Enhanced perioperative care for high-risk patients

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What is the problem we are trying to solve?

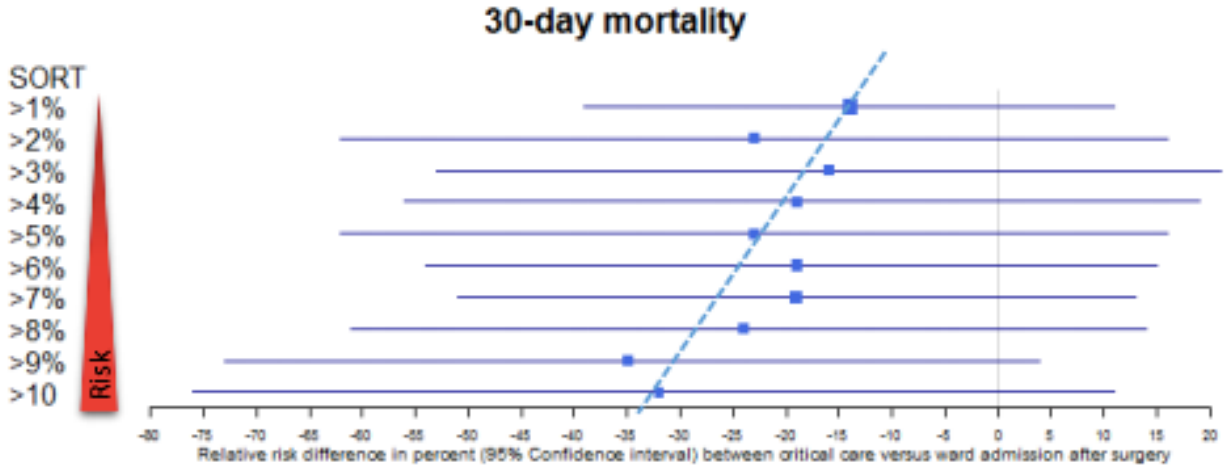
- Critical care:
  - intensive care + high dependency care (level 3 and level 2)
  - 1:1 or 1:2 nursing depending on patient acuity and needs
  - Rapid access to tests and senior clinicians
  - Provision of organ support

- Ward care:
  - 1:10 or worse nurse: patient ratios
  - Longer wait for tests and clinical referrals (unless classified as urgent)
  - No organ support
  - Supported by critical care ‘outreach’

Who should go to postoperative critical care?

- Those who have an absolute indication
- Those with a higher risk of complications or death after surgery
- UK guidelines:
  - >5% mortality within 30 days
  - Pathway driven (e.g. cardiac surgery)

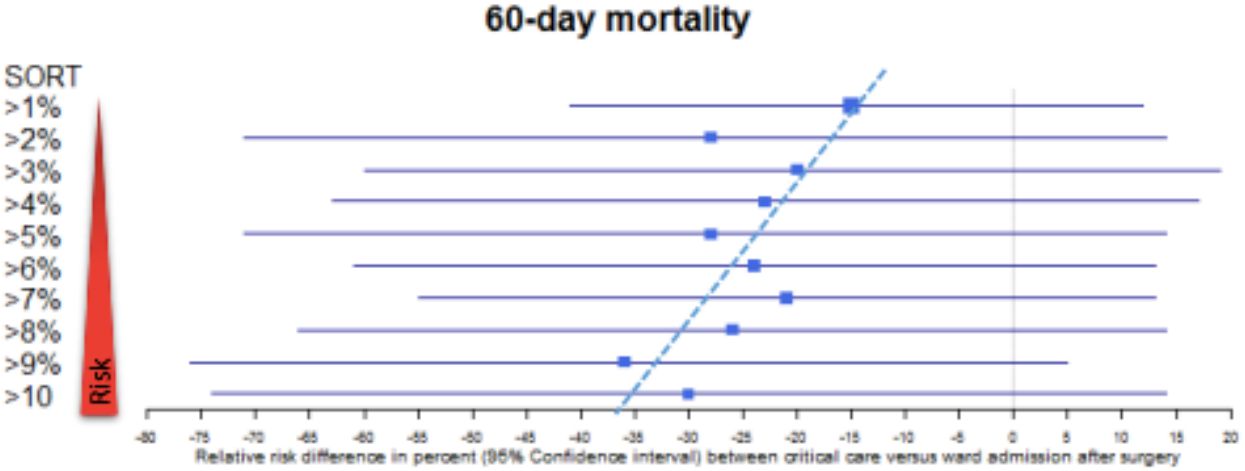
Figure: 30-day and 60-day mortality risk differences between patients admitted to critical care versus surgical ward after surgery stratified by Surgical Outcome Risk Tool (SORT) risk groups



