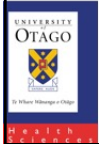


Understanding the Science Behind Aotearoa New Zealand COVID-19 Response
Prof. Michael Baker, University of Otago, New Zealand
Broadcast live from the IPCNC Conference, New Zealand

Understanding the science behind Aotearoa New Zealand COVID-19 response

Professor Michael Baker
University of Otago, Wellington

Infection Prevention and Control Nurses College (IPCNC) Conference
Invercargill, 24 Nov 2022



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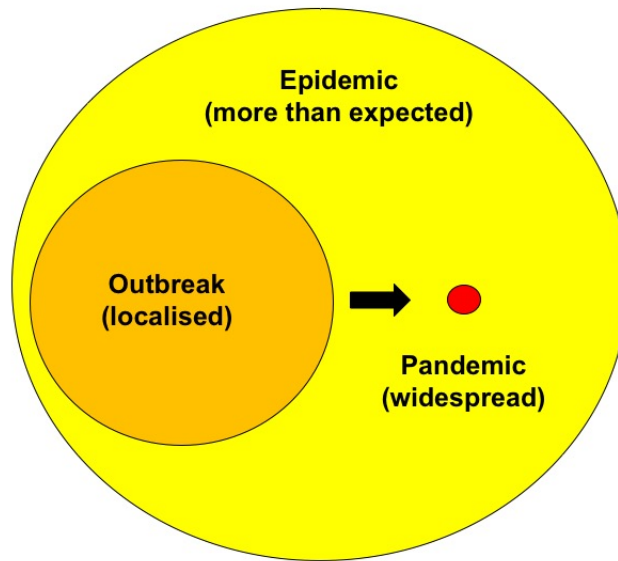
Outline

1. Sizing-up pandemics
2. Choosing a response strategy
3. Choosing interventions
4. Vaccinating against Covid-19
5. Measuring the impact of the strategy & equity
6. Protecting people from getting Covid-19
7. Testing for Covid-19
8. Using information & combating misinformation
9. Planning for future scenarios
10. Applying lessons to improve public health



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1. Sizing-up pandemics



Sizing up pandemics

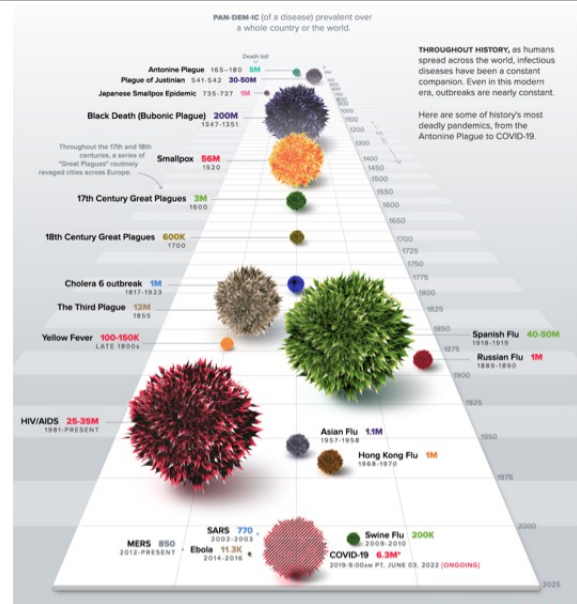
Question 1: What are the most important pieces of information you need to 'size up' a new pandemic threat?

Think about your top 3

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Sizing up pandemics

1. **Transmissibility** & infection dynamics
2. **Severity** impact & inequities
3. **Controllability** & resources needed
4. **Certainty** of knowledge & stability of the threat

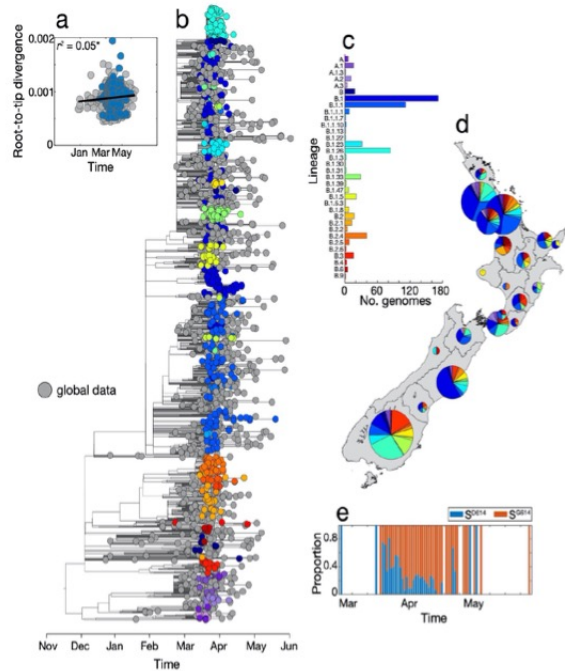


Source: The Visual Capitalist:
<https://www.visualcapitalist.com/history-of-pandemics-deadliest/>

Source: Kvalsvig & Baker, J Royal Soc NZ, 2021

Sizing-up pandemics

- SARS-CoV-2 whole genome sequences
- **245 separate introductions** of the virus out of the 649 cases considered
- Only **19% resulted in transmission** lineage of >1 additional case



Source: Geoghegan et al, Nature Communication 2020

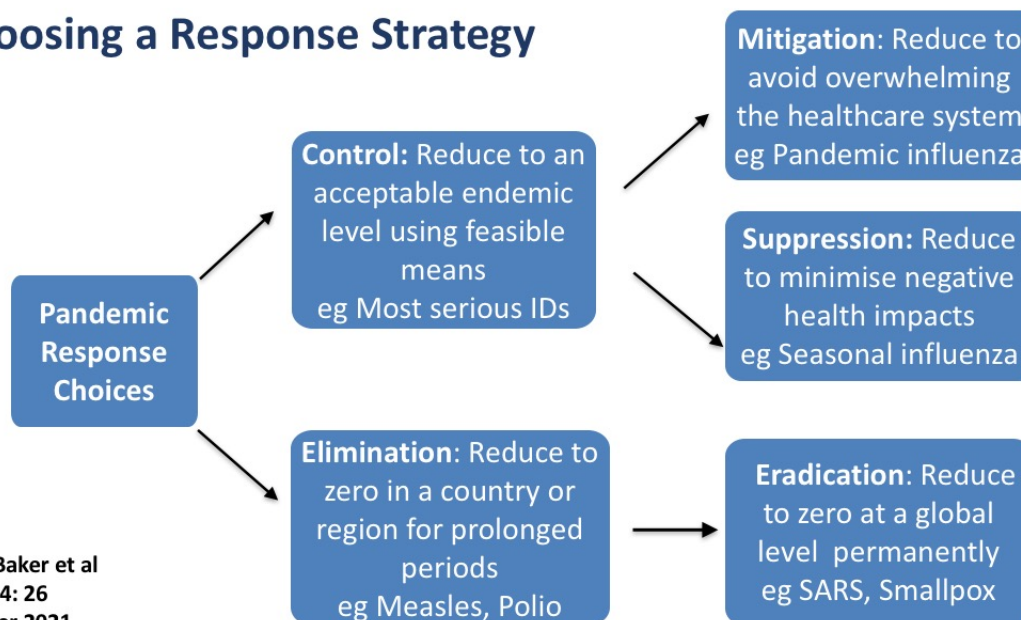
Choosing a Response Strategy

Question 2: What are the main strategic options for responding to a pandemic?

Aim for a list of 3



Choosing a Response Strategy

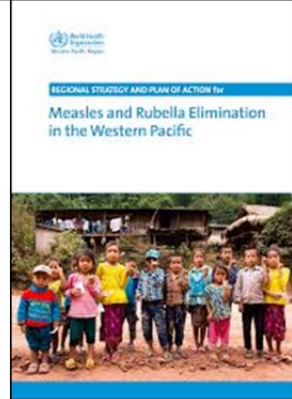


Source: Baker et al
NZMJ 134: 26
November 2021

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Choosing a Response Strategy

Elimination effectively adopted by NZ Gov on 23 March with decision to pursue rapid lockdown with ~100 COVID-19 cases, no deaths



New Zealand's elimination strategy for the COVID-19 pandemic and what is required to make it work

Michael G Baker, Amanda Kvalsvig, Ayesha J Verrall, Lucy Telfar-Barnard, Nick Wilson

In this editorial we summarise the threat posed by the COVID-19 pandemic, the justification for the elimination strategy adopted by New Zealand, and some of the actions required to maximise the chances of success.

What is the size and nature of the threat?

The COVID-19 pandemic, caused by the SARS-CoV-2 virus, has shown a relentless ability to infect the world's population. The virus is highly infectious, with each case typically infecting 2.3 others (a reproduction number (R₀) of about 2.5). Consequently, it has the potential to infect

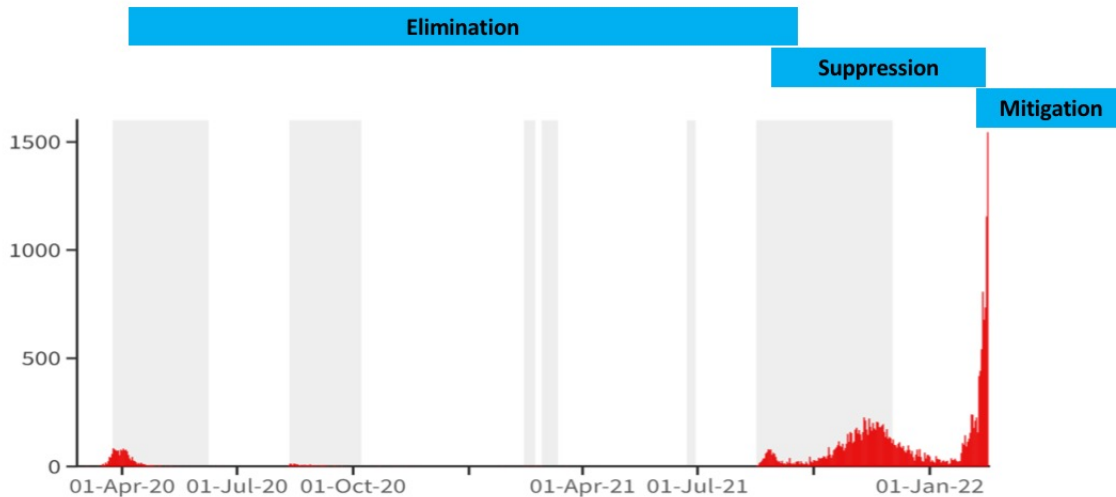
the fact that populations take measures to protect themselves. Under one of the most likely scenarios if the country's current elimination strategy fails, New Zealand could expect approximately 14,400 deaths.¹

In addition, larger numbers of people who are ill and hospitalised could swamp health services at all levels and prevent the delivery of elective services and preventive care.

