

Lessons Learned About Control of COVID-19 From Populations Comparable to NL

Objective

To monitor COVID-19 events and interventions undertaken in the island communities of New Zealand, Australia and Iceland.

Practice Points

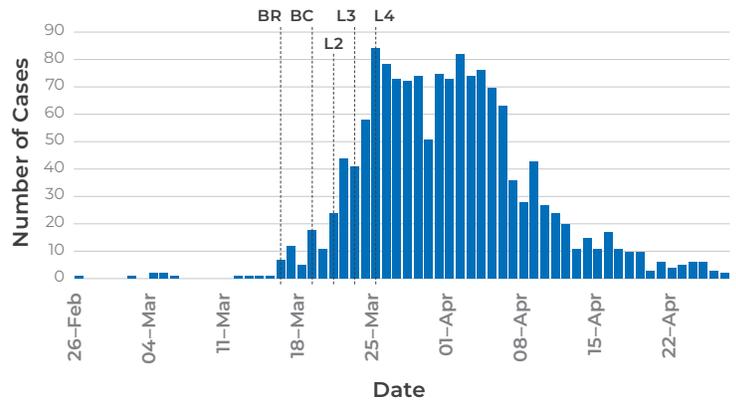
1. Examination of actual events in real time in comparable populations together with predictive modelling of future events, provides good information for public health decision making. The former requires assumptions be made to extrapolate the results to NL whereas the latter requires assumptions be made to obtain results from the models.
2. We decided early in the COVID-19 epidemic to follow events in New Zealand (island population of 4.8 million), Tasmania (island population 540,000), Victoria (population 6.5 million), and Iceland (island population 364,000).
3. The major elements of COVID-19 control are prevention of importation of new cases and management of clusters.

Methods

1. Data on incidence of new cases and deaths, together with a description of various types of interventions imposed or loosened, were obtained from government websites up to September 14, 2020.
2. Events analyzed included first cases, time to peak of incidence curve, time to flattening of the curve (day after 7 days of new cases < 10/1,000,000 population), time to virus eradication (day after 14 days without new cases), time to new cluster (new case of community acquired COVID-19 after the start of loosening restrictions), time to recrudescence (last day of accumulating >70/1,000,000 new cases in less than a week), and time from lockdown to flattening of the curve.

Results

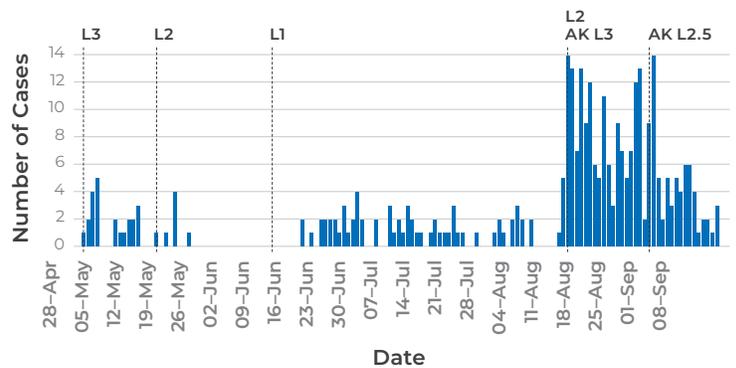
NEW ZEALAND



BR: Border restrictions, compulsory self-isolation (16 Mar); BC: Border closed to all but NZ residents & citizens (19 Mar); L2: Alert level 2 – Reduce (21 Mar); L3: Alert Level 3 – Restrict (23 Mar); L4: Alert Level 4 – Lockdown (25 Mar)

Figure 1. Incidence of New Cases in New Zealand From Start of Pandemic to First Stage of Loosening Restrictions

- The first case was identified on 26 Feb 2020; intermittent cases were identified during the following 18 days; lockdown was imposed on 25 Mar 2020, 28 days after the first case, which also happened to be the peak of the incidence curve. Flattening of the curve occurred 20 days after lockdown, time to flattening the curve was 48 days, and to eradication of the virus 80 days from first case.
- Mortality in the first wave was 1.4%.