SNAP–2
Sprint National Anaesthesia Project

Unpublished data:
T. Thevathasan, *Danny Wong, Steve Harris & SR Moonesinghe*
1st prize ASA and EBPOM free paper competitions

Low risk patients (e.g. SORT <1%) when admitted to the ICU have **2% lower** 30-day mortality risk (95%CI -7 to 4%) compared to ward admitted patients.
High risk patients (e.g. SORT >9%) when admitted to the ICU have **35% lower** 30-day mortality risk (95%CI -73 to 4%) compared to ward admitted patients.



Instrumental variable analysis which mimics a randomisation process

Accounts better for the 'confounding by indication' challenge

NHS intensive care 'at its limits' because of staff shortages

Units are so overwhelmed that life-saving operations are having to be delayed, warn senior doctors

Many units are frequently at 100% capacity when they should not exceed 85%, said one senior doctor. Photograph: Christopher Thomond for the Guardian

NHS intensive care bed delay 'led to patient's death'

15 February 2017 Share

Doctors had to approach a consultant out of the area

Intensive care 'disaster' warning

9 October 2010 Share

The relatively low number of intensive care beds in UK hospitals means it is poorly prepared for major disasters, a report in the Lancet says.

Critical care experts say there may be as few as 3.5 intensive care beds per 100,000 people in the UK, compared with more than 24 per 100,000 in Germany.

Experts believe there will not be more intensive care beds as health budgets shrink

The experts from Canada also said demand for intensive care was likely to rise with an ageing population.

A Department of Health spokesman said the number of beds was rising.

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Health

Bowel surgery death rate 'too high'

Too many patients are dying following emergency bowel surgery, experts who have done a comprehensive audit warn.

6 hours ago | Health

Trainee surgeons use TV-soap dummies

Critical care units 'too full and understaffed'

By Owain Clarke
BBC Wales health correspondent

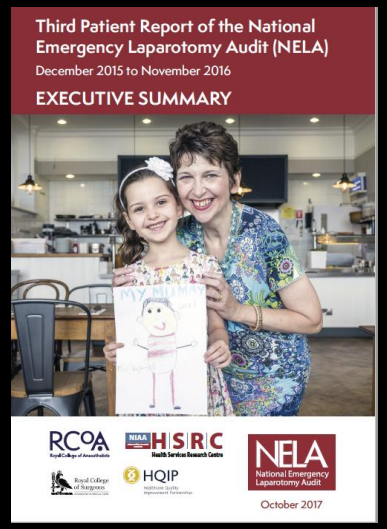
26 August 2016 Share

Demand for critical care is rising but more patients are surviving, the report says

NHS intensive care units sending patients elsewhere due to lack of beds

Exclusive: Doctors say 80% of units sending patients to other hospitals amid chronic shortages

High risk populations:
Consistently not admitted to critical care postoperatively



Articles

Mortality after surgery in Europe: a 7 day cohort study

*Rupert M Pearse, Rui P Moreno, Peter Bauer, Paolo Pelosi, Philipp Metnitz, Claudia Spies, Benoit Vallet, Jean-Louis Vincent, Andreas Hoeft, Andrew Rhodes, for the European Surgical Outcomes Study (EuSOS) group for the Trials groups of the European Society of Intensive Care Medicine and the European Society of Anaesthesiology**

Research

Open Access

Identification and characterisation of the high-risk surgical population in the United Kingdom

Rupert M Pearse[1], David A Harrison[2], Philip James[3], David Watson[1], Charles Hinds[1], Andrew Rhodes[4], R Michael Grounds[4] and E David Bennett[4]

CLINICAL INVESTIGATION

Cancelled operations: a 7-day cohort study of planned adult inpatient surgery in 245 UK National Health Service hospitals

