Australia and the Rhythm of the Covid-19 Epidemic

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Abstract: *Reeling from a devastating bushfire season, Australia was slow to respond to the Covid-19 threat, but when modelling in mid-March showed the same pattern of growth that had overwhelmed European health systems, a closely knit network of public health experts gained the ear of government and rapid national action was taken closing workplaces and imposing stay at home orders. With investments in localized testing, contact tracing and sequencing to track the genomic fingerprint of cases, by the end of April new cases had been brought to near zero. Australia's successful containment efforts have paralleled those of regional neighbours such as China, South Korea, Vietnam and Japan, in stark contrast to the uncontained spread in the United States, Australia's traditional ally. The Australian government has tried to navigate these geopolitical tensions by moderating the Trump administration's attempts to turn the pandemic into a political battlefield. Renewed outbreaks in Australia at the end of June suggest SARS-CoV-2 will not be totally eliminated in Australia, but continuing control efforts will bring it to 'virtual elimination'.*

Pandemics seem to have a rhythm. At first, after the alarm is sounded, it all seems a far away and implausible. Then comes a phase of downplaying the risk — it won't come here, it's not so bad anyway — followed by a polarised debate about whether the official responses are too timid or too extreme (inevitably with economics as much in evidence as health). Then comes a full-on response accompanied by fears of the consequences of infection. Then there is adjustment, resignation and coping

with the new reality. And finally come signs that the worst is over, rarely building to a crescendo but usually to a creeping sense of relief. Perhaps only in retrospect do you realise the burden has been lifted.

In the throes of a pandemic it is hard to discern the underlying rhythm, and not easy to pinpoint what point of the cycle has arrived. As of July 2020, Australia has been through the first phase of apprehending the Covid-19 epidemic and setting an initial response in train. Having come down from an initial peak, the first spike in new infections has occurred. Adjustment to the new reality of a world with a Covid threat is starting, tempered with major uncertainties, prime among them what new turns the viral spread will take, and whether and when effective treatment or vaccine protection will be found.

Early signs

From September 2019 until February 2020 Australia was consumed by a devastating series of bushfires which burnt out more than 12.6 million hectares of land across the country. It was not surprising therefore that it took some time for the Covid-19 pandemic to capture policy and public attention.

Against this background and largely out of the public gaze, Australian hospital systems alert to the spread of SARS-CoV-2 from February 2020 began to make contingency plans in anticipation of a major public health emergency. In early March 2020 epidemic modelling showed that a strategy of merely mitigating the worst effects of the epidemic

would leave the health system overwhelmed, as had occurred in Italy the previous month and was starting to unfold in Spain and France. In mid-March the tenor of the response changed. The public statement from the Australian Health Protection Principal Committee — the federal and state chief medical advisers — on 17 March included a graph showing the daily growth of the epidemic since the one-hundredth case was identified. It showed Australia on exactly the same path as Spain, France and Britain.

Clearly, widespread community transmission was on the way. Government and public health authorities rapidly aligned around a strategy of suppression of the epidemic. Modelling similar to the influential UK and US work produced by Imperial College's Covid-19 response team showed that to avoid catastrophe in the health system, a significant shutdown in social contact would be required.

Australia's Covid-19 response drew on informal and formal public health networks, working from a template of pandemic influenza response plans. However, SARS-CoV-2 was both more infectious and more lethal than the envisaged influenza threat, so adaptations had to be made and this expertise plugged directly into the heart of political decision making. (Margo 2020) Perhaps the most important feature of this system was that it was able to adapt as new information became available — never an easy job, especially when the stakes are millions of lives and livelihoods.

