

# ***COVID-19 and its impact***

Associate Professor Siouxsie Wiles  
Bioluminescent Superbugs Lab



THE UNIVERSITY OF  
**AUCKLAND**  
Te Whare Wānanga o Tāmaki Makaurau  
NEW ZEALAND

**MEDICAL AND  
HEALTH SCIENCES**



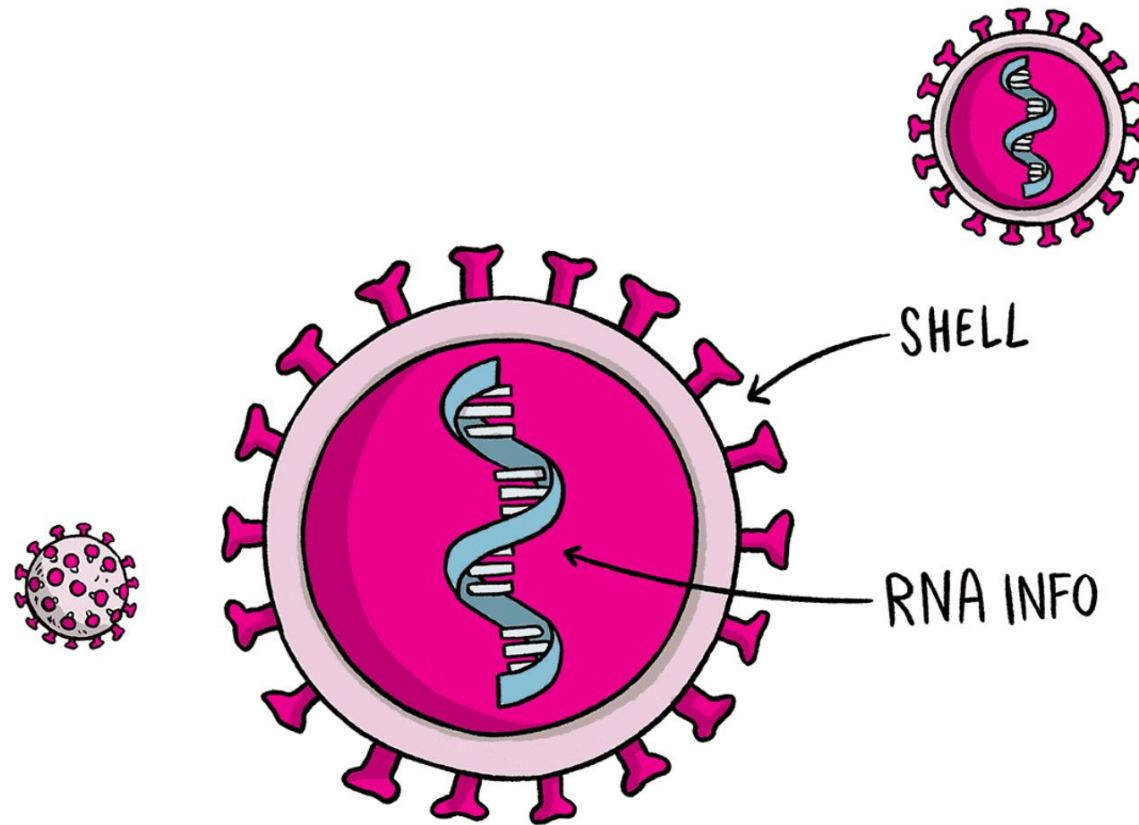
Zika – 2015-2016

Ebola – 2014-2016

H1N1 -2009-2010

SARS -2002-2004





Virus = SARS-CoV-2

Disease = COVID-19

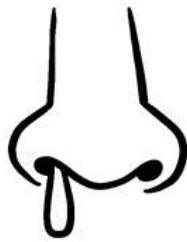
# POTENTIAL SYMPTOMS OF COVID-19



DRY  
COUGH



FEVER



RUNNY  
NOSE



SORE  
THROAT



BREATH-  
LESSNESS



HEADACHE



BODY ACHES/  
SORE MUSCLES



SNEEZE



FATIGUE



DIARRHOEA



CHILLS



LOSS OF  
SMELL

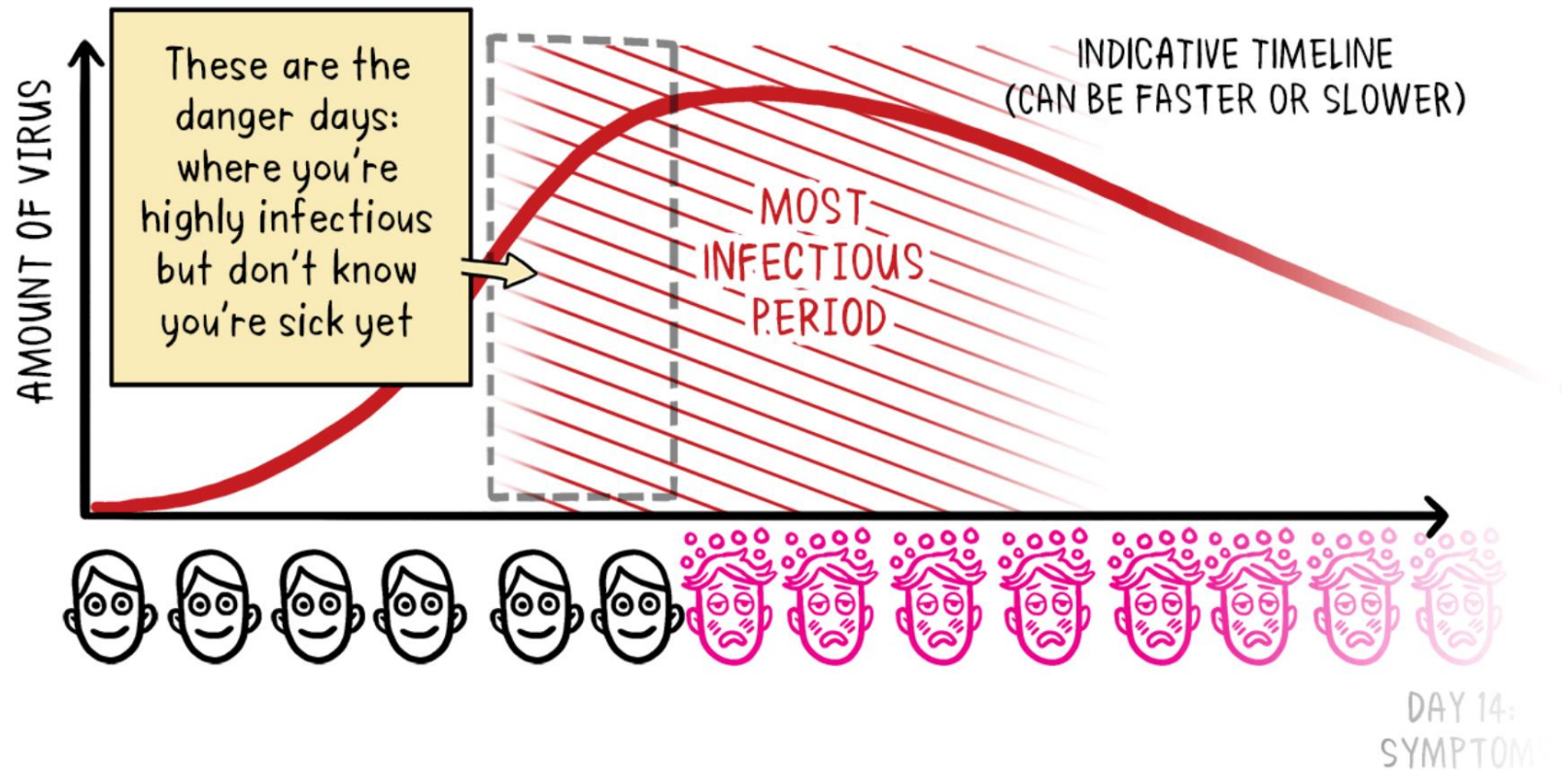
@SIOUXSIEW @XTOTL thespinoff.co.nz

FOR THE LATEST INFO PLEASE SEE [who.int](http://who.int) or [health.govt.nz](http://health.govt.nz)

SOURCE: WHO, CDC CC-BY-SA 4.0

29 APRIL 2020

## Disease = COVID-19



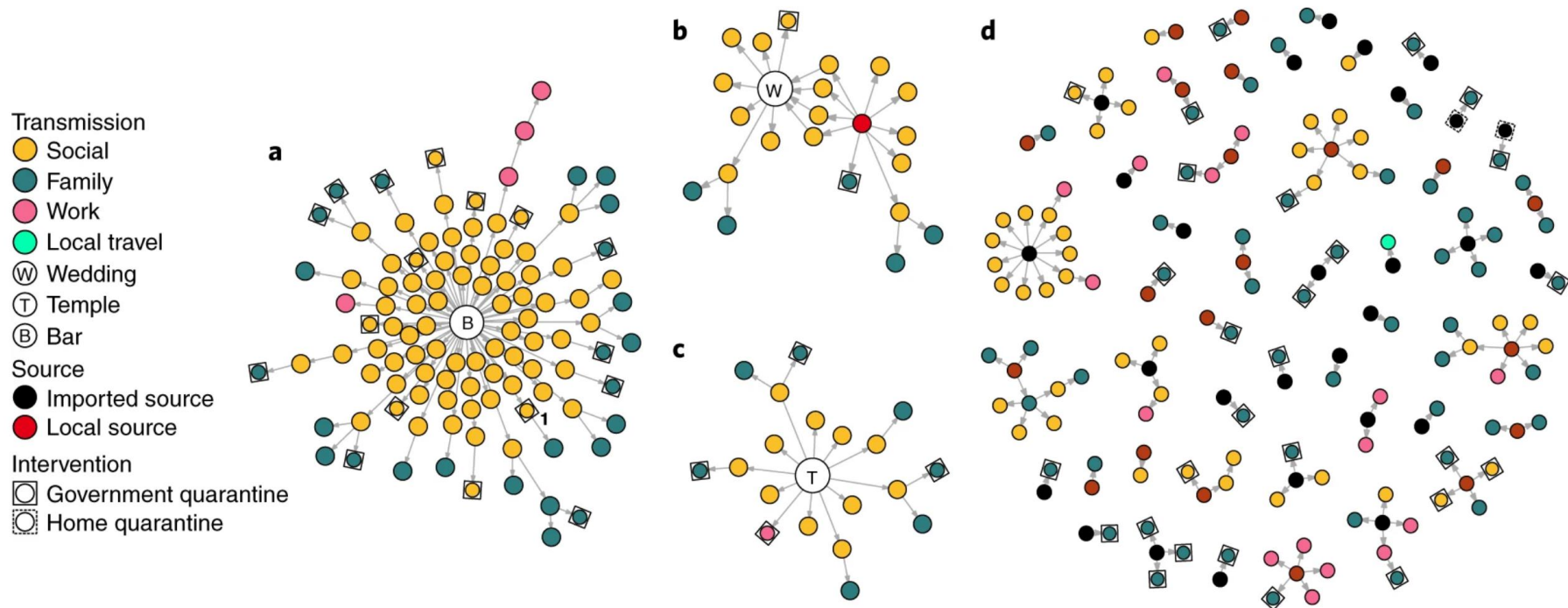


# Clustering and superspreading potential of SARS-CoV-2 infections in Hong Kong

Dillon C. Adam, Peng Wu , Jessica Y. Wong, Eric H. Y. Lau, Tim K. Tsang, Simon Cauchemez, Gabriel M. Leung & Benjamin J. Cowling

*Nature Medicine* (2020) | [Cite this article](#)

17k Accesses | 1403 Altmetric | [Metrics](#)



**a**, Transmission network of the 'bar and band' cluster of undetermined source ( $n = 106$ ). **b**, Transmission network associated with a wedding without clear infector–infectee pairs but linked back to a preceding social gathering and local source ( $n = 22$ ). **c**, Transmission network associated with a temple cluster of undetermined source ( $n = 19$ ). **d**, All other clusters of SARS-CoV-2 infections where the source and transmission chain could be determined.



2020



The number '2020' is rendered in a large, bold, golden-yellow font. The zero is replaced by a circular emblem containing a stylized golden rat, the zodiac sign for 2020. The rat is surrounded by red flowers and clouds. The emblem has a geometric border. The background is a deep red with a subtle pattern of swirling clouds and small stars. Two red lanterns are positioned at the top corners.

HAPPY NEW YEAR



1 in 10,000 at age 20

70 in 10,000 at age 50

890 in 10,000 at age 70

3,680 in 10,000 at age 85

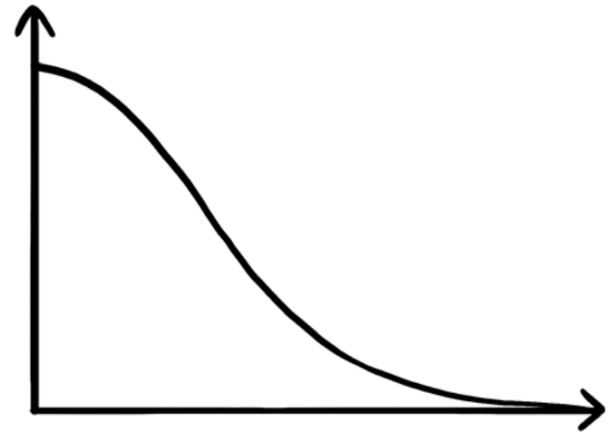
...diabetes, hypertension, COPD,  
coronary artery disease, chronic  
kidney disease, smokers, males.

