Long-term outcomes after sepsis

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Disclosures

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- Chief Scientist Office Scotland
- Health Foundation
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- Society of Critical Care Medicine

Overview

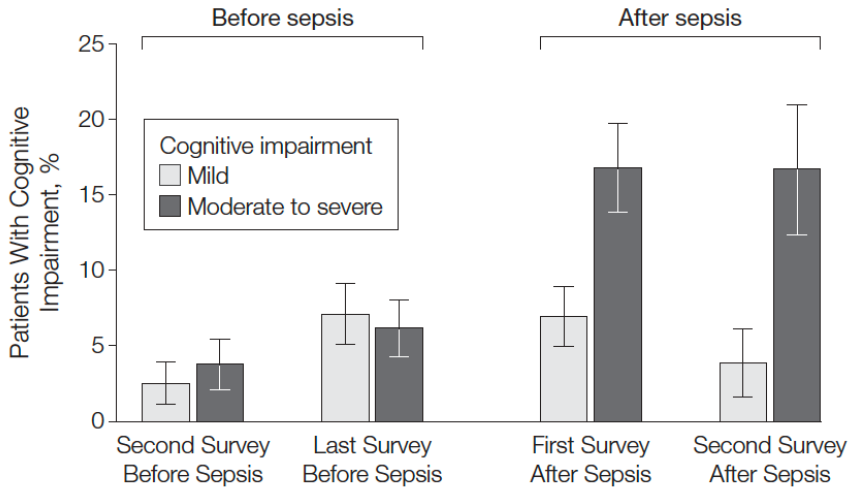
- What are the problems people experience following sepsis?
- Who is most at risk of poor outcomes?
- What can we do to help/prevent problems?
- What next?

What can happen following hospitalisation with sepsis?

Cognitive and Physical Outcomes

- US Health and Retirement Study
- 516 surviving respondents
- Mean age was 76.9 years
- The prevalence of moderate to severe cognitive impairment increased following severe sepsis
- In those with no functional limitations before sepsis, a mean 1.57 new limitations were found
- Non-sepsis hospitalisations were associated with no change in moderate/severe cognition and there fewer functional limitations

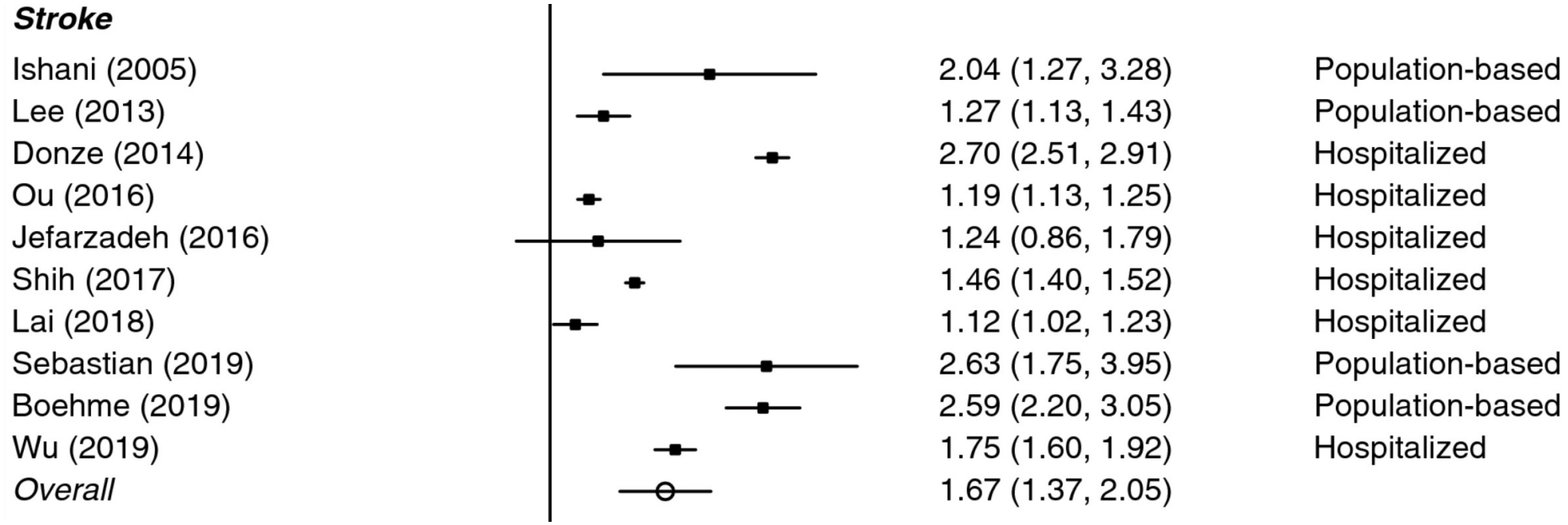
Figure 2. Cognitive Impairment Among Survivors of Severe Sepsis at Each Survey Time Point



Error bars indicate 95% confidence intervals (CIs); IQR, interquartile range.

Iwashyna et al (2010) JAMA
doi:10.1001/jama.2010.1553

Cardiovascular Outcomes



- Meta-analysis, 27 studies
- Sepsis was associated with a higher long-term risk of myocardial infarction (aHR 1.77 [95% CI 1.26 to 2.48]), stroke (aHR 1.67 [95% CI 1.37 to 2.05]), and congestive heart failure (aHR 1.65 [95% CI 1.46 to 1.86]) compared to non-sepsis controls
- Late cardiovascular events which may persist for at least 5 years following hospital discharge

Kosyakovsky et al (2021) ICM
https://doi.org/10.1007/s00134-021-06479-y

Post-Traumatic Stress Disorder

Prevalence of post-traumatic stress disorder symptoms in adult critical care survivors: a systematic review and meta-analysis

Cássia Righy, Regis Goulart Rosa, Rodrigo Teixeira Amancio da Silva, Renata Kochhann, Celina Borges Migliavaca, Caroline Cabral Robinson, Stefania Pigatto Teche, Cassiano Teixeira, Fernando Augusto Bozza & Maicon Falavigna

