Mass General Brigham

Critical Care Psychiatry

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Medical Psychiatry CME
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Disclosures

I have no disclosures to report

Goal

Introduction to Basics of the Critical Care setting

- Assessment of ICU patient
- Pharmacologic Considerations

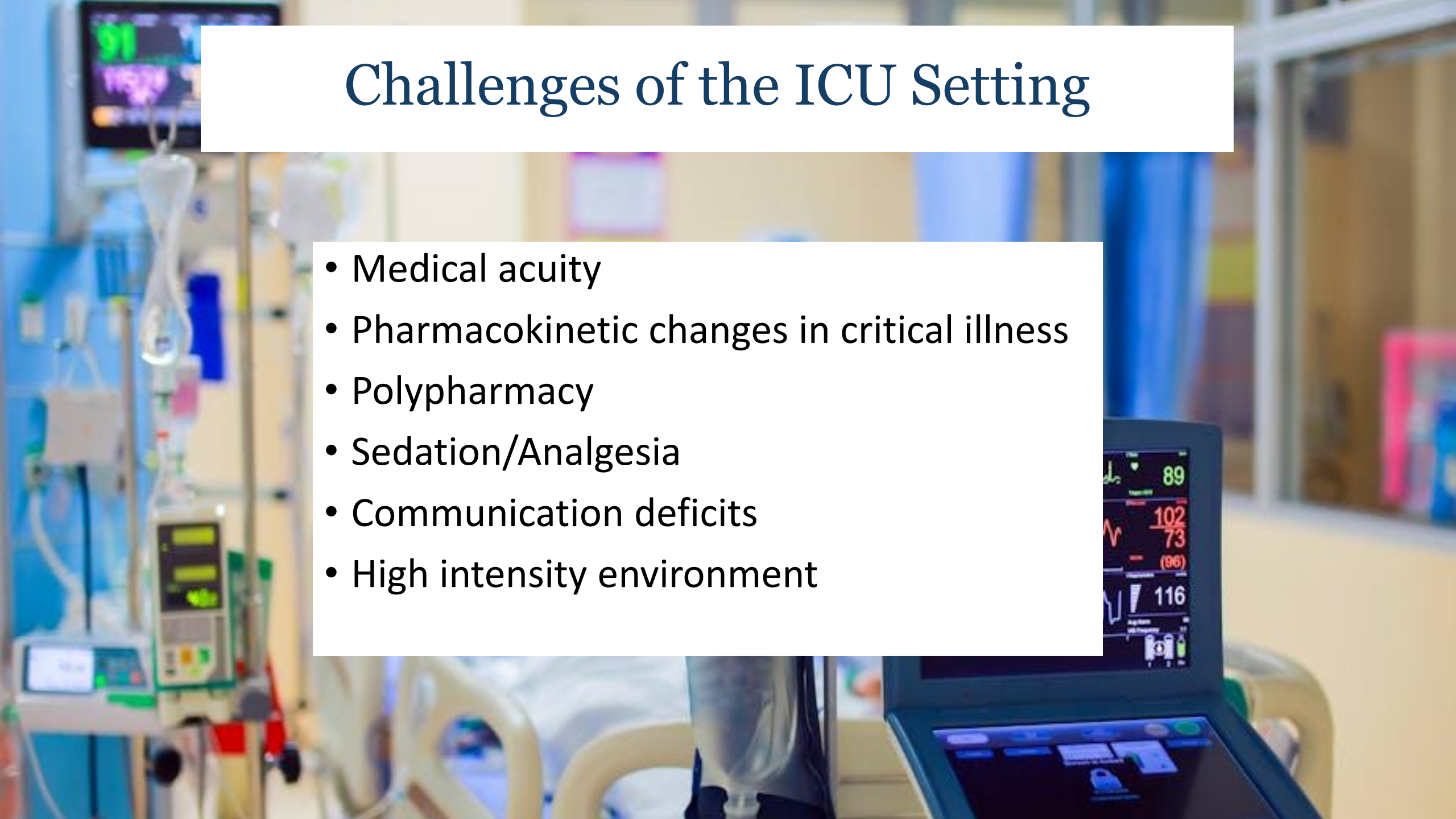
Review Psychiatric Outcomes after Critical Illness

- Post-Intensive Care Syndrome

How can psychiatrists bring our unique expertise to facilitate evidence-based ICU care?

- ICU Liberation Bundle

Challenges of the ICU Setting



- Medical acuity
- Pharmacokinetic changes in critical illness
- Polypharmacy
- Sedation/Analgesia
- Communication deficits
- High intensity environment

Assessment of ICU Patients

Room: Vitals, Drips

Exam

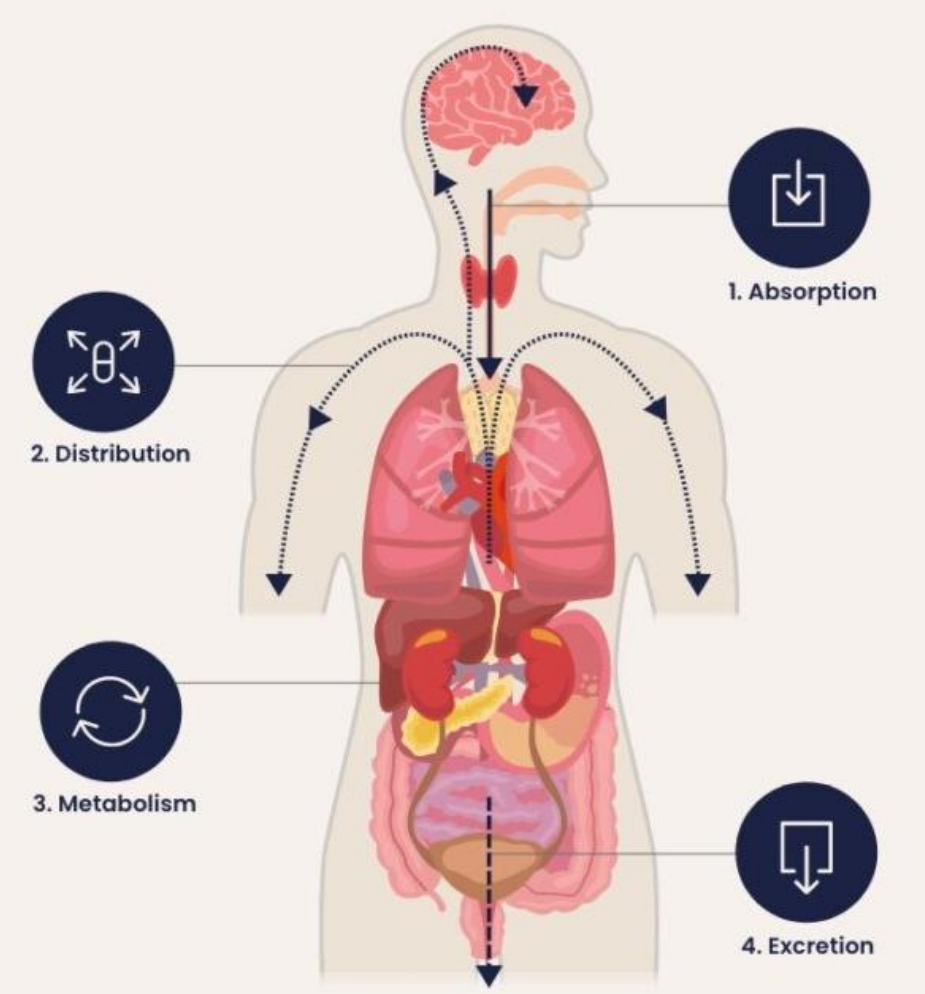
- Response to voice, touch; RASS Score
- Follow commands: Basic commands, lateralized commands, multistep
- Orientation
- Attention

Neurologic exam: tone, clonus, reflexes

Barriers to communication: pointing board, writing board, speaking valve

Collateral

Psychopharmacology in Critical Illness

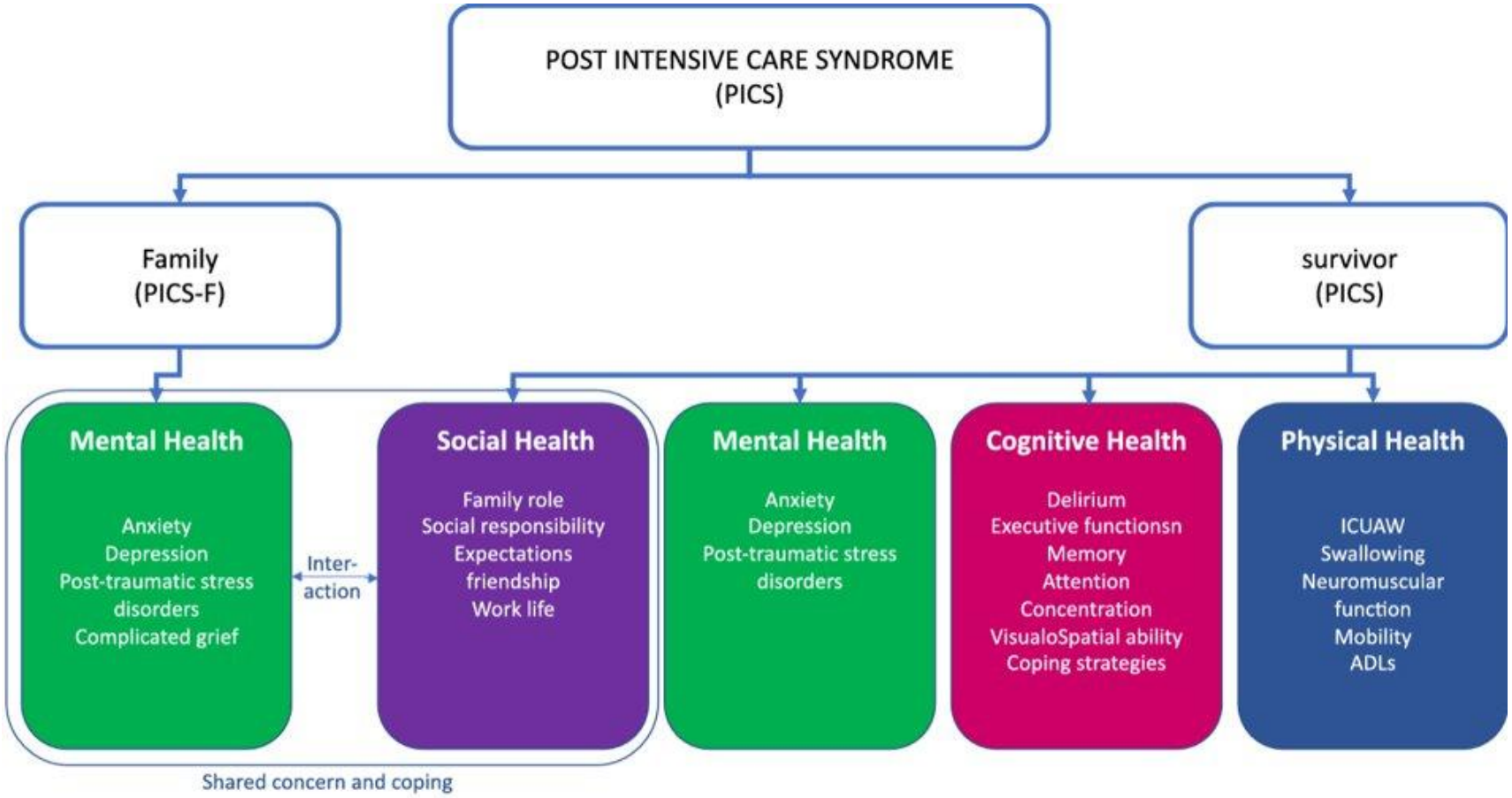


- Use IV route if available for 100% bioavailability
- Get a level when possible (e.g. VPA free and total)
- Consider any dose adjustments (e.g. renal/hepatic impairment)

