Recovery from Critical Illness

Tackling the Post ICU Syndrome
Now and in the Future

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@ICU_Recovery

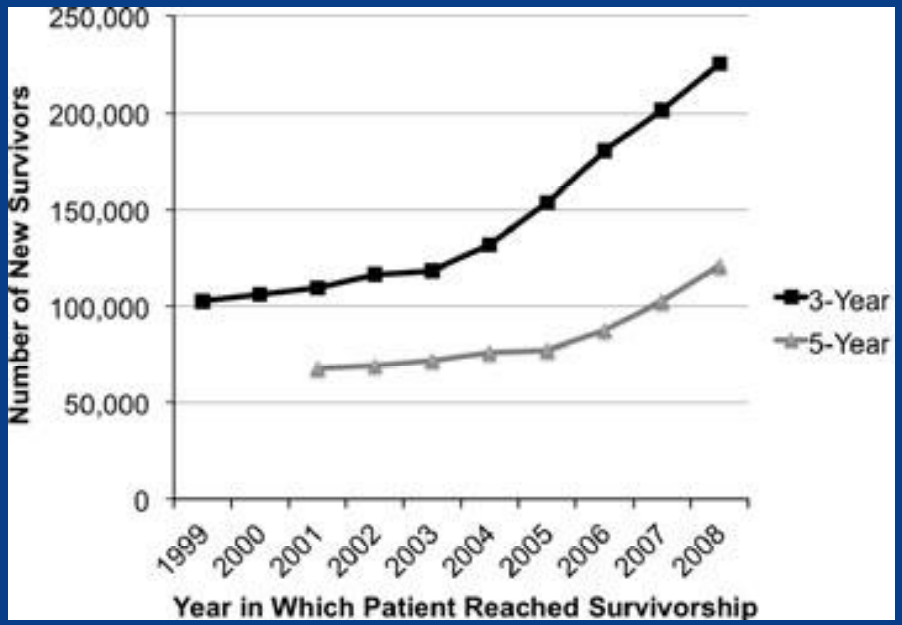
Disclosures

Society of Critical Care Medicine
Department of Defense

- What is Post Intensive Care Syndrome?
- Why does is matter?
- What can we do about it?

Finfer, Vincent NEJM 2014
Needham JAMA 2008

The Burden of Survivorship



Survival is not the end-point for patients and families

In your current ICU practice, do you:

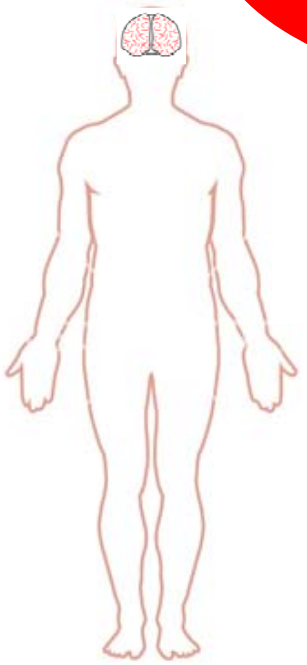
- **A)** see all your ICU patients for an outpatient follow up visit
- **B)** see select patients at high risk for post-ICU complications
- **C)** chart stalk interesting patients to see what happened to them after ICU
- **D)** congratulate yourself for a job well done as your patient rolls off the unit

Post-Intensive Care Syndrome

Mental Health
Depression
Anxiety
PTSD

Cognitive Impairments
Executive Function
Mental Processing Speed
Visuo-spatial
Memory
Attention

Stressed Families
Depression
Anxiety
PTSD



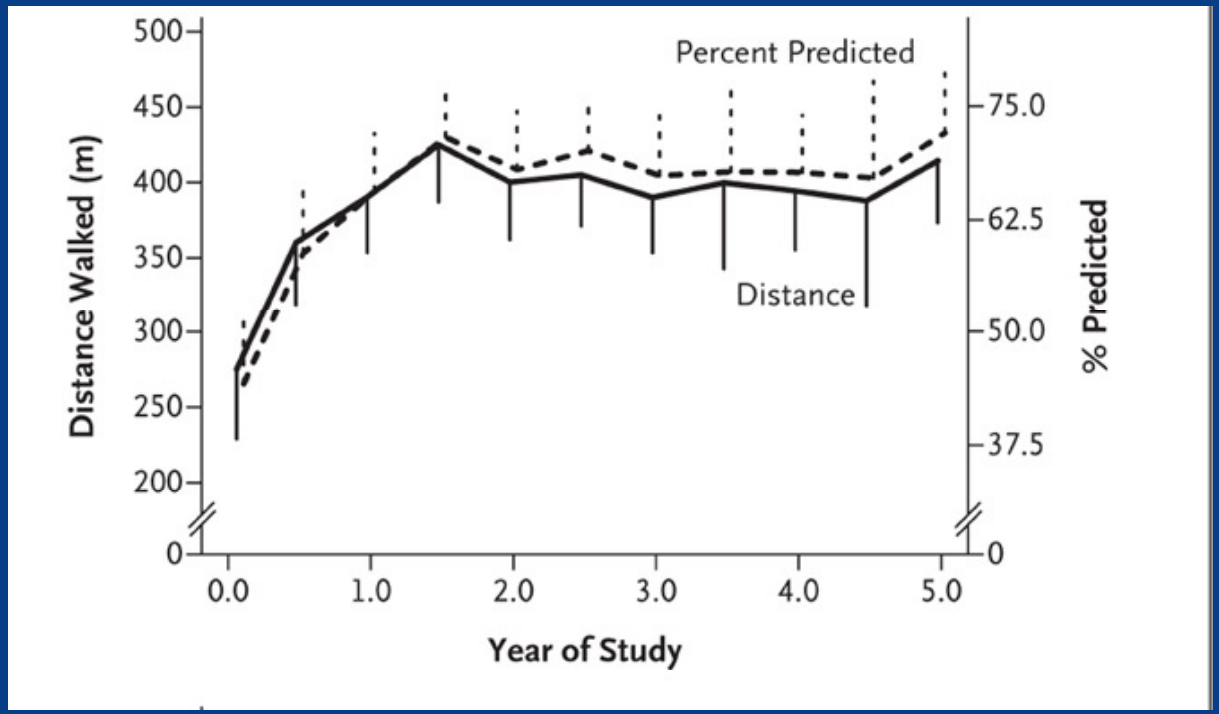
Physical Impairments
Muscle Weakness and Loss
Neuropathies
Pulmonary Function

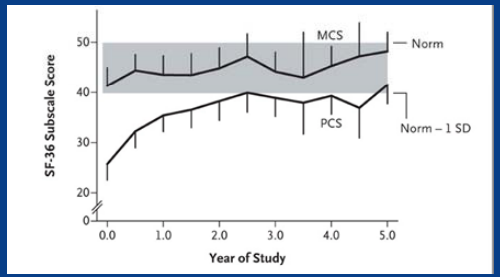
High Burden of Chronic Health Conditions

Needham *et al*. *Crit Care Med* 2012
Adapted with permission from Hallie Prescott


The Esels - path is blocked
because of falling stones.
To enter the restricted area is
strictly prohibited !
There is a DANGER OF LIFE !
The owner assumes no liability.
For the state of NRW the district government Cologne.

