Austin Health

Challenges for recognising and responding to patient deterioration

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anzic research centre

MONASH University

Overview

- Historic Studies on SAEs
- Competing aims for hospitals
- Changing profile of the hospital
- The gap between skill and demand for ward staff
- Deskilling vs re-skilling
- Important steps in the recognition and response to deterioration
- Strategies to address deterioration (pre-emptive + reactive)
- The ACSQHC consensus statement
- Where to from here ?

Historic studies on serious adverse events

- Serious adverse events are common in hospitalized patients
  - Australia[1]
  - New Zealand [2]
  - USA [3]
  - Canada [4]

Adverse events ≅ 10% admissions

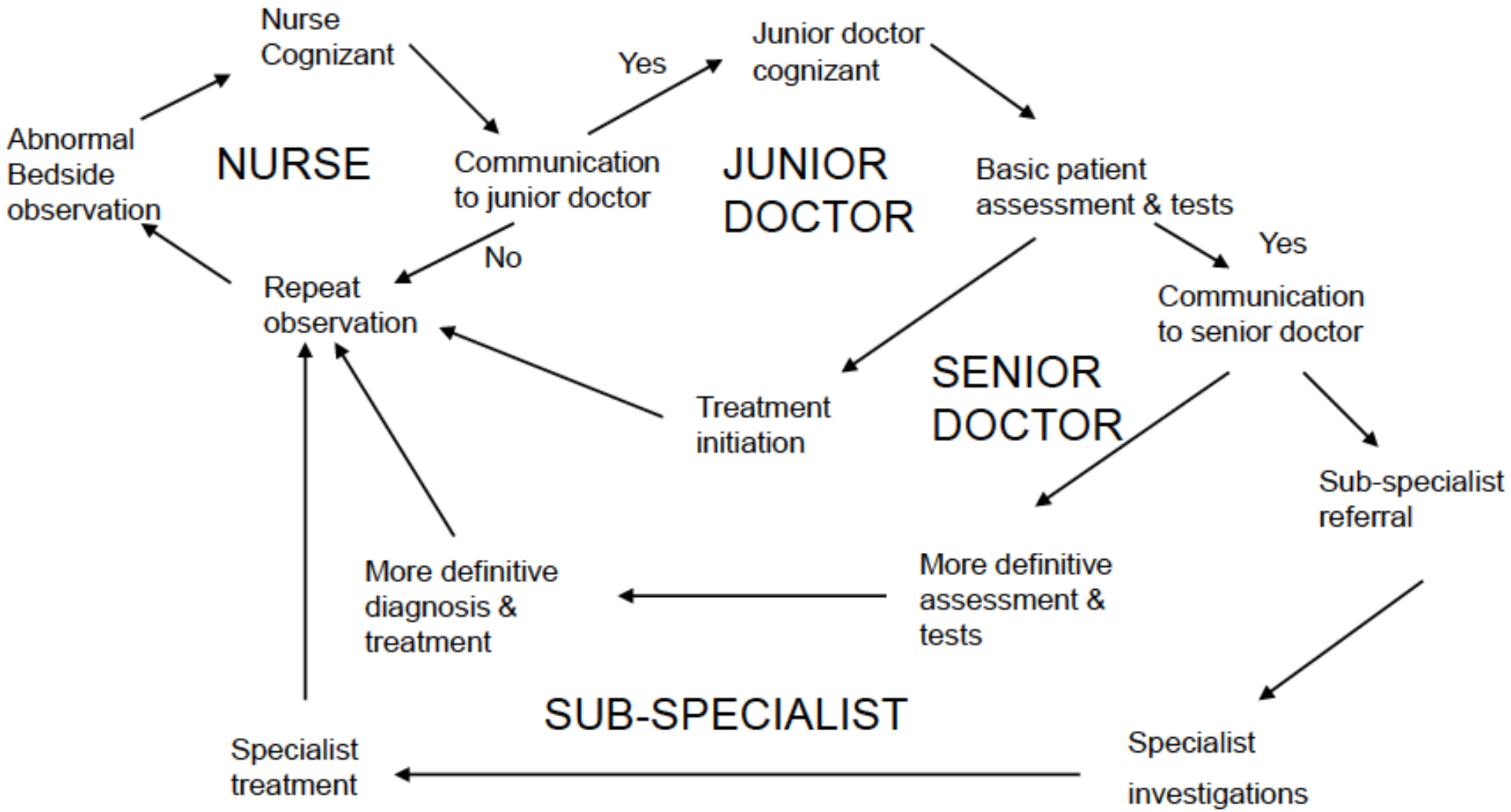
1. Wilson etal MJA 1995
2. Davis etal NZ Med J 1998
3. Brennan / Leape 1984
4. Baker etal 2000

Are there warning signs

- Serious adverse events were preceded by signs of instability in up to 80% for 6-8hr

– Schein etal	Chest 1990	USA
– Buist etal	MJA 1999	Aus
– Hodgets etal	Resuscitation 2002	UK
– Nurmi etal	Act Anaes Scan 2005	Fin
– Bell etal	Resuscitation 2006	Swe

Clinical futile cycles (Buist, BMJ 2007)



Competing aims for the hospital

- Deliver safe + effective care
  - Good outcomes (cure / response)
  - Low rates complications
- Ensure patient access
  - Emergency
  - Elective
- Reduce length of stay
- Keep within budget
- Provide safe, challenging & rewarding conditions for staff

- Staff training
  - JMOs change rotations every 12-14 weeks
  - The start of the year effect
  - Taking staff off-line for protected training
- Research

Changing profile of the hospital

	2000	2018
DOSA	Just coming in	The norm
SAEC	No	Yes
Surgery centre	No	13,000 low-medium risk cases
HITH	Just coming in	Often used
Length of stay / case-mix funding	Long = 20 days major surgery	Progressively shorter
Anaesthetic technique and patient exclusion	Patients declined surgery	Anaesthetist can get anybody through
Endoscopic surgery + interventional radiology	Just evolving	Well established
Societal expectations – patient and clinician	LOMT Not treating was acceptable	Much more complex and invasive procedures done
HMO hours	Long – including 14 hr shifts (see consequences of Rx)	? shorter
Major focus for HMOs	Diagnosis and Rx	Flow and administrative work
Apprenticeship model	Yes	??

The gap between skill and demand

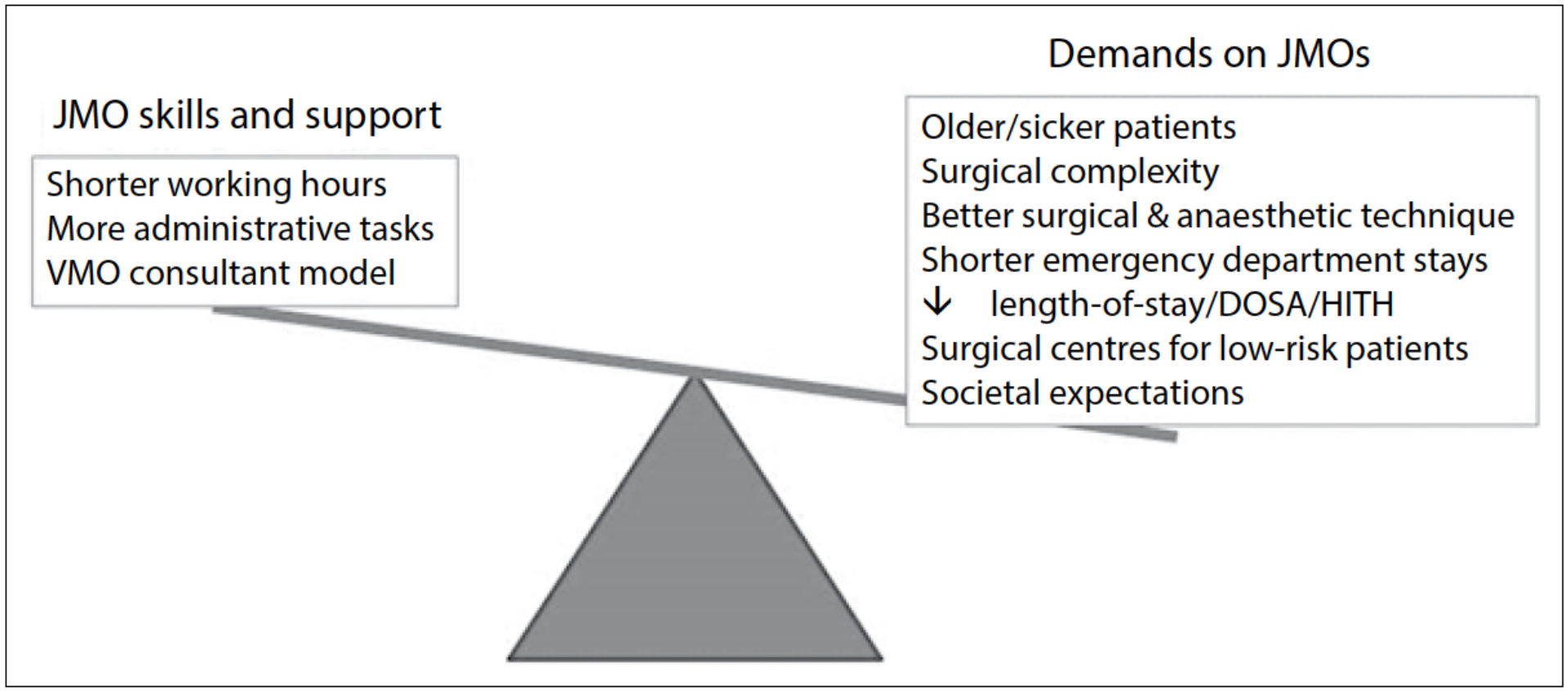


Figure 1: Imbalance between junior medical officer (JMO) skills and supports and the demands placed on them. VMO=visiting medical officer, DOSA=day of surgery admission, HITH=hospital in the home.

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Jones D, et al AIC 2015.

Deskilling vs re-skilling

- In the past
  - Clinical assessment, paper based documentation
  - Longer working hours
- Presently
  - More emphasis on flow + length of stay
  - Negotiating multiple IT platforms
  - Getting and chasing investigations / referrals
- How is the day 1 intern de-skilled ??

Steps in managing deteriorating patients

Preventative strategies → Measuring vital signs → Abnormal vital signs → MET call → Cardiac arrest

Prevention

- ICU liaison nurses
- Peri-op medicine
- HDU / ICU
- HDU-recovery
- Patient cohorting
- Rounding
- Research / audit (Ortho + surgery)
- Goals of care

Detection / recognition

- Taking vital signs
- Escalation policy

Response

- Urgent clinical review process
- Response by parent unit

Response

- Rapid Response Team

Response

- Respond Blue

Risk factors for adverse events already known

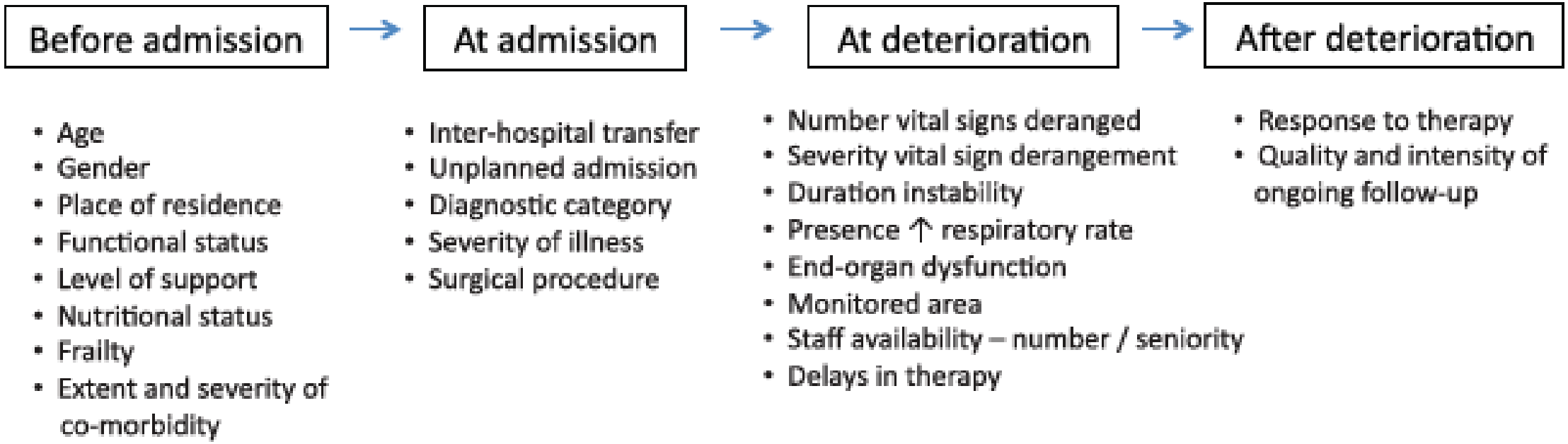

Fig. 1. Model for sequentially stratifying risk of deteriorating patients during hospitalisation.

D. Jones et al. Resuscitation 84 (2013) 1029– 1034

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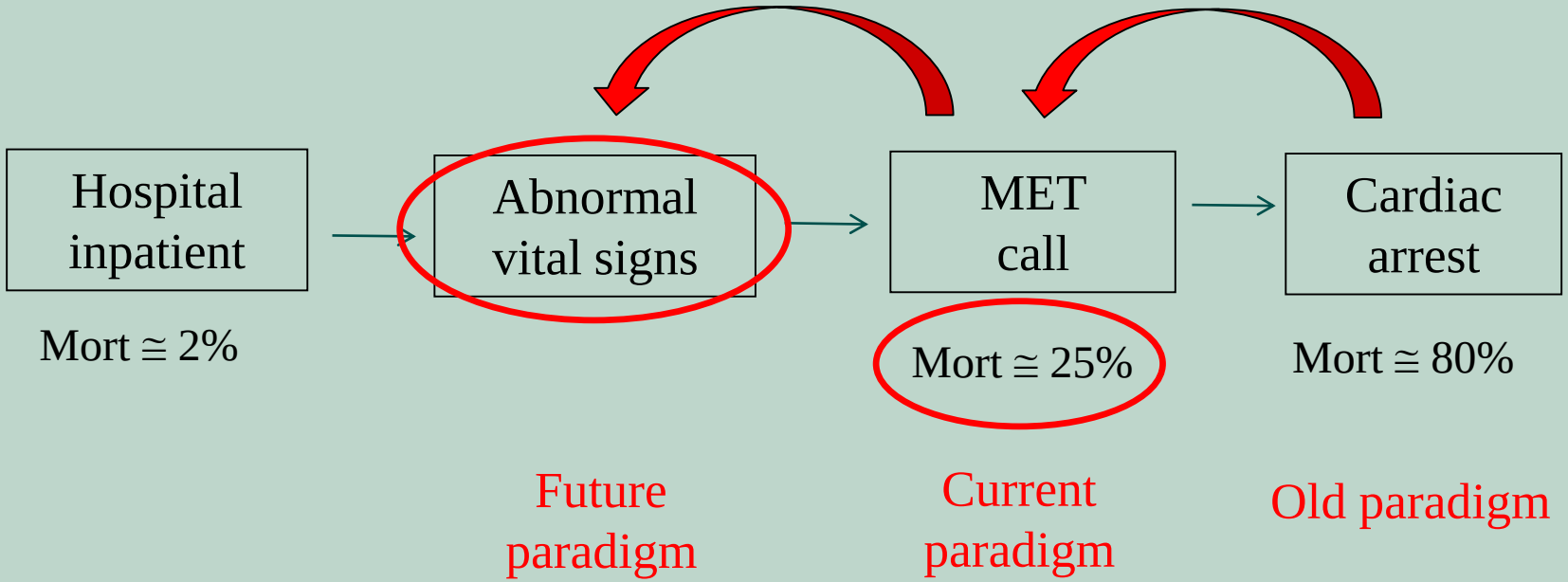
Need to develop preventative strategies



Intensive Care Liaison nurses

- Highly variable design, training, nature of service
- Systematic + integrative reviews
  - Reduced delay in patient discharge [1,2]
  - Effective discharge planning [1]
  - Improved in-hospital mortality [1,2]
  - Reduced ICU re-admission [2]
  - Reduced Adverse events [2]

1. Tabanejad Z, etal . IJCBNM. 2014; 2 :202-210.
2. Endacott R, etal J Clin Nurse 2009

- What do ICU LNs do ?
  - 3799 patients in 2 hospitals
  - 1330 screen and no intervention
  - 978 one review / 1491 multiple reviews

Task	Number (%)
Critical care follow up	1734 (45.6)
Critical care follow up	1734 (45.6)
Abnormal Physiology	188 (4.9)
Part of RRT	914 (24.1)
Follow-up RRT patient	294 (7.7)
Tracheostomy round	15 (0.4)
TPN roud	39 (1.0)
IV line review	24 (0.6)
Other	181 (4.8)

Peri-operative medicine

- Acute pain services
- Ortho-geriatric services
- Cardiology / cardiac surgery
- Most major private medical surgical cases

- ANZCS peri-operative medicine SIG

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Anaesth Intensive Care 2013; 41:

Editorial

D. A. STORY, D. A. JONES

Medical co-management of high risk surgical patients

Perioperative Medicine SIG meeting 2018

Please join us in Melbourne for the Annual Australasian Perioperative Symposium, "Measuring, Managing and Minimising Risk", on October 25-27, 2018.

DOWNLOAD PROGRAM | REGISTER ONLINE

This year's meeting is in association with the Australian and New Zealand Society for Geriatric Medicine (ANZGM) and the Internal Medicine Society of Australia and New Zealand (IMSANZ). The meeting will explore different ways of assessing perioperative risk in a wide variety of patient populations, and equip you with knowledge to help manage at-risk patients within your own clinical environment.

The program showcases a fantastic line up of international and national speakers including the following:

- Professor Carol Peden
- Professor BobbieJean Sweitzer
- Professor Sunil Sahai
- Associate Professor Ruth Hubbard
- Professor David Story
- Professor David A Scott
- Professor Michael Cox
- Professor Imogen Mitchell
- Professor Bernhard Riedel
- Professor Charlie Corke

Nurse rounding

- Systematic review – 16 studies
  - Variable frequency (hourly, 2-hr, etc) – precluded quantitative analysis
  - Improved patient perceptions of nurses responsiveness
  - Reduced falls
  - Reduced nurse buzzing

1. Mitchell MD etal J Nurs Adm 2014; 44: 462-472

Advance care planning and goals of care

- 309 patients aged ≥ 80 yo
- RCT to receive advance care planning or not
- 84% expressed choices / appointed surrogate
  - End of life wishes more likely to be known
  - Family members had less stress, anxiety and depression

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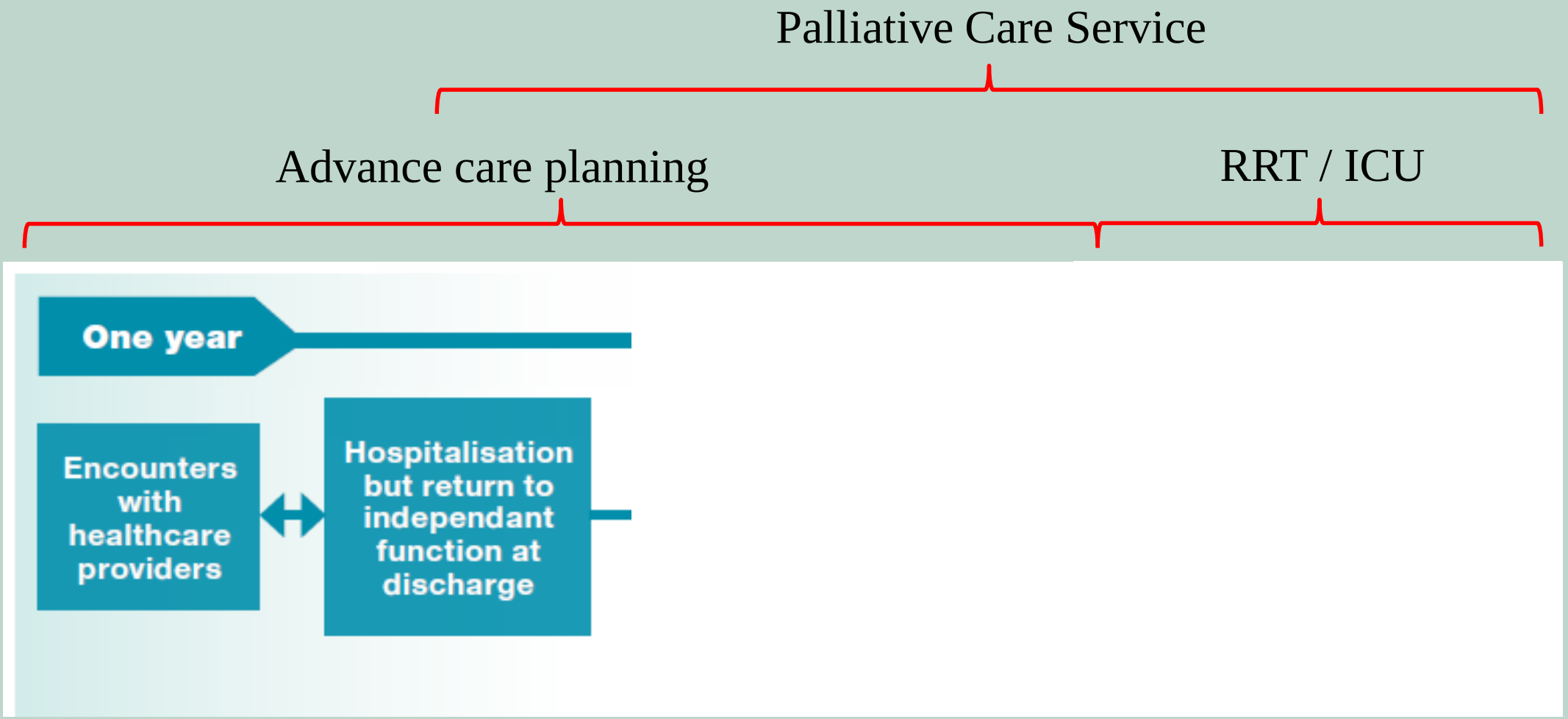
The impact of advance care planning on end of life care in elderly patients: randomised controlled trial

