Policies against Covid-19: Reflections on the way in and the way out

Terrence O'Brien
Robert Carling

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1. Executive Summary

Current policies against Covid are unsustainably costly to jobs and living standards. They produce downsides for other health outcomes, such that the net impact on health over time is becoming questionable. Continuing current policies deliver declining benefits, but rising costs, as shuttered business are driven past the point of no return.

Australia's Covid objectives are now unclear. The influential Australian Health Protection Principal Committee[1] was reported to be using a "non-quarantine infection rate of fewer than 10 new cases per day nationally" as a rough benchmark to determine the timing of the further easing of restrictions. This is unachievably low, as fluctuations in new infection through May and June illustrate, let alone the current Victorian experience.

Having more than 'flattened the curve' of infections by mid-April below intensive care capacities that have been almost tripled, at least some state governments under AHPPC influence seem to have adopted an implicit objective of eliminating Covid. But as the recent Beijing outbreak has shown, this cannot be achieved at any cost, even in a dictatorship.

Which policies worked best to reduce Australian infections to manageable levels? Commonwealth border controls and quarantining of arrivals from overseas from early February, increasingly broadly and firmly applied through March, made the greatest contribution to reversing the previously exponential growth of infections towards the end of March. They need to be continued for the foreseeable future.

Which policies contributed least, at highest cost? The more prescriptive and arbitrary the restrictions on business activity and personal choice, the higher their costs. Measures by the States and Territories in late March to close selected businesses, close state borders, confine people to their houses except for a few limited 'excuses' and progressively restrict gatherings to two people could not have contributed to the peaking of daily new infections in late March and the dramatic falls of early April. (This is because of the significant lags between policy restrictions, behaviour change, declining infections, appearance of symptoms, testing and the reporting of new infections in statistics.) At most, these most onerous restrictions may have contributed to the continuing falls in infections to the very low rates of mid-April and later. Their costs are unsustainable and their benefits could likely have been mostly achieved at lower costs by better voluntary measures.

Domestic lock-ins were arguably counterproductive to Covid control, and came at high non-pecuniary cost to liberty, the rule of law and respect for police. Similarly, changes to the enforcement of corporate law and intrusion in commercial relations between lenders, landlords and their customers have introduced damaging unpredictability into business law and customary responsibilities.

Governments proved unwilling or unable to stop the large Black Lives Matter demonstrations of early June, even though such protests present impossible challenges for contact tracing of any infections spread in close quarters during such prolonged and boisterous events. With token fines for only a few demonstrators, but redoubled police efforts to move on small numbers of people outdoors (eg fishing off a pier),[2] the community's acceptance of the democratic legitimacy of continued lock-ins and business prohibitions has been badly damaged.

Support for sensible social distancing has to be rebuilt, relying on well-informed self-interest rather than heavy-handed prescription of business activity and customer restrictions. Providing growing evidence on the benefits of social distancing harnesses individuals' self-interest and businesses' entrepreneurship to sustain low-cost behaviour change and improve personal risk management.

It took most of February and March to learn that quarantining of arrivals from overseas required active supervision and discipline if it was to work. Now that new infections are largely domestically transmitted, we cannot afford another two months to learn that effective quarantine of the domestically-infected and isolation of their contacts at risk requires similarly effective discipline. Contact tracing has to become speedier and interactive with testing to isolate new infections quickly.

Australia cannot afford to continue or return to the high-cost, low-benefit policies of business shut-downs and domestic lock-ins that multiplied in late March and early April.

Most of all, we need to maintain a sense of proportion. From January to March 2020, 19 died from or with Covid, while 581 died from influenza and pneumonia.[3] (Another 90 have died from or with Covid in the 15 weeks since end-March, for which ABS data on other causes of death are not yet available.)

2. Introduction

The upsurge of Covid-19 infections in China, Europe and North America in February and March occurred with only limited information about precisely how the novel SARS-CoV-2 virus spread, how fatal it might prove to be, and how best to treat the infected. Australia participated in the world-wide rush to implement precautionary policies. There were over 30 separate Australian policy restrictions implemented during those two months.[4]

Understandably, there was little knowledge at that time about which measures would have the most effect in restricting the spread of the disease (that is, deliver the highest 'marginal benefit') and no systematic discussion of the adverse impacts of different restrictions to help identify those with the lowest 'marginal costs'. If information had permitted, it would have been useful to find the policies with the highest marginal benefits and the lowest marginal costs.

The Australian restrictions achieved a remarkably quick initial conquest of the virus, but it is now widely understood that their costs are extremely high (in terms of damage to employment and living standards, social costs and worse health outcomes in other areas). Which restrictions can we now remove, and how quickly, against the persistent risk of recurrent outbreaks of Covid-19, perhaps even amounting to a 'second wave' of infections? To help that analysis, the following Box serves to remind us of the timeline of key events and policy changes, and of Australia's Covid performance and selected international comparisons.

A brief policy timeline and fact base for Covid-19, February – June 2020

International Covid infections and Australian policy actions developed so rapidly during February to April, that it can be hard to remember the sequence and roughly align policies with their likely effects.

Table 1 in the Appendix sets out a timeline of the period from early February to mid May when key international Covid developments were likely to have raised public concern and altered public behaviour in Australia (shown in orange), major Australian policy restrictions on travel and activity were implemented (shown in red), and some key Australian expenditure decisions to support the unemployed or (later) to relax restrictions were taken (shown in green).

Australian recorded Covid infections grew slowly to mid-March, then grew rapidly before plateauing at over 400 new infections a day in the last week of March (Chart 1, Appendix). (We cite a rolling seven-day average to abstract from weekend effects in testing and other noise in the statistics.)

Which policy restrictions had the most effect? It is difficult to attribute the results to particular measures, since rising public concern induced precautionary behaviour changes and Australian governments introduced a cascade of restrictions in mid-to late March. But any direct effect of a policy can only show up in data about nine days after implementation. The lag from infection through incubation to the appearance of symptoms (if any) is about seven days, and from the appearance of symptoms to getting tested, getting results and reporting as a new infection in statistics is about two days.[5] So the remarkable collapse of Australian new infections at end March — notwithstanding the *Ruby Princess* fiasco of 19 March which alone contributed about 20% of Australia's total Covid deaths[6] — could only have been driven by behaviour changes or policy restrictions implemented on or before 20 March, or thereabouts.

Drastic measures such as compulsory government closures of businesses (23 and 26 March), domestic lock-ins (30 March) and police harassment of citizens in public spaces (end-March),[7] could not have shown up in infection statistics until towards the middle of April, by which time new daily infection numbers were already falling precipitously (Appendix: Chart 1). The fall is the more remarkable because Australian testing rates almost tripled from late March to mid-June, so the recorded numbers of new infections would have tended to rise for that reason alone, if other things were equal.[8]

Australia's rate of new Covid infections per million population relative to some other countries is shown in Chart 2 (Appendix).

Australian recorded deaths followed new infections with the predictable lag (of some 20 days after contracting Covid-19), plateauing in the second week of April before falling back to a rate of less than one a day. Death rates are shown in Chart 3 (Appendix) relative to the same group of countries cited above. (Australian deaths will tick up again in weeks to come from the current surge in Victorian infections.)

High current rates of Australian testing are revealing very few positive cases nationally (Appendix: Chart 4), suggesting there is not a large pool of undetected cases lurking to trigger significant 'break-outs' through domestic transmission: Until the Victorian outbreak, Australia has to test over 1000 people to find even one new infection. To the credit of the health system, Australian case fatality rates (ie deaths of those identified in the statistics as infected by Covid) are extremely low by international standards (Appendix: Chart 5).

Numbers of Australians suffering a current Covid infection are now dwarfed by numbers who have recovered, even with Victoria's case surge in late June and early July (Appendix: Chart 6).

Emergent international evidence from serological tests is that those actually infected by Covid are more plentiful than have been recorded in Covid statistics, so the disease has a lower true fatality rate than case fatality rates suggest.[9]

3. Knowing the costs and benefits of restrictions would help choice of strategy

The Australian strategy to manage Covid is now unclear. Australia successfully 'flattened the curve' of infections and boosted health system capacity to handle a feared explosion in Covid hospitalisations that thankfully never eventuated (see Appendix: Chart 6).

Is current policy now an attempt to eliminate the virus from domestic transmission (as the New Zealand Government claimed to have done, and as seems to be the implicit objective of some Australian states)?[10] Or is it to quickly quash new outbreaks at extremely low levels by targeted, rapid contact tracing, rapid tight quarantine and improved treatment protocols? Or can we live with some 'steady state' of new domestic infections that are significant, yet well within the capacity of the health and hospital systems to manage and with sustainable costs? As Victoria gets on top of its current infection breakout, how many new cases a day, nationally or in any state, will be acceptable to reopen borders and resuscitate the economy?

Knowing the relative costs of different restrictive policies would help to clarify the choice among these three approaches.