Physical sequelae

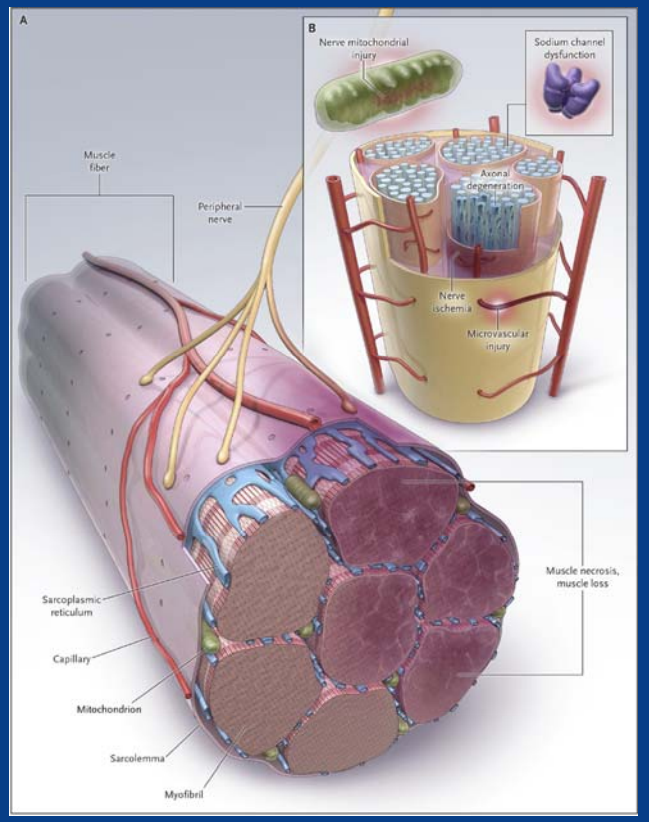




Herridge et al NEJM 2011

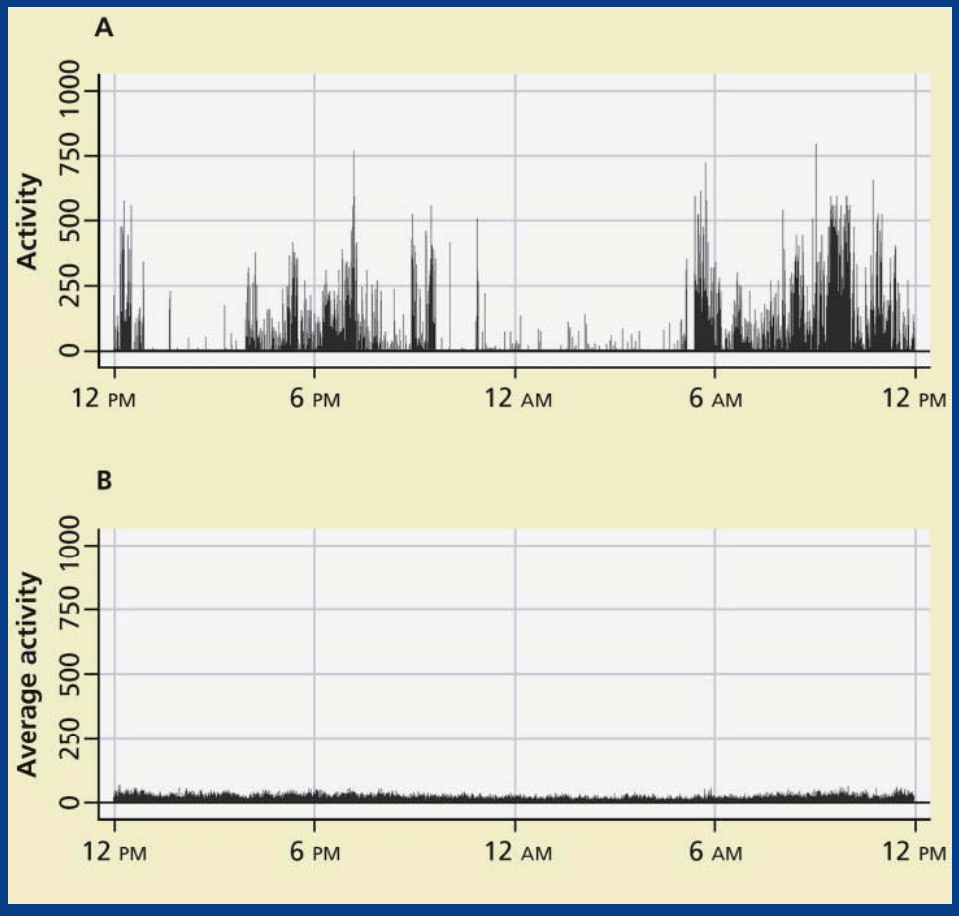
Critical illness myopathy and polyneuropathy

- Limb, respiratory weakness
- Risk factors: sepsis, inflammation, immobility, (steroids, NMB, sugar)
- women >>>> men



Kress and Hall NEJM 2014

Immobility in the ICU



Kamdar et al AJCC 2017

Physical sequelae

Alopecia

Onychomadesis

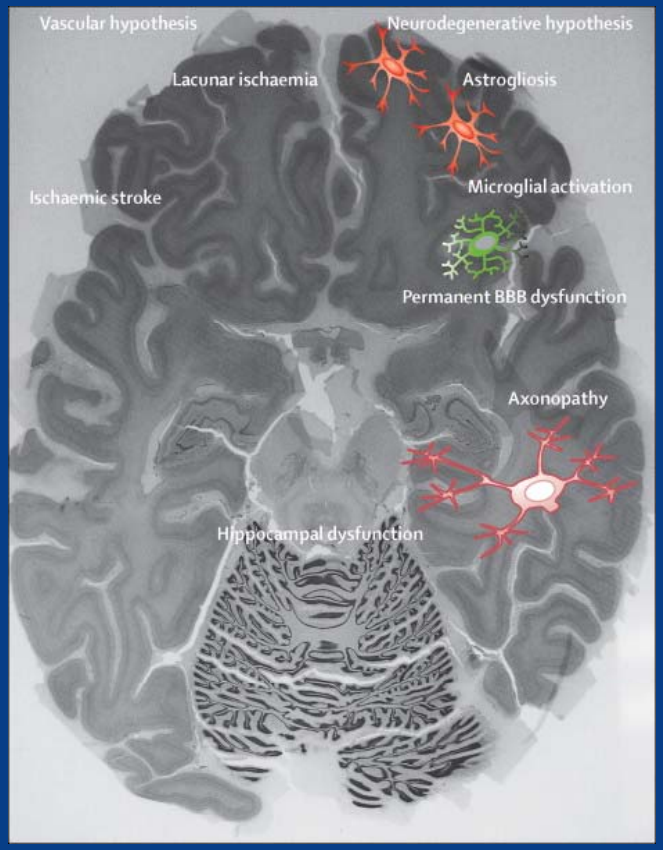
Battle et al J Crit Care 2018

Shoulder Impairment

Assessment	Shoulder Impairment, *n* (%)	Components of Shoulder Impairment, *n* (%)		
		Pain	Decreased Range of Movement	Abnormal Constant-Murley Score (Shoulder Impairment Assessment Score)
Inpatient ($n = 25$)	19 (76)	4 (21)	19 (100)	Not assessed
3 mo ($n = 62$)	45 (73)	11 (24)	45 (100)	41 (91)
6 mo ($n = 61$)	41 (67)	21 (51)	39 (95)	37 (40)

