

# ICU survivorship: What PAs need to know

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## ABSTRACT

The number of people surviving critical illnesses is larger than ever. Many of these patients will rely on physician assistants (PAs) to facilitate their care after discharge from the ICU. As a result, PAs must be able to recognize and treat the numerous short- and long-term challenges this vulnerable population faces, especially given the recent surge of critically ill patients resulting from the COVID-19 pandemic.

**Keywords:** ICU, survivor, critical illness, PAs, aging population, post-intensive care syndrome

## Learning objectives

- Recognize critical illness survival as a growing public health concern, especially in light of the COVID-19 pandemic.
- Identify signs and symptoms associated with PICS.
- Evaluate the recovery of ICU survivors and understand when to refer patients for additional services.

The number of ICU admissions is increasing each year at a rate that far outpaces population growth—a phenomenon likely secondary to the aging population. Although the number of critically ill patients is growing, so too is the number of patients surviving the critical phase of their illnesses. In fact, thanks to modern medicine, the majority of critically ill patients today survive through discharge, with an average ICU mortality of about 10%.<sup>1</sup> The combination of the increasing number of critically ill patients along with a decrease in ICU mortality means that the population of critical illness survivors requiring follow-up care is rapidly expanding, placing a considerable strain on the healthcare system. One study estimated that sepsis alone contributes to as many as 20,000 new cases of cognitive impairment each year, not to mention the physical



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disability that is common among these patients.<sup>2</sup> For this reason, some experts have gone as far as to claim critical illness survivorship as not only a “hidden public health disaster,” but also “the defining challenge of critical care in the 21st century.”<sup>2,3</sup> Given the unprecedented number of critically ill patients cared for during the COVID-19 pandemic, it is more important than ever to acknowledge the burden of critical illness survival.

With more patients leaving the hospital after an ICU stay than ever, clinicians must be able to recognize and treat post-ICU stay complications. Many are inter-related; therefore, the care of critical illness survivors is best approached holistically with a multidisciplinary team of medical, rehabilitation, nutrition, and mental health providers (Figure 1).

## POST-INTENSIVE CARE SYNDROME

The Society of Critical Care Medicine (SCCM) recommends transfer to an ICU for patients requiring advanced therapies such as extracorporeal membrane oxygenation, those who are clinically unstable (such as those in status epilepticus), and patients who are at significant risk for acute decompensation (such as respiratory failure with impending intubation).<sup>4</sup>

For decades, clinicians have observed that patients who have survived a critical illness face unique physical, emotional, and psychologic challenges, but formally studying and addressing these issues remains relatively novel. In September 2012, the Society of Critical Care Medicine (SCCM) facilitated the first meeting with the goal of composing specific recommendations to enhance the care of

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**Key points**

- Critical illness survivorship is a growing public health concern secondary to numerous factors including advances in medical science, the aging population, and the COVID-19 pandemic.
- Survivors of critical illness often face a diverse array of long-term physical, cognitive, and mental health symptoms. Clinicians must be able to recognize and treat these often-debilitating complications.
- The care of survivors of critical illness is best provided by a multidisciplinary team including medical providers, physical and occupational therapists, and mental health professionals.

comprehensive post-ICU clinics; however, there are too few, and they typically are based at tertiary academic medical centers.<sup>7</sup> Most patients discharged from the ICU will rely on their primary care and outpatient specialty care providers to provide appropriate treatment. All PAs must understand their roles in facilitating the recovery of patients who have survived a critical illness (Table 1).

Although the term PICS specifically refers to impairments in physical, cognitive, and mental health status, research has shown that these patients are at high risk for a wide variety of systemic complications and newly diagnosed chronic conditions. This article goes beyond the traditional definition of PICS and presents a systems-based approach for evaluating patients who have been discharged from the ICU.

