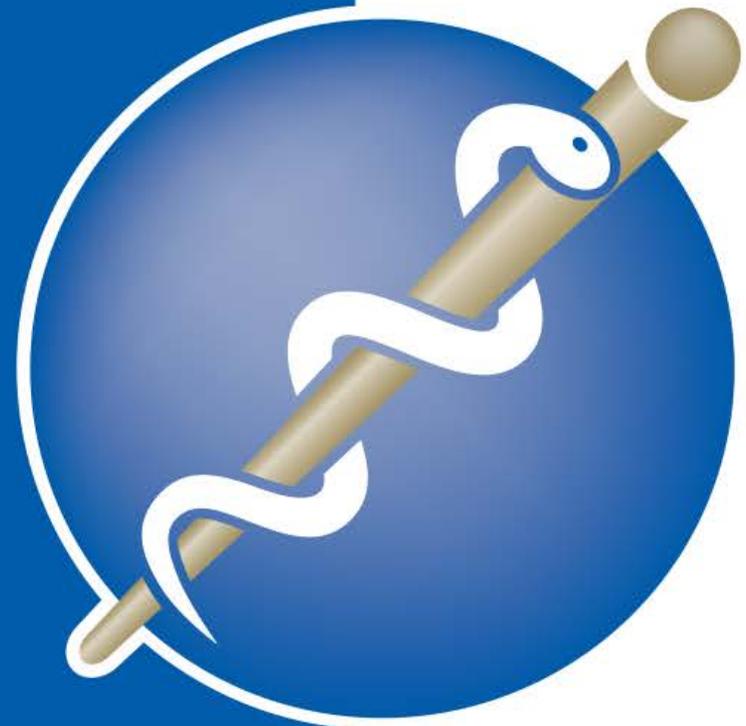


Exceptionally Precise Medical Expertise

COVID-19 vaccines -
Longevity 16

 Nicola Oliver
Mortality and Longevity Expert
n.oliver@medicalintelligence.uk

 @Medical_Intel



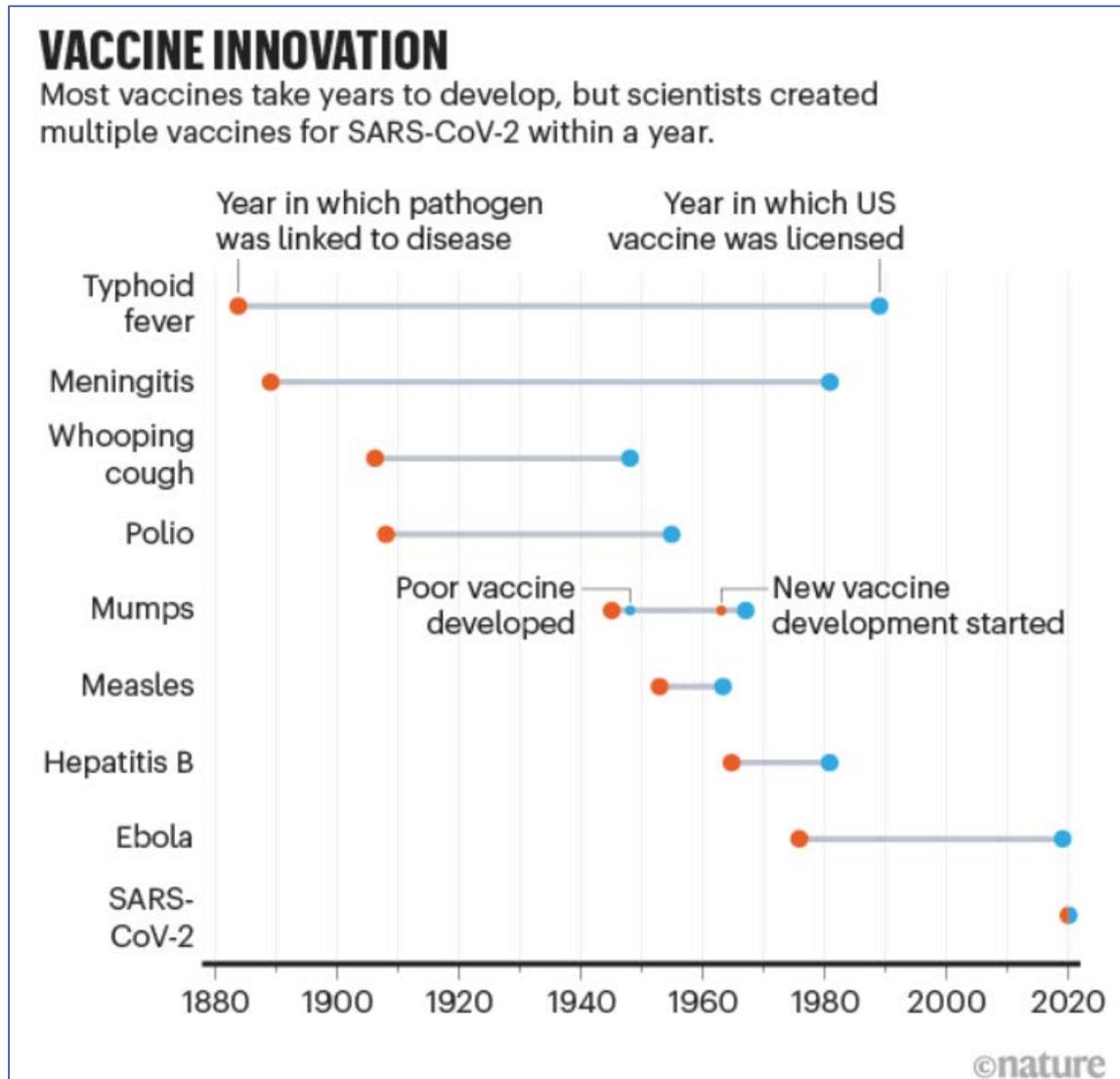
MEDICAL
INTELLIGENCE 



Agenda

- Looking back
- Pioneers
- A few numbers
- Record pace
- How does the vaccine work and what about efficacy?
- mRNA – a little biology lesson
- Challenges ahead