Gustafson et al Crit Care Med 2018

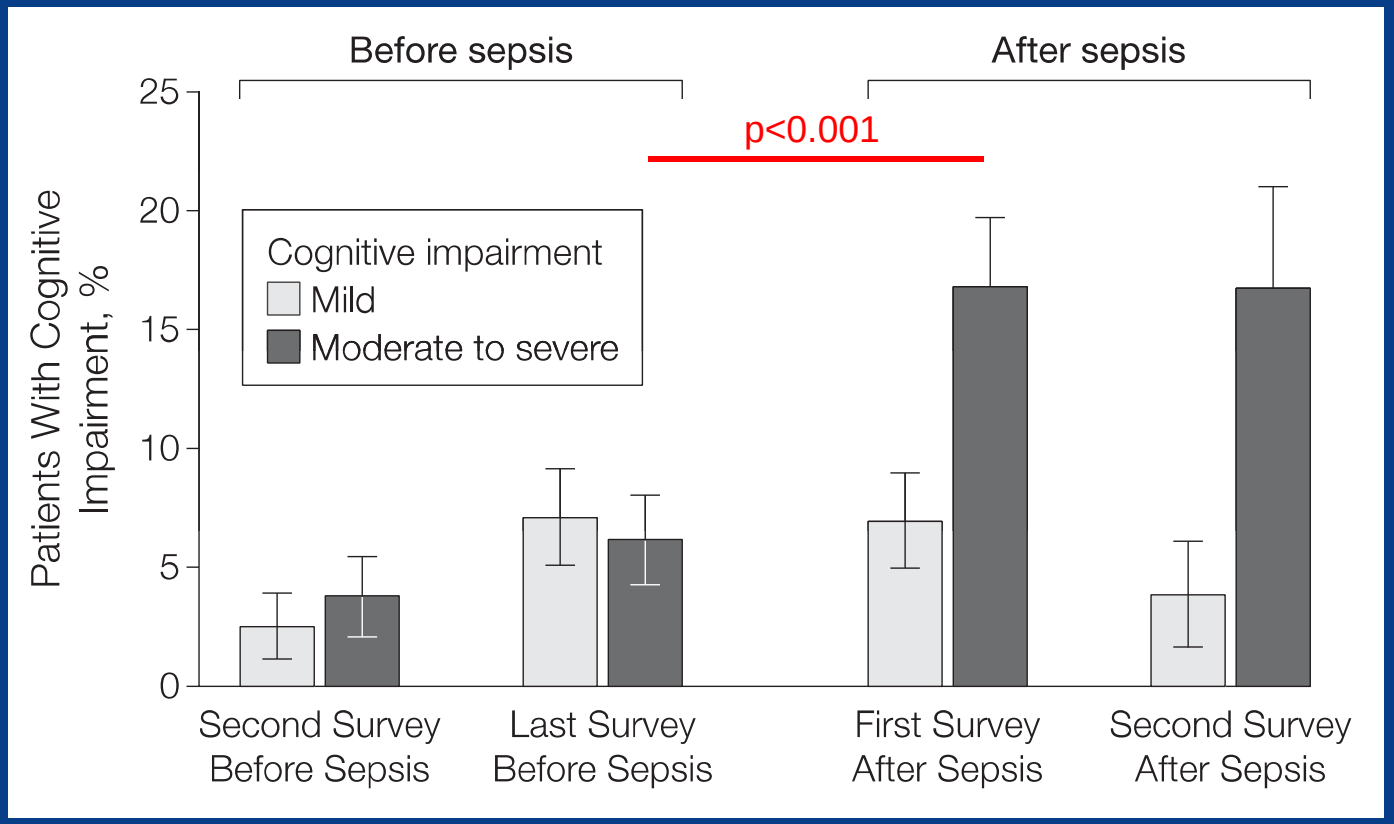
Cognitive outcomes



- deficits in verbal learning and memory,
- decreased hippocampal volume,
- more low frequency EEG activity indicating brain dysfunction

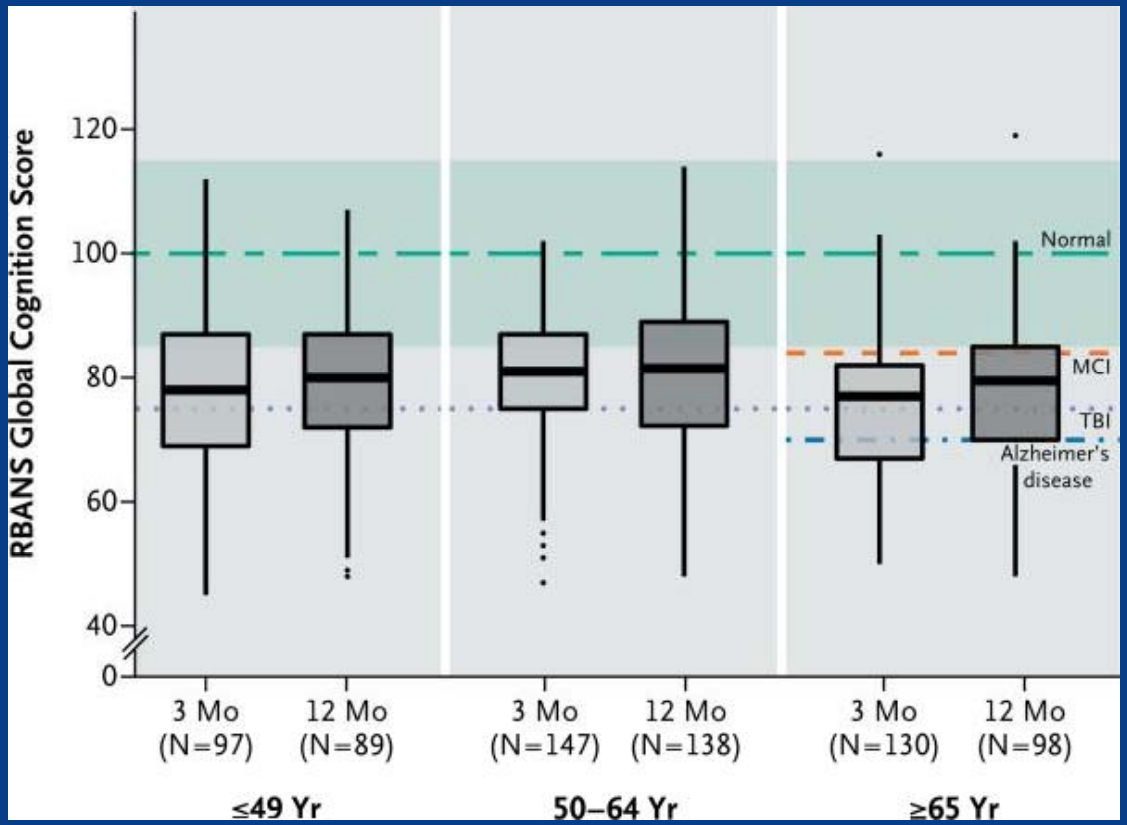
Annane and Sharshar Lancet Resp Med 2015
Semmler et al J Neurol Neurosurg Psych 2013

