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Postacute Sequelae of COVID-19 Critical Illness



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KEYWORDS

- Postacute sequelae of SARS-CoV-2 • Postintensive care syndrome
- Post-acute COVID-19 syndrome • Post-COVID-19 programs • Long COVID

KEY POINTS

- Many survivors of COVID-19 critical illness will experience long-term impairments in physical, mental, cognitive, social, and financial health
- The sequelae of COVID-19 critical illness overlap considerably with postintensive care syndrome; existing knowledge of postintensive care syndrome can serve as a useful framework for approaching patients with COVID-19 recovering from critical illness
- Evaluation and management of postintensive care syndrome and postacute sequelae of COVID-19 critical illness require a multidisciplinary approach
- Post-ICU clinics offer opportunities for quality improvement and research that may improve the care of patients while they are in the ICU

INTRODUCTION

Coronavirus disease 2019 (COVID-19) has claimed over 4 million deaths worldwide¹ and has created an unprecedented burden on intensive care units globally.² Much of the dialogue surrounding the pandemic has centered on mortality, which has been as high as 50% in critically ill patients.³ However, most patients will survive acute illness from COVID-19, and survival, despite being a desired outcome, is also fraught with challenges. Initial reports from Italy, France, and the United States suggest that 66% to 87% of hospitalized patients with COVID-19 have symptoms that persist after hospital discharge.⁴⁻⁶ The term “long COVID” has helped to raise awareness of the postacute sequelae of SARS-CoV-2 infection (PASC) and the potentially long-lasting health consequences that can stem from acute illness. Particularly in patients surviving COVID-19 critical illness, survival will not equate to recovery, and understanding and addressing the long-term needs of survivors is a societal imperative. While PASC has been reported even among patients who were not critically ill or hospitalized, this review focuses on PASC in patients surviving COVID-19 critical illness.

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Postintensive care syndrome (PICS), defined as new or worsening impairments in mental, cognitive, or physical health following critical illness,⁷ affects nearly all ICU survivors at the time of hospital discharge, and continues to impact more than half of these patients 1 year after discharge.⁸ This syndrome has been studied and described for over a decade and can serve as a useful framework for approaching patients surviving COVID-19 critical illness who continue to have impairments in the postacute setting. In this review, we describe PICS—and what this can tell us about PASC in the critically ill.

CLINICAL MANIFESTATIONS OF POSTINTENSIVE CARE SYNDROME AND POSTACUTE SEQUELAE OF SARS-CoV-2 INFECTION IN THE CRITICALLY ILL

Due to medical, scientific, and technological advances in the last several decades, survival rates of patients with ICU have increased dramatically.^{9,10} This rise in survivorship coupled with an aging population have created a growing cohort of patients suffering from varied long-term consequences of critical care.^{11,12} In recent years, there has been a growing body of literature outlining the long-term sequelae of an intensive care unit (ICU) stay (Fig. 1).¹³ While the 3 major components of PICS—deficits in mental, cognitive, or physical health—are illustrated individually, a complex relationship exists between each domain, with a single impairment in any one domain influencing the others,^{8,14–16} and often coexisting with the others.^{17,18} The clinical manifestations, incidence, and risk factors for each component are first described, and then compared with our existing knowledge about these symptoms in PASC.

Cognitive Impairment

In terms of cognitive functioning, critical illness can lead to new and clinically important cognitive impairments regardless of age, coexisting disease, and preexisting conditions, often mirroring the degree of impairment seen in Alzheimer's dementia.^{19,20} Patients who have experienced delirium in the ICU are at particularly high risk for long-term cognitive impairment.¹⁹ The areas of cognition most commonly affected include attention, concentration, mental processing speed, memory, and executive function, with dysfunction in the latter 2 prevalent in 35% of ICU survivors at 3 months.^{21,22} In turn, this places patients