Testing and contact tracing

The most urgent technical challenge was to develop and deliver the capacity to test for the presence of SARS-CoV-2. Australia's readiness to develop diagnostics was in evidence: a sample of the new virus was delivered to Australia on 24 January and using well established PCR gene amplification methods,

once the virus was isolated it could be plugged into the machines and reliable tests set up in a matter of days (University of Melbourne 2020). The Australian government provided research funding to the Peter Doherty Institute at the University of Melbourne to develop novel testing strategies which would simplify the process and reduce the consumables needed. Antibody testing has proved much more difficult, partly because we are still learning about the nature and timing of the antibody response to Covid-19.

When sophisticated diagnostics can be conducted at the local level, they can transform the speed and flexibility of the response. Testing reference laboratories such as the Victorian Infectious Diseases Laboratory decentralized their testing facilities down to the local level. By April 2020 Australia was claiming major progress in the volume of testing conducted, and by June boasted per capita testing rates that were among the highest in the world.
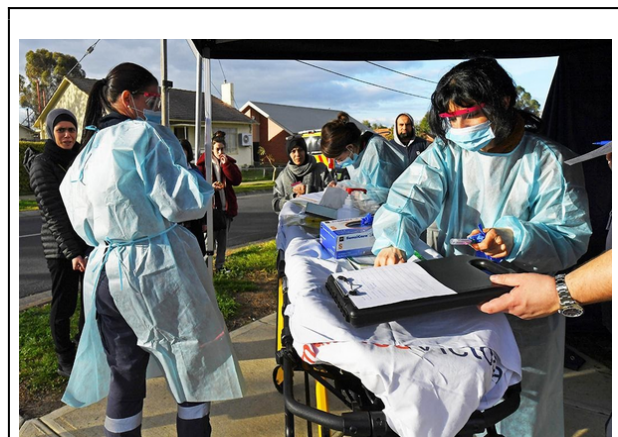
A coronavirus pop-up testing facility in the northern Melbourne suburb of Broadmeadows at the end of June 2020. *James Ross/AAP Image*

Underlying the emphasis on testing was an

epidemic control strategy dependent on finding cases, with contact tracing at its core. Contact tracing was long established public health practice especially for sexually transmitted infections but also for other infectious diseases, using interview and telephone or face to face follow up of all the contacts recalled by the 'index case'. Singapore's development of the 'TraceTogether' phone app launched on 20 March held the promise of an automated system which would make mass contact tracing not only more feasible but also more reliable than people's uncertain recollection. Building on Singapore's software, Australia launched its contact-tracing app, COVIDSafe, on 26 April and within the first twelve hours it was downloaded nearly 1.2 million times. Over the subsequent month downloads steadily increased but by June had plateaued with six million or so downloads – about a third of the total number of mobile phone users in Australia. While the privacy issues associated with the app were generally resolved, it faced an unexpected problem: the number of new cases was simply not large enough for the app to add anything to the existing person-based contact tracing efforts. (Basford 2020)

However, the debate around the launch of the app allowed the Australian government to link the end of physical distancing and the resumption of full economic activity to the extent of COVIDSafe's take-up. This unusually explicit exercise in collective social responsibility served to highlight the extent to which everyday life depends on civic mutuality. Australian governments, Federal and State, have attempted the complex task of alternating between on the one hand calls for altruism and mutual solidarity and on the other hand harsh public health policing with widespread issuing of fines for breaching of orders and threats of imprisonment for serious offenders.

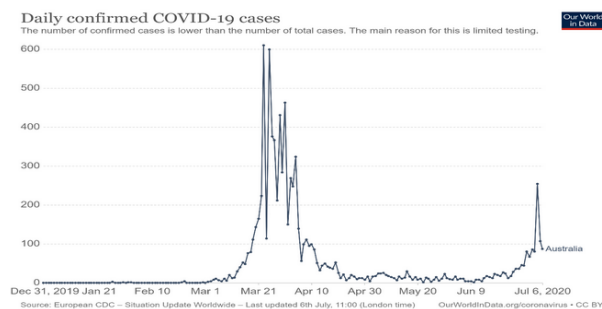There is a long history of advanced liberal governments seeking technological fixes to the dilemmas of social control. While contract tracing apps have fallen short of their promise, a far more powerful tool of epidemic management may prove to be the tracking of epidemic outbreaks by their genetic fingerprint. The Microbiological Diagnostic Unit Public Health Laboratory at the Peter Doherty Institute in Melbourne has been sequencing the virus from as many Victorian samples as it can find, sequencing an estimated three-quarters of all cases in the state. *Nature* reckons this phenomenal effort is, by a long way, "the most comprehensive sequencing coverage in the world for an infectious-disease outbreak." (Watson 2020, 19) Sure enough, when Victoria was struck by an outbreak of cases in June 2020, the State's Health Minister used genomic data on the cases to speculate that a large proportion may have been caused by a single 'super-spreader'. (Boseley 2020)