# "ELIMINATE"

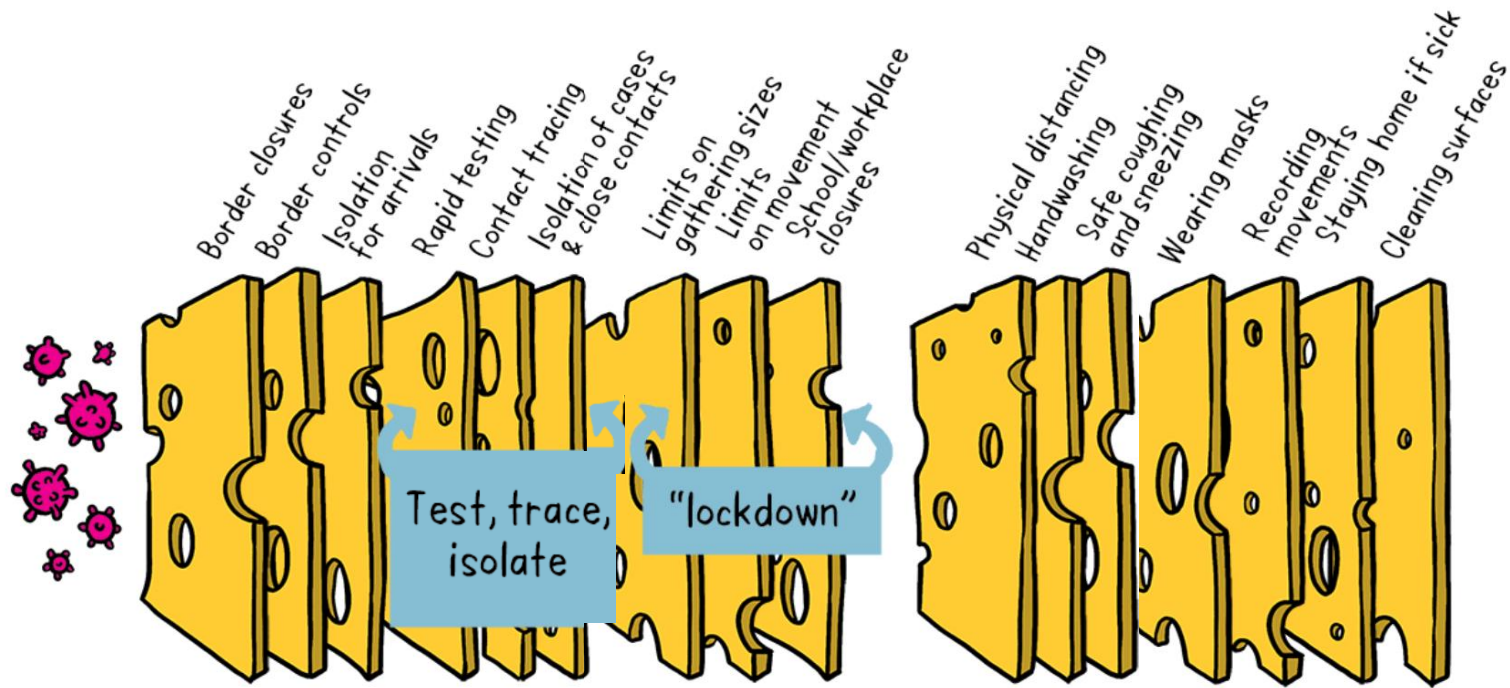
IT USUALLY MEANS...

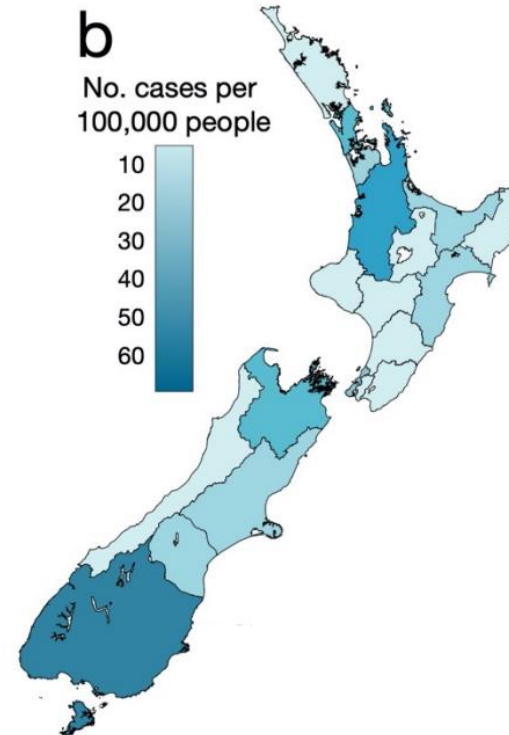
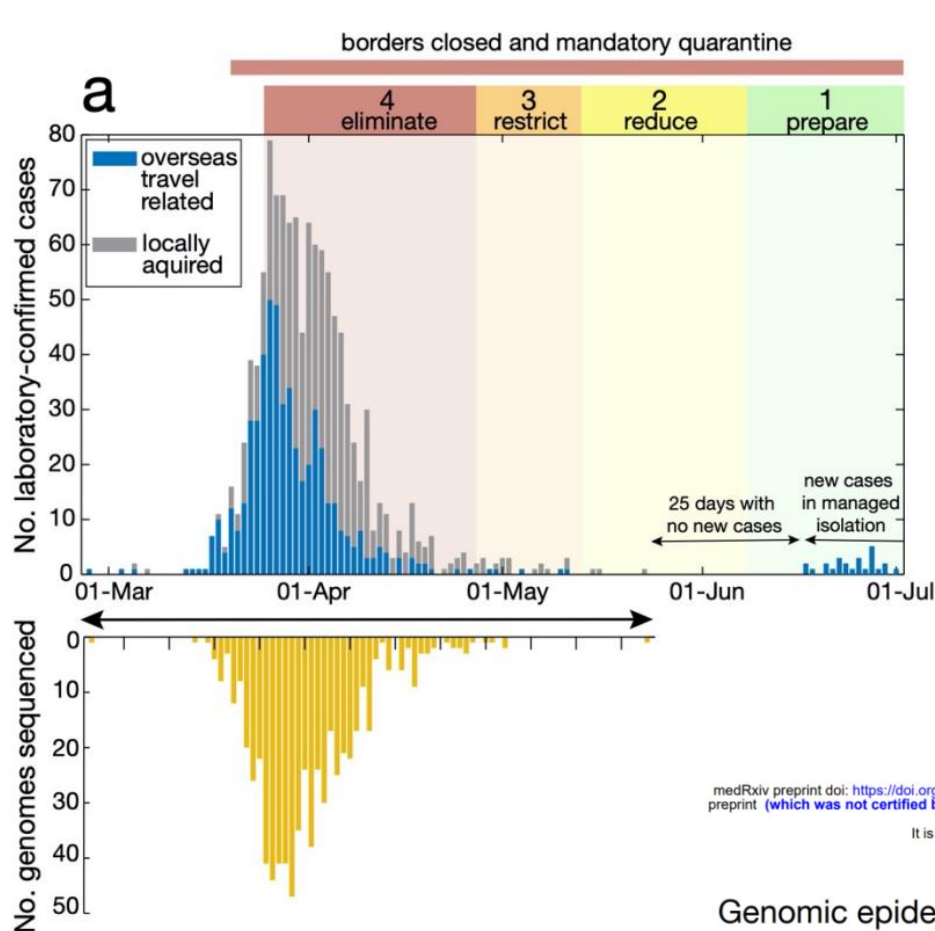
completely remove or get rid of

BUT SCIENTISTS MEAN...



bring cases down to zero or near  
zero in a particular place



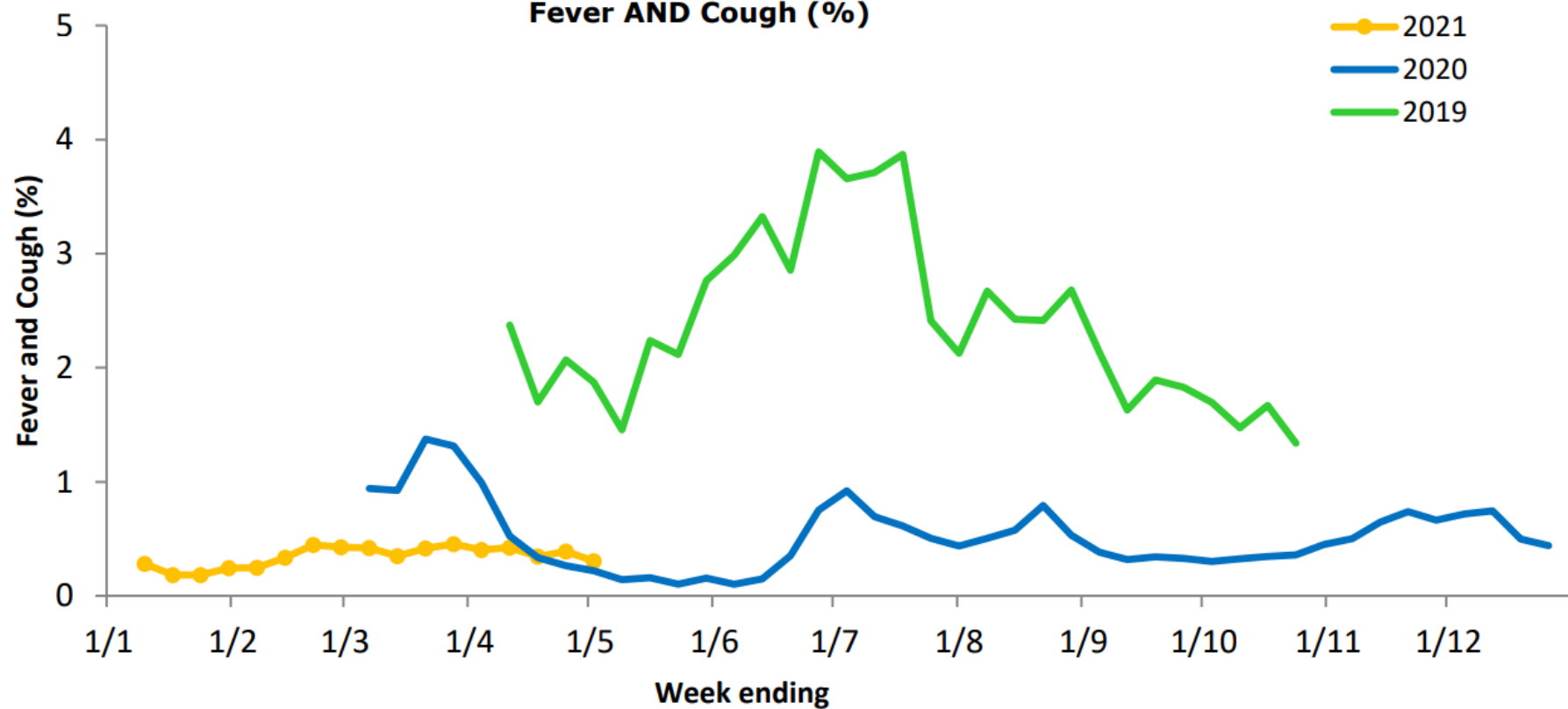


medRxiv preprint doi: <https://doi.org/10.1101/2020.08.05.20168930>; this version posted August 7, 2020. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted medRxiv a license to display the preprint in perpetuity. It is made available under a CC-BY-NC-ND 4.0 International license.