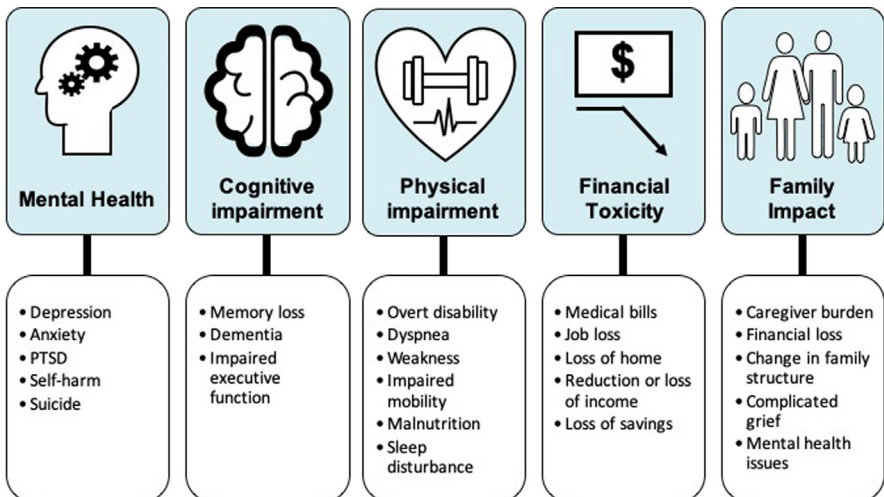


Fig. 1. Common sequelae of critical illness in both COVID-19 and non-COVID-19 survivors.

at higher risk for disruptions in medication adherence and appropriate follow-up, and acts as a major obstacle in returning to premorbid levels of socioeconomic functioning.^{12,22,23} A number of factors unique to COVID-19 ICU survivors increases their risk for cognitive impairment. Frequently, they are mechanically ventilated and on high amounts of sedation.²⁴ Additionally, they have experienced critical illness with the added burdens of social isolation due to infection control measures; lack of family visitation has been identified as an independent risk factor for ICU delirium.²⁵ Consequently, cognitive deficits have been described as some of the most common and debilitating long-term sequelae in patients with PASC, with decreased concentration, memory concerns, and cognitive impairment reported in a median of 24%, 19%, and 17% of patients, respectively.²⁶

Physical Impairment

The spectrum of physical impairment in patients with PICS is wide, with up to 80% of patients experiencing a new physical dysfunction at the time of discharge.^{27,28} These include critical illness neuropathy (CIN), critical illness myopathy (CIM), cachexia, fatigue, dyspnea, impaired pulmonary function, decreased exercise tolerance, sexual dysfunction, and respiratory failure.^{29–31} Functionally, patients are believed to lose as much as a kilogram of lean body mass (LBM) per day, which predisposes to muscle weakness and related physical impairments that can persist for months to years.^{11,32,33} ICU-acquired weakness, defined as neuromuscular dysfunction with no plausible cause other than critical illness and its treatments, is thought to originate from CIN, CIM, or a combination of the two.^{31,34} While the prevalence varies widely based on patient population, risk factors, and methods used for diagnosis, it is believed that 43% of patients in the ICU suffer from this complication, which is associated with both hospital mortality and long-term mortality, with decreased survival seen in patients up to 5 years later.^{35,36} Consequently, patients have difficulties performing their daily activities with persistently lower health-related quality of life (HRQL) measures when compared with age matched norms.^{37,38}

In areas hit hard by the pandemic, ICU staffing shortages may contribute to limited patient mobilization, a preventative measure known to reduce the risk of ICU-acquired weakness.³⁹ Indeed, the receipt of care in overwhelmed and understaffed hospitals has been associated with adverse outcomes.^{25,40} Other risk factors for long-term physical sequelae of critical illness in COVID-19 survivors include frequent use of prone positioning and arterial line placement, which can each increase the risk of neuropathy.⁴¹ Corticosteroids and prolonged use of neuromuscular blocking agents, which are prescribed to treat COVID-19 pneumonia and manage severe acute respiratory distress syndrome, respectively, further increase the risk of CIM when used in combination.^{42,43}