The control threshold

Australia had begun to impose restrictions on foreign arrivals from the beginning of February 2020, beginning with China and then expanding to include Iran, South Korea and Italy before closing borders to all arrivals on 19 March. The first national announcement on social distancing measures was made on 13 March restricting public gatherings to fewer than 500 people. For the whole of March, Australia teetered on the brink of untrammelled community transmission. On one side of that threshold, every person confirmed to be infected is immediately isolated and vigorously followed up, with testing of all contacts who may have been exposed; combined with extensive testing of possible cases across the community, this approach can contain the epidemic spread. On the other side of the threshold, contact tracing becomes a drop in the bucket compared to the number of cases identified on the basis of their symptoms. Asymptomatic cases (about 60 per cent of SARS-CoV-2 infections) will likely never be

identified, and the focus shifts to isolation and care of those who are sick.

In the face of exponential growth in case numbers, shutdown measures were ramped up in the second half of March, closing all non-essential businesses, schools and requiring people to stay at home except for essential tasks. Public focus turned to 'bending the curve'. It did not take long before signs of hope emerged: on 29 March 2020 chief medical officer Brendan Murphy cited tentative signs that Australia might be showing "a somewhat slowing of the growth in the epidemiology curve." These tentative signs consolidated into rapid decline in new cases from its peak in the third week of March, and by the time new cases were numbered in single digits in the last week of April, restrictions began to be lifted (for a detailed chronology of the Australian response see Duckett 2020).

Daily confirmed COVID-19 cases
The number of confirmed cases is lower than the number of total cases. The main reason for this is limited testing.

At the end of April 2020, Australians might have been forgiven for assuming the pandemic was well on the way to being over, at least inside the country. That assumption was mistaken. Those who become infected and then recover are the only part of the population guaranteed to be immune (and it is not yet clear whether that immunity will wear off over the course of months or years). For the remainder of the population, any new case of Covid-19 has the potential to set off a new wave of infections. As physical distancing restrictions

are relaxed, the potential for rapid spread will return, so rapid detection, isolation and contact tracing remain critically important.

It is now dawning on Australians that social regulation in the face of the pandemic will continue not just for days or weeks, but for months if not longer. Even under the most optimistic scenarios of control, and near elimination in a few countries like Australia and New Zealand, the smallest outbreaks must be detected, the immediate vicinity quarantined, contacts traced, tests ramped up, and the arrival of foreigners strictly controlled. These social technologies will need a high degree of popular support, and the negative impacts of distancing will need to be counteracted by increased, and very local, solidarity.

Geopolitical tensions

Three very different patterns of Covid-19 response have emerged across the world. Australia, along with other East and South East Asian countries like China, South Korea, Japan, and Vietnam, as well as New Zealand, have taken a strict approach to control and brought numbers down to very low levels. In other places, failures of leadership and management have allowed the epidemic to spread almost untrammelled, as evident in the US, Brazil and much of Latin America. A third pattern has been those countries, particularly in Europe, where the outbreak was already well established before the virus was identified, but where extensive lockdowns have brought new case numbers down even as residual cases persist.

