Covid Recovery in Aotearoa

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Motu Public Policy and Economic Research

Speaker's Science Forum
Aotearoa New Zealand

Congratulations! We have COVID-19 vaccines …now for the next challenges.

Helen Petousis-Harris, PhD
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The safety challenges

What are we in for?

stuff ☰ business

Auckland Mum of two dies just days after coronavirus vaccine, family distraught

Thisis Notreal · 11:34, Feb 10 2021

Norway adjusts advice for elderly and frail people after COVID-19 vaccine deaths

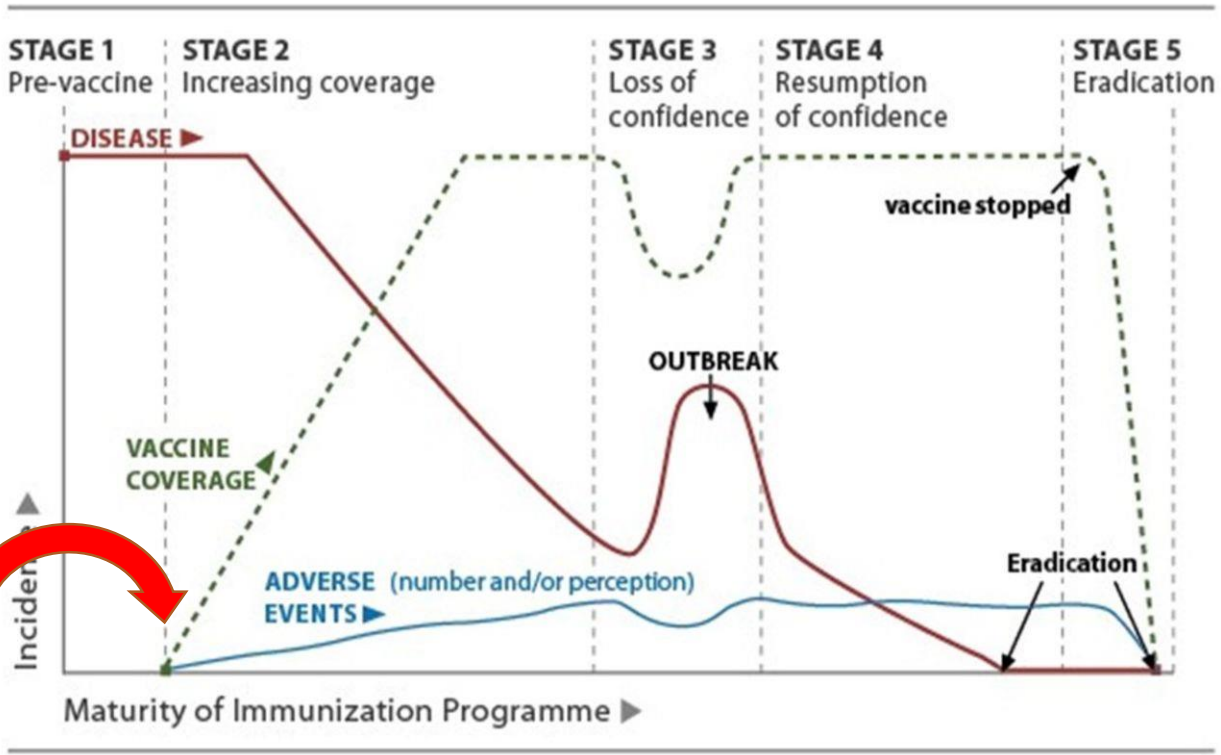
COMMENTS

By Euronews with AP • Updated: 15/01/2021

Svein Andersen was the first in Norway to receive the coronavirus vaccine in the capital Oslo, Sunday, Dec. 27, 2020. • Copyright: Fredrik Hagen/NTB

How do we make sense of this?

Potential stage in the evolution of an immunisation programme, vaccine safety.



We are here

Yonatan Moges Mesfin et al. BMJ Glob Health 2019;4:e001065

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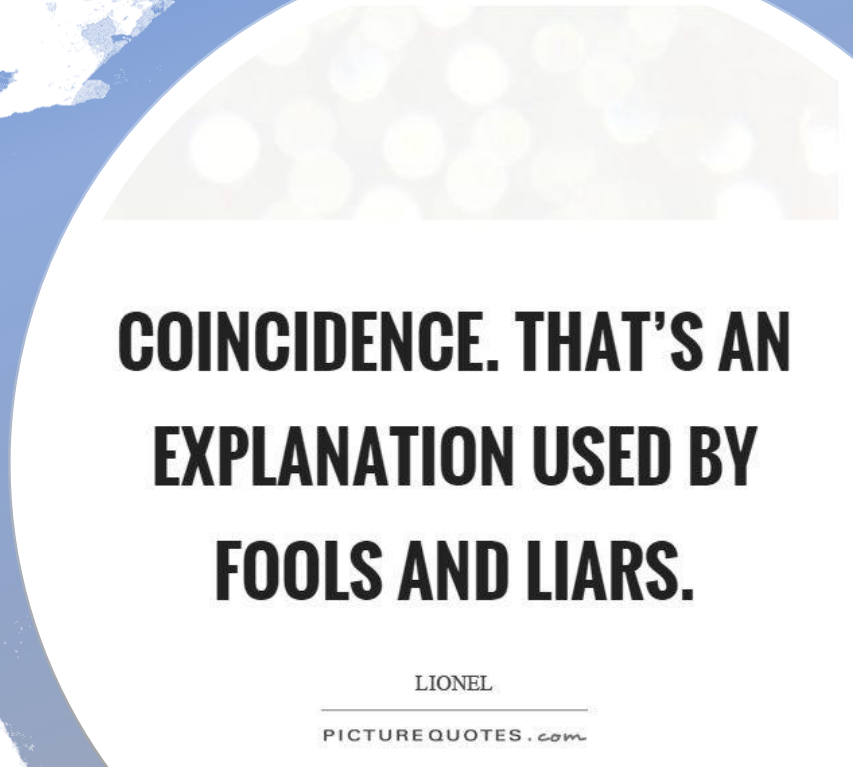
BMJ Global Health

Separating legitimate events from coincidence

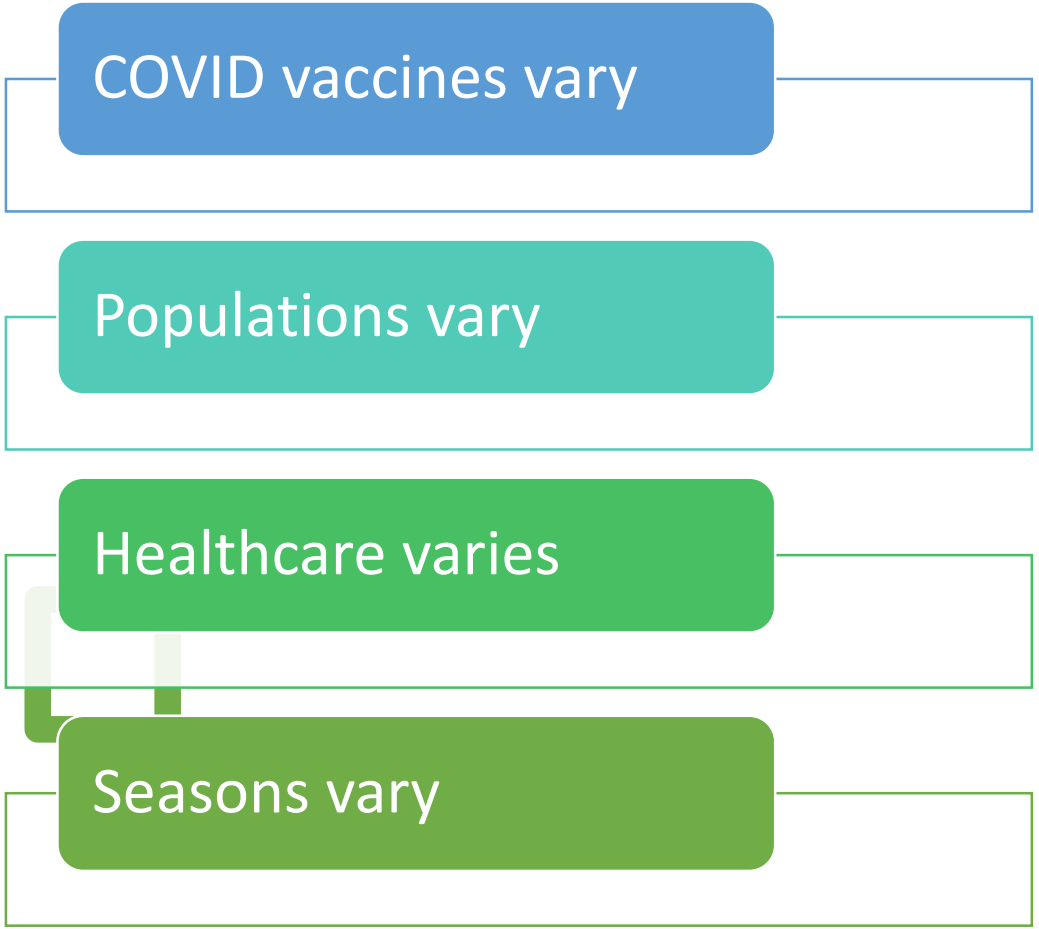
- If 10 million individuals were vaccinated in the UK, 21·5 cases of Guillain-Barré syndrome and 5·75 cases of sudden death would be expected to occur within 6 weeks of vaccination as coincident background cases.
  - need >4million to detect a 2-fold difference
- 397 per 1 million vaccinated pregnant women would be predicted to have a spontaneous abortion within 1 day of vaccination.

