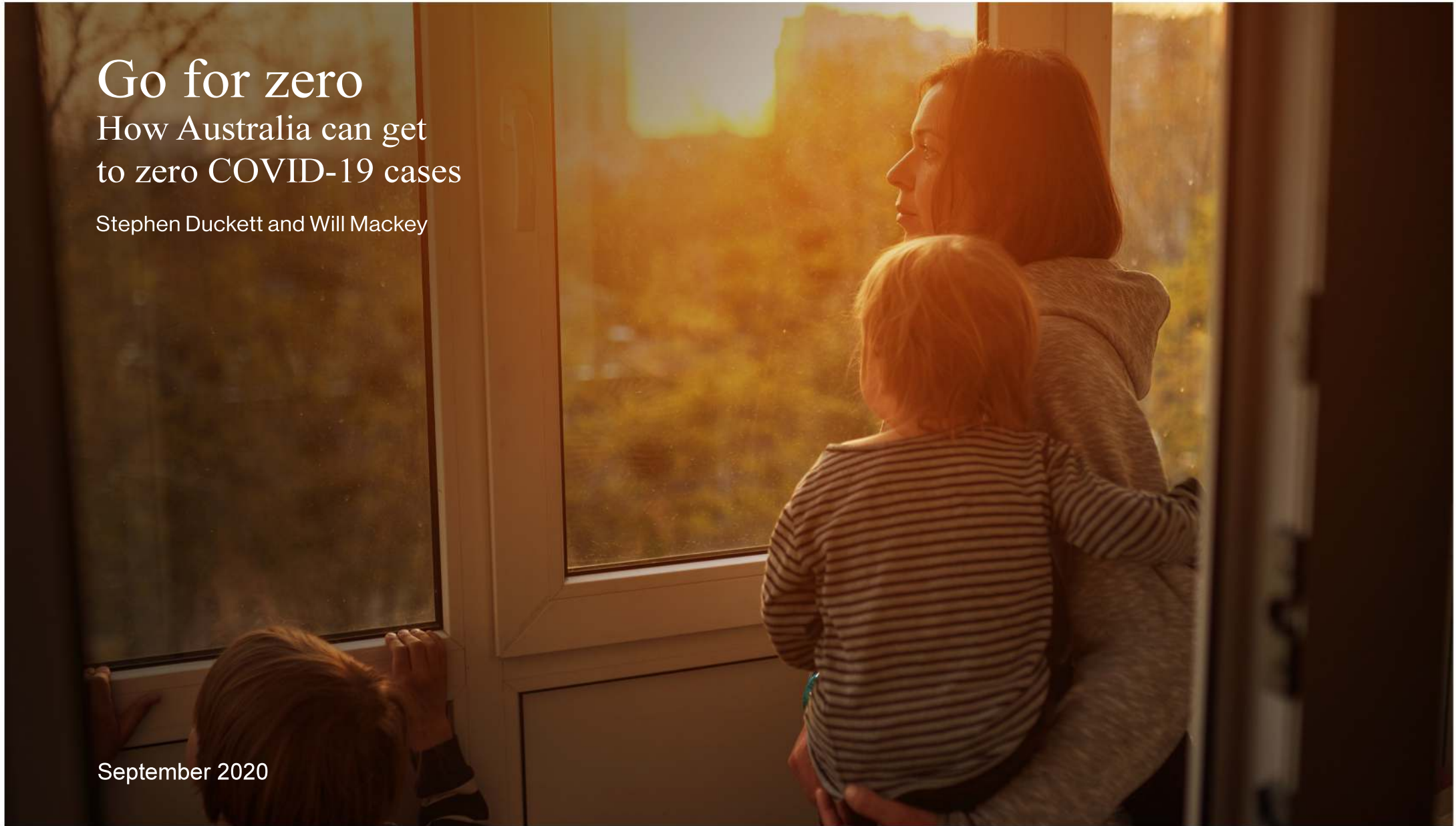


Go for zero

How Australia can get
to zero COVID-19 cases

Stephen Duckett and Will Mackey

September 2020



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Overview

COVID-19 has killed 800,000 people worldwide. The spread of the virus that carries it, SARS-CoV-2, continues to increase. Victoria and NSW are now facing their largest challenges with community transmission. Australia's response to these new challenges are as important as its swift and effective response in March.

This report outlines the health, social, and economic costs associated with three different scenarios: widespread COVID-19 infections, lockdowns, and low-level community transmission. It argues that Australia can minimise the costs to the community over time by taking steps to drive active COVID-19 cases down to zero, in line with the goal set by the National Cabinet in July.

Why aim for zero?

Already more than 650 people have died from COVID-19 in Australia. Widespread COVID-19 infections would pose substantial risks to the health and wellbeing of Australians. Health systems could be overwhelmed, and non-COVID healthcare issues ignored. Ten million Australians are in a higher risk category for COVID-19 complications, and many of them would choose to restrict their activity. The economic costs would also be sizeable: overseas evidence suggests that self-imposed restrictions in activity and consumer spending are close to those of mandated lockdowns.

Low-level community transmission also comes with costs: reduced consumer activity due to fear of the virus, lower consumer and business confidence, and COVID-free states maintaining border closures. The vulnerable are disproportionately at risk because they are less likely to be able to work at home and more likely to live in crowded conditions. And while the virus is spreading in the community there is a much greater risk of superspreader events and a return to uncontrolled spread.

Lockdowns to contain the virus come with substantial costs. Economic activity and jobs take a big hit. There is a loss of freedom and social interaction with loved ones. Domestic and family violence is likely to increase, partly because of this isolation. School closures reduce the level of education provided to the most disadvantaged students and pose a severe imposition on parents – especially mothers – required to look after their children.

Ideally, lockdowns are only done once and done well. The benefit of zero is to reduce the risk of 'yo-yoing' between virus flare-ups and further lockdowns to contain them.

How do we get to zero?

Western Australia, South Australia, Tasmania, the Northern Territory, and the ACT have already reached, and so far maintained, zero community transmission. For the other states, a calibrated response depending on the number of new cases is the best approach.

Victoria should ease restrictions only when new cases are below 20 a day. Victoria, NSW, and Queensland should ease restrictions further when new cases are below 5, and again at zero.

To maintain zero cases there must be effective quarantining of all international arrivals. States must ramp up testing. Contact tracing must be quicker and more efficient, so any cases that sneak through can be jumped on.

Continuing restrictions for the states with COVID-19 will mean more short-term pain; but the payoff will be greater freedom on the other side. Getting to zero means life can return to closer to normal, with a substantially reduced risk of future outbreaks.

Zero is in our sights; now is the time to finish the job.

Grattan's four-point plan

1. Governments should be explicit about their goal of zero active COVID-19 cases in the community and their plans to hit this target

- The National Cabinet should reaffirm and make explicit Australia's target of zero active cases in the community. This should be publicised, to rally the community around the shared goal.
- Each state and territory should have detailed, public plans for reaching zero active cases.
- Governments should implement and maintain 'smarter' restrictions that can reasonably be expected to bring cases down to zero.
- Restrictions on low-risk, high-benefit activities should be relaxed first. These activities should be assessed regularly and restrictions adjusted in line with local and international epidemiological research.

2. Governments should be clear to the public about conditions under which restrictions will be phased out or brought back in

- Governments should set thresholds, to provide clarity on when restrictions will be eased or strengthened.

3. Governments should improve public health efforts

- Tests should be processed and results received within 24 hours, to enable fast contact tracing for positive cases, and short stints of self-isolation for negative cases.
- Contact tracing systems should be improved in all jurisdictions, including digital contact tracing records of patronage at public venues.

- Masks should be made mandatory during high-risk activities when there are active COVID-19 cases in the community.
- Economic supports to aid people forced to miss work due to COVID-19 isolation should be extended.
- More timely, detailed, and relevant data about contact tracing, testing, and isolation should be made public regularly.

4. Once Australia gets to zero cases, governments should use frequent testing and international quarantine to seek to stay at zero cases

- State governments should ensure proper staffing of and training within quarantine facilities, possibly using police supervision, with support from the Commonwealth Government.
- Governments should maintain substantial testing, including regular testing of people connected to the international quarantine system and regular testing of sewage.
- Governments should generate and regularly update outbreak preparedness plans, to enable short, local restrictions to be introduced if a case is detected.

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1 The state of COVID-19

COVID-19 has killed 800,000 people worldwide. The spread of the virus that carries it, SARS-CoV-2, continues to increase, infecting more people in July than in any month during the pandemic. There have been more than 20 million confirmed cases so far, with the real number of infections likely to be far higher.¹

Australia has fared relatively well. The Commonwealth Government, led by the National Cabinet, closed international borders and locked down early. We did so without the serious community transmission that had plagued other countries before they took action. This early action saved lives and – combined with large economic support – saved livelihoods.

But Australia did not have a clear, long-term strategy for dealing with the pandemic.

Victoria and NSW are now facing their largest challenges with community transmission. These challenges are being repeated around the world, in countries that have kept cases down and those that have lost control.

Australia's response to these new challenges are as important as its swift and effective response in March.

1.1 Australia's COVID-19 strategy has been unclear

Australia has taken a long time – too long – to settle on an explicit COVID-19 strategy. In March, the Commonwealth Government emphasised 'slowing the spread' and 'flattening the curve', while states said they were 'stopping the spread'.² The Commonwealth was called on to be clear about the nation's long-term strategy.³ In April, the Prime

Minister attempted to clarify the Commonwealth's position by combining two distinct strategies, saying Australia was pursuing 'a successful suppression/elimination strategy for the virus'.⁴

As Victoria's second wave developed into July, there were calls for an explicit 'elimination' strategy – to get to zero cases in the community before reopening.⁵ But the Commonwealth rejected this. The Deputy Chief Medical Officer announced on 12 July that the Government had a new term for its strategy, 'aggressive suppression':⁶

We have termed this 'aggressive suppression', where we take whatever measures are necessary, including the difficult decisions to reintroduce restrictions and close borders, to shut down community transmission where it occurs.

This was confirmed as the goal for Victoria and NSW as outbreaks continued, with the Deputy Chief Medical Officer announcing on 20 July that the target for NSW and Victoria is 'no community transmission':⁷

I think we should change the wording now to 'no community transmission'. This is the situation in six out of the eight of our jurisdictions. That is the target we'll be going for in NSW and Victoria once we get the current outbreaks under control again. Zero cases of community transmission.

On July 24, the Prime Minister, on behalf of the National Cabinet, reiterated this goal of zero community transmission:⁸

1. Johns Hopkins Coronavirus Resource Center (2020).

2. Duckett et al (2020, p. 36).

3. See Daley and Duckett (2020); Duckett (2020a).

4. Morrison (2020a).

5. Duckett and Mackey (2020a); Blakely (2020); Thorne (2020); and Dore (2020).

6. Coatsworth (2020).

7. 7.30 Report (2020).

8. Morrison (2020b).

National Cabinet recommitted to the suppression strategy for COVID-19, with the goal of no community transmission.

The new, explicit Commonwealth Government goal of zero community transmission is commendable. This report shows that it is the strategy that will have the lowest health, social, and economic costs for Australians. It is a strategy supported by the community, who felt that lockdown restrictions were previously lifted too quickly.⁹

But to achieve this zero goal, state and Commonwealth authorities must take action. In the first half of this year, they fell short.

1.2 Australia's COVID-19 response has been inadequate

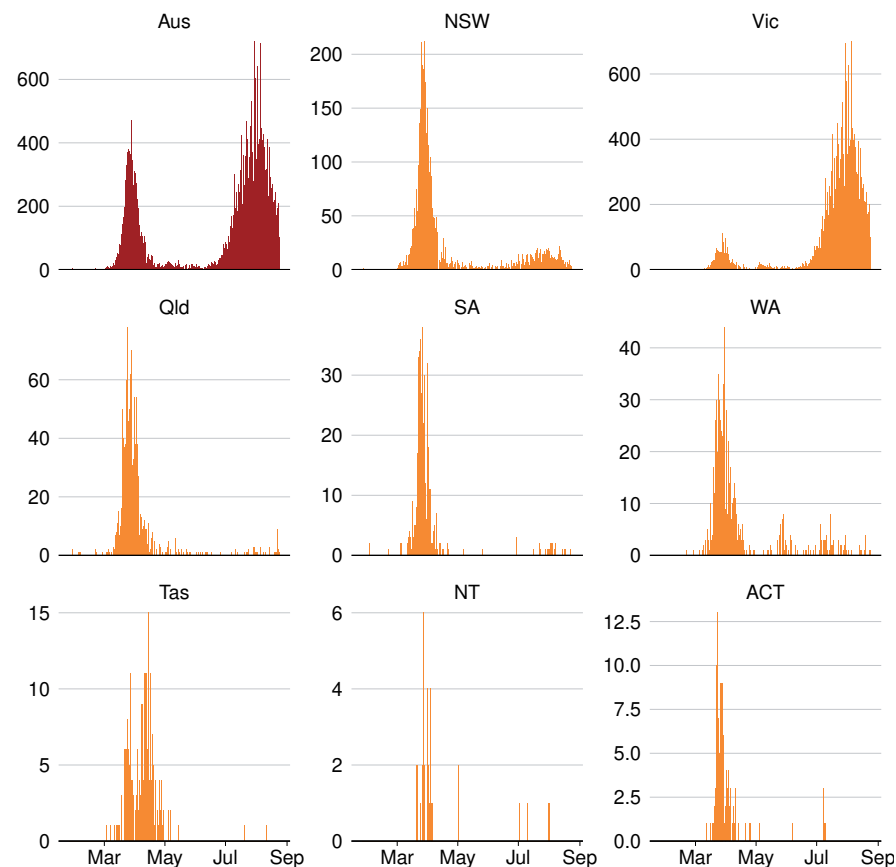
Australia's response to COVID-19 has moved through a series of phases: from caution to an escalated national response, and now to fragmentation as states respond to the COVID-19 caseload within, and on, their borders.¹⁰

In late January, cases began to trickle into Australia via travellers returning from China. Over February, the risk rapidly escalated as COVID-19 spread globally. By March, more and more travellers arriving in Australia tested positive. The Commonwealth Government banned or restricted arrivals from China, then Iran, South Korea, and Italy. On 28 March, mandatory two-week hotel quarantining of Australian international arrivals was introduced; it is still in place today. At the same time, Australia's states and territories except for Victoria, NSW, and the ACT shut their borders (see Section 1.2.3).

When daily case numbers pushed past 200 in mid-March, an escalated national health response was instituted by the coming together of governments in the form of the National Cabinet. Very quickly, as new

Figure 1.1: Australia has managed to drive down COVID-19 cases everywhere except Victoria

New cases from all sources



Source: Data from state and territory updates, collated by Barry (2020).

9. Benson (2020).

10. Australia's response to the COVID-19 pandemic through to June is outlined in detail at Duckett et al (2020, Chapter 2).

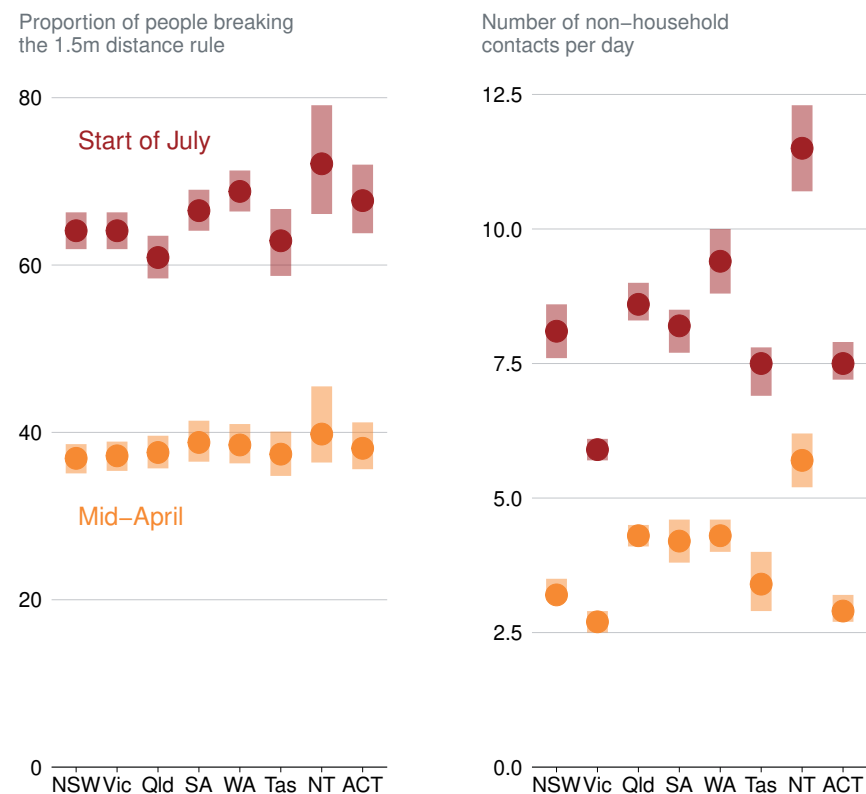
cases reached over 400 per day – mostly from overseas arrivals – all states went into lockdown. Many non-essential businesses closed their doors, schools mostly closed and went online, and Australians stayed at home ‘where possible’.

The Commonwealth Government announced a succession of economic response packages, including increased support for some unemployed – JobSeeker – and a wage subsidy for struggling businesses – JobKeeper. For several weeks, Australian life slowed and the rate of new COVID-19 cases fell, both from international arrivals and from transmission in the community. By the end of April, Australia had fewer than 30 new cases a day. SA, WA, the NT, and the ACT have barely had any locally-transmitted cases since.

In early May, Australians cautiously breathed a sigh of relief. On May 8, the National Cabinet announced its 3-step recovery plan to ease restrictions. Despite seeking national consistency, the plan supported a ‘go-it-alone’ approach, with some states easing restrictions faster than others, and endorsing localised responses to any outbreaks. Slowly, states began to unwind restrictions – starting with small gatherings of 5-to-10 people and scaling up to cafes and restaurants opening, and even large sports events recommencing in some states, albeit with patrons socially distanced.

As case numbers were controlled, area by area, state by state, life returned to something closer to normal. More people started leaving the home. Figure 1.2 shows that, on average, they not only came into contact with more people when they left their homes, but they were less likely to follow the 1.5 metre distancing guidelines when they did.

Figure 1.2: People had more contacts and were less likely to follow social distancing in July compared to April



Notes: The shaded areas show 90 per cent confidence intervals. Mid-April figures are from peak adherence levels around April 8 (for contacts) and April 12 (for distancing).

Source: Golding et al (2020, Table 1).

The Victorian Government revealed that in June, of people who went on to be diagnosed with COVID-19, 90 per cent of people did not self-isolate from when they first felt sick to when they got a test. And 53 per cent didn't self-isolate while awaiting their test results.¹¹

In Victoria and NSW, through local transmission and breaches of quarantine, COVID-19 remained in the community. With restrictions eased and behaviour lapsing, it was only a matter of time until another outbreak.

1.2.1 Victoria's second wave

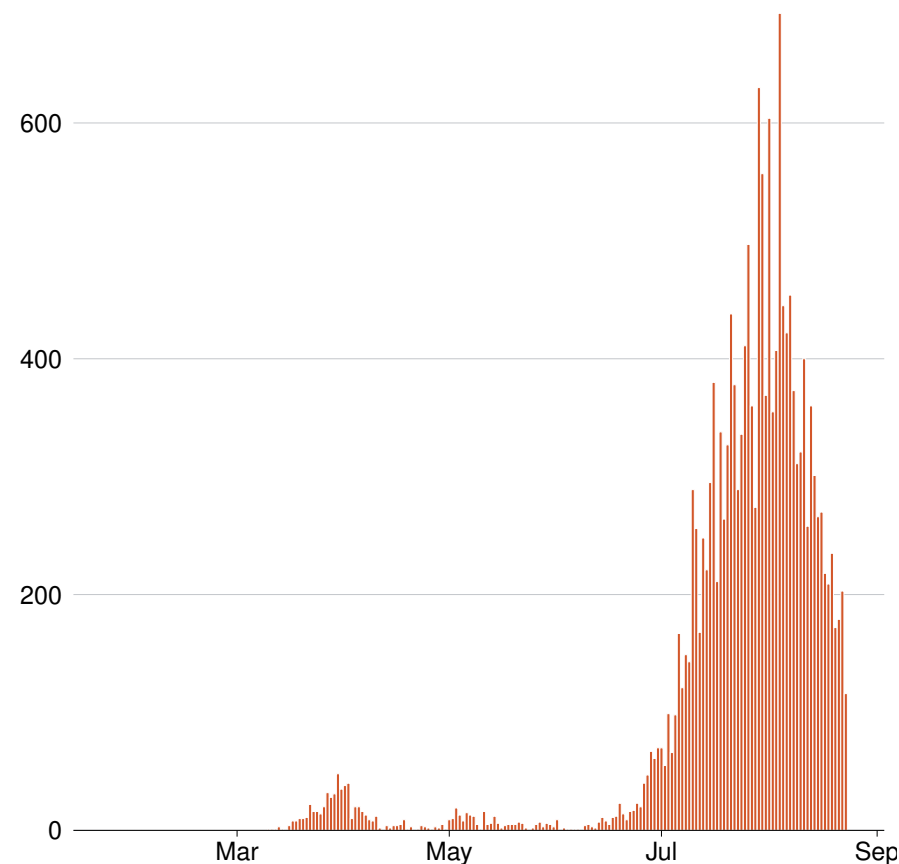
Community transmission in Victoria rumbled along in April and May, with between zero and five new locally-acquired cases detected daily, as Figure 1.3 shows. In late April there was an outbreak at the Cedar Meats abattoir, resulting in more than 100 cases connected to the plant. Despite this, Victoria began to ease its restrictions in mid-May when there were fewer than 10 new cases a day. People could gather in small groups, and schools returned to in-class teaching on 26 May. On 2 June, cafes and restaurants were allowed to open with restricted customer numbers.

Two weeks later, in mid-June, case numbers began to rise again, this time driven by community transmission rather than overseas arrivals. The Government again tightened restrictions. On 21 June, the size of permitted gatherings was reduced. Health authorities targeted the 'hotspots' with a testing blitz – testing anyone, with or without symptoms – scrambling to prevent any further spread.

The Victorian Government put 10 postcodes areas across Melbourne, spanning 36 suburbs, back into Stage 3 lockdown. It immediately locked-down nine public housing estates in Melbourne's inner-west.

Figure 1.3: Victoria had eight times more local cases in the second wave as it did in the first

New cases per day, excluding cases from overseas



Source: Barry (2020).

11. Clayton (2020).

Within hours, police arrived and residents were prevented from leaving for at least five days.

But it wasn't enough. From 8 July, all of Greater Melbourne and Mitchell Shire to the north were put into Stage 3 lockdown. Even that wasn't enough, and on 6 August Melbourne went into Stage 4 lockdown.

1.2.2 Outbreaks in NSW

Despite the border controls, cases leaked from Melbourne into NSW. Figure 1.4 shows that clusters began to emerge in the first half of July, the biggest associated with the Crossroads Hotel on Sydney's western fringe. New cases hovered around 10-to-20 per day, and the NSW Government responded by re-introducing restrictions, bit by bit. Nonetheless, the NSW Premier announced on July 14 that the state 'would not return to lockdown'.

