

LESS IS MORE IN INTENSIVE CARE

ICU beds: less is more? No



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I have seen the future and it is very much like the present, only longer

(Kehlog Albran)

If we want to predict the future, we have to look at the past and the present. The COVID-19 pandemic has highlighted the need for intensive care unit (ICU) beds in an unprecedented manner. However, the reasons why we need more ICU beds are not new.

Changing demographics

Worldwide the population is growing and people live longer. This is mirrored in the increasing age of ICU patients. In many high income countries, the proportion of patients aged over 80 years has risen to 10–15% and is estimated to rise even further [1]. As the age of patients increases, we not only see more patients with increasing comorbidities and frailty but also increasing numbers of elderly patients with high functional status [2]. In addition, increasing numbers of children with corrected or supported congenital disorders are growing into adulthood. More ICU beds are required to treat all these growing populations.

New treatments equal more 'ICU eligible' patients

Historically, many ICU treatments were limited solely to patients most likely to benefit. However, as resources have increased, some have become 'mainstay' and available to more vulnerable and frail patients. During the influenza pandemic of 2009, extracorporeal membrane oxygenation was reserved for young otherwise healthy patients with respiratory failure. Today, indications have broadened and many more patients are eligible. Artificial

organs and mechanical circulatory assist devices now offer long-term survival options to many patients in whom ICU care was previously not considered. Outside the ICU, the increasing availability of new anticancer therapies such as monoclonal antibodies, CAR-T cells and checkpoint inhibitors whose side effects may include severe organ failure is creating a growing cohort of patients who also need ICU admission. As a consequence, the increasing availability of all these treatments will result in greater demand for ICU care.

Only the sick will be in the hospital

Increasingly treatments are being delivered successfully to patients in the community, with only the sickest admitted to the hospital. As a consequence, in the near future, hospitalised patients will be more severely ill than those of today. A small increase in illness severity will then necessitate ICU admission [3]. This may already be a contributing factor in the increasing ICU admissions due to sepsis [4].

ICU for those previously considered 'too well' or 'too sick'

Patients are increasingly admitted to ICU for observation, e.g. intoxicated patients waiting until the time of maximum toxin concentration has past [5]. Other patients need monitoring where therapy can be delivered urgently if required, such as those with potential airway compromise. Admission to an ICU results in better outcomes than admission to a hospital ward [6].

Can these patients be observed elsewhere? Yes, but only in areas adequately equipped and appropriately manned by well-trained staff. Failure to meet these high standards cannot be compensated for by medical emergency intervention teams who respond to deterioration after it has happened. It is time to accept that wards are not staffed and trained to adequately deal with such patients. More ICU beds will bring more patients to the personnel most likely to improve their outcomes.

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In some hospitals, the ICU is the only facility which can provide optimal treatment to terminally ill patients requiring potent analgesic drugs or non-invasive ventilation. Increasingly, ICU admission is being offered to provide end-of-life care (e.g. to facilitate time for family members to attend patients with non-survivable brain injuries who were intubated prior to ICU admission, or to allow opportunities for organ donation, in turn saving the lives of others through transplantation) [7].

Developing countries and changing cultures

The largest increase in demand for ICU beds may come from middle income countries where more than half the global population live [8]. As schooling, social consciousness, wealth and healthcare systems improve, there will be increasing demand to care for the critically ill. This may be greatest in regions where cultural and religious attitudes about sanctity of life lead to indefinite continuation of treatments which might be withdrawn in other countries. Ultimately, those patients will be treated in long-term facilities, but, prior to that, they will stay in ICU longer [9].

Lack of ICU beds is a problem right now

When few ICU beds are available, delays in ICU admission hinder timely provision of care leading to worse outcomes [10, 11]. The impact of ICU strain on patient outcomes is already well-recognised today [12]. Lack of access to ICU puts patients at risk through increased interhospital transfers, cancellation of surgery and premature or out-of-hours discharge from the ICU [13]. Without more ICU beds, increasing pressure to admit patients will exacerbate ICU strain and leaves us little capacity to cope with sudden surges in ICU demand. ICUs in many countries have been overwhelmed by patients with coronavirus (SARS-CoV-2) infections. Lack of intensive care capacity has undoubtedly cost lives during the pandemic and will do again without greater baseline ICU capacity [14].

Looking at the present, it is clear we need more ICU beds to meet current demands, to improve care for our present patients and to cater for future patients. However, we can also deliver these ICU beds more efficiently and responsibly by streamlining processes of care which reduce ICU length of stay, using ICU telehealth, developing practitioner specialist roles and leveraging economies of scale in larger ICUs [15]. The need for 'more ICU' has never been more obvious than today as we watch a global pandemic overwhelm our present ICU resources. Let this be a lesson for the future (Table 1).

Table 1 Summary table

Why we need more ICU beds today
Inequity in access to critical care
No surge capacity
Cancelled elective surgery
Unnecessary interhospital patient transfers
Delays in treatment to critically ill outside ICU
Premature and after-hours discharge from ICU
Why we will need more ICU beds tomorrow
New patients
The next pandemic
More vulnerable and elderly patients
Critical care in the developing world
New indications
'Just in case' admissions for observation
Organ donation and palliative ICU admissions
New treatments
New and expanding artificial organ supports within ICU
Novel high-risk drug therapies for patients outside ICU
Complex elective and emergency surgical procedures

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Compliance with ethical standards

Conflicts of interest

Dr de Lange and Dr Pilcher has no conflicts to declare. Dr. Soares is founder and equity shareholder of Epimed Solutions®, which commercializes the Epimed Monitor System®, a cloud-based software for ICU management and benchmarking.

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