

Previous pandemic & post viral syndromes: Insights for understanding 'Long Covid'

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#longcovid2022



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COVID-19 RESEARCH COLLABORATIVE | AOTEAROA NEW ZEALAND

Outline



1. Most **Infectious Diseases (IDs)** cause **Long-Term Conditions (LTCs)** creating **'Syndemics'**, includes sporadic IDs and pandemic IDs
2. **Well understood LTCs** eg paralytic polio, and **Less understood LTCs** eg **Post-Acute Covid-19 Syndrome (PACS)** and other **Post-Acute Infection Syndromes (PAISs)**
3. Need to choose a response strategy to **minimize infection with pandemic viruses**, especially if consequences poorly understood (ie **precautionary principle**)

Syndemics

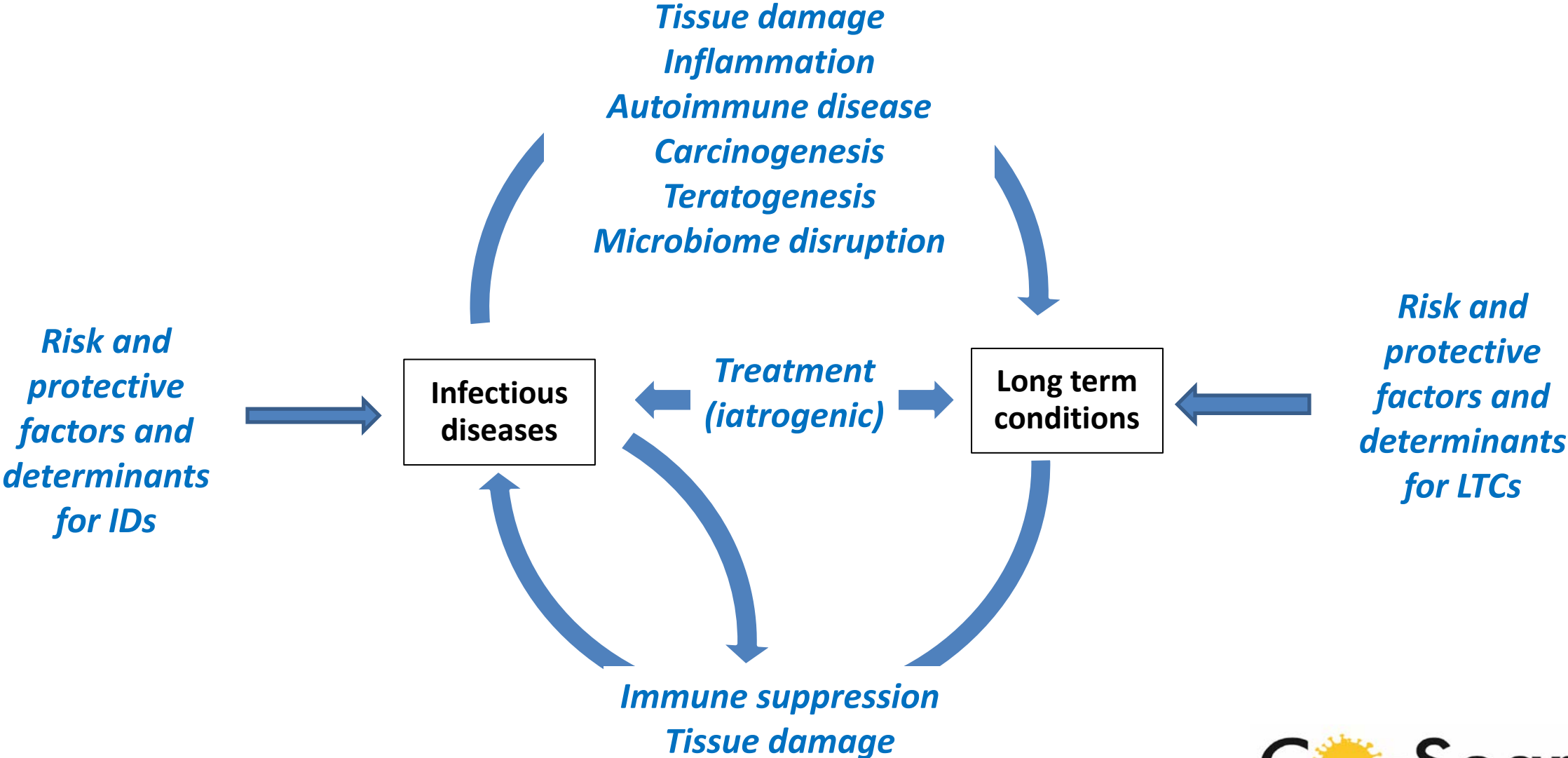


- **Syndemics** are “interacting, co-present, or sequential diseases and the social and environmental factors that promote and enhance the negative effects of disease interaction”*
- **Infectious diseases (IDs)** interacting with **Long-term Conditions (LTCs) / Non-communicable diseases (NCDs)**
- “COVID-19 is not a pandemic. It is a syndemic”. *Richard Horton, Lancet*
- **SYMBIOTIC** = Syndemic Management of the Biology and Treatment of Infections and Chronic conditions, HRC funded programme, University of Otago, Wellington
- **Covid-19 Research Collaboration**



*Source: Singer et al. Syndemics and the biosocial conception of health. *The Lancet* 2017;389(10072):941-50

IDs & LTCs - Syndemics



IDs causing LTCs – Some well understood

Bacterial diseases – with prevention potential

- Group A Streptococcal (GAS) infection → Acute Rheumatic Fever (ARF)
- *H. pylori* → Stomach cancer