A poorly controlled pandemic will greatly increase health inequities. Like seasonal influenza in New Zealand, risk is particularly concentrated in older people and those with severe comorbidities.² Therefore Maori and Pacific peoples could be more

Source: Baker, Kvalsvig, ... Wilson, NZ Med J, 3 April 2020
 NB. The world's first published Covid-19 elimination strategy

Choosing a Response Strategy



Source: Ministry of Health • This data is published on MoH website and differs from the 1pm announcements because they count different time periods
 Chart by The Spinoff

3. Choosing Interventions

Question 3: What is the reproduction number (R)?

Why is it important to reduce R to less than 1?

What are the broad types of interventions to reduce R ?



Choosing Interventions

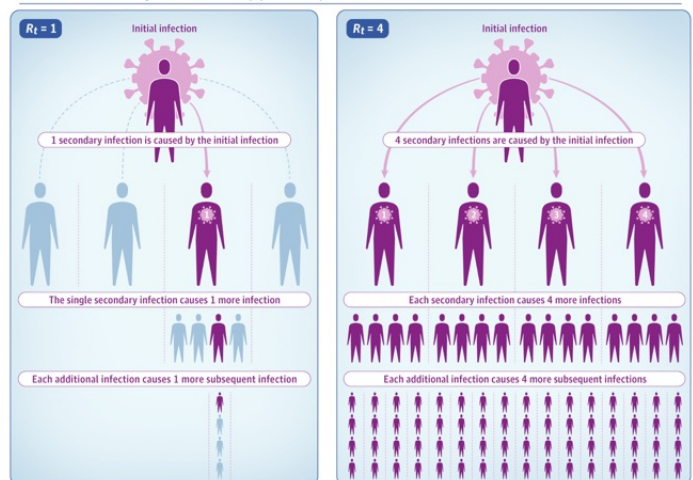
Basic reproductive number, R_0 = mean number of infections directly generated by 1 case in a population where all individuals are susceptible to infection

Effective reproduction number, R_{eff} or R_t = mean number of additional infections caused by an initial infection at a specific time

$R_{eff} > 1 \rightarrow$ exponential increase

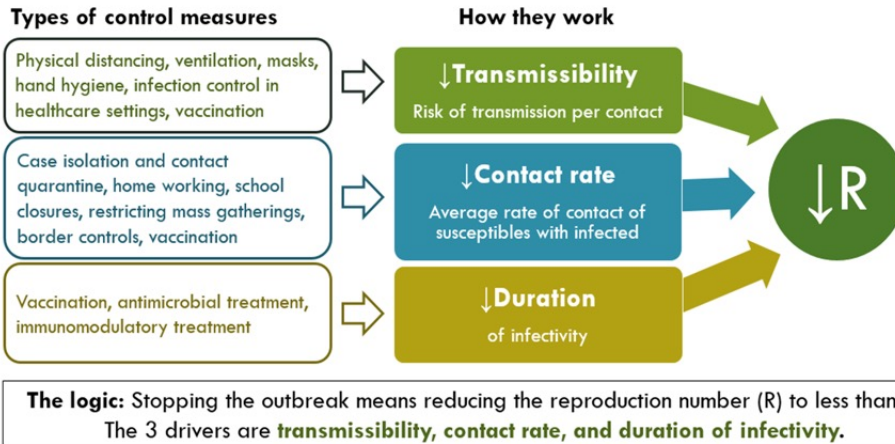
Source: **JAMA. 2020;323(21):2186-2187.**
doi:10.1001/jama.2020.7878c

The effective reproduction number (R_t) of a viral infection is the mean number of additional infections caused by an initial infection in a population at a specific time.



Choosing Interventions

Intervention logic for outbreak control strategies



Source: Kvalsvig & Baker, J Royal Soc NZ, 2021

Interventions: Elimination strategy

1. Exclusion of cases

- *Keep it out* – Border Management

2. Case and outbreak management

- *Stamp it out* – Testing, contact tracing, isolation/quarantine

3. Preventing community transmission

- Hygiene measures, masks
- Physical distancing & travel restrictions
- Vaccination

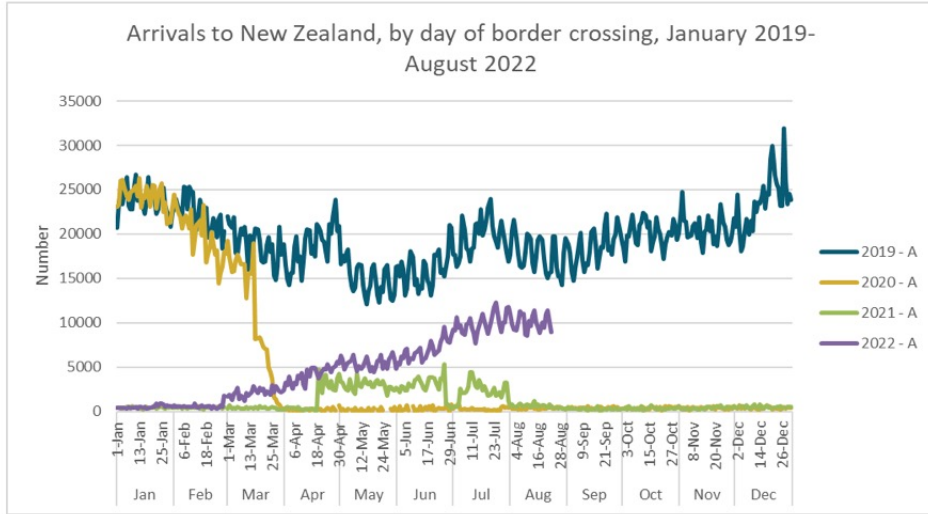
4. Social safety net

- Wage subsidy scheme & many other forms of support

Source: Baker et al 2020, NZ Med J; Baker et al 2020 Med J Australia

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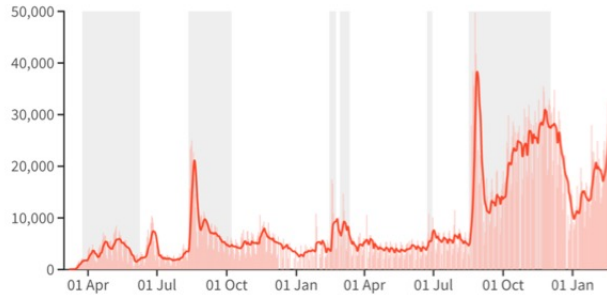
Interventions: Borders



Source: Stats NZ <https://www.stats.govt.nz/indicators/international-travel-provisional#download-data> Daily movements

Interventions: Testing & Contact Tracing

Number of daily Covid tests across New Zealand
 Shaded areas show when NZ or Auckland were above alert level one
 Daily count and seven day average



Source: [StatsNZ Covid-19 Data Portal](https://www.stats.govt.nz/covid-19-data-portal) • Data updated daily - there is a lag in the latest numbers.
 Chart by The Spinoff

Source: MoH



Swabbing for COVID-19, Wellington, May 2020

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Intervention: Physical distancing (lockdown)

New Zealand COVID-19 Alert Levels Summary

Unite against COVID-19

- The Alert Levels are determined by the Government and specify the public health and social measures to be taken in the fight against COVID-19. Further guidance is available on the Covid19.govt.nz website.
- The measures may be updated based on new scientific knowledge about COVID-19, information about the effectiveness of control measures in New Zealand overseas, or the application of Alert Levels at different times (e.g. the application may be different depending on if New Zealand is moving down or up Alert Levels).

- Different parts of the country may be at different Alert Levels. We can move up and down Alert Levels.
- Essential services including supermarkets, health services, emergency services, utilities and goods transport will continue to operate at any level. Employers in those sectors must continue to meet health and safety obligations.
- Restrictions are cumulative (eg at Alert Level 4, all restrictions from Alert Levels 2 and 3 apply).

Updated 6 June 2020

ELIMINATION STRATEGY - New Zealand is working together to eliminate COVID-19

Alert Level	Risk Assessment	Range of Measures (can be applied locally or nationally)
Level 4 – Lockdown Likely the disease is not contained	<ul style="list-style-type: none"> Community transmission is occurring. Widespread outbreaks and new clusters. 	<ul style="list-style-type: none"> People instructed to stay home in their bubble other than for essential personal movement. Safe recreational activity allowed in local areas. Travel is severely limited. All gatherings cancelled and all public venues closed. Businesses closed except for essential services (e.g. supermarkets, pharmacies, clinics, petrol stations and lifeline utilities). Educational facilities closed. Rationing of supplies and reprioritising of facilities possible. Reprioritisation of healthcare services.
Level 3 – Restrict High risk the disease is not contained	<ul style="list-style-type: none"> Community transmission might be happening. New clusters may emerge but can be controlled through testing and contact tracing. 	<ul style="list-style-type: none"> People instructed to stay home in their bubble other than for essential personal movement, including to go to work, school (they have to, or for local recreation). Physical distancing of 1m or more outside home (including public transport, orona mātā in controlled environments like schools and workplaces). People must stay within their immediate household bubble, but can expand this to meet with close family, whānau, or being in company or support in a defined space. This extended bubble should remain exclusive. Schools (ages 10 to 19) and Early Childhood Education centres can fully open, but will be limited capacity. Children should learn at home if possible. People must work from home unless it is not possible. Businesses can open premises, but cannot physically interact with customers. Low risk local recreation activities are allowed. Public venues are closed (e.g. theatres, museums, cinemas, food courts, gyms, pools, playgrounds, markets). Gatherings of up to 10 people are allowed for family, wedding services, funerals and tangihanga. Physical distancing and public health measures must be maintained. Healthcare services use virtual, non-contact consultations where possible. Inter-regional travel is highly limited (e.g. for essential workers, with limited exceptions for other). People at high risk of severe illness (older people and those with existing medical conditions) are encouraged to stay at home where possible, and take additional precautions when leaving home. They may choose to work.
Level 2 – Reduce The disease is contained, but the risk of community transmission remains	<ul style="list-style-type: none"> Household transmission could be occurring. Single or isolated cluster outbreaks. 	<ul style="list-style-type: none"> People can reconnect with friends and family, and socialise in groups of up to 100, go shopping or travel domestically, if following public health guidance. Keep physical distancing of 1m away from people you don't know when out in public or in retail stores. Keep on-site physical distancing in controlled and semi-enclosed workplaces, where possible. No more than 100 people at gatherings, including weddings, birthdays and funerals and tangihanga. Businesses can open to the public if following public health guidance including physical distancing and record-keeping. Alternative ways of working are encouraged where possible. Healthcare businesses must keep groups of customers separated, seated, and served by a single person. Maximum of 100 people at a time. Sport and recreation activities are allowed, subject to conditions on gathering, record-keeping and where practical - physical distancing. Public venues such as museums, libraries and pools can open if they comply with public health measures and ensure 1m physical distancing and record-keeping. Event facilities, including theme parks, concert venues and casinos can have more than 100 people at a time, provided that there are more than 100 in a defined space, and the groups don't mix. Health and disability care services operate normally as possible. It is safe to send your children to school, early learning services and tertiary education. These will keep appropriate measures in place. People at higher risk of severe illness from COVID-19 (e.g. those with underlying medical conditions, especially if not well-controlled, and seniors) are encouraged to take additional precautions when leaving home. They may work, if they agree with their employer that they can do so safely.
Level 1 – Prepare The disease is contained in New Zealand	<ul style="list-style-type: none"> COVID-19 is uncontrolled overseas. Isolated household transmission could be occurring in New Zealand. 	<ul style="list-style-type: none"> Border entry measures to minimise risk of importing COVID-19 cases. Intensify testing for COVID-19. Rapid contact tracing of any positive cases. Self-isolation and quarantine required. Schools and workplaces open, and must operate safely. No restrictions on personal movement but people are encouraged to maintain records of where they have been. No restrictions on gathering but organisers encouraged to maintain records to enable contact tracing. Stay home if you've sick, report flu-like symptoms. Wash and dry hands, cough into elbow, don't touch your face. No restrictions on domestic transport - avoid public transport or travel if sick. No restrictions on work places or services but they are encouraged to maintain records to enable contact tracing.