## Genomic epidemiology reveals transmission patterns and dynamics of SARS-CoV-2 in Aotearoa New Zealand

Jemma L Geoghegan<sup>1,2</sup>, Xiaoyun Ren<sup>2</sup>, Matthew Storey<sup>2</sup>, James Hadfield<sup>3</sup>, Lauren Jelley<sup>2</sup>, Sarah Jefferies<sup>2</sup>, Jill Sherwood<sup>2</sup>, Shevaun Paine<sup>2</sup>, Sue Huang<sup>2</sup>, Jordan Douglas<sup>4</sup>, Fábio K Mendes<sup>4</sup>, Andrew Sporle<sup>5,6</sup>, Michael G Baker<sup>7</sup>, David R Murdoch<sup>8</sup>, Nigel French<sup>9</sup>, Colin R Simpson<sup>10,11</sup>, David Welch<sup>4</sup>, Alexei J Drummond<sup>4</sup>, Edward C Holmes<sup>12</sup>, Sebastián Duchêne<sup>13</sup>, Joep de Lig<sup>2</sup>

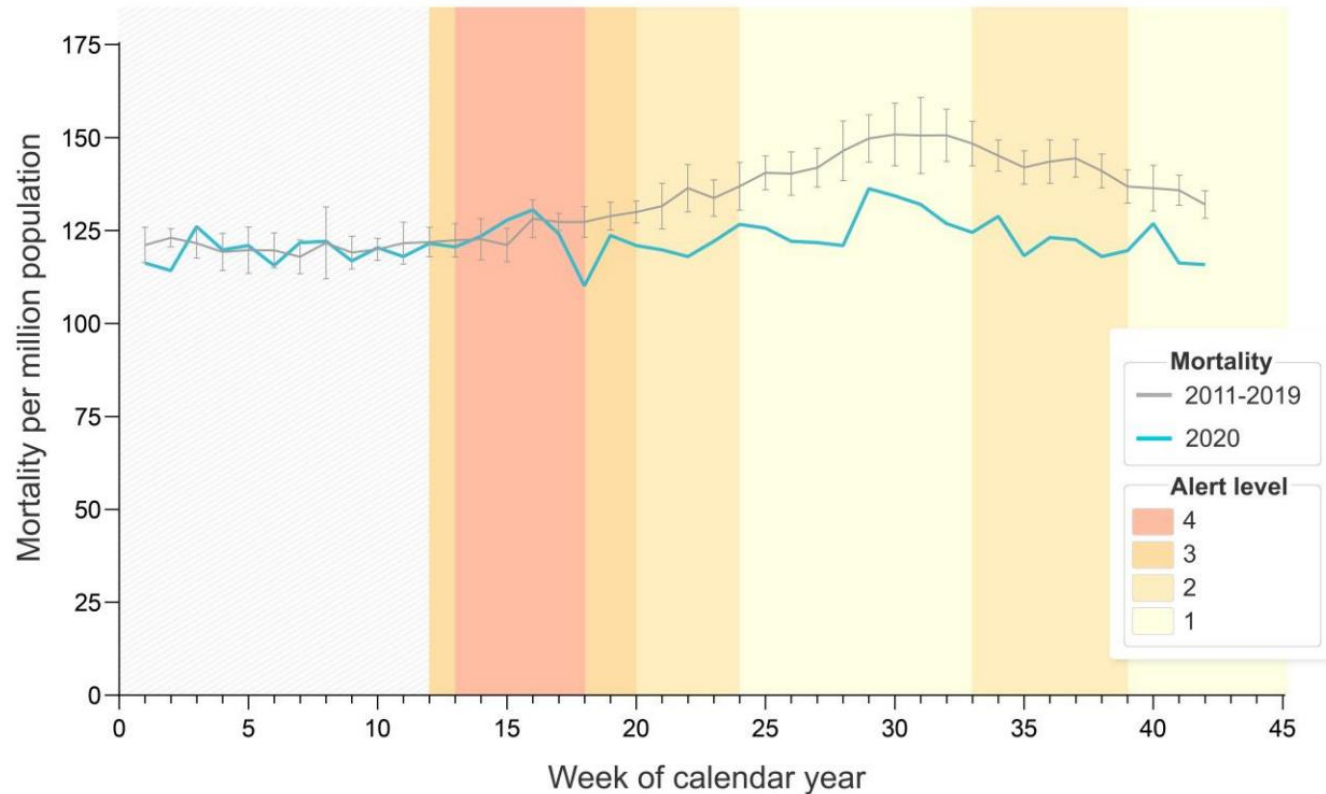
**Flutracking Influenza-Like Illness symptoms  
Fever AND Cough (%)**





# THE LANCET

All-cause mortality in New Zealand by week



CORRESPONDENCE | [VOLUME 397, ISSUE 10268, P25, JANUARY 02, 2021](#)

## Reduced mortality in New Zealand during the COVID-19 pandemic

Stacey Kung • Marjan Doppen • Melissa Black • Tom Hills • Nethmi Kearns ✉

Published: December 14, 2020 • DOI: [https://doi.org/10.1016/S0140-6736\(20\)32647-7](https://doi.org/10.1016/S0140-6736(20)32647-7)

## Coronavirus: Drop in number of premature births over lockdown

Hannah Martin · 14:01, Jul 22 2020



KATHERINE GRIFFITHS/CANBERRA-TIMES

Hospitals around the world, including in Auckland, saw the number of babies born prematurely drop significantly during lockdown.



# COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)



Last Updated at (M/D/YYYY)

8/4/2021, 8:21 PM

Cases

199,597,906

Deaths

4,246,529

Vaccine Doses Administered

4,181,824,795

## Cases and Deaths by

Country/Region/Sovereignty

35,238,173 | 614,295  
US

31,769,132 | 425,757  
India

19,985,817 | 558,432  
Brazil

6,251,953 | 158,263  
Russia

6,242,948 | 112,185  
France

5,951,736 | 130,179  
United Kingdom

5,795,665 | 51,645  
Turkey

4,961,880 | 106,447  
Argentina

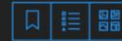
4,807,979 | 121,216  
Colombia

4,523,310 | 81,773  
Spain

4,363,374 | 128,115  
Italy

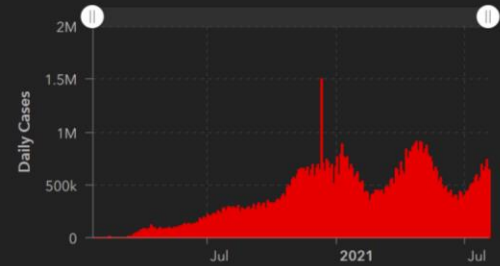


Esri, FAO, NOAA



Powered by Esri

Cumulative Cases

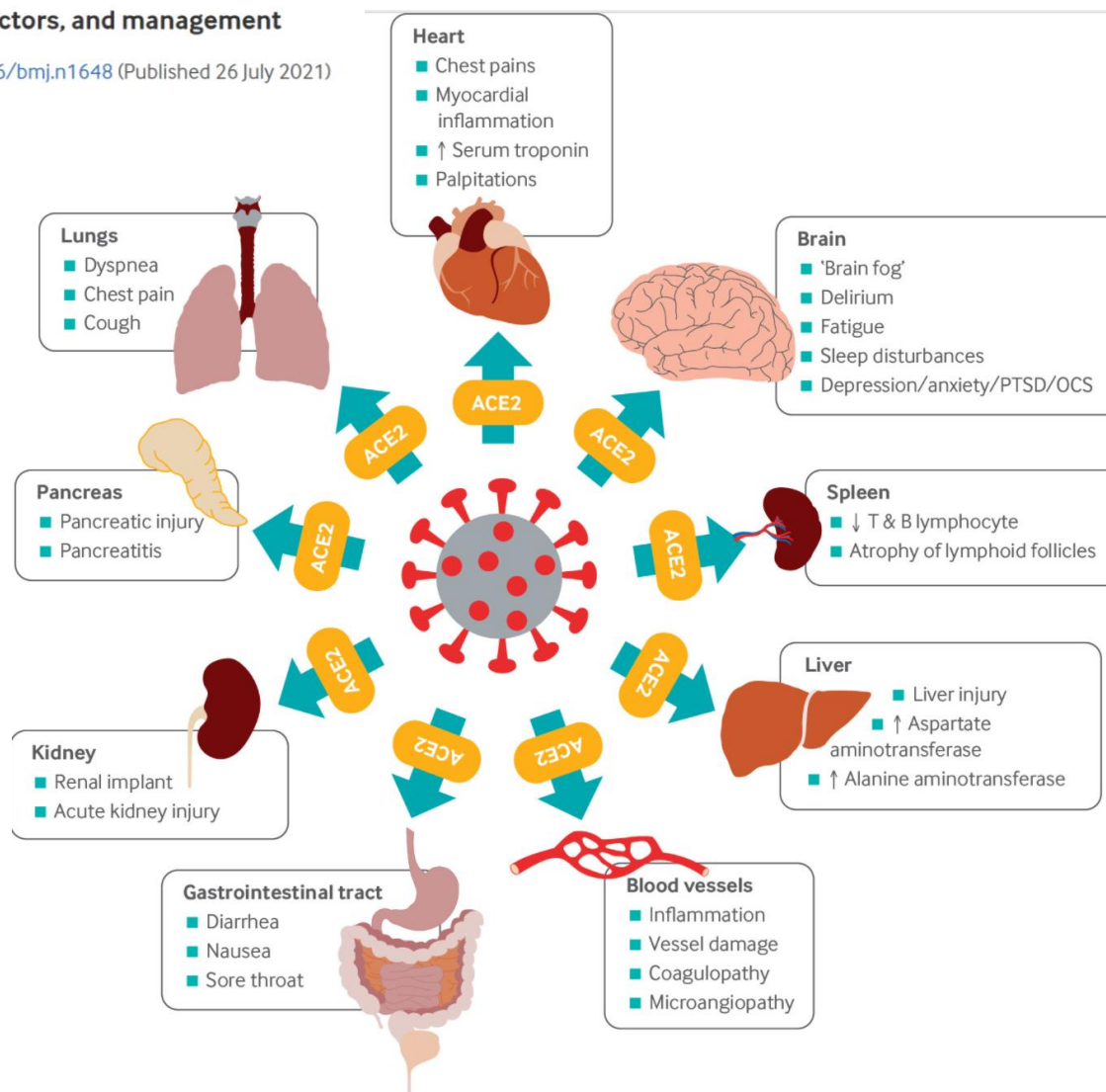


## Clinical Review » State of the Art Review

## Long covid—mechanisms, risk factors, and management

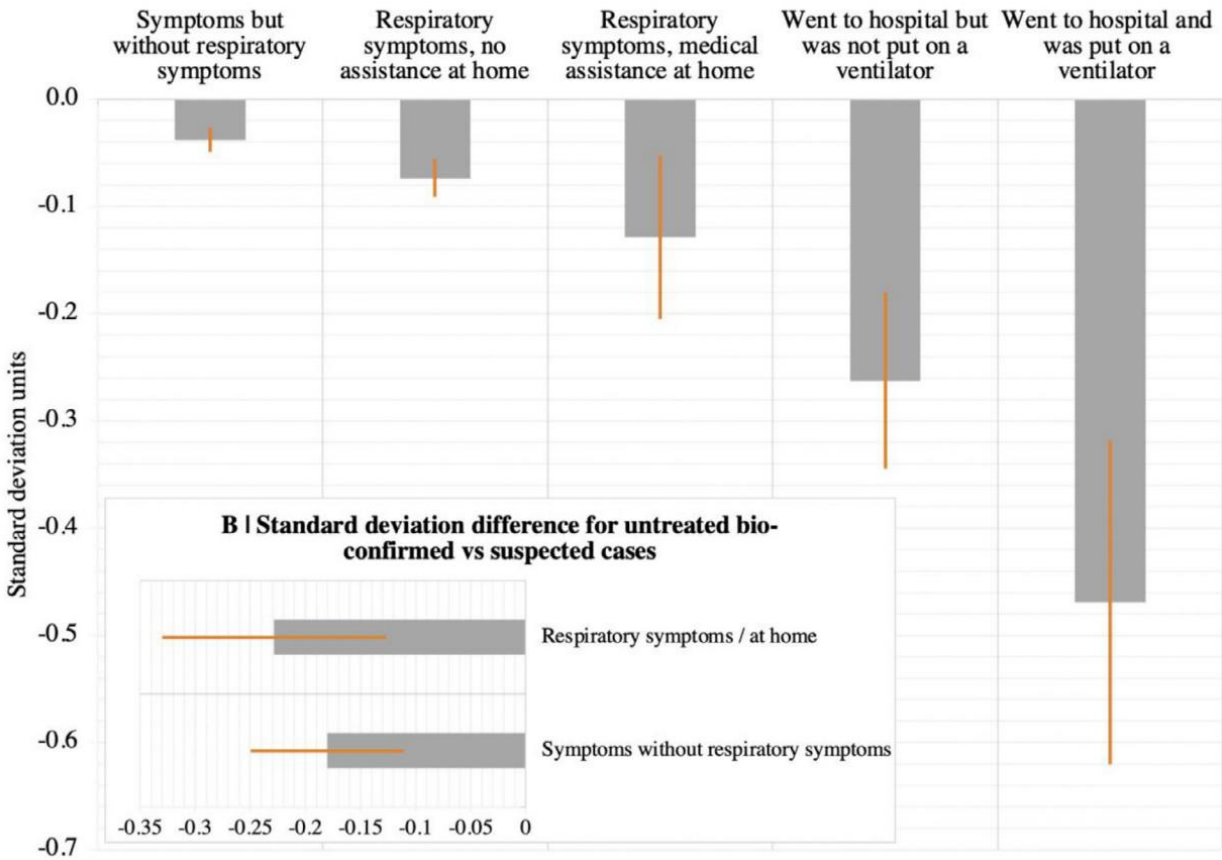
BMJ 2021 ; 374 doi: <https://doi.org/10.1136/bmj.n1648> (Published 26 July 2021)

