microscope Image  
capturing SARS-CoV-2 infecting a cell

## Viruses are obligatory intracellular parasites



## Pandemic Virus

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an emergent virus that spreads across a large region, for instance multiple continents, or worldwide in a population that is susceptible – **without herd immunity**.

## Pandemic Viruses

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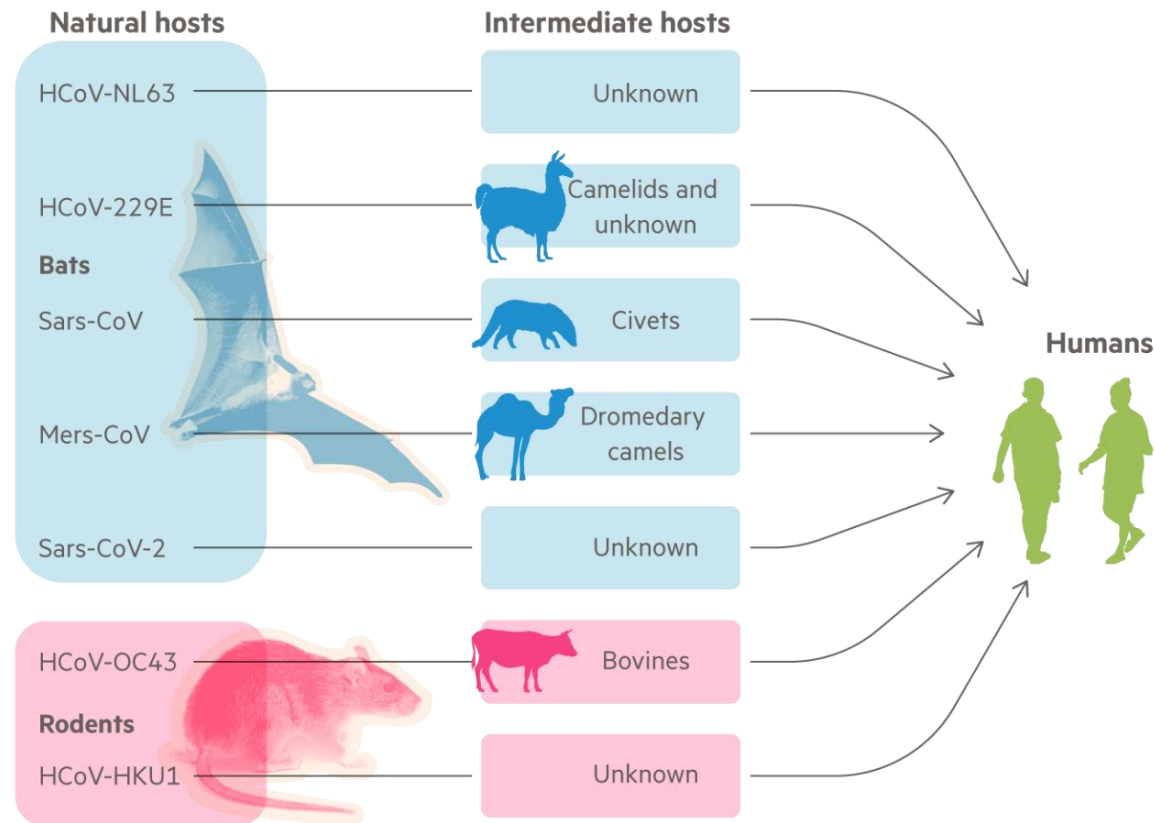
if we accept that new viruses do not emerge through *spontaneous generation*,

we are left with two possibilities:

1. mutant virus in host population is selected;
2. **a virus from another species jumps the species barrier.**

# We still do not know from which species SARS-Cov2 come from

## Animal hosts of human coronaviruses



# let us look at current global epidemiological data

## COVID-19 CORONAVIRUS PANDEMIC

Last updated: September 22, 2020, 17:23 GMT

worldometer

[Graphs](#) - [Countries](#) - [Death Rate](#) - [Symptoms](#) - [Incubation](#) - [Transmission](#) - [News](#)

Coronavirus Cases:

**31,631,409**

[view by country](#)

Deaths:

**971,845**

Recovered:

**23,225,714**

### ACTIVE CASES

**7,433,850**

Currently Infected Patients

**7,371,798** (99%)  
in Mild Condition

**62,052** (1%)  
Serious or Critical

[Show Graph](#)

### CLOSED CASES

**24,197,559**

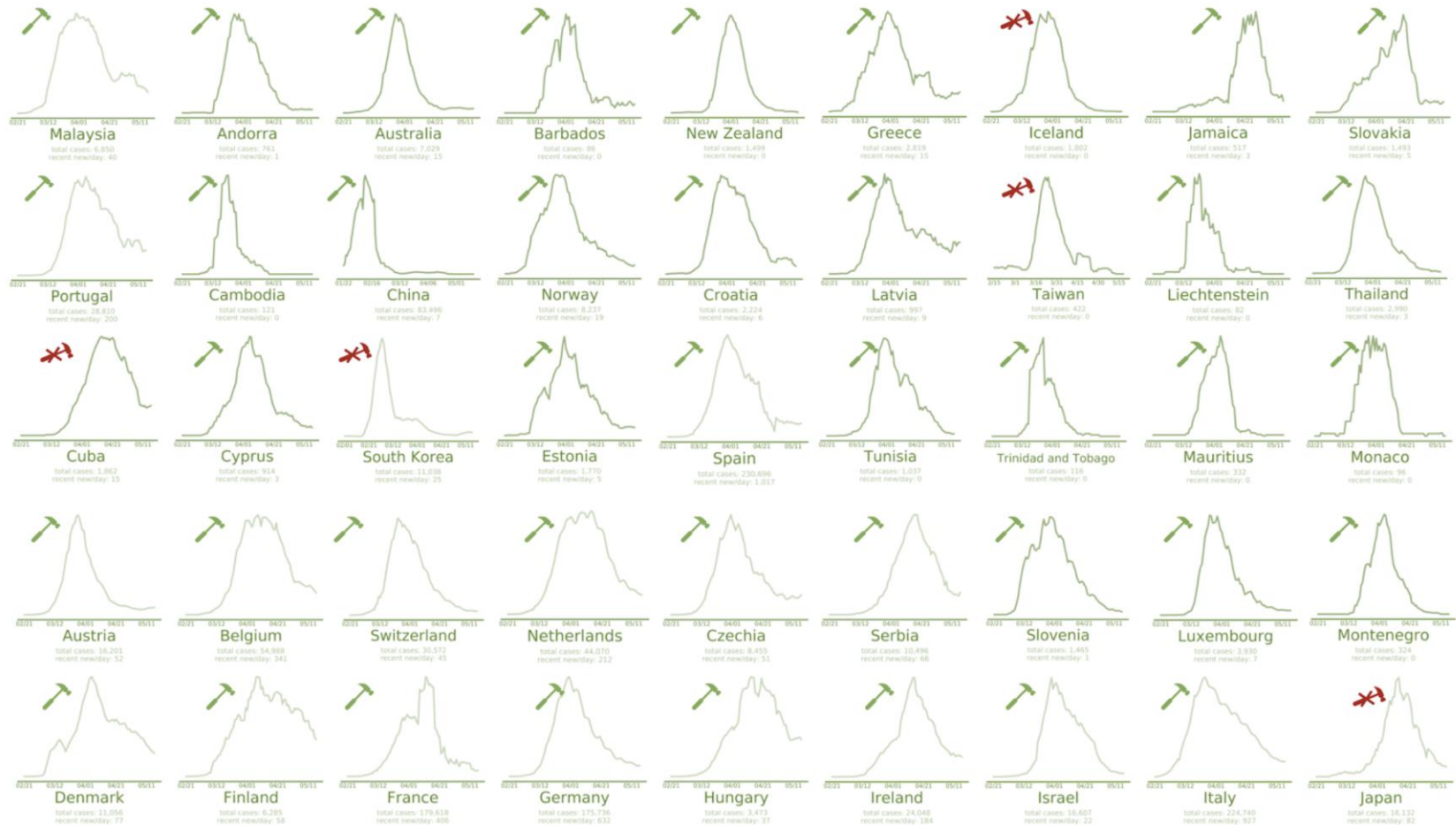
Cases which had an outcome:

**23,225,714** (96%)  
Recovered / Discharged

**971,845** (4%)  
Deaths

[Show Graph](#)

# Control but no elimination - endemic



Source: Tomas Pueyo and Christina Mueller analysis, based on chart from [endcoronavirus.org](https://endcoronavirus.org) and research in the press, May 20<sup>th</sup>

Details on how each country applied the Hammer (or not): [How 45 countries beat the coronavirus](#)



# SARS-CoV-2 is not going away - endemic

The New York Times

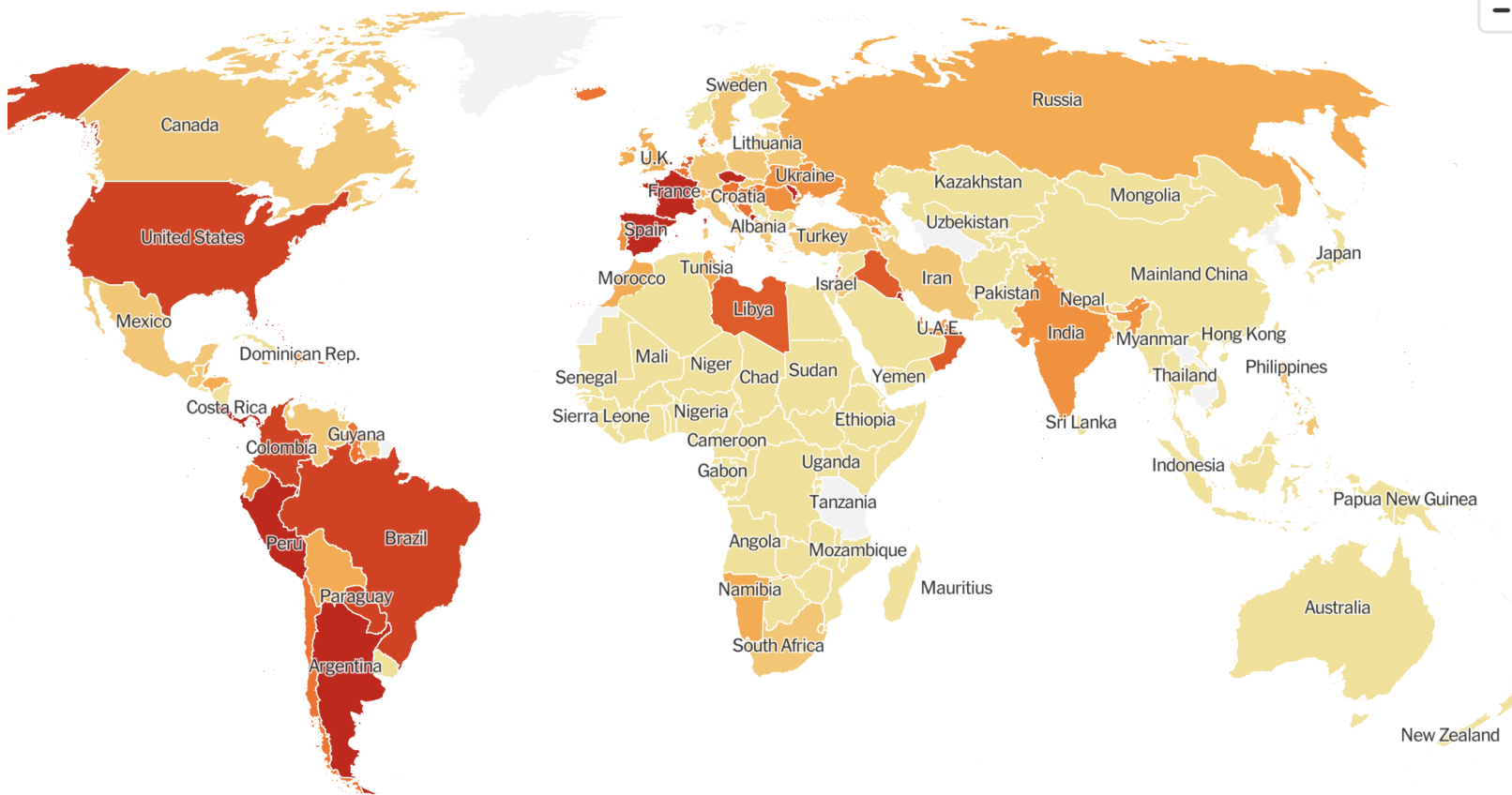
**WORLD** | Covid World Map: Tracking the Global Outbreak



Average daily cases per 100,000 people in the past week













Double-click to zoom into the map.