D. J. N. Wong[1,2,*], S. K. Harris[3],
S. R. Moonesinghe[1,2] on behalf of the SNAP-2: EPICCS collaborators[§]

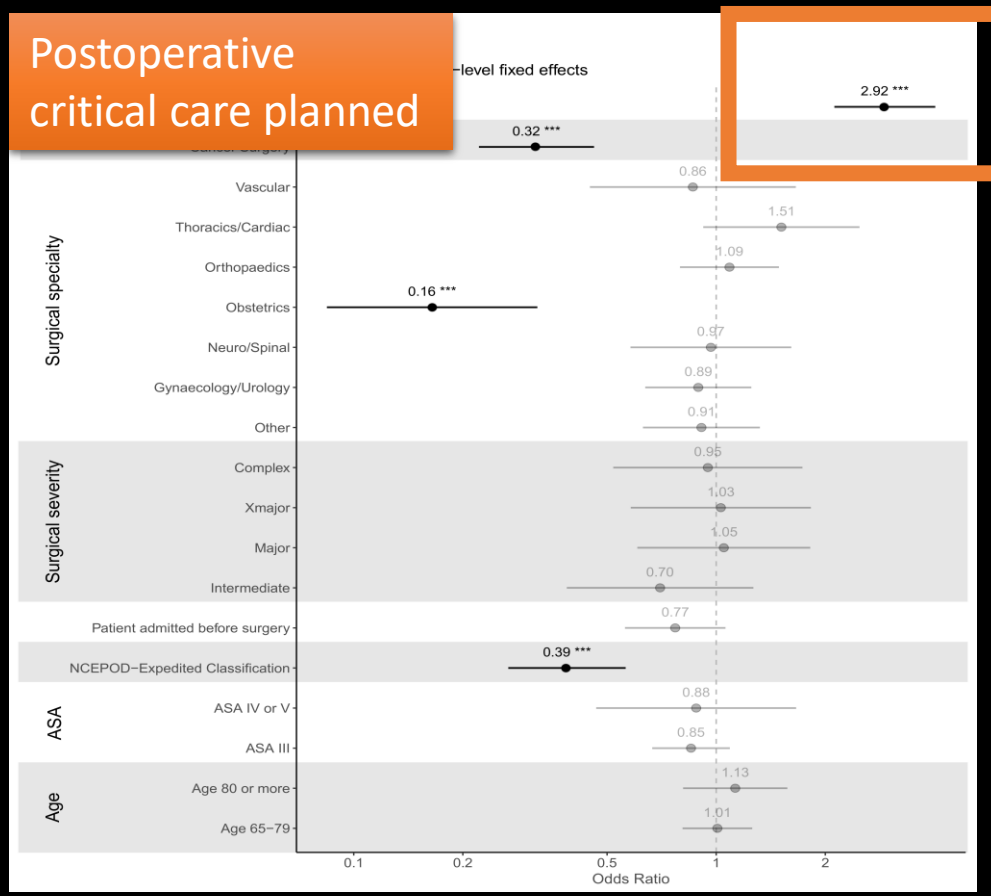
[1]Health Services Research Centre, National Institute of Academic Anaesthesia, Royal College of Anaesthetists, London, UK, [2]UCL/UCLH Surgical Outcomes Research Centre (SOuRCe), Centre for Perioperative Medicine, Department for Targeted Intervention, Division of Surgery and Interventional Science, University College London, London, UK and [3]Bloomsbury Institute of Intensive Care Medicine, University College London, London, UK

*Corresponding author. E-mail: dwong@rcoa.ac.uk

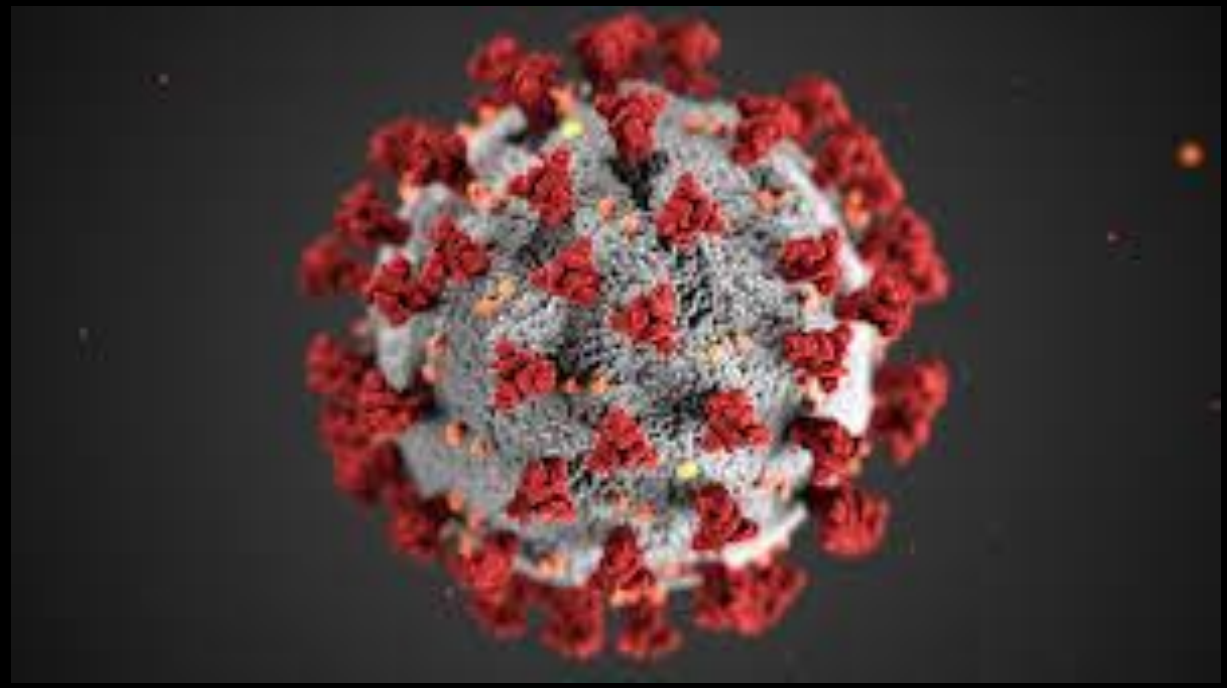
[§]A full list of collaborators and their affiliations is included in the Supplementary Material.