Cite this as: BMJ 2021;374:n1648



# Cognitive deficits in people who have recovered from COVI

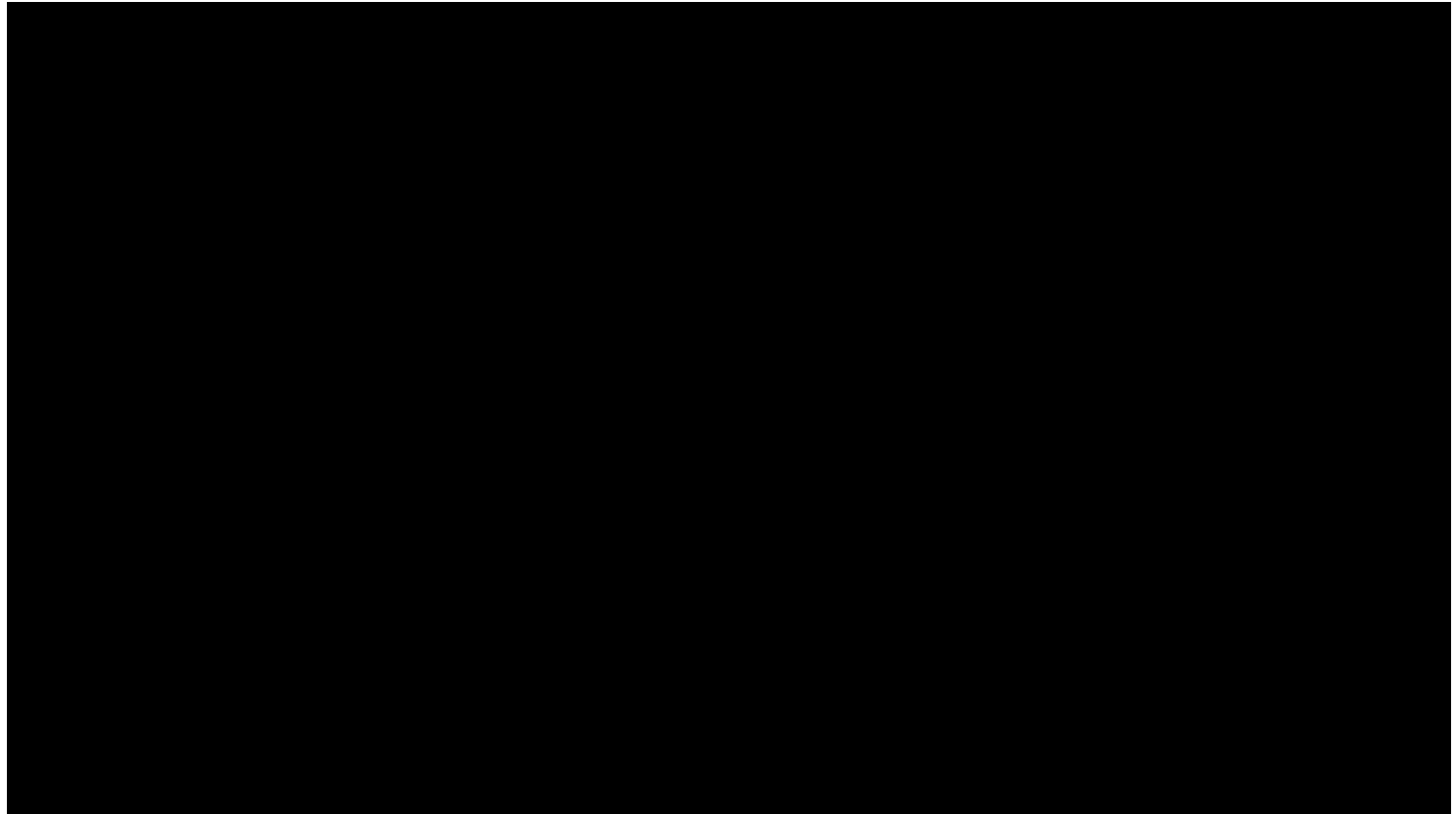
Adam Hampshire<sup>a,\*</sup>, William Trender<sup>a</sup>, Samuel R Chamberlain<sup>b,c</sup>, Amy E. Joel<sup>d</sup>,  
Fiona Patrick<sup>e</sup>, Ndaba Mazibuko<sup>e</sup>, Steve CR Williams<sup>e</sup>, Joseph M Barnby<sup>e</sup>, Peter D. Lee<sup>e</sup>,  
Mitul A Mehta<sup>e</sup>



**Fig. 2.** . Cognitive deficits in people with suspected and confirmed COVID-19 illness.  
A | People who reported having recovered from COVID-19 performed worse in terms of global score. The scale of this deficit increased with the level of treatment received for respiratory difficulty. B | In individuals who did not receive medical assistance, the scale of this deficit was greater in biologically confirmed cases versus suspected cases of COVID-19. Error bars report the standard error.



# **Vaccines Vs Variants**



<https://vimeo.com/180908160>



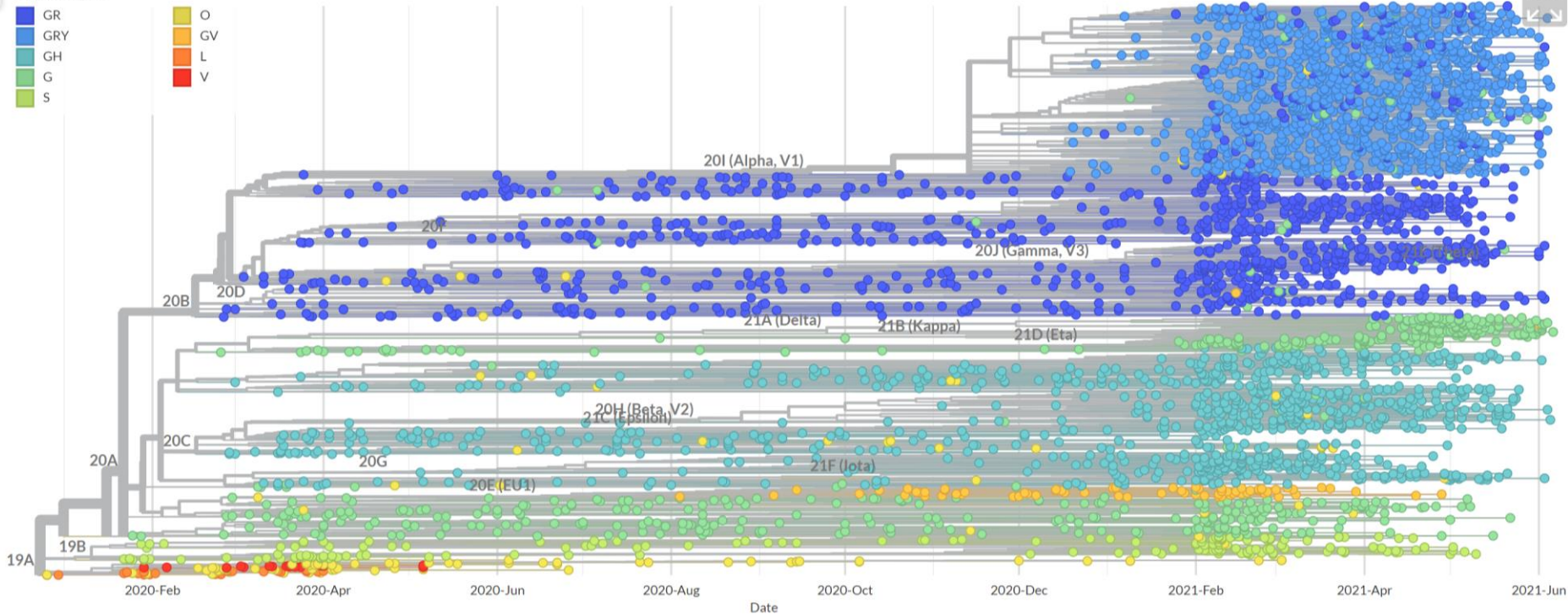
 @baym

## Phylogeny

GISAID Clade ^

ZOOM TO SELECTED

RESET LAYOUT



## Variants of Concern

A SARS-CoV-2 variant that meets the definition of a VOI (see below) and, through a comparative assessment, has been demonstrated to be associated with one or more of the following changes at a degree of global public health significance:

- Increase in transmissibility or detrimental change in COVID-19 epidemiology; or
- Increase in virulence or change in clinical disease presentation; or
- Decrease in effectiveness of public health and social measures or available diagnostics, vaccines, therapeutics.

WHO label	Pango lineage	GISAID clade/lineage	Nextstrain clade	Earliest documented samples	Date of designation
Alpha	B.1.1.7	GRY (formerly GR/501Y.V1)	20I/S:501Y.V1	United Kingdom, Sep-2020	18-Dec-2020
Beta	B.1.351	GH/501Y.V2	20H/S:501Y.V2	South Africa, May-2020	18-Dec-2020
Gamma	P.1	GR/501Y.V3	20J/S:501Y.V3	Brazil, Nov-2020	11-Jan-2021
Delta	B.1.617.2	G/452R.V3	21A/S:478K	India, Oct-2020	VOI: 4-Apr-2021 VOC: 11-May-2021

## Variants of Interest

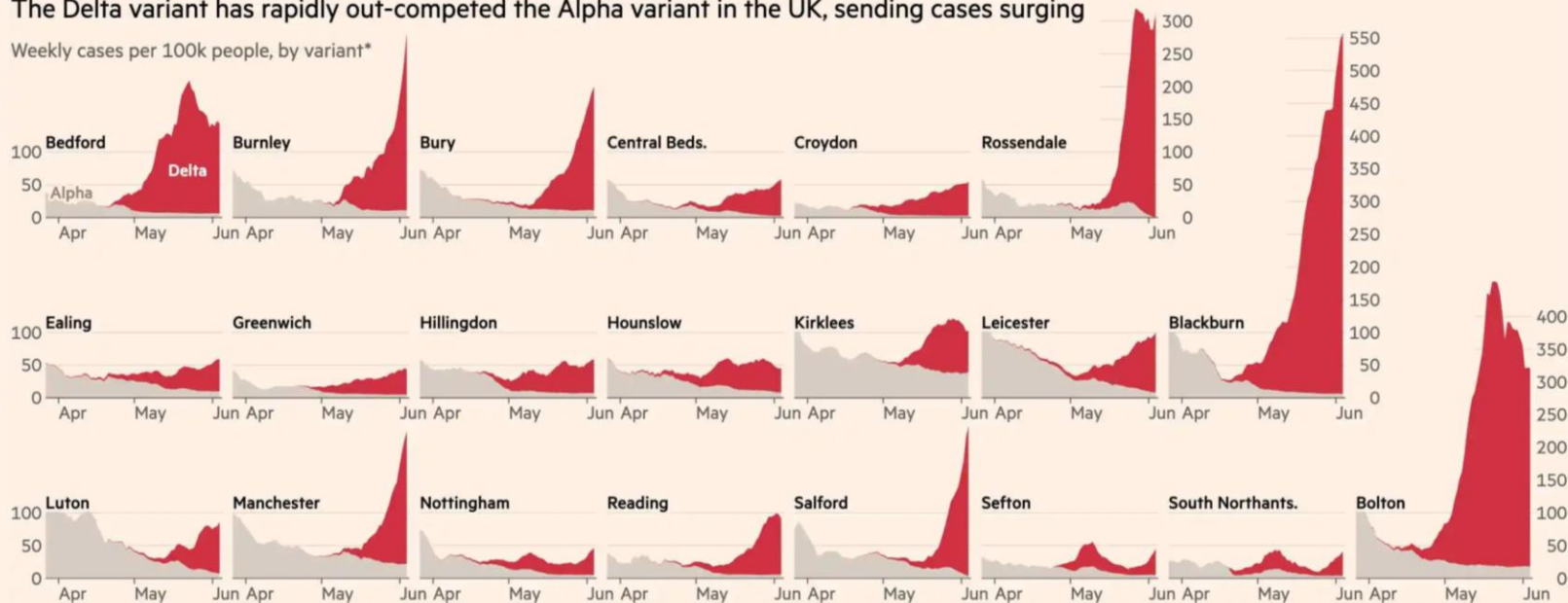
A SARS-CoV-2 isolate is a Variant of Interest (VOI) if, compared to a reference isolate, its genome has mutations with established or suspected phenotypic implications, and either:

- has been identified to cause community transmission/multiple COVID-19 cases/clusters, or has been detected in multiple countries; OR
- is otherwise assessed to be a VOI by WHO in consultation with the WHO SARS-CoV-2 Virus Evolution Working Group.