1. Smith, B. S. (2012). Introduction to Drug Pharmacokinetics in the Critically Ill Patient. Chest, 141(5), 1327–1336.

Post Intensive Care Syndrome (PICS)

- **64%** of survivors of critical illness have at least one symptom at 12 mo. after discharge [1]
- **Risk factors:** older age, psychiatric dx, disease severity, delirium [2]



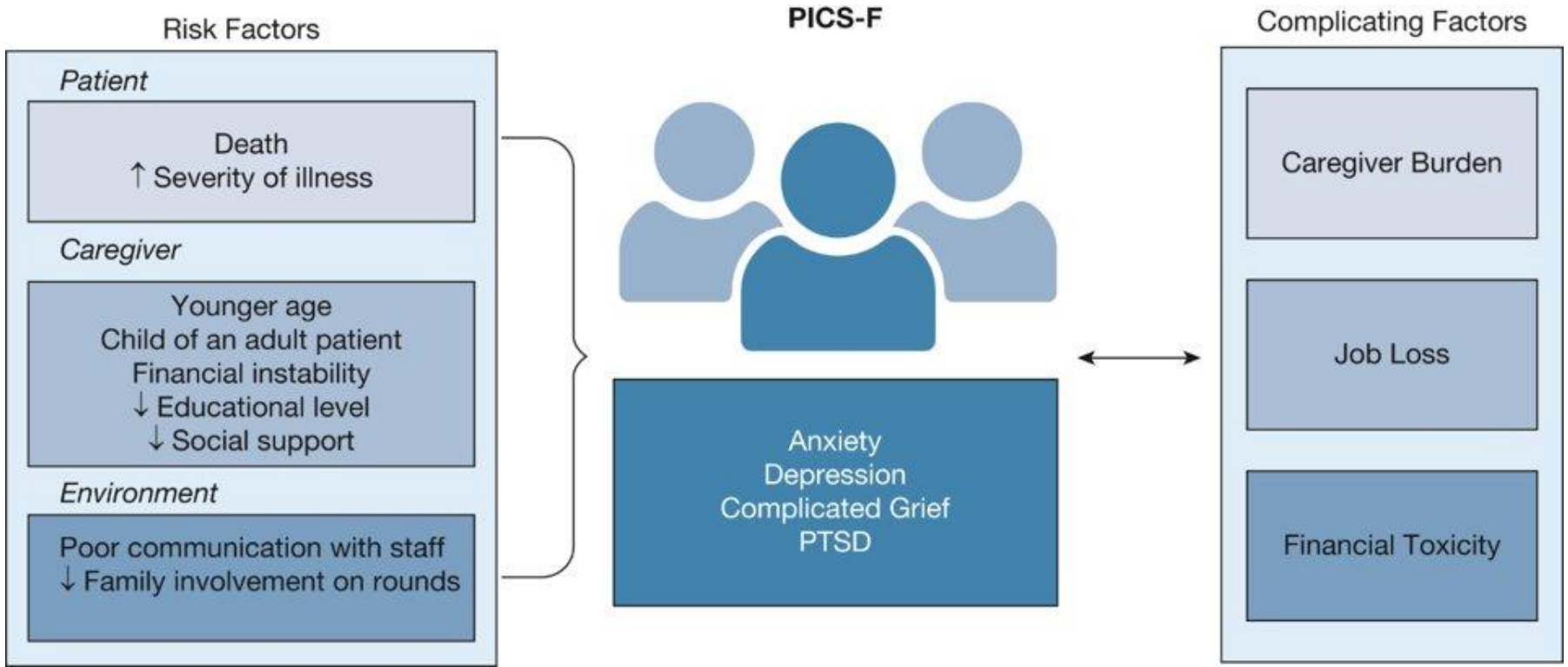
According to: Vester LB, Holm A, Dreyer P. Patients' and relatives' experiences of post-ICU everyday life: A qualitative study. Nurs Crit Care. 2021 Jul 13

Fig. 1 Impact of the post intensive care syndrome

1. Renner, C., Jeitziner et al. (2023). Guideline on multimodal rehabilitation for patients with post-intensive care syndrome. Critical Care (London, England), 27(1), 301–301.
2. Lee M et al. Risk factors for post-intensive care syndrome: A systematic review and meta-analysis. Aust Crit Care. 2020 May;33(3):287-294.

PICS affects families too (PICS-F)

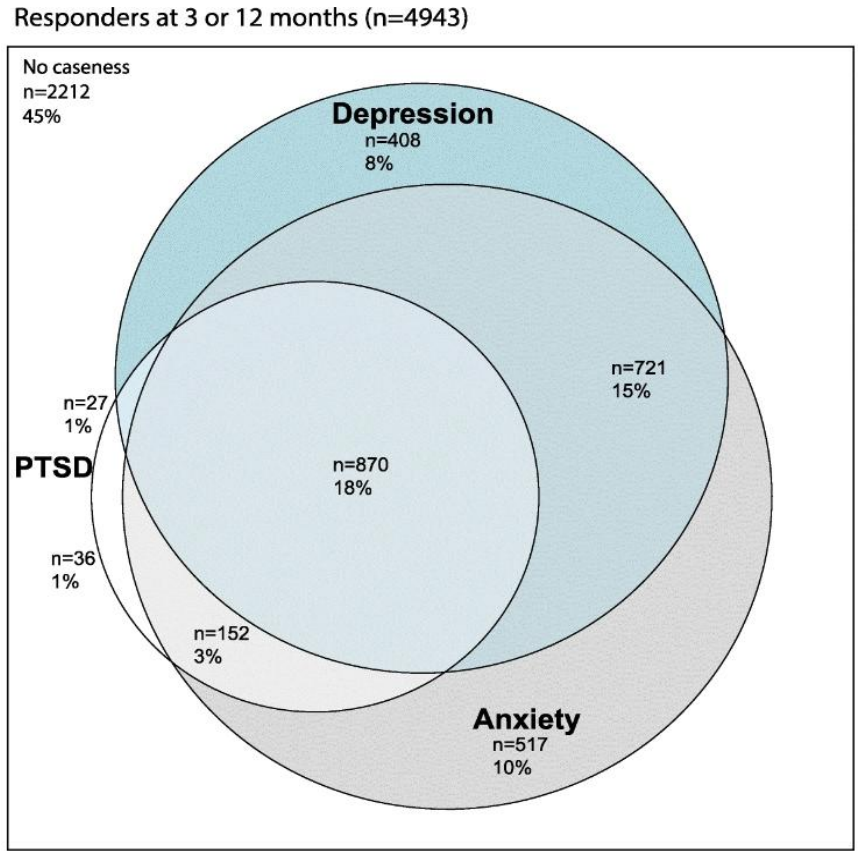
- Up to **30%** of family members [2]
- **Risk factors:**
  - >100 hrs a month direct caregiving, pre-existing mental/physical illness, lack of support, limited visiting hours and poor communication with staff [2]



1. Schwitzer et al. CHEST Crit Care. 2023
2. Davidson, J. E. Critical Care Medicine. 2012.

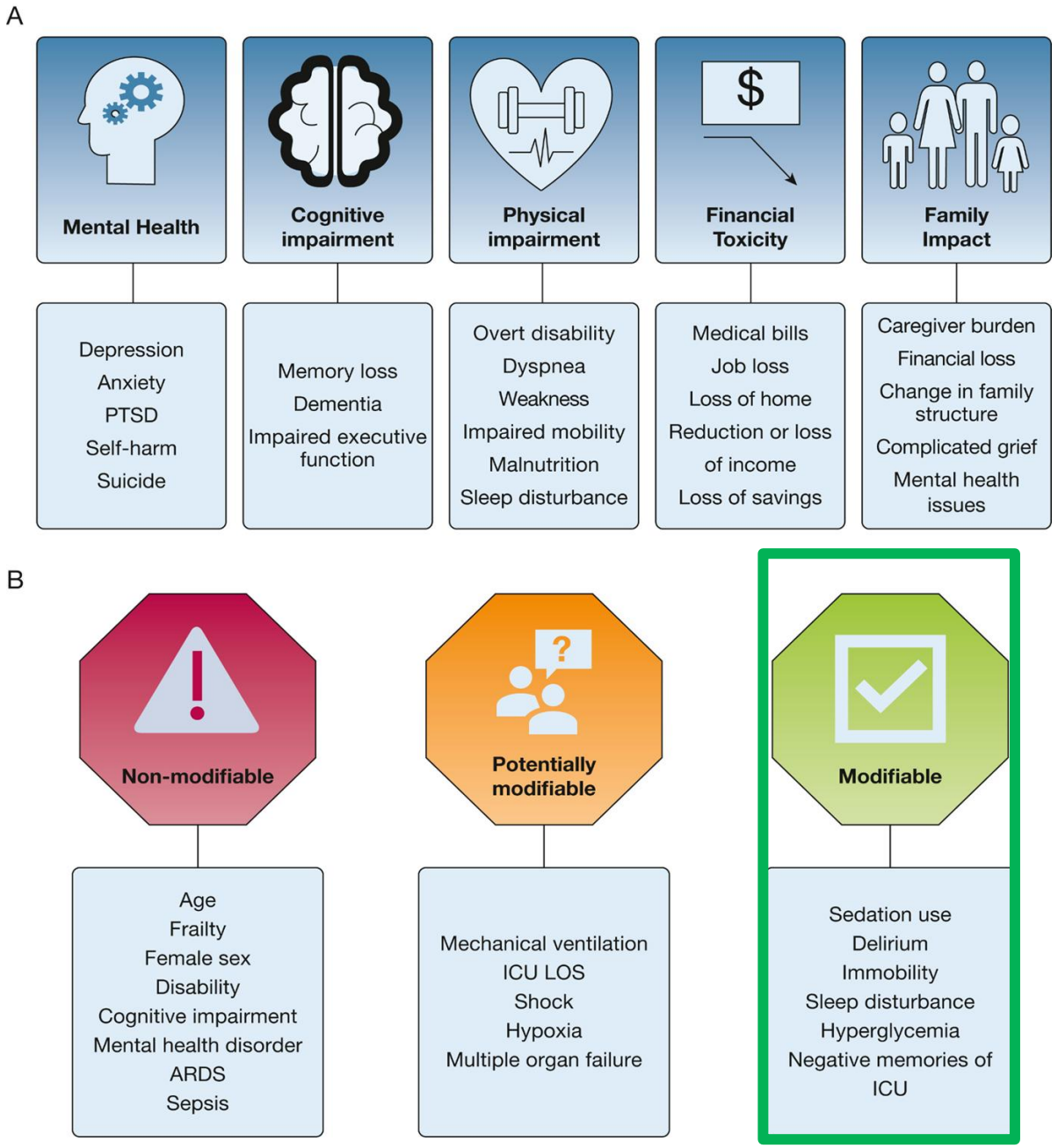
Psychiatric outcomes after critical illness