Vs.

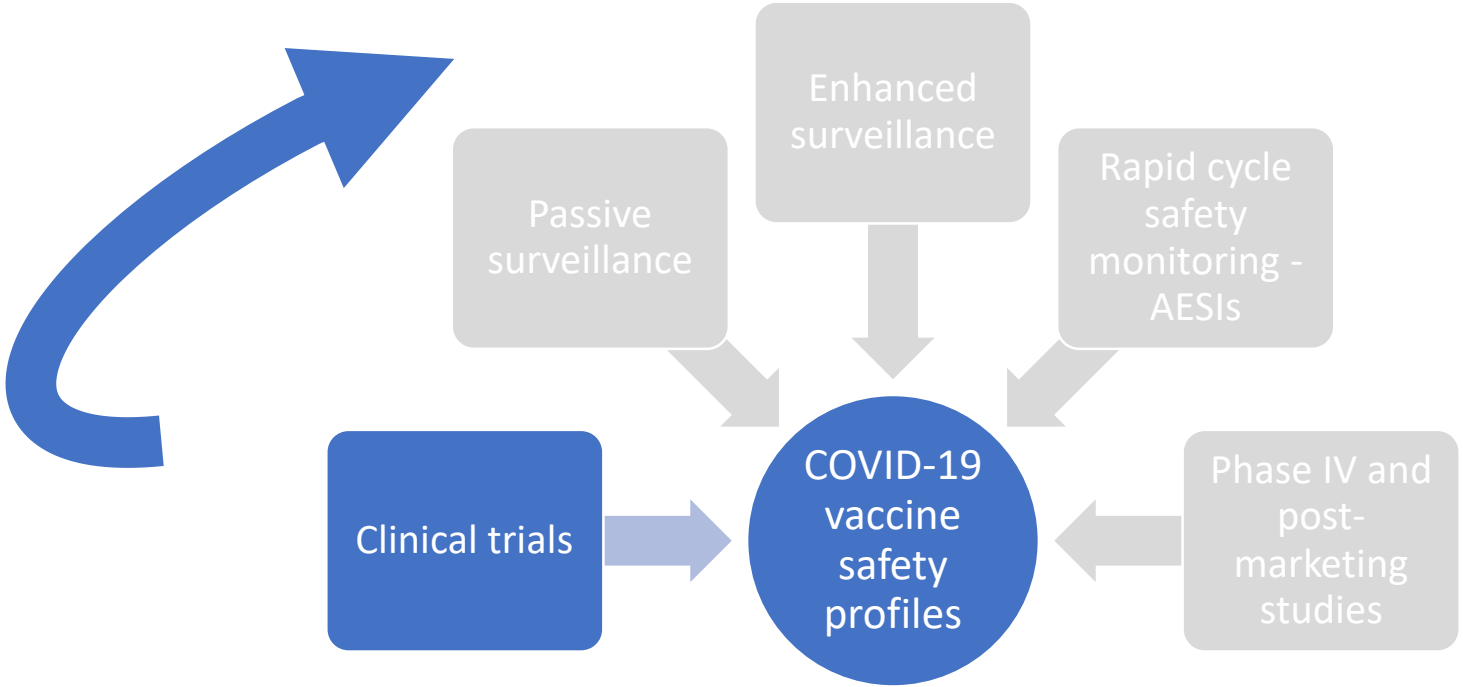


Black, Steven, et al. "Importance of background rates of disease in assessment of vaccine safety during mass immunisation with pandemic H1N1 influenza vaccines." *The Lancet* 374.9707 (2009): 2115-2122.

Beyond rare events – vaccines and people are not all the same



Knowing the safety of COVID-19 vaccines



The body of knowledge

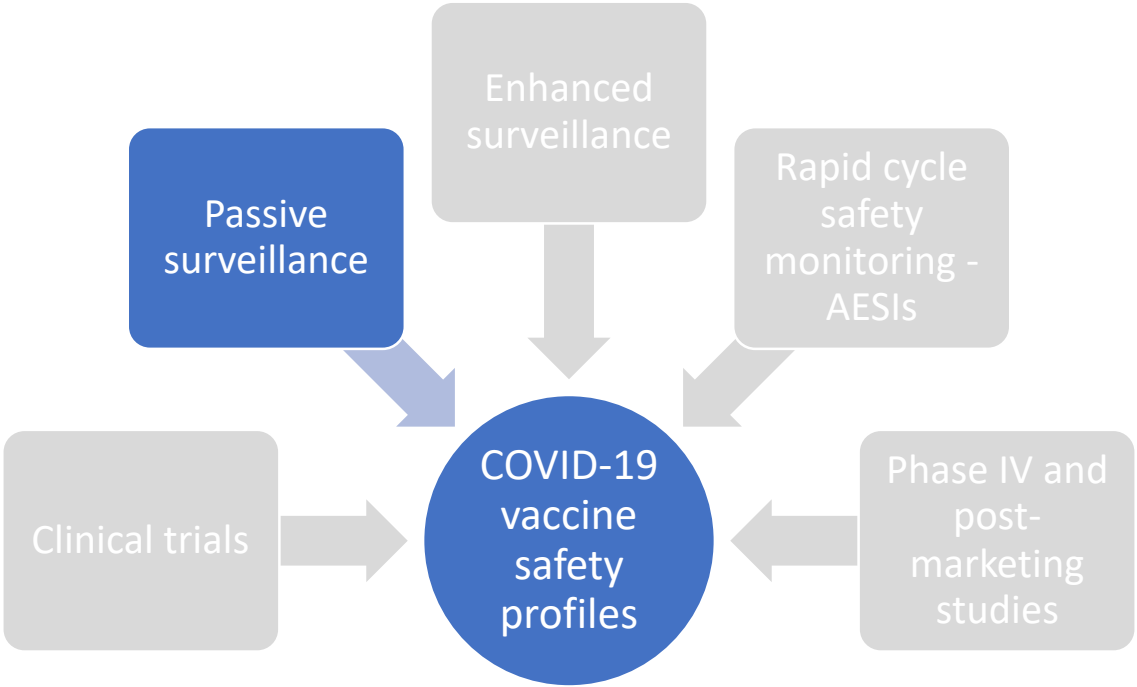
Some limitations of clinical trials

- Phase III trials need to be big enough to show that
  - the vaccine prevents the disease.
  - Provide sufficient evidence of safety.
- Not big enough to measure rare events.
- Cannot measure indirect effects
  - i.e community immunity, transmission
- Participants might not be genetically diverse
  - Almost no Polynesian trial participants
  - We know from NZ vaccine studies that ethnicity is strongly associated with vaccine responses and vaccine effectiveness independent of other variables

