

To: Select Committee On Covid-19 Department of the Senate PO Box 6100 Parliament House Canberra ACT 2600 Sent via email to: covid.sen@aph.gov.au	From: Dr Martin Taylor
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Submission to the Australian Senate Select Committee Inquiry into the Australian Government's response to the COVID-19 pandemic

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Australia has slowed transmission of the COVID19 virus to near zero due to the harsh clampdown on normal liberties of movement and interpersonal contact, making extinction of the virus in Australia a real possibility.¹

But the clampdown has had a huge cost: a bankrupt airline, tourism and hospitality sectors decimated, a 22% crash in GDP, the worst since the Great Depression,² and millions losing their jobs or on reduced work, prompting a \$180 billion federal bailout through the JobKeeper program. And flowing on from this economic disaster are increased social ills of domestic violence, homelessness, illness and death from other unattended causes, mental illness and suicide.³

COVID19 extinction could be achieved without huge social and economic cost

Two key responses that Australian Governments could have, but did not take, which would have obviated crashing the economy are:

- **Mandatory universal testing** of *everyone* in the country, including arrivals, then isolate and treat the positives, and let the negatives get back to their normal lives.
- **Mandatory facemasks in public** and reduced contact but without the severe and intrusive lockdowns in the interim until we know who is positive.

Mandatory universal testing

The social distancing rules and restrictions, shuttering or disruptions of businesses and workplaces, closures of borders, forced isolation of travellers all represent very blunt and intrusive instruments to deal with the fundamental uncertainty that *we cannot be sure if we or*

¹ as envisaged by the Group of Eight Universities in their recent *Road to Recovery* report
<https://go8.edu.au/wp-content/uploads/2020/04/Go8-Road-to-Recovery.pdf>

² <https://theconversation.com/new-oecd-estimates-suggest-a-22-hit-to-australias-economy-135026> &
<https://www.bloomberg.com/news/articles/2020-04-28/australia-economy-news-deepest-downturn-in-90-years-is-coming>

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<https://newsroom.unsw.edu.au/news/business-law/covid-lockdowns-have-human-costs-well-benefits-it-s-time-consider-both>

any of the people around us have the virus. If we could reliably identify that fraction who are infected, then only they need be isolated, rather than locking down the entire population.

Visible symptoms are poor indicators of COVID19 prevalence. The key problem is that many more people may actually be infected without symptoms than those that show symptoms. Between 5 and 80% - an alarmingly wide range- of infected persons are asymptomatic.⁴ Hence, only a pathology test can resolve the uncertainty.

The obvious way to sort the infected from the uninfected is to test *everyone*: rapidly and more than once to be sure.

Instead, governments have passively accepted the scarcity of tests as a given, when they could have been ending the scarcity by rapid domestic industrialisation of testing capacity. We had to wait for a philanthropist to import 10 million test kits from China⁵ two months after the pandemic was declared.

Not rocket science

Government has had the time to develop domestic capacity for universal testing. The COVID19 genome was sequenced and effective DNA primers⁶ for polymerase chain reaction (PCR) amplification identified back in January.⁷

PCR amplification and the related loop-mediated amplification (LAMP) (with a reverse transcriptase or RT step beforehand to translate the viral RNA to DNA) are reactions performed routinely by legions of researchers, pathologists and lab techs for a multitude of purposes.

The only reagents unique to COVID19 are the DNA primers which can readily be synthesised. Protocols to reduce false negative and false positive errors are routine. LAMP tends to produce more false positives, but that's no bad thing, and easily resolved by repeat testing.⁸ False negatives- failures to detect someone who is actually infectious- are of greater concern. Immunoassay might be faster to show a result, but costly and slow to develop and less sensitive.⁹

⁴ <https://www.cebm.net/covid-19/covid-19-what-proportion-are-asymptomatic/>

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<https://www.afr.com/companies/healthcare-and-fitness/forrest-donation-secures-10m-test-kits-from-china-20200429-p54oae>

⁶ The heat resistant DNA copying enzyme from a thermal pool bacterium *Thermophilus aquaticus* cannot fill in the complement of a single strand of DNA melted apart from its matching strand unless it has somewhere to start from. The primer, a synthesised small stretch of DNA binds to its match on the complementary strand during the annealing step of the reaction, which gives the polymerase a place to start copying.

⁷ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7106301/>
<https://www.cdc.gov/coronavirus/2019-ncov/lab/index.html>

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<https://www.abc.net.au/news/2020-03-25/amateur-scientist-making-a-rapid-test-for-coronavirus/12084974>

⁹ <https://onlinelibrary.wiley.com/doi/full/10.1002/jmv.24299>

Test turnaround must be rapid to ensure we catch positives and get them into isolation and under treatment as early as possible, minimising risks of onward transmission, complications and death.

Perhaps the military could do the testing. COVID19 is a national security emergency if ever there was one, and the military are masters of logistics. Even if a quarter of the total nearly 90,000 ADF and reserves¹⁰ were doing 1000 tests each a day the whole country could be tested within a week. The skills needed to assemble reactions using sterile technique can be learned rapidly, but industrialisation of testing would also need the robotics now employed by big labs.

The prevailing sample collection approach of making test subjects go to clinics where swabs are taken from them by health and pathology workers wastes the health workers expensive time while increasing their infection risk and increases the risk of virus spread by having subjects travel, perhaps while sick.

