WILL WE TRUST AI TO REDUCE EMERGENCY DEPARTMENT OVERCROWDING?

To the Editor

AI (Artificial Intelligence) could be tasked to solve wicked problems in the health system, such as emergency department (ED) overcrowding and ambulance ramping. As there are multiple co-dependencies involved in moving patients through a hospital, no one action can solve the issue, but we can begin to look at specific cohorts that occupy beds who may do just as well in a stepped-down clinical setting, such as a virtual ward. Opening up more beds sooner and improving patient flow will most likely positively affect ED overcrowding.

EDs in Australia are experiencing a prolonged challenge with ambulance ramping (when a patient has a prolonged wait within the ambulance on arrival at a hospital due to lack of vacant beds), created by input, throughput and output impediments in the hospital systems.[1] Across the country, we are seeing a deterioration in transfer time from ambulance to ED with South Australian hospitals, for example, seeing only 54% of patients within the targeted time. The new Royal Adelaide Hospital in South Australia was opened in 2017 at the cost of more than AUS$2 billion, delivering 800 new beds, which filled up quickly, now reporting ramping. Expanding hospitals' physical capacity without business model changes may only bring short-term improvements to ED overcrowding, and Morley et al., (2018), found that expanding the ED is an ineffective solution.

Low-acuity presentations and presentations by the elderly are among the main drivers of ED overcrowding and there is an opportunity to treat some of the chronic disease burden in hospitals in a stepped-down clinical setting. While remote patient monitoring has proven itself as being technically feasible for at least a decade, the industrial-scale adoption of treating patients in their homes has come up against several roadblocks from "who pays" to "who is responsible" for the monitoring and actions that need to be taken from analysing vital signs.

Virtual wards offer clinicians a way to treat patients off a hospital campus while reducing the dependency on beds for each patient within a hospital. This type of transformation brings new business models and a rational decision-making process to deliver care to an increasingly complex chronic disease cohort.[2] Virtual patient monitoring will be more likely to be successful if it's trustworthy, accountable and within the clinician's capacity to explain the AI that drives it.[3] Researchers have been successful in leveraging machine learning to predict the 30-day readmission risk for hospitalisation for chronic diseases such as COPD, ischemic heart disease and heart failure.[4] Understanding the likelihood of readmission delivers insight into the resource requirements. It also guides what level of care, such as a virtual ward, should be considered for these patients to improve outcomes and reduce readmissions.

An explainable AI service that monitors the data coming in from virtual wards could be developed to manage chronic diseases from the patients' homes as part of stepping down their care during their hospital admission. Services such as the Hospital Admission Risk Program could also benefit from AI predicting likely outcomes for a patient to readmit.

If we could build a trusted AI system that enables us to identify patients for step-down care from a hospital bed to a virtual ward and predict their likely outcomes, we could see beds opening up, resulting in a greater clinical capacity. Once we can demonstrate to stakeholders that AI can play a role to expand hospital system capacity with new business models like virtual wards, then we are on our way to moving beyond traditional hospital care, to a more equitable healthcare future for patients.

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