The Solutions

After deployment

Knowing the safety of COVID-19 vaccines



Spontaneous safety surveillance

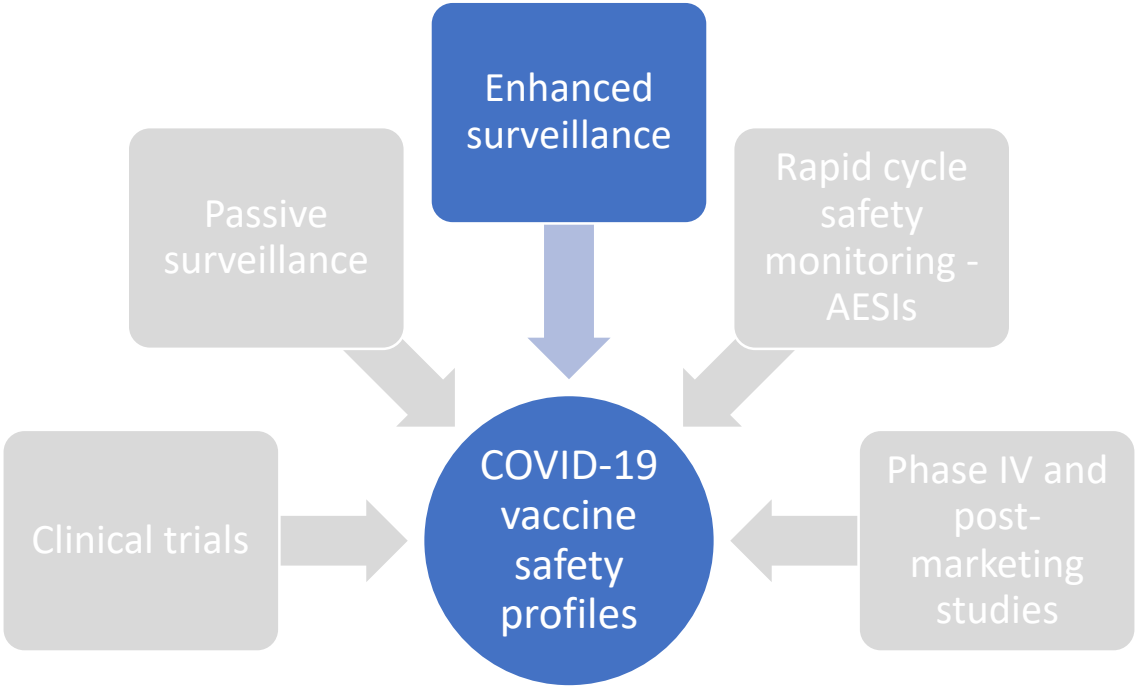
- Passive safety surveillance (voluntary reporting of AEFI)
- Most countries have one
- Most contribute to the WHO Uppsala pharmacovigilance monitoring centre (Vigibase)

✓Good for signal detection

✗Cannot help with causality assessment

Australian Government
Department of Health
Therapeutic Goods Administration

Knowing the safety of COVID-19 vaccines



Enhanced/active monitoring

- e.g. Use of digital technologies to actively collect post vaccine adverse events
  - SmartVax
  - Vaxtracker
  - KiwiVax ☺

✓ Reveal events not picked up by GP visit

✓ Involve patients in pharmacovigilence

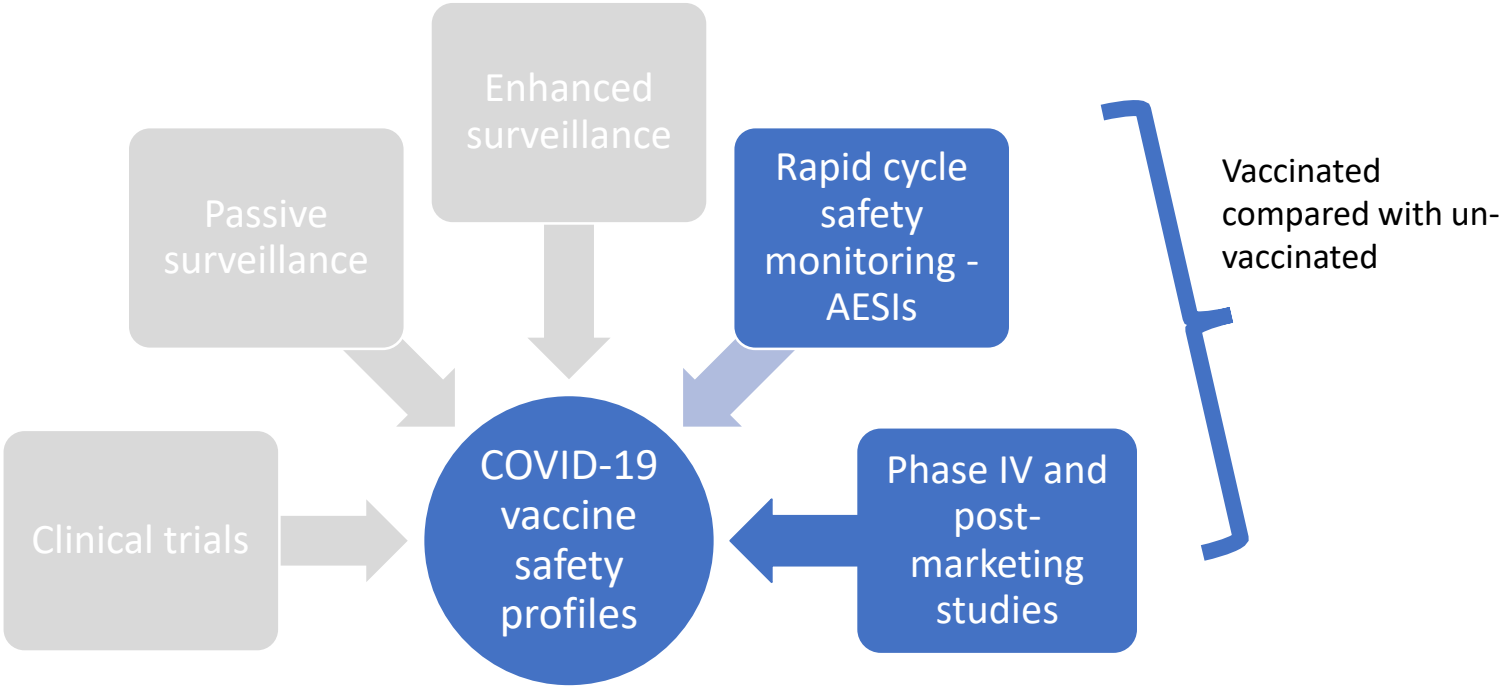
✗ Cannot be used to infer causality of complex or rare events

✗ No unvaccinated for comparison

The most urgent immediate task for most countries is to establish the normal background rates for the adverse events of special interest.