1 in 10 elective inpatient procedures cancelled

Postoperative critical care planned



2020…2021…2022…?

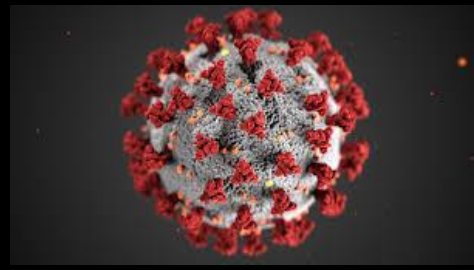


Coronavirus and UK critical care

- Resilience and adaptability
- Capacity can be rapidly expanded – but with caveats
- Going forward
  - Covid and non-Covid pathways
  - Covid and non-Covid patients

Risks and opportunities

- Risks:
  - Huge surgical backlog
  - Potential for worse patient outcomes as a result of longer waiting times
  - In some hospitals, reduction in overall bed capacity due to COVID secure pathways
  - The need to minimise length of hospital stay and improve outcomes has never been more urgent



Opportunities

- Surgical patients accounted for 47% of critical care admissions before COVID:
  - Majority do not require organ support
  - huge opportunity to reduce critical care pressure and optimise surgical patient pathways and outcomes
- Rapid pathway development
- Rapid implementation of enhanced perioperative care services

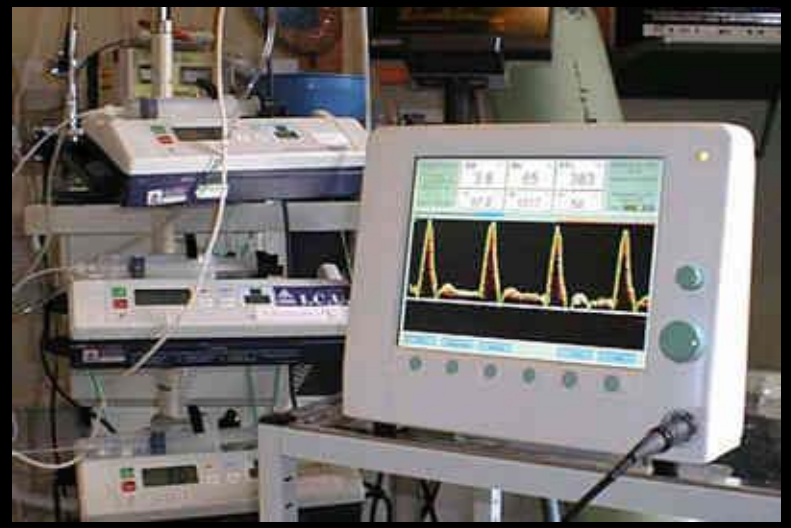
Critical care vs. enhanced care

What is critical care?

- Place of higher nurse: patient ratios
- Place we can do clever monitoring
- Place we can give clever drugs
- Place we can use clever machines

What is enhanced perioperative care?

- Place of higher acuity nursing and medical input than normal wards
- Place we can do continuous monitoring…probably yes
- Place we can give some clever drugs…probably yes
- Place we can use clever machines… probably not?



What works?

Pre-emptive respiratory support??

Haemodynamic optimisation??

What is in the secret sauce??

