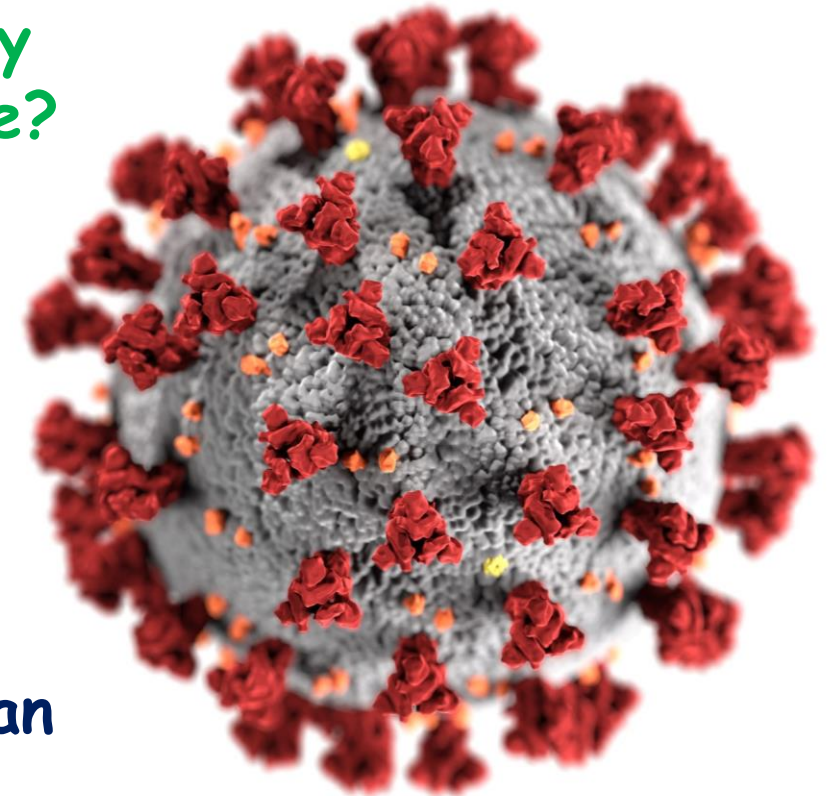




COVID-19
&
The Swedish
Conundrum: Part I
Why did Sweden
not lock down?
What were they
trying to achieve?

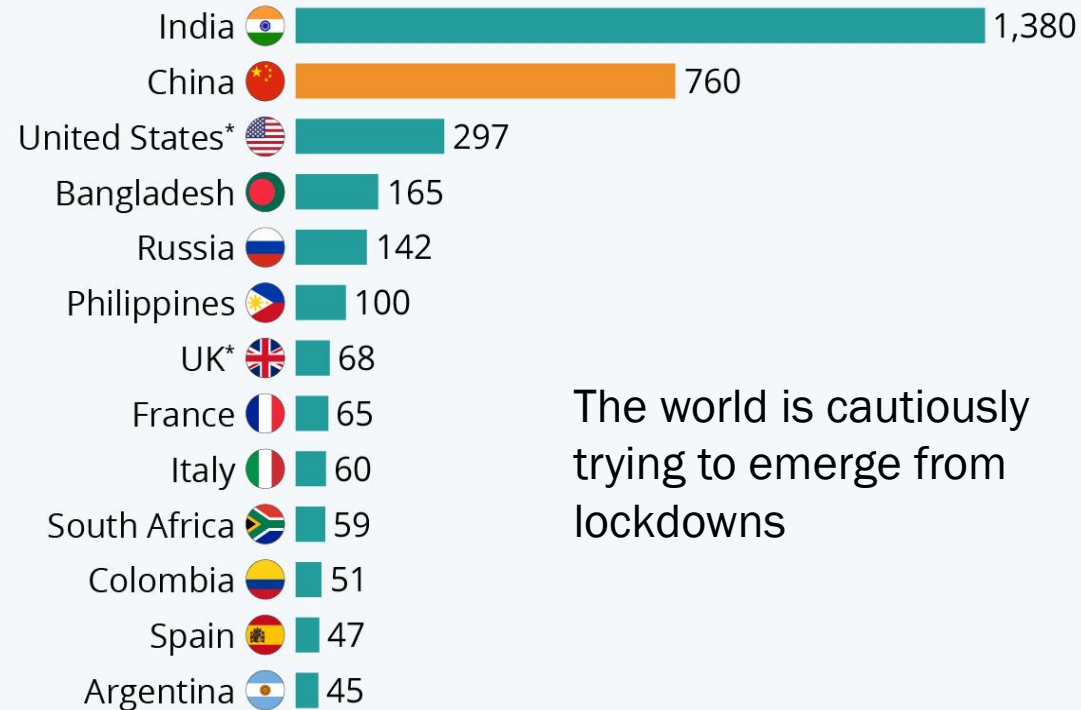


Prathap Tharyan

The Size of Coronavirus Lockdowns

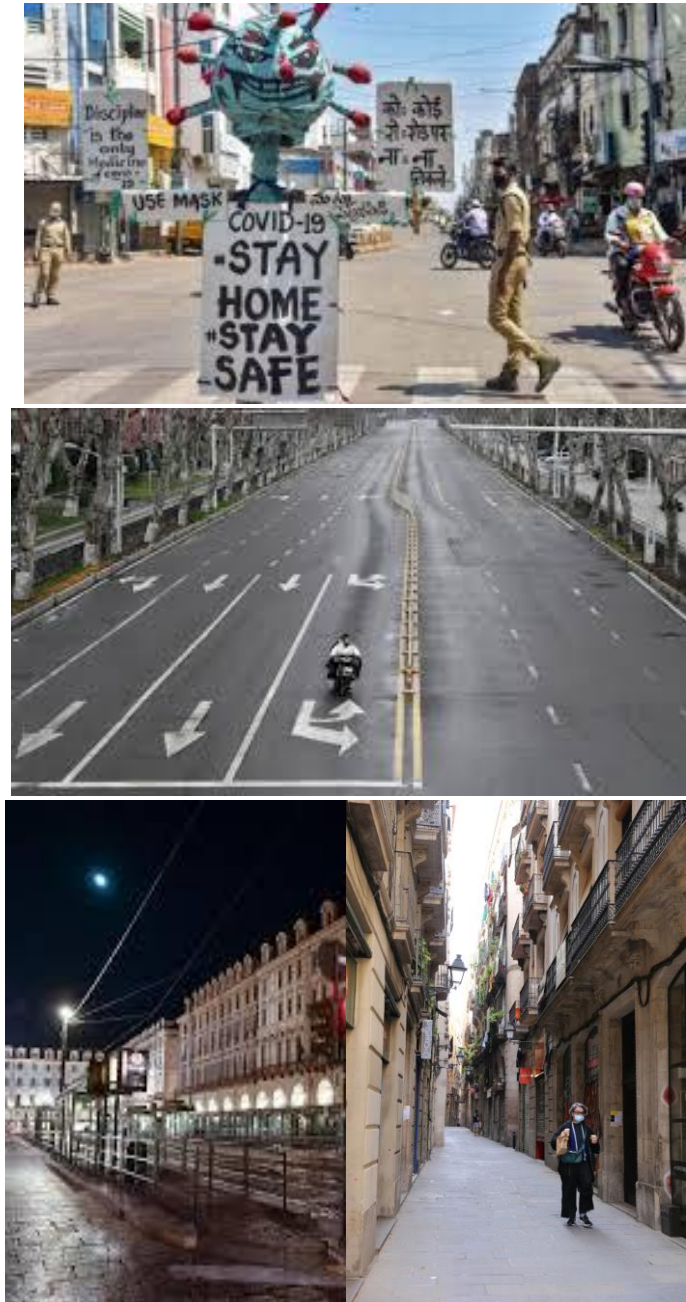
Number of people placed on enforced lockdown due to the coronavirus pandemic, per country (in million people)

■ Ongoing ■ At height of outbreak



* At least partly enforced

Source: Media reports





People enjoying the sun in Stockholm on April 21, 2020

Jonathan Nackstrand /AFP via Getty images (Business Insider May 4 2020)

No Lockdown: Do the Swedes know something the rest of the world does not know?
Or are they playing “**Russian Roulette**” with their “**Herd Immunity**” strategy?