Cognitive Impairment after sepsis



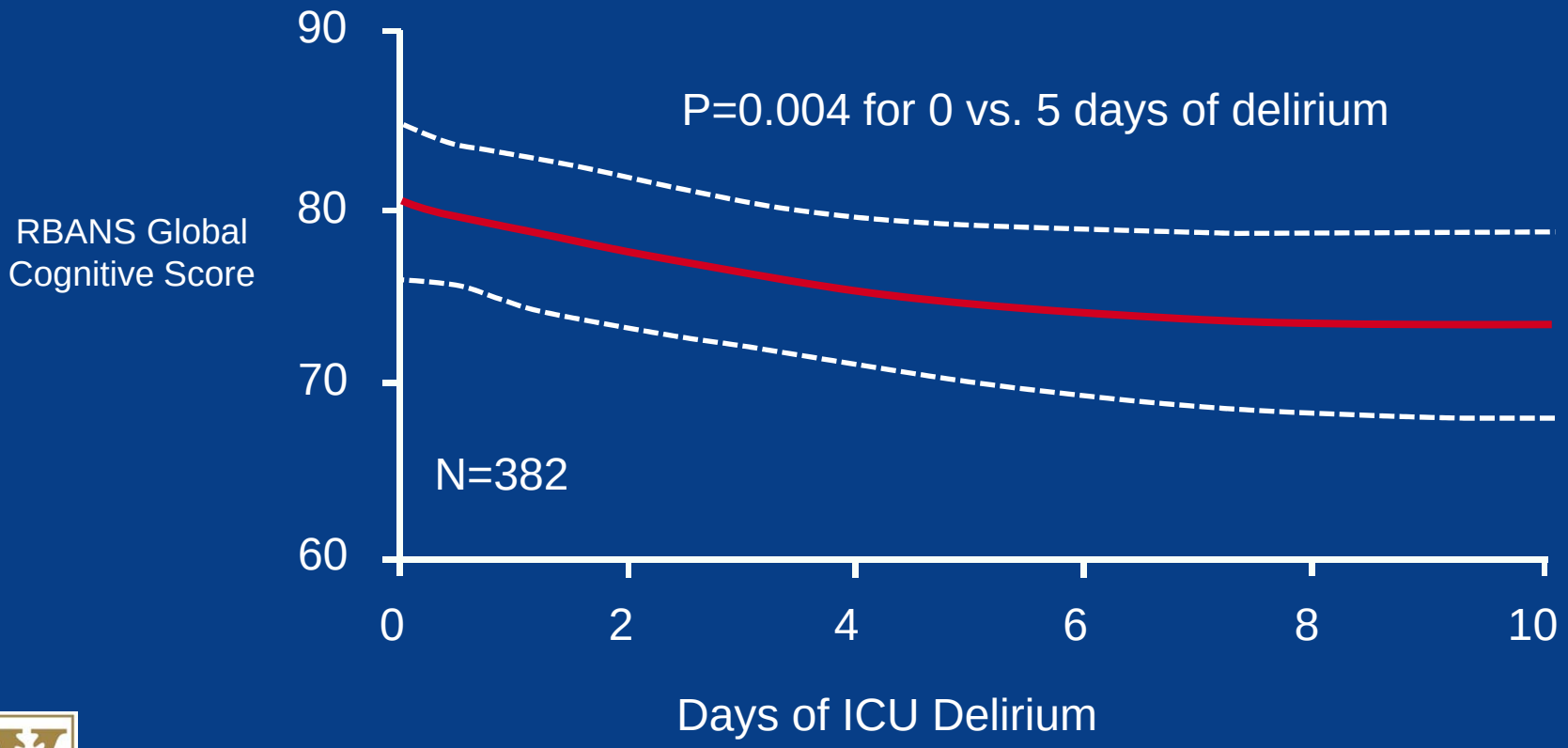
Iwashyna, *et al. JAMA*. 2010

Global Cognition Scores in ICU Survivors



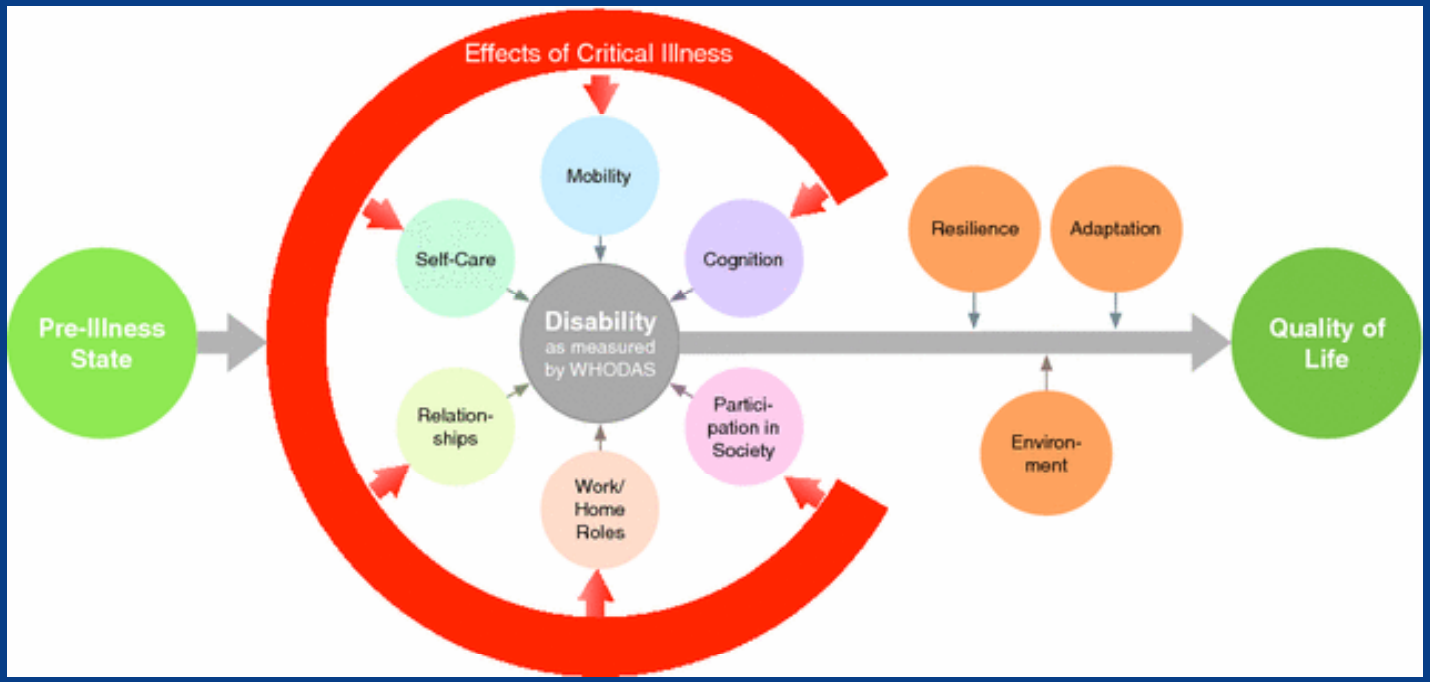
Pandharipande et al. *NEJM* 2013

Delirium is the strongest independent predictor of cognitive impairment



Pandharipande et al. *NEJM* 2013

Cognitive deficits - implications



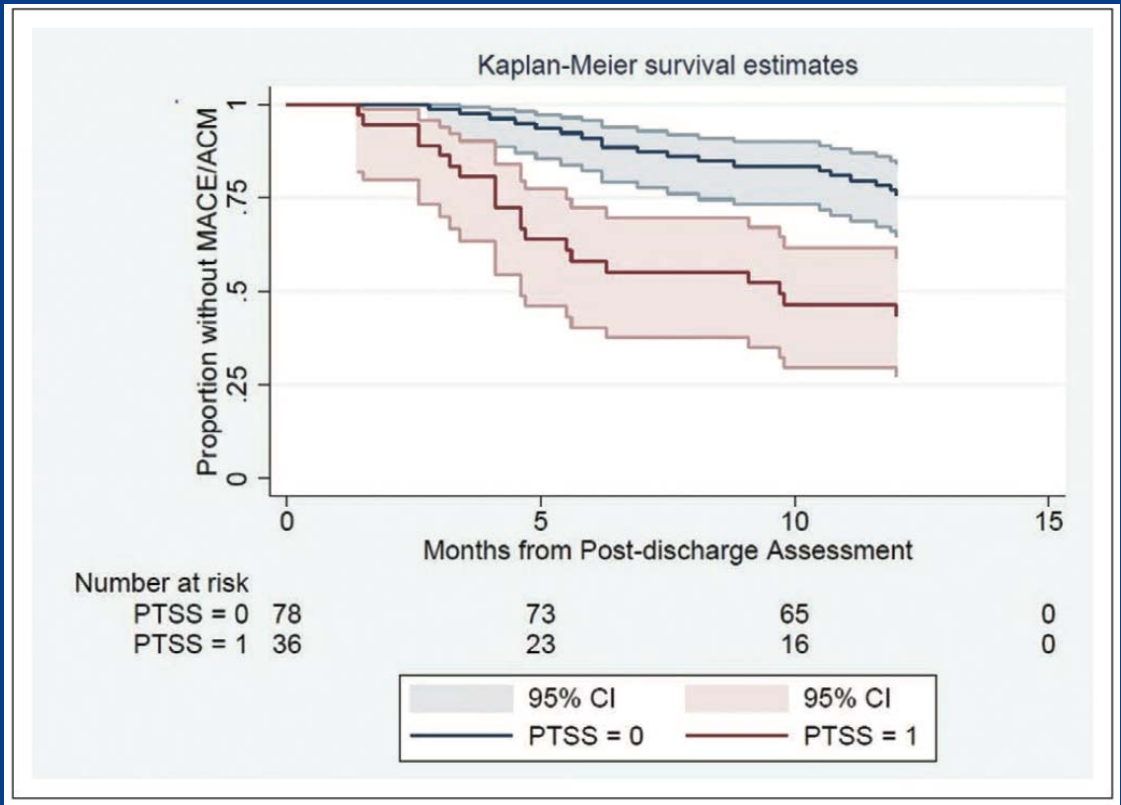
Hodgson et al Intensive Care Med 2017

PTSD after critical illness

- Meta-analysis:
  - Clinically important PTSD symptoms in 1/5 at 1 year
  - higher prevalence in those with
    - comorbid psychopathology
    - benzodiazepines
    - early memories of frightening ICU experiences
  - In European studies, ICU diaries reduced PTSD

