



Office of the Prime Minister's Chief Science Advisor
Kaitohutohu Mātanga Pūtaiao Matua ki te Pirimia

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COVID-19: March Advice

Collated 1 April 2020



Office of the Prime Minister's Chief Science Advisor
Kaitohutohu Mātanga Pūtaiao Matua ki te Pirimia

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12th March 2020

Dear Jacinda

As discussed, this note has been prepared under urgency and covers my view on the likelihood of importing cases of COVID-19 into NZ, to support a decision about border closures. It does not comment on wider issues, such as the costs of border shut downs to the economy, as I am not qualified to assess these.

Key points:

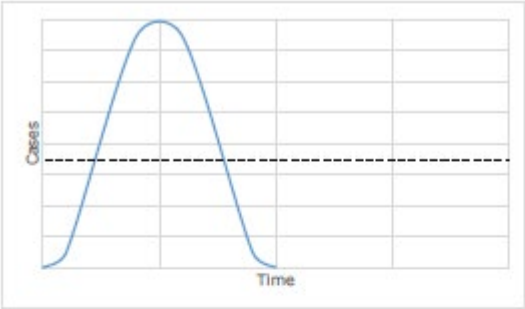
1. *We are in a highly uncertain and rapidly changing global situation.*
2. ***It is well understood that border controls delay epidemics and do not prevent them;*** for this reason there are different views on the merits of border closures amongst experts – and much is dependent on the local context. The WHO does not recommend them.
3. Being an island nation makes border control more practical.
4. Being the gateway to the Pacific adds particular context.
5. *There is no guarantee that we do not already have additional imported cases;* however, each ship or plane that arrives increases the chance of more cases, at an ever increasing rate as numbers climb globally.
6. Until now, we have relied on reducing importation of cases through managing 'hotspots'. The number of 'hotspots' is now sufficiently large that this is becoming unmanageable, with rapid escalation in most reporting countries, and unknown spread in countries where testing has not yet been established to produce comprehensive data.
7. This raises the question of whether more comprehensive border closures have merit.
8. The attached graphic illustrates the logic behind attempting to delay a rapid influx of new cases of COVID-19.
9. It builds on the 'flatten the curve' diagram discussed in the previous Cabinet paper, the first two parts of which illustrate a strategy that is being rapidly replicated around the globe.
 - The first figure shows that a rapid surge in cases may quickly overwhelm the health system capacity.
 - The second figure illustrates the global goal of slowing down the epidemic and 'flattening the curve' in order to avoid unnecessary deaths due to system overload.
 - The third figure posits that by delaying the number of cases entering the country we can enhance the health system capacity enabling further slow down the epidemic, increasing the chance of reducing system overload.

10. Infectious disease experts who support border closure (see 2) have for some time been raising the escalating risk of an epidemic in the USA, which is now manifesting in a sudden surge in cases, which may be the tip of an iceberg; simultaneously, we have a sudden surge in many countries in Europe.
11. If we wish to pursue the 'keep it out' strategy, it is argued by those who believe in delay by use of border controls that we need to urgently reduce the number of passengers from the US, Europe and perhaps all other countries that have not controlled the disease to give us a better chance of controlling the virus when it arrives.
- 12. *The merit of this idea hinges on whether the health system capacity could be significantly improved during the time the border was shut.***
13. In particular, whether this gives a window to increase capacity to handle an increase in cases and (from the TAG paper):
 - a. Vigorously contact trace by scaling up capacity
 - b. Train additional health workforce
 - c. Scale up public messaging
 - d. Scale up all direct resources.
14. The first of these – contact tracing - has been shown to be vital for flattening the curve to slow down the epidemic in countries that have some success in doing this.
15. I am not an expert in public health. My understanding from the recent table top exercises and discussions with the CSA for the Ministry of Health is that there are plans to scale these workforces as far as is practicable, but that a sudden importation of cases would be a challenge at the present time.

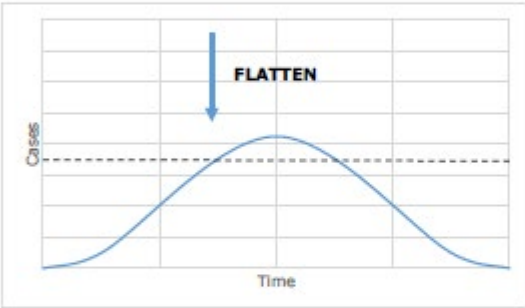
I trust this is useful to the Cabinet's deliberations.

Yours faithfully

Juliet



Health system capacity



Health system capacity



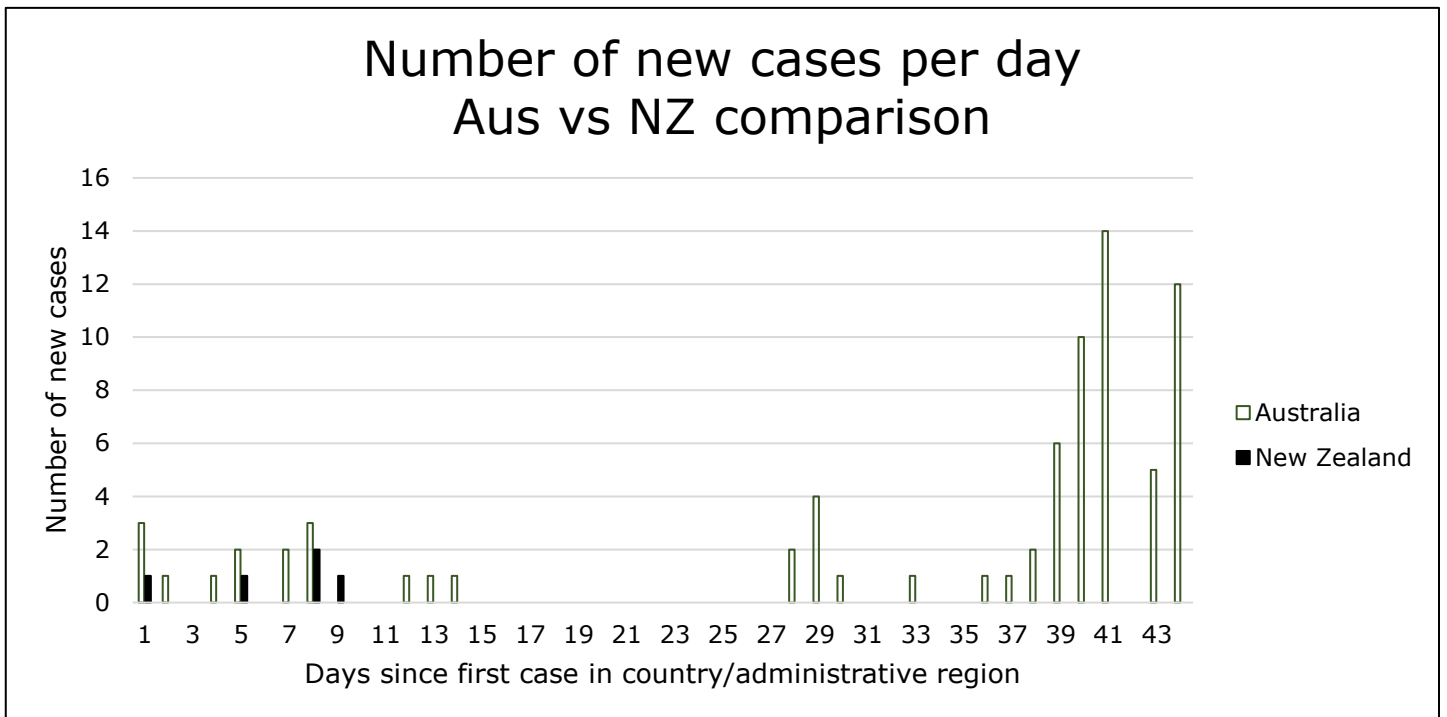
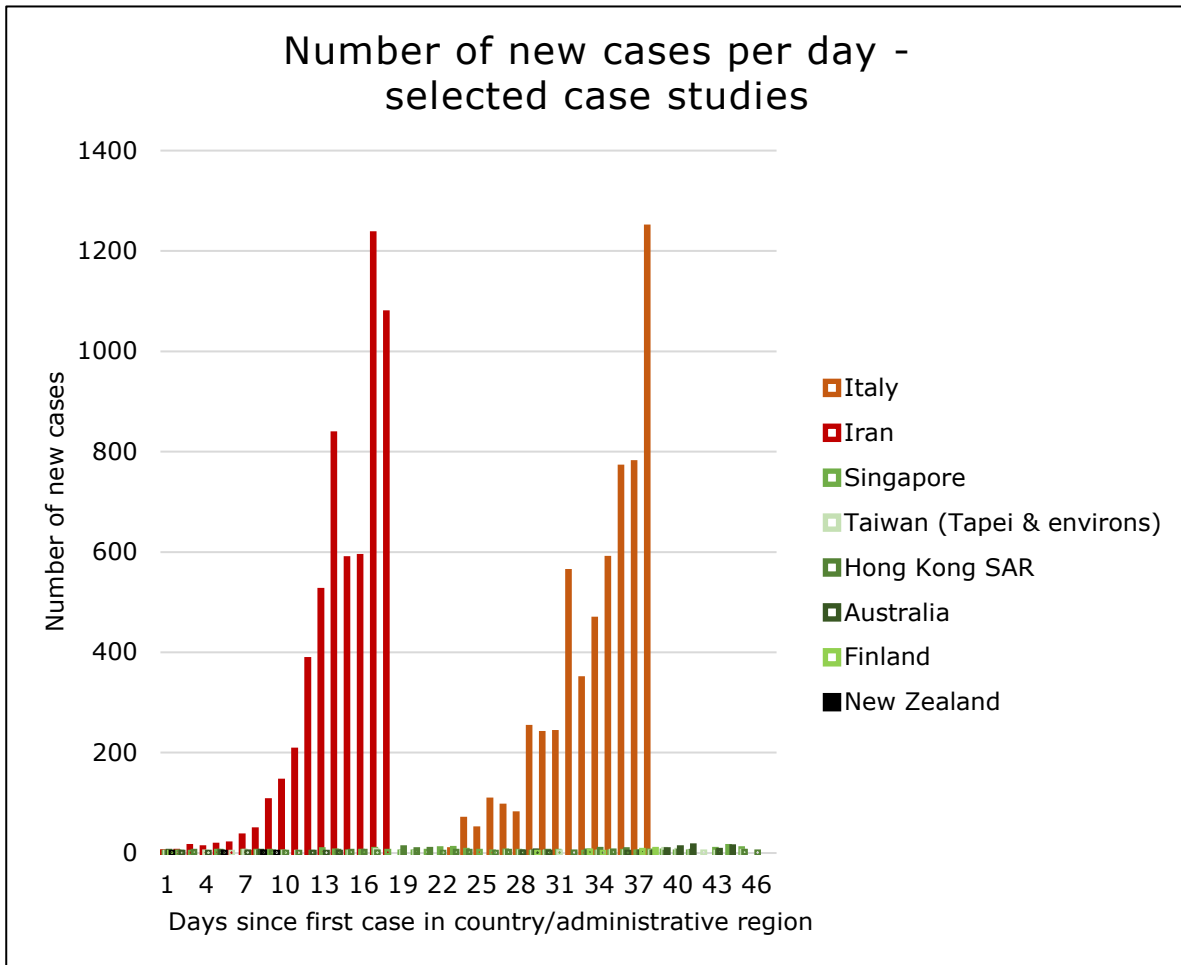
Health system capacity

COVID-19: Charts provided to support verbal advice

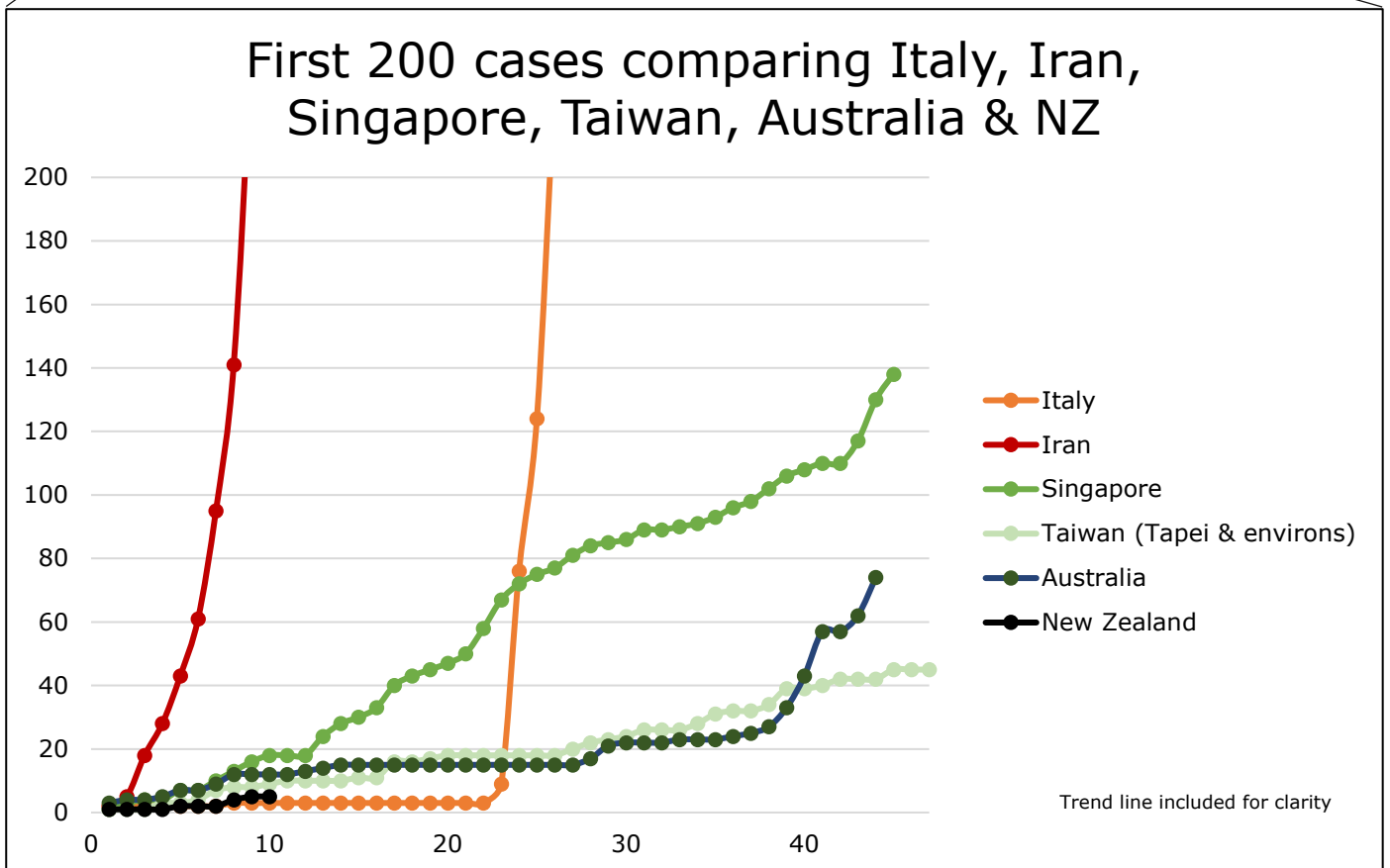
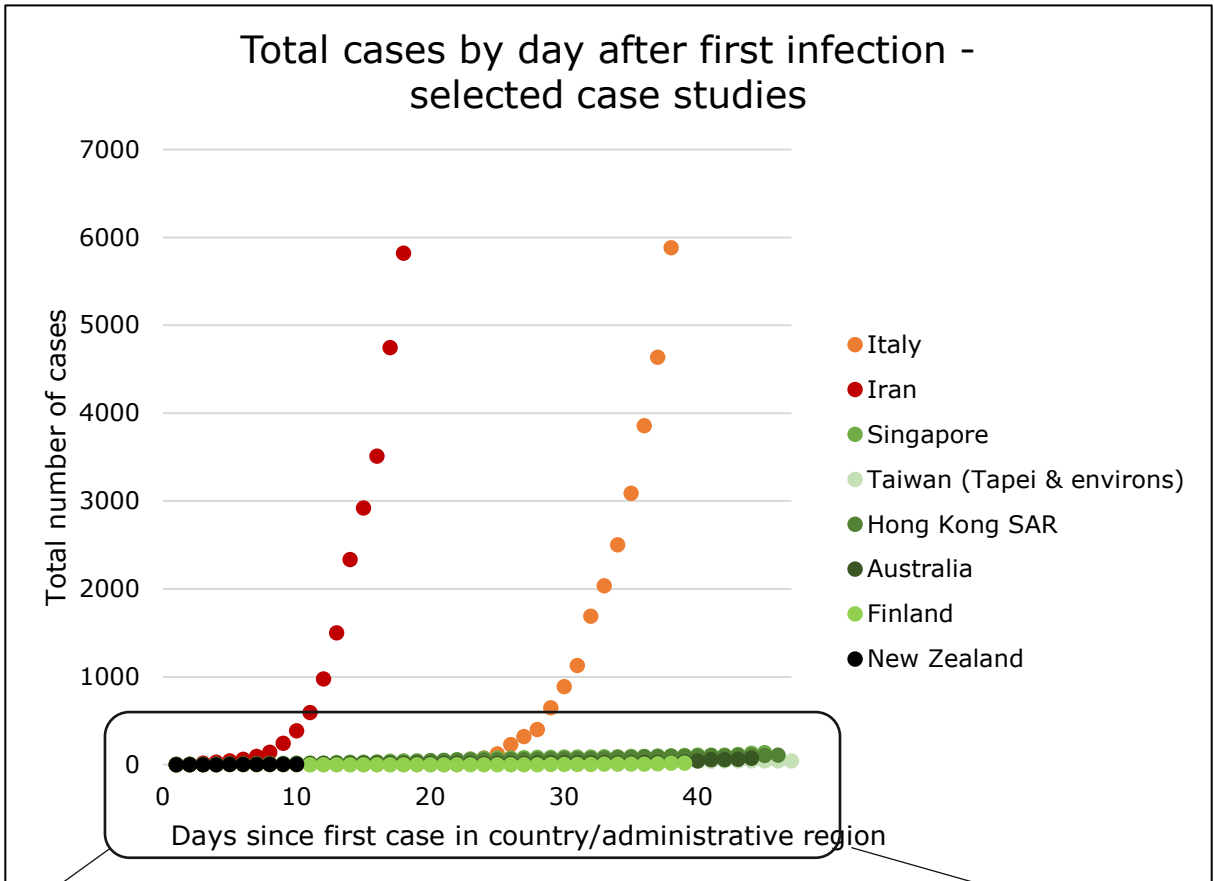
Collated 1 April 2020

For further information and context, [listen to an interview Juliet gave on RNZ's Checkpoint](#) discussing measures to curb the rate of COVID-19 transmission in Aotearoa New Zealand.