Psychological Impairment

The psychological sequelae of PICS are estimated to occur in up to a third of survivors, with PTSD, depression, and anxiety as the predominant conditions.^{13,44} While it can be situational for some, others have symptoms that persist for months to years after discharge, disrupting daily functioning and reducing overall quality of life; ICU survivors also have a higher incidence of suicide and self-harm when compared with hospital survivors who never required ICU admission.^{45,46} The psychological sequelae extend beyond the patient to those in the family as well, collectively known as PICS-Family (PICS-F).⁷ Having a critically ill family member has been shown to have profound effects on relatives, with over two-thirds reporting anxiety or depression when visiting their loved ones, and 30% suffering from anxiety, depression, or PTSD beyond discharge.^{47,48} Further, the complex interactions of the various domains

of PICS, as outlined above, amplify the burden on patient's families as well as dramatically increase the cost for health care systems.^{49,50} Patients with COVID-19 have similarly been found to have high rates of PTSD, anxiety, depression, and insomnia, likely due to both disease-specific and pandemic-related factors including stigmatization, social isolation, and media sensationalism, among others.⁵¹ Existing studies suggest that approximately 30%, 20%, 13%, and 27% of COVID-19 survivors suffer from anxiety, depression, PTSD, and insomnia, respectively.²⁶

As PICS has profound effects across mental, cognitive, and physical domains, a first step involves recognizing the comorbidities that predispose to developing it in the first place. To date, there have been many studies evaluating the risk factors associated with PICS, although the mechanisms continue to be poorly understood. While certain risk factors are preexisting and thus nonmodifiable, others are ICU-specific, and thus have the potential to be optimized (Fig. 2).^{13,52–54} For example, delirium, which is associated with increased mortality, ICU length of stay, and long-term cognitive impairment, may represent one modifiable risk factor.^{12,55–57} As such, multicomponent ICU-level strategies, such as the “ABCDEF bundle,” have been used with success.^{12,56} This systematic method of pain assessment, both spontaneous awakening and breathing trials, choosing safe and effective medication regimens for managing pain and agitation, delirium monitoring, exercise/early mobility, and family engagement, has been shown to reduce the amount of sedative use, duration of

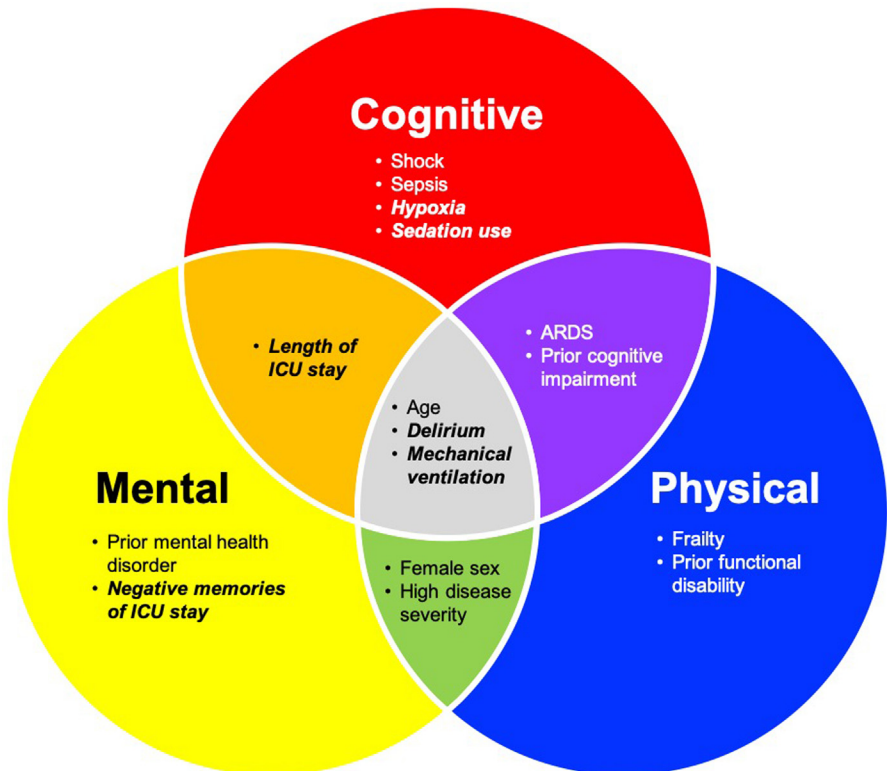


Fig. 2. Risk factors associated with PICS. Each circle represents the PICS domain associated with each risk factor. Those in *italics* represent potentially modifiable risk factors; others are pre-existing.

delirium, and ICU length of stay.^{58–60} With the COVID-19 pandemic bringing a growing number of patients to the ICU, it is becoming increasingly imperative to identify additional modifiable risk factors for PICS so that new preventative interventions can be developed in the future.

