The impact of rapid molecular diagnostic testing for respiratory viruses on outcomes for emergency department patients

To the Editor: Uncontrolled before-and-after studies are highly prone to bias. Wabe and colleagues report on the impact of rapid influenza testing on outcomes for emergency department (ED) patients.[1] They compared outcomes across four hospitals between the 2016 influenza season, when standard testing was used, and 2017, when rapid testing was used. Rapid testing was associated with shorter test turnaround times, more patients receiving results, and lower admission rates.

Before-and-after studies use historical controls, in this case the prior influenza season, to evaluate the impact of interventions. This may be adequate for comparing simple indicators, such as test turnaround time, or for generating hypotheses. However, uncontrolled before-and-after studies are not useful for assessing more complex outcomes, such as admission rates, which are highly vulnerable to bias from other factors that may impact the observed results. For this reason, they are discouraged by some publishing groups.[2]

Frequent genetic drift in influenza virus strains causes variations in the burden and severity of illness each year, which influences ED presentations, testing and admission rates. The 2017 influenza season saw unprecedented numbers of influenza cases and ED presentations in NSW,[3] which likely influenced admission practices. Teasing out the effect of rapid testing on admission rates is therefore not possible using an uncontrolled comparison between two disparate influenza seasons, in the manner of Wabe and colleagues. The steps taken to attempt to reduce seasonal effects cannot address this. It is also not possible to determine the net direction of biases in this study.

Given the higher cost of rapid tests, it is important to have good estimates of their impact to inform economic evaluations. There are stronger methodologies that still allow timely evaluation using routinely collected data. At minimum, a comparison could be made to hospitals that did not implement rapid testing. When data from more seasons are available, an interrupted time series analysis may be appropriate.[4]

Interventions that mitigate the burden of seasonal influenza on health services are critical. Rapid testing is likely one such intervention, and therefore warrants careful evaluation with robust methodologies to inform its use.

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1 Wabe N, Li L, Lindeman R, et al. The impact of rapid molecular diagnostic testing for respiratory viruses on outcomes for emergency department patients. *Med J Aust* 2019; 210: 316–320. https://www.mja.com.au/journal/2019/210/7/impact-rapid-molecular-diagnostic-testing-respiratory-viruses-outcomes-emergency

2 Goodacre S. Uncontrolled before-after studies: discouraged by Cochrane and the EMJ. *Emerg Med J* 2015; 32: 507–508.

3 NSW Health. Influenza monthly epidemiology report, NSW, December 2017 (including a summary for the year 2017). Sydney: NSW Government, 2018. https://www.health.nsw.gov.au/Infectious/Influenza/Publications/2017/december-flu-report.pdf (viewed Nov 2019).

4 Bernal JL, Cummins S, Gasparrini A. Interrupted time series regression for the evaluation of public health interventions: a tutorial. *Int J Epidemiol.* 2017; 46: 348–355. ■