

**A Consensus Statement on the Use of Angiotensin Receptor Blockers
and Angiotensin Converting Enzyme Inhibitors in relation to COVID-19
(Corona Virus Disease 2019)**

This opinion statement has been discussed and agreed by the Specialist Hypertension Research Network of the North Island of Aotearoa and is authored by the following members:

Dr. Hari Talreja, Consultant Nephrologist, Counties Manukau DHB

Dr. Jasmine Tan, Consultant Nephrologist, Waitematā DHB

Dr. Matt Dawes, Cardiovascular Physician/Clinical Pharmacologist, Auckland DHB and Sr lecturer, University of Auckland

Dr. Sharen Supershad, Consultant Nephrologist, Northland DHB

Dr. Kannaiyan Rabindranath, Consultant Nephrologist, Waikato DHB

A/Prof James Fisher, Department of Physiology, University of Auckland

Dr. Sajed Valappil, Consultant Nephrologist, Waitematā DHB

Ms. Veronica van der Merwe, Nurse specialist, The Hypertension Clinic, Auckland

Ms. Lisa Wong, Research Operations Manager, Manaaki Mānawa – The Heart Research Centre

Dr. Walter van der Merwe, Consultant Hypertension Specialist, The Hypertension Clinic, Auckland

Prof Julian Paton, Director, Manaaki Mānawa – The Heart Research Centre, and Department of Physiology, University of Auckland

The consensus has also been supported by Professor Rob Doughty (Heart Foundation Chair, ADHB, University of Auckland) and Associate Professor Gerry Devlin (Medical Director, Heart Foundation).

For further clinical information contact:

Dr Hari Talreja (Hari.Talreja@middlemore.co.nz)

For scientific enquiries contact:

Professor Julian Paton (J.Paton@Auckland.ac.uk)

There has been an unprecedented interest generated in the medical community and on social media around the interaction of Coronavirus (SARS-CoV2) and ACE inhibitors (ACEi) and angiotensin receptor blockers (ARB), and whether these medications increase the risk of COVID-19.

This was triggered by correspondences published in well-known medical journals, *Lancet Respiratory Medicine* and *BMJ*.^{1,2} They observe that the COVID-19 patients with comorbidities such as hypertension and diabetes, had more severe symptoms. The authors hypothesized that diabetes and hypertension treatment with ACE2-stimulating drugs increases the risk of developing severe and fatal COVID-19. They suggest that ACEi and ARB can increase the ACE2 enzyme, which is a receptor used by the virus to gain entry into the host cells. Therefore, these drugs could potentially increase the risk of severe infection.

We reviewed the evidence supporting this hypothesis, and would like to make the following observations:

1. The studies from China report higher prevalence of hypertension in those who developed severe COVID-19 disease.^{3,4} However, a conclusion cannot be drawn that hypertension results in severe infection as these analyses were unadjusted for confounders such as age, and there was no reported data on ACEi and ARB use in these studies.
2. The authors suggest that ACEi and ARB upregulate ACE2 enzyme that enhances infectivity of the SARS CoV2 virus based on animal studies.⁵ However, other animal and human studies did not find any association of circulating ACE2 levels with the use of ACEi or ARBs.^{6,7} Therefore, it is questionable whether these drugs increase ACE2 concentration in lungs and kidneys to allow severe viral infection.
3. To the contrary, there is evidence that ACEi might confer protection in some viral pneumonias.⁸ Based on this, there are on-going trials studying the effect of Losartan (an ARB) in patients with COVID-19 in outpatient and inpatient settings.^{9,10}

Therefore, given the available evidence, we DO NOT advise patients on ACEi or ARB to change therapy. These commonly used medications confer benefits in patients with cardiovascular disease and diabetes, and should not be changed unless clinically indicated. The current evidence on COVID-19 and hypertension, and ACEi or ARB medication is inadequately adjusted and prone to bias, and therefore remains inconclusive.

Our recommendation to prescribed use of ACEi and ARBs is consistent with the viewpoint of numerous societies from around the world including the European Society of Cardiology, the International Society for Hypertension, European Renal Association and European Dialysis and Transplant Association.

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