

Critical Care [ALERT]

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SPECIAL FEATURE

Burnout in the Critical Care Workforce

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The burnout epidemic has plagued the medical profession for decades, with an escalating prevalence most recently fueled by the COVID-19 pandemic.^{1,2} The challenges that hospitals have faced with high patient volumes, critical staff and supply shortages, and their impact on workforce burnout now are well recognized. The pandemic has highlighted that the cost of burnout is not isolated to the individual providers, but also affects the quality of patient care, healthcare systems, and society at large.

The critical care workforce has been on the front line of the COVID-19 pandemic, and initial reports suggesting rising burnout rates in this community likely underestimate its scope and long-term impact.¹ This article summarizes our current understanding of how burnout is affecting critical care teams, including its influence on healthcare provider morale, well-being, and performance. We also will examine potential approaches to prevent and address burnout not only on an individual level, but more importantly,

within medical teams, organizations, and society as a whole.

DEFINITION AND BACKGROUND

Burnout is a syndrome of extreme exhaustion, depersonalization or detachment from work, and skepticism regarding personal accomplishment.² Exhaustion happens when what is demanded exceeds a provider's adaptive capacity, with a focus on the emotional repercussions that follow. The COVID-19 pandemic has amplified the demand for critical care not only in terms of volume of patients per provider, number of shifts, and work hours, but also in the emotional turmoil associated with increased morbidity, accumulating mortality, and constant uncertainty from this disease. This quickly can lead to emotional exhaustion, compassion fatigue, detachment, decreasing ability to empathize or engage, and apathy toward patient care. Callousness and treating patients as objects are associated with the most severe forms of depersonalization. A poor sense of personal

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accomplishment can manifest in a variety of ways, including feelings of helplessness, uselessness, decreased productivity, or a more widespread perception that patient care and professional accomplishments are worthless.

Other work-related conditions that often accompany burnout in healthcare include second victim syndrome and moral distress or injury. Stressful or traumatic work-related events, such as the loss of a patient, unanticipated outcomes, uncertainty, violent patient encounters, near-miss clinical incidents, or multiple difficult events over a short period, can put providers at risk of becoming a “second victim.” The emotional trauma that they experience from the event can include a sense of personal responsibility and failure, rumination and reliving the event, and second-guessing their knowledge and skills. Healthcare providers’ intrinsic values of altruism, compassion, and a desire to help often go along with a strong sense of ethics. When internal (e.g., professional self-doubt, lack of confidence) or external (e.g., scarce resources) barriers prevent the provider from taking the ethically appropriate course of action during clinical activities, moral distress and injury can occur. These situations can affect professional work and personal health, and, if left unaddressed, can lead to mental health issues including post-traumatic stress disorder (PTSD).

Resiliency is an important attribute that can help an individual recover or “bounce back” from these challenging situations, and the term grit often is used to describe one’s ability to persevere and “rise above” adversity.³ Initial efforts to combat burnout often focus on fostering these individual characteristics. Although this is important, experts emphasize that individual strategies alone without team- and system-level support are unlikely to combat healthcare worker burnout and its consequences effectively.⁴

SCOPE OF THE PROBLEM

Burnout is a mounting global healthcare crisis, especially for members of frontline medical teams.^{5,6} Prior to the COVID-19 pandemic, a systematic review of critical care physicians reported an overall burnout rate ranging from 6% to 47%, with a U.S. prevalence in the three burnout domains of

exhaustion, depersonalization, and reduced personal accomplishment of 61%, 44%, and 51%, respectively.⁷ A Mental Health America survey of 1,119 healthcare workers in 2020 found that 93% reported feeling stress and 76% reported burnout.⁸ From 2020 to 2021, critical care physicians have gone from 10th to first place in self-reported burnout based on a national survey.¹ Other members of the interprofessional intensive care unit (ICU) team also have been significantly affected. ICU nurses, for example, reported an increase in burnout rates from 58% to 72%.⁹

In addition to its negative effects on mental health and physical well-being, burnout can affect personal and professional relationships, work performance, teamwork, quality of patient care, and healthcare delivery scope and effectiveness. During the pandemic, physicians have reported an increase in unhealthy habits to cope with their symptoms of burnout, including isolating themselves from others, poor dietary choices, and substance use (alcohol, prescription drugs, smoking).¹ Burnout is associated with poor sleep quality, sleep disorders, mood and libido disturbances, memory impairment, anxiety, depression, and suicidal ideation.¹⁰⁻¹² From a professional perspective, burnout is associated with lower patient satisfaction, increased safety concerns, and an overall lower quality of care.¹³ In a 2021 Medscape physician survey, 10% of respondents felt that burnout was severe enough to consider leaving medicine despite their significant time and financial investment in training.¹ The resulting decreases in productivity and access and increased workforce turnover are estimated to cost healthcare systems between \$3,700 to \$11,000 per physician and approximately \$4.6 billion per year in the United States.¹⁴

DRIVING FACTORS OF BURNOUT

There are many interwoven factors that drive burnout. In general, they can be thought of in domains affecting the life and work of critical care providers, including personal, workplace, and organizational factors. Specific challenges identified in association with the COVID-19 pandemic are listed in Table 1.¹⁵

Younger age has been identified consistently as a strong risk factor for burnout.^{10,16,17}

Table 1: Healthcare Worker Challenges Associated with the COVID-19 Pandemic and Potential Healthcare System Solutions

Principle	Challenges	Solutions
Prepare Me	<ul style="list-style-type: none"> • Insufficient planning, communication 	<ul style="list-style-type: none"> • Dedicated training for frontline, additional staff • Agile leadership, staff quality improvement and empowerment
Support Me	<ul style="list-style-type: none"> • Negative work environment • Longer, more intense shifts 	<ul style="list-style-type: none"> • Appropriate staffing, team and system redesign • Individual, team behavioral support programs • Escalation process for clinical, ethical concerns
Protect Me	<ul style="list-style-type: none"> • Threat of occupational exposure 	<ul style="list-style-type: none"> • Sufficient supplies, protective equipment • Lean processes, safeguards
Care for Me	<ul style="list-style-type: none"> • Risk of illness to self, family 	<ul style="list-style-type: none"> • Organizational, financial support for sick leave, family care plans, medical expenses
Honor Me	<ul style="list-style-type: none"> • Disruption of work-life balance • Neglect of personal, family needs 	<ul style="list-style-type: none"> • Scheduling to allow for personal recovery • Support for caregiver responsibilities • Recognition, gratitude by leaders, peers

At-risk individuals often have limited social support, are single, are living without a family, and have lower income.¹⁸ The social disruption created by the COVID-19 pandemic has increased the risk of personal isolation and created new challenges for individuals with families and social networks. Long work hours have created concerns about childcare, and the threat of occupational exposure to the novel SARS-CoV-2 virus and personal protective equipment shortages have increased concerns for personal safety and the risk of infecting family members. Too often, the result has been physical isolation from loved ones for extended periods and stigma associated with some of the most common and effective coping strategies for work-related stress pre-pandemic, such as social interactions, family gathering, and traveling.^{1,19,20}

In the workplace, traditional drivers of burnout include the high patient acuity and turnover, regular contact with end-of-life care, long work hours, bureaucratic tasks that distract from clinical activities, workflow, and inefficiencies, including challenges navigating electronic medical records.²¹ The COVID-19 pandemic has magnified many of these issues, with drastic and unpredictable increases in workload and staffing challenges that have been exacerbated by illness and mandated quarantines. As a result, frontline healthcare workers have been forced to work longer hours and more shifts without appropriate rest, often with less control over their schedule, in a precarious working environment filled with supply shortages and challenging patient and family interactions driven by limited visitation policies and public misinformation.¹⁹ The uncertainty of best treatment practices, prolonged care requirements, and high morbidity and mortality associated with critical illness caused by COVID-19 all have added to the high risk of second victim syndrome. Patients and providers often suffer through these drawn-out, losing battles, and the lack of common critical care

resources such as oxygen and mechanical ventilation, rationing of usual care, and watching patients die alone as a result of infection control restrictions have only exacerbated the exposure to moral injury.^{17,19}

FIGHTING BURNOUT: AN EVIDENCE-BASED APPROACH

It has been more than 20 years since the Institute of Medicine (IOM) first identified medical error as a leading cause of death in the United States. Experts have proposed that the epidemic of burnout in healthcare is a significant contributing factor to this ongoing problem.⁴ Although burnout starts with individuals, the solution to this major and growing problem requires a coordinated, systematic approach and leadership commitment at the organizational level.¹⁸

A detailed summary of our current understanding of system level solutions and areas for future research can be found in a white paper issued by the National Academy of Medicine in 2019. This expert panel called for healthcare organizations to create a strong culture of support for healthcare workers through leadership commitment to burnout prevention and management, including regular monitoring of organizational prevalence using validated burnout risk assessment tools, rapid implementation of existing evidence-based solutions using established quality improvement methods, and dedicated resources to support research in needed areas.²⁰ Recently, the Critical Care Societies Collaborative summarized existing well-being initiatives among 74 professional societies.²¹ They also provided a series of specific recommendations for medical society responsibilities in this area, including the importance of supporting and sustaining member well-being, integrating well-being into everyday culture and society activities, and creating a safe environment for open discussion without fear of professional repercussions.

A more concise summary of recommended solutions to address the common challenges that interprofessional healthcare teams have faced during the COVID-19 pandemic is listed in Table 1. In addition to an emphasis on appropriate training, supplies, and support for personal and professional needs, strong bi-directional communication strategies and opportunities to participate in quality improvement to streamline workflow processes have been shown to strengthen staff engagement and reduce the risk of burnout. Specific burnout prevention efforts include leadership emphasis through policies, procedures, and role modeling; proactively addressing burnout triggers; fostering trust and mutual support among staff members; and providing restorative care programs.²² Efforts to address adverse outcomes and unanticipated events and to normalize second victim syndrome through peer support have been shown to be effective, sustainable, and cost-effective.²³ This transformation requires collaboration at every leadership level to make a meaningful commitment to the so called “quadruple aim”: enhancing patient experiences, optimizing population health, lowering costs, and improving the work life of healthcare providers.²⁴

Available evidence suggests that an adequate balance between stress and recovery is essential for humans to sustain a high level of performance. Although the best evidence in this area lies in appropriate staffing solutions and schedules that avoid long stretches of consecutive shifts, individual efforts to obtain adequate sleep, good nutrition, regular exercise, and stress management through mindfulness techniques and resiliency workshops remain a responsibility we all share. Prioritizing supportive relationships with team members, partners, coworkers, family, and friends is perhaps the best proven strategy to preserve individual resilience.²⁵

If the challenges confronting our critical care community as a result of the COVID-19 pandemic become our “new normal,” a deliberate and systematic strategy to address burnout may become the defining challenge of this generation of healthcare workers. However, this strategy must be informed by an appropriate level of organizational support and meaningful prospective trials that define the necessary system interventions, barriers, and facilitators to inform the necessary system-level changes to achieve the “quadruple aim.” It is important to note that most of the current evidence on burnout heavily focuses on physicians and nurses, but our multiprofessional ICU team members, including critical care pharmacists, respiratory therapists, and other ICU support staff, cannot be neglected. The next steps are challenging but achievable, provided we approach them with a unified effort. ■

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ABSTRACT & COMMENTARY

Attitudes Toward Hyperoxemia and Oxygen Therapy Among Nurses, Respiratory Therapists, and Physicians

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SYNOPSIS: Critical care clinicians, such as nurses, respiratory therapists, and physicians, have varying opinions regarding oxygen therapy and hyperoxia. Interdisciplinary education addressing current evidence of oxygen therapy and the potentially harmful effects of oxygen is warranted.

SOURCE: Curtis BR, Rak KJ, Richardson A, et al. Perceptions of hyperoxemia and conservative oxygen therapy in the management of acute respiratory failure. *Ann Am Thorac Soc* 2021;18:1369-1379.

Oxygen therapy is an essential component of the management of patients with acute respiratory failure. Although the use of supplemental oxygen is necessary, it is not without complications in some patient populations. Curtis et al sought to understand the perceptions of critical care providers (nurses, respiratory therapists, and physicians) regarding oxygen therapy for patients who require mechanical ventilation in the intensive care unit (ICU). Specifically, they assessed beliefs about hyperoxemia and barriers to implementing clinical practices that promote conservative oxygen therapy strategies.

Using a qualitative study design, the study team conducted semi-structured interviews of individual providers (n = 29) working in a general medical ICU of a community-based hospital and a trauma surgical ICU of an urban, academic hospital. Nurses (n = 10), respiratory therapists (n = 10), and physicians (n = 9, consisting of four critical care medicine fellows and five attendings) were enrolled in the study, since they are actively involved in the management of supplemental oxygen in patients requiring mechanical ventilation.

Three major domains were noted from the interviews: 1) perceptions of hyperoxemia, 2) attitudes toward conservative oxygen therapy, and 3) perceived barriers

to and facilitators of the implementation of conservative oxygen therapy. Regarding hyperoxemia, physicians were more familiar with the term and concept, particularly the potential for lung injury due to long-term exposure of high amounts of oxygen and oxygen free radicals. All providers seemed to be familiar with conservative oxygen strategies for patients with chronic obstructive pulmonary disease. Interestingly, some clinicians were clear that they would be more receptive to conservative oxygen strategies if clinical trials showed a clear benefit. Finally, there were concerns, primarily by nurses and respiratory therapists, about lower oxygen saturations and the added work burden associated with a conservative oxygen strategy that may increase the risk of hypoxia but have negligible patient benefit otherwise. All providers cited poor interprofessional communication as a barrier to implementing a conservative oxygen therapy strategy.

The authors noted that hyperoxemia is not a well-understood concept among critical care providers. Perhaps more concerning, this study indicates that the potential dangers of hyperoxemia are not universally understood among providers responsible for the management of supplemental oxygen. That said, they acknowledge conflicting evidence that complicates the matter and admit that the acceptance and

implementation of a conservative oxygen strategy likely is dependent on clear and consistent evidence supporting its use.^{1,2}

■ COMMENTARY

This study highlights the reality that some providers are unsure of the potential dangers of hyperoxemia. Perhaps the most salient point of these findings is that providers will remain uncertain of how to manage supplemental oxygen (hyperoxemia vs. normoxemia) until large, well-designed studies provide clear answers. In a review by Martin et al, the authors assessed the clinical effects of hyperoxia on patients who were critically ill. Evaluating the impact of hyperoxia on cardiovascular conditions, neurological conditions, respiratory failure, sepsis, and mixed ICU conditions, the authors note that hyperoxia has known harmful effects.³ That said, they also admit that questions remain in terms of how hyperoxia affects the clinical outcomes of critically ill patients.

This study has significant limitations, starting with the acknowledgment that the literature to support conservative oxygen strategies still is developing. There

also are some concerns about the generalizability of the study, since providers interviewed were from a single healthcare system, and it may not reflect institutions where respiratory therapists are nonexistent (e.g., some European countries). Importantly, this study recognizes interdisciplinary education as a way to improve awareness, address deep-seated beliefs, and support practice changes regarding practices such as oxygen management. For practice patterns to change (if the literature supports the change), all providers need to understand the intent of the practice change and the expectations of each team member. ■

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ABSTRACT & COMMENTARY

Medicare Sepsis Performance Measure Criteria Do Not Improve Outcomes

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SYNOPSIS: A longitudinal study of a single health system's adherence to and outcomes of Medicare Sepsis Performance Measures (SEP-1) did not show an improvement in mortality despite improvements in adherence to guideline-mandated care.

SOURCE: Barbash IJ, Davis BS, Yabes JG, et al. Treatment patterns and clinical outcomes after the introduction of the Medicare Sepsis Performance Measure (SEP-1). *Ann Intern Med* 2021;174:927-935.

The Centers for Medicare and Medicaid Services (CMS) began requiring hospitals to report data on compliance to the Severe Sepsis and Septic Shock Early Management Bundle (SEP-1) beginning in October 2015. This longitudinal study reports the effect of all-or-none adherence to the SEP-1 bundle within 11 hospitals comprising the University of Pittsburgh health system over a period of two years (2015-2017). SEP-1 has three- and six-hour bundles. The components of the three-hour bundle in patients with suspected sepsis include blood cultures drawn prior to antibiotic administration, antibiotic administration within three hours of sepsis identification, and baseline blood lactate levels. Additionally, if septic shock is identified at “time zero,” administration of a 30 mL/kg bolus of crystalloid is included in the three-hour bundle. The six-hour

bundle includes a recheck of lactate if initially elevated, a repeat assessment of tissue perfusion and volume status if treated for septic shock, and vasopressors for refractory hypotension (systolic blood pressure < 90 mmHg despite fluid resuscitation).

In this study, Barbash et al used electronic health record (EHR)-level data for adults hospitalized with community-onset sepsis, with time zero defined as the time that the first order for a body fluid culture was placed. Results of 54,225 encounters for adult patients with sepsis admitted through the emergency department were reported, approximately half of whom represent patient encounters prior to SEP-1 bundle implementation. From the EHR, the authors extracted the use of process measures in the SEP-1 bundle

pre-implementation (Q3 of 2015, prior to system-wide implementation) and used these measures to predict use of SEP-1 bundle measures in Q4 of 2017 if SEP-1 criteria had not been implemented. The statistical model that was generated assumed that if SEP-1 criteria had not been implemented, trends in intensive care unit (ICU) admission and mortality would have remained unchanged over the period from 2015 to 2017. Actual utilization of bundle measures in Q4 of 2017 then was compared to predicted utilization of measures in Q4 2017 if SEP-1 criteria had not been implemented.

Patient characteristics before and after bundle implementation were similar. This included demographic characteristics as well as severity of illness scores. There were variable changes in the adoption of measures. Rates of lactate measurement within three hours, 30 mL/kg crystalloid boluses, and antibiotic administration within three hours increased; use of vasopressors was unchanged. There were no meaningful (or statistically significant) changes in rates of admission to the ICU or mortality after implementation of SEP-1, even in a subgroup analysis of patients with septic shock. However, the authors did note the wide confidence intervals in terms of mortality and, as such, could not exclude the possibility of an important clinical effect.