Parker et al CCM 2015

PTSD after critical illness



Agarwal et al CCM 2019

Post ICU deficits - implications

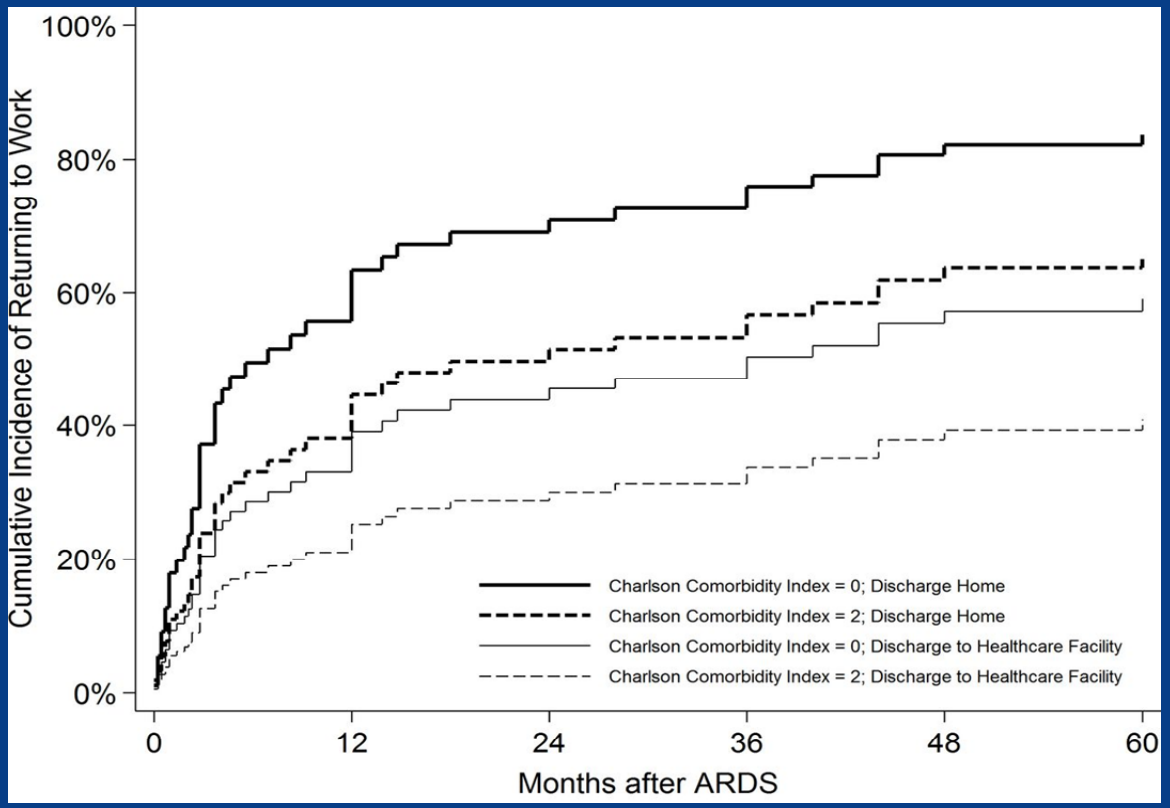
Table 3
Clinical characteristics of Intensive Care Unit Recovery Center (ICU-RC) patients[a].

Characteristic	(n = 62)
Time from D/C to ICU-RC Appt, d	29 (18, 57)
Cognitive impairment (n = 59)[b]	38 (64%)
MoCA	21 (17, 25)
Anxiety alone (n = 59)[b]	19 (32%)
Depression alone (n = 59)[b]	13 (22%)
Anxiety with depression	2 (3%)
Adjustment disorder (n = 59)[b]	4 (7%)
PTSD any (n = 59)[b]	3 (5%)
PTSD alone	1 (2%)
PTSD with anxiety	1 (2%)
PTSD with depression	1 (2%)
6 min walk test completed	
Yes	41 (66%)
Patient unable to complete	17 (27%)
No (not done, other)	4 (6%)
6 min walk % predicted (n = 41)	56 (45, 68)
Tobacco use since discharge[c]	
Never smoker	27 (44%)
No	26 (42%)
Yes	9 (15%)
Weight change from baseline, kg	−2.4 (−10.3, 0.3)
Readmitted within 6 months[d]	19 (31%)
Time to readmission, d	33 (9.5, 73)
Died within 6 months[e]	5 (8%)

Characteristic	(n = 62)
Patient driving on day of ICU-RC visit	
No	34 (55%)
Yes	15 (24%)
Never driver	9 (15%)
Unknown	4 (6%)
Patient returned to work	
No	40 (65%)
Not previously working	15 (24%)
Yes	7 (11%)
Difficulty with ADL[f]	
Ambulating	33 (53%)
Feeding	11 (18%)
Personal hygiene	10 (16%)
Dressing	7 (11%)
Unknown	7 (11%)
Bathing/showering	5 (8%)
Toileting	3 (5%)
No new impairments	17 (27%)

