



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

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COVID-19: May Advice

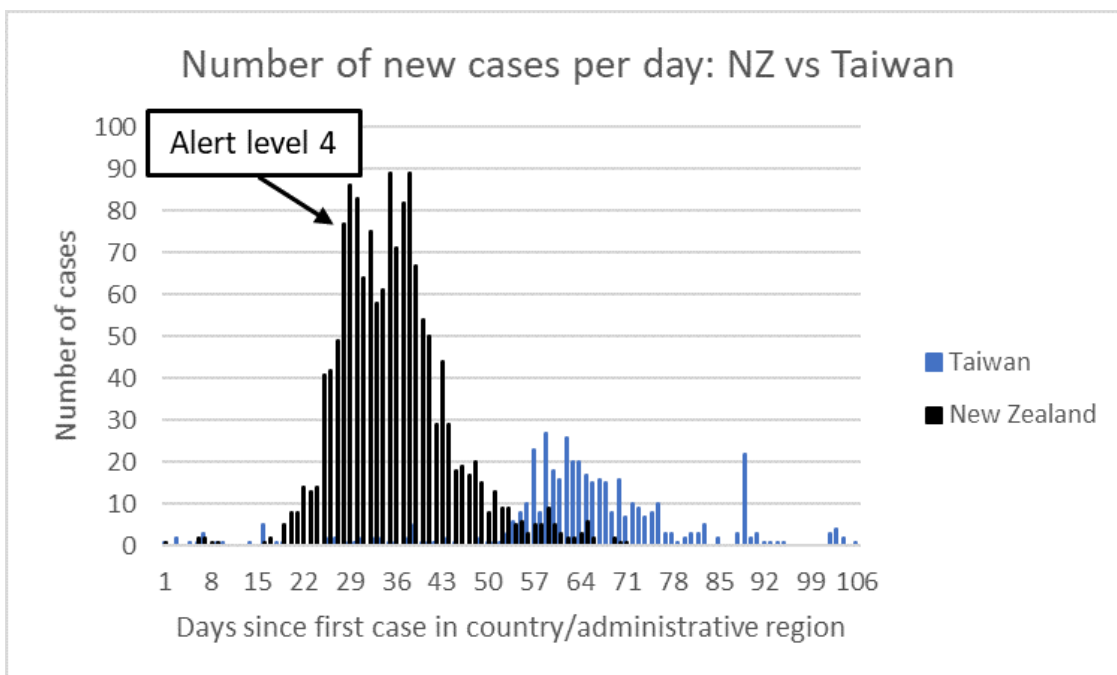
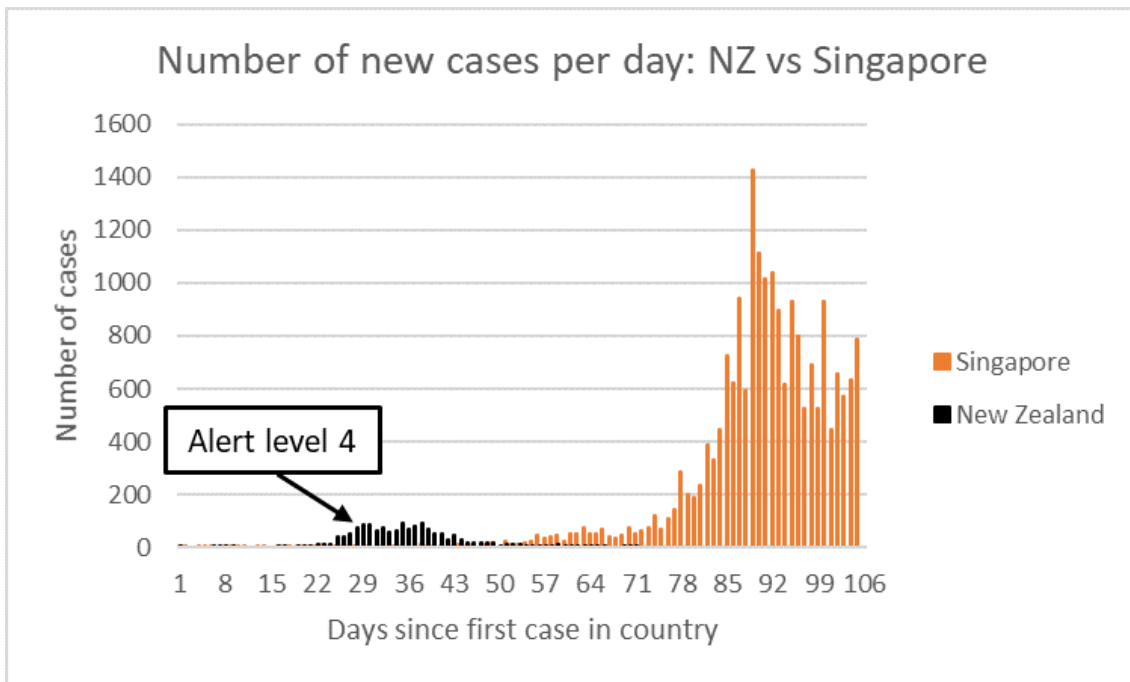
Collated 2 June 2020

Charts and data provided to support verbal advice

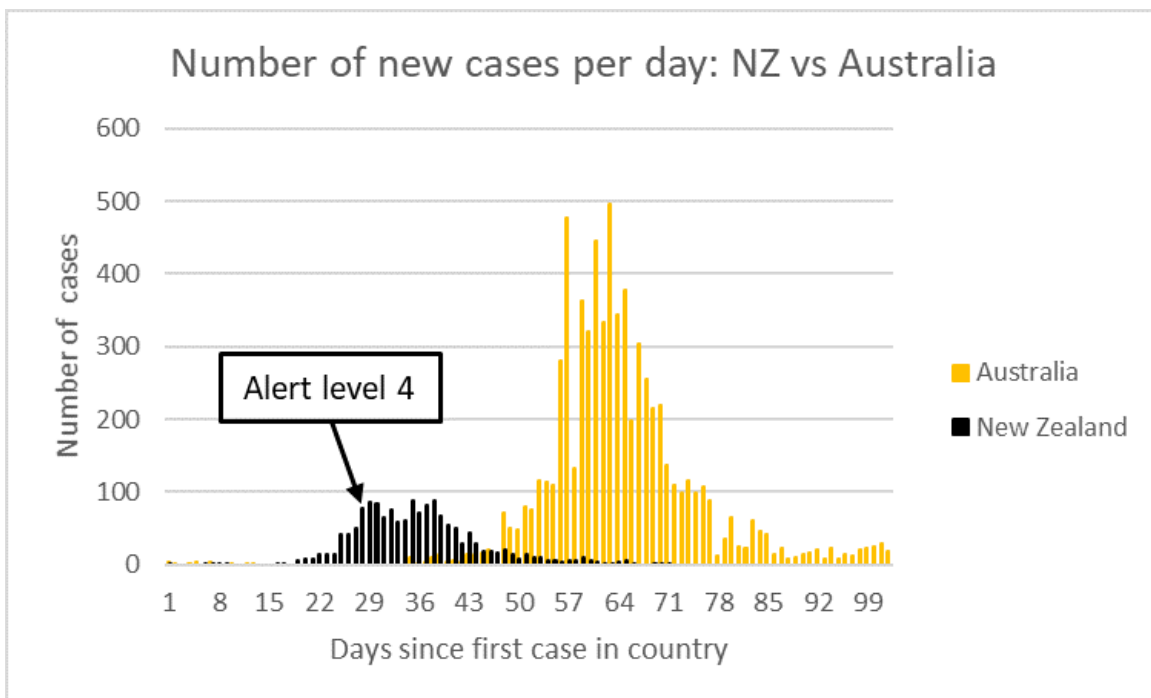
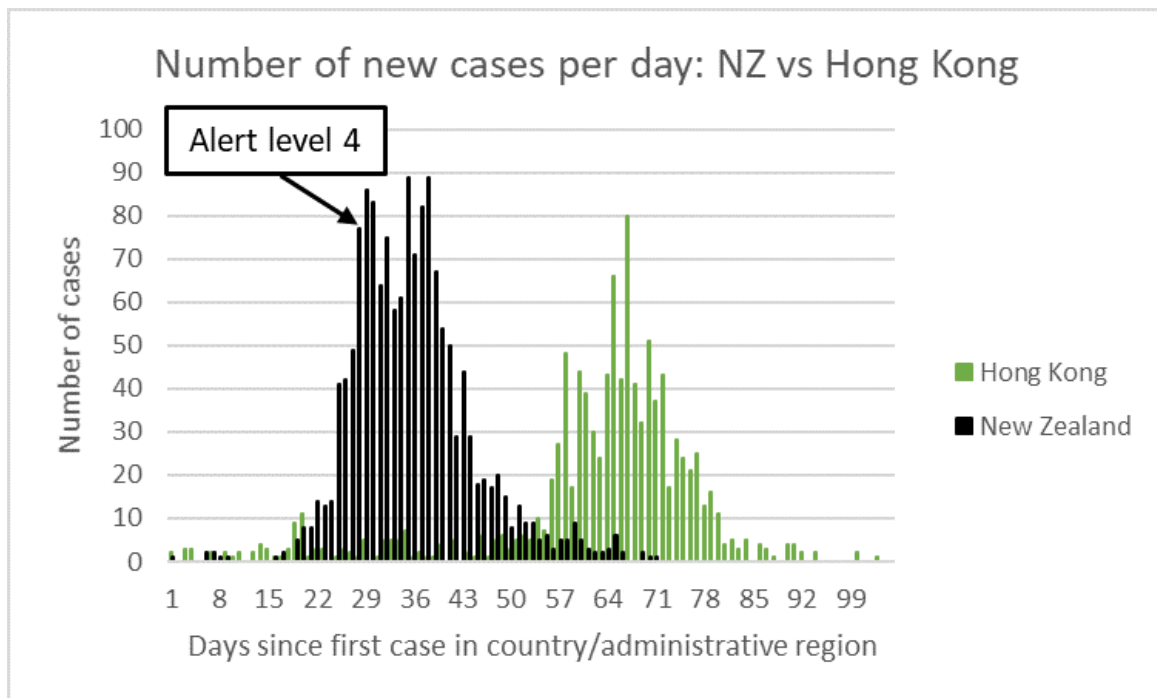
For further information and context:

- [listen to an interview with Juliet on *Stuff's* Coronavirus NZ podcast](#)
- [read this in-depth article by on the COVID-19 response in the *New Zealand Herald*](#)
- [read this reflection by Juliet and Rachel on reopening borders](#)

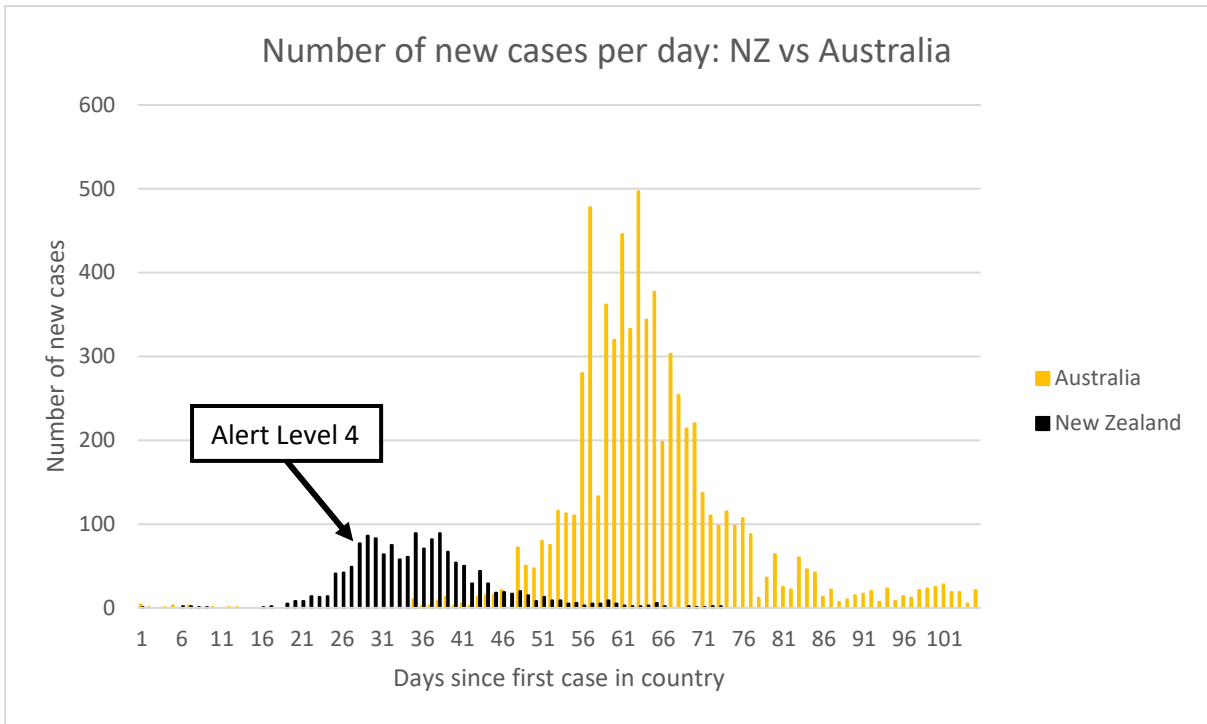
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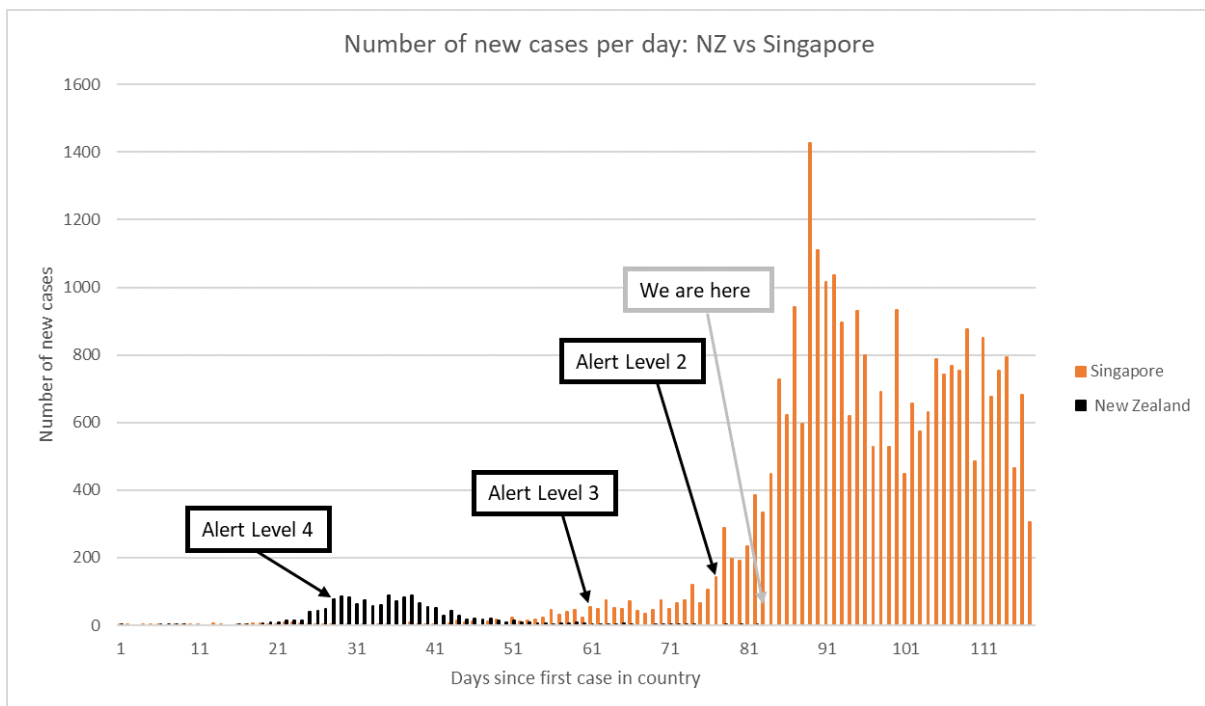
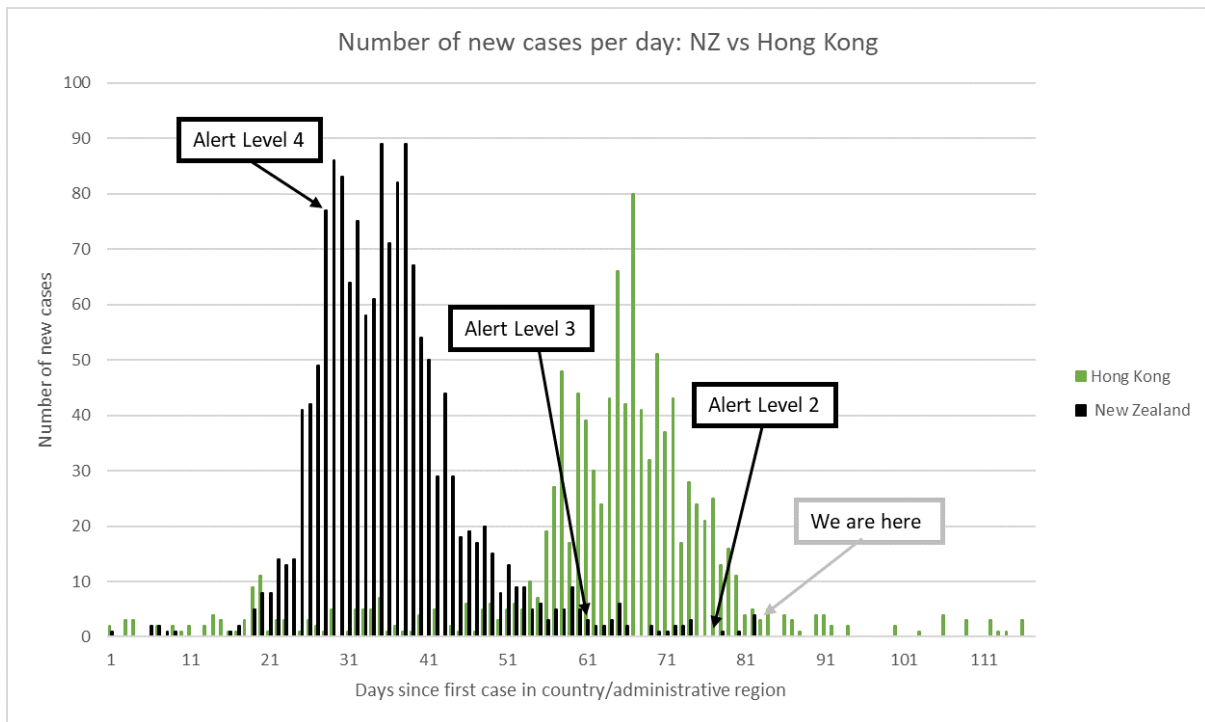
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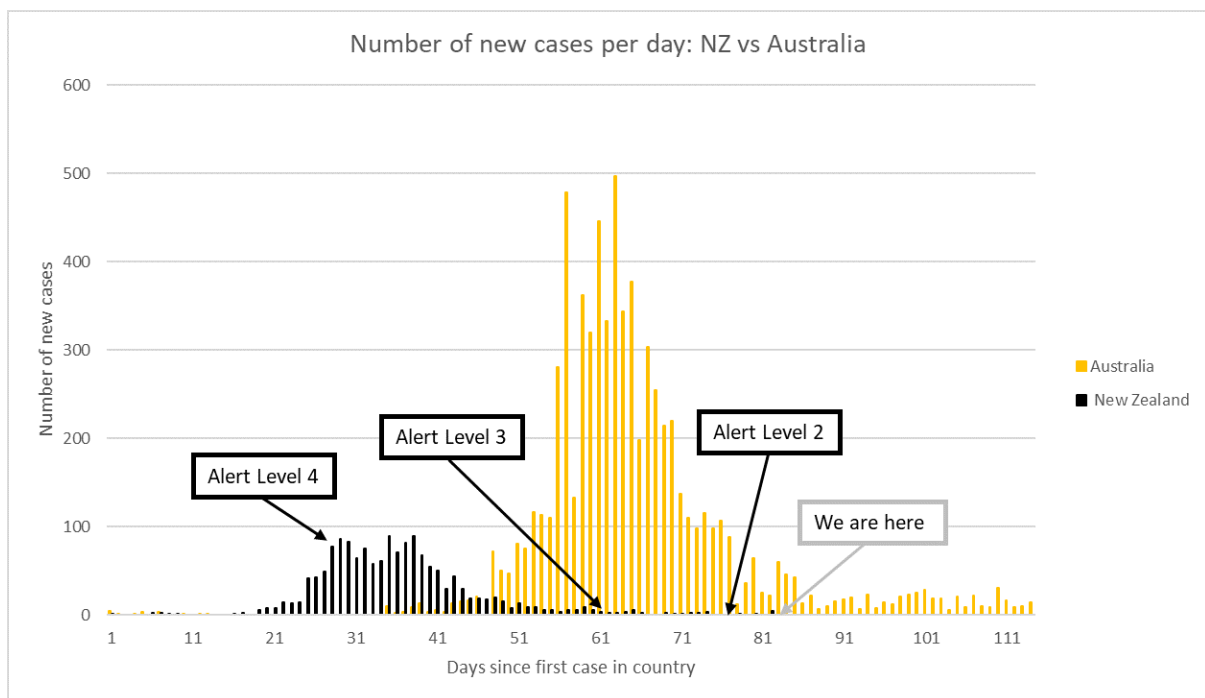
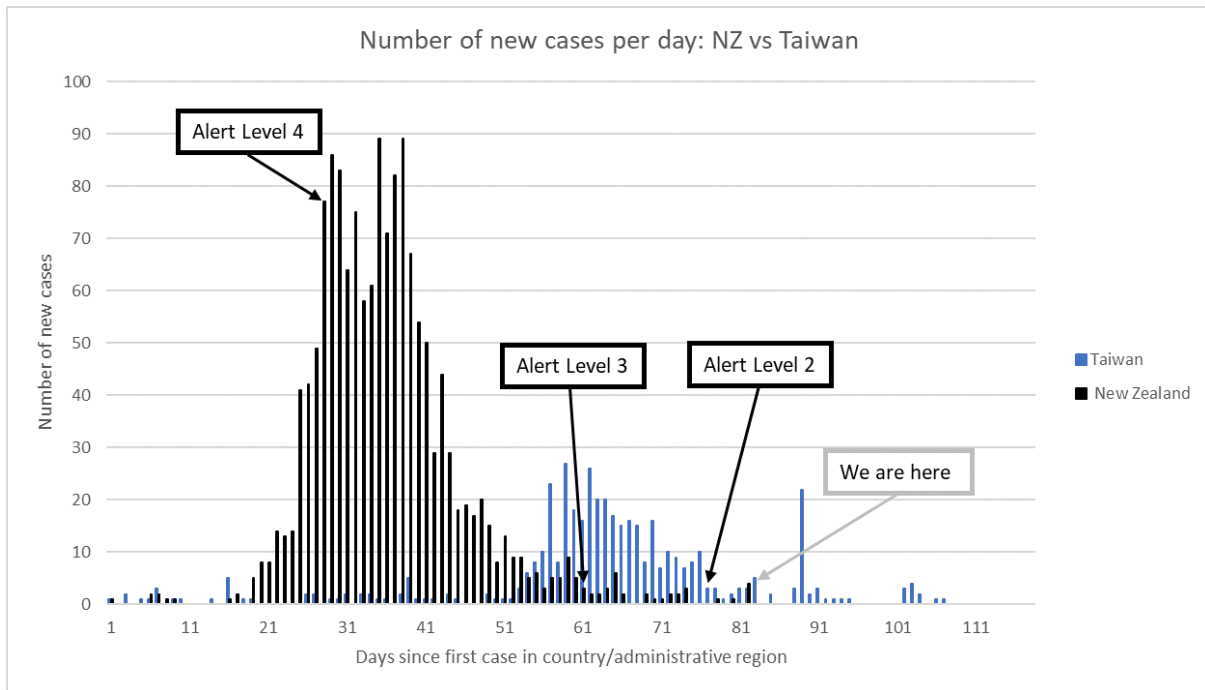
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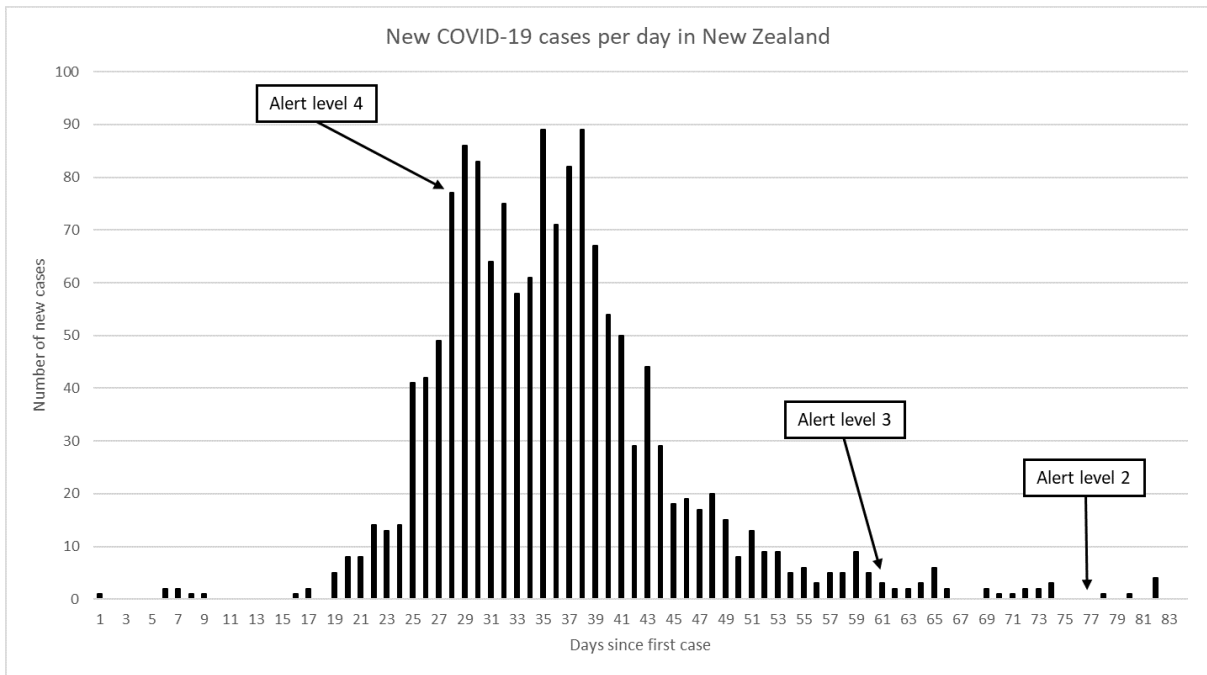
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Overall Summary - Work in progress

Last updated
19 May 2020

Countries	Maximum lockdown level (NZ Equivalence*)	Current Status					Analysis of countries in Levels 3 - 4 (NZ Equivalence)										Source of case data	Notes
		Date of Update	Number of days since first case	Cumulative number of cases	New cases on the date of last update	Current Level of country/region (NZ Equivalence*)	Start date of Level 3 - 4	Number of days from first case until first date of Level 3 - 4	Cumulative number of cases on start date of Level 3 - 4	Number of new cases on start date of Level 3 - 4	End date of Level 3 - 4	Number of days from first case until end date of Level 3 - 4	Cumulative number of cases at the end date of Level 3 - 4	Number of new cases on end date of Level 3 - 4	Total number of days already spent in Level 3 - 4 (Either up to "Date of Update" or to "End date of Level 3-4")	Is the country still in Level 3 - 4		
New Zealand	4	19-May-20	84	1,503	0	2	23-Mar-20	27	174	42	13-May-20	78	1,501	-	52	No	NZ Ministry of Health	14-May - NZ moved to level 2 at 11.59pm 13 May 2020
Australia	3	19-May-20	116	7,068	8	3	23-Mar-20	59	1,709	313		#N/A	#N/A	#N/A	58	Ongoing	COVID-19 in Australia Real Time Report	Control measures and interventions vary in different states
- NSW	3	19-May-20	116	3,081	3	3	23-Mar-20	59	669	136	15-May-20	112	3074	3	54	No	NSW Government Health	
- Victoria	3	19-May-20	116	1,573	6	3	31-Mar-20	67	917	96		#N/A	#N/A	#N/A	50	Ongoing	VIC Department of Health and Human Services	Restrictions to remain in place until 11 May
Austria	3-4	19-May-20	85	16,321	52	1	16-Mar-20	21	1,018	158	01-May-20	67	15,531	79	47	No	Worldometer	
Belgium	3-4	19-May-20	106	55,791	232	2	14-Mar-20	40	689	130	18-May-20	105	55,559	279	66	No	Worldometer	
Croatia	4	19-May-20	85	2,232	0	2	19-Mar-20	24	110	21	04-May-20	70	2,101	5	47	No	Worldometer	
Czechia	3-4	19-May-20	80	8,647	61	2	14-Mar-20	14	189	48	20-Apr-20	51	6,900	154	38	No	Worldometer	11 May and 25 May - Changes on restrictions will be made

Denmark	3-4	19-May-20	83	11,044	76	2	12-Mar-20	15	674	160	11-May-20	75	10,513	84	61	No	Worldometer	
Estonia	3	19-May-20	84	1,794	3	2	16-Mar-20	20	225	25	05-May-20	70	1,713	2	51	No	Republic of Estonia Health Board	20-May - The 2+2 rule is in force in public places: up to two people can be in a public place together and at least a 2-metre distance must be kept from others
France	4	19-May-20	117	180,809	882	2	17-Mar-20	54	7,730	1,097	11-May-20	109	177,423	453	56	No	Worldometer	11 May - Lockdown restrictions ease; schools reopen, shops reopen, groups of fewer than 10 for socialising, Funerals for up to 20, churches reopen
Germany	3-4	19-May-20	114	177,827	238	2	16-Mar-20	50	7,272	1,459	20-Apr-20	85	147,065	1,323	36	No	Worldometer	
Hong Kong (SAR)	2	19-Mar-20	118	1,056	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	No	Worldometer	8 May - Gyms, cinemas, bars and pubs to reopen, 21 May - Secondary schools open
Hubei, China	4					1-2	23-Jan-20	68	444	135	15-May-20	181	0	0			John Hopkins	Based on assumption that first case was Nov. 17, 2019
Rep. Of Ireland	3-4	19-May-20	81	24,251	51	3-4	12-Mar-20	13	70	27		#N/A	#N/A	#N/A	69	Ongoing	Government of Ireland	8 June - Easing the COVID-19 restrictions on 8 June (Phase 2)
Japan	2	19-May-20	126	16,241	28	2+	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	No	Worldometer	
Iceland	2-3	19-May-20	82	1,802	0	2	23-Mar-20	25	588	20	04-May-20	67	1,799	-	43	No	Worldometer	25 May - gatherings up to 200; gyms reopen (50% capacity); bars, pubs and

																		nightclubs reopen (until 11pm)
Italy	3-4	19-May-20	110	226,699	813	2+	10-Mar-20	40	10,149	977	04-May-20	95	211,938	1,221	56	No	Worldometer	
Norway	3-4	19-May-20	84	8,267	10	2+	12-Mar-20	16	800	171	20-Apr-20	55	7,156	78	40	No	Worldometer	
Russia	4	19-May-20	95	299,941	9,263	3	28-Mar-20	43	1,264	228		#N/A	#N/A	#N/A	53	Ongoing	Worldometer	Lockdown extensions until May 31.
Singapore	3-4	19-May-20	118	28,794	451	3-4	03-Apr-20	72	1,167	86		#N/A	#N/A	#N/A	47	Ongoing	Singapore Ministry of Health	1 June- Lockdown to extend to this date
South Korea	1-2	19-May-20	121	11,078	13	1-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	No	Worldometer	Only went to a maximum of Level 1-2, regional higher lockdowns
- Daegu Region, South Korea	3	22-May-20		6,872		3	21-Feb-20	33	209	98							Statista	Difficult to find information on Daegu
Spain	3-4	19-May-20	110	278,803	615	3	14-Mar-20	44	6,391	1,159		#N/A	#N/A	#N/A	67	Ongoing	Worldometer	May to June - Four phase plan to ease lockdown expected to be implemented
Sweden	2	19-May-20	110	30,799	422	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	No	Worldometer	Only went to a maximum of Level 2, Large gatherings of >50 are still prohibited
Taiwan (Territory)	2	19-May-20	120	440	0	1-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	No	Worldometer	Only went to a maximum of Level 1-2
United Kingdom	3-4	24-May-20	115	259,559	2,405	3	24-Mar-20	54	6650	967	15-Jun-20	137	-	-	84	No	UK Government	15 June - All non-essential shops to reopen from 15 June
USA																		
- California	3-4	19-May-20	115	81,795	1,365	2	19-Mar-20	54	1006	331	12-May-20	108	69383	1444	55	No	California Department of Public Health	Not all counties at same level
- Kentucky	4	19-May-20	74	8,069	134	2	22-Mar-20	16	99	45	11-May-20	66	6853	191	51	No	Kentucky Public Health	
- Massachuset ts	3-4	19-May-20	110	87,873	360	3	23-Mar-20	53	2005	388		#N/A	#N/A	#N/A	58	Ongoing	Massachusetts Government	25 May - Offices can reopen

- New York	3-4	19-May-20	79	352,845	1,474	3	12-Mar-20	11	216	0		#N/A	#N/A	#N/A	69	Ongoing	Github	13 June - A stay-at-home order will now remain in place until June 13
Vietnam	3-4	19-May-20	118	324	0	1-2	01-Apr-20	70	218	6	22-Apr-20	91	268	0	22	No	Worldometer	

* The assessment of foreign lockdown measures is based on approximation to our lockdown level conditions and should be viewed with some care.

At a glance coronavirus science update – May 24 2020

Comparison of Outbreaks of Viral Disease:

Disease	Global Deaths	NZ Deaths	Time Period	R ₀ (How many people catch it on average from one infected person without public health intervention)	Deadliness
Spanish Flu	50-100 million	9,000	1918-1920	2.2	5.0%
Seasonal Influenza	290,000 – 650,000 per year	10-25 directly – contribution to up to 500	Annual	1.0	0.1%
SARS	774	0	2002-04	2.8	9.6%
2009 Influenza pandemic (Swine Flu)	203,000	49	2009	1.5	0.2%
MERS	449	0	2012-2015	0.5	35.6%
Ebola	>11,300	0	2013-2016	2.2	50.0%
COVID 19	340,653	21	to 24/5/2020	2-3	Currently 1.4% in New Zealand Highly variable overseas (e.g. 10% in Spain, 0.2% in South Korea)

Impact of an epidemic on New Zealand Health System should a sustainable outbreak occur: The most recent comparable pandemic is the Swine Flu outbreak in 2009 in New Zealand. (Attendance at general practices with influenza: 116,300 (2.7% of population); admitted to hospital: 1,122; Admitted to intensive care: 119). Worst case scenario modelling around the world is using 60-80% of the population infected, 50% with only mild symptoms, 4-5% severe cases and 1-2% on respiratory support. This emphasises the need to prioritise strong measures to reduce the impact.

At the time of this report:

- Total Cases 5.28M cases in 188 countries;
- Highest number of cases in US, Russia, Brazil and UK;
- US has the highest number of deaths at just under 100,000

Useful websites for tracking numbers and spread – most updated in real time

- <https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6>
- <https://www.worldometers.info/coronavirus/coronavirus-cases/>
- https://www.the-scientist.com/news-opinion/coronaviruss-genetics-reveal-its-global-travels-67183?utm_campaign=TS_DAILY%20NEWSLETTER_2020&utm_source=hs_email&utm_medium=email&utm_content=83909011&hsenc=p2ANqtz-ItFxxCToEnpZilgq8_IS6ZaDWqk1_TbjgVr_XhY2bsvfK0X60FIOsajFBXS9hynVzOn5NDHPeegq4-p0Zbhe2BQmmtw&hsmi=83909011

Key features of the virus and outbreak with recent trends and updates:

Feature	Situation to date	Developments and Trends	Level of confidence	Level of uncertainty	Notes
Hope for a vaccine	No vaccine available	Active international effort to address this, including agreements for vaccine distribution.	low	high	Ten vaccines in Phase 1 moving to Phase 2 trials in coming weeks. Highly unlikely that a vaccine will be widely available in less than a year. Two NZ companies have vaccines in development. Coronaviruses pose particular challenges to vaccine development. Summary available on PMCSA website, updated monthly.
Hope for a drug	No drugs available	Active international effort to address this, by repurposing anti-viral candidates against Ebola, MERS and SARS.	low	high	Over 100 clinical trials of potential drugs are underway, some highly speculative. Initial results show Remdesivir partially effective in reducing disease severity. Hydroxychloroquine and macrolide antibiotics being studied but showing potentially risky side effects. Trials will take 1 to 2 months and longer before sufficient amounts of the drugs can be made to treat patients in large numbers. Will contribute if COVID 19 becomes endemic and treatment is needed for the long term. Success highly uncertain.
Incubation period	14 days	Typically 5-6 (range 1-14) days. Two reports of longer period – up to 27 days.	high	low	A report on 1099 patients had the longest incubation of 24 days but with a median of 3 days so the 24 and 27 days are outliers. Could be explained by a second exposure to the virus.

Recovery time	12-14 days	12-14 days	medium	medium	Most cases recover quickly with few complications. However, prolonged illness is now reported in severe cases with a variety of long-term lung, cardiac and renal complications. Mental health trauma a feature of those who have been in ICU.
“Reinfection”	Unlikely	Test may remain positive for some time (Viral RNA detection).	high	low	Reinfection after recovery is not thought to occur. Positive test indicates persistence of viral RNA not ongoing infectivity.
New Zealand situation	High	NZ has had 1154 confirmed and probable cases.	high	low	Epidemic has been brought under control; most current cases are related to existing known clusters. Strategy is to eliminate the virus and manage any new cases aggressively.
Deadliness	Median 3.5%	Around 6.4% for all declared cases internationally. Estimate less than 1% if all mild and asymptomatic cases included. Obviously, this would imply a higher number of cases and R value.	medium	high	Fatality rate likely to decrease as more mild cases identified. In general viruses can become less deadly with time. No evidence that virus is mutating to become more deadly. Apparent fatality rate very dependent on countries’ ability/willingness to test for infection (South Korea 0.2% deaths). Age and underlying medical conditions have been strong predictors of a fatal outcome.
Severity	Median 16 % of cases are severe	Seems to be staying quite stable	medium	high	Important as it impacts the number of likely hospitalisations and is a critical determinant of infrastructure needs. Very few children have had severe disease and required hospitalisation.

<p>How easy is to catch it?</p> <p>R₀</p>	<p>R₀ 2-3 – hard to determine in continuing outbreak</p>	<p>Current estimates 2-3 but rising as number of asymptomatic patients becomes clear. Meaning 2-3 people catch it from each infected person on average – if no measures taken to prevent spread. Very hard to measure meaningfully in a highly managed outbreak with small case numbers.</p>	<p>medium</p>	<p>medium</p>	<p>The actual R value (R₀ is the value before any public health measures are taken) is likely to continue to decrease if containment is successful.</p> <p>No evidence that virus is mutating to become more contagious. In general viruses can become more contagious with time (R₀ increases). Genomic analysis has shown little genetic variation to date. Academic debate as to what constitutes a new strain. Nothing yet of major concern. Watching brief on spike protein mutations.</p>
<p>Methods of Transmission</p>	<p>Person-to-person contact, respiratory droplets, contaminated surfaces</p>	<p>May remain active on untreated surfaces for up to 9 days. Transmission from mild, asymptomatic cases seems a likely explanation for community spread. Most transmission shown to occur in day before and three days after symptoms develop.</p>	<p>medium</p>	<p>high</p>	<p>Typically, coronavirus spread is localised to person-to-person contact and respiratory droplets (coughing and sneezing nearby).</p> <p>Analysis of Chinese data shows 80% of transmission was within families living in close proximity. Supported by NZ case investigations.</p> <p>Few cases of transmission in outdoor settings.</p>
<p>Transmission before symptoms</p>	<p>Likely to be contagious 1-3 days before symptoms noticed</p>	<p>Viral load peaks at the time symptoms develop.</p>	<p>medium</p>	<p>medium</p>	<p>Comparing models to actual cases indicates transmission before symptoms likely in close contact, i.e. within families. Contact with an asymptomatic case should be considered a risk but data suggests relatively rare in casual outdoor contact.</p>
<p>“Super-shedders”</p>	<p>Several major clusters</p>	<p>“Super shedders” have been shown to generate large clusters from indoor gatherings.</p>	<p>medium</p>	<p>medium</p>	<p>“Super-shedders” increase the risk that the virus will spread as they can infect a lot of people before they can be traced. Likely to be a mix of contact opportunity, stage of disease, and patient physiology.</p>

Selectivity	<p>Young children less impacted</p> <p>More men die than women. Concerning death rate in the elderly</p>	<p>Young children appear to be less likely to get serious symptoms.</p> <p>South Korean data suggests more women than men are infected and that the largest number of cases is in the 20-29 age group.</p> <p>This is also the case for NZ. This may be due to social factors rather than biological susceptibility.</p>	medium	medium	<p>Similar diseases cause severe symptoms in the young and the old. Recorded COVID 19 cases show an unusually low incidence of symptoms in the young.</p> <p>There are rare reports of severe immune reactions in young children that have yet to be confirmed. Men (2.8% of those infected); women (1.7% of those infected) die. Most deaths occur in older patients with underlying conditions, including diabetes and obesity.</p> <p>There is one report of the virus crossing the placenta but in general negative effects on pregnancy and the newborn have not been seen.</p>
Uncertainty in testing	<p>Possibility of false negatives</p>	<p>RT-PCR testing is the gold standard.</p> <p>False negatives widely reported early in the illness.</p>	medium	medium	<p>The test relies on finding the viral RNA (its genetic material) in the sample and so can be impacted by sampling issues. The test is very selective and very unlikely to give a false positive. ESR include a positive control in their testing using synthetic DNA. International and NZ efforts continuing to develop accurate rapid tests (minutes instead of hours). Reliable serological testing will assist in epidemiologic analyses.</p>
Transmission to and from animals	<p>Origin of virus likely from bat plus a secondary mammalian host</p>	<p>Further transfers to cats and mink have been verified. Transfer from these animals to humans has not been confirmed.</p>	low	high	<p>Unlikely to be an issue in NZ due to farming methods. Domestic and large cat species, mink, and ferrets can develop infection. There is one suspected case of a mink farm worker contracting the disease from their stock. Virus has been detected on animal fur at low levels.</p>
Numbers inside China	<p>Chinese epidemic now under control</p>	<p>Number of new cases is now very low.</p>	medium	high	<p>Outbreak across China appears under control. Other places where the epidemic has been brought under control include Taipei and environs, Singapore (with a recent re-emergence), Iceland, Hong Kong, Vietnam, and Australia.</p>

Numbers outside China	Rising in many countries	188 other countries impacted and numbers rising in many counties.	medium	high	Self-sustaining outbreaks now underway in US (which has 30% of global cases and most new cases per day) and Europe. Case numbers are falling in Europe other than in Russia. Major concerns remain for South America (especially Brazil), India and Africa.
Predicted numbers globally	Global pandemic	Has topped 5M cases.	medium	high	Likely to come in a number of waves if not eliminated world-wide.
Numbers recovering	Exponential growth	Number of cases listed as recovered 2.10M world-wide.	low	high	Once recovered, people are very likely to be immune, limiting further spread once "herd immunity" achieved. This is a long way off, and even in badly impacted centres such as New York only 20% of the population seems to have been exposed. It is not yet clear how long immunity will last.
Timeframe of outbreak	Pandemic declared	Developing countries now at particular risk.	medium	high	Seasonality effects yet to be determined. Likely to be confounded by seasonal viral infections including influenza. Increasingly likely that virus becomes endemic and need managing in the long term.