We are unaware of any formal government decisions on these issues, but media reports claimed that the Australian Health Protection Principal Committee is using a 'non-quarantine infection rate [ie infections from domestic transmission] of fewer than 10 new cases per day nationally' as a rough benchmark to determine the timing of the further easing of restrictions.[11] That seems an extraordinarily severe target on which there has been no formal governmental agreement or community discussion. Under the AHPPC approach, which restrictions are to be eased, in which sequence? Without analysis of the marginal costs and marginal benefits of different restrictions, governments are taking (or accepting others') decisions in the dark, and heavily swayed by medical experts focused overwhelmingly on the impact of the policy choices on Covid-19 infections and less on the broader costs.

We therefore make a tentative effort to identify which of the Covid policy restrictions produced the greatest marginal benefits in containing the virus, and which generated the highest marginal costs.

4. The 'new normal' is not sustainable

The immediate costs of current restrictions are staggering and the longer the lockdowns and restrictions continue the greater the long-lasting damage and the closer we come to achieving not just a recession but a depression.

At the global level, for example, the World Bank is forecasting a 5.2 per cent decline in world GDP in 2020, which is much worse than the Global Financial Crisis experience and a 7.7 percentage points shortfall from the pre-crisis forecast.[12] That shortfall amounts to $US 11 trillion, and is like losing all the GDP of Japan, Germany and Australia for 12 months. Economic forecasts always warrant scepticism, but actual evidence of a severe contraction – the steepest since World War II – is accumulating daily in statistics such as UK real GDP shrinking by 20.4 per cent in the single month of April.

At the Australian national level, the accumulation of evidence supports the picture of the steepest contraction in the post-war period. Real GDP, having fallen slightly in the March quarter, is set for a much steeper decline in the June quarter. The IMF predicts a contraction of 4.5 per cent for 2020 as a whole. Employment had already fallen 6.4 per cent by May — and even that is an understatement with the JobKeeper scheme sheltering many more jobs that would otherwise have disappeared.

During May 2020, as Covid spending burgeoned and the economy slowed markedly. Commonwealth expenditures almost doubled compared to May 2019 by about $40 billion to $79.5 billion, while revenues fell by almost 20 per cent or about $10 billion. The fiscal deficit from July 2019 to May 2020 was almost $69 billion, a swing of about $72 billion from the $3 billion surplus expected in the 2019-20 MYEFO published only in December 2019.[13]

The benefits in lives saved and illness avoided — though difficult to quantify because the counterfactual is unknown — may be substantial but still insufficient to justify the economic self-destruction under way from the cumulative effects of restrictions. Talk of every life saved justifying the economic costs is nonsense. Lives are prolonged, not saved. And the prolongation of lives threatened by Covid shortens other lives because of the costs of Covid restrictions to other outcomes, including poverty, unemployment, depression, and delayed diagnoses and treatment of other diseases.

Public policy in many fields takes account of the statistical value of life in cost-benefit analysis to guide decisions on measures that could reduce the risk to life. Often the cost (eg of adding a new drug to the Pharmaceutical Benefits list, further increasing airline safety or reducing road speed limits) is judged too great, relative to the benefits. Why aren't the current restrictions being subjected to this kind of test?

We have no reason to doubt opinion polls showing the policies have been popular, but that popularity is likely because the federal budget implications have not yet been published, the immediate adverse impacts have been temporarily disguised by doubling Job Seeker and introducing JobKeeeper payments, and the future costs in taxes, debt service and other spending options foreclosed have not yet begun to be quantified or felt.

5. Imposing effective quarantine gave large benefits

From the timeline of Australian Government border control measures and Covid infections and deaths (Table 1 in the appendix), it seems likely those controls did most of the work in stopping the exponential phase of Covid growth from middle to late March, especially as they were broadened and tightened towards the end of March.

The role of early action in this area is more fully considered in Salvatore Babones's CIS Analysis Paper of 1 June 2020, *The 12-Week Window: Coronavirus crisis Australia didn't have to have.* He argues Australia would have been better served by even earlier and more comprehensive border closures, relying more on what regional economies with experience of SARS and close knowledge of China were doing, rather than on the initially sanguine advice of the Australian Health Protection Principal Committee and the WHO.

Enumerating the costs of border closures and strict quarantine of returning Australians is difficult. They are associated with (though not wholly responsible for) huge losses to the travel, tourist and education industries and significant costs to the individual travellers affected. But some of those costs would have arisen in any event as travellers' and students' caution and other countries' travel restrictions took effect. While the net costs of Australian Government restriction were probably high, we judge the overall net policy impact to be highly beneficial. However, even that restriction will not remain of net benefit indefinitely – the EU is already reopening its borders to some countries including Australia, and the Commonwealth will need to make its own calculations of costs and benefits from such decisions in the future.[14]

Being better prepared in future to implement strict border controls and supervised quarantine very promptly should be one of the major lessons from Covid-19 for the next novel epidemic.

6. Quarantine the small minority of the ill, not the large majority of the healthy

A common sense approach to epidemic control through the ages has been to quarantine the ill, protect the vulnerable, increase social distance (usually spontaneously) to reduce transmission, and let business operate and the vast majority get on with their lives in the healthiest environments they can access for themselves.

It has been a peculiarity of Covid policies in many affluent countries that they seem almost to have inverted historical practice and common sense. Borders of initially lower infection countries (eg the UK) were kept open for months to high inbound travel from higher infection countries (eg Italy, Spain and France). Epidemiological modelling claimed, implausibly, that this made little difference despite its quickly seeding the domestic population with large numbers bearing the virus. Covid-infected elderly patients, admitted to hospital and diagnosed, have been sent back to their care homes, where they infected unto death their vulnerable companions (NYC). Inadequately staffed aged care homes worsened outcomes (France, Sweden).

But in many affluent countries the healthy have been subjected to virtual house arrest, selected businesses have been subjected to an arbitrary mix of closures or prescriptive rules condemning them to economic life support and police have arbitrarily chased people out of fresh air and sunshine into close quarters with their immediate family members. In a sort of Gresham's Law of policy, the prevalence of severely costly policies in many countries apparently discouraged better policies in other countries: if Italy or NYC had to do something because their hospital systems were overwhelmed, we had to copy it.

It is almost as if the spirit of the age discouraged policies focussing on the infected and the vulnerable, as if that would be 'punching down' or 'blaming the victim'; instead all must suffer equally, but at high cost and ineffectively: 'We're all in this together'.

A vignette of these odd approaches is now playing out in Victoria. A surge in daily infections apparently arose though unusually large family infections as Muslim families celebrated Eid;[15] security staff contracted and spread infections from the quarantined; and protestors joined a large demonstration from which contact tracing of a few ensuing infections was impossible. As a backdrop, some 10,000 people allegedly refused to have Covid tests; and some 20% of those meant to be self-quarantining at home were away when follow-up visits were attempted.

This has led to immediate and vigorous but odd policy responses.

As well as useful, targeted responses such as doorknocking families in suburbs where the family clusters resided to further explain self-isolation advice, the state also reversed in the most disruptive way imaginable, the intended and imminent loosening of patronage limits on restaurants.[16] It would be hard to imagine a measure less related to the problem, and more costly to business and employment. And as we all now know, Melbourne is now shut down again and some 3000 public housing tenants in tower blocks are now in 'hard lock-down' without initial arrangements for food, medicine or infection control, and with no 'exit strategy' for them announced at the time of writing.

Now Melbourne is back in domestic lock downs of business and shut-ins of households, including a recent hard shut-in for a week of residents of nine public housing towers, where infections were judged particularly likely to spread because of shared stairwells, corridors and elevators. Infections in these towers are now over 200.

7. The most damaging costs of bad policies are not only measured in dollars

The costs of business shut-downs and household lock-ins are not just economic and are not only felt now. Just as confronting are the costs in increased mental ill-health, suicide, substance abuse, domestic violence, relationship breakdown, loss of time in education, and medical and dental care forgone or deferred. Many of these costs won't show up now but will accrue over many years and may never be attributed to anti-Covid policies in 2020. A recent report suggested there could be an extra 1500 deaths a year for five years from mental health problems brought about by the current crisis – far more than the likely deaths from Covid-19.[17]

Particularly worrisome in commercial policy responses to Covid has been the damage to commercial law and traditional responsibilities, including the waiver of company directors' liabilities if their companies trade while insolvent, and government 'jawboning' of financial institutions and landlords to forbear exercising their legal entitlements with their borrowers and tenants.

Such forbearance may well be sensible and mutually beneficial in many cases, but it will be exploited in other cases. The upending of legal and traditional responsibilities is likely to generate heightened business caution in entering new commitments with borrowers and tenants. Those most hurt by heightened caution are likely to be the more vulnerable borrowers and renters with fewest options.

It is easy to understand why governments think such disruption of commercial norms is desirable, together with JobKeeper, to try to minimise the irreversible destruction of businesses, wealth and jobs. But that only points to the undesirability of the underlying prescriptive closures of some businesses and regulatory condemnation to life support of many others, when less draconian policies could have produced many of the same benefits at lower costs.