Anaesthesia 2020 doi:10.1111/anae.15302

Original Article

Perceptions of UK clinicians towards postoperative critical care

S. Hashim,[1] D. J. N. Wong,[2,3] L. Farmer,[4] S. K. Harris[5,6] and S. R. Moonesinghe[7,8]

Anaesthesia Journal: December 2020

Perceived benefits of postoperative critical care

- *"The wards are under staffed at nursing level and there is a clinical doctor shortage."*
  - ***Consultant Surgeon with 19 years' experience.***

- *"Twice daily consultant led ward rounds with highly knowledgeable nursing staff"*
  - ***Consultant Surgeon with 15 years' experience.***

- *"Better basic nursing care because of nurse to patient ratio"*
  - ***Consultant Anaesthetist with 29 years' experience.***

It’s all about the nurses (and monitoring)

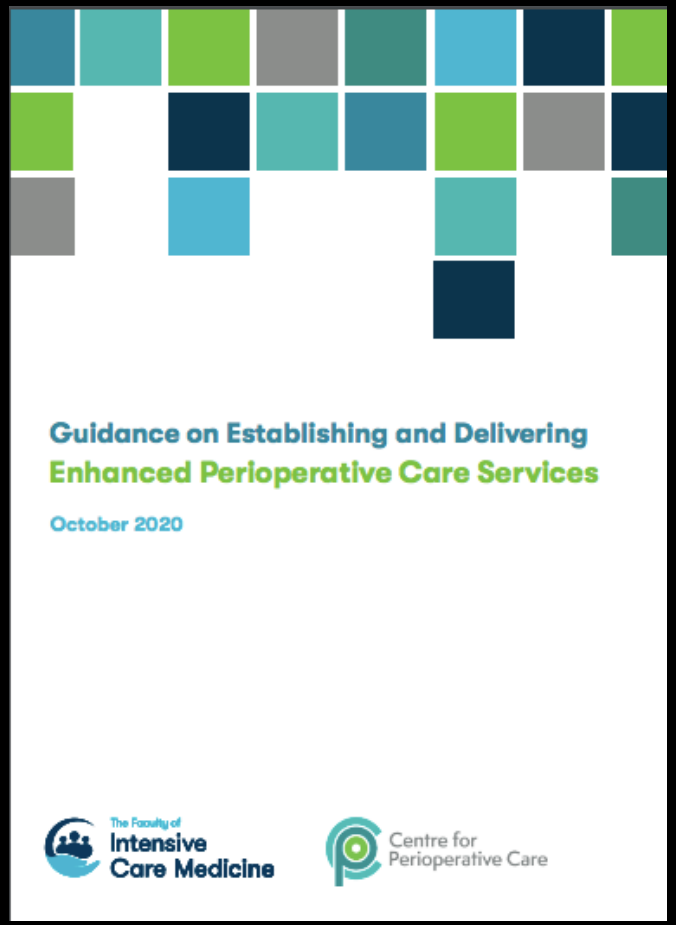
- *“These high-risk patients are better monitored and appropriate and timely actions are taken to maintain physiology”*
  - ***Consultant Anaesthetist with 27 years’ experience.***

- *“Better monitoring and management compared to ward”*
  - ***Consultant Anaesthetist with 19 years’ experience.***

- *“Intensive nurse and medical care on critical care - able to respond quickly to deteriorating parameters compared to ward which is ill equipped, mainly staff-wise to deal with this”*
  - ***Consultant Anaesthetist.***

Enhanced care services

Enhanced perioperative care guidance: www.cpoc.org.uk>guidelines



What it is

- Place / service with highly protocolised care for high risk surgical patients
- Offers some aspects of critical care (e.g. vasoactive agents or non-invasive ventilation)
- Higher nurse/patient ratios and some continuous monitoring
- Led by anaesthetists and surgeons rather than critical care physicians (but with critical care support and rapid access)
- Place which promotes early drinking, eating and mobilisation
- Optimisation of analgesia