- **1 in 5 critical care survivors** have symptoms of PTSD in 12 months after ICU discharge in 2018 systematic review and meta-analysis [1]
- 2018 Prospective study of ICU survivors in the UK found prevalence of anxiety (46%), depression (40%) and PTSD (22%) at 12 months after discharge [2]
- Early delirium-related "delusional memories" associated with increased risk of developing PTSD [3]



1. Righy et al. Crit Care. 2019.
2. Hatch et al. Critical Care. 2018.
3. Granja et al. Crit Care Med. 2008

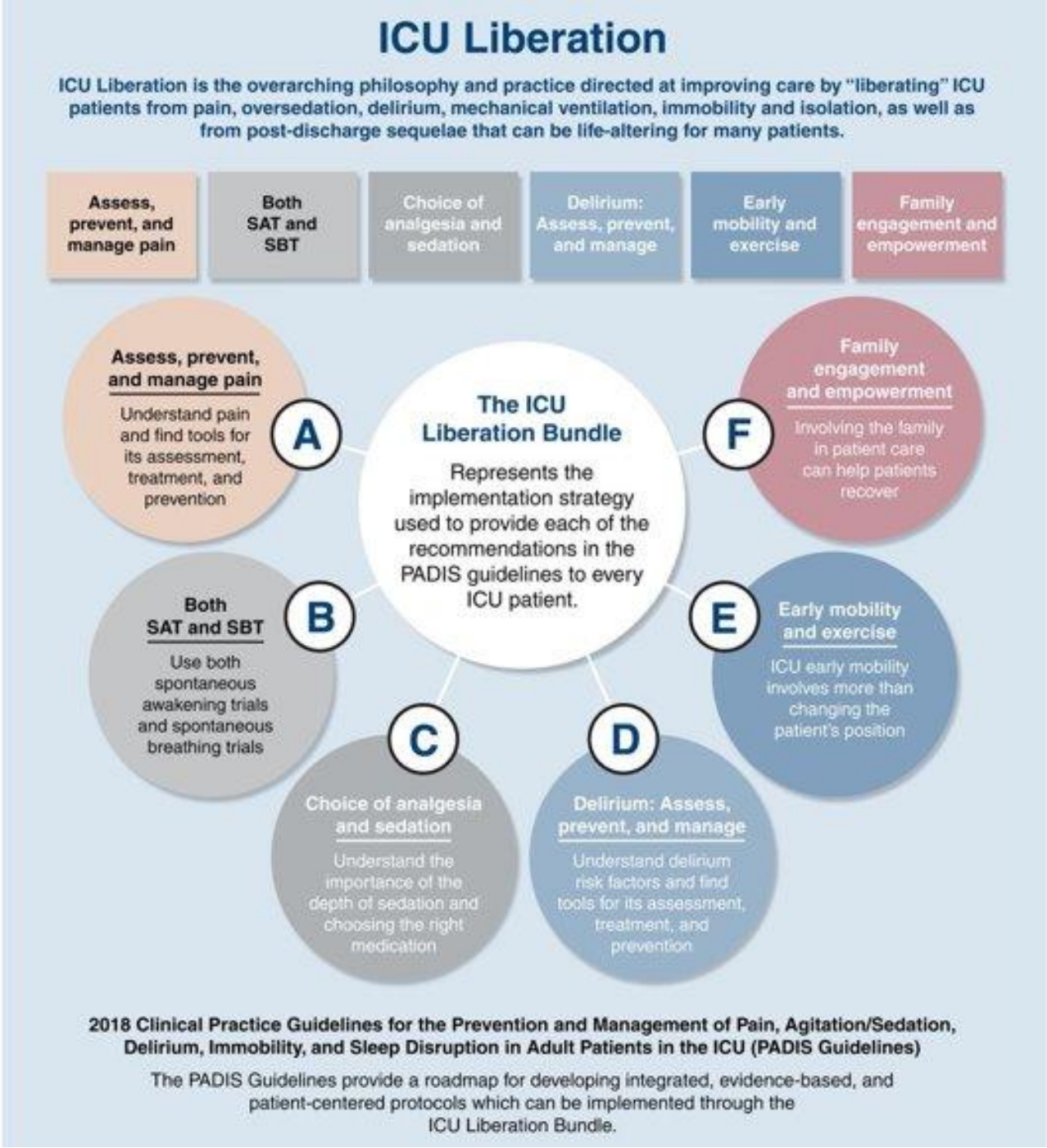
Psychiatrists have a role in PICS prevention and treatment!



Schwiitzer E et al. Survival ≠ Recovery: A Narrative Review of Post-Intensive Care Syndrome. Chest Critical Care Reviews. June 2023.

ABCDEF Bundle

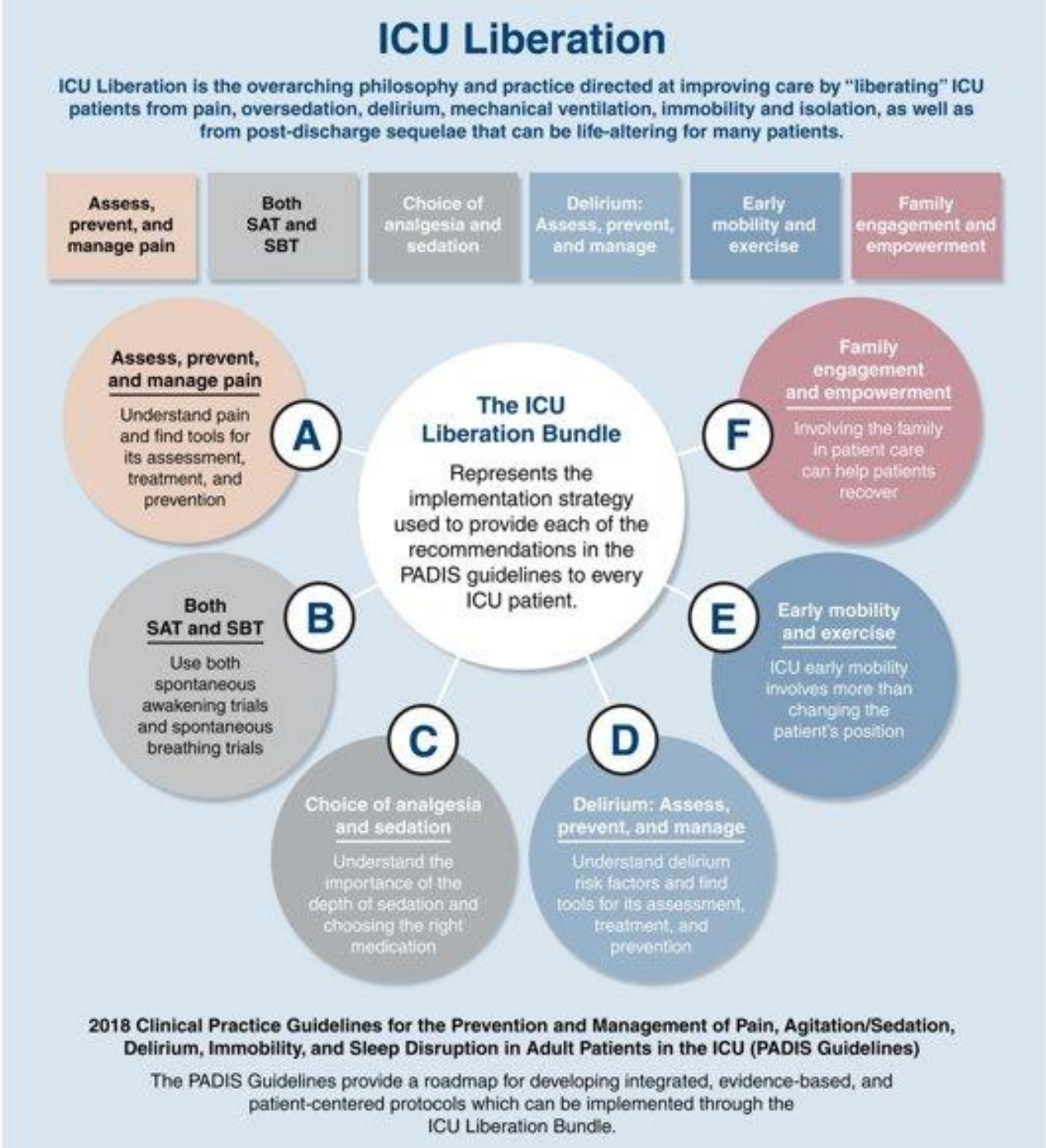
Assess Pain
Both SAT/SBT (Spontaneous Awakening Trials/Spontaneous Breathing Trials)
Choice of Analgesia and Sedation
Delirium
Early Mobility & Exercise
Family engagement & empowerment



ABCDEF Bundle

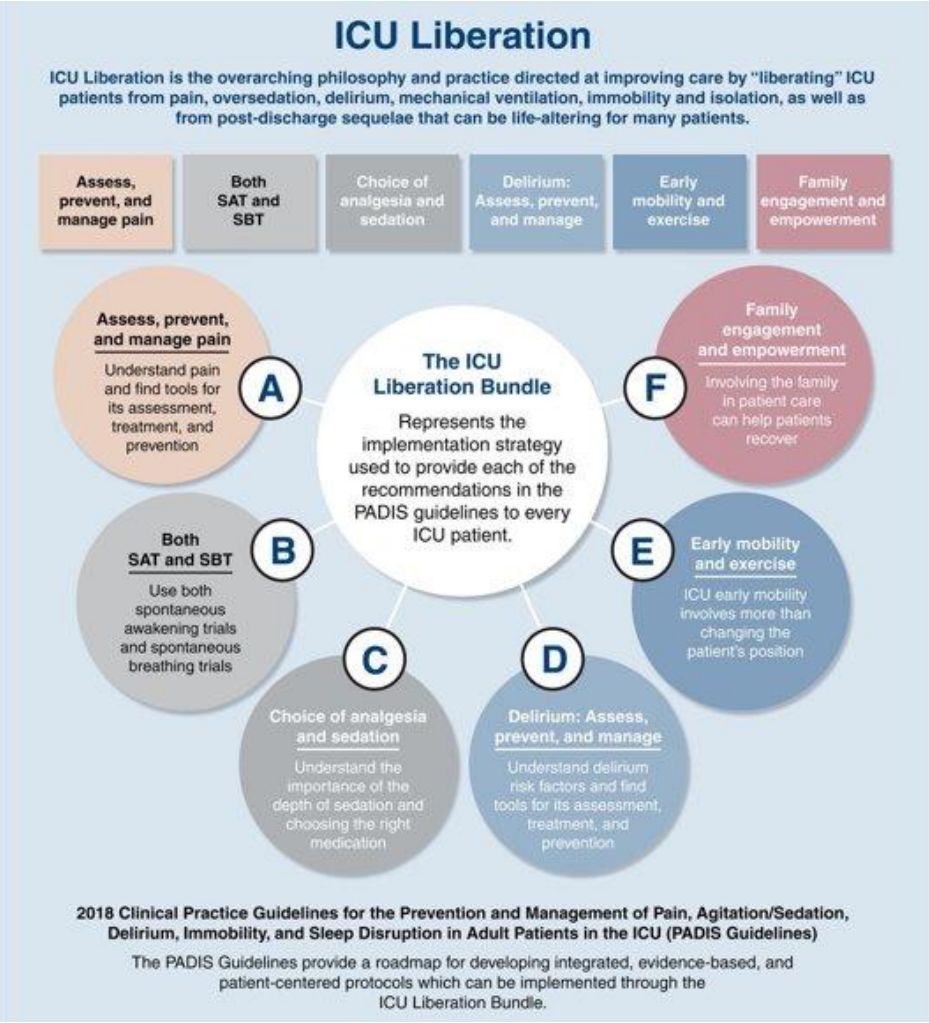
ABCDEF bundle performance associated with **lower likelihood** of:

- Mortality within 7 days (AOR: 0.32)
- Next day mechanical ventilation (AOR: 0.32)
- Physical restraint (AOR: 0.37)
- Delirium (AOR: 0.60)
- ICU re-admission (AOR: 0.54)
- Discharge to facility other than home (AOR: 0.64)



1. Pun BT 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 Jan;47(1):3-14

ABCDEF Bundle



- For every 10% improvement in bundle compliance, hospital survival increased by 7% (OR 1.07) [1]

1. Barnes-Daly MA, et al. Improving Hospital Survival and Reducing Brain Dysfunction at Seven California Community Hospitals: Implementing PAD Guidelines Via the ABCDEF Bundle in 6,064 Patients. Crit Care Med. 2017 Feb;45(2):171-178.

Pain
(Assess and Manage)

- High levels of pain
- Diagnostically challenging

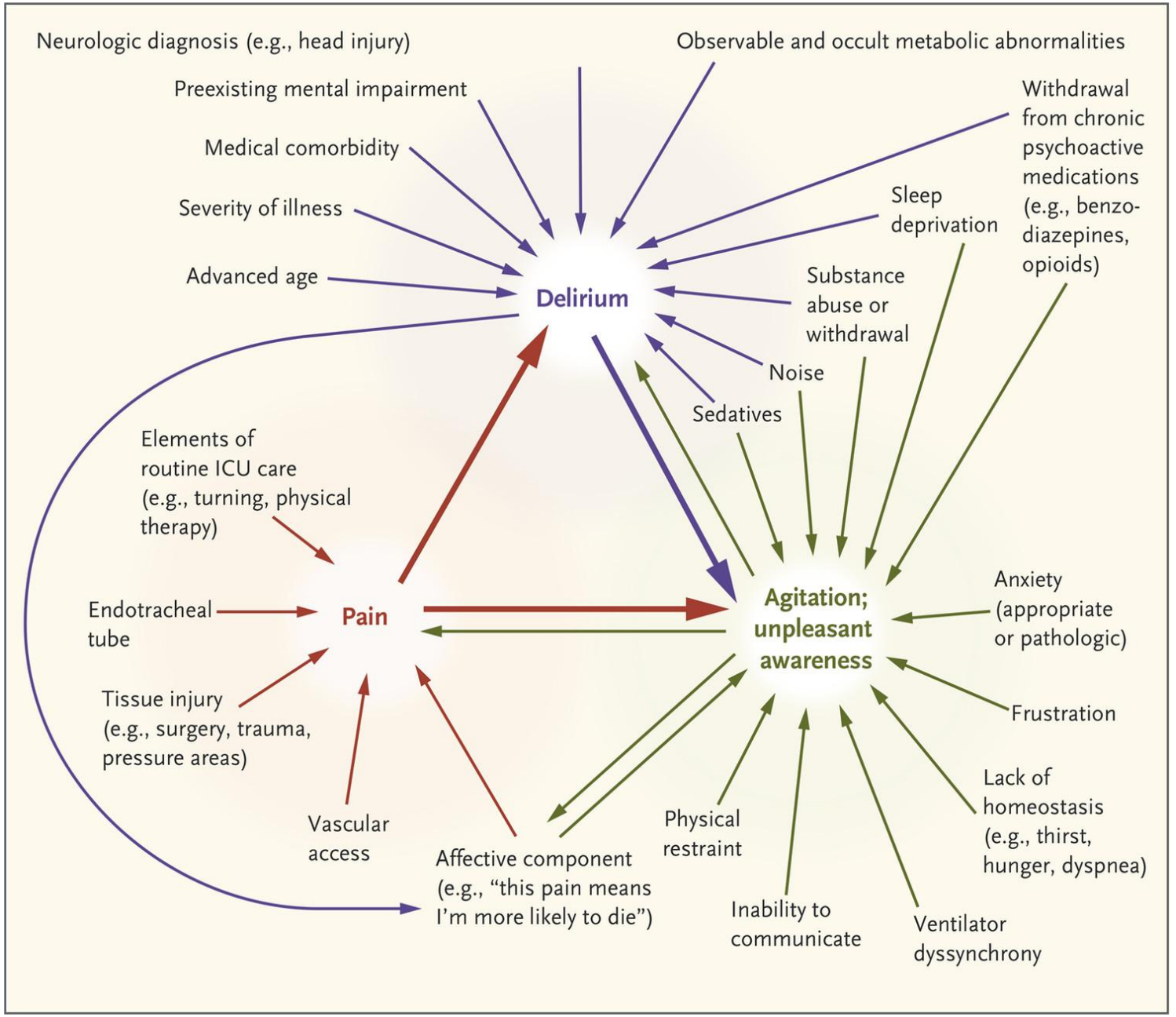
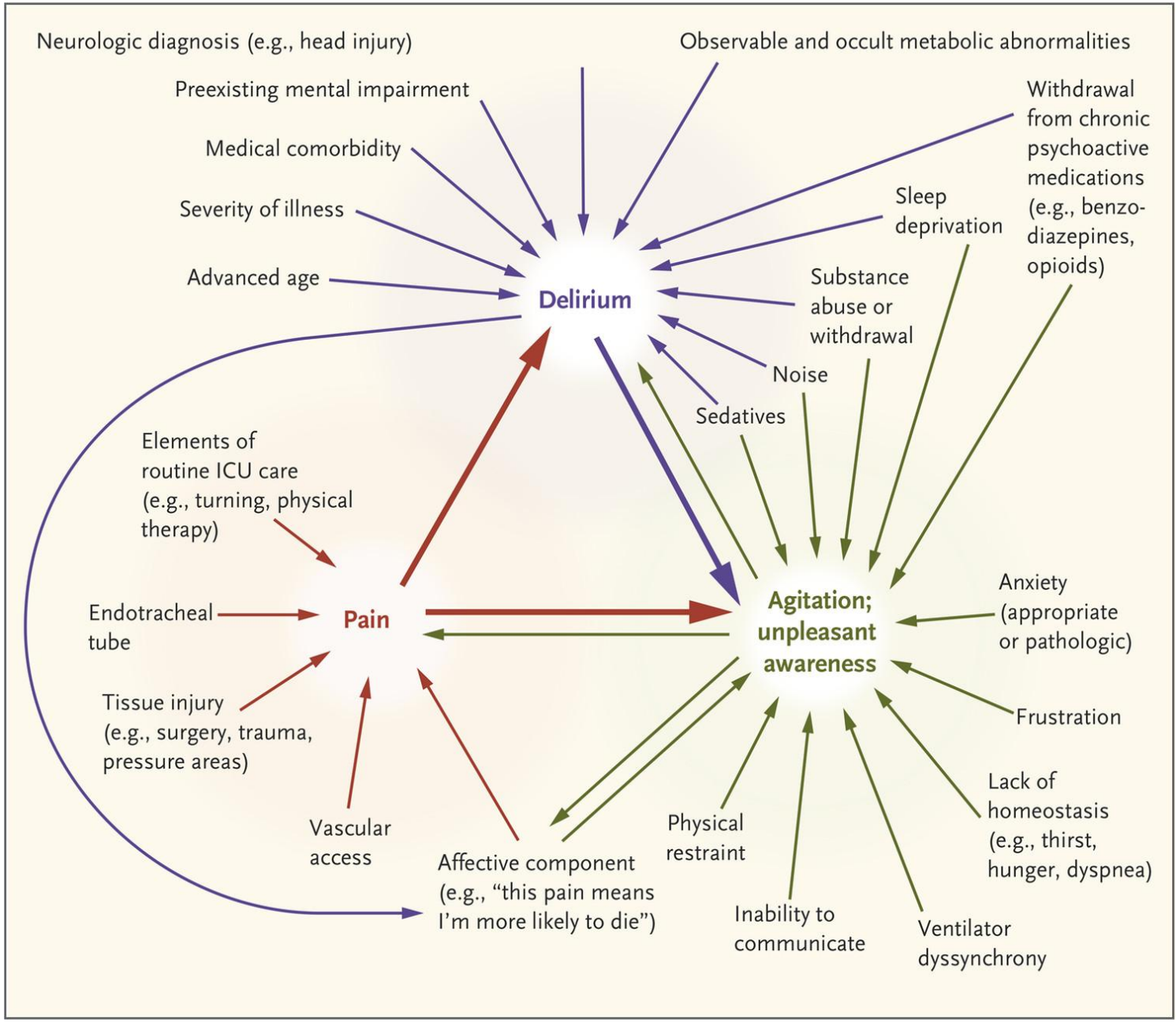


Image: Reade, M. C et al. Sedation and Delirium in the Intensive Care Unit. NEJM. 2014. *370*(5), 444–454

Pain

- >80% ICU patients remember pain/discomfort associated with the endotracheal tube [1]
- 82% of cardiac surgery patients reported pain as the **most common traumatic memory of their ICU stay** at 1 week after discharge [2]
- Memory of pain is independent predictor of post-ICU PTSD [3]



1. Gelinas C, Fillion L, Puntillo KA, Viens C, Fortier M. Validation of the Critical-Care Pain Observation Tool in Adult Patients. Am J Crit Care. 2006;15[4]:420-427.
2. Schelling G, et al. Exposure to high stress in the intensive care unit may have negative effects on health-related quality-of-life outcomes after cardiac surgery. Crit Care Med. 2003 Jul;31(7):1971-80
3. Myhren, H et al. (2010). Posttraumatic stress, anxiety and depression symptoms in patients during the first year post intensive care unit discharge. Critical Care, 14(1).
4. Image: Reade, M. C et al. Sedation and Delirium in the Intensive Care Unit. NEJM. 2014. *370*(5), 444–454

Pain: Assess

- Critical-Care Pain Observation Tool (CCPOT) and Behavioral Pain Scale (BPS) are validated in critically ill patients [1,2]

Table 1 Description of the Critical-Care Pain Observation Tool

Indicator	Description	Score	
Facial expression	No muscular tension observed	Relaxed, neutral	0
	Presence of frowning, brow lowering, orbit tightening, and levator contraction	Tense	1
	All of the above facial movements plus eyelid tightly closed	Grimacing	2
Body movements	Does not move at all (does not necessarily mean absence of pain)	Absence of movements	0
	Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements	Protection	1
	Pulling tube, attempting to sit up, moving limbs/ thrashing, not following commands, striking at staff, trying to climb out of bed	Restlessness	2
Muscle tension Evaluation by passive flexion and extension of upper extremities	No resistance to passive movements	Relaxed	0
	Resistance to passive movements	Tense, rigid	1
	Strong resistance to passive movements, inability to complete them	Very tense or rigid	2
Compliance with the ventilator (intubated patients)	Alarms not activated, easy ventilation	Tolerating ventilator or movement	0
	Alarms stop spontaneously	Coughing but tolerating	1
	Asynchrony: blocking ventilation, alarms frequently activated	Fighting ventilator	2
OR			
Vocalization (extubated patients)	Talking in normal tone or no sound	Talking in normal tone or no sound	0
	Sighing, moaning	Sighing, moaning	1
	Crying out, sobbing	Crying out, sobbing	2
Total, range			0-8

Table 1. Behavioral pain scale

Item	Description	Score
Facial expression	Relaxed	1
	Partially tightened (e.g., brow lowering)	2
	Fully tightened (e.g., eyelid closing)	3
	Grimacing	4
Upper limbs	No movement	1
	Partially bent	2
	Fully bent with finger flexion	3
	Permanently retracted	4
Compliance with ventilation	Tolerating movement	1
	Coughing but tolerating ventilation for most of the time	2
	Fighting ventilator	3
	Unable to control ventilation	4

1. Gelinas C, Fillion L, Puntillo KA, Viens C, Fortier M. Validation of the Critical-Care Pain Observation Tool in Adult Patients. Am J Crit Care. 2006;15[4]:420-427.
2. Payen J, Bru O, Bosson J, Lagrasta A, Novel E, Deschaux I, Lavagne P, Jacquot C. Assessing pain in critically ill sedated patients by using a behavioral pain scale. Crit Care Med. 2001;29 (12);2258-2263

Pain: Assess and Manage

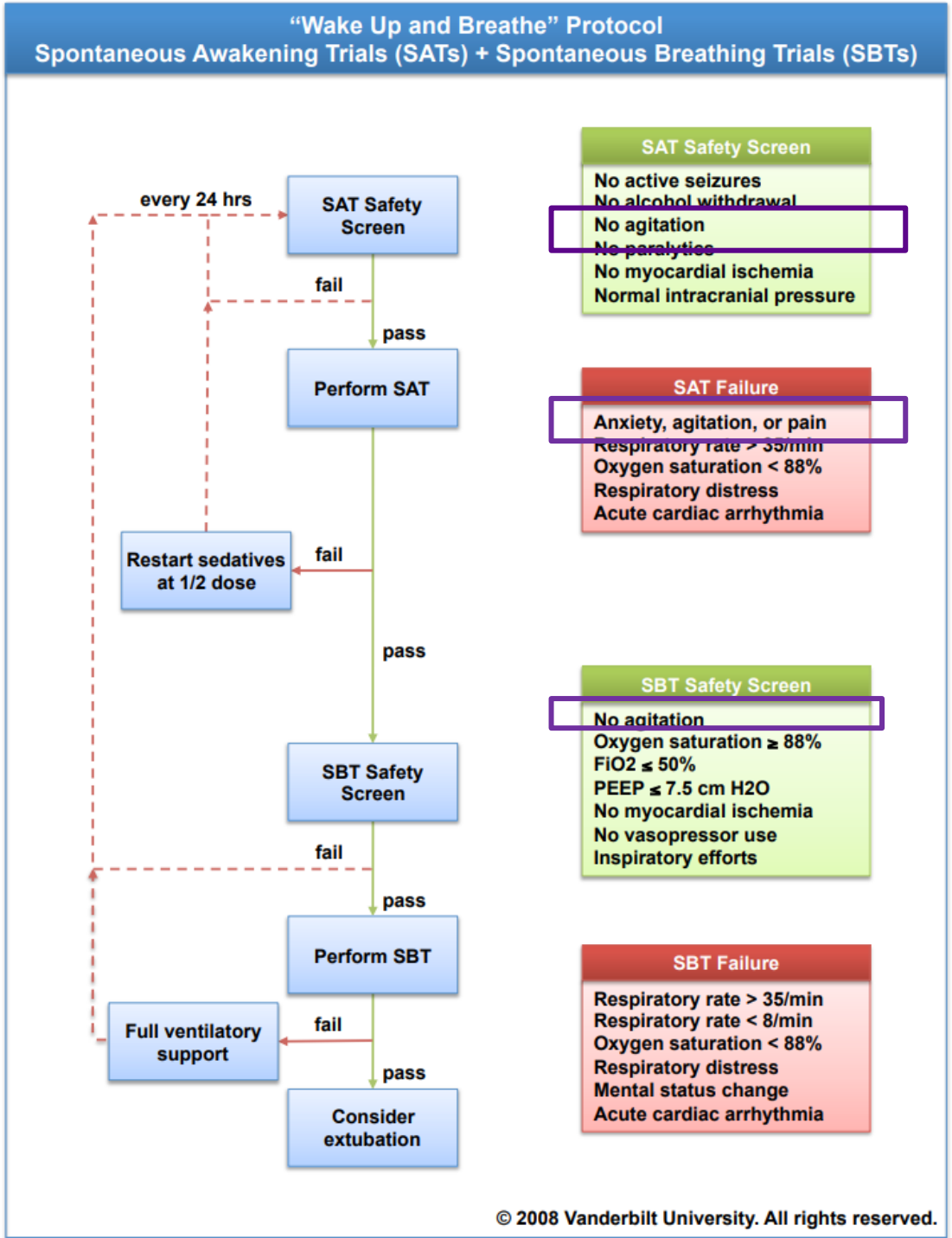
- **Analgosedation:** Strategy for managing pain/discomfort that relies of analgesic agents first before sedatives (e.g. benzodiazepines)
  - Associated with lighter levels of sedation, shorter ventilator duration, reduction in continuous infusion sedatives [1]

- **Multimodal approach [2]**
  - Neuraxial, regional, local nerve blocks
  - Nonopioid analgesics
    - Acetaminophen
    - Short term ketorolac
    - Gabapentinoids: Gabapentin, Pregabalin
    - Alpha-2 agonists: Dexmedetomidine, Clonidine
    - Ketamine

1. Faust, A. C. et al. (2016). Impact of an Analgesia-Based Sedation Protocol on Mechanically Ventilated Patients in a Medical Intensive Care Unit. Anesthesia and Analgesia, 123(4), 903–909.
2. Martyn JAJ, Mao J, Bittner EA. Opioid Tolerance in Critical Illness. N Engl J Med. 2019 Jan 24;380(4):365-378. doi: 10.1056/NEJMra1800222. PMID: 30673555; PMCID: PMC6897318.

Spontaneous Awakening Trial (SAT) & Spontaneous **B**reathing Trial (SBT)

- Daily paired SAT and SBT associated with significant decrease in time on mechanical ventilation, decreased hospital and ICU LOS [1]
- **For every seven patients treated with the intervention (daily SAT followed by SBT), one life was saved (NNT: 7.4) [1]**
- Daily SAT and SBT associated with significant decrease in infection-related ventilator-associated complications (OR: 0.35) [2]



1. Girard TD, et al. Efficacy and safety of a paired sedation and ventilator weaning protocol for mechanically ventilated patients in intensive care (Awakening and Breathing Controlled trial): a randomised controlled trial. Lancet. 2008 Jan 12;371(9607):126-34. 2.
2. Klompas M, et al ; CDC Prevention Epicenters. The preventability of ventilator-associated events. The CDC Prevention Epicenters Wake Up and Breathe Collaborative. Am J Respir Crit Care Med. 2015 Feb 1;191(3):292-301.

Choice of Analgesia & Sedation

- **What is the target sedation level?**
- Evidence supports use of minimal possible level of sedation [1]
- Early light sedation is associated with lower mortality, fewer days of mechanical ventilation and decreased ICU length of stay [2]

Assessing Consciousness: Linking Level of Consciousness & Delirium Monitoring

Step 1 Level of Consciousness: RASS*

Scale	Label	Description	
+4	COMBATIVE	Combative, violent, immediate danger to staff	
+3	VERY AGITATED	Pulls to remove tubes or catheters; aggressive	
+2	AGITATED	Frequent non-purposeful movement, fights ventilator	
+1	RESTLESS	Anxious, apprehensive, movements not aggressive	
0	ALERT & CALM	Spontaneously pays attention to caregiver	VOICE
-1	DROWSY	Not fully alert, but has sustained awakening to voice (eye opening & contact >10 sec)	VOICE
-2	LIGHT SEDATION	Briefly awakens to voice (eyes open & contact <10 sec)	VOICE
-3	MODERATE SEDATION	Movement or eye opening to voice (no eye contact)	VOICE

If RASS is ≥ -3 proceed to CAM-ICU (Is patient CAM-ICU positive or negative?)

-4	DEEP SEDATION	No response to voice, but movement or eye opening to physical stimulation	TOUCH
-5	UNAROUSABLE	No response to voice or physical stimulation	TOUCH

If RASS is -4 or -5 → STOP (patient unconscious), RECHECK later

[3]Sessler, et al. AJRCCM 2002; 166:1338-1344.
[4]Ely, et al. JAMA 2003; 289:2983-2991.
*For RASS equivalents to other sedation-agitation scales see FAQs page 20-21.

1. Reade, M. C et al. Sedation and Delirium in the Intensive Care Unit. NEJM. 2014. *370*(5), 444–454
2. Stephens RJ, et al. Crit Care Med 2018;46(3):471-479

Choice of Analgesia & Sedation

- In mechanically ventilated patients with agitated delirium, addition of **dexmedetomidine (α-2 agonist)** to standard care resulted in **increased:** [1]
  - ventilator free hours
  - days alive
  - days free of delirium

- **PADIS (Pain, Agitation, Delirium, Immobility, Sedation) Focused Update 2025:** recommends use of dexmedetomidine over propofol for sedation in mechanically ventilated adult patients admitted to the ICU where light sedation and/or a reduction in delirium are of highest priorities