Source: NZ Government

Unite against COVID-19

Intervention: Hygiene measures

Traditional infectious disease hygiene:

- Stay at home if sick
- Wash your hands
- Cough & sneeze into tissue/elbow

COVID-19 transmission:

- Asymptomatic/Presymptomatic source
- Respiratory droplets and aerosols



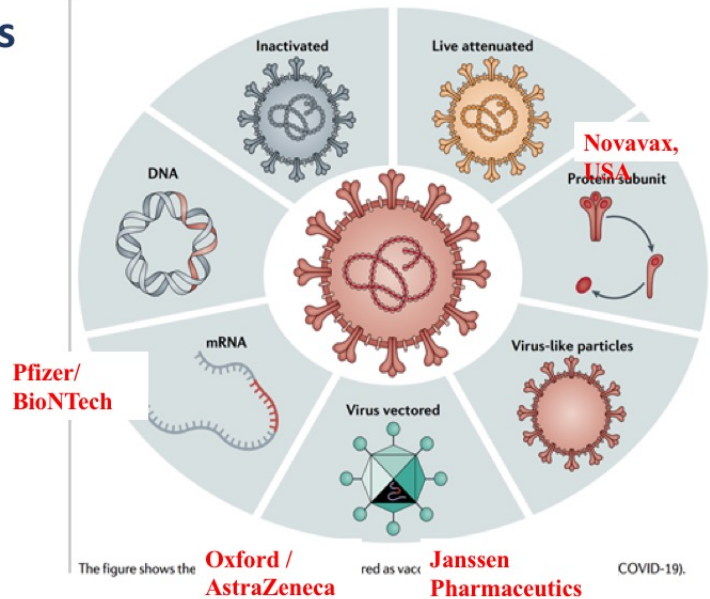
- Masks** (Mass Masking = source control & personal protection), plus
- Improved ventilation/filtration**

Te Papa Face Mask



Interventions: Vaccines

- Multiple vaccines developed & in clinical trials
- Safe and effective at preventing serious disease & death, eg Pfizer/BioNTech vaccine
- Initial uncertainties: Duration of immunity, Interrupting transmission, Coverage of virus variants

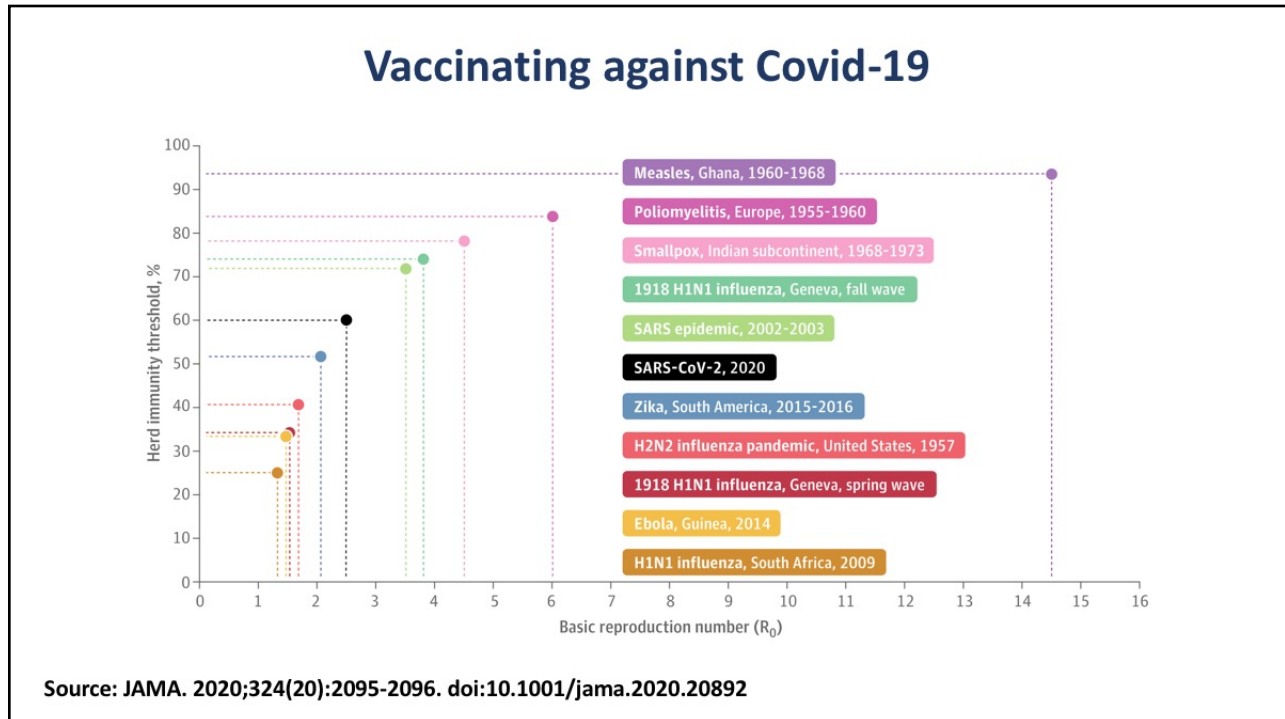


Vaccinating against Covid-19

Question 4: What proportion of the population do we need to vaccinate to achieve population protection / herd immunity threshold?

What is the key 'parameter' that drives this number?

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Vaccinating against Covid-19

Herd immunity threshold = $1 - (1/R_0) = 1 - (1/2.5) = 60%$ (Original variant)
 = $1 - (1/R_0) = 1 - (1/6.0) = 83%$ (Delta variant)
 = $1 - (1/R_0) = 1 - (1/10.0) = 90%$ (Omicron variant)

Vaccine effectiveness (Pfizer BioNTech mRNA)
 = 90% effective against Delta (2 doses)
 = 70% effective against Omicron (3 doses)

Vaccine coverage = total population
 = 80% double dosed for Delta
 = 50% triple dosed for Omicron

Population immunity = vaccine effectiveness x vaccine coverage
 = 90% x 80% = 72% for Delta
 = 70% x 50% = 35% for Omicron

5. Measuring impact of pandemic response & equity

Question 5: How would you measure the success of your pandemic response?

How would you measure its effects on health equity?

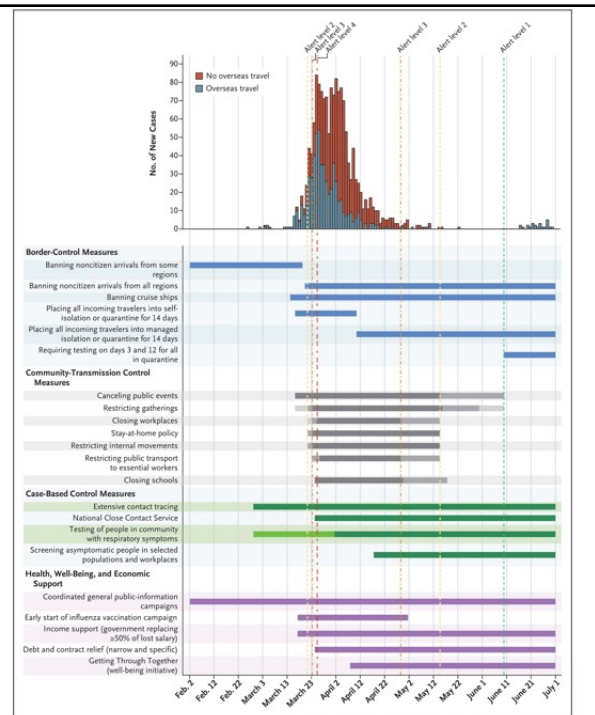
Aim for at least 3 indicators



Impact of response: Cases

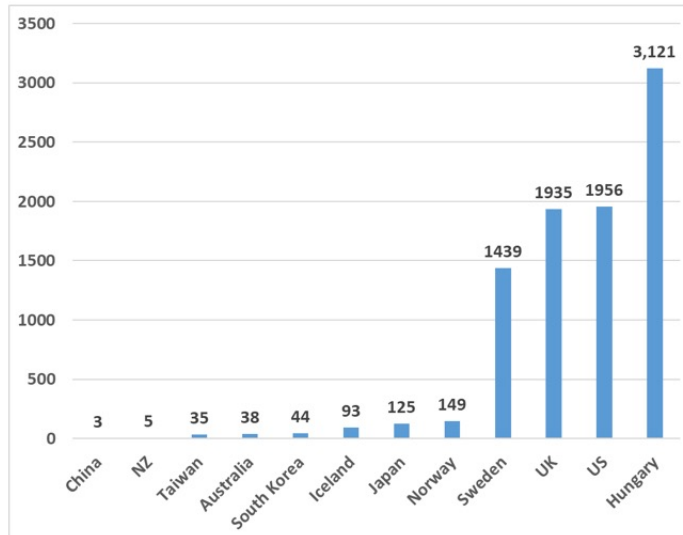
**Rapid decline & end of
community transmission of
COVID-19**

Source: Baker, Wilson, Anglemeyer. NEJM e56 DOI:
 202010.1056/NEJMc2025203, 20 August 2020



Impact of response: Death rates

Death rate from COVID-19 (per million pop, 27 Aug 2021)



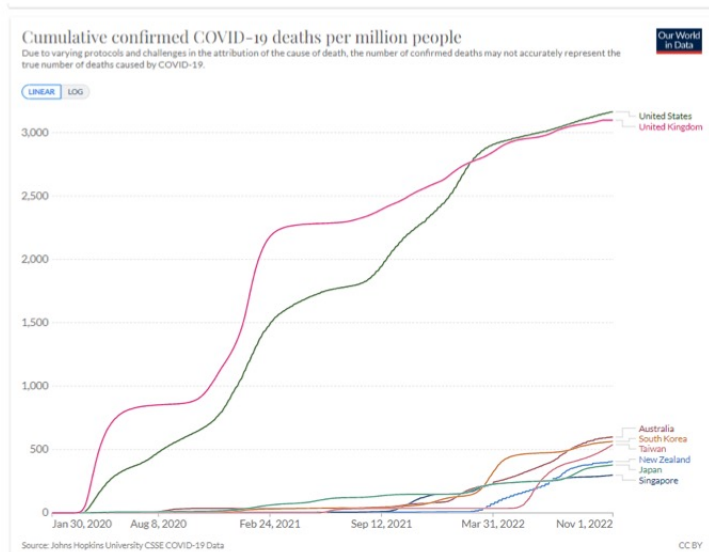
NZ Lives saved by elimination ~9,600 (based on UK mortality = 0.19%)

Impact of response: Cumulative death rates

Jurisdictions in Asia-Pacific region pursuing elimination or tight suppression

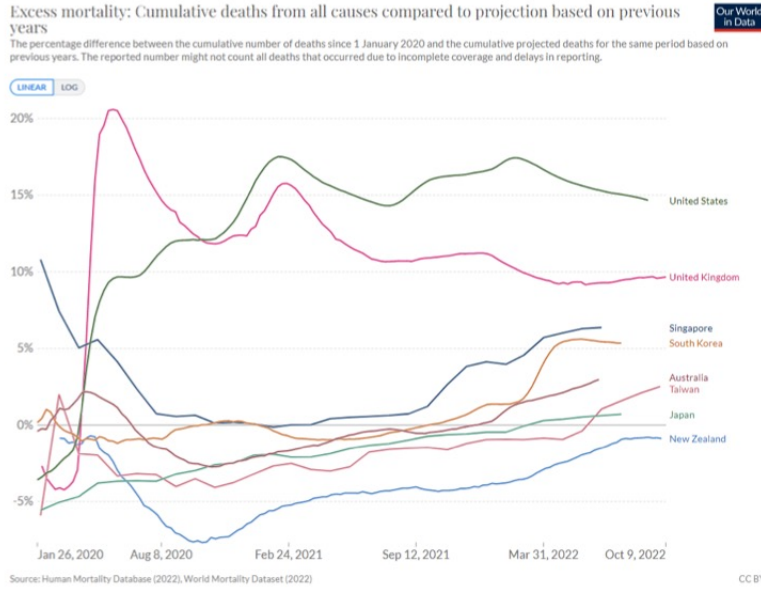
→ Time to roll-out vaccines & prepare for Covid-19 pandemic

→ Reduced Covid-19 mortality, eg NZ 406 per million, 1 Nov 2022



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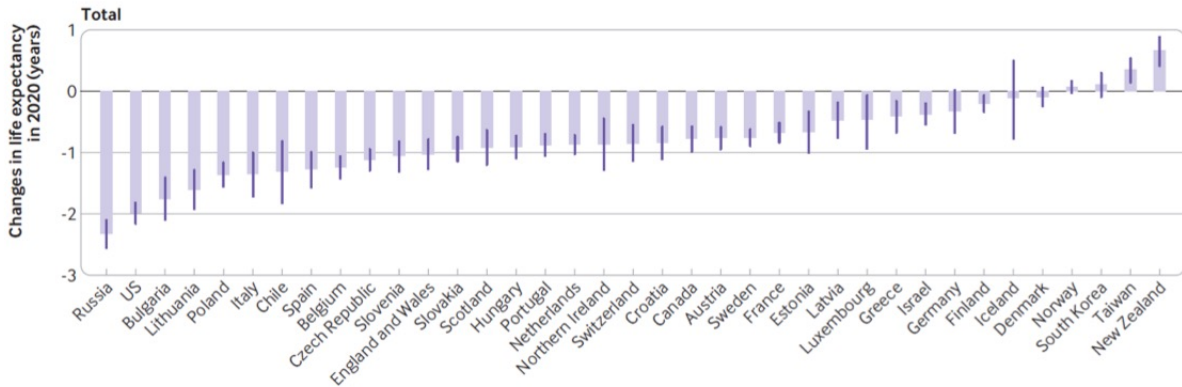
Impact of response: Excess mortality



NZ Excess mortality
1 Nov 2022
-0.87%
N=856

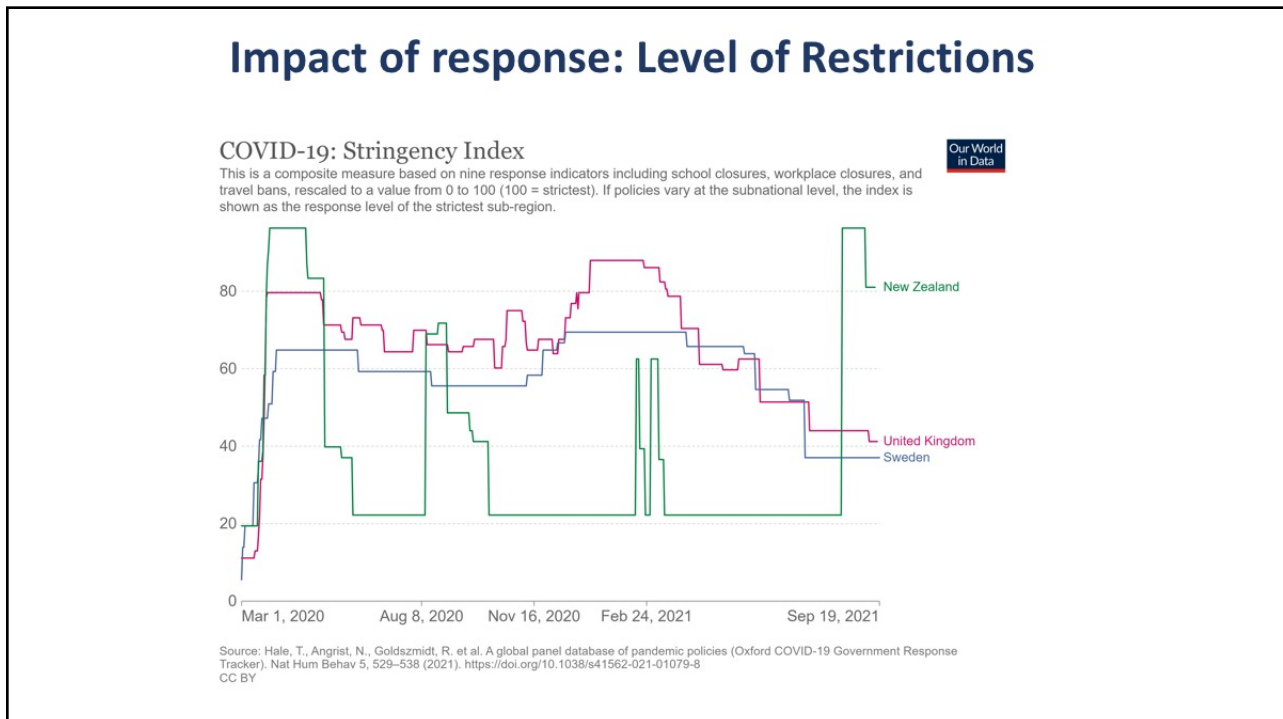
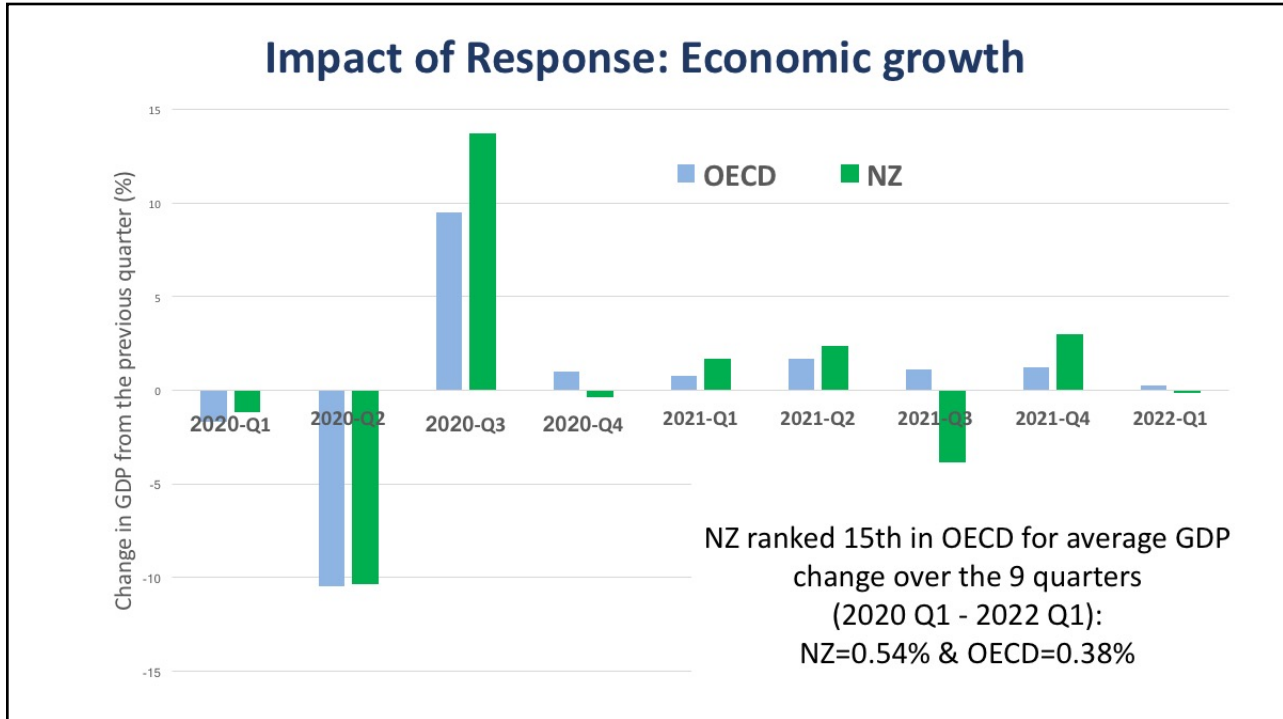
Impact of response: Life expectancy

