

“COVID new normal” in ophthalmology: Implications for ophthalmologists, eye care, ophthalmic education and research

The World Health Organization declared a global pandemic due to coronavirus disease 2019 (COVID-19) on 11 March 2020. Since then, many countries have experienced second or third waves of infections, and there have been over 1.7 million deaths (as of 21 December 2020). Australia and New Zealand have been affected, but have a low rate of community transmission, allowing them a window into what the “new normal” of ophthalmology might be while COVID-19 continues to affect ophthalmology clinical care, education, professional societies and research globally.

Healthcare workers have been disproportionately affected during the pandemic. Avoidance of infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the best available approach while vaccine roll-out is underway. Ophthalmologists may be at higher risk, highlighted by the death of the Chinese whistle-blower ophthalmologist Dr Li Wenliang, who probably contracted the disease from a patient he treated for glaucoma.¹ The reasons that put ophthalmologists at increased risk are complex and include the conduct of ophthalmology examinations in close proximity to patients' faces increasing exposure to respiratory droplets.² The population of ophthalmologists is also ageing and at risk of co-morbidities, and the ophthalmology patient population may be at higher risk of COVID-19 infection.³

Ophthalmologists have had to consider strategies to continue to safely treat patients. At the height of the pandemic in Australia, ophthalmology practice was extensively modified, with face-to-face services limited to time-sensitive or urgent conditions. Since then, non-urgent care has resumed, but as highlighted by the excellent review by Brandão-de-Resende et al,⁴ practicing towards prevention of infection continues to be paramount. These measures all decrease the capacity to see patients in a clinic setting, making a return to the old normal of crowded waiting rooms unlikely in the near future. Telehealth has been useful in reducing clinic visits.⁵ Telehealth applications have included remote

retinal imaging, use of visual acuity applications, home optical coherence tomography devices⁶ and home intraocular pressure measuring devices.⁷ The Australian Government recently extended emergency funding for telehealth, suggesting that this will be part of ophthalmology practice into the future.

Ophthalmologists are unlikely to see ophthalmic complications of COVID-19 unless they are practicing in a population with very high prevalence rates. Despite SARS-CoV-2 detection in tears,^{8,9} less than 5% of patients have conjunctivitis as part of their illness, and very rarely patients present with conjunctivitis as the first symptom of COVID-19 illness. Coronaviruses are recognized to cause uveitis in animal models, but to date there is only one case report of bilateral anterior uveitis in a patient with COVID-19, suggesting this is a rare complication in humans.¹⁰ More recently, retinal complications of COVID-19 have been described (reviewed by Brandão-de-Resende et al).⁴ Data on retinal changes are limited; however, there is mounting evidence of retinovascular changes in patients with COVID-19 including retinal haemorrhages, cotton wool spots and dilatation of retinal veins. It is not uncommon to see microangiographic changes in patients with other viral diseases such as human immunodeficiency virus,¹¹ and it is unknown whether retinal changes seen in patients with COVID-19 are due to the virus itself or due to the inflammatory response to the virus.

Patients requiring intravitreal therapy have been particularly impacted by the COVID-19 pandemic. The intensified visit frequency related to intravitreal therapy had created service pressures on ophthalmic clinics well before the COVID-19 virus struck our communities. In contrast to deferring elective surgery, most ophthalmic societies including the Royal Australian and New Zealand College of Ophthalmologists (RANZCO) recommended empirically that intravitreal treatment continue during the pandemic.¹² Boyd et al provide proof-of-concept calculations confirming this recommendation.¹³ They note that the benefit of treatment

outweighs the risk of developing COVID-19 in almost all cases, except for older patients having repeated injections, and when the community prevalence is approaching 10%. Recent data have shown prevalence of up to 1% in parts of the UK and United States; if this increases then the risk–benefit of intravitreal therapy would need to be reconsidered. It is still unknown how many patients have suffered irreversible vision loss due to missed intravitreal injection appointments during the pandemic due to reluctance or inability to access timely treatment. As well as at home monitoring of disease activity, effective sustained drug delivery to the retina is seen as crucial to reduce clinic visits, prompting novel solutions including the port delivery system using ranibizumab and genetic trials, such as that using ADVM-022, an adeno-associated virus gene therapy vector carrying a coding sequence for aflibercept.

Ophthalmologists in Australia are experiencing an increase in patient numbers as elective and urgent patients return to clinics. Although SARS-CoV-2 has been identified in tears, it is not clear whether these viral particles are infectious.^{8,9} Phacoemulsification cataract surgery is a recognized cause of droplet generation,¹⁴ but the evidence on aerosolization is mixed. McGhee et al¹⁴ demonstrate that despite droplet formation, spread to the surgeon appears to be low and phacoemulsification surgery is probably safe using standard surgical precautions.

Ophthalmology education was disrupted during the pandemic. Medical student ophthalmology programs were suspended or delivered virtually.¹⁵ Ophthalmology trainees had their usual rotations disrupted, with a reduction in patient volumes, particularly elective surgery.¹⁶ Globally, some trainees were redeployed into COVID-facing roles.¹⁷ Arguably, trainees are learning broad skills required by modern medical practitioners in models such as CANMeds; however, ophthalmology is a technical discipline and requires continuous practice to embed skills as they are acquired.

COVID-19 prompted significant change at RANZCO. As the pandemic accelerated, the College developed triage guidelines, collaborated in developing policies on potential redeployment of ophthalmology trainees and cancelled its Annual Congress. Digital transformation was accelerated, with the college working towards online delivery of continuing professional development activities, trainee education and assessment and incorporating use of surgical simulators into all aspects of ophthalmic education. The shift to online learning has brought its own challenges such as reduced audience participation and “zoom fatigue.” Recognition of mental health challenges led to the establishment of a well-being group. Future work for the “new normal” may need to include development of training and standard setting for tele-ophthalmology, further development of team approaches

to deliver ophthalmology care while minimizing COVID-19 risk and further development of artificial intelligence in ophthalmology, for example, use in patient triage or personalizing care by predicting patients most at risk of blindness.

RANZCO reduced fees for trainees and Fellows in 2021 but received pandemic government funding and thus remained in a sound financial position. The American Academy of Ophthalmology was a signatory to a letter to US Congressional leaders requesting financial relief.¹⁸ Other International ophthalmic societies may be struggling financially, potentially impacting ophthalmic training over years to come.

Overall, Australian research has slowed.¹⁹ Although the impact has been mixed, much laboratory and clinical research not directly related to COVID-19 was disrupted and more difficult to publish.²⁰ As the world reopens, “kick-starting” ophthalmology research may be difficult as research deemed relevant to economic and social recovery is likely to skew future funding allocations. A negative effect on ophthalmology research funding is likely to be compounded by a reduction in funding from the fees paid by international students, and external and international sources of research funding as well as an anticipated reduction in the number of international research students.

We await the “COVID new normal.” It is likely that many of the measures put in place due to the COVID-19 pandemic will continue long after infection with SARS-Cov-2 is no longer a threat. Interest in home monitoring devices has accelerated. Working and learning in the online environment has brought challenges; the collegiate nature of RANZCO may be challenged in a purely online environment and efforts to strengthen this may be necessary. Major changes have already occurred in ophthalmology. Leaders in the profession will need to continue advocating for our patients and the science of vision.

CONFLICT OF INTEREST

None declared.

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