■ COMMENTARY

Although adherence to individual components of a sepsis management bundle may have an impact on outcomes,¹ an all-or-none adherence to SEP-1 criteria has not been consistently shown to improve outcomes for either community-onset sepsis^{2,3} or hospital-onset sepsis.⁴

On the other hand, implementation of SEP-1-mandated measures may increase the prescription of unnecessarily broad-spectrum antibiotic therapy.⁵ The Infectious Diseases Society of America (IDSA) has expressed concern about the potential for SEP-1 criteria to drive unnecessary antibiotic use due to overdiagnosis of sepsis as well as the mandate for antibiotic therapy for suspected sepsis.⁶ This mostly is related to determination of when the clock begins for the three-hour and six-hour implementation windows. The authors of the IDSA position paper noted that a “time zero” definition of sepsis is not evidence-based and can vary widely depending on the provider.⁶

A meta-analysis of 17 observational studies assessed the impact of fluid and antibiotic bundles.⁷ All the included studies had a high risk of bias. Although bundles were associated with increased odds of survival, there was substantial heterogeneity of studies in this meta-analysis. The pooled analysis failed to demonstrate superiority of specifically timed antibiotic administration or a specific volume of fluid. Fluid therapy in sepsis is not without risk, as demonstrated by the landmark FEAST trial.⁸

Excess mortality due to cardiovascular collapse was found among children with septic shock who received a 20-40 mL/kg fluid bolus compared to those who were randomized to no bolus.

Over-reliance on protocols in the management of sepsis may lead to missed diagnoses. Clinicians may develop inertia with respect to patients presenting with sepsis, deferring to an all-or-none protocol and “boxes to be checked” approach, especially in busy emergency departments. Critically ill patients with sepsis deserve a careful assessment of physiology. Examples from clinical practice of patients who could worsen despite tight adherence to SEP-1 guidelines include those with unrecognized cardiogenic shock, severe aortic stenosis, left ventricular outflow tract obstruction related to systolic anterior motion of the anterior mitral leaflet, pulmonary embolism, adrenal insufficiency, abdominal compartment syndrome, and right ventricular failure. No benefit is expected, and harm may result in these scenarios with SEP-1-mandated fluid therapy. In all these scenarios, an increasing lactate indicates worsening tissue perfusion but not worsening sepsis. Given the overall low quality of evidence informing the utility of SEP-1 criteria, good-quality, individualized care remains the cornerstone of management of patients with sepsis and septic shock. ■

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CME/CE INSTRUCTIONS

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CME/CE QUESTIONS

1. **As defined by Maslach et al in 1981, what are the three classic domains of burnout?**
 - a. Depersonalization, desensitization, disillusionment
 - b. Desensitization, anger, low sense of personal achievement
 - c. Apathy, depersonalization, disillusionment
 - d. Emotional exhaustion, depersonalization, low sense of personal achievement
2. **Which of the physician specialties is associated with the highest rate of burnout according to the Medscape National Physician Burnout & Suicide Report 2021?**
 - a. Critical care
 - b. Urology
 - c. Infectious diseases
 - d. Rheumatology
3. **Which of the following is an effective organizational-level strategy for the prevention of burnout?**
 - a. Prioritize accurate documentation in the electronic medical records
 - b. Discourage leadership style that is too involved
 - c. Create a strong culture of support for healthcare workers through leadership commitment to burnout prevention and management
 - d. Require participation in well-being activities, such as mindfulness practice
4. **In the study by Curtis et al, which healthcare professional was more familiar with the term and concept of hyperoxemia?**
 - a. Respiratory therapists
 - b. Nurses
 - c. Physicians
 - d. All were equally familiar
5. **In the study by Curtis et al, which of the following perceived barriers to a conservative oxygen therapy strategy was cited by all professionals?**
 - a. Poor interprofessional communication
 - b. Inaccurate and limited available resources
 - c. Implementation climate
 - d. Marginal patient benefit
6. **Which of the following is a component of the three-hour SEP-1 bundle for sepsis management?**
 - a. Serum procalcitonin level
 - b. Serum erythrocyte sedimentation rate
 - c. Serum lactate level
 - d. Vasopressor administration

CME/CE OBJECTIVES

Upon completion of this educational activity, participants should be able to:

- identify relevant topics in the practice of critical care medicine;
- utilize recommendations from current clinical guidelines; and
- manage common critically ill patient and ICU administration scenarios.

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