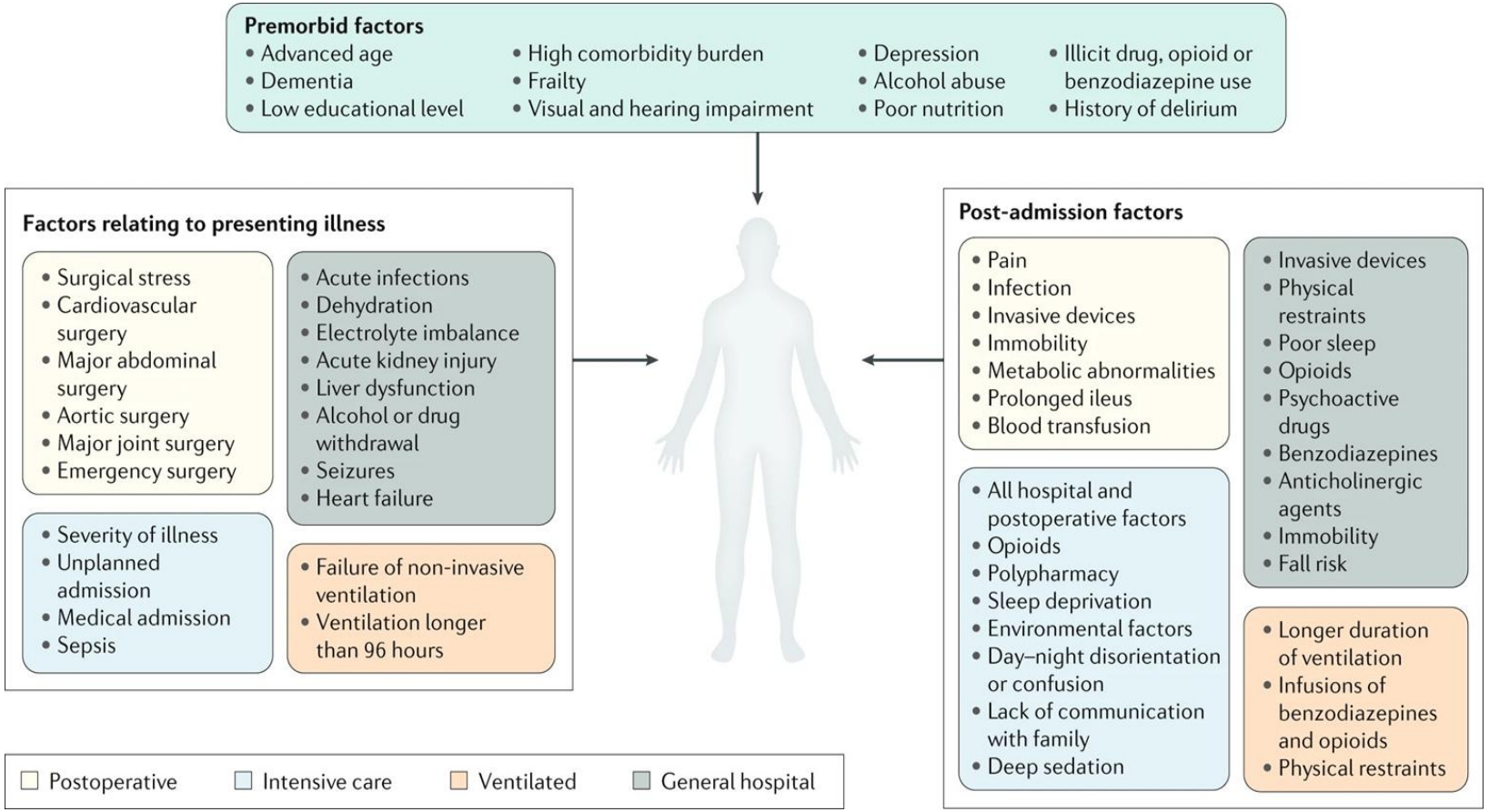
Table 1. Sedatives and Analgesics in Common Use in the ICU.*

Drug (Brand Name)	Mechanism of Action	Typical Adult Dose
Midazolam (Versed)	$GABA_A$ agonist	Bolus, 1 to 5 mg; infusion, 1 to 5 mg/hr
Lorazepam (Ativan)	$GABA_A$ agonist	Bolus, 1 to 4 mg; infusion, 1 to 5 mg/hr
Diazepam (Valium; Diazemuls)	$GABA_A$ agonist	Bolus, 1 to 5 mg
Propofol (Diprivan)	$GABA_A$ agonist, with other effects, including on glutamate and cannabinoid receptors	50 to 200 mg/hr or 1 to 3 mg/kg/hr
Dexmedetomidine (Precedex)	α_2-Agonist	0.2 to 1.5 μg/kg/hr
Remifentanil (Ultiva)	μ-Opioid agonist (also with κ-opioid agonist effects)	0.5 to 2 μg/kg/min; loading dose of 0.4 to 0.8 μg/kg may be considered
Fentanyl (Sublimaze)	μ-Opioid agonist (also with κ-opioid agonist effects)	20 to 100 μg/hr; loading dose of 50 to 100 μg may be considered
Morphine (Roxanol; Duramorph)	μ-Opioid agonist (also with κ-opioid and δ-opioid agonist effects)	1 to 5 mg/hr; loading dose of 2 to 5 mg may be considered
Hydromorphone (Dilaudid)	μ-Opioid agonist (also with κ-opioid and δ-opioid agonist effects)	0.5 to 2 mg/hr; loading dose of 0.4 to 1.5 mg may be considered

1. Reade, M. C.et al. (2016). Effect of Dexmedetomidine Added to Standard Care on Ventilator-Free Time in Patients With Agitated Delirium: A Randomized Clinical Trial. JAMA.
2. Lewis et al. A Focused Update to the Clinical Practice Guidelines for the Prevention and Management of Pain, Anxiety, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU. (2025). Crit Care Medicine.

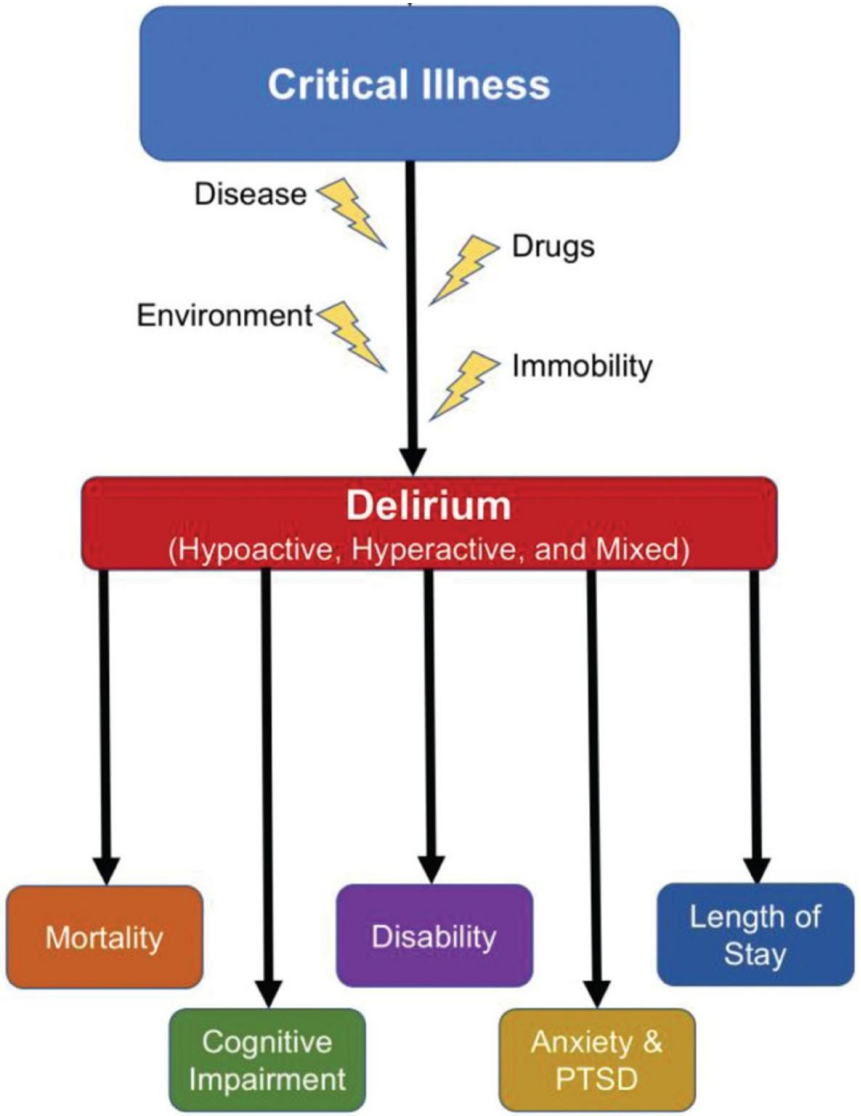
Delirium: Assess, prevent, manage

- Acute onset of deficits in attention and other aspects of cognition; due to an underlying physiologic cause [1]
- 70-80% of ICU patients experience delirium [1]



1. Oldham et al. 2024. JACLP
2. Wilson. Et al. 2020. Nature Review Primer

Delirium is associated with morbidity and mortality



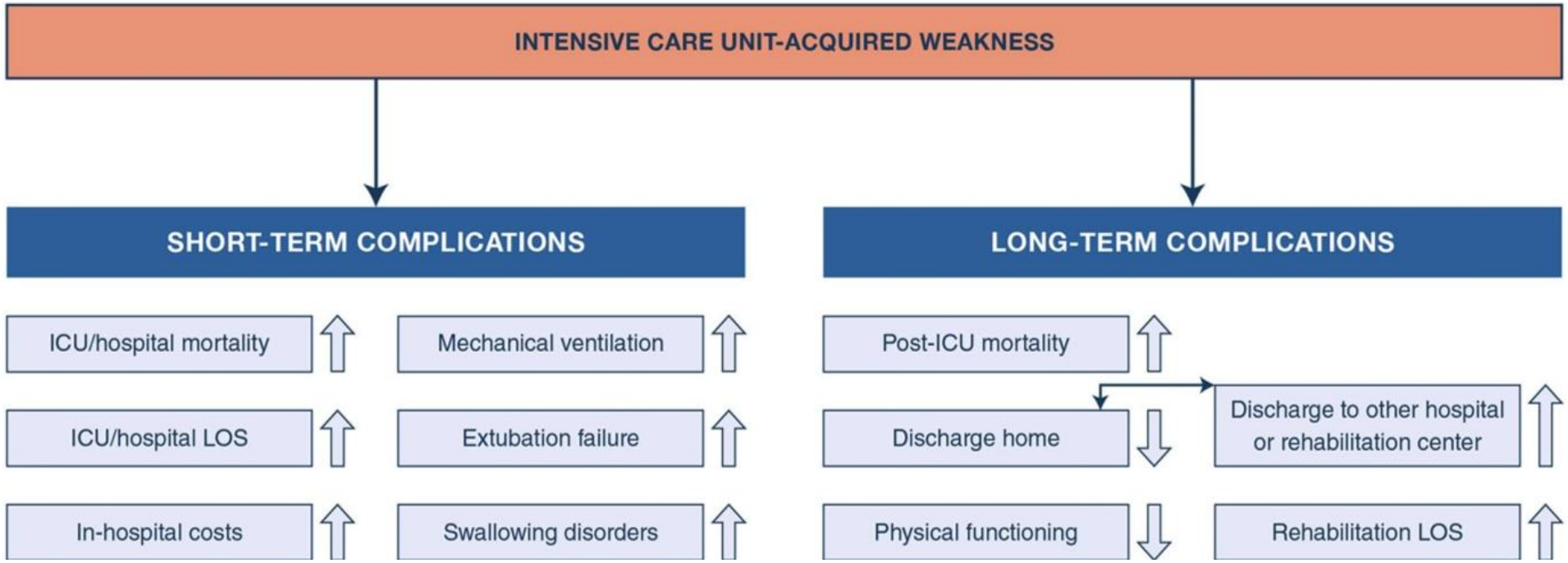
Delirium has been associated with numerous negative outcomes:

- **Independent predictor** of **higher mortality** at 6 months in a cohort of mechanically ventilated patients [1]
- **Higher hospital costs** [2]
- **Cognitive impairment** [3]
- **Increased hospital length of stay** [4]

1. Ely E.W et al. JAMA 2024
2. Leslie. et al. Archives of Internal Medicine. 2008
3. Pandharipande et al. NEJM. 2013.
4. Ely EW et al. *Intensive Care Med* 2001

Early Mobilization

- **ICU acquired weakness:** Diffuse, symmetric weakness of extremities, decreased tone and decreased deep tendon reflexes [1]
  - Loss of muscle mass may exceed 10% in the first 10 days of ICU hospitalization [2]
  - Associated with impairment in physical functioning, quality of life, decreased long term survival [3,4]



1. Vanhorebeek, I. et al. (2020). ICU-acquired weakness. *Intensive Care Medicine*, *46*(4), 637–653.
2. Puthucheary ZA, et al. (2013) Acute skeletal muscle wasting in critical illness. JAMA 310:1591–160
3. Denehy L, Lanphere J, Needham DM. Ten reasons why ICU patients should be mobilized early. Intensive Care Med 2017; 43:8690
4. Dinglas VD et al. Muscle weakness and 5-year survival in acute respiratory distress syndrome survivors. Crit Care Med 2017; 45:446453.