Cite this as: *BMJ* 2010;340:c1345
doi:10.1136/bmj.c1345

Karen M Detering, respiratory physician and clinical leader,[1] Andrew D Hancock, project officer,[1] Michael C Reade, physician,[2] William Silvester, intensive care physician and director[1]

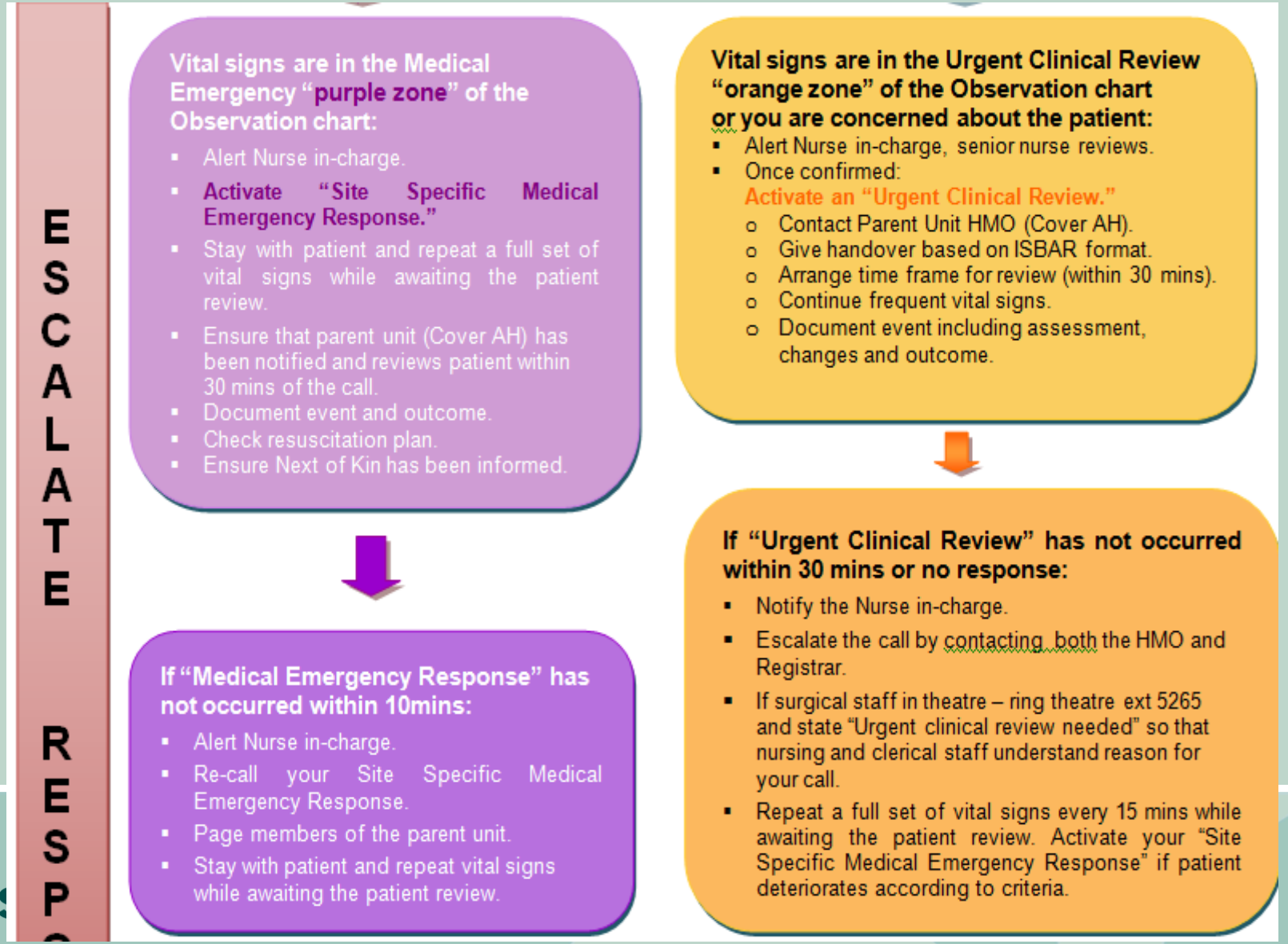
Phase of end of life care

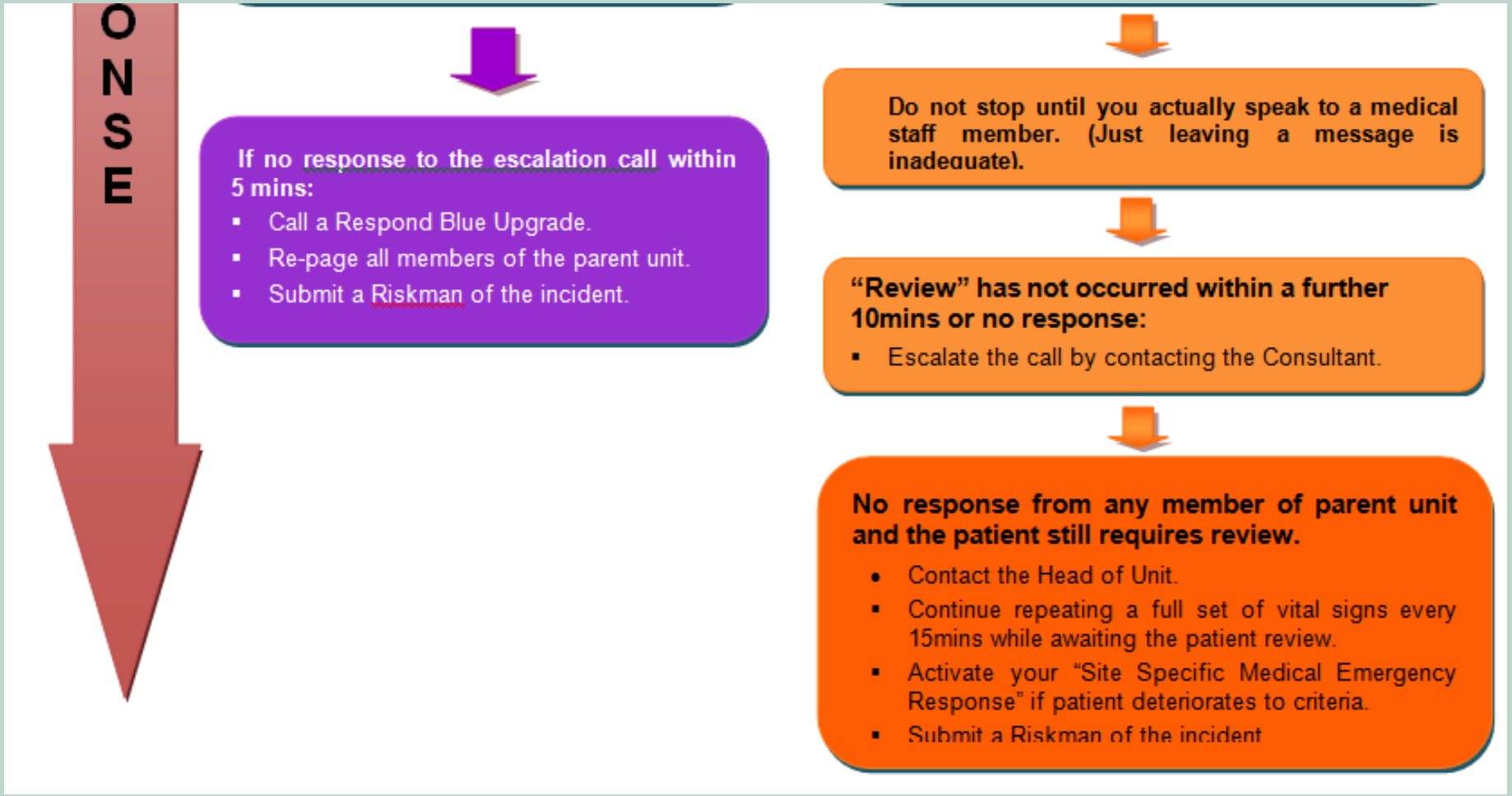


ACQSHC consensus statement – deteriorating patients

- **A. Clinical processes**
  - Measurement and recording of observations
  - Escalation protocols
  - Rapid response systems
  - Communication processes
- **B. Organizational pre-requisites**
  - Organizational supports
  - Education
  - Evaluation and monitoring
  - Use of new technology

Hospital escalation policy




O
N
S
E
If no response to the escalation call within 5 mins:
Call a Respond Blue Upgrade.
Re-page all members of the parent unit.
Submit a Riskman of the incident.
Do not stop until you actually speak to a medical staff member. (Just leaving a message is inadequate).
"Review" has not occurred within a further 10mins or no response:
Escalate the call by contacting the Consultant.
No response from any member of parent unit and the patient still requires review.
Contact the Head of Unit.
Continue repeating a full set of vital signs every 15mins while awaiting the patient review.
Activate your "Site Specific Medical Emergency Response" if patient deteriorates to criteria.
Submit a Riskman of the incident

Expected response

Emergency Call

Response Criteria	Actions Required
• **Any observation is in a purple area** • Airway threat • Respiratory or cardiac arrest • Sudden fall in level of consciousness • New drop in O_2 saturation < 90% • Seizure • You are worried about the patient but they do not fit the above criteria	• Place Emergency call • Registrar to review patient within 10 minutes • Registrar to ensure Consultant is notified

Clinical Review

Response Criteria	Actions Required
• **Any observation is in an orange area** • New or unrelenting chest pain • New or unrelenting shortness of breath • Increased or unexpected fluid or blood loss • You are worried about the patient but they do not fit the above criteria	• Registrar to review patient within 30 minutes • Request review, and note on the back of this form • Registrar to ensure consultant is notified • Ward doctor to attend

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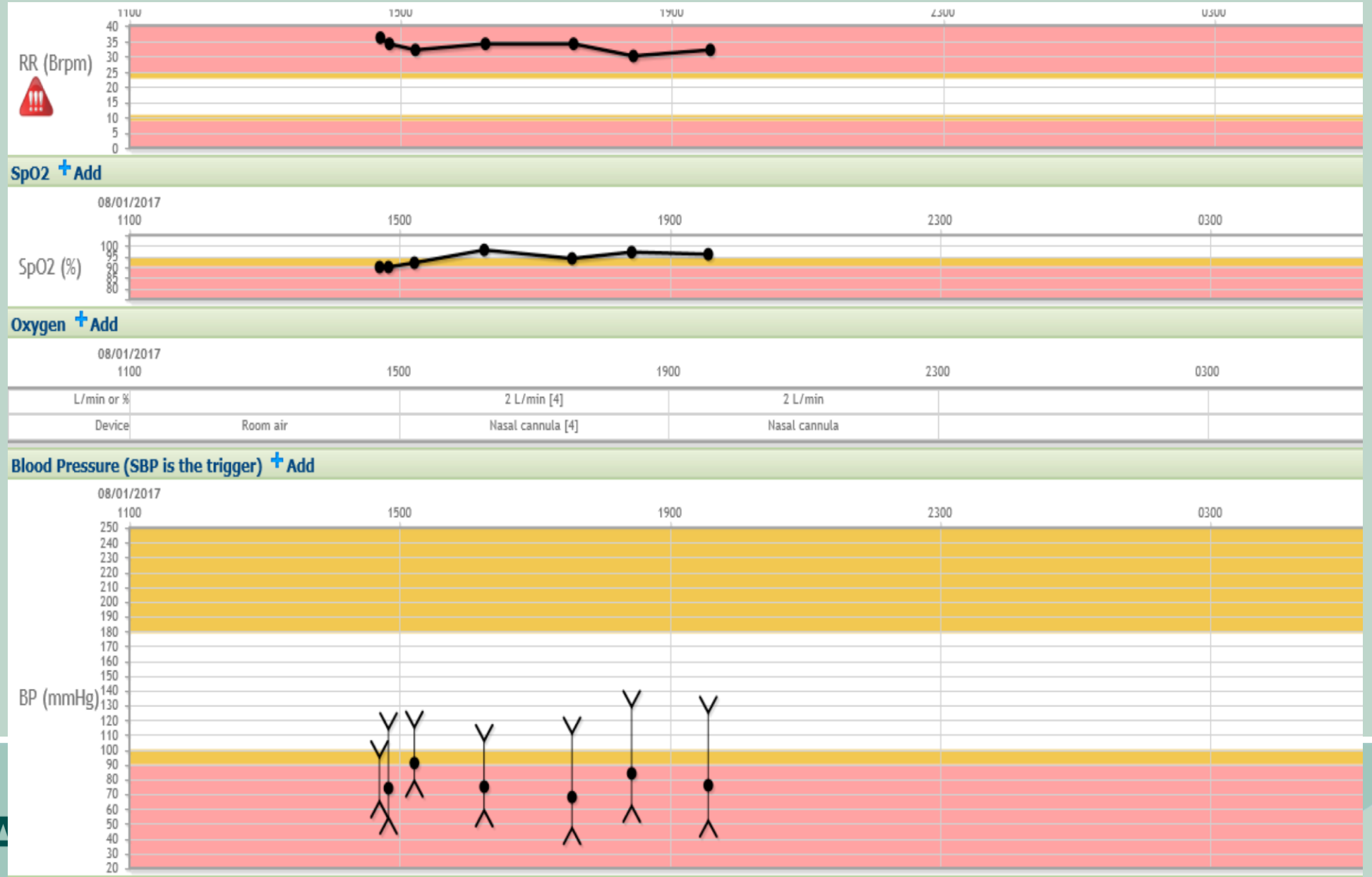
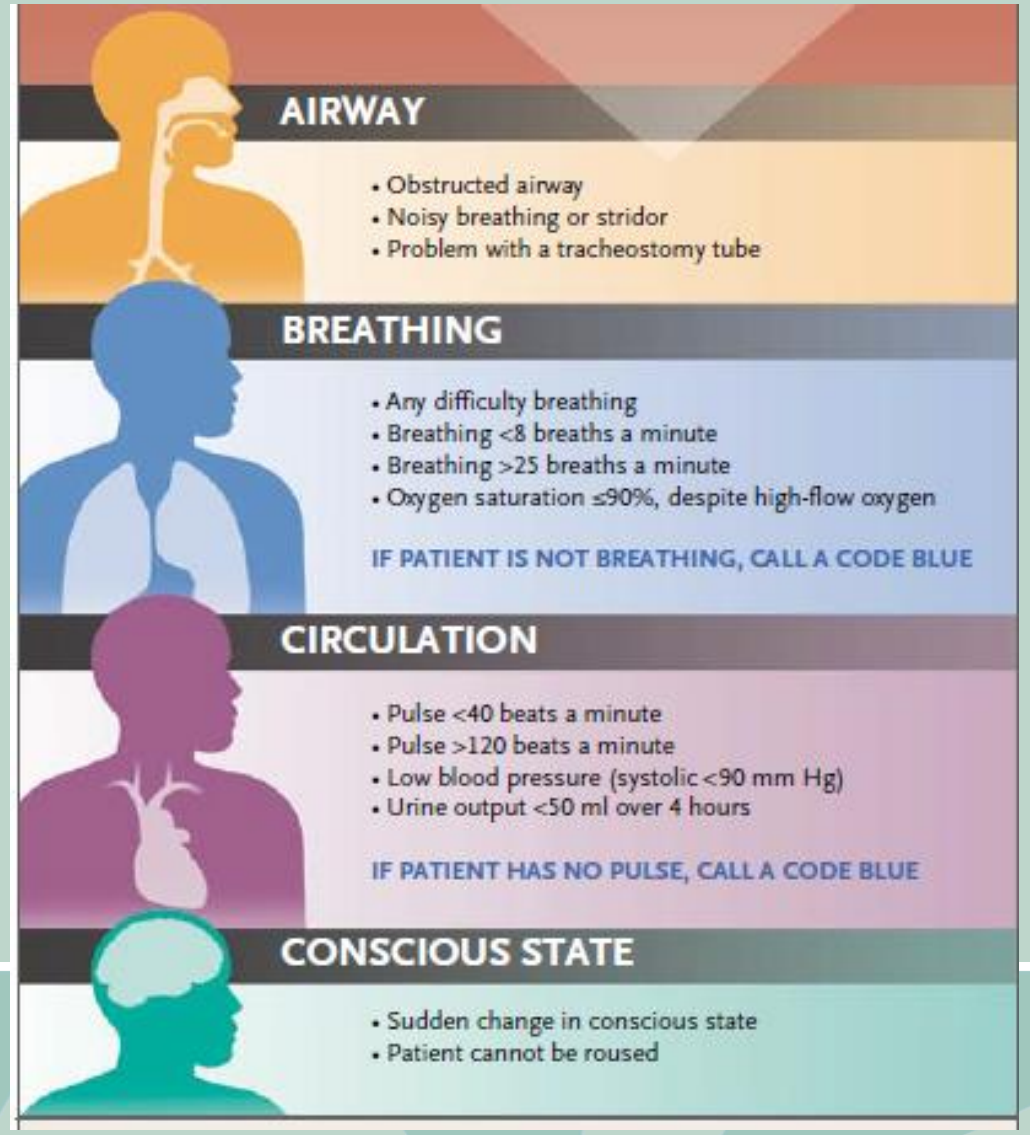
Urgent clinical review and ORC



The Medical Emergency Team



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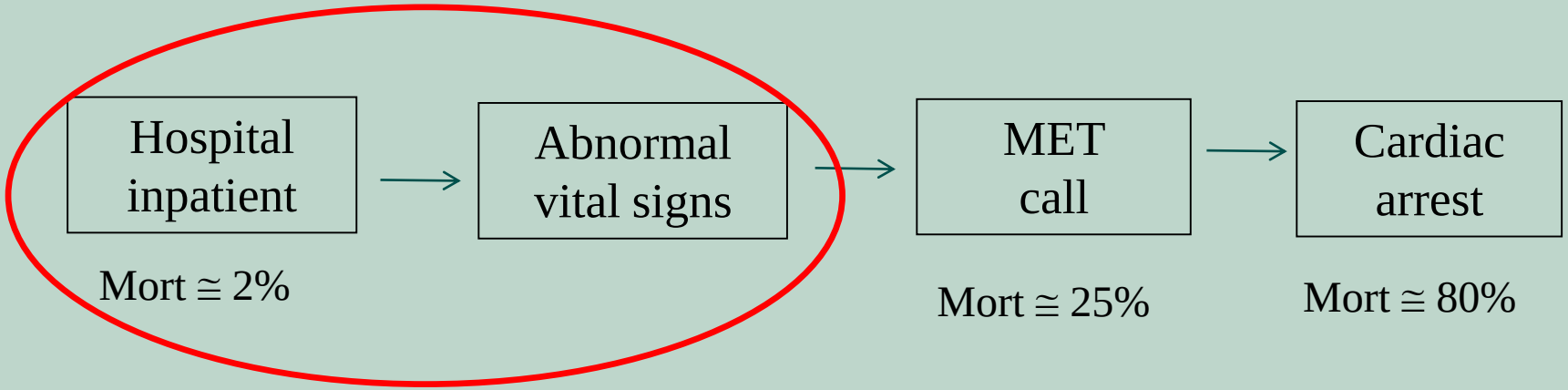
Evidence for RRS effectiveness

- 3 meta-analysis show reduction IHCAs
  - Maharaj 2015
    - RR 0.65 (95 % CI 0.61–0.70) for adults
    - RR 0.64 (95 % CI 0.55–0.74) for paediatrics
  - Winters 2013
    - RR 0.66 (95 % CI 0.54–0.80) for adults
    - RR 0.62 (95 % CI 0.46–0.84) for paediatrics
  - Chan PS 2010
    - RR 0.66 (95 % CI 0.54–0.80) for adults
- One meta-analysis shows decreased hospital mortality

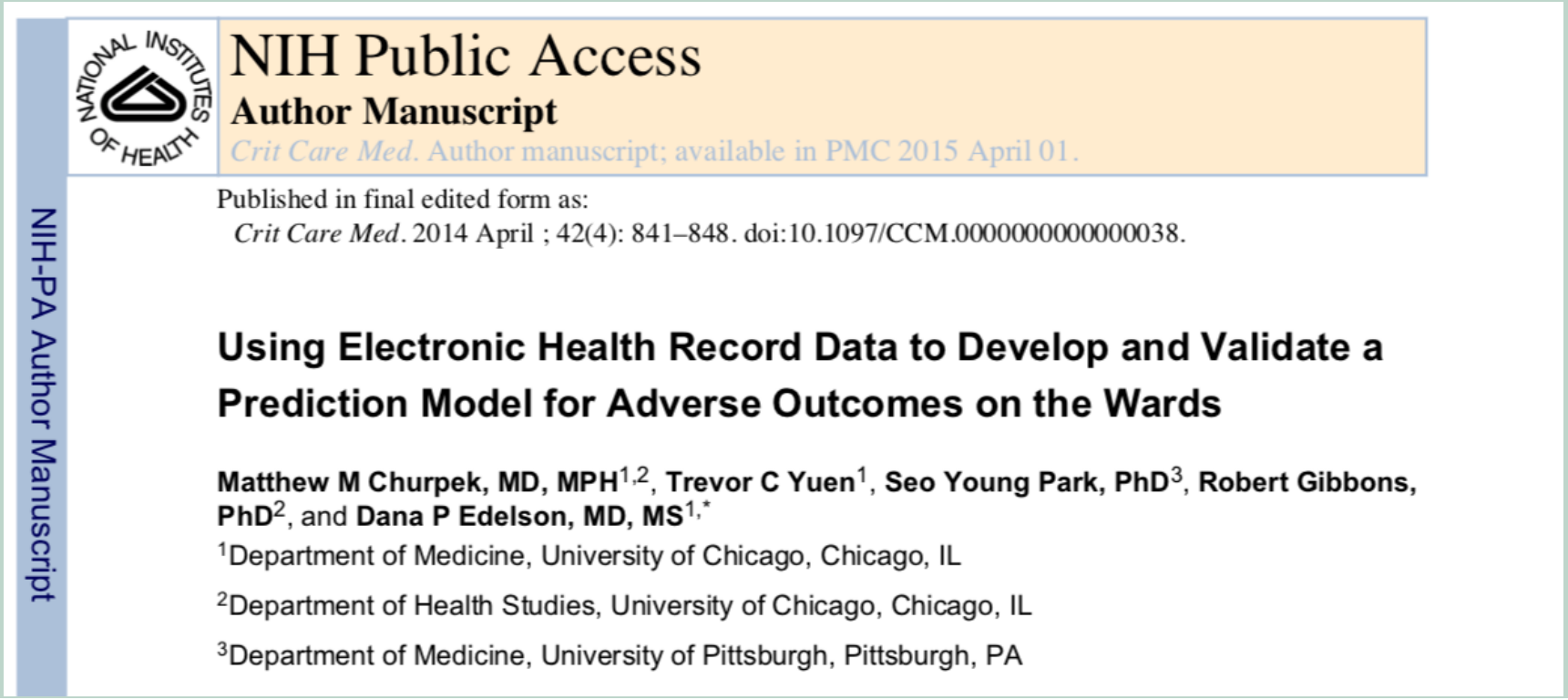
- Maharaj etal Crit Care. 2015
- Winters BD etal Ann Intern Med. 2013
- Chan PS,. Arch Intern Med. 2010

Future directions



Next steps

- Automated vital sign monitoring



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Crit Care Med. Author manuscript; available in PMC 2015 April 01.

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Crit Care Med. 2014 April ; 42(4): 841–848. doi:10.1097/CCM.0000000000000038.

Using Electronic Health Record Data to Develop and Validate a Prediction Model for Adverse Outcomes on the Wards

Matthew M Churpek, MD, MPH[1,2], **Trevor C Yuen**[1], **Seo Young Park, PhD**[3], **Robert Gibbons, PhD**[2], and **Dana P Edelson, MD, MS**[1,*]

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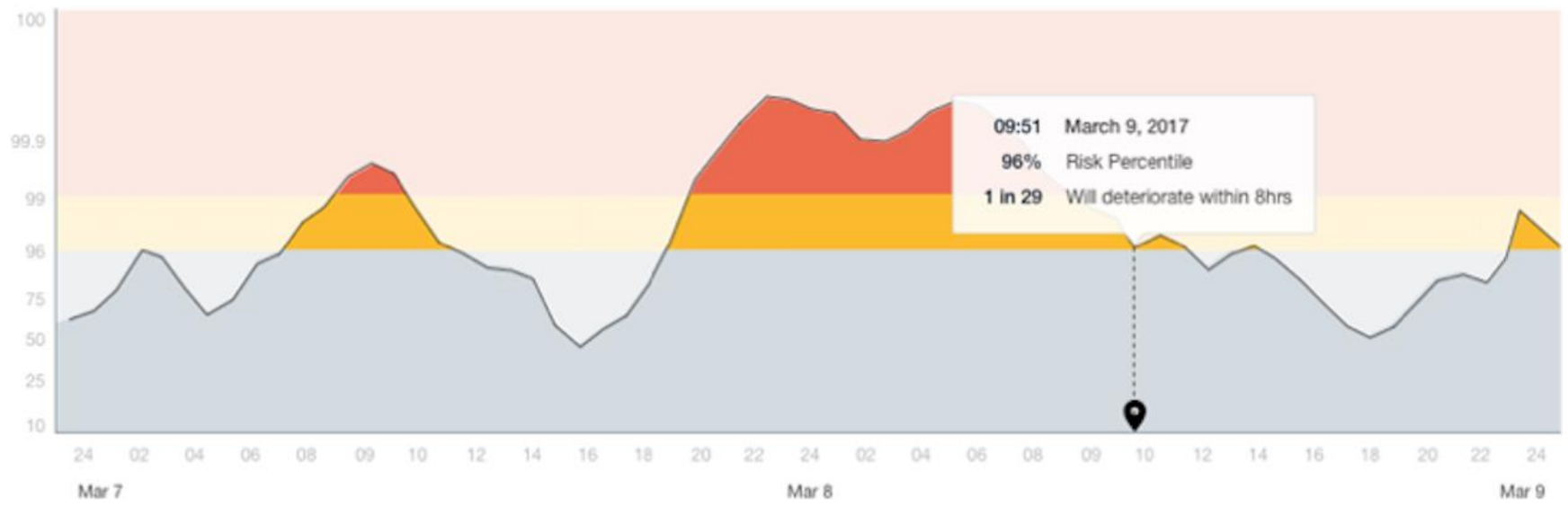
eCART Trend

12 hrs | 24 hrs | **48 hrs** | 72 hrs | 1 week



⚠ Recommended for **Moderate Risk** — RRT Pathway

Disposition

RRT following

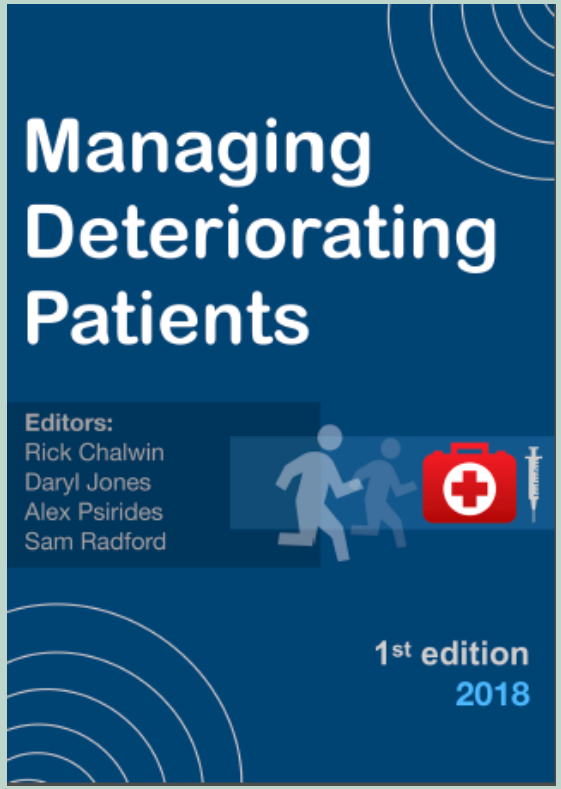
Comments

Clear | Save

Components		15 hours ago
Risk score		96
Temperature (°C)		36.6
Heart Rate (beats/min)	H	110
Systolic blood pressure (mmHg)		122
Diastolic blood pressure (mmHg)	H	79
Respirations (/min)		19
Oxygen Saturation (%)	L	86%
Responds to		Alert
White blood cells (K/µL)	H	13.3
Hemoglobin (g/dL)	H	10.2
Platelets (K/µL)		172
Sodium (mEq/L)	H	148
Potassium (mEq/L)		4.1
Carbon dioxide (mEq/L)		23
Chloride (mEq/L)	H	116
BUN (mg/dL)	H	27
Creatinine (mg/dL)	H	1.2
Glucose (mg/dL)	H	136
Calcium (mg/L)		9.4
Total protein (mg/dL)		7.5
Albumin (g/dL)		3.6
Total bilirubin (mg/dL)		0.9
AST (U/L)	H	41
Alk Phos (U/L)		108

Training of JMOs

- RRT/MET introduced because of deficit of JMOs
- We have made their job more challenging
- Need to train JMOs
- Needs to start at Uni
  - Sam Radford – rotate with MET
  - Charles Gomersall – BASIC
  - rrthandbook.org

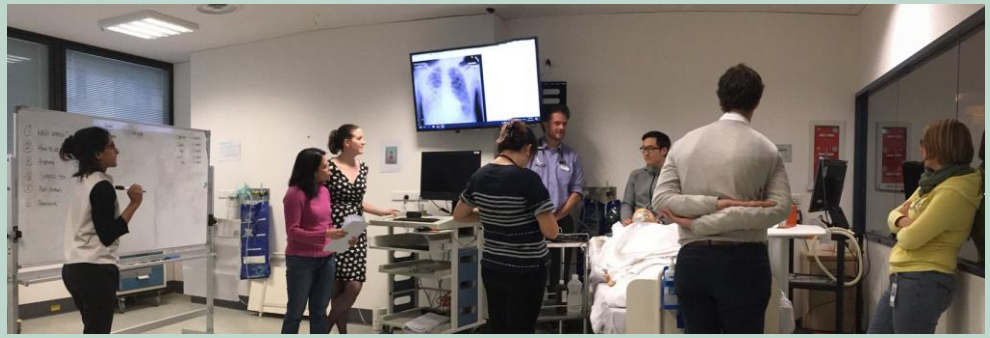


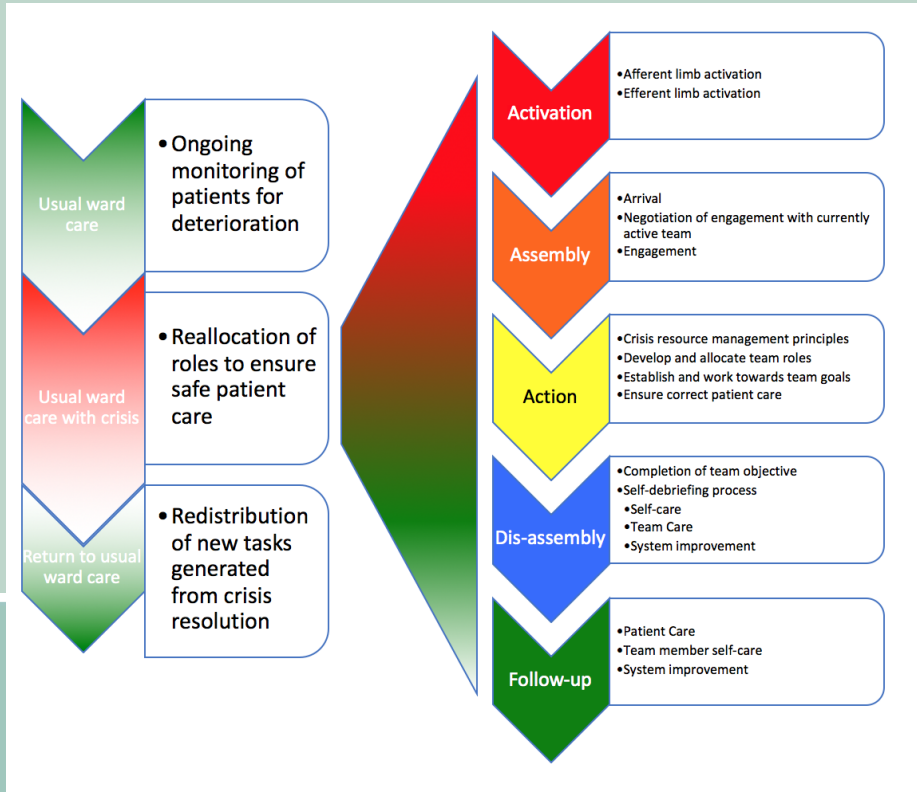
Austin ICU MET-Sim program 2018

- 2018 format developed from monthly ICU registrar simulation program

- 2 MET interprofessional 3 hour simulation-based education per 6 month roster cycle
  - Aligned to 6 monthly ICU registrar rotations of new staff
  - Includes beginning, intermediate and advanced MET nursing team

- Interprofessional faculty who plan and coordinate program improvement process since 2016 inception, based on contemporary literature





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Austin ICU MET-Sim program

- **MET Sim 1 (Feb/Aug)**
  - MET trolley and MET role orientation
  - Common MET syndromes
  - Overview of MET system above the team working at the clinical interface
- **MET Sim 2 (Mar/Sep)**
  - End-of-Life care
  - MDTM discussions
  - Advanced Care Planning
  - Sepsis

- Each session has a focus on
  - teamwork within aspects of the MET timeline
  - team roles and goals
  - current issues in MET system, based on MET data

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ANZICS RRT – team training DVD

ANZICS

RRT TRAINING PROGRAM 2016

THIS DVD–VIDEO CONTAINS ADDITIONAL PDF RESOURCES WHICH CAN BE ACCESSED BY INSERTING THIS DVD INTO A COMPATIBLE PC OR MAC COMPUTER AND NAVIGATING TO THE 'OTHER RESOURCES' FOLDER CONTAINED ON THE DISC.

DVD VIDEO

ANZICS

RRT TRAINING PROGRAM 2016

RECORDED PRESENTATIONS ANZICS SAFETY & QUALITY CONFERENCE 2015

1. HOW I MANAGE A RRT CALL – ALEX PSIRIDES
2. HOW I MANAGE A RRT CALL FOR A PATIENT WITH RESPIRATORY DISTRESS – SAM RADFORD
3. HOW I MANAGE A RRT CALL FOR A PATIENT WITH HYPOTENSION – RUSSELL LAVER
4. THE CONCEPT OF ROLES AND GOALS – DARYL JONES
5. HOW TO RUN TEAM TRAINING SAFELY – PETRA BIERER
6. CENTRALISED TEAM TRAINING – RICK CHALWIN
7. TEAM TRAINING ON A BUDGET – SAM RADFORD

VIDEOS OF SIMULATED RRT CALLS

8. INTUBATION – SAM RADFORD
9. SHOCK STATE – ALEX PSIRIDES

OTHER RESOURCES (ACCESSIBLE VIA PC OR MAC)

10. MANAGING A MET CALL
11. MET: TACHYCARDIA
12. MET: HYPOTENSION
13. MET: HYPOXIA – DYSPNOEA
14. MET: OLIGURIA
15. MET: ALTERED CONSCIOUS STATE
16. ABBREVIATED ASSESSMENT SHEET FOR MET FEEDBACK
17. HOW I MANAGE A RRT CALL – ALEX PSIRIDES
18. HOW I MANAGE A RRT CALL FOR A PATIENT WITH RESPIRATORY DISTRESS – SAM RADFORD
19. HOW I MANAGE A RRT CALL FOR A PATIENT WITH HYPOTENSION – RUSSELL LAVER
20. PRINCIPLES OF NON–TECHNICAL SKILLS AND CRISIS RESOURCE MANAGEMENT – SUMEET RAI
21. THE CONCEPT OF ROLES AND GOALS – DARYL JONES
22. HOW TO RUN TEAM TRAINING SAFELY – PETRA BIERER
23. CENTRALISED TEAM TRAINING – RICK CHALWIN
24. TEAM TRAINING ON A BUDGET – SAM RADFORD

ANZICS RRT TRAINING PROGRAM 2016

DVD VIDEO

ANZICS

RRT TRAINING PROGRAM 2016

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Summary

- Hospital profile has changed profoundly over last 20 years
- Role of ward doctors nurses also changed
- Important pre-emptive approaches include:
  - Nurse rounding
  - ICU liaison nurses
- RRS implementation associated with reductions in cardiac arrests
- However patients reviewed by MET are at-risk
- Pre-MET interventions are needed
  - Medical co-management of high risk surgical patients
  - Advance care planning and setting goals of care
- Role of monitoring needs to be tested