

J. L. Vincent  
H. Burchardi

## Do we need intermediate care units?

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J. L. Vincent (✉)  
Department of Intensive Care, Erasme University Hospital,  
Route de Lennik 808, B-1070, Brussels, Belgium  
Tel.: 32 25 55 33 80, Fax: 32 25 55 45 55  
email: jlvincen@ulb.ac.be

H. Burchardi  
Department of Anesthesiology and Intensive Care Medicine,  
Georg August University of Göttingen, Germany

### Introduction

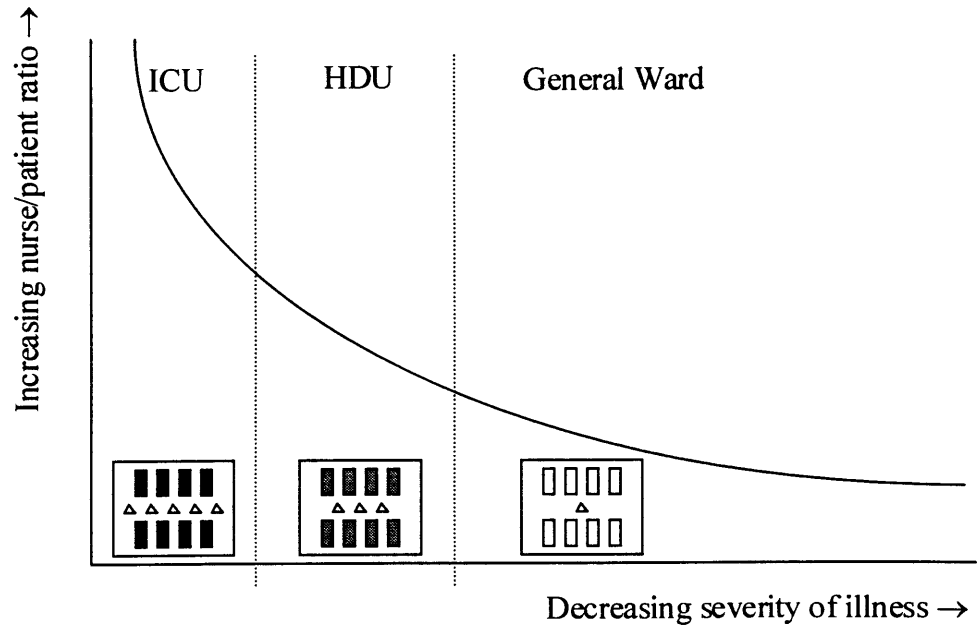
Since its inception during the severe outbreak of poliomyelitis almost 50 years ago, the intensive care unit (ICU) has become a key feature in almost every hospital. Increasingly sick patient populations, improved life-support systems, newer, more effective therapeutic agents, and greater understanding of the pathophysiology of many disease processes have led to a growing need for ICU beds, with the ICU increasingly accounting for a larger and larger proportion of the hospital budget [1]. Intensive care is unquestionably expensive care [2, 3] and resources are not always readily available. As an example, there are frequently insufficient ICU beds available to cater for demand. Indeed, in a recent questionnaire survey of 504 ICUs in 16 Western European countries, 46% of respondents stated that ICU admissions were generally or commonly affected by bed shortages [4]. With increasingly expensive technology being developed, ICU spending is likely further to exceed available funding, and the need for explicit rationing is rapidly becoming a reality. However rationing is applied, the aim must be to provide, without restriction, high-quality intensive care for those who will benefit from it. To this end, several suggestions have been made to limit ICU costs and improve the efficiency of the service. These include the development and imple-

mentation of strict admission and discharge criteria, and the use of intermediate care units. These intermediate care units, also termed high-dependency or “step-down”, units, generally have a higher nurse/patient ratio and greater facilities for intensive monitoring than would be found on a general ward, but fewer staff and less invasive equipment than on an ICU [5, 6] (Fig. 1). Such areas cater for patients who do not require full ICU care but are thought to need more care than could be offered on the general ward. Intermediate care units have been adopted by some hospitals, particularly for specific patient groups, such as cardiac [7], neurosurgical [8], or respiratory [9] patients. The use of such units has been promoted as a means of enabling the earlier discharge of some ICU patients and of providing an alternative to intensive care for patients who merely require intensive monitoring, thus freeing ICU beds. However, such units are not necessarily the solution to overutilization of ICU beds and may merely divert the issue rather than solve it [10]. They may also have negative effects on patient care and staff morale. Importantly, there are few, if any, prospective studies on the benefits of intensive care versus intermediate care which provide objective and hence comparable, admission and discharge criteria. In addition, the literature that is available comes predominantly from the United States, where intensive care training, organisation and management are very different than Europe. In this paper, we will discuss the pros and cons of intermediate care units and conclude with our thoughts and recommendations on the appropriate place of such units in our hospitals today.