Early Mobilization

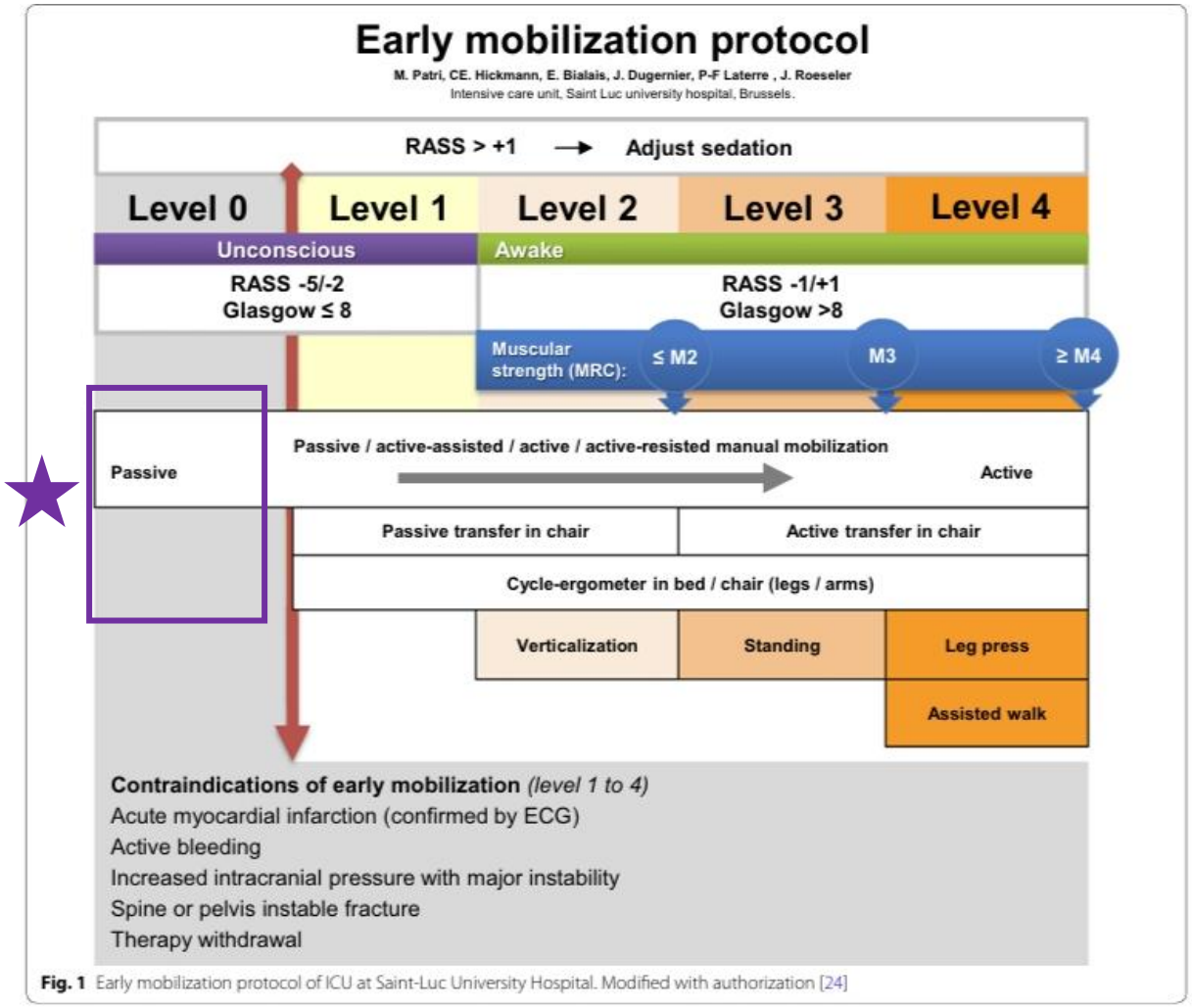


Fig. 1 Early mobilization protocol of ICU at Saint-Luc University Hospital. Modified with authorization [24]

Family Engagement and Empowerment

Strengthens Patient Care

- Important history gathering, understanding cultural context, personal beliefs/wishes

- Flexible visiting policies associated with reduced frequency of delirium (OR: 0.39), lower severity of anxiety symptoms[1]

Impact on Families

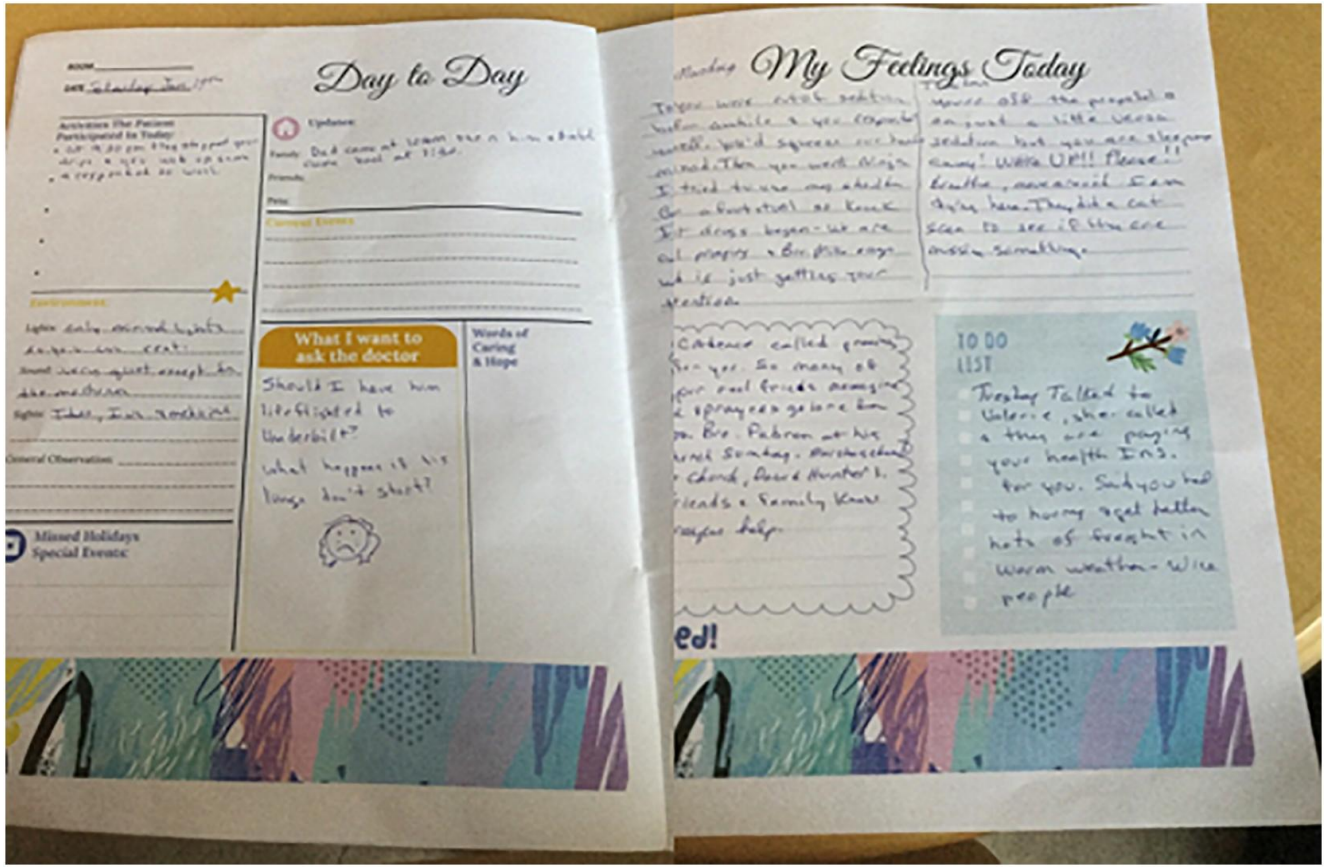
- PICS-Family [2]

1. Nassar Junior AP, et al: Flexible Versus Restrictive Visiting Policies in ICUs: A Systematic Review and Meta-Analysis. Crit Care Med 2018; 46(7):1175–1180
2. Davidson JE, et al. Guidelines for family-centered care in the neonatal, pediatric, and adult ICU. Crit Care Med. 2017 Jan;45(1):103-128.