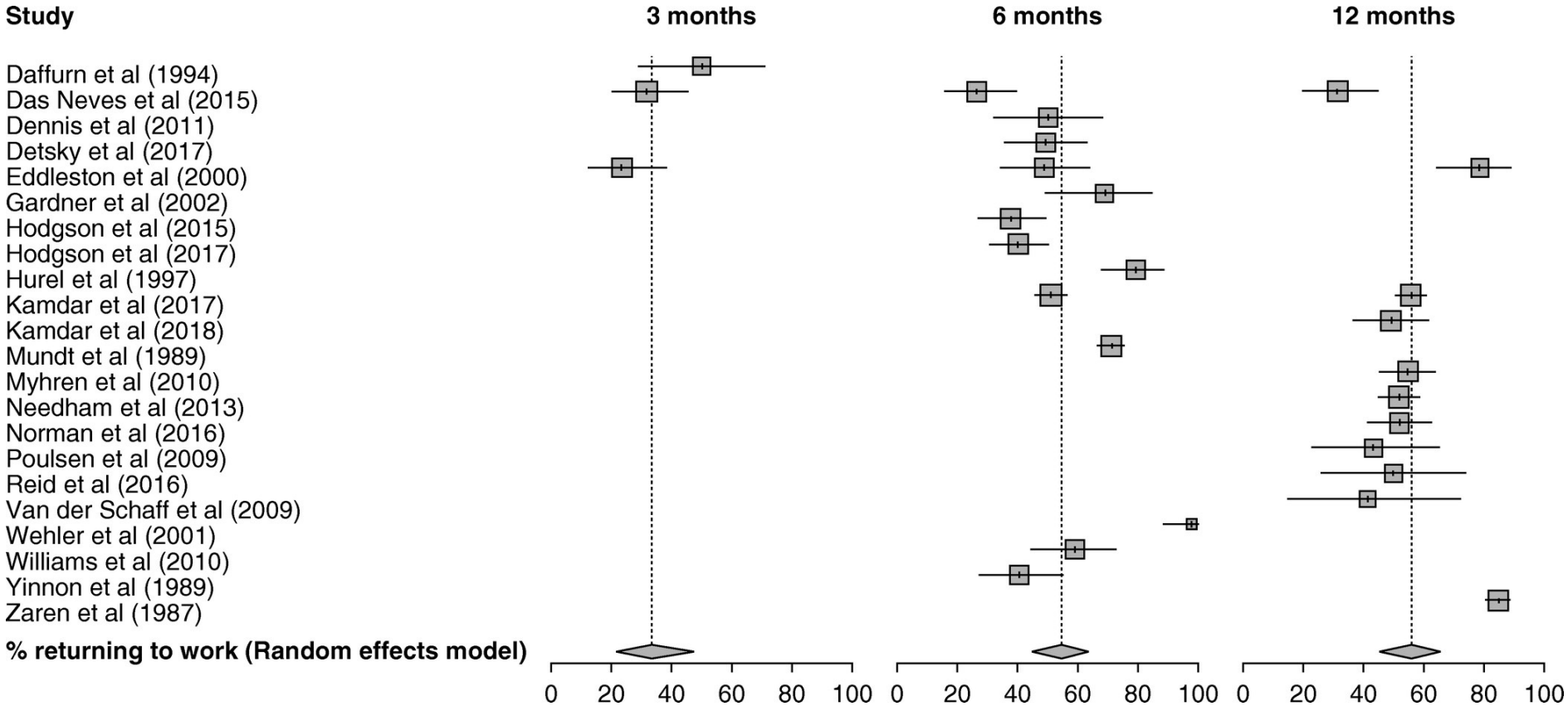
- Meta-analysis
- Diagnosis based on individual study definition
- 48 studies
- 7152 patients
- 3 months: prevalence 15.9%
- 6 months: prevalence 16.8%
- 12 months: prevalence 19%

Stress Disorders Following Prolonged Critical Illness in Survivors of Severe Sepsis

Wintermann, Gloria-Beatrice PhD[1,2,3]; Brunkhorst, Frank Martin MD[3,4,5]; Petrowski, Katja PhD[2]; Strauss, Bernhard PhD[1]; Oehmichen, Frank MD[6]; Pohl, Marcus MD[6]; Rosendahl, Jenny PhD[1,3]

- Prospective, longitudinal
- European
- 4 assessment points across 12 months
- 90 patients (ICU stay greater than 5 days)
- Sepsis a significant predictor of PTSD