Health Care Utilization and Disability

While symptoms of PICS may improve over time, survivors of critical illness still face a number of long-term challenges, including increased mortality, rehospitalization, reduced quality of life, and financial loss. A study of US Medicare beneficiaries comparing ICU survivors to age, sex, and race-matched controls from the general population found that ICU survivors have increased mortality at 3 years (39.5% vs 14.9%)⁶¹; similar findings were seen in Dutch⁶² and Scottish⁶³ cohorts. Long-term mortality in mechanically ventilated ICU survivors is markedly increased, with rates of 41% to 58% reported in multicenter cohorts.^{61,64,65} Similarly, health care utilization, including hospital readmission, increases after critical illness. In an observational study comparing health care utilization among ICU survivors before and after critical illness, ICU survivors in the year following critical illness were found to have an increase in outpatient visits, emergency department visits, and hospitalizations of 8%, 33%, and 60%, respectively, when compared with the prior year.⁶⁶ Expectedly, postdischarge health care costs are also greater than costs in the year before critical illness. Less predictably, health care costs can remain increased from baseline for up to 5 years following discharge.⁶³

Functional status and HRQL also suffer after critical illness.^{67–74} At least partial disability in activities of daily living is seen in one-fifth of previously independent individuals 1 year after discharge.⁶⁹ Frailty, which is associated with new-onset disability,⁷⁵ is also common among survivors of critical illness. In a recent multicenter study, transition to a state of increased frailty occurred in 40% of ICU survivors at 1 year, including 23% of patients who were not frail at baseline.⁷⁶ Likewise, HRQL is worse in ICU survivors compared with population norms. However, it remains unclear to what degree post-ICU HRQL is a reflection of premorbid quality of life. HRQL has also been found to improve over time, particularly during the first year following ICU discharge.^{68,71–73}

Patients with COVID-19 similarly suffer from increased health care utilization and risk of death, with estimates suggesting a 1 in 5 risk of readmission and a 1 in 10 risk of death among hospitalized COVID-19 patients in the first 60 days after discharge.⁷⁷ Beyond readmission and death, survivors also have decreased HRQL, increased outpatient health care visits, and increased pharmacotherapy utilization of opioid pain medications, antidepressants, anxiolytics, and more.^{78,79}

Social and Financial Considerations

The COVID-19 pandemic has brought increased attention to the role of socioeconomic status in critical illness. Indeed, lower socioeconomic position and social vulnerability are associated with increased risk of critical illness and death from COVID-19 infection.^{80,81} However, an inverse relationship between socioeconomic position and health outcomes in ICU survivors has previously been established, with lower socioeconomic position associated with increased risk of long-term mortality and reduced HRQL.^{82,83}

Just as socioeconomic status affects outcomes in the critically ill, critical illness itself has an impact on subsequent social and economic outcomes. Job loss and delayed return to work are common after critical illness, likely a result of post-ICU impairments. Of patients who were previously employed, only 56% to 60% return to work 1 year after critical illness, and one-third remain jobless after 5 years.^{84,85} While the long-term work implications in critically ill COVID-19 survivors are still being

investigated, preliminary evidence suggests similar findings, with less than half of patients surviving COVID-19 critical illness returning to work at 3 to 4 months after discharge.⁷⁹ Consequently, loss of income is common, reported in 71% of ICU survivors in the year following critical illness,⁸⁶ as are other elements of financial toxicity, such as loss of health care coverage, depletion of savings, and medical bills.^{86–88} Family structure and roles may be also altered, as one-quarter of ICU survivors report needing a caregiver 1 year after critical illness. The vast majority of care is provided by family members, half of whom report a resultant negative impact on employment.^{89,90}