WHO, Global Advisory Committee on Vaccine Safety, May 2020

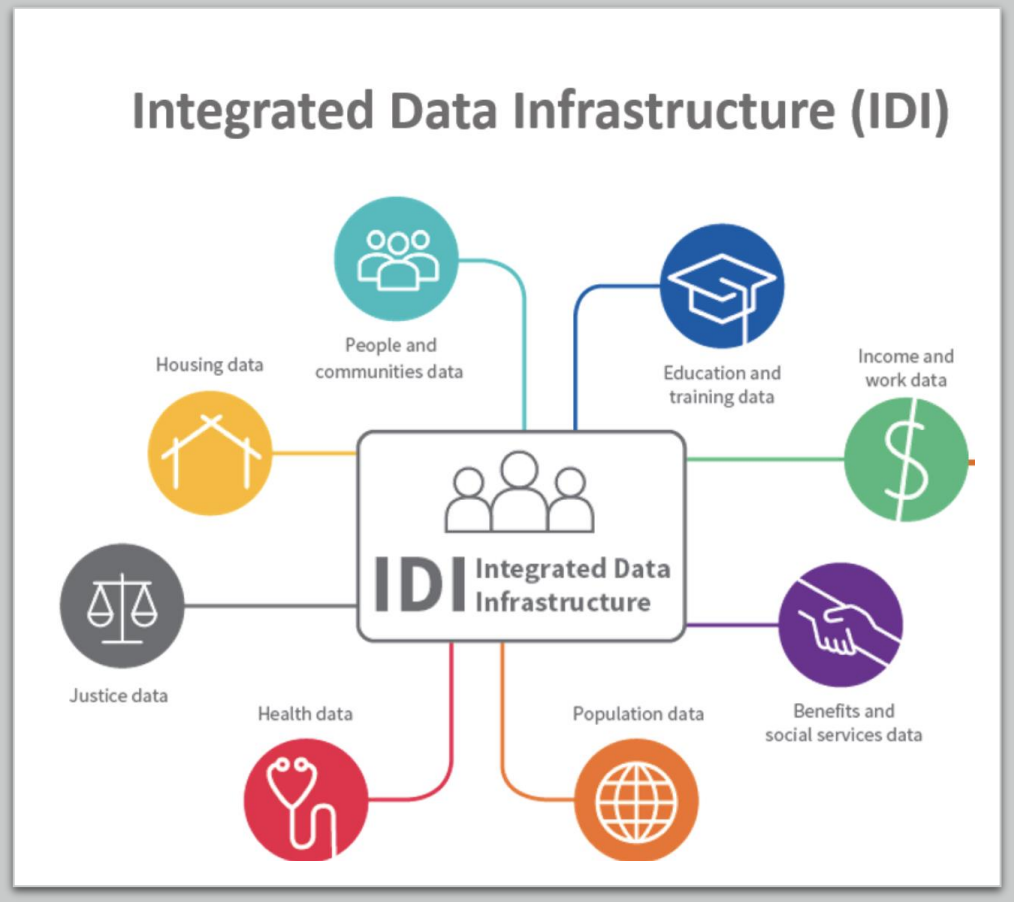
Knowing the safety of COVID-19 vaccines



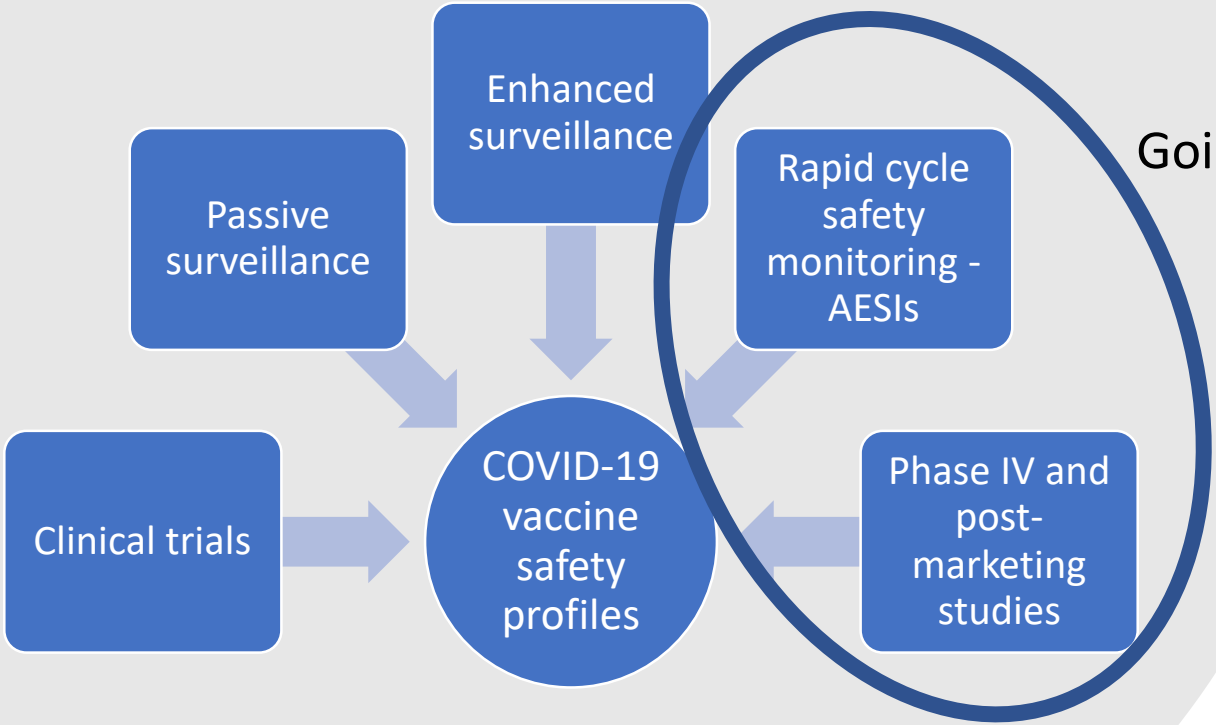
National or site specific:

NZ has exceptional data. We can do vaccine safety monitoring and studies second to none

… but our population is very small



Knowing the safety of COVID-19 vaccines

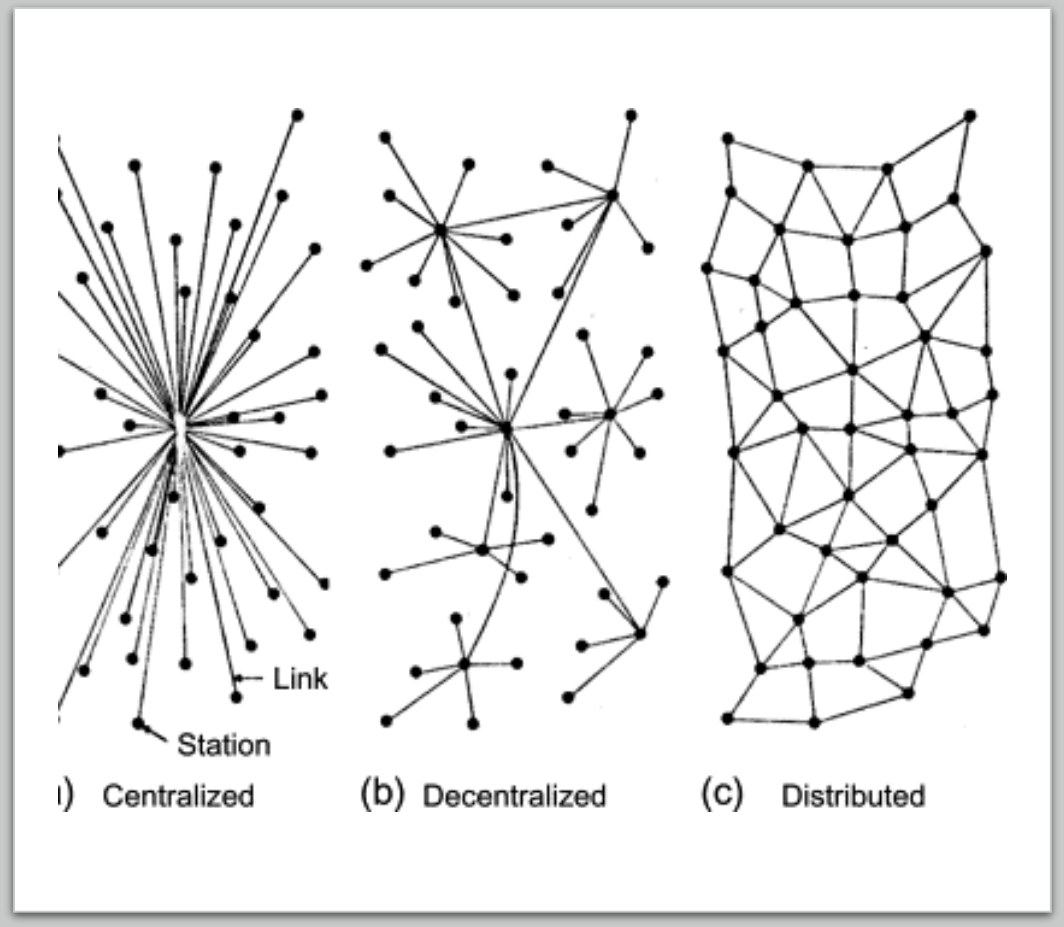


Going BIGGER!

Distributed networks

- Using common methods/protocols at different sites, **different countries**
- Combining outcomes in a kind of meta-analysis
- Systems may vary but if everyone uses the same approaches, same definitions then we can combine findings
- The EU and US have

But don't assume they have all of this covered



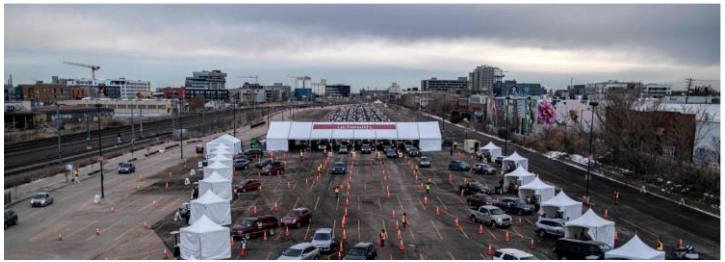
Just last month…

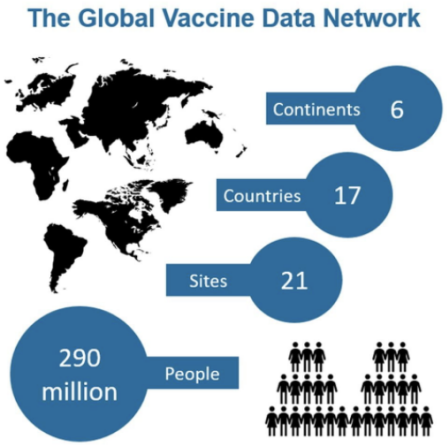
The New York Times

The F.D.A. is struggling to start up its comprehensive monitoring system for vaccinations.