### For intermediate care

Perhaps the first documented proponents of the intermediate care unit were Bone and Balk [11], who developed a non-invasive respiratory care unit primarily for the monitoring of patients with respiratory disorders as

**Fig. 1** Schematic representation of the suggested place of the high-dependency unit *HDU*, catering for patients with a lower severity of illness and requiring less nursing care than on an intensive care unit *ICU* but more than on a general ward. Rectangles represent patients, *black to white* indicating high to low severity of illness; triangles indicate nursing staff



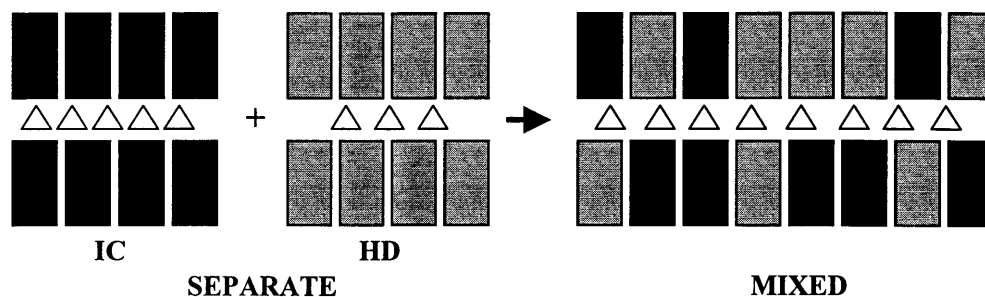
they were weaned from ventilatory support, using a nurse/patient ratio of 1:3 or 4. They suggested that this type of unit provided a more judicious use of health care resources. Since then, many have supported the use of such units as providing a realistic and financially beneficial means of reducing pressure on overloaded ICUs without compromising patient care [7, 10, 12–16]. A key argument in favour of the intermediate care unit is that many patients who are admitted to the ICU do not, in fact, require or benefit from the high level of staffing or monitoring [8, 17–21] but similarly cannot be managed to the full on a general ward. These patients occupy key ICU beds which could be “better” used by another patient with more acute demands. Displacing them to an intermediate care unit would enable them to receive the necessary level of care, but free the much needed ICU bed. Byrick et al. [22] reported that forced closure of an intermediate care unit led to an increase in the number of ICU admissions with a low severity of illness. The potential increase in inefficient use of staff and resources led to the reestablishment of the intermediate care unit. Franklin et al. [23] noted that the use of an intermediate care unit reduced overall mortality in the medical service, suggesting that mortality is unnecessarily increased if unstable patients are discharged to normal wards. Recently, Fox et al. [24] reported that the opening of a high-dependency unit reduced the number of ICU readmissions. Several studies have, indeed, suggested that moving patients from the ICU to an intermediate care unit when they no longer require full ICU facilities, or directly admitting patients at low risk who simply require intensive monitoring to an intermediate care unit instead of to the ICU, can be an effective

means of reducing costs and improving use of ICU resources [25, 26]. Another advantage of such units may be increased patient comfort in terms of less technology, less ambient noise, more privacy, more open visiting hours, etc. [27]. Methods of identifying patients suitable for admission to such units have been proposed based on quantifying severity of illness (e.g. by severity scores) or activity of treatment (e.g. by the Therapeutic Intervention Scoring System TISS) [12, 26], and guidelines have recently been published to promote safe triage of patients to intermediate care units [6].

#### Against intermediate care

Despite the evidence apparently supporting the role of the intermediate care unit in providing a means of improving health care allocation and reducing ICU costs, a recent systematic review of the literature was unable to show a definite improvement in cost-effectiveness with the use of these units [28]. One of the reasons for this may be that a considerable amount of ICU resources is consumed by a relatively small number of severely ill patients, and reducing the number of less sick patients may thus have relatively little impact on overall ICU spending [20]. Overall hospital costs are unlikely to fall as, while treating an ICU patient on an intermediate care unit may be less costly, many of the intermediate care patients would otherwise have been treated on the general ward using fewer resources at considerably lower cost. In addition, the development of intermediate care units is likely to be met by increased demand [29]. Edwards and Stockwell [30] found that the opening

**Fig. 2** Schematic representation of the differences between separate intensive care and high-dependency units *ICU* and *HDU* and a mixed unit. *Black rectangles* represent severely ill patients; *grey rectangles* represent less severely ill patients; *triangles* represent nursing staff



of a high-dependency unit did not reduce the demand for ICU beds. Also, while intermediate care units certainly have less invasive monitoring equipment, they must be fully equipped with equally, and possibly more expensive, non-invasive monitoring instruments. Thus, the major economic argument in favour of intermediate care units is the decrease in staffing levels. However, while levels are reduced, nurses need to be trained to the same standard as intensive care unit nurses, and nursing care perhaps plays an even more important role on the intermediate care unit than on the ICU. In a prospective, multicentre study, Zimmerman et al. [5] analysed the monitoring technology and nursing services required for low-risk monitor ICU admissions. In this study involving more than 8000 patients, the main requirements of these low-risk patients who were suitable for intermediate care, was concentrated nursing care (nurse/patient ratio 1:3–4), with only limited technological requirements.