Social Outcomes: Return to Employment

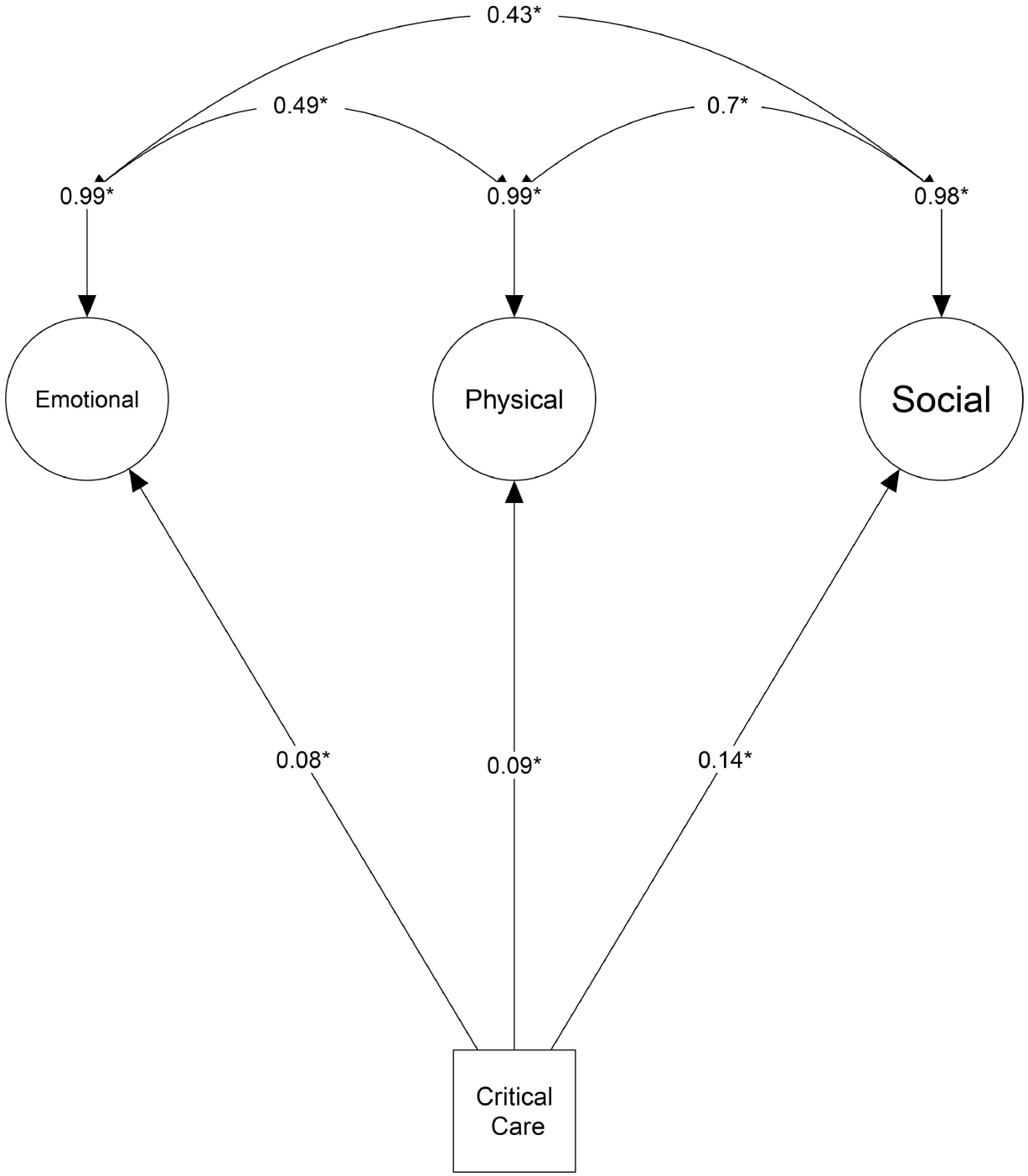


- 22 studies included in the meta-analysis
- **Return to employment**
- At one year following critical illness, pooled estimate for return to work at 12 months was 56% (95% CI: 45-66)
- Positive association with psychosocial health if patients returned to work

McPeake et al (2019) Annals of ATS
https://doi.org/10.1513/AnnalsATS.201903-248OC

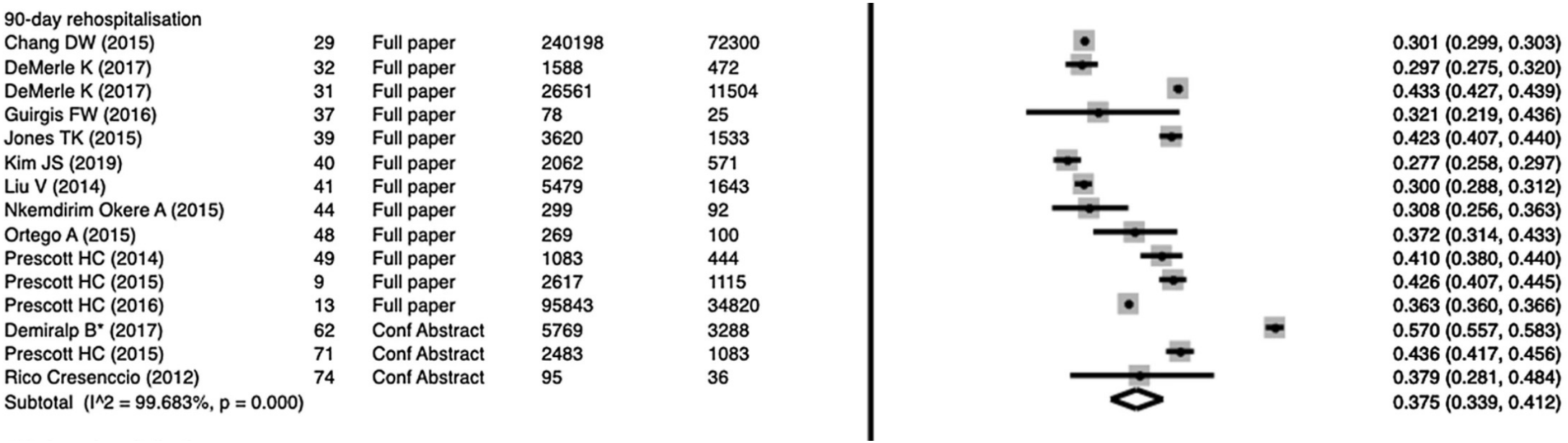
Global Quality of Life

- 809 UK Biobank participants who had been admitted to critical care, alongside 809 hospital controls (n=1618)
-Patients exposed to critical care-more likely to experience mental health issues and **social isolation** following hospital discharge
-Critical care patients more likely to require **government funded welfare** support
-**Social, physical and emotional health closely correlated**



McPeake et al (2021) Lancet Regional Health
https://doi.org/10.1016/j.lanepe.2021.100121