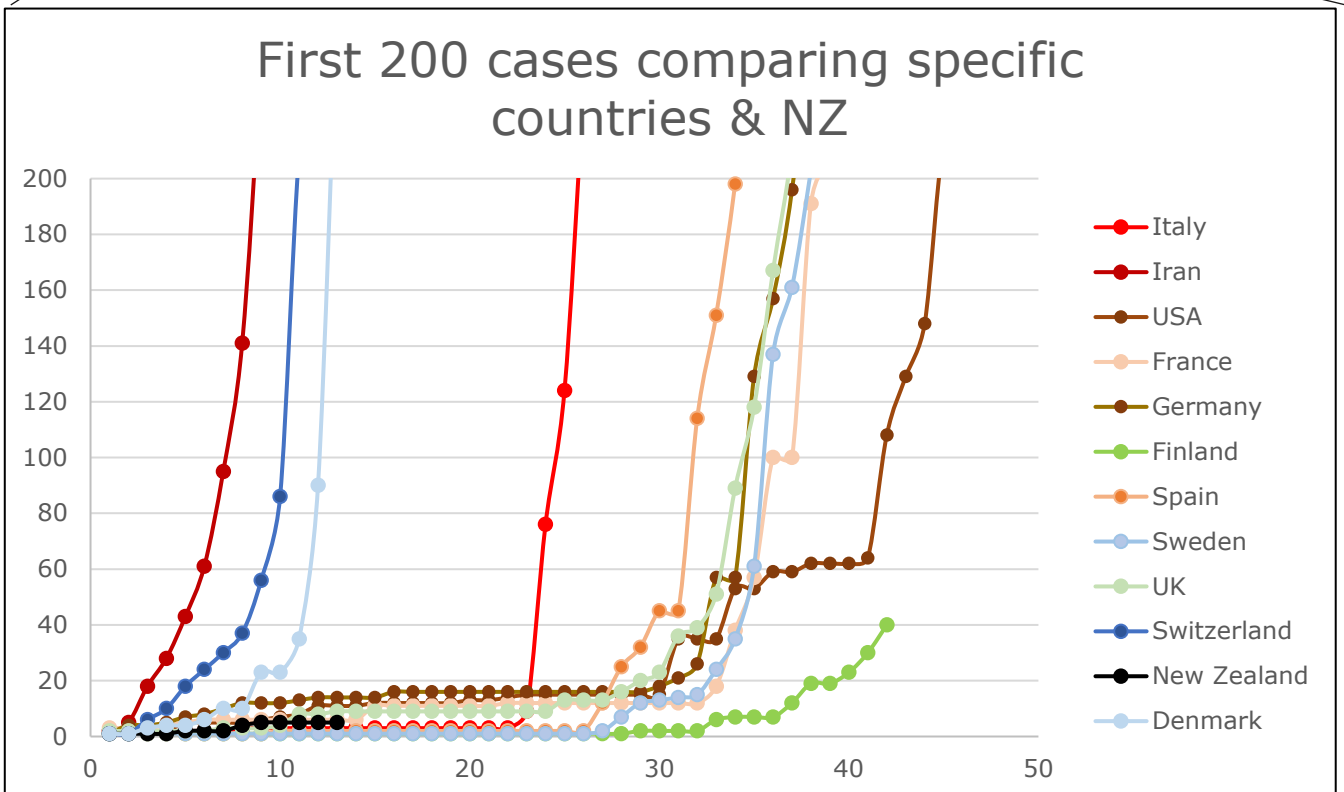
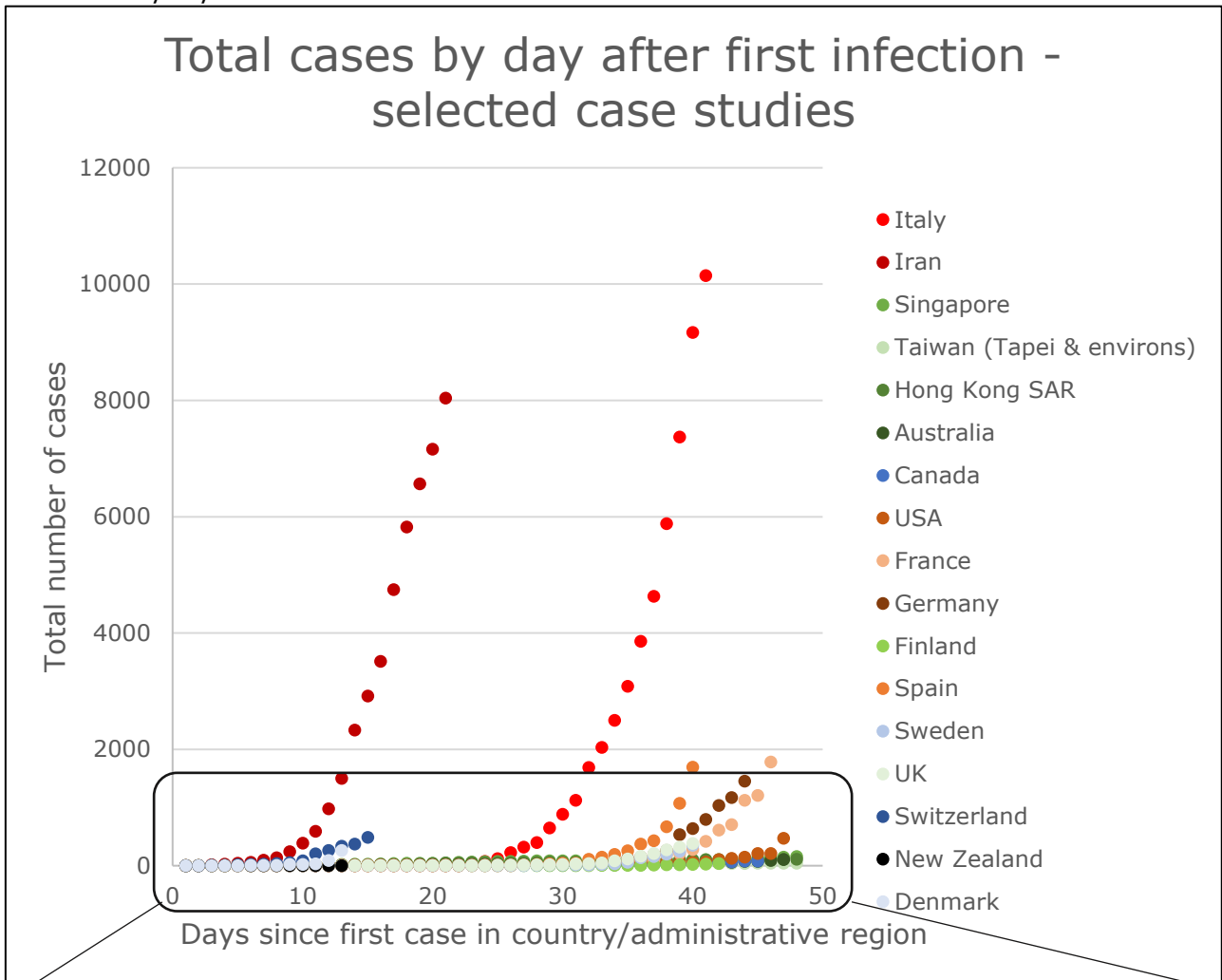
Charts provided 10/03/2020

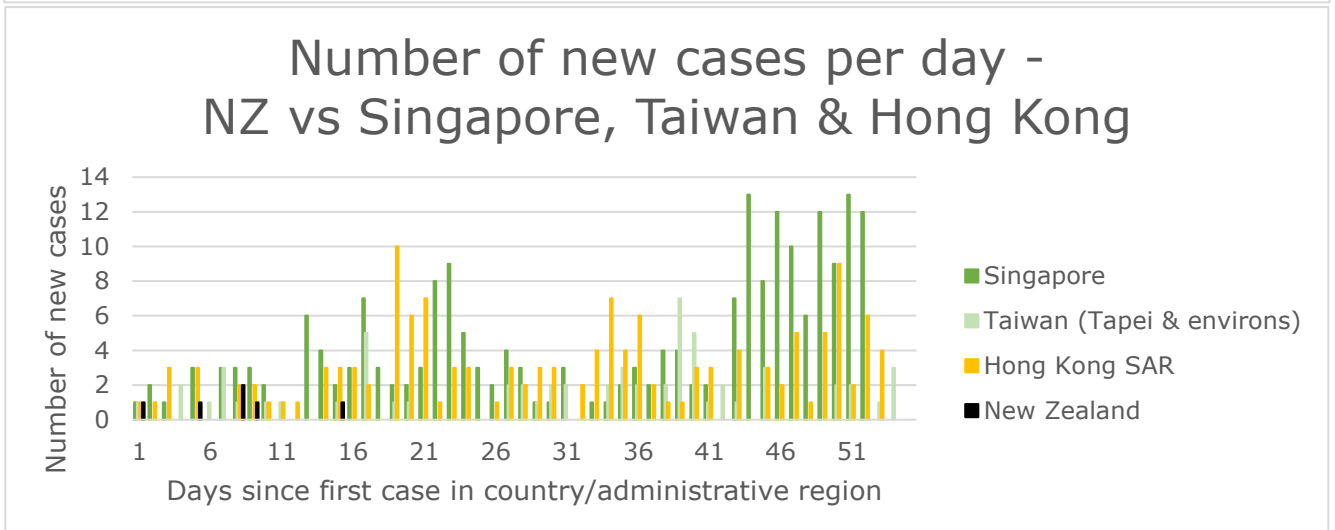
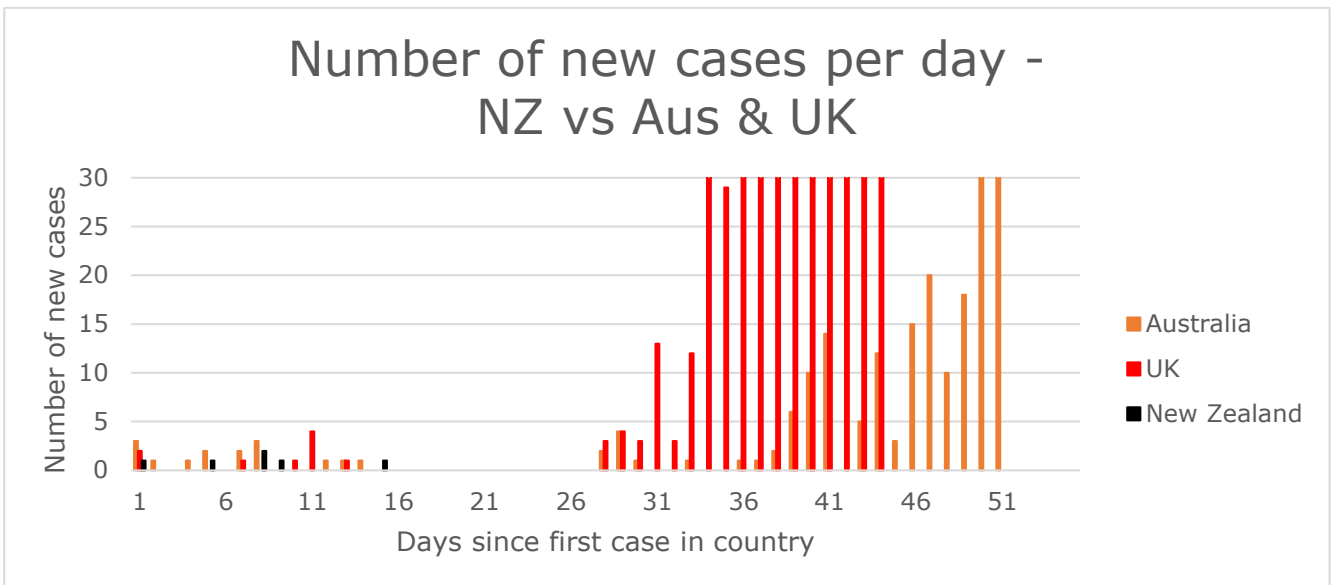
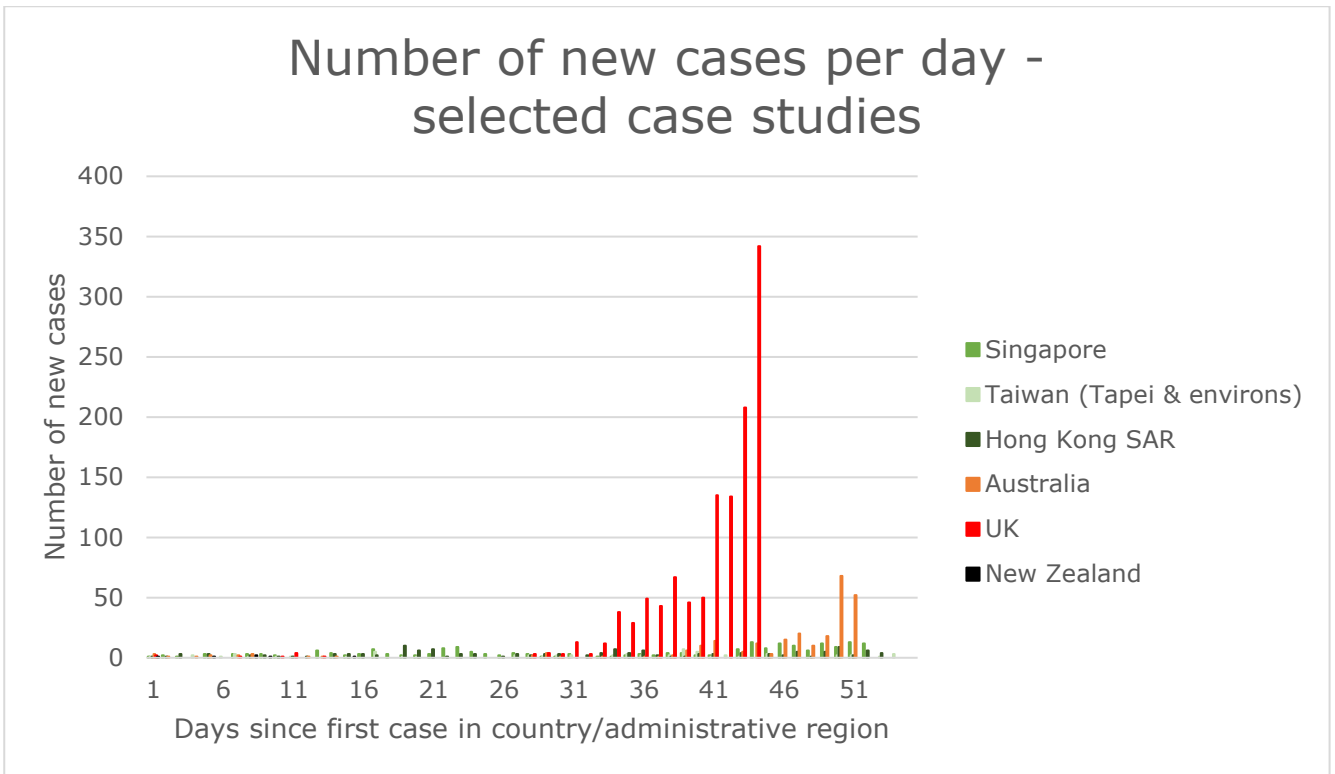