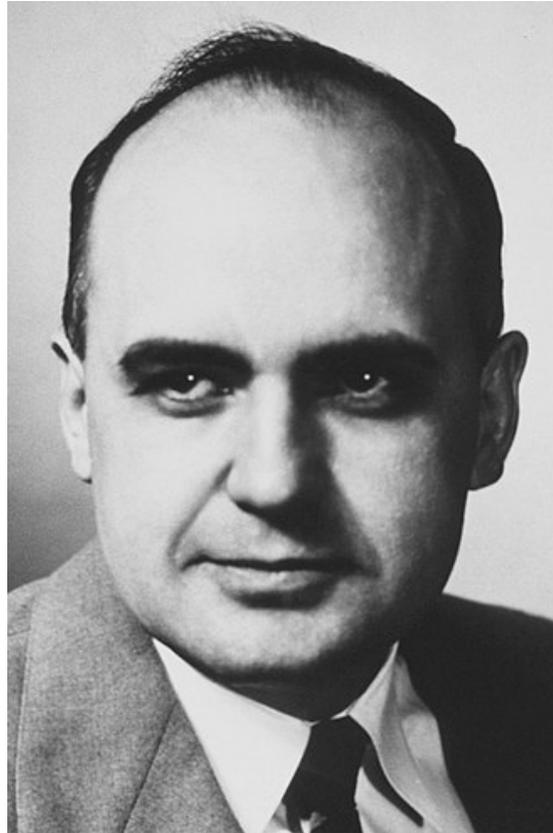
Looking back – history of development



Looking back – early pioneers



Edward Jenner



Maurice Hilleman



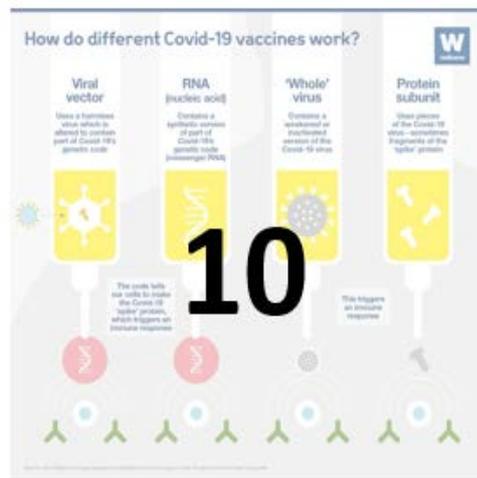
Louis Pasteur

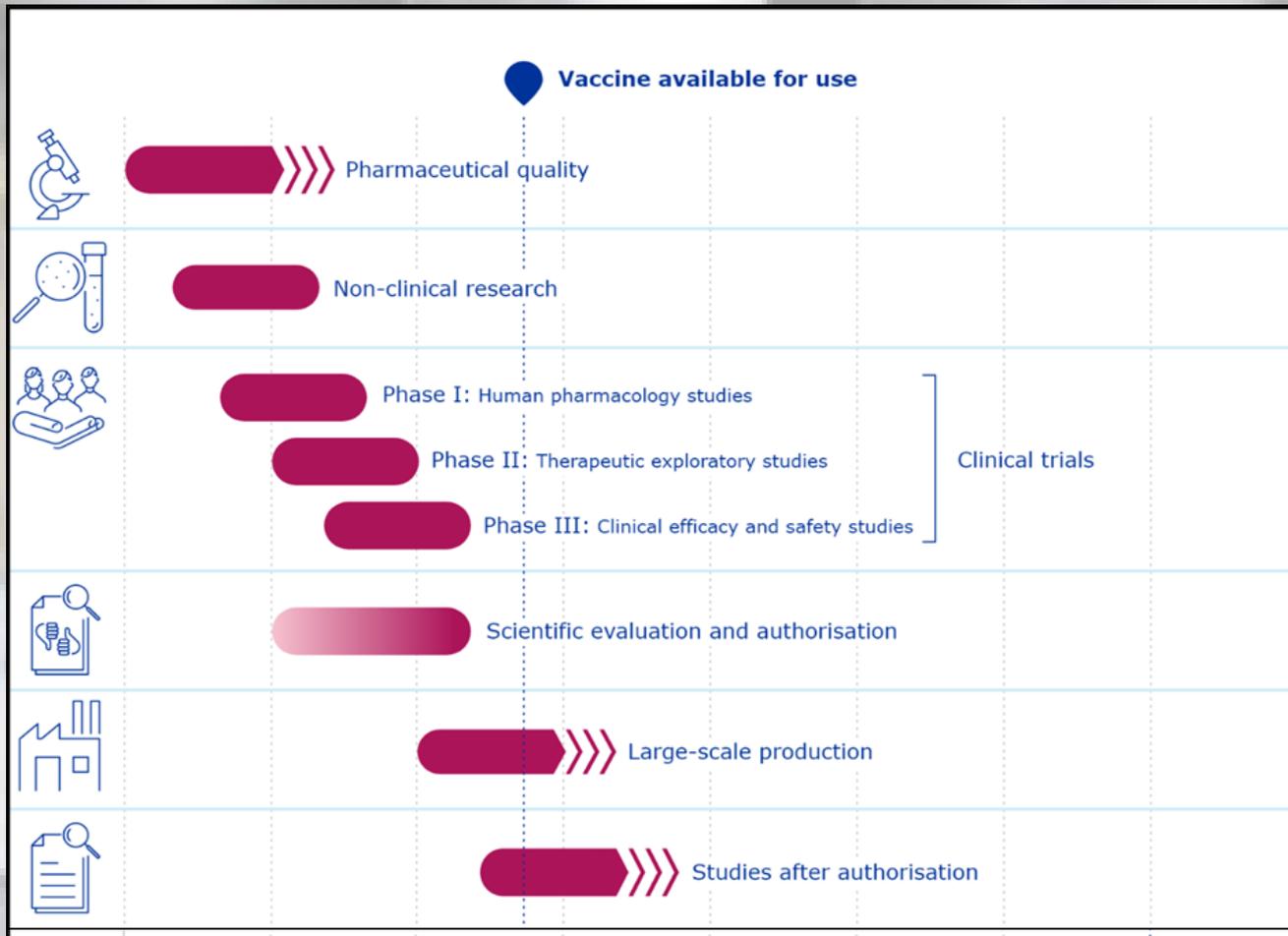
Today's COVID-19 pioneers

**Drs. Ugur Sahin and Ozlem Tureci,
Co-founders,
