24 hours a day?

No Twenty-four-hour coverage is costly, has not demonstrated benefit and diminishes the quality of intensivists' training

Adam M Deane
MB BS, PhD, FCICM, Intensivist[1]

Mary G White
MB BCh, BAO, FFARCSI, Associate Professor[2]

1 Critical Care Service, Royal Adelaide Hospital, Adelaide, SA.

2 Discipline of Acute Care Medicine, University of Adelaide, Adelaide, SA.

adam.deane@adelaide.edu

doi: 10.5694/mja12.11354

At first glance, proposals for having an in-house consultant intensivist providing 24-hour care have some appeal. It has been suggested that because daily intensivist input improves outcomes in the critically ill, moving from an after-hours consultation service to a 24-hour presence onsite would improve the quality of health care.[1] However, this belief is purely speculative and is not supported by data. It is important to recognise that in other areas of medicine, treatments require a certain "dose", and when given in excess of this dose there is no further improvement. For example, excessive administration of what some may consider relatively benign therapies, such as oxygen, intravenous fluid and enteral nutrition, has no benefit and indeed can be harmful beyond a certain dose. The optimal "dose" of an intensivist remains uncertain.

Before introducing major structural changes to a system, its problems should be identified, and the solution provided should have the potential to fix or ameliorate the problems. Accordingly, if onsite intensivists are the solution, there must be a problem with the current level of care provided to the critically ill, and the problem must be one that intensivists have the capacity to address. Recently, Bhonagiri and colleagues evaluated more than 200 000 patient admissions to Australian intensive care units (ICUs) and observed that after adjusting for severity of illness, patients admitted unexpectedly have similar mortality regardless of whether the admission occurs in-hours or after-hours.[2] The investigators did report that patients with planned admissions after undergoing elective surgery were at greater risk of death if they were admitted after-hours when compared with those admitted in-hours. However, a prolonged time spent in theatre (and later admission as a result) is more likely to reflect surgical problems. It is therefore unlikely that an onsite intensivist will influence outcomes in these patients.

A number of ICUs overseas have adopted the model of having a consultant intensivist onsite 24 hours a day. We propose that data from these ICUs will be biased to observe associations with reduced mortality even in the absence of causality. This is based on the likelihood that refusal to admit to ICU on the grounds of futility will be more frequent when intensivists are onsite, thereby reducing ICU mortality while hospital mortality remains unaffected. Further, most studies from these ICUs have evaluated mortality using a before-and-after intervention design. However, ICU mortality appears to be falling over time,[3] so using such a study design is biased toward observing a reduction in mortality even when the intervention is ineffective.

> "The optimal 'dose' of an intensivist remains uncertain"

Despite these inherent biases, every published study has reported that ICU mortality is unaffected by the presence of 24-hour onsite intensivists. Moreover, the pivotal study in this area evaluated staffing across 49 United States ICUs and 65 752 patient admissions.[4] This study reported that in "closed" ICUs (the model used in Australia), mortality was similar whether intensivists were onsite after-hours or available as a consultative service.

An important part of medical training is the progression to independent decision making that is developed when a senior registrar has responsibility for some decisions, but is supported as required by a consultant. In our opinion this skill is a fundamental determinant of subsequent success as an intensivist. The presence of consultant intensivists in-house 24 hours a day will "protect" senior registrars from making independent decisions. Indeed, the whole premise on which this endeavour is based is that all clinical decision making should be effected by the onsite consultant. Junior consultants will subsequently need to acquire these skills without the benefit of senior support.

Australian health care expenditure continues to rise at a rate greater than gross domestic product.[5] The cost implication of introducing intensivists onsite 24 hours a day would be substantial, as salary costs for the increased number of consultant intensivists are fixed, whereas any potential reduction in patient bed-days is unrealised unless beds and smaller ICUs are closed. Such closures are often unpopular and may have unforeseen consequences. For these reasons rigorous cost–benefit modelling must be done, particularly as to date there is no sign of benefit from 24-hour onsite intensivists.

In summary, while the mechanisms underlying any proposed benefit of increasing intensivist "dose" are questionable, the intervention will be costly and may adversely affect training. Unless future well designed studies show an actual benefit for patients, hospitals and health care policymakers should resist any attempts to enforce this potentially expensive and ineffective practice.

Competing interests: No relevant disclosures.

Provenance: Commissioned; not externally peer reviewed.

1 Cartin-Ceba R, Bajwa EK. 24-hour on-site intensivist in the intensive care unit: yes. *Am J Respir Crit Care Med* 2010; 181: 1279-1280.

2 Bhonagiri D, Pilcher DV, Bailey MJ. Increased mortality associated with after-hours and weekend admission to the intensive care unit: a retrospective analysis. *Med J Aust* 2011; 194: 287-292.

3 Moran JL, Bristow P, Solomon PJ, et al. Mortality and length-of-stay outcomes, 1993-2003, in the binational Australian and New Zealand intensive care adult patient database. *Crit Care Med* 2008; 36: 46-61.

4 Wallace DJ, Angus DC, Barnato AE, et al. Nighttime intensivist staffing and mortality among critically ill patients. *N Engl J Med* 2012; 366: 2093-2101.

5 Elshaug AG, Moss JR, Littlejohns P, et al. Identifying existing health care services that do not provide value for money. *Med J Aust* 2009; 190: 269-273. ❑