Readmission

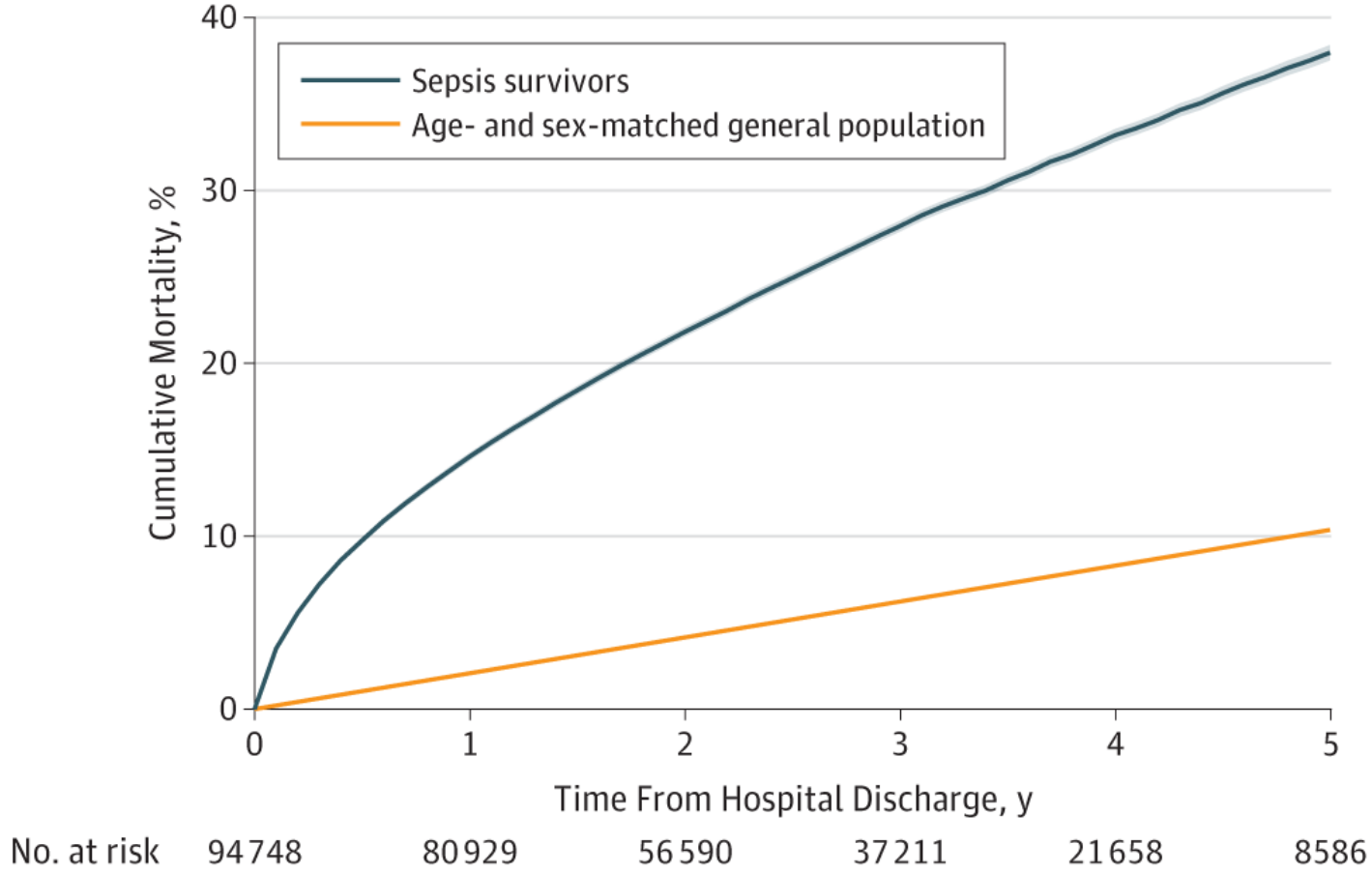


- 56 studies included (all non-randomised)
- Mean rehospitalisation proportion at 90 days was 38.1%
- Infection most common rehospitalisation diagnosis
- Risk factors: Older age, comorbidities and sepsis characteristics

Shankar-Hari et al (2020) ICM
doi: 10.1007/s00134-019-05908-3

Mortality

- 94,748 sepsis survivors from 192 UK critical care units
- Long-term mortality (post hospital)
- By one year following hospital discharge, 15% of survivors had died
- 6-8% dying per year over the subsequent 5 years
- **Risk factors:** Age, gender, ethnicity/race, comorbidities, site of infection and non-surgical admission category



Shankar-Hari et al (2020) JAMAopen
doi:10.1001/jamanetworkopen.2019.4900

Family members and caregivers

- Health and Retirement study in the US
- 929 patient/spouse dyads, representing 1212 hospital admissions for severe sepsis
- Depression was assessed with a modified version of the Centre for Epidemiologic Studies Depression Scale
- Spouses (wives) were at increased risk of developing depression
- 20% had depressive symptoms before sepsis vs 34% following hospital discharge

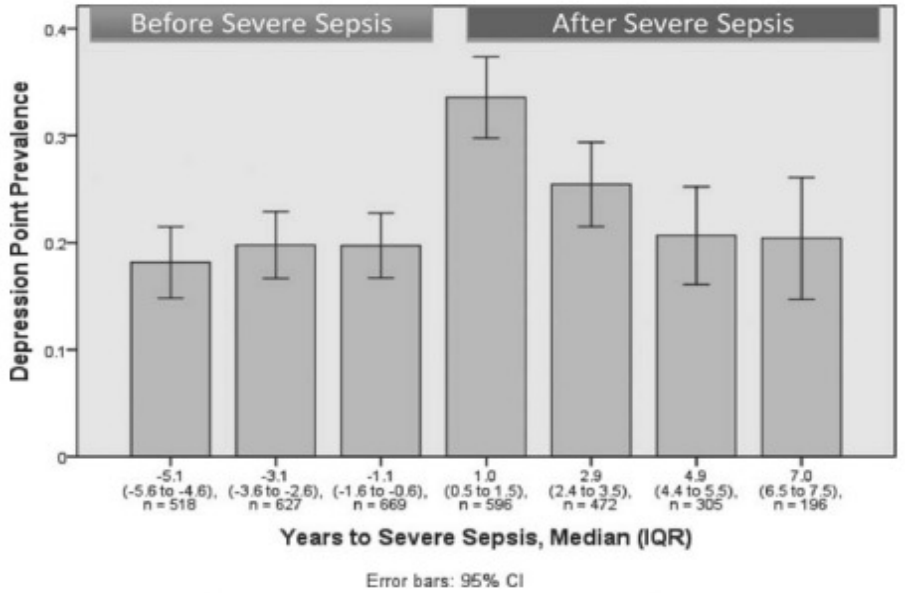


Figure 2. Prevalence of substantial depressive symptoms among wives of patients with severe sepsis. *IQR*, interquartile range; *CI*, confidence interval.