BioNTech**

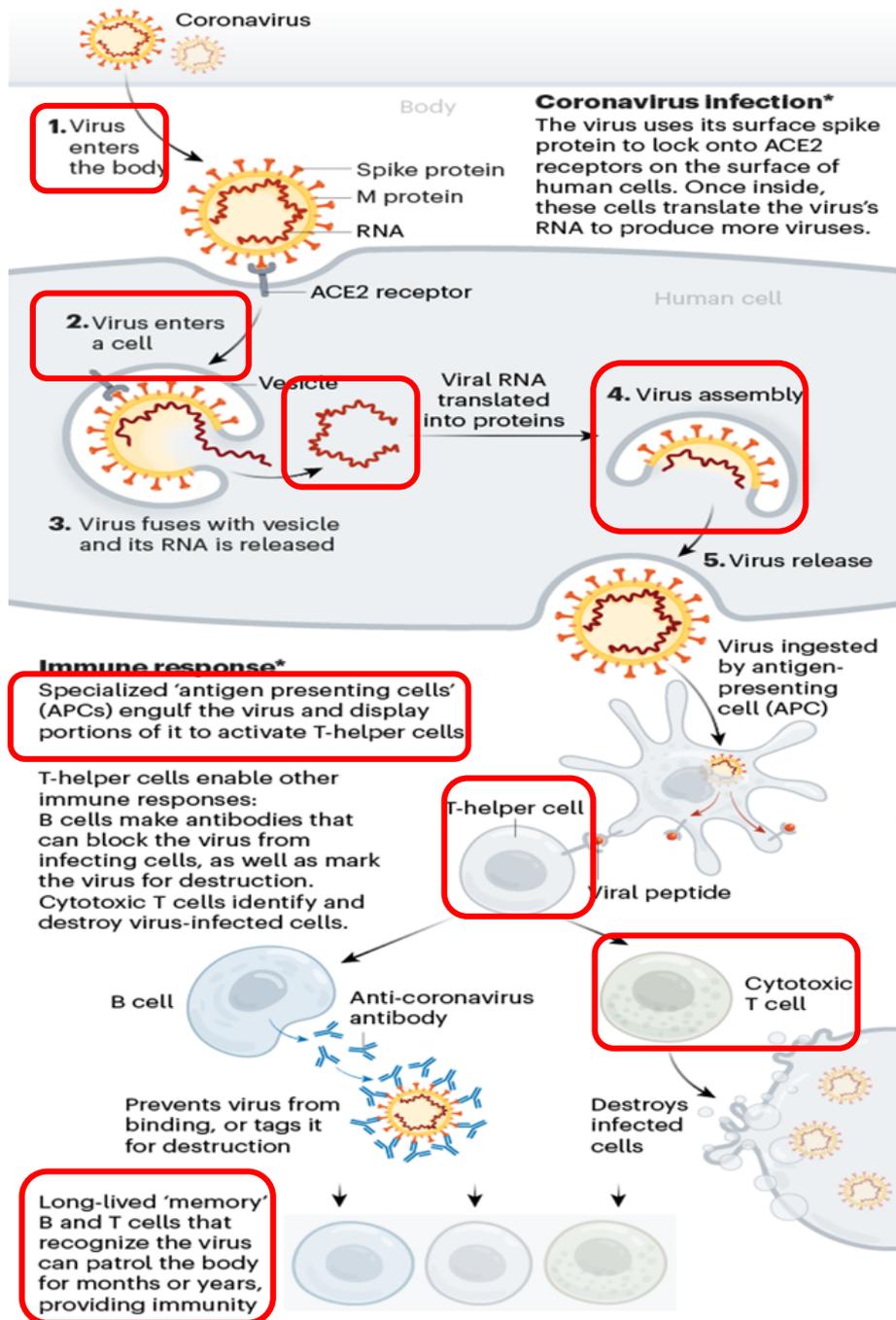


Vaccines in numbers

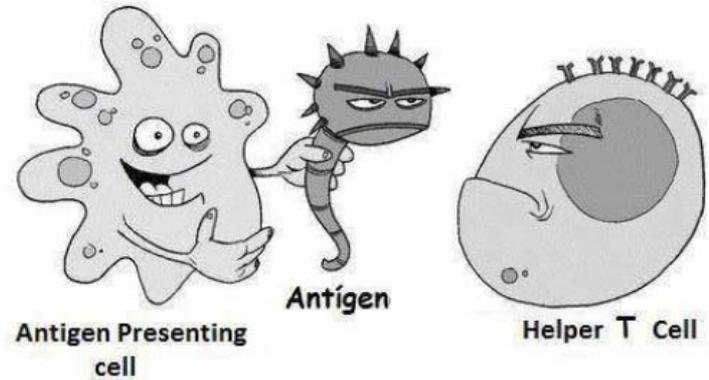








How vaccines work

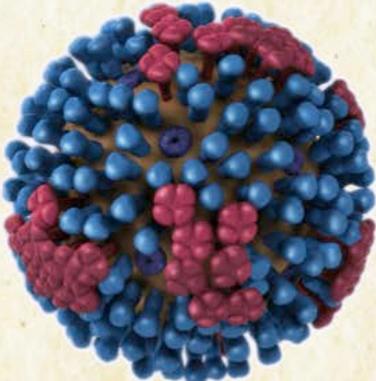


“Look and remember now go fetch!!”



How vaccines work

WANTED
HAVE YOU SEEN THIS VIRUS?

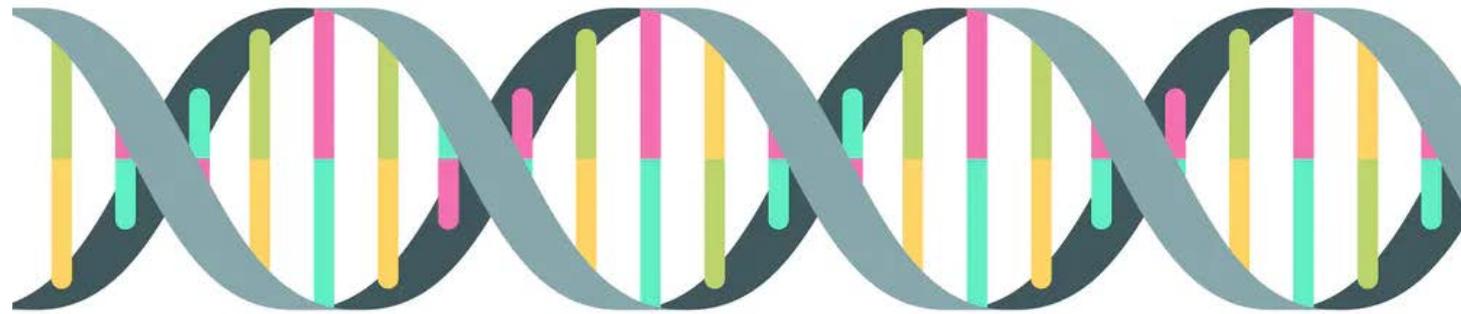


**VACCINES TEACH OUR BODIES
HOW TO RECOGNISE WHAT
THE REALLY BAD GUYS LOOK
LIKE, SO WE CAN STOP THEM
BEFORE THEY HOLD US UP.**

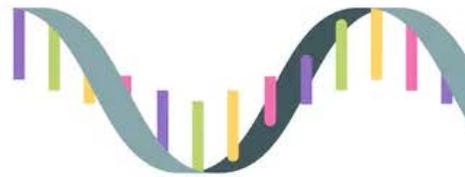




mRNA



DNA



mRNA



Protein

Efficacy

If a vaccine has an efficacy of 80 percent:



It does not mean that the vaccine will only work 80% of the time.