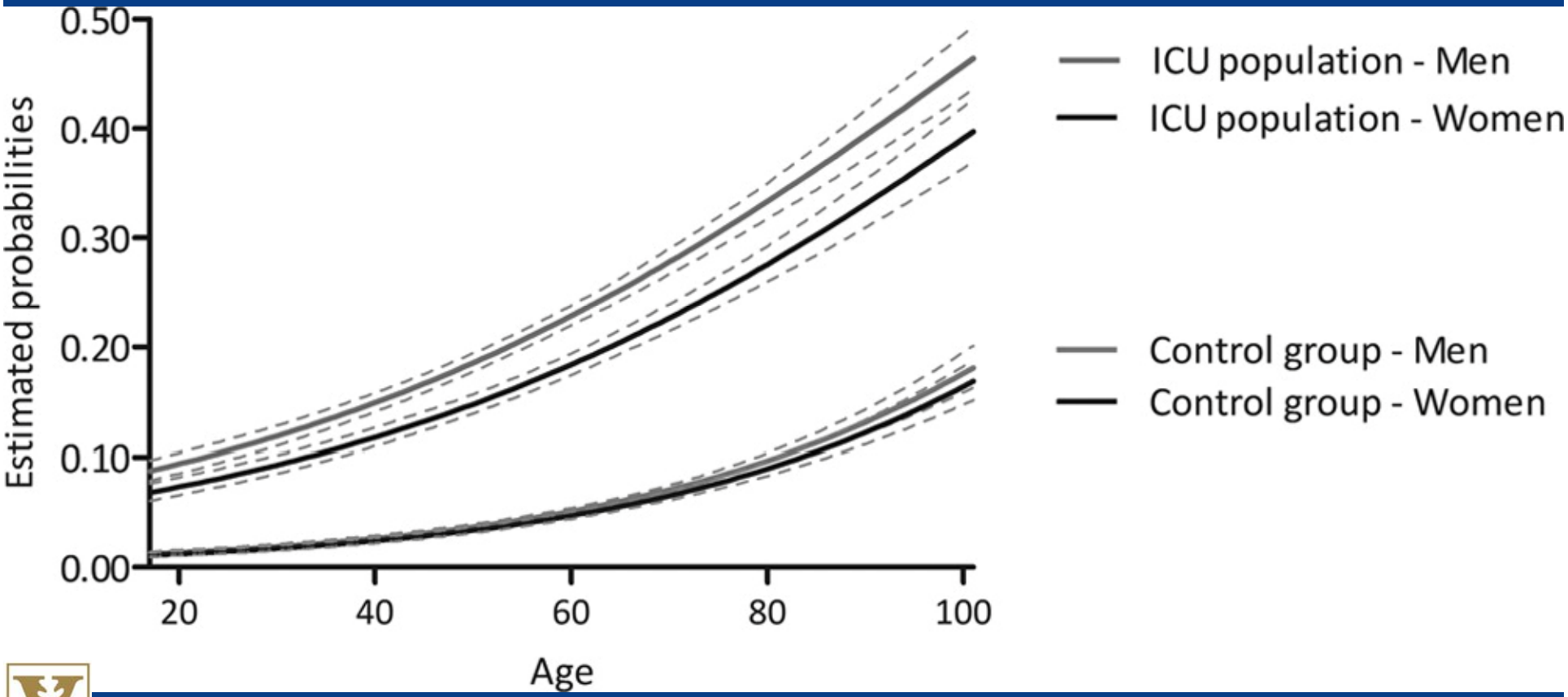
Sevin et al J Crit Care 2018

Return to Work



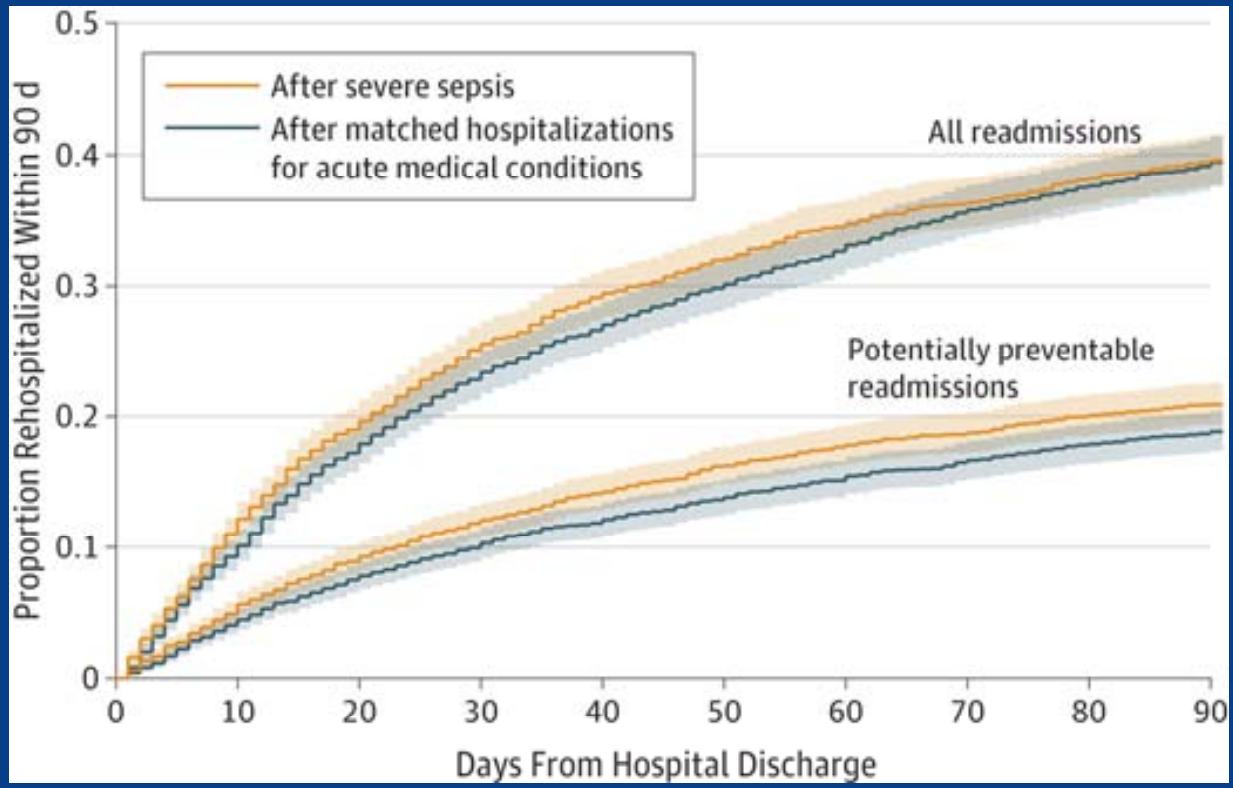
Norman et al CCM 2016
Kamdar et al Thorax 2017

Risk of new chronic illness after ICU



van Beusekom et al Crit Care Med 2019

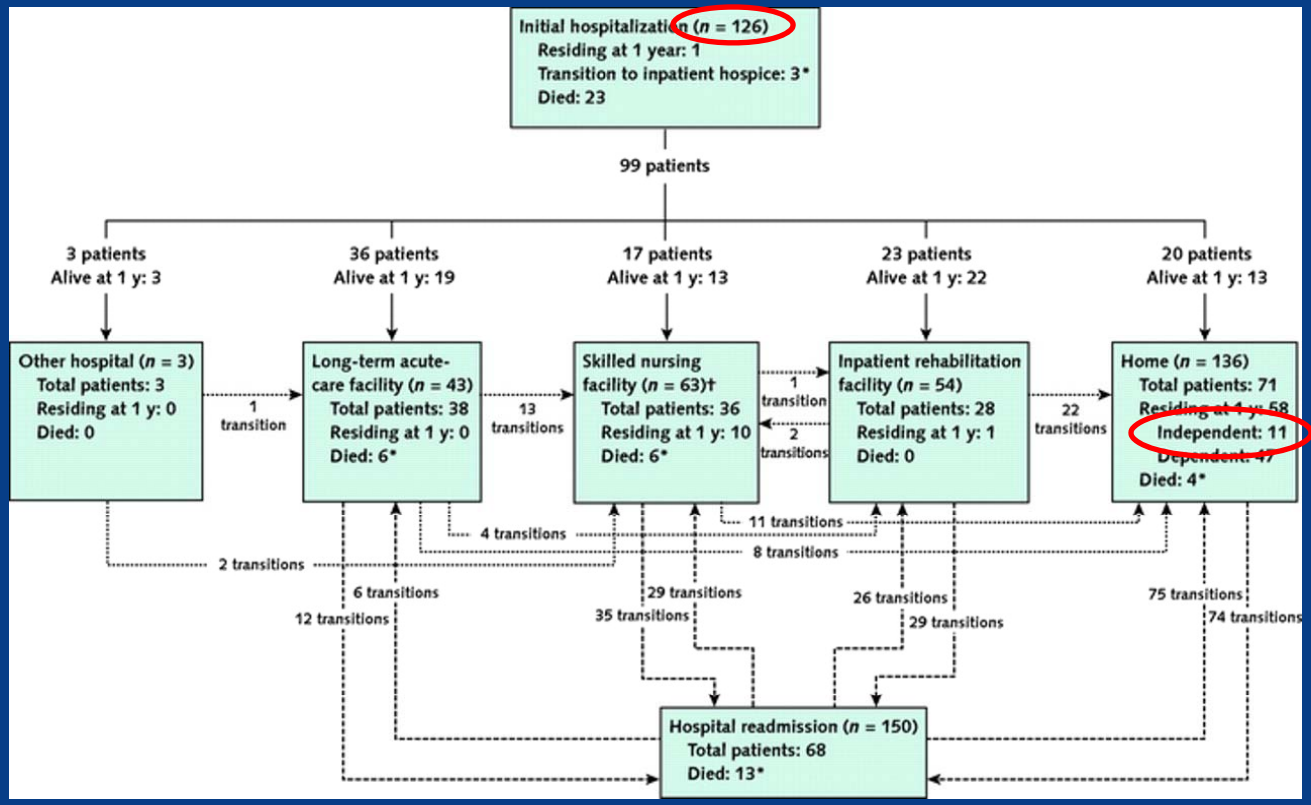
Unmet medical need implications



Prescott et al JAMA 2015

Annals of Internal Medicine | ARTICLE

One-Year Trajectories of Care and Resource Utilization for Recipients of Prolonged Mechanical Ventilation



Unroe et al Ann Int Med 2010


FAMILY DOCTOR
P

What can we do to prevent PICS?