We already have a very successful bowel cancer screening program at a mass scale entirely through the post.¹¹ COVID19 test samples should be done the same way with a streamlined self-swab kit through the post. A false negative due to poor or null samples can be indicated by negative amplification of human DNA markers, and those subjects asked to send in another sample.

Mass testing is cheap compared with crashing the economy

An RT-PCR test could probably cost around \$10 after industrialising testing capacity.¹² An RT- LAMP test would probably be even cheaper, faster and needs less specialised equipment.¹³ Thus, even testing all 25 million Australians twice would only cost the order of half a billion dollars: cheap at twice the price compared with the \$180 billion JobKeeper program. Australian authorities often announce how much testing they have done. But it's not enough to do a lot of testing, or just sentinel testing because the fundamental uncertainty about who has the disease but is roaming around undetected, is not fully resolved.

¹⁰

[https://www.defenceconnect.com.au/key-enablers/4195-how-big-is-too-big-increasing-the-size-of-the-
adf](https://www.defenceconnect.com.au/key-enablers/4195-how-big-is-too-big-increasing-the-size-of-the-adf)

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[http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/bowel-cancer-screening
kit-eligibility](http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/bowel-cancer-screening-kit-eligibility)

¹² A 2004 study found "The reagent and technologist cost of performing the in-house PCR assays ranged from \$5.46 to \$9.81 Canadian dollars (CDN) per test. The commercial assay cost was considerably higher at \$40.37 per test." <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC387602/>

¹³

[https://www.monash.edu/medicine/news/latest/2020-articles/shining-a-light-on-rapid-diagnosis-of-covi
d-19-infection-the-lamp-test](https://www.monash.edu/medicine/news/latest/2020-articles/shining-a-light-on-rapid-diagnosis-of-covid-19-infection-the-lamp-test)

Mandatory facemasks in public

The most baffling response of Australian authorities has been their opposition to the wearing of face masks by the general public to prevent viral spread, an attitude at odds with research.

The anti-mask attitude of authorities is evidently driven not by public health concern but by economic concerns founded on a passive acceptance of scarcity, when every effort should be made to eliminate the scarcity by ramping up domestic production of masks.¹⁴

As one expert put it, *“It doesn’t make sense to imagine that ... surgical masks are really important for health care workers but then not useful at all for the general public.”*¹⁵ The humble surgical mask is equal to full respirators in protecting health workers from flu.¹⁶ Facemasks can dramatically reduce modelled infection spread even if only a fraction of the population wear them.¹⁷ Wearing masks is more effective than doing nothing.¹⁸

The “false sense of security” dismissal of masks by the Australian authorities¹⁹ is not supported by any research showing that people wearing masks are less inclined to maintain a distance.

If anything needs testing for “false sense of security” it’s the 1.5m distance rule. Even someone talking aloud is shedding plumes of fine respiratory aerosols which don’t magically stop at 1.5m and which could be trapped by facemasks.²⁰ If both the infected and uninfected persons nearby are wearing facemasks transmission risk would be drastically reduced.

Even disposable masks do not have to be disposable²¹ and could be conserved to alleviate concerns about scarcities. A spray with alcohol after use can disinfect a dispo-mask ready for the next foray into public.

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[https://www.thelancet.com/journals/lanres/article/PIIS2213-2600\(20\)30134-X/fulltext?fbclid=IwAR13Xz-m-mUi-8q1O01FREbSEjl3tUxpSBiNqXufxgSalXo0QV_cyWu3Qx4](https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(20)30134-X/fulltext?fbclid=IwAR13Xz-m-mUi-8q1O01FREbSEjl3tUxpSBiNqXufxgSalXo0QV_cyWu3Qx4)

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<https://www.sciencemag.org/news/2020/03/would-everyone-wearing-face-masks-help-us-slow-pandemic#>

¹⁶ <https://jamanetwork.com/journals/jama/article-abstract/184819>

¹⁷ <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0009018>

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<https://theconversation.com/why-wear-face-masks-in-public-heres-what-the-research-shows-135623>

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<https://www.health.gov.au/resources/publications/coronavirus-covid-19-information-on-the-use-of-surgical-masks>

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<https://theconversation.com/coronavirus-drifts-through-the-air-in-microscopic-droplets-heres-the-science-of-infectious-aerosols-136663>

²¹ mine is a dispo- dust mask from Bunnings that’s lasted 3 months now, with isopropanol spray after each use.

Virus extinction without crashing the economy

Driving the COVID19 to extinction in Australia may be on the horizon with a current rate of increase below one. But this has come at a huge social and economic cost that could have been avoided by making face masks mandatory in public, combined with mandatory universal testing, isolating and treating positives, and letting the negatives get on with their lives.

About the author

Originally from (and now back in) Brisbane, in my early career, I worked on molecular genetics at Princeton University in the USA, and presented at the first PCR conference in Keystone, Colorado in 1988. I went on to establish my own research molecular genetics lab at University of Arizona in the 1990s, producing some significant outputs.²² After a change of career, I have been working in wildlife conservation science and policy for the past 20 years in the USA and in Australia. I serve on the Adjunct Faculty at the University of Queensland.

Disclaimer

The views expressed in this submission, and any errors made, are the author's own and are not intended to represent the views or policies of any organisation to which the author is affiliated.

²² Taylor, M.F.J., Shen, Y. and Kreitman, M.E., 1995. A population genetic test of selection at the molecular level. *Science*, 270(5241), pp.1497-1499; Taylor, M. and Feyereisen, R., 1996. Molecular biology and evolution of resistance of toxicants. *Molecular biology and evolution*, 13(6), pp.719-734.