EVALUATION OF POSTACUTE SEQUELAE OF SARS-CoV-2 INFECTION IN SURVIVORS OF CRITICAL ILLNESS

While limited evidence exists to inform the optimal evaluation of PASC, significant experience in the post-ICU arena can help guide these efforts.⁹¹ Indeed, to evaluate for PICS and the constellation of downstream effects outlined above, post-ICU clinics have been developed.⁹² Guidelines from the United Kingdom recommend that all adults who have stayed in an ICU for more than 4 days be followed after discharge, though implementation barriers have hampered widespread adoption of this policy in the UK and elsewhere.⁹³ As many patients transfer first to facilities such as skilled nursing facilities or acute rehabilitation units before discharging to home, coordinating the ideal timing of the first post-ICU visit can be challenging. Consensus guidelines recommend an assessment 2 to 4 weeks after hospital discharge.⁹⁴

Experience from centers specializing in post-ICU care suggests that a discharge navigator can be particularly useful in identifying and recruiting eligible patients,^{95,96} and may be associated with decreased readmission rates and decreased loss to follow-up.⁹⁶ The navigator role may be filled by one of many different providers, including nurse practitioners, social workers, respiratory therapists, or case managers. In this role, the provider can connect with patients while still hospitalized, schedule and share information about the post-ICU clinic visit, and serve as a point of contact for the patients and their families as they navigate the transition out of the hospital. In settings where access to post-ICU follow-up may be more limited, navigators may choose to screen for risk factors to identify patients at particularly high risk for PICS and prioritize these patients for follow-up.

To address all of the components of PICS, post-ICU clinics are typically composed of a multidisciplinary team. Providers have debated which medical specialty is best equipped to lead these clinics (ie, intensivists vs rehabilitation specialists), yet this debate seems to only further highlight the importance of the interdisciplinary approach.^{97,98} We believe it is important to incorporate an ICU provider in the clinic, as studies suggest that this can facilitate longitudinal care delivery for patients, circle back to improve processes for future patients in the ICU, and reduce ICU staff burnout.^{92,99,100} In addition to an intensivist, a number of other clinicians typically comprise the multidisciplinary team, including a specialist to assess for physical debility (eg, a physical therapist, physiatrist, and/or respiratory therapist), psychological sequelae (eg, a psychologist and/or social worker), and cognitive impairment (eg, an occupational therapist, speech/language pathologist, or neurocognitive specialist). Additional team members may include a pharmacist, nutritionist, chaplain, case manager, or palliative care specialist.

During the clinic visit, standardized tools should be adopted to systemically evaluate PICS and track progression over time (Fig. 3). Although further research into the optimal assessment tools are needed, guidelines have been developed based on expert opinion.^{94,101} Current guidelines recommend using the Hospital Anxiety