On July 19 the NSW Transport Minister urged people to avoid non-essential travel and social gatherings. As students returned to school, he warned of the 'inherent risk' of catching public transport.¹² The Premier announced a stricter border closure with Victoria.¹³

Restrictions were tightened on pubs across NSW on 17 July, limiting group bookings to a maximum of 10 and capping total numbers at 300 per venue. People were asked to limit non-essential travel. A heightened alert level was introduced for health workers in NSW on 24 July.¹⁴ On the same day, restrictions to restaurants, bars, cafes, and clubs were tightened. Weddings and corporate events were again limited to 150 people.

12. Gorrey and Smith (2020).

13. Smith et al (2020).

14. Koff (2020).

In late July, the NSW Cabinet was reportedly 'divided' over whether the state may have to re-enter lockdown.¹⁵ But small, frequent increases to restrictions remained the policy.¹⁶

New cases continue to appear, and new clusters continue to be identified. But NSW Health and the NSW people have, so far, prevented major outbreaks from occurring (Figure 1.4). In doing so they have saved lives.

However, each new case brings with it the risk of an outbreak. As time rolls on, this risk increases (see Section 4.2.2). Additional social distancing restrictions or lockdowns may be necessary to bring cases down to zero as per the strategy declared by the National Cabinet.

1.2.3 Closures and tightening of state borders

Meanwhile, other states and territories witnessing the crisis unfolding in Victoria put a tighter seal of their internal borders. From 2 July, NSW prevented travellers from Melbourne hotspots entering its state, unless they were a NSW resident or had special circumstances. The ACT followed with similar restrictions on 3 July. On the same day, Queensland began mandatory quarantine for any Victorians entering the state.

As the crisis escalated in Victoria, jurisdictions went even further. NSW closed its border to all Victorian travellers on 8 July. On the same day, South Australia increased its border controls to travellers from Victoria. Tasmania delayed the opening of its borders and pledged to turn back any travellers from Victoria who were not Tasmanian residents. Western Australia tightened its border controls on 9 July to anyone who had been in Victoria in the past 14 days. Although the Northern Territory opened its borders on 17 July, it barred travellers from Victoria

15. Koziol (2020).

16. Smith (2020).

and metropolitan Sydney. In Queensland, interstate arrivals are required to self-isolate. But random checks of people in self-isolation found 17 per cent were not following the isolation protocols.¹⁷

The NSW borders were tightened further on 21 July, affecting people who commute across borders. Some healthcare workers were unable to get to work, and some patients were unable to see their healthcare providers.¹⁸

On 24 July, the Tasmanian Premier announced that a 'safe travel bubble' would be established between South Australia, Western Australia, the Northern Territory, and Tasmania. At the same time, the South Australian Premier announced tougher border restrictions and limits on gatherings, saying that 'the entire nation is on high alert'.¹⁹

The West Australian Premier has been clear that his state's hard border will remain 'as long as it takes to protect people and keep our economy functioning within our borders'.²⁰

1.3 COVID-19 continues to have a devastating global impact on countries that have not brought case numbers down

Globally, about 280,000 new cases of COVID-19 are reported each day.²¹ There are major, uncontrolled outbreaks in countries around the world.

Where major outbreaks have occurred, strict lockdowns have usually been the response. Figure 1.6 shows that as COVID-19 took hold in western Europe, lockdowns were imposed and people stayed home. In each of these places, the restrictions on movement during the first

17. Crockford and Dennien (2020).

18. Davis (2020); and Davis and Burnie (2020).

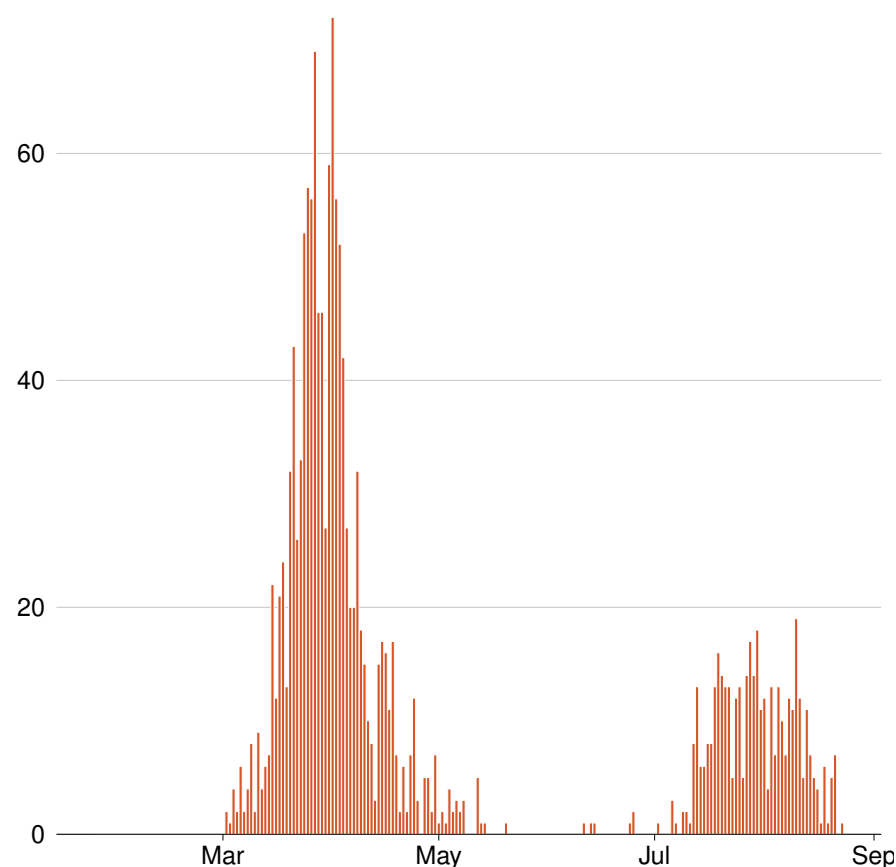
19. Dornin (2020).

20. Thompson (2020).

21. Roser et al (2020).

Figure 1.4: Local cases continue to appear in NSW

New cases per day, excluding cases from overseas



Source: Barry (2020).

wave were more onerous than they were in Australia. More people in these countries spent longer in lockdown than people in New Zealand did during the first wave. The strict lockdowns in NZ *before* the virus had an opportunity to take hold in the community meant life there could return to normal more quickly.

No country in the world is close to herd immunity. Even in Spain – one of the hardest hit in the first wave – the most comprehensive serological survey after the first wave found that only about 6 per cent of the population had been exposed to the virus, far below the estimated 60 per cent required for effective herd immunity²² (see Chapter 2).

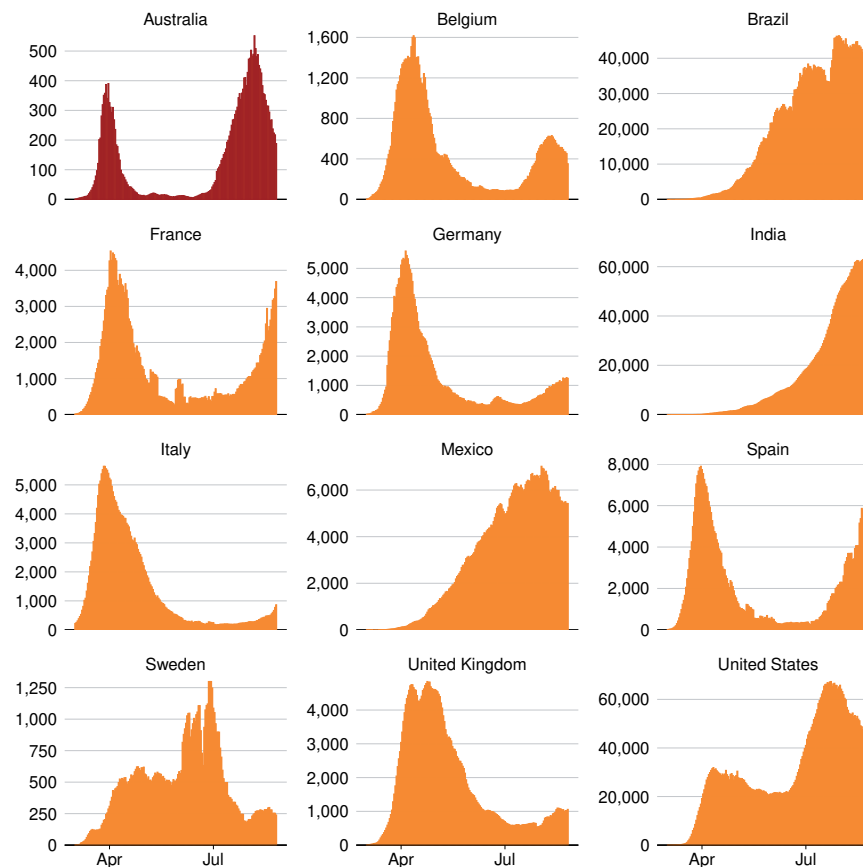
As Spain opened up after its first wave, opening international travel and relaxed social distancing were the right conditions for the virus to spread again, and it did, with new cases growing from early July (Figure 1.5). The benefits from opening international travel were short-lived; most European countries moved to ban travel to Spain just weeks after the country opened its borders in June.²³

This pattern has been repeated throughout Europe and the rest of the world.

Countries that suppressed the virus through lockdowns during the first wave but still had substantial community transmission are now facing second waves.²⁴

Figure 1.7 shows that, in cities that had a serious first wave of COVID-19 infections, weekly all-cause mortality rates were significantly higher than their long-term trends. And the worst may be yet to come.²⁵

Figure 1.5: Many countries are suffering a second wave
Daily confirmed cases of COVID-19



Notes: Rolling 7-day average. Actual figures are likely to be larger due to undetected cases.

Source: Roser et al (2020).

22. Pollán et al (2020).

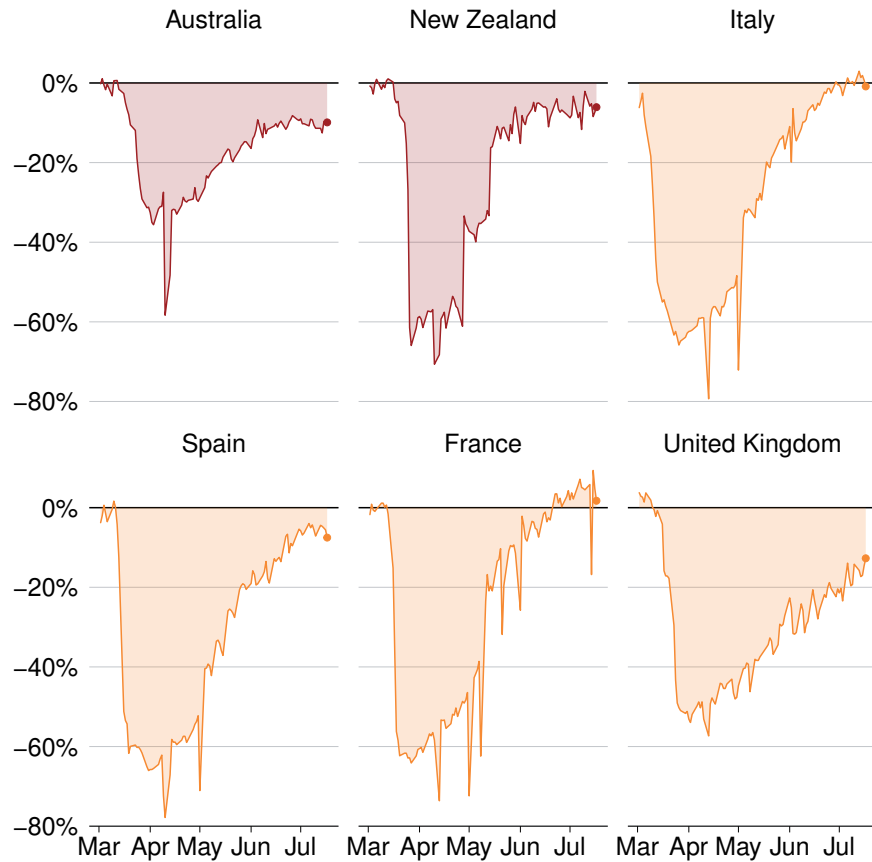
23. Badcock (2020).

24. Bryant (2020); and Courten et al (2020).

25. The Lancet (2020).

Figure 1.6: Lockdowns reduced movement more in NZ and western Europe than in Australia

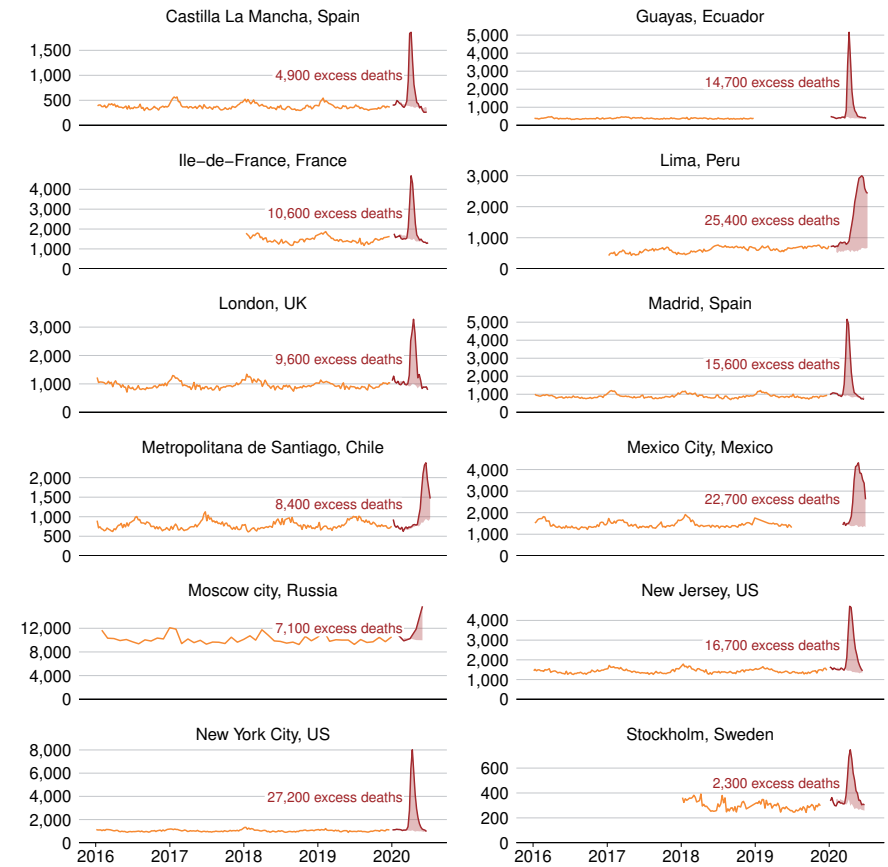
Daily movement compared to pre-COVID trend



Source: Facebook (2020).

Figure 1.7: COVID-19 is not just a 'bad flu'

Weekly deaths (all-cause mortality) in cities with substantial COVID-19 infections



Notes: Data not available for some cities in some years. For full details see *Financial Times* (2020).

Source: Data collated by *Financial Times* (ibid).

1.4 Even countries that controlled the virus are suffering resurgences

Few countries have been able to maintain a suppression strategy without a resurgence in cases or significant restrictions on movement and activity. Figure 1.8 shows the restriction stringency, local mobility, and the number of new cases in Australia and six other countries that have maintained relatively low levels of community transmission.

Japan eased restrictions in May, with residents enjoying some of the most permissive distancing measures of any developed country. Nightclubs and theatres are open, and 5,000 people are able to attend concerts.²⁶ But as restrictions have eased, cases have risen. More than 1,000 cases per day were being detected in Japan by early August, despite lower levels of testing than commonly seen in Australia.²⁷ The Government has not reintroduced restrictions – but some residents appear to be taking action, with Google mobility data showing a reduction in activity.

Singapore continues its battle with infections, averaging about 250 cases per day, mostly in foreign worker dormitories. Economic activity is far from normal. Shops and restaurants are open, but groups are still limited to five people or fewer, and capacity limits remain.²⁸ Google mobility data suggests many Singaporeans are still choosing to stay at home.

South Korea and Norway have so far maintained a suppression strategy without a second wave, but given the community transmission, the risk remains elevated.

South Korea has recovered from a high of 700 daily cases in March, and has largely suppressed the virus since April. An outbreak occurred

in a nightclub district in May, raising concerns about a possible second wave. Rising cases provoked some local governments to increase restrictions. Museums, parks, and art galleries were closed in Seoul in May, and companies were urged to reintroduce flexible working hours for all staff.²⁹ Some nightclubs remain open, and Google data suggests people are moving at pre-COVID levels.³⁰ Over the past month local cases have stabilised at about 20 per day in South Korea.³¹

Norway peaked at 300 daily new cases in early April, leading to lockdowns similar to Australia. Case numbers have been in stable double digits since May, despite a gradual easing of restrictions.³² Large events are still banned, but Google's mobility index suggests Norwegians are more-or-less back to normal travel patterns. Testing rates are one third of Australia's.³³

New Zealand and Taiwan have taken a different path, both reaching zero community transmission for a period. They are now the two developed countries with the least social and economic restrictions.

In Taiwan, the last domestic case of COVID-19 was recorded in May.³⁴ Taiwan's approach was to go hard and early, using measures and infrastructure they developed during the SARS outbreak in 2003. Taiwan has a household registration system that – from January – allowed them to identify citizens and foreigners who had recently travelled in affected areas in China, and place them under home quarantine that was monitored by mobile phones.³⁵ Taiwan has maintained its 'big data' approach to monitoring outbreaks and tracking

26. The Japan Times (2020a).

27. The Japan Times (2020b).

28. Pek (2020).

29. Han-soo (2020); and McCurry and Harding (2020).

30. Barrionuevo and Kim (2020).

31. Ministry of Health and Welfare (Korea) (2020).

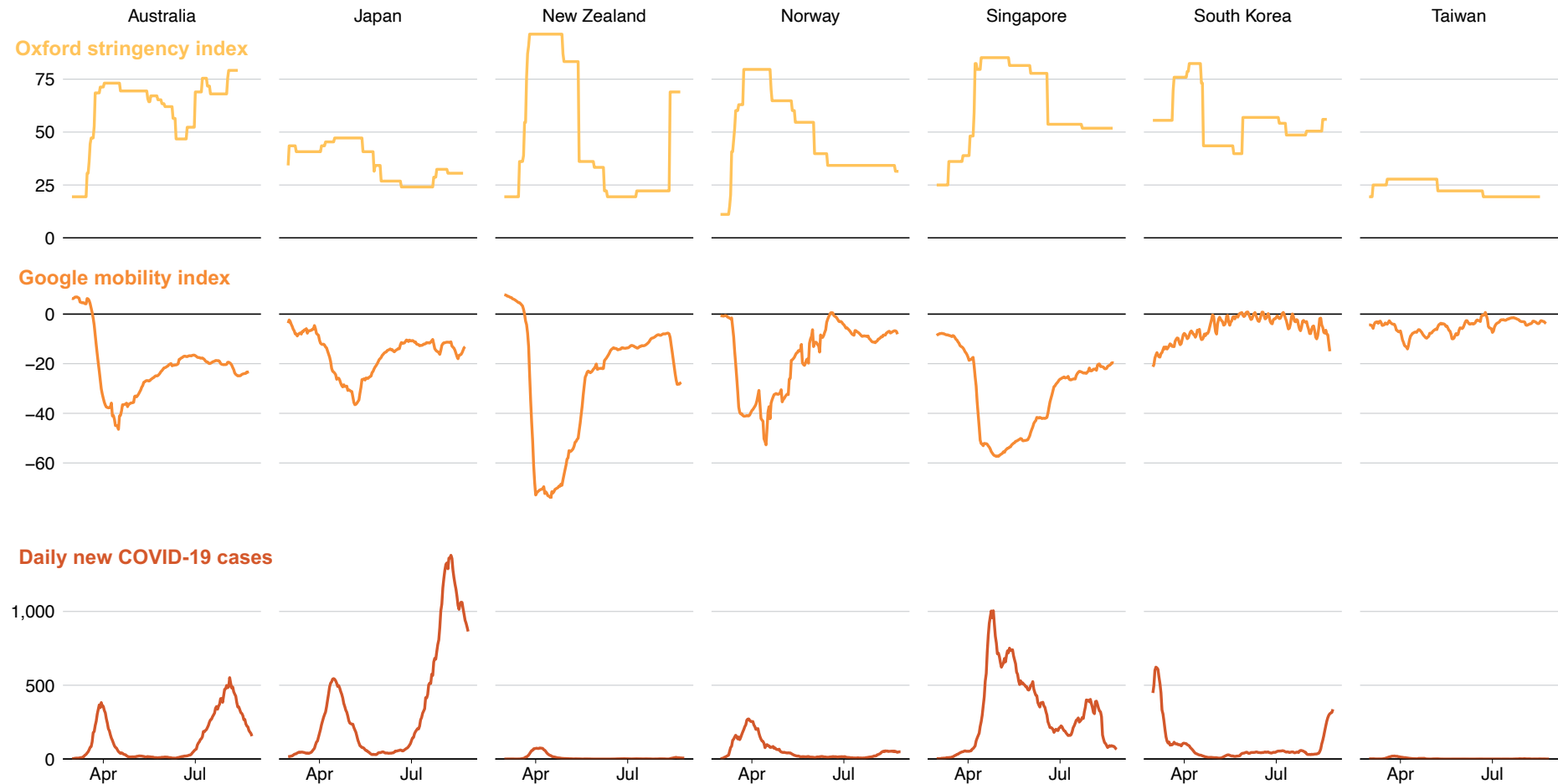
32. Norwegian Institute of Public Health (2020a); and Nikel (2020).

33. Norwegian Institute of Public Health (2020b).

34. Taiwan Centres for Disease Control (2020).

35. Wang et al (2020); Schleich (2020); and Khaliq (2020).

Figure 1.8: Approaches to COVID-19 control around the world



Sources: Hale et al (2020), Google (2020) and Johns Hopkins Coronavirus Resource Center (2020).

people.³⁶ All people catching public transport have their temperature checked. Those with a temperature higher than 37.5 degrees are prohibited from boarding.³⁷ Taiwan doesn't let people who have COVID-19 – or those who have been diagnosed with COVID-19 in the past two months and are still showing any symptoms – fly into the country.³⁸

New Zealand had more than 100 days without local cases of COVID-19. On August 11, four people in Auckland, all in the same family, were confirmed as COVID-positive.³⁹ The source of the cases was not able to be identified and the Prime Minister activated Level 3 restrictions – similar to Australia's Stage 3 – in Auckland. The rest of New Zealand was placed on Level 2 restrictions (gatherings limited to 100 people, maintain physical distancing, and wear a mask where possible).⁴⁰ Testing had slowed in New Zealand throughout the 100 days without new cases, and the four family members had symptoms for five days before getting tested. But testing was quickly ramped up as the new cases were announced. New cases continued to emerge at about 10 per day for a week. Thousands of contacts were successfully traced. From 19 August, cases started to come down.⁴¹ By 26 August, there were 113 cases in the community in NZ,⁴² with 2,060 close contacts identified and 2,004 in self-isolation. Auckland remains in stage 2.5 lockdown.⁴³

New Zealand is an important reminder that reaching zero doesn't entirely eliminate the risk of new cases. In responding, uncertainty about the source of the infection and the ability to ramp up contract

tracing and testing, led to a lock-down led response. The Prime Minister has flagged that for any future outbreaks she is hopeful that a combination of Level 2 restrictions and contact tracing will be sufficient to quickly contain the spread and reduce cases back to zero.

The decisive action in New Zealand to limit the spread of COVID-19 before case numbers got out of hand means that these new restrictions will be in place for a shorter period of time than if they had waited.⁴⁴ While the origin of the new cases is yet to be determined, New Zealand can examine how their COVID-response worked. They can examine the effectiveness of the immediate Level 3 restrictions and of their contact tracing.

These six countries have all taken similar approaches to Australia: use lockdowns to dramatically suppress the spread of the virus. Their health and economic outcomes will be substantially better than countries that took longer to respond or that let the virus spread too far before acting. But, like all countries, they will still face a cost.

36. Lin (2020); and Wang et al (2020).

37. Jixin (2020).

38. Taiwan Centres for Disease Control (2020).

39. Mackay (2020).

40. A. Wade (2020).

41. Mackay (2020).

42. And 21 from quarantined returned travellers: Massola (2020).

43. ABC News (2020a).

44. Plank et al (n.d.); and Kompas et al (2020).

2 The health and social costs of COVID-19

There are health and social costs associated with the COVID-19 pandemic. Some of these are direct effects, such as death and long-term health effects from the COVID-19 disease itself. Others are indirect to the virus, such as the mental health costs due to fear of being infected.⁴⁵

But there isn't a scenario in which there are no costs caused by the pandemic. It can't be wished away. The costs of one plan must be compared with the costs of a viable alternative.

This chapter explores these health and social costs under three different pandemic scenarios: during widespread COVID-19 infections, during lockdowns, and during low-level community transmission. Each of these scenarios involve different health and social costs.

Widespread COVID-19 infections will have the greatest direct impact on the health and wellbeing of Australians. Uncontrolled spread of the pandemic takes a severe mental toll. Health systems can be overwhelmed, and non-COVID healthcare issues ignored. For the 10 million Australians who are in a higher risk category for COVID-19 complications, there are substantial restrictions on freedom during widespread infections in the community.

The costs of lockdowns come from the temporary restriction of freedom of everyone in a local area. This loss of freedom is costly in itself, as is the loss of social interaction with loved ones. Domestic and family violence is likely to increase, partly because of this isolation. School closures reduce the level of education provided to the most

45. Note that this section discusses suicide and domestic and family violence. If you or anyone you know needs support, call Lifeline on 131 114, or Beyond Blue's coronavirus mental wellbeing support service on 1800 512 348, or 1800RESPECT.

disadvantaged children and pose a severe imposition to parents required to look after their kids – especially mothers.

Low-level community transmission brings with it its own health and social costs. The ability to avoid this transmission is provided only to some, with many – because of where they can afford to live or where they can work – unable to avoid contact with others.

None of the scenarios are permanent. Around the world, lockdowns have been required to control outbreaks and establish low-level community transmission. Chapter 1 has shown that after a period of lockdown, Victoria lived with low-level community transmission for a few months before returning to lockdown.

2.1 The health and social costs of unmitigated spread

Letting COVID-19 rip through Australia would cause between 75,000 and 150,000 people to die.⁴⁶ Many more will suffer longer-term illnesses that have been associated with COVID-19, such as chronic fatigue.⁴⁷ The virus would take months – maybe years – to rip through the Australian population and reach the 60 per cent target estimated to be required for herd immunity.⁴⁸ And we do not yet know whether all survivors would have long-term immunity. If re-infection is possible, herd immunity may be unachievable.⁴⁹ Herd immunity has not been responsible for the declines in infection and death in even the most hard-hit countries.⁵⁰

46. Assuming a 0.5-to-1 per cent case fatality rate and a 60 per cent herd immunity threshold.

47. Faux et al (2020). See also Davey (2020).

48. This 'herd immunity' target can change over time as people move or change their activity. See Cowen (2020).

49. Long et al (2020). See also McMillan (2020).

50. Okell et al (2020).

A ‘let it rip’ strategy may provide more freedoms to people at low risk of contracting COVID-19 or significantly suffering from an infection, but it would require tight restrictions on the freedoms of others.⁵¹

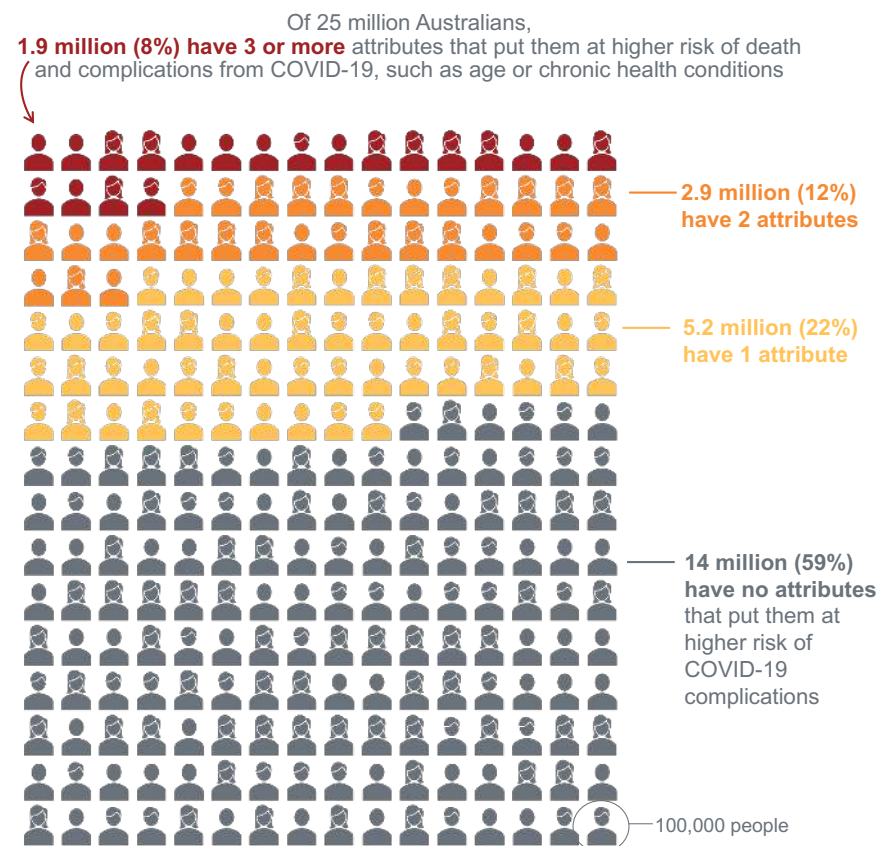
The Department of Health has identified a number of groups that have heightened risk of complications from a COVID-19 infection. They include people over the age of 70; people with cancer, heart disease, diabetes, lung disease, liver disease, kidney failure, severe obesity, immunodeficiency, poorly controlled blood pressure, and some neurological conditions; and Indigenous Australians.⁵²

Data from the National Health Survey in Figure 2.1 shows that about 10 million Australians – 40 per cent – are in at least one of these heightened-risk groups. Nearly 5 million have more than one characteristic that puts them at greater risk. For people in these groups, their risk of death or severe morbidity may be more than twice the rest of the population and increases their overall death rate significantly.⁵³

In countries that have implemented fewer restrictions the tool for which to protect this vulnerable group has been to restrict their movements totally, with limited success.⁵⁴ From the outset in Sweden, the plan to protect the vulnerable was to ensure they stayed inside, that they avoid social contacts, and that they asked for assistance with food shopping and errands.⁵⁵ As of 27 August – half a year into the pandemic – this advice remains in place for the sizeable minority in Sweden who are most vulnerable to a COVID-19 infection.

Uncontrolled spread of COVID-19 would overwhelm Australia’s healthcare systems. Australian intensive care units (ICUs) have

Figure 2.1: About 10 million Australians have at least one high-risk factor for death or complications from a COVID-19 infection



Note: ‘Risk factors’ are any factors identified by the Department of Health as having higher risk of ‘severe’ or ‘moderate’ complications from a COVID-19 infection. The list includes several health conditions, being over 70 years of age, and being an Indigenous Australian.

Source: Grattan analysis of the National Health Survey: ABS (2020a); and the Department of Health ‘Advice for people at risk of coronavirus (COVID-19)’ guidance: Department of Health (2020a).

51. See Andersen et al (2020, Figure A4) for a demonstration of this effect by age. See also Charles (2020).
 52. Department of Health (2020a).
 53. Williamson et al (n.d.); Li et al (2020); and Holman et al (2020).
 54. Charles (2020).
 55. Duckett and Mackey (2020b).

performed well during the pandemic so far.⁵⁶ But in Italy, Spain, New York, Texas, and elsewhere, people had to be turned away when ICU capacity ran out.⁵⁷

In Victoria, almost 1,000 healthcare workers have already been infected with COVID-19.⁵⁸ Healthcare workers – along with people who must work in close physical proximity to others or those who live in crowded homes or group facilities (see Section 2.3) – would be on the front-line of an unmitigated spread of COVID-19. These are people for whom social distancing is not a choice, or for whom protection for themselves means giving up their job or finding alternative accommodation for the duration of the pandemic.

If COVID-19 pressure on healthcare systems mounts, there will be few resources available for non-COVID activity.⁵⁹ And many people – especially those with complicating factors that make their healthcare attendance even more important – will skip regular check-ups for fear of coming into contact with the virus.⁶⁰ As a consequence, the non-COVID death and morbidity toll of the crisis will rise even further.

For people who survive a COVID-19 infection, the longer-term health conditions arising from the infection are just starting to be understood.⁶¹ A study by the Centres for Disease Control and Prevention of patients who had mild symptoms from COVID-19 found that one-in-three had

not returned to their usual health three weeks after testing.⁶² Among young people with no chronic medical conditions, one-in-five had not returned to full health. Among people over the age of 50, half remained unwell three weeks after diagnosis.

Researchers in Italy have found that almost 90 per cent of people who had hospital treatment for COVID-19 were still struggling with symptoms two months after being discharged.⁶³ More than half the otherwise-recovered COVID-19 patients studied in Spain developed neurological problems that have persisted.⁶⁴ Studies around the world have identified lingering pain, insomnia, vertigo, skin rashes, heart arrhythmia, hypertension, and ‘brain fog’ among people who had had COVID-19.⁶⁵

The pandemic is also causing enormous mental health problems. Losing a partner, parent, grandparent, child, or sibling can cause depressive episodes, panic disorders, and post-traumatic stress disorders.⁶⁶ The trauma is likely to be exacerbated when family members are not able to be at the bedside of loved ones because of the virus. A death from COVID-19 doesn’t end there: it can cause a wave of damage to the wellbeing of many others.

When asked by the Centres for Disease Control and Prevention in June, three-quarters of Americans said they would not feel safe if community mitigation strategies were lifted.⁶⁷ The mental health toll of the pandemic is just starting to be understood in the US. People categorised as ‘essential workers’ – healthcare workers, teachers,

56. Le Grand and Dow (2020).

57. Koop (2020).

58. Cunningham (2020a).

59. See Duckett et al (2020, Section 1.4.1).

60. For example, a study looking at the decrease in cancer screening in the UK throughout the COVID-19 pandemic estimates that the slower detection of cancer will lead to a 9 per cent increase in deaths from breast cancer, 5 per cent for lung cancer, and 6 per cent for oesophageal cancer: Maringe et al (2020). See also Outcome Health (2020), Cunningham (2020b), Lazzerini et al (2020), Xiang et al (2020) and Torales et al (2020).

61. See e.g. Puntmann et al (2020).

62. Tenforde et al (2020).

63. Carfi et al (2020).

64. Criado (2020).

65. Couzin-Frankel (2020).

66. See for example Zisook and Shuchter (1991), Zisook et al (1998), Melhem et al (2011) and Keyes et al (2014).

67. Czeisler et al (2020a, Table 2). The rate was higher – 82 per cent – in New York City, where COVID-19 first took hold in the US.

checkout operators, store clerks, etc.⁶⁸ – are most likely to have had an adverse mental health symptom or ‘seriously considered suicide’ in the past month.⁶⁹

2.2 The health and social costs of lockdowns

To slow the spread of COVID-19, Australian governments have used different levels of lockdowns (see Section 1.2). These lockdowns explicitly keep people inside, prevent them from seeing friends and loved ones, and stop them from enjoying the freedoms of movement they had before the pandemic.

The reduction in COVID-19 cases resulting from lockdowns can save hundreds of thousands of lives; prevent even more chronic conditions that result from the virus; and lower the mental toll of an out-of-control pandemic and the uncertainty with which that brings. But lockdowns themselves come with costs.

Mental health hotlines in Australia have reported a 25-to-50 per cent increase in the number of calls received, compared to the same time last year.⁷⁰ But data released by the Coroners Court of Victoria, shown in Figure 2.2, shows that the number of suicides throughout 2020 is the unchanged from previous years. Whether lockdowns or the pandemic itself will cause additional mental health issues in the future remains unknown.⁷¹

Where unmitigated spread of COVID-19 has been shown to take a serious toll on people’s mental health, lockdowns have been shown to stabilise and improve their conditions. Researchers at Cambridge University have used weekly surveys in the UK and global Google data

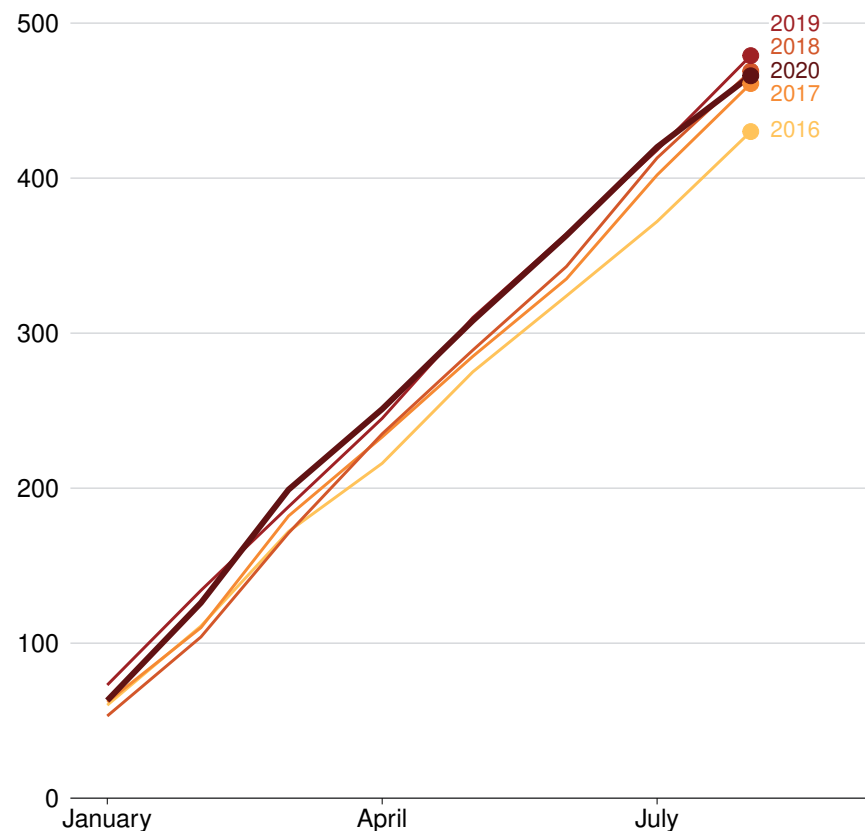
68. People self-identified as an ‘essential worker’ in this survey.

69. Czeisler et al (2020b, Table 1). Lockdowns have, so far, not been shown to increase suicide rates (see the next section).

70. Morrison (2020c).

71. Meyerowitz-Katz (2020).

Figure 2.2: There has been no increase in suicide deaths during 2020
Cumulative annual deaths from suicide in Victoria



Note: The figures for 2020 are as of 26 August, making comparisons imperfect.

Source: Coroners Court of Victoria (2020).

to separate the mental health effects of lockdowns from those of the pandemic.⁷² They find that the pandemic and spread of COVID-19 has a clear negative impact on mental health in the UK, but the introduction of restrictions and controls was associated with a rebound in mental wellbeing.⁷³ The analysis was extended and the findings held in Australia, New Zealand, Ireland, the US, Canada, India, and South Africa.⁷⁴

Lockdowns, job losses, and financial strain increase the risk of domestic violence.⁷⁵ Lockdowns can leave victims of domestic abuse trapped inside their home with their abuser.⁷⁶ The economic hardship suffered by millions of Australians during the pandemic is also likely to increase abuse and violence in the home.⁷⁷

The number of online searches on Google for domestic violence help leapt during the pandemic in Australia.⁷⁸ There were 11 per cent more calls to the domestic violence crisis support-line 1800 RESPECT compared to the same time last year.⁷⁹ The Commonwealth Government announced a \$150 million domestic violence support package at the end of March, but it can't solve all the problems.⁸⁰ The Commonwealth and state governments must continue funding preventive measures to minimise the expected increase in domestic violence associated with the pandemic.

72. Foa et al (2020, Section 3).

73. Ibid (Section 3).

74. Ibid (Section 4).

75. Usher et al (2020); Bradbury-Jones and Isham (2020); and Renzetti (2009).

76. Hegarty and Tarzia (2020). The OECD has also acknowledged this increased risk during lockdowns: OECD (2020a, Box 1.3).

77. Hegarty and Tarzia (2020), Usher et al (2020), Bradbury-Jones and Isham (2020) and Renzetti (2009). The economic costs of COVID-19 are discussed in Chapter 3.

78. Morrison (2020d).

79. Australian Government (2020, p. 10). This figure is based on Department of Social Services data, 28 April 2020. See also Cormack (2020).

80. Morrison (2020d).

School closures are costly for students and parents. Disadvantaged students – those from the poorest 25 per cent of families and those from rural areas – fall further behind their classmates during periods of remote schooling.⁸¹ Many parents have had to stay home to supervise their children. If the parents can work from home, their work output falls; if they can't, they have to take time out from work.⁸² And this burden overwhelmingly falls on women.⁸³

States, and the Northern Territory, which have effectively achieved elimination have implemented border closures against states which have not, requiring travellers from virus-circulating states to quarantine on entry. This has been an effective strategy allowing a quicker return to pre-pandemic life.

But border closures come with costs, especially for communities on the borders, where implementation appears not to have recognised the realities of businesses and services which serve both sides of the border.

In an ideal world, there would be a more nuanced approach to quarantine rules, recognising that border zones may be one conurbation (Gold Coast and Albury-Wodonga are examples) and allow quarantine restrictions to be implemented some distance from the actual state border.

Figure 2.3 shows the number of deaths each week in Australia between 2015-2019 and in 2020 so far. There is a spike in deaths in the final week of March and first week of April 2020 – just after the first lockdowns were introduced and when COVID-19 cases in Australia started to rise. Deaths in these weeks were about 8-to-10 per cent higher than the average of the previous five years.

81. Sonnemann and Goss (2020).

82. Wood and Mackey (2020).

83. OECD (2020a, Box 1.3). See also Section 3.3.3.

Figure 2.4 and Figure 2.5 show that the spike in deaths was most evident among older people with dementia, diabetes, influenza, and respiratory illnesses.

It is unknown whether these additional deaths were a consequence of the pandemic or something else.⁸⁴ And it is not yet possible to distinguish deaths caused by COVID-19, deaths caused by fear of coming into contact with COVID-19 and so avoiding the healthcare system, or deaths caused by consequences arising from lockdowns, such as the loss of social activity and connection with loved ones.

2.3 The health and social costs of low-level community transmission

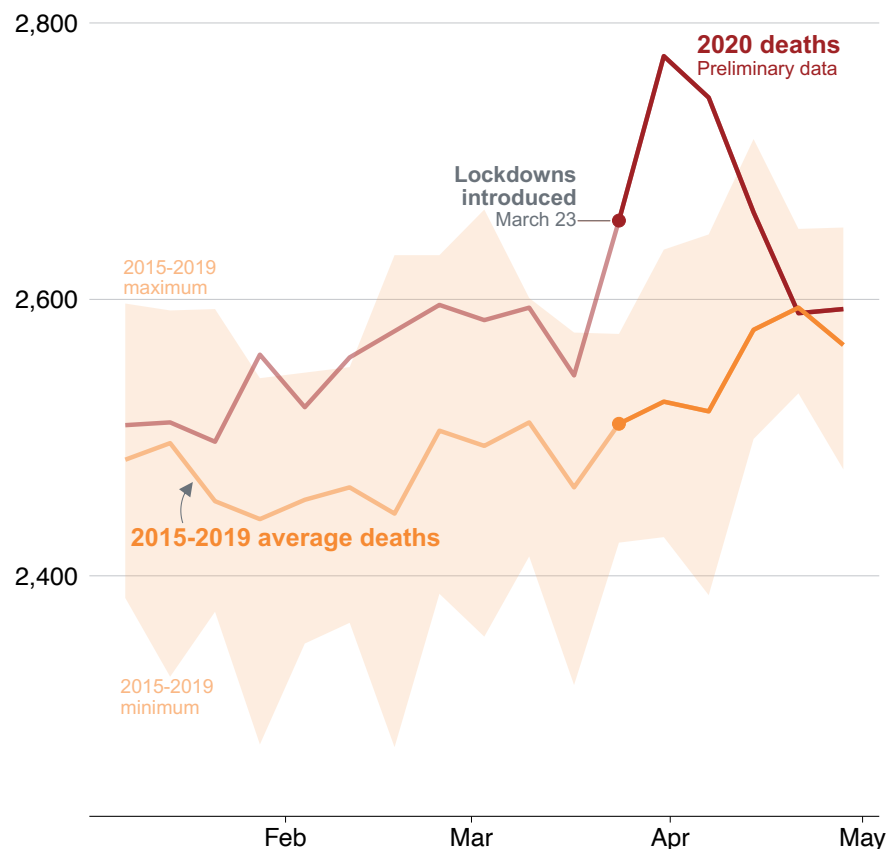
An acceptably ‘low’ level of community transmission has not been defined in Australia. As a consequence, ‘low levels’ of community transmission can mean anywhere between ‘almost zero’ – one or two new cases per day – to ‘low enough as to not overwhelm the health system’ – 1,000 or so new cases per day.⁸⁵

Public health workers need to track down the contacts of every new case of COVID-19. Each close contact must be isolated and tested. During a Stage 3 lockdown, people may have had some contact with 10 others in the past few days. If there are 20 new cases in a day, about 200 contacts need to be tracked down each day. But if lockdown restrictions have been lifted, people may be in contact with 50 others in the past few days, through work, school, pubs, restaurants and so on. In that case, if there are 20 new cases in a day, public health workers would have to track down and isolate 1,000 people each day.