Viral diseases – vaccine preventable

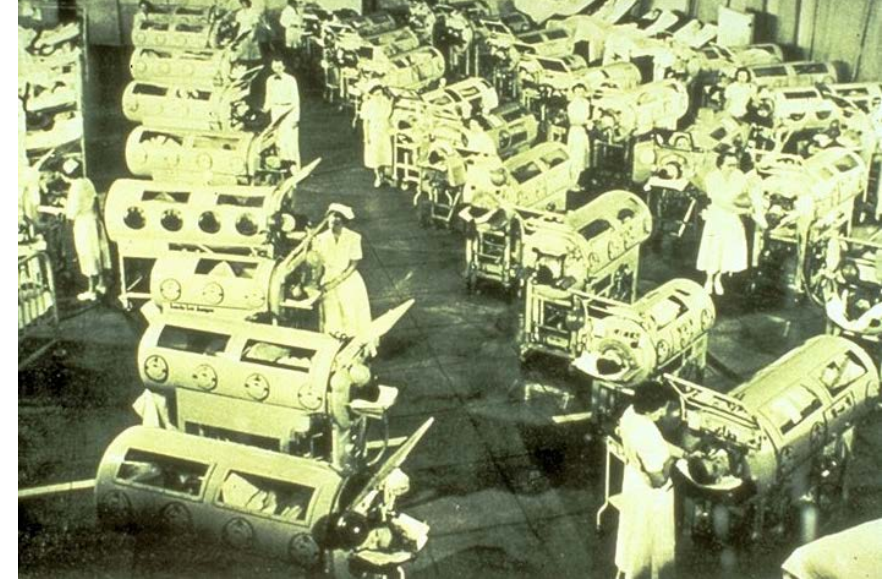
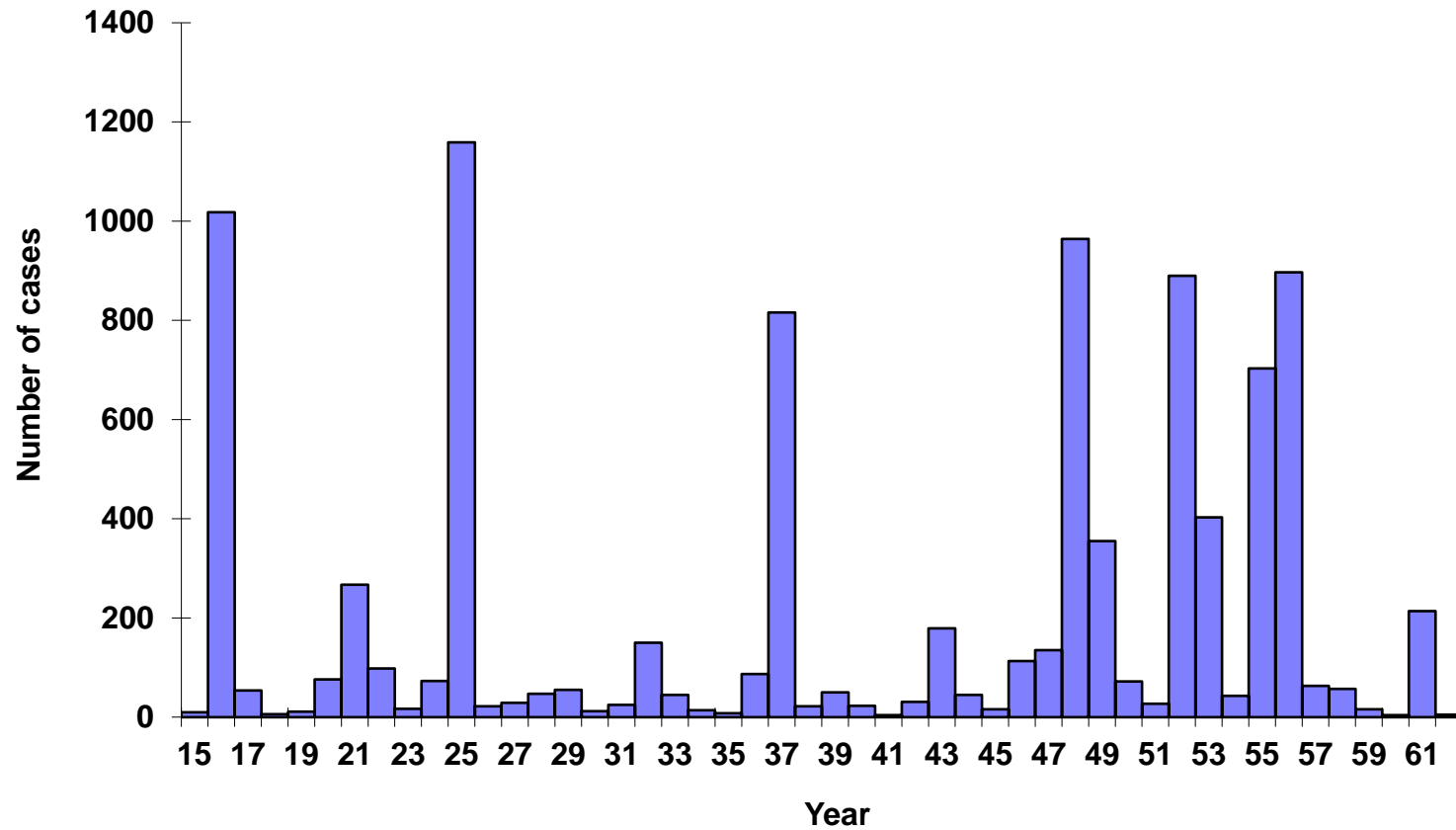
- Rubella → Congenital Rubella syndrome
- Measles → Subacute sclerosing panencephalitis (SSPE), Immune amnesia
- Hepatitis B → Chronic hepatitis, Hepatocellular carcinoma
- HPV → Cervical cancer

Pandemic diseases – not all are well understood

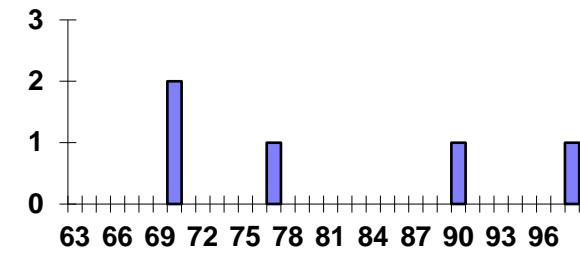
- Pandemic influenza → Post-influenza syndrome ('Long Flu')
- Poliomyelitis (polio) → Paralysis, Post-polio syndrome
- HIV/AIDS → Increased risk of wide range of NCDs
- SARS (SARS-CoV-1) → Post-SARS Syndrome
- Zika Virus → Congenital Zika syndrome

