



Post-intensive care syndrome: A review for the primary care NP

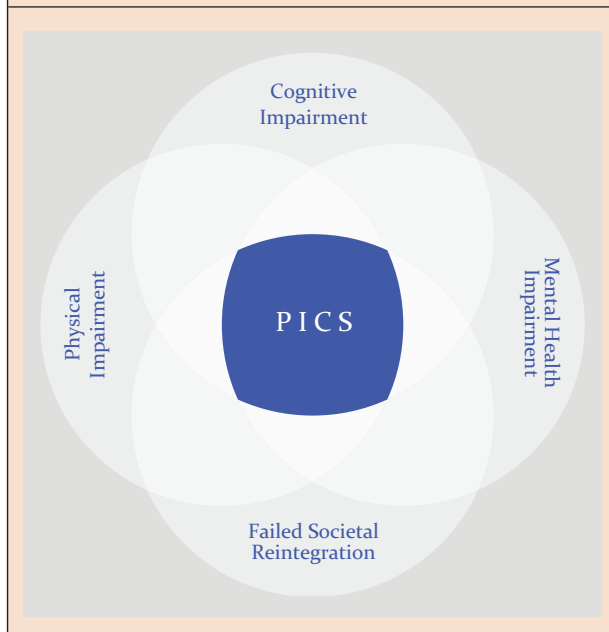
***Abstract:** Post-intensive care syndrome is a costly and complicated collection of physical, cognitive, and mental health problems experienced by survivors of critical illness. The primary care NP is uniquely positioned to assess, monitor, manage, and treat patients with this syndrome following hospital discharge.*

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More than a decade before the COVID-19 pandemic began, advances in critical care technology, the development of safe and effective evidence-based interventions, and a focus on interprofessional team-based care led to substantial improvements in ICU survival rates. During this same period, it was recognized that for some, surviving an ICU stay is associated with a heavy personal

and financial cost. An expanding body of critical care literature has established that many ICU survivors experience profound impairments in their physical, cognitive, and mental health which can persist long after hospital discharge. Collectively, these impairments are known as post-intensive care syndrome (PICS). It is critical that outpatient healthcare providers caring for patients after ICU discharge are aware of the frequency

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Post-intensive care syndrome

and magnitude of PICS. This article aims to review the clinical manifestations, diagnostic evaluation, and approach to management of PICS for the primary care NP (PCNP). While PICS also affects family members and pediatric ICU survivors, the scope of this article is limited to critically ill adults.

History of PICS

In 2010, an international panel of experts gathered at a Society of Critical Care Medicine (SCCM) stakeholder conference to discuss post-intensive care survivorship. Nomenclature was identified as a priority, and through their collaborative efforts, the PICS term was developed and defined. PICS is a collection of “new or worsening impairments in physical, cognitive, or mental health status arising after critical illness and persisting beyond acute care hospitalization.”¹ More recently, PICS has been expanded to include delayed or failed social reintegration following critical care hospitalization as an additional defining attribute.² (See *Post-intensive care syndrome*.)

Incidence and risk factors for PICS

While some patients survive critical illness without long-term sequelae, the published literature indicates that these patients indeed represent the minority. Marra et al. reported that 64% of ICU survivors experienced at least one PICS impairment at 3 months, and 56% had persistent symptoms at 12 months.³ The

social and financial consequences of persistent PICS impairments can be devastating. One-third of survivors will not return to their previous employment 60 months after critical illness.⁴

A wide variety of risk factors for PICS development have been identified (see *PICS risk factors* and *Risk factors warranting PICS screening from the SCCM’s International Consensus Conference on Prediction and Identification of Long-Term Impairments After Critical Illness*). A recent meta-analysis identified 60 individual PICS risk factors, with pooled results indicating older age, female sex, previous mental health diagnosis, high disease severity, a negative ICU experience, and delirium while in the ICU as significant risk factors.⁵

Clinical manifestations

The clinical manifestations associated with PICS are organized into three distinct categories of impairment: physical, cognitive, and mental health. Co-occurrence of impairments in two or more domains is common among survivors.^{3,6}

Physical impairments. Physical impairments associated with PICS include weight loss, proximal weakness, loss of muscle bulk, and fatigue and are primarily associated with pulmonary and neuromuscular system abnormalities.⁷ The understanding behind the pulmonary impairments associated with severe critical illness is based on early work with survivors of acute respiratory distress syndrome who required mechanical ventilation during ICU admission. Patients demonstrated severe pulmonary function abnormalities at extubation, followed by substantial improvement but continued abnormality at 6 months.⁸ Pulmonary function can return to near normal by year 3.⁷