In addition to the lack of evidence in favour of any economic benefit, intermediate care units may not be the ideal answer to current ICU overload problems for several reasons. First, the potential for flexibility is much greater on a larger mixed unit, both in terms of matching bed capacity to need and with regard to manpower use. It is an accepted rule of management that a larger manpower capacity adapts better to a changing workload, allowing more efficient use of resources. A large mixed unit can adapt easily to a sudden influx of severely ill patients, for example, as the result of a large accident, by discharging low-risk monitor patients to the general ward. A smaller unit will not be able to cope with the need for extra beds, as all its beds would already have been taken by severely ill patients who cannot be cared for on the general ward. Any overload situation will, therefore, result in patients being refused ICU admission. The higher average hospital mortality in countries with ICUs of small bed capacity has been shown [31]. Second by, the separation of patients into “intensive” or “intermediate” could be seen as a means of reducing the importance of the individual patient, intensive care being more “necessary” than intermediate care. Nursing staff on the intermediate care unit may, thus, feel “downgraded” compared to their ICU col-

leagues, and there may be reduced interest in the less sick patients. The more heterogeneous workload on the mixed unit can help maintain staff interest and job satisfaction. Medical staff may feel less inclined, or feel it less necessary, to do detailed rounds on intermediate care unit patients; indeed the risk is that rounds will commence on the “more important” ICU patients, and any remaining time will be spent on a brief tour of the intermediate care unit patients. Thirdly, the transfer of patients from one ward to another, while simple on paper, is not always so easy in practice. For the staff, extra paperwork and time are involved to ensure that the handover of care is as smooth as possible. For the patient, continuity of care is upset, and time is needed to adapt to new faces and new routines. Moving patients from the ICU to the general ward will inevitably occur, but the creation of an intermediate care unit introduces an extra, we believe unnecessary, transfer. Fourthly, a potential risk with the intermediate care unit is that once the patient is out of the ICU the admitting physician will want to resume patient care, and the intensivist will lose ‘control’ of the intermediate care unit. Several studies have shown that the intensivist can have positive effects on length of ICU stay and ICU mortality [32–37], and combining intermediate with intensive beds will ensure patient management remains under the auspices of the intensivist, removing any potential for a reduced quality of patient care on the intermediate care unit.

### Summary and recommendations

We acknowledge that there is great variability in the organisation and utilisation of ICU facilities within and between countries, and our arguments may not apply to all hospitals in all countries. In particular, much of the literature derives from the United States where intensive care management and organisation is very different to the situation in Europe. We believe however, that, in general, for the reasons outlined above a separate intermediate care unit is not the most efficient or effective use of resources. In certain situations where a small ICU is always very busy, and patient access is frequently limited, as is often the case in the United King-

dom and some southern European countries [4], the addition of an intermediate care unit may be considered as a way of expanding limited ICU facilities. When designing new hospitals or a new ICU, however, careful thought should be made before incorporating an intermediate care unit in the plans. We would recommend that instead of fragmenting intensive care facilities by separating "intensive" from "intermediate", with the potential risks of reduced staff morale and less than adequate patient care, intensive and intermediate care beds should be combined in one unit (Fig. 2), as is currently the situation in many ICUs, particularly in Europe. Very sick patients are intermingled with less sick patients, thus maintaining staff interest. Keeping a single unit also ensures intensivist overview of all patients. The level of nursing care and monitoring required can be adapted according to the specific needs of individual patients. Utilisation of ICU facilities in many hospitals within Europe is inefficient [3], but we do not believe that the creation of new intermediate care units is the

answer. By establishing a single "mixed" ICU, organisation and resource utilisation can be optimised within that one area. The development and implementation of strict admission and discharge criteria [38] would be a key factor in establishing cost-effectiveness and ensuring the efficient utilisation of the available beds in such a unit. Many patients are admitted to ICUs with no reasonable chance of survival, who will not benefit from intensive care [4, 39], and reducing these unnecessary admissions may have a greater positive impact on ICU costs than providing an intermediate area for patients who just require monitoring [39]. Overall staff numbers and monitoring needs in a mixed unit will be the same as if a two-tier system with intermediate care is developed, and having the two areas combined in one offers additional benefits in terms of management and patient and staff well-being. With effective ICU admission and discharge strategies, we believe intermediate care offers no advantages in providing quality intensive care to all who need it.

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