Polio

Average 200 cases pa 1915-60
Last local wild virus in NZ 1977



A Polio Ward around 1952



Polio

Polio virus infection

- Person to person, mainly faecal-oral to gastrointestinal tract
- Highly infectious
- Asymptomatic in ~70-80%
- Mild febrile illness with gastroenteritis & pharyngitis in ~20%

Long-Term Conditions (LTCs)

- **Paralytic polio** (Central Nervous System Infection) ~0.5-1.0%
Case-fatality 2–5 % in children, 15–30 % in adults
- **Post-polio syndrome** in 25-50% of people with paralytic polio
Decades later



Post-Acute Infection Syndromes (PAISs)

Common categories of symptoms and signs:

- **Exertion intolerance, fatigue**
- **Flu-like symptoms:** eg fever, muscle pain, malaise, irritability
- **Neurological/neurocognitive symptoms:** eg 'brain fog', impaired concentration or memory
- **Rheumatologic symptoms:** eg chronic or recurrent joint pain
- **Trigger-specific symptoms:** eg anosmia and ageusia (loss of smell and taste)

Myalgic Encephalomyelitis (ME) / Chronic Fatigue Syndrome (CFS)

- ME/CFS overlapping concept with PAISs
- Up to 75% of ME/CFS cases report an infection-like episode preceding onset illness, (esp. EBV / glandular fever) → ‘post-infectious fatigue syndrome’ and ‘post-viral fatigue syndrome’
- **NZ:**
 - Tapanui Flu in 1984
 - Estimated 25,000 people with ME/CFS in NZ (ANZMES)
 - Some for 40+ years as a debilitating condition
 - 25% house/bed-bound, remainder reduced QOL

Coronavirus – SARS and MERS

- **Beta-coronaviruses:** SARS-CoV-1, SARS-CoV-2, MERS-CoV
- **SARS** (Severe Acute Respiratory Syndrome) caused by SARS-CoV-1 emerged 2003, Guangdong, China, spread to 29 countries in Asia, Europe, N America
 - 8,422 cases, 916 deaths (case fatality risk = 11%)
 - **Some survivors has persistent shortness of breath, fatigue, reduced QoL, mental health problems up to 14 years later**
- **MERS** (Middle Eastern Respiratory Syndrome) emerged in Jeddah, Saudi Arabia in 2012, still circulating, with discrete outbreaks
 - 2,519 infections, 866 fatalities (CFR = 35%)
 - Similar persisting symptoms to SARS

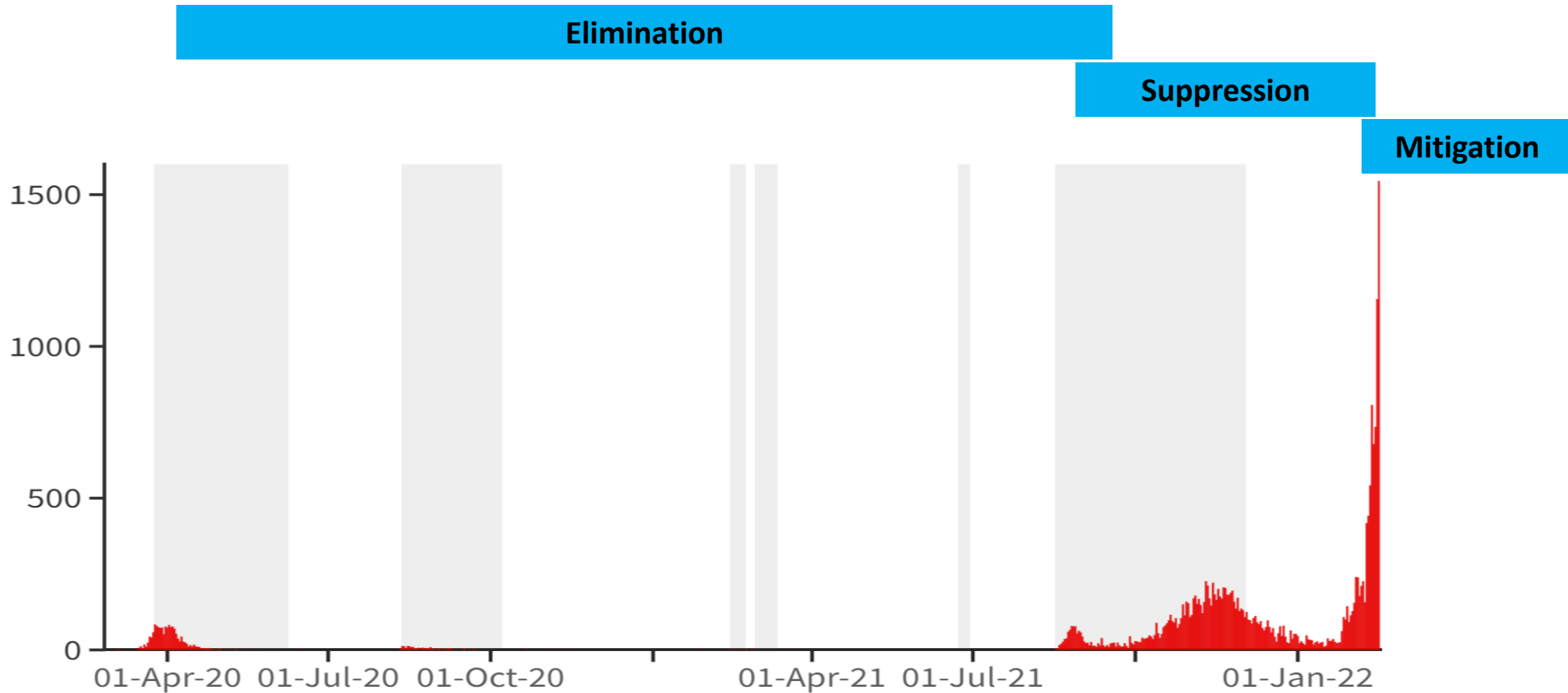
Long-term effects of Covid-19 infection

Covid-19 pandemic concerns:

- Increasing transmissibility & immune evasion from **Omicron variants**
→ **High infection & reinfection**
- No decline in severity (fatality risk) from original variant
- Many **unresolved questions** about post-acute effects, including:
 - Intensity and duration
 - Risk for children
 - Risk in reinfection
 - Protection from vaccination



Choosing a Response Strategy



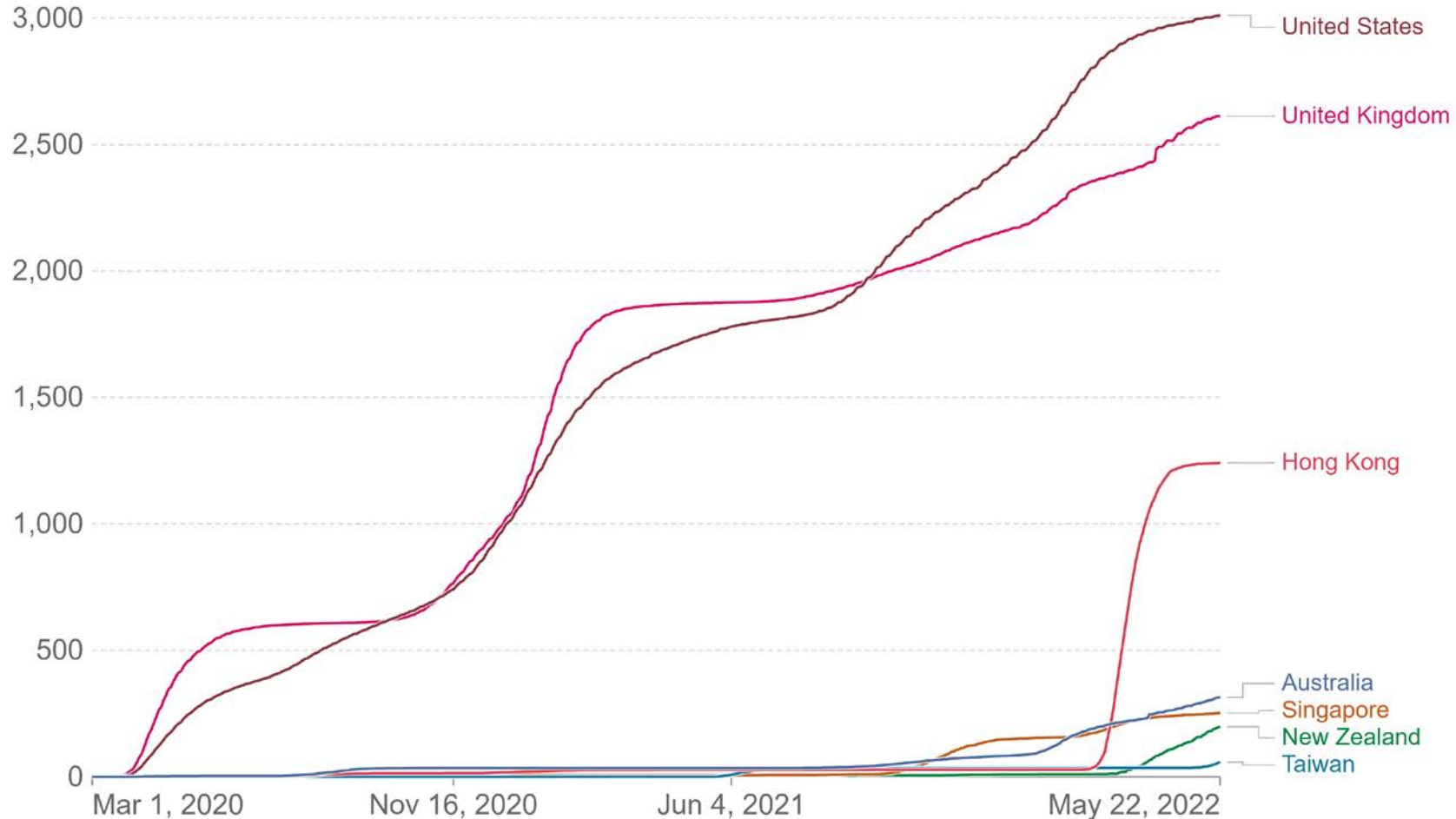
Source: [Ministry of Health](#) • This data is published on MoH website and differs from the 1pm announcements because they count different time periods

Chart by The Spinoff

Covid-19 deaths, Cumulative mortality rate

Cumulative confirmed COVID-19 deaths per million people

Due to varying protocols and challenges in the attribution of the cause of death, the number of confirmed deaths may not accurately represent the true number of deaths caused by COVID-19.