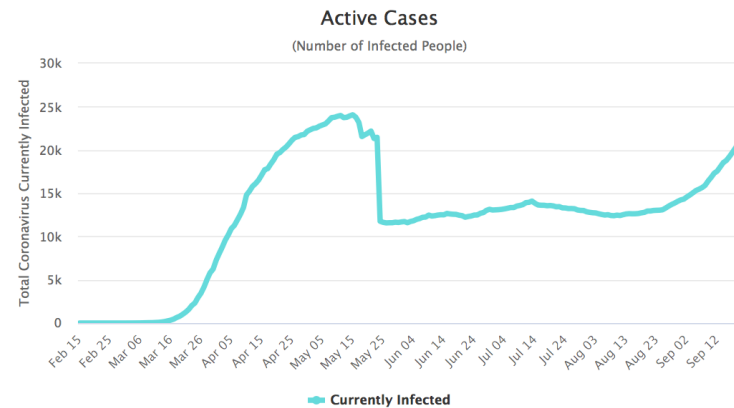


## Portugal's situation

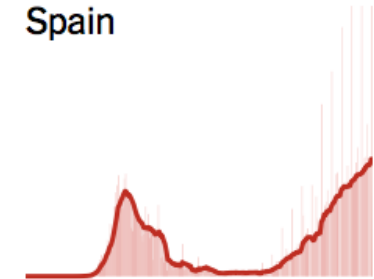
Israel	193,374	2,177	30,561	344	
Spain <a href="#">MAP »</a>	671,468	1,437	77,738	166	
Portugal	69,663	678	4,604	45	
Dominican Rep.	108,783	1,024	4,673	44	
Morocco	103,119	286	14,916	41	
U.K. <a href="#">MAP »</a>	398,625	600	27,500	41	
Jamaica	5,143	175	1,210	41	
Ireland	33,121	682	1,929	40	
Sweden	89,436	878	1,732	17	
Germany <a href="#">MAP »</a>	274,158	331	12,396	15	

# better protection of high risk group

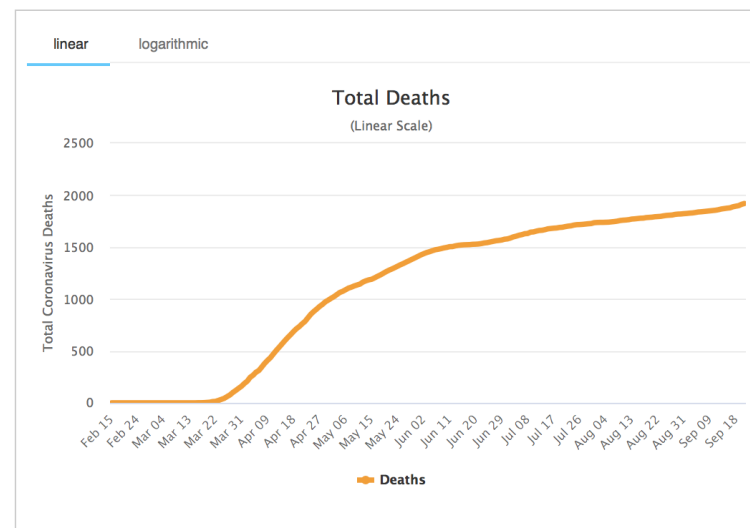
Active Cases in Portugal



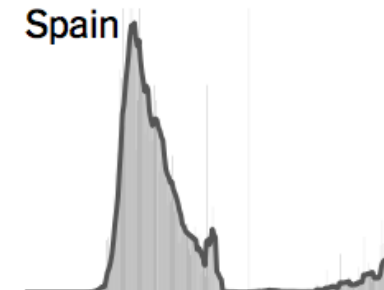
Spain



Total Coronavirus Deaths in Portugal



Spain



## What is the solution for a Pandemic

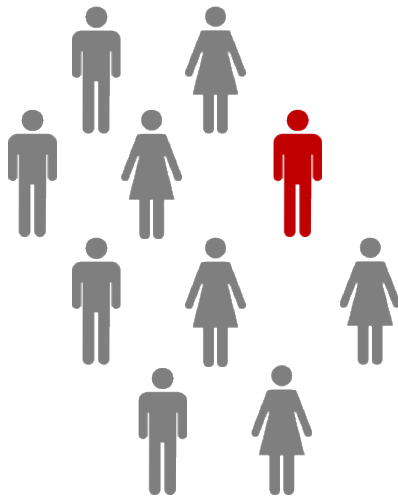
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**Herd Immunity** (**natural infection** or vaccine)

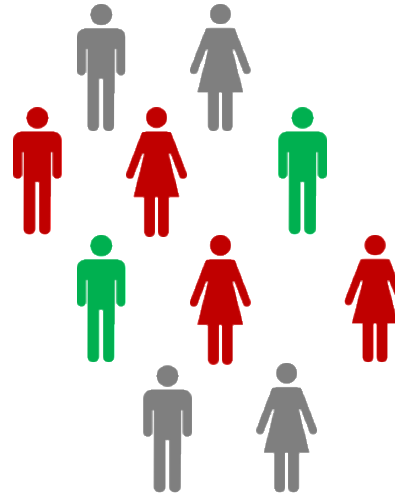
or

**Virus elimination**

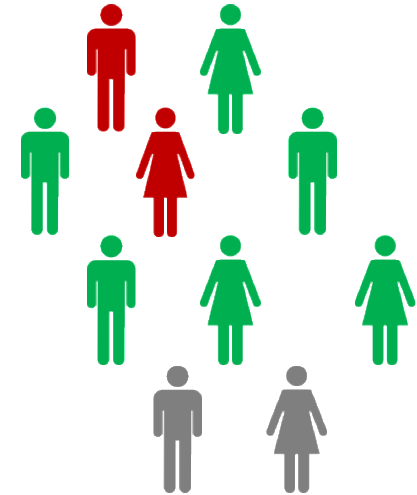
## Herd Immunity: through **natural infection** or **vaccination**