Charts provided 10/03/2020



Charts 12/03/2020





Singapore 212 confirmed cases, 0 deaths

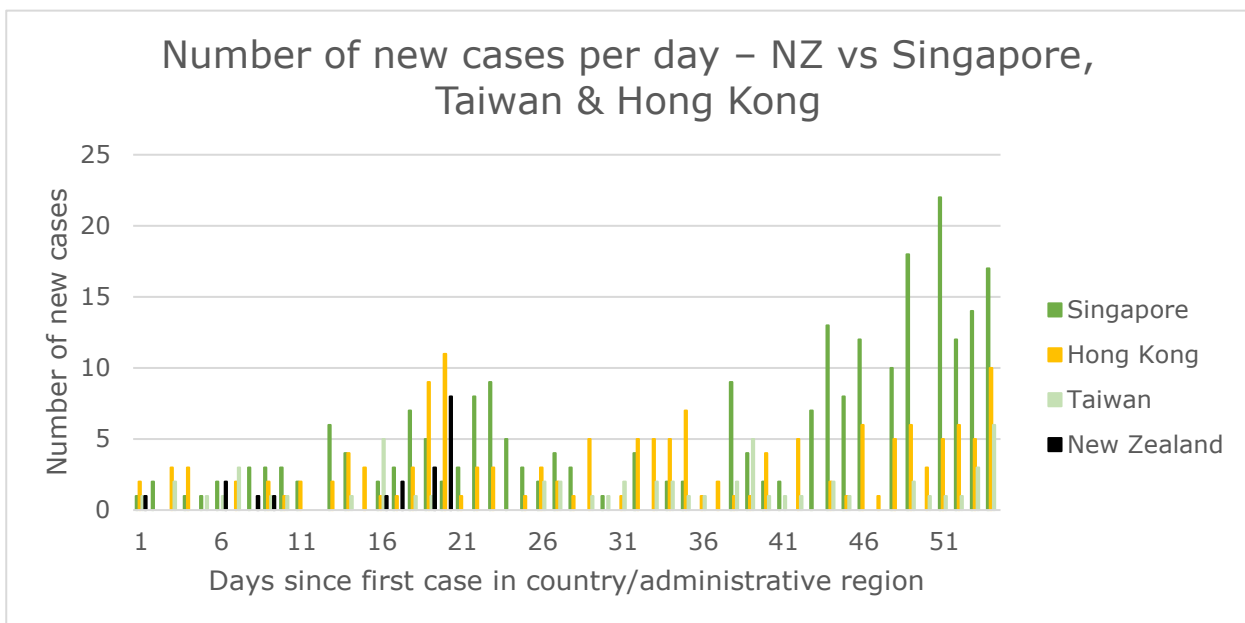
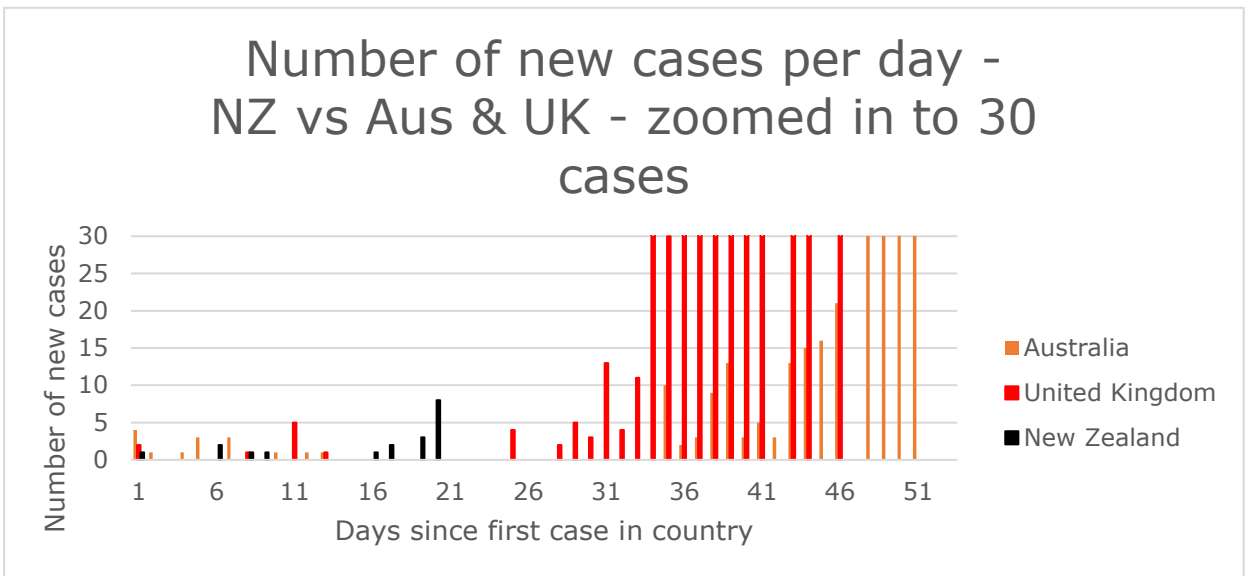
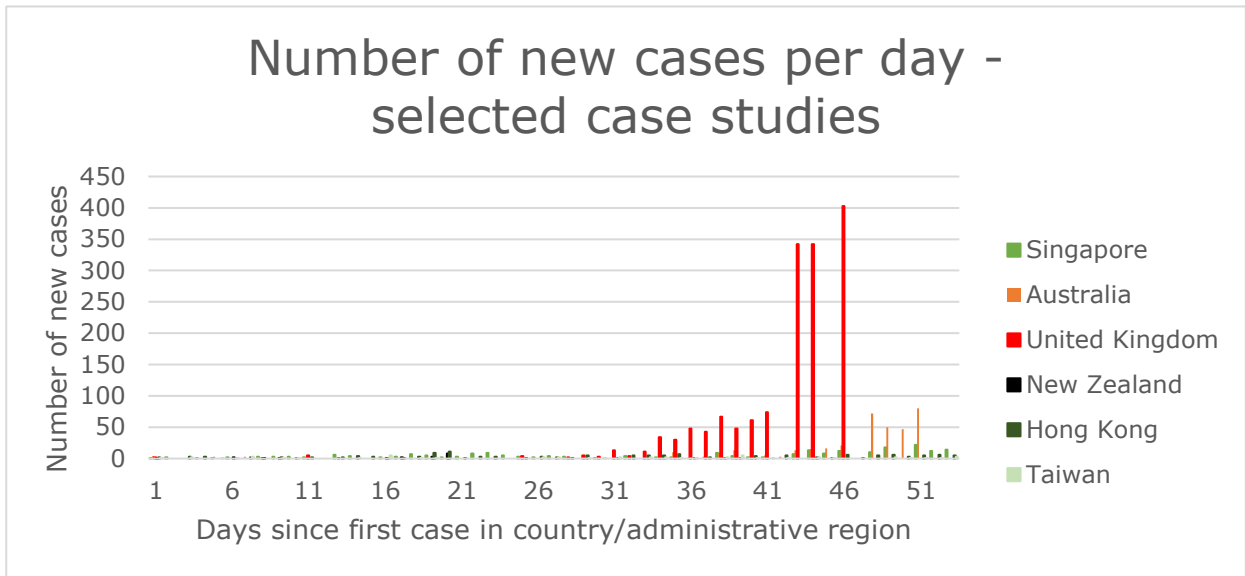
Australia 249 confirmed cases, 3 deaths

Taiwan 53 confirmed cases, 1 death

UK 1144 confirmed cases, 21 deaths

Hong Kong 141 confirmed cases, 4 deaths

NZ 6 confirmed cases, 0 deaths



Singapore: 243 confirmed cases, 0 deaths

Australia: 377 confirmed cases, 3 deaths

Taiwan: 67 confirmed cases, 1 death

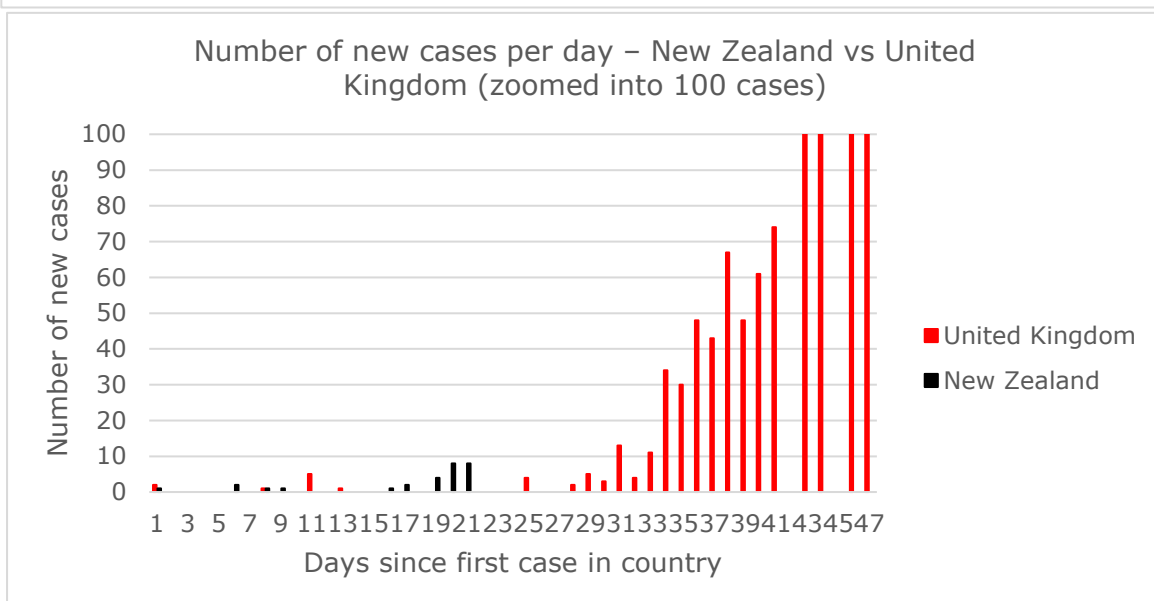
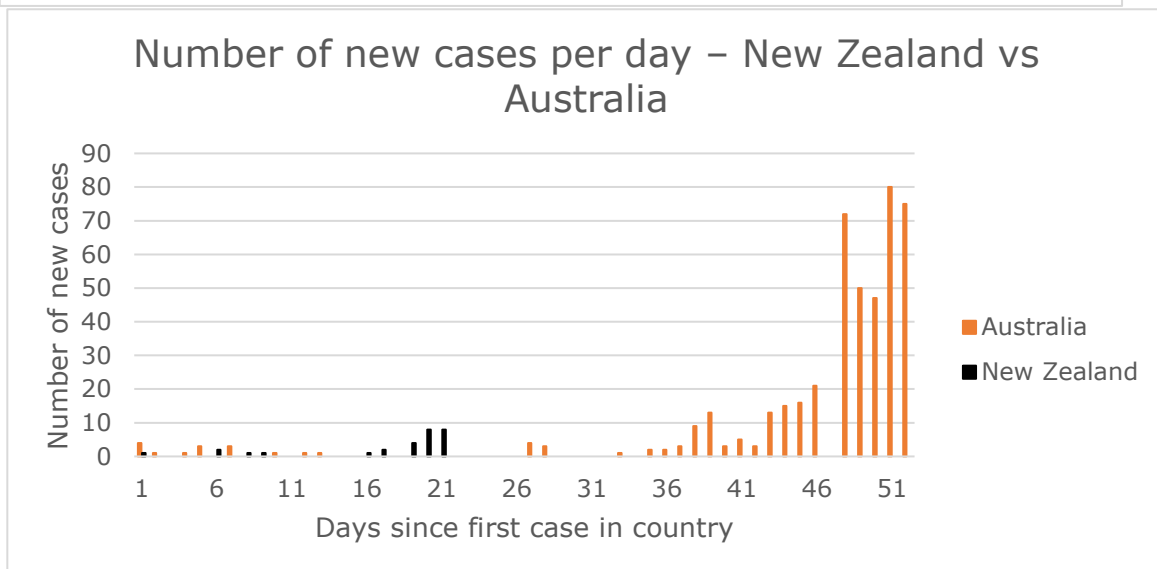
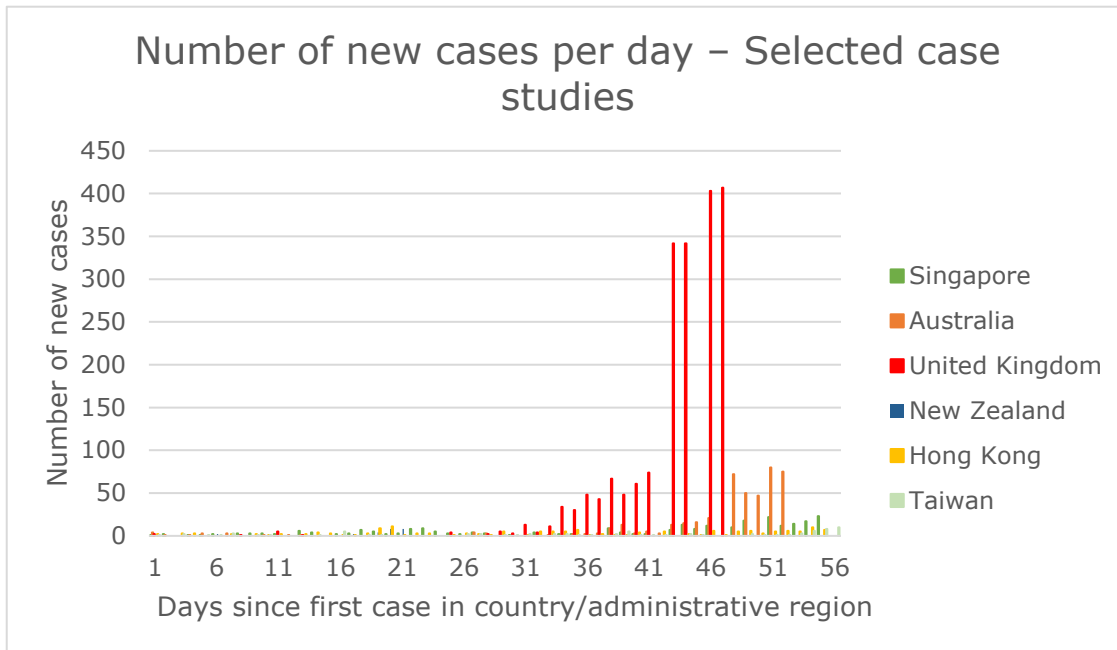
UK: 1543 confirmed cases, 55 deaths

Hong Kong: 155 confirmed cases, 4 deaths

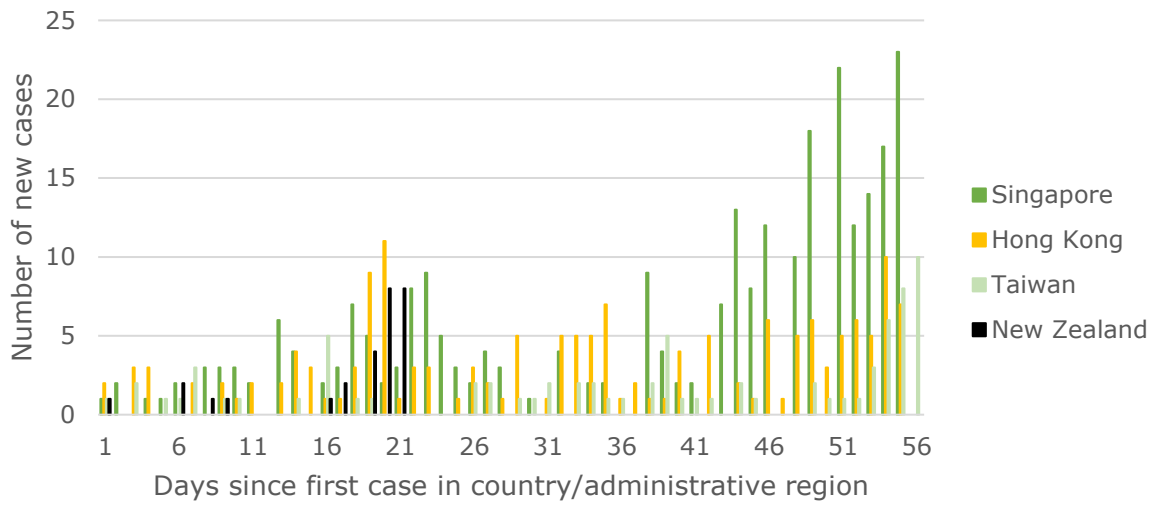
NZ: 20 confirmed cases, 0 deaths (to 18 March 2020)

Charts 19/03/2020

Data up to 17 March 2020 from Johns Hopkins University (<https://github.com/CSSEGISandData/COVID-19>)



Number of new cases per day – NZ vs Singapore, Taiwan & Hong Kong



Note: United Kingdom data excludes the UK territories of Gibraltar, Channel Islands and Cayman Islands.