Critical illness neuromuscular abnormalities contribute to physical impairments observed in ICU survivors. Critical illness neuromuscular abnormality is delineated by subtypes of dysfunction including critical illness polyneuropathy, affecting the motor and sensory axons, and critical illness myopathy, resulting from myofilament loss and muscle fiber apoptosis.⁹ Peripheral nerve and muscle derangements frequently coexist in a spectrum of critical illness neuromuscular abnormalities acquired in the ICU.⁹ The incidence of critical illness neuromuscular abnormalities varies widely by individual study but has been reported via systematic review to be 46%.^{9,10} Impaired physical function resulting from neuromuscular dysfunction acquired in the ICU can lead to diminished functional status, disability in activities of daily living,

and altered quality of life for months to years after the acute period and is known to predict discharge to another facility (not home) and postdischarge mortality.^{11,12}

Cognitive dysfunction. The landmark Bringing to Light the Risk Factors and Incidence of Neuropsychological Dysfunction in ICU Survivors (BRAIN-ICU) study assessed global cognition and executive function of 821 ICU survivors at 3- and 12-months post-ICU discharge.¹³ ICU delirium affected 74% of the patients during their hospital stay. Three months posthospital discharge, 40% of the surviving patients had global cognition scores worse than those typically seen in moderate traumatic brain injury, and 26% had scores similar to patients with mild Alzheimer disease. At 12 months, scores were essentially unchanged.

Mental health impairments. Given the physical and cognitive impairments associated with critical care survivorship, impacts on mental health are not surprising. Forty-one percent of ICU survivors from across the United Kingdom who participated in a multicenter, longitudinal mental health study reported persistent depressive symptoms at 3 months, largely unchanged at 12 months.¹⁴ Patients with symptoms of depression were 47% more likely to die during the first 2 years after discharge than those without.¹⁴ Memories of delusional events and stress reactions during hospitalization are risk factors associated with anxiety symptoms.¹⁵ Prevalence rates of anxiety range from 32% to 40%, which is known to persist up to one year after discharge.¹⁵

Post-ICU depressive symptoms and anxiety strongly correlate with posttraumatic stress disorder (PTSD) in ICU survivors.¹⁵ Recent meta-analysis results indicate that one out of every five adult ICU survivors will develop PTSD in the year following ICU discharge, comparable to PTSD rates of civilian survivors of conflicts of war.¹⁶ The development of PTSD among ICU survivors has been reported to be delayed by as long as a year.¹⁷ In the US alone, 5.7 million patients are admitted annually to ICUs. Allowing for 10%-29% mortality, the results of this meta-analysis indicate that approximately 1 million patients annually will develop PTSD following ICU admission.

Diagnostic evaluation

There is no consensus on the instruments for the evaluation and diagnosis of PICS. A 2017 literature review concluded that there was insufficient evidence to support any measure of physical, cognitive, mental health, or quality-of-life outcomes in adult ICU survivors.¹⁸ In response, clinical experts developed a two-step set of expert-validated PICS outcome instruments.¹⁹ Assessment is divided into two steps: an initial screening, followed by a comprehensive assessment if indicated. Initial screening is appropriate for application by a range of healthcare professionals in the outpatient setting and consists of five brief tests, available free-of-charge, covering the three clinical domains of PICS. Comprehensive assessment is intended to be used by PICS experts if there are concerning findings on the initial screening.

Collectively, initial screening takes approximately 20 minutes per patient to complete.¹⁹ Face-to-face time