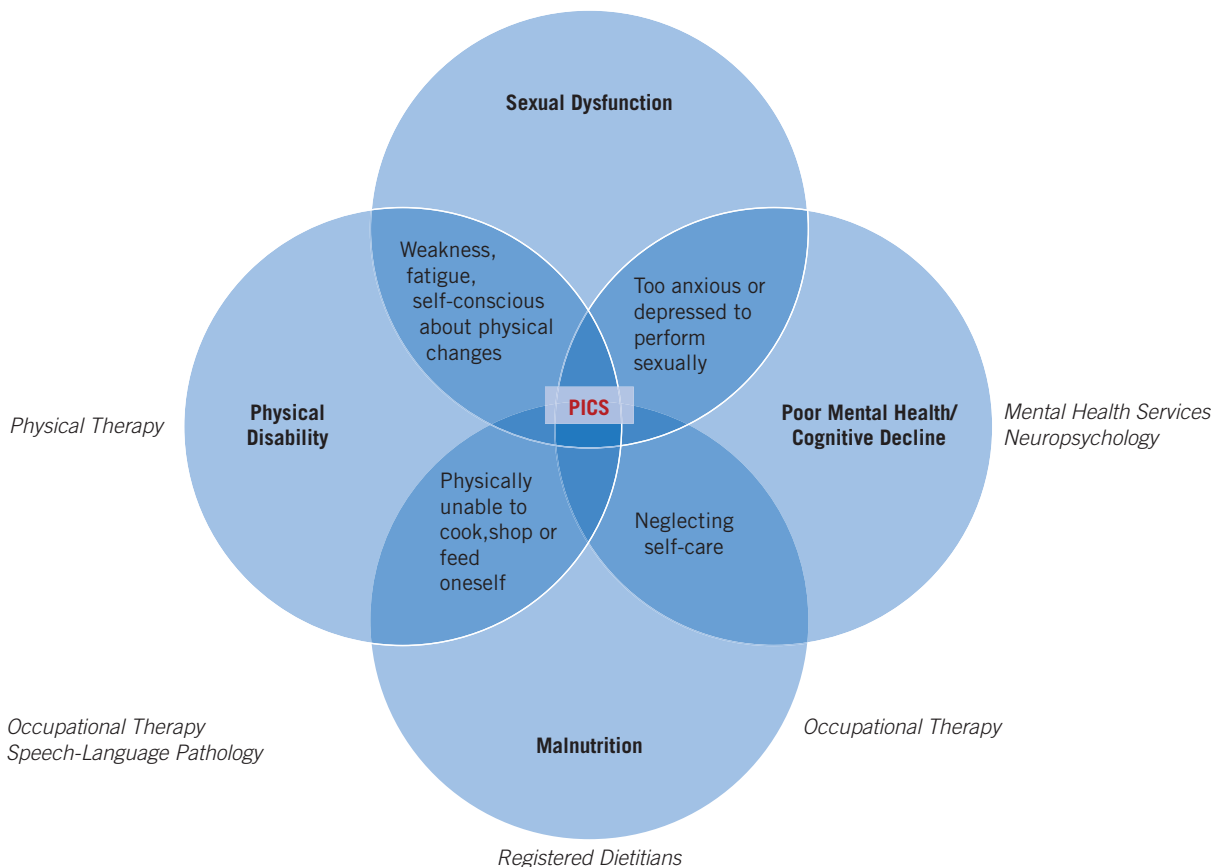
critical illness survivors. The term post-intensive care syndrome (PICS) was conceived at this meeting to describe “new or worsening impairments in physical, cognitive, or mental health status arising after critical illness and persisting beyond acute care hospitalization.”<sup>5</sup>

PICS is not rare. In fact, research demonstrates that most survivors of critical illness experience at least some features of PICS.<sup>6</sup> Unlike substance abuse or cancer survivorship programs, formal recovery programs for PICS remain largely experimental. Some institutions have developed

**NERVOUS SYSTEM**

**Cognitive decline** Among patients with PICS, the most commonly reported impairments are related to cognition, including problems with short-term memory, amnesia, executive functioning, and attention.<sup>6,8</sup> New cognitive impairment affects up to 75% of critical illness survivors, and often lasts in considerable and persistent damage.<sup>8</sup> Three months after ICU discharge, 40% of patients with cognitive decline display a level of dysfunction comparable to that seen with mild traumatic brain injury, and 26% of

**FIGURE 1.** Interdisciplinary management of PICS



patients have cognitive impairment similar to patients with mild Alzheimer disease.<sup>9</sup> Evidence is strong that critically ill patients who develop delirium are at greater risk for cognitive dysfunction after leaving the ICU.<sup>9</sup> PAs in critical care and hospital medicine should aggressively prevent and treat delirium in critically ill patients.

Prioritizing cognitive recovery after a course in the ICU is essential. Although few patients who survive a critical illness return to work, better cognitive function may be associated with decreased unemployment.<sup>10</sup> As appropriate, the clinician should monitor cognitive function over time with instruments such as the Montreal Cognitive Assessment (MoCA), and consider referral to occupational therapy (OT) for assistance with managing the effects of cognitive impairment on activities of daily living such as bathing or balancing a checkbook.

**Psychologic distress** Many survivors of critical illness experience memory disturbances and delusional beliefs about their ICU stay. Delusions of persecution and kidnap are common given the fact that these patients are often given sedating medications while they are tethered to restraints or other restrictive equipment.<sup>11</sup> Survivors of critical illness experience higher rates of PTSD and mood disorders compared with the general population.<sup>12,13</sup> New data even suggest that critical illness survivors may have an increased risk of suicide and self-harm compared with patients discharged from the hospital who never required an ICU stay.<sup>14</sup> Interestingly, most survivors of critical illness who satisfy criteria for depression report physical symptoms such as fatigue and loss of appetite more often than affective symptoms such as tearfulness or feelings of failure, suggesting that these patients may be better served by physical therapy (PT) than cognitive-behavioral therapy.<sup>12</sup> This is consistent with data that physical rehabilitation improves psychologic symptoms following discharge from the ICU.<sup>9</sup> PAs should not delay screening critical illness survivors for mental illness; they should refer patients to mental health services as needed. However, in light of the strong connection between psychologic and physical symptoms in this population, PT may be an important part of the psychologic recovery process as well.