Singapore: 266 confirmed cases, 0 deaths
(population 5.8 million)

Australia: 452 confirmed cases, 5 deaths
(population 25.5 million)

Taiwan: 77 confirmed cases, 1 death
(population 23.8 million)

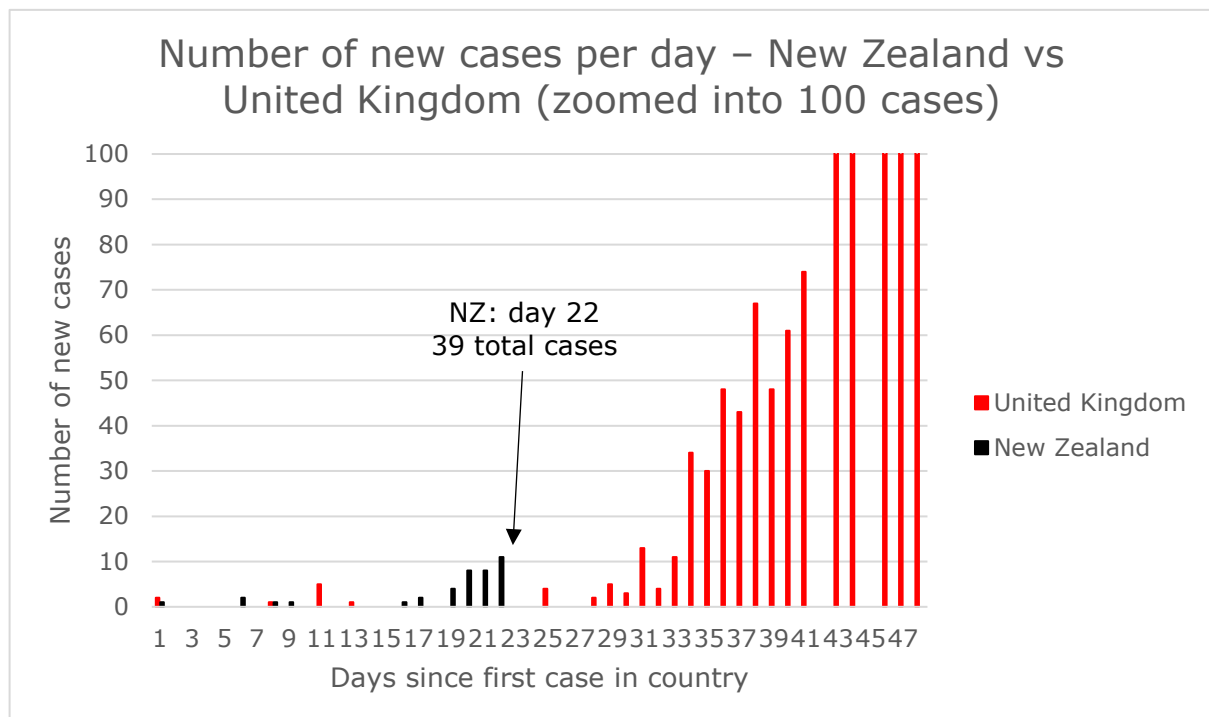
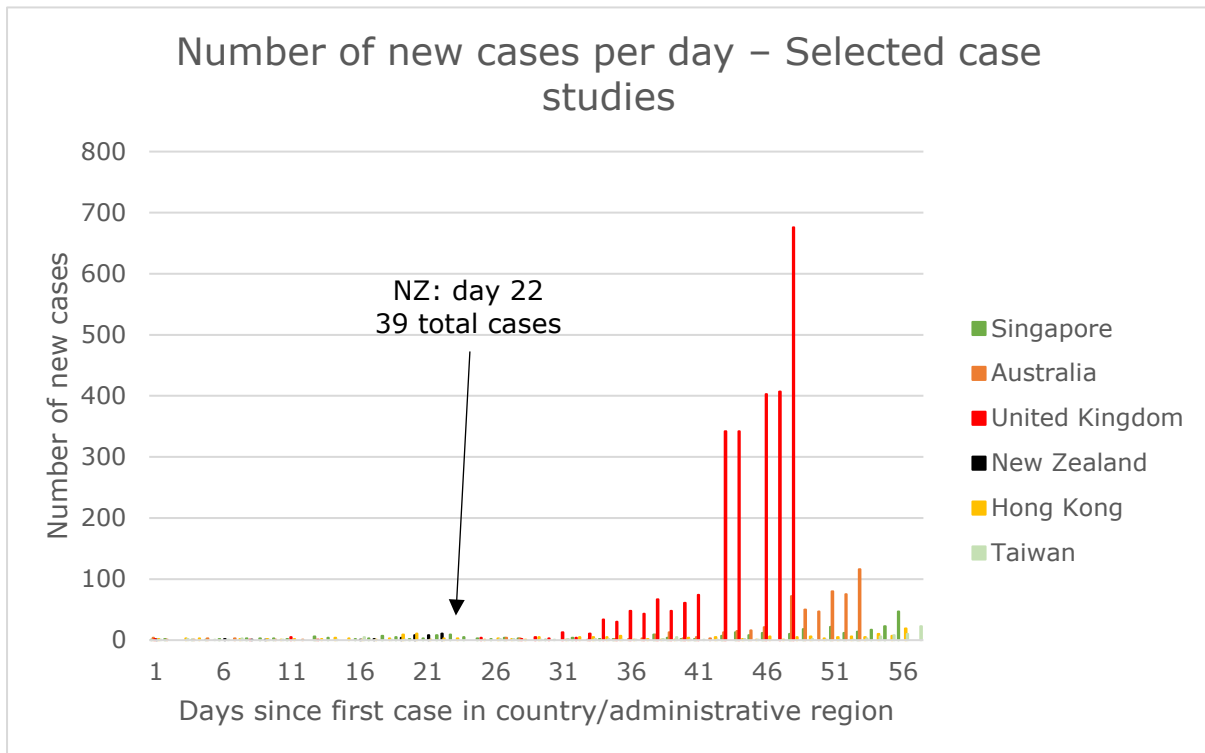
UK: 1950 confirmed cases, 55 deaths
(population 67.8 million)

Hong Kong: 162 confirmed cases, 4 deaths
(population 7.5 million)

NZ (data to 19 March): 28 confirmed cases,
0 deaths
(population 4.8 million)

Charts 20/03/2020

Data up to 18 March 2020 from Johns Hopkins University (<https://github.com/CSSEGISandData/COVID-19>)



Singapore: 313 confirmed cases, 0 deaths
(population 5.8 million)

Taiwan: 100 confirmed cases, 1 death
(population 23.8 million)

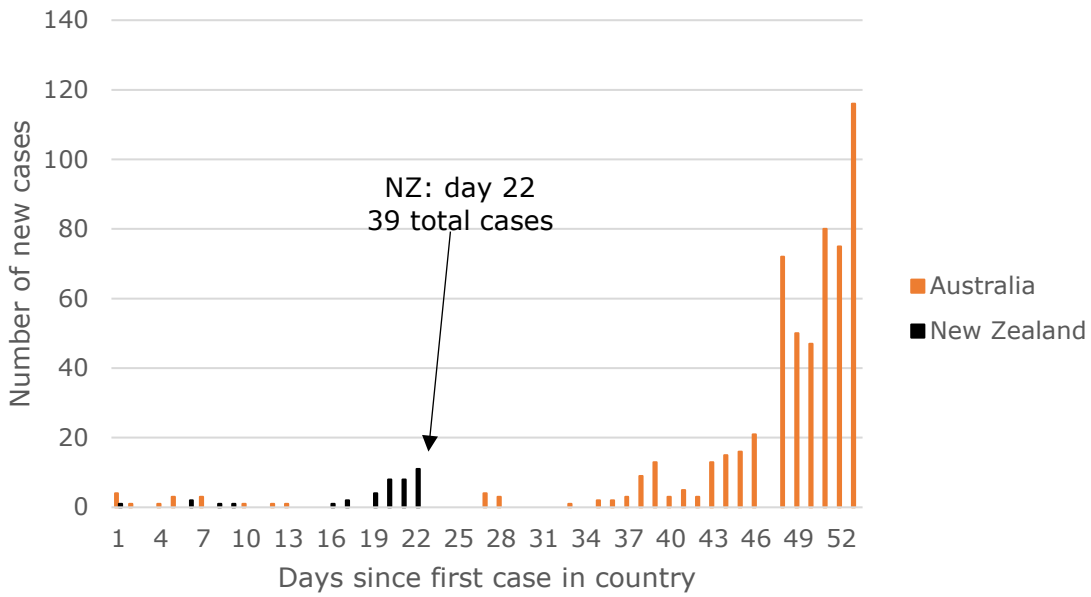
Hong Kong: 181 confirmed cases, 4 deaths
(population 7.5 million)

Australia: 568 confirmed cases, 6 deaths
(population 25.5 million)

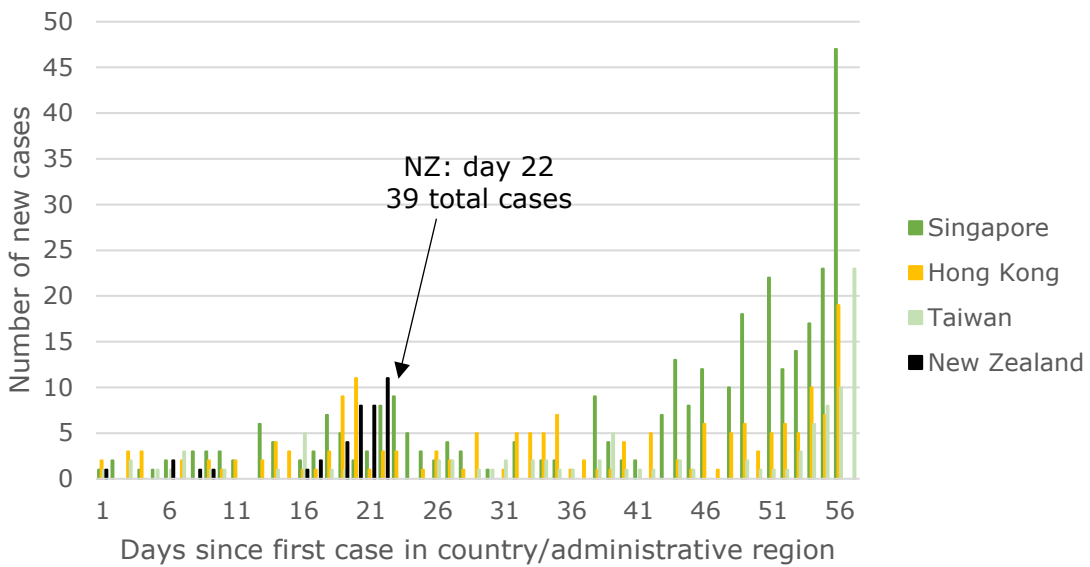
UK: 2626 confirmed cases, 71 deaths
(population 67.8 million)

NZ (data to 20 March): 39 confirmed cases,
0 deaths
(population 4.8 million)

Number of new cases per day – New Zealand vs Australia

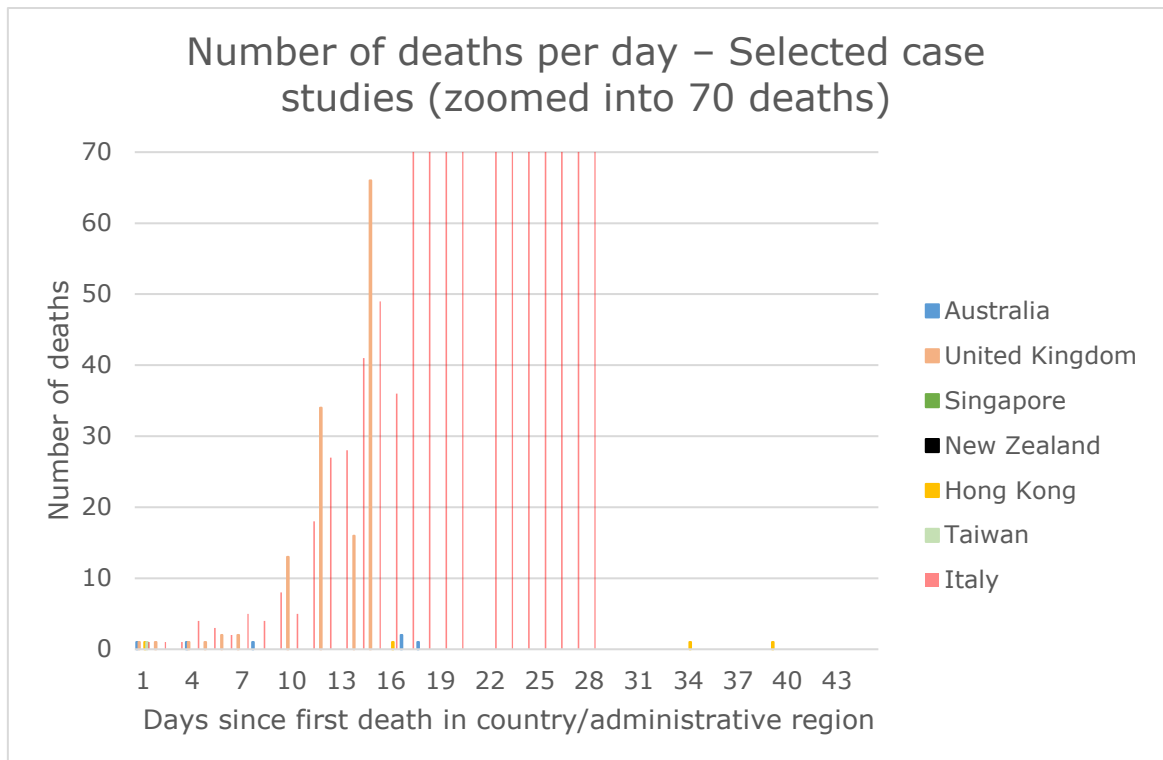
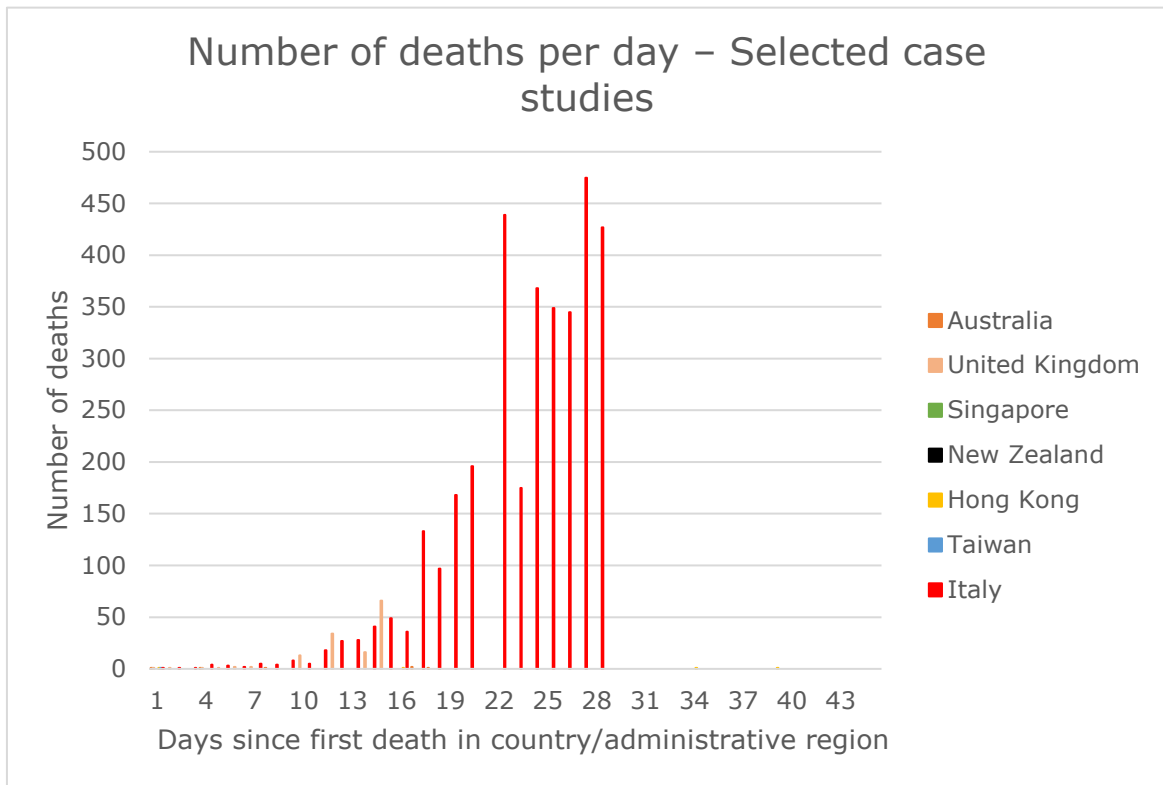