It does mean that in a vaccinated population, 80% fewer people will contract the disease when they come in contact with the virus.





Efficacy

~90%

Reductions in
hospitalisation and
deaths

Variant specific

Optimal efficacy
reached following
second dose

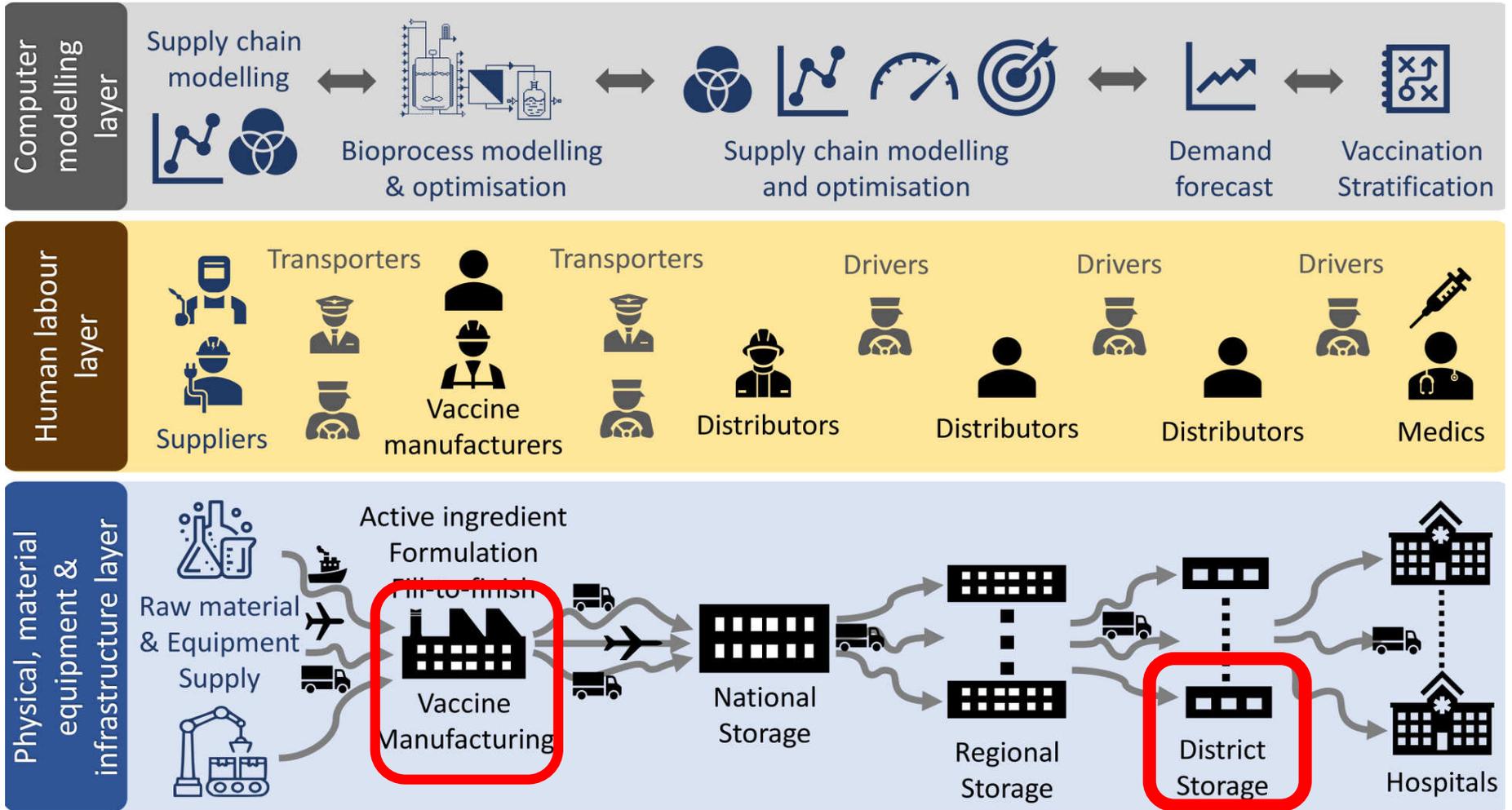
Will we need
boosters?