Although the psychologic effect of critical illness on patients can be immense, family members also may be traumatized by the experience. PICS-family (PICS-F) refers to acute or chronic psychologic distress caused by a family member's time in the ICU.<sup>15</sup> SCCM offers a myriad of resources to guide patients and families through the critical illness recovery process.<sup>16</sup> PAs should familiarize themselves with these resources and provide them to patients as needed.

The COVID-19 pandemic added an additional layer of psychologic trauma to an ICU stay for patients and relatives. Because many hospitals did not allow (and may still be restricting) even immediate family members to visit inpatients, many patients have been left feeling more isolated than ever. ICU diaries, which are journals written

**TABLE 1. Clinician roles in constructing patients' plans of care**

- Manage recommendations from each specialist and clinician, review final plan with patient/family
- Review and interpret 6-minute walk and spirometry results
- Screen for anxiety, depression, and PTSD
- Provide therapeutic dialogue with referrals to assist with ongoing therapy
- Medication reconciliation
- Review and address vaccine status
- Address employment status
- Provide support for individuals involved in care
- Tracheostomy, wound care, and nutritional education as indicated
- Review level of independence for activities of daily living
- Access durable medical equipment and follow up with home health services as indicated
- Ensure services planned at discharge are received

Adapted with permission from Huggins EL, Bloom SL, Stollings JL, et al. A clinic model: post-intensive care syndrome and post-intensive care syndrome-family. *AACN Adv Crit Care*. 2016;27(2):204-211.

by staff members for ICU patients while they are sedated or delirious, are a useful tool for patients and family members trying to piece together the timeline of an illness. They also may help patients make sense of what has happened to them.

**Neuromuscular dysfunction** Muscles and nerves frequently are damaged by the physiologic derangements of a critical illness.<sup>17</sup> ICU-acquired weakness is a form of neuromuscular dysfunction found in as many as 80% of critically ill patients.<sup>18</sup> Notable risk factors include immobility, sepsis, glucose dysregulation, and use of corticosteroids or neuromuscular blocking agents.<sup>19</sup> Although ICU-acquired weakness likely represents an overlapping spectrum of neuromuscular dysfunction, it typically is classified into one of three groups based on clinical and electromyographic (EMG) features: critical illness polyneuropathy (distal, symmetric sensory and motor polyneuropathy that affects limb, respiratory, and autonomic nerves), critical illness myopathy (limb and respiratory muscle weakness with preserved sensory function), or a combination of the two known as critical illness polyneuromyopathy.<sup>18</sup>

Many patients with ICU-acquired weakness continue to have neuromuscular dysfunction on hospital discharge, and some patients suffer from long-term, severe disability.<sup>20</sup> The rehabilitation process often begins during the acute hospitalization, but many patients require continued care after discharge. Recovery often is long and arduous. In the first year after ICU discharge, patients with ICU-acquired weakness are transferred an average of five times among acute care and long-term care hospitals, inpatient rehabilitation facilities, skilled nursing facilities, and home, demonstrating that physical functioning and medical stability fluctuate throughout the course of recovery.<sup>19</sup>

A growing body of evidence suggests that early PT maintains muscle strength and can improve physical function in critically ill patients.<sup>18</sup> PAs in critical care and hospital medicine can accelerate rehabilitation by advocating for early PT and OT during the patient's acute hospitalization. PAs in outpatient settings can assist their patients by facilitating communication between PT, OT, and physical medicine and rehabilitation providers to ensure that patients are receiving appropriate services throughout their recovery.

## RESPIRATORY SYSTEM

Many patients admitted to the ICU require advanced respiratory support, including endotracheal intubation and mechanical ventilation. In addition to patients admitted to the ICU with a diagnosis of respiratory failure secondary to a primary lung pathology, many patients in the ICU develop acute respiratory distress syndrome (ARDS), a severe form of acute lung injury. Also, many patients experience respiratory muscle weakness as a result of ICU-acquired weakness.

As a result, continued monitoring of respiratory status in survivors of critical illness is crucial. Screen patients frequently for respiratory insufficiency via spirometry and the 6-minute walk test, and refer patients to pulmonology as indicated.<sup>21</sup>

## CIRCULATORY SYSTEM

**Cardiovascular complications** Few publications have reported cardiovascular outcomes following critical illness. However, a recent study established that critical illness survivors are at high risk for developing a variety of new chronic conditions in the year following discharge from the ICU, and that hypercholesterolemia and heart disease are the two most prevalent new diagnoses.<sup>22</sup> Maintain a high index of suspicion for cardiovascular disease in patients who have recently been discharged from the ICU in order to facilitate prompt diagnosis and treatment of heart disease in this high-risk population.