**10% infected**  
**90% susceptible**  
**0% immune**



**40% infected**  
**40% susceptible**  
**20% immune**

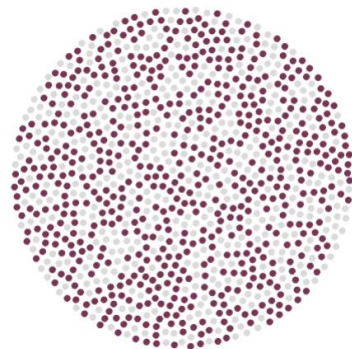


**20% infected**  
**20% susceptible**  
**60% immune**

# Very low Herd Immunity

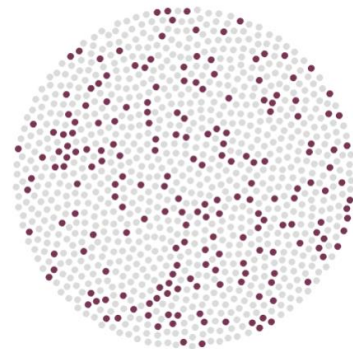
## Herd immunity estimate

At least 60% of population



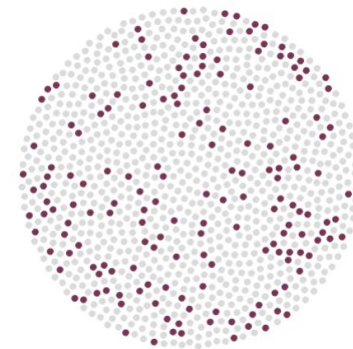
## New York City

19.9% have antibodies May 2



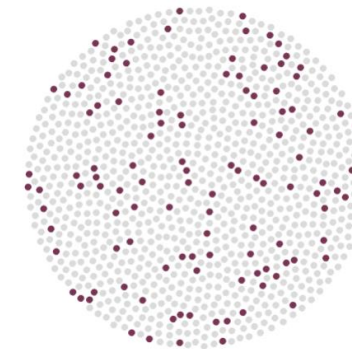
## London

17.5% have antibodies May 21



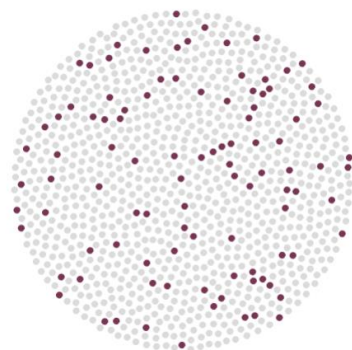
## Madrid

11.3% have antibodies May 13



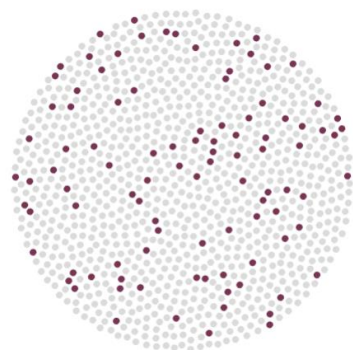
## Wuhan (returning workers)

10% have antibodies April 20



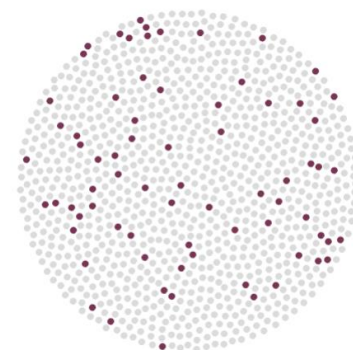
## Boston

9.9% have antibodies May 15



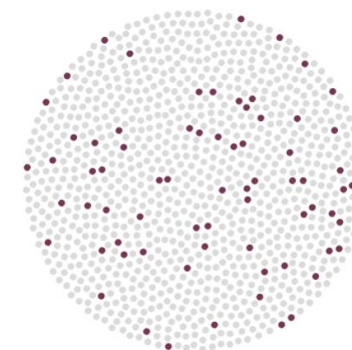
## Stockholm region

7.3% have antibodies May 20



## Barcelona

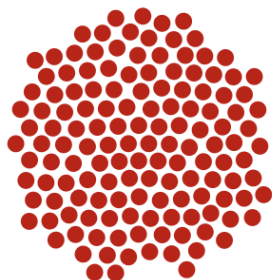
7.1% have antibodies May 13



### Pre-clinical

vaccines not yet in human trials

142



### Phase 1

vaccines in small-scale safety trials

29



### Phase 2

vaccines in expanded safety trials

18



### Phase 3

vaccines in large-scale efficacy trials

9

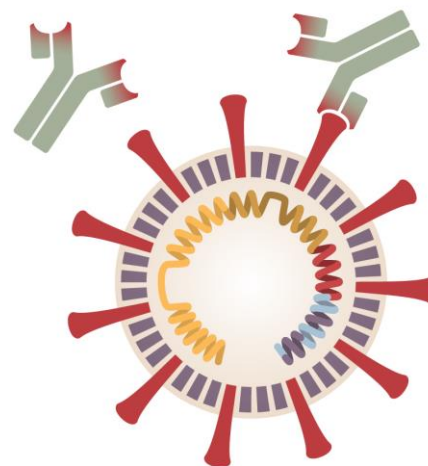


### Approved

vaccines approved for general use

0

Source: WHO. Last updated 4 Sep



We are following **21 coronavirus treatments** for effectiveness and safety:



WIDELY USED

EMERGENCY USE AUTHORIZATION

Ventilators and other respiratory support devices

WIDELY USED

Prone positioning

PROMISING EVIDENCE

EVIDENCE IN HUMANS

Dexamethasone and Other Corticosteroids

PROMISING EVIDENCE

EVIDENCE IN CELLS, ANIMALS AND HUMANS

EMERGENCY USE AUTHORIZATION

Remdesivir



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capturing SARS-CoV-2 infecting a cell