Challenges

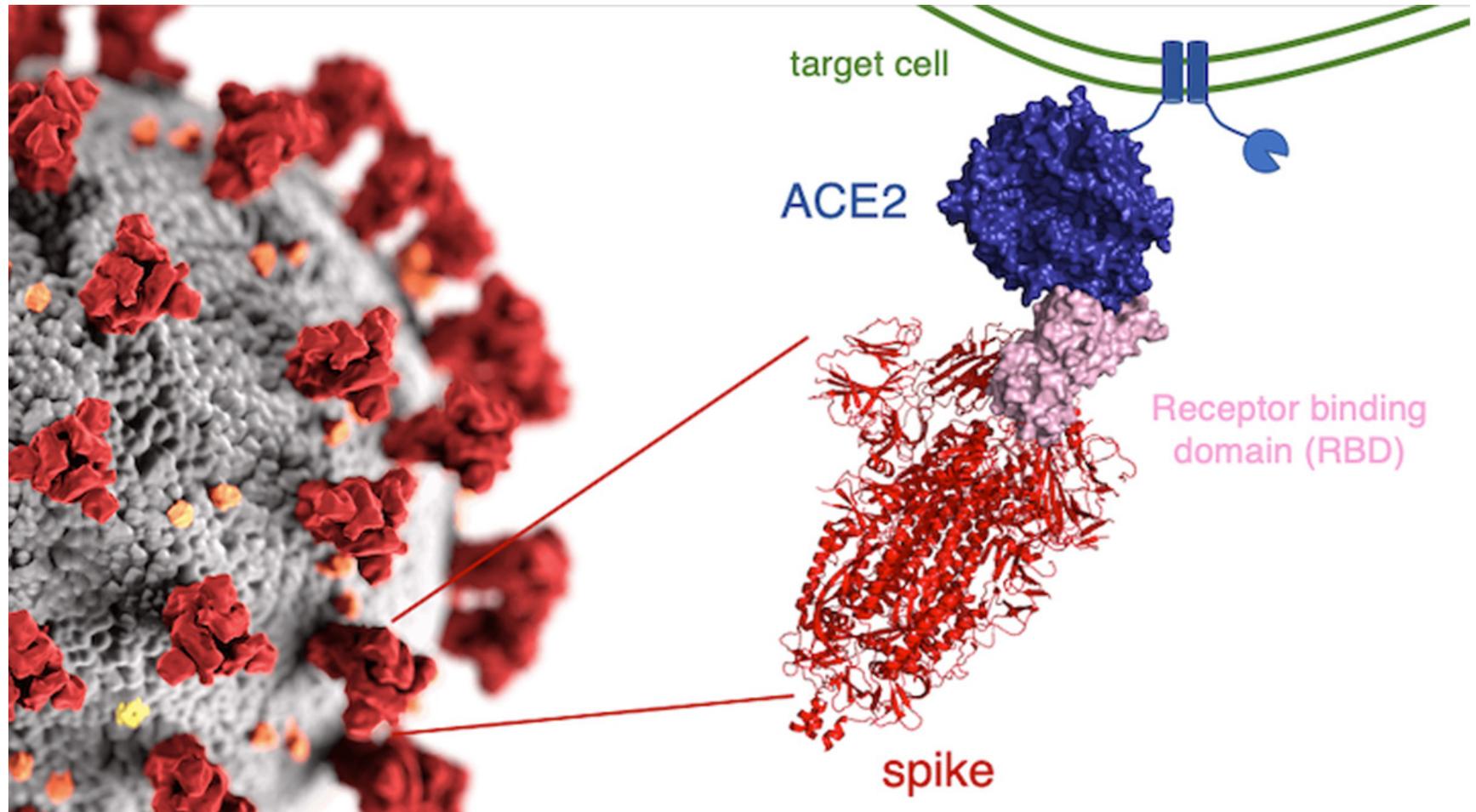
- Supply chain
- Variants
- Equity
- Misinformation



Supply chain



Variants



Variants of Concern

Country/region	Scientific name	WHO name
 Kent, UK	B.1.1.7	Alpha
 South Africa	B.1.351	Beta
 Brazil	P.1	Gamma
 India	B.1.617.2	Delta

Efficacy in the face of variants

Coronavirus variants of concern

Mutations are natural and to be expected in any virus. Several variants of SARS-CoV-2 have been detected

Alpha

First record:
September 2020



Country of first detection:
United Kingdom

Beta

First record:
October 2020



Country of first detection:
South Africa

Gamma

First record:
December 2020



Country of first detection:
Brazil

Delta

First record:
October 2020



Country of first detection:
India

Key mutations
in the spike
protein

N501Y

All three variants have mutations in this receptor-binding domain on the spike protein



E484K and K417N
Mutations seen in
B.1.351 and P.1

E484Q **L452R**



Main concerns

Transmissibility

The B.1.1.7 and B.1.351 variants appear to spread more easily and quickly

Any change on the spike can *potentially affect how easily a virus can infect a cell*

Severity of illness

Studies on B.1.1.7 submitted to the UK's NERVTAG* in January suggested there *could be a link to increased risk of death*

*New and Emerging Respiratory Virus Threats Advisory Group

Vaccine efficacy

Some studies have suggested B.1.351 and P.1 may have mutations that prevent antibodies working as well, *though more research is needed*

Other lab studies have shown *that vaccines retain effectiveness* against B.1.351 and B.1.1.7

The Indian outbreak

While it is unknown if the variant is driving the huge India wave, a WHO official has said that there is *"some available information to suggest increased transmissibility"*

There is also some suggestion of *"reduced neutralisation"*, but it is *too early to say if vaccines are compromised*