Another major area of non-pecuniary costs of inappropriate policies is the damage to the rule of law through arbitrary application of emergency powers, the damage to citizens' equality before the law, and the damage of trust in police and in government itself.

When government health ministers assume emergency powers to issue, on grounds of public health, ill-defined prohibitions on everyday lawful behaviour, trouble inevitably follows. Premiers pontificate on the dangers of golf, or the therapeutic value of visiting one's lover. Police issue just three fines when thousands join a protracted, boisterous, crowded demonstration for which contact tracing of any ensuing infections is impossible, but within days, tell people fishing off a pier to move on. While businesses are shut down and employment decimated, some people have refused Covid tests.

When typical Australians witness such activity, respect for police and belief in the legitimacy of government is damaged, as an enduring non-pecuniary cost of bad policies. The damage has to be stopped as soon as possible.[18]

8. Some costly measures were likely counterproductive or of very little benefit

There is suggestive evidence that some of Australia's more prescriptive rules were actually the inverse of what should have been encouraged. Covid transmission in noisy, protracted mass gatherings with people shouting, barracking or singing is much more prevalent (especially with poor ventilation) than transmission in other circumstances.[19] Sunshine, fresh air and vitamin D are much more helpful in suppressing Covid and reducing transmission than being cooped up inside, especially in apartments sharing elevators and stairwells, and sometimes airconditioning.[20] Confining people to their homes, shutting beaches, stopping surfing and golf, and chasing people out of parks arguably did more harm than good. It may have been better merely to facilitate social distancing in those cases where separate individual choices overloaded facilities (e.g. by limiting numbers accessing each beach at peak times, just as shops limited numbers inside by controls at their doorways.)

The lock-ins may have seemed to public health officials to be of low or little pecuniary cost, but they imposed high compliance costs on citizens, and reduced the credibility and sustainability of both the measures themselves, and of all anti-Covid restrictions.

The unsustainable and credibility-destroying nature of these restrictions were brought to a head by the Black Lives Matter protests in early June which governments advised against but did not try to stop, limit in size or protect with collection of information for contact tracing.

9. Low cost measures that work with individuals' instincts should be developed

Government restrictions are usually thought to mitigate epidemics by mechanistically restricting behaviour and proscribing various activities. But the history of epidemics shows another important channel of behavioural change: when people gain information about an infection risk (for example seeing other rich countries' hospital systems overwhelmed and learning how a disease spreads), they spontaneously change behaviour because of the self-interest they have in avoiding sickness and protecting their families.[21]

In New York City, ridership on subways fell by 60 percent by 16 March, before lock-down requirements shut businesses and forced residents to stay home. Google community mobility data show movement in Sweden without lock-ins fell nearly as much as in neighbouring countries with them. On-line restaurant booking platforms showed very large falls in restaurant bookings, well before government implemented restaurant occupancy rules and forced closures.[22] As economist Jeffery E. Harris noted, "Put bluntly, what flattened the curve was no more than the naked truth."[23]

The most obvious, simple and low-cost personal behavioural changes are social distancing and improved hygiene. To underplay this channel of spontaneous behavioural change leads to excessively prescriptive government interventions that are substantially redundant in reducing transmission, but impose avoidable and arbitrary costs (eg shutting some businesses but not others, when social distancing among customers might have been sufficient).

Governments can effectively harness self-interest and entrepreneurship to cheaply nudge behaviours towards good results. Consider the vexed area of restaurants and the hospitality industry more broadly. At loading rules such as 'one customer per four square metres' or total patronage limits set at 20 or 50 diners, many fine-dining restaurants will never reopen.[24] Forced out of business by arbitrary government rules, sometimes capriciously varied as in the Victorian Government's June decisions, they will reasonably demand governments compensate them.

An alternative approach worth development would be for governments to increase information about the risks of protracted exposures in close quarters in loud and poorly-ventilated environments. Restaurants could innovate to use such information, and attract customers by informing them of their measures.

10. Protecting those most at risk cannot disregard costs to the intended beneficiaries

Residential care codes to give Australia's elderly special protection were strengthened on 1 May.[25]

While this was arguably about three months too late, given how early it became clear even from Chinese data that Covid was particularly dangerous to the elderly and those with co-morbidities, it has to be acknowledged that this area is a minefield, dotted with dilemmas.

For the active elderly, remaining isolated from society in their own homes or under stricter lockdown in an aged care home may be just what they would choose to do without being instructed by governments — but some of them may also prefer sensibly to mitigate their risk at low cost (for example by wearing a mask) and then take their chances against the virus and enjoy seeing their families, travelling and going to cafes and museums.

The elderly are not objects to be isolated against any risk of death regardless of their wishes or needs. Their preferences to see a grandchild even if it entails a risk to the grandparent are as much deserving of respect as the wishes of a younger person who wants to go to a concert, a football match, or even a demonstration.

It is worth remembering that the average length of stay of an aged person in permanent residential aged care has remained relatively steady over the last 10 years at around 2.5 years. Unsurprisingly, the main reason for the great majority of those 'leaving permanent care', as the official data terms it, was death.[26]

Denying the elderly the choices all adults are entitled to may be temporarily beneficial to Covid statistics, but it is a violation of their freedom and not necessarily an improved social outcome on any considered view. Again, we observe that the high costs of restrictive policies against Covid are not only pecuniary.

11. Lessons from other countries' experience

In the space limits of this paper, we focus very briefly on two regional cases, Taiwan and South Korea — widely considered more-or-less success stories for Covid containment at low economic cost, no community lock-ins, and few compulsory business closures.

We also mention one unique policy experiment, Sweden, which case we regard as still inconclusive at the moment, but not travelling well.

Both Taiwan and South Korea are closely economically linked to China and are experienced (Taiwan especially) from the 2002-2003 SARS outbreak in how dangerous new diseases from abroad can spread quickly into their communities. (China had about 5,300 cases of SARS and 350 deaths; Taiwan had about 670 cases and 80 deaths (about twice its deaths to date from Covid). Australia had five SARS cases and no deaths.)[27]

Taiwan and South Korea had built remarkable community support and legislative frameworks for activating (for the duration of a public health emergency) extraordinarily sophisticated tracking, quarantining and isolation efforts. When Covid struck, they quickly deployed very extensive and rapid testing regimes. They have not shut down their economies to anything like the extent Australia has.

In broad and brief outline of the key characteristics of South Korean and Taiwanese systems against Covid, there is seamless government automated cross referencing of real time credit card usage and smartphone location data, feeding into intensive, virtually instant telephone and police feedback based on the information provided. If a citizen or visitor lacks a smartphone, the government provides one to make sure they can be tracked and contacted.[28]

This obviously requires tremendous political and technological pre-preparation, and willingness to trust the government and its officials with information.[29]

None of this sophisticated technology, information pooling, trust and abandonment of privacy is going to happen in Australia for this pandemic, if ever. For Australia, appropriately resourced manual contact tracing will have to bear the burden of any failures in hotel quarantine of returning travellers, refusals to undertake Covid tests, failure to observe self-isolation for domestically-transmitted infections, and mass demonstrations by thousands of untraceable participants.

The case of Sweden is fairly well known, and usually described in foreign commentary as a strategy of 'pursuing herd immunity' by slowing the progress of Covid to prevent overloading the health system, but not seeking to further suppress the virus. This seems more like a classic strategy of 'flattening the curve', but whatever it is called, it is clear that infection and death rates in Sweden have been very high against Nordic comparators. Moreover, Sweden's state epidemiologist observed in mid-June that immunity rates in Stockholm, at then around 14%, were proving remarkably slow to build. (This compares to immunity rates in Italy's Covid epicentre, Bergamo, which now has immunity rates of almost 60%.)[30]

Sweden has not had shutdowns to anything like the extent of its neighbours, or any lock-ins. Its economy was still growing a little in the first quarter of 2020, when all its neighbours were contracting. But the differences, especially in forecasts of contraction over the rest of this year, are not large. The Swedish economy is of course very closely integrated with its Nordic neighbours and the EU, its manufacturing sector is very export-oriented, and its population spontaneously undertook much of the social distancing and reduction in travel, dining and shopping that was occurring everywhere. If economic decline in all your neighbours is throttling your exports and you are being careful of your health, it will be difficult for your economy to prosper, whatever the differences in policy.[31]

Swedish authorities have acknowledged mistakes (as in other countries) in failing to protect those in homes for the elderly, until recent staffing increases. The Swedish Government has recently announced a review of its policies, starting with why fatalities among the aged have been so high.[32] While its death rates are falling (Chart 3), daily new cases per million population had been flat and then were rising until recently (Chart 2). Testing per confirmed case is only a fraction of Australia's (Chart 4), suggesting testing and contact tracing may not yet be sufficient to target Swedish measures as efficiently as possible.[33]

Tomas Pueyo argues forcefully that we can already conclude Sweden's policy is failing.[34] In contrast, Sweden's state epidemiologist reports that Sweden has now returned to normal mortality rates, with no 'excess deaths' apparent from Covid. [35] The Swedish Prime Minister announced on 2 July a committee of inquiry into how policy should change, commencing with why about half Swedish deaths have occurred in care homes. For our part, we suspend judgement and offer two thought experiments:

- Assume an effective vaccine conferring protracted immunity is developed next Monday, found safe next Tuesday, mass produced next Wednesday and Thursday, and administered to most of Sweden next Friday. Sweden's policy would then be a failure. It would have incurred a lot of deaths up front for a degree of immunity quickly surpassed by the benefits of a vaccine.
- Assume instead an effective vaccine is not developed for 10 years, or ever. Sweden's policy may be a success. It would eventually achieve a degree of immunity when other countries have not. Other countries would then relax their policies to allow their communities to build immunity belatedly.

