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# COVID-19 and *Heart, Lung and Circulation*: Riding the 2020 Waves of Change in Australia & New Zealand<sup>☆</sup>



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In 2020, the viral illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and known as coronavirus 2019 disease (COVID-19), has swept across the human populace of Earth. And not just once. As apocalyptic as this pandemic sounds, the “island” nations of Australia and New Zealand have seen relatively far fewer cases and fatalities than elsewhere in the world (at least at time of writing)—the result of largely effective but disruptive public health measures: border controls, closely supervised quarantine, social distancing, face mask use in public, contact tracing, and a series of targeted “lockdowns” including, at times, curfews. *Heart, Lung and Circulation's* Digital Collection of publications relating to COVID-19—*COVID-19 in 2020*—show that the primacy of the pandemic response has had an understandably similar disruptive effect on cardiovascular medicine in Australia—on patient presentations, clinical practice and policy, research and publication. We suggest that the “new normal” in life and medicine, at least for now, will be one of continual adaptation to rapid, overlapping, and ongoing waves of change.

## Acute Cardiovascular Issues

On 11 March 2020, when the pandemic status of COVID-19 was declared by the World Health Organization (WHO), it was already known that the presence of underlying cardiovascular disease was associated with an increased risk of severe disease, conferred a five to ten-fold higher case fatality rate with COVID-19, and that COVID-19 itself causes serious cardiac sequelae [1]. As Denniss et al.'s editorial summarised, some patients with COVID-19 presented with chest pain, chest tightness or palpitations; and acute coronary events could occur not only in patients with preexisting coronary disease but also in those without significant coronary disease related to the increased myocardial demands and consequent demand ischaemia triggered by severe infection and pneumonia [2]. In their review of “COVID-19 Heart”, Dhakal et al. provided an extensive summary of cardiovascular disease management in COVID-19 patients, including fulminant myocarditis, life-threatening arrhythmias, and refractory shock [3].

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SARS-CoV-2 was quickly determined to infect host cells via angiotensin converting enzyme 2 (ACE 2) receptors; initial concern about the safety and efficacy of continued use of ACE-inhibitors and angiotensin receptor blockers in patients being treated for hypertension or heart failure has given way to sustained interest in a possible role of the renin-angiotensin system (RAS) in the pathophysiology of COVID-19. Arnold was among the first to raise the possibility that an imbalance of the RAS, related to genetic and genetic differences in the response to a viral ACE attack, may be linked to the clinical severity of COVID-19 [4]. Kasal et al. have since contributed an elegant review of microvascular dysfunction in COVID-19, and renewed interest in the RAS—reminding us that it is “a powerful homeostatic system developed hundreds of millions of years ago, allowing salt and water retention essential for vertebrates once they left their original marine environment” [5,6]. Importantly, these works have highlighted the intrinsic molecular complexities and vulnerabilities in patients with comorbidities such as hypertension, obesity, diabetes, advanced age, plus pulmonary, renal and other conditions [1–5].

## Changes in Models of Care

On 25 March 2020, in a clear sign that the COVID-19 was to take urgent priority in the Australian health care system, the Australian federal government cancelled all non-urgent elective surgeries, lifting the suspension on 27 April 2020, with non-urgent surgery allowed at reduced capacity. The *Cardiovascular disease and COVID-19 Australian and New Zealand consensus statement*, endorsed by The Cardiac Society of Australia and New Zealand (CSANZ), the Australian and New Zealand Society of Cardiac and Thoracic Surgeons (ANZSCTS), the National Heart Foundation of Australia and the High Blood Pressure Research Council of Australia presented a practical approach to cardiovascular health care delivery to patients with and without SARS-CoV-2 infection. Adaptive health care delivery models and resource allocation would be required throughout the health care system [1]. Subsequently, nine comprehensive CSANZ Position or Consensus Statements [7–15] and an Executive Summary of a tenth [16], were fast-tracked to on-line publication in *Heart, Lung and Circulation*. Designed as “living documents” that would be revised as needed (e.g., when more detailed information became available), each Statement comprehensively outlined the changed models of care with respect to different aspects of cardiovascular practice: acute heart failure and assessing the critically ill [7] assessing suspected acute coronary syndromes [8], interventional cardiology services delivery [9], echocardiography services [10], management of cardiac electrophysiology and cardiac implantable electronic devices [11], genetic heart diseases [12], paediatric and congenital heart disease [13], cardiac rehabilitation and secondary prevention [14], rural and remote cardiology [15], and cardiovascular nursing [16].