What it isn’t

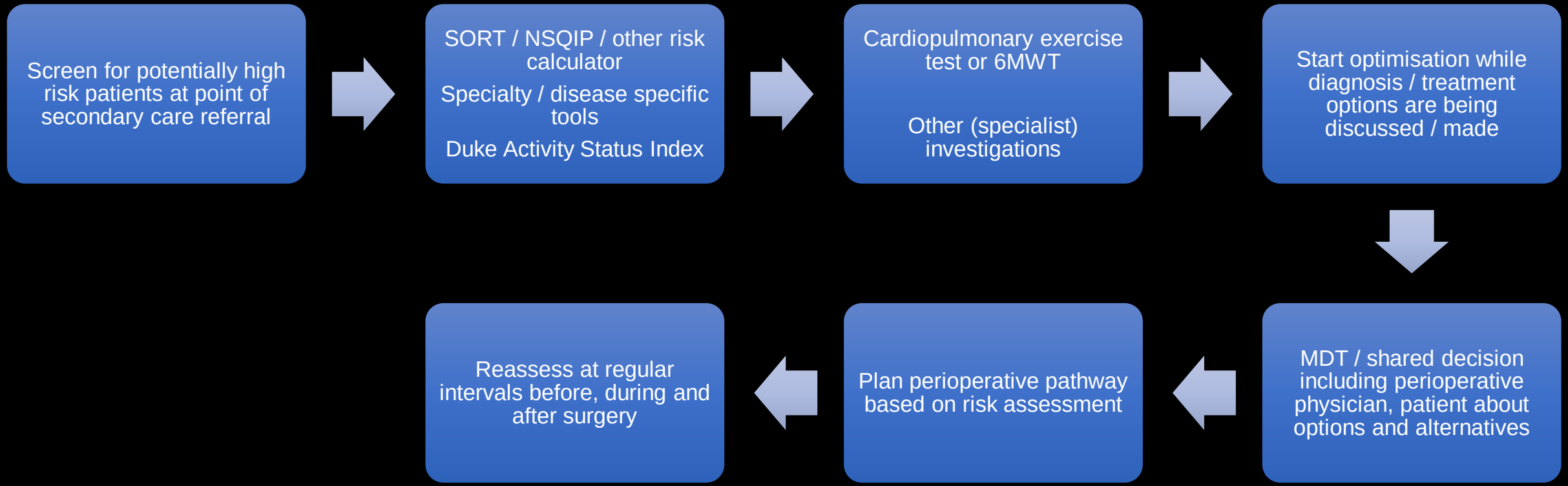
- An intensive care unit
- A place with complex or multiple organ support
- A place for long-term care
- A ‘step-down’ unit

    - Must be efficient with rapid turnover
    - Predominantly nurse driven and delivered care according to protocols
    - Predictable and efficient pathways in and out

Patient selection

The role of individualised risk assessment

The idealised perioperative pathway based on individualised risk assessment



Estimating perioperative risk

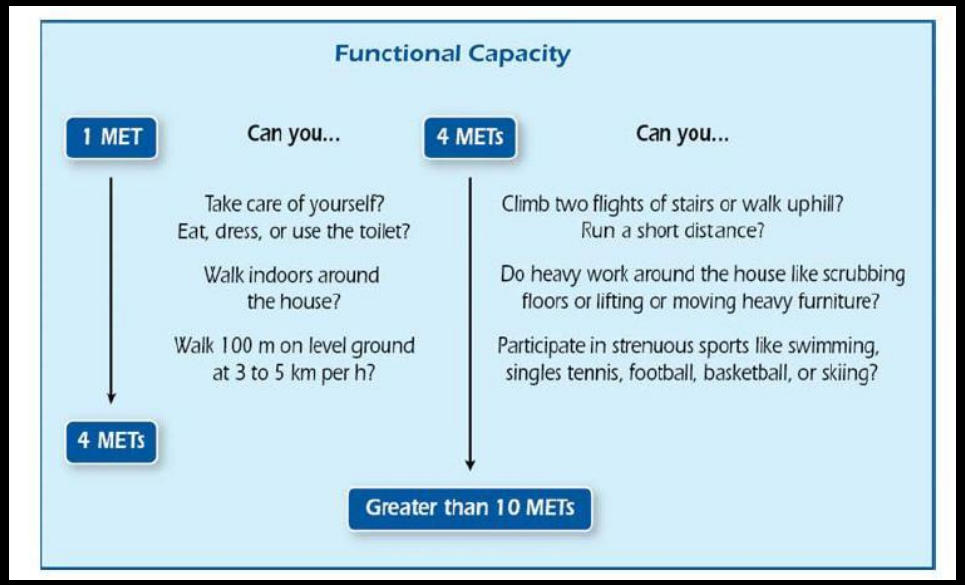
- Assessments of functional capacity
- Generic risk factors and modelling systems