PICS risk factors^{5,6,49-52}

Modifiable

Nonmodifiable

Physical impairment

Increased serum blood urea nitrogen

Advanced age

Acute kidney injury stage 2 or 3

High disease severity

Decreased serum albumin

Unmarried

Acute neurologic findings

Comorbid dementia history

Cognitive impairment

Long ICU length of stay

Advanced age

ICU delirium

Unplanned ICU admission

Mechanical ventilation

Use of sedation/analgesia

Mental health impairment

Extended length of stay

Advanced age

Long ICU length of stay

Female sex

Negative ICU experience

High disease severity

Mechanical ventilation

Comorbid psychiatric history

ICU delirium

Unplanned ICU admission

Acute kidney injury stage 2 or 3

Use of sedation/analgesia

Quality of life

Mechanical ventilation

Advanced age

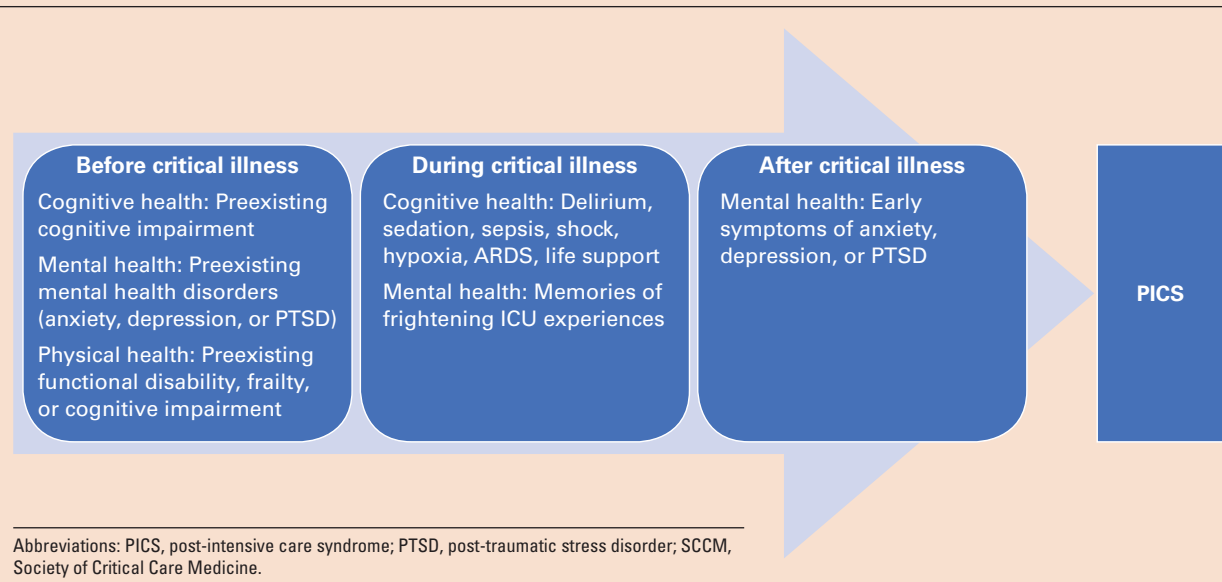
Long ICU length of stay

Unemployment

Acute kidney injury stage 2 or 3

Disadvantaged economic background

Risk factors warranting PICS screening from the SCCM's International Consensus Conference on Prediction and Identification of Long-Term Impairments After Critical Illness²⁵



could be shortened by requesting that the mental health (Patient Health Questionnaire-4 [PHQ-4]) and the health-related quality-of-life scales (EQ-5D-5L) be completed prior to the appointment time, saving in-person exam time for the physical function and cognitive assessments. If additional or expanded testing is added to the battery of screening assessments, this will increase the duration of time needed to complete an expanded screening assessment.

Physical impairment assessment. Physical function is assessed with a Timed Up-and-Go (TUG) test and measured handgrip strength. The TUG test quantifies functional mobility and requires a patient to rise from an armchair, walk 3 meters, pivot, and return to a seated position in the chair.²⁰ The score given is the time taken in seconds to complete all tasks, with those completing all tasks in 20 seconds or less classified as independent. Handgrip strength is a quantitative measure of the muscle strength of the hand and forearm, measured via a dynamometer, and is known to predict declines in cognition, mobility, functional status, and mortality in community-dwelling older adults.²¹

If there are concerning findings on the TUG test or handgrip dynamometer, the Lawton Instrumental Activities of Daily Living Scale is an alternative physical function screening assessment that can be considered for extended evaluation. The Lawton Scale covers eight different activities instrumental to independent function

and is thought to be more sensitive to complex skills necessary for community living versus an instrument focused on activities of daily living only.²² The Lawton Scale takes 10 to 15 minutes to complete, and can be administered via interview or given as a questionnaire.²²

Cognitive dysfunction assessment. Cognition can be assessed with the Mini-Cog® and the animal naming test. The Mini-Cog® takes approximately 3 minutes to administer, has minimal language content, comes in multiple languages, and consists of a 3-item recall and a clock drawing component.²³ The animal naming test, initially developed as a screening tool for hepatic encephalopathy, involves verbally naming as many animals as possible in 1 minute.²⁴ Among healthy control subjects, the ability to name less than 15 animals in 1 minute is an abnormal result and an indication of cognitive impairment.²⁴