Change in life expectancy 2020



Source: Islam BMJ 2021;375:e066768

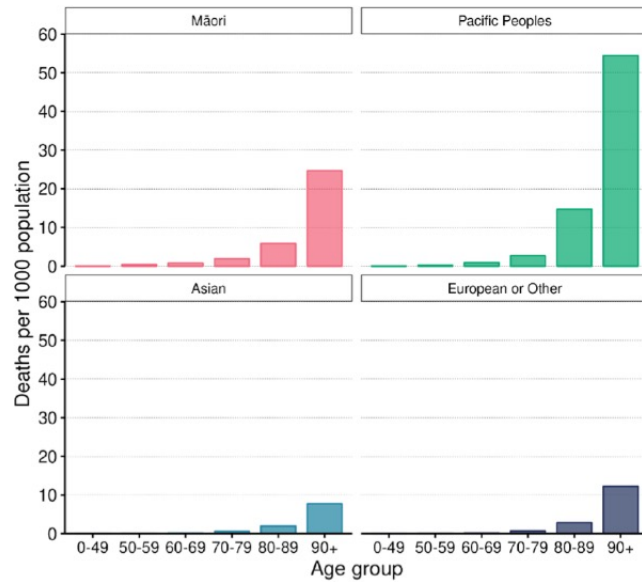
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Impact on equity: Covid-19 mortality rates by ethnicity

Mortality rates by ethnicity and age, all deaths with or after Covid-19 infection, 1 March 2022 to 5 June 2022, per 100,000

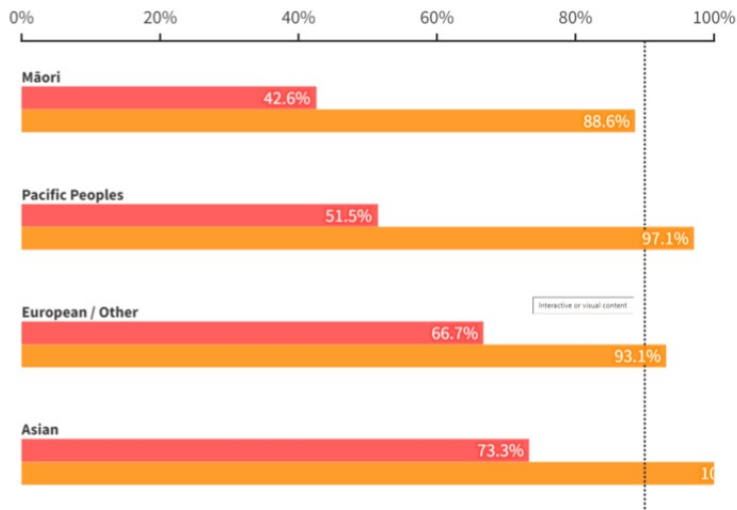
Source: NZ MoH



Impact on equity: Vaccination coverage

Vaccinated proportion, by ethnicity

Fully vaccinated and boosted proportions - of the eligible population



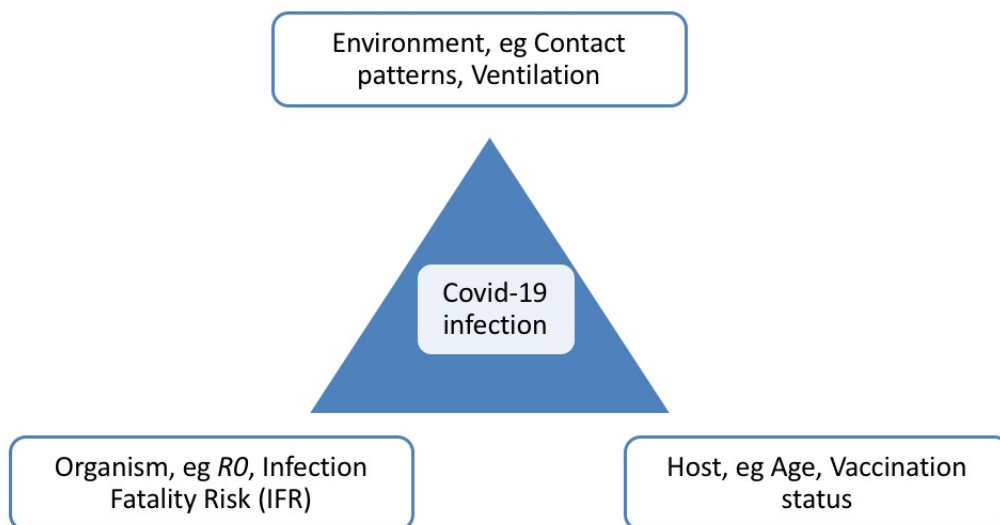
6. Reducing the risk of cases & outbreaks

Question 6: How can we reduce the risk of people getting Covid-19 within New Zealand, eg in health care settings?

Eg What are risk factors for getting infected?



Epidemiological Triad

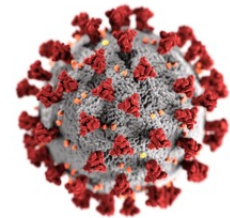


Organism factors

SARS-CoV-2, RNA Virus

- Respiratory pathogen primary transmitted by droplets and aerosols and potentially from surfaces (fomites)
- Often transmitted from pre-symptomatic and asymptomatic cases
- Evolving through antigenic drift and shift

VOCs	Reproduction No. (R_0)	Incubation period*
• Original	2-3	6.7 days
• Alpha	4-5	5.0 days
• Delta	5-8	4.4 days
• Omicron	10+	3.4 days



*Source: Wu JAMA Netw Open. 2022 doi:10.1001/jamanetworkopen.2022.28008

Donald Trump

Covid-19 +ve, 2 Oct 2020

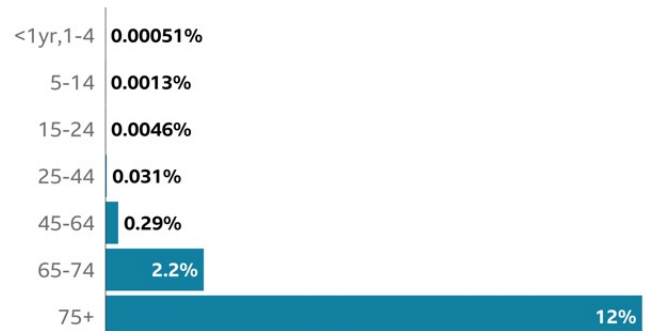
Risk factors for poor outcome:

- Age = 74 years
- BMI = 30
- Income = low (\$750 federal income tax return 2016)
- Housing status = Impending eviction



Host factors

Over-75s remain the most at-risk
 Infection-fatality rate by age group in England



Source: MRC Biostatistics Unit, University of Cambridge (12 October)



Environmental factors

Three C's describe settings where COVID-19 virus spreads more easily:

- **Crowded** places
- **Close-contact** settings, especially where people talk, laugh and sing near each other
- **Confined** and enclosed spaces with poor ventilation

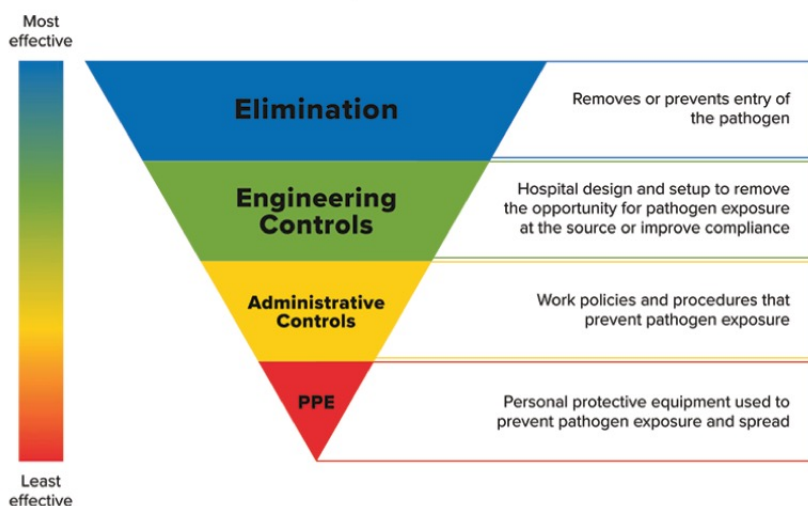
Eg, Mangere AOG Church cluster

197 confirmed cases out of 429 total cases
(28 August 2021)



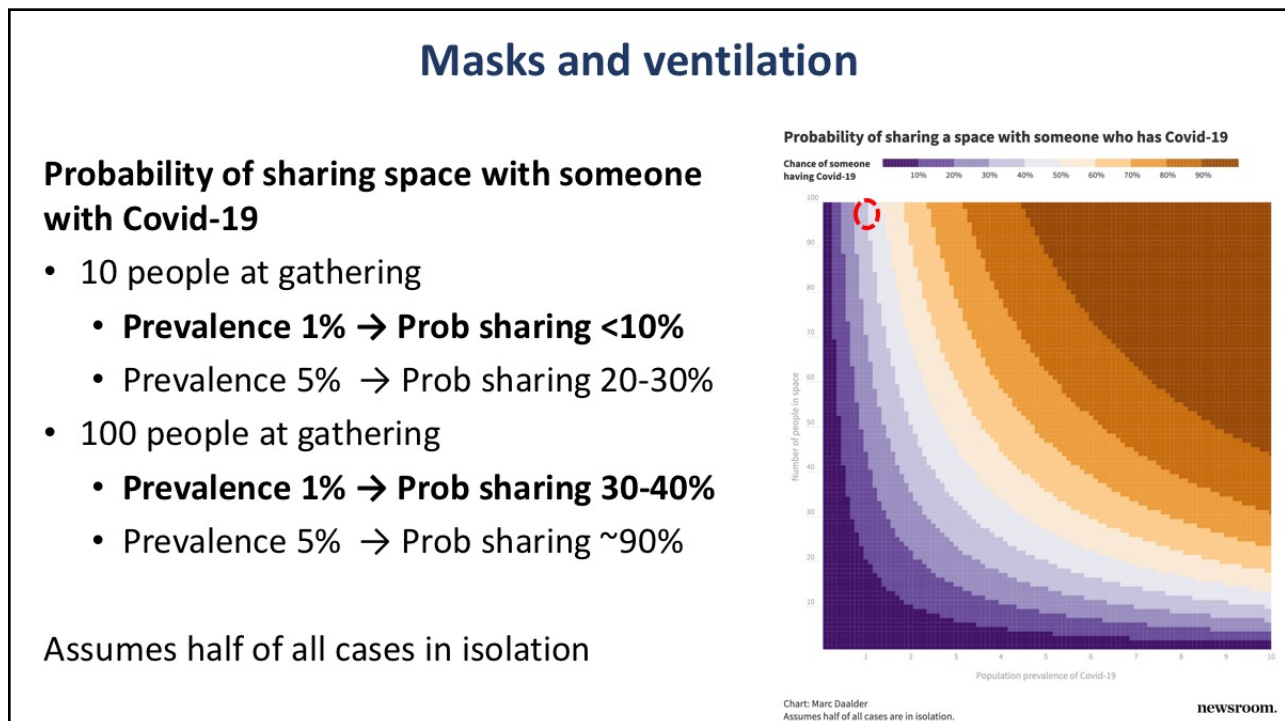
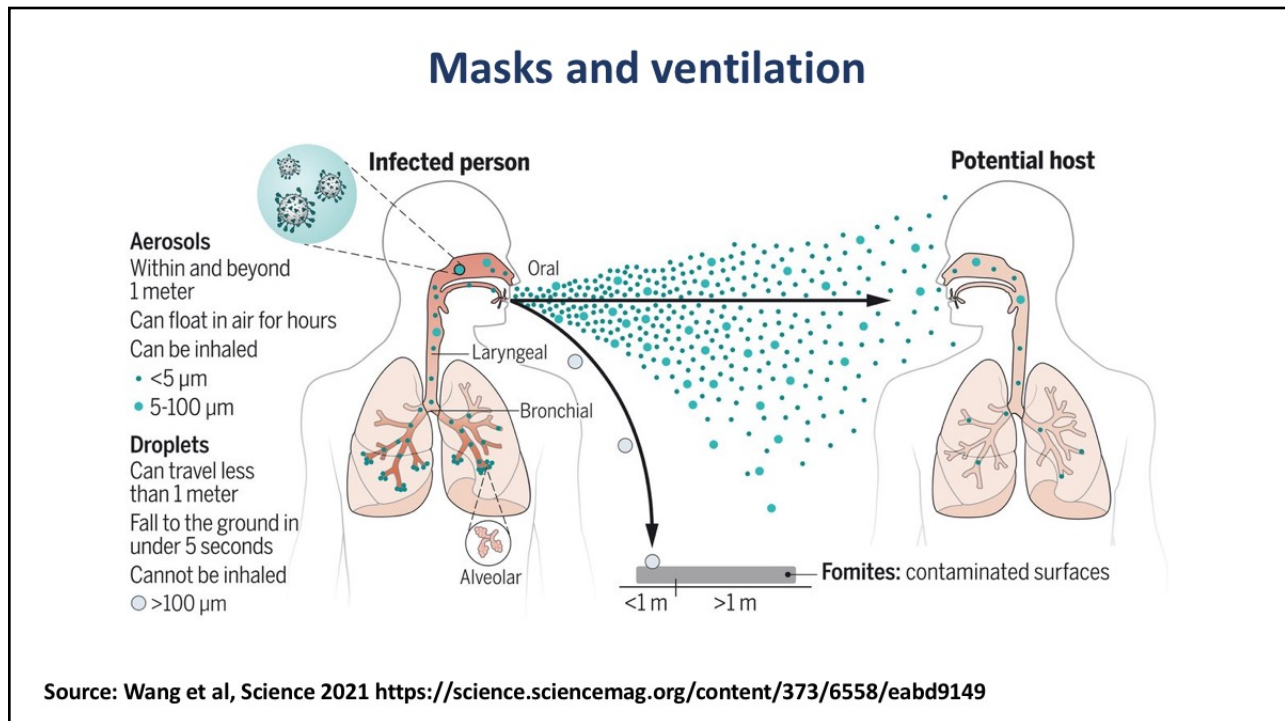
Choice of control measures

Hierarchy of Controls



Source: <https://www.aaha.org/aaha-guidelines/infection-control-configuration/infection-control-strategies/>

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Masks and ventilation

- Fabric/cloth masks
- Surgical/medical/procedure masks
- Respirator style masks – P2 (Particulate respirator, NZ/Aust standard), N95 (US), KN95 (Chinese), FFP2 (Filtering facepiece/European)

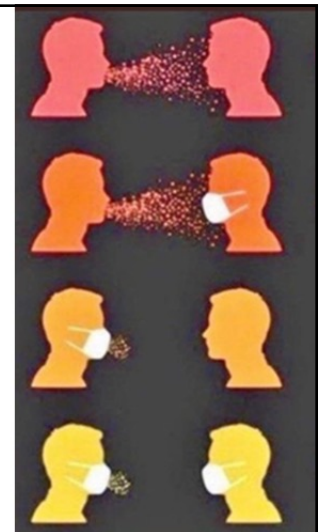


See <https://covid19.govt.nz/prepare-and-stay-safe/keep-up-healthy-habits/face-masks/types-of-face-masks/>



Masks and ventilation

- Physical distancing alone, even at 3.0 m
 - 90% risk of infection after a few minutes
- Only susceptible wears a face mask:
 - Surgical mask risk = 90% after 30 min
 - Respiratory mask risk ~ 20% even after 1 hour
- Both wear mask:
 - Surgical mask risk < 30% after 1 hour
 - Well-fitting Respirator mask risk ~ 0.4% ie ↓risk 225 fold



Source: Bagheri G. PNAS 2021. 118 (49), <https://doi.org/10.1073/pnas.2110117118>

7. Using testing to control Covid-19

Question 7: Would Rapid Antigen Test (RAT) be a useful screening test for patients in the hospital ED who are attending for non-Covid conditions eg, injuries, child birth?

Assume Sensitivity=80%, Specificity=98%

Test 100 patients under 2 scenarios: Prevalence=10%, Prevalence=1%

	Have Covid-19	Do not have Covid-19	
Test positive	True positive	False positive	1. Probability of having Covid-19 if test is positive
Test Negative	False negative	True negative	2. Probability of having Covid-19 if test is negative

Using testing to control Covid-19

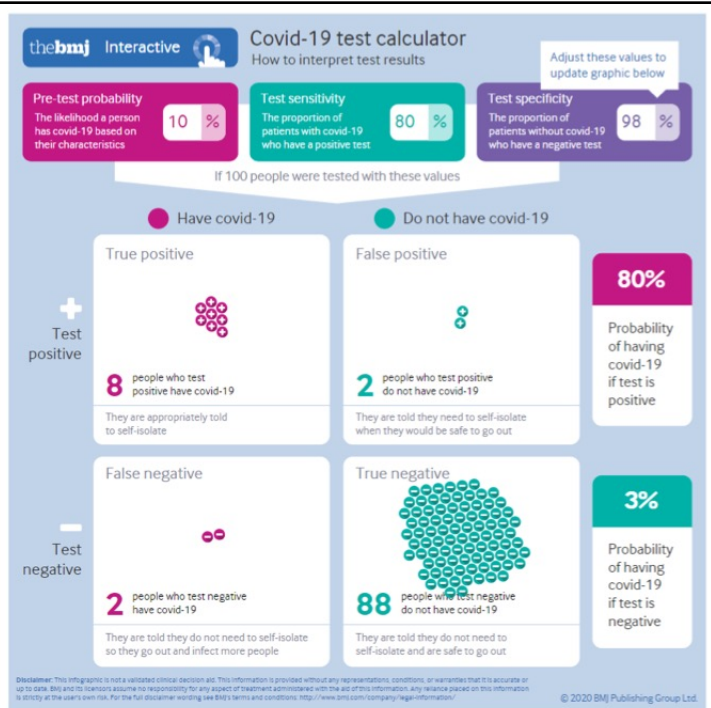
Prevalence 10%

Identify 8 / 10 true positives

Miss 2 / 10 true positives

Falsely identify 2 negatives

Source: Interpreting a covid-19 test result
 BMJ 2020;369:m1808
<https://www.bmj.com/content/369/bmj.m1808>



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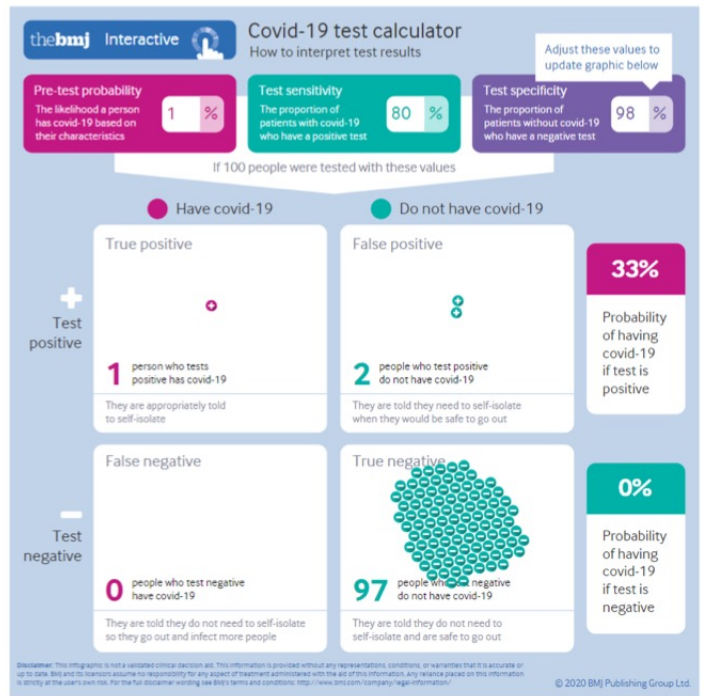
Using testing to control Covid-19

Prevalence 1%

Identify 1 true positive

Falsely identify 2 negatives

Source: Interpreting a covid-19 test result
 BMJ 2020;369:m1808
<https://www.bmj.com/content/369/bmj.m1808>



8. Using information & combating misinformation

Question 8: What is misinformation and disinformation?

Why does it matter?

What should we do about it?

Information and misinformation

Misinformation = false information that is spread, regardless of intent to mislead

Disinformation = deliberately misleading or biased information; manipulated narrative or facts; propaganda.