ICU PAD Guidelines
ABCDEF Bundle Checklist*

- A – Assess, Prevent and Manage Pain
- B – Both SATs and SBTs
- C – Choice of Sedation
- D – Delirium: Assess, Prevent and Manage
- E – Early Mobility and Exercise
- F – Family Engagement and Empowerment

*www.icudelirium.org
*www.iculiberation.org

ICU LIBERATION

LIBERATION, ANIMATION, RESTORATION

ICU Liberation: ABCDEF Bundle

Symptoms Pain, Agitation, Delirium Guidelines	Monitoring Tools	Care ABCDEF Bundle	Done
Pain	Critical-Care Pain Observation Tool (CPOT) NRS Numeric Rating Scale BPS Behavioral Pain Scale	A: Assess, Prevent and Manage Pain	☐
Agitation	Richmond Agitation-Sedation Scale (RASS) Sedation-Agitation Scale (SAS)	B: Both Spontaneous Awakening Trials (SAT) and Spontaneous Breathing Trials (SBT) C: Choice of Analgesia and Sedation	☐ ☐
Delirium	Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) Intensive Care Delirium Screening Checklist (ICDSC)	D: Delirium: Assess, Prevent and Manage E: Early Mobility and Exercise F: Family Engagement and Empowerment	☐ ☐ ☐

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
ICU Care	Ward Care	Preparation for Discharge Home	Early Home Adjustment	Late Community Adjustment
Event	Stabilization	Preparation	Implementation	Adaptation

Cameron and Gignac 2008
Art by Nancy Andrews

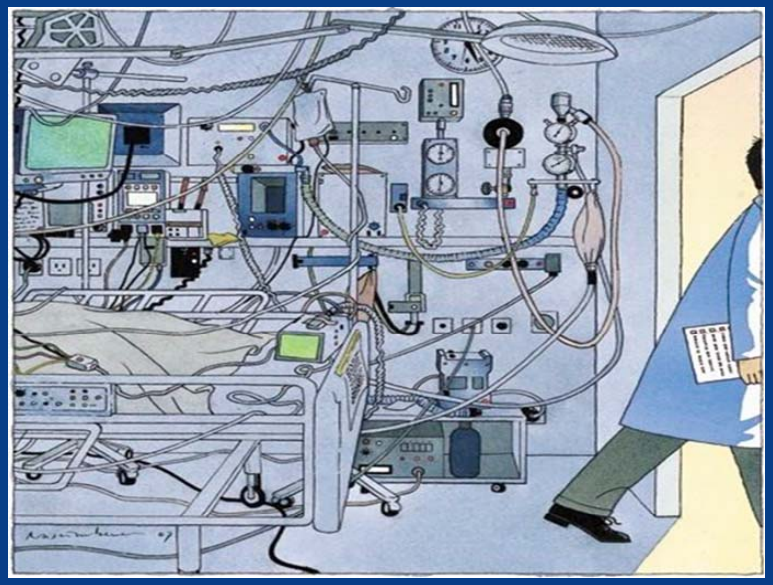
What we can do to ensure good recovery?

- Summarize hospitalization
- Execute discharge planning
  - Med reconciliation
  - Rehab
  - Vaccines
  - Home health/PT/OT/DME/assistive devices
  - Follow up appointments
- Provide WRITTEN information
- Talk to families about trajectory
- Give patients resources to contact

https://sccm.org/MyICUCare/During-the-ICU
https://sccm.org/MyICUCare/THRIVE/Post-intensive-Care-Syndrome.

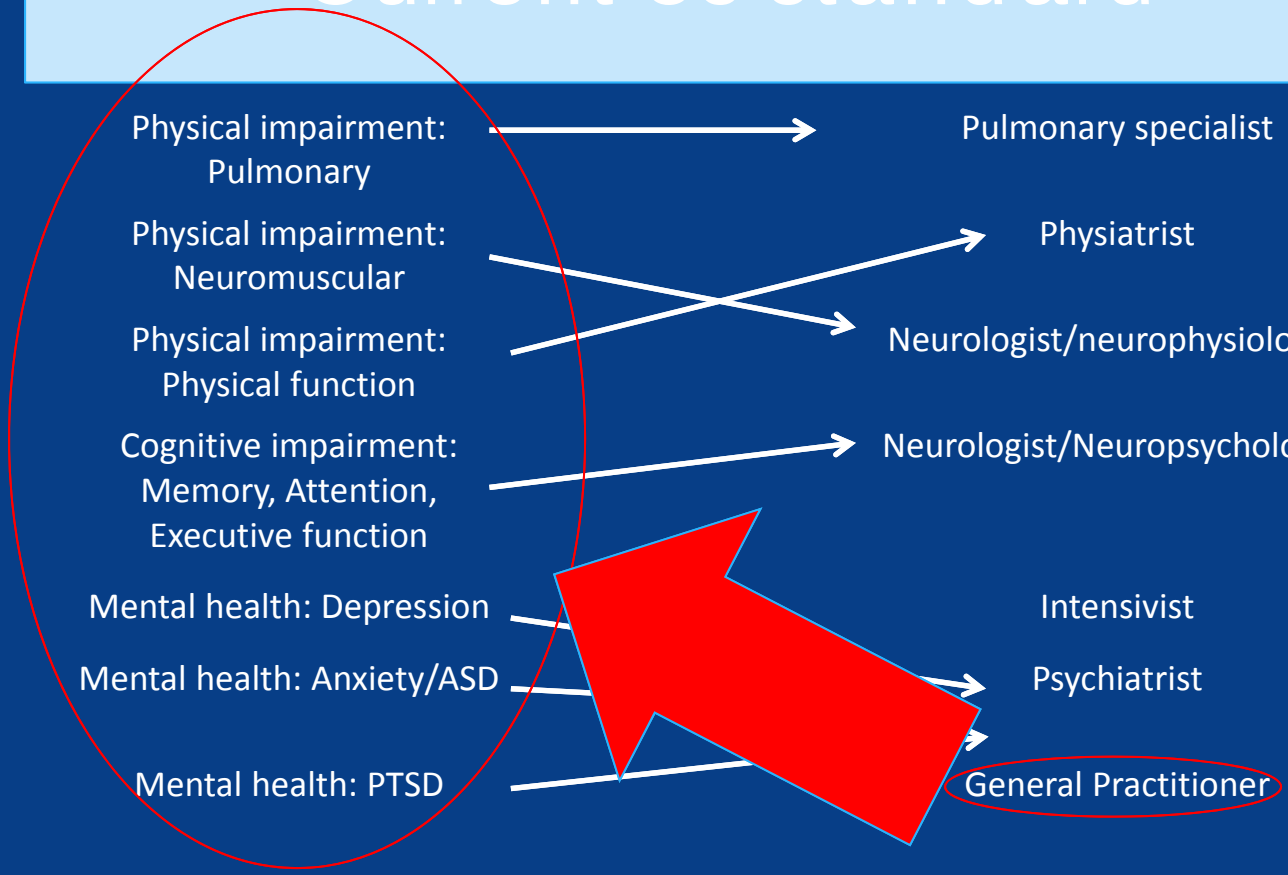
ICU Delirium @ICUdelirium · 19 Dec 2017

After I recovered from 20 days of ICU care, I sought outpatient advice from intensivist who, like most, maintains an office where he sees outpatients. He declined to see me. "What", he asked, "is there to talk about?"



The New Yorker

Current US Standard



Adapted with vague permission from Liz Wilcox

Potential models of care

A patient

- ✓37 yo woman with profound critical illness due to H1N1 ARDS
  - o respiratory failure culminating in
  - o tracheostomy for extended vent wean
  - o ECMO
  - o DVT
  - o bleeding at her cannulation site on anticoagulation
  - o IVC filter placement
  - o profound critical illness myopathy

Would you:

A. Discharge to home, follow up with PCP?
B. Discharge to home with home health, follow up with PCP?
C. Discharge to LTAC, with plans for inpatient rehab, then home?
D. Keep in house until she could participate in 3 hours of therapy daily?