The SCCM recommends the Montreal Cognitive Assessment (MoCA)®.²⁵ Available in several versions and languages, the MoCA® tests short-term memory, visuospatial ability, executive function, attention, concentration, working memory, language, and orientation to time and place.²⁶ Full MoCA® testing takes 10 minutes to administer and requires completion of a paid training and certification course to be able to administer, interpret, and score the results.²⁶

Mental health assessment. Mental health is screened via the Patient Health Questionnaire-4 (PHQ-4), a four-item scale designed to screen for symptoms of anxiety

and depression.²⁷ Respondents are asked to rank how often they have been bothered by nervousness, worry, loss of interest, and feelings of depression or hopelessness during the preceding 2 weeks.

The SCCM recommends the Hospital Anxiety and Depression Scale (HADS) for detection of anxiety and depression among critical care survivors.²⁵ The HADS is slightly longer at 14 items (7 items each for depression and anxiety) and requires approximately 2 to 5 minutes to complete.²⁸ It can be used as an alternative to the PHQ-4, or it can be completed as an additional screening if there are concerning findings on initial screening.

The EuroQol-5D-5L is the recommended health-related quality-of-life assessment.^{19,25} Designed for self-completion, respondents rate their health on five-point scales for five dimensions: mobility, self-care, usual activities, pain and discomfort, and anxiety and depression and rate their overall health on a visual analogue scale (0-100).²⁹ It has been translated into multiple languages, and population norms are available across a wide range of languages and cultures.

PTSD assessment. While not an official component of the basic screening, PTSD symptom assessment is recommended by the SCCM.^{19,25} Multiple PTSD screening tools exist. Recommended by the SCCM, the Impact of Event Scale-Revised (IES-R) is a 22-item self-report questionnaire measuring subjective distress following traumatic events.³⁰ Other screening assessments exist including the 5-item Primary Care PTSD Screen for DSM-5, developed by the US Department of Veterans Affairs specifically for use in primary care and freely available in the public domain.³¹

■ Approach to management

During hospital stay. The ICU Liberation bundle, also known as the A through F (or ABCDEF) bundle, is an evidence-based approach to ICU care to optimize patient recovery and outcomes. Complete and consistent application of all elements of the bundle is associated with improved ICU and hospital outcomes.³² Efforts to reduce healthcare worker and civilian exposure to COVID-19 during the pandemic have had a detrimental effect on ABCDEF bundle application, particularly regarding early mobility and family-centered care.³³ Bundle-restricted critical care, combined with increased COVID-19 survival rates, has created a concern of a burgeoning PICS pandemic as the COVID-19 crisis continues.³⁴

ICU aftercare programs. Standard care following critical illness was traditionally provided in a siloed

approach with physical and cognitive impairments addressed individually as indicated. Hospital-based and home-based physical rehabilitation programs were of mixed success in achieving meaningful improvements in physical function or health-related quality of life following critical care survival.^{35,36} Combined rehabilitation programs, targeting physical and cognitive impairments associated with survival following critical illness, are more promising and provided the foundation for the modern ICU aftercare approach.³⁷ Based on models developed in the United Kingdom and located primarily at large academic medical centers, ICU aftercare programs are outpatient-based, multidisciplinary care teams that coordinate post-ICU health assessment, treatment, and referral to care specialists to promote and optimize recovery following critical illness.³⁸ Postdischarge care following a hospitalization that includes an ICU stay is not currently standardized, and multiple models of care exist.³⁹ Formal ICU aftercare programs remain limited in number and geographic location, impacting access, particularly for those living in rural locations or who are discharged to a care facility rather than home.^{40,41}

■ Implications for the PCNP

PCNPs are trained and educated to autonomously deliver longitudinal care for patients with stable, chronic conditions and organize targeted specialty management.⁴² Patients who survive critical illness and are experiencing any of the associated PICS impairments require long-term coordinated management of the necessary care to support recovery for symptoms that often persist for months to years.³ All patients who present to their primary care provider for a follow-up visit after a hospitalization that included an ICU stay should be screened for signs and symptoms of PICS using established screening tools. A positive screen on any individual tool should trigger a referral to an appropriate specialist. The SCCM recommends specialist referral targeted toward specific symptoms (see *PICS screening and management interventions*).⁴³ Additional interventions to consider at follow-up are numerous and individualized to the specific patient and can include smoking cessation counseling and treatment, assessment of the need for durable medical equipment, medication reconciliation, dysphagia assessment, and fitness to drive a motor vehicle assessment.^{38,40,44}