Effectiveness of previous infection in preventing reinfection = **56.0%** against Omicron variant

Source: Altarawneh et al, NEJM, 8 Feb 2022

Information and misinformation



CORONAVIRUS
Liz Gunn coughs through Counterspin appearance days after Wellington anti-mandate protest ends

08/03/2022



Watch: Liz Gunn appeared on Counterspin last week, days after the protest ended. Credit: Counterspin Media

Former TV host Liz Gunn coughed her way through a rant about overthrowing New Zealand's democratically elected Government days after the Wellington anti-mandate protest ended.

We ran out of foil this evening. You'll need it tomorrow before the government EMR (Electro-Magnetic Radiation) attacks that the MSM is not reporting. If you donate to [@NzFubar](#) we will distribute more foil from the First Aid tent [#EndTheMandatesNow](#) [#convoynz2022](#) [#Convoy2022NZ](#)

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Information and misinformation

Health Belief Model: Cognitive framework for identified factors that increase or decrease health seeking behaviour

HBM Domains	Beliefs & situations that promotes action, eg vaccination	Misinformation/Disinformation that reduces likelihood of action, eg Covid-19
1. Perceived Susceptibility	I am susceptible to this health risk or problem (Covid-19)	Diet and wellness is sufficient to prevent illness (Covid-19)
2. Perceived Severity	The threat to my health is serious	Covid-19 is mild illness, the pandemic is fake
3. Perceived Benefits	I perceive the benefits of recommended action outweigh the barriers or costs	Vaccination is ineffective and dangerous
4. Perceived Barriers	I do not see significant barriers to acting	So much uncertainty and risk with vaccination, better to delay
5. Cues to Action	Cues to action are present to remind me to take action	High exposure to antivax messages, especially for marginalised/underserved populations
6. Self-efficacy	I am confident I can carry out the action successfully	Infection is inevitable so best just to accept it like other viral infections

Information and misinformation



Jami-Lee Ross (+ Billy Te Kahika NZ Public Party)

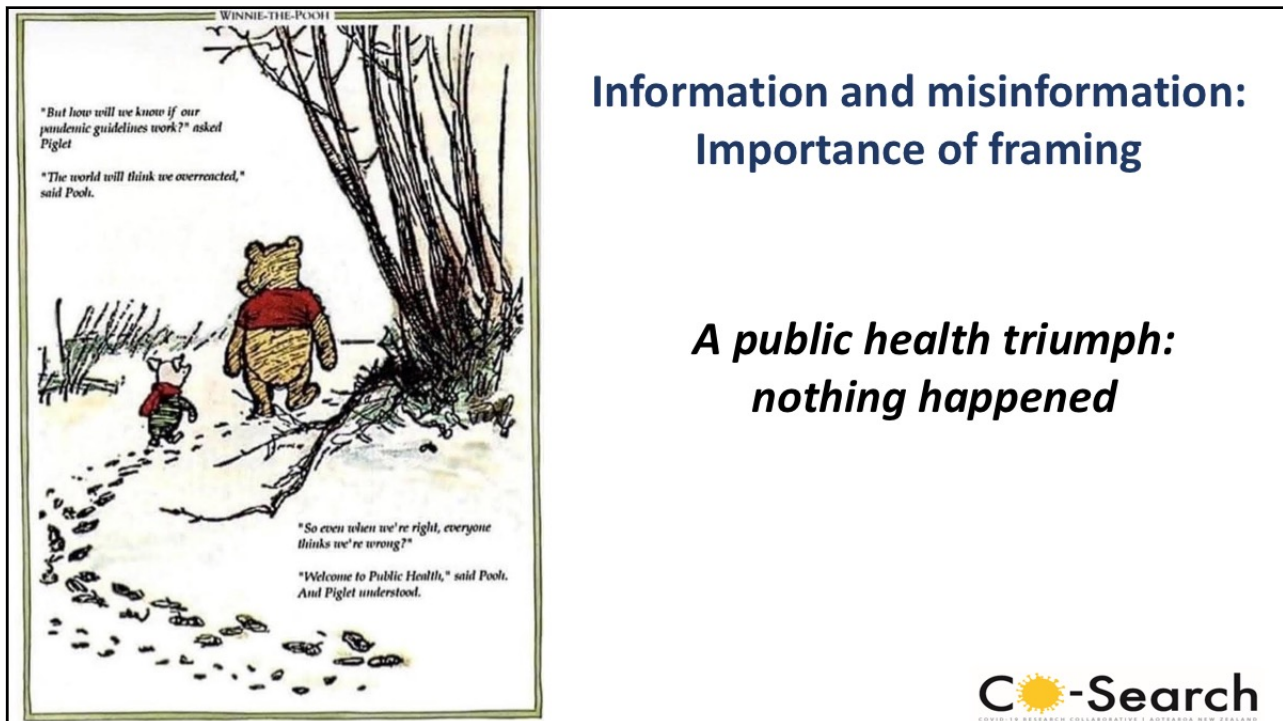
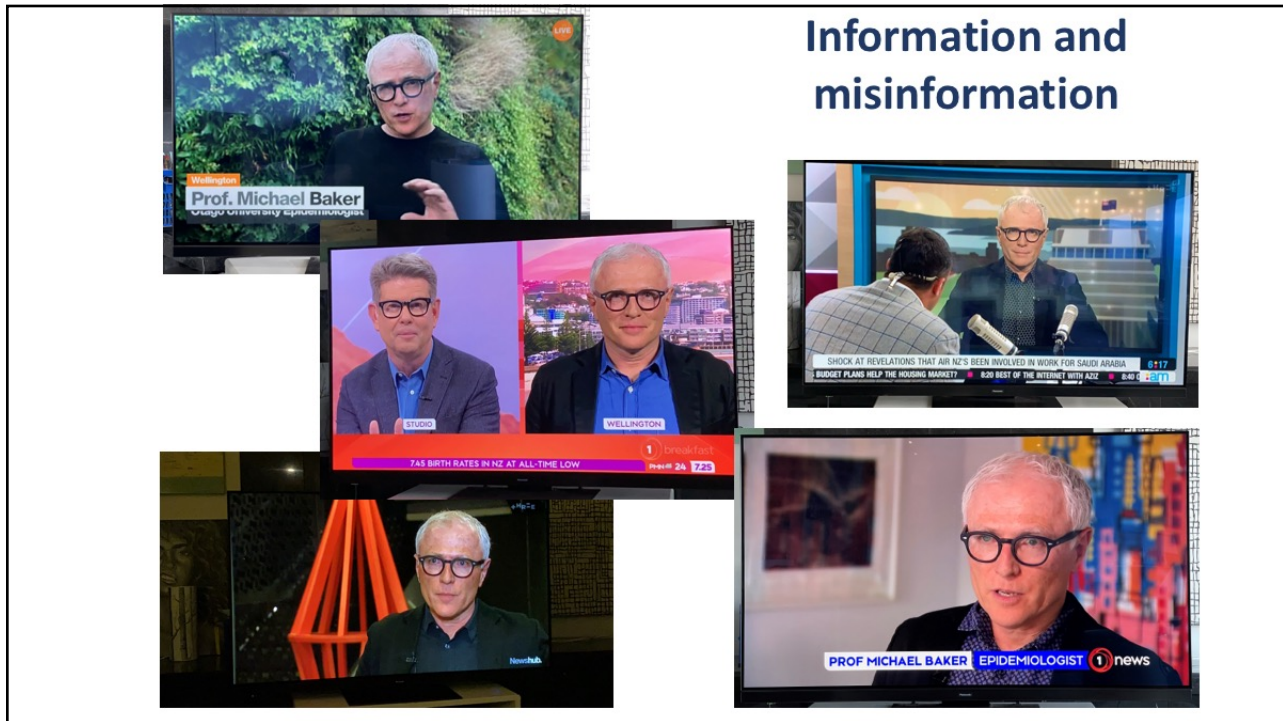


COVID Plan B

COVID-19 SCIENCE AND POLICY SYMPOSIUM
17 AUGUST 2020



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Information and misinformation: Importance of framing

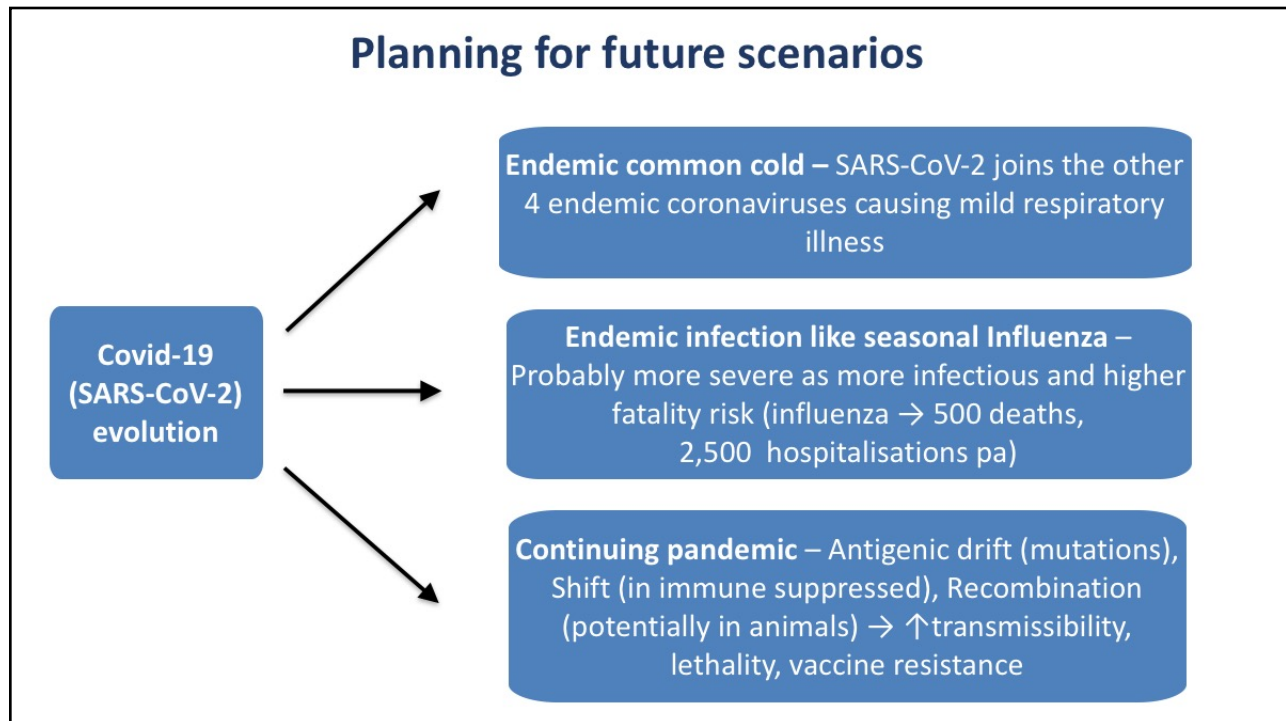
		Protection for others	
		No	Yes
Protection for you	Yes	Protects only you <ul style="list-style-type: none"> • Double vaccinated during Omicron wave • Safety belt • Crash helmet • Sun hat and block 	Protects everyone <ul style="list-style-type: none"> • Wearing a face mask indoors • Not smoking indoors • Safe driving, sober, not speeding • Safe sex
	No	Protects no-one <ul style="list-style-type: none"> • Unmasked • Unvaccinated 	Protects others but not you <ul style="list-style-type: none"> • Self-isolation



9. Planning for future scenarios

Question 9: How will the pandemic end?

