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ICU

# The intensive care unit work environment: Current challenges and recommendations for the future

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## Abstract

The need for critical care services has grown substantially in the last decade in most of the G8 nations. This increasing demand has accentuated an already existing shortage of trained critical care professionals. Recent studies argue that difficulty in recruiting an appropriate workforce relates to a shortage of graduating professionals and unhealthy work environments in which critical care professionals must work. **Objective:** This narrative review summarizes existing literature and experiences about the key work environment challenges reported within the critical care context and suggests best practices—implemented in hospitals or suggested by professional associations—which can be an initial step in enhancing patient care and professional recruitment and retention in our intensive care units, with particular emphasis on the recruitment and retention of an appropriately trained and satisfied workforce. The experiences are categorized for the physical, emotional, and professional environments. A case study is appended to enhance understanding of the magnitude and some of the proposed remedies of these experiences.

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## 1. Improving the intensive care unit environment

The need for critical care services and trained critical care professionals has grown substantially in the last decade in the G8 nations [1]. At the same time, health care facilities are experiencing difficulty in recruiting and retaining health care

professionals [2]. Issues include an aging workforce, the lengthy time to train professionals, and retention difficulties related to the “unhealthy” work environments these professionals are asked to work in [3,4]. In the appendix, 2 hypothetical intensive care units (ICUs) are described—one exemplifying some key work environment challenges and the second reflecting the implementation of best practices—already in place in some hospitals or suggested by professional associations—which may address deficiencies in existing ICU work environments. We suggest these strategies can be an initial step in enhancing patient care and professional recruitment and retention in our ICUs, with particular emphasis on the recruitment and retention of an appropriately trained and

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satisfied workforce. The experiences are categorized for the physical, emotional, and professional environments.

## 2. The physical environment

Although hospitals differ, the physical environment in many ICUs exhibits many “workplace stressors,” including unfriendly lighting, annoying noise, awkwardly placed equipment, and overcrowding. Visual and/or auditory alarms are built into almost all types of patient equipment, and they must be responded to. However, because such a large percentage of alarms are either false-positive or clinically insignificant, the plethora of alarms has been found to create a measurable and negative impact on the staff [5]. Coupled with a lack of distinct acoustic profiles for various ICU monitoring technologies, there may be a “cry wolf effect” [6]. Continual assault of an ICU staff with alarms is also believed to contribute to an environment of heightened stress and frustration levels for its workforce [7].

Additional challenges relate to improperly positioned equipment or monitoring devices that force the ICU workforce to bend, stretch, or even use a stool for access [8]. The ICU workforce also reports that “unfriendly lighting,” for example, bright fluorescent lighting and the absence of natural light are considered a “negative” aspects of their daily work environment [9].

The physical environment can accordingly provide risks to the physical and mental well-being of ICU professionals [10]. Some experts believe such risks lead to increased disability and absenteeism rates, as well as decreased workplace safety [8,11]. It must be recognized that some of these stressors are inevitable. Lighting must sometimes be overly bright, or overly dim, for good clinical reasons. Shortages of beds cannot easily be addressed by ICU personnel. Monitors must be often noisy if they are to be heard.

Other stressors are solvable, but only with difficulty, such as the limitations in physical space known to be a serious problem in many ICUs. These existing space issues are further aggravated by the need to accommodate the seemingly unremitting growth of new technology in the confined bed spaces that are typical of older hospital facilities. As ICUs frequently operate with less than the minimum space recommended [12], concern has been expressed that such examples of inappropriate unit design contribute to patient safety issues, one example is failure to meet the requirements of modern infection control guidelines. This latter issue was a significant concern in reviews of the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak in Canada [13].

Yet there are approaches that can improve matters, often while improving clinical care. For example, attention can be paid to how this equipment is deployed. The sheer number and entanglement of lines found around the bedside of a critically ill patient has the potential to elevate both the

number of hospital-acquired infections and medical error. One promising approach to exploring solutions for the ICU’s physical environment is through the science of human factor engineering. An ergonomically based redesign of patient care areas in the ICU, together with changes to its care delivery systems, could improve both the work environment and patient outcomes [14]. For such a redesign process to be successful, health care providers, architects, engineers, manufacturers, funders, regulators, accrediting bodies, researchers, and members of the public must work together to design convenient, safe, and functional patient care areas. A number of ICUs have done so already; we have much to learn from them. One suggestion is to work with those professional societies who represent the critical care workforce to design and disseminate solutions. Taking a leadership position in publicizing the sometimes harsh working environment of an ICU, together with a call for support of interdisciplinary research to study not only how to design new ICUs, but how to “retrofit” older ICUs to enhance their design in a way that is more conducive to the physical and emotional health of our critical care workforce, is something on which our critical care societies should easily agree.