WHO label	Pango lineage	GISAID clade/lineage	Nextstrain clade	Earliest documented samples	Date of designation
Epsilon	B.1.427/B.1.429	GH/452R.V1	20C/S:452R	United States of America, Mar-2020	5-Mar-2021
Zeta	P.2	GR	20B/S:484K	Brazil, Apr-2020	17-Mar-2021
Eta	B.1.525	G/484K.V3	20A/S484K	Multiple countries, Dec-2020	17-Mar-2021
Theta	P.3	GR	20B/S:265C	Philippines, Jan-2021	24-Mar-2021
Iota	B.1.526	GH	20C/S:484K	United States of America, Nov-2020	24-Mar-2021
Kappa	B.1.617.1	G/452R.V3	21A/S:154K	India, Oct-2020	4-Apr-2021

## The Delta variant has rapidly out-competed the Alpha variant in the UK, sending cases surging

Weekly cases per 100k people, by variant\*



\*Based on applying proportions of sequenced samples to total cases

Sources: FT analysis of data from the Sanger Institute and UK government Covid-19 dashboard

© FT



# Coronavirus Vaccine Tracker

By [Carl Zimmer](#), [Jonathan Corum](#) and [Sui-Lee Wee](#) Updated June 10, 2021

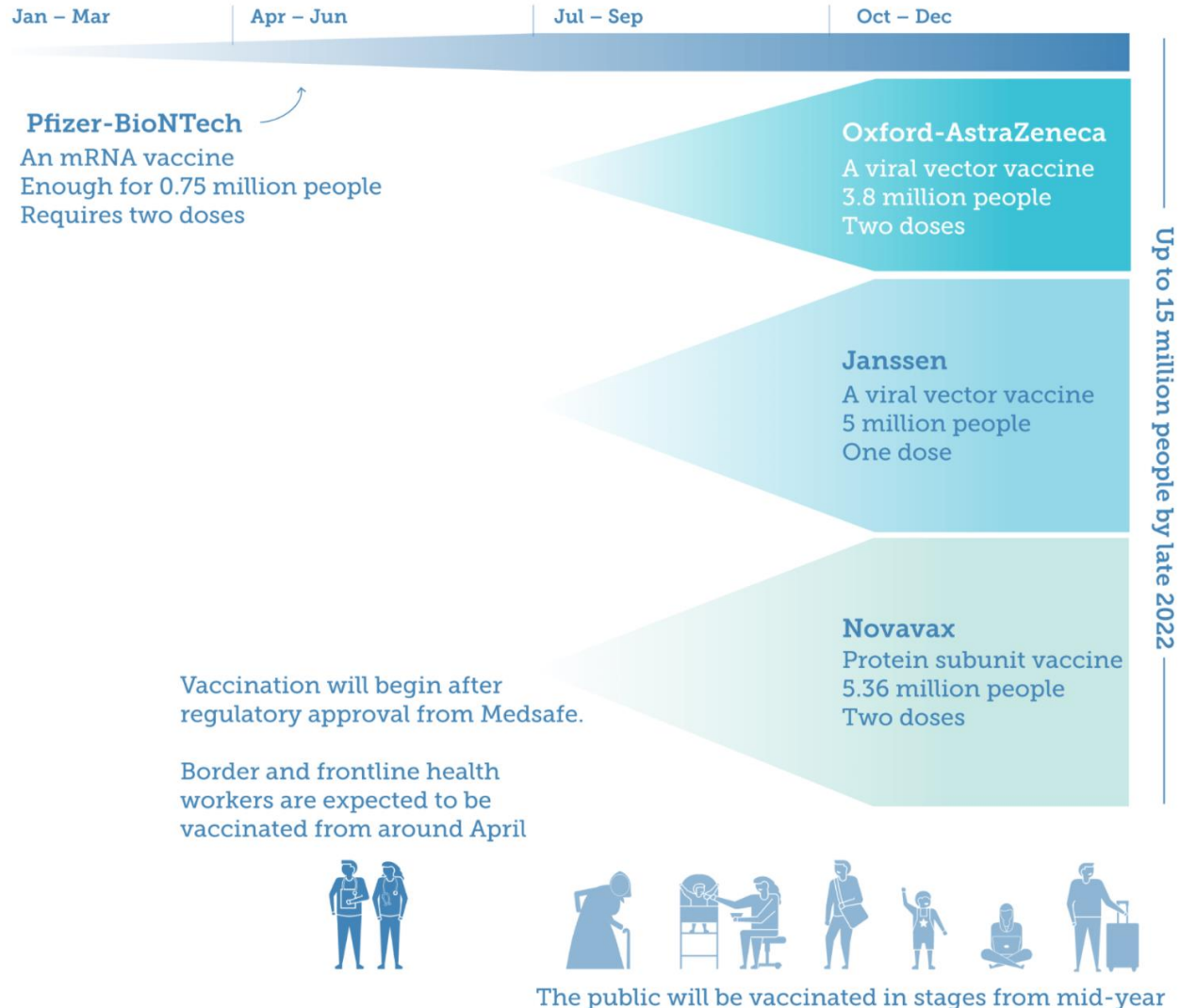


# New Zealand's Covid-19 Vaccine Portfolio

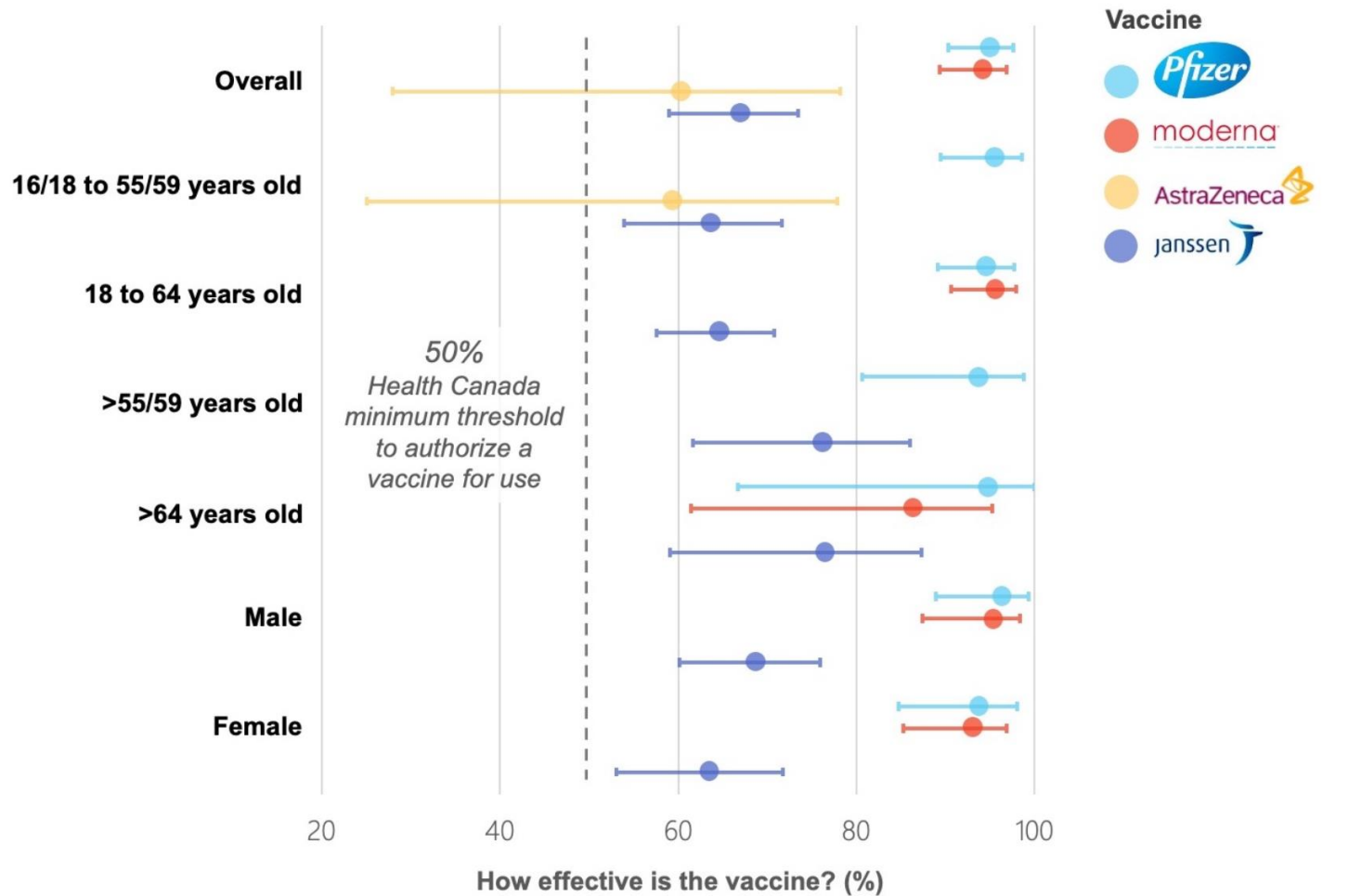
When are COVID-19 vaccines expected to be delivered and when might people get vaccinated?

2021

2022



## Efficacy of COVID-19 vaccines in age and sex subgroups



Width of 95% confidence interval depends on number of participants in subgroup. <sup>1,2,3</sup>

## **Pfizer/BioNTech mRNA vaccine ingredients:**

### Active ingredient:

30 µg of a nucleoside modified mRNA of the spike (S) protein

### Lipid nanoparticle coat:

(helps to transport the mRNA into our cells without it being broken down)

(4 hydroxybutyl)azanediylbis(hexane-6,1-diyl)bis(2-hexyldecanoate) – 0.43 mg

2[(polyethylene glycol)-2000]-N,N-ditetradecylacetamide – 0.05 mg

1,2-distearoyl-sn-glycero-3- phosphocholine – 0.09 mg

cholesterol – 0.2 mg

### Salts to ensure its pH is similar to that of human cells:

potassium chloride – 0.01 mg

monobasic potassium phosphate – 0.01 mg

sodium chloride – 0.36 mg

dibasic sodium phosphate dihydrate – 0.07 mg

### Cryoprotectant to protect the lipid nanoparticle coat when vaccine is frozen:

6 mg of sucrose

## Pfizer COVID-19 vaccine side effects, ages 18–55

SIDE EFFECT	FIRST DOSE	SECOND DOSE
Injection site pain	83%	78%
Fatigue	47%	59%
Headache	42%	52%
Muscle pain	21%	37%
Chills	14%	35%
Diarrhea	11%	10%
Joint pain	11%	22%
Fever	4%	16%
Vomiting	1%	2%



HEALTH AND SCIENCE

# CDC says heart inflammation cases were higher than expected in 16- to 24-year-olds after second Covid vaccine shot, but still rare

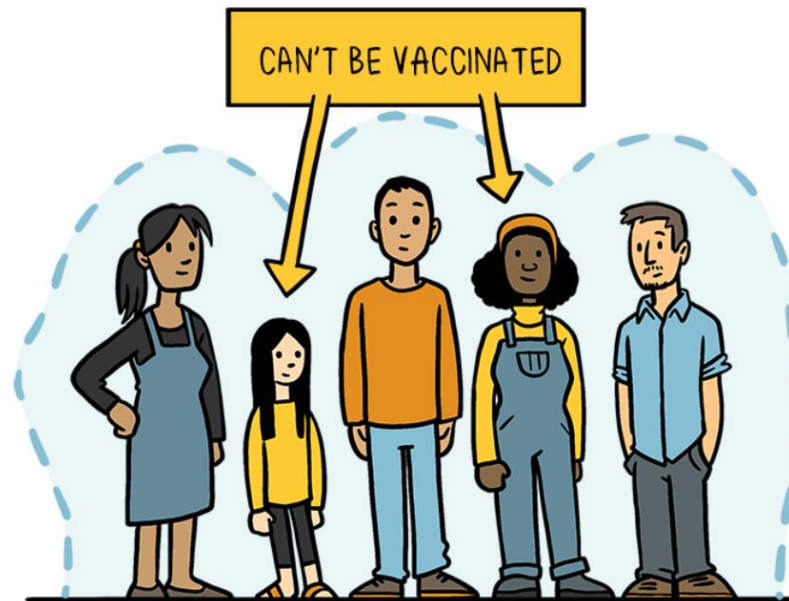
PUBLISHED THU, JUN 10 2021•10:43 AM EDT | UPDATED FRI, JUN 11 2021•3:00 PM EDT