Family caregivers want to be involved in ICU patient care during critical care hospitalizations and expect to continue to be involved as care transitions

PICS screening and management interventions^{19,25}

Potential complication	Screening measures—Initial	Screening measures—Expanded	Management interventions
Physical health			
Mobility impairment	• TUG test		<ul style="list-style-type: none"> • Physical therapy • Occupational therapy • Speech therapy • Durable medical equipment assessment • Dysphagia assessment • Fitness to drive assessment
Decreased functional status	• Handgrip strength	• Lawton Scale for IADLs	
Pulmonary impairment		• Pulse oximetry	<ul style="list-style-type: none"> • Pulmonary specialist referral • Pulmonary rehabilitation • Smoking cessation counseling and treatment • Home oxygen therapy
Cognitive health			
Impairments in memory, attention, and/or executive function	<ul style="list-style-type: none"> • Mini-Cog[®] • Animal Naming Test 	• MoCA [®]	<ul style="list-style-type: none"> • Occupational therapy • Speech therapy
Mental health			
Anxiety and depression	• PHQ-4	• HADS	<ul style="list-style-type: none"> • Psychiatric referral • Psychology referral • Peer support program
PTSD		<ul style="list-style-type: none"> • IES-R • Primary Care PTSD Screen for DSM-5 	
Health-related quality of life	<ul style="list-style-type: none"> • EuroQol-5D-5L • Self-perceived physical and mental health scales 		

Abbreviations: HADS, Hospital Anxiety and Depression Scale; IES-R, Impact of Event Scale-Revised; IADLs, Instrumental Activities of Daily Living; MoCA, Montreal Cognitive Assessment; PHQ-4, Patient Health Questionnaire-4; PTSD, posttraumatic stress disorder; TUG, Timed Up-and-Go.

from the hospital to home.⁴⁵ Family caregivers should be included in all posthospital follow-up visits and considered an integral member of the care team.

As the COVID-19 pandemic progresses and survival rates continue to improve, the burden of care is shifting from the ICU to the outpatient setting. It is imperative that PCNPs familiarize themselves with PICS so they can effectively screen for and properly care for patients who present following a critical care hospitalization.

Frequency and duration of visits. The optimal interval from hospital discharge until the first outpatient clinic visits is not well established, as data on the topic are limited.³⁹ The SCCM recommends that initial post-hospital assessment occur 2 to 4 weeks following discharge.²⁵ The National Institute for Health and Care Excellence based in the United Kingdom recommends assessment prior to hospital discharge and again in 2 to 3 months.⁴⁶ Of note, the timing of initial posthospital visits can be complicated by patient-level issues that limit the ability to travel, including discharge to a care facility or rurality.⁴¹

Waiting 30 or more days following hospital discharge can limit the ability to screen for PICS symptoms that were potentially unrecognized at the time of hospital discharge and require urgent intervention to prevent further decline, potentially increasing the risk of deterioration and hospital readmission. For this reason, critical care survivors should be evaluated in the outpatient setting at the earliest opportunity.

A recently conducted national survey by the Critical and Acute Illness Recovery Organization (CAIRO) Post-ICU Clinic Collaborative found a wide range of visit duration lengths in ICU aftercare programs, from 31-60 minutes to greater than 2 hours.⁴⁰ The initial posthospital outpatient visit requires extensive assessment and exam by the PCNP, with recommended screening alone requiring a minimum of 20 minutes to complete.¹⁹ Therefore, lengthier visit duration, in excess of the standard 15-minute return visit, is necessary.


The frequency of return visits is also not well established. The SCCM Consensus Statement recommended “serial” assessments of unclear duration.²⁵

Mayer et al. suggest an outpatient visit frequency following initial evaluation of 1-, 3-, 6-, and 12-month postdischarge.⁴¹ Outpatient visit frequency should be individualized based on the patient's needs and continue until realization of full recovery.

Future directions

Demand for ICU aftercare services has surged in response to the COVID-19 pandemic.⁴⁷ The limited number of available formal ICU aftercare programs in the US cannot meet the demand for these services. Moving forward with limited resources and addressing gaps in care is challenging. Primary care involvement in ICU aftercare is not only necessary, but appropriate, to help fill this gap and coordinate care across multiple disciplines.⁴⁸ PCNPs have unique training and experience that enables them to excel in the patient management and care coordination necessary for this complex patient population. ICU aftercare is time-intensive, and PCNP success in providing these services will require that they function with full-practice authority and reimbursement parity. PCNPs should continue to advocate for full-practice authority and elimination of incident to billing to increase the feasibility of providing care for this growing and often underserved population.