Another interesting way to think of the Swedish experiment is to contrast it with New Zealand's recent claim to have eliminated SARS-CoV-2 from its population. If Sweden is testing the hypothesis of 'herd immunity', New Zealand is testing the alternative hypothesis of 'herd vulnerability'.[36] Time and the possible development of a vaccine will tell which course was closer to the mark.

12. Dying from Covid, or with Covid?

Many deaths attributed to Covid-19 are connected to another underlying condition. WHO guidelines for categorising causes of death recommend entering Covid as the cause of death in any case where it is present, while other causes may also be coded separately. Perhaps Covid-19 has brought forward by months deaths that would otherwise have occurred anyway from associated causes. Some countries are deliberately recording deaths with ambiguous causes as deaths from Covid.

If we knew the true numbers infected with SARS-CoV-2 (the denominator) the mortality rate from Covid could settle to be as low as 0.3 – 0.5%.[37] (This was the US Centres for Disease Control and Prevention's best estimate in May, involving a case fatality rate of 0.4% and a lower death rate of 0.26% derived from applying a larger denominator, which added estimates of asymptomatic cases to those testing positive).

Why are deaths from Covid-19 more unacceptable than deaths from other causes? Australia typically records around 450 deaths per day from all causes, some of which could be avoided (or delayed) if as a society we were willing to incur the high cost of doing so. Unless a result of a major accident or natural disaster or involving a prominent person, these 450 or so deaths do not make the news, let alone feed into widely reported daily tallies.

All deaths from Covid-19 are regrettable, yet somehow we have wound up in a situation where 450 deaths per day are acceptable as long as none of them are caused by Covid-19. It seems to be a case of the new and highly visible risk crowding out those that are well-established but taken for granted.

What is important over time is 'excess deaths' (above trend) from all causes. Covid may well cause several hundred Australian deaths in 2020, but the disease and the policies to contain it will also reduce deaths in 2020 from seasonal flu, road accidents and the like. So the net effect in 2020 might be quite small. In following years, there will likely be excess deaths from suicides, and from illnesses whose detection and treatment were prevented or disrupted by the cessation of hospital services for other than Covid cases.[38] But will they ever be allocated to their cause in needlessly costly 2020 policies?

13. Don't prolong high net costs with exaggeration of 'second wave' risks

Many of those fearing a 'second wave' of Covid allude, explicitly or implicitly, to the Spanish Flu of 1918-1920, for which there was a second wave from a different strain of the virus starting in August 1918. This second wave killed more (and younger) victims in many countries than the first wave. There was also a third wave, smaller than the first two. Four other influenza outbreaks since the 1890s have also manifested several waves of infection.[39]

Influenzas, pneumonia and colds show seasonality in their severity, spreading more in winter and with more people indoors for longer periods and lower vitamin D levels. Probably Covid-19 will too. Daily new infections in Australia were averaging around 15 a day before flaring to over 100 a day nationally in early July, overwhelmingly from the Victorian upsurge. It would be surprising if there were not repeated flare-ups of Covid-19 as winter progresses and clusters of local transmissions break out periodically.

Rather than the analogy of inundation by a 'second wave' of new Covid infections and deaths necessitating another nation-wide, swingeing shut-down, a better analogy is to repeated games of Whac-A-Mole, a game that repays quick reaction times, agility and moves well-targeted at particular locations of the outbreaks, sustained over time.[40]

With the policies described below, it seems unlikely that future flare-ups would accumulate to a 'second wave' of deaths that would prevent prompt removal of most lesser restrictions and of forced business closures. Overseas transmissions into Australia have been stopped by continuing border closures and finally by supervised quarantine arrangements, apparently effective in most States. Australia now has to make quarantining of domestically-transferred infections and isolation of their contacts as effective as it has made treatment of internationally transferred infections and their contacts. That would allow management of domestic transmissions with continuing low-cost, sensible voluntary social distancing and improved hygiene.

The risk of 'superspreader' events (where one infected person can infect up to hundreds of others in peculiar conditions) is greatly lessened by a continuing ban on large indoor and outdoor gatherings (say over 500 people) and requiring identification for contact tracing of all attending.[41] Contact tracing works better and faster the fewer the numbers of new infections' contacts to trace.

Treatment protocols are improving (for example, US daily fatalities have fallen even though cumulative infections have continued to rise),[42] so case outcomes should improve or at least not deteriorate.

The surge in new infections in Melbourne in June triggered a drastic reversion to shut downs and lock ins. The surge has to be suppressed by local policies correcting local policy failures, not state-wide or Australia-wide policies that are devastating to heavily damaged industries but unrelated to the particular source of infections.

14. The role of medical experts

Medical experts in public health face an unenviable task when confronted by any new disease threat. Our Chief Medical Officers and their staffs had to formulate advice about a novel disease about which little was known initially, and with little or no knowledge of the relative efficacy of different policy restrictions.

Jeers about their work are unwarranted, but we should engage in temperate examination of whether governments have properly harnessed our public health experts in good policy making.

Health officials' professional responsibility and skill is to advise how to minimise disease and deaths. That naturally disposes them to medical risk aversion with lesser concern about costs.

But public health advisers also faced a problem that was entirely avoidable: the absence from the Australian Health Protection Principal Committee of any professional expertise in thinking about the relative costs, both pecuniary and non-pecuniary, of different policy restrictions. That is an expertise that should reside elsewhere in the bureaucracy and be used in Ministers' deliberations and their public explanations of policy choices.

It is striking that we can all identify Commonwealth and State Chief Medical Officers (and in some cases their Deputies) from regular joint press conferences in which they provided a medical shield for their ministers. But few could identify the relevant Treasury Secretaries. That fact is symbolic of policies taken for their assumed benefits, with no enumeration of their costs.[43]

15. A practical path out of the lock down

The discussion above suggests a path forward that maximises the effective controls around the re-emergence of Covid and removes the controls that are unsustainable, of little effect and/or of very high cost.

It also advocates a proportionate, informed preparedness to accept higher daily rates of new infections well within health system capacities. It accepts there will be continuing, occasional deaths just as there are many deaths of the elderly and the health-impaired every day, including every winter from colds and flus. According to the latest quarterly ABS data on doctor-certified deaths from January to March 2020, 581 Australians died from influenza and pneumonia compared to the 19 who died from or with Covid.[44]

A more sustainable approach is to keep the spread of the virus well within the capacity of the medical system to treat the most seriously affected. This doesn't mean aiming at 'herd immunity'; no one knows what that might be. But if a vaccine is not developed soon (or ever) immunity levels in the community will rise. We should accept that a controlled spread means more volatile and occasionally higher new infections than we saw in May and most of June.

Relaxing some restrictions while maintaining closed external borders and quarantine for a while longer will doubtless allow some periodic surges in domestically-transmitted infections from May-June levels of around 15 a day.

Greater contact tracing capacity and local testing, more effective isolation and quarantine measures and improved treatment protocols will keep any such outbreaks small, localised, and well within the much-expanded treatment capacity of the medical system. Singapore and Japan have been mentioned as examples of early policy success perhaps suffering a 'second wave' at a scale to be feared, but their infection rates are under control, as shown in the charts in the Appendix.[45]

16. Conclusion and suggested directions for policy evolution

Australia's rapid successful suppression of the Covid pandemic has come at huge cost. The benefits have been won, and now must be defended at a sustainable cost. It is impossible to envisage new infections being driven to zero at any supportable cost.

Recent policies seem to have evolved, without political endorsement, to attempted *de facto* elimination rather than management of Covid at low levels well within the capacities of the health system to manage.

The costs of these policies are rising weekly, along with the risk that many businesses (mostly small enterprises, many in hospitality and tourism) may never reopen, especially if there are 'second wave' business shut-downs or domestic lock-ins. There is a risk of permanent damage to the composition of the Australian economy, with the government sector larger, small business shrunken as a share of the private sector, unemployment higher, fiscal deficits higher, debt higher, taxes higher than they could otherwise have been and public spending choices pre-empted by higher debt service.

It is clear from the policy timeline that international border closures, supervised quarantine of arrivals and self-isolation of domestic infections did most of the heavy lifting in turning around Australia's period in late March of exponential growth in new Covid infections. Such measures should stay as long as many other countries have much higher rates of infection than Australia now does.