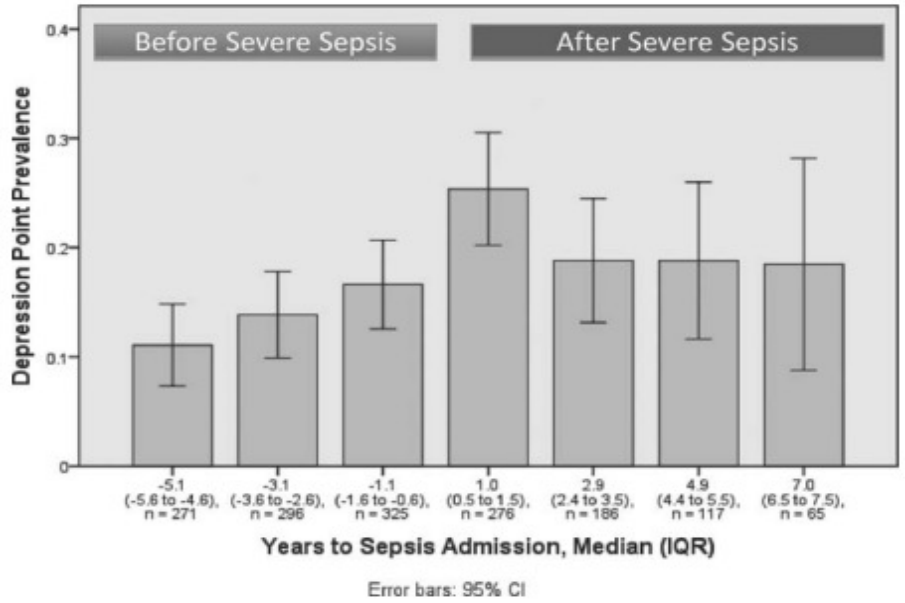
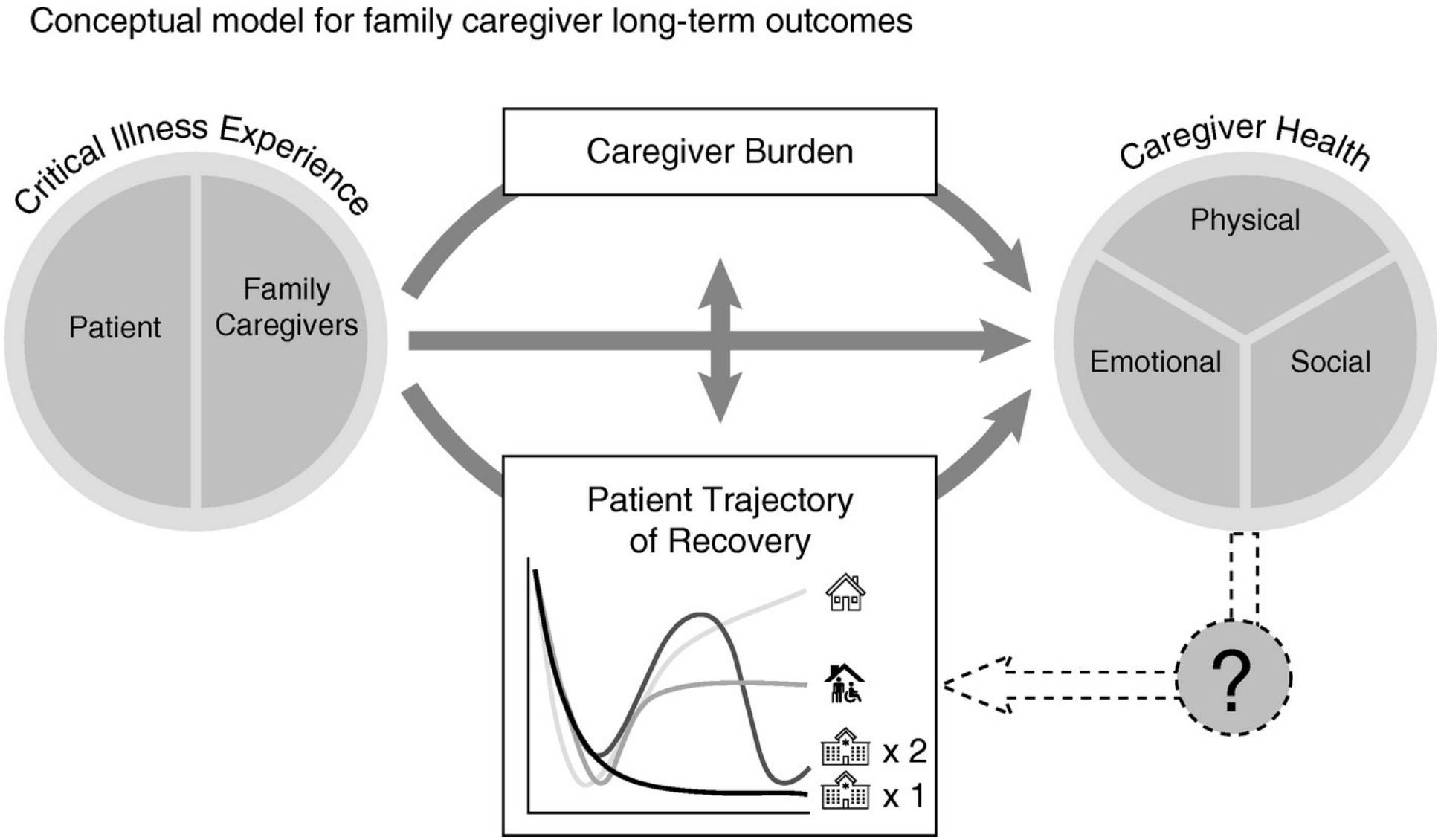


Figure 3. Prevalence of substantial depressive symptoms among husbands of patients with severe sepsis. *IQR*, interquartile range; *CI*, confidence interval.

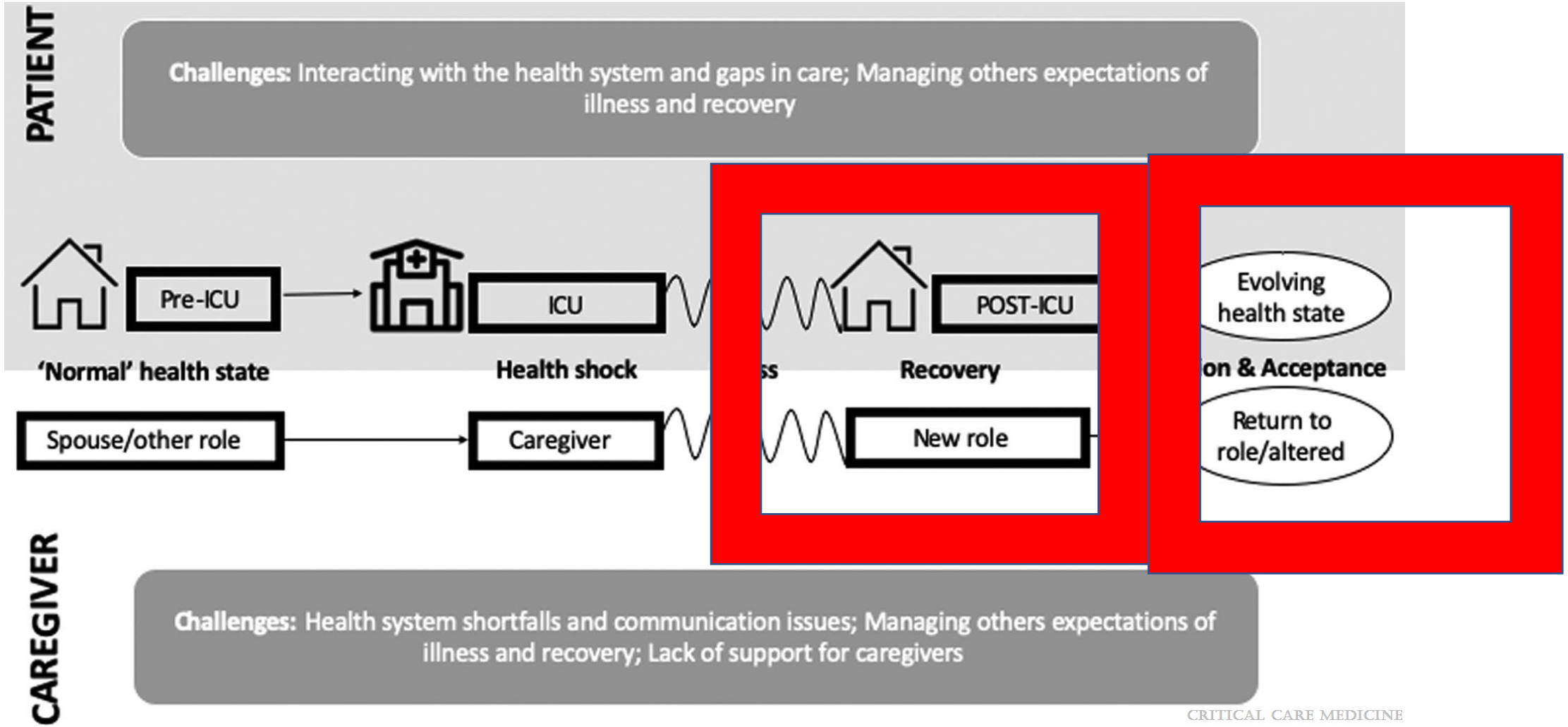
Davydow et al (2012) CCM
doi: 10.1097/CCM.0b013e3182536a81

Family members and caregivers



McPeake et al (2021) Annals of ATS
https://doi.org/10.1513/AnnalsATS.202106-757ED

What can we do?