## 3. The emotional environment of an ICU

Intensive care units provide services for the sickest of patients; the mortality rate in an ICU is greater than other areas of an acute care hospital. As a consequence, the ICU is often described as an emotionally charged atmosphere where life and death decisions are common and must be made with great rapidity. Intensive care units do excellent work, but, unlike in the movies, care is not always successful. Bad patient outcomes can affect providers, who are known to experience feelings of grief, fear of failure, and suppressed anger and frustration [15]. In addition, the critical care workforce must regularly balance conflicting feelings such as hope vs. realism, decisiveness vs. uncertainty, and compassion vs. professionalism. They want to be healers and dislike seeing patients and their families in distress. An additional source of stress originates from exposure to high levels of work intensity, which are typical of a busy ICU. Of particular importance is the high “on-call” demands and its impact on the well-being of ICU professionals, particularly medical residents and fellows. The underlying causes of “on-call” stress include chronic sleep deprivation, excessive, and unpredictable work loads, lack of opportunity for adequate consultation, and the need to take important decisions under excessive time constraints [16]. These could lead to various types of physical and emotional stress and were found to be associated with burnout, sick leaves, and suicidal thoughts [17].

Exposure to high levels of stress arising from the care process itself exerts a very real impact on the psychological and physiologic well-being of ICU staff, increases staff burnout and turnover rates, and influences the quality of care

provided to patients [8,18]. Working in an ICU can therefore be an emotionally exhausting experience that requires enormous effort and skill from its staff. In the absence of proper support and training, the ICU workforce might knowingly or unknowingly resort to denial, depersonalization, and/or avoidance behaviors [15].

Approaches suggested to address the emotional health of an ICU interprofessional workforce include attention to teamwork and communication; these may include formalized programs. Innovative initiatives to address the emotional concerns of staff may include relaxation procedures, role playing, behavioral training, and mental health promotion programs [19]. Maslach, Schaufeli, and Leiter [20] outline a number of individual-centered interventions including assertiveness and stress inoculation training; relaxation and meditation techniques; and training in time management, interpersonal and social skills. Leaders need to encourage workers to admit, and deal with, stress rather than attempt to ignore it. Organizational approaches to dealing with on-call stress may include limiting night shifts, shortening the work period, and monitoring the symptoms of work-related stress, especially in residents and fellows. In our view, these are important and doable interventions that ICU leadership and professional societies should move toward in the future.

#### 4. The professional environment

A “professional environment” is one that enables critical care workers to achieve personal satisfaction in their work and to reach their full potential, while being comfortable with conflict. Group cohesion, effective communication, autonomy, and supportive management are among the important distinguishing characteristics of such an environment [21].

Within the context of challenges briefly touched on in ICUs, effective communication and group cohesion are indispensable for critical care professionals to perform their jobs [22]. Support from coworkers, both physical and emotional, is invaluable. Team building is complicated because ICU personnel must regularly interact with different kinds of health care providers, each with separate and important knowledge, technical skills, and perspectives; it is important to respect the contributions of different providers.

Although autonomy, or “the freedom to act on what you know,” is often considered a key characteristic of a healthy professional environment, autonomy has its limits. Intensive care units exemplify the importance of teamwork, and effective collaboration requires appropriate respect for the contributions of each member within a framework of ensuring quality care. Creating a rewarding safety culture involves attention to systems; improvement is related to building a nonpunitive atmosphere, avoiding the “blame-and-shame” approach, and seeing where systems need to be changed.

Disagreements over different treatment approaches, philosophies, roles, and access to resources in the ICU are

also exacerbated by complex ethical issues around death and dying, workload pressures, how to involve a patient’s family members, and personal wishes of the patient. Left untreated, these issues will impede the development of effective teamwork and collaboration, thereby negatively influencing both patient outcomes and the well-being of the critical care workforce.