These patterns pose a number of challenges to Australia's foreign relations, and especially to the US alliance which has been the mainstay of Australia's international stance since 1941. At the most banal level is the prospect of opening borders - it may well prove feasible to allow travel between Australia and China long before

Australia–US routes can be opened up. More fundamentally, Australia has tried to moderate the intemperate attacks on China which have become characteristic of the US administration's international Covid-19 response. For example, Australia's Prime Minister Scott Morrison called for an independent inquiry into the origins of the virus, in an attempt to temper President Trump's announced withdrawal from the World Health Organization for being too biased in favour of China and his unsubstantiated claims, amplified by Secretary of State Pompeo, that the virus originated in a laboratory in the Wuhan Institute of Virology. These moderating intentions did not deter China from decrying Morrison's call as an attack and were followed by a swiftly deteriorating trade and diplomatic relationship. Perhaps Morrison should have more clearly couched his proposed inquiry into the origins of SARS-CoV-2 in the long history of zoonotic infections originating in bats, including prime Australian examples such as hendra and lyssa viruses.

Parts of the Australian defence policy environment did not hesitate to use the pandemic as an opportunity to beat their anti-China drum. The Australian Strategic Policy Institute criticised WHO, and through WHO, China, but this is hardly a surprise from an organisation set up by former conservative Prime Minister John Howard with much of its funding from the defence department and arms manufacturers. (Jennings 2020)

Can Australia play a role in deterring the weaponization of this pandemic? While Australian practitioners have a long record of making major contributions on the global health stage, a truly international Australian vision has been hampered by the country's persistent tendency to seek protection under the wing of its colonial founder Britain or since 1941, the US. So Australian assertiveness on the pandemic has been limited to the immediate region, seen with the government's

meek defence of the WHO couched in terms of its Asia-Pacific impact. The government's most recent defence policy statement continues this regional focus with an explicit call for concentrating forces and attention on what it described as Australia's strategic environment, the Indo-Pacific, although the strategy's relative silence on the US alliance suggests that it is dawning on the country that Washington is no longer a reliable ally. (Department of Defence 2020)

Neither Australia nor the world will win from attempts to use the Covid-19 pandemic as a weapon in the escalating geopolitical rivalry between China and the US. Economic forces underly this strategic competition, with it increasingly looking like the US is seeking to divide the world into two delinked economic zones. The uncontrolled spread of Covid-19 in the US has been driven by concerns that containment measures are too great an economic restraint. But the dichotomy between health and the economy is a false one. Opponents of lockdown and containment bemoan the economic losses compared to "before." But a world without SARS-CoV-2 is the wrong counterfactual; policy choices are being made in the brute reality of a world where the virus exists. Even if governments abandon all restrictions on movement, people will still behave differently from how they behaved before Covid because they want to keep themselves safe.

Australia's foreign policy dilemma is that its Covid-19 control strategy is far more similar to that pursued by China than the US. Like China, Australia's epidemic is well-controlled, and this is the reality we can expect for the foreseeable future — very few cases, mostly among travellers, and the occasional community outbreak, especially as workplaces become busy again. It's all part of what Tomas Pueyo calls "the hammer and the dance" — "the hammer" being the lockdown policies containing the outbreak and "the dance" is

accepting the consequences of increased transmission as the cost of keeping the economy humming along. (Pueyo 2020)

Second waves and virtual elimination

There is no doubt that second waves of Covid-19 are inevitable. The only issue will be their size and the degree of resistance to reimpositions of bans on public gatherings and closures of schools and workplaces. For Australia and other southern hemisphere countries, the onset of winter and the normal seasonal surge in flu will be the most critical phase of the epidemic thus far.

Covid-19 fatigue seems palpable. People just want the epidemic to be over. And policy fatigue is beginning to parallel the physical fatigue that is one of the long-lasting sequelae of Covid-19 infection. (Garner 2020) Fatigue ripens the temptation to indulge in wishful thinking, but the hope that Australia might be spared spikes in infections was dashed by the surge in the number of new cases from community transmission in the state of Victoria in the second half of June rising to a new peak.