Haines et al (2021) CCM
https://doi.org/10.1097/ccm.0000000000005095

Back to basics

Medication-related Problems in Intensive Care Unit Survivors: Learning from a Multicenter Program

Pamela MacTavish [1]*, Tara Quasim [1,2]*, Colin Purdie [2], Morna Ball [1], Lesley Barker [3], Sarah Connelly [4], Helen Devine [1], Philip Henderson [2], Lucy A. Hogg [5], Rakesh Kishore [1], Phil Lucie [6], Show All...

- Multi-centre cohort study
- Prevalence of medication related problems (MRP) in ICU survivors
- Over 60% of patients had at least one MRP
- Over 80% MRPs were classified as clinically significant
- Drug class most frequently associated with MRP was neurological (**analgesic and psychiatric medications)**

Adverse Events After Transition From ICU to Hospital Ward: A Multicenter Cohort Study*

Sauro, Khara M. PhD[1,2]; Soo, Andrea PhD[1]; de Grood, Chloe BSc[1,2]; Yang, Michael M. H. MD[3]; Wierstra, Benjamin MD[1]; Benoit, Luc MD[1]; Couillard, Philippe MD[1,3]; Lamontagne, François MD, MSc[4]; Turgeon, Alexis F. MD, MSc[5,6]; Forster, Alan J. MD, MSc[7]; Fowler, Robert A. MD, MSc[8]; Dodek, Peter M. MD, MHSc[9]; Bagshaw, Sean M. MD, MSc[10]; Stelfox, Henry T. MD, PhD[1,2]

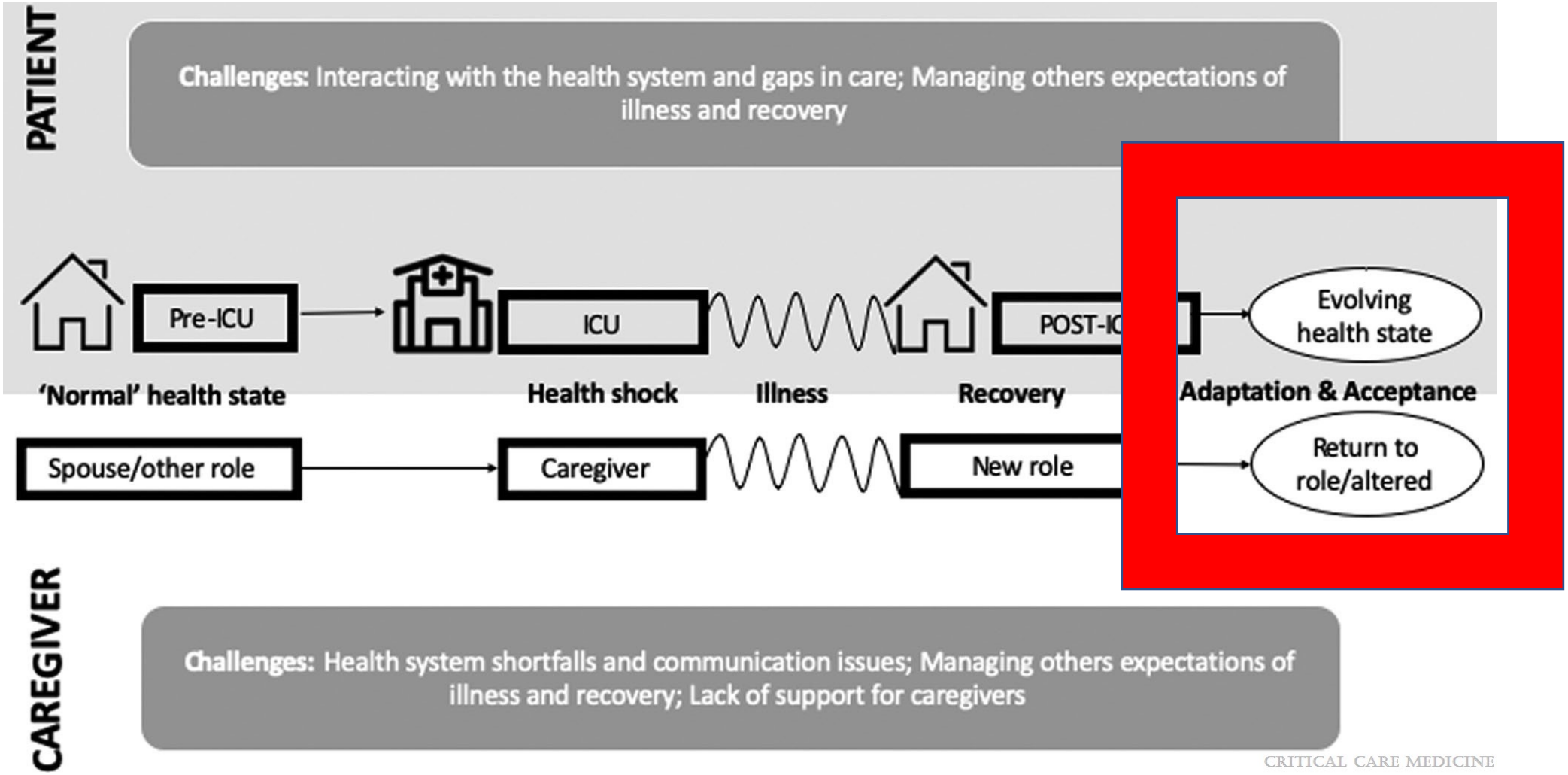
- Multi-centre cohort study
- 451 Canadian patients
- 19% experienced an adverse event (AE) during transition
- 36% of these AEs were thought to be preventable
- Patients with an AE more likely to be readmitted to ICU and spend longer in hospital.