84. It is possible that these excess deaths were linked to the bushfires and bushfire smoke from January and February. However, a similar increase was not seen in the 0-44 age group over this time.

85. See Duckett et al (2020, Section 1.4).

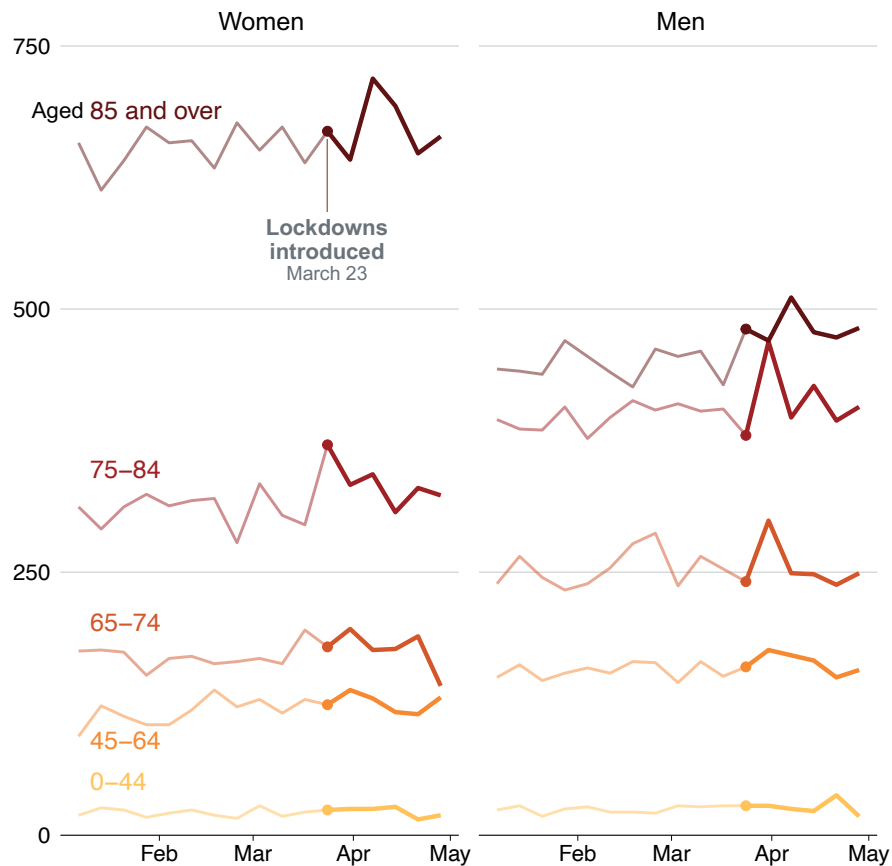
Figure 2.3: There was a small spike in deaths at the end of March
Weekly deaths in 2020 and 2015-2019 (average)



Note: Stage 1 lockdown began on 23 March.

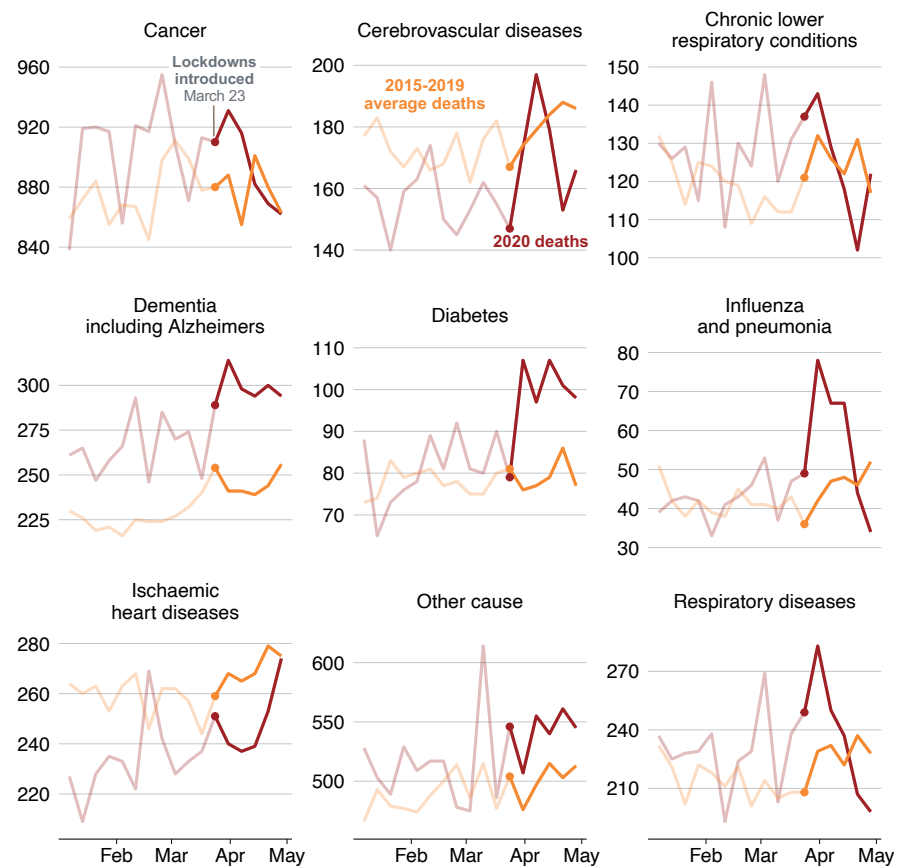
Source: ABS (2020b).

Figure 2.4: The March spike in deaths was among older people...
Weekly deaths in **2020** and **2015-2019 (average)**



Note: Stage 1 lockdown began on 23 March.
Source: ABS (2020b).

Figure 2.5: ... from dementia, diabetes, influenza, and respiratory illness
Weekly deaths in **2020** and **2015-2019 (average)**



Note: Stage 1 lockdown began on 23 March.
Source: ABS (ibid).

If any of those contacts are unknown, or unable to be tracked down by contact tracers before they become infectious themselves, there is a risk of another cluster.⁸⁶ In July, Victoria had between 100 and 800 new cases per day. The number of contacts is enormous. Missing some of them is almost certain, and the likelihood of resulting outbreaks is high.

There is substantial pressure on public health workers, around the clock, while the virus remains in the community. If community transmission bubbles away for months and years, outbreaks are almost certain.⁸⁷

2.4 The risks of outbreaks fall disproportionately on the already-vulnerable

While COVID-19 is in the community, the risks of outbreaks fall disproportionately on those in densely populated accommodation. A COVID-19 case in these homes or facilities is likely to spread because its residents cannot practice social distancing. The millions of people in aged or disability care facilities, prisons, and crowded accommodation throughout Australia are at greater risk while the virus remains.

People living in aged care facilities

People living in aged care facilities are more at risk of outbreaks and of severe complications and death from COVID-19.⁸⁸ More than 1,000 Australians living in government-subsidised aged care facilities have been infected with COVID-19.⁸⁹ Most of these cases have been in Victoria. As of 6 August, 161 had died. Hundreds of staff and close contacts linked to aged care facilities have also been infected.⁹⁰

86. See Duckett et al (2020, Section 3.2).

87. See Section 4.2.2.

88. Vally (2020).

89. Department of Health (2020b).

90. Silva (2020).

Close living quarters and shared common rooms for meals and recreation make contact between residents difficult to prevent. These conditions provide ample opportunity for the virus to spread once it is introduced.

Staff of aged care facilities have to be in close physical proximity to residents. This means residents cannot be sealed off from the outside world. As the virus spreads throughout the community, it will inevitably enter aged care homes. A study of 75,000 aged care residents in Ontario, Canada, found the likelihood of a COVID-19 outbreak in a facility is directly linked to the spread of COVID-19 in its surrounding neighbourhoods.⁹¹

People in prisons

The design and nature of prisons mean that people are in close proximity to each other, making social distancing impossible.⁹² Outbreaks are likely to spread quickly if COVID-19 infects some of the prison population.⁹³ The only way to slow this spread is to isolate prisoners in their cells for most or all of the day, or to make room for social distancing by releasing low-risk prisoners.⁹⁴

There have been major outbreaks of COVID-19 in prisons around the world. In the UK, with over 330,000 cases of COVID-19 in the country, prisons went into pre-emptive lockdowns after health authorities identified the risk.⁹⁵ All 80,000 prisoners in the UK remain locked down in their cells for 23 hours a day, which has limited the spread to about

91. Stall et al (2020). Older facilities and those with more residents also had increased risk of outbreaks.

92. Human Rights Law Centre (2020).

93. Gibson and Hynninen (2020); Russell (2020); and Human Rights Law Centre (2020).

94. Longbottom (2020) and Visontay (2020). However, COVID-induced restrictions on post-release support may complicate this approach: Shepherd and Spivak (2020).

95. Davies (2020).

500 cases.⁹⁶ Prisoners in the US have fared worse. There are been more than 70,000 cases, and 700 deaths, reported in prisons in the US since April.⁹⁷

Prisoners tend to have poorer physical and mental health than the general population.⁹⁸ One-third of prisoners in Australia have a chronic condition such as cancer, heart disease, diabetes, or asthma.⁹⁹ Indigenous Australians are vastly over-represented in Australian prisons and are also at greater risk of complications from COVID-19.

The risk of outbreaks in prisons is starting to be realised in Australia. In Victoria at the end of July, six prisons were placed into lockdown – similar to that implemented in the UK – after a corrections officer tested positive to COVID-19.¹⁰⁰

People living in overcrowded housing

Overcrowded housing has been shown in the US and Singapore to be a significant risk for the spread of COVID-19.¹⁰¹

The severe outbreaks in a public housing tower in Melbourne, where 11 per cent of residents were infected with the virus, illustrated this risk in Australia.¹⁰²

There were 8,000 people living in public housing in Flemington and North Melbourne at the most recent Census, in 2016. A third of those were in homes that required more bedrooms.¹⁰³

96. Ibid.

97. The Marshall Project (2020).

98. Shepherd and Spivak (2020).

99. Human Rights Law Centre (2020).

100. Visontay (2020).

101. Strum (2020); and Kirsten (2020).

102. Department of Health and Human Services (Vic) (2020). These risks were identified by healthcare workers before the June outbreaks in Victoria: Malo (2020).

103. Nolan (*forthcoming*).

Overcrowded housing is not limited to people living in public housing towers. About 1.5 million Australians live in homes with not enough bedrooms; 50,000 of those live in homes that need four or more bedrooms.¹⁰⁴ Many newly-arrived migrants to Australia room-share – where two or more adults not in a relationship share a bedroom.¹⁰⁵

It is impossible for people who live in overcrowded accommodation to practise social distancing or self-isolate. A US study found that during the pandemic, people living in higher-income neighbourhoods sheltered at home earlier, and for longer, than people living in poorer neighbourhoods.¹⁰⁶

People who live in overcrowded housing are more often employed in jobs that require close physical proximity to others, such as retail and food services, as Figure 2.6 shows. This is a vicious cycle: many people who are unable to socially distance at home are also required to have close interactions with others during their working day or night. While the virus remains, these people have little choice but to continue working, and hoping that COVID-19 doesn't head their way.

The Victorian Department of Health and Human Services (DHHS) identified that the outbreak continued because people were not self-isolating when they felt sick or were awaiting COVID-19 test results (see Section 1.2). But for some, skipping work isn't an option. They don't have the savings to miss their casual work hours.

With low-level community transmission, millions of Australians working in jobs that require close physical proximity with others are forced to risk infection or sacrifice their earnings. For the millions more at greater risk of complications and death from a COVID-19 infection (Section 2.1), they must exercise their economic freedom or risk infection in the community.

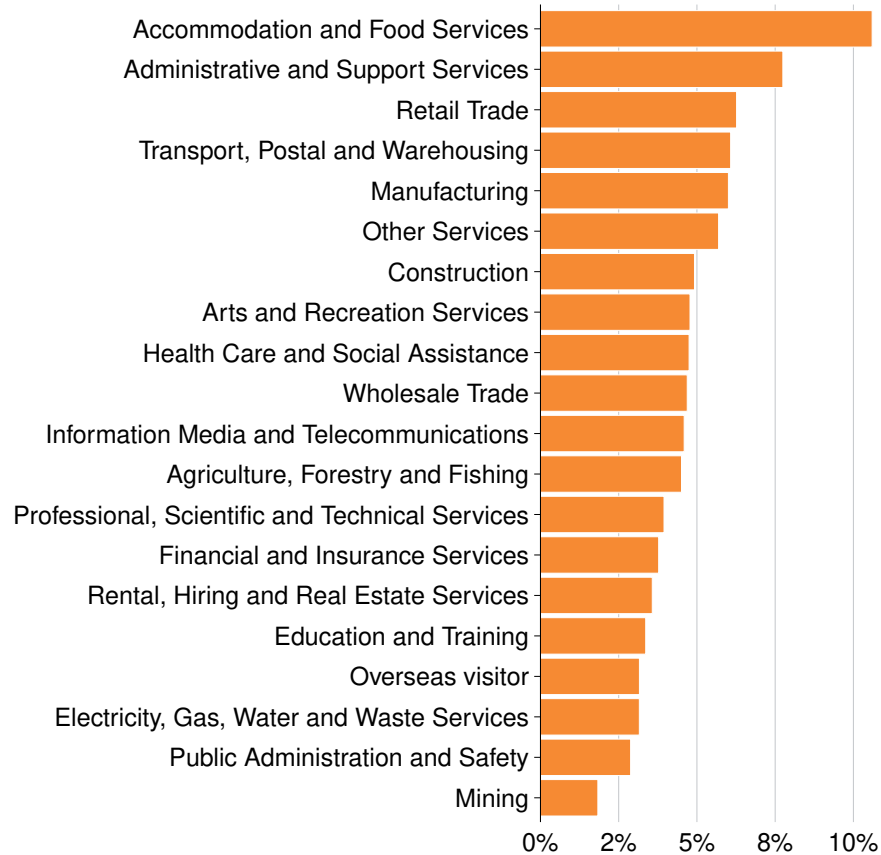
104. Nolan (*forthcoming*).

105. Nasreen and Ruming (2019).

106. OECD (2020a, Figure 1.13).

Figure 2.6: Overcrowded housing is most common among workers in jobs that require close physical proximity

Share of workers living in homes that require more bedrooms



Notes: The number of 'required' bedrooms is defined by the Canadian National Occupancy Scale as: one for each single or couple, and one for each child over the age of 5. Two children of the same gender can share a bedroom.

Source: ABS (2016).

3 The economic costs of COVID-19

The COVID-19 pandemic has caused substantial disruption to economic activity in Australia and throughout the world. The disruption is caused by people's changing behaviour – either because of their fear of contracting COVID-19 or because of social distancing measures put in place to prevent spread of the disease – and by an increase in uncertainty about the future of the global and national economy.

This chapter assesses the economic costs in the same three scenarios as the previous chapter: during widespread COVID-19 infections, during lockdowns, and during low-level community transmission. As with the health and social costs, there are significant economic costs associated with each of these scenarios.

Widespread COVID-19 infections cause people to change their behaviour due to fear of contracting the virus. International experience suggests that while there is widespread infection in the community, there is a substantial reduction in economic activity. This reduction hits places that involve close physical proximity the most – particularly the hospitality, arts and entertainment industries.

The only way to get this economic activity back is to control the virus.

Lockdowns also have a direct impact on the economy. Australia suffered a substantial hit to economic activity and jobs during lockdowns, particularly the 'front line' sectors subject to social distancing restrictions.

However, despite regular pronouncements that the 'effect of lockdowns' on the economy is '\$X' or 'Y per cent', the counterfactual is not business as usual. It is not possible to disentangle the economic effect of lockdowns from the restrictions people place on themselves due to fear of the virus.

The short-term economic costs of low-level community transmission are lower. However, ongoing consumer and business uncertainty while the virus spreads and reduced domestic tourism while state borders remained closed, means the economy is unlikely to return to the pre-COVID normal.

And low-level community transmission comes with a significantly higher risk of the emergence of uncontrolled spread and more lockdowns.

These economic costs – along with the health and social costs – must be compared with each other, rather than with a pre-COVID normal. While the virus remains in the community and throughout the world, it is not possible to wind back the clock. There isn't a 'no pandemic' scenario.

Getting to zero COVID-19 cases in Australia, and staying there, would be the best possible medicine for the economy. Even this would not be a cure-all: some sectors won't bounce back even if we achieve zero cases and lift restrictions. But only through achieving this goal will the economy be able to recover strongly.

3.1 The economic costs of unmitigated spread

While there is COVID-19 in the community, all Australians must take precautions to limit the spread. But the stakes are higher for the 10 million Australians identified in Section 2.1 as being at greater risk of complications from COVID-19. For as long as there is COVID-19 in their community, people in these groups will restrict their own behaviour and their economic activity – regardless of lockdown restrictions defined for them.¹⁰⁷

107. This 'self-lockdown' is described in Holden (2020a).

Studies that compare economic activity in otherwise-similar regions with different lockdown restrictions show that the economic consequences of COVID-19 *itself* is substantial.

Denmark and Sweden had similar levels of exposure to COVID-19 at the beginning of the pandemic, but subsequently took very different approaches. Denmark imposed significant restrictions from early March, closing the border to all foreign nationals, limiting social gatherings to 10, shutting schools, universities and non-essential work, and encouraging the population to stay at home and minimise social contact. Sweden followed a different path – see Box 1 – encouraging people to stay at home if they felt unwell, restricting hospitality to table service, but otherwise allowing people and businesses to operate without restriction.¹⁰⁸

The study authors exploited this difference in approaches to measure the effect of strict social distancing laws on consumer spending. Looking at the spending of 860,000 people in the two countries, they found that while consumer spending dropped by 29 per cent in Denmark, it also fell by 25 per cent in Sweden. That is, all but 4 percentage points of the contraction came from community perceptions of the risk of the virus rather than the imposition of lockdowns.¹⁰⁹

Unemployment claims rose faster in Denmark after its lockdowns were introduced, reaching 3.4 times the historical average in March. But Sweden followed in early April, reaching 3.1 times the historical average. With the virus controlled in Denmark, unemployment claims quickly dropped to 1.2 times normal, while they remain elevated at 2.3 times normal in Sweden.¹¹⁰

108. Andersen et al (2020).

109. Community perceptions of the risk of the virus probably formed early in the pandemic with graphic stories of the health system in Italy being overwhelmed. Although more is known now about treating the virus, community fear of the virus is still high, especially in groups at heightened risk.

110. Andersen et al (2020, Figure A.3).

Analysis in Korea also demonstrated that – in places without lockdowns – increased prevalence of COVID-19 in the community lead to increased unemployment in those areas.¹¹¹

In the US, where the spread of COVID-19 is largely uncontrolled, the primary barrier to economic activity is depressed consumer spending due to the virus itself, rather than government restrictions.¹¹²

Raj Chetty and his Opportunity Insights lab in the US explored the reduction in spending and employment across states with different levels of lockdowns over time.¹¹³ They found that consumer spending and employment fell well before state-level shutdowns were implemented, and re-openings had only modest impacts on economic activity (Figure 3.2). Counties with higher rates of COVID-19 suffered significantly larger declines in spending – regardless of their levels of lockdowns or levels of household income. Chetty notes that the less time people spent out-and-about, the bigger the reduction in spending.¹¹⁴

Where there were COVID-19 cases around, reopenings had little immediate impact on economic activity because consumers were worried that if they went out they could contract the virus.¹¹⁵ A Brookings paper shows that people in the US restrict their movement and practice social distancing – and therefore engage in less economic activity – in response to apprehension about the virus, rather than just in adherence to government policies.¹¹⁶ *The Economist* demonstrated

111. Aum et al (2020).

112. 'Small businesses such as restaurants, dog-care centres, and manufacturers brought back staff beginning in mid-April, believing they could get back to business. Now, many are shutting down or slashing jobs again as local officials and consumers pull back and the pandemic shows no signs of abating.': Simon et al (2020).

113. Chetty et al (2020).

114. Ibid (p. 18).

115. Ibid (Section IV).

116. Gupta et al (2020).

Box 1: The Swedish strategy

Countries around the world have taken different approaches to controlling the spread of COVID-19. Each nation has needed to balance the cost of preventing the spread, with the health, social, and economic costs of viable alternatives.

Sweden has attracted particular attention for its lighter approach to lockdowns. Some commentators point to Sweden as an example for Australia to follow.^a The virus has spread rapidly in Sweden, and their economy is suffering just as badly as their neighbours with heavier lockdowns.

Sweden introduced restrictions to limit the spread of COVID-19, but did so in a way what minimised the disruption to people and businesses. For example, bars and restaurants could remain open with seating constraints, schools were kept open for preschool and primary students, and non-essential international travellers were banned only from countries outside Europe. These measures were much less stringent than those introduced by Sweden's Nordic neighbours.^b

a. For example, see ABC News (2020b).

b. See Chart 2 in Duckett and Mackey (2020b).

c. Our World in Data (2020).

d. See Andersen et al (2020) as described in Section 3.1.

e. Riksbank (2020).

f. RBA (2020a).

For Swedes, there have been severe health consequences. The number of cases of COVID-19 per capita in Sweden has far exceeded comparable nations. At the end of July, Sweden had the 7th highest per-capita death rate in the world, about five-to-10 times higher than its Nordic neighbours.^c

And despite implementing relatively lighter lockdowns, Sweden has suffered economic losses almost as severe as its neighbouring countries. For example, consumer spending has fallen by a similar amount in both Sweden and Denmark.^d Sweden's central bank estimates that GDP in 2020 will fall by 4-to-6 per cent, and unemployment will peak at between 9 and 11 per cent.^e Despite much stricter lockdowns In Australia, the RBA expects unemployment here to peak at just below 10 per cent, and GDP in 2020 to fall by about 6 per cent.^f

Sweden has paid a heavy price for its strategy, and there have been few economic benefits. Furthermore, Sweden is still quite some way from controlling the spread of COVID-19, as their neighbours have done.

this effect by analysing restaurant reservations data in states that came out of lockdown while the virus was still present in the community, shown in Figure 3.1.

A further study exploiting the differences in local lockdowns by county in the US found that only 7 percentage points of the 60 per cent decline in consumer traffic was explained by government-mandated restrictions. The rest was explained by people making personal choices in response to their fear of being exposed to the virus.¹¹⁷ Areas that repealed lockdown orders had only small economic recoveries, because they hadn't properly dealt with COVID-19 or the fears of their populations.

This will be the case in Australia, too. If the 10 million people in heightened-risk groups believe they are at high risk of contracting COVID-19, they will restrict their own economic activity. People change their behaviour in response to perceived risk of the virus, not just because lockdowns require them to change their behaviour.¹¹⁸

In Australia, control of the spread of the virus with lockdowns and controls on international arrivals since March has meant fewer deaths and a softer hit to our economy.