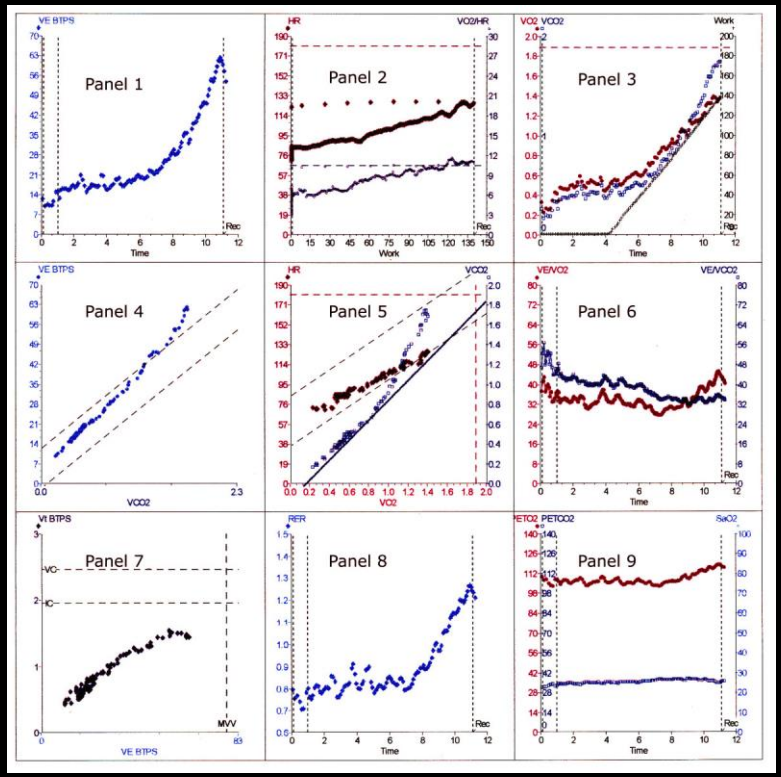
Assessment of functional capacity before major non-cardiac surgery: an international, prospective cohort study

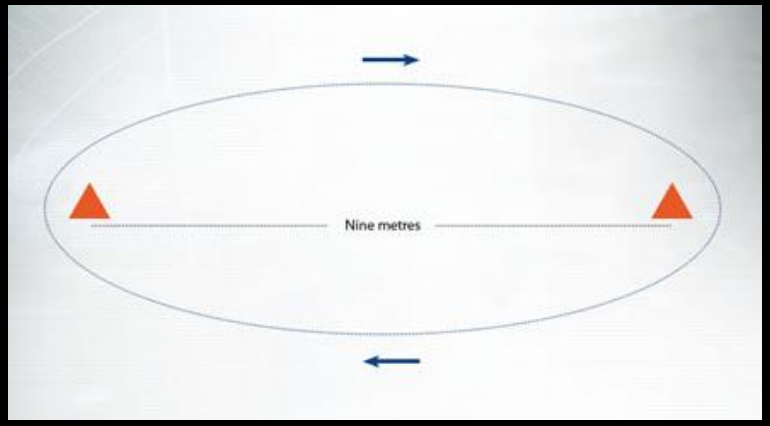
Duminda N Wijeysundera, Rupert M Pearse, Mark A Shulman, Tom E F Abbott, Elizabeth Torres, Althea Ambosta, Bernard L Croal, John T Granton, Kevin E Thorpe, Michael P W Grocott, Catherine Farrington, Paul S Myles, Brian H Cuthbertson, on behalf of the METS study investigators

2018, Lancet

Functional capacity







Answer in a nutshell

- Clinicians very bad at assessing functional capacity
- Good estimates of functional capacity from Duke Activity Status Index or Cardiopulmonary Exercise Testing
- CPET – perhaps limited to assessment for prehabilitation interventions?
- None of these methods much good at estimating perioperative mortality / complications

What contributes to perioperative risk?

- Patient health and fitness
- Surgical Urgency
- Surgical magnitude

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PLOS MEDICINE

October 15, 2020

Developing and validating subjective and objective risk-assessment measures for predicting mortality after major surgery: An international prospective cohort study

Danny Wong and colleagues reveal measures for predicting mortality after surgery.