Transitional care intervention (STAR program)

- Multi-centre RCT
- Nurse navigator-led, multicomponent Sepsis Transition And Recovery program improved 30-day mortality and readmission outcomes after sepsis hospitalization. **Facilitate the delivery of best practice**
- Intervention included: post-discharge medication review, evaluation for new impairments or symptoms, monitoring comorbidities, palliative care approach when appropriate, 'promote care planning'
- The primary outcome was a composite of mortality or hospital readmission at 30 days
- Lower percentage of patients in the intervention group experienced the primary outcome compared with the usual care group (28.7% vs 33.3%).
- Benefits sustained at 12 months in relation to readmission

Kowalkowski et al (2022) AJRCCM
https://doi.org/10.1164/rccm.202203-0590LE

Taylor, S et al (2022) CCM
doi: 10.1097/CCM.0000000000005300



Haines et al (2021) CCM
https://doi.org/10.1097/ccm.0000000000005095

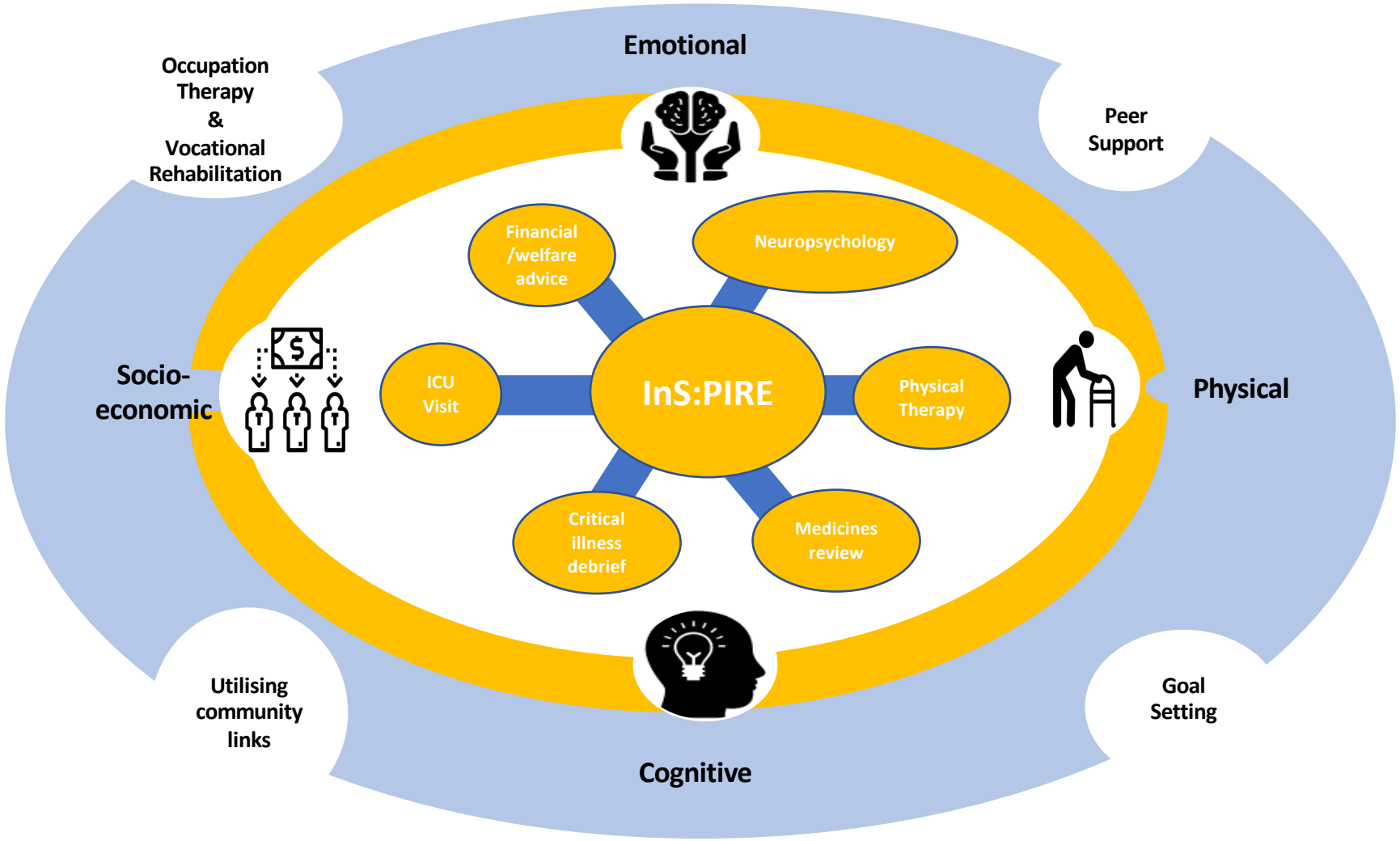
The PRaCTICaL study of nurse led, intensive care follow-up programmes for improving long term outcom[illegible]rom criti[illegible]illness: a pragmatic randomised controlled trial

BMJ 2009 ; 339 doi: https://doi.org/10[illegible] (Published 16 October 2009)
Cite this as: *BMJ* 2009;339:b3723

Effect of a Primary Care Management I[illegible]tion on Mental Health-Related [illegible]ty of Life Among Survivors of Sepsis

A Randomized Clinical Trial

Konrad Schmidt, MD[1,2]; Susanne Worrack, MSc[1,2]; Michael Von Korff, ScD[3]; et al



McPeake et al (2017) Thorax
10.1136/thoraxjnl-2016-209661

Effectiveness

- QI intervention
- InS:PIRE patients (intervention) compared with a usual care cohort at 12 months.
- Sepsis cohort
- 9 hospital sites in Scotland (5 intervention vs 4 usual care)
- 137 intervention patients vs 115 in the usual care cohort
- Covariates for adjustment were chosen a priori and included in hospital characteristics as well as patient specific characteristics

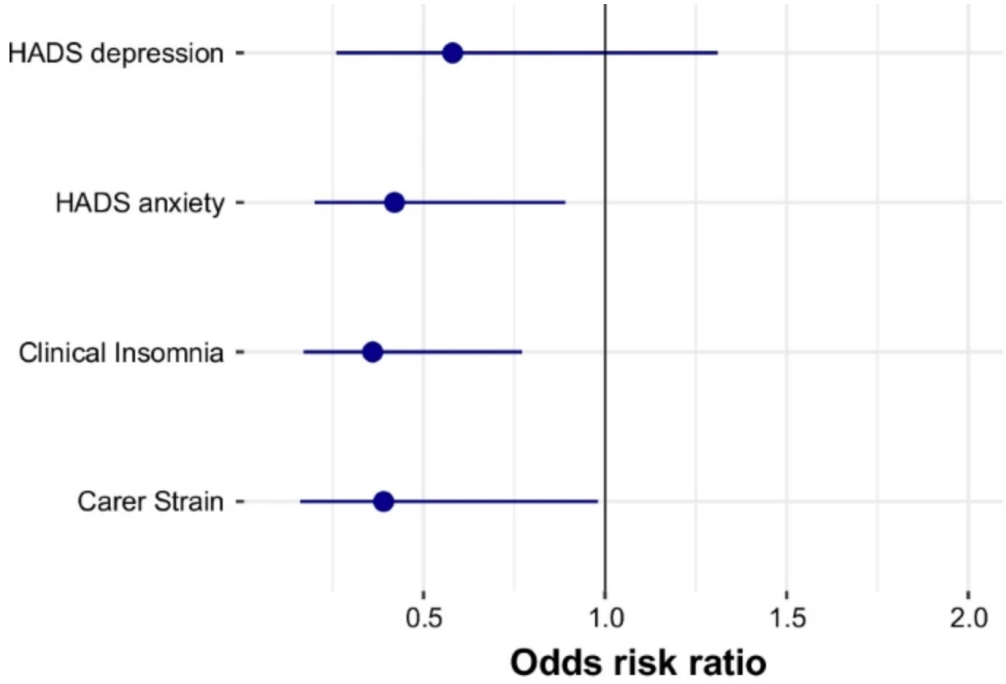
InS:PIRE 12 month outcomes

- After adjustment, there was a significant absolute increase in HRQoL in the intervention cohort in relation to the usual care cohort (0.12 (95% CI: 0.04-0.20), *p*=0.01)
- The intervention cohort had a **62% adjusted odds reduction** of screening for **depression** compared to the usual care cohort (OR 0.38, 95% CI: 0.19-0.76, p=0.01) at 12 months
- The intervention cohort had an adjusted absolute increase in self-efficacy of 2.32 points (95% CI: 0.32-4.31, *p*=0.02)

Henderson et al (2022) Thorax http://dx.doi.org/10.1136/thoraxjnl-2021-218428

What about family members?

- 170 caregivers had data available at 12 months
- 81 intervention caregivers vs 89 in the usual care cohort
- **58% adjusted odds reduction** of screening for anxiety in the intervention cohort
- **61% reduction in the odds of carer strain** in those who received the InS:PIRE intervention



McPeake et al (2022) Critical Care
https://doi.org/10.1186/s13054-022-04014-z

What next?

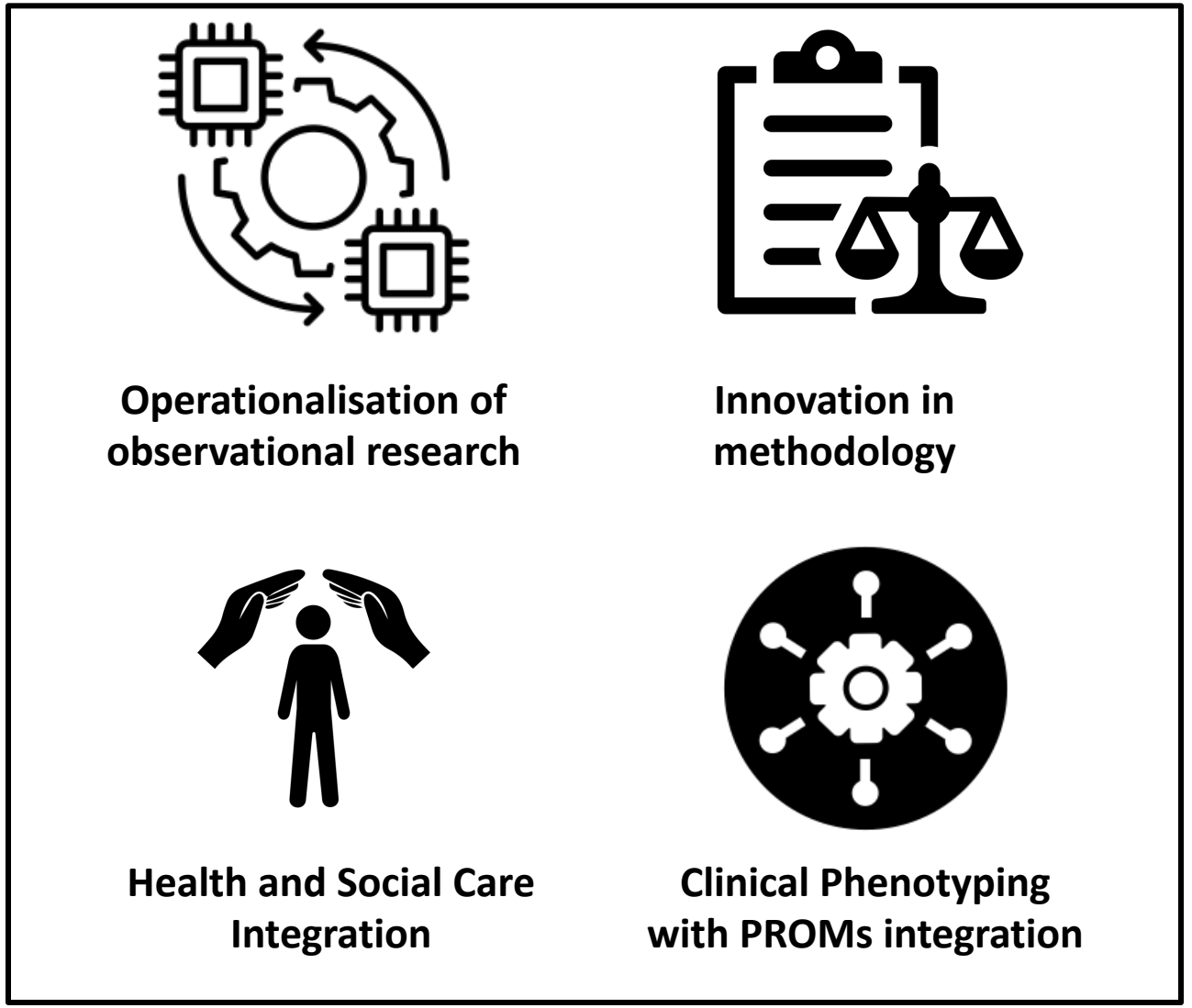
Long-term Host Immune Response Trajectories Among Hospitalized Patients With Sepsis

Sachin Yende, MD, MS[1,2]; John A. Kellum, MD[3]; Victor B. Talisa, MS[2]; et al

- Prospective cohort study, 483 patients in 12 US hospitals, US
- **Clinical phenotyping during recovery**
- To assess the host immune response following persist after discharge.
- Circulating levels of inflammation (interleukin 6 and high-sensitivity C-reactive protein [hs-CRP]), immunosuppression (soluble programmed death ligand 1 [sPD-L1]) were measured at 5 timepoints
- Compared with normal phenotype, those with the hyperinflammation and immunosuppression phenotype had higher 1-year mortality, 6-month all-cause readmission or mortality
- Associations were adjusted for demographic characteristics

Yende et al (2019) Jamanetworkopen
doi:10.1001/jamanetworkopen.2019.8686

Future Research: Long-term outcomes



Conclusion

- Survivors of sepsis encounter multiple challenges following hospitalisation
- Transitions of care are fracture points in the patient journey
- Support is needed across the recovery arc, including a consistent approach to fundamental care
- Future research should integrate biological measurement and PROMs
- Understanding the wider social context is key