

Risk factors for deterioration in mild COVID-19 remain undefined

The current UK wave of COVID-19 continues to put significant strain on a health service also dealing with winter pressures. Reliable data are needed to inform decision-making in the ED as highlighted recently by the editor.¹ However, the current published, presented and preprint studies do not use appropriate outcome measures to give the most useful information for those with 'mild' symptoms of COVID-19.

Patients requiring supportive measures such as supplemental oxygen are necessarily admitted to hospital from the ED. However, those who present with mild symptoms and normal physiology require a decision to admit, discharge or refer to an ambulatory pathway. This strategy is already being used² out of necessity but without formal assessments of individual risk. We know that the majority will make an uneventful recovery, never requiring hospital-based intervention.³ However, it is important to identify those at risk of deterioration. Patients who initially present with mild symptoms but deteriorate after being sent home may have delayed access to interventions and so suffer adverse outcomes. Conversely, setting the threshold for admission too low risks overwhelming already stretched hospital, ambulatory and remote care capacity.

In June 2020, we systematically reviewed the literature to identify studies which used ward-level interventions (eg, supplemental oxygen), or a physiological deterioration suggesting these would be required, as the outcome measure. Five thousand four hundred and twenty-seven records were screened but only 11 observational studies were identified which met our inclusion criteria attempting to identify risk factors for deterioration in those with mild disease. These were relatively small, ranging from 85 to 372 patients, and all in Chinese populations. As might be expected, increasing age, comorbidity and raised markers of inflammation or organ dysfunction on initial presentation were associated with an increased risk of requiring ward level care or higher.

Since then, the number of papers returned by our search strategy has more than quadrupled. However, we remain concerned that this question is still not being considered satisfactorily.

One example is the PRIEST (Pandemic Respiratory Infection Emergency System Triage) study, which uses outcome measures representing critical care intervention and identified risk factors which, significantly, include physiological status at presentation.⁴ Its applicability to those presenting with mild disease may therefore be limited. We maintain that an important group which is potentially missed are those who do not require hospital care at first presentation but subsequently deteriorate. It is possible that using appropriate thresholds for sensitivity and specificity of the PRIEST tool would identify these patients, but no data have been presented to support this. It is also possible that those with mild disease who deteriorate would be under-represented due to the reliance of the tool on physiological factors at presentation. Any secondary analysis of the PRIEST data set⁵ will, unfortunately, suffer from the similar limitations due to the outcome measures chosen.

Another major UK effort is the 4C Mortality score developed from a large dataset of admitted patients.⁶ The authors conclude that their tool, which stratifies admitted patients by predicted mortality, could be used to identify those suitable for community management. This is similar to use of the CURB-65 Score in the ED. However, there is no evidence presented that this would identify those without an immediate requirement for admission who go on to require hospital level intervention.

We propose that, despite the volume of studies being published, there is still an urgent need to address the question of how we decide which patients can be safely discharged from the ED. Logically, studies recording ward-based outcome measures, such as oxygen administration, will be required. The implications failing to address this given the ongoing pandemic are self-evident.

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REFERENCES

- Weber EJ. Highlights from this issue. *Emerg Med J* 2021;38:87.
- Aalam AA, Hood C, Donelan C, et al. Remote patient monitoring for ED discharges in the COVID-19 pandemic. *Emerg Med J* 2021;38:229–31.
- Gandhi RT, Lynch JB, Del Rio C. Mild or moderate Covid-19. *N Engl J Med* 2020;383:1757–66.
- Goodacre S. The pandemic respiratory infection emergency system triage (Priest). *Royal College of Emergency Medicine Virtual Scientific Conference* 2020.
- Goodacre S, Thomas B, Lee E, et al. Post-exertion oxygen saturation as a prognostic factor for adverse outcome in patients attending the emergency department with suspected COVID-19: a substudy of the Priest observational cohort study. *Emerg Med J* 2021;38:88–93.
- Knight SR, Ho A, Pius R, et al. Risk stratification of patients admitted to hospital with covid-19 using the ISARIC who clinical characterisation protocol: development and validation of the 4C mortality score. *BMJ* 2020;370:m3339.