

Physician staffing pattern in intensive care units: Have we cracked the code?

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Abstract

Intensive care is slowly being recognized as a separate medical specialization. Physicians, called intensivists, are being specially trained to manage intensive care units (ICUs) and provide focused, high quality care to critically ill patients. However, these ICUs were traditionally managed by primary physicians who used to admit patients in ICUs under their own care. The presence of specially trained intensivists in these ICUs has started a "turf" war. In spite of the availability of overwhelming evidence that intensivists-based ICUs can provide better patient care leading to improved outcome, there is hesitancy among hospital administrators and other policy makers towards adopting such a model. Major critical care societies and workgroups have recommended intensivists-based ICU models to care for critically ill patients, but even in developed countries, on-site intensivist coverage is lacking in a great majority of hospitals. Lack of funds and unavailability of skilled intensivists are commonly cited as the main reasons for not implementing intensivist-led ICU care in most of the ICUs. To provide optimal, comprehensive and skilled care to this severely ill patient population, it is imperative that a multi-disciplinary team approach must be adopted with intensivists as in-charge. Even though ICU organization and staffing

may be determined by hospital policies and other local factors, all efforts must be made to attain the goal of having round-the-clock onsite intensivist coverage to ensure continuity of specialized care for all critically ill patients.

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INTRODUCTION

"Who should 'man' the intensive care unit (ICU)?" has been an issue of contention for many years now. Doctors belonging to different specialties have made their claims to manage ICUs and treat critically ill patients. However, recent years have seen "critical care" emerging as a distinct specialty and doctors have started specialized training in this field. Those specialized in this field of medicine are known as "intensivists". However, specialized training in this field is not widely available in many countries and the number of these specialist intensivists is not adequate to meet the ever-increasing need^[1,2]. Moreover, the distribution of these specialists is uneven even in advanced countries^[3]. Problems such as lack of proper training in the field of intensive care, lack of proper curriculum, lack of awareness among doctors of different specialties and lack recognition of intensive

care as a specialized branch of medicine have hampered the growth of this specialty^[4]. In addition, conflicting data regarding outcome benefits among patients admitted to ICUs led by intensivists, have also added to the controversy^[5]. Through this article, we intend to review the world literature regarding the staffing patterns in ICU and their impact on patient outcomes.

“OPEN” VS “CLOSED” ICUs

The realization that more severely ill patients require extra care, in a specialized place by dedicated, trained staff led to the development of ICUs as specialized designated areas in hospitals specially designed to manage critically ill patients. Conventionally, patients were admitted by their treating physicians to these designated units where they continued to remain primarily responsible for the care of their patients. In this “open ICU”, different physicians could admit their patients and remain responsible for all decisions regarding patient management. The major drawback of this concept was that these physicians might not have received specialized training for managing critically ill patients and in addition they might not be able to devote their full time and attention to care of ICU patients because of their out-patient responsibilities and the need to care for other hospitalized patients admitted out of ICUs.

As the concept of ICUs being specialized units evolved, the concept of specialized doctors managing ICUs also became important. Hence, the idea of creating “closed ICUs” was born in which patients were admitted by the treating physicians directly under the care of doctors specialized in the field of critical care medicine. These doctors or “intensivists” would be directly responsible for managing the patients admitted to their ICUs, decide who is to be admitted and discharged, and which other specialists to consult. These intensivists typically have no outpatient responsibilities and devote their full time to managing ICU patients. However, a major shortcoming of this concept is that the treating physician, who initially saw the patient and who admitted the patient to ICU, loses all authority and control over patient management.

A third type of ICU, which is in between these two extremes has been developed and adopted effectively in some centers, the so-called “semi-closed” ICUs^[6]. In this model, even though the intensivists are in-charge of the ICU, the patient’s primary physician frequently takes rounds along with the ICU team and contributes to patient management. Therefore, the primary physician does not feel alienated and actively participates in the care of the patient.

There is abundant data which suggests that patient care may be more efficient in “closed ICUs” which may lead to better patient outcomes in terms of shorter ICU and hospital length of stay, reduced duration of mechanical ventilation and reduced mortality^[7-9]. Improved patient outcomes have been shown to persist even when

the closed ICU concept was applied across various specialty ICUs including medical^[7,8], surgical^[10], oncology^[11], trauma^[12] and neurology^[13] ICUs.