Number of new cases per day – NZ vs Singapore, Taiwan & Hong Kong



Charts 20/03/2020

Data up to 19 March 2020 from Johns Hopkins University (<https://github.com/CSSEGISandData/COVID-19>)



Singapore: 345 confirmed cases, 0 deaths (population 5.8 million)

Taiwan: 108 confirmed cases, 1 death (population 23.8 million)

Hong Kong: 208 confirmed cases, 4 deaths (population 7.5 million)

NZ (data to 20 March): 39 confirmed cases, 0 deaths (population 4.8 million)

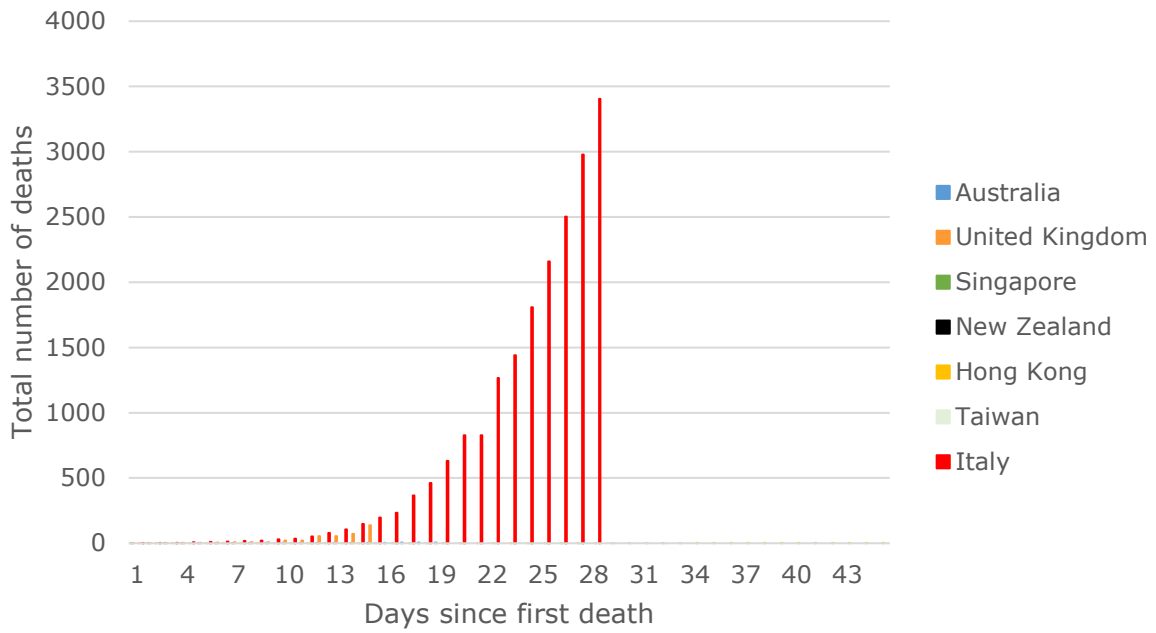
Australia: 681 confirmed cases, 6 deaths (population 25.5 million)

Italy: 41,035 confirmed cases, 3405 deaths (population 60.5 million)

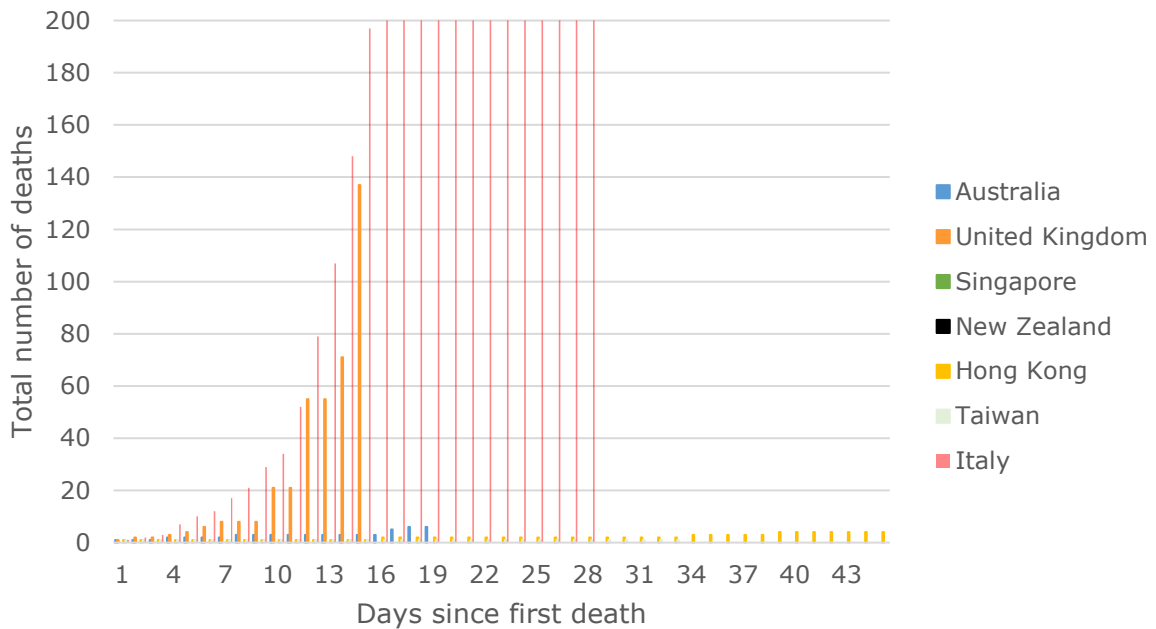
UK: 2689 confirmed cases, 137 deaths (population 67.8 million)

Note: United Kingdom data does not include offshore British territories Gibraltar, the Channel Islands or the Cayman Islands.

Cumulative deaths over time – Selected case studies



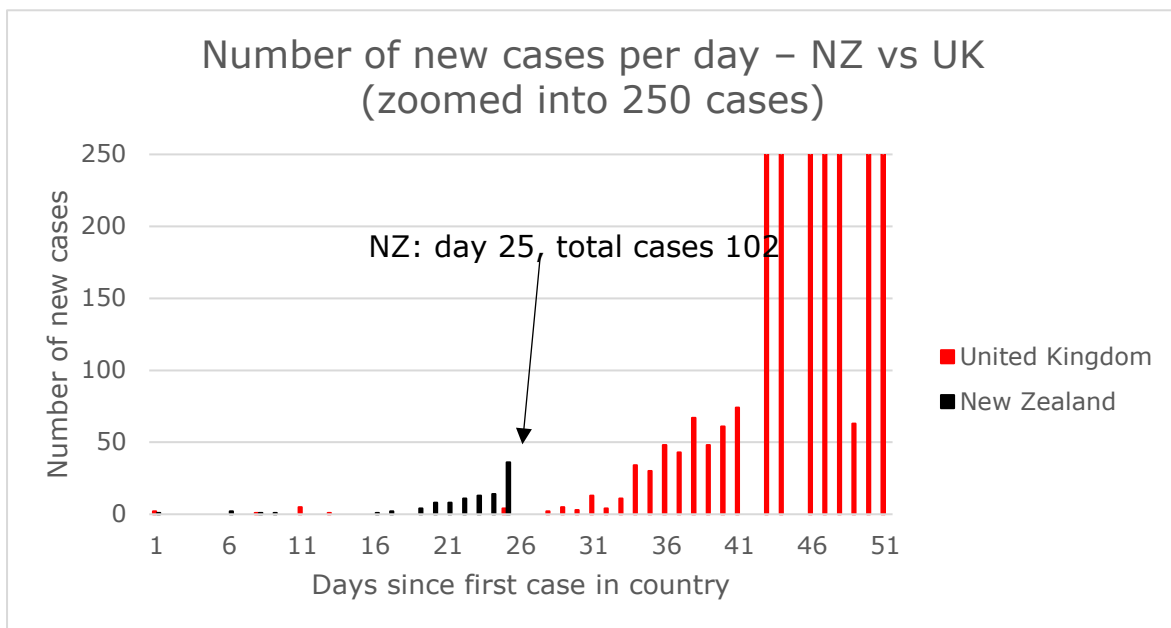
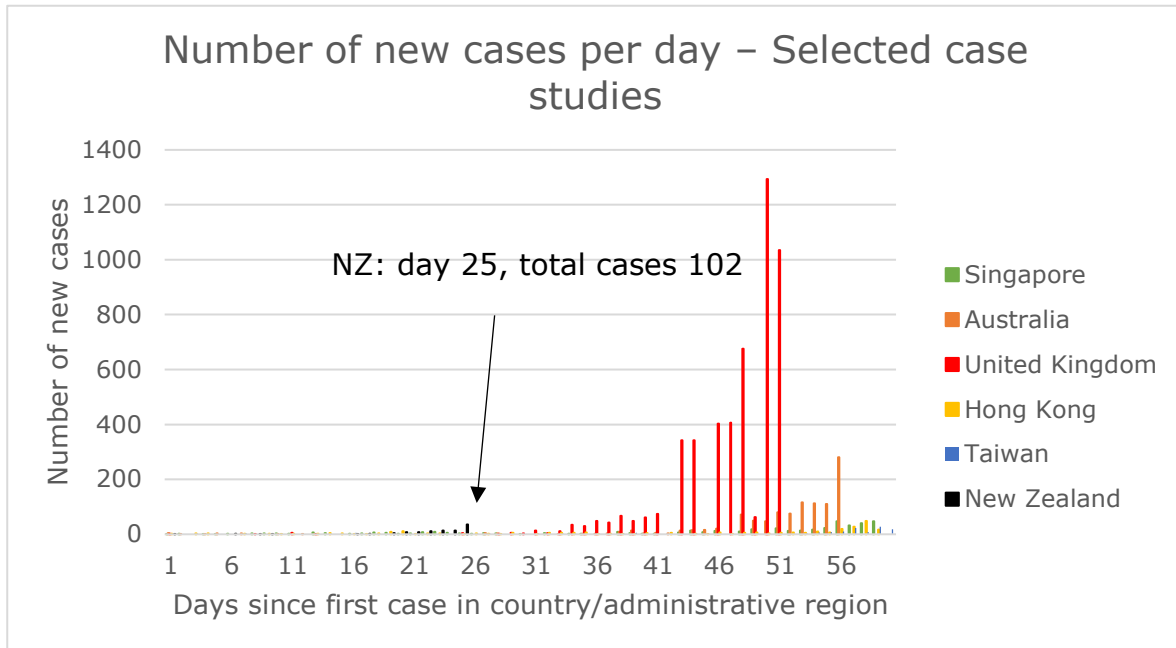
Cumulative deaths over time – Selected case studies (zoomed into 200 deaths)



Charts 23/03/2020

Data up to 21 March 2020 from Johns Hopkins University (<https://github.com/CSSEGISandData/COVID-19>)

Note: United Kingdom data excludes the UK territories of Gibraltar, Channel Islands and Cayman Islands.



Singapore: 432 confirmed cases, 2 deaths (population 5.8 million)

Taiwan: 153 confirmed cases, 2 deaths (population 23.8 million)

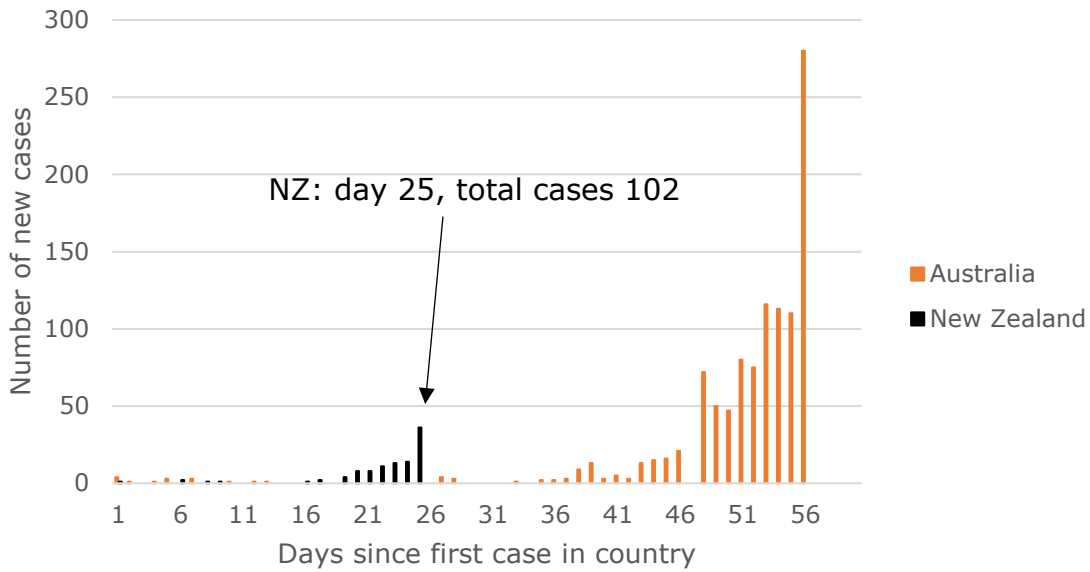
Hong Kong: 273 confirmed cases, 4 deaths (population 7.5 million)

Australia: 1071 confirmed cases, 7 deaths (population 25.5 million)

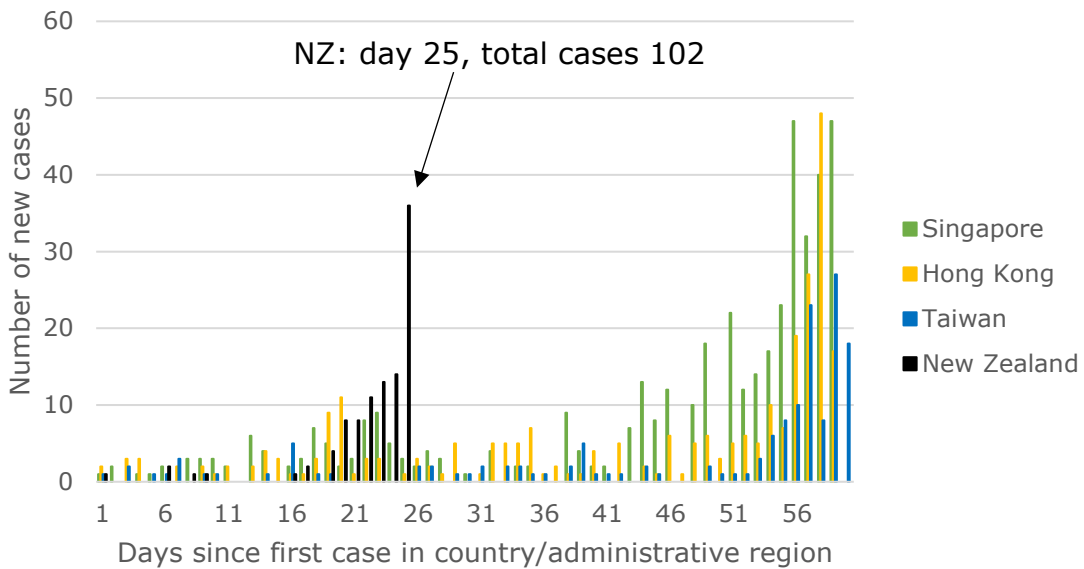
UK: 5018 confirmed cases, 233 deaths (population 67.8 million)