>26,000 patients in UK, Australia and New Zealand

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RESEARCH ARTICLE

Developing and validating subjective and objective risk-assessment measures for predicting mortality after major surgery: An international prospective cohort study

Danny J. N. Wong[1,2], Steve Harris[3], Arun Sahni[1,2], James R. Bedford[1,2], Laura Cortes[2], Richard Shawyer[4], Andrew M. Wilson[5], Helen A. Lindsay[5], Doug Campbell[5], Scott Popham[6], Lisa M. Barneto[7], Paul S. Myles[8], SNAP-2: EPICCS collaborators[¶], S. Ramani Moonesinghe[1,2]*

	Receiver Operating Characteristic			Continuous Net Reclassification Improvement		
	AUROC	95% CI	P value	NRI	95% CI	P value
Clinical judgement	0.894	0.867 to 0.922	Reference	Reference		
SORT	0.911	0.889 to 0.933	0.2155	0.103	-0.032 to 0.238	0.1335
Combined	0.929	0.910 to 0.948	<0.0001	0.131	0.059 to 0.204	0.0004

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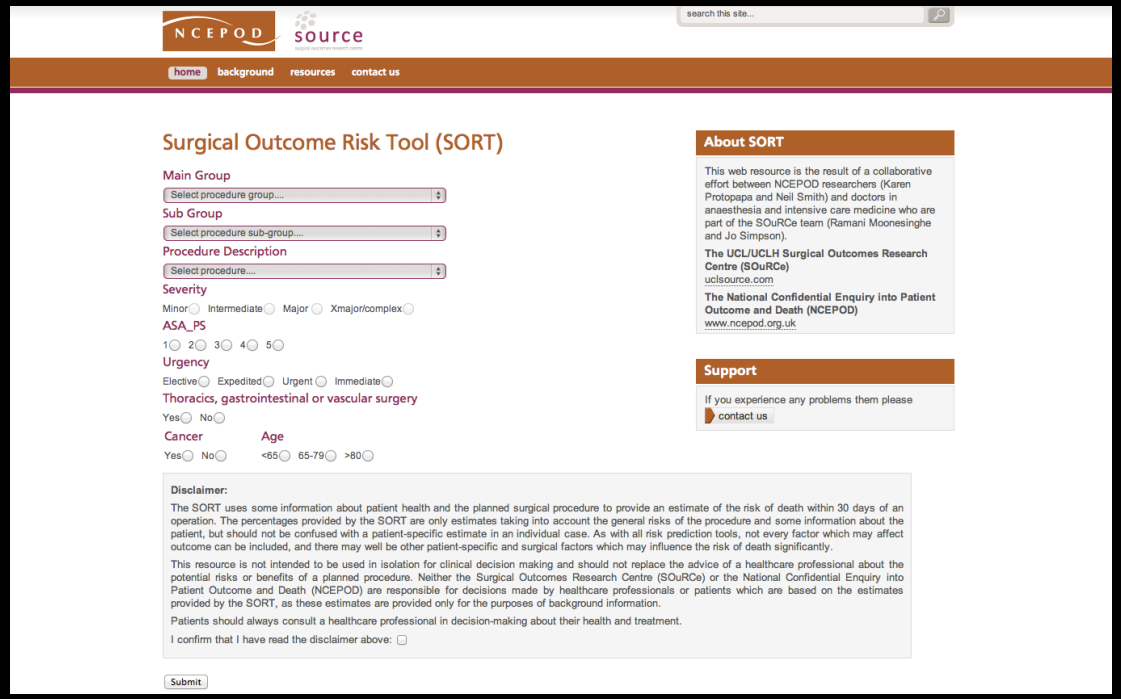
Combined	0.929	0.910 to 0.948	<0.0001	0.131	0.059 to 0.204	0.0004

NRI: Combining clinical judgement with SORT better than either alone
Predominantly reclassified patients from high-risk group to low-risk group



www.sortsurgery.com

Use original SORT if inexperienced colleagues or patients undertaking the assessment

Use SORT / clinical judgement model if experienced colleagues or (ideally) MDT assessment

Patients who could potentially benefit from enhanced perioperative care

- 100,000 operations cancelled on the day of surgery - 7% inpatient activity; tip of iceberg
- 25% of patients undergoing inpatient surgery have SORT predicted mortality >1%
- Approximately 250,000 patients per year

What will the demand be?

- Critical care very under-resourced
- Overall 7 beds per 100,000 adult population: varies between 4 and 10
- Massive regional disparities which lead to inequity of access

- Increasing critical care bed numbers: 10 per 100,000
- Mixed economy of enhanced care and traditional critical care
- Every bed should be “level 3 ready”
- Majority of new beds will probably be enhanced care:
  - Perioperative
  - Respiratory
  - Flip-flop

Wrapping up

- Covid has presented us with so many challenges but also the opportunity and drive for rapid innovation
- Enhanced perioperative care services will hopefully be a positive legacy
- Bridge the gap between ward care and critical care but are a unique step in the perioperative pathway
- Opportunity for surgeons, physicians and anaesthetists to lead the way

Thanks for listening

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