Chronic Critical Illness:
Can it be prevented?

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Disclosures

- Data free zone

The NEW ENGLAND JOURNAL of MEDICINE

Chronic Critical Illness

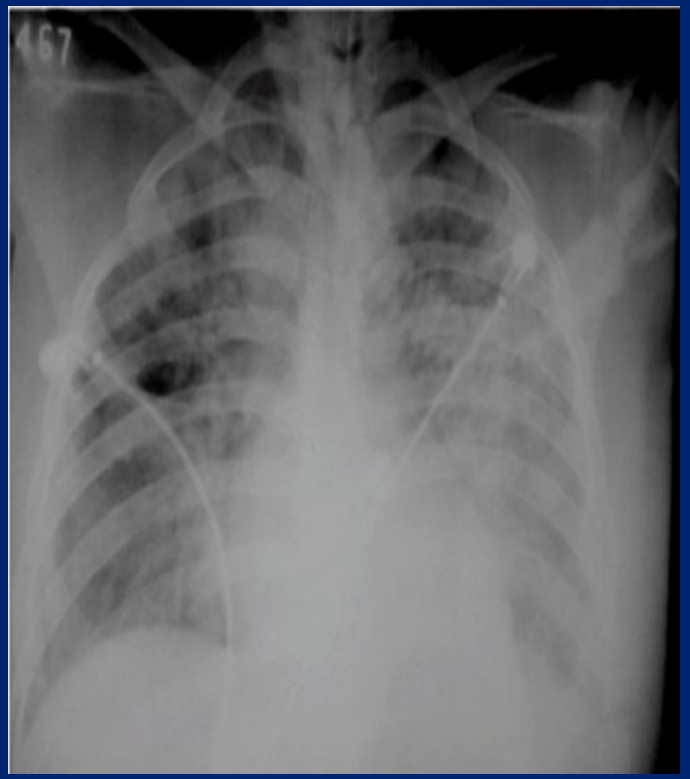
Daniela Lamas, M.D.

The data are discouraging. "Chronic critical illness" is a nebulous term for the condition of "We — intensive care clinicians — have created chronic critical illness, and that makes it especially painful to see. The model that provides ongoing critical care for patients in LTAC [hospitals] and nursing homes shields those patients from our view inside the ICU," says Judith Nelson, "This is a disease. It's sometimes or even often worse than some cancers in terms of its mortality and effect on quality of life. People know what cancer means. They've heard of it. But they've not heard of this."

to the health care system is astronomical — more than $20 billion annually.[1]

A (Very) Old Case

- 65 year-old man with pneumonia and ARDS
  - 30 day LOS with LTVV
  - Tracheostomy
  - LTAC transfer
  - Failure to wean after 3 months



……..except

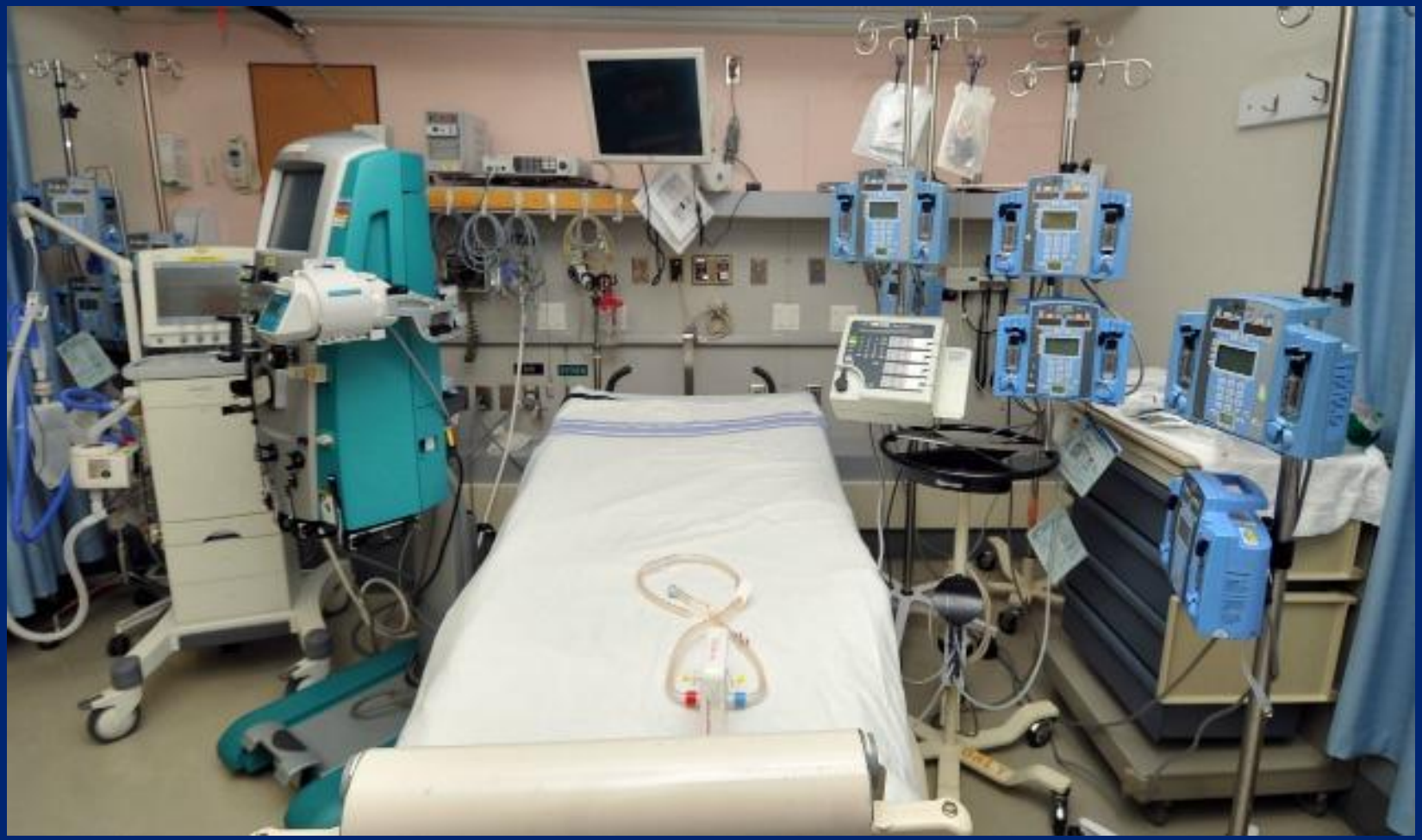
It's 1958

Baltimore City Hospital ICU
(or what it might have looked like)

Austrian physician
Father of CPR and critical care

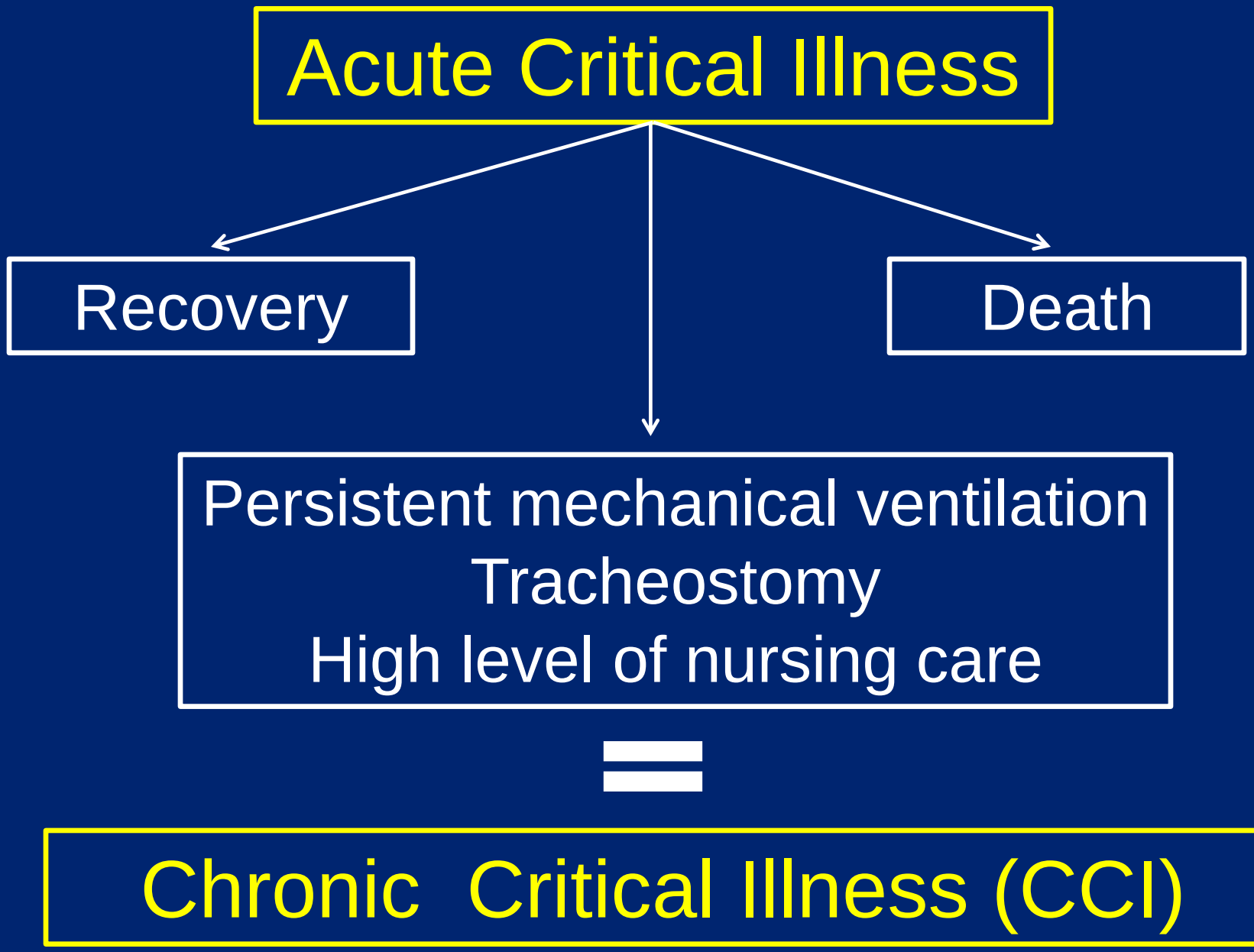
http://www.spectrumhealth.org/blodgett_timeline/
en.wikipedia.org

Fast forward 56 years



Chronic Critical Illness
Objectives

- Define chronic critical illness (CCI)
- Discuss prevalence, impact and outcome
- Suggest CCI prevention strategies
- Suggest areas for future research


Acute Critical Illness
Recovery
Death
Persistent mechanical ventilation
Tracheostomy
High level of nursing care
=
Chronic Critical Illness (CCI)

Chronic Critical Illness
What is it?

- A result of modern medicine:
  - 1985 – term first coined by Girard and Raffin[1]
  - *"The chronically critically ill: to save or let die"*
  - *"where Lazarus meets Darwin"*[2]

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1. Girard and Raffin. Resp Care 1985
2. Lamas D. NEJM 2014

Chronic Critical Illness
What is it?

- Hallmark feature: chronic respiratory failure requiring prolonged mechanical ventilation (PMV)
- Consensus definition: >21 days of consecutive mechanical ventilation for >6 hours per day
- Definitions vary:
  - 2-4 weeks IMV
  - DRG 541 or 542 (elective tracheostomy)

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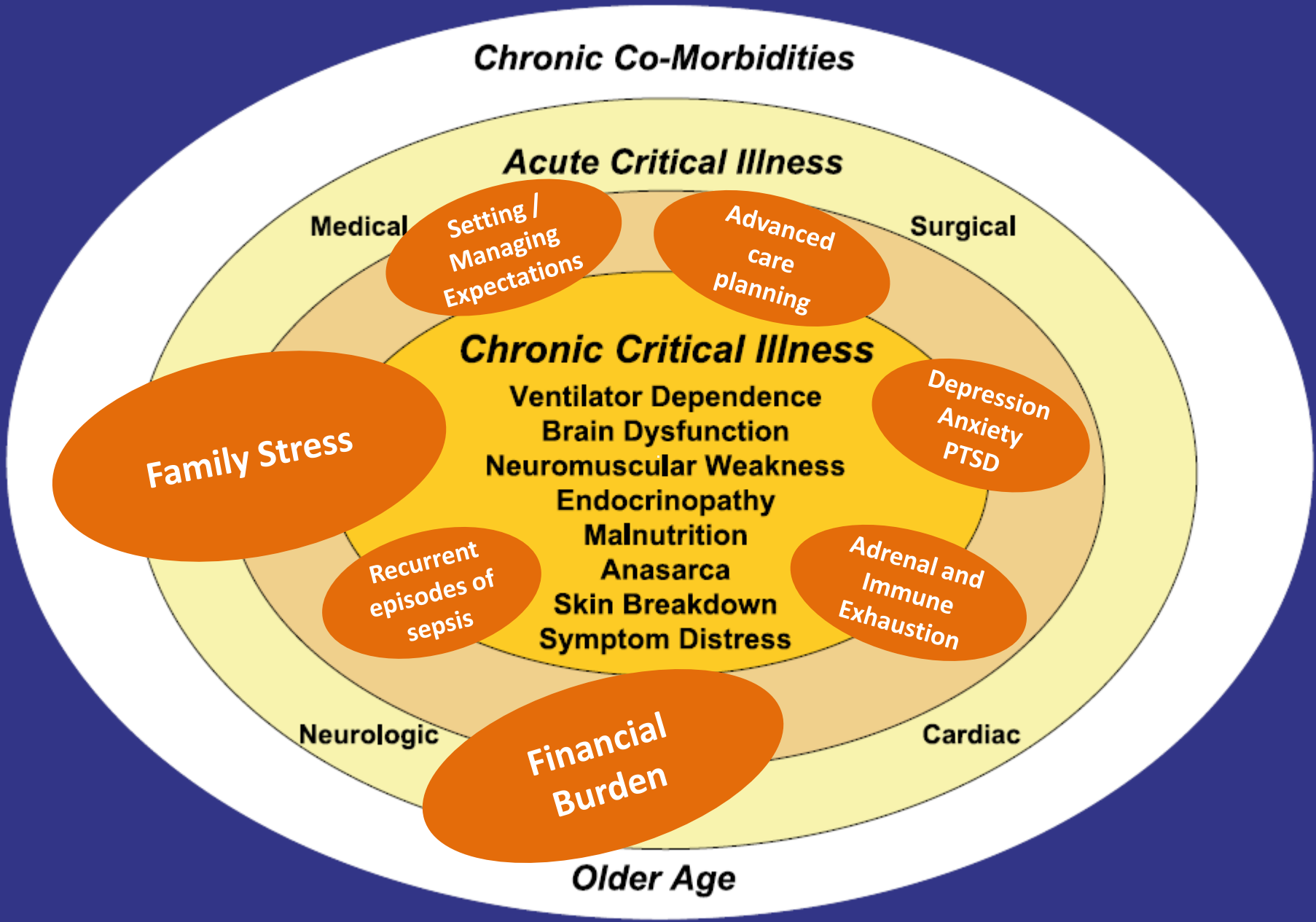
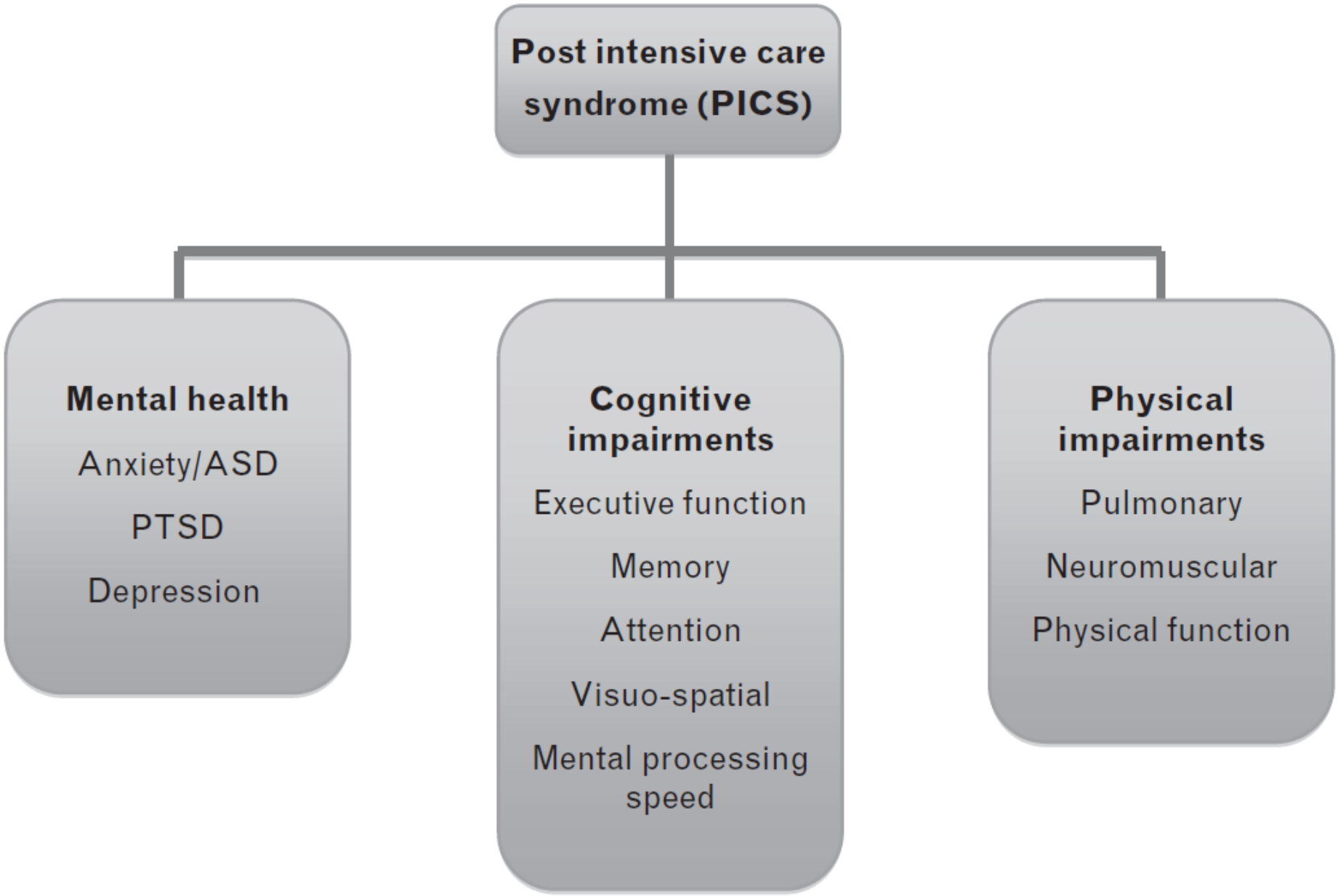
Carson SS. Respir Care 2012

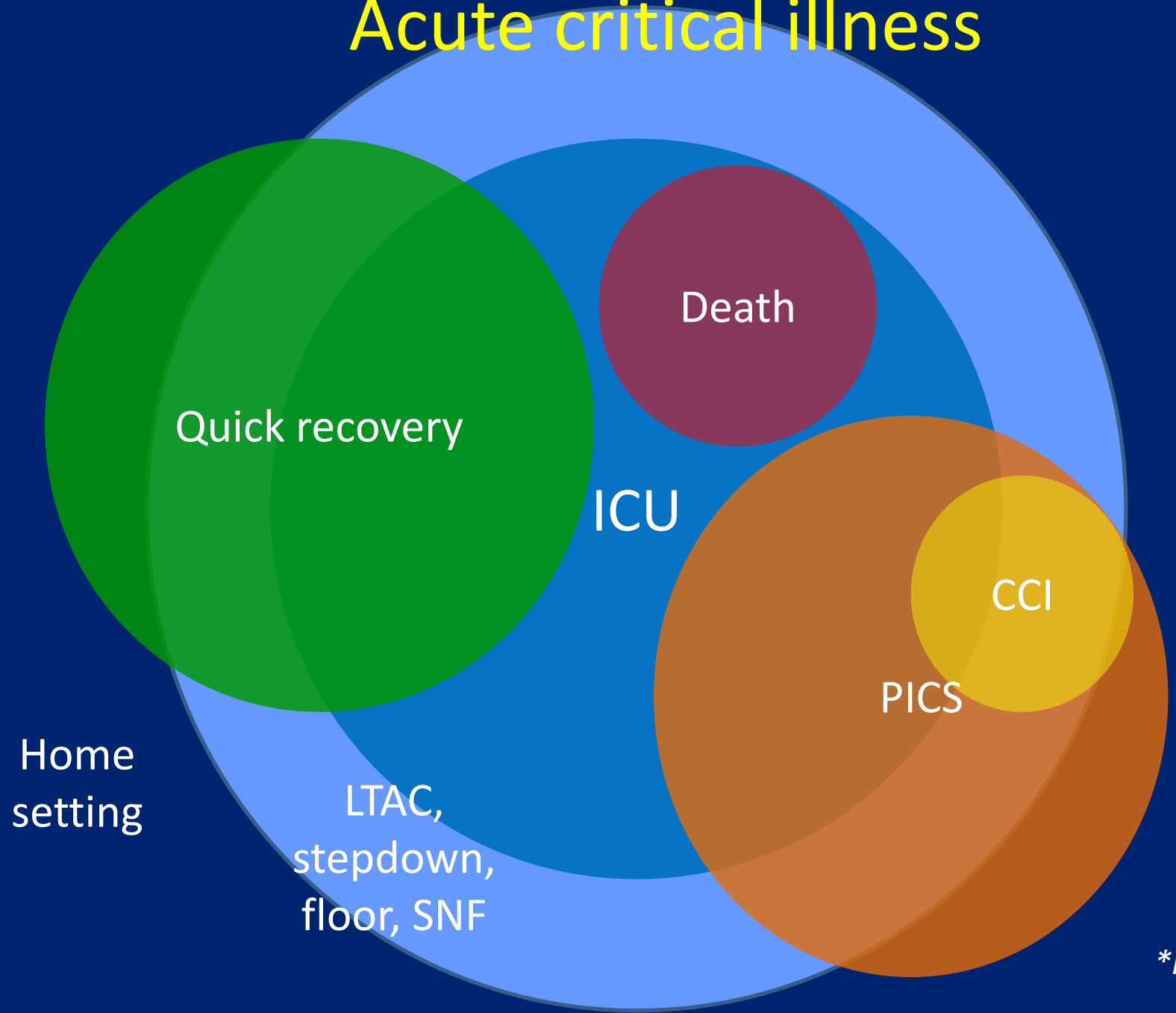


Nelson JE and Carson SS. CCM 2010



Denehy and Elliott. Curr Opin Crit Care 2012

Acute critical illness

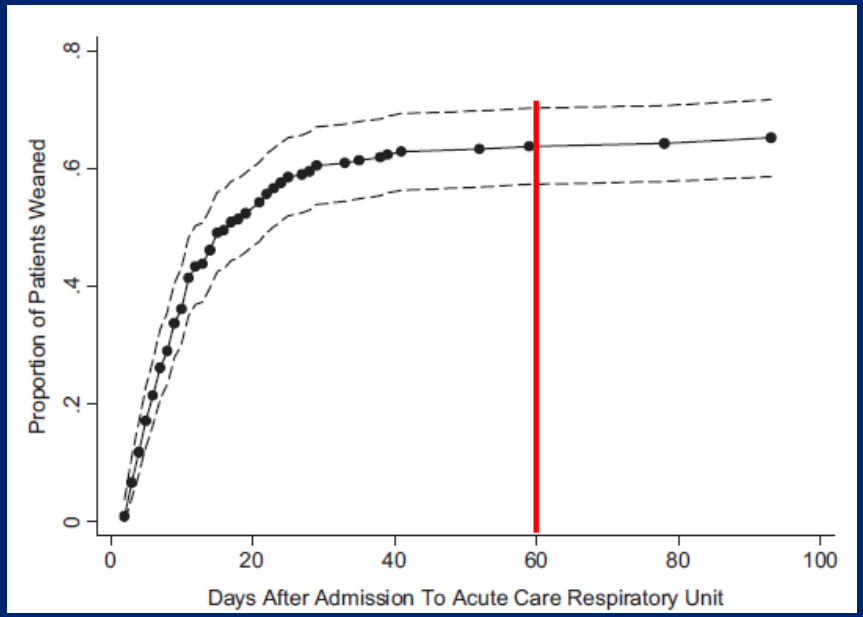


*Not to scale

Chronic Critical Illness
US Prevalence and Impact

- 5-10% of patients requiring mechanical ventilation
- >100,000 patients
- $20 billion / year
- 30-60% liberated
  - Average 14-37 days

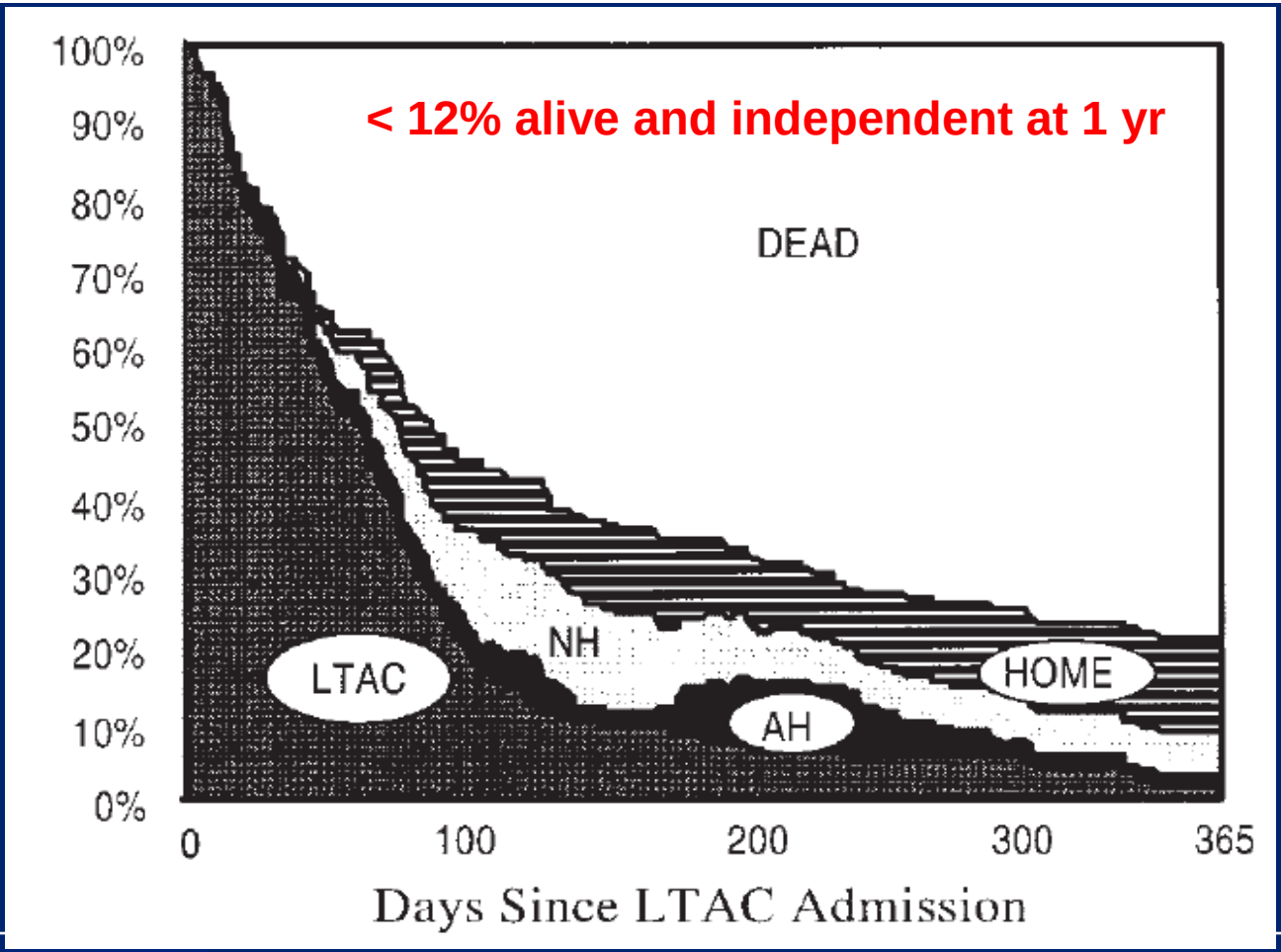
- Single LTAC experience
  - 210 patients, prospective
  - Median: 14d (6-51 IQR)
  - **Very unlikely after 60d**



Bigatello LM et al. CCM 2007
Nelson JE. AJRCCM 2010

Chronic Critical Illness
Outcomes

- Single center
- 133 LTAC patients
- 1995-1996



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Carson et al. AJRCCM 1999

Chronic Critical Illness
Family Overload

- Caregiver depressive symptoms more severe than among Alzheimer's and spinal cord injury caregivers
- "Caregiving overload" common in postdischarge period
- 84% quit work or significantly change their hours to accommodate care needs

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Douglas et al. Chest 2003

Chronic Critical Illness
Communication with families

- Prospective survey. 100 patients with CCI
  - 5 ICUs in NYC
  - 3-7 days after tracheostomy
  - 98% surrogates

- **93%** received no info on expected 1-yr survival
  ~ 50% deceased at 1 year
- **80%** received no info on expected long-term functional status <12% independent at 1 year

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Nelson JE et al. Arch Int Med 2007

Chronic Critical Illness
Communication with families

- 126 patients with CCI
- Survey of surrogate and physician expectations: 1yr survival, functional status, QOL

	High expectations for:		
	1-yr survival	Functional status	QOL
Observed	56%	9%	
Physician	43%	6%	4%
Surrogate	93%	71%	83%

K = <0.08

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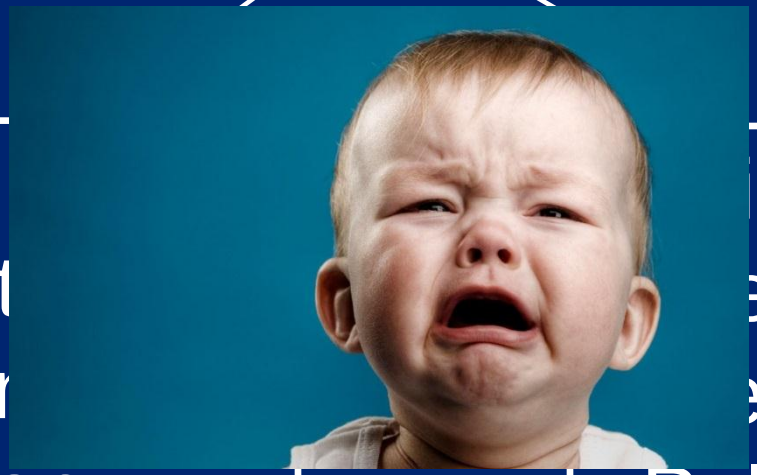
Cox CE et al. CCM 2009
Quest T. Expectation / Reality Gap

What do we do with this information?



Research:
- Prognost
- Treatmer
- Prevention

ical Care:
event
eat
- Palliate

Effective communication with patients & families

Chronic Critical Illness
Who gets better?

- Current prognostic models validated for acute critical illness (APACHE, SOFA, etc)
- Mortality prediction is not enough
- Other (just as) important outcomes:
  - Functional status
  - Cognitive recovery

Chronic Critical Illness

Can it be prevented?

A never event? Probably not

Can we do better? Absolutely

Critical Illness
Barriers to prevention

- Lack of research interest and funding
- Diversity of care venues
- Lack of adherence to best practice
- Lack of clear communication with patients and families
- Continuation of futile care

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Nelson JE et al. Arch Int Med 2007

Chronic Critical Illness
Prevention Strategies

	Management Principles	Potential Future Research
Mechanical Ventilation	Use lung protective ventilation strategies (6cc/kg), conservative fluid management, weaning protocol	Identify risk factors for persistent IMV
Functional Recovery	Prevent hyperglycemia Promote early mobility Minimize use of corticosteroids	Effect of early mobility on long-term outcomes
Nutrition and metabolic support	Both over- and underfeeding associated with CCI Prefer EN over PN	Long-term effects of different feeding strategies
Cognitive and mental health	Minimize sedation, prevent/treat pain and delirium. Avoid benzos where possible	Identify long-term cognitive effects of CCI Develop targeted therapies
Nosocomial infection	Bundles: CVC, VAP, etc. Reduce, remove indwelling devices	Develop uniform practices for CCI Antibiotic stewardship guidelines
Patient-centered care	Maintain communication, solicit preferences at admission, include consultative palliative care	Investigate best practices for providing information

Maguire JM and Carson SS. Curr Opin Crit Care 2013

Surviving Sepsis Campaign BUNDLES

TO BE COMPLETED WITHIN 3 HOURS:

1) Measure lactate level
2) Obtain blood cultures prior to administration of antibiotics
3) Administer broad-spectrum antibiotics
4) Administer 30 mL/kg crystalloid for hypotension or

Surviving Sepsis

Choosing Wisely®

An initiative of the ABIM Foundation

Central Line Bundle

- Communication
  - Daily goals sheet
- Safety programs at unit level
- Central line cart
- Central line checklist
- Empowerment of *all* staff to interrupt line placement

Medscape EDUCATION

ICU LIBERATION www.iculiberation.org

ICU Pain, Agitation, and Delirium Care Bundle

	PAIN	AGITATION	DELIRIUM
ASSESS	Assess pain ≥4x/shift & prn Preferred pain assessment tools: • Patient able to self-report → NRS (0-10) • Unable to self-report → BPS (3-12) or CPOT (0-8) Patient is in significant pain if NRS ≥ 4, BPS > 5, or CPOT ≥ 3	Assess agitation, sedation ≥4x/shift & prn Preferred sedation assessment tools: • RASS (-5 to +4) or SAS (1 to 7) • NMB → suggest using brain function monitoring Depth of agitation, sedation defined as: • *agitated* if RASS = +1 to +4, or SAS = 5 to 7 • *awake and calm* if RASS = 0, or SAS = 4 • *lightly sedated* if RASS = -1 to -2, or SAS = 3 • *deeply sedated* if RASS = -3 to -5, or SAS = 1 to 2	Assess delirium Q shift & prn Preferred delirium assessment tools: • CAM-ICU (+ or -) • ICDSC (0 to 8) Delirium present if: • CAM-ICU is positive • ICDSC ≥ 4
TREAT	Treat pain within 30' then reassess: • Non-pharmacologic treatment–relaxation therapy • Pharmacologic treatment: – Non-neuropathic pain → IV opioids +/- non-opioid analgesics – Neuropathic pain → gabapentin or carbamazepine, + IV opioids – S/p AAA repair, rib fractures → thoracic epidural	Targeted sedation or DSI (*Goal: patient purposely follows commands without agitation*): RASS = -2 – 0, SAS = 3 - 4 • If *under sedated* (RASS >0, SAS >4) assess/treat pain → treat w/sedatives prn (non-benzodiazepines preferred, unless ETOH or benzodiazepine withdrawal is suspected) • If *over sedated* (RASS <-2, SAS <3) hold sedatives until at target, then restart at 50% of previous dose	• Treat pain as needed • Reorient patients; familiarize surroundings; use patient's eyeglasses, hearing aids if needed • Pharmacologic treatment of delirium: – Avoid benzodiazepines unless ETOH or benzodiazepine withdrawal is suspected – Avoid rivastigmine – Avoid antipsychotics if ↑ risk of Torsades de pointes
	• Administer pre-procedural analgesia	• Consider daily SBT, early mobility and exercise	• Identify delirium risk factors: dementia,

Positioning

Pressure Points

ARDSnet

NIH NHLBI ARDS Clinical Network
Mechanical Ventilation Protocol Summary

INCLUSION CRITERIA: Acute onset of

1. $PaO_2/FiO_2 \leq 300$ (corrected for altitude)
2. Bilateral (patchy, diffuse, or homogeneous) infiltrates consistent with pulmonary edema
3. No clinical evidence of left atrial hypertension

PART I: VENTILATOR SETUP AND ADJUSTMENT

1. Calculate predicted body weight (PBW)
   Males = 50 + 2.3 [height (inches) - 60]
   Females = 45.5 + 2.3 [height (inches) -60]
2. Select any ventilator mode
3. Set ventilator settings to achieve initial V_T = 8 ml/kg PBW
4. Reduce V_T by 1 ml/kg at intervals ≤ 2 hours until V_T = 6ml/kg PBW.
5. Set initial rate to approximate baseline minute ventilation (not > 35 bpm).
6. Adjust V_T and RR to achieve pH and plateau pressure goals below.

OXYGENATION GOAL: PaO_2 55-80 mmHg or SpO_2 88-95%
Use a minimum PEEP of 5 cm H_2O. Consider use of incremental FiO_2/PEEP combinations such as shown below (not required) to achieve goal.

Lower PEEP/higher FiO2

FiO_2	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7
PEEP	5	5	8	8	10	10	10	12

FiO_2	0.7	0.8	0.9	0.9	0.9	1.0
PEEP	14	14	14	16	18	18-24

Higher PEEP/lower FiO2

FiO_2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5
PEEP	5	8	10	12	14	14	16	16

FiO_2	0.5	0.5-0.8	0.8	0.9	1.0	1.0
PEEP	18	20	22	22	22	24

PLATEAU PRESSURE GOAL: ≤ 30 cm H_2O
Check Pplat (0.5 second inspiratory pause), at least q 4h and after each change in PEEP or V_T.
If Pplat > 30 cm H_2O: decrease V_T by 1ml/kg steps (minimum = 4 ml/kg).
If Pplat < 25 cm H_2O and V_T< 6 ml/kg, increase V_T by 1 ml/kg until Pplat > 25 cm H_2O or V_T = 6 ml/kg.
If Pplat < 30 and breath stacking or dys-synchrony occurs: may increase V_T in 1ml/kg increments to 7 or 8 ml/kg if Pplat remains ≤ 30 cm H_2O.

and Kansas Foundation for Medical Care.
Endorsed by the Advancing Excellence and Oregon IHI Network Joint Committee, June 2009.

Choosing Wisely®

An initiative of the ABIM Foundation

Critical Care Societies Collaborative - **Critical Care**

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

CHEST AMERICAN COLLEGE of CHEST PHYSICIANS

AMERICAN THORACIC SOCIETY 1905 ATS — *We help the world breathe®* PULMONARY • CRITICAL CARE • SLEEP

Society of Critical Care Medicine — The Intensive Care Professionals

Five Things Physicians and Patients Should Question

1. Daily diagnostic tests
2. Blood transfusion
3. Parenteral nutrition
4. Sedation
5. Life support

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www.choosingwisely.org

Chronic Critical Illness
Prevention Top 5 List

5. Nutrition (choosing wisely campaign item #3)

- Both over and under-feeding have been associated with CCI
- Don’t use parenteral nutrition in adequately nourished critically-ill patients within the first 7 days of an ICU stay
- EN over PN

Chronic Critical Illness
Prevention Top 5 List

4. Sedation (choosing wisely campaign item #4)

"Don't deeply sedate mechanically ventilated patients without a specific indication and without daily attempts to lighten sedation"

Delirium prevention – ESPN/CNN protocol

Consider early mobility – even in the ICU

Chronic Critical Illness
Prevention Top 5 List

3. Mechanical Ventilation

Use lung protective, low-stretch ventilation (6cc/kg) for all patients with ARDS and those at risk (most hospitalized patients)

Target conservative fluid management where feasible

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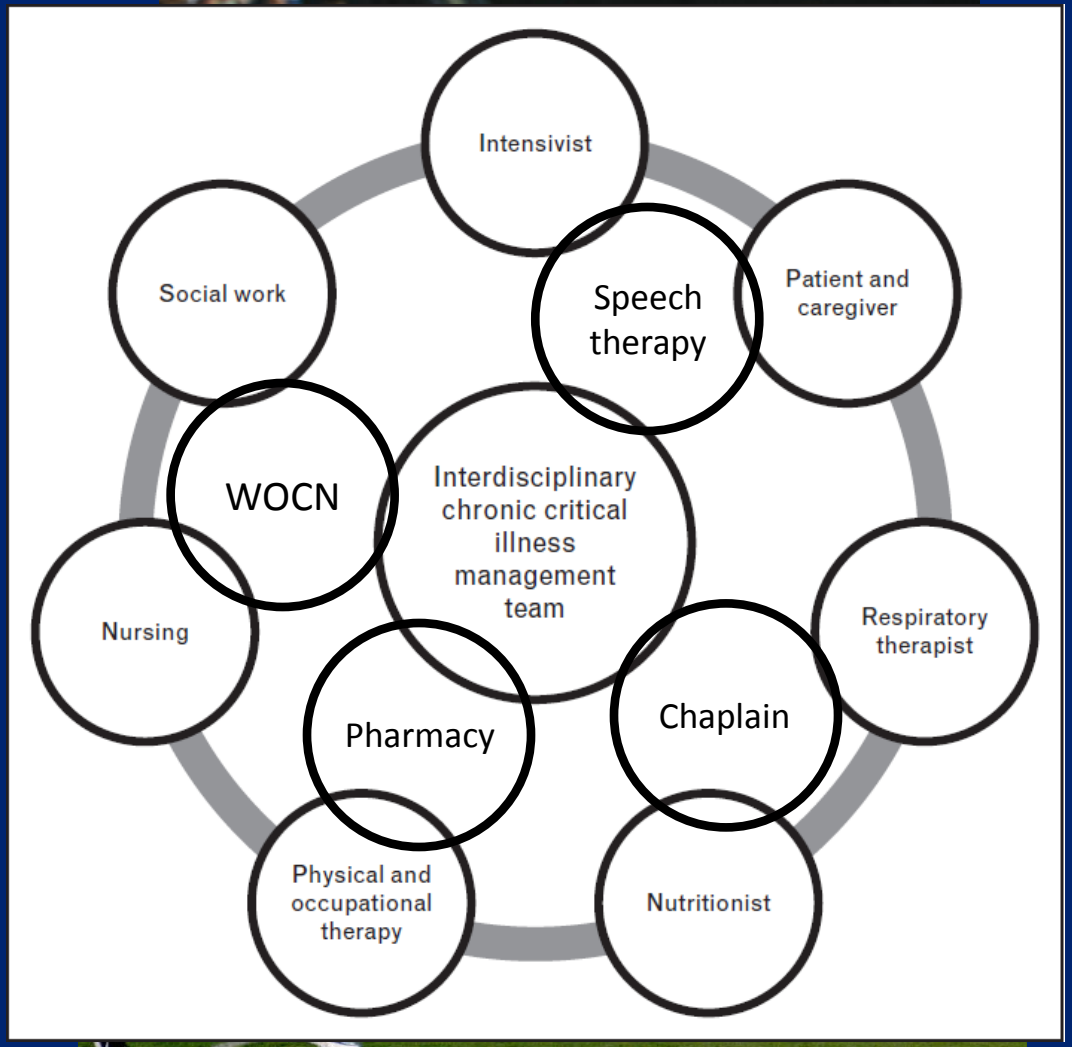
ARDSNet. NEJM 2000

Chronic Critical Illness
Prevention Top 5 List

2. Critical care is a team sport

Consider weekly interdisciplinary rounds and family meetings



Maguire JM and Carson SS. Curr Opin Crit Care 2013

Chronic Critical Illness
Prevention Top 5 List

1. Communication & Awareness (choosing wisely campaign item #5)

"Don't continue life support for patients at high risk for death or severely impaired functional recovery without offering patients and their families the alternative of care focused entirely on comfort"

- Talk to patients and families
- Ask about advanced directives
- Tell them what you expect (50%, 10%)
- Offer alternatives to aggressive care:
  comfort / palliative, hospice

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www.choosingwisely.org

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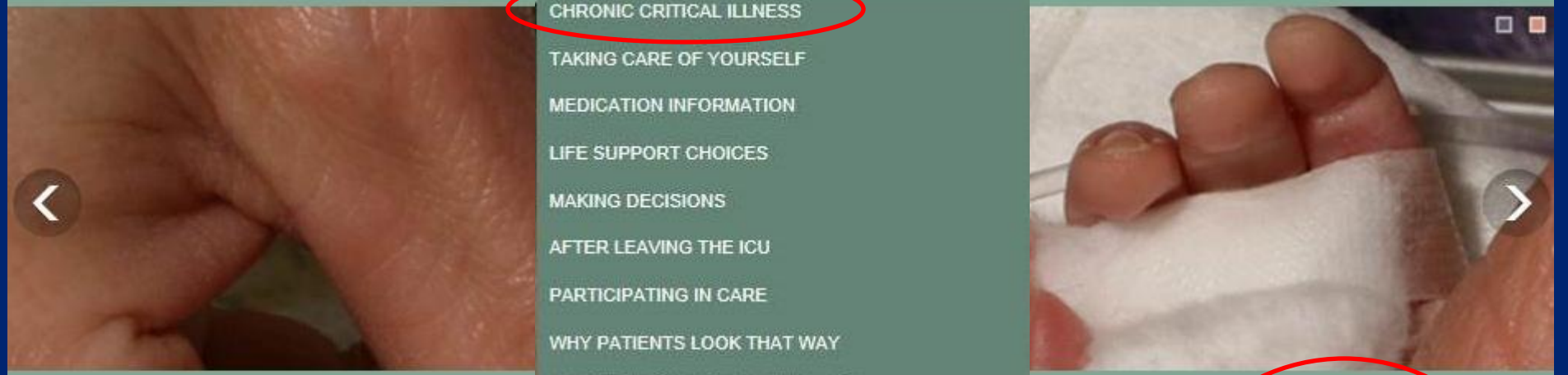
- CHRONIC CRITICAL ILLNESS
- TAKING CARE OF YOURSELF
- MEDICATION INFORMATION
- LIFE SUPPORT CHOICES
- MAKING DECISIONS
- AFTER LEAVING THE ICU
- PARTICIPATING IN CARE
- WHY PATIENTS LOOK THAT WAY
- POST-INTENSIVE CARE SYNDROME



What Is Critical Care?

Critical care is medical care for patients whose illness requires close, constant watch by a team of specially trained caregivers. Most critical care takes place in an intensive care unit (ICU) or a trauma center. Both places of care contain all kinds of machines, tubes, and equipment used to treat the illness.

Feeling scared in the ICU is natural. You may be meeting the care team for the first time, or you may not recognize the care equipment. But understanding how the team and equipment improve health may help you feel more at ease. Also important is learning about treatment options, which may help you make decisions about care.

Spotlight on Life Support

Sometimes, in spite of the best treatment, a critically ill patient will not regain health. Treatment continues, but the goal shifts to making sure the patient dies as dignified and pain-free as possible. The medical care and support used to achieve this goal is called *end-of-life care*.

This shift in care can be scary, but end-of-life care also helps the patient and family deal with any emotional and spiritual concerns with death.

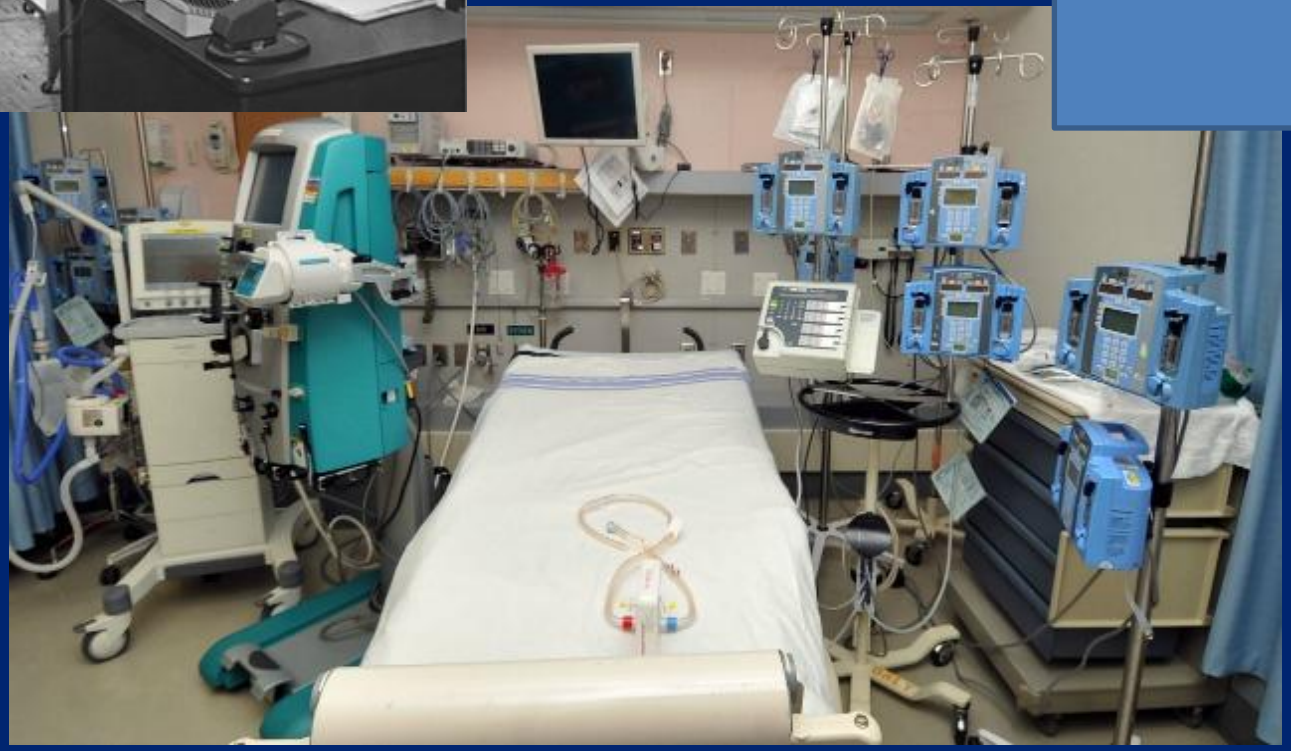
Chronic Critical Illness
Information about the causes of chronic critical illness, available treatments, and recovery.

Why Do ICU Patients Look and Act That Way? A guide to understanding how a patient looks and acts in the ICU.

Glossary
An A to Z list of critical care words and what they mean.

Critical Illness

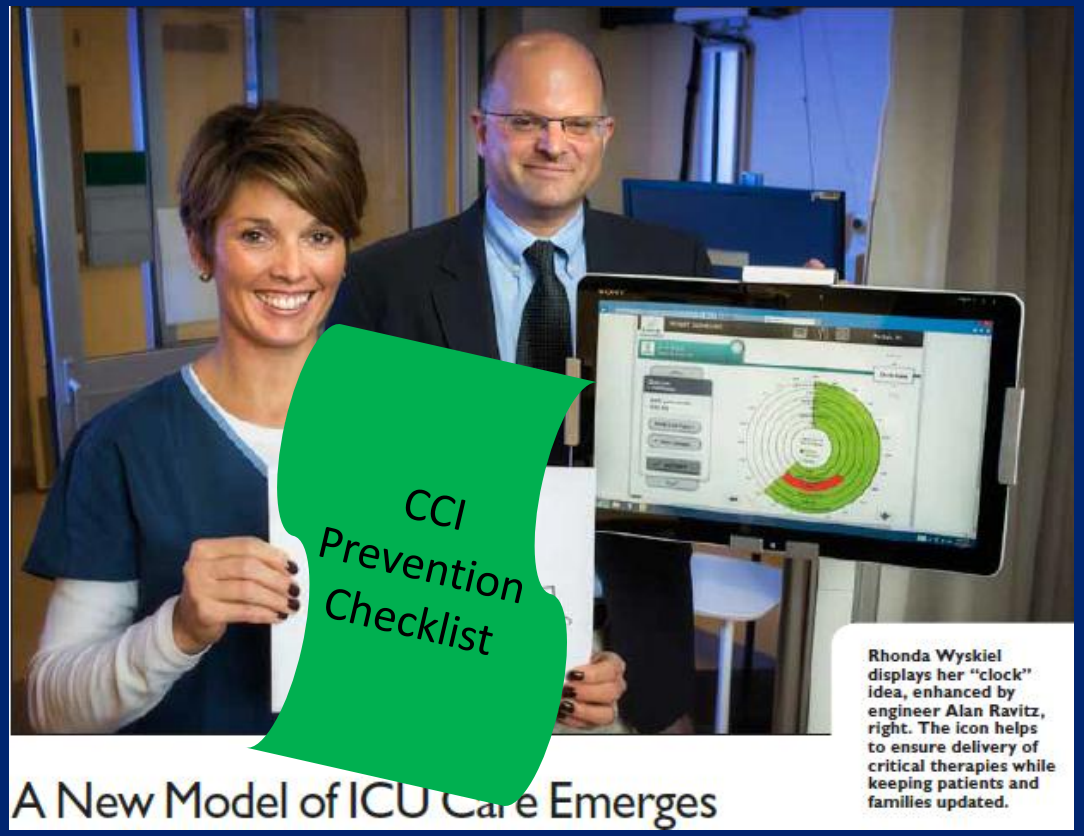
Wave of the future



2064 ?

Critical Illness
Project Emerge

- Preventable patient harm alert system
  (CLABSI, CAUTI, VAP, VAC, etc)
- System of systems
- Tracks over 200 tasks daily
- Family involvement



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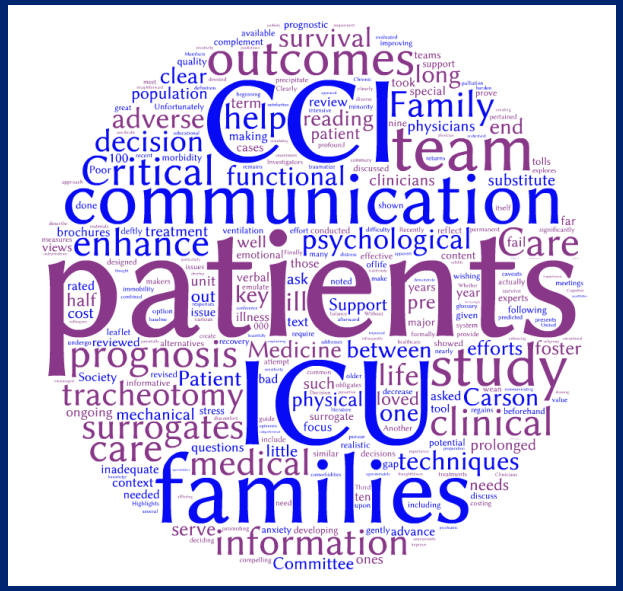
http://www.hopkinsmedicine.org/news/publications/dome/dome_december_2013/a_new_model_of_icu_care_emerges

Chronic Critical Illness
Take Home Points

- CCI: What is it?
  - Mechanical ventilation >21 days
- Prevalence, Impact and Outcomes
  - 5-10% of mechanically ventilated
  - 50% survival at 1 year
  - 12% independence at 1 year
- Can CCI be prevented?
  - Not completely, but we can do better
- What does the future hold?
  - More research, better prevention, prognostication, and communication



Thank you

Special thanks:
Dr. Jerry Staton
Dr. David Schulman

Online Resources

- Choosing Wisely Campaign

  www.choosingwisely.org/

- Patient and family educational resources

  www.myICUcare.org/

- Project Emerge

  http://www.hopkinsmedicine.org/news/publications/dome/dome_december_2013/project_emerge_preventable_harms_and_ways_to_avoid_them