Conclusion

As survival from critical illness continues to improve, post-intensive care sequelae and complications will become more prevalent. Current models of ICU aftercare lack standardization and cannot meet the demand for PICS services and rehabilitation secondary to a variety of system- and patient-level variables. PCNPs are, by virtue of educational training and clinical background, qualified to help fill the ICU aftercare gap and provide high-level ICU aftercare for survivors of critical illness. 

REFERENCES

- Needham DM, Davidson J, Cohen H, et al. Improving long-term outcomes after discharge from intensive care unit: report from a stakeholders' conference. *Crit Care Med*. 2012;40(2):502-509. doi:10.1097/CCM.0b013e318232da75.
- Yuan C, Timmins F, Thompson DR. Post-intensive care syndrome: a concept analysis. *Int J Nurs Stud*. 2021;114:103814. doi:10.1016/j.ijnurstu.2020.103814.
- Marra A, Pandharipande PP, Girard TD, et al. Co-occurrence of post-intensive care syndrome problems among 406 survivors of critical illness. *Crit Care Med*. 2018;46(9):1393-1401. doi:10.1097/ccm.0000000000003218.
- Kamdar BB, Suri R, Suchyta MR, et al. Return to work after critical illness: a systematic review and meta-analysis. *Thorax*. 2020;75(1):17-27. doi:10.1136/thoraxjnl-2019-213803.
- Lee M, Kang J, Jeong YJ. Risk factors for post-intensive care syndrome: a systematic review and meta-analysis. *Aust Crit Care*. 2020;33(3):287-294. doi:10.1016/j.aucc.2019.10.004.
- Unoki T, Sakuramoto H, Uemura S, et al. Prevalence of and risk factors for post-intensive care syndrome: multicenter study of patients living at home after treatment in 12 Japanese intensive care units, SMAP-HoPe study. *PLoS One*. 2021;16(5):e0252167. doi:10.1371/journal.pone.0252167.
- Herridge MS. Recovery and long-term outcome in acute respiratory distress syndrome. *Crit Care Clin*. 2011;27(3):685-704. doi:10.1016/j.ccc.2011.04.003.
- McHugh LG, Milberg JA, Whitcomb ME, Schoene RB, Maunder RJ, Hudson LD. Recovery of function in survivors of the acute respiratory distress syndrome. *Am J Respir Crit Care Med*. 1994;150(1):90-94. doi:10.1164/ajrccm.150.1.8025779.
- Latronico N, Bolton CF. Critical illness polyneuropathy and myopathy: a major cause of muscle weakness and paralysis. *Lancet Neurol*. 2011;10(10):931-941. doi:10.1016/s1474-4422(11)70178-8.
- Lacomis D, Zochodne DW, Bird SJ. Critical illness myopathy. *Muscle Nerve*. 2000;23(12):1785-1788. doi:10.1002/1097-4598(200012)23:12<1785::aid-musl13>3.0.co;2-j.
- Hodgson CL, Udy AA, Bailey M, et al. The impact of disability in survivors of critical illness. *Intensive Care Med*. 2017;43(7):992-1001. doi:10.1007/s00134-017-4830-0.
- Wieske L, Dettling-Ihnenfeldt DS, Verhamme C, et al. Impact of ICU-acquired weakness on post-ICU physical functioning: a follow-up study. *Crit Care*. 2015;19(1):196. doi:10.1186/s13054-015-0937-2.
- Pandharipande PP, Girard TD, Ely EW. Long-term cognitive impairment after critical illness. *N Engl J Med*. 2014;370(2):185-186.
- Hatch R, Young D, Barber V, Griffiths J, Harrison DA, Watkinson P. Anxiety, depression and post traumatic stress disorder after critical illness: a UK-wide prospective cohort study. *Crit Care*. 2018;22(1):310. doi:10.1186/s13054-018-2223-6.