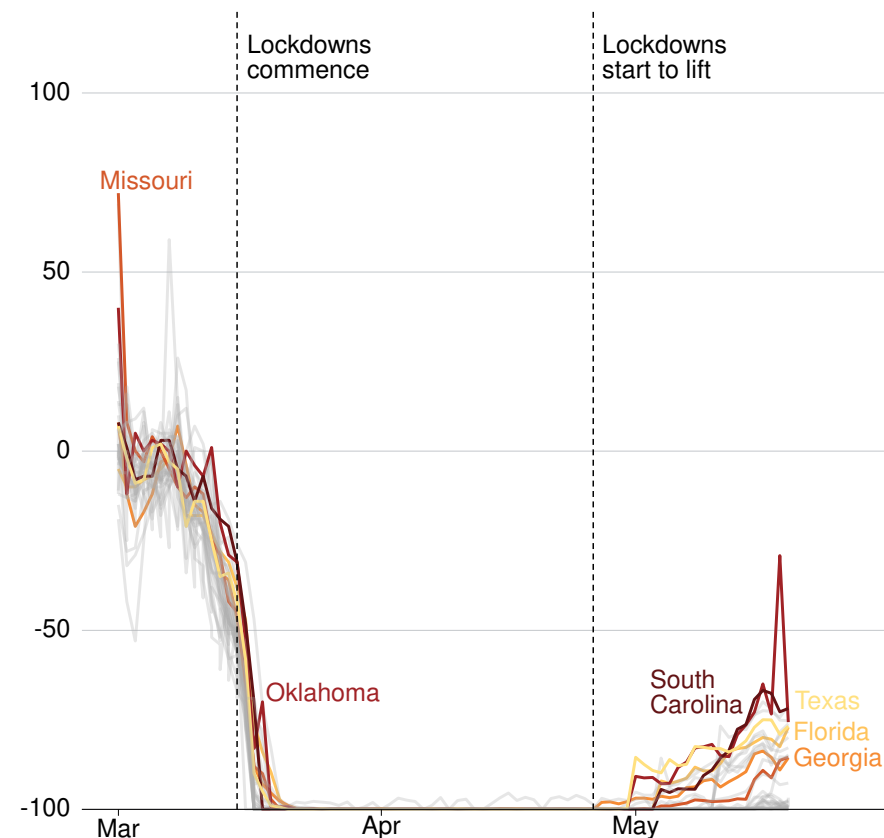
Kompas et al (2020) use an epidemiological model of COVID-19 in Australia to compare the health and economic effects of different approaches. They find that the economic costs of early suppression – the strategy implemented by Australia from March – are much lower than for delayed suppression or no suppression. The authors find that

117. Goolsbee and Syverson (2020). Applying these results to Australia, Holden (2020a) estimates that personal responses to the virus cost the Australian economy about \$3.5 billion per week, whereas formal lockdowns cost only about \$0.5 billion per week.

118. Adams et al (2020).

Figure 3.1: Removing lockdown restrictions doesn't guarantee a return to normal.

Open Table restaurant bookings in US states that have come out of lockdown



Notes: Grey colour represents all other states that have restaurant booking data and which had not lifted lockdowns.

Source: Analysis of OpenTable data based on *The Economist* (2020).

a ‘go hard, go early’ suppression strategy is better from both a public health and economy perspective.¹¹⁹

Economists from the World Bank looked at the spread of COVID-19 and timing of lockdowns in Europe and Central Asia. They concluded that countries that implemented lockdowns in the early stages of the pandemic have had better short-term economic outcomes than those that didn’t use lockdowns, or were slower to use them.¹²⁰

3.2 The economic costs of lockdowns and self-restrictions

Lockdowns come with substantial and unequal short-term economic costs. Restriction of movement and normal behaviour is the goal, and economic hardship is a necessary consequence that has to be alleviated by government spending.

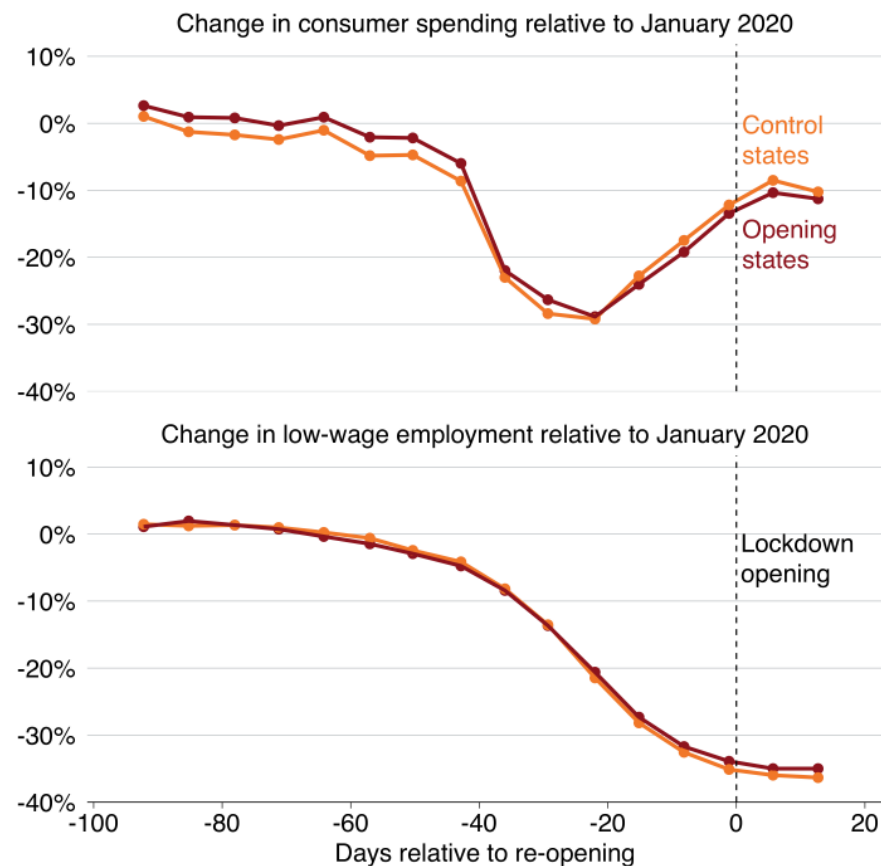
The OECD has estimated economic outcomes for Australia under ‘single wave’ and ‘double wave’ COVID-19 scenarios, shown in Figure 3.3. The economic cost of the initial wave of COVID-19 and its response is a 40 per cent loss to GDP in the second quarter of 2020.

The OECD modelling – published on June 10, before Victoria’s second wave – suggested a strong return, with much of those losses regained in the third and fourth quarters of 2020.

But under the ‘double wave’ scenario, shown in the second panel, Australia suffers an additional quarter of economic contraction as the virus returns in October. Consumers and businesses respond, lockdowns return, and the economy contracts significantly once again.

The outbreaks in NSW and particularly Victoria make a ‘single wave’ scenario impossible for Australia. With Victoria back in lockdown, and

Figure 3.2: US states which re-opened didn’t see significant gains in either consumer spending or employment



Note: The authors estimate the impact of re-opening using a difference-in-differences model, and find that the effect is insignificant at any reasonable confidence level.

Source: Chetty et al (2020).

119. Kompas et al (2020).

120. Demirgüç-Kunt et al (2020).

NSW on high alert, economic activity cannot return to normal, and it cannot bounce back.

The combined economic hit – of lockdowns and community fear – has been estimated at \$1 billion a week. Other states will also feel the effects through reduced interstate and international tourism, and the hit to consumer and business confidence.¹²¹

People working in the hardest-hit industries – arts and recreation, accommodation and food, and services industries that require close physical proximity – face higher unemployment, fewer hours, and lower pay.¹²² These are often young, low-income, casual workers. The JobKeeper and JobSeeker programs are cushioning some of these employment effects. Figure 3.4 shows that in all states and territories, people from poorer areas are more likely to require JobSeeker payments than those at the top. These programs start to be wound back from October.¹²³

Consumer spending decreased in all states and territories in April as the nation entered lockdown. But areas that had fewer reported cases – those that controlled the spread of the virus – had a smaller reduction in spending, and a greater rebound in May as COVID-19 was wiped from the community, as Figure 3.5 shows.

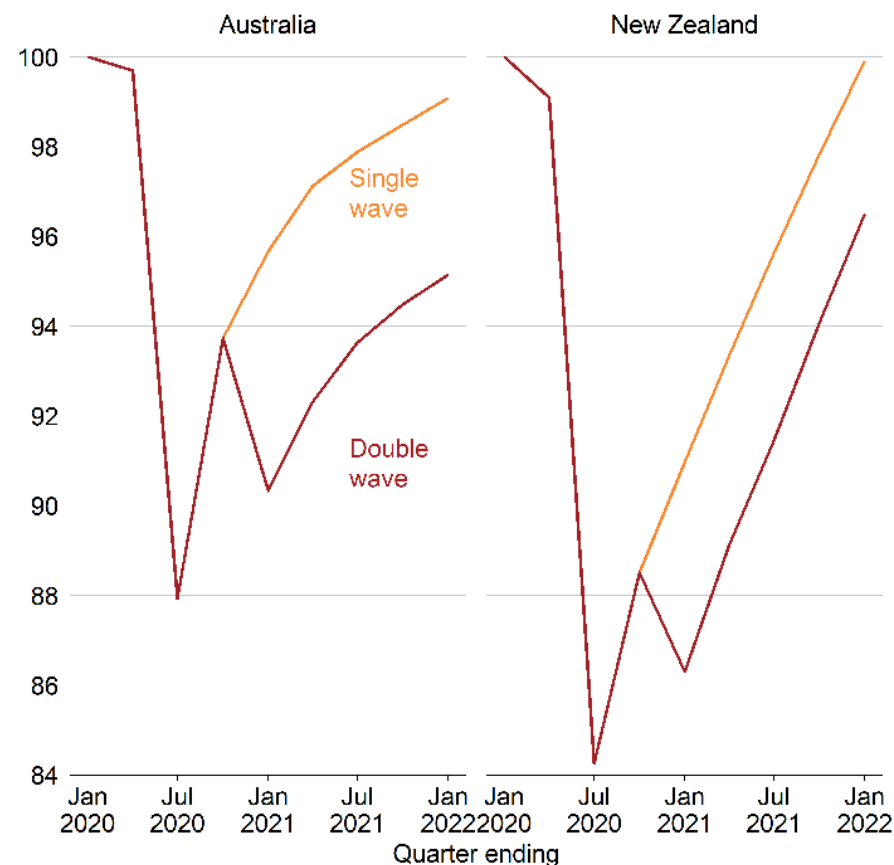
Since then spending has recovered slightly. There was a spike in spending during July, coming from consumers who were eligible for government stimulus payments and superannuation withdrawals. However Victoria, which has failed to control the virus, has lagged behind. Spending data from ANZ tells the same story: at the end of July, personal spending in Victoria was still substantially below 2019

121. Wood and Cowgill (2020). The outbreak in Victoria also delayed plans for an experimental return of international students by Australian National University: Chang (2020).

122. These industries also had big take-ups of JobKeeper: Wood et al (2020b).

123. Wood et al (2020a).

Figure 3.3: A second wave of COVID-19 will further damage the economy
Quarterly GDP, indexed to 2019 Q4



Notes: For the single-wave scenario, the OECD modelling assumes that ‘countries successfully overcome the current outbreak due to the containment measures put in place in the first half of 2020’. In the double-wave scenario, the ‘current easing of containment measures is assumed to be followed by a second, but less intensive, virus outbreak taking place in October/November’.

Source: OECD (2020b).

levels, but it had already increased above 2019 levels in NSW and Queensland.

Jobs data has followed the same trend. At the start of the pandemic the number of payroll jobs nosedived in each state.¹²⁴ Most areas saw improved employment outcomes from May. However Victoria has lagged behind its counterparts, being the only state to experience a second sharp fall in job numbers (Figure 3.6).

A similar story played out in New Zealand where swift and strict lockdowns were implemented for eight weeks beginning in March. As restrictions were eased, and COVID-19 was eliminated from the community, consumer spending rebounded fully. The New Zealand economy had snapped back by June (Figure 3.7).

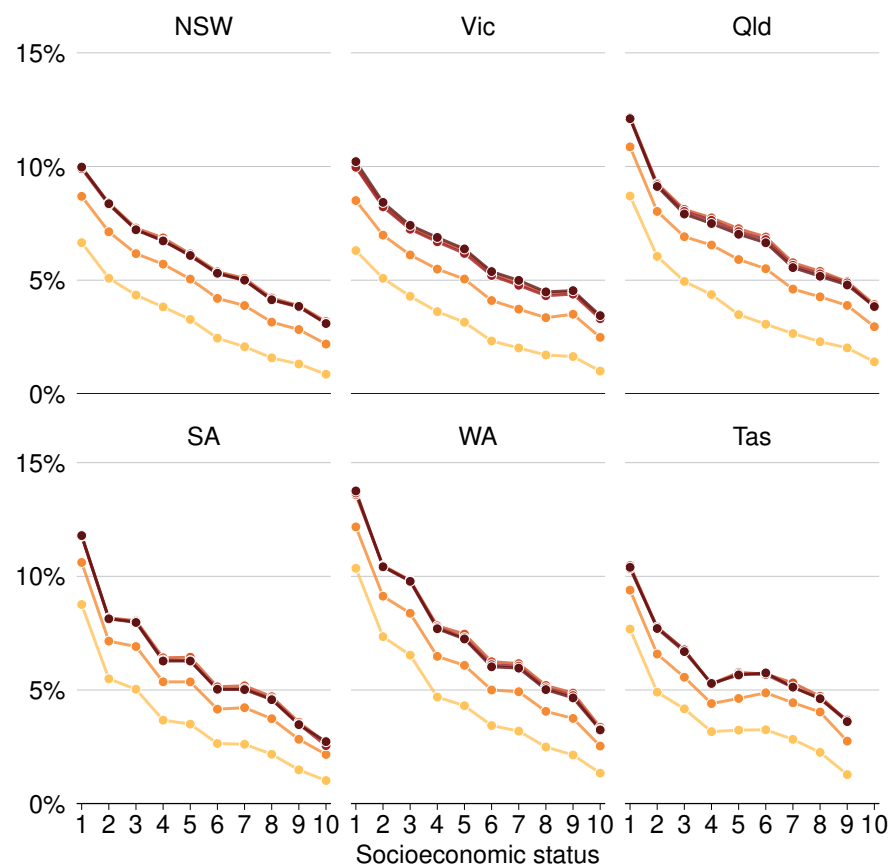
The divergence of the New Zealand and Australian economic recoveries is likely to be made clear when economic figures are produced for July. People in Australia’s largest states face the threat of COVID-19 transmission in the community, and the possibility of further lockdowns in the weeks and months ahead. New Zealanders, with no community transmission and a far lower chance of additional lockdowns in future, can return to life close to normal.

Early economic data is already pointing to a stronger economic recovery in New Zealand than in comparable nations which are still living with community transmission. By June 2020, monthly small business revenue in New Zealand had already recovered to 2019 levels. By contrast, as Figure 3.8 shows, monthly small business revenue in Australia and the UK was still lagging well behind pre-COVID levels.

124. Payroll jobs are those where workers are paid through Single Touch Payroll software. While the data does not cover all workers in Australia, it captures most of them. About 99 per cent of employers with 20 or more workers and 80 per cent of employers with 19 or fewer workers use STP software: ABS (2020d).

Figure 3.4: More people from poor areas are unemployed

Proportion of people in each state who received JobSeeker payments by socioeconomic decile, **March-June**



Notes: JobSeeker recipients by SA2s matched with SEIFA Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) deciles.

Sources: Department of Social Services (2020) and ABS (2016).

A leading indicator of economic performance of the service industries most affected by COVID-19, the Performance of Services Index (PSI), provides another look at this divergence. The PSI crashed in both Australia and New Zealand in the first half of 2020. But it rebounded in June and July in New Zealand, whereas services activity in Australia continued to contract (Figure 3.9).

3.3 The economic costs of low-level community transmission

Even low levels of community transmission dramatically increase the likelihood of further outbreaks and additional lockdowns (see Section 4.2.2). The uncertainty surrounding future outbreaks and lockdowns is itself harming Australia’s economic recovery.

Industries that have suffered under lockdowns and the social distancing restrictions required with low levels of community transmission will find it difficult to recover. Border restrictions are protecting a number of states from outbreaks in other states. These border restrictions limit domestic tourism.

3.3.1 The economic costs of uncertainty

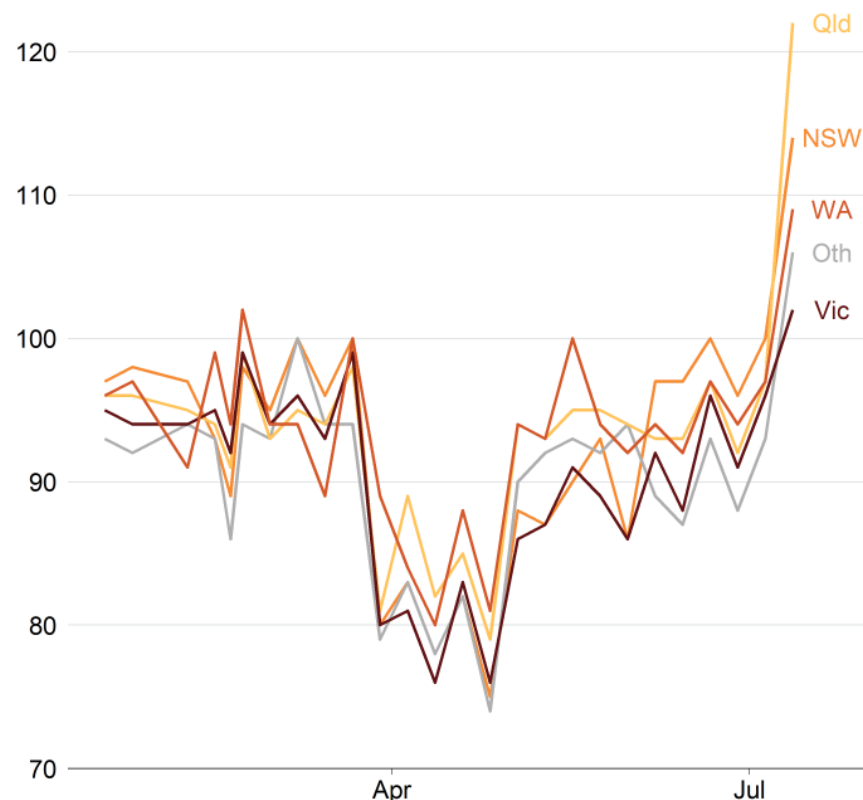
In addition to the economic contractions arising from health concerns, as well as lockdowns and social distancing, COVID-induced uncertainty will hurt the Australian economy and its recovery. The prospect of future outbreaks and lockdowns will hold back the recovery. So will worries about the evolution of government support packages such as JobSeeker and JobKeeper.

Researchers at Stanford University provide an insight into the economic cost of the uncertainty related to COVID-19.¹²⁵ They identify three forward-looking measures of uncertainty drawn from different sources: newspaper-based economic uncertainty, stock market volatility, and

125. S. Baker et al (2020).

Figure 3.5: Consumer spending has recovered more strongly in states which have contained COVID-19

Weekly consumption index per person, indexed to normal weekly base excluding Christmas



Notes: Based on a weekly transaction sample of 250,000 Australian consumers. The state trends broadly align with the ABS retail statistics: ABS (2020c); as well as card spending data released by the Commonwealth Bank: Cranston (2020).

Source: M. Wade (2020) analysis of AlphaBeta (2020).

subjective uncertainty in business expectation surveys. They use these measures to quantify the massive increase in economic uncertainty over the first month of the COVID-19 crisis in the US. They estimate that real GDP in the US could decline by 11 per cent in 2020, with about 60 per cent of the contraction due to the uncertainty itself.

In Australia, two indices show that the pandemic has created immense uncertainty, of the same magnitude as the major political and economic events of the past 20 years.

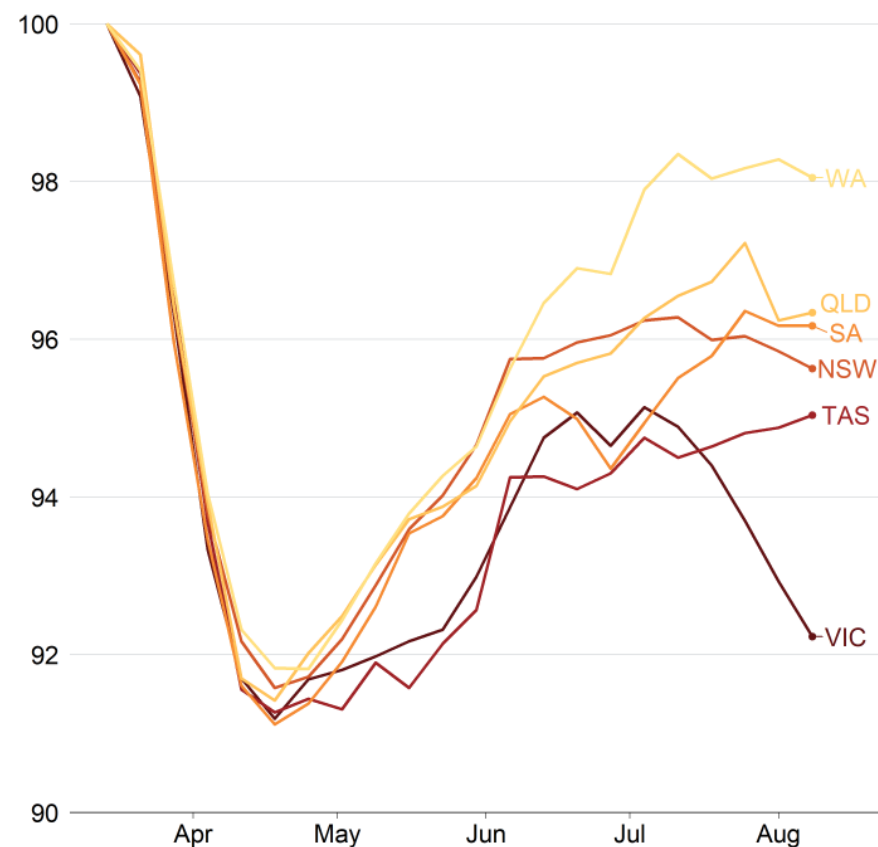
The Economic Policy Uncertainty (EPU) Index rose sharply in March to levels higher than during the Global Financial Crisis, as shown in Figure 3.10. The EPU is constructed by measuring the number of articles in eight major Australian newspapers each month that relate to economic policy uncertainty.

Volatility in the stock market can also signal uncertainty about the future of the economy. The S&P/ASX200 volatility index (VIX) measures sentiment about the future volatility of the ASX200 Australian equities index and is commonly referred to as the ‘investor fear gauge’. Figure 3.11 shows that the VIX hit its highest level in 10 years on 18 March, when the Federal Government recommended all Australians abroad return home.

Both measures of uncertainty have since fallen, as daily case numbers declined and some lockdown restrictions were eased. But the recent case number increases in Victoria and NSW, along with the re-introduction of lockdowns in Victoria, show that the uncertainty from the pandemic won’t truly go away until the virus is under control in Australia. As COVID-19 cases increased in Victoria over June and July, consumer confidence as measured by ANZ-Roy Morgan fell for five straight weeks.¹²⁶

126. ANZ and Roy Morgan (2020).

Figure 3.6: The jobs recovery in Victoria has lagged behind other states
Weekly payroll jobs index, benchmarked to 14 March 2020



Source: ABS (2020d).

The RBA board has identified uncertainty as a major issue, noting that uncertainty about the health situation and the future path of the economy is affecting the consumption and investment plans of many households and businesses.¹²⁷ Previous research from the RBA found that high uncertainty causes households to save rather than spend, and firms to act more cautiously, reducing investment and employment growth.¹²⁸

Duncan et al (2020) similarly argue that uncertainty is one of the biggest impediments to Australia’s economic recovery. They place particular emphasis on the risk of new and increasing outbreaks, and different lockdown restrictions in different states.

In its July 2020 Economic and Fiscal Update, Treasury noted that uncertainty surrounding the pandemic in Australia, as well as globally, could threaten the economic recovery.¹²⁹

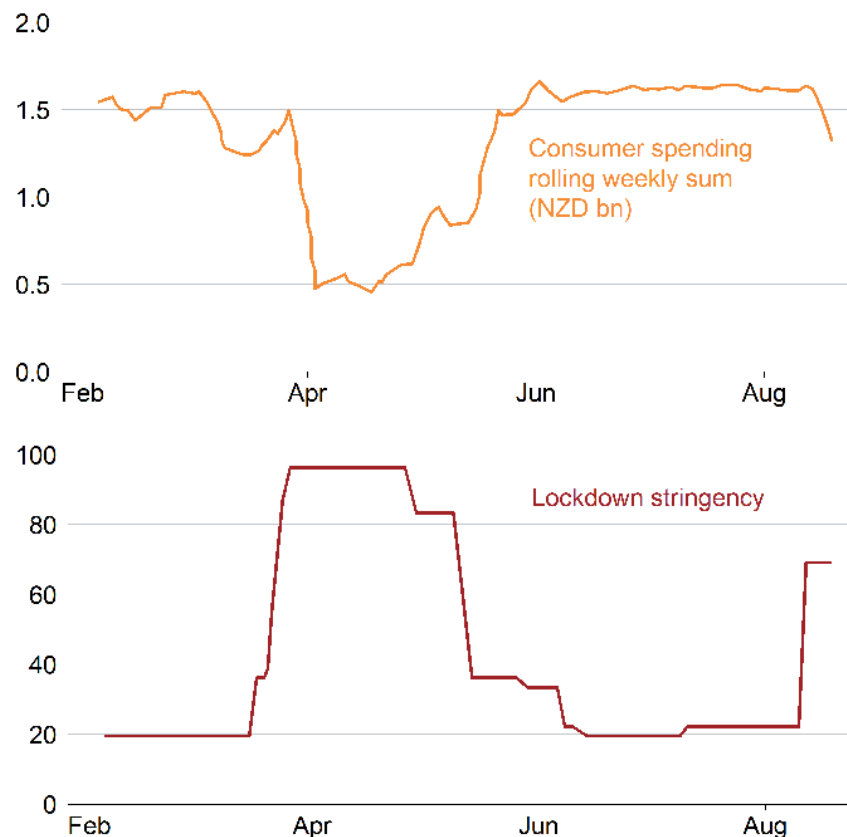
3.3.2 On-again, off-again restrictions limit the ability of some industries to recover

The three sources of COVID-19 economic costs – the virus itself, the lockdowns, and the uncertainty – have significantly affected the Australian economy. The number of payroll jobs recorded by the ABS decreased by 4.9 per cent between the week ending 14 March, when the 100th COVID-19 case was recorded, and the week ending 9 August.¹³⁰

The impact has been unevenly distributed across industries, as Figure 3.14 shows. Some sectors, such as hospitality and arts, have laid-off large numbers of workers. Others, such as water and power utilities, haven’t needed to cut jobs at all.

127. RBA (2020b).
 128. Moore (2016).
 129. Treasury (2020).
 130. ABS (2020d).

Figure 3.7: Consumer spending in NZ has closely followed the lockdown stringency



Note: Spending measures credit card spending.
 Source: The Treasury (2020) and Hale et al (2020).

The nature and speed of the recovery is also going to differ by industry.¹³¹ Each sector can be grouped into one of three broad categories: industries that have been broadly unaffected by the pandemic; industries that have been affected but can bounce back when COVID-19 is eliminated domestically; and industries that will continue to be significantly affected by the global pandemic regardless of domestic conditions.

Unaffected industries

Some industries have fared reasonably well through the crisis: electricity, gas, water, and waste; finance and insurance; and public administration and safety. They have either increased job numbers, or cut less than 1 per cent of their previous workforce.

These sectors will probably continue to perform relatively well, so long as Australia does not completely lose control of COVID-19.

Industries that can bounce back when restrictions are lifted

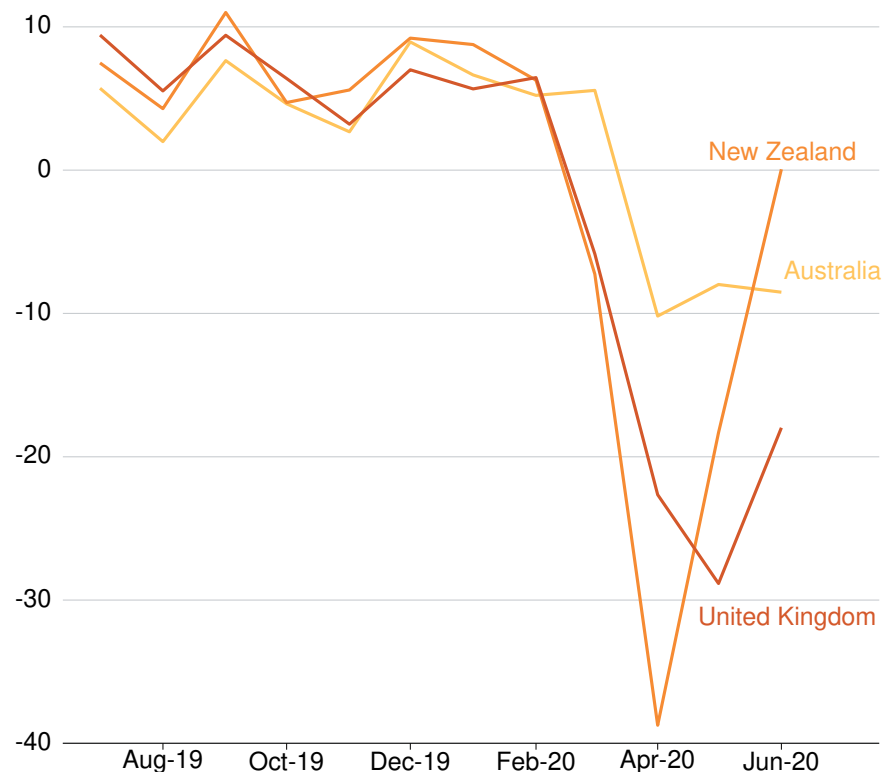
Some sectors that have been significantly affected by the pandemic are likely to make gains if Australia can hit zero active cases of COVID-19. Recovery in these sectors would be the major economic payoff if Australia were to achieve elimination.

For example, the arts and recreation sector has lost nearly 20 per cent of its pre-pandemic jobs, and the rental, hiring, and real estate sector has cut almost 10 per cent. But if Australians can once again visit museums, galleries, and house inspections and auctions, without any fear of outbreaks or lockdowns, both sectors could bounce back provided the community accepts that the risks are low.

131. For each sector, Noakes et al (2020) assesses whether it is likely to exhibit a strong V-shaped recovery, a medium U-shaped recovery, or a weak L-shaped recovery. Also see McKinsey (2020) for an assessment of how long it will take different sectors to recover.

Figure 3.8: Small business revenue has already returned to pre-COVID levels in New Zealand

Change in small business revenue compared with 12 months ago



Source: Xero (2020).

Opening regional and state borders would enable the domestic tourism industry to begin to recover. Domestic tourism grew in Taiwan and New Zealand as those countries achieved elimination of COVID-19.¹³² Any gains in Australia would have wide-ranging benefits, because tourism contributes to a significant proportion of gross value added for numerous industries that have been hit hard by COVID-19 (see Figure 3.12).

Domestic tourism accounts for 70 per cent of all tourism spending in Australia.¹³³ Australia is also a net importer of tourism. In 2018-19 Australians spent about \$58 billion on holidays overseas, more than the \$47 billion spent by international holiday-makers in Australia.¹³⁴ A re-allocation towards domestic tourism could go a long way towards filling the gap from missing international travellers.

But domestic tourism and its connected industries are unlikely to recover if community transmission continues in some parts of Australia. While there are outbreaks in a capital city, tourism to regional areas in that state is limited. And states that have eliminated COVID-19 will continue to restrict travel to and from states that have active cases.¹³⁵

State border closures to the most populous states of NSW and Victoria, where outbreaks are most likely under a suppression strategy, are particularly harmful. Travel to and from NSW and Victoria, and within those states, accounts for about two thirds of all domestic tourism – and more than 85 per cent of all interstate tourism (Figure 3.13). People will be less likely to make travel plans if they fear future lockdowns because governments decide to open up too soon.

132. Chiang et al (2020); and Reidy (2020).

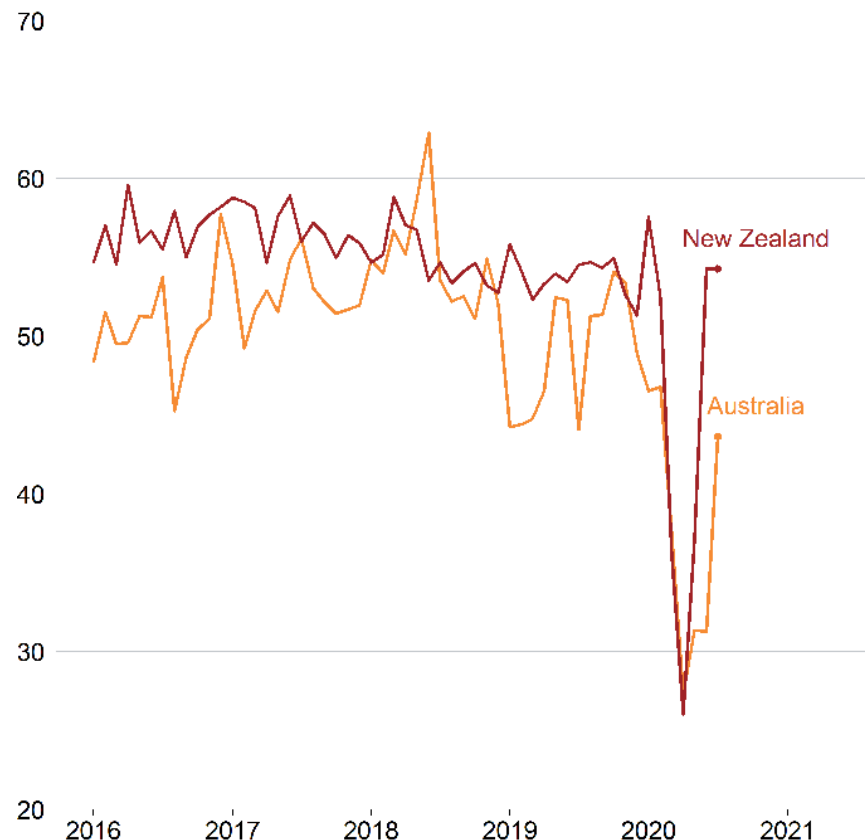
133. ABS (2019).

134. Ibid.

135. When asked how long the WA border would remain closed, Premier Mark McGowan said 'As long as it takes to protect people and keep our economy functioning within our borders'. Thompson (2020).

Figure 3.9: Services in NZ have rebounded more quickly than in Australia

Performance of Services Index

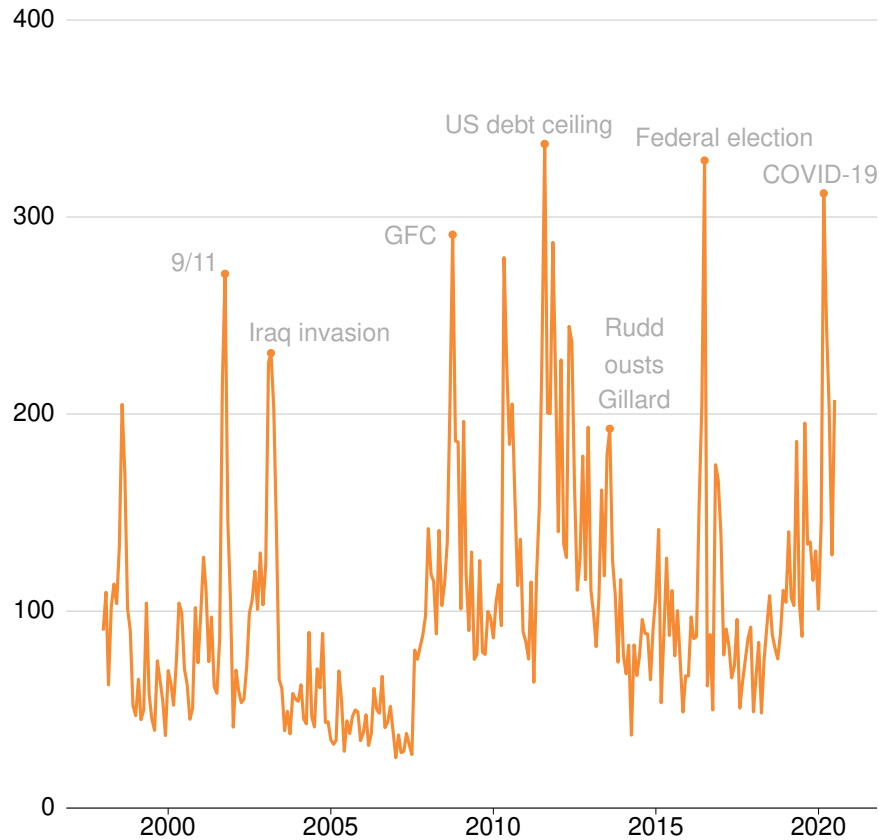


Notes: Seasonally adjusted series. A value above 50 points indicates that services activity is expanding; below 50 indicates it is declining.

Sources: Ai Group (2020) and BusinessNZ (2020).

Figure 3.10: COVID-19 caused a spike in uncertainty about economic policy in Australia

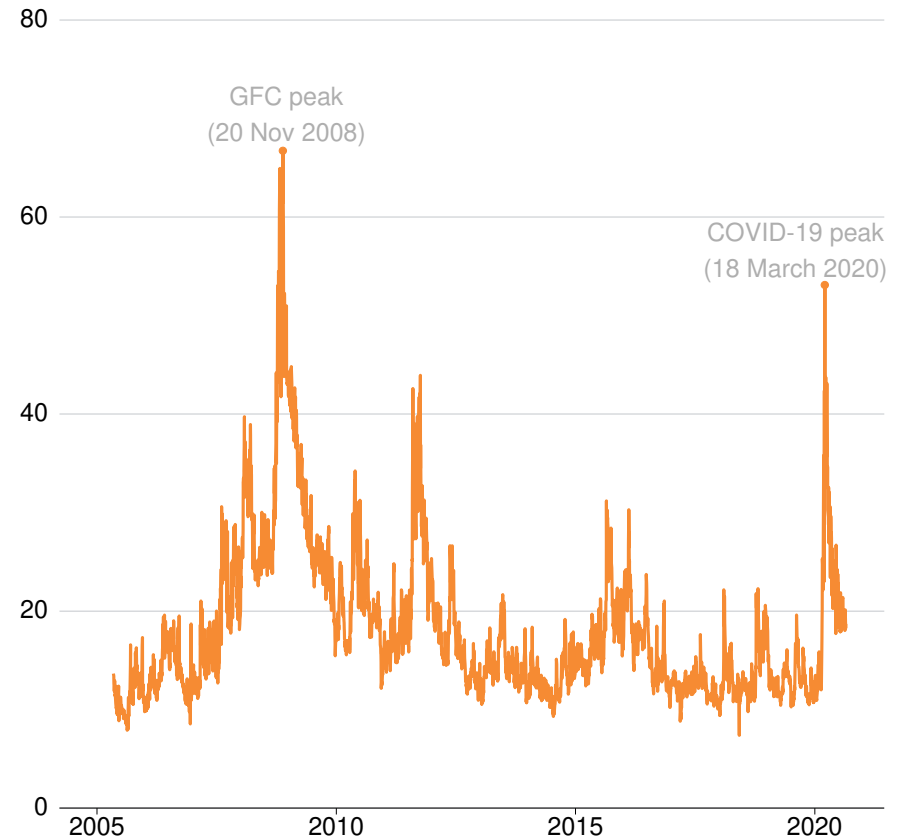
Economic Policy Uncertainty Index, monthly



Note: The index is scaled so that the average between 1998 and 2012 is 100.
Source: EPU (2020).

Figure 3.11: The implied volatility of the Australian stock market has been at its highest level since the GFC

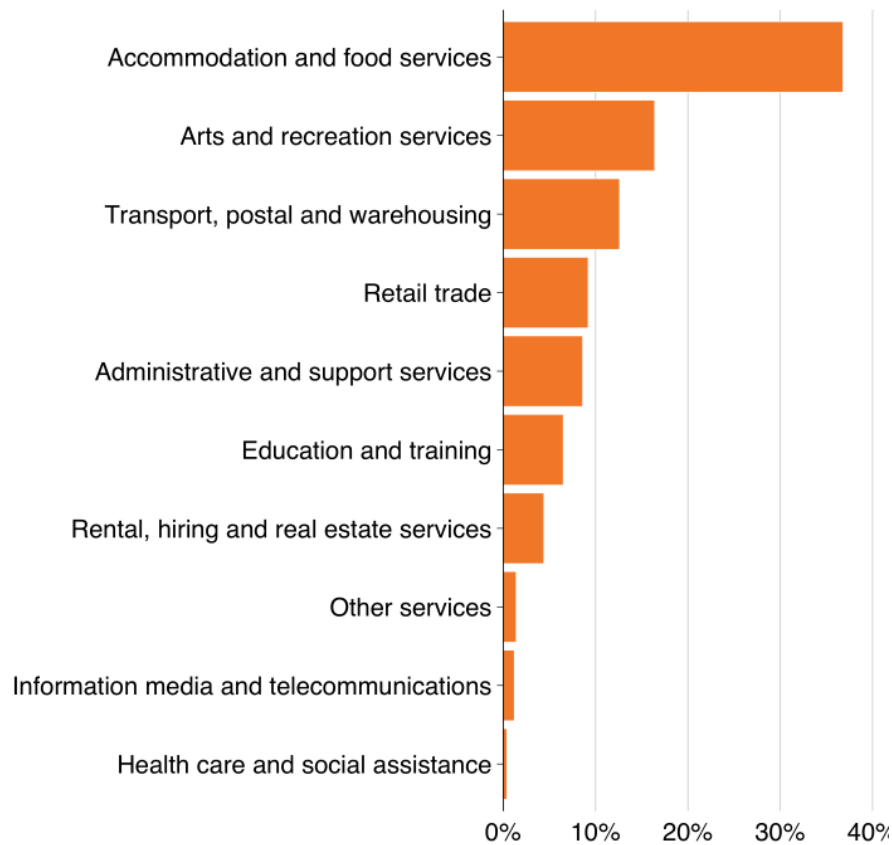
S&P ASX200 VIX, daily



Note: The VIX measures the 30-day implied volatility of the 200 largest companies on the ASX.
Source: Grattan Institute is grateful to Steve Bishop, Tony Carlton, and Terry Pan for providing updated data for Figure 12 in Bishop et al (2018).

Figure 3.12: Tourism supports numerous sectors

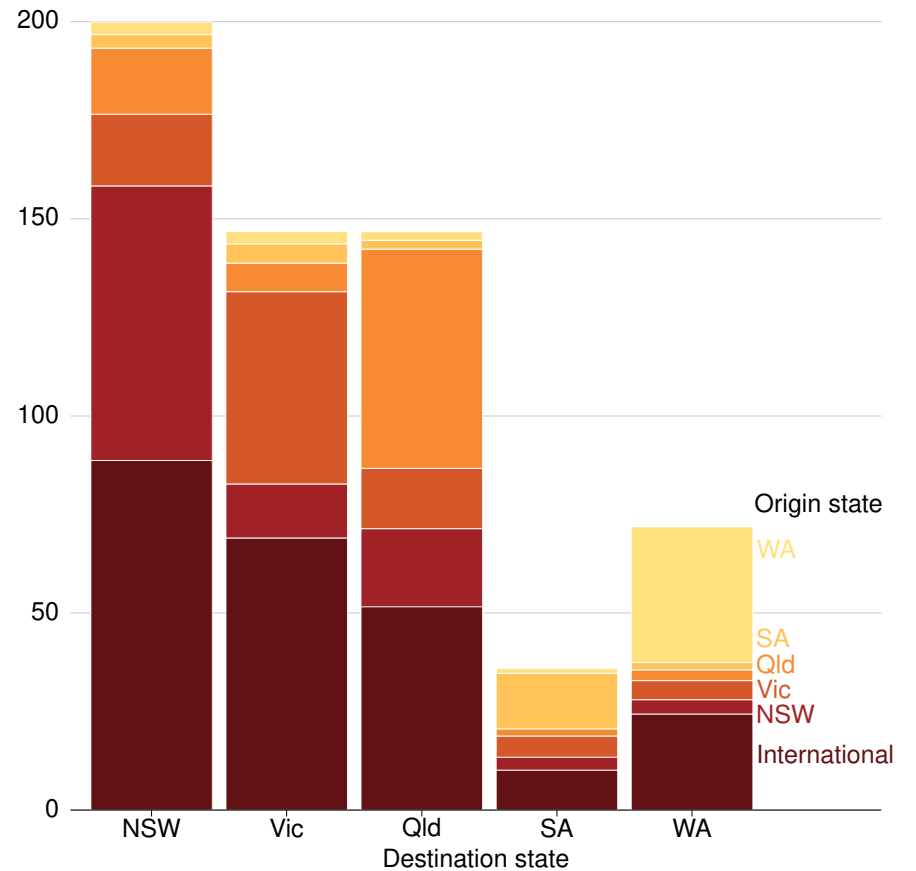
Tourism share of industry gross value added, 2018-19



Source: ABS (2019).

Figure 3.13: Most domestic tourism occurs within states, but NSW and Victoria attract the most out-of-state tourists

Total visitor nights, millions, year ending March 2020



Note: Excludes the ACT, NT, and Tasmania due to data limitations.

Sources: Tourism Research Australia (2020a) and Tourism Research Australia (2020b).

Industries that won't bounce back when restrictions are lifted

Some industries will struggle to recover even if elimination is accomplished.

Maintaining control over domestic cases requires significant limits to international travel, disrupting the flow of people and services. The aviation sector will face reduced demand for international travel, which previously accounted for about a third of total revenue across Qantas and Virgin.¹³⁶

Likewise, the higher education sector will struggle if international student numbers are lower in future. The Government recently loosened visa restrictions for international students, in a bid to ensure Australia remains a more desirable place to study than other countries.¹³⁷ But this will have only a limited effect if total demand for international education remains low. Of course, beyond aviation and higher education there are likely to be other sectors in a similar situation.

