

SARS-CoV-2, the medical profession, ventilator beds, and mortality predictions: personal reflections of an Australian clinician

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It is imperative that we prepare for the worst, and that we do it now



As the Editor-in-Chief of the *MJA*, I'm in the very privileged position of being among the first to critically evaluate early and emerging data forwarded to the Journal. I can also talk to experts around the world because of my medical and academic links. In January 2020, early on in what is now the SARS-CoV-2 pandemic, I remember seeing the first data on the outbreak of COVID-19 in China, the estimated R_0 values, and the initial models of exponential spread. Evidence from past outbreaks provides many lessons, including the importance of public health responses going very hard and very early, well before all the epidemiologic data are in.^{1,2} I therefore watched with increasing alarm that, despite early warnings from the World Health Organization, the initial responses of many governments around the world were limited and slow. I remember when I first saw the disturbing Imperial College modelling for the United Kingdom and the United States, including the different impacts of mitigation and suppression strategies in terms of hospital deaths from COVID-19.¹ In Australia, the messages have yet to fully sink in.

On 26 March we published a new model of COVID-19-related mortality and hospital admissions, validated against Italian data.³ The model is simple and grim; it describes a hypothetical Australian hospital admitting new cases of confirmed COVID-19 infection day after day, assuming that one in 20 patients require intensive care for 10 days, and that the COVID-19 community case load increases by 20% each day. From day 15 — about the time when it is expected that available ICU beds run out — mortality steadily increases, as has happened in Italy. Those familiar with outbreak modelling know how complex such models can be and how many unknowns need to be imputed, especially early in a new outbreak; some employ supercomputers for their calculations, and can take months or years to build their model. Further, the predictive validity of complex models in an outbreak may not apply in other locations because human behaviour is complex and unpredictable.^{4,5} For this reason, simple models may be more robust; at least early on, when they matter most.⁶

Many have spoken out about the public health measures needed to slow the spread of SARS-CoV-2, and bolder action has recently been taken in Australia and elsewhere; those medical leaders who have stepped up and the political leaders who have heeded their advice early enough will have helped save lives. The next wave of heroes will soon emerge as frontline clinicians

in hospitals care for patients during the COVID-19 surge. At the time of writing (26 March), major preparations are underway to increase ICU bed and ventilator capacity, and personal protective equipment (PPE) is being donned to protect staff. According to current COVID-19 surge modelling, however, it won't be enough.

The health workers who will be on the COVID-19 frontline and manage the sickest patients will need our greatest support, every single one of them. We will need to ensure that PPE stocks are not wasted and that they are replenished quickly, a clear government priority supported by the suspension of non-urgent elective surgery announced by the federal government. I hope that manufacturers will be directed to produce everything we need, and quickly; we would re-tool factories in wartime and not rely alone on private companies to step up (although some have). Some may dislike the wartime analogy, but it resonates with me.

We will need to work together to support our medical teams. For families with two health professionals and dependents, we should not place both carers at high risk of exposure and severe disease. This will not be a straightforward rostering task, particularly outside major hospitals and in rural Australia. We need a statewide, and preferably a national plan; closing our internal borders must not impede sensible rostering and medical team deployment. Training needs to ramp up for all staff, and consist of more than simple online videos. We need a clear plan if PPE runs low or out. And we need clear triage rules about which patients should be ventilated if beds run short; health professional leaders and the community must together discuss the complex medical and ethical problems involved, and guidance needs to be finalised as soon as possible. Mental health support will be important, as post-traumatic stress disorder will be a serious risk for ventilated patients and for staff; I suggest resting staff as much as possible now so that they are healthy, physically and mentally, when they are really needed. We will also require our health system leaders to understand that at a time like this every hospital should have a strict command and control structure led by senior clinicians and health professionals, with a designated clinician leader; bureaucrats primarily concerned with finances and political considerations must move to the sidelines.

The Australian Health Practitioner Regulation Agency (AHPRA) is working to determine the role of medical students in this hour of need. Those close to graduating could play direct clinical roles under close supervision if they volunteered, but we need to start upskilling them now if this is to be worthwhile; it takes time to transition from being a medical student to a fully functioning, safe and competent intern. Doctors are being recalled from retirement in the UK and parts of Australia. I hope that this strategy will not be needed, as it places the most vulnerable in the profession in the wrong place. We must also protect staff financially and professionally. The indemnity implications for

doctors required to work outside their scope of usual practice are unclear and must be resolved quickly. I am a gastroenterologist, and I am fully prepared to work on COVID-19 wards or fill gaps in non-COVID wards if required. But what if I make mistakes? And if I die, will insurance cover my family?

The *MJA* has stepped up to play its part in meeting this crisis, including ultra-rapid review of SARS-CoV-2 manuscripts and pre-print publication of unedited papers, to ensure that the newest data and viewpoints are available as soon as possible. In addition, all SARS-CoV-2 articles will be fully accessible without fee. Our medical and structural editors are working from home, carefully reviewing every submission, but the *MJA* will continue to publish as usual in these extraordinary times. The ultra-rapid review and publication model entails a risk of error, but sharing important information too slowly is a much greater hazard. We will transparently correct and update the preprints if appropriate, and we will of course apply our usual high standards of review and editing to refine them before we publish their final versions online and in print.

Models matter, even if they are imperfect representations of the real world.⁷ While the projections reported by Meares and Jones³ may represent a worst case scenario and may not come to pass, it is better that we prepare for the worst, and now. Over the coming months it's going to take courage, brains, and a concerted and unified effort by the medical profession and other health professionals to manage SARS-CoV-2. Let's not leave anyone behind.

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