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

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As the Editor-in-Chief of the MJA, I am in the very privileged position of being among the first to critically evaluate early and emerging data. I'm also able to talk to experts around the world through my medical, research and academic links. Early on in what is now a pandemic, I remember seeing the first outbreak data from China and proposed R0 values, and initial models of exponential spread in January 2020. Evidence from past outbreaks provide many lessons including the importance of the public health measures going very hard and very early, well before all the facts are in (1). I therefore watched with increasing alarm as despite the early warnings from the World Health Organisation (WHO) there were limited initial steps taken by many governments. I remember when I first saw the disturbing Imperial College modelling for the UK and USA, and the impact of mitigation versus suppression strategies in terms of hospital deaths from SARS-CoV-2 (1). The messages have yet to fully sink in here in Australia.

Today we publish a new model of mortality and COVID-19 admissions, validated against Italian data by Meares and Jones (2). The model is simple and grim; it proposes a hypothetical Australian hospital facing new positive COVID-19 admissions each and every day, where 1 in 20 community cases end up in ICU, an ICU admission is 10 days, and there is a 20% increase in SARS-CoV-2 community case load each day. By day 15 (presumably around the time ICU beds run out), the mortality steadily increases linearly, as has happened in Italy where this model was consistent with the data. Those who do outbreak modelling know how complex the models can be and how many unknown assumptions need to be imputed especially early in a new infectious outbreak; some use super computers to do their calculations and can take months or years to build the model. However, the predictive validity of complex models in an outbreak may also fail to hold up elsewhere because human behaviour is complex and changes (3, 4) For this reason, simple models may be more robust at least early on when it matters (5).

Many have spoken out about the public health measures needed to suppress SARS-CoV-2 and recently bolder action has been taken in Australia and elsewhere; those medical leaders who have stepped up and the political leaders who have heeded the advice early enough will have helped to save lives. The next wave of heroes will soon emerge, namely the frontline clinicians in each hospital who will look after the COVID-19 surge. As I write this piece the medical profession in Australia largely continues to undertake business as usual although major preparations are underway to increase ICU bed and ventilator capacity, and personal protective equipment (PPE) is being donned where needed to protect staff. Based on the COVID-19 surge modelling today it won't be enough.

Those who will face the COVID-19 frontline and manage the sickest patients will need our greatest support, every single one of them. We will need to ensure we don't waste current

stocks of PPE and more is obtained, a clear Government priority we must support by cancelling routine surgery and procedures. I hope there will be directives to order manufacturers to make everything we need and fast; we would retool factories in wartime and not rely alone on private companies to step up as many have, and while some dislike the wartime analogies they resonate with me.

We will need to work together to support our medical teams. For two-doctor or health professional families with dependents, both mustn't be placed at high risk of exposure and severe disease, not a straightforward rostering task particularly outside of major hospitals and in rural Australia. We need a state-wide and preferably a country wide plan; the states closing borders must not counteract sensible rostering and medical team deployment. Training of all staff needs to ramp up and this must be more than simple videos on-line. We need a clear plan if PPE runs low or out. And we need clear triage rules for who is ventilated or not if beds run short; health professional leaders and the community together must discuss the complex issues and guidance needs to be finalized as soon as possible. Mental health support must be put in place as post -traumatic stress disorder will be a serious risk, and now. I'd also suggest staff be rested as much as possible from today, as they will need it. In my view, we will also require our health system leadership to understand at a time like this the structure in every hospital should be a military-like command and control one, led by senior frontline clinicians and health professionals with a designated clinician leader; bureaucrats must step to the sidelines.

AHPRA is working to determine the role of medical students in this hour of need. Only those near graduation could play a direct clinical role under close supervision if they volunteered but we had better start upskilling them now if this is going to prove of any use; it takes time to transition from a medical student to a fully functioning safe and competent intern. Calling doctors out of retirement is happening in the UK and in parts of Australia and this may be needed but I hope not, as this strategy places the most vulnerable in the profession in the wrong place, and expert ICU care is highly subspecialized. We must also protect staff financially and professionally. It is as yet unclear what the indemnity implications for doctors called up to work outside their scope of their usual practice and this must be resolved immediately. I am a gastroenterologist; I am fully prepared to step up to either work on COVID wards or fill the gaps in the 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 do its part in this crisis including ultra-rapid review of SARS-CoV-2 papers and pre-print publication so the newest data and viewpoints are released as soon as possible. In addition, all SARS-CoV-2 articles are fully free access for anyone to read. Our medical and structural editors are working from home and the MJA will continue to publish as usual in these extraordinary times. The new rapid publication model risks errors, but being too slow with information sharing is a much bigger risk. We will work to refine the preprints prior to publishing online early and in print, and correct and update along the way.

Models matter even if they are imperfect representations of the real world (6). While the results reported by Meares and Jones may represent a worst-case scenario and may not come to pass, we must better prepare, now. Over the coming months it's going to take courage, brains and a concerted unified effort by the medical profession and health professionals to manage SARS-CoV-2 infection. Let's not leave anyone behind.

References

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