All Statements advised how to continue to provide optimum care for all patients while minimising the risks of exposure to SARS-Co2. This entailed limiting both non-invasive and invasive procedures to those considered critical. There was also an across-the-board emphasis on the need for adequate supplies and appropriate use of personal protective equipment (PPE) for all practitioners delivering clinical care.

Correspondence received has been in strong support of the Statements while drawing attention to associated concerns [17,18]. Sarathy et al. cautioned cardiac services against implementing a fibrinolysis strategy for all patients with ST elevation myocardial infarction (STEMI) [17,19]. They reasserted that primary percutaneous coronary intervention (PCI) remains the standard of care and that, as indicated in the relevant Statements, fibrinolysis should be reserved for select circumstances only [1,9].

Although telehealth delivery has been widely adopted to facilitate continuation of health care provision, by their very nature these methods preclude hands-on physical examination which has been shown to double the accuracy of diagnosis based on history alone [20]. Allahwala et al. considered an appropriate application of telehealth to be triaging patients for physical review. Furthermore, they recommended that patients be encouraged to attend specialist reviews in person, to ensure appropriate management and control of chronic conditions [21]. However, Nicholls et al. welcomed the e-health initiatives indicating that, in an era of integrating new processes into routine clinical care, there are currently opportunities for their formal evaluation, with implications for longer-term use beyond the pandemic [14].

## Longer Term Implications

In Editorials, Adikari et al. and Allahwala et al. have raised concerns that, as health care systems deal with COVID-19 cases, patients with acute and chronic cardiovascular diseases have been delaying or even avoiding medical care due to social distancing measures and concerns about contracting COVID-19 from health care interactions [19,21].

Several relevant Australian studies are now published in the wider literature. Toner et al. reported that in the first month of the COVID-19 lockdown in Australia (March 16 to April 15, 2020), the volume of cases of acute coronary syndromes (ACS) undergoing percutaneous coronary intervention (PCI) seen at a tertiary hospital catheterisation laboratory in Melbourne, Australia, were comparable with volumes seen in the same month in the previous 6 years [22]. However, there was a concerning four-fold increase in the symptom-to-door-time, and the proportion of patients presenting late was higher, threatening the gold standard of care—timely revascularisation to minimise infarct-related morbidity and mortality. In another observational study, Toner et al. found a 41% reduction in hospitalisations due to heart failure in the month of COVID-19 lockdown compared with several earlier years; further, that patients hospitalised

in the COVID-19 lockdown era had significantly higher New York Heart Association (NYHA) functional classifications [23]. None of the patients in either study tested positive for COVID-19, even though they were seen during the peak of the first COVID-19 epidemic curve in Australia.

Recently, Coote et al. drew attention to the delayed presentation of acute ischaemic stroke during the COVID-19 crisis, observed globally [18]. They believe that COVID-19 related measures, like redeployment of specialist stroke unit nurses to other care areas, physically segregating emergency department workspaces and lengthy imaging equipment decontamination times, could combine to delay treatment. Further, that likely consequences for patients would include increased rates of complications [18].

The take-home messages from these “collateral damage” scenarios are that patients should still be encouraged to seek medical care, and especially prompt medical care for cardiac and cerebrovascular emergencies [18,19,21–23], and that hospital workflows and processes, while needing to be flexible in these “unprecedented times”, should not be altered to such a degree that patients needing urgent medical care are disadvantaged [17,18].

If these measures are not taken and even if they are, Allahwala et al. have gone so far as to warn of an “impending tsunami” of a different kind after the first wave(s) of COVID-19—that the long-term consequences of COVID-19 related delay in care of chronic cardiovascular conditions may be a wave of non-COVID-19 acute cardiac conditions [21].