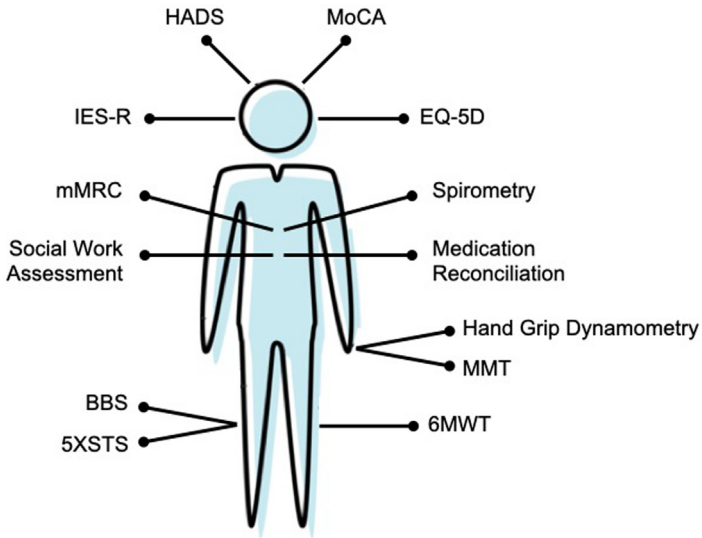


Fig. 3. Outpatient evaluation of PASC in survivors of critical illness. HADS, Hospital Anxiety and Depression Scale; MoCA, Montreal Cognitive Assessment; IES-R, Impact of Event Scale-Revised; EQ-5D, EuroQol-5D; mMRC, Modified Medical Research Council; BBS, Borg Balance Scale; 5XSTS, Five Times Sit-to-Stand; MMT, Manual Muscle Testing; 6MWT, Six-Minute Walk Test

and Depression Scale (HADS) to assess for anxiety and depression, as well as either the Impact of Events Scale-Revised (IES-R) or the shorter IES-6 to evaluate for post-traumatic stress disorder.^{94,101} While expert consensus has not been reached regarding the optimal cognitive screening tool, the Montreal Cognitive Assessment (MOCA) or MOCA-Blind may be used to screen for cognitive impairment.⁹⁴ To evaluate for physical and pulmonary function, the Society of Critical Care Medicine suggests using the 6-minute walk test⁹⁴; our center also uses bedside spirometry and the Modified Medical Research Council dyspnea scale as further assessments of pulmonary function. Some experts also suggest further evaluation of ICU-acquired weakness, including CIM and CIN, through the use of manual muscle testing and handgrip dynamometry; our center also uses the Borg Balance Scale (BBS) and Five Times Sit to Stand (5XSTS) instruments for further assessment of physical disability.¹⁰¹ Finally, the EuroQol-5D (EQ-5D) questionnaire can be used to evaluate both HRQL and pain.¹⁰¹

In addition to using these screening assessments, a complete medication reconciliation should be performed to reduce the risk of polypharmacy. Our center's practice also includes evaluation for new or persistent symptoms, appropriate referrals to further assist with ongoing physical and medical recovery, and screening for health care maintenance gaps such as immunizations. To help educate the patient and family, we summarize the patient's ICU course, counsel on expected ICU recovery and supports available, and answer any questions. We also include family members in this process, as the adverse psychological effects that an ICU stay can have on family members, or PICS-Family, have become increasingly appreciated.⁷ Finally, we ask for feedback to help with ongoing quality improvement efforts within the ICU.

While these appointments have traditionally been performed in-person, the expanding role of telemedicine amidst the COVID-19 pandemic has opened up possibilities

for expanding the reach of post-ICU clinics.¹⁰² This can be particularly useful in the post-ICU population, where limited patient mobility, large geographic distances, financial strain, and reduced access to transportation services can make in-person visits challenging.¹⁰³

MANAGEMENT OF POSTACUTE SEQUELAE OF SARS-CoV-2 INFECTION IN SURVIVORS OF CRITICAL ILLNESS

As PICS and PASC remain relatively novel concepts, much of the management rests on expert opinion or extrapolation from other specialties. Similar to the multidisciplinary approach to assessment that is outlined above, a cross-disciplinary approach incorporating both pharmacologic and nonpharmacological domains will often need to be used.

In treating cognitive dysfunction, the provider should first evaluate for and manage any potentially reversible etiologies. This includes psychiatric conditions such as depression that can manifest with cognitive dysfunction, polypharmacy that may occur due to inadvertently-continued ICU medications on discharge (eg, atypical antipsychotics), sleep disorders, and metabolic or nutritional disturbances. Once these have been addressed, other treatment options such as cognitive therapy and exercise can be considered. Cognitive rehabilitation therapy aims to improve thought processes and behavior through multimodal strategies such as memory training exercises and/or the incorporation of organizational devices such as phone reminders.¹⁰⁴ This has been evaluated in a limited number of studies on ICU survivors and may lead to improvements in cognitive functioning, and particularly executive function, though further studies are needed.¹⁰⁵ For appropriate patients, exercise therapy has been shown to improve cognitive function in patients with mild cognitive impairment, and may similarly be of benefit to patients with PICS-associated cognitive impairment.¹⁰⁶

We typically refer patients with ongoing physical limitations to physical therapy and/or occupational therapy for ongoing recovery, with the acknowledgment that there are limited studies for rehabilitation in CIM and CIN at present.¹⁰⁷ In addition, randomized trials of rehabilitation-based programs for ICU survivors have not yet shown benefit for HRQL metrics.^{108–110} Nevertheless, given its potential to improve functional capacity, we continue to recommend physical and occupational therapy in this patient population. Rehabilitation specialists may also assist with recommendations regarding mobility aides and environmental adjustments. For COVID-19 survivors specifically, providers should avoid prolonging corticosteroid courses in the outpatient setting unless an alternative condition such as organizing pneumonia exists.¹¹¹ In addition, given parallels between myalgic encephalomyelitis/chronic fatigue syndrome and the fatigue that many recovering patients with COVID-19 describe, patients should be counseled on the importance of graded exercise increase to decrease the risk of setbacks and postexertional malaise.¹¹²

Patients with pulmonary limitations due to post-ARDS fibrosis are managed with both supportive and preventative care. The prevalence of post-ARDS fibrosis in patients with and without COVID-19 remains unclear, but can be evaluated with serial pulmonary function testing and imaging.¹¹³ Thus far, evidence suggests that the majority of these patients experience improvement in both physiologic testing and radiographic changes over time.^{67,114,115} In this population, providers can thus assist with oxygen weaning, radiographic and pulmonary function test follow-up, and pulmonary rehabilitation referrals when indicated. Pulmonary rehabilitation, which involves supervised graded aerobic exercise training, strength training, and education on topics such

as breathing techniques, inhaler use, and red flag symptoms, has been shown to improve pulmonary function and HRQL in ARDS survivors.¹¹⁶ We also ensure that vaccinations against *Streptococcus pneumoniae*, influenza, and COVID-19 are up to date. In spite of these measures, a minority of patients might not improve and may ultimately need to be referred to a center specializing in interstitial lung disease.

Patients with persistent psychiatric impairments after ICU survival benefit from referral to a mental health professional for appropriate management. Treatment frequently involves a combination of pharmacotherapy and psychotherapy. Patients with depression can be treated with either an antidepressant or psychotherapy alone, as each has shown efficacy in randomized trials, though data also suggest that combination therapy may be more efficacious than either treatment individually.^{117–119} For anxiety, cognitive behavioral therapy remains the most studied, and thus first-line, psychotherapeutic option, though mindfulness-based therapies are gaining increasing attention and may be more feasible for patients to initiate themselves during the initial recovery period.¹²⁰ Pharmacotherapy for generalized anxiety disorder may also be considered for patients who meet diagnostic criteria. First-line treatment of posttraumatic stress disorder involves trauma-focused therapies such as cognitive behavioral therapy and exposure-based therapy, with medications reserved for individuals with a strong preference toward this.¹²¹ Some post-ICU centers also offer peer support groups through either in-person or virtual platforms, which have been shown to have a myriad of beneficial effects for patients.^{122,123} An additional challenge we have found during the COVID-19 pandemic is that after discharge, recovered patients are frequently hesitant to leave their homes due to fear of contracting the virus again, inadvertently restricting their opportunities for mobilization, which can exacerbate deconditioning and functional limitations, and also lead to worsened quality of life. In these situations, providers should evaluate for anxiety, agoraphobia, and PTSD and refer for treatment when applicable. They can also reinforce masking and social distancing precautions, and assess for appropriate COVID-19 vaccination timing. We have also found that a minority of patients can become consumed with media reports and social media rabbit holes on long COVID-19, which often focus on outlier patients and can thus paint an overly negative picture of COVID-19 recovery. Similar stressors have been described in survivors of the SARS pandemic.¹²⁴ Providers can assist by counseling patients on an expected recovery trajectory, normalizing their experience, and validating their progress.¹²⁵