- Nikayin S, Rabiee A, Hashem MD, et al. Anxiety symptoms in survivors of critical illness: a systematic review and meta-analysis. *General Hosp Psychiatry*. 2016;43:23-29. doi:10.1016/j.genhosppsych.2016.08.005.
- Righy C, Rosa RG, da Silva RTA, et al. Prevalence of post-traumatic stress disorder symptoms in adult critical care survivors: a systematic review and meta-analysis. *Crit Care*. 2019;23(1):213. doi:10.1186/s13054-019-2489-3.
- Myhren H, Ekeberg O, Tøien K, Karlsson S, Stokland O. Posttraumatic stress, anxiety and depression symptoms in patients during the first year post intensive care unit discharge. *Critical Care*. 2010;14(1):R14. doi:10.1186/cc8870.
- Robinson KA, Davis WE, Dinglas VD, et al. A systematic review finds limited data on measurement properties of instruments measuring outcomes in adult intensive care unit survivors. *J Clin Epidemiol*. 2017;82:37-46. doi:10.1016/j.jclinepi.2016.08.014.
- Spies CD, Krampe H, Paul N, et al. Instruments to measure outcomes of post-intensive care syndrome in outpatient care settings – results of an expert consensus and feasibility field test. *J Intensive Care Soc*. 2021;22(2):159-174. doi:10.1177/1751143720923597.
- Podsiadlo D, Richardson S. The timed "Up & Go": a test of basic functional mobility for frail elderly persons. *J Am Geriatr Soc*. 1991;39(2):142-148. doi:10.1111/j.1532-5415.1991.tb01616.x.
- Rijk JM, Roos PR, Deckx L, van den Akker M, Buntinx F. Prognostic value of handgrip strength in people aged 60 years and older: a systematic review and meta-analysis. *Geriatr Gerontol Int*. 2016;16(1):5-20. doi:10.1111/ggi.12508.
- Graf C. The Lawton instrumental activities of daily living scale. *Am J Nurs*. 2008;108(4):52-63. doi:10.1097/01.naj.0000314810.46029.74.
- Borson S, Scanlan J, Brush M, Vitaliano P, Dokmak A. The mini-cog: a cognitive 'vital signs' measure for dementia screening in multi-lingual elderly. *Int J Geriatr Psychiatry*. 2000;15(11):1021-1027. doi:10.1002/1099-1166(200011)15:11<1021::aid-gps234>3.0.co;2-6.
- Campagna F, Montagnese S, Ridola L, et al. The animal naming test: an easy tool for the assessment of hepatic encephalopathy. *Hepatology*. 2017;66(1):198-208. doi:10.1002/hep.29146.
- Mikkelsen ME, Still M, Anderson BJ, et al. Society of Critical Care Medicine's International Consensus Conference on prediction and identification of long-term impairments after critical illness. *Crit Care Med*. 2020;48(11):1670-1679. doi:10.1097/ccm.0000000000004586.
- Nasreddine Z. MoCA Cognitive Assessment. MoCA Test Inc. www.mocatest.org.
- Kroenke K, Spitzer RL, Williams JB, Löwe B. An ultra-brief screening scale for anxiety and depression: the PHQ-4. *Psychosomatics*. 2009;50(6):613-621. doi:10.1176/appi.psy.50.6.613.
- Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand*. 1983;67(6):361-370. doi:10.1111/j.1600-0447.1983.tb09716.x.
- Herdman M, Gudex C, Lloyd A, et al. Development and preliminary testing of the new five-level version of EQ-5D (EQ-5D-5L). *Qual Life Res*. 2011;20(10):1727-1736. doi:10.1007/s11136-011-9903-x.
- Weiss DS. The Impact of Event Scale: Revised. In: *Cross-Cultural Assessment of Psychological Trauma and PTSD. International and Cultural Psychology*. Boston, MA: Springer Science + Business Media; 2007:219-238..