In the CSANZ Position Statement *Optimising Secondary Prevention and Cardiac Rehabilitation for Atherosclerotic Cardiovascular Disease*, Nicholls et al. indicated that as well as introducing limitations in access to standard health services, including attendance at cardiac rehabilitation, the pandemic is having an impact on lifestyle and mental health, compounding to make adherence to treatment guidelines for prevention of recurrent cardiovascular events all the more challenging [14]. O’Neil et al. expanded on the range of mental health and psychological challenges likely as a result of the COVID-19 pandemic and the associated, and at time extended, social isolation practices [24]. They suggest that in addition to an increasing incidence of anxiety, depression, suicidal violence and post-traumatic stress, the pandemic could also see an increase in substance abuse, domestic violence, and relationship discord. Climie and Marques have commented that the prevalence of anxiety, depression and posttraumatic stress disorder will likely increase across all groups of cardiovascular researchers, particularly in those who are also health care providers, such as cardiologists and nurses [25].

More waves of various kinds may yet come. As the COVID-19 pandemic proceeds, various long-term sequelae of COVID-19 itself are becoming more apparent. A post-intensive care syndrome (PICS)—described as a “crisis after a crisis”—has been reported in COVID-19 patients [26]. In a Letter to the Editor, Rathore and Ilyas call for developing countries, like Pakistan, to manage PICS by expanding

multidisciplinary rehabilitation services that could mobilise the strong family and social support systems available in these communities [27].

## Effects on Research and Publication

In 2019, just prior to the COVID-19 pandemic, Climie et al., on behalf of the Australian Cardiovascular Alliance, conducted an online survey investigating perceived challenges faced by Australian cardiovascular researchers [28]. In their Discussion Paper, they commented that the key issues—a lack of both strategic funding and long-term job security—are likely to be further exacerbated by the COVID-19 crisis. Climie and Marques have since outlined strategies to minimise the impact of COVID-19 on the career progression of early and mid-career cardiovascular researchers [25]. Strategic opportunities include courses (online), developing collaborations, promoting awards, engaging in alternative funding, and also exploring new career paths due to COVID-19 [25].

Dunn, Editor-in-Chief of *JACC: Basic to Translational Science*, wrote that as the sheer magnitude of the COVID-19 pandemic became apparent, the pace of scientific publishing accelerated rapidly, dramatically compressing the time from months to weeks for performing experiments and submitting findings to journals, presumably in an effort to mitigate the devastating consequences of the COVID pandemic [28]. This speed has come at the cost of scientific rigour, and journals—including *The New England Journal of Medicine* and *The Lancet*—have issued retraction notices (when peer review could not be independent or private) [29,30]. Dunn noted that on June 21, 2020, Retraction Watch had reported that 20 COVID-19 papers had been retracted, two temporarily retracted, and two cited as containing misleading information (i.e., expressions of concern) [31]. At our time of writing (October 16, 2020), these figures have nearly doubled, with 36 retractions, three temporary retractions, and two expressions of concern.

In 2020, *Heart, Lung and Circulation* also adopted a fast-track to peer review and publication of COVID-19 related submissions; and, although our editors have proceeded with an abundance of caution in assessing the multiple submissions received, at time of writing, our Journal has just received an author-requested withdrawal of an accepted paper due to a “data discrepancy” which is under investigation. Our caution, to researchers, authors, reviewers, and editors alike, is to check accuracy of data, and to be wary of the same data being used more than once in the “rush” to publication. Novelty along with scientific and clinical importance should remain key features of COVID-19 related submissions but not at the expense of diligence and quality.

In general, access to scientific COVID-19 publications has been greatly facilitated by the removal of firewalls for COVID-19, courtesy of publishers, including Elsevier, publisher of *Heart, Lung and Circulation*. For further convenience, *Heart,*

*Lung and Circulation's* publications in 2020 relating to COVID-19 have been made available as a Digital Collection: *COVID-19 in 2020* and reviewed in this Editorial. Beyond 2020, we anticipate that this Digital Collection may grow as additional manuscripts are reviewed and considered for publication.

For now, we all continue to live with COVID-19 and hope for the development of an effective vaccine. We suggest that when such vaccines do become available, COVID-19 related challenges are likely to continue. Our only constant may be an opportunity to not just “ride out” these waves but to “surf” them competently—with confidence in science, medicine, and their practitioners, and in our capacities for agile adaptation and resilience.

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