Berkeley Lovelace Jr.  
@BERKELEYJR

SHARE





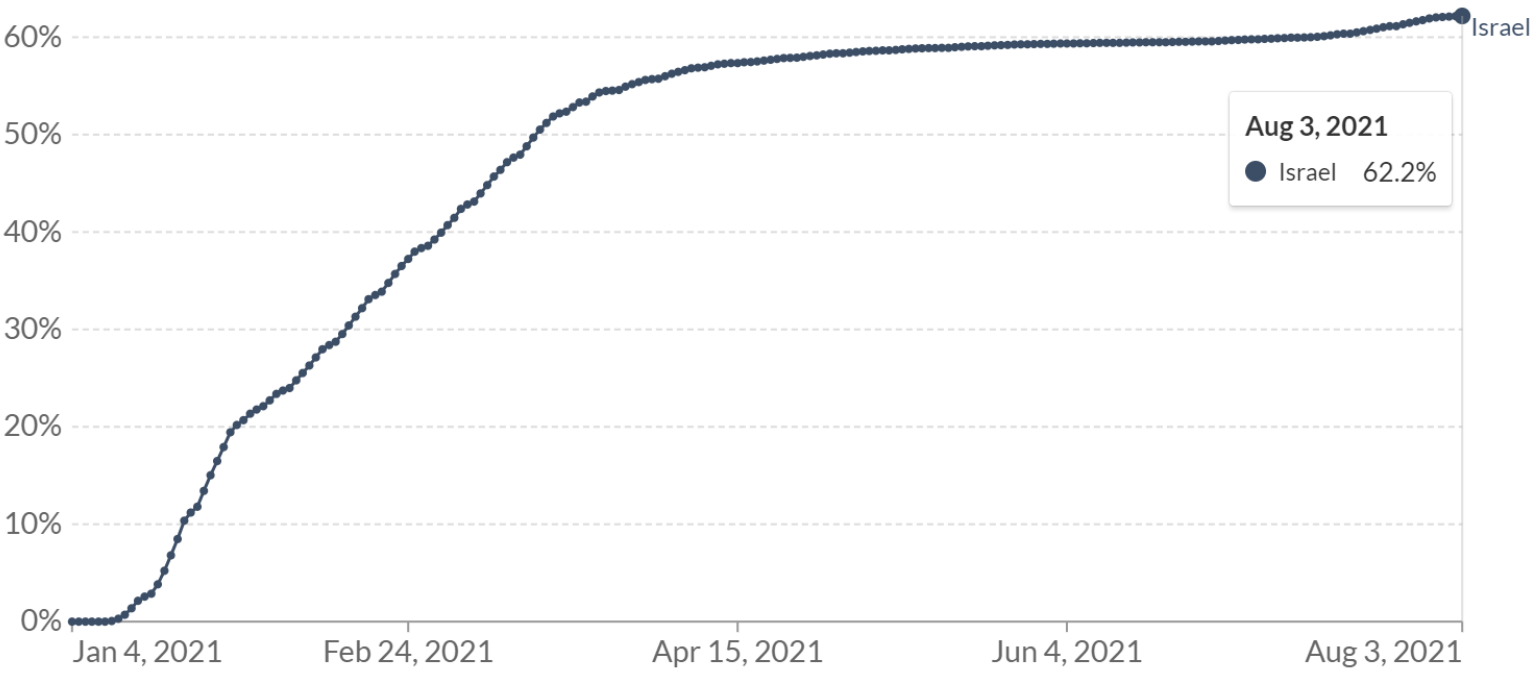
If enough of us are vaccinated then we can protect our whole community, even those who can't be vaccinated.  
That's community immunity.

**How much coverage is  
needed for community  
immunity?**

# Share of the population fully vaccinated against COVID-19

Total number of people who received all doses prescribed by the vaccination protocol, divided by the total population of the country.

[+ Add country](#)



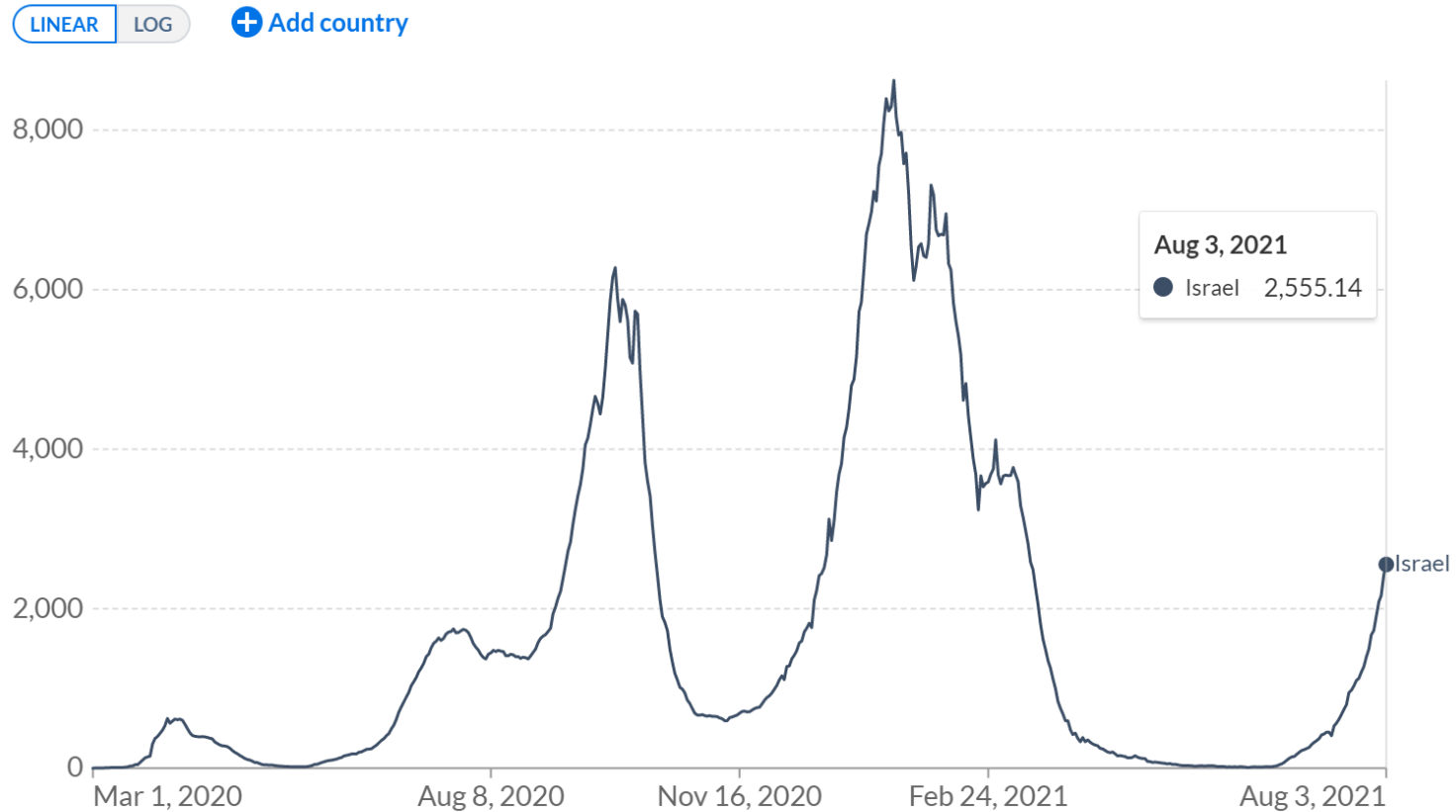
Source: Official data collated by Our World in Data – Last updated 4 August 2021, 08:30 (London time) [OurWorldInData.org/coronavirus](https://OurWorldInData.org/coronavirus) • CC BY

Note: This data is only available for countries which report the breakdown of doses administered by first and second doses. Alternative definitions of a full vaccination, e.g. having been infected with SARS-CoV-2 and having 1 dose of a 2-dose protocol, are ignored to maximize comparability between countries.



# Daily new confirmed COVID-19 cases

Shown is the rolling 7-day average. The number of confirmed cases is lower than the number of actual cases; the main reason for that is limited testing.



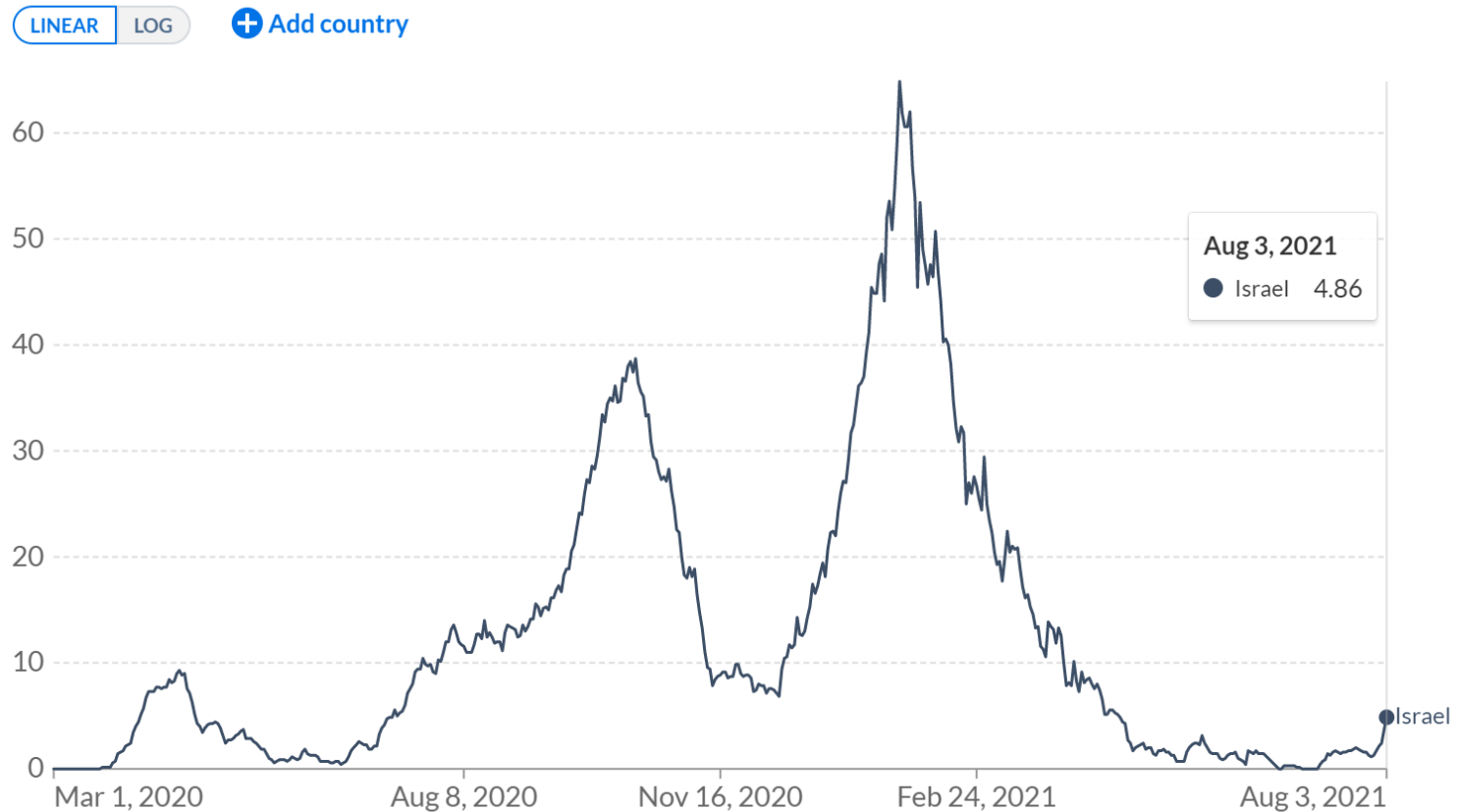
Source: Johns Hopkins University CSSE COVID-19 Data

CC BY



# Daily new confirmed COVID-19 deaths

Shown is the rolling 7-day average. Limited testing and challenges in the attribution of the cause of death means that the number of confirmed deaths may not be an accurate count of the true number of deaths from COVID-19.



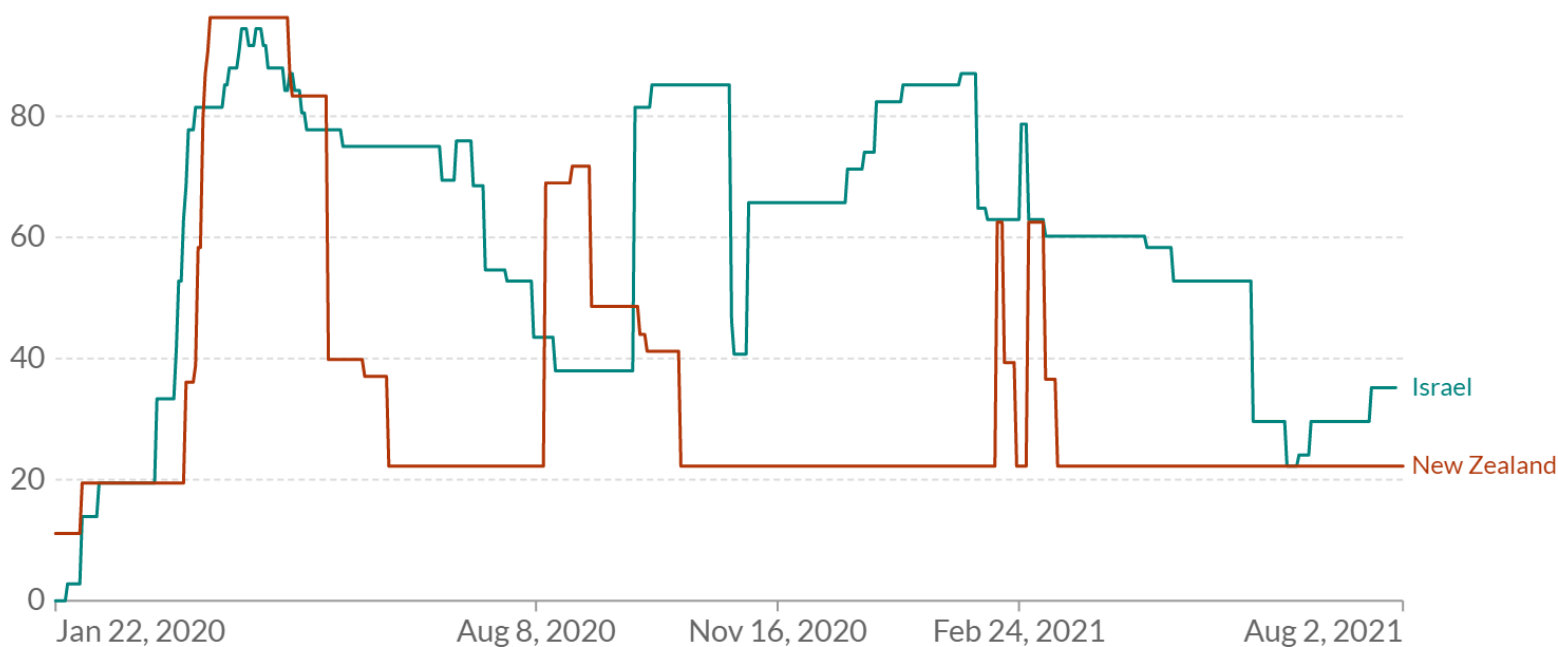
Source: Johns Hopkins University CSSE COVID-19 Data

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## COVID-19: Stringency Index

This 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). If policies vary at the subnational level, the index is shown as the response level of the strictest sub-region.