**Hematopoietic dysfunction** Anemia is exceedingly common among critical illness survivors because of factors such as frequent blood draws, systemic inflammation, and nutritional deficiencies.<sup>23</sup> Because low hemoglobin generally is well tolerated by critically ill patients and red blood cell (RBC) transfusions pose significant risks, patients in the ICU typically do not receive RBC transfusions unless their hemoglobin level is below 7 g/dL. Although this restrictive transfusion strategy reduces the need for transfusions during ICU stays, anemia often persists or worsens after discharge.<sup>24</sup> About 11% of patients require RBC transfusions after leaving the ICU.<sup>24</sup> PAs should not hesitate to order anemia studies including CBC count, iron panel (iron, ferritin, total iron-binding capacity, transferrin), and reticulocyte count in patients who have recently been discharged from the ICU, especially when they present with symptoms such as dyspnea or fatigue.<sup>25</sup>

## ENDOCRINE SYSTEM

In the year following an ICU stay, survivors of critical illness are more likely to be diagnosed with diabetes than the general population, a phenomenon likely related to stress-induced hyperglycemia (a common occurrence in the ICU).<sup>22</sup> Stress-induced hyperglycemia, like gestational diabetes, presents as a period of glucose intolerance that resolves with resolution of the physiologic stress.<sup>26</sup> However, just as gestational diabetes was once considered a temporary state during pregnancy, stress-induced hyperglycemia may double a patient's risk of developing diabetes down the line.<sup>26</sup> As a result, survivors of critical illness, particularly those whose course was complicated by stress-induced hyperglycemia, should be screened for diabetes, because early interventions can reduce progression to type 2 diabetes.<sup>26</sup>

## GENITOURINARY SYSTEM

Sexual dysfunction is an important, yet often overlooked, long-term complication of critical illness. Nearly half of patients are dissatisfied with their sex life following an ICU stay, for reasons such as changes in physical appearance or function (for example, a new colostomy, scars, changes in weight), pain, fatigue, and psychologic distress.<sup>27</sup> Sexual dysfunction has been shown to decrease overall quality of life and place strain on interpersonal relationships, and is an important part of the outpatient evaluation of critical illness survivors.<sup>28</sup> Many of these patients will decline specialist referral for management of sexual dysfunction when offered, likely because it is a lower priority compared with other concerns such as a new disability.<sup>27</sup> However, it is important to screen these patients routinely for sexual dysfunction so that those who are interested in further treatment can receive appropriate care. Additionally, consider referral to mental health services for patients whose sexual dysfunction is likely secondary to psychiatric distress.

## DIGESTIVE SYSTEM AND NUTRITION

Numerous factors influence the nutritional status of critical illness survivors. These include psychologic causes such as anxiety, low mood, and social isolation as well as physical factors such as decreased appetite, early satiety, pain, and ICU-acquired weakness.<sup>29</sup> Unfortunately, this often leads to malnutrition and inadequate energy intake to support recovery following an ICU stay.<sup>29</sup> Inadequate nutrition should be taken seriously because malnourished patients are at a significantly increased risk for post-ICU mortality.<sup>30</sup> Support the nutritional needs of these patients by closely monitoring for weight loss and facilitating intensive support with a multidisciplinary team as needed. This team may include OT for feeding, speech-language pathology for swallowing, and a dietitian for a specific dietary plan.<sup>19</sup>

## INTEGUMENTARY SYSTEM

Patient complaints of hair loss may seem insignificant to clinicians; however, of all the complications of critical illness



this may be among the most distressing to patients. Several different types of alopecia have been reported following an ICU stay, including telogen effluvium, pressure alopecia, and traction alopecia.<sup>31</sup> This is likely related to both massive psychologic stress and severe multisystem illness.<sup>31</sup> One study found that 36% of patients report continued hair loss 3 months after ICU discharge, highlighting the need for PAs to educate patients that hair loss following a critical illness is common.<sup>31</sup> If hair loss persists or is causing significant distress, consider referral to dermatology for more extensive evaluation and treatment.

## CONCLUSION

Patients who survive a critical illness often suffer from a host of long-term obstacles that can significantly hinder quality of life. Clinicians should provide patients with anticipatory guidance about what to expect after ICU discharge and provide support and encouragement throughout recovery. Ideally, PAs in primary care and hospital medicine should counsel patients about their goals of care early on in a disease course, long before admission to an ICU is ever needed, to ensure that any aggressive, unwanted interventions are avoided. **JAAPA**

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