All the most costly and damaging measures involving mandatory business closures, arbitrary customer limits and densities, domestic lock-ins and state border closures were introduced after infection rates were already declining. Given lags from behaviour change to infection, incubation, testing and entry into statistics, these measures could not have contributed to the further collapse of infections until about the second week of April onward. They are measures with the highest economic and non-pecuniary costs, and the least benefits. They should continue to be removed as fast as possible.

In their place, evolving policies should aim to use better information to harness into sustained behaviour change the self-interests of citizens who want to remain healthy and businesses that want to innovate to survive.

Under such a philosophy,

1. Australian governments should acknowledge, based on international and our own experience, that we cannot eliminate Covid at any acceptable and sustainable cost, this side of widespread use of a possible future safe and effective vaccine. Governments should make clear that appreciable breakouts of new infections are to be expected into winter, so people should remain vigilant in social distancing.

2. Policies should focus on encouraging citizens to voluntarily reduce lengthy potential exposures to SARS-CoV-2 in crowds and/or in confined spaces with poor ventilation and boisterous shouting, singing or barracking. Advice to minimise such exposures would reduce citizens' risks voluntarily and at low cost from the type of activities which have proven internationally to be efficient 'superspreader' events.

3. Governments should maintain and improve public education measures on social distancing and good hygiene, for example by publicising lessons from 'super-spreader' events and information on mask wearing, rather than repeating simple messages to the point of boredom.

4. Governments should apply more resources to ensuring contact tracing is done as well as the limitations of a manual system allows, and follow up through testing and effective isolation is quick.[46]

5. Governments should tighten their supervision of the quarantine of those infected by domestic transmission and the isolation of their contacts, mirroring the outcome (if not the means) of the more effective quarantining from 28 March of incoming passengers from overseas.

6. States should remove interstate travel restrictions. Unlike international border closures (which are cost-effective because Australia cannot reduce infection rates or improve quarantine in foreign countries), state border closures involve higher economic costs and less effectiveness than targeted contact tracing and prompt effective isolation of those infected within the states experiencing Covid breakouts

7. Governments should remove business prohibitions such as the patronage limits for restaurants and the patron density limits of 1 person per four square metres, and rely on consumer self-interest and business entrepreneurship to ensure good voluntary compliance with social distancing guidelines, better-informed under point 3 above.

8. Now that the limitations in supply of personal protective equipment for medical staff have been largely overcome, governments could publicise the strengthening evidence on the benefits of voluntary mask-wearing for those at high risk (eg. the elderly, or those with co-morbidities), or those choosing to place themselves in higher-risk situations (eg audiences at concerts, crowds at football matches or demonstrations, and congregations at churches). Australian attitudes to moving in public with respiratory infections like colds and flu (or seeking to avoid Covid) should become more like Japan's. Voluntary mask-wearing is yet another low-cost, high-benefit practice, relative to shutting businesses, destroying jobs and chasing people out of parks.

9. The Commonwealth should remove permission to company directors to trade while insolvent and cease guidance to banks and landlords to forgo the legal framework which governs relations with their customers. Such edicts risk enduring damage to the business climate.

Table 1: Key Australian policy and international events: 1 Feb – 18 May 2020

Australian anti-Covid restrictions and peak rates of infection and death shown in red;
Australian Covid spending measures, and relaxation of restrictive measures shown in green;
Some notable international and Australian events shown in orange.

Date	Policy announcement or international development	3-day rolling average	
		New infections	New deaths
1-Feb	Ban on foreign nationals arriving from China without 14 day isolation in third country; self-isolation for 14 days by Australians returning from China	1.7	0.0
13-Feb	China entry restrictions extended	0.0	0.0
19-Feb	First community transmission recorded in Lombardy, Italy	0.0	0.0
20-Feb	China entry restrictions extended again	0.0	0.0
22-Feb	First Italian deaths from covid-19	2.0	0.0
25-Feb	New Spanish clusters of Covid -19 from Italian contacts confirmed	0.3	0.0
26-Feb	First community transmission cases reported in Spain	0.0	0.0
27-Feb	Emergency Response Plan activated	0.3	0.0
28-Feb	PM declares Covid-19 a pandemic, ahead of WHO	1.0	0.0
29-Feb	Iranian arrivals to quarantine for 14 days in third country	1.0	0.0
1-Mar	Flights banned from Iran; inbound travellers to self quarantine for 14 days	1.0	0.3
5-Mar	Flights banned from South Korea; enhanced testing of arrivals from Italy	7.7	0.3
11-Mar	Flights banned from Italy; $2.4 bn commonwealth health package	12.7	0.0
12-Mar	$17.6 bn Commonwealth stimulus package; WHO declares Covid-19 a pandemic; media reports on overwhelmed Lombardy hospitals commence	15.3	0.0
13-Mar	Australian F1 Grand Prix cancelled; National Cabinet formed to address Covid issues	18.7	0.0
15-Mar	All incoming travellers told to self-isolate (unsupervised) for 14 days	41.0	0.0
16-Mar	Gatherings over 500 banned	47.3	0.7
18-Mar	Biosecurity emergency declared by Governor General; Restrictions on visits to aged care centres introduced; non-essential indoor gatherings limited to 100; 1.5 metres social distancing in cinemas etc; do not travel overseas directive	68.3	0.7
19-Mar	Ruby Princess passengers allowed to disembark	89.0	0.3
20-Mar	All national borders closed; Tasmanian borders closed; Indoors social distancing 4 square meters per person	111.3	0.3
22-Mar	Government announces doubling of Jobseeker payment	177.7	0.3
23-Mar	Stage 1 shutdowns: Closures of cinemas, nightclubs, pubs, casinos; restaurants to takeaway only	333.3	0.3
24-Mar	Bans on Australians travelling overseas; Company directors allowed to trade while companies are insolvent; Victorian schools closed; NT, WA and SA borders closed	316.3	0.0
25-Mar	Stage 2 restrictions decided by National Cabinet. All non-urgent elective surgery cancelled; Victoria also announces intention to move to Stage 3 restrictions; Qld borders closed	441.7	0.3
26-Mar	Closures extended to food courts, personal services, galleries, health clubs, swimming pools, gaming and gambling venues, etc. Hairdressers allowed to operate without 30 min time restriction, but with 1 person per 4 sq metres.	363.3	1.3
27-Mar	Only children who cannot be at home with a parent should attend school	447.7	2.0
28-Mar	All Australian arrivals into supervised quarantine; ADF participation in checks on those already self-isolating at home	318.3	1.7
29-Mar	Stage 3 shutdowns: Limit most indoor and outdoor non-essential gathering to 2 people	336.7	1.0
30-Mar	Australians confined to home except for limited reasons; Playgrounds and skateparks closed; over 70s to self-isolate. JobKeeper payments of $1500/fortnight announced	309.0	1.0
2-Apr	Suspension of non-urgent elective surgery	294.3	1.7
3-Apr	Paris and New York introduce emergency morgues for Covid overflow	222.3	1.3
4-Apr		280.3	3.3
6-Apr		173.3	4.3
7-Apr	Government releases Doherty Institute modelling	98.7	4.0
8-Apr		89.7	3.7
26-Apr		16.3	2.3
27-Apr	Recommence some elective surgeries	15.3	2.7
1-May	National Cabinet agree code for residential aged care and for return to sporting activities	12.3	2.7
2-May	Spanish lockdown on exercise eased; emergency hospital and ice-rink morgue closed	9.7	1.7
5-May	NZ PM joins National Cabinet for discussion including of Australia NZ Covid travel safe zone	19.3	0.7
8-May	Australian 3 step plan for removing restrictions announced: 'Covid safe' by July 2020	23.7	0.7
11-May	France begins cautious easing of lockdown	15.0	0.0
15-May	Australian restoration of elective surgery encouraged in three stages. 50 Covid patients in hospitals; 12 on ventilators	13.7	0.3
18-May	Italian PM announces "calculated risk" in progressively easing lockdowns; "can't afford to wait" for vaccine	18.7	0