And how will we know when we get there?



Planning for future scenarios


Covid-19 Pandemic ends when either:

- SARS-CoV-2 becomes a relatively **predictable endemic threat** (NB. endemic ≠ mild), Or
- Transmission is **eliminated**, for prolonged periods, Or
- **WHO declares** public health emergency of international concern (PHEIC) has ended

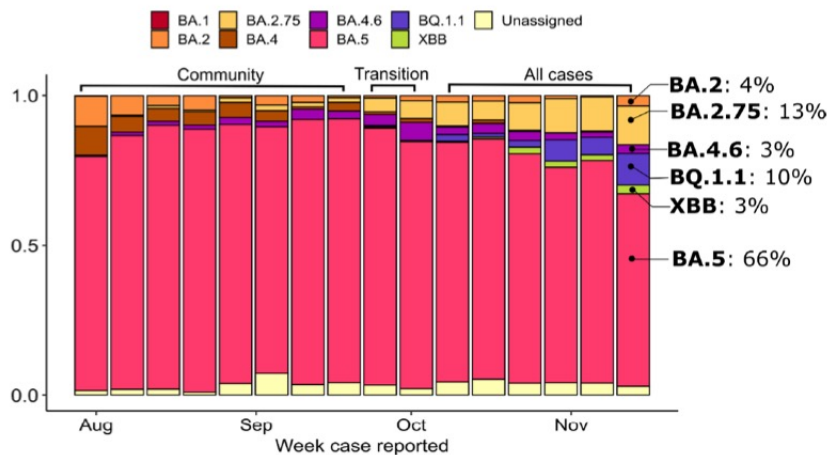
Pandemics/epidemics **typically have multiple endings:**

- **Medical** - disease rates decline to 'acceptable' level
- **Political** - end of the crisis and regulations
- **Social** - return to normalcy

Source: Erica Charters, 28 July 2022, The Guardian



Planning for future scenarios



Variants:

- Delta, Omicron

Subvariants of Omicron:

- BA.1, BA.2
- BA.4, BA.5,
- BA.2.75, BA 4.6
- BQ.1.1

Recombinants:

- XD, XF (Delta+Omicron)
- XBB (BA.2.10.1 + BA.2.10.75)

Source: ESR, COVID-19 Genomics Insights (CGI) Report, Nov 2022

10. Lessons for improving public health

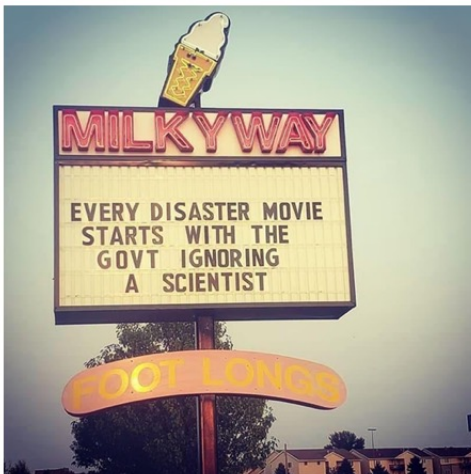
Question 10: What lessons and opportunities are there from the pandemic for better managing other public health threats in the future?

Lessons for improving public health

- a) Improving evidence-informed decision-making (incl. crises)
- b) Adapting responses to future threats (“All hazards”)
- c) Building effective public health and science infrastructure
- d) Supporting effective global health institutions
- e) Seizing public health opportunities provided by the Covid-19 reset



A. Evidence-Informed Decision Making Effective Science + Good Political Leadership



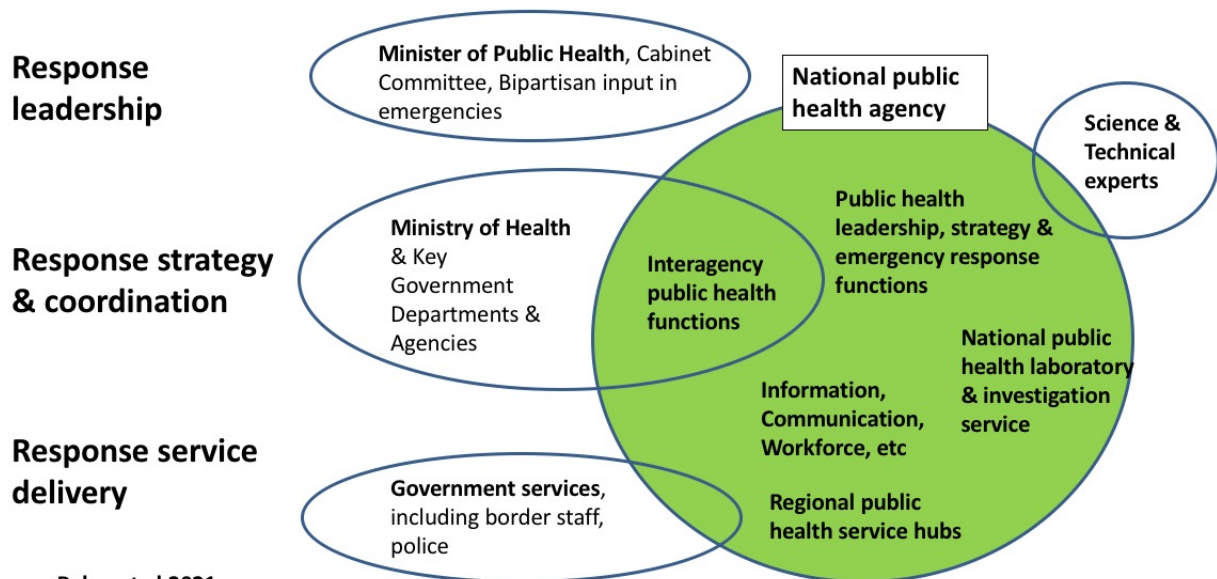
B. All hazards approach – Other pandemics

	Relatively low transmissibility	Relatively high transmissibility
Relatively high case fatality risk	<ul style="list-style-type: none"> • Middle East Respiratory Syndrome (MERS) • Ebola virus disease (EVD) • Severe Acute Respiratory Syndrome (SARS) • Avian Influenza A(H5N1) 	<ul style="list-style-type: none"> • Severe non-seasonal influenza* • Smallpox • Emerging Disease X (e.g. emerging zoonotic disease) • Novel synthetic Disease X (e.g. a bioweapon)
Relatively low case fatality risk	<ul style="list-style-type: none"> • Influenza A(H1N1) – 2009 pandemic • Poliomyelitis 	<ul style="list-style-type: none"> • Chickenpox • Measles

*Approaching the severity potential of the 1918 influenza pandemic

Source: Boyd, Baker, Wilson. Aust N Z J Public Health. 2020 Apr; 44(2): 89–91.

C. Building infrastructure – Public Health capacity & delivery



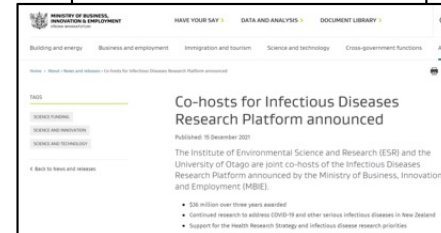
Source: Baker et al 2021

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C. Building infrastructure – Science capacity & Tools

Science-based pandemic tools and resources, including:

- **Population health** eg. epidemiology, public health interventions, evaluation
- **Data and modelling** eg. surveillance, data sciences, disease modelling
- **Infectious diseases** eg. clinical management, microbiology, immunology, vaccinology, diagnostics, IPC
- **Molecular biology** eg. genomics, bioinformatics
- **Laboratory sciences** eg. vaccine development, medicinal chemistry, test development
- **Social sciences** eg. social psychology, communication, disinformation analysis
- **Mātauranga Māori** eg. expertise, community resilience
- **Other areas** – eg. economics



D. Supporting effective global health institutions

WHO has multiple critical global public health functions

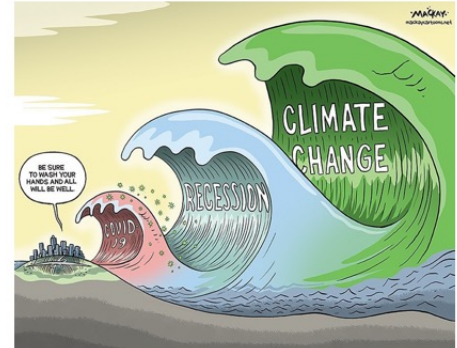
Independent Panel for Pandemic Preparedness and Response report *“COVID-19: Make it the Last Pandemic”* 12 May 2021:

- Increase equity in vaccine production & distribution
- Prepare to prevent a future outbreak from becoming a pandemic
- Strengthen authority & financing of WHO

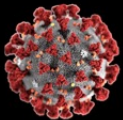


E. Adaptability to future threats & opportunities

- Opportunity for broad **reset** and increased focus on managing major global health threats
- Most NZers want a **green recovery** including focus on reducing disruption change*
- More **equitable** society also assists with collective action against future threats



*Source: Massey Uni Survey, August 2020. 7/10 NZers want a green recovery.



Summary

1. Critical to use an **evidence-informed strategy for responding to public health threats like Covid-19**
2. Covid-19 is a further reminder of the **central importance of equity** in policy and practice
3. Need to **prepare for far more serious threats** than Covid-19, including other pandemics, climate disruption, growing inequity
4. Essential to **invest in public health and science infrastructure** and Covid-19 has shown us what this looks like at national & international levels
5. Important to find better ways of **effective communication and managing disinformation**

 C-Search
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Acknowledgements



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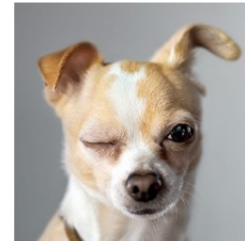
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