[+ Add country](#)

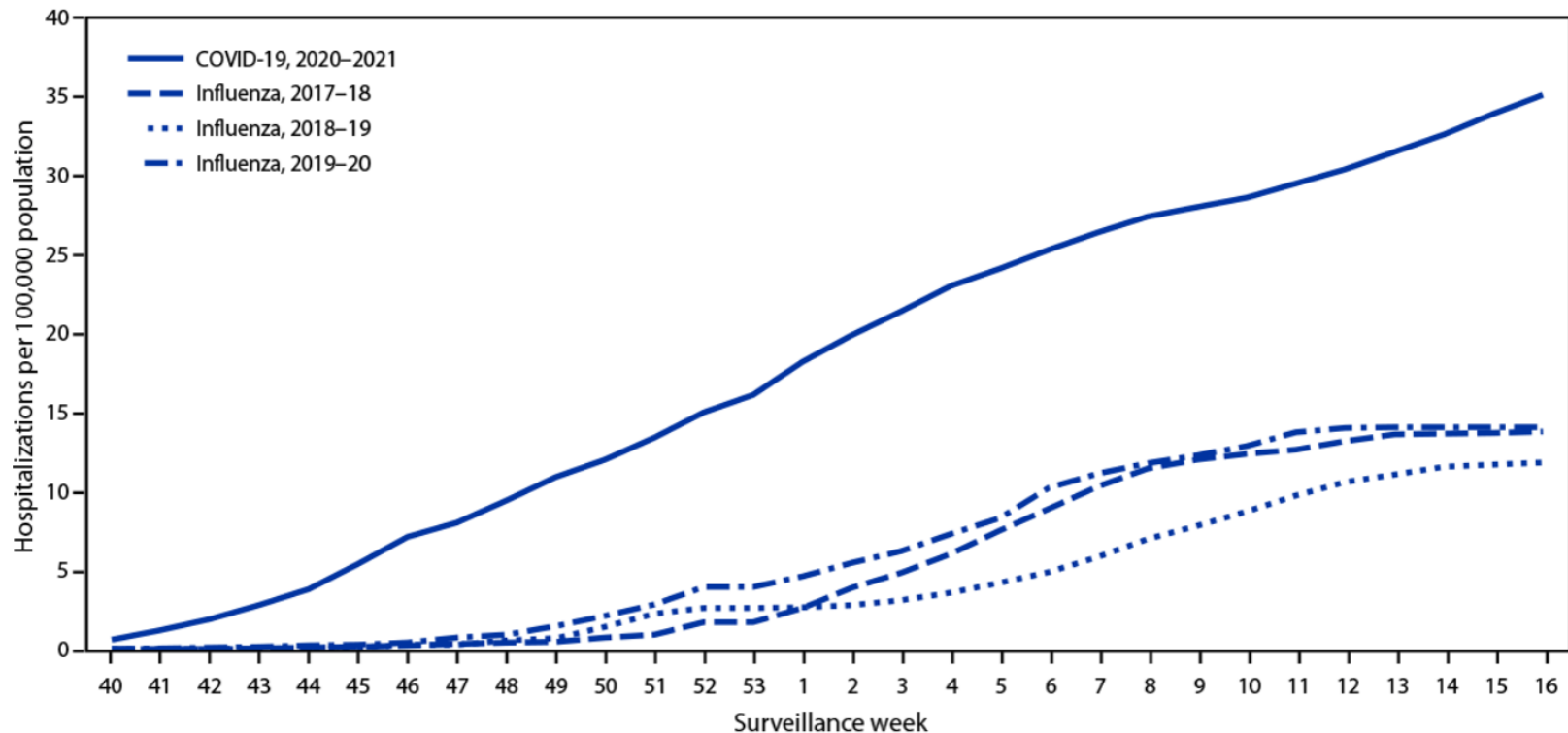


Source: Hale, Angrist, Goldszmidt, Kira, Petherick, Phillips, Webster, Cameron-Blake, Hallas, Majumdar, and Tatlow (2021). "A global panel database of pandemic policies (Oxford COVID-19 Government ResponseTracker)." *Nature Human Behaviour*. – Last updated 3 August 2021, 14:50 (London time)

[OurWorldInData.org/coronavirus](https://OurWorldInData.org/coronavirus) • CC BY

No one is safe  
until everyone is safe

# Hospitalisation rates for 12-17 year olds

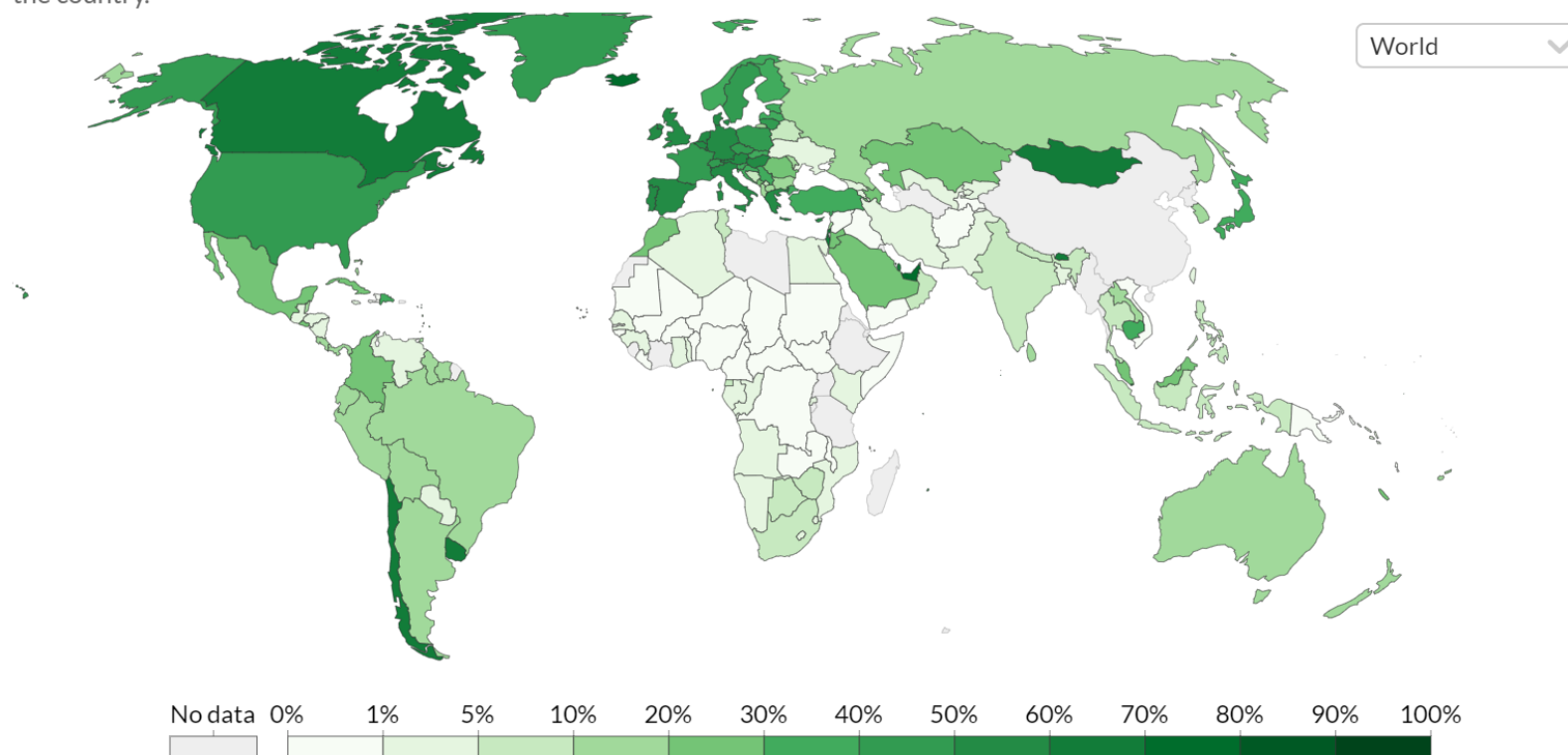


Cumulative rates for COVID-19–associated hospitalizations\* compared with influenza-associated hospitalizations† among adolescents aged 12–17 years, by surveillance week§ — COVID-NET¶ and FluSurv-NET,\*\* 14 states,†† 2017–2021§§

# Share of the population fully vaccinated against COVID-19, Aug 3, 2021

Total number of people who received all doses prescribed by the vaccination protocol, divided by the total population of the country.

Our World  
in Data



Source: Official data collated by Our World in Data - Last updated 4 August 2021, 08:30 (London time)

[OurWorldInData.org/coronavirus](https://OurWorldInData.org/coronavirus) • CC BY

Note: This data is only available for countries which report the breakdown of doses administered by first and second doses. Alternative definitions of a full vaccination, e.g. having been infected with SARS-CoV-2 and having 1 dose of a 2-dose protocol, are ignored to maximize comparability between countries.

SAVE THE CHILDREN



**NO**





[www.TheDropsofLife.com](http://www.TheDropsofLife.com)

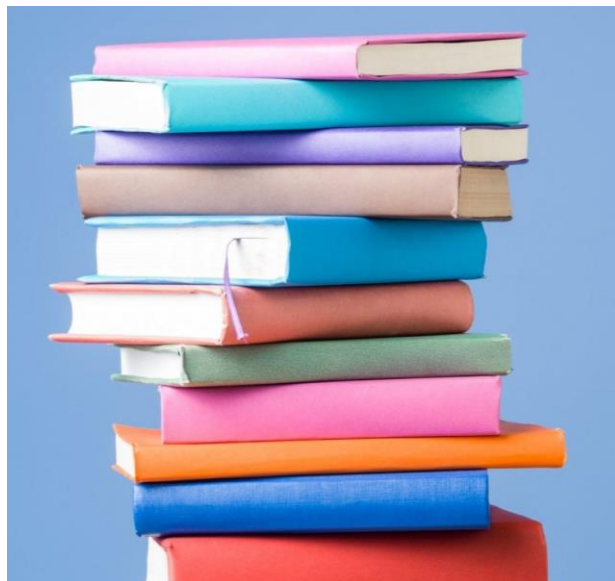
DROPS  
of Life®

ND-04 FEMININE-SOL

Drops of Life – ND-04 Feminine-Sol

\$110.00

1 DROP COATED SILVER =  
1 BOTTLE COLLOIDAL SILVER





# \$1 Billion per year



# COVID *Plan B*



FREEDOM, SOVEREIGNTY, INDEPENDENCE

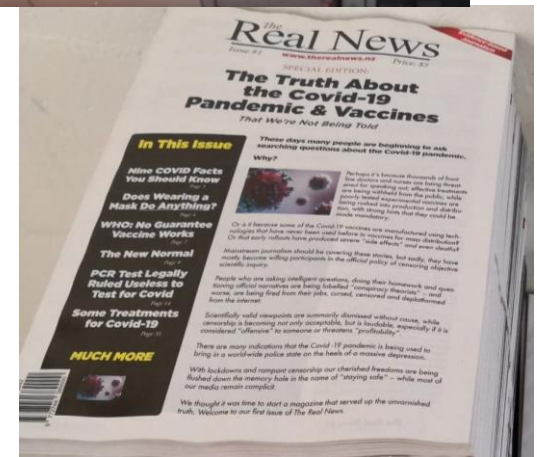
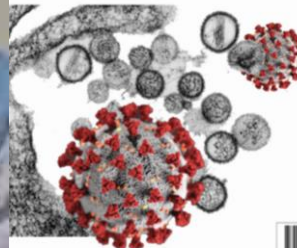