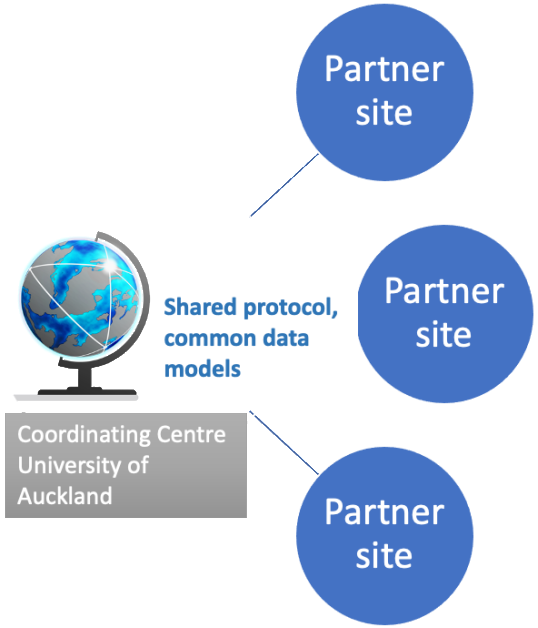
As Millions Get Shots, F.D.A. Struggles to Get Safety Monitoring System Running

For now, the government has been relying on a patchwork of programs that officials say are hampered by limited size and gaps in data collection.





The GVDN uses Big Data to assess vaccine safety and effectiveness across large and diverse populations around the world and over time.



1. Argentina, Hospital de Niños Ricardo Gutierrez, Buenos Aires
2. Australia, Monash Health, Victoria
3. Australia, NCIRS Sydney Children's Hospitals Network, Sydney
4. Canada, British Columbia Provincial Health Services Authority
5. Canada, ICE, Ontario
6. China, School of Public Health, Peking University
7. China, Department of Epidemiology, School of Public Health, Fudan University, Shanghai
8. Denmark, Statens Serum Institut, Copenhagen
9. England Public Health England
10. Ethiopia University of Gondar
11. Europe Vaccine monitoring Collaboration for Europe
12. Finland, Finnish Institute for Health and Welfare THL, Helsinki
13. France, Institut National de la Santé et de la Recherche Médicale (INSERM), Paris
14. Ghana Navrongo Health Research Centre
15. India, The INCLEN Trust International, New Delhi
16. New Zealand, General Practice and Primary Health Care, University of Auckland, Auckland
17. Scotland Public Health Scotland
18. South Africa, University of Witwatersrand, Chris Hani Baragwanath Hospital, Johannesburg
19. Taiwan, Health Data Research Center, National Taiwan University, Taipei
20. United States, Vaccine Safety Datalink, Centers for Disease Control and Prevention, Georgia
21. United States, Centers for Medicare & Medicaid Services, U.S. Food & Drug Administration, Maryland

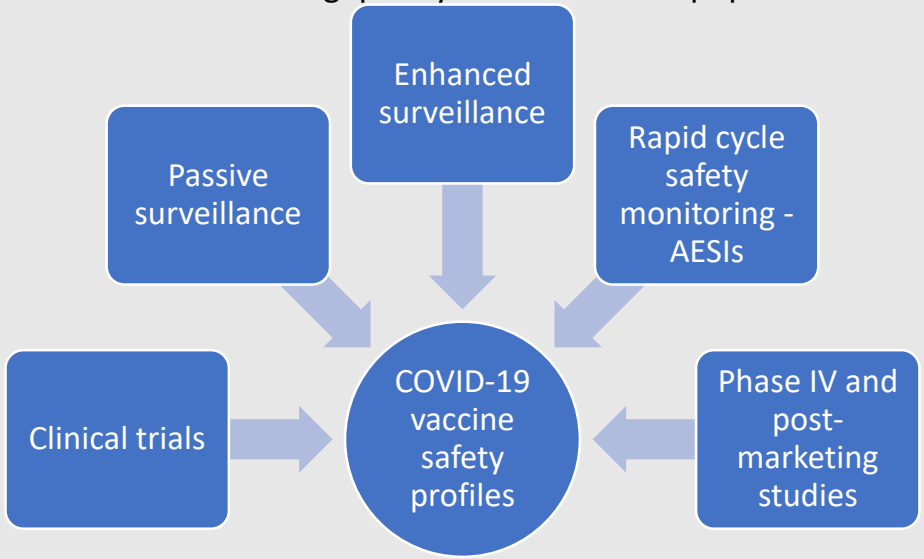
GLOBAL VACCINE DATA NETWORK

Ultimate solution: Global Distributed Networks

Founding support from Gates. Endorsements from Brighton Collaboration and CEPI

Take home messages

- Safety scares can derail immunisation programmes
- Pre-clinical and clinical data give us optimism that COVID-19 vaccines will have a good safety profile.
- We have exceptional tools and protocols at our disposal and can detect and verify rare adverse events.
- However, there are global delays in implementation, leaving us vulnerable to responding to safety scares over the next few months
- Safety data beyond the clinical trials accumulating quickly - and in diverse populations.



Collective body of knowledge

THANK YOU!

New Zealand's Experience and Recovery from Covid-19

John McDermott

Covid-19 vs other pandemics

Table 1: *Twelve large pandemic events with at least 100,000 deaths*

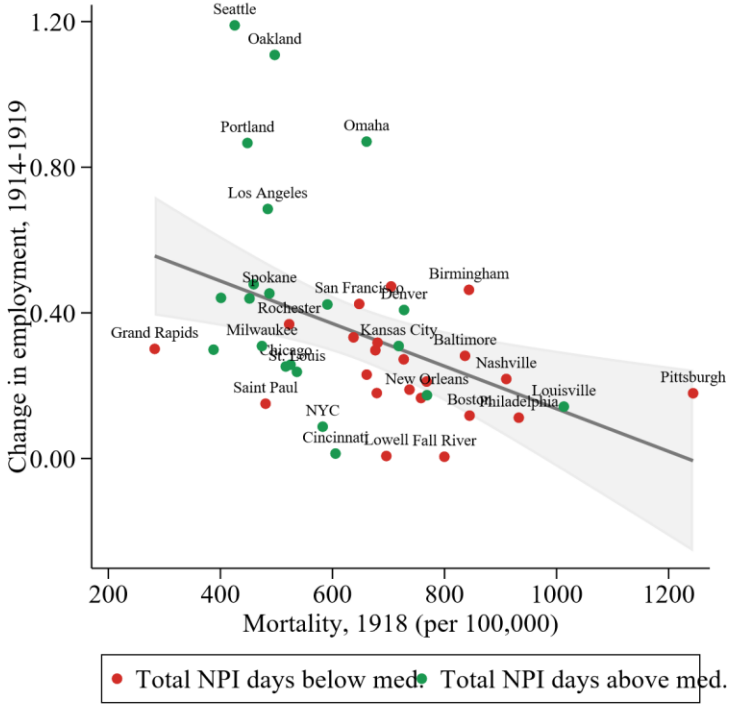
Event	Start	End	Deaths
Black Death	1331	1353	75,000,000
Great Plague of London	1665	1666	100,000
First Asia Europe Cholera Pandemic	1816	1826	100,000
Second Asia Europe Cholera Pandemic	1829	1851	100,000
Russia Cholera Pandemic	1852	1860	1,000,000
Global Flu Pandemic	1889	1890	1,000,000
Sixth Cholera Pandemic	1899	1923	800,000
Encephalitis Lethargica Pandemic	1915	1926	1,500,000
Spanish Flu	1918	1920	100,000,000
Asian Flu	1957	1958	2,000,000
Hong Kong Flu	1968	1969	1,000,000
H1N1 Pandemic	2009	2009	203,000

Source: https://en.wikipedia.org/wiki/List_of_epidemics and references therein.

Mortality vs employment in the Spanish Flu

- Cities that intervened earlier and more aggressively did not perform worse and, if anything, grew faster after the pandemic was over.

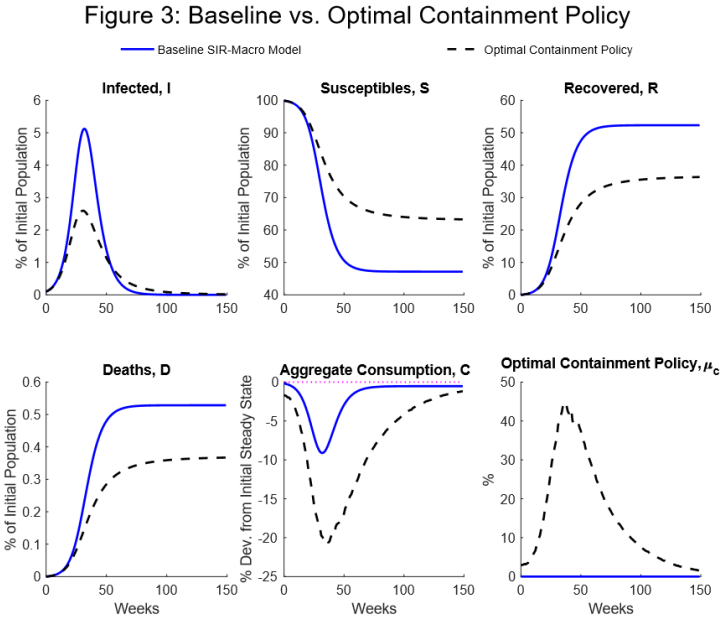
  - Green = cities with non-pharmaceutical interventions above the median
  - Red = cities with non-pharmaceutical interventions below the median



Containment versus the economy

- Eichenbaum et al (2020) study the interactions between economic decisions and epidemics.