L3: Alert level 3 – Restrict (28 Apr); L2: Alert Level 2 – Reduce (14 May); L1: Alert level 1 – Prepare (9 Jun); L2, AK L3: NZ Alert Level 2 - Reduce, Auckland Alert Level 3 – Restrict (12 Aug); AK L2.5: Auckland Alert Level 2 with some extra restrictions (31 Aug)

Figure 2. Incidence of New Cases in New Zealand Since the First Stage of Loosening Restrictions up to 14 Sept 2020

- From 28 Apr to 11 Aug, 2020, new cases were all travel related.

Border control: Obtained by three interventions — travel ban, 14-day isolation in government facilities for returnees, and virus testing at day 3 and day 12 of isolation.

- ◇ There were 147 cases detected at the border, 65% identified at day 3 testing and 35% at day 12 testing.
- ◇ There were no community acquired cases for 102 days after starting to loosen restrictions.

Cluster control of new Community Outbreak:

Lockdown to Level 3 was re-imposed in the region in which new cases were detected (Auckland), the origin of which is still unknown, and the remainder of NZ moved to Alert level 2.

- ◇ First cases were detected on 11 Aug, lockdown followed on 12 Aug, peak of incidence curve occurred 2 days after first case, the incidence of new cases/million/day was never above 10, and restrictions were loosened in Auckland after 18 days (Auckland moved to Alert level 2 on 31 Aug with restrictions on gatherings, funerals and tangihanga).
- ◇ There have been 2 deaths related to the community cluster.
- ◇ Next review of Alert Levels will be 21 Sept 2020. Government has agreed, in principle, to move NZ down to Alert Level 1 on 22 Sept (42 days after start of new community outbreak) and Auckland to Alert Level 2 with eased restrictions on 24 Sept (44 days after start of new community outbreak).

TASMANIA

- First case was on 2 Mar 2020, and lockdown was imposed on 19 Mar 2020.
- There have been 228 cases and 13 deaths since the beginning of pandemic.

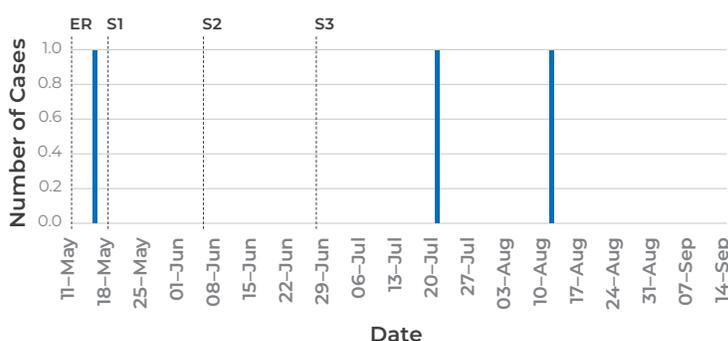


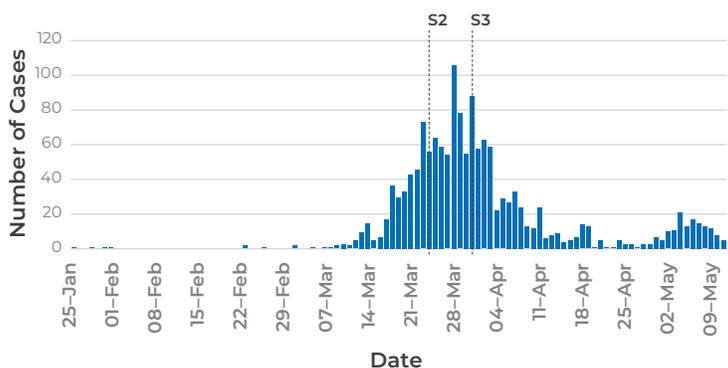
Figure 3. Incidence of New Cases and Stages of Loosening Restrictions in Tasmania up to 14 Sept 2020

- Restrictions started to loosen 70 days after first case detected and 53 days after lockdown.

Border control: Obtained by 14-day isolation in government facilities on coming into Australia and a further 14 days on coming into Tasmania.

Cluster Control: There has been no community transmission or deaths since start of loosening restrictions.