BEYOND COVID-19: THE ROLE OF POST-ICU CLINICS IN QUALITY IMPROVEMENT AND RESEARCH

In response to the COVID-19 pandemic, multidisciplinary post-ICU clinics have been newly created by centers worldwide.⁴⁰ While these clinics currently serve a crucial role in meeting the needs of patients recovering from COVID-19, they also provide a number of opportunities for improving care for all critically ill patients. On a center level, previously undetected issues can be identified during outpatient follow-up and serve as targets for ICU quality improvement. From the standpoint of clinician education, witnessing a patient's recovery process may result in greater reflective practice in the ICU, influencing clinical decision-making and improving accuracy in predicting outcomes.¹²⁶

Post-ICU clinics also provide a much-needed avenue for conducting long-term outcomes research, which has been methodologically challenging in critical care. Loss to follow-up is a common limitation in long-term ICU outcomes studies, likely resulting in the exclusion of some of the most severely ill patients, who may have physical or

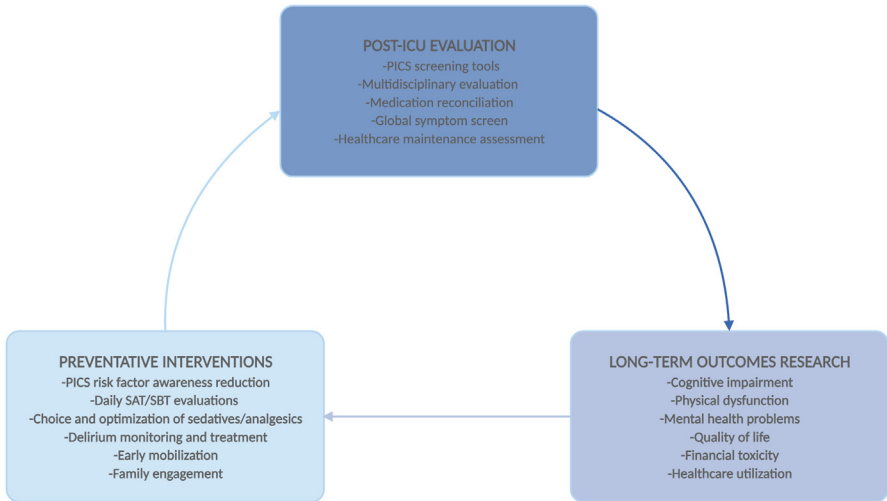


Fig. 4. Role of PICS clinics in improving ICU care. Multidisciplinary evaluation in post-ICU clinics can provide a basis for long-term research, which in turn can inform future preventative interventions in the ICU. PICS, Post-Intensive Care Syndrome; SAT, Spontaneous Awakening Trial; SBT, Spontaneous Breathing Trial.

cognitive deficits leading to study withdrawal.¹²⁷ Such patients may potentially be more likely to present for clinical care than for research follow-up. As more patients survive a critical illness, improving care in the ICU will increasingly need to focus on preventing morbidity, and creating additional opportunities for postdischarge assessment is invaluable. The proliferation of post-ICU clinics during the COVID-19 pandemic may ultimately help improve care for all critically ill patients (Fig. 4).

SUMMARY

Amidst a growing appreciation of the wide-ranging and long-term public health effects of COVID-19, PICS represents a useful contextual framework for diagnosing and treating PASC in critically ill survivors of COVID-19. While these conditions are not one and the same, there is substantial overlap, and providers can draw on existing knowledge of PICS when treating COVID-19 survivors. Further research into the prevention, diagnosis, and treatment of both PICS and PASC are needed as we move into the new frontier of COVID-19 survivorship.

CLINICS CARE POINTS

- Patients recovering from critical illness after COVID-19 infection are at increased risk of cognitive impairment, ICU-acquired weakness, and psychiatric illness including anxiety, depression, PTSD, and insomnia.
- Multidisciplinary management approaches, including non-pharmacologic options such as cognitive rehabilitation therapy, psychotherapy, and peer support groups, represent cornerstones of treatment in postintensive care syndrome.
- Further research into the optimal treatment of PASC in critically ill patients is needed.

CONFLICT OF INTEREST

All authors report no relevant conflicts of interest.

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