SWEDEN'S RELAXED CORONAVIRUS RESPONSE

NO LOCKDOWN IN SWEDEN: A SOCIAL EXPERIMENT IN COMBATING COVID-19

Cafes, bars, restaurants, elementary schools and most businesses, including hair salons and gyms are open and people are allowed to exercise outdoors

Parks and public spaces are open



<https://edition.cnn.com/2020/04/28/europe/sweden-coronavirus-lockdown-strategy-intl/index.html>

Pubs and bars remain open



Photograph: Ali Lorestani/EPA
(The Guardian March 23)

WHY IS SWEDEN IS 'DOING NOTHING'?

MYTH

Protect yourself and others

Advice from the Public Health Agency



Healthy child

Pay attention to symptoms



Healthy adult

Pay attention to symptoms



70+ or other at-risk group

E.g. persons with pre-existing conditions



Ill/Have symptoms

Been in contact with infection/suspected infection



Isolated

Infected with COVID-19

Go shopping	✓	✓	⚠	✗	✗
Travel by public transport	✓	⚠	✗	✗	✗
Get together with friends	✓	✓	⚠	✗	✗
Be outdoors	✓	✓	✓	✓	✗
Be with family at home	✓	✓	⚠	⚠	⚠
Exercise outdoors	✓	✓	✓	✗	✗
Travel (unless you have to)	⚠	⚠	✗	✗	✗



NO
To be avoided



FIND ALTERNATIVES
Can it be arranged differently?



ALLOWED
But pay attention to symptoms



Folkhälsomyndigheten

Sweden has recommended good hygiene as part of infection control

Sweden's Public Health Agency does not recommend face masks for the public

Protect yourself and others from infection



Wash your hands frequently!

Germs can easily get onto your hands and spread to others. Wash your hands frequently with soap and warm water, for at least 20 seconds. Use hand sanitiser if soap and water are not available.



Cough and sneeze into your elbow!

By coughing and sneezing into your elbow or into a tissue you prevent droplets containing germs from spreading around you, or from contaminating your hands. Always put used tissue into the bin and wash your hands.



Avoid touching your eyes, nose and mouth!

It can be hard not to touch your face, so wash your hands often with soap and water to get rid of germs.



Stay at home when you feel unwell!

Stay at home when you feel unwell to avoid infecting others.

“Face masks are meant for healthcare staff and not needed in the community.

The best way to protect oneself and others in daily life is to maintain social distancing and good hand hygiene”



There are germs everywhere around us.

Practicing good hand hygiene is a simple way of protecting yourself and others.

The most common way of spreading infection is through our hands.

SWEDISH PUBLIC HEALTH AGENCY RECOMMENDS SOCIAL DISTANCING



Photo: Henrik Montgomery / TT

- No large gatherings (50 people max.)
 - Does not apply to schools, public transport, gyms
- Work from home if possible
- Keep **arms-length distance** from others in all public spaces including bars and restaurants, gyms, nightclubs, casinos, shops, offices
 - Responsibility of the owner of cafes, bars, pubs, etc to do risk assessments and help prevent spread of infection
 - Customers must be seated (tables spaced 6 feet apart) when eating or drinking; tokens to prevent queues; markings on floors to prevent crowding
- Venues can be ordered to close by the Communicable Diseases Officer, if regulations are not followed, after consulting with the municipality in question,

IS SWEDEN'S APPROACH TOO RELAXED?

- No fines, punitive actions
- Different from other countries
 - Parents with symptoms can send children to school
 - Employees have to self-declare symptoms; self-isolate
 - Can return to work just two days after being symptom-free
- Travel still permitted
 - Domestic air travel permitted; cross-country trains still running
 - Affluent people can escape to the countryside, archipelagos, ski-lodges
 - Sweden's border with Norway still open, border with Finland partially open
- Social distancing not always followed; gatherings of 50 people still too large?
- No masks required, lax precautions in care homes for elderly

People are trusted to behave responsibly and comply



Photograph: Jonathan Nackstrand/AFP <https://www.theguardian.com/world/2020/apr/19/>

Why did not Sweden
lock down?

1

What were they
trying to achieve?

Why did they think
this could work?

2

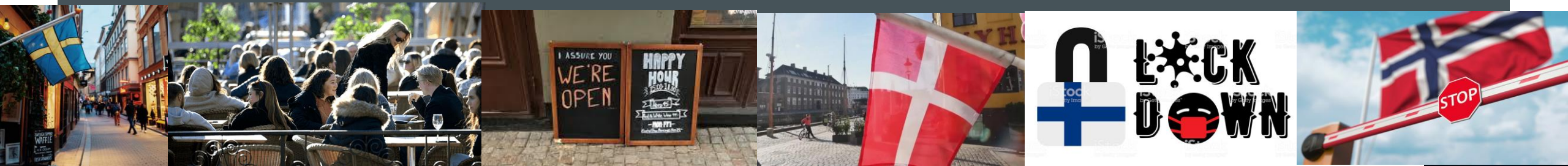
Is it working?

3

What can we learn
from this?

WHY DID SWEDEN CHOSE THIS APPROACH?

IT'S NORDIC NEIGHBOURS- DENMARK, FINLAND & NORWAY LOCKED DOWN



PUBLIC HEALTH POLICY: **LARGELY FREE OF POLITICAL INTERFERENCE**

Public Health Agency formulates, coordinates and evaluate policies; **County councils** and **County medical officers** implement them; both work with **other bodies** (health care providers, physicians, child health services, environmental health committees, county administrative boards, etc.). The PHA formulated and led the Swedish response

Prime Minister Stefan Lofven



Anders Tegnell, Chief Epidemiologist, PHA



SWEDISH CONSTITUTIONAL REQUIREMENT: to prevent 'rule by ministers'

WHAT DETERMINED THE POLICY?