Source: [cdc.gov/science/mediacentre.org/cidrap.umn.edu/WHO.int/sciencenews.org/Birmingham Uni Turnkey lab/ NERVTAG/Imperial College London/bostrazeneca.com/NewScientist](https://www.cdc.gov/science/mediacentre.org/cidrap.umn.edu/WHO.int/sciencenews.org/Birmingham%20Uni%20Turnkey%20lab/NERVTAG/Imperial%20College%20London/bostrazeneca.com/NewScientist)





Equity

Issues Increased risk of variants arising in an unvaccinated population

Economic recovery depends on securing equal access to vaccines in all countries

Question of boosters

Equity benefits us all



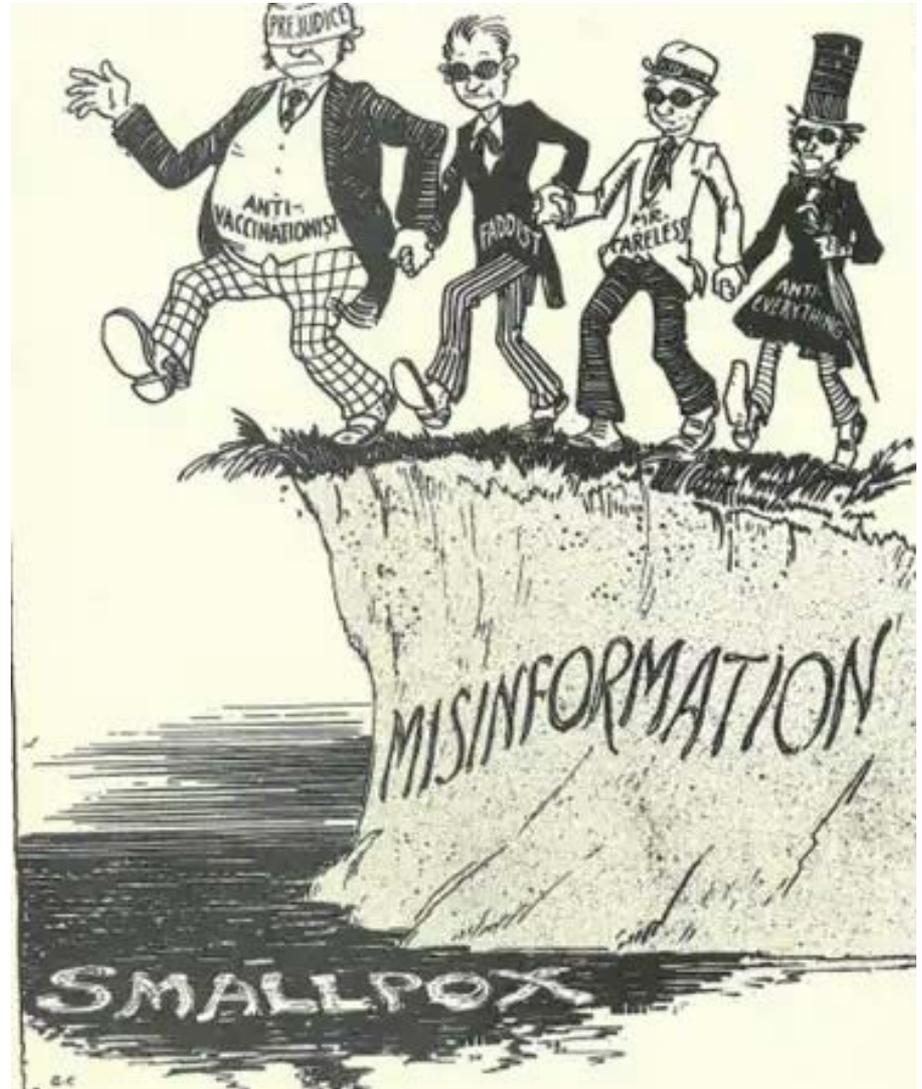
Equity

‘Compared to Europe and North America, which have so far administered at least one dose to 22% and 44% of their populations respectively, just 1% of people in Africa and 4.4% in Asia have received a dose of their vaccine.’