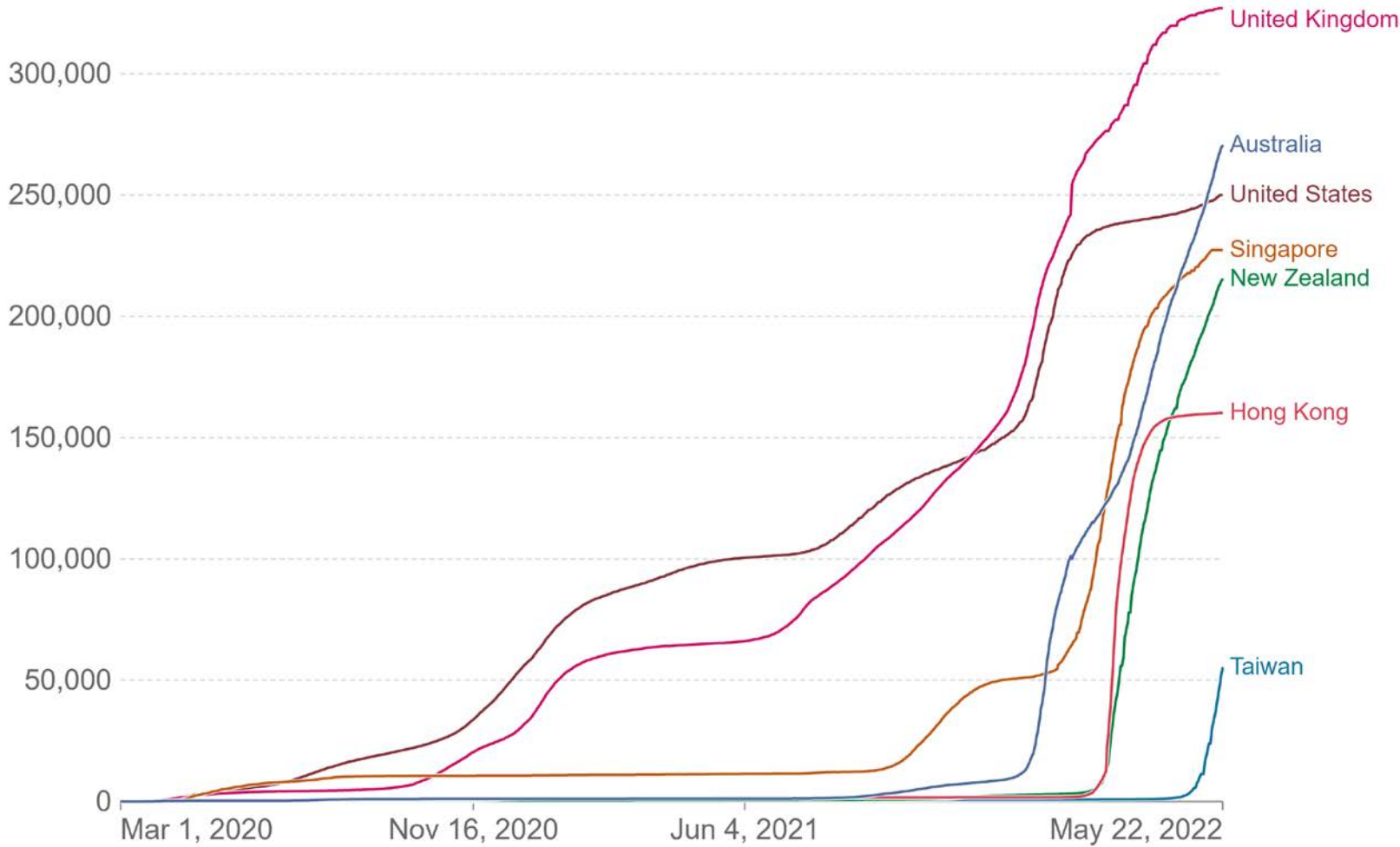


NZ 198 deaths /million

Covid-19 Cases, Cumulative infection rate

Cumulative confirmed COVID-19 cases per million people

Due to limited testing, the number of confirmed cases is lower than the true number of infections.



NZ 216,000 cases / million

Conclusions

Threat of long-term conditions (LTCs) / Non-Communicable Diseases (NCDs):

- Many/most IDs → LTCs / NCDs
- Post-Acute Infection Syndromes (PAISs) real but poorly understood
- Pandemic → ↑ impact because potentially infects majority of people
- SARS-CoV-2 pandemic has unusually large risk of LTCs/NCDs/PAISs

Response:

- ↓ Exposure to causative organisms, eg elimination / suppression strategies
- ↓ Consequences of exposure, eg vaccination, rapid treatment
- ↑ Treatment and rehabilitation, eg diagnosis, treatment, support
- ↑ Surveillance and research, eg NZ-based longitudinal studies

Acknowledgements