Chart 1: Australia: Daily new confirmed Covid cases, 7-day average

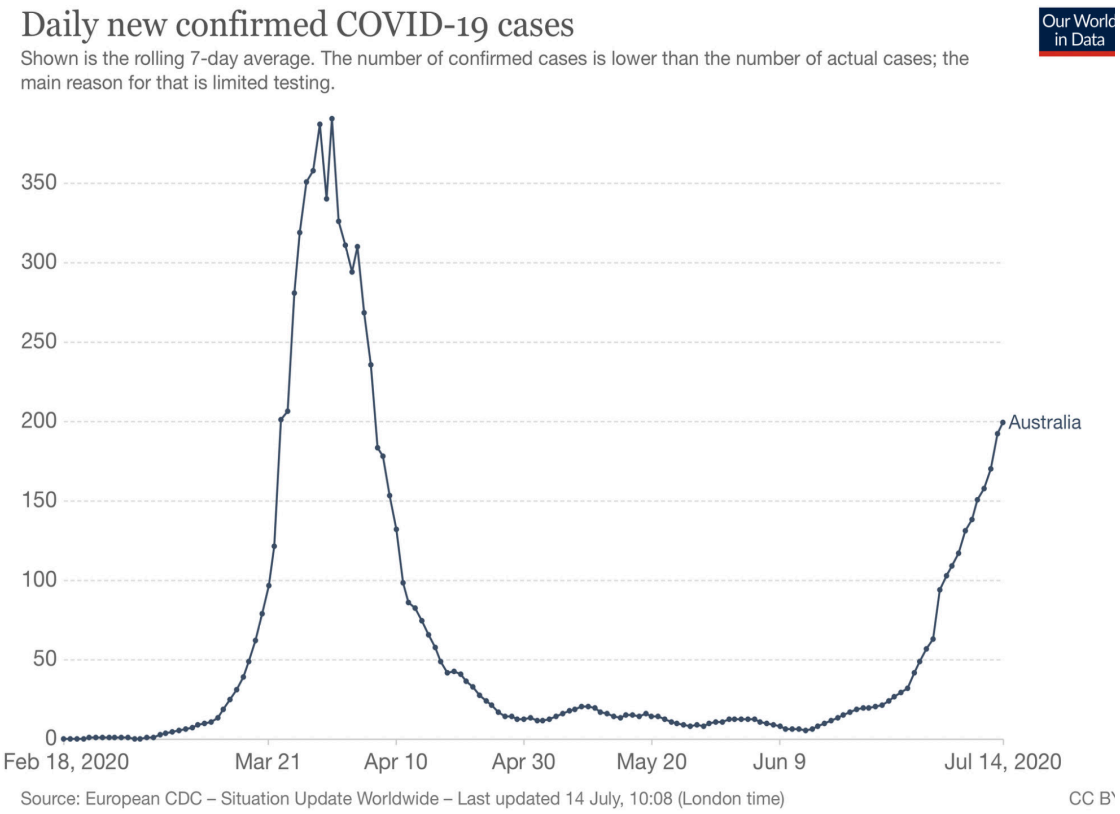


Chart 2: Covid cases per million people, national comparisons

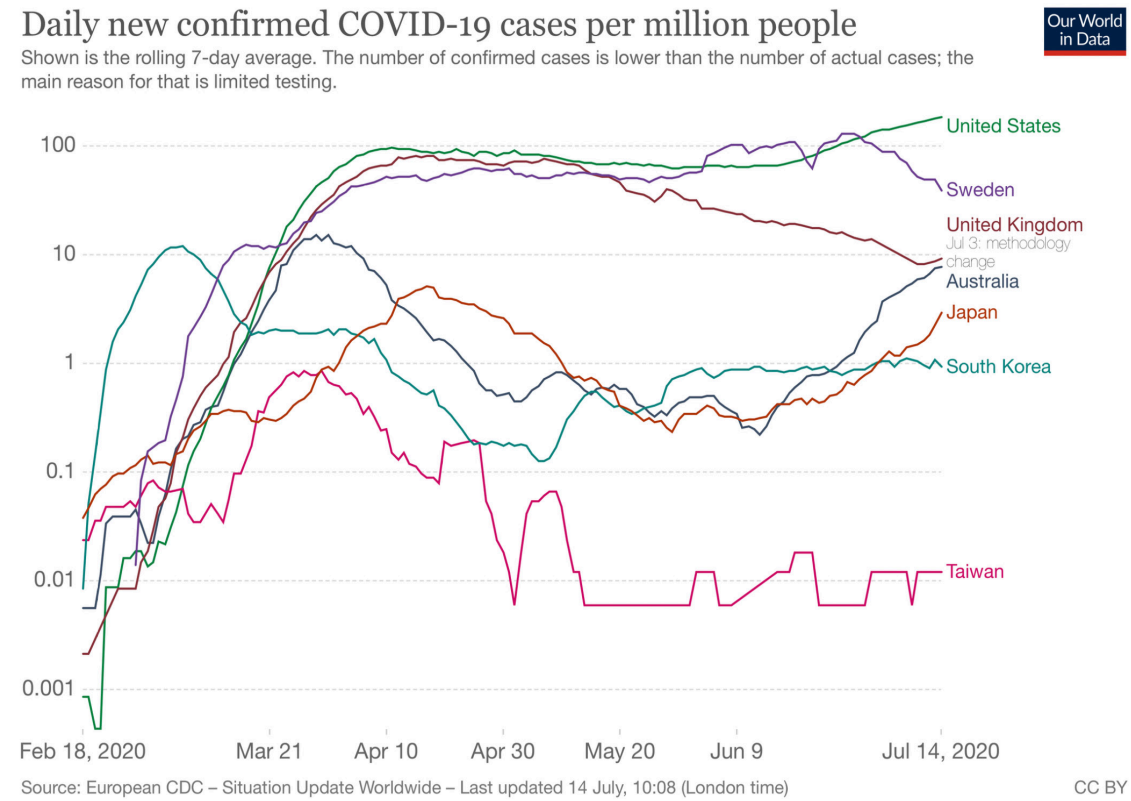


Chart 3: Covid deaths per million people, national comparisons

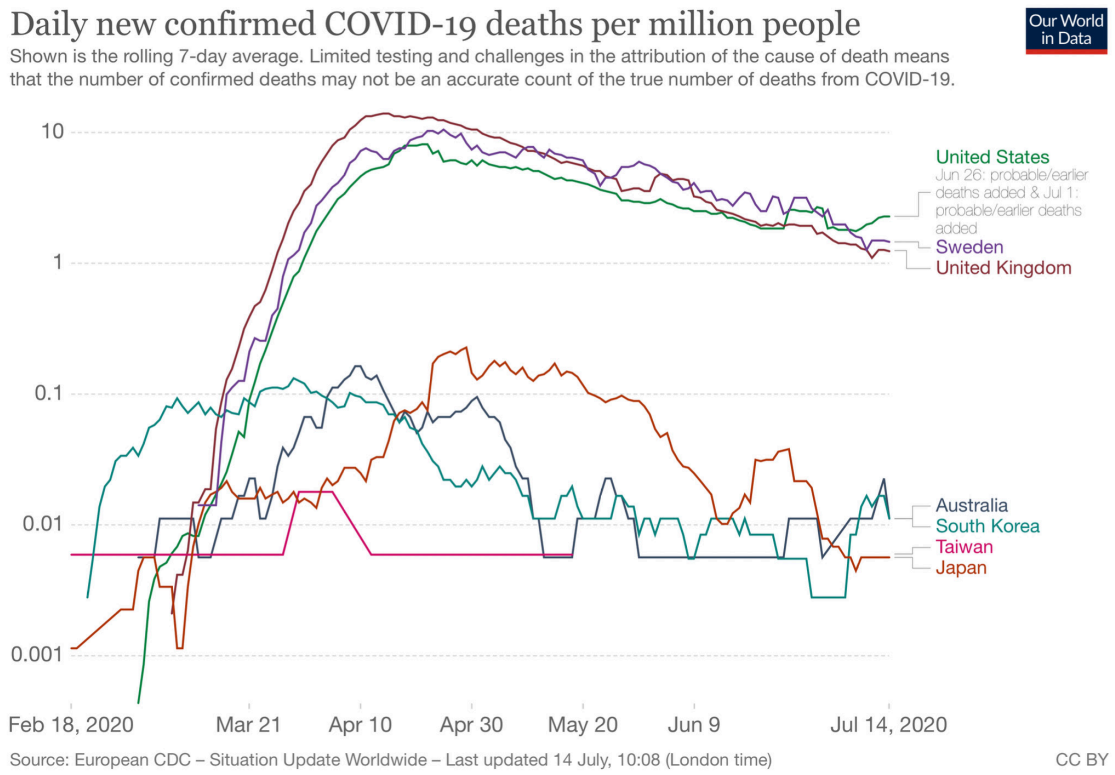


Chart 4: Tests conducted per confirmed case of Covid, national comparisons

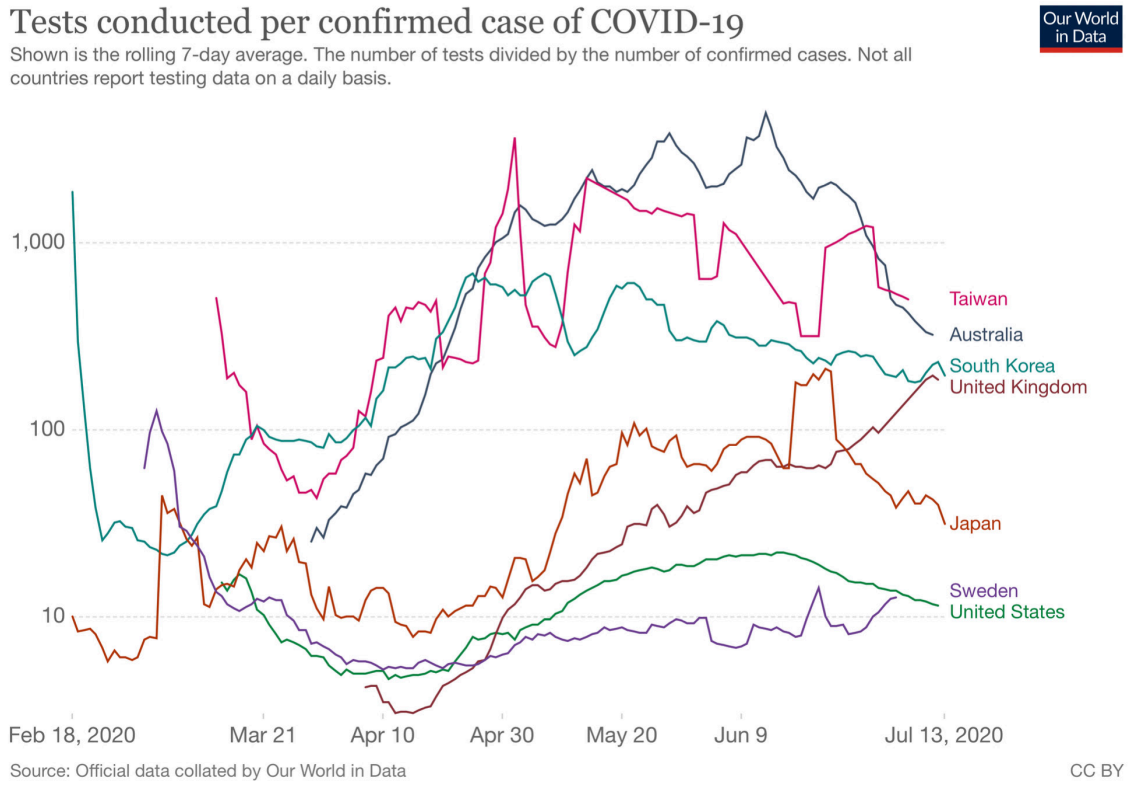


Chart 5: Case fatality rate from Covid, national comparisons

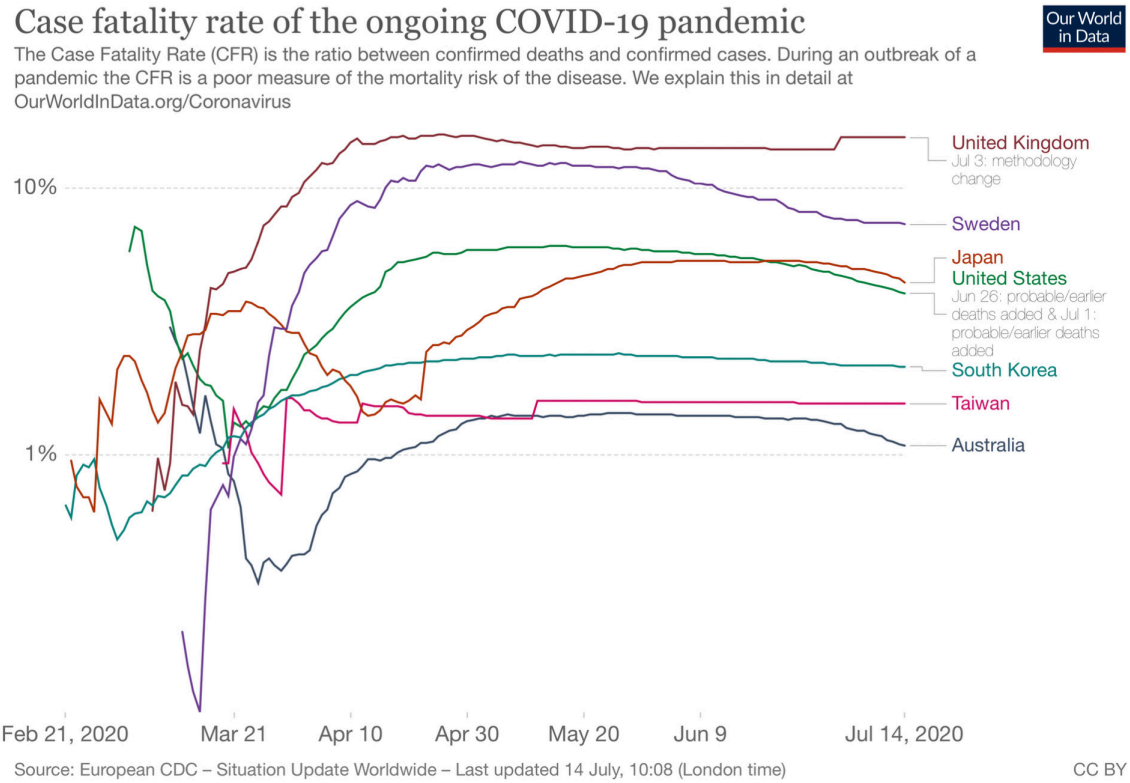
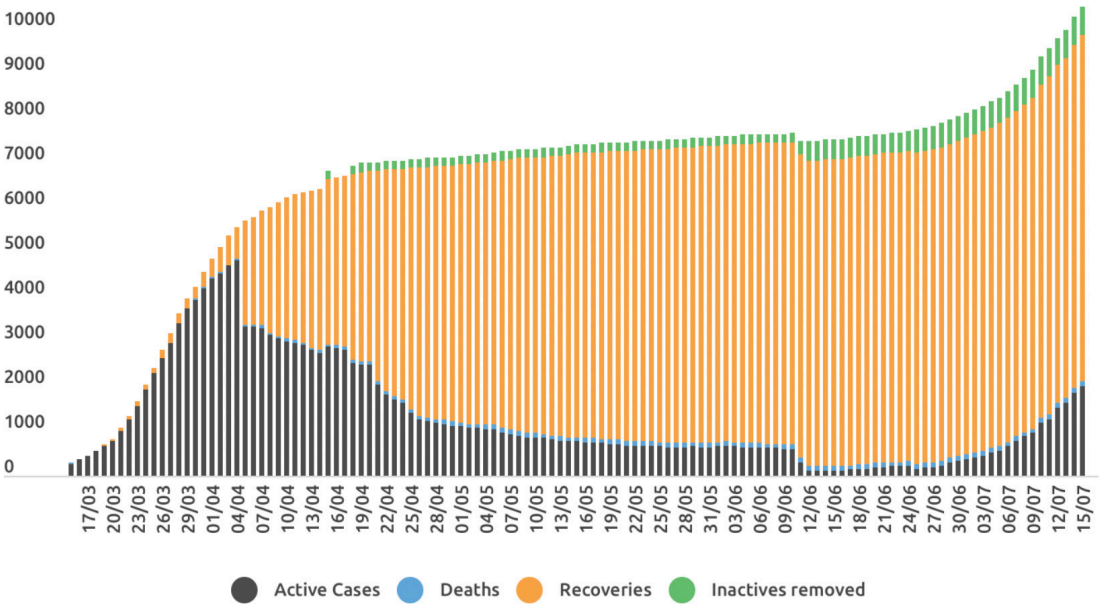


Chart 6: Australian Covid recoveries compared to open cases and deaths



www.covid19data.com.au

View a larger version of this chart.

* To understand more about active cases, including the removal of inactive cases as opposed to recovered, please see the data notes.

Last updated (AEST):	15 July 2020	4:00 PM

Endnotes

1 The Australian Health Protection Principal Committee is comprised of all state and territory Chief Health Officers and is chaired by the Australian Chief Medical Officer. A federal government website claims it to be the "key decision making committee" for health emergencies: https://www.health.gov.au/committees-and-groups/australian-health-protection-principal-committee-ahppc

2 Geoff Chambers and Rachel Baxendale: *Piers off: Fishers get marching orders days after mass protests*, The Australian, 9 June 2020.

3 Australian Bureau of Statistics: *Provisional Mortality Statistics, Jan-Mar 2020*, Catalogue 3303.0.55.004, 24 June 2020. Covid deaths to end March are from *Our World in Data*. Deaths counted in the Provisional Mortality Statists are doctor-certified deaths, which are about 85%-89% of all deaths, and exclude deaths referred to Coroners, such as from accidents, assaults and suicides. Deaths are classified according to the WHO International Classification of Diseases, which now directs that any death at which Covid was present be classified as a Covid death. It may also be entered elsewhere. For WHO purposes, Covid is not classified as a respiratory illness with the influenza and pneumonia data reported above. See https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3303.0.55.004Explanatory%20Notes3Jan-Mar%202020?OpenDocument .

   Peak Covid death rates were in April, beyond the ABS mortality report just published, but total Covid deaths at the time of writing were 109.

4 Table 1 in the Appendix provides a selective timeline of the major Australian policy decisions over the critical period of February to April, as well as of the reporting of key international events that triggered Australians' alarm about the potential of the novel virus.