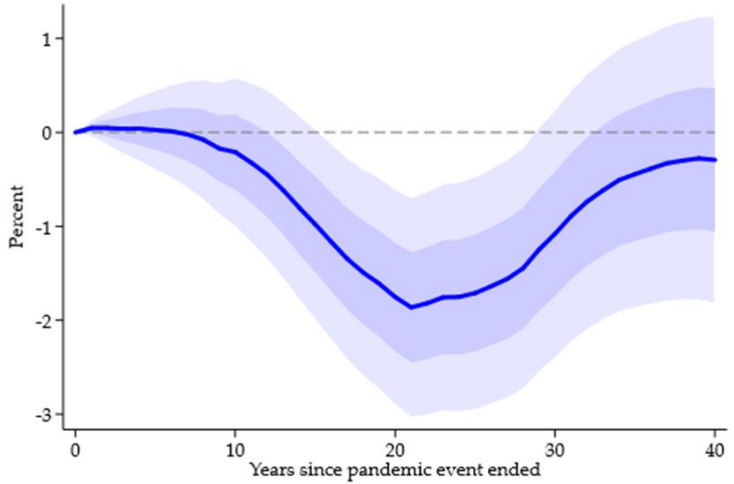
- Government interventions of imposing containment improve social outcomes.



Long term consequences

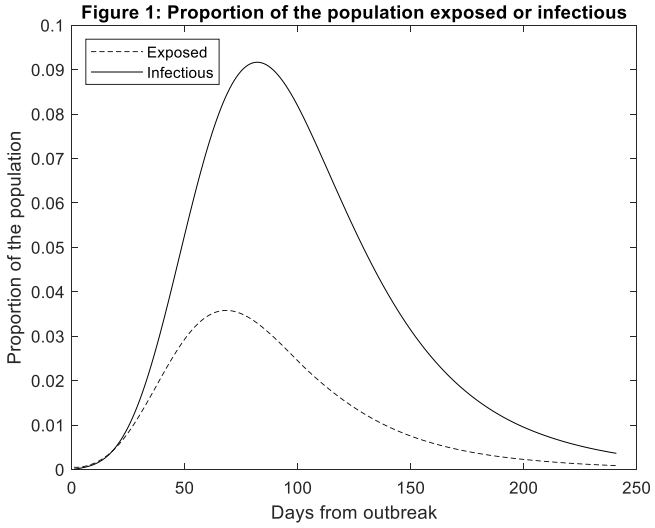
- Interest rates will be 2% lower than they would otherwise have been 20 years on.

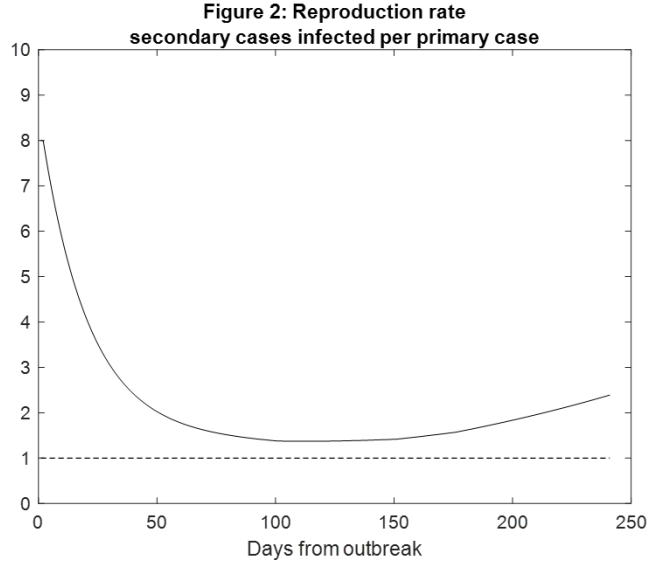
Figure 2: *Response of the European real natural rate of interest following pandemics*



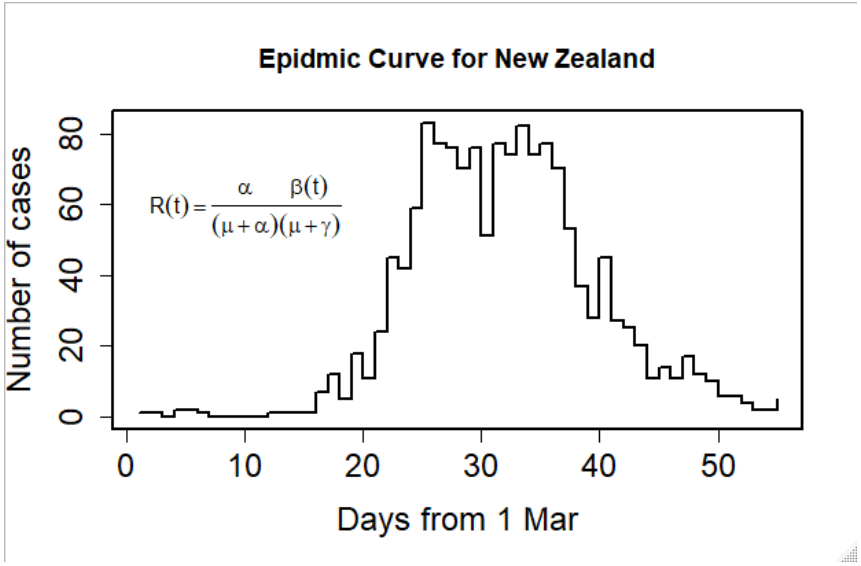
Notes: Response calculated using Equation 2. Shaded areas are 1 and 2 s.d. bands around response estimates. See text.