According to estimates, 162 000 lives could be saved annually if intensivists staff all urban adult ICUs in the United States^[14,15]. Other parameters such as bed utilization^[11], more confidence in clinical judgment by the supporting staff^[7] and hospital costs and post-operative complications are improved^[7,8,10,11-13,16]. Improvement in patient outcomes have also been shown to exist across different patient sub-groups, including patients undergoing major surgeries like esophageal resection^[17], or abdominal aortic surgery^[18] or those with serious medical disorders like acute lung injury^[16].

A large meta-analysis, including nine studies, demonstrated that the relative reductions in mortality rates in intensivist-led ICUs range from 15% to 60%. This meta-analysis also demonstrated that with full implementation of intensivist-model ICUs, at least 53 850 lives could be saved annually in the United States alone^[19].

Even though several studies have exhibited improved patient outcomes in intensivists-based ICUs, the exact rationale behind such improved outcomes is not clear. Various explanations have been proposed although several factors working in conjunction may lead to better patient care and hence, improved outcomes. Intensivists are principally trained to manage critically ill patients. They also tend to spend most of their working time in ICUs, and hence might be more capable to avert, identify early, and manage life-threatening complications in critically ill patients. Intensivists-based ICUs also tend to be more organized and provide continuity of care which may lead to improved family and patient satisfaction^[20]. Intensivists can also synchronize communication and collaboration with the patient, attendants and even specialists belonging to other fields to provide comprehensive patient care. Moreover, they may be better equipped to apply latest cutting edge technology, have up-to-date knowledge of pertinent guidelines and protocols and may be more likely to apply evidence-based medicine to ensure optimal patient care.

A large multi-center study^[21] showed that patients admitted to an intensivists-based ICU were more likely to receive evidence-based therapy such as stress ulcer or deep vein thrombosis prophylaxis, a spontaneous breathing trial for weaning from mechanical ventilation, sedation intervals for patients on mechanical ventilation and intensive insulin treatment. Timely discharge of patients from ICUs, which is more likely in intensivists-based ICUs, can reduce ICU length of stay, hence reducing the morbidity and mortality related to prolonged ICU stay^[9].

In contrast to popular evidence, a single, retrospective multi-center study found that high-intensity ICU physician staffing was associated with a higher severity-adjusted mortality^[5]. Even though the authors could not provide any reasonable justification for these unanticipated results, they attributed this to the discontinuity of care which may occur when patients are transferred to and from a closed

ICU which may affect the outcome, unfavorably. However, the association between high-intensity staffing and poor outcome, in this study, was only present in patients with low severity of illness, which may suggest that less ill patients may have been exposed to unnecessary risks in the ICU which may have led to more complications and hence worse outcome^[5]. Furthermore, it may be more reasonable to believe that trained intensivists may be more likely to perform invasive procedures with their inherent risk of complications which may have affected patient outcomes^[22].

To improve the quality, safety, and economic value of healthcare, the Leapfrog Group was established in 2000 which comprised representatives from a group of prominent employers. To achieve their goals, they have made certain recommendations based on evidence-based medicine which includes an ICU-physician staffing (IPS) standard. According to this IPS standard, they have recommended that intensivists must manage or co-manage ICU patients, and should exclusively provide clinical care in the ICU during daytime hours, but during off-hours a fundamental critical care support-certified non-physician should be physically present to provide cover in the ICU and the intensivists should remain on-call and return pages within 5 min 95% of the time^[23]. Other international societies like the European Society of Intensive Care Medicine^[24] and American College of Critical Care Medicine (ACCM)^[25,26] have also recommended that intensivist-led care must be provided to all critically ill patients admitted to ICUs.

TWENTY FOUR HOURS INTENSIVIST COVERAGE

Several studies have suggested that even daily rounds by a trained intensivist can improve patient outcomes leading to shorter ICU stays, reduced post-operative complications, and hence, lower hospital costs. Hospital mortality has been shown to be reduced by up to three times when intensivists take daily rounds in the ICU^[17,18]. However, to really have a significant impact on patient outcome, it has been suggested that ICUs should have a trained intensivist physically present at all times 24 h per day and 7 d per week^[27-29].