NZ (data to 23 March): 102 confirmed cases, 0 deaths (population 4.8 million)

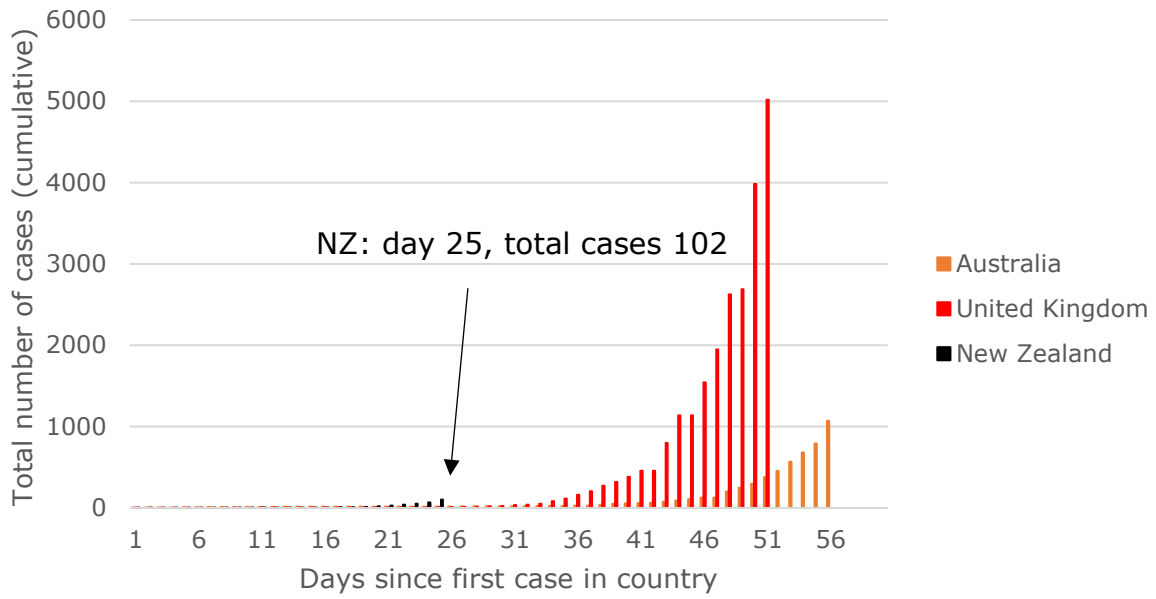
Number of new cases per day – NZ vs Australia



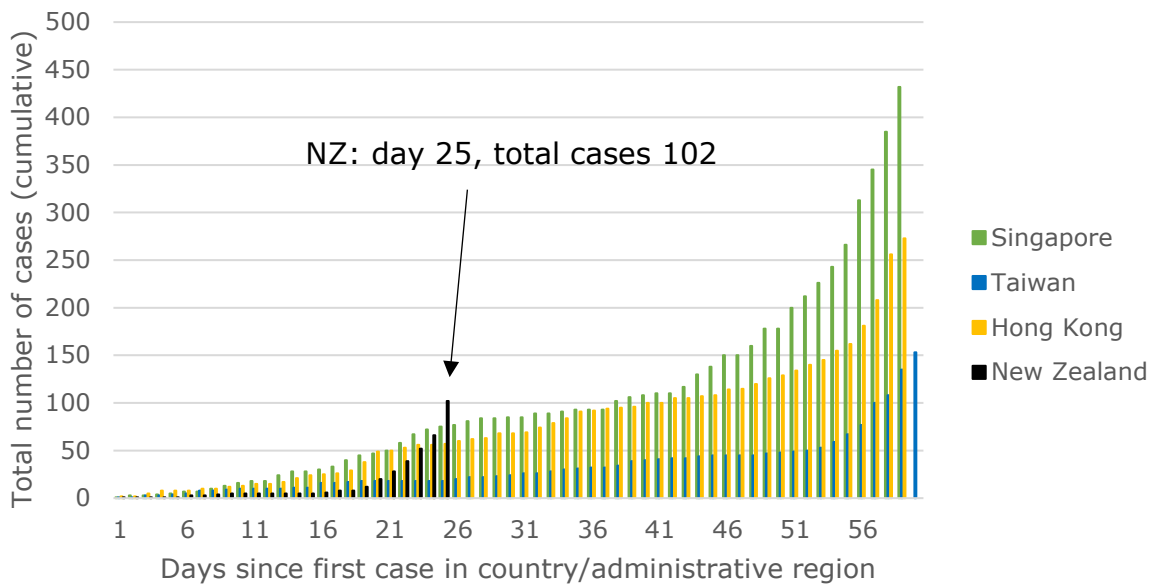
Number of new cases per day – NZ vs Singapore, Hong Kong & Taiwan



Total cases over time – NZ vs UK & Australia



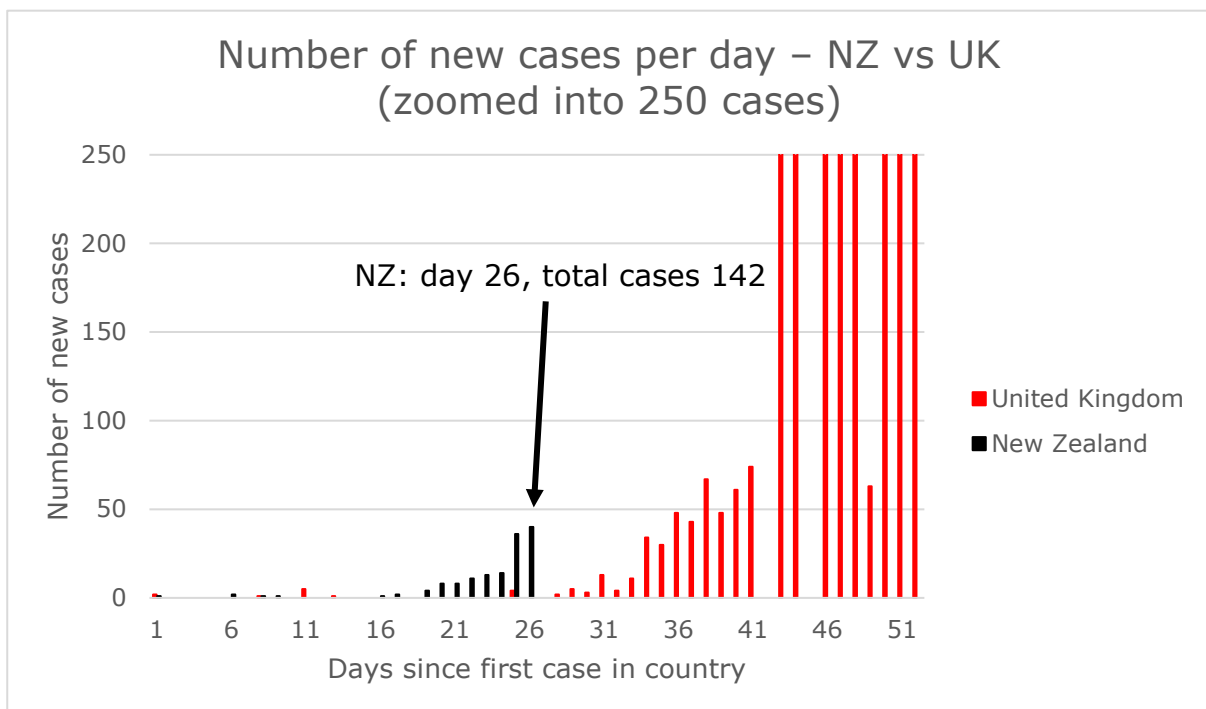
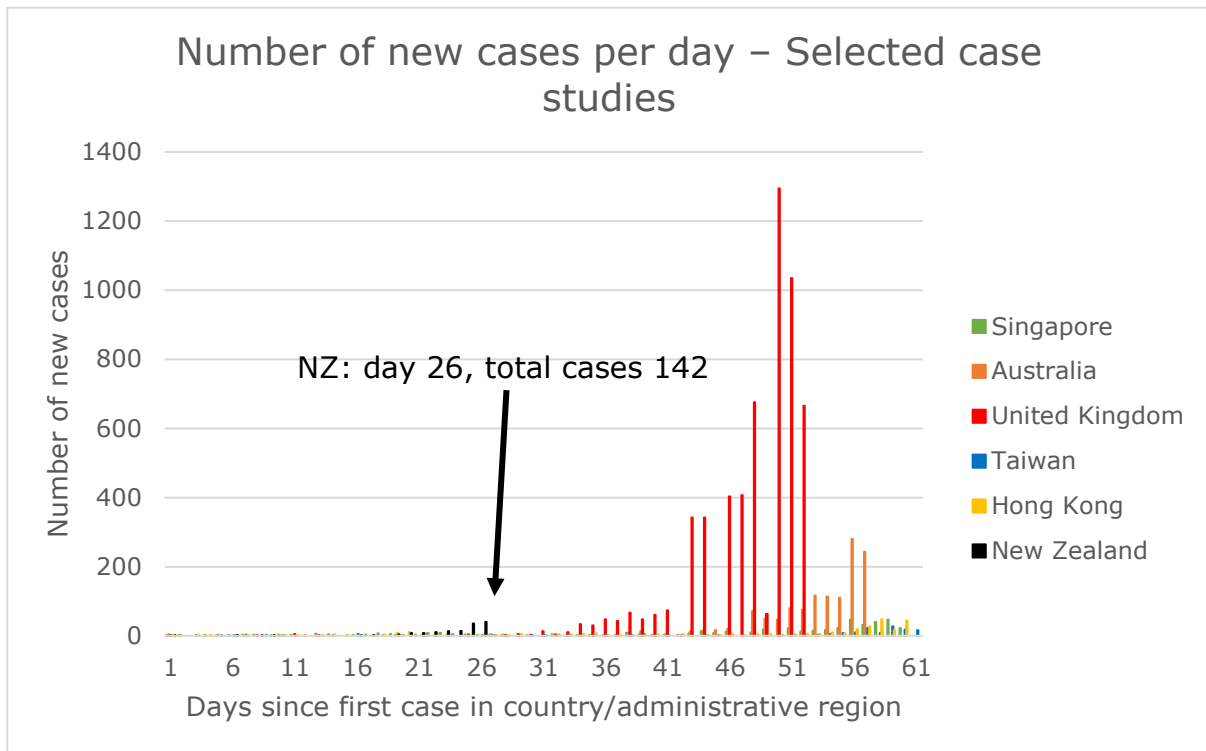
Total cases over time – NZ vs Singapore, Taiwan & Hong Kong



Charts 24/03/2020

Data up to 22 March 2020 from Johns Hopkins University (<https://github.com/CSSEGISandData/COVID-19>)

Note: United Kingdom data excludes the UK territories of Gibraltar, Channel Islands and Cayman Islands.



Singapore: 455 confirmed cases, 2 deaths (population 5.8 million)

Taiwan: 169 confirmed cases, 2 deaths (population 23.8 million)

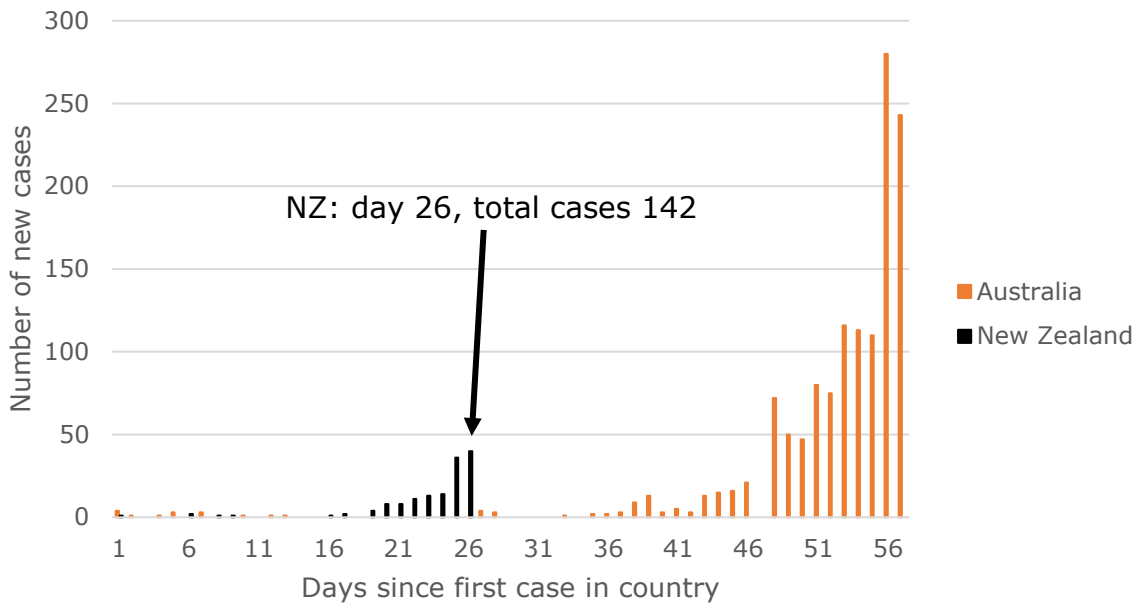
Hong Kong: 317 confirmed cases, 4 deaths (population 7.5 million)

Australia: 1314 confirmed cases, 7 deaths (population 25.5 million)

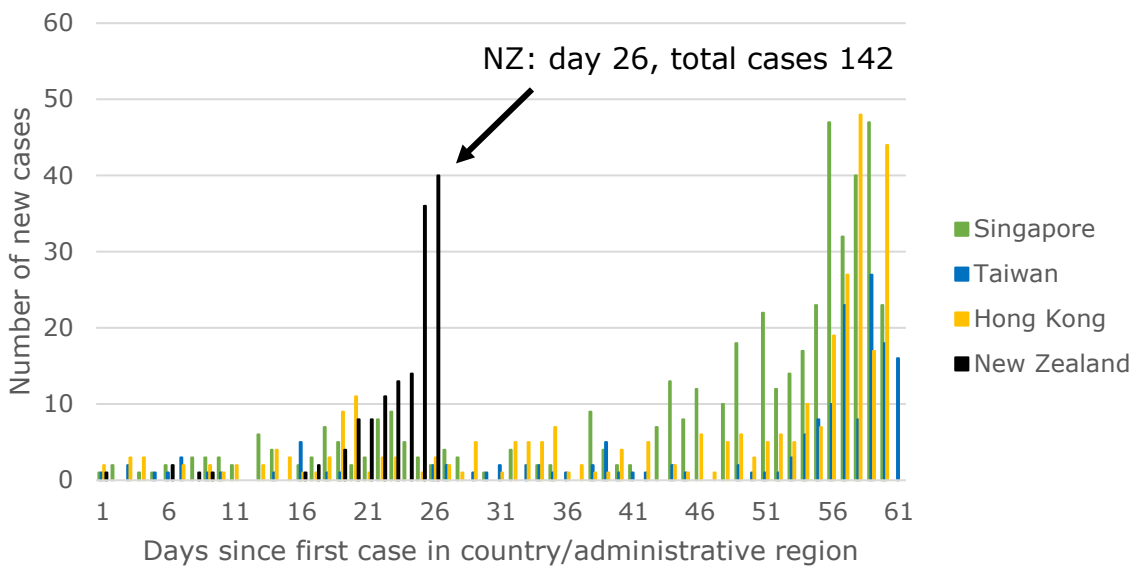
UK: 5683 confirmed cases, 281 deaths (population 67.8 million)

NZ (data to 24 March): 142 confirmed cases, 0 deaths (population 4.8 million)