Public Health Agency used scientific evidence to frame the policy based on:

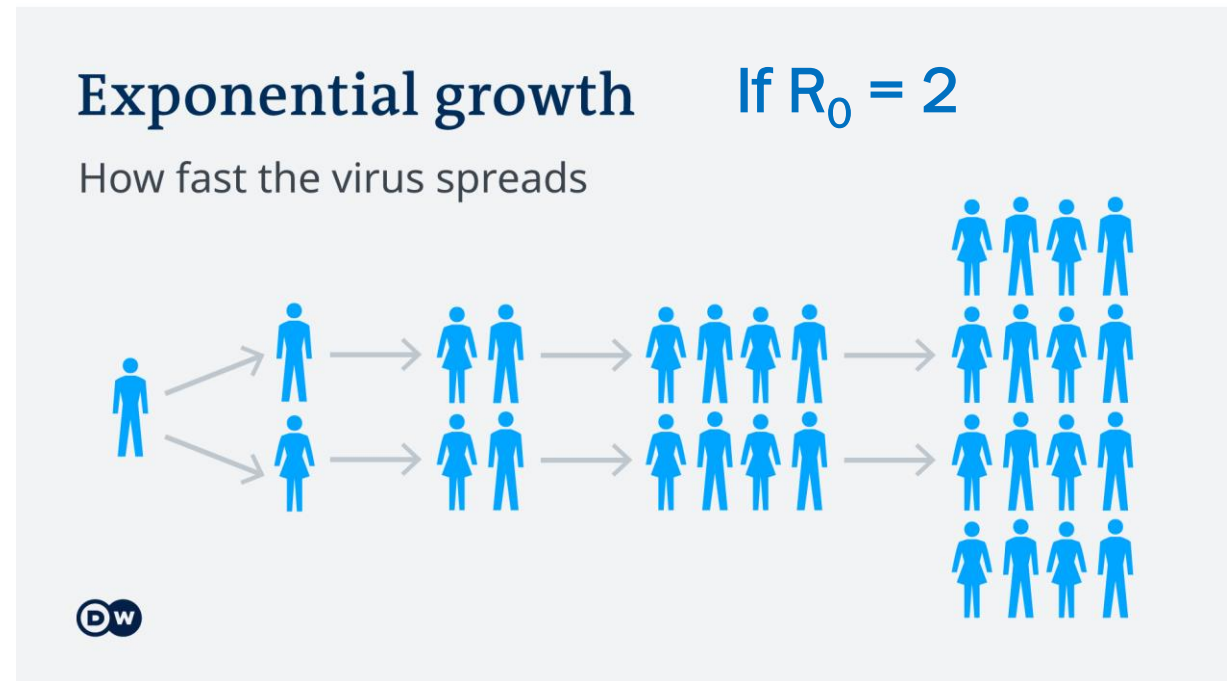
- Data from international sources
- Modelling estimates
- Contextual factors

- Data from **China and Italy** regarding:
 - Spread of infection
 - Effects of measures to contain the spread
 - Population level risk factors for recovery and death
- **Modelling estimates** from:
 - **Imperial College London**
 - **Local estimates and experiences** dealing with H1N1 and Swine Flu
- Sweden's **resources** to meet demands on hospital beds and ICU facilities
- Sweden's **state of preparedness, local and cultural factors**



FACT: SARS-COV-2 THE VIRUS THAT CAUSES COVID-19 IS HIGHLY INFECTIOUS

- **Basic Reproductive Number (R_0 or R naught):**
the expected number of people one infected person can on average infect during the infective period in a *non-immune* population (Zero are immune)
- $R_0 > 1$ results in exponential growth; higher the R_0 faster the progression; $R_0 < 1$ the epidemic stops
- R_0 depends:
 - infectivity of the virus,
 - time for the infected to become infective,
 - how infective the person is (viral load)
 - how long, until recovery /death



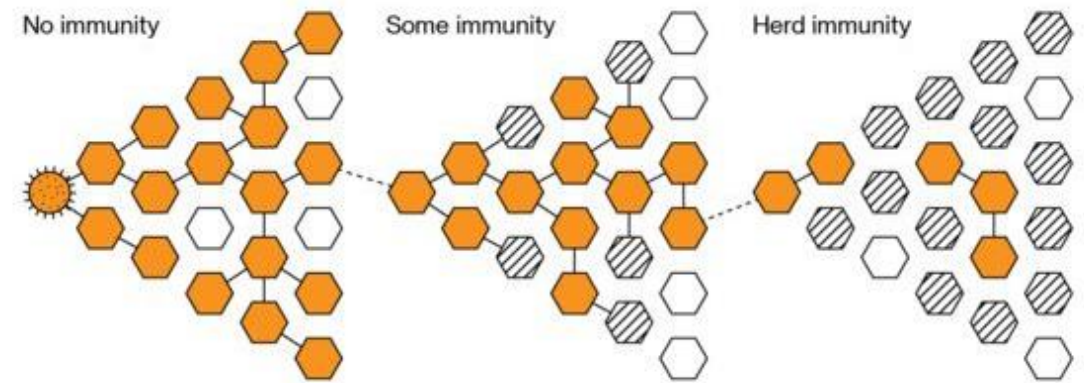
EFFECTIVE REPRODUCTIVE NUMBER AND HERD IMMUNITY

Effective reproductive number: R_e

The number of people one infected person in effect infects on average during the period of infectivity given **dynamic factors**:

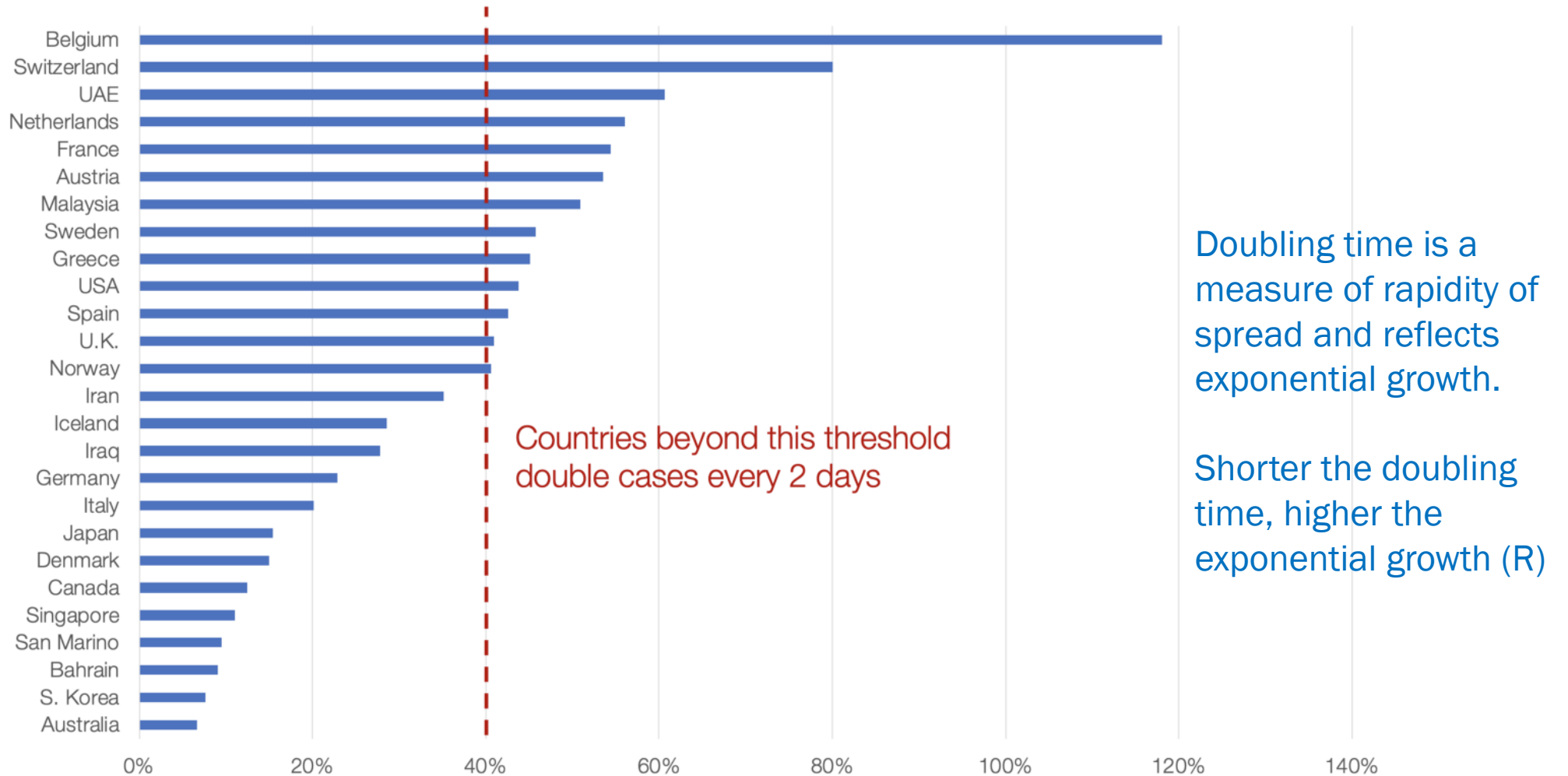
- **Population:**
 - Size
 - Density
 - Organization
 - Mixing
 - Susceptible fraction
- **Environment**
- **Culture**
- The R_e at a point in time is R_t