The need to provide immediate aggressive care to critically ill patients cannot be overstressed. It is imperative that subtle changes suggestive of any deterioration in a patient's condition must be immediately identified and corrective measures taken as early as possible to improve outcome. Trained intensivists are obviously more likely to recognize such slight changes in patient parameters and hence their 24-h presence in the ICU may allow early detection of potential problems and complications and the institution of appropriate interventions. Twenty-four-hour intensivist coverage may ensure increased compliance with evidence-based medicine leading to family satisfaction^[30]. Moreover, round-the-clock intensivists coverage will facilitate consistency of care and allow pa-

tients to receive appropriate treatment by a skilled intensivist at all times.

Data from several studies suggest that 24/X7 in-house intensivist coverage may improve the outcome of critically ill patients^[28-33]. Based on such data, an ESCIM task force issued recommendations on minimal requirements for ICUs. They emphasized that ICU should be led by a trained intensivist and that there should be a qualified intensivist present on-site 24-h per day in moderate-and high-intensity care units^[24]. Similarly, other critical care societies like ACCM and the Society of Critical Care Medicine have also recommended that round-the-clock intensivist coverage is the ideal model for managing critically ill patients in the ICUs^[26].

Time of admission and discharge from ICU may also affect patient outcomes, with patients being admitted or discharged during "off-hours" having a worse outcome^[34,35]. During these "off-hours", ICU staffing may be reduced both in terms of numbers and expertise which may compromise patient care^[3]. Several studies have shown that a significant majority of patients are admitted to ICUs during off-hours^[28,36,37]. The presence of 24 h on-site intensivists ensure that high quality standardized care is always available to the patients, especially during the first few hours immediately after ICU admission, which is the most crucial time period affecting outcome^[28,37,38].

BARRIERS TO IMPLEMENTING INTENSIVIST COVERAGE

Even though there is abundant evidence showing improved patient outcomes in intensivists-based closed ICU models, and various critical care organizations have recommended this model to be implemented in all ICUs^[24,26], implementation of such high-intensity staffing is still inadequate even in developed countries^[3,39]. Even in the United States, more than half of ICUs do not have any intensivists coverage, and high-intensity coverage is present in a mere 26% of ICUs. The staffing pattern is even worse in medical ICUs and more so in smaller non-teaching hospitals. In addition, Leapfrog standards of intensivists staffing are maintained in only 4% of adult ICUs^[3]. A survey of Canadian ICUs also showed that dedicated overnight on-site physician coverage was available in only 60% of ICUs, and only 15% of ICUs had a trained ICU staff physician^[39]. Furthermore, they found that almost half of these physicians, who were present during the night hours, had less than 3 mo ICU experience^[39].

Several reasons for non-adherence to recommendations suggesting intensivists staffing have been proposed including acute shortage of trained ICU physicians, and anticipated high costs associated with 24 h on-site intensivist coverage^[4]. It is projected that the shortage of skilled ICU staff is to get worse in the coming years^[2] and hence, alternative measures to alleviate this shortage must be considered. Protocolized ICUs and telemedicine have been proposed to allow more efficient use of

the scarce skilled manpower and promote standardized care, especially in remote areas ensuring better clinical outcomes and better utilization of the hospital's financial resources^[40-42]. The issue pertaining to increased financial burden involved in employing intensivists to manage ICU patients may not be valid. Data suggest that implementation of the intensivists-based ICU model according to the Leapfrog group's standards can significantly reduce healthcare cost^[43], as adoption of this model may lead to more rational resource utilization by avoiding unnecessary ICU admissions, preventing and timely managing complications, reducing ICU length of stay, and promoting early discharge from ICUs^[18].

CONCLUSION

Critically ill patients not only require trained physician care but also require comprehensive ICU care involving a multi-disciplinary team. This team may involve the services of trained ICU nurses, respiratory therapists, physiotherapists, or pharmacists. The need to involve other specialists in the care of critically ill patients who have multi-system disorders cannot be overstressed. Hence, ICU teams may be designed using a multi-disciplinary approach with intensivists as in-charge of patient care and actively involving the primary physician and other specialists to ensure optimal patient care and better outcomes. ICU organization and staffing may depend on local factors and hospital policies, however all effort must be made to attain the goal of having round-the-clock on-site intensivists coverage to ensure continuity of care.

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