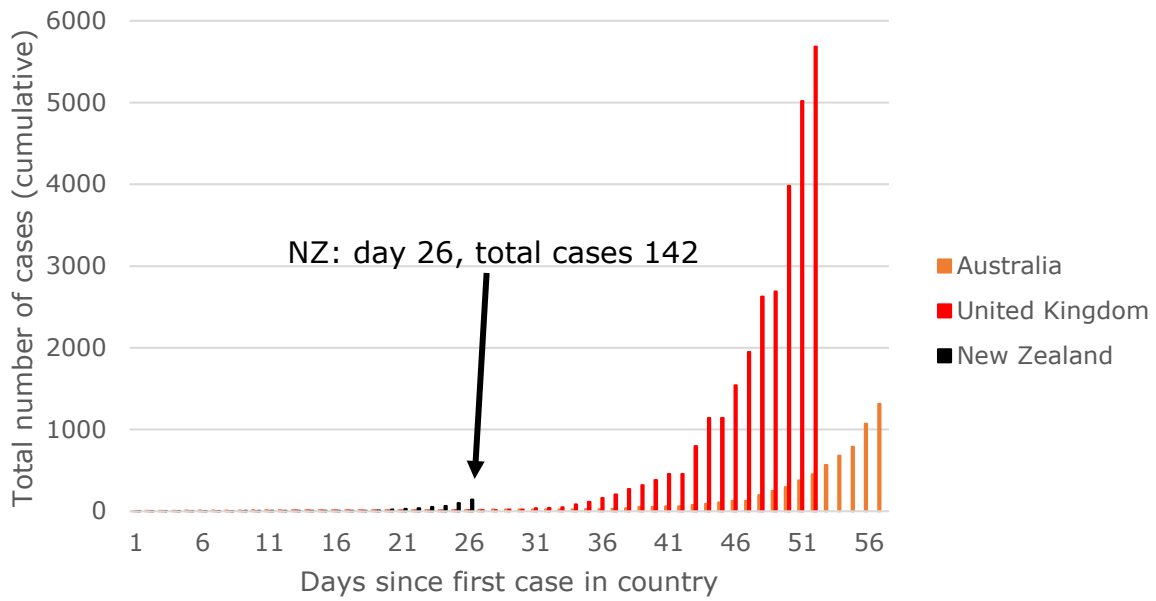
Number of new cases per day – NZ vs Australia



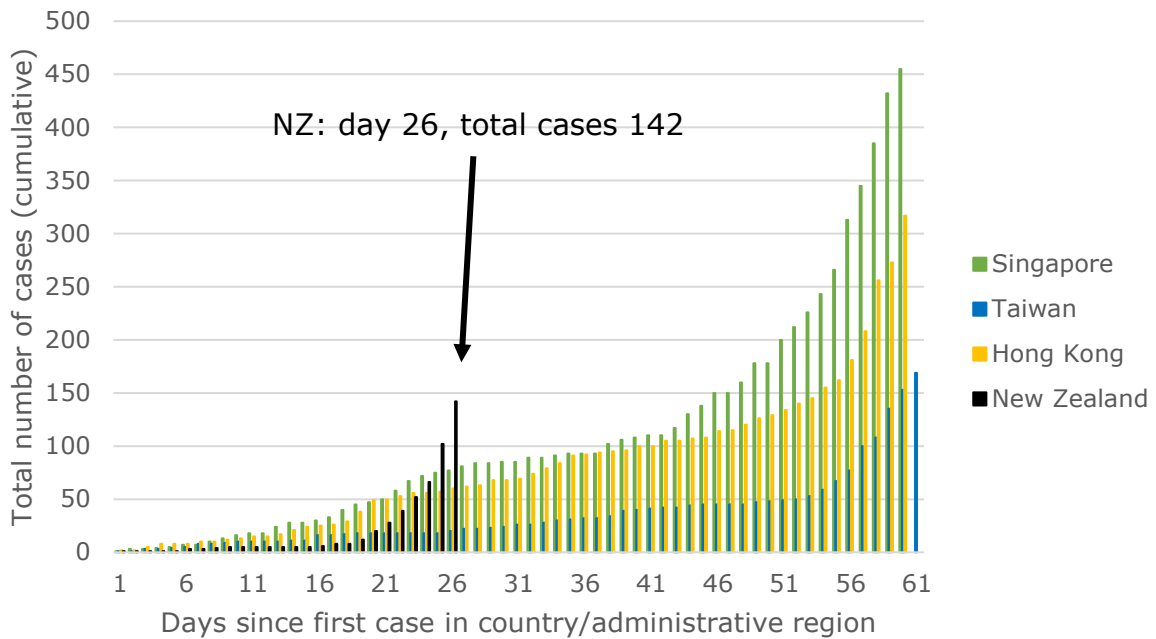
Number of new cases per day – NZ vs Singapore, Taiwan & Hong Kong



Total cases over time – NZ vs Australia & UK



Total cases over time – NZ vs Singapore, Taiwan & Hong Kong

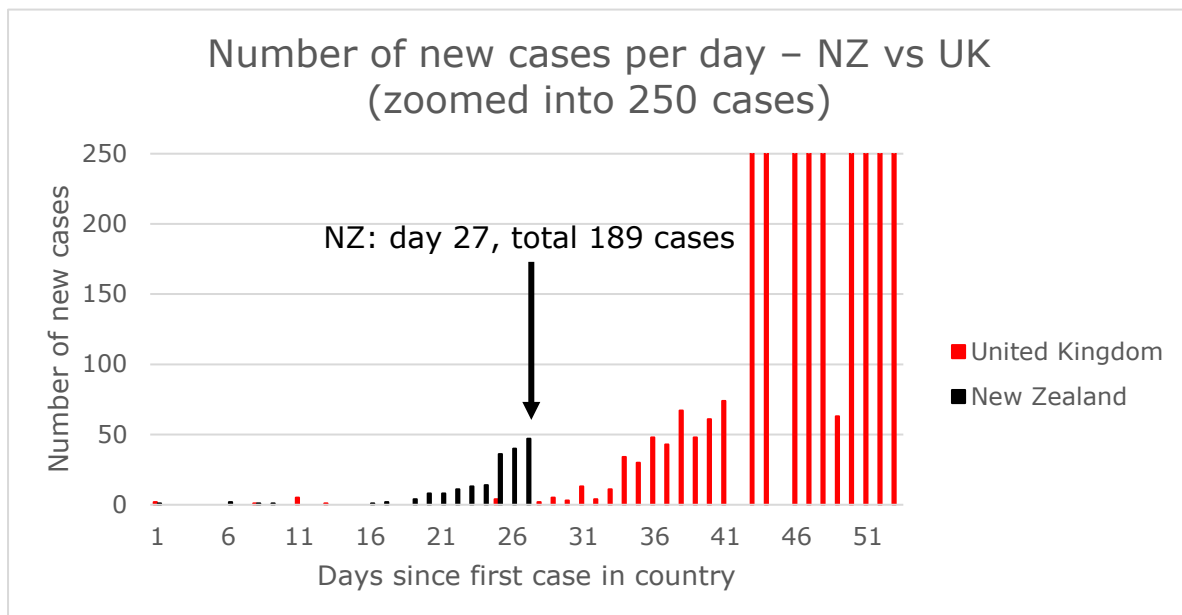
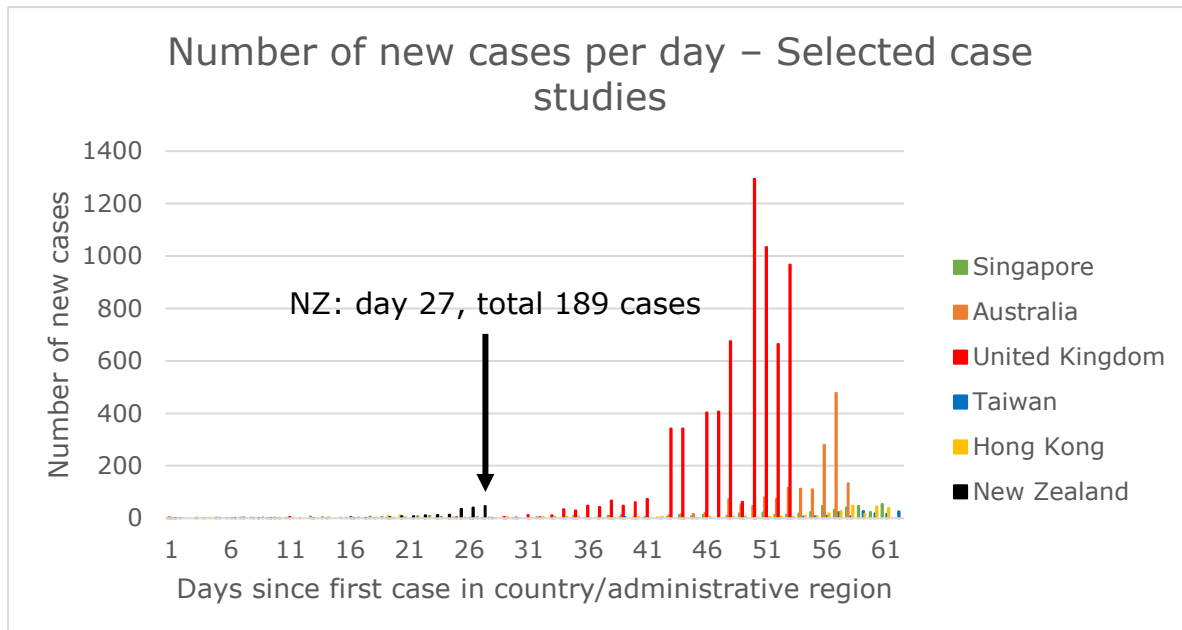


Charts 25/03/2020

Data up to 23 March 2020 from Johns Hopkins University (<https://github.com/CSSEGISandData/COVID-19>)

NZ data to 25 March collated from daily stand-up meetings; only **confirmed** cases included here

Note: United Kingdom data excludes the non-mainland UK territories of Gibraltar, Channel Islands, Bermuda, Isle of Man, Montserrat and Cayman Islands.



Singapore: 509 confirmed cases, 2 deaths
(population 5.8 million)

Taiwan: 195 confirmed cases, 2 deaths
(population 23.8 million)

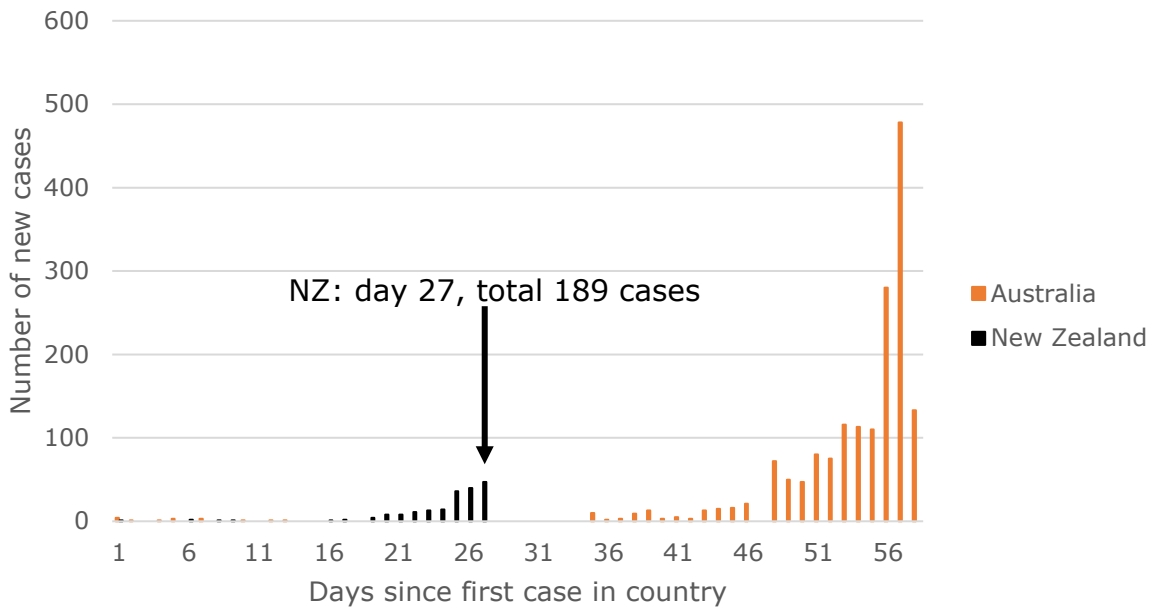
Hong Kong: 356 confirmed cases, 4 deaths
(population 7.5 million)

Australia: 1682 confirmed cases, 7 deaths
(population 25.5 million)

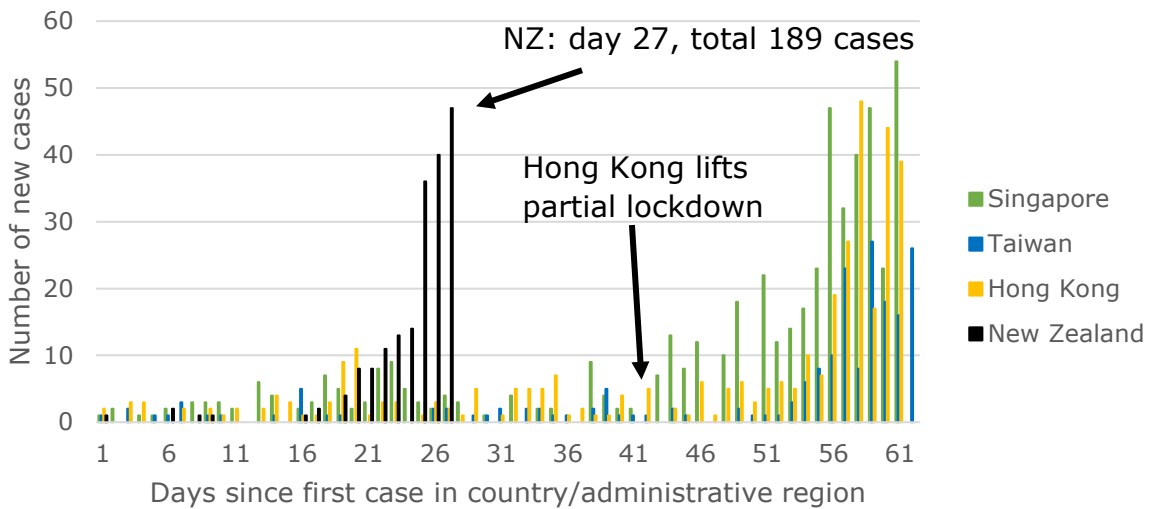
UK: 6650 confirmed cases, 335 deaths
(population 67.8 million)

NZ: 189 confirmed cases, 0 deaths
(population 4.8 million)

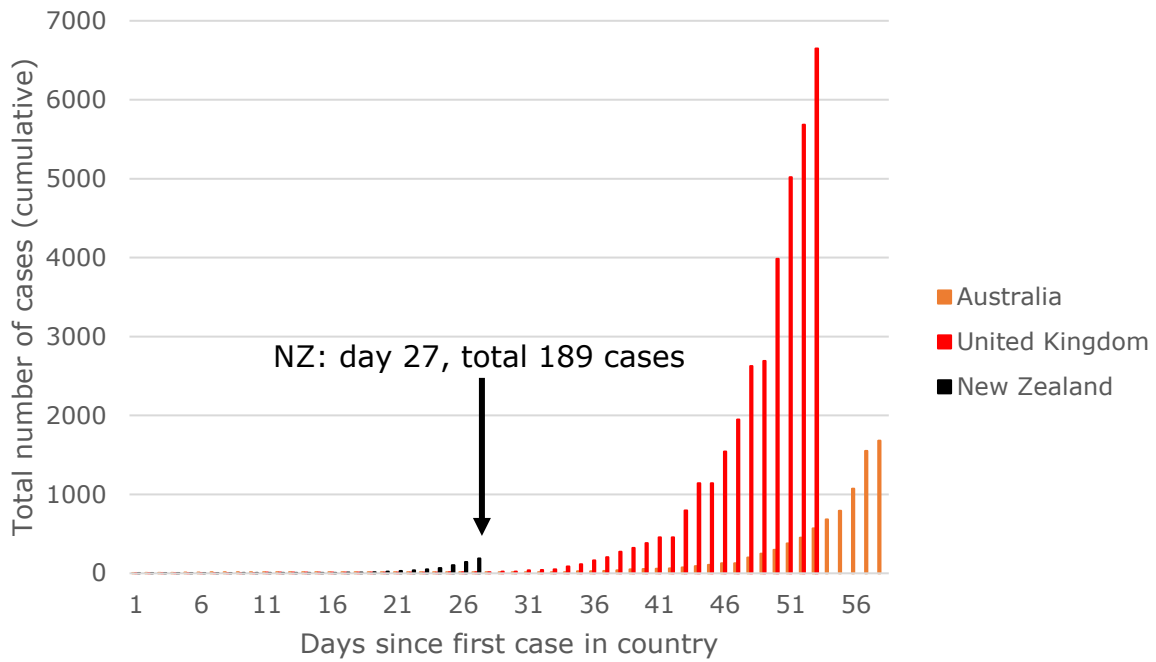
Number of new cases per day – NZ vs Australia