Herd Immunity



- R_e estimates for SARS-CoV-2: = 2.5 to 3.5, Highest = 6
- **Herd Immunity = $1 - 1/R_e$**
- For herd immunity: 60% to 70% (or 83%) of the population have to get immunity through infection or a vaccine
- But 1%-3%, or more, may die (larger the population, more the deaths)

DAILY GROWTH RATE OVER TWO DAYS (5 TO 6 MARCH)



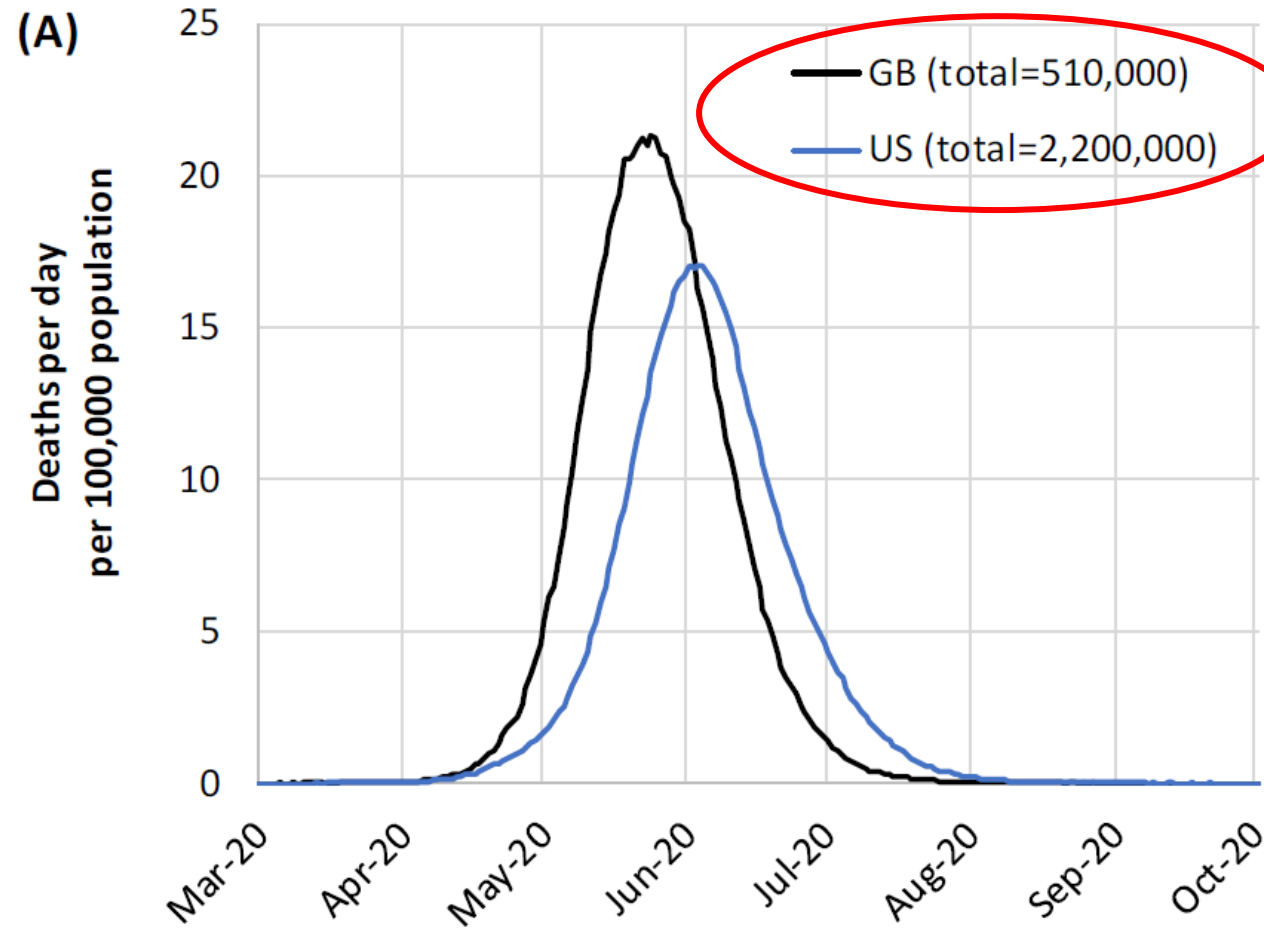
Doubling time is a measure of rapidity of spread and reflects exponential growth.

Shorter the doubling time, higher the exponential growth (R)

Source: Tomas Pueyo analysis from primary data from worldometer
Only includes countries that have >20 cases and >5% growth rate

DO NOTHING: IMPERIAL COLLEGE ESTIMATES OF DEATHS IN UK AND US

Option 1



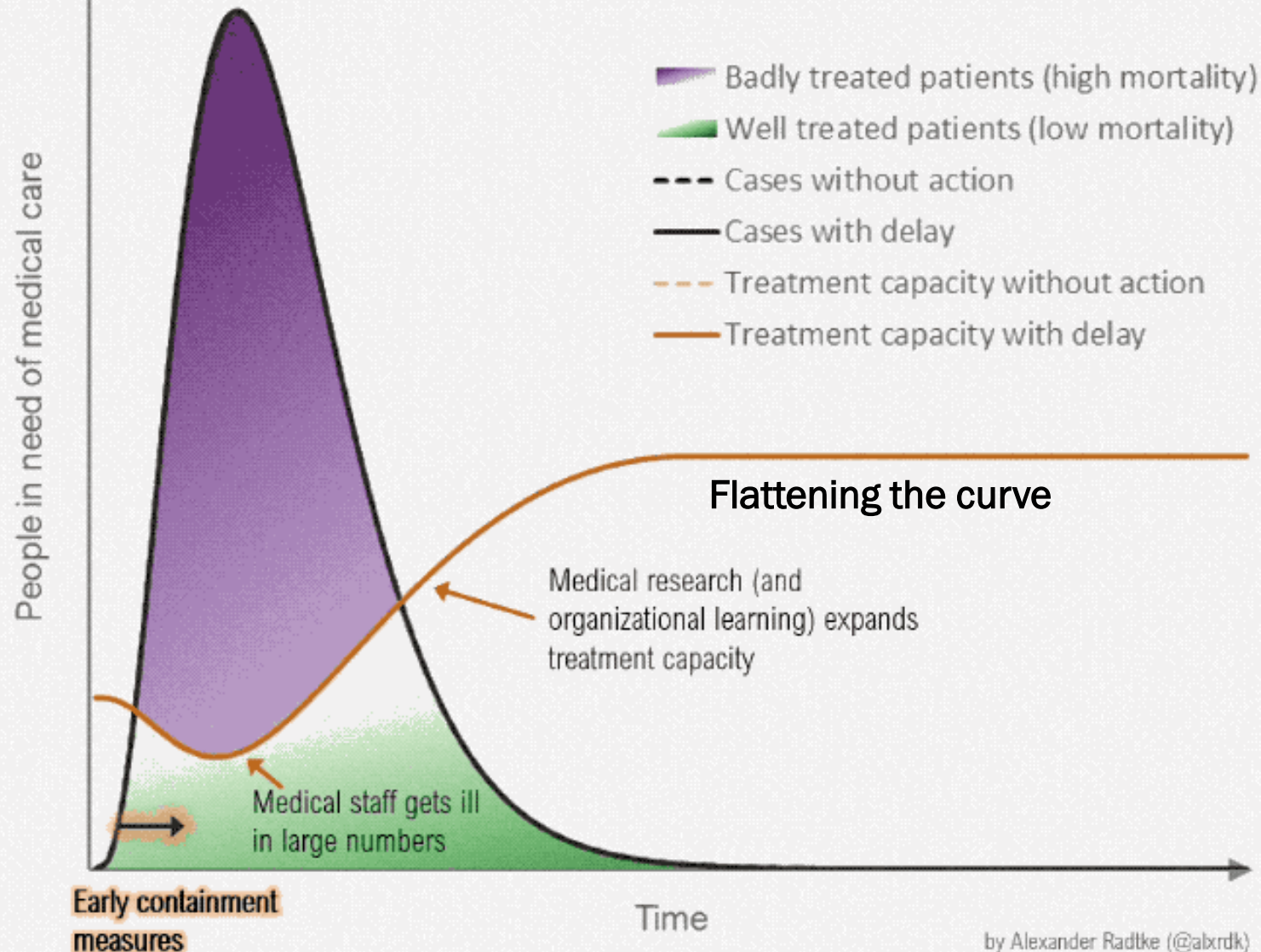
Allows 'herd immunity' to build rapidly and shortens the duration of disruption due to the pandemic

Health systems over-run

Many deaths

Neil M Ferguson, Daniel Laydon, Gemma Nedjati-Gilani *et al.* Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. **Imperial College London** (16-03-2020), doi: <https://doi.org/10.25561/77482>.

Why it is so important to **act early** on COVID-19



- “If 5% of your cases require intensive care and you can’t provide it, most of those people die. As simple as that”.
- Then there is **collateral damage** from deaths due to other treatable causes being neglected by COVID-19 responses
- **Unbridled coronavirus** means **healthcare systems collapse**, and that means **mass death**.”

<https://medium.com/@tomaspuoyo/coronavirus-the-hammer-and-the-dance-be9337092b56>

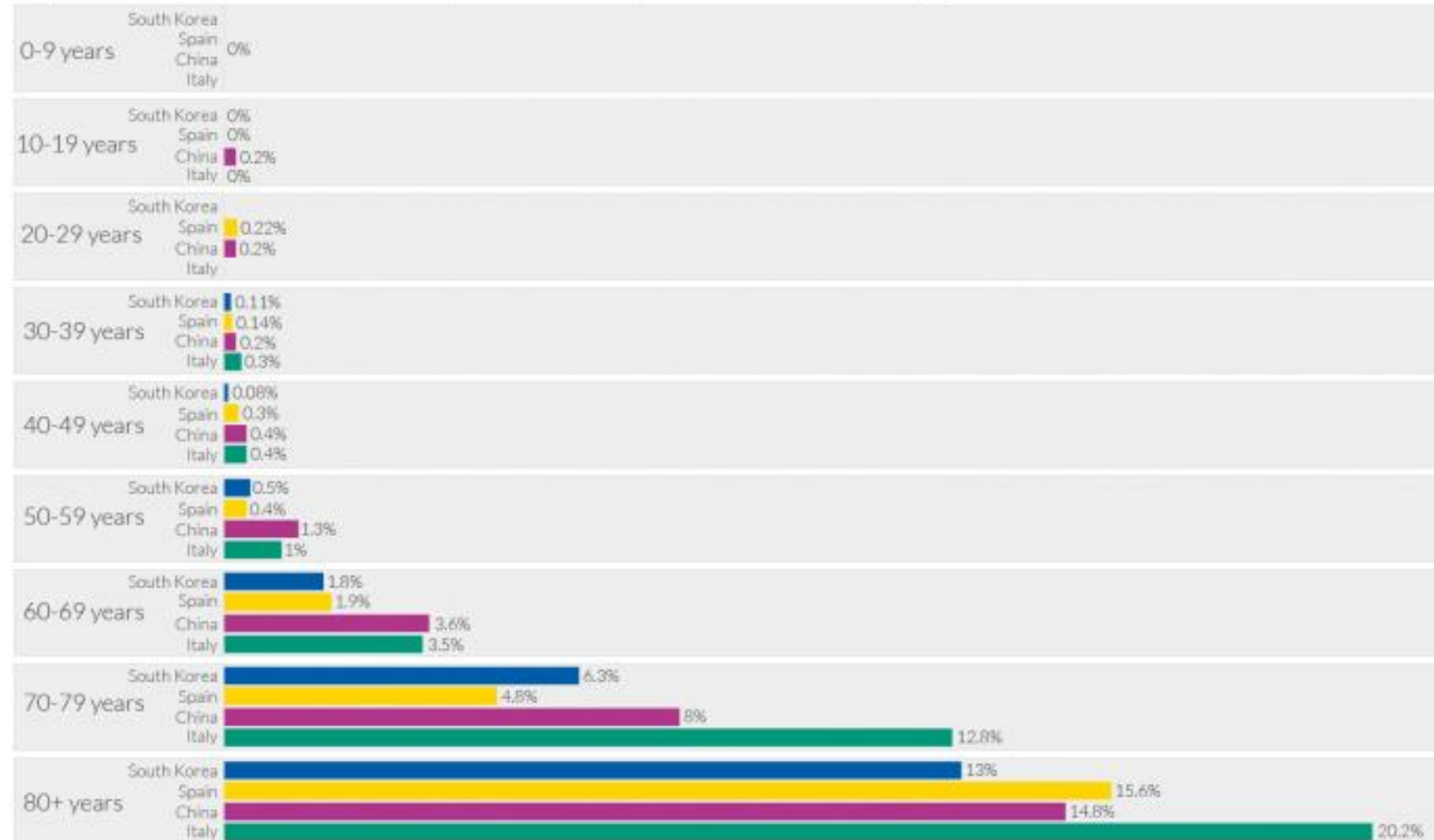
Coronavirus: case fatality rates by age

Our World
in Data

Case fatality rate (CFR) is calculated by dividing the total number of confirmed deaths due to COVID-19 by the number of confirmed cases.

Two of the main limitations to keep in mind when interpreting the CFR:

- (1) many cases within the population are unconfirmed due to a lack of testing.
- (2) some individuals who are infected will eventually die from the disease, but are still alive at time of recording.



Most deaths
are in older
people

Note: Case fatality rates are based on confirmed cases and deaths from COVID-19 as of: 17th February (China); 24th March (Spain); 24th March (South Korea); 17th March (Italy).

Data sources: Chinese Center for Disease Control and Prevention (CCDC); Spanish Ministry of Health; Korea Centers for Disease Control and Prevention (KCDC).

Onder G, Rezza G, Brusaferro S. Case-Fatality Rate and Characteristics of Patients Dying in Relation to COVID-19 in Italy. JAMA.

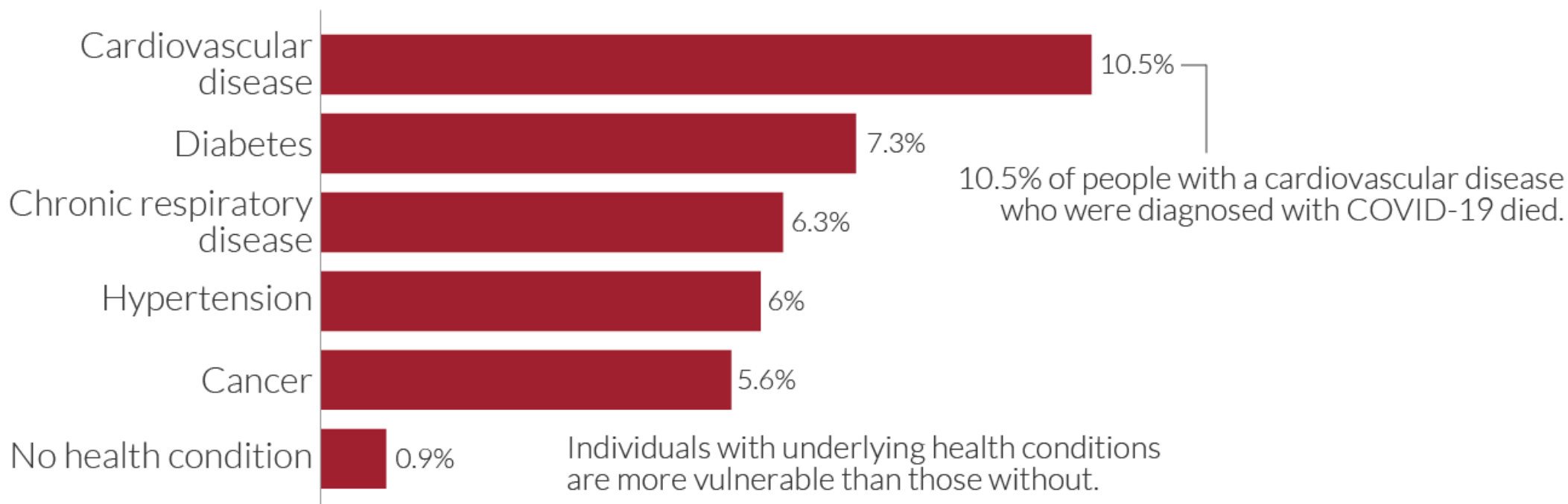
OurWorldinData.org - Research and data to make progress against the world's largest problems.

Licensed under CC-BY by the authors Hannah Ritchie and Max Roser.

Coronavirus: early-stage case fatality rates by underlying health condition in China



Case fatality rate (CFR) is calculated by dividing the total number of deaths from a disease by the number of confirmed cases. Data is based on early-stage analysis of the COVID-19 outbreak in China in the period up to February 11, 2020.



Data source: Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. *Vital surveillances: the epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19)—China, 2020*. China CDC Weekly.

[OurWorldinData.org](https://ourworldindata.org) – Research and data to make progress against the world's largest problems.

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ESTIMATES OF SEVERITY OF SARS-COV-2/COVID-19

80% Mild; 20% More severe (5% Critical care)

Age-group (years)	% symptomatic cases requiring hospitalisation	% hospitalised cases requiring critical care	Infection Fatality Ratio
0 to 9	0.1%	5.0%	0.002%
10 to 19	0.3%	5.0%	0.006%
20 to 29	1.2%	5.0%	0.03%
30 to 39	3.2%	5.0%	0.08%
40 to 49	4.9%	6.3%	0.15%
50 to 59	10.2%	12.2%	0.60%
60 to 69	16.6%	27.4%	2.2%
70 to 79	24.3%	43.2%	5.1%
80+	27.3%	70.9%	9.3%

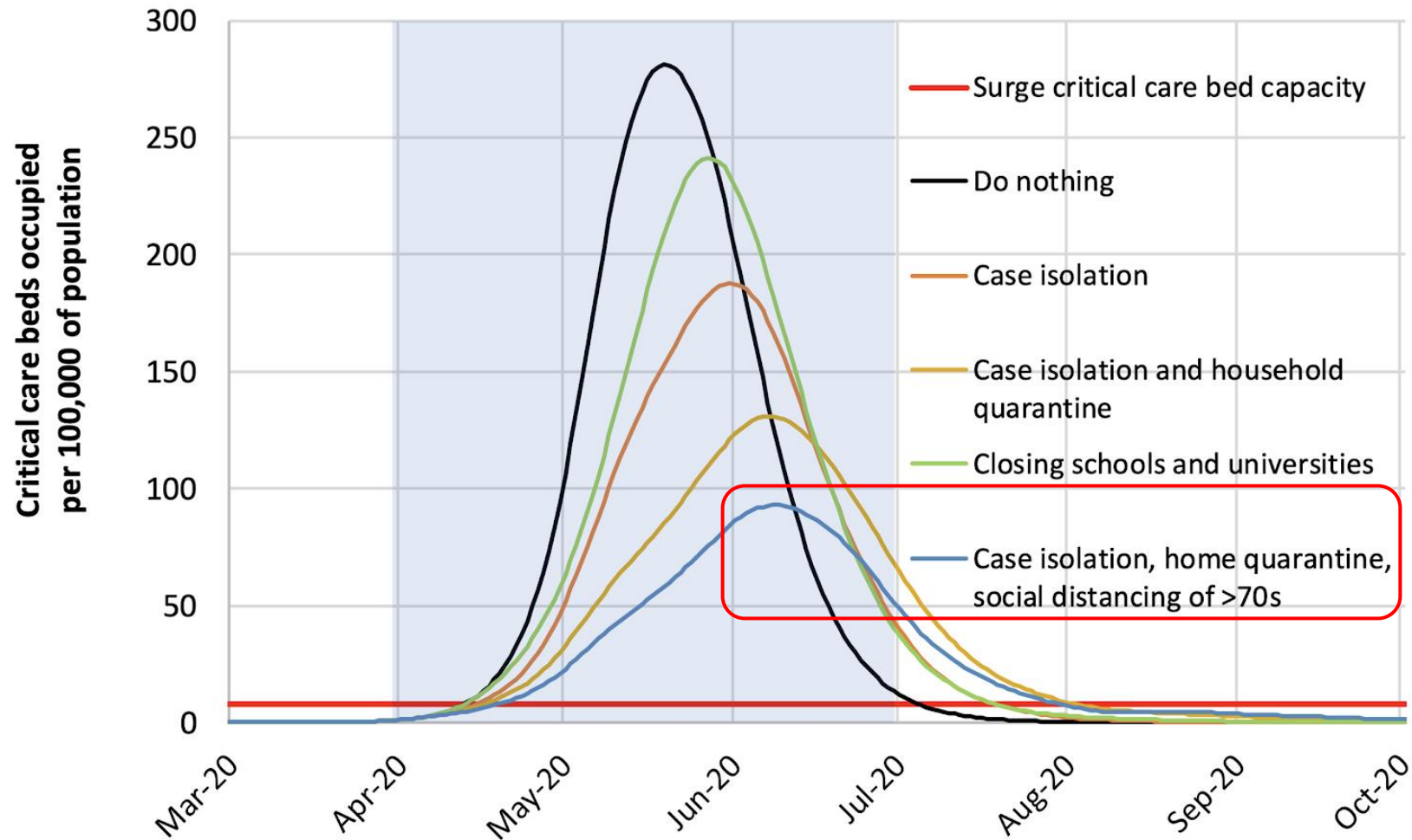
Neil M Ferguson, Daniel Laydon, Gemma Nedjati-Gilani *et al.* Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. **Imperial College London** (16-03-2020), doi: <https://doi.org/10.25561/77482>.

Option 2

PEAK NEED FOR ICU BEDS FOR UK: MITIGATION

Mitigation. Aim is to use available measures not to interrupt transmission completely, but to reduce the health impact

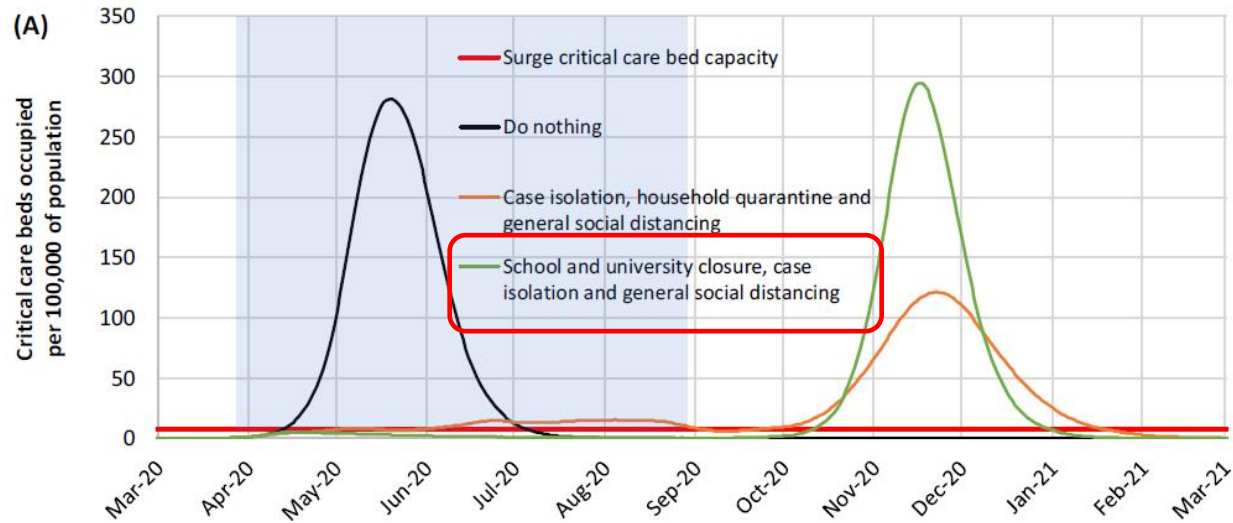
Allows population immunity to build more gradually and transmission to drop eventually to low levels



Source: Impact of non-pharmaceutical interventions (NPIs) to reduce COVID19 mortality and healthcare demand, Neil Ferguson et. al, Imperial College

Option 3

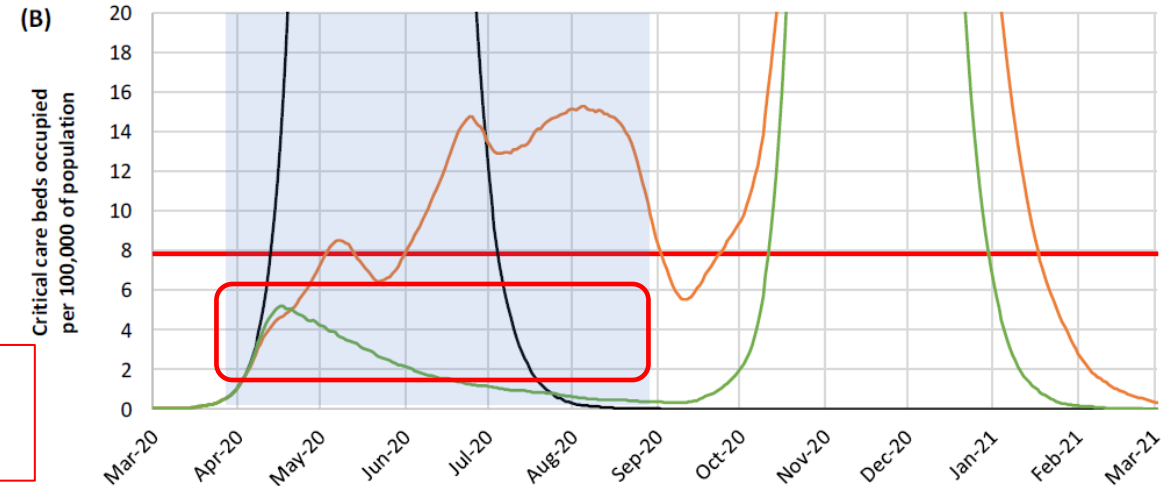
PEAK NEED FOR ICU BEDS FOR UK: SUPPRESSION



Suppression: Aim-reduce the reproduction number $R < 1$ to reduce case numbers to low levels or eliminate human-to-human transmission.

Deaths: — GB ~20,000
Health systems not over-run

The main challenge is that suppression needs to be maintained – at least intermittently, when infections arise again – for as long as the virus is circulating in the human population, or until treatments or a vaccine become available



Neil M Ferguson, Daniel Laydon, Gemma Nedjati-Gilani *et al.* Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. Imperial College London (16-03-2020), doi: <https://doi.org/10.25561/77482>.

IMPERIAL COLLEGE REPORT CONCLUSIONS

- “We therefore conclude that epidemic suppression is the only viable strategy at the current time.
- The social and economic effects of the measures which are needed to achieve this policy goal will be profound.
- However, we emphasize that is not at all certain that suppression will succeed long term; no public health intervention with such disruptive effects on society has been previously attempted for such a long duration of time.
- How populations and societies will respond remains unclear”

UK and the Netherlands changed from considering herd immunity as a strategy to suppression after this report

Neil M Ferguson, Daniel Laydon, Gemma Nedjati-Gilani *et al.* Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. **Imperial College London** (16-03-2020), doi: <https://doi.org/10.25561/77482>.

SWEDEN WAS SCEPTICAL OF THE IMPERIAL COLLEGE REPORT

The Imperial College model for Sweden predicted that Sweden would see 80,000 deaths if they did not lock down and only around 40,000 if they did.

Dr. Anders Tegnell



© Claudio Bresciani/EPA-EFE/Shutterstock

- “We have had a fair amount of people looking at it and they are sceptical.
- They think Imperial chose a number of variables that gave a prognosis that was quite pessimistic, and that you could just as easily have chosen other variables that gave you another outcome”.
- “It’s not a peer-reviewed paper. It might be right, but it might also be terribly wrong. In Sweden, we are a bit surprised that it’s had such an impact.”

SWEDEN WAS SCEPTICAL OF SUPPRESSION STRATEGIES

Dr. Anders Tegnell



<https://en.wikipedia.org/>

- “We are just trying to slow it, because this disease will **never go away**. If you manage, like South Korea, to get rid of it, even they say that they count on it coming back.
- **Stopping it might even be negative**, because you would have a pent-up possible spread of the disease, and then once you open the gates, there is a possibility that there **would be an even worse outcome**.”
- “We have data showing that the flu epidemic and the winter norovirus dropped consistently this year, meaning that **our social distancing and handwashing is working**”

WHAT WERE THEY TRYING TO ACHIEVE?

Sweden decided to go for a mitigation strategy

Not stringently enforced; based on education and making recommendations



Ann Linde, Foreign Minister

“This is a marathon, not a sprint.”