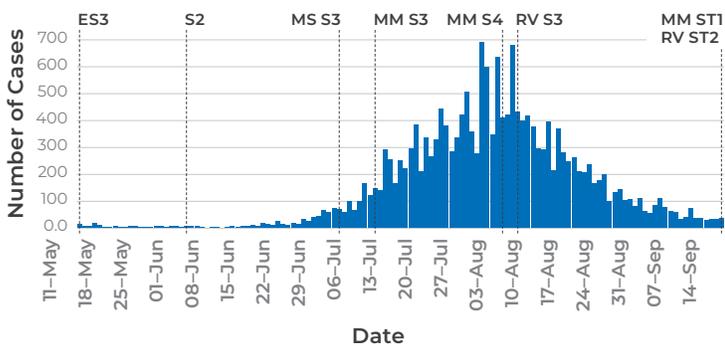
VICTORIA



S2: Stage 2 Stay Safe Directions (23 Mar); S3: Stage 3 Stay at Home Restrictions – 1st wave Lockdown (30 Mar)

Figure 4. Incidence of New Cases in Victoria From Start of Pandemic to First Stage of Loosening Restrictions

- The first case was identified on 25 Jan 2020, peak of the incidence curve was 62 days after first case, intermittent cases were identified for the next 45 days, time to flattening the curve was 73 days. Lockdown was imposed on 30 Mar 2020, 3 days after the peak of incidence. Time from lockdown to flattening of the curve was 6 days; eradication of the virus was never achieved.
- Mortality in the first wave was 1.2%.



ES3: Easing of some Stage 3 Restrictions (11 May); S2: Stage 2 Stay Safe Directions (1 Jun); MS S3: 36 Melbourne Suburbs Stage 3 Stay at Home Restrictions (1 Jul); MM S3: Metropolitan Melbourne Stage 3 Stay at Home Restrictions (8 Jul); MM S4: Metropolitan Melbourne Stage 4 Stay at Home Restrictions (2 Aug); RV S3: Regional Victoria Stage 3 Stay at Home Restrictions (5 Aug); MM ST1, RV ST2: Metropolitan Melbourne First Step of New Reopening Roadmap, Regional Victoria Second Step of New Reopening Roadmap (14 Sept)

Figure 5. Incidence of New Cases in Victoria Since the First Stage of Loosening Restrictions up to 14 Sept 2020

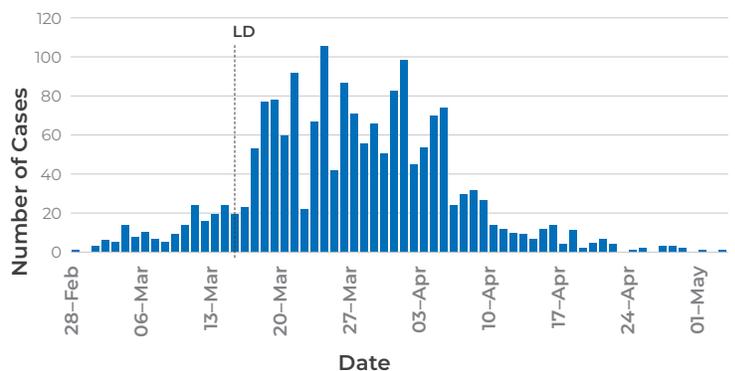
Border control: Obtained by 14-day isolation in government facilities. Failures in hotel quarantine by private security firms that were contracted to operate them, such as illegal socializing between staff and physical contact between guards and quarantined travelers, led to the current community outbreak.

Cluster control of new Community Outbreak: The unofficial “beginning” of the new community outbreak was 1 Jun 2020. Lockdown was imposed in stages and by region.

- ◇ Under Stage 3 restrictions, people could leave home for only one of four reasons: shopping for food or other essential items, care and caregiving, outdoor exercise and work/study if this could not be done from home. Stage 4 restrictions included a curfew from 8pm to 5am and more restrictive time, distance (within 5km) and gathering limits for shopping and exercise.

- ◇ Failure to adhere to lockdown caused further spread of the virus. As many as 9 out of 10 people who later tested positive were not isolating between the onset of symptoms and getting a test. In addition, 53% of positive cases did not isolate between being tested and receiving their results.
- ◇ Rise in incidence of new cases occurred on 1 Jun 2020, peak of incidence curve was 58 days after recrudescence, and curve is starting to flatten (less than 10 new cases/million/day for the last 6 days). Full lockdown occurred on 2 Aug and flattening of the curve occurred 44 days later.
- ◇ There have been 710 deaths since 1 Jun 2020 (with first death occurring on 23 Jun).
- ◇ Victoria released a 4-step Roadmap to Recovery which begins on 14 Sept. The steps are subject to “trigger points” and public health advice. Trigger points are based on daily average case numbers and source of transmission being known. Restrictions will only be eased when the time period passes AND the number of cases is low enough to move to the next step.
- ◇ Regional Victoria started on the Second Step and had reached the necessary trigger point to move to the Third Step on 17 Sept.