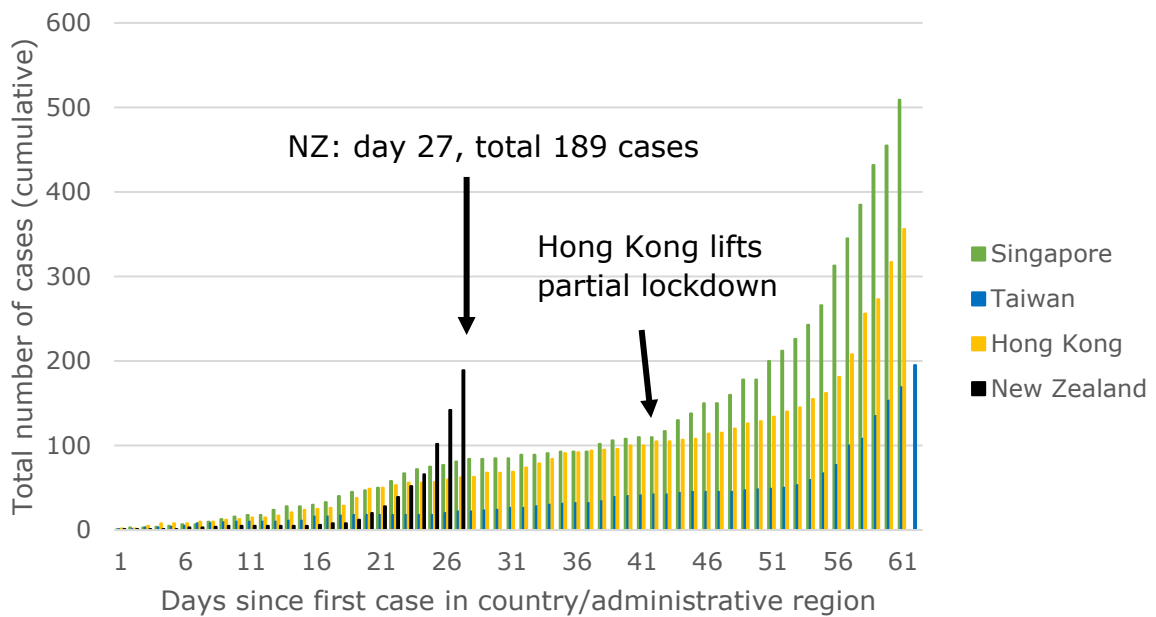
Number of new cases per day – NZ vs Singapore, Taiwan & Hong Kong



Total cases over time – NZ vs UK & Australia



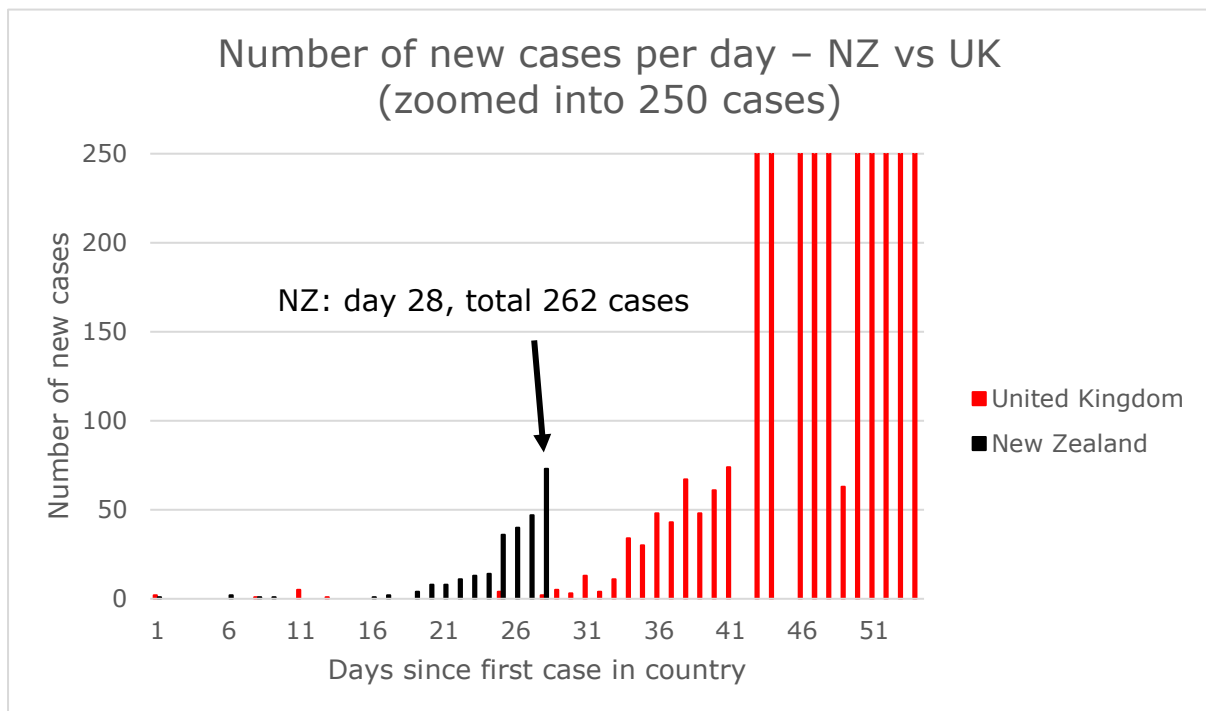
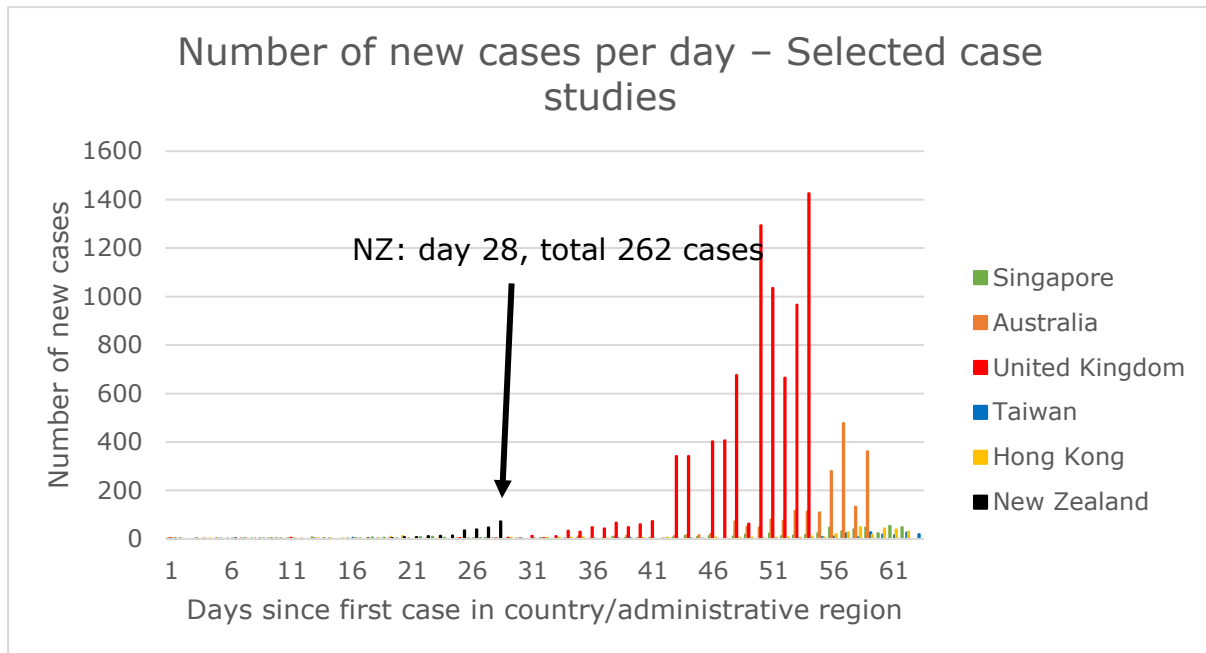
Total cases over time – NZ vs Singapore, Taiwan & Hong Kong



Charts 26/03/2020

Data up to 24 March 2020 from Johns Hopkins University (<https://github.com/CSSEGISandData/COVID-19>)
NZ data to 26 March collated from daily stand-up meetings; only **confirmed** cases included here

Note: United Kingdom data excludes the non-mainland UK territories of Gibraltar, Channel Islands, Bermuda, Isle of Man, Montserrat and Cayman Islands.



Singapore: 558 confirmed cases, 2 deaths (population 5.8 million)

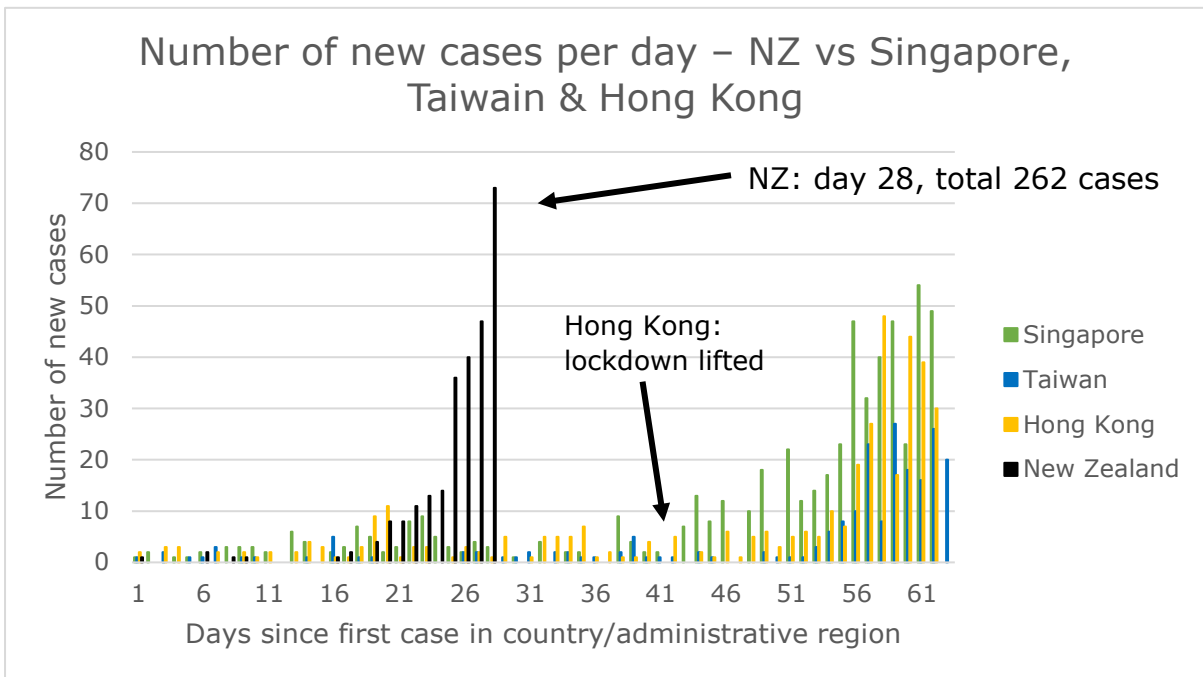
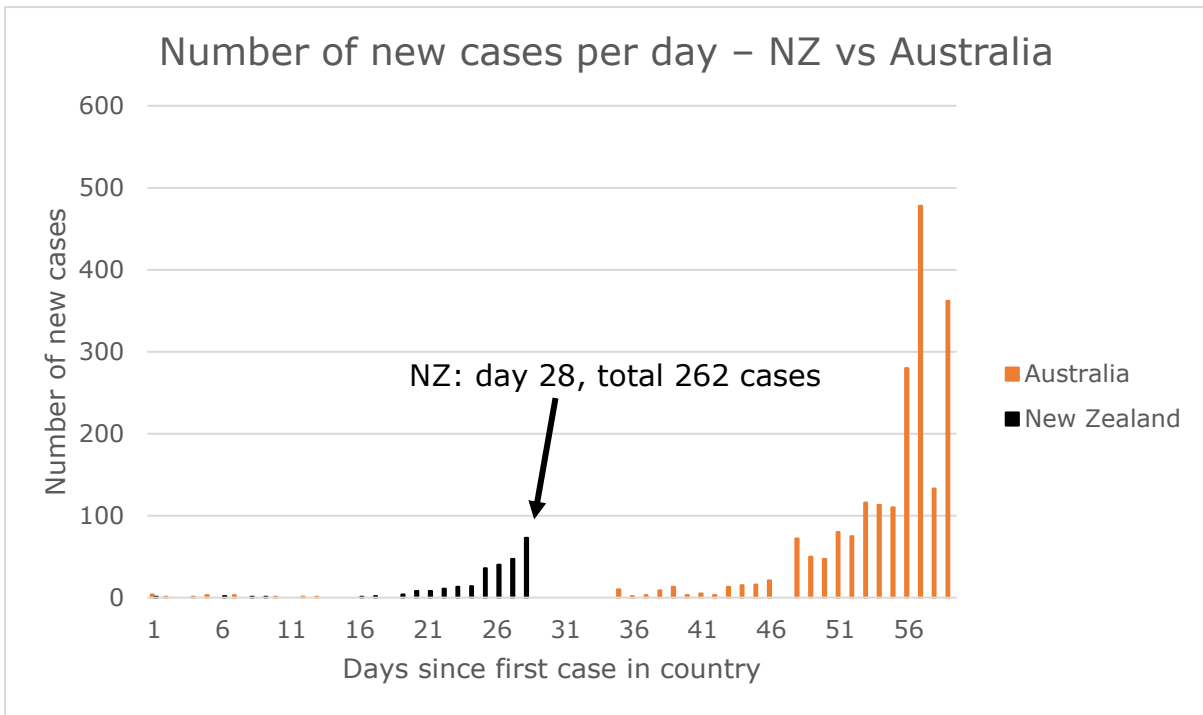
Taiwan: 215 confirmed cases, 2 deaths (population 23.8 million)

Hong Kong: 386 confirmed cases, 4 deaths (population 7.5 million)

Australia: 2044 confirmed cases, 8 deaths (population 25.5 million)

UK: 8077 confirmed cases, 422 deaths (population 67.8 million)

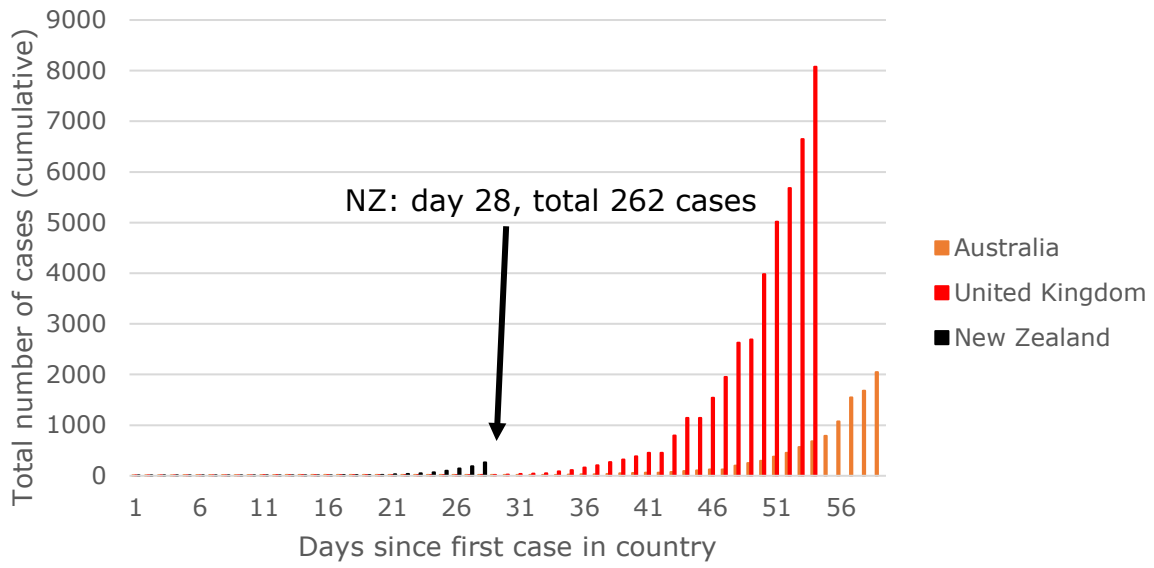
NZ: 262 confirmed cases, 0 deaths (population 4.8 million)



Interventions:

- United Kingdom in lockdown from Monday 23 March
- Australia heading into 'stage two' restrictions from midnight Wednesday 25 March
- Singapore currently at Dorscon 'orange' level; stepping up restrictions from midnight Thursday 26 March
- Hong Kong restricting non-resident entry from Wednesday 25 March; was in partial lockdown for three weeks in January/February but lifted restrictions on 2 March, leading to an influx of imported cases.
- New Zealand moving to alert level four (lockdown) from midnight Wednesday 25 March

Total cases over time – NZ vs UK & Australia



Total cases over time – NZ vs Singapore, Taiwan & Hong Kong