Six months into this pandemic and some patterns are becoming clear. For countries that have taken a strong containment-and-control approach and were able to catch the epidemic early — including Australia, China, South Korea and Vietnam — the daily count of new cases has come down from its initial peak but relatively small upsurges have been occurring as new clusters of infection come to light. This pattern speaks to the virulence of SARS-CoV-2 — any amount of active virus, no matter how small, will break out at an exponential rate.

In a handful of countries, rates have been brought down to close to zero, and these are touted as places where elimination may be possible. New Zealand and Iceland are the prime examples, both having the advantage of being islands with relatively small populations. But even when numbers have reached zero, new cases have appeared, albeit attributed to arrivals from overseas.

In practical terms, there may be little difference between tight control and elimination strategies. The control strategies adopted by Australia and many East Asian countries depend on finding active cases and immediately implementing the isolation, quarantine and contact-tracing strategies needed to contain them. If this isn't done, we now know that exponential spread is inevitable.

Back in early April, the Grattan Institute, a public policy think tank, was arguing that Australia should set itself the goal of total elimination of Covid-19. (Daley and Duckett 2020) Only with total elimination, it said, could physical distancing be abandoned, and full economic activity resumed. What we have learnt since then, not only from Australian experience but also particularly from China, suggests a more realistic strategy might be one which could be termed 'virtual elimination' – near total but not quite. This strategy would include working towards zero levels of community transmission through a mix of sentinel surveillance (random testing of slices of the population), location-specific quarantine when outbreaks appeared, and the mainstays of isolation and contact tracing.

The current Victorian upsurge has exposed some of the limitations of both state and national strategies. Any criticism seems churlish compared to the unmitigated disasters in the United States and Britain but, even so, improvements can be made. In particular, the highly centralised Victorian response has given local authorities little flexibility to respond to changing conditions. Neither local hospitals nor local government are informed about the location of new cases as they are identified. Every positive case is notifiable to public health

authorities centrally, and the centre carries out contact tracing as well as assigning a case management team. This leaves little room for nurturing local initiative or empowerment. This highly centralized system thus runs the risk of making it much harder to gain local cooperation when further outbreaks require lockdowns.

Regrettably, much of the Australian public health advice has been anodyne and not designed to foster active and ongoing commitment to control measures. In effect, the message from Australian governments, Federal and State, has been "trust us, we will find all cases and eliminate the threat, go about your business normally." This is the implicit message of the COVIDSafe app and the "snap back" slogans. A much more robust strategy would involve building mutuality into the response, with citizen action serving as a sign of social solidarity. This is the real significance of the debate about mask wearing. Face masks undoubtedly contribute to slowing the spread of Covid-19, and the Australian government's reluctance to advocate, much less mandate, their use amounts to telling its citizens it has the problem under control.

The key to harm-reduction measures is that they take the world as it is and reduce risk, rather than making impossible demands. The science is still unclear about how much transmission takes place from touching surfaces, for instance, or the extent to which the virus can float long distances in the air. But we do know that the risk attached to hugging and kissing is vastly higher than touching a banister, or that spending a prolonged period in a closed room with someone else is orders of magnitude more likely to cause transmission than going to a physically distanced supermarket. And while touching your nose or face may provide a route of access for the virus, there is little point in telling people to avoid an almost constant unconscious action.

Victorian health authorities have been reluctant to call the June 2020 spike a second wave of the epidemic. Waves are a way of describing long-term patterns involving thousands of cases — in many ways Australia has not even seen a first wave yet. But spikes, outbreaks and lockdowns are all terms with which Australians will need to become familiar. As Australia pursues the path to virtual elimination, the most urgent priority is far more active citizen engagement than we have seen to date.

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Readers of this special may be also interested in another COVID-19 special, **Vulnerable Populations Under COVID-19 in Japan**, edited by David H. Slater.

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