ICU diaries

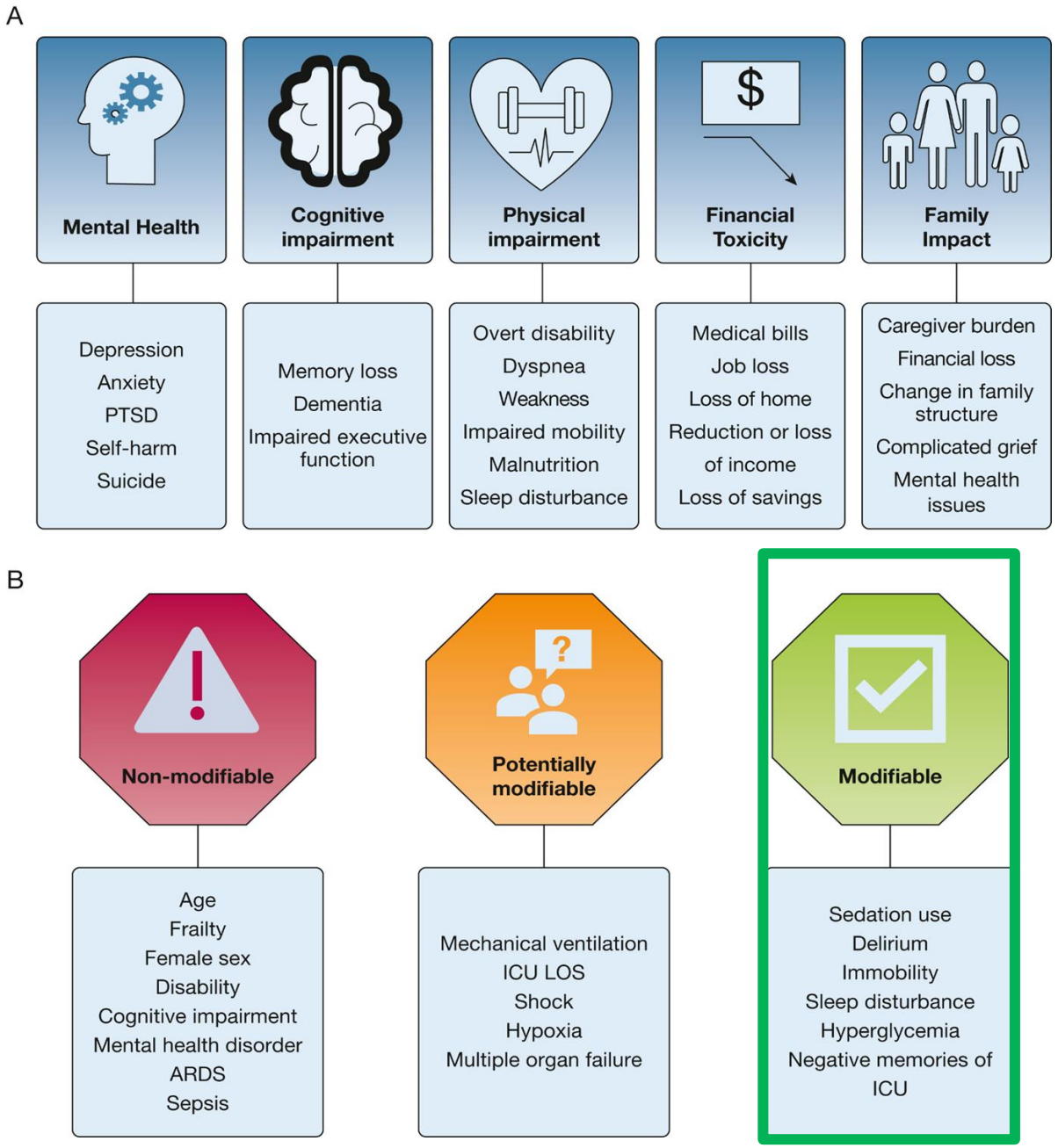
- Tool for tracking information, communicating with ICU staff, processing emotions [1]

- ICU diaries:
  - Decrease anxiety & depression symptoms in ICU survivors [2]
  - May improve PTSD symptoms in relatives of ICU survivors [2]



1. Mickelson RS et al. The use and usefulness of ICU diaries to support family members of critically ill patients. J Crit Care. 2021 Feb;61:168-176
2. McIlroy AP et al. The Effect of ICU Diaries on Psychological Outcomes and Quality of Life of Survivors of Critical Illness and Their Relatives: A Systematic Review and Meta-Analysis. Crit Care Med 2019;47(2):273–279.

Psychiatrists have a role in PICS prevention and treatment!



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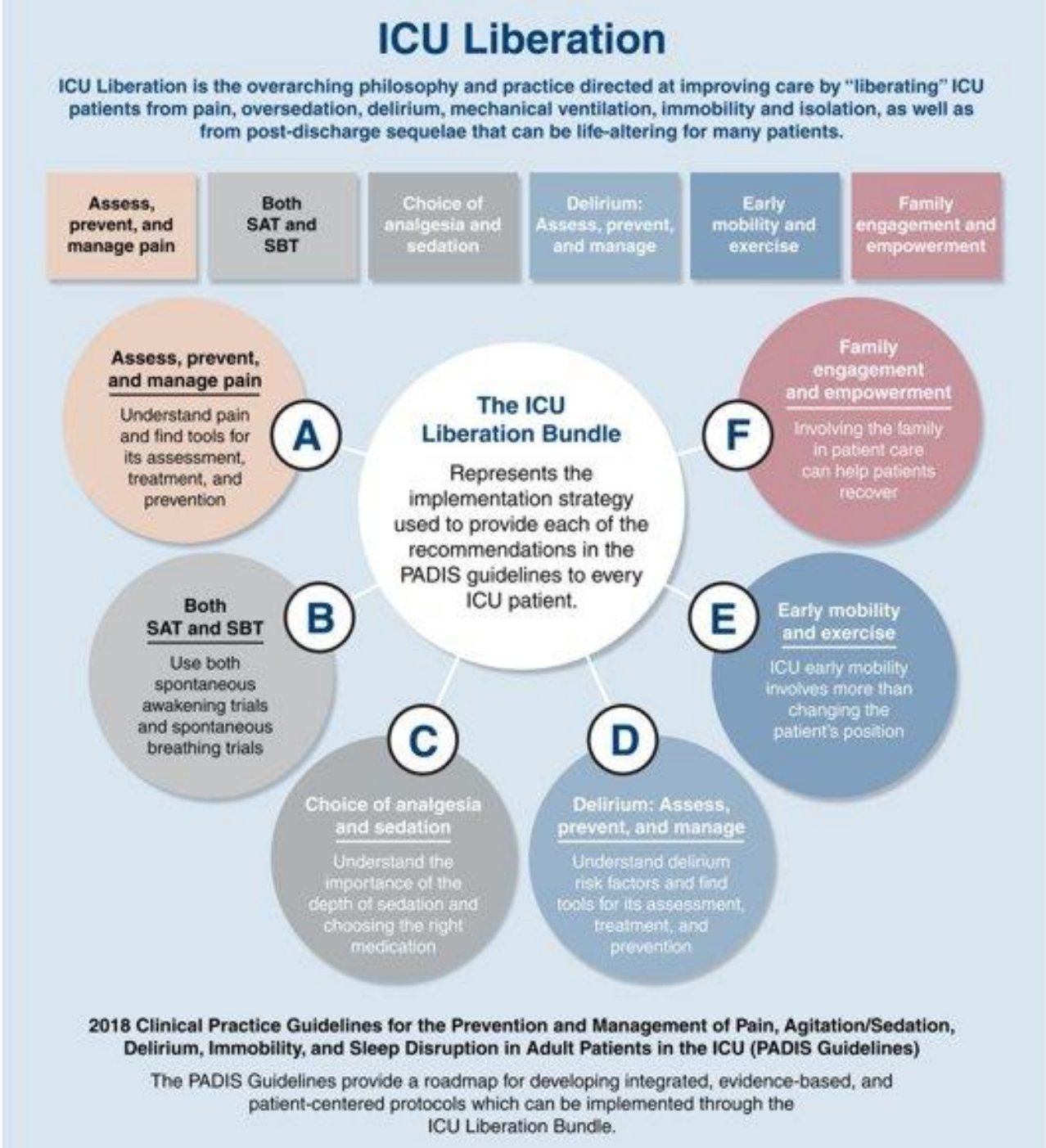
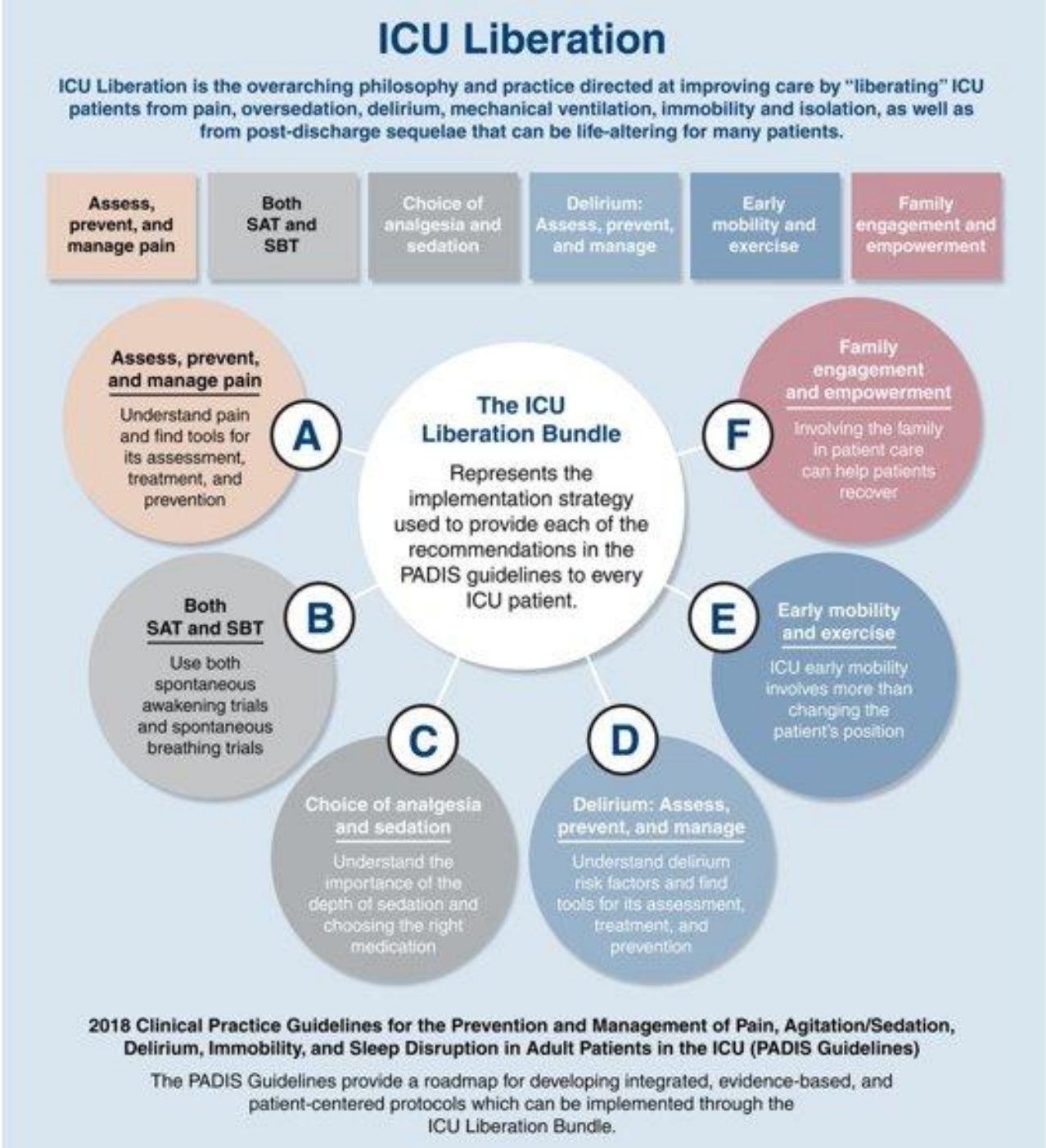
Tools for Critical Care Psychiatrist

A: Is pain contributing to restlessness/agitation?
B: Management of agitation to facilitate SAT/SBT
C: What is the target sedation?
C/D: Is dexmedetomidine indicated?
D: What delirium prevention measures can be optimized?
E: Mobilization
F: Family education & involvement: ICU diaries



Take-aways

- Survivors of critical illness experience elevated rates of psychiatric symptoms
- ICU Liberation (ABCDEF) Bundle adherence saves lives and prevent PICS
- Psychiatry can be vital in implementation of ICU Liberation Bundle



Thank you!

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