31. Prins A, Bovin MJ, Smolenski DJ, et al. The Primary Care PTSD Screen for DSM-5 (PC-PTSD-5): development and evaluation within a veteran primary care sample. *J Gen Intern Med.* 2016;31(10):1206-1211. doi:10.1007/s11606-016-3703-5.
32. Pun BT, Balas MC, Barnes-Daly MA, et al. Caring for critically ill patients with the ABCDEF bundle: results of the ICU liberation collaborative in over 15,000 adults. *Crit Care Med.* 2019;47(1):3-14. doi:10.1097/CCM.0000000000003482.
33. Aziz S, Arabi YM, Alhazzani W, et al. Managing ICU surge during the COVID-19 crisis: rapid guidelines. *Intensive Care Med.* 2020;46(7):1303-1325. doi:10.1007/s00134-020-06092-5.
34. Nakanishi N, Liu K, Kawakami D, et al. Post-intensive care syndrome and its new challenges in coronavirus disease 2019 (COVID-19) pandemic: a review of recent advances and perspectives. *J Clin Med.* 2021;10(17):3870. doi:10.3390/jcm10173870.
35. McDowell K, O'Neill B, Blackwood B, et al. Effectiveness of an exercise programme on physical function in patients discharged from hospital following critical illness: a randomised controlled trial (the REVIVE trial). *Thorax.* 2017;72(7):594-595. doi:10.1136/thoraxjnl-2016-208723.
36. Elliott D, McKinley S, Alison J, et al. Health-related quality of life and physical recovery after a critical illness: a multi-centre randomised controlled trial of a home-based physical rehabilitation program. *Crit Care.* 2011;15(3):R142. doi:10.1186/cc10265.
37. Jones C, Skirrow P, Griffiths RD, et al. Rehabilitation after critical illness: a randomized, controlled trial. *Crit Care Med.* 2003;31(10):2456-2461. doi:10.1097/01.ccm.0000089938.56725.33.
38. Sevin CM, Bloom SL, Jackson JC, Wang L, Ely EW, Stollings JL. Comprehensive care of ICU survivors: development and implementation of an ICU recovery center. *J Crit Care.* 2018;46:141-148. doi:10.1016/j.jcrc.2018.02.011.
39. Schofield-Robinson OJ, Lewis SR, Smith AF, McPeake J, Alderson P. Follow-up services for improving long-term outcomes in intensive care unit (ICU) survivors. *Cochrane Database Syst Rev.* 2018;11(11):CD012701. doi:10.1002/14651858.CD012701.pub2.
40. Danesh V, Boehm LM, Eaton TL, et al. Characteristics of post-ICU and post-COVID recovery clinics in 29 U.S. health systems. *Crit Care Explor.* 2022;4(3):e0658. doi:10.1097/CCE.0000000000000658.
41. Mayer KP, Boustany H, Cassidy EP, et al. ICU recovery clinic attendance, attrition, and patient outcomes: the impact of severity of illness, gender, and rurality. *Crit Care Explor.* 2020;2(10):e0206. doi:10.1097/CCE.0000000000000206.
42. The National Organization of Nurse Practitioner Faculties. Statement on acute care and primary care nurse practitioner practice. 2021.
43. Davidson JE, Hopkins RO, Louis D, Iwashyna T. *Post-Intensive Care Syndrome.* Society of Critical Care Medicine; 2013.
44. Meyer J, Waldmann C. Driving (or not) after critical illness. *J Intensive Care Soc.* 2015;16(3):186-188. doi:10.1177/1751143714564817.
45. Hetland BD, McAndrew NS, Kupzyk KA, et al. Family caregiver preferences and contributions related to patient care in the ICU. *West J Nurs Res.* 2022;44(3):214-226. doi:10.1177/01939459211062954.
46. National Institute for Health and Care Excellence: Guidelines. *Rehabilitation after critical illness in adults.* National Institute for Health and Clinical Excellence; 2009.
47. Santhosh L, Block B, Kim SY, et al. Rapid design and implementation of post-COVID-19 clinics. *Chest.* 2021;160(2):671-677. doi:10.1016/j.chest.2021.03.044.
48. Santhosh L, Block B, Kim SY, et al. Response. *Chest.* 2022;161(1):e63-e64. doi:10.1016/j.chest.2021.07.046.
49. Ohbe H, Goto T, Nakamura K, Matsui H, Yasunaga H. Development and validation of early prediction models for new-onset functional impairment at hospital discharge of ICU admission. *Intensive Care Med.* 2022;48(6):679-689. doi:10.1007/s00134-022-06688-z.
50. Mayer KP, Ortiz-Soriano VM, Kalantar A, Lambert J, Morris PE, Neyra JA. Acute kidney injury contributes to worse physical and quality of life outcomes in survivors of critical illness. *BMC Nephrol.* 2022;23(1):137. doi:10.1186/s12882-022-02749-z.
51. Shao C, Gu L, Mei Y, Li M. [Analysis of the risk factors of cognitive impairment in post-intensive care syndrome patient]. *Zhonghua Wei Zhong Bing Ji Jiu Yi Xue.* 2017;29(8):716-720. doi:10.3760/cma.j.issn.2095-4352.2017.08.009.
52. Kang J, Jeong YJ, Hong J. The effect of post-intensive care syndrome on the quality of life of intensive care unit survivors: a secondary analysis. *Aust Crit Care.* 2021;34(3):246-253. doi:10.1016/j.aucc.2020.08.006.

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