Sweden’s aims were to:

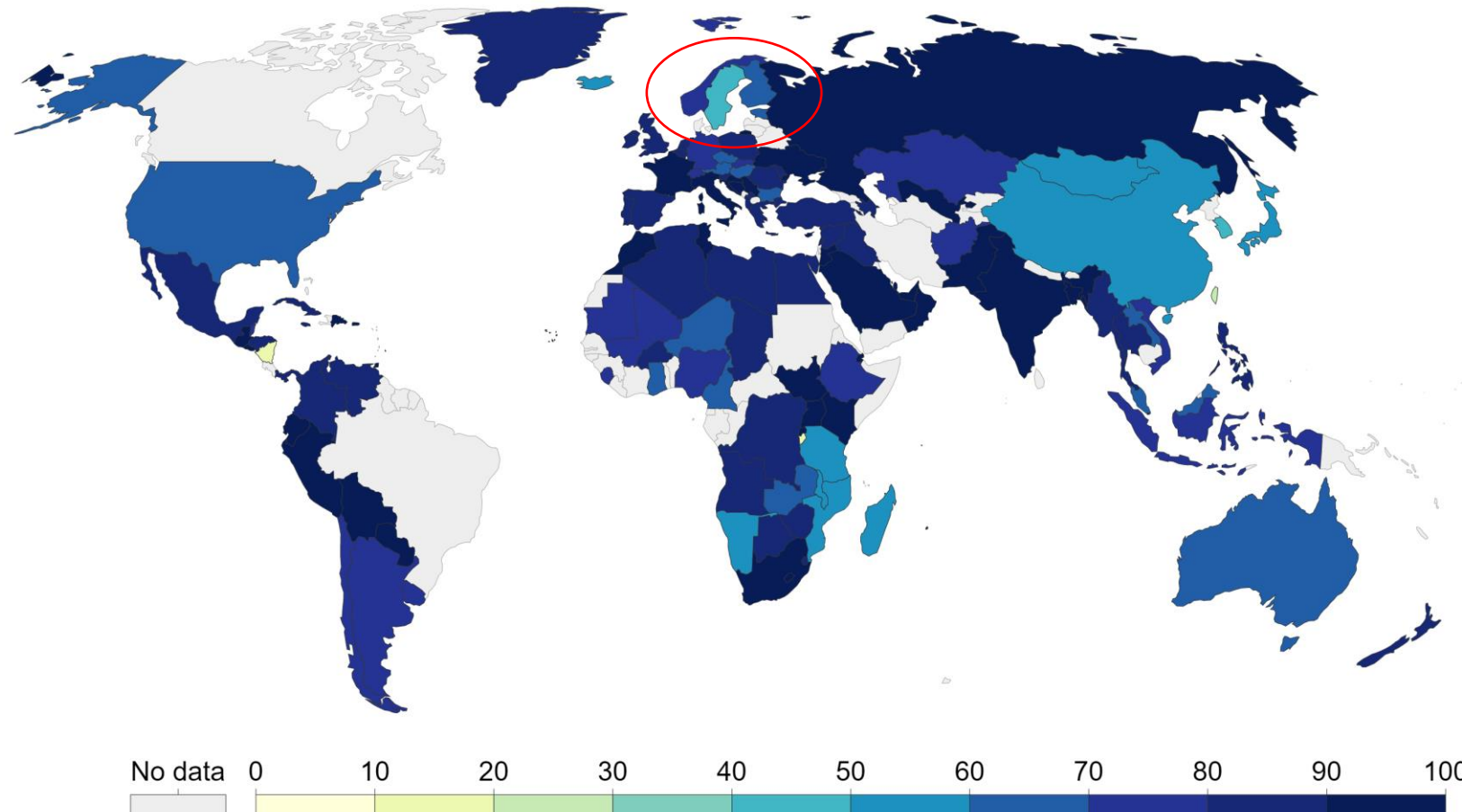
- “Save lives, stop the virus from spreading, ensure the healthcare system can cope and mitigate the consequences for business and jobs.”
- “These are not voluntary measures. We believe the best way for us is a combination of some binding regulations and clear advice to the public.
- As far as possible, we want to build on a strong, longstanding relationship of trust between authorities and the public.”
- “It must also be sustainable for the long term.”

* Sweden did not close primary schools

COVID-19: Government Response Stringency Index, May 8, 2020

The Government Response Stringency Index is a composite measure based on nine response indicators including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100 = strictest response).

This index simply records the number and strictness of government policies, and should not be interpreted as 'scoring' the appropriateness or effectiveness of a country's response.



Source: Hale, Webster, Petherick, Phillips, and Kira (2020). Oxford COVID-19 Government Response Tracker – Last Updated 8th May.
OurWorldInData.org/coronavirus • CC BY

Our World
in Data

Government Stringency Index Indicators

1. School closures*;
2. Workplace closures;
3. Cancellation of public events;
4. Restrictions on public gatherings;
5. Closures of public transport;
6. Stay-at-home requirements;
7. Public information campaigns;
8. Restrictions on internal movements;
9. International travel controls

- Building up herd immunity was not the primary motive but a hoped-for secondary outcome
- How to balance saving lives with saving the economy?
- How to ensure mitigation strategies can be sustained till herd immunity or a vaccine stops the pandemic?
- How to do this while building on existing strengths?

In Swedish, “Lagom” means: “just right;” “not too much,” “not too little.”

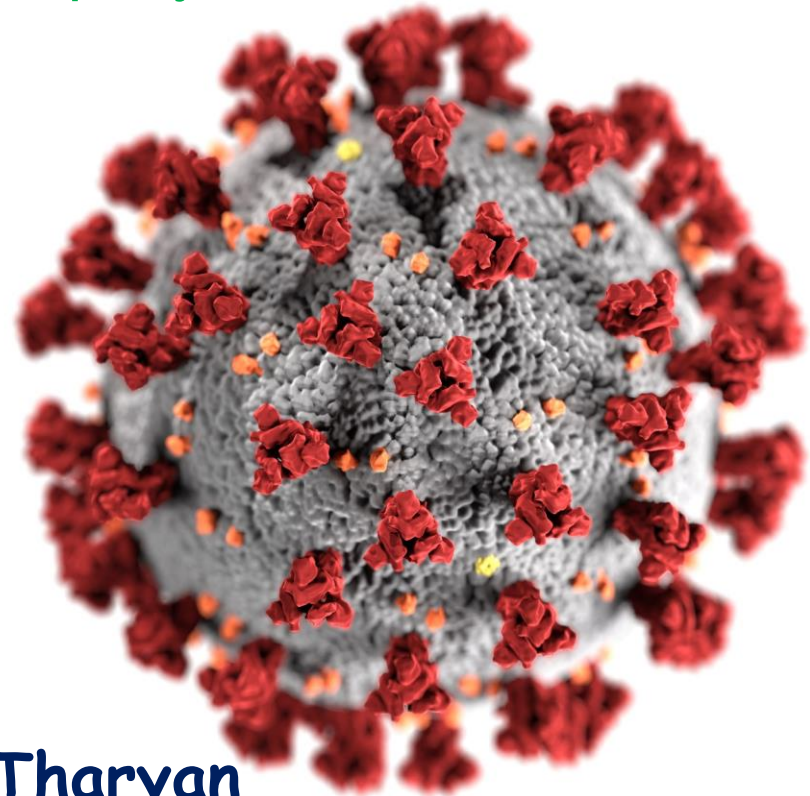
What was the Swedish Conundrum?

Be sure to watch the next episode

The Swedish Conundrum: Part II



Why did Sweden think
their policy could work?
Could such a policy work
in India?



Prathap Tharyan