The consequence of failure to deal with these professional issues can lead to burnout, known to be related to prolonged exposure to high levels of stress. Burnout is associated with depersonalization, emotional exhaustion, and reduced feelings of personal accomplishment and can lead to turnover and to diminished performance; indeed, such aspects of an ICU’s work environment as ineffective communication and lack of group cohesion are also related to high staff turnover rates [23]. Signs of burnout include an inability to leave work, absenteeism, irritability, fatigue, decreased sense of personal accomplishment, and lower levels of job satisfaction [24].

Another significant consequence of burnout is medical error. Medical error can adversely influence such patient outcomes as mortality rates, disability at time of discharge, and hospital length of stay. The notion that medical errors should be attributed to staff incompetence and human error is no longer acceptable. Rather, avoidable medical errors are the result of multiple system failures, including long shift hours, excessive work load, lack of resources, and design flaws.

Fortunately, a significant part of burnout is amenable to preventive strategies. This requires effective interventions at both the individual and organization levels. Individual-centered interventions are necessary but not sufficient in decreasing professional burnout; effective interventions require ICU leaders to get involved at the organizational level by making improvements to the physical, mental, and professional practice environments and through building stronger multidisciplinary professional relationships [20,25].

Because of systemwide shortages of trained professionals, many ICUs must regularly cope with understaffing, excessive workloads, and overtime. Excessive workloads might well improve short-term productivity but often at the expense of increasing long-term costs for a health care organization [3]. Staff satisfaction improves with the commitment to ensuring “manageable” workloads and with employers committing to supporting and encouraging a balance of home and work life. A Canadian survey revealed that 50% of physicians do not feel that they have “balance in their lives” because of excessive work demands [2]. Pay levels cannot always compensate for these stresses. The literature suggests that empowerment could be achieved through activities such as allowing the workforce more freedom in setting their work schedule, in organizing team-training programs, and in providing regular academic career development opportunities for interested staff [26]. Successful ICUs in the

future will be those that provide multiple professional growth opportunities, thereby creating a “drawing card” for professionals in the workforce.

## 5. The elements of an attractive and rewarding ICU work environment

Intensive care units specialize in helping very sick people recover, and it is therefore not surprising that some ICUs are taking the lead in healing themselves. Critical care researchers, decision makers, associations, and societies are becoming increasingly involved in addressing the existing challenges to the physical, emotional, and professional environments of critical care professionals—reflected in the first example in the appendix—and are expanding our knowledge about how to create attractive and rewarding practice environments. Critical care leaders have before them an opportunity, indeed an obligation, to study and implement changes that would improve the work environments of our ICUs.

Of particular importance is the valuable role played by critical care professional associations and societies, who have identified improving work environments as a top priority, and have carried out and published a number of studies that aim at identifying the essential elements that would make such an environment attractive and rewarding. For example, the American Association of Critical Care Nurses (AACN) have identified 6 essential, evidence-based and relationship-centered, standards for establishing and sustaining a healthy work environment, including skilled communication, true collaboration, effective decision making, appropriate staffing, meaningful recognition, and authentic leadership [27]. Professional bodies, such as the Society of Critical Care Medicine and AACN, can help to build the resources needed to empower critical care organizations and professionals in the successful implementation of the identified healthy work environment standards.

Technology may provide some of the solutions. More widespread use of advanced technologies and reorganization of critical care services might also be nontraditional ways to deliver improved care, while simultaneously creating an attractive and rewarding environment for critical care professionals. Although some authors argue that the “ideal” ICU will be a closed unit, staffed 24 hours by dedicated intensivists, it must be anticipated that shortages in both human and financial resources required to implement such a model will necessitate thinking about alternative strategies for the organization and delivery of critical care services. As technology advances, the use of electronic enabling approaches, such as telemedicine and electronic ICUs, may play a greater role in providing a rewarding practice environment where appropriate care is delivered in a manner that supports a widely distributed

workforce. Attention also continues to be directed to the technological changes that will characterize future ICUs, such as “distance monitoring,” health informatics, communication networks, resource libraries, point of care tools, and real-time reporting/quality control systems [28,29].