Nga Kaitiaki Tuku Iho Inc  
the wellbeing of people and their environments

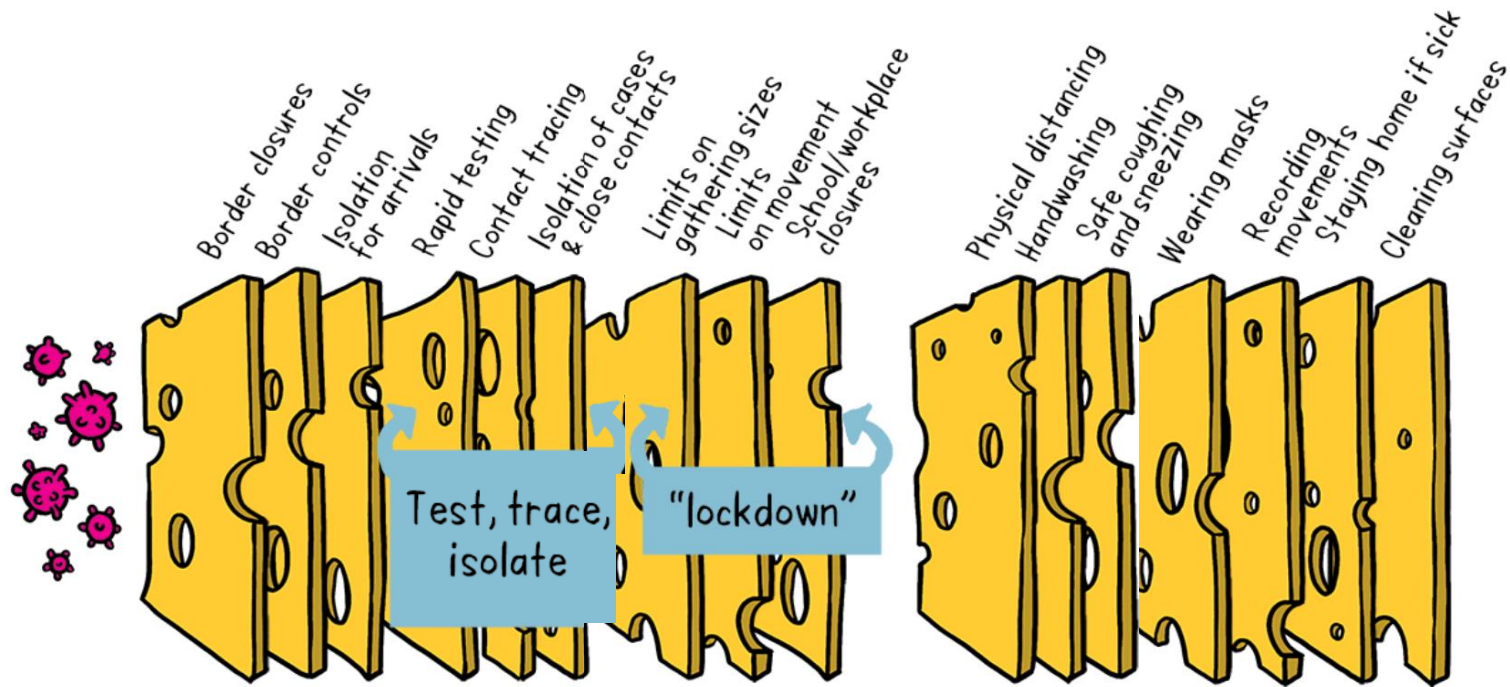


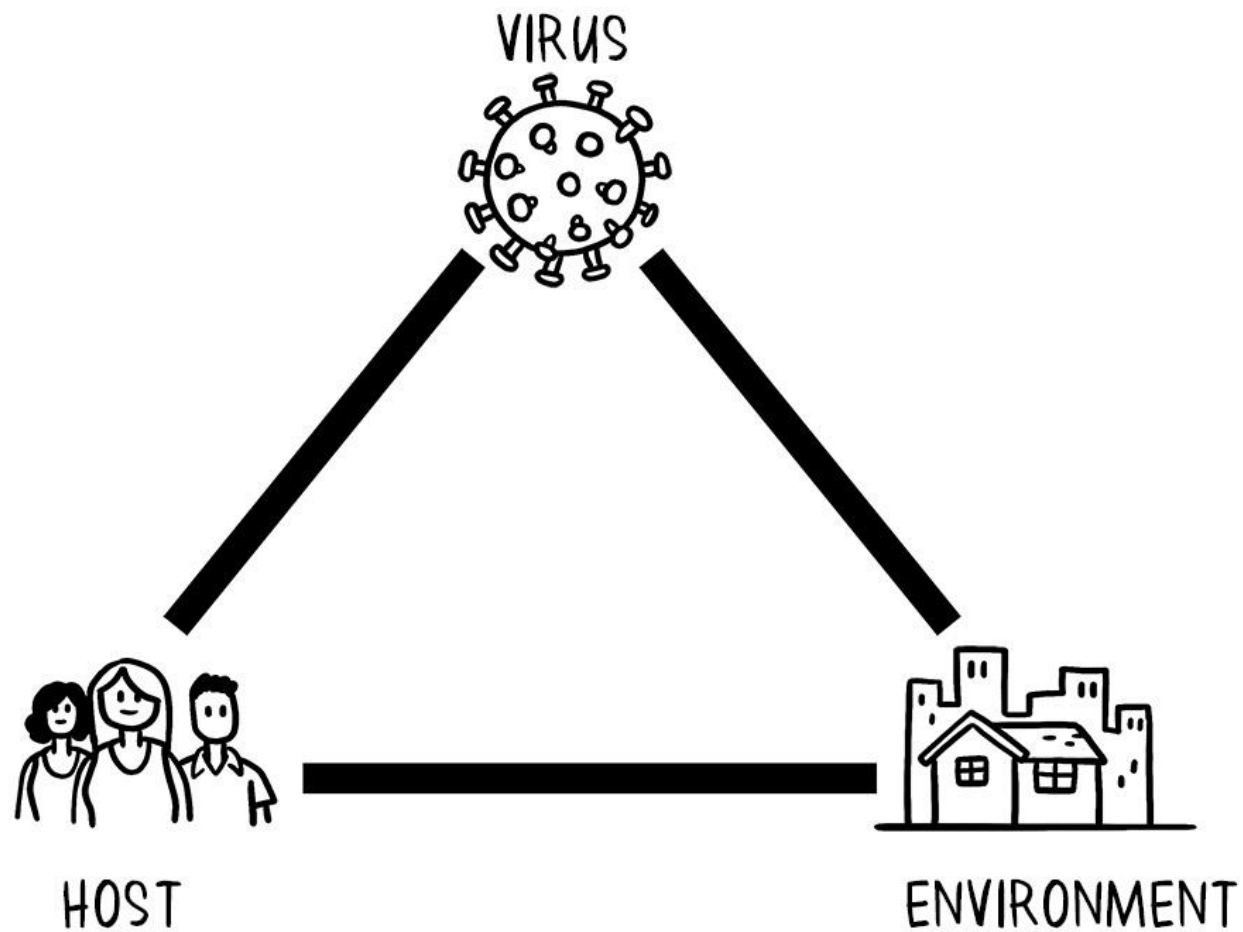
## Special Edition

Scientifically proven all-natural  
anti-virals that have shown efficacy in  
treating **MANY** serious viral illnesses







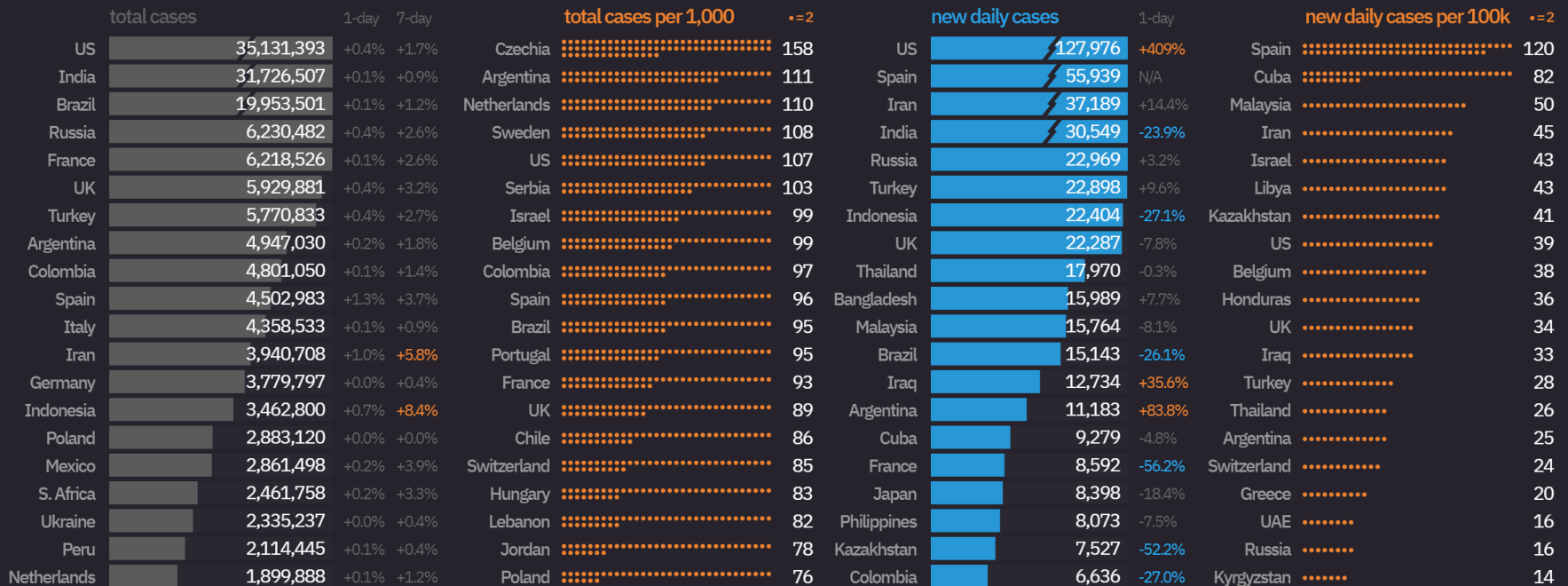






## Top Countries

Updated 4 August 2021



Cases

Deaths

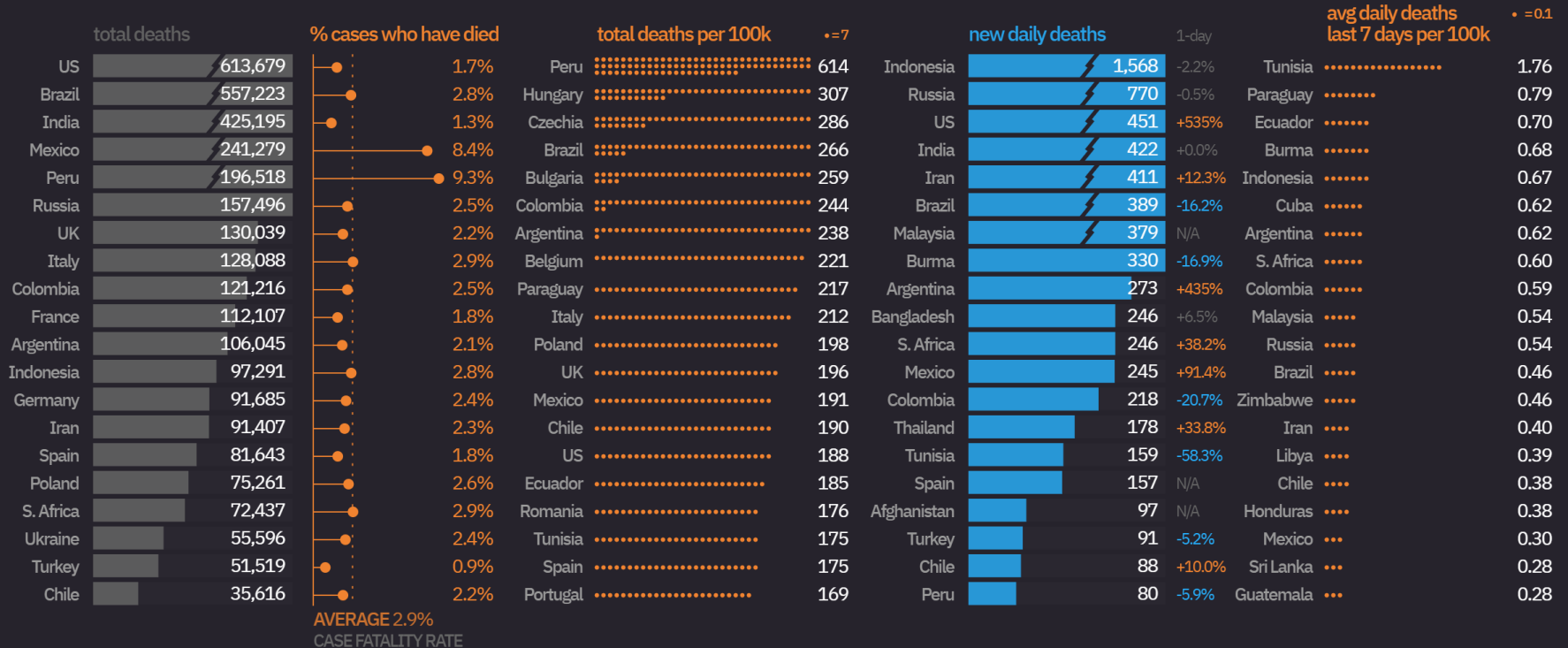
Vaccinations

Show More



## Top Countries

Updated 4 August 2021



Cases

Deaths

Vaccinations

Show More