The Vanderbilt Model

TEAM:

- Respiratory therapy
- Pharmacy
- Critical Care
- Psychology
- Case management

SELECTION CRITERIA:

- *ARDS or sepsis*
- *Mechanical ventilation*
- *Delirium*

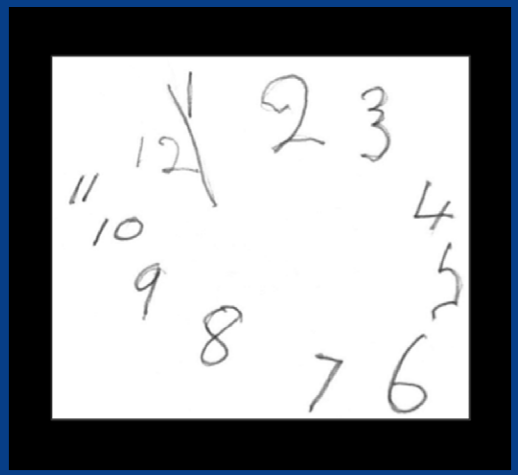
In clinic

- ✓ 37 yo woman profound critical illness* due to H1N1
- ✓ *vent, trach, ecmo, paralysis, delirium, DVT, filter

1. myopathy
2. polyneuropathy
3. malnutrition
4. hair loss
5. anticoagulation
6. hypotension
7. syncopal episodes
8. diarrhea
9. off work
10. not driving
11. ~~trach~~

A typical cognitive evaluation

- MOCA 21/30
  - "significant impairment"
- problems organizing and attending
  - errors on a clock drawing
- multiple errors on a serial 7's task
  - 100, 93, 83, 73, 63
- concrete thinking on similarities test
  - how are a watch and a ruler alike?
    -they both have numbers
  - how are a car and a train alike?
    -they are both made of metal

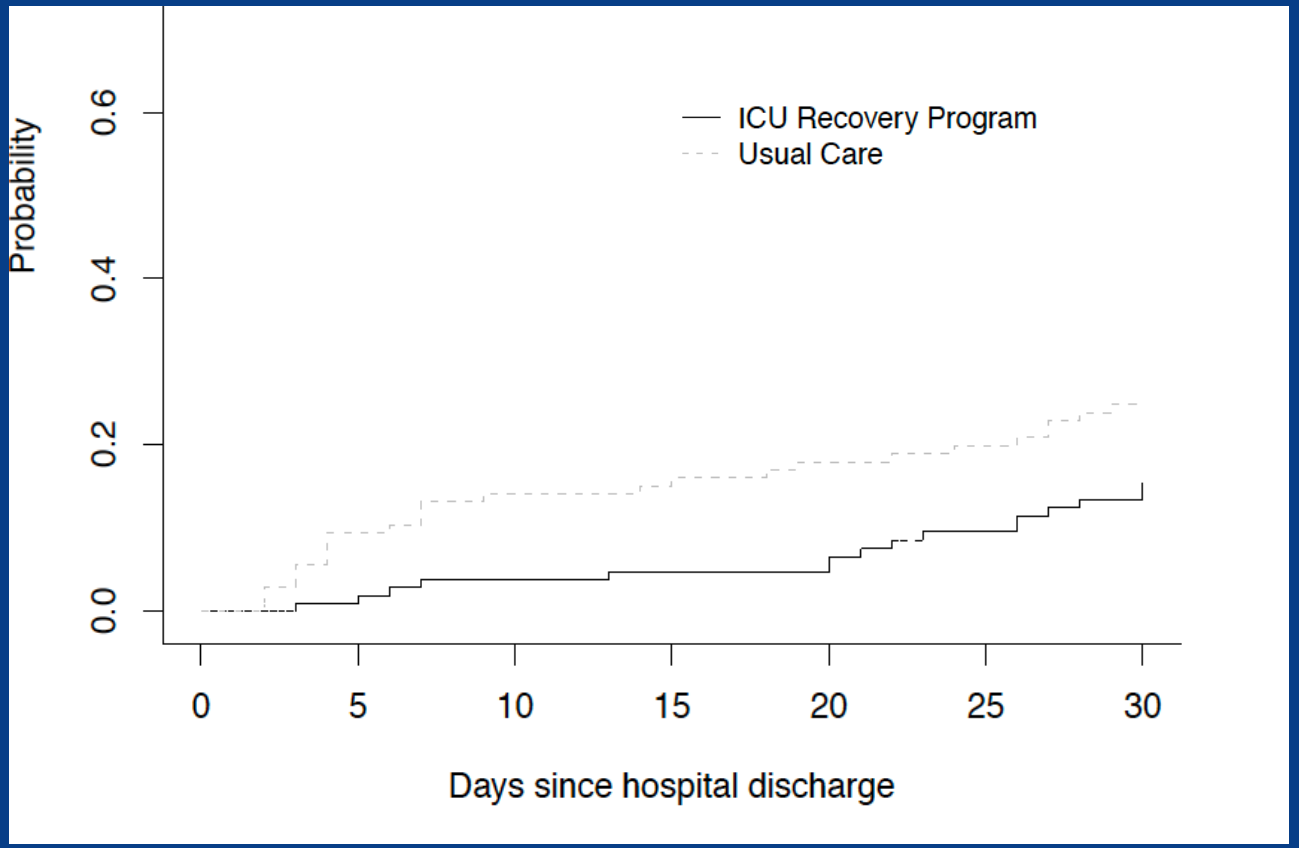


"Although her job is not particularly cognitively demanding, her cognitive problems are so great that they would likely interfere with her performance."

“Interventions”

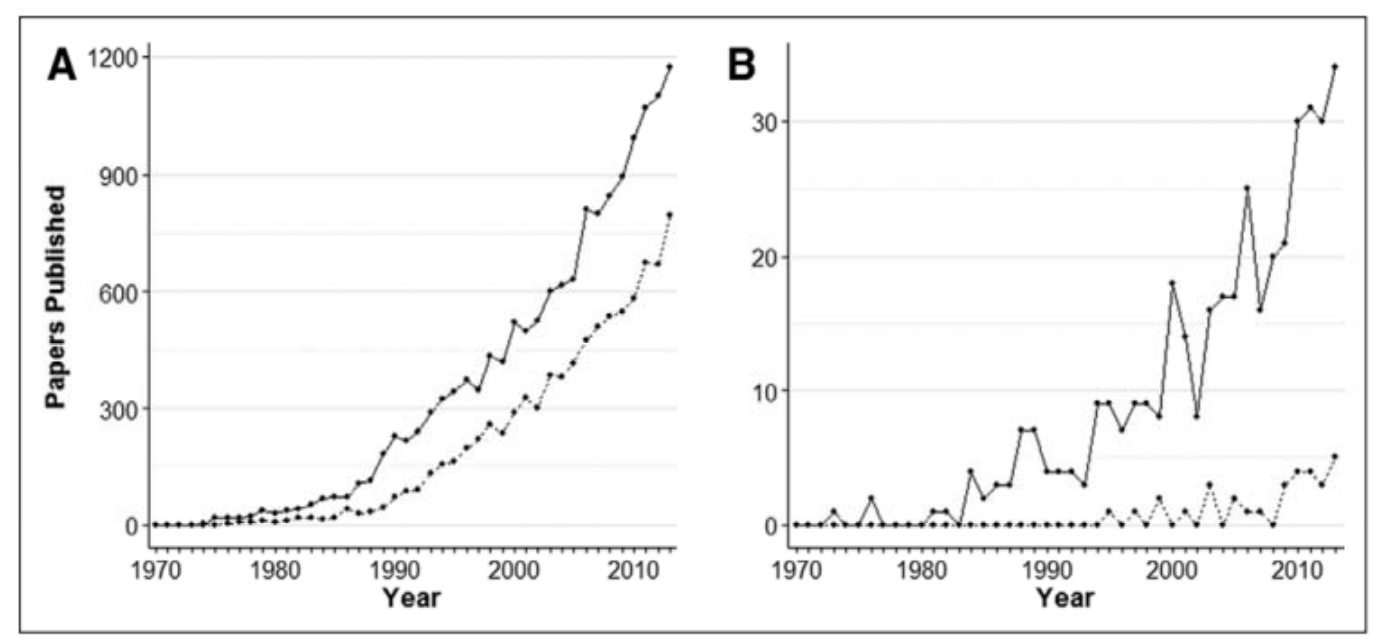
- Stop meds
- metoprolol, enoxaparin
- Start (“better”) meds
  - rivaroxaban
- Prevent complications
  - IVC filter out
  - Immunize
- Educate, reassure
  - PT/OT
  - ADLs
  - Alopecia
- Counsel
  - Return to work
  - Driving
  - Nutrition and weight
- Navigate
  - Letter to housing
  - Disability placard

Readmission after critical illness



Bloom, Stollings

Critical Care Citations



All critical care citations

ICU Survivor outcomes

Turnbull et al CCM 2016

The Thrive Collaboratives

ICU Recovery at Vanderbilt

James Jackson
Joanna Stollings
Tess Huggins
Sarah Bloom
Olivia Kirkpatrick
Art Wheeler
Wes Ely

thrive

@ICU_Recovery

The Center for Critical Illness, Brain Dysfunction, and Survivorship (CIBS)

CAIRN
Collaborative Assessment of ICU Recovery Needs

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA