

Recovery After Critical Illness

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Pulmonary/ Critical Care Medicine

Wake Forest School of Medicine



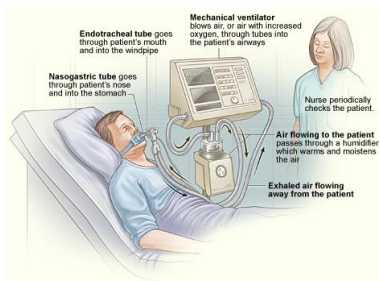
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Objectives

- To describe the long-term effects of critical illness
- To define PICS
- To introduce our ICU Recovery Clinic
- To describe the SCCM's THRIVE Initiative -> CAIRO

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Critical Illness



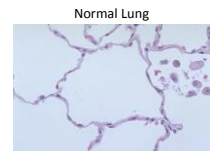
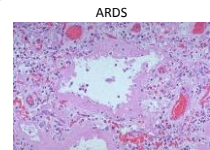
- >5.7 million people are admitted annually to ICUs

- 2 of the most common reasons for admission are Acute Respiratory Distress Syndrome (ARDS) and sepsis

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NHLBI and SCCM

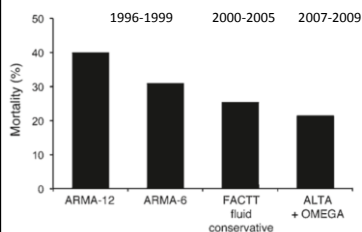
ARDS



- Acute, diffuse, inflammatory form of lung injury
- Results in severe oxygenation impairments

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ARDS



- Incidence of ARDS is likely stable over time but increases with age

- Mortality has been decreasing

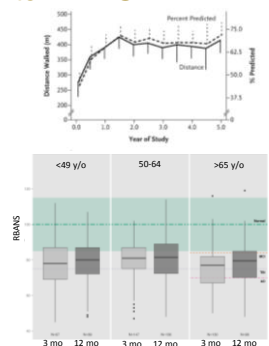
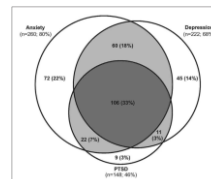
- Increasing attention has been paid to the long-term outcomes after ARDS

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Matthay J Clin Invest 2012

Problems After ARDS

- Common:
 - Physical Impairment
 - Cognitive Impairment
 - Neuropsychiatric Problems: Anxiety, Depression, PTSD



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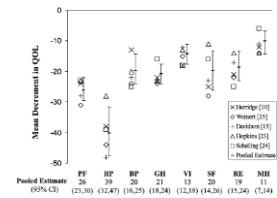
Herridge NEJM 2011 Huang CCM 2016 Pandharipande NEJM 2013

Problems after ARDS

- Other:
 - Weight loss, malnutrition
 - Dysphagia, hoarseness
 - Chronic pain
 - Sexual dysfunction
 - Rashes, hair loss
 - Sleep disturbance
- New Reports:
 - High Rates of Incident Diabetes
 - Development of significant chronic co-morbidities

Morbidity/ Mortality after ARDS

- Quality of Life (Dowdy):
 - Physical Function
- Loss of Work (Herridge):
 - 48% Return to work at 1 year
 - 65% Return to work at 2 years
- Healthcare Utilization (Ruhl):
 - 10% Re-hospitalized at 1 month
 - 40% re-hospitalized within 1 year
- Mortality
 - ICU Discharge: 20-30%
 - 1-2 Month: 40-50%
 - 1 Year: 50-66%



Sepsis

Sepsis Kills.

250,000 Americans die each year from sepsis. That's more than from AIDS, breast cancer and prostate cancer COMBINED. Sepsis is the body's life-threatening reaction to an infection. Anyone can get sepsis. A small cut, a bug bite or an infected tooth can all lead to sepsis.

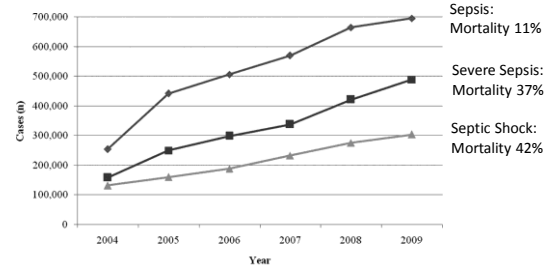
Sepsis is preventable and treatable. Do you know the Signs of Sepsis?



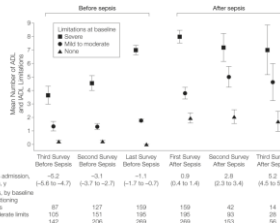
THE ROYAL STAMMUN FOUNDATION
FOR SEPSIS PREVENTION

Help Save Lives. Share the Signs of Sepsis with your family and friends. For more information, visit www.royalstammunfoundationforspsis.org

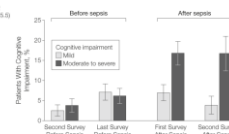
Sepsis



Problems after Sepsis

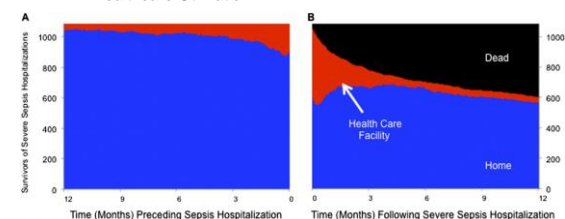


- Common:
 - Physical Impairment
 - Cognitive Impairment
 - Neuropsychiatric Problems: Anxiety, Depression, PTSD



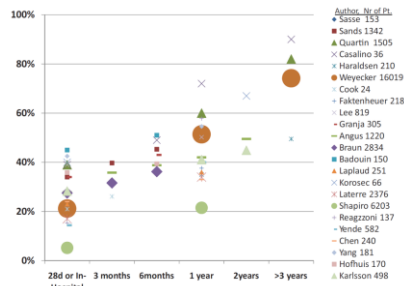
Morbidity/ Mortality after Sepsis

- Decreased Quality of Life
- Loss of Work: 50% unemployed at 1 year
- Healthcare Utilization



Morbidity/ Mortality after Sepsis

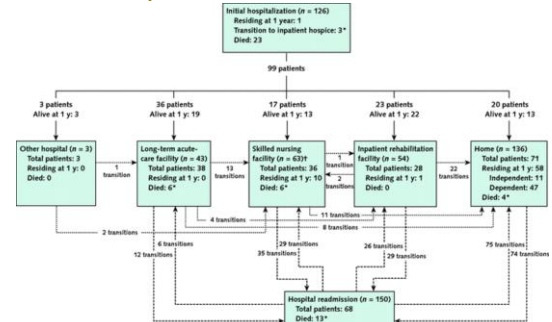
Long-Term Mortality



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Winters CCM 2010

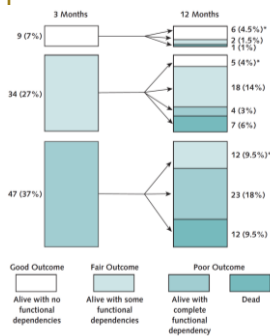
Complex Care of Sick Patients



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Unroe Annals Int Med 2010

Complex Care of Sick Patients



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Unroe Annals Int Med 2010

A call to Arms

EDITORIAL

Annals of Internal Medicine

Survivorship Will Be the Defining Challenge of Critical Care in the 21st Century

"The emerging picture of critical illness survivorship is deeply disturbing. In the year or two after discharge, patients are ravaged. They cannot walk. They cannot think clearly. They suffer from posttraumatic psychiatric syndromes. Their bodies hurt, are disfigured, and refuse to function like they did before. Many intensivists have a file of heartbreaking letters from former patients, grateful to be alive but desperate for help in getting their lives back."

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Iwashyna Annals Int Med 2010

A call to Arms

EDITORIAL

Annals of Internal Medicine

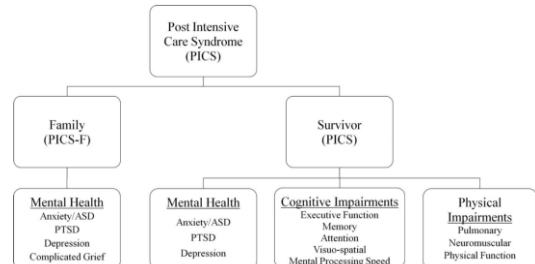
Survivorship Will Be the Defining Challenge of Critical Care in the 21st Century

"In the ICU, with lives at risk and death so imminent, it is easy to miss opportunities to improve the quality of our patients' lives after the ICU. Working as hard as we must to save patients' lives may leave us feeling that little time remains for other goals (15). And so we immobilize our patients. We catheterize and even paralyze them. Too often, we tranquilize them in the misguided hope that if they do not remember the ICU, their critical illness will not scar them. An alternative is emerging. We can recognize that survivorship care must begin on the first day a patient spends in the ICU. This may mean redesigning basic features of ICU care to place a premium on maintaining patients' physical and cognitive function."

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What's in a Name? Post-Intensive Care Syndrome



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Needham CCM 2012

Wake Forest ICU Survivor's Clinic

Recovery Clinic

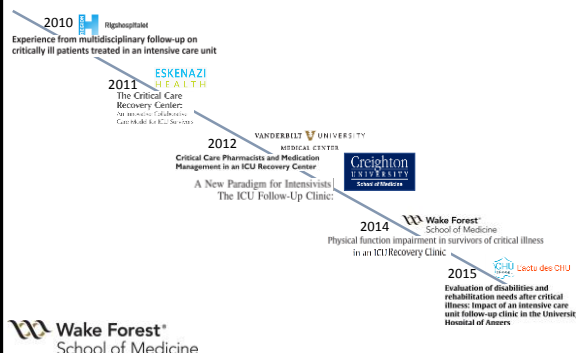
- Est -
2014

- Reasons:
 - Wanted to see if we could help bridge a perceived gap in care
 - Wanted to learn what problems our patients faced after critical illness
- Simultaneous Research Agenda

Background of ICU Recovery Clinics

- 1998: Reading, UK
 - "Intensive After Care After Intensive Care"
- 2006 UK Survey:
 - 30% of hospitals in UK, many nurse-led
 - all felt under-resourced

Background of ICU Recovery Clinics



Our ICU Recovery Clinic Structure

- Screening: Convenience Sampling
 - Inclusion Criteria:
 - Septic Shock and/or
 - ARF requiring MV >24 hrs
 - Exclusion Criteria
 - Bedbound or Wheelchair Bound
 - Active cancer on treatment
 - Discharged to SNF or LTACH
 - Scheduling of Appointment

Change in Personnel Over Time:

- Fellow
- MICU Research Nurse
- Critical Care Clinical Pharmacist

Added Exclusion Criteria:

- Active Drug Use
- Significant Travel (>90 mins)

Change in Scheduling:

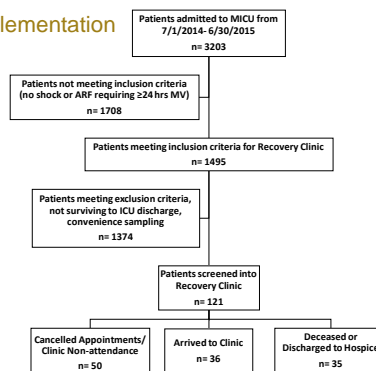
- 7-10 days to 21-30 days

Our ICU Recovery Clinic Structure

Visit to Clinic

- Pharmacy Assessment– BCCP or resident pharmacist
- Physician Visit- Attending +/- fellow
 - Physical function
 - Includes SPPB, handgrip as standard of care
 - Memories from ICU
 - Assessment of resolution of organ failures
 - Need for referrals, prescriptions, and management of gaps in care
 - Explanation of expected recovery from critical illness
- Study Participation if consented (after year 1 of ICU RC)

Implementation



Year 1 Cohort: Characteristics

Baseline Patient Characteristic	n=36
Age, average, years	64.5 (27.5)
Sex, Male (%)	19 (53%)
BMI, median (IQR)	27.4 (11.7)
APACHE II (at admission)*, median (IQR)	28.5 (8.0)
Charlson comorbidity index, median (IQR)	4.0 (3.3)
Diagnosed with ARDS*, n (%)	9 (25%)
Required RRT, n (%)	5 (14%)
In-hospital cardiac arrest, n (%)	0 (0%)
Received steroids, n (%)	17 (47%)
Received neuromuscular blockade*, n (%)	5 (14%)
Received vasopressors*, n (%)	16 (44%)
Days on ventilator, median (IQR)	3.0 (4.3)
Hospital LOS, median (IQR)	13.0 (10.3)

Year 1 Cohort: Physical Function

Objective and subjective physical function measures at the time of ICU Recovery Clinic visit related to readmissions and mortality.

Patient characteristic	All patients n = 36	1st Readmission* n = 10	1st Mortality* n = 10	1st Mortality* n = 10
Hand grip strength†, kg force, median (IQR)				
Left	26.7 (14.0)	31 (90)	31 (90)	31 (90)
Right	19.3 (16.1)	15 (15)	15 (15)	15 (15)
SPPB*, median (IQR)				
Balance subscore	3 (3)	6 (60)	6 (60)	6 (60)
Gait subscore	1 (1)	0 (0)	0 (0)	0 (0)
Total score	5 (5)	6 (60)	6 (60)	6 (60)
Short form-36†, median (IQR)				
Physical functioning	35 (30)	40 (100)	40 (100)	40 (100)
Physical role	6 (25)	10 (100)	10 (100)	10 (100)
Emotional role	66.7 (100)	10 (100)	10 (100)	10 (100)
Vitality	30 (30)	10 (100)	10 (100)	10 (100)
Mental health	68 (44)	10 (100)	10 (100)	10 (100)
Social functioning	50 (50)	10 (100)	10 (100)	10 (100)
Body pain	42.5 (37.5)	10 (100)	10 (100)	10 (100)
General health	40 (30)	10 (100)	10 (100)	10 (100)
Physical summary score	21.8 (28.8)	10 (100)	10 (100)	10 (100)
Mental summary score	78.7 (61.7)	10 (100)	10 (100)	10 (100)

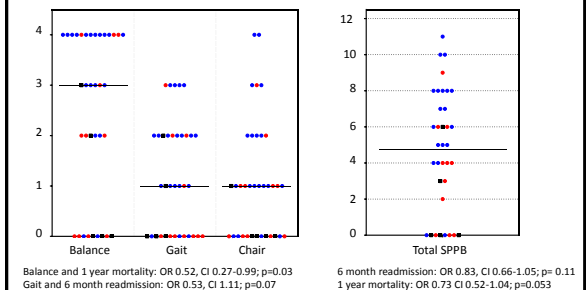
Objective and subjective physical function testing completed at the time of the ICU Recovery Clinic visit.
Abbreviations: kg = kilograms; IQR = interquartile range; SPPB = Short Physical Performance Battery; OR = odds ratio; CI = confidence interval.
Readmissions completed readmissions to Wake Forest only.

* Missing data for 1 patient.
† Missing data for 6 patients.

Year 1 Cohort

- Mortality at 1 year: 14%
- Readmissions by 6 months (to WFBMC): 35%

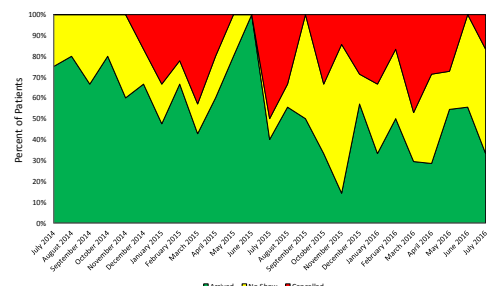
Year 1 Cohort: Relation between Physical Function and Readmissions/ Mortality



Year 1 Cohort: Pharmacy Data

Clinical Pharmacist's Intervention Type (Total n=22)	n (%)
Patient education	18 (43%)
Optimization or correction of drug dosing error	6 (14%)
Optimization or correction of therapeutic timing error	5 (12%)
Correction of drug selection error	5 (12%)
Recommendation for additional laboratory work or monitoring	3 (7%)
Assistance with cost of medication or supplies	3 (7%)
Therapeutic recommendation for therapy omission	1 (2%)
Correction of dosage form or route selection error	1 (2%)
Total Interventions	42 (100%)

Clinic Challenges





CAIRO

- THRIVE will become an SCCM Committee
- SCCM THRIVE Collaboratives -> CAIRO
 - Critical + Acute Illness Recovery Organization

Thanks to everyone!

- Critical Care Research Team:
 - D. Clark Files, Kevin Gibbs, Jessica Palakshappa, Peter Morris
 - James Davidson, Sheetal Gandotra, Alexis Smith
 - Rebecca Bookstaver, Michael Kenes, Kristin Welborn and our ICU Clinical Pharmacy Team
 - Mary LaRose, Lori Flores, Lina Purcell
 - Carolann Young, Shannon Shields
 - Oksana Creech, Alison Bode
 - CTSI Research Coordinator Pool

Post-ICU Recovery

- THRIVE: SCCM initiative to help increase awareness of and research into recovery after critical illness



- <https://www.youtube.com/watch?v=T03palv4mYU>
 - THRIVE: Live after the Intensive Care Unit
- <https://www.youtube.com/watch?v=DU7Ax-xaDiw>
 - THRIVE: Wellness After the ICU