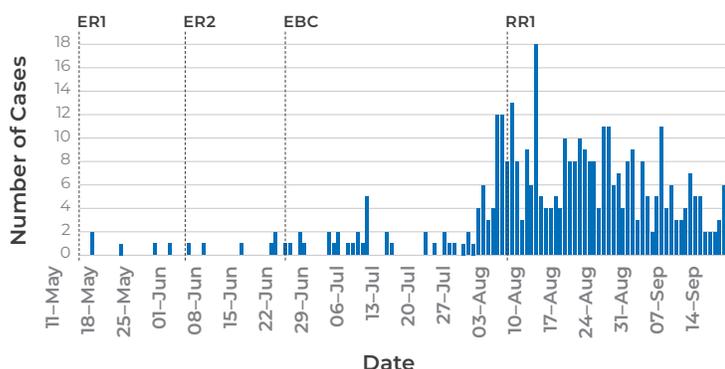
ICELAND



LD: Lockdown measures started (March 13 – 24)

Figure 6. Incidence of New Cases in Iceland From Start of Pandemic to First Stage of Loosening Restrictions

- First case was identified on 28 Feb 2020, restrictions were imposed around 15 Mar, peak of initial incidence curve (prior to 26 Jul) was 25 days after first case, time to flattening of the initial curve was 62 days. Flattening of the curve occurred 30 days after introduction of restrictions, virus was never eradicated.
- Mortality in the first wave was 0.5%.



LD: Lockdown measures started (March 13 - 24); ER1: Easing of Many Restrictions (May 4); ER2: Further easing of Restrictions (May 25); EBC: Easing of Border Control Measures (June 15); RR1: Some Restrictions Re-imposed (July 31)

Figure 7. Incidence of New Cases in Iceland Since the First Stage of Loosening Restrictions up to 14 Sept 2020

Border control: No full travel ban, testing on arrival and initially no isolation. On 15 Jun, Iceland allowed single PCR testing at the border for Icelandic citizens/residents and travelers of other EU & Schengen states instead of 14-day self-isolation.

- ◊ On 13 Jul, double PCR testing was required for Icelandic citizens & residents with special precautions to be taken for the first 5 days after arrival until the 2nd PCR test. This was expanded on 31 Jul to include all those arriving from high risk areas and who intended to stay in Iceland for 10 days or more.
- ◊ As of 19 Aug 2020, all passengers arriving in Iceland must either undergo a double testing procedure, one test upon arrival and another 5-6 days later (along with quarantine between tests), or a 14-day quarantine.
- ◊ From 15 Jun to 14 Sept, number of cases detected at the border was 116 and number in the community was 251.

Cluster control: 26 Jul 2020 is the unofficial “beginning” of the second community outbreak. Precautionary measures were introduced on 31 Jul and re-imposed a 100-person limit of larger gatherings and reinstated the 2-meter social distancing rule.

- ◊ Rise in the incidence of new cases occurred on 26 Jul, peak of recrudescence occurred 11 days after start of recrudescence, curve has not yet been flattened, despite 45 days of restrictions.
- ◊ There have been no new deaths since 19 Apr.

Conclusions

1. In the initial wave, both New Zealand and Victoria delayed imposition of lockdown because cases were intermittent.
2. Border control to prevent importation of new cases depends on either 14-day isolation or double testing. New Zealand used both interventions and were successful in preventing importation. Iceland failed to prevent importation with a single test at the borders.
3. Escape from isolation led to recrudescence in Victoria.
4. Imposition of lockdown flattened the curve within 20–44, but the efficacy was dependent on adherence to restrictions. Poor adherence led to recrudescence in Victoria.
5. Early loosening of restrictions in New Zealand was not associated with new cases and rapid imposition of restrictions limited the new cluster.
6. A few community transmission cases at the beginning predict increased subsequent incidence but a few cases after lockdown suggest that restrictions can begin to loosen.