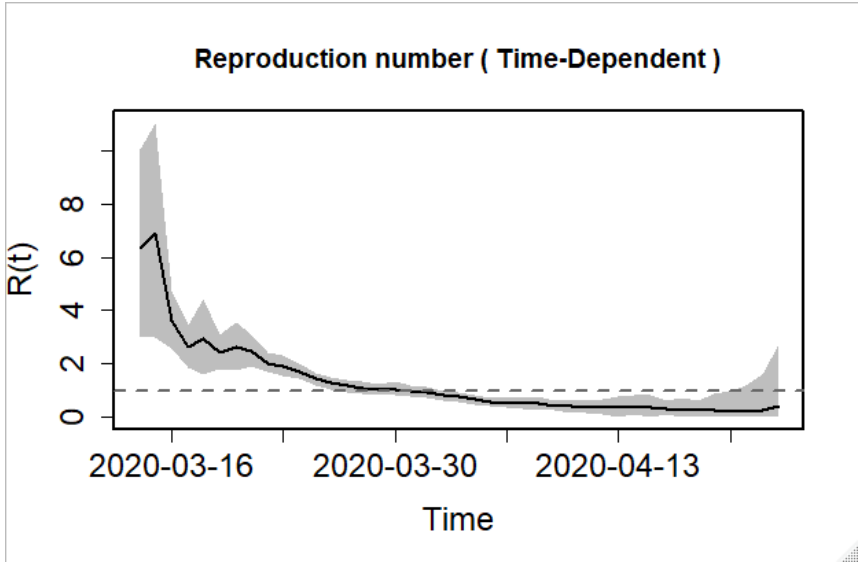
SEIR model of an infectious disease



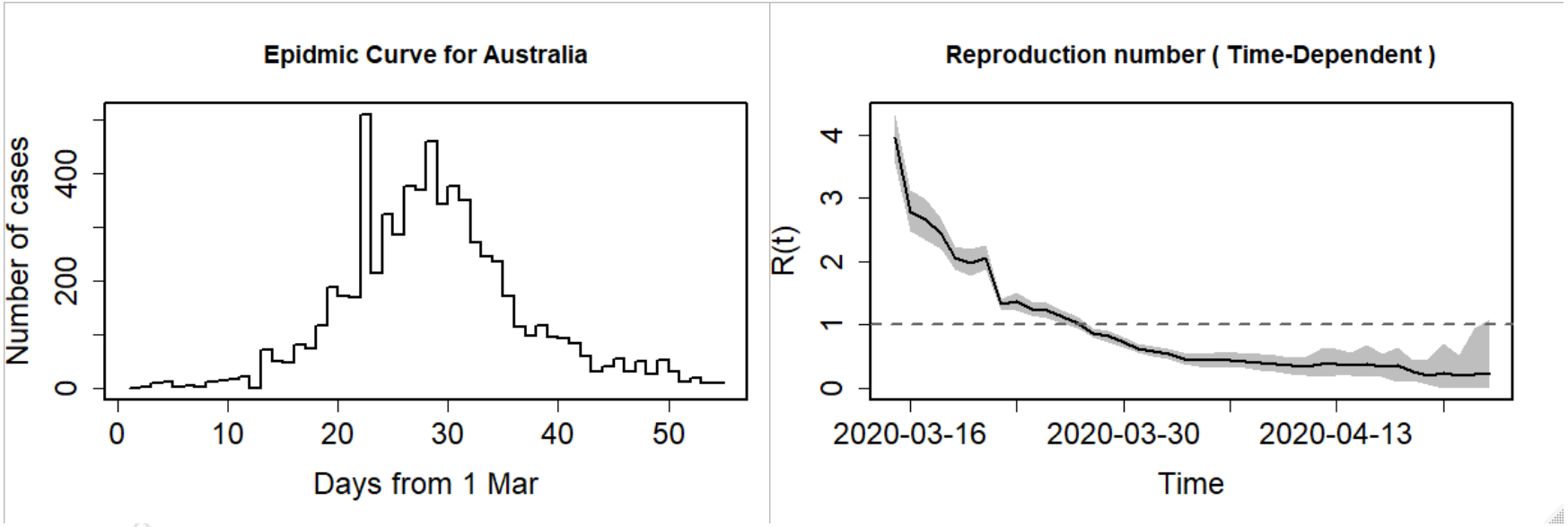


New Zealand's experience

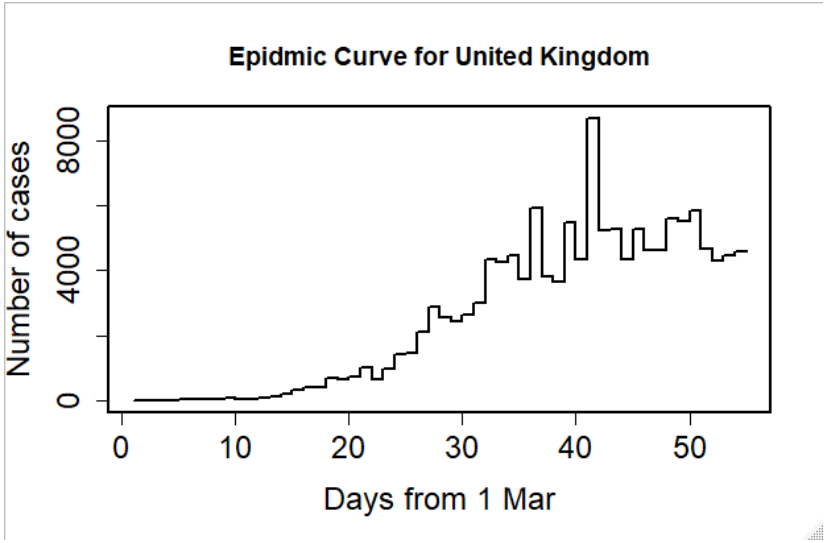


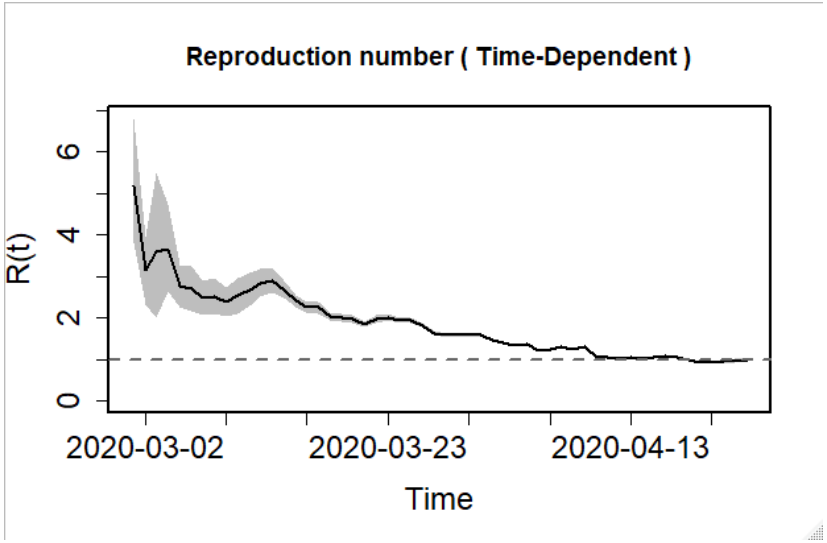


Australia’s experience

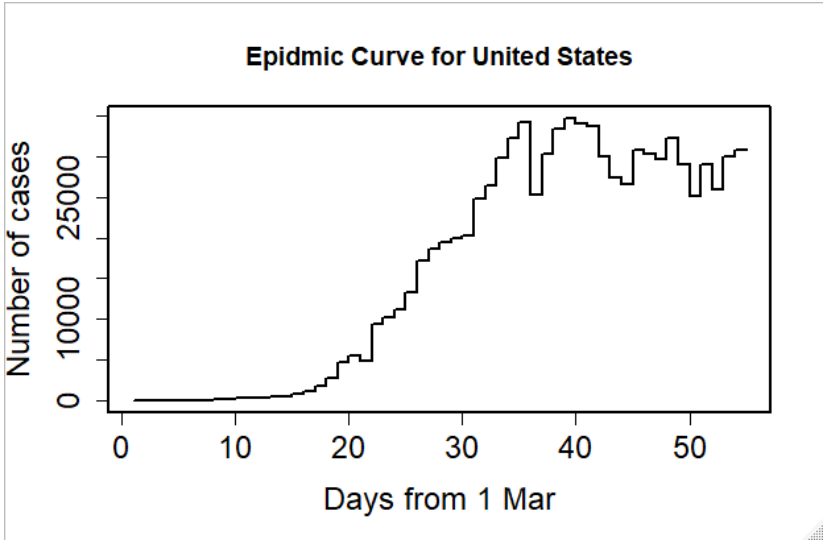


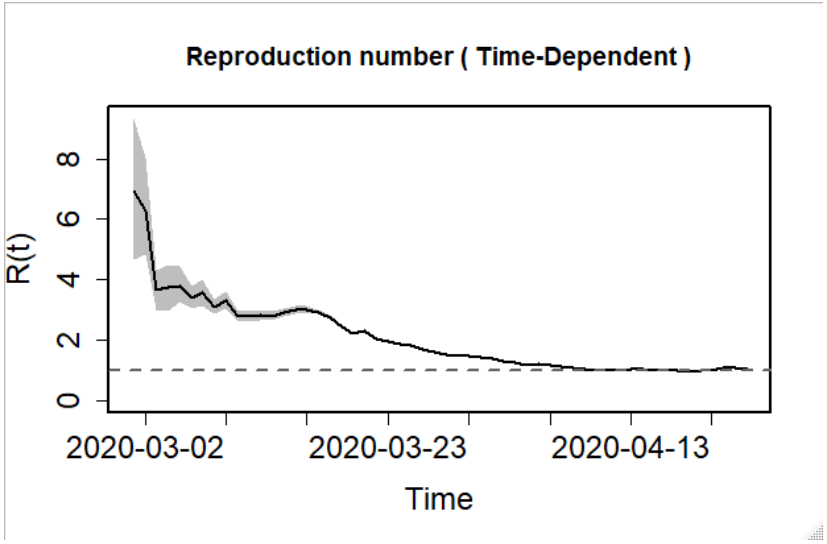
United Kingdom’s experience





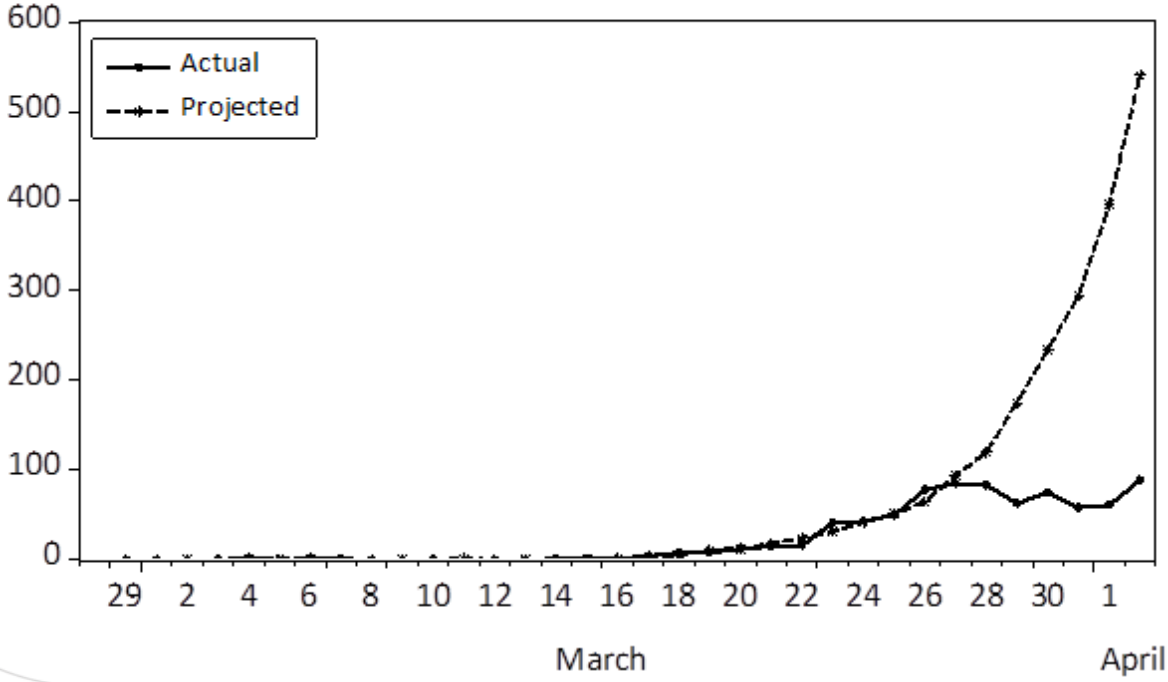
United States' experience



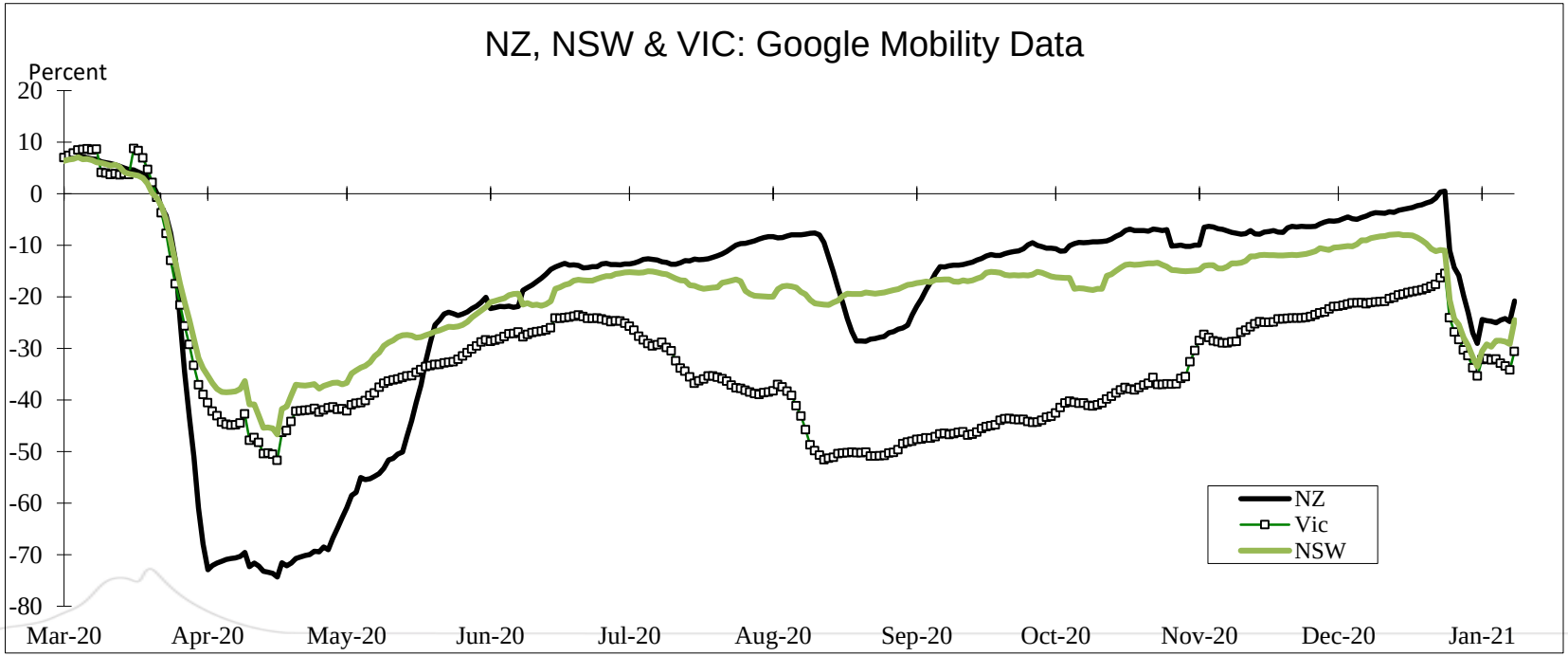