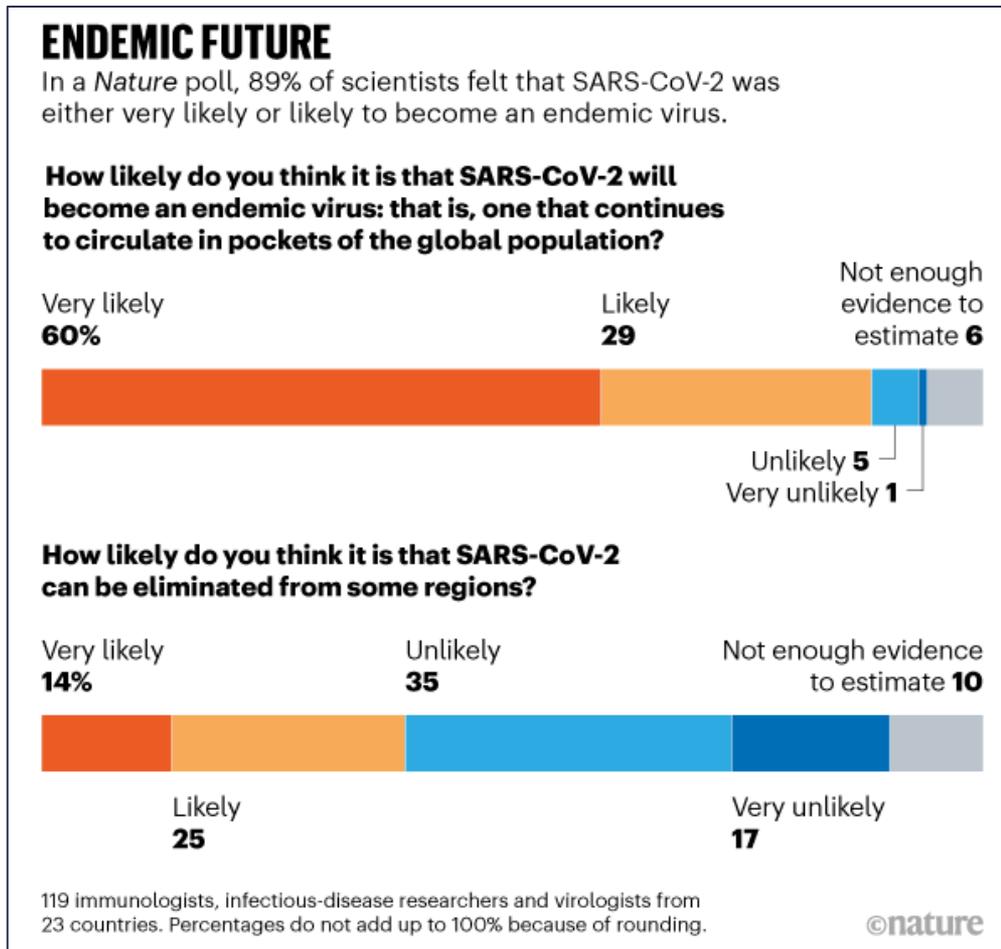
Prachi Patkee, Swiss Re

Misinformation

- Not new
- Andrew Wakefield & the MMR controversy
- Social media



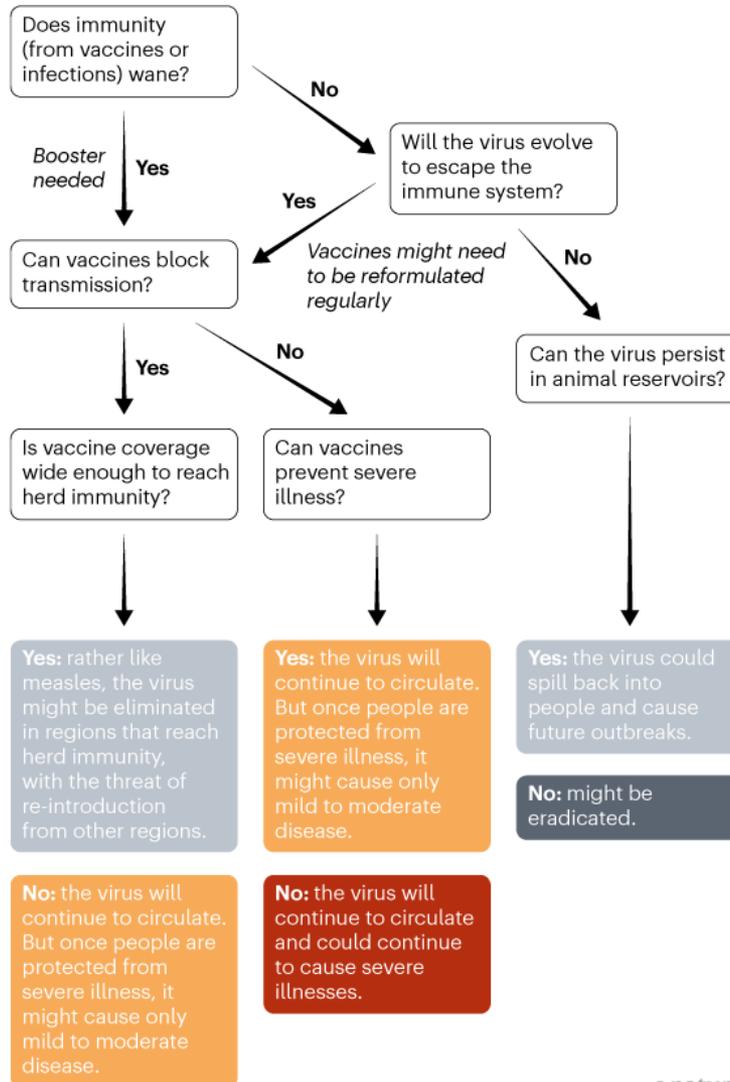
Endemic potential and what this means





CORONAVIRUS: HERE TO STAY?

SARS-CoV-2 has spread so far around the world that it is very unlikely to be eradicated. Here are some of the key factors that are likely to lead to it becoming endemic.





The road ahead

- **Vaccine equity**
- **Examine the endemic potential**
- **Variants, variants, variants.....**
- **Will the virus become ‘just another coronavirus?’**

Thank You

Questions?

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