Employment in sectors within this final category will probably remain low for some time. There will also be flow-on effects to the rest of the economy. For example, while international students come to live in Australia primarily for study, they also support many other sectors of the economy.

3.3.3 Workers in the hardest-hit industries

Australian workers who were already vulnerable have been hit hardest by the economic costs of COVID-19 (see Figure 3.14).

Borland (2020) argues that young, female, and low-income workers have been most affected. Analysing ABS data, he looks at the decline

136. Calculated from FY2019 annual reports for Virgin and Qantas. See Qantas (2019) and Virgin Australia (2019).

137. Tudge and Tehan (2020).

in weekly hours worked February and May, for occupations within each earnings decile. While workers from across the income distribution lost work, low-income earners were disproportionately affected. The amount of work done in May declined by almost 30 per cent for workers in the bottom 10 per cent of earnings, but fell by only 5 per cent for workers in the top 10 per cent. Workers in the worst-affected industries, such as accommodation and food, and arts and recreation, are disproportionately young and female.

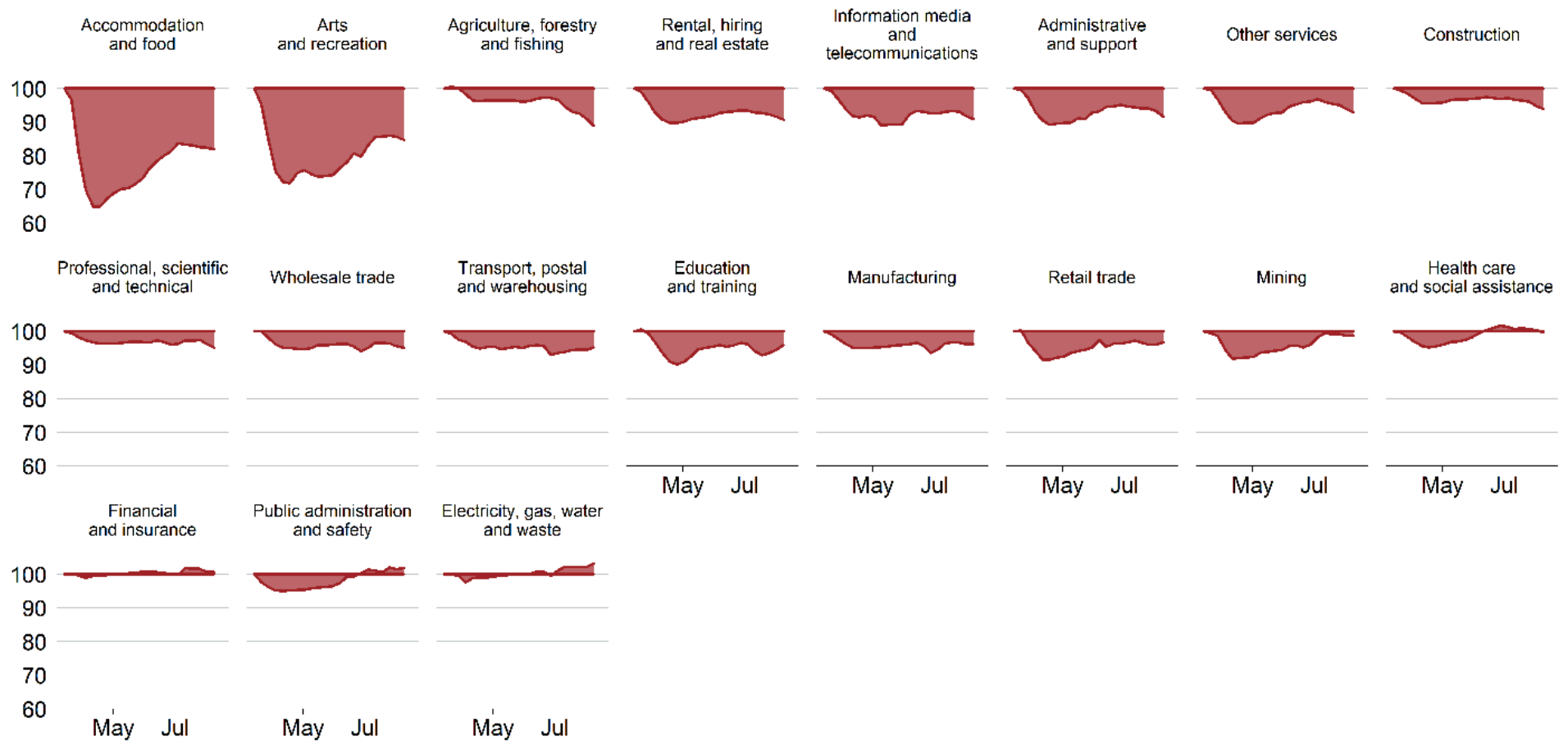
Wilkin (2020) uses HILDA to analyse the characteristics of workers within industries which were directly affected by lockdowns, as well as industries which continued normal operations but suffered large falls in business. He finds that young and female workers were over-represented across these two groups of industries. Wilkins also finds that less-educated workers were more exposed within industries directly affected by lockdowns, in part reflecting the youth of many of those workers.

International research has found similar and consistent results. Around the world vulnerable workers – young, female, and with low income and low education – have borne a disproportionate burden from COVID-19.¹³⁸

As vulnerable workers are hit hardest by COVID-19, it follows that they will also benefit the most by getting the virus under control, and lifting lockdowns. For example, women – Figure 3.15 – and workers under the age of 30 – Figure 3.16 – were most likely to lose their job during the first months of the pandemic. However both groups made significant gains in mid-April as Australia seemed to get control of the virus and some lockdown measures were eased.

138. These findings have been consistent across the US: Mongey et al (2020); across the UK: Allas et al (2020) and Andrew et al (2020); and across the EU: Pouliakas and Branka (2020).

Figure 3.14: Payroll jobs index by industry, benchmarked to 14 March 2020



Note: Industries are ordered by the decline in the payroll jobs index between 14 March and 8 August.

Source: ABS (2020d).

IMF research also finds that income inequality has generally increased in the years after major pandemics.¹³⁹

In the US, Mongey et al (2020) argue that workers with lower incomes and education levels are more likely to be affected by social distancing policies. They also find that during the first two months of the pandemic, non-university-educated workers suffered a 4 percentage point larger decline in employment than university-educated workers.

Research from McKinsey in the UK finds that low-income workers are more likely to have been laid off during the pandemic.¹⁴⁰ They similarly find that low-education workers are more likely to have been laid off, but add that not all highly educated workers in the UK have been insulated from the pandemic's economic costs.¹⁴¹ Researchers at the European Centre for the Development of Vocational training find similar results across the EU.¹⁴²

If Australia can get to zero local cases of COVID-19, the most vulnerable workers will gain the most benefit. But even low-level community transmission, which is likely to result in further outbreaks and lockdowns, runs the risk of placing a burden back on their shoulders for even longer.

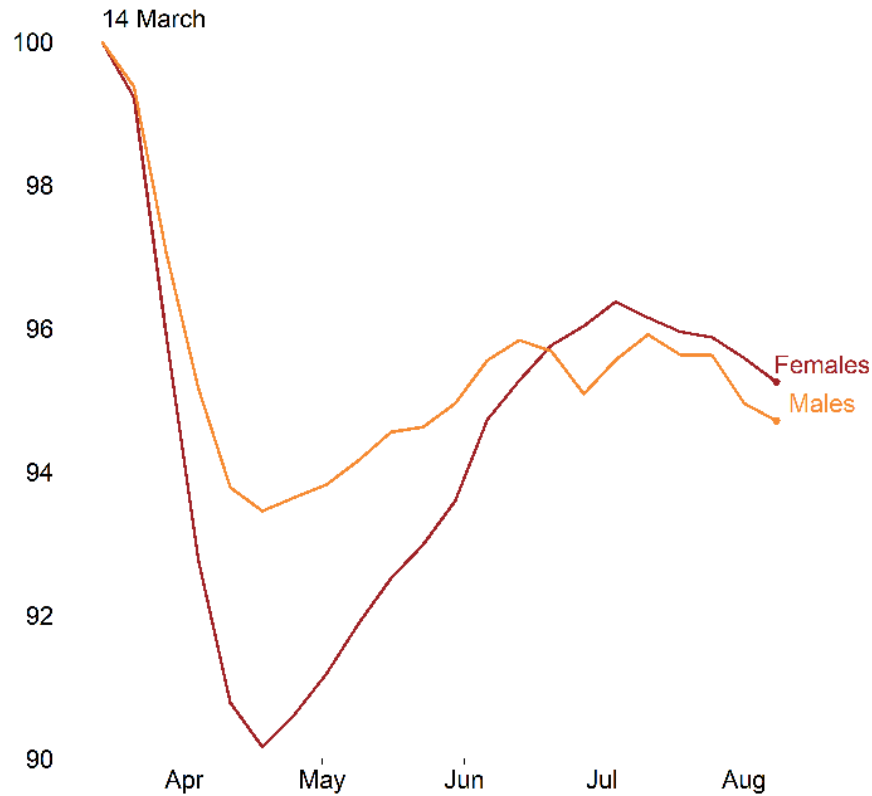
139. Furceri et al (2020).

140. Allas et al (2020).

141. For example, almost half of employees in the arts, entertainment, and recreation sector in the UK, which was hard hit, have a university degree or higher.

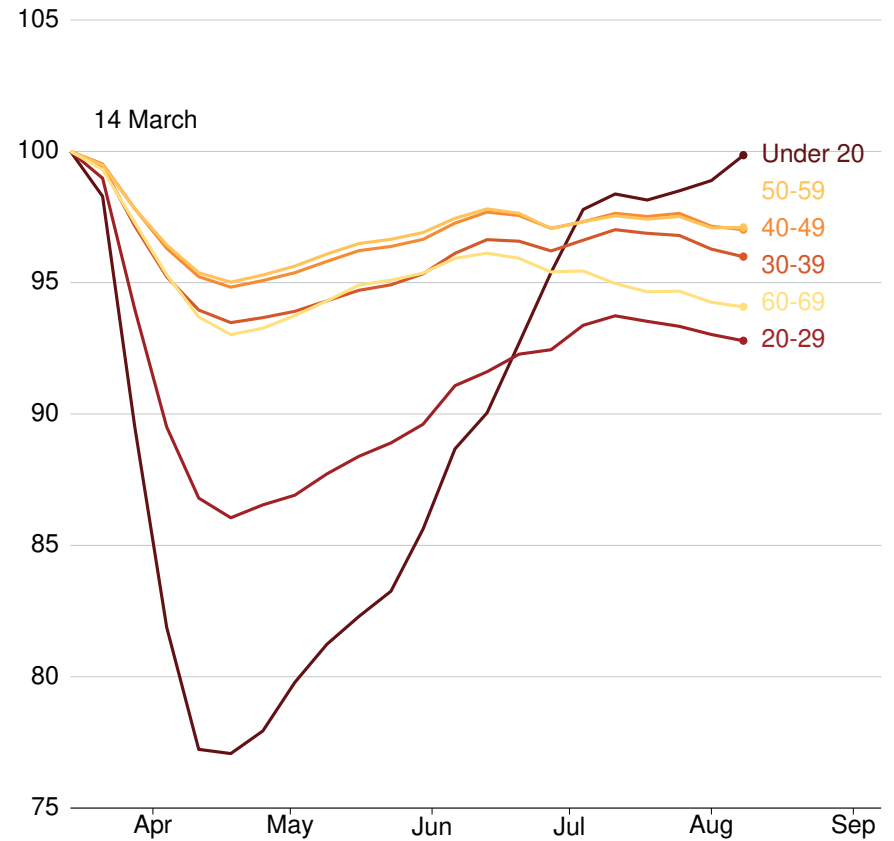
142. Pouliakas and Branka (2020).

Figure 3.15: Female workers were more likely to have lost their jobs
Weekly payroll jobs index, benchmarked to 14 March 2020



Source: ABS (2020d).

Figure 3.16: Workers under the age of 30 were most likely to have lost their jobs
Weekly payroll jobs index, benchmarked to 14 March 2020



Notes: Excludes workers aged 70+, because they can get the Age Pension and draw on their superannuation savings.

Source: ABS (ibid).

4 Getting to zero and staying there

Chapters 2 to 3 outlined the health, social, and economic costs associated with different COVID-19 scenarios. Lockdowns have significant health, social, and economic costs, but they are not nearly as costly as the unmitigated spread of COVID-19 throughout Australia.

Low-level community transmission provides greater freedom to most Australians – provided there are no breakouts that require further restrictions. But even with only low-level community transmission, many of the most vulnerable are at unavoidably greater risk of catching the disease. It also restricts the freedoms of those for whom a COVID-19 infection is more likely to cause serious complications. And state borders will remain closed between those ‘with’ and ‘without’ COVID-19 infections, doing additional damage to Australia’s tourism industry and harming those living close to borders.

These scenarios aren’t permanent. Over time, low-level community transmission is likely to turn into a scenario of rapidly spreading COVID-19 infections that require lengthy lockdowns to prevent unmitigated spread. Chapter 1 showed that most countries, including those with sophisticated testing, tracking, and isolation systems, have suffered second waves that required increased lockdown measures.

State governments should actively and explicitly pursue the National Cabinet’s stated goal of achieving zero COVID-19 cases in Australia. This chapter explains why and how Australia should reach that target, and what needs to be done to stay there.

4.1 First, improve the testing, tracing, and isolation systems

A strong test-trace-isolate system is crucial in getting case numbers under control and preventing further outbreaks.¹⁴³

Identifying COVID-19 cases early is key. Australia is conducting about 2,800 tests every day per million population – more than almost any other country.¹⁴⁴ Victoria has conducted more tests than any other state.

While there are cases in the community, random tests – including of asymptomatic people – should be conducted. This should include regular testing of known COVID hotspots (such as abattoirs), of people whose jobs require close physical proximity (such as health and aged care workers, teachers, and food and hospitality workers), and of people who attend school or events that require them to have contact with others.

Tests should be processed and results received within 24 hours to allow fast contact tracing for positive cases, and short stints of self-isolation for negative cases.

Once a region is believed to have zero active cases in the community, sewage testing should be done. The ACT used this technique to confirm that the territory was truly ‘COVID-free’ in July.¹⁴⁵

When someone tests positive, tracing their contacts is urgent. All contacts need to be reached and told to isolate so there is less risk of them spreading the virus themselves.

143. See Duckett et al (2020, Section 3.2).

144. Roser et al (2020).

145. Lowrey (2020).

The enormous task of contact tracers – the number of contacts they need to track down and the accuracy and speed of doing so – is crucially important in understanding the potential spread of COVID-19.¹⁴⁶ But these figures are not reported by the Commonwealth or state governments.¹⁴⁷

Contact tracing systems should continue to be improved in all jurisdictions. Contact tracers should be aided by digital contact tracing records of patronage at public venues, using QR codes to ‘sign in’ to a venue, with information being automatically uploaded to public health authorities if there is a confirmed case in that area.

The contact tracing systems are only successful if contacts self-isolate. Data cited by the Victorian Premier suggests this wasn’t happening in his state in July.¹⁴⁸

On 22 July, the Premier said about 9-in-10 people who tested positive for COVID-19 had not isolated in the time between feeling sick and getting tested. More concerning was that half of people who had symptoms and were awaiting the results of a test had not self-isolated. A system that relies on self-isolation in which people are unable or refuse to self-isolate cannot succeed.

The story was different in Canberra, where a police spot-check on 11-12 July of 450 people required to be in self-isolation found complete compliance.¹⁴⁹

Broadening the testing regime, improving – and reporting on – the accuracy and speed of contact tracing, and communicating the risk of transmission more effectively to the public so they understand the

146. A survey in the UK, for example, found that each infected case had, on average, 36 contacts traced: Keeling et al (2020).

147. Duckett (2020b).

148. Daniel Andrews COVID-19 update on 22 July.

149. Meddemmen (2020).

importance of adhering to self-isolation guidelines are the starting points of a successful COVID-19 strategy.

4.2 Go for zero

While the number of new daily cases in Victoria was rising in July, health officials were pushed to their limit.¹⁵⁰ The number one priority for the state was to get the numbers under control. Lockdowns were the only option. Victorians didn’t appear to be responding to the second wave of Stage 3 lockdowns as they did to the first. Figure 4.1 shows that while there was a decrease in mobility throughout July, it wasn’t down to the levels achieved in April.

Nonetheless, the number of new cases started to slowly fall.

Now that community transmission is low – but stubbornly persistent – and Stage 4 restrictions draw to a scheduled close in the middle of September, the Victorian Government is faced with a decision: to lift or ease restrictions; or continue with Stage 4 lockdowns – or some revised version of lockdowns – until the number of active local COVID-19 cases reaches zero.

The decision it makes now will have lasting effects on Australia’s way of life until or unless a vaccine or cure is developed.

4.2.1 Be explicit about the goal and what should be done to achieve it

The National Cabinet must reaffirm and make explicit Australia’s target, how far we are from achieving it, and what we all need to do to get there.

The goal must be zero *active cases in the community*. This distinction is important. There can be zero community transmission on a lucky

150. See Section 1.2.1.

day, even as COVID-19 continues to spread. Zero *active* cases in the community means there is no chance for the virus to spread.

Modelling from the Department of Health (similar to that in Figure 4.3) could be used to give Australians a picture of how far away we are from zero active cases. This would provide an ‘end point’; something to aim for. The Commonwealth Government should launch a campaign that promotes the shared goal.

4.2.2 Opening up too much and too early puts us back to square one

Opening up with low, ‘manageable’ levels of community transmission was the approach taken by Victoria and NSW, along with the National Cabinet, in May and June.

This approach is tempting: the virus appears to be under control, so why not give people an early mark and let some return to parts of their normal life earlier than expected?¹⁵¹ Some of the businesses that were forced to shut can re-open their doors; some people can start to see friends and family at restaurants and pubs.

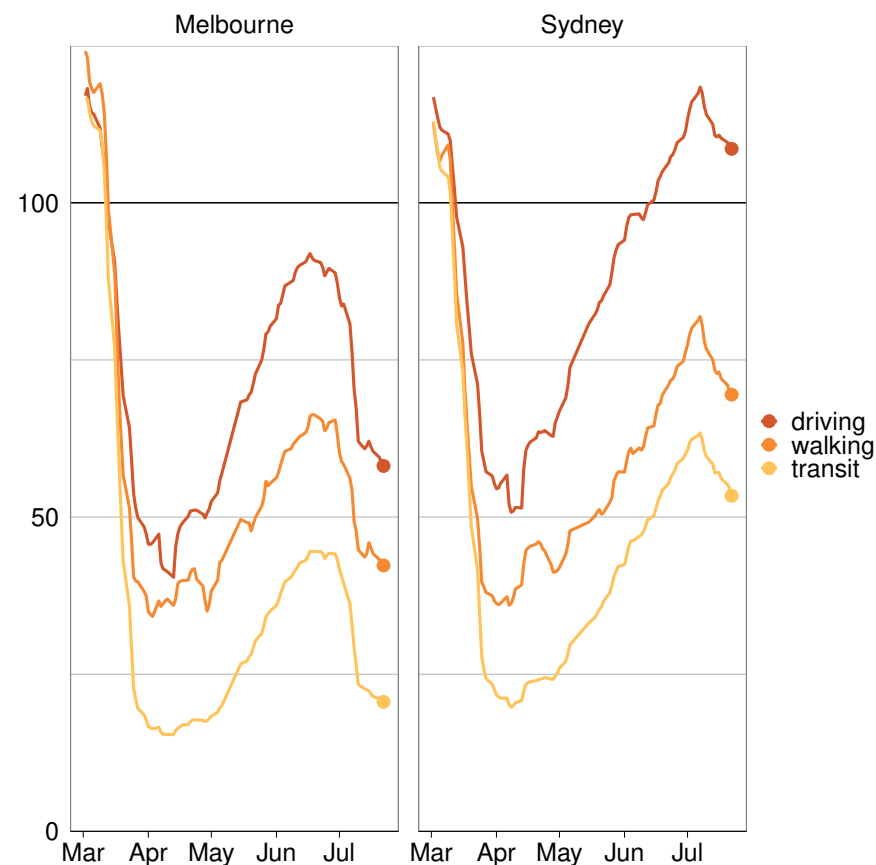
But Figure 4.2 shows that more than 75 per cent of Australians asked in July said they were more concerned about moving too quickly to relax COVID-19 lockdowns.¹⁵² Across gender, ages, and political divides, the overwhelming majority were concerned that lockdowns were being eased too quickly; that the virus would spread and more people would get infected.

151. Economist Paul Krugman described the decision of many US states to come out of lockdown in June as ‘failing the marshmallow test’: ‘You have to be strict and you have to be patient, staying the course until the pandemic is over, not giving in to the temptation to return to normal life while the virus is still widespread.’: Krugman (2020).

152. These results were similar in May: Benson (2020).

Figure 4.1: Melburnians were slower to respond to the second round of lockdowns

Mobility compared to January



Source: Apple (2020).

Section 2.3 and Section 3.3 show that while there are active COVID-19 cases in the community, the economic recovery will stall, life will remain challenging for many Australians, and parts of normal life will remain unattainable for everyone.

While community transmission remains, people who don't have the luxury of practicing social distancing will remain at risk of infection. People living in high-density or crowded housing, and those working jobs that require close contact with others, will remain at the highest risk of contracting COVID-19, and spreading it to others.¹⁵³

The federal Department of Health has identified that 10 million Australians are at higher risk of severe or moderate complications to a COVID-19 infection.¹⁵⁴ For them, the real threat of COVID-19 in the community means they have to maintain their own personal lockdowns.¹⁵⁵ Opening up doesn't mean freedom for these groups; it means greater risk of coming into contact with a virus that could kill them, or seriously harm their long-term health.¹⁵⁶

The spread of COVID-19 is dominated by a few: most people will pass the virus on to nobody else, but some will pass it on to many.¹⁵⁷ As COVID-19 remains in the community, the risk of a 'superspreader' event rises over time. If there are no restrictions, even with a low level of new cases – say five per day, so 150 per month, and on and on, for months and years – a superspreader event becomes almost inevitable.