The ICU work-life issues discussed in this review are not exhaustive. The significant achievements in the ICU quality of patient care and work environments that have occurred in the last 2 decades have not yet diffused to all hospitals, and change does not come easily in complex environments such as the ICU [30]. Fortunately, there is a strong “will to change” and thereby transform the environment in our ICUs to ensure high-quality patient care and a quality work-life that does not burn out talented providers. Our challenge to ICU leaders is to work with professional societies, governments, and funding agencies to create an agenda for change in the ICU workplace. Although not a “sexy” research or leadership agenda to some, improving the ICU workplace *is* the very core of our future.

## Appendix A. Diagnosing the problem: The current ICU environment in some of our hospitals

It is 0100 hours. The ICU has no empty beds but has just received a call from the emergency department requesting 2 more referrals. The rotating resident wants to further investigate Mr Smith in ICU bed no. 5, who had been admitted with a diagnosis of septic shock shortly after his return from the Dominican Republic; she suspects malaria and would like to obtain more information from the Centre for Disease Control and Prevention (CDC) through the internet, but the hospital network is “down.” The ICU fellow, who has been on duty since 3:00 PM, is paged to supervise a code on the surgical ward (4 floors up and at the opposite end of the hospital). The nurse climbs off a step stool she has to use to reach a patient monitor and narrowly escapes tripping over the dangling wires. She has a question about infection control procedures for a patient with tuberculosis, but the on-call physician is not answering his page, and in the absence of the fellow, it is unclear whom to ask. A second-year resident rotating to the ICU is still upset about a young patient who died unexpectedly the week before; she does not know how to handle these powerful emotions. A large yellow flashing light on top of the monitor bank at ICU bed no. 7 has been going off for half an hour, but it seems that everyone now assumes the alert has been attended to and everyone is ignoring it. The ICU fellow returns from the ward to seek an empty bed for the surgical patient whose code he had been called for; the arrest has been resuscitated, and the patient’s family is demanding that “everything be done” for this 95-year-old with severe dementia. “He is a vet” they say and “he deserves the best.” Laboratory results for Mrs Jones in ICU bed no. 10 cannot be retrieved, so the

resident decides to continue fluid resuscitation and reassess tomorrow. He hopes this is the right decision, but there is no one available to give better advice, and he has not eaten a hot meal for 4 days; he wants to go home.

## The ICU environment in the future

Saturday, December 11, 2016. It is 0100 hours. The ICU at Case Study Health Science Center has no empty beds and has just received a call from the emergency department about 2 possible referrals who are in unstable condition. The intensivist and charge nurse on duty determined the new emergency department patients will be placed in "acuity-adjustable beds" so that they will not have to be transferred if their condition worsens. Overhead, they hear an alert about a code on one of the surgical wards, and the intensivist makes a mental note to check his BlackBerry for a message from the Rapid Response/Outreach Team who will attend to it. There have been a few alarms through the night, but all required attention as determined by the computer system that also lets the attending physician see how, when, and by whom each one was handled.

Mr Smith in ICU bed no. 5 was admitted with a diagnosis of septic shock, having recently returned from the Dominican Republic. The primary care nurse and resident suspect malaria and use a kiosk located outside the patient's room to browse guidelines and evidence through the hospital intranet. The first-year resident, observing a patient at the other end of the hall, has a question about the hospital's standard procedures regarding infection control. He uses his Personal Digital Assistant (PDA) to quickly review a checklist that is provided on the hospital intranet.

The second-year resident, who is still upset about a young patient who died unexpectedly, drops by to see the full-time social worker based at the unit. The social worker is busy talking with a patient's family who are having trouble deciding on end-of-life care but makes an appointment with the resident for later in her shift.

The fellow needs to have an intravenous fluid inserted into a patient; because he knows that the staff nurse is very capable in this area, he immediately asks for her opinion on the case. As part of the routine discharge process, the nurse is doing medication reconciliation, matching medications and allergies on the electronic transfer orders to what the patient has been getting in the ICU.

Later that night, as he was preparing to sign out, the resident quickly and easily transfers the patient list and appropriate notes to the next shift via the electronic sign-out system. The new team is able to immediately see what's going on in the ward and what has happened through the night. At the end of the week, statistics and evaluations are generated for each shift, e-mailed to the members of the ICU team, and posted at the workstation to give feedback to the entire team.

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