5 Blakely, Tony; Bablani, Laxman; and Andersen, Patrick: *Flattening the curve to help Australia's hospitals prepare*, Pursuit, University of Melbourne, 28 March 2020, p 2

6 Stephen Duckett: *Coming out of COVID-19 lockdown: The next steps for Australian health care*, Grattan Institute, June 2020, p 35.

7 The notorious images of police cars cruising Rushcutters Bay Park to move on a solitary sunbather arose on 31 March 2020: https://www.youtube.com/watch?v=rZQv5Sk1hds. Paradoxically, being outdoors in fresh air and sunshine, helping to maintain healthy Vitamin D levels, is protective against Covid infection, not a contributor to it.

8 https://ourworldindata.org/coronavirus-testing .

9 Winter, Amy; Hegde, Sonia: *The important role of serology for COVID-19 control*, The Lancet, 21 April 2020. The outbreak in the Austrian ski resort of Ischgl led to some 40% of the local population becoming seropositive to Covid (and presumably now having immunity), with 85% of them not knowing they had been infected. See Jacquelin Magnay: *Corona hotspot: 85% didn't know they had it*, the Australian, 27 June 2020.

10 For example, Queensland, WA and SA with low or no new infections for a period talk of prolonging closed state borders against other states with higher new infections.

11 Rachael Baxendale: *Coronavirus: Restrictions to be eased despite spike in Victorian cases*, The Australian, 10 June 2020, https://www.theaustralian.com.au/nation/politics/coronavirus-restrictions-to-be-eased-despite-spike-in-victorian-cases/news-story/fdb461afda280e2ac910c092d2d597c8 .

12 World Bank, *Global Economic Prospects*, June 2020.

13 Parliamentary Budget Office: *Government finances – May 2020*, 8 July 2020.

14 European Union: *Re-open EU*, 30 June 2020.

15 Rachel Baxendale and John Ferguson: *Coronavirus Melbourne: Eid family feast sparks big cluste*r, the Australian, 25 June 2020.

16 Peta Credlin interview with Shane Delia: *Cafes, restaurants victims are being 'kicked when are down'*, Sky News.com.au, 22 June 2020.

17 Projection by University of Sydney Brain and Mind Centre as reported in *The Australian*, 7 May 2020.

18 See Ryan McMaken, *How shutdowns will keep killing the economy, even when they're over*, Mises Wire, 24 April 2020.

19 Jonathan Kay, *COVID-19 Superspreader events in 28 countries: critical patterns and lessons*, Quillette 23 April 2020.

20 For a summary of evidence on vitamin D deficiency and respiratory illnesses, see Matt Ridley, *The growing evidence on vitamin D and Covid,* The Spectator UK, 18 May 2020.

21 In New York City, ridership on subways fell by 60 percent by 16 March, before lock-down requirements shut businesses and forced residents to stay home. Google community mobility data show movement in Sweden without lock-ins fell nearly as much as in neighbouring countries with them. On-line restaurant booking platforms showed very large falls in restaurant bookings, well before government implemented restaurant occupancy rules and forced closures. See Jeffrey E. Harris, *The coronavirus epidemic curve is already flattening in New York City*, National Bureau of Economic Research Working Paper 26917, April 2020.

22 For Google's community mobility reports, see for example https://www.nytimes.com/interactive/2020/05/15/world/europe/sweden-coronavirus-deaths.html; and for Open Table booking trends, see https://www.opentable.com/state-of-industry.

23 In a study of the H1N1 Swine Flu epidemic of 2009 in the U.S. – when there were no quarantines or lock downs – economists noted that the incidence of new cases fell well below the exponential path predicted

from epidemiologists' classical models, which they attributed to spontaneous caution in people's behaviour. Similarly, the incidence of HIV reached a peak in 1983, before the advent of the first antiviral medication in 1986 and about a year before San Francisco's Director of Public Health ordered the closure of fourteen bathhouses in October 1984. See Jeffrey E. Harris, *The coronavirus epidemic curve is already flattening in New York City*, National Bureau of Economic Research Working Paper 26917, April 2020.

24 Alan Kohler, *Food for thought: social distancing will cripple restaurants*, The Australian, 20 June 2020.

25 Scott Morrison, Press Conference Transcript, 1 May 2020.

26 Australian Institute of Health and Welfare, *GEN Aged Care Data*, 2017-18, June 2019.

27 World Health Organisation, *Cumulative number of reported probable cases of SARS, 1 Nov 2002 to 11 July 2003*, https://www.who.int/csr/sars/country/2003_07_11/en/

28 This discussion draws heavily on analysis by Tomas Pueyo et al: *Coronavirus: How to do testing and contact tracing*, Part 3 of 'Coronavirus: Learning how to dance', Medium, 28 April 2020.

29 On the question of trust, it is unlikely Taiwanese or South Korean public health officials would spend their time Tweeting about the similarities between Covid and Captain Cook.

30 Niclas Rolander, Charles Day and Bloomberg: *Sweden's top epidemiologist at a loss to explain why herd immunity is going 'surprisingly slow'*, Fortune, 17 June 2020.

31 Jan Brico. Florian Misch, Khaled Sakr and Alexandra Solovyeva: S*weden: Will COVID-19 economics be different?,* International Monetary Fund, 4 June 2020.

32 Ben Hall: *Sweden launches inquiry into coronavirus handling*, Financial Times, 1 July 2020.

33 For a lucid explanation of why many tests per discovered case is a good sign, see *Coronavirus: How to do testing and contact tracing*, Part 3 of 'Coronavirus: Learning how to dance', Medium, 28 April 2020.

34 Tomas Pueyo *et al*: *Coronavirus: Should we aim for herd immunity like Sweden?,* Medium, 10 June 2020.

35 Cited in Jacquelin Magnay: *Corona hotspot: 85% didn't know they had it*, the Australian, 27 June 2020.

36 We owe the idea of 'herd vulnerability' to Holman Jenkins: *Coronavirus: Nobody started off knowing what steps to take,* The Australian, 24 June 2020.

37 US Centres for Disease Control and Prevention: *Coronavirus Diseases 2019: Pandemic Planning Scenarios*, 20 May 2020: Current Best Estimate, Scenario 5.

38 For an example from the United Kingdom, see Dennis Campbell and Caroline Bannock: *Coronavirus crisis could lead to 18,000 more cancer deaths, experts warn*, The Guardian 29 April 2020.

39 See Tom Jefferson and Carl Heneghan: *Covid 19 – Epidemic 'Waves'*, Centre for Evidence Based Medicine, Oxford, 30 April 2020. They warn that interpreting the Spanish Flu case is complicated by great uncertainty in the numbers affected, and puzzlement as to which victims succumbed to influenza (not a reportable disease at the time) and which succumbed to bacterial superinfections or Asprin overdoses in the age before antibiotics.

40 https://en.wikipedia.org/wiki/Whac-A-Mole

41 The nature of superspreader events and the role in crowded conditions of loud speech, singing or barracking in projecting droplets carrying SARS-CoV-2 virus is fascinatingly recounted by Jonathan Kay: *Covid-19 Superspreader events in 28 Countries: Critical Patterns and Lessons*, Quillette, 23 April 2020. See also the extraordinary story of the infamous South Korean superspreader, 'Patient 1', at https://graphics.reuters.com/CHINA-HEALTH-SOUTHKOREA-CLUSTERS/0100B5G33SB/index.html.

42 For the gap between infections and deaths, see: <iframe src="https://ourworldindata.org/grapher/covid-tests-cases-deaths-per-million?time=2020-03-16..&country=~USA" loading="lazy" style="width: 100%; height: 600px; border: 0px none;"></iframe>

43 Parliamentary Budget Office*: Medium-term fiscal projection scenarios: impact of COVID-19 pandemic and response,* 5 June 2020.

44 Australian Bureau of Statistics: *Provisional Mortality Statistics, Jan-Mar 2020*, Catalogue 3303.0.55.004, 24 June 2020. Covid deaths to end March from *Our World in Data*. We note again that March was not the peak month for Covid deaths, which was April.

45 For their latest data, see https://ourworldindata.org/coronavirus-data-explorer?casesMetric=true&dailyFreq=true&perCapita=true&smoothing=7&country=GBR+AUS+JPN+SGP .

46 Tomas Pueyo *et al: Coronavirus: How to do testing and contact tracing, op cit.*

About the Authors

Terrence O'Brien

Terrence O'Brien is a retired public servant who has worked for some 40 years in the Commonwealth Treasury, Office of National Assessments, Productivity Commission and at the OECD and World Bank.

Robert Carling

Robert Carling is a Senior Fellow at The Centre for Independent Studies where he undertakes research into a wide range of public finance issues, writes papers for publication, and regularly comments in the media on taxation and other budget issues. Before joining the CIS, Robert was a senior official with the New South Wales Treasury, the Commonwealth Treasury, the IMF and the World Bank.

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Level 1, 131 Macquarie St, Sydney NSW 2000 • **phone:** 02 9438 4377 • **email:** cis@cis.org.au