Forecasts on the eve of the lockdown

Figure 5. Projected Daily Incidences of covid-19 versus Actual

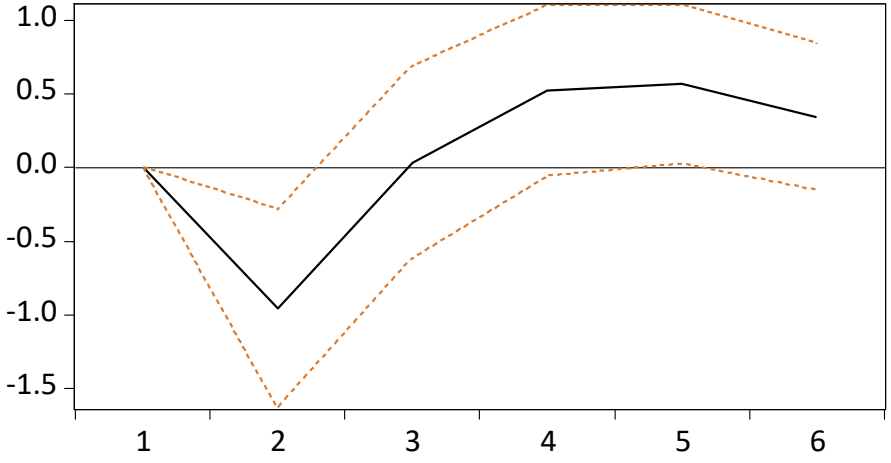


Impact of lockdown on mobility

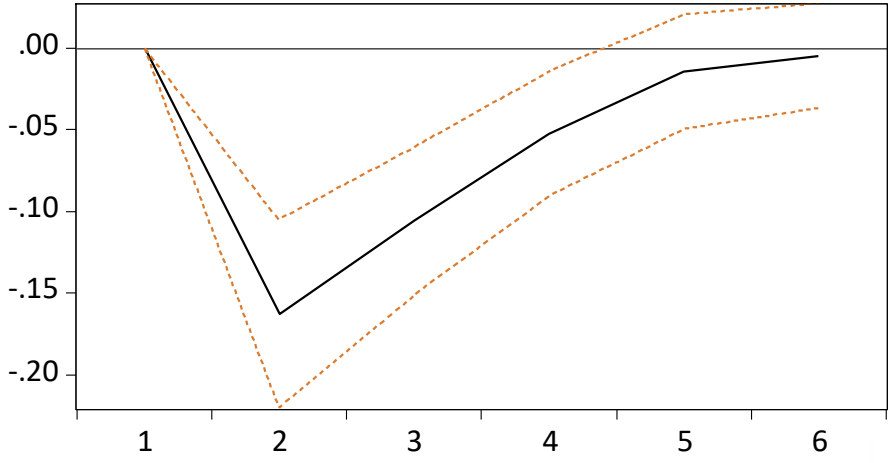


Impact of mobility on GDP

Response of GDP to Mobility



Response of R0 to Mobility



Kia ora, thanks for attending!

Speaker's Science Forum

Aotearoa New Zealand

Questions welcome.

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