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## Night thoughts

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Transitions in and out of the intensive care unit (ICU) are major steps in the trajectory of hospitalised critically ill patients, for whom accurate clinical assessment, selection of the correct level of care, and maintenance of continuity of care are fundamental determinants of outcome. Out-of-hours (OOH) discharge is known to be associated with adverse outcomes for patients, and is now being used as a quality indicator in the UK and USA. Leaving aside for one moment what 'out-of-hours' might mean in health services ostensibly offering 24 h care 7 days a week, it would seem reasonable to hypothesise that, as health services improve with time, secular trends might demonstrate a reduction in frequency and in adverse outcomes of being discharged at night from an ICU to an ordinary ward.

However, in this issue of *Intensive Care Medicine*, Gantner and colleagues present an analysis of the ANZ-ICS case mix program database which shows that discharge out-of-hours (taken as 1800–0600 hours) from ICUs in Australia and New Zealand is associated with a markedly elevated adjusted risk of death, and that neither the risk nor the rate of OOH discharge (around 15 %) has changed over the 8-year study period (2005–2012) [1]. Risk was higher for OOH discharge in private hospitals, and applied to all diagnostic groups examined, including post-cardiac surgical patients. Patients discharged OOH tended to have more severe illness at ICU admission, and longer ICU stays. These patients are more likely to have had prior limited physiological reserve, or to have sustained substantial loss of physical capacity during their ICU stay, and therefore to be at higher risk following discharge. The odds ratio for mortality was 1.34 which is very similar to previous studies in Australia: 1.7 [2], 1.63 [3]; in Australia and New Zealand: 1.4 [4]; in the UK: 1.46 [5]; in Canada: 1.22 [6], 1.2 [7]; and in France: 1.56 [8]. The consistency of the impact of night discharge on outcome is remarkable since it is observed across countries with different healthcare systems and funding.

Why are the nights dangerous? There are several potential explanations. Given that nighttime discharge is unlikely to be seen as desirable, it is almost certainly a surrogate measure of premature discharge in the setting of continuing referrals of critically ill patients to an already full ICU. The principle of distributive justice [9] encourages the intensivist to exchange the "less severe" patient for one who is more acutely ill; the unspoken assumption is that delayed admission (or the inconvenience of providing off-site intensive care support) is more disadvantageous than the risks of premature discharge. This decision disadvantages the discharged patient, the patient's family and, in the long term, the ICU team. Gantner and colleagues report that, during the study period, the proportion of discharges by hour of day

remained constant, but the absolute number of ICU discharges increased by 38.5 %. It is therefore reasonable to assume that nighttime discharge is an expression of rationing, with increased referrals to intensive care offsetting any increase in resources.

The second possible explanation is poor decision-making by the medical staff. Admission and discharge decisions should be taken by the senior ICU physician on duty, not by trainees or non-intensivists. As ICUs in Australia and New Zealand are managed by intensivists (the so-called 'closed model'), one has to assume that the discharge decisions were taken in the full knowledge of potentially adverse outcomes. This suggests the opportunity for undertaking fieldwork to understand the nature of senior decision-making at the time of admission and discharge, and prospective studies of decision-support models for readiness for discharge [10, 11].

A third possibility is that nighttime discharge is accompanied by poor handover procedures and lapses in communication. Transitions in care are known to be associated with discontinuities in treatment [12] and an increased risk of adverse events. As nighttime hospital staffing is a fraction of those present during the day, discharged patients may be reviewed cursorily, or not at all, by junior medical staff preoccupied with other emergency duties until their shift ends.

Finally, suboptimal care in ordinary wards is a likely contributor to post-ICU complications. In the Western world, ICU populations contain an increasing proportion of the frail elderly, whose reserves are so compromised that they cannot cope with the reduction in basic nursing care associated with ward care. Intensive care specialists may fail to recognise that the patient they are about to release from the ICU suffers from nocturnal delirium, is so weak she cannot sit up in bed unaided, reach a nurse call button, or hold a glass of water to her lips, and still has a low-grade inflammatory response slowing the progression of tissue healing. In the ICU, these problems are scarcely noticed because the environment is configured to deal with them, but in the ordinary wards they become major barriers to recovery. Intermediate care facilities [13] and expert ward support in the form of outreach care or rapid response teams [14] may help to mitigate the ward environment, but the real challenge lies in reconfiguring the entire hospital system so that it provides safe care for all acutely ill patients regardless of location [15].

What lessons can we learn from the growing literature on nighttime discharge from the ICU? We make some suggestions for minimising both the frequency and the impact of OOH discharges in Table 1. Reduction of nighttime discharge rates and prevention of adverse consequences for our patients is not merely an ICU

**Table 1** Approaches to minimising the frequency and impact of OOH discharges from ICU

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1. Patient level
    - a. Discharge decisions to be made only by the intensive care specialist
    - b. Early identification of patient readiness for discharge to permit forward planning
    - c. Daily assessment of patient reserve, dependence and therapeutic workload
    - d. Critical incident reporting for unplanned nighttime discharges
  2. ICU level
    - a. Registry of out-of-hours discharges and delayed admissions
    - b. Formalised hand-over procedures
    - c. Integration of step-down (high-dependency) units with the ICU
    - d. Modification of the nurse:patient ratio instead of transferring the patient to another location
  3. Hospital level
    - a. Active integrated bed management linking intensive care to other departments
    - b. Electronic patient records across the hospital
    - c. 24 h outreach care
    - d. Vital signs early warning systems to enable prompt detection of impending critical illness
    - e. Anticipation of need for ICU admission (planned or emergency surgery)
    - f. Anticipation of seasonal effects (i.e. influenza)
  4. Health policy and ethics
    - a. National registries and case mix programmes to monitor ICU performance
    - b. Discussions with ethicists and the public on the impact of rationing intensive care resources
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issue, it is a challenge for hospital management, for health policy makers, and for the public. Local and national data on nighttime discharges will lend weight to discussions with funders, and should be incorporated in discussions about the wide international variations in intensive care resources [16]. Is the lack of ICU beds for the next admission a consequence of unwillingness to confront end-of-life care issues while continuing futile care? Do we audit our own individual discharge decision-making in terms of post-ICU deaths and ICU readmissions, and are those decisions better or worse than predictive instruments [10, 11, 17], which might in time become incorporated in electronic clinical decision support systems? Given the impact on mortality, we should record all unplanned nighttime discharges as critical incidents.

The eighteenth century poet Edward Young's major work 'Night Thoughts' describes how rapidly life and opportunity escape our grasp. It is our duty as intensivists to minimise this adverse effect on our patients. If we had at our disposal a drug which could reduce mortality by 20–50 %, we would all be using it. Avoiding nighttime discharge is that drug.

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