As the perceived risk of infection decreases, many people will respond to low levels of community transmission by relaxing their own social

153. See Section 2.3.

154. See notes of Figure 2.1.

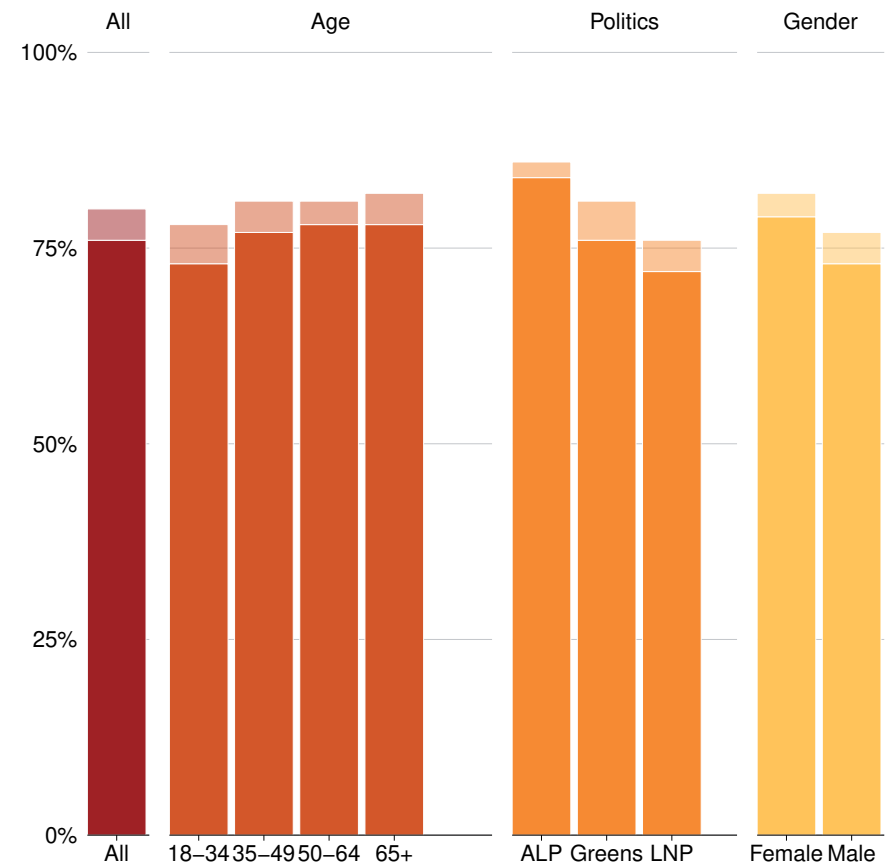
155. Holden (2020a).

156. Faux et al (2020).

157. See Duckett et al (2020, pp. 40–41). While research is evolving in this area, early analysis suggests that about 10 per cent of people are responsible for about 80 per cent of COVID-19 spread: Endo et al (2020).

Figure 4.2: Across the board, most Australians were worried that lockdowns had ended too quickly

Proportion of people who in mid-July were 'more concerned about moving too quickly to relax COVID-19 lockdowns and having the virus spread further and more people get infected'



Source: Benson (2020).

distancing behaviour. This happened in June across Australia: people had contact with more people outside the house, and broke the ‘1.5 metres’ rule more often.¹⁵⁸

With each new case, Australia rolls the dice. Eventually our luck will run out and there will be outbreaks. Outbreaks have to be dealt with. So restrictions will be reinstated. Businesses closed. Plans cancelled. Australia will be back to where it was in July: on the edge, uncertain of the future.

Social distancing and lockdowns are a heavy price to pay, but the nature of this virus means that we must pay this price now, or continue to pay it – on-and-off – for an unknown duration into the future.

If there are no active cases in the community, international arrivals still present a risk (Section 4.4.1). But even one breach of quarantine per week still leaves the risk of outbreaks and their consequences about 97 per cent lower than a strategy that involves low levels of community transmission (described above).

4.2.3 Maintain restrictions until there are zero active cases

As new cases of community transmission head towards zero – when Australia feels it has again got the virus under control, and community perceptions of risk fall – it will take strong leadership and community engagement to remain in lockdown.¹⁵⁹ But polling shows there is a public appetite for maintaining restrictions longer if it means less spread of the virus in future (Figure 4.2). If the Victorian Government, backed by the National Cabinet, chooses to go for zero active cases, the state must maintain restrictions for longer *now* but will significantly reduce its chance of outbreaks in future.

158. Golding et al (2020, Table 1). See also Figure 1.2.

159. Group of Eight (2020, p. 48).

The prospect of Victoria reaching zero cases increases with time spent with restrictions, and with the level of adherence to social distancing policies. Whether – and when – Victoria can get to zero active cases depends, more than anything else, on Victorians.

If each person who has the SARS-CoV-2 virus in their system avoided passing it on to anybody else before they recovered, the virus would disappear. But the nature of the virus and of human beings make this impossible to do without intervention.

The virus builds up in the body silently over days.¹⁶⁰ Before showing symptoms, a person has already been contagious for days. Many people show no or subtle symptoms.¹⁶¹ This means that ‘staying at home if you feel sick’ is only a partial measure. People who are *possibly* carrying the virus must act as if they are. While the virus is circulating through the community, that means everyone in the community must avoid possibilities of transmission by wearing masks, avoiding contact, and staying home where possible.

Human nature makes this difficult. The virus preys on our human connection and exploits the ways we have developed to work, learn, and enjoy our lives. Avoiding a hug at a social gathering is hard, and it's harder still at a wedding or a funeral.

This nature is why, when perceptions of risk are low, adherence to social distancing decays, and we tend to slow revert to the way things were before the pandemic. This perpetuates the spread of COVID-19, meaning that reaching zero active cases is enormously challenging.

Figure 4.3 shows the probability that zero cases will be achieved in Victoria by each date. This model was developed by researchers

160. Duckett et al (2020, Section A.8.2 and Figure A.3).

161. In a substantial serological study conducted in Spain (see Section 1.3), Pollán et al (2020) found that 20 to 35 per cent of people who had been infected with COVID-19 did not show symptoms (or did not notice that they had symptoms).

Box 2: NSW's long road

After being the epicentre of the COVID-19 pandemic in Australia during the first wave, NSW drove new COVID-19 cases down to zero by June. But an outbreak at a pub, linked to the growing cases in Victoria, caused more community spread. NSW now has about 10-to-20 new cases per day. The Premier has declared that the state will not return to lockdown, but additional restrictions have been put in place.

NSW is now living with the kind of low levels of community transmission described in Section 2.3 and Section 3.3. Capacity limits and distancing rules threaten the viability of small venues. Music venues are unable to operate. All venues are required to have a 'COVID-19 Safe Hygiene Marshal'.^a

People who are at greater risk of complications from a COVID-19 infection, or those who do not want to risk an infection regardless, will continue to self-isolate, unable to share in the freedoms shared by their neighbours. Those close to somebody at risk, such as family, partners, and friends, may want to tighten their bubble and limit their own freedoms, too.

But the living circumstances of some – such as people in crowded housing – will make this kind of self-isolation impossible. For people whose work requires close physical proximity to others – in schools, in retail, in hospitality, in health care, and elsewhere – their workplace is the greatest risk to their health. Many who would prefer to avoid the risk will not be able to do so.

a. NSW Health (2020).

b. Gallagher (2020).

c. As was seen during the first wave of infections in Australia: Golding et al (2020). See also Figure 1.2.

d. See Section 1.3 and Section 1.4.

The limits on economic activity in the hospitality sector will continue to harm its mostly young workforce for as long as there are cases in the community. Large events, including most lectures at university, will have to remain closed heading into 2021. Domestic tourism into and out of NSW will remain limited, as states that have achieved zero cases maintain border closures.

With testing, contact tracing, and timely isolation, the army of staff at NSW Health have kept the re-introduction of COVID-19 within its control. This is commendable. NSW Health must maintain – and continue to improve – its testing, tracing, and isolation capabilities. The public must also contribute by wearing masks in public spaces.

But unless NSW acts to drive COVID-19 cases down to zero, community transmission will continue in the state until or unless a vaccine is developed.^b And NSW will only maintain low-level community transmission if social distancing is maintained, and testing, tracing, and isolation is persistently efficient.

As Section 4.2.2 shows, each new case on each new day has the potential to go undetected and spread widely. As time goes on, and with decaying adherence to social distancing,^c the risk of an outbreak rises.^d And maintaining control over an outbreak will require tougher restrictions.

NSW has a long road ahead.

at the University of Melbourne and run on the request of Grattan Institute at the beginning of August.¹⁶² The model assumes relatively widespread mask use and effectiveness. It assumes that about 90 per cent of people who have received a positive COVID-19 test result self-isolate, and that schools remain closed. The difference between the two lines is people’s adherence to social distancing.¹⁶³ On the red line, 85 per cent of Victorians are appropriately distancing themselves most (85 per cent) of the time. This allows for some slip-ups and some non-adherence; but not much. On the orange line, social distancing starts at 85 per cent adherence but decays, decreasing to 30 per cent adherence. Figure 4.3 shows that this makes all the difference.

Under Victoria’s current policy settings – Stage 4 restrictions – it will not achieve the National Cabinet’s goal of zero community transmission by the end of the six-week lockdown, in the middle of September. Even if adherence to social distancing is maintained, more time is needed to get cases down.

Whether Victoria will be closer to the red line or the orange will depend on how long Stage 4 lockdowns are kept in place; the exact allowances if Stage 3 lockdowns are implemented; and people’s behaviour when they are allowed more freedom. As long as Stage 4 lockdowns are maintained, Victoria’s path is likely to be closer to the red line. If restrictions are eased, the risk of new infections will increase, and the prospect of reaching zero cases will fall.

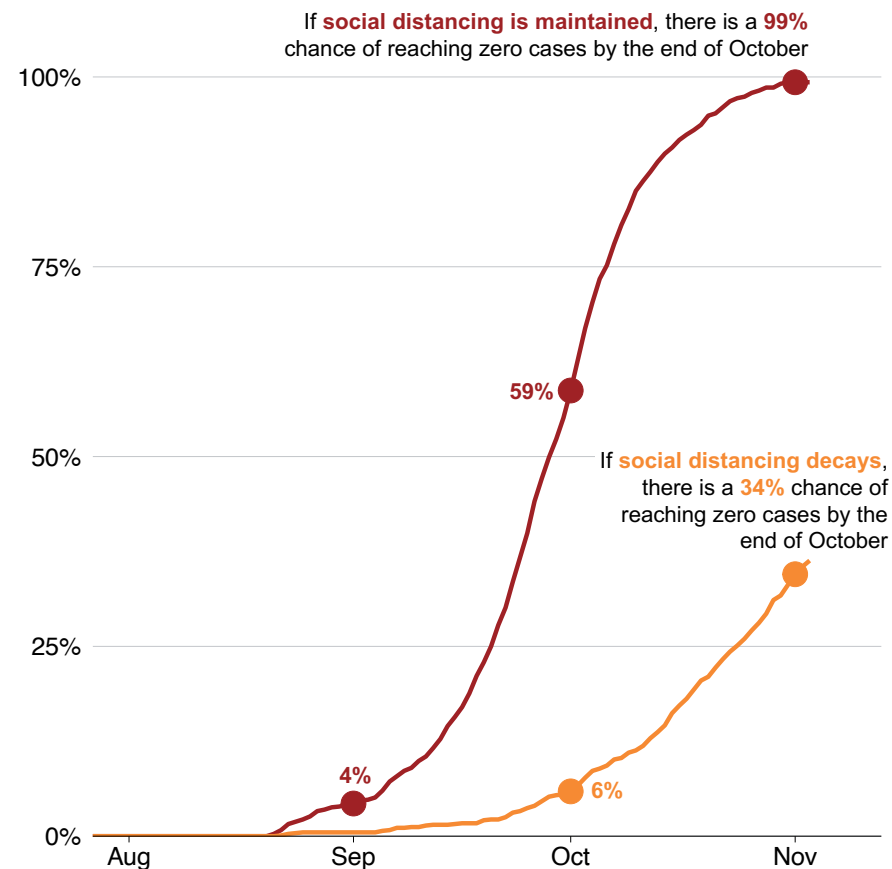
Governments, backed up by the National Cabinet, should reiterate their goal to get to zero active cases in the community. And the quicker this is done the better, because the longer lockdowns linger, the more harm is done to people’s livelihoods.

162. These scenarios are explained in detail in Appendix A. See also Blakely et al (2020).

163. These findings are broadly consistent with Grattan Institute modelling earlier this year: Duckett et al (2020).

Figure 4.3: Victoria is likely to reach zero infectious cases by the end of October if social distancing is maintained

Probability of reaching zero active COVID-19 cases in Victoria



Notes: See Appendix A..

Source: Blakely et al (2020).

4.3 Be clear about when restrictions will be phased out (and in)

COVID-19 restrictions are not all-or-nothing. Restrictions in Australia were phased in as cases increased, and they should be phased out as cases decrease. Governments should be clear about the criteria for moving from one state to the next. This would engage and motivate people; they could see the light at the end of the tunnel getting bigger. And it would reduce uncertainty for businesses and consumers alike.

Knowledge about the transmission of SARS-CoV-2 is increasing rapidly and this should inform the path out of restrictions. The new restrictions should be evidence-based and smarter than the old. Recent research has clarified the risks of transmission in younger people, for example. The risk of transmission for children younger than 10 appears lower than for older children.¹⁶⁴

A paper published in the *British Medical Journal* on 25 August 2020 concluded that the ‘current rules on safe physical distancing are based on outdated science’.¹⁶⁵ The authors assessed the risks of different activities and locations (see Table 4.1). Their matrix provides the opportunity for a smarter restrictions strategy, based on updated science.¹⁶⁶

As Table 4.1 shows, outdoor activities are safer than indoor, lower occupancy safer than higher, and face masks are better than no face masks. Using this evidence, the Queensland, NSW, and Victorian governments should announce a clear path to zero active cases.

The ‘smarter restrictions’ strategy should be staged, with progression between stages – both relaxing restrictions and if necessary reimposing them – based on the number of new daily cases. The activity limits at each step along the path to zero should be tight, especially initially, to reduce the ever-present risk of super-spreader events and outbreaks.

When there are **fewer than 20 new daily cases for five consecutive days**:

- require masks for both indoors and outdoors
- allow outdoor gatherings up to 10 people
- allow indoor gatherings up to 5 people with spatial distancing (>4m² per person per room) across no more than two households
- allow primary schools to return subject to maintaining some elements of spatial distancing, especially in interactions between teachers and between parents
- remove 5km travel restrictions
- allow building and construction to resume
- allow workplaces with fewer than 20 employees, and which have COVIDSafe plans including spatial distancing, to return; but require all other businesses to work from home where possible.

164. Park et al (2020); and Pollán et al (2020).

165. Jones et al (2020).

166. The table provides a qualitative assessment of risks. Implementation involves developing and applying quantitative thresholds of ‘high occupancy’ and other factors. Knowledge about transmission, and the causal path from restrictions to infections, is still developing. While there is still this uncertainty it is prudent to be cautious in setting threshold and activity levels.

When there are **fewer than five new daily cases for five consecutive days**:

- require masks indoors and on public transport
- allow outdoor gatherings up to 30 people
- allow indoor gatherings, without shouting or singing, up to 20 people, with spatial distancing
- allow cafés and restaurants with spatial distancing
- allow schools, universities, and libraries to return with spatial distancing
- allow workplaces with fewer than 100 employees, and which have COVIDSafe plans including spatial distancing, to return; but require all other businesses to work from home where possible.

When there are **zero new daily cases for five consecutive days**:

- require masks indoors and on public transport
- allow outdoor gatherings up to 100 people
- allow indoor gatherings, without shouting or singing, up to 50; and gatherings with shouting or singing up to 30, both with spatial distancing
- allow return to work with spatial distancing
- lift state border restrictions

When there are **confirmed to be zero active cases in the community to a reasonable level of certainty**:

- remove all restrictions other than international quarantine

While the virus circulates in the community – even at the low levels contemplated in our strategy – there will be risks of outbreaks. If numbers rise and, for example, we don't keep new cases at fewer than 20, the staging process should work in reverse, with restrictions re-imposed.

4.4 Staying at zero

Staying at zero active cases requires some of the same tools used to get to zero cases:¹⁶⁷

- effective quarantining of international arrivals;
- high levels of targeted testing of people with symptoms, as well as random testing;
- high levels of preparedness for possible outbreaks, including efficient contact tracing.

4.4.1 International arrivals must be successfully quarantined

Australia must learn from the failures of Victoria's hotel quarantine system. Maintaining successful quarantine of all international arrivals is paramount to the success of any suppression attempts in Australia.

The privatised quarantine in Victoria, with its ineffective and incomplete contractual obligations on the security companies with poorly trained staff, must not continue. This private system was obviously not set up to assure the quality that is required in this high-stakes situation.¹⁶⁸ At almost any cost, the proper staffing of and training within quarantine facilities must be ensured by state governments – possibly using police supervision – with support from the Commonwealth Government.

167. These are outlined in New Zealand's 'COVID-19 elimination strategy': M. G. Baker et al (2020).

168. Holden (2020b). See also Aghion and Holden (2011).

Table 4.1: Outdoor is safer than indoor, low occupancy is safer than high, and masks are safer than no masks

Type and duration of group activity	Low occupancy			High occupancy		
	Outdoors and well ventilated	Indoors and well ventilated	Poorly ventilated	Outdoors and well ventilated	Indoors and well ventilated	Poorly ventilated
Masks, brief						
Silent	Yellow			Yellow		
Speaking	Yellow			Yellow		
Shouting, singing	Orange			Orange		
Masks, long						
Silent	Yellow			Yellow	Orange	Red
Speaking	Yellow*			Orange*	Orange	Red
Shouting, singing	Orange	Orange	Red	Orange	Red	Red
No masks, brief						
Silent	Yellow			Orange		
Speaking	Orange	Orange	Red	Orange	Red	Red
Shouting, singing	Orange	Orange	Red	Orange	Red	Red
No masks, long						
Silent	Yellow	Orange	Red	Orange	Red	Red
Speaking	Orange	Orange	Red	Orange	Red	Red
Shouting, singing	Orange	Orange	Red	Orange	Red	Red

Notes: Red indicates high risk of transmission, orange indicates medium risk, and yellow indicates low risk. * denotes borderline cases highly dependent on quantitative definitions of distancing, number of individuals, and time of exposure.

Source: Jones et al (2020). Adapted by permission from BMJ Publishing Group Limited.

Each breach of quarantine is an opportunity for the virus to spread. COVID-19 takes its opportunities to spread. These opportunities can be reduced by reaching zero cases, and reduced further by tightening the quarantine of international arrivals. Each reduction in risk increases the likelihood that Australians will live fuller, more secure lives into the future.

4.4.2 Maintain substantial testing and outbreak preparedness

While COVID-19 remains active around the world, there is a chance it will reappear in Australia. If this happens, it needs to be caught quickly. This can only be achieved with routine, large-scale testing of the population.

When there are no active cases of COVID-19 in Australia, three testing regimes should run concurrently:

1. Frequently test people connected to international arrivals, including their contacts and people in the community where international arrivals are quarantined. All international arrivals should have a follow-up test one week after their 14-day quarantine period.
2. Randomly test a representative sample of the population every fortnight, using pooled testing techniques to reduce cost.
3. Test sewage where possible, to identify traces of COVID-19 by broad geographical area.

Strong testing regimes can prevent international arrival breaches turning into outbreaks, and stop those outbreaks requiring further lockdowns.

Even when there are zero active cases, outbreaks may occur, as the New Zealand experience shows. Contact tracing capacity must be

maintained, along with the option of localised restrictions, to jump on outbreaks quickly.

4.4.3 Slowly reopen to return to life as (near) normal

When COVID-19 has been apparently eliminated from the Australian community, coming out of lockdown slowly will provide some protection against undetected cases.

Businesses and consumers will spend less time in lockdown over the next year if community transmission is stamped out. The decreased likelihood of future lockdowns will enable businesses to plan and invest with greater confidence.¹⁶⁹

Customers will be able to return to hospitality and the arts with fewer social distancing requirements. Gigs, concerts, and theatre will become economically viable again.

4.4.4 Consider a tight travel bubble

Achieving zero active cases of COVID-19 in the Victorian, NSW, and Queensland communities will enable all states to fully open their internal borders. This will reinvigorate domestic tourism, as it has in other countries that have achieved zero community cases.

To capitalise on this opportunity, Australia should launch a domestic tourism campaign, similar to that in other countries that have achieved zero active cases. Taiwan is 'kickstarting' its domestic tourism; New Zealand is encouraging Kiwis to 'do something new, New Zealand'.¹⁷⁰ It's working – domestic tourism in NZ rebounded fully during school holidays in July.¹⁷¹

169. See Section 3.3.1. See also Daley (2020).

170. Euronews (2020); and Thornber (2020).

171. Tourism New Zealand (2020).

With the virus eliminated in Australia, a travel bubble with New Zealand could be considered, allowing quarantine-free travel between the two countries. Over time the bubble could be extended to other countries that have eliminated COVID-19 from their community and that have their own international arrival restrictions.

4.5 The longer term

Australians will breathe a huge sigh of relief when pandemic restrictions – including domestic travel restrictions – are lifted. But it is critically important that some of the lessons of the pandemic are not forgotten.

The second wave of the pandemic affected the poor much more than the rich.¹⁷² Policy neglect of social housing created the conditions in public housing towers for rapid transmission of the virus. As Figure 2.6 shows, many people in industries that require high social contact live in overcrowded accommodation. Australia's recovery strategy should involve significant investment in social housing to eliminate this overcrowding, meet currently unmet needs, and reduce the likelihood of transmissions if and when a future pandemic occurs.

172. Duckett (2020c).

Appendix A: The likelihood of Victoria achieving zero cases over time

Figure 4.3 shows two scenarios that were modelled to estimate the date of the last person with COVID-19 in Victoria clearing the virus and becoming non-infectious. In these scenarios, lockdowns continue beyond 19 August indefinitely to explore the likelihood of achieving zero cases over time.

The first scenario (shown in red) is the estimated probability of getting to zero cases in Victoria under a current 'best case' scenario. Here we assume that:

- 85 per cent of Victorians are appropriately physically distancing 85 per cent of the time
- 90 per cent of the population is wearing a mask during close interactions with people outside of their household
- Mask-wearing reduces the likelihood of infection transmission by an average of about 75 per cent per contact
- 30 per cent of people are essential workers and cannot self-isolate / socially distance appropriately during work hours (but are still wearing masks as above)
- Schools continue to be largely closed
- Asymptomatic cases are around 20 per cent of total COVID-19 cases
- Tracking and tracing efficiency declines with growing case numbers (i.e. the contact tracing services are overwhelmed at high case-loads)
- 20 per cent of people are using the COVIDSafe App effectively

- An average of 93 per cent of people who have tested positive self-isolate appropriately (we do not include people self-quarantining when they are symptomatic and haven't yet had a test or are waiting for a test result; including them would improve things moderately.)
- There is no general decline or 'fatigue' in people's adherence to these measures over time.
- We assume this is Victoria-wide

In the second scenario (shown in orange), we have the same factors as above, but include a simple, linear decline in adherence to social distancing over time from 85 per cent to a 30 per cent baseline, reducing by an average of 1 per cent per day.

This modelling is an update of a paper published in the Medical Journal of Australia on 17 July:

Blakely T, Thompson J, Carvalho N, Bablani L, Wilson N, Stevenson M. *Maximizing the probability that the 6-week lock-down in Victoria delivers a COVID-19 free Australia.* Med J Aust 2020; <https://www.mja.com.au/journal/2020/maximizing-probability-6-week-lock-down-victoria-delivers-covid-19-free-australia>

It allows for an extra 14 days of COVID-cases up to and including those reported on 23 July.

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